FE-95DF744-13

DF700

Disk Array Subsystem

Maintenance Manual

REV.18

Read this manual carefully and keep it.
• Before starting operation, read the safety instructions carefully and fully understand them. • After reading this manual, keep it at hand for your reference.

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Preface

This manual explains the operation introduction, installation, maintenance, and WEB of the DF700 disk array subsystem for service personnel to make them understand the DF700.

This manual contains information on maintenance works of the DF700 series disk array subsystem such as subsystem outline, structure, installation, and actions against failures.
When performing a maintenance work, read this manual carefully, and fully understand the theory of operation, operation procedure, and instructions before starting the work.

This manual was carefully prepared and reviewed for completeness and correctness. However, please feel free to contact us concerning any question, mistake, omission, or any other issues about this manual.

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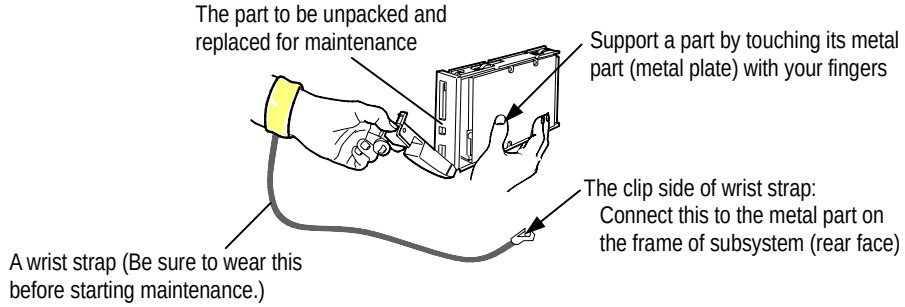
Cautionary Notes

On This Manual

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- Hitachi, Ltd. is not liable for any troubles or accidents which are caused by operation not written in this manual.
- The DF700 Maintenance Manual may be revised without prior notice.
- The subsystem is a "class 1 laser system" which emits no hazardous laser beam.
  Be sure to operate it according to this manual. Do not perform any operations other than those written in this manual. Otherwise, unexpected failures or accidents may be caused.
  The subsystem is a "class 1 laser system" which emits no hazardous laser beam.
  The subsystem complies with FDA radiation performance standards 21CFR subchapter J.

General Cautionary Notes

- It is feared that user data is lost unless the power is turned off correctly following the specified procedure.
- The Disk Drives are precise components. Never apply them any shock nor vibration.
- When replacing the batteries, turn off the AC Power Unit Switch of the subsystem, charge the batteries for six hours or longer, and then return the subsystem to the customer.
- In order to protect parts from the electrostatic discharge, every worker must put a wrist band on his/her wrist before starting installation or maintenance work and start the work after connecting the grounding clip to a metallic portion of the frame. (The wrist band must be put on when connecting the LAN cable.)
- Do the work with the wrist band put on. Do not put off the wrist band till the work is finished.
- When handling a part, hold it in the way that fingertips of the hand putting the wrist band on touch a metallic portion of the part.
  (The above is necessary in order to discharge the charged static electricity and prevent a charge caused by handling.)
- Be sure to touch the subsystem with the wrist band put on. If you touch the subsystem without putting on the wrist band, the static electricity charged on your body flows to the subsystem in an instant because no resistance exists between your body and the subsystem causing a subsystem trouble.



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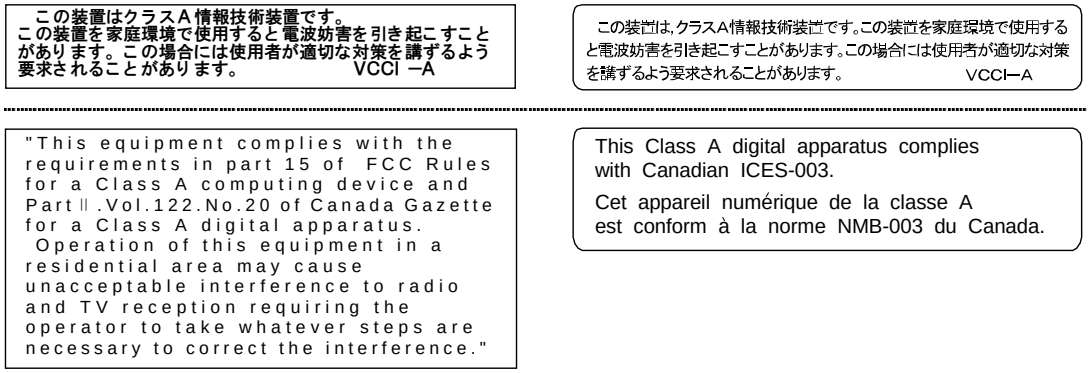
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Note

EMI Regulation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference in which case the user will be required to correct the interference at his own expense. Testing was done with shielded cables. Therefore, in order to comply with the FCC regulations, you must use shielded cables with you installation.

EMI Regulation Labels Affixed on the Subsystem.



The EMI test was done in the following configuration.
If a trouble occurs in another configuration, a user may be requested to take appropriate preventive measures.

- DF700-RKM/RKS/RKXS+H1J
- DF700-RKM/RKS+RKAJ+H2J
- DF700-RKXS+RKAJAT+H2J
- DF700-RKM/RKS+RKAJ(×2)+RKAJAT+U7
- DF700-RKXS+RKAJAT(×3)+U7
- DF700-RKM/RKS/RKXS+RKNAS(×2)+U7
- DF700-RKH/RKHE+RKAJ(×1)+RKAJAT(×2)+U7
- DF700-RKH/RKHE+RKAJ(×2)+U7

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Model Name Conversion

Throughout this document, product model name is written as "DF700". When you want to use this document for the HT-4064 series, please conversion the model name "DF700" with "HT-4064".

Table 1 Conversion Table for Model Name and Other Model Name

The model name which is used in this document	The model name replace to DF700	Type
DF700-××××	HT-4064-××××	Rackmount model (DF700-RKM) Rackmount model (DF700-RKAJ) Rackmount model (DF700-RKAJAT) Rackmount model (DF700-RKS) Rackmount model (DF700-RKXS) Rackmount model (DF700-RKH) Floor model (RKM + H1J) Floor model (RKS+ H1J) Floor model (RKXS+ H1J) Floor model (RKM + RKAJ + H2J) Floor model (RKS + RKAJ + H2J) Floor model (RKM + RKAJAT + H2J) Floor model (RKS + RKAJAT + H2J) Floor model (RKXS + RKAJAT + H2J)
DF-F700-××××	HT-F4064-××××	Optional component Accessory component

This manual also describes the subsystems of the DF600 series model names. Read this manual by converting the description of the following abbreviated model names.

Table 2 Table for Conversion of Abbreviated Model Names

Abbreviated model name	DF model name	HT model name
RKA	DF600-RKA	HT-4063-RKA
RKAJAT	DF600-RKAJAT	HT-4063-RKAJAT
RKAJATL	DF600-RKAJATL	HT-4063-RKAJATL

*1 : The RKAJAT exists in both the DF600 series model name and the DF700 series model name. In this manual, the work is the same for both of them.

The subsystem name is described as SANRISE in this manual.
When using it as a manual of Hitachi Data Systems Corporation (HDS), read it as follows, and use it.

Table 3 Table of subsystem names reading in different ways

The model name which is used in this document	Model name for Hitachi Data Systems Corporation (HDS)
SANRISE 9900V	Lightening 9900V
SANRISE Universal Storage Platform (USP)	TagmaStore Universal Storage Platform (USP)
SANRISE Adaptable Modular Storage (AMS)	TagmaStore Adaptable Modular Storage (AMS)
SANRISE Workgroup Modular Storage (WMS)	TagmaStore Workgroup Modular Storage (WMS)

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The following two types of Basic Chassis exist in the SANRISE AMS1000.

- DF-700-RKH (abbr.: RKH)
- DF-700-RKHE (abbr.: RKHE)

This manual does not describe the RKHE except for the following differences.
When the RKHE is used, it becomes the same procedure as the RKH. Therefore, read the RKH as the RKHE excluding the part described in parallel and use it.

Table 4 Differences between the RKH and the RKHE

Chassis Name	Installed Control Unit Model Name	Processor (Control CPU)	Control Memory (L2 Cache Memory)
RKH	DF-F700-F1JH	POWER PC 7447A (1.4GHz)	512 K bytes
RKHE	DF-F700-F2JH	POWER PC 7448 (1.7GHz)	1 M bytes

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Manual Composition

This Maintenance Manual is composed of 13 volumes, that is, Maintenance Manuals- for Theory, for Maintenance, for Installation, Microprogram, System Parameter, Addition/ Subtraction/Relocation, Troubleshooting, Messages, Replacement, Parts Catalog, and for WEB. Each volume and chapter has table of contents to help readers to find just the page they want. Besides, glossary a contained in each appendix.

For the composition of the each volume, refer to the following.

Maintenance Manual - for Safety Summary :
This "Safety Summary" volume describes the cautionary notes to handle the maintenance work safely.

1 About the symbols ..... SAFE 0020
2 General Safety Guidelines ..... SAFE 0020
3 Hazard Warning Statements ..... SAFE 0070
4 Warning Labels Affixed on the Subsystem ..... SAFE 0170

Maintenance Manual - for Theory :
This "Theory" volume describes the cautionary/prohibited notes in the maintenance work, the outline of the subsystem, and the configuration, etc.

Chapter 1. Warranty and Service ..... THEO 01-0000
Chapter 2. Outline of Subsystem ..... THEO 02-0000
Chapter 3. Major Specifications of the Subsystem ..... THEO 03-0000
Chapter 4. Theory of Operation ..... THEO 04-0000
Chapter 5. Outline of P.P ..... THEO 05-0000

Maintenance Manual - for Installation :
This "Installation" volume describes the setting of the subsystem and the installation of the parts, etc.

Chapter 1. Before Starting Installation Work ..... INST 01-0000
Chapter 2. Installing Floor Model ..... INST 02-0000
Chapter 3. Installing Rackmount Model ..... INST 03-0000

Maintenance Manual - for Microprogram :
This "Microprogram" volume describes the new and update installation of the microprogram.

Chapter 1. Installation of Microprogram ..... MICRO 01-0000
Chapter 2. Procedure for Recovery from a Failure ..... MICRO 02-0000
Chapter 3. Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete " Message Is Output ..... MICRO 03-0000

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Maintenance Manual - for System Parameter :
This "System Parameter" volume describes the setting of the system parameter of the subsystem, etc.

Chapter 1. Setting (Storage Navigator Modular) ..... SYSPR 01-0000
Chapter 2. Setting Host Group/Targets ..... SYSPR 02-0000
Chapter 3. Setting the RAID/LU/Spare Disk ..... SYSPR 03-0000
Chapter 4. Setting Configuration Information ..... SYSPR 04-0000
Chapter 5. Setting Host Connection Parameters ..... SYSPR 05-0000
Chapter 6. Setting an Extra-cost Optional Feature ..... SYSPR 06-0000
Chapter 7. System Parameter Setting List ..... SYSPR 07-0000

Maintenance Manual - for Addition/Subtraction/Relocation :
This "Addition/Subtraction/Relocation" volume describes the addition, subtraction and relocation related to the setting of the subsystem.

Chapter 1. Adding Optional Components ..... ADD 01-0000
Chapter 2. Subtracting Optional Components ..... ADD 02-0000
Chapter 3. Relocation/Removal Work ..... ADD 03-0000

Maintenance Manual - for Troubleshooting :
This "Troubleshooting" volume describes the trouble analysis of the subsystem, etc.

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Chapter 2. Before Maintenance Work ..... TRBL 02-0000
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Chapter 13. Procedure for Determining Failure of Local Tape in NAS System ..... TRBL 13-0000

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Maintenance Manual - for Messages:
This “Message” volume describes the content of the message which occurs at the time of the subsystem failure.

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Chapter 2. CUDG Detected Messages ..... MSG 02-0000
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Maintenance Manual - for Replacement :
This “Parts Replacement” volume describes the replacement work of each part and the periodic maintenance, etc.

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Chapter 3. Periodic Maintenance ..... REP 03-0000
Chapter 4. Maintenance Tools ..... REP 04-0000
Chapter 5. Recycling ..... REP 05-0000

Maintenance Manual - for Parts Catalog :
This “Parts Catalog” volume describes each part installed in the subsystem.

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Maintenance Manual - for WEB :
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Safety Summary

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⚠ SAFETY SUMMARY

The hazard warnings which appear on the warning labels on the machine or in the manual have one of the following alert headings consisting of a safety alert symbol and a signal word, DANGER, WARNING, or CAUTION.

1. ⚠ About the symbols

⚠	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
⚠ **DANGER :**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **WARNING :**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION :**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION :	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

2. ⚠ General Safety Guidelines

Read the following safety guidelines carefully and follow them when you conduct maintenance of the machine.

Before starting maintenance

- Maintenance of the machine must be done only by trained and qualified engineers.
- Read and follow the safety guidelines and procedures in this manuals.
- In this manual and on the machine, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- When warning labels become dirty or start peeling off, replace them.
- Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand. Be alert and use your common sense.
- This disk array is a “class 1 laser system” which emits no hazardous laser beam.
  Be sure to operate it according to this manual. Do not perform any operations other than those written in this manual. Otherwise, unexpected failures or accidents may be caused.

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⚠ SAFETY SUMMARY (Continued)

During work

- For each procedure, follow the given method and sequence of steps.
- Use the spare, consumables, and materials for maintenance which are specified in the manual; otherwise, personal injury or damage of the machine, as well as deterioration of the product's quality, may result.
- Use the special tools and instruments specified for the work in the manual or commercially available tools and instruments which fit the purpose.
- Use measurement instruments and powered tools which are properly calibrated or periodically inspected.
- Keep the maintenance area neat and tidy.
- Always put away parts, materials, or tool when not in use.
- Wear an eye protector where liquid may splash or anything may fly about.
- When lifting anything heavy, lift it using your legs with your back kept erect, to prevent injury to your back or spine.
  When lifting anything, for the weight of which CAUTION is indicated, use a proper lifting tool or have somebody help you.
- Keep a soldering iron and its stand away from you to prevent accidental contact and burns.
- When using sharp objects or cutting tools, make sure that no part of your body lies in the path of the blade, or point.
- Before finishing your work, check if the subsystem is returned to its original state.
  (Make sure that all parts removed during maintenance have been in stalled back in their original positions in the machine. Make sure that no tool or foreign material left in the machine.)

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⚠ SAFETY SUMMARY (Continued)

Prevention of electric shocks

- Before starting work, make sure that, unless otherwise specifically instructed, there is no potential electric hazard in the maintenance area such as insufficient grounding or a wet floor.
- Before starting work, note where the emergency power-off switches are located and make sure you know how to operate them.
- Unless otherwise specifically instructed, cut off all power sources to the machine before staring maintenance. Just switching off the machine power supplies is usually not enough. When power is fed from a wall or floor outlet, unplug the power supply cord, or turn off the switch on the power distribution panel or board.
  When the power supply has a lockout device(*1), lock it up after the powering off and keep the key.
  Attach a notice on the panel or board prohibiting the use of the switch.
  If the machine power has been already turned off, make sure yourself that these conditions are satisfied.
  *1 The following is a portion of 29 CFR 1910.147 "The control of hazardous energy (lockout/tagout)," in the OSHA (Occupational Safety & Health Administration U.S Department of Labor USA) Regurations.
  - *Lockout device. A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.*
  - *Energy isolating device. A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch, a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.*
- Do not touch any uninsured conductor or surface, where so instructed, which remains charged for a limited time after the external power supply to the machine is disconnected.
- When working on a machine which has a grounding terminal, make sure that the terminal is properly connected to the facility's ground.
- When working close to a hazardously energized part, do not work alone; work with another person who can immediately turn off the power in an emergency.

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⚠ SAFETY SUMMARY (Continued)

- Do not wear any metallic item such as a wrist watch with a metallic surface, or metallic accessories.
  If you wear eyeglasses with a metallic frame, take care not to let the frame touch an uninsured surface.
- Make sure that your hands and arms are dry.
- Unless otherwise specifically instructed, use only one hand when it is necessary to work near an exposed live electric circuit.
  This prevents the completion of the circuit through both hands even if you accidentally touch the circuit.
- Do not use a dental mirror near an exposed live electric circuit.
  The mirror surface is conductive and can become hazardous even if it is made of plastic.
- Unless otherwise specifically instructed, do not supply power to any subassembly such as a power supply unit or a motor while it is removed from the machine.

Preventing being caught by rotating or moving parts

- Tuck in your tie, scarf, shirt, or any other loose clothing so that it will not be caught by a rotating or moving part.
- Tie up long hair.
- Unless otherwise specifically instructed, do not supply power to any device with rotating or moving parts which are not properly covered.
- When instructed to supply power to any device with rotating or moving parts whose covers have been removed, work with another person who can immediately turn off the power in an emergency.

Procedure in an emergency

For electric shock

- Do not panic. Do not become another victim through contact with the injured person.
- First, shut off the electric current passing through the victim.
  Use the emergency power-off switch, if there is one, or otherwise, a normal power-off switch. If this cannot be done, push the victim away from the source of the electric current by using a nonconductor object such as a dry wooden stick.
- Then, call an ambulance.
- If the victim is unconscious, artificial respiration may be necessary.
  A proper method for performing artificial respiration or resuscitation should be learned beforehand.
- If the victim's heart is not beating, cardiac resuscitation should be performed by a trained and qualified person.

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⚠ SAFETY SUMMARY (Continued)

For outbreak of fire

- First shut off all the power from the machine using the emergency power-off switch.
- If the fire continues burning after the power is shut off, take suitable actions including the use of a fire extinguisher or a call for the fire department.

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⚠ SAFETY SUMMARY (Continued)

3. ⚠ Hazard Warning Statements

The following are the hazard warning statements contained in this manual.

3.1 ⚠ DANGER statements

- Do not disassemble the case, do not modify it, or do not peel off the label. There are high voltage parts inside: If you attempt any of these actions, you may get an electrical shock or burn.

(REP 05-0000)

- Do not disassemble the battery; this may cause short circuits inside or outside of the battery. If the components are exposed to the air, the battery may cause overheat, burst or ignite. Disassembling the battery may expose you to its alkaline solution, which can be dangerous.

(REP 05-0000)

- Do not cut the output cable. Do not modify the connector. If you attempt any of these actions, you may get an electrical shock or burn. A short-circuit may cause abnormal chemical reactions inside the battery which leads to overheating, bursting or ignition.

(REP 05-0000)

- Follow the instructions when you recharge the battery pack. If you recharge it in a way different from specified here, it may cause the following problems: The battery may become charged excessively; excessive current may be produced; or the battery cannot be recharged. As a result, the battery may leak, become overheated, burst, or ignite.

(REP 05-0000)

- Do not use excessive force when you connect the battery pack to the charger or other devices. If you cannot connect it easily, check the positive and negative are correct for the connector. If you connect the battery in reverse, it will be charged incorrectly and abnormal chemical reactions may occur inside. As a result, the battery may become overheated, burst or ignite.

(REP 05-0000)

- Do not connect the battery to a power receptacle. If you apply an excessive amount of voltage to the battery, it may produce excessive current making the battery overheat, burst or ignite.

(REP 05-0000)

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⚠ SAFETY SUMMARY (Continued)

- Do not use or leave the battery where the temperature can become high, such as, near a fire or a heating element. High temperatures may damage the battery's separator, which may cause short circuit, making it overheat, burst or ignite.

(REP 05-0000)

- Do not incinerate the battery pack or heat it. If you do so, the insulator may melt, the safety fuse/
mechanism may be damaged, or the electrolyte may gush out. As a result, the battery may become burst, explode or ignite.

(REP 05-0010)

- Do not connect the negative terminal to the positive with metal wire. Do not carry or store the battery with other metal parts. This may cause a short circuit or produce excessive current which can cause the battery to leak, overheat, burst or ignite.

(REP 05-0010)

- Do not let the battery become wet by soaking it in the water or seawater. If the battery gets wet, a short circuit may occur and an excessive amount of current may be produced causing abnormal chemical reactions inside. As a result, the battery may become overheated, burst or ignite.

(REP 05-0010)

- Do not nail the battery, hit it with a hammer, or stamp on it. The battery may be broken or dented and a short circuit may occur inside. As a result, the battery may become overheated, burst or ignite.

(REP 05-0010)

- Do not solder directly to the battery. If you do so, heat will melt the insulator and damage the safety fuse/mechanism. As a result, the battery may leak or may become overheated, burst or ignite.

(REP 05-0010)

- Do not recharge the battery where there is a high temperature, such as near a fire. This may cause abnormal chemical reactions inside the battery and it may become overheated, burst or ignite. High temperatures may also cause deterioration of performance/life of the battery.

(REP 05-0010)

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⚠ SAFETY SUMMARY (Continued)

3.2 ⚠ WARNING statements

- If the Subsystem falls when the elevator of the lifter is at a high position, a personal injury will be caused.
  Perform the positioning, fastening, or other handlings very carefully.

  (INST 03-0430)

- Do not place the battery pack in the microwave oven or under high pressure. Either of these actions will rapidly heat the battery or break its seals: As a result, the battery may become overheated, burst or ignite.

  (REP 05-0020)

- If you find anything strange or unusual with the battery when you use/carry/store it, remove the battery from the device and stop using it. For example, strange smells, strange colors, or deformation are a sign you must stop using the battery.

  (REP 05-0020)

- If it takes longer than the specified time to complete recharging, stop recharging the battery: Otherwise, the battery may become overheated, burst or ignite.

  (REP 05-0020)

- If the battery leaks and gets into your eyes, immediately flush your eyes with clean water (tap water) and do not rub your eye. Then visit the doctor immediately. If you do not seek any treatment for your eyes, problems may occur later. Because the battery uses highly concentrated alkaline as electrolyte, it may burn or you may lose your sight if it contacts your skin or eyes. If the battery's liquid contacts your skin or eyes, you must flush them with plenty of clean water and visit the doctor at once.

  (REP 05-0020)

3.3 ⚠ CAUTION statements

- Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

  (INST 01-0100, INST 01-0130)
  (REP 02-1041, REP 02-1043, REP 02-1240, REP 03-0060)

- Attach or remove the Rear Cover carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

  (INST 01-0120)

- Do not lean against the rear cover. The cover comes off, and it causes the injury.

  (INST 01-0120)

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⚠ SAFETY SUMMARY (Continued)

- Open or close the door carefully following the procedure. Otherwise, you may hurt you fingers by pinching them.

(INST 01-0150)

- The unpacking should be done by two or more personnel to prevent turning over of the subsystem or being caught under the subsystem.

(INST 02-0020, INST 03-0310)

- Perform the work with enough care because the Floor (RKM+H1H/RKS+ H1J/RKXS+H1J) Model, Floor (RKM+RKAJ+H2J/RKM+RKAJAT+H2J/RKS+RKAJ+H2J/RKS+RKAJAT+H2J/ RKXS+RKAJAT+H2J) Model, and Floor Model are heavy; their masses are about 70 kg and 115 kg respectively.

(INST 02-0020)

- When moving the subsystem, remove the skirts and raise the leveling bolts. Otherwise, an accident such as a falling may be caused because of contact with the floor or catching of a part.

(INST 02-0020)

- When moving the subsystem across a difference in floor level, etc., use a gangway, which forms a slope with an inclination angle of less than eight degrees.

(INST 02-0020)

- Masses of RKM is approximately 58 kg, and RKS/RKXS is approximately 56 kg.
  When raising each of them, take measures to prevent it from slipping because the slipping may cause a personnel injury owing to a pinching.

(INST 02-0060)

- When raising the subsystem, it is dangerous to do it by using the handles. Be sure to raise the subsystem by holding its front and rear portions made of sheet metal.

(INST 02-0060, INST 02-0100)

- Masses of RKM is approximately 58 kg, RKS/RKXS is approximately 56 kg, and RKAJ/RKAJAT 40 kg is approximately.
  When raising each of them, take measures to prevent it from slipping because the slipping may cause a personnel injury owing to a pinching.

(INST 02-0100)

- Do not block the vent holes. Or else, temperature rise inside the subsystem may cause a failure or even a fire.

(INST 02-0140)

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⚠ SAFETY SUMMARY (Continued)

- Work carefully because the mass of the single RKM is about 58 kg, RKS/RKXS is about 56 kg, RKH is about 47 kg, RKAJ/RKAJAT is about 40 kg.

  (INST 03-0310, INST 03-0420, INST 03-0430)

- Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

  (INST 02-0340, INST 03-0710, INST 03-0730, INST 03-0770)
  (ADD 01-0480, ADD 03-0040, ADD 03-0090)

- Do not put your hands at both ends of the skirt when installing the front skirt. The fingers and the like are pinched between the side skirts, and it causes the injury.

  (INST 02-0350)

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.

  (INST 03-0420, INST 03-0430)

- Be sure to perform the operation with two or more workers.

  (INST 03-0420, INST 03-0430)
  (REP 02-0950, REP 02-0990)

- Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.

  (INST 03-0430)

- Be sure to install it in order from the bottom to prevent the falling of the rack when you install the subsystem on the rack.

  (INST 03-0430)

- Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the subsystem enters the rack frame across the end of it. Otherwise, falling of the subsystem may be caused.

  (INST 03-0440)

- The cable of PDB is a fixed type. Do not loosen the installation part. If it is loosened, the connected part is damaged, and it causes an electric shock or fire.

  (INST 03-0730)

- Do not disassemble or remodel parts for maintenance. Otherwise, a failure or a serious accident may be caused. Be sure to replace parts in units of formally defined maintenance part.

  (REP 01-0000)

- When replacing the power supply, do it in haste after preparing a replacement power supply and arranging cables, etc. so that they do not disturb the replacement.

  (REP 01-0000)

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⚠ SAFETY SUMMARY (Continued)

- A closed type nickel-hydrogen battery can cause an electric shock or explosion if it is handled wrongly. Observe the following requirements for handling.
  - Do not disassemble or remake the battery.
  - Do not deform the battery.
  - Do not connect plus and minus poles with a metallic article such as a wire.
  - Do not reverse the connections of plus and minus poles.
  - Do not peel off the covering tube.
  - Do not connect the battery directly to the outlet.
  - Do not connect the battery to anything other than this subsystem for charging/discharging.
  - Do not leave the battery in a hot place. Store it in a dark and cool place.
  - Do not discard a used battery at the site where it was removed for replacement.

  (REP 02-0240)

- Since each fan is rotating with high-speed, be careful not to be caught by it.

  (REP 02-0300, REP 03-0020, REP 03-0040)

- Be sure to keep the front bezel and rear panel clean. Or else, the ventilation is deteriorated so that the temperature inside the subsystem may rise causing a failure or even a fire.

  (REP 03-0030, REP 03-0060)

- Be careful not to move the subsystem during cleaning.

  (REP 03-0030, REP 03-0060)

- If a battery is handled wrongly, it is feared that an explosion is caused.

  (REP 03-0070)

- Do not disassemble the battery, or a burn or electric shock may be caused.

  (REP 03-0070)

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⚠ SAFETY SUMMARY (Continued)

3.4 ⚠ CAUTION statements

- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

  (ADD 01-0140, ADD 01-0380, ADD 01-0390, ADD 01-0400, ADD 01-0410, ADD 01-0420, ADD 01-0422, ADD 01-0430, ADD 01-0432, ADD 02-0160, ADD 02-0280, ADD 02-0340, ADD 02-0390, ADD 02-0400, ADD 02-0440, ADD 02-0460, ADD 02-0480, ADD 02-0500)
  (REP 02-0390, REP 02-0420, REP 02-0470, REP 02-0510, REP 02-0520, REP 02-0540, REP 02-0570, REP 02-0610, REP 02-0640, REP 02-0660, REP 02-0690, REP 02-0720, REP 02-0750, REP 02-1060, REP 02-1090, REP 02-1120, REP 02-1210)

- Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

  (REP 02-1050, REP 02-1060, REP 02-1090, REP 02-1120, REP 02-1210)

3.5 ⚠ CAUTION statements

- When doing a hot replacement of a part, do not wear metallic accessories or a watch so as to avoid an electric shock. Be careful not to touch any of live parts with a screwdriver, etc.

  (REP 01-0000)

- If you touch a live part, it is feared that you receive an electric shock.

  (REP 03-0030, REP 03-0060)

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⚠ SAFETY SUMMARY (Continued)

3.6 CAUTION statements

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.

  (INST 01-0000, INST 01-0100, INST 01-0130, INST 02-0200, INST 02-0250, INST 02-0270, INST 03-0330, INST 03-0490)
  (ADD 01-0140, ADD 01-0210, ADD 01-0380, ADD 01-0400, ADD 01-0420, ADD 01-0430, ADD 02-0160, ADD 02-0210, ADD 02-0280, ADD 02-0390, ADD 02-0440, ADD 02-0480, ADD 03-0000)
  (REP 01-0010, REP 02-0070, REP 02-0390, REP 02-0540, REP 02-0660, REP 02-0770, REP 02-0830, REP 02-0910, REP 02-0950, REP 02-0990, REP 02-1041, REP 02-1043, REP 02-1060, REP 02-1090, REP 02-1120, REP 02-1140, REP 02-1210, REP 02-1240)

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.

  (INST 01-0000, INST 02-0200, INST 02-0250, INST 02-0270, INST 03-0330, INST 03-0490)
  (ADD 01-0140, ADD 01-0210, ADD 01-0380, ADD 01-0400, ADD 01-0420, ADD 01-0430, ADD 02-0160, ADD 02-0210,ADD 02-0280, ADD 02-0390, ADD 02-0440, ADD 02-0480, ADD 03-0000)
  (REP 01-0010, REP 02-0070, REP 02-0390, REP 02-0540, REP 02-0660, REP 02-0770, REP 02-0830, REP 02-1060, REP 02-1090, REP 02-1120, REP 02-1140, REP 02-1210)

- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

  (INST 01-0000, INST 03-0330, INST 03-0490)
  (ADD 03-0000)
  (REP 01-0010)

- Since front bezels of the RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.

  (INST 01-0100)
  (REP 02-1041)

- When installing or removing the Front Bezel, try not to operate the main switch incorrectly with the hook or the ON/OFF button of the Front Bezel.

  (INST 01-0100, INST 01-0130)
  (REP 02-1041, REP 02-1043)

- Since front bezels of the RKH/RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.

  (INST 01-0130)
  (REP 02-1043)

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⚠ SAFETY SUMMARY (Continued)

- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

(INST 02-0200)
(ADD 01-0140, ADD 01-0380, ADD 01-0400, ADD 01-0420, ADD 01-0430, ADD 02-0160, ADD 02-0280, ADD 02-0390, ADD 02-0440, ADD 02-0480)
(REP 02-0390, REP 02-0540, REP 02-0660)

- When you install an ENC Unit, support its metal part with your hand that has the wrist strap. By so doing, you can discharge the static electricity from your body may change the parts.

(INST 02-0250)

- When you install are RKNAS, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

(REP 02-1060, REP 02-1090, REP 02-1120, REP 02-1210)

- Disk Drives are precision components. Be careful not to expose drives to hard shock.

(INST 02-0270)
(ADD 01-0210, ADD 02-0210)
(REP 02-0070)

- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

(INST 02-0270)
(ADD 01-0210)
(REP 02-0070)

- Take full care to connect cables correctly.

(INST 02-0300, INST 03-0610, INST 03-0740)

- Press the rail against the rack frame as much as possible to secure the rail to the rack frame. If there is a gap between the rail and the rack frame, the rail may interfere with the equipment.

(INST 03-0200, INST 03-0250, INST 03-0300)

- When you remove a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

(ADD 02-0210)

- For the system Disk Drives (The Disk Drives #0 to #4 of the RKM/RKS/RKXS or the Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID#0 connected to the RKH) regardless of the data Disk Drives, the Spare Drives and the Disk Drives which do not configure the RAID group, do not remove the Disk Drives #0 and #1 at the same time with the subsystem power turned on. There is a possibility of downing the subsystem if removing them.

(REP 02-0070)

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⚠ SAFETY SUMMARY (Continued)

- When only two Disk Drives (the Disk Drives #0 and #1) are installed in the RKM/RKS or the RKAJ corresponding to the unit ID#0 connected to the RKH, do not remove these two at the same time.
  There is a possibility of downing the subsystem if removing them.

  (REP 02-0070)

- For RKXS in which only three Disk Drives (Disk Drive #0 to #2) are installed, do not remove these three at the same time. Be careful that the subsystem may go down if they are removed.

  (REP 02-0070)

- The replacement of the component is restricted in time. This operation requires referring to the manual. If the subsystem is left with this component removed for more than 10 minutes, it will stop by detecting the thermal alarm.

  (REP 02-0300, REP 02-0340)

- When the CALM LED on the Control Unit is on while the ALM LED of the Fan Assembly is on, be sure to solve the trouble of the Control Unit first.

  (REP 02-0300)

- When a trouble of the Power Unit is detected due to a trouble of the Fan Assembly, the Power Unit does not need to be replaced. When a trouble of the Power Unit is detected during replacement of the Fan Assembly, pull out and then insert the Power Unit.

  (REP 02-0340)

- When replacing the Fan Assembly, do it in haste after preparing a replacement Fan Assembly and arranging cables, etc. so that they do not disturb the replacement.

  (REP 02-0300)

- When replacing the Power Unit, do it in haste after preparing a replacement Power Unit and arranging cables, etc. so that they do not disturb the replacement.

  (REP 02-0340)

- When you install an ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. By so doing, you can discharge the static electricity from your body may change the parts.

  (REP 02-0830)

- When you install a Disk Drive or Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

  (REP 02-0950)

- When you install a Disk Drive or ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

  (REP 02-0990)

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⚠ SAFETY SUMMARY (Continued)

- When a device is kept with power-off for more than three months, the battery may be excessively discharged, and it may cause an unrecoverable damage for RKM/RKS. In such a storing condition, either charge the battery at least once every three months for more than six (6) hours, or switch off the battery. Even though the battery is switched off, to prevent damages from natural discharge, the battery must be charged once every six months for more than six (6) hours.
  When the battery without the switch is installed, charge it once every six months for more than six (6) hours.

  (REP 03-0070)

- When a device is kept with power-off for more than six months, the battery may be excessively discharged, and it may cause an unrecoverable damage for RKXS/RKH. In such a storing condition, the battery must be charged once every six months for more than six (6) hours.

  (REP 03-0070)

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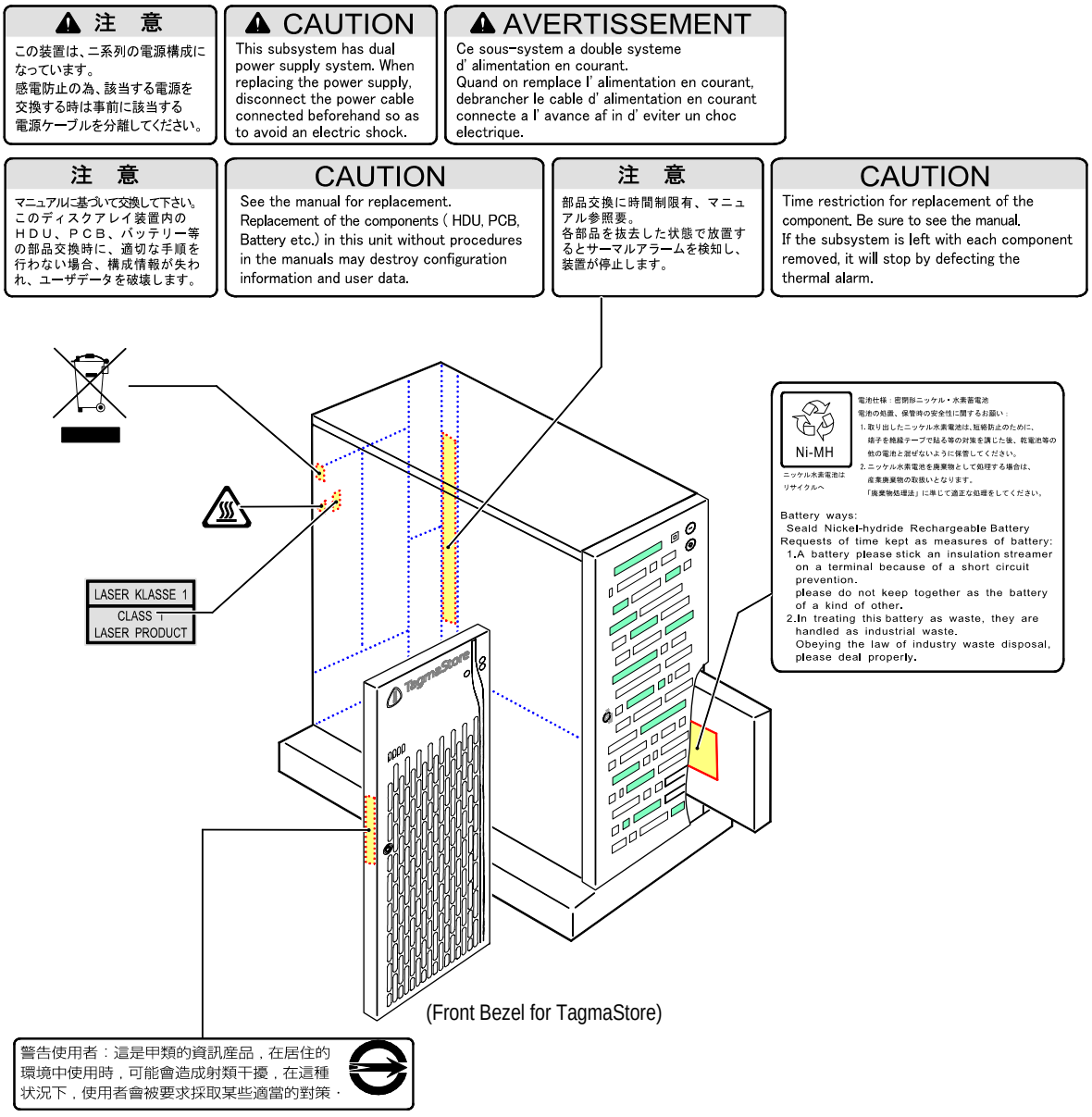
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⚠ SAFETY SUMMARY (Continued)

4. ⚠ Warning Labels Affixed on the Subsystem

4.1 Floor (RKM+H1J) Model/Floor (RKS+H1J) Model/ Floor (RKXS+H1J) Model



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⚠ SAFETY SUMMARY (Continued)

4.2 Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model/Floor (RKS+RKAJ+H2J) Model/Floor (RKS+RKAJAT+H2J) Model

⚠ 注　意

この装置は、ニ系列の電源構成になっています。
感電防止の為、該当する電源を交換する時は事前に該当する電源ケーブルを分離してください。

⚠ CAUTION

This subsystem has dual power supply system. When replacing the power supply, disconnect the power cable connected beforehand so as to avoid an electric shock.

⚠ AVERTISSEMENT

Ce sous-system a double systeme d' alimentation en courant.
Quand on remplace l' alimentation en courant, debrancher le cable d' alimentation en courant connecte a l' avance af in d' eviter un choc electrique.

注　意

マニュアルに基づいて交換して下さい。
このディスクアレイ装置内のＨＤＵ、ＰＣＢ、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われ、ユーザデータを破壊します。

CAUTION

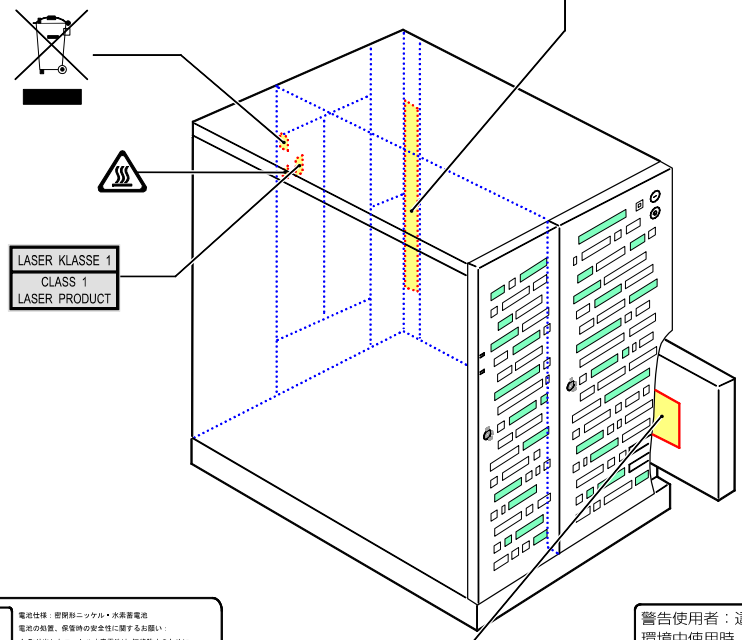
See the manual for replacement. Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and user data.

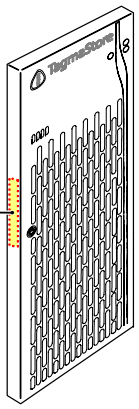
注　意

部品交換に時間制限有、マニュアル参照要。
各部品を抜去した状態で放置するとサーマルアラームを検知し、装置が停止します。

CAUTION

Time restriction for replacement of the component. Be sure to see the manual.
If the subsystem is left with each component removed, it will stop by defecting the thermal alarm.





(Front Bezel for TagmaStore)

Ni-MH

ニッケル水素電池は
リサイクルへ

電池仕様：密閉形ニッケル・水素蓄電池
電池の処置、保管時の安全性に関するお願い。
1.取り出したニッケル水素電池は、短絡防止のために、
端子を絶縁テープで貼る等の対策を講じた後、乾電池等の他の電池と混ぜないように保管してください。
2.ニッケル水素電池を廃棄物として処理する場合は、
産業廃棄物の取扱いとなります。
「廃棄物処理法」に準じて適正な処理をしてください。

Battery ways:
Seald Nickel-hydride Rechargeable Battery
Requests of time kept as measures of battery:
1.A battery please stick an insulation streamer on a terminal because of a short circuit prevention.
please do not keep together as the battery of a kind of other.
2.In treating this battery as waste, they are handled as industrial waste.
Obeying the law of industry waste disposal, please deal properly.

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種状況下，使用者會被要求採取某些適當的對策．

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⚠ SAFETY SUMMARY (Continued)

4.3 Floor (RKXS+RKAJAT+H2J) Model

⚠ 注 意

この装置は、ニ系列の電源構成になっています。
感電防止の為、該当する電源を交換する時は事前に該当する電源ケーブルを分離してください。

⚠ CAUTION

This subsystem has dual power supply system. When replacing the power supply, disconnect the power cable connected beforehand so as to avoid an electric shock.

⚠ AVERTISSEMENT

Ce sous-system a double systeme d' alimentation en courant.
Quand on remplace l' alimentation en courant, debrancher le cable d' alimentation en courant connecte a l' avance af in d' eviter un choc electrique.

注 意

マニュアルに基づいて交換して下さい。
このディスクアレイ装置内のＨＤＵ、ＰＣＢ、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われ、ユーザデータを破壊します。

CAUTION

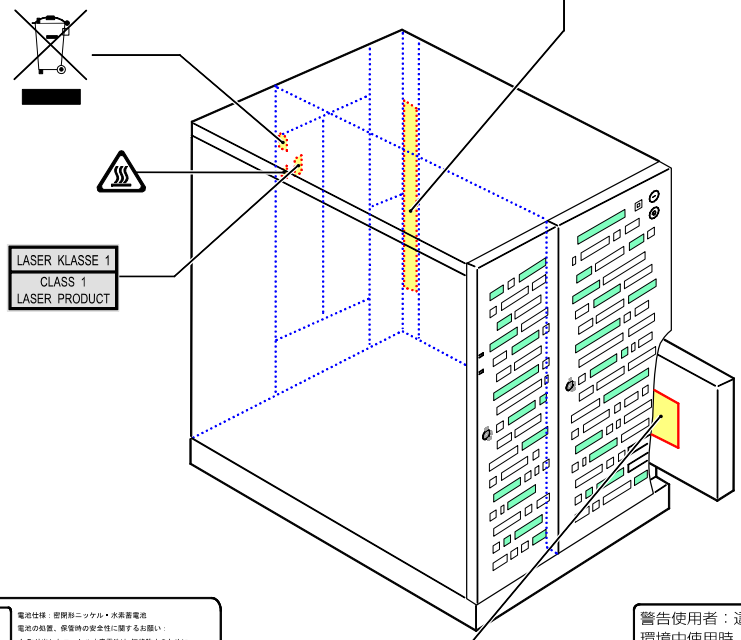
See the manual for replacement.
Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and user data.

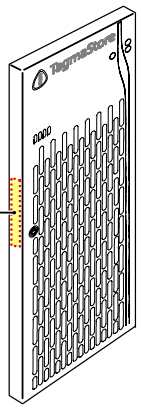
注 意

部品交換に時間制限有、マニュアル参照要。
各部品を抜去した状態で放置するとサーマルアラームを検知し、装置が停止します。

CAUTION

Time restriction for replacement of the component. Be sure to see the manual.
If the subsystem is left with each component removed, it will stop by defecting the thermal alarm.





(Front Bezel for TagmaStore)



警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種狀況下，使用者會被要求採取某些適當的對策。

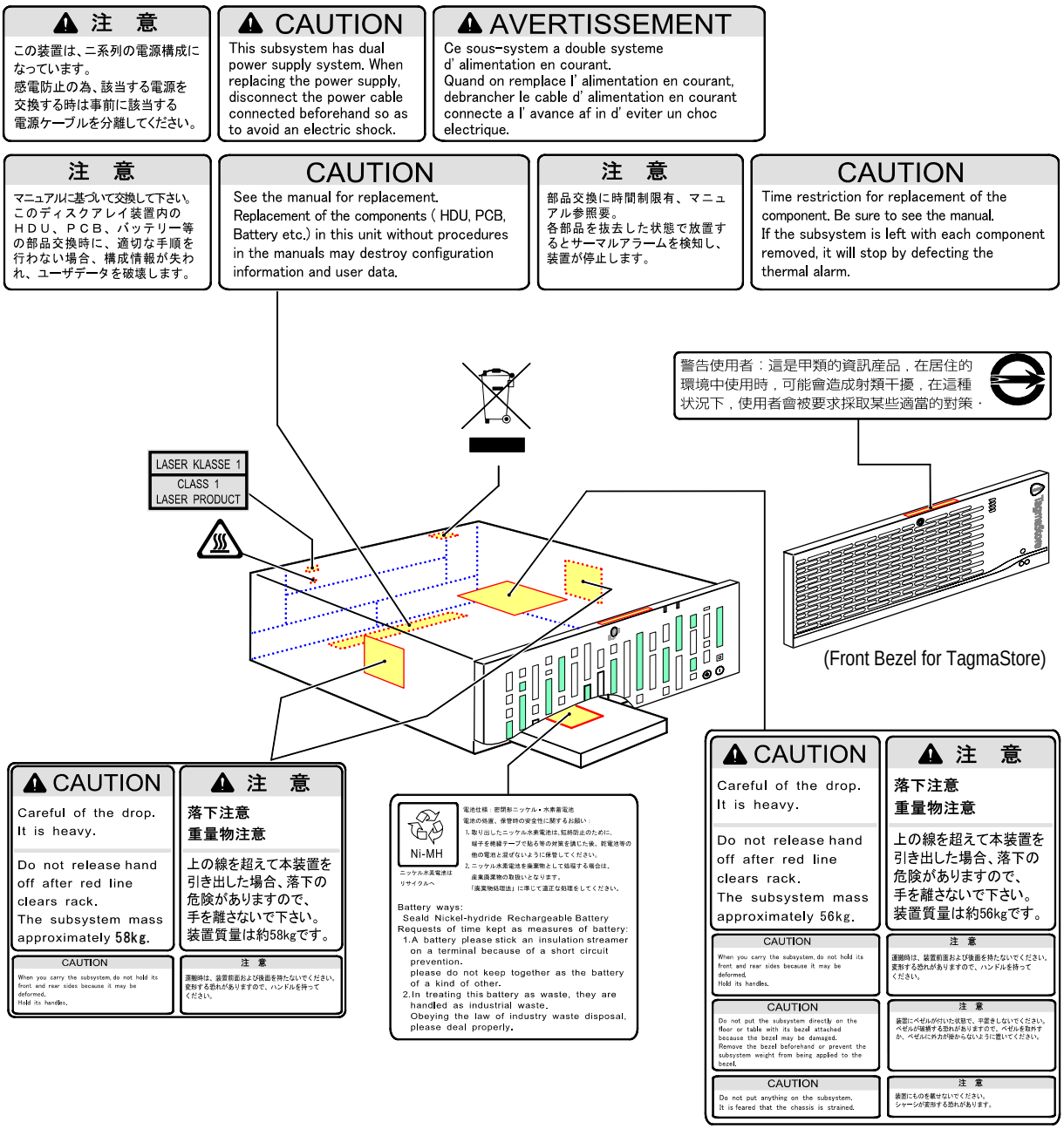
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⚠ SAFETY SUMMARY (Continued)

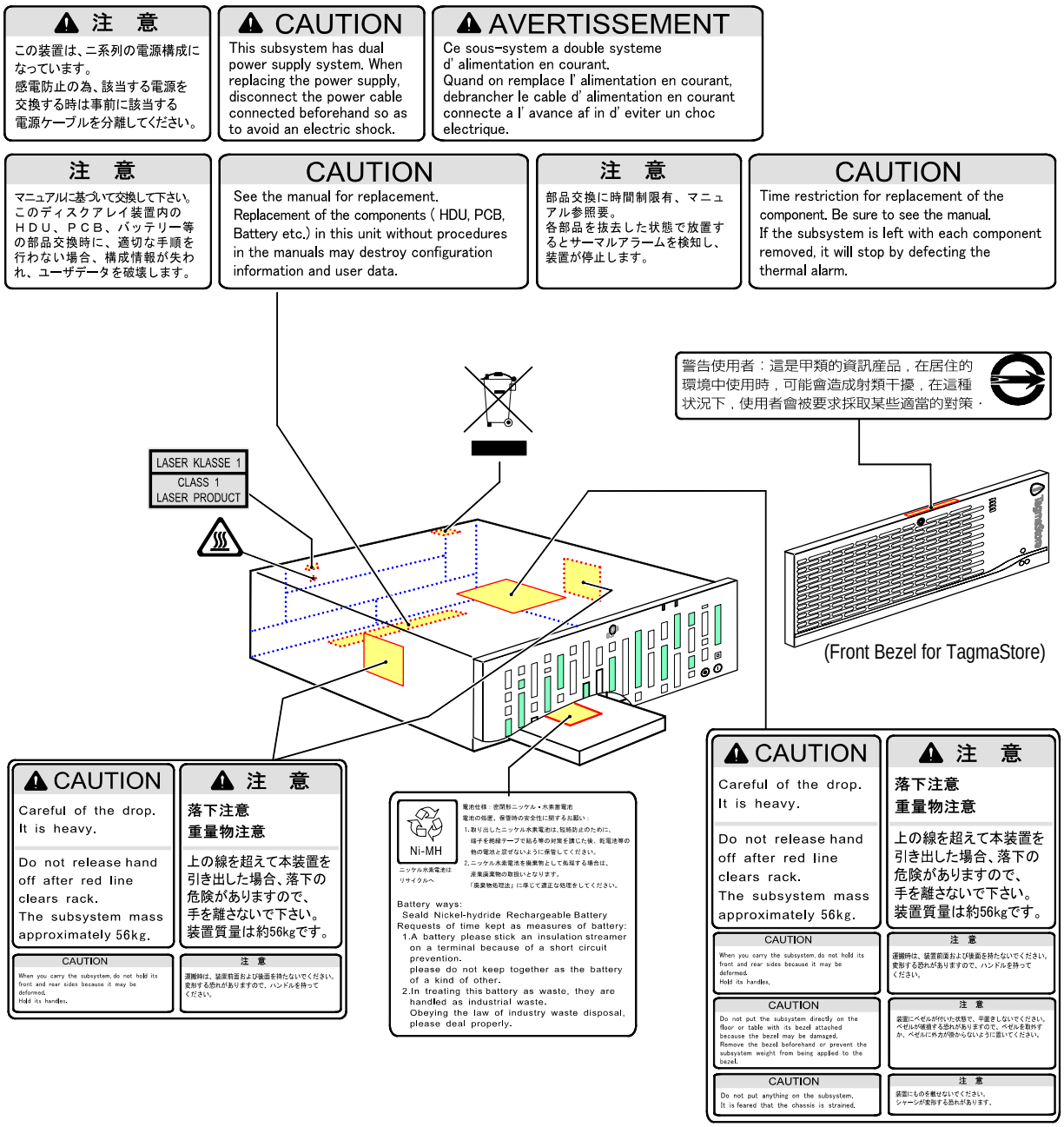
4.4 Rackmount model (RKM)



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⚠ SAFETY SUMMARY (Continued)

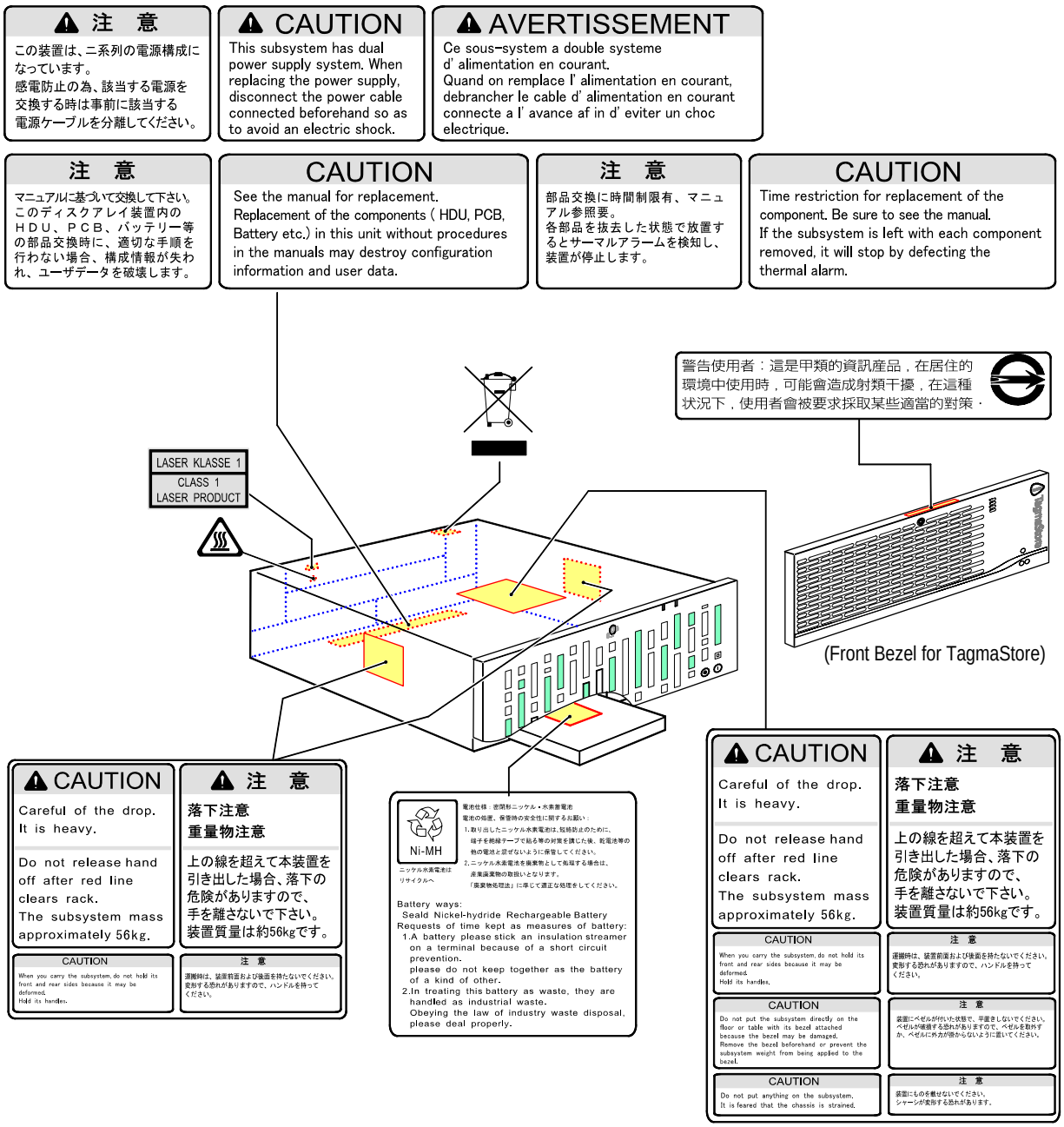
4.5 Rackmount model (RKS)



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⚠ SAFETY SUMMARY (Continued)

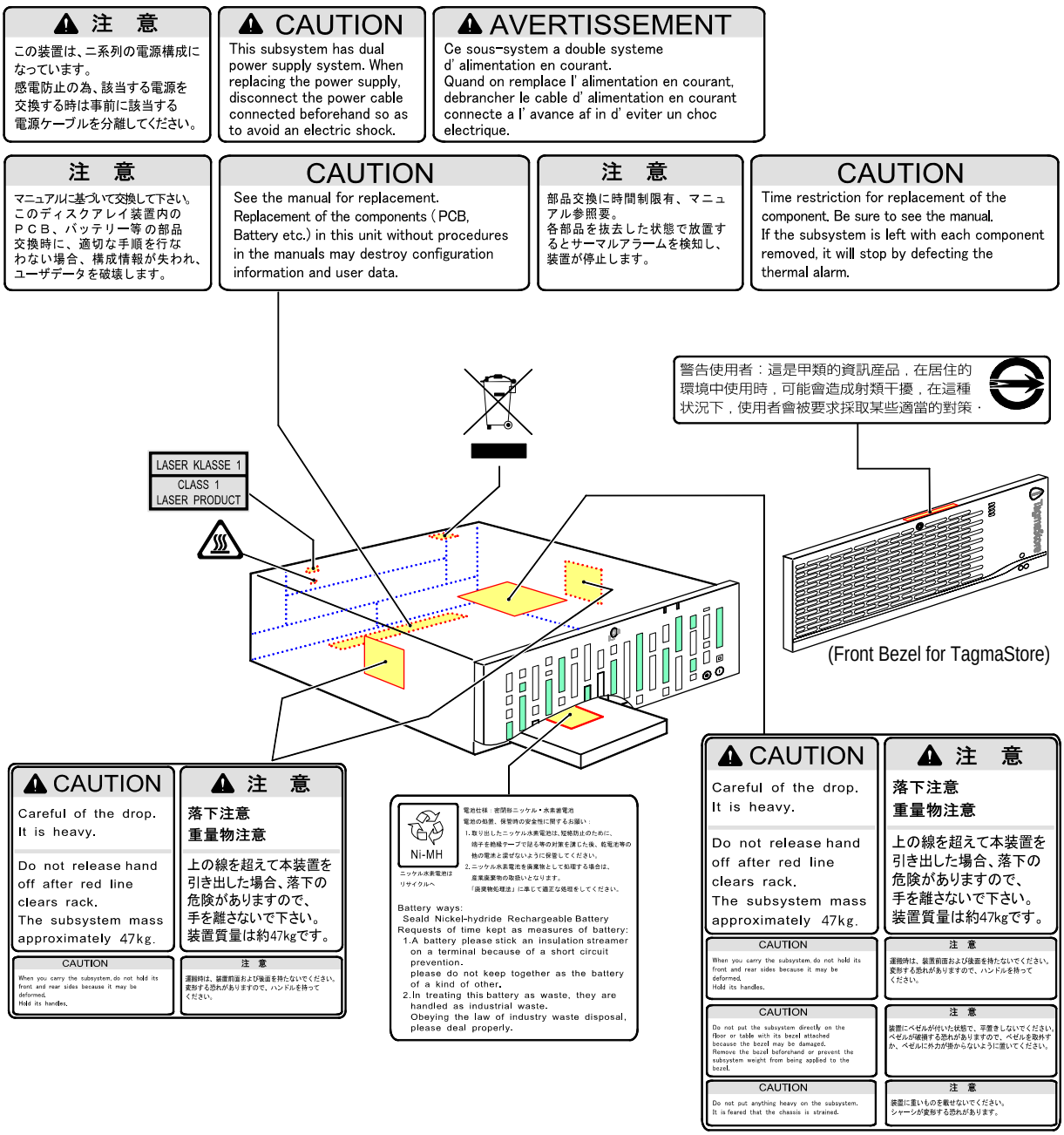
4.6 Rackmount model (RKXS)



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⚠ SAFETY SUMMARY (Continued)

4.7 Rackmount model (RKH)



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⚠ SAFETY SUMMARY (Continued)

4.8 Rackmount model (RKAJ)

⚠ 注　意

この装置は、ニ系列の電源構成になっています。
感電防止の為、該当する電源を交換する時は事前に該当する電源ケーブルを分離してください。

⚠ CAUTION

This subsystem has dual power supply system. When replacing the power supply, disconnect the power cable connected beforehand so as to avoid an electric shock.

⚠ AVERTISSEMENT

Ce sous-system a double systeme d' alimentation en courant.
Quand on remplace l' alimentation en courant, debrancher le cable d' alimentation en courant connecte a l' avance af in d' eviter un choc electrique.

注　意

マニュアルに基づいて交換して下さい。
このディスクアレイ装置内のＨＤＵ、ＰＣＢ、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われ、ユーザデータを破壊します。

CAUTION

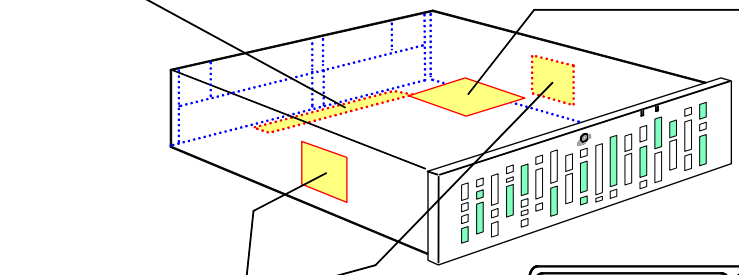
See the manual for replacement.
Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and user data.

注　意

部品交換に時間制限有、マニュアル参照要。
各部品を抜去した状態で放置するとサーマルアラームを検知し、装置が停止します。

CAUTION

Time restriction for replacement of the component. Be sure to see the manual.
If the subsystem is left with each component removed, it will stop by defecting the thermal alarm.



⚠ CAUTION

Careful of the drop.
It is heavy.

Do not release hand off after red line clears rack.
The subsystem mass approximately 40kg.

⚠ 注　意

落下注意
重量物注意

上の線を超えて本装置を引き出した場合、落下の危険がありますので、手を離さないで下さい。
装置質量は約40kgです。

CAUTION

When you carry the subsystem, do not hold its front and rear sides because it may be deformed.
Hold its left and right sides.

注　意

運搬時は、装置前面および後面を持たないでください。
変形する恐れがありますので、側面を持ってください。

⚠ CAUTION

Careful of the drop.
It is heavy.

Do not release hand off after red line clears rack.
The subsystem mass approximately 40kg.

⚠ 注　意

落下注意
重量物注意

上の線を超えて本装置を引き出した場合、落下の危険がありますので、手を離さないで下さい。
装置質量は約40kgです。

CAUTION

When you carry the subsystem, do not hold its front and rear sides because it may be deformed.
Hold its left and right sides.

注　意

運搬時は、装置前面および後面を持たないでください。
変形する恐れがありますので、側面を持ってください。

CAUTION

Do not put the subsystem directly on the floor or table with its bezel attached because the bezel may be damaged.
Remove the bezel beforehand or prevent the subsystem weight from being applied to the bezel.

注　意

装置にベゼルが付いた状態で、平置きしないでください。
ベゼルが破損する恐れがありますので、ベゼルを取外すか、ベゼルに外力が掛からないように置いてください。

CAUTION

Do not put anything on the subsystem.
It is feared that the chassis is strained.

注　意

装置にものを載せないでください。
シャーシが変形する恐れがあります。

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⚠ SAFETY SUMMARY (Continued)

4.9 Rackmount model (RKAJAT)

⚠ 注　意

この装置は、ニ系列の電源構成になっています。
感電防止の為、該当する電源を交換する時は事前に該当する電源ケーブルを分離してください。

⚠ CAUTION

This subsystem has dual power supply system. When replacing the power supply, disconnect the power cable connected beforehand so as to avoid an electric shock.

⚠ AVERTISSEMENT

Ce sous-system a double systeme d' alimentation en courant.
Quand on remplace l' alimentation en courant, debrancher le cable d' alimentation en courant connecte a l' avance af in d' eviter un choc electrique.

注　意

マニュアルに基づいて交換して下さい。
このディスクアレイ装置内のＨＤＵ、ＰＣＢ、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われ、ユーザデータを破壊します。

CAUTION

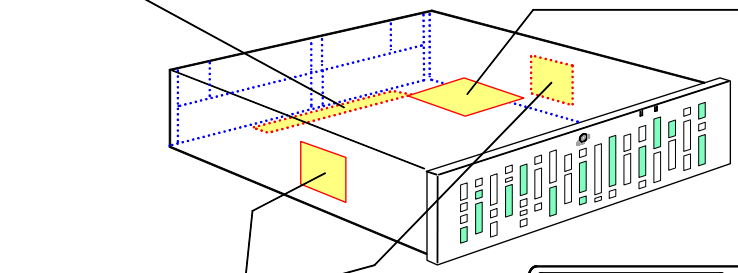
See the manual for replacement.
Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and user data.

注　意

部品交換に時間制限有、マニュアル参照要。
各部品を抜去した状態で放置するとサーマルアラームを検知し、装置が停止します。

CAUTION

Time restriction for replacement of the component. Be sure to see the manual.
If the subsystem is left with each component removed, it will stop by defecting the thermal alarm.



⚠ CAUTION

Careful of the drop.
It is heavy.

Do not release hand off after red line clears rack.
The subsystem mass approximately 40kg.

⚠ 注　意

落下注意
重量物注意

上の線を超えて本装置を引き出した場合、落下の危険がありますので、手を離さないで下さい。
装置質量は約40kgです。

CAUTION

When you carry the subsystem, do not hold its front and rear sides because it may be deformed.
Hold its left and right sides.

注　意

運搬時は、装置前面および後面を持たないでください。
変形する恐れがありますので、側面を持ってください。

CAUTION

Do not put the subsystem directly on the floor or table with its bezel attached because the bezel may be damaged.
Remove the bezel beforehand or prevent the subsystem weight from being applied to the bezel.

注　意

装置にベゼルが付いた状態で、平置きしないでください。
ベゼルが破損する恐れがありますので、ベゼルを取外すか、ベゼルに外力が掛からないように置いてください。

CAUTION

Do not put anything on the subsystem.
It is feared that the chassis is strained.

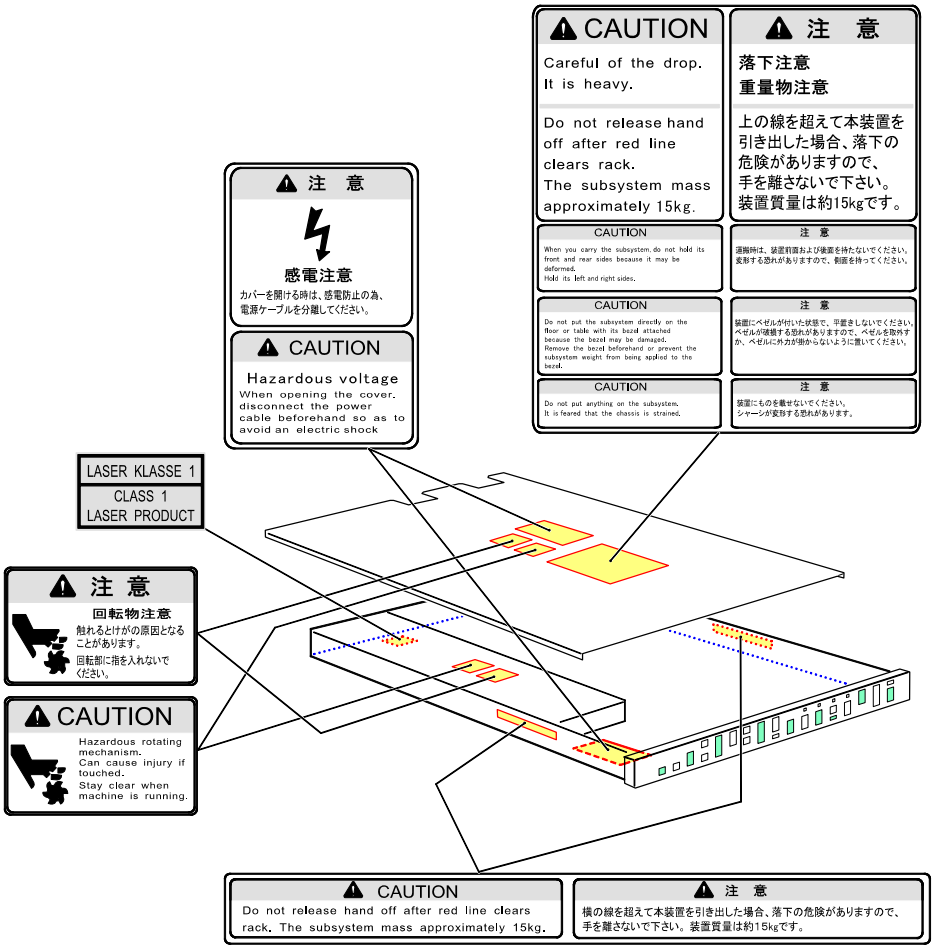
注　意

装置にものを載せないでください。
シャーシが変形する恐れがあります。

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⚠ SAFETY SUMMARY (Continued)

4.10 NAS Unit (RKNAS)



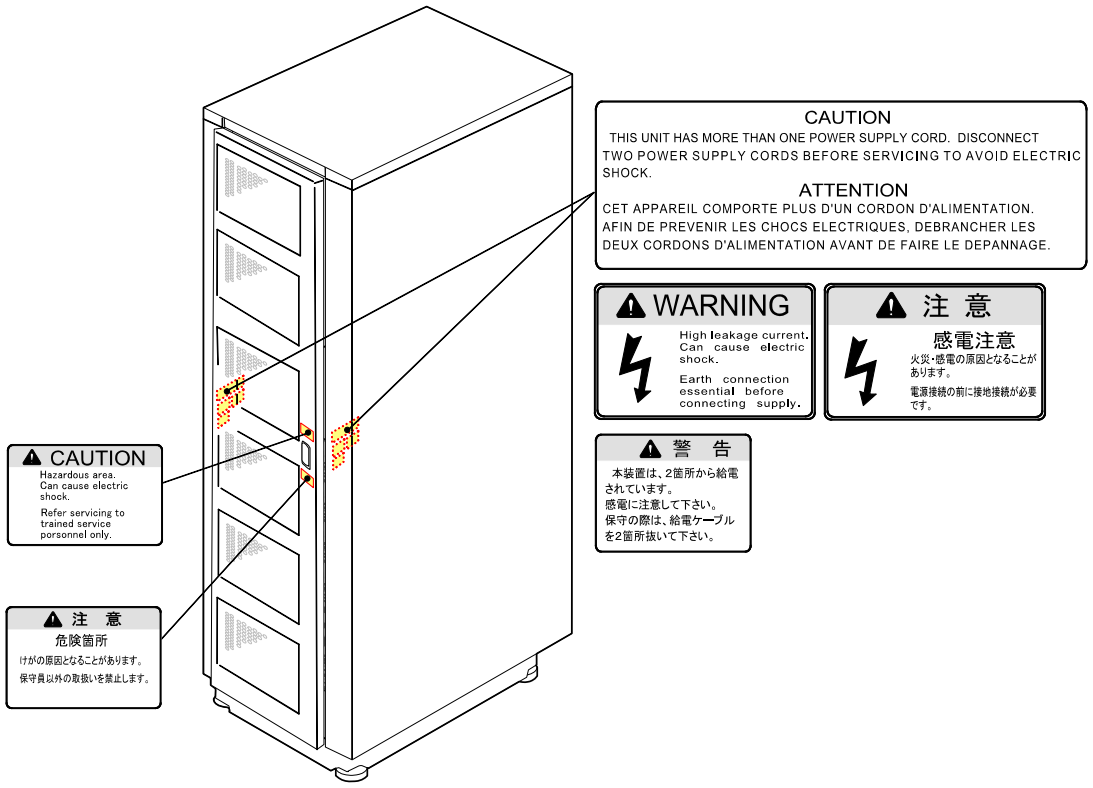
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⚠ SAFETY SUMMARY (Continued)

4.11 Rackmount model with U7 rack frame



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Theory

Chapter 1. Warranty and Service ..... THEO 01-0000

Chapter 2. Outline of Subsystem ..... THEO 02-0000

Chapter 3. Major Specifications of the Subsystem ..... THEO 03-0000

Chapter 4. Theory of Operation ..... THEO 04-0000

Chapter 5. Outline of P.P ..... THEO 05-0000

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Chapter 2. Outline of Subsystem

This chapter explained about the outline of the subsystem which composes a disk array system. In this chapter, it mechanical and power supplying system structures of each model are explained separately.

2.1 What is RAID

To put RAID to practical use, some techniques such as striping, mirroring, and parity disk are used.

- Striping
  It means to store data spreading it on several Disk Drives. Since a datum is written on several Disk Drives, time required to access each Disk Drive is shortened and thus, time required for reading or writing is shortened.
- Mirroring
  It means to copy all the contents of one Disk Drive to one or more Disk Drives at the same time in order to enhance reliability.
- Parity disk
  It is a data writing method used when configure RAID with three or more Disk Drives.
  Parity of data in the corresponding positions of two or more Disk Drives is generated and stored on another Disk Drive.

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2.1.1 Application of RAID technology

When one I/O processing spans multiple Disk Drives (when the stripe size is too small) during transaction processing in RAID 5, the performance cannot be exhibited sufficiently.

Therefore, the stripe size of 64 k bytes is set as a default value in this subsystem. When the Cache Partition Manager function of the priced option is used in the microprogram revision 0733/A-x or more, the stripe size can be changed to 256 k bytes or 512 k bytes for each LU. Lump writing of data on the Disk Drive and pre-reading of old data are performed by use of the cache memory so as prevent occurrence of write penalty as far as possible.

- Write penalty
  In the RAID 5 configuration, 3 to 16 Disk Drives compose one parity group (2D+1P to 15D+1P); in the RAID 6 configuration, 4 to 30 Disk Drives compose one parity group (2D+2P to 28D+2P). Since parity data is generated from 2 to 15 data disks in the group, when partial writing of one stripe in the group occurs in the transaction processing, it is necessary to generate the corresponding parity data in the group once again. For RAID 5, since parity data is calculated by the following calculation formula, "data before update", "parity before update" and "data after update" are necessary to create the parity.

  RAID 5:
  [New parity] = ([Data before update] EOR [Data after update]) EOR [Parity before update]

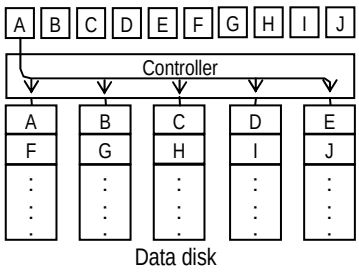
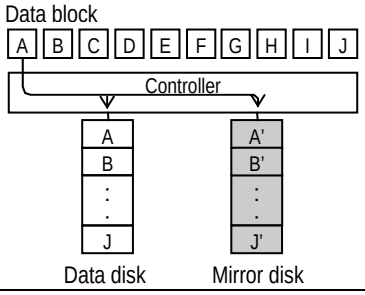
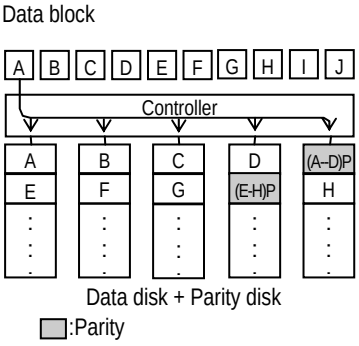
  RAID 6:
  [New P parity] = ([Data before update] EOR [Data after update]) EOR [P parity before update]
  [New Q parity] = [Coefficient parity] AND ([Data before update] EOR [Data after update]) EOR [Q parity before update]

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2.1.2 RAID levels

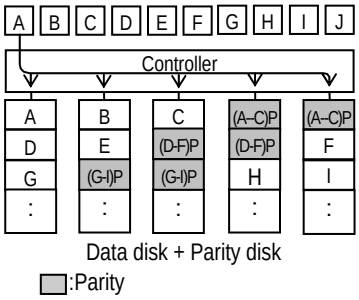
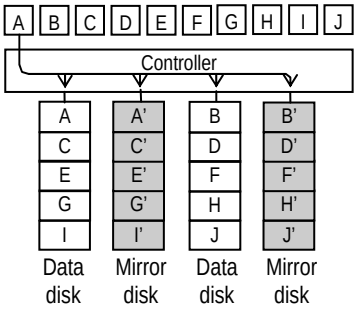
It is necessary to understand the characteristics of each RAID level to make the environment most suitable for the system you want to construct.
The SANRISE AMS/WMS series support RAID 1, RAID 5 (2D+1P to 15D+1P), RAID 6 (2D+2P to 28D+2P) and RAID 1+0 (2D+2D to 8D+8D), and also support RAID 0 (2D to 16D) if the RKM/RKS/RKAJ/RKA is connected.

Table 2.1.1 Outline of RAID Levels

Level	Configuration	Characteristics	
RAID 0		Outline	RAID 0 stripes data across Disk Drives (five Disk Drives in the DF700) to attain higher throughput.
		Advantages	Because Disk Drives having redundant data is not needed, Disk Drives can be used efficiently.
		Disadvantage	Data is lost in any failure of the Disk Drive.
RAID 1		Outline	RAID 1 provides data redundancy by copying all the contents of two Disk Drive to another (mirroring). Read/write performance is a little better than the individual Disk Drive.
		Advantages	Data is not lost even if a failure occurs in any Disk Drive. Performance is not lowered even when a Disk Drive fails.
		Disadvantage	RAID 1 is expensive because it requires twice the Disk capacity.
RAID 5		Outline	RAID 5 consists of three or more Disk Drives. It uses one of them as a parity disk and writes divided data on the other Disk Drives. Recovery from a failure of a data is possible by utilizing the parity data. Since the parity data is stored on all the Disk Drives, a bottleneck of the parity disk does not occur.
		Advantages	When reading data, RAID 5 stripes data across Disk Drives in the same way as that in RAID 0 to attain higher throughput.
		Disadvantage	When writing data, since parity data is required to be updated, performance of writing small random data is lowered although there is no problem regarding writing of continuous data. The performance is also lowered when a Disk Drive fails.

*1 : Only the RAID levels supported by DF700 are explained.

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Level	Configuration	Characteristics	
RAID 6	Data block  Data disk + Parity disk :Parity	Outline	RAID 6 consists of four or more disk drives. Two independent disk drives of them are used as parity disk drives and data is scattered and written to the rest of them. The parity data enables data to be restored even when the two disk drives fail at the same time.
		Advantages	RAID 6 has ability to withstand failures that is superior to RAID 5 because one data block has two parities.
		Disadvantage	The performance is lowered because the number of disk drives is increased by one in comparison with that of RAID 5. The performance is lowered when one or two disk drives is/are failed.
RAID 1+0	Data block  	Outline	RAID 1+0 provides data redundancy like RAID 1 by copying all the contents of two Disk Drive to another. Different from RAID 1, data striping is performed over two to eight (RKS is seven) sets of two Disk Drives.
		Advantages	Data is not lost even if any Disk Drive fails. Besides, since RAID 1+0 stripes data, it can make the performance of dealing with small size random accesses higher comparing with RAID 1. Performance is not lowered even when a Disk Drive fails.
		Disadvantage	RAID 1+0 is expensive because it requires twice the disk capacity.

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2.2 Outline of the Subsystem

2.2.1 Outline of functions

(1) Fibre/iSCSI model

DF700 subsystem has two models: floor model and rackmount model.

There are eight types of the floor model : one is a combination of the RKM and the floor standing kit (hereafter referred to as Floor (RKM+H1J) Model) and one is a combination of the RKM, the RKAJ, and the floor standing kit (hereafter, referred to as Floor (RKM+RKAJ+H2J) Model) and one is a combination of the RKM, the RKAJAT, and the floor standing kit (hereafter, referred to as Floor (RKM+RKAJAT+H2J) Model) and one is a combination of the RKS and the floor standing kit (hereafter referred to as Floor (RKS+H1J) Model) and one is a combination of the RKS, the RKAJ, and the floor standing kit (hereafter, referred to as Floor (RKS+RKAJ+H2J) Model) and one is a combination of the RKS, the RKAJAT, and the floor standing kit (hereafter, referred to as Floor (RKS+RKAJAT+H2J) Model) and one is a combination of the RKXS and the floor standing kit (hereafter, referred to as Floor (RKXS+H1J) Model) and one is a combination of the RKXS, the RKAJAT, and the floor standing kit (hereafter, referred to as Floor (RKXS+RKAJAT+H2J) Model).

The rackmount model is a subsystem which is used in the form of a combination of the DF700-RKH/DF700-RKM/ DF700-RKS/ DF700-RKXS (hereafter, referred to as RKH/RKM/RKS/RKXS.), the DF700-RKAJ/DF700-RKAJAT (hereafter, referred to as RKAJ/RKAJAT) and the DF600-RKA (hereafter, referred to as RKA).(‡1)(‡2)

For an external power supplying, RKH, RKM, RKS, RKXS, RKA, RKAJ, and RKAJAT are supplied from AC power supply.

Features of the subsystem are explained below.

- The RKH is CTU (Control Unit subsystem) that does not install the Disk Drive. The RKH(‡4) is a subsystem which connects the RKAJ/RKAJAT/RKA, configures a subsystem, and performs the RAID control of the Disk Drive to be installed in them by the Control Unit. The subsystem can connect up to 30 RKAJs(‡4)/RKAs (Disk Drives (for FC): A maximum of 450), up to 28 RKAJATs (Disk Drives <For Serial-ATA: A maximum of 420>, and in this case, RKAJ(‡4)/RKAs is one to two).
- Each of the RKM, Floor (RKM+H1J) Model, RKS, and Floor (RKS+H1J) Model, RKXS, and Floor (RKXS+H1J) Model is a subsystem that has up to 15 Disk Drives installed and controls the Disk Drives as components of RAID with controllers.
- Each of the Floor (RKM+RKAJ+H2J) Model, Floor (RKM+RKAJAT+H2J) Model, Floor (RKS+RKAJ+H2J) Model, Floor (RKS+RKAJAT+H2J) Model, and Floor (RKXS+RKAJAT+H2J) Model is a subsystem that has up to 30 Disk Drives installed and controls the Disk Drives as components of RAID with controllers.
- The RKAJ/RKAJAT/RKA(‡3) mounts up to fifteen Disk Drives and can be used being connected with the RKH(‡4), RKM, RKS, RKXS.(‡2)
- The Fibre Channel (Non-OFC) and iSCSI (1000 Base-T) are adopted in the interface with the host computer. Also, the RKH can be used by combining two types of the host interfaces from the Fibre Channel, iSCSI and NAS (the NAS interface can be used from the microprogram revision 0732/A or more).
- The RKM, RKS, RKXS, RKAJ, RKAJAT and RKA(‡3) are models to be mounted on a 19-type rack frame, however, them can also be used as floor model when combined with the optional kit.

‡1 : The two or more RKHs/RKMs/RKSs cannot be connected to the one system.

‡2 : RKAJ/RKA cannot be connected to RKXS.

‡3 : The RKA/RKM/RKS can be connected with the microprogram from the revision 0720/A or more, and the RKH can be connected from the revision 0731/A or more (The RKHE can be applied from the microprogram revision 0760/A).

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‡4 : The Chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only.

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- A system (‡1) which can connect up to 30 RKAJs/RKAJATs/RKAs (‡3) to one RKH(‡4) using the special cables, and makes 450 Disk Drives one set by the Control Unit of the RKH can be configured. Also, when the SATA Disk Drives are connected, the system (‡1) which makes 30 FC Disk Drives and 420 SATA Disk Drives one set can be configured.
- Up to the 14 RKAJs/RKAJATs/RKAs(‡3) can be connected to the one RKM by the exclusive cables and a system(‡1) with a set of the 225 Disk Drives controlled by the controller of the RKM can be constructed. When the SATA Disk Drives are connected, a system(‡1) with a set of the 15 FC Disk Drives and the 210 SATA Disk Drives can be constructed.
- Up to the 6 RKAJs/RKAJATs/RKAs(‡3) can be connected to the one RKS by the exclusive cables and a system(‡1) with a set of the 105 Disk Drives controlled by the controller of the RKS can be constructed. When the SATA Disk Drives are connected, a system(‡1) with a set of the 15 FC Disk Drives and the 90 SATA Disk Drives can be constructed.
- Up to six RKAJATs can be connected to an RKXS using the special cables, and a system with a set of 105 Disk Drives can be constructed by the Control Unit of RKXS.
- A special rack frame (DF-F700-U7) is provided, which can mount a various combination of the RKH/RKM/RKS/RKXS (4 U units high) and RKAJ/RKAJAT/RKA(‡3)(s) (3 U units high) up to a height of 38 U units.(‡2)
- The Fibre Channel interface is adopted, and it can be transferred between the hosts with the maximum of 400 M bytes/s (in case of the RKS/RKXS, the FC Interface Board is added). The iSCSI interface connection can be transferred between the hosts at the maximum of 100 M bytes/s.
- The Fibre Channel interface provides 2 ports per Control Unit (RKH/RKM).
- Although the Fibre Channel interface of the RKS/RKXS installs only one port per Control Unit, it is extending one port to two connectors by configuring the Mini-Hub in the Control Unit. When the FC Interface Board is added, it installs two ports per Control Unit.
- The Fibre Channel interface of the RKH is the four ports per Control Unit installation (at the time of the FC Interface Board addition).
- If the microprogram revision 0750/A or more is applied by the iSCSI interface connection, it is possible to communicate with twice the number of the hosts at the maximum compared to the previous revision (the maximum of 128 hosts for the revision less than 0750/A and the maximum of 255 hosts for the revision 0750/A or more).
  The registration of the CHAP User and the definition of the iSCSI target are also extended to be able to define approximately twice the number compared to the previous revision.
- The RKHE which improved the performance of the RKH is applied from the microprogram revision 0760/A.

‡1 : The two or more RKHs/RKMs/RKSs cannot be connected to the one system.

‡2 : RKAJ/RKA cannot be connected to RKXS.

‡3 : The RKA/RKM/RKS can be connected with the microprogram from the revision 0720/A or more, and the RKH can be connected from the revision 0731/A or more (The RKHE can be applied from the microprogram revision 0760/A).

‡4 : The Chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only.

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(a) Scalability

- Various systems that meet the wide range of needs can be constructed from the single RKM with up to 15 Disk Drives to a system in which the number of Disk Drives can be increased up to 225 (15 FC Disk Drives and 210 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 14 RKAJs/RKAJATs/RKAs(‡2) are connected to the RKM.(‡1)
- Various systems that meet the wide range of needs can be constructed from the single RKS with up to 15 Disk Drives to a system in which the number of Disk Drives can be increased up to 105 (15 FC Disk Drives and 90 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 6 RKAJs/RKAJATs/RKAs(‡2) are connected to the RKS.(‡1)
- Various systems that meet the wide range of needs can be constructed from the single RKXS with up to 15 Disk Drives to a system in which the number of Disk Drives can be increased up to 105 when up to 6 RKAJATs are connected to the RKXS.(‡1)
- Various systems that meet the wide range of needs can be constructed in which the number of Disk Drives can be increased up to 450 (30 FC Disk Drives and 420 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 30 RKAJs/RKAJATs/RKAs(‡2) are connected to the RKH(‡3).(‡1)
- By using the rack frame (U7) exclusive to DF700, you can construct a system conforming to your demand.
- The Spare Disk Drives, which can be set up to 15 in one system and up to 30 in case of the RKH, do not choose the positions to be installed.
  You can use the system effectively by mounting each Spare Disk in a Disk Drive slot left unused as a result of a system construction.
- From the host computer, the subsystem can be used not only as a single large scale Disk Drive but also as 4,096 logical disks (LUs) at the maximum (RKM: 2,048 logical disks (LUs) at the maximum/RKS/RKXS: 512 logical disks (LUs) at the maximum).
- The flexible system, which the Fibre Channel connectors of SW become connectable for the number of the connectors, can be constructed for the Fibre Channel device subsystem including the host computer and the DF700 by connecting to the Fabric switch (hereafter, it is called SW).

(b) Multi-RAID configuration

- Four RAID levels, that is, RAID 0, RAID 1, RAID 5, RAID 6, and RAID 1+0 can be set up. (When the RKAJAT connected: RAID 1, RAID 5, and RAID 1+0 can be set up)
- Because RAID 1, RAID 5, and RAID 1+0 are provided with redundancy by virtue of mirror disk(s) and parity disk(s), they do not lose data even when a failure occurs in one of Disk Drives, and moreover, data can be read/written from/onto them as if there existed no failure.
- Since RAID 6 has redundancy by virtue of its two parity disks, it not only prevents data to be lost even when up to two Disk Drives fail at the same time but also allows data to be read/written as if no failure occurred.
- With RAID 1+0 of DF700, you can construct a flexible system conforming to your demands from a system configured with 4 data disks (2D+2D) to that with 16 data disks (8D+8D).

‡1 : The two or more RKHs/RKMs/RKSs/RKXSs cannot be connected to the one disk subsystem.

‡2 : The RKM can be connected with the microprogram from the revision 0720/A or more, and the RKH can be connected from the revision 0731/A or more (The RKHE can be applied from the microprogram revision 0760/A).

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‡3 : The Chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only.

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- With RAID 5 of DF700, you can construct a flexible system conforming to your demands from a system configured with 3 data disks (2D+1P) to that with 16 data disks (15D+1P).
- With RAID 6 of DF700, you can construct a flexible system conforming to your demands from a system configured with 4 data disks (2D+2P) to that with 30 data disks (28D+2P).

(c) High-speed data transfer

- The subsystem can read and write data at a high-speed by activating Disk Drives in parallel.
- With the Fibre Channel connection, the subsystem can transfer data between the host computer and the subsystem at a maximum speed of 400 M bytes/s (RKS/RKXS is 200 M bytes/s). Enough throughput can be got when connecting devices and making a multiple access.
- With the iSCSI connection, the subsystem can transfer data between the host computer and the subsystem at a maximum speed of 100 M bytes/s. Enough throughput can be got when connecting devices and making a multiple access.
- By using a non-volatile large-capacity cache memory (RKH is 2,048 M bytes/CTL to 8,192 M bytes/CTL, RKM is 1,024 M bytes/CTL to 4,096 M bytes/CTL, RKS is 2,048 M bytes/CTL, RKXS is 512 M bytes/CTL or 1,024 M bytes/CTL), speed-up of command execution at the time of read/write hit was achieved.

(d) Large capacity

- A maximum of 450 subsystems can be connected. The subsystems provide a maximum of 129.4 T bytes disk capacity at RAID 0. Further, when the RKAJAT is connected, the maximum disk capacity of 154.2 T bytes is realized (in the case of RAID 5).

(e) High data availability

- With the redundant RAID configuration (RAID 1,RAID 5, or RAID 1+0), the subsystem can continuously read or write data without shutting down the subsystem by using the parity and/or mirror disks even when a Disk Drive failed.
- The redundant RAID 6 configuration can prevent a system from stopping and allows data to be read/written continuously by means of the parity disks when failures occur in up to two Disk Drives at the same time.

(f) High data reliability

- The Controller of the DF700 adds the original 8-byte data assurance codes to data from a host computer by automatically generating them, writes them in the Disk Drive together with the data, and checks them when reading the data, and thus the data reliability is improved.
- On the data bus in the controller, the automatic generation of the data assurance codes and the check are executed to enhance data reliability in data distribution/concentration control which is peculiar to the disk array.

(g) Diagnostic and maintenance functions

- Diagnosis and maintenance of the subsystem can be done on a screen of a PC connected to the subsystem via a LAN.
- Status of the subsystem can be checked and a faulty part can be identified by the Storage Navigator Modular.
- Diagnosis of the subsystem can be done from a distant place by using the remote maintenance function (SNMP).

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(h) Maintenance

- Adding Disk Drive and maintenance can be performed without powering off the system.
- All the subject components for maintenance can be replaced without powering off the subsystem. (Excluding the Basic Chassis of Rack Mount Style and Additional Chassis of Rack Mount Style.)
- When the correction copy which originates in the blockade of the dynamic sparing or the data Disk Drive is completed, if the capacity and the rotational speed are the same of the data Disk Drive and the Spare Disk Drive of the recovery destination and both of them are not the Disk Drives of the RKA, the copy back does not operate even though the blocked Disk Drive is replaced because the attributes of the data Disk Drive and the Spare Disk Drive are switched.

  Therefore, the influence to the customer's business is suppressed because there is no deterioration of the host I/O performance by the copy back start after the Disk Drive replacement, and the maintenance time is satisfied with the level of the replacement time of the Disk Drive, and the maintenance cost can be reduced.

  In the following cases, the copy backless does not operate, and the copy back surely operates after the Disk Drive replacement.

  - When the capacity or the rotational speed of the failed Disk Drive and the Spare Disk Drive which recovered the data differs
  - When either one of the failed Disk Drive and the Spare Disk Drive which recovered the data is the Disk Drive of the RKA

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(2) NAS model

The NAS model is only a rackmount model.

The subsystem is used by further connecting the DF700-RKNAS2G/RKNAS4G (called RKNAS2G/RKNAS4G hereafter, and these two are generically called RKNAS) to the existing rackmount model combining the RKAJ/RKAJAT/RKA with the RKH/RKM/RKS/RKXS.

The RKH, RKM, RKS, RKXS, RKAJ, RKAJAT, RKA and RKNAS are the models whose power supply fed from the outside is the AC power supply.

- The interface with the host computer adopts the LAN (GbE) and can be accessed by the NFS/CIFS protocol. Also, the RKH can be used by combining two types of the host interfaces from the Fibre Channel, iSCSI and NAS (the NAS interface can be used from the microprogram revision 0732/A or more). (The RKHE can be applied from the microprogram revision 0760/A)
- The Fibre Channel interface cannot be used in the RKNAS2G/RKNAS4G.
- A system similar to the rackmount model of the Fibre model can be constructed by combining the Disk Drives in the similar method of the rackmount model of the Fibre model.
- One RKNAS has GbE (Copper) x 4 ports of the LAN in the host interface and used by configuring a pair of the NAS cluster with two RKNASs. It becomes a configuration such as a pair of the NAS clusters (two RKNASs) is connected to one RKH/RKM/RKS/RKXS.
- A pair of the NAS clusters (two RKNASs) is connected to each Control Unit of the RKH/RKM/RKS/RKXS by using the PCI Express cable and the CTRL cable.
- The RKNAS2G installs the Cache memory of 2 G bytes and can be connected only to the RKS and RKXS.
- The RKNAS4G installs the Cache memory of 4 G bytes and can be connected only to the RKH and RKM.

Features of the subsystem are explained below.

(a) Scalability

- Various systems that meet the wide range of needs can be constructed from the single RKM with up to 15 Disk Drives to a system in which the number of Disk Drives can be increased up to 225 (15 FC Disk Drives and 210 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 14 RKAJs/RKAJATs/RKAs(‡2) are connected to the RKM.(‡1)
- Various systems that meet the wide range of needs can be constructed from the single RKS with up to 6 Disk Drives to a system in which the number of Disk Drives can be increased up to 105 (15 FC Disk Drives and 90 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 6 RKAJs/RKAJATs are connected to the RKS.(‡1)
- Various systems that meet the wide range of needs can be constructed from the single RKXS with up to 15 Disk Drives to a system in which the number of Disk Drives can be increased up to 105 when up to 6 RKAJATs are connected to the RKXS.(‡1)
- Various systems that meet the wide range of needs can be constructed in which the number of Disk Drives can be increased up to 450 (30 FC Disk Drives and 420 SATA Disk Drives, in the case where the SATA Disk Drives are connected) when up to 30 RKAJs/RKAJATs/RKAs(‡2) are connected to the RKH(‡3).(‡1)

‡1 : The two or more RKHs/RKMs/RKSs/RKXs cannot be connected to the one disk subsystem.

‡2 : It is connectable to the Microprogram revision 0720/A or more for the RKM and the Microprogram revision 0731/A or more for the RKH (The RKHE can be applied from the microprogram revision 0760/A).

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‡3 : The chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only.

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- By using the rack frame (U7) exclusive to DF700, you can construct a system conforming to your demand.
- The Spare Disk Drives, which can be set up to 15 in one system and up to 30 in case of the RKH, do not choose the positions to be installed.
  You can use the system effectively by mounting each Spare Disk in a Disk Drive slot left unused as a result of a system construction.
- From the host computer, the subsystem can be used not only as a single large scale Disk Drive but also as 4,096 logical disks (LUs) at the maximum (RKM: 2,048 logical disks (LUs) at the maximum / RKS/RKXS: 512 logical disks (LUs) at the maximum).
- The data sharing can be easily performed from two or more different types of servers connected through the LAN by using the NFS/CIFS protocol of the LAN (GbE) interface.

(b) Multi-RAID configuration

- The multi RAID configuration similar to the rackmount model of the Fibre model can be achieved.

(c) High-speed data transfer

- The subsystem can read and write data at a high-speed by activating Disk Drives in parallel.
- With the Fibre Channel connection, the subsystem can transfer data between the host computer and the subsystem at a maximum speed of 400 M bytes/s (RKS/RKXS is 200 M bytes/s). Enough throughput can be got when connecting devices and making a multiple access.
- By using a non-volatile large-capacity cache memory (RKH is 2,048 M bytes/CTL to 8,192 M bytes/CTL, RKM is 1,024 M bytes/CTL to 4,096 M bytes/CTL, RKS is 2,048 M bytes/CTL, RKXS is 512 M bytes/CTL or 1,024 M bytes/CTL), speed-up of command execution at the time of read/write hit was achieved.

(d) Large capacity

- The Disk Drive capacity similar to the rackmount model of the Fibre model can be achieved.

(e) High data availability

- The high data availability similar to the rackmount model of the Fibre model can be achieved.

(f) High data reliability

- The high data reliability similar to the rackmount model of the Fibre model can be achieved.

(g) Diagnostic and maintenance functions

- Diagnosis and maintenance of the subsystem can be done on a screen of a PC connected to the subsystem via a LAN.
- Status of the subsystem can be checked and a faulty part can be identified by the Storage Navigator Modular.
- Diagnosis of the subsystem can be done from a distant place by using the remote maintenance function (SNMP).
- The failure of the file system can be monitored by using the NAS Manager Modular from the PC connected to the DF700 with the LAN. Also, the data in the subsystem can be protected from the virus by performing the virus scan in cooperation with the scan server installed on the LAN.

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(h) Maintenance

- The addition and the maintenance of the disk subsystem can be done without turning off the power supply of the system.
- All the parts for the maintenance target can be replaced without turning off the power supply of the subsystem.
- All the parts for the maintenance target can be replaced without stopping the operation from the host computer. Depending on the replacement parts, the operation from the host computer can be continued by performing the failover and failback between the NAS clusters (two RKNASs).
- When the correction copy which originates in the blockade of the dynamic sparing or the data Disk Drive is completed, if the capacity and the rotational speed are the same of the data Disk Drive and the Spare Disk Drive of the recovery destination and both of them are not the Disk Drives of the RKA, the copy back does not operate even though the blocked Disk Drive is replaced because the attributes of the data Disk Drive and the Spare Disk Drive are switched.

  Therefore, the influence to the customer's business is suppressed because there is no deterioration of the host I/O performance by the copy back start after the Disk Drive replacement, and the maintenance time is satisfied with the level of the replacement time of the Disk Drive, and the maintenance cost can be reduced.

  In the following cases, the copy backless does not operate, and the copy back surely operates after the Disk Drive replacement.

  - When the capacity or the rotational speed of the failed Disk Drive and the Spare Disk Drive which recovered the data differs
  - When either one of the failed Disk Drive and the Spare Disk Drive which recovered the data is the Disk Drive of the RKA

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2.2.2 Differences between the DF700 and DF600

Differences between the subsystem and DF600 are explained below.

- Capability of installing up to 15 Disk Drives in the basic frame
  The RK/RKS of the DF600 can install up to 14 Disk Drives, whereas the both RKM and RKS of the DF700 can install up to 15 Disk Drives.
- Capability of connecting the additional frame to the RKS
  The additional frame cannot be connected to the RKS of the DF600, whereas up to 6 additional frames (RKAJs/RKAJATs) can be connected to the RKS of the DF700.
- The Mini-HUB is adopted as the Fibre Channel interface of the RKS/RKXS.
  The Fibre Channel Interface of the RKS of the DF600 was one connector per Control Unit, but the Fibre Channel interface of the RKS/RKXS of the DF700 became two connectors per Control Unit because the Mini-HUB is configured in the Control Unit even though the FC Interface Board is not added.
  The number of connectors of two connectors, which can be used, is determined by the Topology of the Fibre Channel to be connected and the transfer rate.
  The Point-to-Point Topology is used at the connection through the SAN Switch, etc., and it can use only one connector (0A-0 and 1A-0) of two connectors per Control Unit.
  Next, the transfer rate auto (auto negotiation) can use only one connector (0A-0 and 1A-0) of two connectors per Control Unit.
  The translation rate1Gbps and 2 Gbps can use both of two connectors.
- The FC interface board can be added in the RKS/RKXS
  The DF600-RKS had one port per Control Unit, and the FC Interface Board could not be added to the Control Unit, but the DF700-RKS/RKXS of the microprogram revision 0726/A or more has the FC Interface Board added to the Control Unit and one port per Control Unit can be added as two ports per Control Unit.
  Also, the DF600-RKS is 2 Gbps Fibre Channel Optical (Non-OFC) for the type of the Fibre Channel interface, but the DF700-RKS/RKXS becomes 4 Gbps Fibre Channel Optical (Non-OFC) when the FC Interface Board is added.
- Adoption of high-speed RISC processor
  The microprocessor for the RKM of the DF700, it was changed from POWER PC 7455 (677 MHz) for the RKM of the DF600 to POWER PC 7447A (1.0 GHz) that is faster and has higher performance. It is POWER PC7447A (500 MHz) as for the RKS/RKXS. It is POWER PC7447A (1.4 GHz) as for the RKH. It is POWER PC7448 (1.7 GHz) as for the RKHE.
- With the Fibre Channel connection, the subsystem can transfer data between the host computer and the subsystem at a maximum speed of 400 M bytes/s (RKS/RKXS is 200 M bytes/s).
  Enough throughput can be got when connecting devices and making a multiple access.
- Adoption of RAID 6
  The DF600 supports RAID 0, RAID 1, RAID 5, and RAID 1+0, whereas the DF700 supports RAID 6 in addition to the above.

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- Duplicated power supply
  In the DF700 like the DF600, the power supply which integrates functions of the IN BOX and the Power Unit is duplicated as a standard configuration.

- Adoption of Fibre Channel Disk Drive
  The Disk Drives with the Fibre Channel interface are adopted in the same way as the DF600. The maximum number of Disk Drives that can be connected to the RKM of the DF700 is 225, which is equivalent to that for the RK of the DF600, that is, 224. This enables users to construct various RAID configurations. The maximum number of Disk Drives that can be connected to the RKS is 14 for the DF600, whereas it is 105 for the DF700; it also makes it possible to construct various RAID configurations.
  The maximum number of the Disk Drives which can be connected to the RKH of the DF700 is 450, almost equal to the RKH of the DF600, and various RAID configurations can be constructed.

- Adoption of SATA Disk Drive (DF700-RKAJAT model only)
  The Disk Drives with the SATA interface are adopted for the RKS/RKM of the DF700 in the same way as the RK of the DF600.
  The maximum number of SATA Disk Drives that can be connected to the RKM of the DF700 is 210, which is equivalent to that for the RK of the DF600. This enables users to construct various RAID configurations. The Disk Drives cannot be connected to the RKS of the DF600, whereas the RKS of the DF700 can connect up to 90 Disk Drives. This also enables users to construct various RAID configurations.
  The maximum number of the SATA Disk Drives which can be connected to the RKH of the DF700 is 420, as same as the RKH of the DF600, and various RAID configurations can be constructed.

- The model only for the SATA Disk Drive is adopted. (DF700-RKXS model)
  There was no model only for the SATA Disk Drive in DF600. In DF700, SATA Disk Drive is adopted for the RKXS Basic Chassis and up to six Additional Chassis for SATA Disk Drive (RKAJAT) can be connected, so that it became possible to configure more various systems.

- Adoption of NAS Unit (DF700-RKNAS model)
  There was no NAS model for the DF600. However, by combining the RKNAS with the Basic Chassis of the DF700 (RKH/RKM/RKS/RKXS), the data sharing can be easily performed from two or more different types of servers connected through the LAN by using the NFS/CIFS protocol of the LAN (GbE) interface. (The DF700-RKM/RKS/RKXS can be used from the microprogram revision 0726/A. Also, the DF700-RKH can be used from the microprogram revision 0732/A, and the DF700-RKHE can be used from the microprogram revision 0760/A.)

- The iSCSI Interface Board can be added in the RKH/RKM/RKS/RKXS
  There was no iSCSI model in the DF600, but the iSCSI Interface Board is added in the Control Unit, and two iSCSI interfaces/CTL can be added in the DF700 with the microproram revision 0730/B or more. Also, the maximum transfer speed of the iSCSI interface becomes the maximum of 100 M bytes/s (The RKHE can be applied from the microprogram revision 0760/A).

- Two types of the host Interface Boards can be installed in the RKH.
  There was only the Fibre Channel of the host interface in the DF600, but there are three types of the host interfaces, the Fibre Channel, iSCSI and NAS, in the DF700. The RKH can be used by combining two types of the host interfaces from the Fibre Channel, iSCSI and NAS

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(the NAS interface can be used from the microprogram revision 0732/A or more). (The RKHE can be applied from the microprogram revision 0760/A)

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2.3 Subsystem Structure

For a single unit of Rackmount model, there are RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKA. Floor model or Rackmount model are configured by combining single units.

RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKA has a Power Unit power-supplied from AC power supply.

(1) RKM, RKS, RKXS, RKAJ, RKAJAT, Floor (RKM+H1J) Model, Floor (RKM+RKAJ+H2J) Model, Floor (RKS+H1J) Model, Floor (RKS+RKAJ+H2J) Model, Floor (RKXS+H1J) Model, Floor (RKXS+RKAJAT+H2J) Model

The subsystem can be composed of a combination of the RKM/RKS and RKAJ (s) or RKXS and RKAJAT.

There are eight types of the floor model :

- The one is a combination of the RKM and the floor standing kit (Floor (RKM+H1J) Model)
- The one is a combination of the RKM, the RKAJ, and the floor standing kit (Floor (RKM+RKAJ+H2J) Model) and one is a combination of the RKM, the RKAJAT, and the floor standing kit (Floor (RKM+RKAJAT+H2J) Model)
- The other is a combination of the RKS and the floor standing kit (Floor (RKS+H1J) Model) and one is combination of the RKS
- The RKAJ, and the floor standing kit (Floor (RKS+RKAJ+H2J) Model) and one is a combination of the RKS, the RKAJAT, and the floor standing kit (Floor (RKS+RKAJAT+H2J) Model)
- The other is a combination of the RKXS and the floor standing kit (Floor (RKXS+H1J) Model)
- The one is combination of the RKXS, the RKAJAT, and the floor standing kit (Floor (RKXS+RKAJAT+H2H) Model).

The rackmount model that the RKM is the Basic Chassis can make the system configuration which connects the RKM (one unit) and the maximum of ten units of the RKAJ/RKAJAT/RKA (Disk Drive: Maximum of 165 units) to one rack when the U7 rack frame is used.
The system configuration, which connects the maximum of 14 units of the RKAJ/RKAJAT/RKA (Disk Drive: Maximum of 225 units) to the maximum of two racks, can be made.
The rackmount model that the RKS is the Basic Chassis can make the system configuration which connects the RKS (one unit) and the maximum of six units of the RKAJ/RKAJAT (Disk Drive: Maximum of 105 units) to one rack when the U7 rack frame is used.
The rackmount model that the RKXS is the Basic Chassis can make the system configuration which connects the RKXS (one unit) and the maximum of six units of the RKAJAT (Disk Drive: Maximum of 105 units) to one rack when the U7 rack frame is used.
The rackmount model that the RKH is the Basic Chassis can make the system configuration which connects the RKH (one unit), the RKAJ (one unit), and the maximum of nine units of the RKAJ/RKAJAT/RKA (Disk Drive: Maximum of 165 units) to one rack when the U7 rack frame is used.
The system configuration, which connects the maximum of 30 units of the RKAJ/RKAJAT/RKA (Disk Drive: Maximum of 450 units) to the maximum of three racks, can be made.
However, the maximum connection number of the RKAJAT is 28 units.

Racks heights are measured in meters, EIA units, and “U”. 1EIA unit equals 1U, which equals 44.45 mm.

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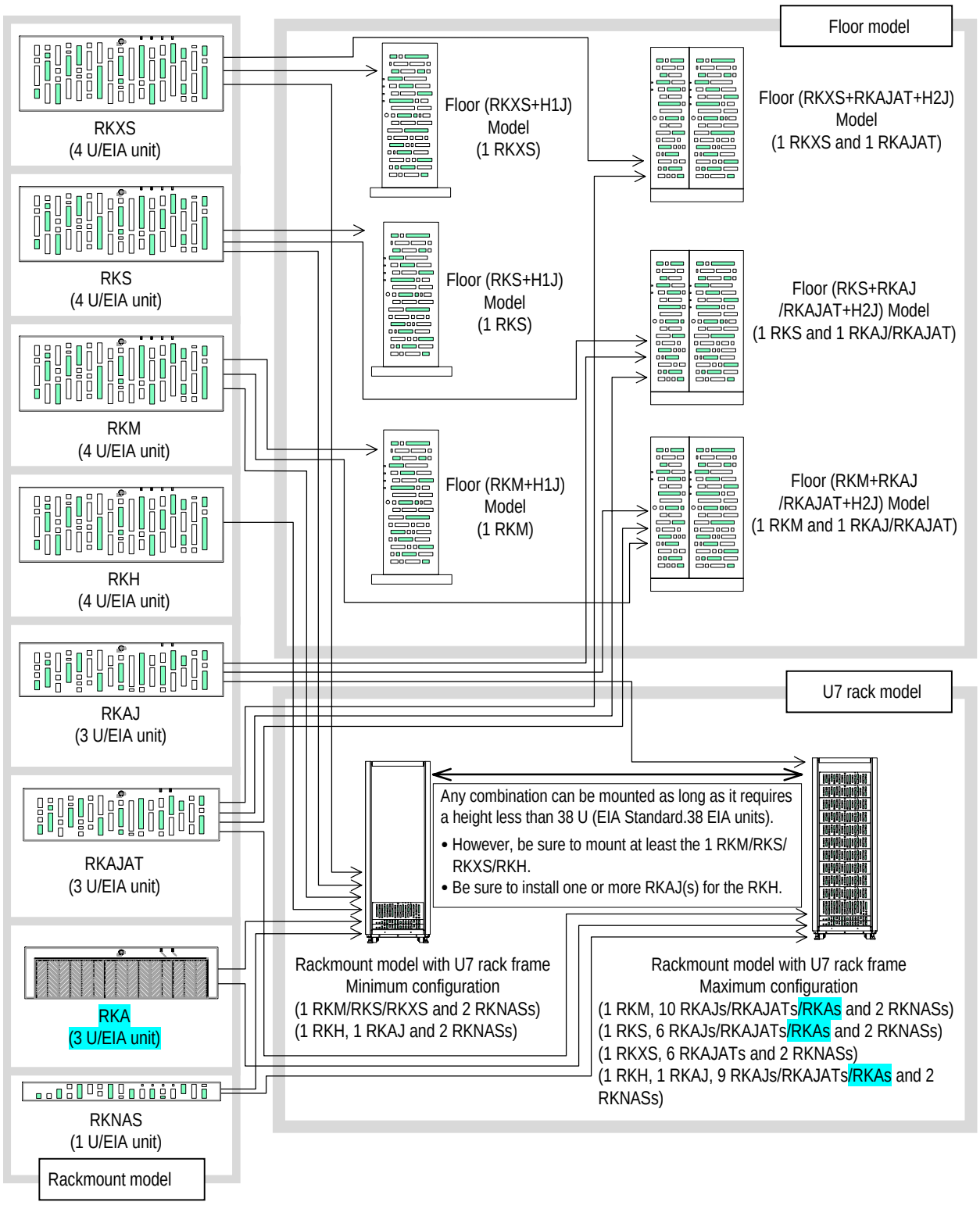


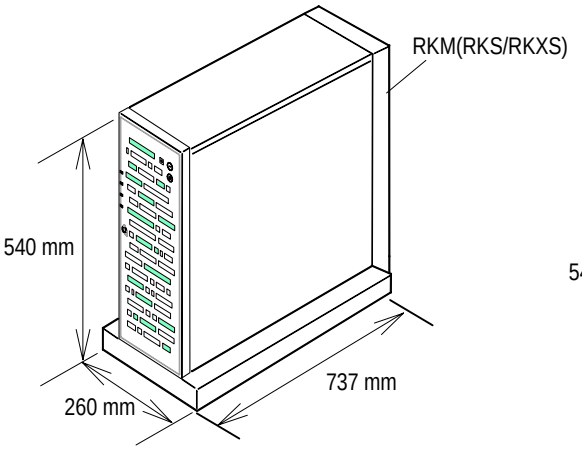
Figure 2.3.1 Subsystem Configuration

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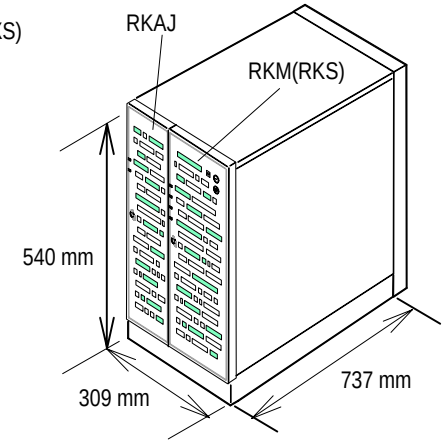
2.3.1 External appearances

(1) Appearances of Floor (RKM+H1J) Model, Floor (RKS+H1J) Model, Floor (RKXS+H1J) Model, Floor (RKM+RKAJ+H2J) Model, Floor (RKM+RKAJAT+H2J) Model, Floor (RKS+RKAJ+H2J) Model, Floor (RKS+RKAJAT+H2J) Model, Floor (RKXS+RKAJAT+H2J) Model, RKM, RKS, RKXS, RKAJ, and RKAJAT

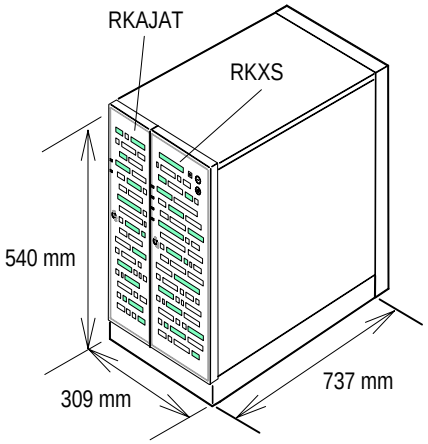
(a) Floor (RKM+H1J) Model, Floor (RKS+H1J) Model, Floor (RKXS+H1J) Model, Floor (RKM+RKAJ+H2J) Model, Floor (RKM+RKAJAT+H2J) Model, Floor (RKS+RKAJ+H2J) Model, Floor (RKS+RKAJAT+H2J) Model, Floor (RKXS+RKAJAT+H2J) Model



(a) Floor (RKM+H1J) Model/
Floor (RKS+H1J) Model/
Floor (RKXS+H1J) Model



(b) Floor (RKM+RKAJ+H2J) Model/
Floor (RKS+RKAJ+H2J) Model/
Floor (RKM+RKAJAT+H2J) Model/
Floor (RKS+RKAJAT+H2J) Model



(c) Floor (RKXS+RKAJAT+H2J) Model

Figure 2.3.2 Appearances of the Floor Models

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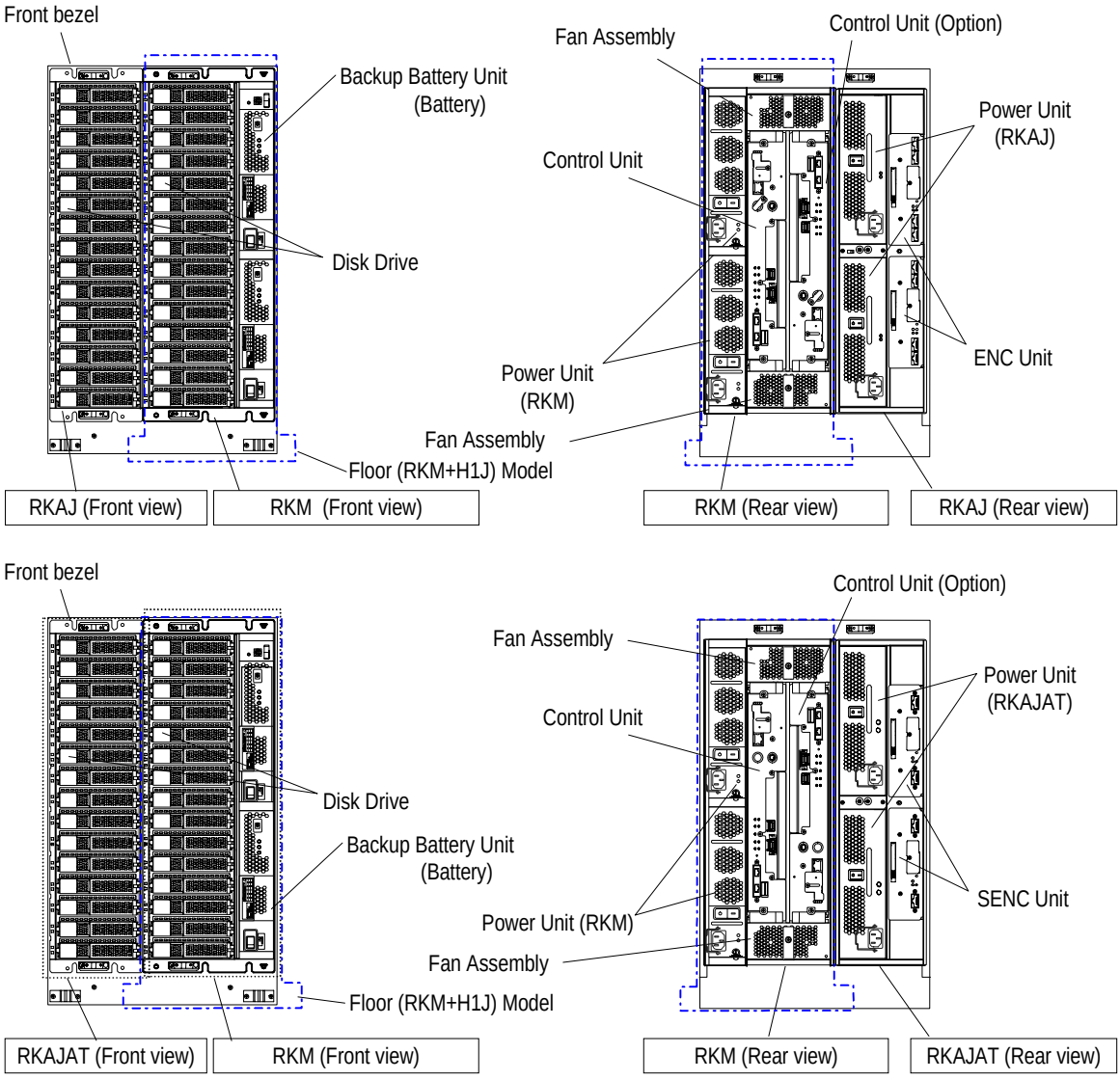


Figure 2.3.3 Major Components of the Floor Model 1

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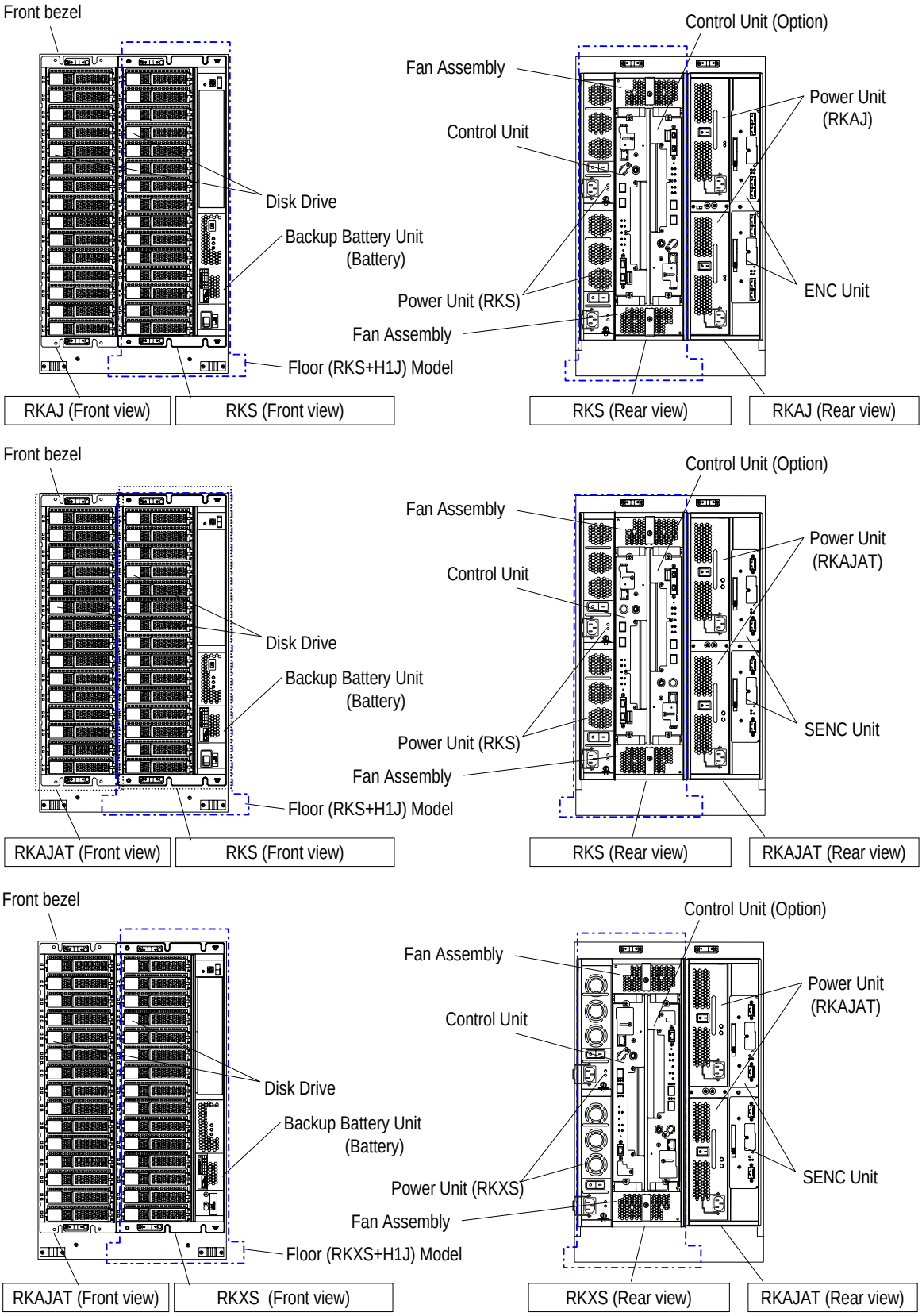


Figure 2.3.3.1 Major Components of the Floor Model 2

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(b) Rackmount model (RKM, RKS, RKXS, RKH, RKAJ, RKAJAT)

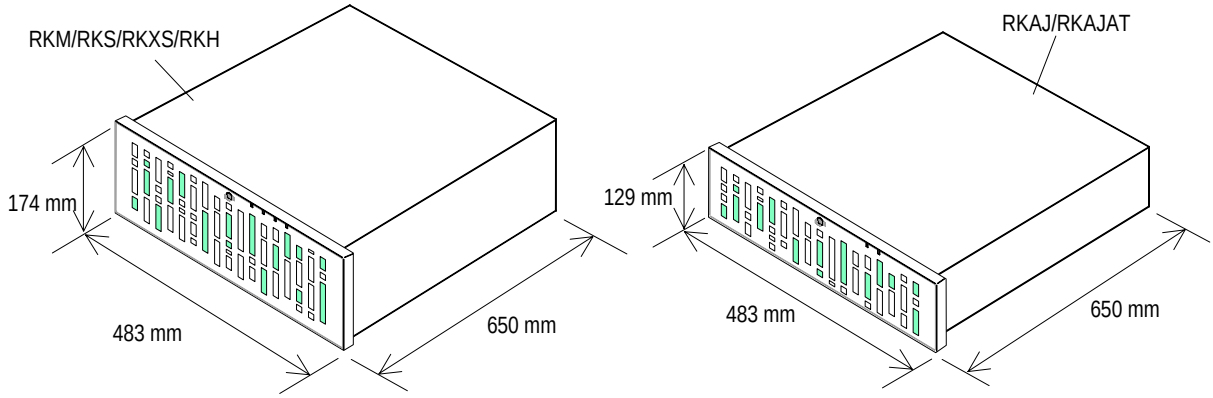


Figure 2.3.4 Appearances of the RKM, RKS, RKXS, RKH, RKAJ and RKAJAT

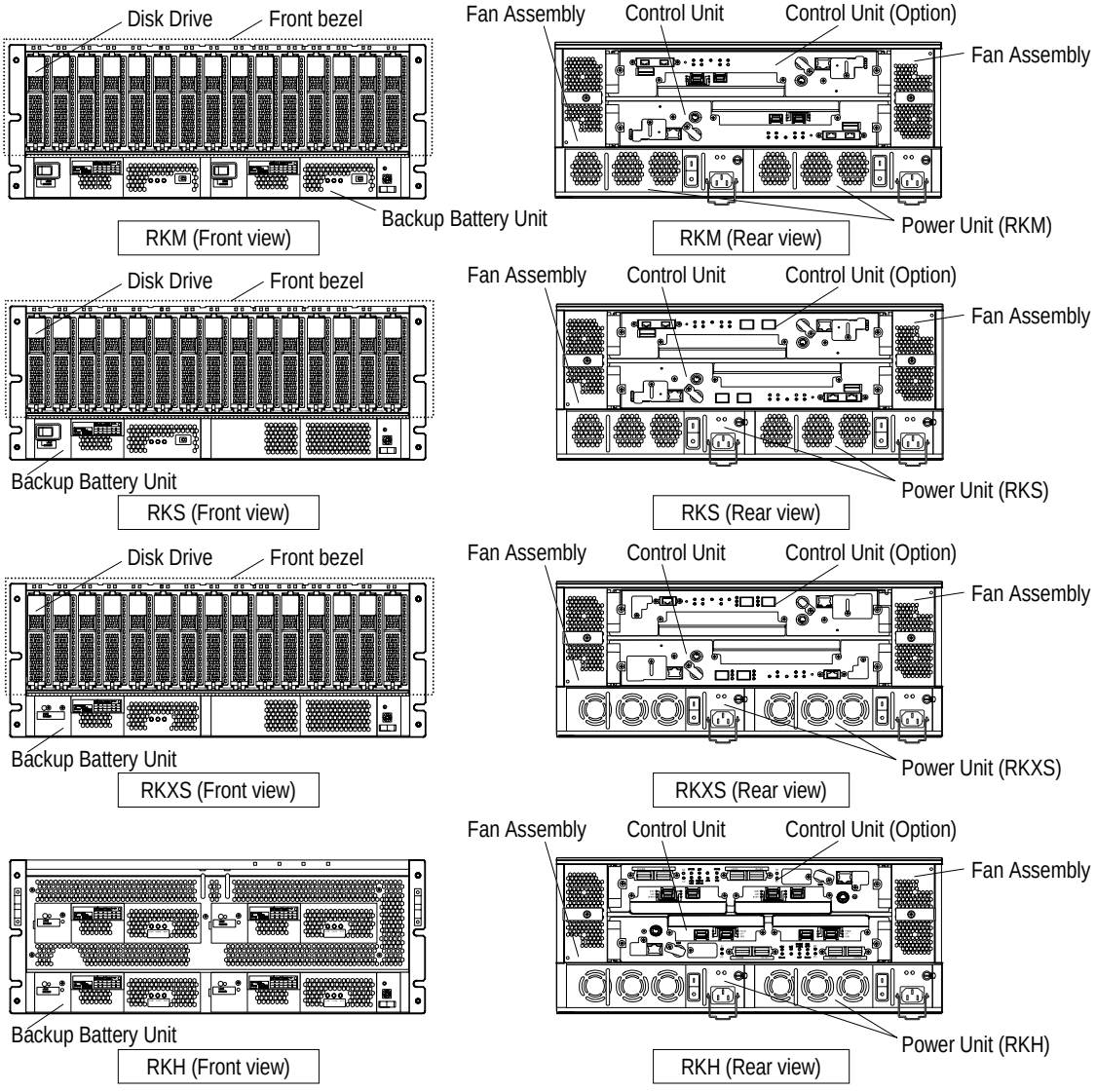


Figure 2.3.5 Major Components of the RKM, RKS, RKXS and RKH

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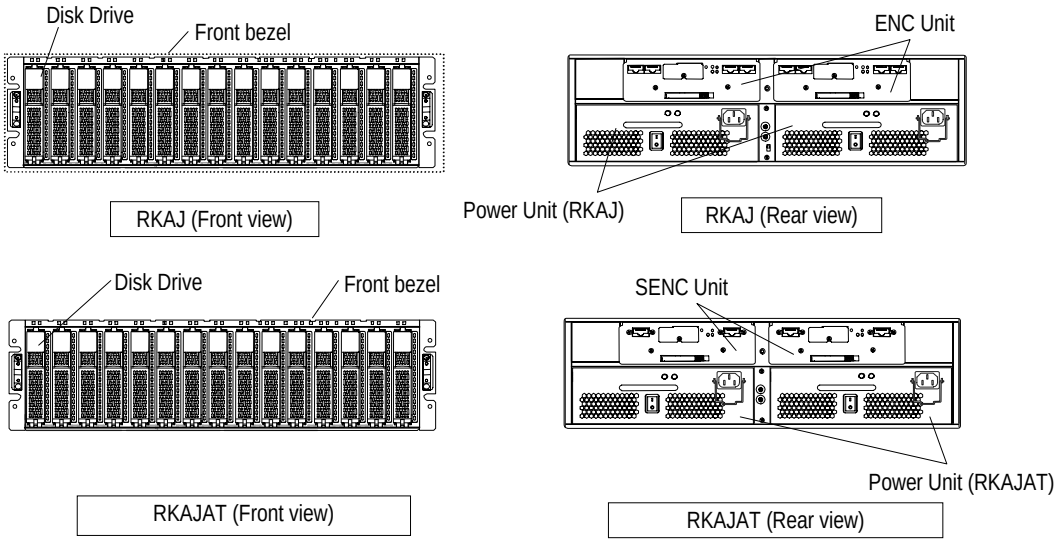


Figure 2.3.6 Major Components of the RKAJ, RKAJAT

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(c) NAS model

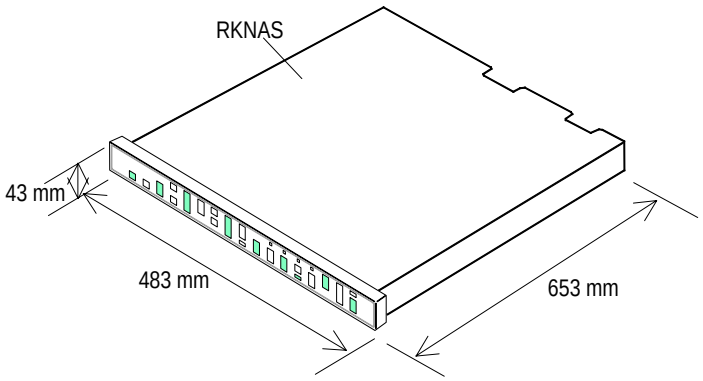
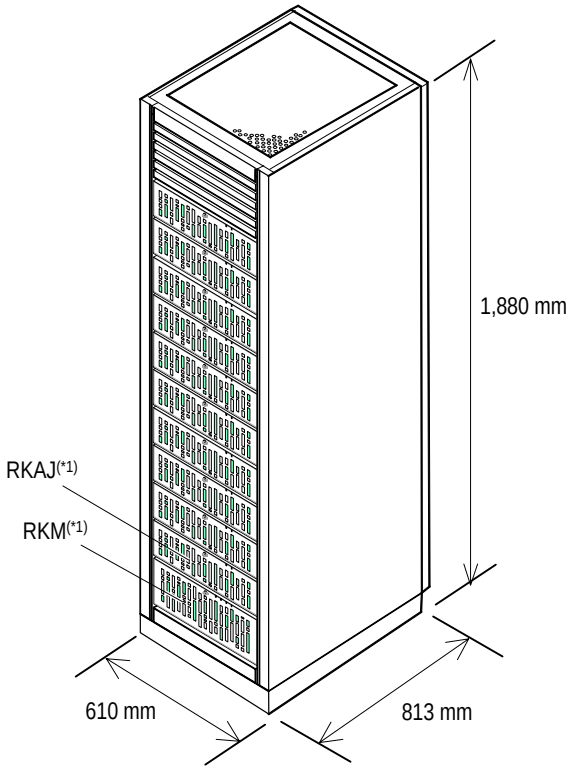


Figure 2.3.6.1 Appearances of the NAS Model

(d) Rackmount model with U7 rack frame



*1 : This figure shows an example of a subsystem with the one RKM and eleven RKAJs.

Figure 2.3.7 Appearances of the Rackmount Model with U7 Rack Frame

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2.3.2 Configuration of floor model

(1) Floor (RKM+H1J) Model/Floor (RKS+H1J) Model/Floor (RKXS+H1J) Model
This model is produced by the combination of the RKM/RKS/RKXS and Floor Setting Kit (DF-F700-H1J).

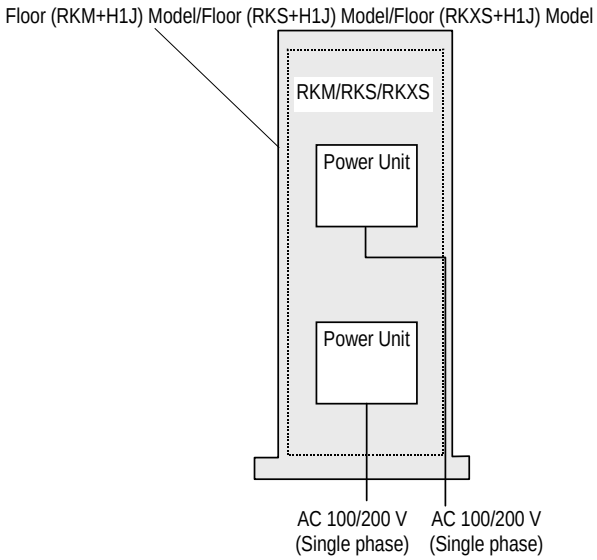


Figure 2.3.8 System Configuration of Floor (RKM+H1J) Model/Floor (RKS+H1J) Model/Floor (RKXS+H1J) Model

(2) Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model/Floor (RKS+RKAJ+H2J) Model/ Floor (RKS+RKAJAT+H2J) Model/Floor (RKXS+RKAJAT+H2J) Model
This model is produced by the combination of the RKM/RKS, RKAJ, and Floor Setting Kit (DF-F700-H2J). This model is produced by the combination of the RKM/RKS, RKAJAT, and Floor Setting Kit (DF-F700-H2J). This model is produced by the combination of the RKXS, RKAJAT, and Floor Setting Kit (DF-F700-H2J).

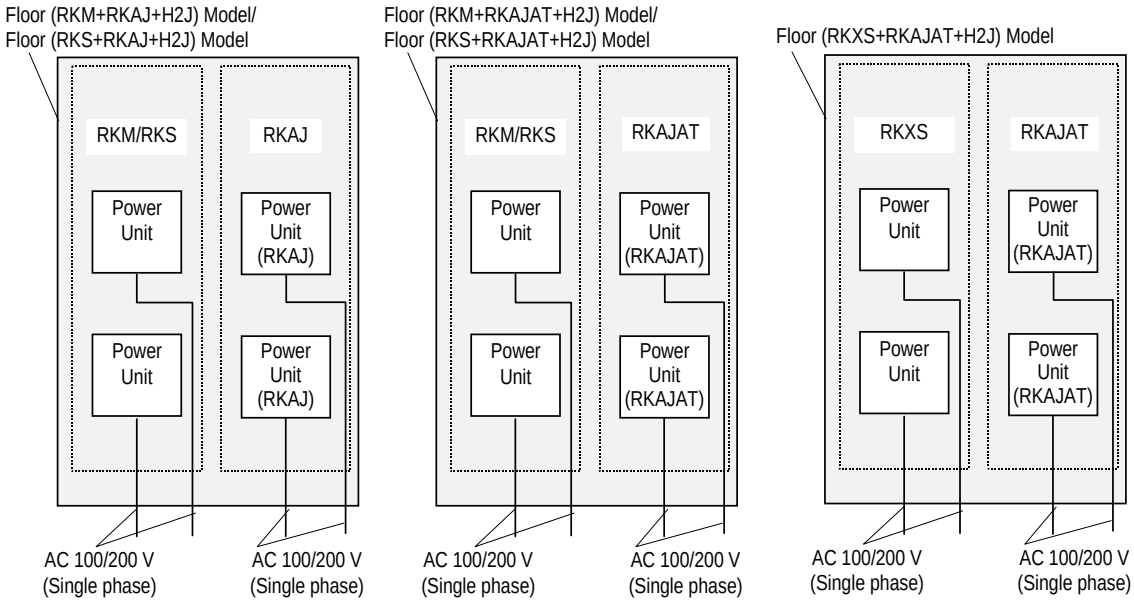


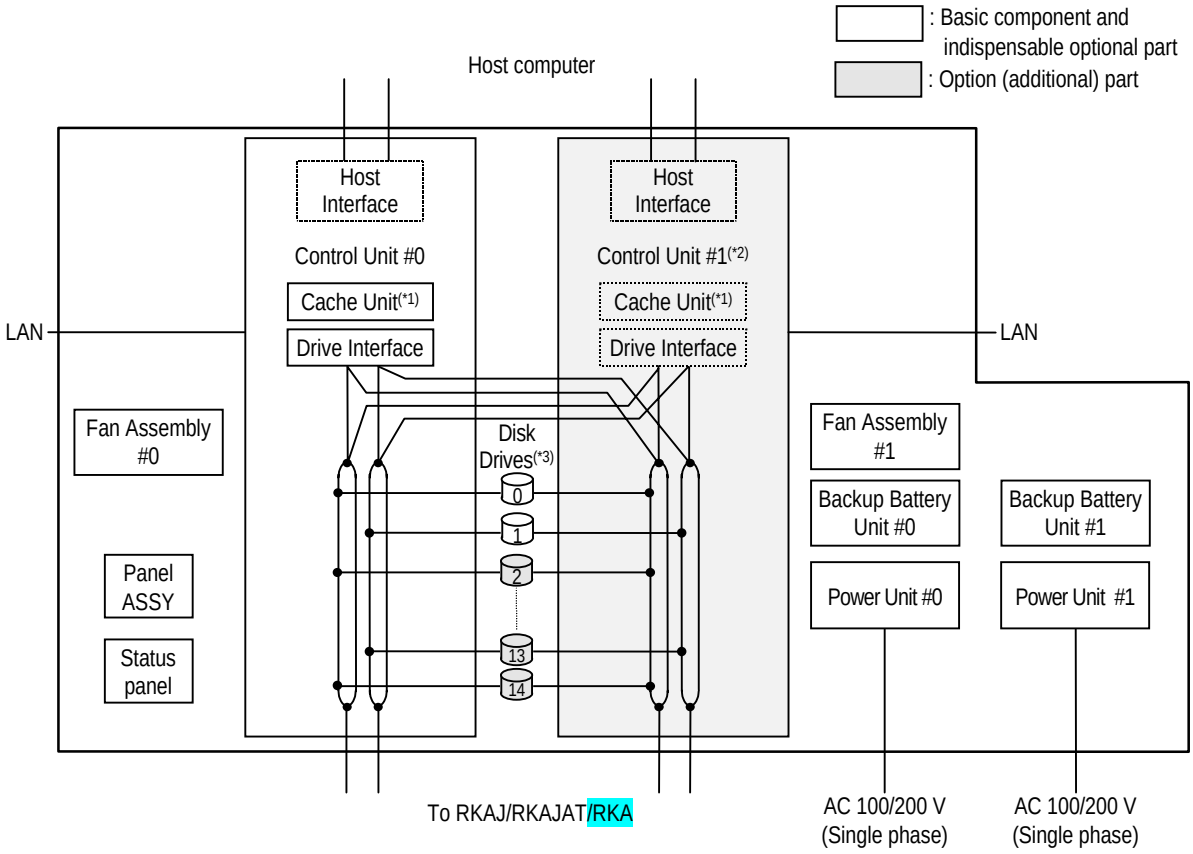
Figure 2.3.9 System Configuration of Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model/ Floor (RKS+RKAJ+H2J) Model/Floor (RKS+RKAJAT+H2J) Model/Floor (RKXS+RKAJAT+H2J) Model

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2.3.3 System configuration of the rackmount model

(1) System configuration of the rackmount model

The block configurations of the RKM, RKS, RKXS, RKAJ, RKAJAT and RKH are shown in Figures 2.3.10, 2.3.10.1, 2.3.11, 2.3.12, 2.3.13 and 2.3.13.1, respectively.



*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ (It supports from the microprogram revision 0720/A-M.)

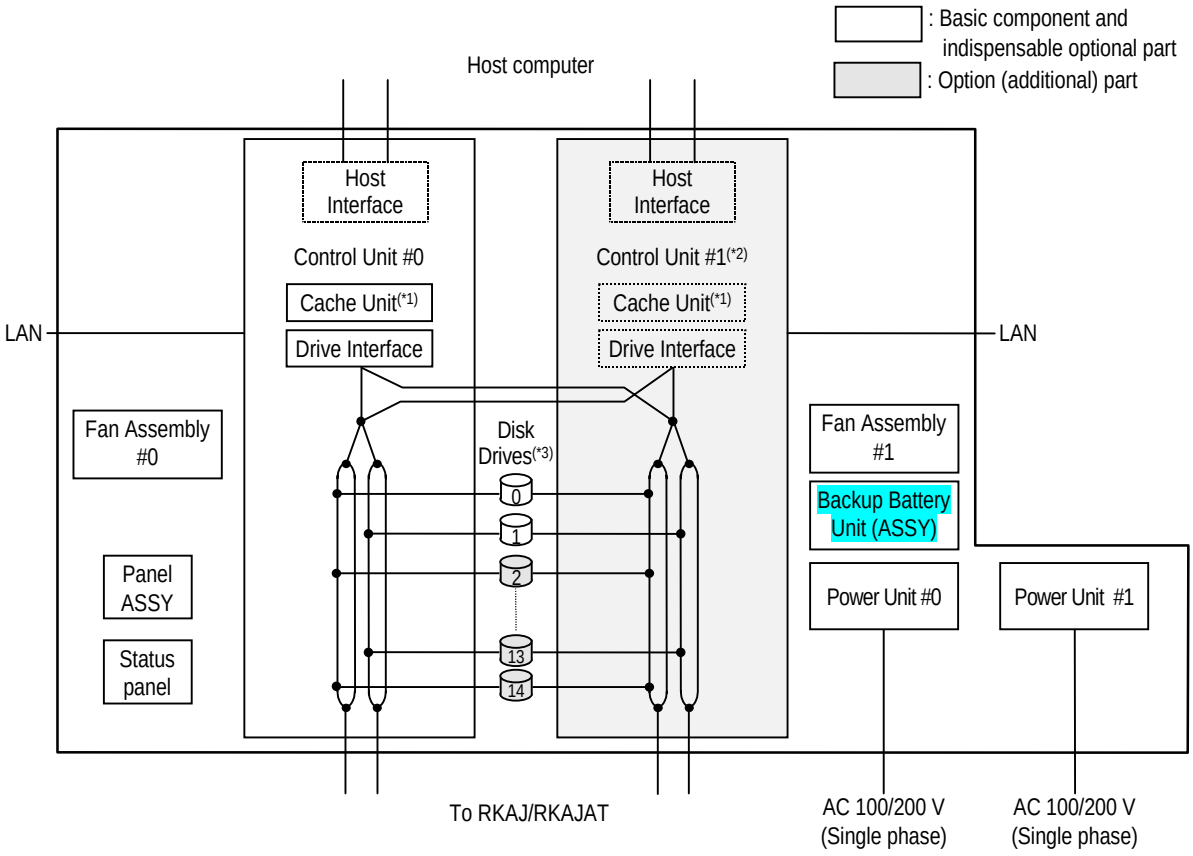
*2 : Control Unit (Fibre Channel interface standard installation)
RKM : DF-F700-F1JM (Fibre Channel interface, 2 port. ENC standard installation)

*3 : Disk Drive :
DF-F700-AGF72, DF-F700-AGH72, DF-F700-AGF146, DF-F700-AGH146, DF-F700-AGF300

*4 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.10 System Configuration Block Diagrams of the RKM

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*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ (It supports from the microprogram revision 0720/A-S.)

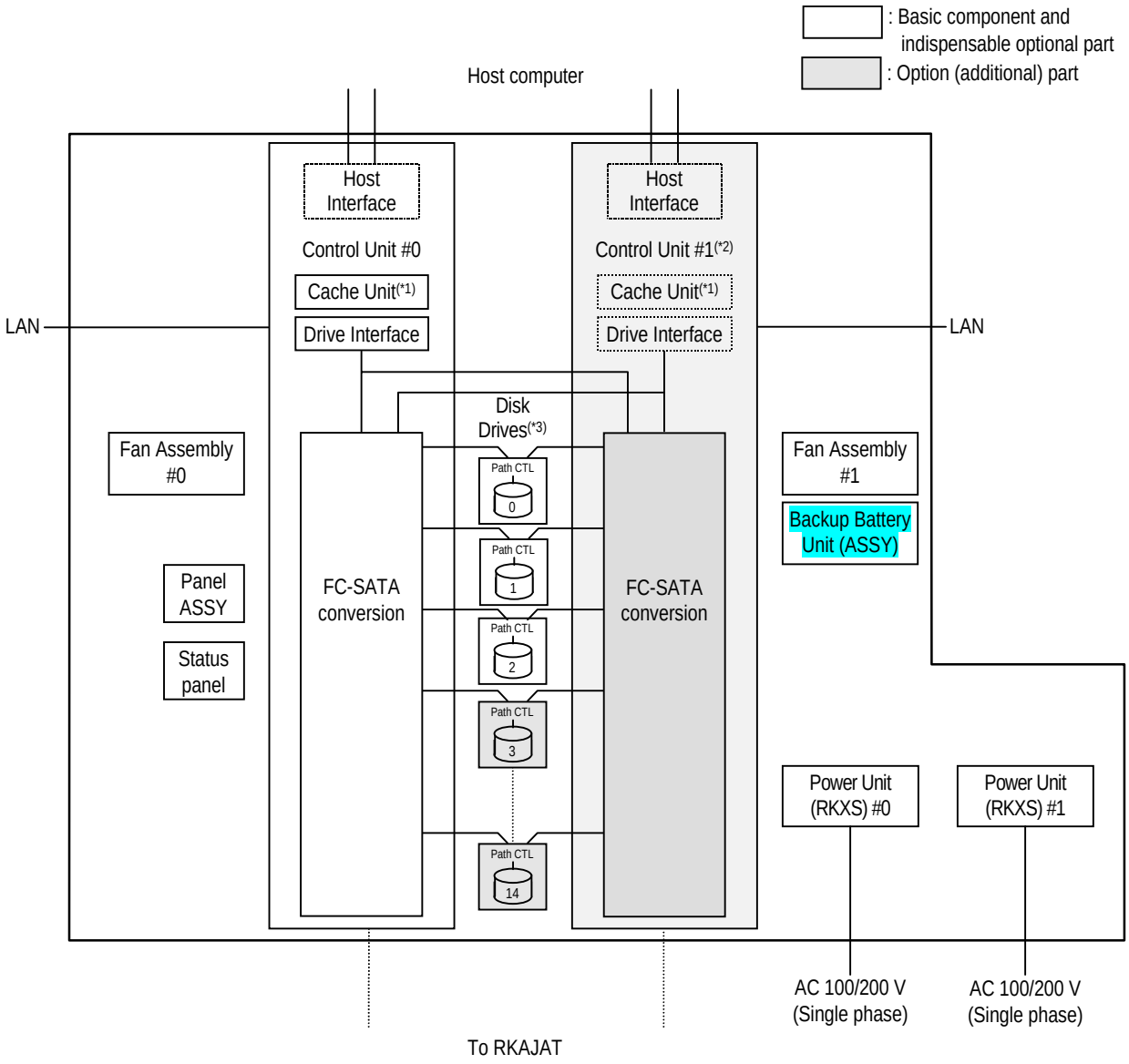
*2 : Control Unit (Fibre Channel interface standard installation)
RKS : DF-F700-F1JS (Fibre Channel interface, 2 port. (The Mini-HUB configuration is indicated.) ENC standard installation)

*3 : Disk Drive :
DF-F700-AGF72, DF-F700-AGH72, DF-F700-AGF146, DF-F700-AGH146, DF-F700-AGF300

*4 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.10.1 System Configuration Block Diagrams of the RKS

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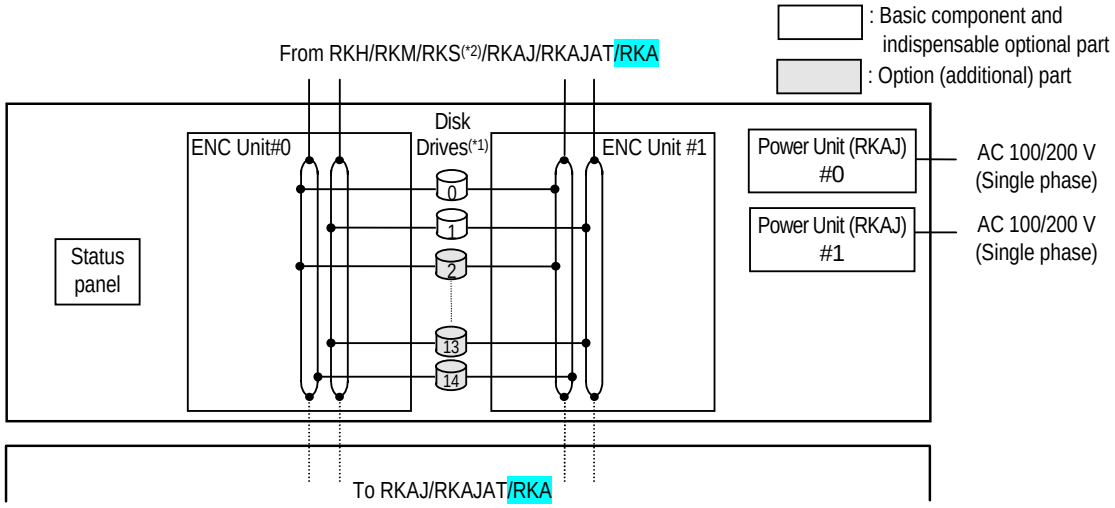
*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C512JX

*2 : Control Unit (Fibre Channel interface standard installation)
DF-F700-F1JXS (Fibre Channel interface, 2 port. (The Mini-HUB configuration is indicated.) SENC standard installation))

*3 : Disk Drive :
DF-F700-ATE250R, DF-F700-ATE400R, DF-F700-ATE500R

Figure 2.3.11 System Configuration Block Diagrams of the RKXS

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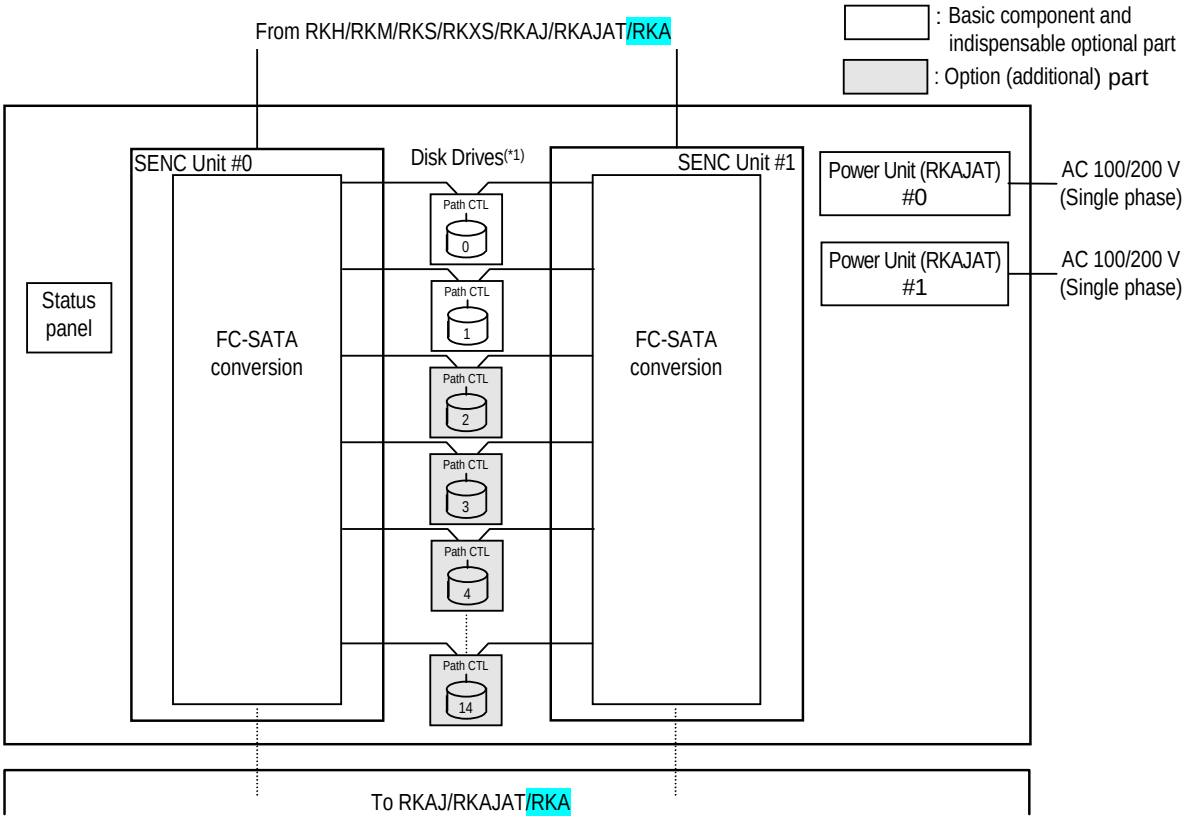


*1 : Disk Drive :
DF-F700-AGF72, DF-F700-AGH72, DF-F700-AGF146, DF-F700-AGH146, DF-F700-AGF300

*2 : When connecting RKAJ, a dual controller configuration is required for the RKM/RKS.

*3 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.12 System Configuration Block Diagrams of the RKAJ

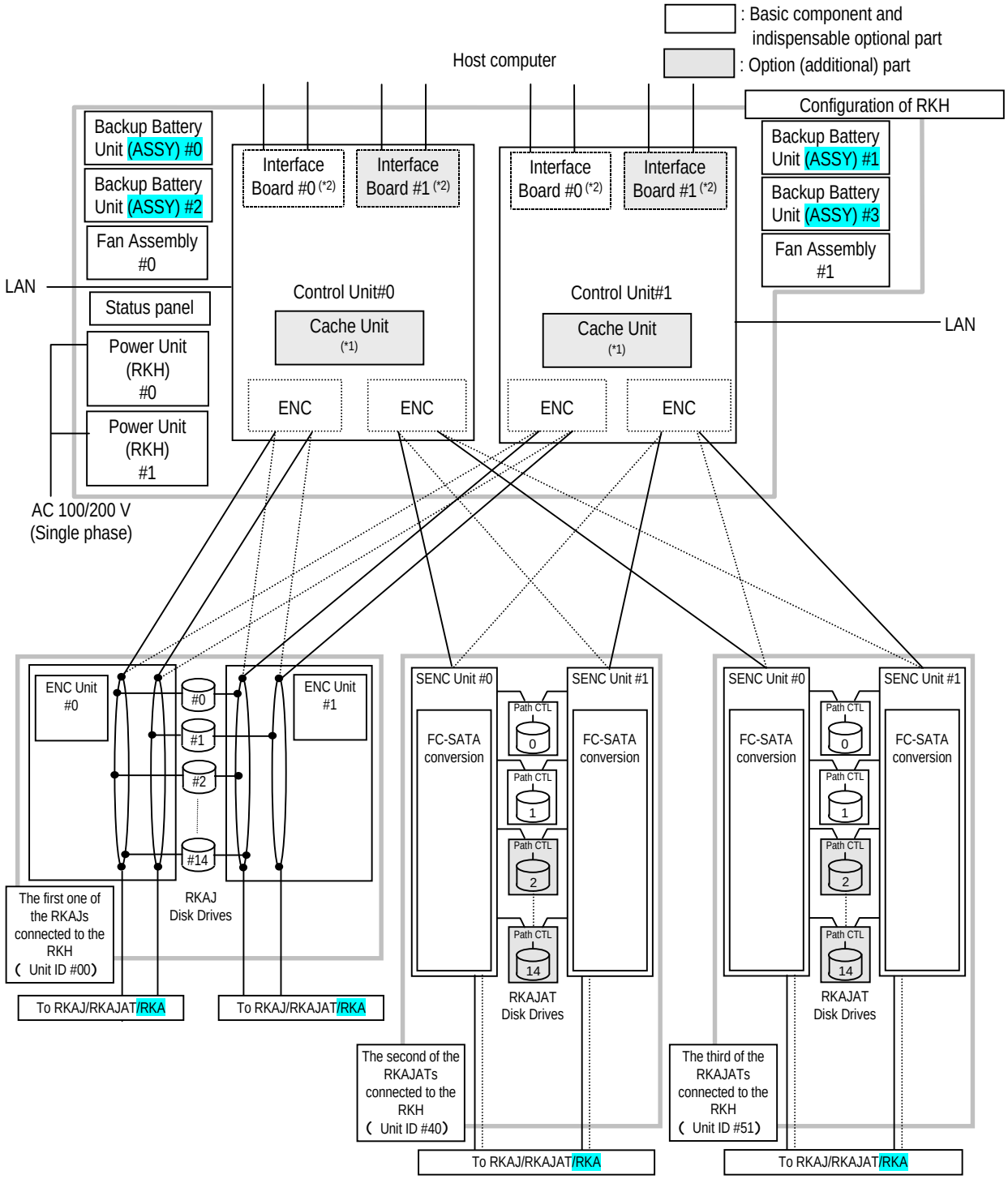


*1 : Disk Drive :
DF-F700-ATE250R, DF-F700-ATE400R, DF-F700-ATE500R

*2 : The RKAJAT cannot be connected to the RKH as the unit ID #0.

Figure 2.3.13 System Configuration Block Diagrams of the RKAJAT

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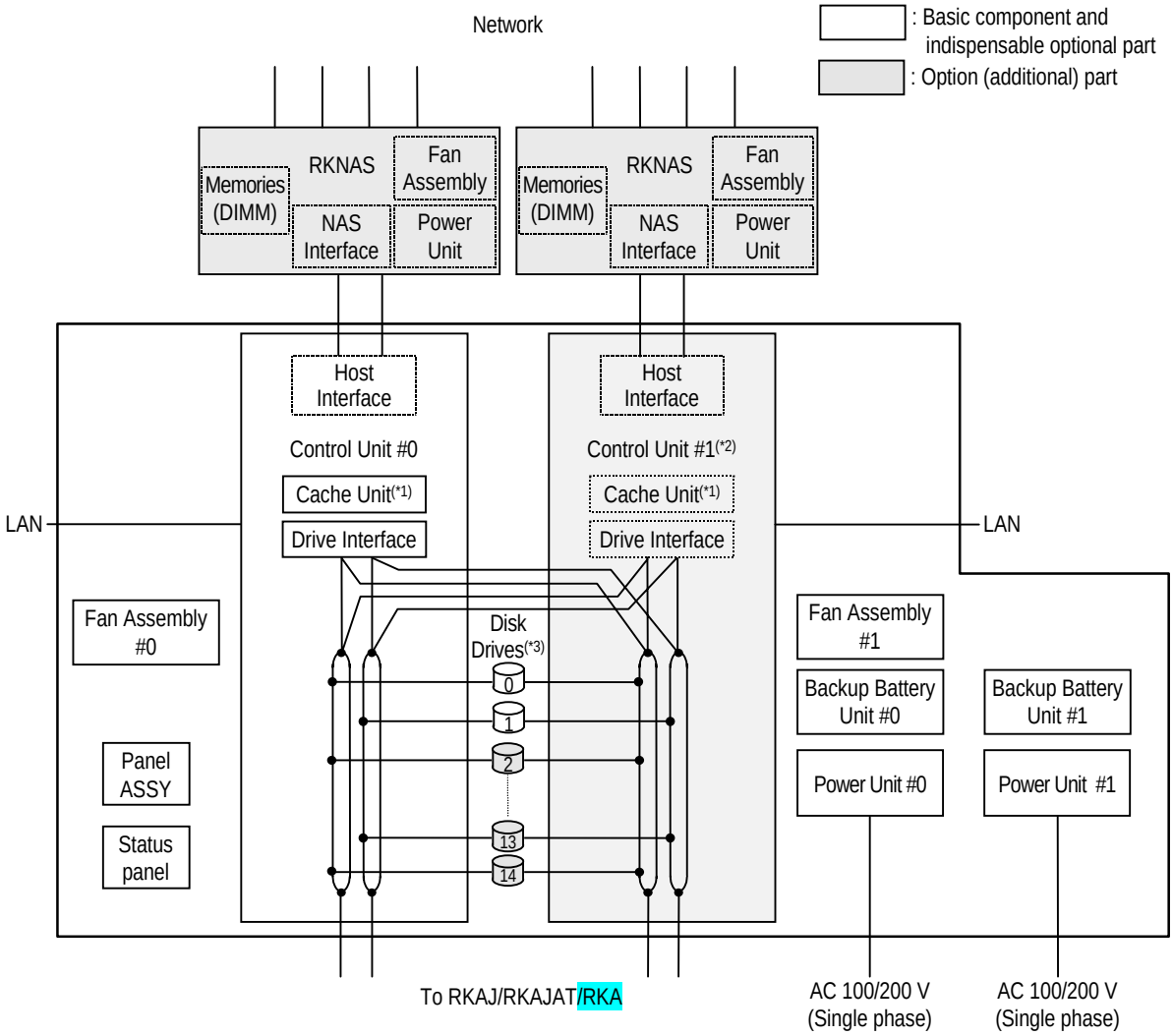
*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ
*2 : Interface Board :
DF-F700-DJ4G2H, DF-F700-DJASH, DF-F700-DJSC2H
*3 : Refer to Troubleshooting "Loop structure of RKH" (TRBL 06-0641) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.13.1 System Configuration Block Diagrams of the RKH

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(2) The system configuration when installing the RKNAS

The block configurations of the RKM and RKNAS, RKS and RKNAS, RKXS and RKNAS, and RKH and RKNAS are shown in Figures 2.3.13.2, 2.3.13.3, 2.3.13.4 and 2.3.13.5, respectively.



*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ (It supports from the microprogram revision 0720/A-M.)

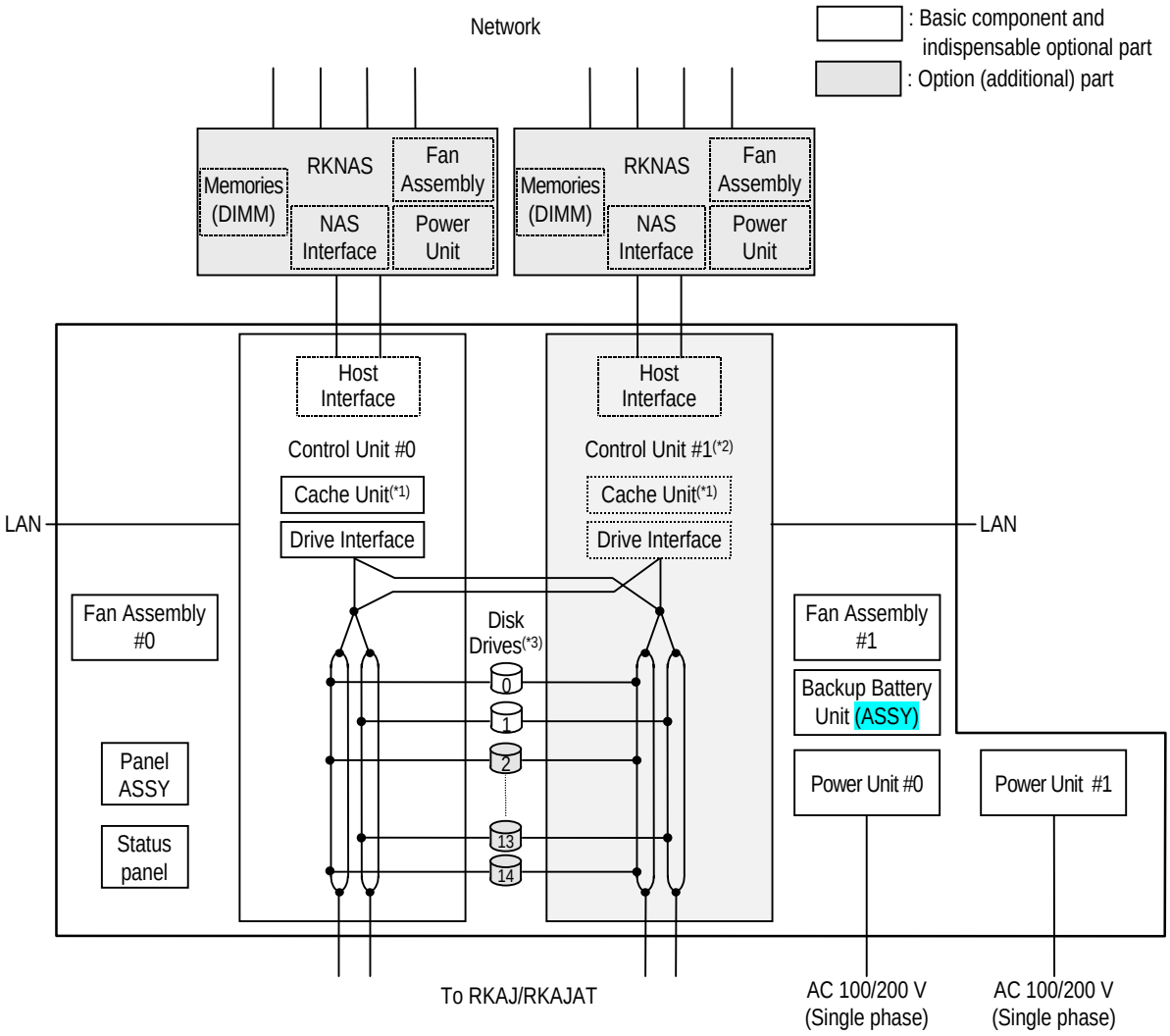
*2 : Control Unit
RKM : DF-F700-F1JM

*3 : Disk Drive :
DF-F700-AGF72, DF-F700-AGH72, DF-F700-AGF146, DF-F700-AGH146, DF-F700-AGF300

*4 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.13.2 System Configuration Block Diagrams of the RKM and RKNAS

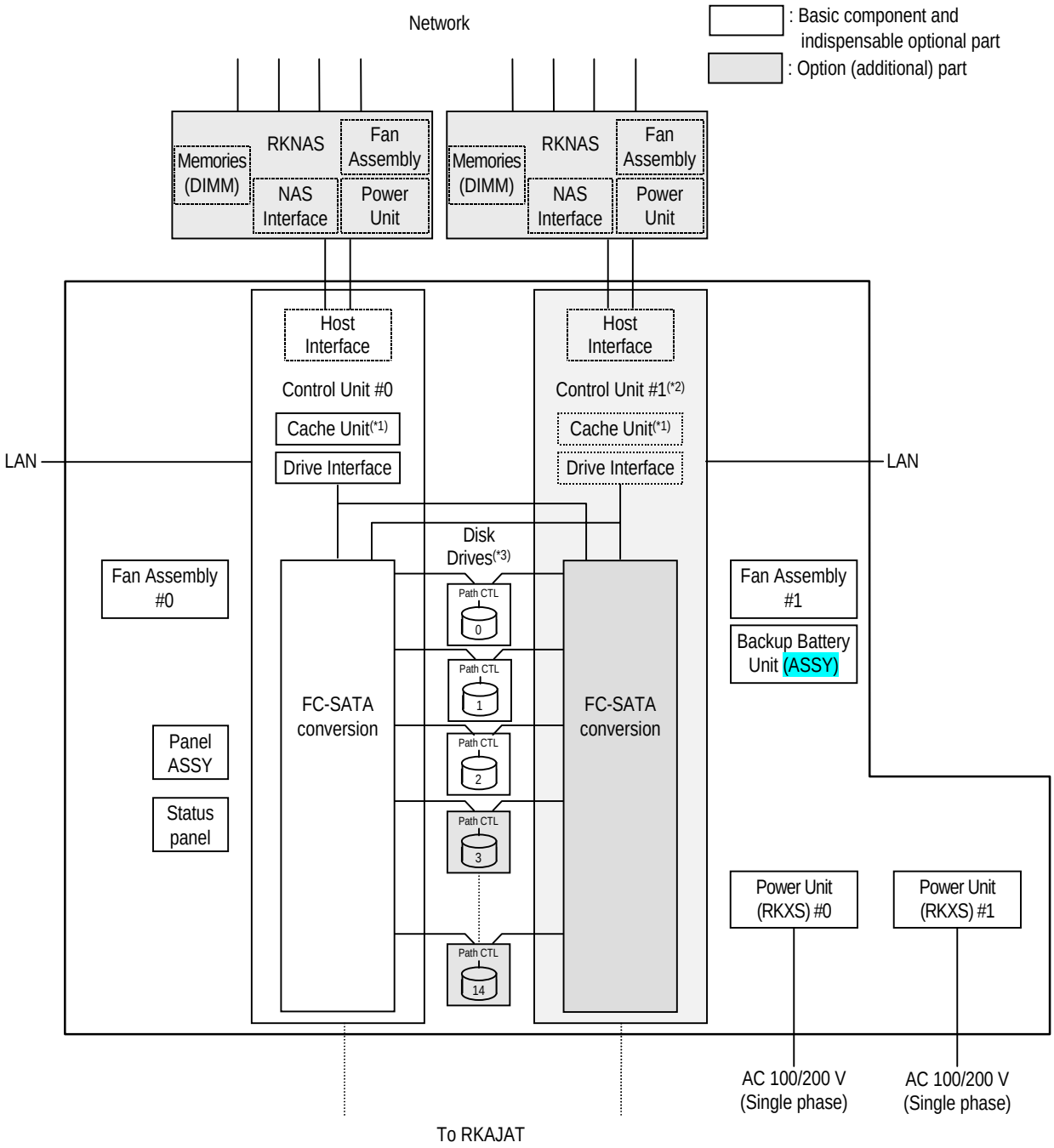
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*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ (It supports from the microprogram revision 0720/A-S.)
*2 : Control Unit
RKS : DF-F700-F1JS
*3 : Disk Drive :
DF-F700-AGF72, DF-F700-AGH72, DF-F700-AGF146, DF-F700-AGH146, DF-F700-AGF300
*4 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.13.3 System Configuration Block Diagrams of the RKS and RKNAS

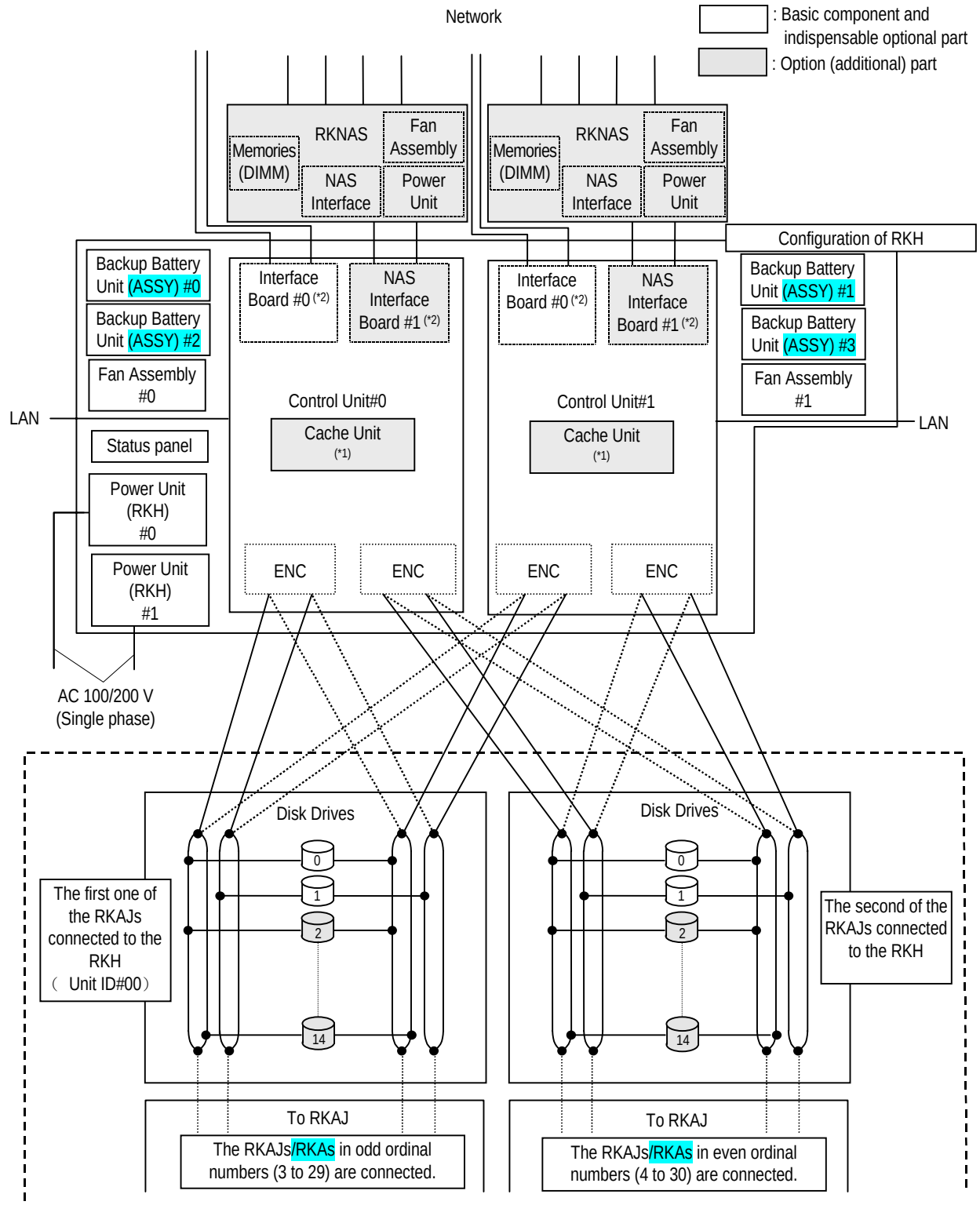
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*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C512JX
*2 : Control Unit
DF-F700-F1JXS
*3 : Disk Drive :
DF-F700-ATE250R, DF-F700-ATE400R, DF-F700-ATE500R

Figure 2.3.13.4 System Configuration Block Diagrams of the RKXS and RKNAS

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*1 : Cache Unit :
DF-F700-C1GJ, DF-F700-C2GJ

*2 : Interface Board :
Interface Board #0 : DF-F700-DJ4G2H, Interface Board #1 : DF-F700-DJNASH

*3 : Refer to Troubleshooting "Loop structure of RKH" (TRBL 06-0641) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.3.13.5 System Configuration Block Diagrams of the RKH and RKNAS

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2.3.4 Configuration of rackmount model with U7 rack frame

(1) Configuration of rackmount model with U7 rack frame

The DF-F700-U7 is an exclusive rack frame for mounting up to a height of 38 U (EIA Standard). (1 RKM and 10 RKAJs)

It consists of a rack frame main body and PDBs to be used to supply AC power to power supply units of the mounted RKM(s), RKS(s) and RKAJ(s). The four PDBs are installed to allow the power system to be duplicated.

Up to the eleven RKAJs/RKAs can be mounted through an addition of the UPDU7 (optional).

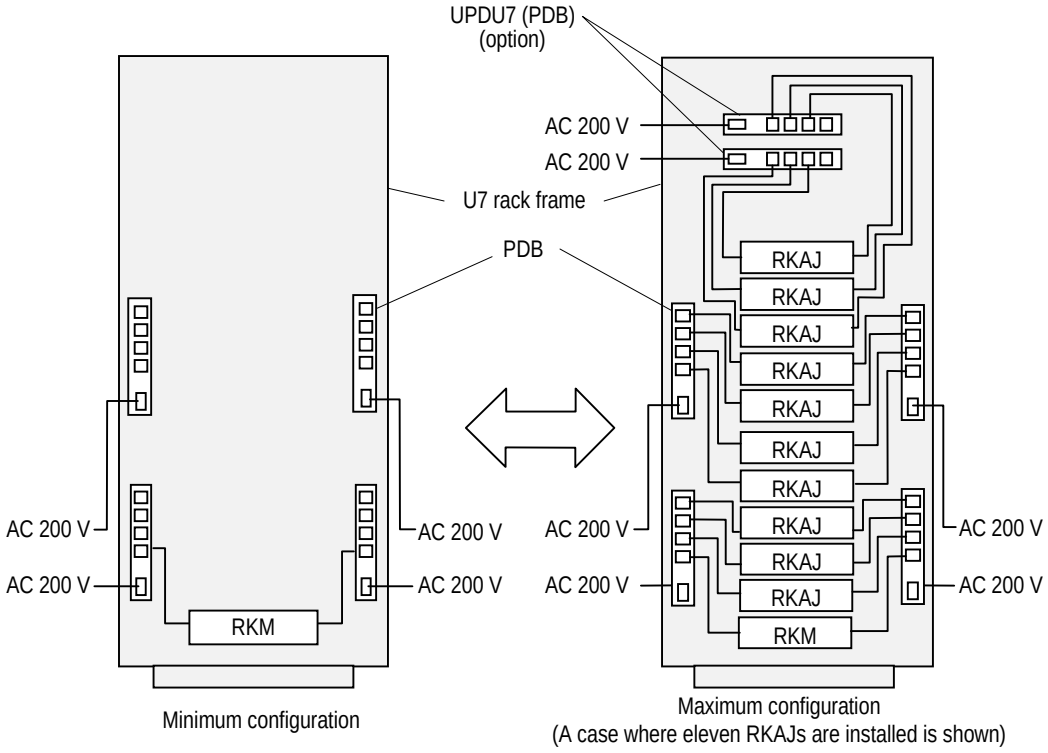


Figure 2.3.14 System Configuration of Rackmount Model with U7 Rack Frame

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2.4 Configuration of Internal Power Supply System

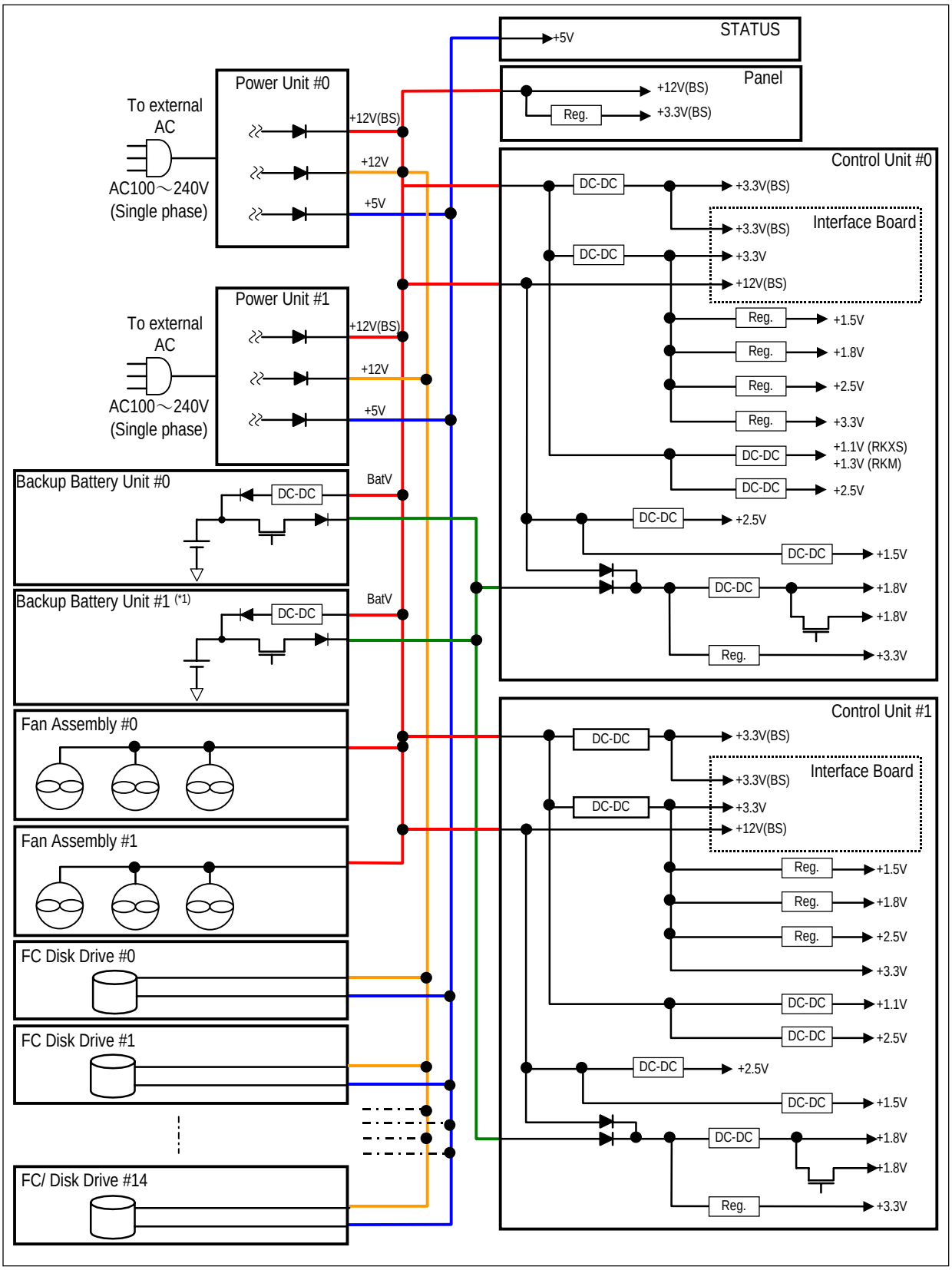
For a single unit of Rackmount model, there are RKH/RKM/RKS/RKXS/RKAJ/RKAJAT/RKA Floor model or Rackmount model are configured by combining single units.

There is an RKNAS as an optional subsystem of the rackmount model.
RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKA/RKNAS has a Power Unit power-supplied from AC.

(1) Internal power supply system configuration (RKM/RKS/RKXS/RKH/RKAJ/RKAJAT)
Figure 2.4.1, Figure 2.4.2, Figure 2.4.2.1, Figure 2.4.3, and Figure 2.4.4 shows the connection diagrams of the internal power supply system of the RKM, RKS, RKXS, RKH, RKAJ, and RKAJAT respectively.
Input power to the RKM, RKS, RKXS, RKH, RKAJ and RKAJAT is supplied from the Power Unit.
Even if the main switch is off, each voltage (BS) is supplied. To turn off each voltage (BS), the AC Power unit switch of the Power Unit needs to be turned off (‡1).
Two Power Units are installed as the standard to duplicate the power supply system.
Accordingly, the subsystem can continue its operation even when a failure occurs in one of the Power Unit or power cables.
Further, part replacement can be done while the subsystem is operating.

‡1 : In the situation where the main switch is turned off, do not leave the components removed from the subsystem for a long time. The power supply alarm can be given because of an abnormal alarm.

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*1 : This Backup Battery Unit is not installed in RKS.

Figure 2.4.1 Connection diagram of Power Supply System (RKM/RKS)

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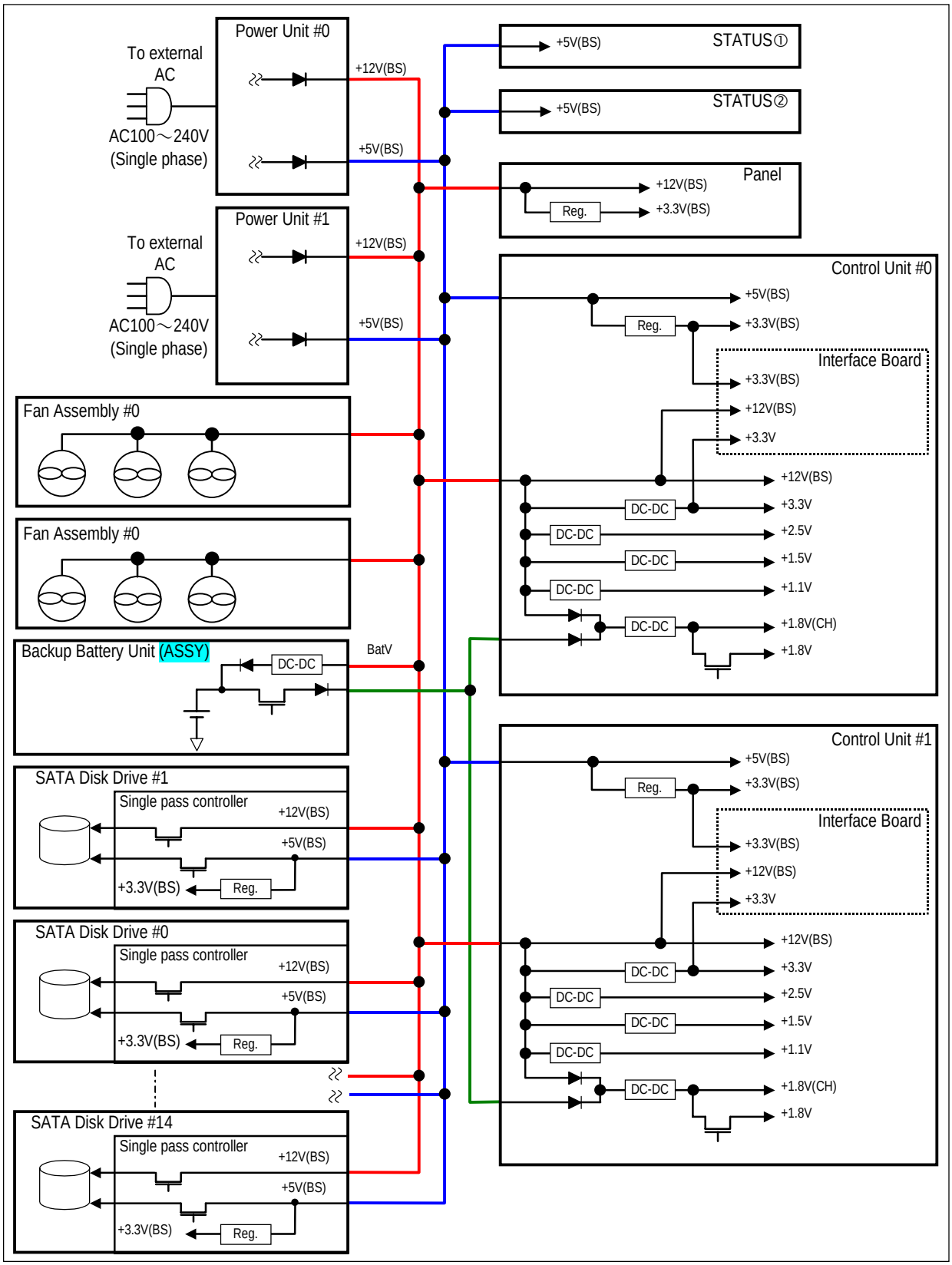


Figure 2.4.2 Connection diagram of Power Supply System (RKXS)

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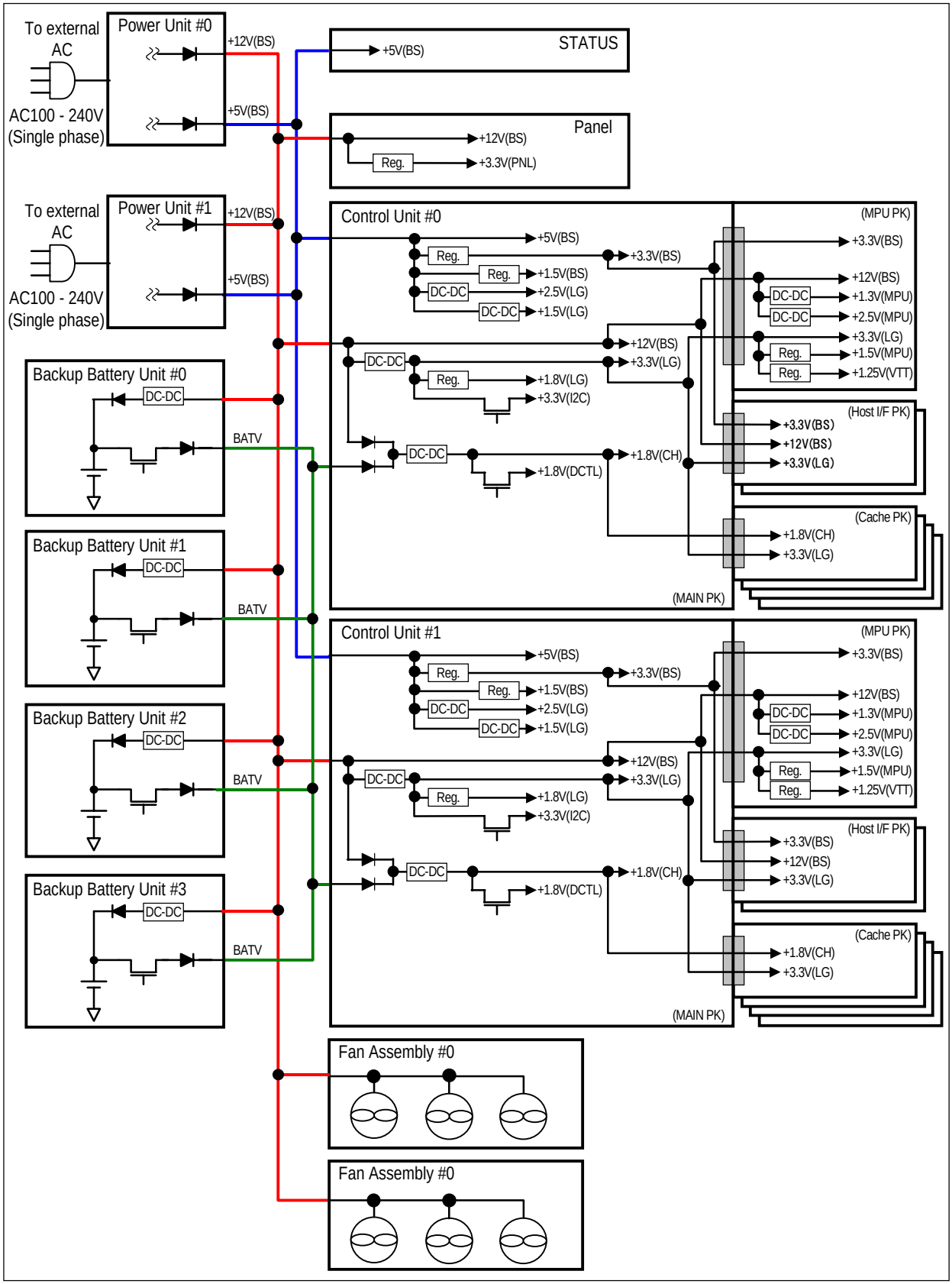


Figure 2.4.2.1 Connection diagram of Power Supply System (RKH)

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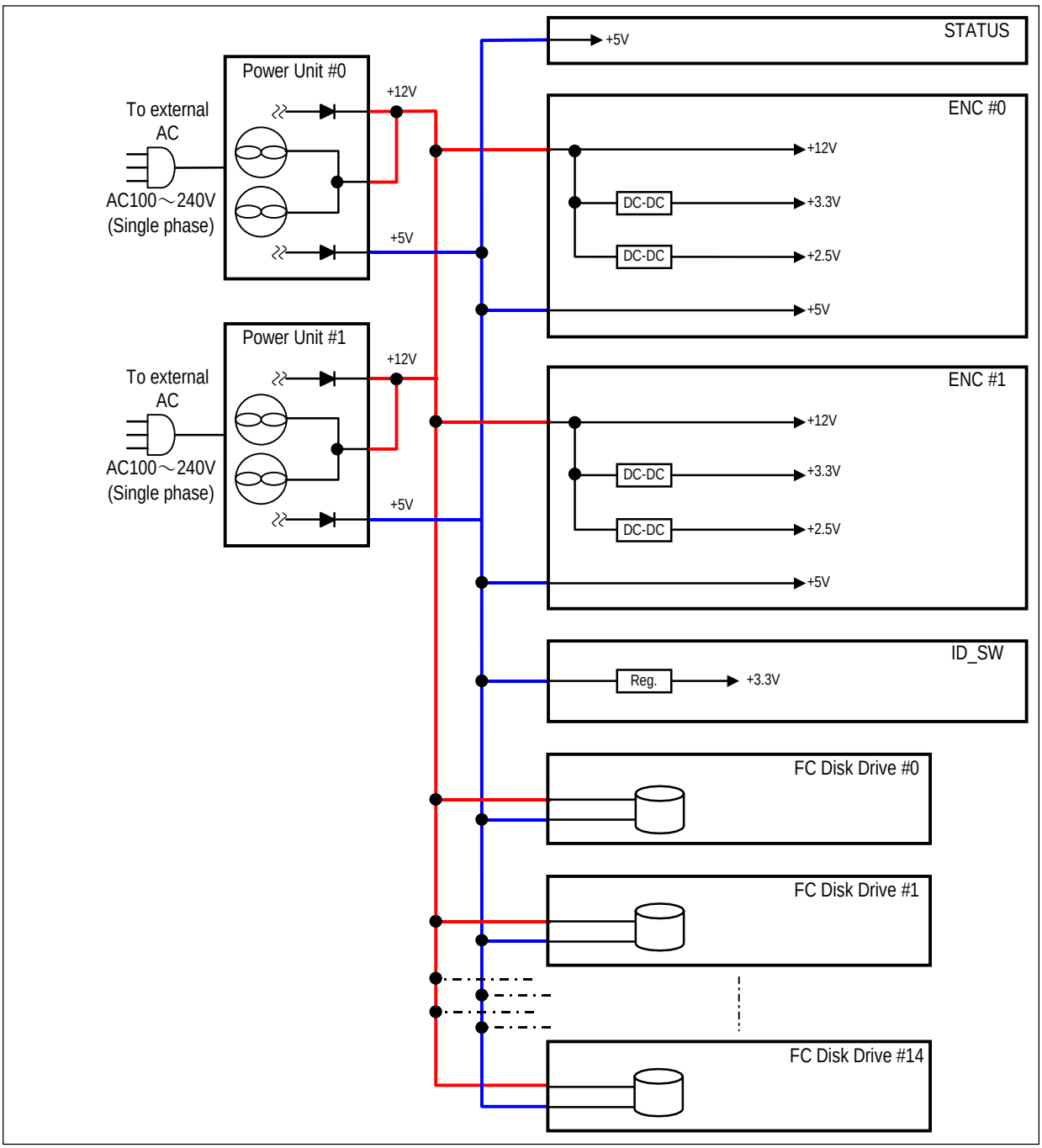


Figure 2.4.3 Connection diagram of Power Supply System (RKAJ)

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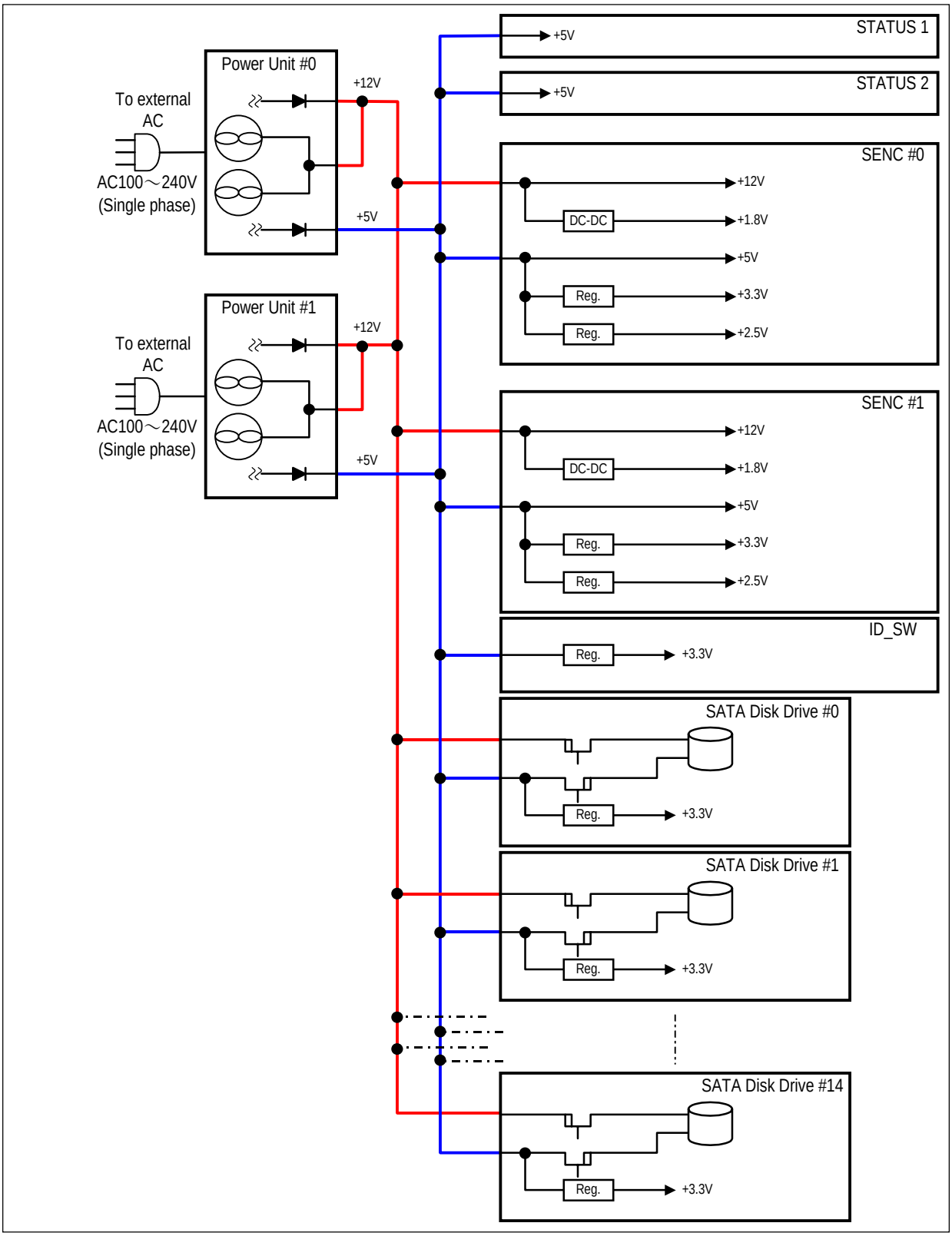


Figure 2.4.4 Connection diagram of Power Supply System (RKAJAT)

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(2) Internal power supply system configuration (RKNAS)

Figure 2.4.5 shows the connection diagrams of the internal power supply system of the respectively.

Input power to the RKNAS is supplied from the Power Unit.

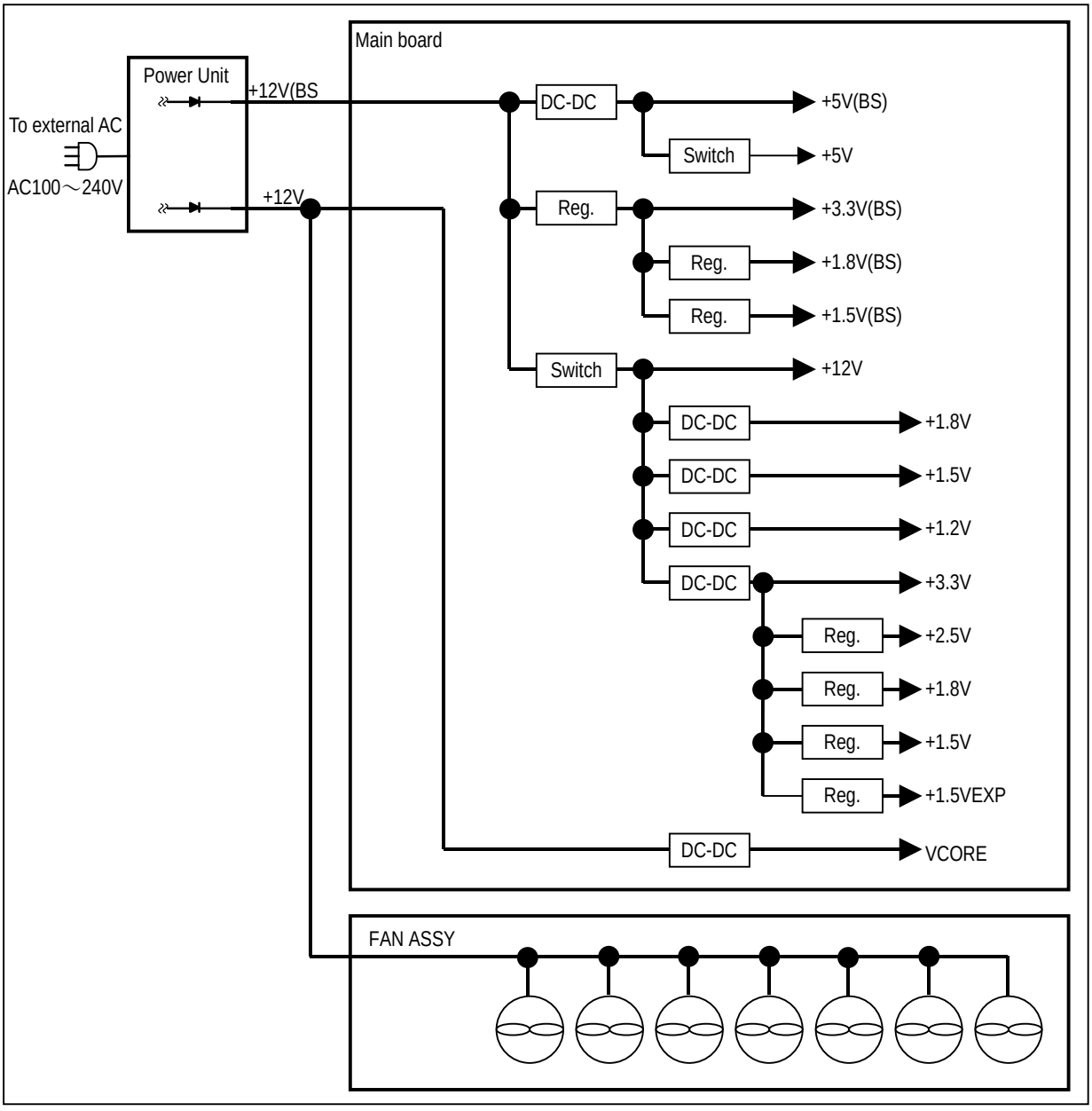


Figure 2.4.5 Connection diagram of Power Supply System (RKNAS)

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2.5 Configuration of Internal Data System

Figure 2.5.1, Figure 2.5.2, Figure 2.5.3, Figure 2.5.4, Figure 2.5.5, Figure 2.5.5.1, Figure 2.5.6, and Figure 2.5.7 shows the connection block diagram of the internal data system of the RKM, RKS, RKXS, RKH, RKAJ, RKAJAT, RKA and RKNAS respectively.
Figure 2.5.8 shows the connection block diagram of the internal data system of the RKM+RKAJAT+RKAJ respectively.
Figure 2.5.9 shows the connection block diagram of the internal data system of the RKS+RKAJAT+RKAJ respectively.
Figure 2.5.10 shows the connection block diagram of the internal data system of the RKXS+RKAJAT respectively.
Figure 2.5.10.1 shows the connection block diagram of the internal data system of the RKH+RKAJ respectively.
Figure 2.5.11 shows the connection block diagram of the internal data system of the RKNAS4G+RKM+RKAJ respectively.
Figure 2.5.12 shows the connection block diagram of the internal data system of the RKNAS2G+RKS+RKAJ respectively.
Figure 2.5.13 shows the connection block diagram of the internal data system of the RKNAS2G+RKXS+RKAJAT respectively.
Figure 2.5.13.1 shows the connection block diagram of the internal data system of the RKNAS4G+RKH+RKAJ.

(1) Host interface

In the DF700, the PCI-X bus is adopted for the connection of the host interface and the Control Unit, and the Fibre Channel interface or the iSCSI interface is supported in standard.
In the Fibre Channel configuration, one Control Unit can have up to two ports. With the dual Controller configuration, the subsystem can have up to four Fibre Channel ports.
(The RKS/RKXS in which the Interface Board is not installed has the Fibre Channel one port on the Control Unit, but it will be the Fibre Channel two connectors per Control Unit using the Mini-HUB, and the maximum of the Fibre Channel four connectors at the time of the dual system.)

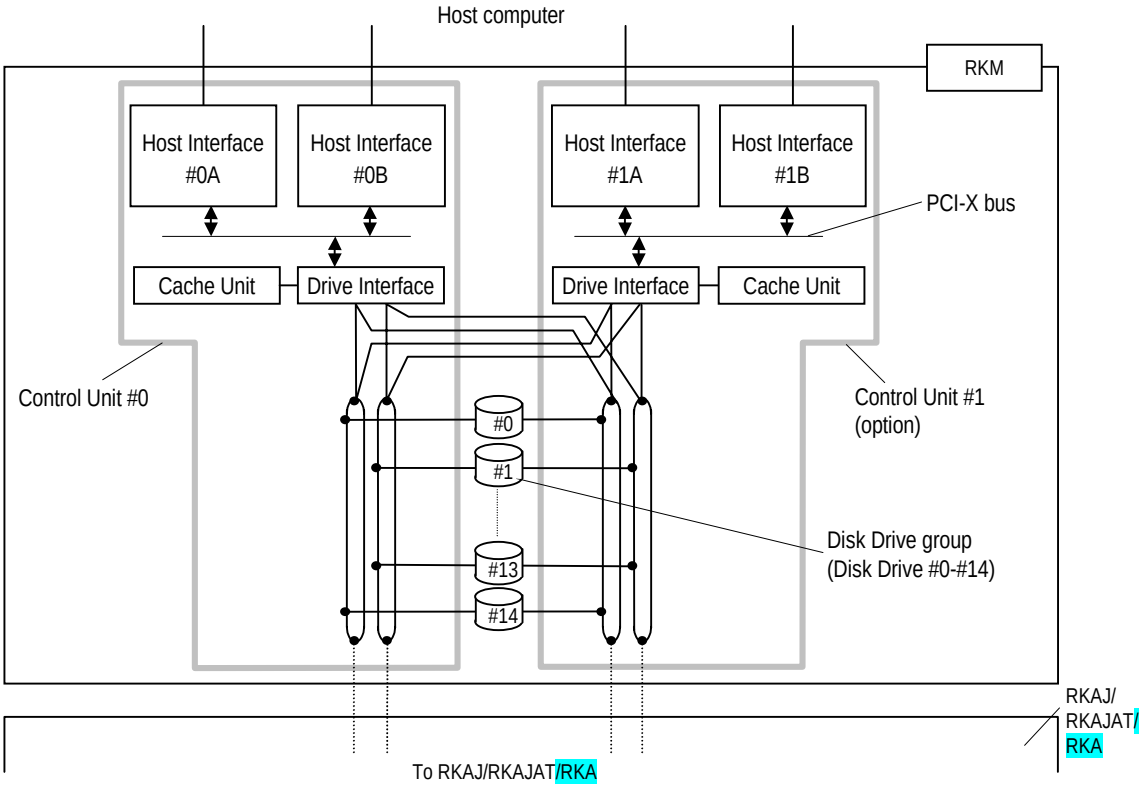
(2) Cache memory backup

The Cache Unit is backed up by the battery. Therefore, data in the Cache Unit is maintained even when a sudden power failure or a power supply unit failure occurs.

(3) Spare Disks

When a spare Disk Drive is set in a group of Disk Drives, even if a failure occurs in the Disk Drive, the same operation as before can be performed through reconstruction of data to the Spare Disk Drive. Up to 15 (for the RKH, up to 30) Spare Disk Drives can be set.

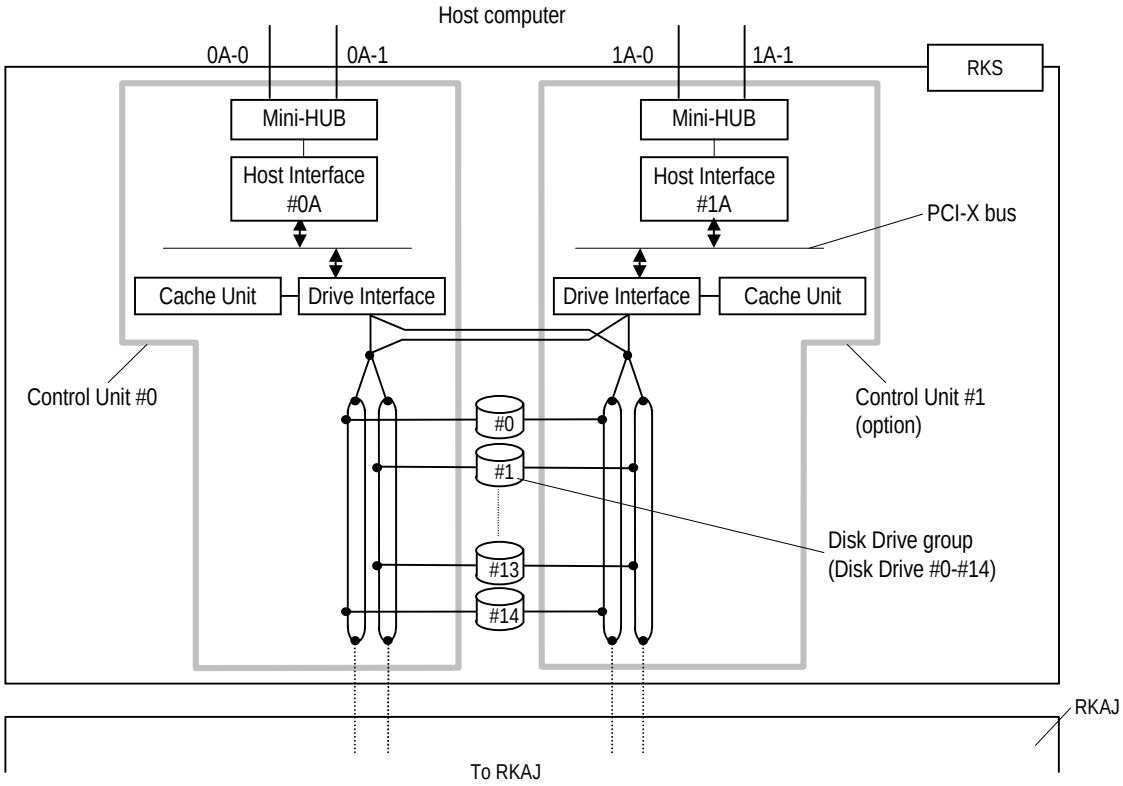
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*1 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.1 Internal Data Connection of the RKM

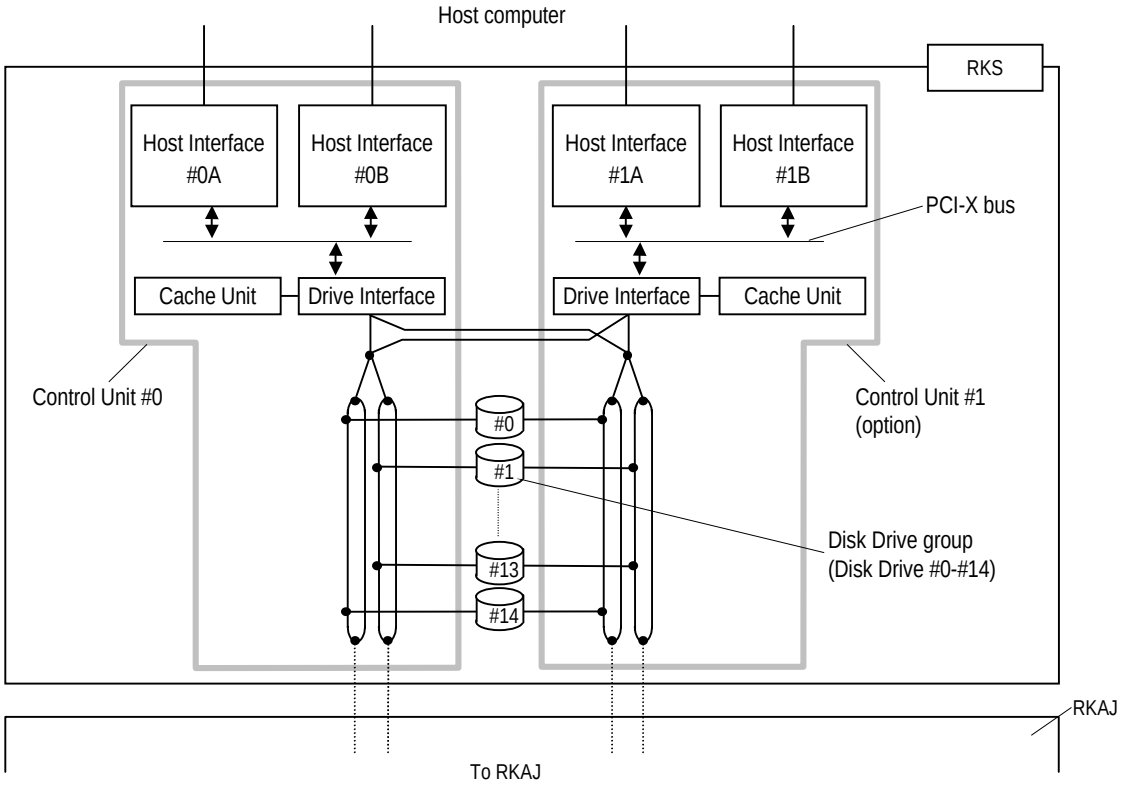
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*1 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.2 Internal Data Connection of the RKS (When the FC Interface Board is not added)

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*1 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.3 Internal Data Connection of the RKS (When the FC Interface Board is added)

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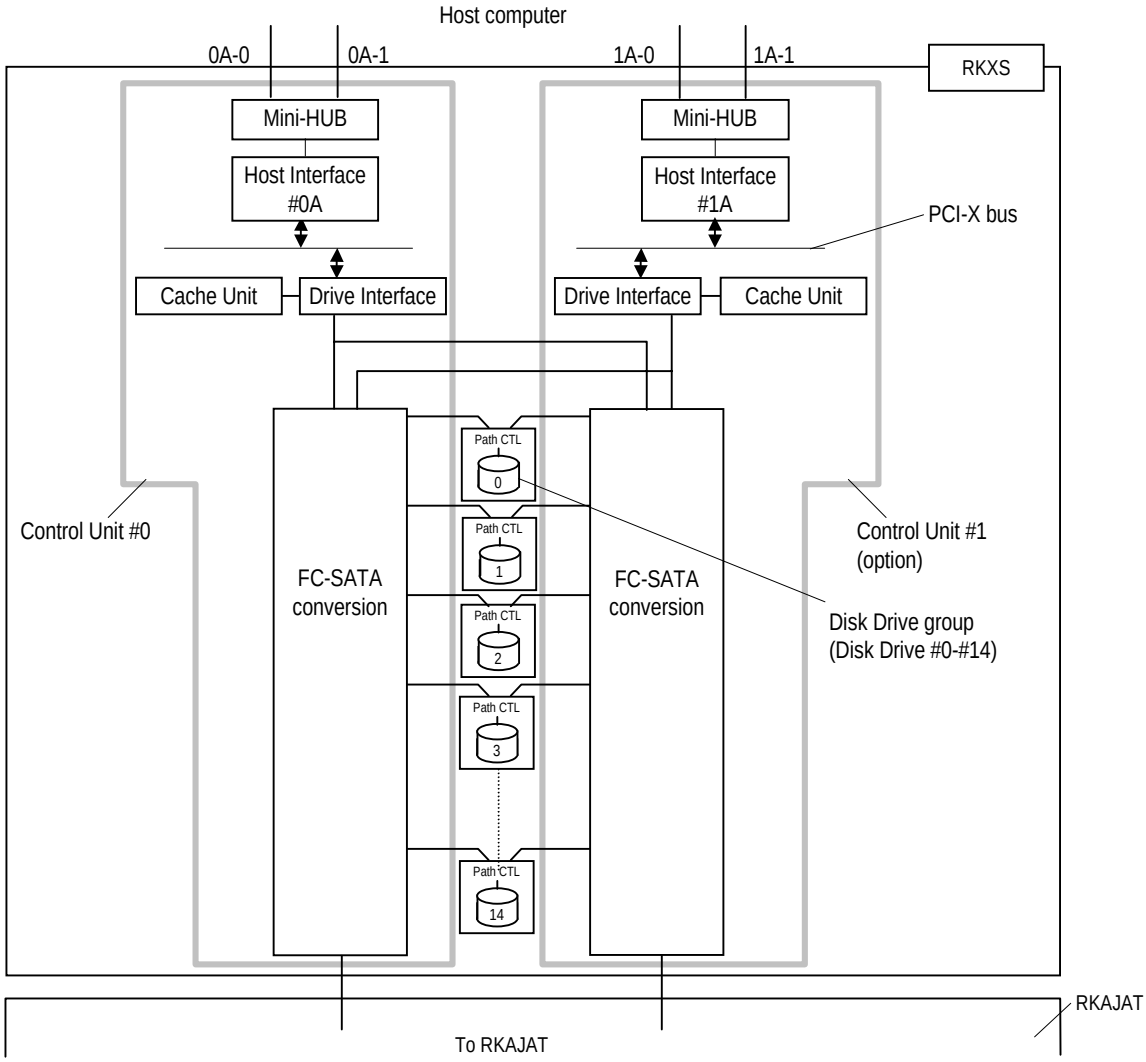


Figure 2.5.4 Internal Data Connection of the RKXS (When the FC Interface Board is not added)

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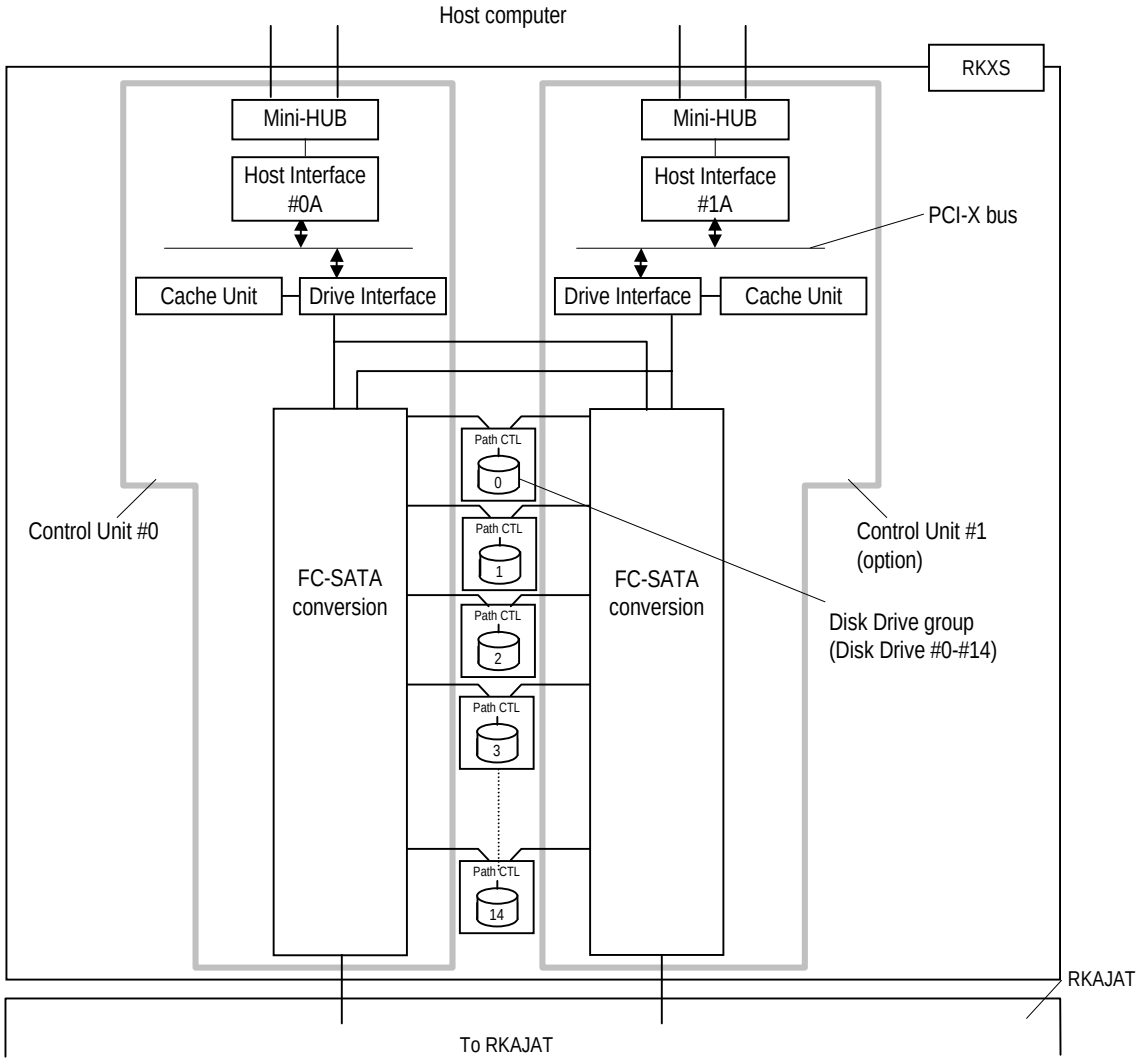
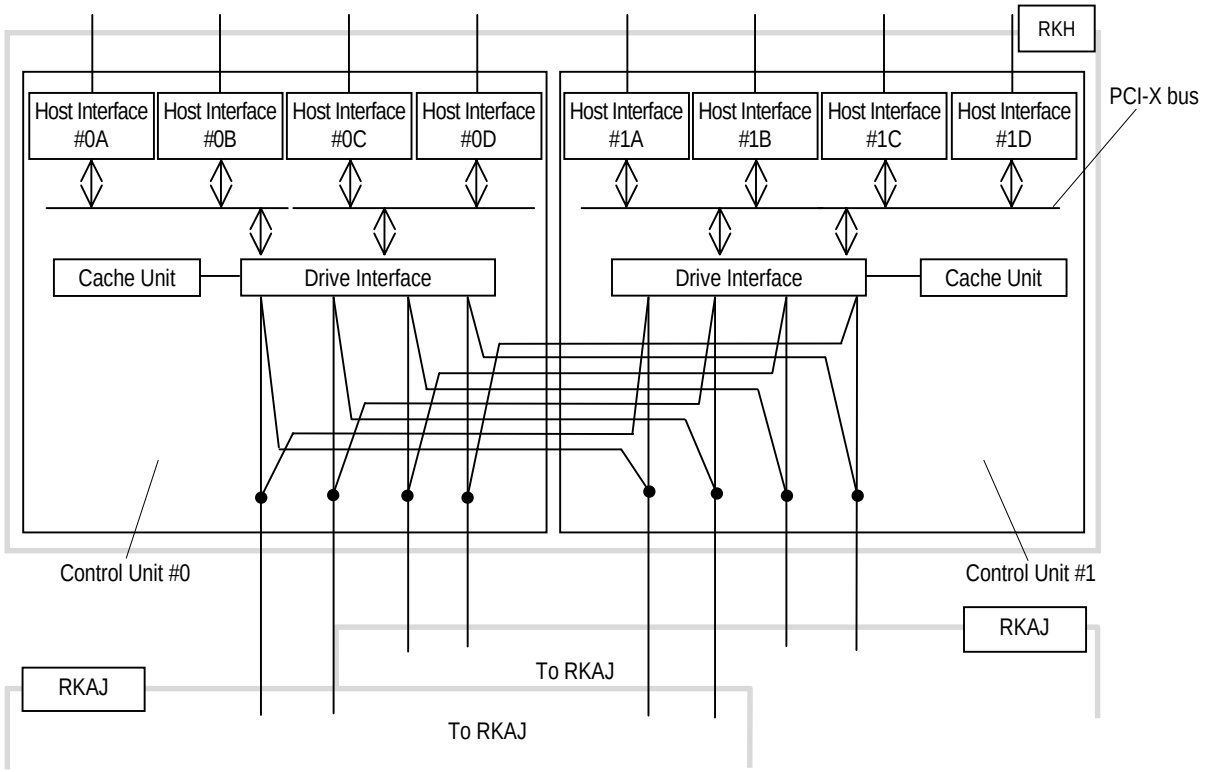


Figure 2.5.5 Internal Data Connection of the RKXS (When the FC Interface Board is added)

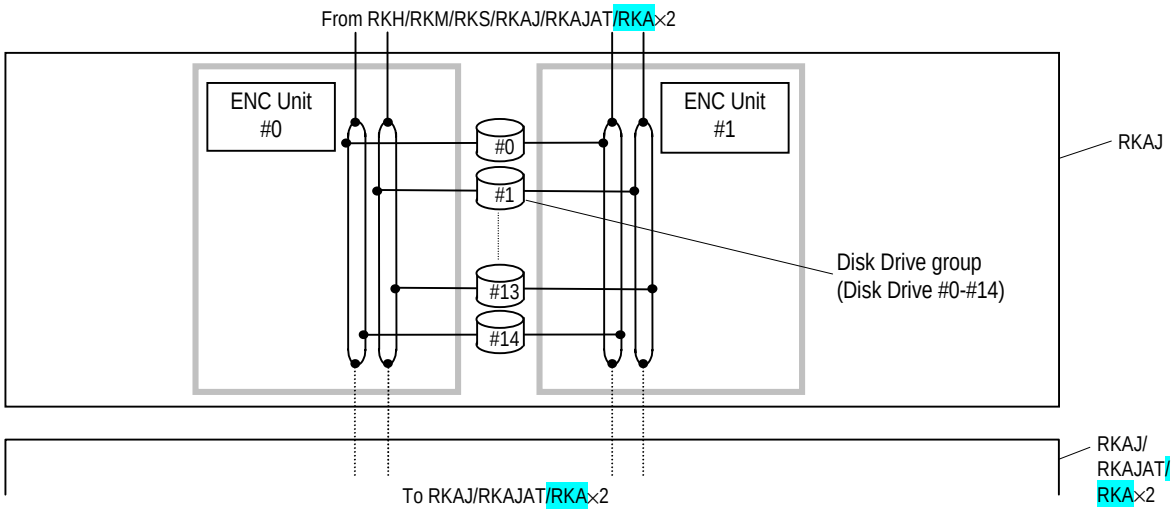
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*1 : Refer to Troubleshooting "Loop structure of RKH" (TRBL 06-0641) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.5.1 Internal Data Connection of the (RKH)

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*1 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.6 Internal Data Connection of the RKAJ

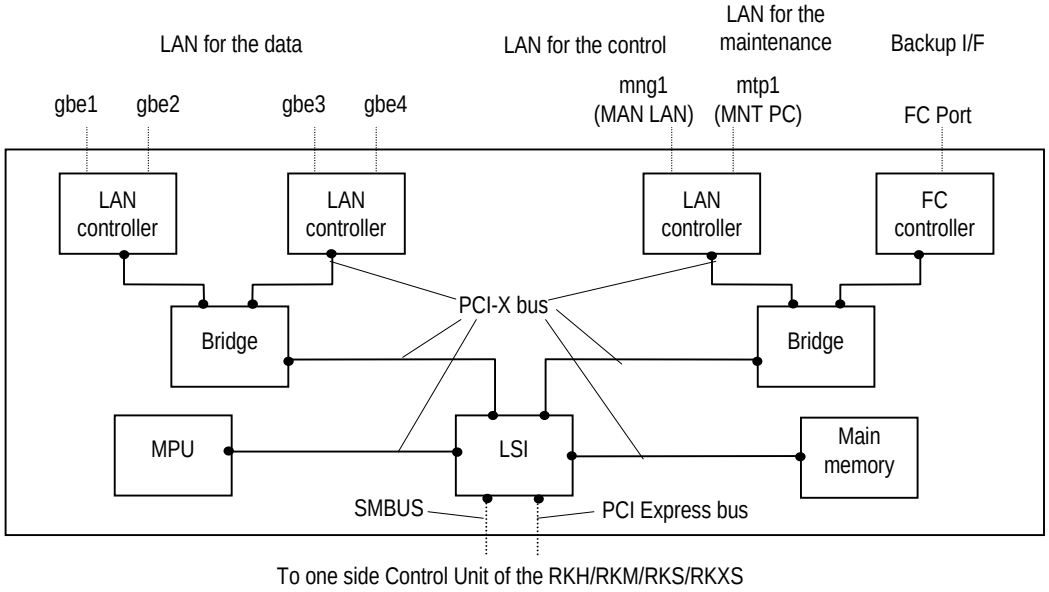


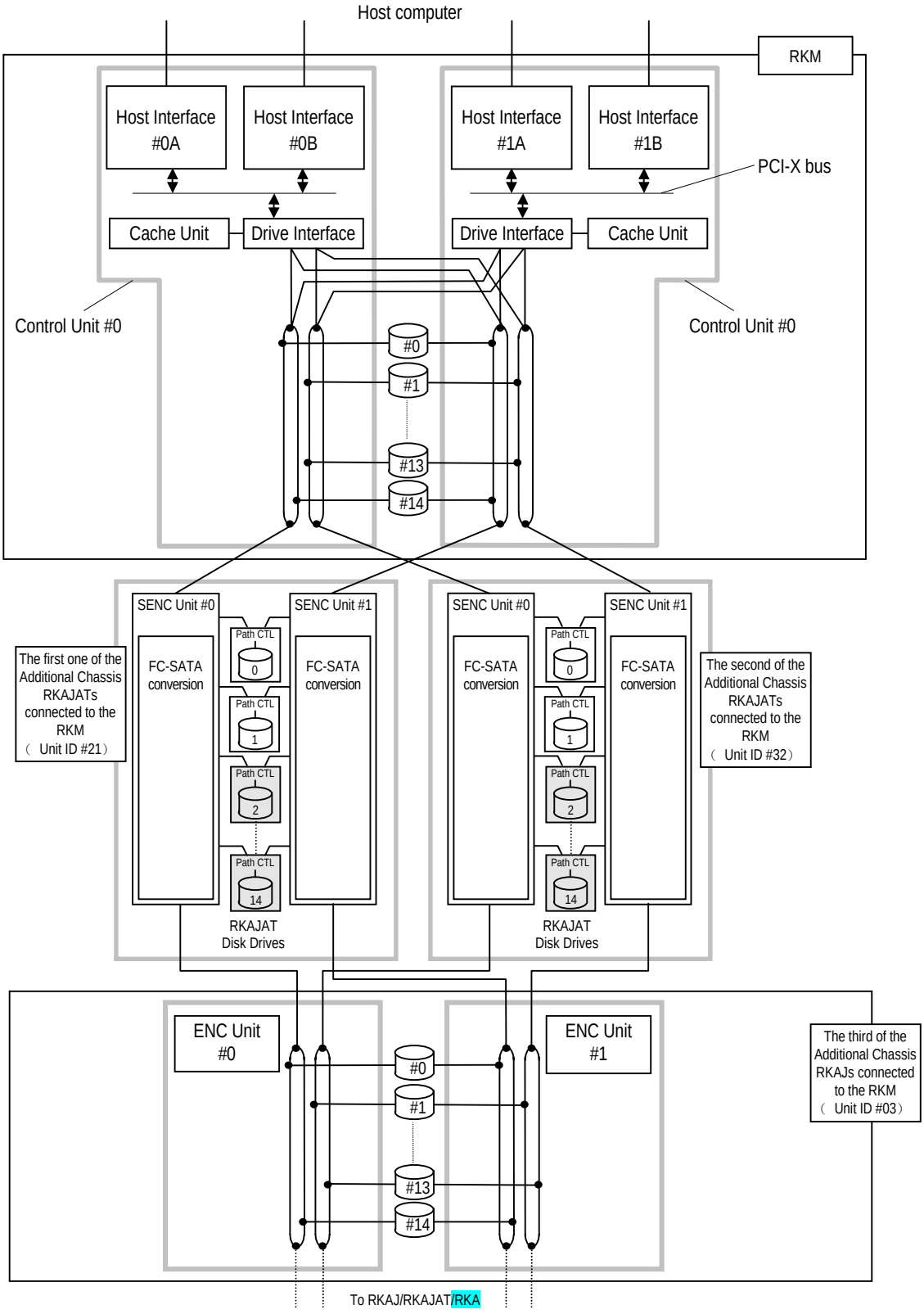
Figure 2.5.7 Internal Data Connection of the RKNAS (‡1)

‡1 : The RKNAS calls RKNAS2G (2 G bytes Cache memory) and the RKNAS4G (4 G bytes Cache memory) generically.

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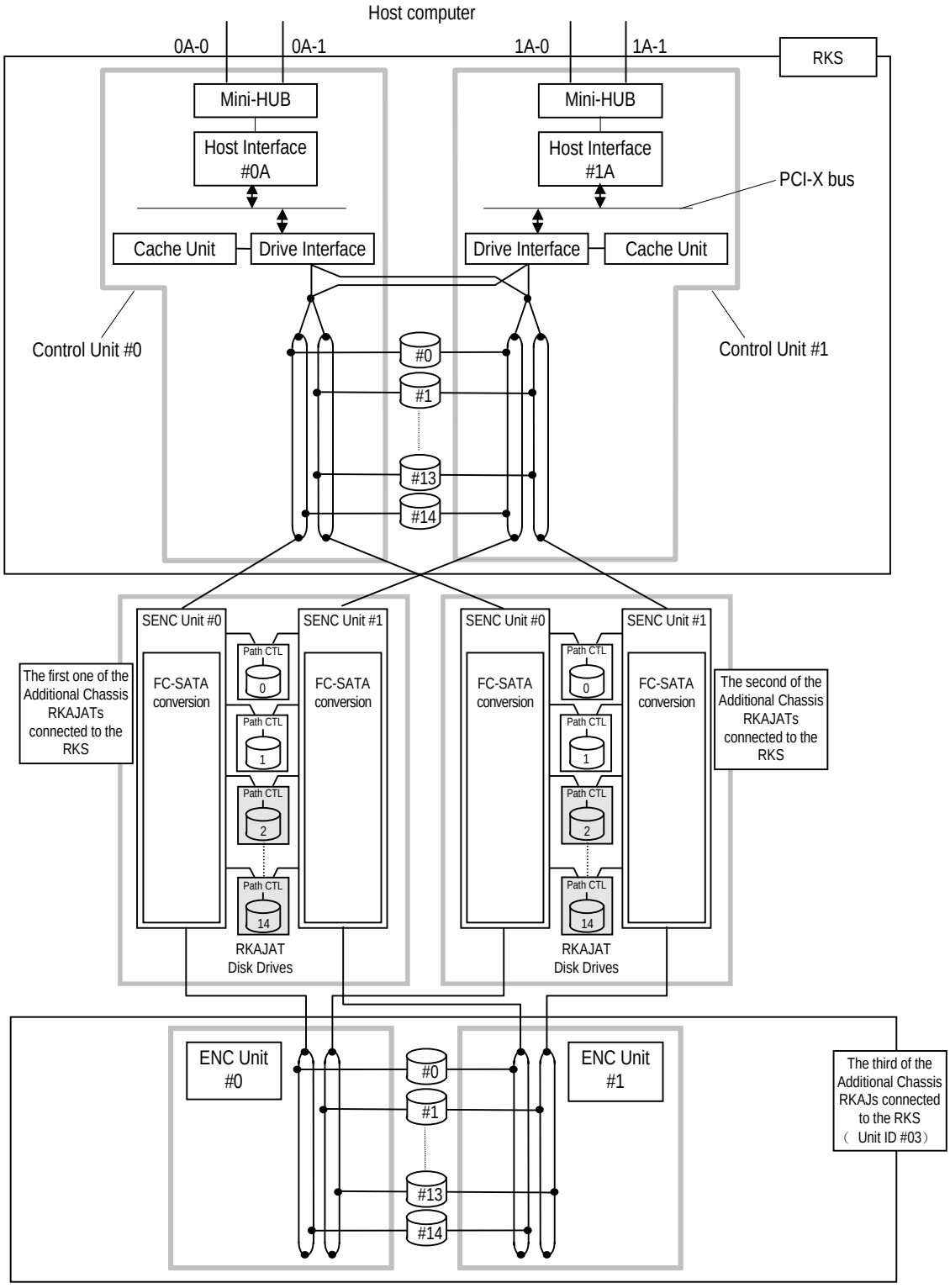


*1 : A case, where the RKAJAT, RKAJAT, RKAJ, and so forth are connected to the RKM in this order, is shown.

*2 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.8 Internal Data Connection of the RKM+RKAJ/RKAJAT

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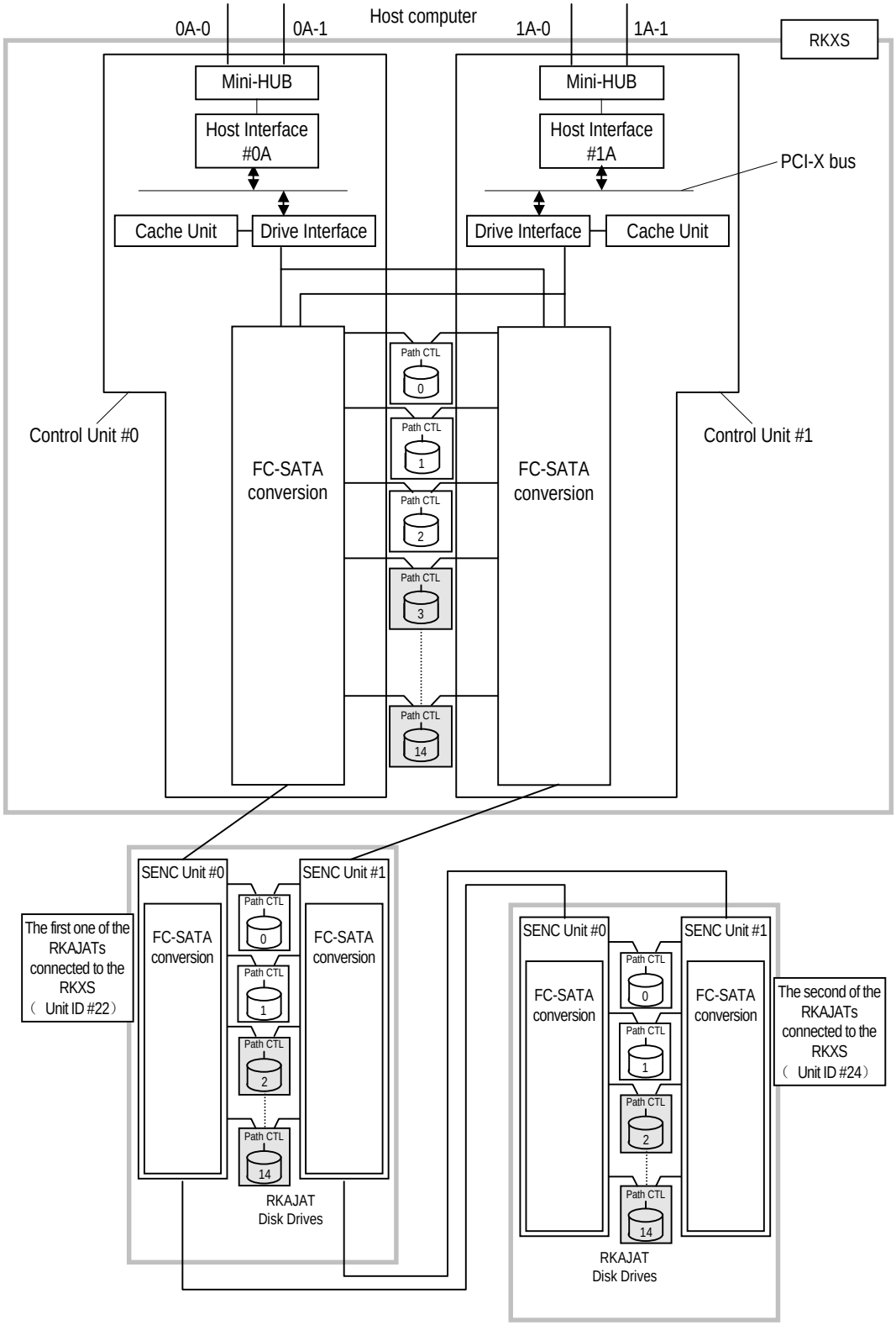


*1 : A case, where the RKAJAT, RKAJAT, RKAJ, and so forth are connected to the RKS in this order, is shown. In the case of the RKS, up to 6 RKAJs/RKAJTs can be connected.

*2 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.9 Internal Data Connection of the RKS+RKAJ/RKAJAT (When the FC interface board is not added)

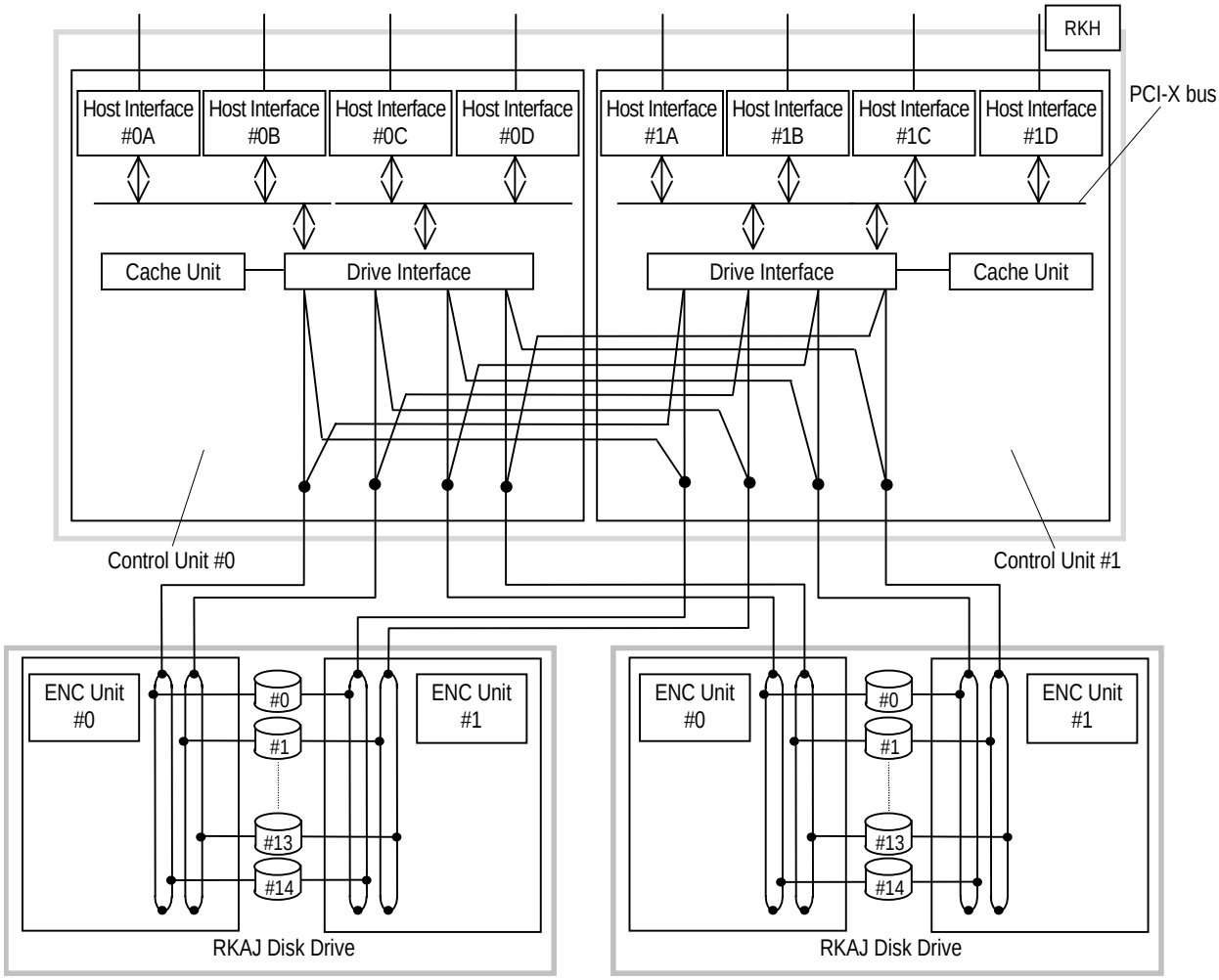
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*1 : A case, where the RKAJAT, RKAJAT, and so forth are connected to the RKXS in this order, is shown.
In the case of the RKXS, up to 6 RKAJTs can be connected.

Figure 2.5.10 Internal Data Connection of the RKXS+RKAJAT (When the FC interface board is not added)

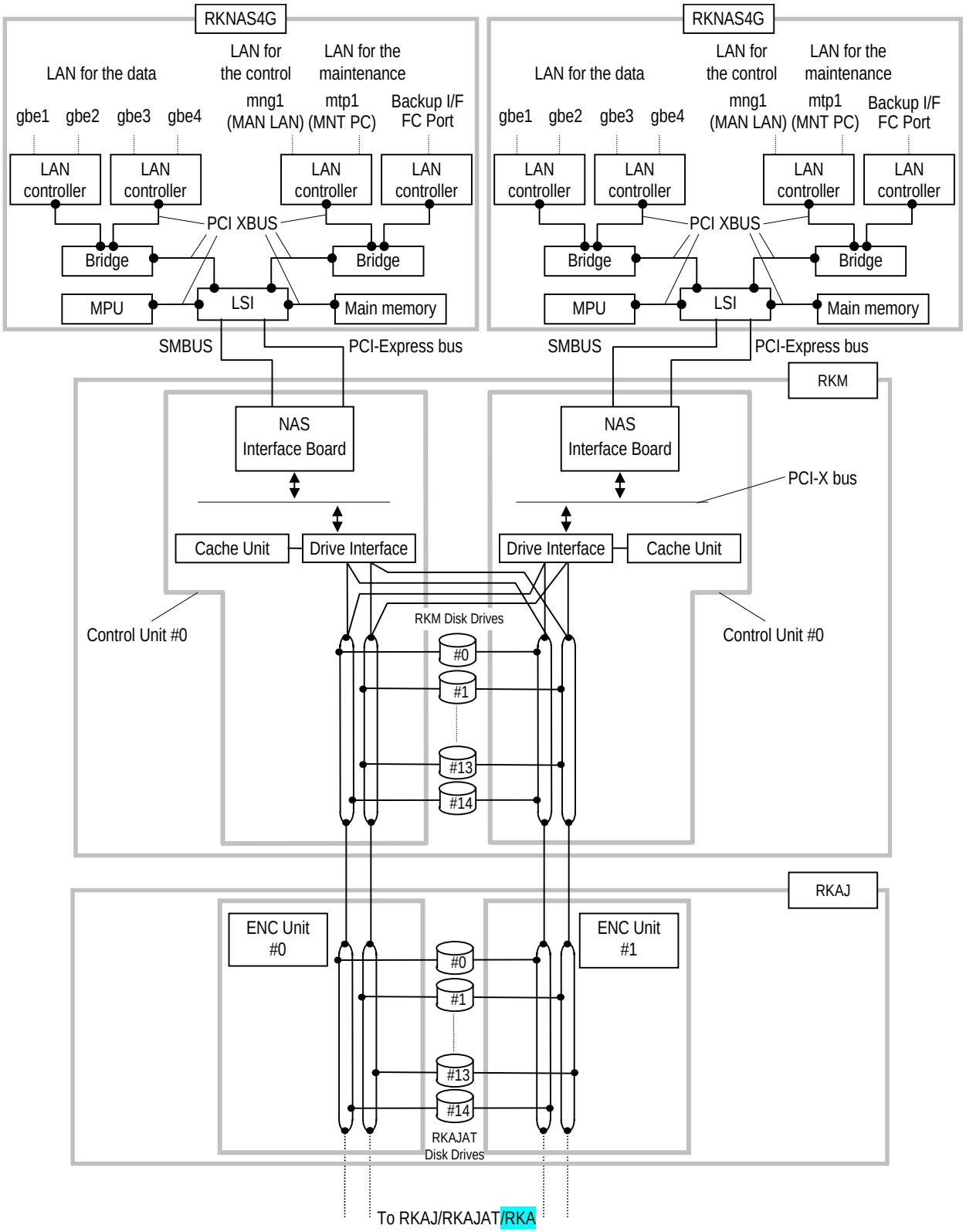
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*1 : Refer to Troubleshooting "Loop structure of RKH" (TRBL 06-0641) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.10.1 Internal Data Connection of the RKH+RKAJ

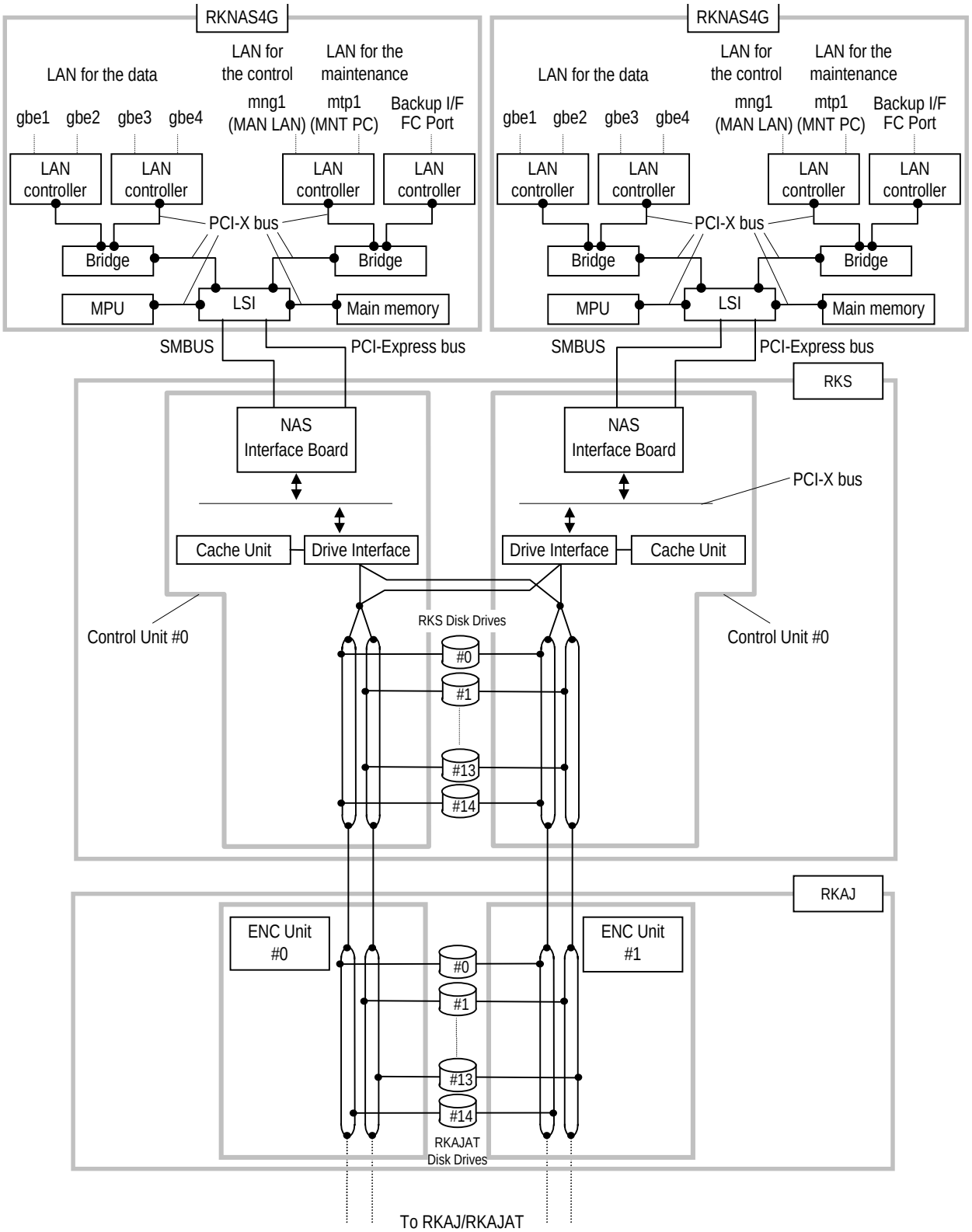
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*1 : Refer to Troubleshooting "Loop structure of RKM/RKAJ" (TRBL 06-0620) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.11 Internal Data Connection of the RKNAS4G+RKM+RKAJ

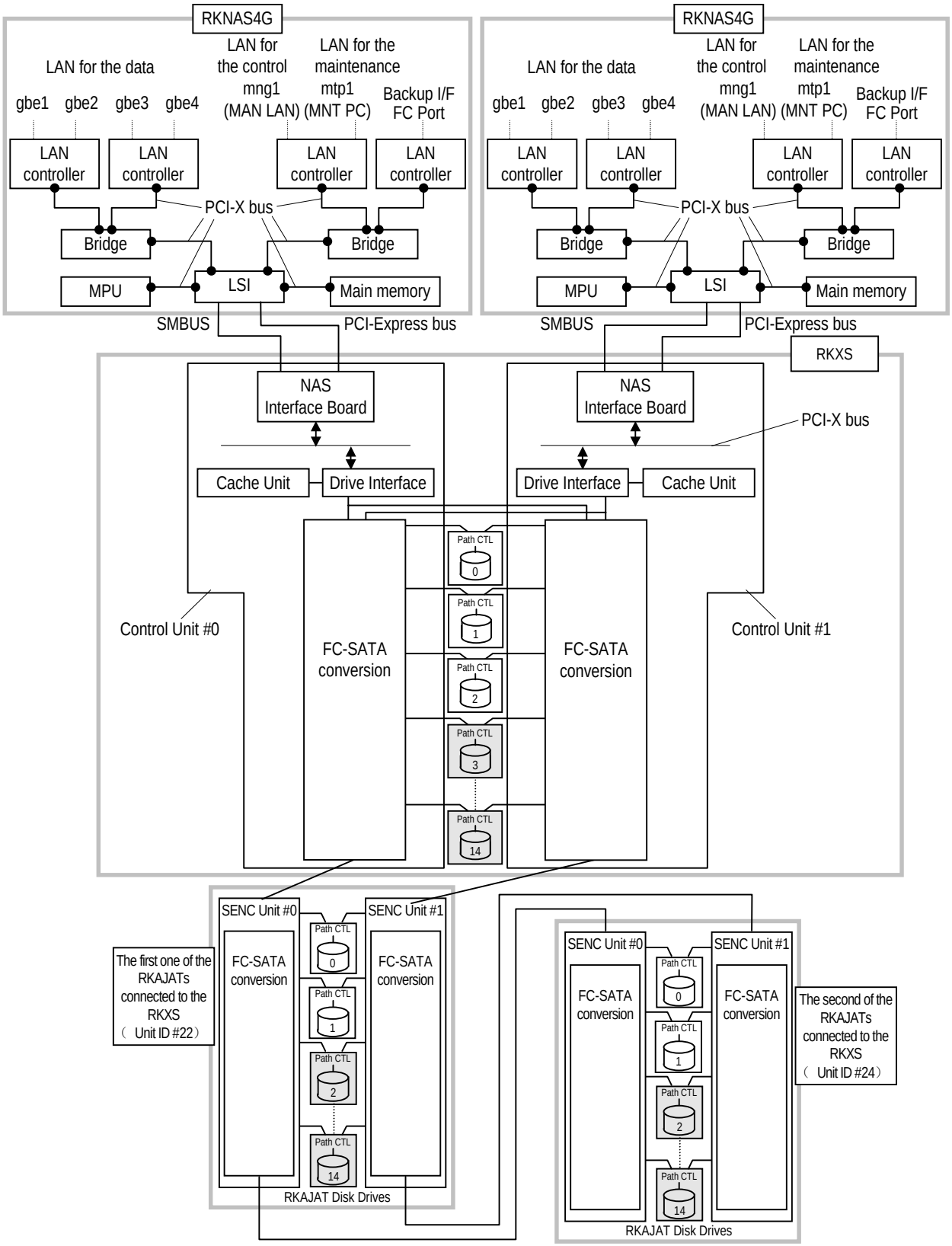
Copyright © 2005, 2006, Hitachi, Ltd.



*1 : Refer to Troubleshooting "Loop structure of RKS" (TRBL 06-0630) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

Figure 2.5.12 Internal Data Connection of the RKNAS2G+RKS+RKAJ

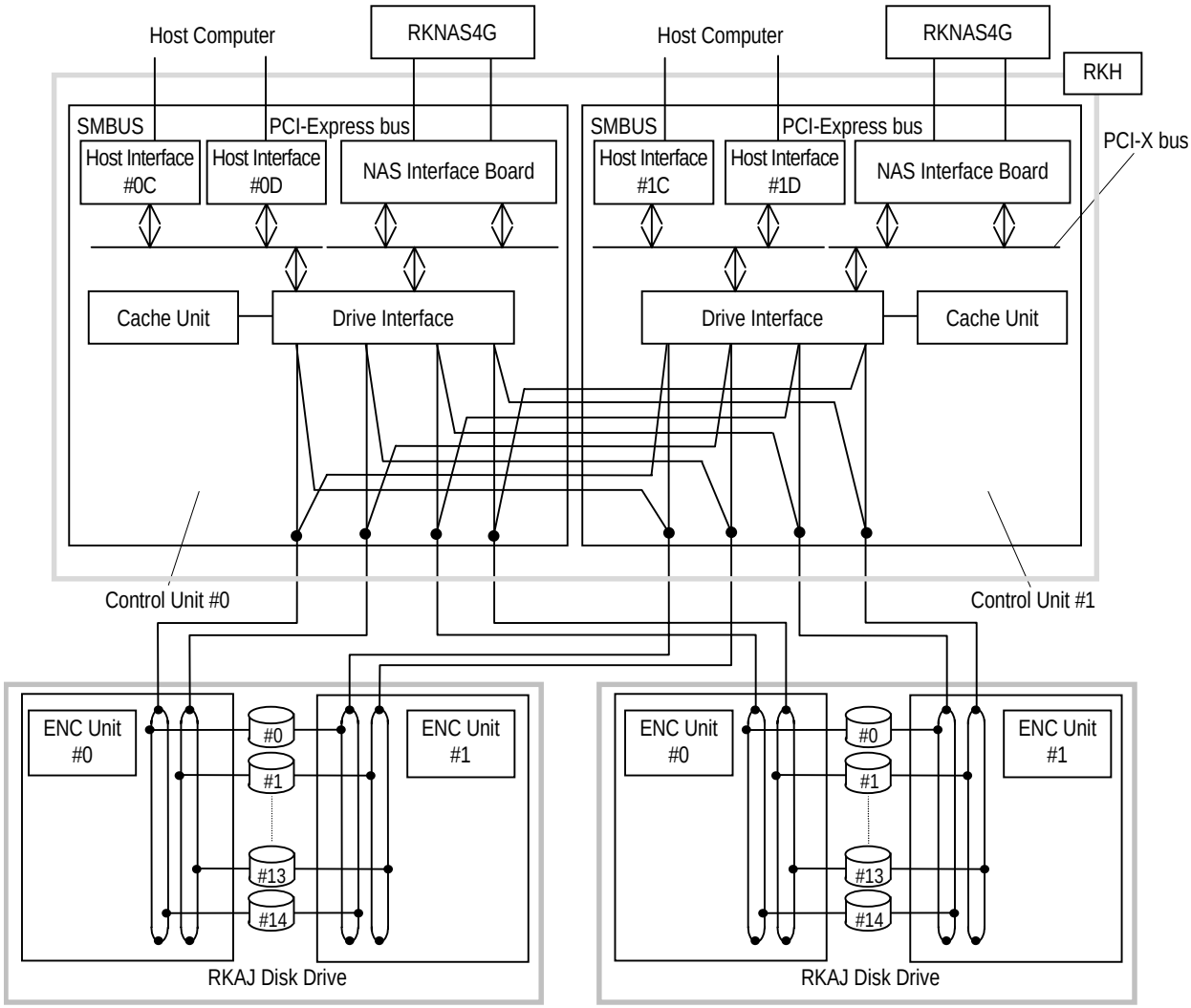
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*1 : A case, where the RKAJAT, RKAJAT, and so forth are connected to the RKXS in this order, is shown.
In the case of the RKXS, up to 6 RKAJTs can be connected.

Figure 2.5.13 Internal Data Connection of the RKNAS2G+RKXS+RKAJAT

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*1 : Refer to Troubleshooting "Loop structure of RKH" (TRBL 06-0641) when checking the flow of the signal of the Fibre Channel Loop on the Disk Drive side.

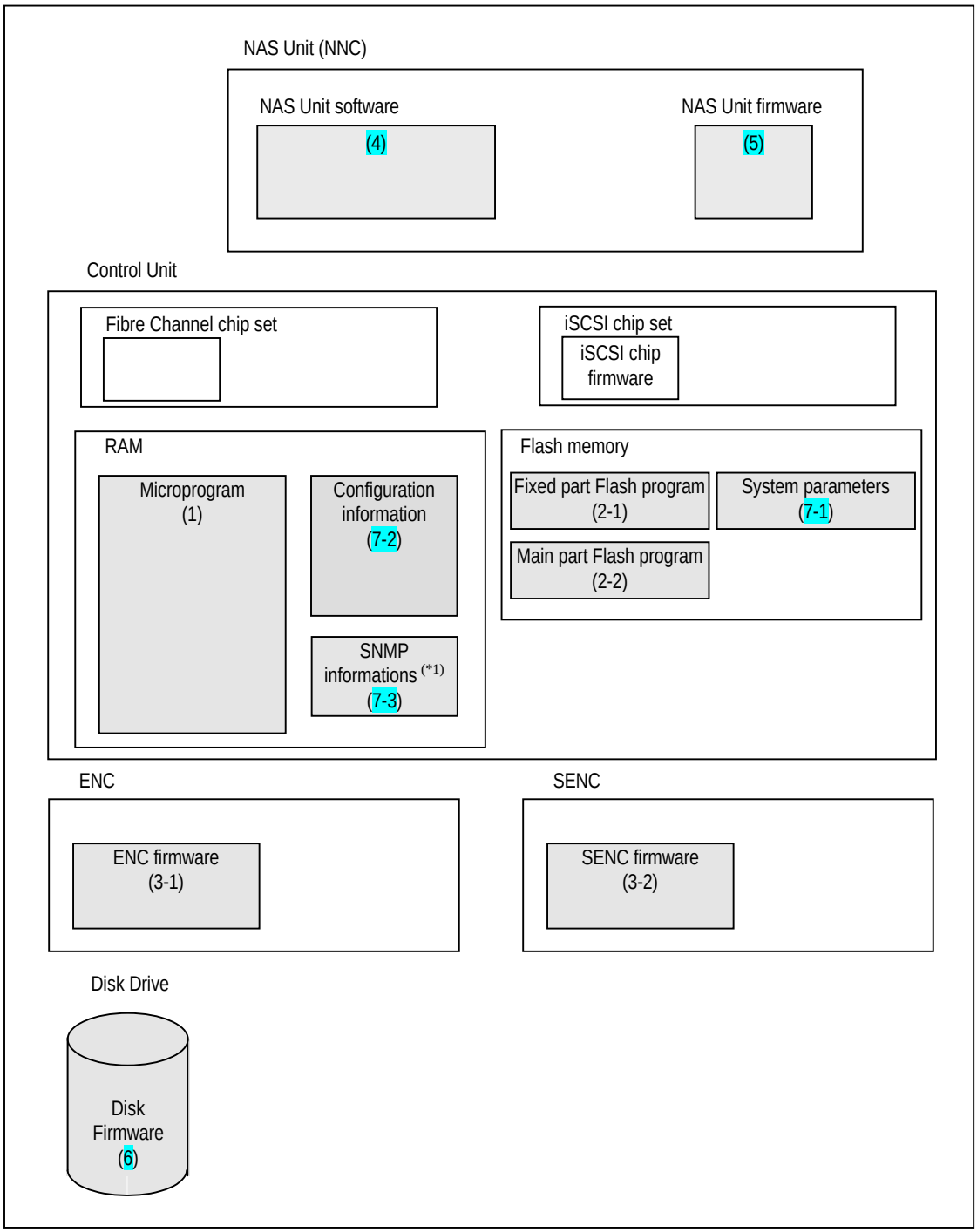
Figure 2.5.13.1 Internal Data Connection of the RKNAS4G+RKH+RKAJ

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2.6 Configuration of Built-in Software

2.6.1 Block diagram of built-in software configuration

The built-in software configuration is shown in Figure 2.6.1.
For the shaded portions in the figure, detailed explanations are given on the succeeding pages.



*1 : The SNMP information can be used when the SNMP function is validated by the P-002D-J200.

Figure 2.6.1 Software Structure

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(1) Microprograms

- These are programs that control.
- Their version numbers are controlled in the format of 07xxxxxx.
- There are types of microprograms shown below corresponding to as many usages.

No.	Type of usage	Version	Supplying media
1	Fibre Channel, NAS, iSCSI	07xxxxxx (×:Optional)	One CD

- "/xx" in the version number may not be added or may be controlled by the other method.

(2) Flashprograms

- These are programs to start up the subsystem after powering on.

(2-1) Fixed part Flash program

No.	Name	Type
1	Fixed part Flash program	07xxxxxx (×:Optional)

(2-2) Main part Flash program

No.	Name	Type
1	Main part Flash program (Fibre Channel) (*1)	07xxxxxx (×:Optional)
	*1 : This program and the microprogram are controlled unitarily.	

(3) ENC/SENC firmware

- The version of the firmware can be see using Storage Navigator Modular or through the Web.

(3-1) ENC firmware

- This firmware controls the RKAJ/RKA.

(3-2) SENC firmware

- This firmware makes a change from the S-ATA to the FC.
- This firmware controls the RKAJAT.

(4) NAS Unit software

- This software controls the NAS Unit.
- The version can be referred to from the NAS Setup of the Storage Navigator Modular.

(5) NAS Unit firmware

- This firmware controls the NAS Unit.
- The version can be referred to from the Storage Navigator Modular.

(6) Disk firmware

- You can also refer to even a version of firmware which the disk has independently. (You can do it by means of a simplicity trace.)

(7) Parameter Information

The parameters are classified into the following three types for operating the subsystem.

(7-1) System parameters

- Parameters necessary for the subsystem start-up process from the turning on of the main switch to the coming on of the READY LED (green) are called system parameters.
  For the details of it, refer to the for System Parameter "Chapter 1. Setting (Storage Navigator Modular)" (SYSPR 01-0000).
- The system parameters are stores in the flash memory.
  Back up of the system parameter is automatically performed to the drive in the changing opportunity.

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(7-2) Configuration information

- This is a piece of information on the configuration, such as the RAID configuration and LU capacity, for the subsystem to record user data.
- The configuration information exists on the Disk Drives when the subsystem main switch is turned off, and is spread onto the RAM at the time when the main switch is turned on. When it is changed, that on the Disk Drives are also changed.

(7-3) SNMP information

The SNMP information is a parameter for making the SNMP agent support function work effectively.

- When the SNMP information makes the SNMP agent support function effective, it edits the template on the SNMP EVA FD and registers the template with the subsystem.
  To update the information, edit the SNMP information on the SNMP EVA FD and register it with the subsystem.
  For the details of it, refer to the "SNMP Agent Support Function User's Guide".

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2.6.2 Storages for parameters

The storages in which the parameters on the controller are stored are shown in Table 2.6.1.

Table 2.6.1 Storages for Parameter

No.	Parameter	Storage	Description
1	• Fixed part Flash program • Main part Flash program • System parameters	Flash memory	• The parameters are stored in the flash memory. No provision of storage against a power shut off is required for the parameters because the flash memory can retain information even if a power is shut off. • The parameters can be backed up to the following to provide against a trouble. Fixed part Flash program..... Cannot be backed up. Main part Flash program..... Automatically backed up to the system area. System parameters..... Automatically backed up to the system area.
2	• Microprogram • Configuration information • SNMP information	System area	• Generally, information in a RAM is erased when the main switch is turned off. Therefore, the subsystem also stores the parameters used on the RAM on the Disk Drive. (An area is reserved in the Disk Drive to store them. The area is called system area.)

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Chapter 3. Major Specifications of the Subsystem

Basic specifications of the subsystem and the optional devices which compose a disk array system are shown below.

(1) When the subsystem configuration of the Fibre Channel interface (Floor model)

(a) Floor (RKM+H1J) Model/Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model

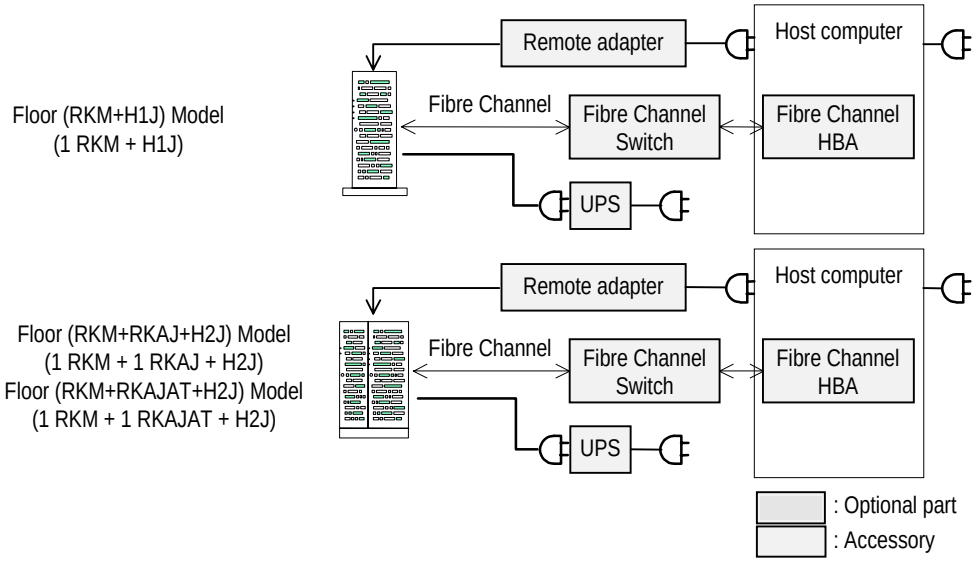


Figure 3.1 System Outline of Floor Model (RKM+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J)

(b) Floor (RKS+H1J) Model/Floor (RKS+RKAJ+H2J)/Floor (RKS+RKAJAT+H2J) Model

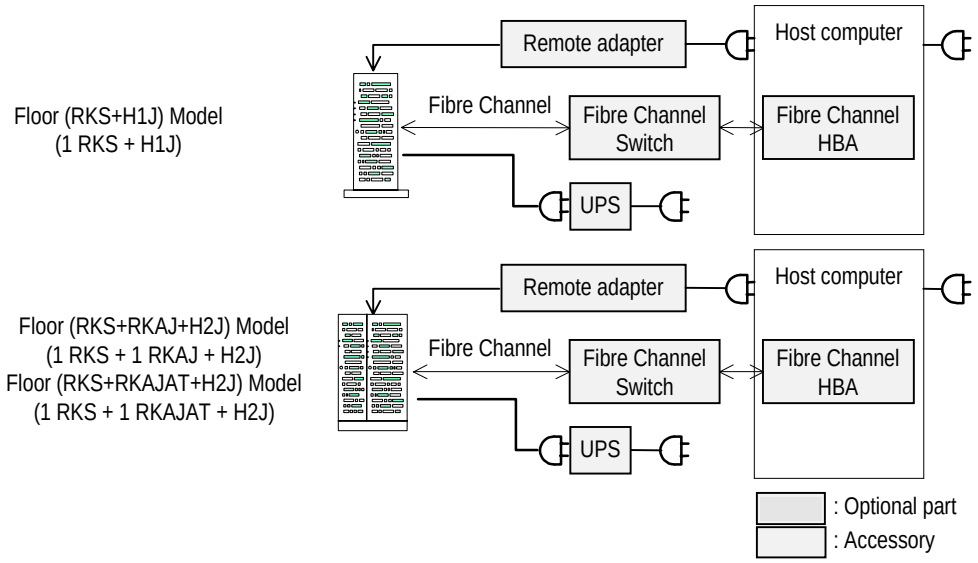


Figure 3.2 System Outline of Floor Model (RKS+H1J/RKS+RKAJ+H2J/RKS+RKAJAT+H2J)

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(c) Floor (RKXS+H1J) Model/Floor (RKXS+RKAJAT+H2J)

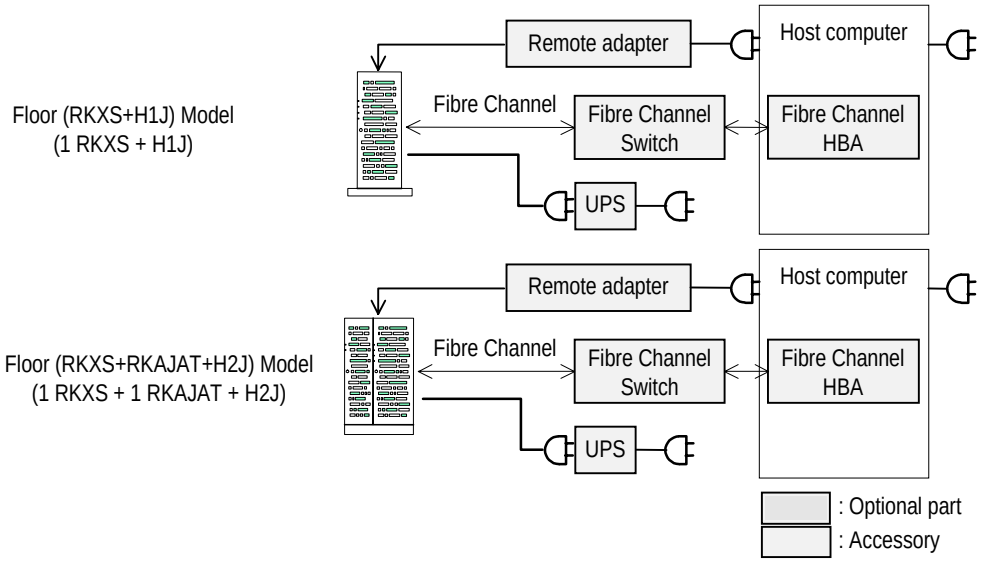


Figure 3.3 System Outline of Floor Model (RKXS+H1J/RKXS+RKAJAT+H2J)

(2) When the subsystem configuration of the iSCSI interface (Floor model)

(a) Floor (RKM+H1J) Model/Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model

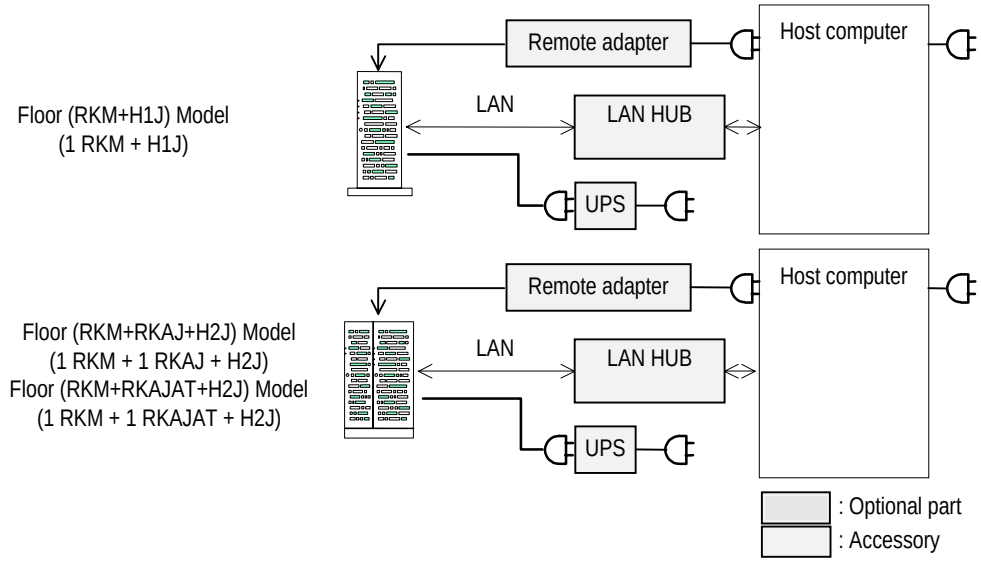


Figure 3.4 System Outline of Floor Model (RKM+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J)

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(b) Floor (RKS+H1J) Model/Floor (RKS+RKAJ+H2J/Floor (RKS+RKAJAT+H2J)

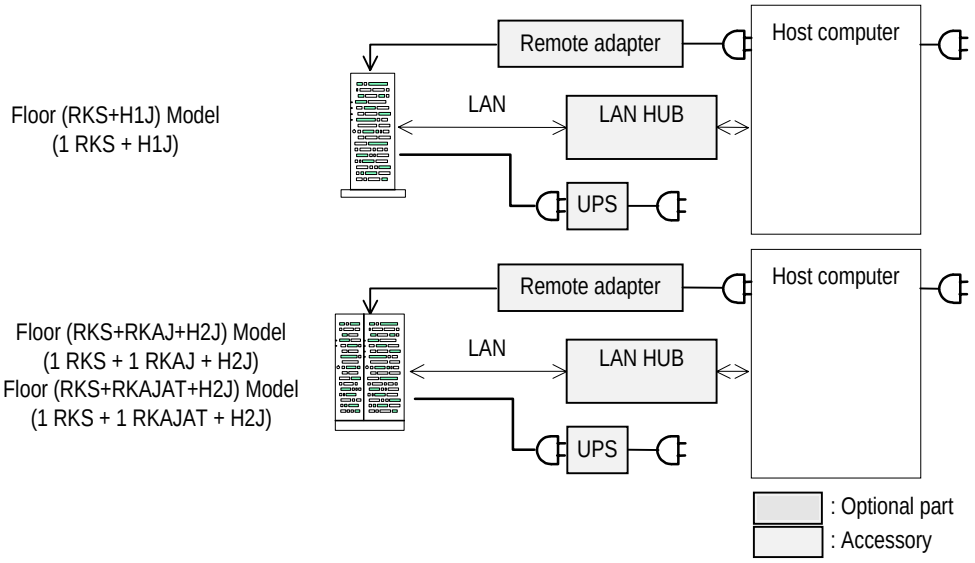


Figure 3.5 System Outline of Floor Model (RKS+H1J/RKS+RKAJ+H2J/RKS+RKAJAT+H2J)

(c) Floor (RKXS+H1J) Model/Floor (RKXS+RKAJAT+H2J)

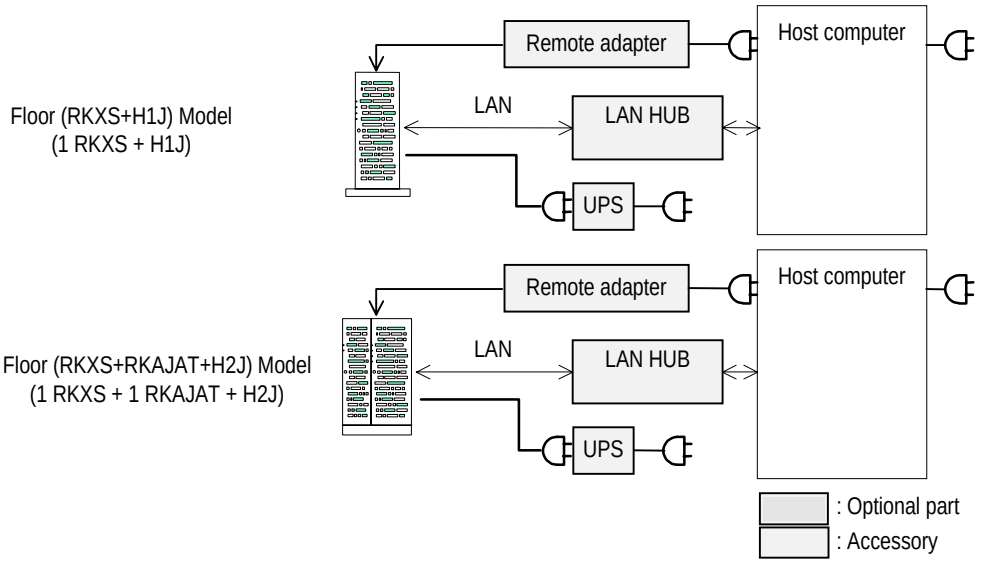


Figure 3.6 System Outline of Floor Model (RKXS+H1J/RKXS+RKAJAT+H2J)

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(3) When the subsystem configuration of the Fibre Channel interface (Rackmount model)

(a) Rackmount model (RKM/RKAJ/RKAJAT/RKA)

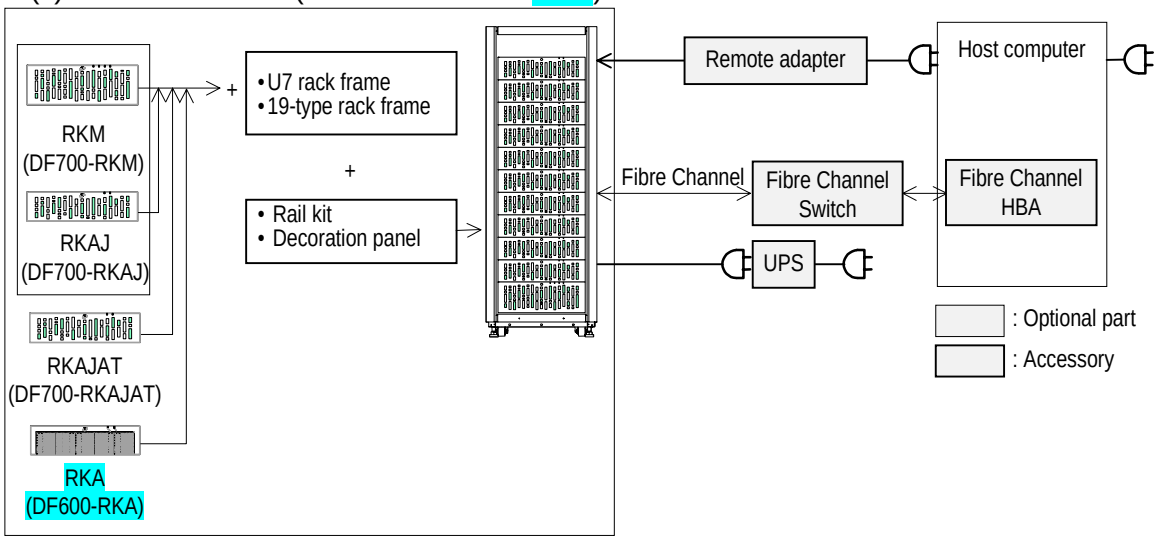


Figure 3.7 System Outline of Rackmount Model (RKM/RKAJ/RKAJAT/RKA)

(b) Rackmount model (RKS/RKAJ/RKAJAT)

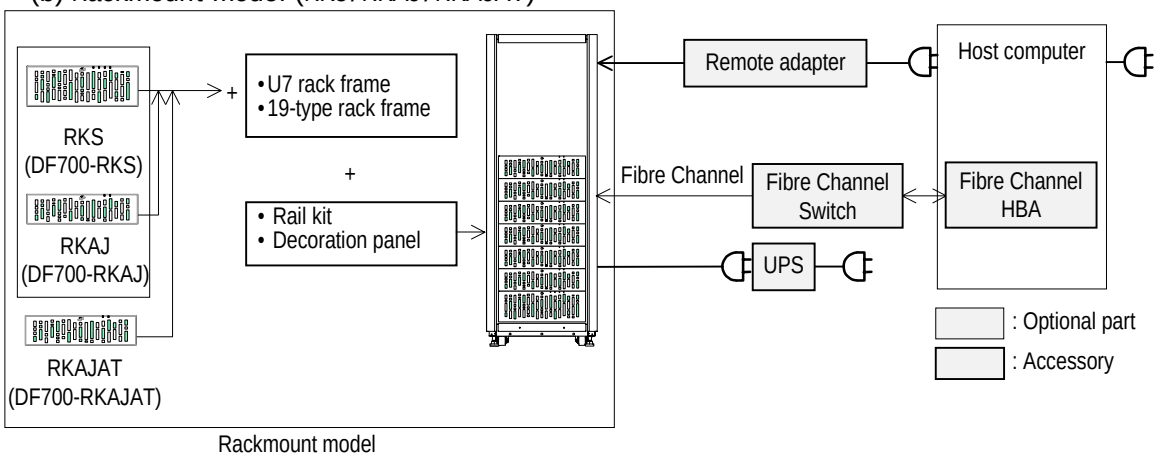


Figure 3.8 System Outline of Rackmount Model (RKS/RKAJ/RKAJAT)

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(c) Rackmount model (RKXS/RKAJAT)

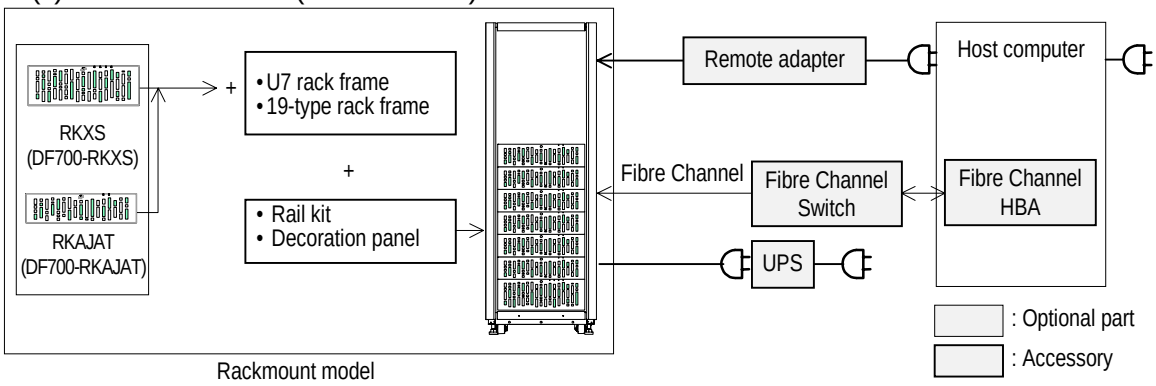


Figure 3.9 System Outline of Rackmount Model (RKXS/RKAJAT)

(d) Rackmount model (RKH/RKAJ/RKAJAT/RKA)

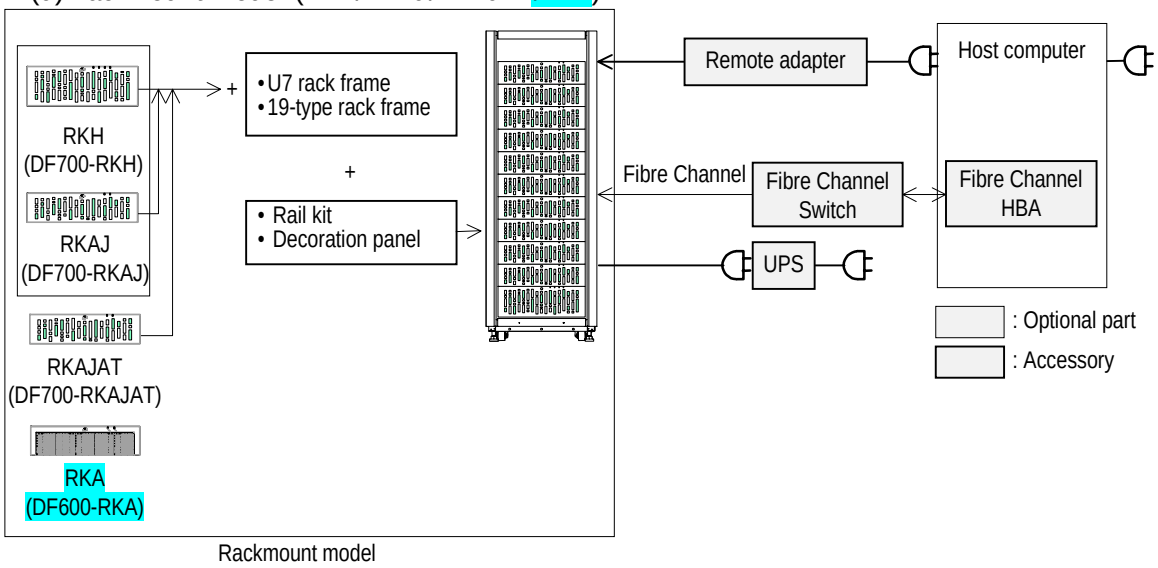


Figure 3.9.1 System Outline of Rackmount Model (RKH/RKAJ/RKAJAT/RKA)

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(4) When the subsystem configuration of the NAS (Rackmount model)

(a) Rackmount model (RKNAS/RKM/RKAJ/RKAJAT/RKA)

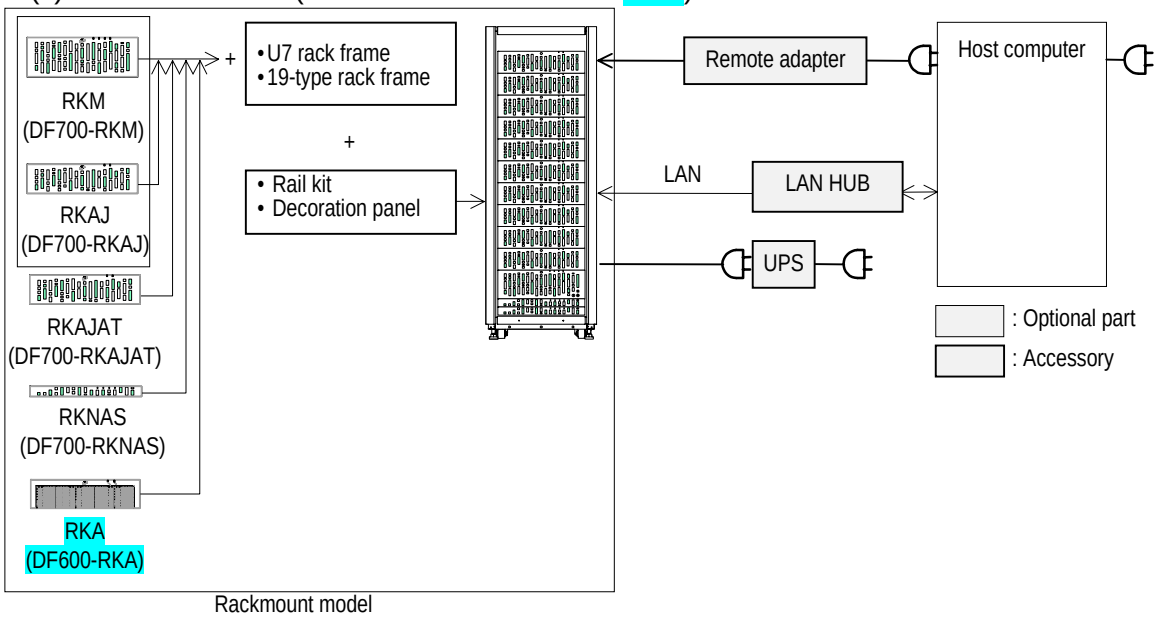


Figure 3.10 System Outline of Rackmount Model (RKNAS/RKM/RKAJ/RKAJAT/RKA)

(b) Rackmount model (RKNAS/RKS/RKAJ/RKAJAT)

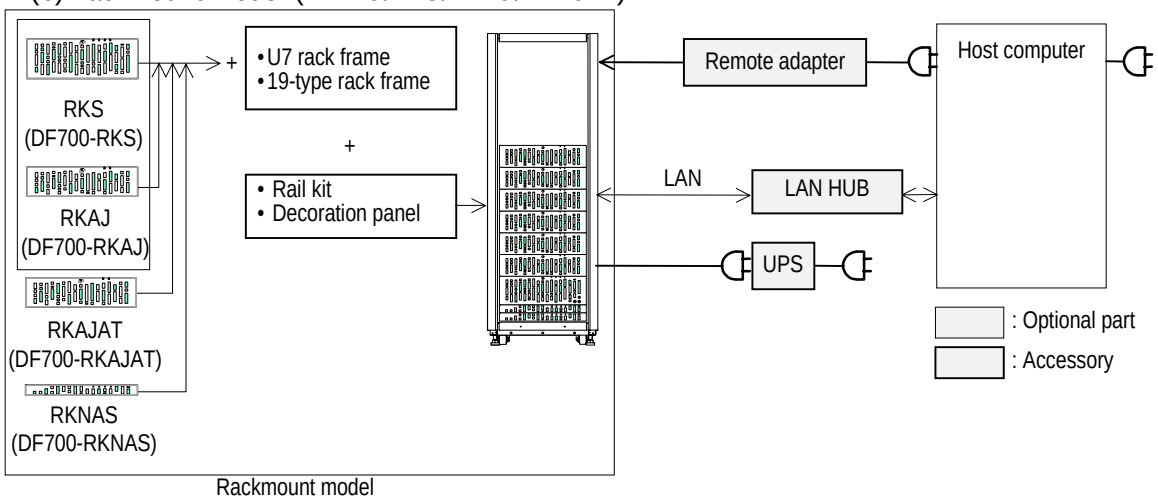


Figure 3.11 System Outline of Rackmount Model (RKNAS/RKS/RKAJ/RKAJAT)

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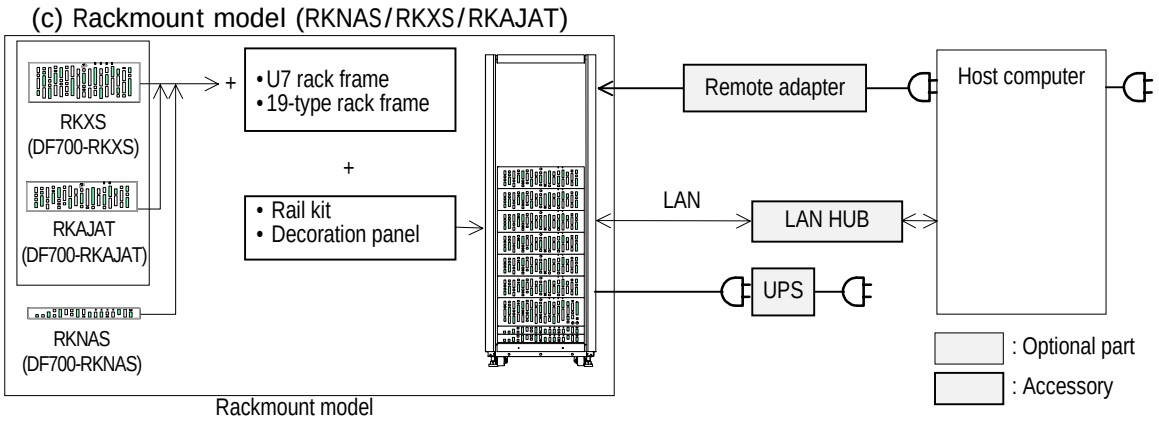


Figure 3.12 System Outline of Rackmount Model (RKNAS/RKXS/RKAJAT)

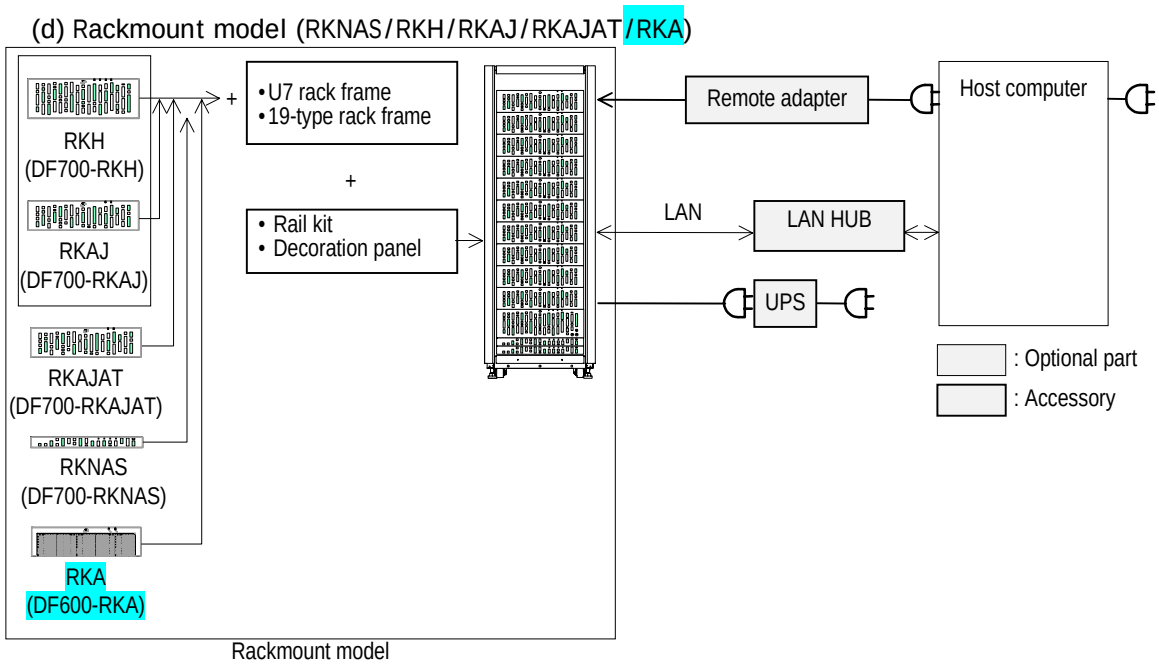


Figure 3.12.1 System Outline of Rackmount Model (RKNAS/RKH/RKAJ/RKAJAT/RKA)

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(5) When the subsystem configuration of the iSCSI interface (Rackmount model)

(a) Rackmount model (RKM/RKAJ/RKAJAT/RKA)

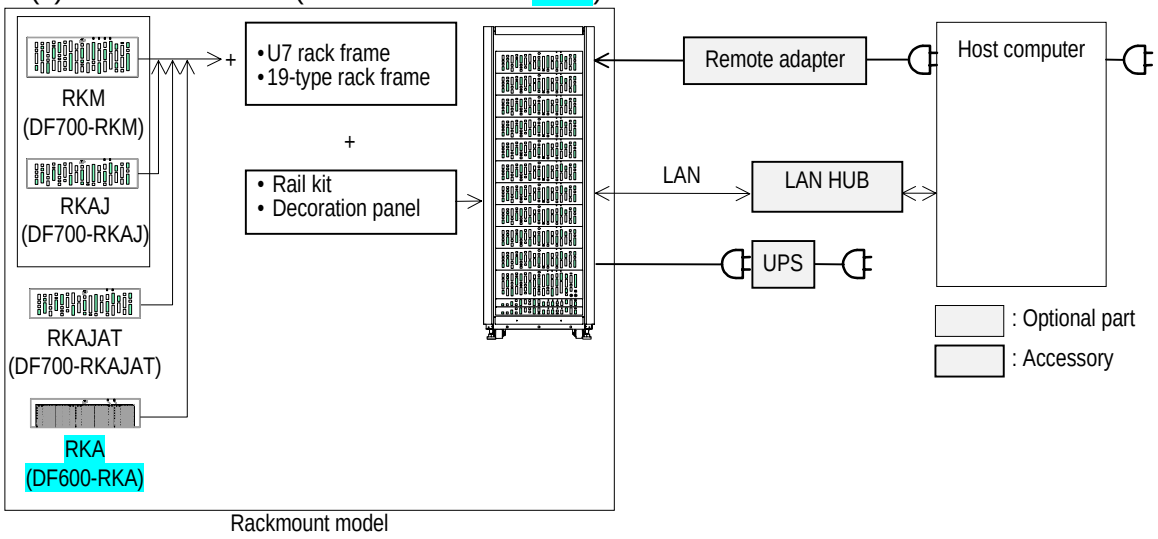


Figure 3.13 System Outline of Rackmount Model (RKM/RKAJ/RKAJAT/RKA)

(b) Rackmount model (RKS/RKAJ/RKAJAT)

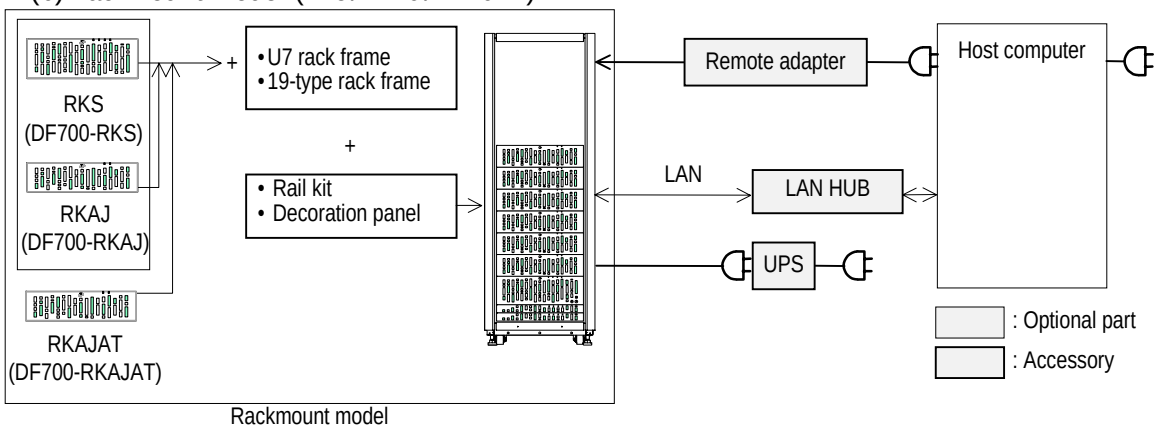


Figure 3.14 System Outline of Rackmount Model (RKS/RKAJ/RKAJAT)

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(c) Rackmount model (RKXS/RKAJAT)

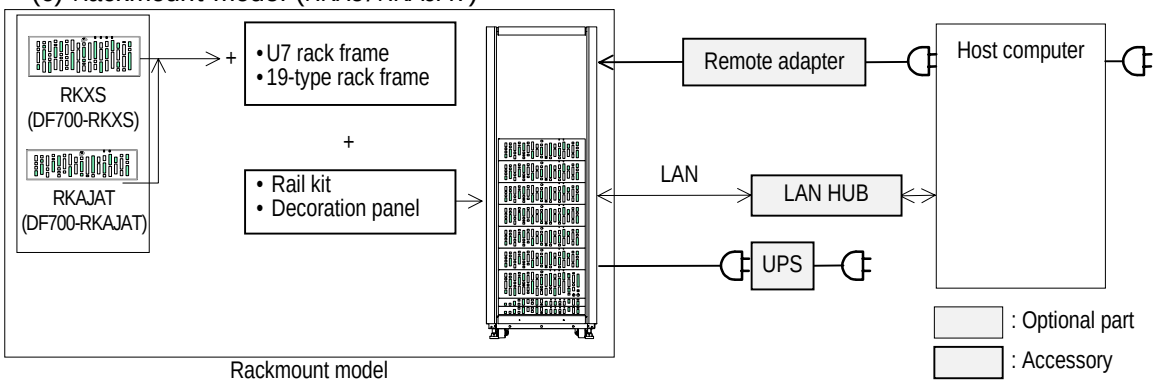


Figure 3.15 System Outline of Rackmount Model (RKXS/RKAJAT)

(d) Rackmount model (RKH/RKAJ/RKAJAT/RKA)

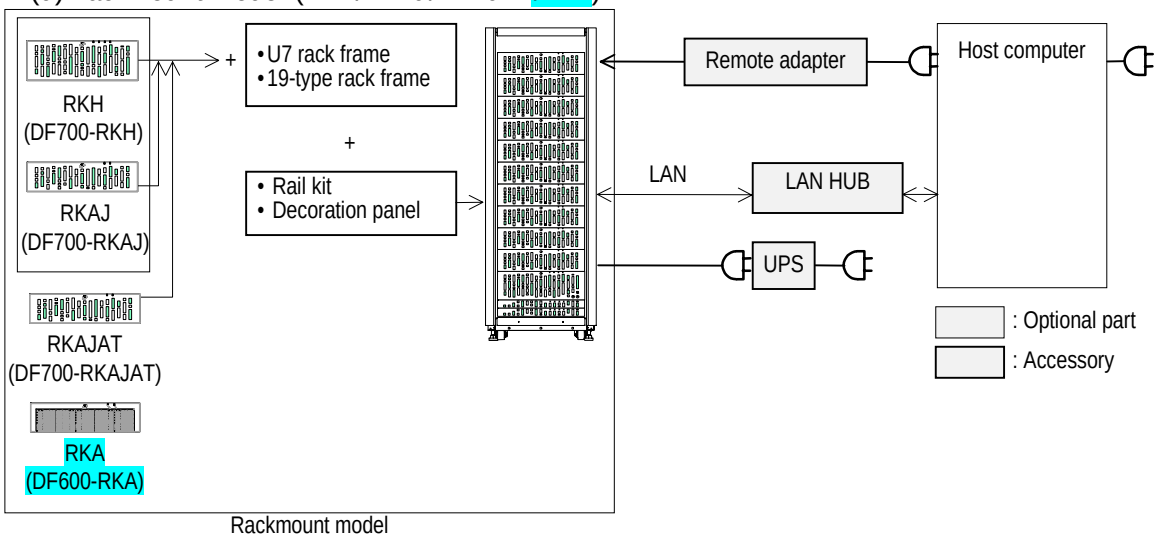


Figure 3.15.1 System Outline of Rackmount Model (RKH/RKAJ/RKAJAT/RKA)

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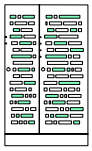
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3.1 Basic Specifications of the Subsystem

(1) Floor (RKM+H1J) Model/Floor (RKM+RKAJ+H2J) Model/Floor (RKM+RKAJAT+H2J) Model

Table 3.1.1 Basic Specifications

Item \ Model			Floor model		
			Floor (RKM+H1J) Model	Floor (RKM+RKAJ+H2J) Model	Floor (RKM+RKAJAT+H2J) Model
Configuration	Configuration		1 RKM + H1J Floor setting kit (Optional)	1 RKM + 1 RKAJ + H2J Floor setting kit (Optional)	1 RKM + 1 RKAJAT + H2J Floor setting kit (Optional)
	Subsystem appearance				
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4		
	Data capacity(*1) (G byte)		71.3/143.3/287.6 G byte		71.3/143.3/287.6 G byte (RKM) 245.7/393.4/491.9 G byte (RKAJAT)
	Rotational speed (min^{-1})		71.3/143.3/287.6 G byte : 10,000 71.3/143.3 G byte : 15,000		71.3/143.3/287.6 G byte : 10,000 (RKM), 71.3/143.3 G byte : 15,000 (RKM), 245.7/393.4/491.9 G byte : 7,200 (RKAJAT)
	Maximum mountable quantity (unit)		15	30	
Host interface	Host interface		4 G bps Fibre Channel Optical (Non-OFC)/ 1 G bps iSCSI [1000Base-T](*5)		
	Data transfer speed (i.e. maximum speed for transfer to host)		400 M bytes/s (Fibre Channel)/ 100 M bytes/s (iSCSI)(*5)		
	Number of ports	Single controller	Fibre Channel : 2/ iSCSI: 2(*5)		
		Dual controller	Fibre Channel : 4/ iSCSI: 4(*5)		
	Transferred block size (bytes)		512		
RAID specifications (*2)	RAID level(*3)		0/1/5/6/1+0		
	RAID configuration (unit of addition)	RAID 0	2D to 15D	2D to 16D	—
		RAID 1	1D+1D		
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P	
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P	
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D	

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

*2 : D : Data disk
P : Parity disk

*3 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*4 : D : Data disk
P : Parity disk

*5 : It indicates the value of when the iSCSI interface board is added to the control unit.

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Item		Model	Floor model		
			Floor (RKM+H1J) Model	Floor (RKM+RKAJ+H2J) Model	Floor (RKM+RKAJAT+H2J) Model
Internal logic specifications	Control CPU		POWER PC 7447A (1.0 G Hz)		
	Control memory		•Flash memory : 16 M bytes •L2 Cache memory : 512 k bytes •SDRAM : 1 G bytes		
	Data assurance method		•Data bus : Parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code		
Physical specifications	Start-up time	(min)	Standard : 4(*1)		
	Chassis size (W×D×H)	(mm)	(260×737×540)	(309×737×540)	
	Mass(*2)	(kg)	70 approx.	115 approx.	
	Acoustic noise(*3)	(dB)	56 approx.	59 approx	
	EIA Standard for unit (U) (*4)		—		
Input power specifications	Input voltage	(V)	AC 100/200 (100 to 120/200 to 240)		
	Frequency	(Hz)	50/60 ± 1		
	Number of phases, cabling		Single-phase with protective grounding		
	Steady-state current(*5)(*6) AC 100 to 120 / 200 to 240	(A)	4.2×2/2.1×2	4.2×2+2.6×2/2.1×2+1.3×2	4.2×2+2.4×2/2.1×2+1.2×2

*1 : The start-up time may be longer than four minutes depending on the configuration.
*2 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*3 : A noise emitted at the time of start is not included.
*4 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*5 : For the both systems, plan the facilities for supplying power to the subsystem according to the specifications for the single power supply because when a failure occurs, only the one power supply operates.
*6 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.

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Item	Model		Floor model		
			Floor (RKM+H1J) Model	Floor (RKM+RKAJ+H2J) Model	Floor (RKM+RKAJAT+H2J) Model
Input power specifications	Breaking current (A)		16.0		
	Required power	Steady state (VA)	840 or less	1,360 or less	1,320 or less
		Starting state(*1) (VA)	840 or less	1,400 or less	1,320 or less
	Heat value (normal) (kJ/h)		3,025 or less	4,900 or less	4,755 or less
Cache specifications	Capacity (M bytes/CTL)		1,024 to 4,096		
	Control method		Read LRU/Write after		
	Battery backup		Provided		
	Backup duration(*2) (h)		24 (When cache of 4,096 M bytes/CTL)		
Maintenance specifications/anti-fault specifications	Parts to which hot replacement is applicable(*3)		•Control Unit •Disk Drive •Power Unit (RKM) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI) and Host Connector	•Control Unit •Disk Drive •Power Unit (RKM) •Power Unit (RKAJ) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI) and Host Connector •ENC Unit	•Control Unit •Disk Drive •Power Unit (RKM) •Power Unit (RKAJAT) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI) and Host Connector •SENC Unit

*1 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown.
(Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

*2 :
- The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- If the subsystem is not energized for more than three months, the over discharging of the battery occurs and it may cause the battery an unrecoverable damage. In this case, the battery must be energized more than 6 hours at least once three months, or store the subsystem with the switch of the battery turned off. Even when the switch is turned off, the battery discharges naturally. Even in this case, however, charge the battery once per six months for longer than 6 hours because spontaneous discharge is done.
  When the battery without the switch is installed, charge it once every six months for more than six (6) hours.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*3 : Only the trained service personnel can perform a hot replacement.

*4 : The battery in the Backup Battery unit is a part to be recycled.

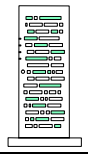
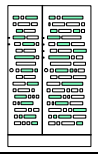
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Item	Model	Floor model		
		Floor (RKM+H1J) Model	Floor (RKM+RKAJ+H2J) Model	Floor (RKM+RKAJAT+H2J) Model
Maintenance specifications/anti-fault specifications	Microprogram installation method	Flash memory/Disk Drive (resident)		
	SVP (built-in exclusive tool) function	•Failure information logging/Power control •Controlling microprogram patching •Disk Drive controlling microprogram down loading •Configuration information change •Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)		
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks		
	Collection of trace and dump	Download the trace and dump through LAN on the maintenance PC.		
	Display function	•Status LEDs (POWER, READY, WARNING, and ALARM) •LED of maintenance part		
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)	AC 1,500 V (100 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more		

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(2) Floor (RKS+H1J) Model/Floor (RKS+RKAJ+H2J) Model/Floor (RKS+RKAJAT+H2J) Model

Table 3.1.2 Basic Specifications

Item \ Model			Floor model		
			Floor (RKS+H1J) Model	Floor (RKS+RKAJ+H2J) Model	Floor (RKS+RKAJAT+H2J) Model
Configuration	Configuration		1 RKS + H1J Floor setting kit (Optional)	1 RKS + 1 RKAJ + H2J Floor setting kit (Optional)	1 RKS + 1 RKAJAT + H2J Floor setting kit (Optional)
	Subsystem appearance				
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4		
	Data capacity(*1) (G byte)		71.3/143.3/287.6 G byte		71.3/143.3/287.6 G byte (RKS) 245.7/393.4/491.9 G byte (RKAJAT)
	Rotational speed (min^{-1})		71.3/143.3/287.6 G byte : 10,000 71.3/143.3 G byte : 15,000		71.3/143.3/287.6 G byte : 10,000 (RKS), 71.3/143.3 G byte : 15,000 (RKS), 245.7/393.4/491.9 G byte : 7,200 (RKAJAT)
	Maximum mountable quantity (unit)		15	30	
Host interface	Host interface		2 G bps Fibre Channel Optical (Non-OFC)/ 4 G bps Fibre Channel Optical (Non-OFC)(*4) 1 G bps iSCSI [1000Base-T](*7)		
	Data transfer speed (i.e. maximum speed for transfer to host)		200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*6) 100 M bytes/s (iSCSI)(*7)		
	Number of Host connector	Single controller	Fibre Channel : 2(*5)		
		Dual controller	Fibre Channel : 4(*5)		
	Transferred block size (bytes)		512		
RAID specifications (*2)	RAID level(*3)		0/1/5/1+0		
	RAID configuration (unit of addition)	RAID 0	2D to 15D	2D to 16D	—
		RAID 1	1D+1D		
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P	
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P	
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D	

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

*2 : D : Data disk
P : Parity disk

*3 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*4 : It indicates the value of when the FC interface board is added to the control unit.

*5 : When the FC Interface Board is not added to the Control Unit, one Mini-HUB is configured every two connectors.

*6 : The case where the FC Interface Board is added to the Control Unit is shown, and the maximum transfer rate for the host may be temporarily set to 400 Mbytes/s (Fibre Channel) according to the conditions of the host I/O.

*7 : It indicates the value of when the iSCSI interface board is added to the control unit.

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Item			Model	Floor model		
				Floor (RKS+H1J) Model	Floor (RKS+RKAJ+H2J) Model	Floor (RKS+RKAJAT+H2J) Model
Internal logic specifications	Control CPU			POWER PC7447A (500 M Hz)		
	Control memory			•Flash memory : 16 M bytes •L2 Cache memory : 512 k bytes •SDRAM : 1 G bytes		
	Data assurance method			•Data bus : Parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code		
Physical specifications	Start-up time (min)			Standard : 4(*1)		
	Chassis size (W×D×H) (mm)			(260×737×540)	(309×737×540)	
	Mass(*2) (kg)			70 approx.	115 approx.	
	Acoustic noise(*3) (dB)			56 approx.	59 approx	
	EIA Standard for unit (U) (*4, *5)			—		
Input power specifications	Input voltage (V)			AC 100/200 (100 to 120/200 to 240)		
	Frequency (Hz)			50/60 ± 1		
	Number of phases, cabling			Single-phase with protective grounding		
	Steady-state current(*6)(*7) AC 100 to 120/200 to 240 (A)			4.0×2/2.0×2	4.0×2+2.6×2/2.0×2+1.3×2	4.0×2+2.4×2/2.0×2+1.2×2
	Breaking current (A)			16.0		
	Required power	Steady state (VA)		800 or less	1,320 or less	1,280 or less
		Starting state(*8) (VA)		800 or less	1,360 or less	1,280 or less
	Heat value (normal) (kJ/h)			2,880 or less	4,755 or less	4,610 or less

*1 : The start-up time may be longer than four minutes depending on the configuration.
*2 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*3 : A noise emitted at the time of start is not included.
*4 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*5 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*6 : For the both systems, plan the facilities for supplying power to the subsystem according to the specifications for the single power supply because when a failure occurs, only the one power supply operates.
*7 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.
*8 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown. (Example : 300 W=300 VA) The actual required power may exceed the value shown in the table when the tolerance is included.

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Item	Model	Floor model		
		Floor (RKS+H1J) Model	Floor (RKS+RKAJ+H2J) Model	Floor (RKS+RKAJAT+H2J) Model
Cache specifications	Capacity (M bytes/CTL)	1,024 , 2,048		
	Control method	Read LRU/Write after		
	Battery backup	Provided		
	Backup duration(*1) (h)	24 (When cache of 2,048 M bytes/CTL)		
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable(*2)	•Control Unit •Disk Drive •Power Unit (RKS) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •Interface Board (FC/iSCSI) and Host Connector	•Control Unit •Disk Drive •Power Unit (RKS) •Power Unit (RKAJ) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •Interface Board (FC/iSCSI) and Host Connector •ENC Unit	•Control Unit •Disk Drive •Power Unit (RKS) •Power Unit (RKAJAT) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •Interface Board (FC/iSCSI) and Host Connector •SENC Unit
	Microprogram installation method	Flash memory/Disk Drive (resident)		
	SVP (built-in exclusive tool) function	•Failure information logging/Power control •Controlling microprogram patching •Disk Drive controlling microprogram down loading •Configuration information change •Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)		
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks		
	Collection of trace and dump	Download the trace and dump through LAN on the maintenance PC.		
	Display function	•Status LEDs (POWER, READY, WARNING, and ALARM) •LED of maintenance part		
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)	AC 1,500 V (100 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more		

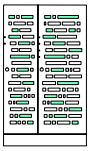
*1 : • The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- If the subsystem is not energized for more than three months, the over discharging of the battery occurs and it may cause the battery an unrecoverable damage. In this case, the battery must be energized more than 6 hours at least once three months, or store the subsystem with the switch of the battery turned off. Even when the switch is turned off, the battery discharges naturally. Even in this case, however, charge the battery once per six months for longer than 6 hours because spontaneous discharge is done.
  When the battery without the switch is installed, charge it once every six months for more than six (6) hours.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*2 : Only the trained service personnel can perform a hot replacement.
*3 : The battery in the Backup Battery unit is a part to be recycled.

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(3) Floor (RKXS+H1J) Model/Floor (RKXS+RKAJAT+H2J) Model

Table 3.1.3 Basic Specifications

Item \ Model			Floor model	
			Floor (RKXS+H1J) Model	Floor (RKXS+RKAJAT+H2J) Model
Configuration	Configuration		1 RKXS + H1J Floor setting kit (Optional)	1 RKXS + 1 RKAJAT + H2J Floor setting kit (Optional)
	Subsystem appearance			
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4	
	Data capacity(*1) (G byte)		245.7/393.4/491.9	
	Rotational speed (min^{-1})		7,200	
	Maximum mountable quantity (unit)		15	30
Host interface	Host interface		2 G bps Fibre Channel Optical (Non-OFC))/ 4 G bps Fibre Channel Optical (Non-OFC)(*4)/ 1 G bps iSCSI [1000Base-T](*6)	
	Data transfer speed (i.e. maximum speed for transfer to host)		200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*7)/ 100 M bytes/s (iSCSI)(*6)	
	Number of Host connector	Single controller	Fibre Channel : 2(*5)/ iSCSI: 2(*6)	
		Dual controller	Fibre Channel : 4(*5)/ iSCSI: 4(*6)	
	Transferred block size (bytes)		512	
RAID specifications (*2)	RAID level(*3)		1/5/6/1+0	
	RAID configuration (unit of addition)	RAID 0	—	
		RAID 1	1D+1D	
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

*2 : D : Data disk
P : Parity disk

*3 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*4 : It indicates the value of when the FC interface board is added to the control unit.

*5 : When the FC Interface Board is not added to the Control Unit, one Mini-HUB is configured every two connectors.

*6 : It indicates the value of when the iSCSI interface board is added to the control unit.

*7 : The case where the FC Interface Board is added to the Control Unit is shown, and the maximum transfer rate for the host may be temporarily set to 400 Mbytes/s (Fibre Channel) according to the conditions of the host I/O.

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Item		Model	Floor model	
			Floor (RKXS+H1J) Model	Floor (RKXS+RKAJAT+H2J) Model
Internal logic specifications	Control CPU		POWER PC7447A (500 M Hz)	
	Control memory		•Flash memory : 16 M bytes •L2 Cache memory : 512 k bytes •SDRAM : 1 G bytes	
	Data assurance method		•Data bus : Parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code	
Physical specifications	Start-up time (min)		Standard : 4(*1)	
	Chassis size (W×D×H) (mm)		(260×737×540)	(309×737×540)
	Mass(*2) (kg)		70 approx.	115 approx.
	Acoustic noise(*3) (dB)		59 approx.	60 approx
	EIA Standard for unit (U) (*4, *5)		—	
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)	
	Frequency (Hz)		50/60 ± 1	
	Number of phases, cabling		Single-phase with protective grounding	
	Steady-state current(*6)(*7) AC 100 to 120/200 to 240 (A)		3.0×2/1.5×2	3.0×2+2.4×2/1.5×2+1.2×2
	Breaking current (A)		16.0	
	Required power	Steady state (VA)	600 or less	1,080 or less
		Starting state(*8) (VA)	600 or less	1,080 or less
	Heat value (normal) (kJ/h)		2,160 or less	3,890 or less

*1 : The start-up time may be longer than four minutes depending on the configuration.
*2 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*3 : A noise emitted at the time of start is not included.
*4 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*5 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*6 : For the both systems, plan the facilities for supplying power to the subsystem according to the specifications for the single power supply because when a failure occurs, only the one power supply operates.
*7 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.
*8 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown. (Example : 300 W=300 VA) The actual required power may exceed the value shown in the table when the tolerance is included.

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Item	Model	Floor model	
		Floor (RKXS+H1J) Model	Floor (RKXS+RKAJAT+H2J) Model
Cache specifications	Capacity (M bytes/CTL)	512, 1,024	
	Control method	Read LRU/Write after	
	Battery backup	Provided	
	Backup duration(*1) (h)	24 (When cache of 1,024 M bytes/CTL)	
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable(*2)	•Control Unit •Disk Drive •Power Unit (RKXS) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •Interface Board (FC/iSCSI) and Host Connector	•Control Unit •Disk Drive •Power Unit (RKXS) •Power Unit (RKAJAT) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •Interface Board (FC/iSCSI) and Host Connector •SENC Unit
	Microprogram installation method	Flash memory/Disk Drive (resident)	
	SVP (built-in exclusive tool) function	•Failure information logging/Power control •Controlling microprogram patching •Disk Drive controlling microprogram down loading •Configuration information change •Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)	
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks	
	Collection of trace and dump	Download the trace and dump through LAN on the maintenance PC.	
	Display function	•Status LEDs (POWER, READY, WARNING, and ALARM) •LED of maintenance part	
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)	AC 1,500 V (100 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more	

*1 : • The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*2 : Only the trained service personnel can perform a hot replacement.
*3 : The battery in the Backup Battery unit is a part to be recycled.

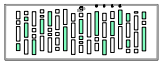
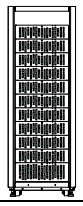
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(4) Rackmount (RKM+RKAJ/RKAJAT/RKA) Model

Table 3.1.4 Basic Specifications

Item		Model	Rackmount model				
			RKM	RKAJ	RKAJAT	RKM + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame	
						One rack	Two racks
Configuration	Configuration		1 RKM	1 RKAJ	1 RKAJAT	1 RKM+RKAJ/ RKAJAT/RKA (10units)(*1) (Maximum configuration) + U7 rack frame (Optional)	1 RKM+RKAJ/ RKAJAT/RKA (14units) (Maximum configuration) + U7 rack frame (Optional)
	Subsystem appearance						
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4				
	Data capacity (*2) (G byte)		71.3/143.3/287.6		245.7/393.4/491.9	71.3/143.3/245.7/287.6/393.4/491.9	
	Rotational speed (min-1)		71.3/143.3/287.6 G byte : 10,000, 71.3/143.3 G byte : 15,000		7,200	RKAJ/RKA: 10,000 (71.3/143.3/287.6 G byte) 15,000 (71.3/143.3 G byte) RKAJAT: 7,200 (245.7/393.4/491.9G byte)	
	Maximum mountable quantity (*3) (unit)		15			165	225
Host interface	Host interface		4 G bps Fibre Channel Optical (Non-OFC)/ 1 G bps iSCSI [1000Base-T](*4)	—		4 G bps Fibre Channel Optical (Non-OFC)/ 1 G bps iSCSI [1000Base-T](*4)	
	Data transfer speed (i.e. maximum speed for transfer to host)		400 M bytes/s (Fibre Channel)/ 100 M bytes/s (iSCSI)(*4)	—		400 M bytes/s (Fibre Channel)/ 100 M bytes/s (iSCSI)(*4)	
	Number of ports	Single controller	Fibre Channel : 2/ iSCSI: 2(*4)	—		Fibre Channel : 2/ iSCSI: 2(*4)	
		Dual controller /Optional	Fibre Channel : 4/ iSCSI: 4(*4)	—		Fibre Channel : 4/ iSCSI: 4(*4)	
	Transferred block size (bytes)		512				

*1 : When nine or more RKAJ/RKAJATs/RKAs are mounted on U7 rack, optional PDU/PDB is necessary.
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.
*3 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*4 : It indicates the value of when the iSCSI interface board is mounted to the control unit.

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Item			Model: Rackmount model				
			RKM	RKAJ	RKAJAT	RKM + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame	
						One rack	Two racks
RAID specifications (*2)	RAID level (*1)		0/1/5/6/1+0		1/5/6/1+0	Mount RKAJ/RKA: 0/1/5/6/1+0 Mount RKAJAT: 1/5/6/1+0	
	RAID configuration (unit of addition)	RAID 0	2D to 15D	2D to 16D	—	Mount RKAJ/RKA: 2D to 16D Mount RKAJAT: Not support	
		RAID 1	1D+1D				
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P(*3)		2D+1P to 15D+1P	
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P			
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D			
Internal logic specifications	Control CPU		It is the same as 'With U7 rack frame'	—		POWER PC 7447A (1.0 G Hz)	
	Control memory			—		• Flash memory : 16 M bytes • L2 Cache memory : 512 k bytes • SDRAM : 1 G bytes	
	Data assurance method			—		• Data bus : Parity • Cache memory :ECC (1 bit for correction, 2 bits for detection) • Disk Drive : Data assurance code	
Physical specifications	Start-up time (min)		Standard : 4(*4)				
	Chassis size (W×D×H) (mm)		(483×650×174)	(483×650×129)		(610×808×1,880)	610×2× (808×1,880)
	Mass(*5) (kg)		58 approx.	40 approx.	40 approx.	690 approx.	1,050 approx.
	Acoustic noise(*6) (dB)		57 approx.	60 approx		65 approx.	66 approx.
	EIA Standard for unit (U) (*7)		4	3		Max. 38	Max. 38
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)			AC 200 (200 to 240)	
	Frequency (Hz)		50/60 ± 1				
	Number of phases, cabling		Single-phase with protective grounding				
	Steady-state current(*8) AC 100/200 (A)		4.2×2/2.1×2	2.6×2/1.3×2	2.4×2/1.2×2	-/20.0(One PDB)	-/20.0(One PDB)

*1 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*2 : D : Data disk
P : Parity disk

*3 : It is recommended to use the RAID configuration within 6D+1P.

*4 : The start-up time may be longer than four minutes depending on the configuration.

*5 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).

*6 : A noise emitted at the time of start is not included.

*7 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.

*8 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.

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Item			Model: Rackmount model				
			RKM	RKAJ	RKAJAT	RKM + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame	
						One rack	Two racks
Input power specifications	Breaking current (A)		16.0	10.0		7.5 (for each output of PDB)	
	Required power	Steady state (VA)	840 or less	520 or less	480 or less	6,040 or less (RKM+RKAJ (10units))/ 5,640 or less (RKM+RKAJAT (10units))	8,120 or less (RKM+RKAJ (14units))/ 7,560 or less (RKM+RKAJAT (14units))
		Starting state (*1) (VA)	840 or less	560 or less	480 or less	6,440 or less (RKM+RKAJ (10units))/ 5,640 or less (RKM+RKAJAT (10units))	8,680 or less (RKM+RKAJ (14units))/ 7,560 or less (RKM+RKAJAT (14units))
	Heat value (normal) (kJ/h)		3,025 or less	1,875 or less	1,730 or less	21,745 or less (RKM+RKAJ (10units))/ 20,305 or less (RKM+RKAJAT (10units))	29,235 or less (RKM+RKAJ (14units))/ 27,220 or less (RKM+RKAJAT (14units))
Cache specifications	Capacity (M bytes/CTL)		1,024 to 2,048	—		1,024 to 4,096	
	Control method		Read LRU/ Write after	—		Read LRU/Write after	
	Battery backup		Provided	—		Provided	
	Backup duration(*2) (h)		24 (When cache of 2,048 M bytes/CTL)	—		24 (When cache of 4,096 M bytes/CTL)	
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable (*3)		•Control Unit •Disk Drive •Power Unit (RKM) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector	•Disk Drive •Power Unit (RKAJ) •ENC Unit	•Disk Drive •Power Unit (RKAJAT) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RKM/RKAJ/RKAJAT/RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector •ENC Unit •SENC Unit •PDB	

*1 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown. (Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

*2 :
- The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- If the subsystem is not energized for more than three months, the over discharging of the battery occurs and it may cause the battery an unrecoverable damage. In this case, the battery must be energized more than 6 hours at least once three months, or store the subsystem with the switch of the battery turned off. Even when the switch is turned off, the battery discharges naturally. Even in this case, however, charge the battery once per six months for longer than 6 hours because spontaneous discharge is done.
  When the battery without the switch is installed, charge it once every six months for more than six (6) hours.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*3 : Only the trained service personnel can perform a hot replacement.

*4 : The battery in the Backup Battery unit is a part to be recycled.

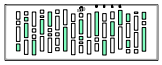
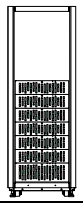
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Item		Model: Rackmount model				
		RKM	RKAJ	RKAJAT	RKM + RKAJ/RKAJAT + 19-type rack frame	
					With U7 rack frame	
					One rack	Two racks
Maintenance specifications /anti-fault specifications	Microprogram installation method	It is the same as 'With U7 rack frame'	—	Flash memory/Disk Drive (resident)		
	SVP (built-in exclusive tool) function		—		• Failure information logging/Power control • Controlling microprogram patching • Disk Drive controlling microprogram down loading • Configuration information change • Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)	
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks				
	Collection of trace and dump	It is the same as 'With U7 rack frame'	—		Download the trace and dump through LAN on the maintenance PC.	
	Display function	• Status LEDs (POWER, READY, WARNING, and ALARM) • LED of maintenance part				
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)			AC 1,500 V (100 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more				

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(5) Rackmount (RKS+RKAJ/RKAJAT) Model

Table 3.1.5 Basic Specifications

Item \ Model			Rackmount model			
			RKS	RKAJ	RKAJAT	RKS + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame One rack
Configuration	Configuration		1 RKS	1 RKAJ	1 RKAJAT	1 RKS + RKAJ/RKAJAT (6 units)(*1) (Maximum configuration) + U7 rack frame (Optional)
	Subsystem appearance					
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4			
	Data capacity (*2) (G byte)		71.3/143.3/287.6		245.7/393.4/491.9	71.3/143.3/245.7/287.6/393.4/491.9
	Rotational speed (min-1)		71.3/143.3/287.6 G byte : 10,000, 71.3/143.3 G byte : 15,000		7,200	RKAJ: 10,000 (71.3/143.3/287.6 G byte) 15,000 (71.3/143.3 G byte) RKAJAT: 7,200 (245.7/393.4/491.9G byte)
	Maximum mountable quantity (*3) (unit)		15			105
Host interface	Host interface		2 G bps Fibre Channel Optical (Non-OFC))/ 4 G bps Fibre Channel Optical (Non-OFC)(*4)/ 1 G bps iSCSI [1000Base-T](*6)		—	2 G bps Fibre Channel Optical (Non-OFC))/ 4 G bps Fibre Channel Optical (Non-OFC)(*4)/ 1 G bps iSCSI [1000Base-T](*6)
	Data transfer speed (i.e. maximum speed for transfer to host)		200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*7)/ 100 M bytes/s (iSCSI)(*6)		—	200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*7)/ 100 M bytes/s (iSCSI)(*6)
	Number of p Host connector	Single controller	Fibre Channel : 1 (*5)/ iSCSI: 2(*6)		—	Fibre Channel : 2(*5)/ iSCSI: 2(*6)
		Dual controller /Optional	Fibre Channel : 2 (*5)/ iSCSI: 4(*6)		—	Fibre Channel : 4(*5)/ iSCSI: 4(*6)
	Transferred block size (bytes)		512			

*1 : Up to the nine RKAJ/RKAJATs can be mounted through an addition of the PDU/PDB (optional).
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.
*3 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*4 : It indicates the value of when the FC interface board is added to the control unit.
*5 : When the FC Interface Board is not added to the Control Unit, one Mini-HUB is configured every two connectors.
*6 : It indicates the value of when the iSCSI interface board is added to the control unit.
*7 : The case where the FC Interface Board is added to the Control Unit is shown, and the maximum transfer rate for the host may be temporarily set to 400 Mbytes/s (Fibre Channel) according to the conditions of the host I/O.

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Item			Model: Rackmount model			
			RKS	RKAJ	RKAJAT	RKS + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame One rack
RAID specifications (*2)	RAID level (*1)		0/1/5/6/1+0		1/5/6/1+0	Mount RKAJ only: 0/1/5/6/1+0 Mount RKAJAT: 1/5/6/1+0
	RAID - configuration (unit of addition)	RAID 0	2D to 15D	2D to 16D	—	Mount RKAJ only: 2D to 16D Mount RKAJAT: Not support
		RAID 1	1D+1D			
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P(*3)		2D+1P to 15D+1P
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P		
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D		
Internal logic specifications	Control CPU		It is the same as 'With U7 rack frame'	—		POWER PC 7447A (500 M Hz)
	Control memory			—		• Flash memory : 16 M bytes • L2 Cache memory : 512 k bytes • SDRAM : 1 G bytes
	Data assurance method			—		• Data bus : Parity • Cache memory :ECC (1 bit for correction, 2 bits for detection) • Disk Drive : Data assurance code
Physical specifications	Start-up time (min)		Standard : 4(*4)			
	Chassis size (W×D×H) (mm)		(483×650×174)	(483×650×129)		(610×808×1,880)
	Mass(*5) (kg)		56 approx.	40 approx.	40 approx.	500 approx.
	Acoustic noise(*6) (dB)		57 approx.	60 approx		63 approx.
	EIA Standard for unit (U) (*7)		4	3		Max. 38
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)			AC 200 (200 to 240)
	Frequency (Hz)		50/60 ± 1			
	Number of phases, cabling		Single-phase with protective grounding			
	Steady-state current(*8) AC 100/200 (A)		4.0×2/2.0×2	2.6×2/1.3×2	2.4×2/1.2×2	-/20.0(One PDB)

*1 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*2 : D : Data disk
P : Parity disk

*3 : It is recommended to use the RAID configuration within 6D+1P.

*4 : The start-up time may be longer than four minutes depending on the configuration.

*5 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).

*6 : A noise emitted at the time of start is not included.

*7 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.

*8 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.

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Item			Model: Rackmount model — RKS	RKAJ	RKAJAT	RKS + RKAJ/RKAJAT + 19-type rack frame / With U7 rack frame / One rack
Input power specifications	Breaking current (A)		16.0	10.0		7.5 (for each output of PDB)
	Required power	Steady state (VA)	800 or less	520 or less	480 or less	3,920 or less (RKS+RKAJ (6units))/ 3,680 or less (RKS+RKAJAT (6units))
		Starting state (*1) (VA)	800 or less	560 or less	480 or less	4,160 or less (RKS+RKAJ (6units))/ 3,680 or less (RKS+RKAJAT (6units))
	Heat value (normal) (kJ/h)		2,880 or less	1,875 or less	1,730 or less	14,115 or less (RKS+RKAJ (6units))/ 13,250 or less (RKS+RKAJAT (6units))
Cache specifications	Capacity (M bytes/CTL)		1,024	—		1,024 , 2,048
	Control method		Read LRU/ Write after	—		Read LRU/Write after
	Battery backup		Provided	—		Provided
	Backup duration(*2) (h)		24 (When cache of 1,024 M bytes/CTL)	—		24 (When cache of 2,048 M bytes/CTL)
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable (*3)		•Control Unit •Disk Drive •Power Unit (RKS) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector	•Disk Drive •Power Unit (RKAJ) •ENC Unit	•Disk Drive •Power Unit (RKAJAT) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RKS/RKAJ/RKAJAT) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector •ENC Unit •SENC Unit •PDB

*1 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown.
(Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

*2 : • The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
• In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
• Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
• When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
• Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
• If the subsystem is not energized for more than three months, the over discharging of the battery occurs and it may cause the battery an unrecoverable damage. In this case, the battery must be energized more than 6 hours at least once three months, or store the subsystem with the switch of the battery turned off. Even when the switch is turned off, the battery discharges naturally. Even in this case, however, charge the battery once per six months for longer than 6 hours because spontaneous discharge is done.
When the battery without the switch is installed, charge it once every six months for more than six (6) hours.
• To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*3 : Only the trained service personnel can perform a hot replacement.

*4 : The battery in the Backup Battery unit is a part to be recycled.

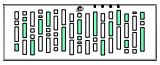
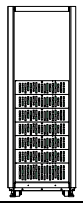
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Item	Model	Rackmount model			
		RKS	RKAJ	RKAJAT	RKS + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame One rack
Maintenance specifications /anti-fault specifications	Microprogram installation method	It is the same as 'With U7 rack frame'	—	Flash memory/Disk Drive (resident)	
	SVP (built-in exclusive tool) function		—	• Failure information logging/Power control • Controlling microprogram patching • Disk Drive controlling microprogram down loading • Configuration information change • Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)	
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks			
	Collection of trace and dump	It is the same as 'With U7 rack frame'	—		Download the trace and dump through LAN on the maintenance PC.
	Display function	• Status LEDs (POWER, READY, WARNING, and ALARM) • LED of maintenance part			
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)			AC 1,500 V (100 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more			

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(6) Rackmount (RKXS+RKAJAT) Model

Table 3.1.6 Basic Specifications

Item \ Model			Rackmount model		
			RKXS	RKAJAT	RKXS + RKAJAT + 19-type rack frame With U7 rack frame One rack
Configuration	Configuration		1 RKXS	1 RKAJAT	1 RKXS + RKAJAT (6 units)(*1) (Maximum configuration) + U7 rack frame (Optional)
	Subsystem appearance				
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4		
	Data capacity (*2) (G byte)		245.7/393.4/491.9		
	Rotational speed (min^{-1})		7,200		
	Maximum mountable quantity (*3) (unit)		15		105
Host interface	Host interface		2 G bps Fibre Channel Optical (Non-OFC)/ 4 G bps Fibre Channel Optical (Non-OFC)(*4)/ 1 G bps iSCSI (1000Base-T)(*6)	—	2 G bps Fibre Channel Optical (Non-OFC)/ 4 G bps Fibre Channel Optical (Non-OFC)(*4)/ 1 G bps iSCSI (1000Base-T)(*6)
	Data transfer speed (i.e. maximum speed for transfer to host)		200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*7)/ 100 M bytes/s (iSCSI)(*6)	—	200 M bytes/s (Fibre Channel)/ 400 M bytes/s (Fibre Channel)(*7)/ 100 M bytes/s (iSCSI)(*6)
	Number of Host connector	Single controller	Fibre Channel : 1 (*5)/ iSCSI : 2(*6)	—	Fibre Channel : 2(*5)/ iSCSI : 2(*6)
		Dual controller /Optional	Fibre Channel : 2 (*5)/ iSCSI : 4(*6)	—	Fibre Channel : 4 (*5)/ iSCSI : 4(*6)
	Transferred block size (bytes)		512		

*1 : Up to the nine RKAJATs can be mounted through an addition of the PDU/PDB (optional).
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.
*3 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*4 : It indicates the value of when the FC interface board is added to the control unit.
*5 : When the FC Interface Board is not added to the Control Unit, one Mini-HUB is configured every two connectors.
*6 : It indicates the value of when the iSCSI interface board is mounted to the control unit.
*7 : The case where the FC Interface Board is added to the Control Unit is shown, and the maximum transfer rate for the host may be temporarily set to 400 Mbytes/s (Fibre Channel) according to the conditions of the host I/O.

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Item			Model: Rackmount model — RKXS	RKAJAT	RKXS + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame One rack
RAID specifications (*2)	RAID level (*1)		1/5/6/1+0		
	RAID - configuration (unit of addition)	RAID 0	—		
		RAID 1	1D+1D		
		RAID 5	2D+1P to 14D+1P	2D+1P to 15D+1P(*3)	2D+1P to 15D+1P
		RAID 6	2D+2P to 13D+2P	2D+2P to 28D+2P	
		RAID 1+0	2D+2D to 7D+7D	2D+2D to 8D+8D	
Internal logic specifications	Control CPU		It is the same as 'With U7 rack frame'	—	POWER PC 7447A (500 M Hz)
	Control memory			—	• Flash memory : 16 M bytes • L2 Cache memory : 512 k bytes • SDRAM : 1 G bytes
	Data assurance method			—	• Data bus : Parity • Cache memory :ECC (1 bit for correction, 2 bits for detection) • Disk Drive : Data assurance code
Physical specifications	Start-up time (min)		Standard : 4(*4)		
	Chassis size (W×D×H) (mm)		(483×650×174)	(483×650×129)	(610×808×1,880)
	Mass(*5) (kg)		56 approx.	40 approx.	500 approx.
	Acoustic noise(*6) (dB)		59 approx.	60 approx	63 approx.
	EIA Standard for unit (U) (*7)		4	3	Max. 38
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)		AC 200 (200 to 240)
	Frequency (Hz)		50/60 ± 1		
	Number of phases, cabling		Single-phase with protective grounding		
	Steady-state current(*8) AC 100/200 (A)		3.0×2/1.5×2	2.4×2/1.2×2	-/20.0(One PDB)

*1 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*2 : D : Data disk
P : Parity disk

*3 : It is recommended to use the RAID configuration within 6D+1P.

*4 : The start-up time may be longer than four minutes depending on the configuration.

*5 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).

*6 : A noise emitted at the time of start is not included.

*7 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.

*8 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.

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Item			Model: RKXS	Model: RKAJAT	Model: RKXS +RKAJAT + 19-type rack frame / With U7 rack frame / One rack
			Rackmount model		
Input power specifications	Breaking current (A)		12.5	10.0	7.5 (for each output of PDB)
	Required power	Steady state (VA)	600 or less	480 or less	3,480 or less
		Starting state (*1) (VA)	600 or less	480 or less	3,480 or less
	Heat value (normal) (kJ/h)		2,160 or less	1,730 or less	12,540 or less
Cache specifications	Capacity (M bytes/CTL)		512, 1,024	—	1,024
	Control method		Read LRU/ Write after	—	Read LRU/Write after
	Battery backup		Provided	—	Provided
	Backup duration(*2) (h)		24 (When cache of 1,024 M bytes/CTL)	—	24 (When cache of 1,024 M bytes/CTL)
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable (*3)		•Control Unit •Disk Drive •Power Unit (RKXS) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector	•Disk Drive •Power Unit (RKAJAT) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RKXS) •Power Unit (RKAJAT) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector •SENC Unit •PDB

*1 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown.
(Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

*2 :
- The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*3 : Only the trained service personnel can perform a hot replacement.

*4 : The battery in the Backup Battery unit is a part to be recycled.

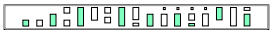
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Item	Model	Rackmount model		
		RKXS	RKAJAT	RKXS +RKAJAT + 19-type rack frame With U7 rack frame One rack
Maintenance specifications /anti-fault specifications	Microprogram installation method	Flash memory/Disk Drive (resident)		
	SVP (built-in exclusive tool) function	• Failure information logging/Power control • Controlling microprogram patching • Disk Drive controlling microprogram down loading • Configuration information change • Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)		
	Spare Disk	Up to 15 of mounted Disk Drive s can be set to Spare Disks		
	Collection of trace and dump	It is the same as 'With U7 rack frame'	—	Download the trace and dump through LAN on the maintenance PC.
	Display function	• Status LEDs (POWER, READY, WARNING, and ALARM) • LED of maintenance part		
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)		AC 1,500 V (100 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more		

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(7) NAS Unit (RKNAS)

Table 3.1.7 Basic Specifications

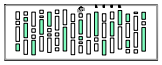
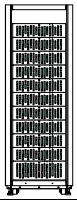
Item \ Model			RKNAS
Configuration	Configuration		1 RKNAS
	Subsystem appearance		
Host interface	Host interface		1 G bps Ethernet
	Data transfer speed (i.e. maximum speed for transfer to host)		100 M bytes/s
	Number of ports	Single controller	—
		Dual controller	8 (4/1RKNAS)
Internal logic specifications	Control CPU		Intel LV-Xeon2.8GHz
	Control memory		Bios : 1 M bytes L2 Cache memory : 1 M bytes
	Data assurance method		Data bus : Through-parity Cache memory :ECC (1 bit for correction, 2 bits for detection)
Physical specifications	Start-up time (min)		Standard : 3(*1)
	Chassis size (W×D×H) (mm)		(483×650×43)
	Mass(*2) (kg)		15 approx.
	Acoustic noise(*3) (dB)		60 approx.
	EIA Standard for unit (U) (*4)		1
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)
	Frequency (Hz)		50/60 ± 1
	Number of phases, cabling		Single-phase with protective grounding
	Steady-state current(*5) AC 100/200 (A)		2.0/1.4
	Breaking current (A)		10.0
	Required power	Steady state (VA)	280 or less
		Starting state (*6) (VA)	280 or less
	Heat value (normal) (kJ/h)		1,010 or less

*1 : The start-up time may be longer than three minutes depending on the configuration.
*2 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*3 : A noise emitted at the time of start is not included.
*4 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*5 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.
*6 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown.
(Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

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(8) Rackmount (RKH+RKAJ/RKAJAT/RKA) Model

Table 3.1.8 Basic Specifications

Item \ Model		Rackmount model				
		RKH	RKAJ	RKAJAT	RKH + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame	
					One rack	Three racks
Configuration	Configuration	1 RKH	1 RKAJ	1 RKAJAT	1 RKH+RKAJ/RKA (10units)/ RKH+RKAJ (1unit) +RKAJAT (9units)(*1) (Maximum configuration) + U7 rack frame (Optional)	1 RKH+RKAJ/RKA (30units)/ RKH+RKAJ/RKA (2units) +RKAJAT (28units) (Maximum configuration) + U7 rack frame (3units) (Optional)
	Subsystem appearance					
Disk Drive used	Disk Drive size (W×D×H) (mm)	—	101.6×146.1×25.4			
	Data capacity (*2) (G byte)	—	71.3/143.3/287.6	245.7/393.4/491.9	71.3/143.3/245.7/287.6/393.4/491.9	
	Rotational speed (min^{-1})	—	71.3/143.3/287.6 G byte :10,000 71.3/143.3 G byte :15,000	7,200	RKAJ/RKA: 10,000 (71.3/143.3/287.6 G byte) 15,000 (71.3/143.3 G byte) RKAJAT: 7,200 (245.7/393.4/491.9G byte)	
	Maximum mountable quantity (*3) (unit)	—	15		150	450
Host interface	Host interface	4 G bps Fibre Channel Optical (Non-OFC)/ 1 G bps iSCSI [1000Base-T](*4)	—		4 G bps Fibre Channel Optical (Non-OFC)/ 1 G bps iSCSI [1000Base-T](*4)	
	Data transfer speed (i.e. maximum speed for transfer to host)	400 M bytes/s (Fibre Channel)/ 100 M bytes/s (iSCSI)(*4)	—		400 M bytes/s (Fibre Channel)/ 100 M bytes/s (iSCSI)(*4)	
	Number of ports / Dual controller	Fibre Channel : Max.8/ iSCSI: 4(*4)	—		Fibre Channel : Max.8/ iSCSI: 4(*4)	
	Transferred block size (bytes)	512				

*1 : When nine or more RKAJ/RKAJATs/RKAs are mounted on U7 rack, optional PDU/PDB is necessary.
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.
*3 : Can be mounted on the Hitachi special rack frame (U7). For the mounting, special rails for the rack frame and decoration panel(s) are required separately depending on the number of the mounted subsystem(s).
*4 : It indicates the value of when the iSCSI interface board is mounted/added to the control unit.

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Item			Model: RKH	RKAJ	RKAJAT	RKH + RKAJ/RKAJAT + 19-type rack frame: With U7 rack frame: One rack	RKH + RKAJ/RKAJAT + 19-type rack frame: With U7 rack frame: Three racks
			Rackmount model				
RAID specifications (*2)	RAID level (*1)		—	0/1/5/6/1+0	1/5/6/1+0	Mount RKAJ/RKA: 0/1/5/6/1+0 Mount RKAJAT: 1/5/6/1+0	
	RAID configuration (unit of addition)	RAID 0	—	2D to 16D	—	Mount RKAJ/RKA: 2D to 16D Mount RKAJAT: Not support	
		RAID 1	—	1D+1D			
		RAID 5	—	2D+1P to 15D+1P(*3)		2D+1P to 15D+1P	
		RAID 6	—	2D+2P to 28D+2P			
		RAID 1+0	—	2D+2D to 8D+8D			
Internal logic specifications	Control CPU		It is the same as 'With U7 rack frame'	—		RKH : POWER PC 7447A (1.4 G Hz) RKHE : POWER PC 7448 (1.7 G Hz)	
	Control memory			—		• Flash memory : 16 M bytes • L2 Cache memory : 512 k bytes (RKH) 1 M bytes (RKHE) • SDRAM : 1 G bytes	
	Data assurance method			—		• Data bus : Parity • Cache memory :ECC (1 bit for correction, 2 bits for detection) • Disk Drive : Data assurance code	
Physical specifications	Start-up time (min)		Standard : 5(*4)				
	Chassis size (W×D×H) (mm)		(483×650×174)	(483×650×129)		(610×808×1,880)	610×2× (808×1,880)
	Mass(*5) (kg)		47 approx.	40 approx.	40 approx.	680 approx.	1,910 approx.
	Acoustic noise(*6) (dB)		57 approx.	60 approx.		65 approx.	70 approx.
	EIA Standard for unit (U) (*7)		4	3		Max. 38	Max. 38
Input power specifications	Input voltage (V)		AC 100/200 (100 to 120/200 to 240)			AC 200 (200 to 240)	
	Frequency (Hz)		50/60 ± 1				
	Number of phases, cabling		Single-phase with protective grounding				
	Steady-state current(*8) AC 100/200 (A)		2.6×2/1.3×2	2.6×2/1.3×2	2.4×2/1.2×2	-/20.0(One PDB)	-/20.0(One PDB)

*1 : Although the subsystem with a configuration of RAID 6, RAID 5, RAID 1, or RAID 1+0 provides data reliability enhanced by means of redundancy, a possibility remains that user data is lost owing to an unexpected failure of a host computer or hardware/software of the subsystem itself.
Therefore, users are requested to back up all data for restoration in case where the original data is lost.

*2 : D : Data disk
P : Parity disk

*3 : It is recommended to use the RAID configuration within 6D+1P.

*4 : The start-up time may be longer than five minutes depending on the configuration.

*5 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).

*6 : A noise emitted at the time of start is not included.

*7 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.

*8 : The current value in the operation by a single power supply unit is same as that in the operation by both power supply units.

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Item			Model: RKH	RKAJ	RKAJAT	RKH + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame: One rack	RKH + RKAJ/RKAJAT + 19-type rack frame With U7 rack frame: Three racks
			Rackmount model				
Input power specifications	Breaking current (A)		12.5	10.0		7.5 (for each output of PDB)	
	Required power	Steady state (VA)	520 or less	520 or less	480 or less	5,720 or less (RKH+RKAJ)/ 5,360 or less (RKH+RKAJAT)	16,120 or less (RKH+RKAJ)/ 15,000 or less (RKH+RKAJAT)
		Starting state (*1) (VA)	520 or less	560 or less	480 or less	6,120 or less (RKH+RKAJ)/ 5,400 or less (RKH+RKAJAT)	17,320 or less (RKH+RKAJ)/ 15,080 or less (RKH+RKAJAT)
	Heat value (normal) (kJ/h)		1,875 or less	1,875 or less	1,730 or less	20,600 or less (RKH+RKAJ)/ 19,300 or less (RKH+RKAJAT)	58,035 or less (RKH+RKAJ)/ 54,000 or less (RKH+RKAJAT)
Cache specifications	Capacity (M bytes/CTL)		2,048 to 8,192	—		2,048 to 8,192	
	Control method		Read LRU/ Write after	—		Read LRU/Write after	
	Battery backup		Provided	—		Provided	
	Backup duration(*2) (h)		48 (When cache of 2,048 M bytes/CTL)	—		48 (When cache of 8,192 M bytes/CTL)	
Maintenance specifications /anti-fault specifications	Parts to which hot replacement is applicable (*3)		•Control Unit •Disk Drive •Power Unit (RKH) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector	•Disk Drive •Power Unit (RKAJ) •ENC Unit	•Disk Drive •Power Unit (RKAJAT) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RKH/RKAJ/RKAJAT/RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •Interface Board (FC/iSCSI/NAS) and Host Connector •ENC Unit •SENC Unit •PDB	

*1 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the uninterrupted power supply (UPS), specify the power factor as 100% for calculation. Value at 100 V/200 V is shown.
(Example : 300 W=300 VA)
The actual required power may exceed the value shown in the table when the tolerance is included.

*2 :
- The backup time of the data on the Cache memory is indicated (in the case of the battery full charge).
- In the battery that exceeds the periodic replacement cycle, the backup time may become remarkably short.
- Non-volatility of data in the cache memory is ensured against power trouble such as a sudden power failure. It transfers data in the Cache memory to Disk Drives by turning off the power normally, and prevents the battery charge from being wasted.
- When the subsystem enters the Cache Backup mode, a warning (lighting of the orange LED) informing of a voltage drop of the battery may be issued when the subsystem is started. It shows that the remaining capacity of the battery is not sufficient, and in this state, the subsystem operates disabling the Write Cache function automatically.
  When the battery is charged, the warning indication disappears, and the subsystem continues the operation enabling the Write Cache function. The warning indication disappears within six hours at the latest. Even when the warning is being indicated, normal functional operation is assured although the operation is performed in the Write-Through mode and the R/W performance is lowered because the Write Cache function is disabled.
- Since battery is subject to effect of environmental temperature, avoid using a battery in unnecessarily continuous operation at high temperature.
- When a device is kept with power-off for more than six months, the battery may be excessively discharged, and it may cause an unrecoverable damage. In such a storing condition, the battery must be charged once every six months for more than six (6) hours.
- To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

*3 : Only the trained service personnel can perform a hot replacement.

*4 : The battery in the Backup Battery unit is a part to be recycled.

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Item	Model	Rackmount model				
		RKH	RKAJ	RKAJAT	RKH + RKAJ/RKAJAT + 19-type rack frame	
					With U7 rack frame	
					One rack	Three racks
Maintenance specifications /anti-fault specifications	Microprogram installation method	It is the same as 'With U7 rack frame'	—	Flash memory/Disk Drive (resident)		
	SVP (built-in exclusive tool) function		—		• Failure information logging/Power control • Controlling microprogram patching • Disk Drive controlling microprogram down loading • Configuration information change • Disk Drive recovery initiating process (This process is automatically executed when Disk Drive is replaced.)	
	Spare Disk	Up to 30 of mounted Disk Drive s can be set to Spare Disks				
	Collection of trace and dump	It is the same as 'With U7 rack frame'	—		Download the trace and dump through LAN on the maintenance PC.	
	Display function	• Status LEDs (POWER, READY, WARNING, and ALARM) • LED of maintenance part				
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)			AC 1,500 V (100 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more				

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3.2 Basic Specifications of the Disk Drive

Table 3.2.1 FC Disk Drive

Item \ Mode		DF-F700-AGF72	DF-F700-AGH72	DF-F700-AGF146	DF-F700-AGH146	DF-F700-AGF300
Disk Drive Model Name	Seagate	ST373207FC (DKS2D-J072FC)	ST373454FC (DKS2D-K072FC)	ST3146707FC (DKS2D-J146FC)	ST3146854FC (DKS2D-K146FC)	ST3300007FC (DKS2D-J300FC)
	HGST	HUS103073FLF210 (DKR2F-J72FC)	-	HUS103014FLF210 (DKR2F-J146FC)	-	HUS103030FLF210 (DKR2F-J300FC)
Capacity (G bytes)		71.31	71.31	143.30	143.30	287.62
Number of Heads	Seagate	2	4	2	8	8
	HGST	3	-	3	-	10
Number of Disks	Seagate	1	2	1	4	4
	HGST	2	-	2	-	5
SeekTime (ms) (Read/Write)	minimum	0.2/0.5	0.27/0.45	0.2/0.5	0.4/0.6	0.65/0.85
	average	4.7/5.4	3.5/4.0	4.7/5.4	3.8/4.1	4.9/5.5
	maximum	9.7/10.4	7.4/7.9	9.7/10.4	6.7/7.1	10.0/11.0
Average latency time (ms)		2.99	2.01	2.99	2.01	2.99
Rotational speed (min^{-1})		10,000	15,000	10,000	15,000	10,000
Interface data transfer rate (MB/S)		200	200	200	200	200
Internal data transfer rate (MB/S)		59 to 118	85.6 to 142.7	59 to 118	76.13 to 113.78	58.75 to 114.13
Interface		FC-AL	FC-AL	FC-AL	FC-AL	FC-AL

Table 3.2.2 SATA Disk Drive

Item \ Mode		DF-F700-ATE250R	DF-F700-ATE400R	DF-F700-ATE500R
Disk Drive Model Name	HGST	HDS722525VLSA80 HDS724040KLSA80(*1) HDS725050KLA360(*1)	HDS724040KLSA80 HDS725050KLA360(*1)	HDS725050KLA360
Capacity (G bytes)		245.74	393.45	491.94
Number of Heads		6	10	10
Number of Disks		3	5	5
SeekTime (ms) (Read/Write)	minimum	0.8/1.3	0.8/1.3	0.8/1.3
	average	8.2/9.2	8.2/9.2	8.2/9.2
	maximum	14.7/15.7	14.7/15.7	14.7/15.7
Average latency time (ms)		4.17	4.17	4.17
Rotational speed (min^{-1})		7,200	7,200	7,200
Interface data transfer rate (MB/S)		150	150	300
Internal data transfer rate (MB/S)		29.7 to 61.4	29.8 to 61.5	31.0～64.5
Interface		SATA	SATA	SATA

*1 : Capacity restriction version

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Chapter 4. Theory of Operation

This chapter explains the flow and format of data. It also explains the data processing.

4.1 Power On/Off Sequence

4.1.1 IMPL sequence

The procedure for processing the IMPL executed when the subsystem is started is explained below. The IMPL sequence is broadly divided into four processes and they are executed sequentially.

(1) Boot loader
After the boot loader is booted from the flash memory, it executes the minimum CUDG and hardware initialization. Then, it loads the local memory loader from the flash memory to the local memory and transfers the control to the local memory loader.

(2) Local memory loader
The local memory loader performs the CUDG and hardware initialization which are necessary for loading the OS load module. It loads the OS load module in the local memory after the spin-up of all Disk Drives of the RKH, RKM, RKS, RKXS, RKAJ, RKAJAT and RKA is completed. And then, the local memory loader passes the control to the OS.

(3) OS
The OS initializes the table on the local memory for the communication between the tasks using the root task of the OS and generates the DF initialization task.

(4) DF initialization task
After making the initial setting of the hardware and the DF table, DF initialization task generates DF task. The load of the CUDG and the takeover information is executed in the DF task, and then the loop diagnosis on the Disk Drive side and the load of pinned data are performed.

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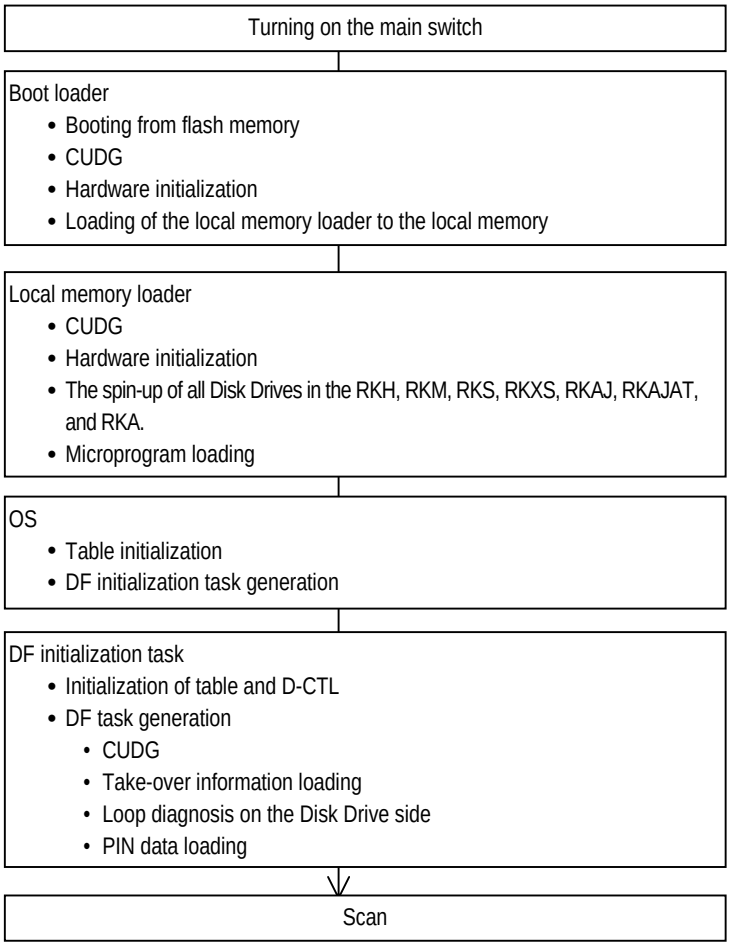


Figure 4.1.1 IMPL Sequence

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4.1.2 Disk Drive powering on sequence

If all the Disk Drive motors are rotated at the same time an overcorrect may be caused. To avoid it, the drives are started in the following sequence.

(1) Disk Drive starting sequence (RKM/RKS/RKXS/RKAJ/RKAJAT/RKA)

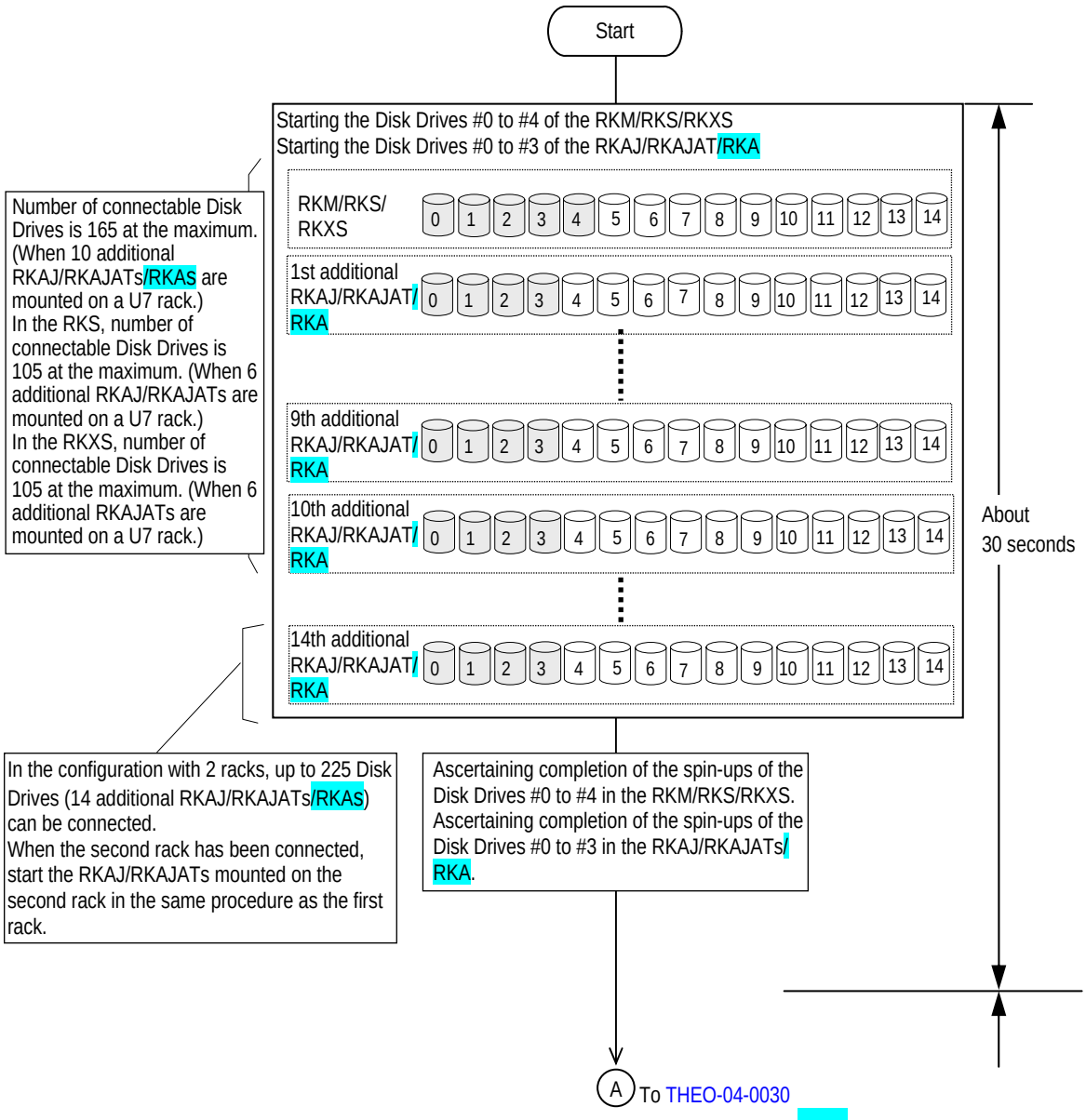


Figure 4.1.2(1/3) Disk Drive Starting Sequence (RKM/RKS/RKXS/RKAJ/RKAJAT/RKA)

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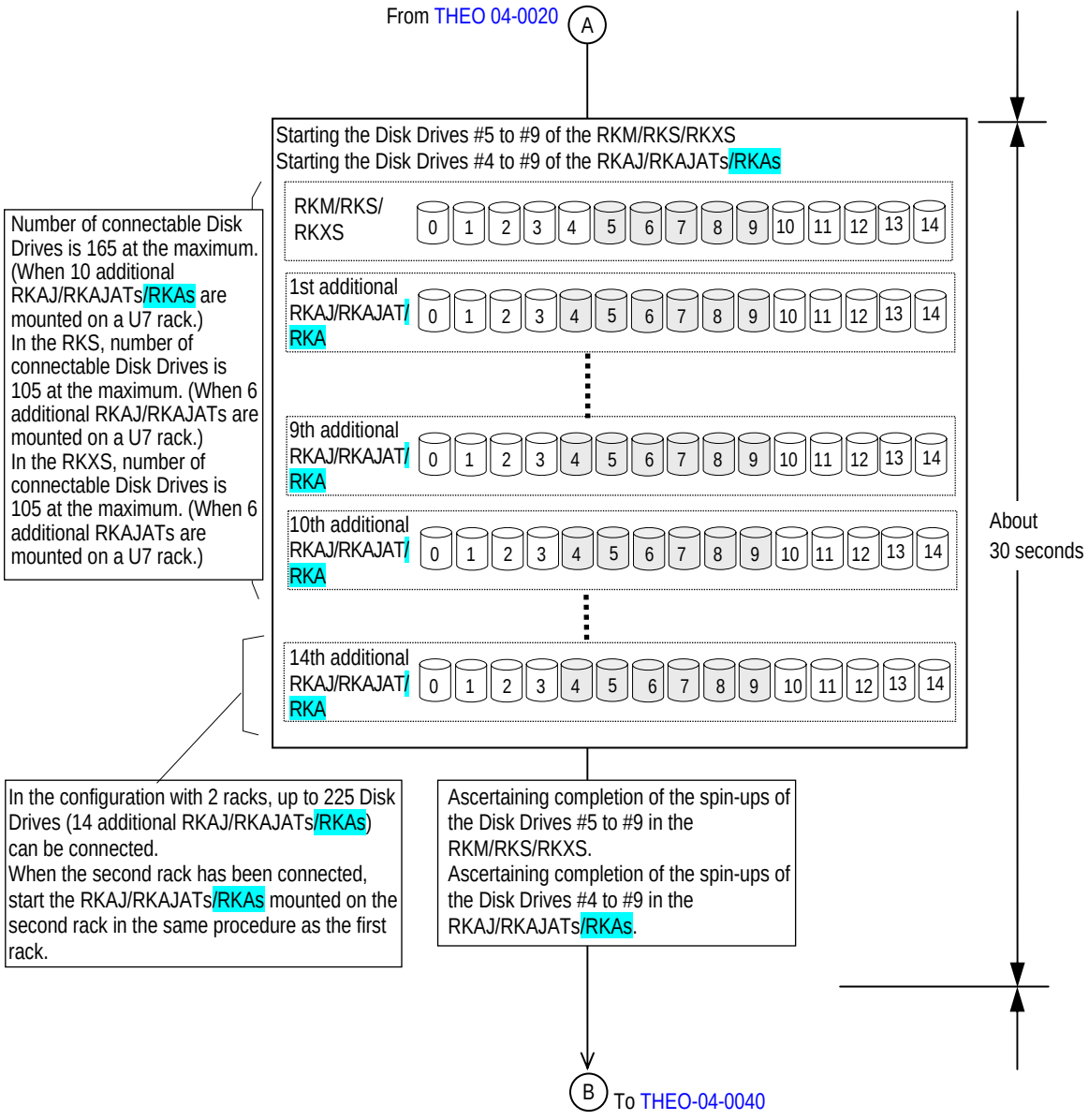


Figure 4.1.2(2/3) Disk Drive Starting Sequence (RKM/RKS/RKXS/RKAJ/RKAJAT/RKA)

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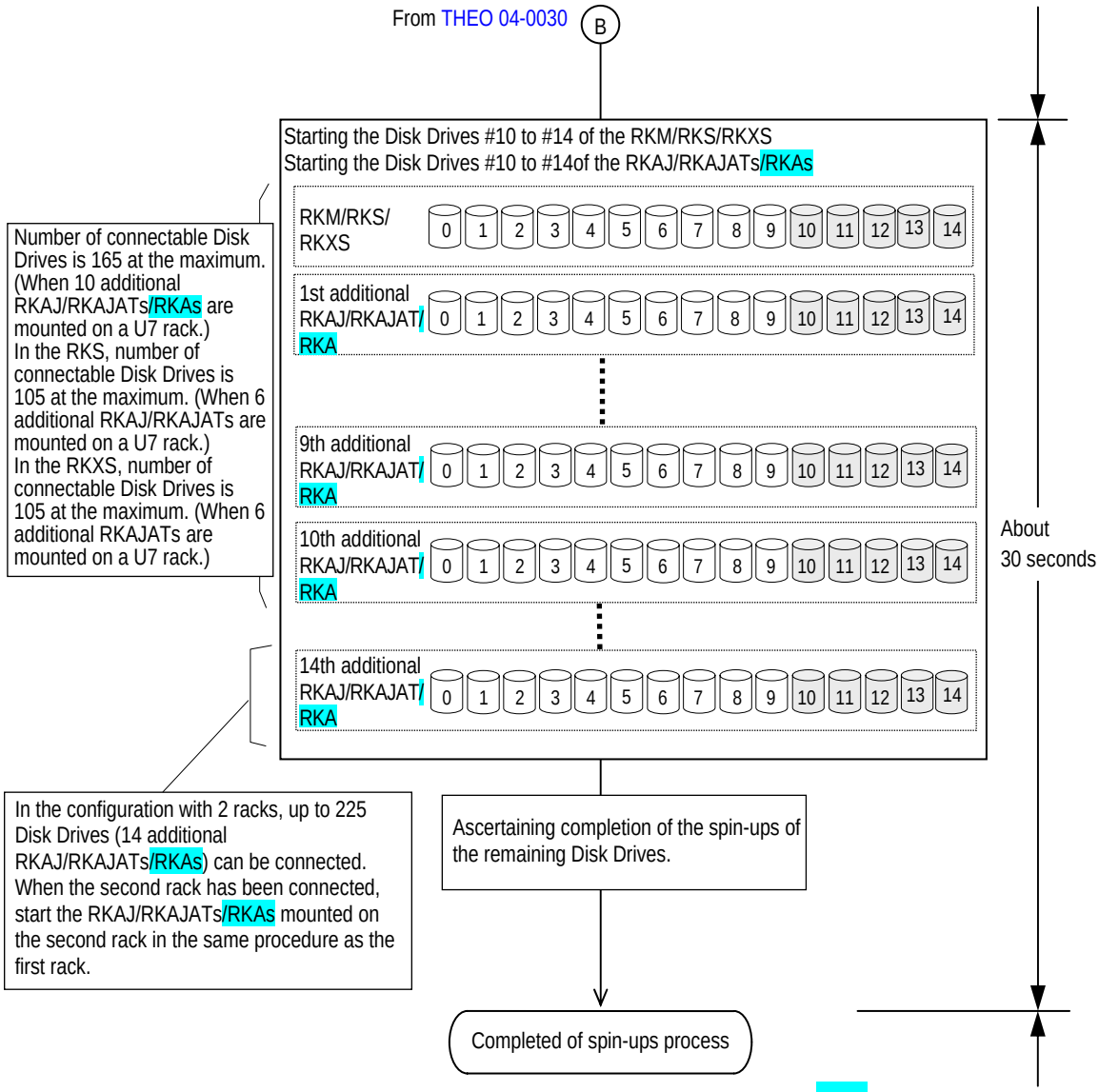


Figure 4.1.2(3/3) Disk Drive Starting Sequence (RKM/RKS/RKXS/RKAJ/RKAJAT/RKA)

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(2) Disk Drive starting sequence (RKH/RKAJ/RKAJAT/RKA)

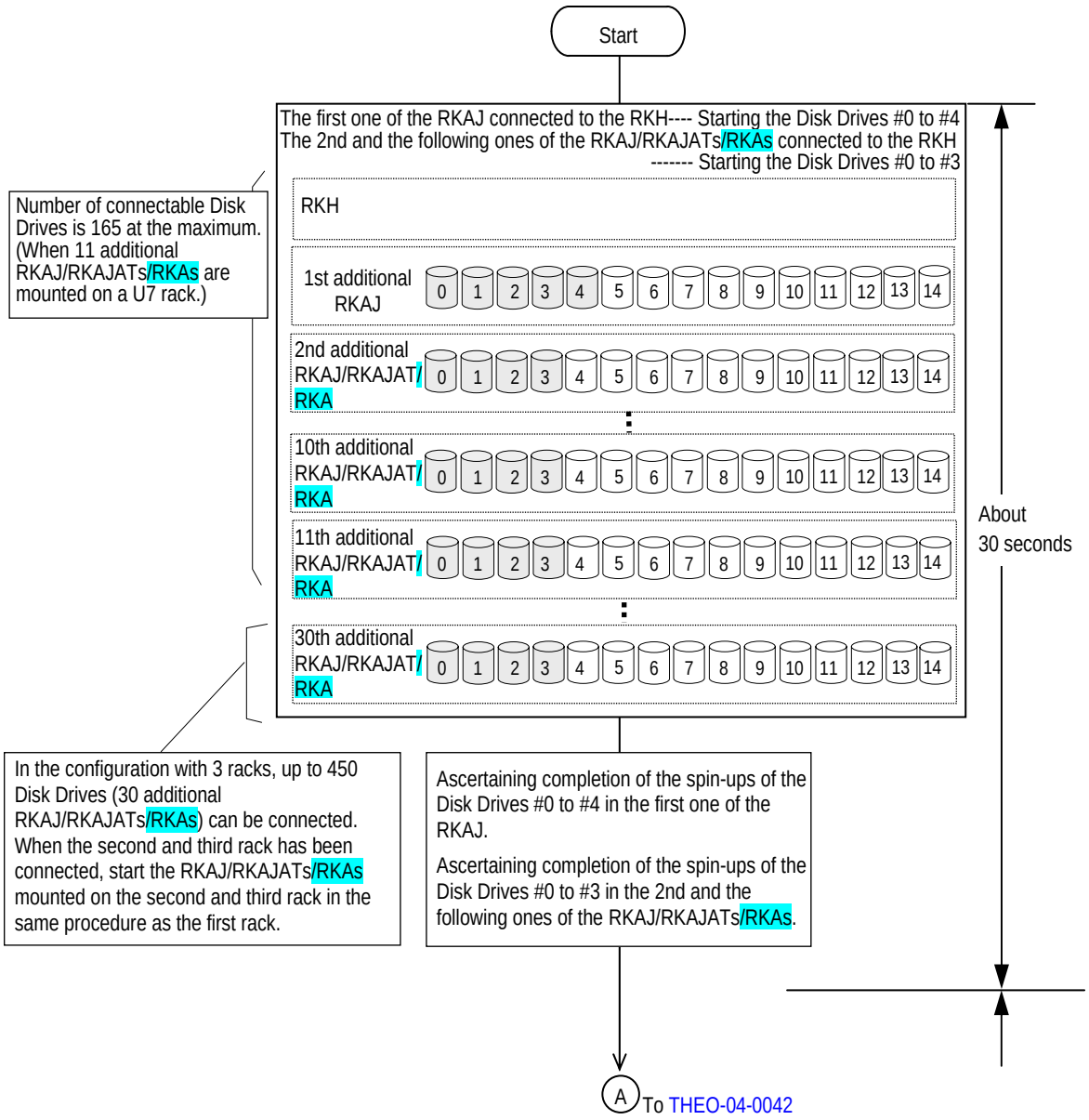


Figure 4.1.2.1 (1/3) Disk Drive Starting Sequence (RKH/RKAJ/RKAJAT/RKA)

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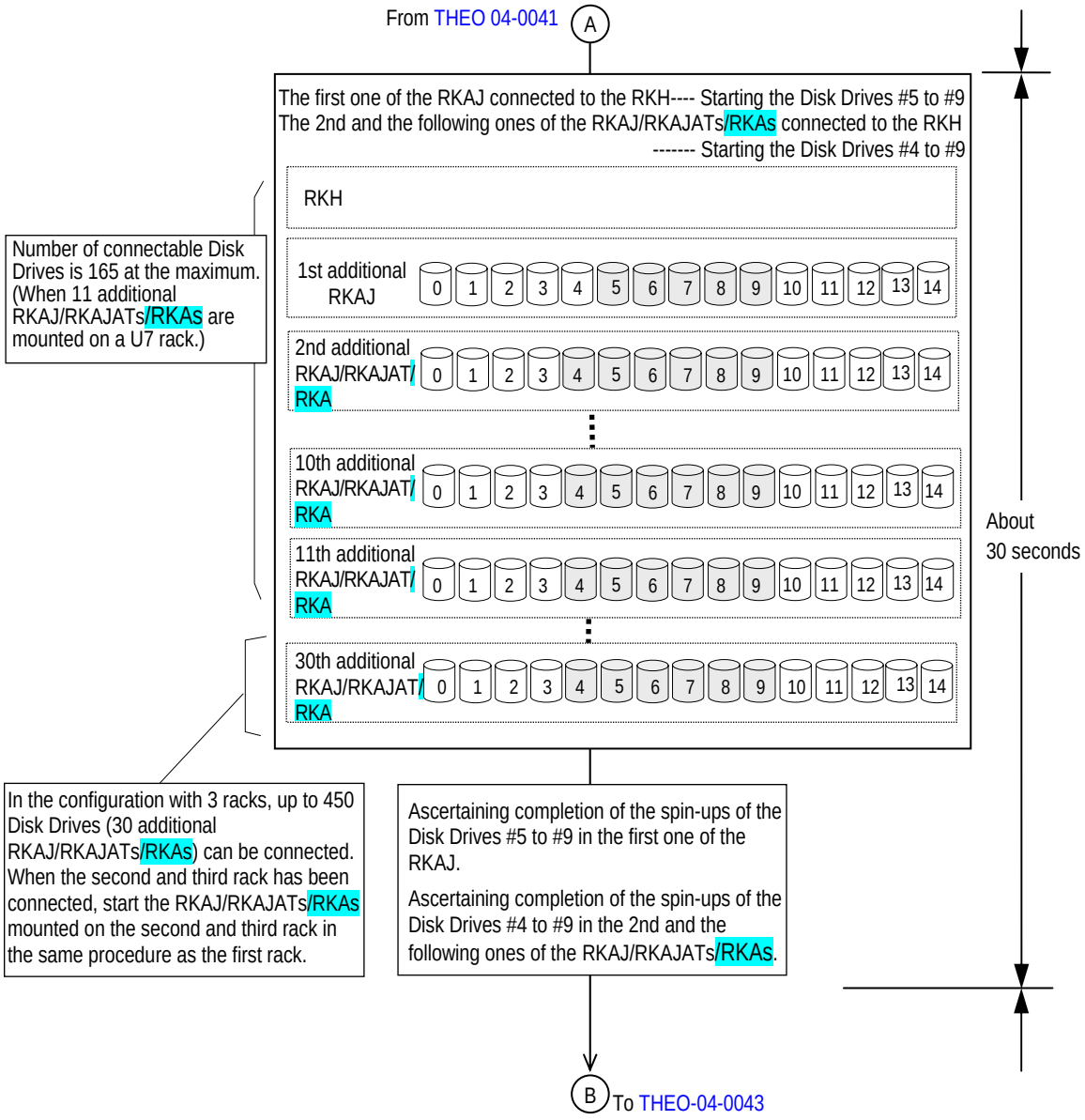


Figure 4.1.2.1 (2/3) Disk Drive Starting Sequence (RKH/RKAJ/RKAJAT/RKA)

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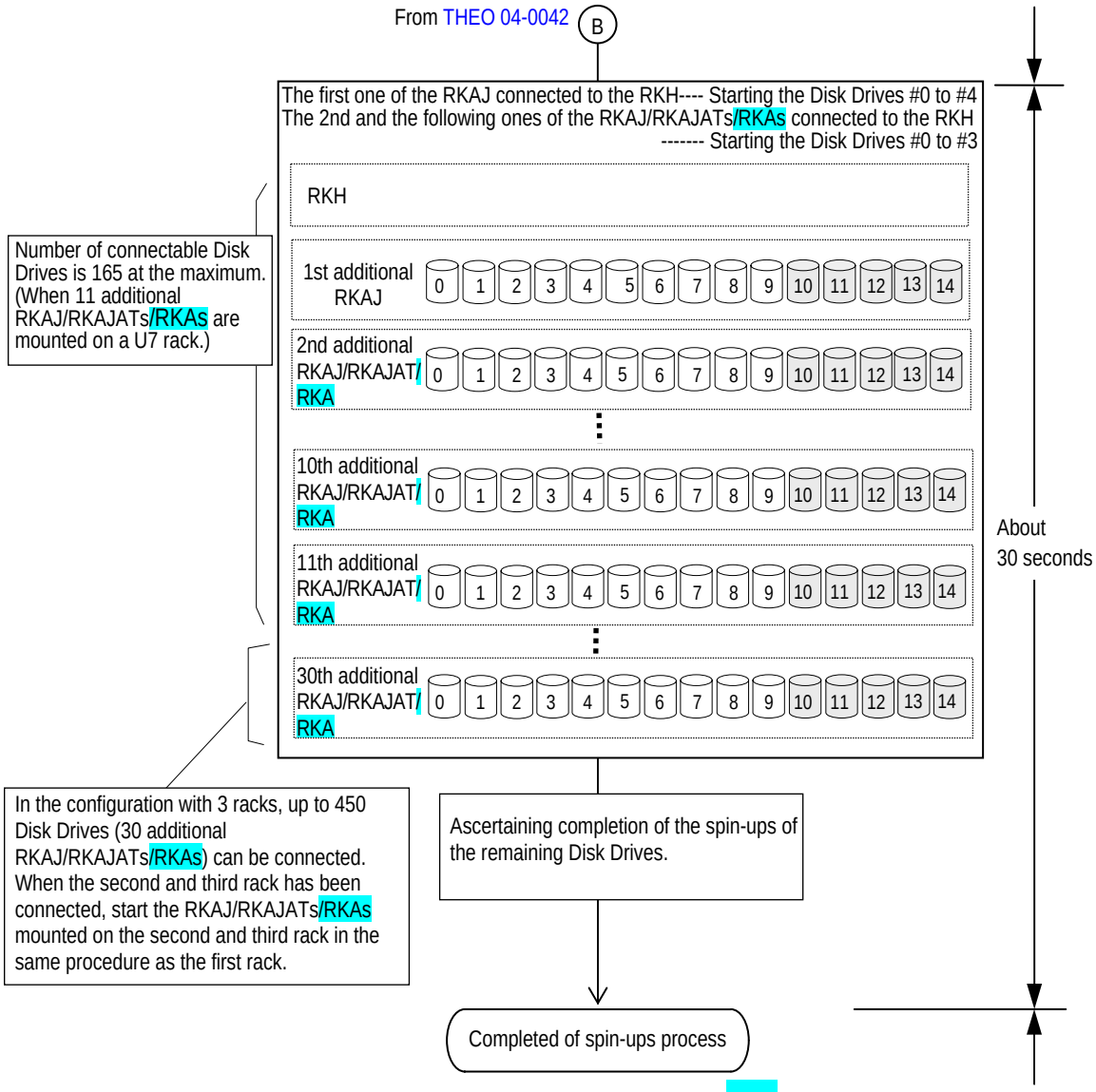


Figure 4.1.2.1 (3/3) Disk Drive Starting Sequence (RKH/RKAJ/RKAJAT/RKA)

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4.1.3 Sequential shutdown

If the subsystem receives instructions of a stop (remote control) by having turned off the power supply of the host computer and a stop (local control) by having turned off the main switch, when the NAS Unit is connected, the shutdown instruction is issued to the NAS Unit. By receiving it, the power supply of the NAS Unit is turned off after terminating the job which the NAS OS is executing.
After that, the termination status of the processing, which is beginning or executing, is monitored for all the logical devices.
After ascertaining completion of all of them, it executes the destaging.
When doing the above, if a track failed to be destaged (pinned data) occurs, it stores the Pin information in the system area on the system disk.
Then, after the take-over information is stored in the system area of the system disk and the power supplying from the Backup Battery Unit is shut off, the subsystem is notified of the permission for powering off.
The AC Power Unit Switch of the subsystem becomes able to be turned off after receiving the permission.

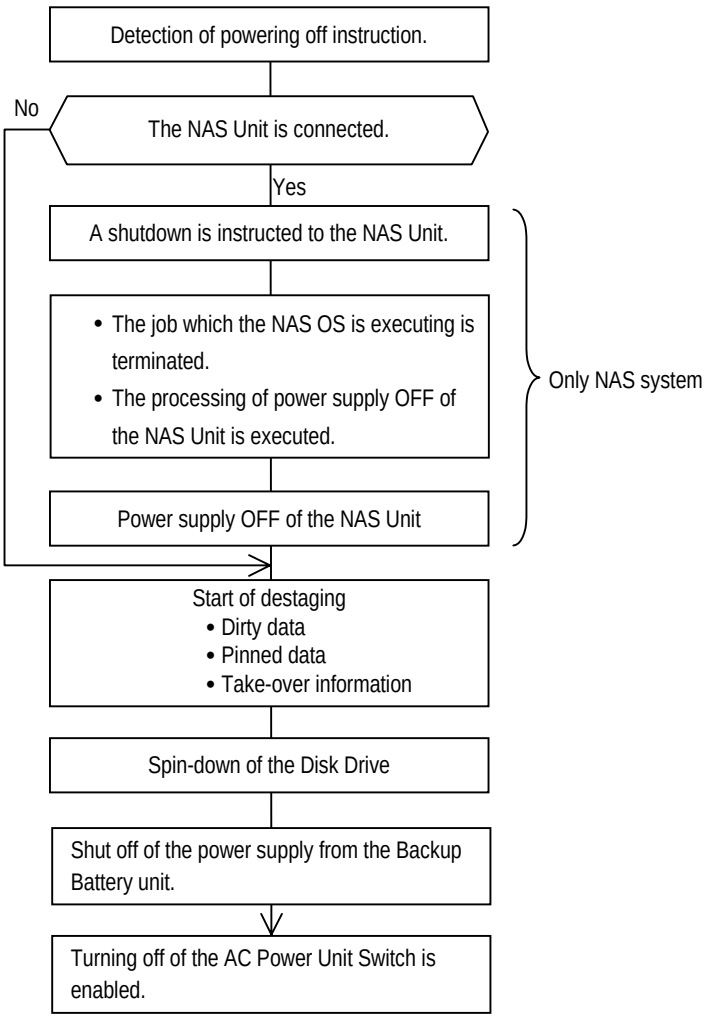


Figure 4.1.3 Flow Chart of Sequential Shutdown

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4.2 Data Format

Figure 4.2.1 shows the data format.

To the sub-block, the check code the address assurance code (LA), write sequence (WR_SEQ), reserve (RSV) and data assurance code (LRC), is added.

The physical format on the physical disk is that recorded in the data field in units of 520 bytes.

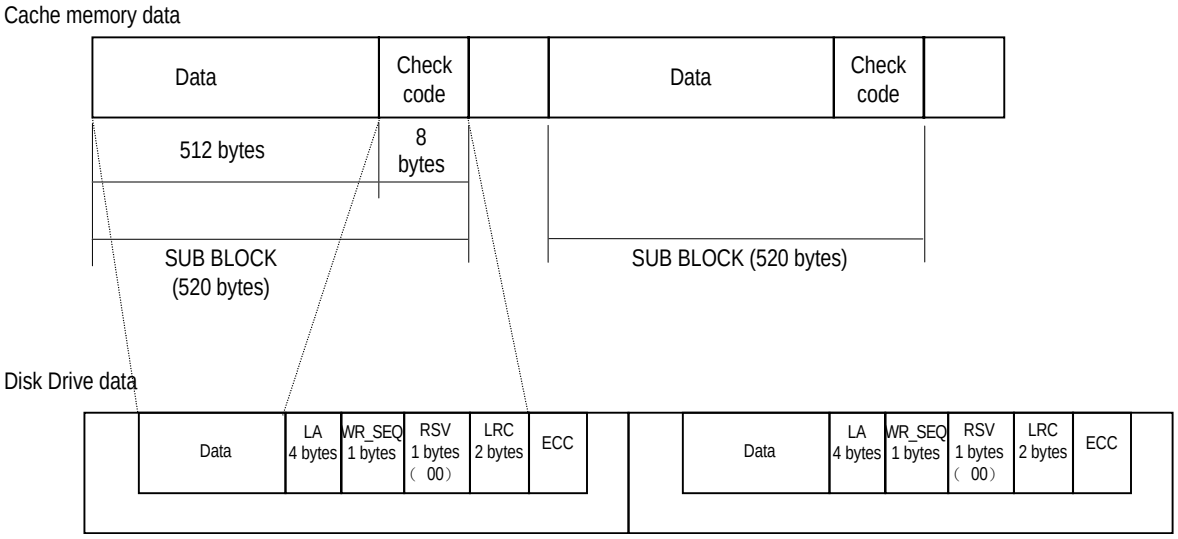


Figure 4.2.1 Data Format

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4.3 Read/Write Operation

4.3.1 Command execution

In the subsystem, all R/W commands are executed via the Cache memory.

- When the data is on the Cache memory at reading, the data on the Cache memory is transferred to the host computer (Read hit processing). The data when the NAS Unit is connected is transferred to the host computer via the NAS Unit.
- Only when the data is not on the Cache memory at reading, the data is transferred to the host computer directly from the Disk Drive (Read miss processing). The data when the NAS Unit is connected is transferred to the host computer via the NAS Unit. The data is left in the Cache memory then, the read hit operation can be performed at the time of the next reading.
- To improve the responding performance of the write processing, the write-after processing that returns the completion report to the host computer when the data writing to the Cache memory is completed is performed. When the NAS Unit is connected, a completion report is returned to the host computer via the NAS Unit. After that, the Controller generates the parity and writes the data on the Disk Drive asynchronously.
- Data in the Cache memory is backed up by batteries. Thus, a data loss caused by a power failure, etc. can be prevented.
- The Write-Through means the operation to write the write data to the Disk Drive and respond to the host computer immediately after the subsystem received the write data from the host computer.
  Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through.
  When the NAS Unit is connected, the completion report is returned to the host computer via the NAS Unit.
  The conditions that the subsystem executes the Write-Through are as follows.
  - When the LU Cache warning of the system parameter is disable (default) and the subsystem receives the write data in the PIN area
  - When the write special response mode of the system parameter is enable (However, the write command for the LUs of RAID 1 and RAID 1+0 are excluded.)
  - When the forced write through mode of the system parameter is valid and a blockade of the Control Unit (it is not this condition in the single controller configuration) or a power unit failure occurred.
  - When the Backup Battery Unit (ASSY) that can operate normally is lost
  - When a failure occurs in the battery backup circuit (except when the Control Unit is blocked)

Data flows are shown in Figure 4.3.1.

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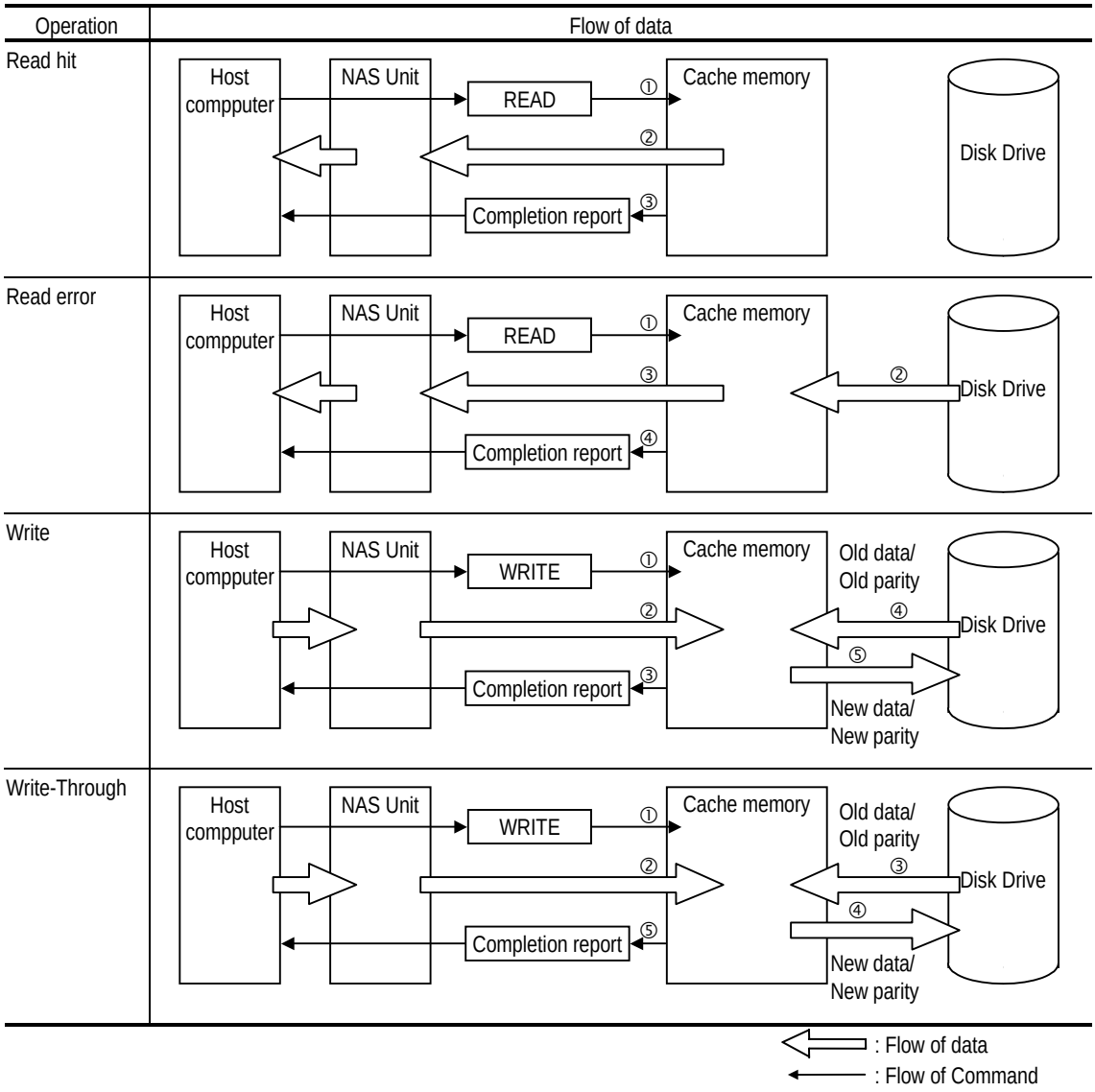


Figure 4.3.1 Flow of Data

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4.3.2 Dual system configuration

(1) Feature of dual system

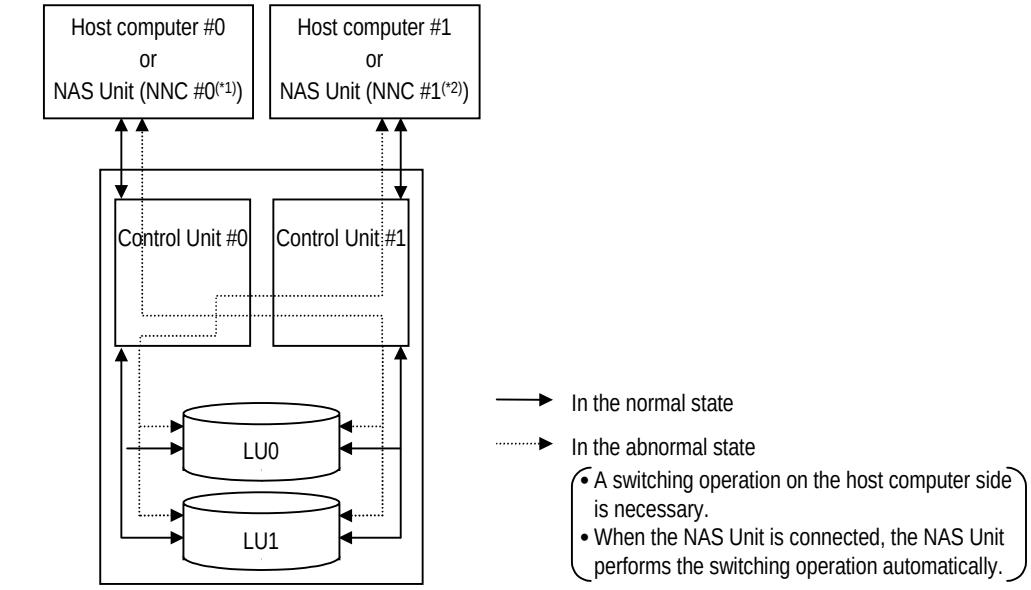
(a) The flexible system can be configured by virtue of the two Control Units installed.
This allows the system configuration, which fits the host computer operation, to be provided.
For details, refer to Item (2), "Dual system configuration".

(b) Data is duplicated and written on the Cache memories on the two Control Units respectively.
The duplication makes it possible to continue the operation and assure user data even when a Controller failure occurs.

(2) Dual system configuration

The Dual Active mode makes the two controllers operate in parallel.
In this system configuration, it allocates the controlled LU to each Control Unit. For the method of accessing to the LU, which is not controlled, from the Control Unit, there are two ways, "reallocating to the Control Unit in charge of the LU" and "requesting to the Control Unit in charge of the LU", and it is determined by the access frequency of each Control Unit.

In the Dual system configuration, it executes the processing by requesting it to the Control Unit in charge of the LU when accessing to the LU, which is not controlled, from the Control Unit.
If no access is made from the controller that controls the LU within one minute, however, re-assignment of the LU to the controller is made.
Incidentally, when one of the dual controller attempts to access an LU that is out of its control, the performance will be lowered because it accomplished the access by making a request to another controller that controls the LU for the access.



*1 : In the case of the RKH, NNC #1.
*2 : In the case of the RKH, NNC #3.

Figure 4.3.2 System Configuration

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4.4 Cache Memory Control

4.4.1 Purpose of Cache memory

(1) Mitigation of the write penalty (overheads for generating the parity which is unique to RAID) that accompanies the write-after operation
The write data received here is nonvolatile with the batteries to prevent the data loss due to the power failure before it is written in the Disk Drive. Also, the write data is double written in the Cache memories of both Control Units, and the data loss can be prevented at the time of a Control Unit failure by becoming the dual controller configuration (optional).

(2) Speed-up of sequential reading operation by means of pre-fetch
The reading performance is enhanced as follows. The subsystem studies the received commands and when it perceives that it is receiving read commands to read data from continuous addresses, it executes the pre-fetch operation to read the next read data from a Disk Drive before receiving the next read command. Thus the subsystem makes it possible to read from the cache memory when it receives the read command from a host.

(3) Faster sequential read operation
Performance of the sequential read operation is improved through impounding some amount of write data in the Cache memory at the sequential access and destaging it out to an HDD at once.

(4) Achieving the cache read hit at executing a highly local job by the LRU algorithm
Further, a one-hundred percent cache hit rate can be realized by virtue of the Cache Residency Manager function (see "4.5 (7) Cache Residency Manager" (THEO 04-0170).).

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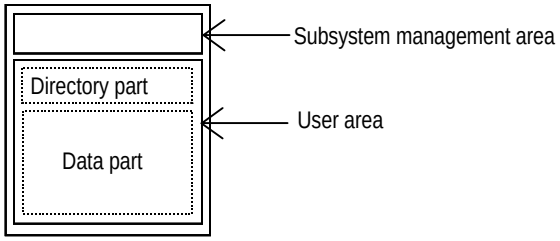
4.4.2 Cache memory configuration

The cache memory consists of the following components.

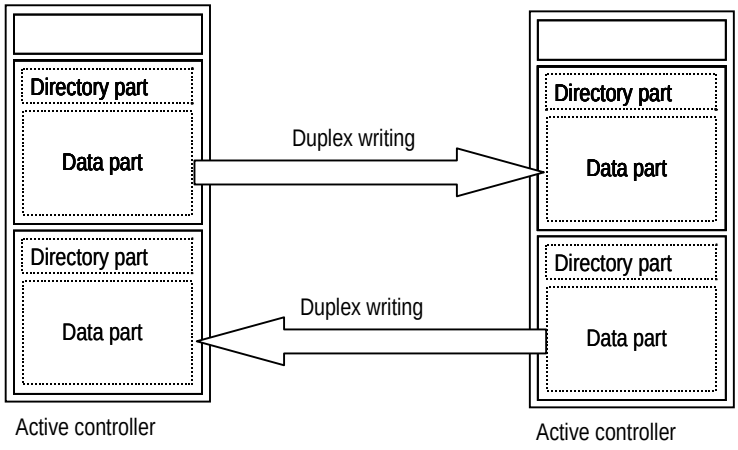
- Subsystem management area
- Directory part
- Data part

The cache memory configuration corresponding to each subsystem configuration is shown below.

a. For the single controller configuration



b. For the dual controller configuration (in the Dual Active mode)



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4.4.3 Cache memory structure

(1) Cache memory structure

The Cache memory consists of a directory section for controlling data and a data section for storing user data.

(2) Data part

The data in the Cache memory is controlled by dividing it into the segments with the fixed length of 16 k bytes (a default value). However, when the Cache Partition Manager function is used, the segment length can be changed to 4 k bytes or 8 k bytes. Also, the segment length can be changed to any of 64 k bytes, 256 k bytes or 521 k bytes in the microprogram revision 0733/A-x or more.

The minimum unit of data is sub-block (logical block of 512 bytes). When the segment length is 16 k bytes, one segment is 32 sub-blocks. Data storage is done in units of sub-block.

When a command to write data of one logical block (512 bytes) is received, for example, a segment is secured and the received write data is stored in one of the sub-blocks in the segment. The data area is also used as a work area while of the parity generation.

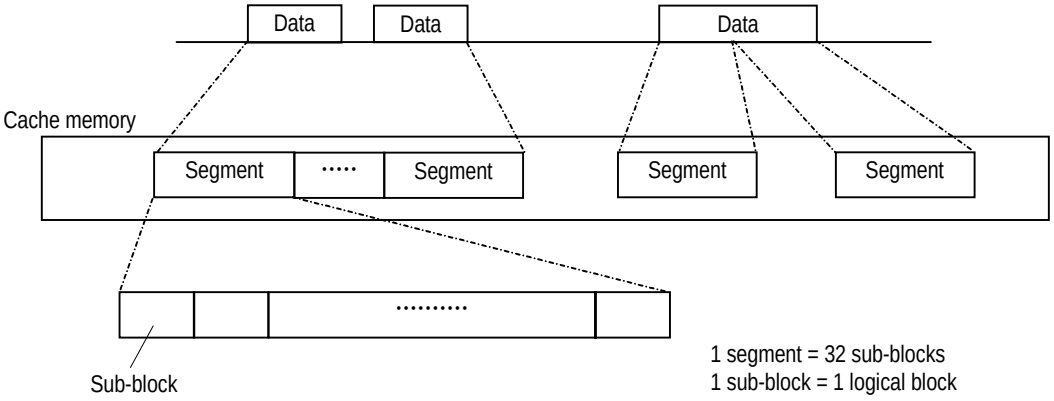


Figure 4.4.1 Data Structure in Cache Memory

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(3) Directory part

The directory consists of a hash table for deciding hit or miss and SGCBs for controlling the segments. The SGCB has a one-to-one correspondence with the segment and has a pointer to the segment concerned and information regarding the status of the segment concerned.
The hash table stores the segment management information addresses.
When the segment management information is NULL, an error is occurs.

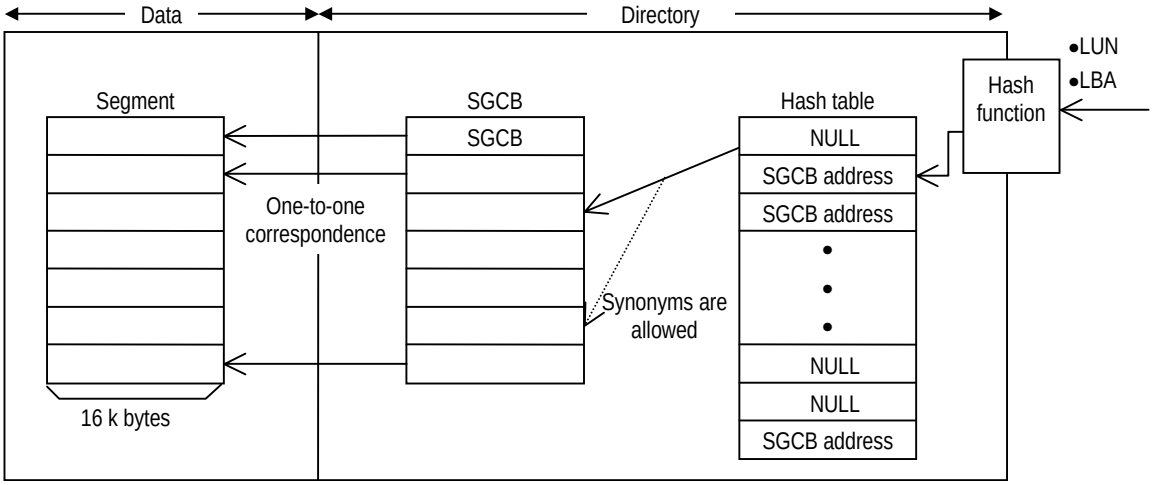


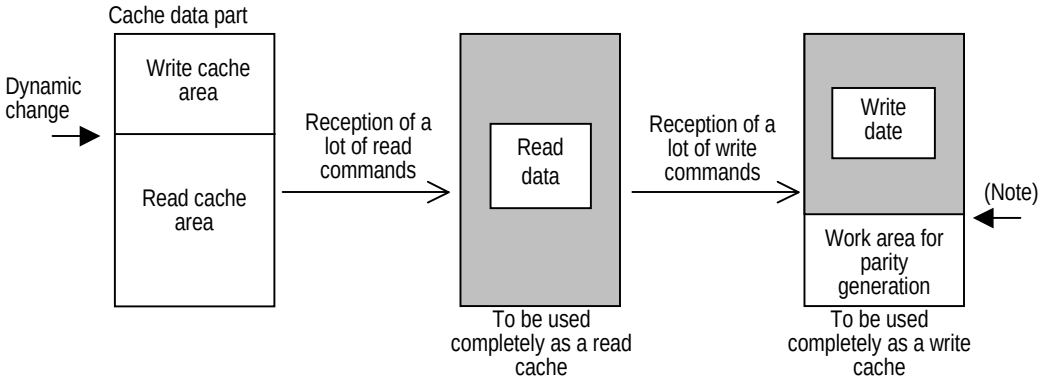
Figure 4.4.2 Control Structure in Cache Memory

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4.4.4 Basic operation of cache control

The following dynamic optimizing operation is performed in the cache control.

(1) Dynamic optimization of read/write cache area assignment
The read and write cache areas are not fixed but dynamically assigned according to an I/O instruction from a host.



NOTE : No wider write cache data area than the threshold value is assigned in order to secure the area for parity generation.

(2) Dynamic optimization of destaging algorithm
The optimum destaging algorithm is selected automatically according to a writing pattern given by a host computer. (Refer to Subsection "4.4.5 Destaging operation" (THEO 04-0140).)

(3) Dynamic optimization of staging algorithm
The optimum staging algorithm is selected automatically through a study of a read command issued by a host computer. (Refer to Subsection "4.4.6 Staging operation (Writing to the Cache memory)" (THEO 04-0150).)

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4.4.5 Destaging operation

Write data transferred from a host computer is stored in the cache memory and written to a Disk Drive asynchronously. This operation to write data to a Disk Drive asynchronously is called destaging operation.

In the destaging operation, random and sequential accesses are discriminated and written to a Disk Drive in a way optimum for each of them.

(1) Destaging of random data

Data is destaged in units of LBA. Old data and its parity to be destaged are staged from a disk. A new parity is generated from new data, the old data, and the old parity and then the new data and new parity are destaged in units of LBA.

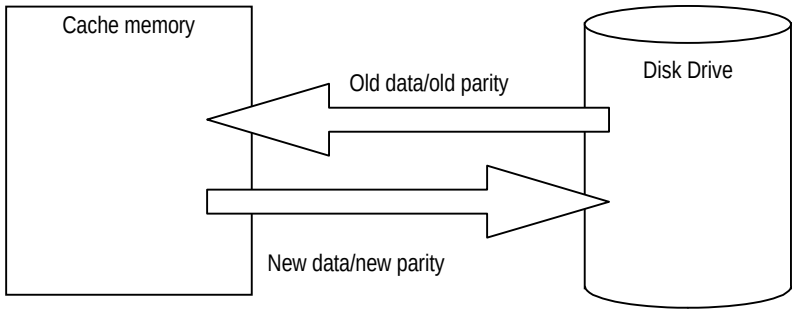


Figure 4.4.3 Destaging of Random Data

(2) Destaging of sequential data

Data is destaged in units of stripe. A new parity is generated from write data, and then new data and the new parity are destaged in units of stripe.

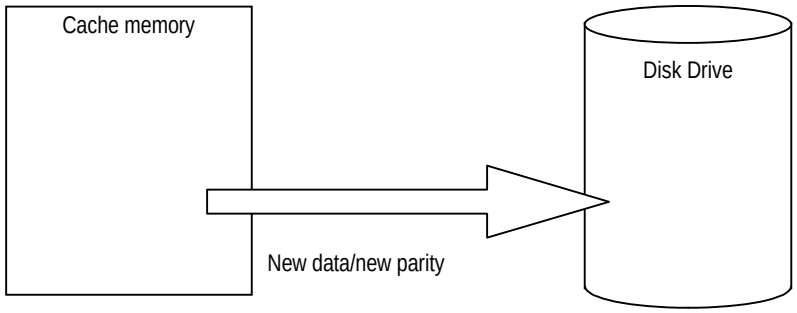


Figure 4.4.4 Destaging of Sequential Data

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4.4.6 Staging operation (Writing to the Cache memory)

(1) Random reading

The LRU (Least Recently Used) method is used for assigning the Cache memory to improve the hit rate.

(2) Sequential reading

According to the learning of received commands, in case of a command to read back data from consecutive addresses is received, a pre-fetch read data from the next area of the HDD is performed prior to the following read command. When the following read command is received, the data is read back from the Cache memory, so that the read performance is improved.

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4.5 Optional Functions

(1) ShadowImage in-system replication

This subsystem provides the ShadowImage in-system replication function as an optional function.

To use the ShadowImage in-system replication, the P-002D-J311 (the P-002D-J311W for RKS/RKXS) is required separately.

The ShadowImage in-system replication controls LU copying done within one and the same subsystem. It can create a copy (secondary volume) of an LU within one and the same subsystem keeping the redundancy that the source LU (primary volume) has.

(For the details, refer to the manual supplied with the P-002D-J311 or the P-002D-J311W.)

(2) TrueCopy remote replication

The subsystem provides the TrueCopy remote replication as an optional function. To use the TrueCopy remote replication, the P-002D-J312 (the P-002D-J312W for RKS/RKXS) is required separately.

The TrueCopy remote replication supports the mode, in which data of disk subsystems connected via the Fibre Channel interface are equalized, by always synchronizing their data. Besides, the function makes the copying speed higher by transferring differential data only.

(For the details, refer to the manual supplied with the P-002D-J312 or the P-002D-J312W.)

(3) TrueCopy Extended Distance (‡1)

The subsystem provides the TrueCopy Extended Distance as an optional function. To use the TrueCopy Extended Distance, the P-002D-J315 is required separately.

TrueCopy Extended Distance supports the mode, in which data of disk subsystems connected via the Fibre Channel interface are equalized, by always synchronizing their data periodically. Besides, the function makes the copying speed higher by transferring differential data only.

(For the details, refer to the manual supplied with the P-002D-J315.)

(4) Copy-on-write SnapShot

This subsystem provides the Copy-on-write SnapShot as an optional function.

To use the Copy-on-write SnapShot, the P-002D-J310 (the P-002D-J310W for RKS/RKXS) is required separately.

Copy-on-write SnapShot is a function to internally retain a logical duplication of the primary volume data at the time of the command instruction.

Copy-on-write SnapShot can create up to 14 duplication volumes per primary volume and manage data in two or more generations within the disk subsystem.

(For the details, refer to the manual supplied with the P-002D-J310 or the P-002D-J310W.)

(5) Data Retention Utility

This subsystem provides the Data Retention Utility as an optional function.

To use the Data Retention Utility, the P-002D-J309 (the P-002D-J309W for RKS/RKXS) is required separately.

Data Retention Utility is an option for protecting a logical unit (LU) against an illegal access from a host computer by setting an access attribute to LU.

(For the details, refer to the manual supplied with the P-002D-J309 or the P-002D-J309W.)

‡1 : This is supported in the microprogram revision 0735/A or more.

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(6) LUN Manager

The subsystem provides the LUN Manager as an optional function.
To use the LUN Manager, the P-002D-J308 (the P-002D-J308W for RKS/RKXS) is required separately.
The LUN Manager enables the subsystem to make a suitable response to each connected host even within the same port by grouping the connected hosts within a port and setting the logical unit mapping and the Host Connection mode for each host group.
(For the details, refer to the manual supplied with the P-002D-J308 or the P-002D-J308W.)

(7) Cache Residency Manager

This subsystem provides the Cache Residency Manager as an optional function.
To use the Cache Residency Manager, the P-002D-J305 is required separately.
The Cache Residency Manager to make the data of the specified LU resident in the Cache memory installed in the Control Unit, and to execute all the accesses from the server related to the LU concerned by cache hit without generating any access of the Disk Drive.
(For the details, refer to the manual supplied with the P-002D-J305.)

(8) SNMP Agent Support Function

This subsystem provides the SNMP Agent Support Function as an optional function.
To use the SNMP Agent Support Function, the P-002D-J303 is required separately.
The SNMP Agent Support Function reports occurrences of failure to the workstation for monitoring the network via the SNMP (Simple Network Management Protocol) of the open platform. It reports conditions of command operation (such as a number of command receptions and number of cache hits) of the disk array subsystem.
It enables you to refer to the conditions of command operation depending on a type of access from a host and you can utilize it as information for tuning subsystem performance.
(For the details, refer to the manual supplied with the P-002D-J303.)

(9) LUN Expansion

This subsystem provides the LUN Expansion as an optional feature.
To use the LUN Expansion, the P-002D-J304 is required separately.
The LUN Expansion is that to expand a size of an LU (volume) accessed by a host computer by combining LUs (volumes) internally.
(For the details, refer to the manual supplied with the P-002D-J304).

(10) Password Protection

The subsystem provides the Password Protection as an optional function.
To use the Password Protection, the P-002D-J302 is required separately.
The Password Protection prevents any DF700 from being concurrently accessed by users by limiting users of Storage Navigator Modular to be permitted to access the DF700. It can suspend the information provided from the DF700 to the user who has no access authority, and avoid the case that two or more users update the configuration information at the same time.
(For the details, refer to the manual supplied with the P-002D-J302.)

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(11) Performance Monitor

This subsystem provides the Performance Monitor as an optional function.
To use the Performance Monitor, the P-002D-J306 is required separately. Performance Monitor acquires information on performance of the subsystem and utilization rates of resources. Further, the information acquired is displayed with line graphs in the Monitor. (For the details, refer to the manual supplied with the P-002D-J306.)

(12) Cache Partition Manager

The subsystem provides the Cache Partition Manager as an optional function. To use the Cache Partition Manager, the P-002D-J307 is required separately.
Cache Partition Manager is a function to tune the cache memory and has the following functions. (For the details, refer to the manual supplied with the P-002D-J307.)

- A function to partition the cache memory and to make each LU's domain exclusive
- A function to be able to change the segment length from 16 k bytes of a default value to 4 k bytes or 8 k bytes for each partition to the partitions other than the master partitions
  It can also be changed to 64 k bytes, 256 k bytes or 512 k bytes in the microprogram revision of 0733/A-x or more.
- Function which can change the stripe size from the default value of 64 k bytes to 256 k bytes or 512 k bytes for each LU in the microprogram revision 0733/A-x or more.

(13) NAS Manager Modular 1000 Suite/NAS Manager Modular 500 Suite/NAS Manager Modular 200 Suite/NAS Manager Modular 100 Suite

This subsystem provides the NAS Manager Modular Suite as an optional function.
This function is supported in the microprogram revision 0726/A-x or more for the RKM/RKS/RKXS and in the microprogram revision 0732/A-H or more for the RKH.
To use the NAS Manager Modular Suite, the P-9P13-J8D00S(RKH)/P-9P13-J8D01S(RKM)/P-9P13-J8D02S(RKS)/P-9P13-J8D03S(RKXS) are required separately.
The NAS Manager Modular Suite is the utility bringing the four functions such as the NAS Data Control Modular, the NAS File Sharing Modular, the NAS Manager Modular and the NAS Sync Image Modular together.

- NAS Data Control Modular
  The NAS Data Control Modular is a function to achieve the interface of the NAS OS and the Disk Drive control processor among the NAS OS programs.
- NAS File Sharing Modular
  This means the basic functions such as the kernel of the NAS OS, the file system, the file sharing, etc. among the NAS OS programs.
  These functions are bundled with the NAS Manager Modular Suite free of charge.
- NAS Manager Modular
  The NAS Manager Modular is a function to achieve the operation, control, and failure monitoring of the NAS Modular system (for the details, refer to the manual supplied with the P-9P13-J8D00S(RKH)/P-9P13-J8D01S(RKM)/P-9P13-J8D02S(RKS)/P-9P13-J8D03S(RKXS)).
- NAS Sync Image Modular
  The NAS Sync Image Modular is a function to create the snapshot to be able to recover the data to the past status even if the client erroneously changed the data of the file system shared in the NAS Modular system (for the details, refer to the manual supplied with the P-9P13-J8D00S(RKH)/P-9P13-J8D01S(RKM)/P-9P13-J8D02S(RKS)/P-9P13-J8D03S(RKXS)).

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(14) NAS Backup Restore Modular

This subsystem provides the NAS Backup Restore Modular as an optional function.
This function is supported in the microprogram revision 0726/A-x or more for the RKM/RKS/RKXS and in the microprogram revision 0732/A-H or more for the RKH.
To use the NAS Backup Restore Modular, the P-9P13-J8D004/P-9P13-J8D014/P-9P13-J8D024/P-9P13-J8D034 are required separately.
The NAS Backup Restore Modular is a function to protect the data shared in the NAS Modular system.
The NAS Backup Restore provides the following functions to protect the data.

- Snapshot function
- Backup/restore function
- Remote copy function

By using each function, the data can be reproduced at the file system level irrespective of the operating conditions of the application (for the details, refer to the manual supplied with the P-9P13-J8D004/P-9P13-J8D014/P-9P13-J8D024/P-9P13-J8D034).

(15) NAS Anti Virus Agent Modular

This subsystem provides the NAS Anti Virus Agent Modular as an optional function.
This function is supported in the microprogram revision 0726/A-x or more for the RKM/RKS/RKXS and in the microprogram revision 0732/A-H or more for the RKH.
To use the NAS Anti Virus Agent Modular, the P-9P13-J8D005/P-9P13-J8D015/P-9P13-J8D025/P-9P13-J8D035 are required separately.
The NAS Anti Virus Agent Modular is a function to check the Virus of the data sent from the CIFS client (for the details, refer to the manual supplied with the P-9P13-J8D005/P-9P13-J8D015/P-9P13-J8D025/P-9P13-J8D035).

(16) Modular Volume Migration

This subsystem prepares Modular Volume Migration as an optional function.
P-002D-J316 (the P-002D-J316W for RKS/RKXS) is separately required to use Modular Volume Migration.
Modular Volume Migration is a function to transfer the LU to other RAID groups in the disk array subsystem with the Read operation and the Write operation from the host continued.
This function is supported in the microprogram revision 0760/A-x or more (refer to the attached manual of P-002D-J316 or the P-002D-J316W for more details).

(17) Account Authentication

This subsystem prepares Account Authentication as an optional function.
P-002D-J317 is separately required to use Account Authentication.
Account Authentication controls the login authentication to the array subsystem and the access to the subsystem resource by using the account information that the user registered beforehand. The user ID, the password, and the information on the roll classification are included in the account information, and the login authentication is performed with the user ID and the password, and right or wrong of the update setting and the information reference to each resource of the subsystem is decided by the roll classification.

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Therefore, the illegal access to the DF700 can be prevented (refer to the attached manual of P-002D-J317 for more details).

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(18) Audit Logging

This subsystem prepared Audit Logging as an optional function.
P-002D-J318 is separately required to use Audit Logging.
Audit Logging is a function to generate the log of the event when the user performs the setting operation, configuration change, etc. for the DF700.
The log is generated in the syslog form, and it is immediately output to the server for syslog that the user set (refer to the attached manual of P-002D-J318 for more details).

(19) Power Saving

This subsystem prepares Power Saving as an optional function.
P-002D-J319 is separately required to use Power Saving.
Power Saving is the function to reduce the electric power consumption of the DF700 by spinning down (rotation stop of the Disk Drives) the Disk Drives which configure the RAID Group that the user specified (refer to the manual attached to P-002D-J319 for the details).

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4.6 Operation Against Disk Failure Occurs

(1) I/O operation against Disk Drive failure

In the subsystem with the RAID1, RAID5, or RAID1+0 configuration, even when a failure occurs in one Disk Drive and data cannot be read from it, the target data can be recovered by means of using data on the other normal Disk Drives.

In the case of RAID1 and RAID1+0, data on the mirror Disk Drive is used, and in the case of RAID5, data on the other Disk Drive on the same stripe is used. By means of these measures, even when a Disk Drive failure occurs, reading/writing can be done as before.

Even when failures occur in two Disk Drives at the same time and reading from them becomes impossible, the RAID 6 configuration can restore the data concerned utilizing data stored in normal Disk Drives.

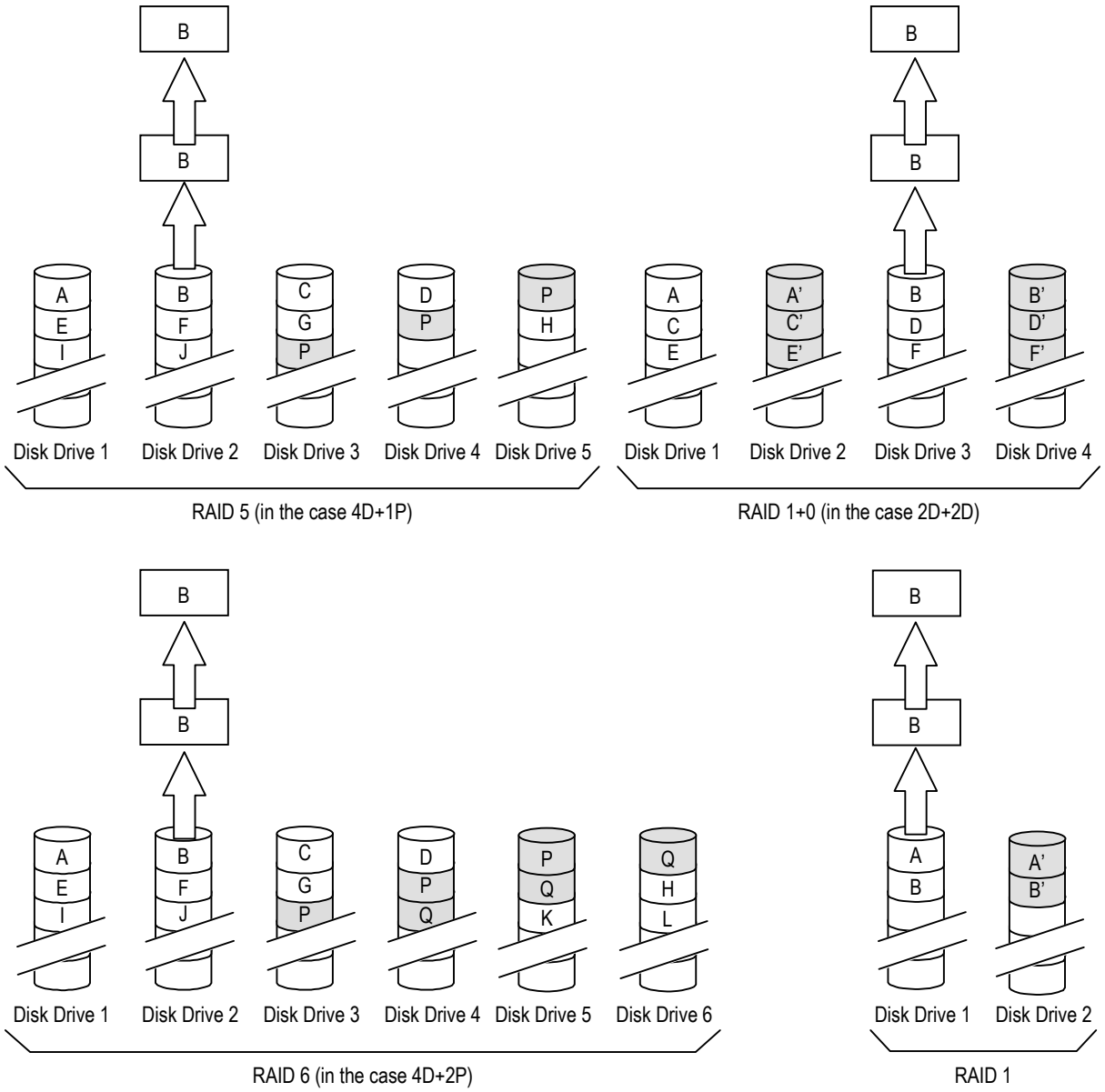
In the RAID 6 configuration, each Disk Drive utilizes data in the other Disk Drives in the same stripe. If failures occur in two Disk Drives, reading/writing can be done in the same way as before the failures by virtue of the above.

Figure 4.6.2 shows the outline of the data reading operation performed when a Disk Drive failure occurs.

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Data B reading request

(a) Data B read request

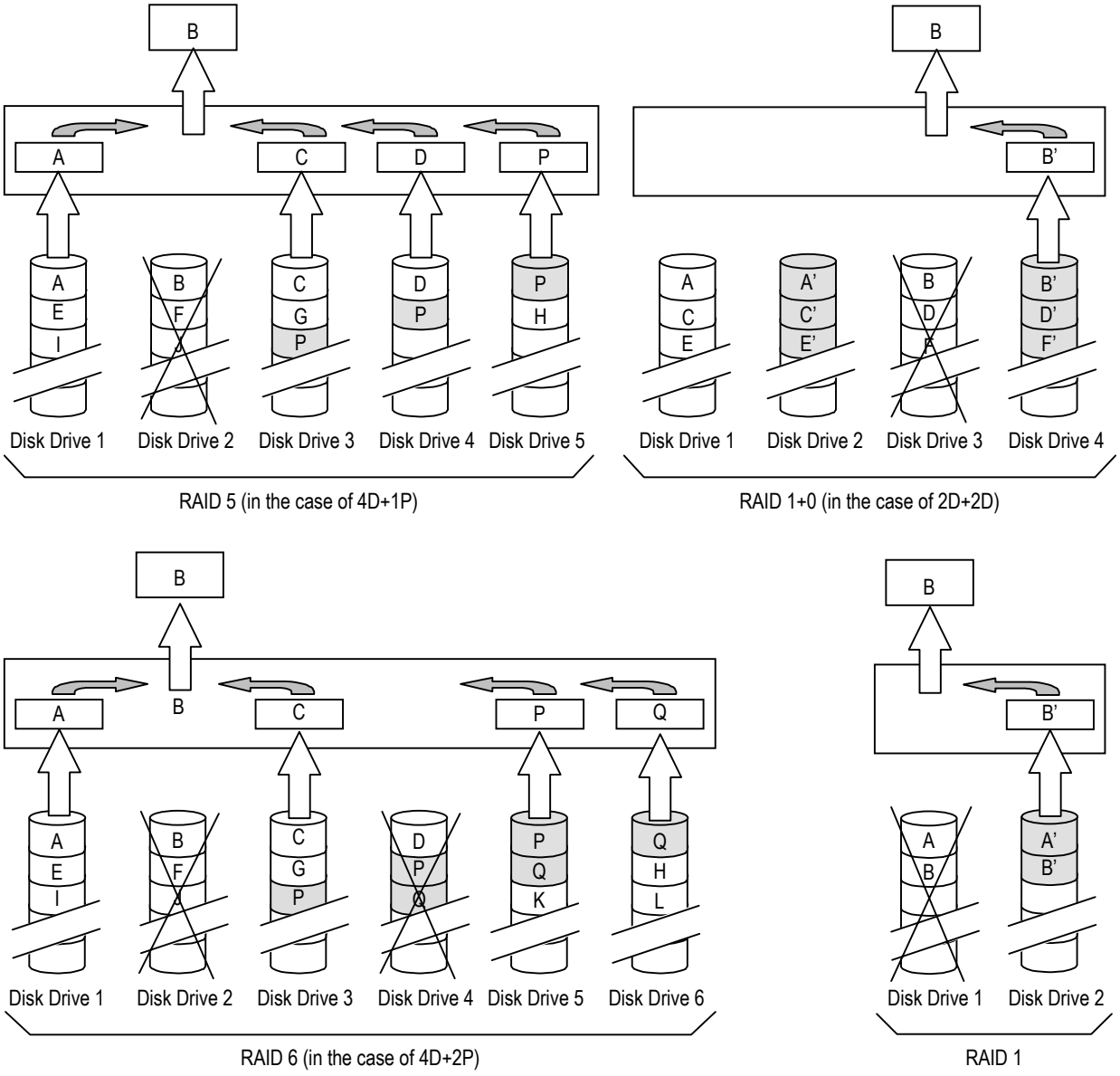


A, B, C ⋯ ; data
P ; parity data
A', B', C'⋯ ; mirror data

Figure 4.6.1 Data Reading Operation When Disk Drive is Normal

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(b) When a Disk Drive failure occurs



A, B, C ⋯ ; data
P ; parity data
A', B', C'⋯ ; mirror data

Figure 4.6.2 Data Reading Operation When a Disk Drive Failure Occurs

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(2) Data assurance when a disk failure occurs

The subsystem can have a Spare Disk (s) optionally. Data on a Disk Drive which is blocked owing to its failure or a Disk Drive in which a number of error occurrence has exceeded the specified value is automatically reconstructed on the Spare Disk.

The data to be copied on the Disk Drive to restructure data in the Spare Disk Drive is the data on the logical unit which an LU format is already completed.

This operation is performed in the background without making the host computer conscious of it, so that I/O request can be accepted continuously. When the failed Disk Drive is replaced, the data saved on the Spare Disk is copied to the new Disk Drive.

The data recovery processing to the Disk Drive of the Dynamic sparing function, Correction copy function and Copy back function operates to one set of the Disk Drives. After the data recovery to one set of the Disk Drives is completed, the data recovery is started to one another set. Also, these three functions do not operate at the same but serve as operation of the order of ① Correction copy function, ② Copy back function, and ③ Dynamic sparing function. For example, when two sets of the Disk Drives are blocked in the RAID Group of the RAID level 6, the Correction copy function does not recover two sets of the blocked data at the same time, but recovers one set at a time.

(a) Dynamic sparing

Errors which occur during ordinary reading/writing operation are controlled for each Disk Drive. When a number of error occurrences of a Disk Drive exceeds the specified value, data on the Disk Drive is automatically copied onto the Spare Disk because it is determined that there exists a risk that a failure (an uncorrectable error) will occur in the Disk Drive. This function is called a dynamic sparing function.

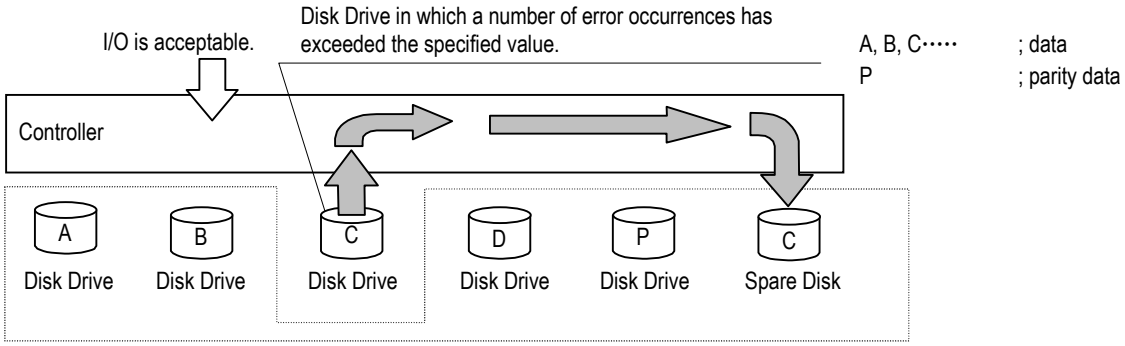


Figure 4.6.3 Dynamic Sparing

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(b) Correction copy

In the subsystem with the RAID 5 and RAID 6 configuration, when a failure occurs in a Disk Drive and data reading/writing from on it cannot be done, the data on the failed Disk Drive is restored using those on the other data Disk Drives and the parity Disk Drive, and then copied onto the Spare Disk. In the subsystem with the RAID 1 or RAID 1+0 configuration, when the same situation as above occurs, data on the mirror Disk Drive is copied onto the Spare Disk. In the RAID 0 configuration, the correction copy cannot be done.

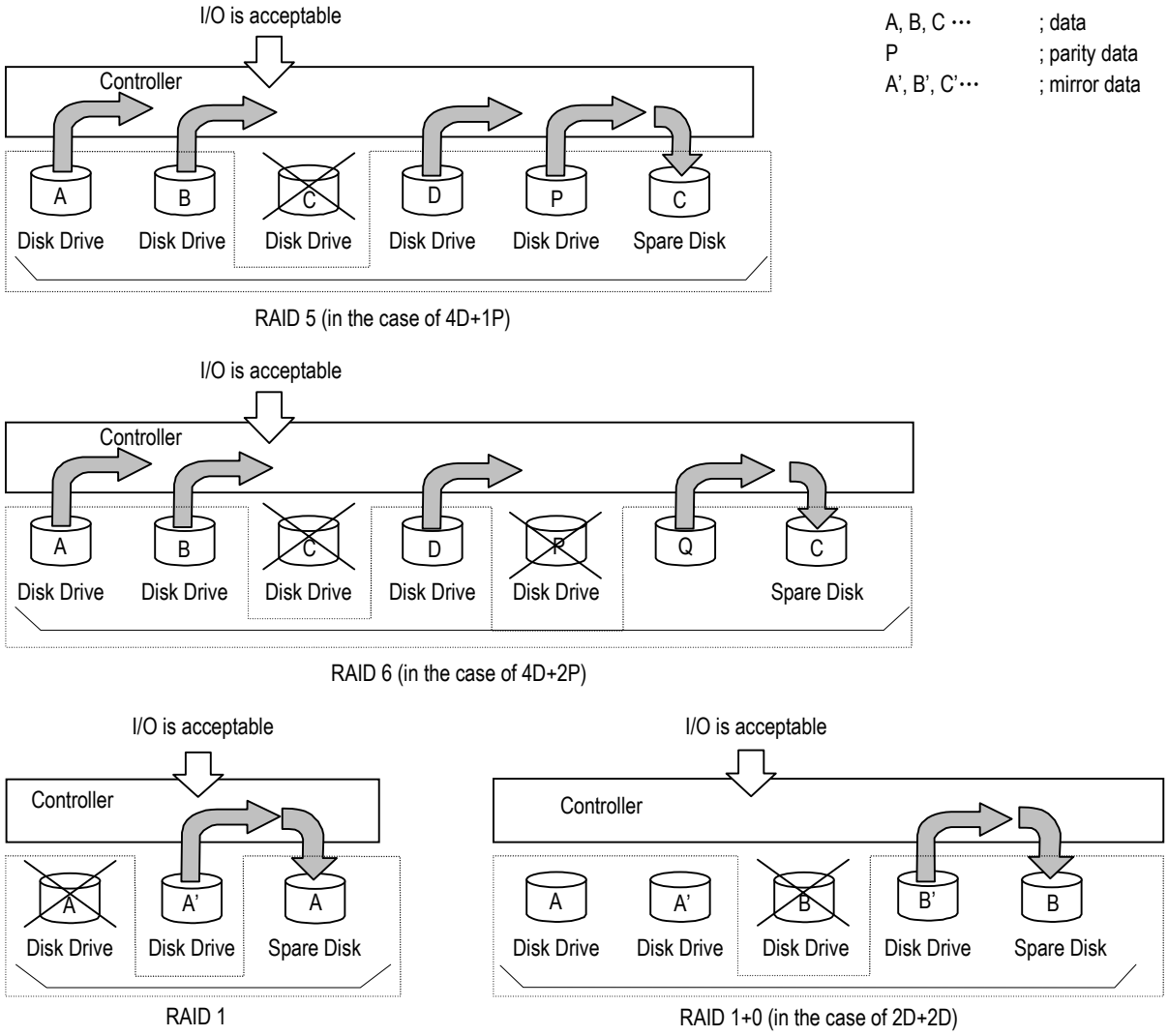


Figure 4.6.4 Correction Copy

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(3) Operation after replacing the failed Disk Drive

Copy back is the processing returned to the original status by copying the data in the Spare Disk to the replaced Disk Drive after replacing the failed Disk Drive when the data is reconstructed in the Spare Disk Drive by the dynamic sparing or the correction copy.

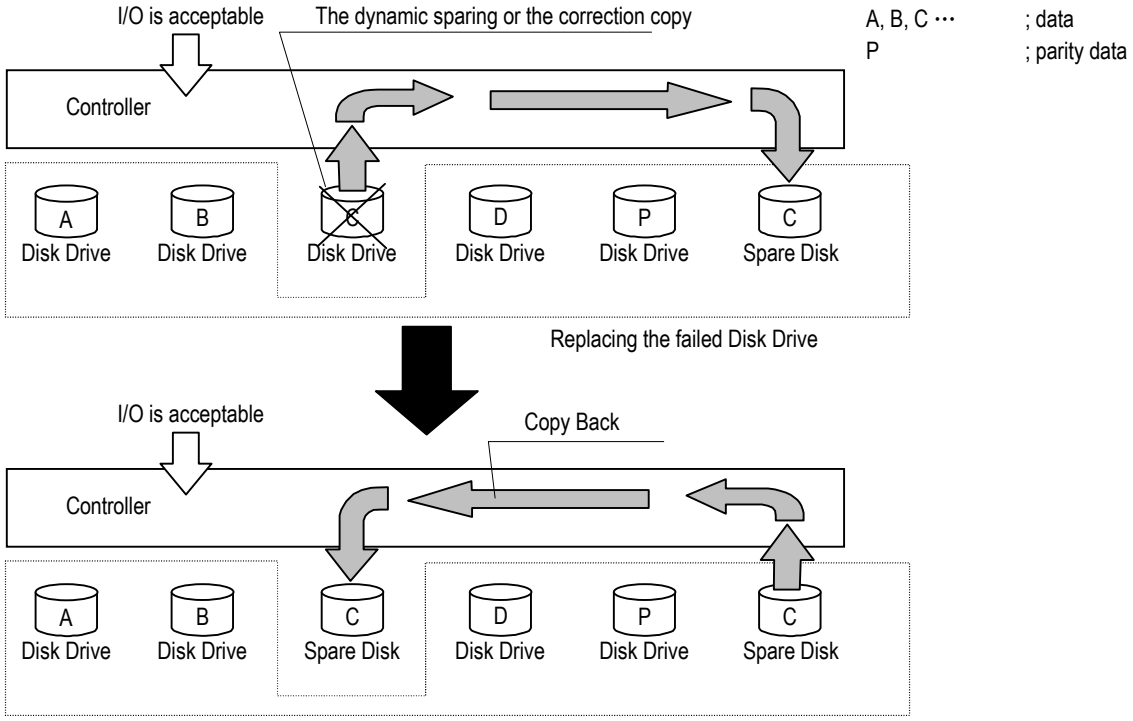


Figure 4.6.5 Copy back

The Copy back may or may not operate depending on the relationship among the setting value of "Spare Drive", the Spare Disk which recovered the data, and the failed Disk Drive.
The setting value of "Spare Drive" and the operation specification are shown in Table 4.6.1.

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Table 4.6.1 Setting of "Spare Drive" and the Operation Specification (FC Disk Drive)

The first parameter (Spare Drive)	The second parameter (Applying No Copy back Mode on All the Units)	Operation specification
Fixing (Fixed)	-	If the failed Disk Drive is replaced, the data saved in the Spare Disk Drive is copied back to the replaced Disk Drive (refer to Figure 4.6.5). The location of the Disk Drive which configures the RAID Group never changes from the time of creating the RAID Group. Therefore, this parameter is set when fixing the location of the Disk Drive which configures the RAID Group.
Variable (Variable)(*1) (This is set in default.)	Microprogram revision less than 0740/C	
	-	Although the dynamic sparing or the correction copy is completed, the data saved in the Spare Disk Drive is not copied to the replaced Disk Drive if the capacity and the rotational speed of the failed Disk Drive and the Spare Disk Drive which recovered the data are the same and both of them are not the Disk Drives of the RKA. The Copy backless operates because the replaced Disk Drive becomes a new Spare Disk Drive (refer to Figure 4.6.7). In the following cases, the Copy backless does not operate, and the Copy back surely operates after replacing the failed Disk Drive. •- When the capacity or the rotational speed of the failed Disk Drive and the Spare Disk Drive which recovered the data differs • When either of the failed Disk Drive and the Spare Disk Drive which recovered the data is the Disk Drive of the RKA
	Microprogram revision 0740/C or more	
	Disable (Default)	The operation specification is the same as the one of the microprogram revision less than 0710/C.

*1 : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

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The first parameter (Spare Drive)	The second parameter (Applying No Copy back Mode on All the Units)	Operation specification
Variable (Variable) (*1) (This is set in default.)	Microprogram revision 0740/C or more	
	Enable	The Copy backless operates after completing the dynamic sparing or the correction copy when the capacity of the failed Disk Drive and the Spare Disk Drive which recovered the data is the same (refer to Figure 4.6.7). The Disk Drive of the RKA is the target of the Copy backless. When the capacity of the failed Disk Drive and the Spare Disk Drive which recovered the data differs, the Copy backless does not operate, and the Copy back surely operates after replacing the failed Disk Drive. This parameter is set when making the Disk Drive of the RKA a target of the Copy backless. However, it is required to observe the restrictions on the operation shown below when setting this parameter. Basically, observe the operational restriction shown in (a). In an unavoidable case, observe the operational restriction shown in (b). (a) The FC Disk Drive to be installed in the subsystem must be unified to the Disk Drive of the same rotational speed. (b) When the FC Disk Drives whose rotational speeds are different exist in the subsystem, the I/O performance for the FC Disk Drives to be installed in the subsystem, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance must be all designed as the FC Disk Drives of 10,000 min^{-1} rotation. When the FC Disk Drives of 10,000 min-1 rotation and 15,000 min-1 rotation are mixed in the subsystem, if the Copy backless operates, the RAID Group may be configured of the FC Disk Drives of 10,000 min^{-1} rotation and 15,000 min^{-1} rotation. If this condition occurs, the FC Disk Drives of 10,000 min^{-1} rotation are newly added to the Disk Drives which configure the RAID Group even though the RAID Group is created by the FC Disk Drives of 15,000 min^{-1} rotation, and the I/O performance for the LU created in the RAID Group, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance are deteriorated. Also, when the setting is changed to “Invalid”, investigate if there is a RAID Group in which the FC Disk Drives of different rotational speeds are mixed, and check that there is no problem on the I/O performance, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance.
*1 : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.		

Table 4.6.1.1 Setting of “Spare Drive” and the Operation Specification (SATA Disk Drive)

The first parameter (Spare Drive)	The second parameter (Applying No Copy back Mode on All the Units)	Operation specification
Fixing (Fixed)	-	If the failed Disk Drive is replaced, the data saved in the Spare Disk Drive is copied back to the replaced Disk Drive (refer to Figure 4.6.5). The location of the Disk Drive which configures the RAID Group never changes from the time of creating the RAID Group. Therefore, this parameter is set when fixing the location of the Disk Drive which configures the RAID Group.
Variable (Variable) (*1) (This is set in default.)	Disable (Default)	Although the dynamic sparing or the correction copy is completed, the data saved in the Spare Disk Drive is not copied to the replaced Disk Drive if the capacity and the operational condition (720 hours/month operation supported or 330 hours/month operation supported) of the failed Disk Drive and the Spare Disk Drive which recovered the data are the same and both of them are not the Disk Drives of the RKA. The Copy backless operates because the replaced Disk Drive becomes a new Spare Disk Drive (refer to Figure 4.6.7).
	Enable	

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*1 : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKXS, the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

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(3-1) When "Spare Drive" is fixed

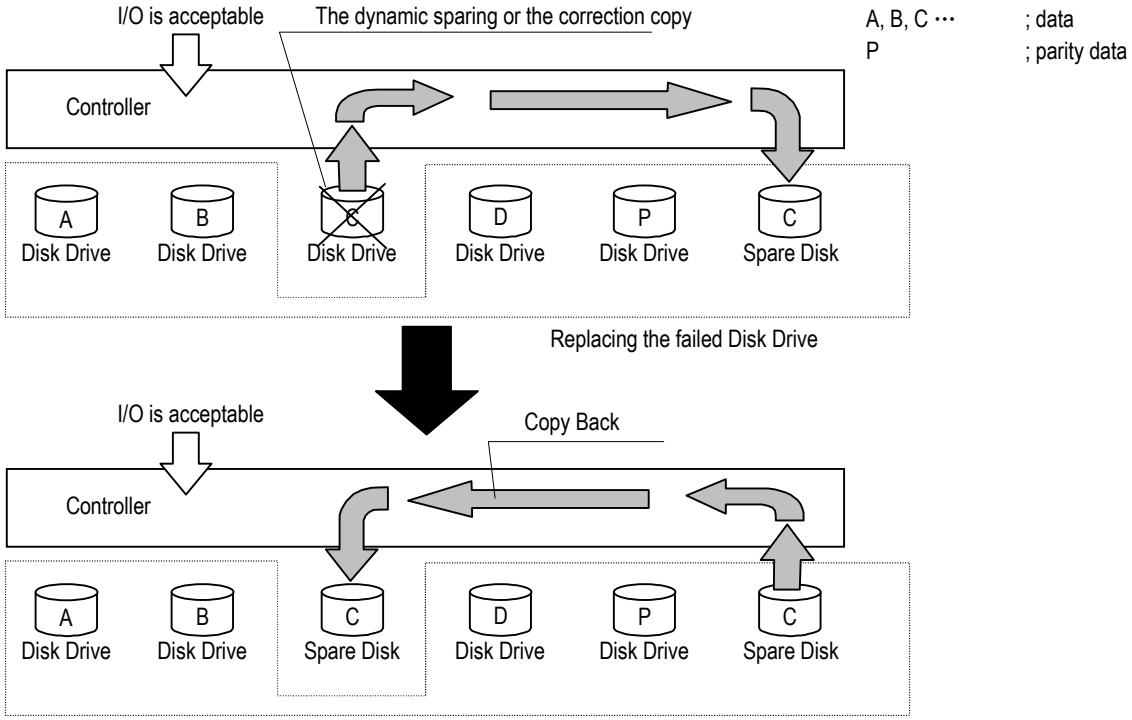


Figure 4.6.6 Copy back

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(3-2) When "Spare Drive" is variable

(When "Spare Drive" is variable and "Applying No Copy Back Mode on All the Units" is disabled in the microprogram revision 0740/C or more)

(a) When both of the failed Disk Drive and the Spare Disk Drive are not the Disk Drives of the RKA and the rotational speed, the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive are the same, the Copy backless operates at the time of completing the Disk Drive restoration (the dynamic sparing or the correction copy).

The Copy back does not operate if the failed Disk Drive is replaced.

NOTE : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS/RKXS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

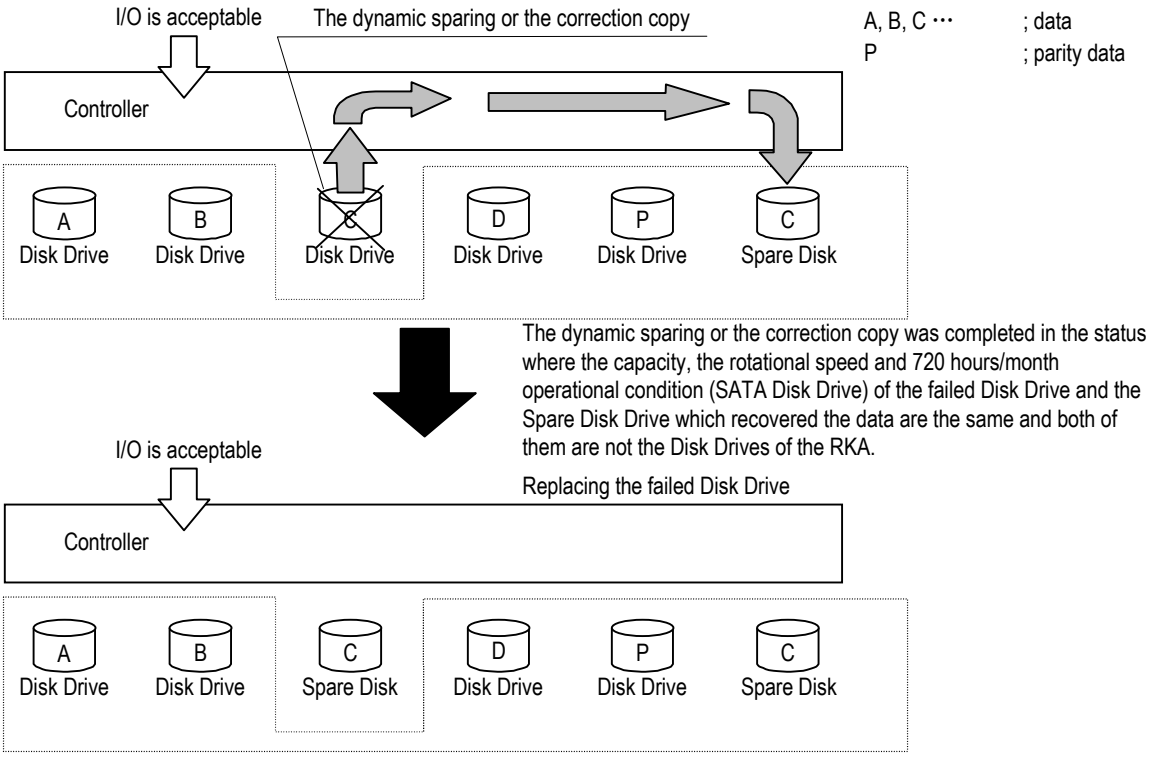


Figure 4.6.7 Copy backless

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(b) When either of the failed Disk Drive and the Spare Disk Drive is the Disk Drive of the RKA, or the rotational speed, the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive differ, the Copy backless does not operate and the copy back operates after replacing the failed Disk Drive at the time of completing the Disk Drive restoration (the dynamic sparing or the correction copy).

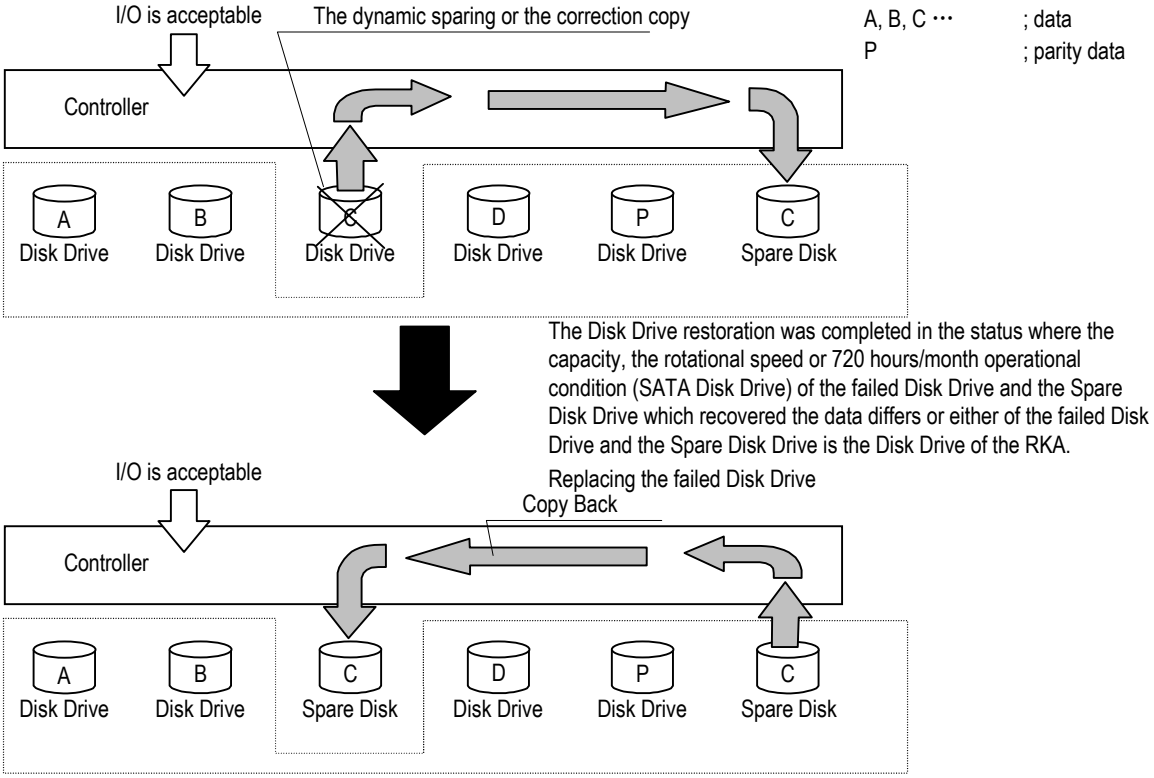


Figure 4.6.8 Copy back

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(c) The combination of the failed Disk Drive which becomes the copy backless and the Spare Disk Drive

The Copy backless operates depending on the types of the failed Disk Drive and the Spare Disk Drive and the relation between the rotational speed, the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive.
The relation between the failed Disk Drive and the Spare Disk Drive is shown in Table 4.6.2 to Table 4.6.4.

Table 4.6.2 Availability of the Copy Backless Operation between the Disk Drives of the RKM/RKS/RKAJ

Attribute				Spare Disk				
	Chassis			RKM/RKS/RKAJ				
Failed Disk Drive (FC)	RKM/RKS/RKAJ	Capacity [G bytes]		73		146		300
			Rotational speed [min^{-1}]	10,000	15,000	10,000	15,000	10,000
		73	10,000	○	×	×	×	×
			15,000	×	○	×	×	×
		146	10,000	-	-	○	×	×
			15,000	-	-	×	○	×
		300	10,000	-	-	-	-	○

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

Table 4.6.2.1 Availability of the Copy Backless Operation between the Disk Drives of the RKXS/RKAJAT/RKAJATL

Attribute				Spare Disk		
	Chassis			RKXS/RKAJAT/RKAJATL		
Failed Disk Drive (SATA)	RKXS/RKAJAT/RKAJATL	Capacity [G bytes]		250	400	500
			Operational Condition	330 hours/month	330 hours/month	720 hours/month
		250	330 hours/month	○	×	×
		400	330 hours/month	-	○	×
		500	720 hours/month	-	-	○

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

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Table 4.6.3 Availability of the Copy Backless Operation between the Disk Drive of the RKM/RKS/RKXS/ RKAJ/RKAJAT/RKAJATL and the Disk Drive of the DF600-RKA

Attribute				Spare Disk (Failed Disk Drive)				
	Chassis			DF600-RKA				
Failed Disk Drive (Spare Disk)	RKM/RKS/RKX/SRKAJ/ RKAJAT/RKAJATL	Capacity [G bytes]	Rotational speed [min^{-1}]	73		146		300
				10,000	15,000	10,000	15,000	10,000
		73	10,000	×	×	×(-)	×(-)	×(-)
			15,000	×	×	×(-)	×(-)	×(-)
		146	10,000	-(×)	-(×)	×	×	×(-)
			15,000	-(×)	-(×)	×	×	×(-)
		300	10,000	-(×)	-(×)	-(×)	-(×)	×
		250	7,200	-	-	-	-	×
		400	7,200	-	-	-	-	-
		500	7,200	-	-	-	-	-

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

Table 4.6.4 Availability of the Copy Backless Operation between the Disk Drives of the DF600-RKA

Attribute				Spare Disk				
	Chassis			DF600-RKA				
Failed Disk Drive	DF600-RKA	Capacity [G bytes]		73		146		300
			Rotational speed [min^{-1}]	10,000	15,000	10,000	15,000	10,000
		73	10,000	×	×	×	×	×
			15,000	×	×	×	×	×
		146	10,000	-	-	×	×	×
			15,000	-	-	×	×	×
		300	10,000	-	-	-	-	×

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

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(3-3) When "Spare Drive" is variable and "Applying No Copy Back Mode on All the Units" is enabled in the microprogram revision 0740/C or more

(a) When the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive is the same, the Copy backless operates and the Copy back does not operate after replacing the failed Disk Drive at the time of completing the Disk Drive restoration (the dynamic sparing or the correction copy).

NOTE : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS/RKXS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

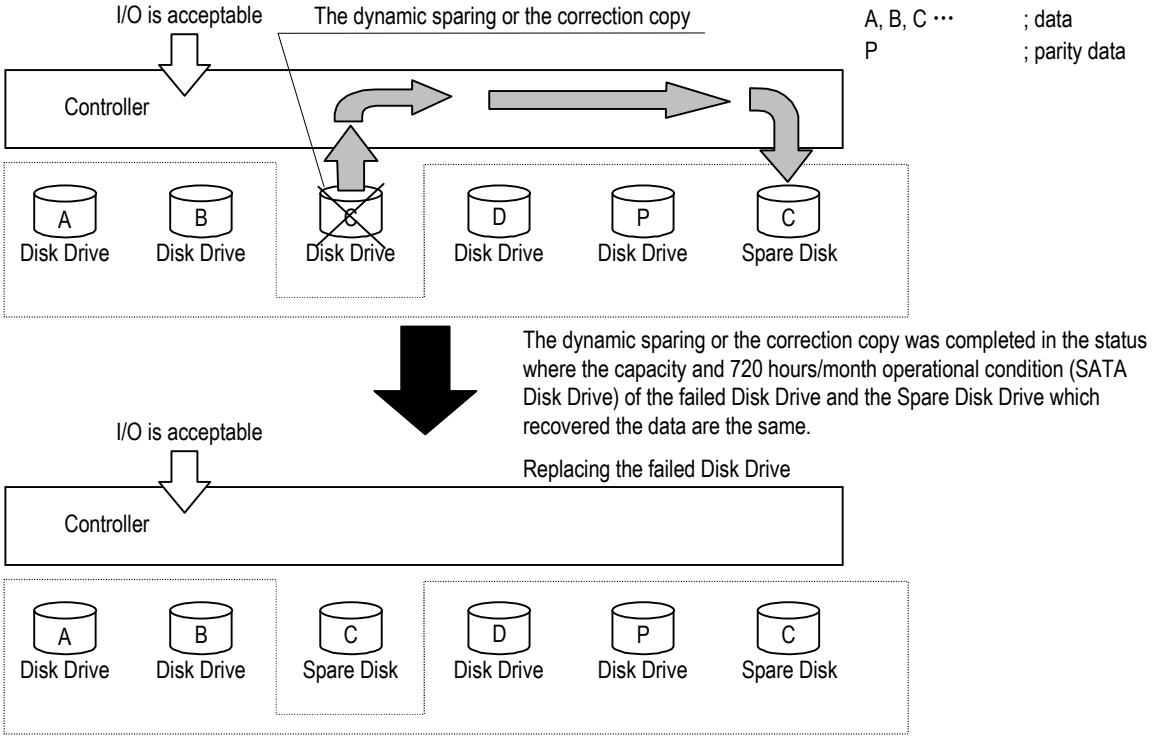


Figure 4.6.9 Copy backless

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(b) When the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive differs, the Copy backless does not operates and the Copy back operates after replacing the failed Disk Drive at the time of completing the Disk Drive restoration (the dynamic sparing or the correction copy).

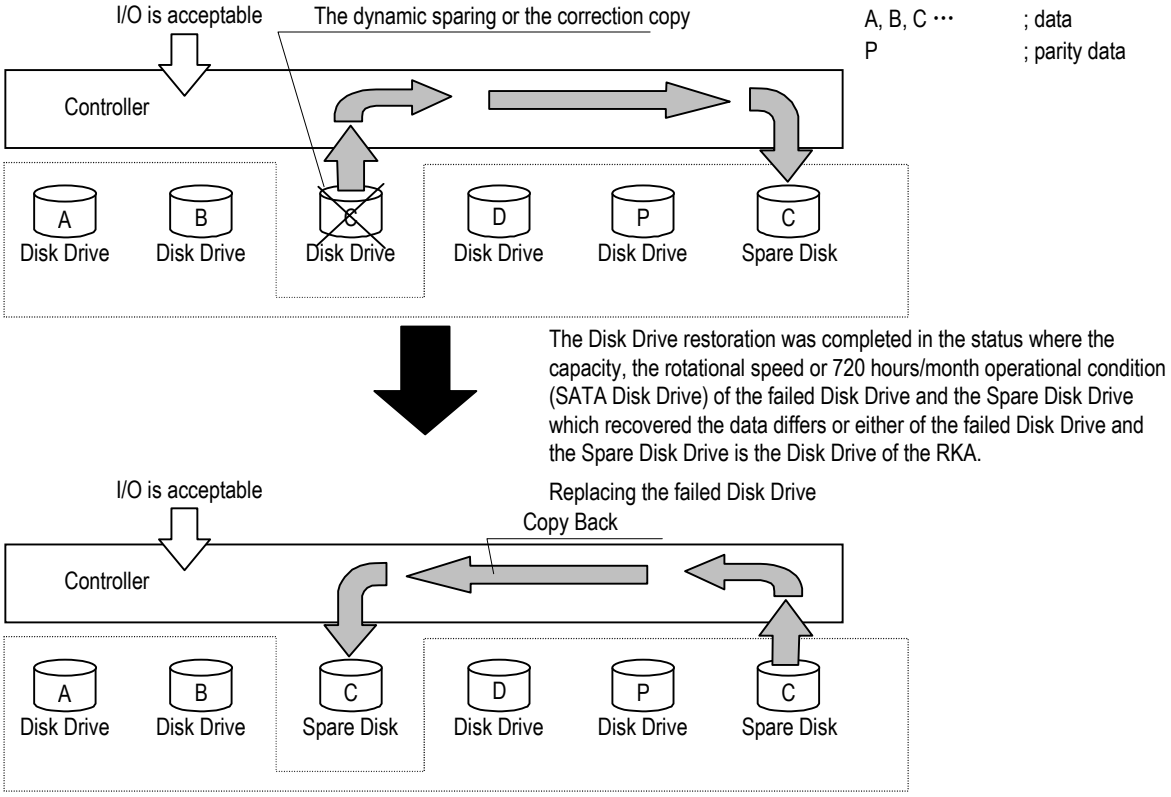


Figure 4.6.10 Copy back

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(c) The combination of the failed Disk Drive which becomes the copy backless and the Spare Disk Drive

The Copy backless operates depending on the types of the failed Disk Drive and the Spare Disk Drive and the relation between the rotational speed, the capacity and 720 hours/month operational condition (SATA Disk Drive) of the failed Disk Drive and the Spare Disk Drive.
The relation between the failed Disk Drive and the Spare Disk Drive is shown in Table 4.6.5 to Table 4.6.7.

Table 4.6.5 Availability of the Copy Backless Operation between the Disk Drives of the RKM/RKS/RKAJ

Attribute				Spare Disk				
	Chassis			RKM/RKS/RKAJ				
Failed Disk Drive (FC)	RKM/RKS/RKAJ	Capacity [G bytes]		73		146		300
			Rotational speed [min^{-1}]	10,000	15,000	10,000	15,000	10,000
		73	10,000	○	○	×	×	×
			15,000	○	○	×	×	×
		146	10,000	-	-	○	○	×
			15,000	-	-	○	○	×
		300	10,000	-	-	-	-	○

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

Table 4.6.5.1 Availability of the Copy Backless Operation between the Disk Drives of the RKXS/RKAJAT/RKAJATL

Attribute				Spare Disk		
	Chassis			RKXS/RKAJAT/RKAJATL		
Failed Disk Drive (SATA)	RKXS/RKAJAT/RKAJATL	Capacity [G bytes]		250	400	500
			Operational Condition	330 hours/month	330 hours/month	720 hours/month
		250	330 hours/month	○	×	×
		400	330 hours/month	-	○	×
		500	720 hours/month	-	-	○

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

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Table 4.6.6 Availability of the Copy Backless Operation between the Disk Drive of the RKM/RKS/RKXS/ RKAJ/RKAJAT/RKAJATL and the Disk Drive of the DF600-RKA

Attribute				Spare Disk (Failed Disk Drive)				
	Chassis			DF600-RKA				
Failed Disk Drive (Spare Disk)	RKM/RKS/RKXS/RKAJ/ RKAJAT/RKAJATL	Capacity [G bytes]		73		146		300
			Rotational speed [min^{-1}]	10,000	15,000	10,000	15,000	10,000
		73	10,000	○	○	× (-)	× (-)	× (-)
			15,000	○	○	× (-)	× (-)	× (-)
		146	10,000	- (×)	- (×)	○	○	× (-)
			15,000	- (×)	- (×)	○	○	× (-)
		300	10,000	- (×)	- (×)	- (×)	- (×)	○
		250	7,200	-	-	-	-	×
		400	7,200	-	-	-	-	-
		500	7,200	-	-	-	-	-

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

Table 4.6.7 Availability of the Copy Backless Operation between the Disk Drives of the DF600-RKA

Attribute				Spare Disk				
	Chassis			DF600-RKA				
Failed Disk Drive	DF600-RKA	Capacity [G bytes]		73		146		300
			Rotational speed [min^{-1}]	10,000	15,000	10,000	15,000	10,000
		73	10,000	○	○	×	×	×
			15,000	○	○	×	×	×
		146	10,000	-	-	○	○	×
			15,000	-	-	○	○	×
		300	10,000	-	-	-	-	○

○ : Copy backless
× : Copy back
- : The Disk Drive restoration does not operate.

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(4) Method for selecting a Spare Disk

When data is restored to a Spare Drive in the case where two or more Spare Drives are installed, the Spare Drive is selected according to priorities of the following items.

Priority item	Description	Degree of priority
Drive type	It is judged whether the drive that requires restoration is FC or S-ATA and only a drive of the same type is used.	High ↑
Drive capacity	A spare disk with the same capacity as a RAID group to be restored is used preferentially. When a drive with the same capacity does not exist, a drive with the most approximate and larger capacity is selected preferentially.	↕
The loop of the drive interface	The Spare Disk Drive in the same loop as the Disk Drive targeted for the restoration is used preferentially.	Low ↓

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4.7 Setting RAID Group

You can set the RAID group and RAID level shown below by using the setting function.

(1) RAID level

The range of the RAID levels supported by the DF700 is shown in the table below.

Table 4.7.1 Range of Supported RAID Levels

No.	RAID level	Supported range			Remarks
		RKM + RKAJ/RKA	RKS + RKAJ	RKM/RKS + RKAJ/ RKAJAT/RKA, RKXS+RKAJAT	
1	RAID 0	2D to 16D	2D to 16D	2D to 16D: RKM/RKS/RKAJ/RKA Not supported: RKXS/RKAJAT	The stripe size is 64 k bytes in default. When the Cache Partition Manager is unlocked in the microprogram revision 0733/A or more, it can be changed to 256 k bytes or 512 k bytes.
2	RAID 1	1D+1D	1D+1D	1D+1D	
3	RAID 5	2D+1P to 15D+1P	2D+1P to 15D+1P	2D+1P to 15D+1P	
4	RAID 6	2D+2P to 28D+2P	2D+2P to 28D+2P	2D+2P to 28D+2P	
5	RAID 1+0	2D+2D to 8D+8D	2D+2D to 8D+8D	2D+2D to 8D+8D	

(2) Selection of Disk Drives

Disk drives for a RAID group

It is possible to create the RAID Group by selecting either one optional Disk Drive of FC and SATA among the Disk Drives which are not set in the RAID Group or the Spare Disks and not blocked.

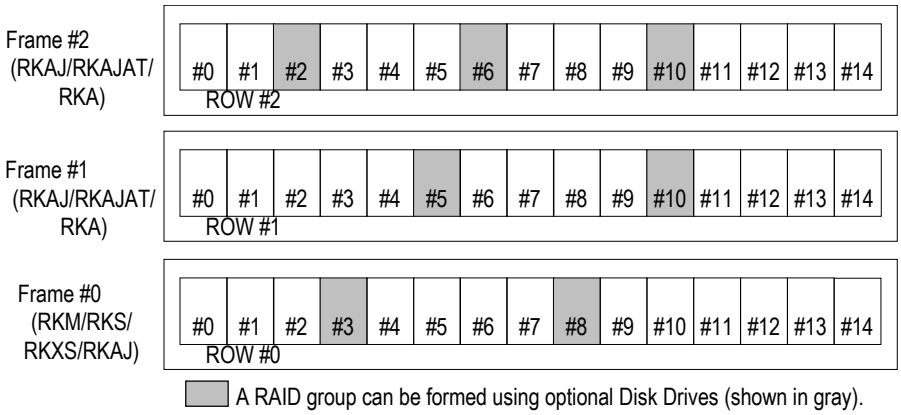
However, the Disk Drives of the even-numbered slots are allocated in Loop #0 and the Disk Drives of the odd-numbered slots are allocated in Loop #1 in the Basic Chassis and the Additional Chassis, so that it is recommended to evenly select the Disk Drives of the even-numbered slots and the odd-numbered slots in the chassis as the Disk Drives which configure the RAID Group in consideration of the load distribution of the back-end path.

When selecting the Disk Drives to configure the RAID Group manually, it is recommended to continuously select the Disk Drives in the Basic Chassis and the Additional Chassis (either one Disk Drive of FC and SATA which are not set in the RAID Group or the Spare Disks and not blocked) with Storage Navigator Modular.

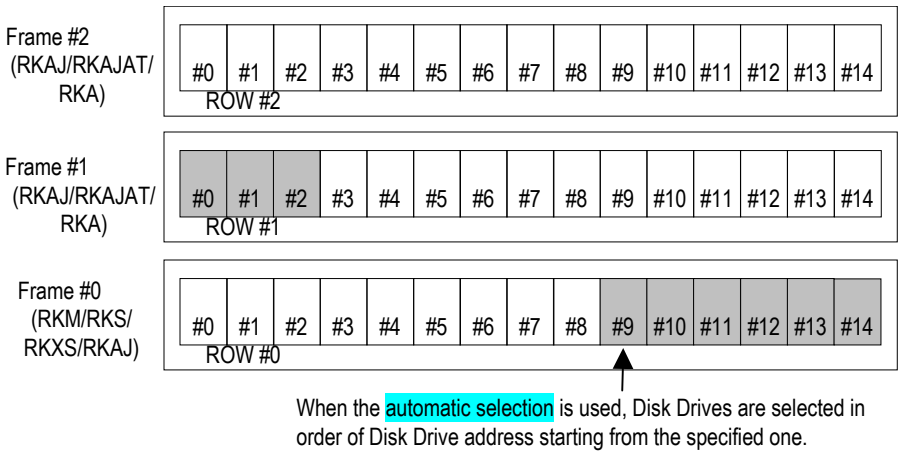
When using the automatic selection, the Disk Drives for the RAID width (number of Disk Drives in the parity group) × depth (number of parity groups) are allocated from the specified first Disk Drive by the numerical order (in ascending order) in device # order as the RAID Group configuration.

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(2-1) Selection of optional Disk Drives



(2-2) Automatic selection



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(3) User data area

All the Disk Drives allocated to a RAID group are managed as those having the same capacity because of the full mapping.

The size of the user data in one Disk Drive is the specified Disk Drive capacity from which the system area capacity is subtracted and rounded with 0x0800.

Expression:

User data size = ((LAST LBA + 1) - Data portion beginning LBA) & 0xFFFFF800

When the capacity of the Disk Drives installed within the range where the RAID group is allocated is smaller than the specified Disk Drive capacity, the RAID group cannot be defined.

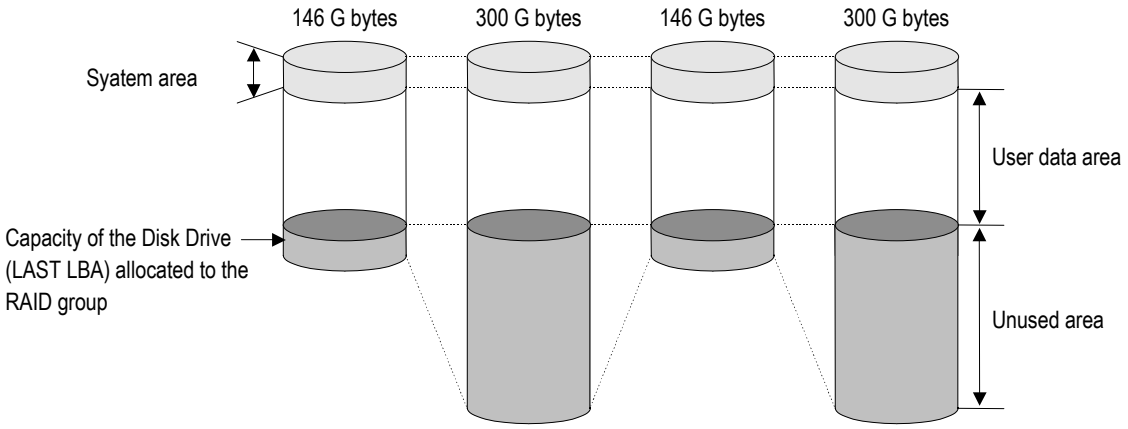


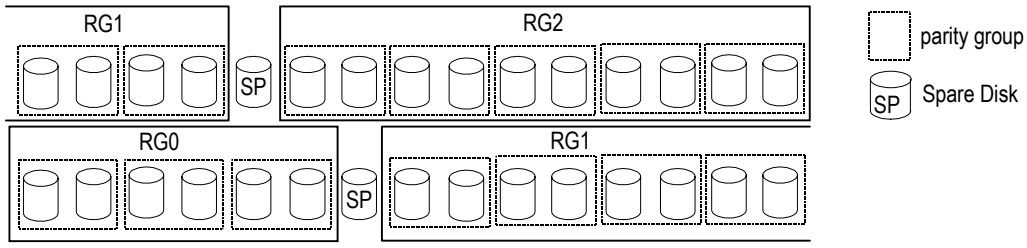
Figure 4.7.1 User Data Area

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(4) Image of RAID group definition for each RAID level (RKM/RKS/RKXS or the RKAJ corresponding to the unit ID #0 connected to the RKH + RKAJ/RKAJAT/RKA)

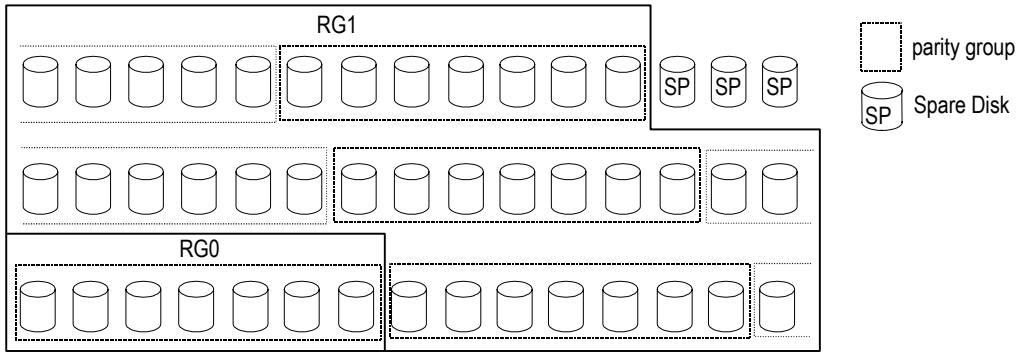
(a) RAID 0 (when connected RKXS/RKAJAT, RAID 0 is not supported)

• In the case of 2D



RG0 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 3
RG1 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 6
RG2 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 5

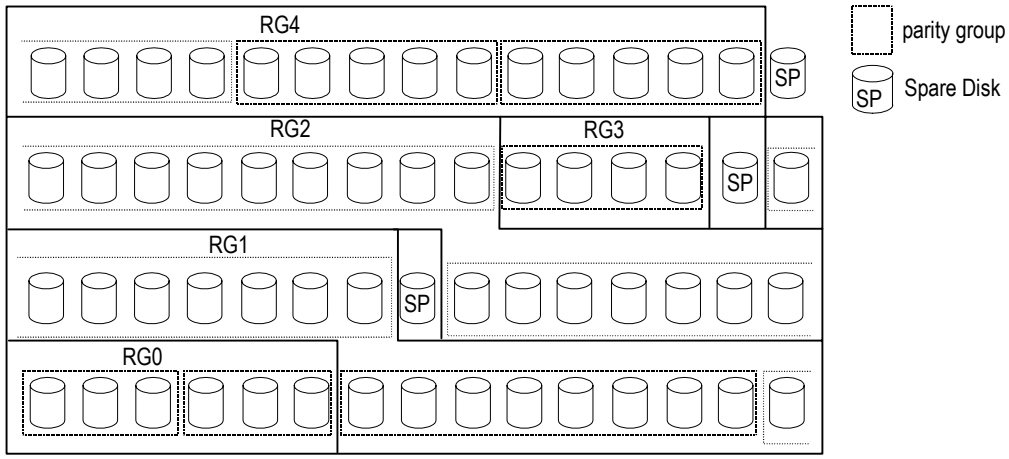
• In the case of 7D



RG0 : Number of the Disk Drive in the parity group = 7
Number of parity groups = 1
RG1 : Number of the Disk Drive in the parity group = 7
Number of parity groups = 5

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- In the case of 2D to16D



RG0 : 3D Number of the Disk Drive in the parity group = 3
Number of parity groups = 2

RG1 : 8D Number of the Disk Drive in the parity group = 8
Number of parity groups = 2

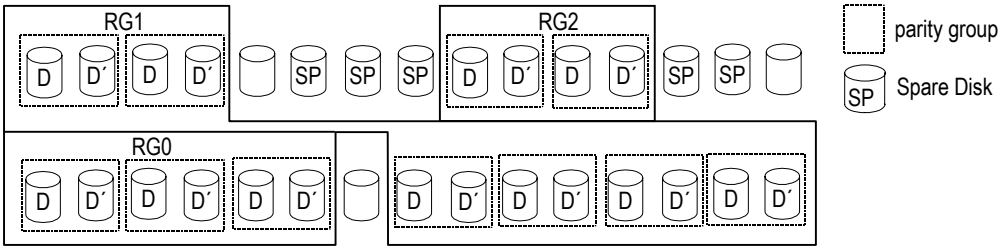
RG2 : 16D Number of the Disk Drive in the parity group = 16
Number of parity groups = 1

RG3 : 4D Number of the Disk Drive in the parity group = 4
Number of parity groups = 1

RG4 : 5D Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

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(b) RAID 1

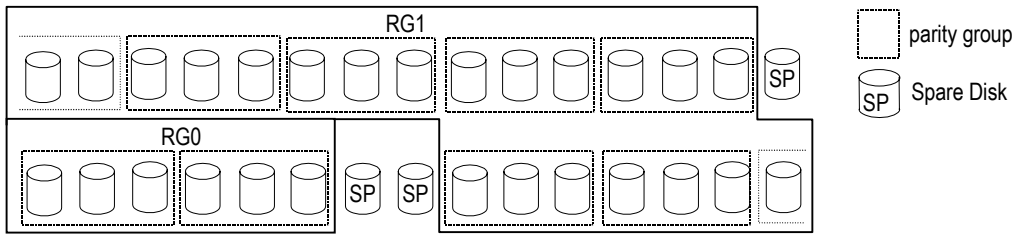


RG0 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 3
RG1 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 6
RG2 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 2

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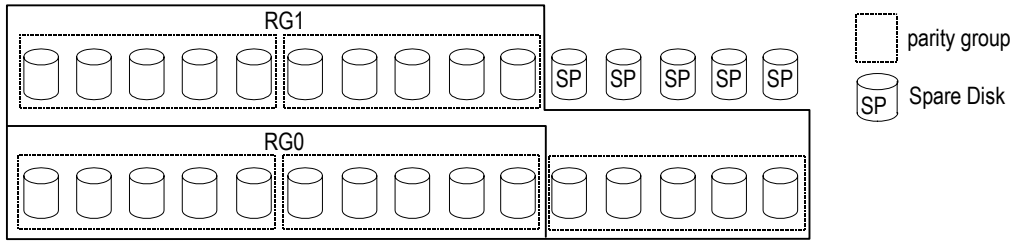
(c) RAID 5

- In the case of 2D + 1P



RG0 : Number of the Disk Drive in the parity group = 3
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 3
Number of parity groups = 7

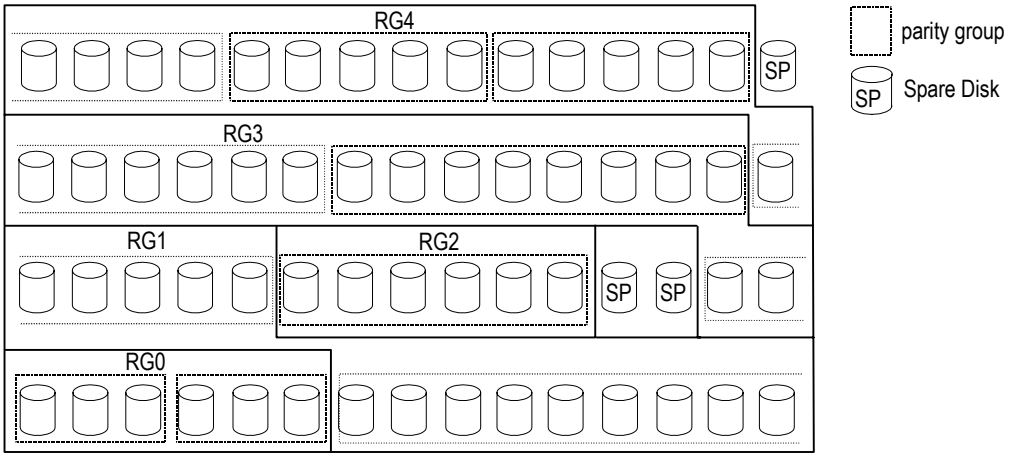
- In the case of 4D + 1P



RG0 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

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• In the case of 2D + 1P to 15D + 1P



RG0 : 2D + 1P Number of the Disk Drive in the parity group = 3
Number of parity groups = 2

RG1:13D + 1P Number of the Disk Drive in the parity group = 14
Number of parity groups =1

RG2: 5D + 1P Number of the Disk Drive in the parity group = 6
Number of parity groups = 1

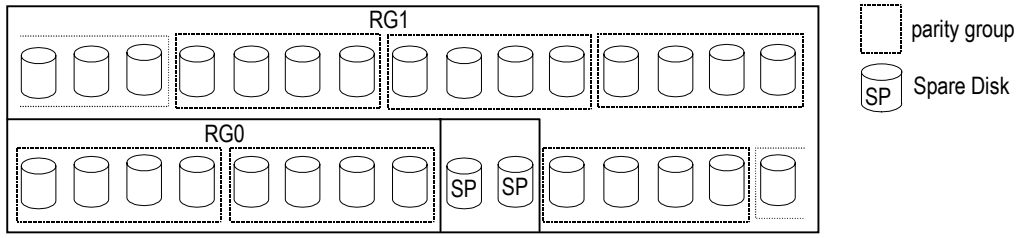
RG3: 7D + 1P Number of the Disk Drive in the parity group = 8
Number of parity groups = 2

RG4: 4D + 1P Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

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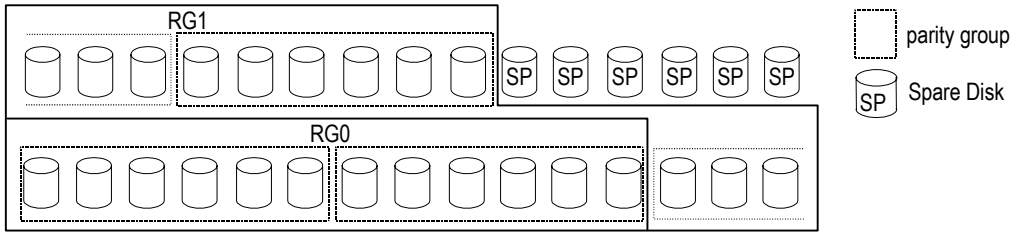
(d) RAID 6

- In the case of 2D + 2P



RG0 : Number of the Disk Drive in the parity group = 4
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 4
Number of parity groups = 5

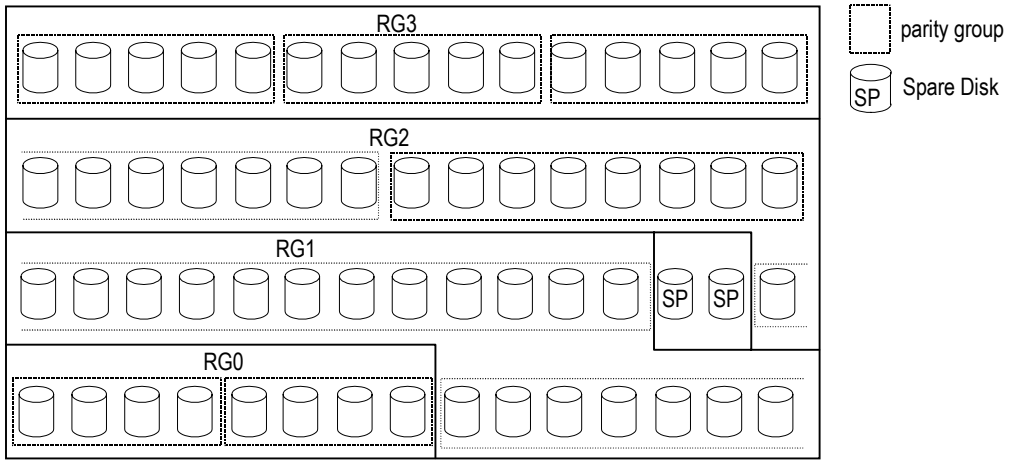
- In the case of 4D + 2P



RG0 : Number of the Disk Drive in the parity group = 6
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 6
Number of parity groups = 2

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• In the case of 2D + 2P to 28D + 2P



RG0 : 2D + 2P Number of the Disk Drive in the parity group = 4
Number of parity groups = 2

RG1:17D + 2P Number of the Disk Drive in the parity group = 19
Number of parity groups =1

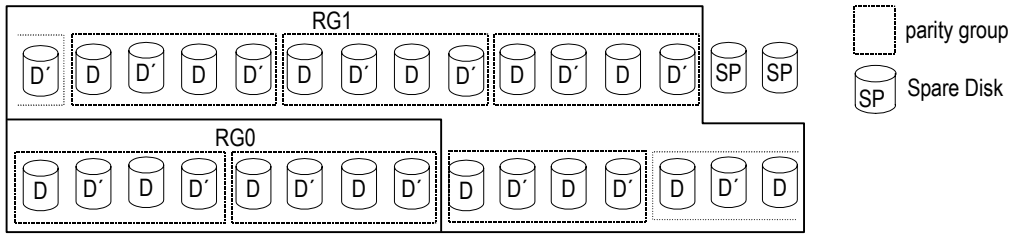
RG2: 6D + 2P Number of the Disk Drive in the parity group = 8
Number of parity groups = 2

RG3: 3D + 2P Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

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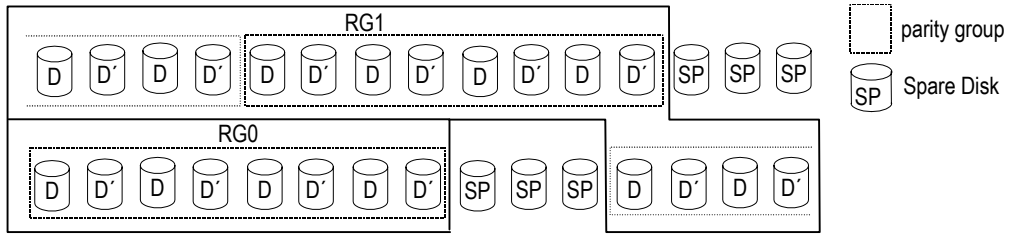
(e) RAID 1+0

- In the case of 2D + 2D



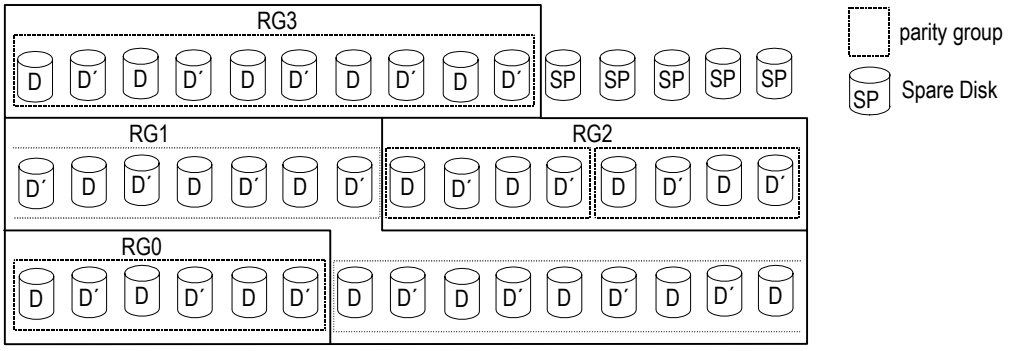
RG0 : Number of the Disk Drive in the parity group = 4
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 4
Number of parity groups = 5

- In the case of 4D + 4D



RG0 : Number of the Disk Drive in the parity group = 8
Number of parity groups = 1
RG1 : Number of the Disk Drive in the parity group = 8
Number of parity groups = 2

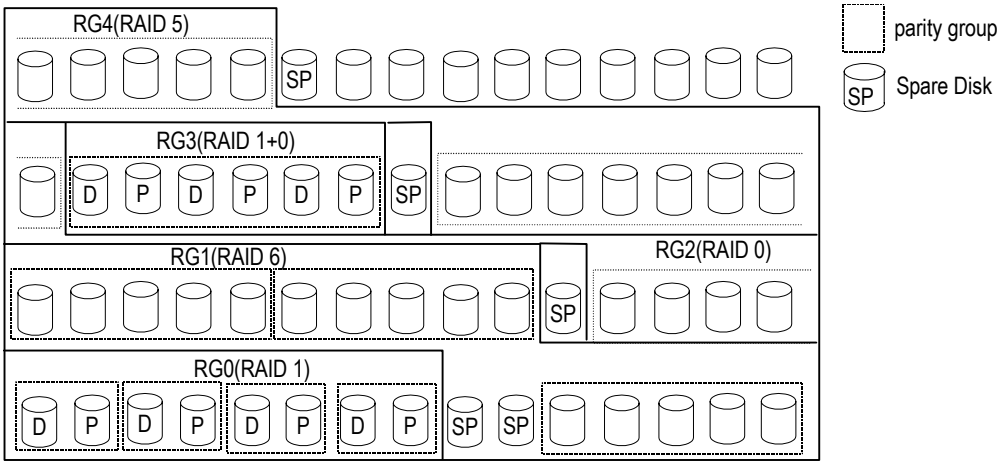
- In the case of 2D + 2D to 8D + 8D



RG0 : 3D + 3D Number of the Disk Drive in the parity group = 6
Number of parity groups = 1
RG1 : 8D + 8D Number of the Disk Drive in the parity group = 16
Number of parity groups = 1
RG2 : 2D + 2D Number of the Disk Drive in the parity group = 4
Number of parity groups = 2
RG3 : 5D + 5D Number of the Disk Drive in the parity group = 10
Number of parity groups = 1

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(d) In the case where RAID levels coexist



RG0 (RAID 1) :1D+1D Number of the Disk Drive in the parity group = 2
Number of parity groups = 4

RG1 (RAID 6) : 3D + 2P
Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

RG2 (RAID 0) : 5D
Number of the Disk Drive in the parity group = 5
Number of parity groups = 1

RG3 (RAID 1+0) : 3D + 3D
Number of the Disk Drive in the parity group = 6
Number of parity groups = 1

RG4 (RAID 5) : 11D + 1P
Number of the Disk Drive in the parity group = 12
Number of parity groups = 1

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4.8 Online Verify

(1) Outline of Function

The online verify function executes verification of the disk medium surface, detects a disk medium fault, and recovers the data by reassignment to prevent an occurrence of data loss caused by a disk medium fault.

(2) Online Verify Specification

Check results of the online verify for each state of the check object and action against error are shown in Table 4.8.1.

Table 4.8.1 Check results and action against the error according to the state of the check object (1/2)

Check object	LU state		Check results	Retry	Action against error
RAID-0	LU undefined		Correctable error, uncorrectable error	Yes (*1)	The alternate sector is assigned.
			Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.)
	LU defined	Unformatted	Correctable error, uncorrectable error	Yes (*1)	The alternate sector is assigned.
			Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.)
		Normal / blocked	Correctable error	Yes (*2)	The alternate sector is assigned, and the writing is performed. (*3)
			Uncorrectable error, hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.)
RAID-1/1+0/5/6	LU undefined		Correctable error, uncorrectable error	Yes (*1)	The alternate sector is assigned.
			Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.) (*4)
	LU defined	Unformatted	Correctable error, uncorrectable error	Yes (*1)	The alternate sector is assigned.
			Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.)(*4)
		Normal / blocked	Correctable error, uncorrectable error	Yes (*2)	The data is restored, the alternate sector is assigned, and the writing is performed. (*3)
			Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.) (*4)

*1 : Retry one time by the VERIFY command.

*2 : When there is staging data or no data on the cache, retry two times by the READ command. When there is dirty data, pin data, or write incomplete data on the cache, retry two times by the VERIFY command. When errors occur in both retries, recover the data. If there is no error in both retries, it is treated as normal.

*3 : (a) If the data recovery fails, ignore the faulty sector and go to the next LBA.
(b) Even if the alternate sector assignment fails, execute the recovery data write & verify function. When returned due to sector exhaustion, block the corresponding drive and go to the next drive.
(c) If the write & verify of the recovered data fails, leave the recovered data as dirty data and go to the next LBA.

*4 : Error count is managed. (When this error occurs at a disk drive twice within 24 hours, the disk drive is blockaded in case of redundant composition.)

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Table 4.8.1 Check results and action against the error according to the state of the check object (2/2)

Check object	LU state	Check results	Retry	Action against error
RAID undefined	LU undefined	Correctable error, uncorrectable error	Yes (*1)	The alternate sector is assigned.
		Hardware error, other errors	None	Ignore the error and continue the processing. (The test is continued from the next LBA. At this time, the Disk Drive is not blocked.) (*2)
System area (*3)	–	Correctable error, uncorrectable error, hardware error, other errors	None	Blocked system area. Immediately after the blockade, it is recovered by the automatic operation of the system copy. (The retrials are to be made up to ten times.)

*1 : Retry one time by the VERIFY command.
*2 : Error count is managed. (When this error occurs at a disk drive twice within 24 hours, the disk drive is blockaded in case of redundant composition.)
*3 : The system drive of the RKXS is only the target of the online verify.

(3) Online Verify Starting Timing

The online verify function is active from becoming ready to scheduled stop. The start of the online verification after being READY is resumed from the position when the planned shutdown was normally performed last time. The operation of the online verification can be set to disable or enable by the Storage Navigator Modular.

However, the online verify function is not executed during the drive recovery operation or the copy operation of ShadowImage in-system replication/TrueCopy remote replication/Copy-on-Write Snapshot/TrueCopy Extended Distance with the copying pace set to 15.

(4) Online Verify by Dual Controller

In the dual controller configuration, the controller 0 takes charge of the even number Chassis (Basic Chassis, Additional Chassis #2, 4, …, 14), and the controller 1 takes charge of the odd number Chassis (Additional Chassis #1, 3, …, 13). When online verify function is completed, it will be executed again from the beginning.

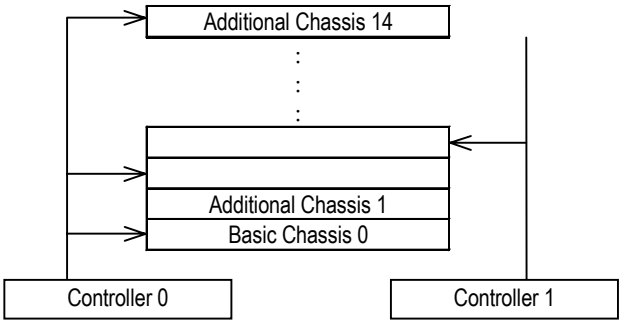


Figure 4.8.1 Online Verify by Dual Controller

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(5) Online Verify Execution Timing

The 1/6-thinned-out processing of the FC drives is performed in the SATA drives. However, when the SATA drives are the system drives, the online verification for the system area is performed every time.

Table 4.8.2 Online Verify Execution Timing

No.	Drive Type	Area	Online Verify Execution Timing	Remarks
1	FC	System area (*1)	Not performed	
2		User data area	Performed every time	
3	SATA (720 hours/month operation impossible)	System area (*1)	Performed every time	
4		User data area	Performed with 1/6-thinned-out operation	ATE250R, ATE400R
5	SATA (720 hours/month operation supported)	System area (*1)	Performed every time	The Disk Drive other than the above-mentioned whose microprogram revision is 0750/A or more.
6		User data area	Performed every time	

*1 : The system drive (HDU#0 to#4) of the basic cabinet is only the target of the online verify.

‡1 : When the online verification processing is executed for all the chassis, the 1st, 2nd, 3rd, and the following rounds of the processing are performed for the chassis with the FC drives, whereas the 2nd through 6th rounds are not executed for the chassis with the SATA drives and the processing is resumed from the 7th round. That is to say, only the round of 6n+1 ("n" is an integer of 0 or more) is executed.
However, the processing is executed for the SATA drives, which can be supported for 720 hours/month operation, in the same way as that for the FC drives.

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4.9 Setting of LAN interface

LAN interface and the setting on DF700 are shown below.

(1) Type of LAN interface

The subsystem installs following LAN interfaces;

Parts	Name of LAN port	Use
Controller	Maintenance port	For maintenance operation
	User management port	For customer
NAS unit	Maintenance LAN port	For maintenance operation
	Management LAN port	For customer
	Data LAN port	For customer
iSCSI interface board	iSCSI port	For customer

(2) Setting item of LAN interface

When you use LAN interface of subsystem, following setting should be correct between subsystem and device connected to the subsystem.

○ : Setting item of subsystem
✧ : Setting item of device connected to the subsystem
× : Not required

Setting item		IP address, subnet mask, default gateway	Negotiation	LAN port number	MTU
Maintenance port of controller	Using WEB	○	✧ (Auto negotiation)	×	✧ (1500)
	Using SNM(*1)	×	✧ (Auto negotiation)	○	✧ (1500)
User management port of controller	Using WEB	○	○	×	✧ (1500)
	Using SNM(*1)	○	○	○	✧ (1500)
Maintenance LAN port of NAS unit		○(*2)	✧ (Auto negotiation)	×	✧ (1500)
Management LAN port of NAS unit		○	○	×	○
Data LAN port of NAS unit		○	○	×	○
iSCSI port		○	✧ (1000Mbps/ Full duplex)	○	✧ (1500)

*1 : Storage Navigator Modular

*2 : When the subsystem has NAS unit, the network address of IP address of Maintenance LAN port of NAS unit is set same as Maintenance port.

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(a) Setting of IP address, subnet mask and default gateway

Set IP address, subnet mask and default gateway to each LAN port.

(a-1) Setting of the subsystem shipped from the factory

Setting item		IP address	Subnet mask	Default gateway
Maintenance port of controller	CTL0	10.0.0.16	255.255.255.0	0.0.0.0
	CTL1	10.0.0.17		
User management port of controller	CTL0	192.168.0.16		
	CTL1	192.168.0.16		
Maintenance LAN port of NAS unit	NNC0	10.0.0.10		
	NNC1	10.0.0.11		
	NNC2	10.0.0.12		
	NNC3	10.0.0.13		
Management LAN port of NAS unit	NNC0	192.168.1.1		
	NNC1	192.168.1.2		
	NNC2	192.168.1.5		
	NNC3	192.168.1.6		
Data LAN port of NAS unit		(Not assigned the interface information of NAS unit)		
iSCSI port	Port 0A	192.168.0.200	255.255.255.0	0.0.0.0
	Port 0B	192.168.0.201		
	Port 1A	192.168.0.204		
	Port 1B	192.168.0.205		

(a-2) Notes on Setting

If you use DHCP mode for user management port, IP address, subnet mask and default gateway are assigned automatically from DHCP server. In this case, you cannot set above parameters.

If you set these parameters, be careful about the followings.

(i) For the head value of IP address, '0', '127' and '255' cannot be specified.
You cannot set 0.xxx.xxx.xxx, 127.xxx.xxx.xxx and 255.xxx.xxx.xxx.
The The following IP address is reserved on NAS unit. So, you cannot assign following IP address for management LAN port of controller and data LAN port of NAS unit.
- 172.29.1.xxx
- 172.29.2.xxx
- 172.29.3.xxx
- 172.29.4.xxx

(ii) Set correct subnet mask.
You cannot use discontinuous one-bit IP address for example 255.0.255.0.

(iii) Set a host address of IP address and default gateway address which is not 0 or 255.
For example, when subnet mask is 255.255.255.0, you cannot set like 192.168.0.0 and 192.168.0.255 for IP address and default gateway address.

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(iv) Set the same network address for IP address and default gateway.
If no default gateway address for management port is specified, set "0.0.0.0".
If no default gateway address for user management port of NAS unit is specified, it is no need to set.
For example, when subnet mask is 255.255.255.0 and IP address is 192.168.0.16, you cannot set 192.168.1.1 for default gateway.

(v) When you set following IP address, you cannot set same network address.
Set individual network address for each IP address.
- Maintenance port of controller / User management port of controller
- Maintenance LAN port of NAS unit / Management LAN port of NAS unit
- Maintenance LAN port of NAS unit / Data LAN port of NAS unit
- Management LAN port of NAS unit / Data LAN port of NAS unit

For example, when subnet mask is 255.255.255.0 and IP address of maintenance port is 10.0.0.16, you cannot set 10.0.0.xxx for user port.

(vi) When the network address of the LAN device, which is connected via the Gateway in the extension of the user management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
If this is the case, set network address other than maintenance port in the LAN device which is connected via the Gateway in the extension of the user management port, or set maintenance port other than the network address of LAN device which is connected via the Gateway. (Refer to System Parameter "4.2 (3) Setting of LAN" (SYSPR 04-0080).)

(a-3) Method of setting
- User management port of controller
  Refer to System Parameter "4.2 (3) Setting of LAN" (SYSPR 04-0080).
- Maintenance port of controller and Maintenance LAN port of NAS unit
  Refer to System Parameter "4.2 (4) Setting of Maintenance LAN" (SYSPR 04-0100).
- Management LAN port of NAS unit
  Refer to System Parameter "4.2 (16) Setting of NNC LAN" (SYSPR 04-0280).
- Data LAN port of NAS unit
  Refer to NAS Manager Modular User's Guide.
- iSCSI port
  Refer to System Parameter "4.2 (10) Setting of iSCSI" (SYSPR 04-0191).

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(b) Setting of negotiation

Set negotiation to each LAN port.

(b-1) Setting of the subsystem shipped from the factory

Setting item	Negotiation
Maintenance port of controller	Auto negotiation (10M/100Mbps, Half/Full duplex)
User management port of controller	Auto negotiation (10M/100Mbps, Half/Full duplex)
Maintenance LAN port of NAS unit	Auto negotiation (10M/100M/1000Mbps, Half/Full duplex)
Management LAN port of NAS unit	Auto negotiation (10M/100M/1000Mbps, Half/Full duplex)
Data LAN port of NAS unit	(Not assigned the interface information of NAS unit)
iSCSI port	1000Mbps, Half duplex

(b-2) Microprogram revision and Storage Navigator Modular for Setting

Microprogram revision and Storage Navigator Modular for setting negotiation is shown below.

○ : Settable, × : Unsettable

Microprogram revision	Less than 0726/B	0726/B or more, less than 0730A	0730/A or more, less than 0750/A	0750/A or more
Storage Navigator Modular	Less than 2.60	2.60 or more, less than 3.00	3.00 or more, less than 5.00	5.00 or more
Maintenance port of controller	× (Auto negotiation (10M/100Mbps, Half/Full duplex))			
User management port of controller	× (Auto negotiation (10M/100Mbps, Half/Full duplex))			○
Maintenance LAN port of NAS unit	× (NAS unit is not supported)	× (Auto negotiation (10M/100M/1000Mbps, Half/Full duplex))		
Management LAN port of NAS unit	× (NAS unit is not supported)	○		
Data LAN port of NAS unit	× (NAS unit is not supported)	○		
iSCSI port	× (iSCSI is not supported)		× (1000Mbps, Half duplex)	

(b-3) Notes on Setting

Conform the negotiation of subsystem to the negotiation of the device connected to LAN port. If the negotiation of subsystem is different from the negotiation of the device connected to LAN port, the throughput or response performance of network communication may decrease and the control Unit may not communicate the destination device across a network.

(b-4) Method of setting

- User management port of controller
  Refer to System Parameter "4.2 (3) Setting of LAN" (SYSPR 04-0080).
- Management LAN port of NAS unit
  Refer to System Parameter "4.2 (16) Setting of NNC LAN" (SYSPR 04-0280).
- Data LAN port of NAS unit
  Refer to NAS Manager Modular User's Guide.

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(c) Setting of LAN port number

Set LAN port number to use when connecting.

(c-1) Setting of the subsystem shipped from the factory

Setting item	LAN port number
Maintenance port of controller	2000
User management port of controller	
iSCSI port	3260

(c-2) Microprogram revision and Storage Navigator Modular for Setting

Microprogram revision and Storage Navigator Modular for setting negotiation is shown below.

○ : Settable, × : Unsettable

Microprogram revision	Less than 0726/E	0726/E or more, less than 0730A	0730/A or more
Storage Navigator Modular	Less than 2.61	2.61 or more, less than 3.00	3.00 or more
Maintenance port of controller	(Same as LAN port number of User management port of controller)		
User management port of controller	× (2000)	○	
iSCSI port	× (iSCSI is not supported)		○

(c-3) Notes on Setting

(i) When you change LAN port number, confirm that the LAN port number is not used.
If you set LAN port number that one already uses, the control Unit may not communicate the destination device across a network.

(ii) If you change LAN port number, you have to change setting of LAN port number on your PC.
In case of User management port of controller, edit “Service” file on PC using Storage Navigator Modular.
In case of iSCSI port, change the setting of LAN port number on iSCSI initiator.

(c-4) Method of setting

- User management port of controller
  Refer to System Parameter “4.2 (3) Setting of LAN” (SYSPR 04-0080).
- iSCSI port
  Refer to System Parameter “4.2 (10) Setting of iSCSI” (SYSPR 04-0191).

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(d) Setting of MTU

Set packet size of sending (MTU : Max Transfer Unit) to each LAN port.

(d-1) Setting of the subsystem shipped from the factory

Setting item	Negotiation
Maintenance port of controller	1500
User management port of controller	
Maintenance LAN port of NAS unit	
Management LAN port of NAS unit	
Data LAN port of NAS unit	(Not assigned the interface information of NAS unit)
iSCSI port	1500

(d-2) Microprogram revision and Storage Navigator Modular for Setting

Microprogram revision and Storage Navigator Modular for setting MTU is shown below.

○ : Settable, × : Unsettable

Microprogram revision	Less than 0726/B	0726/B or more, less than 0730A	0730/A or more
Storage Navigator Modular	Less than 2.60	2.60 or more, less than 3.00	3.00 or more
Maintenance port of controller	× (1500)		
User management port of controller	× (1500)		
Maintenance LAN port of NAS unit	× (NAS unit is not supported)	× (1500)	
Management LAN port of NAS unit	× (NAS unit is not supported)	○	
Data LAN port of NAS unit	× (NAS unit is not supported)	○	
iSCSI port	× (iSCSI is not supported)		× (1500)

(d-3) Notes on Setting

Conform the MTU of subsystem to the MTU of the device connected to LAN port.
If the MTU of subsystem is different from the MTU of the device connected to LAN port, the control Unit may not communicate the destination device across a network.

(d-4) Method of setting

- Management LAN port of NAS unit
  Refer to System Parameter "4.2 (16) Setting of NNC LAN" (SYSPR 04-0280).
- Data LAN port of NAS unit
  Refer to NAS Manager Modular User's Guide.

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Chapter 5. Outline of P.P.

5.1 P.P.s Required for Maintenance

P.P.s included in DF700 required for maintenance are divided mainly into three categories depending on the related part.

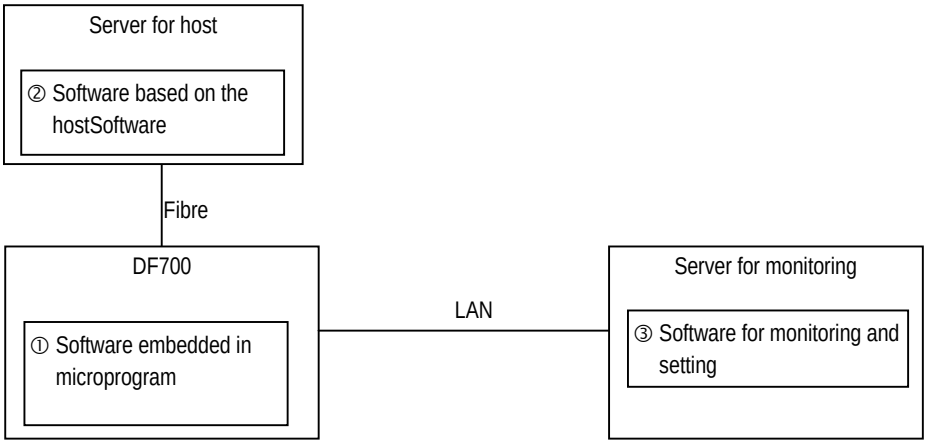


Figure 5.1.1 P.Ps required for maintenance and its related parts (Fibre model)

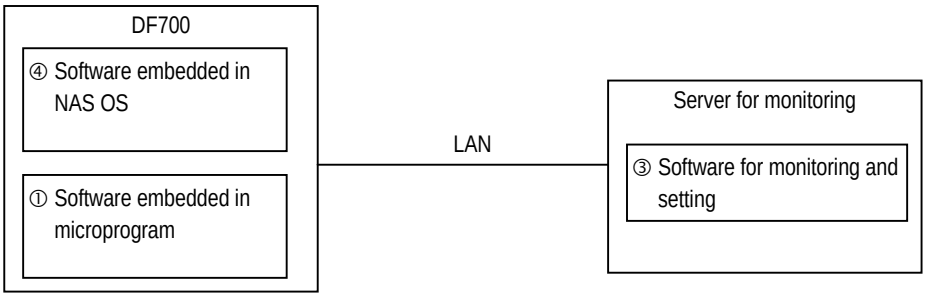


Figure 5.1.2 P.Ps required for maintenance and its related parts (NAS model)

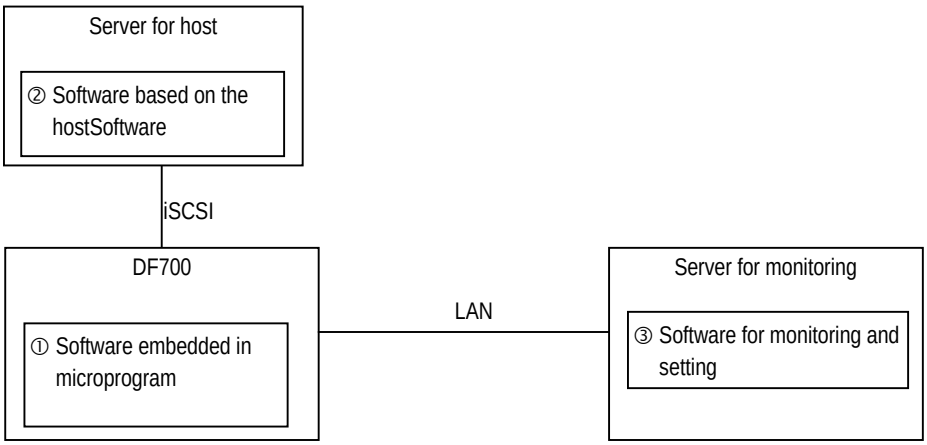


Figure 5.1.3 P.Ps required for maintenance and its related parts (iSCSI model)

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① Software embedded in microprogram:
Is software embedded in microprogram in DF700. This software will be enabled by unlocking.

② Software based on the host:
Is software performed and installed on server for host connected to the DF700 with Fibre Channel/iSCSI interface.

③ Monitoring, setting software:
Is software performed and installed on the monitoring server / PC connected to the DF700 with a LAN.

④ Software embedded in NAS OS:
It is the software installed in the NAS OS of the DF700-RKNAS, and becomes effective if the key is opened and it is installed separately.

The P.Ps required for maintenance are shown in Table 5.1.1.

Table.5.1.1 The P.Ps Required for Maintenance

No.	Program product	Type	Object for maintenance	Related part			The title of manual
				Basic Microprogram	Host computer	Monitoring	
1	Storage Navigator Modular	P-002D-J301	③	○	–	○	• Storage Navigator Modular (for GUI) User's Guide
2	ShadowImage in-system replication (include RAID Manager)	P-002D-J311/ P-002D-J311W	①,②	○	○	–	• ShadowImage in-system replication User's Guide • Command Control Interface (CCI) User and Reference Guide
3	TrueCopy remote replication (include RAID Manager)	P-002D-J312/ P-002D-J312W	①,②	○	○	–	• TrueCopy remote replication User's Guide • Command Control Interface (CCI) User and Reference Guide
4	TrueCopy Extended Distance (*1) (include RAID Manager)	P-002D-J315	①,②	○	○	–	• TrueCopy Extended Distance User's Guide • Command Control Interface (CCI) User and Reference Guide
5	Copy-on-write SnapShot (include RAID Manager)	P-002D-J310/ P-002D-J310W	①,②	○	○	–	• Copy-on-write SnapShot User's Guide • Command Control Interface (CCI) User and Reference Guide
6	Data Retention Utility (include RAID Manager)	P-002D-J309/ P-002D-J309W	①,②	○	○	–	• Data Retention Utility User's Guide • Command Control Interface (CCI) User and Reference Guide
7	LUN Manager	P-002D-J308/ P-002D-J308W	①	○	–	–	• LUN Manager User's Guide
8	Cache Residency Manager	P-002D-J305	①	○	–	–	• Cache Residency Manager User's Guide
9	SNMP Agent Support Function	P-002D-J303	①	○	–	–	• SNMP Agent Support Function User's Guide

*1 : This is supported in the microprogram revision 0735/A or more.

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No.	Program product	Type	Object for maintenance	Related part			The title of manual
				Basic Microprogram	Host computer	Monitoring	
10	LUN Expansion	P-002D-J304	①	○	–	–	• LUN Expansion Function User's Guide
11	Password Protection	P-002D-J302	①	○	–	–	• Password Protection User's Guide
12	Performance Monitor	P-002D-J306	①	○	–	–	• Performance Monitor User's Guide
13	Cache Partition Manager	P-002D-J307	①	○	–	–	• Cache Partition Manager User's Guide
14	In-System Replication Bundle	P-002D-J313/ P-002D-J313W	①	○	–	–	• ShadowImage in-system replication User's Guide • Copy-on-write SnapShot User's Guide • Command Control Interface (CCI) User and Reference Guide
15	NAS Backup Restore Modular	P-9P13-J8D004/ P-9P13-J8D014/ P-9P13-J8D024/ P-9P13-J8D034	④	○	–	–	• NAS Backup Restore Modular User's Guide
16	NAS Anti Virus Agent Modular	P-9P13-J8D005/ P-9P13-J8D015/ P-9P13-J8D025/ P-9P13-J8D035	④	○	–	–	• NAS Anti Virus Agent Modular User's Guide
17	NAS Manager modular_1000 Suite	P-9P13-J8D00S	④	○	–	–	• NAS Manager Modular User's Guide • NAS Sync Image Modular User's Guide
18	NAS Manager modular_500 Suite	P-9P13-J8D01S	④	○	–	–	
19	NAS Manager modular_200 Suite	P-9P13-J8D02S	④	○	–	–	
20	NAS Manager modular_100 Suite	P-9P13-J8D03S	④	○	–	–	
21	Modular Volume Migration (*1)	P-002D-J316/ P-002D-J316W	①,②	○	○	–	• Modular Volume Migration User's Guide • Command Control Interface (CCI) User and Reference Guide
22	Account Authentication (*1)	P-002D-J317	①	○	–	–	• Account Authentication User's Guide
23	Audit Logging (*1)	P-002D-J318	①	○	–	–	• Audit Logging User's Guide
24	Power Saving (*2)	P-002D-J319	①	○	–	–	• Power Saving User's Guide

*1 : This is supported in the microprogram revision 0760/A or more.
*2 : This is supported in the microprogram revision 0770/A or more.

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Installation

Chapter 1. Before Starting Installation Work ..... INST 01-0000

Chapter 2. Installing Floor Model ..... INST 02-0000

Chapter 3. Installing Rackmount Model ..... INST 03-0000

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Chapter 1. Before Starting Installation Work

1.1 Before Starting Installation Work

Take notice of the following when performing a installation work for the subsystem. Read and understand them well before performing the installation.

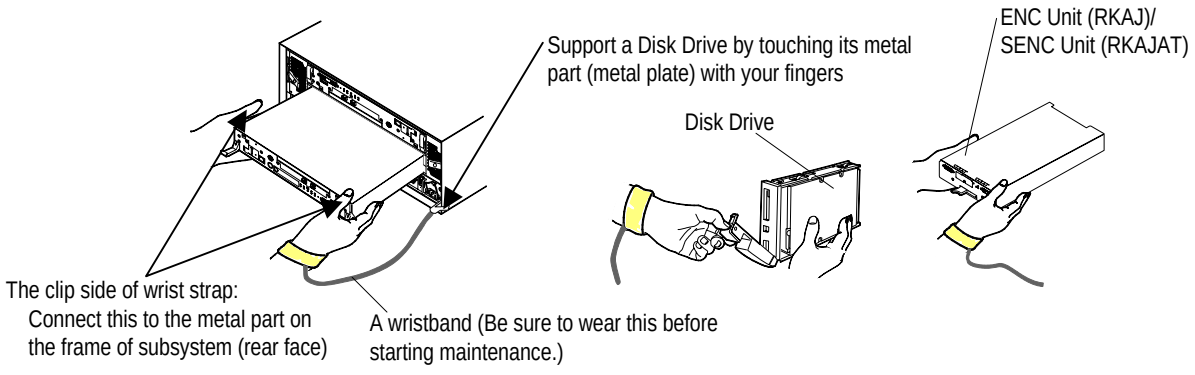
(1) Note at the time of the unpacking
- Unpack it indoor.
  Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
- Work on the unpacking in the place where a rapid difference of temperature does not occur. It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(2) Note on installing and removing parts
Generally, each part is equipped with high-precision components. Remove and install the part gently so as not to give it any shock.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

Be sure to wear the wristband, connect its lead wire to the subsystem enclosure before starting the work, and do not remove them until the work is completed.
When installing a Disk Drive, Control Unit and ENC Unit/SENC Unit, hold it with your hand wearing the wristband having fingers contact metallic portions on the sides of the part.



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(3) Note on cable routing

(a) Handling of cables on the floor

- Protect cables which cannot be accommodated by the subsystem and thus laid on the floor or cables which cross a passage with cable protecting, etc.
- Do not make inter-device cables apart from the floor but lay them on the floor.

(b) Handling of under-floor cables when the subsystem is installed on the free access floor.

- Give excess lengths to cables routed under the floor so that they can easily be laid on the slab. Do not make them to be hung dangling.

(c) How to route cables

- Give adequate margin of length to cables to withstand earthquakes, etc.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cable and power cable apart each other. When they have to be positioned close each other, do not make them run in parallel but make them cross each other.
- When using cable protecting duct, be careful not to damage or break cables by catching them.

(d) Be sure to insert or pull out a cable connector holding it with your hand. If you pull a cable, a trouble may be caused.

(e) When bending the FC I/F cable and RC (ENC) cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(4) Installation of the adaptable microprogram

It is required to install the adaptable microprogram depending on the parts to be installed. Check the adaptable microprogram revision referring to Microprogram "1.9 Adaptable microprogram revision" (MICRO 01-0360).

(5) Note on restarting

When restarting the subsystem, turn on the main switch after waiting more than one minute after the main switch is turned off (after the POWER LED goes out).

If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.

When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

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(6) Note on completing a maintenance work

Close all the external covers when a maintenance work is completed.

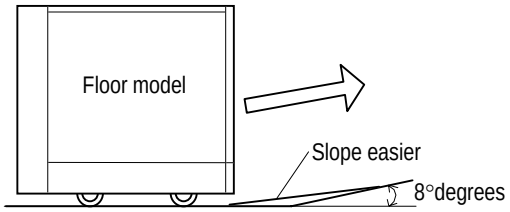
It is required to make all the external covers closed to operate the subsystem properly.

(Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

(7) Note on moving the Floor Model

The allowable maximum inclination angle at the end of the slope for the Floor Model is eight degrees.

When moving the Floor Model through a slope steeper than the above or across a level difference of the floor, use a gangway, etc. to make the slope easier.



(8) Notes while the array subsystem is being started

Because the status where the array subsystem is being started is in the middle of the transition to the status of the subsystem power turned on (Ready status) from the status of the subsystem power turned off, do not perform the following work while the array subsystem is being started.

- Installing or removing the parts
- Inserting or pulling out the cables
- Restarting the array subsystem
- Setting the power control (local or remote)
- Setting the remote adaptors

Also, the setting function or the reference function using the Storage Navigator Modular cannot be executed to the array subsystem which is being started.

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1.2 Fibre Channel Interface

1.2.1 Restrictions on Using the Fibre Channel Interface

When using the 2G bps Fibre Channel interface or the 4G bps Fibre Channel interface as the 1G bps mode, GBIC used with HBA (Host Bus Adapter), SW that becomes a connection destination has the following restrictions. Otherwise, a Linkup malfunction may occur.

Restrictions:

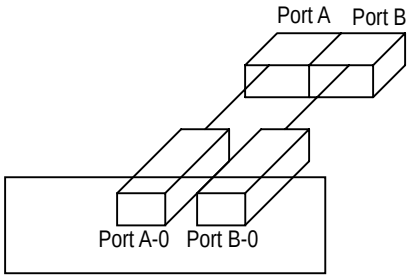
(1) Vixel CD Laser is not supported. However, Vixel GBIC (VCSEL) is supported.
CD Laser or VCSEL is identified by first digit of the serial number.
[CD Laser] : 3****, 4****
[VCSEL] : 7**** or more

(2) Point to Point topology with 1G bps Qlogic X6729A or X6730A is not supported.

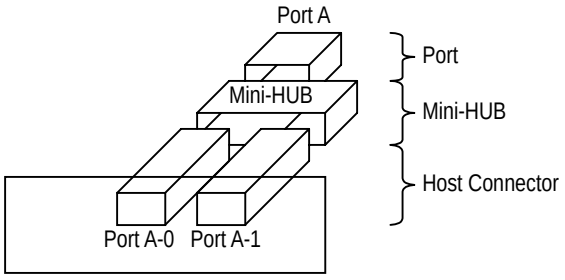
(3) Point to Point with Sun default 1G bps Fibre Channel Host Bus Adapter Board (Qlogic OEM product (X6929A/X6730A) which were mentioned (2)) is not supported.

1.2.2 Mini-HUB

When the Interface Board is not installed in the Control Unit of the RKS/RKXS, the host interface configures Mini-HUB in the Control Unit and extends one Port to two host connectors. However, the link status between the host and subsystem is recognized as one port.



FC connectors at the time of installing or adding the RKH FC Interface Board.
FC connectors at the time of installing the RKM FC Interface Board.
FC connectors at the time of adding the RKS/RKXS FC Interface Board.



FC connector when the RKS/RKXS FC Interface Board is not added

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1.2.3 Connection Specifications of RKS/RKXS

When the Interface Board is not installed in the Control Unit of the RKS/RKXS, the host connector which can be used for connecting to the upper device differs depending on the topology set to the Port of the RKS/RKXS and the connection destination of the Fibre Channel Interface Board, and it is shown as below.

Table 1.2.1 Available Host Connector of each topology setting and connection method

No.	Topology of RKS/RKXS	Transfer speed of RKS/RKXS	Direct Connection of Host	Switch Connection	Direct Connection of SANRISE UPS (*1) Direct Connection of SANRISE NSC (*2) Direct Connection of SANRISE 9900V
1	Loop	Auto	Host Connector #0	Not Support	Not Support
2		1Gbps/2Gbps	Host Connector #0 and #1	Not Support	Host Connector #0
3	Point-to-Point	Auto/1Gbps/2Gbps	Not Support	Host Connector#0	Not Support

*1 : SANRISE USP:It is the abbreviation of SANRISE Universal Storage Platform, and a high-ranking model of the SANRISE series.

*2 : SANRISE NSC:It is the abbreviation of SANRISE Network Storage Controller, and a high-ranking model of the SANRISE series.

When connecting directly to the host, the Loop topology is set to port.

- Connect it to the host connector 0 side, when transfer speed of RKS/RKXS is Auto (do not connect it to the host connector 1 side).
- Both host connector 0 and 1 is available, when transfer speed of RKS/RKXS is 1Gbps or 2Gbps.
- Port that set the Point-to-Point topology cannot be connected directly to the host, SANRISE USP, SANRISE NSC or SANRISE 9900V.

When connecting it to Switch, the Point-to-Point topology is set to port.

- Connect it to the host connector 0 side (do not connect it to the host connector 1 side).
- Port that set the Loop topology cannot be connected to Switch.

When connecting it to SANRISE USP, SANRISE NSC or SANRISE 9900V directly, set the Loop topology and the fixed speed (1 G bps, 2 G bps) to the Port.

- Connect it to the host connector 0 side (do not connect it to the host connector 1 side).
- Port that set the Point-to-Point topology cannot be connected to SANRISE USP, SANRISE NSC or SANRISE 9900V.
- It cannot be connected directly to SANRISE USP, SANRISE NSC or SANRISE 9900V with the Port which the transfer rate is set to “Auto”.

1.2.4 Fibre Channel Configuration of RKS/RKXS

The following Fibre Channel information is set to Port.
When the Interface Board is not installed in the Control Unit of the RKS/RKXS, the information of these items is not set to each host connector which connects the Fibre Channel of the RKS/RKXS.

Port Address/ Topology/ Transfer Rate/ Adding Host Group/ Host Group Options/ LU Mapping Information

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1.2.5 Attention of Host Directly Connection for RKS/RKXS

In the hardware configuration which does not install the interface board in the Control Unit of the RKS/RKXS, when making Port of the RKS/RKXS to Loop topology and linking the host with both of the host connector 0 side and 1 side, it needs to be careful about the following items.

- Exclusive Access of LU
  Each host connector of RKS/RKXS cannot be set LU mapping. It is necessary to set the access path between hosts and LUs according to the assignment of the LUs to the hosts using LUN Manager.
- Transfer Speed of Host
  Transfer speed of RKS/RKXS is set to the port. It is necessary to set the same transfer speed both host connectors.

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1.3 Model Name

1.3.1 Components and indispensable parts

Table 1.3.1 Components and indispensable parts (SANRISE AMS500 (Adaptable Modular Storage))

No.	Name	Model	Components
1	RKM	DF700-RKM	Frame (1), Control unit (1), Panel (1), Backup battery unit (2), Fan assembly (2), AC cable J2H (2), Power unit (RKM) (2)
2	RKAJ	DF700-RKAJ	Frame (1), AC cable J2H (2), Power unit (RKAJ) (2), ENC unit (2), ENC cable (4)
3	RKAJAT	DF700-RKAJAT	Frame (1), AC cable J2H (2), Power unit (RKAJAT) (2), SENC unit (2), ENC cable (2)
4	Floor (RKM+H1J) Model	DF700-RKM+ DF-F700-H1J	RKM (1), Floor setting kit H1J (1), Control unit (1), Panel (1), Power unit (RKM) (2), Backup battery unit (2), Fan assembly (2), AC cable J1H (2)
5	Floor (RKM+RKAJ+H2J) Model	DF700-RKM+ DF700-RKAJ+ DF-F700-H2J	RKM (1), RKAJ (1), Floor setting kit H2J (1), Control unit (1), Panel (1), Power unit (RKM) (2), Power unit (RKAJ) (2), Backup battery unit (2), Fan assembly (2), ENC unit (2), ENC cable (4), AC cable J1H (4)
6	Floor (RKM+RKAJAT+H2J) Model	DF700-RKM+ DF700-RKAJAT+ DF-F700-H2J	RKM (1), RKAJAT (1), Floor setting kit H2J (1), Control unit (1), Panel (1), Power unit (RKM) (2), Power unit (RKAJAT) (2), Backup battery unit (2), Fan assembly (2), SENC unit (2), ENC cable (2), AC cable J1H (4)
7	RKNAS	DF700-RKNAS	Frame (1), AC cable J2H (2), Memory (DIMM) of 1G bytes (4) (Not included in RKNAS), NAS Interface cable(PCI-Express cable, CTRL cable) (2), LAN cable (2)
8	Cache memory	DF-F700-C1GJ	Cache memory of 1,024 M bytes
		DF-F700-C2GJ	Cache memory of 2,048 M bytes
9	Interface Board	DF-F700-DJ4G2	4Gbps Fibre Channel Interface Board (including Host Connector (2)) (1)
		DF-F700-DJNAS	NAS Interface Board (1)
		DF-F700-DJSC2	iSCSI Interface Board (two ports) (1)
10	Disk Drive(*1)	DF-F700-AGF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE400R	3.5-type Disk Drive (393.4 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE500R	3.5-type Disk Drive (491.9 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})

*1 : This values of storage capacity are calculated as 1 G bytes = 1,000,000,000 bytes.
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Table 1.3.2 Components and indispensable parts (SANRISE AMS200 (Adaptable Modular Storage))

No.	Name	Model	Components
1	RKS	DF700-RKS	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2)
		DF700-RSS014F	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Disk Drive (146Gbytes) (4)
		DF700-RSS034F	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Disk Drive (300Gbytes) (4)
		DF700-RSD1H5F	Frame (1), Control unit (including 2 G bps Host Connector (2)) (2), 4G bps FC Interface Board (including 4 G bps Host Connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Cache memory (1Gbytes) (2), Disk Drive (72Gbytes) (5)
		DF700-RSD134F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Cache memory (1Gbytes) (2), Disk Drive (300Gbytes) (4)
		DF700-RSD13AF	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Cache memory (1Gbytes) (2), Disk Drive (300Gbytes)(10)
		DF700-RSD115F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Cache memory (1Gbytes) (2), Disk Drive (146Gbytes)(5)
		DF700-RSD135F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Cache memory (1Gbytes) (2), Disk Drive (300Gbytes)(5)
		DF700-RSD015F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Disk Drive (146Gbytes)(5)
		DF700-RSD035F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKS) (2), Disk Drive (300Gbytes)(5)
2	RKAJ	DF700-RKAJ	Frame (1), AC cable J2H (2), Power unit (RKAJ) (2), ENC unit (2), ENC cable (4)
3	RKAJAT	DF700-RKAJAT	Frame (1), AC cable J2H (2), Power unit (RKAJAT) (2), SENC unit (2), ENC cable (2)
4	Floor (RKS+H1J) Model	DF700-RKS+ DF-F700-H1J	RKS (1), Floor setting kit H1J (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Power unit (RKS) (2), Backup battery unit (1), Fan assembly (2), AC cable J1H (2)
5	Floor (RKS+RKAJ+H2J) Model	DF700-RKS+ DF700-RKAJ+ DF-F700-H2J	RKS (1), RKAJ (1), Floor setting kit H2J (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Power unit (RKS) (2), Power unit (RKAJ) (2), Backup battery unit (1), Fan assembly (2), ENC unit (2), ENC cable (4), AC cable J1H (4)
6	Floor (RKS+RKAJAT+H2J) Model	DF700-RKS+ DF700-RKAJAT+ DF-F700-H2J	RKS (1), RKAJAT (1), Floor setting kit H2J (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Power unit (RKS) (2), Power unit (RKAJAT) (2), Backup battery unit (1), Fan assembly (2), SENC unit (2), ENC cable (2), AC cable J1H (4)
7	RKNAS	DF700-RKNAS	Frame (1), AC cable J2H (2), Memory (DIMM) of 1G bytes (2) (Not included in RKNAS), NAS Interface cable (PCI-Express cable, CTRL cable) (2), LAN cable (2)
8	Cache memory	DF-F700-C1GJ	Cache memory of 1,024 M bytes
		DF-F700-C2GJ	Cache memory of 2,048 M bytes
9	Interface Board	DF-F700-DJNAS	NAS Interface Board (1)
		DF-F700-DJSC2	iSCSI Interface Board (two ports) (1)

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No.	Name	Model	Components
10	Disk Drive(*1)	DF-F700-AGF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE400R	3.5-type Disk Drive (393.4 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE500R	3.5-type Disk Drive (491.9 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})

1 : This values of storage capacity are calculated as 1 G bytes = 1,000,000,000 bytes.
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Table 1.3.2.1 Components and indispensable parts (SANRISE WMS100 (Workgroup Modular Storage))

No.	Name	Model	Components
1	RKXS	DF700-RKXS	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2)
		DF700-RXS024F	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Disk Drive (250Gbytes) (4)
		DF700-RXS044F	Frame (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Disk Drive (400Gbytes) (4)
		DF700-RXSH44F	Frame (1), Control unit (including 2G bps Host connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (1), Disk Drive (400Gbytes) (4)
		DF700-RXSH48F	Frame (1), Control unit (including 2G bps Host connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (1), Disk Drive (400Gbytes) (8)
		DF700-RXDH44F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (2), Disk Drive (400Gbytes) (4)
		DF700-RXDH48F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (2), Disk Drive (400Gbytes) (8)
		DF700-RXSH54F	Frame (1), Control unit (including 2G bps Host connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (1), Disk Drive (500Gbytes) (4)
		DF700-RXSH58F	Frame (1), Control unit (including 2G bps Host connector (2)) (1), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (1), Disk Drive (500Gbytes) (8)
		DF700-RXDH54F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (2), Disk Drive (500Gbytes) (4)
		DF700-RXDH58F	Frame (1), Control unit (including 2G bps Host connector (2)) (2), Panel (1), Backup battery unit (1), Fan assembly (2), AC cable J2H (2), Power unit (RKXS) (2), Cache memory (512Mbytes) (2), Disk Drive (500Gbytes) (8)
2	RKAJAT	DF700-RKAJAT	Frame (1), AC cable J2H (2), Power unit (RKAJAT) (2), SENC unit (2), ENC cable (2)
3	Floor (RKXS+H1J) Model	DF700-RKXS+ DF-F700-H1J	RKXS (1), Floor setting kit H1J (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Power unit (RKXS) (2), Backup battery unit (1), Fan assembly (2), AC cable J1H (2)
4	Floor (RKXS+RKAJAT+H2J) Model	DF700-RKXS+ DF700-RKAJAT+ DF-F700-H2J	RKXS (1), RKAJAT (1), Floor setting kit H2J (1), Control unit (including 2 G bps Host Connector (2)) (1), Panel (1), Power unit (RKXS) (2), Power unit (RKAJAT) (2), Backup battery unit (1), Fan assembly (2), ENC unit (2), ENC cable (2), AC cable J1H (4)
5	RKNAS	DF700-RKNAS	Frame (1), AC cable J2H (2), Memory (DIMM) of 1G bytes (2) (Not included in RKNAS), NAS Interface cable (PCI-Express cable, CTRL cable) (2), LAN cable (2)
6	Cache memory	DF-F700-C512JX	Cache memory of 512 M bytes
		DF-F700-C1GJ	Cache memory of 1,024 M bytes
7	Interface Board	DF-F700-DJNAS	NAS Interface Board (1)
		DF-F700-DJSC2	iSCSI Interface Board (two ports) (1)
8	Disk Drive(*1)	DF-F700-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE400R	3.5-type Disk Drive (393.4 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE500R	3.5-type Disk Drive (491.9 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})

*1 : This values of storage capacity are calculated as 1 G bytes = 1,000,000,000 bytes.
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Table 1.3.2.2 Components and indispensable parts (SANRISE AMS1000 (Adaptable Modular Storage))

No.	Name	Model	Components
1	RKH (*1)	DF700-RKH	Frame (1), Control unit (DF-F700-F1JH) (2), Panel (1), Backup battery unit (4), Fan assembly (2), AC cable J2H (2), Power unit (RKH) (2)
	RKHE (*1)	DF700-RKHE	Frame (1), Control unit (DF-F700-F2JH) (2), Panel (1), Backup battery unit (4), Fan assembly (2), AC cable J2H (2), Power unit (RKH) (2)
2	RKAJ	DF700-RKAJ	Frame (1), AC cable J2H (2), Power unit (RKAJ) (2), ENC unit (2), ENC cable (4)
3	RKAJAT	DF700-RKAJAT	Frame (1), AC cable J2H (2), Power unit (RKAJAT) (2), SENC unit (2), ENC cable (2)
4	RKNAS	DF700-RKNAS	Frame (1), AC cable J2H (2), Memory (DIMM) of 1G bytes (4) (Not included in RKNAS), NAS Interface cable (PCI-Express cable, CTRL cable) (2), LAN cable (2)
5	Cache memory	DF-F700-C1GJ	Cache memory of 1,024 M bytes
		DF-F700-C2GJ	Cache memory of 2,048 M bytes
6	Interface Board	DF-F700-DJ4G2H	4Gbps Fibre Channel Interface (including Host Connector (2))
		DF-F700-DJNASH	NAS Interface Board (1)
		DF-F700-DJSC2H	iSCSI Interface Board (two ports) (1)
7	Disk Drive (*2)	DF-F700-AGF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-AGH146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min^{-1})
		DF-F700-AGF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min^{-1})
		DF-F700-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE400R	3.5-type Disk Drive (393.4 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})
		DF-F700-ATE500R	3.5-type Disk Drive (491.9 G bytes) installed in a canister. (Disk rotational speed: 7,200 min^{-1})

*1 : The RKH and the RKHE cannot be used mixing them in the same subsystem.

*2 : This values of storage capacity are calculated as 1 G bytes = 1,000,000,000 bytes.
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1.3.2 Optional parts

Table 1.3.3 Optional Parts

No.	Classification	Model	Name	Constitution/Specification
1	Spare Disk Drive	-	Disk Drive	Name : Refer to the column of the Disk Drive.
2	Controller	DF-F700-F1JM	Controller (RKM)	Array Control Unit for duplication, Software P.P.
		-	Cache Unit	Name : Refer to the column of the Cache Unit.
		DF-F700-F1JS	Controller (RKS)	Array Control Unit for duplication, Software P.P. (Fibre I/F (2) is standard installation.)
		-	Cache Unit	Name : Refer to the column of the Cache Unit.
		DF-F700-F1JXS	Controller (RKXS)	Array Control Unit for duplication, Software P.P. (Fibre I/F (2) is standard installation.)
		-	Cache Unit	Name : Refer to the column of the Cache Unit.
3	Floor setting kit	DF-F700-H1J	Floor setting kit for RKM/RKS	Floor setting kit
		DF-F700-H2J	Floor setting kit for RKM+RKAJ/ RKS+RKAJ	Floor setting kit
4	Disk Drive for addition (RKM/RKS/RKXS/RKAJ/ RKAJAT)	-	Disk Drive	Name : Refer to the column of the Disk Drive.
5	FC Interface Board for addition	DF-F700-DJ4G2W (RKS/RKXS)	4G bps FC Interface Board	Name : Refer to the column of the Interface Board.
		DF-F700-DJ4G2H (RKH)	4G bps FC Interface Board	Name : Refer to the column of the Interface Board.
6	NAS Interface Board	DF-F700-DJNAS (RKM/RKS/RKXS)	NAS Interface Board	Name : Refer to the column of the Interface Board.
		DF-F700-DJNASH (RKH)	NAS Interface Board	Name : Refer to the column of the Interface Board.
7	iSCSI Interface Board	DF-F700-DJSC2 (RKM/RKS/RKXS)	iSCSI Interface Board	Name : Refer to the column of the Interface Board
		DF-F700-DJSC2H (RKH)	iSCSI Interface Board	Name : Refer to the column of the Interface Board
8	Rack frame	DF-F700-U7	Rack frame	Rack frame
9	PDB	DF-F700-UPDU7	PDB	Power distribution box for U7 rack. PDB (1), Bracket (2), Cable clamp (1)
10	Remote adapter	DF-F700-VR4A	Remote adapter (Main unit)	Adapter for PS interlock control (Power cables for 100V and 200V each are standard equipment)
		DF-F700-VR4H	Remote adapter (Hub)	Hub for remote adapter (Power cables for 100V and 200V each are standard equipment)
11	Upgrade kit	DF-F700-RSUPS	Upgrade kit (for single controller)	Kit for upgrading RKS single controller to RKM single controller. RKM (1), Control Unit (1), Interface Board (1) (including Host Connector (2))
		DF-F700-RSUPD	Upgrade kit (for dual controller)	Kit for upgrading RKS dual controller to RKM dual controller. RKM (1), Control Unit (2), Interface Board (2) (including Host Connector (4))
		DF-F700-F2JH	Upgrade kit	Kit for upgrading RKH to RKHE. Control Unit (DF-F700-F2JH) (2)
12	Unit addition support kit	DF-F700-K1BUP	Unit addition support kit	Support kit for connecting SANRISE 9500V additional subsystems (RKA and RKAJAT/ RKAJATL) with SANRISE AMS/WMS Series. CD (1)(including ENC/SENC firmware), 1 m ENC cable (4)

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1.3.3 Accessory parts

Table 1.3.4 Accessory Parts

No.	Classification	Model	Name	Constitution/Specification
1	Power cable(*1)	DF-F700-J1H	Power cable	2.5 m, 2-pole power cable with grounding terminal (AC 125 V, 13 A or 15 A)
		DF-F700-J2H	Power cable	2.5 m, 2-pole power cable with grounding terminal (AC 250 V, 13 A or 15 A)
		DF-F700-J2H5	Power cable	5.0 m, 2-pole power cable with grounding terminal (AC 200 V, 13 A or 15 A)
		DF-F700-J2H10	Power cable	10.0 m, 2-pole power cable with grounding terminal (AC 200 V, 13 A or 15 A)
2	Fibre channel interface cable	DF-F700-KB5M	SC-LC Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (5 m)
		DF-F700-KB10M	SC-LC Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (10 m)
		DF-F700-KB20M	SC-LC Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (20 m)
		DF-F700-KB50M	SC-LC Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (50 m)
		DF-F700-KB1HM	SC-LC Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (100 m)
		DF-F700-KC5M	LC-LC Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (5 m)
		DF-F700-KC10M	LC-LC Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (10 m)
		DF-F700-KC20M	LC-LC Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (20 m)
		DF-F700-KC50M	LC-LC Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (50 m)
		DF-F700-KC1HM	LC-LC Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (100 m)
3	Remote adapter cable	DF-F700-VRC2	Remote adapter cable	For control of Remote adapter, 2 m
		DF-F700-VRC5	Remote adapter cable	For control of Remote adapter, 5 m
		DF-F700-VRC10	Remote adapter cable	For control of Remote adapter, 10 m
		DF-F700-VRC20	Remote adapter cable	For control of Remote adapter, 20 m
		DF-F700-VRC50	Remote adapter cable	For control of Remote adapter, 50 m
4	Tray for remote adapter	DF-F700-HVR4	Tray for remote adapter	Rail kit for mounting the Remote adapter on the U7 rack frame.
5	Rack rail (for Chassis)	DF-F700-URHT7	Rail for Mounting chassis	Rail Kit for U7 and HA8000/8500
		DF-F700-UR7	Rail for Mounting chassis	Rail Kit for U4J/EP8000/SUN/AP7000
		DF-F700-URNS7	Rail for Mounting chassis	Rail Kit for NSC
6	Rack rail (for NAS Unit)	DF-F700-URHTN7	Rail for Mounting NAS Unit	Rail Kit for U7
		DF-F700-URN7	Rail for Mounting NAS Unit	Rail Kit for U4J/EP8000/SUN/AP7000
		DF-F700-URRAN7	Rail for Mounting NAS Unit	Rail Kit for HA8000/8500
7	ENC cable	DF-F700-K5B	FC cable assembly	FC cable 5 m (2)
8	Decoration panel	DF-F700-U71D	Decoration panel	Panel to cover vacant space (1 EIA) of the U7 rack frame.

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1.4 Installation Configuration of the Subsystem

The installation forms of DF700 have the floor model combining RKM/RKS/RKXS/RKAJ/RKAJAT and the Floor Standing Kit, and the rack-mount model mounted on the 19-inch rack frame.
As another rackmount model product, the RKH is provided.
The RKH is a subsystem with no Disk Drive installed in it.
The floor models have the types of which RKM/RKS/RKXS is alone, an RKAJ is added to RKM/RKS, and an RKAJAT is added to RKM/RKS/RKXS.
The rack-mount model uses the special U7 rack frame.
For a U7 rack frame, up to ten RKAJs (up to 165 Disk Drives) can be connected to an RKM.
The configuration, in which up to 14 RKAJs and an RKM (up to 225 Disk Drives) are connected to two U7 rack frames, can be formed as the subsystem.
RKAJ/RKAJAT can be mixed and connected to RKM/RKS, and the mixed configuration, in which up to 14 for an RKM and up to six for an RKS are connected, can be formed.
Up to six RKAJs (up to 105 Disk Drives) can be connected to an RKS.
Up to six RKAJATs (up to 105 Disk Drives) can be connected to an RKXS.
RKXS can be only connected to RKAJAT, and cannot be mixed and connected to RKAJ/RKAJAT.
In the case of one U7 rack frame, the maximum of nine RKAJs (the maximum of 150 Disk Drives) can be connected to the minimum configuration of AMS1000 configured with one RKAJ and one RKAJ.
Be sure to mount at least the one RKH and RKAJ.
The configuration, in which up to 29 RKAJs and an RKH (up to 450 Disk Drives) are connected to two U7 rack frames, can be formed as the subsystem.
RKAJ/RKAJAT can be mixed and connected to RKH, and the mixed configuration, in which up to 30 for an RKH are connected, can be formed.
However, the maximum connection number of the RKAJAT is 28 units.

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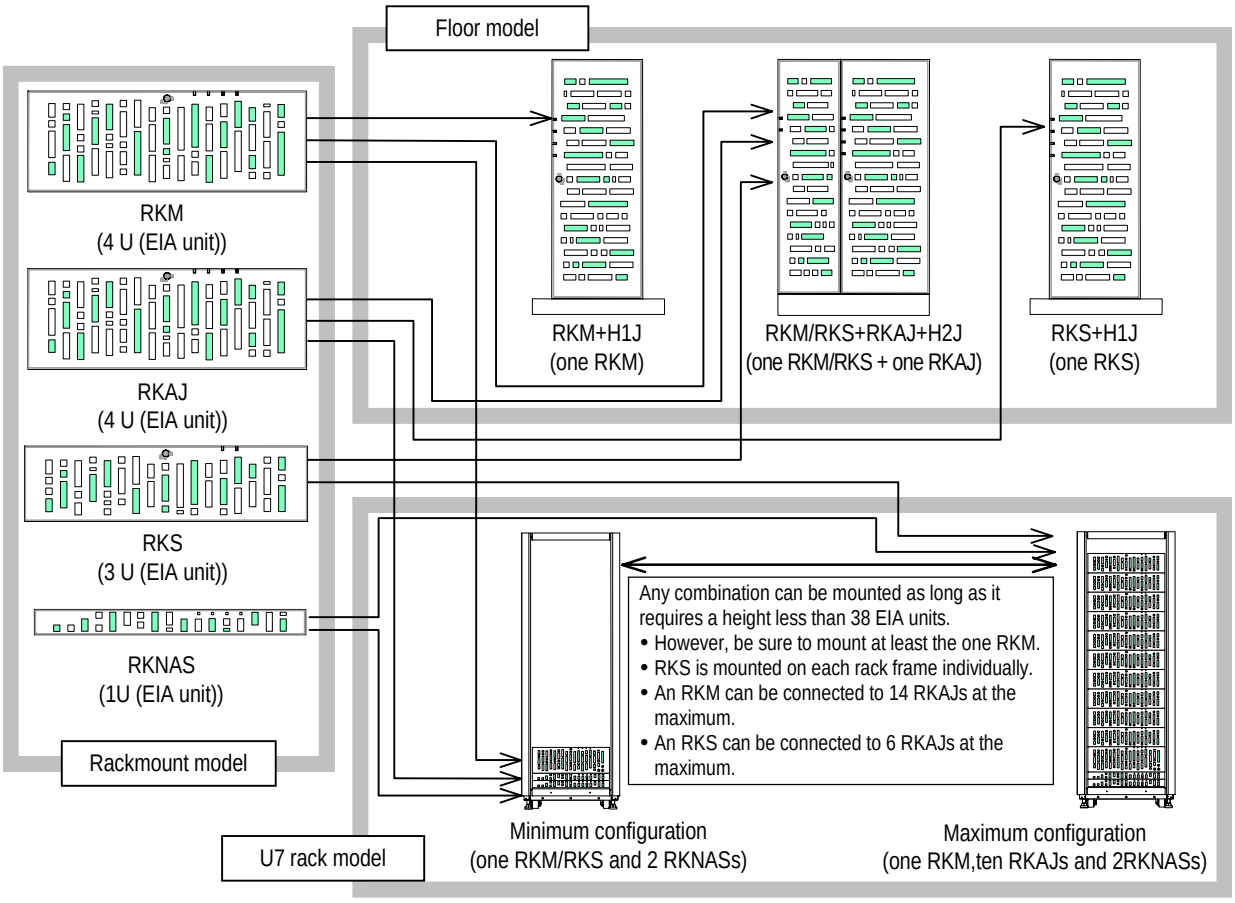


Figure 1.4.1 Subsystem Configuration (RKM/RKS+RKAJ+RKNAS)

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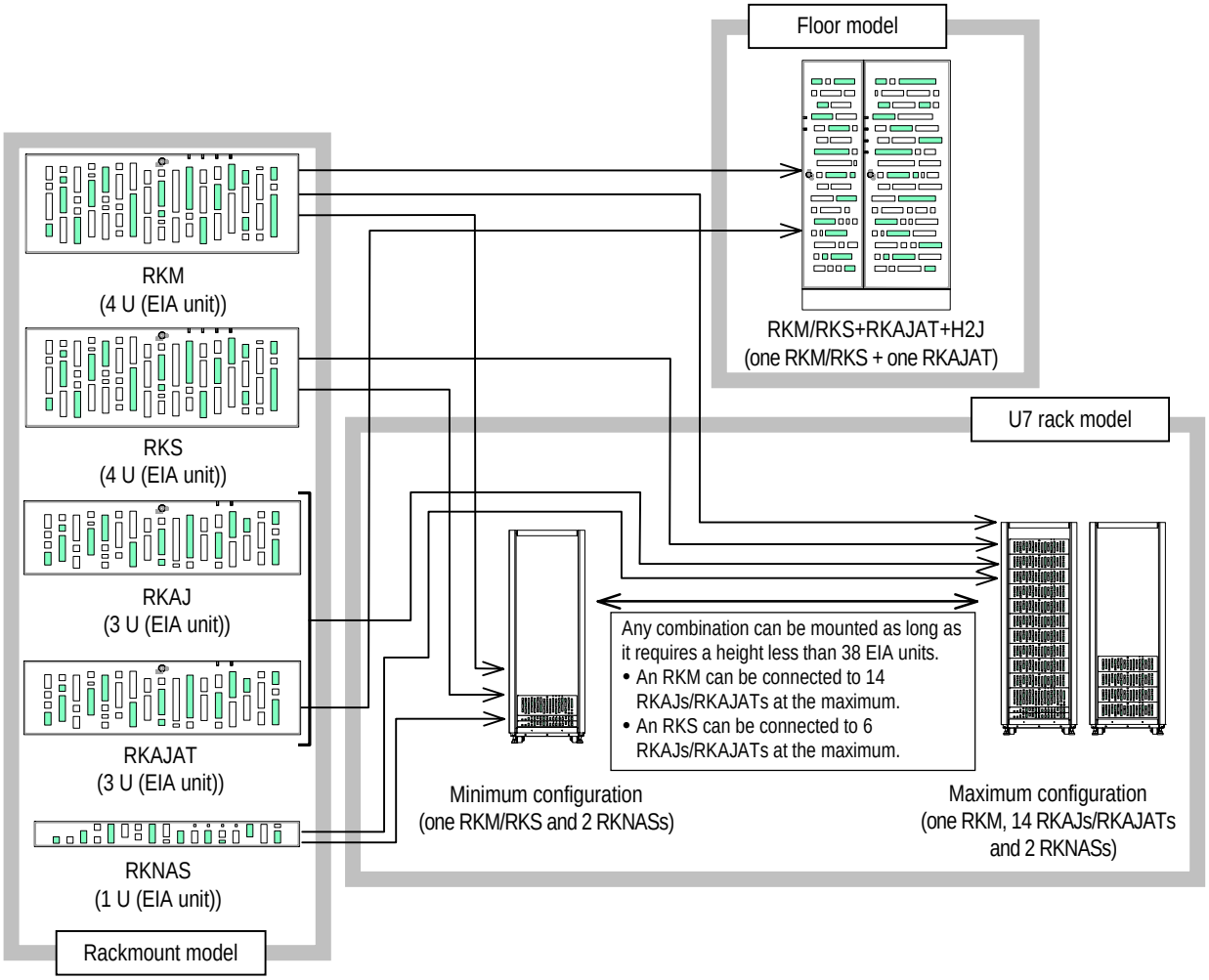


Figure 1.4.2 Subsystem Configuration (RKM/RKS+RKAJ/RKAJAT+RKNAS)

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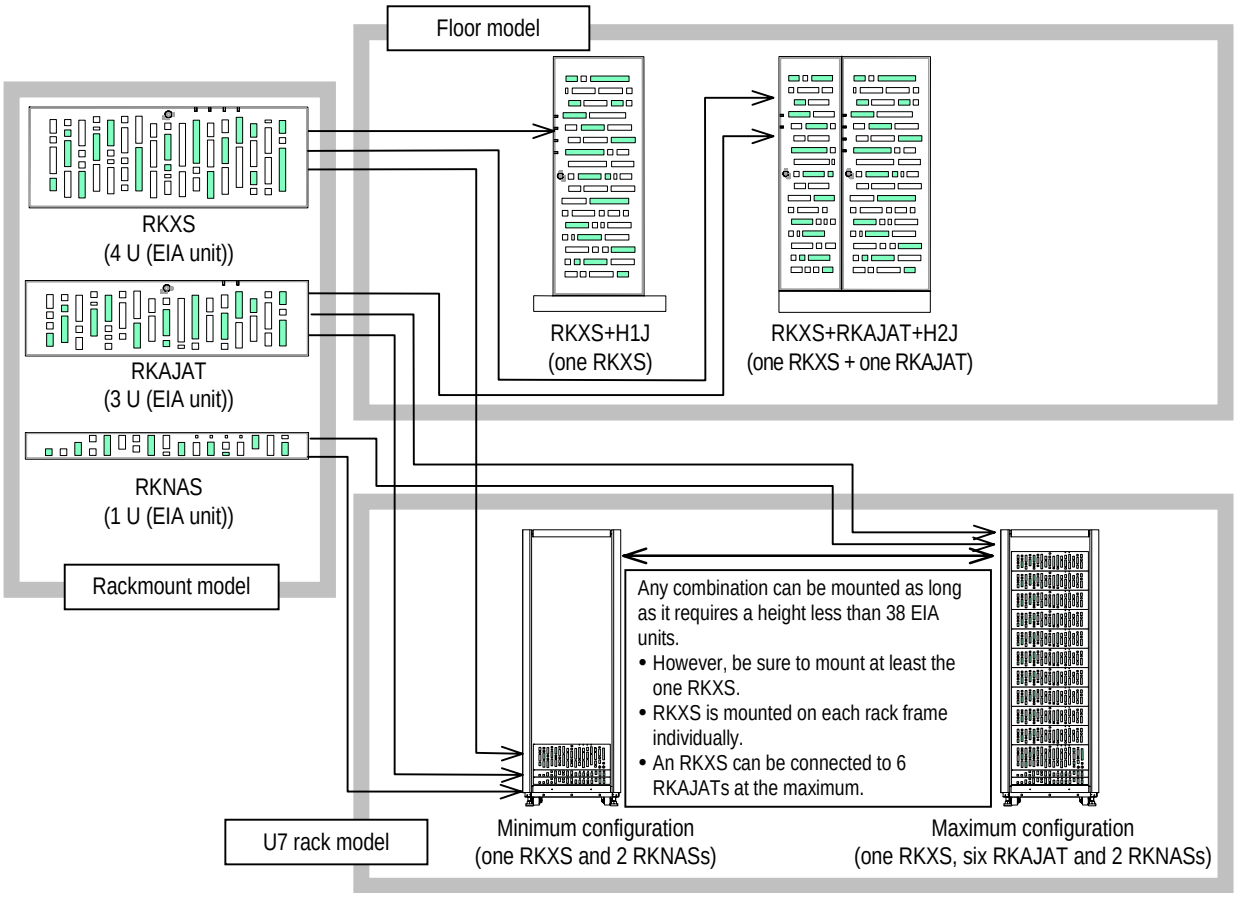


Figure 1.4.3 Subsystem Configuration (RKXS+RKAJAT+RKNAS)

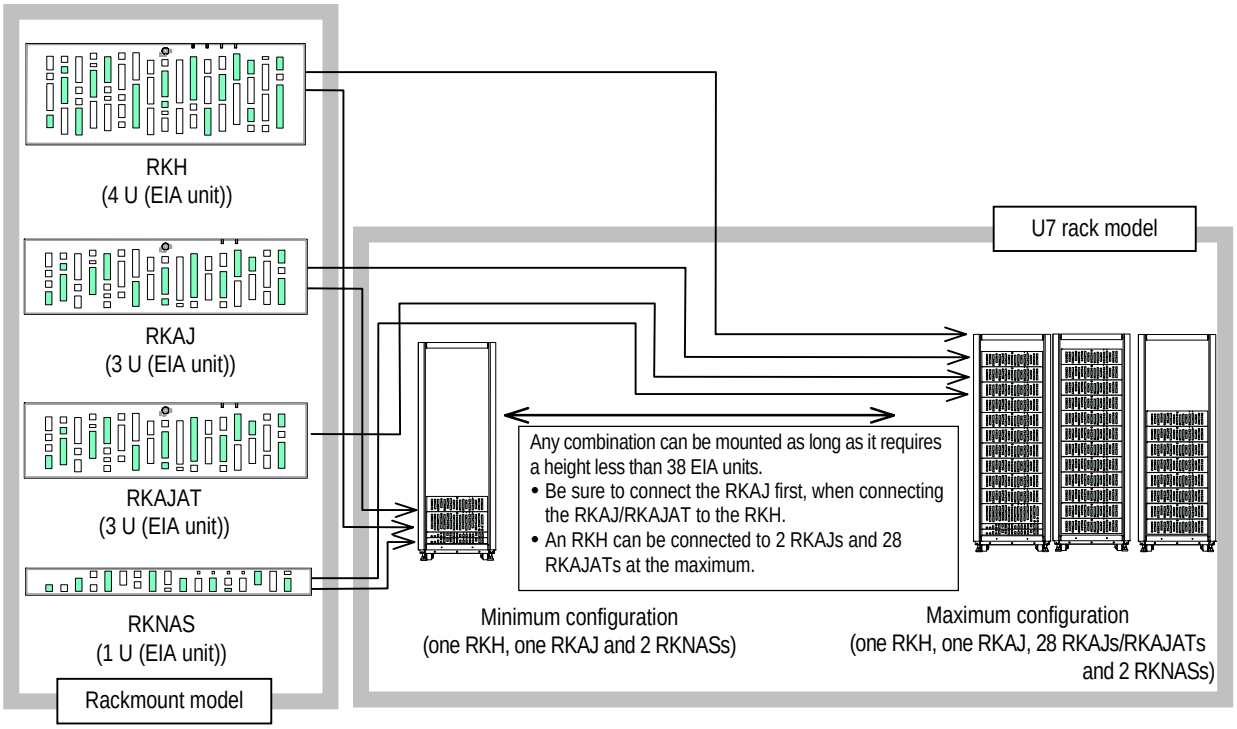


Figure 1.4.4 Subsystem Configuration (RKH+RKAJ+RKAJ/RKAJAT+RKNAS)

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1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem

1.5.1 How to attach/remove Front Bezel of Floor Model

⚠ CAUTION

Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Since front bezels of the RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.
- When installing or removing the Front Bezel, try not to operate the main switch incorrectly with the hook or the ON/OFF button of the Front Bezel.

A key is necessary to attach or remove the Front Bezel.

(1) Procedure for removal

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.
(b) Pull the Front Bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the Front Bezel from the slots on the subsystem main body by shifting the bezel to the left and remove the bezel.

(2) Procedure for attachment

(a) Hold the side of front bezel with your both hands.
(b) Hang the hook of the Front Bezel (lower side) on the hole in the bottom right part of the subsystem.
(c) Hang the hook of the Front Bezel (upper side) on the hole in the top right part of the subsystem.
(d) After making the hooks of the front bezel engaged, press the bezel against the main body until it is stopped.
(e) Fix the front bezel by turning the key.

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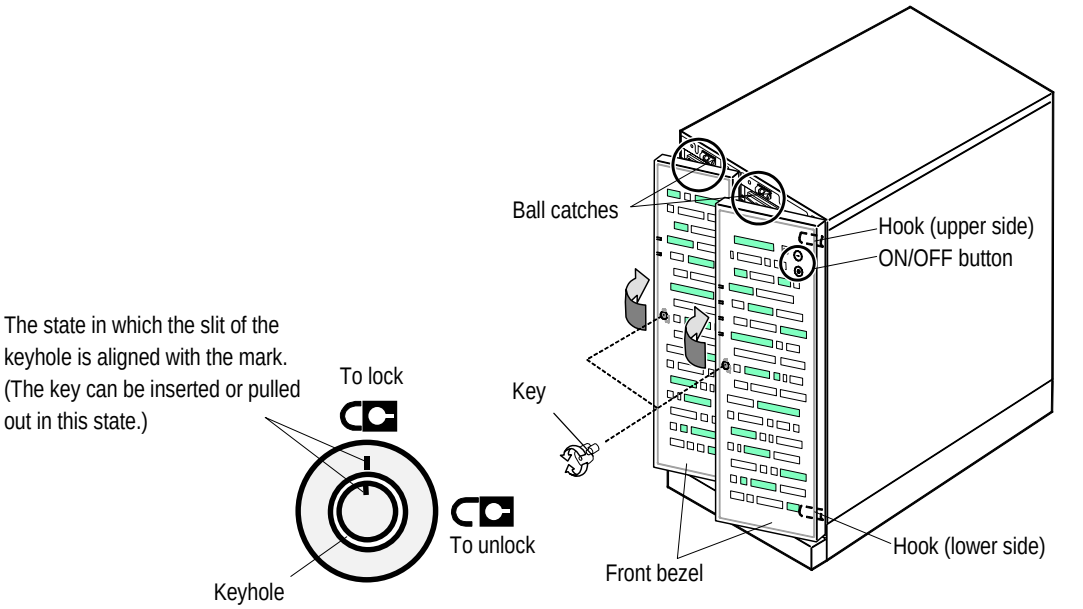
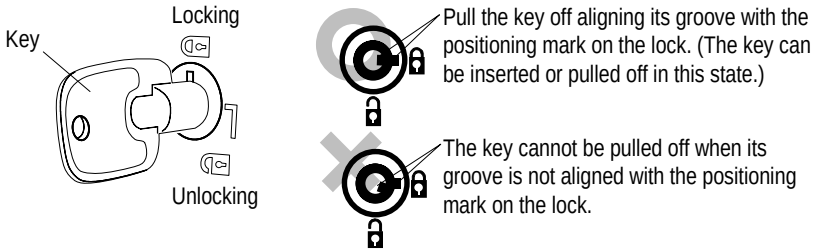


Figure 1.5.1 Procedure for Attaching/Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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1.5.2 How to attach/remove Rear Cover of Floor Model

⚠ CAUTION

- Attach or remove the Rear Cover carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.
- Do not lean against the rear cover. The cover comes off, and it causes the injury.

(1) Procedure for removal

(a) Hold the rear cover with your both hands.

(b) When you disengage the rear cover from a ball catch by pulling the upper part of it toward you, you can remove the rear cover.

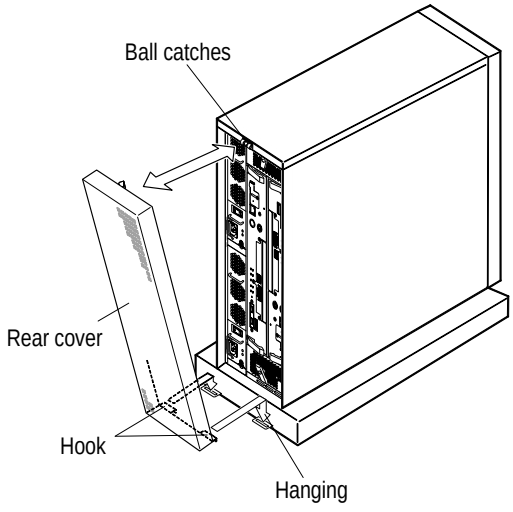
(2) Procedure for attachment

NOTE : When installing Rear Cover, be careful not to catch cables.

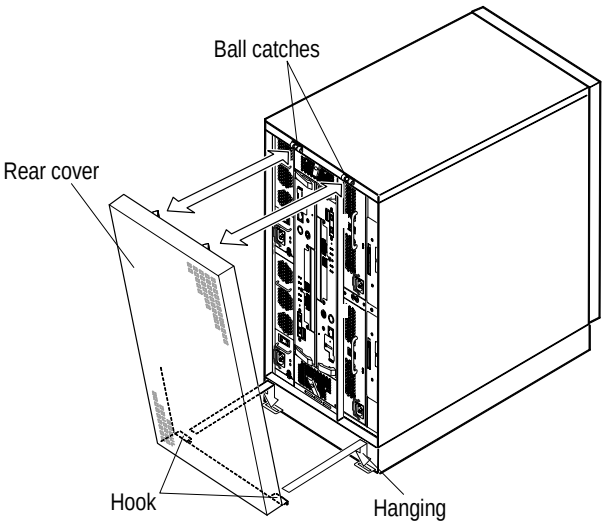
(a) Hold the rear cover with your both hands.

(b) Hang the hook under the rear cover.

(c) Fasten the rear cover by pressing it against the ball catch at the upper part of the subsystem main body.



(a) Floor (RKM+H1J) Model
Floor (RKS+H1J) Model
Floor (RKXS+H1J) Model



(b) Floor (RKM+RKAJ+H2J) Model
Floor (RKM+RKAJAT+H2J) Model
Floor (RKS+RKAJ+H2J) Model
Floor (RKS+RKAJAT+H2J) Model
Floor (RKXS+RKAJAT+H2J) Model

Figure 1.5.2 Procedure for Attaching/Removing Rear Cover

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1.5.3 How to attach/remove Front Bezel of the Rackmount Model

CAUTION

Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Since front bezels of the RKH/RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.
- When installing or removing the Front Bezel, try not to operate the main switch incorrectly with the hook or the ON/OFF button of the Front Bezel.

A key is necessary to attach or remove the Front Bezel.

(1-1) Basic subsystem and Additional subsystem

(1) Procedure for removal

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.

(b) Pull the front bezel toward you holding its sides to disengage it from the ball catches.

(c) Disengage the two hooks of the front bezel from the slots on the subsystem main body by shifting the bezel to the right and remove the bezel.

(2) Procedure for attachment

(a) Hold the side of Front Bezel with your both hands.

(b) Hang the hook of the Front Bezel (left side) on the hole in the bottom left part of the subsystem.

(c) Hang the hook of the Front Bezel (right side) on the hole in the bottom right part of the subsystem.

(d) After making the hooks of the front bezel engaged, press the bezel against the main body until it is stopped.

(e) Fix the front bezel by turning the key.

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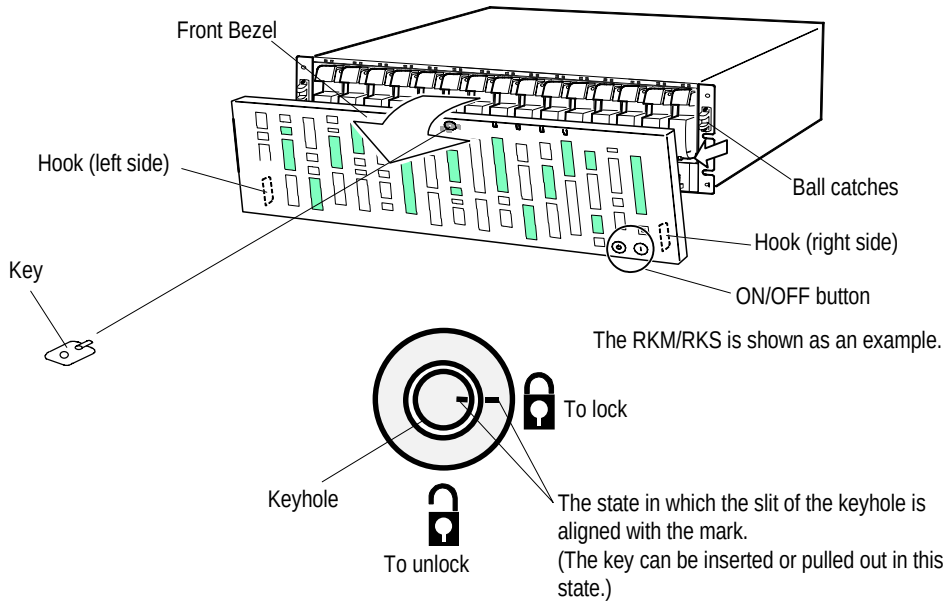
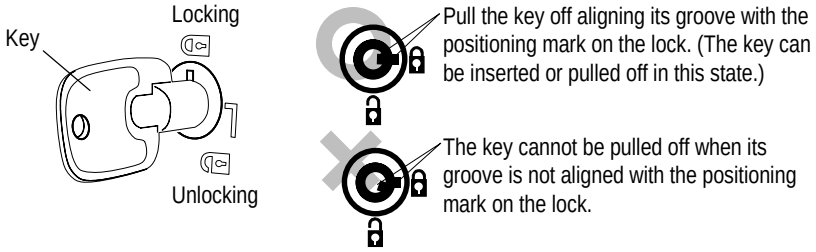


Figure 1.5.3 Procedure for Attaching/Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



- When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
- When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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(1-2) NAS Unit

(1) Procedure for removal

(a) Pull the front bezel toward you holding its sides to disengage it from the ball catches.

(2) Procedure for attachment

(a) Hold the side of Front Bezel with your both hands.

(b) After making the hooks of the front bezel engaged, press the bezel against the main body until it is stopped.

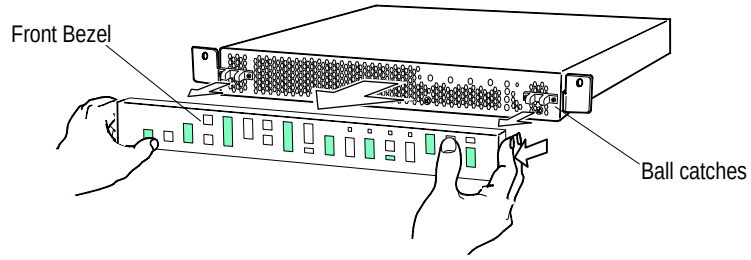


Figure 1.5.3.1 Procedure for Attaching/Removing Front Bezel

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1.5.4 How to open/close the Rear Door of U7 rack frame

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

For the procedure for removing and installing the Font Bezel, refer to "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100).

(1) Fit an Allen wrench in the key socket on the rear door, turn the Allen wrench in the direction shown by the arrow (⟶), and open the rear door slowly leaving the wrench as it is.
(2) To close the rear door, fit the Allen wrench in the key socket on the door, turn the wrench in the direction shown by the arrow (⟶), press the door against the main body leaving the wrench as it is, and then turn the wrench in the direction shown by the arrow (·····>) to return it to its original state.
(3) Make sure that the rear door is latched and cannot be opened.

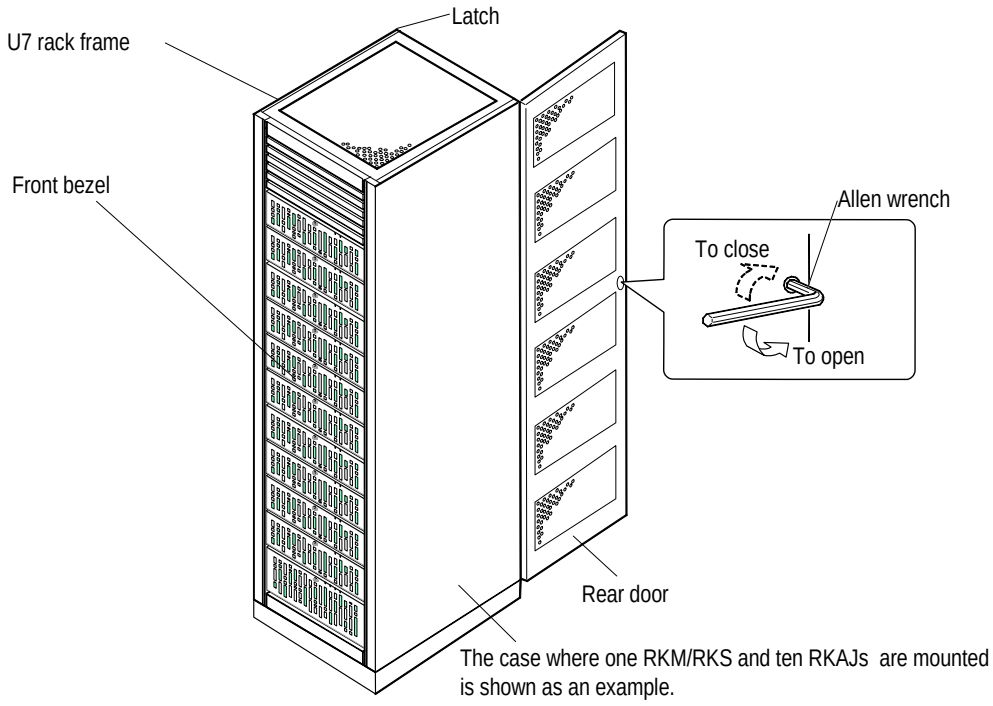


Figure 1.5.4 Procedure for Opening/Closing Rear Door

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1.6 Device ID Setting and ENC Cable Connection

Set the specified device ID and connect the ENC cable by executing the ACE tool of Storage Navigator Modular. When an error message is displayed during operation of the ACE Tool, take recovery actions referring to Message "Chapter 10. ACE Tool Error Message" (MSG 10-0000).

1.6.1 Example of device ID and ENC cable connection

(1) For RKM+RKAJ

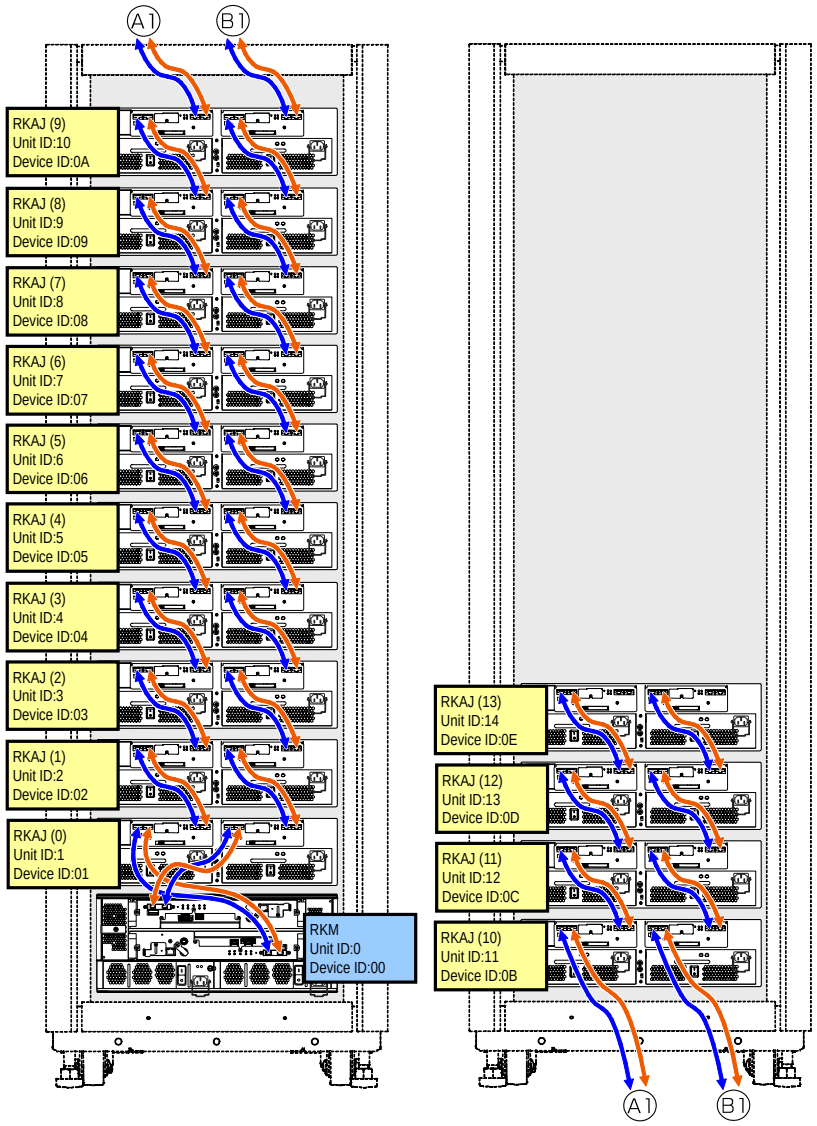


Figure 1.6.1 Example of RKM+RKAJ ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)

	Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID
1st	#0	#00	5th	#4	#04	9th	#8	#08	13th	#12	#0C
2nd	#1	#01	6th	#5	#05	10th	#9	#09	14th	#13	#0D
3rd	#2	#02	7th	#6	#06	11th	#10	#0A	15th	#14	#0E

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4th	#3	#03	8th	#7	#07	12th	#11	#0B

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(2) For RKM+RKAJ+RKAJAT

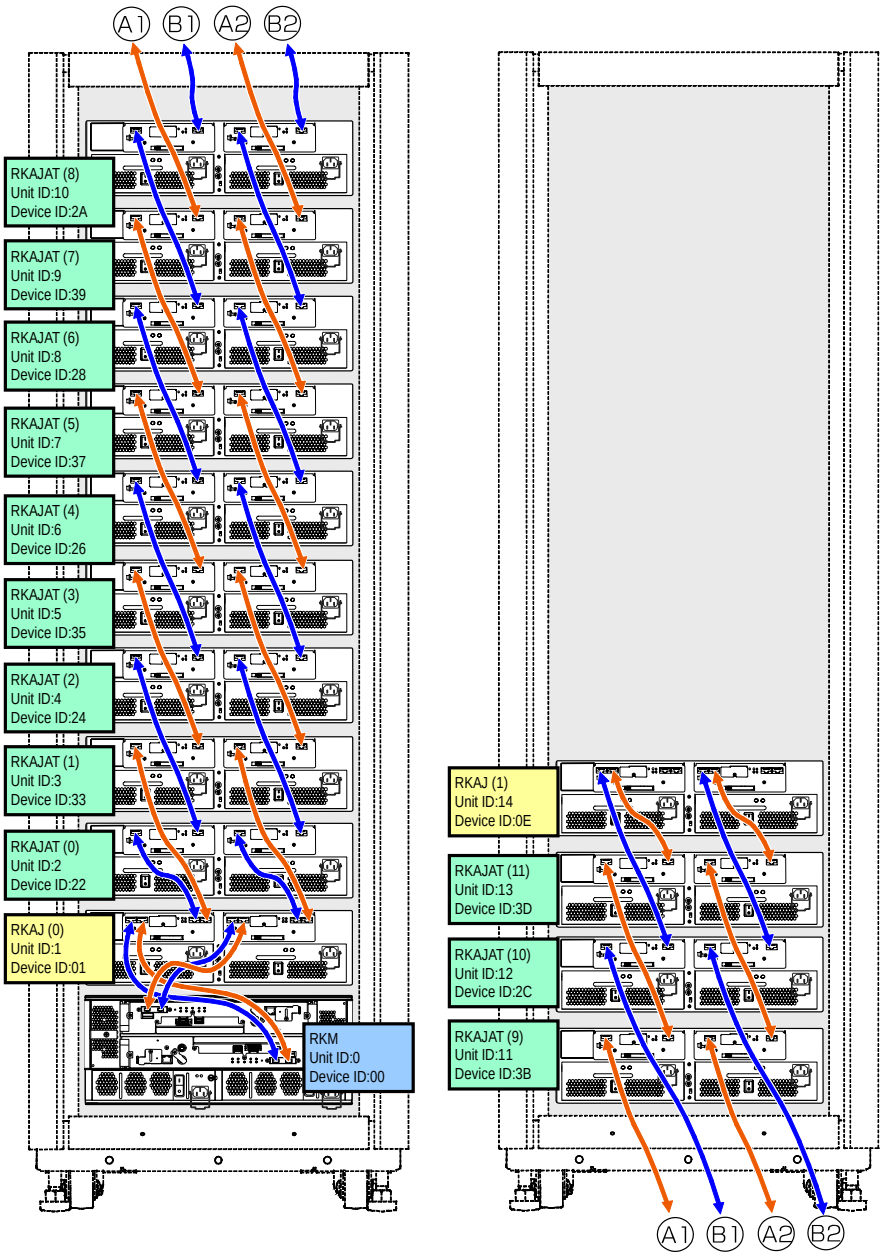


Figure 1.6.2 Example of RKM+RKAJ+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)

	Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID
1st	#0	#00	5th	#4	#24	9th	#8	#28	13th	#12	#2C
2nd	#1	#01	6th	#5	#35	10th	#9	#39	14th	#13	#3D
3rd	#2	#22	7th	#6	#26	11th	#10	#2A	15th	#14	#0E
4th	#3	#33	8th	#7	#37	12th	#11	#3B			

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(3) For RKXS+RKAJAT

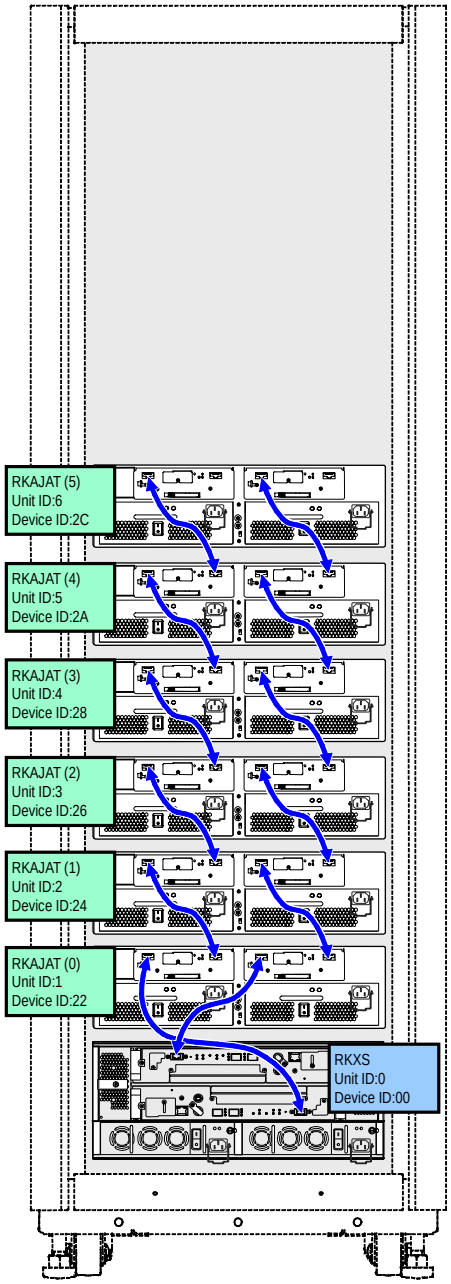


Figure 1.6.3 Example of RKXS+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)

	Unit ID	Device ID		Unit ID	Device ID
1st	#0	#00	5th	#4	#28
2nd	#1	#22	6th	#5	#2A
3rd	#2	#24	7th	#6	#2C
4th	#3	#26			

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(4) For RKH+RKAJ/RKA+RKAJAT

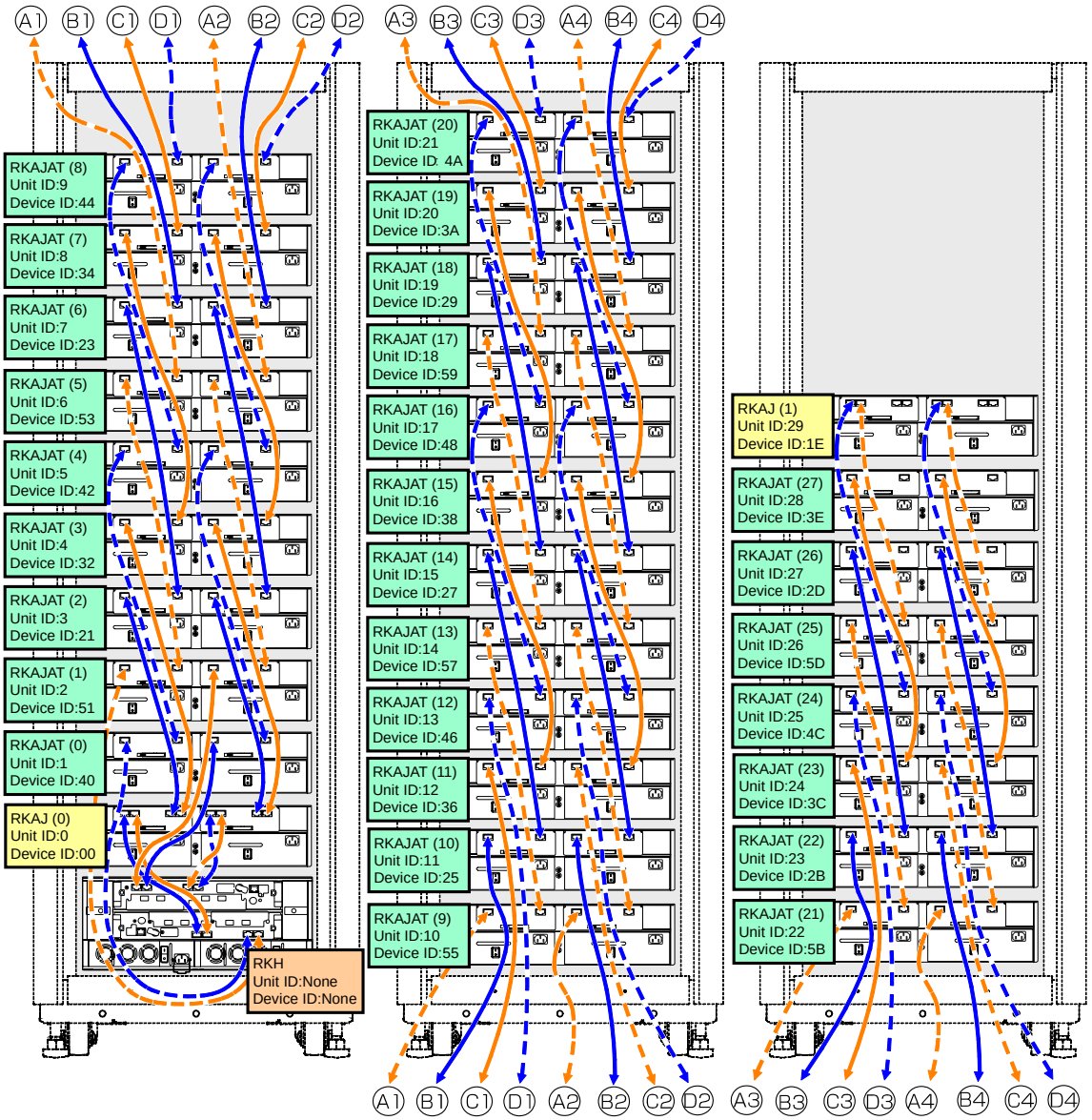


Figure 1.6.4 Example of RKH+RKAJ/RKA+RKAJAT ENC cable connection
(The figure shows an example in which the maximum configuration of RKH+RKAJ+RKAJAT is installed in the U7 rack frame.)

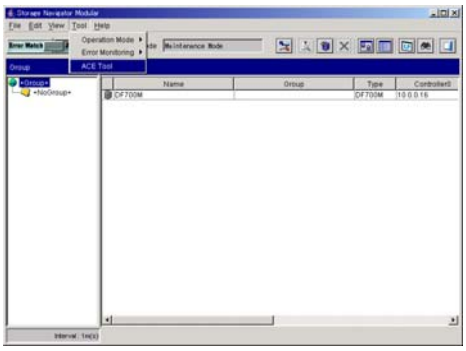
	Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID
1st	-	-	9th	#7	#23	17th	#15	#27	25th	#23	#2B
2nd	#0	#00	10th	#8	#34	18th	#16	#38	26th	#24	#3C
3rd	#1	#40	11th	#9	#44	19th	#17	#48	27th	#25	#4C
4th	#2	#51	12th	#10	#55	20th	#18	#59	28th	#26	#5D
5th	#3	#21	13th	#11	#25	21st	#19	#29	29th	#27	#2D
6th	#4	#32	14th	#12	#36	22nd	#20	#3A	30th	#28	#3E
7th	#5	#42	15th	#13	#46	23rd	#21	#4A	31st	#29	#1E
8th	#6	#53	16th	#14	#57	24th	#22	#5B			

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1.6.2 Checking methods of device ID and ENC cable connection when mounting the newly introduced rack

(1) Start Storage Navigator Modular and select [Tool] and [ACE Tool] in this order in the main window. The ACE Tool is started and a window for selecting a subsystem is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



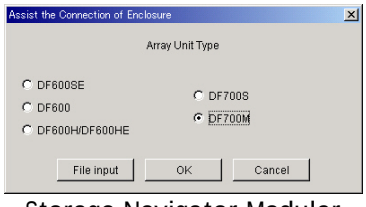
(2) Select the subsystem, and click the [OK] button.

NOTE : When selecting a subsystem in (1), this dialog is not displayed.

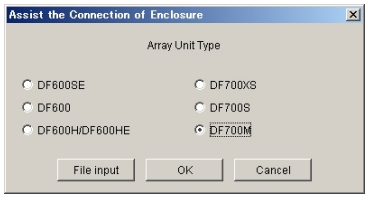
The Array Unit Type name to be selected varies depending on the Basic subsystem model name.

Basic subsystem model name	Array Unit Type name
DF700-RKM	DF700M
DF700-RKS	DF700S
DF700-RKXS	DF700XS
DF700-RKH	DF700H
DF700-RKHE	DF700HE
DF600-RK	DF600
DF600-RKH	DF600H
DF600-RKHE	DF600HE

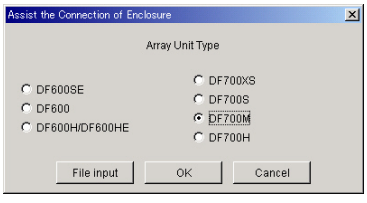
Storage Navigator Modular version is Ver.1.01 or less.



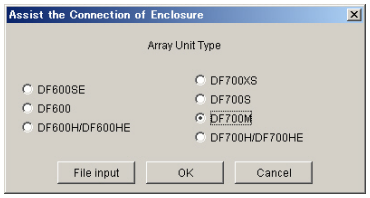
Storage Navigator Modular version is Ver.2.00 or more, Ver.3.10 less than.



Storage Navigator Modular version is Ver.3.10 or more, Ver.6.0 less than.

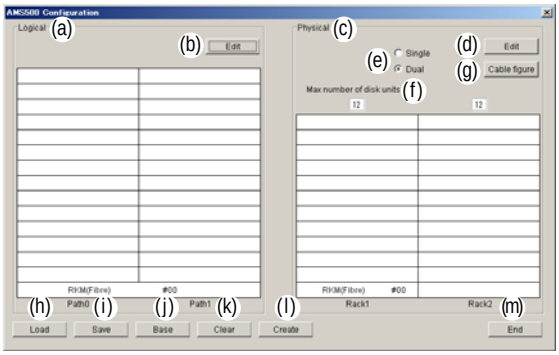


Storage Navigator Modular version is Ver.6.0 or more.



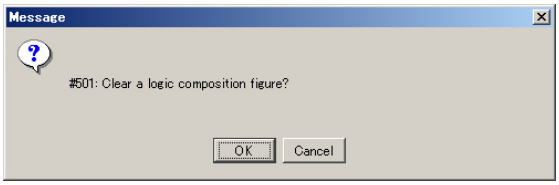
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(3) Set the subsystem to be configured in the frame part of the Physical.
Click the [Edit] button in the Physical part.



(a) [Logical] : The device ID can be checked per Path.
(b) [Edit in Logical] button : The chassis frame in Logical can be edited manually. If [Create] button is selected after the setting, the subsystem and the device ID are displayed in the Logical part and the Physical part.
(c) [Physical] : The device ID can be checked per Rack.
(d) [Edit in Physical] button : The chassis frame in Physical can be edited manually. If [Create] button is selected after the setting, the subsystem and the device ID are displayed in the Logical part and the Physical part.
(e) [Single, Dual in Physical] button : It selects the installation configuration of the Control Unit.
(f) [Max number of disk units] button : The maximum number of chassis frames per Rack can be specified.
(g) [Cable figure] button : The ENC cable connection figure is displayed.
(h) [Load] button : The configuration figure can be read.
(i) [Save] button : The configuration figure can be stored in files.
(j) [Base] button : The chassis frame type and the device ID are displayed automatically in the Logical part and the Physical part.
(k) [Clear] button : The subsystem and the device ID, which have been set, are cleared.
(l) [Create] button : The name and ID number of the subsystem are displayed in the Logical part and Physical part.
(m) [End] button : It returns to the device model selection window.

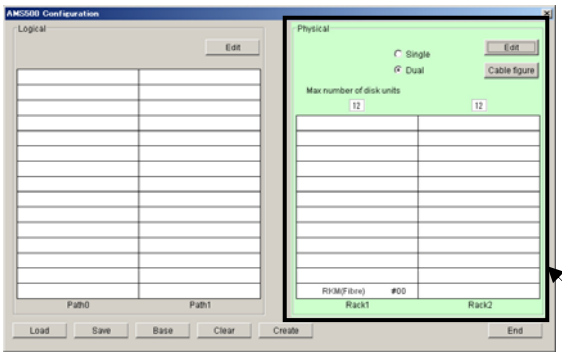
(4) Click the [OK] button.



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(5) If the chassis frame section the Physical part is clicked, the “Unit Select” window is displayed. Select RKAJ (Fibre), RKA (Fibre), RKAJAT (SATA) or Empty and input the configuration. Check that the actual rack mounting position and the Physical part are the same.

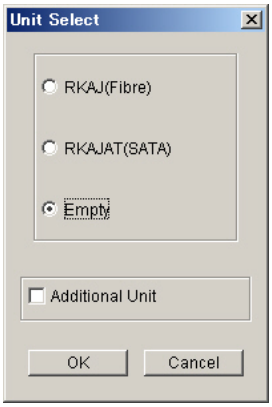
NOTE : The RKXS can be connected to the additional chassis, RKAJAT and RKAJATL. Use it by reading the RKAJATL as the RKAJAT.



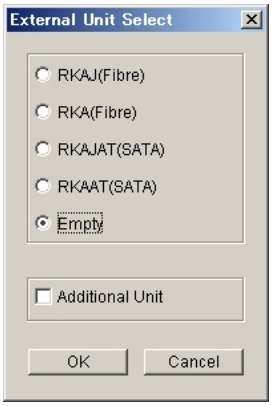
Physical part

Frame type selection window

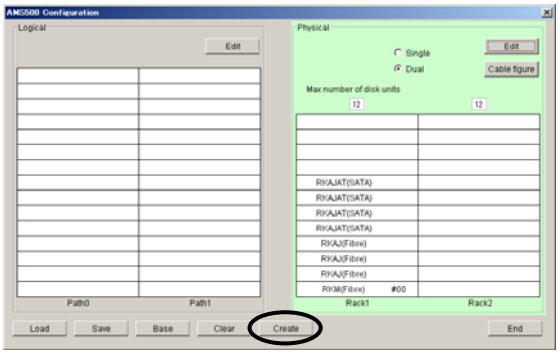
Storage Navigator Modular version is Ver.1.01 or less.



Storage Navigator Modular version is Ver.2.00 or more.



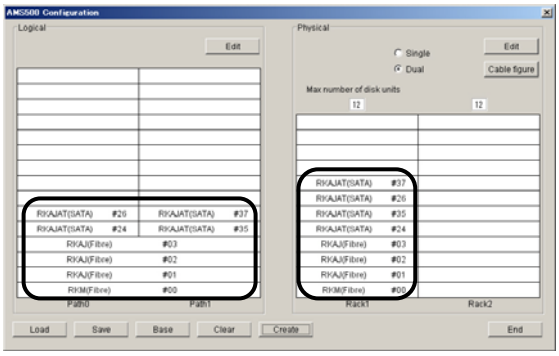
(6) Click the [Create] button.



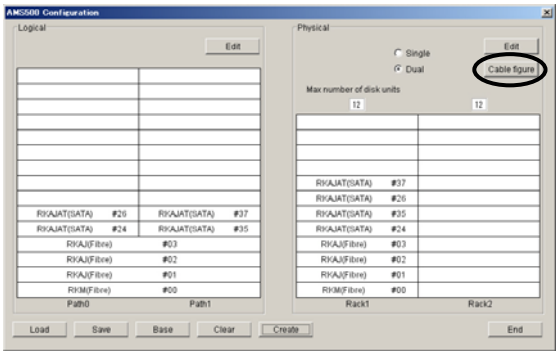
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(7) The device ID# is output in the Logical part and the Physical part window.

NOTE : The RKXS can be connected to the Additional Chassis, RKAJAT and RKAJATL. Use it by reading the RKAJATL as the RKAJAT.

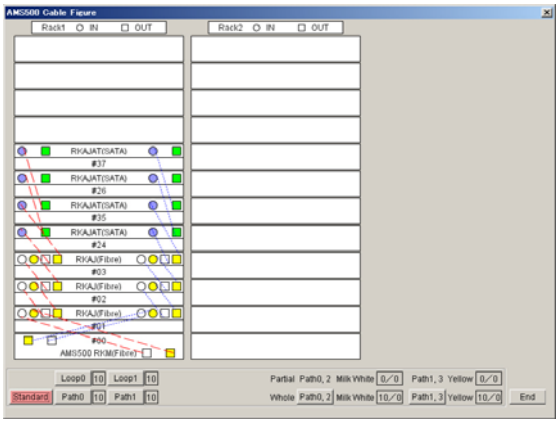


(8) Click the [Cable figure] button.



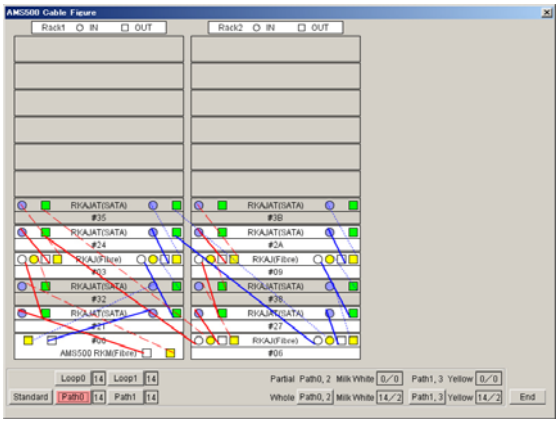
(9) The ENC cable connection diagram is displayed.
Refer to the ENC cable connection figure, and perform the ENC cable connection.

NOTE : The RKXS can be connected to the Additional Chassis, RKAJAT and RKAJATL. Use it by reading the RKAJATL as the RKAJAT.



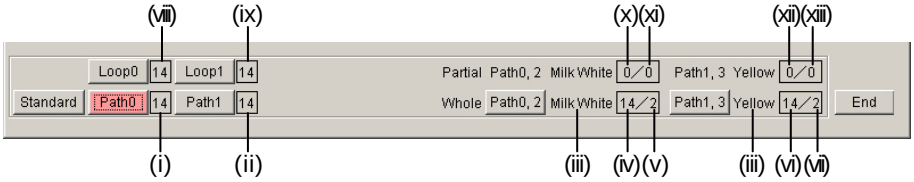
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(a) When Path 0 is selected, the Path 0 is highlighted and the disk units connected to its lines are displayed in white.



When the each [Path] button is clicked, the displayed lines connected to the path are highlighted, disk units connected to the lines are displayed in white, and disk units not connected to the lines are displayed in gray.
To cancel the highlighting, click the [Standard] button.

The explanations of the buttons are shown below.



[Explanation of each button]

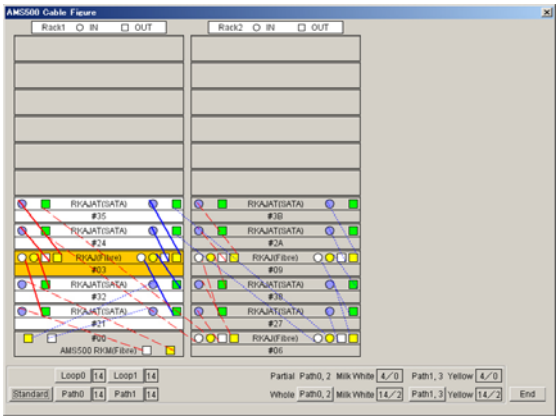
[Standard] button	: It returns the window line to the initial status (the highlighting is cancelled).
[Path0] button	: The line connected to Path0 is highlighted.
[Path1] button	: The line connected to Path1 is highlighted.
[Path2] button	: The line connected to Path2 is highlighted (it is not displayed in the 700M (RKM)).
[Path3] button	: The line connected to Path3 is highlighted (it is not displayed in the 700M (RKM)).
[Path0/2] button	: The lines connected to Path0 and Path2 are highlighted (Path2 does not exist in the 700M (RKM)).
[Path1/3] button	: The lines connected to Path1 and Path3 are highlighted (Path3 does not exist in the 700M (RKM)).
[Loop0] button	: The line connected to Loop0 is highlighted.
[Loop1] button	: The line connected to Loop1 is highlighted.

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[Explanation of the window display]

(i) The number of ENC cables of Path0 is displayed.
(ii) The number of ENC cables of Path1 is displayed.
(iii) The color of the binders attached to both ends of the ENC cable is displayed.
(iv) The number of ENC cables of Path0 is displayed.
(v) The number of ENC cables (long ENC cables) between the racks of Path0 is displayed.
(vi) The number of ENC cables of Path1 is displayed.
(vii) The number of ENC cables (long ENC cables) between the racks of Path1 is displayed.
(viii) The number of ENC cables of Loop0 is displayed.
(ix) The number of ENC cables of Loop1 is displayed.
(x) The number of the cables of the Path 0 connected to the selected disk unit or that of the Path 0 connected to the additional disk unit is displayed.
(xi) The number of the inter-rack cables (long ENC cables) of the Path 0 connected to the selected disk unit or that of the Path 0 connected to the additional disk unit is displayed.
(xii) The number of the cables of the Path 1 connected to the selected disk unit or that of the Path 1 connected to the additional disk unit is displayed.
(xiii) The number of the inter-rack cables (long ENC cables) of the Path 1 connected to the selected disk unit or that of the Path 1 connected to the additional disk unit is displayed.

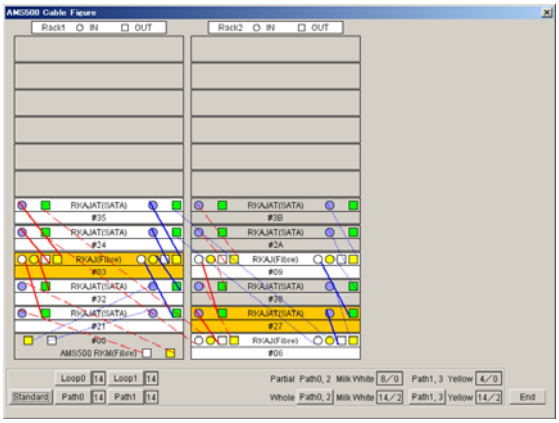
(b) When [RKAJ(Fibre) #03] is selected, the [RKAJ(Fibre) #03] disk unit is displayed in orange and disk units connected to the [RKAJ(Fibre) #03] disk unit are displayed in white.
Besides, the displayed ENC cables connected to the [RKAJ(Fibre) #03] disk unit are highlighted.



To cancel the selection of the disk unit, click the [Standard] button.

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(c) When [RKAJ(Fibre) #03] is selected and [RKAJAT(SATA) #27] is clicked while the control [Ctrl] key is pressed, the chassis frame connected to the [RKAJ(Fibre) #03 and RKAJAT(SATA) #27] chassis frame is displayed in white. Also, the connecting ENC cable from the [RKAJ(Fibre) #03 and RKAJAT(SATA) #27] chassis frame is highlighted.



Any of the following methods is able to cancel the selection of two or more chassis frames.

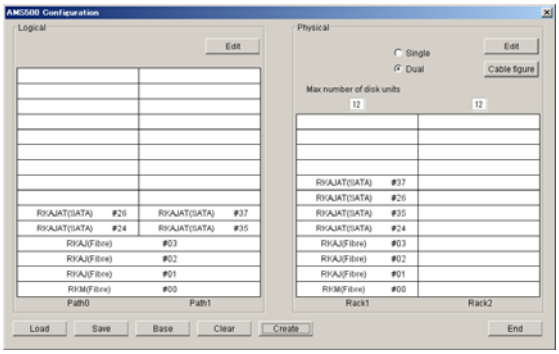
① Click the selected chassis frame again while the control [Ctrl] key is pressed.

② Click the [Standard] button.

③ Click another chassis frame while the control [Ctrl] key is not pressed.

(10) Click the [End] button in the ENC cable connection figure.
It returns to the Configuration window.

(11) Click the [End] button.



(12) Click the [OK] button.



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1.6.3 Procedure for making the configuration diagram when adding the disk unit(s)

When adding the disk unit(s) to the subsystem already installed, you can display the configuration of the existing subsystem using the following procedure in addition to the procedure explained above. The procedure is to get the configuration information with the configuration copying function of Storage Navigator Modular and to have the file read.

① Set up the specified device ID and connect the ENC cable by executing the ACE tool.

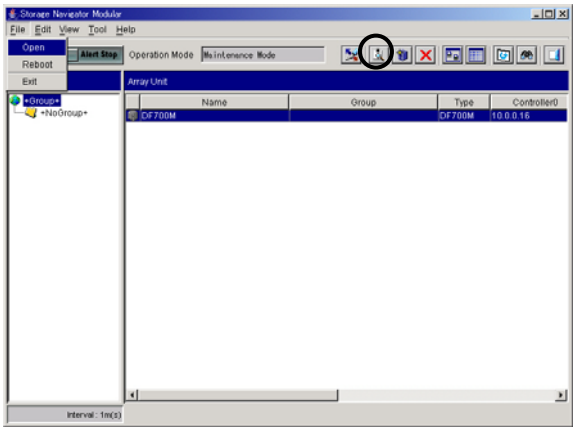
② If error messages are displayed during the operation, refer to Message "Chapter 10. ACE Tool Error Message" (MSG 10-0000) and perform the recovery method.

(1) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to System Parameter "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050).

(2) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the selection methods as shown below.

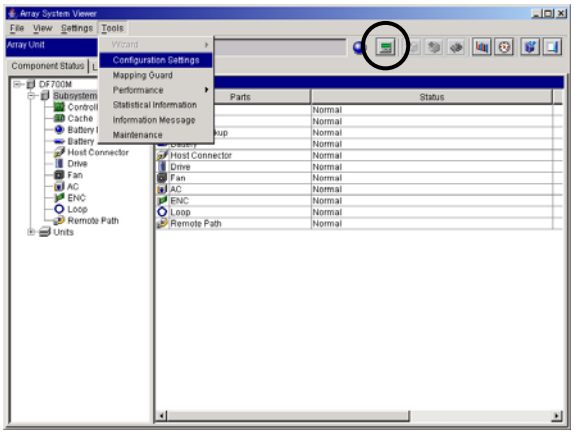
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

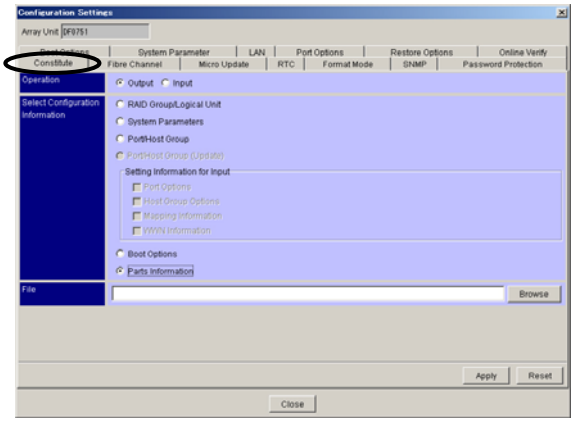


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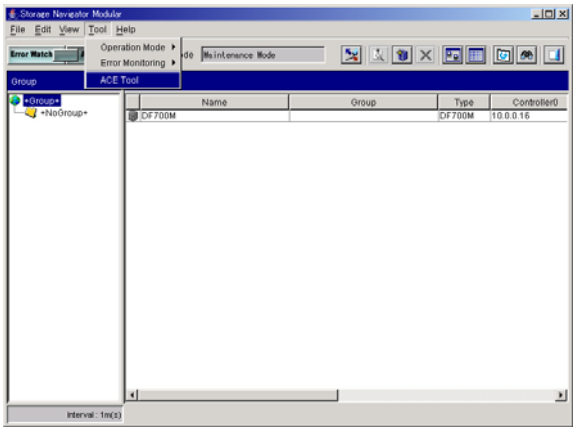
(3) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] in the tool bar.



(4) Click the [Constitute] tab.
Get the configuration information by selecting [Parts Information].



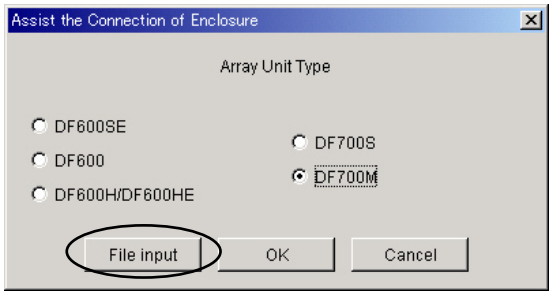
(5) Select [Tool] and [ACE Tool] in this order in the main window.
The ACE tool starts up and the "Array Unit Type" window is displayed.



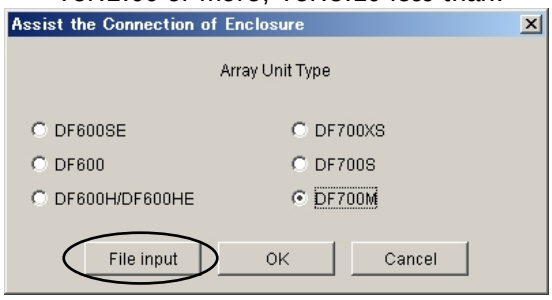
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(6) Select the subsystem, and click the [File input] button.

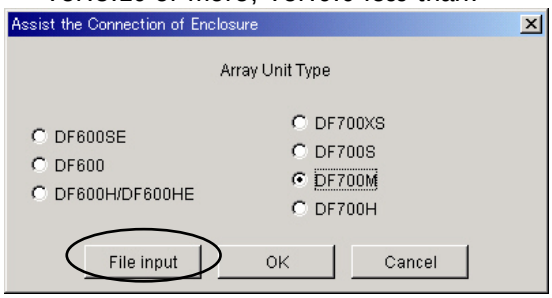
Storage Navigator Modular version is Ver.1.01 or less.



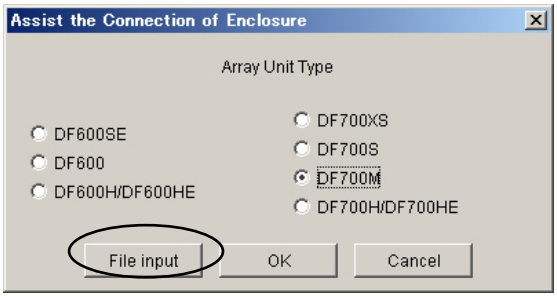
Storage Navigator Modular version is Ver.2.00 or more, Ver.3.10 less than.



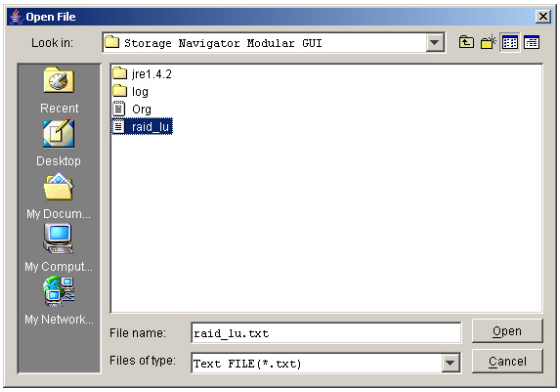
Storage Navigator Modular version is Ver.3.10 or more, Ver.6.0 less than.



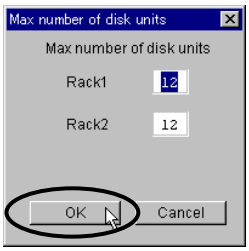
Storage Navigator Modular version is Ver.6.0 or more.



(7) Have the file that has been got in Step (4) read.



(8) Enter the number of the disk units in each of the Rack boxes according to the actual state in which the disk units are installed. When the rack is not specified, the entries are made in regular order starting from Rack 1.

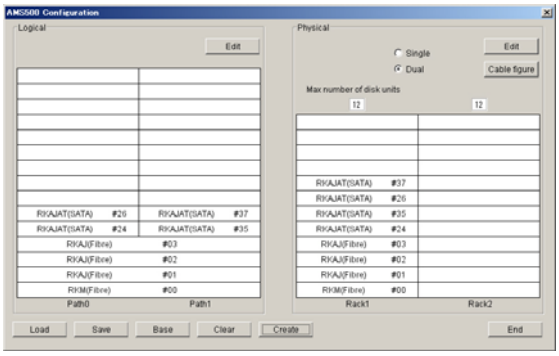


(9) Click the [OK] button.

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(10) The device ID numbers are displayed in the Logical part and Physical part.

NOTE : The RKXS can be connected to the Additional Chassis, RKAJAT and RKAJATL. Use it by reading the RKAJATL as the RKAJAT.



The post-addition configuration can be derived from the diagrams above.
For the creation procedure, refer to "1.6.2 (3) Set the subsystem to be configured in the frame part of the Physical." (INST 01-0190) and add the chassis frame to be added by the connection tool and perform the specified device ID and ENC cable connection.

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1.7 Power On/Off Procedure

The Disk Drive may emit mechanical sound "click-clack" when the Disk Drive is started (spun up) immediately after the subsystem powering on and when the Disk Drive is powered off (spun down). However, since there is no problem if the WARNING LED (orange) or the ALARM LED (red) on the Basic Chassis is not lighting up or blinking at low speed, please use the subsystem as it is.
If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

1.7.1 Subsystem power on

(1) In the case of Floor model, make sure that the AC Power Unit Switch of the Power Unit is turned off.
In the case of Rackmount model, make sure that the circuit breaker is turned off.
(2) Check that the AC Input Power Switches of the RKNAS are turned off when the RKNAS is installed in the rack.
(3) Make sure that the main switch is turned off.
(4) All turn on the battery switch of the Backup Battery Unit on the front of the subsystem.
(In case of the Backup Battery Unit of REV.C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.)
(5) In the case of Rackmount model, turn on the circuit breaker of the PDB.
(6) Turn on all the AC Input Power Switches of the RKNAS.
(7) Turn on the AC Power Unit Switch of the Power Unit on the Basic and Additional Chassis. (‡1)
(8) Turn on the main switch.

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‡1 : When the Disk Drives are not installed in the RKAJ/RKAJAT in the floor model (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J, or RKXS+RKAJAT+H2J), turn off the AC Input Power Switch of the RKAJ/RKAJAT always.

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(9) Check that the RDY LED (green) on the Basic subsystem lights up usually after about four minutes for the RKM/RKS/RKXS and five minutes for the RKH.
When doing this, when the RDY LED (green) on the front of the Basic Chassis is blinking at high-speed in the dual controller configuration, the RDY LED (green) on the front of the Basic Chassis lights up after it blinks at high-speed for the maximum of 30 to 50 minutes and 40 to 60 minutes for the RKH because the automatic download of the ENC/SENC firmware is operating.
Also, when the WARN LED (orange) on the front of the Basic Chassis is blinking at high speed in the single controller configuration, the RDY LED (green) on the front of the Basic Chassis lights up after the WARN LED (orange) on the front of the Basic Chassis blinks at high speed for the maximum of 30 to 85 minutes because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on is operating.
If the RDY LED (green) on the front of the Basic Chassis does not light up even if time passes, collect the full dump (refer to Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130)), turn off the main switch, turn off the AC Input Power Switches of all the subsystem, and then replace the Control Unit (refer to Replacement "2.5.5 (2) Procedure for replacement with the power turned off" (REP 02-0500)).

(10) Check that "I10000 Subsystem is ready" is displayed referring to the Information Message on WEB.

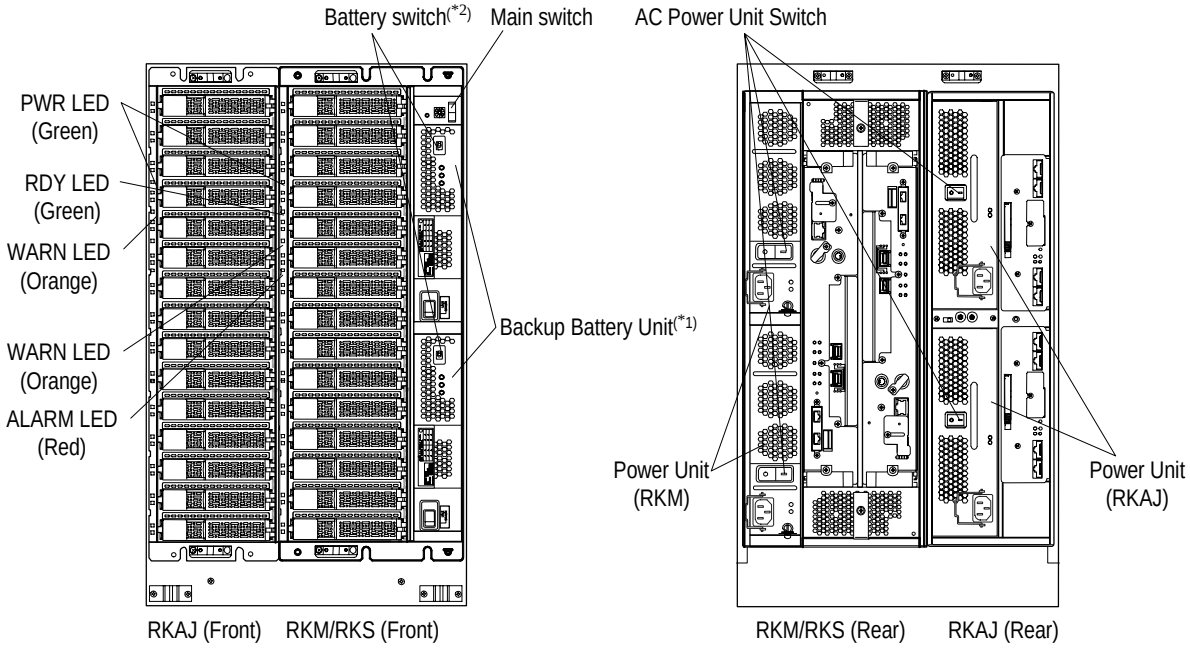
(11) Check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to the Information Message on WEB when the Basic Chassis is the RKH/RKHE.

(12) Check When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).
If the ALARM LED (red) on the front of the Basic Chassis or the WARN LED (orange) on the front of the Basic Chassis and the Additional Chassis lights on or blinks at low speed, refer to Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" (TRBL 08-0000).

NOTE : The EALM LED (red) on the Control Unit (on the rear side of the subsystem) may come on after powering on the subsystem. However, it is not a problem if the EALM LED (red) goes out until the RDY LED (green) comes on the front of the Basic Chassis.

(13) Check that "IZYR00 Automatic ENC microprogram download completed successfully" and "IZYS00 Automatic ENC microprogram download start" are displayed in Information Message on WEB.
When "IZYQ00 Automatic ENC microprogram download failed" is displayed in Information Message on WEB, perform the maintenance according to the recovery method of the message code. However, if [Unit Window] – [Tool] – [Maintenance] – [ENC Micro Update] – [Automatic Download] is set to [Disable] in Storage Navigator Modular, Procedure (13) is not necessary.

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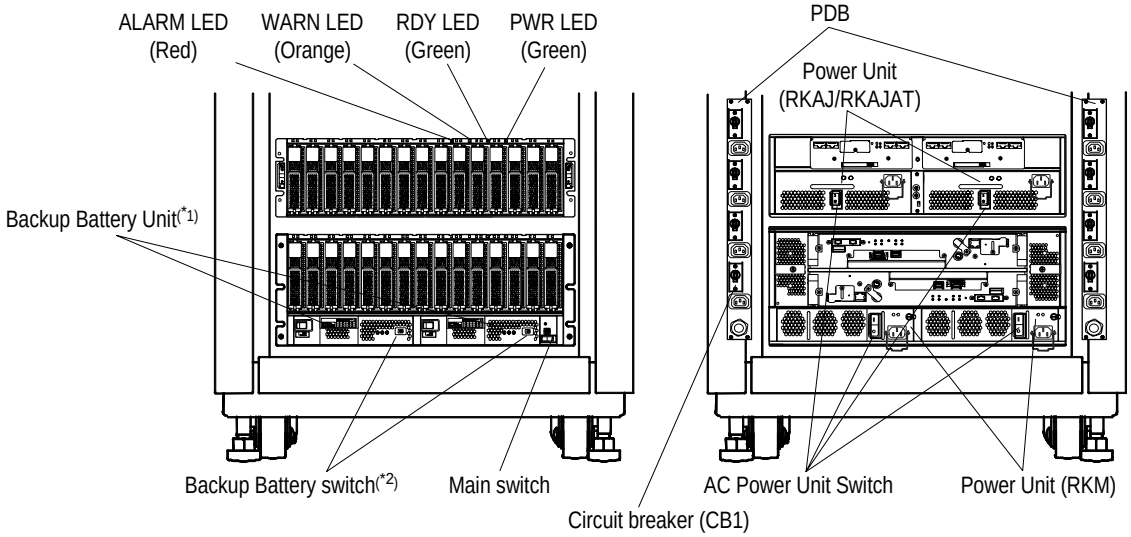


*1 : Only one battery is installed in RKS/RKXS under the subsystem.

*2 : In case of the Backup Battery Unit of REV.C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS, there is no battery switch.

*3 : The figure shows RKM + RKAJ.

Figure 1.7.1 Location of Switches for Power On (Floor model)



*1 : Only one battery is installed in RKS/RKXS under the subsystem.

*2 : In case of the Backup Battery Unit of REV.C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, there is no battery switch.

*3 : The figure shows RKM + RKAJ.

Figure 1.7.2 Locations of Switches for Power On (Rackmount model)

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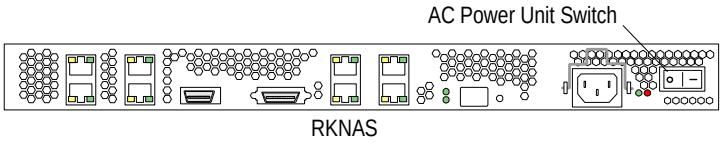


Figure 1.7.2.1 Locations of Switches for Power On (RKNAS)

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1.7.2 Subsystem power off (Sequential shutdown)

NOTE : • Do not perform the planned shutdown (power-off) while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, but for the maximum of 40 to 60 minutes in case of the RKH).

• In the case of the single controller configuration, do not perform the planned shutdown (power-off) while the WARN LED (orange) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 85 minutes).

• When Power Saving of the priced option is used, if you perform the planned shutdown of the system after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host when the subsystem power is turned on.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then perform the planned shutdown of the subsystem.
If the spin-down fails, execute the spin-down again.

(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the front of the subsystem is off. (‡1)
(3) Turn off the AC Power Unit Switch of the Power Unit on the Basic and Additional subsystem.
(4) Turn off all the AC Input Power Switches of the RKNAS when the RKNAS is installed in the rack.
(5) Turn off the battery switch of the Backup Battery Unit. (In case of the Backup Battery Unit of REV.C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.)
(6) All turn off the circuit breaker of the PDB.

‡1 : The PWR LED (green) of the RKA/RKAJ does not go out when the main switch is turned off in the Maintenance mode, however, this is not a problem.

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1.7.3 Stop/Start/Restart of the NAS OS(‡1)

(1) Before performing Stop/Start/Restart of the NAS OS

NOTE : In the case of the mixed configuration of the Fibre Channel interface and the iSCSI interface, if stop/start/restart of the NAS OS is executed with the I/O load applied from the Fibre Channel/iSCSI interface, the processing may terminate abnormally (time-out).

(a) Check that the AC Input Power Switch of the RKNAS is turned on. If not, refer to "1.7.1 Subsystem power on" (INST 01-0290) and turn it on.

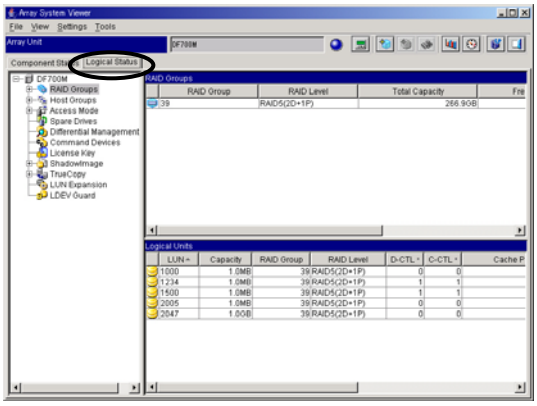
(b) Check that the Control Unit connected to the RKNAS to operate is not blocked. If blocked, perform the maintenance of the Control Unit to operate first.

(c) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode".

(d) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

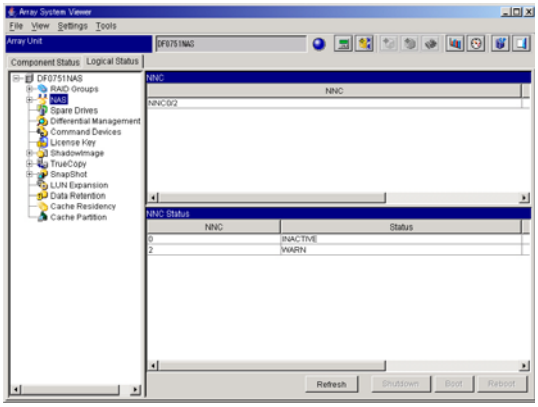
(e) Click the [Logical Status] tab in the unit window.



‡1 : Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

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(f) Click the [NAS] icon.



(g) Check the NAS Unit status.

○: Operation enabled -: Operation disabled(*3)

Image	Status	Stop	Start	Restart
NEW	• The NAS OS is not installed.	-	-	-
INST	• The NAS OS is in installation process.	-	-	-
ACTIVE	• The NAS OS is in operation and the Node is in operation.	○(*2)	○	○
STOP	• The NAS OS is normally stopped	-	○	○
DOWN	• The NAS OS is abnormally stopped	-	○	○
BOOT	• The NAS OS is in start process.	○	-	○
SHUTDOWN	• The NAS OS is in stop process.	-	○	○
INACTIVE	• The NAS OS is in operation and the Node is stopped.	○	○	○
DUMP	• A NAS Dump is being collected.	○	○	○
HUNGUP	• The NAS OS is hung-up.	-	○	○
WARN	• The NAS Manager is not installed, or the NAS OS is in operation and the status of the Node is unknown.	○	○	○
DISUSE	• The Control Unit is blocked, so the NAS OS of the NNC concerned cannot be used. (*1)	-	-	-

*1 : It is necessary to recover the blocked status of the Control Unit connected to the NAS Unit on the side where "DISUSE" is displayed.

*2 : Stopping the NAS OS can be executed only when both NAS Units status are "ACTIVE" in the cluster.

*3 : The button of the Storage Navigator Modular can be clicked, but the processing is not executed.

(h) Check the operation of each button.

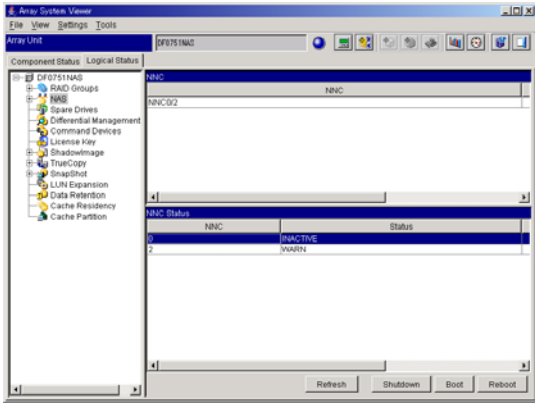
Button Name	Operation
Shutdown	Put the NAS OS into the stop status.
Boot	Start the NAS OS.
Reboot	Restart the NAS OS which is in the stop status. The operation is not different from the "Boot" button.
Refresh	Update the display information to the latest information.

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(2) Stopping the NAS OS

NOTE : • Do not stop the NAS OS without a customer's permission.
- When the status of the NNC (NAS Unit) to stop the NAS OS is "STOP" or "DOWN", the NAS OS has already stopped.
- Stopping the NAS OS can be executed only when both NAS Units status are "ACTIVE" in the cluster.
- The time that takes to stop the NAS OS differs depending on the setting status of the cluster.
  When the cluster is stopped, it is about one minute.
  When the cluster is started, it takes time (for the maximum of 60 minutes) in proportion to the number of resource groups.
- When stopping NAS OS from Storage Navigator Modular immediately after the power supply of the array subsystem was started or the cluster start of NAS was performed from NAS Manager Modular, check with the customer that the cluster and the resource group are available (the cluster status is "ACTIVE" and the resource group status is "Online" or "Offline"), and stop NAS OS.
  If NAS OS is stopped at the time other than the above-mentioned, the subsequent cluster operation and the resource group operation may not be able to be performed normally (example: when the cluster stop is performed from NAS Manager Modular in the NAS Unit of the one that is not stopped, the cluster stop may not be completed).
  In this case, restart the NAS Unit of the one that is not stopped from Storage Navigator Modular.

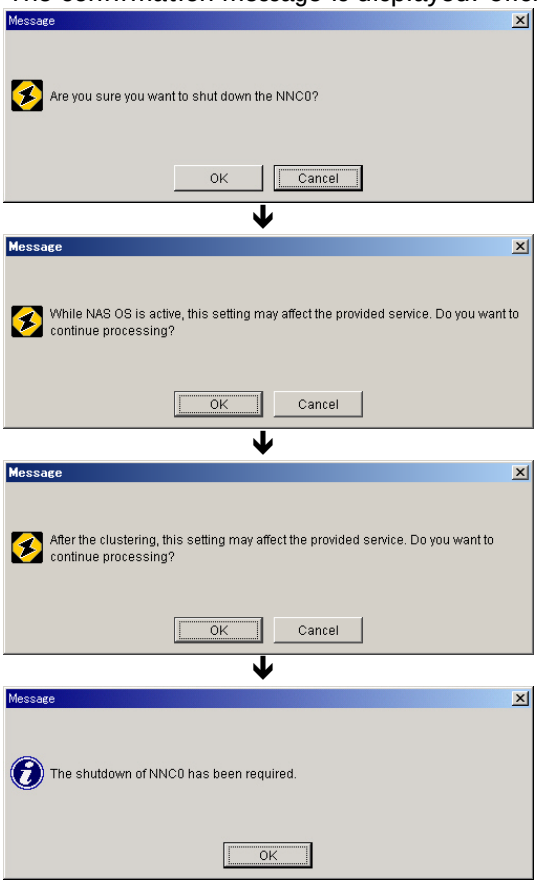
(a) Select the NNC (NAS Unit) to stop the NAS OS from the "NNC Status".



(b) Click the [Stop] button at the lower right of the window.

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(c) The confirmation message is displayed. Click the [OK] button.



(d) Check that "Status" of the NNC (NAS Unit) which stopped the NAS OS is "STOP".

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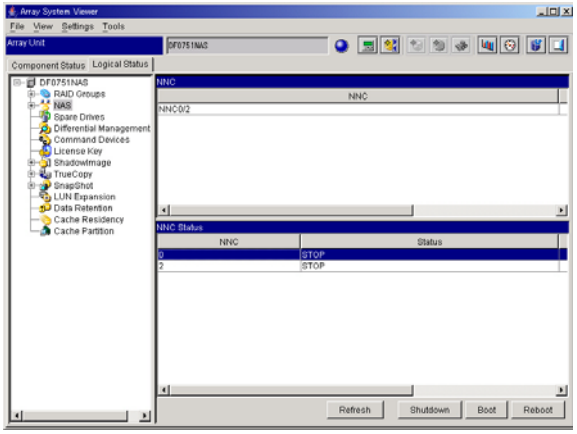
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(3) Starting the NAS OS

NOTE : When the status of the NNC (NAS Unit) to start the NAS OS is “NEW”, it cannot start because the NAS OS is not installed. When “Status” is other than “NEW”, “STOP”, and “DOWN”, the NAS OS has already started.
The time that takes to start the NAS OS is about three minutes regardless of the setting status of the cluster.

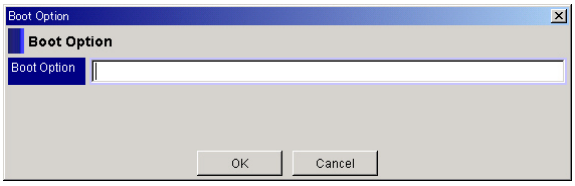
(a) Select the NNC (NAS Unit) to start the NAS OS from the “NNC Status”.



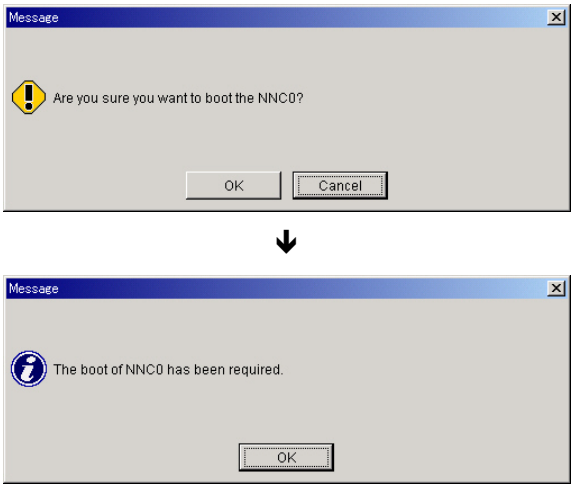
(b) Click the [Boot] button at the lower right of the window.

(c) The start option setting window is displayed. Click the [OK] button.

NOTE : When starting the NAS OS, do not specify any start option.



(d) The confirmation message is displayed. Click the [OK] button.



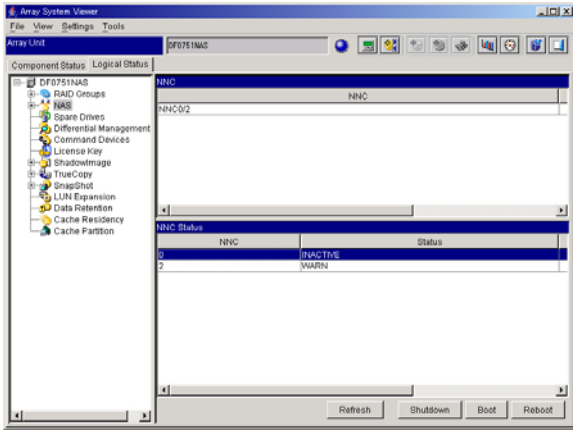
(e) Check that “Status” of the NNC (NAS Unit) which started the NAS OS is “INACTIVE” or “ACTIVE”. However, a NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320).).

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(4) Restarting the NAS OS

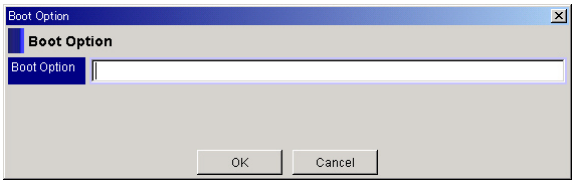
NOTE : • Do not restart the NAS OS without a customer's permission.
- When the status of the NNC (NAS Unit) to restart the NAS OS is "STOP" or "DOWN", the NAS OS has already stopped. Please execute it according to "1.7.3 (3) Starting the NAS OS" (INST 01-0350).
- The time that takes to restart the NAS OS is the sum of the time applied for "1.7.3 (2) Stopping the NAS OS" (INST 01-0340) and "1.7.3 (3) Starting the NAS OS" (INST 01-0350).
- When restarting NAS OS from Storage Navigator Modular immediately after the power supply of the array subsystem was started or the cluster start of NAS was performed from NAS Manager Modular, check with the customer that the cluster and the resource group are available (the cluster status is "ACTIVE" and the resource group status is "Online" or "Offline"), and restart NAS OS.
  If NAS OS is restarted at the time other than the above-mentioned, the subsequent cluster operation and the resource group operation may not be able to be performed normally (example: when the cluster stop is performed from NAS Manager Modular in the NAS Unit of the one that is not restarted, the cluster stop may not be completed).
  In this case, restart the NAS Unit of the one that is not restarted from Storage Navigator Modular.

(a) Select the NNC (NAS Unit) to restart the NAS OS from the "NNC Status".



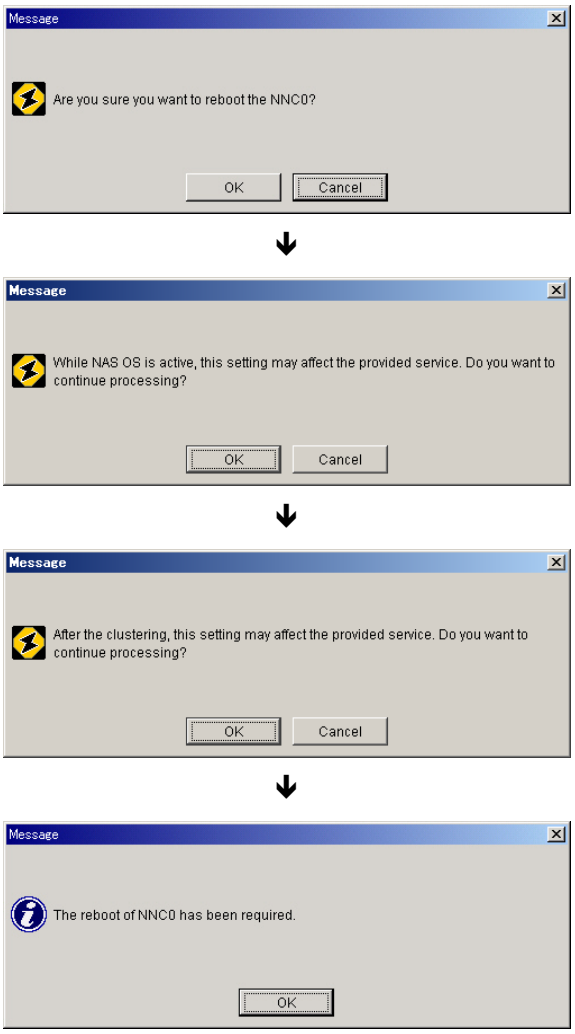
(b) Click the [Reboot] button at the lower right of the window.

(c) The start option setting window is displayed. Click the [OK] button.



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(d) The confirmation message is displayed. Click the [OK] button.



(e) Check that “Status” of the NNC (NAS Unit) which restarted the NAS OS is “INACTIVE” or “ACTIVE”.
However, a NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320).).

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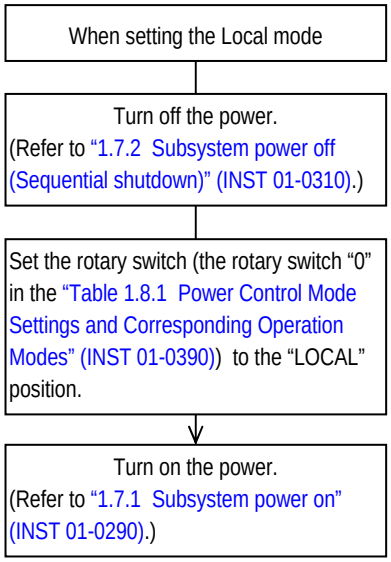
1.8 Setting the Power Control Mode (Local/Remote Mode)

Set the mode of the power control. When the Remote mode is selected, the remote control to control turning on/off of the subsystem power by a host computer is enabled.

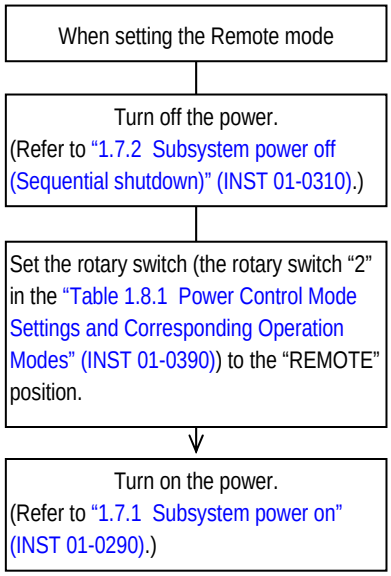
(1) Procedure for setting the Remote/Local mode

The remote adapter is not needed when the UPS with the interlocking function is used.

(a) Setting the Local mode



(b) Setting the Remote mode



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(2) Setting the Rotary switch

Set the mode of power control.

Either Local mode or Remote mode is set by the Rotary switch. Local/Remote mode settings and corresponding operation modes are shown in Table 1.8.1.

Table 1.8.1 Power Control Mode Settings and Corresponding Operation Modes

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment. When the remote adaptor is not used.)
1	—	—
2	REMOTE	Remote mode by means of the HOST AC (using a remote adapter)
3	—	—
4	UPS Interlock mode 1	Interlock mode 1 with an UPS exclusive for the subsystem To set the mode, connect AC#0 and AC#1 to the UPS and an external and an external AC power supply or the PDB of the U7 rack frame respectively.
5	UPS Interlock mode 2	Interlocking mode 2 with an UPS exclusive for the subsystem To set the mode connect AC#0 and AC#1 to the one UPS.(*1)
6	UPS Interlock mode 3	Interlocking mode 3 with an UPS exclusive for the subsystem To set the mode, connect each of AC#0 and AC#1 to the different UPSs. (*2)
7	—	—
8	—	—
9	—	—

: Do not make this setting when the UPS is not connected.

*1 : The duplication of the power supply system becomes unable to be done.

*2 : This cannot be used in the case of the single controller configuration.

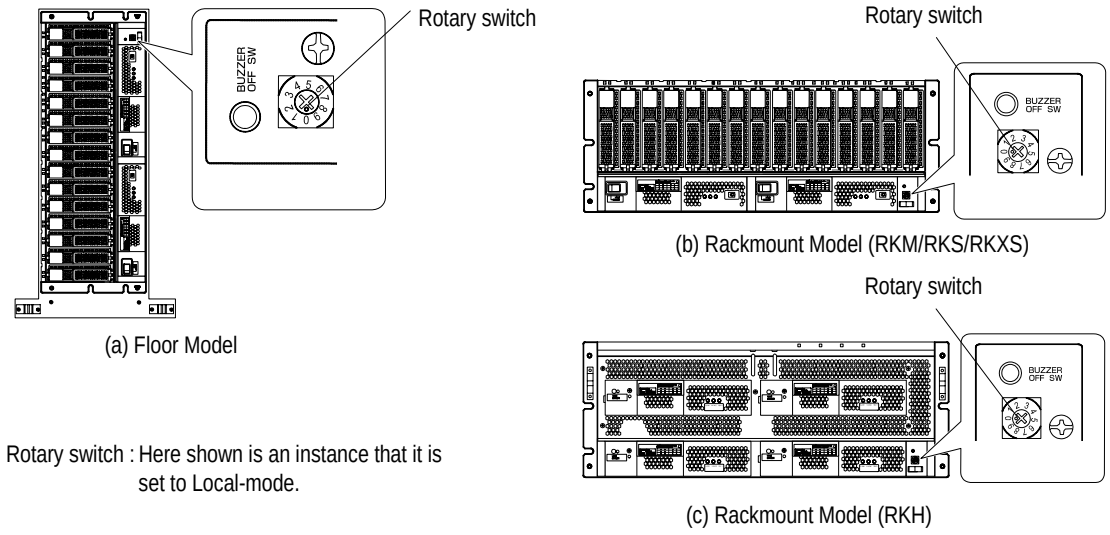


Figure 1.8.1 Location of Rotary Switch for Setting Power Control Mode

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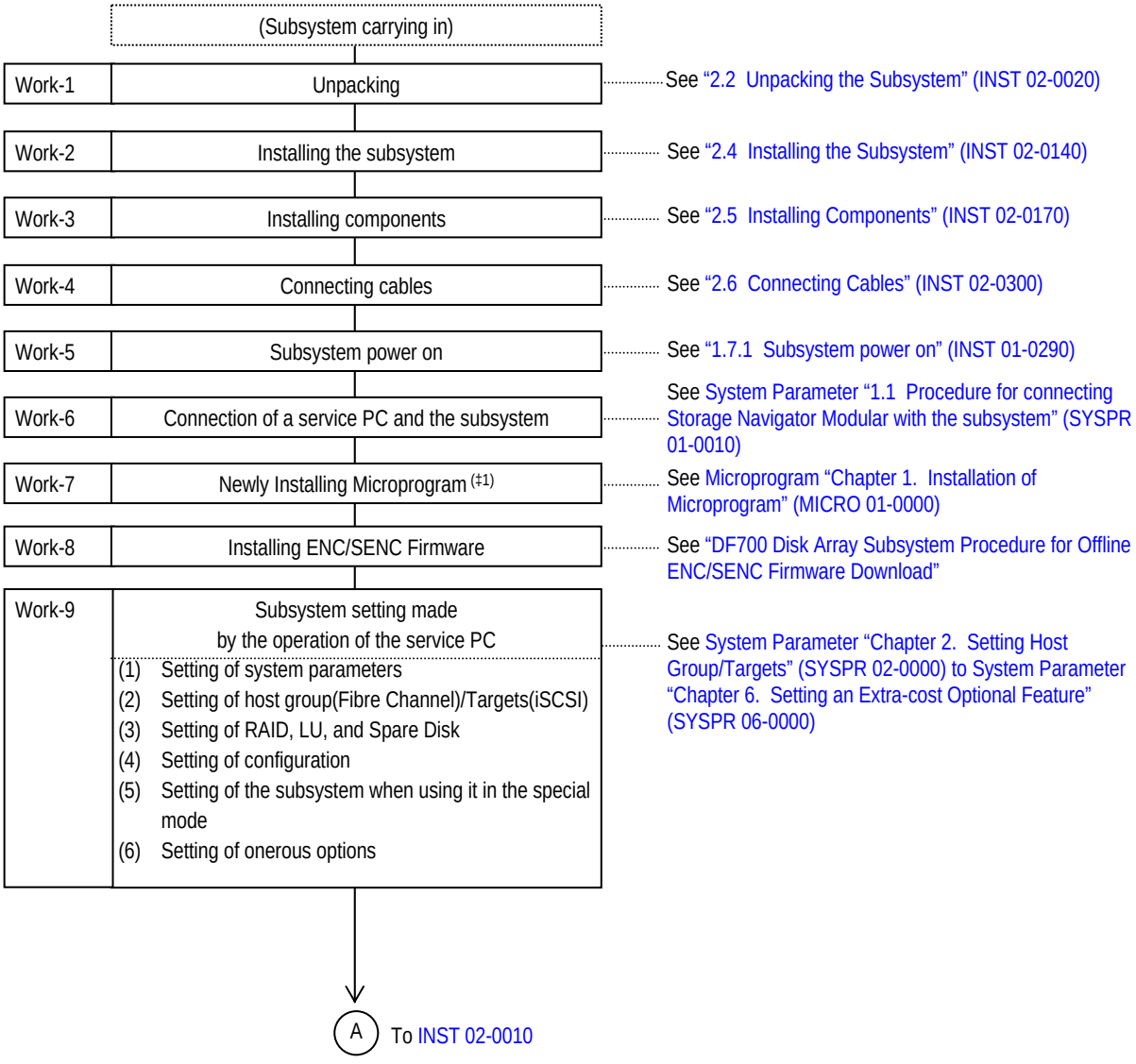
Chapter 2. Installing Floor Model

2.1 Procedures for Installing Floor Model

(1) Procedures for installing floor model

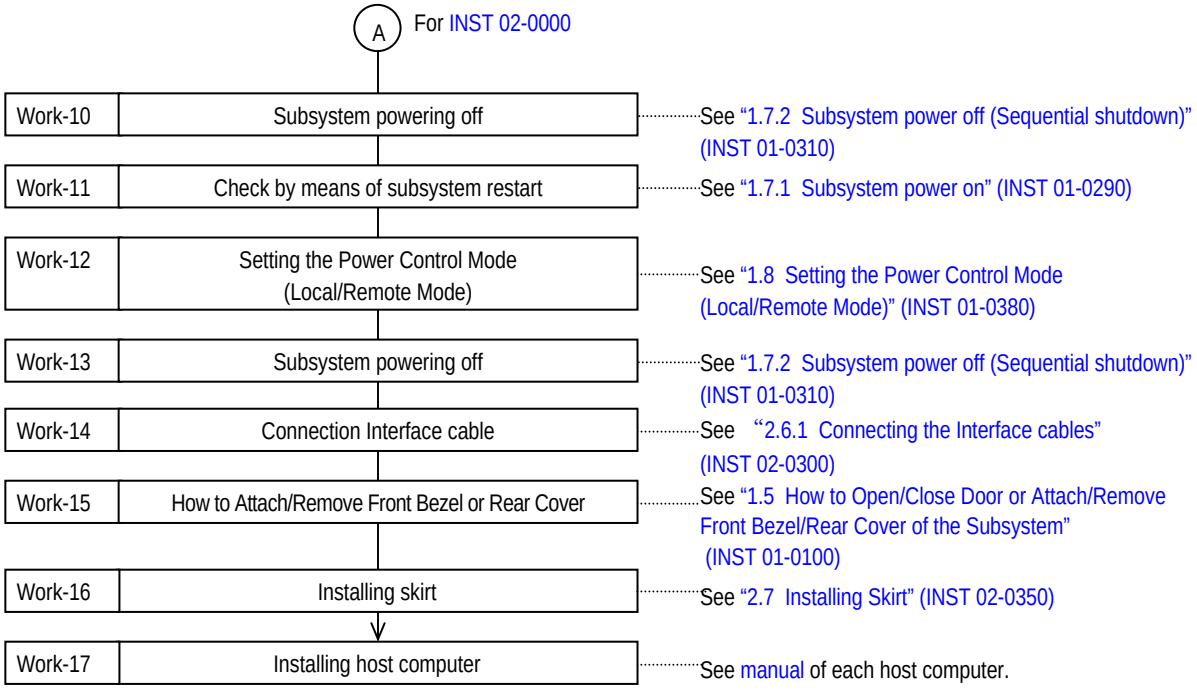
Before installing and moving subsystem, confirm the following work.

The following procedure is common with the system configuration in the Fibre Channel interface and the system configuration in the iSCSI interface.



‡1 : Normally, microprograms are installed when the subsystem is shipped from the factory.

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(2) Tool for installation work

Names and usages of tools to be used for installation are shown below.

Table 2.1.1 Tool for Installation Work

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
	Phillips screwdriver	No.2	For general works
	Slotted screwdriver	No.1	For Device ID Setting Switch
	Allen wrench	No.3	For installing the floor standing kits (H1J and H2J)
Tool of other	Wrist band	–	Band for protecting the subsystem from the static electricity
	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium II (233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended)

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2.2 Unpacking the Subsystem

⚠ CAUTION

- The unpacking should be done by two or more personnel to prevent turning over of the subsystem or being caught under the subsystem.
- Perform the work with enough care because the Floor (RKM+H1H/RKS+H1J/RKXS+H1J) Model, Floor (RKM+RKAJ+H2J/RKM+RKAJAT+H2J/RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J) Model, and Floor Model are heavy; their masses are about 70 kg and 115 kg respectively.
- When moving the subsystem, remove the skirts and raise the leveling bolts. Otherwise, an accident such as a falling may be caused because of contact with the floor or catching of a part.
- When moving the subsystem across a difference in floor level, etc., use a gangway, which forms a slope with an inclination angle of less than eight degrees.

(1) Unpacking

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

The procedure for unpacking the subsystem is shown below.

(a) Loosen the polyester bands.
(b) Remove the outer package and packing materials.
(c) Take the subsystem out of the polyethylene bag.
(d) Remove bands, etc. applied to the subsystem.

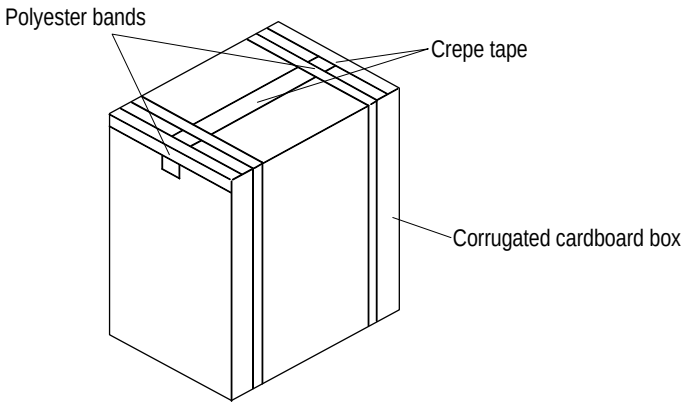


Figure 2.2.1 Packed Subsystem

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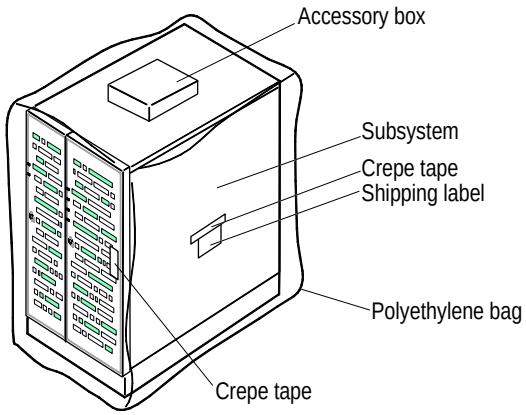
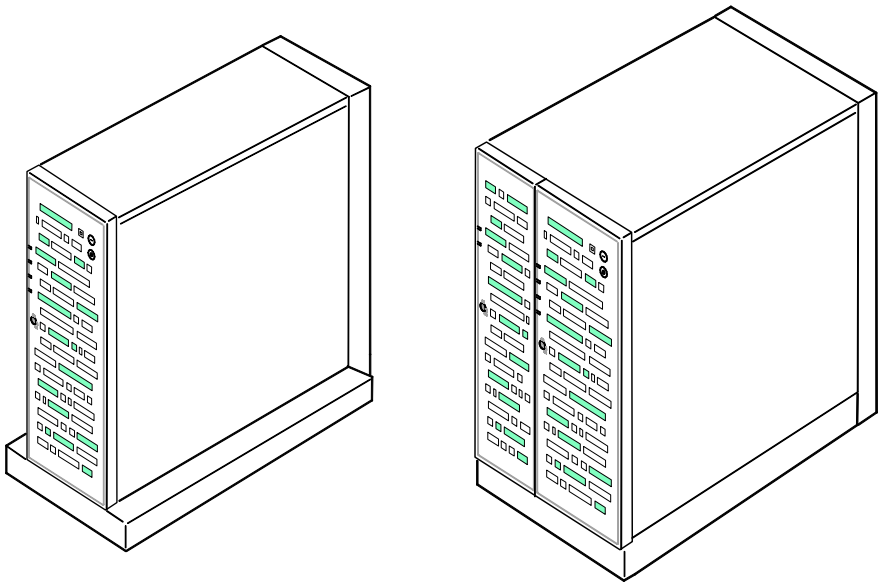


Figure 2.2.2 Packed Subsystem after Removing Other Package

(2) Inspecting the subsystem visually

Check the exterior of the subsystem visually for distortion or damage owing to the transport.



(a) Floor (RKM+H1J) Model
Floor (RKS+H1J) Model
Floor (RKXS+H1J) Model

(b) Floor (RKM/RKS+RKAJ+H2J) Model
Floor (RKM/RKS+RKAJAT+H2J) Model
Floor (RKXS+RKAJAT+H2J) Model

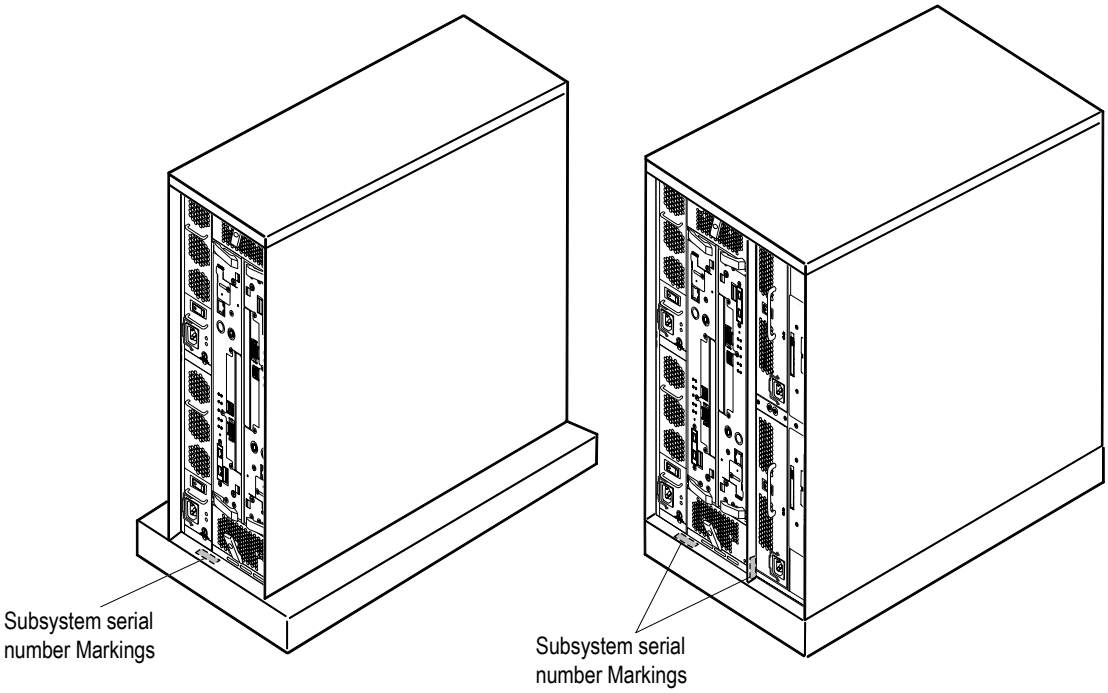
Figure 2.2.3 External Appearances of Floor Model Subsystem

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(3) Checking contents of package

(a) Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

(b) The key for the front bezel(‡1) supplied with the subsystem must be kept by service personnel in order to prevent users from maintaining the subsystem.
The key for Front Bezel is used to mount and dismount Front Bezel.



(a) Floor (RKM+H1J) Model
Floor (RKS+H1J) Model
Floor (RKXS+H1J) Model

(b) Floor (RKM/RKS+RKAJ+H2J) Model
Floor (RKM/RKS+RKAJAT+H2J) Model
Floor (RKXS+RKAJAT+H2J) Model

*1 : (a) of the figure shows (RKM+H1J) model and (b) shows (RKM + RKAJ + H2J) model.

Figure 2.2.4 Locations of Subsystem Serial Number Markings

‡1 : Two keys for Front Bezel are attached to Floor Model (RKM+H1J/RKS+H1J)
Four keys for Front Bezel are attached to Floor Model (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J).

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2.3 Installing Floor Stand Kit

2.3.1 Installing Floor Stand Kit

NOTE : Be sure to remove the Disk Drives before installing the subsystem on the Floor stand kit. Do not installing floor stand kit the subsystem with the Disk Drives installed.

When the subsystem to be installed has already been made as the floor model, this work is not necessary. When the kit has already been installed, go to "2.4 Installing the Subsystem" (INST 02-0140).
When remaking the subsystem into the floor model, perform the work explained in "2.3.2 Procedure for installing Floor Stand Kit" (INST 02-0060).
It is required to install the floor standing kit, which is an optional component (see Table 2.3.1), to the RKM/RKS/RKXS or a combination of the RKM/RKS + RKAJ or the RKM/RKS + RKAJAT or the RKXS +RKAJAT to produce the floor model.

Table 2.3.1 Composition of Floor Stand Kit

Kit type	No.	Part No.	Part name	Quantity	Remarks
Floor stand kit H1J	1	2106507-A	CART	1	—
	2	3266239-A	Top cover	1	—
	3	3266232-A	Option bezel (Front cover)	1	—
	4	1507088-1	Side cover (R)	1	For right side
	5	1507087-1	Side cover (L)	1	For left side
	6	3183095-408	Washer and socket bolt (M4×8)	17	—
	7	3266240-A	Front Skirt (H1J)	1	—
	8	2106469-A	Side Skirt (R)	1	For right side
	9	2106469-B	Side Skirt (L)	1	For left side
	10	3266231-A	Option tray (Frame UPS)	1	—
	11	5518619-1	Bracket (UPS)	1	—
	12	—	Power cable	2	J1H
	13	3266241-A	Rear cover	1	H1J only
	14	3266191-A	Clamp (H1J)	1	H1J only
	15	SB306	Bind screw (M3×6.3)	4	—
	16	3274577-1	Label (Handle)	1	—
Floor stand kit H2J	1	2106502-A	CART	1	—
	2	3266235-A	Top cover	1	—
	3	3266232-A	Option bezel (Front cover)	1	—
	4	150787-1	Side cover (R)	1	For right side
	5	1507087-1	Side cover (L)	1	For left side
	6	3183095-408	Washer and socket bolt (M4×8)	24	—
	7	3266233-A	Front Skirt (H2J)	1	—
	8	2106462-A	Side Skirt (R)	1	For right side
	9	2106462-B	Side Skirt (L)	1	For left side
	10	3266231-A	Option tray (Frame UPS)	1	—
	11	5518619-1	Bracket (UPS)	1	—
	12	—	Power cable	4	J1H
	13	3266234-A	Rear cover	1	H2J only
	14	3266192-A	Clamp (H2J)	1	H2J only
	15	3259043-445	EMI gasket	2	Against radio-frequency radiation
	16	SB306	Bind screw (M3×6.3)	4	—
	17	3274577-1	Label (Handle)	1	—
	18	5409042-2	Repeat binder	2	—

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2.3.2 Procedure for installing Floor Stand Kit

(1) Floor (RKM+H1J) Model/Floor (RKS+H1J) Model/Floor (RKXS+H1J) Model

(a) Installing the CART

⚠ CAUTION

Masses of RKM is approximately 58 kg, and RKS/RKXS is approximately 56 kg. When raising each of them, take measures to prevent it from slipping because the slipping may cause a personnel injury owing to a pinching.

(i) Lock the cart to the floor.
Turn the leveling bolts in the direction shown by the arrow so that each clearance between the caster and the floor becomes about 2.5 mm.

(ii) Fix the left side handle with the label (handle).

(iii) Raise the RKM/RKS making its top facing left, and place it on the Cart.

⚠ CAUTION

When raising the subsystem, it is dangerous to do it by using the handles. Be sure to raise the subsystem by holding its front and rear portions made of sheet metal.

(iv) Fasten front and rear sides of the RKM/RKS to the cart each with four washer and socket bolts.

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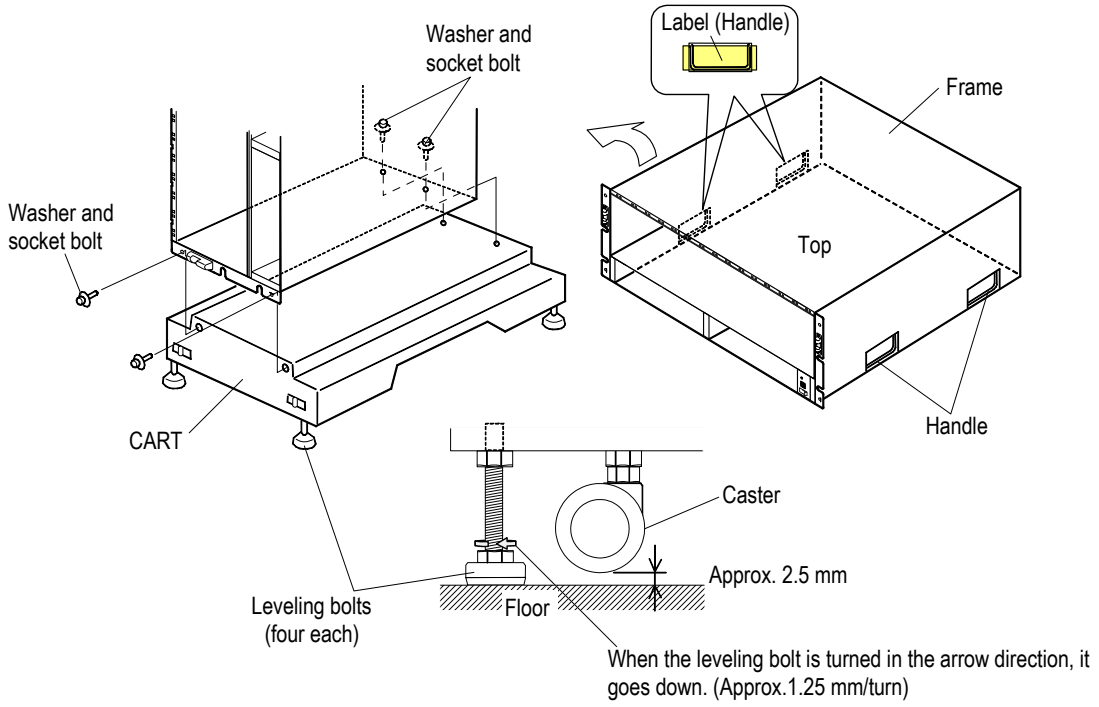


Figure 2.3.2 Installing CART

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(b) Installing the side covers

(i) Slide the side cover (L) in the direction shown by the arrow and fit its hook and center claw to the side panel of the frame.

(ii) Insert the three claws at the bottom of the side cover (L) into the three slots on the cart and then make the side cover (L) stand upright.

(iii) Press the front end of the side cover (L) against the subsystem main body so that there is no gap between them.

(iv) Fasten top of the side cover (L) to the frame with two washer and socket bolts①.

(v) Insert the three claws at the bottom of the side cover (R) into the three slots on the cart and then make the side cover (R) stand upright.

(vi) Press the front end of the side cover (R) against the subsystem main body so that there is no gap between them.

(vii) Fasten top of the side cover (L) to the frame with two washer and socket bolts①.

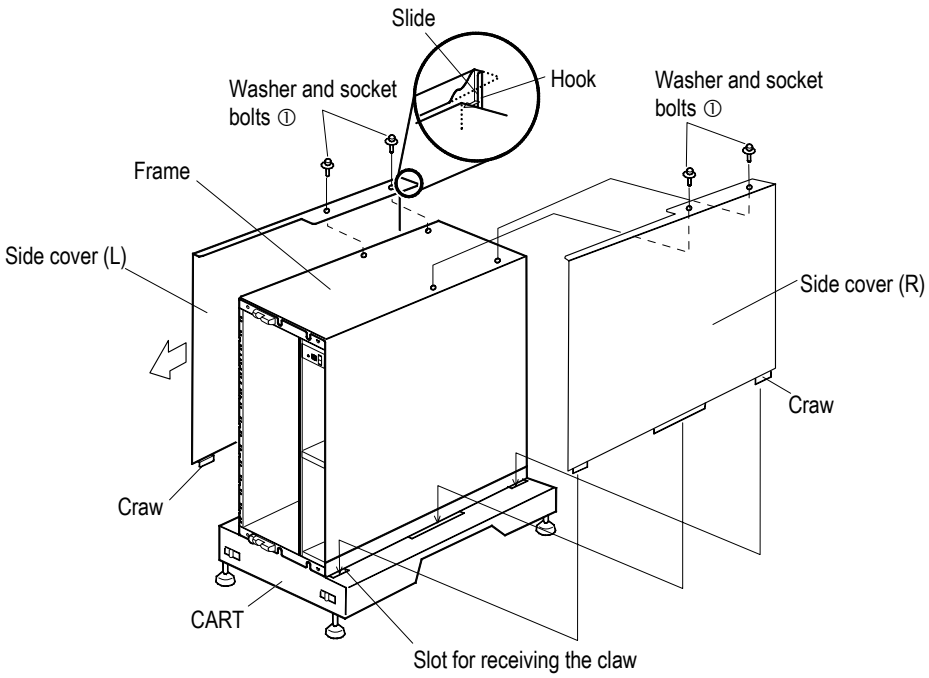


Figure 2.3.4 Installing Side Covers

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(c) Installing the top cover

(i) Place the top cover on the RKM/RKS main body.

(ii) Fasten its front and rear sides with four and one washer and socket bolts respectively.

(iii) Fasten the bracket to the upper rear side of the Option tray with two binding screws (M3×6).

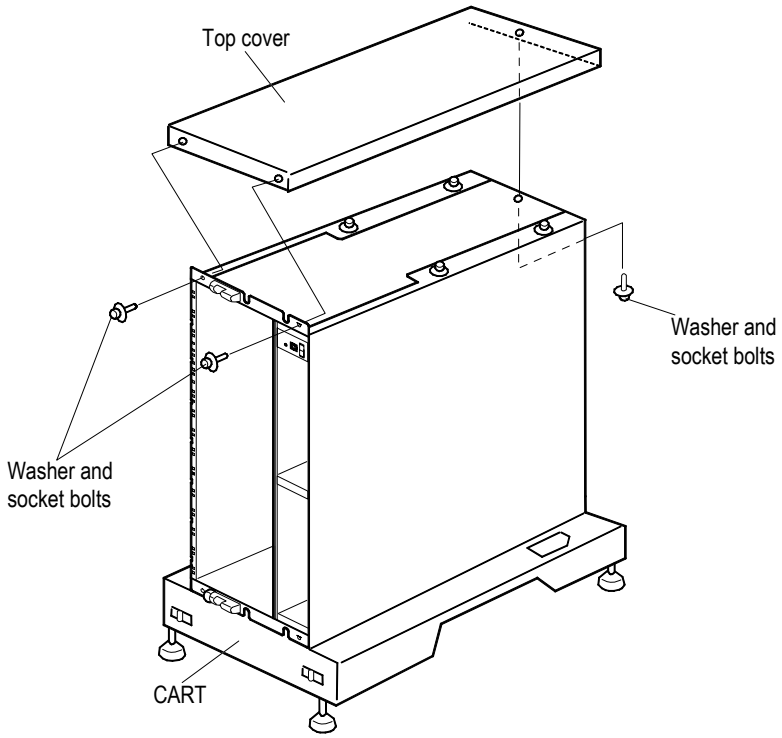


Figure 2.3.5 Installing Top Covers

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(2) Floor (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J, RKXS+RKAJAT+H2J) Model

(a) Installing the CART

CAUTION

- Masses of RKM is approximately 58 kg, RKS/RKXS is approximately 56 kg, and RKAJ/RKAJAT 40 kg is approximately.
  When raising each of them, take measures to prevent it from slipping because the slipping may cause a personnel injury owing to a pinching.

(i) Lock the cart to the floor.
Turn the leveling bolts in the direction shown by the arrow so that each clearance between the caster and the floor becomes about 2.5 mm.

(ii) Stick the EMI gasket on the front side surface of the basic subsystem (RKM/RKS/RKXS).

(iii) Fix the left side handle of the basic subsystem with the label (handle).

CAUTION

When raising the subsystem, it is dangerous to do it by using the handles. Be sure to raise the subsystem by holding its front and rear portions made of sheet metal.

(iv) Raise the basic subsystem, the additional subsystem (RKAJ/RKAJAT) making its top facing left, and place it on the cart.

(v) Fasten front and rear sides of the subsystem to the CART each with four washer and socket bolts.
When installing the subsystem on the cart, install the basic subsystem first, and then install the additional subsystem.

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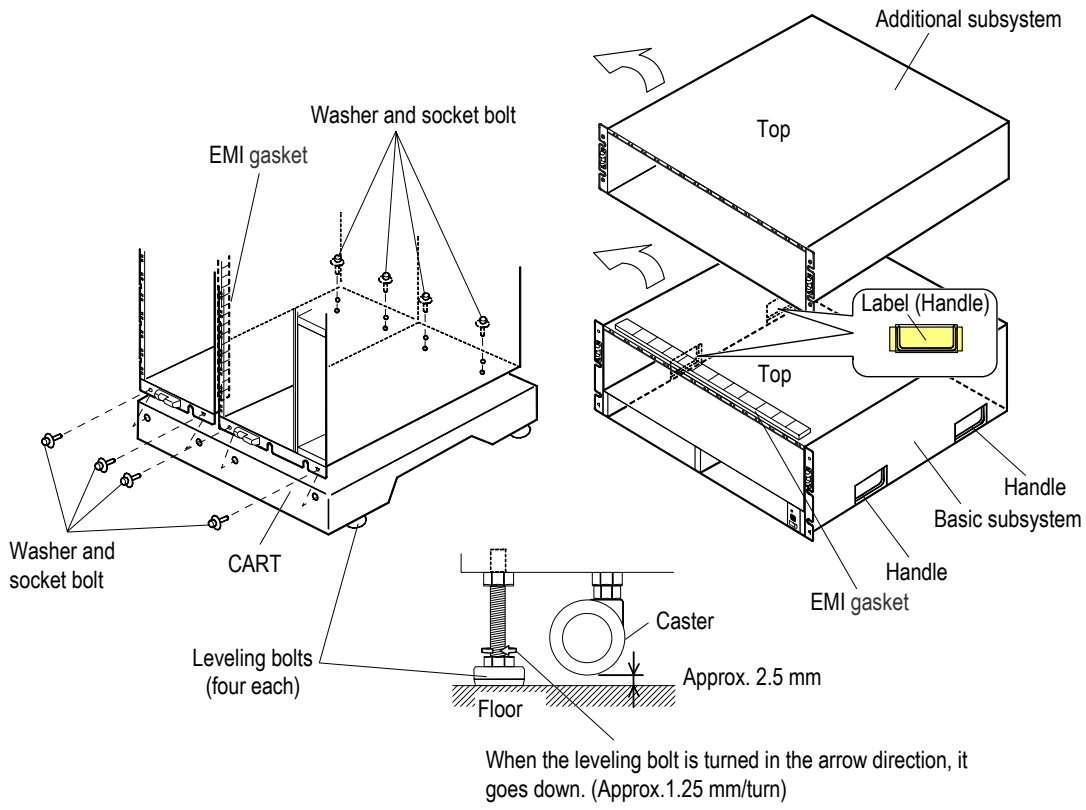


Figure 2.3.6 Installing CART

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(b) Installing the side covers

(i) Slide the side cover (L) in the direction shown by the arrow and fit its hook and center claw to the side panel of the additional subsystem.

(ii) Insert the three claws at the bottom of the side cover (L) into the three slots on the cart and then make the side cover (L) stand upright.

(iii) Press the front end of the side cover (L) against the subsystem main body so that there is no gap between them.

(iv) Fasten top of the side cover (L) to the additional subsystem with two washer and socket bolts①.

(v) Insert the three claws at the bottom of the side cover (R) into the three slots on the cart and then make the side cover (R) stand upright.

(vi) Press the front end of the side cover (R) against the subsystem main body so that there is no gap between them.

(vii) Fasten top of the side cover (L) to the basic subsystem with two washer and socket bolts①.

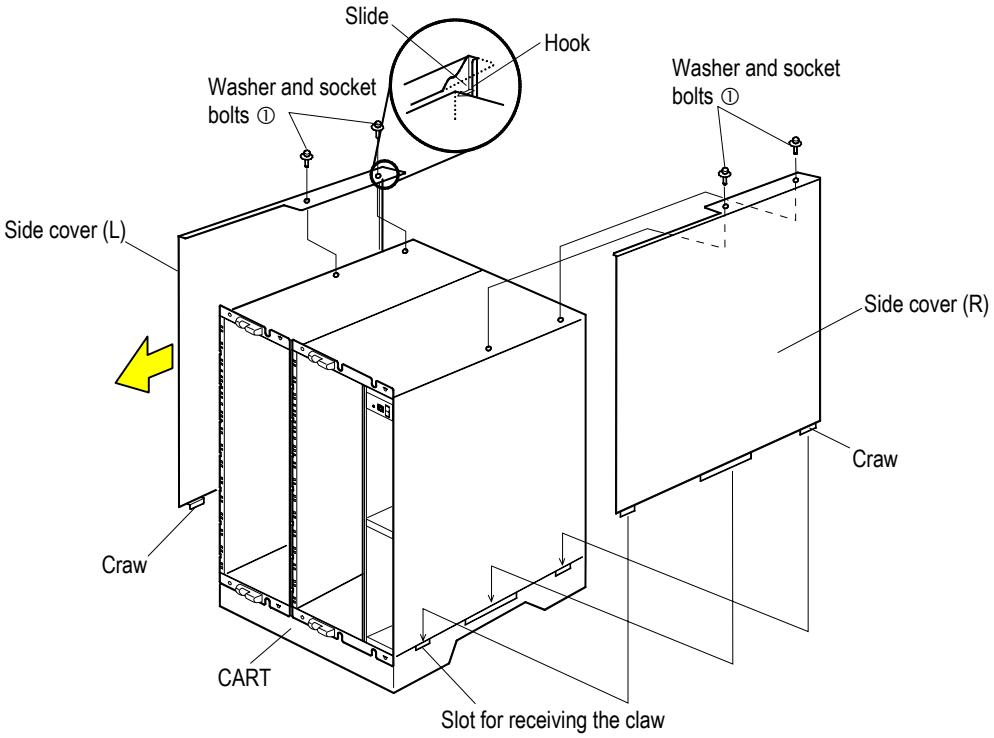


Figure 2.3.8 Installing Side Covers

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(c) Installing the top cover

(i) Place the top cover on the RKM/RKAJ main body.

(ii) Fasten its front and rear sides with six and two washer and socket bolts respectively.

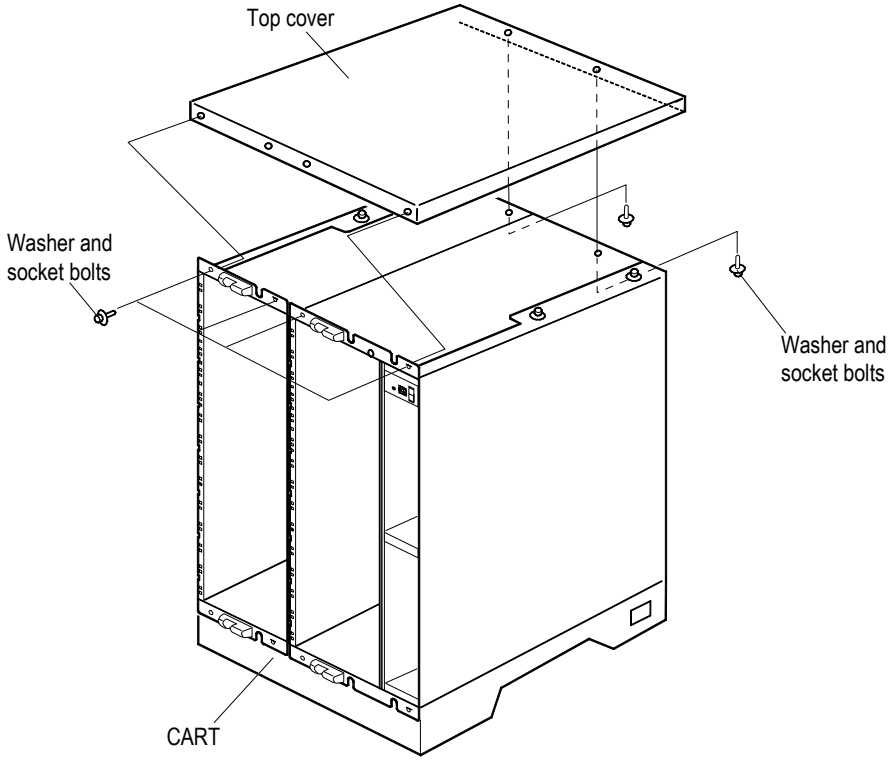


Figure 2.3.9 Installing Top Covers

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2.4 Installing the Subsystem

2.4.1 Subsystem floor-space and service clearance

CAUTION

Do not block the vent holes. Or else, temperature rise inside the subsystem may cause a failure or even a fire.

Install the subsystem so that the air intakes and the air exhaust remain clear. Figure 2.4.1 shows floor space and service clearance of the floor model

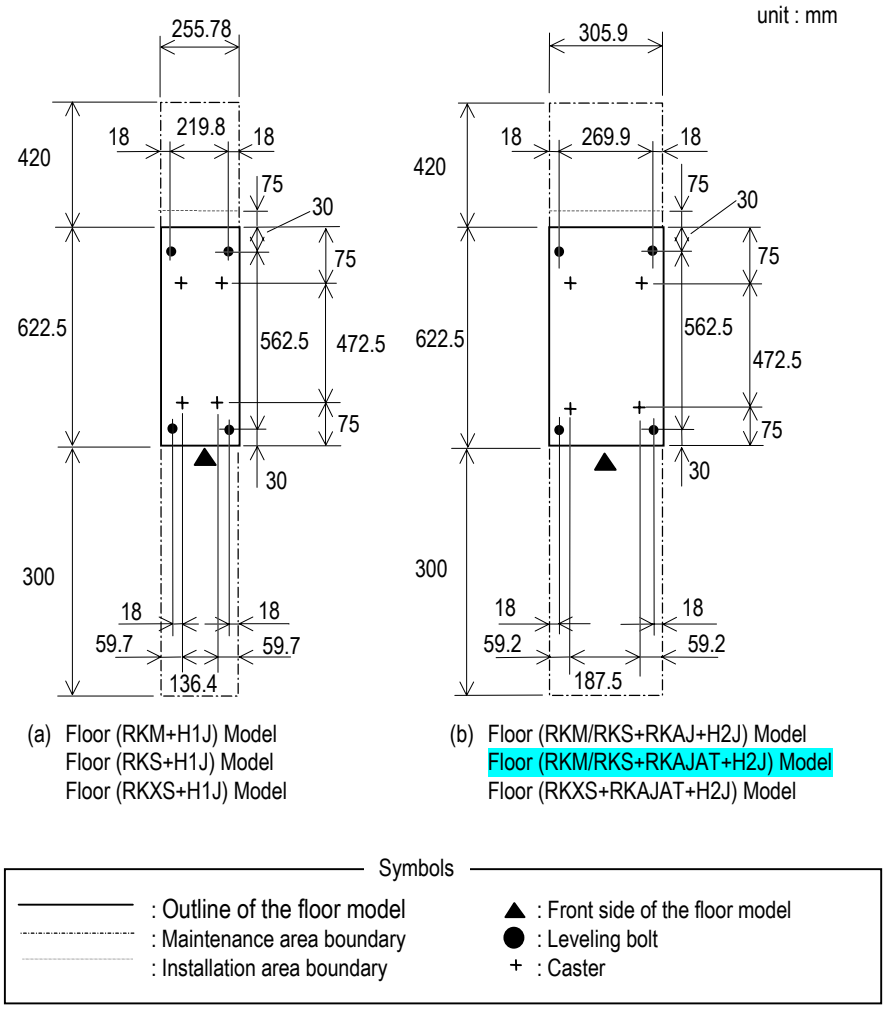


Figure 2.4.1 Floor space and service clearance of Floor Models

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2.4.2 Installing the subsystem

(1) Adjusting leveling bolts

(a) Be sure to remove the skirt when moving the subsystem.
Pull Front-skirt toward you and remove it. Then pull side-skirts toward you and remove them.

(b) Move the subsystem to the place where it is to be installed. When moving it, turn the leveling bolts to make the casters contact the floor.

(c) Adjust the leveling bolts so that the tilts of the subsystem to the front or rear, and left or right become 0±2 mm.

(d) Turn the leveling bolts in the direction shown by the arrow so that each clearance between the caster and the floor becomes about 2.5 mm.

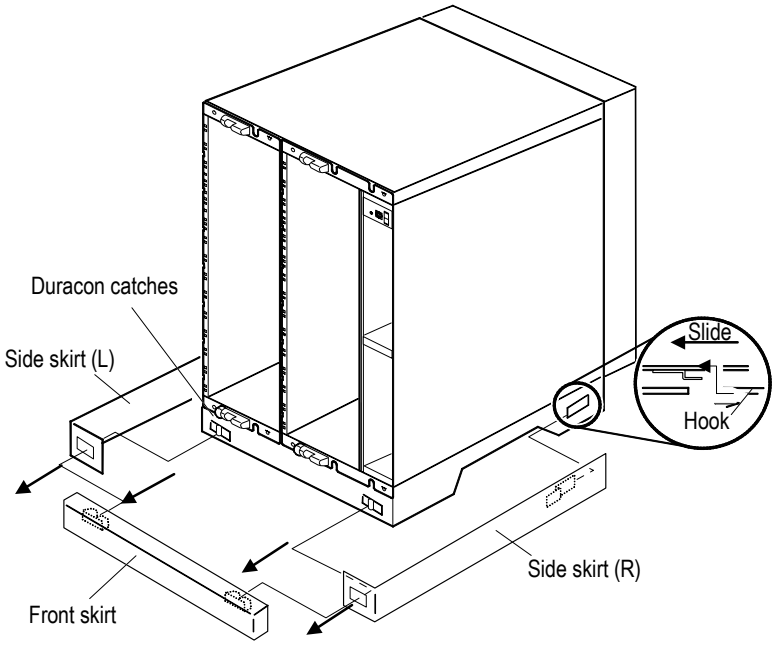


Figure 2.4.2 Removing Skirt

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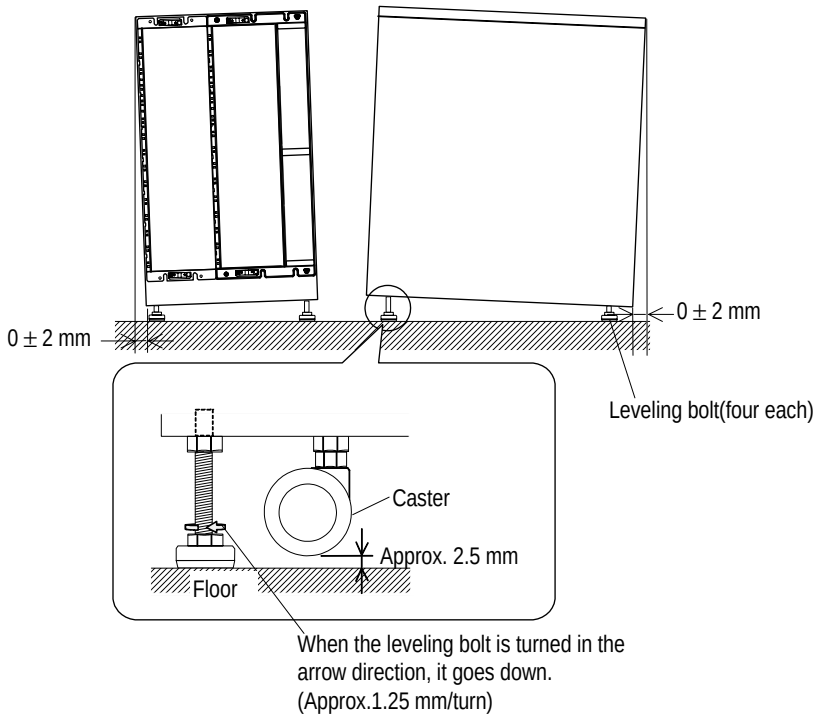


Figure 2.4.3 Adjusting Leveling Bolts

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2.5 Installing Components

Install the components in the subsystem. When installing them, take care not to apply them any shock.
When some of the components have already been installed, check if they are firmly installed. If not, fasten them tightly.

The figures in this section are drawn for the procedure of Floor model (RKM/RKS+RKAJ+H2J). The procedure of other Floor models is similar to the case shown in the figures here.

When the front bezel is attached, remove it before installing a component. (See "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100).)

Table 2.5.1 Components Required for the Floor (RKM+H1J/RKS+H1J)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1(*1)	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JM	1 or 2(*2)	for RKM
		DF-F700-F1JS	1 or 2(*2)	for RKS
4	Cache Unit	DF-F700-C1GJ	1 or 2(*3)	The Cache Units with a model name selected from those shown on the left are installed.
		DF-F700-C2GJ		
5	FC Interface Board (RKM)	DF-F700-DJ4G2	1(*2) (*4)	4G bps FC Interface Board
6	FC Interface Board for addition	DF-F700-DJ4G2W	1(*2) (*4)	4G bps FC Interface Board (It is optional parts for RKS)
7	iSCSI Interface Board	DF-F700-DJSC2	1(*4)	iSCSI Interface Board
8	Power Unit	—	2	—
9	Disk Drive	DF-F700-AGF72	2 to 15(*2)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F700-AGH72		
		DF-F700-AGF146		
		DF-F700-AGH146		
		DF-F700-AGF300		

*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the lower side of the subsystem.
*2 : When no component is installed, a dummy part is installed instead.
*3 : It is a number per Control Unit. But install one Cache memory per Control Unit in RKS.
*4 : It is a number per Control Unit.

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Table 2.5.2 Components Required for the (RKM/RKS+RKAJ+H2J)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1(*1)	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JM	1 or 2(*2)	for RKM
		DF-F700-F1JS	1 or 2(*2)	for RKS
4	Cache Unit	DF-F700-C1GJ	1 or 2(*3)	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F700-C2GJ		
5	FC Interface Board (RKM)	DF-F700-DJ4G2	1(*2) (*4)	4G bps FC Interface Board
6	FC Interface Board for addition	DF-F700-DJ4G2W	1(*2) (*4)	4G bps FC Interface Board (It is optional parts for RKS)
7	iSCSI Interface Board	DF-F700-DJSC2	1(*4)	iSCSI Interface Board
8	Power Unit	—	2	for RKM/RKS
9	Power Unit	—	2	for RKAJ
10	ENC Unit	—	2	—
11	Disk Drive	DF-F700-AGF72	2 to 30(*2)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F700-AGH72		
		DF-F700-AGF146		
		DF-F700-AGH146		
		DF-F700-AGF300		

*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the lower side of the subsystem.
*2 : When no component is installed, a dummy part is installed instead.
*3 : It is a number per Control Unit. But install one Cache memory per Control Unit in RKS.
*4 : It is a number per Control Unit.

Table 2.5.2.1 Components Required for the (RKM/RKS+RKAJAT+H2J)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1(*1)	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JM	1 or 2(*2)	for RKM
		DF-F700-F1JS	1 or 2(*2)	for RKS
4	Cache Unit	DF-F700-C1GJ	1 or 2(*3)	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F700-C2GJ		
5	FC Interface Board (RKM)	DF-F700-DJ4G2	1(*2) (*4)	4G bps FC Interface Board
6	FC Interface Board for addition	DF-F700-DJ4G2W	1(*2) (*4)	4G bps FC Interface Board (It is optional parts for RKS)
7	iSCSI Interface Board	DF-F700-DJSC2	1(*4)	iSCSI Interface Board
8	Power Unit	—	2	for RKM/RKS
9	Power Unit	—	2	for RKAJ
10	SENC Unit	—	2	—
11	Disk Drive	DF-F700-AGF72	2 to 15(*2)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F700-AGH72		
		DF-F700-AGF146		
		DF-F700-AGH146		
		DF-F700-AGF300		
		DF-F700-ATE250R	2 to 15(*2)	
		DF-F700-ATE400R		
		DF-F700-ATE500R		

*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the lower side of the subsystem.
*2 : When no component is installed, a dummy part is installed instead.
*3 : It is a number per Control Unit. But install one Cache memory per Control Unit in RKS.
*4 : It is a number per Control Unit.

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Table 2.5.3 Components Required for the (RKXS+H1J)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1(*1)	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JXS	1 or 2(*2)	for RKXS
4	Cache Unit	DF-F700-C512JX	1(*3)	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F700-C1GJ		
5	FC Interface Board for addition	DF-F700-DJ4G2W	1(*1) (*3)	4G bps FC Interface Board (It is optional parts)
6	iSCSI Interface Board	DF-F700-DJSC2	1(*3)	iSCSI Interface Board
7	Power Unit	—	2	—
8	Disk Drive	DF-F700-ATE250R	2 to 15(*2)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F700-ATE400R		
		DF-F700-ATE500R		

*1 : There is only one Backup Battery Unit to be installed in the RKXS and install it in the lower side of the subsystem.
*2 : When no component is installed, a dummy part is installed instead.
*3 : It is a number per Control Unit.

Table 2.5.4 Components Required for the (RKXS+RKAJAT+H2J)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1(*1)	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JXS	1 or 2(*2)	for RKXS
4	Cache Unit	DF-F700-C512JX	1(*3)	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F700-C1GJ		
5	FC Interface Board for addition	DF-F700-DJ4G2W	1(*1) (*3)	4G bps FC Interface Board (It is optional parts)
6	iSCSI Interface Board	DF-F700-DJSC2	1(*3)	iSCSI Interface Board
7	Power Unit	—	2	for RKXS
8	Power Unit	—	2	for RKAJAT
9	SENC Unit	—	2	—
10	Disk Drive	DF-F700-ATE250R	2 to 30(*2)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F700-ATE400R		
		DF-F700-ATE500R		

*1 : There is only one Backup Battery Unit to be installed in the RKXS and install it in the lower side of the subsystem.
*2 : When no component is installed, a dummy part is installed instead.
*3 : It is a number per Control Unit.

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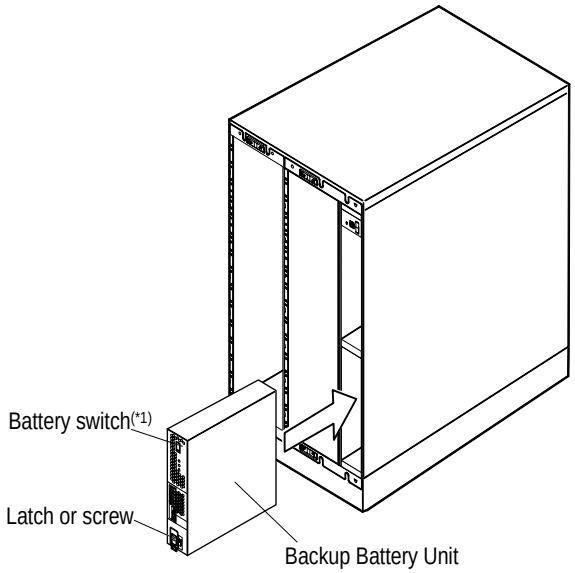
(1) Installing the Backup Battery Unit

(a) Make sure that the battery switch on the Battery Unit is turned off.

NOTE : In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS, this work is unnecessary because there is no battery switch.

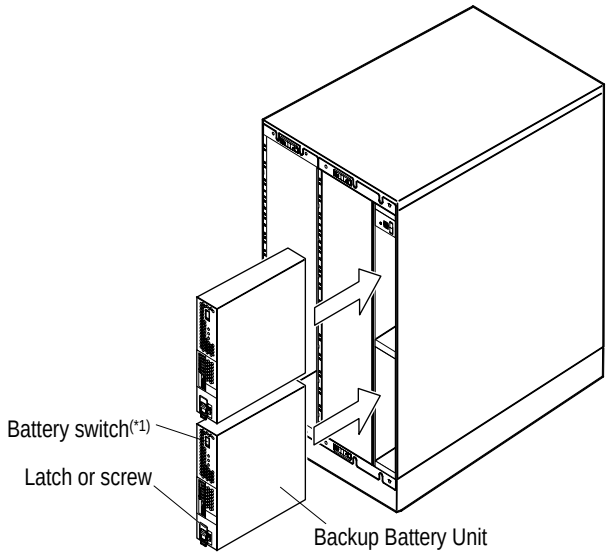
(b) Insert the Backup Battery Unit into the specified position in the subsystem.

NOTE : There is only one Backup Battery Unit to be installed in the RKS/RKXS and install it in the lower side of the subsystem.



*1 : In case of the Backup Battery Unit of REV. C to be installed in the RKS and the Backup Battery Unit to be installed in the RKXS, there is no battery switch.

Figure 2.5.1 Installing Backup Battery Unit (RKS/RKXS)



*1 : In case of the Backup Battery Unit of REV. C to be installed in the RKM, there is no battery switch.

Figure 2.5.1.1 Installing Backup Battery Unit (RKM)

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(2) Installing the Fan Assembly

This installing work is only applied to RKM/RKS/RKXS.

The two same Fan Assemblies are installed facing each other in the state in which each of them faces upper and lower. When installing them, make each of them face reverse direction correctly.

(a) Insert the Fan Assembly in the specified position in the subsystem, raise it by fitting the hook of the lever to the cutout of the subsystem, and tighten it with the fixing screw.

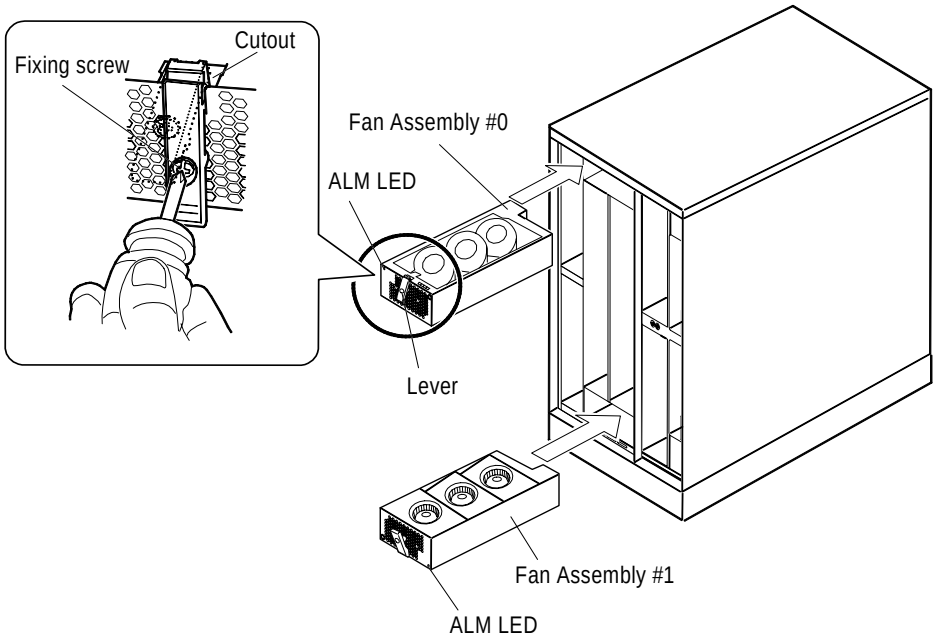


Figure 2.5.2 Installing Fan Assembly

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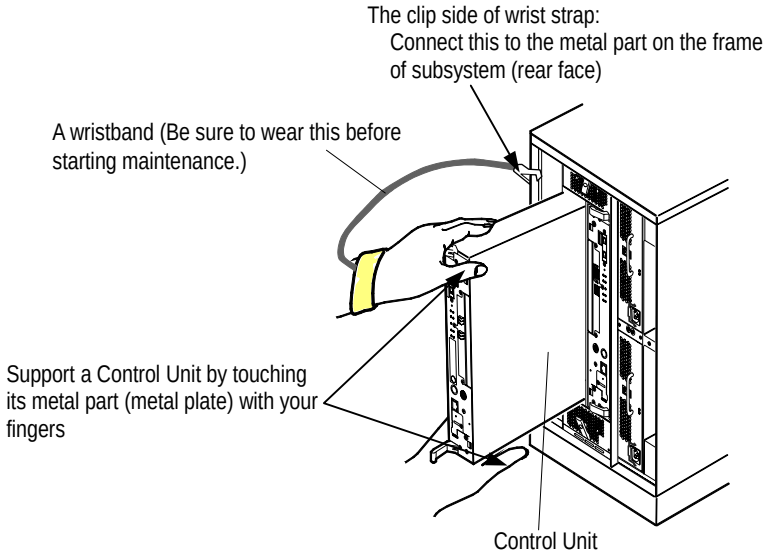
(3) Installing the Control Unit, Cache Unit, and Interface Board

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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<Working Procedure>

(a) In the case of RKS/RKXS

(a-1) When the interface board is not installed in the Control Unit of the RKS/RKXS

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.

• Be careful not to insert Cache Units at the reversed direction.

(iii) Make sure that the Cache Unit is firmly installed.

(iv) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(v) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover to the right and #1 with the cover to the left.

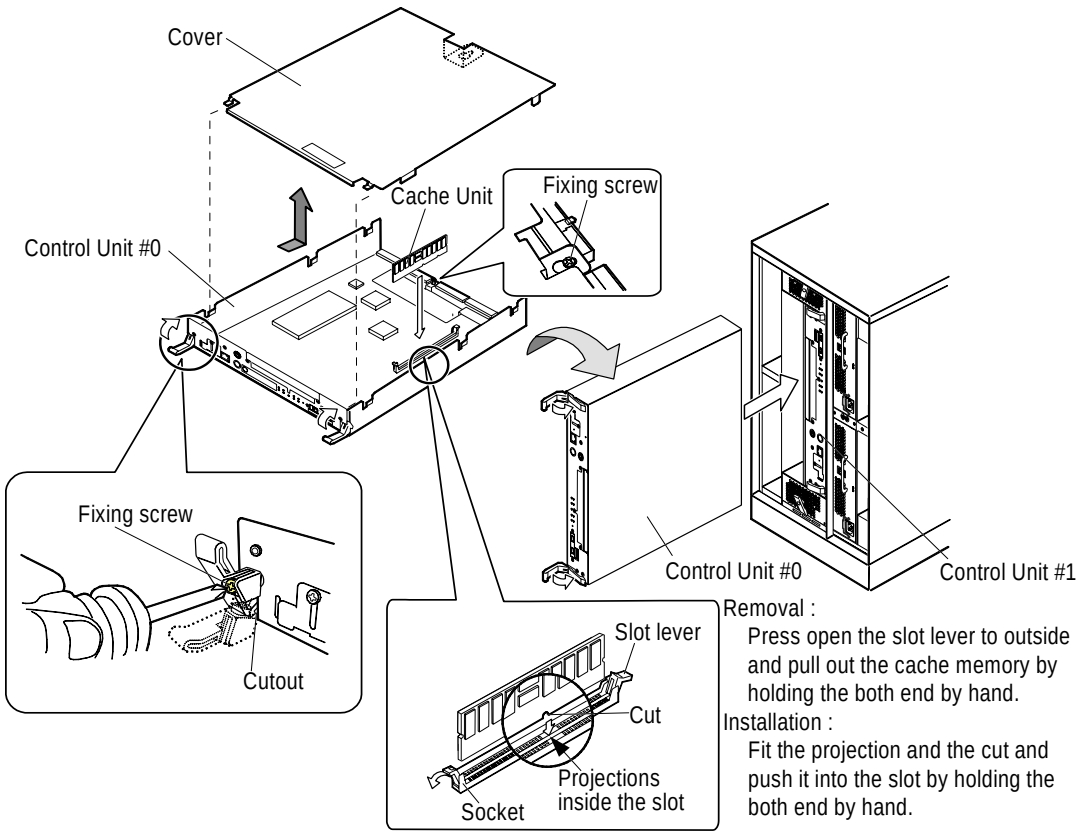


Figure 2.5.3 Installing Control Unit

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(a-2) When the interface board is installed in the Control Unit of the RKS/RKXS

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Remove two host connectors for 2 G bps from the Control Unit.

• Pull it out after raising the lever for Type 1.

• Pull it out after pushing down the lever toward for Type 2.

After this, hand over the removed two host connectors for 2 G bps to the customer, and ask him/her to keep them carefully.

(iii) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). Insert the connectors surely.

Install the Interface Board making its sheet metal part face inside of the Control Unit.

(iv) Make sure that the Interface Board is firmly installed.

(v) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.

• Be careful not to insert the Cache Units in the reverse orientation.

• Insert the Cache Units in the cache slots in regular order starting from the slot #0.

• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

(vi) Make sure that the Cache Unit is firmly installed.

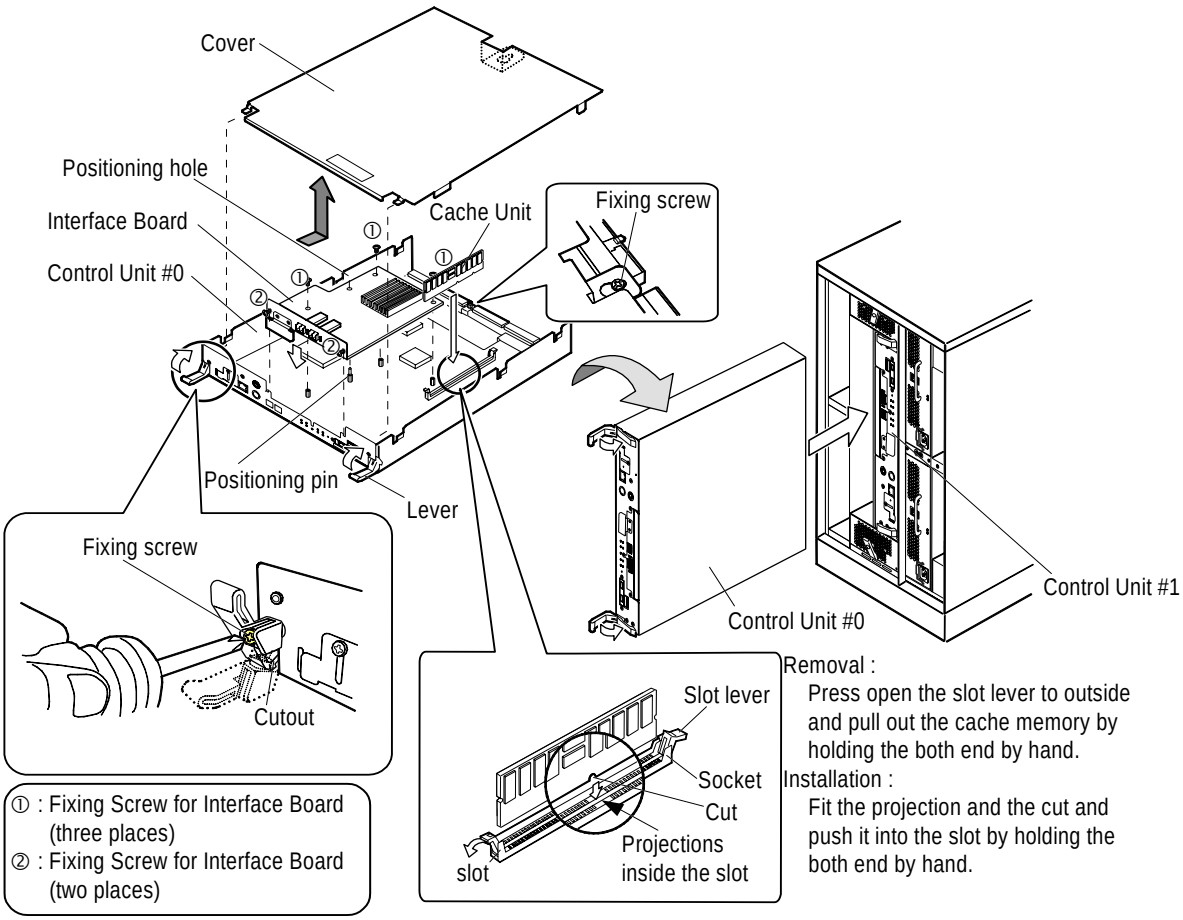
(vii) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(viii) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.

In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover to the right and #1 with the cover to the left.

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*1 : The figure shows the case where the FC Interface Board is added to the Control Unit of the RKS.

Figure 2.5.3.1 Installing Control Unit, Cache Unit and Interface Board

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(b) In the case of RKM

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). Insert the connectors surely.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

(iii) Make sure that the Interface Board is firmly installed.

(iv) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Be careful not to insert the Cache Units in the reverse orientation.
• Insert the Cache Units in the cache slots in regular order starting from the slot #0.
• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

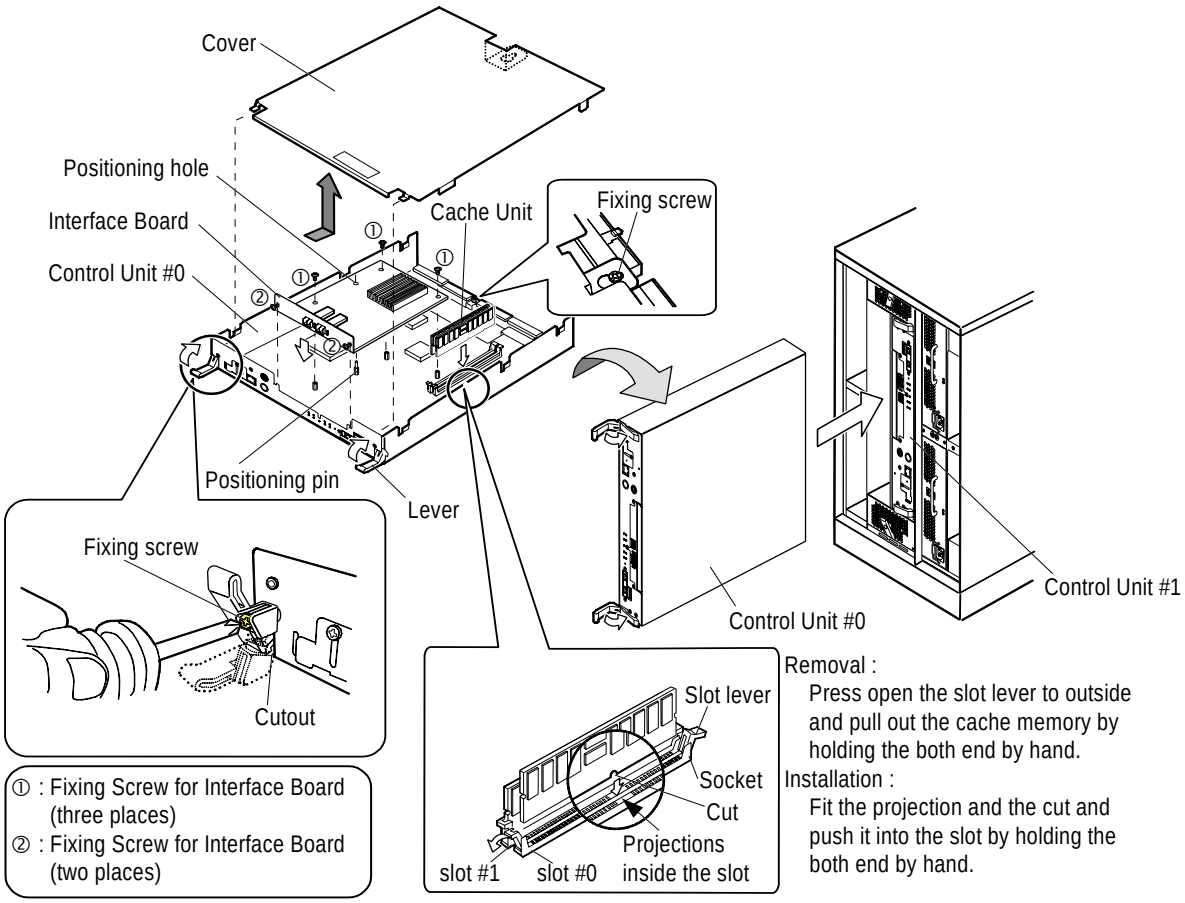
(v) Make sure that the Cache Unit is firmly installed.

(vi) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(vii) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover to the right and #1 with the cover to the left.

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

Figure 2.5.3 Installing Control Unit, Cache Unit and Interface Board

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(4) Installing Power Unit

(a) Power Unit of RKM/RKS/RKAJ

Since the Power Units of the basic subsystem (RKM/RKS/RKXS) and the additional subsystem (RKAJ/RKAJAT) are different from each other, install each of them in the specified location taking care not to install the wrong one.

(i) Make sure that the AC Power Unit Switch is turned off.

(ii) Shift the latch (fixing screw) of the Power Unit (basic subsystem) to the Release position, insert it slowly into the sheet metal slit part at the right of the power Unit, and then push it to the end.

(iii) Shift the latch (fixing screw) of the Power Unit (additional subsystem) to the Release position, insert it slowly into the sheet metal slit part at the right of the power Unit, and then push it to the end.

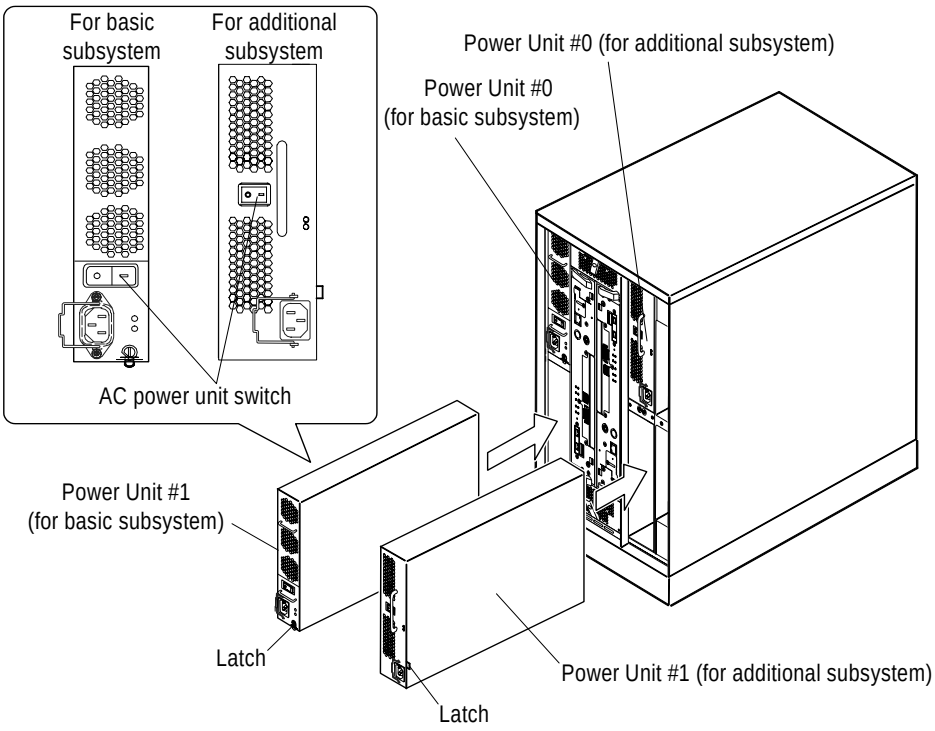


Figure 2.5.4 Installing Power Unit

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(5) Installing the ENC Unit/SENC Unit

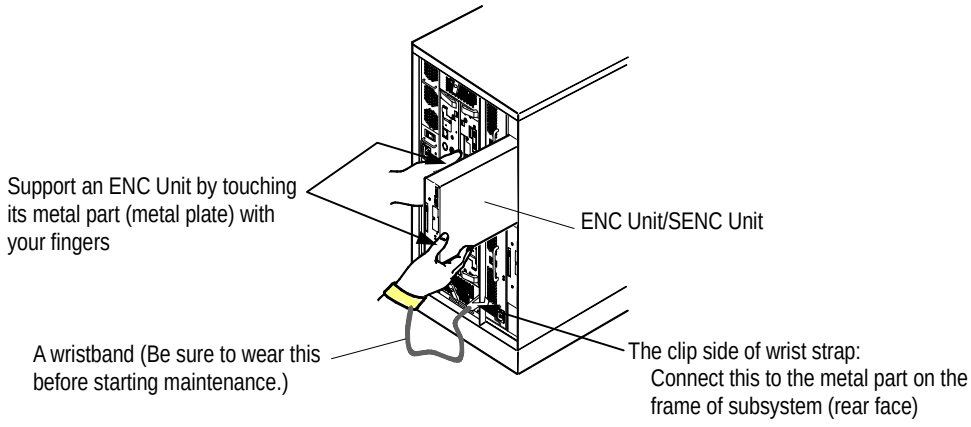
This installation work is only applied to Floor model (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J, RKXS+RKAJAT+H2J).

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install an ENC Unit, support its metal part with your hand that has the wrist strap. By so doing, you can discharge the static electricity from your body may change the parts.

The ENC Unit is a precision machine that may have troubles because of electrostatic discharge. Be sure to put on the wristband before starting work in order to protect ENC Units from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert an ENC Unit into the subsystem, support the ENC Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Insert the ENC Unit/SENC Unit into the specified location in the subsystem with its lever being raised, then return the lever in the direction shown by the arrow (⟶).

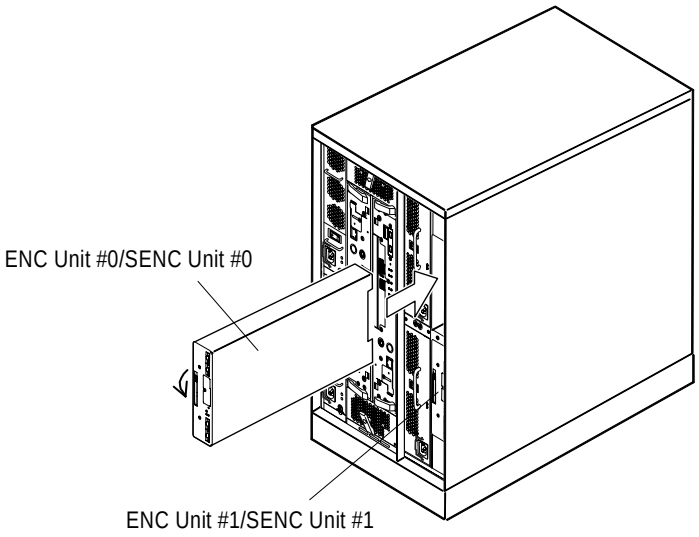


Figure 2.5.5 Installing ENC Unit/SENC Unit

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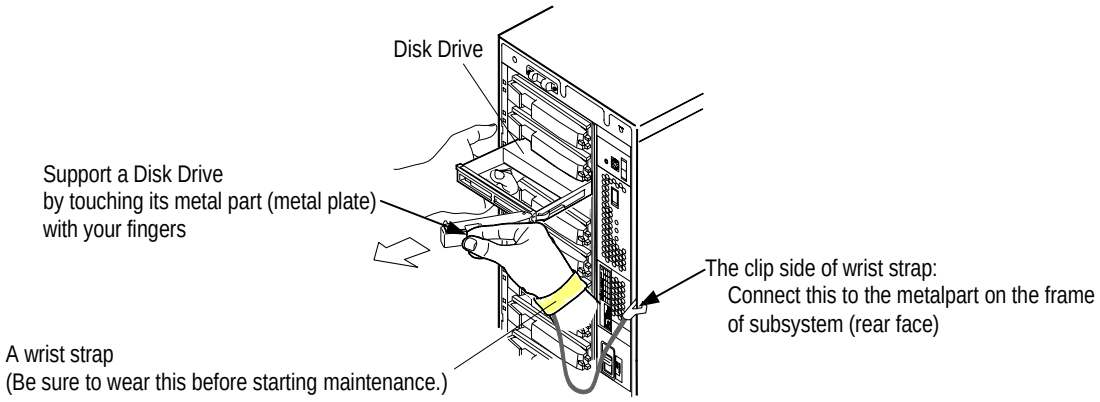
(6) Installing the Disk Drive

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components. Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

The Disk Drive is a precision machine that may have troubles because of electrostatic discharge. Be sure to put on the wristband before starting work in order to protect Disk Drives from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part). When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.

(b) Insert the Disk Drive into the position (address) where it was by holding it with the handle.

(i) Fit the Disk Drive in the guide rail of the RKAJAT and slide it in the direction shown by the arrow.

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

(d) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.
There are two types of the dummies (Disk Drives), and the installation methods are different respectively.

- The dummy (Disk Drive) of which the external appearance is similar to the Disk Drive
  There is no label attached on the handle part.
  Install it in the same way as the Disk Drive.
- The dummy (Disk Drive) of which the external appearance is all black
  This is the dummy (Disk Drive) of the resin all-in-one molded piece (black) with no stopper and handle part.
  Insert it into the slot slowly so that the latch (round dent) part of the dummy (Disk Drive) comes to the right side.

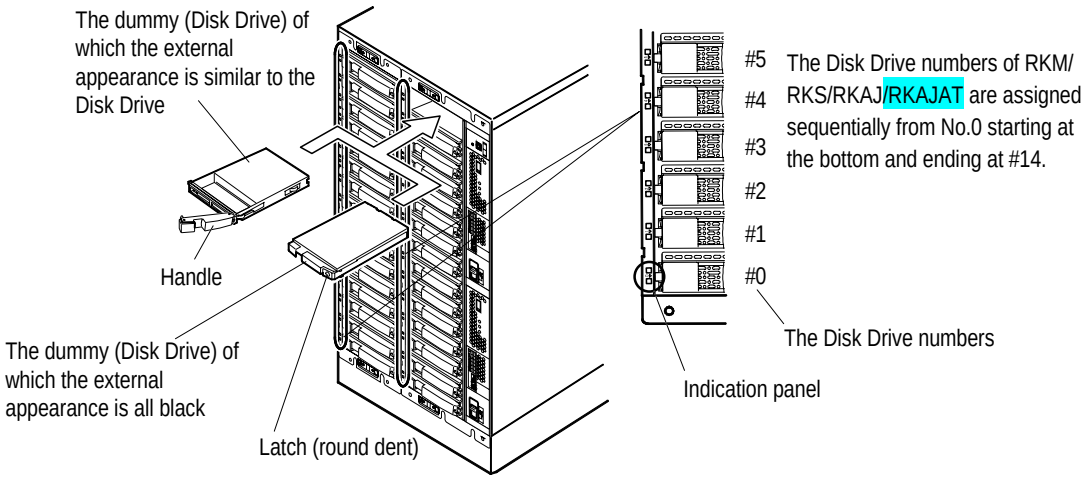


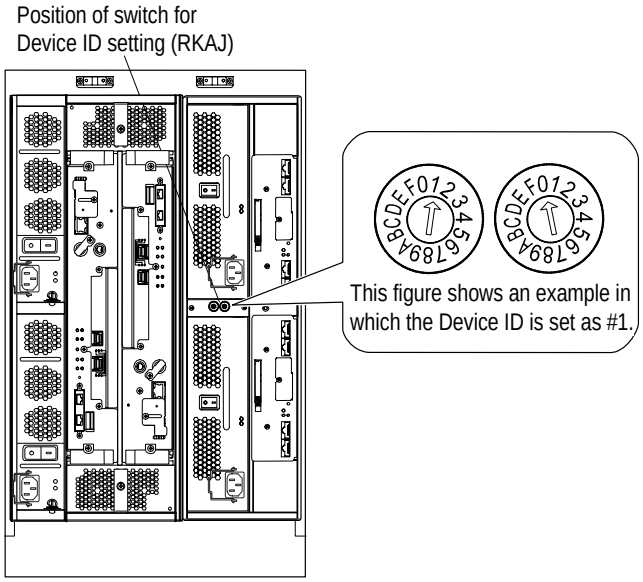
Figure 2.5.6 Installing the Disk Drive/Dummy (Disk Drive)

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(7) Setting Unit number

The device ID number of the RKM/RKS/RKXS has been set to #0. Set the Device ID number of the RKAJ to be connected to the RKM/RKS to #1.

Set #21 for RKAJAT of RKM/RKS/RKXS + RKAJAT. Set x in ascending order.



*1: The figure shows Floor (RKM+RKAJ+H2J) Model.

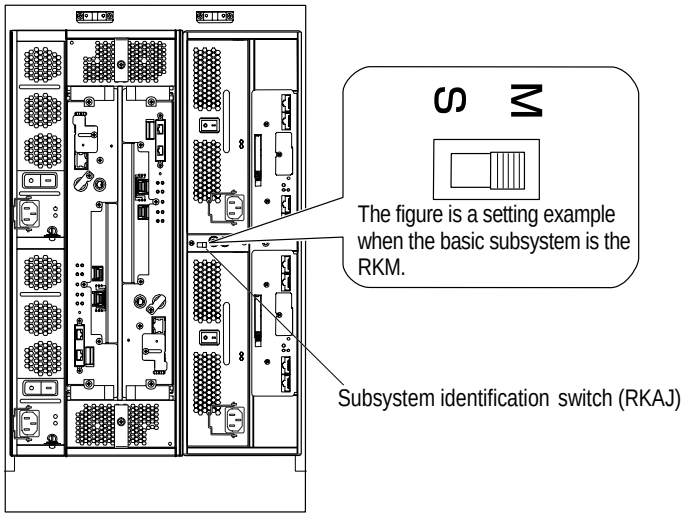
Figure 2.5.7 Position of Switch for Device ID Setting

(8) Setting the subsystem identification switch

Set only the RKAJ.

When the basic subsystem to be connected is the RKM, set it in the M side, and when it is the RKS, set it in the S side.

Check the RKM and RKS by the subsystem model names. (Refer to "2.2 (3) Checking contents of package" (INST 02-0040).)



*1: The figure shows Floor (RKM+RKAJ+H2J) Model.

Figure 2.5.8 Position of the subsystem identification switch

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2.6 Connecting Cables

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "1.1 (3) Note on cable routing" (INST 01-0010).

The figures in this chapter are drawn for the procedure of Floor model (RKM/RKS+RKAJ+H2J). The cable connection procedure of other Floor model is similar to the case shown in the figures here.

Remove Rear-cover if installed.

2.6.1 Connecting the Interface cables

(1) Connecting the Fibre Channel Interface cables

Two types of cable are provided as the Fibre Channel Interface cables(‡1) to be used so that they fit to connector shapes of the RKM/RKS and host computer (or HBA (Host Bus Adapter), SW) to be connected.

Table 2.6.1 shows correspondences between the connector shapes and cable types. Choose the applicable cables from the table correctly.

Table 2.6.1 Types Cables to be Connected

Control Unit side (for RKM/RKS side)			Host computer side (HBA (Host Bus Adapter), SW)	Types Cables to be Connected	
Parts name of connected cable plug	Model	Connector form	Connector form	Cable connector shape	Model
Control Unit	DF-F700-F1JM (RKM) DF-F700-F1JS (RKS) DF-F700-F1JXS (RKXS)	LC	SC	LC-SC cable	DF-F700-KB×M(*1)
			LC	LC-LC cable	DF-F700-KC×M(*1)
Interface Board	DF-F700-DJ4G2	LC	SC	LC-SC cable	DF-F700-KB×M(*1)
			LC	LC-LC cable	DF-F700-KC×M(*1)

*1 : "x" denotes a valuable (1 to 5) that shows a cable length.

‡1 : When the multiple Interface Boards are used, make sure of the port corresponding to the host computer to be connected.

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Connect the Fibre Channel Interface cables after making sure of the ports to be connected the Location Label (rear side of the subsystem).
Route the Fibre Channel Interface cable to the Clamp).

NOTE : • When bending the Fibre Channel Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• The RKS/RKXS has the limitation in the connection configuration of the Fibre Channel interface cable depending on the existence of the addition of the FC Interface Board and the topology set to the Port.
The connection configuration of the topology set to Port and the Fibre Channel Interface cable. (See "1.2.2 Mini-HUB" (INST 01-0020).)
• The installing direction of the Control Unit differs. Be careful not to make wrong selection of the port to be connected.

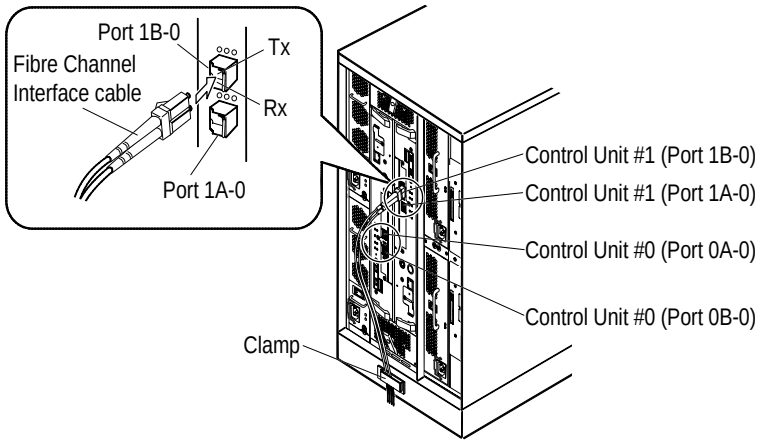
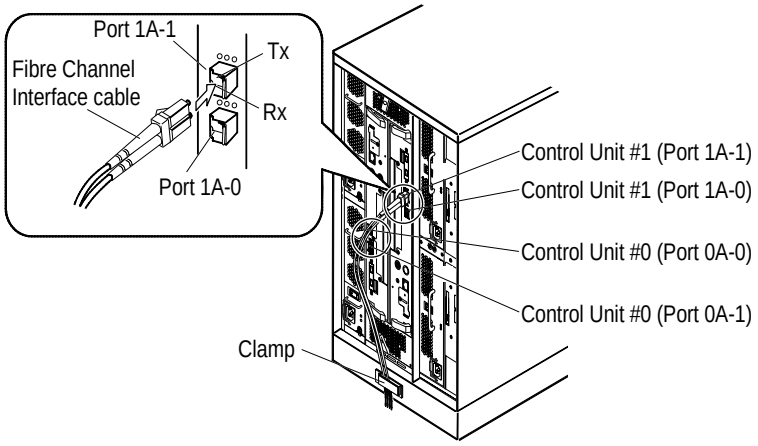


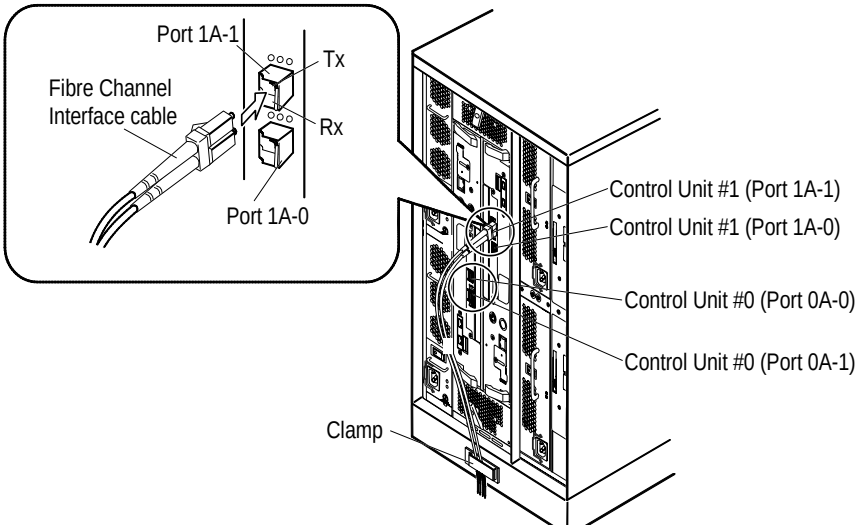
Figure 2.6.1 Port Layout of Fibre Channel (RKM)

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*1 : The figure shows the floor (RKS + RKAJ + H2J) model
(case where the FC Interface Board is not added to the Control Unit of the RKS).

Figure 2.6.1.1 Port Layout of Fibre Channel (RKS/RKXS)



*1 : The figure shows the floor (RKS + RKAJ + H2J) model
(case where the FC Interface Board is added to the Control Unit of the RKS).

Figure 2.6.1.2 Port Layout of Fibre Channel when the FC Interface Board is installed (RKS/RKXS)

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(2) Connecting the iSCSI Interface cables

Connect the iSCSI Interface cables after making sure of the ports to be connected the label.
Route the iSCSI Interface cable to the Clamp.

NOTE : • When bending the iSCSI Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• The installing direction of the Control Unit differs. Be careful not to make wrong selection of the port to be connected.

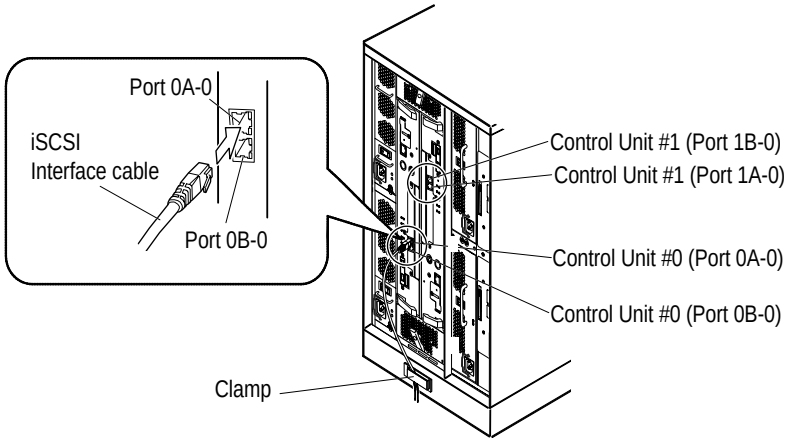


Figure 2.6.1.3 Port Layout of iSCSI (RKM/RKS/RKXS)

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2.6.2 Connecting ENC cables

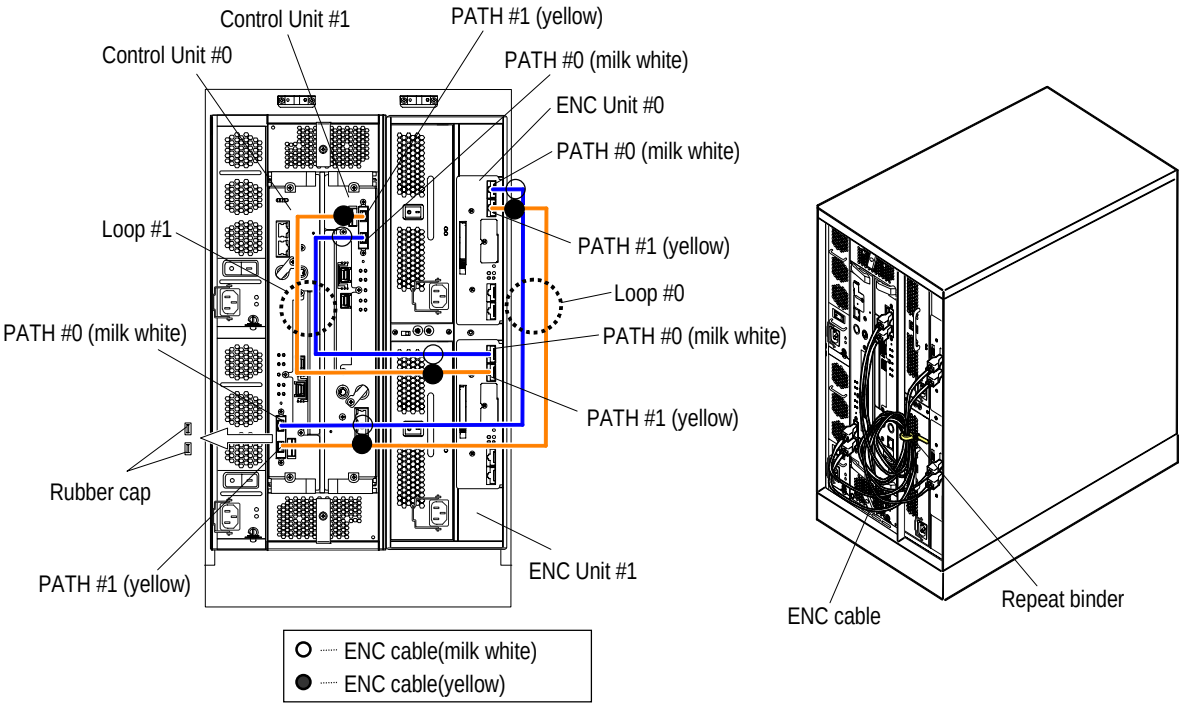
In the case of the Floor (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J, RKXS+RKAJAT+H2J) model with both of the RKM/RKAJ, it is required to connect the Control Unit (RKM/RKS) and the ENC Unit (RKAJ) with the ENC cables (‡1). (The ENC cables are supplied with the RKAJ/RKAJAT.)
Take care the method of connecting the cable is different about the Floor (RKM/RKS+RKAJ+H2J) and the Floor (RKM/RKS+RKAJAT+H2J, RKXS+RKAJAT+H2J).

NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses .
• Connect the two (Loop#0 and Loop#1) systems of each of the Control Unit and the ENC Unit with the ENC cables.
Parts of the Loop#0 and Loop #1 systems are discriminated from each other by means of color markings in milk white and yellow respectively.
When connecting the left and right sets of the Control Unit and ENC Unit with the ENC cables, be sure to connect each of the cables to the sets of adjacent connectors of the same kind, that is, the PATH#0 (marked in milk white) and the PATH#1 (marked in yellow) of the ENC Unit and the Control Unit.

(1) Floor (RKM/RKS+RKAJ+H2J) Model
(a) Remove the rubber cap on the Control Unit.
(b) Connect the ENC cable to the Control Unit.
(i) To the PATH#0 (marked in milky white on the RKM side), connect the ENC cable marked in milky white.
(ii) To the PATH#1 (marked in yellow on the RKM side), connect the ENC cable marked in yellow.
(c) Connect the ENC cable to the ENC Unit.
(i) To the PATH#0 (on the ENC Unit side and marked in milk white), connect the ENC cable (marked in milk white) led from the PATH#0 (on the Control Unit) side and marked in milk white).
(ii) To the PATH#1 (on the ENC Unit side and marked in yellow), connect the ENC cable (marked in yellow) led from the PATH#1 (on the Control Unit) side and marked in yellow).
(d) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder, and put it inside the subsystem.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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*1: The figure shows Floor (RKM+RKAJ+H2J) Model.

Figure 2.6.2 ENC Cable Connection (Floor (RKM/RKS+RKAJ+H2J) Model)

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(2) Floor (RKM/RKS+RKAJAT+H2J) Model

(a) Remove the rubber cap on the Control Unit.

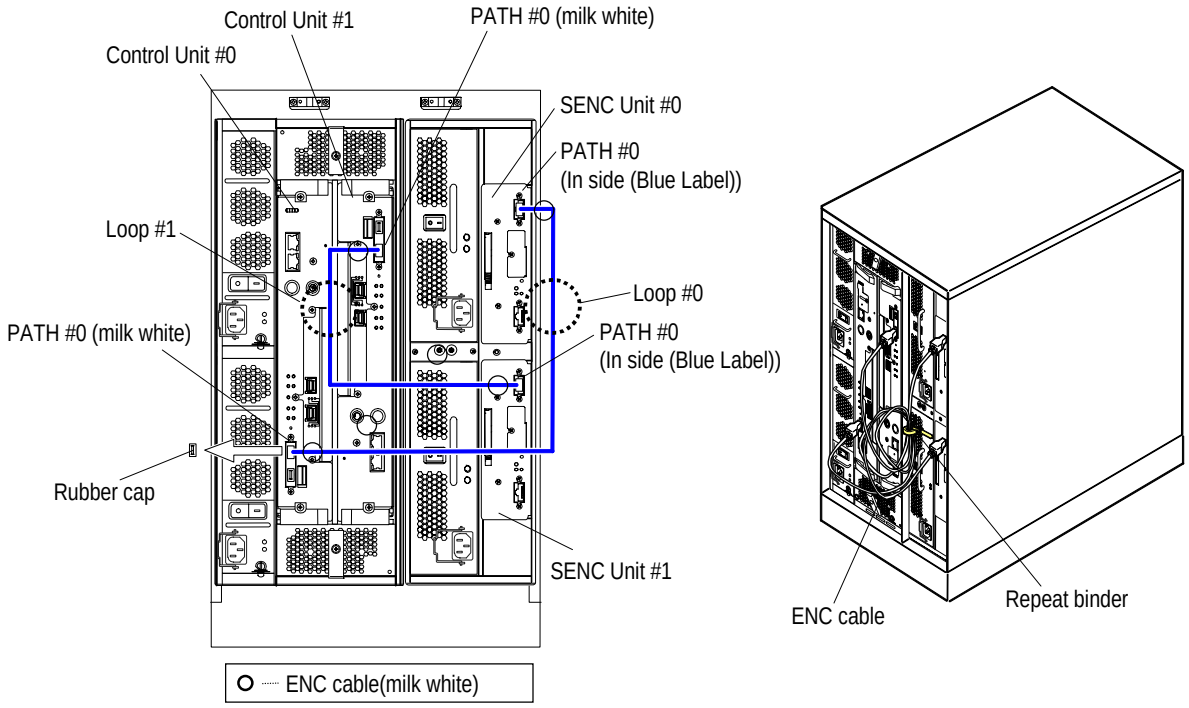
(b) Connect the ENC cable to the Control Unit.

To the PATH#0 (marked in milky white on the RKS/RKM side), connect the ENC cable marked in milky white.

(c) Connect the ENC cable to the SENC Unit.

To the PATH#0 (on the SENC Unit side and marked in blue label), connect the ENC cable (marked in milk white) led from the PATH#0 (on the Control Unit) side and marked in milk white).

(d) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder, and put it inside the subsystem.



*1: The figure shows Floor (RKM+RKAJAT+H2J) Model.

Figure 2.6.2.1 ENC Cable Connection (Floor (RKM/RKS+RKAJAT+H2J) Model)

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(3) Floor (RKXS+RKAJAT+H2J) Model

(a) Remove the rubber cap on the Control Unit.

(b) Connect the ENC cable to the Control Unit.

To the PATH#0 (marked in milky white on the RKXS side), connect the ENC cable marked in milky white.

(c) Connect the ENC cable to the SENC Unit.

To the PATH#0 (on the SENC Unit side and marked in blue label), connect the ENC cable (marked in milk white) led from the PATH#0 (on the Control Unit) side and marked in milk white).

(d) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder, and put it inside the subsystem.

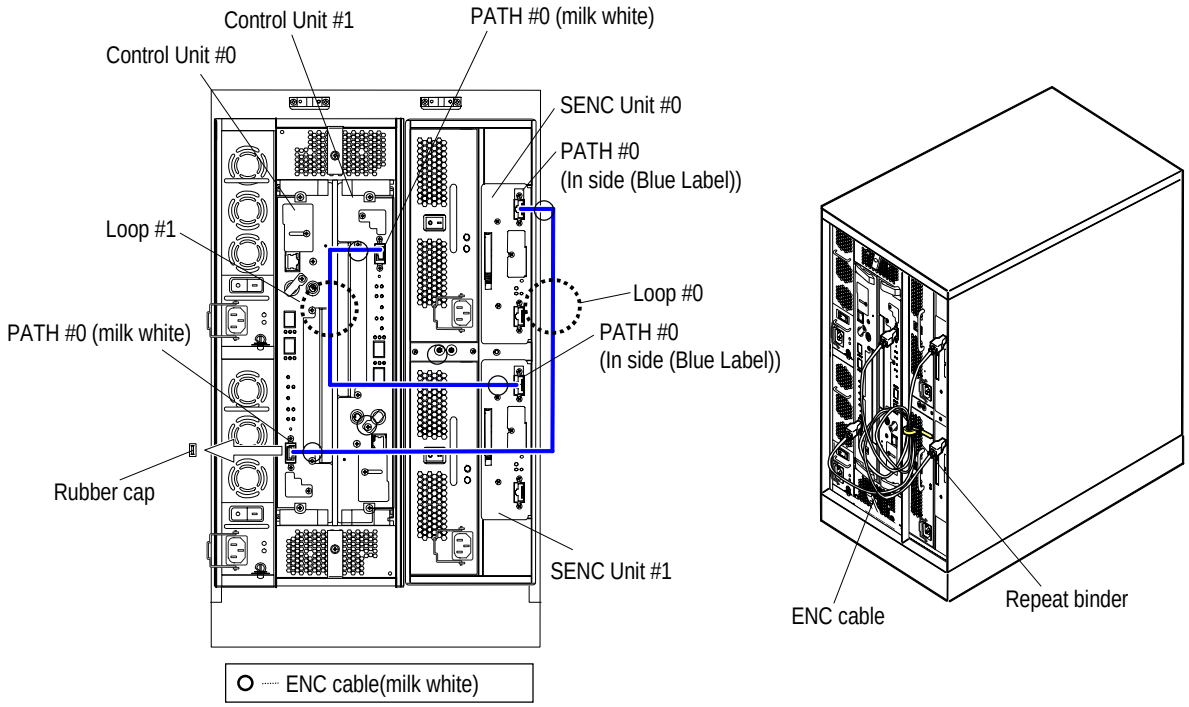


Figure 2.6.3 ENC Cable Connection (Floor (RKXS+RKAJAT+H2J) Model)

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2.6.3 Connecting power cables

(1) Connecting the power cables of Power Unit

CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : • Connect the power cable to the two systems, Power Unit #0 and Power Unit #1.
• Although the subsystem has a dual power-system, each Power Unit is required to have capacity for the whole subsystem to cope with one power-system failure. Accordingly the facility power source for each Power Unit is also required to have capacity for the whole subsystem.

(a) Make sure that all the Power Unit AC Power Unit switches are turned off.
(b) Connect the connectors (Power Unit side) of the power cables (white, yellow) to the receptacle of the Power Unit.
(c) Connect the power cable to the power outlet.

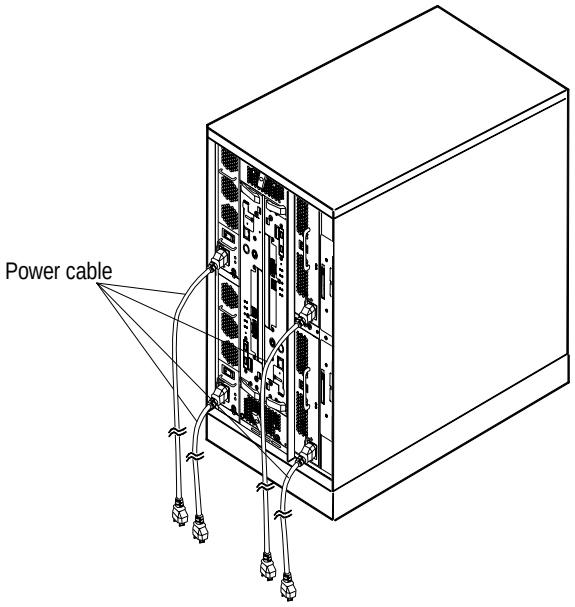


Figure 2.6.4 Power Cable Connection

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2.7 Installing Skirt

CAUTION

Do not put your hands at both ends of the skirt when installing the front skirt. The fingers and the like are pinched between the side skirts, and it causes the injury.

(1) Floor (RKM+H1J/RKS+H1J/RKXS+H2J) Model

(a) Install the side skirt (L) by inserting its hooks into rectangular holes on the cart and by sliding it.

(b) Install the side skirt (R) by inserting its hooks into rectangular holes on the cart and by sliding it.

(c) After both side skirts was installed, fit the duracon catch of the front skirt.

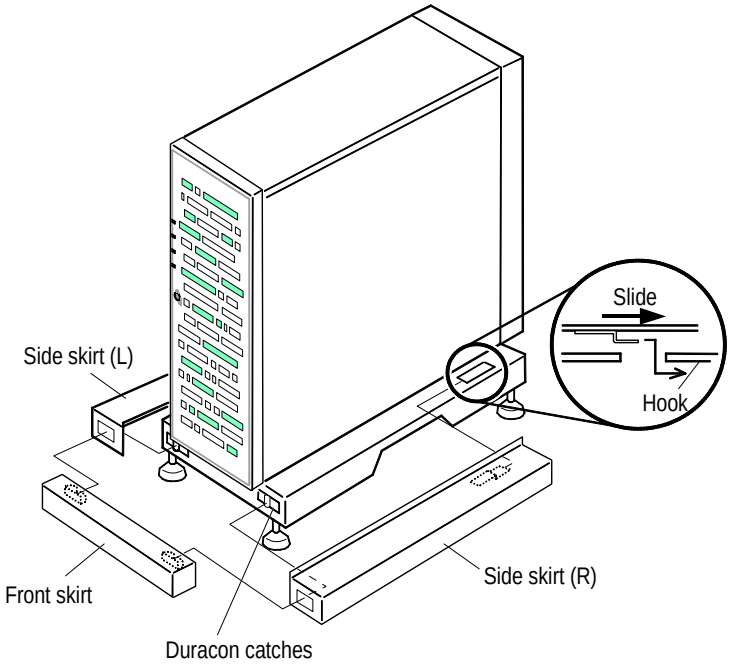


Figure 2.7.1 Installing Skirt

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(2) Floor (RKM/RKS+RKAJ+H2J, RKM/RKS+RKAJAT+H2J, RKXS+RKAJAT+H2J) model

(a) Install the side skirt (L) by inserting its hooks into rectangular holes on the cart and by sliding it.

(b) Install the side skirt (R) by inserting its hooks into rectangular holes on the cart and by sliding it.

(c) After both side skirts was installed, fit the duracon catch of the front skirt.

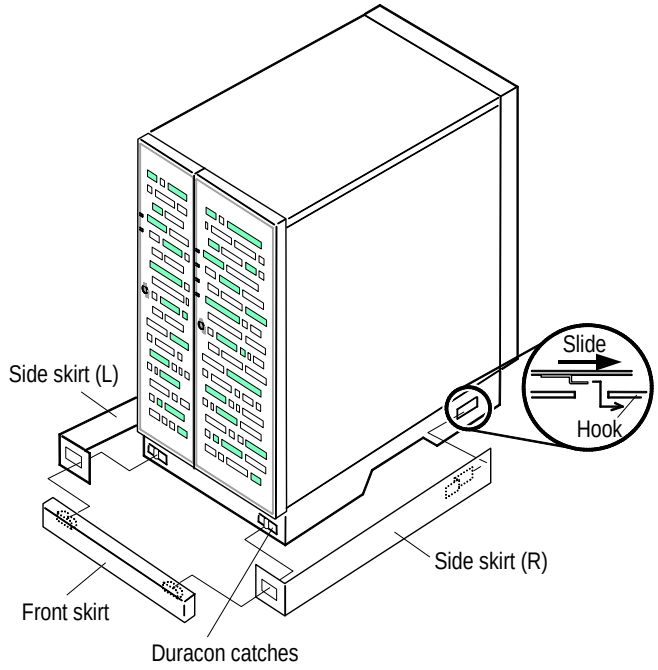


Figure 2.7.2 Installing Skirt

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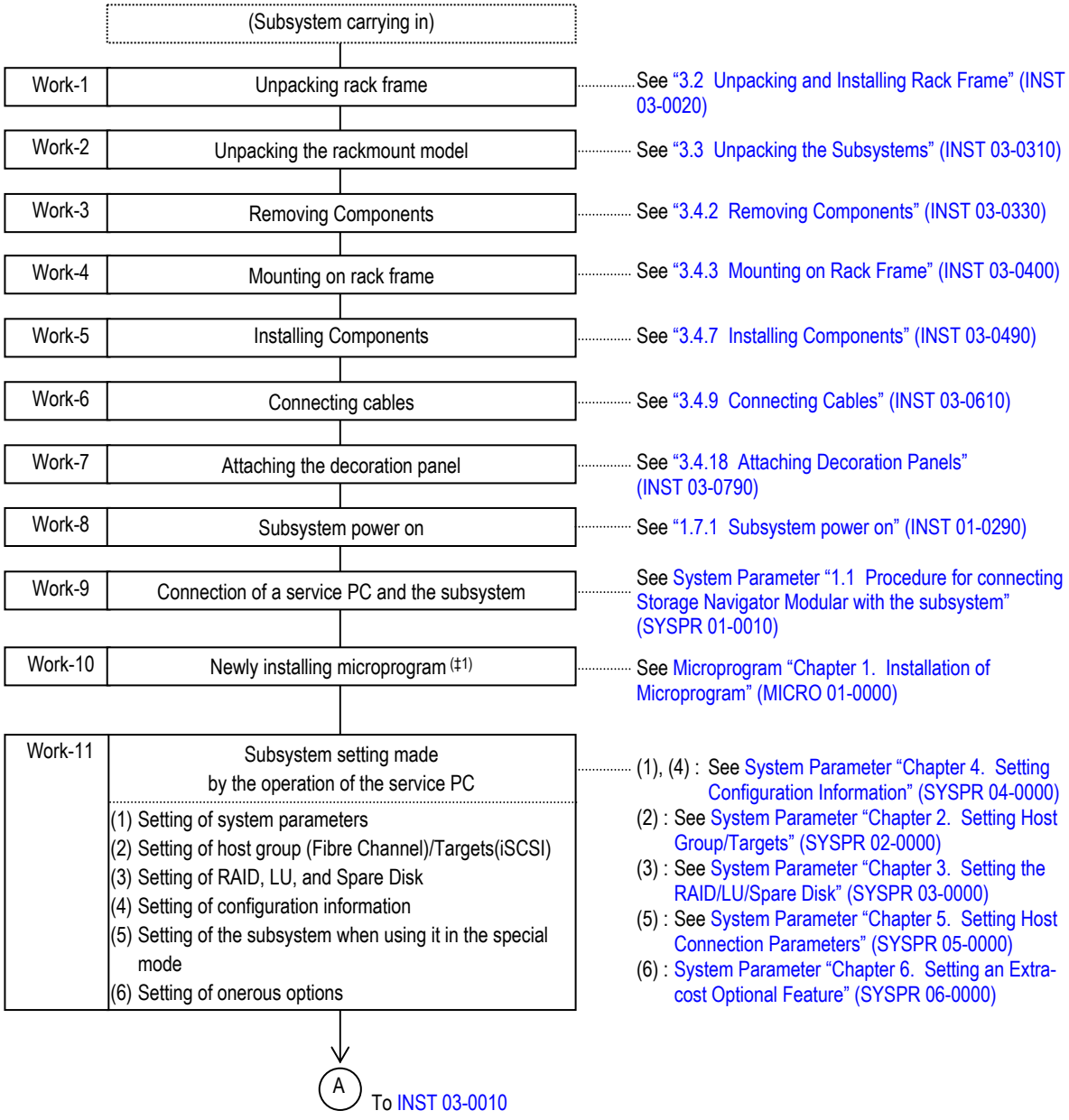
Chapter 3. Installing Rackmount Model

3.1 Procedures for Installing Rackmount Model

(1) Procedures for installation

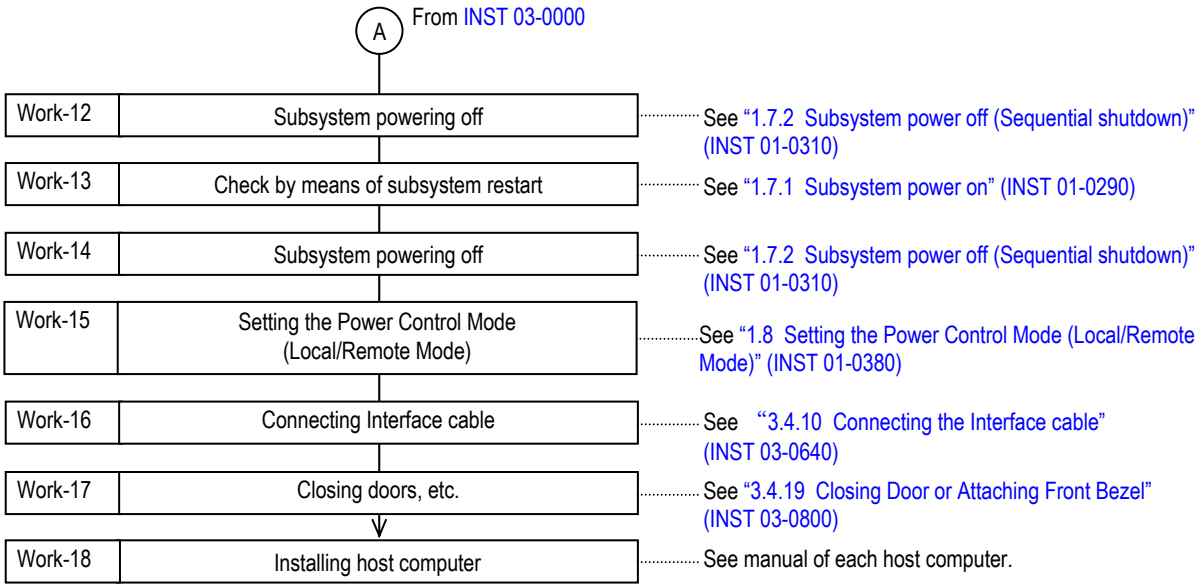
In the case of a new introduction or moving, perform the installation after making sure of the following necessary works.

(a) At the time of the Fibre Channel interface configuration, the system configuration of the iSCSI interface, or the system configuration of the Fibre Channel interface and the iSCSI interface



‡1 : Normally, microprograms are installed when the subsystem is shipped from the factory.

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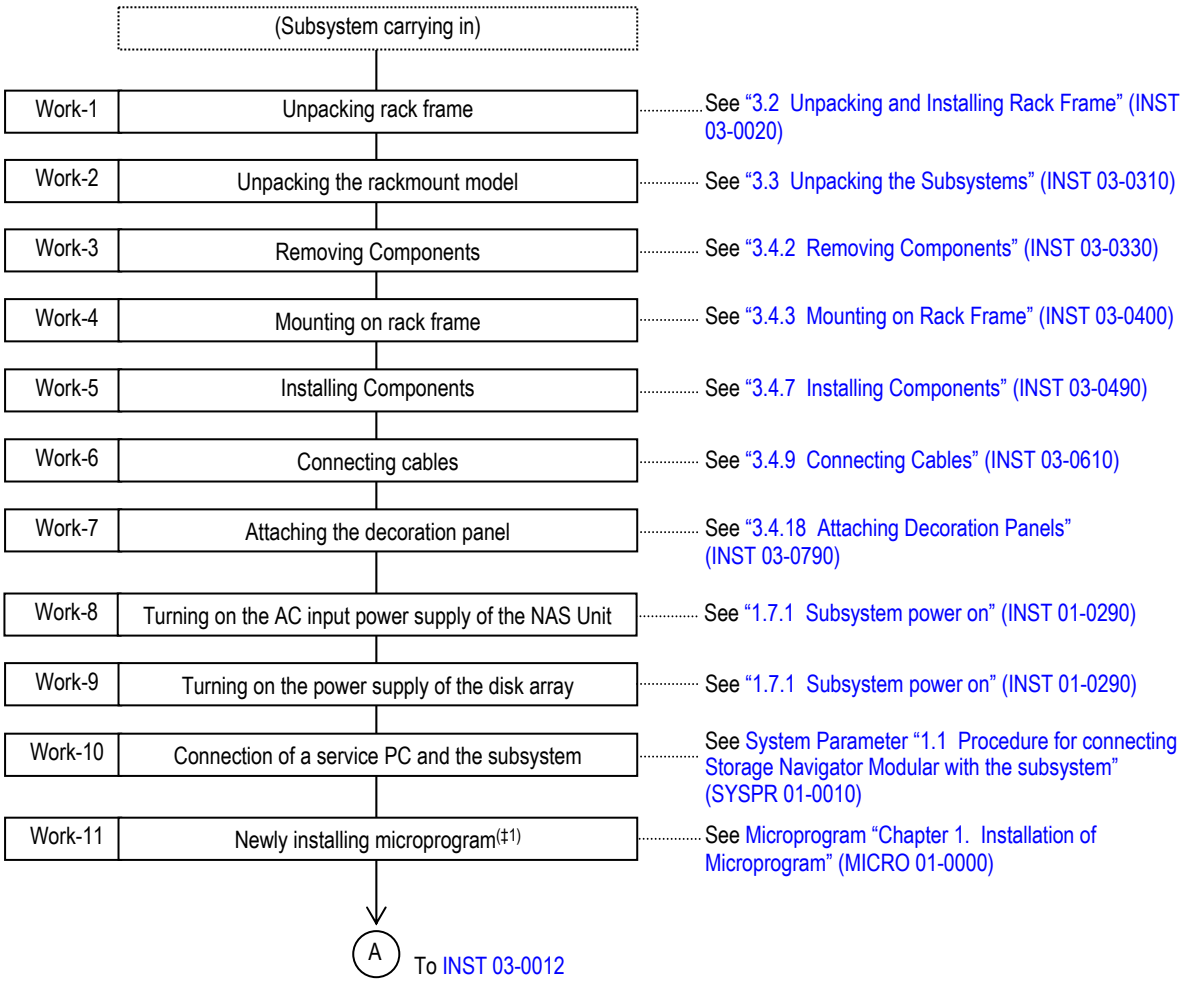
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(b) At the time of the system configuration of the NAS model

Perform a prior check necessary to construct the environment indispensable to the NAS model (hereafter, it is called the NAS Modular system). Refer to the DF700 NAS SOFTWARE Maintenance Manual "Chapter 2 NAS Modular System Device Explanation" (NAS 02-0000) for the details. Also, install a necessary tool peculiar to the NAS model in the maintenance PC used for the installation work of the NAS model and the maintenance work. Refer to the DF700 NAS SOFTWARE Maintenance Manual "8.1 Appendix A: Setting up an FTP Server on the Maintenance PC" (NAS 08-0000) for the details.

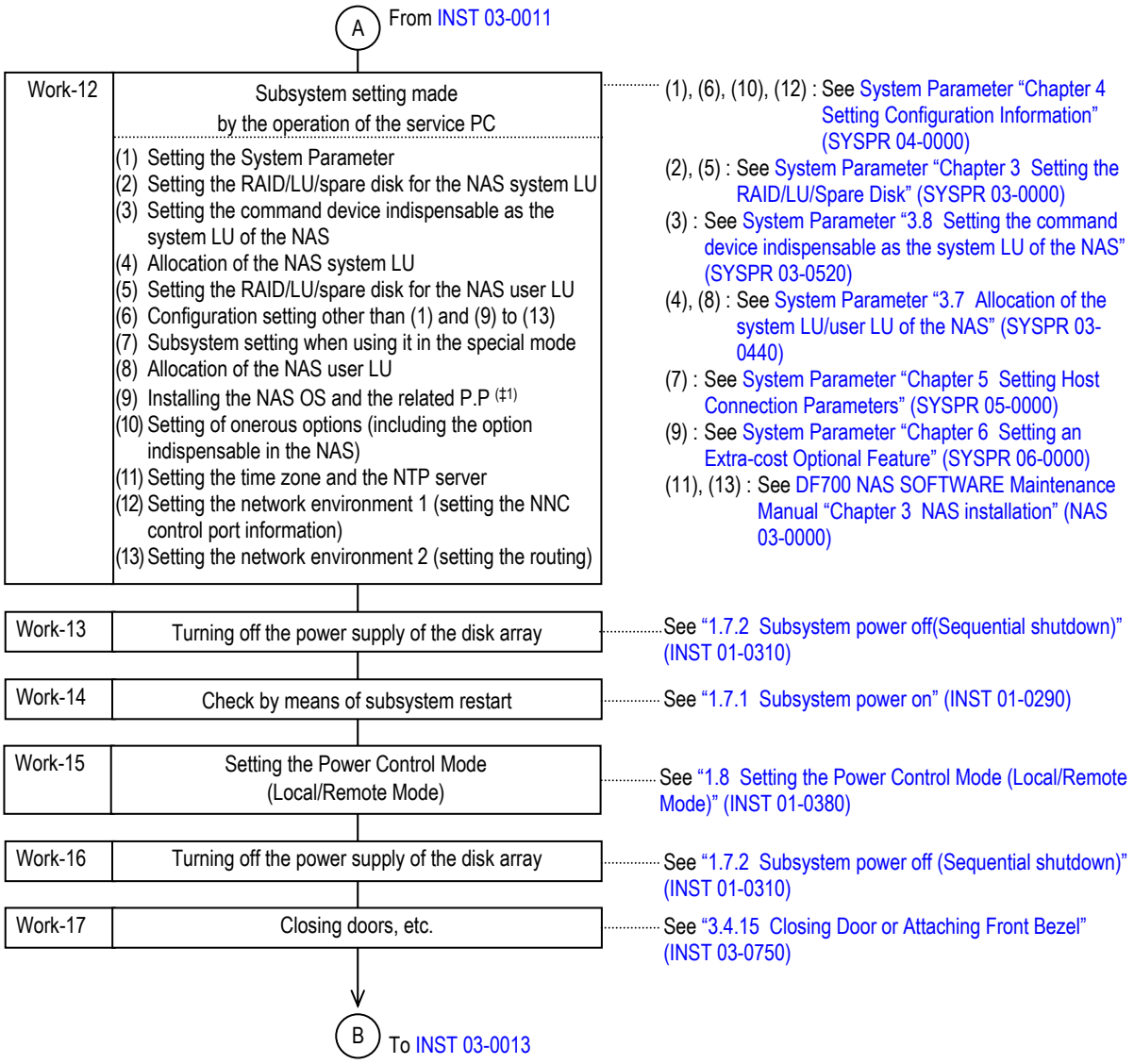
Perform the construction of the NAS Modular system in the following procedures.

Perform the Work (12) also in the procedures of (1) to (13).



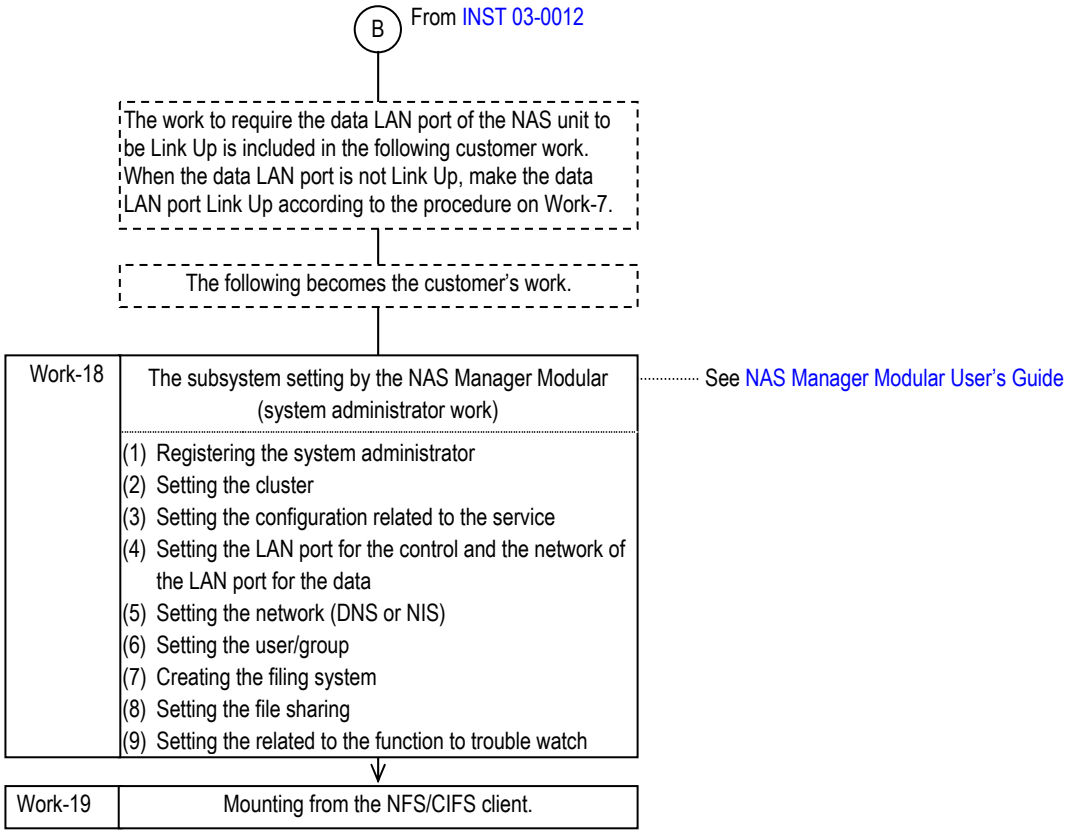
‡1 : The microprogram, the NAS OS and the NAS BIOS are usually installed at the time of shipment of the subsystem.

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‡1 : The microprogram, the NAS OS and the NAS BIOS are usually installed at the time of shipment of the subsystem.

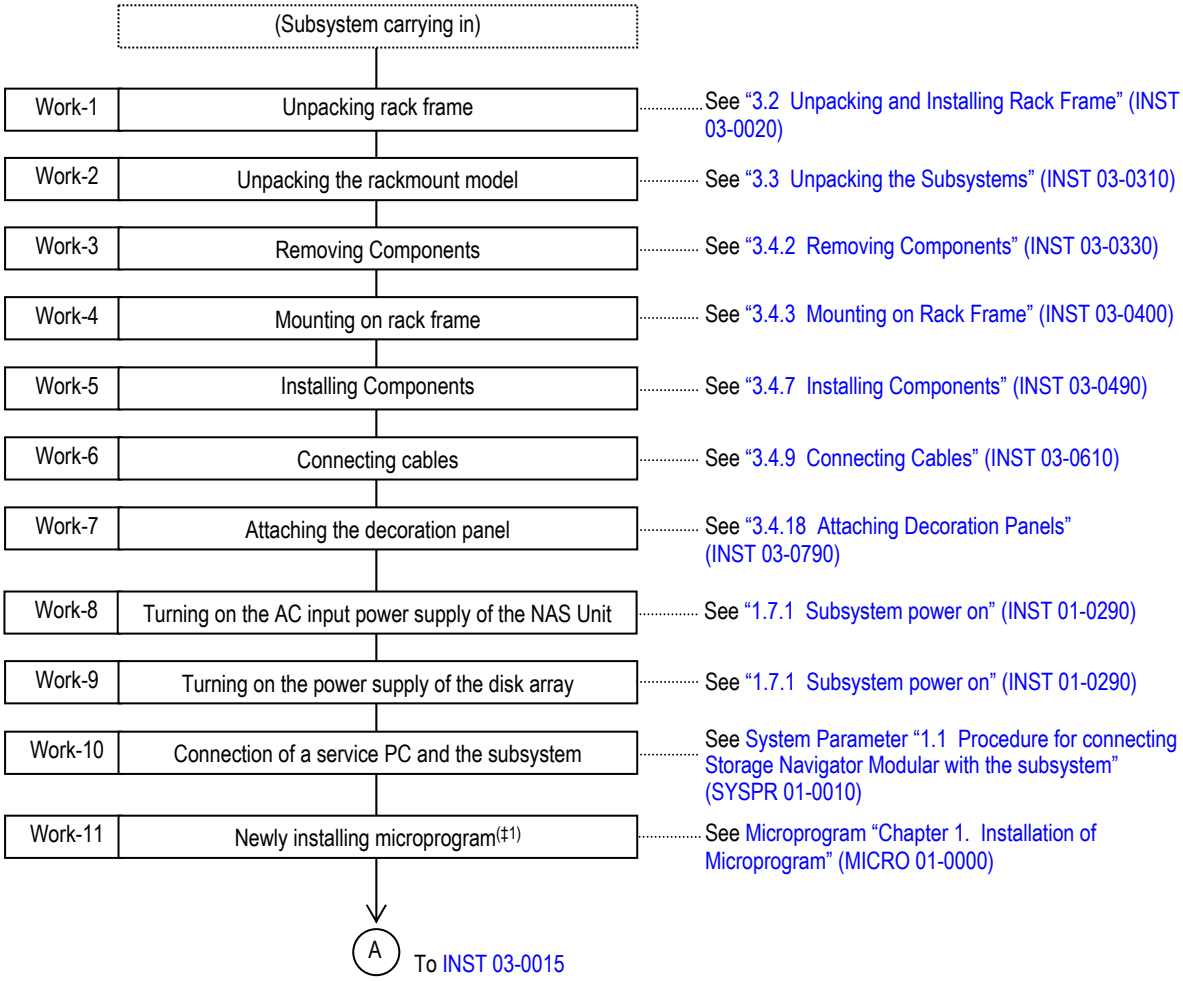
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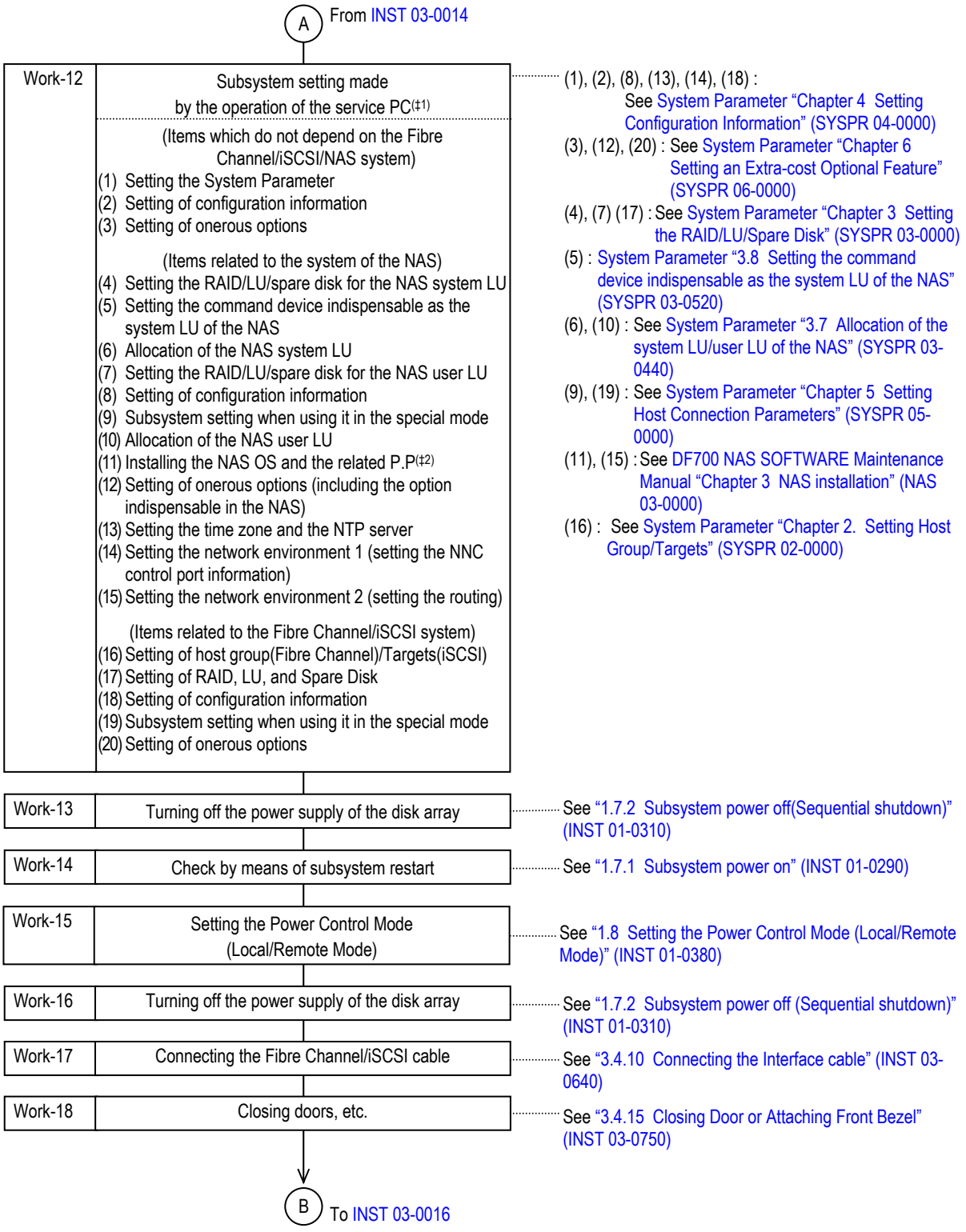
(c) At the time of the NAS system and the Fibre Channel interface configuration, or the NAS system and the iSCSI interface configuration

Perform a prior check necessary to construct the environment indispensable to the NAS model (hereafter, it is called the NAS Modular system). Refer to the DF700 NAS SOFTWARE Maintenance Manual "Chapter 2 NAS Modular System Device Explanation" (NAS 02-0000) for the details. Also, install a necessary tool peculiar to the NAS model in the maintenance PC used for the installation work of the NAS model and the maintenance work. Refer to the DF700 NAS SOFTWARE Maintenance Manual "8.1 Appendix A: Setting up an FTP Server on the Maintenance PC" (NAS 08-0000) for the details.



‡1 : The microprogram, the NAS OS and the NAS BIOS are usually installed at the time of shipment of the subsystem.

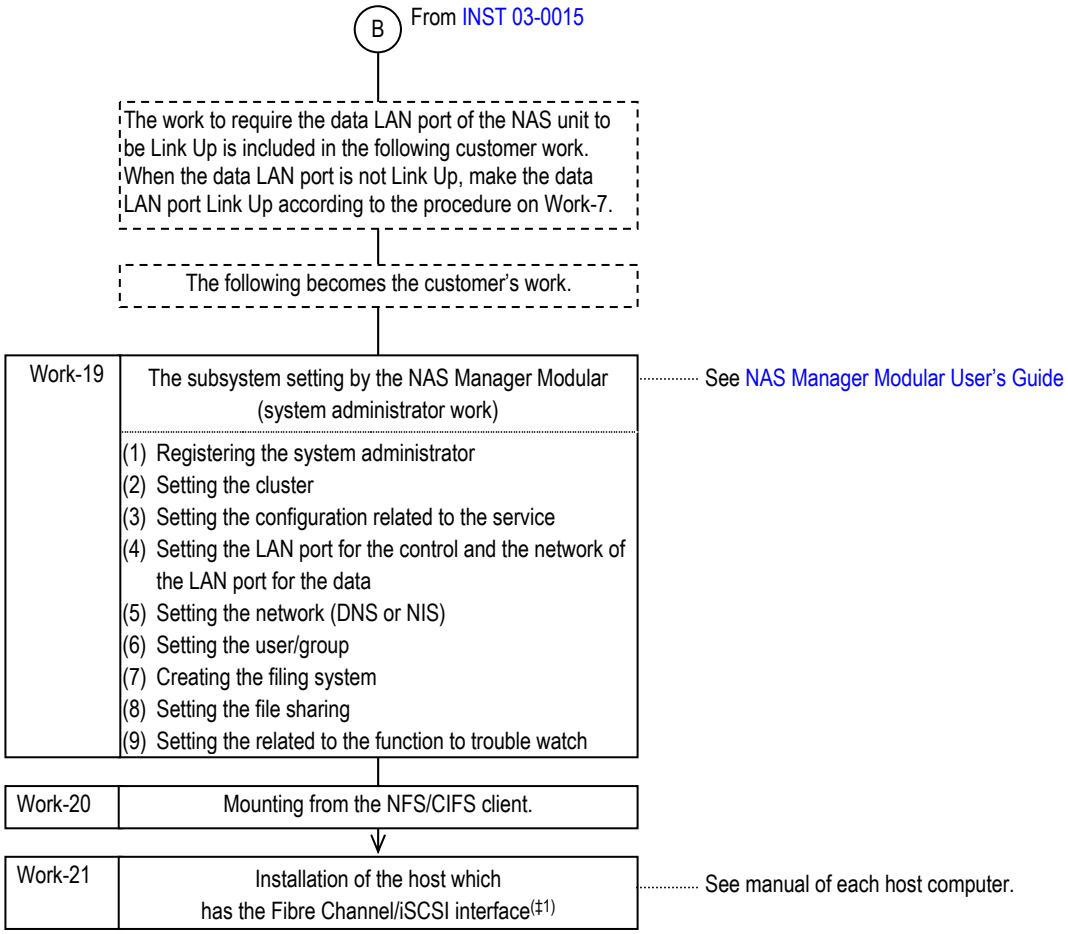
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‡1 : The settings of the items which do not depend on the Fibre Channel/iSCSI/NAS system, the items related to the system of the NAS and the items related to the Fibre Channel/iSCSI system are in no special order. The settings common to each item, such as the configuration setting, can be executed at the same time.

‡2 : The microprogram, the NAS OS and the NAS BIOS are usually installed at the time of shipment of the subsystem.

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‡1 : The installation of the host which has the Fibre Channel/iSCSI interface (Work-21) can be performed before the subsystem setting by the NAS Manager Modular (system administrator work) (Work-19).

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(2) Tools required

The following tools are required for the installation.

Table 3.1.1 Tools Required

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
	Phillips screwdriver	No.2	Installation of skirts and securing the subsystem.
	Slotted screwdriver	No.1	For Device ID Setting Switch
	Allen wrench	No.3	Securing of cable cramps
	Allen wrench	No.4	Securing of rail and connection of power cable.
	Allen wrench	No.6	Opening/closing of doors; removal of stabilizers
	Spanner	No.22	Adjustment of leveling bolts
Tool of other	Wrist band	–	Band for protecting the subsystem from the static electricity
	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended)

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3.2 Unpacking and Installing Rack Frame

3.2.1 U7 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas)

NOTE : When installing the rack rails in the rack frame that has already been in use, perform the installation works in Step "3.2.1 (11) Installing the rails" (INST 03-0100) and the following steps.

The exterior of the packed rack frame is shown in the "Figure 3.2.1 Packed Status of the U7 Rack Frame" (INST 03-0030).

Table 3.2.1 show optional parts required to install one subsystem.

As many kits as the subsystems to be mounted are required.

Table 3.2.1 Parts Required for Installation of DF-F700-URHT7

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3272150-1	1	For right hand side	—
2	Rail	3272150-2	1	For left hand side	—
3	Stopper	5528571-1	2	For securing the subsystems	—
4	Cage nut (M5)	5528564-1	12(*1)	For securing the rail, subsystems	—
5	Cage nut (M6)	5528564-3	3(*2)	Not used	—
6	Fastener	5510146-1	14(*1)	For securing the rail, subsystems	—
7	Bind screw (M4×8)	SB408N	8(*1)	For securing the stopper	—
8	Bind screw (M5×10)	SB510N	6(*1)	For securing the subsystems	—
9	Hexagon socket bolt (M5×20)	3261899-520	10(*1)	For securing the rail	—
10	Hexagon socket bolt (M6×12)	BS612N	3(*1)	For securing the subsystems	—
11	LL washer (M4)	5513553-433	6(*1)	For securing the stopper	—
12	LL washer (M5)	5513553-513	10(*1)	For securing the rail	—
13	Washer	5513554-6	3(*2)	Not used	—
14	Lock washer	5513569-6	3(*2)	Not used	—
15	Wire rope	5490846-1	2(*2)	Not used	—
16	Repeat binder (Cable)	5409042-3	3(*2)	Used to fix a slackened part of overlong cable	—
17	Cleat (Cable)	5409055-1	4(*1)	For securing the cable	—
18	Clamp (Fibre)	5511447-1	2	For securing the cable	—
19	Binder (Flat)	5409039-1	6	For securing the cable	—
20	Power cable	3272181-E	2	Power cable (900 mm)	—

*1 : 2 spares are included.

*2 : 1 spare is included.

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(1) Unpacking

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(a) Remove the external packaging and packing materials.
(b) Take the rack frame out of the polyethylene bag.
(c) Check all items provided with the U7 rack frame against the table below.

Table 3.2.2 Parts Required for Installation of DF-F700-U7(*1)

No.	Product name	Parts No.	Quantity	Comment
1	U7 rack frame	—	1	—
2	SKIRT (S)	3256549-A	1	For right hand side
3	SKIRT (S)	3256549-B	1	For left hand side
4	SKIRT (F)	3256547-A	1	—
5	SKIRT (R)	3256548-A	1	—
6	Bind screw (M4×8)	SB408	10	For securing the holder and skirt
7	Holder (R)	5507132-1	2	For right hand side
8	Holder (L)	5507132-2	2	For left hand side
9	AC power cable	—	4	—

*1 : Exclusive rack frame for mounting an subsystem(s).

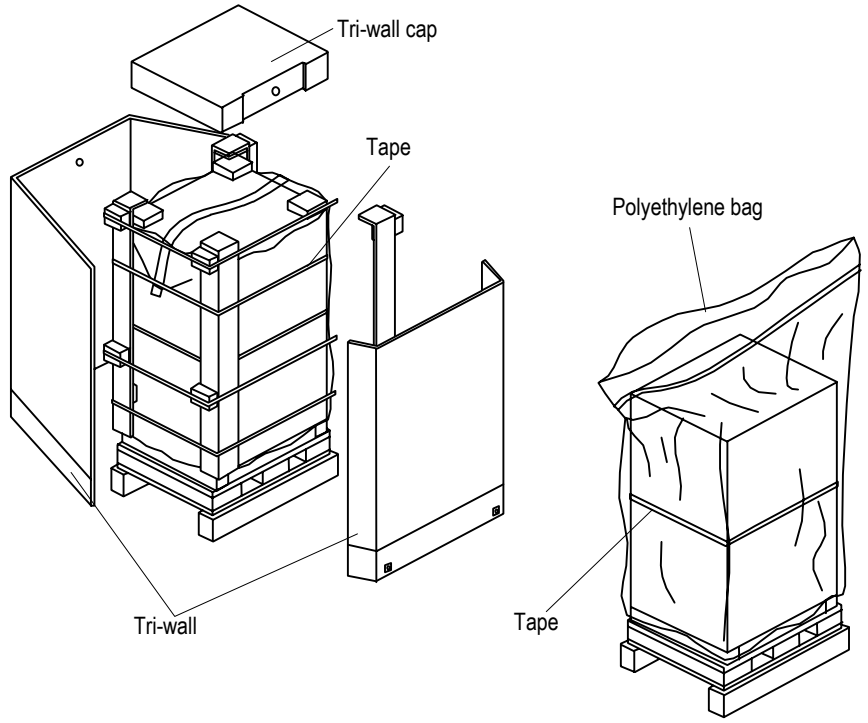


Figure 3.2.1 Packed Status of the U7 Rack Frame

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(2) Inspecting the subsystem visually

Check the exterior of the subsystem visually for distortion or damage owing to the transport.

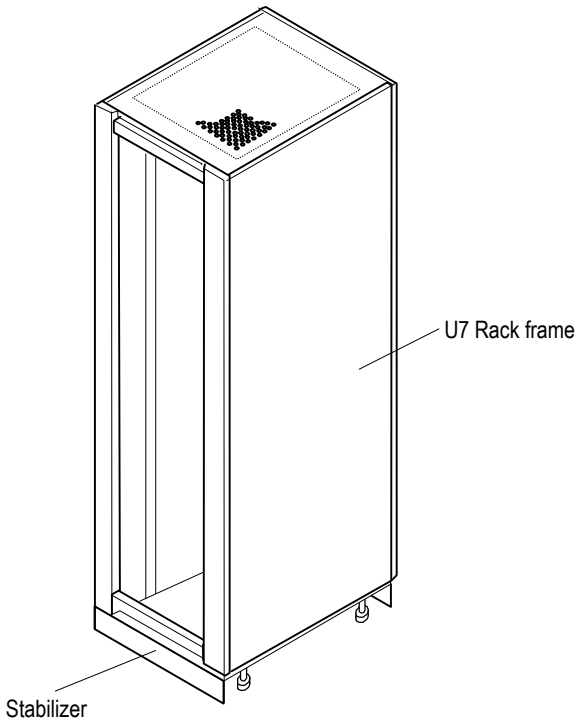


Figure 3.2.2 Exterior Rack Frame

(3) Checking contents of package

Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

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(4) Installation and maintenance areas

Figure 3.2.3 shows installation and maintenance areas for the DF-F600-U7 rack frame.

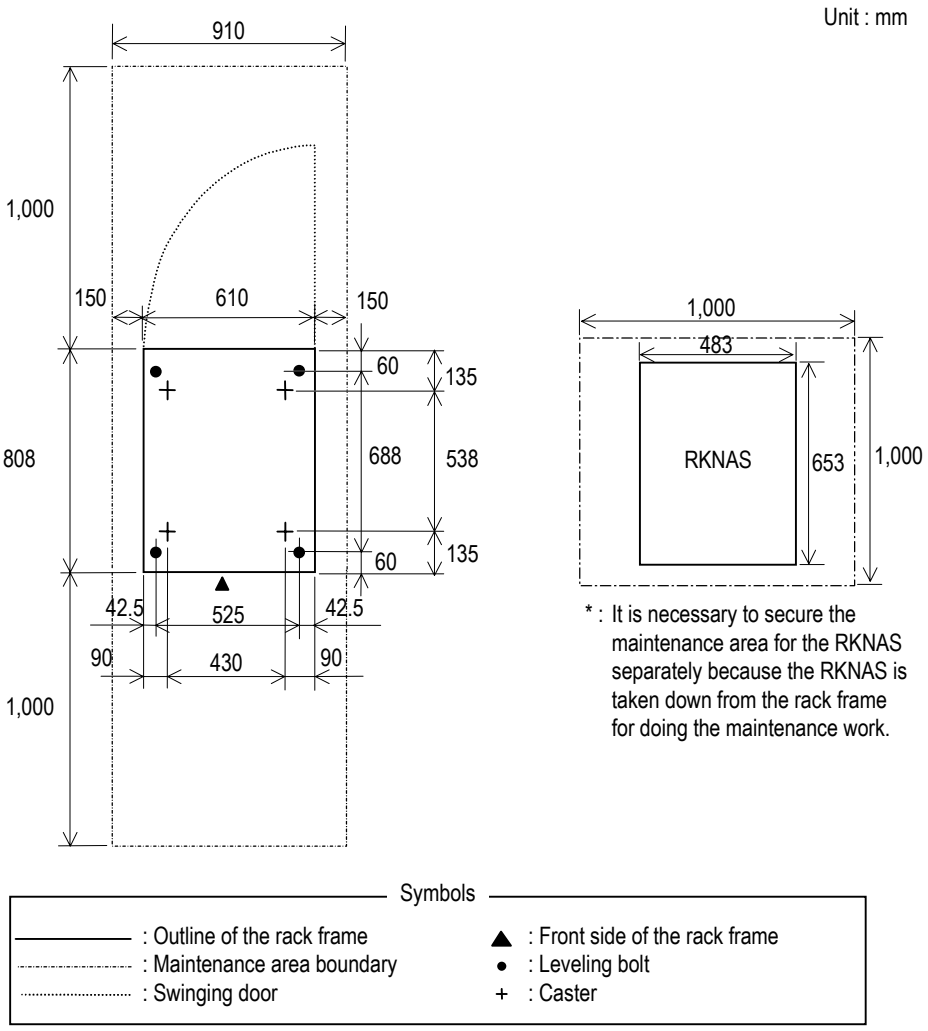


Figure 3.2.3 Installation and Maintenance Areas of Rack Frame

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(5) Move the unpacked subsystem to the site where it is to be installed.
When moving the subsystem, attach the stabilizers to prevent it from falling.

(6) Removing stabilizers
(a) Remove the allen bolt (M8×40) with an Allen wrench.
(b) Remove the stabilizers from subsystem.
Keep the removed allen bolt (M8×40) and stabilizers. (They will be necessary when the rack frame is moved again later.)

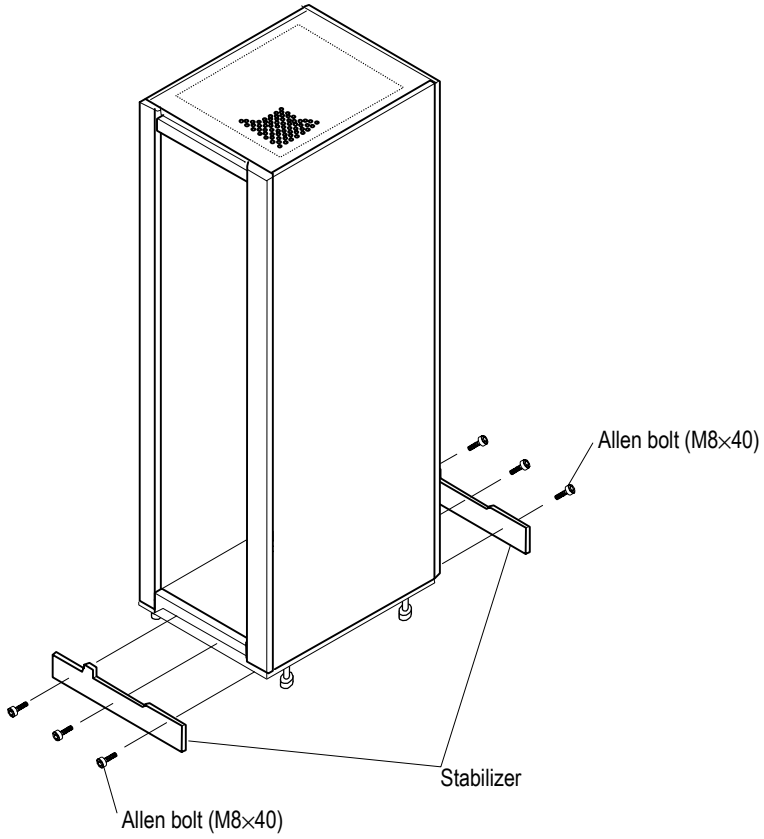


Figure 3.2.4 Removing the Stabilizers

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(7) Settling the rack frame

Settle the rack frame in the installation site by adjusting the leveling bolts.

(a) Turn the each leveling bolt in the direction shown by the arrow so that the clearance between the caster and the floor becomes about 2.5 mm.

(b) Adjust the leveling volts so that the tilts of the subsystem to the front or rear and left or right become 0 ± 2 mm.

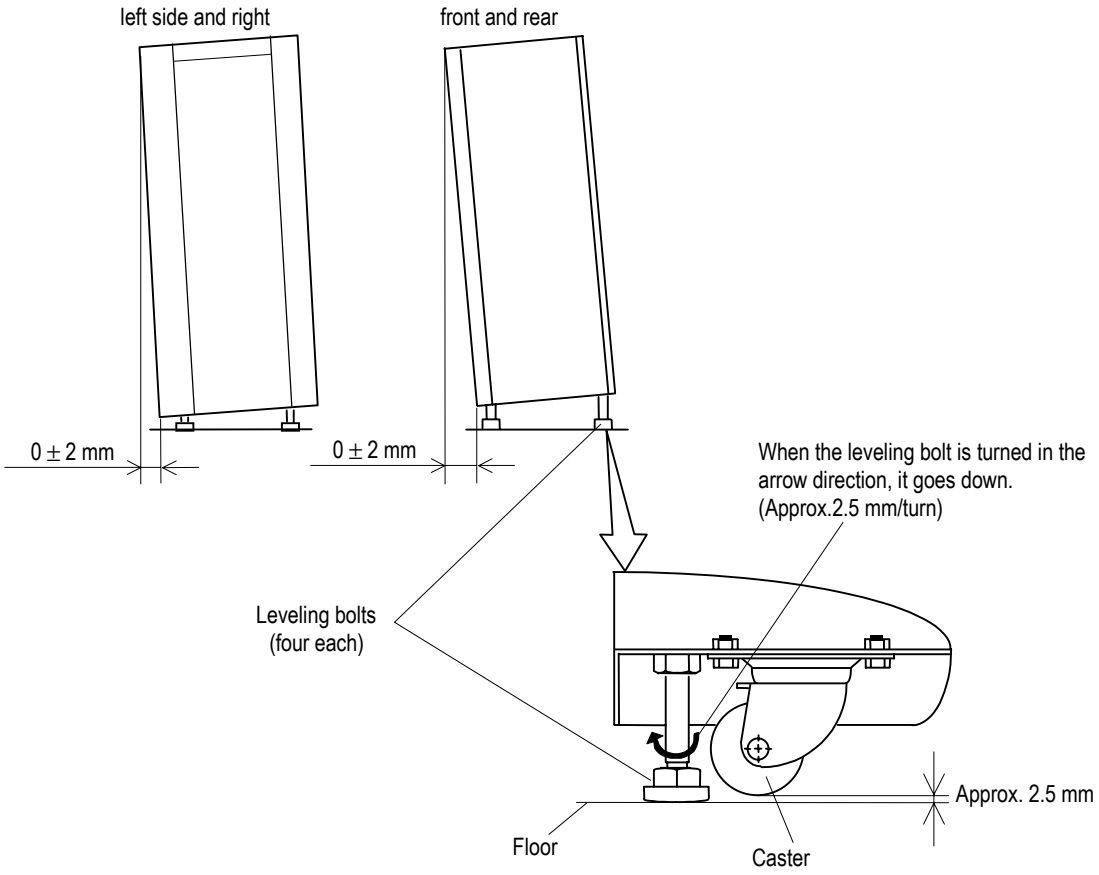


Figure 3.2.5 Adjusting Leveling Bolts

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(8) Installing the skirts

Make the bottom of the skirt contact the floor to prevent a trouble caused by an electrostatic discharge.

(a) Fasten the skirt bracket and skirt (F) with the binding screws.

(b) Fasten the holder to the lower part on the side with binding screws.

(c) Install the skirt (S)'s on the left and right sides of the subsystem.

To install the skirt (S), engage it with the holders of the frame by sliding it in the direction from rear to front.

(d) Fasten the skirt (S) with the binding screws.

(e) For wiring on the floor, pull out the plug of PDB before installing the skirt (R).

(f) For wiring on the floor, loosen two screws (M3×8) of the skirt (R), adjust the sliding section and pass the cable.

(g) Install the skirt (R) by fitting its claws into the rectangular holes on the skirt (S).

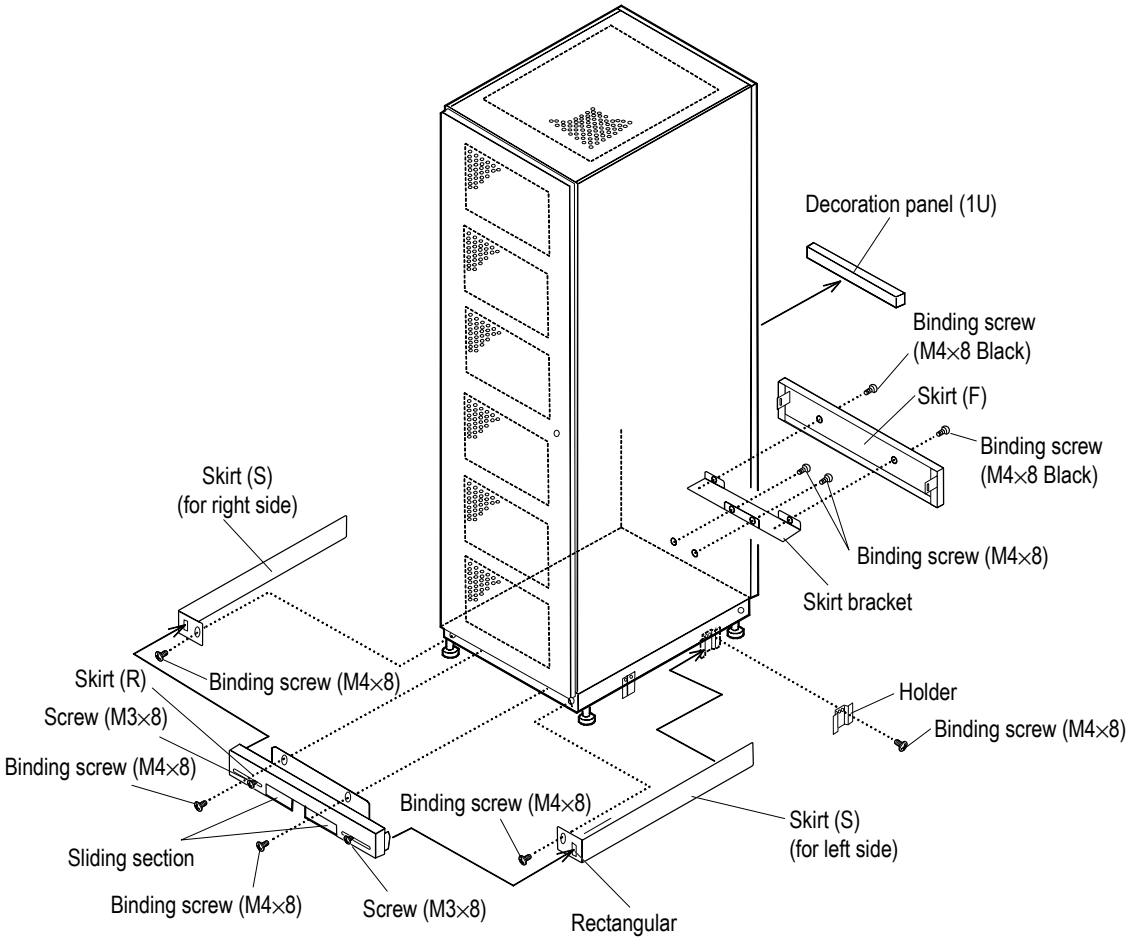


Figure 3.2.6 Installing Skirts and Removing Decoration Panel(s)

(9) Removing the decoration panels (1 U)

When the decorative panels have been attached, it is necessary to remove the one(s) attached to the location(s) where the subsystem(s) is to be mounted.

(a) Pull the decorative panel toward you.

(b) The decorative panel will be come off.

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(10) Removing the protection paper

(a) Open the rear door.

(Refer to "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)

(b) Remove the protection paper which covers the Rear door.

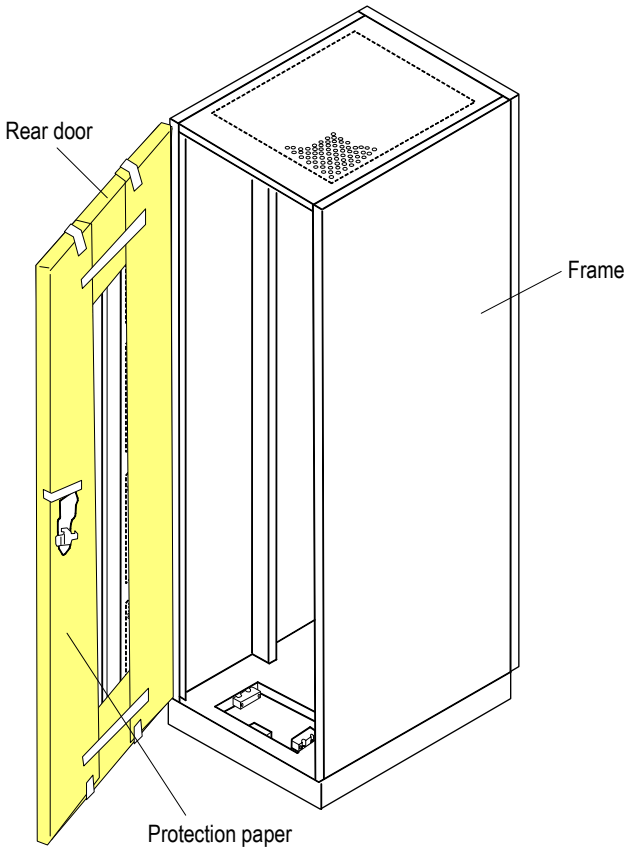


Figure 3.2.6.1 Removing the protection paper

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(11) Installing the rails

If the rails have already been installed, this installation is not required.

For the components list, see "Table 3.1.1 Tools Required" (INST 03-0014).

EIA units and intervals of mounting holes of 19-inch rack frame conforming to EIA standard

- A unit (U) space conforming to EIA standard is 19 inches wide and 44.5mm high as shown in the figure below.
- The boundary of the unit falls on the middle of the interval of 12.7mm.
- When the unit space is shifted by 0.5 units, the unit boundary is shifted from the normal position by 22.2mm.

For the U7 rack frame

Wide intervals: Repeat of 44.45mm (31.75mm + 12.7mm)

Maximum number of mountable unit spaces: 38

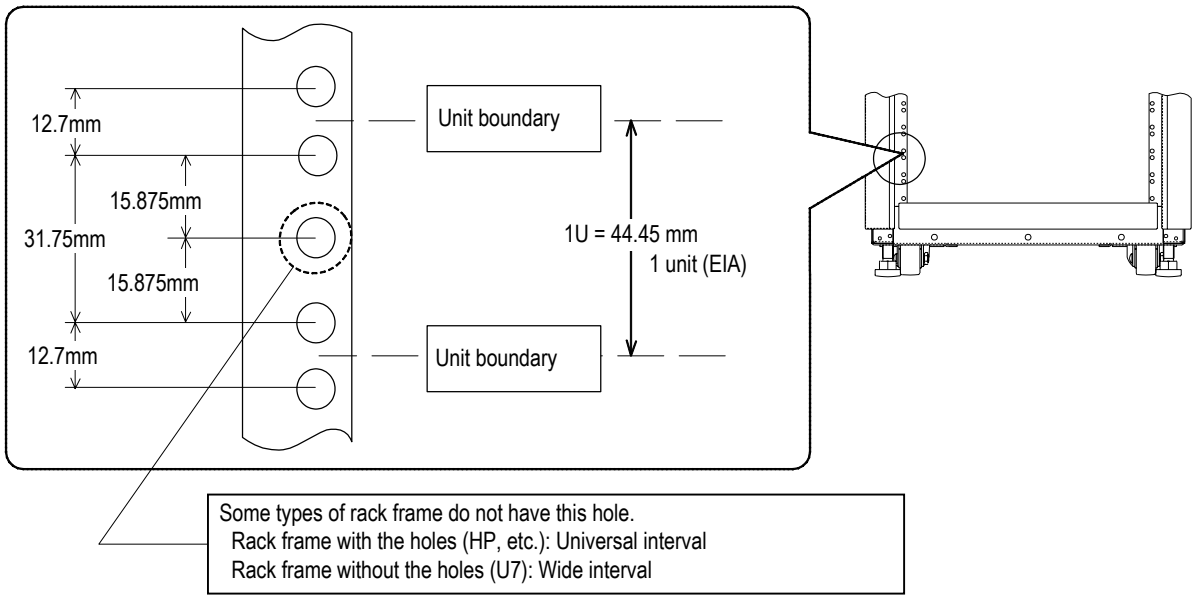
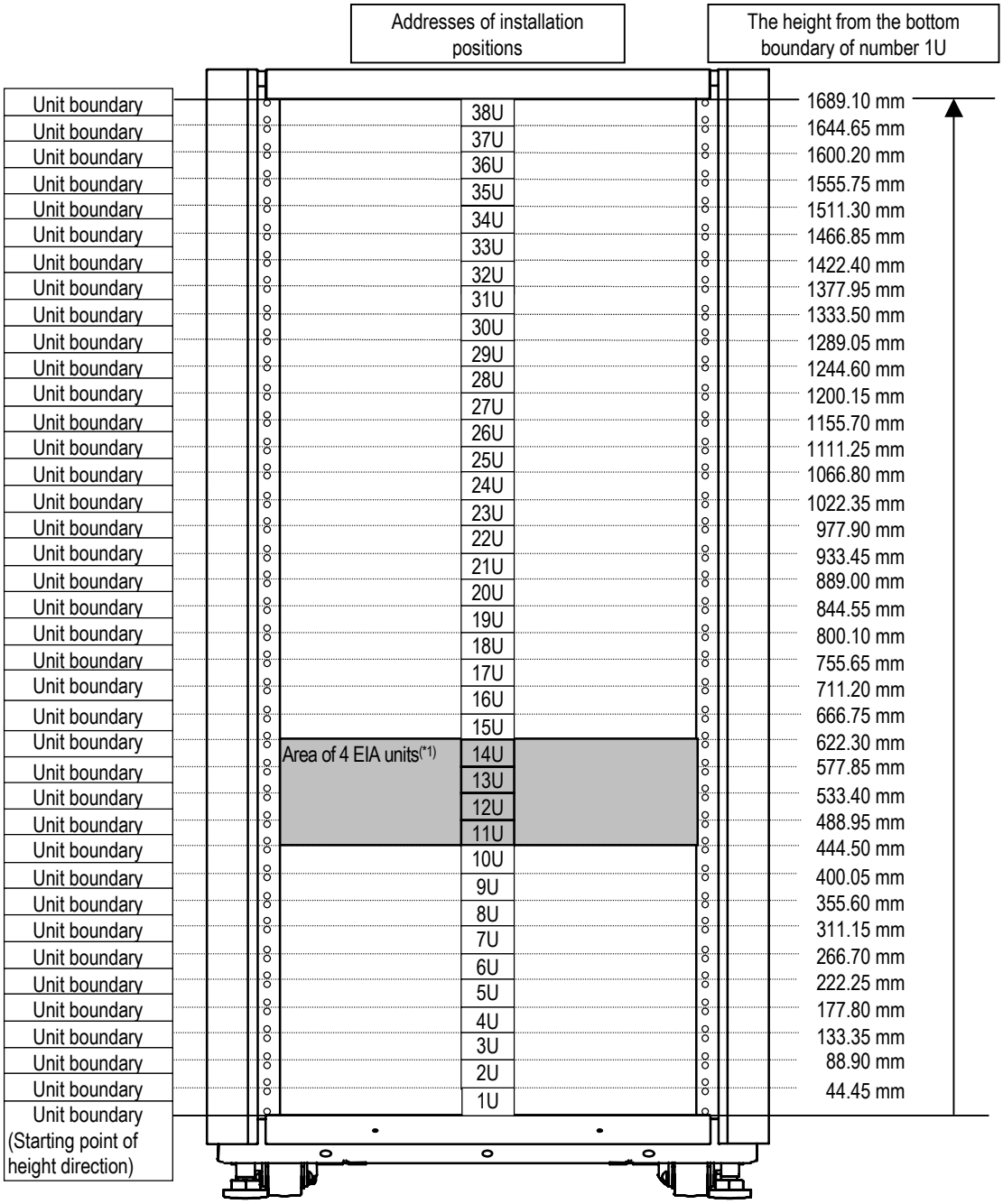


Figure 3.2.7 Attachment Hole Size of Rack

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The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame. In the case of the U7 rack frame, you must count the holes to know the address because no number is marked on the rack frame.
The following figure illustrates the whole layout of addresses of installation positions in the U7 rack frame.
There are 38 addresses, that is, the 1U to 38U counted in the vertical direction starting from the lower boundary of the 1U (the lowest unit).

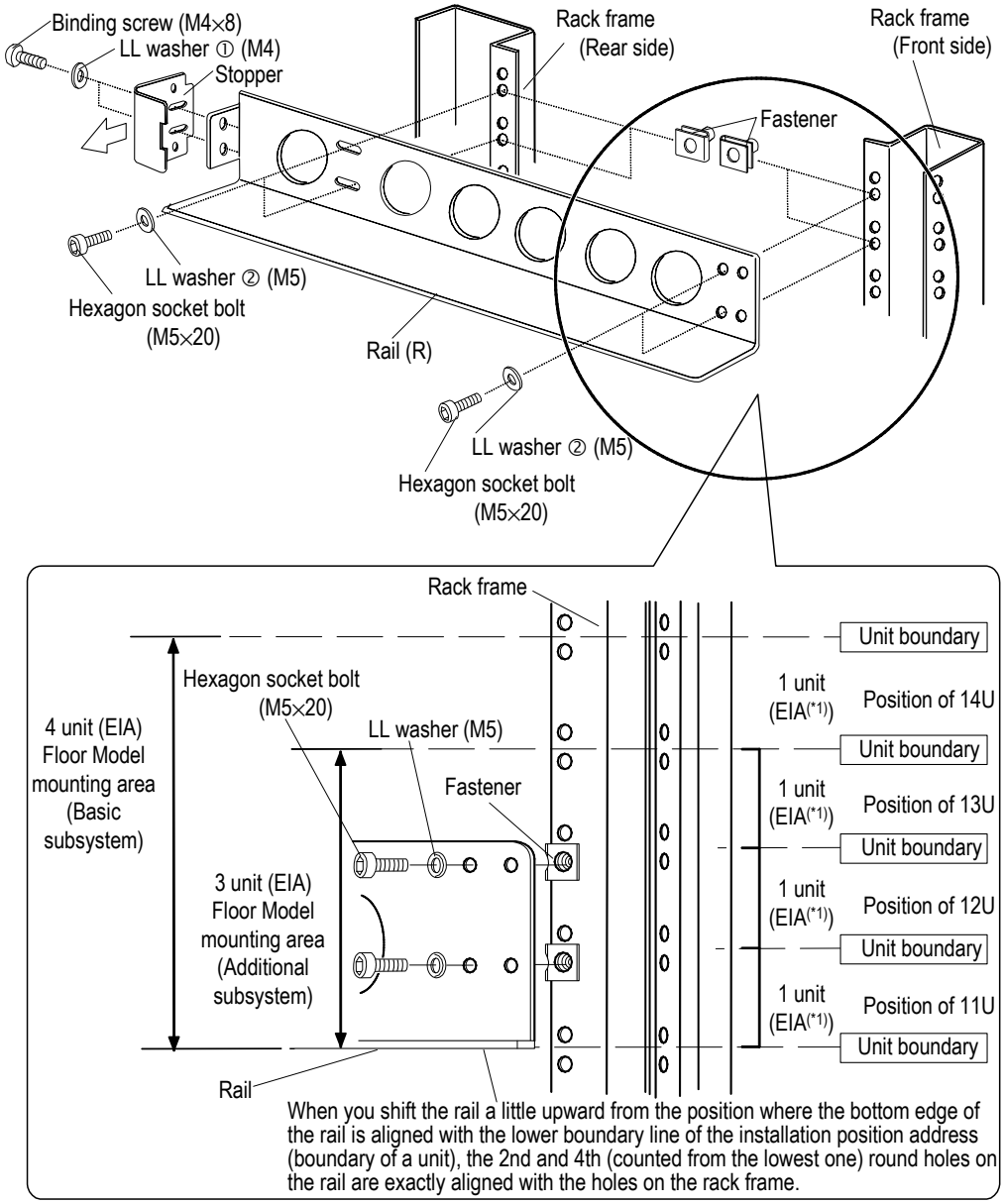


*1 : The grayed are shows a layout of an area for installing the subsystem at the 11U

Figure 3.2.8 Whole Layout of Installation Position Addresses

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(a) Slide the stopper in the direction shown by the arrow and temporarily fix it to the Rail (R) using the binding screws and LL washers ① (M4 (at two places.)).
For the installation position address, see Figure 3.2.8.
(b) On the right side of the installation location in the rack frame, align the round holes of the Rail (R) with those of the rack frame and insert the fasteners (at four places in total in front and rear.).
(c) Fasten the Rail (R) to the rack frame using the hexagon socket bolts and LL washers ② (M5 (at two places each on the front and rear sides.)).
(d) Install the Rail (L) to the rack frame in the same way.



*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.9 Installation of Rails to the Rack frame and Installation Positions

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(12) Installing fasteners on the front side of the rack frame

Install the fasteners on the front side of the rack frame in order to fasten the subsystems to be mounted on the rack frame.

(a) Fit the two fasteners to each of the right and left beams on the front side of the rack frame referring to Figures 3.2.10 and 3.2.11.

Install the mounting fasteners at the 2nd and 5th (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) round holes.

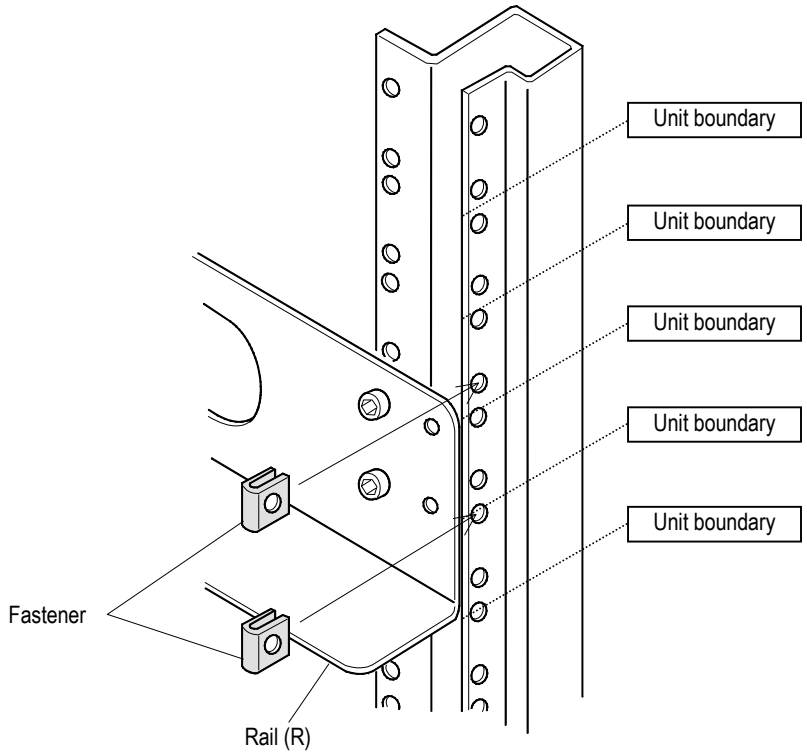


Figure 3.2.10 Installing Fasteners on the Front Side of the Rack Frame

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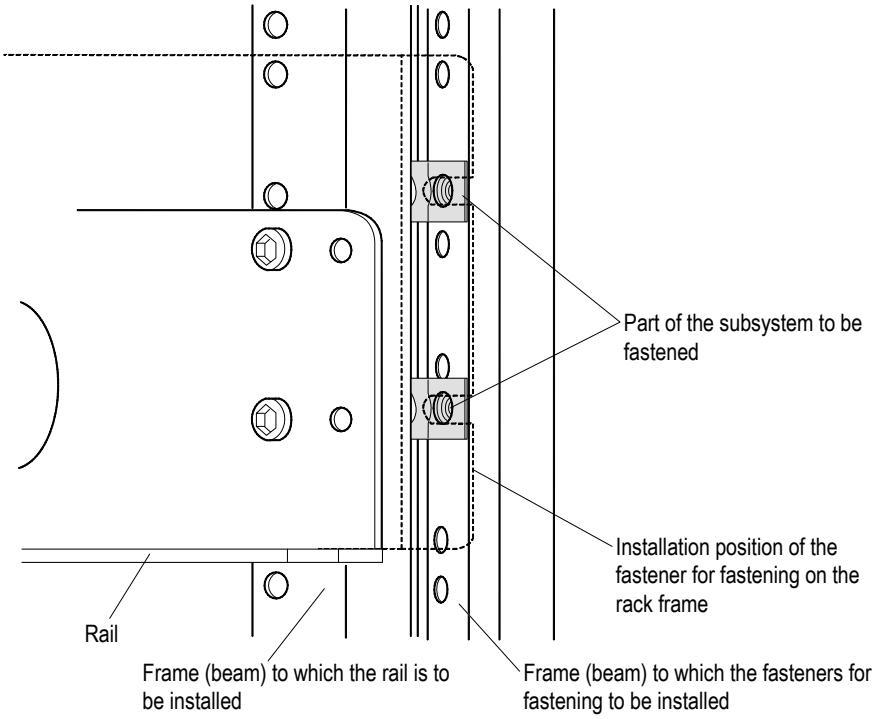


Figure 3.2.11 Installation Positions of Fasteners and Relation with Rails

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3.2.2 HP Rack Frame

The DF700 can be mounted on the HP rack frame by installing the rack rails for Hitachi common rack frame (DF-F700-UR7) which are accessory parts.
Installation procedure for the case where the HP rack frame with the rack rails HP rack frame (HP model name: J1501A) are used is shown below.

The exterior of the packed rack frame is shown in the Figure 3.2.22.
Table 3.2.3 show optional parts required to install one subsystem.
As many kits as the subsystems to be mounted are required.

Table 3.2.3 Parts Required for Installation of DF-F700-UR7 (Rev.B or C)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front rail	3272207-1	1	For left hand side	–
2	Front rail	3272207-2	1	For right hand side	–
3	Rear rail	3272208-1	2	For left/right commonness	–
4	Stopper	5528618-1	2	For securing the subsystems	–
5	Spacer	5528619-1	2	For securing the rail (For U4J)	–
6	Bind screw (M5×10)	SB510N	18	For securing the subsystems, rail (2 spares are included.)	–
7	Bind screw (M4×6)	SB406N	14	For securing the rail (2 spares are included.)	–
8	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	–
9	19"PART (nickel plated)	5528564-1	10	For securing the cage nut, subsystems, rail (2 spares are included.)	Not used
10	Rack nut	5510146-1	14	For securing the subsystems, rail (6 spares are included.)	–
11	Hexagon Socket Head Bolts	5503443-1	10	For securing the rail (2 spares are included.)	Not used
12	LL washer	5513553-513	10	For securing the rail (2 spares are included.)	Not used
13	Repeat binder (Cable)	5409042-1	3	For securing cables on the subsystem (1 spare is included.)	–

(1) Appearance of HP rack frame
Figure 3.2.12 shows appearance of the HP rack frame.

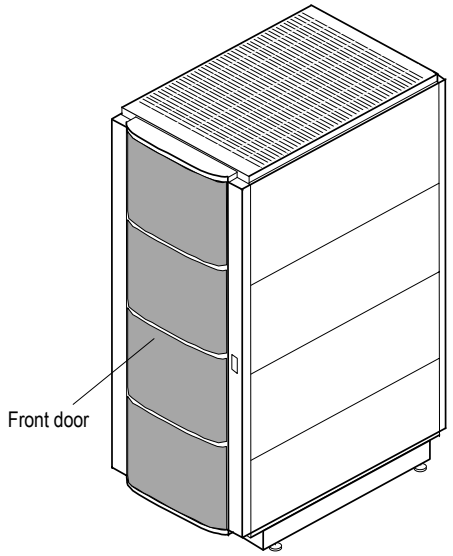


Figure 3.2.12 Appearance of Rack Frame (HP Model Name: J1501A)

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(2) Installing the rails

If the rails have already been installed, this installation is not required.

For the components list, see "Table 3.2.3 Parts Required for Installation of DF-F700-UR7 (Rev.B or C)" (INST 03-0150).

EIA units and intervals of mounting holes of 19-inch rack frame conforming to EIA standard

- A unit (U) space conforming to EIA standard is 19 inches wide and 44.5 mm high as shown in the figure below.
- The boundary of the unit falls on the middle of the interval of 12.7 mm.
- When the unit space is shifted by 0.5 units, the unit boundary is shifted from the normal position by 22.2 mm.

For the HP rack frame

Universal intervals: Repeat of 44.45 mm (15.875 mm + 15.875 mm + 12.7 mm)

Maximum number of mountable unit spaces: 32

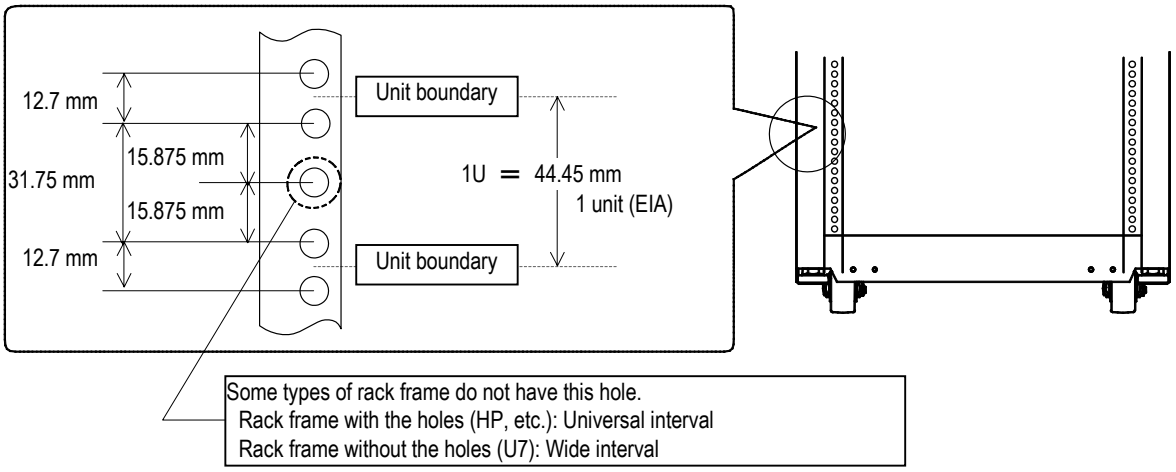
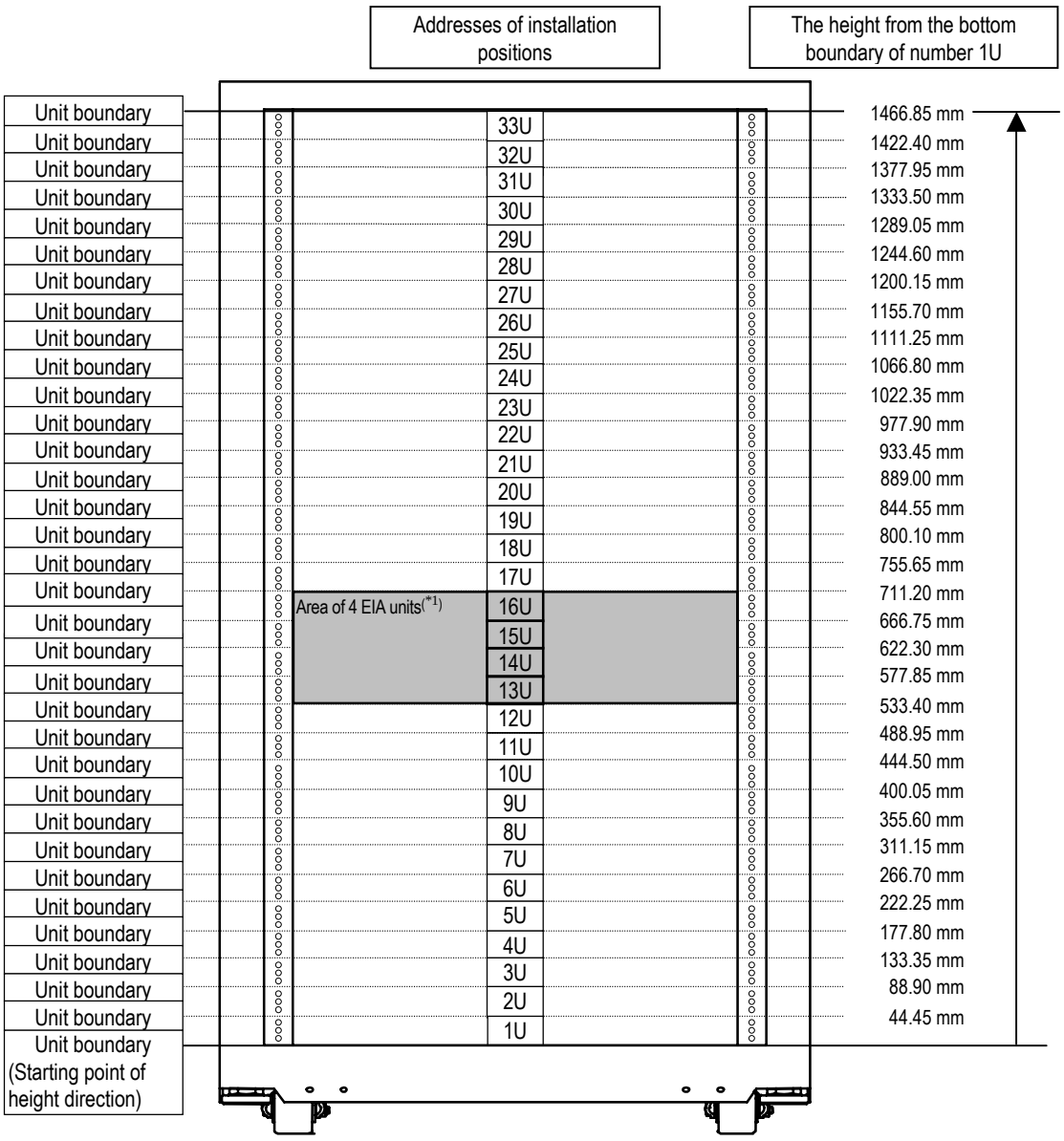


Figure 3.2.13 Attachment Hole Size of Rack

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Addresses within the rack frame are called (EIA) unit numbers.
The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame.

NOTE : When the HP rack frame has front door, mount the subsystem leaving a space with a height of 1unit (EIA) unit or more from the bottom of the rack frame.



*1 : The grayed are ▭ shows a layout of an area for installing the Basic subsystem at the 11U

Figure 3.2.14 Whole Layout of Installation Position Addresses (HP)

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Install the rack rail to the rack frame referring to Figure 3.2.15 - Figure 3.2.17.

(a) Installing the spacer

Install the spacer (there is no vertical distinction) to fix the rail to the front side of the rack frame. (One right and left place for each)

Fasten the 2nd and 8th holes counted upward from the unit boundary of the subsystem installation position and the screw holes at both ends of the space with the binding screws (M5 x 10) from the rear side of the frame.

(b) Remove the rail fixing screws (M4 x 6) of the factory setting.

(c) Fix the places, where the screw holes of the front rail and those of the rear rail are matched, temporarily with the binding screws (M4 x 6 (six places)) (fix at least four places, temporarily).

(d) Install the rack nuts at the 4th and 6th positions counted from the unit boundary of the subsystem installation position of the rear side of the rack frame.

(e) Fasten the holes at two places near the center of the front side of the front rail and the screw holes of the spacer with the binding screws (M5 x 10).

(f) Fasten the rear side of the rear rail and the rack nuts of (d) with the binding screws (M5 x 10).

(g) Fasten the binding screws (M4 x 6) which were temporarily fixed in (c).

(h) Install the rack nuts in the holes at the sheet metal folding part of the front rail (two places).

(i) Perform the above-mentioned installation for the right and left of the rack frame.

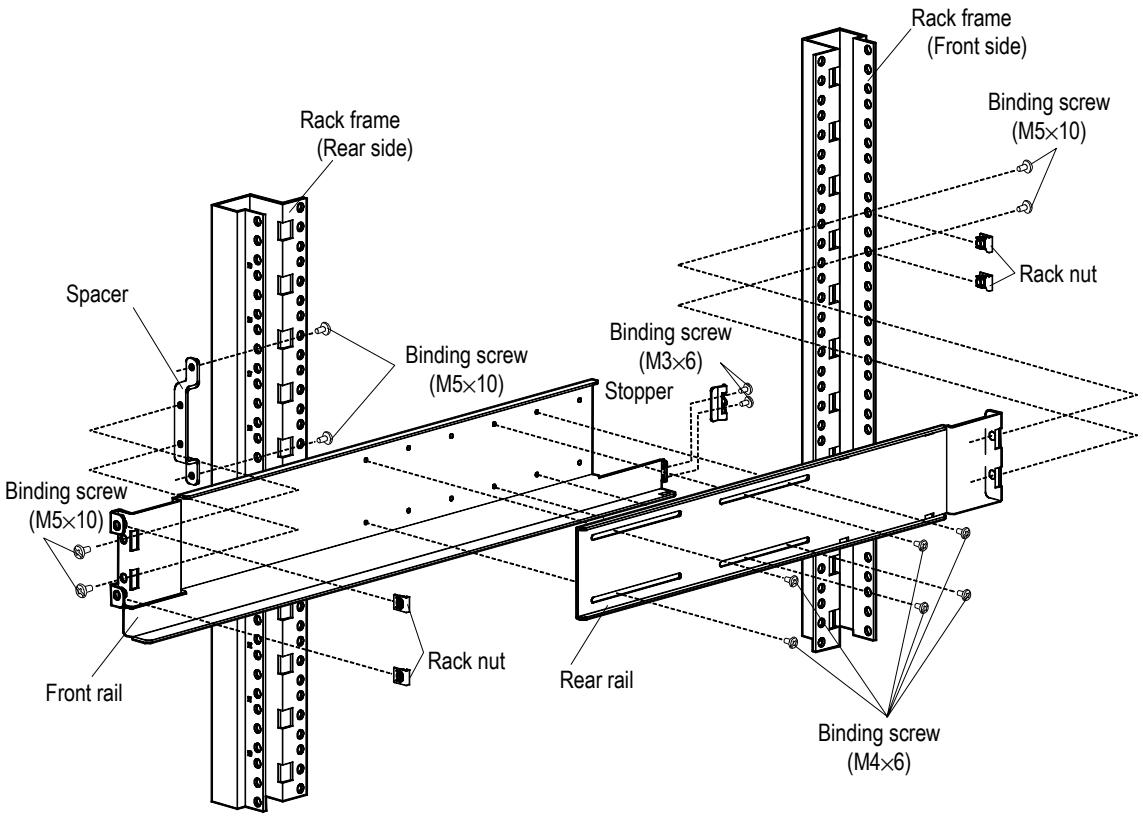
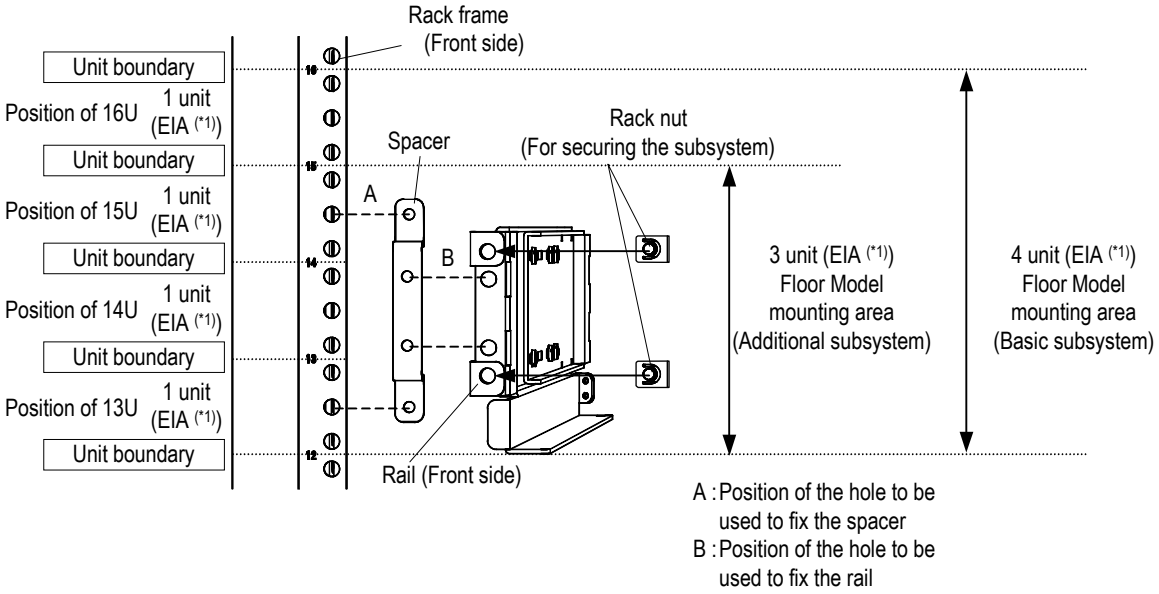


Figure 3.2.15 Installation of Rails to the Rack frame

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*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.16 Location of installing the rail on the front side of the Rack frame

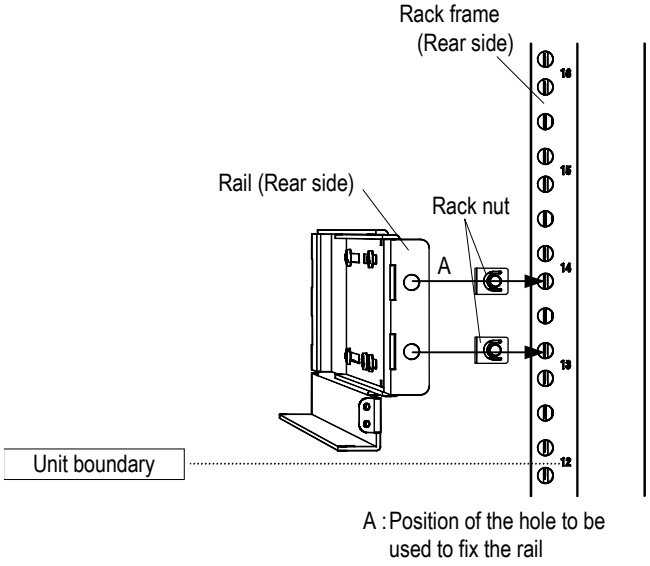


Figure 3.2.17 Location of installing the rail on the rear side of the Rack frame

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CAUTION

Press the rail against the rack frame as much as possible to secure the rail to the rack frame. If there is a gap between the rail and the rack frame, the rail may interfere with the equipment.



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3.2.3 Sun StorEdge Rack Frame

The RKM/RKAJ/RKAJAT/RKS can be mounted on the Sun 19-inch rack frame by installing the rack rails (DF-F700-UR7) which are accessory parts.
Installation procedure for the case where the Sun 19-inch rack frame with the rack rails (DF-F700-UR7) are used is shown below.

The Components-list of SUN StorEdge Rack-rail is shown in Table 3.2.4.
The packaging of the Rack-frame is shown in Figure 3.2.18.

Table 3.2.4 Components of Rack-rail (DF-F700-UR7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front rail	3272207-1	1	For left hand side	–
2	Front rail	3272207-2	1	For right hand side	–
3	Rear rail	3272208-1	2	For left/right commonness	–
4	Stopper	5528618-1	2	For securing the subsystems	–
5	Spacer	5528619-2	2	For securing the rail (For U4J)	Not used
6	Bind screw (M5×10)	SB510N	18	For securing the subsystems (14 spares are included.)	–
7	Bind screw (M4×6)	SB406N	14	For securing the rail (6 spares are included.)	–
8	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	–
9	19"PART (nickel plated)	5528564-1	10	For securing the cage nut, subsystems, rail (2 spares are included.)	Not used
10	Rack nut	5510146-1	14	For securing the subsystems (10 spares are included.)	–
11	Hexagon Socket Head Bolts	5503443-1	10	For securing the rail (2 spares are included.)	–
12	LL washer	5513553-5113	10	For securing the rail (2 spares are included.)	–
13	Repeat binder (Cable)	5409042-1	3	Used to fix a slackened part of overlong cable (1 spare is included.)	–

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(1) Appearance of Sun 19-inch rack frame

Figure 3.2.18 shows appearance of the Sun 19-inch rack frame.

(There are two types of Sun 19-inch rack frames: Sun StorEdge and Sun Fire.)

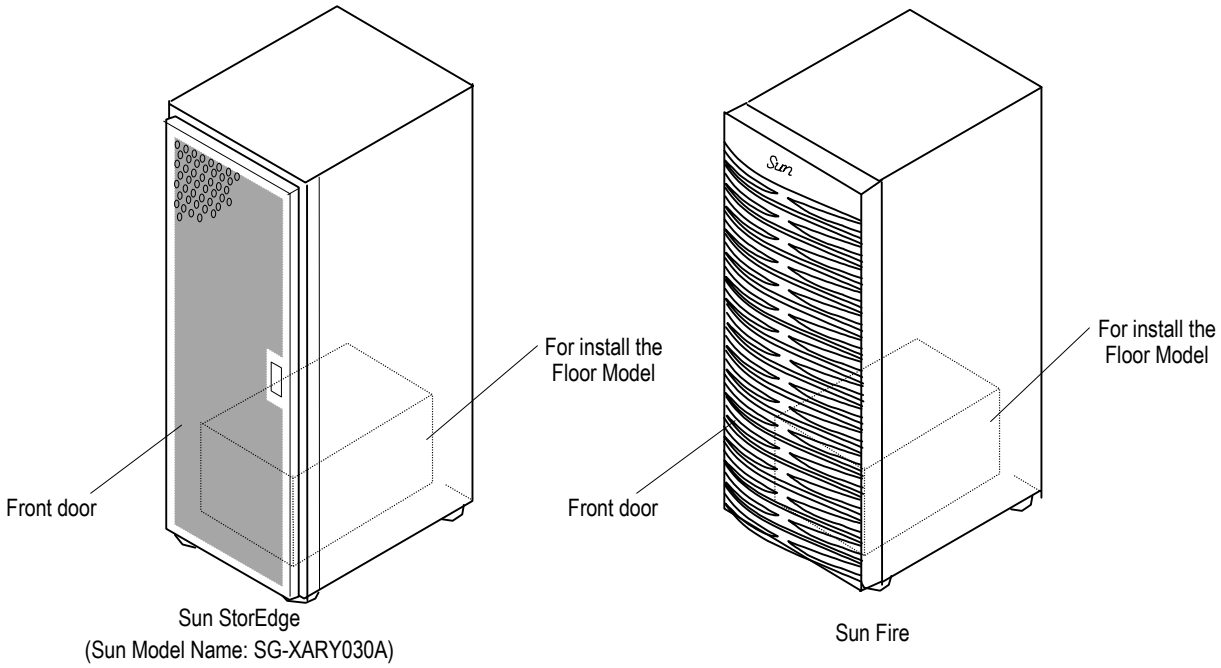


Figure 3.2.18 Appearance of Sun 19-inch Rack Frame

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(2) Installing rails

Install the rack rail to the rack frame referring to Figure 3.2.19 - Figure 3.2.21.

(a) Remove the rail fixing screws (M4 x 6) of the factory setting.

(b) Fix the places, where the screw holes of the front rail and those of the rear rail are matched, temporarily with the binding screws (M4 x 6 (four places)).

NOTE : For SUN Fire, fix it temporarily with the binding screws (M4 x 6 (six places)) (fix at least four places, temporarily).

(c) Fasten the holes at two places near the center of the front side of the front rail and the 4th and 6th screw holes counted from the boundary of the subsystem installation position of the front side of the rack frame with the hexagonal socket head bolts and the LL washers M5.

(d) Fasten the holes at two places of the rear side of the rear rail and the 4th and 6th screw holes counted from the boundary unit of the subsystem installation position with the hexagonal socket head bolts and the LL washers M5.

(e) Fasten the binding screws (M4 x 6) which were temporarily fixed in (b).

(f) Install the rack nuts in the holes at the sheet metal folding part of the front rail (two places).

(g) Perform the above-mentioned installation for the right and left of the rack frame.

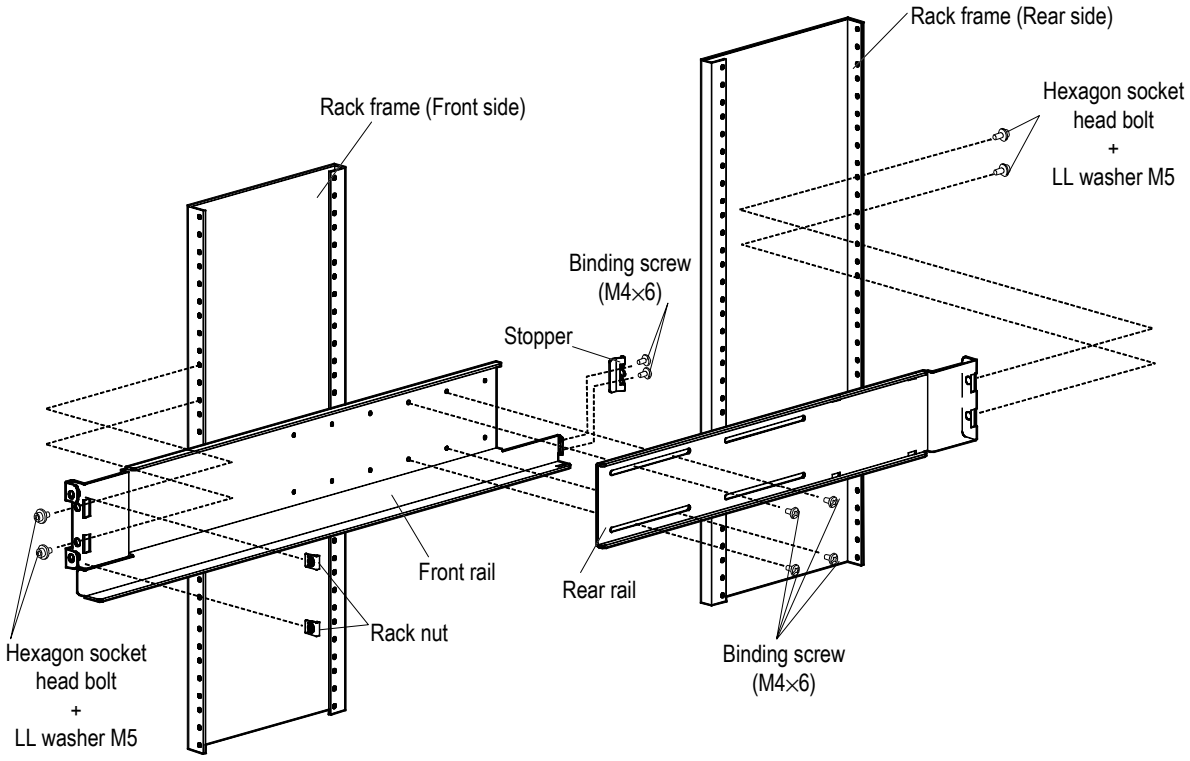
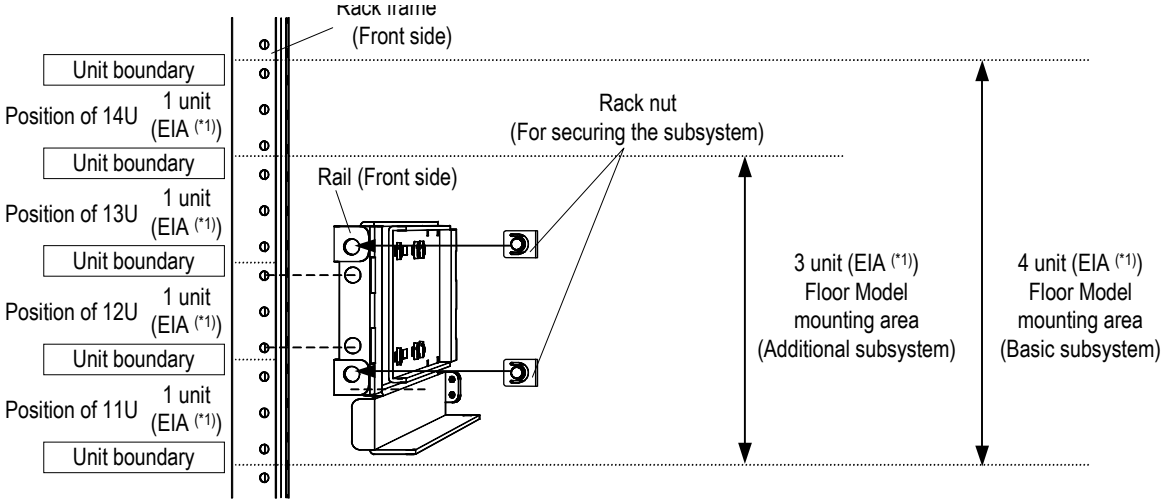


Figure 3.2.19 Installation of Rails to the Rack frame

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*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.20 Location of installing the rail on the front side of the Rack frame

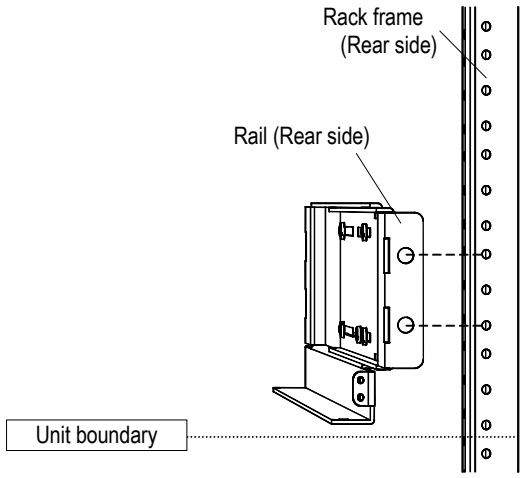


Figure 3.2.21 Location of installing the rail on the rear side of the Rack frame

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CAUTION

Press the rail against the rack frame as much as possible to secure the rail to the rack frame. If there is a gap between the rail and the rack frame, the rail may interfere with the equipment.



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3.2.4 RS6000 Rack Frame

The subsystems can be mounted on the IBM RS6000 rack frame by installing the rack rails (DF-F700-UR7), which are accessory parts.

(1) When installingDF-F700-UR7

The Components-list of RS6000 Rack-rail is shown in Table 3.2.5.

Table 3.2.5 Components of Rack-rail (DF-F700-UR7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front rail	3272207-1	1	For left hand side	—
2	Front rail	3272207-2	1	For right hand side	—
3	Rear rail	3272208-1	2	For left/right commonness	—
4	Stopper	5528618-1	2	For securing the subsystems	—
5	Spacer	5528619-1	2	For securing the rail (For U4J)	Not used
6	Binding screw (M5×10)	SB510N	18	For securing the subsystems, rail (6 spares are included.)	—
7	Binding screw (M4×6)	SB406N	14	For securing the rail (2 spares are included.)	—
8	Binding screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	—
9	19"PART (nickel plated)	5528564-1	10	For securing the cage nut, subsystems, rail (2 spares are included.)	Not used
10	Rack nut	5510146-1	14	For securing the subsystems, rail (2 spares are included.)	—
11	Hexagon Socket Head Bolts	5503443-1	10	For securing the rail (2 spares are included.)	Not used
12	LL washer	5513553-513	10	For securing the rail (2 spares are included.)	Not used
13	Repeat binder (Cable)	5409042-1	3	For securing cable routing (1 spare is included.)	—

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(a) Installing the rails and rack nut

Install the rails and rack nut in order to mount the subsystem(s) on the rack frame.

EIA units and intervals of mounting holes of 19-inch rack frame conforming to EIA standard

- A unit (U) space conforming to EIA standard is 19 inches wide and 44.5 mm high as shown in the figure below.
- The boundary of the unit falls on the middle of the interval of 12.7 mm.
- When the unit space is shifted by 0.5 units, the unit boundary is shifted from the normal position by 22.2 mm.

For the IBM RS6000 rack frame

Universal intervals: Repeat of 44.45 mm (15.875 mm + 15.875 mm + 12.7 mm)

Maximum number of mountable unit spaces: 32

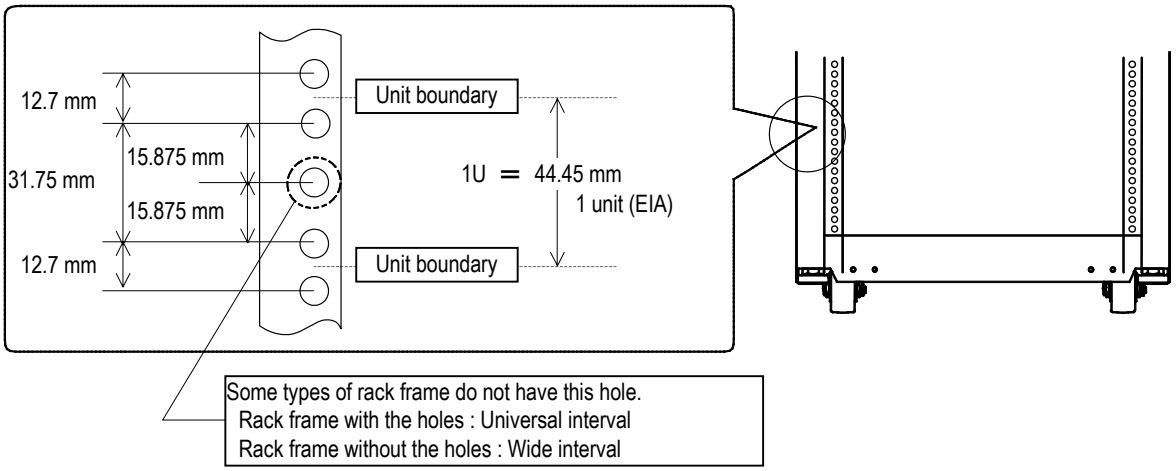


Figure 3.2.22 Attachment Hole Size of Rack

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Install the rack rail to the rack frame referring to Figure 3.2.23 - Figure 3.2.25.

(i) Remove the rail fixing screws (M4 x 6) of the factory setting.

(ii) Fix the places, where the screw holes of the front rail and those of the rear rail are matched, temporarily with the binding screws (M4 x 6 (six places))
(fix at least four places, temporarily).

(iii) Install the rack nuts at the 4th and 6th positions counted from the boundary unit of the subsystem installation position for both front and rear sides of the rack frame.

(iv) Fasten the holes at two places near the center of the front side of the front rail and the rack nut installation parts of the front side of the rack frame with the binding screws (M5 x 10) (two places).

(v) Fasten the holes of the rear side of the rear rail and the rack nut installation parts of the rear side of the rack frame with the binding screws (M5 x 10) (two places).

(vi) Fasten the binding screws (M4 x 6) which were temporarily fixed in (ii).

(vii) Install the rack nuts in the holes at the sheet metal folding part of the front rail (two places).

(viii) Perform the above-mentioned installation for the right and left of the rack frame.

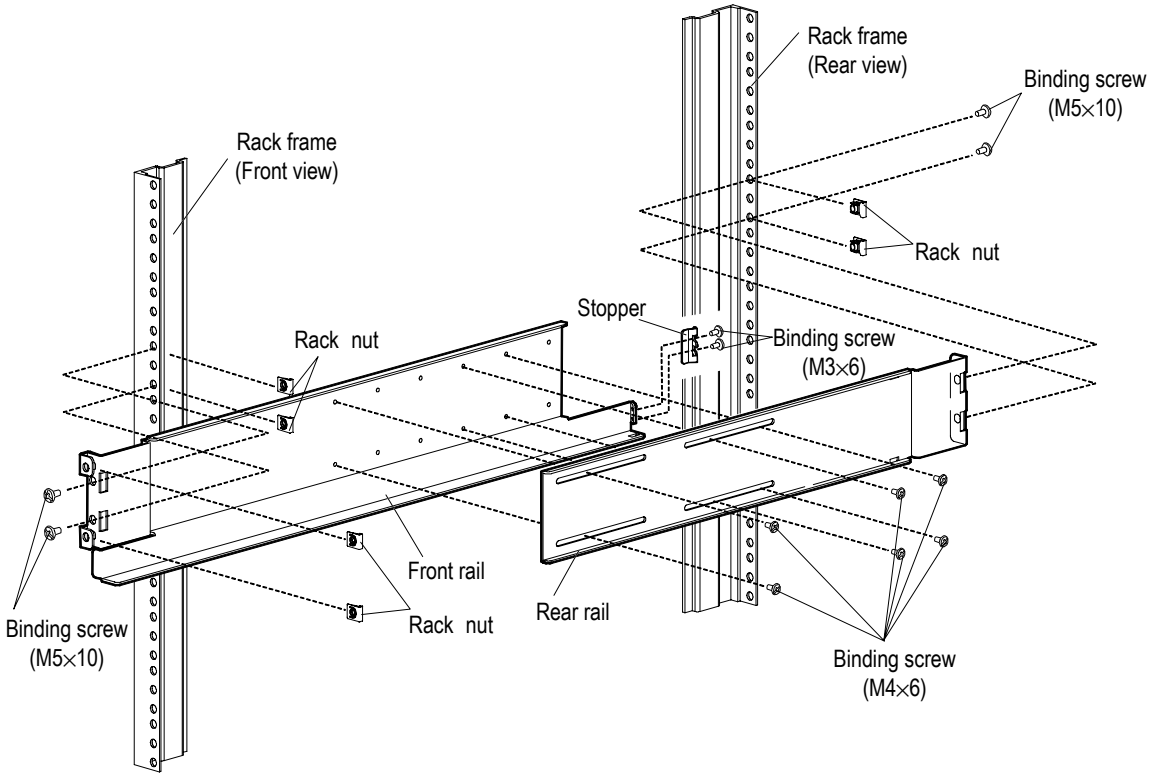
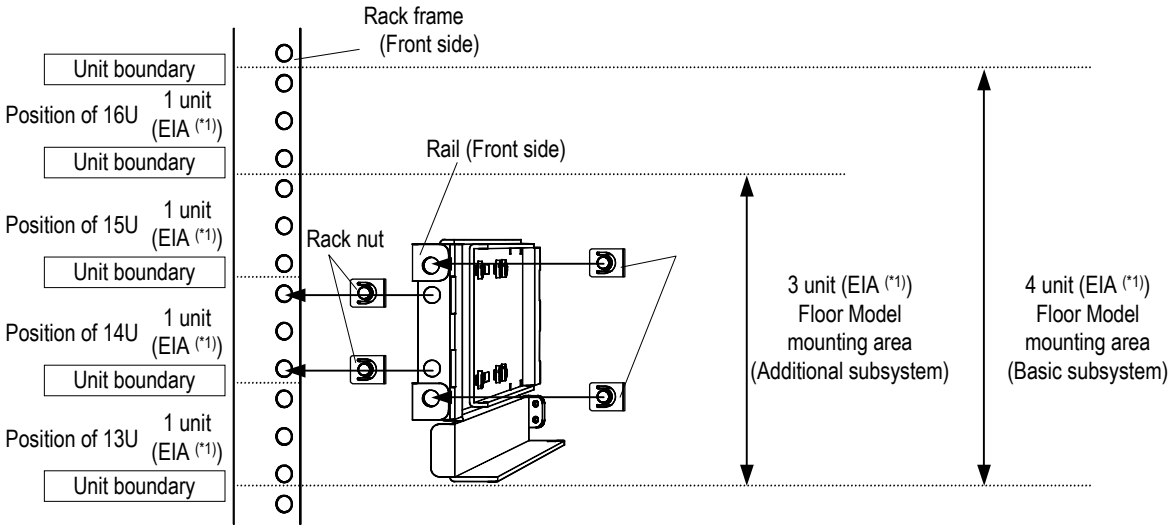


Figure 3.2.23 Installation of Rails to the Rack frame

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*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.24 Location of installing the rail on the front side of the Rack frame

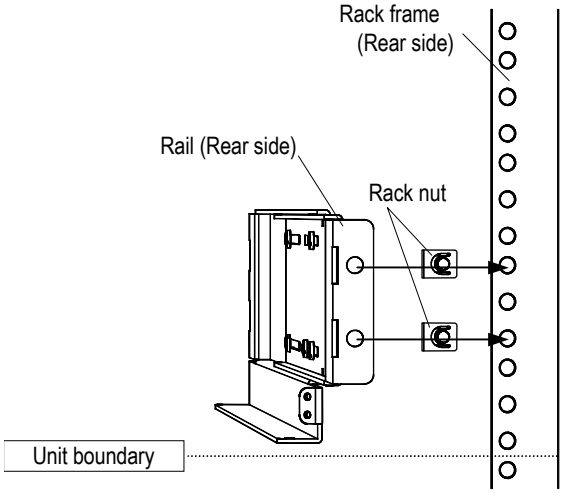


Figure 3.2.25 Location of installing the rail on the rear side of the Rack frame

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CAUTION

Press the rail against the rack frame as much as possible to secure the rail to the rack frame. If there is a gap between the rail and the rack frame, the rail may interfere with the equipment.



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3.2.5 NSC (Network Storage Controller) Rack Frame

The subsystems can be mounted on the NSC Rack Frame by installing the rack rails (DF-F700-URNS7), which are accessory parts.

(1) When installingDF-F700-URNS7

The Components-list of NSC Rack-rail is shown in Table 3.2.6.

Table 3.2.6 Components of Rack-rail (DF-F700-URNS7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3274867-A	1	For right hand side	—
2	Rail	3274495-002	1	For left hand side	—
3	Stopper	5528571-001	2	For securing the subsystems	—
4	Fastener	5510146-001	14(*1)	For securing the rail, subsystems	—
5	Bind screw (M4×8)	SB408N	8(*1)	For securing the stopper	—
6	Bind screw (M5×10)	SB510N	6(*1)	For securing the subsystems	—
7	Hexagon socket bolt (M5×20)	3261899-520	10(*1)	For securing the rail	—
8	LL washer (M4)	5513553-433	6(*1)	For securing the stopper	—
9	LL washer (M5)	5513553-513	10(*1)	For securing the rail	—
10	Repeat binder (Cable)	5409042-003	4(*2)	Used to fix a slackened part of overlong cable	—
11	Cleat (Cable)	5409055-001	4(*1)	For securing the cable	—
12	Clamp (Fibre)	5511447-001	2	For securing the cable	—
13	Binder (Flat)	5409039-001	6	For securing the cable	—
14	Power cable	3272181-E	2	Power cable	—

*1 : 2 spares are included.

*2 : 1 spare is included.

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(a) Installing the rails

If the rails have already been installed, this installation is not required.

For the components list, see "Table 3.2.6 Components of Rack-rail (DF-F700-URNS7) (per one unit)" (INST 03-0301).

EIA units and intervals of mounting holes of 19-inch rack frame conforming to EIA standard

- A unit (U) space conforming to EIA standard is 19 inches wide and 44.5 mm high as shown in the figure below.
- The boundary of the unit falls on the middle of the interval of 12.7 mm.
- For the NSC Rack Frame

  Wide intervals: Repeat of 44.45 mm (31.75 mm + 12.7 mm)

  Maximum number of mountable unit spaces: 40

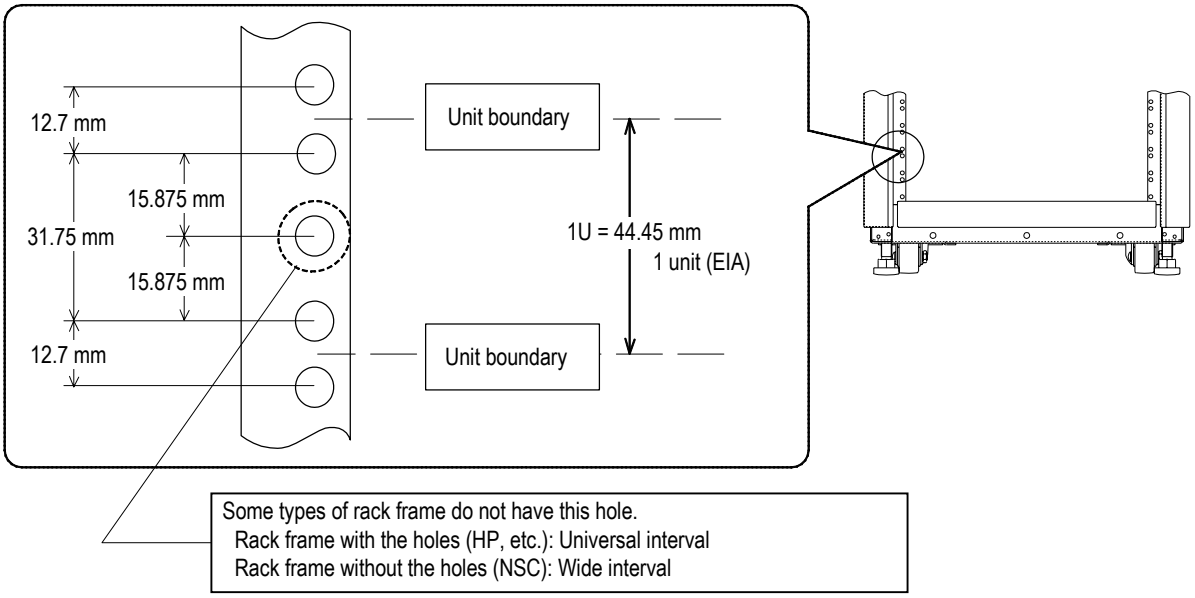
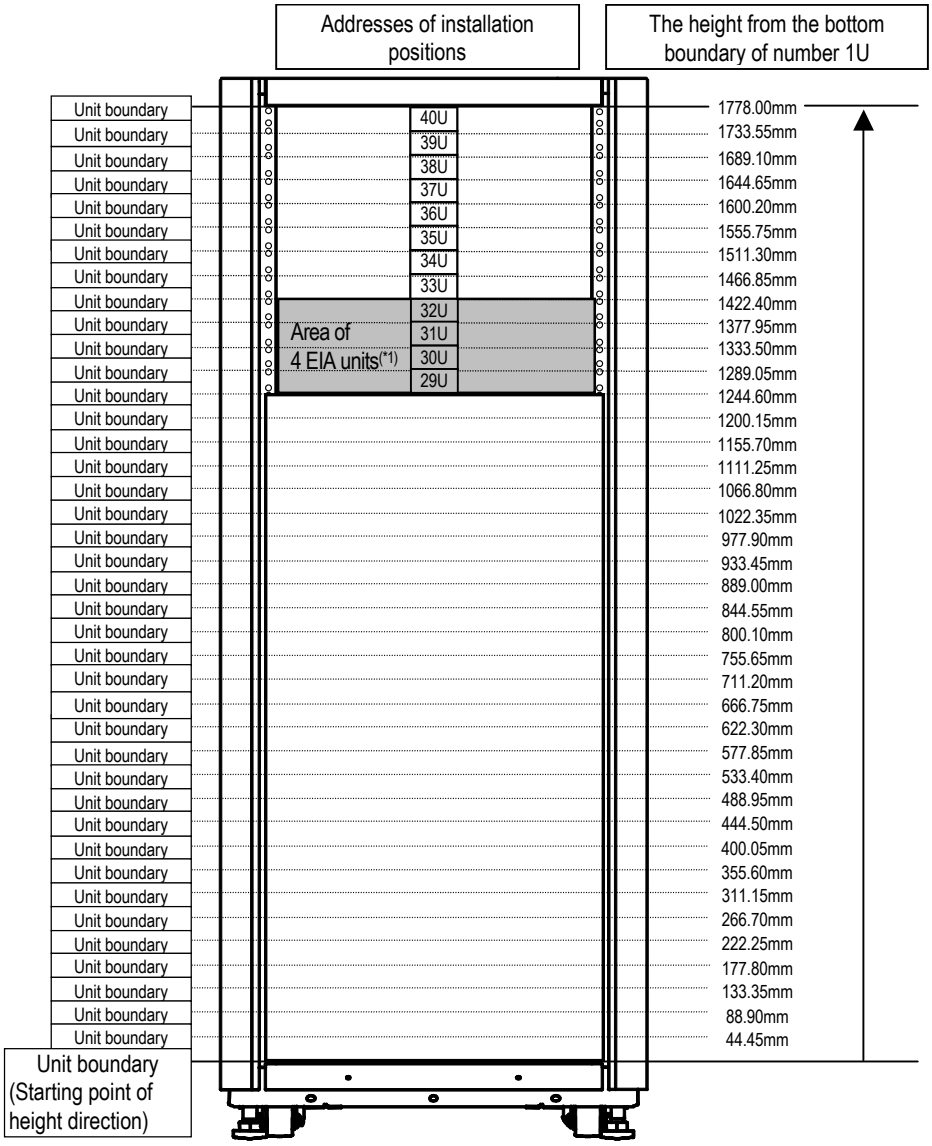


Figure 3.2.26 Attachment Hole Size of Rack

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The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame. In the case of the NSC Rack Frame, you must count the holes to know the address because no number is marked on the rack frame.
The following figure illustrates the whole layout of addresses of installation positions in the NSC Rack Frame.
There are 40 addresses, that is, the 1U to 40U counted in the vertical direction starting from the lower boundary of the 1U (the lowest unit).
The subsystem can be installed up to three sets (one basic subsystem and two additional subsystems) between 29U and 40U.



*1 : The grayed are ▭ shows a layout of an area for installing the subsystem at the 29U

Figure 3.2.27 Whole Layout of Installation Position Addresses

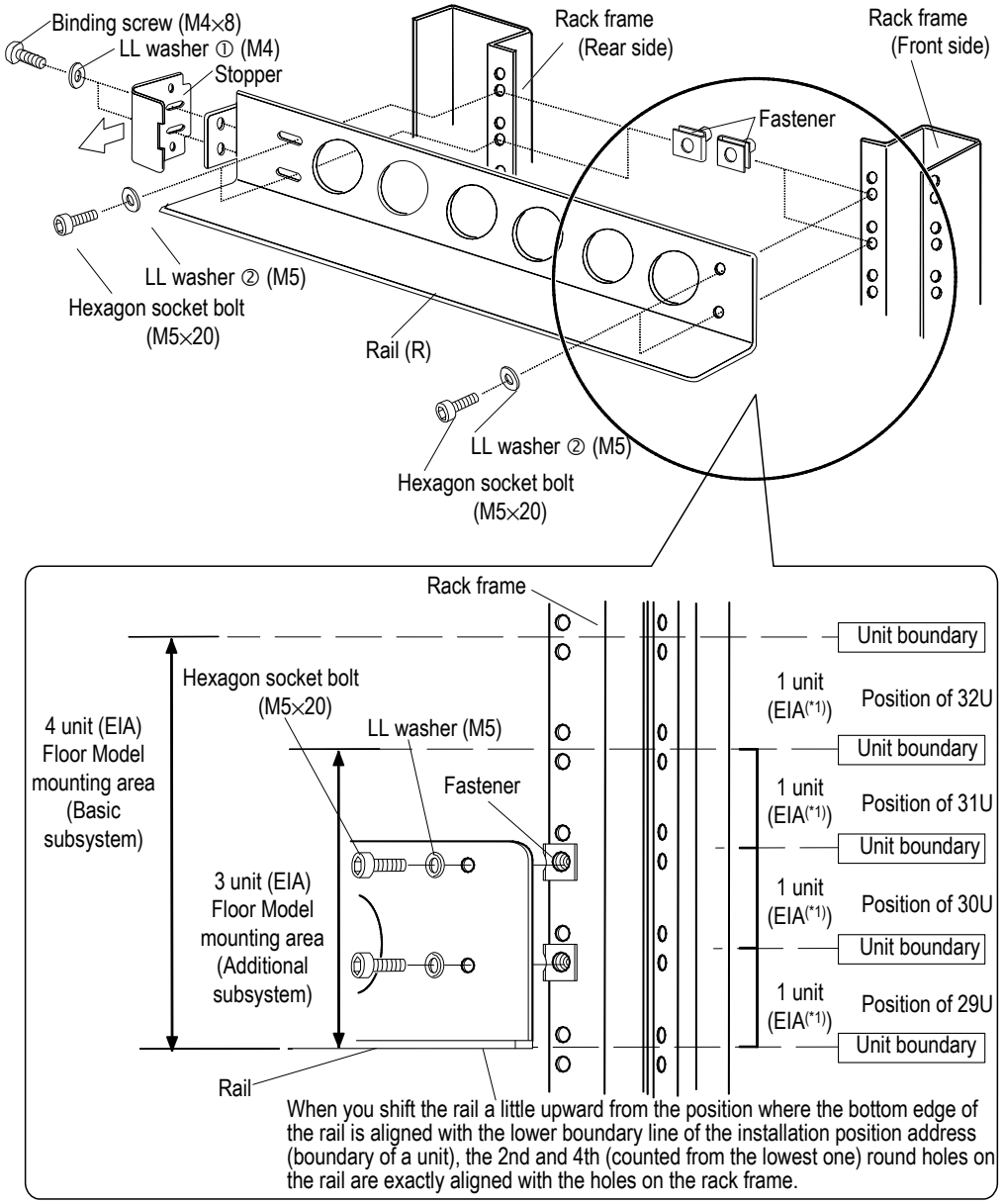
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(i) Slide the stopper in the direction shown by the arrow and temporarily fix it to the Rail (R) using the binding screws and LL washers ① (M4 (at two places.)).
For the installation position address, see Figure 3.2.27.

(ii) On the right side of the installation location in the rack frame, align the round holes of the Rail (R) with those of the rack frame and insert the fasteners (at four places in total in front and rear.). See Figure 3.2.28.

(iii) Fasten the Rail (R) to the rack frame using the hexagon socket bolts and LL washers ② (M5 (at two places each on the front and rear sides.)).

(iv) Install the Rail (L) to the rack frame in the same way.



*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.28 Installation of Rails to the Rack frame and Installation Positions

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(b) Installing fasteners on the front side of the rack frame

Install the fasteners on the front side of the rack frame in order to fasten the subsystems to be mounted on the rack frame.

(i) Fit the two fasteners to each of the right and left beams on the front side of the rack frame referring to Figures 3.2.29 and 3.2.30.

Install the mounting fasteners at the 2nd and 5th (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) round holes.

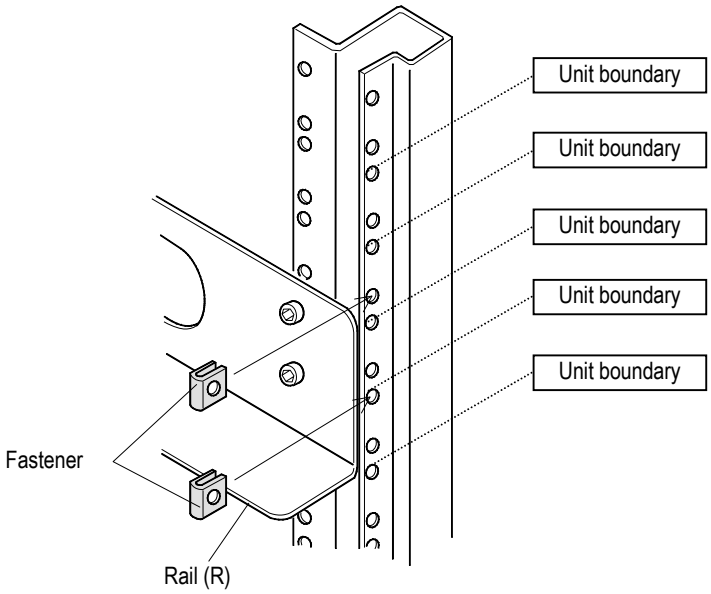


Figure 3.2.29 Installing Fasteners on the Front Side of the Rack frame

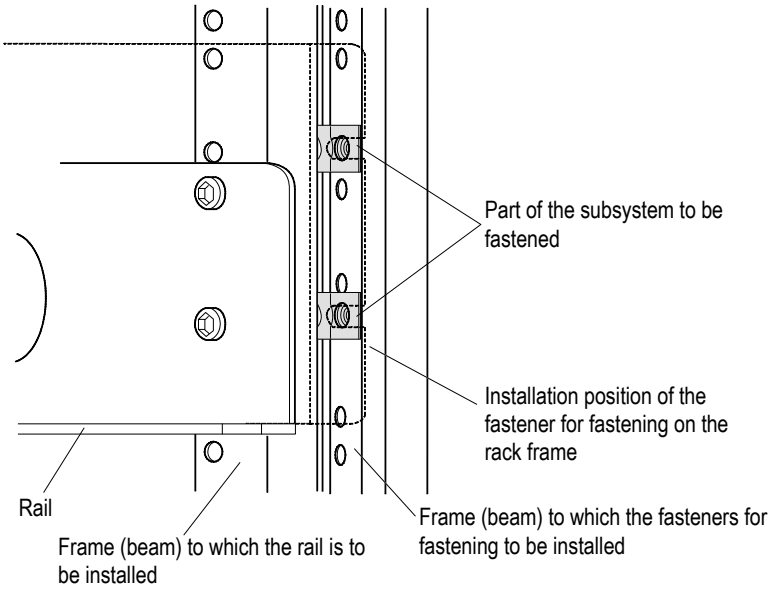


Figure 3.2.30 Installation Positions of Fasteners and Relation with Rails

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3.3 Unpacking the Subsystems

⚠ CAUTION

- The unpacking should be done by two or more personnel to prevent turning over of the subsystem or being caught under the subsystem.
- Work carefully because the mass of the single RKM is about 58 kg, RKS/RKXS is about 56 kg, RKH is about 47 kg, RKAJ/RKAJAT is about 40 kg.

(1) Unpacking

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

Figure 3.3.1 shows the subsystem within the outer package and Figures 3.3.2 show the packed subsystem without the outer package.

(a) Remove the outer package and packing materials.
(b) Take the subsystem out of the polyethylene bag.
(c) Remove tapes, etc. applied to the subsystem.
(d) Remove desiccating agent from the lower of the subsystem.
(e) Check the exterior of the subsystem visually for distortion or damage owing to the transport.

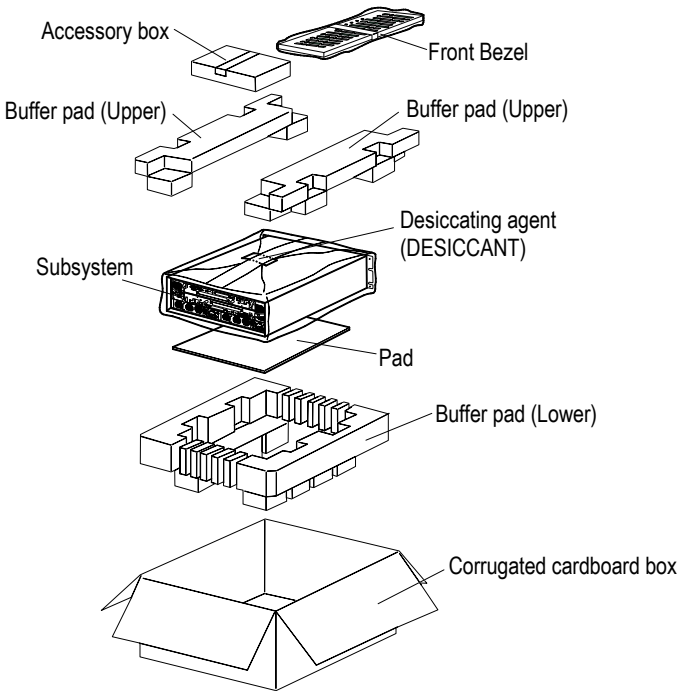


Figure 3.3.1 Packed Subsystem

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(2) Checking contents of package

(a) Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

(b) The key for the front bezel supplied with the subsystem must be kept by service personnel in order to prevent users from maintaining the subsystem.
The key for Front Bezel is used to mount and dismount Front Bezel

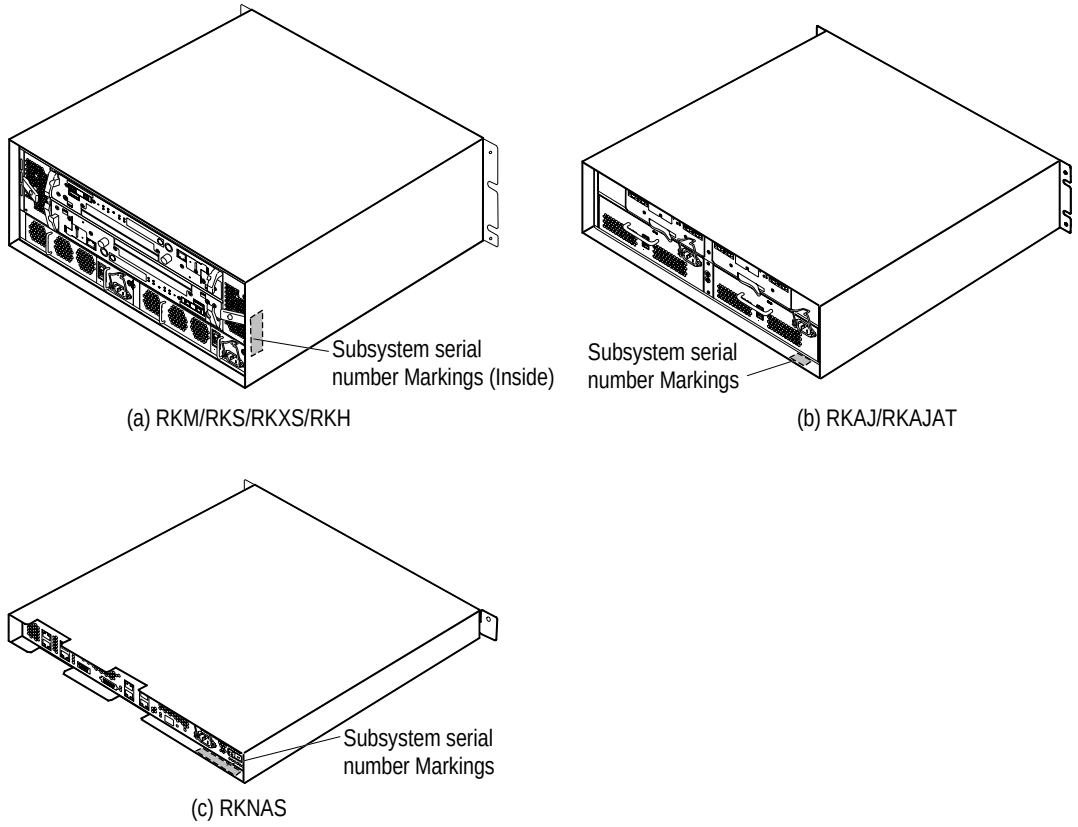


Figure 3.3.2 Locations of Subsystem Serial Number Markings

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3.4 Installing the Rackmount Model

3.4.1 Work Procedure before Installing the Rack Mounting

Install it in the Rack Frame with each component mounted when installing it with 1m or less in height or lifter. (Work from "3.4.3 Mounting on Rack Frame" (INST 03-0400).)

In other cases, install it in the Rack Frame after removing each component.
(Work from "3.4.2 Removing Components" (INST 03-0330).)

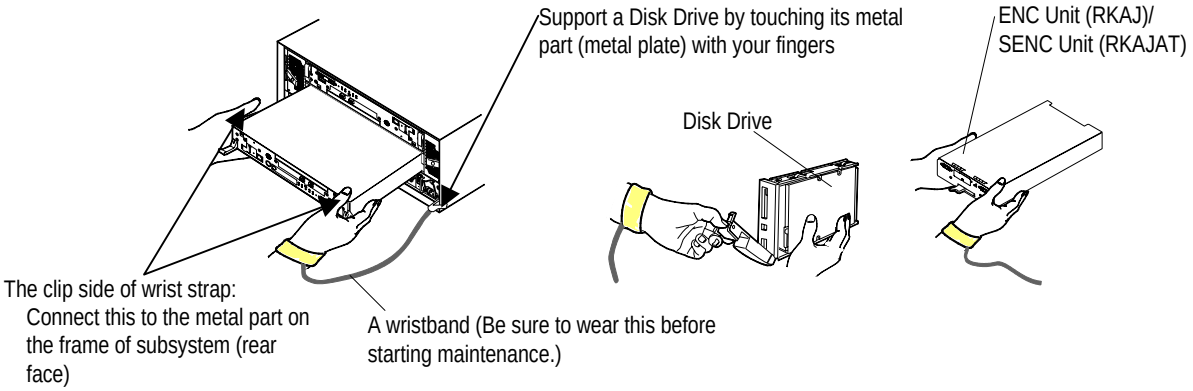
Since the device ID numbers are set at the factory when the subsystem is newly introduced, make sure of them, and then mount the devices in appropriate order from the lowest one. (For the setting of the device ID number, refer to "3.4.7 (1-2) Setting Device ID number" (INST 03-0520).

3.4.2 Removing Components

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

Be sure to wear the wristband, connect its lead wire to the subsystem enclosure before starting the work, and do not remove them until the work is completed.
When installing a Disk Drive, Control Unit and ENC Unit/SENC Unit, hold it with your hand wearing the wristband having fingers contact metallic portions on the sides of the part.



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(1) Removing Disk Drive

(1) Remove the Front Bezel. (“1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem” (INST 01-0100).)

(2) Remove the Disk Drive or a dummy (Disk Drive).
Pull the stopper at the upper part of the Disk Drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive or dummy (Disk Drive) by pulling it out taking care not to apply a shock to it.

(3) Keep the Disk Drive of dummy (Disk Drive) that has been removed temporarily in the component safekeeping container at the location shown on the address label with its handle returned to its original state (locked by the stopper). It is to be installed in the disk array unit after the unit is mounted on the rack frame.

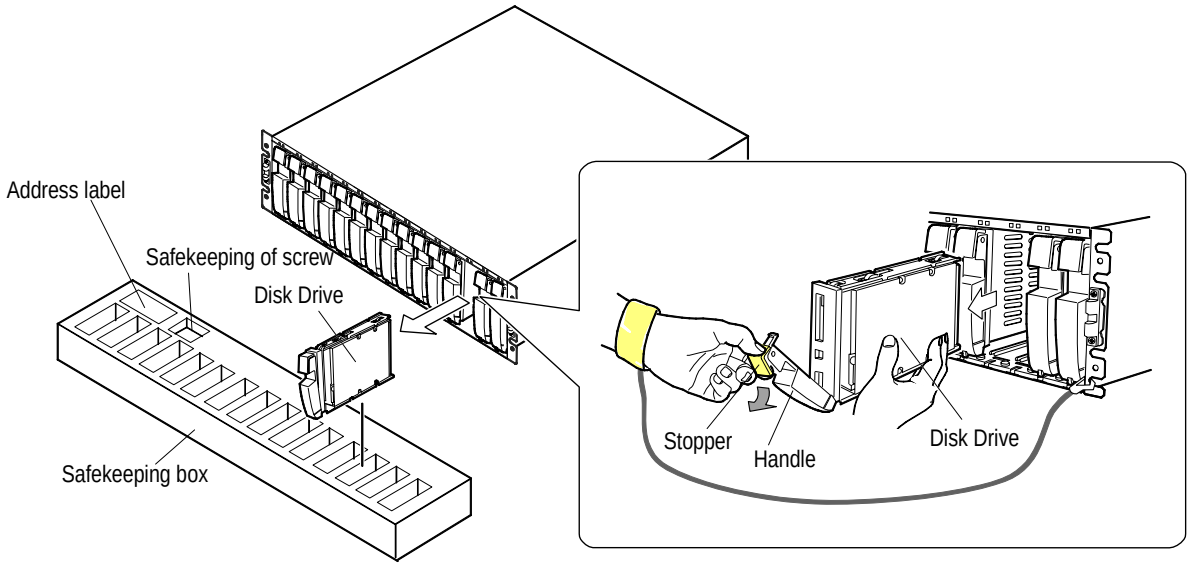


Figure 3.4.1 Removing Disk Drive

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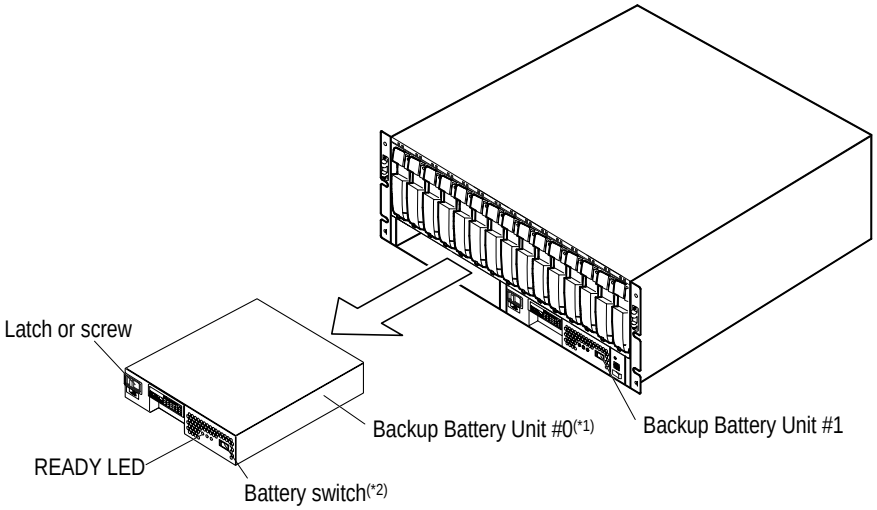
(2) Removing Backup Battery Unit

This Removing work is only applied to RKM/RKS/RKXS/RKH.

(a) Shift the latch on the Battery Units to the Release position and pull the Battery Unit toward you until the latch pin comes out (to release the Unit).
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, loosen the screw that is fixing the latch of the Backup Battery Unit, set the latch to the Release position, and then pull out the Backup Battery Unit forward.

NOTE : Handle the Battery Unit carefully because its depth is shallow (150mm) and weight is heavy (3.0kg).

(b) Take out the Battery Unit holding its main body by your both hands.



*1 : Only one battery is installed in RKS/RKXS left side of the subsystem.

*2 : In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS, there is no battery switch. Also, the latch is fixed with a screw.

*3 : The figure shows RKM.

Figure 3.4.2 Removing Backup Battery Unit (RKM/RKS/RKXS)

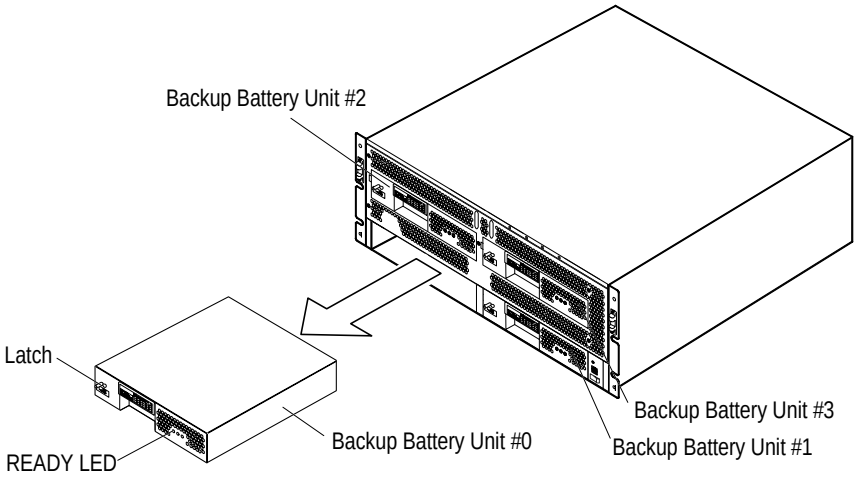


Figure 3.4.2.1 Removing Backup Battery Unit (RKH)

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(3) Removing Fan Assembly

This Removing work is only applied to RKM/RKS/RKXS/RKH.

(a) Loosen the screw which is fixing the lever of the Fan Unit, open the lever, and move it forward.

(b) Remove the Fan Assembly by pulling it out holding its main body with your both hands.

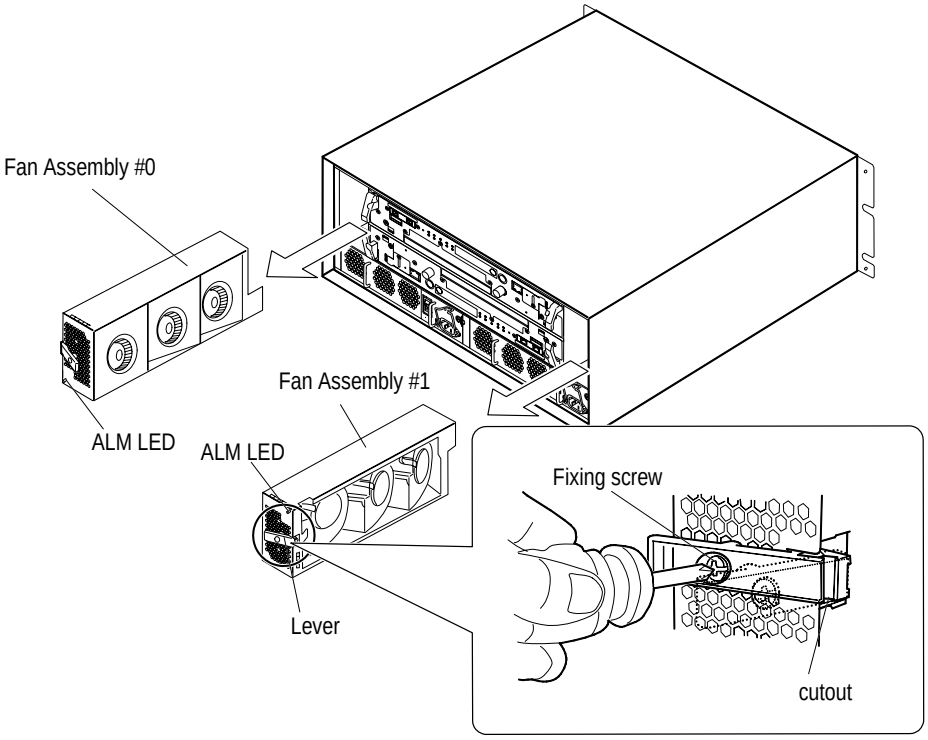


Figure 3.4.3 Removing Fan Assembly

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(4) Removing the Control Unit

(a) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(b) Remove the Control Unit by pulling it out toward you.

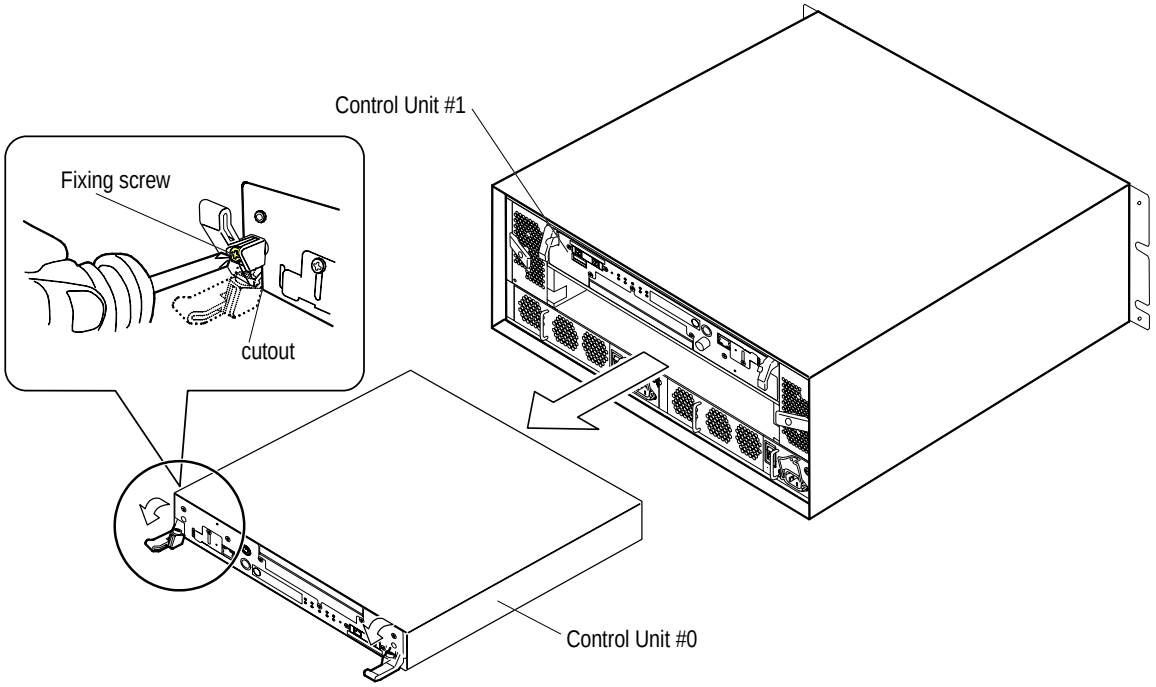


Figure 3.4.4 Removing Control Unit

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(5) Removing ENC Unit (for RKAJ) and SENC Unit (for RKAJAT)

(a) Raise the lever on the ENC Unit/SENC Unit in the direction shown by the arrow ① (←) and pull out the ENC Unit/SENC Unit a little way toward you.

(b) Remove the ENC Unit/SENC Unit by pulling it out toward you.

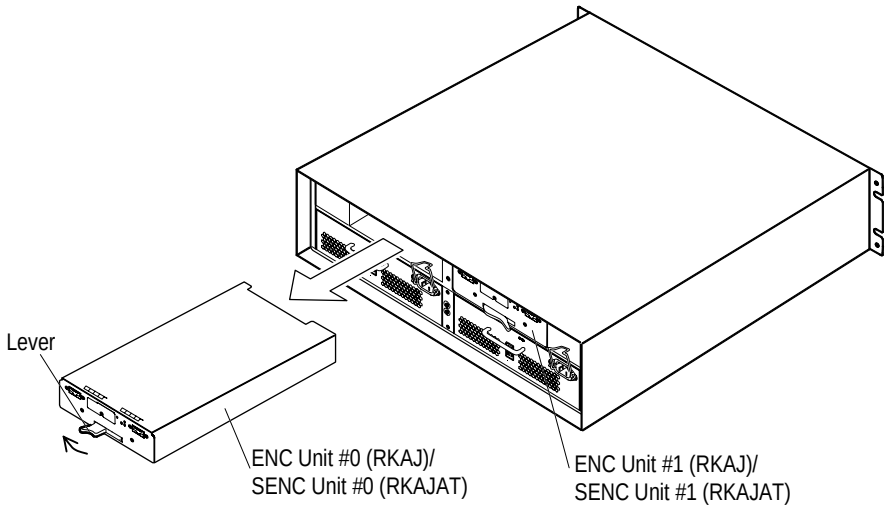


Figure 3.4.5 Removing ENC Unit/SENC Unit

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(6) Removing Power Unit

(a) Loosen the screw which is fixing the latch of the Power Unit, shift the latch (fixing screw) to the Release position, and move it forward by holding the handle.

(b) Remove the Power Unit by pulling it out holding its main body with your both hands.

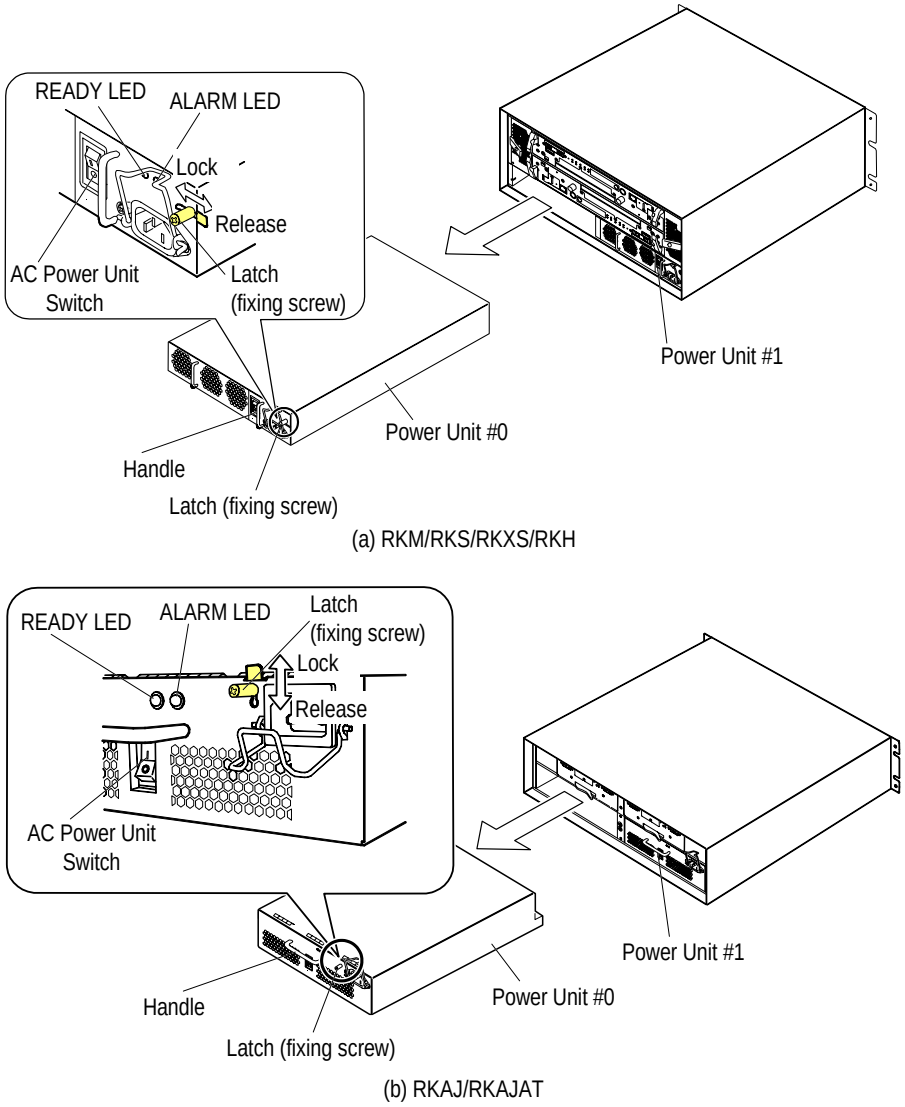


Figure 3.4.6 Removing Power Unit

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3.4.3 Mounting on Rack Frame

Install it in the Rack Frame after sticking the EMI gasket on the Frame.

(1) Sticking EMI gasket

Stick the EMI gasket supplied with the rack rail on the top of the RKM/RKAJ /RKAJAT frame.

(a) Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.

(b) Stick the EMI gasket by aligning it with the front end of the top of the frame.

(c) Stick the EMI gasket by aligning it with the back end of the top of the frame.

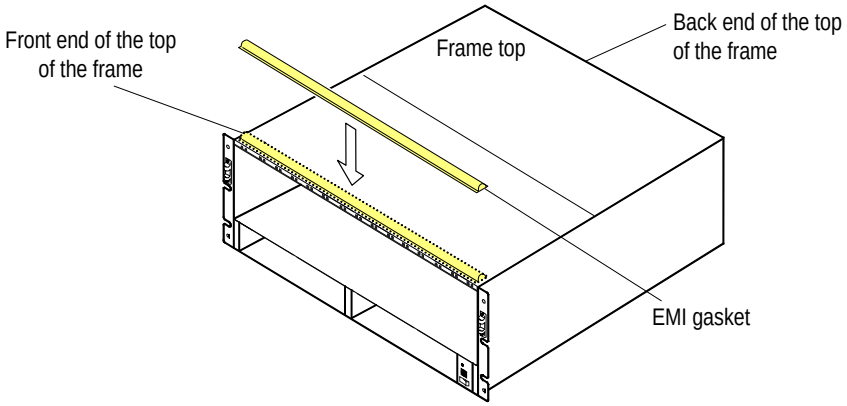


Figure 3.4.7 Position for Sticking EMI Gasket (Basic subsystem)

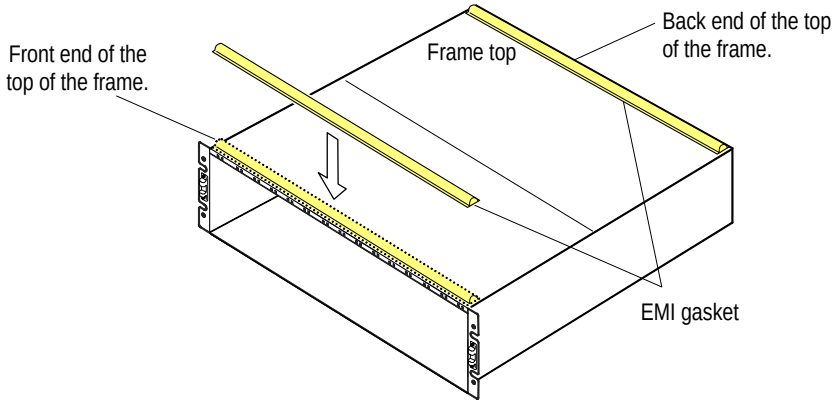


Figure 3.4.8 Position for Sticking EMI Gasket (Additional subsystem)

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3.4.4 Mounting lifter on rack frame

Figure 3.4.9 shows external appearance of the special lifter.

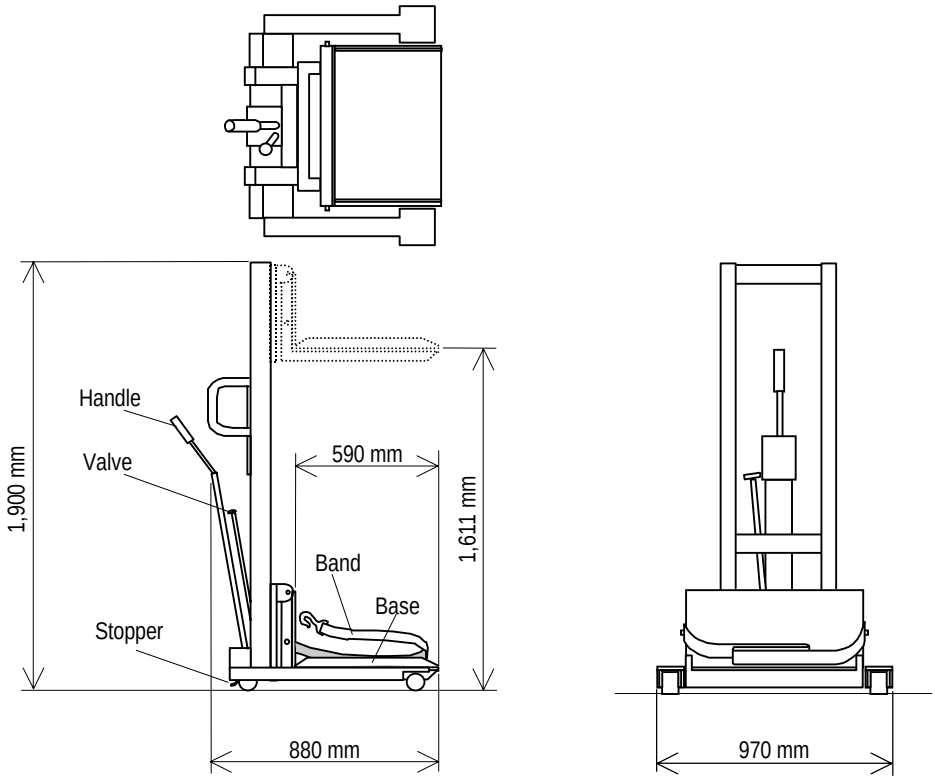


Figure 3.4.9 External lifter

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CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Be sure to perform the operation with two or more workers.
- Work carefully because the mass of the single RKM is about 58 kg, RKS/RKXS is about 56 kg, RKH is about 47 kg, RKAJ/RKAJAT is about 40 kg.

(1) Bring the special lifter close to the subsystem to be mounted and apply the brake to the lifter.

NOTE : When putting the subsystem on the special lifter, be sure to remove the front bezel beforehand.

(2) Put the subsystem on the special lifter.
Put the subsystem with its front bezel removed on the lifter.

(3) Secure the subsystem to the lifter with a band of the lifter.
Bind the subsystem with the band tightly by fitting the length of the belt to the subsystem.

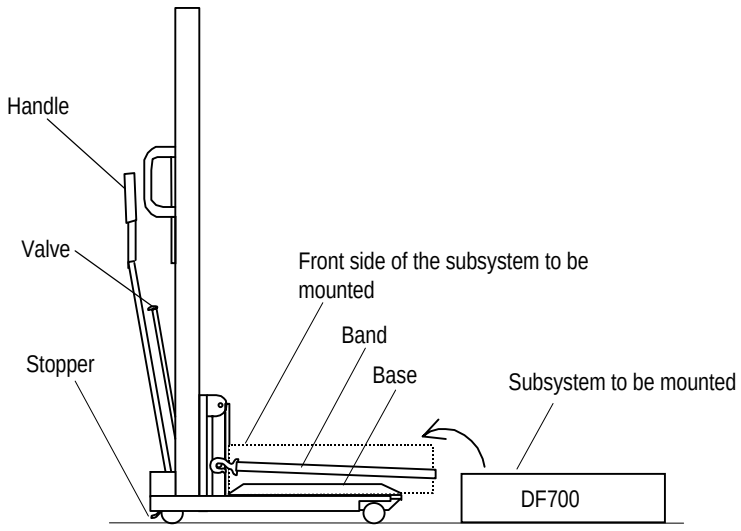


Figure 3.4.10 Setting the Subsystems on Special Lifter

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3.4.5 Mounting subsystem on rack frame

⚠ WARNING

If the Subsystem falls when the elevator of the lifter is at a high position, a personal injury will be caused.
Perform the positioning, fastening, or other handlings very carefully.

⚠ CAUTION

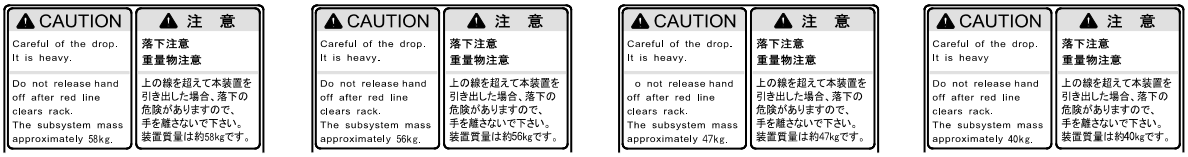
- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.
- Be sure to perform the operation with two or more workers.
- Work carefully because the mass of the single RKM is about 58 kg, RKS/RKXS is about 56 kg, RKH is about 47 kg, RKAJ/RKAJAT is about 40 kg.
- Be sure to install it in order from the bottom to prevent the falling of the rack when you install the subsystem on the rack.

(1) Take off the brake of the special lifter on which the subsystem has been put, and move the lifter close to the rack frame.
(2) Adjust the position of the subsystem so that it is seated in the center of the rack frame.
(3) Move the pumping handle of the special lifter to the right and left repeatedly to lift the subsystem up to the height suitable for the mounting.
Be careful not to lift the elevating base too high. If you lift it too high, lower it by opening the up/down valve gently.
(4) Remove the band and adjust the position of the subsystem so that the subsystem comes in the center in front of the rack frame. If the subsystem is positioned off-centered, a screw contacts the front bezel preventing the bezel from being opened or closed.
(5) Shift the subsystem onto the rails in the rack frame. When shifting the subsystem, push it in to the end gently.

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CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the subsystem enters the rack frame across the end of it. Otherwise, falling of the subsystem may be caused.



RKM RKS/RKXS RKH RKAJ/RKAJAT

(6) After mounting the subsystem on the rack frame, lower the elevating base to the lowermost position by gently opening the up/down valve of the special lifter and take off the brake of the lifter.

(7) Move the special lifter to the place where the lifter does not disturb the following works.

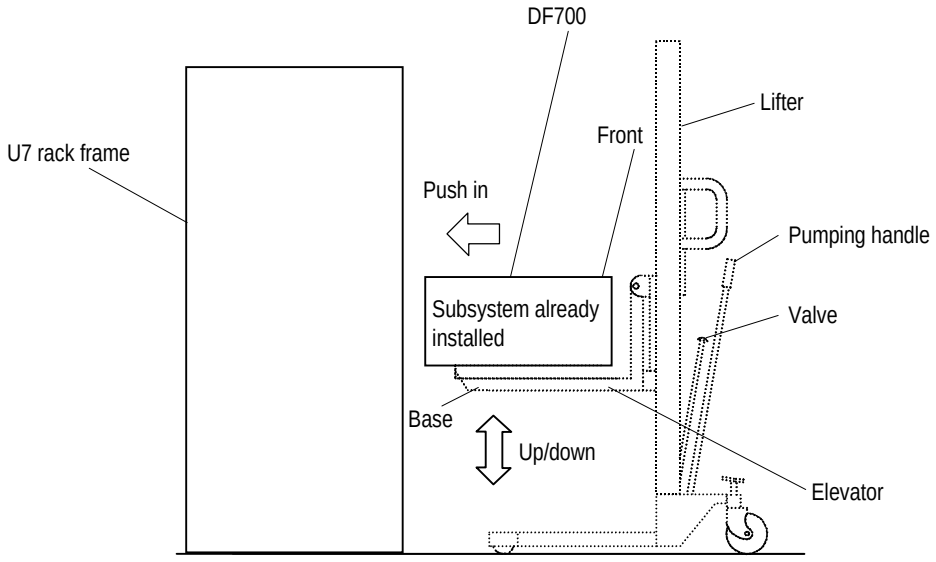


Figure 3.4.11 Mounting Subsystem on Rack Frame

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3.4.6 Securing the subsystem

(1) U7 Rack frame

This is common for the three unit and four unit Rackmount models.

(a) Fastening the front side of the subsystem

(i) Fasten the subsystem to the rack frame with the four M5×10 binding screws.

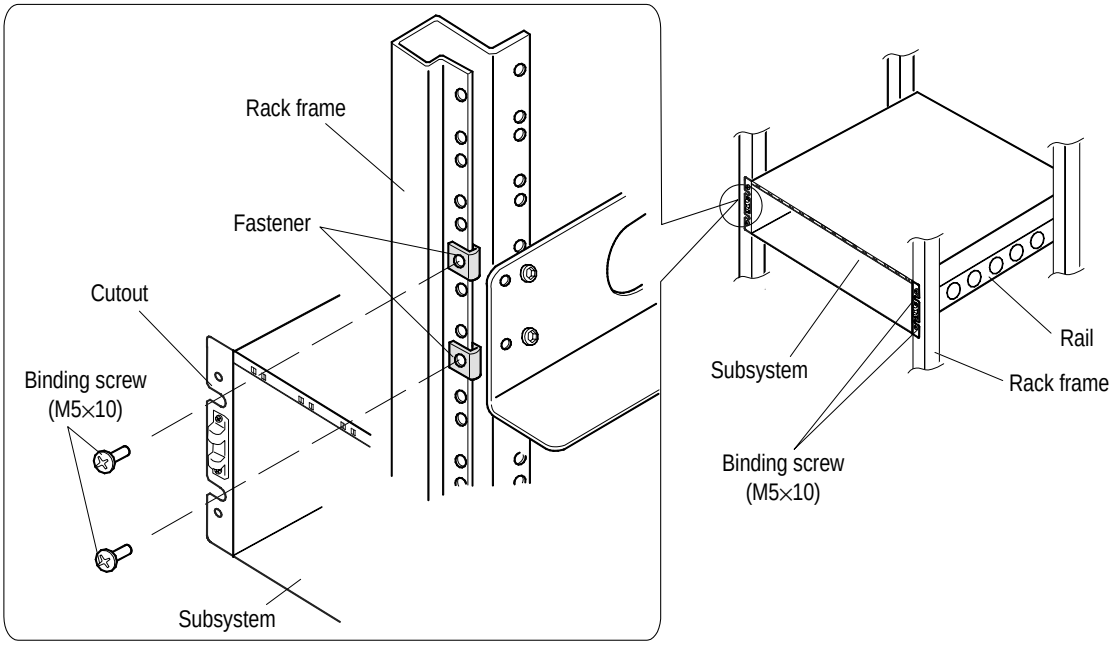


Figure 3.4.12 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

This is common for the three unit and four unit Rackmount models.

(i) Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.

(ii) Tighten the binding screws.

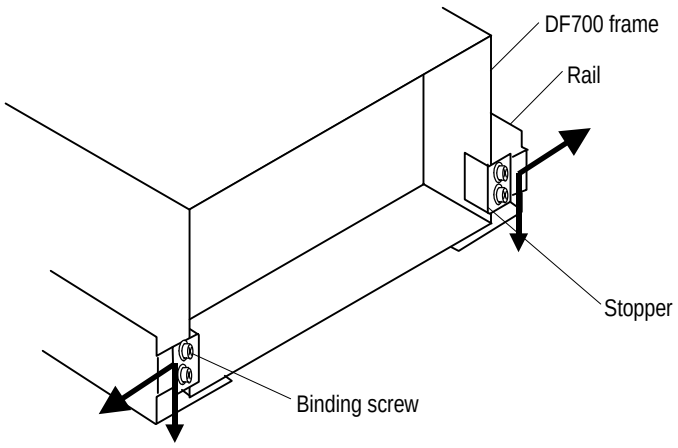


Figure 3.4.13 Securing Rear Side of the Subsystem

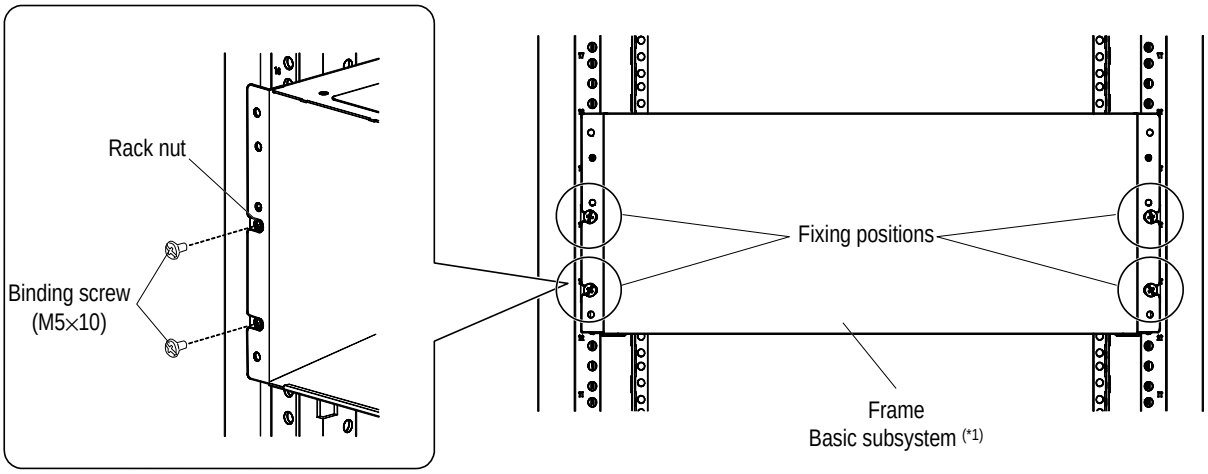
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(2) HP Rack frame

(a) Fastening the front side of the subsystem

This is common for the three unit and four unit Rackmount models.

(i) Fasten the cutouts of the subsystem to the rack frame with the binding screws (M5 x 10) (four places).



*1 : Fasten Additional subsystem (3U) as well.

Figure 3.4.14 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

(i) Slide each of the two stoppers in the direction shown by the arrow until it contacts with the frame.

(ii) Tighten the binding screws (M3 x 6) to fix it.

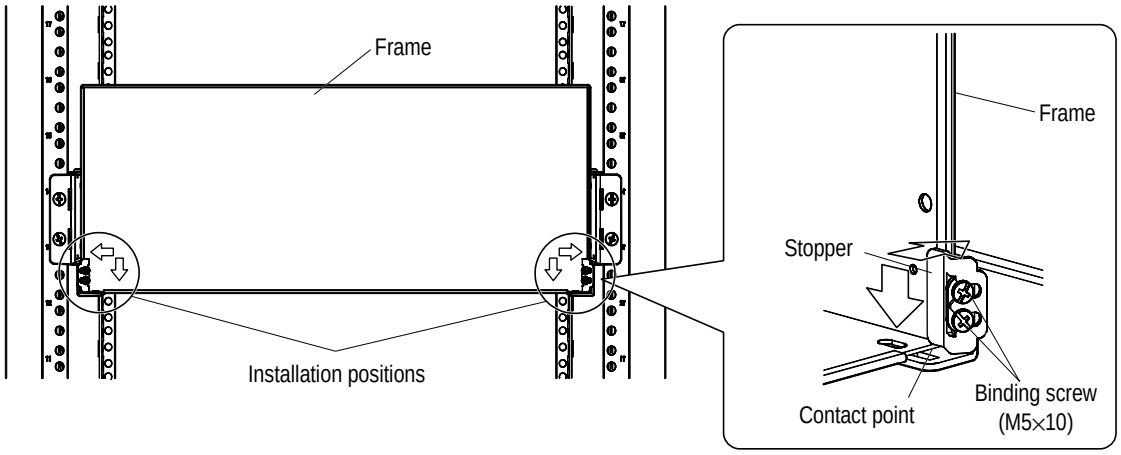


Figure 3.4.15 Securing Rear Side of the Subsystem

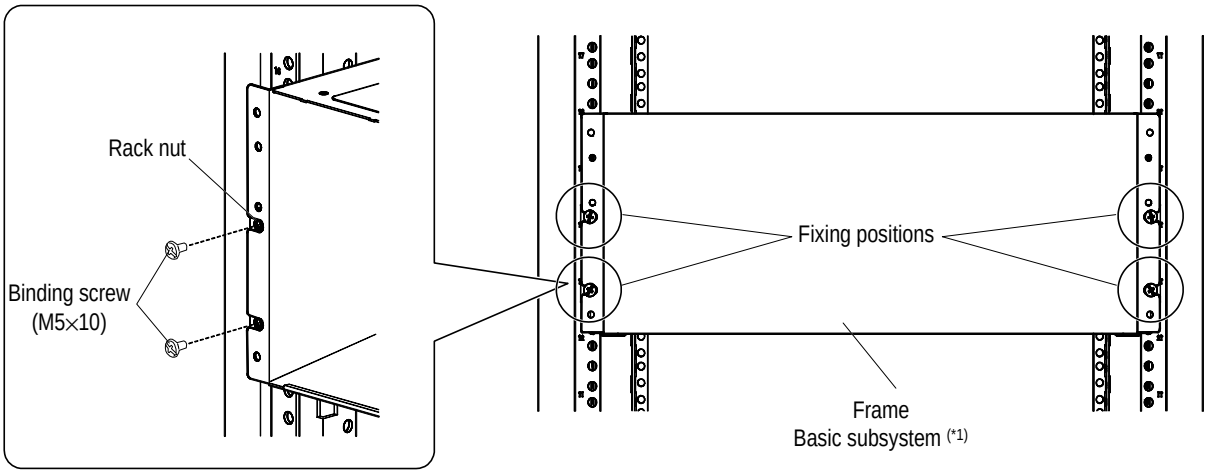
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(3) Sun StorEdge Rack frame

(a) Fastening the front side of the subsystem

This is common for the three unit and four unit Rackmount models.

(i) Fasten the cutouts of the subsystem to the rack frame with the binding screws (M5 x 10) (four places).



*1 : Fasten Additional subsystem (3U) as well.

Figure 3.4.16 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

(i) Slide each of the two stoppers in the direction shown by the arrow until it contacts with the frame.

(ii) Tighten the binding screws (M3 x 6) to fix it.

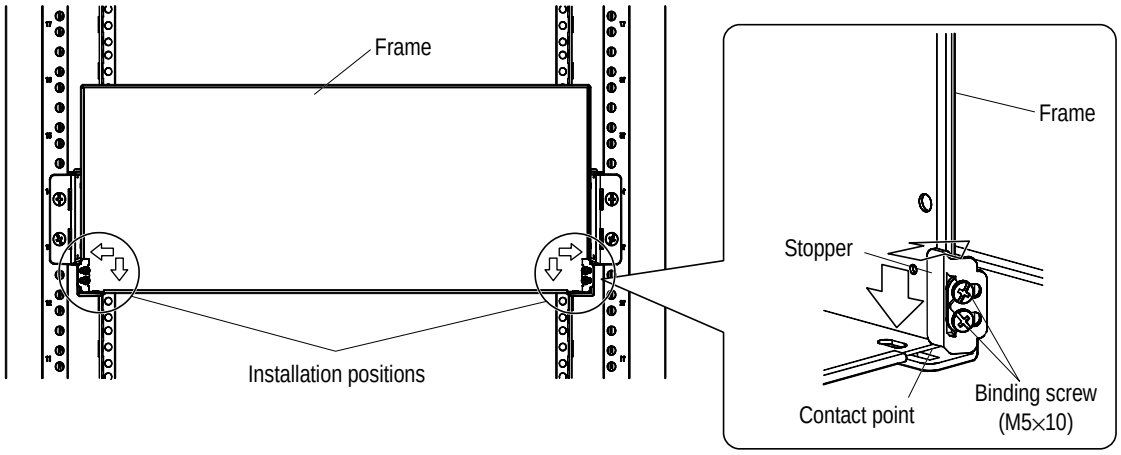


Figure 3.4.17 Securing Rear Side of the Subsystem

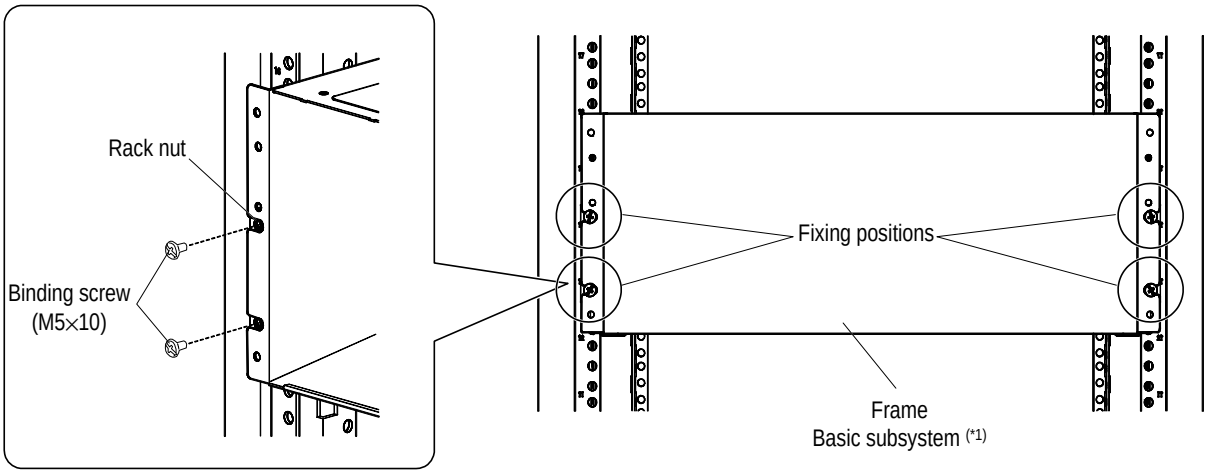
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(4) IBM RS6000 Rack frame

(a) Fastening the front side of the subsystem

This is common for the three unit and four unit Rackmount models.

(i) Fasten the cutouts of the subsystem to the rack frame with the binding screws (M5 x 10) (four places).



*1 : Fasten Additional subsystem (3U) as well.

Figure 3.4.18 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

(i) Slide each of the two stoppers in the direction shown by the arrow until it contacts with the frame.

(ii) Tighten the binding screws (M3 x 6) to fix it.

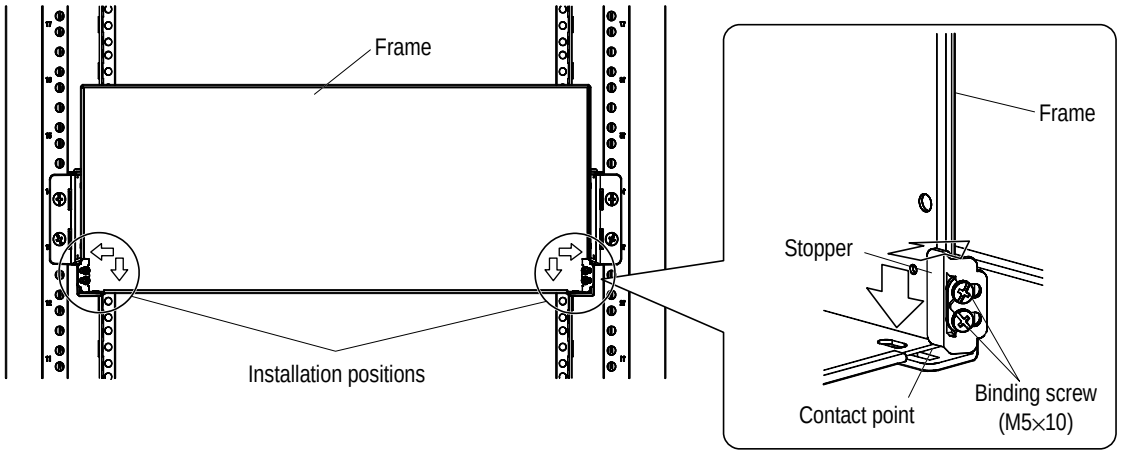


Figure 3.4.19 Securing Rear Side of the Subsystem

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(5) NSC Rack frame

This is common for the three unit and four unit Rackmount models.

(a) Fastening the front side of the subsystem

(i) Fasten the subsystem to the rack frame with the four M5×10 binding screws.

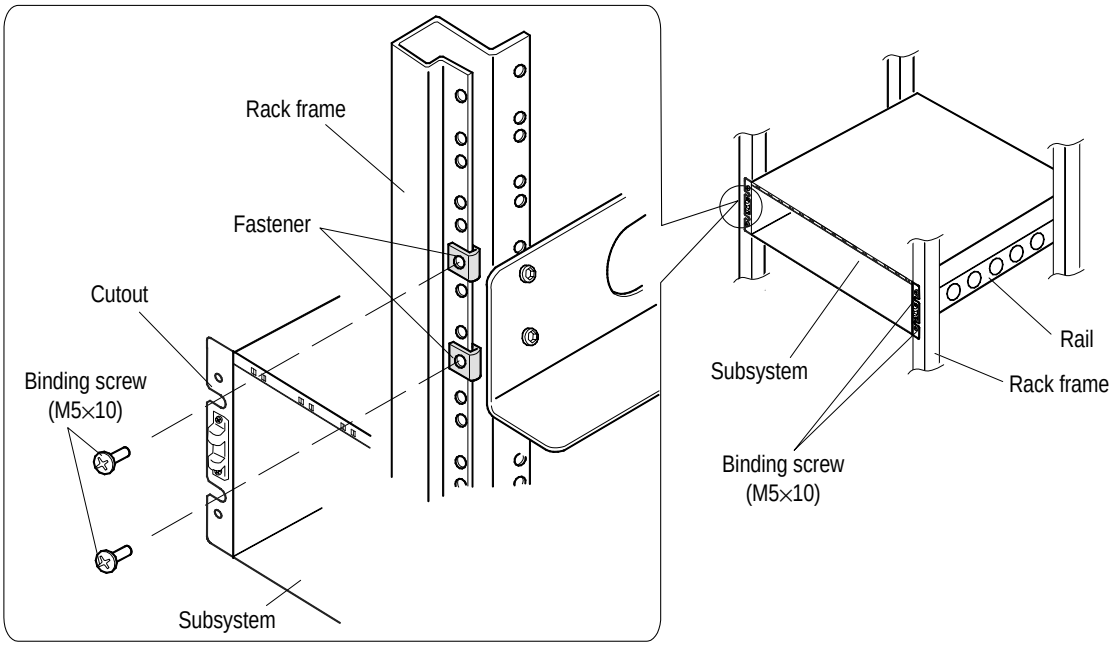


Figure 3.4.20 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

This is common for the three unit and four unit Rackmount models.

(i) Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.

(ii) Tighten the binding screws.

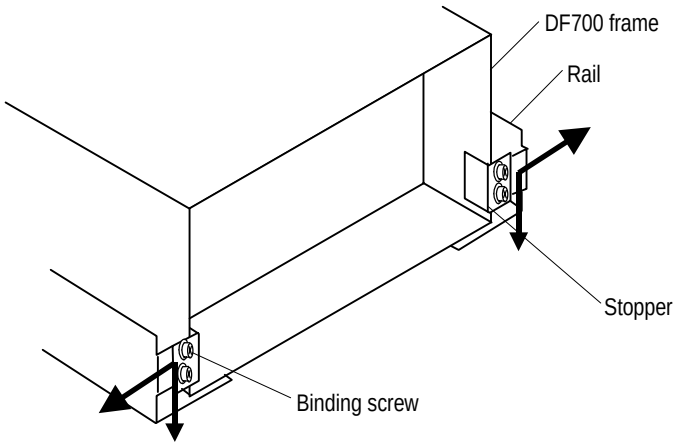


Figure 3.4.20.1 Securing Rear Side of the Subsystem

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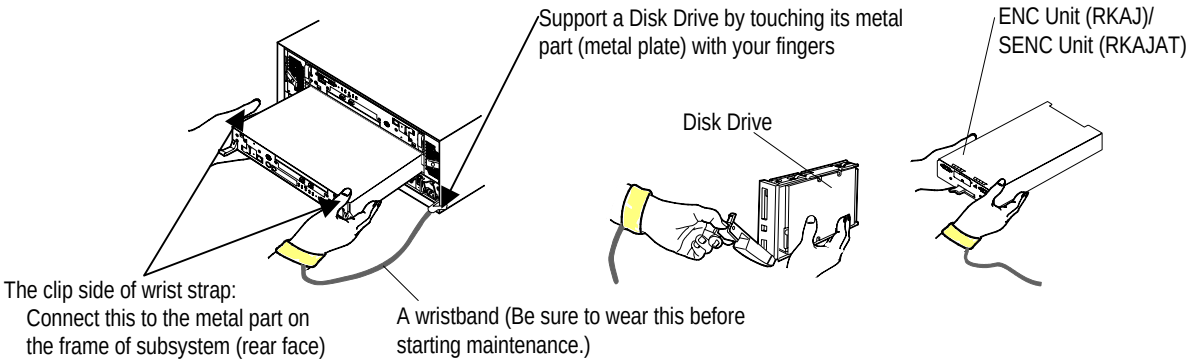
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3.4.7 Installing Components

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

Be sure to wear the wristband, connect its lead wire to the subsystem enclosure before starting the work, and do not remove them until the work is completed.
When installing a Disk Drive, Control Unit and ENC Unit/SENC Unit, hold it with your hand wearing the wristband having fingers contact metallic portions on the sides of the part.



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When the components are not installed, install them. If they have already been installed, go to the next step since this work is not needed.

Table 3.4.1 Parts Required for Installation of RKM/RKS

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F700-AGF72	2 to 15(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F700-AGH72		
		DF-F700-AGF146		
		DF-F700-AGH146		
		DF-F700-AGF300		
2	Backup Battery Unit	—	2(*2)	—
3	Fan Assembly	—	2	—
4	Control Unit	DF-F700-F1JM	1 or 2(*1)	for RKM
		DF-F700-F1JS	1 or 2(*1)	for RKS
5	Cache Unit	DF-F700-C1GJ	1 or 2(*3)	The Cache Unit with a model name selected from those shown on the left is installed.
		DF-F700-C2GJ		
6	Interface Board	DF-F700- DJ4G2	1 or 2	4G bps FC Interface Board (RKM)
		DF-F700- DJ4G2W	1 or 2	4G bps FC Interface Board (It is optional parts for RKS)
		DF-F700- DJNAS	1 or 2	NAS Interface Board
		DF-F700- DJSC2	1 or 2	iSCSI Interface Board
7	Power Unit	—	2	—

*1 : When no component is installed, a dummy part is installed instead.

*2 : There is only one Backup Battery Unit to be installed in the RKS and it is installed in the left side when seen from the front of the subsystem.

*3 : It is a number per Control Unit. But install one Cache memory per Control Unit in RKS.

Table 3.4.2 Parts Required for Installation of RKXS

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F700-ATE250R	3 to 15(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F700-ATE400R		
		DF-F700-ATE500R		
2	Backup Battery Unit	—	1(*2)	—
3	Fan Assembly	—	2	—
4	Control Unit	DF-F700-F1JXS	1 or 2(*1)	—
5	Cache Unit	DF-F700-C512JX	1(*3)	The Cache Unit with a model name selected from those shown on the left is installed.
		DF-F700-C1GJ		
6	Interface Board	DF-F700- DJ4G2W	1 or 2	4G bps FC Interface Board (It is optional parts for RKXS)
		DF-F700- DJNAS	1 or 2	NAS Interface Board
		DF-F700- DJSC2	1 or 2	iSCSI Interface Board
7	Power Unit	—	2	—

*1 : When no component is installed, a dummy part is installed instead.

*2 : There is only one Backup Battery Unit to be installed in the RKXS and it is installed in the left side when seen from the front of the subsystem.

*3 : It is a number per Control Unit.

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Table 3.4.3 Parts Required for Installation of RKH/RKHE

No.	Component name	Model	Quantity	Remark
1	Backup Battery Unit	—	4	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F700-F1JH	2	for RKH
		DF-F700-F2JH	2	for RKHE
4	Cache Unit	DF-F700-C1GJ	2 or 4(*1)	The Cache Unit with a model name selected from those shown on the left is installed.
		DF-F700-C2GJ		
5	Interface Board	DF-F700- DJ4G2H	0/2/4	4G bps FC Interface Board (RKM)
		DF-F700- DJNASH	0/2	NAS Interface Board
		DF-F700- DJSC2H	0/2(*2)	iSCSI Interface Board
6	Power Unit	—	2	—

*1 : It is a number per Control Unit.

*2 : The iSCSI Interface Board can be installed to the Control Unit #0.

Table 3.4.4 Components Required for the RKAJ

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F700-AGF72	2 to 15(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F700-AGH72		
		DF-F700-AGF146		
		DF-F700-AGH146		
		DF-F700-AGF300		
1	ENC Unit (RKAJ)	—	2	—
2	Power Unit (RKAJ)	—	2	—
3	ENC cable	—	4	See "3.4.11 Connecting the ENC cables" (INST 03-0670)

*1 : When no component is installed, a dummy part is installed instead.

Table 3.4.5 Components Required for the RKAJAT

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F700-ATE250R	2 to 15(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F700-ATE400R		
		DF-F700-ATE500R		
1	SENC Unit (RKAJAT)	—	2	—
2	Power Unit (RKAJAT)	—	2	—
3	ENC cable	—	2	See "3.4.11 Connecting the ENC cables" (INST 03-0670)

*1 : When no component is installed, a dummy part is installed instead.

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(1) Installing the Disk Drive

(1-1) Procedure for attachment

(a) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.

(b) Insert the Disk Drive into the position (address) where it was by holding it with the handle.

(i) Fit the Disk Drive in the guide rail of the RKAJAT and slide it in the direction shown by the arrow.

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

(d) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.
There are two types of the dummies (Disk Drives), and the installation methods are different respectively.

- The dummy (Disk Drive) of which the external appearance is similar to the Disk Drive
  There is no label attached on the handle part.
  Install it in the same way as the Disk Drive.
- The dummy (Disk Drive) of which the external appearance is all black
  This is the dummy (Disk Drive) of the resin all-in-one molded piece (black) with no stopper and handle part.
  Insert it into the slot slowly so that the latch (round dent) part of the dummy (Disk Drive) comes to the lower side.

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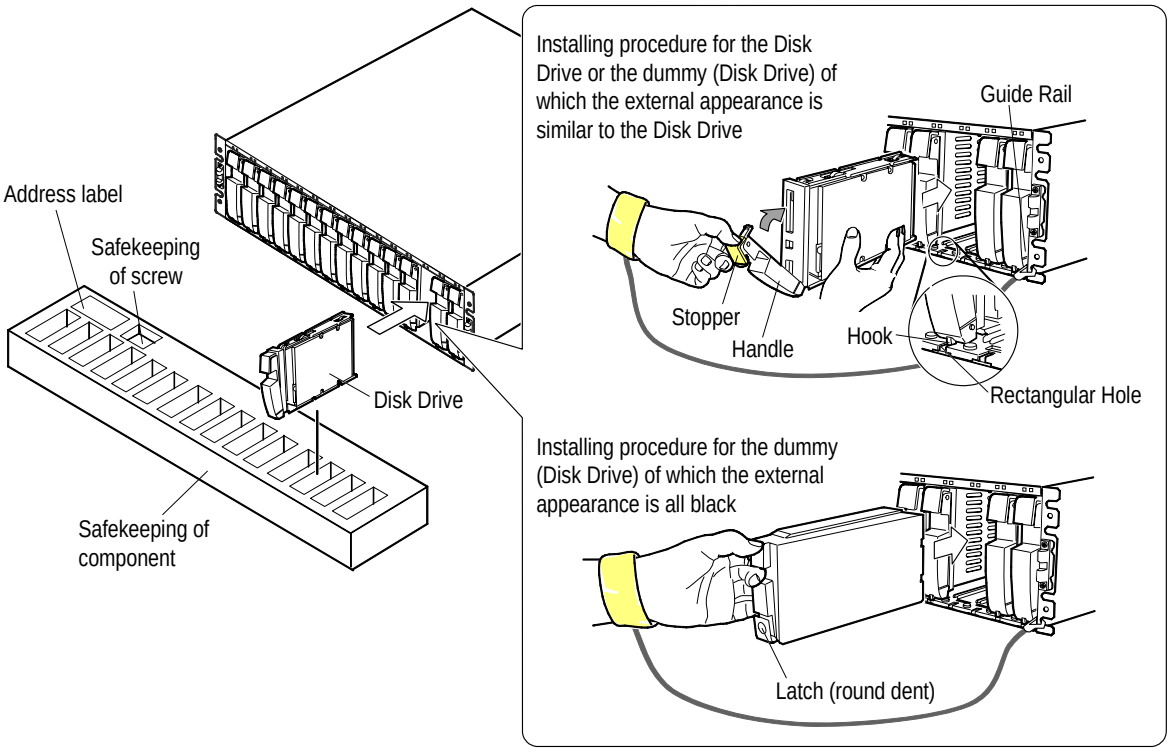


Figure 3.4.21 Installing the Disk Drive/Dummy (Disk Drive)

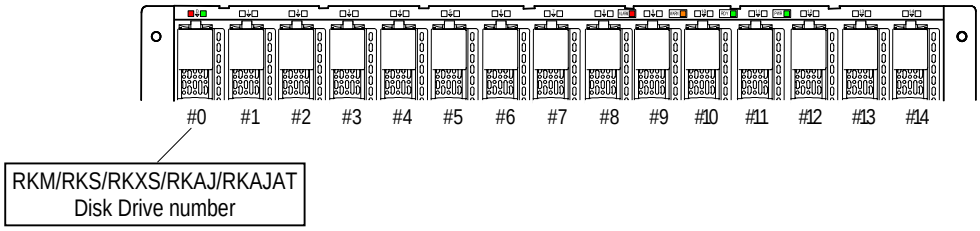


Figure 3.4.22 Disk Drive Mounting Location

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(1-2) Setting Device ID number

The subsystem ID of the RKM/RKS/RKXS or the RKAJ to be connected to the RKH is set to # 0. Set the Device ID numbers of the RKAJ/RKAJAT in serial order starting from the RKAJ/RKAJAT connected next to the RKH/RKM/RKS/RKXS.

In the case of a configuration of one RKM/RKS+ RKAJs + RKAJATs, set the device IDs of the RKAJ, the RKAJATs connected to the Path 0, and the RKAJATs connected to the Path 1 as #0x, #2x, and #3x respectively. Set the "x" as an ascending serial number in each of the Path 0 and Path 1 without discrimination between the RKAJ and RKAJAT.
Set #2x for RKAJAT of RKXS + RKAJAT. Set x in ascending order.

In the case of a configuration of one RKH + RKAJs, set the device IDs of the RKAJs, the RKAJATs connected to the PATH #0, and the RKAJATs connected to the PATH #1 as #0x, #2x, and #3x respectively. Set the "x" as an ascending serial number in each of the PATH #0 and PATH #1 without discrimination between the RKAJ and RKAJAT.
Set the device IDs of the RKAJs, the RKAJATs connected to the PATH #2, and the RKAJATs connected to the PATH #3 as #1x, #4x, and #5x respectively. Set the "x" as an ascending serial number in each of the PATH #2 and PATH # 3 without discrimination between the RKAJ and RKAJAT.

For details of the device ID setting, refer to "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

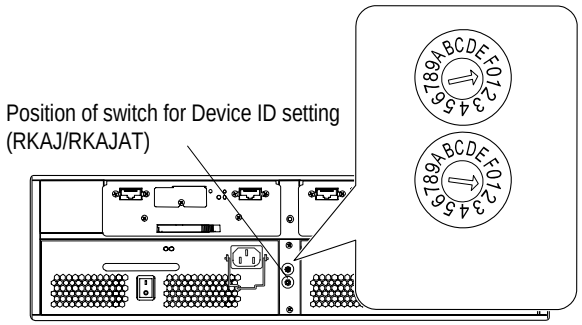


Figure 3.4.23 Position of Switch for Device ID Setting

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(1-3) Setting the subsystem identification switch

Set only the RKAJ.

When the basic subsystem to be connected is the RKM/RKH, set it in the M side, and when it is the RKS, set it in the S side.

Check the RKM and RKS by the subsystem model names. (Refer to "2.2 (3) Checking contents of package" (INST 02-0040).)

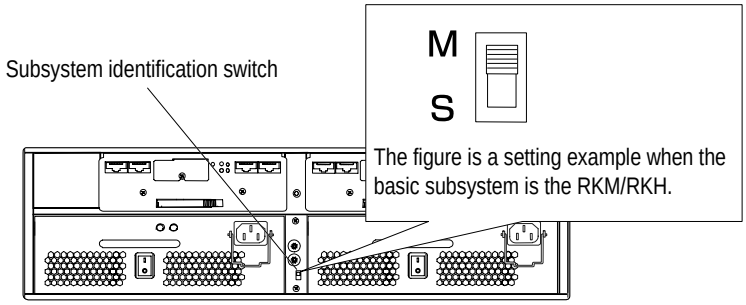


Figure 3.4.24 Position of Switch for the Subsystem Identification

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(2) Installing Backup Battery Unit

This installation work is only applied to RKM/RKS/RKXS/RKH.

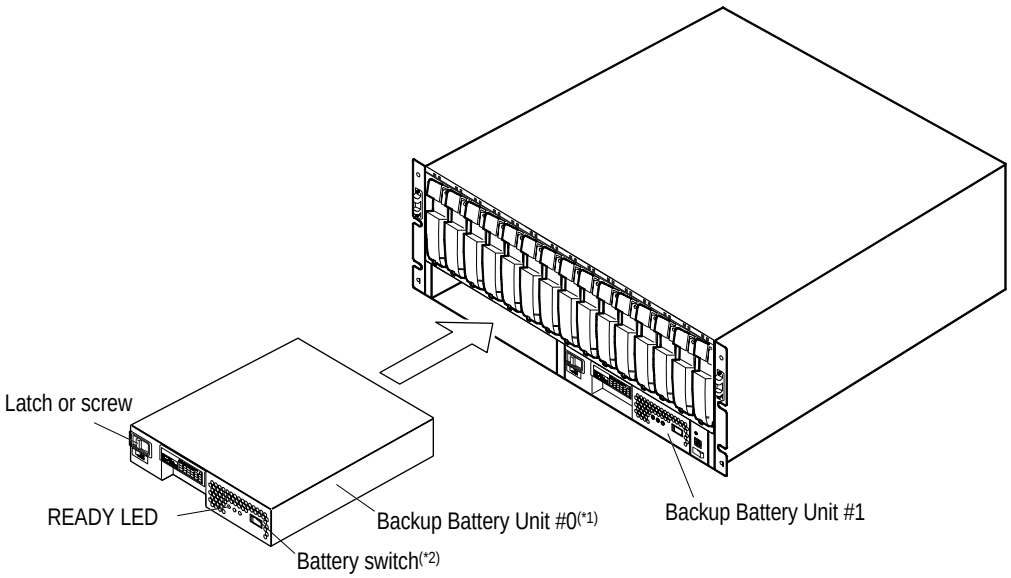
(a) Remove the Front Bezel. ("1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))

(b) Make sure that the battery switch on the Backup Battery Unit is turned off.

NOTE : In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(c) Insert the Backup Battery Unit in the specified location in the subsystem to the position where it is completely fixed until the latch moves to Lock side.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, shift the latch (fixing screw) of the Backup Battery Unit to the Release position, and insert the subsystem.
Shift the latch (fixing screw) of the Backup Battery Unit to the Lock position, tighten the latch (fixing screw).

NOTE : There is only one Backup Battery Unit to be installed in the RKS/RKXS and it is installed in the left side when seen from the front of the subsystem.



*1 : Only one battery is installed in RKS/RKXS left side of the subsystem.

*2 : In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS, there is no battery switch. Also, the latch is fixed with a screw.

*3 : The figure shows RKM.

Figure 3.4.25 Installing Backup Battery Unit (RKM/RKS/RKXS)

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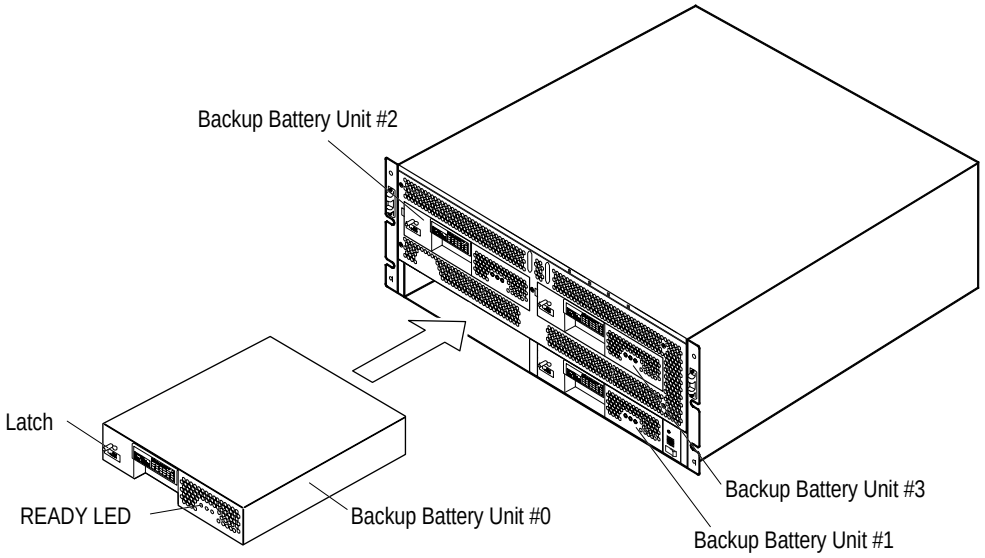


Figure 3.4.25.1 Installing Backup Battery Unit (RKH)

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(3) Installing Fan Assembly

This installing work is only applied to RKM/RKS/RKXS/RKH.

The two same Fan Assembly are installed facing each other in the state in which each of them faces left and right. When installing them, make each of them face reverse direction correctly.

(a) Insert the Fan Assembly in the specified position in the subsystem, raise it by fitting the hook of the lever to the cutout of the subsystem, and tighten it with the fixing screw.

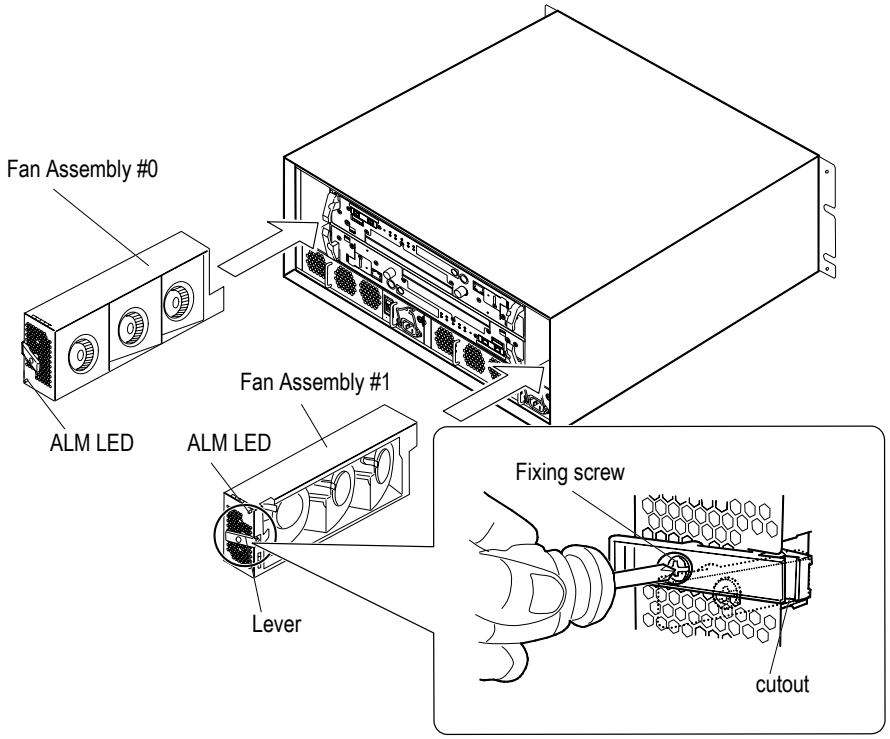


Figure 3.4.26 Installing Fan Assembly

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(4) Installing the Control Unit, Cache Unit and Interface Board

When the Cache Unit and the Interface Board are already installed, the installing work for Cache Unit and the Interface Board is not required.

(a) In the case of RKS/RKXS

(a-1) When the interface board is not installed in the Control Unit of the RKS/RKXS

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.

• Be careful not to insert Cache Units at the reversed direction.

(iii) Make sure that the Cache Unit is firmly installed.

(iv) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(v) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.

In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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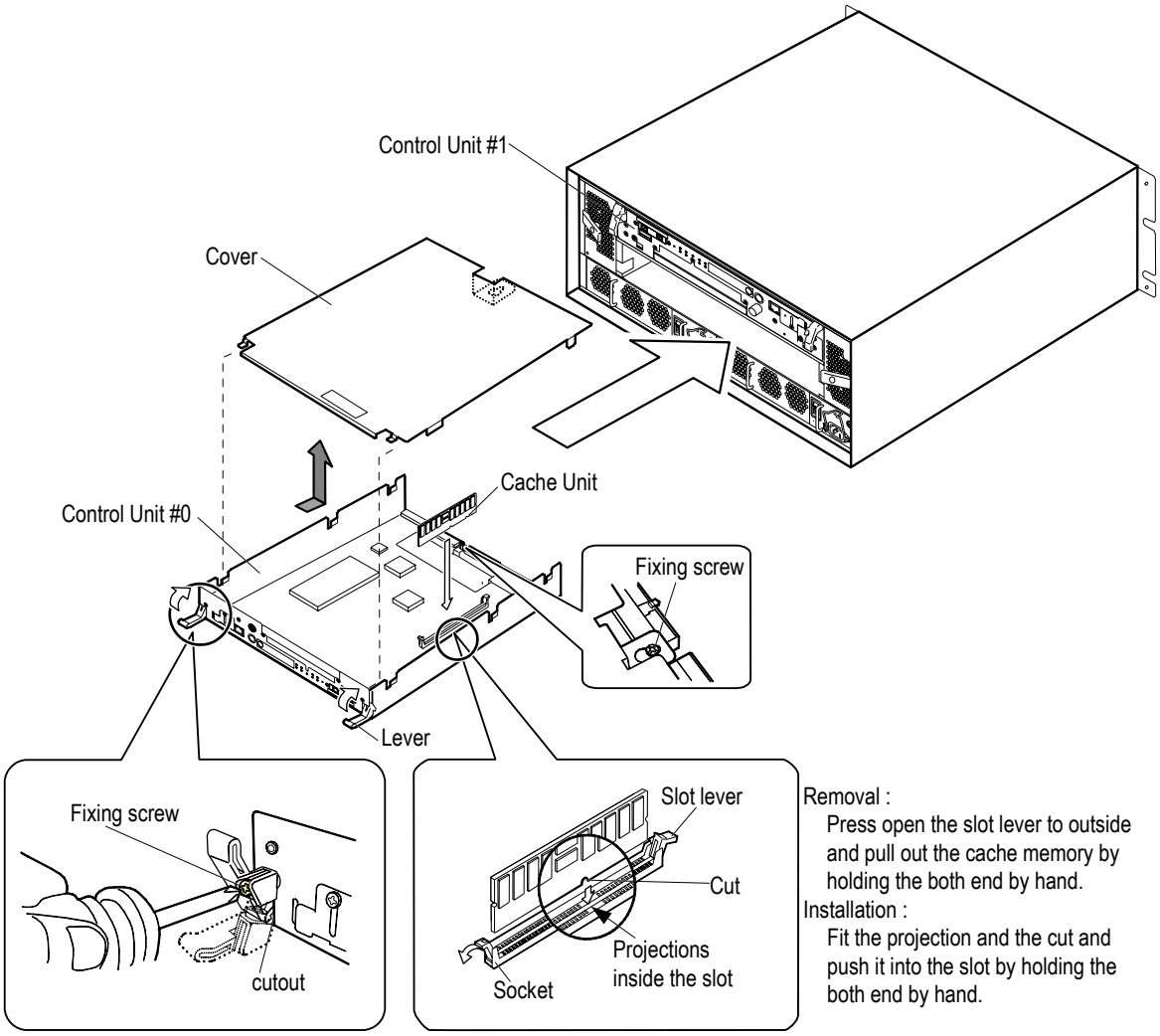


Figure 3.4.27 Installing Control Unit and Cache Unit

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(a-2) When the Interface Board is installed in the Control Unit of the RKS/RKXS

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Remove two host connectors for 2 G bps from the Control Unit.

- Pull it out after raising the lever for Type 1.
- Pull it out after pushing down the lever toward for Type 2.

After this, hand over the removed two host connectors for 2 G bps to the customer, and ask him/her to keep them carefully.

(iii) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). Insert the connectors surely.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

(iv) Make sure that the Interface Board is firmly installed.
When the NAS Interface Board was installed, loosen the screws of the connector cover for the maintenance of the Control Unit, attach the Panel, and fix it by tightening the screws.

(v) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE :
- For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
- Be careful not to insert the Cache Units in the reverse orientation.
- Insert the Cache Units in the cache slots in regular order starting from the slot #0.
- Insert the dust cover in the Cache slot in which the Cache memory is not installed.

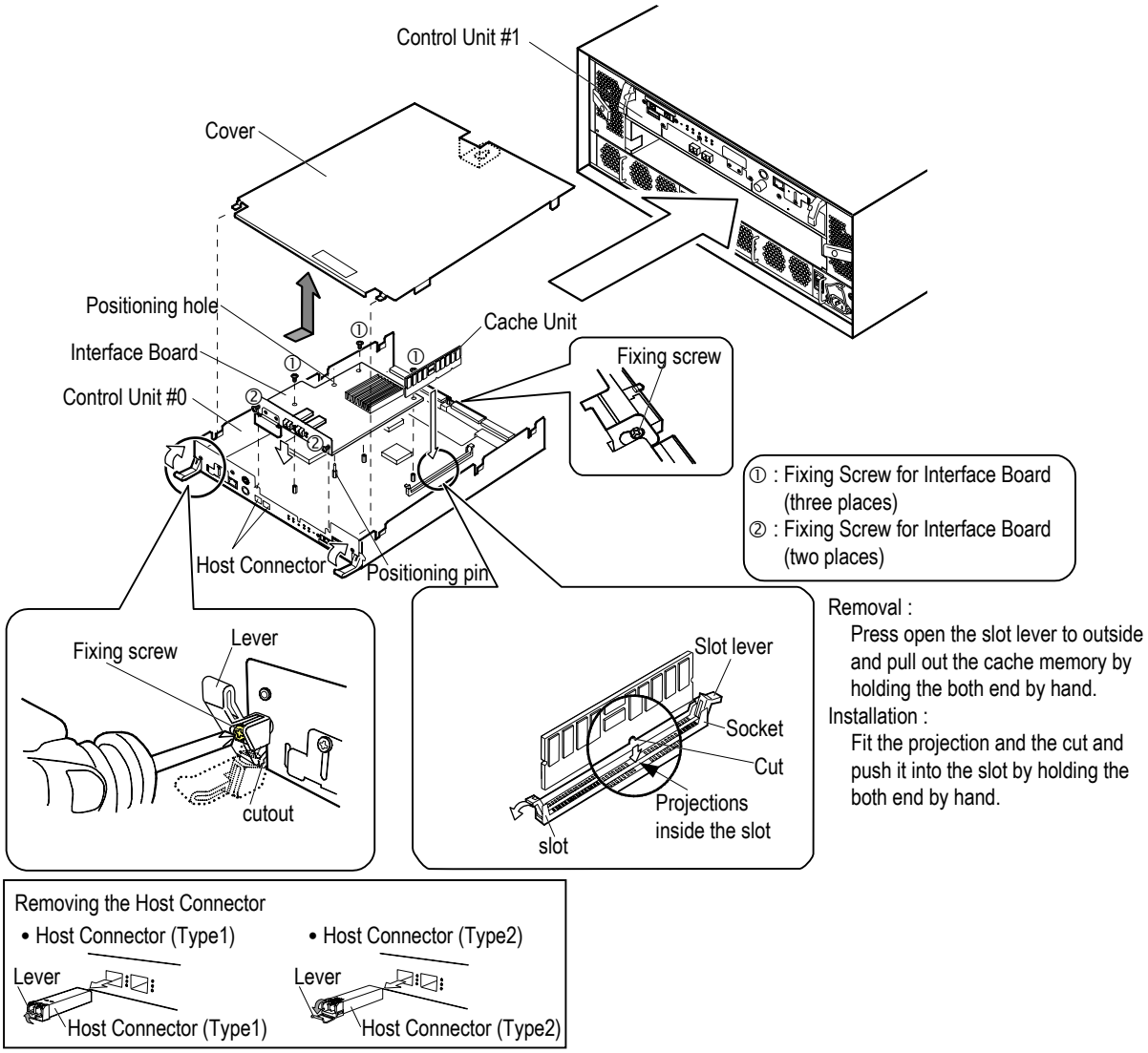
(vi) Make sure that the Cache Unit is firmly installed.

(vii) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(viii) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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*1 : The figure shows the case where the FC Interface Board is added to the Control Unit of the RKS.

Figure 3.4.27.1 Installing Control Unit, Cache Unit and Interface Board

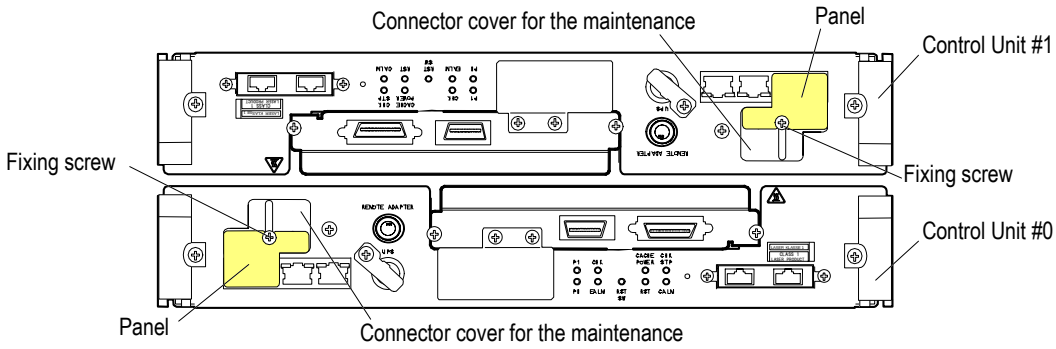


Figure 3.4.27.2 Installation position of Panel when NAS Interface Board is installed

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(b) In the case of RKM

(i) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(ii) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). Insert the connectors surely.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

(iii) Make sure that the Interface Board is firmly installed.
When the NAS Interface Board was installed, loosen the screws of the connector cover for the maintenance of the Control Unit, attach the Panel, and fix it by tightening the screws.

(iv) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Be careful not to insert the Cache Units in the reverse orientation.
• Insert the Cache Units in the cache slots in regular order starting from the slot #0.
• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

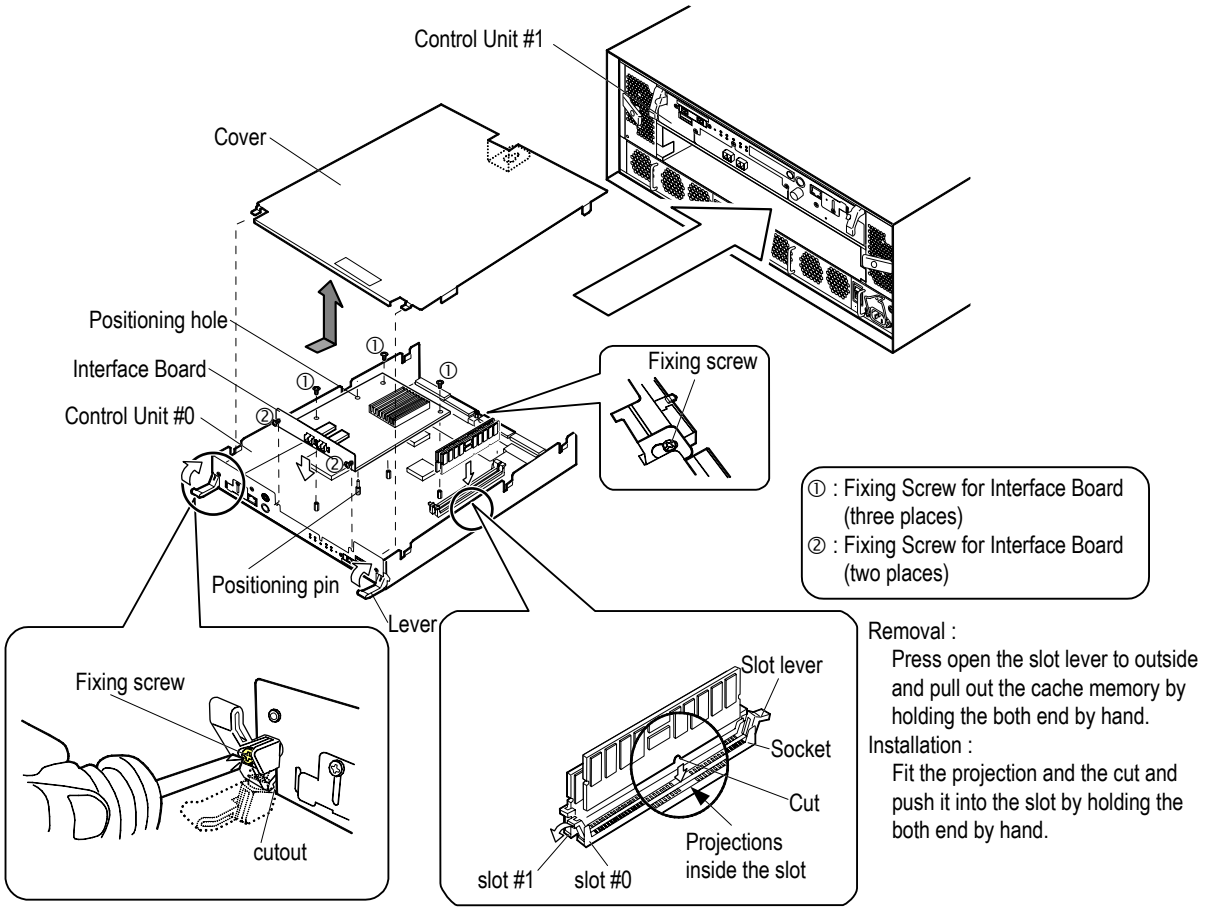
(v) Make sure that the Cache Unit is firmly installed.

(vi) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(vii) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

Figure 3.4.28 Installing Control Unit, Cache Unit and Interface Board

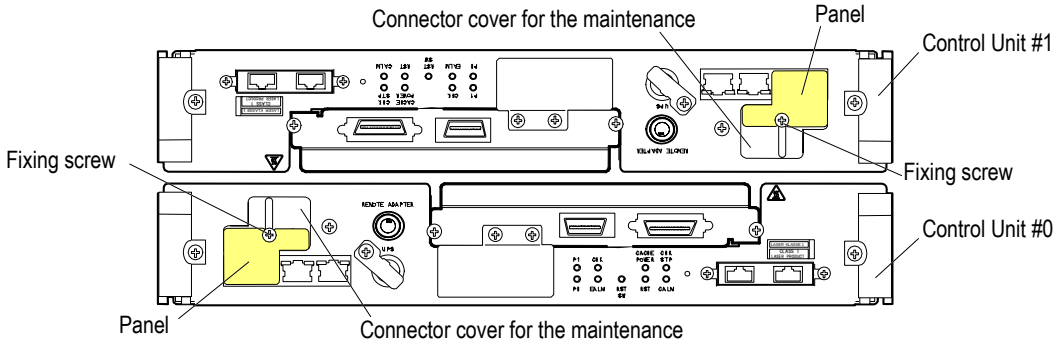


Figure 3.4.28.1 Installation position of Panel when NAS Interface Board is installed

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(c) In the case of RKH/RKHE

NOTE : Use the Control Unit whose model name is the DF-F700-F1JH for the RKH.
Use the Control Unit whose model name is the DF-F700-F2JH for the RKHE.
The Control Unit of the RKH and the Control Unit of the RKHE cannot be mixed.

(i) Loosen two fixing screws for the cover at the back of the cover, remove the cover in the direction shown by the arrow (⟶).

(ii) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). Insert the connectors surely.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : • Be careful that the position to install the Interface Board is determined. (Refer to Table 3.4.6).
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1.

(iii) Make sure that the Interface Board is firmly installed.
When the NAS Interface Board was installed, loosen the screws of the connector cover for the maintenance of the Control Unit, open it.

(iv) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • Be careful not to insert the Cache Units in the reverse orientation.
• If the Cache memories are not installed in the slot #0 and the slot #1, the blockade of the Control Unit occurs.
Be sure to install the Cache memories in the slot #0 and the slot #1.
• Install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
• Install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively.
• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

(v) Make sure that the Cache Unit is firmly installed.

(vi) Attach the cover in the opposite direction of which it was removed, and tighten the fixing screw for the cover at the back of the cover.

(vii) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

Table 3.4.6 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board

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6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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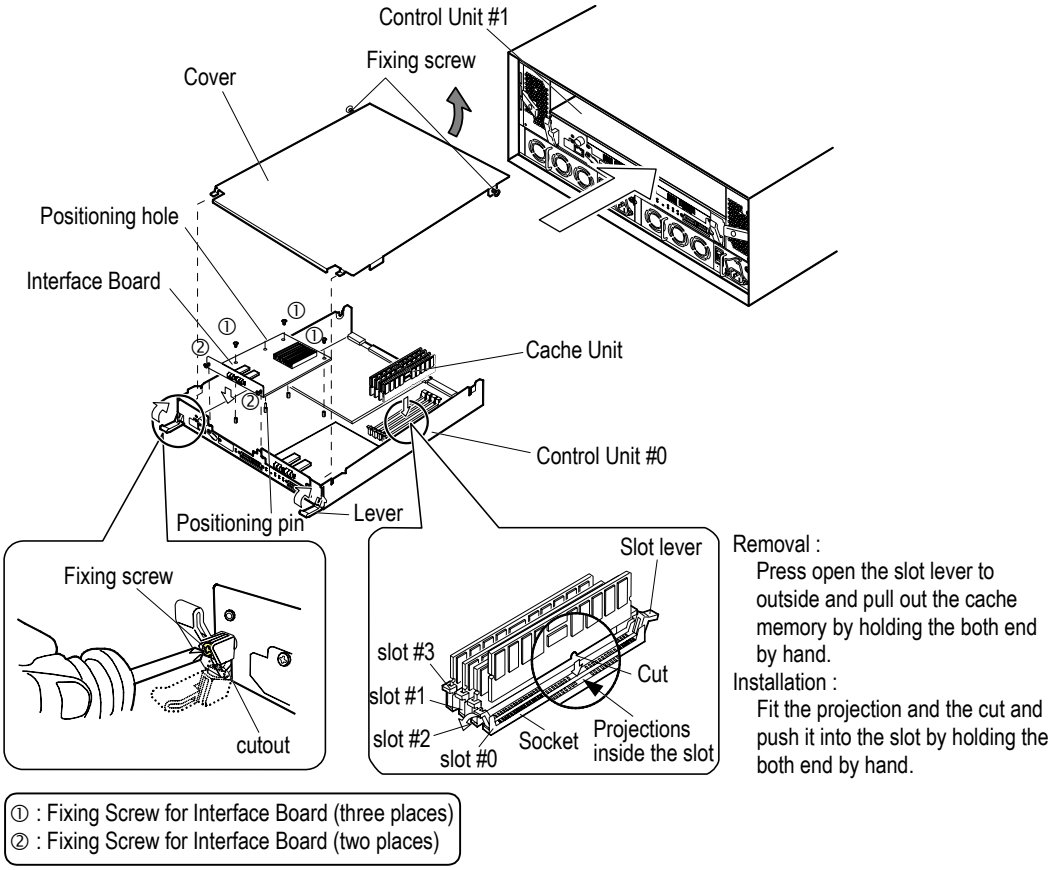


Figure 3.4.28.1 Installing Control Unit, Cache Unit and Interface Board

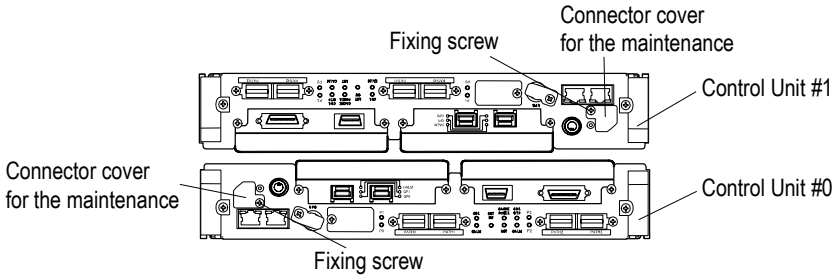


Figure 3.4.28.2 Installation position of Panel when NAS Interface Board is installed

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(5) Installing ENC Unit (for RKAJ) and SENC Unit (for RKAJAT)

Install the ENC unit in the RKA and the SENC unit in the RKAJAT.

(a) Insert the ENC Unit/SENC Unit into the specified location in the subsystem with its lever being raised, then return the lever in the direction shown by the arrow (⟶).
Take notice that the forms differ between the ENC Unit and SENC Unit.

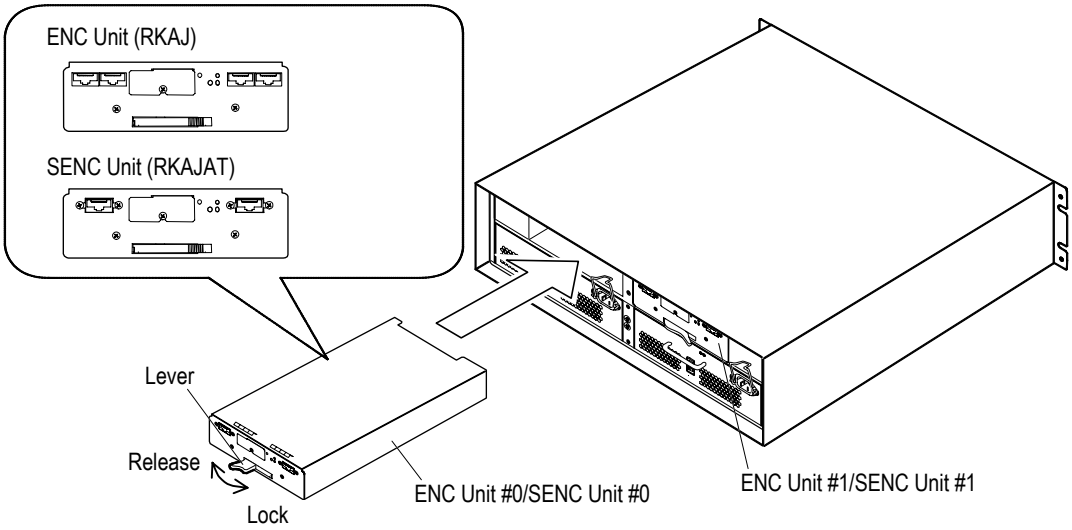


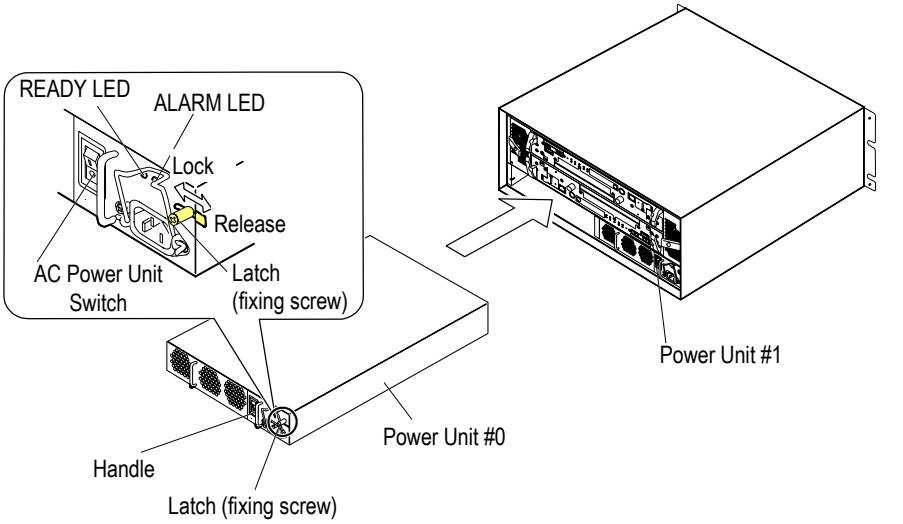
Figure 3.4.29 Installing ENC Unit/SENC Unit

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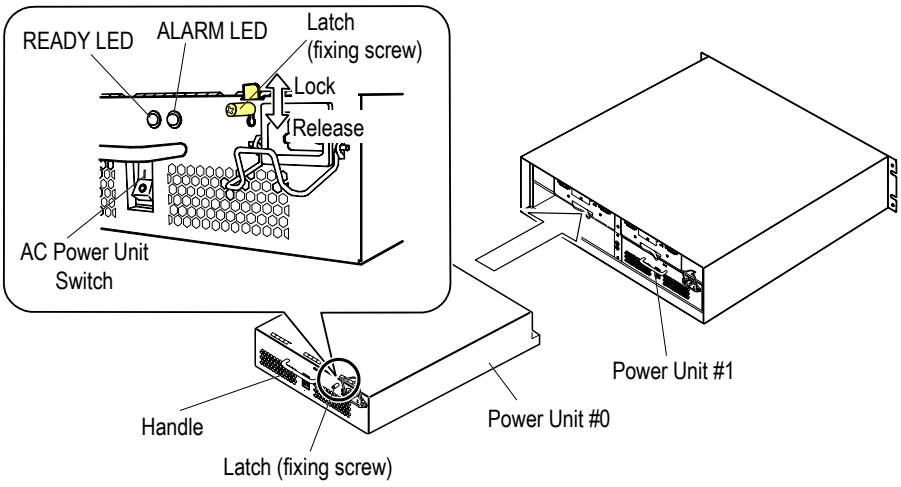
(6) Installing Power Unit

(a) Make sure that the AC Power Unit Switch is turned off.

(b) Shift the latch (fixing screw) of the Power Unit to the Release position, insert it slowly into the sheet metal slit part at the top of the power Unit, and then push it to the end.



(a) RKM/RKS/RKXS/RKH



(b) RKAJ/RKAJAT

Figure 3.4.30 Installing Power Unit

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3.4.8 Installing the RKNAS

(1) Installing in the U7 rack Frame

When installing the RKNAS in the U7 rack frame, use the rack rail (DF-F700-URHTN7). The Components-list of U7 rack rail is shown in Table 3.4.8.

Table 3.4.8 Components of Rack-rail (DF-F700-URHTN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3274740-A	1	For right hand side	–
2	Rail	3274740-B	1	For left hand side	–
3	Stopper	5531106-1	2	For securing the subsystems	–
4	Rack nut	5510146-1	12	For securing the subsystems and the rails (2 spares are included.)	–
5	Bind screw with washer (M3×10)	3261960-310	6	For securing the Stopper (2 spares are included.)	–
6	Bind screw (M5×10)	SB510N	4	For securing the subsystems (2 spares are included.)	–
7	Bind screw (M5×16)	SB516N	10	For securing the rails (2 spares are included.)	–

(a) Installing the rail

(i) On the left side of the installation location in the rack frame, align the round holes of the Rail (L) with those of the rack frame and insert the Rack nut (at four places in total in front and rear.). (Refer to Figure 3.4.30.1)

(ii) Fasten the Rail (L) to the rack frame using the binding screw (M5×16) (at two places each on the front and rear sides.).

(iii) Install the Rail (R) to the rack frame in the same way.

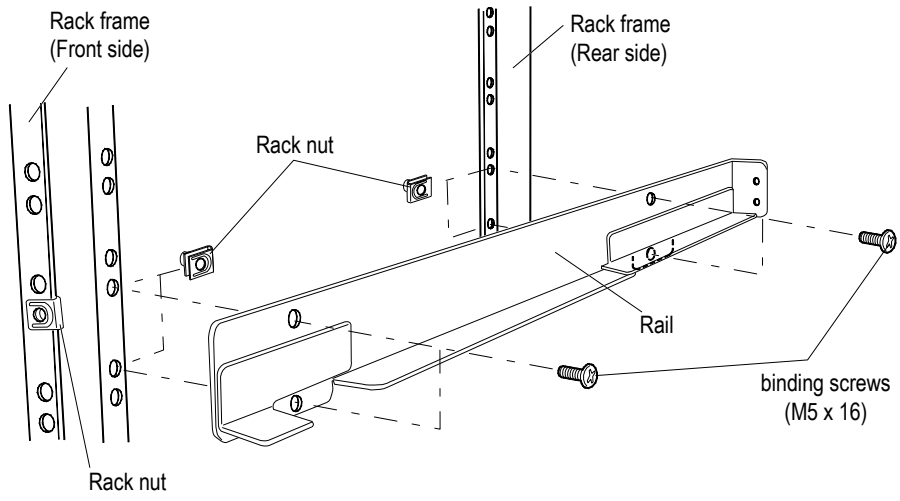


Figure 3.4.30.1 Installing the Rail for the RKNAS Installation (U7 rack frame)

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(b) Installing the RKNAS

(i) Install the RKNAS in the rail.

(ii) Fix the front part of the RKNAS to the rack with two binding screws (M5 x 10) (one place each at right and left).

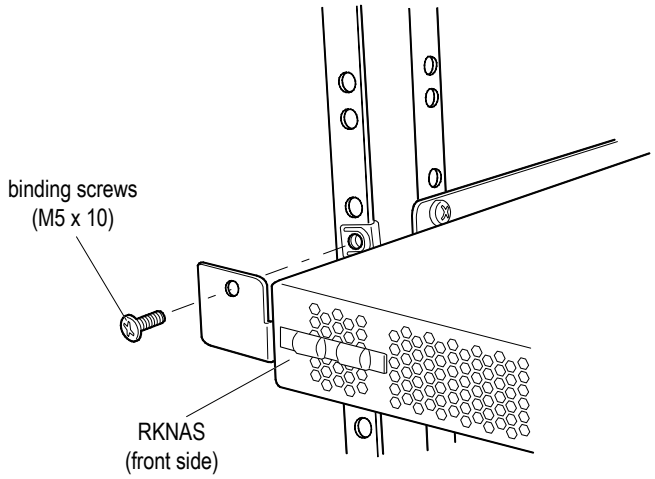


Figure 3.4.30.2 Fixing the Front Part of the RKNAS

(iii) Fix the rear part of the RKNAS with two Stoppers and four binding screws with washer (M3 x 10) (one place each at right and left for the Stoppers, and two places each at right and left for the binding screws with washer (M3 x 10)).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

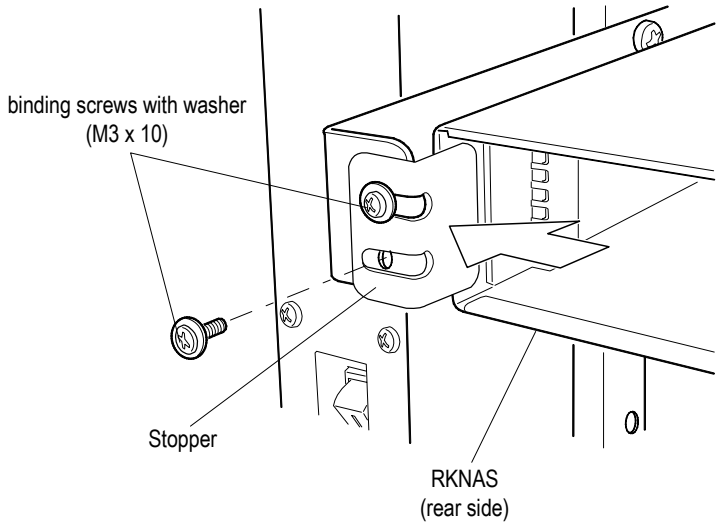


Figure 3.4.30.3 Fixing the Rear Part of the RKNAS

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(2) Installing in the 19-inch rack Frame

When installing the RKNAS in the 19-inch rack frame, use the rack rail (DF-F700- URN7). The Components-list of 19-inch rack rail is shown in Table 3.4.9.

Table 3.4.9 Components of Rack-rail (DF-F700-URN7) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front Rail	2850146-A	1	For right hand side	–
2	Front Rail	2850146-B	1	For left hand side	–
3	Rear Rail	3274832-1	1	For right hand side	–
4	Rear Rail	3274832-2	1	For left hand side	–
5	Stopper	5531200-1	2	For securing the subsystems	–
6	Spacer	5531202-1	2	For securing the subsystems	–
7	Bind screw (M5×10)	SB510N	10	For securing the rails (2 spares are included.)	–
8	Bind screw (M4×8)	SB408N	10	For securing the rails (2 spares are included.)	–
9	Bind screw (M3×6)	SB306N	6	For securing the stopper (2 spares are included.)	–
10	Screw	SC306N	6	For securing the Spacer (2 spares are included.)	–
11	Rack nut	5510146-1	10	For securing the rails (2 spares are included.)	–
12	Bind screw (M5×8)	3274845-508	4	For securing the subsystems (2 spares are included.)	–

(a) Installing the rail

(i) Install the Rack nuts in the installation position of the front rail (two places).

(ii) Fix the front side of the front rail with the Binding screws (M5x10) (two places).

(iii) Install the Spacer in the front of the front rail, and fix it with the Screws (M3x6) (two places).

(iv) Install the Rack nuts in the installation position of the rear rail (two places).

(v) Fix the rear side of the rear rail with the Binding screws (M5x10) (two places).

(vi)) Fix the front rail and the rear rail with the Binding screws (M4x8) (four places).

(vii) Perform the above-mentioned installation to the right and left of the rack frame.

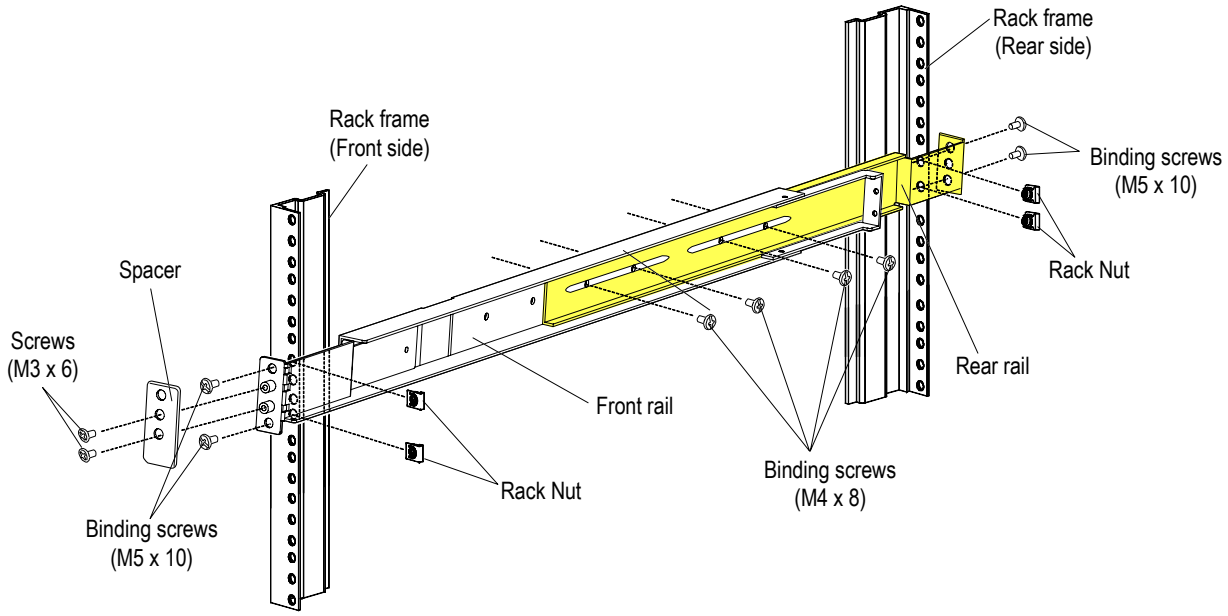


Figure 3.4.30.4 Installing the Rail for the RKNAS Installation (19-inch rack frame)

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(b) Installing the RKNAS

(i) Install the RKNAS in the rail.

(ii) Fix the front part of the RKNAS to the rack with two Binding screws (M5 x 8) (one place each at right and left).

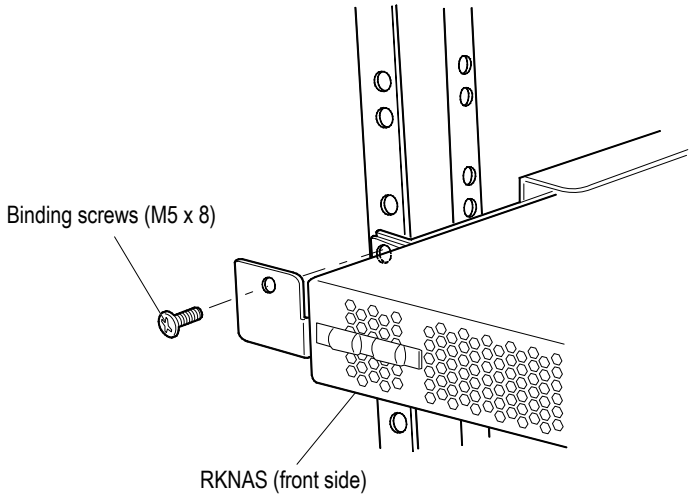


Figure 3.4.30.5 Fixing the Front Part of the RKNAS

(iii) Fix the rear part of the RKNAS with two Stoppers and four Binding screws (M3 x 6) (one place each at right and left for the Stoppers, and two places each at right and left for the Binding screws (M3 x 6)).

NOTE : Shift each of the two Stoppers in the direction shown by the arrow and make it contact the frame.

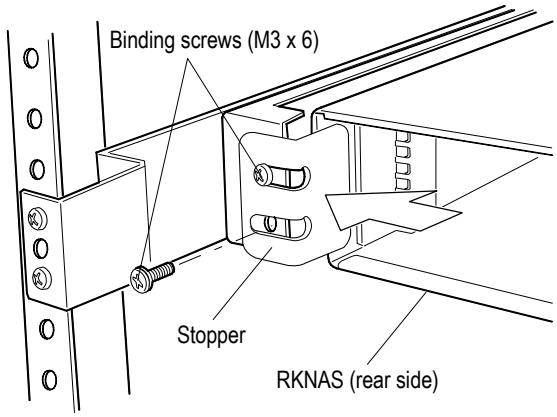


Figure 3.4.30.6 Fixing the Rear Part of the RKNAS

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3.4.9 Connecting Cables

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "1.1 (3) Note on cable routing" (INST 01-0010).

NOTE : Power supply system of the subsystem is duplicated.
It is recommended to connect each system to outlet of one of the two power sources independent of each other.

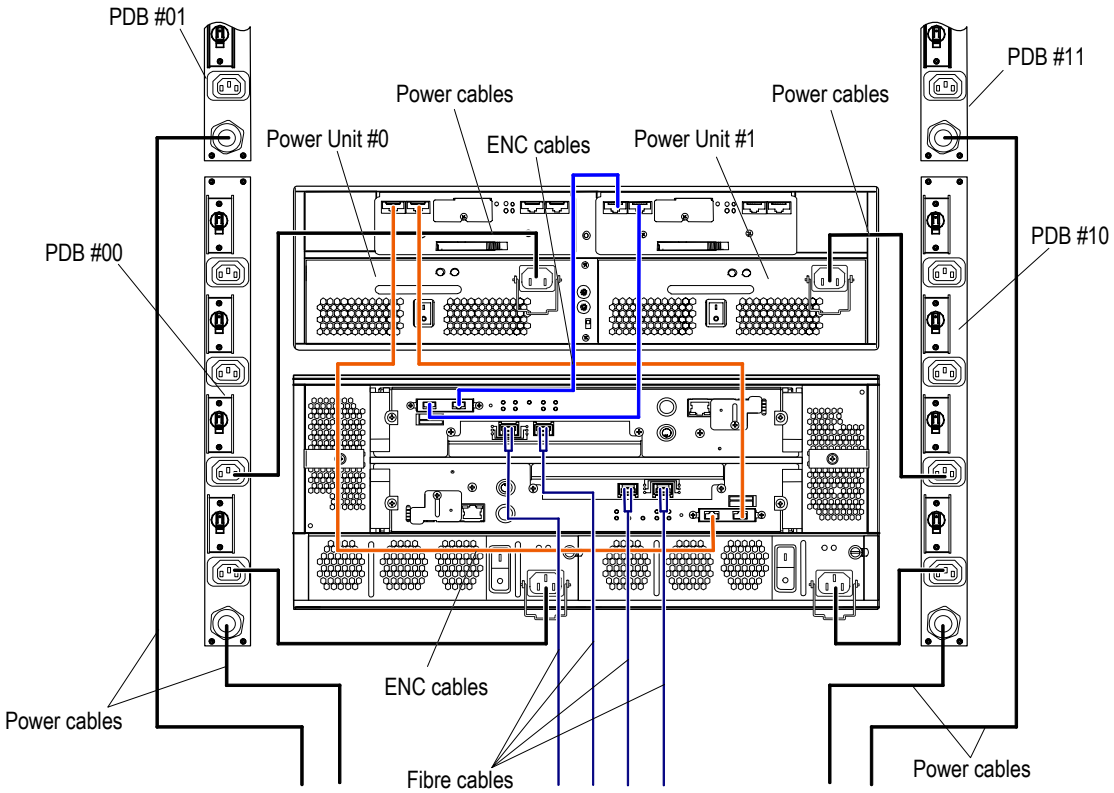
The cable routing for the subsystem which is mounted on the rack frame is shown in Figure 3.4.31, Figure 3.4.32, Figure 3.4.32.1 and Figure 3.4.32.2. Types of the cables to be used are shown in Table 3.4.10.

Table 3.4.10 Types Cables to be Connected

No.	Cable name	Remarks
1	Fibre Channel Interface cable	See "3.4.10 Connecting the Interface cable" (INST 03-0640)
2	iSCSI Interface cable	See "3.4.10 Connecting the Interface cable" (INST 03-0640)
3	ENC cable	See "3.4.11 Connecting the ENC cables" (INST 03-0670)
4	Power cable(*1) (100 V)	See "3.4.12 Connecting the power cables" (INST 03-0710)
5	Power cable (200 V) (Rack frame PDB)	See "3.4.13 Connecting the power cables (Rack frame PDB)" (INST 03-0730)
	Power cable (Added PDB)	See Addition/Subtraction/Relocation "1.5.2 (5) Installing the power Cable (Added PDB append parts) and cable holder." (ADD 01-0480)

*1 : When replacing power cable of the RKM/RKAJ/RKAJAT/RKS, which has already been connected, with the optional power cable, refer to Addition/Subtraction/Relocation "3.3.1 Disconnecting the power cables" (ADD 03-0090).

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*1 : The figure shows the connection of RKM and RKAJ.

Figure 3.4.31 FC Interface cable Routing for the Subsystem (RKM/RKS+RKAJ)

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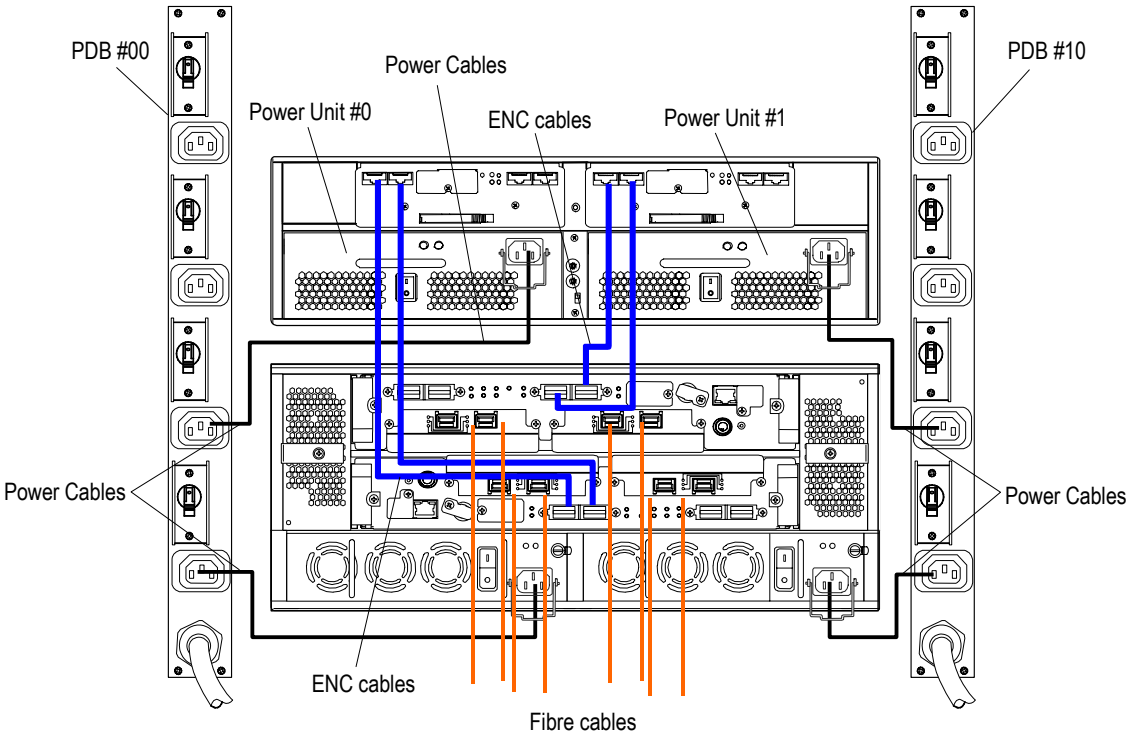
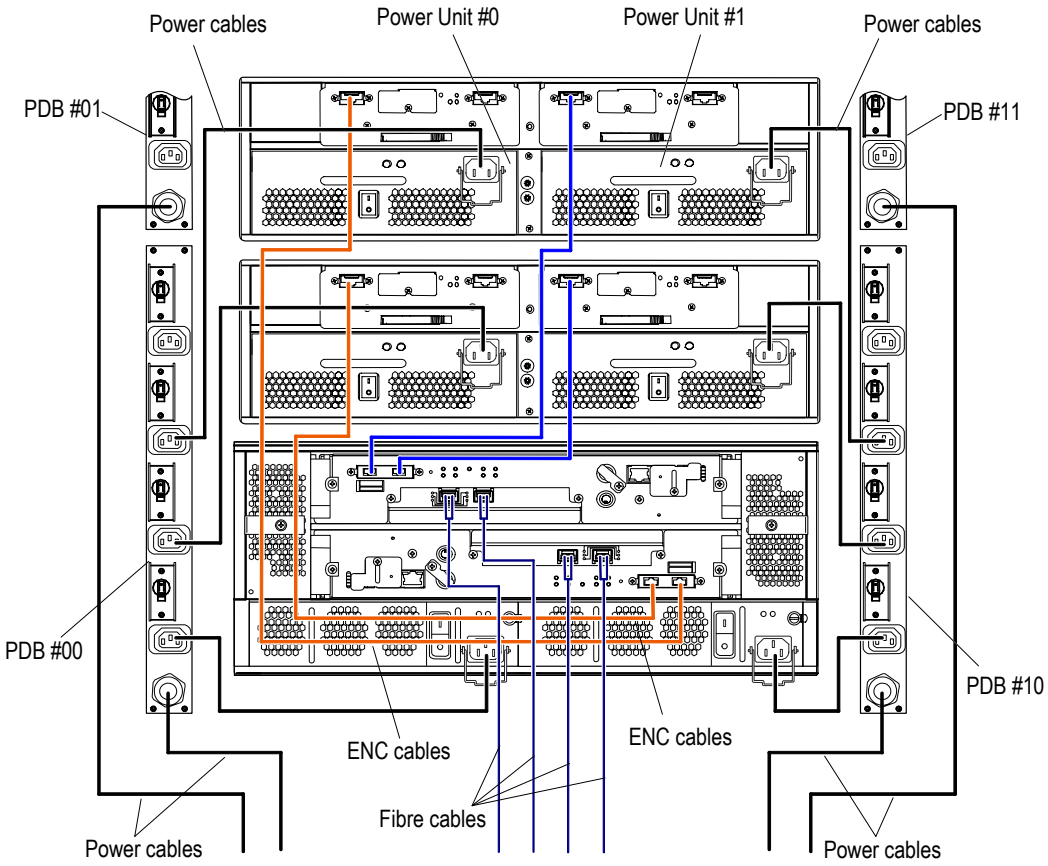


Figure 3.4.31.1 FC Interface cable Routing for the Subsystem (RKH+RKAJ)

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*1 : The figure shows the connection of RKM and RKAJAT.

Figure 3.4.32 FC Interface cable Routing for the Subsystem (RKM/RKS+RKAJAT)

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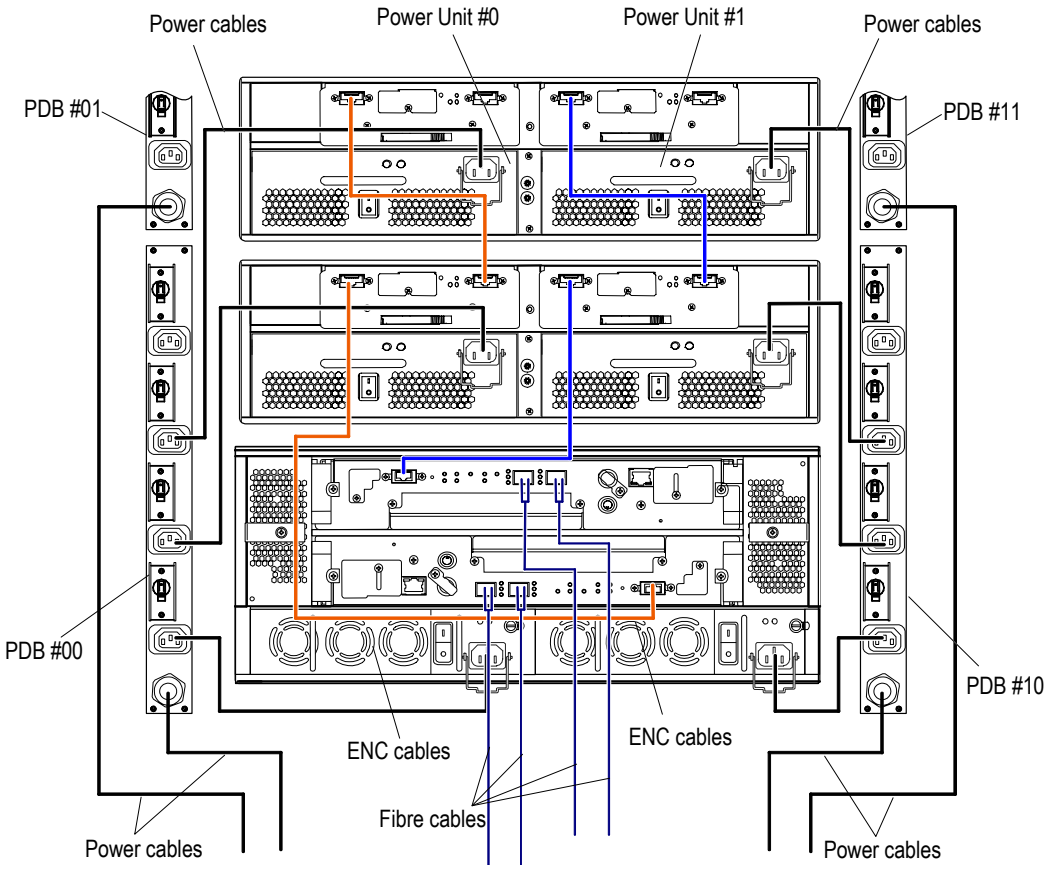


Figure 3.4.32.1 FC Interface cable Routing for the Subsystem (RKXS+RKAJAT)

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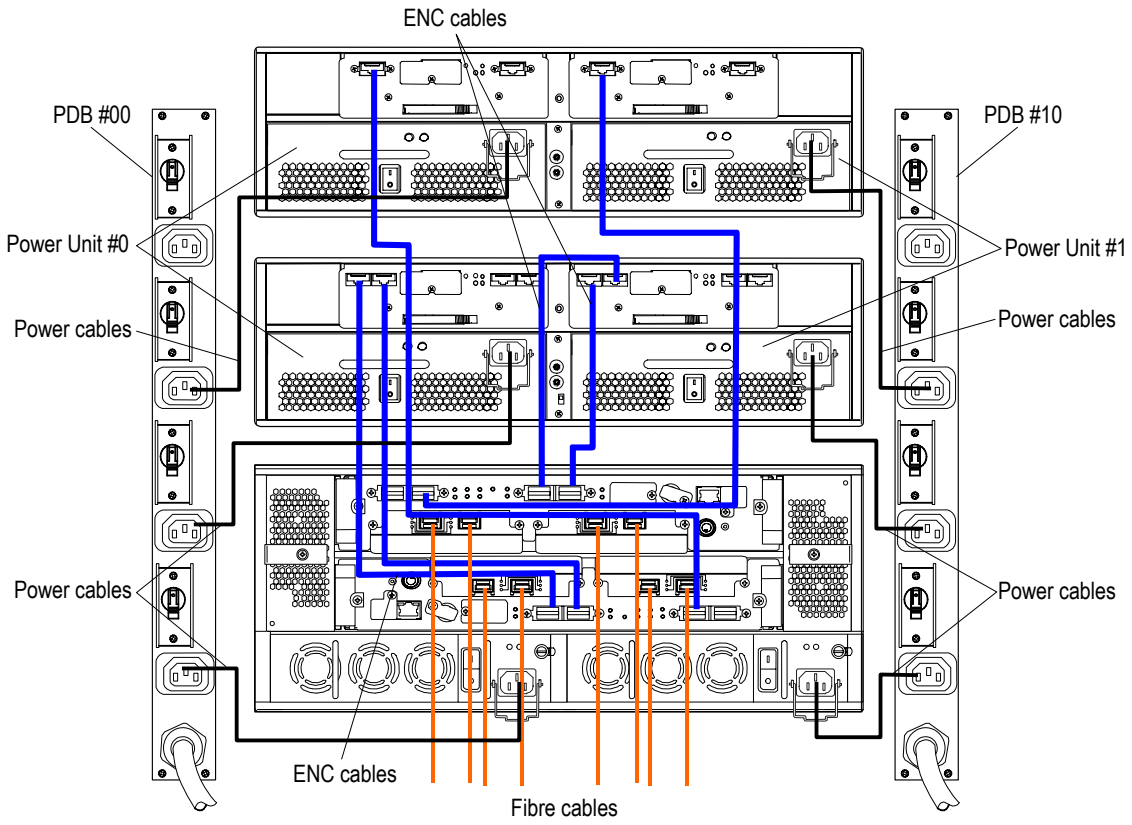
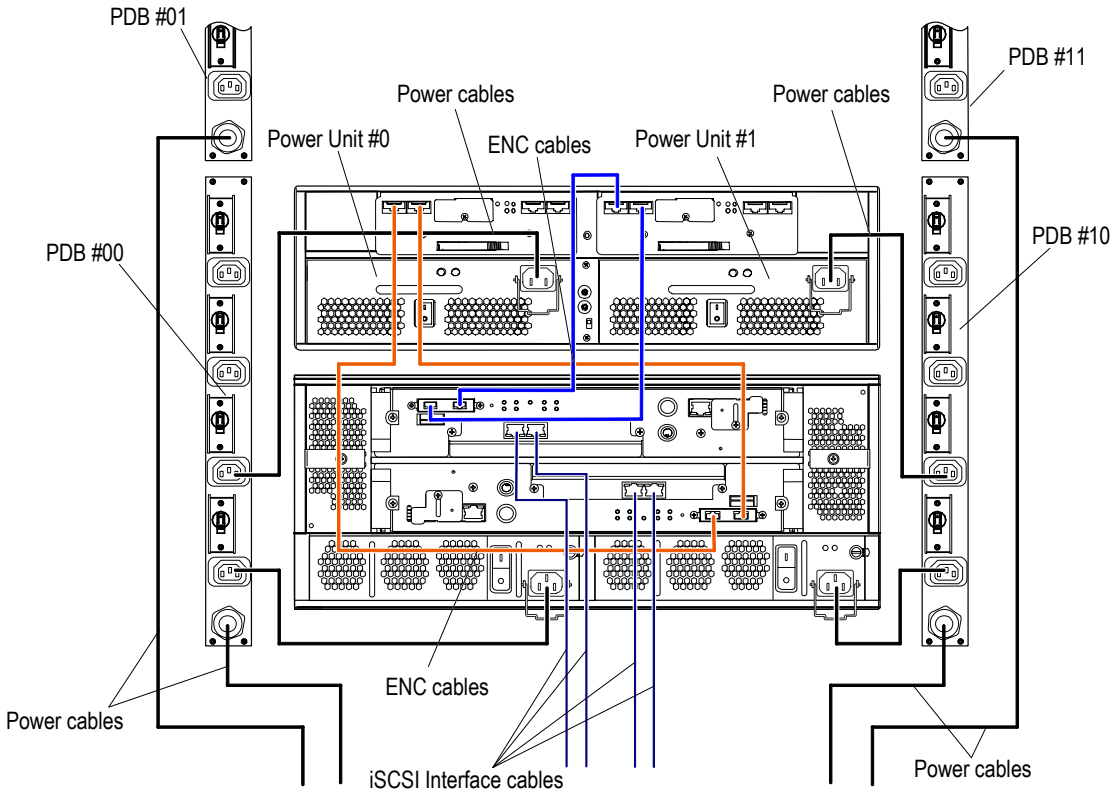


Figure 3.4.32.2 FC Interface cable Routing for the Subsystem (RKH+RKAJ+RKAJAT)

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*1 : The figure shows the connection of RKM and RKAJ.

Figure 3.4.32.3 iSCSI Interface cable Routing for the Subsystem (RKM/RKS+RKAJ)

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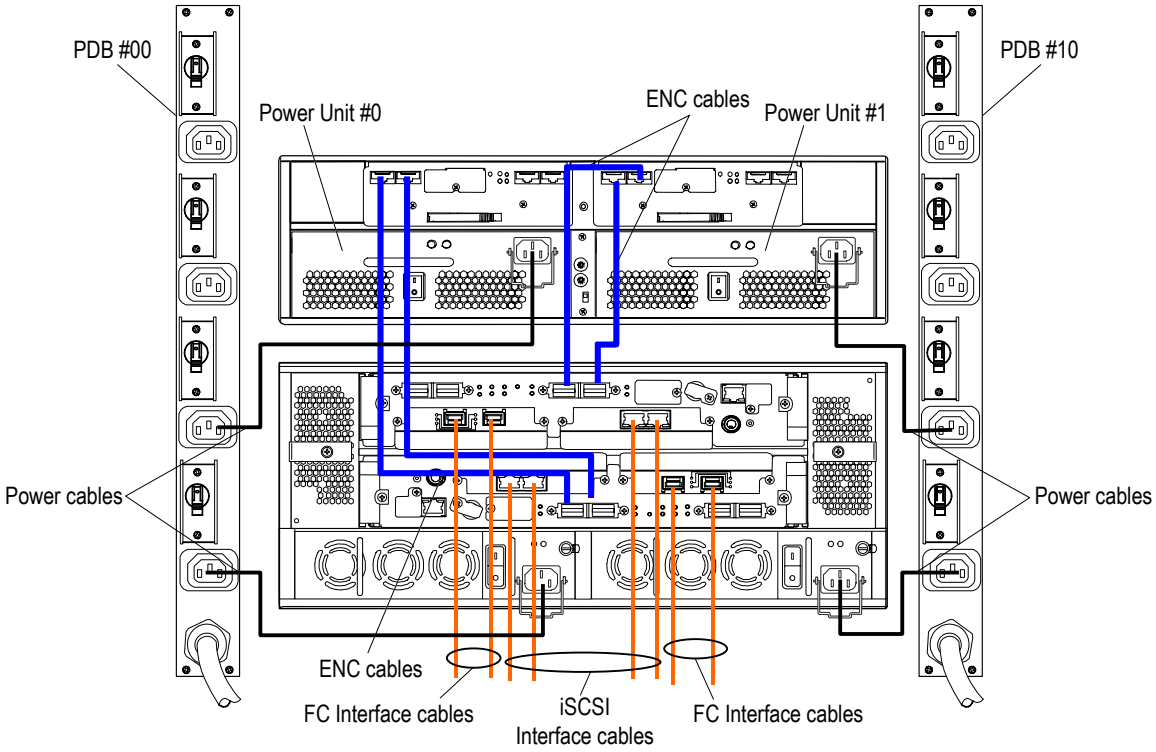


Figure 3.4.32.4 iSCSI Interface cable Routing for the Subsystem (RKH+RKAJ)

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3.4.10 Connecting the Interface cable

(1) Connecting the Fibre Channel Interface cable

Two types of cable are provided as the Fibre Channel Interface cables(‡1) to be used so that they fit to connector shapes of the RKM/RKS/RKXS/RKH and host computer (or HBA (Host Bus Adapter), SW) to be connected.

Table 3.4.11 shows correspondences between the connector shapes and cable types. Choose the applicable cables from the table correctly.

Table 3.4.11 Types Fibre Channel Interface Cables to be Connected

FC Interface Board side (for RKM/RKS/RKXS/RKH side)			Host computer side (HBA (Host Bus Adapter), SW)	Types Cables to be Connected	
Parts name of connected cable plug	Model	Connector form	Connector form	Cable connector shape	Model
Control Unit	DF-F700-F1JM (RKM) DF-F700-F1JS (RKS) DF-F700-F1JXS (RKXS) DF-F700-F1JH (RKH) DF-F700-F2JH (RKHE)	LC	SC	LC-SC cable	DF-F700-KB×M(*1)
			LC	LC-LC cable	DF-F700-KC×M(*1)
Interface Board	DF-F700-DJ4G2 (RKM) DF-F700-DJ4G2W (RKS/RKXS) DF-F700-DJ4G2H (RKH)	LC	SC	LC-SC cable	DF-F700-KB×M(*1)
			LC	LC-LC cable	DF-F700-KC×M(*1)

*1 : "x" denotes a valuable (1 to 5) that shows a cable length.

(a) Connect the Fibre Channel Interface cables after making sure of the ports to be connected the LOCATION (REAR) label. (Refer to Figure 3.4.33, Figure 3.4.33.1.)

NOTE : • When bending the Fibre Channel Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

• The RKS/RKXS has the limitation in the connection configuration of the Fibre Channel interface cable depending on the existence of the addition of the FC Interface Board and the topology set to the Port.
The connection configuration of the topology set to Port and the Fibre Channel Interface cable. (See "1.2.2 Mini-HUB" (INST 01-0020).)

(b) Pull all the Fibre Channel Interface cables into the rack frame passing them through an opening for cables on the bottom plate of the rack frame.

‡1 : When the multiple ports are used, make sure of the port corresponding to the host computer to be connected.

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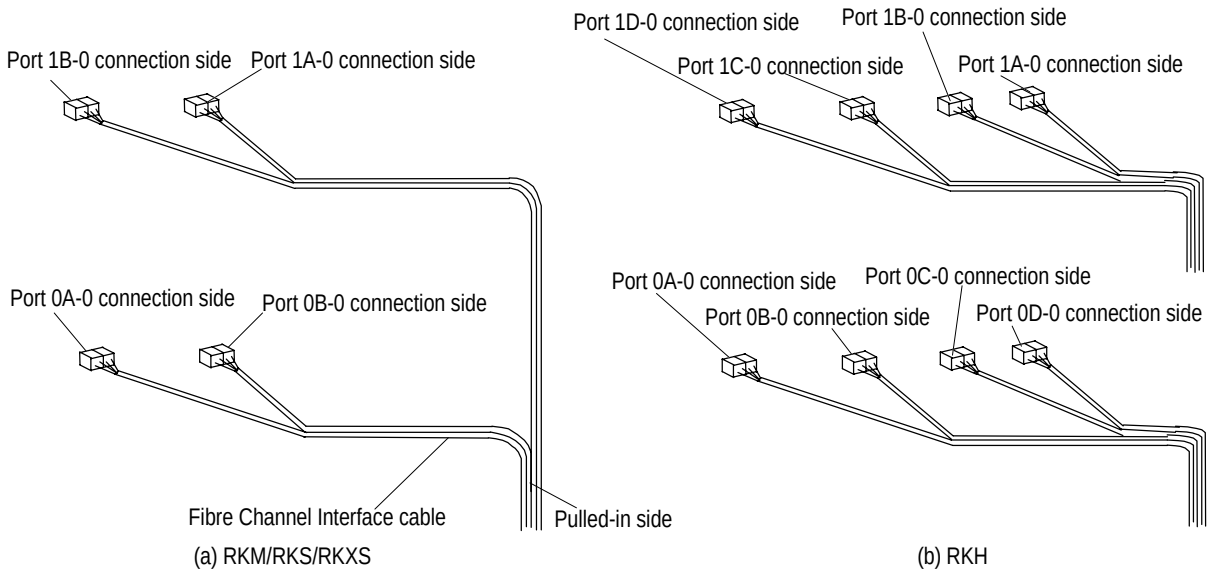


Figure 3.4.33 Binding Fibre Channel Interface Cables (RKM, RKS/RKXS (FC Interface Board is added), RKH)

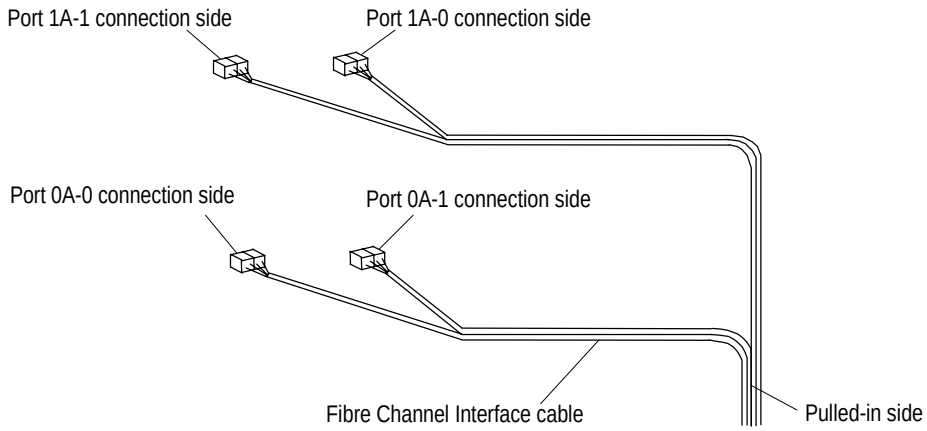


Figure 3.4.33.1 Binding Fibre Channel Interface Cables (RKS/RKXS (FC Interface Board is not added))

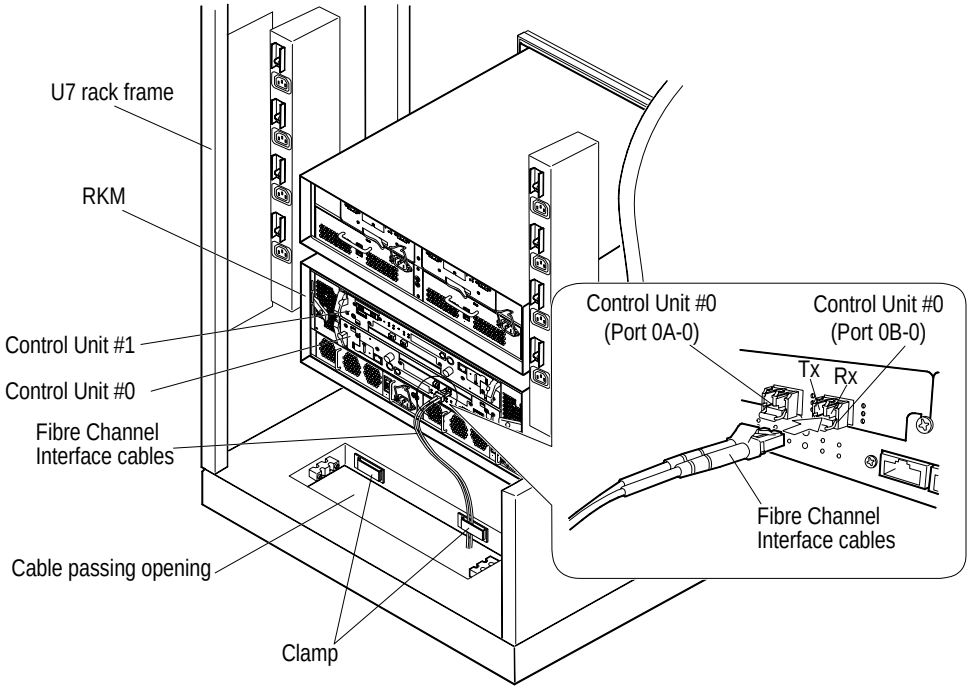
(c) Connect the Fibre Channel Interface cable to the connector of the each port.

NOTE : Insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(d) In the case of the U7 rack frame, affix the clamps attached to the DF-F700-URHT7 (rail kit for the U7) on it, and perform the routing of the Fibre Channel interface cables.
In the case of the NSC rack frame, affix the clamp attached to the DF-F700-URNS7 (rail kit for the NSC) on it, perform the routing of the Fibre Channel interface cables, and fix them with the repeat binders.

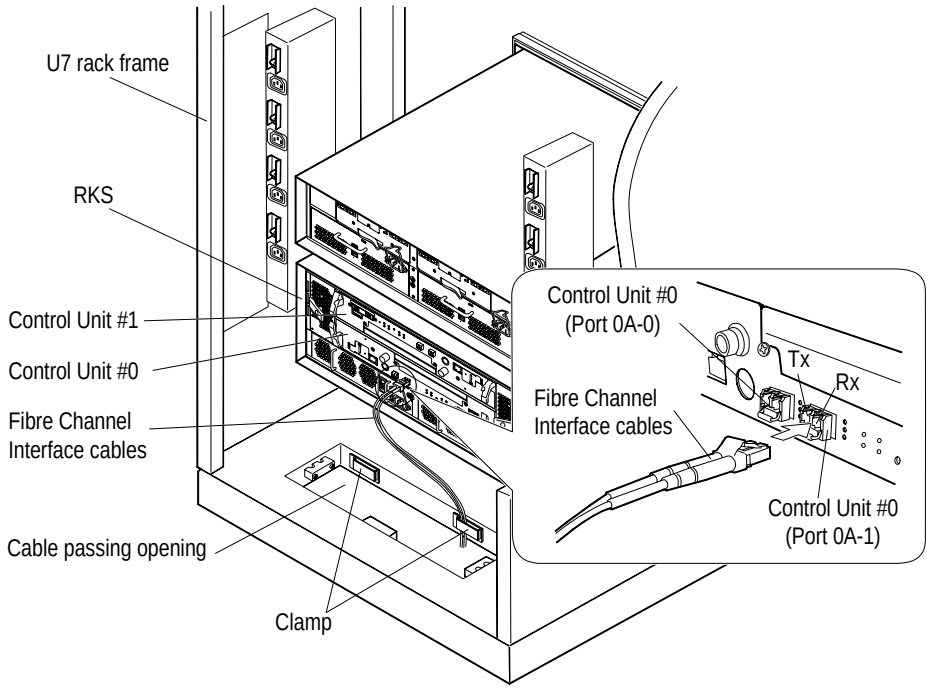
(e) Fasten the Fibre Channel Interface cables to the rack frame at the cable passing opening on the he bottom plate giving them excessive lengths so that they will not be pulled.

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

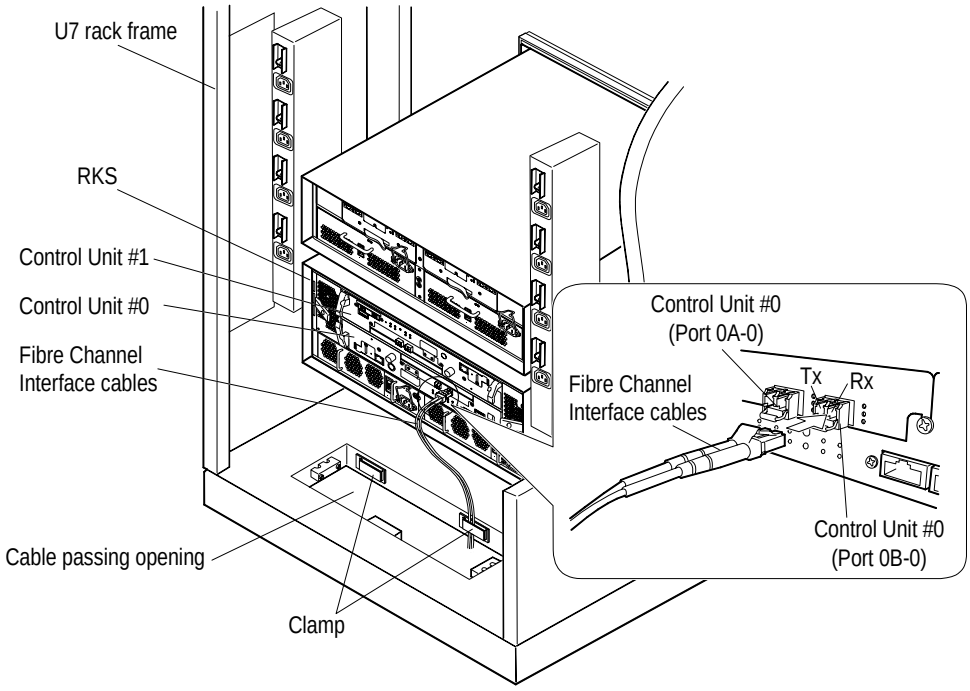
Figure 3.4.34 Fibre Channel Interface Cable Routing in the U7 rack frame (RKM)



*1 : The figure shows the case where the FC Interface Board is not added to the Control Unit of the RKS.

Figure 3.4.34.1 Fibre Channel Interface Cable Routing in the U7 rack frame (RKS/RKXS)

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*1 : The figure shows the case where the FC Interface Board is added to the Control Unit of the RKS.

Figure 3.4.34.2 Interface Cable Routing at the time of adding the FC Interface Board in the U7 rack frame (RKS/RKXS)

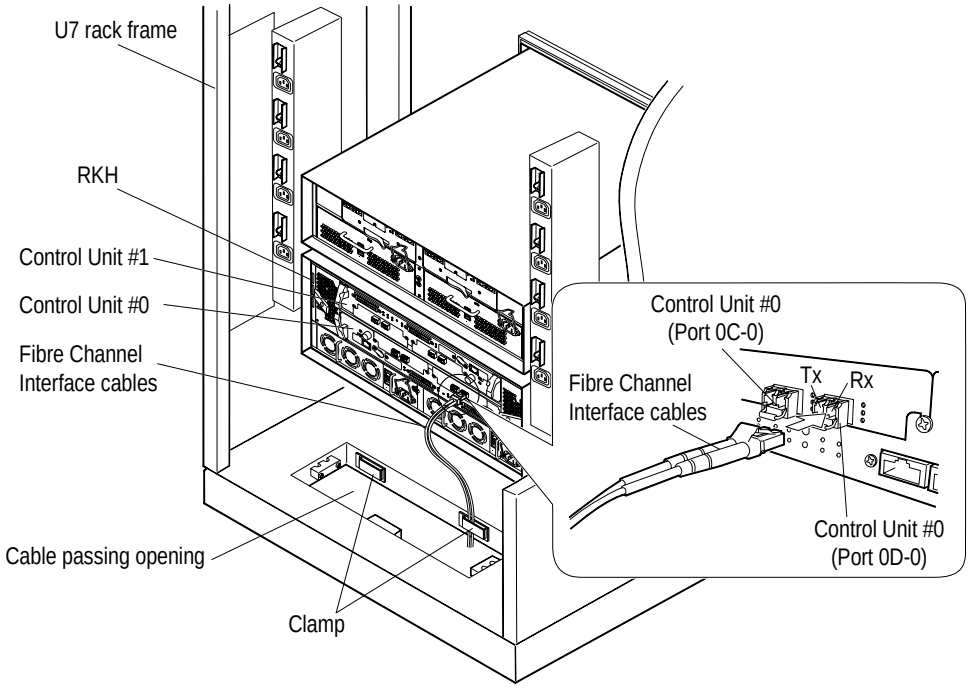
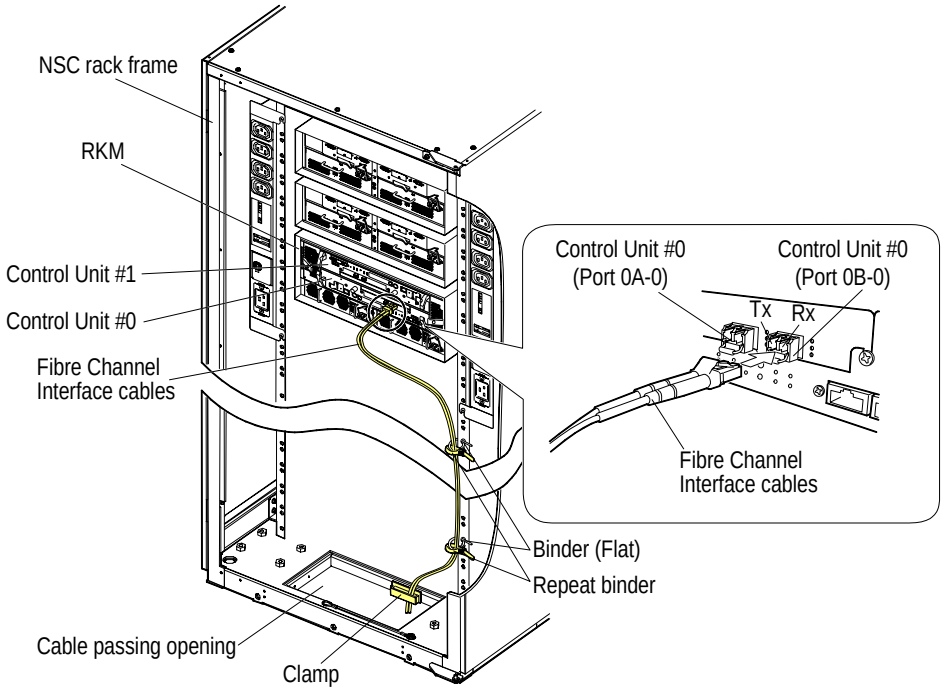


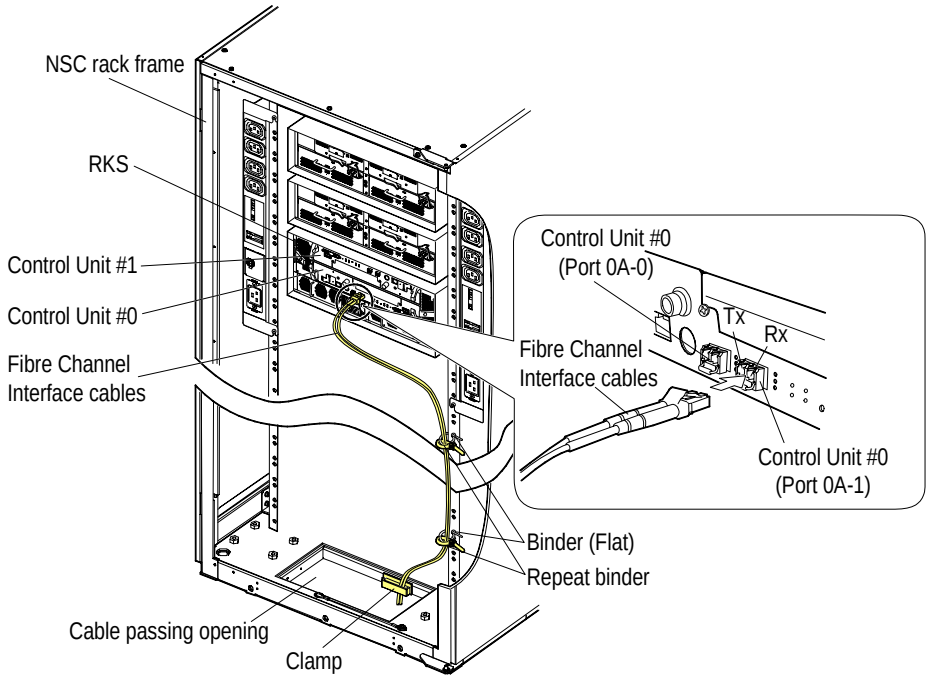
Figure 3.4.34.3 Fibre Channel Interface Cable Routing in the U7 rack frame (RKH)

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

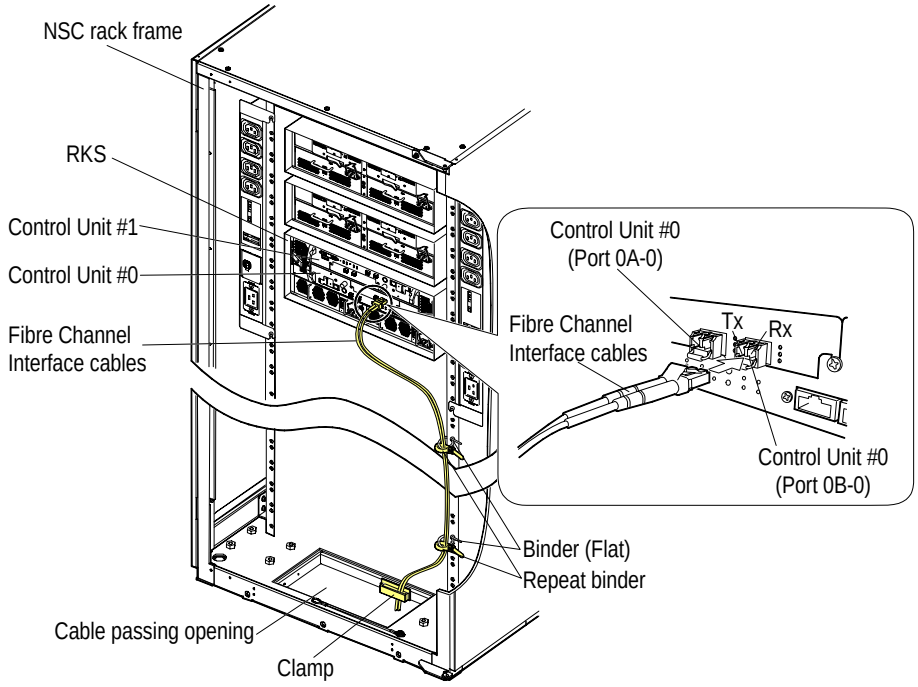
Figure 3.4.34.4 Fibre Channel Interface Cable Routing in the NSC rack frame (RKM)



*1 : The figure shows the case where the FC Interface Board is not added to the Control Unit of the RKS.

Figure 3.4.34.5 Fibre Channel Interface Cable Routing in the NSC rack frame (RKS/RKXS)

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*1 : The figure shows the case where the FC Interface Board is added to the Control Unit of the RKS.

Figure 3.4.34.6 Interface Cable Routing at the time of adding the FC Interface Board in the NSC rack frame (RKS/RKXS)

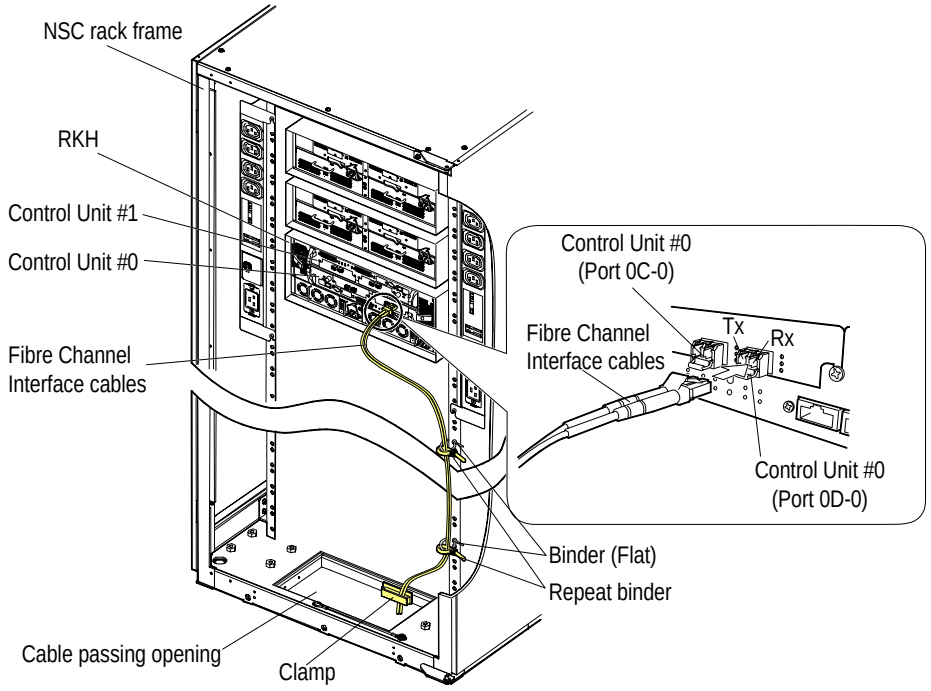


Figure 3.4.34.7 Fibre Channel Interface Cable Routing in the NSC rack frame (RKH)

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(2) Connecting the iSCSI Interface cable

(a) Connect the iSCSI Interface cables after making sure of the ports to be connected the LOCATION (REAR) label. (Refer to Figure 3.4.34.4.)

NOTE : When bending the iSCSI Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(b) Pull all the Interface cables into the rack frame passing them through an opening for cables on the bottom plate of the rack frame.

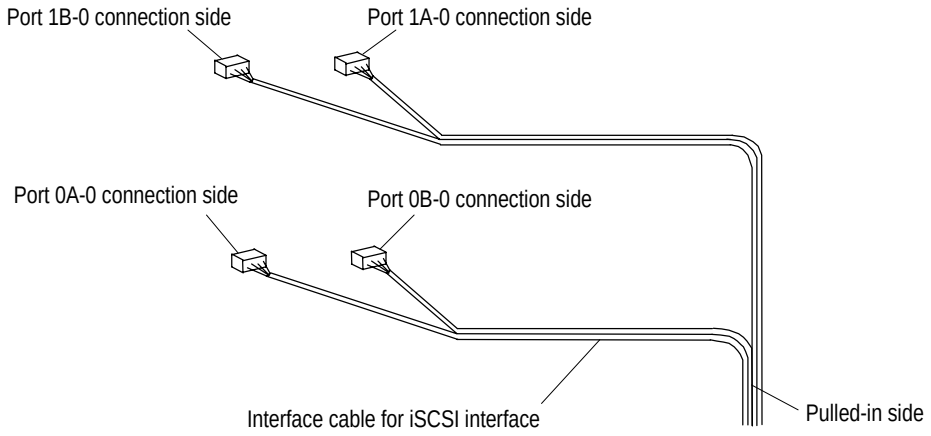


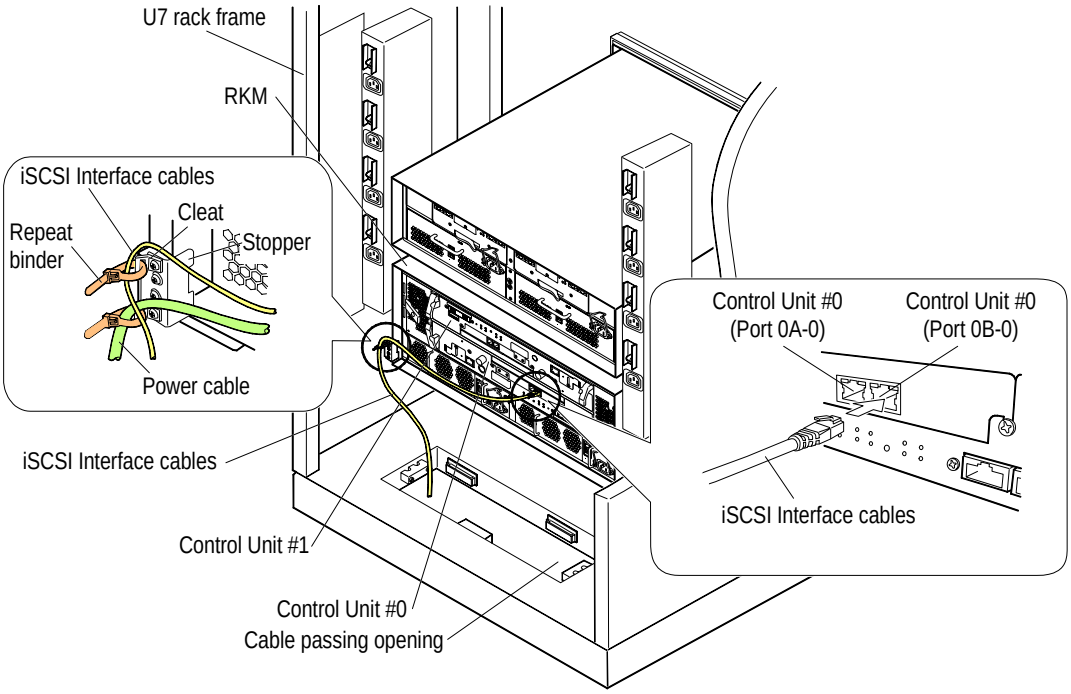
Figure 3.4.34.8 Binding Interface Cables (RKH/RKM/RKS/RKXS (iSCSI Interface Board is installed))

(c) Connect the Interface cable to the connector of the each port.

(d) In case of the U7 rack frame, perform the routing of the iSCSI interface cables, attach the cleat to the stopper, and fix the iSCSI interface cables through the repeat binder.
In the case of the NSC rack frame, perform the routing of the iSCSI interface cables, and fix them with the repeat binders.

(e) Fasten the iSCSI interface cables giving them excessive lengths so that they will not be pulled.

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*1 : The figure shows the case where the iSCSI Interface Board is installed in the Control Unit of the RKM.

Figure 3.4.34.9 iSCSI Interface Cable Routing in the U7 rack frame (RKM/RKS/RKXS)

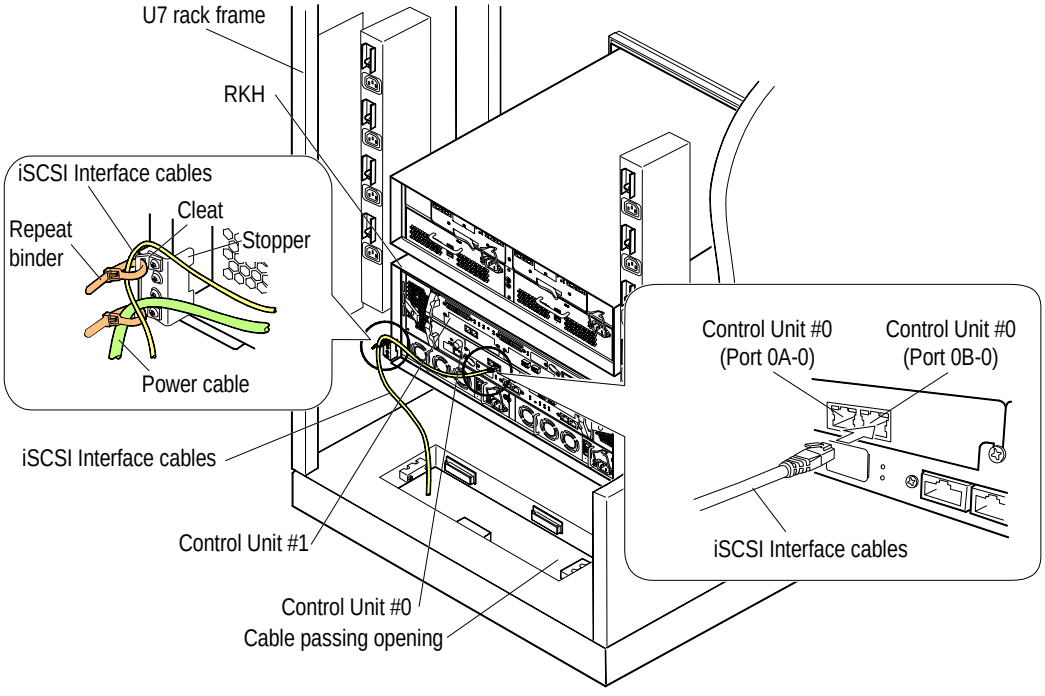
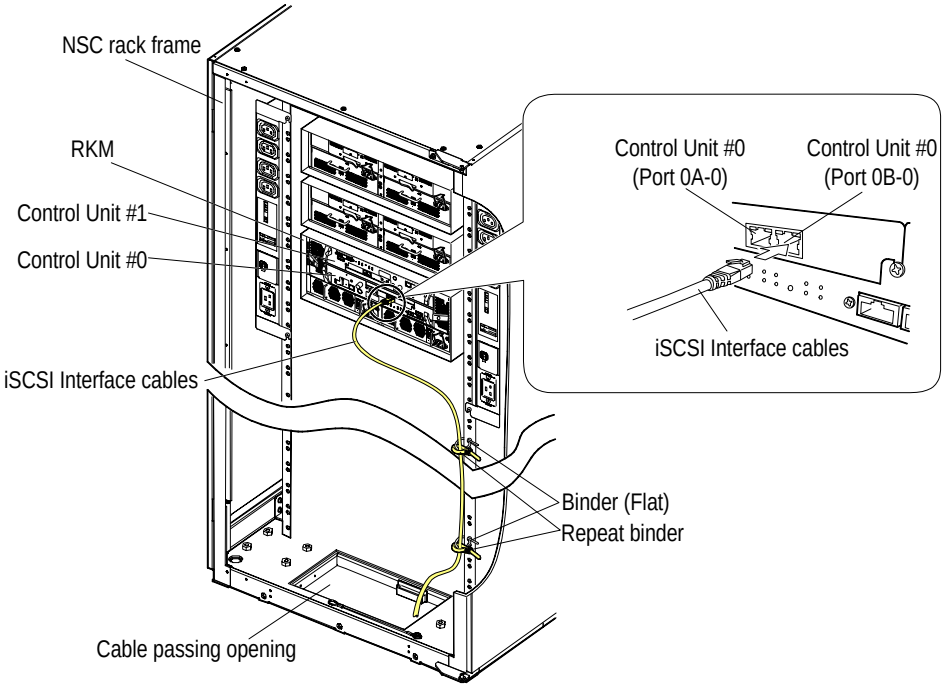


Figure 3.4.34.10 iSCSI Interface Cable Routing in the U7 rack frame (RKH)

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*1 : The figure shows the case where the iSCSI Interface Board is installed in the Control Unit of the RKM.

Figure 3.4.34.11 iSCSI Interface Cable Routing in the NSC rack frame (RKM/RKS/RKXS)

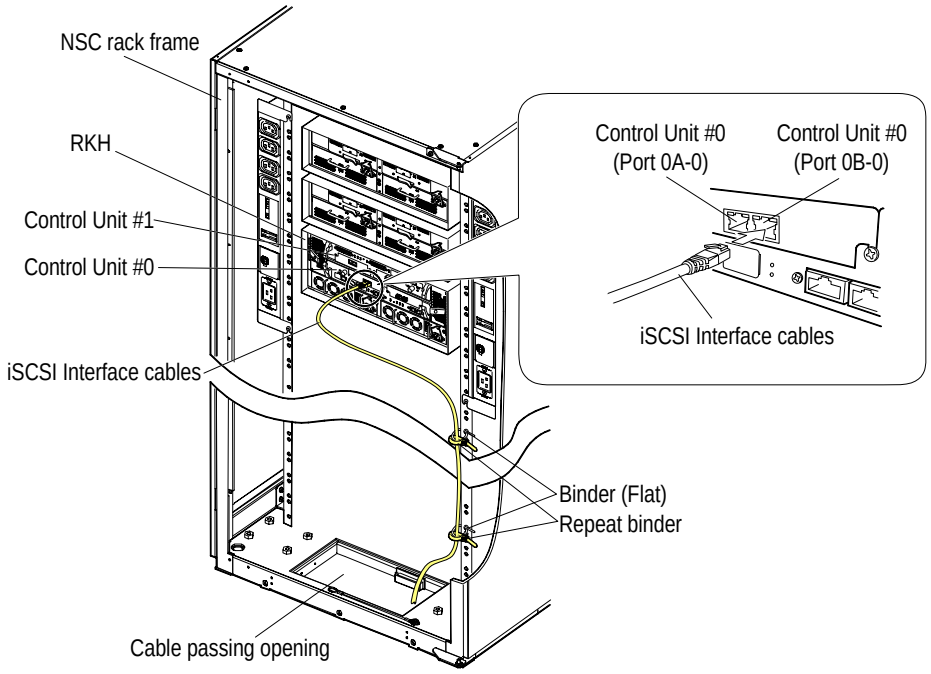


Figure 3.4.34.12 iSCSI Interface Cable Routing in the NSC rack frame (RKH)

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3.4.11 Connecting the ENC cables

According to the cable figure to be output from ACE Tool, connect the ENC cable.
For the operation method of ACE Tool, refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).
When connecting the RKM/RKS and RKAJ, execute the procedure (1).
(Refer to "(1) When connecting the RKM and RKAJ" (INST 03-0670).)
When connecting the RKM/RKS and RKAJAT, execute the procedure (2).
(Refer to "(2) When connecting the RKM and RKAJAT" (INST 03-0690).)
When connecting the RKXS and RKAJAT, execute the procedure (3).
(Refer to "(3) When connecting the RKXS and RKAJAT" (INST 03-0701).)
When connecting the RKH and RKAJ, execute the procedure (4).
(Refer to "(4) When connecting the RKH and RKAJ" (INST 03-0703).)
When connecting the RKH+RKAJ and RKAJAT, execute the procedure (5).
(Refer to "(5) When connecting the RKH+RKAJ and RKAJAT" (INST 03-0705).)

(1) When connecting the RKM/RKS and RKAJ

In the case of the RKAJ with both of the Control Unit of RKM/RKAJ, it is required to connect the Control Unit (RKM/RKS) and the ENC Unit with the ENC cables (‡1). (The ENC cables are supplied with the RKAJ.)

NOTE : • In single controller configuration, connect the ENC cable only to the Loop #0 (ENC Unit #0) side. Do not connect it to the Loop #1 (ENC unit #1) side. When two or more RKAJ are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should be connected for the RKAJ.

• When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

Execute the following referring to "Figure 3.4.35 Connecting ENC Cables" (INST 03-0680).

(a) Remove the rubber cap on the Control Unit.
(b) Connect the ENC cable to the Control Unit.
(c) Connect the ENC cable to the ENC Unit of the RKAJ.

NOTE : Connect the Control Unit#0 of the RKM/RKS with the ENC Unit#0 of the RKAJ and the Control Unit#1 of the RKM/RKS with the ENC Unit 1 of the RKAJ. Connect two Path#0 connectors (with milk white indication) using the ENC cable and also connect two Path#1 connectors (with yellow indication) using another ENC cable (see Figure 3.6.4).

(i) To the PATH#0 (marked in milky white on the RKM/RKS side), connect the ENC cable marked in milky white.
(ii) To the PATH#1 (marked in yellow on the RKM/RKS side), connect the ENC cable marked in yellow.

(d) When the two or more RKAJs are mounted, connect each of the sets of the adjacent connectors of the same kind, that is, the PATH#0 and PATH#1 of the RKAJs using the ENC cables. (see Figure 3.4.32)
For the ENC cable connection in which the maximum configuration of RKM and RKAJs is installed, refer to "Figure 1.6.1 Example of RKM+RKAJ ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)" (INST 01-0160).

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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(i) Remove the rubber cap of the ENC Units in the locations where the ENC cables are to be connected.

(ii) Connect each of the connectors PATH#0 (marked in milk white) and PATH#1 (marked in yellow) of the ENC Unit, from which the rubber cap was removed, with the ENC cables marked in the same color respectively.

(iii) Connect each of the connectors PATH#0 (marked in milk white) and PATH#1 (marked in yellow) of the adjacent RKAJ with the ENC cables marked in the same color.

(e) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

NOTE : Do not fix the ENC cable and the power cable together.

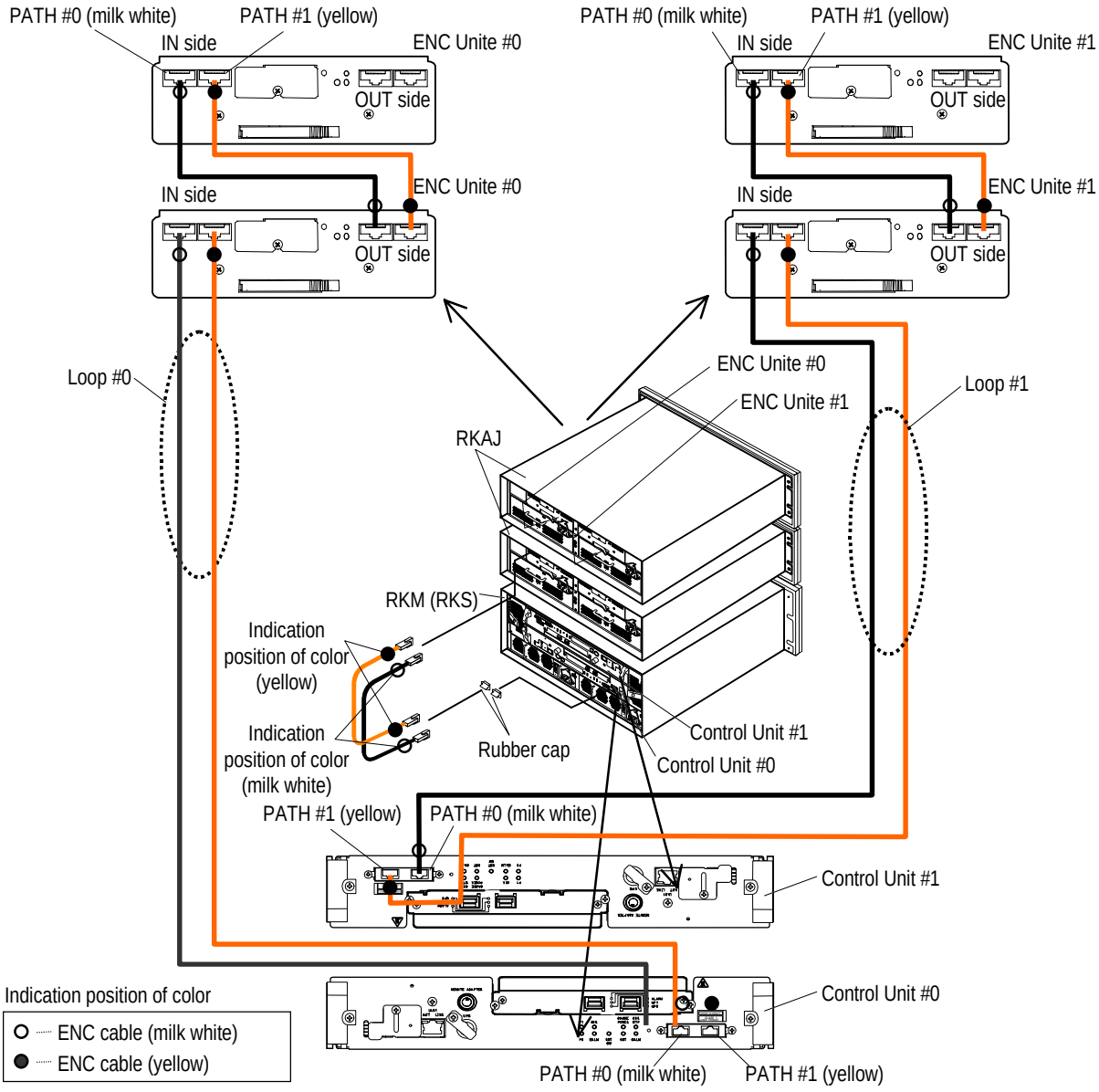


Figure 3.4.35 Connecting ENC Cables (RKM/RKS+RKAJ)

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(2) When connecting the RKM/RKS and RKAJAT

In the case of the RKAJAT with both of the Control Unit of RKM/RKS, it is required to connect the Control Unit (RKM) and the SENC Unit with the ENC cables (‡1). (The ENC cables are supplied with the RKAJAT.)

NOTE : • In single controller configuration, connect the ENC cable only to the Loop #0 (SENC Unit #0) side. Do not connect it to the Loop #1 (SENC unit #1) side. When two or more RKAJAT are connected, however, both cables in SENC Unit #0 and SENC Unit #1 should be connected for the RKAJAT.
• When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• The IN and OUT connectors of the SENC unit of the RKAJAT have indications by means of blue and green labels respectively.

Execute the following referring to "Figure 3.4.36 Connecting ENC Cables (RKM+RKAJAT)" (INST 03-0700).

(a) Attach milk white or yellow Mini-Binders to the ENC cable.
(b) Remove the rubber cap on the Control Unit.
(c) Connect the ENC cable to the Control Unit.
(d) Connect the ENC cable to the SENC Unit of the RKAJAT.

NOTE : Connect the Control Unit#0 of the RKM/RKS with the ENC Unit#0/SENC Unit#0 of the RKAJ/RKAJAT and the Control Unit#1 of the RKM/RKS with the ENC Unit #1/SENC Unit #1 of the RKAJAT (see Figure 3.4.35).

(i) Connect the cable marked in milky white from PATH#0 (marked in milky white) of RKM/RKS to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID#1).
(ii) Connect the cable marked in yellow from PATH#1 (marked in yellow) of RKM/RKS to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID#2).

(e) When the two or more RKAJATs are mounted, connect the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit of the RKAJATs using the ENC cables. (see Figure 3.4.36) For the ENC cable connection in which the maximum configuration of RKM and RKAJATs is installed, refer to "Figure 1.6.2 Example of RKM+RKAJ+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)" (INST 01-0170).

(i) Remove the rubber cap of the SENC Units in the locations where the ENC cables are to be connected.
(ii) Connect each of the connectors the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit, from which the rubber cap was removed, with the ENC cables.

(f) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

NOTE : Do not fix the ENC cable and the power cable together.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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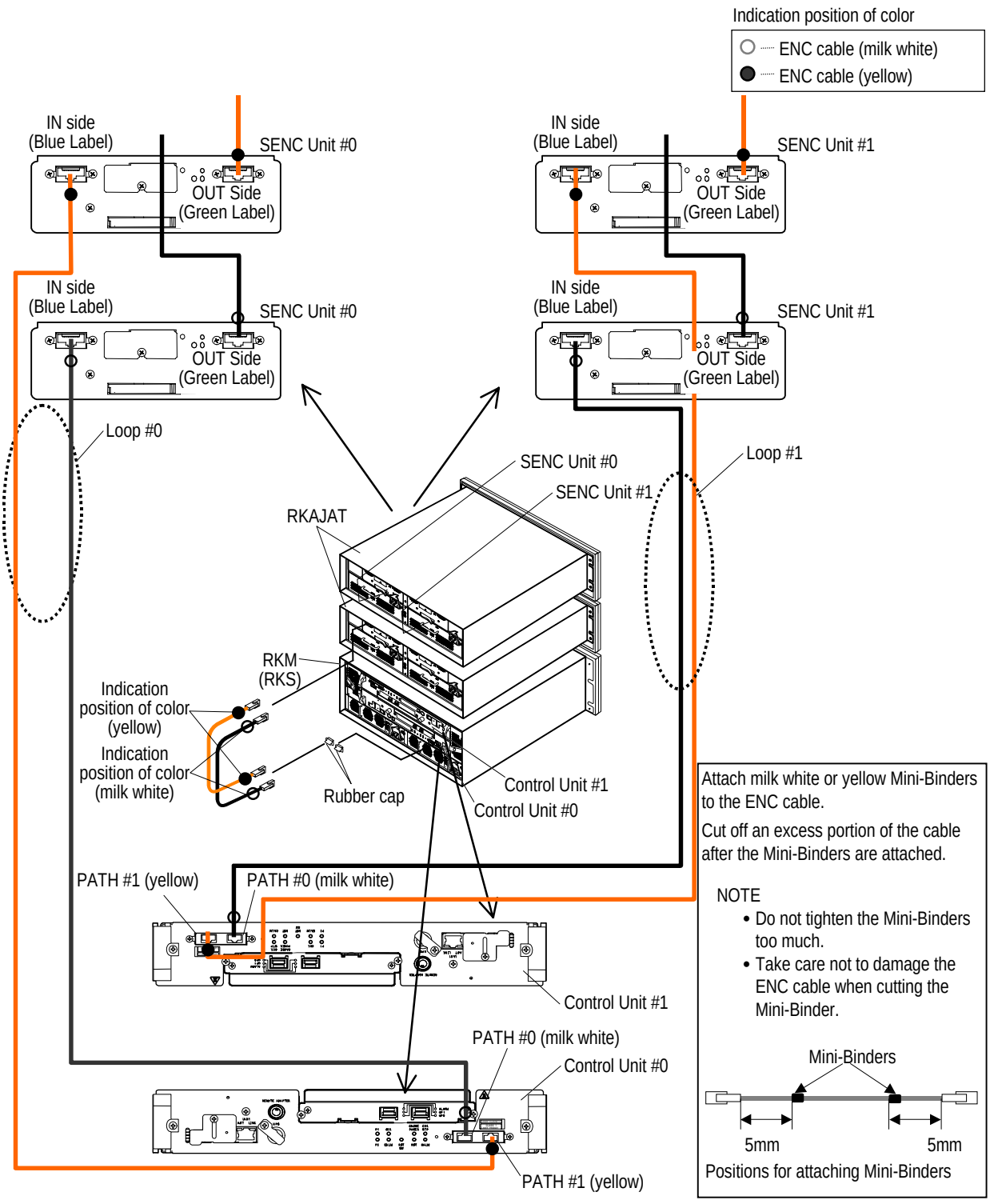


Figure 3.4.36 Connecting ENC Cables (RKM/RKS+RKAJAT)

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(3) When connecting the RKXS and RKAJAT

In the case of the RKAJAT with both of the Control Unit of RKXS, it is required to connect the Control Unit (RKXS) and the SENC Unit with the ENC cables (‡1). (The ENC cables are supplied with the RKAJAT.)

NOTE : • In single controller configuration, connect the ENC cable only to the Loop #0 (SENC Unit #0) side. Do not connect it to the Loop #1 (SENC unit #1) side. When two or more RKAJAT are connected, however, both cables in SENC Unit #0 and SENC Unit #1 should be connected for the RKAJAT.
• When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• The IN and OUT connectors of the SENC unit of the RKAJAT have indications by means of blue and green labels respectively.

Execute the following referring to "Figure 3.4.36.1 Connecting ENC Cables (RKXS+RKAJAT)" (INST 03-0702).

(a) Attach milk white or yellow Mini-Binders to the ENC cable.
(b) Remove the rubber cap on the Control Unit.
(c) Connect the ENC cable to the Control Unit.
(d) Connect the ENC cable to the ENC Unit/SENC Unit of the RKAJ/RKAJAT.

NOTE : Connect the Control Unit#0 of the RKXS with the ENC Unit#0/SENC Unit#0 of the RKAJ/RKAJAT and the Control Unit#1 of the RKXS with the ENC Unit #1/SENC Unit #1 of the RKAJAT (see Figure 3.4.36.1).

(i) Connect the cable marked in milky white from PATH#0 (marked in milky white) of RKXS to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID#1).
(ii) Connect the cable marked in yellow from PATH#1 (marked in yellow) of RKXS to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID#2).

(e) When the two or more RKAJATs are mounted, connect the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit of the RKAJATs using the ENC cables. (see Figure 3.4.36.1) For the ENC cable connection in which the maximum configuration of RKXS and RKAJATs is installed, refer to "Figure 1.6.3 Example of RKXS+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U7 rack frame.)" (INST 01-0171).
(i) Remove the rubber cap of the SENC Units in the locations where the ENC cables are to be connected.
(ii) Connect each of the connectors the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit, from which the rubber cap was removed, with the ENC cables.

(f) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

NOTE : Do not fix the ENC cable and the power cable together.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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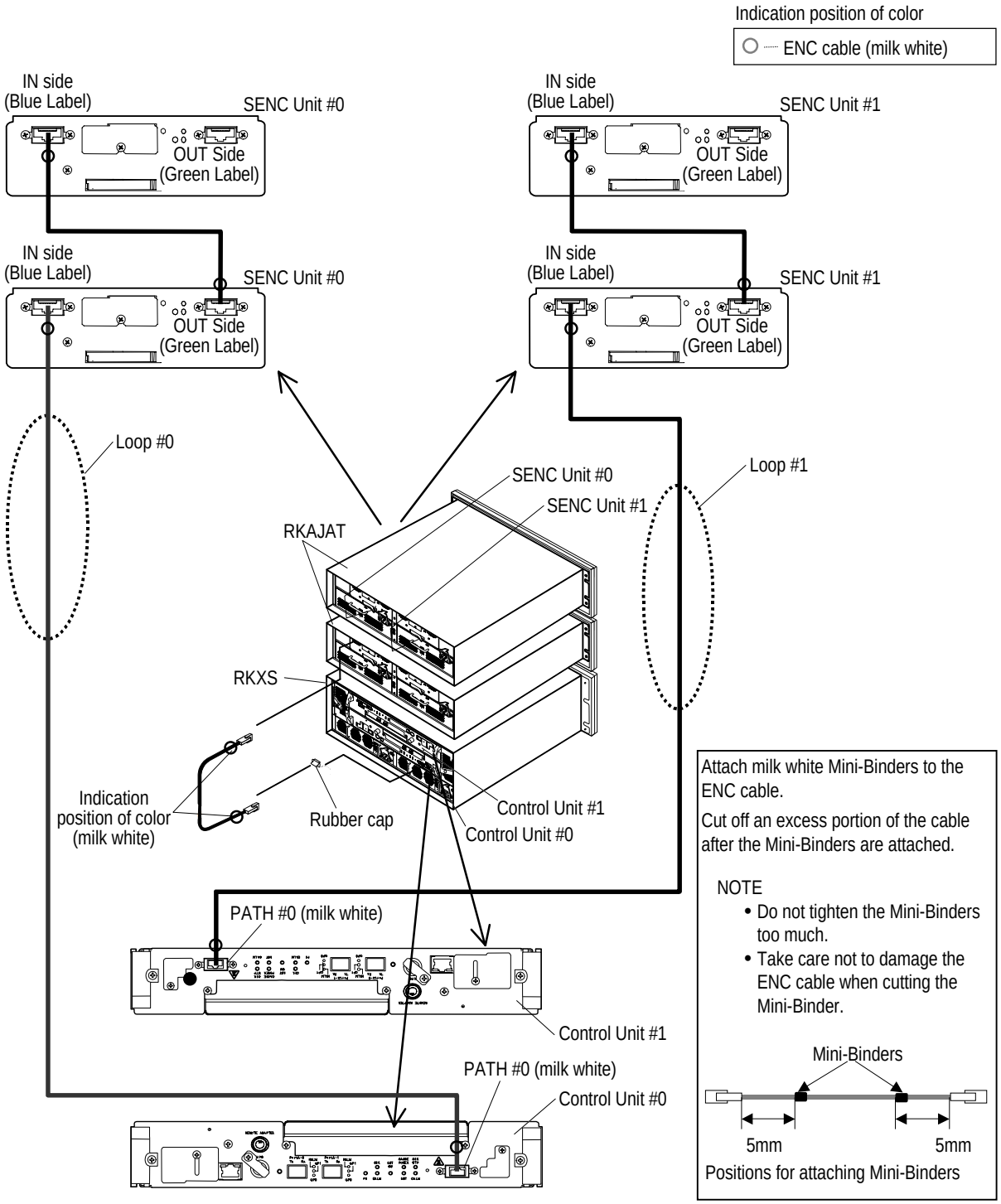


Figure 3.4.36.1 Connecting ENC Cables (RKXS+RKAJAT)

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(4) When connecting the RKH and RKAJ

In the case of the RKAJ with both of the Control Unit of RKH, it is required to connect the Control Unit (RKH) and the ENC Unit with the ENC cables (‡1).

NOTE : When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses .

Execute the following referring to Figure 3.4.36.2.

(a) Remove the rubber cap on the Control Unit.

(b) Connect the ENC cable to the RKH.

(c) Connect the ENC cable to the ENC Unit of the RKAJ.

NOTE : Connect the Control Unit#0 of the RKH with the ENC Unit#0 of the RKAJ and the Control Unit#1 of the RKH with the ENC Unit#1 of the RKAJ. Connect two Path#0, #2 connectors (with milk white indication) using the ENC cable and also connect two Path#1, #3 connectors (with yellow indication) using another ENC cable (see Figure 3.4.36.2).

(i) To the PATH#0, #2 (marked in milky white on the RKH side), connect the ENC cable marked in milky white.

(ii) To the PATH#1, #3 (marked in yellow on the RKH side), connect the ENC cable marked in yellow.

(d) When the two or more RKAJs are mounted, connect each of the sets of the adjacent connectors of the same kind, that is, the PATH#0, PATH#1, PATH#2 and PATH#3 of the RKAJs using the ENC cables. (see Figure 3.4.36.2)

For the ENC cable connection in which the maximum configuration of RKH and RKAJs is installed, refer to Figure 1.6.1 (INST 01-0160).

(i) Remove the rubber cap of the ENC Units in the locations where the ENC cables are to be connected by loosening the thumb screws.

(ii) Connect each of the connectors PATH#0, #2 (marked in milk white) and PATH#1, #3 (marked in yellow) of the ENC Unit, from which the rubber cap was removed, with the ENC cables marked in the same color respectively.

(iii) Connect each of the connectors PATH#0, #2 (marked in milk white) and PATH#1, #3 (marked in yellow) of the adjacent RKAJ with the ENC cables marked in the same color.

(e) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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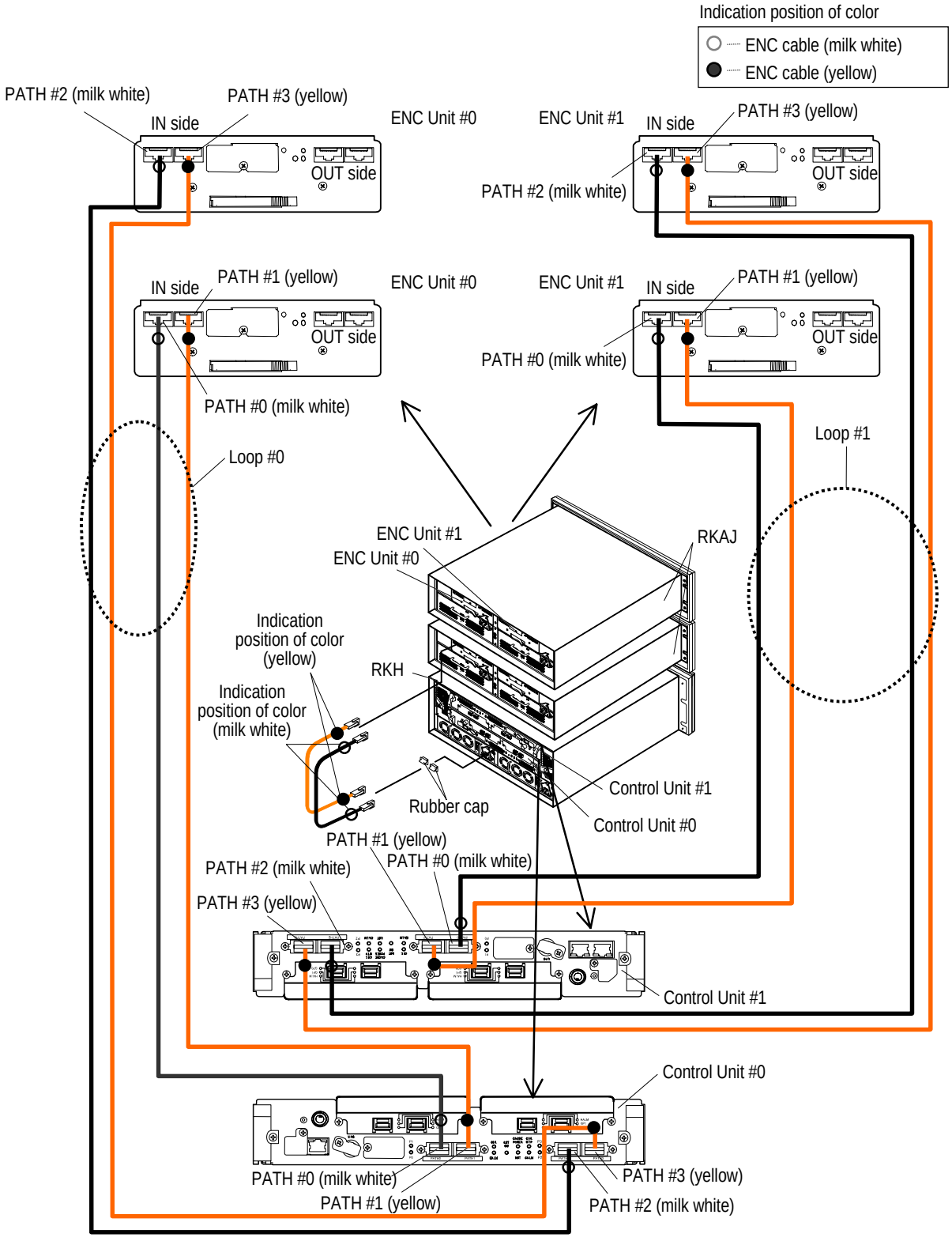


Figure 3.4.36.2 Connecting ENC Cables (RKH+RKAJ)

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(5) When connecting the RKH+RKAJ and RKAJAT

In the case of the RKAJAT with both of the Control Unit of RKH, it is required to connect the Control Unit (RKH) and the ENC Unit/ SENC Unit with the ENC cables [‡1].

NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses ..
• The IN and OUT connectors of the SENC Unit of the RKAJAT have indications by means of blue and green labels respectively.

Execute the following.

When connecting the RKH+ RKAJ and RKAJAT, refer to Figure 3.4.36.3.

(a) Attach milk white or yellow Mini-Binders to the ENC cable.
(b) Remove the rubber cap on the Control Unit.
(c) Connect the ENC cable to the RKH.
(d) Connect the ENC cable to the ENC Unit of the RKAJ.

NOTE : Connect the Control Unit#0 of the RKH with the ENC Unit#0 of the RKAJ and the Control Unit#1 of the RKH with the ENC Unit#1 of the RKAJ.
Connect two PATH#0 connectors (with milk white indication) using the ENC cable and also connect two PATH#1 connectors (with yellow indication) using another ENC cable.

(i) To the PATH#0 (marked in milky white on the RKAJ side), connect the ENC cable marked in milky white.
(ii) To the PATH#1 (marked in yellow on the RKAJ side), connect the ENC cable marked in yellow.

(e) When the two or more RKAJATs are mounted, connect the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit of the RKAJATs using the ENC cables.
For the ENC cable connection in which the maximum configuration of RKH+RKAJs and RKAJATs is installed, refer to Figure 1.6.2 (INST 01-0170).
(i) Remove the rubber cap of the ENC Units/SENC Units in the locations where the ENC cables are to be connected by loosening the thumb screws.
(ii) Connect each of the connectors the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit, from which the rubber cap was removed, with the ENC cables.
(f) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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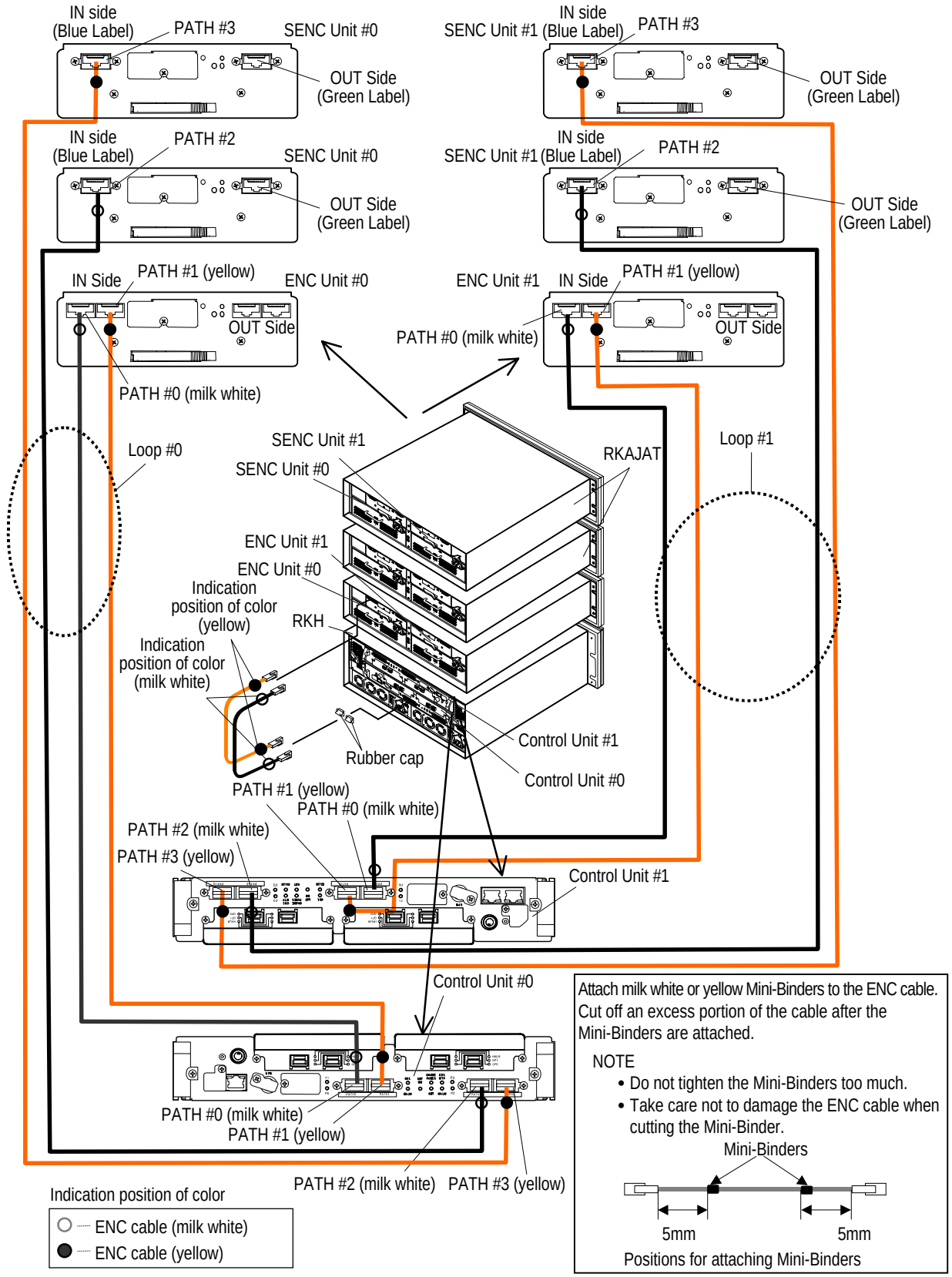


Figure 3.4.36.3 Connecting ENC Cables (RKH+RKAJ and RKAJAT)

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3.4.12 Connecting the power cables

Connecting the power cables of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

(1) U7 rack frame

(a) Make sure that the breaker of the each PDB has been turned off.

(b) Make sure that the AC Power Unit Switch of the each Power Unit has been turned off.

(c) Insert the power cable plug into the receptacle on the each Power Unit.

(d) Pass Repeat Binders through the cleats attached to the right and left stoppers and fasten the power cable with the Binders.

(e) Insert the each power cable plug into the corresponding receptacle of the PDB. (Use the PDB receptacles in the order from the J10 to J13.)

NOTE : • Be sure to plug the power cable for the Power Unit#0 in the receptacle of the PDB#00 or PDB#01.
Be sure to plug the power cable for the Power Unit#1 in the receptacle of the PDB#10 or PDB#11.
If they are plugged in the receptacles of the PDBs on the same side, the function of the duplicated power supply does not work.

• Do not plug any cable other than the power cable of the mounted subsystem in the outlet of the PDB.

• Limit the total current output from the outlets J10 to J13 so that it does not exceed 20 amperes (‡1).

(f) Hang the cable clamp of PDB on the plug of the power cable.

(g) Route the power cables.

(h) Push in the plug of the power cable which has been inserted into the PDB again.
It may be loosened owing to a routing.

‡1 : When installing the two or more RKMs, connect them so that the load on a PDB does not exceed 20 A after checking the load through a calculation.
RKH one unit : 2.6 A
RKM one unit : 4.2 A
RKS one unit : 4.0 A
RKXS one unit : 3.0 A
RKAJ one unit : 2.6 A
RKAJAT one unit : 2.4 A

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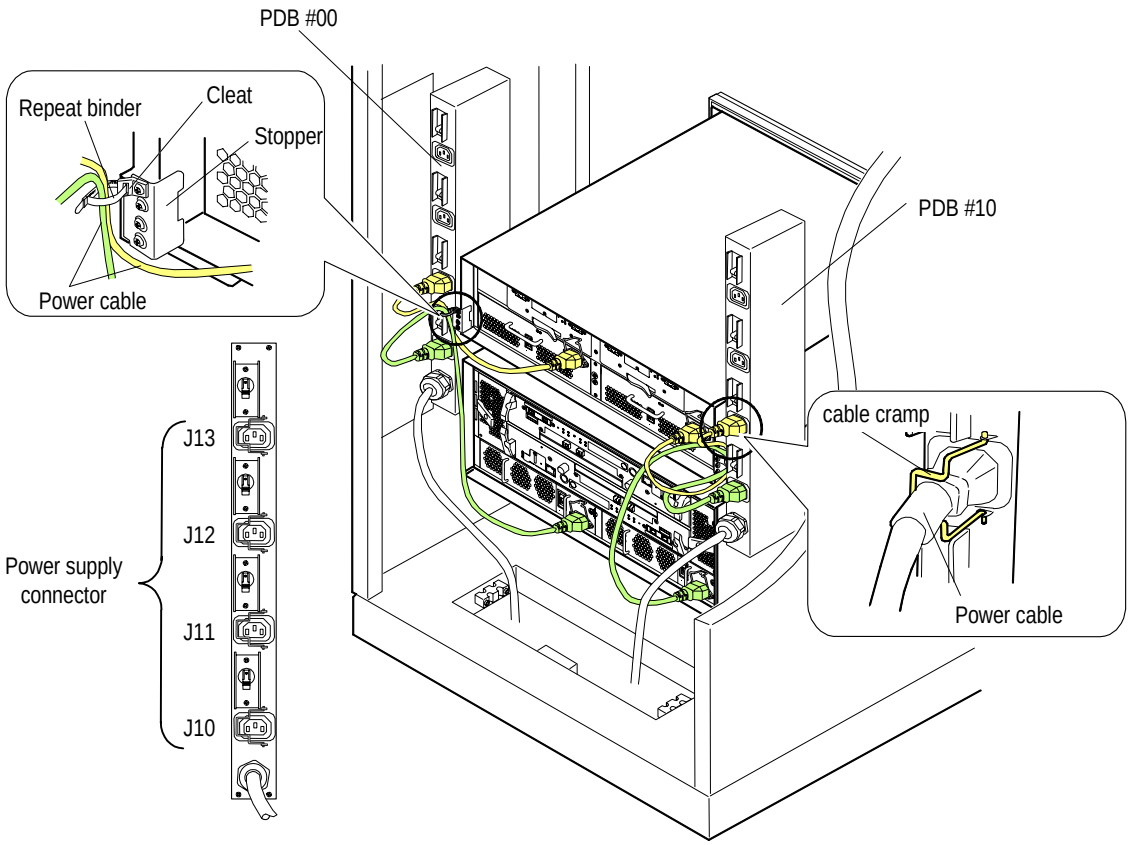


Figure 3.4.37 Routing Power Cables to the Mounted Subsystem in the U7 rack frame

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(2) NSC rack frame

(a) Make sure that the AC Power Unit Switch of the each Power Unit has been turned off.

(b) Insert the power cable plug into the receptacle on the each Power Unit.

(c) Pass Repeat Binders through the cleats attached to the right and left stoppers and fasten the power cable with the Binders.

(d) Insert the each power cable plug into the corresponding receptacle of the PDB. (Use the PDB receptacles in the order from the J102 to J104.)

NOTE : • Be sure to plug the power cable for the Power Unit#0 in the receptacle of the PDB#10.
Be sure to plug the power cable for the Power Unit#1 in the receptacle of the PDB#11.
If they are plugged in the receptacles of the PDBs on the same side, the function of the duplicated power supply does not work.

• Do not plug any cable other than the power cable of the mounted subsystem in the outlet of the PDB.

(e) Hang the cable clamp of PDB on the plug of the power cable.

(f) Route the power cables.

(g) Push in the plug of the power cable which has been inserted into the PDB again.
It may be loosened owing to a routing.

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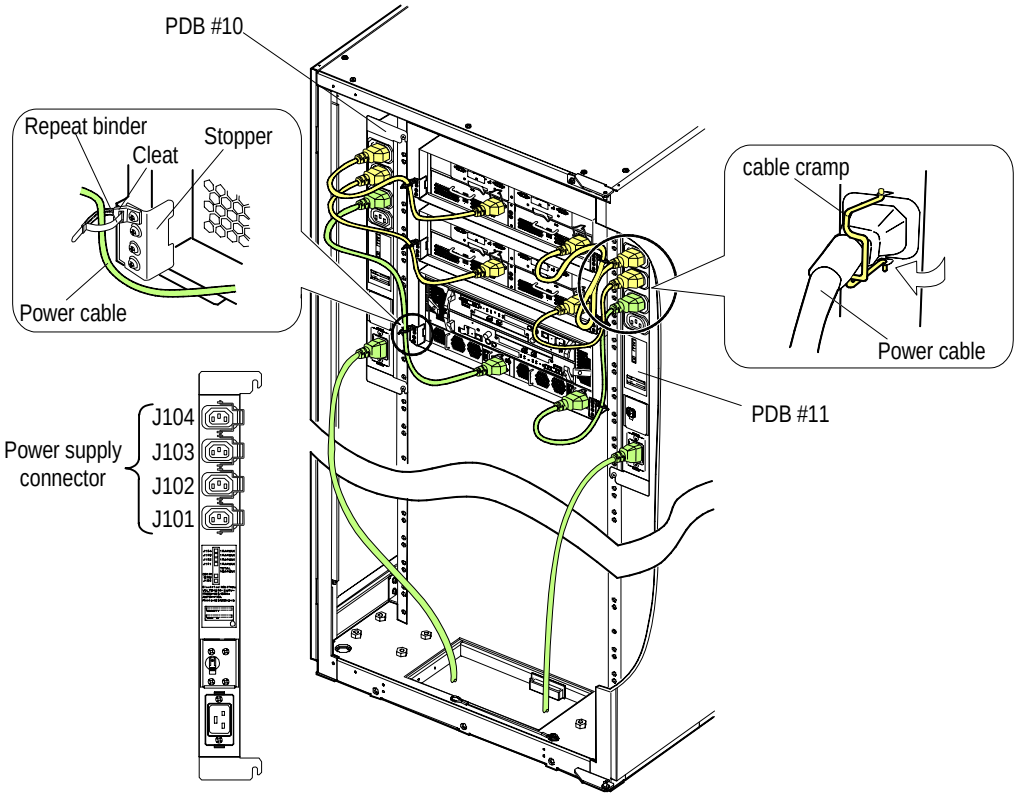


Figure 3.4.37.1 Routing Power Cables to the Mounted Subsystem in the NSC rack frame

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3.4.13 Connecting the power cables (Rack frame PDB)

⚠ CAUTION

- Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.
- The cable of PDB is a fixed type. Do not loosen the installation part. If it is loosened, the connected part is damaged, and it causes an electric shock or fire.

NOTE : Make sure that conductors shall be provided with 30 A over current protection in accordance with Article 240 of the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part 1, CSA C22.1, Section 14.

(1) Open the rear door. (See Subsection, "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)
(2) Make sure that the power supply switches of the PDBs are turned off.
(3) Put out the power cables of PDBs through the Cable passing opening at the bottom of the Rack.
(4) Remove the cable holders from the rack frame by removing the hexagon socket head bolts.
(5) Fasten the power cables to the rack frame by attaching the cable holders with the Allen bolts.
(6) Make sure that the connecter is securely fixed after the assembly work.

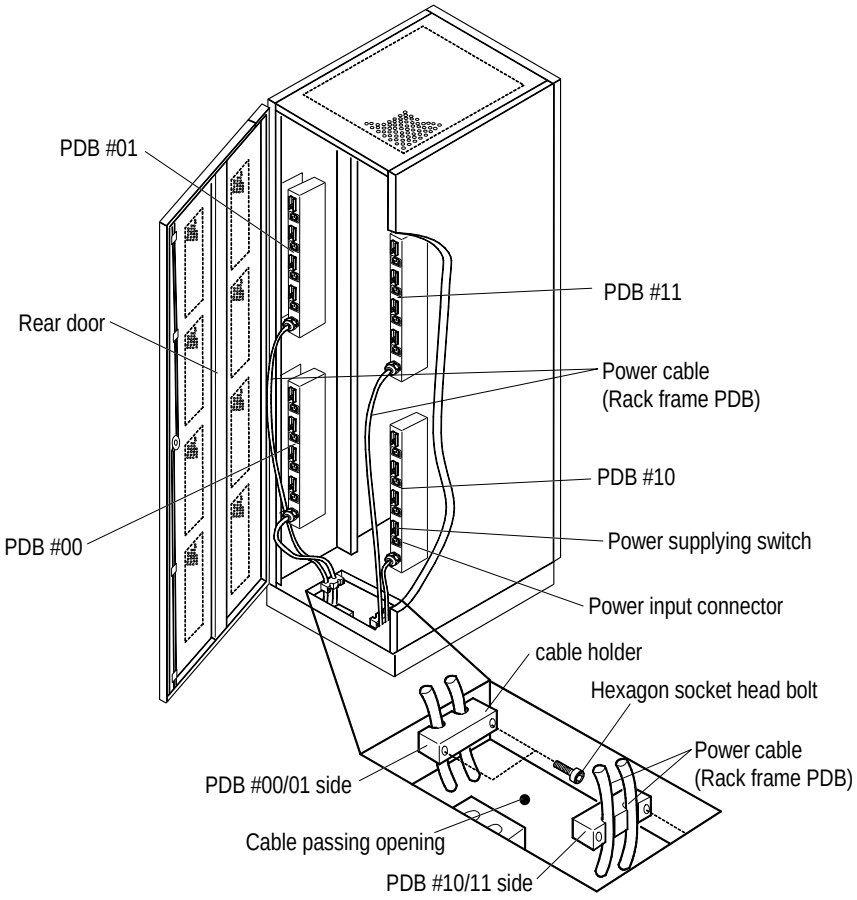


Figure 3.4.38 Connecting Power Cables (Rack frame PDB)

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3.4.14 Connecting the cables for the RKNAS

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "1.1 (3) Note on cable routing" (INST 01-0010).

The cable routing for the subsystem which is mounted on the rack frame is shown in Figure 3.4.31, Figure 3.4.32. Types of the cables to be used are shown in Table 3.4.12.

Table 3.4.12 Types Cables to be Connected

No.	Cable name	Remarks
1	NAS Interface cable (PCI-Express cable, CTRL cable)	See "3.4.15 Connecting the NAS interface cable" (INST 03-0750)
2	LAN cable for NAS	See "3.4.16 Connecting the LAN cable for the NAS" (INST 03-0760)
3	Power cable (100 V) for NAS	See "3.4.17 Connecting the power cable for the NAS" (INST 03-0770)
4	LAN cable for the data	Connect to LAN for the User
5	LAN cable for the control	Connect to NAS Manager control PC
6	FC cable for the backup	Connect to the backup device

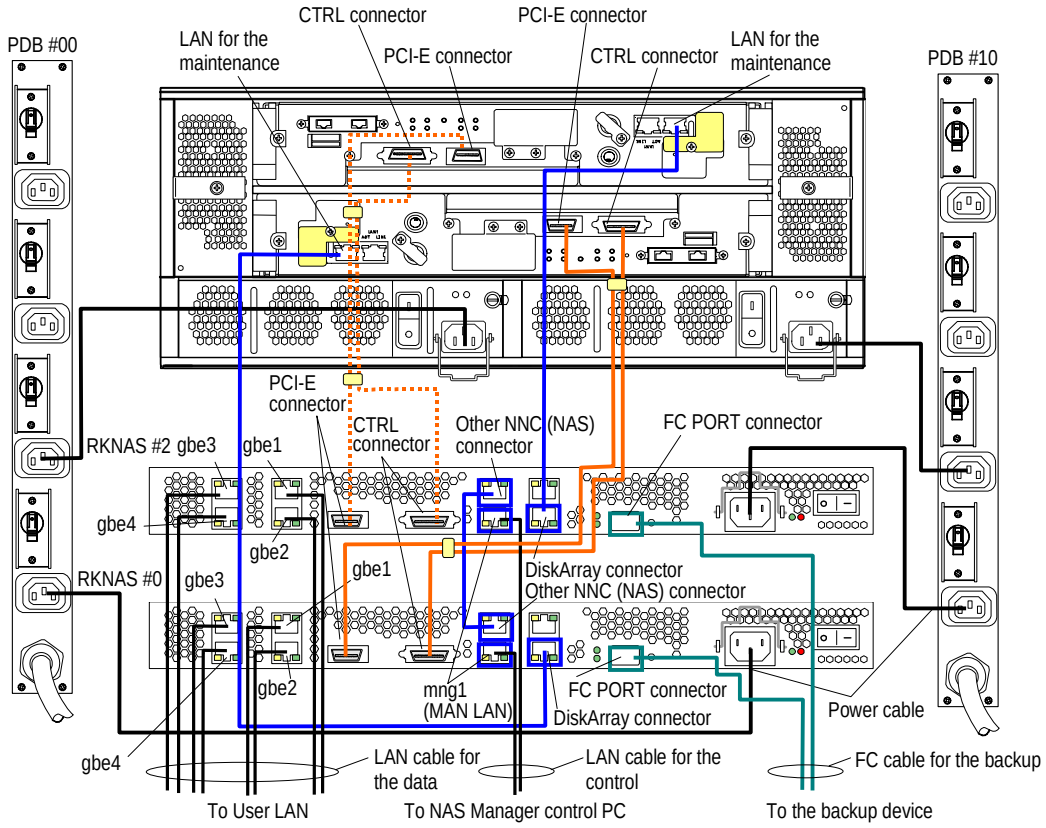


Figure 3.4.39 Connecting Cables for NAS

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3.4.15 Connecting the NAS interface cable

When connecting the RKNAS, it is necessary to connect the NAS Interface Board of the RKM/RKS/RKXS/RKH and the RKNAS with the PCI-Express cable and the CTRL cable.

Perform the following, referring to the Figure 3.4.40.

(1) Connect the PCI-Express cable to the PCI-E connector on the NAS Interface Board of the RKM/RKS/RKXS/RKH. Connect the CTRL cable to the CTRL connector as well.

(2) Connect the PCI-Express cable and the CTRL cable to the RKNAS.
Bundle the connected PCI-Express cable and the CTRL cable with a repeat binder (at the position approximately 150mm from the tip of the cable).

(3) Bundle the extra length of the connected PCI-Express cable and the CTRL cable lightly in a circular pattern with the repeat binder.

NOTE : Do not fix the PCI-Express cable and the CTRL Cable together with the power cable.

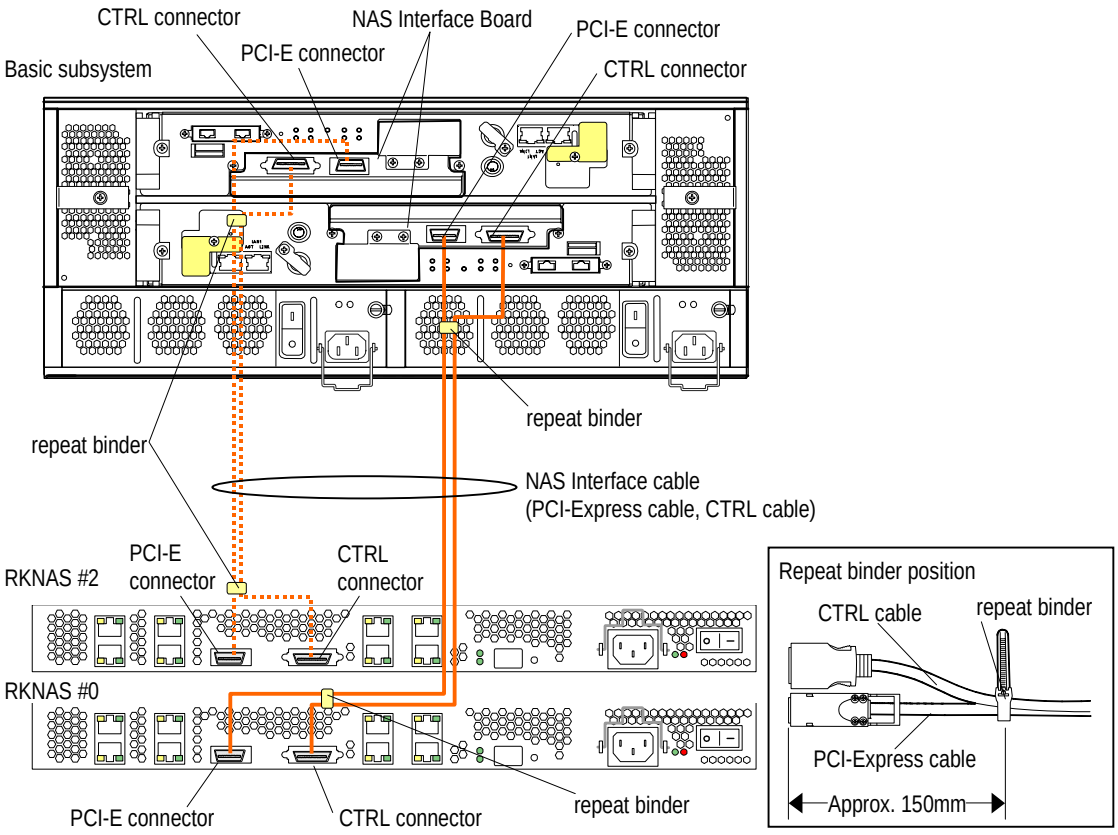


Figure 3.4.40 Connecting NAS Interface Cables (RKM/RKS/RKXS)

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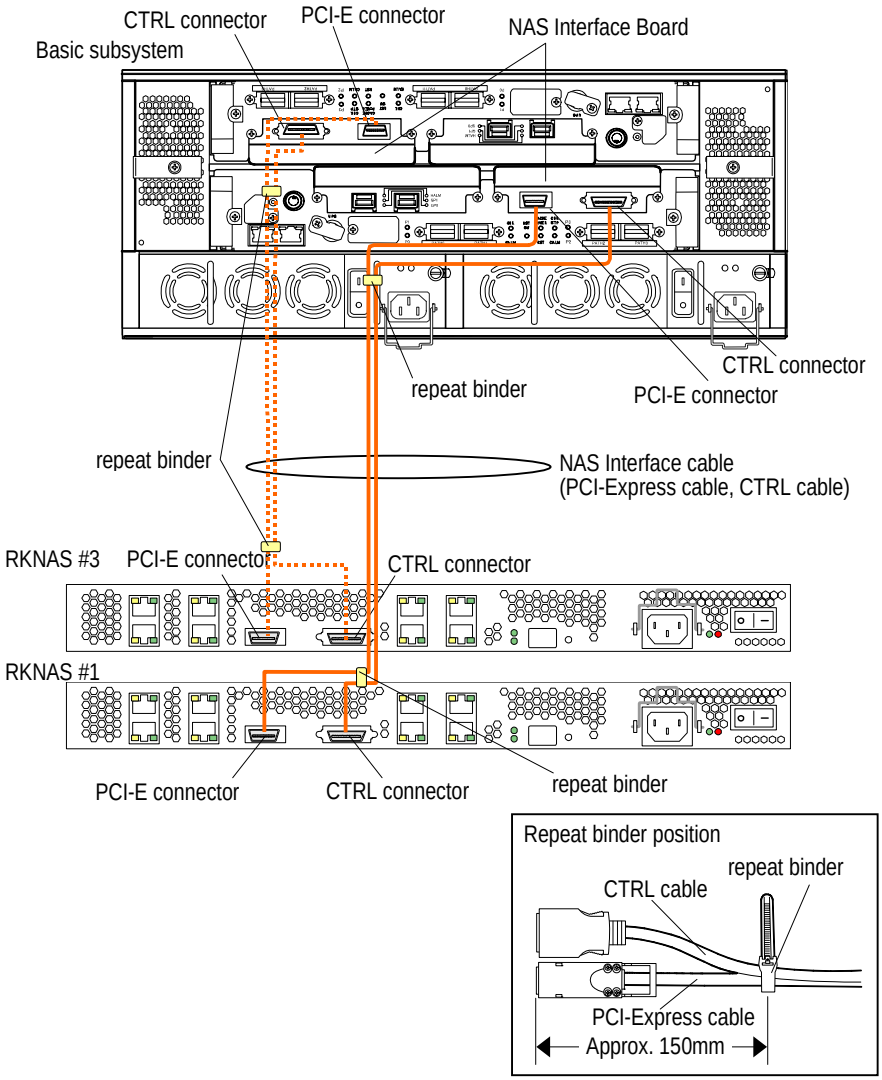


Figure 3.4.40.1 Connecting NAS Interface Cables (RKH)

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3.4.16 Connecting the LAN cable for the NAS

When connecting the RKNAS, it is necessary to connect the Control Unit of the RKM/RKS/RKXS/RKH and the LAN cable of RKNAS.
Also, connect between the RKNASs with the LAN cable.
Perform the following, referring to the Figure 3.4.41.

(1) Attach the labels on both ends of the LAN cable. (The labels are supplied with the RKNAS.)
Attach the yellow labels on the LAN cable between the Control Unit and the RKNAS.
Attach the red labels on the LAN cable between the RKNAS #0 and the RKNAS #2.
When the Basic Chassis is the RKH, attach the red label on the LAN cable between the RKNAS #1 and the RKNAS #3.
(2) Connect the LAN cable on which the yellow labels are attached to the LAN connector for the maintenance on the Control Unit of the RKM/RKS/RKXS/RKH.
(3) Connect the LAN cable on which the yellow labels are attached to the DiskArray connector of the RKNAS.
(4) Connect between the Other NNC connector of the RKNAS #0 and the Other NNC connector of the RKNAS #2 with the LAN cable on which the red labels are attached.
(5) Connect the control LAN cable to the mng1 connector of the RKNAS.
(6) Connect the data LAN cable to the gbe1 - gbe4 connector of the RKNAS.
If the covers are attached to the gbe1 - bge4 connectors, connect the cables after removing them.

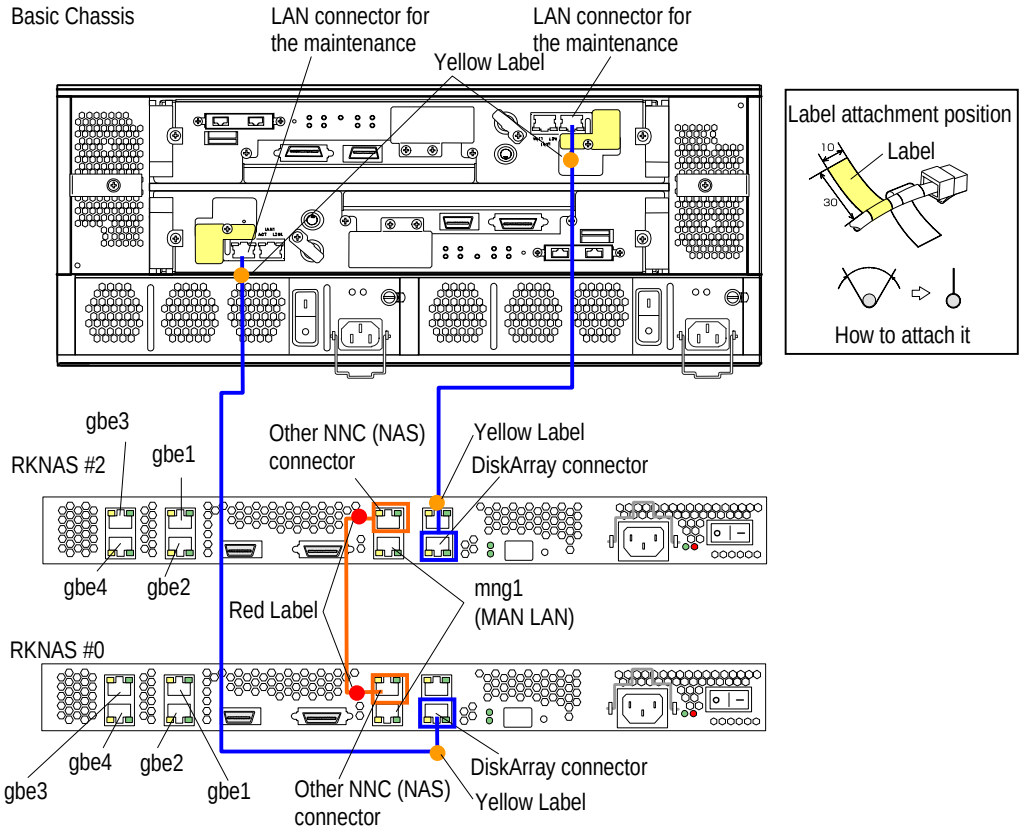


Figure 3.4.41 Connecting LAN Cables for NAS (RKM/RKS/RKXS)

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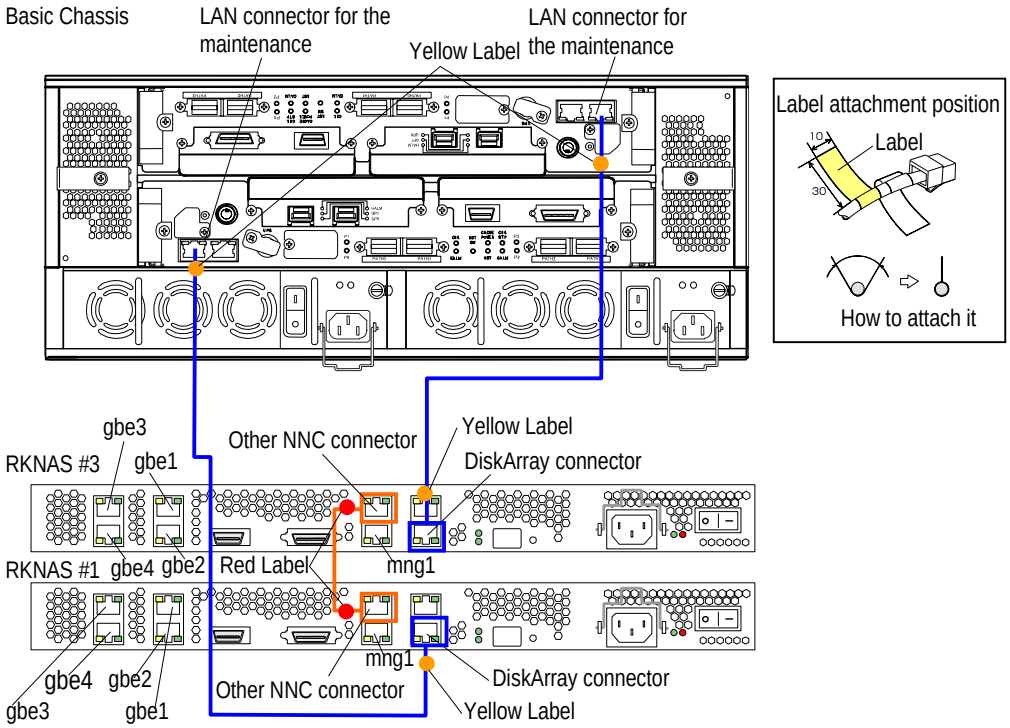


Figure 3.4.41.1 Connecting LAN Cables for NAS (RKH)

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3.4.17 Connecting the power cable for the NAS

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

(1) Check that all the breakers of the PDB are turned off.
(2) Check that all the AC Input Power Switches of the RKNAS power supply unit are turned off.
(3) Insert the socket of the power cable in the RKNAS power supply unit.
(4) Insert the plug of the power cable in the PDB (use it from J10 to J13 in order).

NOTE : • Be sure to insert the power cable for the RKNAS #0 in the PDB #00/01.
In the case of the RKH, be sure to insert the power cable for the RKNAS #1 in the PDB #00/01.
Be sure to insert the power cable for the RKNAS #2 in the PDB #10/11.
In the case of the RKH, be sure to insert the power cable for the RKNAS #3 in the PDB #10/11.
It cannot be duplicated if inserting it in the same PDB side.
• Do not insert anything other than the installed power cable in the outlet of the PDB.
• Do not let the total current output from J10 to J13 exceed 20A (‡1).

(5) Hang the cable clamp of the PDB on the plug of the power cable.
(6) Route the power cable.
(7) Push the plug of the power cable inserted into the PDB again. It may be loosen by routing.

‡1 : When installing the two or more RKMs, connect them so that the load on a PDB does not exceed 20 A after checking the load through a calculation.
RKH one unit : 2.6 A
RKM one unit : 4.2 A
RKS one unit : 4.0 A
RKXS one unit : 3.0 A
RKAJ one unit : 2.6 A
RKAJAT one unit : 2.4 A
RKNAS one unit : 2.0 A

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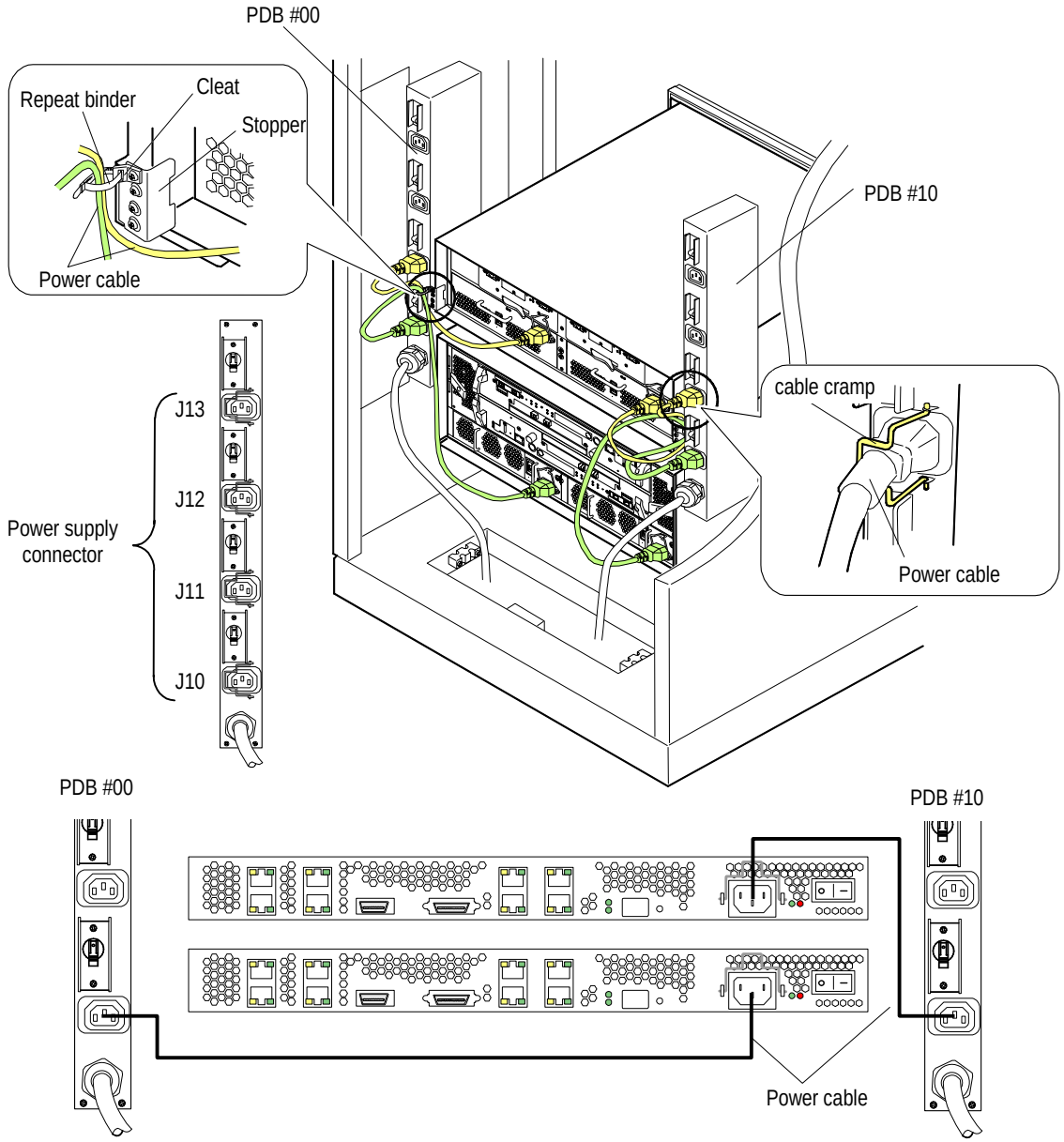


Figure 3.4.42 Connecting Power Cables for NAS

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3.4.18 Attaching Decoration Panels

When a vacant space is left on the front side of the rack frame, install the decoration panels there.

(1) Fit the decoration panels to the front side of the rack frame one by one starting from the top.
(2) The decoration panel can be installed when the two extrusions of it are aligned with the holes, which are prepared on the rack frame with intervals of one EIA unit, and then pressed into the holes.

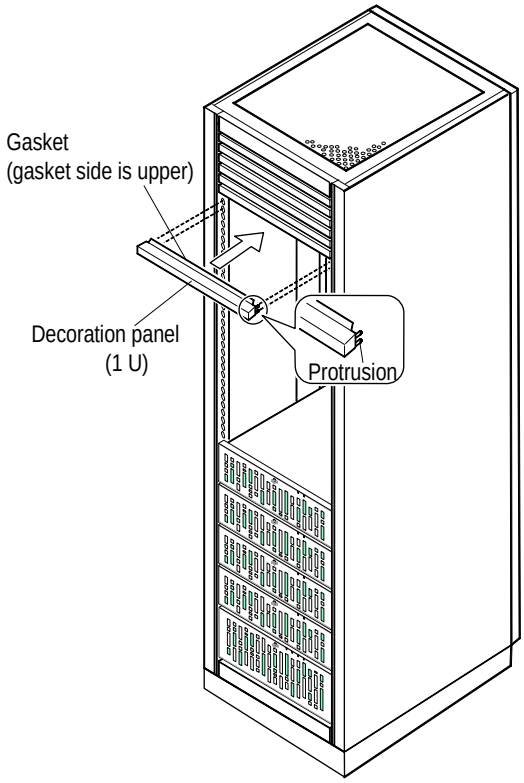


Figure 3.4.43 Attaching Decoration Panel

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3.4.19 Closing Door or Attaching Front Bezel

(1) Close the rear door. (Refer to "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)

(2) Attach the Front Bezel. (Refer to "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130).)

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Microprogram

Chapter 1. Installation of Microprogram ..... MICRO 01-0000

Chapter 2. Procedure for Recovery from a Failure ..... MICRO 02-0000

Chapter 3. Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete " Message Is Output ..... MICRO 03-0000

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Chapter 1. Installation of Microprogram

This work is for new installation or update installation of the microprogram in the subsystem.

NOTE : • If new installation is performed, user data is lost. When user data already exists, be sure to perform update installation.
- Do not perform the update installation of the microprogram while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).
- Do not perform the new or update installation of the microprogram, update of the NAS BIOS firmware, or the installation of the NAS OS while the array subsystem is being started.
- When the subsystem is in the single controller configuration, the update installation of the microprogram which uses the Storage Navigator Modular cannot be performed. In this case, change the subsystem to the Maintenance Mode, and perform the update installation of the microprogram by using WEB in the Maintenance Mode.

1.1 Materials necessary for installation

- Maintenance PC(‡1)
- LAN cross cable
- CD-ROM for microprogram installation

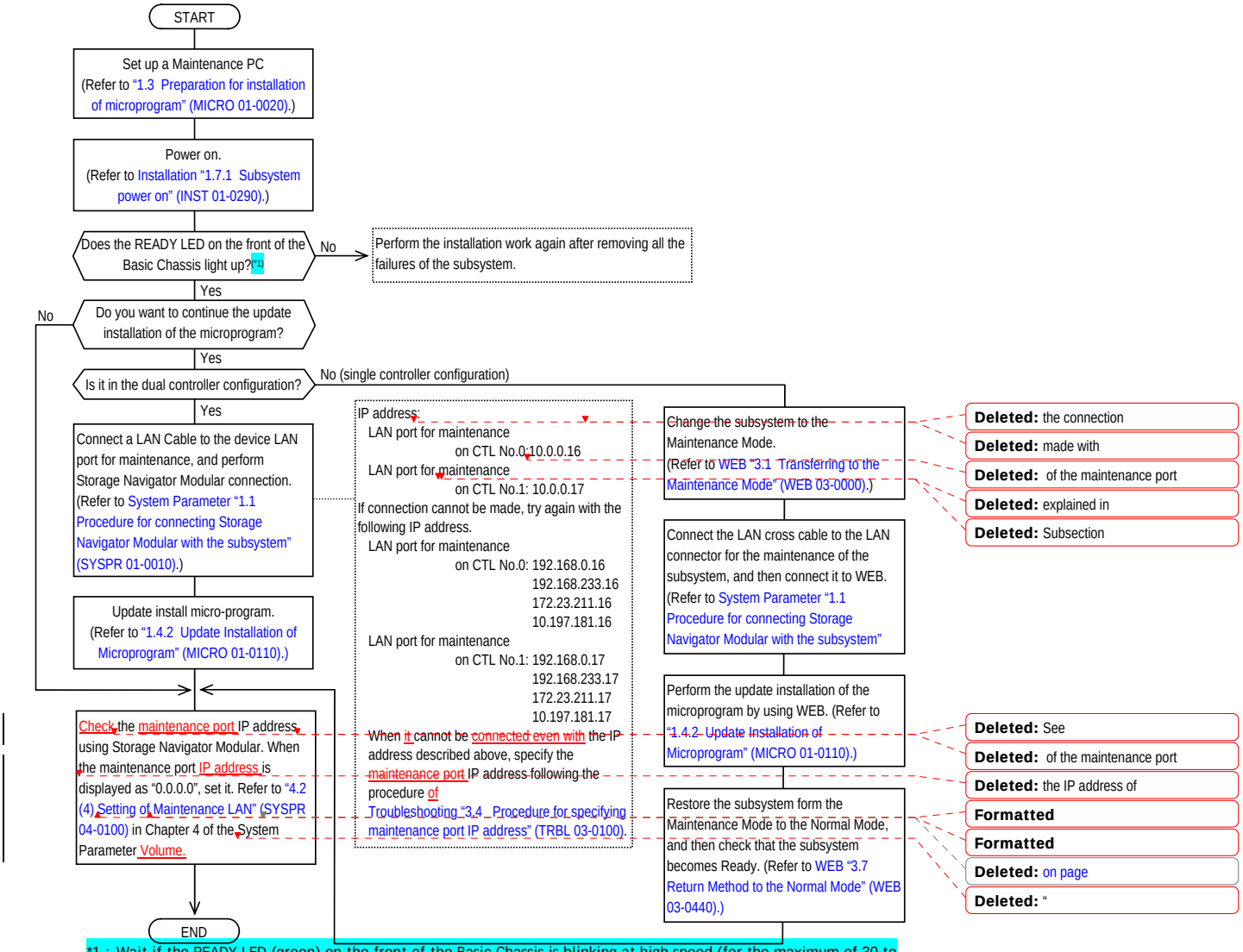
‡1 : The service PC must have a CD-ROM drive for the microprogram installation. If the Maintenance PC has no CD-ROM drive, it must be set up beforehand via a network.
(See "1.3 (4) Procedure for setting up the Maintenance PC" (MICRO 01-0050).

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1.2 Outline of procedure for installation (update installation)

(1) Install the microprogram using the WEB or Storage Navigator Modular connection from the Maintenance PC.

(2) In the Maintenance PC, JRE (‡1) 1.3.1 03 must be installed. (See "1.3 (4) Procedure for setting up the Maintenance PC" (MICRO 01-0050).)



*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

‡1 : Java runtime environment.

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1.3 Preparation for installation of microprogram

(1) Outline

Set up the Maintenance PC before starting the update installation. Outline of the setting up is shown below

- Installation of the JRE 1.3.1 03
- Setting of the security policy file
- Copying of the microprogram from the CD-ROM for the microprogram installation to the service PC

(2) Prerequisites for setting up of a Maintenance PC

Prerequisites concerning the user ID of Windows are as follows.

- The user ID of Windows at the time when the microprogram is installed in the Maintenance PC must be identical with that at the time when a maintenance work is done.
- The user ID mentioned above must be defined not with full size Japanese characters but with half size alphabetic characters and/or numerals.

A prerequisite of a drive for booting the OS of the Maintenance PC

- The drive for booting the OS must be the c drive.

(3) Java error codes displayed at the time of update installation and actions for coping with them.

When the PC does not satisfy the prerequisite shown in Item (2) Prerequisites for setting up of a Maintenance PC. Details of the Java errors and actions for coping with them are shown below.

If the message code of the Java error that occurred does not exist in Table 1.3.1, refer to Message "7.1 Web error messages (Uploading Function)" (MSG 07-0000).

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Table 1.3.1 Java error codes

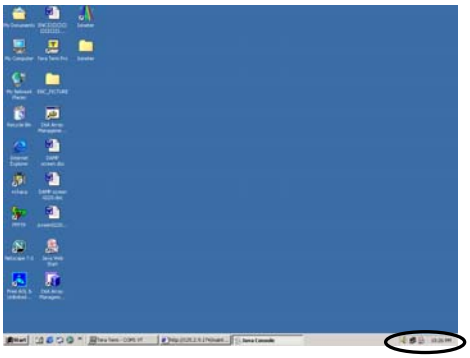
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram is selected. Cause estimated • A drive for booting the OS is not the c drive. • The user name of Windows at the time when the microprogram was installed in the Maintenance PC is not identical with that at the time when the microprogram is updated, or two-byte characters (full size characters or Japanese characters) are used to define the user name	① Check if the drive for booting the OS is the c drive. (Refer to the note (a) of (3) in Subsection 1.3.) In the case of the dual boot, boot Windows using the c drive and perform the installation again. ② Check if the user name of Windows at the time when the microprogram is installed in the Maintenance PC is identical with that at the time when the microprogram is updated and if two-byte characters (such as full size characters and Japanese characters) are not used. If an illegal specification has been made, perform the logon over again using an appropriate user name and perform the installation again after connecting the browser.
1219	An error occurred during the communication with the subsystem. Confirm the subsystem status and the LAN environment.	Time when the error occurs • The error occurs when the resource for the LAN cannot be ensured. Cause estimated • The error occurs because the resource (memory) of the Maintenance PC is insufficient.	① Reboot the subsystem and the Maintenance PC and quit unnecessary application programs. Make sure that the subsystem is in the Ready status, place the subsystem in the Maintenance mode, and perform the installation again. ② If the error recurs in spite of the operations above, replace the Maintenance PC and perform the installation over again from the beginning. Use a Maintenance PC whose memory capacity is as large as possible.

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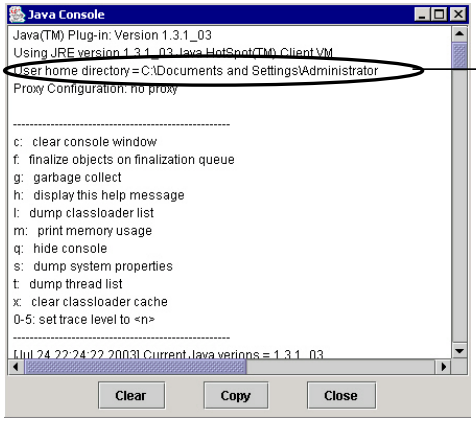
(a) Method for checking the drive for booting the OS

A method for checking the boot drive when the Java message (message code: 1216) is issued is shown below.

(i) Double click the [: Java icon]on the task tray at the bottom right in the Maintenance PC window.



(ii) Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: ¥*****…).



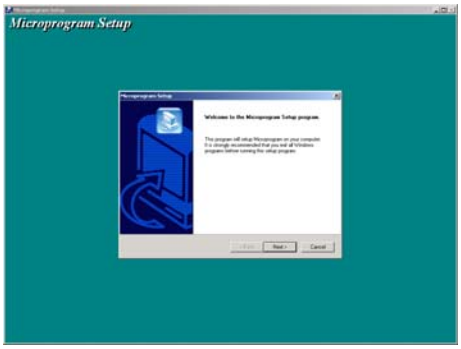
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(4) Procedure for setting up the Maintenance PC

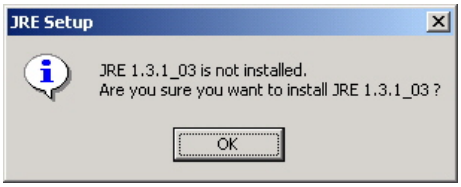
(a) When the version other than JRE 1.3.1 03 is installed in the service PC, the microprogram replacement may not be performed normally.
When the version other than JRE 1.3.1 03 is installed, be sure to uninstall the JRE, and then go to Procedure (b).
Open [Setting] – [Control Panel] from the start menu of Windows, and delete the JRE by "Addition and Deletion of Applications" to uninstall the JRE.

(b) Double click the "Program¥micro upload¥micro setup¥Setup. exe" of the CD-ROM for microprogram installation.

(c) The initial window of the setting up appears.
When the [Next] button is pressed, the JRE 1.3.1 03 installer is activated in the case where the JRE 1.3.1 03 is not installed yet.
In the case where the JRE 1.3.1 03 has been installed, windows shown in Steps (d) to (h) are not displayed.

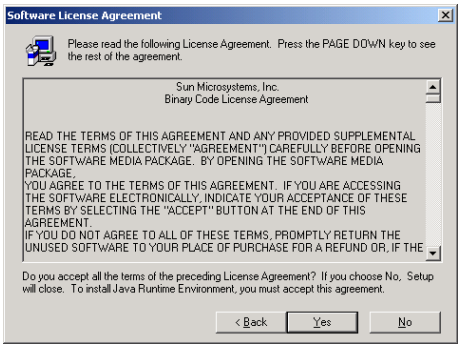


(d) A dialog box for asking confirmation of starting the JRE 1.3.1 03 installer. Click the [OK] button.

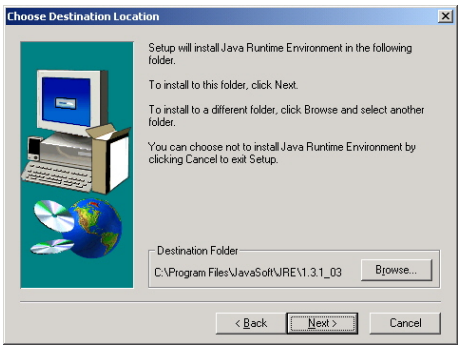


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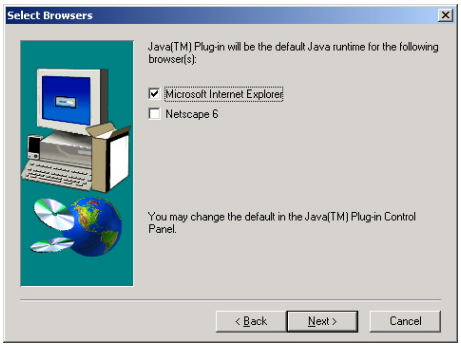
(e) A window of product licensing contract is displayed. Click the [Yes] button.



(f) A window for selecting a directory in which the JRE 1.3.1 03 is to be installed. Select the directory for the installation and click the [Next] button.

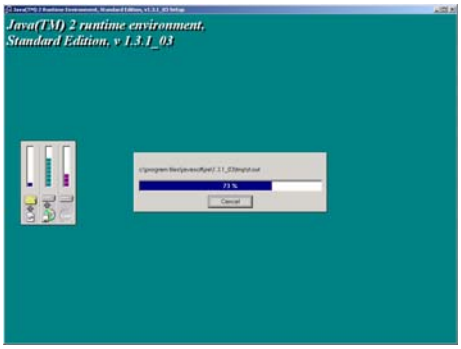


(g) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



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(h) Installation of the JRE 1.3.1 03 is started.



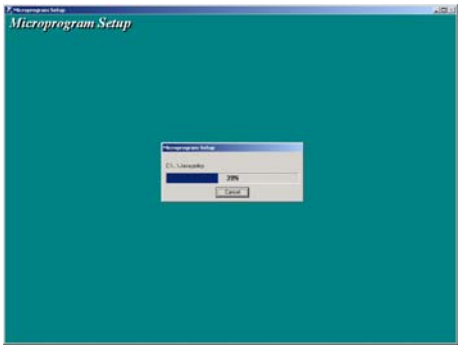
(i) After the installation of the JRE 1.3.1 03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.



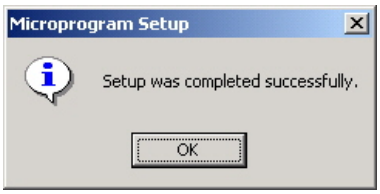


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(j) The microprogram is copied on the Maintenance PC.
Create a directory to which the microprogram is to be copied directly under the "C:¥diskarray-microprogram¥microprogram" for each microprogram revision and copy the microprogram file with the subdirectories (DF700M, DF700S, ENC, ---) into the directory.



(k) The setting up is completed. Press the [OK] button.



(5) Notes
(a) Note that the settings of the security policy file is changed when the Maintenance PC is set up.
(b) If the microprogram is transferred to a directory other than "C:¥diskarray-microprogram¥microprogram" which is a directory copied by the installer, the installation cannot be done. Therefore, care should be taken.
(c) Do not change a name of the unified version directory(‡1) or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

‡1 : For the unified version directory, refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090).

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1.3.1 Hierarchy of Microprogram Storage Directories

The hierarchical structure of Microprogram storage directories is shown in Table 1.3.2.
The structure of directories of the CD-ROM for installing the Microprogram is the same as that shown in Table 1.3.2.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:¥diskarray-microprogram¥microprogram."
When installing the Microprogram, specify the unified version directory.

Table 1.3.2 Directory Hierarchy

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The Microprogram becomes unable to be installed if the directory name is changed.

NOTE : When using the NAS model, the microprogram, the BIOS firmware, and the NAS OS may be newly released at the same time. In this case, perform the installation work in the following order unless otherwise instructed.
① Installation of the microprogram
② Installation of the BIOS firmware
③ Installation of the NAS OS

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1.4 Procedure for installation

1.4.1 The point to be checked before installation

Make sure of the following before starting installation

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem.
- When newly installing, the subsystem does not become READY after turning on the main switch of the subsystem because the microprogram is not installed. ("RB8400 Download failed" is displayed on the "Information Message".)
- When the microprogram is already installed in the disk array subsystem, check that the READY LED (green) on the front of the Basic Chassis lights up. When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, do not perform the update work for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.
- When the microprogram is already installed in the disk array subsystem, check that the WARNING LED (orange) on the front of the Basic Chassis goes out, and the READY LED (green) lights up. When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed.
- Check with Information Message on WEB ("I141xy (or I141HH) System copy completed" is displayed for the Disk Drive indicated by "I140xy <or I140HH> System copy start") that the system copy is not being operated. If the system copy is being executed, install it after completing the system copy.
- If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance the update installations in the status that TrueCopy remote replication/ TrueCopy Extended Distance is enabled, the following phenomena occur.
  - Both of the TrueCopy remote replication path or the TrueCopy Extended Distance path are blocked.
    When the paths are blocked, the failure monitoring program (ASSIST), notice of the E-MAIL ASSIS function, and the TRAP of SNMP Agent Support Function occur. Give the check and the notice to the Failure Monitoring Department in advance.
  - When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

  If the array subsystem is the update installed unavoidably, the update installation it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

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- If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
  When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

  NOTE : When Power Saving of the priced option is used, if you perform the update installation of the microprogram in the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the microprogram replacement is completed.
  Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then install the microprogram in the subsystem.
  If the spin-down fails, execute the spin-down again.

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1.4.2 Update Installation of Microprogram

Please execute "(1) Procedure for download" (MICRO 01-0110) and "(2) Replacing the microprogram" (MICRO 01-0170) to the update installation.

NOTE : • Do not perform the update installation of the microprogram while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

- When registering the disk array subsystem at the time of connecting the disk array subsystem, specify only the Control Unit #0 in [Connection Destination] (refer to System Parameter "1.1 (3) (c) Registering the disk array subsystem" (SYSPR 01-0060)).
- When executing the update installation online at the time of the NAS Unit connection, check the fail-over of the NAS Unit before performing (3-2), and stop the NAS OS of the NAS Unit. After that, check the fail-back after the microprogram replacement. (Refer to DF700 SOFTWARE Maintenance Manual "4.2.1 NAS Hardware Replacement Flow" (NAS 04-0020).)(‡1)
- When the CIFS file system is created and used, the update installation during the system operation cannot be performed.
- When the LU, whose status of the forced parity correction is any of "Correcting", "Waiting", "Waiting Disk Drive Recovery", "Uncorrected", "Uncorrected 1" and "Uncorrected 2", is in the subsystem, change the status of the LU to "Restored" or "Skip" by executing or skipping the forced parity correction (recommendation).

(1) Procedure for download

Download the microprogram from the CD-R into the subsystem. In the download, the microprogram is stored in the subsystem; the microprogram of the subsystem is not replaced.

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web. (See Subsection Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection System Parameter "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050).))

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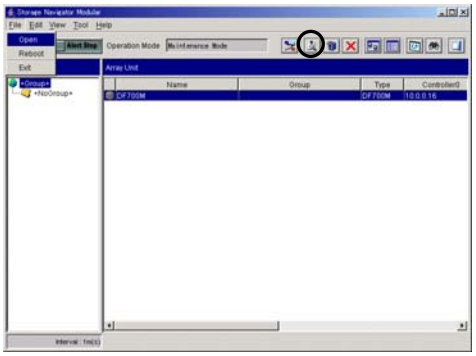
‡1 : Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

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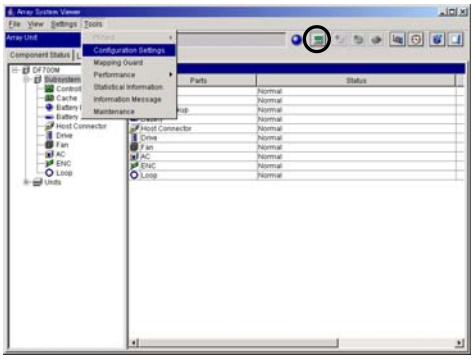
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

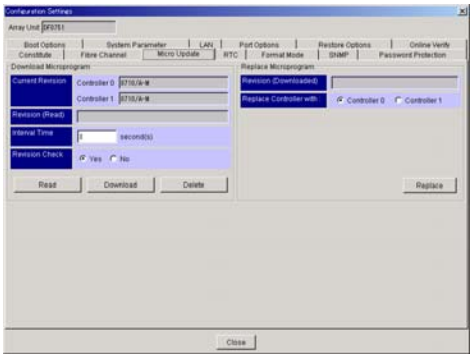


(d) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



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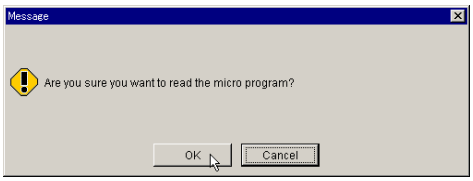
(e) Click the [Micro Update] tab.



(f) Read in the microprogram to the Maintenance PC in which Storage Navigator Modular is installed. Click the [Read] button.
When a microprogram revision is displayed in the [Revision(Read)] box, the microprogram has already been read in. When only the Unified version directory(‡1) storing the microprogram is specified, the whole microprogram is read in automatically.

(g) Since a message asking for confirmation whether or not to read in the microprogram, click the [OK] button.

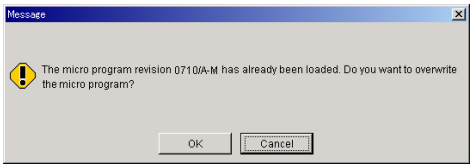
NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the download of the microprogram again from the beginning.



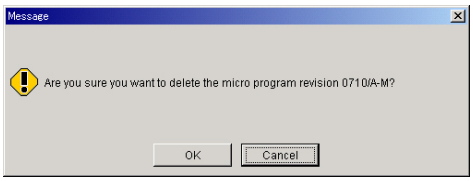
‡1 : For the unified version directory, refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090).

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In the case where the microprogram has already been read in, the message asking for the confirmation is displayed. When you click the [OK] button, the microprogram is overwritten. When you abort the reading in, click the [Cancel] button.



When you eliminate the microprogram that has already been read in to the computer, click the [Delete] button. Since the message asking for confirmation is displayed, click the [OK] button.



(h) Since a window for specifying the directory in which the microprogram to be read in is stored is displayed, specify the Unified version directory(‡1) . When you click the [OK] button, reading in of the microprogram is started.
Examples of the path entry are shown below.

When using Windows®:

c:/diskarray-microprogram/microprogram/micro/0710A

When using Solaris™, IRIX®, HP-UX®, or Red Hat Linux®:

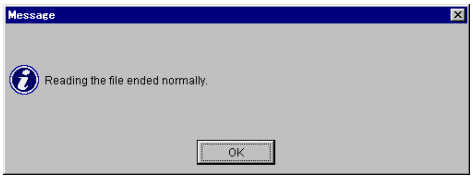
diskarray-microprogram/microprogram/micro/0710A

Unified version directory in the hard disk in which the micro program is copied.

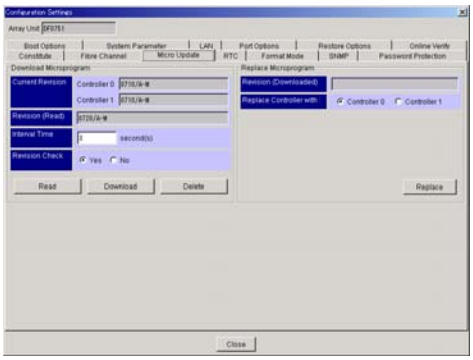
‡1 : For the unified version directory, refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090).

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(i) Since a message is displayed when the reading in of the microprogram is completed, click the [OK] button.

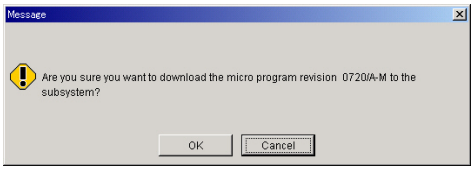


The revision of the microprogram that has been read in is displayed in the [Revision(Read)] box.



(j) Click the [Download] tab.

(k) The confirmation window is display. Click the [OK] button.

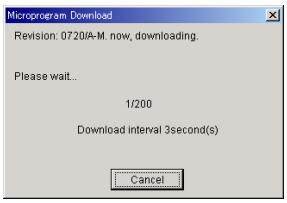


The confirmation window is display. Click the [Yes] button.

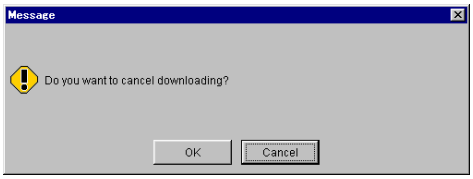


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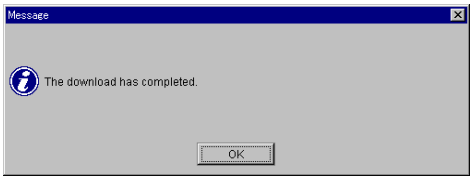
The download of the microprogram starts by clicking the [Yes] button, and the dialog is displayed.



When you abort the downloading, click the [Cancel] button.
A message asking for confirmation is displayed. When you click the [OK] button, the downloading is aborted.
When you click the [Cancel] button, the downloading is continued.



(l) Since a message is displayed when the downloading is completed normally, click the [OK] button.



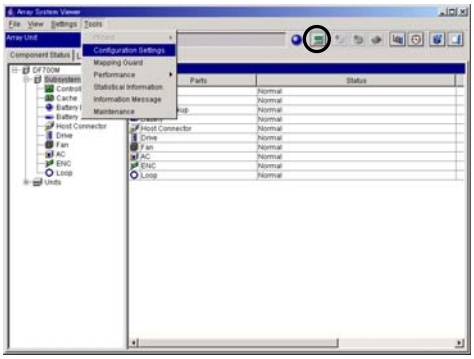
NOTE : After the microprogram is downloaded, be sure to restart the disk array subsystem or replace the microprogram. If the Control Unit board is replaced in the online mode before restarting the disk array subsystem or replacing the microprogram, the replaced Control Unit may be detached. When the subsystem is burdened with a heavy I/O load by a host at the time of the downloading, the downloading may be terminated abnormally. Perform the downloading again.

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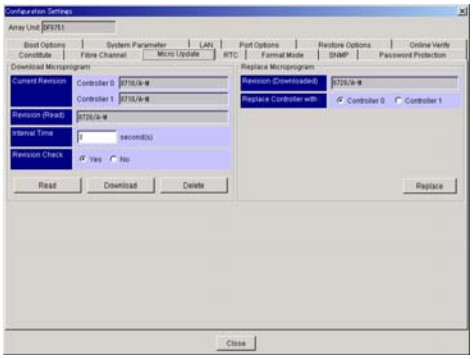
(2) Replacing the microprogram

Replace the microprogram that was downloaded to the disk array subsystem with the microprogram installed in the Control Unit. When making replacement, be sure to replace the microprograms of the both Control Units 0 and 1. When the microprogram of one of the Control Units is replaced and the unit window of Storage Navigator Modular is closed, the unit window may be opened no more. If the unit window becomes unable to be opened, replace the microprogram after changing the registration to that in which only the Control Unit whose microprogram has not be replaced is registered.

(a) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

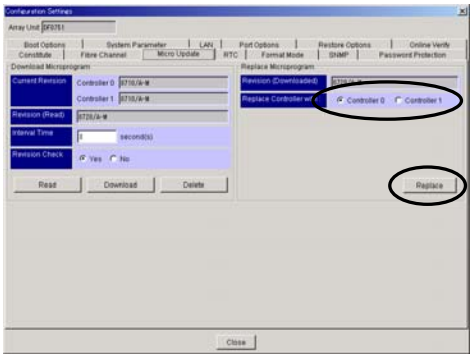


(b) Click the [Micro Update] tab.



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(c) Select the Control Unit whose microprogram is to be replaced and click the [Replace] button.



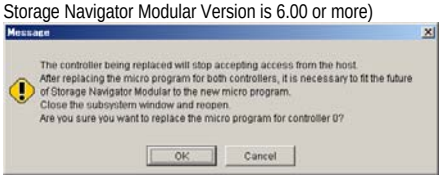
(d) The confirmation window is display. Check if the selected Control Unit is correctly displayed and click the [OK] button.

NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the replace of the microprogram again from the beginning.

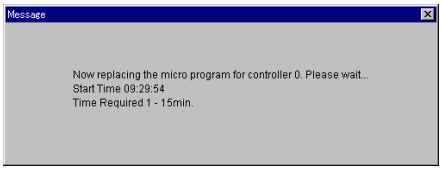
Storage Navigator Modular Version is less than 6.00)



Storage Navigator Modular Version is 6.00 or more)



↓



NOTE : Then "W0100x CTL alarm (CTL-x)" message is displayed in information message of Web and Array Unit becomes Warning Status.

↓

Click the [OK] button according to the dialog message.



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(e) When the replacement of the microprogram terminates normally, a completion message is displayed. Click the [OK] button.



NOTE : When making the access from the host accepted by the instruction from Storage Navigator Modular, the following message may be displayed if it is not operated for 20 minutes or more in the case where Account Authentication is valid, and it may not be completed normally. Perform the dummy replacement (‡1) of the Control Unit whose microprogram was replaced to make the access from the host accepted.
If the access from the host is made accepted when the replacement of the microprogram is completed, the dummy replacement (‡1) is unnecessary.



(f) In the case of the dual controller configuration, also replace the microprogram of the other Control Unit according to the procedure (c) to (e).
However, in the case of the NAS model, perform the failback of the I/O to the side replace first, and then perform the failover of the I/O to the side to be replaced next according to the DF700 Software Maintenance Manual “4.2.1 NAS Hardware Replacement Flow” (NAS 04-0020). After that, replace the microprogram according the procedure (c) to (e)(‡2).

(g) Click the [Close] button.

(h) Select [View] – [Refresh] in the unit window.

(i) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

(j) Click the [Micro Update] tab and check that the revision of the microprogram replaced to [Current Revision] is displayed.

‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.
‡2 : Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

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(k) When the revision check of the both Control Units is completed, the microprogram replacement of the array subsystem ends.
However, in the case of the NAS model, perform the failback of the I/O according to the DF700 Software Maintenance Manual "4.2.1 NAS Hardware Replacement Flow" (NAS 04-0020).

NOTE : • When the replacement of the microproram is made for only one of the dual Control Unit, the disk array subsystem is put in the status in which a warning is issued. The warning is called off when the other one of the dual Control Unit is replaced. When you replace the microprogram, be sure to make the replacement for the both Control Units continuously.
• When the microprogram was replaced online after performing the processing to change the system configuration (LU formation, format, LU owner right change, etc.), the "I140xy (or I140HH) System copy started" message may be displayed two or more times in Information Message on WEB, but it is not a problem.

(3) Checking the maintenance port IP address
Check that the maintenance port IP address has been set correctly using Storage Navigator Modular.
When the maintenance port IP address is displayed as "0.0.0.0", set it.
Refer to System Parameter "4.2 (4) Setting of Maintenance LAN" (SYSPR 04-0100).

Deleted: Make sure
Deleted: of the maintenance port
Deleted: of the maintenance port

(4) Checking the READY LED (green) on the front of the Basic Chassis
Check that the READY LED (green) on the front of the Basic Chassis lights up. When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, the READY LED (green) on the front of the Basic Chassis lights up after blinking at high speed for the maximum of 30 to 50 minutes (40 to 60 minutes in case of the RKH) because the automatic download of the ENC/SENC firmware is being operated.

(5) Checking the completion of the automatic download of the ENC/SENC firmware
Check that "IZYR00 Automatic ENC microprogram download completed successfully" and "IZYS00 Automatic ENC microprogram download start" are displayed in Information Message on WEB.
When "IZYQ00 Automatic ENC microprogram download failed" is displayed in Information Message on WEB, perform the maintenance according to the recovery method of the message code. However, if [Unit Window] – [Tool] – [Maintenance] – [ENC Micro Update] – [Automatic Download] is set to [Disable] in Storage Navigator Modular, Procedure (5) is not necessary.

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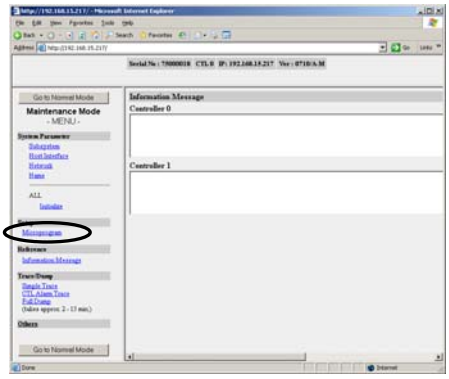
1.4.3 Procedure for new installation

NOTE : If new installation is performed, user data is lost. When user data already exists, be sure to perform update installation.

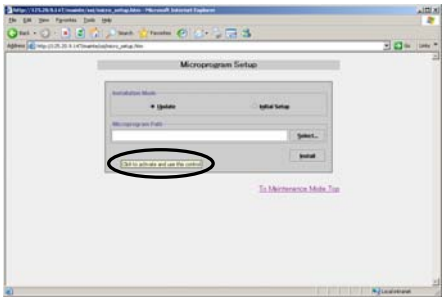
(1) Set the operation mode in the Maintenance Mode. (See "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000).)

(2) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web. (See Subsection "3.1 Procedure to WEB connection" (TRBL 03-0000).)

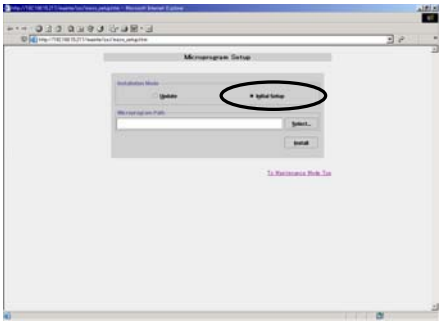
(3) Click "Maintenance", "Setup", and "Microprogram" in this order in the Web window.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].



(4) When the Microprogram Setup window is displayed, check the "Initial Setup" radio button of the "Installation Mode". When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.



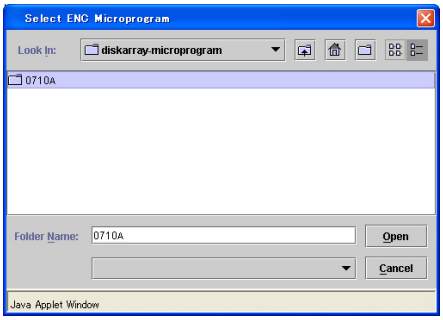
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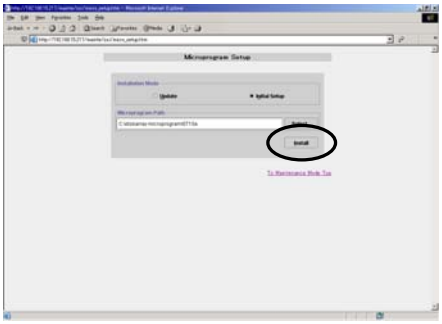
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(5) Set the microprogram path.
Specify the Unified version directory(‡1) in which the microprogram that has been copied to the Maintenance PC is stored.
When the “Select” button is clicked, the “Select Microprogram” window is displayed. Select the Unified version directory in which the microprogram is stored and click the “Open” button.

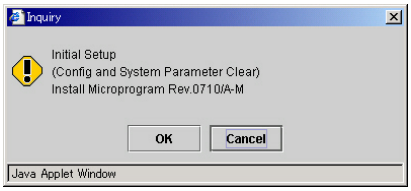
NOTE : If the window is not displayed, the JRE 1.3.1 03 may have not been installed or the installation of it may have failed.
Perform the installation of the JRE1.3.1 03 (See “1.3 Preparation for installation of microprogram” (MICRO 01-0020).) again.



(6) Click the [Install] button to install the microprogram.



(7) A dialog box for confirming whether to execute the installation is displayed. Press the [OK] button when you want to install or [Cancel] when you want to abort.

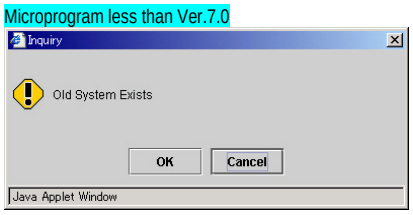


‡1 : For the unified version directory, refer to “1.3.1 Hierarchy of Microprogram Storage Directories” (MICRO 01-0090).

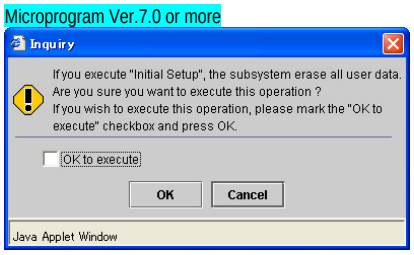
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(8) The following dialog box is displayed when the microprogram has already been installed in the subsystem in the case where the initial setting up is specified.

Microprogram less than Ver.7.0



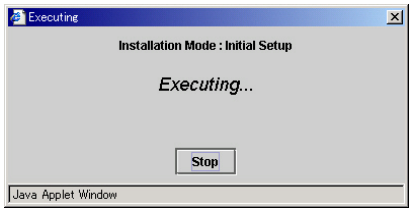
Microprogram Ver.7.0 or more



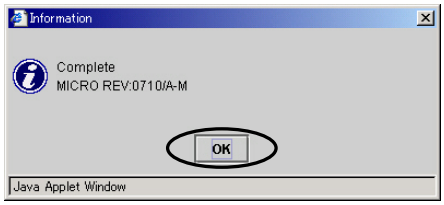
(9) When you want to continue the installation, press the [OK] button. When you want to abort the installation, press the [Cancel] button.

(10) When the installation is started, the following dialog box showing that the installation is in progress is displayed. The installation type and a name of a file being processed is displayed in the dialog box. When you abort the installation, press the [Stop] button.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the window in the procedure (11) was displayed, execute the new installation procedure again from the beginning.

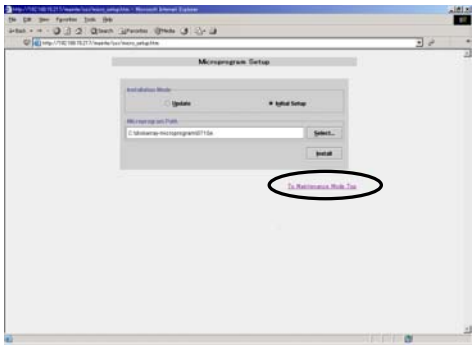


(11) When the installation is completed, the completion window is displayed. Click the [OK] button.

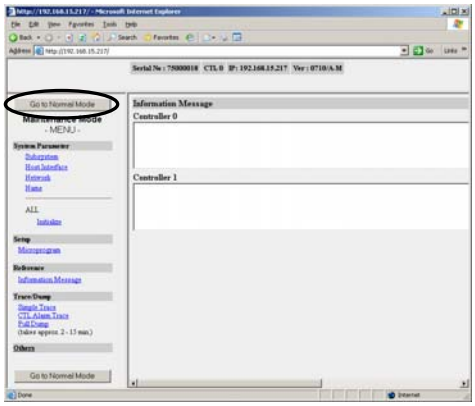


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(12) Go to the “Maintenance Mode” window by clicking “To Maintenance Mode Top” in the Microprogram Setup” window.

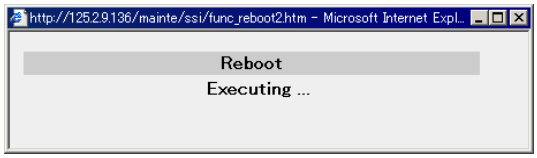


(13) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.



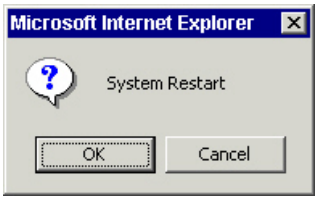
(14) When the [Go to Normal Mode] button is clicked, the following window is displayed.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the display of the following window disappears, click [View] – [Refresh] of the menu bar or the [Refresh] button of the tool bar, and then update the page of WEB. After that, click the [Go To Normal Mode] button when the main window is displayed.



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(15) Click the [OK] button.



(16) The subsystem becomes READY in about four minutes (about five minutes in case of the RKH).
Check that the READY LED (green) on the front of the Basic Chassis lights up usually after four minutes in case that the Basic Chassis is the RKM/RKS/RKXS, and after five minutes in case of the RKH.
At this time, if the subsystem is a dual controller configuration and the READY LED (green) on the front of the Basic Chassis is blinking at high speed, the READY LED (green) on the front of the Basic Chassis lights up after blinking at high speed for the maximum of 30 to 50 minutes (40 to 60 minutes in case of the RKH) because the automatic download of the ENC/SENC firmware is being operated. Also, when the subsystem is a single controller configuration and the READY LED (green) on the front of the Basic Chassis does not light up but the WARNING LED (orange) is blinking at high speed, the READY LED (green) on the front of the Basic Chassis lights up after the WARNING LED (orange) on the front of the Basic Chassis blinks at high speed for the maximum of 30 to 85 minutes because the update of the flash program or the automatic download of the ENC/SENC firmware is being operated.
If the READY LED (green) on the front side of the Basic Chassis does not come on, the installation may have failed. Perform the installation over again.
If the READY LED (green) on the front of the Basic Chassis still does not light up, collect the Full Dump (refer to Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130)), turn off the main switch, turn off all the AC Input Power Switches, and then replace the Control Unit (refer to Replacement "2.5.5 (2) Procedure for the replacement with the power turned off" (REP 02-0500)).

NOTE : Do not perform the update installation of the microprogram while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

(17) Check that "I10000 Subsystem is ready" is displayed referring to Information Message on WEB.

(18) When the Basic Chassis is the RKH/RKHE, check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to Information Message on WEB.

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(19) Check that "IZYR00 Automatic ENC microprogram download completed successfully" and "IZYS00 Automatic ENC microprogram download start" are displayed in Information Message on WEB. When "IZYQ00 Automatic ENC microprogram download failed" is displayed in Information Message on WEB, perform the maintenance according to the recovery method of the message.

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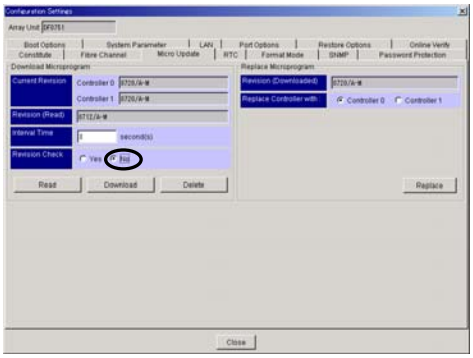
1.4.4 Procedure for the version downgrade

Perform (2) Download of the microprogram and (3) Replacement of the microprogram for the version downgrade of the microprogram.

NOTE : Do not perform the update installation of the microprogram while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

(1) Restrictions of the version downgrade of the microprogram
For the restrictions of the version downgrade of the microprogram, refer to "1.7 Restrictions of the version downgrade of the microprogram" (MICRO 01-0290).

(2) Download of the microprogram
(a) Make the Storage Navigator Modular to read the microprogram of which the version is to be downgraded, according to the procedure for update installation ("1.4.2 Update Installation of Microprogram (1) Procedure for download (a) to (i)" (MICRO 01-0110 to MICRO 01-0150).
(b) Check [No] of [Revision Check].



(c) Download the microprogram of which the version is to be downgraded in the subsystem from the Storage Navigator Modular, according to the procedure for update installation ("1.4.2 Update Installation of Microprogram (1) Procedure for download (j) to (l)" (MICRO 01-0150 to MICRO 01-0160).

(3) Replacement of the microprogram
Replace the microprogram which is downloaded in the array subsystem to the microprogram of the Control Unit, according to the procedure for update installation ("1.4.2 Update Installation of Microprogram (2) Replacing the microprogram" (MICRO 01-0170).

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1.5 Checking the start and the termination of the ENC/SENC firmware automatic download

The ENC/SENC firmware is a function that is managed as a part of the microprogram and checks the version of all ENC/SENC firmware in the subsystem when the subsystem starts or the SENC is replaced, and downloads it automatically if necessary.

(1) Opportunity to start the automatic download

The ENC/SENC firmware starts the download automatically in the following opportunities. In the single controller configuration, the automatic download of the ENC/SENC firmware operates only at the time of the starting opportunity.

<Start-up Opportunity>

- When the main switch of the subsystem is turned on, and the subsystem enters the READY status
- When rebooting on remote
- When rebooting automatically
- When rebooting the Control Unit in the maintenance mode

<Maintenance Opportunity>

- When the Control Unit is inserted online
- When the ENC Unit/SENC Unit are inserted online
- When the chassis frame is added online
- When the microprogram is changed online
- When the ENC microprogram automatic download function is enabled
- When the following warnings are released before starting the automatic download
  Loop Warning/ENC Warning/Control Unit Warning/SNMP Warning/Disk drive Warning/PIN Warning/Power Unit Warning/UPS Warning/Battery backup Unit Warning/Battery backup circuit Warning/Fan Unit Warning
- When the following warnings, which caused the abnormal termination of the automatic download, are released
  Loop Warning/ENC Unit Warning/Control Unit Warning/Disk drive Warning/ENC replacement which occurred in the SES error

(2) Restriction items during the automatic download

Do not perform the following work during the ENC/SENC firmware automatic download.

- Planned shutdown
- Update installation of the microprogram from Storage Navigator Modular
- Setting change of Boot Options by Storage Navigator Modular
- Setting change of LAN by Storage Navigator Modular
- Text file input of Boot Options of the configuration copy information by Storage Navigator Modular
- Unlocking of the priced options by Storage Navigator Modular
- Setting change of SNMP by Storage Navigator Modular
- Setting change of Cache Residency Manager by Storage Navigator Modular
- Validation of Power Saving with Storage Navigator Modular
- Parts replacement

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- Adding optional components
- Subtracting optional components
- Relocation / Removal work
- Changing to the maintenance mode of the array subsystem by pressing RST SW of the Control Unit

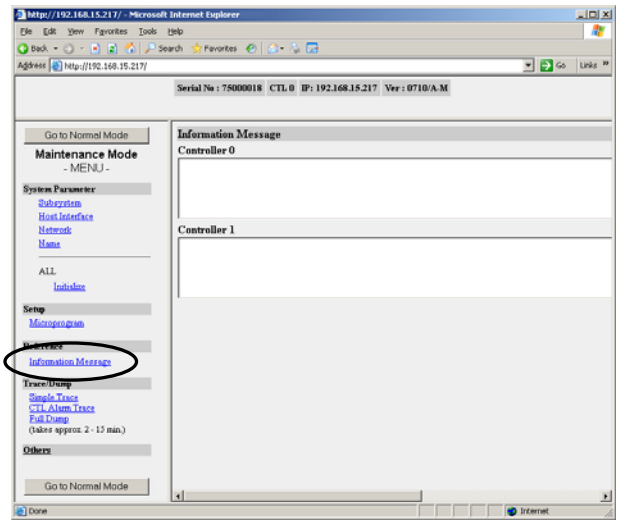
Execute the above-mentioned work after the ENC/SENC firmware automatic download is completed.

(3) Checking the start messages and the termination messages of the automatic download.
When the download starts, it takes up to 30 to 85 minutes to terminate it.

NOTE : The download does not start when the subsystem is in the warning status. Connect to the WEB and perform the recovery procedure for each WEB message (Troubleshooting "Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000)).
If the warning status is recovered and the subsystem is maintained in the normal status for one minute, the download starts.

(a) Connect the LAN cross cable to the LAN connector for maintenance of the subsystem and connect to WEB (Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000).)

(b) Click [Information Message] in the main window menu frame in the normal mode.



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(c) Check that there are the start message and the normal termination message displayed in "Information Message".

Table 1.5.1 Message Check

Message	Content
IZYS00 Automatic ENC microprogram download start	Indicates that the automatic download started.
IZYR00 Automatic ENC microprogram download completed successfully	Indicate that the automatic download terminated normally.
IZYQ00 Automatic ENC microprogram download failed	Indicate that the automatic download terminated abnormally.

<Message Check Example>

- When it is normal (ENC Unit #0 and #1 are objects)

  Automatic ENC microprogram download start
  ENC#0 microprogram download start
  ENC#0 microprogram download complete
  ENC#1 microprogram download start
  ENC#1 microprogram download complete
  Automatic ENC microprogram download completed successfully

- When it is normal (when there is no object ENC Unit)

  Automatic ENC microprogram download start
  Automatic ENC microprogram download completed successfully

- When it is abnormal

  Automatic ENC microprogram download start
  ENC#0 microprogram download start
  ENC#0 microprogram download complete
  ENC#1 microprogram download start
  ENC alarm (Unit-01, ENC-1)
  Loop alarm (Path-0, Loop-1)
  :
  ENC microprogram download error detected (Unit-01)
  :
  ENC#1 microprogram download complete
  Automatic SENC microprogram download failed

(4) Recovery method when terminating abnormally after starting the automatic download.

(a) Perform the maintenance for the warnings which were output from the automatic download start to the abnormal termination.

(b) Check the start message and the termination message of the automatic download again.

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1.6 Procedure for the NAS BIOS firmware update

Use the Storage Navigator Modular, and perform the update of the BIOS for each NAS Unit.
Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

(1) Procedure for the firmware update

(a) Before performing the NAS BIOS firmware update, request the user for the fail-over of the NAS Unit (NNC) that the firmware update is performed.

(b) Connect the LAN to the LAN connector for the maintenance of the NAS Unit. (Refer to Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000).)

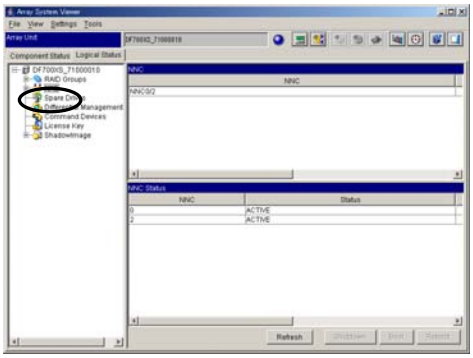
(c) Start the Storage Navigator Modular and change the operation mode to the "maintenance mode". (Refer to System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).)

(d) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

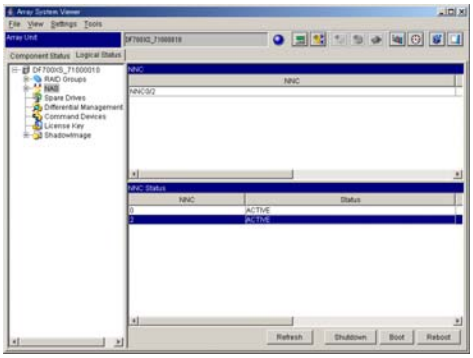
(e) Click the [Logical Status] tab, and click the [NAS].
When the status of the NAS Unit is "NEW", "ACTIVE", "INACTIVE" or "WARN", go to Step (f).
When the status of the NAS Unit is "STOP", go to Step (i).
When the status of the NAS Unit is "DOWN" and the following message is displayed, go to Step (f) after removing the failure factors according to the recovery method of the information message on WEB.
When anything other than the following messages is displayed, perform the update from the beginning again after removing the failure factors according to the recovery method of the information message on WEB.
- IB230X NNC BIOS firmware installation failed [check sum error]
- IB240X NNC BIOS firmware installation failed [download error]
- IAPN00 NNC BIOS firmware installation timeout

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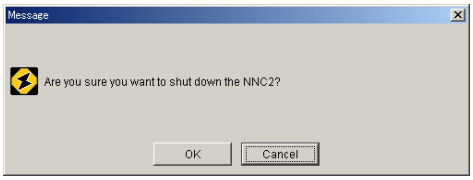


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(f) Select the NAS Unit that the firmware update is performed.

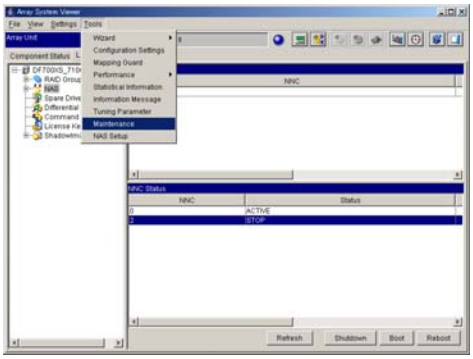


(g) When the [Shutdown] button is clicked, a confirmation message is displayed. Click the [OK] button.



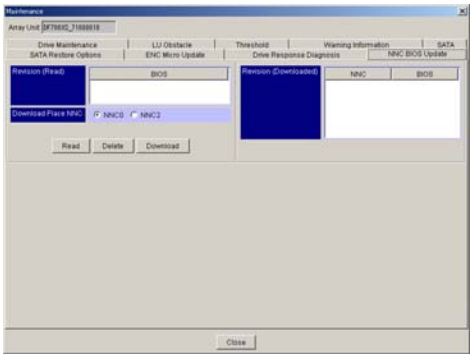
(h) Check that the status of the stopped NAS Unit is “STOP”, “DOWN” or “NEW”.

(i) Select [Tools] – [Maintenance] in the unit window.

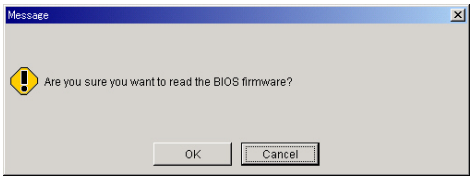


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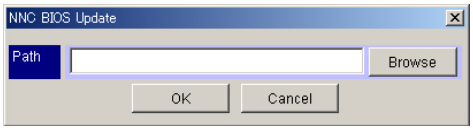
(j) Click the [NNC BIOS Update] tab.



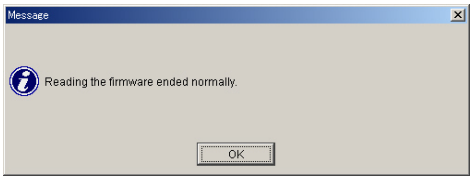
(k) When the [Read] button is clicked, a confirmation message is displayed. Click the [OK] button.



(l) Specify "C:¥diskarray-microprogram¥microprogram¥07xxx" (xxx indicates 26x or more) for the path, and click the [OK] button.

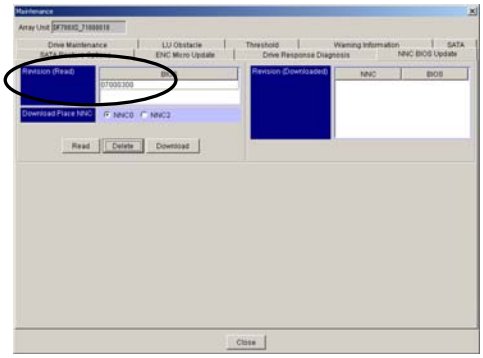


(m) The window of the reading completion is displayed. Click the [OK] button.



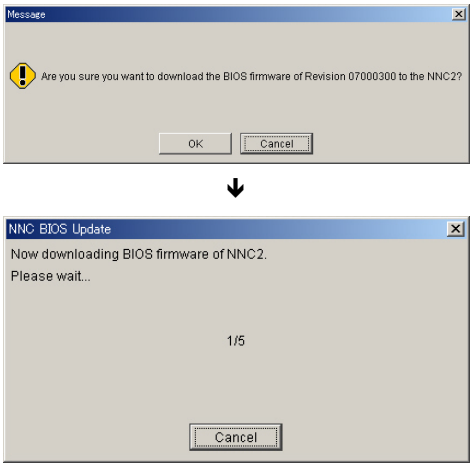
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(n) Check the revision by “Revision (Read)”.

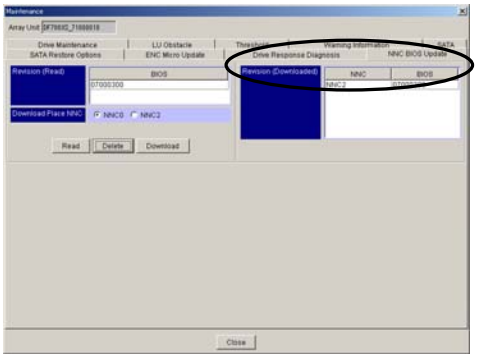


(o) Select the download destination from “Download Place NNC” and click the [Download] button.

(p) The confirmation message is displayed. Click the [OK] button.



(q) Check the revision by “Revision (Downloaded)”.



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(r) Click the [Close] button.
(s) Request the user for the fail-back of the NAS Unit.
(t) Request the fail-over of another NAS Unit.
(u) Perform the work from (5) to (19) to the NAS Unit that was the fail-over.
(v) Request the user for the fail-back.

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(2) Recovery method at the time of the firmware update failure

When the NAS BIOS firmware update failed, perform the update again in the following procedure.

(a) Remove the failure factors according to the recovery method of the information message on WEB.

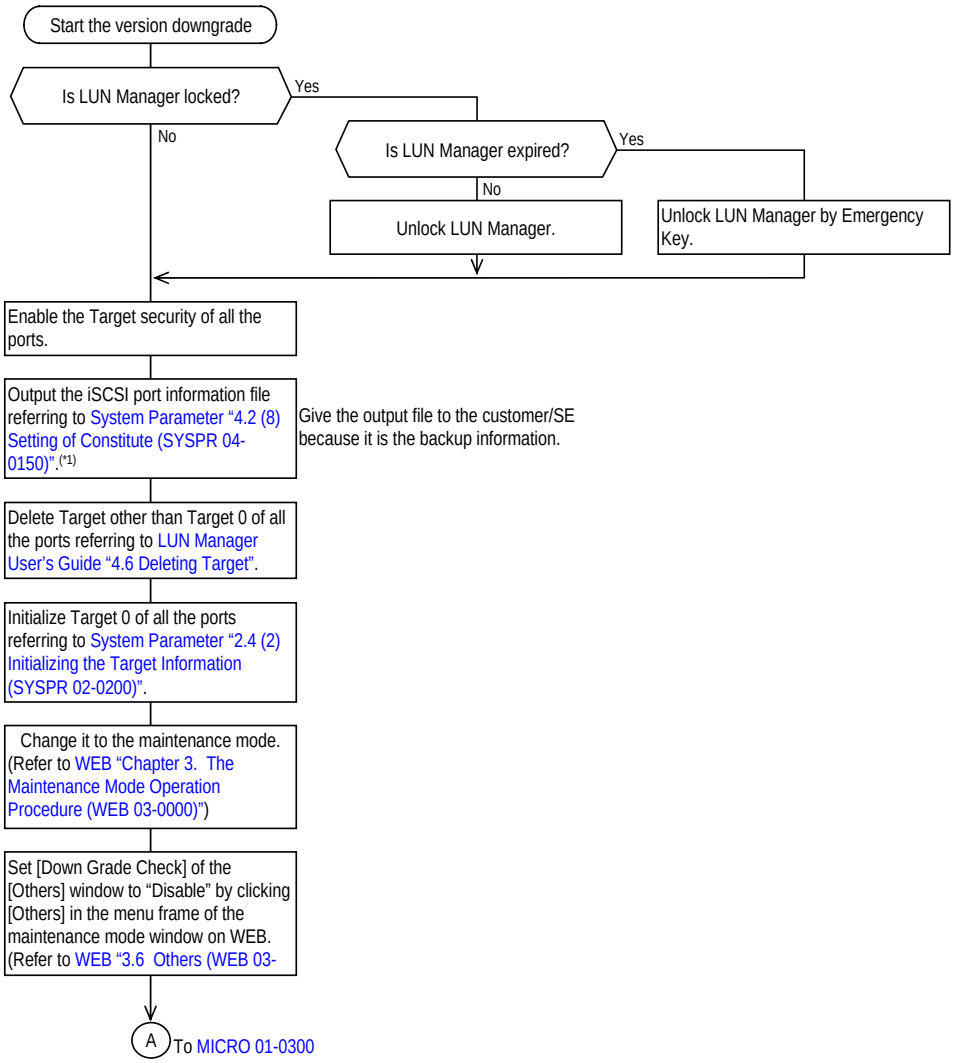
(b) Perform the NAS BIOS firmware update again.

NOTE : If the NAS Unit receives the start instruction from the Storage Navigator Modular or the NAS Unit is turned on from the planned shutdown status of the subsystem, the NAS Unit may start with the old BIOS, may not start, or may try to start with the new BIOS even though the firmware update failed.
In any cases, perform the NAS BIOS firmware update again after removing the failure factors of the NAS BIOS firmware update.

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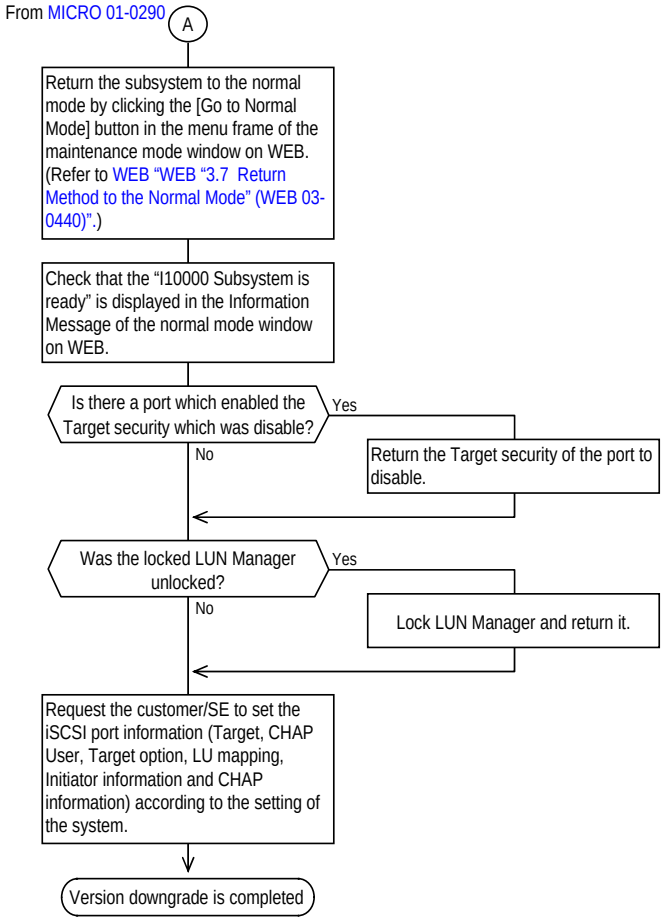
1.7 Procedure of the version downgrade of the microprogram

The procedure of the version downgrade of the microprogram in the status that the extension function of the number of the iSCSI connection hosts (The number of host connections is 129 or more and 255 or less, the number of iSCSI targets is 129 or more and 255 or less, the number of CHAP User definitions is 257 or more and 512 or less, and the number of mappings of the iSCSi initiator of the LUN Manager is 129 or more and 256 or less.) is used is shown below.



*1 : Report to the customer/SE that the file output is not performed about secret of CHAP User or CHAP information by the viewpoint on security.

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1.8 Restrictions of the version downgrade of the microprogram

The version of the microprogram cannot be downgraded if corresponding to the conditions in Table 1.7.1, so that follow the actions to be taken.

Table 1.8.1 Restrictions of the version downgrade of the microprogram

Unified version (*1) ("x" is optional.)		Restrictions of the microprogram to be downloaded		Actions to be taken
Microprogram of the Control Unit	Microprogram to be downloaded			
0720/A – 0720/C or less	071x/x	1	The RAID level defines the RAID Group of RAID6.	Install the microprogram of which the unified version is 0720/A or more. Or, install the microprogram after the RAID level deletes the RAID Group of RAID6.
		2	The RKA is connected.	Install the microprogram of which the unified version is 0720/A or more. Or, install the microprogram after reducing the connected RKA.
		3	The microprogram less than the unified version 071x/x cannot be installed in the RKXS.	Install the microprogram of which the unified version is 0720/A or more.
0720/C – 0726/A or less	0720/A – 0720/C or less	4	The Cache memory of DF-F700-C2GJ is installed in the Control Unit.	Install the microprogram of which the unified version is 0720/C or more. Or, install the microprogram after replacing the Cache Unit of the DF-F700-C2GJ, which is installed in the Control Unit, to the Cache Unit of the DF-F700-C1GJ.
	071x/x	–	Restrictions in 1 to 4.	Refer to the actions to be taken for each of 1 to 4.
0726/A – 0726/E or less	0720/C – 0726/A or less	5	The FC Interface Board is added to the Control Unit board of the RKS/RKXS.	Install the microprogram whose unified version is 0726/A or more. Or, install the microprogram after reducing the FC Interface Board.
		6	The NAS Interface Board is installed on the Control Unit board of the RKM/RKS/RKXS.	Install the microprogram whose unified version is 0726/A or more. Or, install the microprogram after reducing the NAS Interface Board.
		7	At the time of RKNAS connection, the microprogram less than the unified version 0726/A cannot be installed.	Install the microprogram whose unified version is 0726/A or more.
		8	The IP address of the maintenance port after the version downgrade is set except for CTL0: 10.0.0.16 or 192.168.0.16 CTL1: 10.0.0.17 or 192.168.0.17	The IP address of the maintenance port after the version downgrade becomes CTL0: 10.0.0.16 or 192.168.0.16 CTL1: 10.0.0.17 or 192.168.0.17
	0720/A – 0720/C or less	–	Restrictions in 4 to 8.	Refer to the actions to be taken for each of 4 to 8.
	071x/x	–	Restrictions in 1 to 8.	Refer to the actions to be taken for each of 1 to 8.

*1: Refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090) for the unified version.

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Unified version (*1) ("x" is optional.)		Restrictions of the microprogram to be downloaded		Actions to be taken
Microprogram of the Control Unit	Microprogram to be downloaded			
0726/E – 0730/A or less	0726/A – 0726/E or less	9	The LAN port number of the Control Unit is set other than 2000.	The LAN port number of the Control Unit becomes 2000 after the version downgrade. Also, it is required to change the service file of the computer in which the Storage Navigator Modular is installed.
	0720/C – 0726/A or less	–	Restrictions in 5 to 9.	Refer to the actions to be taken for each of 5 to 9.
	0720/A – 0720/C or less	–	Restrictions in 4 to 9.	Refer to the actions to be taken for each of 4 to 9.
	071x/x	–	Restrictions in 1 to 9.	Refer to the actions to be taken for each of 1 to 9.
0730/x	0726/E – 0730/A or less	10	The iSCSI interface board is installed on the Control Unit board of the RKM/RKS/RKXS.	Install the microprogram whose unified version is 0730/A or more. Or, install the microprogram after reducing the iSCSI interface board.
	0726/A – 0726/E or less	–	Restrictions in 9 to 10.	Refer to the actions to be taken for each of 9 to 10.
	0720/C – 0726/A or less	–	Restrictions in 5 to 10.	Refer to the actions to be taken for each of 5 to 10.
	0720/A – 0720/C or less	–	Restrictions in 4 to 10.	Refer to the actions to be taken for each of 4 to 10.
	071x/x	–	Restrictions in 1 to 10.	Refer to the actions to be taken for each of 1 to 10.
0731/x	0730/A – 0731/A or less	11	The microprogram less than the unified version 0731/A cannot be installed in the RKH.	Install the microprogram whose unified version is 0731/A or more.
	0726/E – 0730/A or less	–	Restrictions in 10 to 11.	Refer to the actions to be taken for each of 10 to 11.
	0726/A – 0726/E or less	–	Restrictions in 9 to 11.	Refer to the actions to be taken for each of 9 to 11.
	0720/C – 0726/A or less	–	Restrictions in 5 to 11.	Refer to the actions to be taken for each of 5 to 11.
	0720/A – 0720/C or less	–	Restrictions in 4 to 11.	Refer to the actions to be taken for each of 4 to 11.
	071x/x	–	Restrictions in 1 to 11.	Refer to the actions to be taken for each of 1 to 11.
0732/x	0731/A – 0732/A or less	12	The NAS Interface Board is installed on the Control Unit board of the RKH.	Install the microprogram whose unified version is 0732/A or more. Or, install the microprogram after subtracting the NAS Interface Board.
	0730/A – 0731/A or less	–	Restrictions in 11 to 12.	Refer to the actions to be taken for each of 11 to 12.
	0726/E – 0730/A or less	–	Restrictions in 10 to 12.	Refer to the actions to be taken for each of 10 to 12.
	0726/A – 0726/E or less	–	Restrictions in 9 to 12.	Refer to the actions to be taken for each of 9 to 12.
	0720/C – 0726/A or less	–	Restrictions in 5 to 12.	Refer to the actions to be taken for each of 5 to 12.
	0720/A – 0720/C or less	–	Restrictions in 4 to 12.	Refer to the actions to be taken for each of 4 to 12.
	071x/x	–	Restrictions in 1 to 12.	Refer to the actions to be taken for each of 1 to 12.

*1: Refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090) for the unified version.

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Unified version (*1) ("x" is optional.)		Restrictions of the microprogram to be downloaded		Actions to be taken
Microprogram of the Control Unit	Microprogram to be downloaded			
0733/x – 0735/A or less	0732/A – 0733/A or less	13	The Cache Partition Manager is unlocked, and the segment size of the partition is set to 64 k bytes, 256 k bytes or 512 k bytes.	Install the microprogram whose unified version is 0735/A or more. Or, install the microprogram after setting the segment size of all the partitions to 16 k bytes or less.
		14	The Cache Partition Manager is unlocked, and the stripe size of the LU is set to 256 k bytes or 512 k bytes.	Install the microprogram whose unified version is 0735/A or more. Or, install the microprogram after setting the stripe size of all the LUs to 64 k bytes.
	0731/A – 0732/A or less	–	Restrictions in 12 to 14.	Refer to the actions to be taken for each of 12 to 14.
	0730/A – 0731/A or less	–	Restrictions in 11 to 14.	Refer to the actions to be taken for each of 11 to 14.
	0726/E – 0730/A or less	–	Restrictions in 10 to 14.	Refer to the actions to be taken for each of 10 to 14.
	0726/A – 0726/E or less	–	Restrictions in 9 to 14.	Refer to the actions to be taken for each of 9 to 14.
	0720/C – 0726/A or less	–	Restrictions in 5 to 14.	Refer to the actions to be taken for each of 5 to 14.
	0720/A – 0726/C or less	–	Restrictions in 4 to 14.	Refer to the actions to be taken for each of 4 to 14.
	071x/x	–	Restrictions in 1 to 14.	Refer to the actions to be taken for each of 1 to 14.
0735/x – 0750/A or less	0733/A – 0735/A or less	15	TrueCopy Extended Distance is unlocked.	Install the microprogram whose unified version is 0735/A or more. Or, install the microprogram after locking TrueCopy Extended Distance.
	0732/A – 0733/A or less	–	Restrictions in 13 to 15.	Refer to the actions to be taken for each of 13 to 15.
	0731/A – 0732/A or less	–	Restrictions in 12 to 15.	Refer to the actions to be taken for each of 12 to 15.
	0730/A – 0731/A or less	–	Restrictions in 11 to 15.	Refer to the actions to be taken for each of 11 to 15.
	0726/E – 0730/A or less	–	Restrictions in 10 to 15.	Refer to the actions to be taken for each of 10 to 15.
	0726/A – 0726/E or less	–	Restrictions in 9 to 15.	Refer to the actions to be taken for each of 9 to 15.
	0720/A – 0726/A or less	–	Restrictions in 5 to 15.	Refer to the actions to be taken for each of 5 to 15.
	071x/x	–	Restrictions in 1 to 15.	Refer to the actions to be taken for each of 1 to 15.

*1: Refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090) for the unified version.

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Unified version (*1) ("x" is optional.)		Restrictions of the microprogram to be downloaded		Actions to be taken
Microprogram of the Control Unit	Microprogram to be downloaded			
0750/A – 0760/A or less	0735/A – 0750/A or less	16	Negotiation of user management port is set except "Auto" (When version downgrade of the microprogram is done via user management port)	First, set the negotiation of user management port to "Auto" and negotiation of device connected to user management port to Auto negotiation. Then, install the microprogram
	0733/A – 0735/A or less	–	Restrictions in 15 to 16.	Refer to the actions to be taken for each of 15 to 16.
	0732/A – 0733/A or less	–	Restrictions in 13 to 16.	Refer to the actions to be taken for each of 13 to 16.
	0731/A – 0732/A or less	–	Restrictions in 12 to 16.	Refer to the actions to be taken for each of 12 to 16.
	0730/A – 0731/A or less	–	Restrictions in 11 to 16.	Refer to the actions to be taken for each of 11 to 16.
	0726/E – 0730/A or less	–	Restrictions in 10 to 16.	Refer to the actions to be taken for each of 10 to 16.
	0726/A – 0726/E or less	–	Restrictions in 9 to 16.	Refer to the actions to be taken for each of 9 to 16.
	0720/A – 0726/A or less	–	Restrictions in 5 to 16.	Refer to the actions to be taken for each of 5 to 16.
	071x/x	–	Restrictions in 1 to 16.	Refer to the actions to be taken for each of 1 to 16.
0760/A – 0770/A or less	0750/A – 0760/A or less	17	Account Authentication is unlocked.	Install the microprogram whose unified version is 0760/A or more. Or, install the microprogram after locking Account Authentication.
		18	Modular Volume Migration is unlocked.	Install the microprogram whose unified version is 0760/A or more. Or, install the microprogram after locking Modular Volume Migration.
	0735/A – 0750/A or less	–	Restrictions in 16 to 18.	Refer to the actions to be taken for each of 16 to 18.
	0733/A – 0735/A or less	–	Restrictions in 15 to 18.	Refer to the actions to be taken for each of 15 to 18.
	0732/A – 0733/A or less	–	Restrictions in 13 to 18.	Refer to the actions to be taken for each of 13 to 18.
	0731/A – 0732/A or less	–	Restrictions in 12 to 18.	Refer to the actions to be taken for each of 12 to 18.
	0730/A – 0731/A or less	–	Restrictions in 11 to 18.	Refer to the actions to be taken for each of 11 to 18.
	0726/E – 0730/A or less	–	Restrictions in 10 to 18.	Refer to the actions to be taken for each of 10 to 18.
	0726/A – 0726/E or less	–	Restrictions in 9 to 18.	Refer to the actions to be taken for each of 9 to 18.
	0720/A – 0726/A or less	–	Restrictions in 5 to 18.	Refer to the actions to be taken for each of 5 to 18.
	071x/x	–	Restrictions in 1 to 18.	Refer to the actions to be taken for each of 1 to 18.

*1: Refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090) for the unified version.

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Unified version (*1) ("x" is optional.)		Restrictions of the microprogram to be downloaded		Actions to be taken
Microprogram of the Control Unit	Microprogram to be downloaded			
0770/A or more	0760/A – 0770/A or less	19	Power Saving is unlocked.	Install the microprogram whose unified version is 0770/A or more. Or, install the microprogram after locking Power Saving.
	0750/A – 0760/A or less	–	Restrictions in 17 to 19	Refer to the actions to be taken for each of 17 to 19.
	0735/A – 0750/A or less	–	Restrictions in 16 to 19.	Refer to the actions to be taken for each of 16 to 19.
	0733/A – 0735/A or less	–	Restrictions in 15 to 19.	Refer to the actions to be taken for each of 15 to 19.
	0732/A – 0733/A or less	–	Restrictions in 13 to 19.	Refer to the actions to be taken for each of 13 to 19.
	0731/A – 0732/A or less	–	Restrictions in 12 to 19.	Refer to the actions to be taken for each of 12 to 19.
	0730/A – 0731/A or less	–	Restrictions in 11 to 19.	Refer to the actions to be taken for each of 11 to 19.
	0726/E – 0730/A or less	–	Restrictions in 10 to 19.	Refer to the actions to be taken for each of 10 to 19.
	0726/A – 0726/E or less	–	Restrictions in 9 to 19.	Refer to the actions to be taken for each of 9 to 19.
	0720/A – 0726/A or less	–	Restrictions in 5 to 19.	Refer to the actions to be taken for each of 5 to 19.
	071x/x	–	Restrictions in 1 to 19.	Refer to the actions to be taken for each of 1 to 19.

*1: Refer to "1.3.1 Hierarchy of Microprogram Storage Directories" (MICRO 01-0090) for the unified version.

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1.9 Adaptable microprogram revision

Check the microprogram revision adapted to the type name referring to Table 1.9.1.

Table 1.9.1 Adaptable microprogram revision

- : No limits
N/A : Unsupported

Part name	Type name	Model name			
		WMS100	AMS200	AMS500	AMS1000
		Initial revision : 0720/A-X	Initial revision : 0711/A-S	Initial revision : 0712/A-M	Initial revision : 0732/A-H
FC Disk Drive	DF-F700-AGF72	N/A	-	-	-
	DF-F700-AGH72	N/A	-	-	-
	DF-F600-AEF72	N/A	N/A	0720/A-M or more	-
	DF-F600-AEH72	N/A	N/A	0720/A-M or more	-
	DF-F700-AGF146	N/A	-	-	-
	DF-F700-AGH146	N/A	-	-	-
	DF-F600-AEF146	N/A	N/A	0720/A-M or more	-
	DF-F600-AEH146	N/A	N/A	0720/A-M or more	-
	DF-F700-AGF300	N/A	-	-	-
	DF-F600-AEF300	N/A	N/A	0720/A-M or more	-
SATA Disk Drive	DF-F700-ATE250R	-	-	-	-
	DF-F600-ATE250R	-	0720/A-S or more	0720/A-M or more	-
	DF-F700-ATE400R	-	-	-	-
	DF-F600-ATE400R	-	0720/A-S or more	0720/A-M or more	-
	DF-F700-ATE500R	0750/A-X or more	0750/A-S or more	0750/A-M or more	0750/A-H or more
Cache Unit	DF-F700-C512JX	-	N/A	N/A	N/A
	DF-F700-C1GJ	-	-	-	-
	DF-F700-C2GJ	N/A	0720/A-S or more	0720/A-M or more	-
FC Interface Board	DF-F700-DJ4G2	N/A	N/A	-	N/A
	DF-F700-DJ4G2W	0730/B-X or more	0730/B-S or more	N/A	N/A
	DF-F700-DJ4G2H	N/A	N/A	N/A	-
NAS Interface Board	DF-F700-DJNAS	0726/E-X or more	0726/E-S or more	0726/E-M or more	N/A
	DF-F700-DJNASH	N/A	N/A	N/A	-
iSCSI Interface Board	DF-F700-DJSC2	0730/B-X or more	0730/B-S or more (*1)	0730/B-M or more	N/A
	DF-F700-DJSC2H	N/A	N/A	N/A	-
Additional Chassis	DF-700-RKAJ	N/A	-	-	-
	DF-700-RKAJAT	-	-	-	-
	DF-600-RKAJAT	-	0720/A-S or more	0720/A-M or more	-
	DF-600-RKAJATL	-	N/A	N/A	N/A
	DF-600-RKA	N/A	N/A	0720/A-M or more	-
NAS Unit	DF-700-RKNAS2G	0726/E-X or more	0726/E-S or more	N/A	N/A
	DF-700-RKNAS4G	N/A	N/A	0726/E-M or more	-
Control Unit	DF-F700-F1JXS	-	N/A	N/A	N/A
	DF-F700-F1JS	N/A	-	N/A	N/A
	DF-F700-F1JM	N/A	N/A	-	N/A
	DF-F700-F1JH	N/A	N/A	N/A	-
	DF-F700-F2JH	N/A	N/A	N/A	0760/A-H or more

*1: Control revision F or more

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Chapter 2. Procedure for Recovery from a Failure

2.1 Procedure for recovery from a failure during installation

Identify a factor of the failure based on the statuses of the LEDs and follow the recovery procedure concerned.

<Failure which causes system down>

- LED status

WARNING LED	ALARM LED	Recovery procedure
Blinking	On	Connect the WEB and recover from the failure following the recovery procedure against each WEB message. For the details, refer to Troubleshooting "Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000).

- Details of WEB error logs (Refer to Message "Chapter 5. Flash Detected Messages" (MSG 05-0000) for the detail of content or recovery methods.)

Message code	Message text	Recovery procedure
RB0000	Upload system error	The configuration of the directory from which the microprogram is installed on the client PC is incorrect.
RB0100	File remove error	The file in the RAM disk on the device cannot be deleted.
RB0A00	Upload file SUM check error	An error was detected in the file by SUM check.
RB3100	File open error	The file in the RAM disk on the device cannot be opened.
RB3200	File read error	The file in the RAM disk on the device cannot be read.
RB3500	Bad block ID	The block ID is illegal.
RB7000	Program size too large	The program size is too large for the storage capacity.
RB8100	Install failed	The writing to all the system drives failed.
RB8300	Empty system retry full install	The updating installation cannot be done because the microprogram is not installed.
RBA000	Down grade check NG	Although the version downgrade of the microprogram was attempted, the update installation terminated abnormally because Down Grade Check was not Disable.
RBC000	No drive available	The access to all the system drives is disabled.
RBC10x	Drive block size error (Unit-0, HDU-x)	The value of the block size of the capacity data reported from the Disk Drive was other than the specified value.
RBC20x	Unknown drive (Unit-0, HDU-x)	The value of the logical block address of the capacity data reported from the Disk Drive was equal to or less than the size of the system area.
RBC2HH	Unknown drive (Unit-0, HDU-x)	The value of the logical block address of the capacity data reported from the Disk Drive was equal to or less than the size of the system area.

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<Install partially complete (The installation of some of the Disk Drives failed.)>

- LED status

WARNING LED	ALARM LED	Recovery procedure
Off(*1)	Off	Connect the WEB and recover from the failure following the recovery procedure against each WEB message. For the details, refer to Troubleshooting "Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000). It may be a Disk Drive failure. For the details, refer to "Chapter 3. Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete" Message Is Output" (MICRO 03-0000).

*1 : When a beep of the buzzer is stopped by a pressing of the TRACE SW/BUZZER OFF SW, the process is continued automatically and the blinking of the WARNING LED is stopped.
The subsystem is placed in the READY status.

- Details of WEB error logs

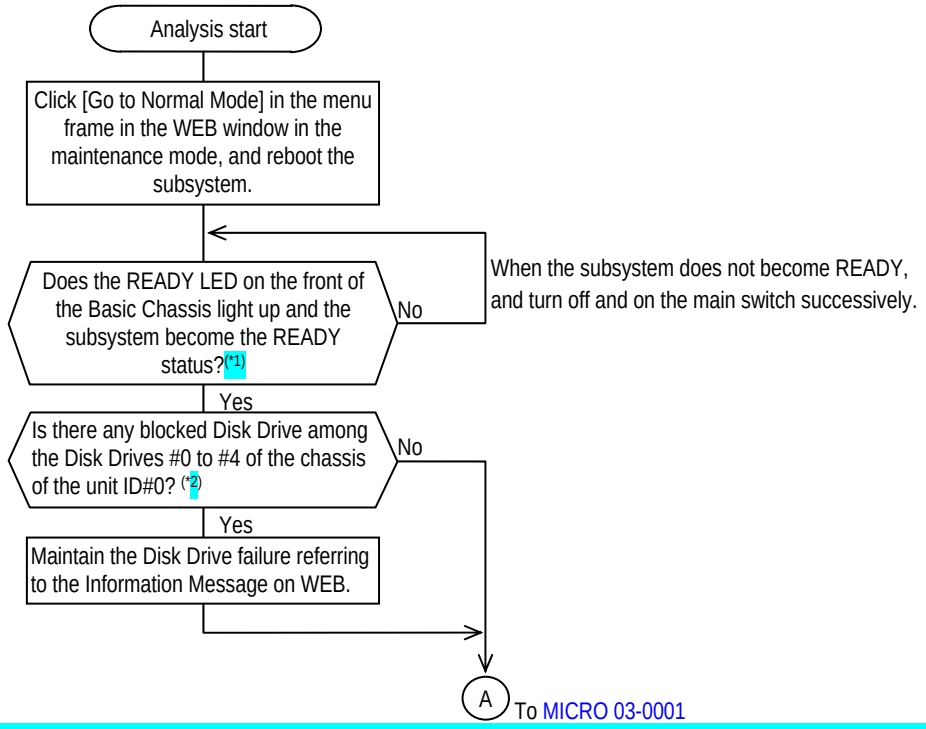
Message code	Message text	Recovery procedure
RB8200	Install partially complete	The installation of some of the Disk Drives failed.

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Chapter 3. Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete" Message Is Output

The "Install partially complete" message is displayed in the WEB window when the subsystem detected either of the following statuses. Also, the "Install partially complete" status can be checked in the LED status. When this message code is displayed on WEB, there may be a Disk Drive failure. Therefore, analyze it in the following procedure, and take a necessary action.

- When the microprogram was installed in the maintenance mode, at least one Disk Drive was not installed among the Disk Drives #0 to #4 of the chassis of the unit ID#0.
- When the microprogram was installed in the maintenance mode, at least one failed in the write of the microprogram among the Disk Drives #0 to #4 of the chassis of the unit ID#0.

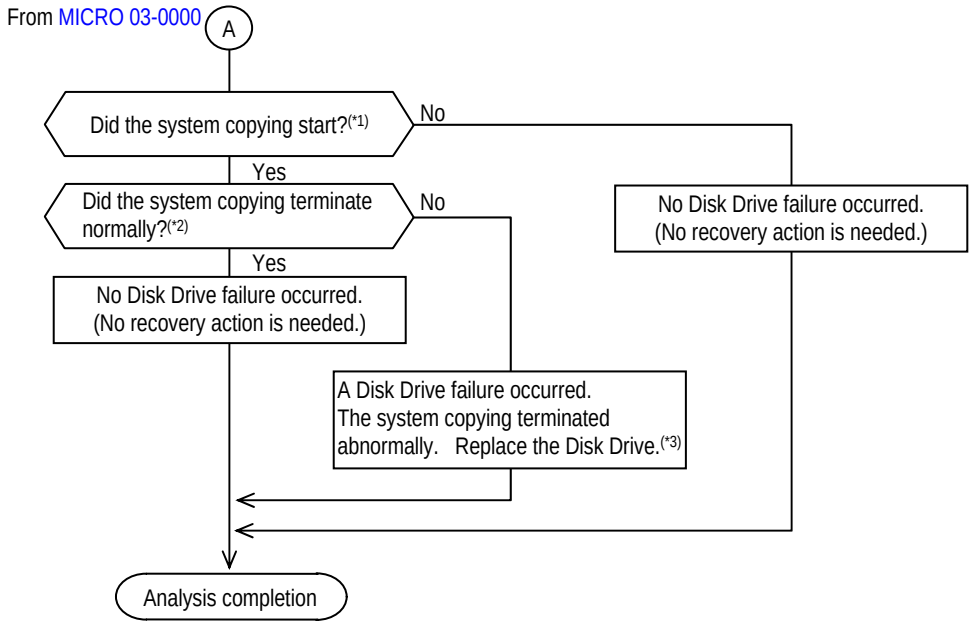


*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

*2 : The ALM LED (red) on the Disk Drive lights up, and any of the following messages is displayed in the Information Message on WEB.

- HDU alarm message ····· "W060AT SATA HDU alarm", "W060xy HDU alarm" or "W060HH HDU alarm", "W0GG00 HDU alarm [RKA]", "W0GH00 HDU alarm [RKAJ]"
- Spare HDU alarm message ··· "W061AT SATA Spare HDU alarm", "W061xy Spare HDU alarm" or "W061HH Spare HDU alarm", "W0GJ00 Spare HDU alarm [RKA]", "W0GK00 Spare HDU alarm [RKAJ]"

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*1 : Refer to "3.1 Procedure for Checking whether system copy operation occurred" (MICRO 03-0010).
*2 : Refer to "3.2 Procedure for checking the status of system copy complete" (MICRO 03-0020).
*3 : For the replacement of the Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

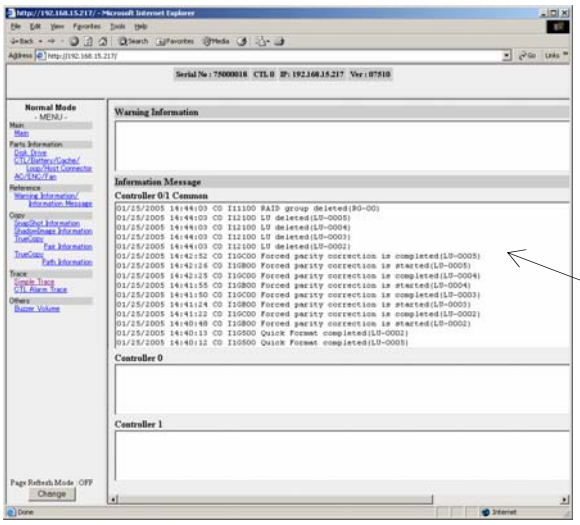
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3.1 Procedure for Checking whether system copy operation occurred

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.



• When the occurred of system copy

MM/DD/YYYY HH:MM:SS Cx I140xy (or I140HH) System copy started (Unit-x, HDU-y)

Date Time Detect Controller #

x : Unit ID #
y : Disk Drive #

For the RKH, "I140HH System copy started (Unit-x, HDU-y)" is displayed.

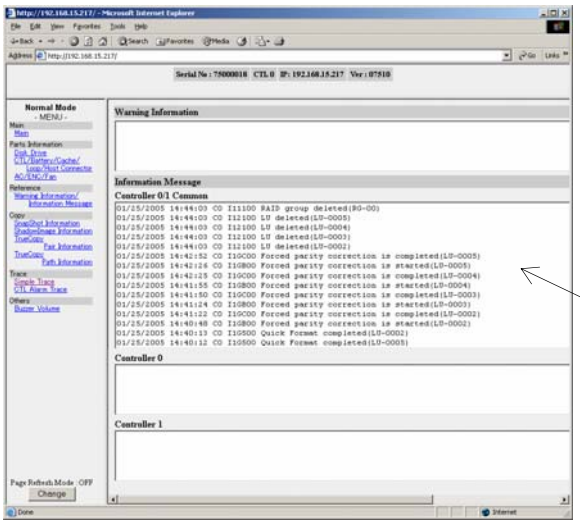
• When the not occurred of system copy

The message above is not displayed but a message "I10000 Subsystem is Ready" is displayed.

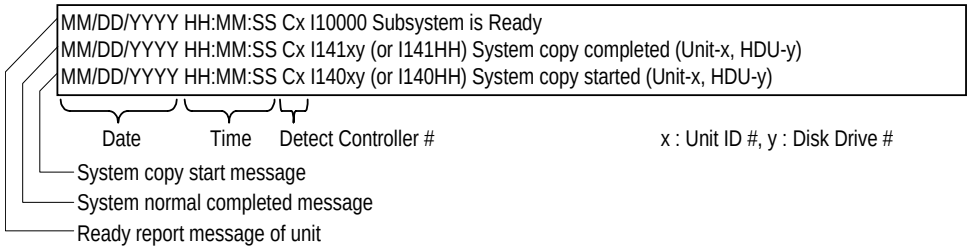
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3.2 Procedure for checking the status of system copy complete

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.

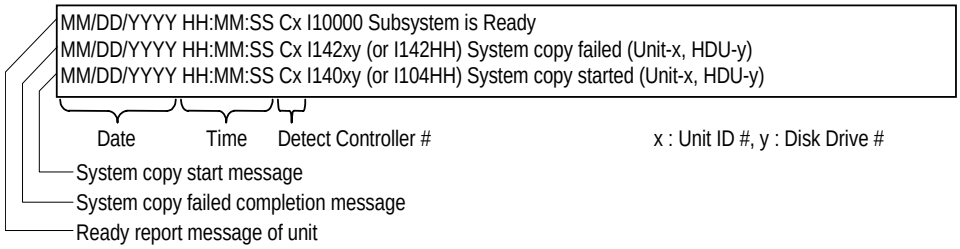


• When the normal completed of system copy



For the RKH, "I140HH System copy started (Unit-x, HDU-y)", "I141HH System copy completed (Unit-x, HDU-y)" is displayed.

• When the not occurred of system copy



For the RKH, "I140HH System copy started (Unit-x, HDU-y)", "I142HH System copy failed (Unit-x, HDU-y)" is displayed.

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System Parameter

Chapter 1. Setting (Storage Navigator Modular) ..... SYSPR 01-0000
Chapter 2. Setting Host Group/Targets ..... SYSPR 02-0000
Chapter 3. Setting the RAID/LU/Spare Disk ..... SYSPR 03-0000
Chapter 4. Setting Configuration Information ..... SYSPR 04-0000
Chapter 5. Setting Host Connection Parameters ..... SYSPR 05-0000
Chapter 6. Setting an Extra-cost Optional Feature ..... SYSPR 06-0000
Chapter 7. System Parameter Setting List ..... SYSPR 07-0000

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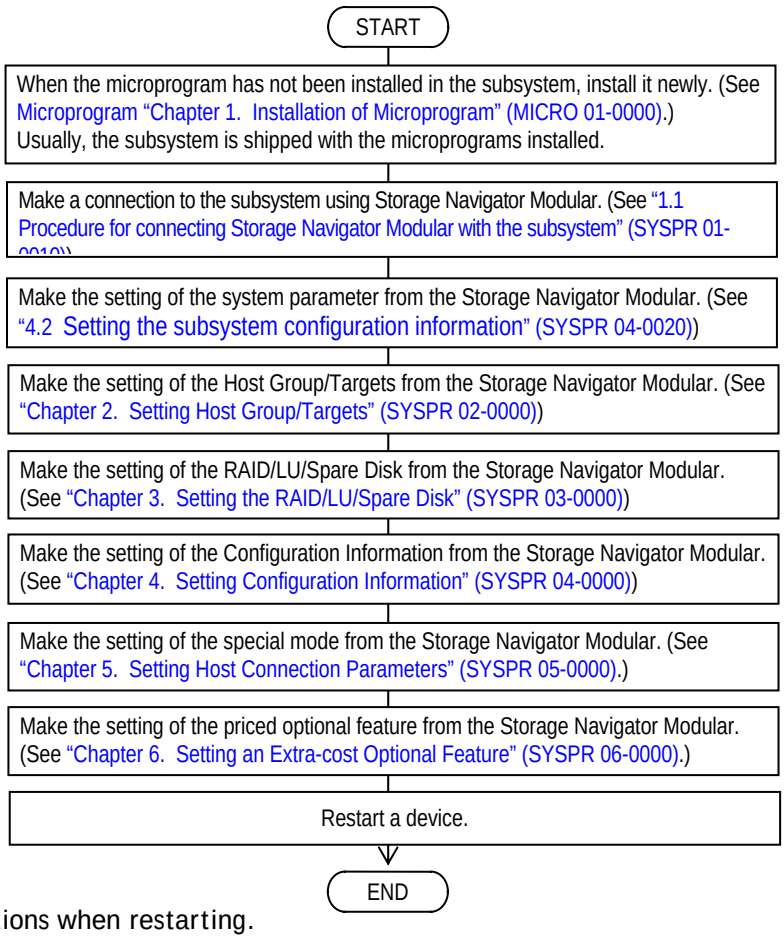
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Chapter 1. Setting (Storage Navigator Modular)

This chapter explains method of setting the subsystem parameters using Storage Navigator Modular.
The Storage Navigator Modular can execute the setting function or the reference function by connecting it to the array subsystem when the array subsystem is in the Ready status.

The procedures for setting device parameters are described below.



Precautions when restarting.
If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

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If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

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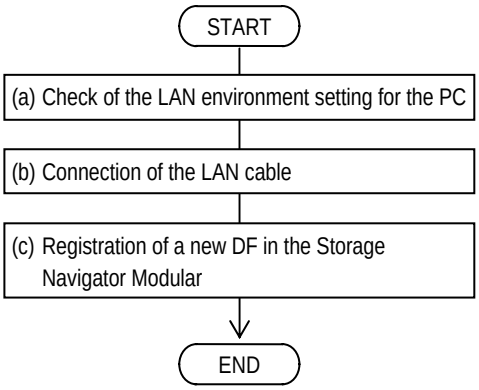
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1.1 Procedure for connecting Storage Navigator Modular with the subsystem

The procedure for connecting Storage Navigator Modular with the subsystem is shown below.

NOTE : When the microprogram installed in the subsystem to be connected is 0726/E or more, the LAN Port Number may be changed. If there is no problem on the LAN connection or the IP address setting and the array cannot be registered in the following procedure, it is necessary to change the LAN Port Number of the PC referring to the LAN Port Number set in the array subsystem (refer to "4.2 (17-1) (a)" (SYSPR 04-0340)).



(1) Checking the LAN environment setting

(a) Make sure that the Storage Navigator Modular has been installed. (Make sure that the activation file startsnm.bat exists.)

(b) Check the LAN environment setting for the PC

- Make sure that the following settings have been made, or change the settings to the following.
  For the maintenance PC, set the IP address shown in No. 1 in Table 1.1.1 below.
  When it cannot be connected, specify the connectable value and perform the WEB connection by setting the values of No.2 to No.5 in order.
  If not connected yet, refer to Troubleshooting "3.4 Procedure for specifying maintenance port IP address" (TRBL 03-0100).

Table 1.1.1 Operational Environment

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1:172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1:10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

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- Manual change of the network parameter of the Maintenance port
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.
  Therefore, the LAN port for the maintenance when performing the WEB connection is set as any value of No.1 to No.5 in Table 1.1.1 on the work other than the installation of the subsystem at the time of the shipment.

  NOTE : However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
  If this is the case, set network address other than maintenance port in the LAN device which is connected via the Gateway in the extension of the User management port, or set maintenance port other than the network address of LAN device which is connected via the Gateway. (Refer to "4.2 (4) Setting Maintenance of LAN"(SYSPR 04-0100).)

(c) Make sure that negotiation of Maintenance PC is set to auto negotiation.
To check negotiation of Maintenance PC, refer to Troubleshooting "3.1 (6) Procedure for setting negotiation" (TRBL 03-0041).

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(2) Connecting the LAN cross cable

Connect the Control Unit #0 LAN Maintenance port of the subsystem and the LAN card of a PC. For the NAS Unit connection configuration, remove the cover of the LAN connector for the maintenance of the NAS Unit, and connect it with the LAN connector for the maintenance and the LAN cross cables of the PC.

NOTE : At the time of the NAS connection, connect it to the LAN connector for the maintenance of the NAS Unit. In such case, check that the AC Input Power of the NAS Unit is turned on. If it is turned off, turn on the AC Input Power of the NAS Unit. (Refer to Installation "1.7 Power On/Off Procedure" (INST 01-0290))

(a) For the RKM/RKS/RKXS

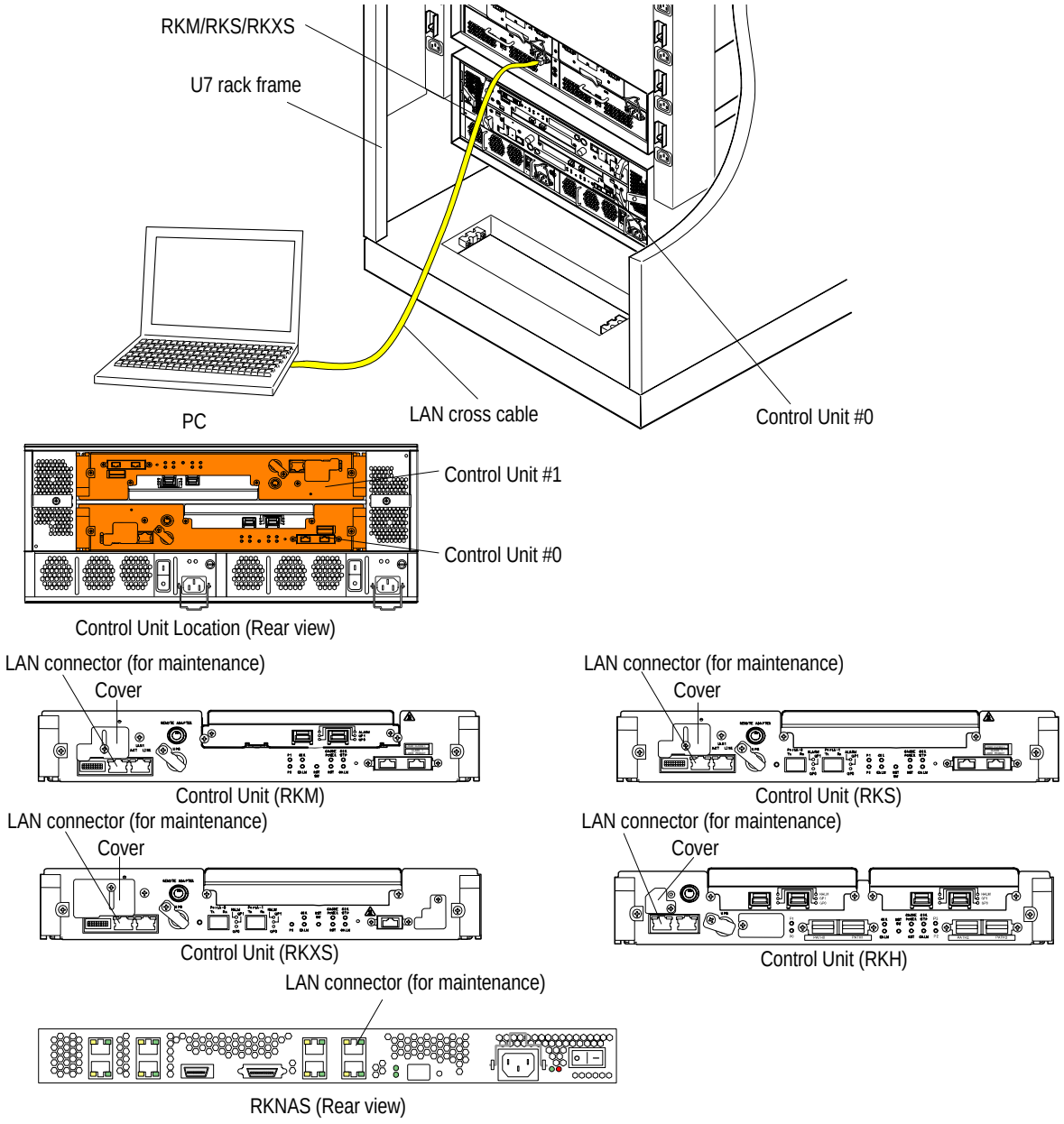


Figure 1.1.1 Connecting the LAN cable (for the RKM/RKS/RKXS)

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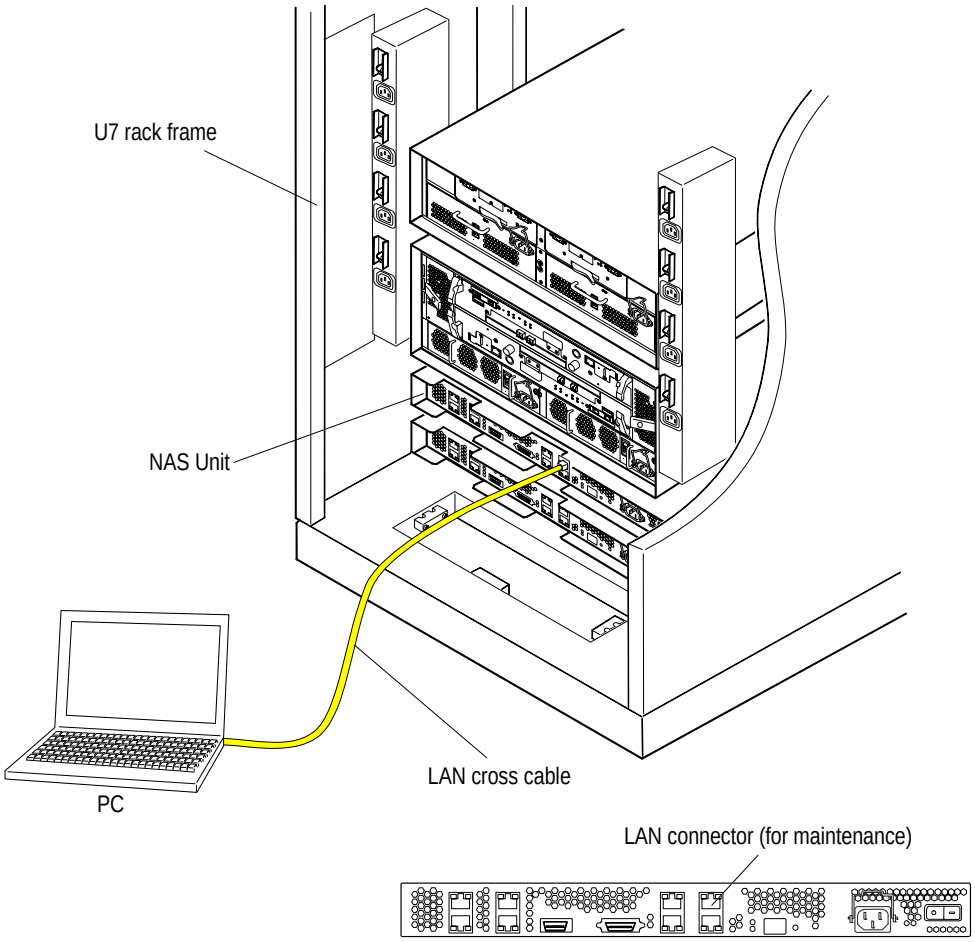


Figure 1.1.2 Connecting the LAN cable (for the NAS Unit)

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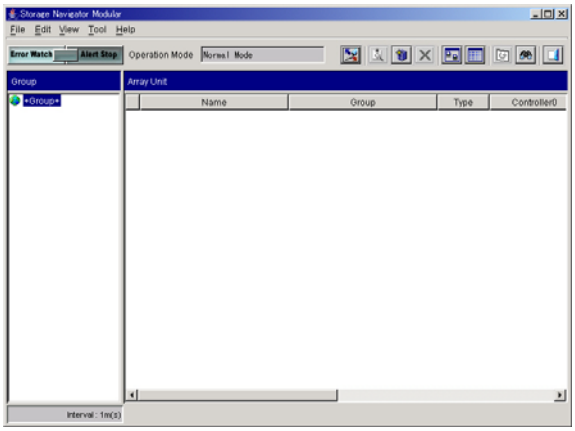
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(3) Registering the newly introduced DF in the Storage Navigator Modular

(a) Activating the Storage Navigator Modular

(i) Execute the batch file or shell script for activating the Storage Navigator Modular.
In the case of Windows, activate the batch file, startsnm.bat.

(ii) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed(‡1).



In the case of Windows, the prompt window is also displayed.
The prompt window has nothing to do with operation of Storage Navigator Modular. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.
You can execute the display of the Storage Navigator Modular Operation Mode and state of the failure monitoring and the following functions in the main window.
For the operation of each function, refer to the page explaining each function.

- Registration of the disk array subsystem (registration, deletion, change, and properties display)
- Execution of the failure monitoring and setting of the failure monitoring option
- Change of the Operation Mode
- Display of the version

‡1 : The mode change cannot be done at the time of the initial activation of the Storage Navigator Modular. A registration of a password validates the mode change.

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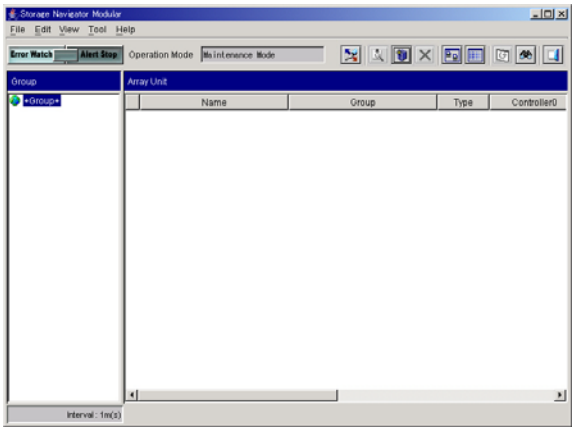
(b) Changing the Maintenance Mode

Storage Navigator Modular has three Active Modes, that is, the Normal Mode, Management Mode, and Maintenance Mode. In the Normal Mode, the program displays the configuration and statuses of the disk array. In the Management or Maintenance Mode, it can set the configuration of the disk array in addition to the function in the Normal Mode.

(i) Changing the Normal Mode to the Maintenance Mode

Change the Operation Mode from the Normal Mode to the Maintenance Mode.
When the log-in has been made in the Normal Mode, [Normal Mode] is displayed as a detailed information of the [Operation Mode] in the upper part of the main window.

① In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.
Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

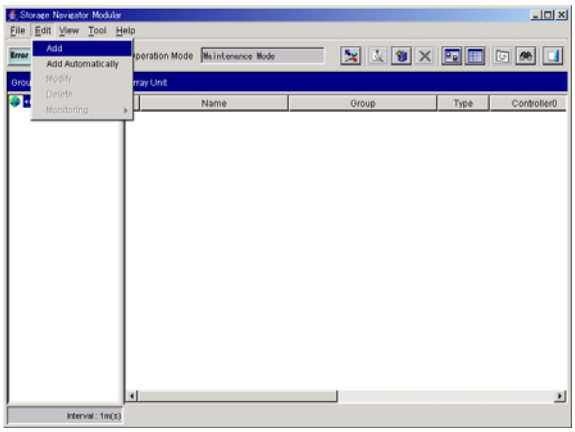


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(c) Registering the disk array subsystem

Register the disk array subsystem to be operated in order to operate it from the Storage Navigator Modular. A registration of a non-existent disk array subsystem cannot be done.

(i) Select [Add] in the main window or click [: Add].



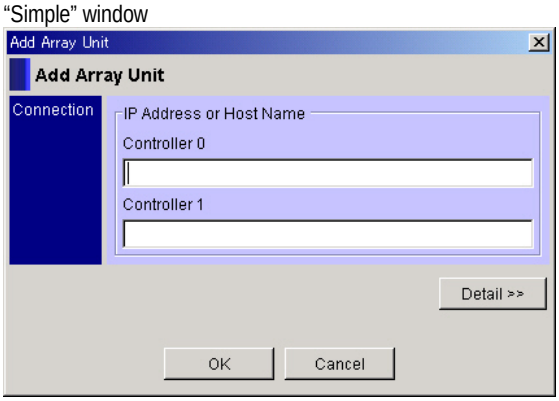
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(ii) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

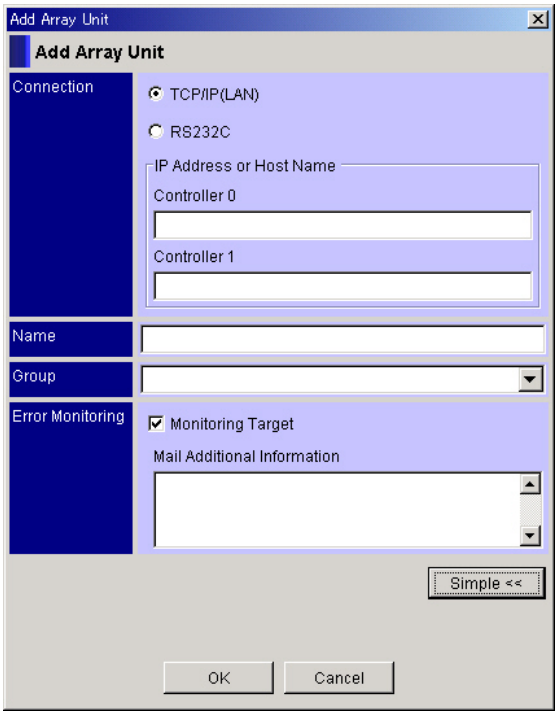
NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. [Array Unit Type] is used to select a type of the subsystem to be connected. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.

• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select TCP/IP (LAN) connection to be used for the disk array subsystem. RS232C is not supported in DF700.
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).
The maximum number of the groups allowed to be registered is 200.
The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

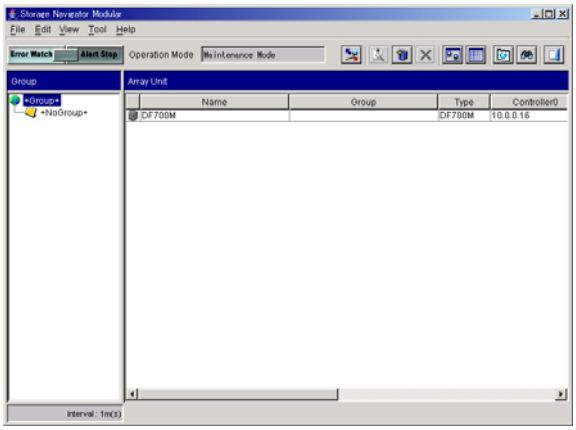
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[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

(iii) When a message informing of a completion of the registration is displayed, click the [OK] button.



(iv) The updated main window is displayed.



When an entry has been made in [Group Name], the group name is displayed in the tree diagram on the right side of the window. A clicking on the group name displays an icon(s) of the disk array subsystem(s) registered in the group.
There are two types of icon of the disk array subsystem as shown below: an icon for the dual system and that for the single system.

• Icon for the dual system :

• Icon for the single system :

The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

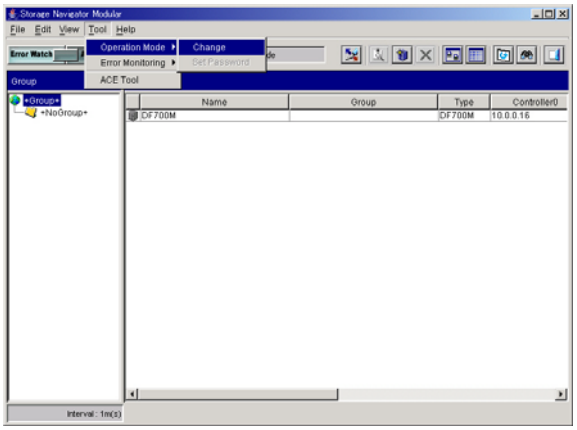
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(d) Changing the Maintenance Mode to the Normal Mode

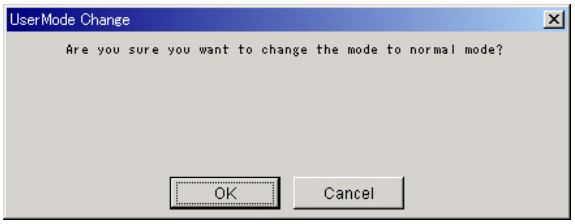
Change the Operation Mode from the Maintenance Mode to the Normal Mode.

When the log-in has been made in the Maintenance Mode, [Maintenance mode] is displayed as a detailed information of the [Operation Mode] in the upper part of the main window.

(i) Select [Tool] – [Operation Mode] – [Change] in the main window or click [ : Change Operation Mode].



(ii) The message asking for the confirmation is displayed. Click [OK] button.



(iii) [Normal Mode] is displayed for the [Operation Mode] in the upper part of the main window. When the unit window is displayed, the Storage Navigator Modular operates in the [Normal Mode].

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1.2 Setting the LAN Port Number

When it cannot be accessed the array subsystem from the Storage Navigator Modular due to the duplication of the LAN Port Number, the access will be possible by changing the LAN Port Number which the Storage Navigator Modular uses.

- "Inspect skinny" option that is the VoIP function option of firewall of Cisco is effective, and the Storage Navigator Modular cannot access to the Subsystem through the firewall. In this case, it is necessary to change in LAN port number.

(1) Prerequisites

The LAN Port Number can be changed by the Storage Navigator Modular only when the prerequisites described below are all satisfied.

- Microprogram Version 0726/E or more
- Storage Navigator Modular Version 2.61 or more
  The CLI is not supported in this version.
- The Storage Navigator Modular is available connecting to the LAN port of both control units.

NOTE : It is possible to change the LAN port number for every control unit from the user port management port. Refer to "4.2 (17-1) Recovery method" (SYSPR 04-0340).

(2) Restrictions

The LAN Port Number cannot be changed in the following conditions.

- While the LAN port to be changed is used in the other application or the failure monitor. In this case, change the LAN Port Number after stopping the program that is activated.

(3) Points of concern

When using this function, consider the following points.

- Use the number not used in the connected network in the range of 1024 to 49151 for the LAN Port Number that can be changed.
- When the HiCommand are used, the setting needs to be changed.
- When the initialization of the array subsystem and initial setup of the microprogram are performed, the set LAN Port Number returns to the initial value (2000).
- When returning the microprogram to the revision 0726/E less than after the LAN port number was changed other than 2000, execute it after returning the LAN port number to 2000.
- When returning the Storage Navigator Modular version to the Version 2.61 or less after changing the LAN Port Number to the number other than 2000, return the LAN Port Number to 2000, and then return the Storage Navigator Modular version to the Version2.61 or less.
- When changing the LAN Port Number, set the same LAN Port Number for both Control Units, and change the port number of all the array subsystems at the site concerned to the same number.
- When the LAN Port Number set to the array subsystem and the LAN Port Number described in the services file in the PC to be connected do not correspond, the PC cannot be connected to the LAN port of array subsystem. When the PC cannot be connected to the LAN port of array subsystem after changing the LAN Port Number, check the LAN Port Number of the array subsystem and the LAN Port Number described in the services file in the PC.

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(4) Procedure of changing LAN Port Number

Refer to "4.2 (17) Setting of LAN Port Number" (SYSPR 04-0300).

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Chapter 2. Setting Host Group/Targets

- Make a setting for making the subsystem recognized by a server.
- The setting of the host group/targets must be made for each port.

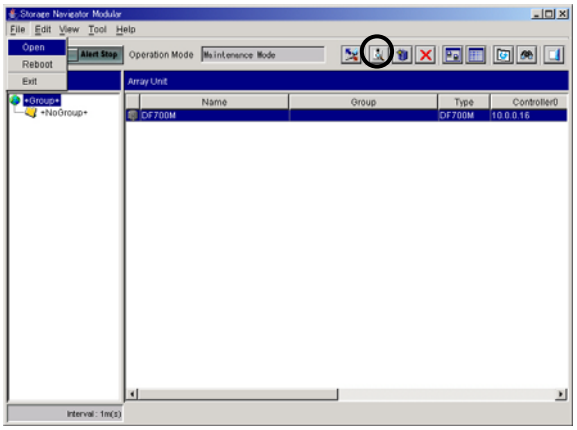
2.1 Before setting host group/Targets

(1) Turn on the power supply.

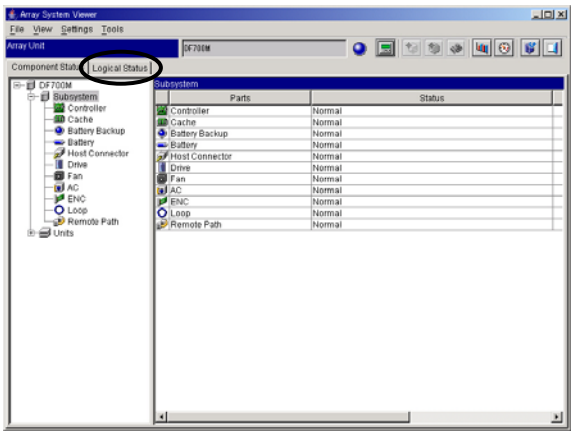
(2) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050), "Registering the newly introduced DF in the Storage Navigator Modular" in Subsection 1.1.

(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



(4) On the unit window, click the [Logical Status] tab.



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2.2 Setting of option

- When the Fibre Channel interface is added in the RKM/RKS/RKXS/RKH or the RKS/RKXS, or in case of the NAS system.
  : Go to "2.2 (1) For Fibre model/NAS model" (SYSPR 02-0010)
- When the iSCSI interface is added in the RKM/RKS/RKXS/RKH.
  : Go to "2.2 (2) For iSCSI model" (SYSPR 02-0090)

(1) For Fibre model/NAS model(‡1)

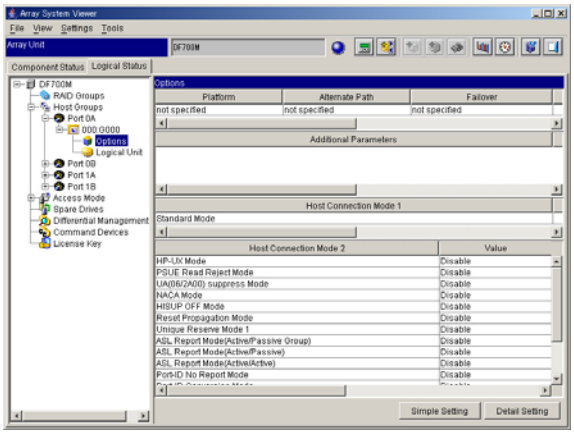
There are two methods for setting the options, that is, the simple setting and detail setting. When making the simple setting, select elements of an environment of the host computer to be connected. When the selection is made, the host group options (host connection mode 1 and 2) necessary for the host computer to be connected are set automatically.
When making the detail setting, directly set the necessary host group options (host connection mode 1 and 2) in the same way as conventional one.

(a) Simple setting

Set the host group options (host connection mode 1 and 2) necessary for the host computer to be connected by selecting elements of the environment of the host, that is, platform, alternative path, fail-over, and additional parameter. Since some host environments require detail setting as well as the simple setting, refer to the table of host connection parameters.

(i) Click the [Logical Status] tab in the unit window.

(ii) Display the [000:G000] by clicking the port through a controller for which you want to set the host connection mode. Then display the options and logical unit by double clicking on the [000:G000] and select the options.



NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board(‡2).

(iii) Click the [Simple Setting] button that is displayed at the lower right part of the window.

‡1 : The setting is supported in the Storage Navigator Modular Ver.2.60 or more.
‡2 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(iv) "Options (Simple)"Property window is opened.
Select [Platform], [Alternative Path], and [Fail-Over] according to an environment of the host to be connected.

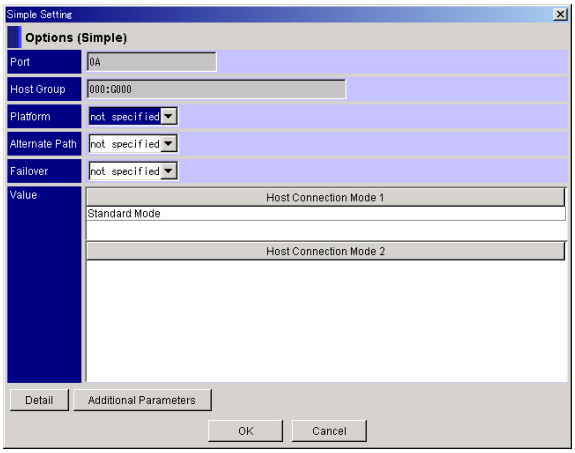
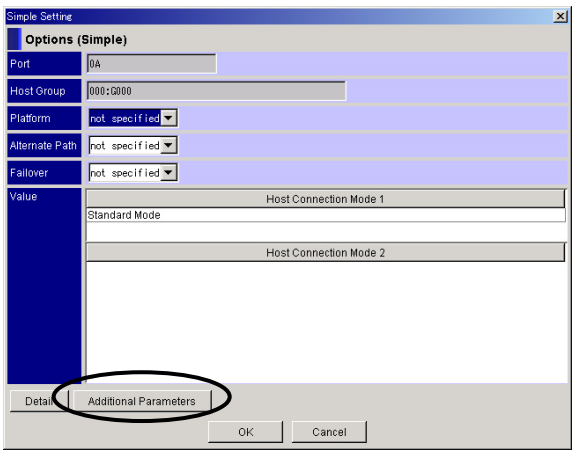


Table 2.2.1 Simple Setting Item List

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Platform	Not specified	Select one of the items	Not selected
		HP-UX		
		Solaris		
		AIX		
		WindowsNT		
		Windows2000		
		Windows2003		
		Linux		
		Tru64		
2	Alternative path	Not specified	Select one of the items	Not selected
		PV Link		
		HDLM		
		VxVM		
3	Fail-over	Not specified	Select one of the items	Not selected
		MC/ServiceGuard		
		Sun Cluster		
		VCS		
		HACMP		
		MSCS		
		Tru Cluster		

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(v) Click the [Additional Parameters] button.



(vi) The "Additional Parameters" window is opened. Select the [Item] as occasion demands and click the [OK] button.

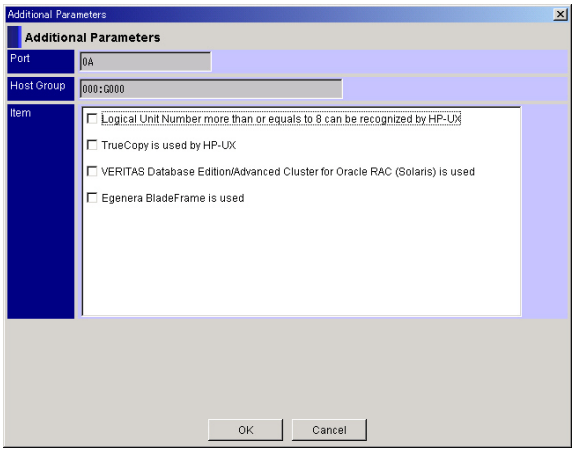


Table 2.2.2 Simple Setting Item List

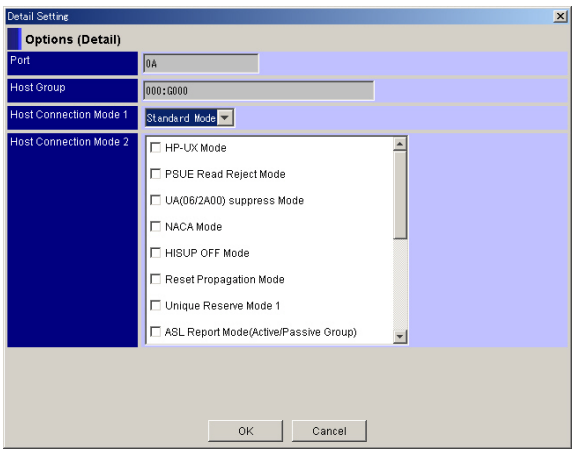
No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Additional Parameters	Logical Unit Number more than or equals to 8 can be recognized by HP-UX.	Select	Not selected
		TrueCopy(*1) is used by HP-UX		
		VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris) is used		
		Egenera BladeFrame is used		

*1 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

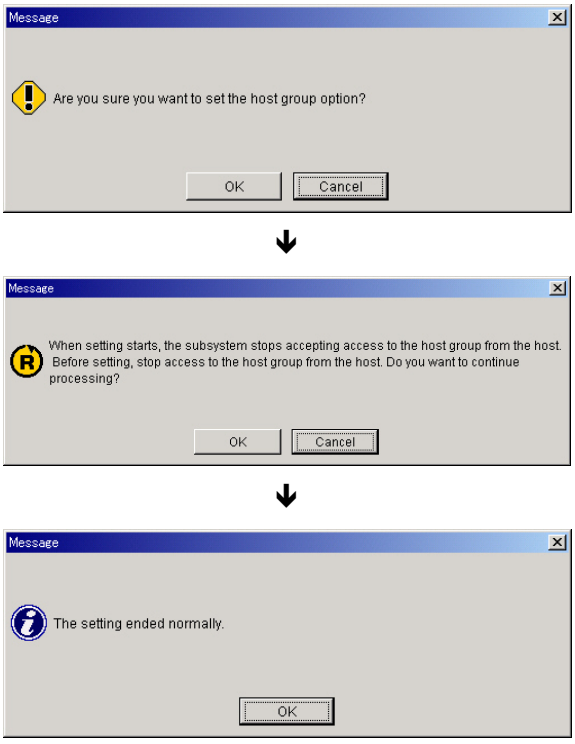
(vii) Click the [Detail] button as occasion demands.

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(viii) Select [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.

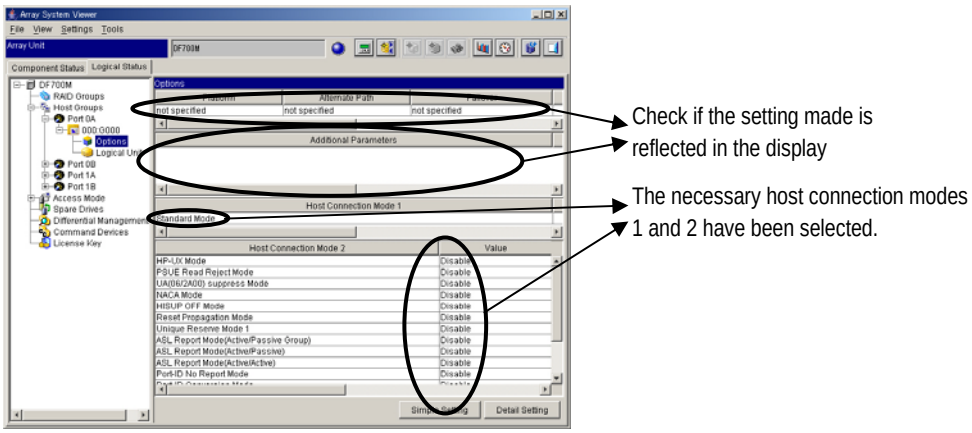


(ix) Click the [OK] button in the "Options (Detail)" window.



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(x) The setting that has been made is displayed.
Make sure that the selected host environment (platform, alternative path, and fail-over) and the Additional Parameter are reflected in the display. Besides, when you have set the host connection mode 1 and 2 directly, make sure that the mode that has been set is reflected in the display.



NOTE : For the RKH, the port number 0C, 0D, 1C, or 1D is displayed depending on the installation status of the Interface Board(‡1).

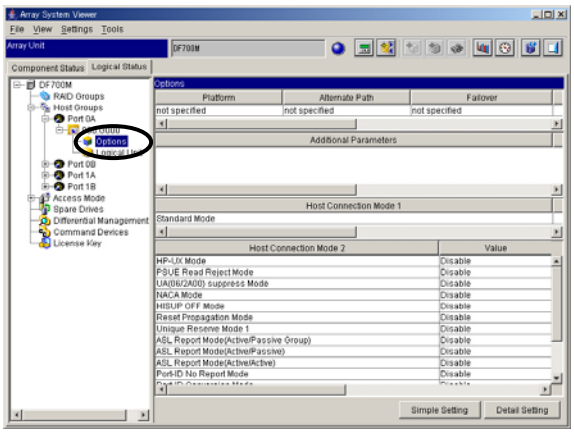
(xi) Make the settings for the rest of the ports in the same way.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(b) Detail setting

(i) Display the 000:G000 by double clicking the [Controller] which is an object of the setting and then double clicking the [Port] in the unit window.
Display the [Options] and [Logical Unit] by clicking the [000:G000], and then click the [Options].



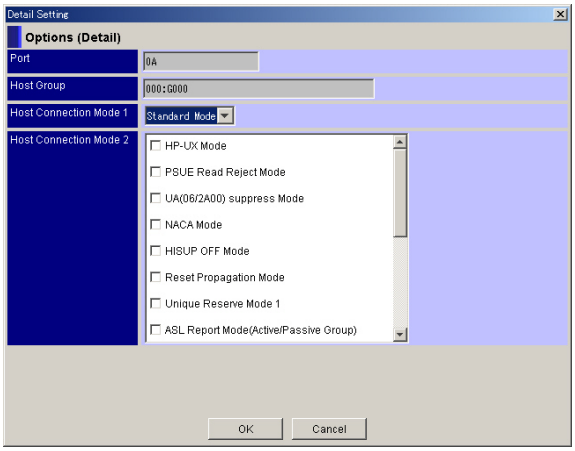
NOTE : For the RKH, the port number 0C, 0D, 1C, or 1D is displayed depending on the installation status of the Interface Board(‡1).

(ii) Click the [Detail Setting] button that is displayed at the lower right part of the window.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(iii) The "Options (Detail)" window is opened.
Set a [Host Connection Mode 1 (select one mode)] and a [Host Connection Mode 2 (more than one mode can be selected)].



Host Connection Mode 1 : See No. 1 in Table 2.2.3, "List of Host Group Setting Items".
Host Connection Mode 2 : See No. 2 in Table 2.2.3, "List of Host Group Setting Items".

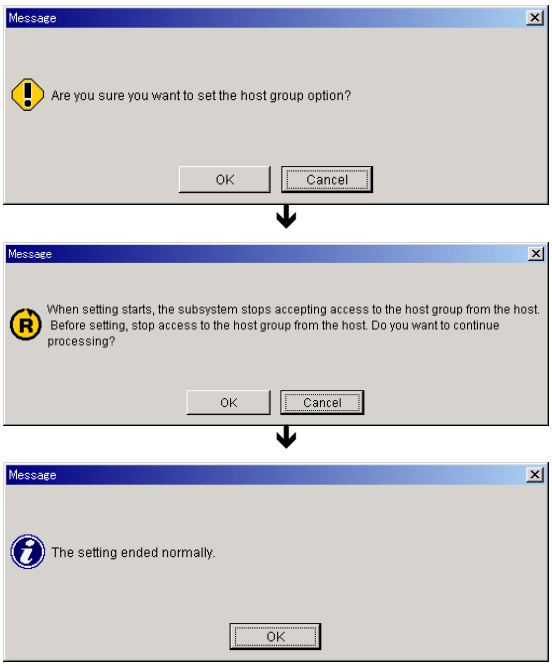
Table 2.2.3 List of Host Group Setting Items

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Host Connection Mode 1 (Only one mode can be selected.)	Standard Mode : Open system emulation mode	Select	Basic mode
		Open VMS Mode : VMS mode		
		TRESPASS Mode : TRESPASS mode		
		Wolfpack Mode : WolfPack mode		
2	Host Connection Mode 2 (Two or more modes may be selected.)	HP-UX Mode: This mode makes LUs, whose LU numbers are 8 up to 63, recognized when the subsystem is connected to the HP server.	Select	Not selected
		PSUE Read Reject Mode : Set it when the fence level of TrueCopy remote replication is used with Data and the pair status suppresses the read access to P-VOL at the time of PSUE transition.	Select	Not selected
		UA (06/2A00) suppress Mode : Unit attention (06/2A00) is suppressed.	Select	Not selected
		NACA Mode : Supports NACA (Normal Auto Contingent Allegiance) that is a standard on SCSI-3.	Select	Not select
		HISUP OFF Mode : Not use	Select	Not selected
		Reset Propagation Mode : Set it when the own port also resets the command while another port received the command reset instruction.	Select	Not select
		Unique Reserve Mode 1 : Supports Persistent Reserve command.	Select	Not select
		ASL Report Mode (Active/Passive Group) : Not use	Select	Not selected
		ASL Report Mode (Active/Passive) : Not use	Select	Not selected
		ASL Report Mode (Active/Active) : Not use	Select	Not selected
		Port-ID No Report Mode: Not use	Select	Not selected
		Port-ID Conversion Mode: When using the DBE_AC with direct connection.	Select	Not selected
		Tru Cluster Mode: When using Tru Cluster, you need to set this mode.	Select	Not selected

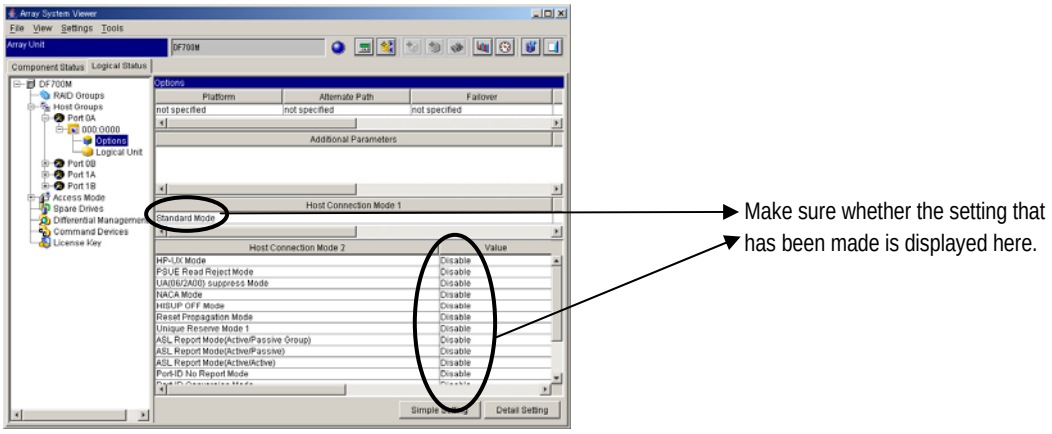
Copyright © 2005, 2006, Hitachi, Ltd.

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Host Connection Mode 2 (Two or more modes may be selected.)	Product Serial Response Mode : This mode enables each LU to be assigned a unique DID in the SUN Cluster 3.0 system.	Select	Not select
		Same Node Name Mode : This mode enables that each port of same array responses same World Wide Node Name.	Select	Not selected
		CCHS Mode : CCHS convert Mode	Select	Not selected
		SPC-2 Mode : Set it when it indicates the conformity to SPC-2 in the Inquiry data and responds to Inquiry. Do not set it usually.	Select	Not selected

(iv) The confirmation window is display. Click the [OK] button.



(v) The detail of the setting that has been made is displayed.
Make sure that the setting that has been made is reflected on the display.



NOTE : For the RKH, the port number 0C, 0D, 1C, or 1D is displayed depending on the installation status of the Interface Board(‡1).

(vi) Make the setting for the other ports in the same way.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(2) For iSCSI model(‡1)

There are two methods for setting the options, that is, the simple setting and detail setting. When making the simple setting, select elements of an environment of the host computer to be connected. When the selection is made, the targets options (host connection mode 1 and 2) necessary for the host computer to be connected are set automatically.

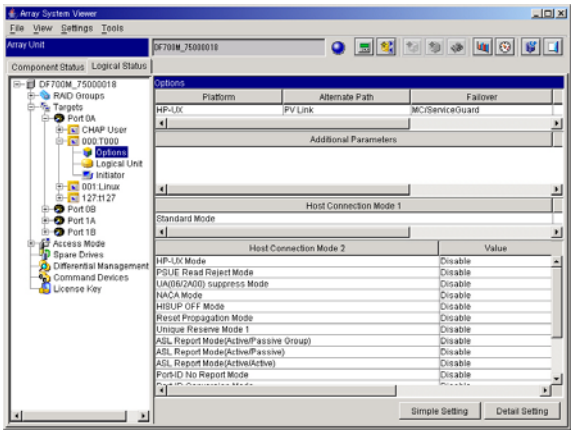
When making the detail setting, directly set the necessary targets options (host connection mode 1 and 2) in the same way as conventional one.

(a) Simple setting

Set the host group options (host connection mode 1 and 2) necessary for the host computer to be connected by selecting elements of the environment of the host, that is, platform, alternative path, fail-over, and additional parameter. Since some host environments require detail setting as well as the simple setting, refer to the table of host connection parameters.

(i) Click the [Logical Status] tab in the unit window.

(ii) Display the [000:T000] by clicking the port through a controller for which you want to set the host connection mode. Then display the options and logical unit by double clicking on the [000:T000] and select the options.



NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board(‡2).

(iii) Click the [Simple Setting] button that is displayed at the lower right part of the window.

‡1 : Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

‡2 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(iv) "Options (Simple)"Property window is opened.
Select [Platform], [Alternative Path], and [Fail-Over] according to an environment of the host to be connected.

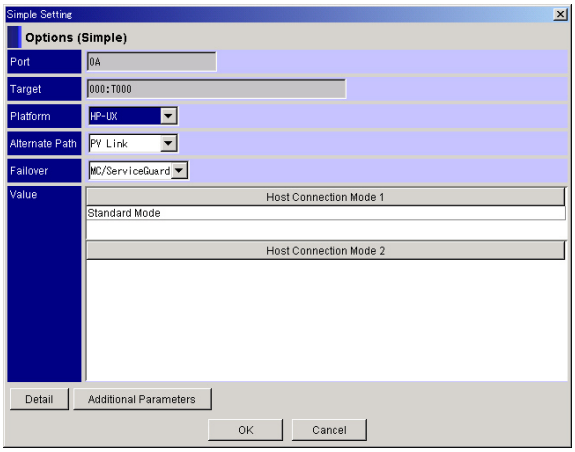


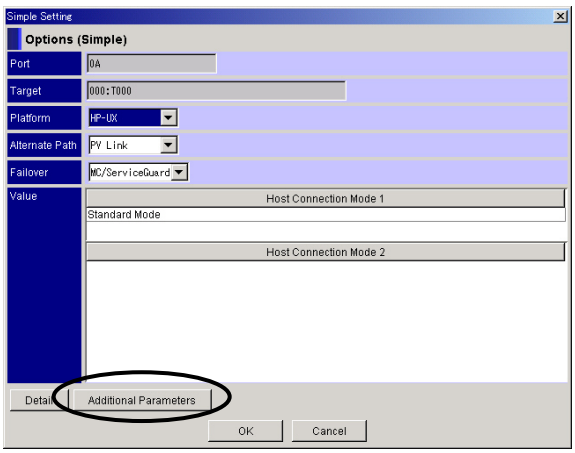
Table 2.2.4 Simple Setting Item List

No.	Menu item	Contents		Factory setting
		Parameter(*1)	How to set	
1	Platform	Not specified	Select one of the items	Not selected
		HP-UX		
		Solaris		
		AIX		
		WindowsNT		
		Windows2000		
		Windows2003		
		Linux		
		Tru64		
2	Alternative path	Not specified	Select one of the items	Not selected
		PV Link		
		HDLM		
		VxVM		
3	Fail-over	Not specified	Select one of the items	Not selected
		MC/ServiceGuard		
		Sun Cluster		
		VCS		
		HACMP		
		MSCS		
		Tru Cluster		

*1 : When the host to be connected is Windows XP, select "Not specified" for all the items.

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(v) Click the [Additional Parameters] button.



(vi) The "Additional Parameters" window is opened.
Select only appropriate items (if the inapplicable item has been selected, uncheck the box of the item), and click the [OK] button.

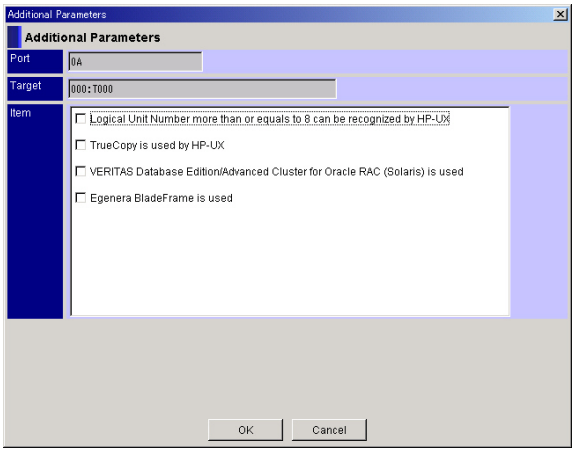


Table 2.2.5 Simple Setting Item List

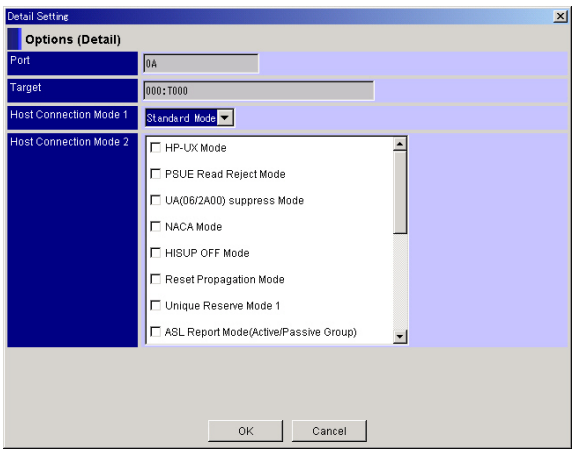
No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Additional Parameters	Logical Unit Number more than or equals to 8 can be recognized by HP-UX.	Select	Not selected
		TrueCopy(*1) is used by HP-UX		
		VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris) is used		
		Egenera BladeFrame is used		

*1 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

(vii) Click the [Detail] button as occasion demands.

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(viii) Select [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.

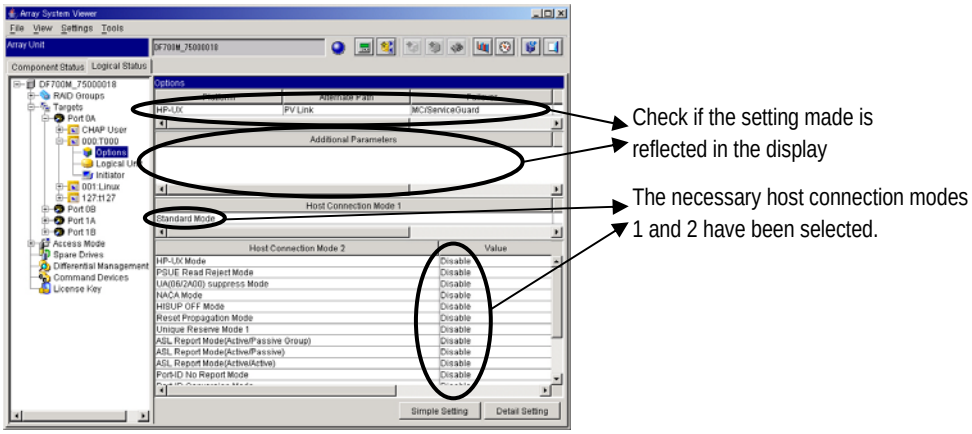


(ix) Click the [OK] button in the "Options (Detail)" window.



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(x) The setting that has been made is displayed.
Make sure that the selected host environment (platform, alternative path, and fail-over) and the Additional Parameter are reflected in the display. Besides, when you have set the host connection mode 1 and 2 directly, make sure that the mode that has been set is reflected in the display.



NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board(‡1).

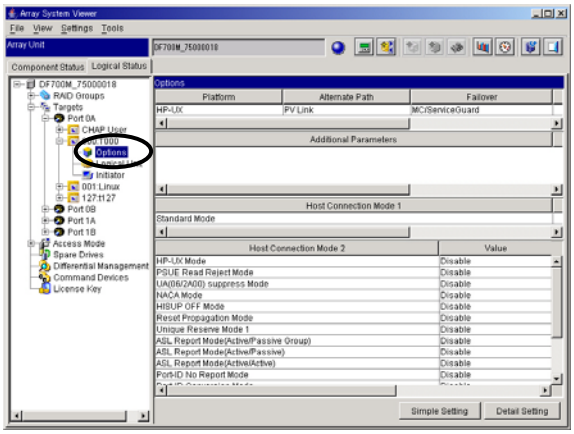
(xi) Make the settings for the rest of the ports in the same way.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(b) Detail setting

(i) Display the 000:T000 by double clicking the Controller which is an object of the setting and then double clicking the [Port] in the unit window.
Display the [Options] and [Logical Unit] by clicking the [000:T000], and then click the [Options].



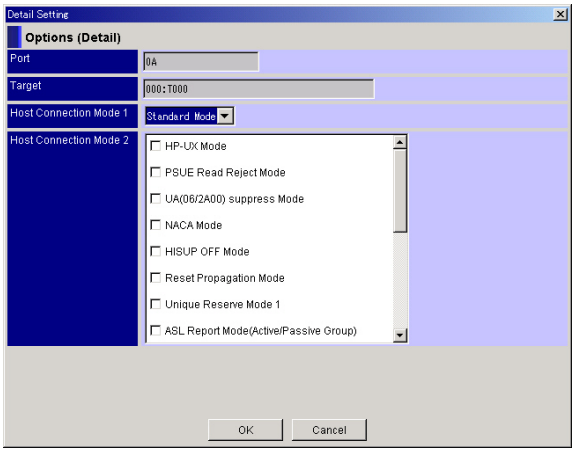
NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board(‡1).

(ii) Click the [Detail Setting] button that is displayed at the lower right part of the window.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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(iii) The "Options (Detail)" window is opened.
Set a [Host Connection Mode 1 (select one mode)] and a [Host Connection Mode 2 (more than one mode can be selected)].



Host Connection Mode 1 : See No. 1 in Table 2.2.6, "List of Host Group Setting Items".
Host Connection Mode 2 : See No. 2 in Table 2.2.6, "List of Host Group Setting Items".

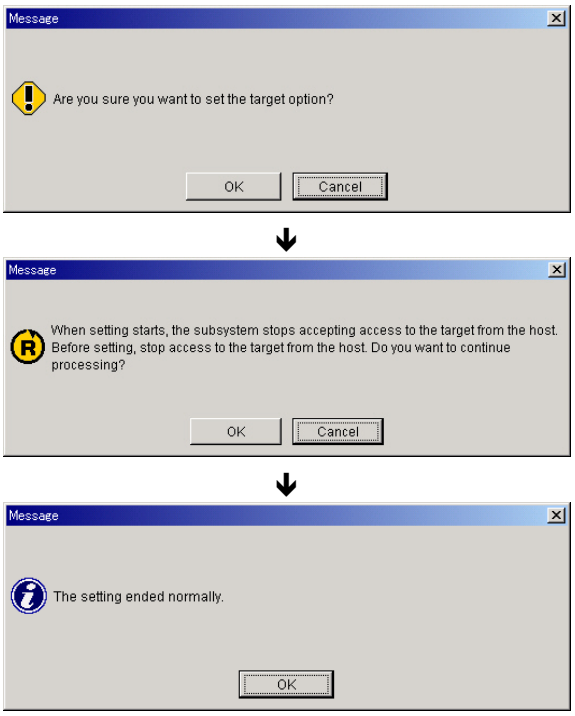
Table 2.2.6 List of Host Group Setting Items

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Host Connection Mode 1 (Only one mode can be selected.)	Standard Mode : Open system emulation mode	Select	Basic mode
		Open VMS Mode : VMS mode		
		TRESPASS Mode : TRESPASS mode		
		Wolfpack Mode : WolfPack mode		
2	Host Connection Mode 2 (Two or more modes may be selected.)	HP-UX Mode: This mode makes LUs, whose LU numbers are 8 up to 63, recognized when the subsystem is connected to the HP server.	Select	Not selected
		PSUE Read Reject Mode : Set it when the fence level of TrueCopy remote replication is used with Data and the pair status suppresses the read access to P-VOL at the time of PSUE transition.	Select	Not selected
		UA (06/2A00) suppress Mode : Unit attention (06/2A00) is suppressed.	Select	Not selected
		NACA Mode : Supports NACA (Normal Auto Contingent Allegiance) that is a standard on SCSI-3.	Select	Not select
		HISUP OFF Mode : Not use	Select	Not selected
		Reset Propagation Mode : Set it when the own port also resets the command while another port received the command reset instruction.	Select	Not select
		Unique Reserve Mode 1 : Supports Persistent Reserve command.	Select	Not select
		ASL Report Mode (Active/Passive Group) : Not use	Select	Not selected
		ASL Report Mode (Active/Passive) : Not use	Select	Not selected
		ASL Report Mode (Active/Active) : Not use	Select	Not selected
		Port-ID No Report Mode: Not use	Select	Not selected
		Port-ID Conversion Mode: When using the DBE_AC with direct connection.	Select	Not selected
		Tru Cluster Mode: When using Tru Cluster, you need to set this mode.	Select	Not selected

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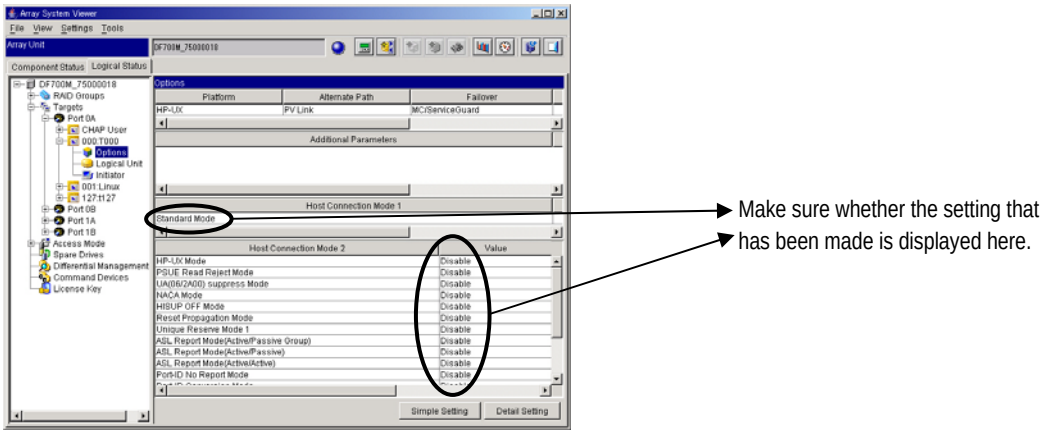
No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Host Connection Mode 2 (Two or more modes may be selected.)	Product Serial Response Mode : This mode enables each LU to be assigned a unique DID in the SUN Cluster 3.0 system.	Select	Not select
		Same Node Name Mode : This mode enables that each port of same array responses same World Wide Node Name.	Select	Not selected
		CCHS Mode : CCHS convert Mode	Select	Not selected
		SPC-2 Mode : Set it when it indicates the conformity to SPC-2 in the Inquiry data and responds to Inquiry. Do not set it usually.	Select	Not selected

(iv) The confirmation window is display. Click the [OK] button.



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(v) The detail of the setting that has been made is displayed.
Make sure that the setting that has been made is reflected on the display.



NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board(‡1).

(vi) Make the setting for the other ports in the same way.

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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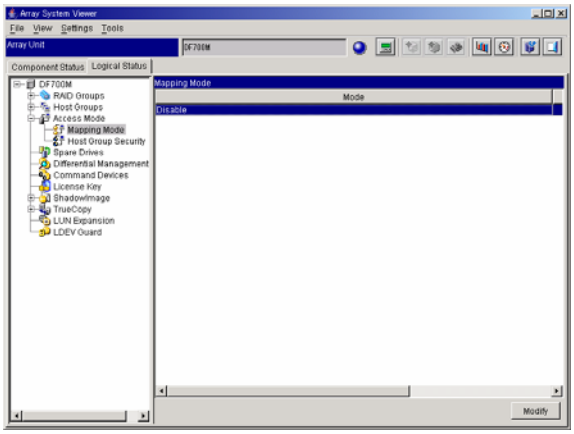
2.3 Setting LU mapping

(1) For Fibre model/NAS model

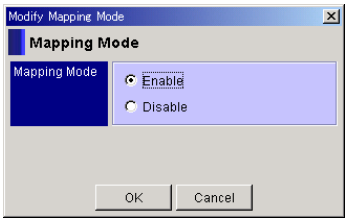
Set mappings of the Port ID, and Host LUN for a LUN so that they are used in the configuration set by a host computer. The setting of the mapping can be modified while an I/O is being executed using the existing mapping setting. However enabling mapping stops host I/O temporarily.

NOTE : When the array subsystem and the host computer are connected with the Fibre Channel interface, the logical unit of the array subsystem cannot be recognized unless the logical unit of number 0 is not created in the array subsystem depending on the host computer.
When using this host computer, create the logical unit of number 0 or map the logical unit to Host LUN (H-LUN) 0.

(a) In the unit window, click [Mapping Mode] after double clicking [Access Mode], and then select [Disable] from the [Mode] menu.
Click the [Modify] button that is displayed at the lower right part of the window.

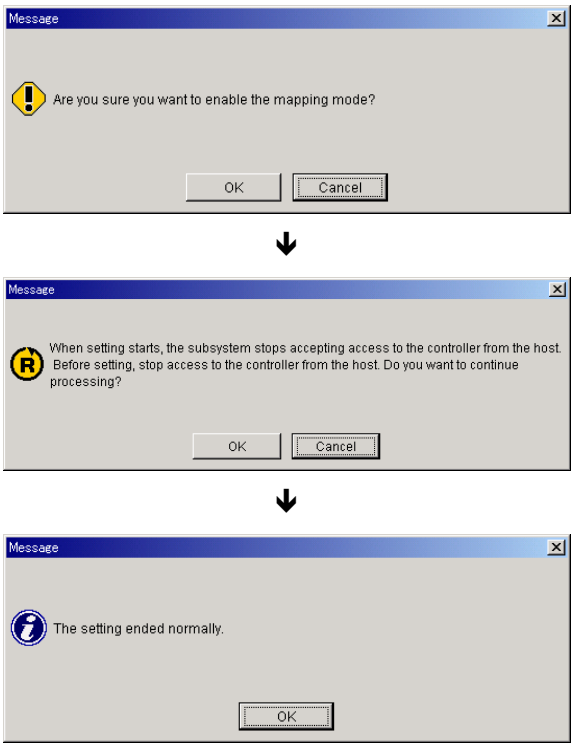


(b) Since the Modify Mapping Mode dialog box is displayed, select [Enable] for the [Mapping Mode] and click the [OK] button.

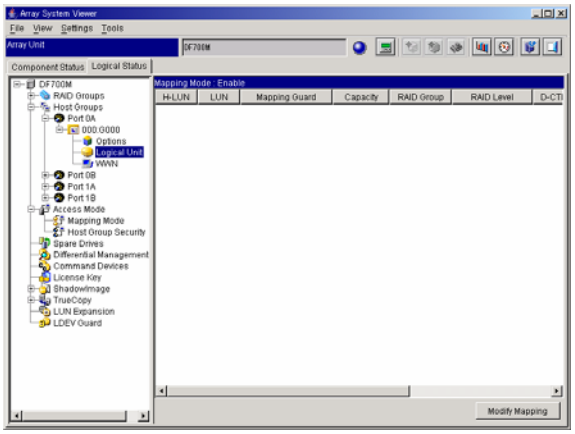


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(c) The confirmation window is display. Click the [OK] button.



(d) In the unit window, display [000: G000] by double clicking the [Port XX] to be specified after double clicking the [Host Groups].
Display the [Options] and [Logical Unit] by clicking the [000:G000], and then click the [Logical Unit].



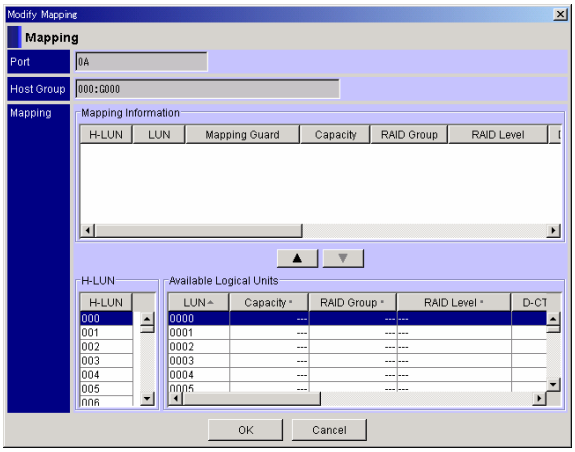
NOTE : For the RKH, the port number 0C, 0D, 1C, or 1D is displayed depending on the installation status of the Interface Board(‡1).

‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

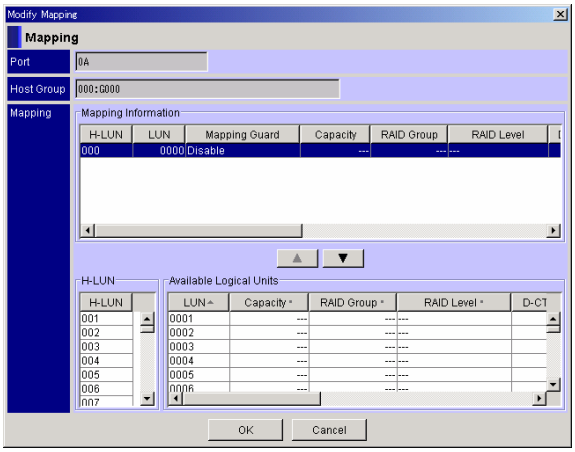
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(e) Click the [Modify] button that is displayed at the lower right part of the window.

(f) Select one H-LUN from the [H-LUN] list of the mapping. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [▲] button.

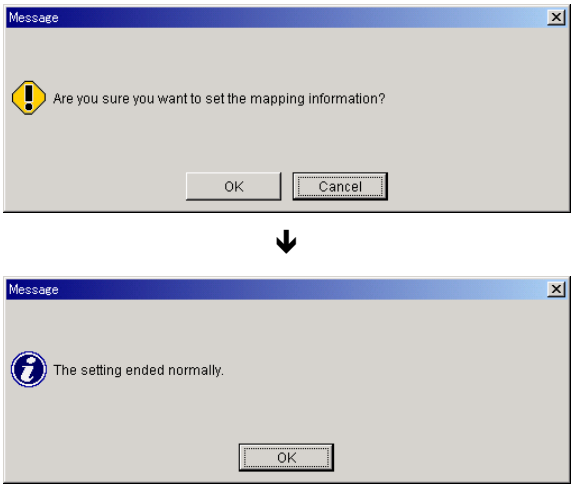


The H-LUN and LUN that were selected are moved to the [Mapping Information] list.



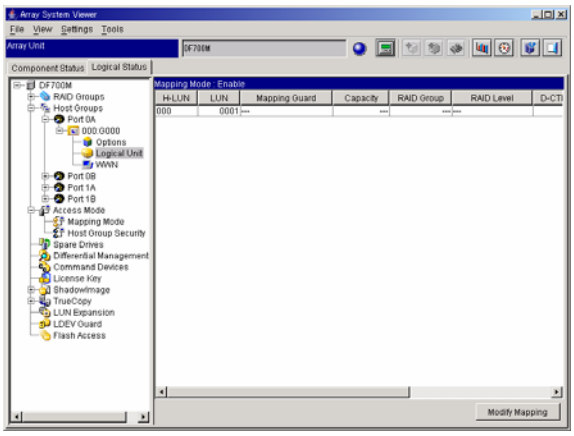
(g) Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



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The mapping information is updated and the following window is displayed.



NOTE : For the RKH, the port number 0C, 0D, 1C, or 1D is displayed depending on the installation status of the Interface Board(‡1).

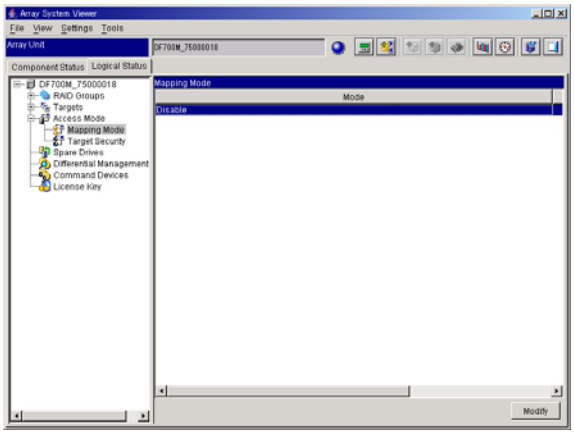
‡1 : The setting is supported in the Storage Navigator Modular Ver.3.10 or more.

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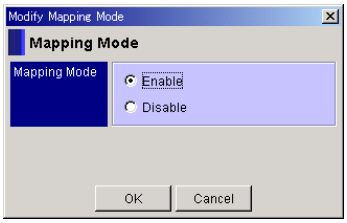
(2) For iSCSI model(‡1)

Set mappings of the Port ID, and Host LUN for a LUN so that they are used in the configuration set by a host computer. The setting of the mapping can be modified while an I/O is being executed using the existing mapping setting. However enabling mapping stops host I/O temporarily.

(a) In the unit window, click [Mapping Mode] after double clicking [Access Mode], and then select [Disable] from the [Mode] menu.
Click the [Modify] button that is displayed at the lower right part of the window.



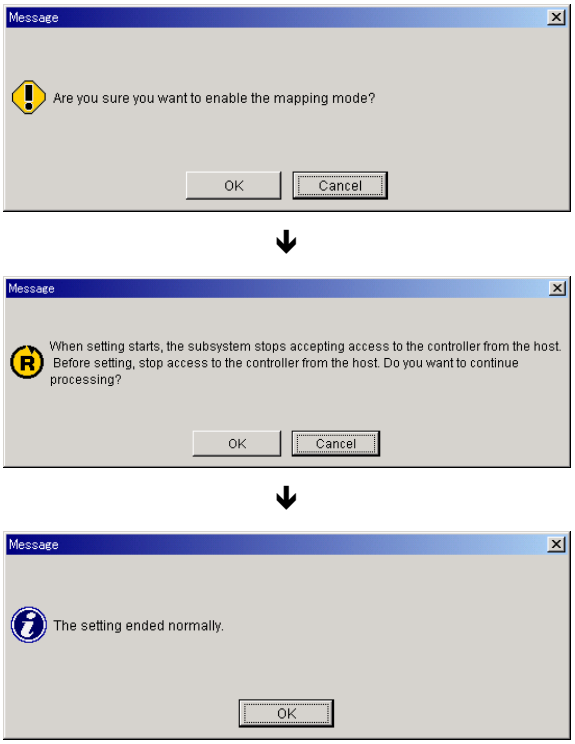
(b) Since the Modify Mapping Mode dialog box is displayed, select [Enable] for the [Mapping Mode] and click the [OK] button.



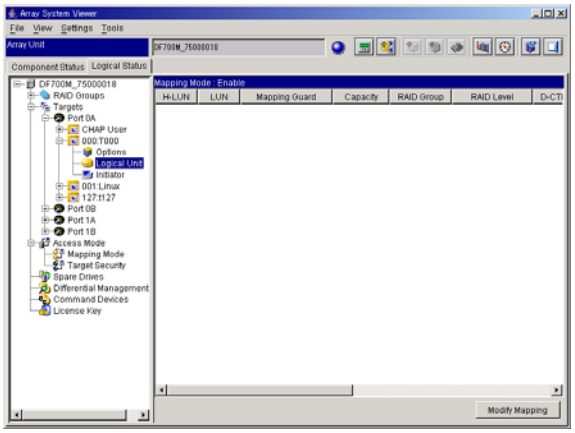
‡1 : Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

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(c) The confirmation window is display. Click the [OK] button.



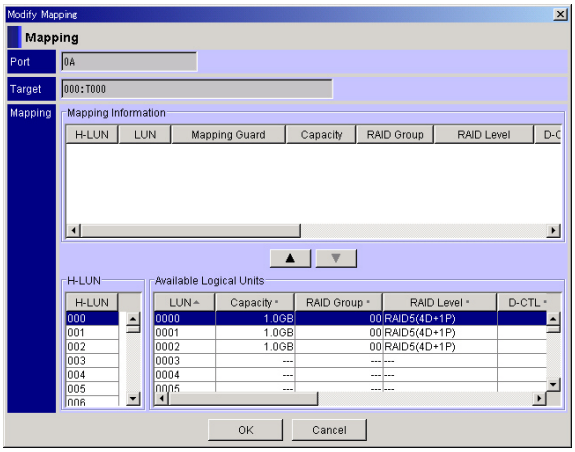
(d) In the unit window, display [000: T000] by double clicking the [Port XX] to be specified after double clicking the [Targets].
Display the [Options] and [Logical Unit] by clicking the [000:T000], and then click the [Logical Unit].



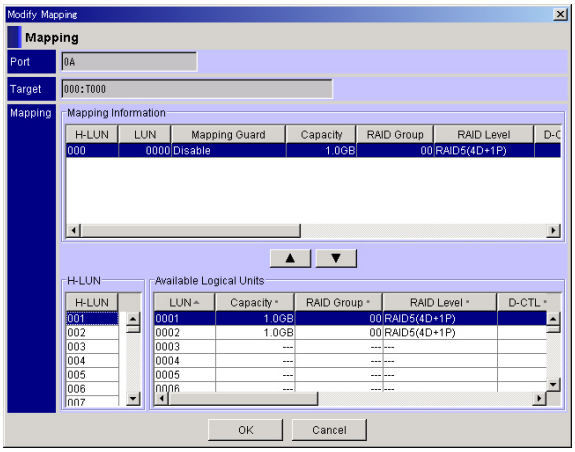
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(e) Click the [Modify] button that is displayed at the lower right part of the window.

(f) Select one H-LUN from the [H-LUN] list of the mapping. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [▲] button.

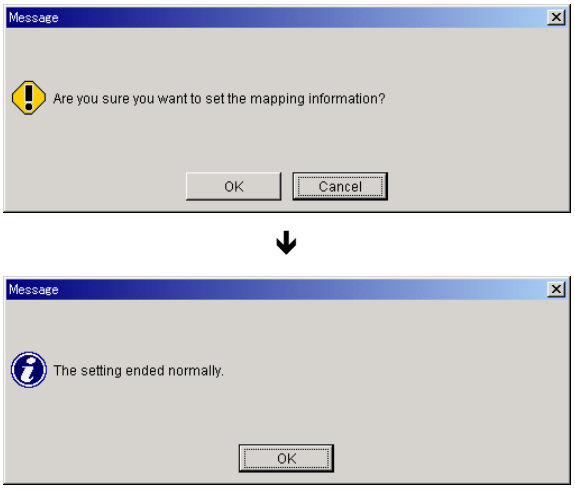


The H-LUN and LUN that were selected are moved to the [Mapping Information] list.



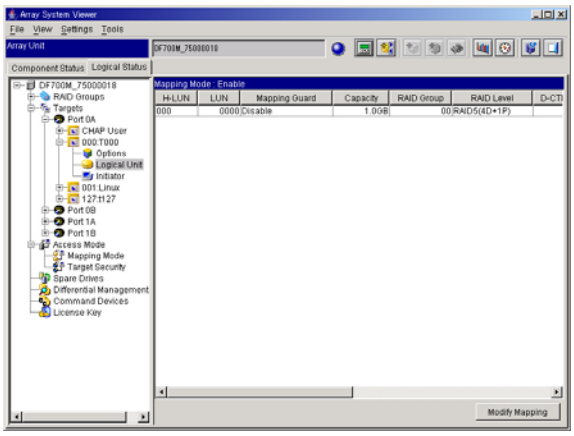
(g) Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



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The mapping information is updated and the following window is displayed.



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2.4 Setting Target Information

Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

The Host Connection Mode, the mapping information of Logical Unit, and LUN security information are set to the targets, not to the ports at the time of iSCSI interface addition. This enables you to select the host computer to which the subsystem is connected depending on each target.

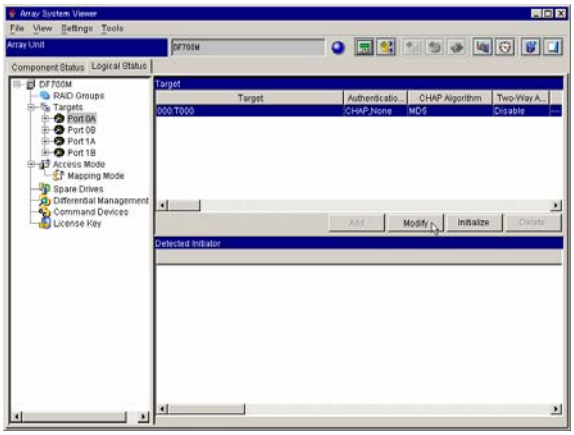
For targets, only the "000:T000" is supported.
Up to 128 targets can be set when the LUN Manager, which is an extra cost optional feature, is used. (The maximum of 255 for the microprogram of the version 0750/A or more)

(1) Changing the Target Information

This enables you to change the iSCSI Name, Name Authentication Method, and CHAP User information of Two-Way Authentication about the Target.

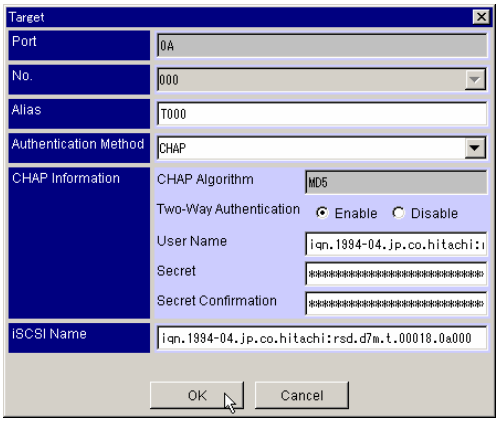
(a) Click the [Logical Status] tab in the unit screen.

(b) Double-click the port which changes the information on the two-way authentication, select [000:T000], and click the [Modify] button.



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(c) The “Target” dialog is displayed. In the “Target” dialog, enter the “Alias” and “iSCSI Name”. Select the “Authentication Method” from the drop-down list.

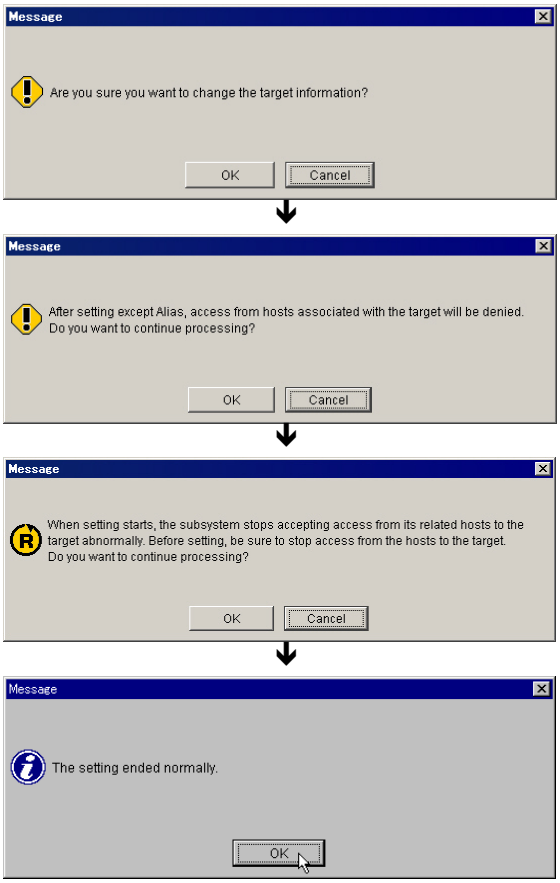


① [Alias] : Enter the Alias of the Target with 32 or less alphanumeric character. (Excluding \, /, :, ;, *, ?, “, <, >, | and ‘)
Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.

② [Authentication Method] : Select the “CHAP”, “None”, or “CHAP,None”.

③ [iSCSI Name] : Enter the name of the iSCSI Name with 233 or less alphanumeric character. A period (.), hyphen (-), and colon (:) can be used.

(d) Click the [OK] button.
(e) The confirmation message is displayed. Select the [OK] button.

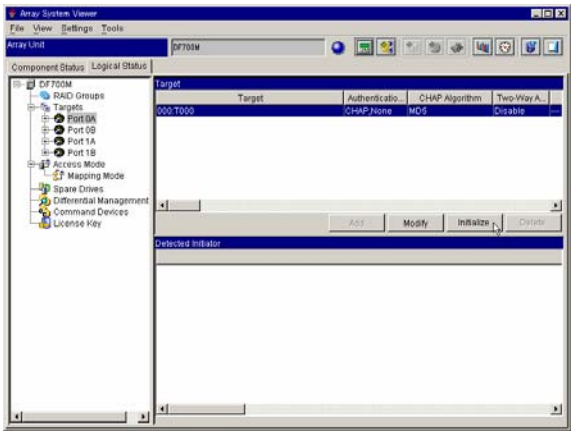


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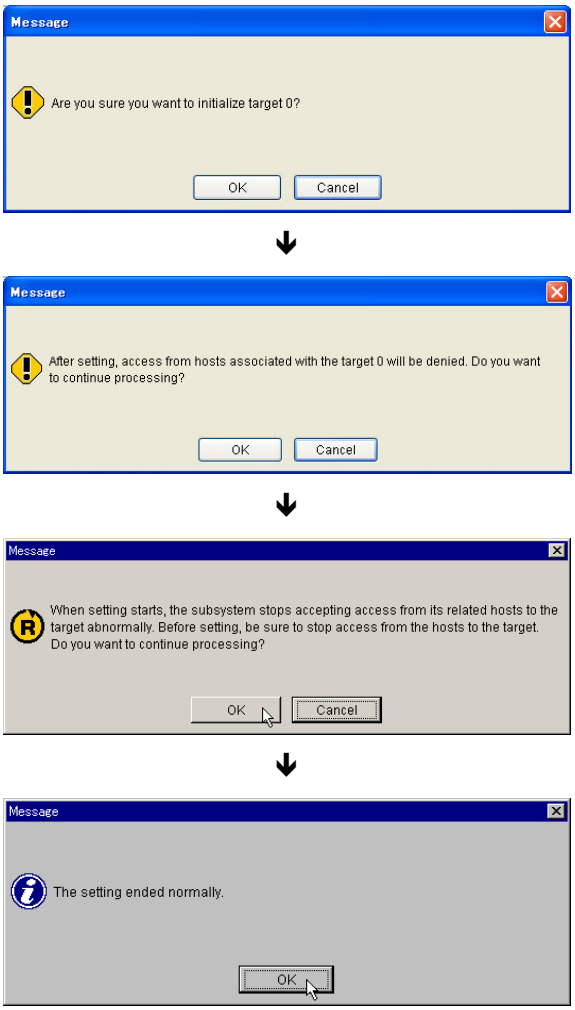
(2) Initializing the Target Information

(a) Click the [Logical Status] tab in the unit window.

(b) Double-click the port which initializes the target information, select [000:T000], and click the [Initialize] button.



(c) The confirmation message is displayed. Select the [OK] button.



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2.5 Setting CHAP Authentication

Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

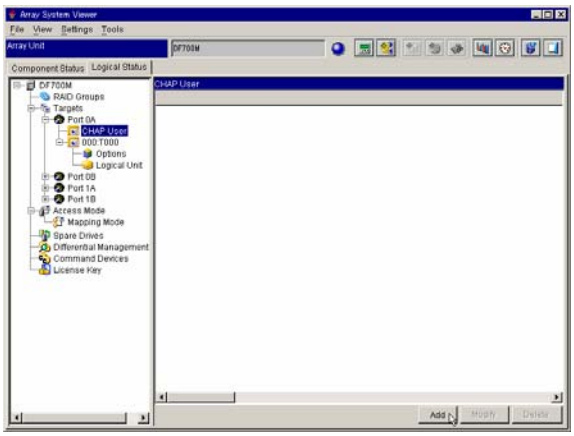
The disk array subsystem can authenticate the iSCSI User both Initiator Authentication and Two-Way Authentication (Target Authentication) with the CHAP (Challenge Handshake Authentication Protocol).
Set the same iSCSI User information (User Name/Secret) both host side and disk array subsystem side for Initiator Authentication.
Set the same iSCSI User information (User Name/Secret) both host side and disk array subsystem side for Two-Way Authentication (Target Authentication).

(1) Adding a CHAP User

To authenticate the initiator, set the CHAP User to the port and assign it to the Target.

(a) Click the [Logical Status] tab on the Unit screen.

(b) Double-click the Port to which you want to add the CHAP User and select [CHAP User].

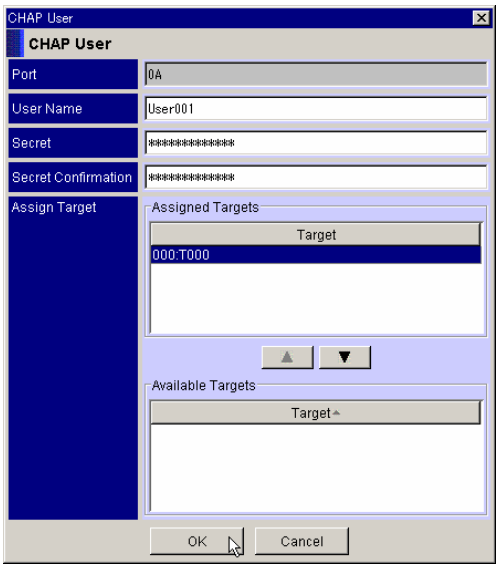


(c) Select the [Add] button.

The “CHAP User” dialog is displayed.

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(d) In the “CHAP User” dialog, enter the [User Name], [Secret], and [Secret Confirmation].



① [User Name] : Enter the name of the User with 256 or less alphanumeric character. The following symbols can be used: (. - + @ _ = : / [ ] , ~ (space))

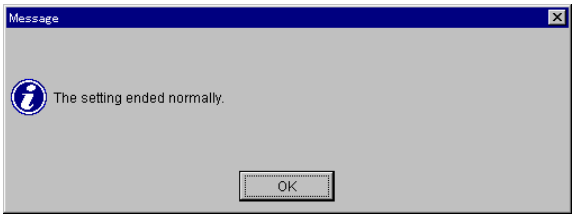
② [Secret] : Enter the Secret from 12 through 32 alphanumeric characters. The following symbols can be used: (. - + @ _ = : / [ ] , ~ (space))

③ [Secret Confirmation] : Enter the characters that enter into the [Secret].

(e) From the “Available Targets” list, select the target to be assigned, select the ▲ button.

(f) Click the [OK] button.

(g) The confirmation message is displayed. Select the [OK] button.

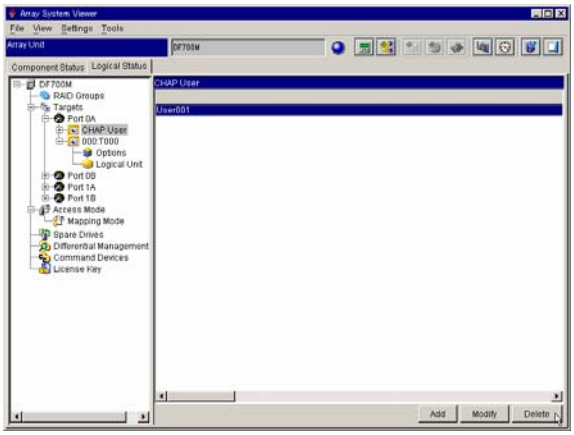


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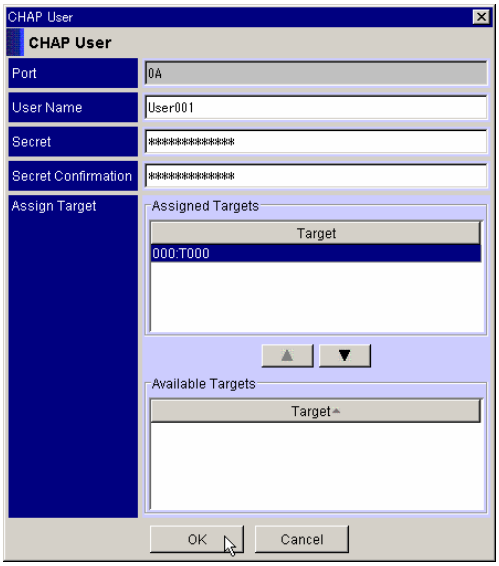
(2) Changing the CHAP User

(a) Click the [Logical Status] tab on the Unit screen.

(b) Double-click the Port of which you want to change the CHAP User, and then select the [CHAP User].



(c) Select the CHAP User to be changed from the [CHAP User] list. Select the [Modify] button.

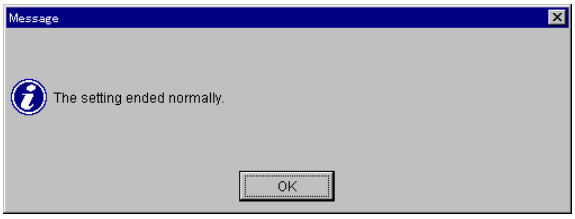


The “CHAP User” dialog is displayed.

(d) As necessary, enter the [User Name], [Secret], and [Secret Confirmation]. And then select the [OK] button.

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(e) The confirmation message is displayed. Select the [OK] button.

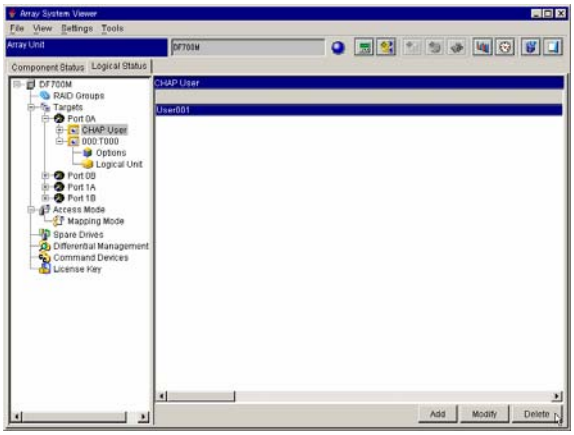


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(3) Deleting the CHAP User

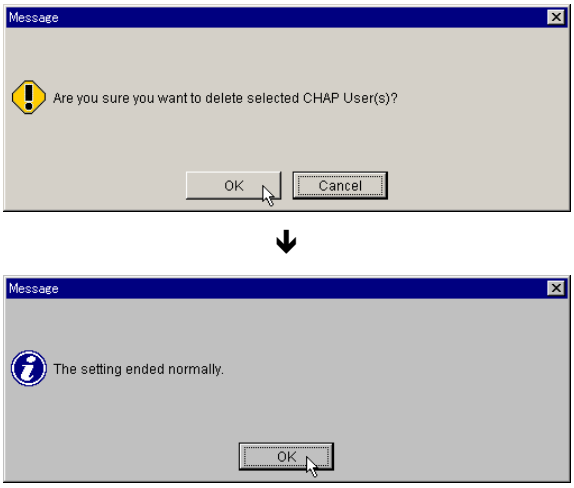
(a) Click the [Logical Status] tab on the Unit screen.

(b) Double-click the Port of which you want to delete the CHAP User and select [CHAP User].



(c) Select the CHAP User to be deleted from the [CHAP User] list. Select the [Delete] button.

(d) The confirmation message is displayed. Select the [OK] button.

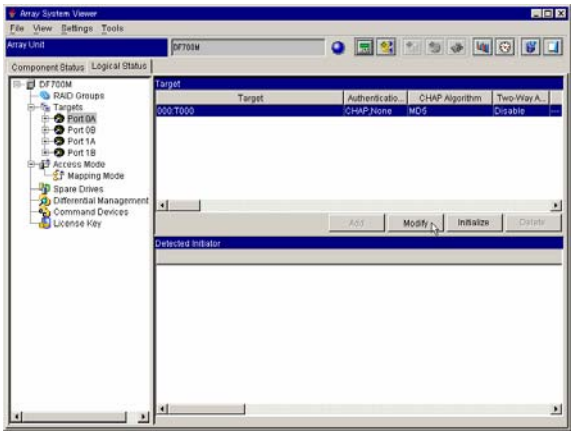


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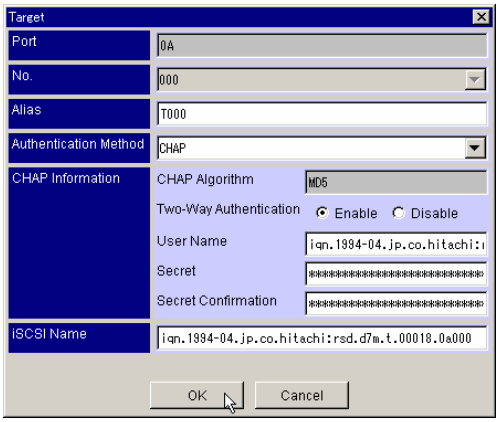
(4) Changing the Two-Way Authentication Information

(a) Click the [Logical Status] tab on the Unit screen.

(b) Double-click the port which changes the information on the two-way authentication, select [000:T000], and click the [Change] button.



(c) Select [Enable] for the “Two-Way Authentication”.



① [User Name] : Enter the name of the User with 256 or less alphanumeric character.
The following symbols can be used: (. - + @ _ = : / [ ] ~ (space))

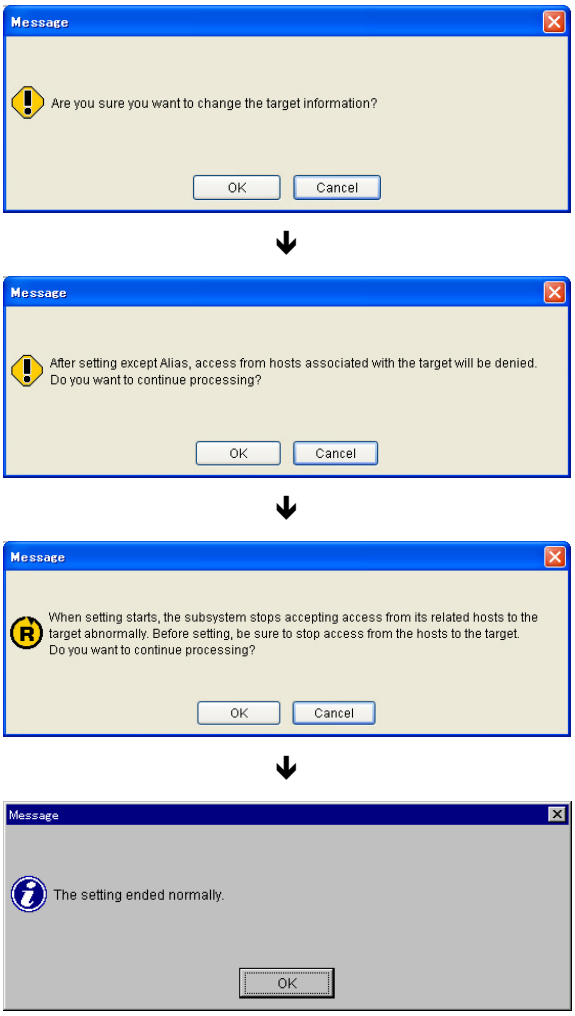
② [Secret] : Enter the Secret from 12 through 32 alphanumeric characters.
The following symbols can be used: (. - + @ _ = : / [ ] ~ (space))

③ [Secret Confirmation] : Enter the characters that enter into the [Secret].

(d) Select the [OK] button.

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(e) The confirmation message is displayed. Select the [OK] button.



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Chapter 3. Setting the RAID/LU/Spare Disk

This function performs the RAID group setting, LU setting, LU formatting, and Spare Disk setting. Further, it can make the following settings.

Procedure Flow diagram for setting RAID groups, LUs and Spare Disks.

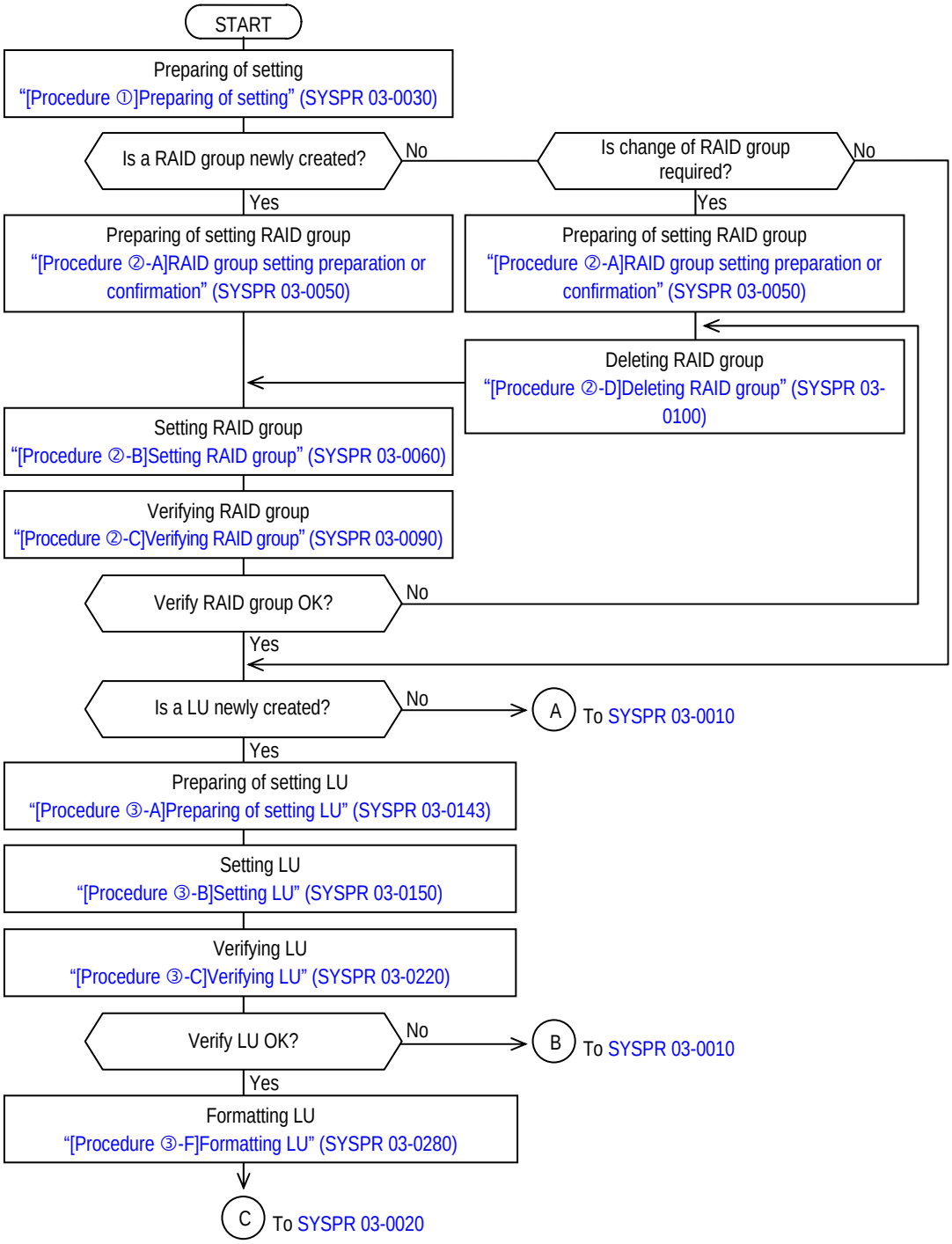


Figure 3.1.1 (1/3)Setting Flow the RAID/LU/Spare Disk

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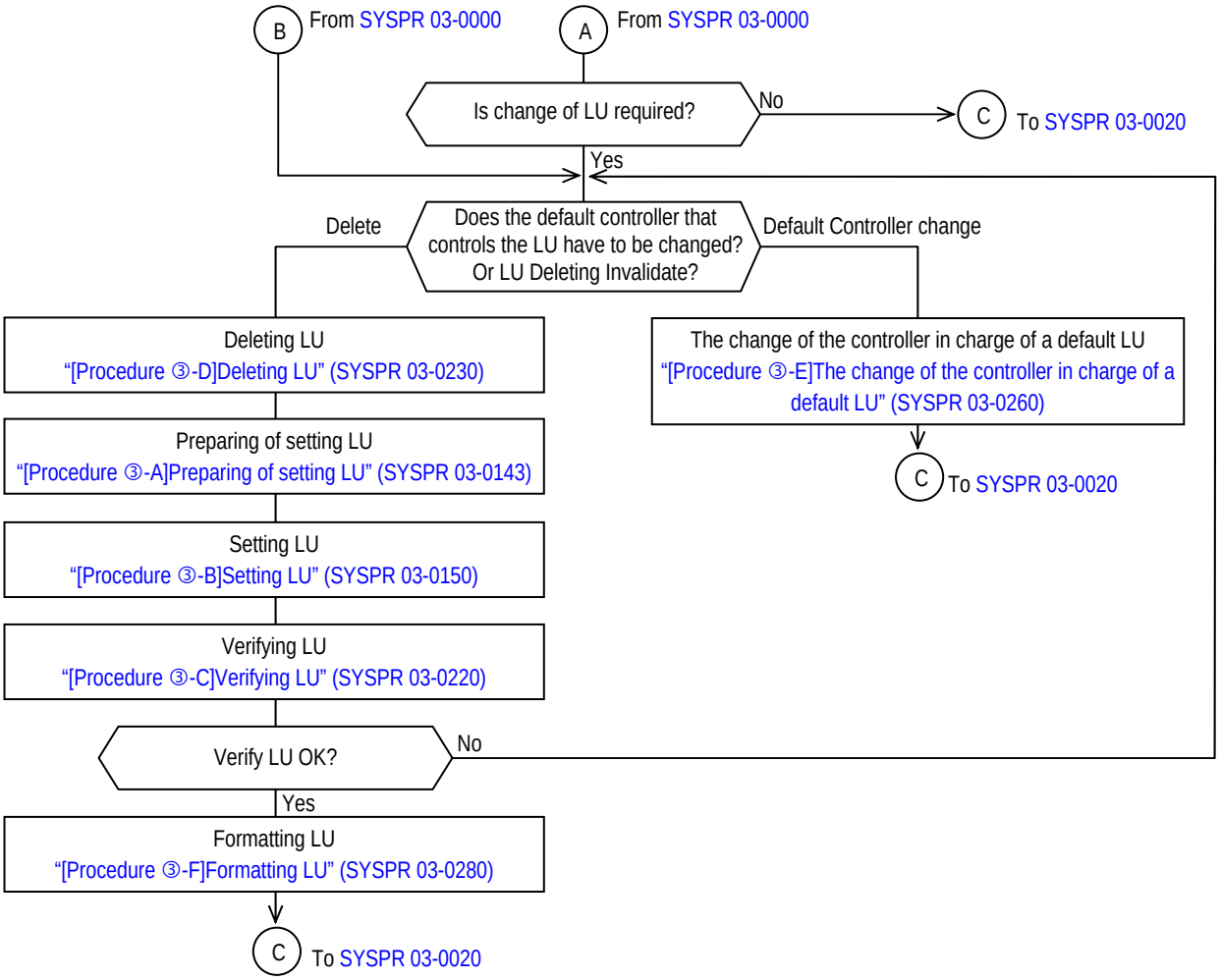


Figure 3.1.1 (2/3)Setting Flow the RAID/LU/Spare Disk

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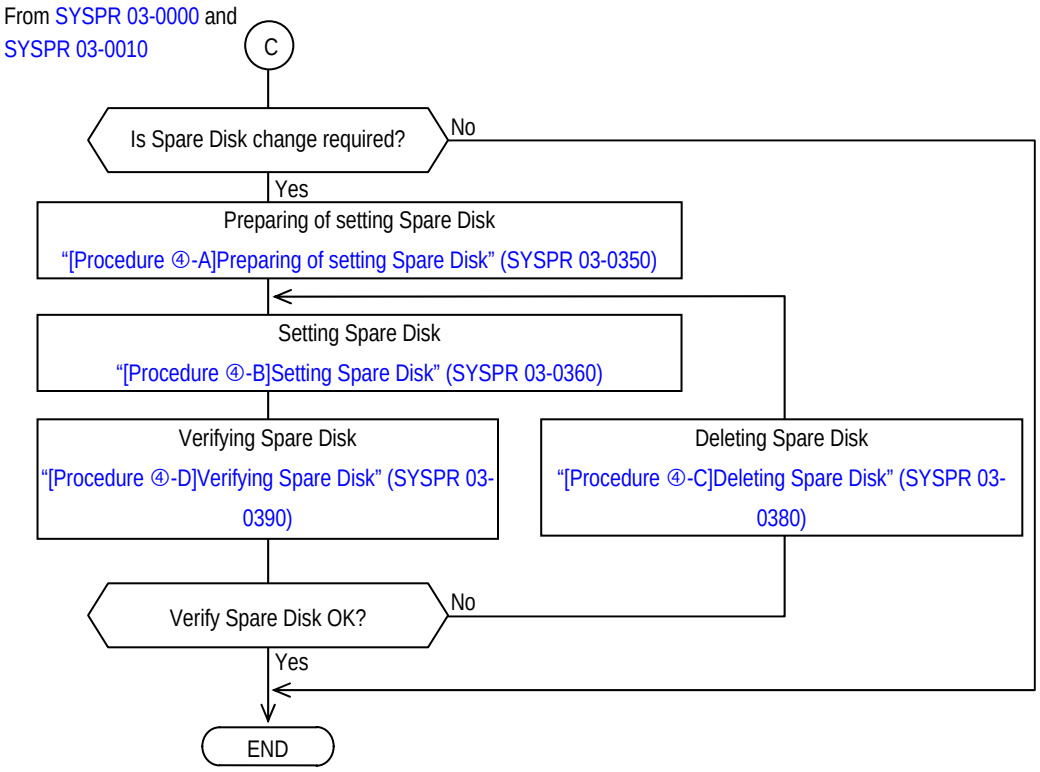


Figure 3.1.1 (3/3) Setting Flow the RAID/LU/Spare Disk

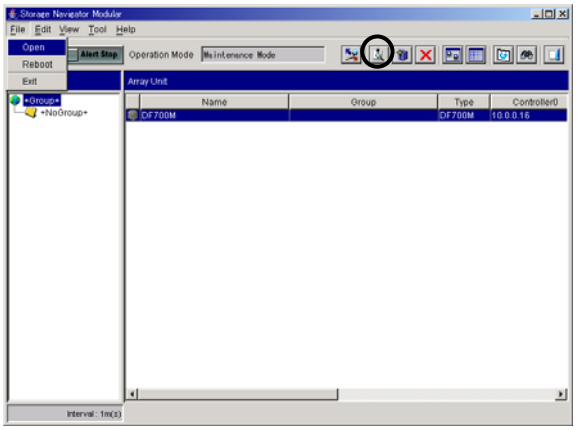
Copyright © 2005, Hitachi, Ltd.

3.1 Preparation of RAID/LU setting

[Procedure ①]Preparing of setting

(1) Start the Storage Navigator Modular and set the operation mode to "Management Mode"(‡1).
(2) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

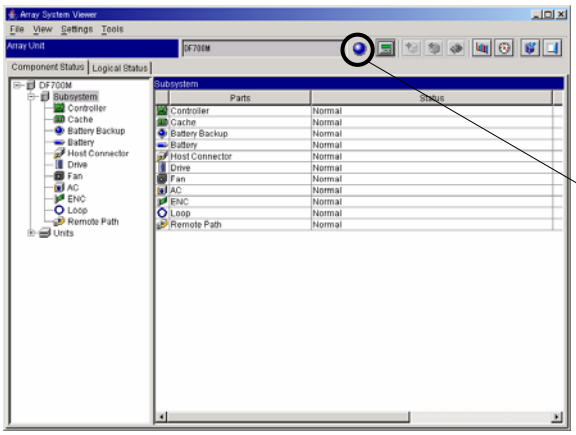
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



‡1 : For details of the setting method, refer to the Subsection "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050)

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(3) Check that the unit is ready.



Displayed in green in the ready state.

(4)
- When newly creating or changing a RAID group, go to "3.2 RAID group setting" (SYSPR 03-0050).
- Go to "3.3 Setting of LU" (SYSPR 03-0140) when changing an LU without changing a RAID group.
- When neither the RAID group nor LU is to be changed, select [Mode] – [Exit] or click [: Exit].

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3.2 RAID group setting

This setting is used to set, delete and reference a RAID group. This function can be used in the device ready state. (The unit does not need to be re-booted.)

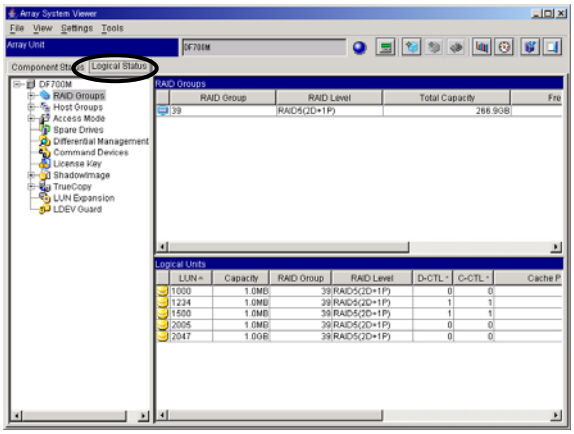
NOTE : Deletion of a RAID group indicates that all the user data of the deleted RAID group are lost. Before deleting the RAID group, back up the user data. For the RAID group and RAID levels which can be set by this device, refer to Theory "4.7 Setting RAID Group" (THEO 04-0260).

NOTE : • It is recommended to set at least four RAID Groups in order to make the NAS system LU for the usual operation, NAS system LU for the backup, and the NAS user LU into another RAID Group. Refer to DF700 NAS SOFTWARE Maintenance Manual "3.2.1 Construction of NAS System LU" (NAS 03-0010) for the detail.

• The deletion of the RAID Group used at the time of the NAS Unit connection has restrictions in the opportunity to execute. Refer to "3.9 Restrictions of the operation opportunity for the system LU/user LU of the NAS" (SYSPR 03-0560) for the restrictions of the execution opportunity.

[Procedure ②-A]RAID group setting preparation or confirmation

(1) Click the [Logical Status] tab in the unit window.



RAID groups and logical units defined for the disk array subsystem are displayed.

[RAID Group] : Information on all RAID groups defined for the disk array subsystem are displayed.

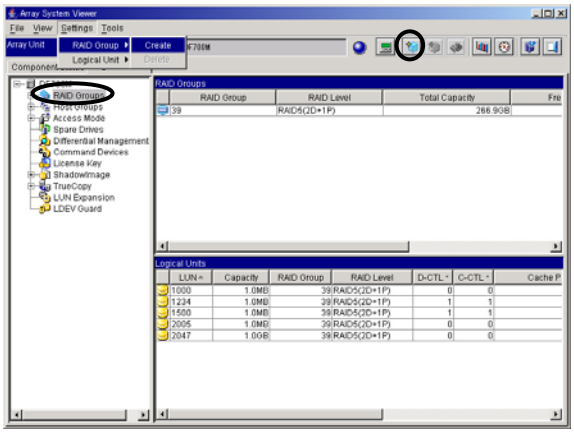
[Logical Unit] : Information on all Logical Units defined for the disk array subsystem are displayed.

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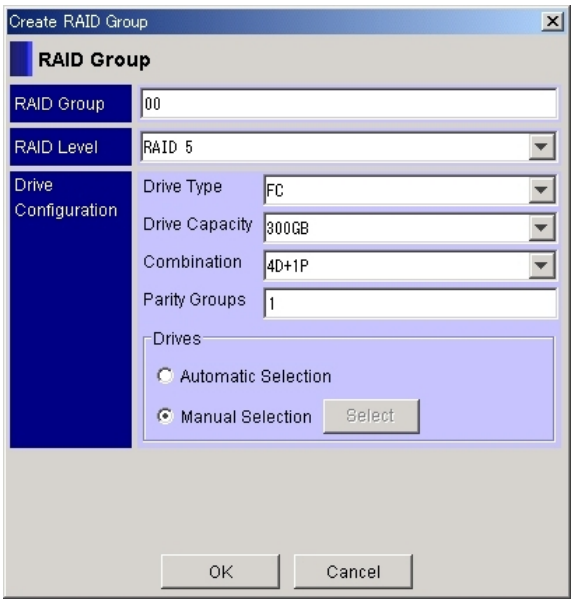
[Procedure ②-B]Setting RAID group

(1) When creating a RAID group by selecting a drive manually

(a) Click [RAID Groups] in the unit window and then select [Settings] – [RAID Group] – [Create], or click the [: RAID Group Settings] button.



(b) Since the Create RAID Group dialog box is displayed, select or enter the [RAID Level] and [Drive Configuration] (drive type, combination, and number of parity groups).

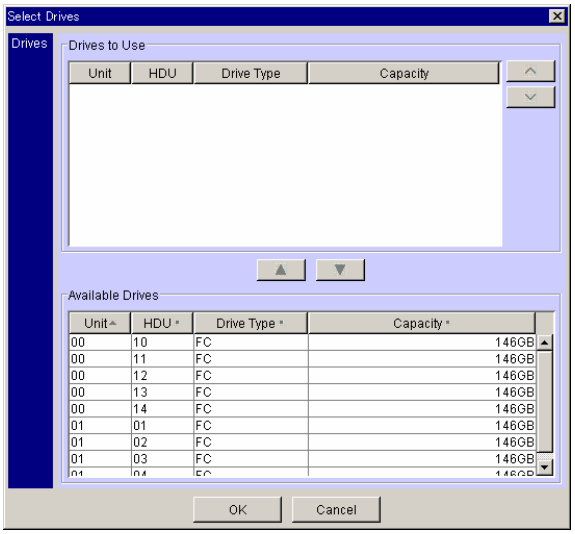


(c) Select [Manual Selection] for the [Drives] and click the [Select] button.

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(d) Since the Select Drives dialog box is displayed, select the drive you want to assign to a RAID group from [Available Drives] by operating the [Shift] key.

NOTE : It is possible to create the RAID Group by selecting either one optional Disk Drive of FC and SATA among the Disk Drives which are not set in the RAID Group or the Spare Disks and not blocked.
However, the Disk Drives of the even-numbered slots are allocated in Loop #0 and the Disk Drives of the odd-numbered slots are allocated in Loop #1 in the Basic Chassis and the Additional Chassis, so that it is recommended to evenly select the Disk Drives of the even-numbered slots and the odd-numbered slots in the chassis as the Disk Drives which configure the RAID Group in consideration of the load distribution of the back-end path.
When selecting the Disk Drives to configure the RAID Group manually, it is recommended to continuously select the Disk Drives in the Basic Chassis and the Additional Chassis (either one Disk Drive of FC and SATA which are not set in the RAID Group or the Spare Disks and not blocked) with Storage Navigator Modular.



(e) Move the selected drive to the [Drives to Use] box by clicking the [▲] button and click the [OK] button.
(f) Since the Create RAID Group dialog box returns, click the [OK] button.
(g) The confirmation window is display. Click the [OK] button.

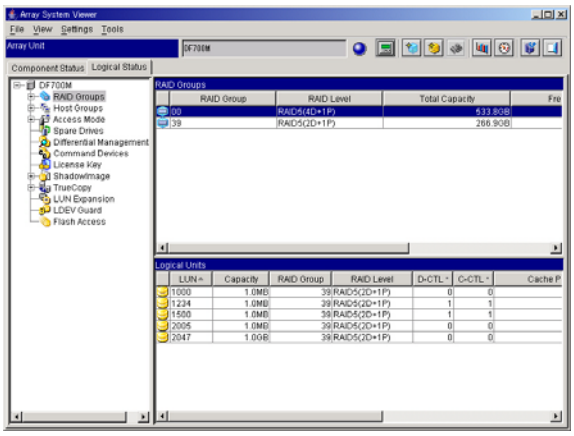


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(h) The screen from which a RAID group was updated is displayed.

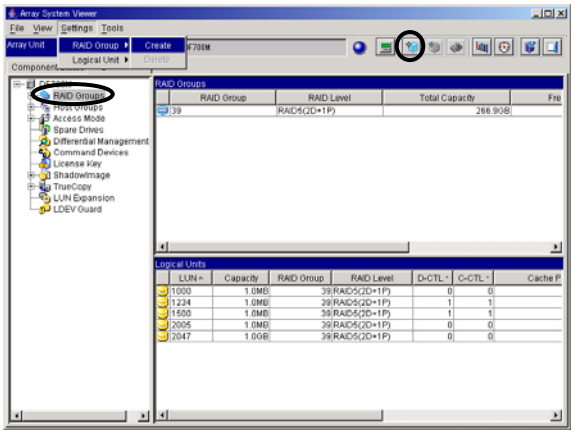


- When setting the multiples RAID Group, return to the "[Procedure ②-B]Setting RAID group" (SYSPR 03-0060), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to "3.3 Setting of LU" (SYSPR 03-0140).
- When verifying RAID group [NG], go to "[Procedure ②-D]Deleting RAID group" (SYSPR 03-0100).

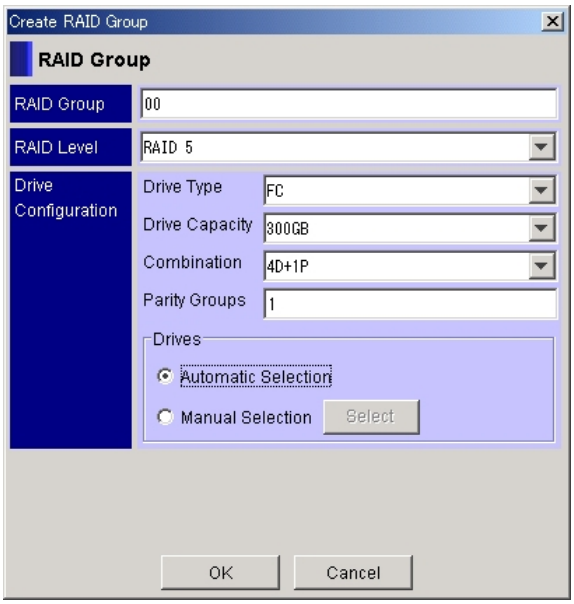
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(2) When the Disk Drive is selected automatically and the RAID Group is created

(a) Click [RAID Groups] in the unit window and then select [Settings] – [RAID Group] – [Create], or click the [ : RAID Group Settings] button.



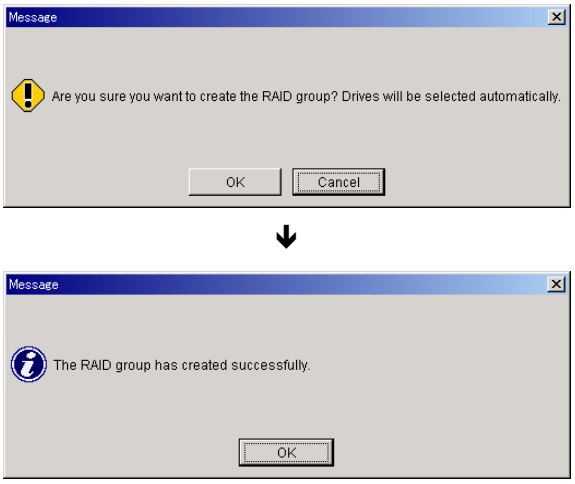
(b) Since the Create RAID Group dialog box is displayed, select or enter the [RAID Level] and [Drive Configuration] (drive type, combination, and number of parity groups).



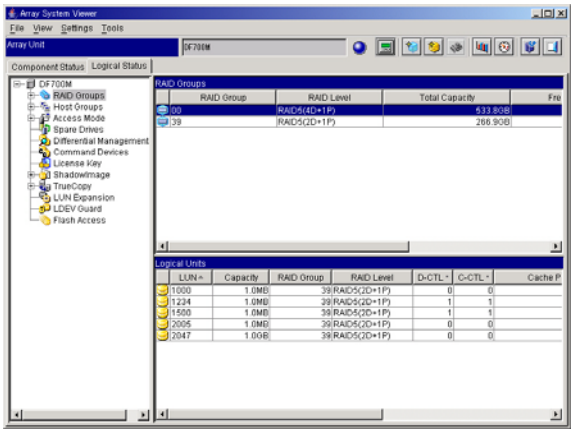
(c) Select [Automatic Selection] for the [Drives] and click the [Select] button.

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(d) The confirmation window is display. Click the [OK] button.(‡1)
When the capacity of the Disk Drive (single unit) to be created in the RAID group exceeds the capacity of the Spare Disk in the subsystem, the error message is displayed.(‡1)



(e) The screen from which a RAID group was updated is displayed.



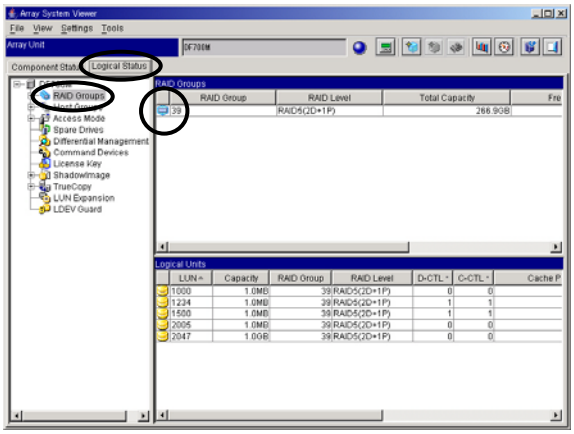
- When setting the multiples RAID Group, return to the "[Procedure ②-B]Setting RAID group" (SYSPR 03-0060), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to "3.3 Setting of LU" (SYSPR 03-0140).
- When verifying RAID group [NG], go to "[Procedure ②-D]Deleting RAID group" (SYSPR 03-0100)

‡1 : Check the Disk Drive capacity (referring to Subsection "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).), replace the Disk Drive with that having the appropriate capacity, and set the RAID group again.

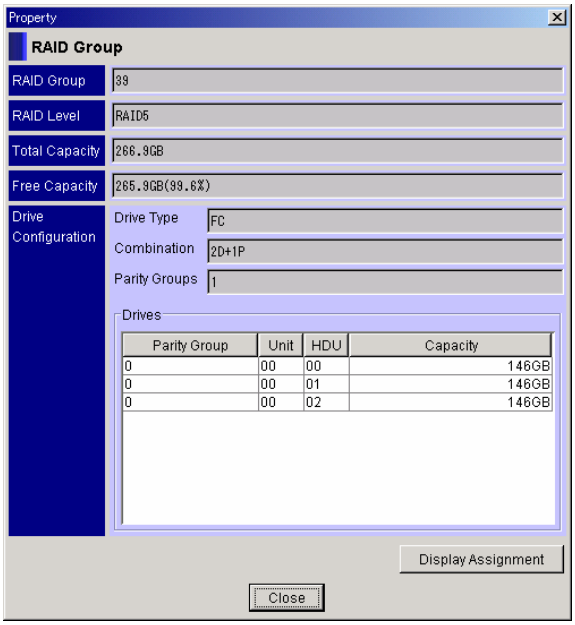
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[Procedure ②-C]Verifying RAID group

(1) Click the [Logical Status] tab in the unit window. Also, click [RAID Groups].



(2) The setting made in [Procedure ②-B] can be referred to by double clicking on the icon of the RAID group created.



- When setting the multiples RAID Group, return to the "[Procedure ②-B]Setting RAID group" (SYSPR 03-0060), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to "3.3 Setting of LU" (SYSPR 03-0140).
- When verifying RAID group [NG], go to "[Procedure ②-D]Deleting RAID group" (SYSPR 03-0100).

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[Procedure ②-D]Deleting RAID group

The RAID Group can be deleted even when LUs are defined in the specified RAID Group.

NOTE : All user data is lost by deleting the RAID group and its associated LU. Backup user data before deleting the RAID group.

[Conditions of deletion]

- When the LU, whose status of the forced parity correction is any of "Correcting", "Waiting", "Waiting Disk Drive Recovery", "Uncorrected", "Uncorrected 1" and "Uncorrected 2", is in the RAID Group of the deletion target, this RAID Group cannot be deleted.
  Change the status of the LU to "Restored" or "Skip" by executing or skipping the forced parity correction for this LU, and then delete the RAID Group which has this LU.
- The RAID Group cannot be deleted when Sub LUs of the unified LU(‡1) remain in the RAID Group to be deleted. In the case of the finally defined Sub LU, delete the RAID Group after separating the Sub LU from the unified LU. If it is not the finally unified Sub LU, separate all the unified Sub LUs from the Main LU, and delete the RAID Group after separating them from the unified LU.
- The RAID Group cannot be deleted when there are the following LUs in the RAID Group to be deleted.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs set to the command device
  - DM-LUs
  - System LUs of NAS
  - User LUs of NAS
  - Reserve LUs of Modular Volume Migration
  - LUs registered in the data pool
- When the Dynamic sparing/Correction copy/Copy back is operating in the RAID Group to be deleted, delete the RAID Group after the Disk Drives are restored.
- When there are LUs executing the LU switching processing in the RAID Group to be deleted, the RAID Group cannot be deleted because the microprogram is executing the internal processing. Wait for one minute or so, and delete the RAID Group.
- When there are LUs of the pair whose status of Modular Volume Migration is COPY in the RAID Group to be deleted, the RAID Group cannot be deleted. Delete the RAID Group after the pair status of Modular Volume Migration becomes PSUS.

‡1 : Support a function (LUN Expansion function) that creates a unified LU by combining LUs. The LUN Expansion function is an optional function.

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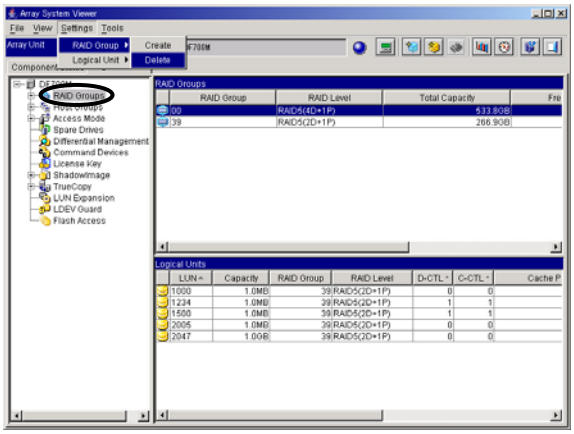
To use the LUN Expansion function, the P-002D-J304 is required separately. For the procedure to dissolve the unification of the unified LU, refer to the manual supplied with the P-002D-J304.

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- The RAID Group cannot be deleted when there LUs whose attribute is any of "Read Only", "Protect" and "Can't Guard" in the Data Retention Utility setting, whose S-VOL setting is "Setting impossible (invalid)", and whose mode is either of "Read Capacity 0 (Zer)" and "Inquiry command shielding (Zer/Inv)". Set the attribute to "Read/Write" in the Data Retention Utility setting, the S-VOL setting to "Setting possible (valid)" and the mode to "Unset", and delete the RAID Group.
- The RAID Group to which the Power Saving function is set cannot be deleted. Delete the RAID Group after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is "Normal (Spin Up)".

(1) Click [RAID Groups] in the unit window, and then select all the RAID Groups to be deleted by clicking them while pressing the Shift key.

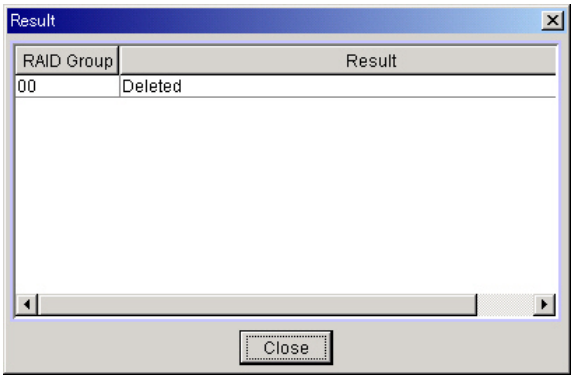
(2) Select [Settings] – [RAID Group] – [Delete].



(3) If the confirmation message is displayed. Click the [OK] button.

- When there is no formatted LU in a RAID group

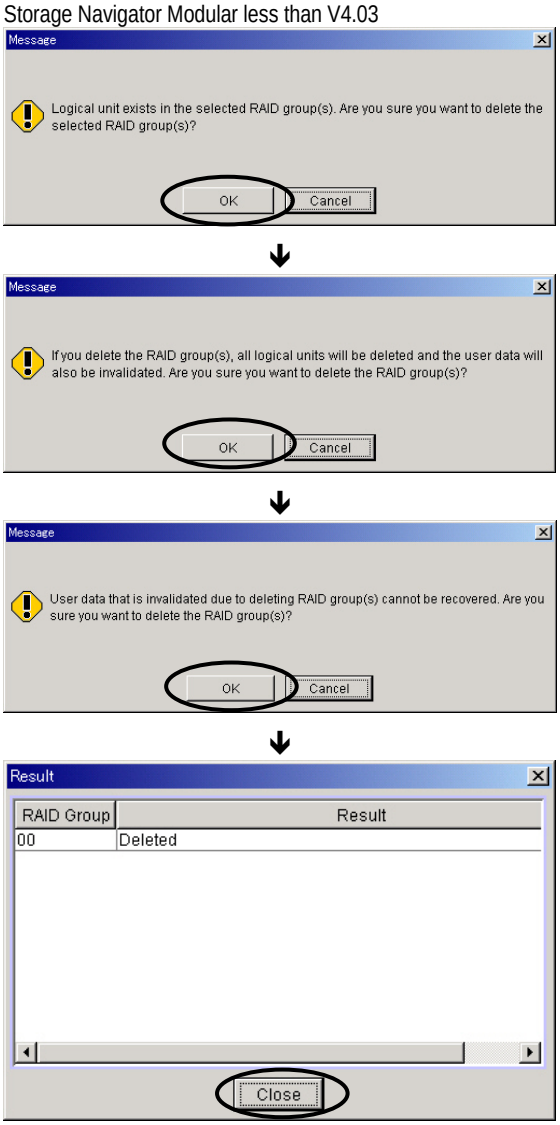




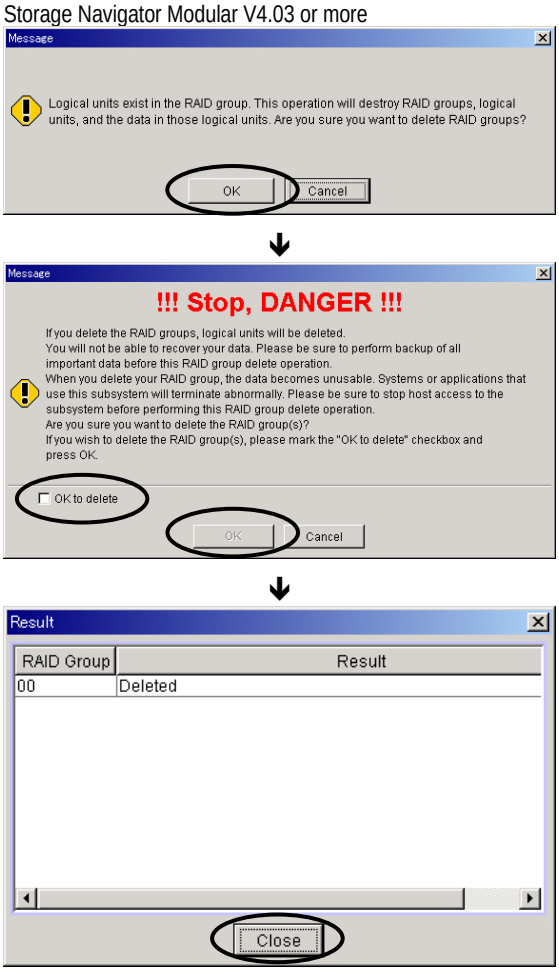
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- When there is a formatted LU in a RAID group

Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03

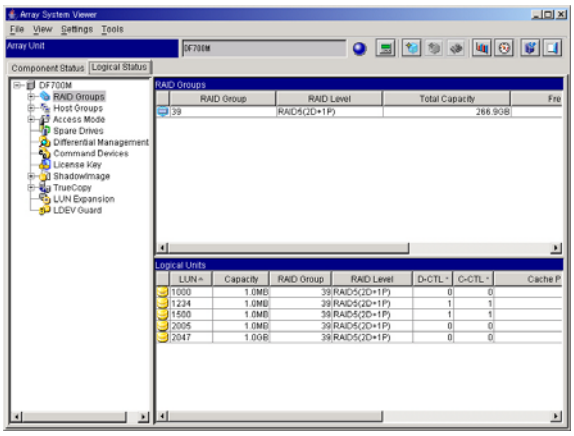


Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more



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(4) The screen from which selected RAID groups were deleted is displayed.



- When setting the RAID group, go to "[Procedure ②-B]Setting RAID group" (SYSPR 03-0060).

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3.3 Setting of LU

This setting is used to set, delete, reference and formatting an LU.
This function can be used in the device ready state.

NOTE : The LUs in the RAID Group to which the Power Saving function is set cannot be set.
Set the LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is "Normal (Spin Up)".

[The areas of LUs]

The areas of LUs are shown in Figure 3.3.1.

(1) Setting areas of LUs

- The areas where LUs can be created are "unused free area" and "area where LUs are deleted". At the time when the RAID Group is created, the user data area all becomes "unused free area".
- LUs are created in "unused free area" in default. When creating LUs, select the unused free area as needed.
- LUs are created in the free area where the address is consecutive from the small LBA (logical block address). The free areas of (A) to (B) cannot create one LU that matches (A) and (B) because they are not consecutive on the address in the user data area.
  LUs can be created for each of the free area of (A), (B) or (c) within the range of the capacity.
- The LU capacity becomes the value entered with the Storage Navigator Modular at the time of the LU creation. The LU capacity that can be confirmed from the Storage Navigator Modular or the host computer is the value entered with the Storage Navigator Modular. However, when the RAID Group which creates LUs is nD+mP or nD+qD, the user data area is ensured on the microprogram management with the value of multiples of 1[M byte] $\times$ n. Therefore, the LU capacity which can be created may be less than that calculated by the value entered with the Storage Navigator Modular.

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(2) Deleted areas of LUs

- The LUs other than the LUs of the value whose LBA (logical block address) at the head of the area is the largest can also be deleted.
- LUs may not be able to be deleted depending on the setting or status of the LUs (example: LUs set to the pair of ShadowImage in-system replication).
- The free capacity of the user data area increases by only the capacity of the deleted LUs by deleting LUs. However, whether the free capacity of the user data area is all used to create one LU is depending on the position of the free area of LUs in the user data area.
- When two or more "areas where LUs are deleted" are consecutive on the address by deleting LUs, those areas are merged, and they become one "free area where LUs are deleted".
- When "free area where LUs are deleted" and "unused free area" are consecutive on the address, those free areas are merged, and become one "unused free area". Although LUs other than the LUs adjacent to "unused free area" shown in Figure 3.3.1 are deleted, the capacity of "unused free area" does not increase.
- If the LUs created between the user data areas are deleted, the areas where LUs are deleted ((A) and (B)) are made. LUs can be created again in each divided free area of (A) and (B) within the capacity range of each free area.

NOTE : Changing (Deletion) of LU and formatting of LU indicates that all the user data of the deleted RAID group are lost.
Before deleting the RAID group, back up the user data.

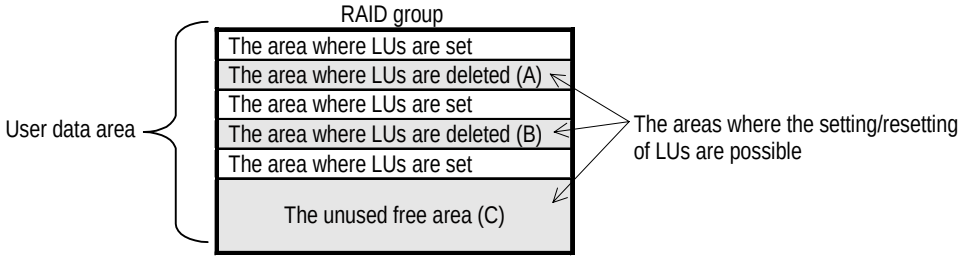


Figure 3.3.1 The Areas of LUs

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[Restrictions at the time of the NAS Unit connection]

Set up only the system LU at the time of the NAS Unit connection according the following restrictions.

No.	Internal LU number (*1)	System LU	Capacity restriction		Control Unit in charge(*2)
			Bytes	Blocks	
1	0	For the system Disk Drive (CTL 0)	14,013 M bytes (or more)	28,698,624 blocks (or more)	0
2	1	For the system Disk Drive (CTL 1)	14,013 M bytes (or more)	28,698,624 blocks (or more)	1
3	2	For the volume for the dump storage (CTL 0)	4,925 M bytes (or more)	10,086,400 blocks (or more)	0
4	3	For the volume for the dump storage (CTL 1)	4,925 M bytes (or more)	10,086,400 blocks (or more)	1
5	4	For the command device	35 M bytes (or more)	71,680 blocks (or more)	0
6	5	For work for the dump edit result storage	4,195 M bytes (or more)	8,591,360 blocks (or more)	0
7	6	For the system common volume	2,537 M bytes (or more)	5,195,776 blocks (or more)	0
8	7	Volume for the common volume backup	2,537 M bytes (or more)	5,195,776 blocks (or more)	0
9	8	Volume 2 for the common volume backup	2,537 M bytes (or more)	5,195,776 blocks (or more)	0

*1 : An Internal LU number is a recommended value. There is no problem in the system operation even if a value other than the one described is set.

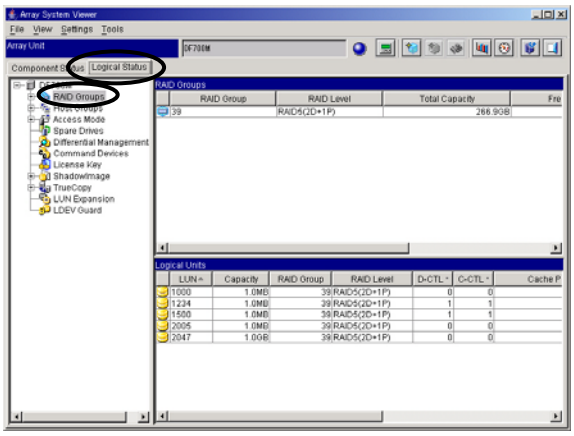
*2 : An Control Unit in charge is a recommended value. There is no problem in the system operation even if a value other than the one described is set.

NOTE :
- At the time of the NAS Unit connection, it is recommended to set the NAS system LU for the usual operation, the NAS system LU for the backup, and the NAS user LU to another RAID group. Refer to DF700 NAS SOFTWARE Maintenance Manual "3.2.1 Construction of NAS System LU" (NAS 03-0010) for the detail.
- The deletion or the format of the system LU and the user LU used at the time of the NAS Unit connection has restrictions of the opportunity to execute. Refer to "3.9 Restrictions of the operation opportunity for the system LU/user LU of the NAS" (SYSPR 03-0560) for the restrictions of the execution opportunity.
- When intermixing Fibre Channel/iSCSI and NAS interfaces in RKH, it is recommended to set user LUs and system LUs for NAS on RAID groups that are NOT used for LUs used for Fibre Channel/iSCSI access.
- When intermixing Fibre Channel/iSCSI and NAS interfaces in RKH, it is recommended to use different partitions for NAS logical units and Fibre Channel/iSCSI logical units by using Cache Partition Manager function.
- It is possible to access the same LU from Fibre Channel interface and iSCSI interface, as was with multiple Fibre Channel ports. However, if exclusive access is necessary at the application level, then it is recommended to install exclusive access by LU mapping, as was with multiple Fibre Channel ports.
- When making the ShadowImage I/O switch mode enabled, create system LU and P-VOL of the ShadowImage in-system replication at the time of NAS connection in different RAID groups respectively.
- When the array subsystem and the host computer are connected with the Fibre Channel interface, the logical unit of the array subsystem cannot be recognized unless the logical unit of number 0 is not created in the array subsystem depending on the host computer.
  When using this host computer, create the logical unit of number 0 or map the logical unit to Host LUN (H-LUN) 0.

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[Procedure ③-A]Preparing of setting LU

(1) Click the [Logical Status] tab in the unit window. Also, click [RAID Groups].



[RAID Group] : Information on all RAID groups defined for the disk array subsystem are displayed.
- [RAID Group] : A number of the RAID group is displayed.
- [RAID Level] : A RAID level that has been specified is displayed.
- [Total Capacity] : A whole capacity of a RAID group is displayed.
- [Free Capacity] : A remaining capacity of a RAID group is displayed.
- [Type] : A type of a drive assigned to a RAID group is displayed.

[Logical Unit] : Information on all the logical units, to which the disk array unit is assigned, is displayed.
- [LUN] : A number of the logical unit (xxx) is displayed.
- [Capacity] : A capacity specified for the logical unit is displayed.
- [RAID Group] : The RAID group defined as the logical unit is displayed.
- [RAID Level] : A RAID level of the RAID group defined as the logical unit is displayed.
- [D-CTL] : A number of a controller, which controls the logical unit according to the default setting, is displayed.
- [C-CTL] : A number of a controller, which controls the logical unit according to the current setting, is displayed.
- [Cache Partition] : Cache Partition No.
- [Type] : A type of a drive defined as a logical unit is displayed.
- [Status] : A status of the logical unit is displayed.

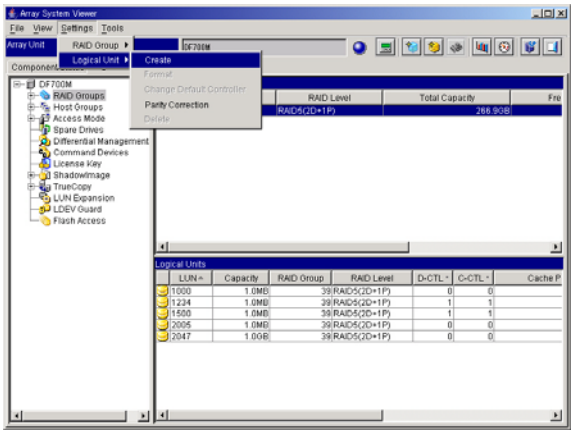
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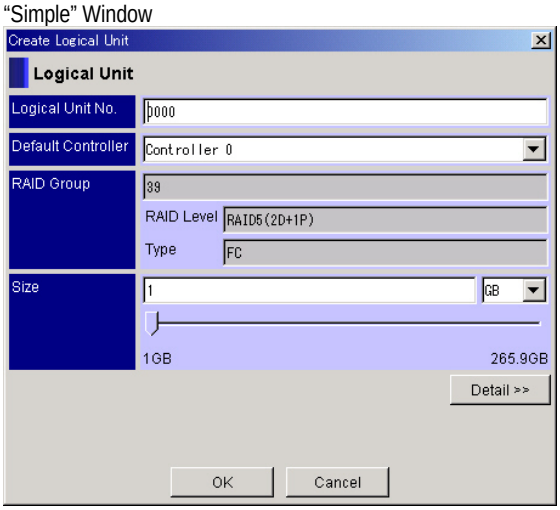
[Procedure ③-B]Setting LU

(1) Click the RAID group for which an LU is to be created, and then select [Settings] – [Logical Unit] – [Create] or click [: Create New Logical Unit].

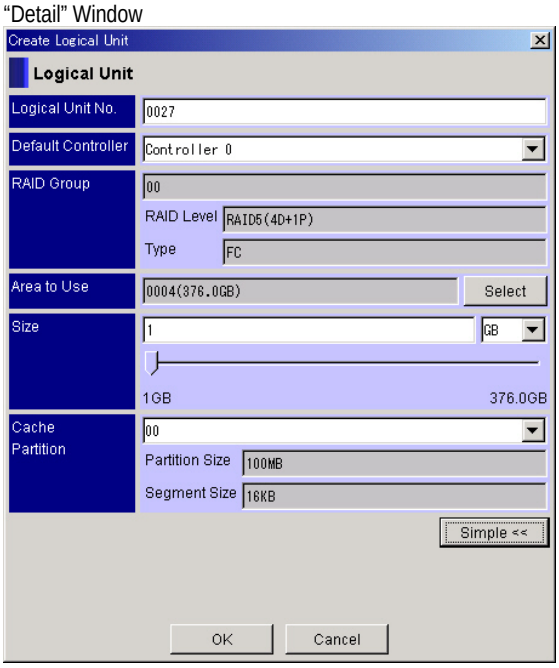


(2) Enter the capacity value and select the controller that controls the LU using the "Controller" boxes.
When setting LUs again in the area where LUs are deleted, click the [Detail] button and display the [Detail] setting window.

"Simple" Window



"Detail" Window



For an LU number, the number of an LU to be created is displayed, and for a RAID group number, the number of a RAID group to be created is displayed.
An LU with any number can be created.
When setting the LU, enter a number of the LU you want to create in the LU setting dialog box.

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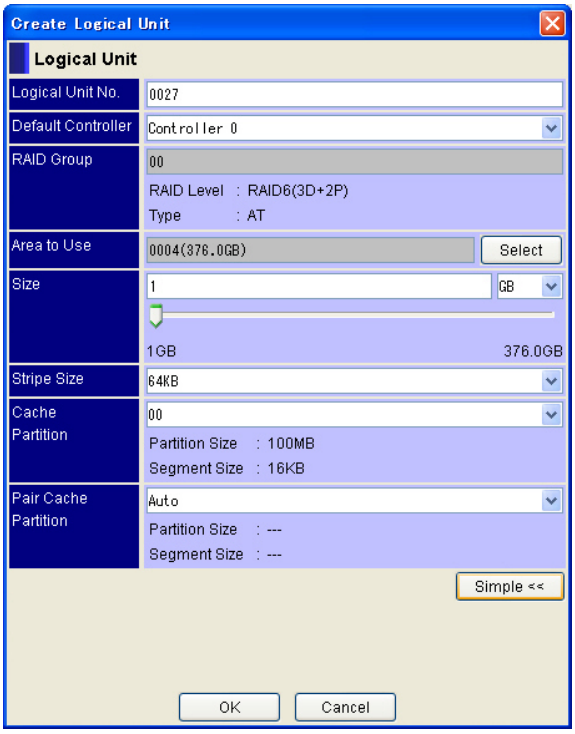
(a) Capacity specification method

When explicitly specifying a value, select the [Specified Value] radio button and specify a capacity (the number of blocks) using a decimal number.

Besides, for the specification of the number of blocks, refer to "(c) Setting value of the number of logical blocks" (SYSPR 03-0170). (Besides, you can also enter the capacity value by the M byte or G byte in the case of Storage Navigator Modular.)

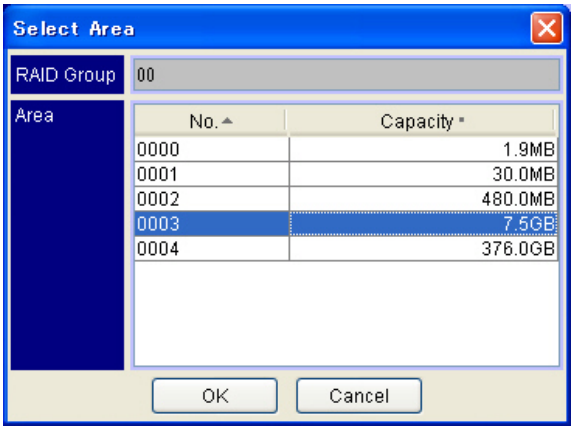
When setting LUs again in the area where LUs are deleted, select that in which area on the user data area to set the LUs according to the following procedure.

(i) Click the [Select] button in the "Detail" setting window.

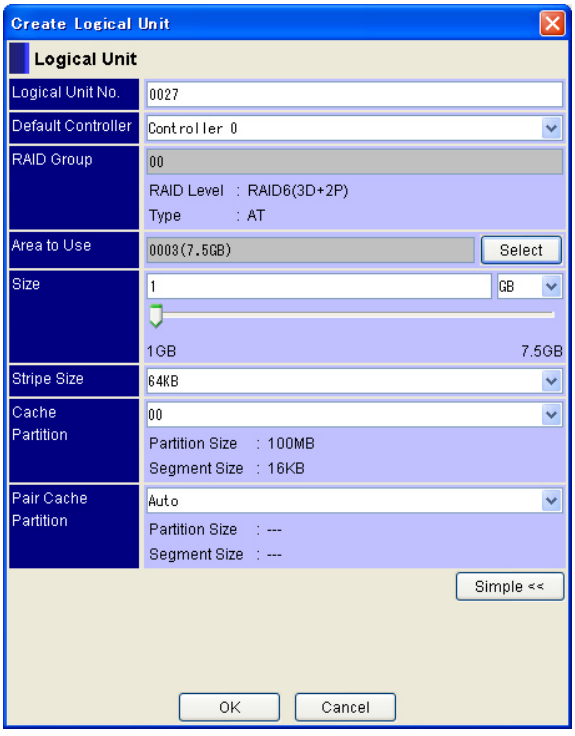


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(ii) Select the setting area, and click the [OK] button.
In the example shown in the window below, No.0000, No.0001, No.0002 and No.0003 are the areas where LUs were deleted before, and LUs can be set again. No. 0004 is the unused free area.



(iii) Set the capacity within the range of the capacity displayed in the "Detail" setting window.



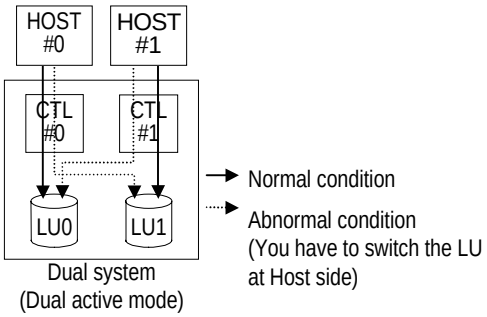
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(b) "Controller No." specification method

Select the [Controller 0] or [Controller 1] radio button and specify a Controller in charge of an LU to be set (if the Controller is incorrectly specified, note that LU switching occurs and performance is deteriorated).

Even if a Controller in charge is specified when a dual system is connected, nothing is displayed when a single system is connected.

NOTE : If the dual active mode is selected in a dual system, a controller in charge needs to be specified when setting an LU. Refer to the following diagram to perform the setting of the LU for which the controller in charge was specified. When changing the specification of the controller in charge, refer to the "[Procedure ③-E]The change of the controller in charge of a default LU" (SYSPR 03-0260) to change the controller in charge.



- The function of "Dual active mode"

  Specify a Controller which accesses an LU from a host computer for the Controller in charge of the LU.

  In an example of the above diagram, CTL0 and CTL1 are the controllers in charge of LUs for LU0 and LU1 respectively. In this example, select the "CTL0" radio button at LU0 setting, and select the "CTL1" radio button at LU1 setting.

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(c) Setting value of the number of logical blocks

(i) Logical Units can split all the RAID Groups to the maximum of 512(RKS/RKXS), 2,048(RKM) or 4,096(RKH), respectively.

(ii) Set the number of logical blocks set for each logical unit using the following multiples in accordance with RAID levels.

Table 3.3.1 Number of Logical Blocks and RAID Levels

RAID level	RAID width	Logical block number
RAID 0	2D	4,096
	3D	6,144
	4D	8,192
	5D	10,240
	6D	12,288
	7D	14,336
	8D	16,384
	9D	18,432
	10D	20,480
	11D	22,528
	12D	24,576
	13D	26,624
	14D	28,672
	15D	30,720
	16D	32,768
RAID 1	1D+1D	2,048
RAID 5	2D+1P	4,096
	3D+1P	6,144
	4D+1P	8,192
	5D+1P	10,240
	6D+1P	12,288
	7D+1P	14,336
	8D+1P	16,384
	9D+1P	18,432
	10D+1P	20,480
	11D+1P	22,528
	12D+1P	24,576
	13D+1P	26,624
	14D+1P	28,672
	15D+1P	30,720
RAID 6	2D+2P	4,096
	3D+2P	6,144
RAID 6	4D+2P	8,192
	5D+2P	10,240
	6D+2P	12,288
	7D+2P	14,336
	8D+2P	16,384
	9D+2P	18,432
	10D+2P	20,480
	11D+2P	22,528
	12D+2P	24,576
	13D+2P	26,624
	14D+2P	28,672
	15D+2P	30,720
	16D+2P	32,768
	17D+2P	34,816
	18D+2P	36,864
	19D+2P	38,912
	20D+2P	40,960
	21D+2P	43,008
	22D+2P	45,056
	23D+2P	47,104
	24D+2P	49,152
	25D+2P	51,200
	26D+2P	53,248
	27D+2P	55,296
	28D+2P	57,344
RAID 1+0	2D+2D	4,096
	3D+3D	6,144
	4D+4D	8,192
	5D+5D	10,240
	6D+6D	12,288
	7D+7D	14,336
	8D+8D	16,384

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(iii) When dividing RAID groups into multiple logical units, set the sum total of the number of logical blocks of each logical unit below the number of logical blocks per parity shown below. However, when creating multiple parity groups in each RAID group, set them below the number of logical blocks of one parity group multiplied by the number of parity groups.

(iv) The number of logical blocks of one parity group is shown below.

Table 3.3.2 Number of Logical Blocks of One Parity Group

Disk Drive capacity / RAID configuration (*1) (*2)		71.3 G bytes	143.3 G bytes	245.7 G bytes	287.6 G bytes	393.4 G bytes	491.9 G bytes
		Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks
RAID 0	2D	278,556,672	559,788,032	-	1,123,549,184	-	-
	3D	417,835,008	839,682,048	-	1,685,323,776	-	-
	4D	557,113,344	1,119,576,064	-	2,247,098,368	-	-
	5D	696,391,680	1,399,470,080	-	2,808,872,960	-	-
	6D	835,670,016	1,679,364,096	-	3,370,647,552	-	-
	7D	974,948,352	1,959,258,112	-	3,932,422,144	-	-
	8D	1,114,226,688	2,239,152,128	-	4,494,196,736	-	-
	9D	1,253,505,024	2,519,046,144	-	5,055,971,328	-	-
	10D	1,392,783,360	2,798,940,160	-	5,617,745,920	-	-
	11D	1,532,061,696	3,078,834,176	-	6,179,520,512	-	-
	12D	1,671,340,032	3,358,728,192	-	6,741,295,104	-	-
	13D	1,810,618,368	3,638,622,208	-	7,303,069,696	-	-
	14D	1,949,896,704	3,918,516,224	-	7,864,844,288	-	-
	15D	2,089,175,040	4,198,410,240	-	8,426,618,880	-	-
	16D	2,228,453,376	4,478,304,256	-	8,988,393,472	-	-
RAID 1	1D+1D	139,278,336	279,894,016	479,971,328	561,774,592	768,475,136	960,823,296
RAID 5	2D+1P	278,556,672	559,788,032	959,942,656	1,123,549,184	1,536,950,272	1,921,646,592
	3D+1P	417,835,008	839,682,048	1,439,913,984	1,685,323,776	2,305,425,408	2,882,469,888
	4D+1P	557,113,344	1,119,576,064	1,919,885,312	2,247,098,368	3,073,900,544	3,843,293,184
	5D+1P	696,391,680	1,399,470,080	2,399,856,640	2,808,872,960	3,842,375,680	4,804,116,480
	6D+1P	835,670,016	1,679,364,096	2,879,827,968	3,370,647,552	4,610,850,816	5,764,939,776
	7D+1P	974,948,352	1,959,258,112	3,359,799,296	3,932,422,144	5,379,325,952	6,725,763,072
	8D+1P	1,114,226,688	2,239,152,128	3,839,770,624	4,494,196,736	6,147,801,088	7,686,586,368
	9D+1P	1,253,505,024	2,519,046,144	4,319,741,952	5,055,971,328	6,916,276,224	8,647,409,664
	10D+1P	1,392,783,360	2,798,940,160	4,799,713,280	5,617,745,920	7,684,751,360	9,608,232,960
	11D+1P	1,532,061,696	3,078,834,176	5,279,684,608	6,179,520,512	8,453,226,496	10,569,056,256
	12D+1P	1,671,340,032	3,358,728,192	5,759,655,936	6,741,295,104	9,221,701,632	11,529,879,552
	13D+1P	1,810,618,368	3,638,622,208	6,239,627,264	7,303,069,696	9,990,176,768	12,490,702,848
	14D+1P	1,949,896,704	3,918,516,224	6,719,598,592	7,864,844,288	10,758,651,904	13,451,526,144
	15D+1P	2,089,175,040	4,198,410,240	7,199,569,920	8,426,618,880	11,527,127,040	14,412,349,440

*1 : Maximum number of blocks 1 is applied for the RAID Group excluding the Drives #0 to #4 of the Basic Chassis.
Maximum number of blocks 2 is applied for the RAID Group including at least one Drive of the Drives #0 to #4 of the Basic Chassis.

*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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RAID configuration \ Disk Drive capacity (*1) (*2)		71.3 G bytes Number of Logical Blocks	143.3 G bytes Number of Logical Blocks	245.7 G bytes Number of Logical Blocks	287.6 G bytes Number of Logical Blocks	393.4 G bytes Number of Logical Blocks	491.9 G bytes Number of Logical Blocks
RAID 6	2D+2P	278,556,672	559,788,032	959,942,656	1,123,549,184	1,536,950,272	1,921,646,592
	3D+2P	417,835,008	839,682,048	1,439,913,984	1,685,323,776	2,305,425,408	2,882,469,888
	4D+2P	557,113,344	1,119,576,064	1,919,885,312	2,247,098,368	3,073,900,544	3,843,293,184
	5D+2P	696,391,680	1,399,470,080	2,399,856,640	2,808,872,960	3,842,375,680	4,804,116,480
	6D+2P	835,670,016	1,679,364,096	2,879,827,968	3,370,647,552	4,610,850,816	5,764,939,776
	7D+2P	974,948,352	1,959,258,112	3,359,799,296	3,932,422,144	5,379,325,952	6,725,763,072
	8D+2P	1,114,226,688	2,239,152,128	3,839,770,624	4,494,196,736	6,147,801,088	7,686,586,368
	9D+2P	1,253,505,024	2,519,046,144	4,319,741,952	5,055,971,328	6,916,276,224	8,647,409,664
	10D+2P	1,392,783,360	2,798,940,160	4,799,713,280	5,617,745,920	7,684,751,360	9,608,232,960
	11D+2P	1,532,061,696	3,078,834,176	5,279,684,608	6,179,520,512	8,453,226,496	10,569,056,256
	12D+2P	1,671,340,032	3,358,728,192	5,759,655,936	6,741,295,104	9,221,701,632	11,529,879,552
	13D+2P	1,810,618,368	3,638,622,208	6,239,627,264	7,303,069,696	9,990,176,768	12,490,702,848
	14D+2P	1,949,896,704	3,918,516,224	6,719,598,592	7,864,844,288	10,758,651,904	13,451,526,144
	15D+2P	2,089,175,040	4,198,410,240	7,199,569,920	8,426,618,880	11,527,127,040	14,412,349,440
	16D+2P	2,228,453,376	4,478,304,256	7,679,541,248	8,988,393,472	12,295,602,176	15,373,172,736
	17D+2P	2,367,731,712	4,758,198,272	8,159,512,576	9,550,168,064	13,064,077,312	16,333,996,032
	18D+2P	2,507,010,048	5,038,092,288	8,639,483,904	10,111,942,656	13,832,552,448	17,294,819,328
	19D+2P	2,646,288,384	5,317,986,304	9,119,455,232	10,673,717,248	14,601,027,584	18,255,642,624
	20D+2P	2,785,566,720	5,597,880,320	9,599,426,560	11,235,491,840	15,369,502,720	19,216,465,920
	21D+2P	2,924,845,056	5,877,774,336	10,079,397,888	11,797,266,432	16,137,977,856	20,177,289,216
	22D+2P	3,064,123,392	6,157,668,352	10,559,369,216	12,359,041,024	16,906,452,992	21,138,112,512
	23D+2P	3,203,401,728	6,437,562,368	11,039,340,544	12,920,815,616	17,674,928,128	22,098,935,808
	24D+2P	3,342,680,064	6,717,456,384	11,519,311,872	13,482,590,208	18,443,403,264	23,059,759,104
	25D+2P	3,481,958,400	6,997,350,400	11,999,283,200	14,044,364,800	19,211,878,400	24,020,582,400
	26D+2P	3,621,236,736	7,277,244,416	12,479,254,528	14,606,139,392	19,980,353,536	24,981,405,696
	27D+2P	3,760,515,072	7,557,138,432	12,959,225,856	15,167,913,984	20,748,828,672	25,942,228,992
	28D+2P	3,899,793,408	7,837,032,448	13,439,197,184	15,729,688,576	21,517,303,808	26,903,052,288
RAID 1+0	2D+2D	278,556,672	559,788,032	959,942,656	1,123,549,184	1,536,950,272	1,921,646,592
	3D+3D	417,835,008	839,682,048	1,439,913,984	1,685,323,776	2,305,425,408	2,882,469,888
	4D+4D	557,113,344	1,119,576,064	1,919,885,312	2,247,098,368	3,073,900,544	3,843,293,184
	5D+5D	696,391,680	1,399,470,080	2,399,856,640	2,808,872,960	3,842,375,680	4,804,116,480
	6D+6D	835,670,016	1,679,364,096	2,879,827,968	3,370,647,552	4,610,850,816	5,764,939,776
	7D+7D	974,948,352	1,959,258,112	3,359,799,296	3,932,422,144	5,379,325,952	6,725,763,072
	8D+8D	1,114,226,688	2,239,152,128	3,839,770,624	4,494,196,736	6,147,801,088	7,686,586,368

*1 : Maximum number of blocks 1 is applied for the RAID Group excluding the Drives #0 to #4 of the Basic Chassis.
Maximum number of blocks 2 is applied for the RAID Group including at least one Drive of the Drives #0 to #4 of the Basic Chassis.

*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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(v) Number of logical blocks per Disk Drive.

Table 3.3.3 Number of Blocks (m) and Capacity per Disk Drive

Disk Drive model name / Capacity(*1)		71.3 G bytes	143.3 G bytes	247.5 G bytes	287.6 G bytes	393.4 G bytes	491.9 G bytes
Capacity (user area size) per Disk Drive	Number of blocks (m)	139,279,360	279,895,040	479,972,352	561,774,592	768,475,136	960,823,296
	Capacity (bytes)	71,311,032,320	143,306,260,480	245,745,844,224	287,628,591,104	393,459,269,632	491,941,527,552

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

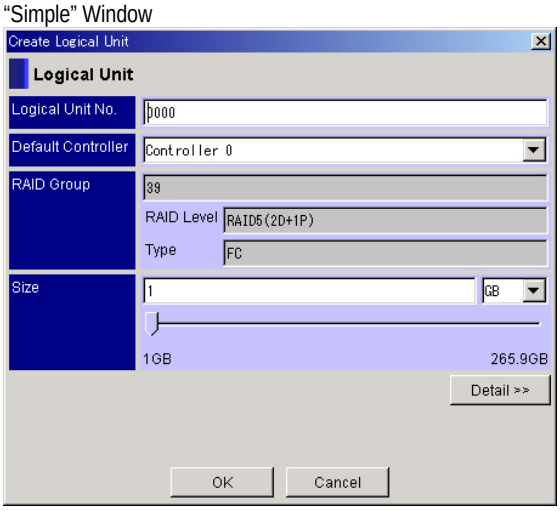
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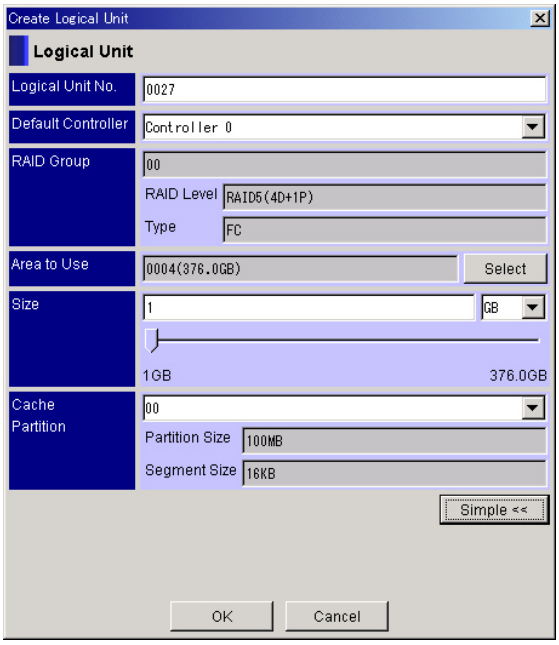
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(3) After completion of the setting, click [OK] button.

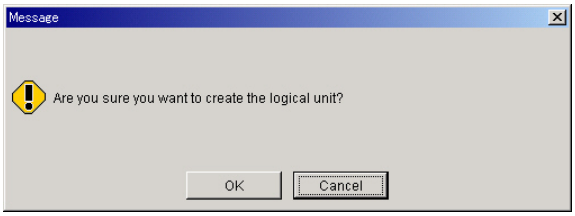
"Simple" Window



"Detail" Window



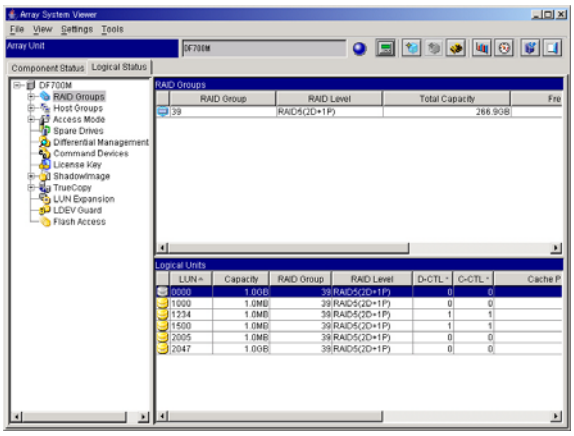
(4) The confirmation window is display. Click the [OK] button.





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(5) Preset LU information is updated and the screen is displayed.



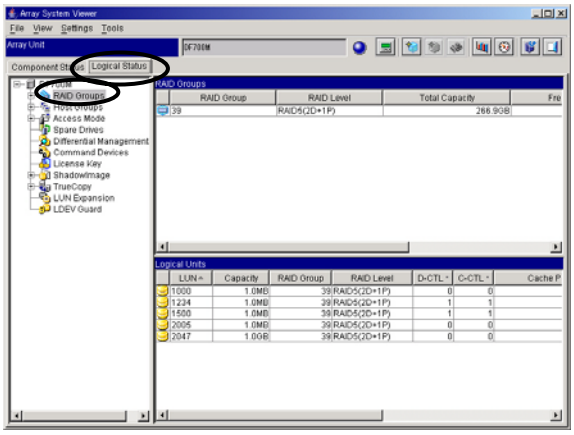
For a "Controller No." at LU creation, specify a controller in charge of a default LU. "Current controller" when an LU was created becomes equal to the current of the controller in charge of the default LU. However, if LU switching might have occurred, it does not become equal.

(6) When both Fibre Channel/iSCSI and NAS interfaced are used, be sure to perform LU mapping on all created LUs, and make sure that LUs used by Fibre Channel/iSCSI and LUs used by NAS are mapped exclusive of each other.
For details on how to do LU mapping, refer to "2.3 Setting LU mapping" (SYSPR 02-0100).

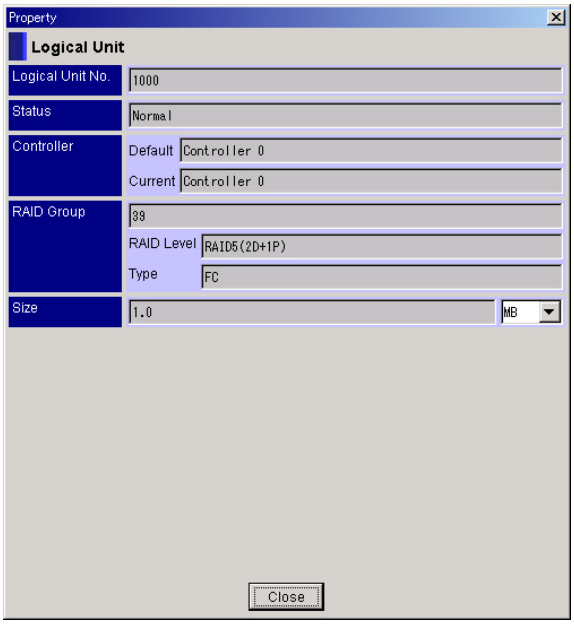
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[Procedure ③-C]Verifying LU

(1) Click the [Logical Status] tab. Usually, when the setting of an LU is completed, the [Logical Status] tab is in the clicked state. Also, click [RAID Groups].



(2) The setting made in [Procedure ③-B] can be referred to by a double clicking on the icon of the RAID group created.



- If the confirmation of LU is OK, go to the "[Procedure ③-F]Formatting LU" (SYSPR 03-0280).
- If the confirmation of LU is NG, and if the change of LU in charge is required, go to the "[Procedure ③-E]The change of the controller in charge of a default LU" (SYSPR 03-0260).
- If the setting of Default LU controller, go to the "[Procedure ③-D]Deleting LU"(SYSPR 03-0230).

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[Procedure ③-D]Deleting LU

NOTE : All user data is lost by deleting the LU. Backup user data before deleting the RAID group.

[Conditions of deletion]

- When the LU, whose status of the forced parity correction is any of "Correcting", "Waiting", "Waiting Disk Drive Recovery", "Uncorrected", "Uncorrected 1" and "Uncorrected 2", this LU cannot be deleted.
  Change the status of the LU to "Restored" or "Skip" by executing or skipping the forced parity correction for this LU, and then delete this LU.
- The Sub LUs of the unified LU(‡1) cannot be deleted. In the case of the finally unified Sub LU, delete the LUs after separating the Sub LU from the unified LU. If it is not the finally unified Sub LU, separate all the unified Sub LUs from the Main LU, and delete the LUs after separating them from the unified LU.
- The following LUs cannot be deleted. Perform the release for the LUs, and delete the LUs.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs set to the command device
  - DM-LUs
  - System LUs of NAS
  - User LUs of NAS
  - Reserve LUs of Modular Volume Migration
  - LUs registered in the data pool
- When the Dynamic sparing/Correction copy/Copy back is operating, delete the LUs after the Disk Drives are restored.
- When there are LUs executing the LU switching processing, the LUs cannot be deleted because the microprogram is executing the internal processing. Wait for one minute or so, and delete the LUs.
- The LUs of the pair whose status of Modular Volume Migration is COPY cannot be deleted. Delete the LUs after the pair status of Modular Volume Migration becomes PSUS.
- The LUs whose attribute is any of "Read Only", "Protect" and "Can't Guard" in the Data Retention Utility setting, whose S-VOL setting is "Setting impossible (invalid)", and whose mode is either of "Read Capacity 0 (Zer)" and "Inquiry command shielding (Zer/Inv)" cannot be deleted. Set the attribute to "Read/Write" in the Data Retention Utility, the S-VOL setting to "Setting possible (valid)", and the mode to "Unset", and delete the LUs.

‡1 : Support a function (LUN Expansion function) that creates a unified LU by combining LUs. The LUN Expansion function is an optional function.
To use the LUN Expansion function, the P-002D-J304 is required separately. For the procedure to dissolve the unification of the unified LU, refer to the manual supplied with the P-002D-J304.

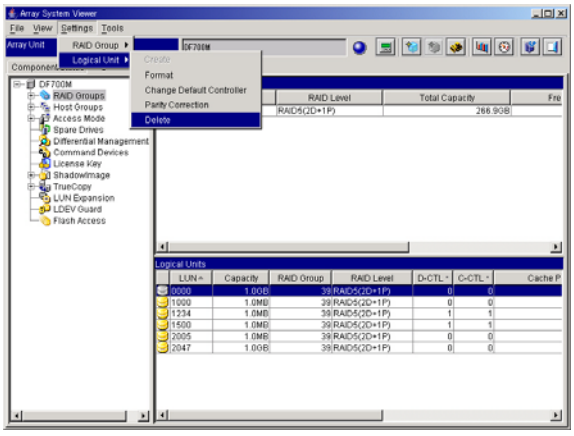
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(1) Deleting the LU

(a) Click [RAID Groups] in the unit window, and then click the logical unit to be deleted from [Logical Unit].

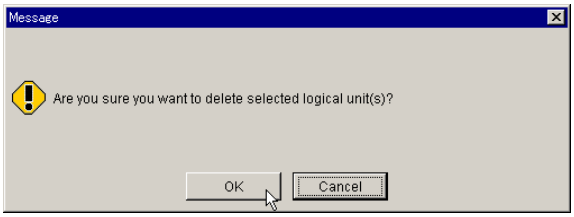
When you select multiple logical units, hold down the [Ctrl] key and click the icons of the logical units that you wish to delete.

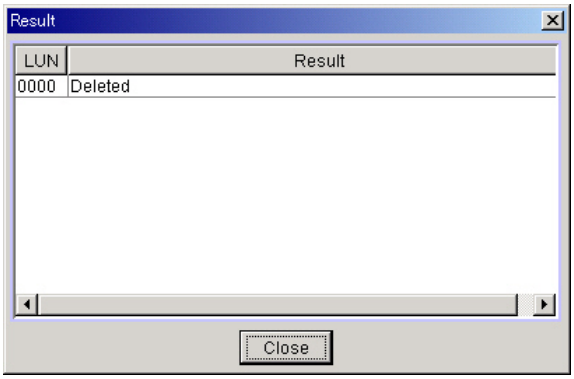
(b) Select [Settings] – [Logical Unit] – [Delete].



(c) A confirmation message is displayed indicating whether last LUs should be deleted or not.

- When there is no formatted LU in a RAID group

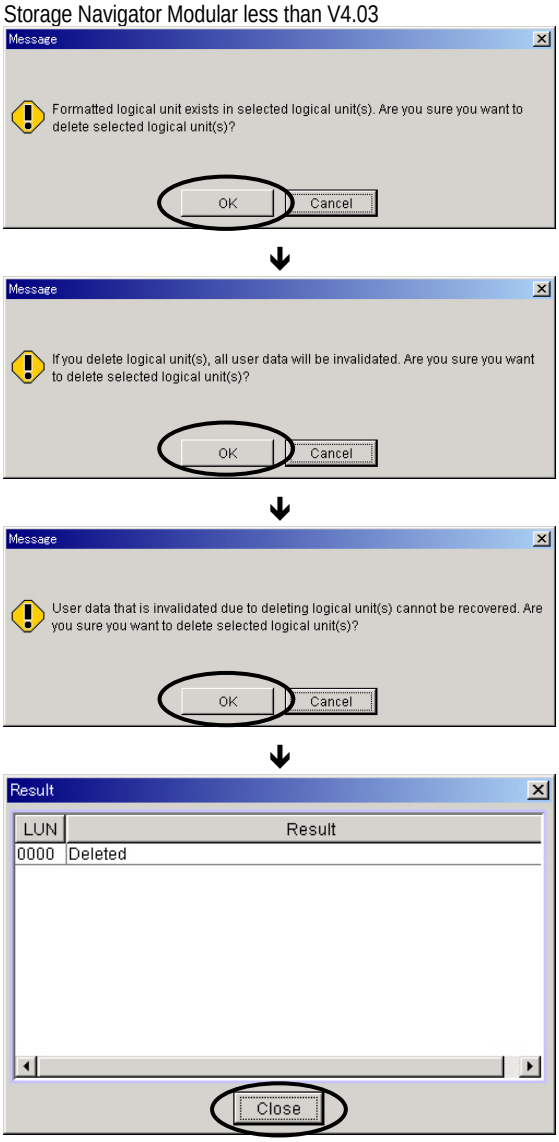




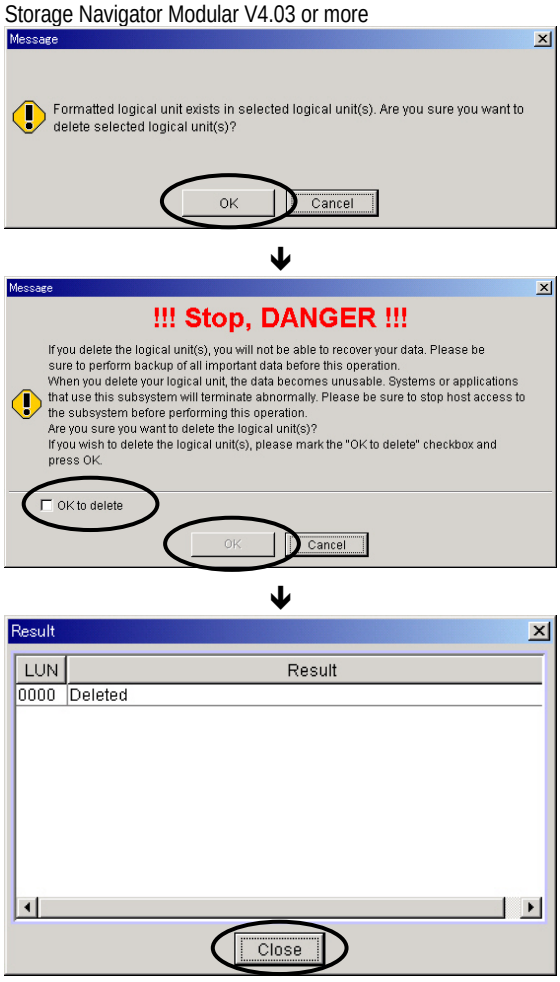
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- When there is a formatted LU exists

Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03

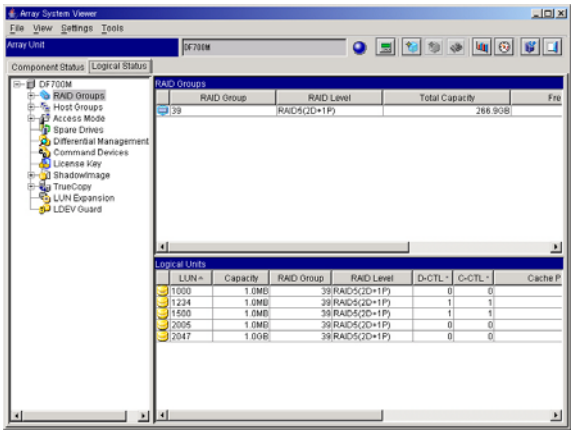


Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more



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(d) The LU information in which last LUs have been deleted is updated and the window is displayed.



- When setting the LU, go to "[Procedure ③-B]Setting LU" (SYSPR 03-0150).

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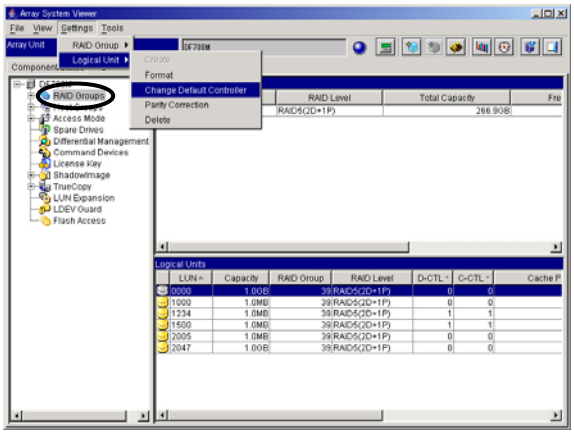
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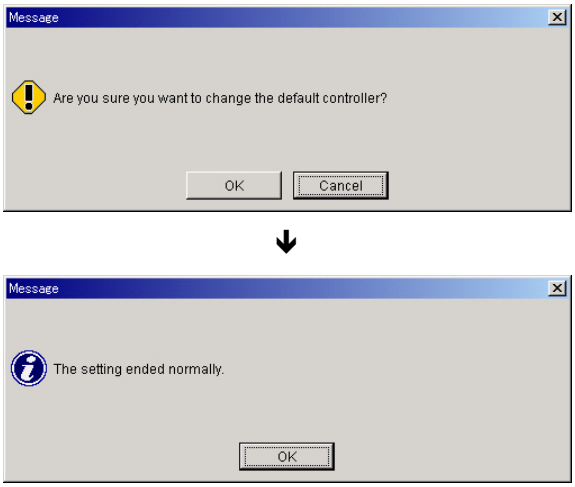
[Procedure ③-E]The change of the controller in charge of a default LU

NOTE : The change of the controller in charge of a default LU can be used only for the dual active mode configuration of a dual system.

(1) Click [RAID Groups] in the unit window, and then click an icon of an LU the default Controller controlling which is to be changed, and then select [Settings] – [Logical Unit] – [Change Default Controller].

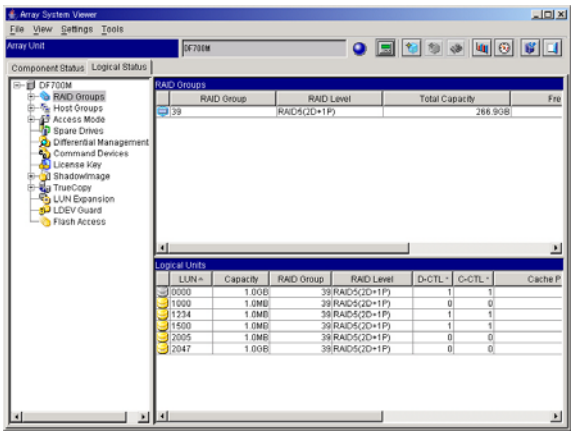


(2) The confirmation window is display. Click the [OK] button.



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The window, in which information on the changed LU is updated, is displayed.

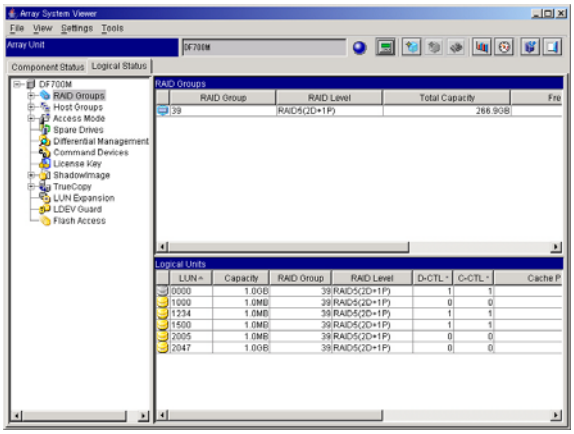


- Go to "[Procedure ③-C]Verifying LU" (SYSPR 03-0220).

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[Procedure ③-F]Formatting LU

An LU is formatted.



(1) Formatting while online

The format data, the parity data and the check code are written in the entire area of the LU. The subsystem ensures the consistency of the data by writing this check code in the Disk Drive.

The host immediately makes the specified LUs usable and the operation at the early stage of the system enabled by executing the format in the background.

The maximum number of LUs in which the format can be specified at the same time is the number of LUs that can be created for per subsystem. Also, when the number of LUs executing the format is less than the number of LUs that can be created per subsystem, the LU to be formatted can be added from the Storage Navigator Modular.

However, the LU that internally executes the format at the same time becomes the maximum of 6 LUs/Control Unit.

Even when Storage Navigator Modular is quit while the formatting is being executed, the formatting is continued.

Even when the Storage Navigator Modular is terminated during the format execution, the format is continued without stopping. After that, if the Storage Navigator Modular is started again and the [Logical Status] tab is clicked, the progress ratio (Quick Formatting (×%)) of the format is displayed in the status column of the logical unit in the list view.

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Table 3.3.4 LU Formatting Mode and while Online Description of Operation

No.	Connection mode of array disk management mode and device configuration Single system Dual system	Restriction
1	Can be executed during online processing.	• For ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance and Copy-on-write SnapShot, pair definition cannot be executed when LU is in quick format. • The unification and the separation of a logical unit cannot be executed for a logical unit in format. • The data pool cannot be set for a logical unit in format. • Copy-on-write SnapShot, and P-VOL of image (V-VOL) cannot be specified for a logical unit in the format. • The forced parity correction cannot be executed for a logical unit in format. • Do not start or restart the NAS OS until the format is completed when formatting the LUs of the same RAID Group as the NAS system LUs. This could result in boot failure or increase in boot time of NAS OS. Also, the download time of the NAS Dump may increase as well or the download may fail, so that do not download the NAS Dump until the format is completed when formatting the LUs of the same RAID Group as the NAS system LUs. • When a data loss occurs owing to a power failure and battery exhaustion, an LU being formatted enters the Unrestored status. Basically, use the LU after the formatting is completed.

Prerequisites : • Host access performance deteriorates during format.
Formatting will impact the host access performance, especially on the LU being formatted and on the LU in the same RAID Group as the LU being formatted. Please do formatting during off-hours with less host access.

• When the fail-over or the fail-back is executed between the clusters during the NAS connection, check if the formatting is being executed. If it is being executed, change the format priority mode to "Host". Also, when the formatting is executed during the execution of the fail-over or the fail-back, change the format priority mode to "Host". If the format priority mode is not changed to the "Host", the fail-over or the fail-back is terminated abnormally.
When the fail-over or the fail-back is completed after changing the format priority mode, return the format priority mode to the original setting (it is usually "Standard"). Refer to "4.2 (13) Setting of Format Mode" (SYSPR 04-0230) for the method of changing the format priority mode.

• The LUs in the RAID Group to which the Power Saving Function is set cannot be formatted.
Format the LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is "Normal (Spin Up)".

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NOTE : • The progress and the operation status of the format are succeeded over the planned shutdown.
- When PIN OVER occurs during format, a formatting is interrupted. The formatting is resumed automatically after PIN OVER is recovered. Refer to Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)" (TRBL 06-0550).
- When the host I/O is executed to the LUs being formatted, the termination processing may delay. In that case, the termination processing of the format may take the maximum of 400 seconds after the progress ratio of the format becomes 99 %.
- If the owner right to the LU is switched, the formatting operation becomes standby status depending on the number of operations in the Control Unit in charge.
  When the Control Unit having the owner right is formatting five LUs or less in case that the owner right of the LU being formatted is switched or when the Control Unit is not executing the format, the LU whose owner right is switched continues to be formatted.
  When the Control Unit having the owner right is formatting six LUs or more in case that the owner right of the LU being formatted is switched, the order of LUs that the Control Unit executes the format becomes the order of which the format is specified from the Storage Navigator Modular. At this time, the LU whose owner right is switched is continuously formatted or becomes the standby status.

The LU format cannot be executed in the following cases. When formatting them, follow the actions to be taken for each case.

- The LU format cannot be performed when the subsystem is restarting. Restart the subsystem, and perform the format after it becomes the Ready status.
- The LU format cannot be performed for the P-VOL or the S-VOL of ShadowImage in-system replication, TrueCopy remote replication and TrueCopy Extended Distance. Perform the LU format after releasing the pair.
- The LU format cannot be performed for the P-VOL or the V-VOL (SnapShot image) of Copy-on-write SnapShot. Perform the LU format after releasing the pair.
- The LU format cannot be performed in the status that the microprogram of only one Control Unit is replaced in the dual controller system. Perform the LU format after completing the replacement of the microprogram of both Control Units.
- When the specified LUs do not exist, perform the LU format after specifying correct LUs in CLI.
- The Sub LUs of the unified LU cannot be formatted. Specify the Main LU of the unified LU, and format it. When you want to format the Sub LUs of the unified LU, separate the Sub LUs from the unified LU, and format the Sub LUs.

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- The LU format cannot be performed for the P-VOL or the S-VOL which executing Modular Volume Migration. Perform the LU format after completing Modular Volume Migration. If you want to format it immediately, cancel Modular Volume Migration, and then perform the LU format.
- The LUs registered in the data pool cannot be formatted. Delete the LUs from the data pool, and perform the LU format.
- When the Disk Drive blockade mode is set valid, if the status of the specified LUs are Normal or Regression, it cannot be formatted. Set the Disk Drive blockade mode to invalid, and perform the LU format. Return the Disk Drive blockade mode to valid after executing the format.
- When either of the "Read Only" and "Protect" is set for the access attribute of the LUs in Data Retention Utility, either of "Read Capacity 0 (Zer)" and "Inquiry command shielding (Zer/Inv)" is set for the mode, and "Setting impossible (invalid)" is set for the S-VOL setting, the LU format cannot be performed. Return the access attribute of the LUs to "Read/Write (default)", and perform the LU format.
- If two or more LUs are formatted using the Disk Drives whose capacity is 500 Gbytes or more, the resources to format the LUs may be insufficient inside the subsystem. Perform the LU format after completing the LU format which is being executed.
- The format cannot be performed if the Disk Drives which configure the RAID Group in which the specified LUs belong are uninstalled or blocked (one Disk Drive is blocked in the case other than RAID6 and two are blocked for RAID6). Perform the maintenance for the Disk Drives which install or block the Disk Drives, and perform the LU format.
- The LU format cannot be performed when the status of the forced parity correction of the specified LUs is any of "Uncorrected", "Parity Correcting", "Waiting Parity Correction", "Waiting Drive Reconstruction", "Uncorrected and Drive Detached" and "Correction Aborted". Perform the LU format after changing the status of the forced parity correction of the LU to "Correction Skipped" or "Recovery Completed" referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)' (TRBL 06-0060)".
- The LU format cannot be performed for system LUs or user LUs of NAS. Release the LUs from the allocation of the NAS system LUs or the NAS user LUs, and perform the LU format.

When you specify the formatting, you can specify which of the formatting or host access you give priority throughout the system. (Refer to "4.2 (13) Setting of Format Mode" (SYSPR 04-0230).) The specification can be changed in the online status.

Although the format priority mode is set to "Standard" by default, the copy performance or the restore performance may be deteriorated substantially when any one of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance and Copy-on-write SnapShot of the priced options is executing the copy or restore for the pair at the time of the format execution. In that case, set the format priority mode to "Host" and restrict the format processing.

When the formatting is specified, whether the formatted data is made default or 0 (zero) can be specified for the entire system. (Refer to "4.2 (13) Setting of Format Mode" (SYSPR 04-0230).) The specification concerned can be changed online, but it is formatted by the format data of the point in time when the format is indicated.

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NOTE : Use the 0 (zero) specification of the format data only when it is necessary to clear the logical unit 0 (zero) at the time of connecting to SANRISE USP or SANRISE NSC.

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< Standard time required for an LU Formatting >

An LU Formatting takes a long time from start to completion. (Refer to Table 3.3.4.1) Table 3.3.4.1 shows the standard of the time required of the LU Formatting when selecting optional numbers of the Disk Drives which configure the RAID Group. The time required of the LU Formatting also increases as the number of the FC or S-ATA Disk Drives that configures the RAID Group increases. Figure 3.3.2 and Figure 3.3.3 shows the graph where the standard of the time required of the LU Formatting can be confirmed in the case of all the numbers. A horizontal axis corresponds to the number of the Disk Drives, and the vertical axis corresponds to the time required of the LU Formatting.

NOTE : The data above are standard times required for an LU Formatting for one or two RAID groups.
Further, the times required for the restoration vary depending on the Disk Drive capacity, number of Disk Drives, and RAID configuration.
Besides, as to some types of Disk Drives, the times required for the restoration is shortened by 10 to 20 percent.

Table 3.3.4.1 Standard Time Required for an LU Formatting (‡1) (‡2)

Unit: min

Item	Disk Drives (G bytes)(*1)			71.3	143.3	245.7	287.6	393.4	491.9
SANRISE AMS500 AMS200	4 Disk Drives	RAID 6	(2D+2P)	40	75	290	150	460	570
	6 Disk Drives		(4D+2P)	45	80	330	170	520	640
	10 Disk Drives		(8D+2P)	70	140	500	270	810	990
	14 Disk Drives		(12D+2P)	100	200	700	400	1120	1390
	18 Disk Drives		(16D+2P)	150	290	710	590	1150	1450
	30 Disk Drives		(28D+2P)	250	510	900	1060	1450	1810
	3 Disk Drives	RAID5	(2D+1P)	25	45	280	90	450	470
	5 Disk Drives		(4D+1P)	40	75	310	140	440	510
	9 Disk Drives		(8D+1P)	65	130	480	270	760	820
	11 Disk Drives		(10D+1P)	85	170	580	340	930	990
	13 Disk Drives		(12D+1P)	100	200	690	410	1120	1180
	16 Disk Drives		(15D+1P)	130	250	730	500	1180	1360
	4 Disk Drives	RAID1+0	(2D+2D)	25	80	290	95	440	490
	8 Disk Drives		(4D+4D)	35	90	440	120	700	720
	16 Disk Drives		(8D+8D)	65	190	710	240	1150	1330
	2 Disk Drives	RAID1	(1D+1D)	25	45	270	80	430	460

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

‡1 : The time shown above is a general guideline of a recovery time for a case where no I/O operation is requested by a host computer. If an I/O operation is requested by a host computer, the time becomes longer.

‡2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

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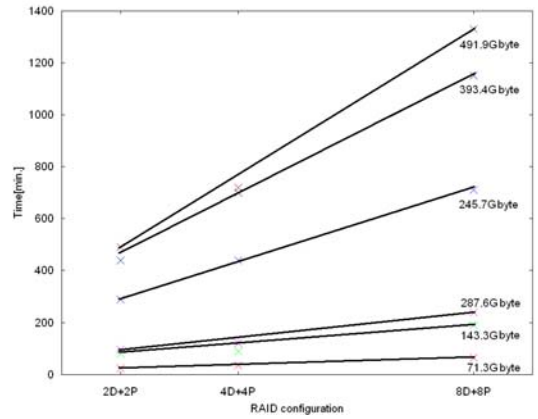
Unit: min

Item			Disk Drives (G bytes)(*1)	71.3	143.3	245.7	287.6	393.4	491.9
SANRISE WMS100	4 Disk Drives	RAID 6	(2D+2P)	-	-	310	-	640	670
	6 Disk Drives		(4D+2P)	-	-	520	-	1090	1120
	10 Disk Drives		(8D+2P)	-	-	880	-	990	1780
	14 Disk Drives		(12D+2P)	-	-	1270	-	2600	3280
	18 Disk Drives		(16D+2P)	-	-	1630	-	3350	4210
	30 Disk Drives		(28D+2P)	-	-	1690	-	3450	5330
	3 Disk Drives	RAID5	(2D+1P)	-	-	300	-	600	640
	5 Disk Drives		(4D+1P)	-	-	430	-	510	720
	9 Disk Drives		(8D+1P)	-	-	790	-	1630	1690
	11 Disk Drives		(10D+1P)	-	-	960	-	1990	2050
	13 Disk Drives		(12D+1P)	-	-	1180	-	2400	3040
	16 Disk Drives		(15D+1P)	-	-	1450	-	2950	3700
	4 Disk Drives	RAID1+0	(2D+2D)	-	-	330	-	460	600
	8 Disk Drives		(4D+4D)	-	-	690	-	890	1210
	16 Disk Drives		(8D+8D)	-	-	1420	-	1840	2440
	2 Disk Drives	RAID1	(1D+1D)	-	-	270	-	440	470
SANRISE AMS1000	4 Disk Drives	RAID 6	(2D+2P)	20	45	250	70	400	470
	6 Disk Drives		(4D+2P)	25	45	280	90	440	530
	10 Disk Drives		(8D+2P)	45	80	430	160	690	860
	14 Disk Drives		(12D+2P)	60	120	590	230	950	1210
	18 Disk Drives		(16D+2P)	80	160	640	310	960	1300
	30 Disk Drives		(28D+2P)	150	310	660	550	1060	1330
	3 Disk Drives	RAID5	(2D+1P)	20	45	250	70	400	460
	5 Disk Drives		(4D+1P)	25	45	260	85	420	490
	9 Disk Drives		(8D+1P)	40	75	390	150	630	780
	11 Disk Drives		(10D+1P)	50	95	470	190	760	940
	13 Disk Drives		(12D+1P)	55	110	550	220	890	1120
	16 Disk Drives		(15D+1P)	75	160	600	280	1030	1300
	4 Disk Drives	RAID1+0	(2D+2D)	25	45	250	70	400	480
	8 Disk Drives		(4D+4D)	35	65	350	130	560	690
	16 Disk Drives		(8D+8D)	65	130	590	250	1030	1270
	2 Disk Drives	RAID1	(1D+1D)	20	45	240	70	370	460

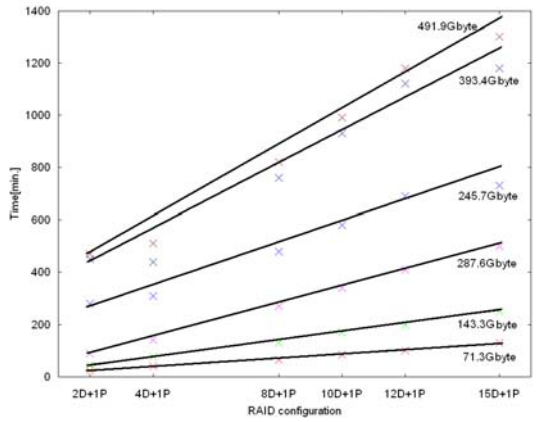
*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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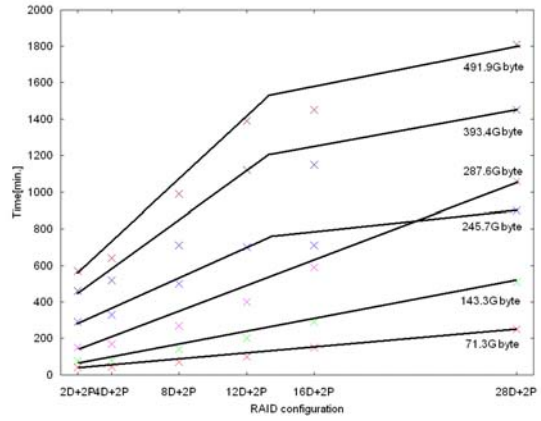
AMS 200/500 (RAID 1+0)



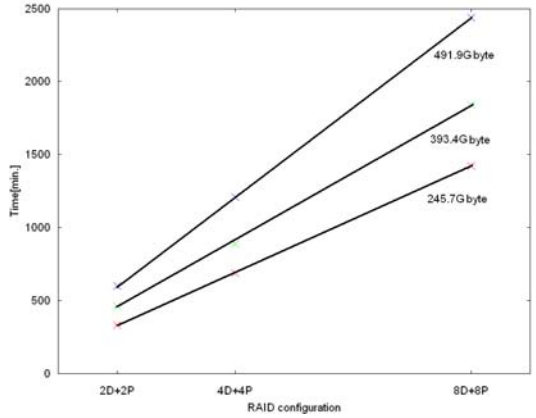
AMS 200/500 (RAID 5)



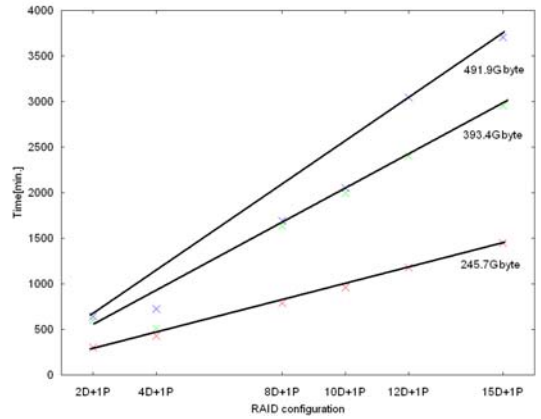
AMS 200/500 (RAID 6)



WMS 100 (RAID 1+0)



WMS 100 (RAID 5)



WMS 100 (RAID 6)

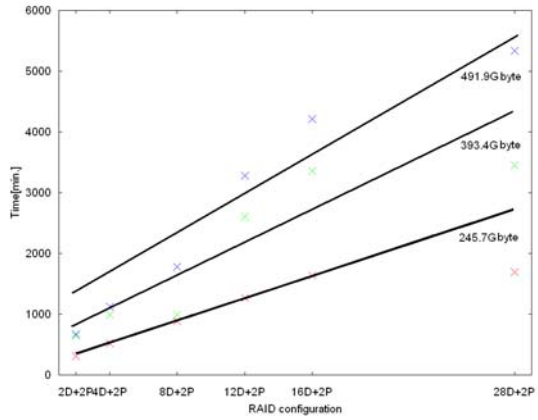
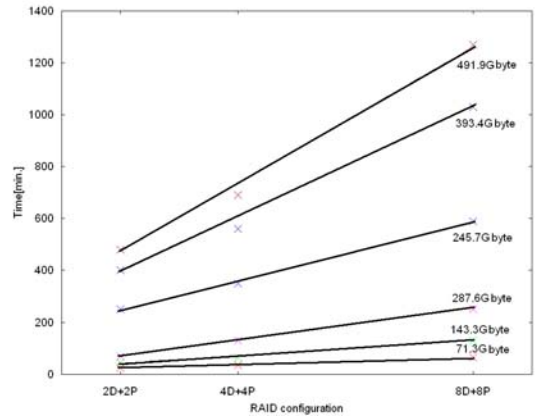


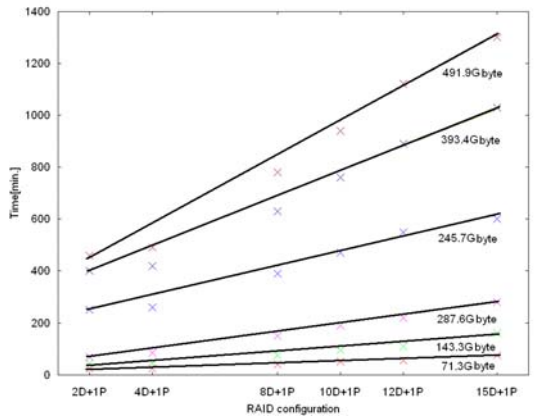
Figure 3.3.2 Standard Time Required for an LU Formatting

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AMS 1000 (RAID 1+0)



AMS 1000 (RAID 5)



AMS 1000 (RAID 6)

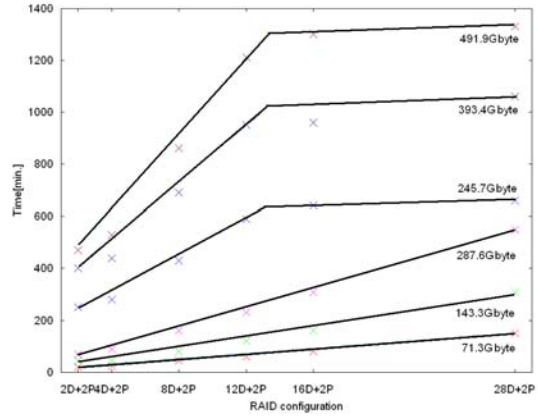
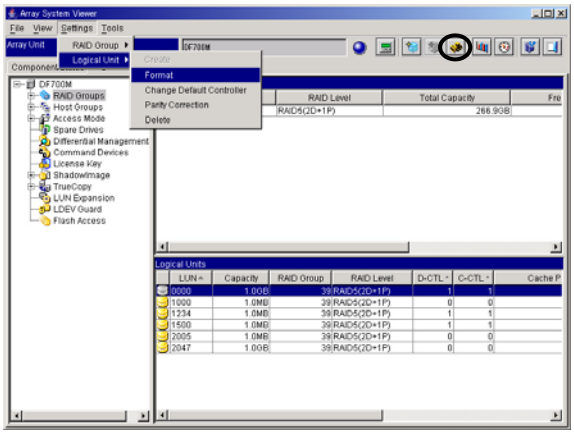


Figure 3.3.3 Standard Time Required for an LU Formatting

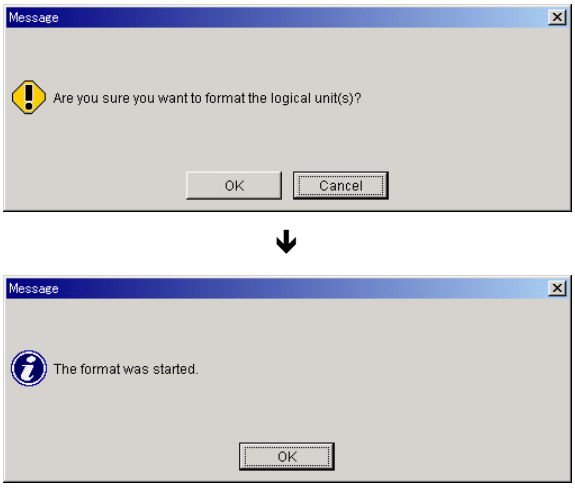
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(a) Select an LU or LU's to be formatted, and then select either of the [Settings] – [Logical Unit] – [Format].



(b) If the confirmation message is displayed. Click the [OK] button.

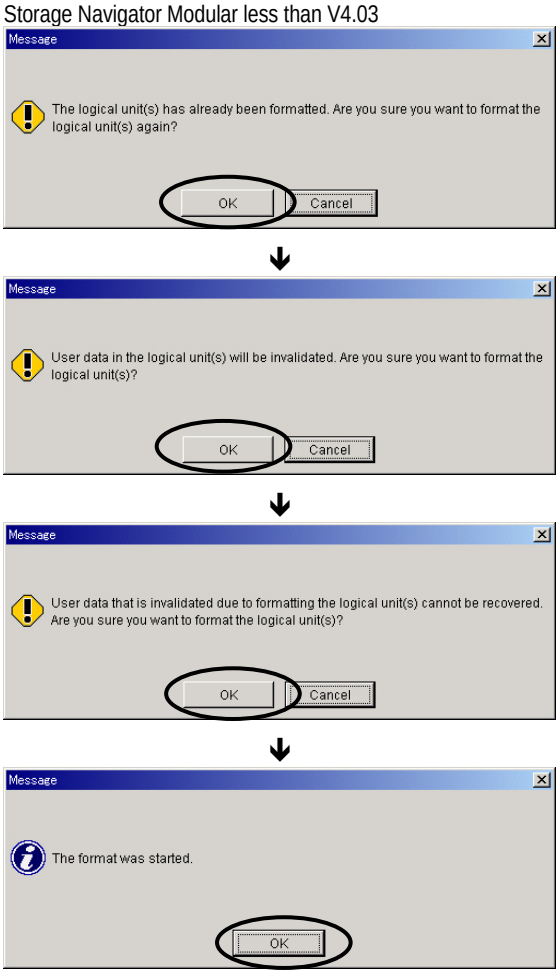
• When an LU that has been "Quick" formatted does not exist



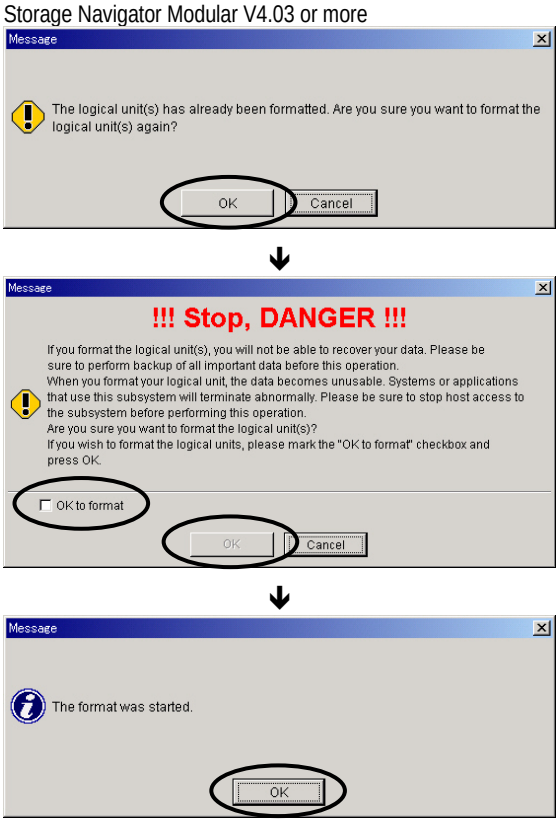
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• When an LU that has been “Quick” formatted exists

Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03



Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more

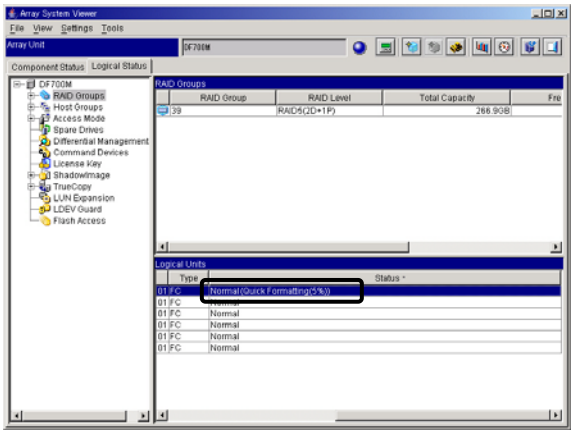


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(c) If [OK] is clicked, the specified LU is formatted(‡1).
At this point, this LU can be recognized from the host computer.

(d) When the format starts, the progress of the LU format executed in the background is displayed in [Status] of the logical unit on the window. The message in the format is displayed in the column of the status of the logical unit.

NOTE : The value of percentage is not updated unless the subsystem status is referred to through selections of [Display] and [Latest Information] in this order.



‡1 : When a specified LU is formatted, the user data within the specified LU is lost. When incorrectly specifying an LU, press the [Cancel] button and redo processing by selecting an LU to be reformatted.

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If formatting terminates abnormally, refer to Table 3.3.5.

Table 3.3.5 Contents of Display of Execution Result Screen

No.	Status		Result
1	"Abnormal end"	"CHECK CONDITION (xx-xxxx)" is displayed(*1) Sense key Sense code	Unsuccessful Format Unit Unsuccessful command
2		A message is displayed.	Unsuccessful Other errors than the above

*1 : Because this function internally uses the Format Unit command, it displayers a sense key and a sense code when the pertinent command returns the Check Condition status.

When "Abnormal" is indicated on "Status", sense-key, sense-code or message-text is indicated.

When sense key and sense code = 02-xx xx, 03-xx xx, 04-xx xx or 0B-xx xx;

For the above code, a hardware fault is assumed. When the subsystem is not recovered from the failure after retrying, remove the cause of the error considering the type and meaning of the error. (Refer to Message "Chapter 9. Failure Analysis by Sense Data" (MSG 09-0000) of the Maintenance Manual.

When sense key and sense code = 05-xxxx;

For the above code, an operation error is assumed. Upon checking the following items and re-execute processing. If the error is not recovered, contact our company.

① Is logical unit 0 defined? Codes which will occur are 05-25 00 and 25-25 81.

② In spite of none of drive mounted states, is ALL RAID specified and is an LU specified for ALL CAPA formatted? A code which will occur is 05-26 00.

③ Is an attempt made to define an LU exceeding the capacity of the defined RAID group? A code which will occur is 05-25 80.

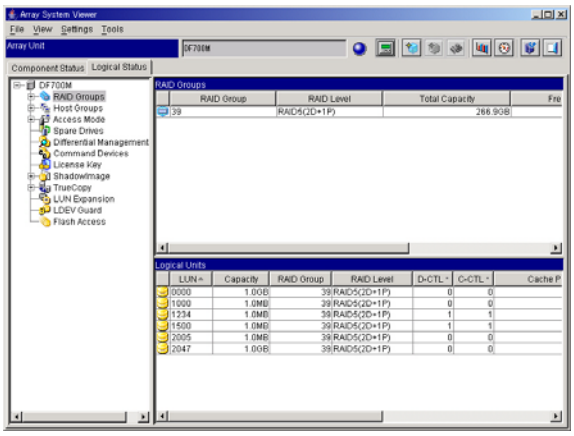
When sense key and sense code = 0B-FD01;

Switching of a controller in charge of an LU occurred during formatting. Check the controller in charge and re-execute formatting from the controller in charge.

When message-text is indicated, take measure according to the message.

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(f) Preset LU information is updated and the screen is displayed.



- The formatting LU has terminated, go to "3.4 Setting of Spare Disk" (SYSPR 03-0350).

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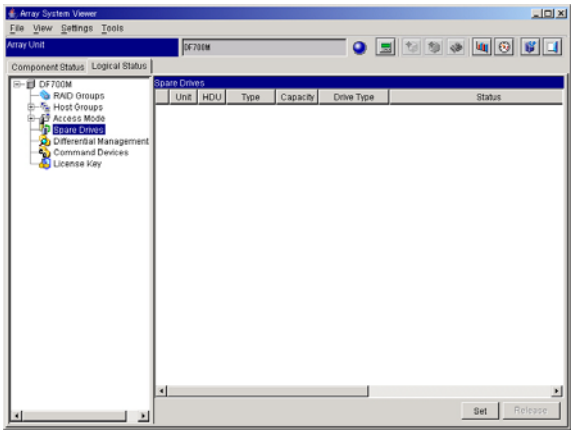
3.4 Setting of Spare Disk

This setting is used to set, delete and reference a Spare Disk.
The drive that can be set as the Spare Disk is a data disk.

NOTE : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS/RKXS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

[Procedure ④-A]Preparing of setting Spare Disk

(1) Select a [Spare Drives] from the tree.

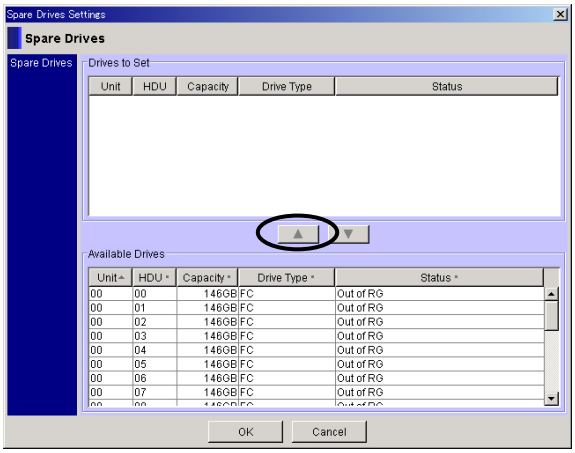


(2) Click the [Set] button that is displayed at the lower right part of the window.

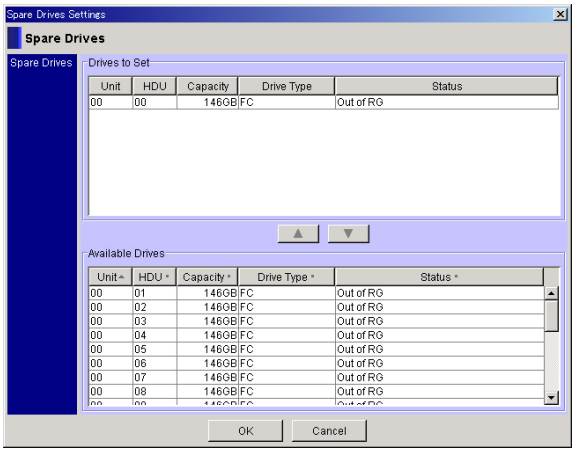
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[Procedure ④-B]Setting Spare Disk

(1) Select an HDU you want to specify as a spare drive from the [Available Drives] list and click the [▲] button.

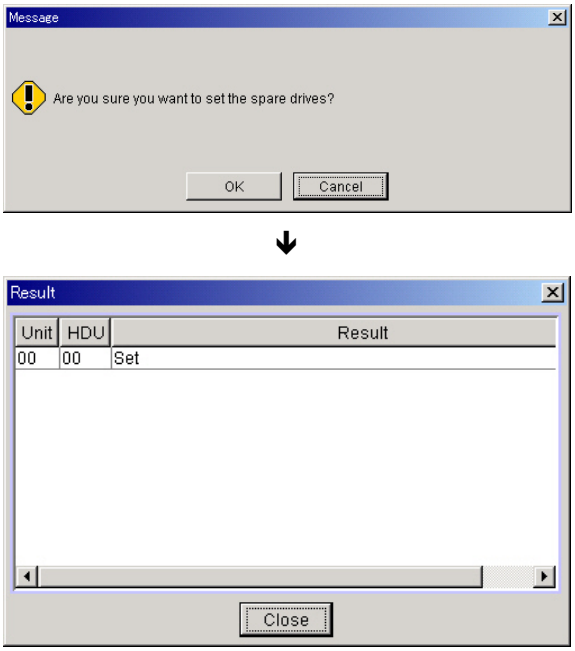


(2) The selected HDU is moved to the [Drives to Set] list. Click the [OK] button.



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(3) The confirmation window is display.
When incorrectly specifying a Disk Drive, press the [Cancel] button and redo processing by [Procedure ④-B].

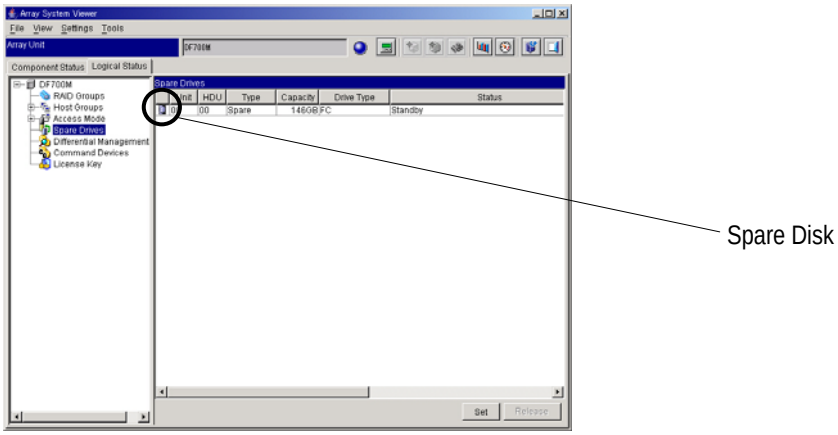


- When verifying the Spare Disk, go to "[Procedure ④-D]Verifying Spare Disk" (SYSPR 03-0390).

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[Procedure ④-C]Deleting Spare Disk

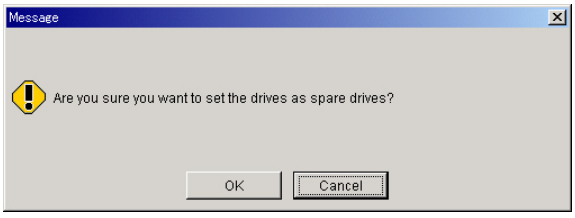
(1) Select the [Spare Drives] from the tree and select the Spare Disk to be removed from the [Spare Drives] by clicking it.

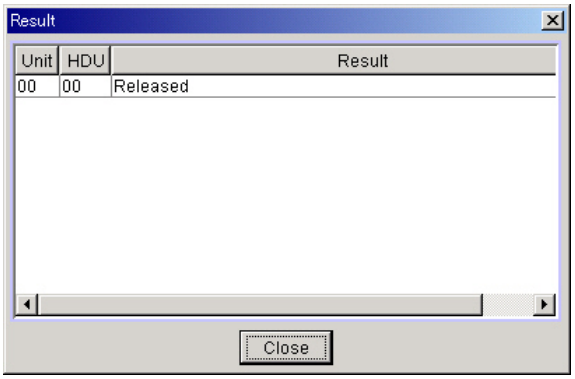


 : Data Disk  : Spare Disk

(2) Click the [Release] button that is displayed at the lower right part of the window.

(3) The Spare Disk reset confirmation is displayed.
Click the [OK] button. When incorrectly specifying a Disk Drive, press the [Cancel] button and redo processing by [Procedure ④-C].





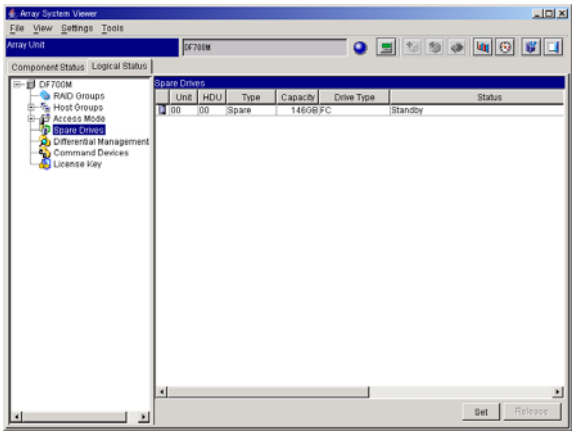
- When setting the Spare Disk, go to "[Procedure ④-B]Setting Spare Disk" (SYSPR 03-0360).

NOTE : When you have set a configuration of the [RAID Group] or [Logical Unit], be sure to execute the [Update to the Latest Information] after closing the parameter window in order to make the RAID group icon in the unit window the latest.

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[Procedure ④-D]Verifying Spare Disk

(1) You can make sure of the spare drive that has been set on the right side of the window by selecting [Spare Drives] from the tree in the unit window.



 : Data Disk  : Spare Disk

- If confirmation is OK, go to "Chapter 2. Setting Host Group/Targets" (SYSPR 02-0000)
- If confirmation is NG, go to "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0380)

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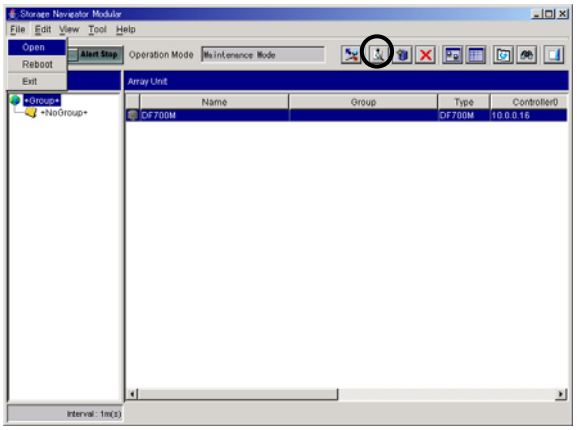
3.5 Checking the status of Disk Drive

Display the array unit component status and information by using icons. When you double-click each icon, the information of the component part indicated by the icon is displayed.

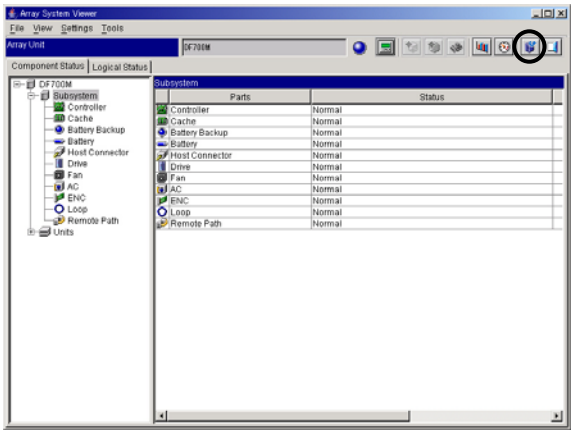
(1) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

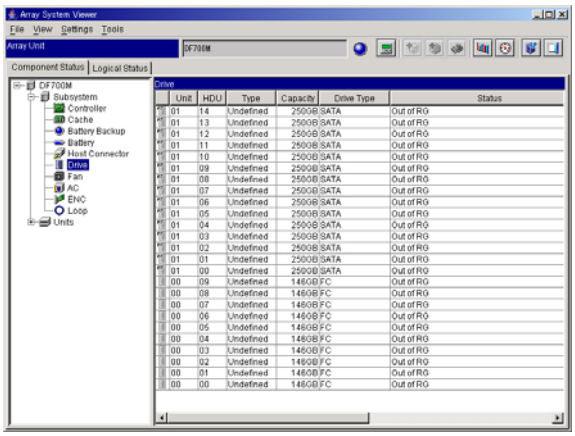


(2) To update the component display, on the View menu, select Refresh or click [ : Refresh] button in the tool bar.



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(3) When you double-click Drive icon, the property screen of the component part is displayed.



NOTE : Vendor ID, Product ID, Revision, and Serial No. may not be displayed depending on the drive mounting and drive status.

[Unit] : Unit No.
[HDU] : HDU No.
[Type] : Drive using form
- Data : Data drive
- Spare : Spare drive
- Undefine : Normal (LU not defined)

[Capacity] : Storage capacity of a drive
[Drive Type] : Drive type
[Status] : Drive status
- Normal : Normal
- Detached : Blockade
- Detached (Unmount) : The drive in the blockade status is not installed.
- Standby : Normal (LU not defined)
- Out of RG : Normal (RAID not defined)
- Undefine : Normal (LU not defined)
- Unmount : The drive is not installed.
- Recovery : Under recovery (correction copy or copy-back in progress)
- Unitx HDUy : Position of a corresponding data drive when using spare Disk Drives.
- Waiting : Spare drive not used

[Vendor ID] : Vendor ID of drive
[Product ID] : Product ID of drive
[Revision] : Firmware revision of drive
[Serial No.] : Serial No. of a drive

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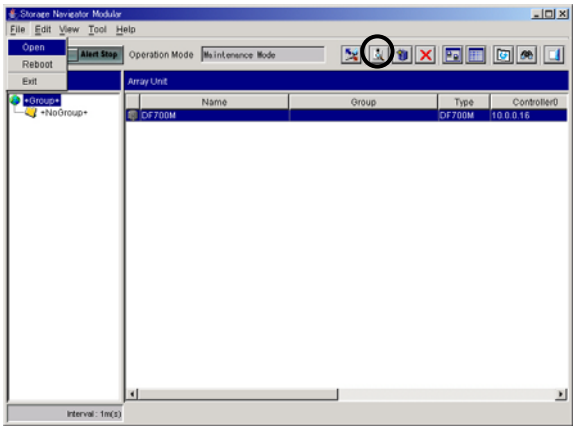
3.6 Checking the Disk Drive which configures the RAID Group

(1) Start the Storage Navigator Modular and set the operation mode to "Management Mode"(‡1).

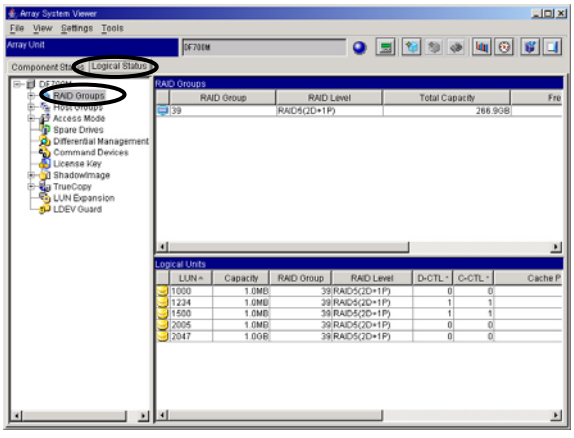
(2) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



(3) Double click [Logical Status] in the unit window, and select the RAID Groups icon from the tree view.

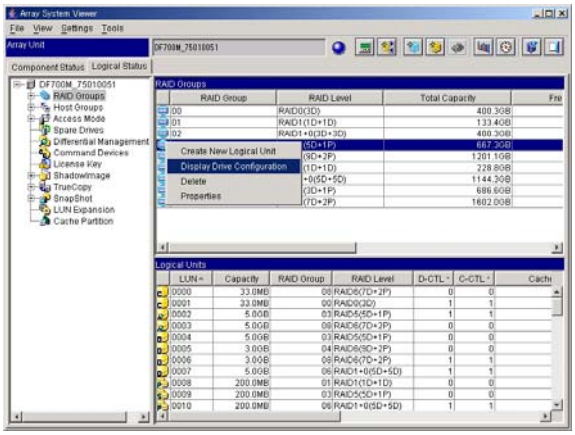


(4) Select the target RAID Group icon from the list view in the unit window.

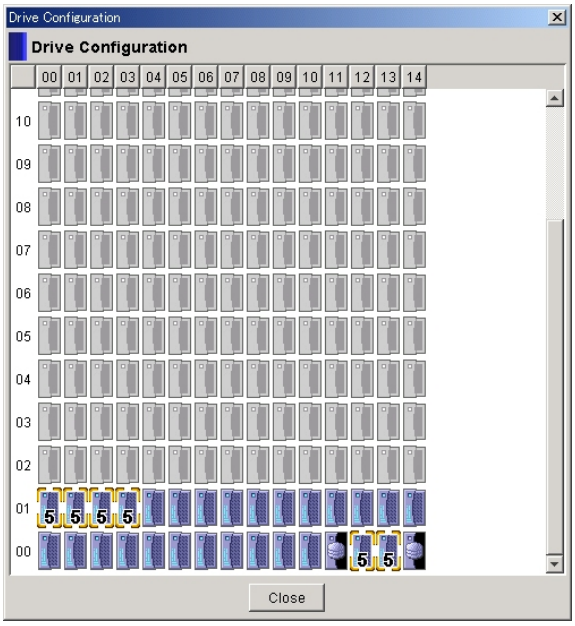
‡1 : For details of the setting method, refer to the Subsection "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050)

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(5) Click the right mouse button for the selected RAID Group icon, and select the Disk Drive configuration display from the context menu.



(6) The Disk Drive which configures the target RAID Group is highlighted in the Drive Configuration window.



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3.7 Allocation of the system LU/user LU of the NAS

Allocation of the system LU and the user LU used at the time of the NAS connection has restrictions of the opportunity to execute. Refer to "3.9 Restrictions of the operation opportunity for the system LU/user LU of the NAS" (SYSPR 03-0560) for the restrictions of the execution opportunity.
The setting of the command device needs to be completed before performing the setting of the system LU allocation.
Refer to "3.8 Setting the command device indispensable as the system LU of the NAS" (SYS 03-0520) for the setting of the command device.

3.7.1 Setting, change or deletion the system LU allocation

The capacity of the system LU has the following restrictions.
Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

Table 3.7.1 Capacity Restrictions of System LU

No.	System LU	Capacity restriction	
		Bytes	Blocks
1	System Disk(CTL0)	14,013 M bytes (or more)	28,698,624 blocks (or more)
2	System Disk(CTL1)	14,013 M bytes (or more)	28,698,624 blocks (or more)
3	Volume for Dump(CTL0)	4,925 M bytes (or more)	10,086,400 blocks (or more)
4	Volume for Dump(CTL1)	4,925 M bytes (or more)	10,086,400 blocks (or more)
5	Command Device	35 M bytes (or more)	71,680 blocks (or more)
6	Working Area for Dump	4,195 M bytes (or more)	8,591,360 blocks (or more)
7	System Common Volume	2,537 M bytes (or more)	5,195,776 blocks (or more)
8	Backup Volume for Common	2,537 M bytes (or more)	5,195,776 blocks (or more)
9	Backup Volume for Common 2	2,537 M bytes (or more)	5,195,776 blocks (or more)

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NOTE : The LUs in the RAID Group to which the Power Saving function is set cannot be set to the NAS system LUs. Set the NAS system LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is "Normal (Spin Up)".

(1) Before performing Setting/change/deletion of the system LU allocation

(a) Turn on the AC input power supply on NAS Unit.

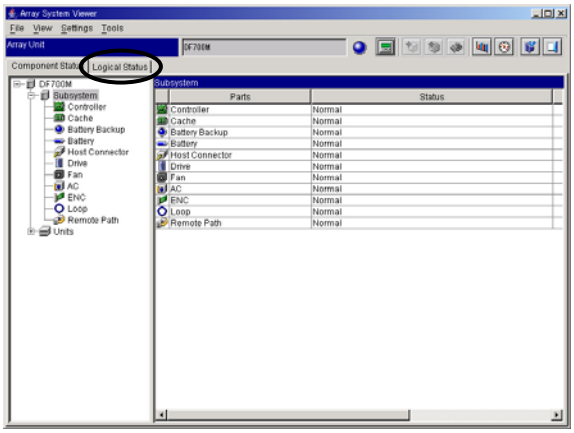
(b) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

(c) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the selection methods as shown below.

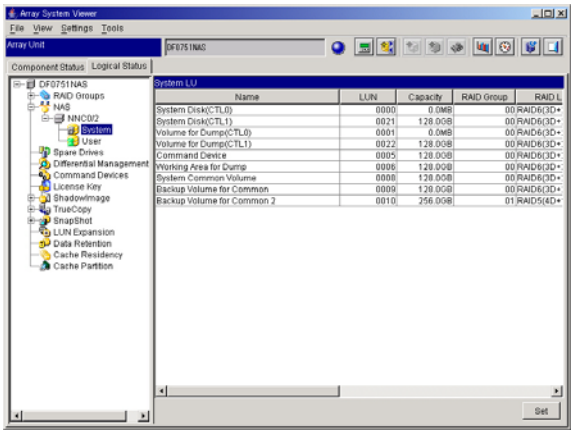
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

(d) On the unit window, click the [Logical Status] tab.



(e) Double click [NAS] and display [NNC0/2]. Also, double click [NNC0/2], display [System] and [User], and select [System]. The list of the system LU is displayed. (The following window assumes the time of change or deletion.)

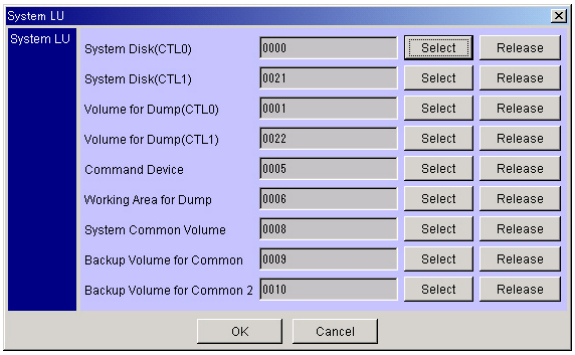


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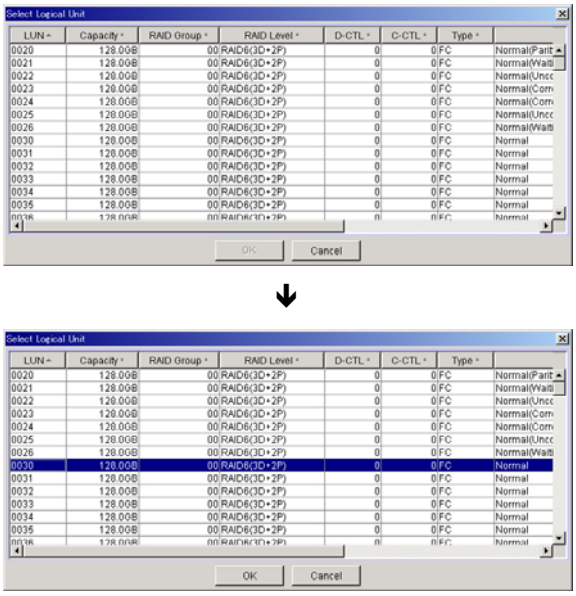
(2) Setting or change the system LU allocation

(a) Click the [Set] button displayed at the lower right of the window.

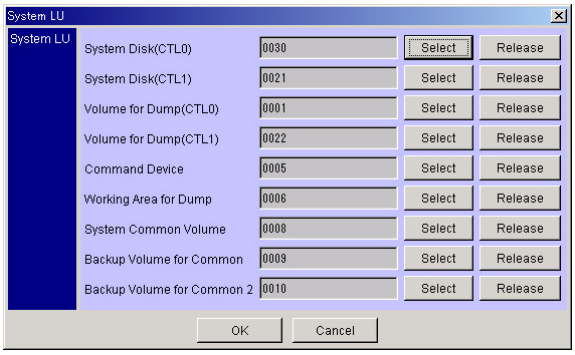
(b) Click the [Select] button of the system LU to be set.



(c) Select the LUN to be allocated, and click the [OK] button.

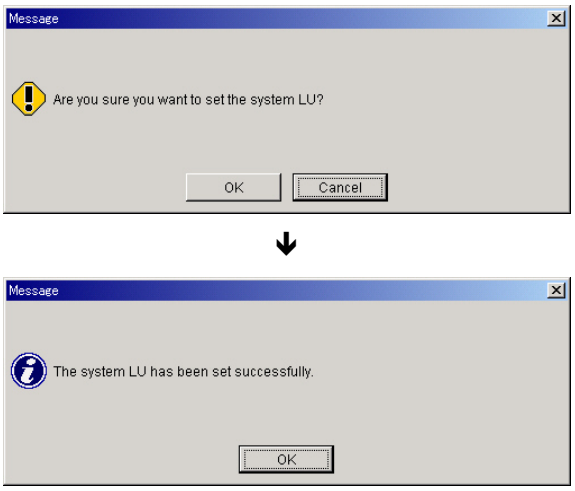


(d) Check that the selected LU is reflected, and click the [OK] button.



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(e) The confirmation message is displayed. Click the [OK] button.

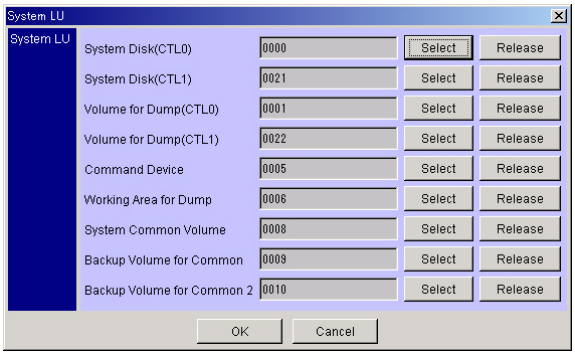


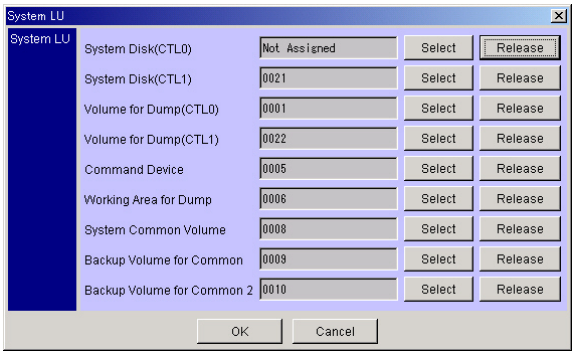
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(3) Deletion the system LU allocation

(a) Click the [Set] button displayed at the lower right of the window.

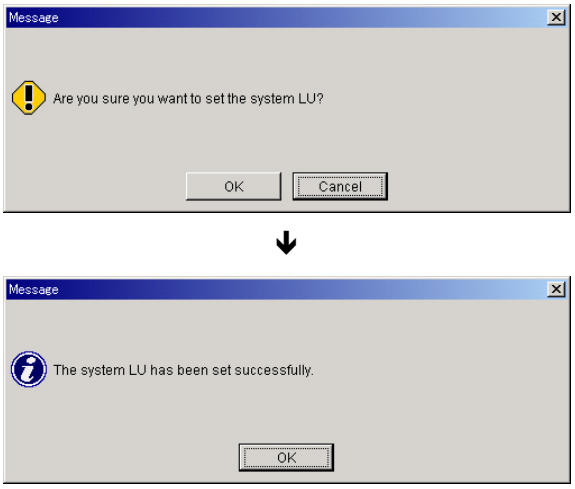
(b) Click the [Release] button of the system LU to be set.





(c) Click the [OK] button.

(d) The confirmation message is displayed. Click the [OK] button.



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3.7.2 Setting, change or deletion the user LU allocation

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

NOTE : The LUs in the RAID Group to which the Power Saving function is set cannot be set to the NAS User LUs. Set the NAS User LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is "Normal (Spin Up)".

(1) Before performing Setting/change/deletion of the user LU allocation

(a) Turn on the AC input power supply on NAS Unit.

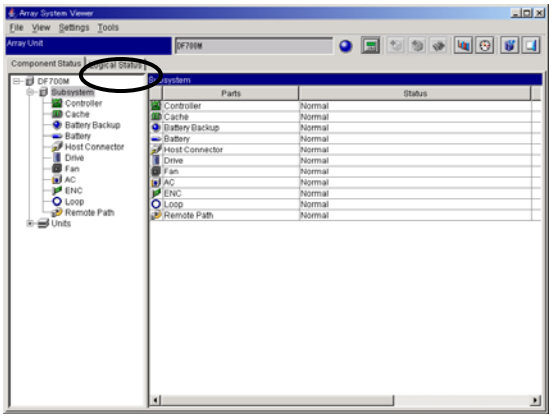
(b) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050), "Registering the newly introduced DF in the Storage Navigator Modular" in Subsection 1.1.

(c) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the selection methods as shown below.

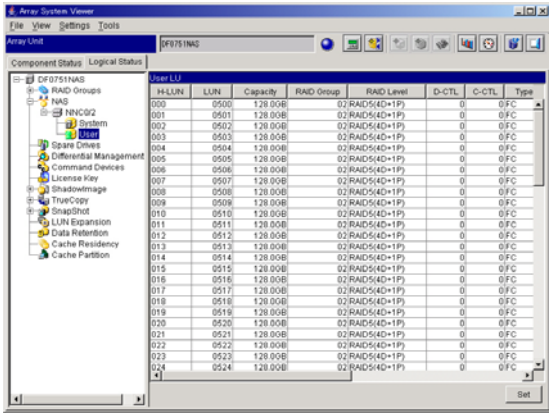
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

(d) On the unit window, click the [Logical Status] tab.



(e) Double click [NAS] and display [NNC0/2]. Also, double click [NNC0/2], display [System] and [User], and select [System]. The list of the system LU is displayed. (The following window assumes the time of change or deletion.)

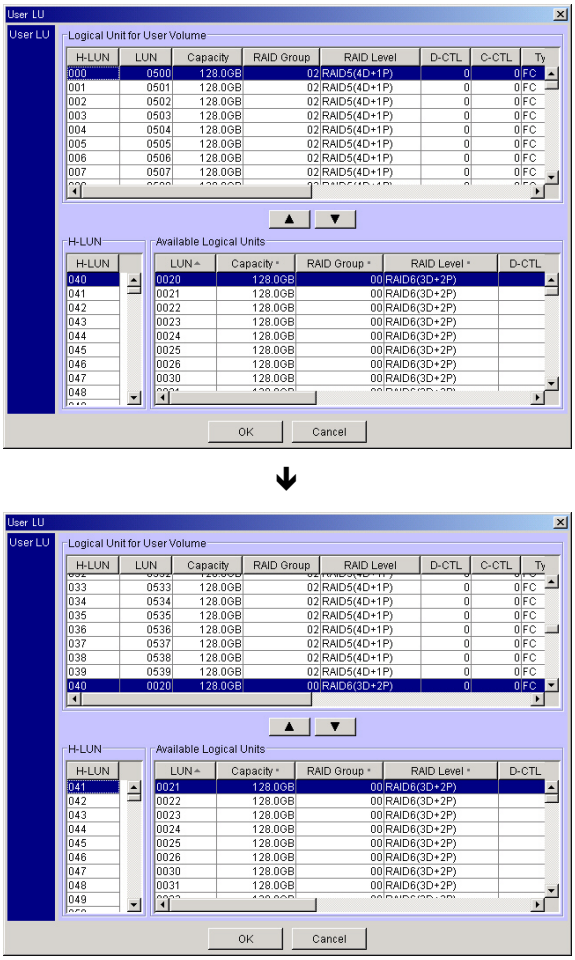


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(2) Setting or change the user LU allocation

(a) Click the [Set] button displayed at the lower right of the window.

(b) Select one H-LUN from the [H-LUN] list of the user LU, select one LUN that wants to be allocated in the H-LUN from the list of [Available Logical Units], and click the ▲ button.

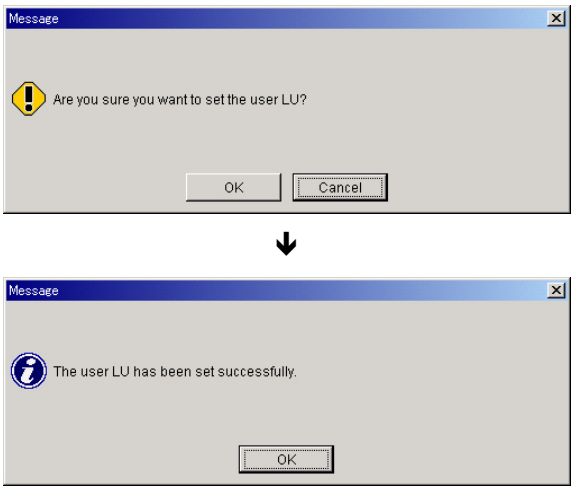


The selected H-LUN and LUN move to [Logical Unit for User Volume].

(c) Repeat the operation of (b), move all the LUNs that want to be allocated to [Logical Unit for User Volume], and click the [OK] button.

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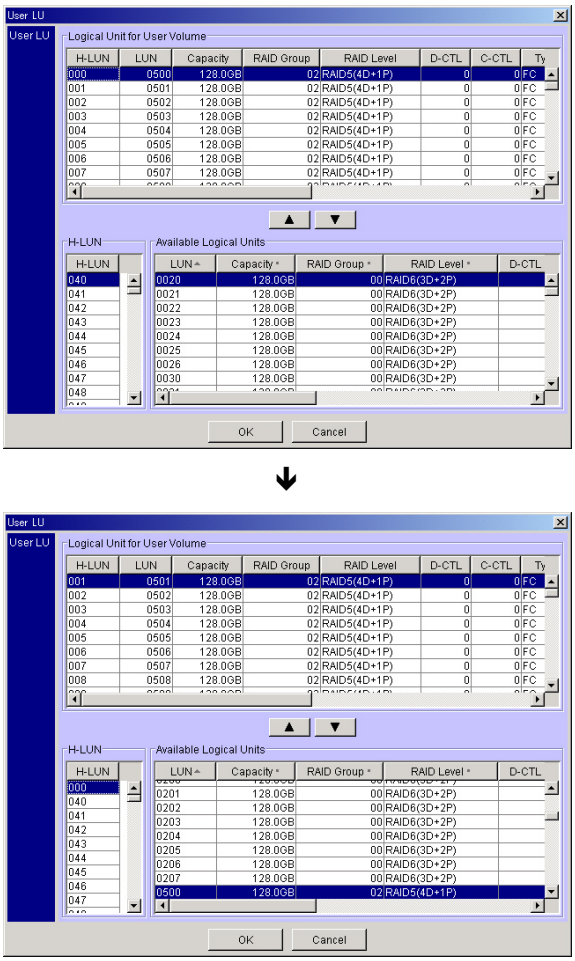
(d) The confirmation message is displayed. Click the [OK] button.



(3) Deletion the user LU allocation

(a) Click the [Set] button displayed at the lower right of the window.

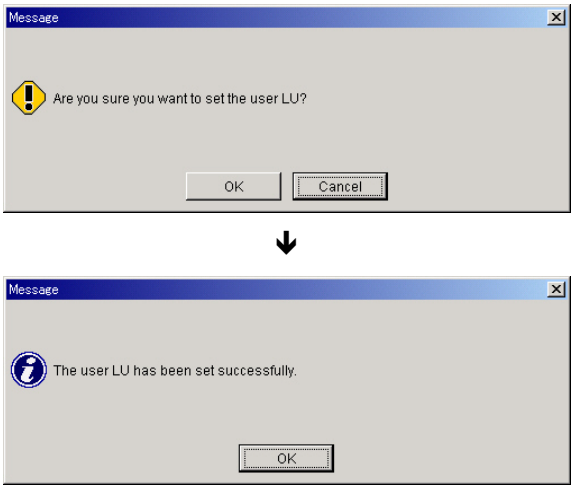
(b) Select the LUN to release from the “Logical Unit for User Volume”, and click the ▼ button.



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(c) Repeat the operation of (b), move all the LUNs that want to be released to [Available Logical Units], and click the [OK] button.

(d) The confirmation message is displayed. Click the [OK] button.



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3.8 Setting the command device indispensable as the system LU of the NAS

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

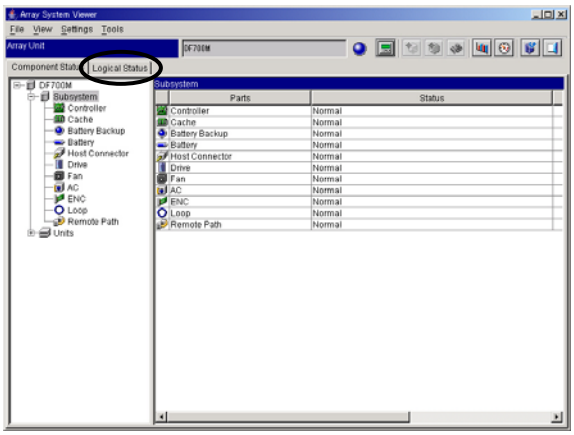
The command device is the interface with the RAID Manager on the NAS Unit.
The commands for ShadowImage in-system replication, NAS Backup Restore, etc. are issued from the RAID Manager for the command device of the disk subsystem.
Setting the command device is required for the RAID Manager to accept the Read/Write command for ShadowImage in-system replication and NAS Backup Restore executed by the disk subsystem and to return the reading demand to the NAS Unit.
One command device is set for one disk subsystem. The Storage Navigator Modular is used to set the command device.

NOTE : • The logical unit to be allocated to the command device needs to be created using the Storage Navigator Modular and formatted beforehand. Also, the capacity of the logical unit is necessary by 35 M bytes or more.
• Up to two command devices can be set for one disk subsystem, but the command device that can be allocated to the NAS Unit is only one.
• The command device cannot be set to the LU which is already allocated to the system LU.

(1) Before performing Setting/change/deletion of the command device
(a) Turn on the AC input power supply on NAS Unit.
(b) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050), "Registering the newly introduced DF in the Storage Navigator Modular" in Subsection 1.1.
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
• Selecting [File] – [Open]
• Double-clicking an icon of the disk array subsystem you want to set
• Clicking [: Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

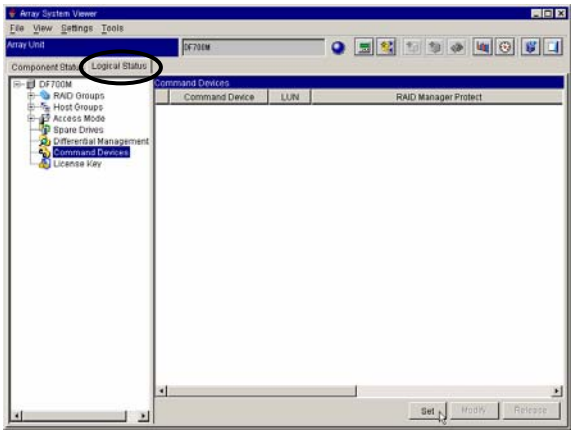
(d) On the unit window, click the [Logical Status] tab.



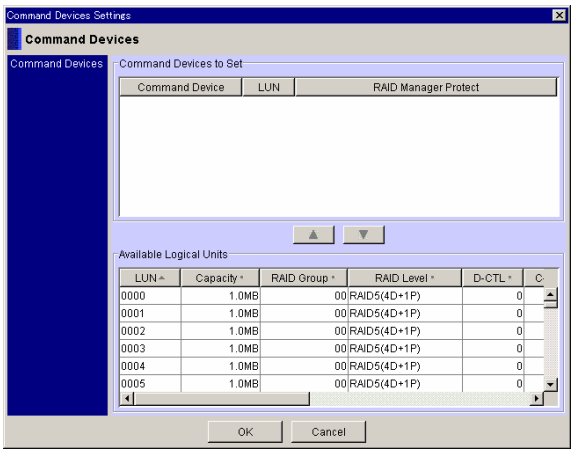
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(2) Setting or change the command device

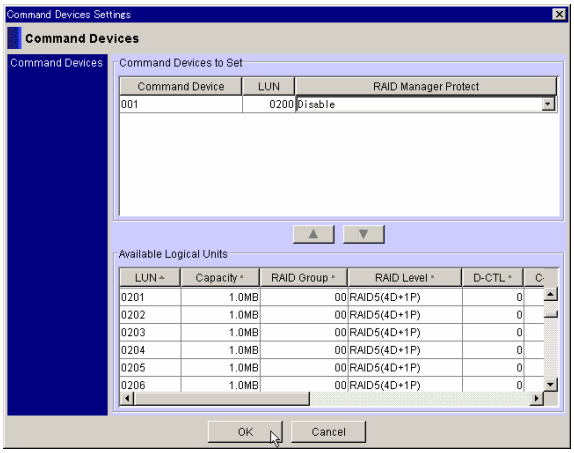
(a) Click [Command device], and click the [Setting] button at the lower right of the window.



(b) Select the LUN that wants to be set to the command device from [Logical unit list that can be used], and click the ▲ button.



(c) It moves to "Command Devices to Set" that the selected LUN sets.
For using the protecting function of the RAID Manager, select [Enable] from the pull-down menu of "RAID Manager protect". Click the [OK] button.

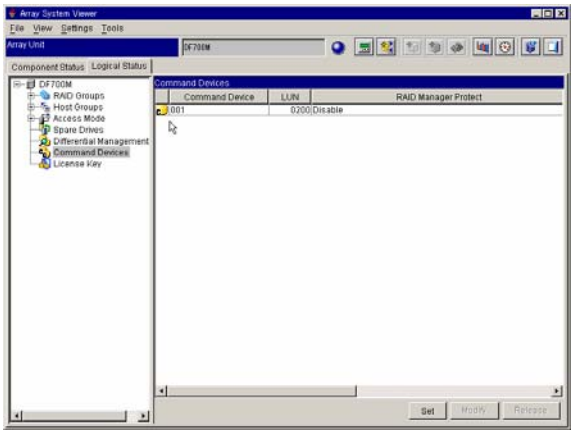


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(d) The confirmation message is displayed. Click the [OK] button



The set content is displayed.

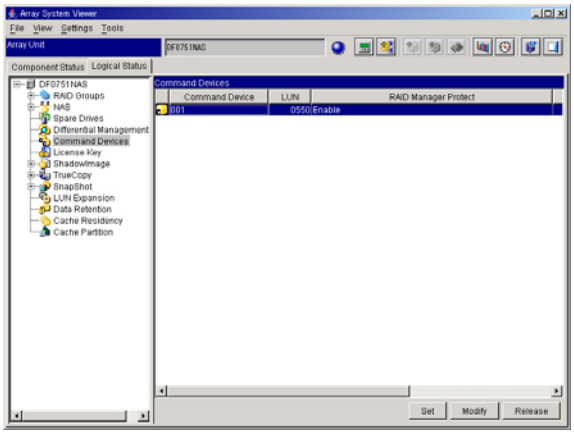


NOTE : Refer to "RAID Manager System Administrator Guide (SANRISE AMS series)" for the protection function of the command device.

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(3) Deletion the command device

(a) Click [Command device], and click the [Release] button at the lower right of the window.



(b) The confirmation message is displayed. Click the [OK] button

The set content is displayed.

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3.9 Restrictions of the operation opportunity for the system LU/user LU of the NAS

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

The operation of the system LU/user LU of the NAS may not be possible depending on the status of the NAS OS. Check the status of the NAS OS referring to WEB "Chapter 2 The Normal Mode Operation Procedure" (WEB 02-0000).

Table 3.9.1 Restrictions of the Operation Opportunity for the System LU

○: Operation enabled -: Operation disabled

No.	Operation	NAS OS Status	Operation Enabled or Disabled
1	LU format, Change/Release of the system LU (Excluding the System Disk Drive) allocation	It is stopping normally (STOP)	○
		Excluding that it is stopping normally (STOP)	-
2	Change/Release of the system LU (System Disk Drive) allocation	Under uninstallation (NEW), normal stop (STOP), abnormal stop (DOWN), and stop processing (SHUTDOWN)	○
		Other than the above	-
3(*1)	RAID Group deletion including the system LU, LU deletion, unification of the LU, and separation of the unified LU, Command device setting of the LU, Secondary volume specification of ShadowImage in-system replication	It is stopping normally (STOP)	-
		Excluding that it is stopping normally (STOP)	-
4	The operation of the system LU other than No.1 and 2.	It is stopping normally (STOP)	○
		Excluding that it is stopping normally (STOP)	○

*1 : The operation is impossible regardless of the status of the NAS OS unless the system LU allocation is released.

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Table 3.9.2 Restrictions of the Operation Opportunity for the User LU

○: Operation enabled -: Operation disabled

No.	Operation	NAS OS Status	Operation Enabled or Disabled
1	LU format, (*2) Unification of the LU, Separation of the unified LU	It is stopping normally (STOP)	○
		Excluding that it is stopping normally (STOP)	-
2	Change/Release of the user LU allocation	It is stopping normally (STOP)	○
		The NAS OS is normally operating.	(*1)
		Excluding that it is stopping normally (STOP)	-
3(*3)	RAID Group deletion including the user LU, LU deletion, Command device setting of the LU, Pair formation of ShadowImage in-system replication (*4), Pair formation of TrueCopy(*5) (both primary and secondary volumes), Pair formation of Copy-on-write SnapShot (both primary and secondary volumes)	It is stopping normally (STOP)	-
		Excluding that it is stopping normally (STOP)	-
4	Operation for the user LU other than items 1, 2, and 3	It is stopping normally (STOP)	○
		Excluding that it is stopping normally (STOP)	○

*1 : When the NAS OS is attaching the LU, the operation execution is impossible, and when the NAS OS is detaching the LU, the operation execution is possible.

*2 : The LU in the unformatted status can be formatted regardless of the status of the NAS OS.

*3 : The operation is impossible regardless of the status of the NAS OS unless the user LU allocation is released.

*4 : When the primary volume is the user LU specification, the pair formation of ShadowImage in-system replication is possible regardless of the status of the NAS OS. If the file system is created for the user LU of the NAS, the access attribute of S-VOL Disable of Data Retention Utility is automatically set. Therefore, when the secondary volume is the user LU specification, if the file system is already created, the pair formation of ShadowImage in-system replication is impossible regardless of the status of the NAS OS.

*5 : TrueCopy means TrueCopy remote replication and TrueCopy Extended Distance.

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Chapter 4. Setting Configuration Information

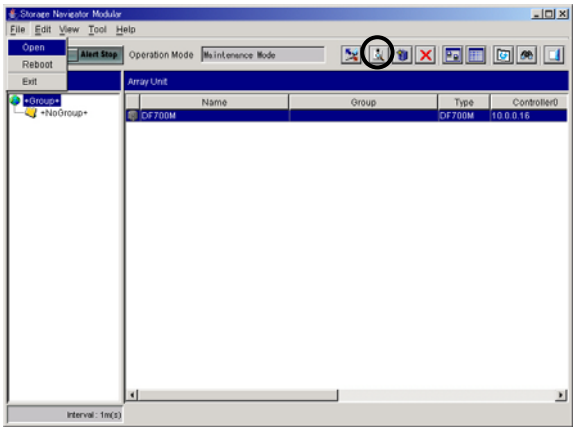
4.1 Before setting configuration information

NOTE : If the setting is changed while an I/O is being executed, the I/O may be abnormally stopped or the succeeding I/O may be unable to be executed. Therefore, change the setting after stopping the I/O.
Besides, the setting on the host computer side must be changed depending on the host computer.

Operation as described below.

(1) Turn on the power supply.
(2) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode"(‡1).
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

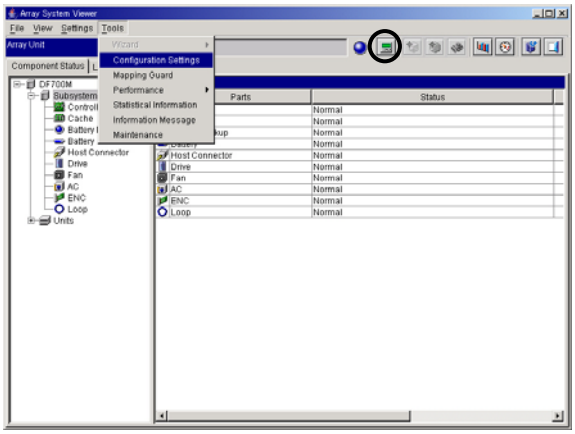
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



‡1 : For details of the setting method, refer to the Subsection "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050).

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(4) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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4.2 Setting the subsystem configuration information

The setting of the configuration information has the other functions as shown below.

- The name of the configuration setting shows indication of a tag in the "Parameter" window.
- The setting entered is validated when the [Apply] button at lower right part of the "Parameter" window is clicked.
- The setting of each parameter of the "Port Option", "Fibre Option" and "iSCSI" must be made for each port (each of Port 0A, 0B, 1A, and 1B).

Table 4.2.1 The menu items of setting parameter

No.	Menu item	Use	Contents	Factory setting	Reference page
1	Boot Options	Sets parameters necessary for the reboot of the subsystem.	① Setting the system start attributes	Depending on the configuration at shipment	"(1) Setting Boot Options" (SYSPR 04-0040)
			② Setting the Delay Planned Shutdown	0 minute	
			③ Setting the Drive blocking mode	Disable	
			④ Setting the Vender ID	HITACHI	
			⑤ Setting the Product ID	DF600F	
			⑥ Setting the ROM Microprogram Version	Not set	
			⑦ Setting the RAM Microprogram Version	Not set	
2	System Parameter	To be used to set the system parameters.	① Selection of system parameters	—	"(2) Setting of System Parameter" (SYSPR 04-0070)
			② Setting of an action against a processor failure	Reset of occurred.	
			③ Web title	—	
			④ Setting of the mode for executing the Write and Verify	ON	
3	LAN	Reference to and setting of the LAN configuration information.	① Maintenance Port IP Address Automatic Change Mode(*2)	Disable	"(3) Setting of LAN" (SYSPR 04-0080)
			② Reference to and/or setting of enable(*1) or disable of the DHCP mode.	OFF	
			③ Reference to and setting of IP Address.	192.168.0.16	
			④ Reference to and setting of SUB NET MASK.	255.255.255.0	
			⑤ Reference to and setting of Default Gateway.	0.0.0.0	
			⑥ Reference to and setting of Negotiation. (*3)	Auto	
			⑦ Reference to the Ether Address.	—	
4	Maintenance LAN	Refer to/set the maintenance port IP address.	① Reference to and setting of IP Address.	Control Unit #0: 10.0.0.16 Control Unit #1: 10.0.0.17	"(4) Setting of Maintenance LAN" (SYSPR 04-0100)"

*1 : When DHCP mode is valid, IP address is obtained from the DHCP server.
When the DHCP server has not started up or DHCP function has been miss-set, obtaining the IP address fails and the device IP address remains to be "0.0.0.0". (Storage Navigator Modular or WEB cannot be used via LAN.)
In this case, the device IP address can be obtained by starting up the DHCP server or setting DHCP function correctly if necessary.
When the IP address of this subsystem is acquired using the DHCP function with the configuration which uses this subsystem as an external disk drive of the DHCP server, if the network address of the reserved IP address for the maintenance port is assigned as an IP address, the IP addresses of the ports for user control and maintenance) compete, and they cannot be operated normally. In this case, request the system administrator not to assign "10.0.0.x," "192.168.0.x," "192.168.233.x" "172.23.211.x," or "10.197.181.x" to the DHCP server as an IP address.
*2 : Microprogram Ver.0735/B, Ver.0740/B or more.
*3 : Microprogram Ver.0750/A or more.

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No.	Menu item	Use	Contents	Factory setting	Reference page
5	Port Options	Set the port options of a controller	① Reference/setting of the port option for each port	—	"(5) Setting of Port Options" (SYSPR 04-0110)
6	Restore Options	Refers to and/or sets an option of drive restoration.	① Reference to and/or setting of the mode for Drive Restoration Mode.	Interleave (Normal)	"(6) Setting of Restore Options" (SYSPR 04-0120)
			② Reference to and/or setting of the occasion for Drive Restoration.	Automatic	
			③ Reference to and/or setting of the interval time, processing unit size.	(*1)	
			④ Reference to and setting of Dynamic Sparing.	Execute (Read& Online Verify mode)	
			⑤ Reference to and setting of Spare Drive operation.	Variable	
			⑥ Reference to and setting of Applying No Copy Back Mode on All the Units operation. (*2)	Not selected (Disable)	
7	Online Verify	Refers to and/or sets validity or invalidity of online verification.	① Refers to and/or sets validity or invalidity of online verification.	Yes (Execute mode)	"(7) Setting of Online Verify" (SYSPR 04-0140)
8	Constitute	Writes system parameters and configuration information such as the RG/LU onto (a) file(s) or reads them from (a) file(s).	① Output of system parameters and configuration information to (a) file(s).	—	"(8) Setting of Constitute" (SYSPR 04-0150)
			② Input of system parameters and configuration information to (a) file(s).		
9	Fibre Channel(*3)	Reference to and setting of information regarding the Fibre Channel.	① Reference of Node Name.	—	"(9) Setting of Fibre Channel" (SYSPR 04-0170)
			② Reference of Port Name.	—	
			③ Reference/setting of Topology Information for each port	Loop	
			④ Setting of Port Address for each port.	0000EF	
			⑤ Setting of Transfer Rate for each port.	Auto	
10	iSCSI(*4)	Reference to and setting of information regarding the iSCSI.	① Reference of IP address.	port 0A : 192.168.0.200 port 0B : 192.168.0.201 port 1A : 192.168.0.204 port 1B : 192.168.0.205	"(10) Setting of iSCSI" (SYSPR 04-0192)
			② Reference of Sub Net Mask.	255.255.255.0	
			③ Reference/setting of Gateway for each port	0.0.0.0	
			④ Setting of TCP/IP Port number for each port.	3260	
			⑤ Keep Alive Timer	60	
11	Micro Update	Down load and replace the microprogram.	① Setting of down load of the microprogram.	—	"(11) Setting of Micro Update" (SYSPR 04-0200)
			② Setting of replacement of the microprogram.		
12	RTC	Reference to and setting of date, time.	① Setting procedure.	—	"(12) Setting of RTC" (SYSPR 04-0220)
			② Reference to and setting of the date.		
			③ Reference to and setting of the time.		

*1 : Interval time : 0 (× 10 ms)
Recoverable data size : 1 (× 128 block)
*2 : It is possible to refer to the status of the function or set the function in the combination of the microprogram revision 0740/C or more and the Storage Navigator Modular Ver.4.05 or more.
*3 : When the FC Interface Board of the is not installed in the Control Unit, this tab is not displayed.
*4 : When the iSCSI Interface Board is not installed in the Control Unit, this tab is not displayed.

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No.	Menu item	Use	Contents	Factory setting	Reference page
13	Format Mode	Setting of Format mode.	① Reference to and setting Format Mode. ② Reference to and setting Format Data.	Normal Default	"(13) Setting of Format Mode" (SYSPR 04-0230)
14	SNMP	Writes SNMP information onto (a) file(s) or reads them from (a) file(s).	① Output of SNMP information to (a) file(s). ② Input of SNMP information to (a) file(s).	—	"(14) Setting of SNMP" (SYSPR 04-0240)
15	Time Zone	Do the reference to/setting of the time zone and the NTP server IP address.	① Reference to/setting of the time zone ② Reference to/setting of the NTP server IP address	—	"(15) Setting of Time Zone" (SYSPR 04-0260)
16	NNC LAN(*1)	Do the reference to/setting of the NNC control port.	① Reference to/setting of the IP address ② Reference to/setting of the Subnet mask ③ Reference to/setting of the MTU ④ Reference to/setting of the Negotiation	—	"(16) Setting of NNC LAN" (SYSPR 04-0280)
17	LAN Port Number (*2)	Do the setting of the LAN Port Number on the subsystem side.	① Setting of the LAN Port Number on the subsystem side	2000	"(17) Setting of LAN Port Number" (SYSPR 04-0300)
18	iSNS(*3)	Do the reference to/setting of the iSNS.	① Specify whether to use iSNS Server or not	—	"(18) Setting the iSNS Server Information" (SYSPR 04-0360)
19	Ping(*3)	Reference to and setting of information regarding the Ping.	① Select the port to be sending ping ② Specify the IP Address of the initiator	—	"(19) Sending Ping" (SYSPR 04-0370)
20	Backend Diagnosis (*4)	Set the automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side of the subsystem.	① Setting of the automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side of the subsystem	10	"(20) Setting of the automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side" (SYSPR 04-0390)

*1 : When the NAS Interface Board is not installed in the Control Unit, this tab is not displayed.
*2 : Microprogram Ver.0726/E or more.
*3 : When the iSCSI Interface Board is not installed in the Control Unit, this tab is not displayed.
*4 : Microprogram Ver.0740/D or more.

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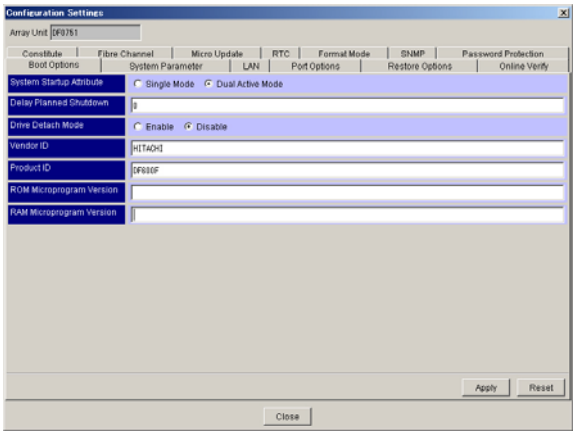
(1) Setting Boot Options

Parameter settings, which are shown in the "List of DF700 Boot Option/System Parameter Settings" in the "Read before you start" supplied with the subsystem, have been made when the subsystem is shipped from the factory. Reset the boot options when necessary.
When any of the Boot Options is changed, the subsystem becomes unable to receive access from a host computer until the reboot is completed. Reset the Boot Options after making sure that access from the host computer has been stopped.

NOTE : Do not perform setting Boot Options while the READY LED (green) on the front of the Basic Chassis lights up is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

NOTE : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

(a) Click the [Boot Options] tab. A window for setting the boot options is displayed in the [Parameter] window.



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No	Parameter name	Construction	Kind of parameter		Default setting
1	System start attributes(*1)	Specifies the system start attributes.	Single mode	Made in the case of the single Control Unit configuration.	Depending on the configuration at shipment
			Dual Active mode	Made in the case of the dual Control Unit configuration.	
2	Delay Planned Shutdown	Specifies the delay time until the start of the deliberate shutdown by the minute.	0 to 60 minutes	Specifies the delay time until the start of the deliberate shutdown by the minute.	0 minute
3	Drive Detach mode	Specifies an operation to be performed when a drive failure occurs in the same RAID group.	Disable	When a failure also occurs in the second(third) Disk Drive while one Disk Drive is blocked due to a failure in one RAID Group of RAID 1/1+0/5(6), do not make the second(third) Disk Drive blocked.	Disable
			Enable	When a failure occurs in the second(third) Disk Drive while one Disk Drive is blocked due to a failure in one RAID Group of RAID 1/1+0/5(6), block the second(third) Disk Drive and make the LUs in the RAID Group concerned blocked (unformatted status).	
4	Vender ID	Specifies the Vender ID	8 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 8th to 15th bytes of the Standard Inquiry. Normally, no change from the default value, “HITACHI”, is required.	HITACHI
5	Product ID	Specifies the Product ID	16 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 16th to 31th bytes of the Standard Inquiry. Normally, no change from the default value, “DF600F”, is required.	DF600F
6	ROM Microprogram Version	Specifies the ROM Microprogram Version	2 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 32th to 35th bytes of the Standard Inquiry. Normally, no change from the default value, “Not set”, is required.	Not set
7	RAM Microprogram Version	Specifies the RAM Microprogram Version	2 or less half size alphabetic characters and/ or numerals.		

*1 : The NAS Unit connection configuration does not support “Single mode”.
Be sure to select “Dual Active mode”.

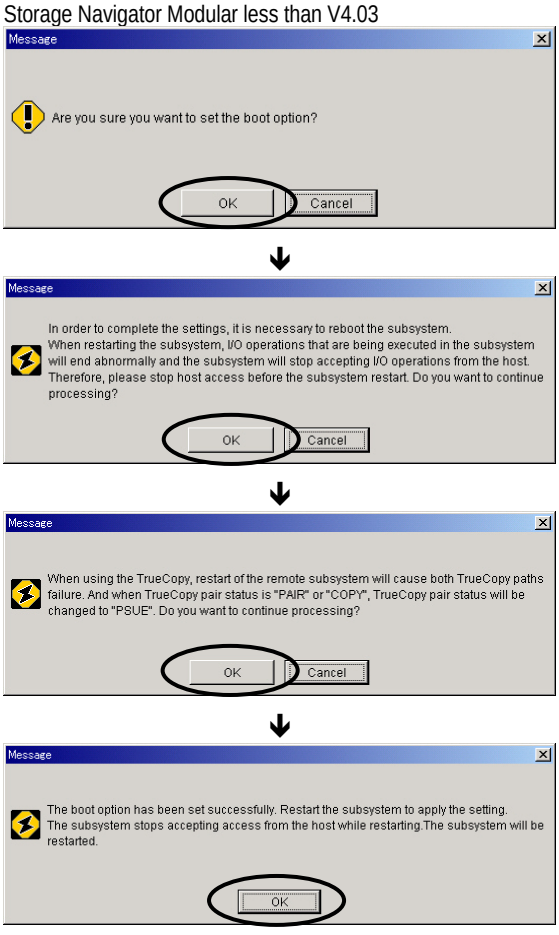
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(b) Verify that the changes that have been made are correct and click the [Apply] button.
When the [Reset] button is clicked, the change is canceled.

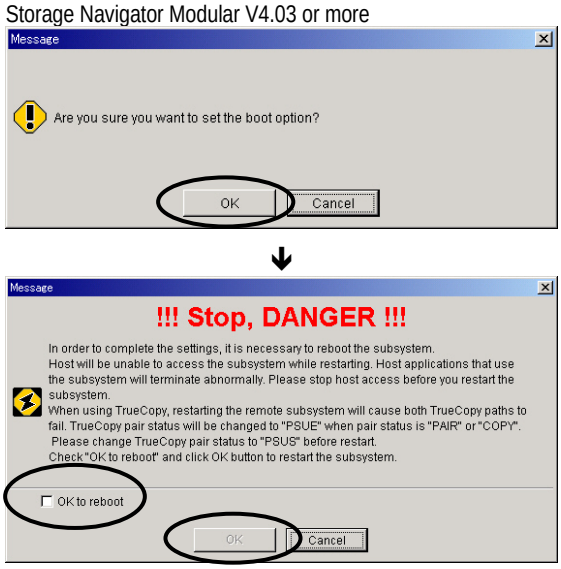
(c) The confirmation window is display.
The former setting is valid until the subsystem is restarted.
When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, restart the subsystem after making sure that accesses from a host computer has ceased.

NOTE : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03

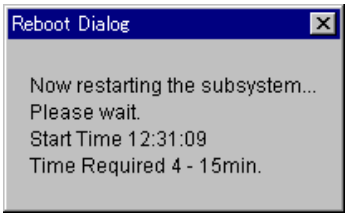


Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more



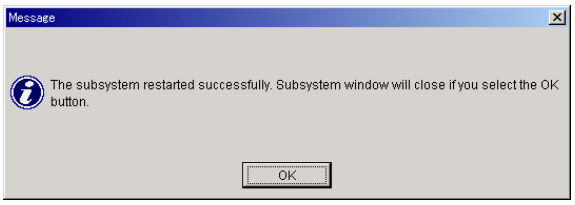
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(d) When you choose to restart the subsystem, the time the restart began is displayed. This usually takes approximately four to fifteen minutes. (about five to fifteen minutes in case of the RKH)



NOTE : It may take time for the subsystem to respond, depending on the condition of the subsystem. If it does not respond after 15 minutes or more, check the condition of the subsystem.

(e) A message appears, stating that the restart is successful. Click the [OK] button.



The Unit screen is closed. To perform other operations on the Main screen, select an array unit from the Main screen and open the selected Unit screen.

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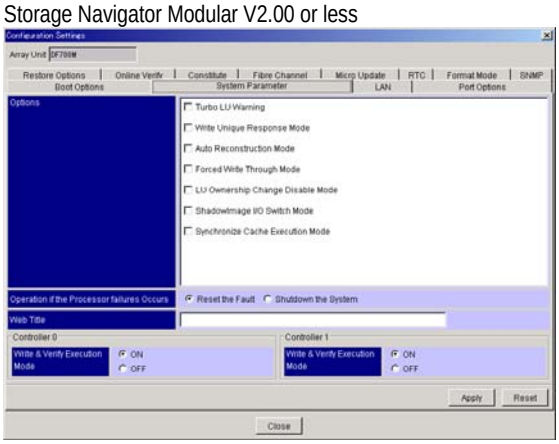
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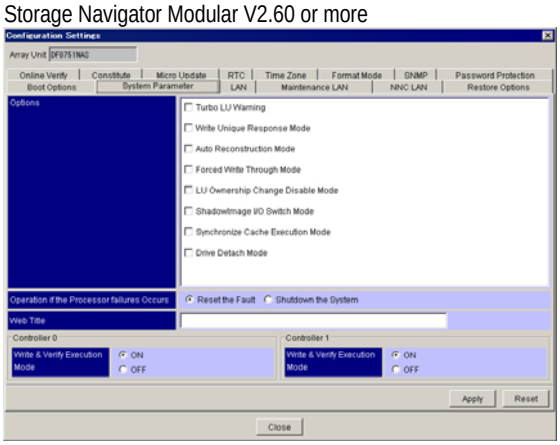
(2) Setting of System Parameter

(a) Click the [System Parameter] tab. The window for setting the "System Parameter" is displayed in the Parameter window.

Storage Navigator Modular V2.00 or less



Storage Navigator Modular V2.60 or more



No.	Parameter name		Construction	Kind of parameter		Default setting
1	Option	Turbo LUN Warning	This parameter is to be specified when the Turbo LU setting function is used.	Disable (Not checked)	When the write operation is received within the PIN range, the write command is executed in the Write-Through mode (*1).	Disable
				Enable (Checked)	Even if the write operation is received within the PIN range, the Cache memory is used when the write command is received.	
2		Write Unique Response Mode	This parameter is to be specified when a host of the NX series is connected.	Disable (Not checked)	The cache memory is used when the write command is received.	Disable
				Enable (Checked)	The write command is executed unconditionally in the Write-Through mode.(*1) (However, the write command for the LUs of RAID 1 and RAID 1+0 are excluded.)	
3		Auto Reconstruction Mode	This parameter specifies operations to be performed when a disk drive is pulled out.	Disable (Not checked)	Even when a disk drive is pulled out, the correction copy to a spare disk drive is not performed.	Disable
				Enable (Checked)	When a disk drive is pulled out, the correction copy to a spare disk drive is performed.	
4		Forced Write Through Mode	This parameter specifies the way to execute the write command to be used after the CTL detachment or a power failure occurs.	Disable (Not checked)	Even if the CTL detachment or a power failure has occurred, the cache memory is used when the write command is received.	Disable
				Enable (Checked)	When the CTL detachment or a power failure has occurred, the write command is executed in the Write-Through mode. (*1)	
5		LU Ownership change Disable Mode (*2)	This parameter specifies an operation to re-assign an LU to a controller that is not controlling the LU when the controller attempts to access the LU.	Disable (Not checked)	Request the internal processing to the Control Unit in charge of the LU. However, when there is no access for one minute from the Control Unit side in charge of the LU, reallocate the Control Unit in charge of the LU.	Disable
				Enable (Checked)	The access is always made by a Control Unit that controls the LU concerned by request without re-assigning the LU to a Control Unit that wants to access the LU.	

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*1 : The Write-Through means the operation to write the write data to the Disk Drive and respond to the host computer immediately after the subsystem received the write data from the host computer. Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through.
*2 : When the NAS Interface Board is installed in the Control Unit, be sure to select “Disable” for “LU Ownership change Disable Mode”.

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No.	Parameter name		Construction	Kind of parameter		Default setting
6	Option	ShadowImage I/O Switch Mode	This parameter specifies an operation of a ShadowImage in-system replication P-VOL to be performed when a disk drive double failure occurs.	Disable (Not checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the status is changed to PSUE.	Disable
				Enable (Checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the executor of the host I/O is switched to an S-VOL to continue the execution.	
7		Synchronize Cache Execution Mode	This parameter specifies an operation to be performed when the Synchronize Cache command is received.	Disable (Not checked)	No operation is performed when the Synchronize Cache command is received.	Disable
				Enable (Checked)	When the Synchronize Cache command is received, the whole data in the cache memory is written to disk drives.	
8		Drive Detach Mode(*1)	Specifies an operation to be performed when a drive failure occurs in the same RAID group.	Disable (Not checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives of RAID 6) is blocked due to a failure, do not make the second(third) Disk Drive blocked.	Disable
				Enable (Checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives or RAID 6) is blocked due to a failure, block the second(third) Disk Drive and make the LUs in the RAID Group concerned blocked (unformatted status).	
9	Operation if the processor failure occurs		This parameter specifies an operation to be performed when a processor failure occurs.	Reset of occurred	The parameter resets the failure and reboots the Control Unit. (If the power supply is not turned off after the first reboot, the Control Unit is blocked when the processor failure occurs at the second time.)	Reset of occurred
				System down	The parameter blocks the Control Unit where the failure occurred.	
10	WBE Title		In the case where the Web function that is built in the disk array subsystem is displayed with the browser, this parameter specifies characters to be displayed on the title bar of the browser.	32 or less half size alphabetic characters and/ or numerals.	Characters to be entered are half size alphabetic characters, numerals, and/or characters other than numerals (excluding ', ", and \).	Not set
11	Write and verify mode		This parameter specifies an execution mode for write and verify operation for the Control Unit #0 or Control Unit #1.	ON	Only the write operation is executed skipping the verify operation to the write and verify command issued by the host.	ON
				OFF	Both the write and verify operations are executed to the write and verify command issued by the host.	

*1 : It can be set in the microprogram revision 0726/A or more and the Storage Navigator Modular V2.60 or more.

(b) Check if the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the settings that have been made are cancelled. To terminate the setting, click the [Close] button.

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(3) Setting of LAN

According to the following combination of microprogram and Storage Navigator Modular, refer the appropriate section.

Microprogram	Storage Navigator Modular	Reference section
Ver.0735/B, Ver.0740/B or more	Ver.3.53, Ver.4.01 or more	Refer to "(3-1) When the microprogram is Ver.0735/B, Ver.0740/B or more and the Storage Navigator modular is Ver.3.53, Ver.4.01 or more" (SYSPR 04-0080).
Ver.0740/A, Ver.0731/A or more, less than Ver.0735/B	Ver.4.00, Ver.3.00 or more, less than Ver.3.53	Refer to "(3-2) When the microprogram is Ver.0740/A, Ver.0731/A or more, less than Ver.0735/B and the Storage Navigator modular is Ver.4.00, Ver.3.00 or more, less than Ver.3.53" (SYSPR 04-0085).
other than those above	other than those above	Refer to "(3-3) When the microprogram is less than Ver.0731/A or the Storage Navigator Modular is less than Ver.3.00" (SYSPR 04-0088).

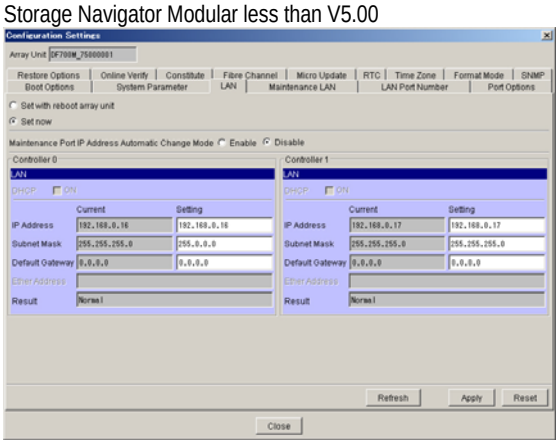
(3-1) When the microprogram is Ver.0735/B, Ver.0740/B or more and the Storage Navigator modular is Ver.3.53, Ver.4.01 or more

NOTE : When there is the LAN access such as the Storage Navigator Modular, the WEB, and the SNMP to the LAN port to be set, the setting of the LAN cannot be performed.
Request the customer to stop the LAN access to the LAN port to be set.
Furthermore, when there is a Web connection to the LAN port to be set, the setting of the LAN cannot be performed.
Request the customer to stop the LAN access to the LAN port to be set.
(The microprogram revision is 0740/C or more and the Storage Navigator Modular is Ver.4.05 or more) when the [Apply] button is clicked although there is the LAN access, an error message is displayed.
According to the error message, refer to "netstat.inf" file in the directory where Storage Navigator Modular is installed, request the customer to stop the LAN access to the LAN port to be set, and try again.

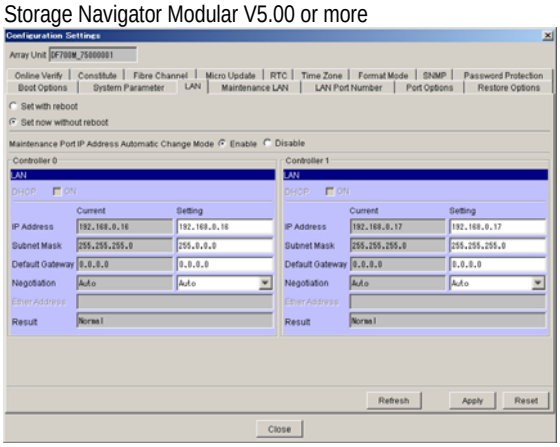
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(a) Click the [LAN] tab. The setting window of "LAN" is displayed in the Parameter window. Check "Set now" (Storage Navigator Modular less than V5.00)/"Set now without reboot" (Storage Navigator Modular V5.00 or more).

Storage Navigator Modular less than V5.00



Storage Navigator Modular V5.00 or more



However, when you want to change the DHCP function, select "Set it after restarting". In that case, be careful of the following.

NOTE :
- When the [Apply] button is clicked after entering the LAN information, the display returns to the value before the input, but the setting value is reflected by performing the restart of the subsystem.
- Do not perform the setting of the LAN to restart the subsystem while the READY LED (green) is blinking at high-speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
- If the array subsystem connected to the NAS Unit restarts, the cluster between the NAS Units stops.
  When restarting the array subsystem unavoidably, stop the cluster between the NAS Units, stop the NAS OS of both NAS Units, and then execute it. Start the cluster between the NAS Units again after completing the restart of the array subsystem.
- When the TrueCopy remote replication/TrueCopy Extended Distance is enabled, and the array subsystem to be restarted is the remote disk subsystem, transit the pair status of the TrueCopy remote replication/TrueCopy Extended Distance (S-VOL) to the PSUS, and then perform the restart.
  If the restart is executed, it becomes a path blockade, and the notice of SNMP Agent Support Function and TRAP occur. Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade of TrueCopy remote replication/TrueCopy Extended Distance automatically recovers after restarting.
- When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
  Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
  If the spin-down fails, execute the spin-down again.

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(b) Set "Maintenance Port IP Address Automatic Change Mode".

① [Disable] : Only the IP address of user management port is set.
The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.

② [Enable] : The IP address of maintenance port is changed automatically by IP address of user management port as follows. If maintenance port is used, be careful to maintenance port changed automatically.
- 10.xxx.xxx.xxx --- CTL0 : 192.168.0.16, CTL1 : 192.168.0.17
- other than 10.xxx.xxx.xxx --- CTL0 : 10.0.0.16, CTL1 : 10.0.0.17

However, in the case of following, this option is cannot be selected.
- "DHCP" is enabled.
- using the NAS model.

NOTE : In changing IP address process, following IP address of maintenance port may be set temporarily. Check following IP address is not used in the network of maintenance LAN port.

NOTE : If changing IP address is failed, the IP address of maintenance port may be set above IP address.

No.	Current IP address of user management port	Setting IP address of user management port	Temporarily IP address of maintenance port
1	172.xxx.xxx.xxx	10.xxx.xxx.xxx	CTL0:192.168.0.16, CTL1:192.168.0.17
2	other than 172.xxx.xxx.xxx	other than 10.xxx.xxx.xxx	CTL0:10.0.0.16, CTL1:10.0.0.17
3	10.xxx.xxx.xxx	172.xxx.xxx.xxx	CTL0:192.168.0.16, CTL1:192.168.0.17
4	other than 10.xxx.xxx.xxx	other than 172.xxx.xxx.xxx	CTL0:172.23.211.16, CTL1:172.23.211.17
5	other than 10.xxx.xxx.xxx, and other than 172.xxx.xxx.xxx	172.xxx.xxx.xxx	CTL0:10.0.0.16, CTL1:10.0.0.17
6	other than 10.xxx.xxx.xxx, and other than 172.xxx.xxx.xxx	other than 172.xxx.xxx.xxx	CTL0:172.23.211.16, CTL1:172.23.211.17

(c) Perform the setting of the LAN information.

① [DHCP] : The DHCP function is set.
When the checkbox is checked, the DHCP mode becomes enabled.
It cannot be selected when "Set now" (Storage Navigator Modular less than V5.00)/"Set now without reboot" (Storage Navigator Modular V5.00 or more).

② [LAN] : The LAN parameter is set.
When the checkbox of [DHCP] is checked, it becomes a gray display.

[IP Address] : The IP Address is set.
Do not set same IP address as the NNC control port when connecting it to the same network as the NNC control port with the NAS system configuration.

[Subnet Mask] : Subnet Mask is set.

[Default Gateway] : Default Gateway is set.
When network address of the default gateway is different from network address of IP address, the gateway address cannot be set.
If no Gateway address is specified, set "0.0.0.0".

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[Negotiation] : The negotiation is set.
It cannot be set when the microprogram version is less than 0750/A and the Storage Navigator Modular version is less than 5.00. In that case, it operates by the automatic negotiation.

NOTE : Use it matching the subsystem and the negotiation set to the device connected to the subsystem. When the negotiation differs between the devices, it may not be able to communicate normally.
In the combination of the negotiations set to the subsystem and set to the device connected to the subsystem, the patterns that can be operated are shown below.

		Devices connected to the subsystem				
		Auto	10 Mbps Half	10 Mbps Full	100 Mbps Half	100 Mbps Full
Subsystem	Auto	○	×	×	×	×
	10 Mbps Half	×	○	×	×	×
	10 Mbps Full	×	×	○	×	×
	100 Mbps Half	×	×	×	○	×
	100 Mbps Full	×	×	×	×	○

○ : Communication possible, × : Communication impossible

[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

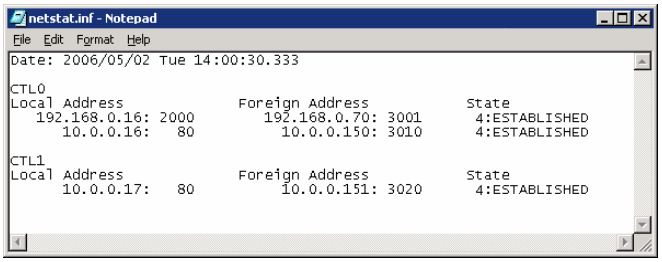
[Result] : The result of the setting processing of the LAN is displayed.
The setting results and the actions to be taken to be displayed are as shown below.

No.	Setting result	Description	Recovery method
1	-	The setting result value which is not assumed with the Storage Navigator Modular was received.	Press the [Refresh] button again. If the display becomes "---" no matter how many times it is done, set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
2	Normal	The setting processing was completed normally.	Completed normally
3	Now setting	This indicates that the setting is being processed.	Press the [Refresh] button again after waiting for a while (about five minutes). If it is still the same display no matter how many times it is updated, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
4	Abnormal (Time out)	The setting processing was not completed though it passed the fixed time.	Close all the SNMs and WEBs of the terminal connected to the user control port, and set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
5	Abnormal (A failure occurs in the disk array subsystem)	The setting processing terminated abnormally due to the internal failure occurrence.	Maintain it referring to the information message on WEB. After that, set up the LAN again immediately. When it is displayed although no failure occurs, set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))

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(d) If it is checked that the changed content is correct and the [Apply] button is clicked, the setting confirmation window is displayed. Click the [OK] button.
If "Maintenance Port IP Address Automatic Change Mode" is enabled, the unit window closes. So, register the subsystem with new IP address of maintenance port.
If the [Reset] button is clicked, the change content is cancelled. Click the [Close] button to terminate the setting.

If the microprogram revision is 0740/C or more and the Storage Navigator Modular is Ver.4.05 or more, when the [Apply] button is clicked although there is the LAN access, an error message is displayed. According to the error message, refer to "netstat.inf" file in the directory where Storage Navigator Modular is installed, request the customer to stop the LAN access to the LAN port to be set, and try again.



[Local Address] : IP address of the subsystem and LAN port number
[Foreign Address] : IP address of PC and LAN port number connecting with the subsystem
[State] : Status of TCP connection
Regardless of "Status" in the netstat.inf file, stop the all appreciation currently connecting from "Foreign address"

- 0:CLOSE : There are no connections
- 2:SYN_SENT : Waiting for reply of connection request
- 3:SYN_RCVD : Waiting for confirmation of connection reply
- 4:ESTABLISHED : Establishing connection
- 5:CLOSE_WAIT : Waiting for request of connection termination from application
- 6:FIN_WAIT_1 : Waiting for request of connection termination, or waiting for reply of connection termination sent
- 7:CLOSING : Waiting for reply of request for connection termination
- 8:LAST_ACK : Waiting for confirmation of request for connection termination
- 9:FIN_WAIT_2 : Waiting for request of connection termination
- 10:TIME_WAIT : Waiting for connection termination
- 99:--- : The status which is not assumed

(e) When "Setting result" is displayed as "Now setting", it is changing the setting.
Click the [Refresh] after waiting for a while (about five minutes).
If "Setting Result" all becomes "Normal", the setting change is completed.

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(f) When the setting change is completed, request the customer to check if it can be connected to the port for the user control.
If it cannot be connected to the user control port, check the setting content and set it again.

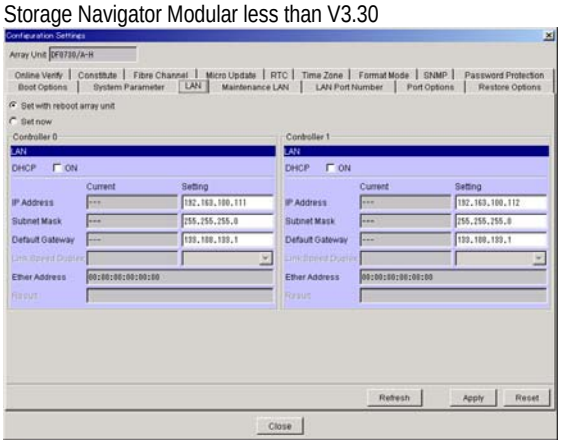
(g) Request the customer to delete the subsystem registration with the IP address before the setting, and perform the subsystem registration again the IP address after the setting with the Storage Navigator Modular.

(3-2) When the microprogram is Ver.0740/A, Ver.0731/A or more, less than Ver.0735/B and the Storage Navigator modular is Ver.4.00, Ver.3.00 or more, less than Ver.3.53

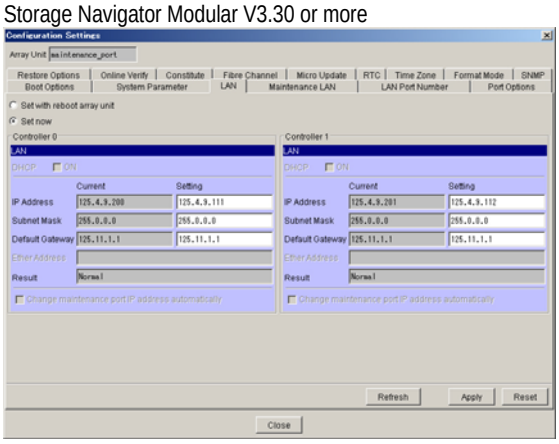
NOTE : When there is the LAN access such as the Storage Navigator Modular, the WEB, and the SNMP to the port for the user control of the Control Unit to be set, the setting of the LAN cannot be performed.
Request the customer to stop the LAN access to the port for the user control to be set.
Furthermore, when there is a Web connection to the LAN port to be set, the setting of the LAN cannot be performed.
Request the customer to stop the LAN access to the LAN port to be set.

(a) Click the [LAN] tab. The setting window of "LAN" is displayed in the Parameter window. Check "Set now".

Storage Navigator Modular less than V3.30



Storage Navigator Modular V3.30 or more



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However, when you want to change the DHCP function, select "Set with reboot array unit"

NOTE : • When the [Apply] button is clicked after entering the LAN information, the display returns to the value before the input, but the setting value is reflected by performing the restart of the subsystem.
• Do not perform the setting of the LAN to restart the subsystem while the READY LED (green) is blinking at high-speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
• If the array subsystem connected to the NAS Unit restarts, the cluster between the NAS Units stops.
When restarting the array subsystem unavoidably, stop the cluster between the NAS Units, stop the NAS OS of both NAS Units, and then execute it. Start the cluster between the NAS Units again after completing the restart of the array subsystem.
• When the TrueCopy remote replication/TrueCopy Extended Distance is enabled, and the array subsystem to be restarted is the remote disk subsystem, transit the pair status of the TrueCopy remote replication/TrueCopy Extended Distance (S-VOL) to the PSUS, and then perform the restart.
If the restart is executed, it becomes a path blockade, and the notice of SNMP Agent Support Function and TRAP occur. Perform the notice and the check to the Failure Monitoring Department in advance.
The path blockade of TrueCopy remote replication/TrueCopy Extended Distance automatically recovers after restarting.
• When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

(b) Perform the setting of the LAN information.
① [DHCP] : The DHCP function is set.
When the checkbox is checked, the DHCP mode becomes enabled.
It cannot be selected when "Set now".
② [LAN] : The LAN parameter is set.
When the checkbox of [DHCP] is checked, it becomes a gray display.
[IP Address] : The IP Address is set.
The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.
Also, do not set same IP address as the NNC control port when connecting it to the same network as the NNC control port with the NAS system configuration.
[Subnet Mask] : Subnet Mask is set.
[Default Gateway] : Default Gateway is set.
The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.
When network address of the default gateway is different from network address of IP address, the gateway address cannot be set.
If no Gateway address is specified, set "0.0.0.0".

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[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

[Result] : The result of the setting processing of the LAN is displayed. The setting results and the actions to be taken to be displayed are as shown below.

No.	Setting result	Description	Recovery method
1	-	The setting result value which is not assumed with the Storage Navigator Modular was received.	Press the [Refresh] button again. If the display becomes "---" no matter how many times it is done, set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
2	Normal	The setting processing was completed normally.	Completed normally
3	Now setting	This indicates that the setting is being processed.	Press the [Refresh] button again after waiting for a while (about five minutes). If it is still the same display no matter how many times it is updated, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
4	Abnormal (Time out)	The setting processing was not completed though it passed the fixed time.	Close all the SNMs and WEBs of the terminal connected to the user control port, and set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
5	Abnormal (A failure occurs in the disk array subsystem)	The setting processing terminated abnormally due to the internal failure occurrence.	Maintain it referring to the information message on WEB. After that, set up the LAN again immediately. When it is displayed although no failure occurs, set the LAN again. If it is still the same display, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))

③ [Change maintenance port IP address automatically] :

If you use this option, select "Set with reboot array unit". When the checkbox is checked, maintenance port is changed automatically by IP address of user management port as follows,

- CTL0 : 10.0.0.16 or 192.168.0.16
- CTL1 : 10.0.0.17 or 192.168.0.17

However, in the case of following, this option is cannot be selected.

- the microprogram is less than Ver.0733 and the Storage Navigator Modular is less than Ver.3.30.
- "Set now" is selected.
- "DHCP" checkbox is checked.
- using the NAS model.

(c) If it is checked that the changed content is correct and the [Apply] button is clicked, the setting confirmation window is displayed.
Click the [OK] button.
If the [Reset] button is clicked, the change content is cancelled. Click the [Close] button to terminate the setting.
When "Setting result" is displayed as "Now setting", it is changing the setting.

(d) Click the [Refresh] after waiting for a while (about five minutes).
If "Setting Result" all becomes "Normal", the setting change is completed.

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(e) When the setting change is completed, check if it can be connected to the port for the user control.
If it cannot be connected to the user control port, check the setting content and set it again.

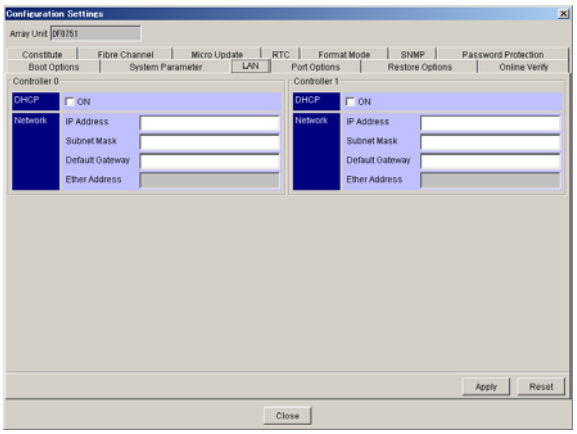
(f) Request the customer to delete the subsystem registration with the IP address before the setting, and perform the subsystem registration again the IP address after the setting with the Storage Navigator Modular.

(3-3) When the microprogram is less than Ver.0731/A or the Storage Navigator Modular is less than Ver.3.00

NOTE : • Do not perform setting of LAN while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

- When the array subsystem connected to the NAS Unit restarts, the cluster between the NAS Units stops.
  When the array subsystem is restarted unavoidably, stop the cluster between the NAS Units, stop the NAS OS of both NAS Units, and then execute it.
  Start the cluster between the NAS Units again after completing the restart of the array subsystem.
- When the TrueCopy remote replication/TrueCopy Extended Distance is enabled, and the array subsystem to be restarted is the remote disk subsystem, transit the pair status (S-VOL) of the TrueCopy remote replication/TrueCopy Extended Distance to the PSUS, and then perform the restart.
  If the restart is executed, it becomes a path blockade, and the notice of SNMP Agent Support Function and TRAP occur. Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade of TrueCopy remote replication/TrueCopy Extended Distance automatically recovers after restarting.
- When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
  Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.
  If the spin-down fails, execute the spin-down again.

(a) Click the [LAN] tab. The setting window of “LAN” is displayed in the Parameter window.



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(b) Perform the setting of the LAN information.

① [DHCP] : The DHCP function is set.
When the checkbox is checked, the DHCP mode becomes enabled.

② [LAN] : The LAN parameter is set.
When the checkbox of [DHCP] is checked, it becomes a gray display.

[IP Address] : The IP Address is set.
The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.
Also, do not set same IP address as the NNC control port when connecting it to the same network as the NNC control port with the NAS system configuration.

[Subnet Mask] : Subnet Mask is set.

[Default Gateway] : Default Gateway is set.
The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.
When network address of the default gateway is different from network address of IP address, the gateway address cannot be set.
If no Gateway address is specified, set "0.0.0.0".

[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

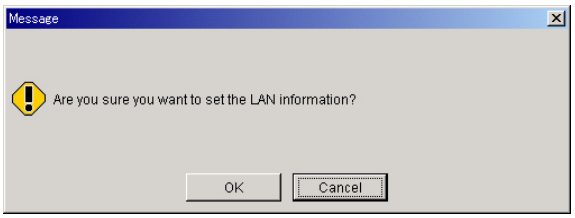
The LAN can be set to the Control Unit which connects the LAN cable.
For the dual Control Unit, connect the LAN cable to one of the Control Units and set the LAN, and then reconnect the LAN cable to the other Control Unit and set the LAN again.
Or, when setting the information of both Control Units at the same time, set LAN after connecting the LAN cable to each Control Unit.

(c) If it is checked that the changed content is correct and the [Apply] button is clicked, the setting confirmation window is displayed.
If the [Reset] button is clicked, the change content is cancelled. Click the [Close] button to terminate the setting.

NOTE : The display returns to the value before the input by clicking the [Apply] button after entering the LAN information, but the setting value is reflected by performing the restart of the subsystem.
Check if the setting content is reflected correctly after restarting.

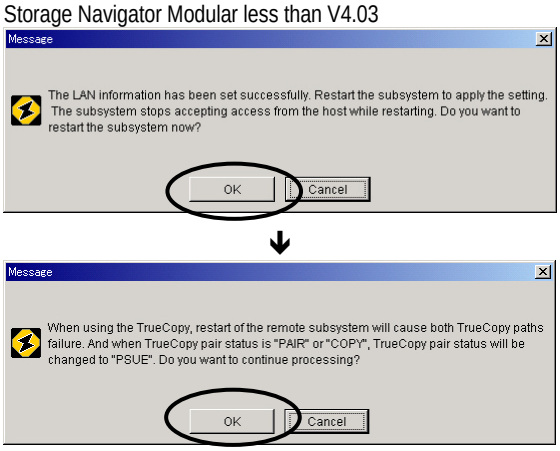
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(d) Click the [OK] button.

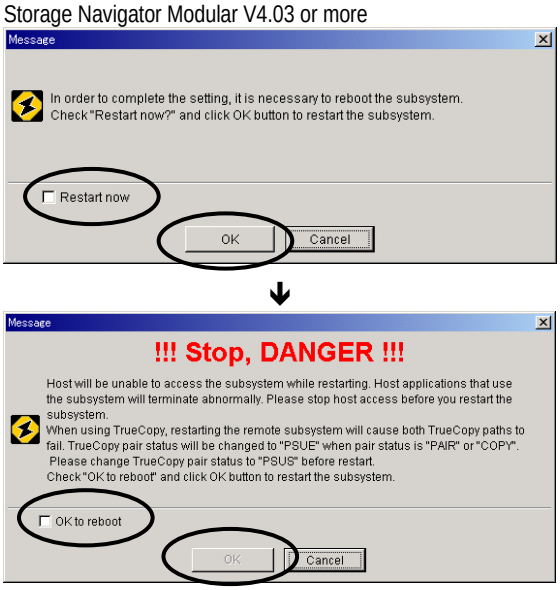


(e) To restart the array subsystem, click the [OK] button.

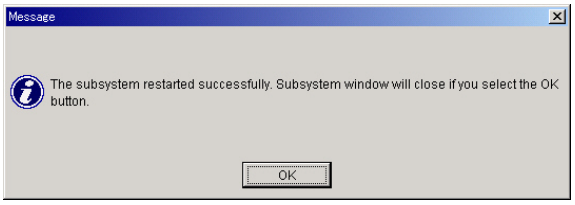
Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03



Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more



(f) When the setting is completed, the completion window is displayed. Click the [OK] button.



(g) When the setting change is completed, check if it can be connected to the port for the user control.

If it cannot be connected to the user control port, check the setting content and set it again.

(h) Request the customer to delete the subsystem registration with the IP address before the setting, and perform the subsystem registration again the IP address after the setting with the Storage Navigator Modular.

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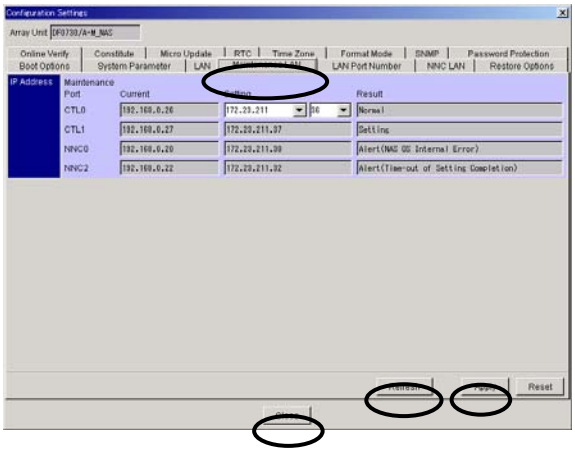
(4) Setting of Maintenance LAN

NOTE : • Do not make the setting of the Maintenance LAN while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

- If the following Microprogram revision or Storage Navigator Modular is used, this function will not work when connected to the maintenance port. Connect LAN cable to the user port and perform the setting.
  - Microprogram revision of the subsystem is 0730/A
  - Microprogram revision of the subsystem is 0726/E or less.
  - Storage Navigator Modular revision is 3.00
  - Storage Navigator Modular revision is 2.60 or less.
- When there is a connection in the maintenance port, the setting of the Maintenance LAN cannot be changed (it becomes "Connection waiting time-out"). Close all the programs which perform the communication to the maintenance port when changing the setting of the Maintenance LAN.
- If setting of user port is incorrect, the setting of maintenance port will be fail.
  Set correct setting for user port according to error message. (Refer to "4.2 (3) Setting of LAN" (SYSPR 04-0080).)
- If "Maintenance Port IP Address Automatic Change Mode" is enabled, the IP address of maintenance port can not be changed.
  If you change maintenance LAN setting, set "Maintenance Port IP Address Automatic Change Mode" to "Disable". (Refer to "4.2 (3) Setting of LAN" (SYSPR 04-0080).)

(a) Click the "Maintenance LAN" tab. The "Maintenance LAN" setting window appears is displayed in the "Parameters" window.

For the Maintenance mode



[IP address] : This is to be used to sets the IP address of the maintenance port. (When RKNAS is not connected, "NNC x" is not displayed.)

[Current] : This displays the an IP address currently set is displayed.

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[Setting] : This is to be used to sets an the IP address. It selects a network address from a pull-down menu.
The same network address as the network address of the IP address which is currently specified for the user control port cannot be set.
In the Maintenance mode, at he host address can also be selected also.

[Setting Result] : This displays a result of the IP address change process is displayed.
The setting results to be displayed and corresponding actions to be taken are shown below.

No.	Setting result	Description	Actions to be taken
1	-	An unexpected setting result value was received from through Storage Navigator Modular.	Press the [Refresh] button again. If the display becomes "---" no matter how many times it is done, set the Maintenance LAN again. If the same information is displayed in spite of the above operation, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
2	Normal	The setting result is completed normally.	(Normal completion)
3	Setting	This indicates that the setting is being processed.	Wait far a while (about five minutes), and press the [Refresh] button again. When the same information is displayed no matter how many times the update is repeated, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
4	Alert (Time-out of Disconnection)	The setting processing was not completed though it passed the fixed time.	Close all the SNMs and WEBs of the terminal connected to the maintenance port, and make the setting again. If the same information is displayed in spite of the operation above, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
5	Alert (Internal Error)	The setting processing terminated abnormally due to the internal failure occurrence.	Maintain it referring to the information message on WEB. Make the setting again immediately after the recovery. When this indication is displayed although no failure has occurred, make the setting again. If the same information is displayed in spite of the above operation, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
6	Not Specified	The NAS Unit is not started.	Wait until the NAS Unit becomes ready and press the [Refresh] button again. If the same information is displayed no matter how many times the update is repeated, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
7	Setting Reserved	The NAS Unit stops.	Wait until the NAS Unit restarts, and press the [Refresh] button again. When the same information is displayed no matter how many times the update is repeated, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))

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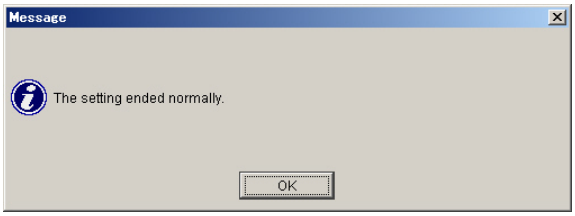
No.	Setting result	Description	Actions to be taken
8	Alert (Time-out of Setting Completion)	The setting result is not returned from the NAS OS.	Check that no trouble has occurred in the NAS Unit and make the setting again. If the same information is displayed in spite of the above operation, replace the Control Unit, PCI Express, and/or NAS Chassis. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390), DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
9	Alert (NAS OS Internal Error)	A trouble occurred in the NAS OS during the process.	Check that no trouble has occurred in the NAS Unit and make the setting again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
10	Alert (Time-out of Setting)	A time-out occurred in the NAS OS during the process.	Check that no trouble has occurred in the NAS Unit and make the setting again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
11	Alert (Segment Duplication)	The network address of the IP address intended to be set is already used for a port of the NAS Unit.	Set the other IP address of the maintenance port. When the same information is displayed no matter which IP address is specified, set the maintenance port IP address, which has been set before the change, again, and change the duplicate IP address of the port.

(b) When you check that the changes is correct and click the [Apply] button, the setting confirmation window is displayed.
If you click the [Reset] button, the change is canceled. To terminate the setting, click the [Close] button.

(c) Click the [OK] button in the setting confirmation window.



(d) The following confirmation window is displayed when the setting change is received. Click the [OK] button. The change process is started.



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(e) Close the unit window, and check that the Storage Navigator Modular can be connected to the subsystem by the set IP address (refer to "1.1 Procedure for connecting Storage Navigator Modular with the subsystem" (SYSPR 01-0010).).
When it cannot be connected even if five minutes or more passed after starting the setting change, connect it to the subsystem with the IP address before the change, and maintain it according to the message of the setting result displayed in the setting window of "Maintenance LAN".

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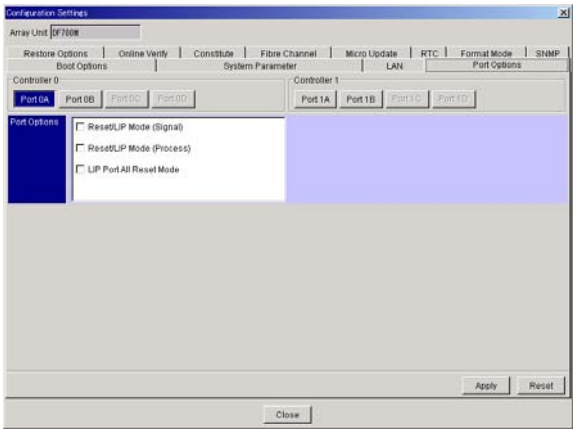
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(5) Setting of Port Options

(a) Click the [Port Options] tab. The window for setting the "Port Options" is displayed in the Parameter window.

(b) Click the [Port 0A] button.



[Port Options] : Specify a port options. Select an option you want to set by clicking its check box.

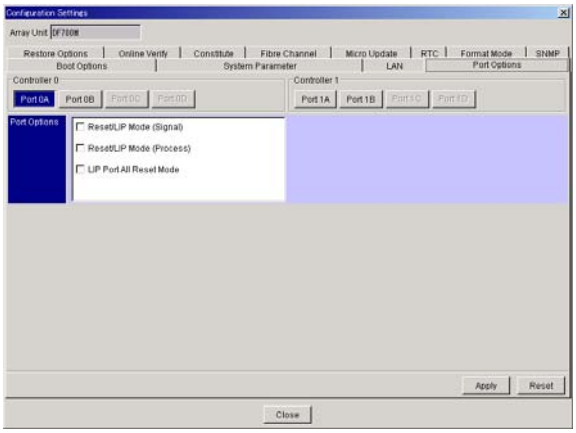
[Reset/LIP Mode 'Signal] : This is a mode for transmitting the Reset/LIP signal to another port.

[Reset/LIP Mode (Process)] : This is a mode for propagating the reset operation to another port.

[Reset ALL LIP Port Mode] : This is a mode for executing the reset operation when the LIP is received.

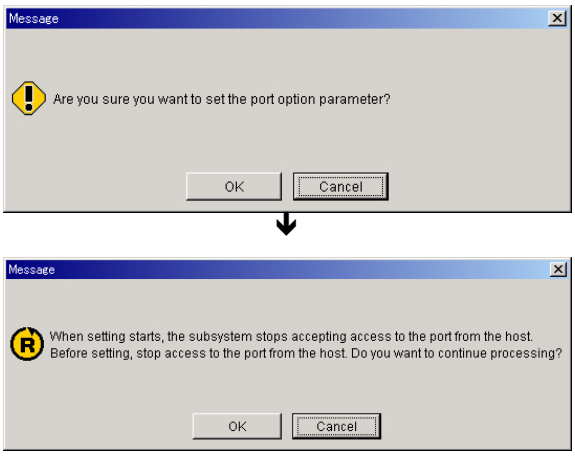
NOTE : The Reset/LIP mode (signal transmission) is effective when the Reset/LIP mode (processing transmission) is set.

(c) When the changes is completed, click the [Apply] button at lower right corner of the "Parameter" window. When the [Reset] button is clicked, the change is cancelled.

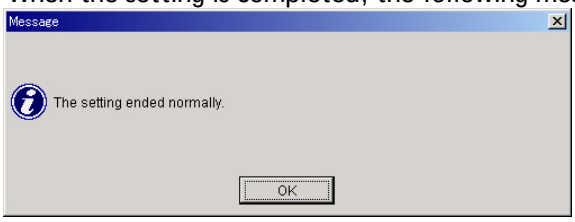


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(d) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.

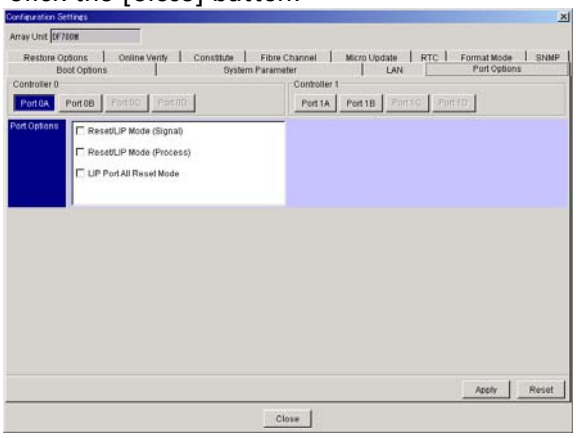


(e) When the setting is completed, the following message is displayed. Click the [OK] button.



(f) The setting/verification of the port 0A is completed. Do the same for the other ports.

(g) Click the [Close] button.



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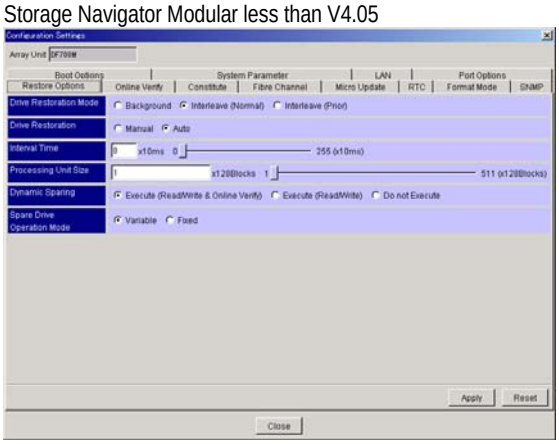
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(6) Setting of Restore Options

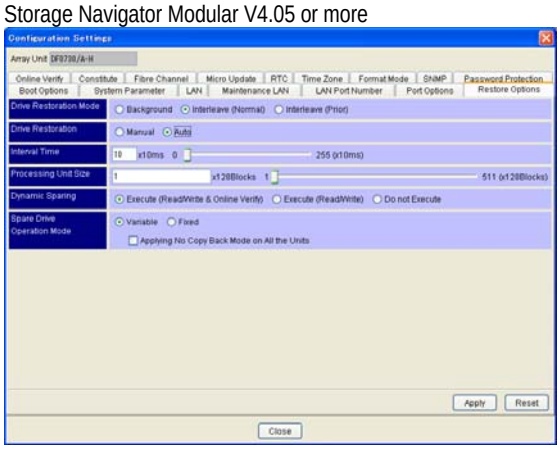
It becomes availableness as soon as possible when an option is set up by using this function during the drive is being restored.

(a) Click the [Restore Options] tab. The window for setting the "Restore Option" is displayed in the Parameter window.

Microprogram less than Ver.4.0C,
Storage Navigator Modular less than V4.05



Microprogram Ver.4.0C or more,
Storage Navigator Modular V4.05 or more



① [Drive Restoration Mode] : Specify a method of drive restoration.

[Background] : The restoration is performed at a free time when no host I/O operation is performed.

[Interleave (Normal)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is given to a host command. (The restoration is performed after a host command execution is completed.)

[Interleave (Prior)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is taken to a host command.

② [Drive Restoration] : Specify whether to start operations (data restoration onto a failed drive, data restoration onto a spare drive, data copying from a spare drive to an original drive, and dynamic sparing) automatically or manually.

[Manual] : A data restoration and data copying from a Spare Drive to an original drive are started manually. (Not supported)

[Auto] : A data restoration and data copying from a Spare Drive to an original drive are started automatically.

③ [Interval Time] : Specify an interval of the restoration.
The default value is 0x10 ms. Concurrently with I/Os from the host, the restorations are performed in succession.
Treat 10ms as the unit and specify a multiplier within a range of 0 to 255.

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④ [Processing Unit Size] : Specify a size of data to be restored.
The default value is 128 blocks; data of 64kbytes is restored at a time. When "Interleave" is specified, specified size of data is restored, a time specified as the "interval time" is waited for, and the next restoration is performed.
Treat 512 bytes (1 block) as the unit and specify a multiplier within a range of 1 to 511.

⑤ [Dynamic Sparing] : Specify a mode (for restoring data onto a Spare Drive) to be used when the failure count exceeds a threshold value controlled in the preventive maintenance.

[Execute (Read/Write & Online Verify)] : When the count of read/write errors or online verification errors exceeds a threshold value, data is restored onto a spare drive (in the case where the spare drive is unused) and failed drive is detached.

[Execute (Read/Write)] : When the count of read/write errors exceeds a threshold value, data is restored onto a Spare Drive (in the case where the Spare Drive is unused) and failed drive is detached.
When the count of online verification errors exceeds a threshold value, the dynamic sparing is not performed.

[Do not Execute] : When the count of read/write errors or online verification errors exceeds a threshold value, the dynamic sparing is not performed.

⑥ [Spare Drive] : Set whether to make the copy backless function (‡1) enable or disable.
It is set as [Variable] in default, and the Copy backless function is enabled.

Table 4.2.2 Setting and Operation Specifications of "Spare Drive" and "Applying No Copy Back Mode on All the Units"

Spare Drive	Applying No Copy back Mode on All the Units	Operation specification				
		The relationship between the Failed Disk Drive and the Spare Disk Drive				Restrictions / Notes
		The capacity and the rotational speed are corresponding	The capacity and the rotational speed are not corresponding	Only the capacity is corresponding	Only the rotational speed is corresponding	
Fixing (Fixed)	-	Copy back	Copy back	Copy back	Copy back	The location of the Disk Drive which configures the RAID Group never changes from the time of creating the RAID Group. Therefore, this parameter is set when fixing the location of the Disk Drive which configures the RAID Group.

‡1 : For details of the Copy backless function, refer to Theory "4.6 (3) Operation after replacing the failed Disk Drive" (THEO 04-0240)

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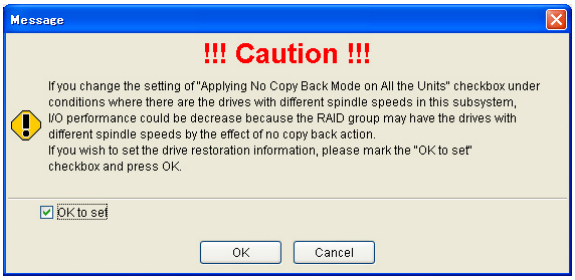
Spare Drive	Applying No Copy back Mode on All the Units	Operation specification				Restrictions / Notes
		The relationship between the Failed Disk Drive and the Spare Disk Drive				
		The capacity and the rotational speed are corresponding	The capacity and the rotational speed are not corresponding	Only the capacity is corresponding	Only the rotational speed is corresponding	
Variable (Variable) (*1) (This is set in default.)	Microprogram revision less than 0740/C					
	-	Copy backless (However, the Disk Drive of RKA is Copy back.)	Copy back	Copy back	Copy back	-
	Microprogram revision 0740/C or more					
	Disable	Copy backless (However, the Disk Drive of RKA is Copy back.)	Copy back	Copy back	Copy back	(This is set in default.)
	Enable	Copy backless	Copy back	Copy backless	Copy back	This parameter is set when making the Disk Drive of the RKA a target of the Copy backless. However, it is required to observe the restrictions on the operation shown below when setting this parameter. Basically, observe the operational restriction shown in (a). In an unavoidable case, observe the operational restriction shown in (b). (a) The FC Disk Drive to be installed in the subsystem must be unified to the Disk Drive of the same rotational speed. (b) When the FC Disk Drives whose rotational speeds are different exist in the subsystem, the I/O performance for the FC Disk Drives to be installed in the subsystem, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance must be all designed as the FC Disk Drives of 10,000 min^{-1} rotation. When the FC Disk Drives of 10,000 min-1 rotation and 15,000 min-1 rotation are mixed in the subsystem, if the Copy backless operates, the RAID Group may be configured of the FC Disk Drives of 10,000 min^{-1} rotation and 15,000 min^{-1} rotation. If this condition occurs, the FC Disk Drives of 10,000 min^{-1} rotation are newly added to the Disk Drives which configure the RAID Group even though the RAID Group is created by the FC Disk Drives of 15,000 min^{-1} rotation, and the I/O performance for the LU created in the RAID Group, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance are deteriorated. Also, when the setting is changed to “Invalid”, investigate if there is a RAID Group in which the FC Disk Drives of different rotational speeds are mixed, and check that there is no problem on the I/O performance, the copy performance of the copy system function of the priced options (ShadowImage in-system replication, etc.), the format performance and the Disk Drive restoration performance.

*1 : When the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS/RKXS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

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(b) Verify that the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled. To terminate the setting, click the [Close] button.

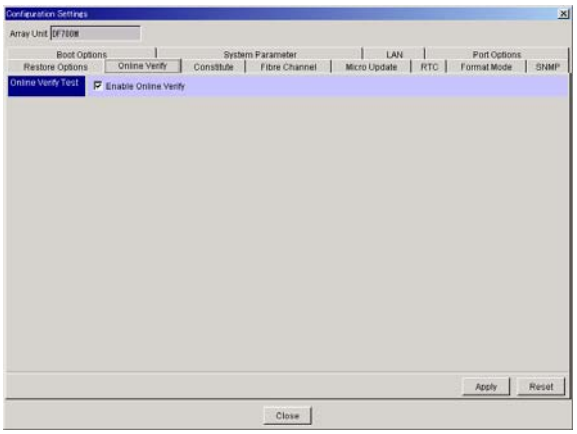
(c) Click the [OK] button following the displayed message.
However, the following message is displayed in the combination of the microprogram revision 0740/C or more and the Storage Navigator Modular Ver. 4.05 or more.
When changing the setting of “Copy backless permission of all chassis”, check that the customer/SE can strictly observe the restrictions on the operation shown in the underlined part of the Table 4.2.2 above, and click the [OK] button after turning on the [Agree] checkbox following the message.



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(7) Setting of Online Verify

(a) Click the [Online Verify] tab. The window for setting the "Online Verify" is displayed in the Parameter window.



① [Online Verify Test] : Set whether or not to carry out the online verification test. When the check box is checked, the test is carried out. However, the online verify test is not executed for the Disk Drives in the RAID Group to which the Power Saving function is set.

(b) Verify that the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled. To terminate the setting, click the [Close] button.

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(8) Setting of Constitute

Output configuration information of the disk array subsystem to a text file or set the configuration by using the text file.

The configuration information to be output to a text file includes RAID group/logical unit, system parameters, and port/host group information.

The configuration to be set includes RAID group/logical unit, system parameters, and port/host group information.

Each element of the configuration, that is, RAID group/logical unit, system parameters, or port/host group information is operated by a respective file.

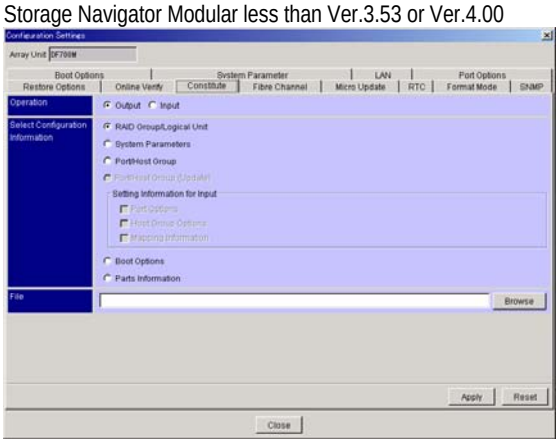
You can copy the configuration from/to the disk array subsystems by outputting the configuration information from the disk array subsystem to a text file and setting it for another disk array subsystem using the text file that has been output.

You can set a disk array subsystem by editing the text file. Use this function to create the same disk array subsystem. Change the element of the configuration using a respective function.

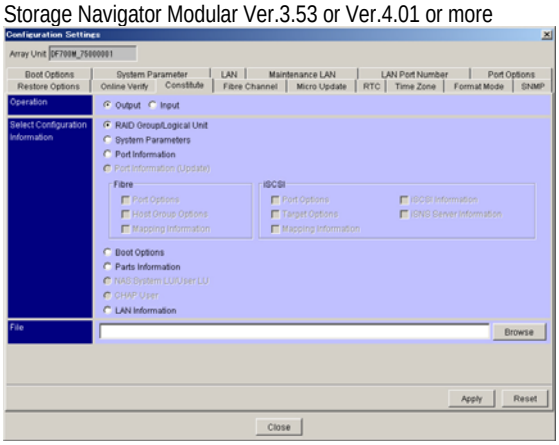
NOTE : Do not perform the text input of Boot Options of the configuration copy information while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH). (Do not select [Input] or [Boot Options].)

(a) Click the [Constitute] tab. The window for setting the "Constitute" is displayed in the Parameter window.

Storage Navigator Modular less than Ver.3.53 or Ver.4.00



Storage Navigator Modular Ver.3.53 or Ver.4.01 or more



① [Operation] : Output the set information to a text file or enter the information to be set.

[Output] : Selected information is output to a text file with a specified file name.

[Input] : Selected information is loaded and set with a specified file name.

② [Select Configuration Information] : Select information to be output to the text file or to be set through a reading of a text file.

[RAID Group/Logical Unit] : This is information on definition of the RAID group/logical unit set for the disk array subsystem.

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[System Parameters] : This is the setting of system parameters made for the disk array subsystem.

[Port/Host Group] : This is information on the port/host group set for the disk array subsystem.

[Port/Host Group (Update)] : This is port/host group information to be set for the disk array subsystem.

[Setting Information for Input] : Select information to be set from the following items.

[Port Options] : Specify this when setting a port option.

[Host Group Options] : Specify this when setting a host group option.

[Mapping Information] : Specify this when setting a mapping information.

[Boot Option] : This is the setting of Boot Option made for the disk array subsystem.

[Parts Information] : This is the setting of parts information made for the disk array subsystem.

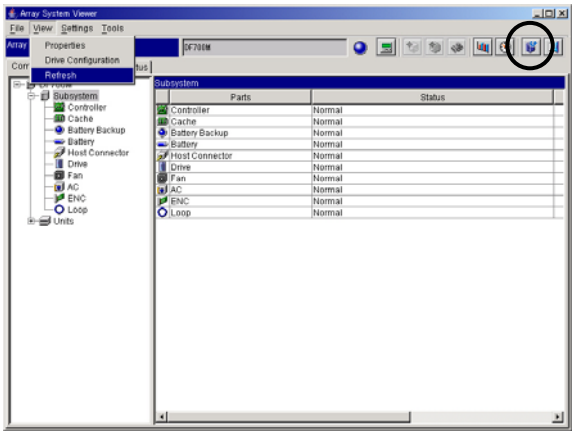
[LAN Information] : This is the setting of LAN information for user management port and maintenance port. (It is effective when the microprogram is Ver.0735/B or Ver.0740/B or more, and the Storage Navigator Modular is Ver.3.53 or Ver.4.01 or more.)

NOTE : When you input LAN Information file, note following.

- If the “Maintenance Port IP Address Automatic Change Mode” is “ON” in the file; the IP address of maintenance port written in the file will be ignored. However, do not delete the setting of maintenance port written in the file.
- If “Maintenance Port IP Address Automatic Change Mode” is “OFF” in the file; only the network address for the IP address of maintenance port written in the file is reflected.

(b) To terminate the setting, click the [Close] button.

(c) The unit screen is displayed. When you set the composition of [RAID/Logical Unit File], click the RAID group for which an LU is to be created, and then select [View] – [Refresh] or click [ : Refresh].

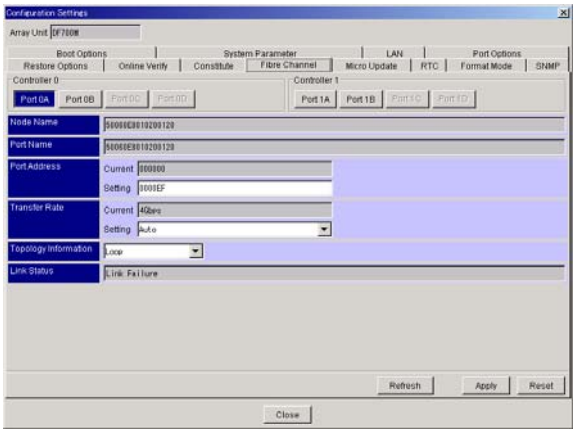


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(9) Setting of Fibre Channel

(a) Click the [Fibre Channel] tab. The window for setting the "Fibre Channel" is displayed in the Parameter window.

(b) Click the [Port 0A] button.



① [Node Name] : Data of eight bytes is displayed with a hexadecimal number (16 characters).

② [Port Name] : Data of eight bytes is displayed with a hexadecimal number (with 16 characters).

③ [Port Address] : A port address is displayed or set with a six-figure hexadecimal number.

<Current Value>

A current port address is displayed with a six-figure hexadecimal number.

<Setting>

A port address you want to set with a six-figure hexadecimal number.

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④ [Transfer Rate] : A transfer rate of the Fibre Channel can be displayed or set.

<Current Value>

A current transfer rate of the Fibre Channel is displayed.

<New Value>

[1Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 1Gbps.

[2Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 2Gbps.

[4Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 4Gbps.

[Auto] : Set this when using the Fibre Channel at a transfer rate that is changed automatically.

NOTE : Set [Transfer Rate] of Fibre Channel to the same value as the transfer rate of devices connected directly with an array subsystem.
Also, when connecting it to SANRISE Universal Storage Platform, SANRISE Network Storage Controller or SANRISE 9900V directly, set the transfer speed of both Fibre Channel ports to the same fixed speed (any of [1 G bps], [2 G bps] and [4 G bps]).

Transfer Rate of Devices Connected with an Array Subsystem	Transfer Rate of an Array Subsystem
1G bps	1G bps
2G bps	2G bps
4G bps	4G bps
Auto (*1)	Transfer Rate (*2)

*1 : When Array Subsystem is connected to Devices(SANRISE Universal Storage Platform, SANRISE Network Storage Controller, SANRISE 9900V directly) as an external storage, set the transfer rate of Devices to other than "Auto", and set the transfer rate of Array Subsystem to the same transfer rate as Transfer Rate of Devices.

*2 : Set Transfer Rate of an Array Subsystem as follows.

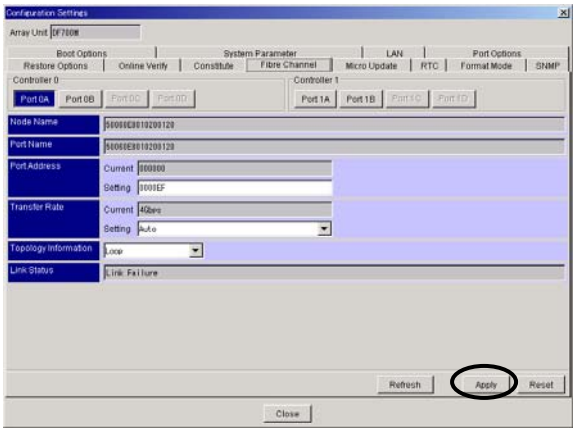
Transfer Rate of Devices [MAX Speed]	Transfer Rate of an Array Subsystem
Auto [2G bps]	2G bps
Auto [4G bps]	4G bps
Auto [unknown]	Auto

⑤ [Topology Information] : The topological setting value is specified through a selection from a pull down menu. When connecting it to SANRISE Universal Storage Platform, SANRISE Network Storage Controller or SANRISE 9900V directly, specify [Loop].

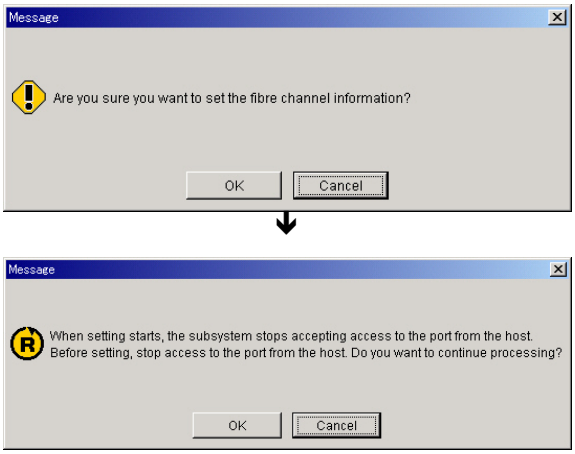
⑥ [Link Status] : This item cannot be set for the DF700.

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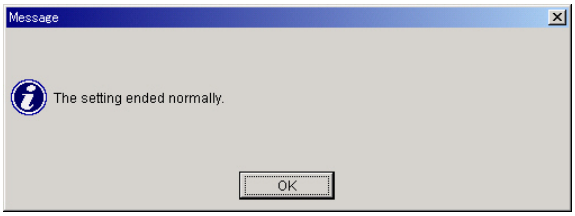
(c) When the changes is completed, click the [Apply] button at lower right corner of the "Configuration Settings" window.



(d) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.

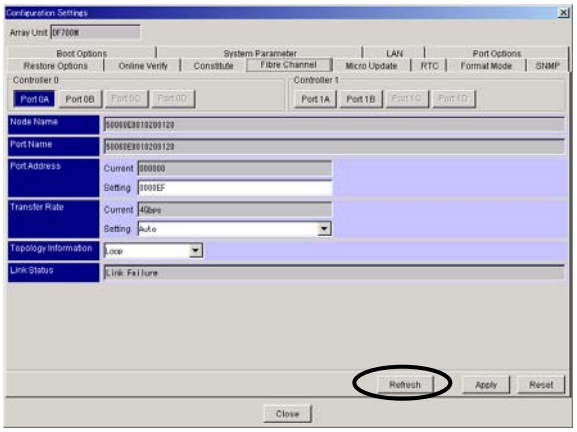


(e) When the setting is completed, the following message is displayed. Click the [OK] button.



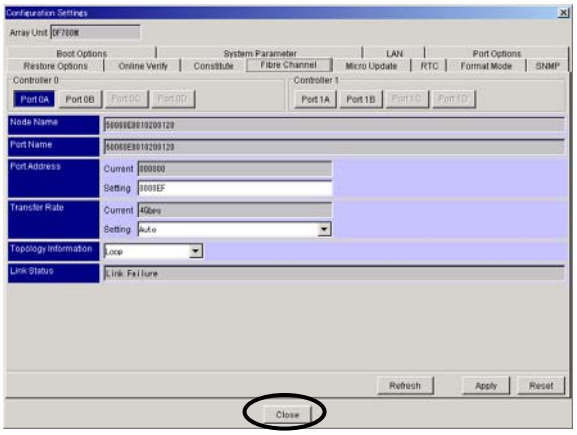
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(f) Click the [Latest Information Display] button at the lower right part of the "Parameter" window to check if the setting is reflected on the display.



(g) The setting /verification for the Port 0A is completed. Do the same for the other ports.

(h) When the setting for all the ports are completed, click the [Close] button.



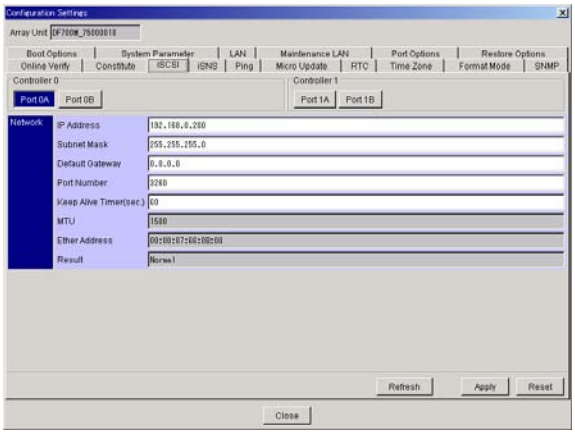
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(10) Setting of iSCSI

Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

(a) Click the [iSCSI] tab. The window for setting the "iSCSI" is displayed in the Parameter window.

(b) Click the [Port 0A] button.



① [IP Address] : The IP Address can be set in the decimal number form.

② [Subnet Mask] : The Subnet Mask can be set in the decimal number form.

③ [Default Gateway] : The Default Gateway can be set in the decimal number form.

④ [Port Number] : The Port Number can be set in the decimal number form.

⑤ [Keep Alive Timer(sec.)] : The Keep Alive Timer(sec.) can be set in the decimal number form.

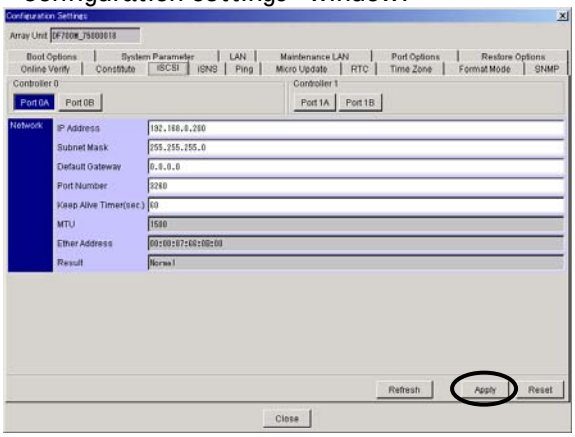
⑥ [MTU] : This item cannot be set for the DF700.

⑦ [Ether Address] : This item cannot be set for the DF700.

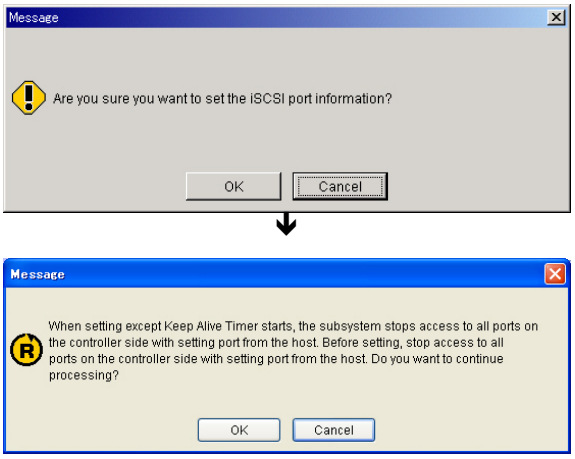
⑧ [Result] : This item cannot be set for the DF700.

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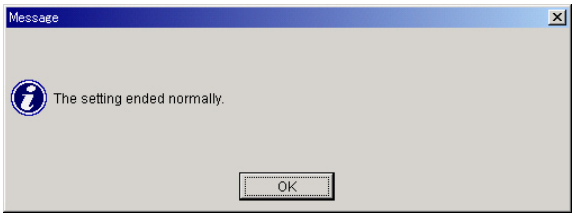
(c) When the changes is completed, click the [Apply] button at lower right corner of the "Configuration Settings" window.



(d) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.

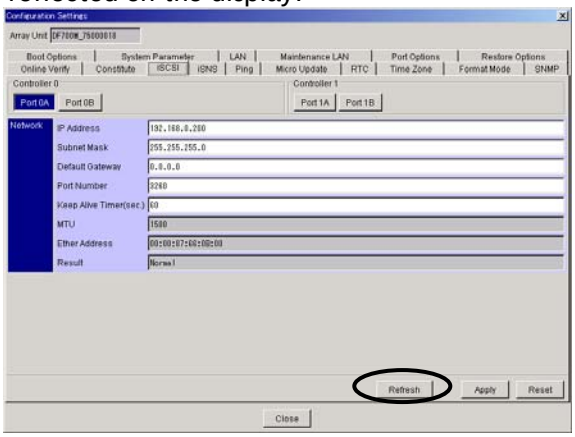


(e) When the setting is completed, the following message is displayed. Click the [OK] button.



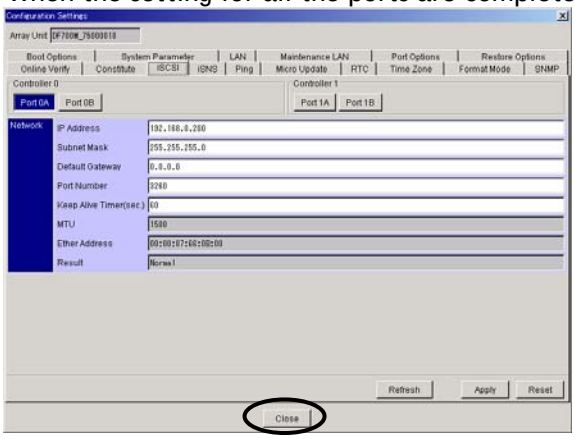
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(f) Click the [Refresh] button at the lower right part of the window to check if the setting is reflected on the display.



(g) The setting /verification for the Port 0A is completed. Do the same for the other ports.

(h) When the setting for all the ports are completed, click the [Close] button.



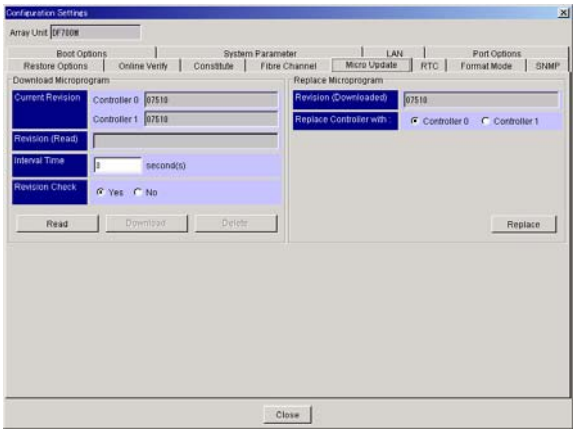
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(11) Setting of Micro Update

Replace microprograms of the controllers with the microprogram downloaded onto the disk array subsystem.

When performing the replacement, be sure to replace microprograms of the both controllers (controller #0 and controller #1).

(a) Click the [Micro Update] tab. The window for setting the "Micro Update" is displayed in the Parameter window.



<Download Microprogram>

① [Current Revision] : The microprogram revision of each controller of the disk array subsystem is displayed.

② [Revision(Read)] : The revision of the microprogram loaded on to the computer, in which Storage Navigator Modular is installed, is displayed. When the microprogram is not loaded, a blank is displayed.

③ [Interval Time] : Set an interval of downloading. Set it within a range of 1 to 60 seconds.

NOTE : You can use it while an I/O requested by a host computer is executed, however, the I/O performance of the host computer is lowered when the downloading is performed. To prevent the performance from the lowering, make the interval longer.

④ [Revision Check] : Instruct to perform the revision check of the microprogram to be downloaded.

[Yes] : Select it when upgrading the version of the microprogram by the online replacement ([Yes] is selected by default).

[No] : Select it when downgrading the version of the microprogram.

⑤ [Read] : Load the microprogram onto the computer in which Storage Navigator Modular is installed. Specify the directory in which the microprogram is installed following the instructions given in the window.

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⑥ [Download] : Download the microprogram onto the disk array subsystem.

NOTE : When the microprogram is not loaded, this item is grayed and cannot be selected.

⑦ [Delete] : Delete the microprogram loaded onto the computer in which Storage Navigator Modular is installed.

NOTE : When the microprogram is not loaded, this item is grayed and cannot be selected.

<Replace Microprogram>

① [Revision(Downloaded)] : The microprogram that has been read in is downloaded to the disk array subsystem.

② [Replace Controller with] : Replace the microprogram of the controller specified.

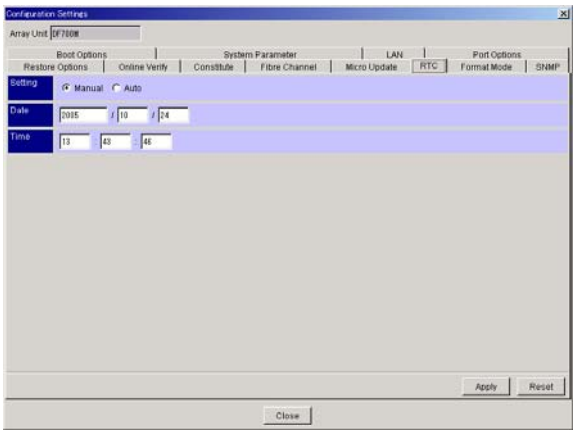
NOTE : When the replacement is performed for only one of the controllers, the disk array subsystem is given a warning. The warning is cancelled when the microprogram of another controller is replaced. When replacing the microprogram, be sure to perform the replacement for the both controllers continuously.

(b) To terminate the setting, click the [Close] button.

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(12) Setting of RTC

(a) Click the [RTC] tab. The window for setting the "RTC" is displayed in the Parameter window.



① [Setting] : Specify the method for the setting.
[Manual] : Set a date and time to be set.
[Auto] : Set the time of the personal computer or server workstation that executes Storage Navigator Modular.

② [Date] : The date currently set can be displayed or set.

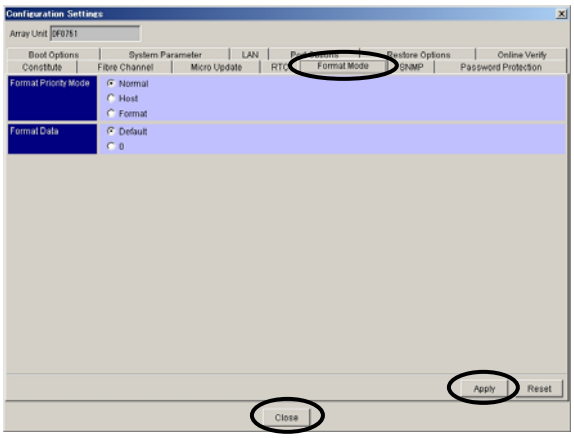
③ [Time] : The time currently set can be displayed or set.

(b) Verify that the changes that has been made is correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled. To terminate the setting, click the [Close] button.

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(13) Setting of Format Mode

(a) Click the [Format Mode] tab. The window for setting the "Format Mode" is displayed in the Parameter window.



[Format Priority Mode] : Select a mode for giving/not giving priority to a formatting.

[Normal] : When the load of the host I/O is low, the format processing is executed continuously, and if not, it is executed in every constant interval. This is the setting of default.

[Host] : When the format priority mode is "Normal" and the format is performed during the copy/restoration of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot, the copy/restoration performance may be greatly deteriorated. In that case, make the format priority mode "Host" and limit the operation of the format.
The format processing is executed in every constant interval according to the load of the host I/O. The deterioration of the host I/O performance is reduced.

[Format] : The "Format" of the format priority mode is a mode that makes the effect by the host access a minimum and completes the format quickly for the format online by the Disk Drive addition or the format online by the recovery work for the dual failures of the Disk Drive.
The format processing is executed regardless of the load of the host I/O. The host access performance may be deteriorated in the meantime because the host I/O processing which can be executed per unit of time decreases substantially.

[Format Data(‡1)] : Select to a format Data.

[Default] : A formatting is performed when default Data.

[0] : A formatting is performed when 0.
This is set when it is necessary to clear the logical unit by the data of 0(zero) connecting the subsystem to SANRISE Universal Storage Platform or SANRISE Network Storage Controller.

‡1 : Format Data is supported in Storage Navigator Modular Revision Ver.2.00 or more.

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NOTE : Be careful that "Format" or the format priority mode which restricts the command from the host significantly influences the access performance of the host.
Also, in the case shown below, if the format priority mode is made "Format", the host access performance may be greatly deteriorated, or the command may be time-out, so that do not set the format priority mode to "Format".

- When the host access is performed for LU in the RAID Group which is the same as the LU in format
- When the format is performed while ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot is in use
- When the format is performed during execution of the forced parity correction.

The host performance and the standard of the format time when each format priority mode is specified are shown below. (*3)

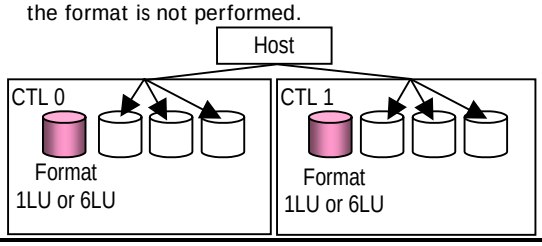
No.	Mode	1 LU/CTL format			6 LU/CTL format		
		Without host access	With host access		Without host access	With host access	
		Format performance (*1)	Host performance (*2)	Format performance (*1)	Format performance (*1)	Host performance (*2)	Format performance (*1)
1	Normal (*1)	100 %	75 %	7 %	100 %	75 %	25 %
2	Host	7 %	85 %	5 %	30 %	90 %	20 %
3	Format	100 %	35 %	90 %	100 %	30 %	90 %

*1 : The format performance is described as 100 % when the format priority mode is set to "Standard" and the format is executed in the condition that there is no access from the host computer.

*2 : The host performance is 100 % when the format is not performed.

*3 : The comparative performance is for the following configuration, and it changes according to the configuration or the amount of the host access. Also, the comparative performance changes for the host access for the LU in format.
Configuration of the performance measurement and explanation of the condition

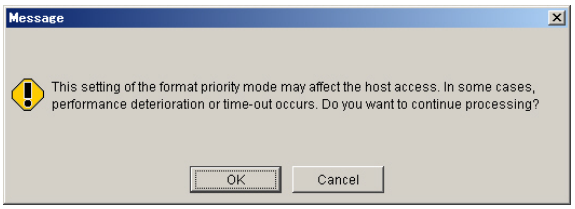
- All the LUs are created in another RAID Group, and the host I/O of random RD/WR=75 %:25 %, length 4 k bytes and TAG8 is executed in the LU (3 LU/CTL) that the format is not performed.



(b) Verify that the changes that has been made is correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled.

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(c) If the Format Priority Mode is select to “Format”, the following window is displayed. Click [OK] button to set it to “Format”.



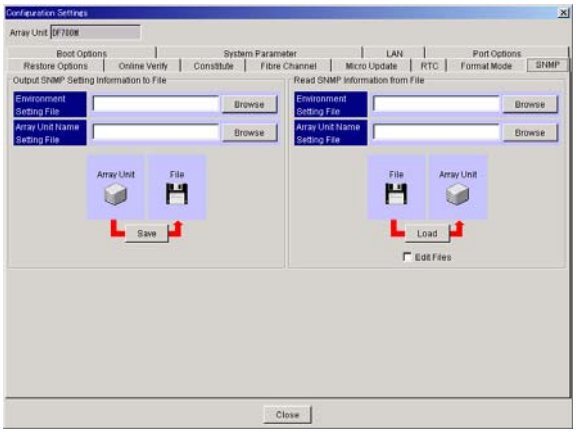
(d) To terminate the setting, click the [Close] button.

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(14) Setting of SNMP

NOTE : Do not perform setting of SNMP while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

(a) Click the [SNMP] tab. The window for setting the "SNMP" is displayed in the Parameter window.



<Output SNMP Setting Information to File>

① [Environment Setting File] : Environment setting file is output to a text file with a specified file name.

② [Array Unit Name Setting File] : Array Unit Name setting file is output to a text file with a specified file name.

<Read SNMP Information from File>

① [Environment Setting File] : Environment setting file is loaded and set with a specified file name.

② [Array Unit Name Setting File] : Array Unit Name setting file is loaded and set with a specified file name.

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(b) Setting the operation environment and the disk array subsystem name

(i) Preparation of the operation environment setting file and the disk array name setting file

- The samples of the operation environment setting file (config.txt) and the disk array subsystem name setting file (name.txt) are stored in the priced option program (SNAP). Edit them according to the SNAP environment beforehand.

  NOTE : Refer to the manual attached to the priced option program for the editing method.

- Store the edited files (config.txt and name.txt) in the service PC.
  Example) \\Windows (or WinNT)\Temp\

(ii) Loading the edited files

- Specify the path, in which the operation environment setting file (config.txt) is stored, in the column of the operation environment setting file of the "Setting SNAP Information from File".
- Specify the path in which the disk array subsystem name setting file (name.txt) is stored, in the column of the disk array subsystem name setting file.
- Click the [Load] button.

(c) Checking the settings

(i) Outputting the edited files

- Specify the path in which the operation environment setting file (config.txt) is stored, in the column of the operation environment setting file of the "Output SNMP Setting Information to File"
- Specify the path in which the disk array subsystem name setting file (name.txt) is stored, in the column of the disk array subsystem name setting file.
- Click the [Save] button.

(ii) Checking the operation environment setting file and the disk array subsystem name setting file

- Open the operation environment setting file (config.txt) and the disk array subsystem name setting file (name.txt) stored in the specified paths and check if the settings are reflected appropriately.
- If the setting is wrong or not reflected, terform the procedure (c) after correcting the setting file.
  The correction of the setting and the reflection in the subsystem can be performed by making the check box of "Edit" effective and by clicking the [Load] button.

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(15) Setting of Time Zone

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

When it is the time of the NAS unit connection, setting the Time Zone is necessary. Except for this connection, setting the Time Zone isn't necessary. If there is the NTP server in users's site and the user want to synchronize the clock of disk array subsystem to NTP server, execute this setting.

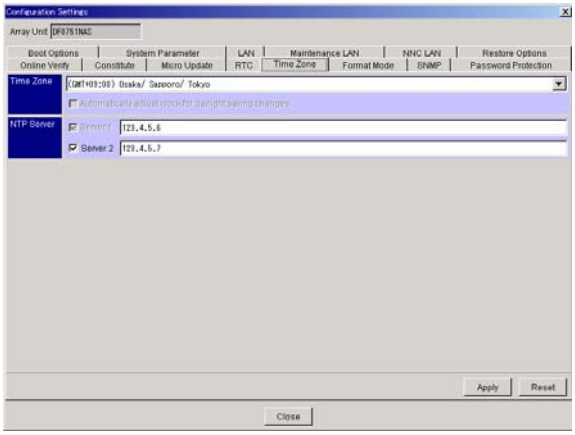
(a) Before setting Time Zone

When setting the Time Zone at the time of the NAS Unit connection, it is necessary to restart the NAS OS of the NAS Unit after clicking the [Apply] button in (c).

When setting the Time Zone online at the time of the NAS unit connection, check that the fail-over of the NAS Unit by the user is completed before performing the operations following (b). Restart the NAS OS of the NAS Unit after clicking the [Apply] button in (c) (refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)).

Then, check that the fail-back by the user is completed.

(b) Click the [Time Zone] tab. The setting window of "Time Zone" is displayed on the parameter window.



① [Time Zone] : Refer to/set the time zone.
The default value is "(GMT+9:00) Osaka/ Sapporo/ Tokyo".
[Automatically adjust clock for daylight saving changes]: Specify whether to use the summer time.

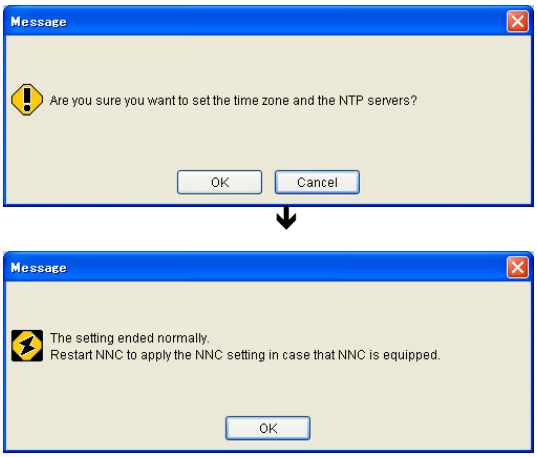
② [NTP Server] : Refer to and set the IP address of the NTP server.

NOTE : Input is surely required for "Server 1". Because "Server 2" is for standby, input is not indispensable.

(c) Check that the changes content is correct and click the [Apply] button. The content of the change is canceled by clicking the [Reset] button. Click the [Close] button to end the setting.

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(d) A message asking you to verify the setting is displayed.



NOTE : When the NAS OS is stopped or uninstalled, disregard this message.

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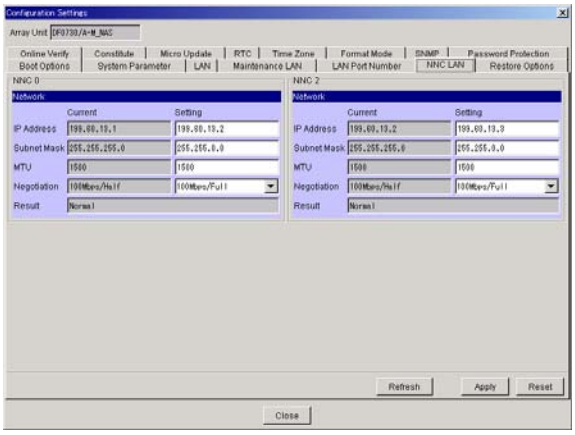
(16) Setting of NNC LAN

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

NOTE : At the time of setting the NNC LAN, do not perform the configuration change of the NNC control LAN (insertion/pulling out of the LAN cable, etc.).

(a) Click the [NNC LAN] tab. The setting window of "NNC LAN" is displayed on the parameter window.

NOTE : The combination of the NNC to be set differs depending on the subsystem configuration. The following window shows NNC 0 and NNC 2, but the combination may be NNC 1 and NNC 3 according to the subsystem configuration. There is no difference for the setting items.



① [Network] : Refer to/set the network setting of the NNC control port.

[IP Address] : Specify the display of the current value of the IP address and the setting value.

[Subnet Mask] : Specify the display of the current value of the subnet mask and the setting value.

[MTU(‡1)] : Specify the display of the current value of the MTU and setting value. The setting value can specify the range of 1500 to 16110 only with a number. The same value must be set for both NNCs. The default value and the recommended value are "1500".

[Negotiation] : Specify the display of the current value of the negotiation and setting value.

‡1 : The MTU indicates the maximum value of the data which can be sent at one transfer through the communication network.

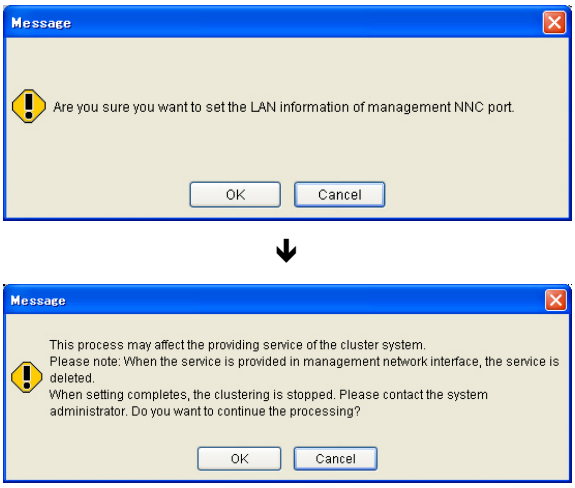
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No.	Setting result	Description	Actions to be taken
1	-	An unexpected setting result value was received from through Storage Navigator Modular.	Press the [Refresh] button again. If the display becomes "---" no matter how many times it is done, set the Maintenance LAN again. If the same information is displayed in spite of the above operation, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
2	Normal	The setting result is completed normally.	(Normal completion)
3	Setting	This indicates that the setting is being processed.	Wait far a while (about five minutes), and press the [Refresh] button again. When the same information is displayed no matter how many times the update is repeated, replace the Control Unit. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390))
4	Alert (Cluster status is illegal)	The processing was rejected because the status of the NAS Unit in the cluster is not normal.	Check the status of both NAS Units in the cluster (WEB "2.4 (d) NNC (NAS Unit)" (WEB 02-0110)), and if a failure occurs, reset it after recovering the failure (Troubleshooting "Chapter 1. Flowchart for troubleshooting" (TRBL 01-0000)), and if the NAS OS stops, reset it after starting the NAS OS (Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)).
5	Alert (System LU is being set)	The processing was rejected because the NAS OS is setting the system LU.	Wait for a while (about 25 minutes), and set it again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
6	Alert (System LU is being recovery)	The processing was rejected because the NAS OS is recovering the system LU.	Wait for a while (about 15 minutes), and set it again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
7	Alert (Setting completion waiting time-out)	The setting result is not returned from the NAS OS.	Check if there is no abnormality in the NAS Unit, and set it again. If the same information is displayed in spite of the above operation, replace the Control Unit, PCI Express, and NAS Chassis. (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390), DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1, 2)" (NAS 07-0120))
8	Alert (NAS OS internal failure)	An abnormality occurred in the NAS OS during the processing.	Check if there is no abnormality in the NAS Unit, and set it again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
9	Alert (Setting time-out)	A time-out occurred in the NAS OS during the processing.	Check if there is no abnormality in the NAS Unit, and set it again. If the same information is displayed in spite of the above operation, replace the NAS Chassis. (DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120))
10	Alert (Segment duplicated error)	The network address of the IP address to be set is used for another port of the NAS Unit.	Set another IP address. When the display is the same even if any IP address is specified, set the IP address which was set before the change again, and change the IP address of the duplicated port.

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(b) When the changes is completed, click the [Apply] button at the lower right of the "NNC LAN" parameter window.
The content of the change is canceled by clicking the [Reset] button.

(c) The message of the setting confirmation is displayed.
Click the [OK] button.



NOTE : This caution message is displayed only when the setting of "IP Address" or "Subnet Mask" was changed.

(d) When the setting ends, the following message is displayed. Click the [OK] button.



NOTE : Check to the user that it can be operated from the NAS Manager Modular after the setting.

(e) The setting result can be checked by clicking the [Refresh] button. When "Being set" is displayed in the setting result, check the setting result again after it passes for a while.
If the setting result is all displayed as "Normal", and the input setting value and the value displayed in "Current" are all the same, the setting is completed.

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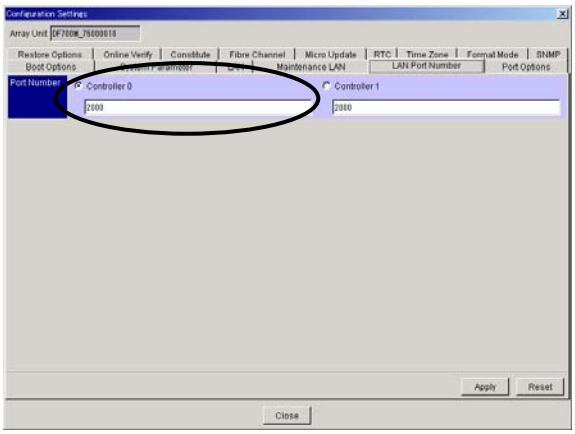
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(17) Setting of LAN Port Number

The port number of the TCP/IP connection used for the communication between the array subsystem and the Storage Navigator Modular can be set with the optional LAN Port Number (the range of 1024 to 49151). (The array subsystem default value is "2000".)
The LAN port number of the array subsystem is set in the Storage Navigator Modular, and the LAN port number which the Storage Navigator Modular uses is set by editing the "services" file of the computer in which the Storage Navigator Modular is installed.
It is required that each LAN port number communicated between the array subsystem and the Storage Navigator Modular is set to the same value. Also, the LAN port number of the array subsystem can be set per Control Unit. This LAN port number is common to the LAN port for the user control and the LAN port for the maintenance per Control Unit.

[When LAN is connected to both Control Units and the setting change is performed]

(a) Click the [LAN Port Number] tab. The setting window of "LAN Port Number" is displayed on the parameter window.
Only the information on the Control Unit side connected to the service PC through LAN is displayed in the activated status.
Fist of all, the work procedure is displayed here based on the case where the service PC is connected to the Control Unit 0 of the array subsystem.



① [Port Number] : Refer to/set the LAN Port Number.

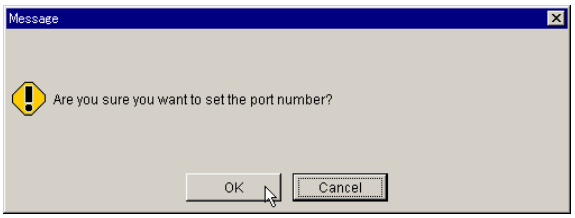
(b) Click the radio button of the Control Unit 0, and enter the LAN Port Number to be set.
Enter a port number that is not used by the OS that is operating Storage Navigator Modular, various types of applications, etc. in the port number field.

NOTE : Set the LAN Port Number one side each. Here, the operation set in the order of the Control Unit 0 to the Control Unit 1 is shown.

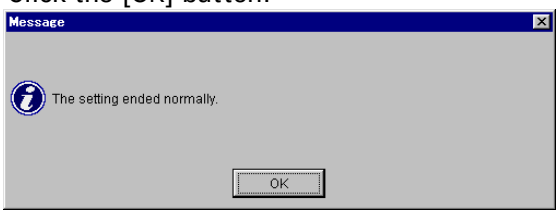
(c) Click the [Apply] button.

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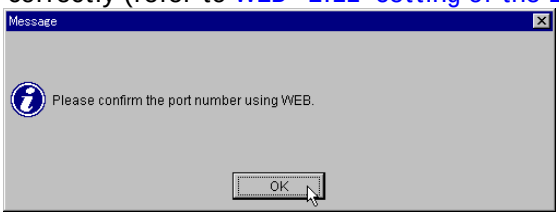
(d) The following message appears. Click the [OK] button.



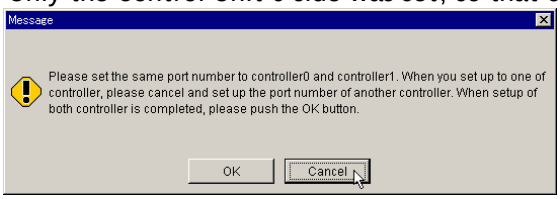
(e) Click the [OK] button.



(f) The following message appears. Click the [OK] button after referring to WEB that it is set correctly (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).



(g) Only the Control Unit 0 side was set, so that click the [Cancel] button.



(h) Close the window, and return to the main window.

(i) Replace the LAN cross cable from the Control Unit 0 to the Control Unit 1.

(j) Select [Edit] – [Add] in the main window. The simple registration window of the array subsystem is displayed.

(k) Enter only the IP address of the LAN port for the maintenance of the Control Unit 1 in the simple registration window, and click the [OK] button.
The simple registration window is closed automatically.

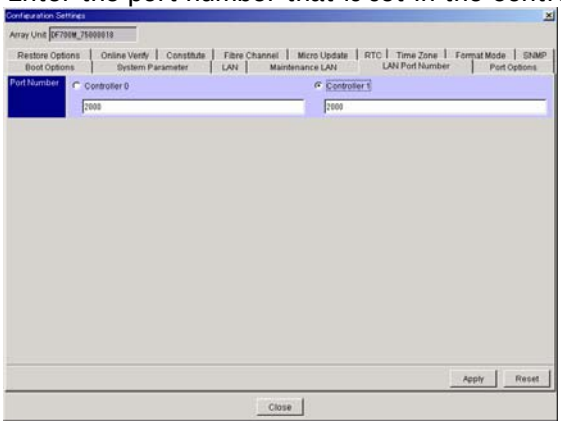
(l) Click the icon of the array subsystem for the Control Unit 1 registered immediately before in the main window, and display the unit window.

(m) Select [Tools] – [Configuration Settings] from the menu bar in the unit window. The configuration setting window is displayed.

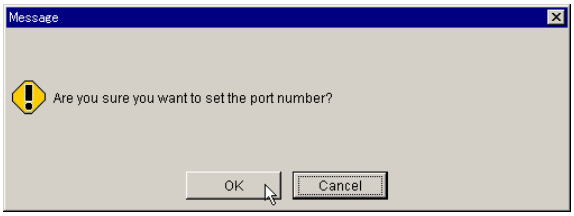
(n) Click the [LAN Port Number] tab in the configuration setting window. The setting window of "LAN Port Number" is displayed in the Parameter window. Only the information on the Control Unit 1 side is displayed here as the activated status.

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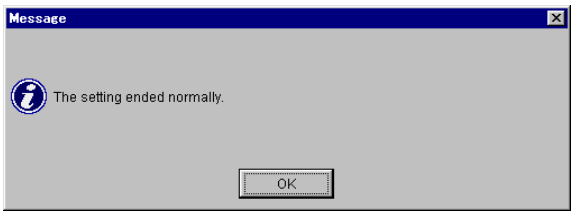
(o) Click the radio button of the Control Unit 1, and enter the LAN Port Number to be set.
Enter the port number that is set in the Control Unit 0.



(p) Click the [Apply] button.
(q) The following message appears. Click the [OK] button.



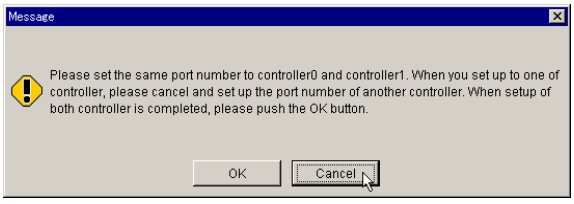
(r) Click the [OK] button.



(s) The following message appears. Click the [OK] button after referring to WEB that it is set correctly (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).

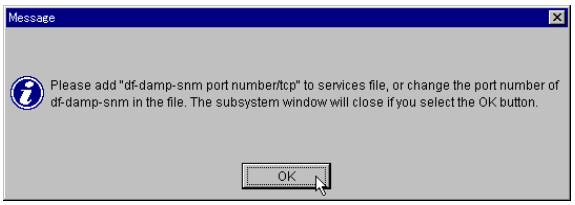


(t) Both Control Units were set to the same LAN Port Number, so that click the [OK] button.



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(u) Click the [OK] button.



The Unit screen is closed.

(v) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Storage Navigator Modular uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.
When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services), Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name>  <port number>/<protocol>  [aliases...]   [#<comment>]
#

echo                7/tcp
echo                7/udp
 :
 :
radacct          1813/udp                        #RADIUS accounting protocol
df-damp-snm      2001/tcp                        #Storage Navigator Modular
nfsd             2049/udp    nfs                 #NFS server
knetd            2053/tcp                        #Kerberos de-multiplexor
man              9535/tcp                        #Remote Man Server
```

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• UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, ``Assigned Numbers'' (October 1994).  Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#             http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name  port/protocol  [aliases ...]   [# comment]

tcpmux                1/tcp                           # TCP port service multiplexer
tcpmux                1/udp                           # TCP port service multiplexer
 :
 :
 gdp-port             1997/tcp                        # Cisco Gateway Discovery Protocol
gdp-port    1         997/udp                         # Cisco Gateway Discovery Protocol
df-damp-snm           2001/tcp                        # Storage Navigator Modular
nfs                   2049/tcp    nfsd
nfs                   2049/udp    nfsd
```

NOTE : When there is no line of "df-damp-snm" in the services file, use the LAN Port Number of "2000" and connect it.
Also, when it cannot be connected with the LAN Port Number specified in the file, use "2000" and connect it again.

(w) After starting the Storage Navigator Modular, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Storage Navigator Modular, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Storage Navigator Modular installed in the customer's computer, add the port information which the Storage Navigator Modular uses (a line where [service-name] is "df-damp-snm", [port/protocol] is "(set LAN Port Number)/tcp" and [comment] is "# Storage Navigator Modular"), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.
Also, when the LAN port number used in the Storage Navigator Modular is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.
Delete the backup file of the services file for the service PC as needed.

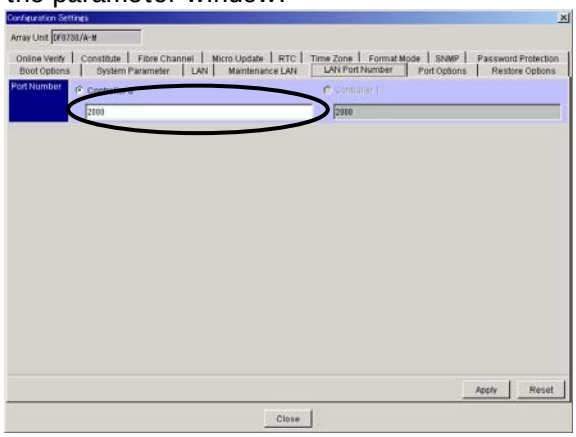
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[When LAN is connected to one of the Control Units and the setting change is performed]

Connect the PC to the Control Unit side where the setting change is performed, and open the configuration setting window of the Storage Navigator Modular. The procedure for setting the Control Unit 1 after setting the Control Unit 0 is displayed here.

NOTE : When performing the setting change for one of every Control Units, perform the subsystem registration to the Storage Navigator Modular in one of every Control Units. It takes more than usual time when connecting it to one of the Control Units by using the subsystem registration information of both Control Units.

(a) Click the [LAN Port Number] tab. The setting window of "LAN Port Number" is displayed on the parameter window.



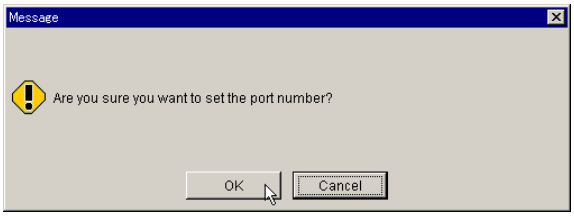
① [Port Number] : Refer to/set the LAN Port Number.

(b) Enter the LAN Port Number to be set.

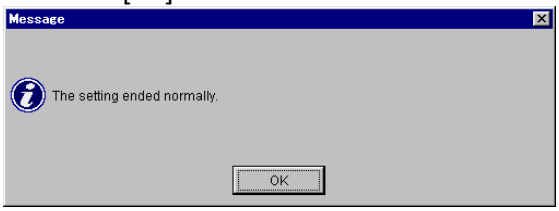
Enter a port number that is not used by the OS that is operating Storage Navigator Modular, various types of applications, etc. in the port number field.

(c) Click the [Apply] button.

(d) The following message appears. Click the [OK] button.

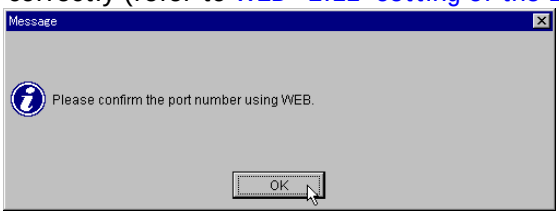


(e) Click the [OK] button.

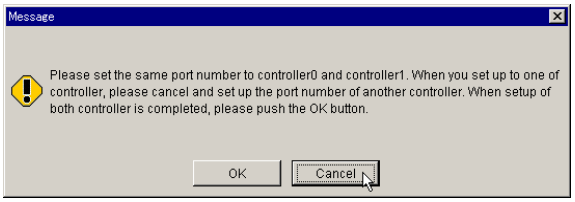


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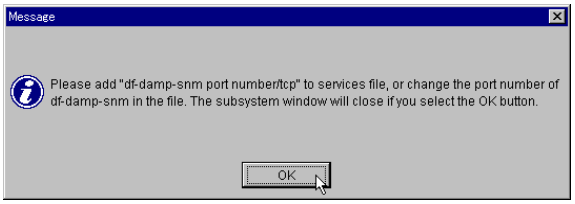
(f) The following message appears. Click the [OK] button after referring to WEB that it is set correctly (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).



(g) Click the [OK] button.

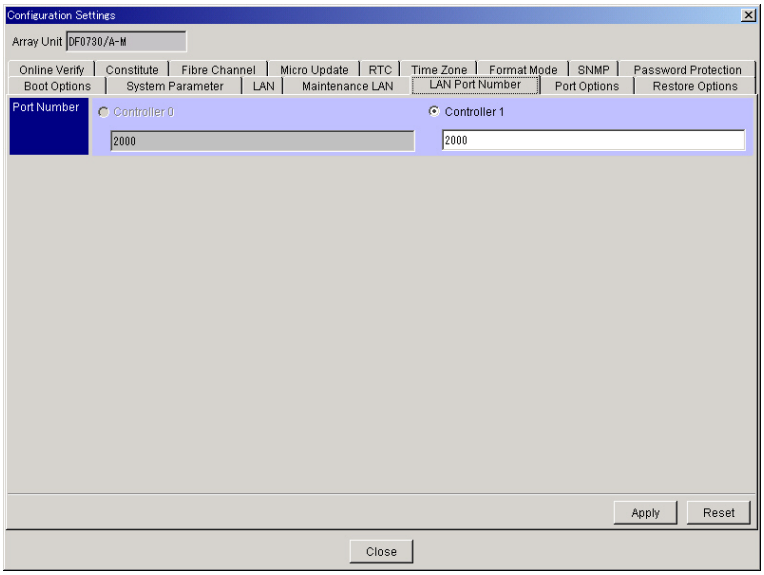


(h) Click the [OK] button.



The Unit screen is closed.

(i) Switch the connection of the Storage Navigator Modular to the Control Unit 1 side. After that, click the [LAN Port Number] tab. The setting window of "LAN Port Number" is displayed in the Parameter window.

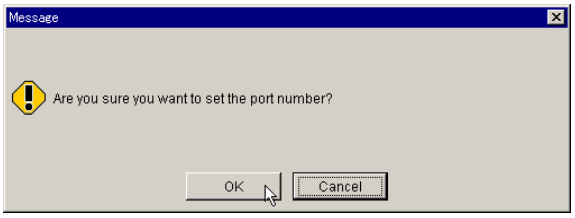


Copyright © 2006, Hitachi, Ltd.

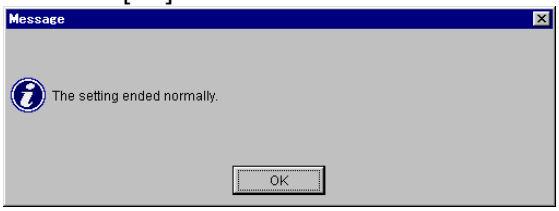
(j) Enter the LAN Port Number to be set.
Enter a port number that is not used by the OS that is operating Storage Navigator Modular, various types of applications, etc. in the port number field.

(k) Click the [Apply] button.

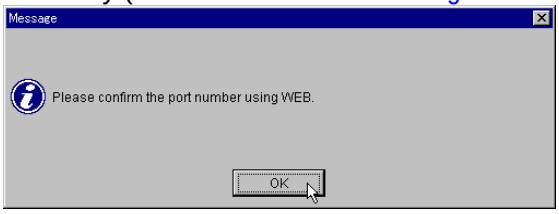
(l) The following message appears. Click the [OK] button.



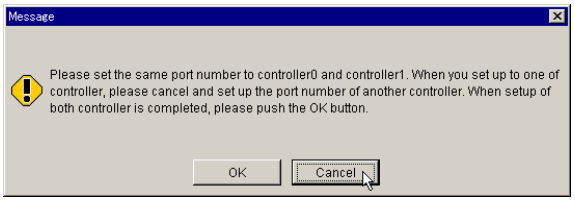
(m) Click the [OK] button.



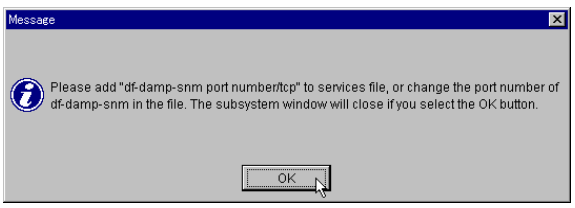
(n) The following message appears. Click the [OK] button after referring to WEB that it is set correctly (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).



(o) Click the [OK] button.



(p) Click the [OK] button.



The Unit screen is closed.

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(q) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Storage Navigator Modular uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.
When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services), Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name>  <port number>/<protocol>  [aliases...]   [#<comment>]
#

echo                7/tcp
echo                7/udp
 :
 :
radacct          1813/udp                          #RADIUS accounting protocol
df-damp-snm      2001/tcp                          #Storage Navigator Modular
nfsd             2049/udp   nfs                    #NFS server
knetd            2053/tcp                          #Kerberos de-multiplexor
man              9535/tcp                          #Remote Man Server
```

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, ``Assigned Numbers'' (October 1994).  Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#           http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name  port/protocol  [aliases ...]   [# comment]

tcpmux              1/tcp                     # TCP port service multiplexer
tcpmux              1/udp                     # TCP port service multiplexer
 :
 :
 gdp-port           1997/tcp                  # Cisco Gateway Discovery Protocol
gdp-port    1       997/udp                   # Cisco Gateway Discovery Protocol
df-damp-snm         2001/tcp                  # Storage Navigator Modular
nfs                 2049/tcp   nfsd
nfs                 2049/udp   nfsd
```

NOTE : When there is no line of “df-damp-snm” in the services file, use the LAN Port Number of “2000” and connect it.
Also, when it cannot be connected with the LAN Port Number specified in the file, use “2000” and connect it again.

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(r) After starting the Storage Navigator Modular, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Storage Navigator Modular, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Storage Navigator Modular installed in the customer's computer, add the port information which the Storage Navigator Modular uses (a line where [service-name] is "df-damp-snm", [port/protocol] is "(set LAN Port Number)/tcp" and [comment] is "# Storage Navigator Modular"), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.
Also, when the LAN port number used in the Storage Navigator Modular is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.
Delete the backup file of the services file for the service PC as needed.

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(17-1) Recovery method

When a problem occurs during the LAN Port Number change work, recover it according to the following procedure.

(a) When the setting of either Control Unit failed (Or, when setting the LAN Port Number for every Control Unit)

Connect the LAN cable only to the Control Unit to be set and perform the setting change of the LAN Port Number.

(i) Set the LAN Port Number of the Control Unit to be set in the services file.
If it is unknown, check it using the WEB browser (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).

(ii) Connect the LAN cable only to the Control Unit to be set, and register it in the Storage Navigator Modular with the IP address of the Control Unit concerned.

(iii) Started the Storage Navigator Modular.

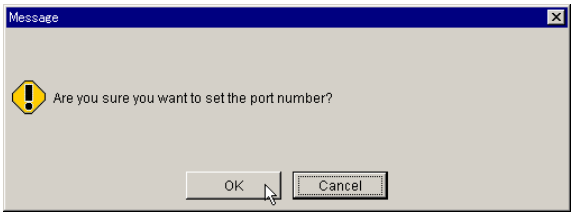
(iv) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.

(v) Click the [LAN Port Number] tab.

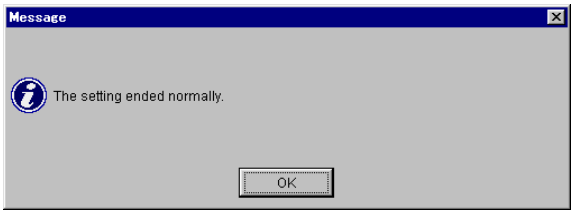
(vi) Select the radio button of the Control Unit to be set, and enter the LAN Port Number to be set in the text file of the [Port Number].
Setting the LAN Port Number of the other Control Unit which has already performed the setting change.

(v) Click the [Apply] button.

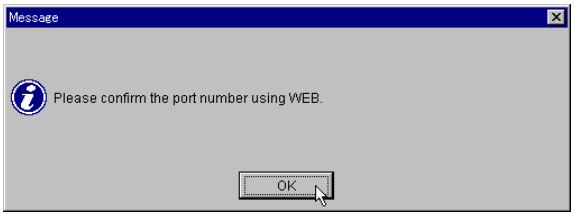
(vi) The following message appears. Click the [OK] button.



(vii) Click the [OK] button.

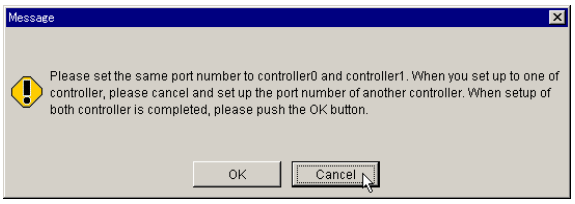


(viii) The following message appears. Click the [OK] button after referring to WEB that it is set correctly (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).

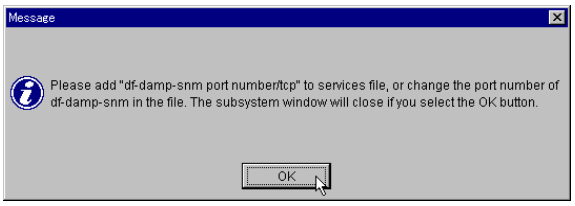


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(ix) Click the [OK] button.



(x) Click the [OK] button.



The Unit screen is closed.

(xi) Edit the services file to the new LAN Port Number.

(xii) Check that the Storage Navigator Modular can be started again.

(b) Although the LAN Port Number of the services file and the LAN Port Number set in the array subsystem are same, the Storage Navigator Modular cannot be accessed to the array subsystem.

(i) Check the LAN Port Number of the services file and the LAN Port Number of the array subsystem by the WEB browser again (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).

(c) Already when it is not possible to accessed it from Storage Navigator Modular to the array subsystem.

(i) Confirm both Control Units are same LAN Port Number (refer to WEB "2.11 Setting of the LAN Port Number" (WEB 02-0240)).
Register to the services file, and start Storage Navigator Modular.

(ii) If they are still same, there is a possibility that LAN Port Number overlaps with other equipment.
When this is verified, connect LAN crossing cable directly with the LAN port of the control unit in the Subsystem and change the LAN port number.
Please set it by one (refer to "4.2 (17-1) (a)" (SYSPR 04-0340)).

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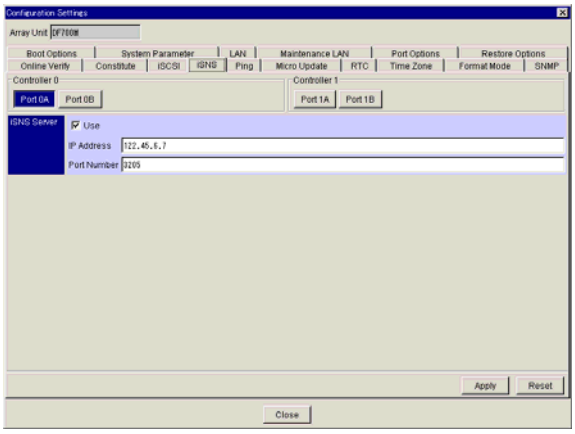
(18) Setting the iSNS Server Information

Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

iSNS(Internet Storage Name Service) provides the same function as the Name Server of the Fabric Switch on the Fibre Channel interface.

The disk array subsystem registers the iSCSI port information on the iSNS Server. The host as iSCSI initiator discovers the iSCSI target with iSCSI disk array subsystem information registered on the iSNS Server.

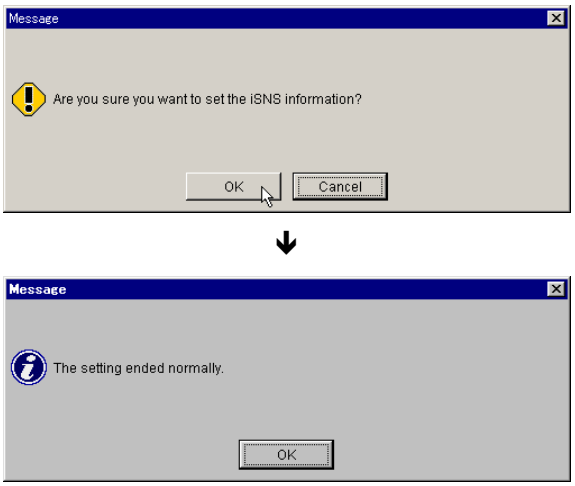
(a) Click the [iSNS] tab. The setting window of "iSNS" is displayed on the parameter window.



① [iSNS Server] : Specify whether to use iSNS Server or not. When using the iSNS server, specify the IP Address and Port Number of the iSNS Server.

(b) When the changes is completed, click the [Apply] button at the lower right of the window. The content of the change is canceled by clicking the [Reset] button.

(c) The message of the setting confirmation is displayed.
Click the [OK] button.



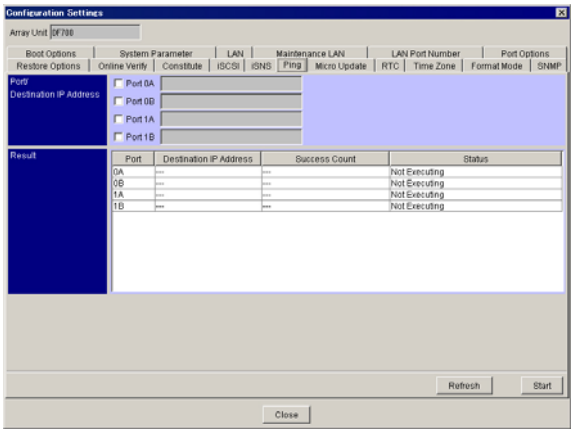
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(19) Sending Ping

Setting is supported in Storage Navigator Modular Revision Ver.3.00 or more.

Sends the ping to the initiator (host) and displays the result of the sending.

(a) Click the [Ping] tab. The setting window of "Ping" is displayed on the parameter window.

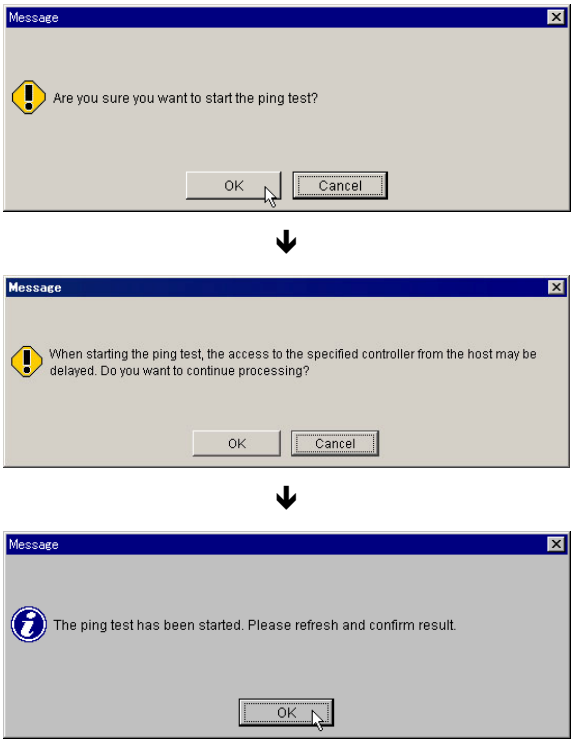


① [Port] : Select the port to be sending ping.

② [Destination IP Address] : Specify the IP Address of the initiator.

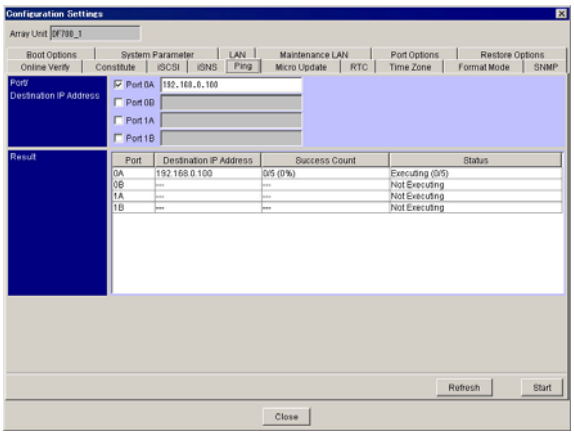
(b) When the changes is completed, click the [Start] button at the lower right of the window.

(c) The message of the setting confirmation is displayed. Click the [OK] button.



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The result is displayed.



(d) As necessary, select the [Refresh] button to display the latest information.

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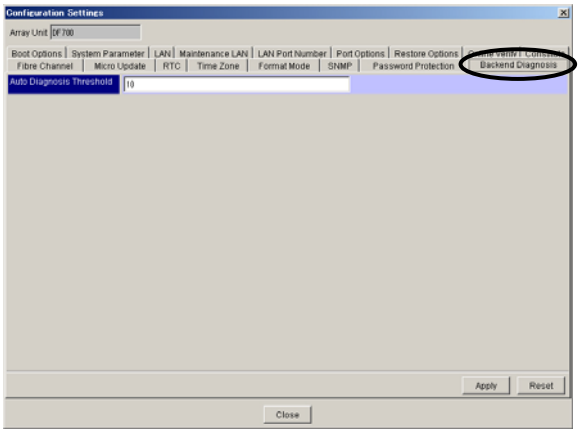
(20) Setting of the automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side

It can be set in the microprogram revision 0740/D or more and the Storage Navigator Modular Ver. 4.07 or more.

The automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side of the array subsystem can be set by the optional numerical values (the range of 1 to 255).

The default value is "10". However, this threshold value is not usually changed.

(a) Click the [Backend diagnosis] tab. The setting window of "Backend Diagnosis" is displayed on the Parameter window.

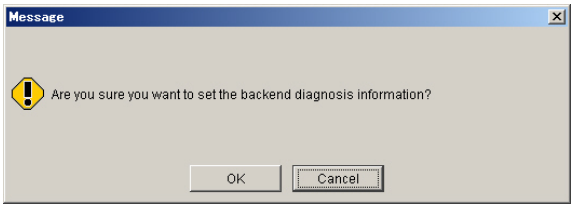


① [Automatic Diagnosis Threshold] : The automatic diagnosis threshold of the Fibre Channel loop on the Disk Drive side of the array subsystem is referred to and set.

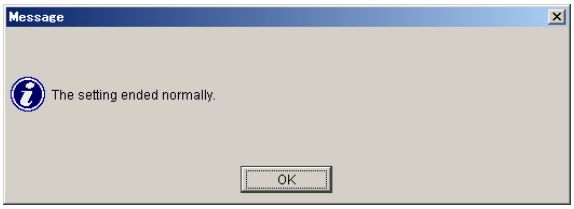
(b) Enter the automatic diagnosis threshold to be set. (the range of 1 to 255)

(c) Check that the set contents are correct, and click the [Apply] button. (The changes are cancelled by clicking the [Reset] button. When terminating the setting, click the [Close] button.)

(d) The confirmation message is displayed, so that click the [OK] button.



(e) Click the [OK] button.



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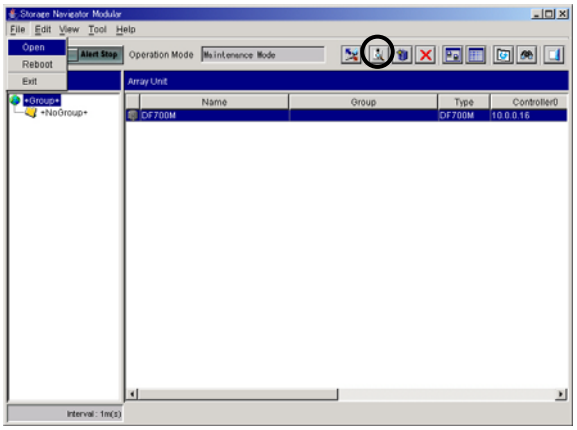
Chapter 5. Setting Host Connection Parameters

Set a subsystem from the Storage Navigator Modular. A procedure for setting the host connection parameters for the subsystem offline is shown below. Make the setting following the procedure.

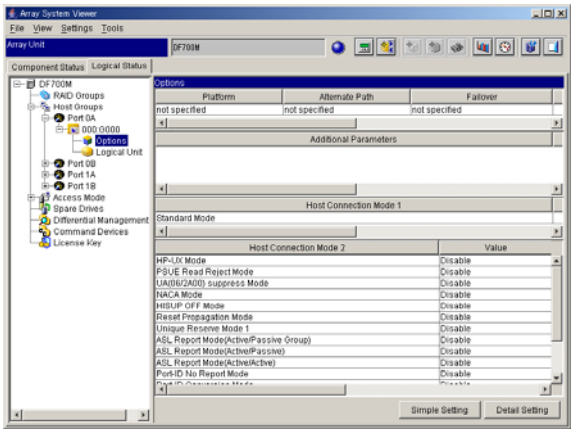
5.1 Simple setting for Connecting to the Host Computer

(1) Turn on the power supply.
(2) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode". For the procedure for changing to the Maintenance Mode, refer to Section "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050).
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



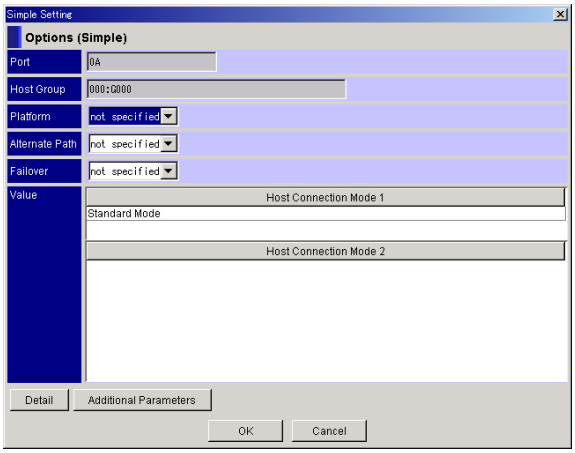
(4) Click the [Logical Status] tab in the unit window.
(5) Display the [000: G000] by double clicking the [Port XX] for which you want to set the mode for connecting a host after double clicking the [Host Groups].
Display the option and logical unit by double clicking the [000: G000], and then click the [Options].



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(6) Click the [Simple Setting] button that is displayed at the lower right part of the window.

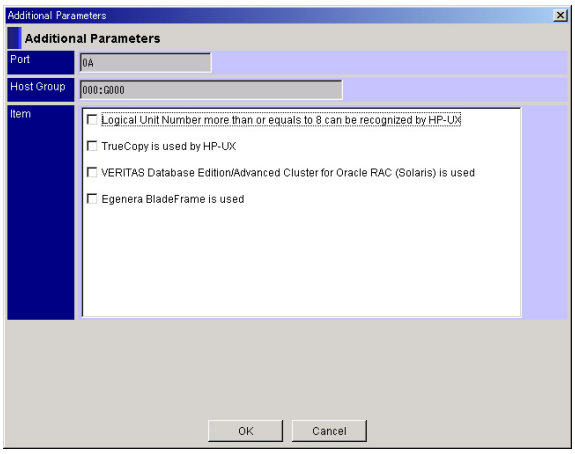
(7) The [Options (Simple)] dialog box is opened.
Select [Platform], [Alternative Path], and [Failover] that conform to the environment of a host to be connected.



No.	Menu Item	Description		Setting made at the factory
		Parameters	Selection Method	
1	Platforms	Not specified	Select one of items	Not specified
		HP-UX		
		Solaris		
		AIX		
		WindowsNT		
		Windows2000		
		Windows2003		
		Linux		
		Tru64		
2	Alternate Path	Not specified	Select one of items	Not specified
		PV Link		
		HDLM		
		VxVM		
		MPxIO		
3	Fail-over	Not specified	Select one of items	Not specified
		MC/ServiceGuard		
		SunCluster		
		VCS		
		HACMP		
		MSCS		
		TruCluster		

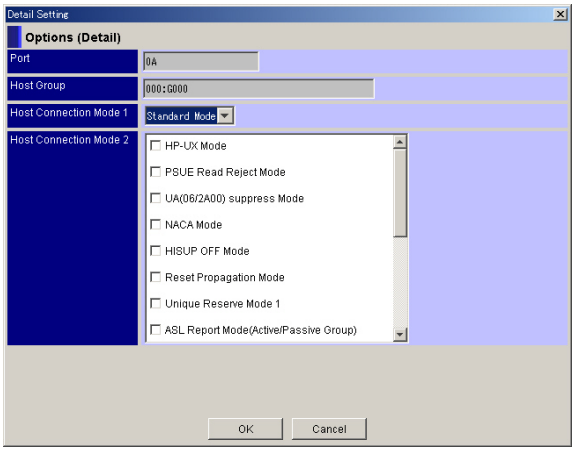
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(8) Click the [Additional Parameters] button. The [Additional Parameters] dialog box is opened. Select items as occasion demands and click the [OK] button.



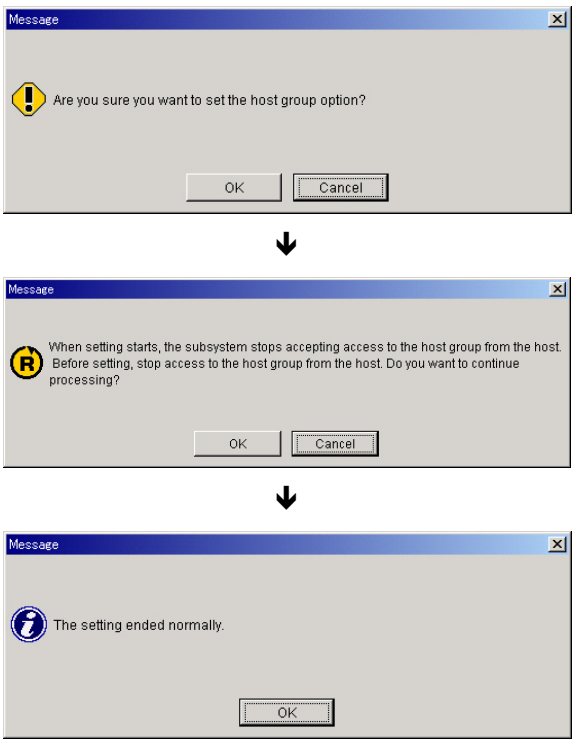
No.	Menu Item	Description		Setting made at the factory
		Parameters	Selection Method	
1	Additional Parameter	Logical Unit Number more than or equals to 8 can be recognized by HP-UX	Selection	Not selected.
		TrueCopy(*1) is used by HP-UX	Selection	Not selected.
		VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used	Selection	Not selected.
		Egenera BladeFrame is used	Selection	Not selected.
*1 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.				

(9) Click the [Detail] button when necessary. Select the [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.



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(10) The confirmation window is display. Click the [OK] button.



(11) The settings that have been made are displayed.

Verify that the display reflects the selected host environment (platform, alternative path, and fail-over) and the additional parameters. When the host connection modes 1 and 2 are set directly, verify that the display reflects the mode setting that has been made.

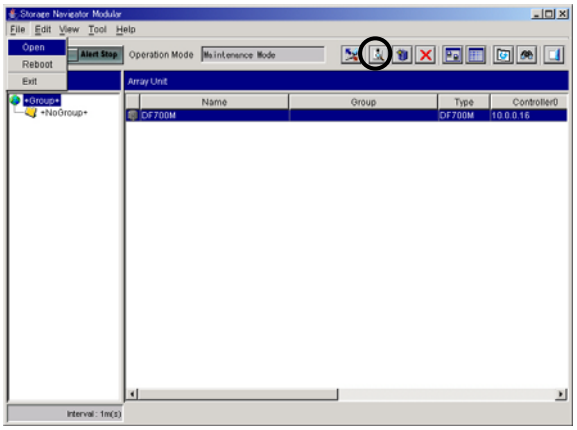
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5.2 Simple setting for Connecting to the Host Computer

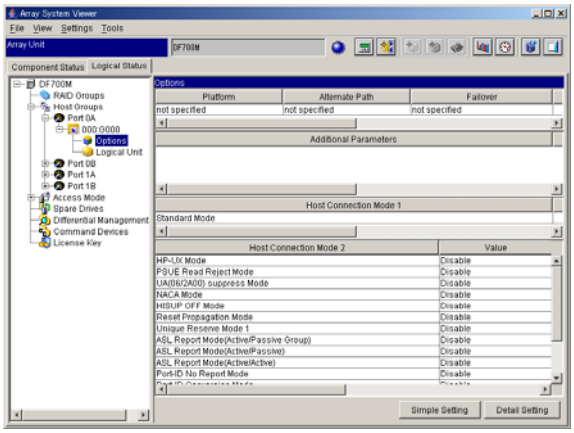
The following describes the procedure for setting a subsystem offline when the host group option setting is required for the combination that simple setting does not have.
To make the setting, follow these steps.

(1) Turn on the power supply.
(2) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode".
For the procedure for changing to the Maintenance Mode, refer to Section "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050).
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



(4) Click the [Logical Status] tab in the unit window.
(5) Display the [000: G000] by double clicking the [Port XX] for which you want to set the mode for connecting a host after double clicking the [Host Groups].
Display the option and logical unit by double clicking the [000: G000], and then click the [Options].



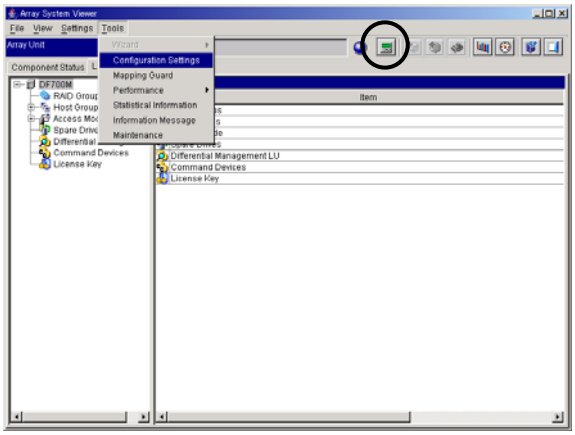
(6) Click the [Simple Setting] button that is displayed at the lower right part of the window.
(7) Perform the operation corresponding to a model to be set.

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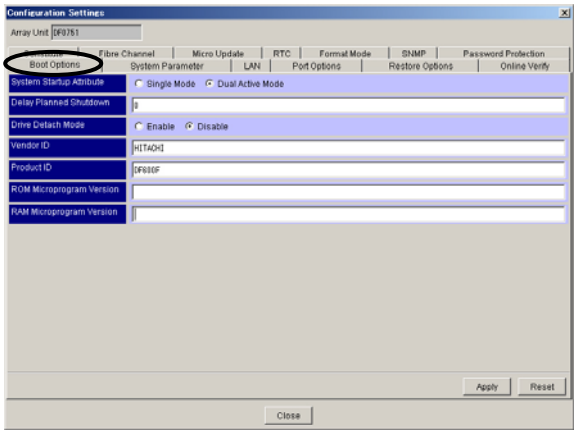
5.3 When using the subsystem in Drive Detach Mode

(1) When the microprogram revision is less than 0726/A

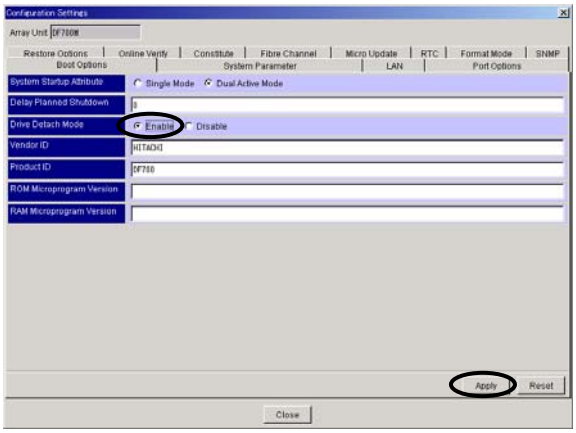
(a) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



(b) Click the [Boot Options] tab.



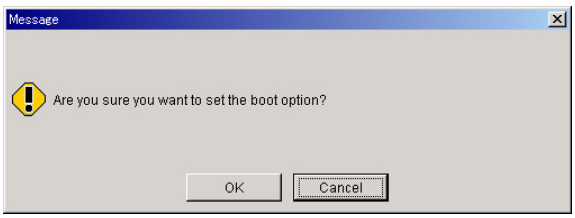
(c) For the [Drive Detach Mode], select the [Enable] radio button.



(d) After the setting is complete, click the [Apply] button.

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(e) The confirmation window is display. Click the [OK] button.

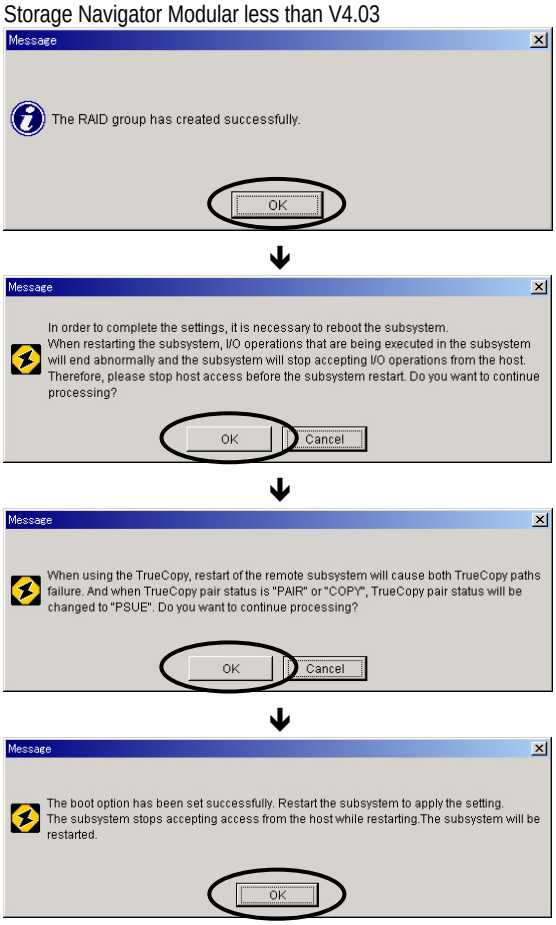


(f) The confirmation window is display.

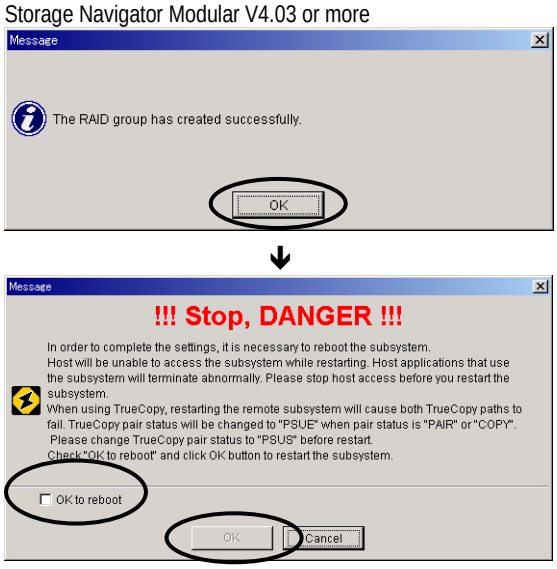
The former setting is valid until the subsystem is restarted.
When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, restart the subsystem after making sure that accesses from a host computer has ceased.

NOTE : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

Microprogram less than Ver.4.0B,
Storage Navigator Modular less than V4.03

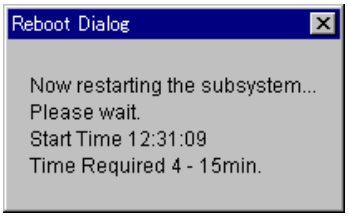


Microprogram Ver.4.0B or more,
Storage Navigator Modular V4.03 or more



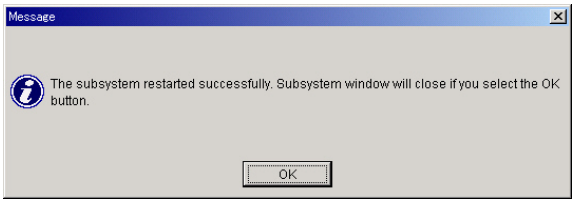
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(g) When you choose to restart the subsystem, the time the restart began is displayed. This usually takes approximately four to fifteen minutes. (about five to fifteen minutes in case of the RKH)



NOTE : It may take time for the subsystem to respond, depending on the condition of the subsystem. If it does not respond after 15 minutes or more, check the condition of the subsystem.

(h) A message appears, stating that the restart is successful. Click the [OK] button.

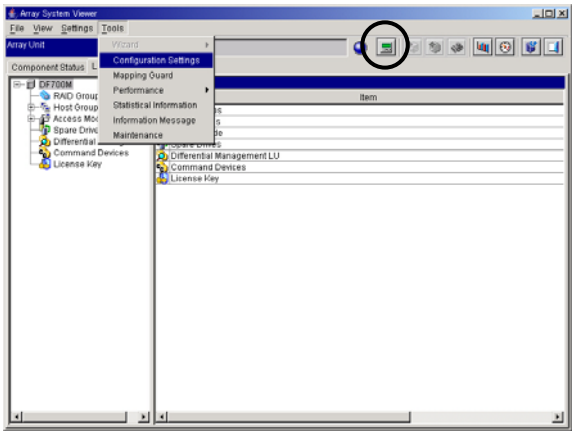


The Unit screen is closed. To perform other operations on the Main screen, select an array unit from the Main screen and open the selected Unit screen.

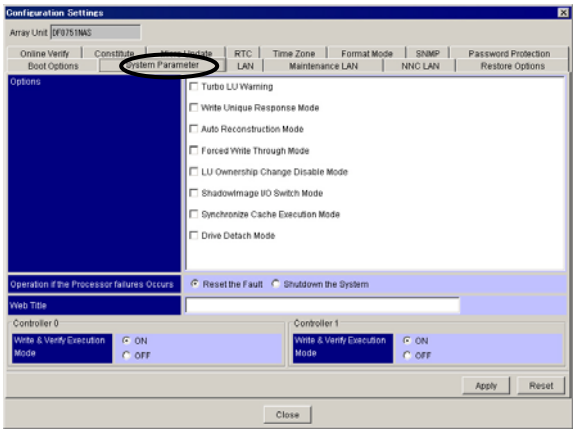
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(2) When the microprogram revision is 0726/A or more (Use the Storage Navigator Modular V2.60 or more)

(a) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



(b) Click the [System Parameter] tab.

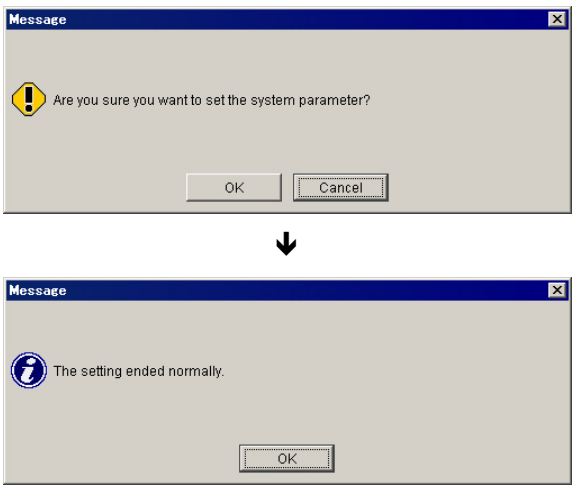


(c) Select the [Drive Detach Mode].

(d) After the setting is complete, click the [Apply] button.

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(e) The confirmation window is display. Click the [OK] button.



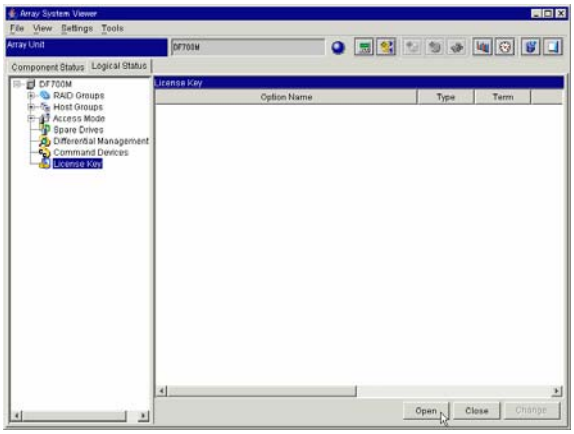
(f) Click the [OK] button.

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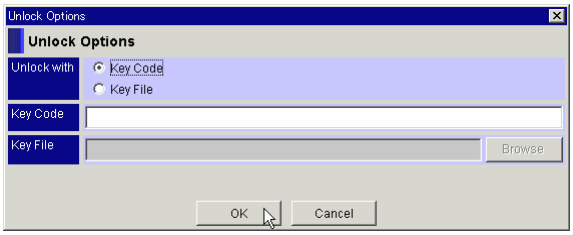
Chapter 6. Setting an Extra-cost Optional Feature

(1) Click the [Logical Status] tab on the Unit screen.

(2) Click the [License Key] icon.



(3) Click the [Open] button.



(4) When you unlock the option using the key code, click the Key Code radio button, then set up the key code. For the key code of the priced optional features, refer to the priced optional features manual.
When you unlock the options using the key file, click the Key File radio button, and then set up the path for the key file. The [Browse] button is used, the path to a key file can be set correctly.

(5) Click the [OK] button.

NOTE : Depending on the option, the subsystem may need to be restarted in order to set the unlocking feature effective.

NOTE : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

For setting optional feature, refer to the installation or setting section in the manual attached to an extra-cost each extra-cost optional feature.

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When connecting the NAS Unit, it is necessary to install the priced option indispensable only to the NAS system. Refer to the following procedure, and perform the installation of the priced option.

(1) Installation of the priced option indispensable to the NAS system

The NAS OS/Manager/Sync Image function of the Modular NAS system (hereafter, it is called the NAS-OS function) is the priced option, so that the NAS-OS function cannot be used normally (in the locked status). In order to use this function, it is necessary to change the status to that the NAS-OS function can be used (in the unlocked status).

The setting procedure for the installation, uninstallation, validation, and invalidation of the NAS-OS function using the Storage Navigator Modular is shown here. Refer to the "Storage Navigator Modular User's Guide" for the operation of the Storage Navigator Modular.

Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

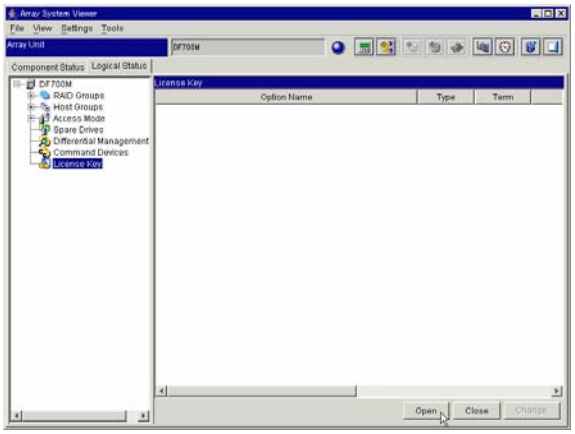
NOTE : Perform the installation and uninstallation after checking that the disk array subsystem to operate is normal. In the status that the failure such as the Control Unit blockade occurs, neither installation nor uninstallation can be performed.

The key code or the key file supplied with the NAS-OS function is necessary for the installation.

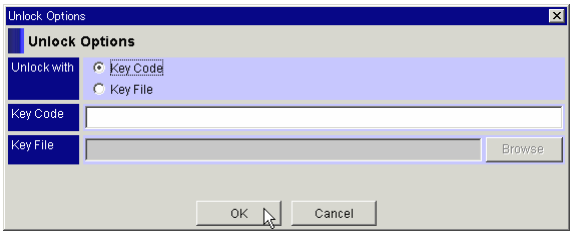
The procedure for installing the NAS-OS function is shown.

(a) Click the [Logical Status] tab on the Unit screen.

(b) Click the [License Key] icon. And Click the [NAS-OS].



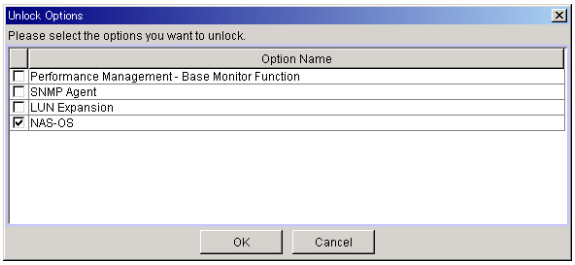
(c) Click the [Open] button.



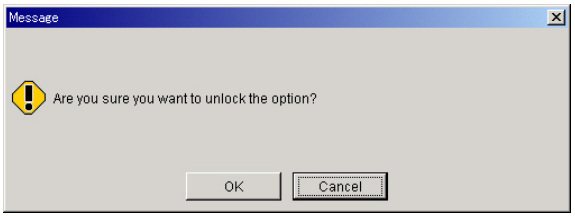
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(d) Input the key code of 48 characters in “Key Code”, or select the key file from “Unlock with” and input the path in “Key File”, and then click the [OK] button.

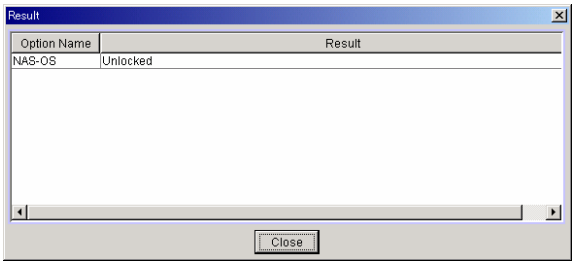
(e) When unlocking it by the key file, the option list window is displayed. Check that a check mark is put to “NAS-OS”, and click the [OK] button.



(f) The confirmation message is displayed. Click the [OK] button.



The NAS-OS is displayed in "Option Name" and the Unlocked is displayed in "Result".



(g) Click the [Close] button.

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(2) Un-installation

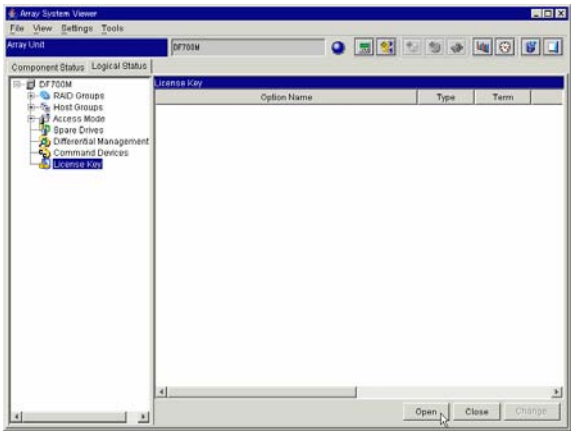
Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

The key code supplied with the NAS-OS function is necessary for the un-installation. Once it is uninstalled, the NAS-OS function cannot be used until it is unlocked again by the key code or the key file (in the locked status).

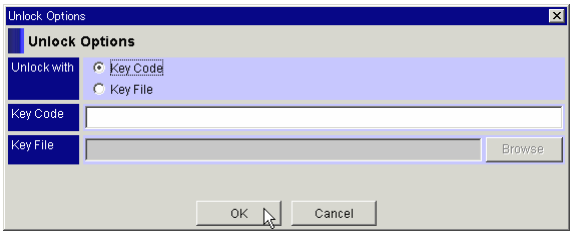
The procedure for un-installation the NAS-OS function is shown.

(a) Click the [Logical Status] tab on the Unit screen.

(b) Click the [License Key] icon. And Click the [NAS-OS].



(c) Click the [Close] button.



(d) Input the key code of 48 characters in “Key Code”, and then click the [OK] button.

(e) The confirmation message is displayed. Click the [OK] button.

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(3) Set the validation and invalidation

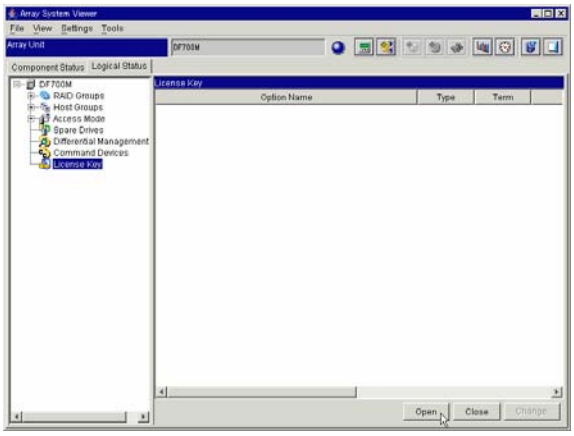
Setting is supported in Storage Navigator Modular Revision Ver.2.60 or more.

The NAS-OS function can set the validation and invalidation for using the function in the installed status (in the unlocked status).

The procedure for set the validation and invalidation the NAS-OS function is shown.

(a) Click the [Logical Status] tab on the Unit screen.

(b) Click the [License Key] icon. And Click the [NAS-OS].



(c) Select the NAS-OS, and then click the [Change] button.

(e) The confirmation message is displayed. Click the [OK] button.

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Chapter 7. System Parameter Setting List

(1) DF700 system parameter setting

The following table lists the parameter settings using Storage Navigator Modular.

System Parameter Setting for DF700

	System Parameter	
1	System Startup Attribute	Depends on System Configuration
2	Drive Detach mode enable	Disable (Standard setting)
3	Turbo LU Warning	Disable (Standard setting)
4	Operation if the Processor failures Occurs	Reset a Fault (Standard setting)
5	ROM Microprogram Version	No change is needed
6	RAM Microprogram Version	No change is needed
7	Write & Verify Executing Mode	On (Standard setting)
8	DHCP (*1)	OFF (Standard setting)
9	Maintenance port IP address	To be set according to the network setting
10	IP Address	To be set according to the network setting
11	Subnet Mask	To be set according to the network setting
12	Default Gateway	To be set according to the network setting
	Host Group	
1	LU Mapping Mode	Depends on System Configuration (*2)

*1 : When the DHCP mode is validated, the IP Address is acquired from the DHCP server.
If the DHCP server is not started up or the DHCP function has been wrongly set, the acquisition of the IP Address will fail and the IP Address of the subsystem will remain "0.0.0.0". (This is a state in which Storage Navigator Modular or the Web cannot be used via a LAN.)
In such a case, you can acquire the IP Address by starting up the DHCP server or by setting the DHCP function correctly when necessary.

*2 : When the SANRISE AMS500 is connected, the logical unit which is not wanted to be accessed by the port must be masked by means of the LU mapping mode.

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(2) Host Connection Parameters setting

When making the simple setting of the host group options, select items shown on gray backgrounds.

Only when using the combination not described in the simple setting, select the required parameter from detail settings.

Host Connection Parameters Setting (1/5)

✓: Parameter which is automatically set by the simple setting
blank: Parameter which is manually set if necessary

Host Group Option							
Simple Setting							
1	Platforms		HP-UX				
2	Alternate Path		None		PV Link		VxVM(*1)
3	Fail Over		None	MC/ ServiceGuard	None	MC/ ServiceGuard	None
Detail Setting: The following parameters will be selected automatically according to simple setting.							
	Host Connection Mode 1 (Select one of these modes)	Standard Mode	✓	✓	✓	✓	✓
		Open VMS Mode					
		Wolfpack Mode					
		TRESPASS Mode					
	Host Connection Mode 2 (Multiple selections)	HP-UX Mode					
		PSUE Read Reject Mode					
		UA(06/2A00) Suppress Mode					
		NACA Mode					
		HISUP OFF Mode					
		Reset Propagation Mode					
		Unique Reserve Mode 1					
		ASL Report Mode (Active/Passive Group)					
		ASL Report Mode (Active/Passive)					
		ASL Report Mode (Active/Active)					
		Port-ID No Report Mode					
		Port ID Conversion Mode					
		TruCluster Mode					
		Product Serial Response Mode					
		Same Node Name Mode					
		CCHS Conversion Mode					
		SPC-2 Mode					
Additional Parameter: Select these parameters only when you use the appropriate function. When selecting it, the parameter that belongs to the following host connection mode is automatically selected.							
4	Logical Unit Number more than or equals to 8 can be recognized by HP-UX		HP-UX Mode(*2)				
5	TrueCopy(*3) is used by Hp-UX		PSUE Read Reject Mode(*4)				
6	VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used		Not selected				
7	Egenera BladeFrame Is used		Not selected				

*1 : When using VERITAS Volume Manager(VxVM), Array Support Library (ASL) for AMS/WMS series is required. Please download from the Web screen of VERITAS.

*2 : Each host group can set the maximum of 256 logical units from the logical unit #0 to #511 for the RKXS/RKS, #0 to #2047 for the RKM and #0 to #4095 for the RKH to the mapping of the logical unit. However, the maximum number of the logical units of which the server can recognize differs depending on the platform.

*3 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

*4 : Set this mode when you use the Fence Level of TrueCopy remote replication with "DATA" and want to make the read access suppressed to the P-VOL at the time of the PSUE transition.

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Host Connection Parameters Setting (2/5)

✓: Parameter which is automatically set by the simple setting
blank: Parameter which is manually set if necessary

Host Group Option											
Simple Setting											
1	Platforms		Solaris								
2	Alternate Path		None			HDLM(*1)		VxVM(*2)		MpxIO(*5)	
3	Fail Over		None	Sun Cluster(*4)	VCS(*3)	None	Sun Cluster(*4)	None	VCS(*3)	None	Sun Cluster(*4)
Detail Setting: The following parameters will be selected automatically according to simple setting.											
	Host Connection Mode 1 (Select one of these modes)	Standard Mode	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Open VMS Mode									
		Wolfpack Mode									
		TRESPASS Mode									
	Host Connection Mode 2 (Multiple selections)	HP-UX Mode									
		PSUE Read Reject Mode									
		UA(06/2A00) Suppress Mode									
		NACA Mode									
		HISUP OFF Mode									
		Reset Propagation Mode									
		Unique Reserve Mode 1									
		ASL Report Mode (Active/Passive Group)									
		ASL Report Mode (Active/Passive)									
		ASL Report Mode (Active/Active)									
		Port-ID No Report Mode									
		Port ID Conversion Mode									
		TruCluster Mode									
		Product Serial Response Mode									
		Same Node Name Mode									
		CCHS Conversion Mode									
		SPC-2 Mode									
Additional Parameter: Select these parameters only when you use the appropriate function. When selecting it, the parameter that belongs to the following host connection mode is automatically selected.											
4	Logical Unit Number more than or equals to 8 can be recognized by HP-UX		Not selected								
5	TrueCopy(*6) is used by Hp-UX		Not selected								
6	VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used		Not selected	Unique Reserve Mode 1 (*7)		Not selected		Unique Reserve Mode 1 (*7)		Not selected	
7	Egenera BladeFrame Is used		Not selected								

*1 : When using Hitachi Dynamic Link Manager (HDLM), take notice of the following:
(1) Vendor ID: If this text is changed, it cannot be managed by HDLM. Do not change this text.
(2) Serial Number: When the multiple storages of same types exist, a different Serial Number needs to be allocated for each disk array subsystem.

*2 : When using VERITAS Volume Manager (VxVM), Array Support Library (ASL) for AMS/WMS series is required. Please download from the Web screen of VERITAS.

*3 : VERITAS Cluster Server

*4 : The combination of the Sun Cluster and the HDLM needs to set the "Reset Propagation Mode" depending on the HDLM version.
Verify the Hardware note of the HDLM, and then set the Reset Propagation Mode from the detail setting.

*5 : SUN Multi Path (MPxIO)

*6 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

*7 : When using VERITAS Storage Foundation For Oracle RAC or the IO fencing function supported from the VCS Ver4.0, the Unique Reserve Mode 1 needs to be set.

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Host Connection Parameters Setting (3/5)

✓: Parameter which is automatically set by the simple setting
blank: Parameter which is manually set if necessary

Host Group Option									
Simple Setting									
1	Platforms		AIX						
2	Alternate Path		None		HDLM(*1)		VxVM(*2)		
3	Fail Over		None	HACMP	None	HACMP	None	VCS(*3)	
Detail Setting: The following parameters will be selected automatically according to simple setting.									
	Host Connection Mode 1 (Select one of these modes)	Standard Mode	✓	✓	✓	✓	✓	✓	
		Open VMS Mode							
		Wolfpack Mode							
		TRESPASS Mode							
	Host Connection Mode 2 (Multiple selections)	HP-UX Mode							
		PSUE Read Reject Mode							
		UA(06/2A00) Suppress Mode	✓	✓	✓	✓	✓	✓	
		NACA Mode(*2)	✓	✓	✓	✓	✓	✓	
		HISUP OFF Mode							
		Reset Propagation Mode		✓		✓			
		Unique Reserve Mode 1							
		ASL Report Mode (Active/Passive Group)							
		ASL Report Mode (Active/Passive)							
		ASL Report Mode (Active/Active)							
		Port-ID No Report Mode							
		Port ID Conversion Mode							
		TruCluster Mode							
		Product Serial Response Mode							
		Same Node Name Mode							
		CCHS Conversion Mode							
		SPC-2 Mode							
Additional Parameter: Select these parameters only when you use the appropriate function. When selecting it, the parameter that belongs to the following host connection mode is automatically selected.									
4	Logical Unit Number more than or equals to 8 can be recognized by HP-UX		Not selected						
5	TrueCopy(*4) is used by Hp-UX		Not selected						
6	VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used		Not selected						Unique Reserve Mode 1(*5)
7	Egenera BladeFrame Is used		Not selected						

*1 : When using Hitachi Dynamic Link Manager (HDLM), take notice of the following:
(1) Vendor ID: If this text is changed, it cannot be managed by HDLM. Do not change this text.
(2) Serial Number: When the multiple storages of same types exist, a different Serial Number needs to be allocated for each disk array subsystem.

*2 : When using VERITAS Volume Manager (VxVM), Array Support Library (ASL) for AMS/WMS series is required. Please download from the Web screen of VERITAS.

*3 : VERITAS Cluster Server

*4 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

*5 : When using VERITAS Storage Foundation For Oracle RAC or the IO fencing function supported from the VCS Ver4.0, the Unique Reserve Mode 1 needs to be set.

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Host Connection Parameters Setting (4/5)

✓: Parameter which is automatically set by the simple setting
blank: Parameter which is manually set if necessary

Host Group Option									
Simple Setting									
1	Platforms		Windows 2000/2003						
2	Alternate Path		None		HDLM(*1)		VxVM(*2)		
3	Fail Over		None	MSCS	None	MSCS	None	VCS	MSCS
Detail Setting: The following parameters will be selected automatically according to simple setting.									
	Host Connection Mode 1 (Select one of these modes)	Standard Mode	✓		✓	✓	✓	✓	✓
		Open VMS Mode							
		Wolfpack Mode		✓					
		TRESPASS Mode							
	Host Connection Mode 2 (Multiple selections)	HP-UX Mode							
		PSUE Read Reject Mode							
		UA(06/2A00) Suppress Mode							
		NACA Mode							
		HISUP OFF Mode							
		Reset Propagation Mode		✓		✓		✓	✓
		Unique Reserve Mode 1							
		ASL Report Mode (Active/Passive Group)							
		ASL Report Mode (Active/Passive)							
		ASL Report Mode (Active/Active)							
		Port-ID No Report Mode							
		Port ID Conversion Mode							
		TruCluster Mode							
		Product Serial Response Mode							
		Same Node Name Mode							
		CCHS Conversion Mode							
		SPC-2 Mode							
Additional Parameter: Select these parameters only when you use the appropriate function. When selecting it, the parameter that belongs to the following host connection mode is automatically selected.									
4	Logical Unit Number more than or equals to 8 can be recognized by HP-UX		Not selected						
5	TrueCopy(*3) is used by Hp-UX		Not selected						
6	VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used		Not selected						
7	Egenera BladeFrame Is used		Not selected						

*1 : When using Hitachi Dynamic Link Manager (HDLM), take notice of the following:
(1) Vendor ID: If this text is changed, it cannot be managed by HDLM. Do not change this text.
(2) Serial Number: When the multiple storages of same types exist, a different Serial Number needs to be allocated for each disk array subsystem.

*2 : When using VERITAS Volume Manager (VxVM), Array Support Library (ASL) for AMS/WMS series is required. Please download from the Web screen of VERITAS.

*3 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

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Host Connection Parameters Setting (5/5)

✓: Parameter which is automatically set by the simple setting
blank: Parameter which is manually set if necessary

Host Group Option										
Simple Setting										
1	Platforms		Linux					Tru64		Others Not specified
2	Alternate Path		None		HDLM	VxVM(*1)		None		None
3	Fail Over		None	VCS(*2)	None	None	VCS(*2)	None	Tru Cluster	None
Detail Setting: The following parameters will be selected automatically according to simple setting.										
	Host Connection Mode 1 (Select one of these modes)	Standard Mode	✓	✓	✓	✓	✓	✓	✓	✓
		Open VMS Mode								
		Wolfpack Mode								
		TRESPASS Mode								
	Host Connection Mode 2 (Multiple selections)	HP-UX Mode								
		PSUE Read Reject Mode								
		UA(06/2A00) Suppress Mode								
		NACA Mode								
		HISUP OFF Mode								
		Reset Propagation Mode								
		Unique Reserve Mode 1								
		ASL Report Mode (Active/Passive Group)								
		ASL Report Mode (Active/Passive)								
		ASL Report Mode (Active/Active)								
		Port-ID No Report Mode								
		Port ID Conversion Mode								
		TruCluster Mode							✓	
		Product Serial Response Mode								
		Same Node Name Mode								
		CCHS Conversion Mode								
		SPC-2 Mode								
Additional Parameter: Select these parameters only when you use the appropriate function. When selecting it, the parameter that belongs to the following host connection mode is automatically selected.										
4	Logical Unit Number more than or equals to 8 can be recognized by HP-UX		Not selected					Not selected		Not selected
5	TrueCopy(*3) is used by Hp-UX		Not selected					Not selected		Not selected
6	VERITAS Database Edition/Advanced Cluster for Oracle RAC (Solaris) is used		Not selected	Unique Reserve Mode 1(*4)	Not selected	Not selected	Unique Reserve Mode 1(*4)	Not selected		Not selected
7	Egenera BladeFrame Is used		Not selected					Not selected		Not selected

*1 : When using VERITAS Volume Manager (VxVM), Array Support Library (ASL) for AMS/WMS series is required. Please download from the Web screen of VERITAS.

*2 : VERITAS Cluster Server

*3 : TrueCopy displayed means TrueCopy remote replication and TrueCopy Extended Distance.

*4 : When using VERITAS Storage Foundation For Oracle RAC or the IO fencing function supported from the VCS Ver4.0, the Unique Reserve Mode 1 needs to be set.

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Addition/Subtraction/Relocation

Chapter 1. Adding Optional Components ..... ADD 01-0000

Chapter 2. Subtracting Optional Components ..... ADD 02-0000

Chapter 3. Relocation/Removal Work ..... ADD 03-0000

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Chapter 1. Adding Optional Components

1.1 Before Starting Addition of Optional Components

If you make a mistake in operation during an addition of the optional component, it is feared that user data in the subsystem is lost. Therefore, perform the following before starting the addition of the optional component to provide against an unexpected accident.

(1) Backup user data.
Backup user data in the subsystem by the operation on the host computer side.

(2) The work to add an optional component varies depending on the component and a location where the component is to be installed. Besides, perform the addition after making sure whether the work must be done with the subsystem power on or off.
- An addition with the subsystem power on :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.
- An addition with the subsystem power off :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.

(3) When adding the optional component, it is required to change the settings of the subsystem using a service PC connected via a LAN. Make the following preparations before starting the addition of the optional component.
- Prepare a PC in which Storage Navigator Modular is installed. The PC must be used in the LAN environment.
- Ask the customer whether the subsystem is operable via a LAN. If not, obtain customer's permission to operate the subsystem via a LAN.

(4) Promote mutual understanding with the user about the possibility of a system down in order to minimize damage caused by failures.

(5) When adding the optional component with the subsystem power on, the operation replacing dummy Disk Drive with Disk Drive has to be finished within 10 minutes.

(6) Do not make the addition work when the READY LED (green) on the front of the Basic Chassis is blinking at high speed. Perform the addition work after checking that the READY LED (green) on the front of the Basic Chassis lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of RKH).

(7) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the addition work. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the addition work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(8) When adding DF600-RKA/RKAJAT/RKAJATL, understand the specification of the Power Unit/weight, etc. in the manual of DF600, and perform the installation and the addition work safely.

(9) When adding the DF600-RKA, install the Disk Drives whose capacity is 71.3 Gbytes or more.

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(10) When RKA/RKAJAT/RKAJATL of the DF600 is connected, the version of the ENC/SENC firmware should be the following. Also, the purchase of the addition support kit of the DF-F700-K1BUP is indispensable.

(a) In the case of RKA

- SH firmware: 1A or more

(b) In the case of RKAJAT/RKAJATL

- SR firmware: 5.75 B or more
- H8S firmware: 02-02-07 or more

Perform the version check and the update of the firmware beforehand, referring to "Procedure for Offline ENC/SENC Firmware Download" of the DF600.

(11) If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

(12) If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

(13) When the iSCSI Interface Board is added to the Basic Chassis, it is required to make the microprogram version 0730/B or more.

(14) When the iSCSI Interface Board is added to the RKS, it is required to make the module revision F or more for the Control Unit.

(15) Do not add the optional parts while the array subsystem is being started.
When the array subsystem is being started, add the optional parts after the array subsystem becomes the Ready status.

(16) It is required to install the adaptable microprogram depending on the parts to be added.
Check the adaptable microprogram revision referring to Microprogram "1.9 Adaptable microprogram revision" (MICRO 01-0360).

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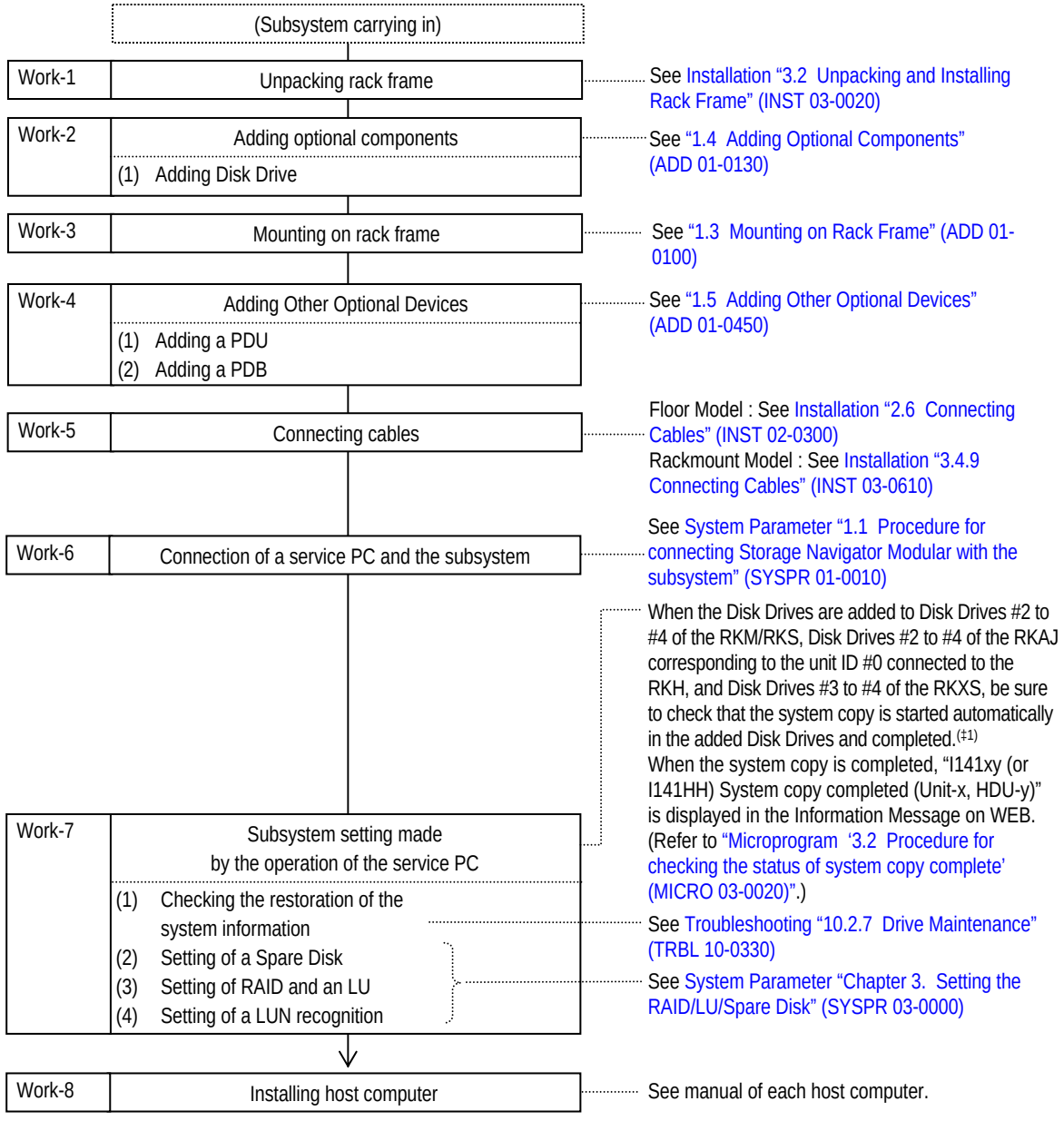
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1.2 Procedures for Adding Optional Components

(1) Procedure for adding an optional component while the subsystem power online

NOTE : • For safety use, always close the front bezel after the operation.
• Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.

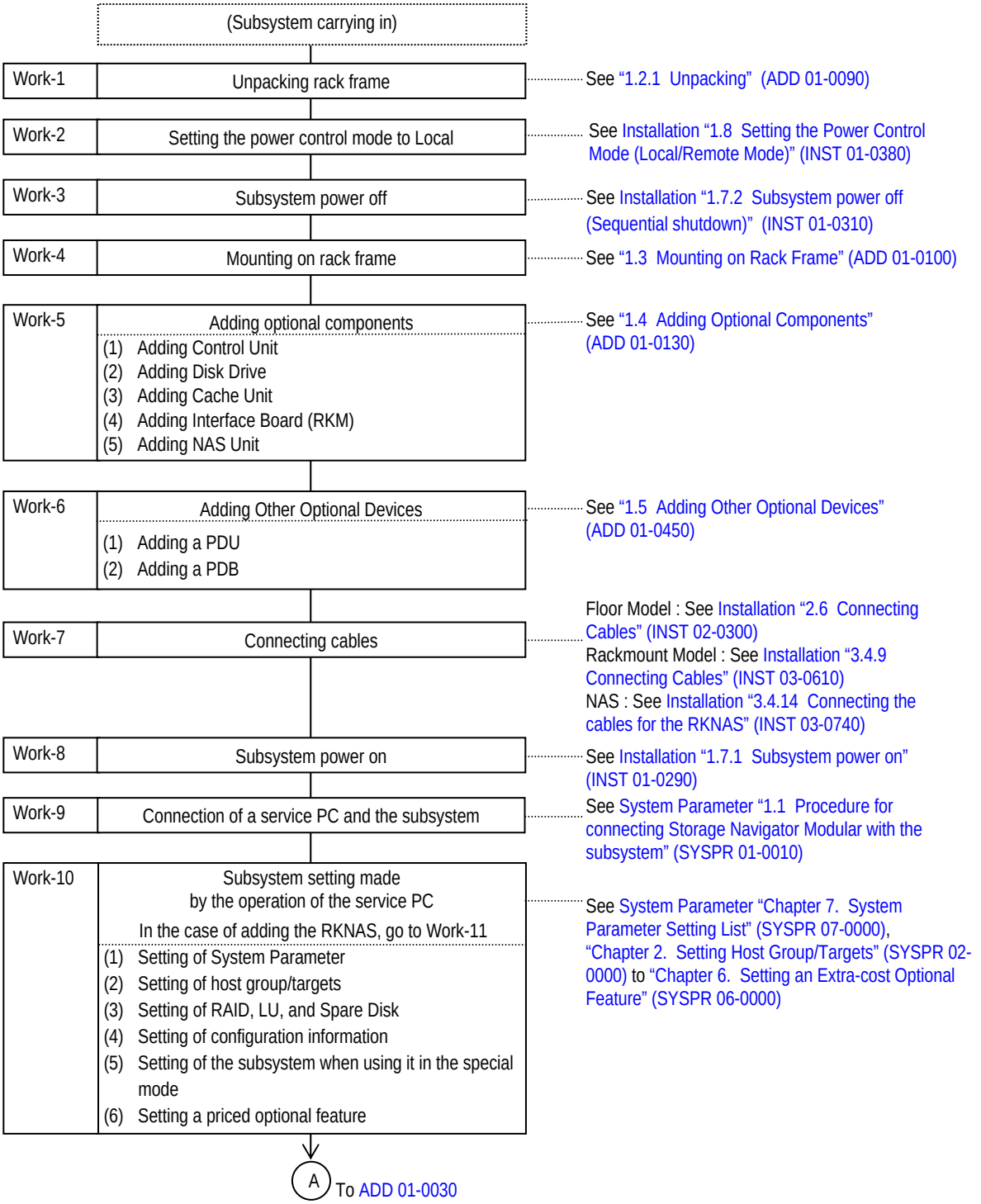


‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive. Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).

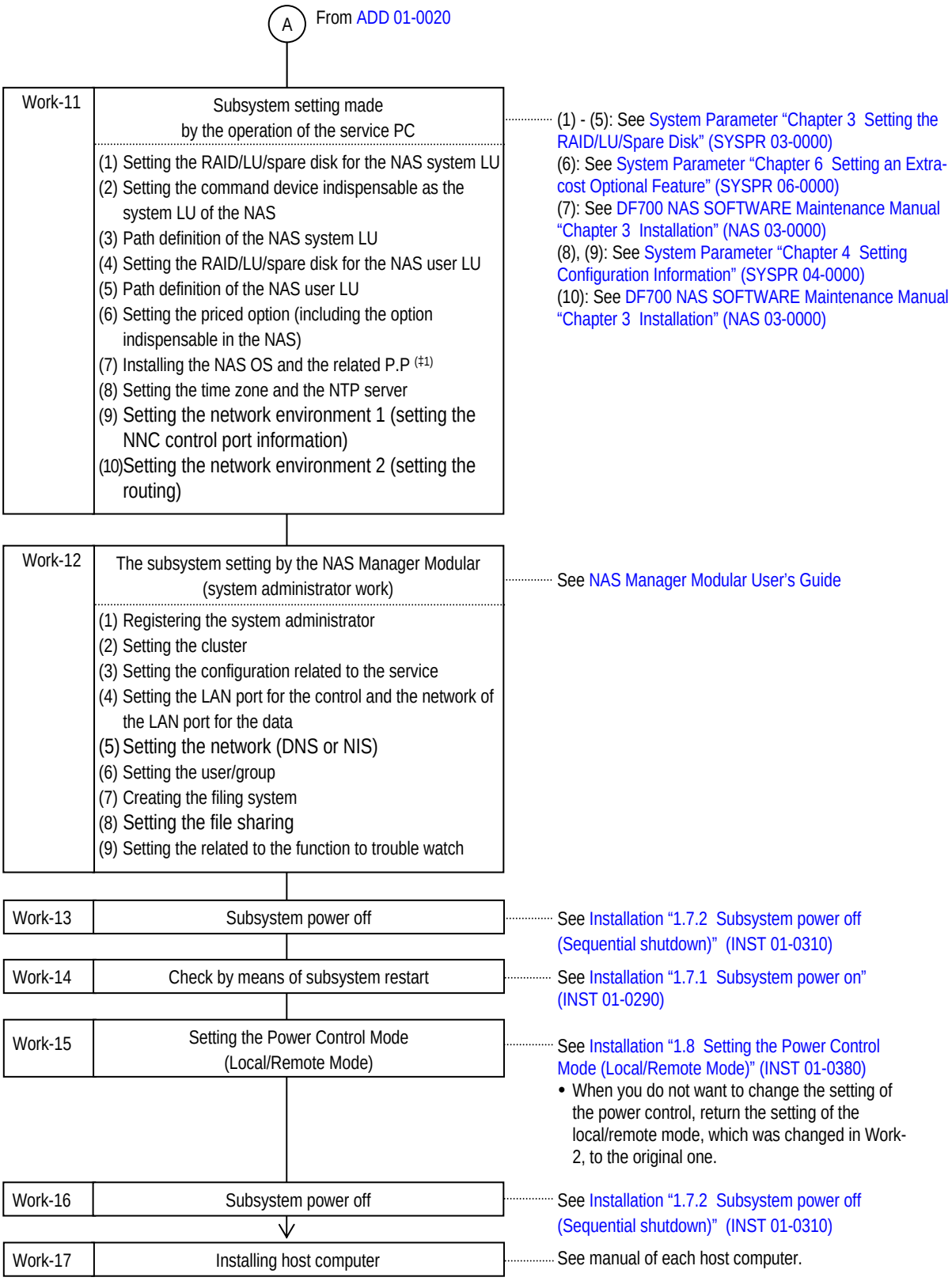
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(2) Procedure for adding the optional components offline (with the subsystem power turned off)

NOTE : • For safety use, always close the front bezel after the operation.
• For the see Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310).
• Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.



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‡1 : Normally, the microprogram and the NAS OS are installed when the subsystem is shipped from the factory.

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(3) Component to be added and condition of addition

(3-1) Rackmount disk array for extension

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Rackmount disk array for extension	DF700-RKAJ DF700-RKAJAT DF600-RKA DF600-RKAJAT DF600-RKAJATL	A set of an disk array and basic accessories to be mounted on a rack frame	• Prepare the following components at least for the disk array to be added. Two Disk Drives • Up to 14 RKAJs/RKAs can be connected to the one RKM. • Up to 14 RKAJATs can be connected to the one RKM • A mixed configuration, in which up to the 14 RKAJs/RKAs,RKAJATs are connected to the one RKM. • Up to 6 RKAJs can be connected to the one RKS. • Up to 6 RKAJATs can be connected to the one RKS. • A mixed configuration, in which up to the 6 RKAJs, RKAJATs are connected to the one RKS. • A mixed configuration, in which up to the 6 RKAJATs are connected to the one RKXS. • Up to 30 RKAJs/RKAs can be added to the one RKH. However, the chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only. • Up to 30 RKAJATs can be added to the one RKH. However, the chassis connectable to the RKH as the chassis of the unit ID #0 is the RKAJ only. • A mixed configuration, in which up to the 30 RKAJs/RKAs/RKAJATs are connected to the one RKH. Be sure to connect the RKAJ to the first unit when performing the connection in a mixed configuration.	Possible "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)	Possible "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

*1 : Data is exchanged between a host computer and the subsystem.

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(3-2) Optional components for addition

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Control Unit	DF-F700-F1JM	Array Control Unit (2port) for duplication For RKM	• Install the Cache memory with a capacity same as that of the Cache memory of the installed Control Unit (#0 side). • The RKM requires the Interface Board.	Impossible	Possible "1.4.2 Adding a Control Unit" (ADD 01-0140)
	DF-F700-F1JS	Array Control Unit (1port) for duplication For RKS			
	DF-F700-F1JXS	Array Control Unit (1port) for duplication For RKXS			
Disk Drive(*2) (Including Spare Disk)	DF-F700-AGF72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 10,000 min^{-1})	• Select from the Disk Drives shown on the left according to the intended total capacity of the subsystem. • The Spare Disk Drives can be set up to 15 in the whole subsystem (up to 30 in case of the RKH).	Varies depending on the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)	Varies depending on) the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)
	DF-F700-AGH72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F700-AGF146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 10,000 min^{-1})			
	DF-F700-AGH146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F700-AGF300	3.5-inch Disk Drive (287.6 G bytes) (Disk rotational speed : 10,000 min^{-1})			
	DF-F700-ATE250R (RKXS/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F700-ATE400R (RKXS/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F700-ATE500R (RKXS/RKAJAT)	3.5-inch Disk Drive (491.9 G bytes) (Disk rotational speed : 7,200 min^{-1})			
Cache Unit	DF-F700-C1GJ	Cache memory (1,024 M bytes)	• For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.	Impossible	Possible "1.4.4 Adding a Cache Unit" (ADD 01-0380)
	DF-F700-C2GJ (Excluding RKXS)	Cache memory (2,048 M bytes)			
	DF-F700-C512JX (RKXS special use)	Cache memory (512 M bytes)			
FC Interface Board	DF-F700-DJ4G2W (RKS/RKXS)	Independent two-port FC Interface Board (corresponding to 4 G bps) (including host connectors for 4G bps (2))	• Install the interface board after removing the dummy interface board from the Control Unit.	Impossible	Possible "1.4.6 Adding a FC Interface Board" (ADD 01-0420)
	DF-F700-DJ4G2H (RKH)	4G bps FC Interface Board (including host connectors for 4G bps (2))			
iSCSI Interface Board	DF-F700-DJSC2 (RKM/RKS/RKXS)	iSCSI Interface Board	–	Impossible	Possible "1.4.7 Adding an iSCSI Interface Board" (ADD 01-0430)
	DF-F700-DJSC2H (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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(3-3) Addition/subtraction of Disk Drive/disk array

No.	Unit of addition/ subtraction	Component to be added/subtracted	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)
1	Subsystem	RKAJ/RKAJAT/RKA	Possible(*2) (The final RKAJ/ RKAJAT/RKA only)	Possible(*2) (The final RKAJ/ RKAJAT/RKA only)	–(*3)	–(*3)
			Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)	Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)	–	–
2	Disk Drive	RKM /RKS/RKXS #0 to 4 or RKAJ corresponding to the unit ID #0 connected to the RKH #0 to 4	Possible(*4)	Impossible	Possible(*4)	Impossible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	–	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	–
3		RKM /RKS/RKXS #5 to 14 or RKAJ corresponding to the unit ID #0 connected to the RKH #5 to 14	Possible	Possible	Possible	Possible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The additional subsystem can be added at the end of the configuration. An addition in the middle of the configuration cannot be done.

*3 : In the replacement for storage capacity expansion, it is not necessary to replace the disk array. Replace only the Disk Drive(s) installed in the disk array.

*4 : When adding or replacing the additional Disk Drives of #0 to #4 in the RKM/RKS/RKXS or the Disk Drives of #0 to #4 in the first RKAJ to be connected to the RKH, be sure to perform the addition work with the subsystem power turned on, and check that the system copy is started automatically in the added Disk Drives and completed. (‡1) When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive. Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0360).

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No.	Unit of addition/ subtraction	Component to be added/subtracted	Addition for storage capacity expansion Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement for storage capacity expansion Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)
4	Disk Drive	RKAJ #0 to 3 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible(*3) (*2) Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible(*3) Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible(*2) Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)
5		RKAJ #4 to 14 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : When adding or replacing the additional Disk Drives of #0 to #4 in the RKM/RKS/RKXS or the Disk Drives of #0 to #4 in the first RKAJ to be connected to the RKH, be sure to perform the addition work with the subsystem power turned on, and check that the system copy is started automatically in the added Disk Drives and completed. (‡1) When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)

*3 : If the additional subsystem is not mounted when adding any of the Disk Drives #0 to #3 to the additional subsystem, add it first.

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0360).

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No.	Unit of addition/ subtraction	Component to be added/subtracted	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1))	Power offline (with the subsystem power turned off)
6	Disk Drive	RKAJAT #0 to 3	Possible(*3)	Possible(*3)	Possible	Possible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)
7		RKAJAT #4 to 14	Possible	Possible	Possible	Possible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : When adding or replacing the additional Disk Drives of #0 to #4 in the RKM/RKS/RKXS or the Disk Drives of #0 to #4 in the first RKAJ to be connected to the RKH, be sure to perform the addition work with the subsystem power turned on, and check that the system copy is started automatically in the added Disk Drives and completed. (‡1) When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)

*3 : If the additional subsystem is not mounted when adding any of the Disk Drives #0 to #3 to the additional subsystem, add it first.

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive. Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the "1.4.3 (5) Restoring the system information" (ADD 01-0360).

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(3-4) NAS Unit/Adding optional components for NAS

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
NAS Unit (RKNAS)	DF-700-RKNAS4G	Install the Memory (DIMM) of 4Gbytes in the RKNAS.	• Connect it to the RKH or RKM. • The case of the dual Controller configuration only.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
	DF-700-RKNAS2G	Install the Memory (DIMM) of 2Gbytes in the RKNAS.	• Connect it to the RKS or the RKXS. • The case of the dual Controller configuration only.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
NAS Interface Board	DF-F700-DJNAS (RKM/RKS/RKXS)	NAS Interface Board	• When connecting it to the RKNAS, install it in the basic subsystem.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
	DF-F700-DJNASH (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.

(3-5) Other optional additional device

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
PDB	DF-F700-UPDU7	For U7	Additional PDB for U7 rack frame	Possible "1.5.2 Mounting a PDB (UPDU7)" (ADD 01-0460)	Possible "1.5.2 Mounting a PDB (UPDU7)" (ADD 01-0460)

*1 : Data is exchanged between a host computer and the subsystem.

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(4) Tool for optional work

Table 1.1.1 Tool for Optional Work

Division	Tool name	Specification	Floor Model	Rackmount Model (U7 rack frame)
Tool	Lifter	–	–	○
	Phillips screwdriver	No.1	○	○
	Phillips screwdriver	No.2	○	○
	Slotted screwdriver	No.1	○	○
	Allen wrench	No.3	○	-
	Allen wrench	No.4	–	○
	Allen wrench	No.5	–	○
	Allen wrench	No.6	–	○
	Spanner	No.8	–	–
	Spanner	No.13	–	–
	Spanner	No.22	–	○
Tool of other	Wrist band	–	○	○
	LAN cross cable	Category 5	○	○
	PC for maintenance(*1)	Pentium	○	○

*1 : For maintenance. (Pentium (Pentium Ⅱ (233 MHz or more) is recommended.)
Memory 40 Mbytes or more. (64 Mbytes or more is recommended.)

For the usage of the tools for adding optional components, refer to the chapter for each type.

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1.2.1 Unpacking

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(1) Checking exterior of optional component
Check the exterior of each component visually for distortion or damage owing to transport.

(2) Checking contents of package
Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

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1.3 Mounting on Rack Frame

In the case of adding Disk Drives to a subsystem of the rackmount model, the additional subsystem must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem.

When the Additional Chassis are added, there are the offline (with the subsystem power turned off) addition and the online addition.
Perform the addition referring to "1.6.1 Procedure for adding the additional subsystem to the subsystem of rackmount model with U7 rack frame" (ADD 01-0490).

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1.3.1 Work immediately after abnormal termination

When an error occurred during the addition of the additional chassis, separate the additional chassis of which the addition is not completed due to including the failure suspect part by performing the following work.
Take recovery actions against the trouble after performing the following operations, and then make the addition again.
Be careful that the subsystem may go down if the existing system (‡1) and the chassis of which the addition is completed are separated.

NOTE : • Be sure to remove the ENC cables one by one with an interval for twenty seconds or more.
If the ENC cables are removed without leaving each interval for twenty seconds or more, the system may go down.
• If the AC Input Power Switch is turned off with the ENC cables indicated by the ACE tool connected, the subsystem may go down.

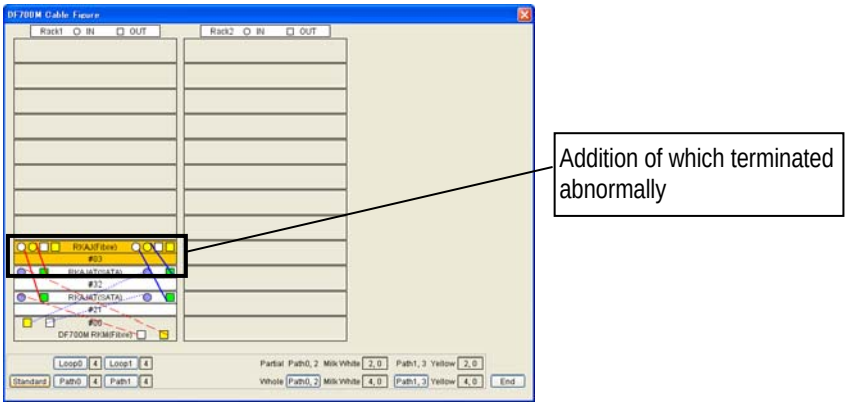
(1) Make sure of the additional subsystem addition of which terminated abnormally.
Make sure of the additional subsystems addition of which terminated abnormally according to one of the following messages displayed in the Information Message window of the Web as shown below.
- Unit ID# that the "I8040x (or I804HH) Unit ADD FAIL" message is displayed.
- Additional chassis that the "I8000x (or I800HH) Unit ADD start (Unit-x)" message is not displayed even five minutes or more passed after connecting the ENC cables.
- Additional chassis that the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message is not displayed after the addition.

(2) Construct the current subsystem configuration with the ACE tool of Storage Navigator Modular, and then display the ENC cable connection diagram. (Refer to Installation "1.6.2 Checking methods of device ID and ENC cable connection when mounting the newly introduced rack" (INST 01-0180).

‡1 : The existing subsystem is the basic chassis or the additional chassis that configures the subsystem under operation.
The additional chassis to be connected is connected to the existing subsystem.
The additional chassis that the addition is completed (the additional chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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(3) Select the additional disk array unit addition of which terminated abnormally in the ENC cable.



(4) Remove the ENC cables, which connect subsystems displayed in orange and blue in the ENC cable connection diagram and are displayed with red and blue solid lines in the diagram, one by one with an interval for twenty seconds or more (‡1).
At this time, remove the ENC cables of the ENC Unit/SENC Unit whose ALM LED (red) lights on as a priority.
In addition, for the additional chassis that the "I8040x (or I804HH) Unit ADD FAIL" message is not displayed, remove the ENC cables after checking that the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message is not displayed.

NOTE : • Be sure to remove the ENC cables one by one with an interval for twenty seconds or more.
If the ENC cables are removed without leaving each interval for twenty seconds or more, the system may go down.
• Never remove the ENC cables connecting the chassis of the unit ID# displayed in the message "I8020x (or I802HH) Unit ADD complete (Unit-x)" and the chassis of the unit ID# before it.
If removed, the subsystem may go down.
• For the additional chassis that the "I8040x (or I804HH) Unit ADD FAIL" message is not displayed, the recognition of the chassis may be completed (‡2) immediately before removing the ENC cables. In that case, the Loop blockade and the ENC blockade occur immediately after removing the ENC cables, so that perform the work with checking it.
Stop removing the ENC cables if they occur. The Loop blockade and the ENC blockade are recovered by inserting the ENC cables again.

(5) Turn off all the AC Input Power Switches of the added chassis indicated in orange after rechecking that the ENC cable of a red solid line and a blue solid line which is connecting the orange subsystem and the white subsystem was removed (‡1).

NOTE : • If the AC Input Power Switch is turned off with the ENC cables indicated by the ACE tool connected, the subsystem may go down.
• Never turn off the AC Input Power Switch of the additional chassis of the unit ID# displayed in the message "I8020x (or I802HH) Unit ADD complete (Unit-x)" because the subsystem goes down.

‡1 : When the subsystem goes down, be sure to perform the procedures (4) and (5) continuously, and then turn off the main switch and turn it on after one or more minutes have elapsed. In that case, do not turn off the battery switch of the Backup Battery Unit in front of the subsystem. If it is turned off, the user data lost may occur.

‡2 : Additional chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message.

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1.3.2 Device ID setting

The subsystem ID of the RKM/RKS/RKXS or the RKAJ to be connected to the RKH is set to # 0. Set the Device ID numbers of the additional subsystem in serial order starting from the RKAJ/RKAJAT/RKA connected next to the RKM/RKS/RKXS.

In the case of a configuration of one RKM+ RKAJs/RKAs + RKAJATs, set the device IDs of the RKAJ/RKA, the RKAJATs connected to the Path 0, and the RKAJATs connected to the Path 1 as #0x, #2x, and #3x respectively.
Set the "x" as an ascending serial number in each of the Path 0 and Path 1 without discrimination between the RKAJ/RKA and RKAJAT.

In the case of a configuration of one RKS+ RKAJs + RKAJATs, set the device IDs of the RKAJ, the RKAJATs connected to the Path 0, and the RKAJATs connected to the Path 1 as #0x, #2x, and #3x respectively.
Set the "x" as an ascending serial number in each of the Path 0 and Path 1 without discrimination between the RKAJ/RKAJAT and RKAJ/RKAJAT.

Set #2x for RKAJAT/RKAJATL of RKXS + RKAJAT/RKAJATL.
Set x in ascending order.

In the case of a configuration of one RKH + RKAJs/RKAs + RKAJATs, set the device IDs of the RKAJs/RKAs, the RKAJATs connected to the PATH #0, and the RKAJATs connected to the PATH #1 as #0x, #2x, and #3x respectively. Set the "x" as an ascending serial number in each of the PATH #0 and PATH #1 without discrimination between the RKAJ/RKA and RKAJAT.
Set the device IDs of the RKAJs/RKAs, the RKAJATs connected to the PATH #2, and the RKAJATs connected to the PATH #3 as #1x, #4x, and #5x respectively. Set the "x" as an ascending serial number in each of the PATH #2 and PATH # 3 without discrimination between the RKAJ/RKA and RKAJAT.

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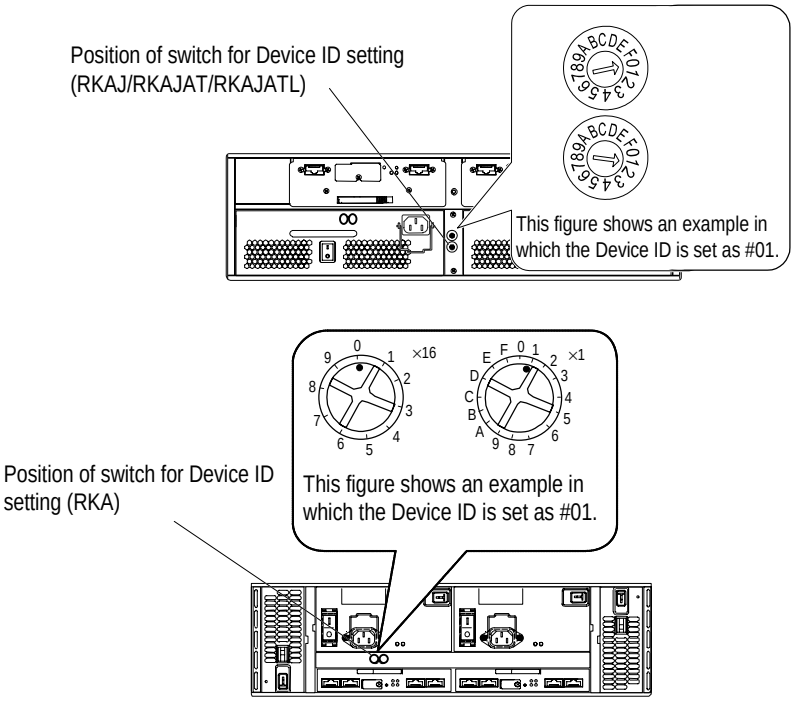


Figure 1.3.1 Setting of Device ID

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1.4 Adding Optional Components

1.4.1 Subsystems optional components for addition

(1) Optional components for addition

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
Control Unit	DF-F700-F1JM	Array Control Unit for duplication (2port) In the RKM	• Install the Cache memory with a capacity same as that of the Cache memory of the installed Controller (#0 side).	Impossible	Possible "1.4.2 Adding a Control Unit" (ADD 01-0140)
	DF-F700-F1JS	Array Control Unit for duplication (1port) In the RKS			
	DF-F700-F1JXS	Array Control Unit for duplication (1port) In the RKXS			
Disk Drive(*2) (including Spare Disk)	DF-F700-AGF72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 10,000 min^{-1})	• Select from the Disk Drives shown on the left according to the intended total capacity of the subsystem. • The Spare Disk Drives can be set up to 15 in the whole subsystem (up to 30 in case of the RKH).	Varies depending on the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)	Varies depending on) the disk array to be added. "1.4.3 Adding a Disk Drive" (ADD 01-0190)
	DF-F700-AGH72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F700-AGF146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 10,000 min^{-1})			
	DF-F700-AGH146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 15,000 min^{-1})			
	DF-F700-AGF300	3.5-inch Disk Drive (287.6 G bytes) (Disk rotational speed : 10,000 min^{-1})			
	DF-F700-ATE250R (RKXS/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F700-ATE400R (RKXS/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes) (Disk rotational speed : 7,200 min^{-1})			
	DF-F700-ATE500R (RKXS/RKAJAT)	3.5-inch Disk Drive (491.9 G bytes) (Disk rotational speed : 7,200 min^{-1})			
Cache Unit	DF-F700- C1GJ	Cache memory (1,024 M bytes)	• For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.	Impossible	Possible "1.4.4 Adding a Cache Unit" (ADD 01-0380)
	DF-F700-C2GJ (Excluding RKXS)	Cache memory (2,048 M bytes)			
	DF-F700-C512JX (RKXS special use)	Cache memory (512 M bytes)			
FC Interface Board	DF-F700-DJ4G2W (RKS/RKXS)	Independent two-port FC Interface Board (corresponding to 4 G bps) (including host connectors for 4G bps (2))	• Install the interface board after removing the dummy interface board from the Control Unit.	Impossible	Possible "1.4.6 Adding a FC Interface Board" (ADD 01-0420)
	DF-F700-DJ4G2H (RKH)	4G bps FC Interface Board (including host connectors for 4G bps (2))			
iSCSI Interface Board	DF-F700-DJSC2 (RKM/RKS/RKXS)	iSCSI Interface Board	–	Impossible	Possible "1.4.7 Adding an iSCSI Interface Board" (ADD 01-0430)
	DF-F700-DJSC2H (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.
*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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(2) NAS Unit/Adding optional components for NAS

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
NAS Unit (RKNAS)	DF-700-RKNAS4G	Install the memory (DIMM) of 4Gbytes in the RKNAS.	• Connect it to the RKM. • The case of the dual Controller configuration only.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
	DF-700-RKNAS2G	Install the memory (DIMM) of 2Gbytes in the RKNAS.	• Connect it to the RKS or the RKXS. • The case of the dual Controller configuration only.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
NAS Interface Board	DF-F700-DJNAS (RKM/RKS/RKXS)	Interface Board (NAS)	• When connecting it to the RKNAS, install it in the basic subsystem.	Impossible	Possible "1.4.8 Adding a NAS Unit" (ADD 01-0440)
	DF-F700-DJNASH (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.

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1.4.2 Adding a Control Unit

An addition of the Control Unit is done when duplicating the Control Unit.

⚠ CAUTION

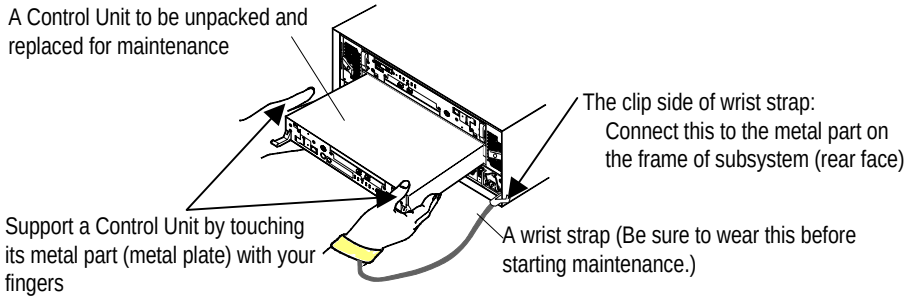
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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(1) Turn off the main switch.
(2) Make sure that the PWR (POWER) LED (green) on the panel goes out.

NOTE : When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to Replacement, "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the cache is in the cache backup state, cancel the status.

(3) Make sure that the CACHE POWER LED (green) on the Controller is off.
When the CACHE POWER LED (green) is on, user data which has not written on the disk exists in the cache memory.
(4) Turn off the AC Power Unit Switch of the Power Unit (#0, #1).
(5) Remove the dummy (control Unit).
Loosen the fixing screws (right and left) of the dummy (Control Unit), slide the latches downward, and remove the dummy (Control Unit).
(6) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.
(7) Remove the dust cover from the cash slot of the Control Unit #1 to be added
(Insert the dust cover in the Cache slot in which the Cache memory is not installed).
(8) Install the Cache memory, which has the same capacity as that of the installed Controller#0, in the Controller#1 to be added by the set of two boards.
(9) When the Interface Board is installed in the Control Unit #0, install the Interface Board in the Control Unit #1 to be added, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). At this time, insert the connector surely. Install the Interface Board making its sheet metal part face inside of the Control Unit.
Install the same type of the Interface Board as the Control Unit #0 in the Control Unit #1.
(10) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(11) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.

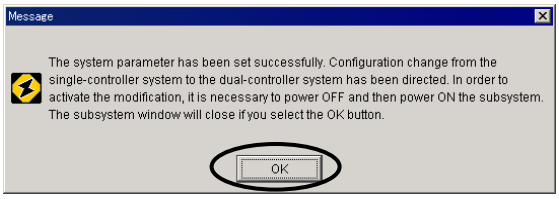
NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1.
Install the Control Unit #0 with the cover up and #1 with the cover down.

(12) Connect the interface cable, the LAN cable, and the ENC cable.

NOTE : • When connecting the Interface cable and the ENC cable, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

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(13) Turn on the AC Power Unit Switch of the Power Unit.
(14) Turn on the main switch.
(15) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.
(16) Connect the PC to be connected with Storage Navigator Modular and the Control Unit #0 with a LAN cable. (Refer to System Parameter "1.1 Procedure for connecting Storage Navigator Modular with the subsystem" (SYSPR 01-0010).)
(17) Set the system starting attribute of Boot Option to the dual active mode to operate it by the dual system. (Refer to System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0040).)
Besides, since the following message is displayed after the system parameters have been set, click the [OK] button.

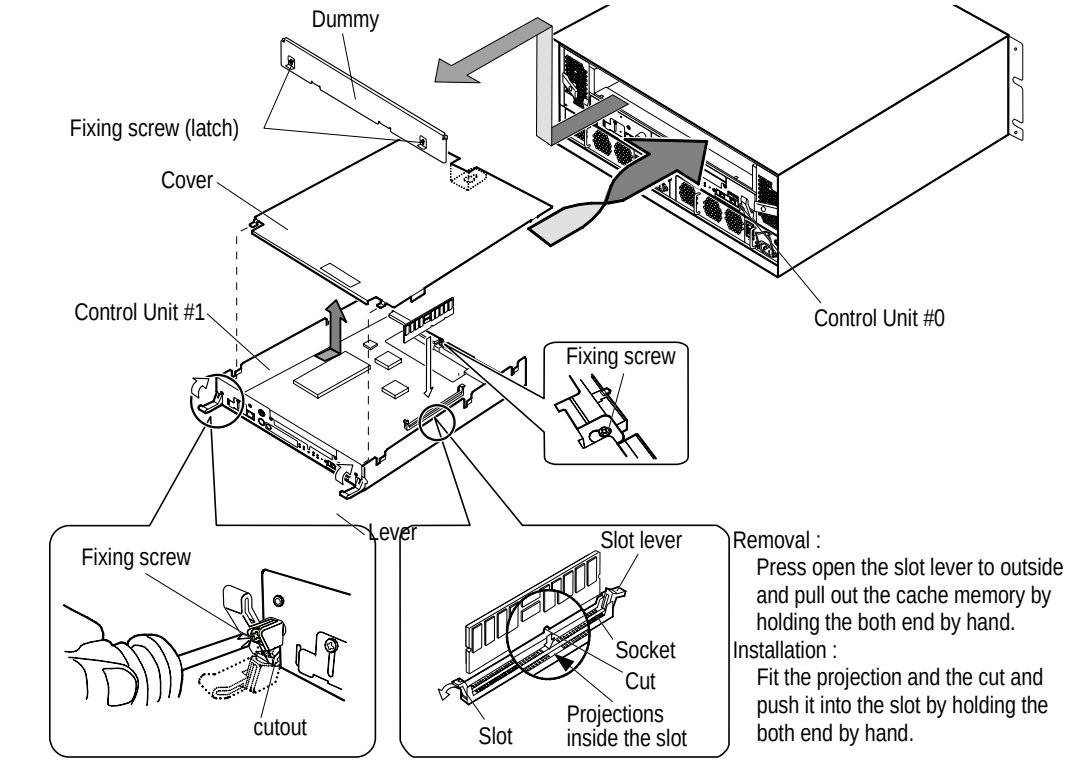


(18) Turn off the main switch.
(19) Make sure that the PWR (POWER) LED (green) on the panel goes out.
(20) Turn on the main switch after waiting for one minute or longer.
(21) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.
(22) Connect the LAN cross cable to the LAN port for the maintenance of the Control Unit #1.
(23) Because the subsystem configuration was changed from the single Control Unit to the dual Control Unit, register the IP address of the Control Unit #1 in the array subsystem after deleting the target array subsystem in which the Storage Navigator Modular is registered. (Refer to System Parameter "1.1 Procedure for connecting Storage Navigator Modular with the subsystem" (SYSPR 01-0010).)
(24) Reset the configurations for the Control Unit #1.

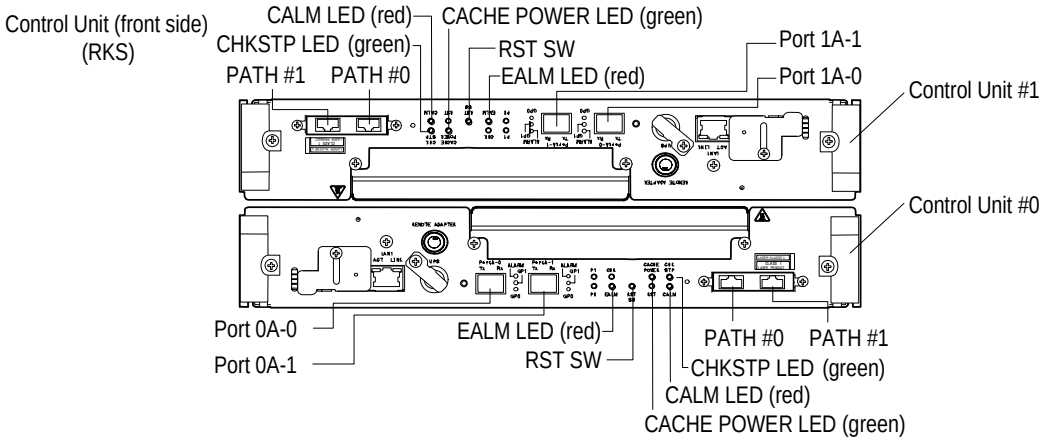
NOTE : A setup for the dual controller is necessary for the controller 1. (Refer to System Parameter "Chapter 4. Setting Configuration Information" (SYSPR 04-0000).)
When the cache is in the cache backup state, cancel the status.

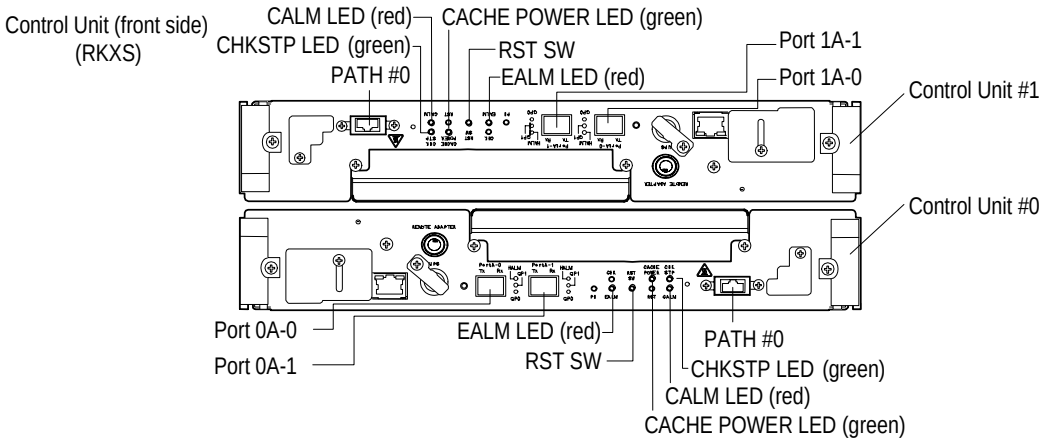
(25) Turn off the main switch.
(26) Make sure that the PWR (POWER) LED (green) on the panel goes out.
(27) Remove the LAN cable connected to the Storage Navigator Modular from the Control Unit#0.
(28) Turn on the main switch.
(29) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.
(30) Check that the maintenance port IP address is set correctly.
When the maintenance port IP address is displayed as "0.0.0.0", set it.
Refer to System Parameter "4.2 (4) Setting of Maintenance LAN" (SYSPR 04-0100).

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Removal :
Press open the slot lever to outside and pull out the cache memory by holding the both end by hand.
Installation :
Fit the projection and the cut and push it into the slot by holding the both end by hand.

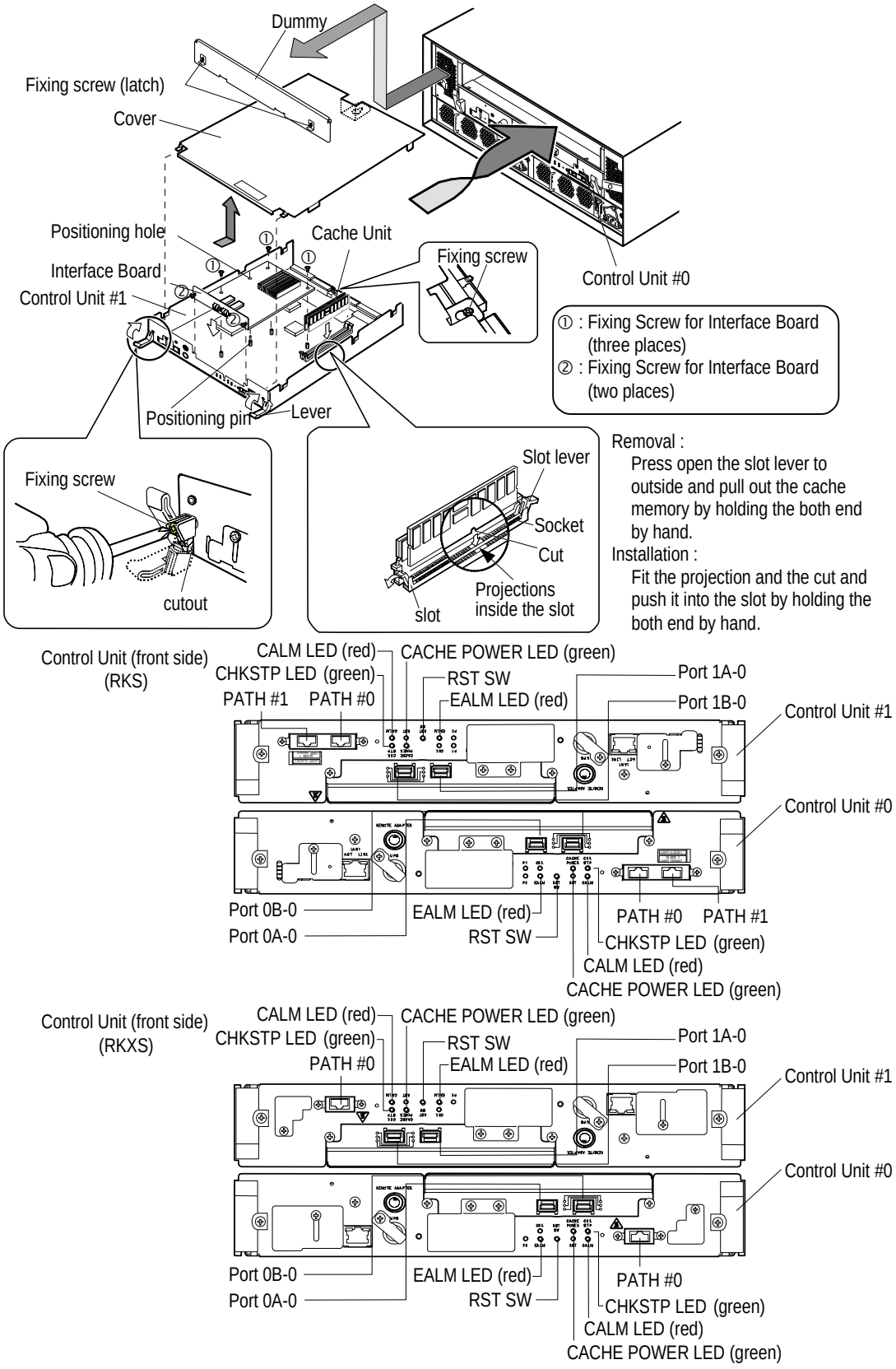




*1 : The figure shows the case where the FC Interface Board is not installed in the Control Unit of the RKS/RKXS.

Figure 1.4.1 Adding the Control Unit (RKS/RKXS)

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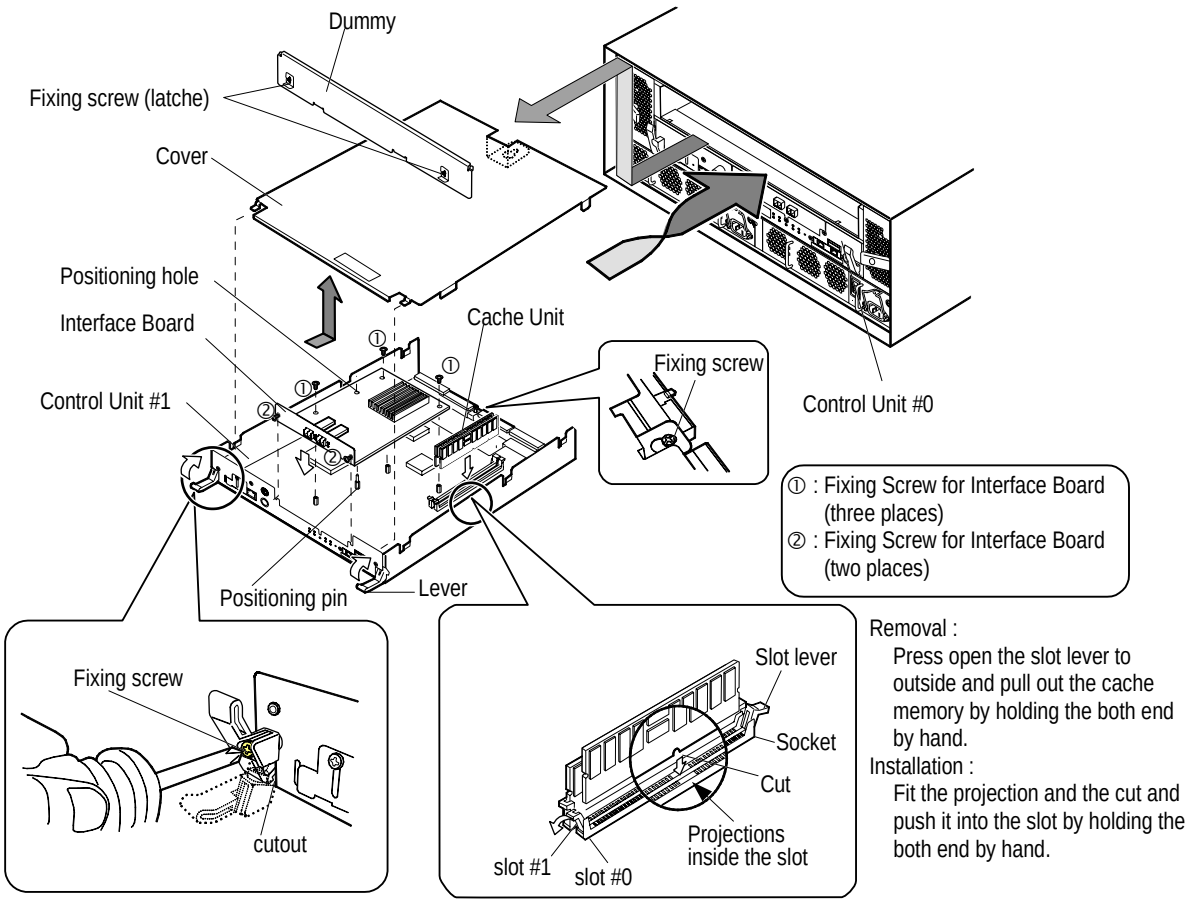
*1 : The figure shows the case where the FC Interface Board is added to the Control Unit of the RKS/RKXS.

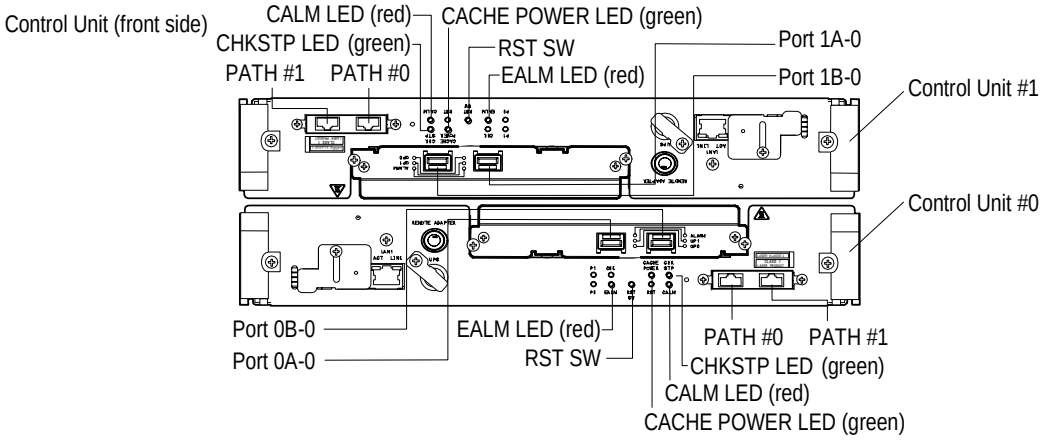
Figure 1.4.1.1 Adding the Control Unit (RKS/RKXS) (FC Interface Board is installed)

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

Figure 1.4.1.2 Adding the Control Unit (RKM)

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1.4.3 Adding a Disk Drive

A procedure for adding/subtracting the Disk Drive varies depending on a location of the Disk Drive and a condition (whether the subsystem power is on or off).
Take care to use a procedure appropriate for the purpose because a use of an inappropriate procedure may cause an accident such as a loss of user data.

Table 1.4.1 Kinds of Disk Drive Addition and Subtraction

No.	Unit of addition/ subtraction	Component to be added/ subtracted	Addition for storage capacity expansion Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement for storage capacity expansion Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
1	Disk Drive	RKM/RKS/RKXS #0 to 4 RKAJ corresponding to the unit ID #0 connected to the RKH #0 to 4	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Impossible –	Possible(*2) Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Impossible –
2		RKM/RKS/RKXS #5 to 14 RKAJ corresponding to the unit ID #0 connected to the RKH #5 to 14	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : When the Disk Drives are added additionally or by replacement in #0 to #4 of the RKM/RKS/RKXS or the Disk Drives of #0 to #4 of the first RKAJ connected to the RKH, be sure to check that the addition work is performed with the subsystem power turned on and the system copy is automatically started in the added Disk Drives and completed. The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).
When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)

*3 : If the RKAJ/RKAJAT is not mounted when adding any of the Disk Drives #0 to #3 to the RKAJ/RKAJAT, add it first.

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No.	Unit of addition/ subtraction	Component to be added/ subtracted	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
3		RKAJ #0 to 3 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible(*3) Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible(*2) Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)
4		RKAJ #4 to 14 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)
5		RKAJAT #0 to 3	Possible(*3) Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Possible(*2) Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Possible Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Possible Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : When the Disk Drives are added additionally or by replacement in #0 to #4 of the RKM/RKS/RKXS or the Disk Drives of #0 to #4 of the first RKAJ connected to the RKH, be sure to check that the addition work is performed with the subsystem power turned on and the system copy is automatically started in the added Disk Drives and completed. The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).
When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram1 '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)

*3 : If the RKAJ/RKAJAT is not mounted when adding any of the Disk Drives #0 to #3 to the RKAJ/RKAJAT, add it first.

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No.	Unit of addition/ subtraction	Component to be added/ subtracted	Addition for storage capacity expansion		Replacement for storage capacity expansion	
			Addition of the disk array(s) or the Disk Drive(s) in order to expand a storage capacity		Replacement with the Disk Drive(s) having larger capacity in order to expand a storage capacity	
			Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)	Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
6		RKAJAT #4 to 14	Possible	Possible	Possible	Possible
			Refer to "1.4.3 (2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250)	Refer to "1.4.3 (2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260)	Refer to "1.4.3 (3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)	Refer to "1.4.3 (3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

*1 : Data is exchanged between a host computer and the subsystem.

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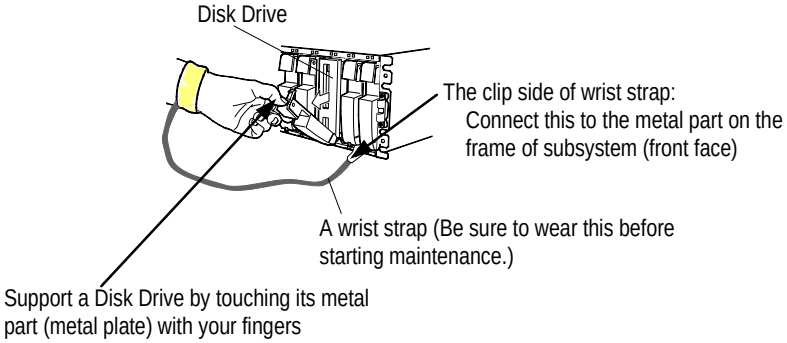
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(1) Before starting addition of Disk Drive

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

NOTE : • The Disk Drive is a precision machine. Never apply a shock or vibration to it.
• Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Locations and numbers of Disk Drives

The mounting position number of the Disk Drive is decided by the combination of the Disk Drive number set to the device number.

For details of the device ID setting, refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

Set the subsystem identification switch for the RKAJ.

When the basic subsystem to be connected is the RKM/RKH, set it in the M side, and when it is the RKS, set it in the S side.

The Disk Drive number is #0 to #14 from the left sequentially seen sideways (for the floor model, it is #0 to #14 from the bottom).

The Disk Drive is not installed in RKH.

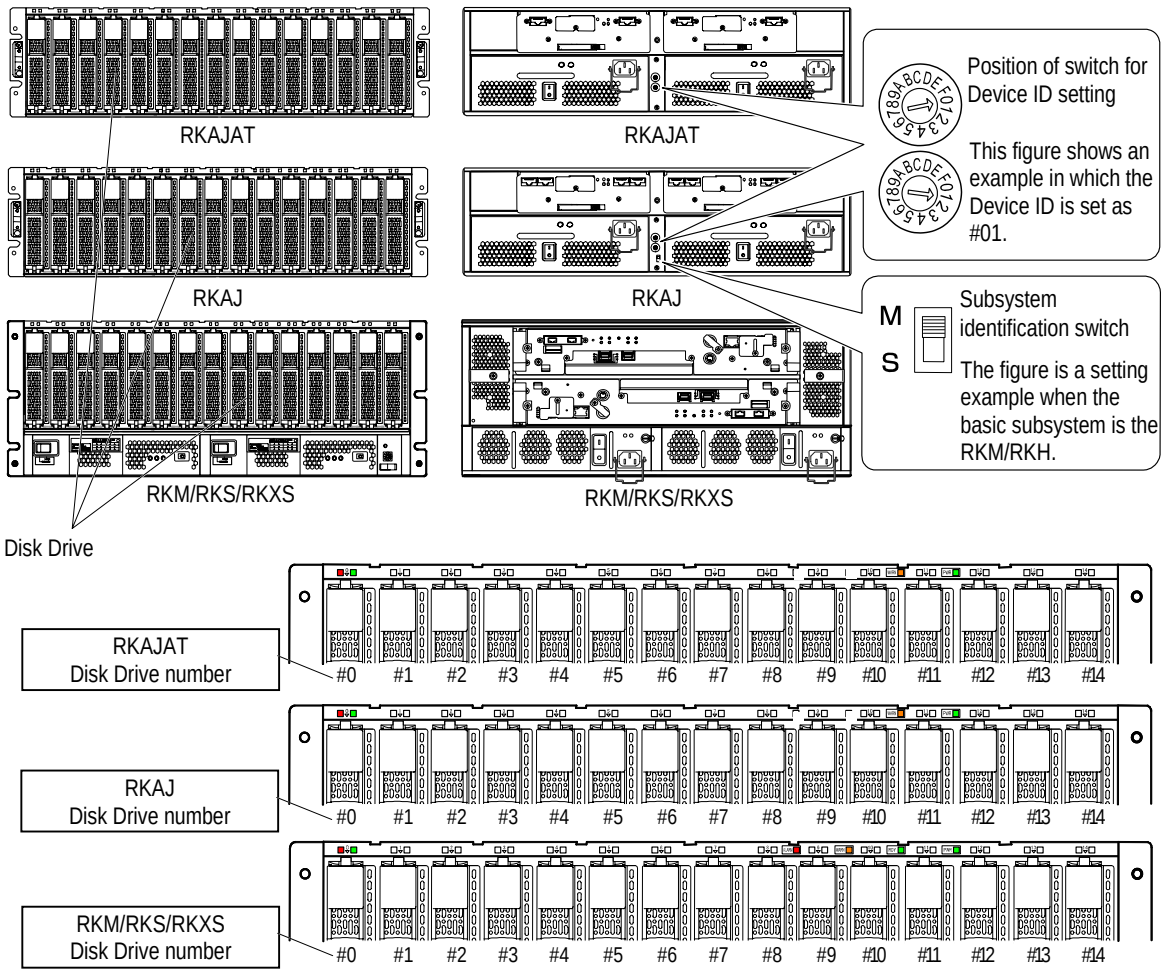


Figure 1.4.2 Disk Drive Mounting Location

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(b) If necessary number of vacant slots do not exist in the subsystem to which the Disk Drives are to be added. (Refer to "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490))
Arrange to mount two or more Disk Drives(‡1) on the added RKAJ/RKAJAT.
Set the Device ID number of the RKAJ/RKAJAT to be added.

(c) The Disk Drives for the Spare Disk Drives can be set up to 15 in one subsystem (up to 30 in case of the RKH) can be set in the optional positions.
Assign the Disk Drive, which has not been assigned to be a data disk, to be a Spare Disk.

(d) When adding the RKA or adding the Disk Drive to the RKA in the microprogram revision 0740/C or more, it is possible to treat the Disk Drive of the RKA as the target of the copy backless(‡2) if the customer/SE observes(‡3) either of the restrictions(‡4) on the operation shown below.

- The FC Disk Drive to be installed in the subsystem must be unified to the Disk Drive of the same rotational speed.
- The I/O performance and the Disk Drive restoration performance to the FC Disk Drive to be installed in the subsystem must be designed as the FC Disk Drive of 10,000 min^{-1} rotation.

When setting(‡5) this function, fully check that the customer/SE can strictly observe(‡3) the restrictions (‡4) on the operation shown below.

‡1 : The two of them must be installed in the slots Disk Drive #0 and Disk Drive #1.

‡2 : Refer to Theory "4.6. (3) Operation after replacing failed Disk Drive" (THEO 04-0240) for the details of the function.

‡3 : The customer/SE must observe the restrictions on the operation until the RAID Group configuration of the subsystem is reconstructed.

‡4 : If the customer/SE does not observe the restrictions on the operation, the following problems may occur.
If the FC Disk Drives of the different rotational speed are mixed in the subsystem, when the FC Disk Drive of 15,000 min^{-1} rotation is blocked, the FC Disk Drive of 10,000 min^{-1} rotation may be the Disk Drive which configures the RAID Group instead of the FC Disk Drive of 15,000 min^{-1} rotation.
If this condition occurs, the host I/O performance to the logical units which were configured only with 15,000 min^{-1} rotation in the RAID Group is deteriorated to the performance of the FC Disk Drive of 10,000 min^{-1} rotation.

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‡5 : Set it in (2-1)–Work 7, (2-2)–Work 9, (3-1)-Work 12 and (3-2)–Work 15.
This setting can be executed in the combination of the microprogram revision 0740/C or more and the Storage Navigator Modular Ver.4.05 or more.

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(2) Procedure for adding Disk Drive (in order to expand a storage capacity)

- A procedure for adding the Disk Drive to a vacant slot of the subsystem is shown below.
- When an addition of the additional subsystem is necessary because of insufficient vacant slots, add the additional subsystem first following the procedure explained in the item shown below. (Refer to "1.3 Mounting on Rack Frame" (ADD 01-0100).)
- When the Disk Drives are additionally added to the vacant slots of #2 to #4 of the RKM/RKS, #2 to #4 of the RKAJ corresponding to the unit ID #0 connected to the RKH and #3 to #4 of the RKXS, it cannot be performed with the subsystem power turned off.
  Perform the addition of the Disk Drives online (in order to expand the storage capacity) according to (2-1), and be sure to check that the system copy starts automatically to the added Disk Drives and it is completed. (‡1)
  When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to "Microprogram '3.2 Procedure for checking the status of system copy complete' (MICRO 03-0020)".)
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

The work for addition varies depending on whether the work is done while the power is turned on or off (with the subsystem power turned off).

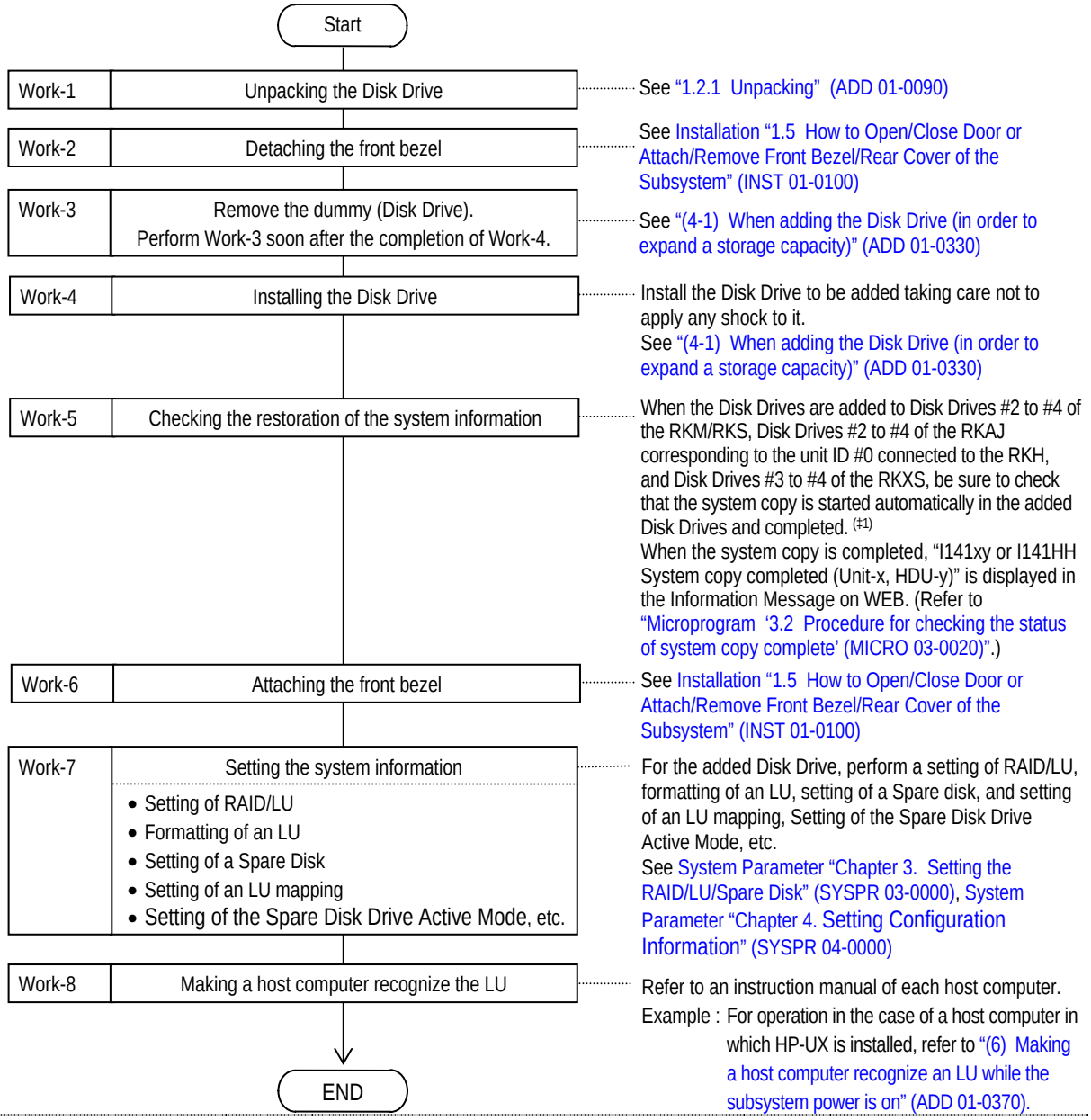
- Procedure for adding a Disk Drive while the power is turned online :
  See "(2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0250).
- Procedure for adding the Disk Drives offline (with the subsystem power turned off) :
  See "(2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)" (ADD 01-0260).

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(2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is online

A procedure for adding the Disk Drive (in order to expand a storage capacity) without shutting down the subsystem is shown below.

NOTE : When adding the two or more Disk Drives in the installation of the Disk Drives (Work-4), checking the restoration of the system information (Work-5) for the each Disk Drive one by one, and then install the Disk Drives one by one.

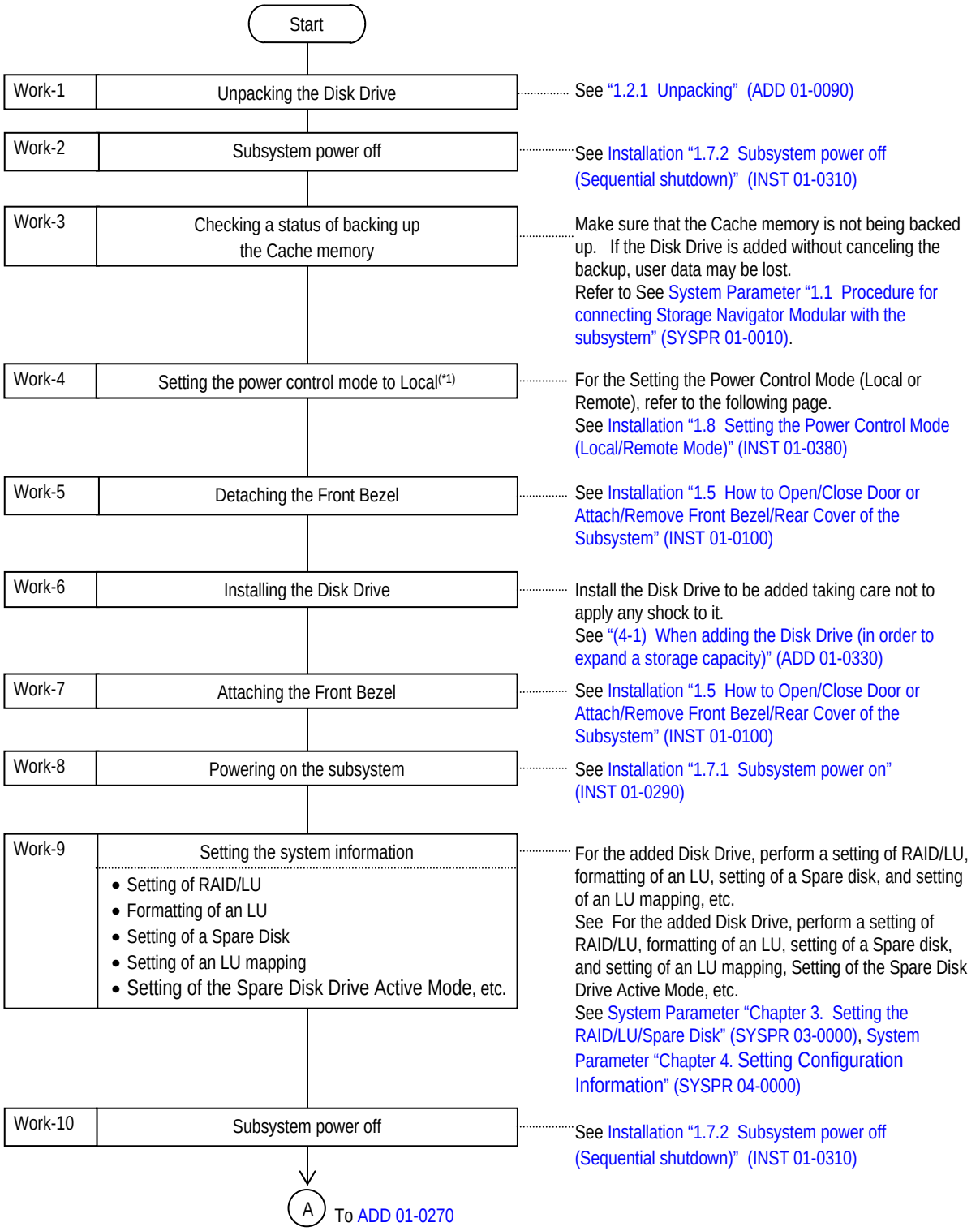


‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).

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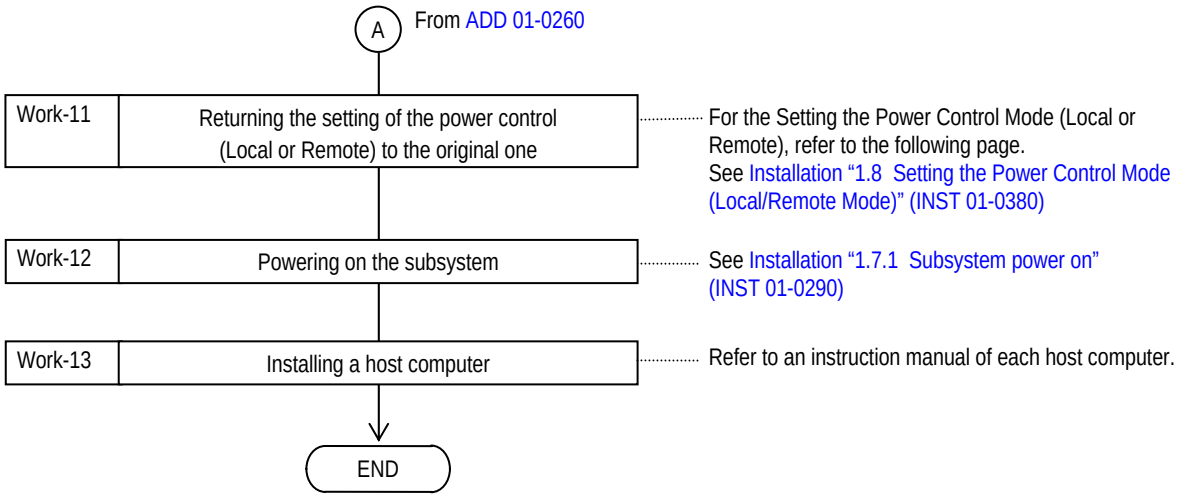
(2-2) Procedure for adding the Disk Drives offline (with the subsystem power turned off)

A procedure for adding the Disk Drive (in order to expand a storage capacity) after turning off the subsystem power is shown below.



*1 : When the subsystem power control works interlocking with the UPS, etc., make an adjustment so that the power is supplied to it.

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(3) Procedure for replacing Disk Drive (in order to expand a storage) capacity

- A procedure for replacing the Disk Drive installed in the subsystem with the Disk Drive having a larger capacity is shown below.
- When replacing two or more Disk Drives, be sure to replace them one by one in order of location.
- When the Disk Drives #0 to #4 of the RKM/RKS/RKXS or the Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID #0 connected to the RKH are added by replacement, it cannot be performed with the subsystem power turned off. Perform the replacement of the Disk Drives online (in order to expand the storage capacity) according to (2-1), and be sure to check that the system copy starts automatically to the added Disk Drives and it is completed(‡1).
  When the system copy is completed, "I141xy (or I141HH) System copy completed (Unit-x, HDU-y)" is displayed in the Information Message on WEB. (Refer to Microprogram, "3.2 Procedure for checking the status of system copy complete" (MICRO 03-0020).)
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

The procedure for the replacement varies depending on whether the replacement is performed while the power is turned online or offline (with the subsystem power turned off).

- Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online .... "(3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online" (ADD 01-0290)
- Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)..... "(3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)" (ADD 01-0310)

‡1 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the

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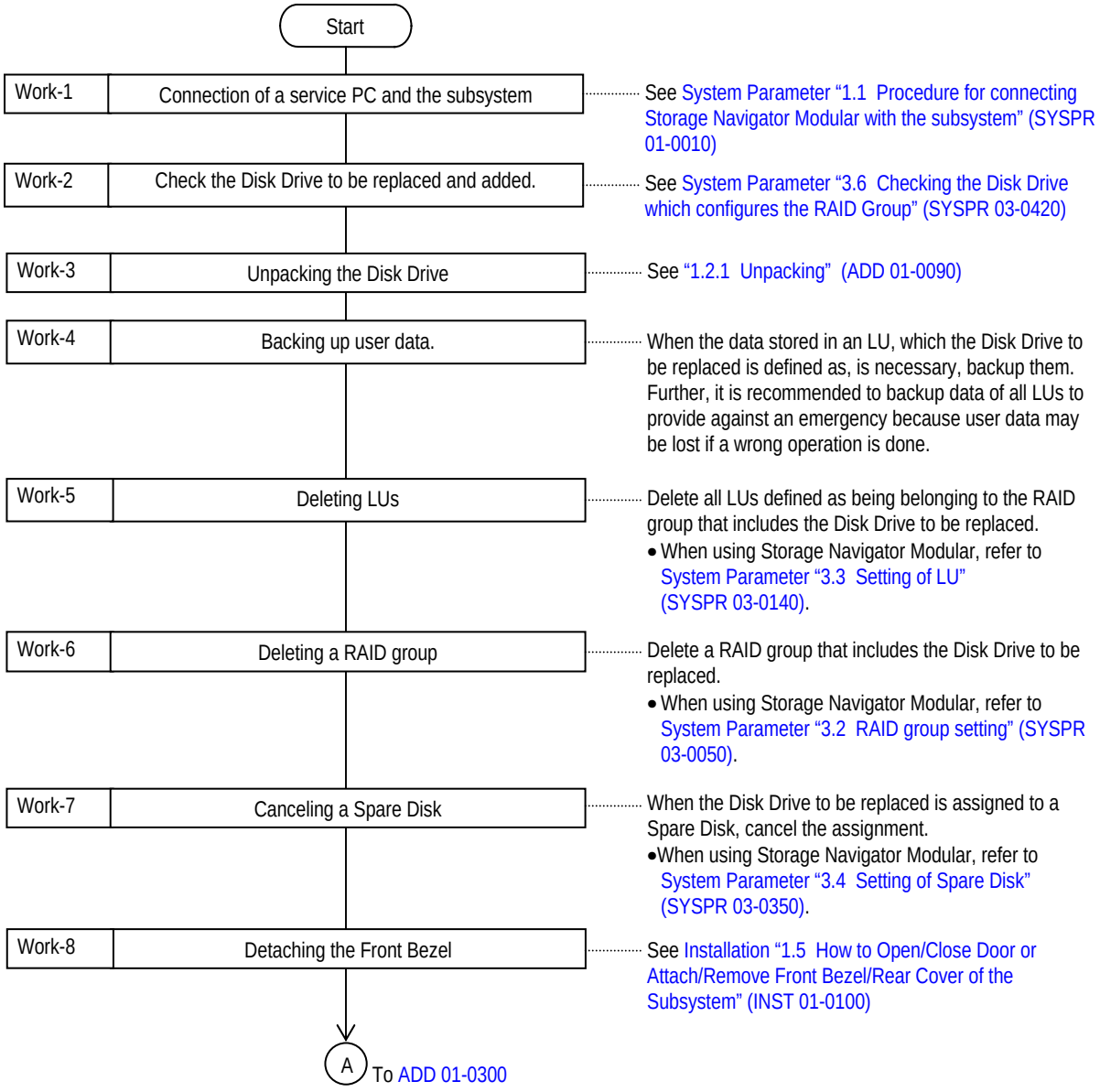
system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).

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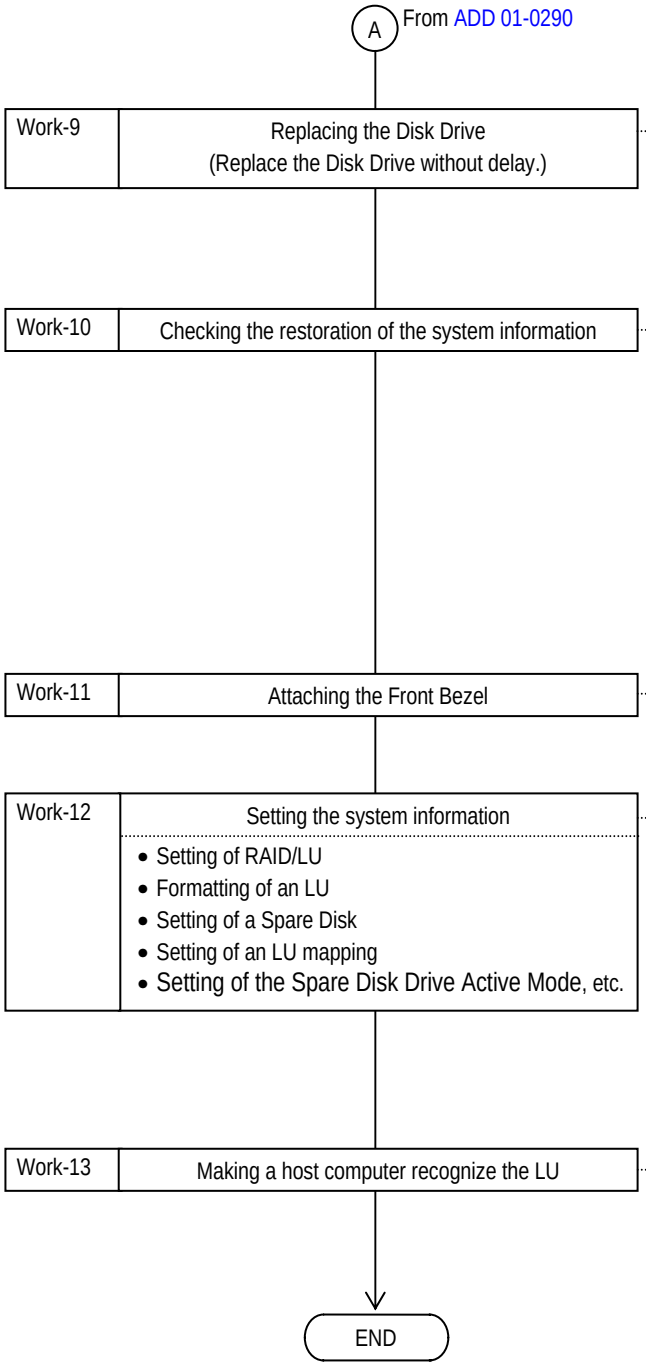
(3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is online

A procedure for replacing the Disk Drive (in order to expand a storage capacity) without shutting down the subsystem is shown below.

NOTE : When two or more Disk Drives are added by the replacement work of the Disk Drives on Work-7, it is necessary to check the restoration of the system information on Work-10 for each unit and install the Disk Drives one by one.



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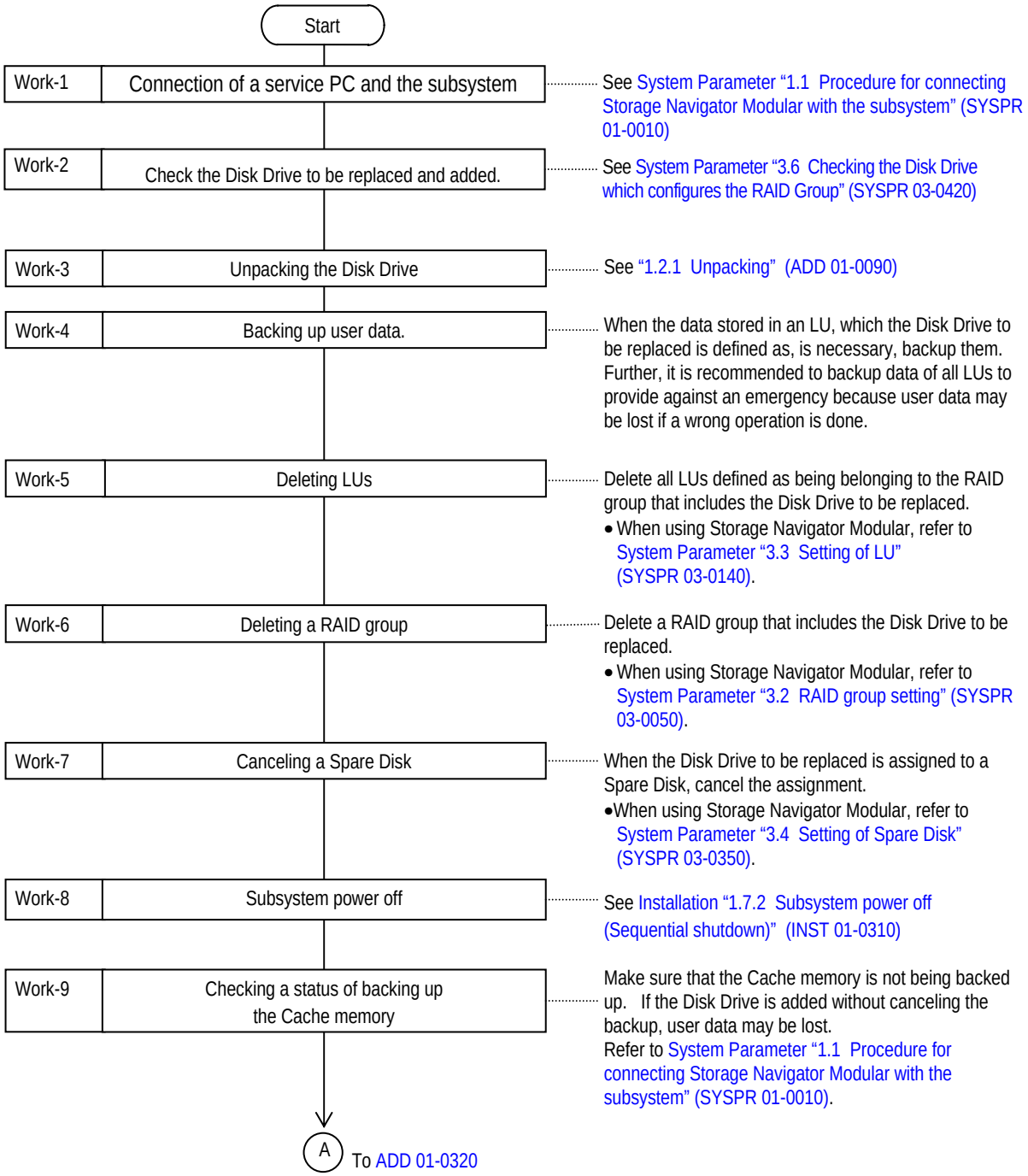


‡1: The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).

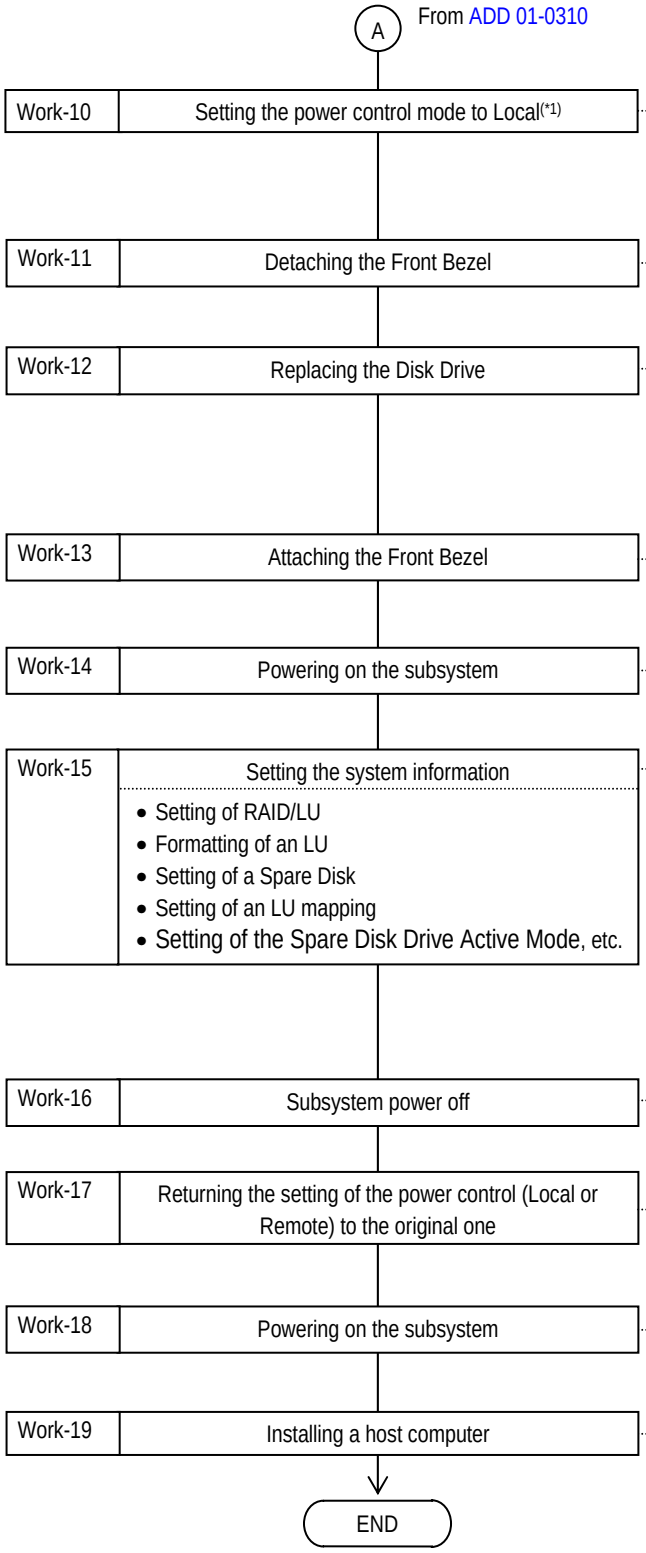
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(3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is offline (with the subsystem power turned off)

A procedure for replacing the Disk Drive (in order to expand a storage capacity) after powering off the subsystem is shown below.



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*1 : When the subsystem power control works interlocking with the UPS, etc., make an adjustment so that the power is supplied to it.

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(4) Installing/removing Disk Drive

When installing/removing the Disk Drive in the addition or subtraction of it, follow the procedure shown below.

- Procedure for adding a Disk Drive (RKM/RKAJ /RKS):
  See Item "(4-1) When adding the Disk Drive (in order to expand a storage capacity)" (ADD 01-0330).
- Procedure for replacing a (RKM/RKAJ /RKS):
  See Item "(4-2) When replacing the Disk Drive (in order to expand a storage capacity)" (ADD 01-0350).

(4-1) When adding the Disk Drive (in order to expand a storage capacity)

Perform the following operations (a) to (d) for each of the Disk Drives to be added (in order to expand a storage capacity) one by one.

(a) Pull the dummy (Disk Drive), and remove it.

There are two types of the dummies (Disk Drives), and the installation methods are different respectively.

- The dummy (Disk Drive) of which the external appearance is similar to the Disk Drive
  There is no label attached on the handle part.
  Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the dummy (disk drive) by pulling it.
- The dummy (Disk Drive) of which the external appearance is all black
  This is the dummy (Disk Drive) of the resin all-in-one molded piece (black) with no stopper and handle part.
  Pressing the latch (round dent) at the lower part of the dummy (Disk Drive), hold the upper part and pull it out, and then remove it.

Because the dummy (disk drive) that has been removed will be used when the added Disk Drive is de-installed, keep it in custody with its handle returned to its original state (locked by the stopper).

Keep the dummy (Disk Drive) similar to the Disk Drive in the status that the handle is returned to the original (the stopped is locked).

NOTE : Exteriors of the Disk Drive and dummy (Disk Drive) are similar to each other. Be careful not to install or remove a wrong one.
Disk Drive : The label to display the model name and the revision is attached on the handle part.

(b) Install the Disk Drive to be added taking care not to apply any shock to it (see Figure 1.4.4.1).

(i) Fit the Disk Drive in the guide rail of the RKAJAT and slide it in the direction shown by the arrow.

(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) When the Disk Drive has been added while the subsystem power is on, the ALARM LED on the Disk Drive will go out a little while after the Disk Drive has been inserted.
Make sure that the LED goes out.

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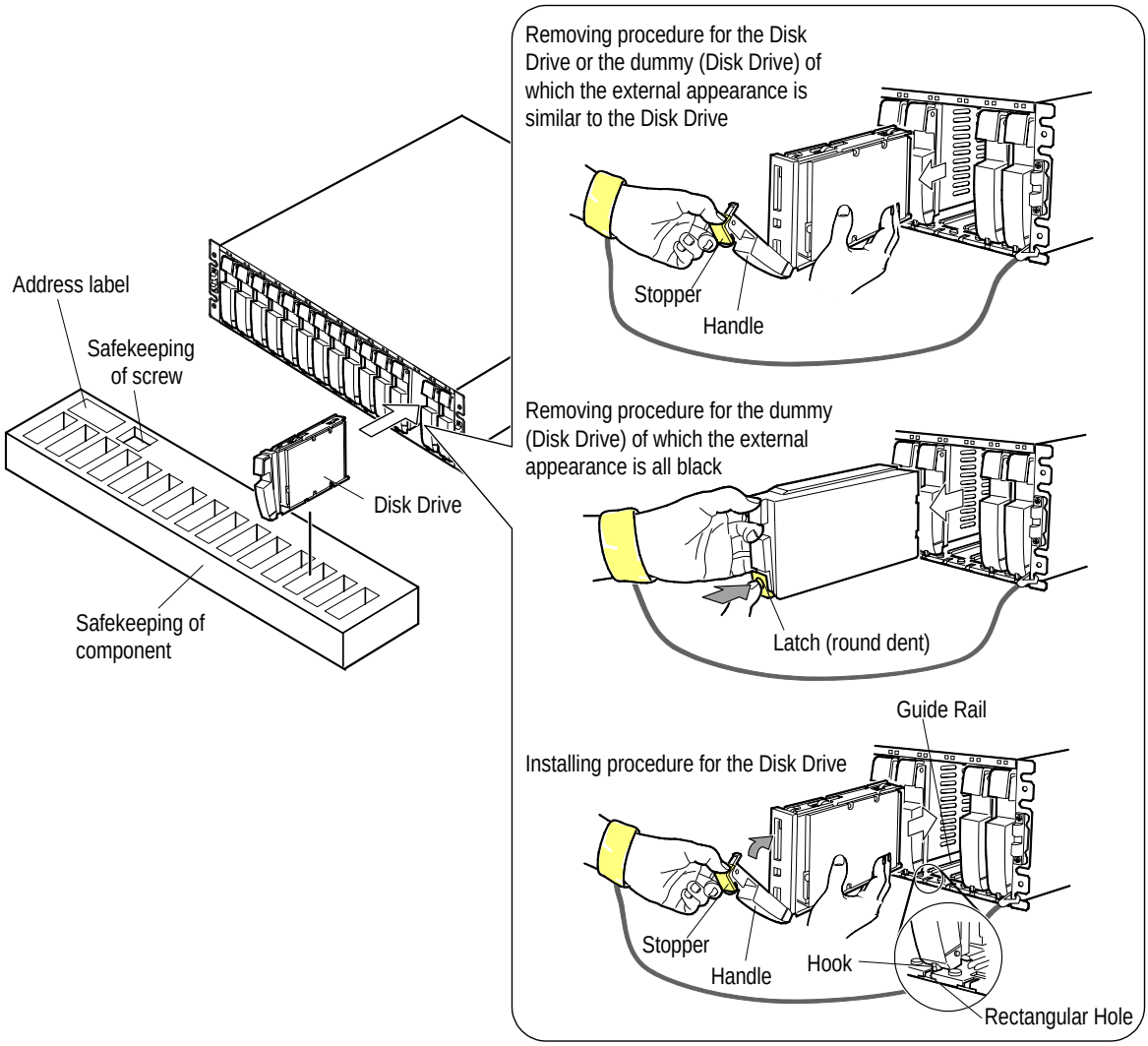


Figure 1.4.4.1 Removing the Dummy (Disk Drive) and Installing the Disk Drive

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(4-2) When replacing the Disk Drive (in order to expand a storage capacity)
Perform the following operations (a) and (d) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Pull the stopper at the upper part of the Disk Drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it. (see Figure 1.4.4.2).
When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the Disk Drive to be added taking care not to apply any shock to it (see Figure 1.4.4.2).
(i) Fit the Disk Drive in the guide rail of the RKAJAT and slide it in the direction shown by the arrow.
(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.
(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) When the Disk Drive has been added while the subsystem power is on, the ALARM LED on the Disk Drive will go out a little while after the Disk Drive has been inserted.
Make sure that the LED goes out.

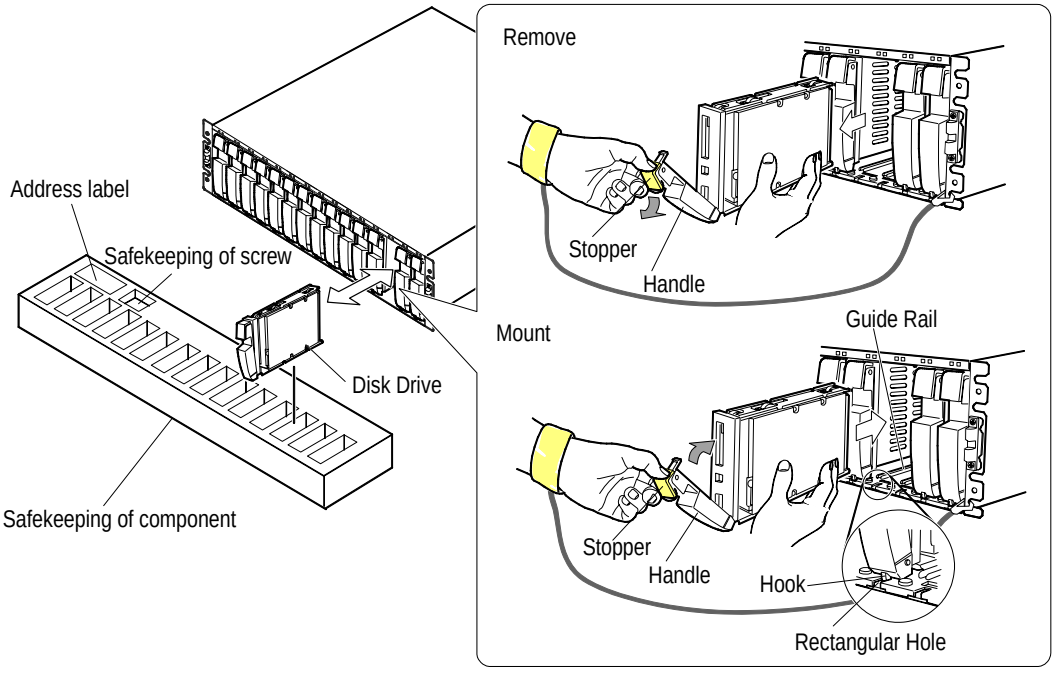


Figure 1.4.4.2 Operation of Mount/Remove the Disk Drive

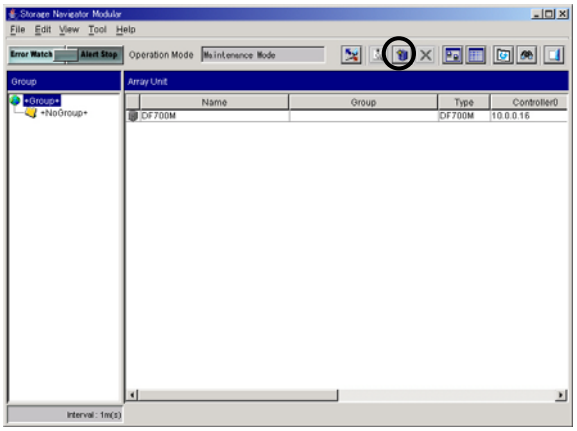
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(5) Restoring the system information

A restoration of the system information can be done by using either of the Storage Navigator Modular.

(5-1) Restoring the system information using Storage Navigator Modular

(a) Start Storage Navigator Modular, position the focus ([ ]) on the [Disk Array Subsystem Registration] ([ ]) on the tool bar by pressing the [Tab] key, and then press the [Ctrl], [Shift], and [E] keys at the same time.



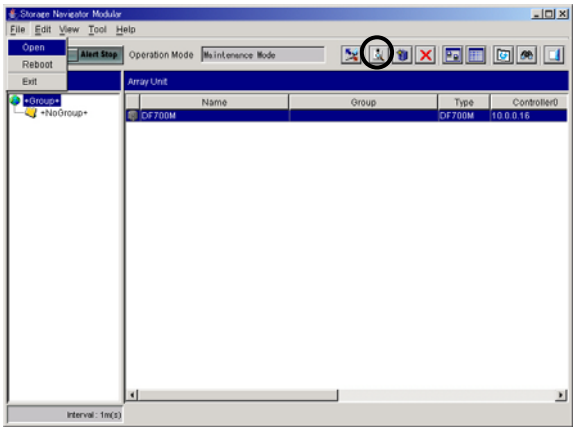
Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

(b) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

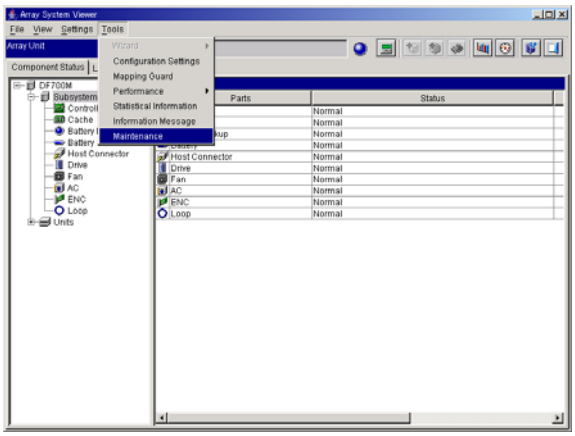
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

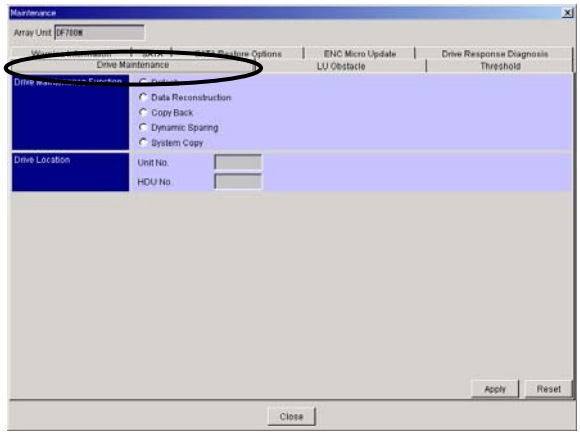


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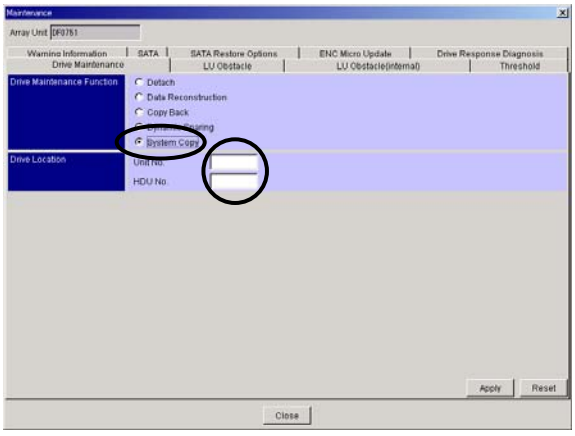
(c) Select [Tools] – [Maintenance] in the unit window.



(d) Click the [Drive Maintenance] tab.



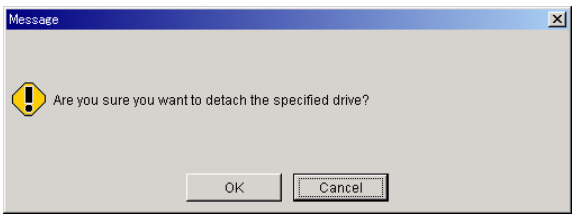
(e) Select the [System Copy] and set the number of the Disk Drive that has been added.



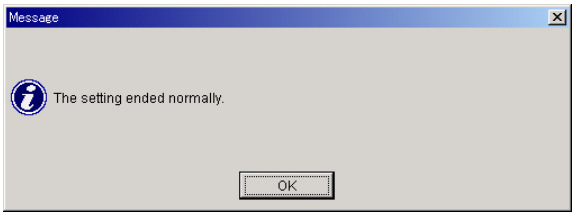
(f) Click the [Apply] button.

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(g) The confirmation window is display. Click the [OK] button.



(h) A window showing that the setting has been completed is displayed.
Press the [OK] button.



(i) When “System copy started (Unit-x, HDU-y)” and “System copy completed (Unit-x, HDU-y)” are displayed at the “Information Message” in the WEB window, the system copy has been completed.

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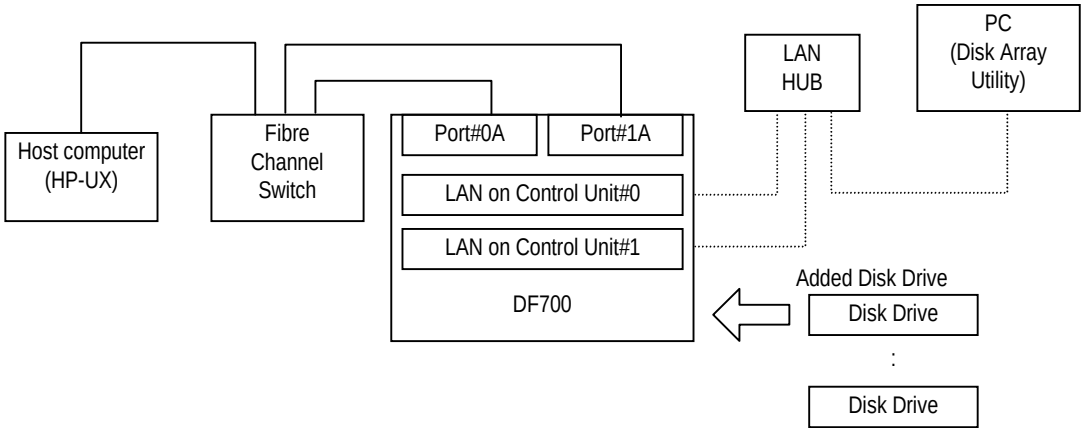
(6) Making a host computer recognize an LU while the subsystem power is on

< An example of the case of a host in which HP-UX is installed >

An example of the procedure to make the Disk Drive added while the subsystem power is on recognized by the host computer in which the HP-UX is installed is shown below.

(a) System configuration

LAN connect the PC, in which the Storage Navigator Modular is installed.



(b) Operation procedure

(i) Make sure that the host computer and the DF700 are in the Ready status. (I/Os host computer can be continued)

(ii) Install the Disk Drives to be added in the DF700.

(iii) Set a new RAID group for the installed Disk Drives.

(iv) Set (an) LU(s) newly for the RAID group which has been set in step (iii).

(v) Format the LU(s) which has been set in step (iv).

(vi) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF700 has been recognized by the host computer. (However, the status of the newly added LU is displayed as NO-NW.)

(vii) Execute the "insf -e" command from the host to create a device file of the LU which has been newly added.

(viii) Issue the "ioscan -nfC disk" command from the host computer to verify that the DF700 has been recognized by the host computer. (The status of the newly added LU is displayed as CLAIMED.)

(ix) Execute a creation of a file system by creating the volume group and logical volume for the newly added LU from the host computer.

By operating as explained above, the LU(s) which has been newly created becomes able to be used by the host computer.

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1.4.4 Adding a Cache Unit

⚠ CAUTION

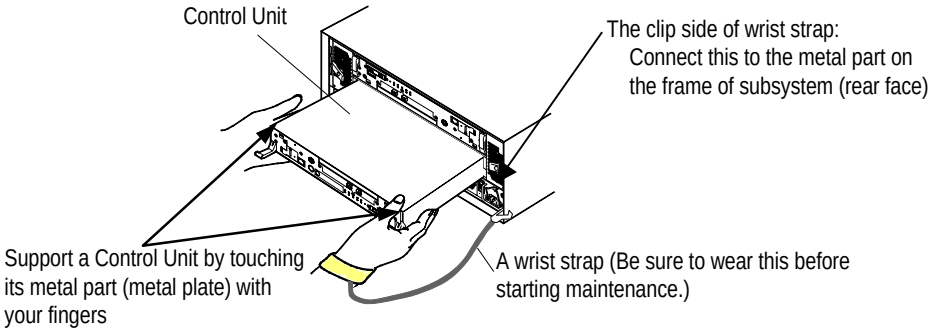
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

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<Working Procedure>

(1) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(2) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(3) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(4) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(5) Remove the Control Unit by pulling it out toward you.

(6) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(7) Remove the Cache Unit.
Place the removed Cache Unit in the place where anti-static measures are taken.

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(8) Install the Cache Unit in the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Remove the dust cover when installing the Cache Unit.
• For the RKM, insert the Cache Units in the cache slots in regular order starting from the slot #0.
• In the case of the RKH, if the Cache memories are not installed in the slot #0 and the slot #1, the blockade of the Control Unit occurs.
Be sure to install the Cache memories in the slot #0 and the slot #1.
• Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(9) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(10) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(11) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(12) Turn on the AC Power Unit Switch of the both Power Units.
(13) Turn on the main switch.
(14) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(15) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

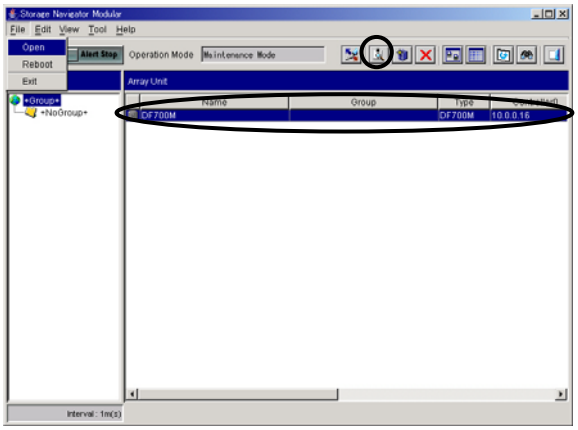
‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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When the priced option, Cache Partition Manager, is used, there is a possibility that you must have the customer/SE update the setting of the parameter of the priced option, Cache Partition Manager, after adding the Cache memory.
Check the status of the subsystem according to the following procedure.

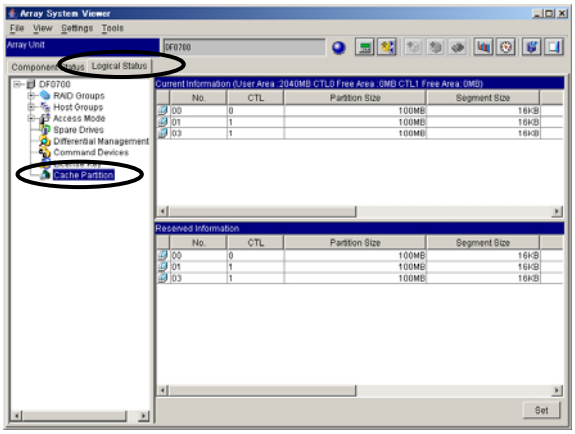
(16) Connect the LAN cross cable to the LAN connector for the maintenance of the subsystem (refer to Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000)).
(17) Connect Storage Navigator Modular.
(a) Be careful of the connection positions of the cables because the installation directions are different in the Control Unit #0 and #1.
Refer to System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050) for the changing method to the maintenance mode.
(b) Click the icon of the array subsystem that you want to set from the main window. There are the following three types of the selection methods.
• Select [File] - [Open].
• Double click the icon of the array subsystem that you want to set.
• Click the [: Open] button.

NOTE : Check whether the LAN port number is not changed when the main window is not displayed even if you click on the icon of the array subsystem (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)). Execute it again after using the changed LAN port number.

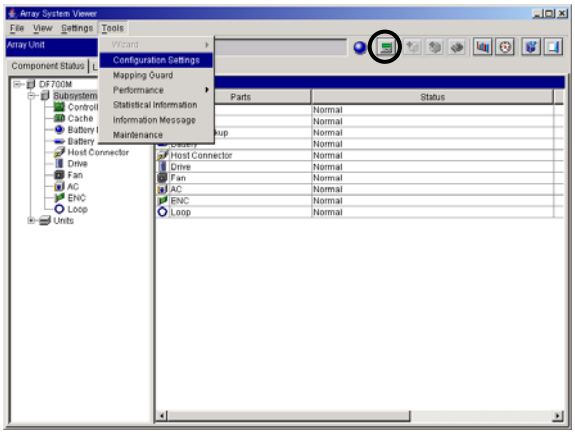


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(18) Click [Logical Status] in the unit window, and check that the icon of the priced option, Cache Partition Manager, is displayed (the priced option, Cache Partition Manager, is unlocked) in the tree view.
The addition work of the Cache memory is completed when the icon of the priced option, Cache Partition Manager, is not displayed in the tree view.
When the icon of the priced option, Cache Partition Manager, is displayed (the priced option, Cache Partition Manager, is unlocked) in the tree view, there is a possibility that you must update the setting of the parameter of the priced option, Cache Partition Manager, to use the Cache memory. Check whether it is necessary or not according to the following procedure.

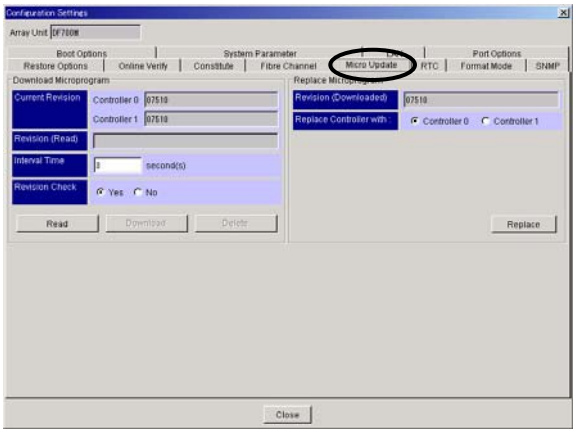


(19) Select [Tool] – [Configuration Setting] in the unit window, or click [: Configuration Setting].



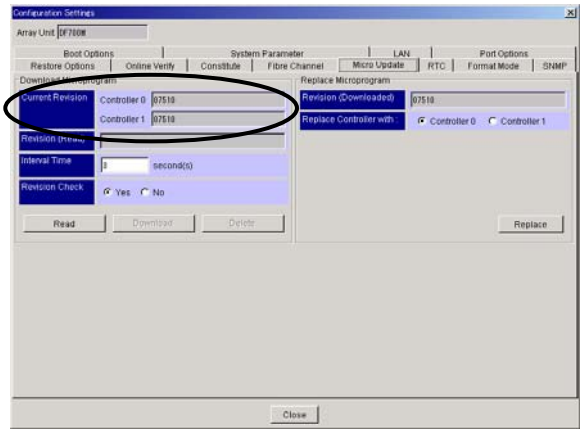
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(20) Click the [Micro Update] tab.

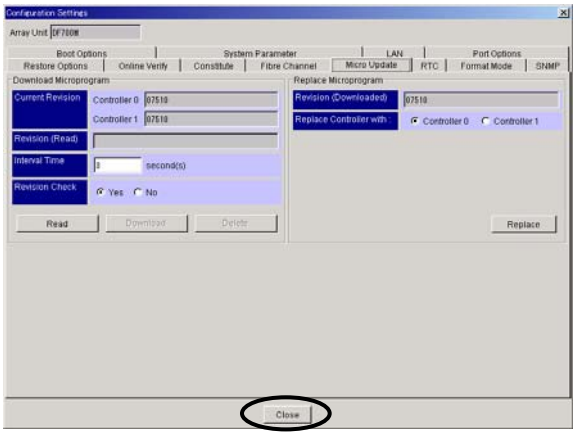


(21) Check [Current Revision] of [Download Microprogram].

- When the revision of the microprogram is 0770/A or less
  Request the customer/SE to update the setting of the parameter of the priced option, Cache Partition Manager.
  This is the end of the addition work of the Cache memory.
- When the revision of the microprogram is 0770/A or later
  Continue the confirmation work according to the following procedure.

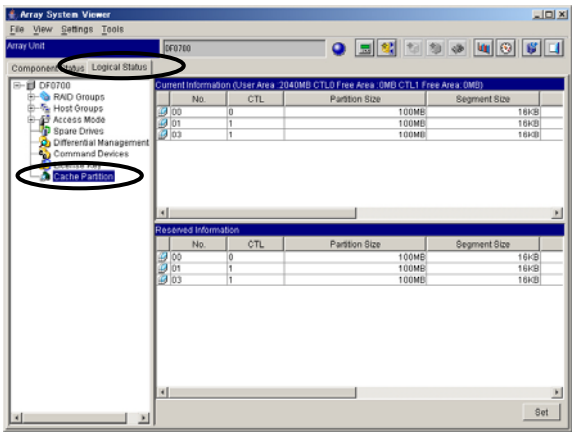


(22) Click the [Close] button of the [Configuration Setting] window.



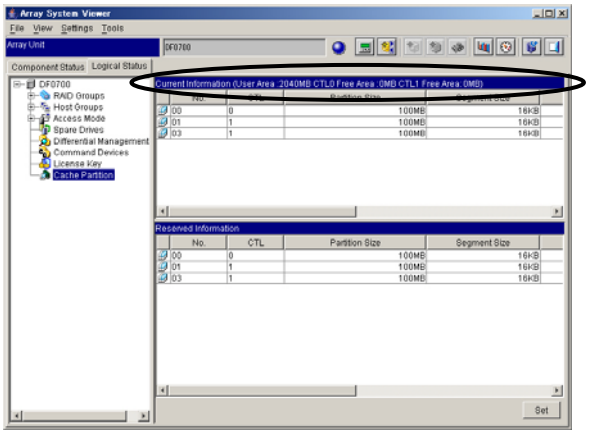
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(23) Click the [Logical Status] tab in the unit window, and then click the [Cache Partition] icon of the tree view.



(24) Check [Current Information] of the list view.

- When [CTL0 Free Capacity] and [CTL1 Free Capacity] are 0 M byte
  The size of the master partition is extended by adding the Cache memory.
  You have the customer/SE set the priced option, Cache Partition Manager, and then request the customer/SE to update the setting of the parameter if necessary.
  This is the end of the addition work of the Cache memory.
- When [CTL0 Free Capacity] and [CTL1 Free Capacity] are not 0 M byte
  This indicates that there is an unused area in the Cache memory.
  Although the Cache memory is added, the partition size is not extended because the partitioning functions (partition and size change) of the Cache memory are being used (‡1).
  Request the customer to update the setting of the parameter of the priced option, Cache Partition Manager.
  This is the end of the addition work of the Cache memory.



‡1 : • Even one sub-partition exists or it is reserved.
• The subsystem is the dual controller configuration, and there is even one different size among four sizes; the master partition 0 in [Current Information], the master partition 1, the master partition 0 in [Reservation Information] and the master partition 1.

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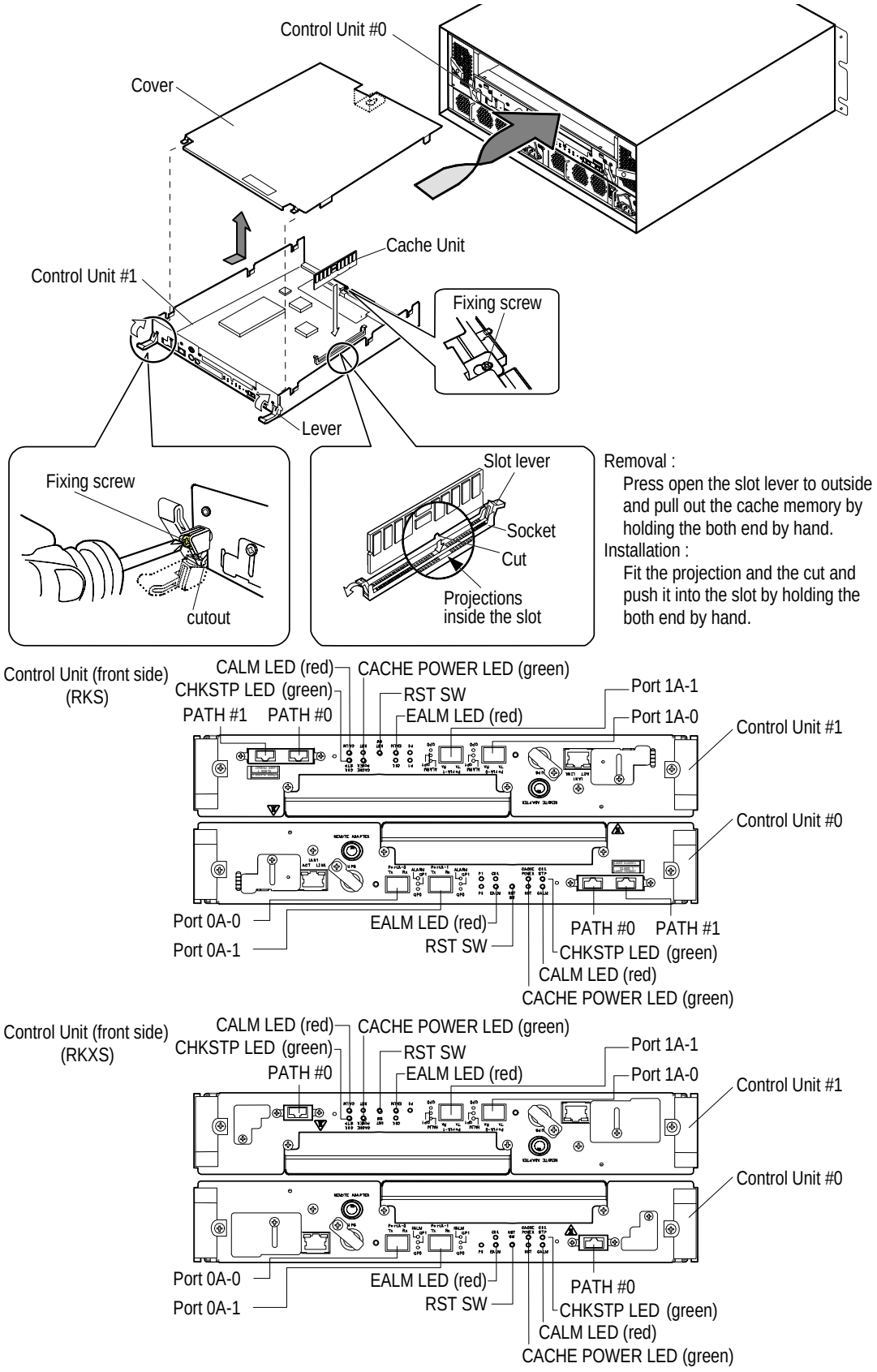


Figure 1.4.5 Adding the Cache Unit (RKS/RKXS)

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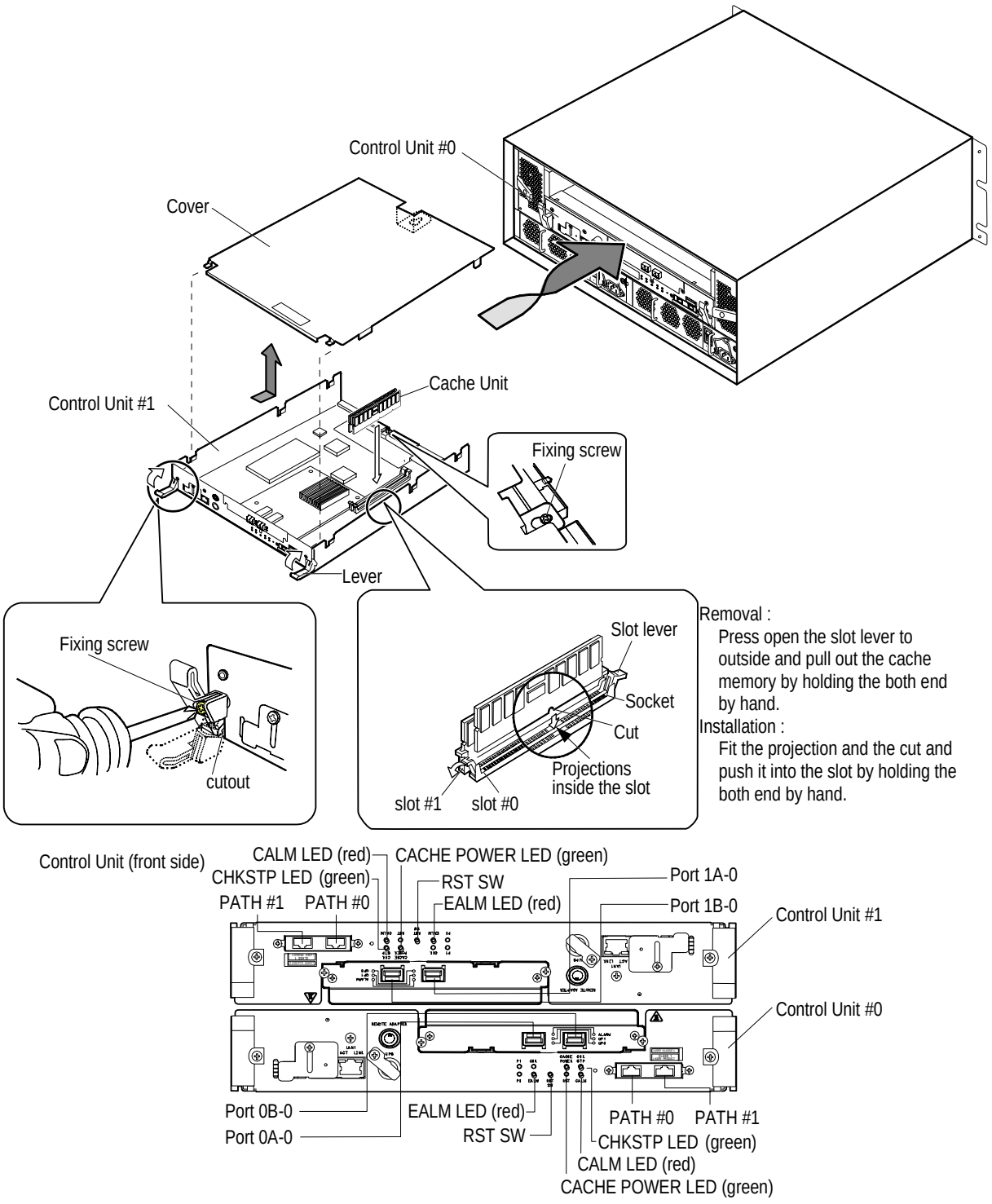
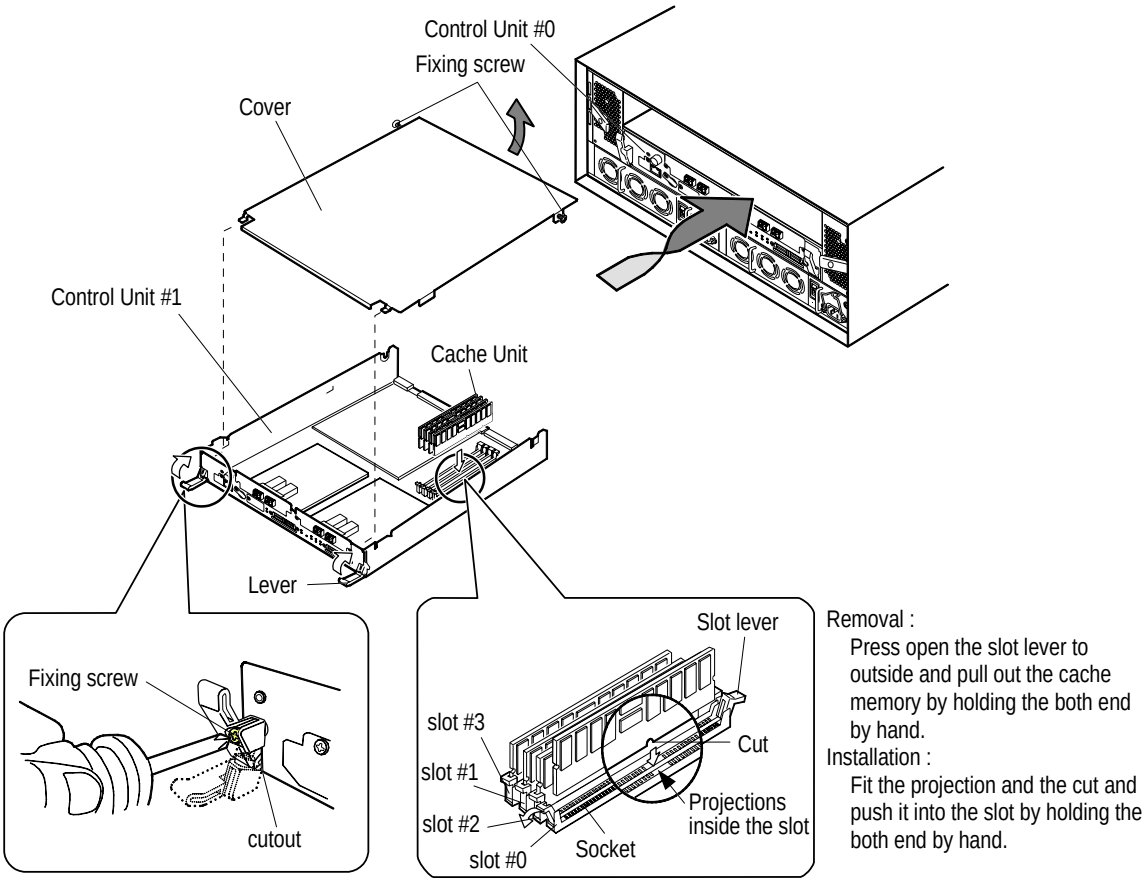


Figure 1.4.5.1 Adding the Cache Unit (RKM)

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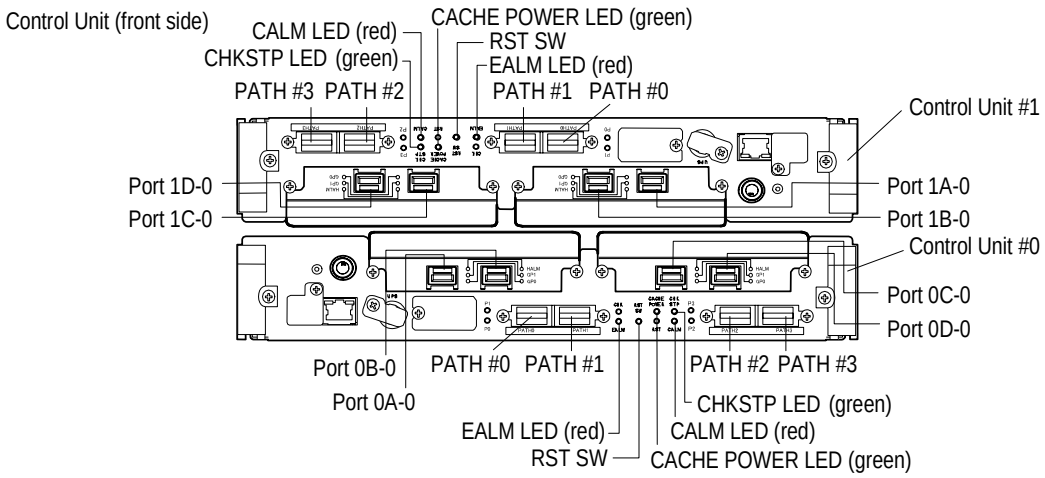


Figure 1.4.5.2 Adding the Cache Unit (RKH)

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1.4.5 Adding a NAS Interface Board

⚠ CAUTION

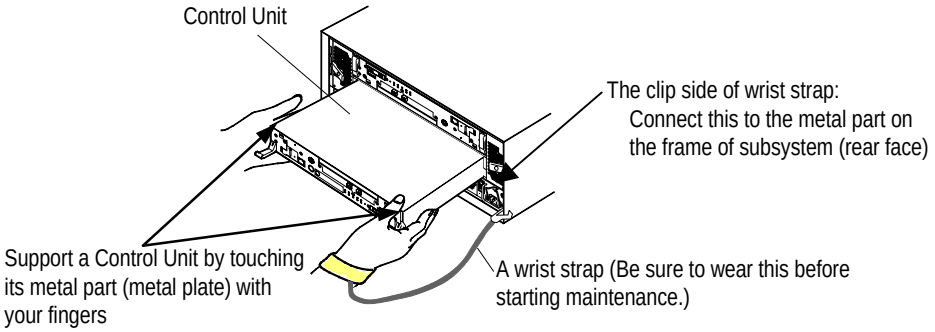
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.
• Obtain the RKNAS when adding NAS Interface Board.

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(1) Collect Simple Trace and Constitution Information (Port Information). (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(4) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.
(5) Remove the all cables connected to the Control Unit.

NOTE :
- When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
- When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(8) Remove two host connectors for 2 G bps from the Control Unit.
- Pull it out after raising the lever for Type 1.
- Pull it out after pushing down the lever toward for Type 2.

After this, hand over the removed two host connectors for 2 G bps to the customer, and ask him/her to keep them carefully.

(9) Loosen the fixing screws ② (two places) of the Interface Board (or the dummy Interface Board) installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(10) Install the adding Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the Interface Board may become the inside of the Control Unit.

NOTE :
- Add the NAS Interface Board for RKH on #1 side. If interface #1 side is already used, move that board to the #0 side.
- Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1 (Refer to "Table 1.4.2 Installation position of the Interface Board" (ADD 01-0414)).

(11) Loosen the screws of the connector cover for the maintenance of the Control Unit and open it, and then attach the panel and fix it by tightening the screws.
It is not necessary to attach the panel for the RKH.
(12) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(13) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE :
- Do not catch a ENC cable, when the Control Unit for the inserted.
- The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(14) In the case of the dual control Unit composition, perform the procedure from (4) to (13) to the other Control Unit.

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(15) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(16) Turn on all the AC Power Unit Switches of the RKNAS.

(17) Turn on the AC Power Unit Switch of the Power Unit on the Basic Chassis.

(18) Turn on the main switch.

(19) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).

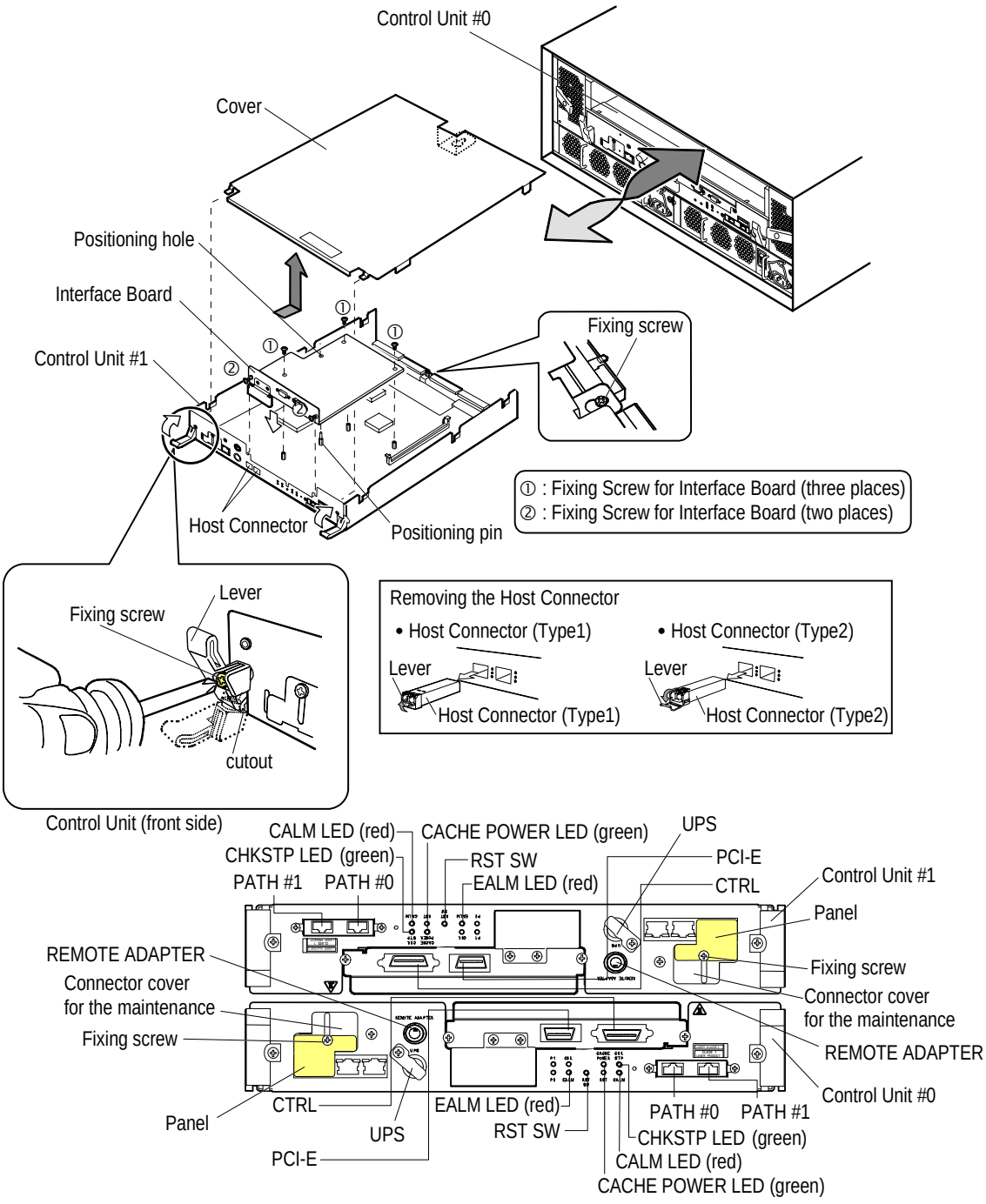
(20) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed, for the maximum of 30 to 50 minutes (RKH: for the maximum of 40 to 60 minutes).

(21) Add the NAS Unit, and configure the system parameter (refer to "1.4.8 Adding a NAS Unit" (ADD 01-0440).)

(22) When moving the FC Interface Board from the interface #1 side to the #0 side because NAS Interface Board was removed, configure the host group and Fibre Channel port setting. (refer to System Parameter "Chapter 2 Setting Host Group/Targets" (SYSPR 02-0000), and System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170).)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : The figure shows the case where the NAS Interface Board is installed in the Control Unit of the RKS/RKXS.

Figure 1.4.6 Adding a NAS Interface Board (RKM/RKS/RKXS)

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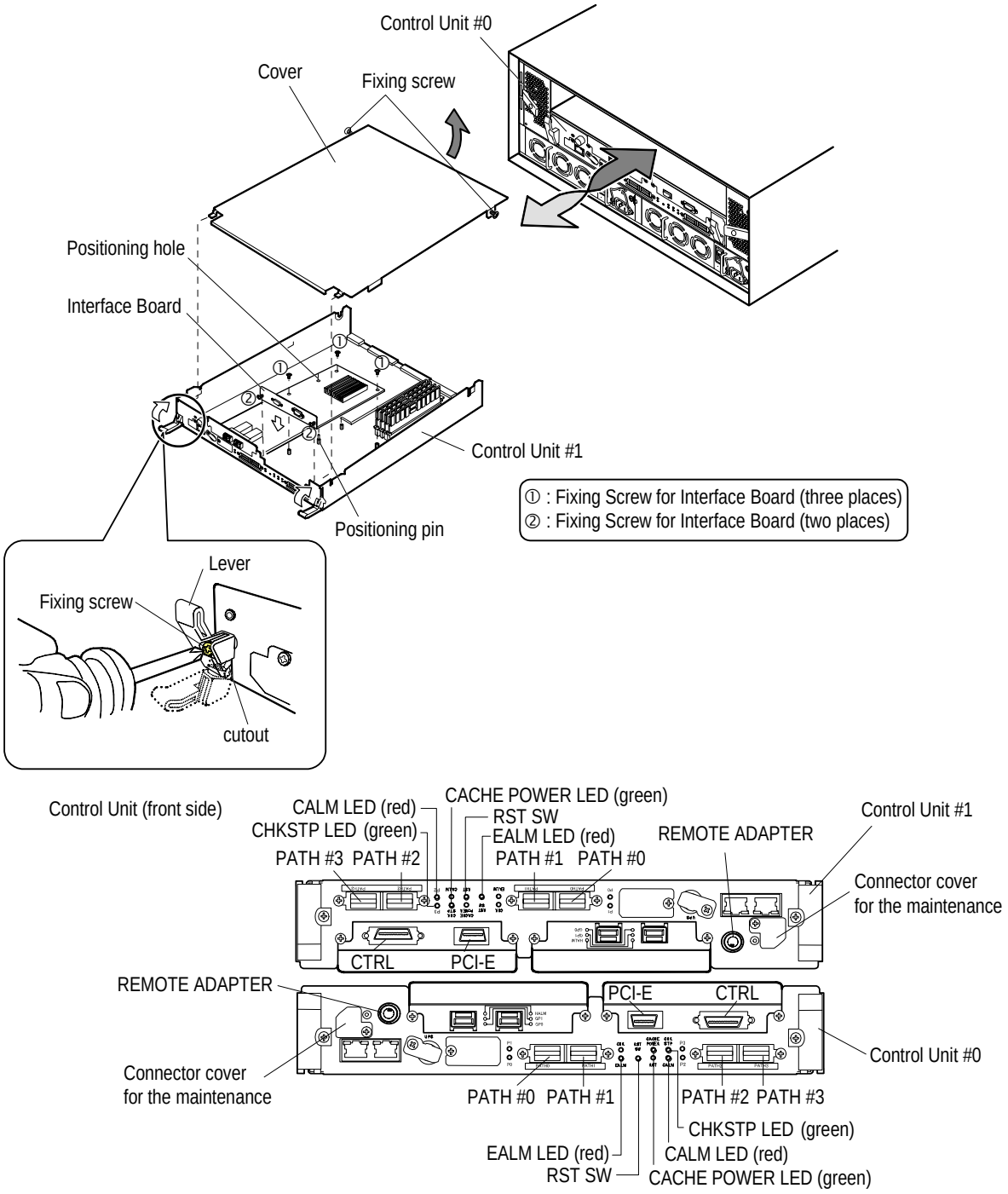


Figure 1.4.6.1 Adding a NAS Interface Board (RKH)

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Table 1.4.2 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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1.4.6 Adding a FC Interface Board

⚠ CAUTION

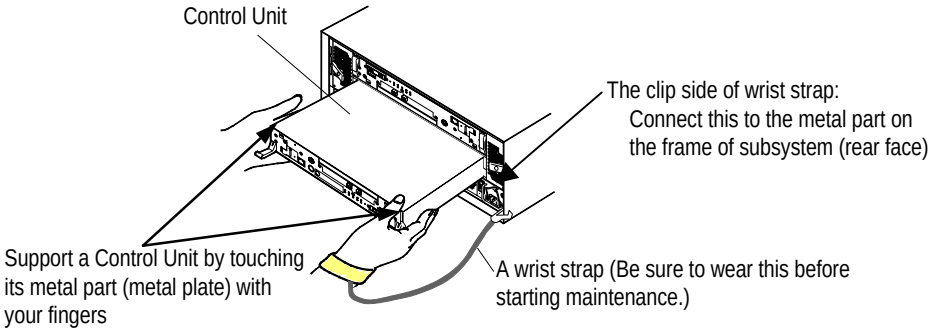
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and adding maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

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(1) For the RSK/RKXS, if the Power Unit of the subsystem is turned off, turn it on (refer to Installation "1.7.1 Subsystem power on" (INST 01-0290)).
(2) Connect WEB for the RKS/RKXS (Refer to Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000)).
(3) Check that the microprogram version is 0726/A or more for the RKS/RKXS (Refer to WEB "2.2 Screen Outline" (WEB 02-0010)).
(4) If the microprogram version is less than 0726/A, perform the update installation of the microprogram whose version is 0726/A or more for the RKS/RKXS (Refer to Microprogram "Chapter 1 Installation of Microprogram" (MICRO 01-0000)).
(5) Collect Simple Trace and Constitution Information. (Refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(6) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(7) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(8) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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(9) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(10) Remove the Control Unit by pulling it out toward you.

(11) Remove two host connectors for 2 G bps from the Control Unit.
• Pull it out after raising the lever for Type 1.
• Pull it out after pushing down the lever toward for Type 2.
After this, hand over the removed two host connectors for 2 G bps to the customer, and ask him/her to keep them carefully.

(12) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(13) Loosen the fixing screws ② (two places) of the Interface Board (or the dummy Interface Board) installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(14) Install the adding Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the Interface Board may become the inside of the Control Unit.

NOTE : Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1. (Refer to "Table 1.4.3 Installation position of the Interface Board" (ADD 01-0425).)

(15) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

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(16) Insert it into the position in the Control Unit with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

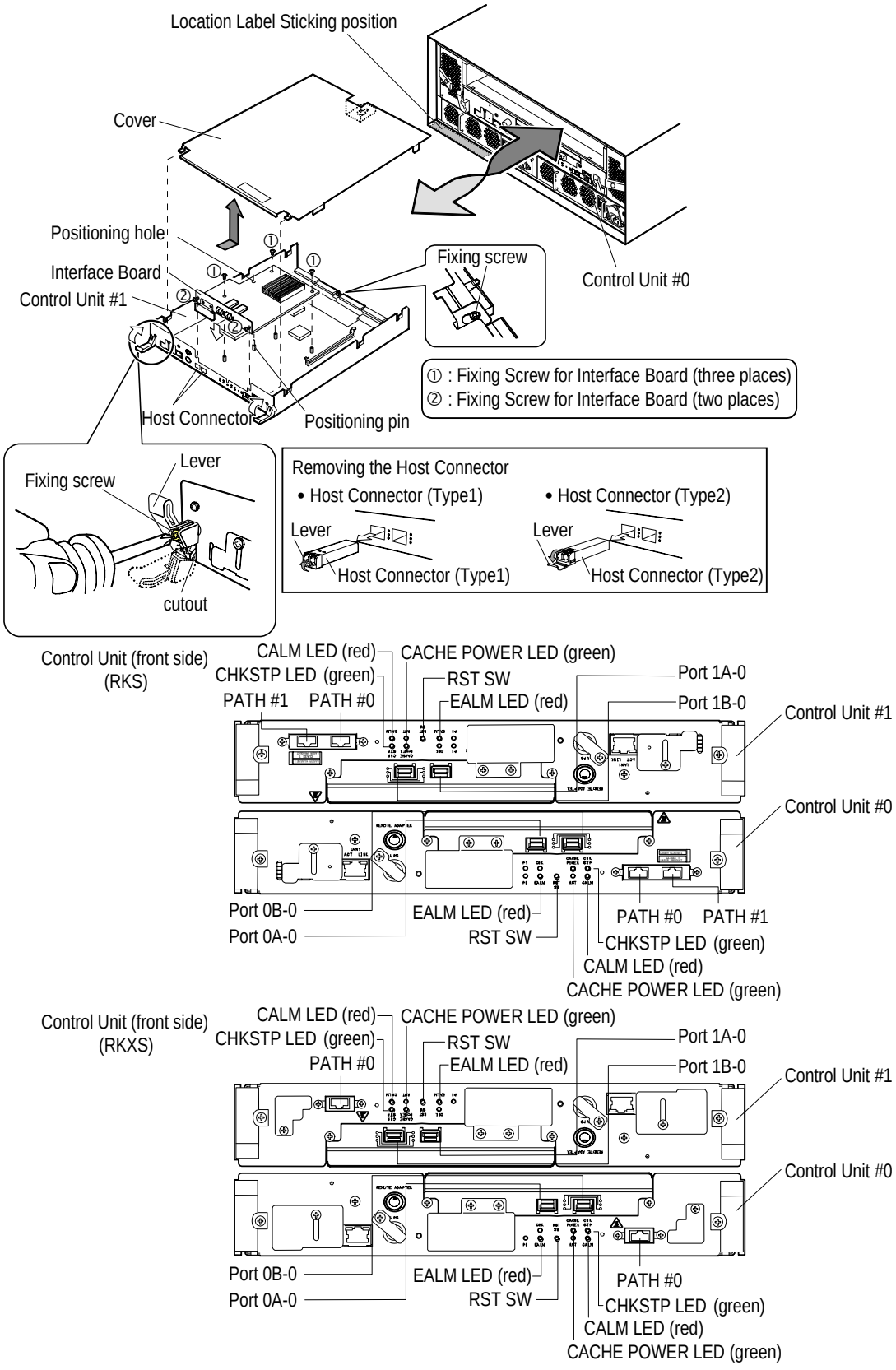
(17) Stick the Location Label attached to the added interface board on the rear side of the subsystem.
(18) In the case of the dual control Unit composition, perform the procedure from (8) to (17) to the other Control Unit.
(19) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(20) Turn on the AC Power Unit Switch of the both Power Units.
(21) Turn on the main switch.
(22) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(23) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(24) For the added FC Interface Board Port (Port 0B-0 and Port 1B-0 become usable for the RKS/RKXS), configure the host group and Fibre Channel port setting. (Refer to System Parameter “Chapter 2 Setting Host Group/Targets” (SYSPR 02-0000), and System Parameter “4.2 (9) Setting of Fibre Channel” (SYSPR 04-0170).)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKS/RKXS.

Figure 1.4.7 Adding a FC Interface Board

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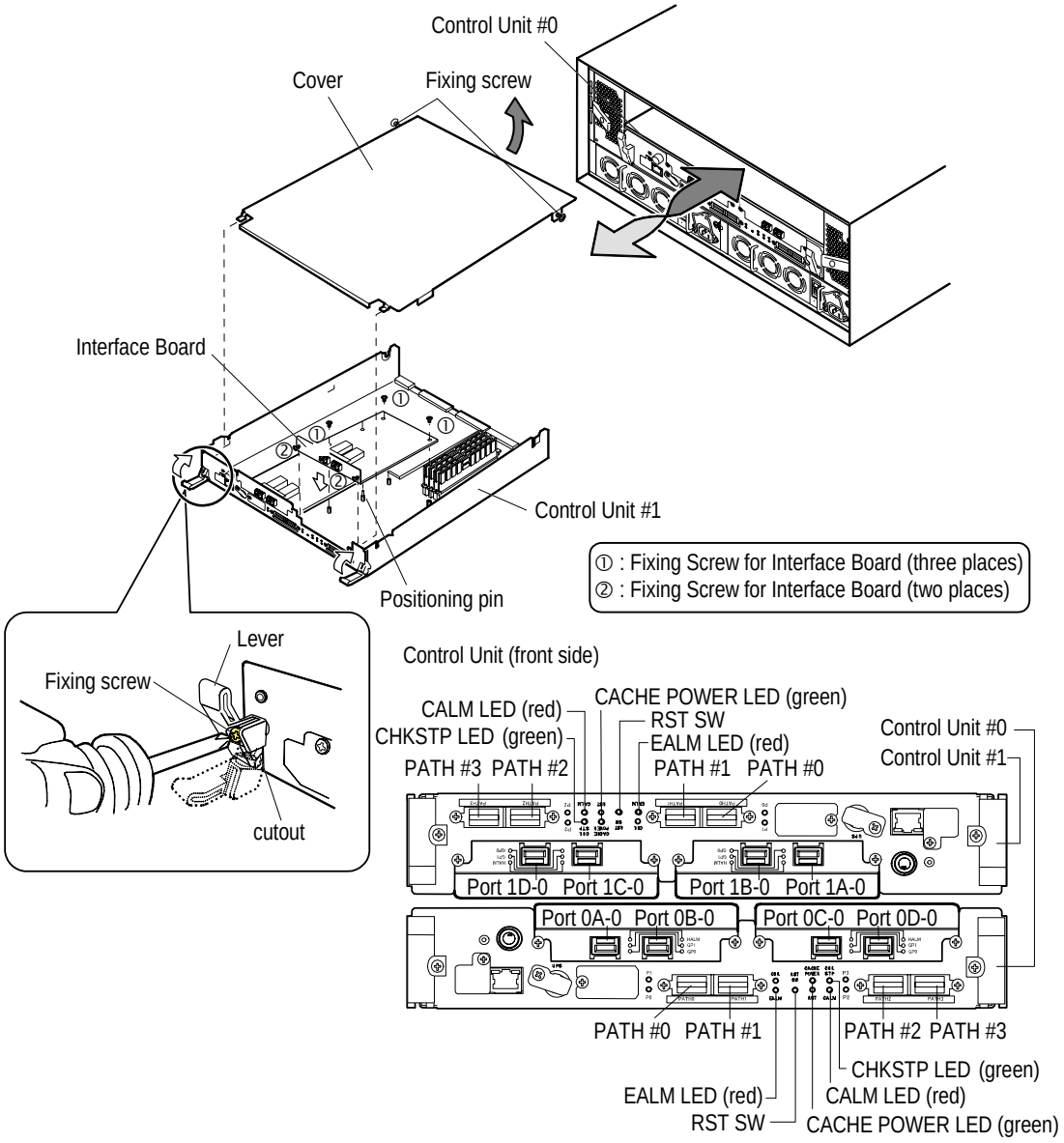


Figure 1.4.7.1 Adding a FC Interface Board (RKH)

Table 1.4.3 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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1.4.7 Adding an iSCSI Interface Board

CAUTION

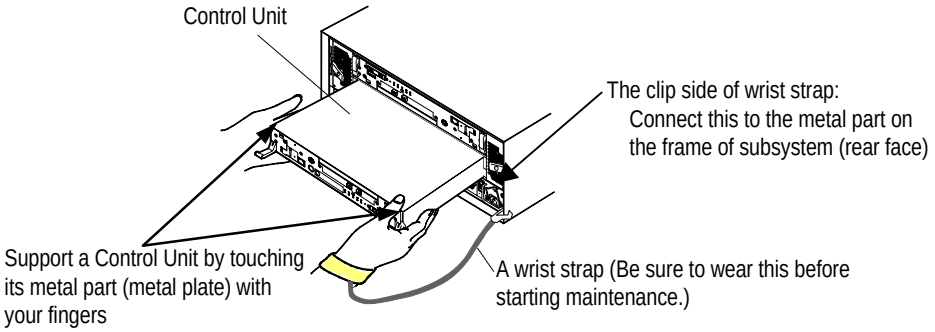
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE :
- For the RKH, only the Interface Board #0 can be installed as the iSCSI Interface Board.
- When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
- After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

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(1) If the microprogram version is less than 0730/A, perform the update installation of the microprogram whose version is 0730/A or more for the RKS/RKXS. (Refer to Microprogram "Chapter 1 Installation of Microprogram" (MICRO 01-0000).)

(2) When the iSCSI Interface Board is added to the RKS, if the module revision of the Control Unit is E or less, replace it to the Control Unit whose module revision is F or more.
Check the module revision of the Control Unit with the Name Plate on the front side of the Control Unit.
When F of the REVISION on the Name Plate is not painted out, it is required to replace the Control Unit. Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) for the replacement of the Control Unit.

(3) Collect Simple Trace and Constitution Information. (Refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(4) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(5) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(6) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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(7) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(8) Remove the Control Unit by pulling it out toward you.
(9) Remove two host connectors for 2 G bps from the Control Unit.
• Pull it out after raising the lever for Type 1.
• Pull it out after pushing down the lever toward for Type 2.
After this, hand over the removed two host connectors for 2 G bps to the customer, and ask him/her to keep them carefully.
(10) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(11) Loosen the fixing screws ② (two places) of the Interface Board (or the dummy Interface Board) installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(12) Install the adding Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the Interface Board may become the inside of the Control Unit.

NOTE : • Add the iSCSI Interface Board for the RKH on the interface #0 side.
If necessary, remove the Interface Board installed on the #0 side and install it on the #1 side.
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1. (Refer to "Table 1.4.4 Installation position of the Interface Board" (ADD 01-0435).)

(13) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

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(14) Insert it into the position in the Control Unit with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(15) Connect the iSCSI Interface cables to the adding Interface Board.
Stick the Location Label attached to the added interface board on the rear side of the subsystem.

(16) In the case of the dual control Unit composition, perform the procedure from (6) to (15) to the other Control Unit.

(17) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(18) Turn on the AC Power Unit Switch of the both Power Units.

(19) Turn on the main switch.

(20) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).

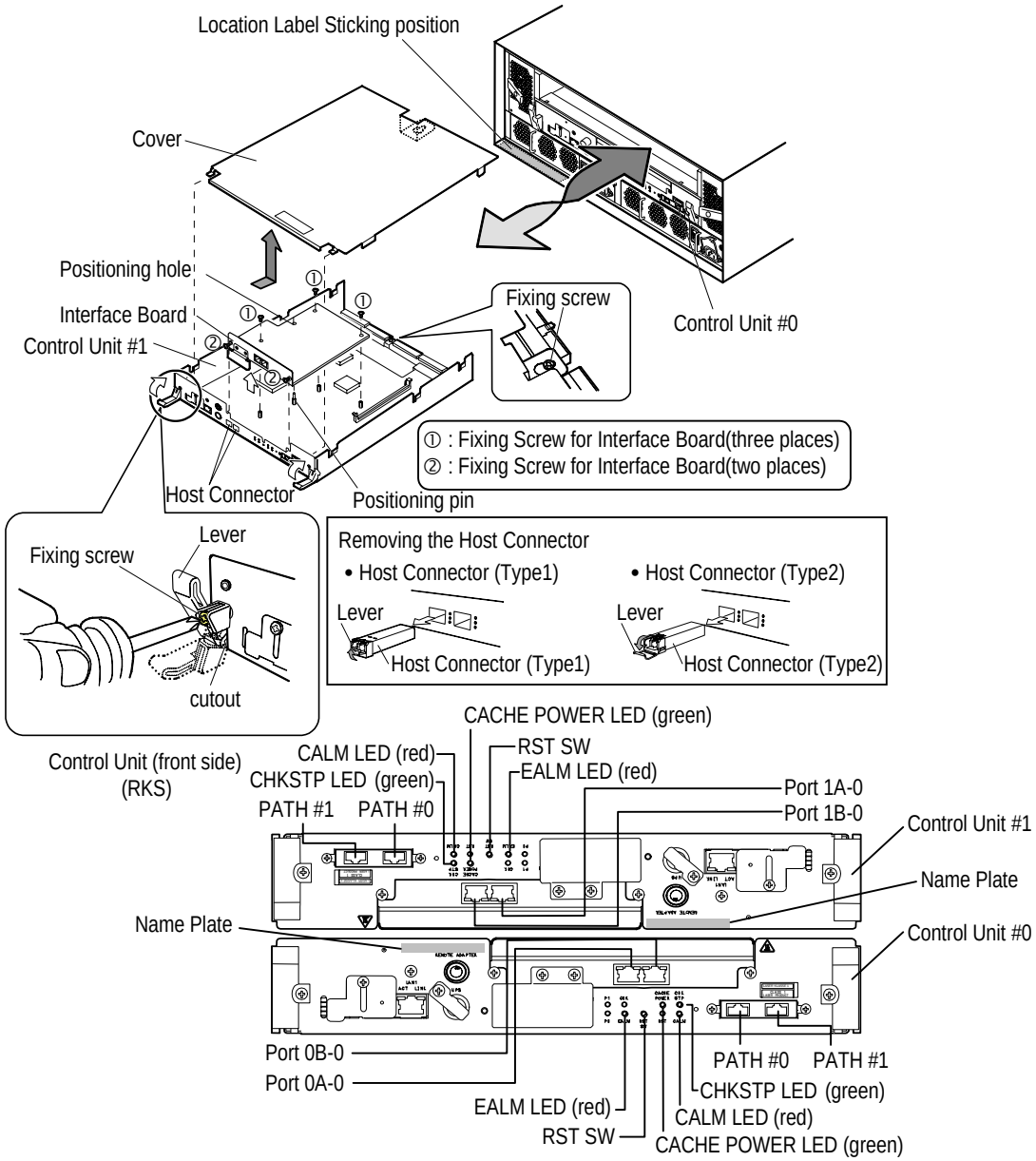
(21) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

(22) For the added iSCSI Interface Board Port, Configure the host group and iSCSI port setting. (Refer to System Parameter “Chapter 2 Setting Host Group/Targets” (SYSPR 02-0000), and System Parameter “4.2 (10) Setting of iSCSI” (SYSPR 04-0191).)

(23) When moving the FC Interface Board from the interface #1 side to the #0 side because iSCSI Interface Board was removed, configure the host group and Fibre Channel port setting. (Refer to System Parameter “Chapter 2 Setting Host Group/Targets” (SYSPR 02-0000), and System Parameter “4.2 (9) Setting of Fibre Channel” (SYSPR 04-0170).)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : The figure shows the case where the iSCSI Interface Board is installed in the Control Unit of the RKS.

Figure 1.4.8 Adding an iSCSI Interface Board

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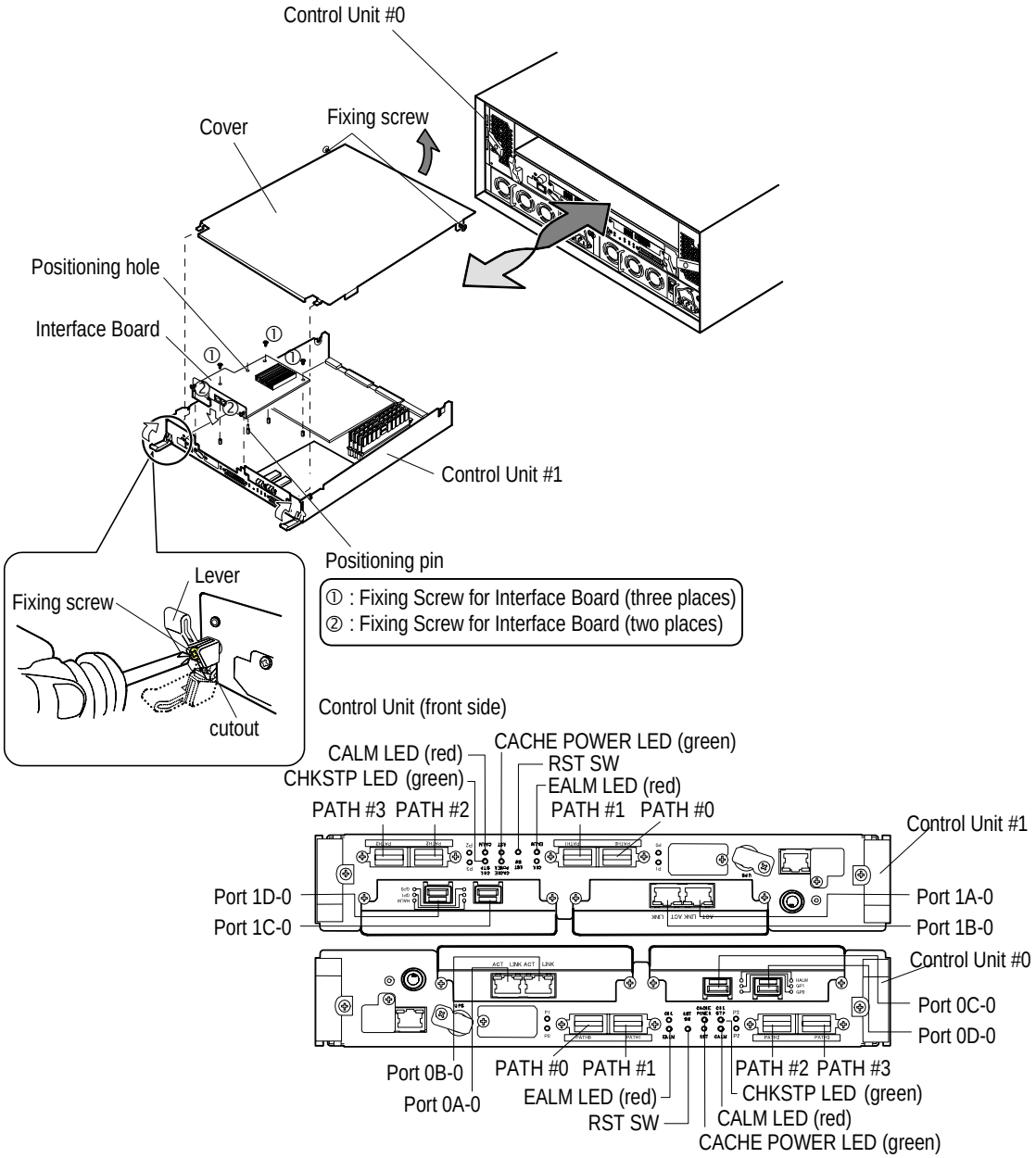


Figure 1.4.8.1 Adding an iSCSI Interface Board (RKH)

Table 1.4.4 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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1.4.8 Adding a NAS Unit

NOTE : The data of the old disk array subsystem cannot be used in the NAS system.

NOTE : The addition of the NAS Unit cannot be performed in the disk array subsystem in which the Account Authentication is unlocked. When operating the NAS system, it is required to lock the Account Authentication.

(1) Install the interface board for the NAS
Refer to "1.4.5 Adding a NAS interface Board" (ADD 01-0400) and install the Interface Board for the NAS.

(2) Install the NAS Unit
Refer to Installation "3.4.8 Installing the RKNAS" (INST 03-0601) and install the NAS Unit.

NOTE : Remove all of the installed basic chassis and the additional chassis from the rack, and install it so that the NAS Unit becomes the bottom of the rack.

(3) Connect the cables for the NAS
Refer to Installation "3.4.14 Connecting the cables for RKNAS" (INST 03-0740) to Installation "3.4.17 Connecting the power cables for NAS" (INST 03-0770) and connect the cables for the NAS.

(4) Turn on the AC Power Unit Switch of the both Power Units.

(5) Turn on the main switch.

(6) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).

(7) Check that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
If this occurs, refer to Information Message screen on WEB, and check that "IA1S0x NNC NAS OS not found (NNC-x)" is displayed. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)

(8) Setting the System Parameter
(a) Setting the RAID/LU/spare disk for the NAS system LU
See System Parameter "Chapter 3 Setting the RAID/LU/Spare Disk" (SYSPR 03-0000)
(b) Setting the command device indispensable as the system LU of the NAS
See System Parameter "3.8 Setting the command device indispensable as the system LU of the NAS" (SYSPR 03-0520)
(c) Allocation of the NAS system LU
See System Parameter "3.7 Allocation of the system LU/user LU of the NAS" (SYSPR 03-0440)
(d) Setting the RAID/LU/spare disk for the NAS user LU
See System Parameter "Chapter 3 Setting the RAID/LU/Spare Disk" (SYSPR 03-0000)
(e) Allocation of the NAS user LU
See System Parameter "3.7 Allocation of the system LU/user LU of the NAS" (SYSPR 03-0440)
(f) Setting the priced option (including the option indispensable in the NAS)
See System Parameter "Chapter 6 Setting an Extra-cost Optional Feature" (SYSPR 06-0000)

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

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(g) Installing the NAS OS and the related P.P
See DF700 NAS SOFTWARE Maintenance Manual “Chapter 3 NAS installation” (NAS 03-0000)

(h) Setting the time zone and the NTP server
See System Parameter “Chapter 4 Setting Configuration Information” (SYSPR 04-0000)

(i) Setting the network environment 1 (setting the NNC control port information)
See System Parameter “Chapter 4 Setting Configuration Information” (SYSPR 04-0000)

(j) Setting the network environment 2 (setting the routing)
See DF700 NAS SOFTWARE Maintenance Manual “Chapter 3 NAS installation” (NAS 03-0000)

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1.5 Adding Other Optional Devices

1.5.1 Other optional additional devices

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
PDB (UPDU7)	DF-F700-UPDU7	For U7	Additional PDB for U7 rack frame	Possible "1.5.2 Mounting a PDB (UPDU7)" (ADD 01-0460)	Possible "1.5.2 Mounting a PDB (UPDU7)" (ADD 01-0460)

*1 : Data is exchanged between a host computer and the subsystem.

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1.5.2 Mounting a PDB (UPDU7)

(1) Height of Required Space in Rack Frame

The height of the space required for mounting the PDB on the rack frame is one unit of the EIA standard.

(2) Optional Parts for Mounting (Model Name : DF-F700-UPDU7)

NOTE : The current capacity for a PDB is limited to up to 20 amperes. When mounting the subsystem, connect them avoiding applying the current of more than 20 amperes to a PDB. (RKH one unit : 2.6 A, RKM one unit : 4.2 A, RKS one unit : 4.0 A, RKXS one unit : 3.0 A, RKAJ one unit : 2.6 A, RKAJAT one unit : 2.4 A, RKNAS one unit : 2.0 A)
Up to four subsystems in total combining 0 to 1 RKHs/RKMs/RKSs/RKXSs and 0 to 4 RKAJs/RKAJATs can be connected to a single PDB.
Up to four RKHs/RKMs/RKSs/RKXSs can be connected to a single PDB.

The optional parts and their quantities required to mount the one PDB are shown below.

Table 1.5.1 Composition of DF-F700-UPDU7 (per set)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	PDB	—	1	Adding rack frame in PDB	—
2	Power cable	3259166-A	1	L6-30P 4.5 m	—
3	Support metal bracket	32663121-1	2	U7 rack frame	For U7 rack
4	RAC NUT (Fastener)	5510146-1	5	U7 rack frame rack frame (2 spare is included)	—
5	LL Washer	2051001-513	5	U7 rack frame (2 spare is included)	For U7 rack
6	Socket bolt (M5 × 20)	BS520	5	U7 rack frame (2 spare is included)	For U7 rack
7	Bind screw (M5 × 10)	SB510	5	For securing the PDB (2 spare is included)	—
8	Name plate	3243319-232	1	Already affixed to PDB	—
9	Cable holder	3230194-1	1	Adding PDB	—
10	Socket bolt (M4 × 30)	BS430	3	For securing the cable holder	—
11	Plate holder	5519109-1	1	Adding PDB	—
12	Socket bolt (M4 × 8)	BS408	2	For securing the plate holder	—

(3) Tool Required

- Phillips screwdriver (No.1, No.2)
- Allen wrench (No.4)
- Allen wrench (No.5)

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(4) Installing UPDU7 in U7 Rack Frame

Install the PDB making it face the rear of the rack frame.

NOTE : When adding PDB, mount PDB in two-part set due to the duplicated power supply.

(a) Attach the fasteners (four places) to the positions in the rear of the U7 rack frame where the rack accommodating the UPDU7 components is to be mounted.

(b) Attach the support metal brackets to the positions where the Fasteners are attached in Step (a), and fix the brackets with socket bolts of M5×20 size (two places per bracket).

(c) PDB components onto the rack frame, engaging the front holes of the rack with those of the support metal brackets attached in Step (b). Then, fix the rack with binding screws of M5×10 size (four places).

(d) Add another two-part set of PDB in the same way.

(e) Route and connect cables, observing the rules provided in Installation "1.1 (3) Note on cable routing" (INST 01-0010).

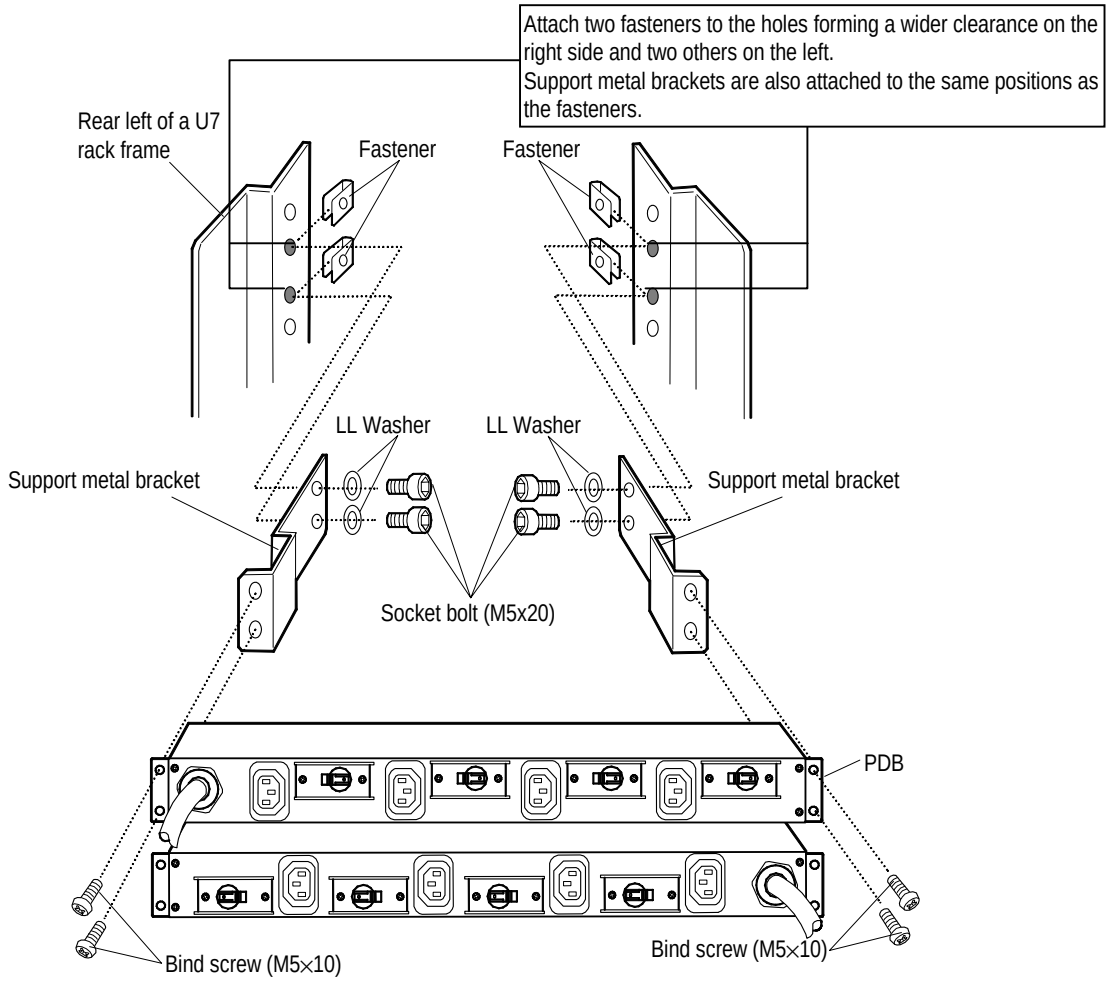


Figure 1.5.1 Installing the PDB (UPDU7)

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(5) Installing the power Cable (Added PDB append parts) and cable holder.

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : Make sure that conductors shall be provided with 30 A over current protection in accordance with Article 240 of the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part 1, CSA C22.1, Section 14.

(a) Open the rear door. (See Installation "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)
(b) Make sure that the power supply switches of the PDBs are turned off.
(c) Remove the cable holder (adding PDB).
(d) Put out the power cables of PDBs through the Cable passing opening at the bottom of the Rack.
(e) Fasten the power cables to the rack frame by attaching the cable holders (adding PDB) with the hexagon socket head bolt M4×30.
(f) Make sure that the connecter is securely fixed after the assembly work.

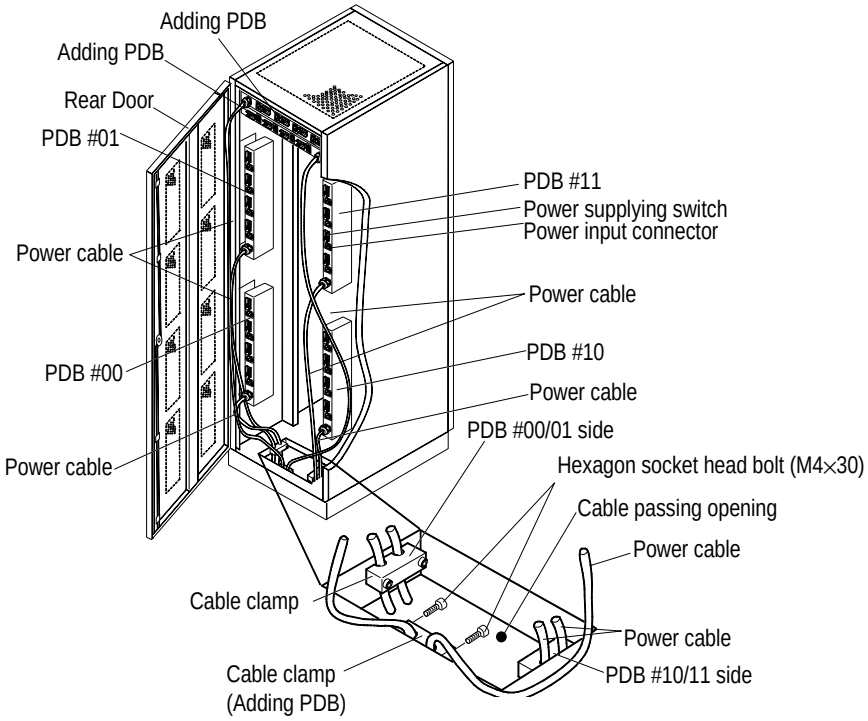


Figure 1.5.2 Installing the PDB (UPDU7)

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1.6 Adding the Additional Subsystem to the Rack Frame

In the case of adding Disk Drives to a subsystem of the rackmount model, the additional subsystem must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem (‡1).
The procedure for adding the Additional Chassis to the U7 rack frame online or offline (with the subsystem power turned off)(‡2) is shown.
When mounting the additional subsystem on the rack frame, installation of as many rack rail kits (DF-F700-URHT7) as the additional subsystem to be added are required.
When the decoration panels/filler panels of the rack frame are attached, it is necessary to remove the panels at the installation positions.

1.6.1 Procedure for adding the additional subsystem to the subsystem of rackmount model with U7 rack frame

(1) Prerequisites

Before starting the addition, make sure that the following requirements are satisfied. If not, an abnormal termination of the addition or a system down may be caused.

(a) The addition must be done only when any WARNING (WARN) LED (orange) on the subsystem is off. If any WARNING (WARN) LED (orange) on the subsystem is on, take an action to make the LED lighting up or blinking. (Refer to Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000).)

(b) Do not perform the recognition (‡2) operation of the additional chassis during the execution of the format command (it is not the LU format from the Storage Navigator Modular) from the host computer. When the format was executed from the host computer, add the additional chassis after the format is completed.

(c) Do not make the addition work when the READY LED (green) on the front of the Basic Chassis is blinking at high speed. Perform the addition work after checking that the READY LED (green) on the front of the Basic Chassis lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of RKH).

(d) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the addition work. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the addition work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

‡1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

‡2 : The expression "with the subsystem power on" described here means a state in which the power of the disk array subsystem is turned on. (System operation with a host is no concern of it.)

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(e) When adding DF600-RKA/RKAJAT/RKAJATL, understand the specification of the Power Unit/weight, etc. in the manual of DF600, and perform the installation and the addition work safely.

(f) When RKA/RKAJAT/RKAJATL of the DF600 is connected, the version of the ENC/SENC firmware should be the following. Also, the purchase of the addition support kit of the DF-F700-K1BUP is indispensable.

(i) In the case of RKA

- SH firmware: 1A or more

(ii) In the case of RKAJAT/RKAJATL

- SR firmware: 5.75 B or more
- H8S firmware: 02-02-07 or more

Perform the version check and the update of the firmware beforehand, referring to "Procedure for Offline ENC/SENC Firmware Download" of the DF600.

(g) When adding the RKA, check that the microprogram revision is 0720/A or more. When the microprogram revision is less than 0720/A, add the RKA after performing the update installation of the most recent microprogram of 0720/A or more (Refer to Microprogram "Chapter 1 Installation of Microprogram" (MICRO 01-0000)).

(2) Restrictions

Observe the following restrictions strictly. There is fear of the abnormal termination of the addition or the subsystem down.

(a) The part replacement cannot be performed during the recognition(‡1) of the additional chassis ((5) - Work 9).

(b) Do not execute the format command (it is not the LU format from the Storage Navigator Modular) from the host computer during the recognition(‡1) operation of the additional chassis ((5) - Work 9).

‡1 : The recognition indicates that the Control Unit of the existing RKM/RKS/RKXS/RKH recognizes the Additional Chassis (the "I8020x (or I802HH) Unit Add complete (Unit-x) message is displayed).

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(3) Specifications

(a) At least the following components must have been installed in the additional subsystem to beaded.

- Two Disk Drives (a combination of the Disk Drives #0 and #1)
- Two ENC Units/SENC Units (Standard installation, four ENC cables (ENC Unit), two ENC cables (SENC Unit) are included.)
- Two Power Units (AC) (additional subsystem)'s (Standard installation)

For five or more Disk Drives, add the remaining Disk Drives after completing the recognition of all additional subsystems (Refer to "1.6.3 Verifying the additional subsystem" (ADD 01-0770)).

(b) Be sure to connect one to two ENC cables(‡1) per ENC Unit/SENC Unit between the RKM/RKS/RKH and the Additional Chassis, the RKXS and the RKAJAT, and the Additional Chassis and the Additional Chassis.

(c) Restriction of number of the additional subsystems allowed to be added is that the total number of the subsystems must not exceed the allowable maximum after the addition.
The RKM can be connected to the additional subsystem and up to 15 units can be installed including the RKM.
The RKS can be connected to the additional subsystem and up to 7 units can be installed including the RKM.
The RKXS can be connected to the RKAJAT/RKAJATL and up to 7 units can be installed including the RKXS.
The RKH can be connected to 30 additional subsystems at the maximum.
However, the RKH must connect the RKAJ as the chassis of the unit ID #0 for sure in any configuration (the maximum connection number only with the RKAJ/RKA is 30, and when the RKAJAT is connected with the maximum connection number, it is 28 for the RKAJAT and two for the RKAJ/RKA).

(d) Final arrangement of the Disk Drives to be added
It is required to check which slots to arrange the Disk Drives beforehand in the addition of the Additional Chassis according with the addition of the Disk Drives.
Decide the arrangement of the Disk Drives according to the next priority order (this is not the order of the additional installation of the Disk Drives).

① Disk Drives #0 and #1 of the Additional Chassis to be added (Installation is indispensable.)
② Disk Drives #2 and #3 of the Additional Chassis to be added
③ Vacant slots of the Disk Drives of the existing chassis (‡2)
④ Disk Drives #4 to #14 of the Additional Chassis to be added

‡1 : Two ENC cables are used between the Control Unit of the RKH and the ENC Unit of the RKAJ/RKA, the Control Unit of the RKM and the ENC Unit of the RKAJ/RKA, the Control Unit of the RKS and the ENC Unit of the RKAJ, and the ENC Unit of the RKAJ/RKA and the ENC Unit of the RKAJ/RKA, and one ENC cable is used between the Control Unit of the RKM and the SENC Unit of the RKAJAT, the Control Unit of the RKS and the SENC Unit of the RKAJAT, the Control Unit of the RKXS and the SENC Unit of the RKAJAT, the ENC Unit of the RKAJ and the SENC Unit of the RKAJAT, and the SENC Unit of the RKAJAT and the SENC Unit of the RKAJAT.

‡2 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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(e) The number of the installed Disk Drives of the Additional Chassis when making the subsystem recognize the Additional Chassis with the subsystem power turned on
Install the Disk Drives #0 to #3 only in the Additional Chassis to be added when making the subsystem recognize the Additional Chassis with the subsystem power turned on. When the number of the Disk Drives to be installed finally in one Additional Chassis is less than four, be sure to install the Disk Drives in the Disk Drives #0 and #1.
- When the number of the Disk Drives is two, install two of them in the Disk Drives #0 and #1.
- When the number of the Disk Drives is three, install three of them in the Disk Drive #0 to #2.
- When the number of the Disk Drives is four, install four of them in the Disk Drive #0 to #3.

If five or more Disk Drives are finally installed in one Additional Chassis, install four Disk Drives of #0 to #3 when making the subsystem recognize the Additional Chassis. Add the remaining Disk Drives of #4 to #14 after completing the recognition of the Additional Chassis (refer to "1.6.3 Verifying the additional subsystem" (ADD 01-0770)).

(f) Install them after all the additional subsystem have been recognized(‡1) ((5)-Work-9), connect the ENC cables between the existing subsystem (‡2) and the additional subsystem to be connected to the subsystem for the each loop one by one. (Refer to "1.6.2 Recognition and connection of the additional subsystem" (ADD 01-0570).)

(g) When failures occur in both of the existing subsystem (‡2) and the additional subsystem while the operation to make the additional subsystem recognized(‡1) ((5)-Work-9) is being done, take a recovery action against the failure of the existing subsystem preferentially after the additional subsystem has been recognized(‡1).
After that, take a recovery action against the failure of the additional subsystem, and then resume the operation.

(h) When the Additional Chassis is added with the subsystem power turned on in the subsystem of the dual controller configuration, complete the addition work by making the existing chassis (‡2) recognize the Additional Chasses one by one, and then perform the addition work of the next Additional Chassis. (Refer to "(5) Procedure for adding the Additional Chassis with the subsystem power turned on" (ADD 01-0530).)

(i) When adding the Additional Chassis with the subsystem power turned off, install all the Disk Drives to be added in the chassis, connect between all the chassis with the ENC cables, and turn on the subsystem power. (Refer to "(6) Procedure for adding the Additional Chassis in the status that the subsystem power is turned off" (ADD 01-0550).)

(j) Types of Additional Chassis
- The Additional Chassis to be added to the RKXS must be only the RKAJAT.
- There should be no RKA in the Additional Chassis to be added to the RKS.
- The chassis of unit ID #0 of the RKH must be the RKAJ.

‡1 : The recognition indicates that the Control Unit of the existing RKM/RKS/RKXS/RKH recognizes the Additional Chassis (the "I8020x (or I802HH) Unit Add complete (Unit-x) message is displayed).

‡2 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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(k) Last chassis of the existing subsystem(‡2)
- When adding the RKAJ/RKA to the RKM/RKS, the last chassis of the existing subsystem(‡1) should not be the RKAJAT in odd numbers.
- When adding the RKAJ/RKA to (PATH #0 and PATH #1) of the RKH, the last chassis of (PATH #0 and PATH #1) of the existing subsystem(‡1) should not be the RKAJAT in odd numbers.
- When adding the RKAJ/RKA to (PATH #2 and PATH #3) of the RKH, the last chassis of (PATH #2 and PATH #3) of the existing subsystem(‡1) should not be the RKAJAT in odd numbers.
- The chassis of the unit ID#0 of the RKH can only connect the RKAJ.

(l) When adding the optional component with the subsystem power on, the operation replacing dummy Disk Drive with Disk Drive has to be finished within 10 minutes.

(m) When adding the RKA, install the Disk Drives whose capacity is 71.3 Gbytes or more.

(n) Do not add the optional parts while the array subsystem is being started.
When the array subsystem is being started, add the optional parts after the array subsystem becomes the Ready status.

(o) When adding the RKA or adding the Disk Drive to the RKA in the microprogram revision 0740/C or more, it is possible to treat the Disk Drive of the RKA as the target of the copy backless (‡3) if the customer/SE observes (‡4) either of the restrictions (‡5) on the operation shown below.
- The FC Disk Drive to be installed in the subsystem must be unified to the Disk Drive of the same rotational speed.
- The I/O performance and the Disk Drive restoration performance to the FC Disk Drive to be installed in the subsystem must be designed as the FC Disk Drive of 10,000 min^{-1} rotation.

When setting(‡6) this function, fully check that the customer/SE can strictly observe (‡4) the restrictions(‡5) on the operation shown below.

---

‡1 : The recognition indicates that the Control Unit of the existing RKM/RKS/RKXS/RKH recognizes the Additional Chassis (the "I8020x (or I802HH) Unit Add complete (Unit-x) message is displayed).

‡2 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

‡3 : Refer to Theory "4.6. (3) Operation after replacing failed Disk Drive" (THEO 04-0240) for the details of the function.

‡4 : The customer/SE must observe the restrictions on the operation until the RAID Group configuration of the subsystem is reconstructed.

‡5 : If the customer/SE does not observe the restrictions on the operation, the following problems may occur.
If the FC Disk Drives of the different rotational speed are mixed in the subsystem, when the FC Disk Drive of 15,000 min^{-1} rotation is blocked, the FC Disk Drive of 10,000 min^{-1} rotation may be the Disk Drive which configures the RAID Group instead of the FC Disk Drive of 15,000 min^{-1} rotation.
If this condition occurs, the host I/O performance to the logical units which were configured only with 15,000 min^{-1} rotation in the RAID Group is deteriorated to the performance of the FC Disk Drive of 10,000 min^{-1} rotation.

‡6 : Set it in (5)–Work 11 and (6)–Work 15.
This setting can be executed in the combination of the microprogram revision 0740/C or more and the Storage Navigator Modular Ver.4.05 or more.

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(p) When the priced option, Power Saving, is used in the array subsystem, "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is displayed in Information Message on WEB, the WARNING LED (orange) on the front of the Basic Chassis lights up or blinks, and the array subsystem may become the Warning status while adding the Additional Chassis.
When "IZYR00 Automatic ENC microprogram download completed successfully" is displayed in Information Message on WEB in the following procedure, the message code "W0GM00" disappears from Warning Information on WEB, "I54C00 Power Saving function became possible to work without the limit by SENC" is displayed in Information Massage on WEB, the WARNING LED (orange) on the front of the Basic Chassis goes out, and the subsystem Warning of the array subsystem recovers.

(4) Procedure for adding the Additional Chassis
The procedure for adding the Addition Chassis has two types; one is the procedure to perform it with the subsystem power turned off, and the other is the procedure to perform it with the subsystem power turned on.
Perform the isolation of the work procedure referring to Table 1.6.1.

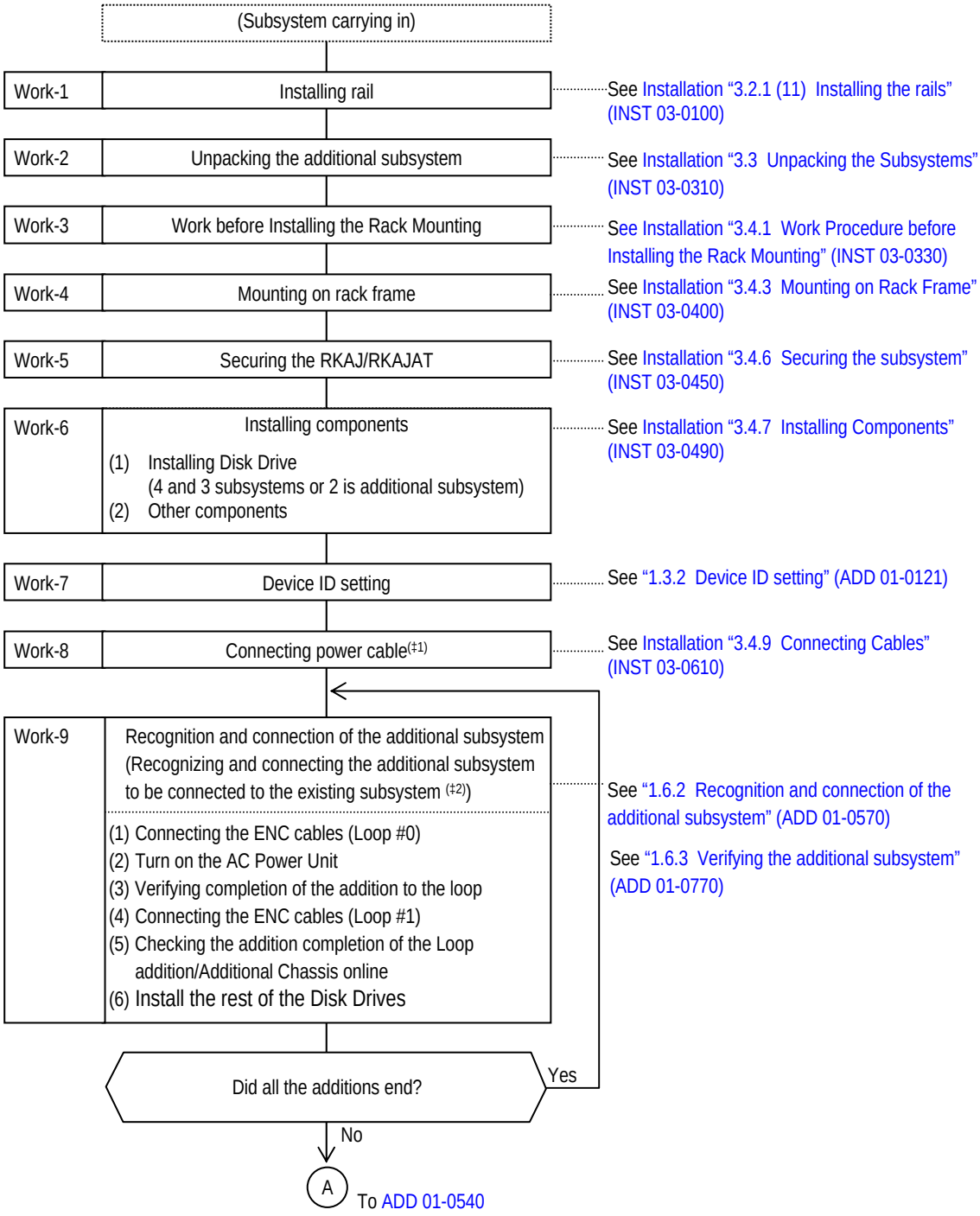
Table 1.6.1 Isolation of the Procedure for Adding the Additional Chassis

Power Status of the Subsystem in the Addition Work	Controller Configuration	Reference Place of the Procedure for the Addition Work
ON	Single	Cannot be operated
	Dual	"(5) Procedure for adding the Additional Chassis with the subsystem power turned on" (ADD 01-0530)
OFF	Single	"(6) Procedure for adding the Additional Chassis in the status that the subsystem power is turned off" (ADD 01-0550)
	Dual	

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(5) Procedure for adding the Additional Chassis with the subsystem power turned on

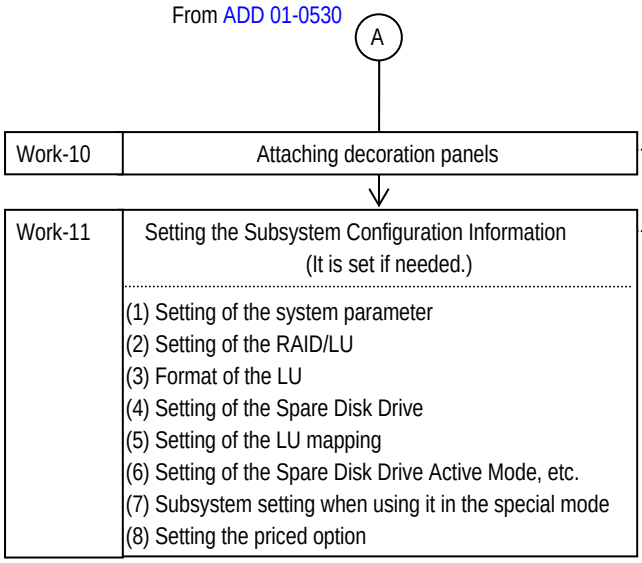
The addition work can be performed only at the time of the dual controller configuration with the subsystem power turned on. Check the following work, and then work on it.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

‡2 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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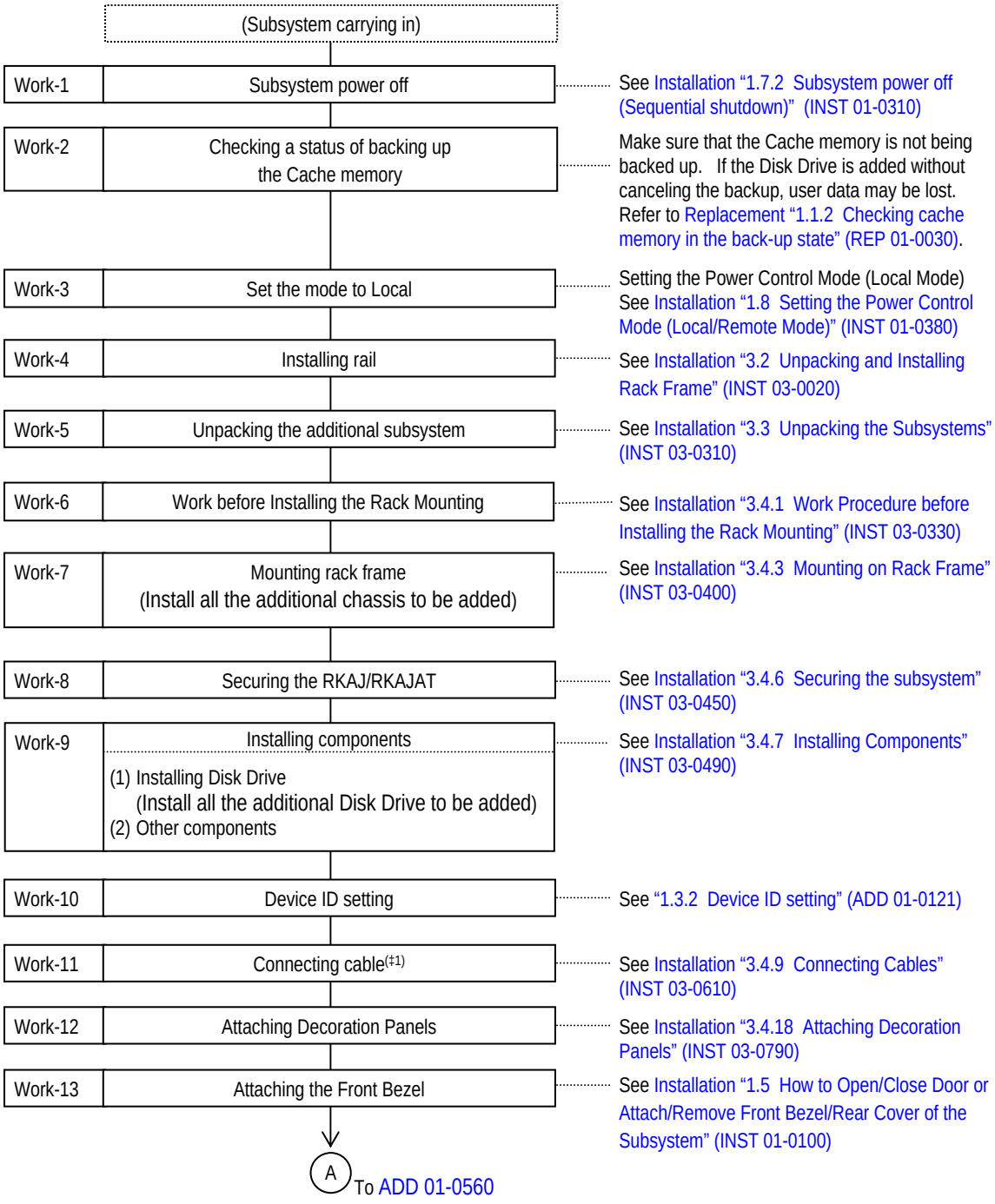


See Installation "3.4.18 Attaching Decoration Panels" (INST 03-0790)

(1): See System Parameter "Chapter 4 Setting Configuration Information" (SYSPR 04-0000)
(2) to (6): See System Parameter "Chapter 3 Setting the RAID/LU/Spare Disk" (SYSPR 03-0000)
(7): See System Parameter "Chapter 5 Setting Host Connection Parameters" (SYSPR 05-0000)
(8): See System Parameter "Chapter 6 Setting an Extra-cost Optional Feature" (SYSPR 06-0000)

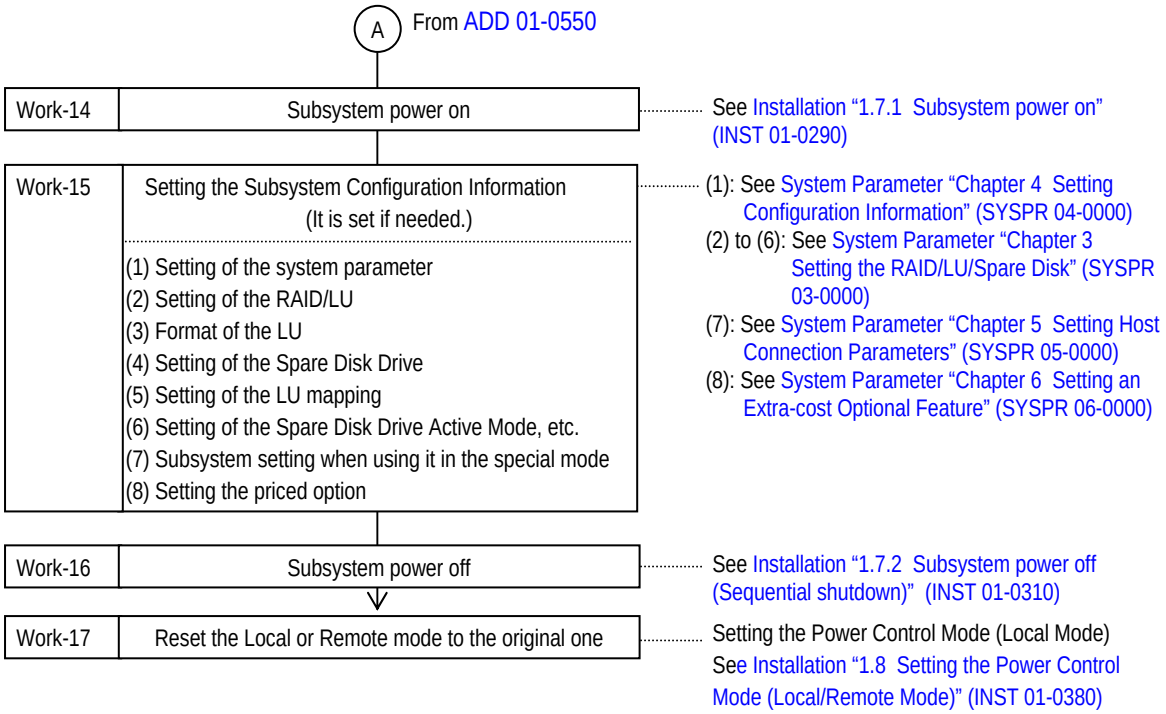
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(6) Procedure for adding the Additional Chassis with the subsystem power turned off
Check the following work, and then work on it.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

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1.6.2 Recognition and connection of the additional subsystem

Satisfy the following conditions to recognize the additional chassis.

Table 1.6.2 Prior Check of the Recognition Operation of the Additional Chassis

No.	Item to be checked	Matter to be checked	Actions to be taken when the conditions on the left were not satisfied	Check result
1	Disk Drive	The Disk Drives #0 to #3 must be installed in the additional subsystem to be added.	Install the Disk Drives #0 to #3 in the Additional Chassis to be added. When two Disk Drives are installed in the Additional Chassis finally, install the Disk Drives #0 and #1, and when three Disk Drives, install the Disk Drives #0, #1 and #2.	
		When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must be installed in the additional subsystem.	Remove the Disk Drives from #4 to 14. Add the Disk Drives #4 to 14 after completing the recognition of the Additional Chassis according to the procedure for the addition work.	
2	ENC Unit/SENC Unit	The two units must be installed in the additional subsystem to be added.	Check that it is installed at the time of the shipment.	
3	Power Unit	The two units must be installed in the additional subsystem to be added.		
4	Fan Assembly (RKA)	The two units must be installed in the additional subsystem to be added.		
5	WARNING (WARN) LED of the Basic Chassis	No WARNING (WARN) LED on the front of the Basic Chassis must be lighting up or blinking.	Perform the maintenance referring to the Information Message on WEB and according to the message displayed. Check that the WARNING LED on the front of the Basic Chassis was turned off after completing the maintenance work.	
6	Information Message on WEB	The message, which says that the maintenance is necessary, should not be displayed.	Perform the maintenance according the message displayed. Check that the message, which says that the maintenance is not completed, is not displayed after completing the maintenance work.	
7	Mainframe of WEB	Subsystem Status is Ready, and there should be no abnormality in the status of the replacement part.	Perform the maintenance referring to the Information Message on WEB and according to the message displayed. Check that the Subsystem Status is Ready and there is no abnormality in the status of the replacement part.	
8	READY LED on the front of the basic chassis	The READY LED on the front of the basic chassis should light up.	• Because the automatic download of the ENC/SENC firmware is operating, check that the WANING LED (orange) on the front of the Basic Chassis goes out in the maximum of 30 to 50 minutes (the maximum of 40 to 60 minutes in case of the RKH), the READY LED (green) lights up, and "IZYR00 Automatic ENC microprogram download completed successfully" is displayed in the Information Message on WEB. • After the READY LED on the front of the Basic Chassis lights up, recheck that the message, which says that the maintenance is necessary, is not displayed referring to the Information Message on WEB. • When the READY LED on the Basic Chassis continues blinking, collect the simple trace, and contact the Technical Support Center.	

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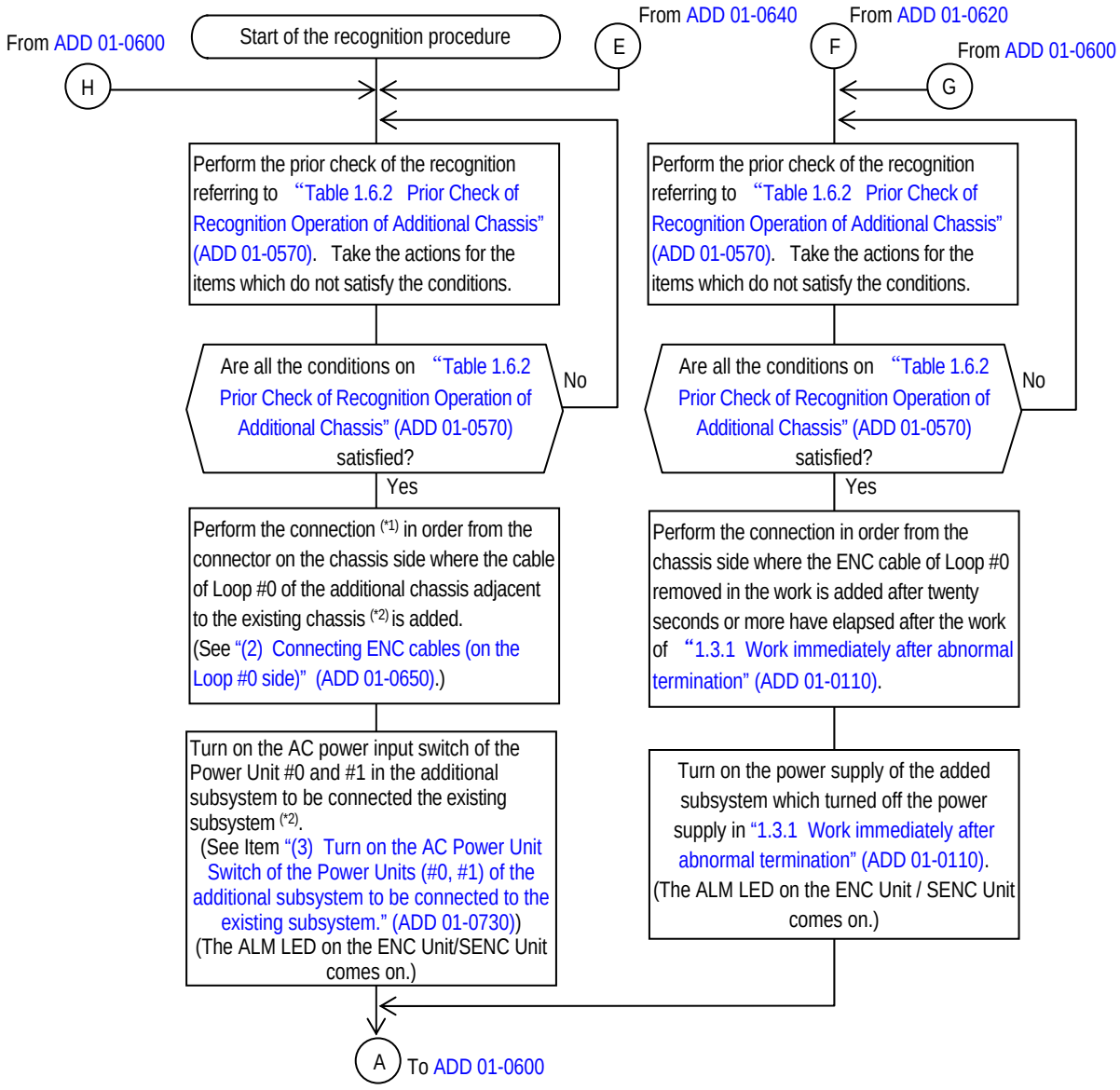
No.	Item to be checked	Matter to be checked	Actions to be taken when the conditions on the left were not satisfied	Check result
9	Device ID	The device ID must be set correctly (Refer to "1.3.2 Device ID setting" (ADD 01-0121).)	Set the device ID after checking the correct device ID with the ACE tool.	
10	Subsystem identification switch (RKAJ)	The subsystem identification switch must be set correctly. (Refer to Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521).)	Set the subsystem recognition switch to "M" when the Basic Chassis is the RKH/RKM and to "S" when it is the RKS.	
11	Other maintenance works	No other maintenance work must be in progress.	Complete all the maintenance work in progress.	

When the conditions above are satisfied, perform the work according to "(1) Procedure for making the additional subsystem recognized" (ADD 01-0590).

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(1) Procedure for making the additional subsystem recognized

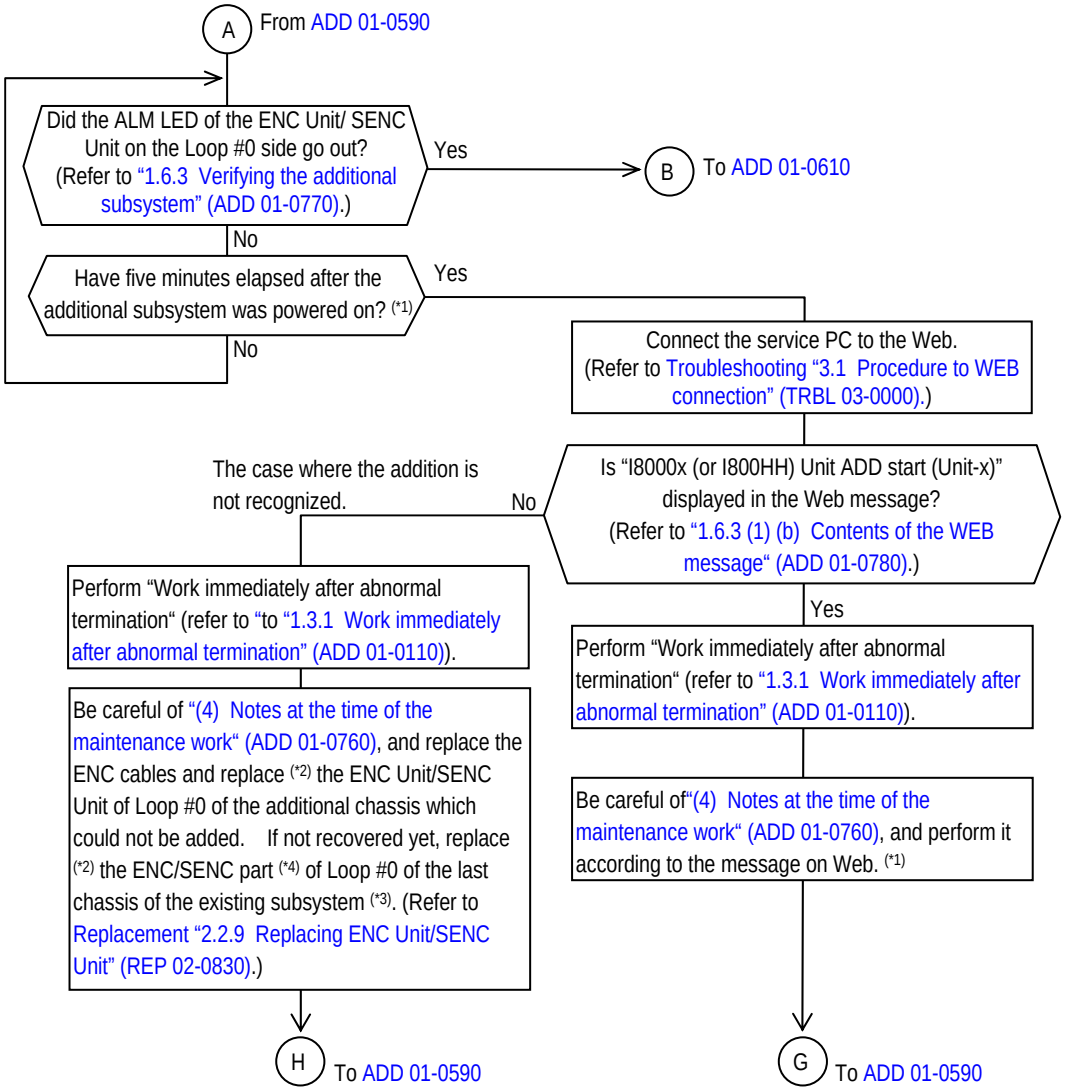
Perform the additional subsystem recognition operation following the flowchart below. Perform the recognition operation for the Additional Chassis to be connected to the existing subsystems one by one starting from the Additional Chassis nearest to the Basic Chassis. The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.



*1 : The recognition operation is possible even when mistaking the connection of the ENC cables and executing it from Loop #1. However, in this case, perform the recognition operation by reading 0 as 1 and 1 as 0 on the Loop #0 and Loop #1 sides and ENC Unit/SENC Unit #0 and #1 sides of the work procedure.

*2 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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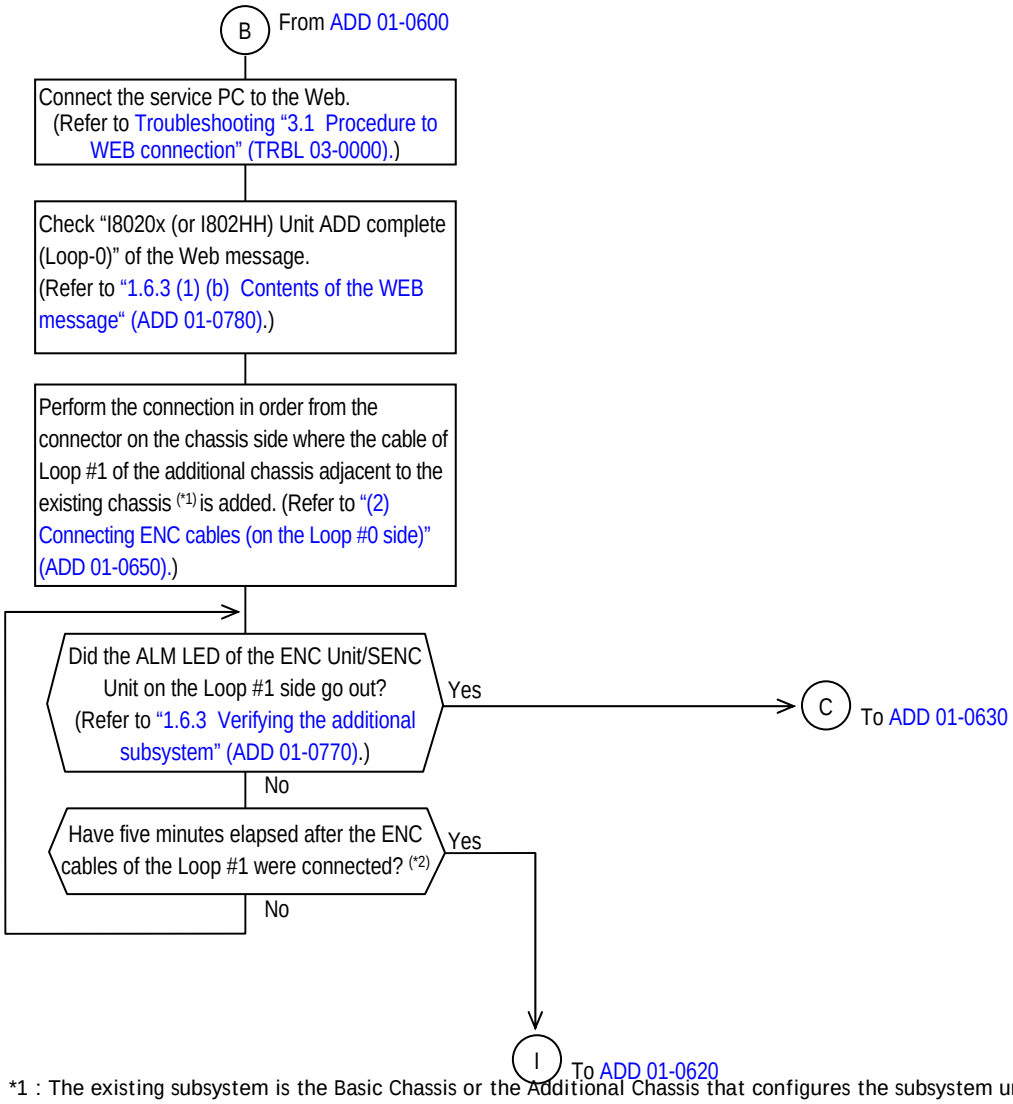
*1 : When the Disk Drives other than #0 to 3 are installed and the recognition operation is started at the time of the Additional Chassis recognition, the message "I80E00 Unit ADD warning [HDU number over]" is output in the "Information message" window on the WEB window. When this message is output, the addition process may not be completed within the specified time (five minutes). However, even if this message is displayed, do not pull out the Disk Drives during the Additional Chassis recognition. There is fear of the abnormal termination of the addition or the subsystem down.

*2 : Perform the addition of the Additional Chassis again from the beginning by replacing the ENC Unit/SENC Unit #0 of the Additional Chassis which could not be added and the ENC cables connected to the ENC/SENC Unit #0. Even if the same phenomenon still occurs, replace the ENC/SENC part of the last chassis of the existing subsystem, and perform the addition of the Additional Chassis again from the beginning.

*3 The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

*4 : It indicates the Control Unit #0 when the existing last subsystem is the Basic Chassis and indicates ENC Unit/SENC Unit #0 when it is the Additional Chassis.

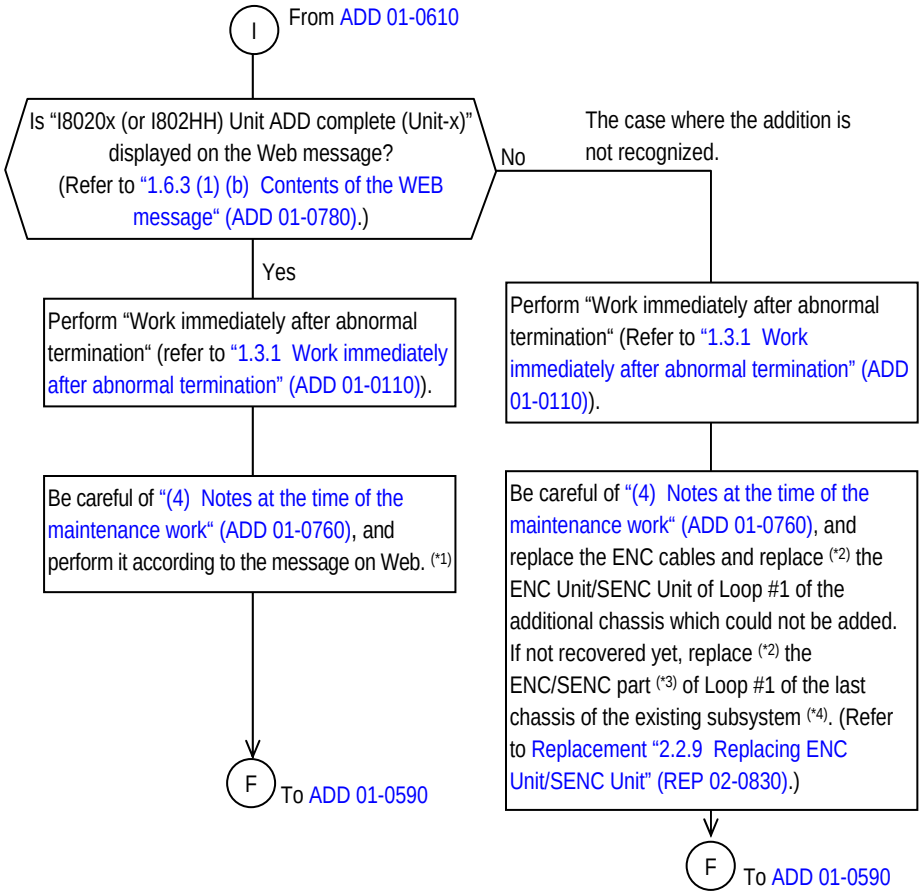
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*1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

*2 : When the Disk Drives other than #0 to 3 are installed and the recognition operation is started at the time of the Additional Chassis recognition, the message "I80E00 Unit ADD warning [HDU number over]" is output in the "Information message" window on the WEB window. When this message is output, the addition process may not be completed within the specified time (five minutes). However, even if this message is displayed, do not pull out the Disk Drives during the Additional Chassis recognition. There is fear of the abnormal termination of the addition or the subsystem down.

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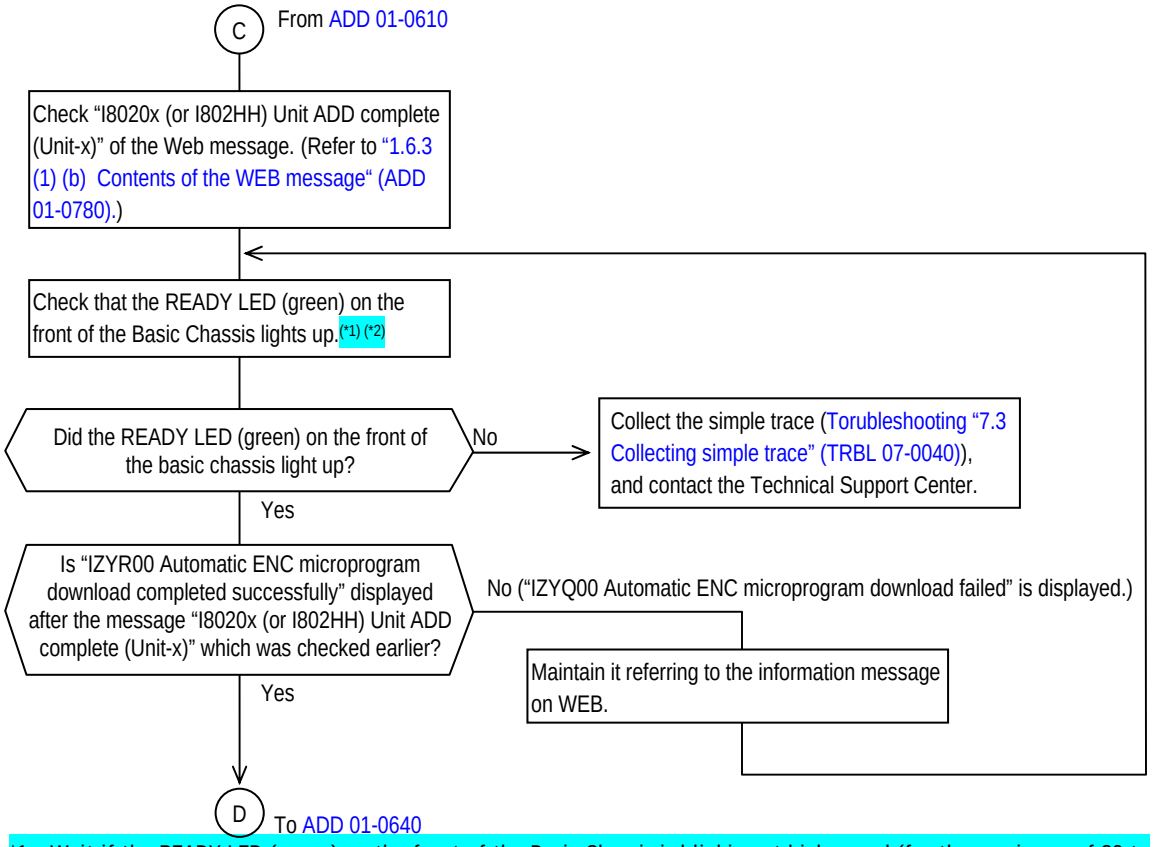
*1 : When the Disk Drives other than #0 to 3 are installed and the recognition operation is started at the time of the Additional Chassis recognition, the message "I80E00 Unit ADD warning [HDU number over]" is output in the "Information message" window on the WEB window. When this message is output, the addition process may not be completed within the specified time (five minutes). However, even if this message is displayed, do not pull out the Disk Drives during the Additional Chassis recognition. There is fear of the abnormal termination of the addition or the subsystem down.

*2 : Perform the addition of the Additional Chassis again from the beginning by replacing the ENC Unit/SENC Unit #1 of the Additional Chassis which could not be added and the ENC cables connected to the ENC/SENC Unit #1. Even if the same phenomenon still occurs, replace the ENC/SENC part of the last chassis of the existing subsystem, and perform the addition of the Additional Chassis again from the beginning.

*3 : It indicates the Control Unit #1 when the existing last subsystem is the Basic Chassis and indicates ENC Unit/SENC Unit #1 when it is the Additional Chassis.

*4 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

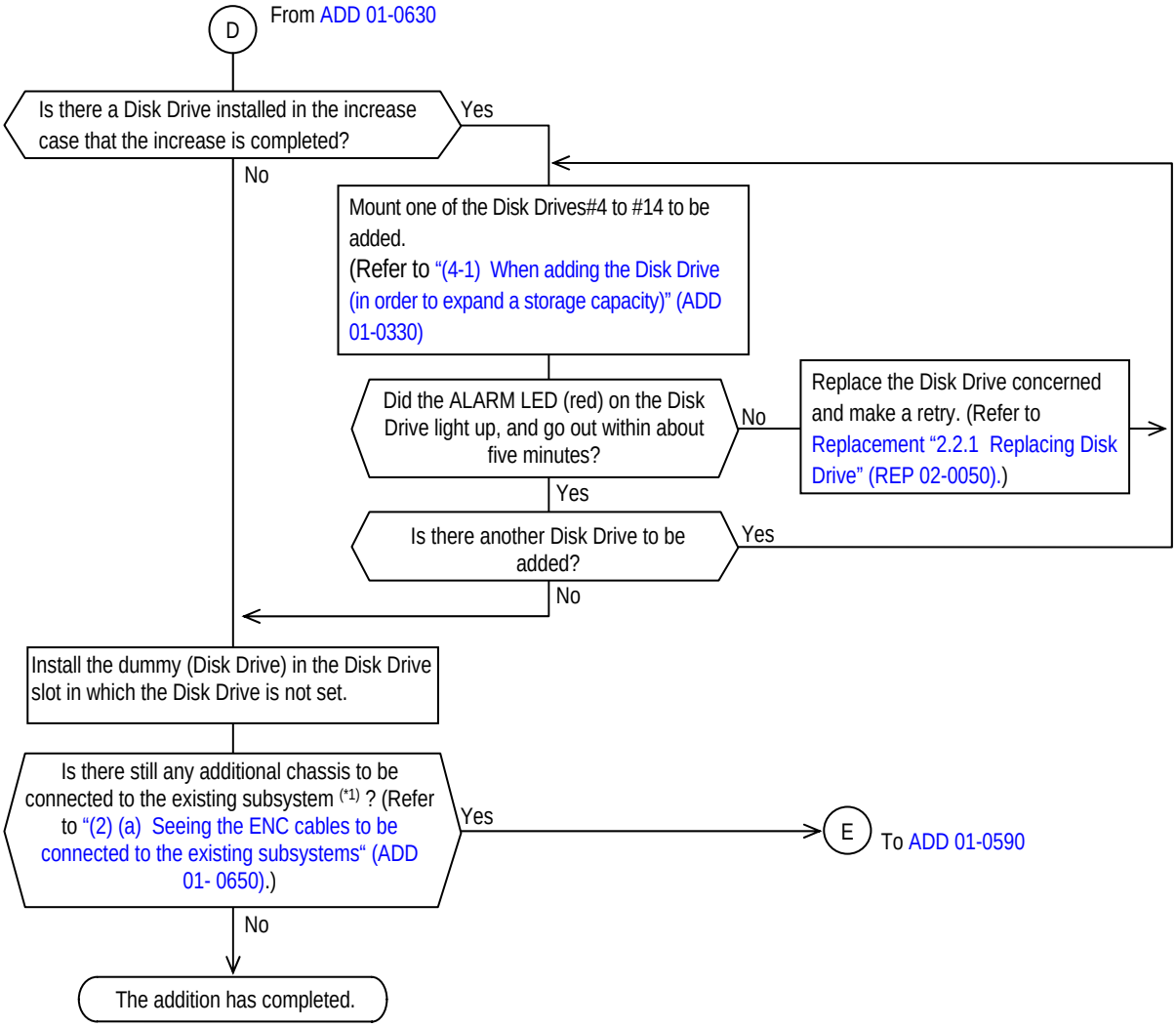
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*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

*2 : When the priced option, Power Saving, is used in the array subsystem, "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is displayed in Warning Information on WEB, the WARNING LED (orange) on the front of the Basic Chassis lights up or blinks, and the array subsystem may become the Warning status.
When "IZYR00 Automatic ENC microprogram download completed successfully" is displayed in Information Message on WEB in the following procedure, the message code "W0GM00" disappears from Warning Information on WEB, "I54C00 Power Saving function became possible to work without the limit by SENC" is displayed in Information Massage on WEB, the WARNING LED (orange) on the front of the Basic Chassis goes out, and the subsystem Warning of the array subsystem recovers.

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*1 : The existing subsystem is the Basic Chassis or the Additional Chassis that configures the subsystem under operation. The Additional Chassis to be connected is connected to the existing subsystem. The Additional Chassis that the addition is completed (the Additional Chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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(2) Connecting ENC cables (on the Loop #0 side)

Perform the recognition operation for the Adding Chassis to be connected to the existing subsystems one by one starting from the Adding Chassis nearest to the Basic Chassis.

When adding the Additional Chassis online, it is required to connect the ENC Unit/SENC Unit on the Loop #0 (ENC #0) side of the Additional Chassis to be added and the output connector of FC-AL (RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKA) in the last chassis of the existing subsystem with the ENC cables.(‡1)

Do not connect the ENC cables of the both loops Loop #0 and Loop #1 at a time.
Otherwise, the subsystem may go down.
Connect the ENC cables of the Loop #1 after verifying the completion of the addition to the Loop #0.

Use the ENC cable (1 meter) in the DF-F700-K1BUP when connecting RKA/RKAJAT/RKAJATL(‡2) of the DF600 to the existing subsystem.

(a) Seeing the ENC cables to be connected to the existing subsystems

See the required connections using the ACE Tool.

For the operation method of ACE Tool, refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

Refer to "<Example of connection>" (ADD 01-0740).

(i) Change the color of the displays of all the adding subsystems to orange by selecting them while the Ctrl key is pressed.
Cables connected to the subsystems displayed in a color changed to white are the ENC cables to be connected to the existing subsystems.

(ii) In the case of the RKAJAT/RKAJATL(‡2), also see the details of the paths because the milk white or yellow Mini-Binders are to be attached to the ENC cables.
Attach the milk white Mini-Binders to the ENC cables of the PATH #0 and the yellow Mini-Binders to those of the PATH #1.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

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(iii) See the details of the Loops using the ACE Tool.
When the ACE Tool is used, the Loop #0 is displayed with red or green lines and the Loop #1, with blue or pink lines.
You can highlight the display of the Loop #0 by clicking the [Loop 0] button.

NOTE : • Be sure to connect the ENC cable from the chassis to be added.
If it is connected from the existing subsystem, the loop failure occurs.
- For the single Control Unit configuration, connect the Loop #0 (ENC Unit #0/SENC Unit #0) side only, and do not connect the Loop #1 (ENC Unit #1/SENC Unit #1) side.
When the multiple additional subsystem are mounted, however, connect the ENC Unit #1/SENC Unit #1 as well as the ENC Unit #0/SENC Unit #0 among the additional subsystem by the ENC cables.
- When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
- For the RKA, the ENC cables are connected to the two paths, the PATH #0 side (or the PATH #2 side) and the PATH #1 side (or the PATH #3 side) of the ENC Unit #0 side (Loop #0), and the two path, the PATH #0 side (or the PATH #2 side) and the PATH #1 side (or the PATH #3 side) of the ENC Unit #1 side (Loop #1) (total of four).
The ENC Unit connector and the ENC cable connected to it have the same color indication.
Be careful to keep the color of PATH #0 and PATH #2 same in milky white and PATH #1 and PATH #3 in yellow.
For the RKAJAT, the ENC cables are connected to the one path, the PATH #0 side (or any of the PATH #1 side, PATH #2 side and PATH #3 side) of the SENC Unit #0 (Loop #0), and the one path, the PATH #0 side (or any of the PATH #1 side, PATH #2 side and PATH #3 side) of the SENC Unit #1 (Loop #1) (total of two).
- The IN and OUT connectors of the SENC Unit of the RKAJAT/RKAJATL(‡1) have indications by means of blue and green labels respectively.

‡1 : RKAJATL can be only connected to RKXS.

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(b) Attach the milk white or yellow Mini-Binders to the ENC cables
Cut off an excess portion of the cable after the Mini-Binders are attached.

NOTE : • Do not tighten the Mini-Binders too much.
• Take care not to damage the ENC cable when cutting the Mini-Binder.

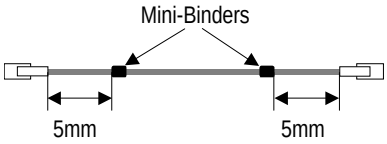


Figure 1.6.1 Positions for attaching Mini-Binders

(c) Remove the rubber cap(‡1) of the output connector of the existing final subsystem FC-AL.
(d) Make connections on the Loop #0 side as directed by the ACE Tool
(see the Loop #0 in "Figure 1.6.6 Connecting ENC Cables of the Existing Subsystem (RKAJ) and the Additional Subsystems (one RKAJ)" (ADD 01-0690) - "Figure 1.6.10 Connecting ENC Cables of the Existing Subsystem (RKAJATL) and the Additional Subsystems (four RKAJATLs)" (ADD 01-0720).
Connect the ENC Unit/SENC Unit on the Loop #0 side of the added RKAJ/RKAJAT/RKA connecting to the existing subsystem and the FC-AL output connector on the Loop #0 side of the existing subsystem with the ENC cable.

NOTE : The connection on the Loop #1 side is not performed here because it is connected after the connection on the Loop #0 side is completed.

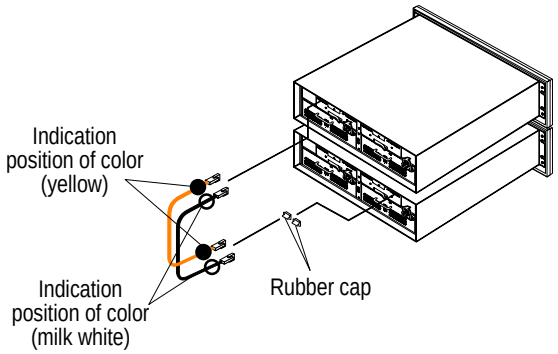


Figure 1.6.2 ENC Cable and Rubber cap

‡1 : Keep unused cables carefully to prepare for an occasion to use them.

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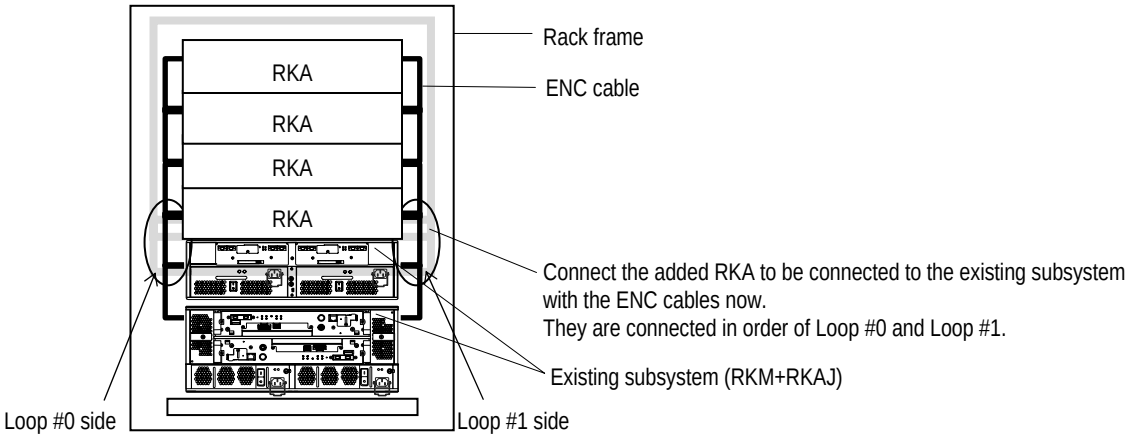
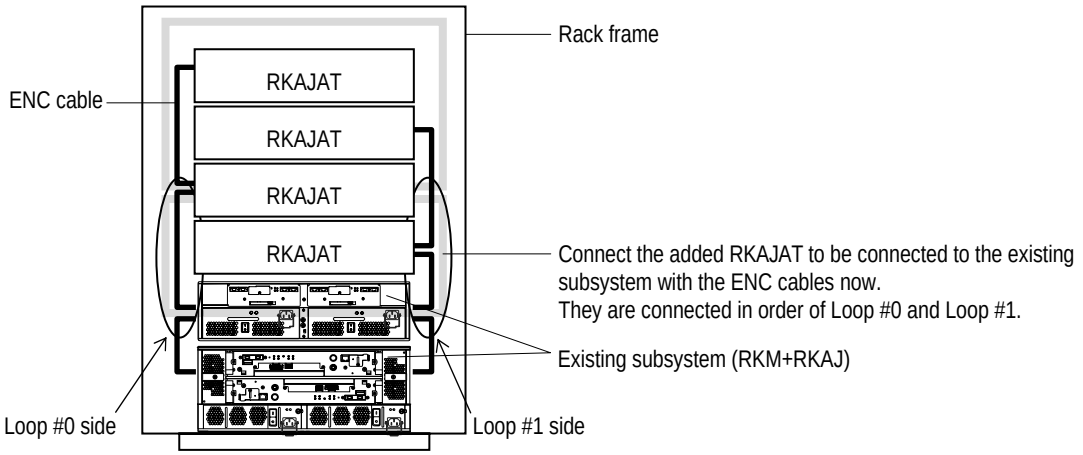


Figure 1.6.3 Connecting the ENC cables (RKM+RKAJ+RKAs)



*1: The connection method of the ENC cables is the same for the RKS.

Figure 1.6.4 Connecting the ENC cables (RKM+RKAJ+RKAJATs)

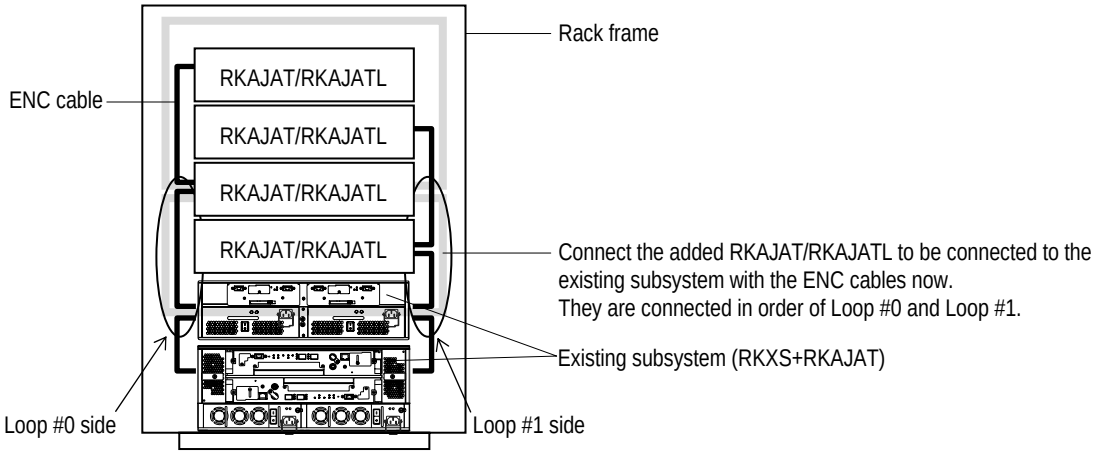


Figure 1.6.5 Connecting the ENC cables (RKXS+RKAJAT+RKAJATs/RKAJATLs)

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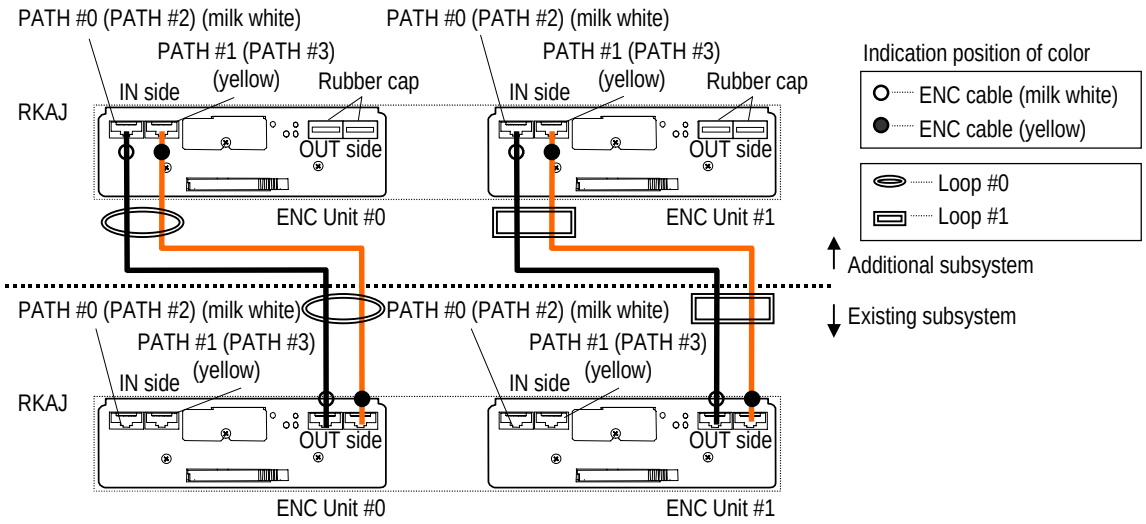


Figure 1.6.6 Connecting ENC Cables of the Existing Subsystem (RKAJ) and the Additional Subsystems (one RKAJ)

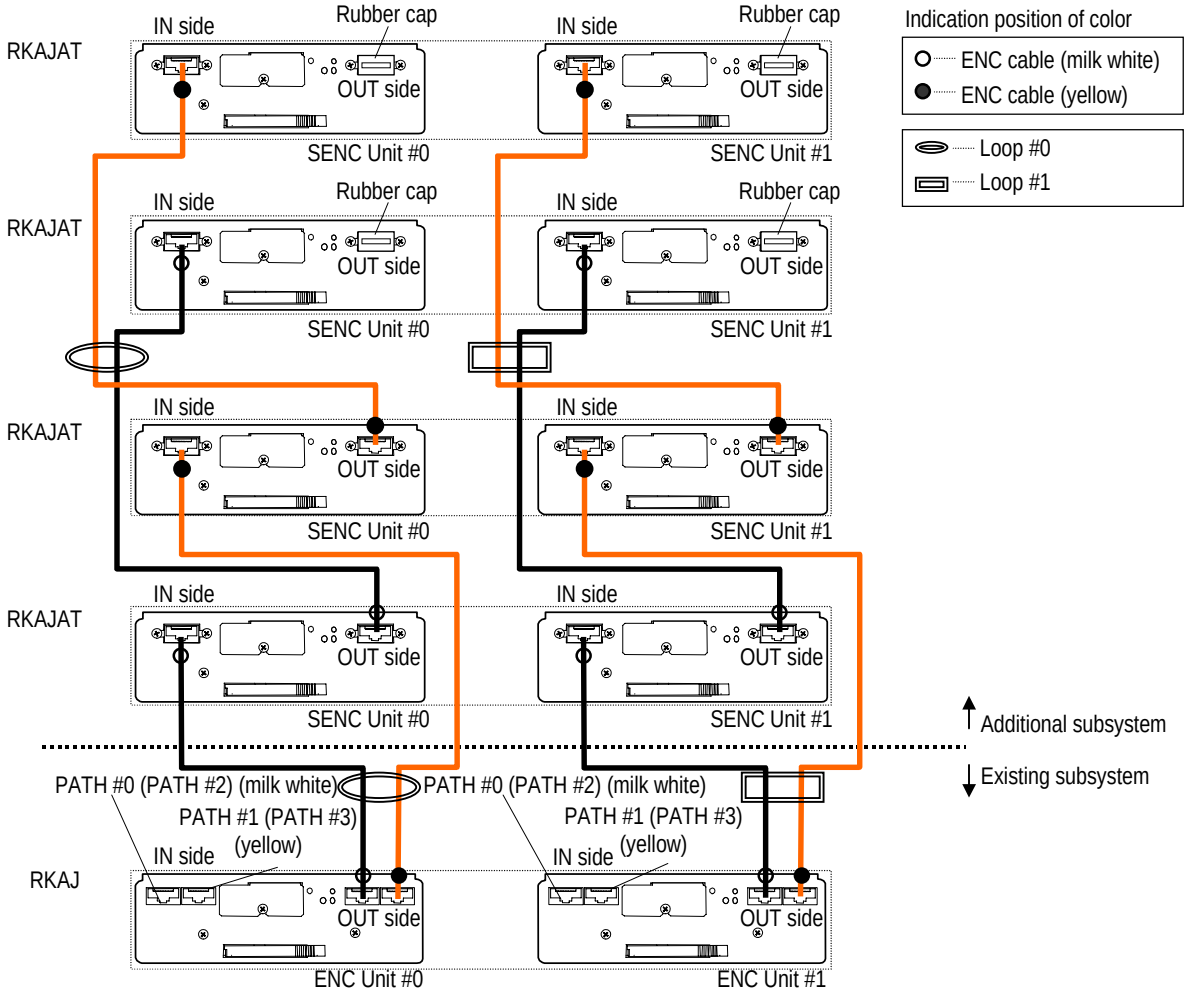


Figure 1.6.7 Connecting ENC Cables of the Existing Subsystem (RKAJ) and the Additional Subsystems (four RKAJATs)

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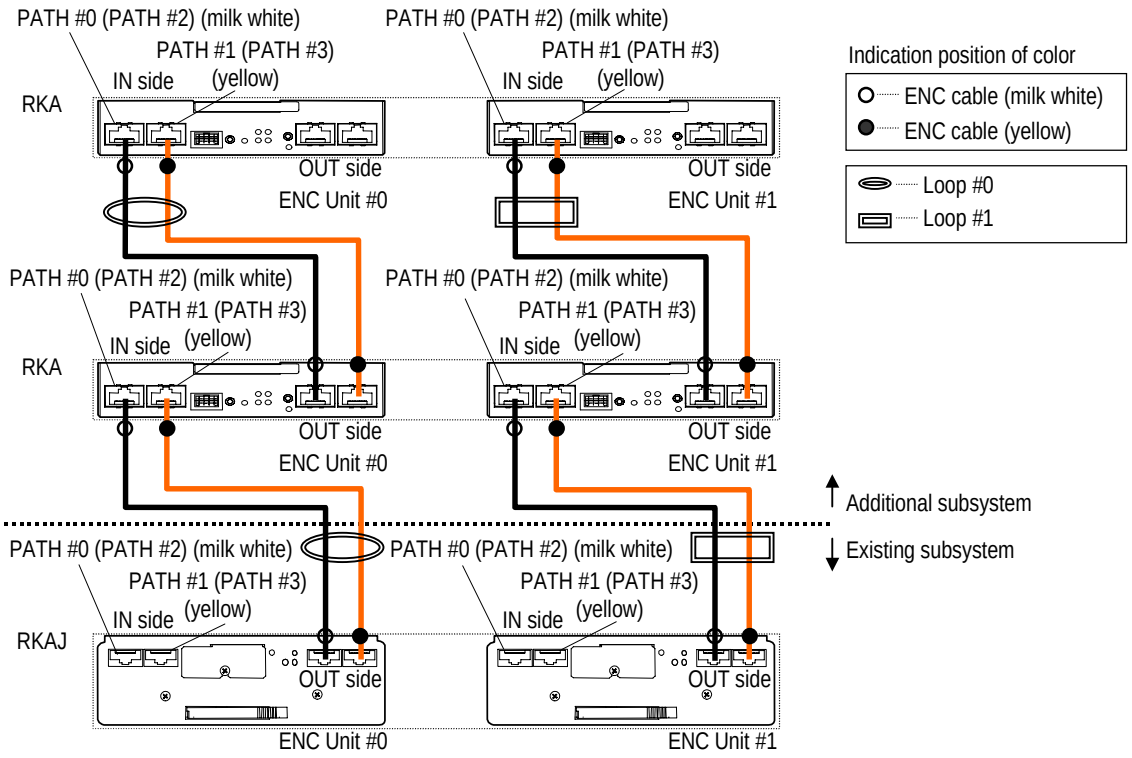


Figure 1.6.8 Connecting ENC Cables of the Existing Subsystem (RKAJ) and the Additional Subsystems (two RKAs)

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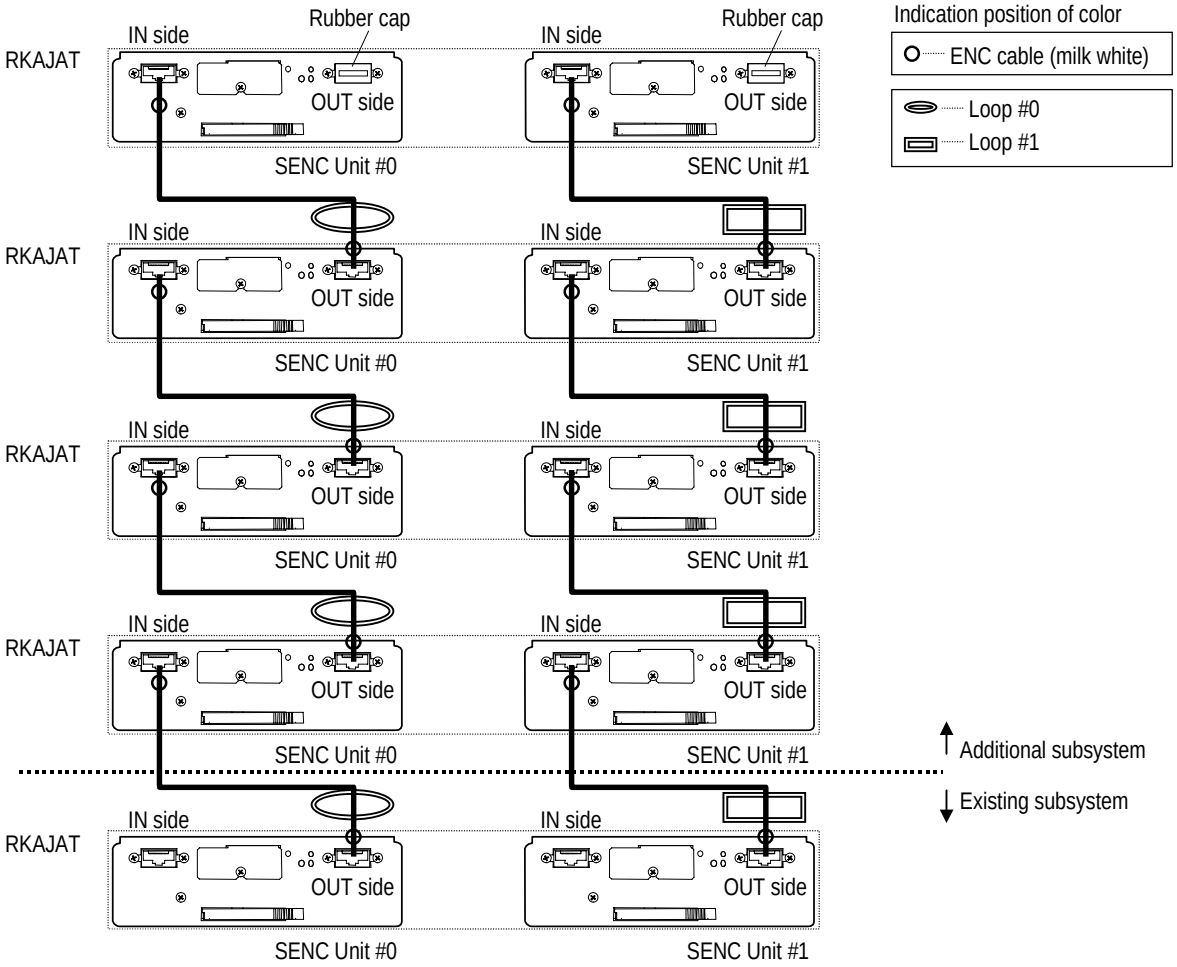


Figure 1.6.9 Connecting ENC Cables of the Existing Subsystem (RKAJAT) and the Additional Subsystems (four RKAJATs)

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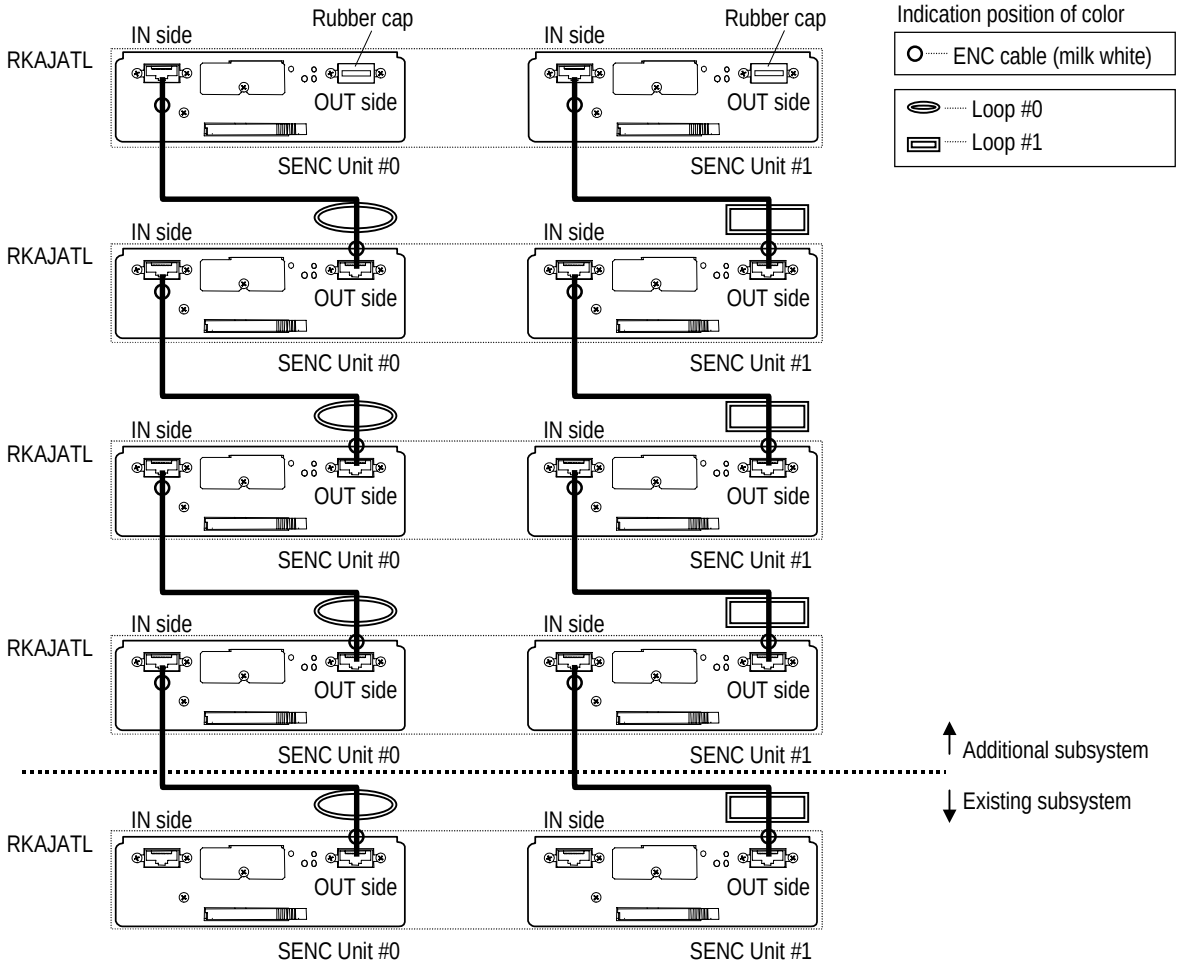


Figure 1.6.10 Connecting ENC Cables of the Existing Subsystem (RKAJATL) and the Additional Subsystems (four RKAJATLs)

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(3) Turn on the AC Power Unit Switch of the Power Units (#0, #1) of the additional subsystem to be connected to the existing subsystem.

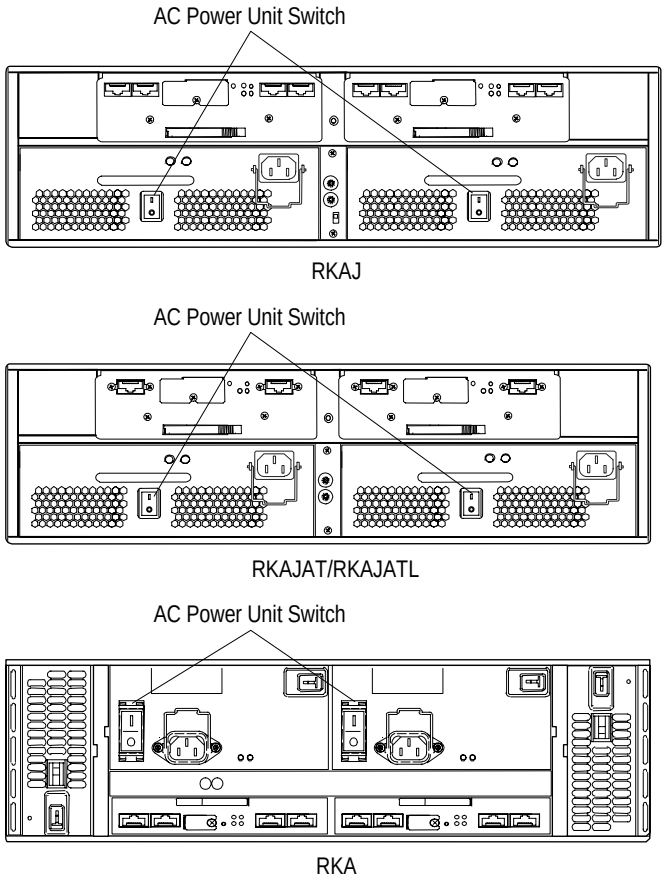


Figure 1.6.11 Locations of Switches for Power On

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<Example of connection>

- Before the addition
  Configuration of RKM + Two RKAJs
- At the time of completing the final addition
  Configuration of RKM + Two RKAJs + Two RKAJATs + Two RKAJs + Five RKAJATs

Refer to Figure 1.6.12 Example of ENC Cable Connections Directed by ACE Tool.
When the additional chassis to be added is selected, the color on the selected subsystem changes from gray to orange.
The ENC cables connected to the subsystems displayed in a color changed from gray to white are the ENC cables that are to be connected to the existing subsystems (‡1).
Check the recognition of the adding subsystems to be connected to the existing subsystems(‡1) one by one starting from the adding subsystem nearest to the basic subsystem.
Connect the ENC cable on the Loop #1 side after the addition concerning the Loop #0 is completed.

(i) The first recognition : Fibre #02 (RKAJ) and SATA #23 (RKAJAT)
(ii) The second recognition : Fibre #02 (RKAJ) and SATA #34 (RKAJAT)

NOTE : • Do not connect the ENC cables of the Loops #0 and #1 at the same time because the subsystem may go down otherwise.
- When the ACE Tool is used, the Loop #0 is displayed with red lines and the Loop #1, with blue lines.
- The additional chassis that the addition is completed becomes the existing subsystem (*1).
  For example, when adding the RKAJAT of the second chassis after adding the two RKM+RKAs, read the RKAJAT that the addition is already completed as the existing subsystem (*1).

‡1 : The existing subsystem is the basic chassis or the additional chassis that configures the subsystem under operation. The additional chassis to be connected is connected to the existing subsystem. The additional chassis that the addition is completed (the additional chassis of the unit ID# displayed in the "I8020x (or I802HH) Unit ADD complete (Unit-x)" message) becomes the existing subsystem.

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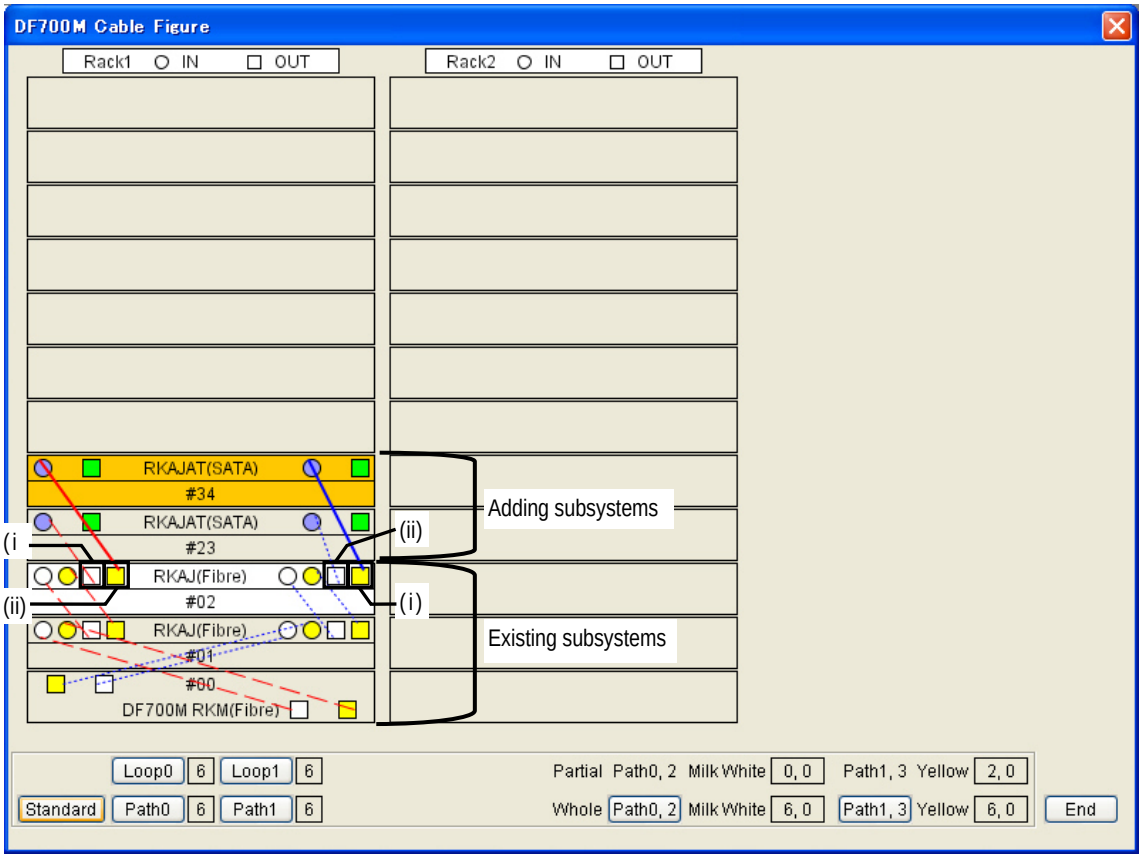


Figure 1.6.12 Example of ENC Cable Connections Directed by ACE Tool
(When the RKAJAT is added after adding the RKAJAT to the RKM+RKAJ+RKAJ)

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(4) Notes at the time of the maintenance work

When a failure occurs during the recognition of the Additional Chassis, and the maintenance work is performed to recover it, be careful of the following items.

(a) When a failure occurs in the existing subsystem or the Additional Chassis to be added during the Additional Chassis recognition

Because the maintenance work affects the Additional Chassis recognition process, remove the Additional Chassis which failed the addition from the existing subsystem by performing "1.3.1 Work immediately after abnormal termination" (ADD 01-0110), and then perform the maintenance referring to the Information Message on WEB.

If the maintenance work of the failure recovery is performed during the Additional Chassis recognition, there is fear of the abnormal termination of the addition or the subsystem down.

(b) When a failure occurs in the Additional Chassis and the existing subsystem at the same time during the Additional Chassis recognition

After performing "1.3.1 Work immediately after abnormal termination" (ADD 01-0110), fist of all, perform the maintenance of the Additional Chassis giving priority to the existing subsystem, and then restart the Additional Chassis recognition operation again from the beginning.

(c) When the subsystem went down during the Additional Chassis recognition

Perform "1.3.1 Work immediately after abnormal termination" (ADD 01-0110), perform the maintenance work according the Information Message on WEB, restart the subsystem in the configuration of the existing subsystem before the addition, and then restart the addition from the beginning.

When the subsystem goes down even after retrying the addition, perform the addition after the subsystem went down (offline addition (with the subsystem power turned off)), and then restart the subsystem.

(d) When a Loop failure occurs during the Additional Chassis recognition (when the blocked part is not specified)

Perform "1.3.1 Work immediately after abnormal termination" (ADD 01-0110), and recover the Loop failure by pulling out the ENC cables corresponding to the blocked Loop of the Additional Chassis that the addition failed.

If the Loop failure is still not recovered, it may be recovered by performing the dummy replacement(‡1) for the ENC Unit/SENC Unit of the existing last subsystem of the Loop concerned. The ENC/SENC blockade occurs when pulling out the ENC Unit/SENC Unit, but the ENC/SENC blockade and the Loop failure are both recovered by inserting the ENC Unit/SENC Unit.

‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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1.6.3 Verifying the additional subsystem

(1) Checking the addition completion of the Additional Chassis

(1-1) Verifying completion of the addition to the loop

(a) Procedure for verifying completion of the addition to the loop

When the ALM LED (red) on the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED (orange) of the additional subsystem are off, the addition to the loop has been completed normally.

(The ALM LED (red) on the ENC Unit/SENC Unit of the Additional Chassis which is not adjacent to the existing subsystem is not a problem in the lighting status at this time. In the process of completing the Loop addition of each Additional Chassis, the ALM LED (red) on the ENC Unit/SENC Unit installed in the Additional Chassis will be turned off.)

Incidentally, the completion of the addition to the loop or a message output when a trouble occurs can be checked in the "Information Message" window that is one of the WEB windows.

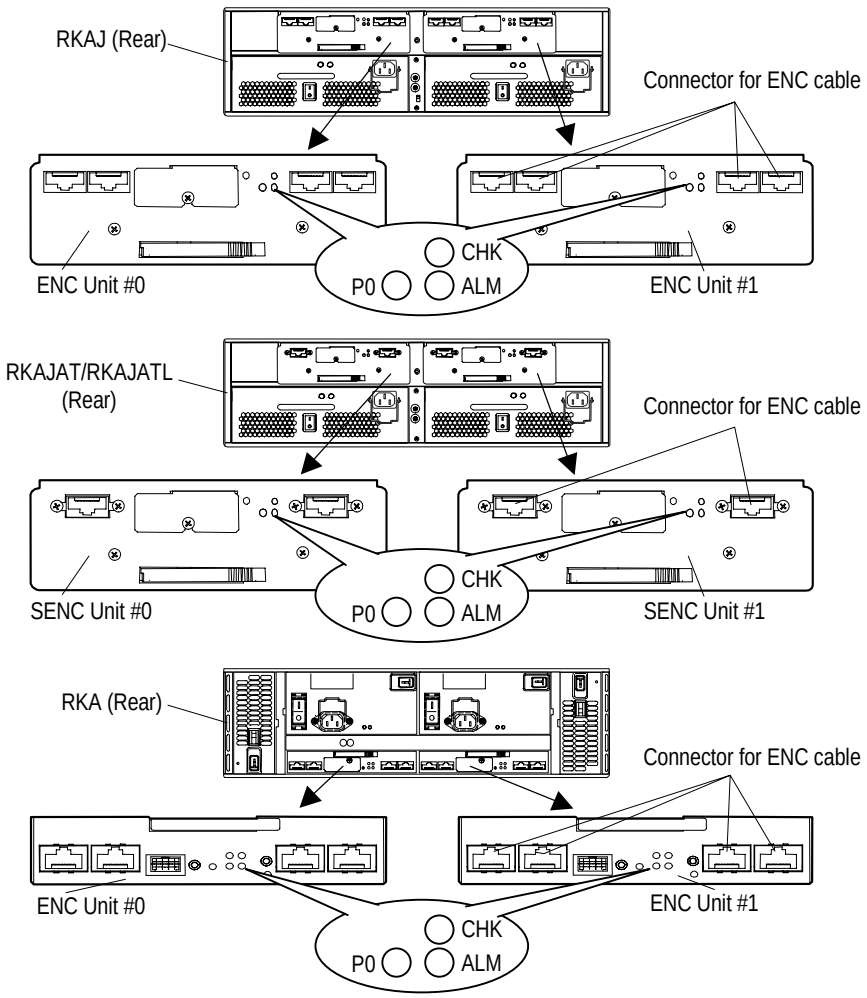
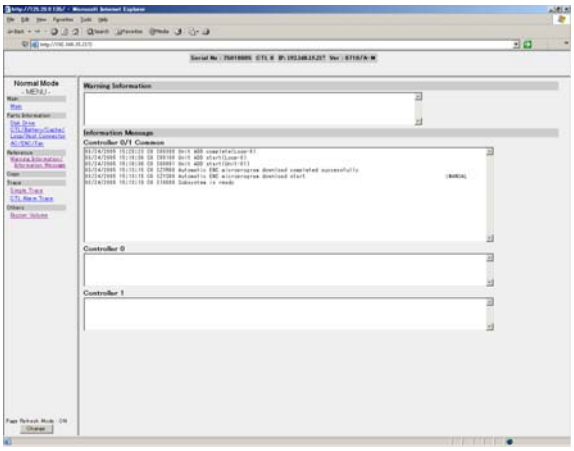


Figure 1.6.13 Locations of LED for additional subsystem

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(b) Contents of the WEB message

[In the case of normal termination]



MM/DD/YYYY HH:MM:SS Cz I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8000x (or I800HH) Unit ADD start (Unit-x)

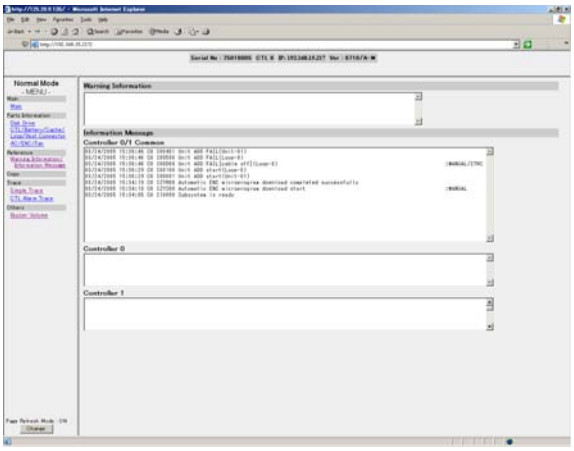
Date Time Detect Controller# x : Unit ID#, y : Loop#

The message to start the addition of the Additional Chassis online
The message to start the Loop addition online
The message to complete the Loop addition online

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[In the case of abnormal termination]

Take a recovery action according to the message notifying of the abnormal termination.



MM/DD/YYYY HH:MM:SS Cz I8040x (or I804HH) Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cz I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I80D0y Unit ADD FAIL [cable off] (Loop-y) :MANUAL/TRC
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8000x (or I800HH) Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

The message to start the addition of the Additional Chassis online
The message to start the Loop addition online
A message informing of a factor of an abnormal termination (See Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)).
The message to terminate the Loop addition abnormally online
The message to terminate the addition of the Additional Chassis abnormally online

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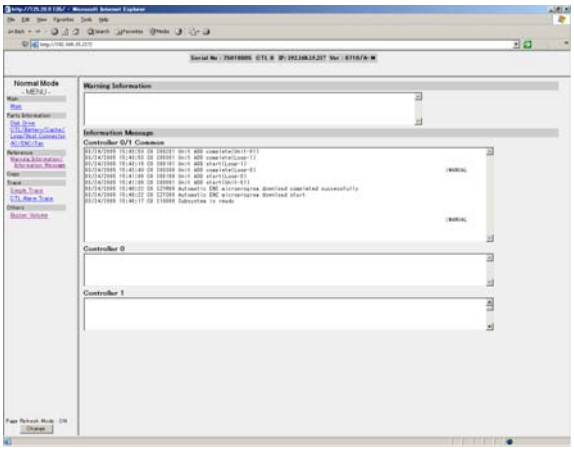
(1-2) Checking the completion of the online addition of the Loop addition and the Additional Chassis

(a) Procedure for checking the completion of the online addition of the Loop addition and the Additional Chassis

When the ALM LED (red) of the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED (orange) of the additional subsystem are off, you can verify completion of the addition to the loop by viewing the "Information message" window in the WEB window.

(b) Contents of the WEB message

[In the case of normal termination]



MM/DD/YYYY HH:MM:SS Cz I8020x (or I802HH) Unit ADD complete (Unit-x)
MM/DD/YYYY HH:MM:SS Cz I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8000x (or I800HH) Unit ADD start (Unit-x)

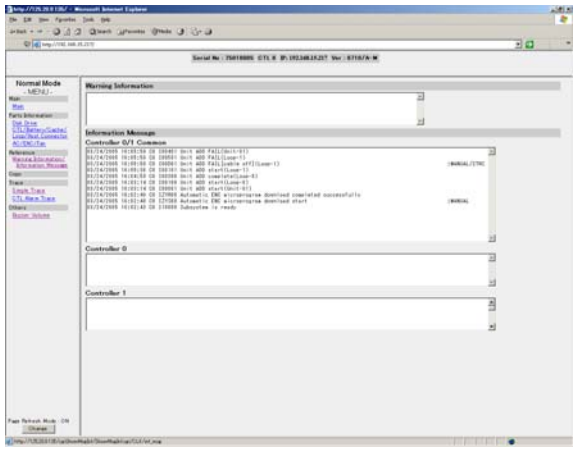
Date Time Detect Controller# x : Unit ID#, y : Loop#

The message to start the addition of the Additional Chassis online
The message to start the Loop addition online
The message to complete the Loop addition online
The message to start the Loop addition online
The message to complete the Loop addition online
The message to complete the addition of the Additional Chassis online

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[In the case of abnormal termination]

Take a recovery action according to the message notifying of the abnormal termination.



MM/DD/YYYY HH:MM:SS Cz I8040x (or I804HH) Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cz I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD FAIL [cable off] (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8030y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8010y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8000y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cz I8000x (or I800HH) Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

The message to start the addition of the Additional Chassis online
The message to start the Loop addition online
The message to complete the Loop addition online
The message to start the Loop addition online
A message informing of a factor of an abnormal termination (See Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)).
The message to terminate the Loop addition abnormally online
The message to terminate the addition of the Additional Chassis abnormally online

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Chapter 2. Subtracting Optional Components

2.1 Before Starting Subtraction of Optional Components

If you make a mistake in operation during a subtraction of the optional component, it is feared that user data in the subsystem is lost. Therefore, perform the following before starting the subtraction of the optional component to provide against an unexpected accident.

(1) Backup user data.
Backup user data in the subsystem by the operation on the host computer side.

(2) The work to subtraction an optional component varies depending on the component and a location where the component is to be installed. Besides, perform the addition after making sure whether the work must be done with the subsystem power on or off.
- An subtraction with the subsystem power on :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.
- An subtraction with the subsystem power off :
  A status in which the subsystem power is turned on irrespective of whether the system (host computer) is turned on or off.

(3) When subtraction the optional component, it is required to change the settings of the subsystem using a service PC connected via a LAN. Make the following preparations before starting the addition of the optional component.
- Prepare a PC in which Storage Navigator Modular is installed. The PC must be used in the LAN environment.
- Ask the customer whether the subsystem is operable via a LAN. If not, obtain customer's permission to operate the subsystem via a LAN.

(4) Promote mutual understanding with the user about the possibility of a system down in order to minimize damage caused by failures.

(5) Be sure to install a dummy Control Unit and a dummy Disk Drive in a vacant slot because dummy Control Unit and dummy Disk Drive are required for adjusting the cooling air flow. When subtracting the optional component with the subsystem power on, the operation replacing Disk Drive with dummy Disk Drive has to be finished within 10 minutes.

(6) When the Spare Disk Drive Active Mode(‡1) is set as variable or it was set as variable in the past, the RAID Group configuration and the Spare Disk Drive configuration may be different from the configuration at the time of the introduction depending on the occurrence conditions of the Disk Drive failures after the installation.
When "Applying No Copy Back Mode on All the Units" of [Configuration Settings] – [Restore Option] is set as enable or it was set to enable in the past, it is possible that the FC Disk Drives of 15,000 min^{-1} rotation and 10,000 min^{-1} rotation are mixed in the RAID Group in the microprogram revision 0740/C or more.
Check if the configuration examples conform to that described in "2.1.1 Preparatory works for subtraction" (ADD 02-0010) before starting the subtraction. When the conformity is confirmed, execute the procedure for the preparation.

(7) Do not subtract the parts while the array subsystem is being started.
When the array subsystem is being started, subtract the parts after the array subsystem becomes the Ready status.

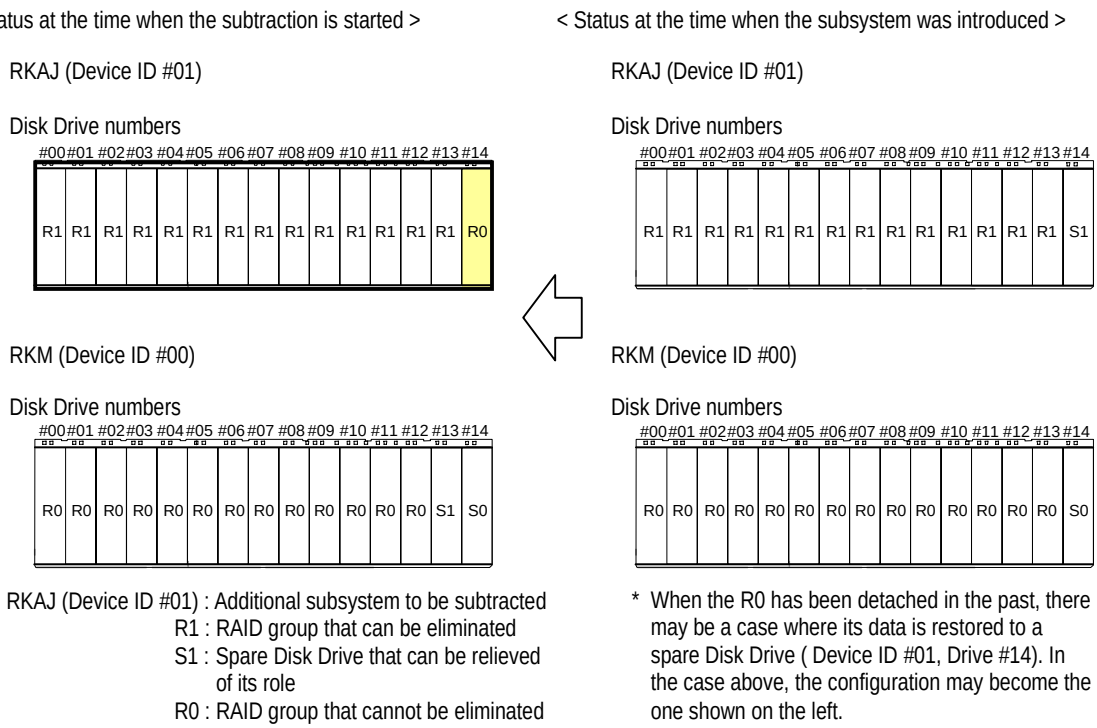
‡1 : For details of the spare Disk Drive operation mode, refer to System Parameter "(6) Setting of Restore Options" (SYSPR 04-0120) and "Theory "4.6 (3) Operation after replacing failed Disk Drive" (THEO 04-0240).

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2.1.1 Preparatory works for subtraction

When the Spare Disk Drive Active Mode is set as variable or it was set as variable in the past, the RAID Group configuration or the Spare Disk Drive configuration may be different from the configuration at the time of the introduction.
The Configuration examples concerned are shown in the following Items (1) to (4).
When they conform to these configuration examples, execute the following works before starting the subtraction.
Also, if the RAID group configuration of the Additional Chassis to be subtracted was changed from that at the time when the subsystem was introduced, restore the additional chassis to be subtracted to the configuration at the time when the subsystem was introduced, and then execute the subtraction work.

(1) When the additional subsystem to be de-installed has a Disk Drive that composes a RAID group unable to be eliminated



RKAJ (Device ID #01) : Additional subsystem to be subtracted
R1 : RAID group that can be eliminated
S1 : Spare Disk Drive that can be relieved of its role
R0 : RAID group that cannot be eliminated
S0 : Spare Disk Drive that cannot be relieved of its role

* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

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(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(c) Relieve spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0380).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330).)

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(f) Reset the spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0360).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, repeat the works again from Step (c).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(i) Make sure that the current settings of the RAID groups and spare disks are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and spare Disk Drive are reversed.

---

‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Storage Navigator Modular is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled in the microprogram revision 0740/C or more, the Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14. The Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #01 and the Disk Diver number #14.

‡2 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡3 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0230).

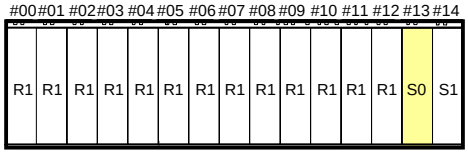
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(2) When the additional subsystem to be de-installed has a Spare Disk Drive that cannot be relieved of its role

< Status at the time when the subtraction is started >

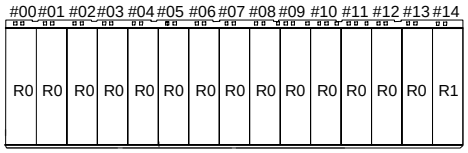
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



RKAJ (Device ID #01) : Additional subsystem to be subtracted

R1 : RAID group that can be eliminated

S1 : Spare Disk Drive that can be relieved of its role

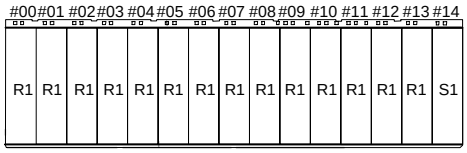
R0 : RAID group that cannot be eliminated

S0 : Spare Disk Drive that cannot be relieved of its role

< Status at the time when the subsystem was introduced >

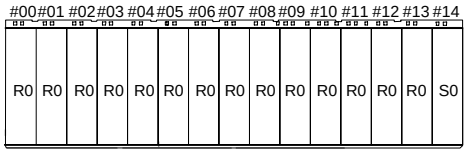
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

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(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(c) Relieve Spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0380).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330).)

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a Spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(f) Reset the Spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0360).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a Spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, make a dummy replacement(‡4) of the Spare Disk Drive (Device ID #00, Drive #14) that was detached and repeat the works from Step (c) after making sure that the Disk Drive was recovered from the detachment(‡5).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

---

‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Storage Navigator Modular is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled in the microprogram revision 0740/C or more, the Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14. The Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #00 and the Disk Diver number #14.

‡2 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡3 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0230).

‡4 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

‡5 : "I009xy (or I009HH) Spare HDU recovered (x: Unit number, y: HDU number)" is displayed in the Information Message of the Web and the ALARM LED (red) on the Disk Drive concerned goes out.

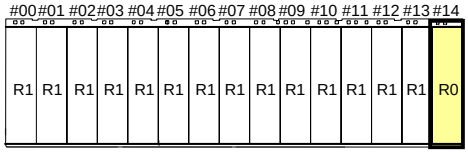
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(3) When the Disk Drives to be de-installed include a Disk Drive that composes a RAID group unable to be eliminated

< Status at the time when the subtraction is started >

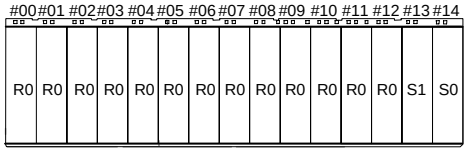
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



RKAJ (Device ID #01) : Additional subsystem that has a Disk Drive to be subtracted

R1 : RAID group that can be eliminated

S1 : Spare Disk Drive that can be relieved of its role

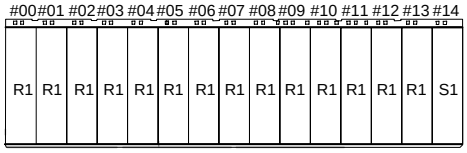
R0 : RAID group that cannot be eliminated

S0 : Spare Disk Drive that cannot be relieved of its role

< Status at the time when the subsystem was introduced >

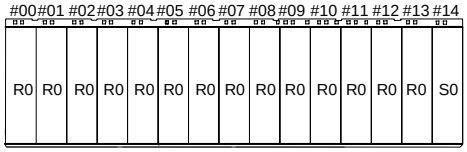
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

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(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(c) Relieve Spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0380).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330).)

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a Spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(f) Reset the spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0360).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a Spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than that to be subtracted. If such a Disk Drive exists, repeat the works again from Step (c).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Storage Navigator Modular is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled in the microprogram revision 0740/C or more, the Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14. The Spare Disk Drive (S1) of the device ID #00 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #01 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #01 and the Disk Diver number #14.

‡2 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡3 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0230).

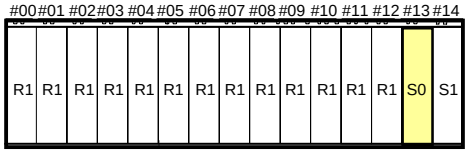
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(4) When a Spare Disk Drive that cannot be eliminated is included in Disk Drives to be subtracted

< Status at the time when the subtraction is started >

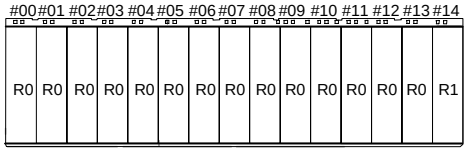
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



RKAJ (Device ID #01) : Additional subsystem that has a Disk Drive to be subtracted

R1 : RAID group that can be eliminated

S1 : Spare Disk Drive that can be relieved of its role

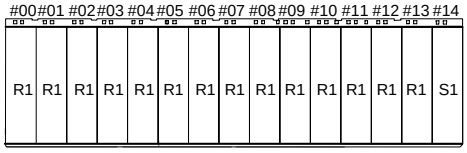
R0 : RAID group that cannot be eliminated

S0 : Spare Disk Drive that cannot be relieved of its role

< Status at the time when the subsystem was introduced >

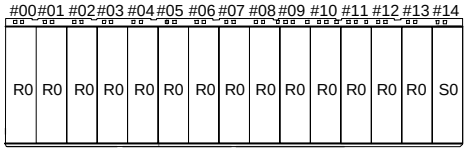
RKAJ (Device ID #01)

Disk Drive numbers



RKM (Device ID #00)

Disk Drive numbers



* When the R0 has been detached in the past, there may be a case where its data is restored to a spare Disk Drive (Device ID #01, Drive #14). In the case above, the configuration may become the one shown on the left.

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(a) Make sure that the model names of Disk Drive (Device ID #01, Drive #14) and the Spare Disk Drive (Device ID #00, Drive #13) are the same(‡1).
You can make sure of it by checking the "Product ID" and "Capacity" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(b) Output the text file of the "RAID group/Logical unit" in the configuration copy information. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(c) Relieve spare Disk Drives other than the S1of their roles. (For the details, refer to System Parameter "[Procedure ④-C]Deleting Spare Disk" (SYSPR 03-0380).)

(d) Execute the dynamic sparing for the Disk Drive (Device ID #01, Drive #14). (For the details, refer to Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330).)

(e) Make sure that the Disk Drive (Device ID #00, Drive #13) becomes a data Disk Drive that is a component of the R0 and the Disk Drive (Device ID #01, Drive #14) becomes a detached Disk Drive(‡2) as a Spare Disk Drive after the dynamic sparing is completed(‡3).
You can make sure of it by checking the "Type" and "Status" of the Disk Drive shown when you select the Component Status tab of Storage Navigator Modular. (For the details, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

(f) Reset the Spare Disk Drive that was relieved of its role in Step (c) referring to the text file that was output in Step (b). (For the details, refer to System Parameter "3.4 [Procedure ④-B]Setting Spare Disk" (SYSPR 03-0360).)
However, the Disk Drive (Device ID #00, Drive #13) cannot be set as a spare Disk Drive.

(g) Make sure that there is no other Disk Drive, which composes a RAID group that cannot be eliminated, than the additional unit to be de-installed. If such a Disk Drive exists, make a dummy replacement(‡4) of the Spare Disk Drive (Device ID #00, Drive #14) that was detached and repeat the works from Step (c) after making sure that the Disk Drive was recovered from the detachment(‡5).

(h) Output the text file of the "RAID group/Logical unit" in the configuration copy information again. (For the details, refer to System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

(i) Make sure that the current settings of the RAID groups and Spare Disk Drives are correct and neither more not less by comparing the text file that was output in Step (b) with that output in Step (h). At this time roles of the Disk Drives (Device ID #00, Drive #13 and Device ID #01, Drive #14) as a data Disk Drive and Spare Disk Drive are reversed.

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‡1 : When "Spare Drive" of [Configuration Settings] – [Restore Options] of the Storage Navigator Modular is variable (default value) and "Applying No Copy Back Mode on All the Units" is enabled in the microprogram revision 0740/C or more, the Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may not be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14. The Spare Disk Drive (S0) of the device ID #01 and the Disk Drive number #13 may be the same model name as the Disk Drive of the device ID #00 and the Disk Drive number #14 or the Disk Drive whose the rotational speed differs and the capacity is the same as the Disk Drive of the device ID #00 and the Disk Diver number #14.

‡2 : The Disk Drive (Device ID #01, Drive #14) is detached. However, do not replace it because the detachment does not mean a trouble.

‡3 : It takes a while to complete the dynamic sparing. For the standard time required, refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" in Replacement "(4) Confirming completion of data recovery or copy back" (REP 02-0230).

‡4 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

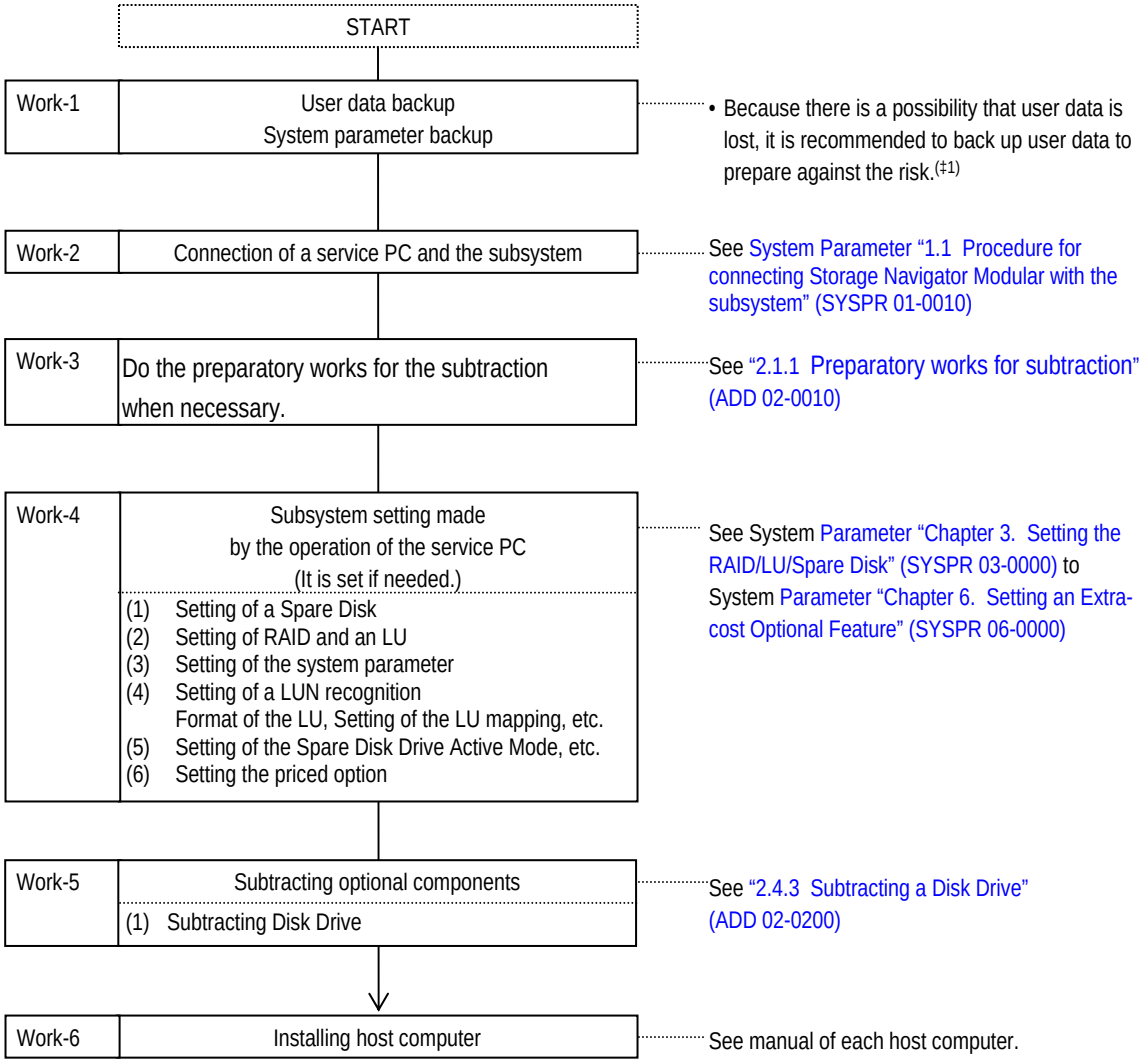
‡5 : "I009xy (or I009HH) Spare HDU recovered (x: Unit number, y: HDU number)" is displayed in the Information Message of the Web and the ALARM LED (red) on the Disk Drive concerned goes out.

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2.2 Procedures for Subtracting Optional Components

(1) Procedure for subtracting an optional component while the subsystem power online

NOTE : For safety use, always close the front bezel after the operation.

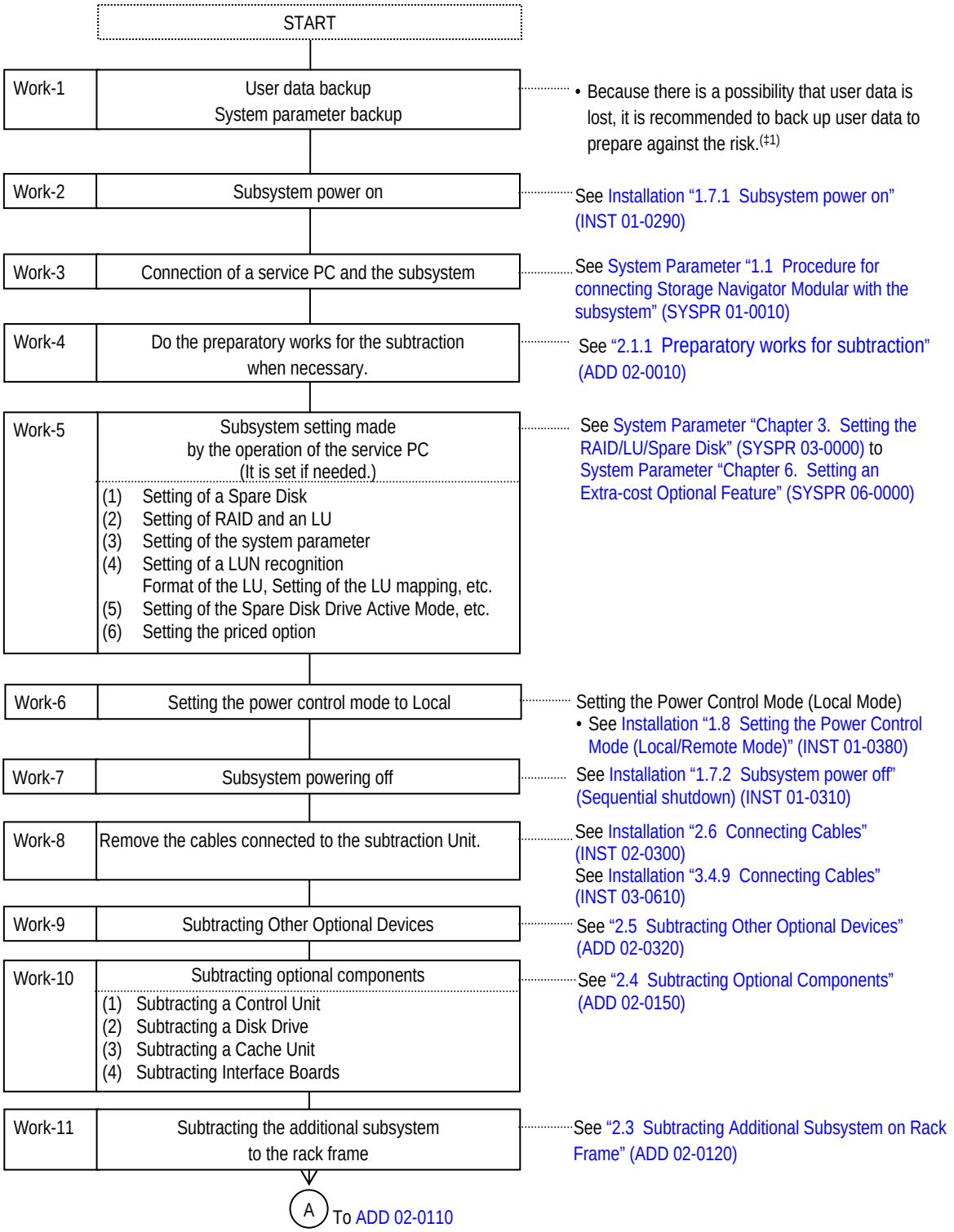


‡1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.

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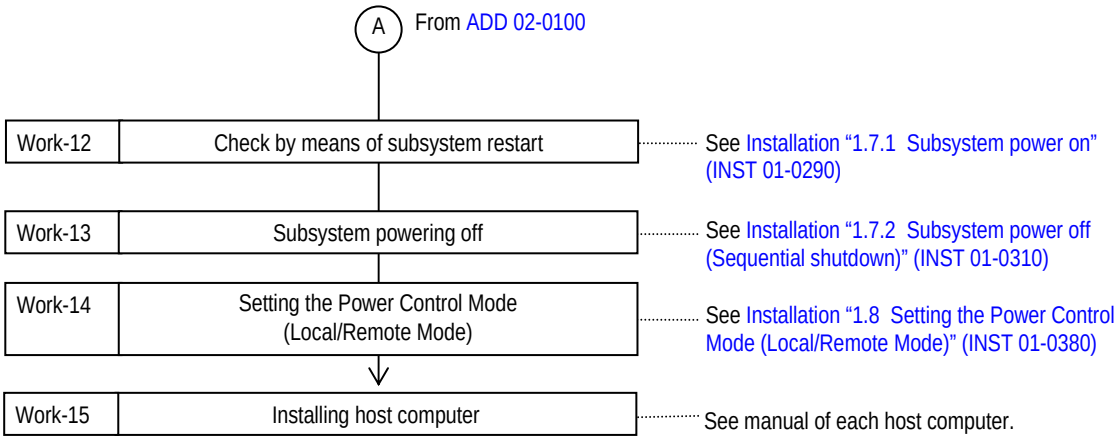
(2) Procedure for the offline subtraction (with the subsystem power turned off)

NOTE : • For safety use, always close the front bezel after the operation.
• For the see Installation "1.7 Power On/Off Procedure" (INST 01-0290).



‡1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.

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2.3 Subtracting Additional Subsystem on Rack Frame

Select a procedure from the following and execute it.

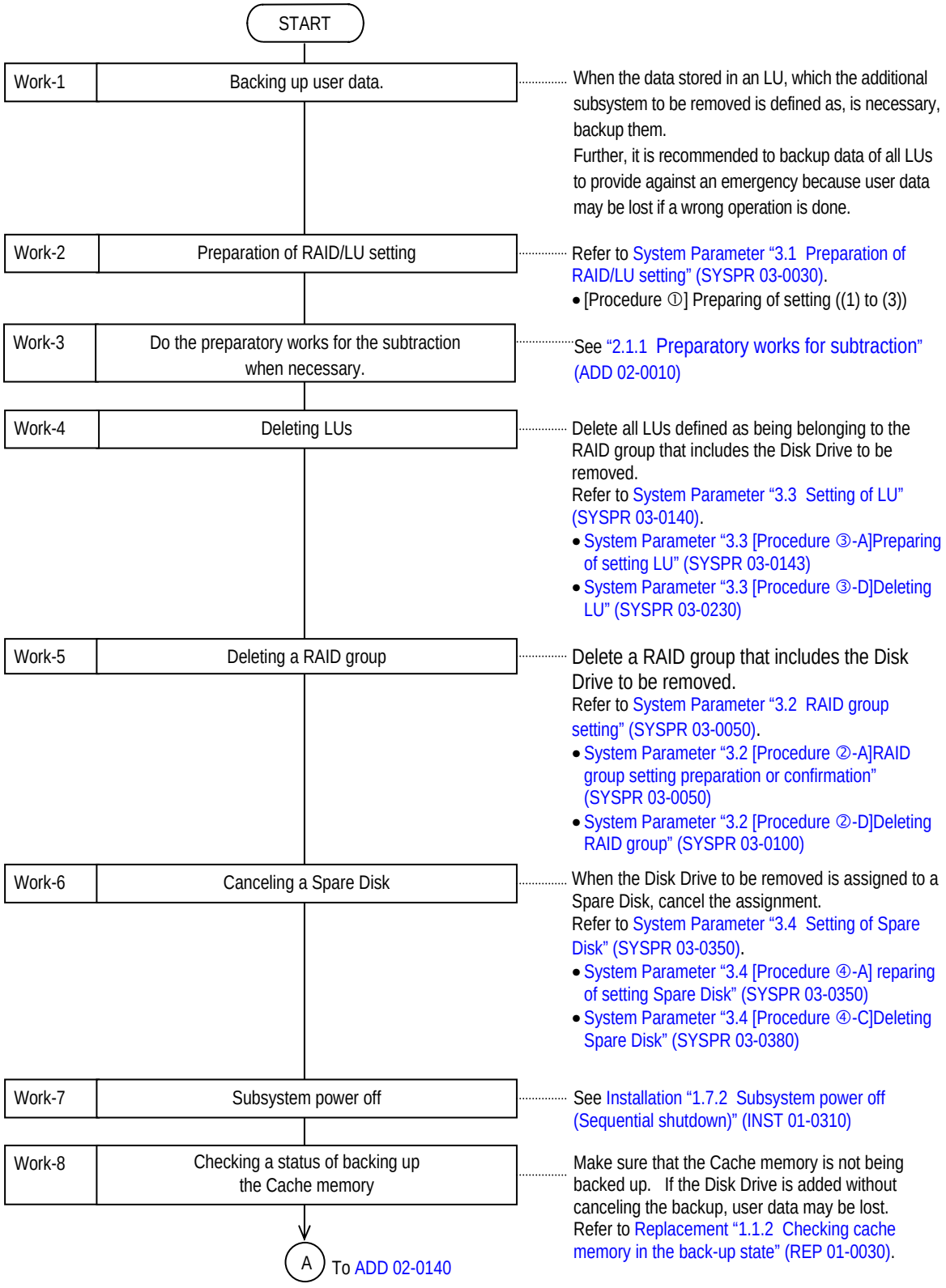
No.	Model	Power status during the subtraction	Restriction	Subtraction Process section
1	Rackmount model	Subtraction with the power turned on	–	Impossible(*1)
2		Subtraction with the power turned off	1. Remove the Disk Drive. 2. When the Additional Chassis are subtracted offline (with the subsystem power turned off), only the last Additional Chassis of the configuration can be subtracted. While configuring additional subsystem, the additional subsystem cannot be removed. 3. Turn off the AC Power Unit Switch of the subsystem. 4. Subtract the additional subsystem in the opposite procedure of the operation of adding the additional subsystem to the rack frame.	Refer to "1.6 Adding the Additional Subsystem to the Rack Frame (In the case of the connection to the RKM)" (ADD 01-0490)

*1 : Additional subsystem cannot be removed while the subsystem power is on. Be sure to perform it offline (with the subsystem power turned off).
When removing additional subsystem with subsystem power turned online, system may go down since the subsystem recognizes that a failure occurs in the removed additional subsystem.

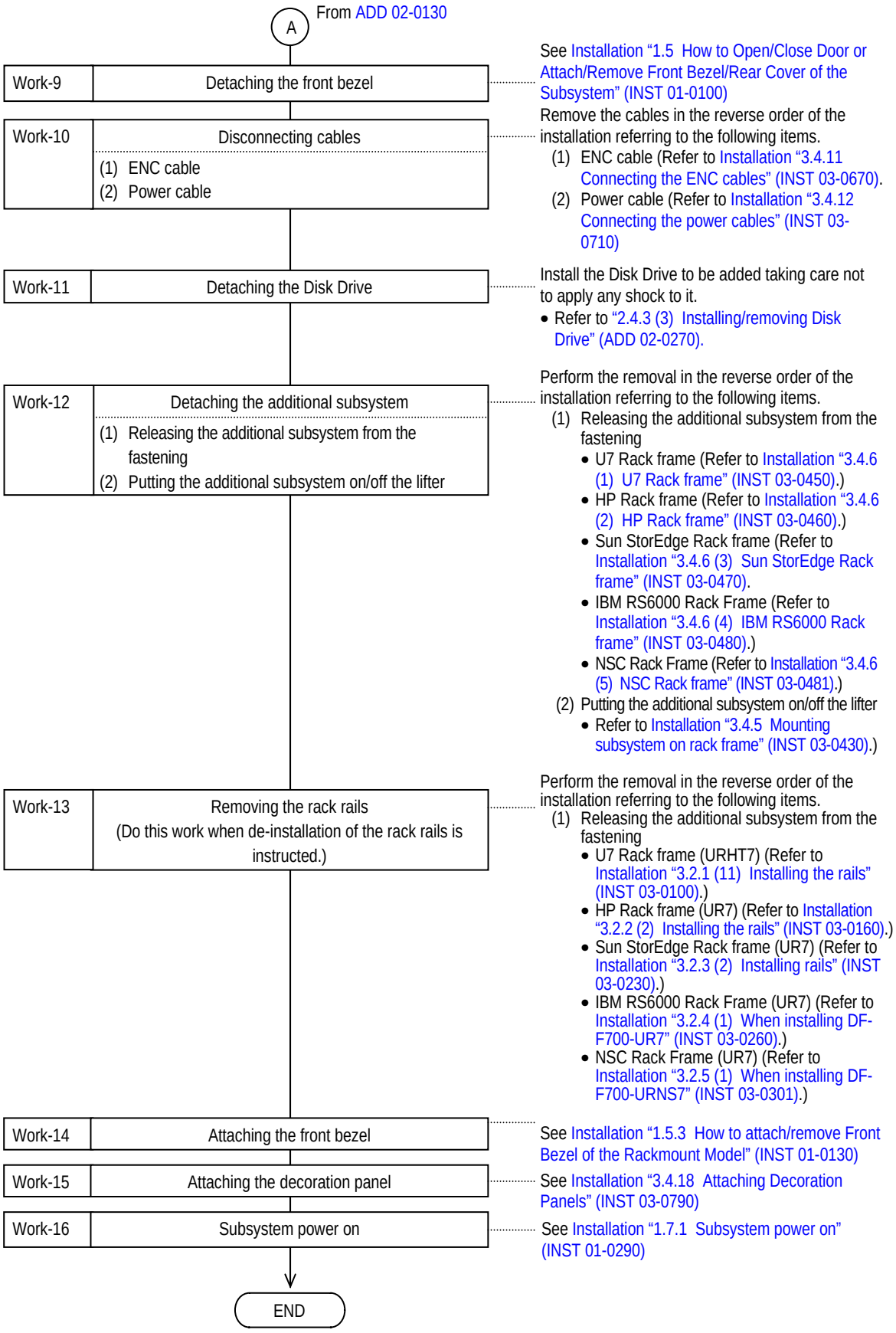
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(1) Procedure for subtracting the Additional Chassis offline (with the subsystem power turned off)

A procedure for subtracting the RKAJ/RKAJAT after powering off the subsystem is shown below.



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2.4 Subtracting Optional Components

2.4.1 Subsystems optional components for subtraction

(1) Subtracting optional components

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
Control Unit	DF-F700-F1JM	Array Controller (2port) for duplication. For RKM	–	Impossible	Possible "2.4.2 Subtracting a Control Unit" (ADD 02-0160)
	DF-F700-F1JS	Array Controller (1port) for duplication. For RKS			
	DF-F700-F1JXS	Array Controller (1port) for duplication. For RKXS			
Disk Drive(*2) (including Spare Disk)	DF-F700-AGF72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 10,000 min^{-1})	–	Varies depending on the disk array to be subtraction. "2.4.3 (2) (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Varies depending on) the disk array to be subtraction. "2.4.3 (2) (2-2) Procedure for subtracting Disk Drive while the subsystem power is offline (with the subsystem power turned off)" (ADD 02-0250)
	DF-F700-AGH72	3.5-inch Disk Drive (71.3 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F700-AGF146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 10,000 min-1)			
	DF-F700-AGH146	3.5-inch Disk Drive (143.3 G bytes) (Disk rotational speed : 15,000 min-1)			
	DF-F700-AGF300	3.5-inch Disk Drive (287.6 G bytes) (Disk rotational speed : 10,000 min-1)			
	DF-F700-ATE250R (RKXS/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F700-ATE400R (RKXS/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes) (Disk rotational speed : 7,200 min-1)			
	DF-F700-ATE500R (RKXS/RKAJAT)	3.5-inch Disk Drive (491.9 G bytes) (Disk rotational speed : 7,200 min-1)			
Cache Unit	DF-F700-C1GJ	Cache memory (1,024 M bytes)	• For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.	Impossible	Possible "2.4.4 Subtracting a Cache Unit" (ADD 02-0280)
	DF-F700-C2GJ (Excluding RKXS)	Cache memory (2,048 M bytes)			
	DF-F700-C512JX (RKXS special use)	Cache memory (512 M bytes)			
FC Interface Board	DF-F700-DJ4G2H (RKH)	4G bps FC Interface Board (including host connectors for 4G bps (2))	–	Impossible	Possible "2.4.6 Subtracting a FC Interface Board" (ADD 02-0440)
iSCSI Interface Board	DF-F700-DJSC2 (RKM/RKS/RKXS)	iSCSI Interface Board	–	Impossible	Possible "2.4.7 Subtracting an iSCSI Interface Board" (ADD 02-0480)
	DF-F700-DJSC2H (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.

*2 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

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(2) NAS Unit/Subtracting optional components

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
NAS Unit (RKNAS)	DF-700-RKNAS4G	Install the Memory (DIMM) of 4Gbytes in the RKNAS.	–	Impossible	Possible "2.4.8 Subtracting a NAS Unit" (ADD 02-0540)
	DF-700-RKNAS2G	Install the Memory (DIMM) of 2Gbytes in the RKNAS.			
NAS Interface Board	DF-F700-DJNAS (RKM/RKS/RKXS)	NAS Interface Board	–	Impossible	Possible "2.4.5 Subtracting a NAS Interface Board" (ADD 02-0390)
	DF-F700-DJNASH (RKH)				

*1 : Data is exchanged between a host computer and the subsystem.

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2.4.2 Subtracting a Control Unit

⚠ CAUTION

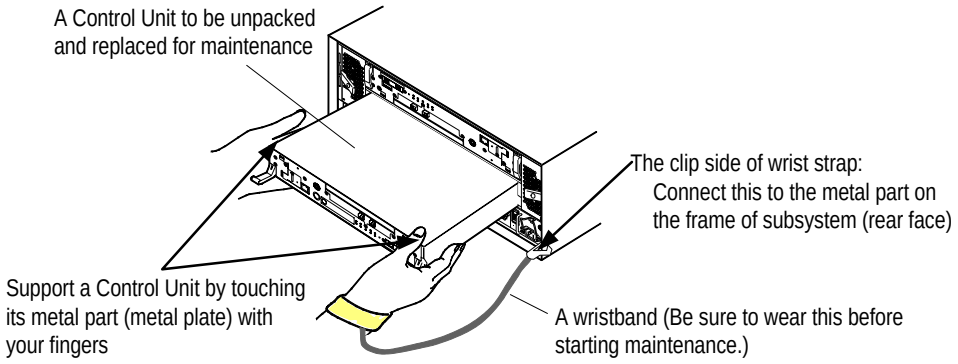
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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(1) Subtracting Process for the Control Unit

Select a procedure from the following and execute it.

No.	Model	Power status during the subtraction	Restriction	Subtraction Process section
1	RKM/RKS/ RKXS	Subtraction with the power turned on	–	Impossible
2		Subtraction with the power turned off	The case of the dual Controller configuration only	Refer to "2.4.2 (2) Procedure for subtraction with the power turned off" (ADD 02-0180)

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(2) Procedure of subtraction for the Control Unit

(a) Connect the PC to be connected with Storage Navigator Modular and the Control Unit #0 with a LAN cable. (System Parameter "1.1 Procedure for connecting Storage Navigator Modular with the subsystem" (SYSPR 01-0010))

(b) Set the system starting attribute of Boot Option to the single mode to operate it by the single system (refer to System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0040)).

(c) Turn off the main switch.

(d) Make sure that the PWR (POWER) LED (green) on the panel goes out.

NOTE : When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the cache is in the cache backup state, make the Subtracting after canceling the mode.

(e) Make sure that the CACHE POWER LED (green) on the Control Unit is off.

NOTE : When the CACHE POWER LED (green) is on, user data which has not written on the disk exists in the cache memory.

(f) Turn off the AC Power Unit Switch of the Power Unit.

(g) Remove the Fibre Channel cable, LAN, ENC cable, and RS232C cables connected to the Control Unit #1.

NOTE : • Connect only the Loop #0 (ENC Unit #0) side to make the single Control Unit configuration. The Loop #1 (ENC Unit #1) side is not connected.
When two or more additional subsystem are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should be connected for the additional subsystem.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(h) Remove the Control Unit #1.
Loosen the screws (right and left) which are fixing the levers of the Control Unit #1, push down the levers forward, and pull out the Control Unit.

(i) Install the dummy (control Unit).
Install the dummy (Control Unit) by fitting its right and left claws to the cutouts of the basic subsystem, slide the latches upward, and tighten the fixing screws (right and left).

NOTE : Do not catch a ENC cable, when the Control Unit for the inserted.

(j) Turn on the AC Power Unit Switch of the Power Unit.

(k) Turn on the main switch.

(l) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.

(m) Check that the maintenance port IP address is set correctly.
When the maintenance port IP address is displayed as "0.0.0.0", set it.
Refer to System Parameter "4.2 (4) Setting of Maintenance LAN" (SYSPR 04-0100).

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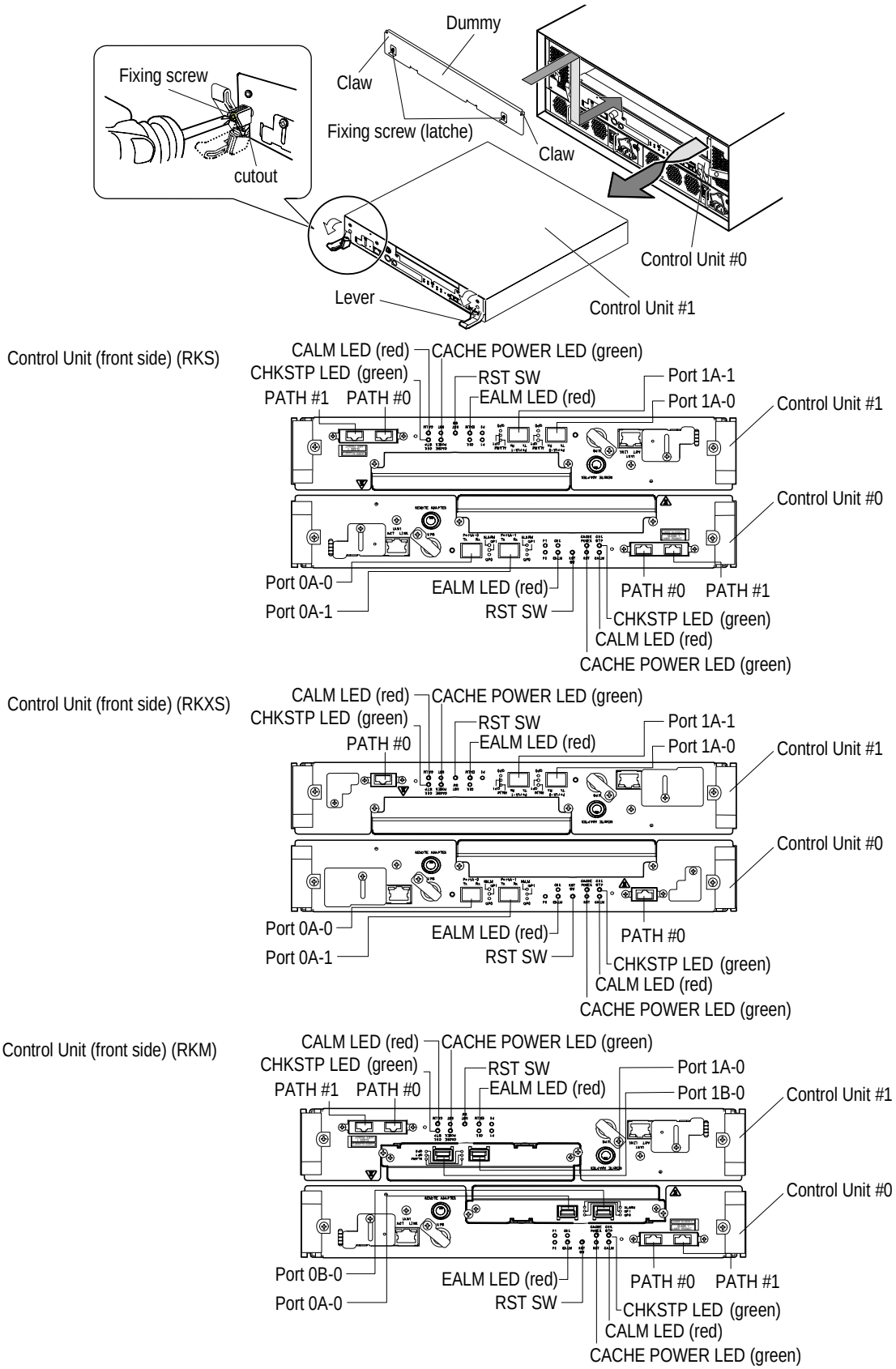


Figure 2.4.1 Subtracting Controller (RKS/RKXS/RKM)

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2.4.3 Subtracting a Disk Drive

A procedure for subtracting the Disk Drive varies depending on a location of the Disk Drive and a condition (whether the subsystem power is online or offline (with the subsystem power turned off)). Take care to use a procedure appropriate for the purpose because a use of an inappropriate procedure may cause an accident such as a loss of user data.

Table 2.4.1 Kinds of Disk Drive Subtraction

No.	Unit of addition/ subtraction	Component to be added/ subtracted	Subtraction	
			Removal of the Disk Drive(s) which is not used (from which a setting of a RAID group has been deleted)	
			Power online (A host is in operation (*1).)	Power offline (with the subsystem power turned off)
1	Disk Drive	RKM/RKS/RKXS #0 to 4 RKAJ corresponding to the unit ID #0 connected to the RKH #0 to 4	Impossible (*2) –	Impossible(*2) –
2		RKM/RKS/RKXS #5 to14 RKAJ corresponding to the unit ID #0 connected to the RKH #5 to 14	Possible Refer to "2.4.3 (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Possible Refer to "2.4.3 (2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0250)
3		RKAJ #0 to 3 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible(*3) Refer to "2.4.3 (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Impossible(*3) Refer to "2.4.3 (2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0250)
4		RKAJ #4 to 14 (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)	Possible Refer to "2.4.3 (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Possible Refer to "2.4.3 (2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0250)
5		RKAJAT #0 to 3	Possible(*2) Refer to "2.4.3 (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Possible(*2) Refer to "2.4.3 (2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0250)
6		RKAJAT #4 to 14	Possible Refer to "2.4.3 (2-1) Procedure for subtracting Disk Drive while the subsystem power is online" (ADD 02-0230)	Possible Refer to "2.4.3 (2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)" (ADD 02-0250)

*1 : Data is exchanged between a host computer and the subsystem.

*2 : The Disk Drives #0 to #4 of the RKM/RKS/RKXS cannot be decreased because the microprogram is stored in them. The Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID #0 connected to the RKH cannot be decreased because the microprogram is stored in them.

*3 : Since the Disk Drives #0 to #3 of the RKAJ/RKAJAT are used for monitoring the RKAJ/RKAJAT , be sure to decrease them so that either set of the two Disk Drives, #0 and #1 or #2 and #3, is left. (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)
All of the Disk Drives #0 to #3 cannot be removed from the RKAJ/RKAJAT at the middle of a configuration. (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)
When you want to subtract all the Disk Drives of #0 to #3 in the RKAJ/RKAJAT of the last configuration, subtract the whole RKAJ/RKAJAT offline (with the subsystem power turned off). (Excluding the RKAJ corresponding to the unit ID #0 connected to the RKH)

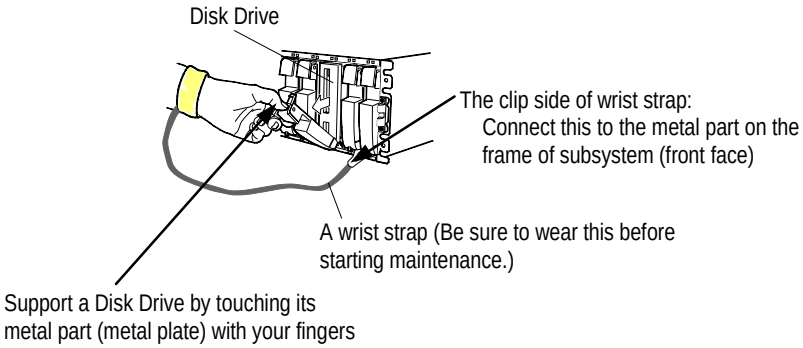
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(1) Before starting subtraction of Disk Drive

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you remove a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Locations and numbers of Disk Drives

The mounting position number of the disk drive is decided by the combination of the disk drive number set to the device number (device ID).

Set #0 for the device ID of RKM/RKS/RKXS and set the device ID of RKAJ/RKAJAT as follows.

Set #0x for the device ID of RKAJ.

Set the device ID of RKAJAT to be connected to RKXS to 2x.

There is no device ID for the RKH.

NOTE : Set x in ascending order in PATH #0 and #1 without the distinction of RKAJ/RKAJAT.

For details of the device ID setting, refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

Set the subsystem identification switch for the RKAJ.

When the basic subsystem to be connected is the RKM, set it in the M side, and when it is the RKS, set it in the S side.

The disk drive number is #0 to #14 from the left sequentially seen sideways (for the floor model, it is #0 to #14 from the bottom).

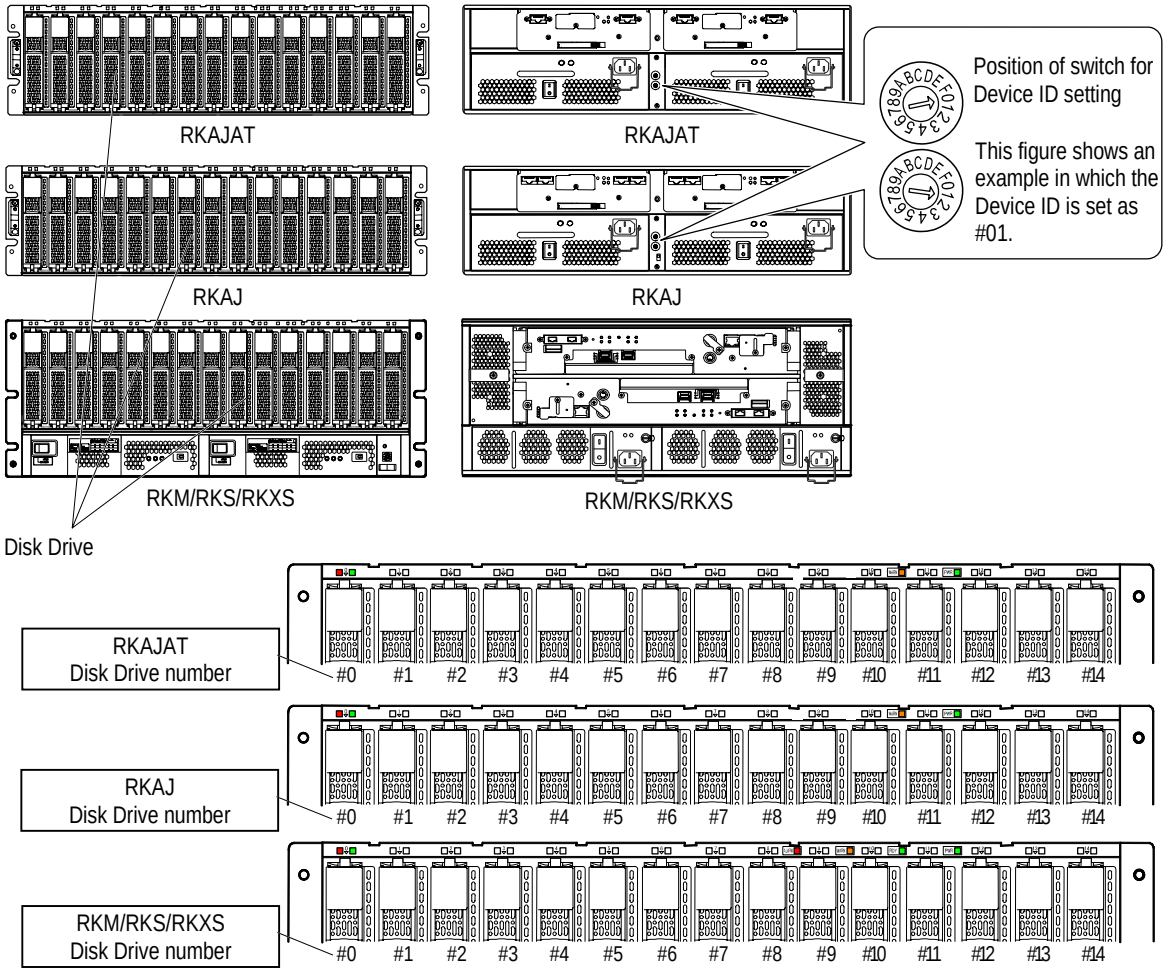


Figure 2.4.2 Disk Drive Mounting Location

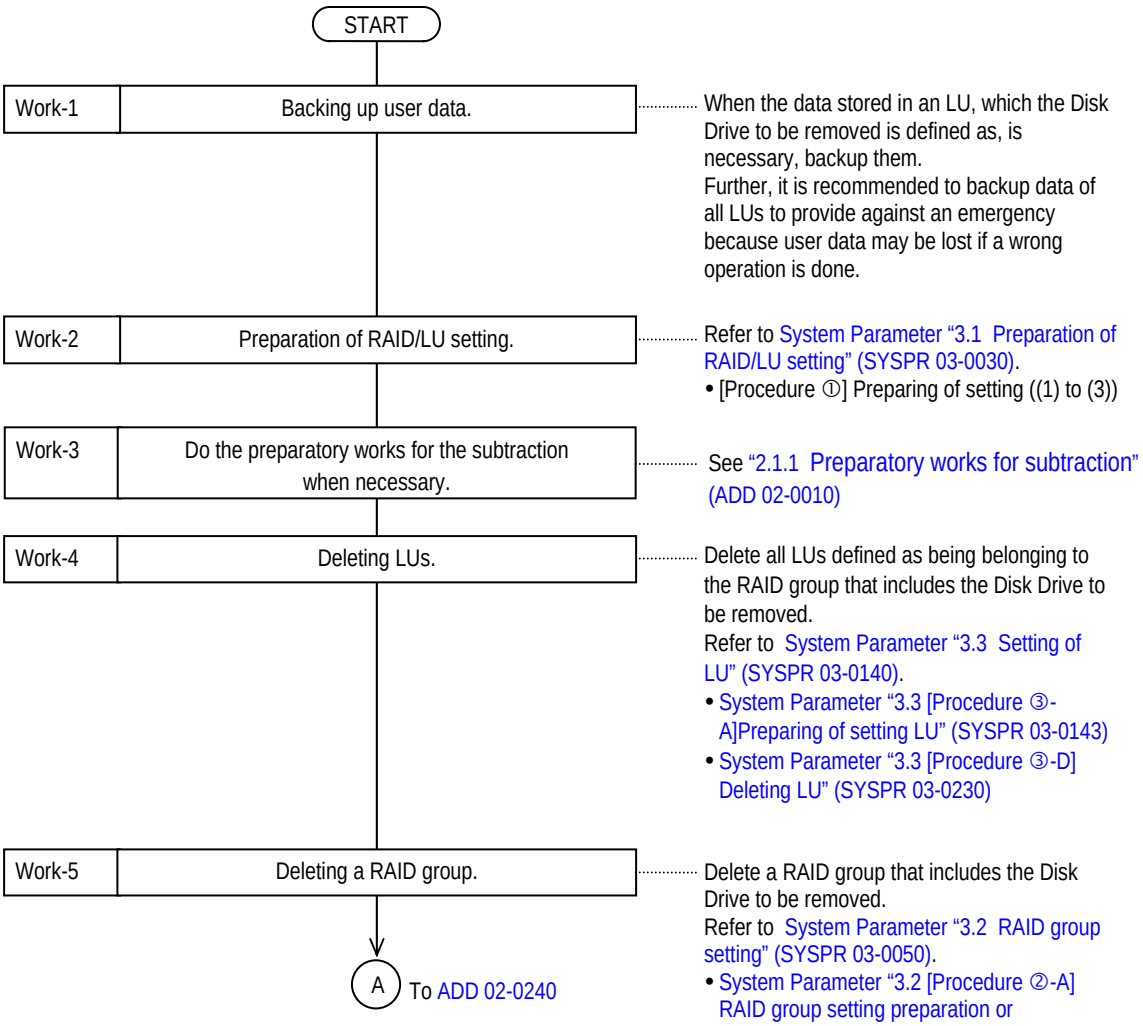
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(2) Procedure for subtracting Disk Drive

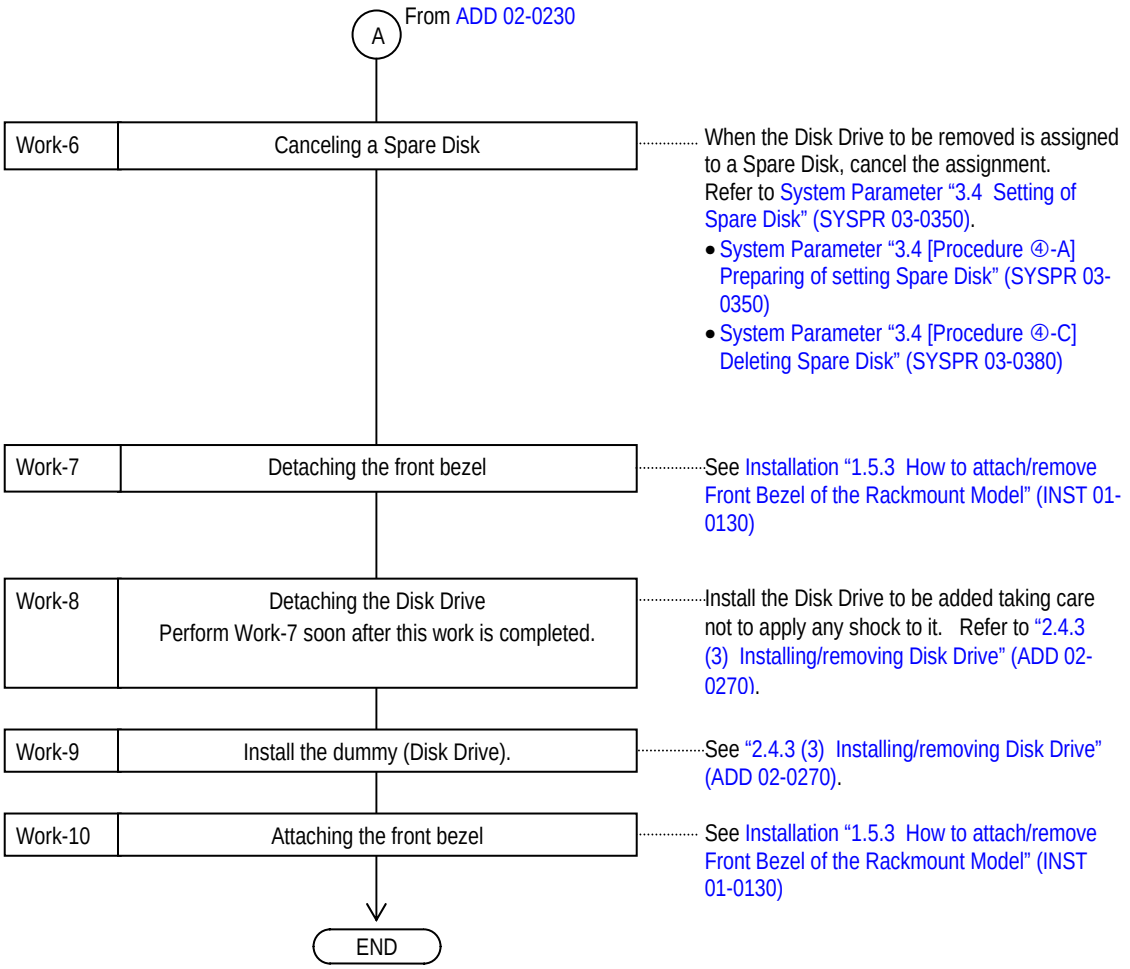
- A procedure for subtracting the Disk Drive installed in the subsystem is shown below.
- Any of the Disk Drives #0 to #4 of the RKM/RKS/RKXS cannot be subtracted.
- To remove all of the Disk Drives #0 and #1 of the RKAJ/RKAJAT, it is required to remove them together with the RKAJ/RKAJAT in which they are installed.
- It is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

(2-1) Procedure for subtracting Disk Drive while the subsystem power is online

A procedure for subtracting the Disk Drive without shutting down the subsystem is shown below.



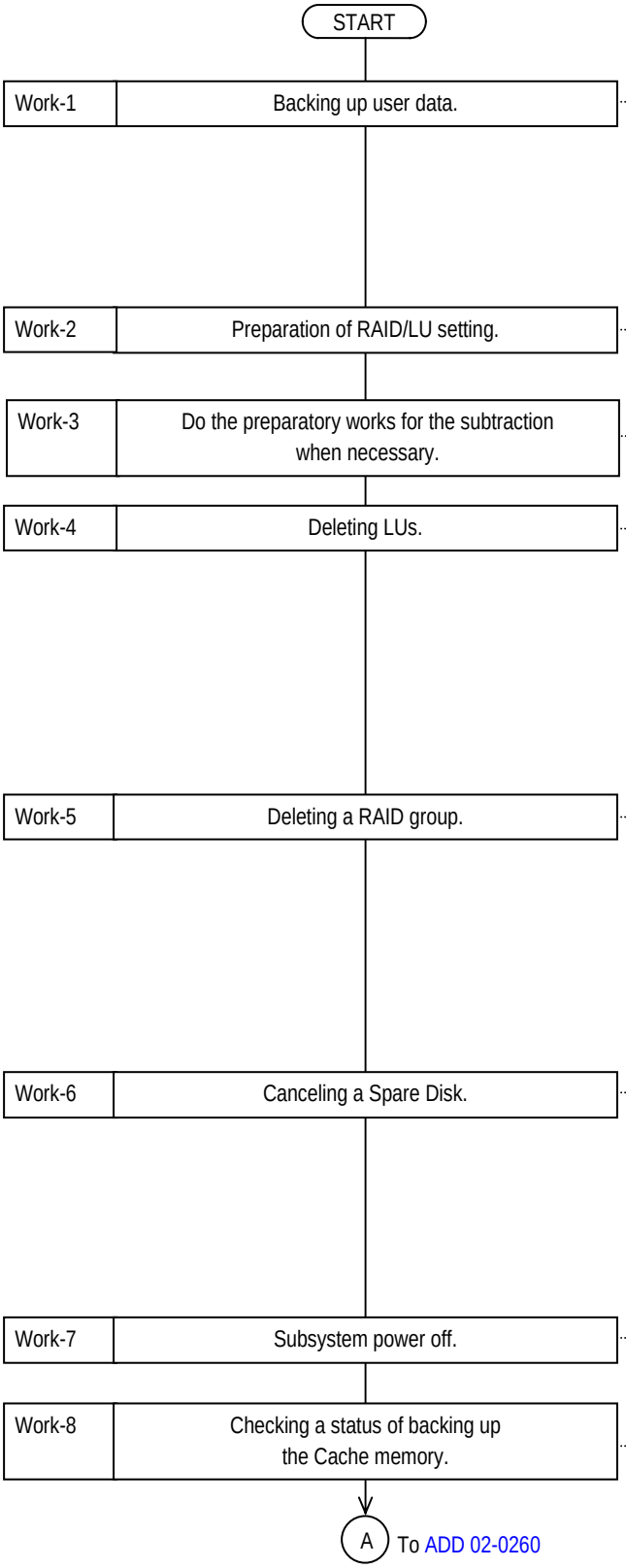
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(2-2) Procedure for subtracting the Disk Drives offline (with the subsystem power turned off)

A procedure for subtracting the Disk Drive after powering off the subsystem is shown below.



When the data stored in an LU, which the Disk Drive to be removed is defined as, is necessary, backup them.
Further, it is recommended to backup data of all LUs to provide against an emergency because user data may be lost if a wrong operation is done.

Refer to System Parameter "3.1 Preparation of RAID/LU setting" (SYSPR 03-0030).
- [Procedure ①] Preparing of setting ((1) to (3))

See "2.1.1 Preparatory works for subtraction" (ADD 02-0010)

Delete all LUs defined as being belonging to the RAID group that includes the Disk Drive to be removed.
Refer to System Parameter "3.3 Setting of LU" (SYSPR 03-0140).
- System Parameter "3.3 [Procedure ③-A]Preparing of setting LU" (SYSPR 03-0143)
- System Parameter "3.3 [Procedure ③-D] Deleting LU" (SYSPR 03-0230)

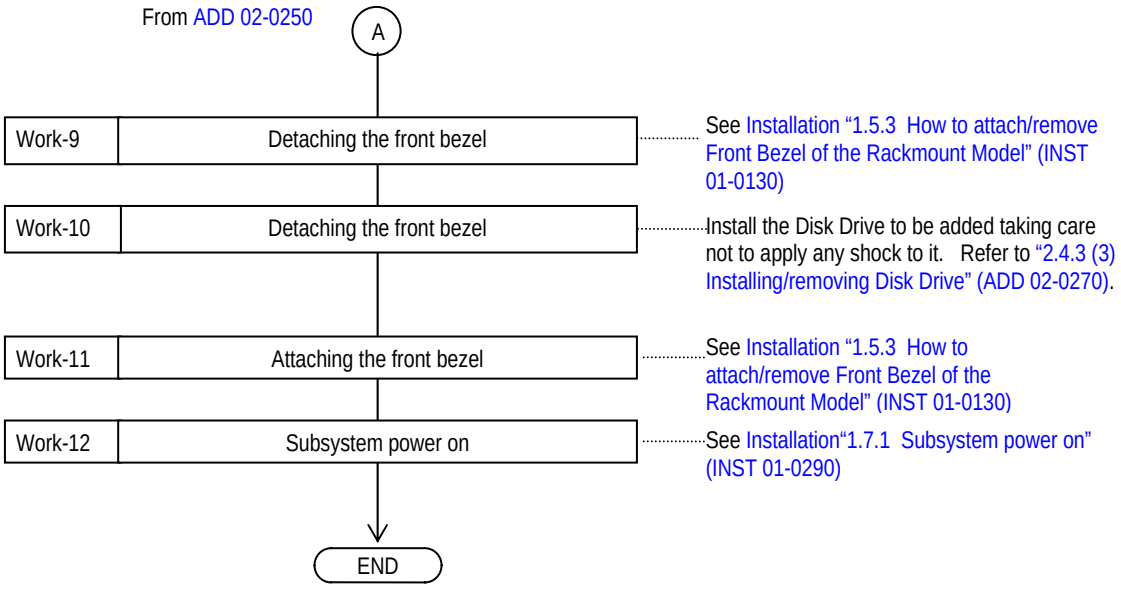
Delete a RAID group that includes the Disk Drive to be removed.
Refer to System Parameter "3.2 RAID group setting" (SYSPR 03-0050).
- System Parameter "3.2 [Procedure ②-A] RAID group setting preparation or confirmation" (SYSPR 03-0050)
- System Parameter "3.2 [Procedure ②-D] Deleting RAID group" (SYSPR 03-0100)

When the Disk Drive to be removed is assigned to a Spare Disk, cancel the assignment.
Refer to System Parameter "3.4 Setting of Spare Disk" (SYSPR 03-0350).
- System Parameter "3.4 [Procedure ④-A] Preparing of setting Spare Disk" (SYSPR 03-0350)
- System Parameter "3.4 [Procedure ④-C] Deleting Spare Disk" (SYSPR 03-0380)

See Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310)

Make sure that the Cache memory is not being backed up. If the Disk Drive is added without canceling the backup, user data may be lost.
Refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).

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(3) Installing/removing Disk Drive

When installing or removing a Disk Drive in the work for decreasing the number of Disk Drives, follow the procedure explained below.

Perform the following operations (a) and (b) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it. (see Figure 2.4.3).

When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

(b) Install the dummy (Disk Drive) in the slot from which the Disk Drive has been removed.

Be sure to insert the dummy (Disk Drive) in the vacant slot because it is necessary to regulate a cooling air flow inside the disk array.

There are two types of the dummies (Disk Drives), and the installation methods are different respectively.

- The dummy (Disk Drive) of which the external appearance is similar to the Disk Drive

  There is no label attached on the handle part.

  (i) Fit the Disk Drive in the guide rail of the RKAJAT and slide it in the direction shown by the arrow.

  (ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.

  (iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

- The dummy (Disk Drive) of which the external appearance is all black

  This is the dummy (Disk Drive) of the resin all-in-one molded piece (black) with no stopper and handle part.

  Insert it into the slot slowly so that the latch (round dent) part of the dummy (Disk Drive) comes to the lower side.

NOTE : Exteriors of the Disk Drive and dummy (Disk Drive) are similar to each other. Be careful not to install or remove a wrong one.

Disk Drive : The label to display the model name and the revision is attached on the handle part.

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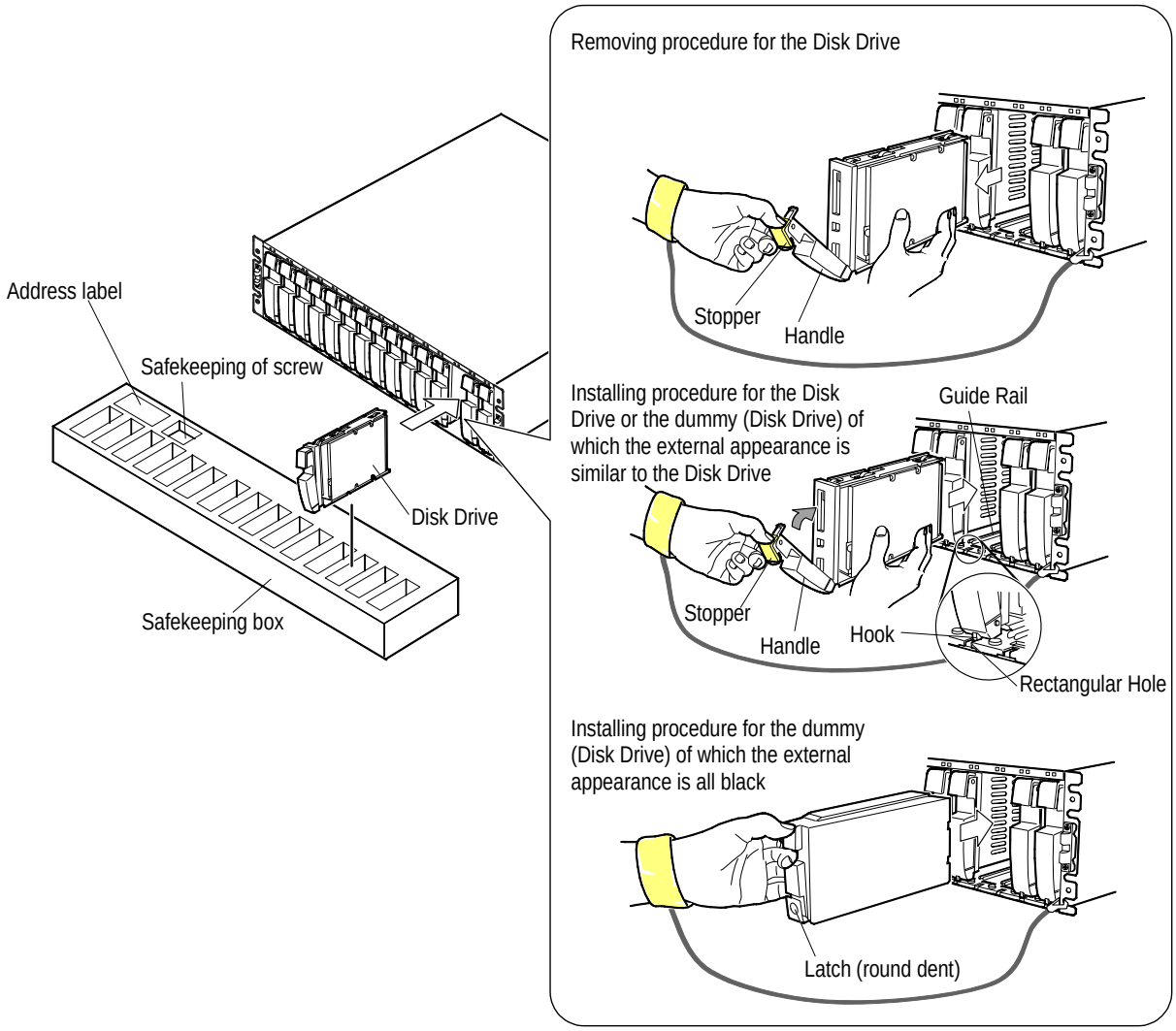


Figure 2.4.3 Removing the Disk Drive and Installing the Dummy (Disk Drive)

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2.4.4 Subtracting a Cache Unit

⚠ CAUTION

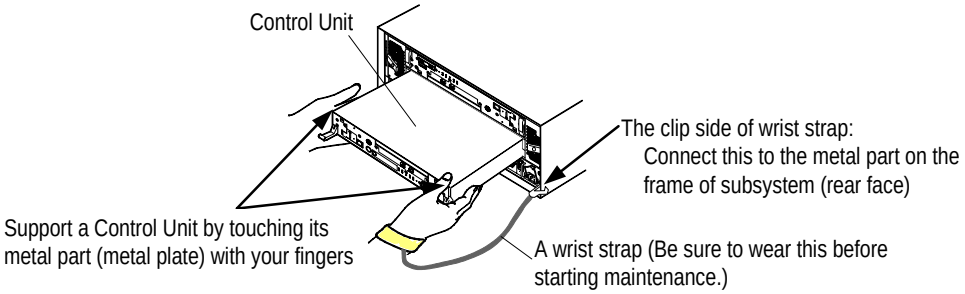
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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<Working Procedure>

When the priced option, Cache Partition Manager, is used, there is a possibility that the Cache memory cannot be subtracted or the setting of the parameter of the priced option, Cache Partition Manager, is updated when subtracting the Cache memory.
There is a procedure to check the status of the subsystem before subtracting the Cache memory.

(1) Connect the LAN cross cable to the LAN connector for the maintenance of the subsystem (refer to Troubleshooting "3.1 Procedure to WEB connection" (TRBL 03-0000)).

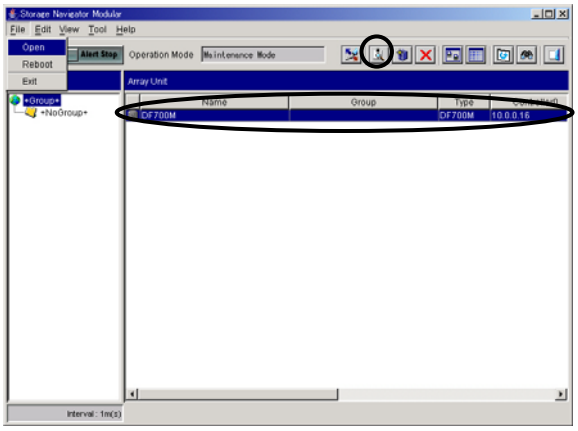
(2) Connect Storage Navigator Modular.

(a) Be careful of the connection positions of the cables because the installation directions are different in the Control Unit #0 and #1.
Refer to System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050) for the changing method to the maintenance mode.

(b) Click the icon of the array subsystem that you want to set from the main window. There are the following three types of the selection methods.

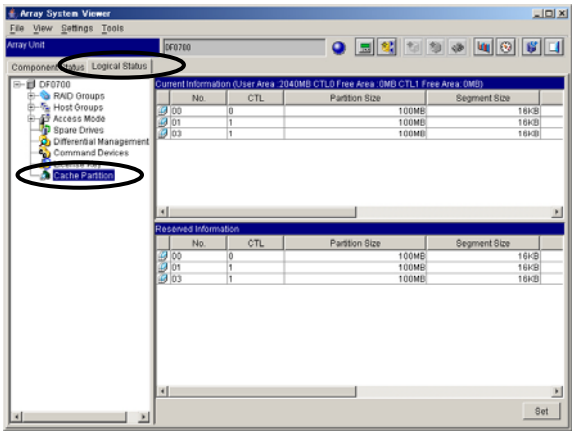
- Select [File] - [Open].
- Double click the icon of the array subsystem that you want to set.
- Click the [: Open] button.

NOTE : Check whether the LAN port number is not changed when the main window is not displayed even if you click on the icon of the array subsystem (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).
Execute it again after using the changed LAN port number.



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(3) When the icon of the priced option, Cache Partition Manager, is displayed in the tree view, there is a possibility that the Cache memory cannot be subtracted. In this case, check whether the Cache memory can be subtracted according to the following procedure.
When the icon of the priced option, Cache Partition Manager, is not displayed in the tree view, go to Procedure (11).

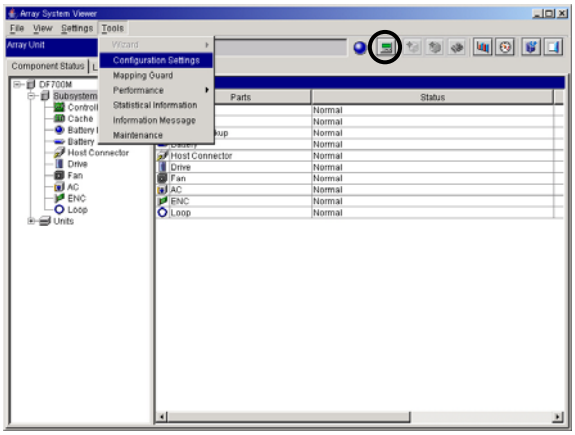


(4) Check the subsystem that subtracts the Cache memory.

- The Cache memory of WMS100 cannot be subtracted to 512 M bytes per Control Unit in the status that the priced option, Cache Partition Manager, is enabled.
- The Cache memory of AMS500 cannot be subtracted to 1G bytes per Control Unit in the status that the priced option, Cache Partition Manager, is enabled.

Check with the customer/SE whether to subtract the Cache memory after locking (‡1) the priced option, Cache Partition Manager, or to stop the subtraction work of the Cache memory.
When subtracting the Cache memory after locking (‡1) the priced option, Cache Partition Manager, go to Procedure (11) after the customer/SE locks the priced option, Cache Partition Manager.

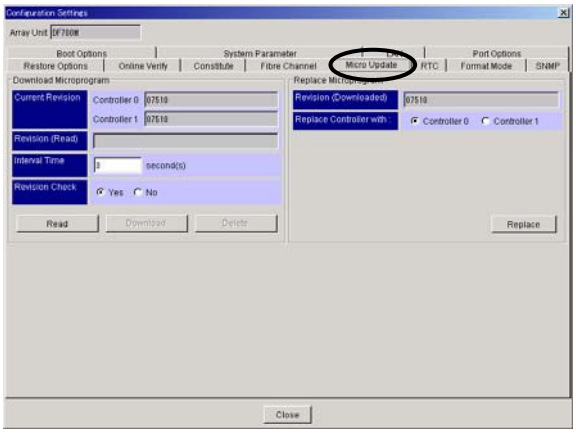
(5) Select [Tool] – [Configuration Setting] in the unit window, or click [: Configuration Setting].



‡1 :Request the customer/SE for the lock of the priced option, Cache Partition Manager.

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(6) Click the [Micro Update] tab.



(7) Check [Current Revision] of [Download Microprogram].

- When the revision of the microprogram is 0770/A or less

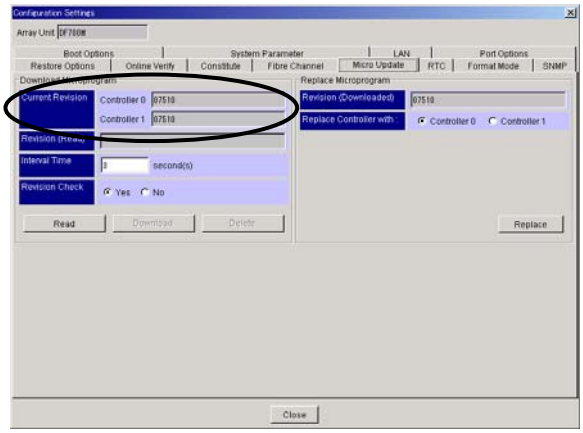
  The Cache memory cannot be subtracted in the status that the priced option, Cache Partition Manager, is enabled.

  In that case, check with the customer whether to make the priced option, Cache Partition Manager, disabled (‡1) once and then return it to be enabled and set the parameter of the priced option, Cache Partition Manager, again (‡2) or to stop the subtraction work of the Cache memory.

  When subtracting the Cache memory after making the priced option, Cache Partition Manager, disabled, go to Procedure (11) after the customer/SE makes the priced option, Cache Partition Manager, disabled (‡1).

- When the revision of the microprogram is 0770/A or later

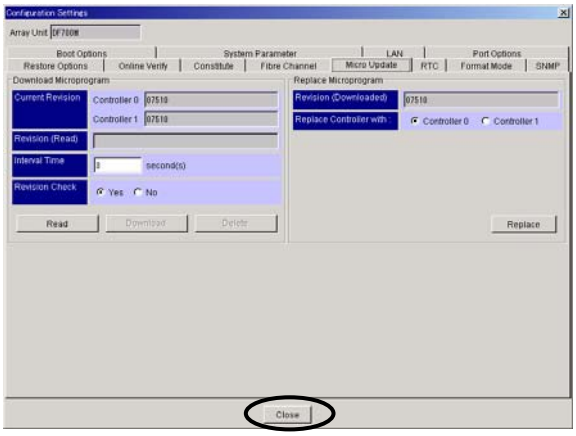
  Continue the confirmation work according to the following procedure to check whether the subtraction of the Cache memory is possible.



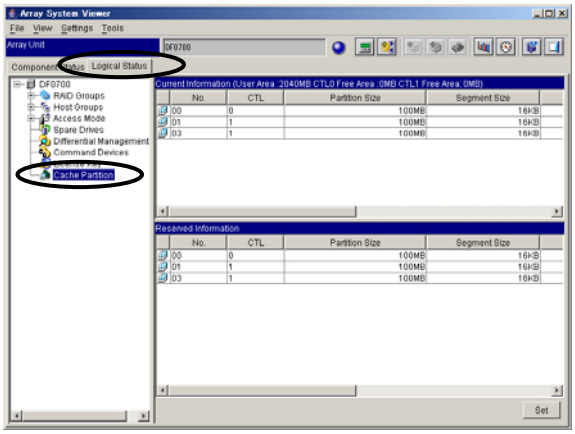
‡1 :Request the customer/SE for the lock of the priced option, Cache Partition Manager.
‡2 :Request the customer/SE for the validation and the parameter setting of the priced option, Cache Partition Manager.

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(8) Click the [Close] button of the [Configuration Setting] window.



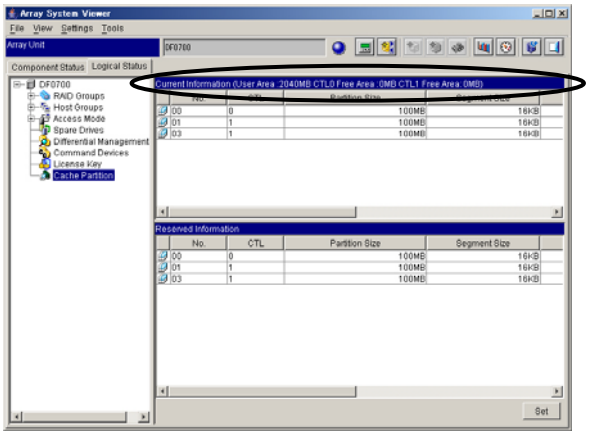
(9) Click the [Logical Status] tab in the unit window, and then click the [Cache Partition] icon of the tree view.



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(10) Check [Current Information] and [Reservation Information] in the list view.
(a) The partition No.02 to No.31 are listed in [Current Information] or [Reservation Information] (‡1).
(b) The subsystem is the dual controller configuration, and there is even one different size among four sizes; the size of the partition No.00 and the size of the partition No.01 in [Current Information] and the partition No.00 and the partition No.01 in [Reservation Information] (‡2).

When either (a) or (b) is applied, the Cache memory cannot be subtracted in the status that the priced option, Cache Partition Manager, is enabled.
Check with the customer whether to make the priced option, Cache Partition Manager, disabled (‡3) once and then return it to be enabled and set the parameter of the priced option, Cache Partition Manager, again (‡4) or to stop the subtraction work of the Cache memory.
When subtracting the Cache memory after making the priced option, Cache Partition Manager, disabled, go to Procedure (11) after the customer/SE makes the priced option, Cache Partition Manager, disabled (‡3).
When neither (a) nor (b) is applied, go to Procedure (11) and subtract the Cache memory.



‡1 : The partition No.02 to No.31 are called sub-partition. This indicates that the sub-partition is added or reserved for the addition by the partitioning function of the Cache memory.
‡2 : This indicates that the partition size is changed or the change of the partition size is reserved by the partitioning function of the Cache memory.
‡3 : Request the customer/SE for the lock of the priced option, Cache Partition Manager.
‡4 : Request the customer/SE for the validation and the parameter setting of the priced option, Cache Partition Manager.

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(11) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : When the subsystem power has already been turned off, make sure that the cache memory is not being backed up. (Refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the cache memory is being backed up, execute Step (b) and the following steps after canceling the backing up.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(12) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(13) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.
(14) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(15) Remove the Control Unit by pulling it out toward you.
(16) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(17) Remove the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

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(18) Install the subtracted Cache Unit in the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• If the Cache memory is not installed in slot #0 for RKM, the Control Unit blockade is caused. Be sure to install the Cache memory in slot #0.
• For the RKM, insert the Cache Units in the cache slots in regular order starting from the slot #0.
• In the case of the RKH, if the Cache memories are not installed in the slot #0 and the slot #1, the blockade of the Control Unit occurs.
Be sure to install the Cache memories in the slot #0 and the slot #1.
• Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(19) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(20) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

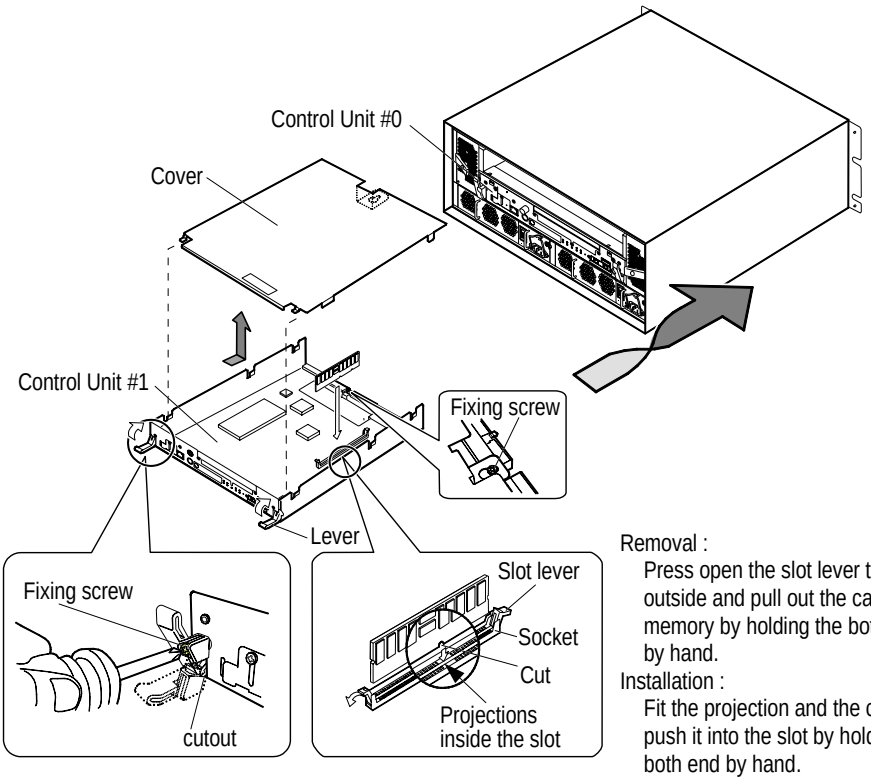
(21) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(22) Turn on the AC Power Unit Switch of the both Power Units .
(23) Turn on the main switch.
(24) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(25) Check that the READY LED (green) or the WARNING LED (orange) on the front of the Basic Chassis lights up. The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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Removal :
Press open the slot lever to outside and pull out the cache memory by holding the both end by hand.
Installation :
Fit the projection and the cut and push it into the slot by holding the both end by hand.

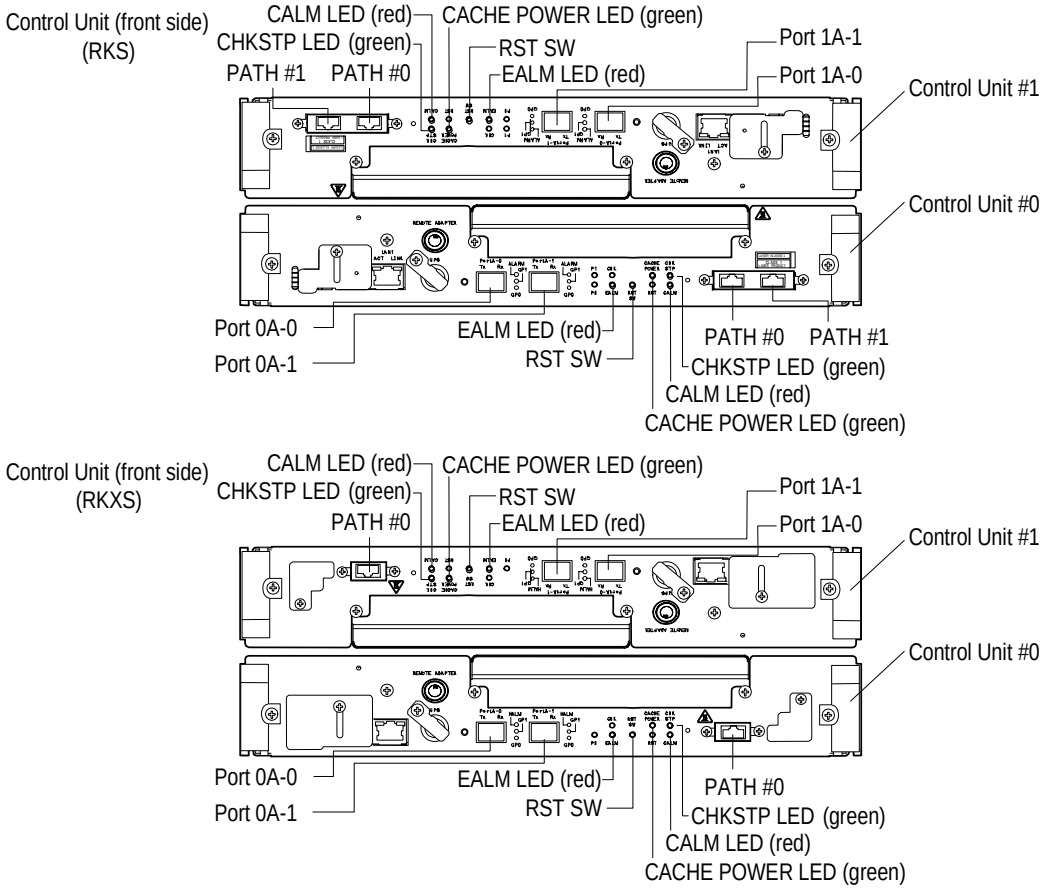


Figure 2.4.4 Subtracting Cache Unit (RKS/RKXS)

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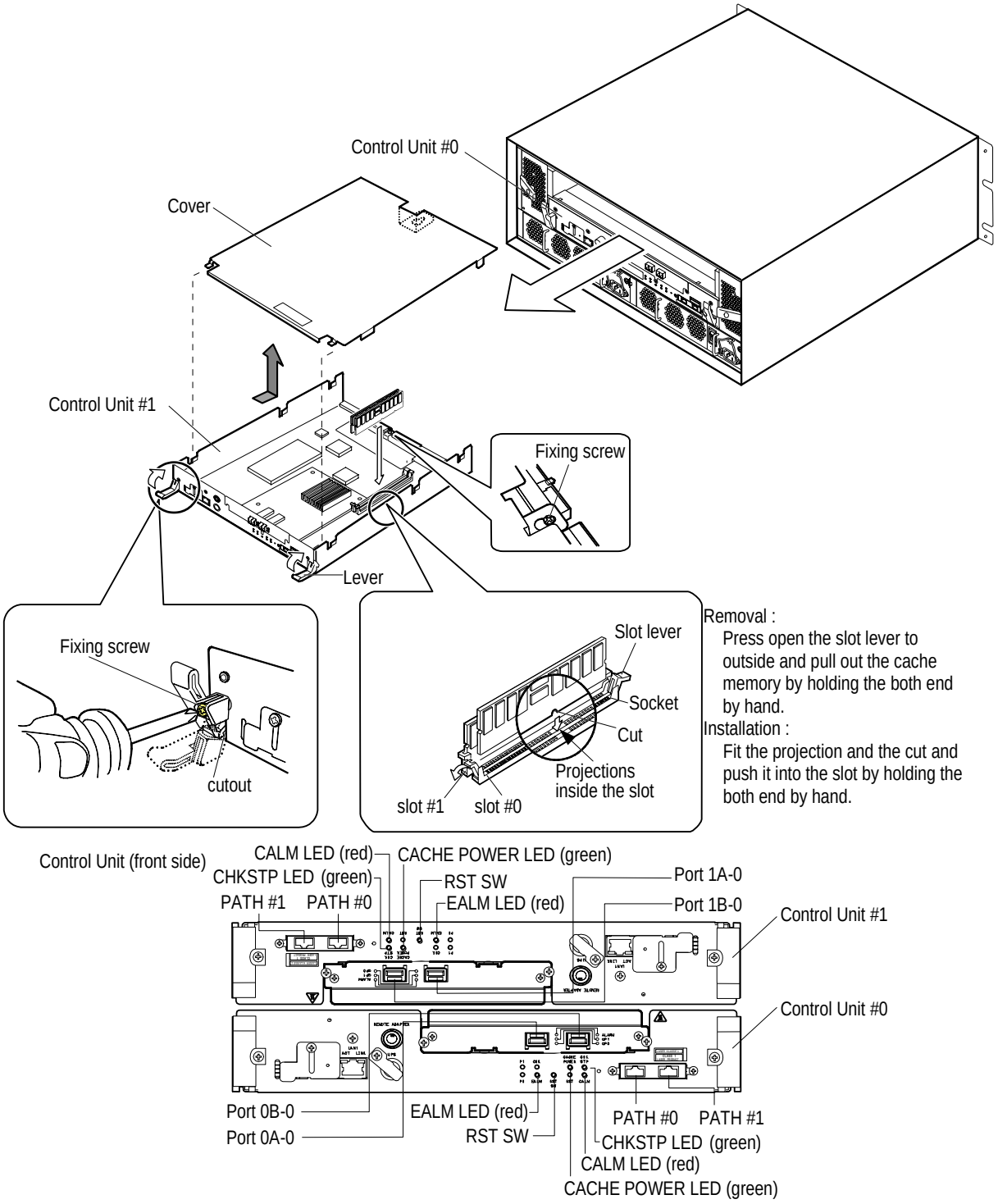
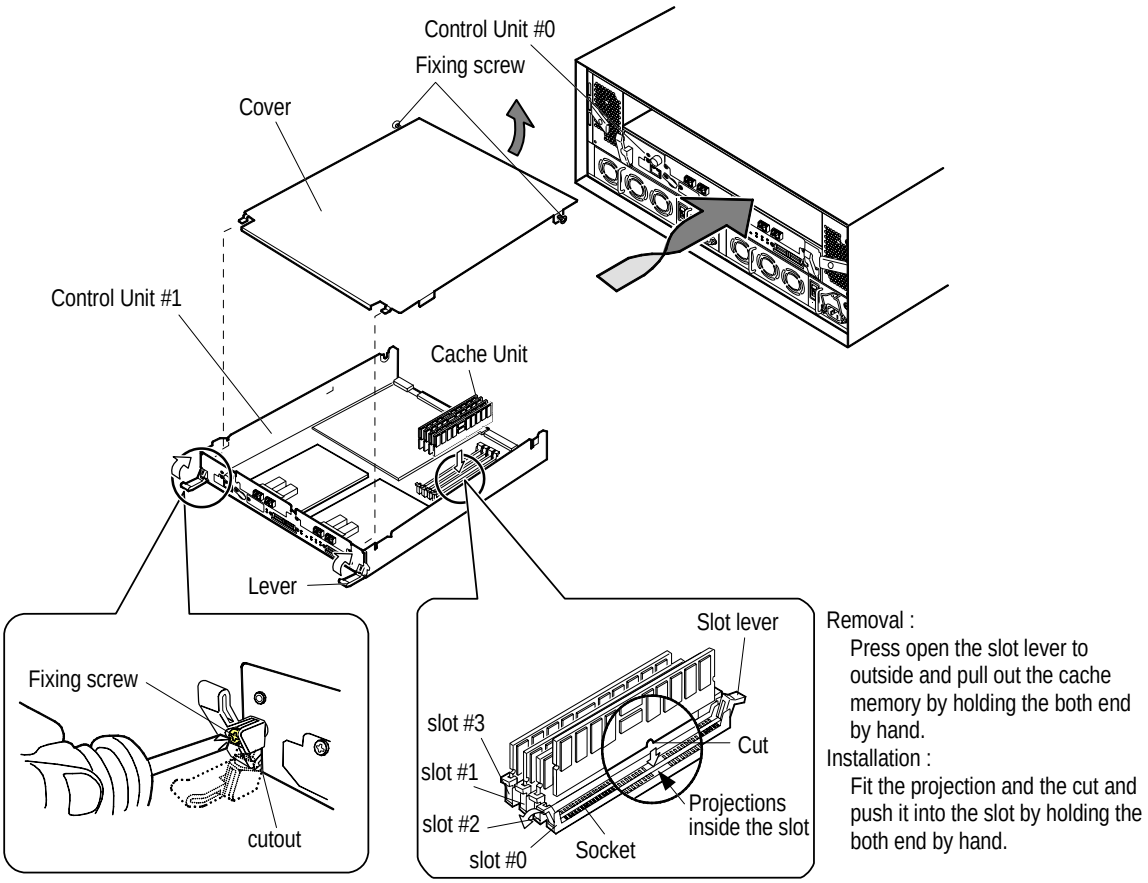


Figure 2.4.4.1 Subtracting Cache Unit (RKM)

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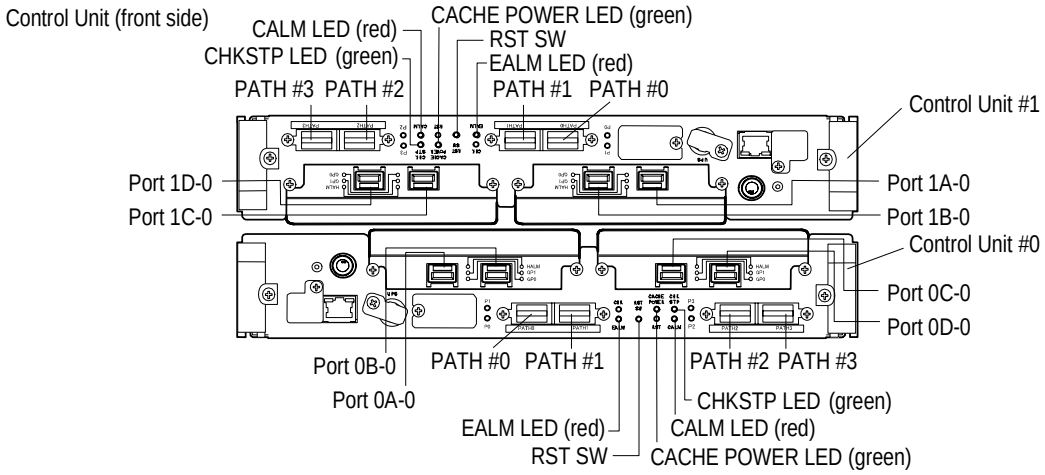


Figure 2.4.4.2 Subtracting Cache Unit (RKH)

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2.4.5 Subtracting a NAS Interface Board

⚠ CAUTION

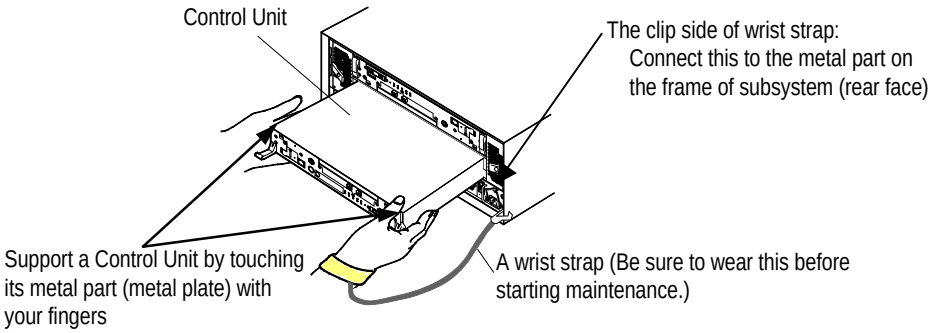
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the Additional Chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

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(1) Collect Simple Trace and Constitution Information. (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(4) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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(7) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(8) Loosen the fixing screws ② (two places) of the NAS Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the NAS Interface Board upwards and remove it from the Control Unit.

NOTE : • Place the removed Interface Board in the place where anti-static measures are taken.
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1 (Refer to "Table 2.4.2 Installation position of the Interface Board" (ADD 02-0430)).

(9) When the 4 G bps interface is used, install the 4 G bps FC Interface Board (RKH: DF700-DJ4G2H, RKM: DF700-DJ4G2, RKS/RKXS: DF700-DJ4G2W) fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the 4 G bps FC Interface Board (RKH: DF700-DJ4G2H, RKM: DF700-DJ4G2, RKS/RKXS: DF700-DJ4G2W) may become the inside of the Control Unit.
Go to Procedure (12).
(10) When the 2Gbps interface is used, install the dummy Interface Board and fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the dummy Interface Board may become the inside of the Control Unit.
(11) Install the two host connectors for 2 G bps (for the RKS/RKXS), which were removed when the NAS Interface Board was added, in the Control Units respectively.
(12) Loosen the screws of the connector cover for the maintenance of the Control Unit and remove the Panel attached when the NAS Interface Board was added.
Hand over the removed Panel to the customer, and ask him/her to keep it carefully.
(13) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(14) Insert it into the position in the Control Unit with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(15) In the case of the dual control Unit composition, perform the procedure from (4) to (14) to the other Control Unit.
(16) Remove the NAS Unit. (Refer to "2.4.8 Subtracting a NAS Unit" (ADD 02-0540).)
(17) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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(18) Turn on the AC Power Unit Switch of the both Power Units.
(19) Turn on the main switch.
(20) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(21) Check that the READY LED (green) or the WARNING LED (orange) on the front of the Basic Chassis lights up. The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(22) When installing the FC Interface Board after Subtracting the NAS Interface Board, configure the host group and Fibre Channel port setting. (refer to System Parameter "Chapter 2 Setting Host Group/Targets" (SYSPR 02-0000), and System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170).)

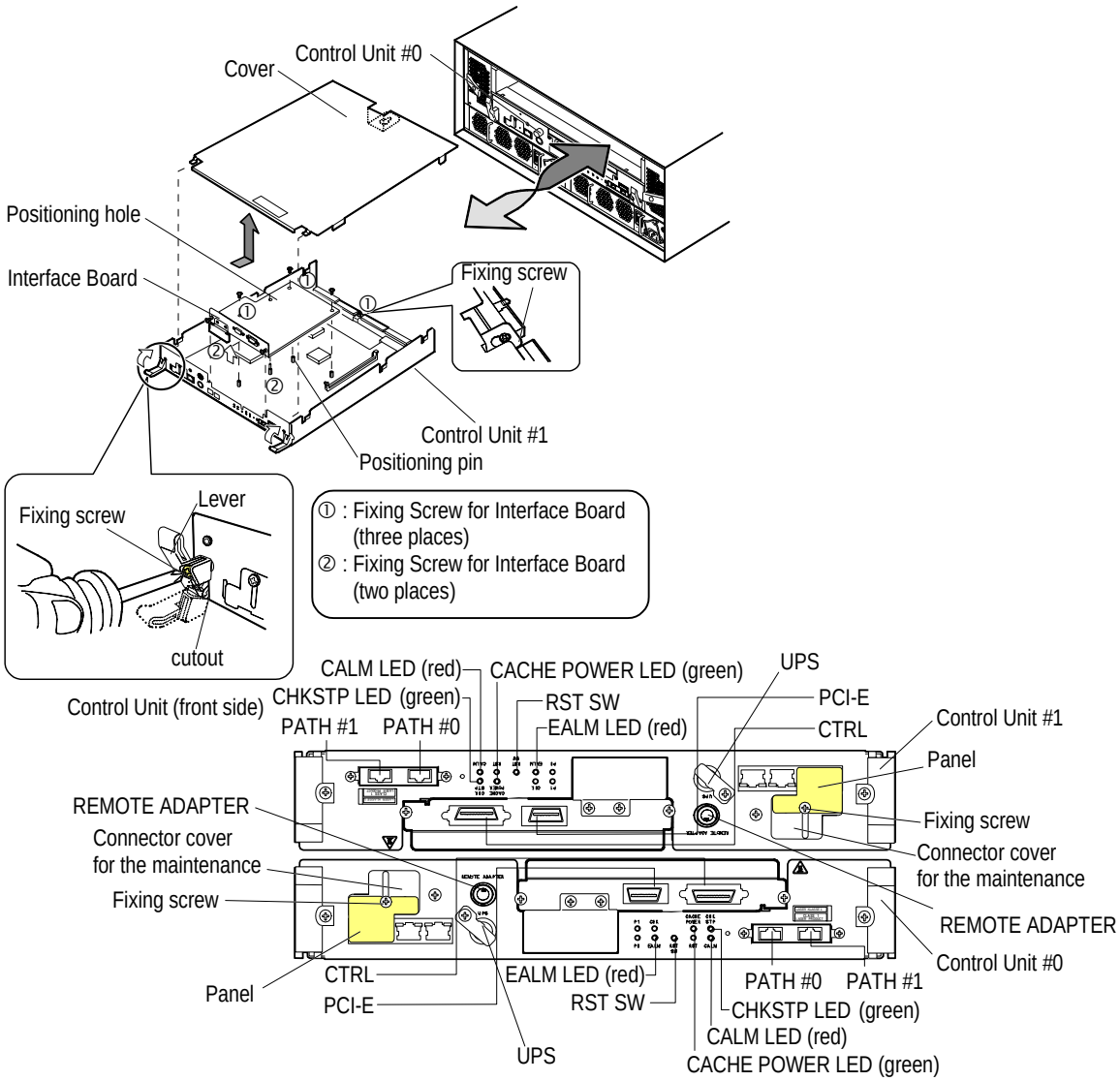


Figure 2.4.5 Subtracting NAS Interface Board

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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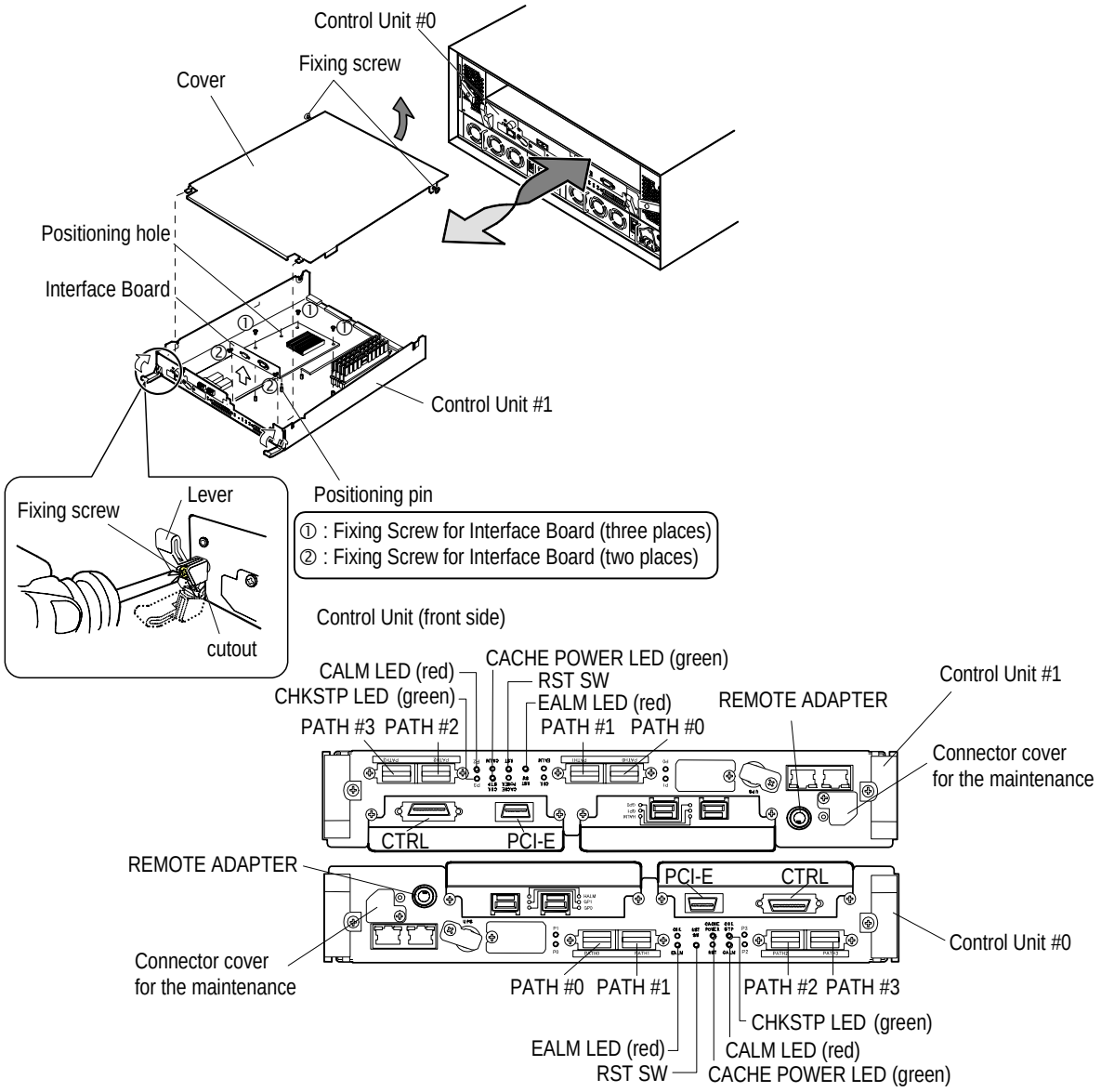


Figure 2.4.5.1 Subtracting NAS Interface Board (RKH)

Table 2.4.2 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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2.4.6 Subtracting a FC Interface Board

This work is for the RKH only.

⚠ CAUTION

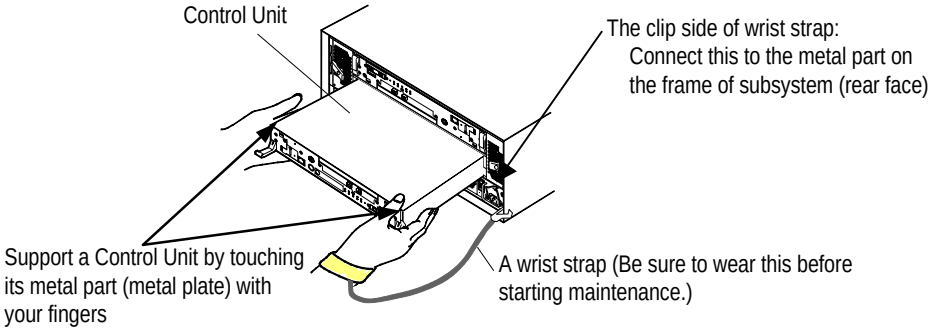
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and adding maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • Do the works for the Control Unit #0 and #1.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations.

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(1) Collect Simple Trace and Constitution Information. (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.

- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(4) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(5) Remove the all cables connected to the Control Unit.

NOTE :
- When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
- When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen the two fixing screws for the cover at the back of the cover, and remove it.
(8) Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(9) Install the dummy Interface Board and fix it by tightening the fixing screws ② (two places). At this time, install it so that the sheet metal part of the dummy Interface may become the inside of the Control Unit.
(10) Attach the cover, and tighten the fixing screw for the cover at the back of the cover.
(11) Insert it into the position in the Control Unit with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(12) Perform the procedure from (4) to (11) to the other Control Unit.
(13) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(14) Turn on the AC Power Unit Switch of the both Power Units.
(15) Turn on the main switch.
(16) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(17) Check that the READY LED (green) on the front of the Basic Chassis lights up. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(18) For the added FC Interface Board Port, configure the host group and Fibre Channel port setting. (Refer to System Parameter "Chapter 2 Setting Host Group/Targets" (SYSPR 02-0000), and System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170).)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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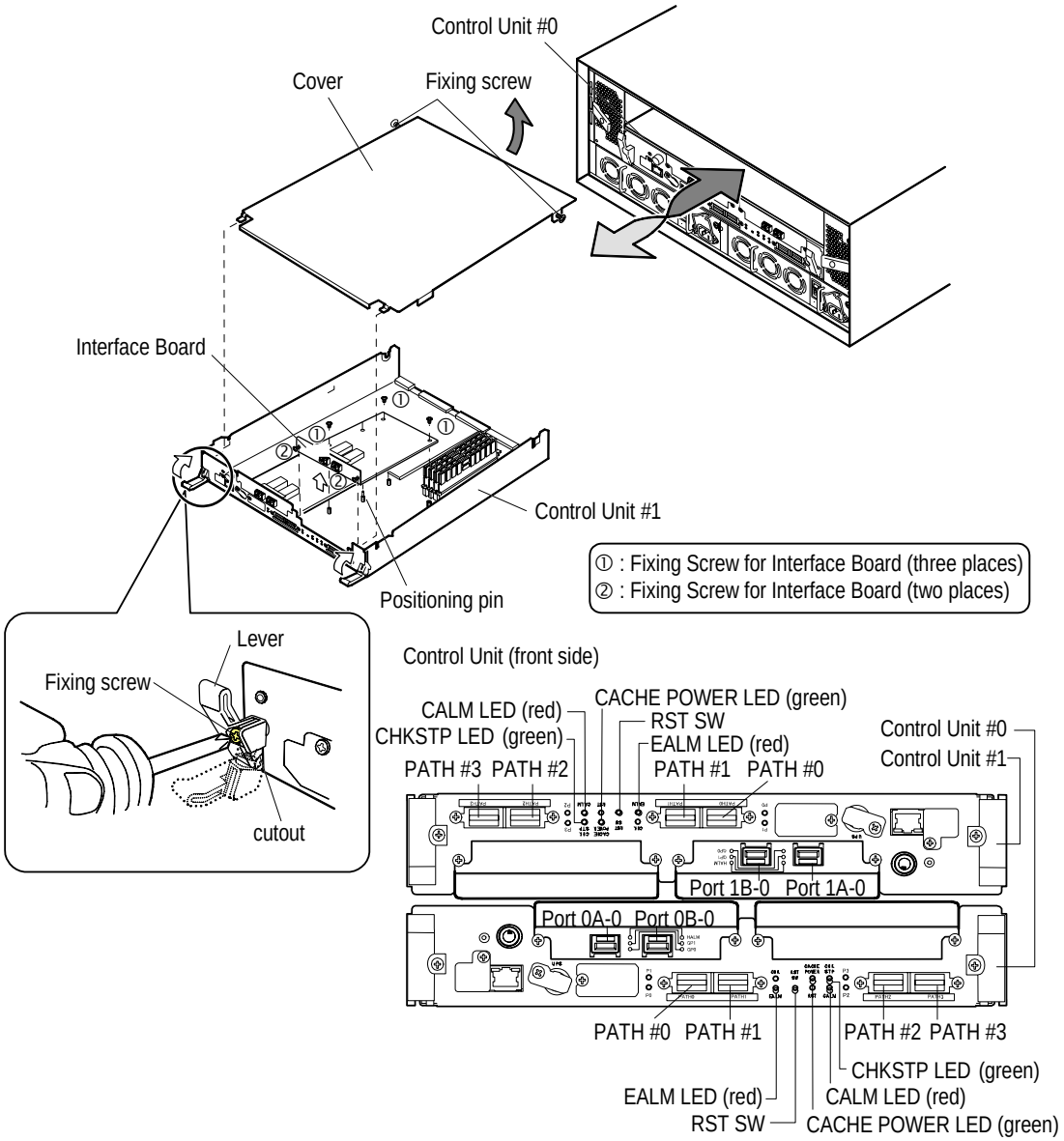


Figure 2.4.5.2 Subtracting a FC Interface Board (RKH)

Table 2.4.2.1 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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2.4.7 Subtracting an iSCSI Interface Board

CAUTION

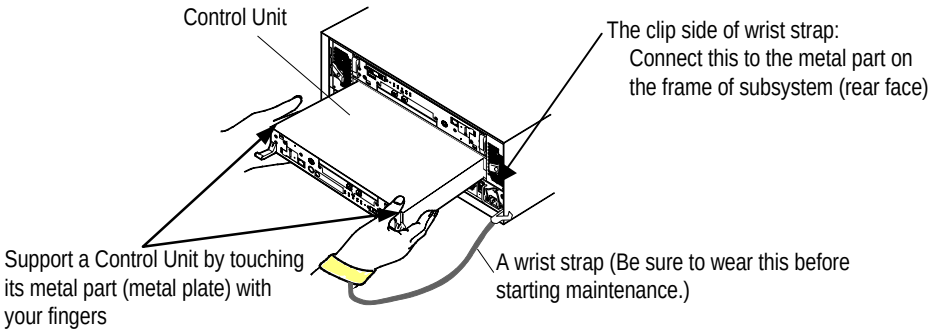
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the Additional Chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



NOTE : • When the subsystem operates in the dual controller configuration, do the works for the both Control Units. In the case of the single controller configuration, do the work for the Control Unit #0 only.
• After the work is completed, be sure to return the Control Units #0 and #1 to their original locations. In the case of the single controller configuration, return the Control Unit to a location of the Control Unit #0.

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(1) Collect Simple Trace and Constitution Information. (Refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : When the installation position of the Interface Board is changed (‡1) or when the Interface Board of the different type is installed in the position where the Interface Board is currently installed, the following configuration information of the interface is all cleared. Be sure to perform the collection of the simple trace and the acquisition of the configuration information to back up the configuration information before the change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information/iSCSI port setting information
- CHAP security information (iSCSI)

(2) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the Cache is in the backup status, cancel the status.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(3) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(4) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(5) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
- When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

‡1 : Even if the installed Interface Board is changed to the uninstalled, the configuration information is maintained in the subsystem.

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CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(6) Remove the Control Unit by pulling it out toward you.
(7) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(8) Loosen the fixing screws ② (two places) of the iSCSI Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the iSCSI Interface Board upwards and remove it from the Control Unit.

NOTE : • Place the removed Interface Board in the place where anti-static measures are taken.
• When subtracting the iSCSI Interface Board for the RKH on the interface #0 side, remove the FC Interface Board installed on the #1 side and install it on the #0 side.
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1 (Refer to "Table 2.4.3 Installation position of the Interface Board" (ADD 02-0530)).

(9) When the 4 G bps interface is used, install the 4 G bps FC Interface Board (RKM: HT-F4064-DJ4G2, RKS/RKXS: HT-F4064-DJ4G2W, RKH: HT-F4064-DJ4G2H) fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the 4 G bps FC Interface Board (RKM: HT-F4064-DJ4G2, RKS/RKXS: HT-F4064-DJ4G2W, RKH: HT-F4064-DJ4G2H) may become the inside of the Control Unit.
Go to Procedure (11).
(10) When the 2Gbps interface is used, install the dummy Interface Board and fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the dummy Interface Board may become the inside of the Control Unit.
(11) Install the two host connectors for 2 G bps (for the RKS/RKXS), which were removed when the iSCSI Interface Board was added, in the Control Units respectively.
(12) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

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(13) Insert it into the position in the Control Unit with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch an ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

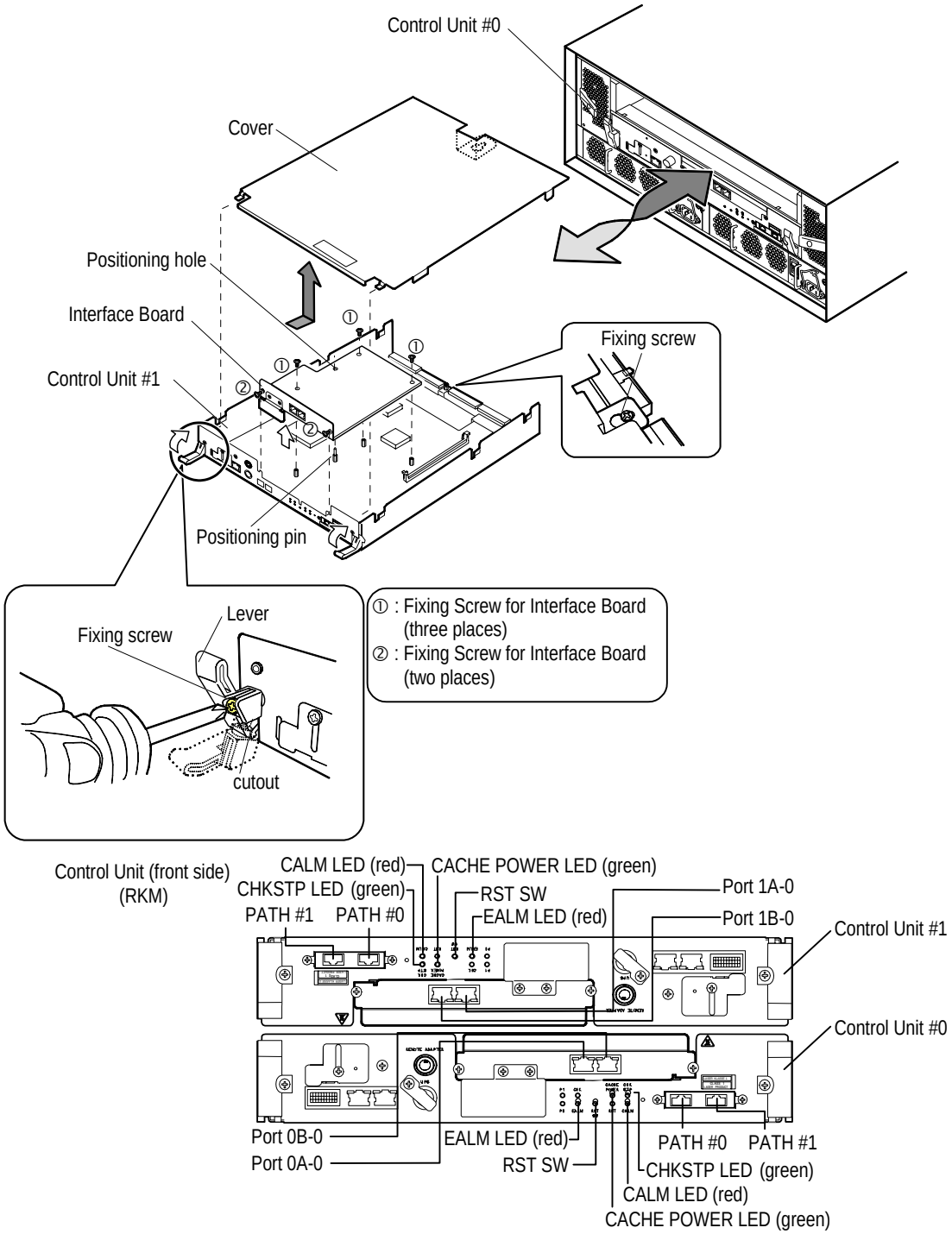
(14) In the case of the dual control Unit composition, perform the procedure from (4) to (13) to the other Control Unit.
(15) Connect the removed all cables to the Control Unit.

NOTE : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(16) Turn on the AC Power Unit Switch of the both Power Units.
(17) Turn on the main switch.
(18) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
The WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes).
(19) Check that the READY LED (green) or the WARNING LED (orange) on the front of the Basic Chassis lights up. The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).
(20) When moving the FC Interface Board from the interface #1 side to the #0 side or replacing the FC Interface Board after subtracting the iSCSI Interface Board, configure the host group and Fibre Channel port setting. (Refer to System Parameter “Chapter 2 Setting Host Group/Targets” (SYSPR 02-0000), and System Parameter “4.2 (9) Setting of Fibre Channel” (SYSPR 04-0170).)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : The figure shows the case where the iSCSI Interface Board is installed in the Control Unit of the RKM.

Figure 2.4.6 Subtracting iSCSI Interface Board

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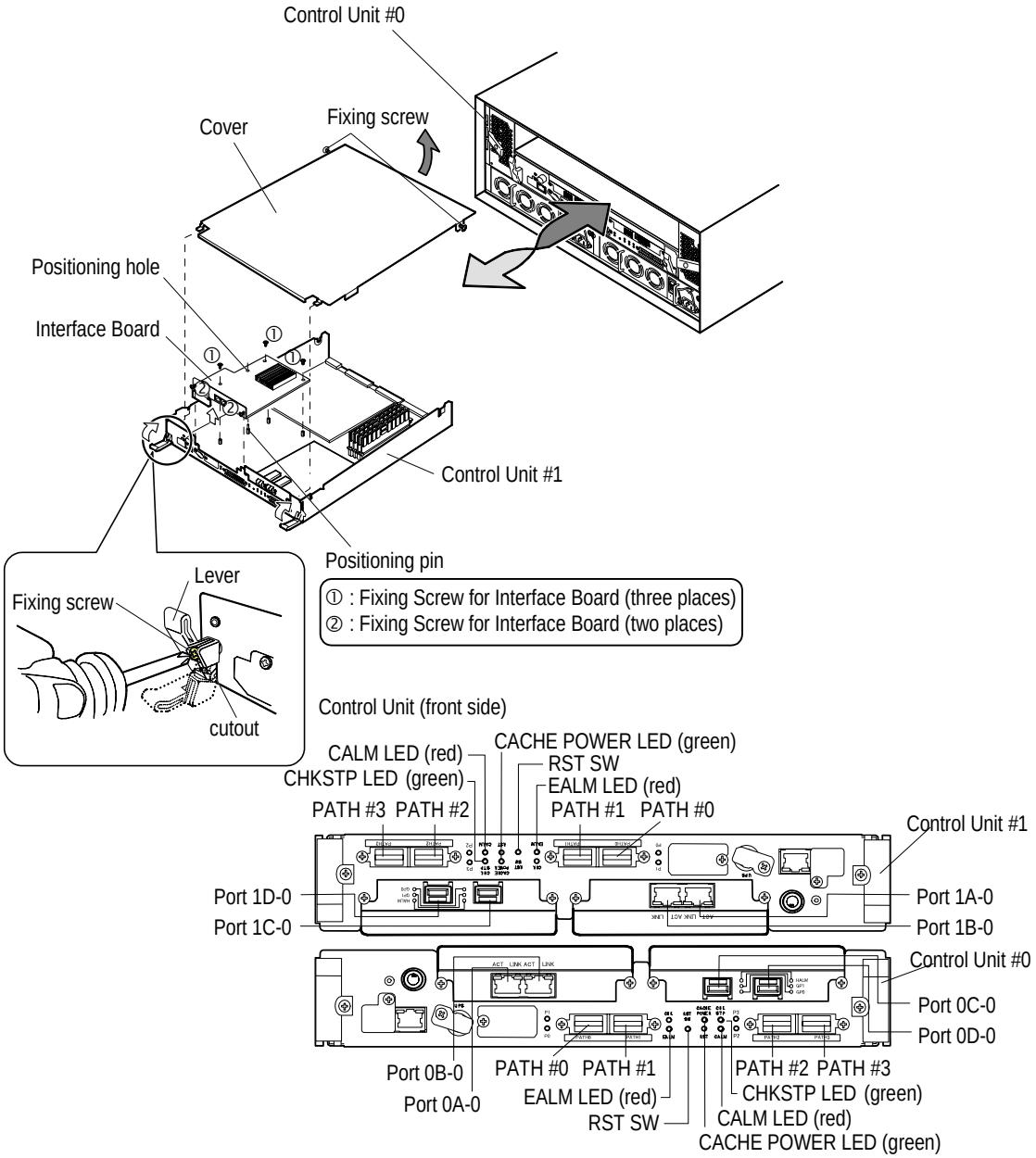


Figure 2.4.6.1 Subtracting iSCSI Interface Board (RKH)

Table 2.4.3 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

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2.4.8 Subtracting a NAS Unit

(1) Remove the cables for the NAS.
(2) Remove the NAS Unit from the rack.
(3) Remove the NAS Interface Board.
Remove the NAS Interface Board referring to "2.4.5 Subtracting a NAS interface board" (ADD 02-0390).

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2.5 Subtracting Other Optional Devices

2.5.1 Other optional subtraction devices

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power online (A host is in operation(*1).)	Power offline (with the subsystem power turned off)
PDB (UPDU7)	DF-F700-UPDU7	For U7	Additional PDB for U7 rack frame	Possible Refer to "2.5.2 Subtracting a PDB (UPDU7)" (ADD 02-0560)	Possible Refer to "2.5.2 Subtracting a PDB (UPDU7)" (ADD 02-0560)

*1 : Data is exchanged between a host computer and the subsystem.

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2.5.2 Subtracting a PDB (UPDU7)

(1) Subtracting Process for the PDB (UPDU7)

Select a procedure from the following and execute it.

No.	Model	Power status during the subtraction	Restriction	Subtraction Process section
1	Rackmount model	Subtraction with the power turned on	• This is the dedicated rack for the U4/U7 rack frame. • Only the PDB whose all the outlets for output to which the power cable plugs are not connected can be subtracted.	Refer to "2.5.2 (2) Procedure for subtraction" (ADD 02-0560)
2		Subtraction with the power turned off		

(2) Procedure for subtraction

(a) Make sure that the power cable plugs are not connected to all the outlets for output on the PDB to be subtracted.

(b) Disconnect the power cable, which is connected to the PDB to be de-installed to supply power to it, by pulling its power feeder plug for safety.

(c) Remove the PDB to be subtracted from the rack frame.

Remove the PDB in the opposite procedure of the installing operation referring to "1.5.2 Mounting a PDB (UPDU7)" (ADD 01-0460).

Keep the subtracted components as the occasion demands.

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Chapter 3. Relocation/Removal Work

3.1 Before Starting Relocation/Removal Work

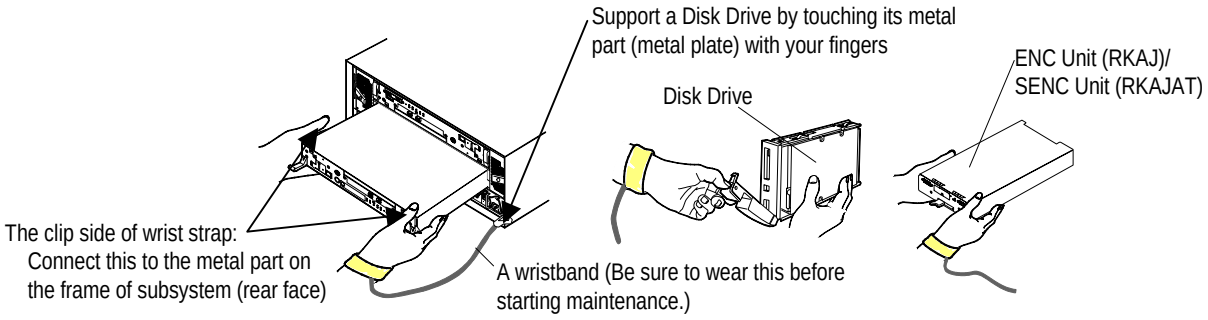
Take notice of the following when performing a installation work for the subsystem.
When moving or removing a subsystem, take care of the following matters.

(1) Note on installing and removing parts
Generally, each part is equipped with high-precision components. Remove and install the part gently so as not to give it any shock.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

Be sure to wear the wristband, connect its lead wire to the subsystem enclosure before starting the work, and do not remove them until the work is completed.
When installing a Disk Drive, Control Unit or ENC Unit/SENC Unit, hold it with your hand wearing the wristband having fingers contact metallic portions on the sides of the part.



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(2) Note on cable routing

(a) Handling of cables on the floor

- Protect cables which cannot be accommodated by the subsystem and thus laid on the floor or cables which cross a passage with cable protecting, etc.
- Do not make inter-device cables apart from the floor but lay them on the floor.

(b) Handling of under-floor cables when the subsystem is installed on the free access floor.

- Give excess lengths to cables routed under the floor so that they can easily be laid on the slab. Do not make them to be hung dangling.

(c) How to route cables

- Give adequate margin of length to cables to withstand earthquakes, etc.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cable and power cable apart each other. When they have to be positioned close each other, do not make them run in parallel but make them cross each other.
- When using cable protecting duct, be careful not to damage or break cables by catching them.

(d) Be sure to insert or pull out a cable connector holding it with your hand. If you pull a cable, a trouble may be caused.

(e) When bending the FC I/F cable and RC (ENC) cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(3) Note on restarting

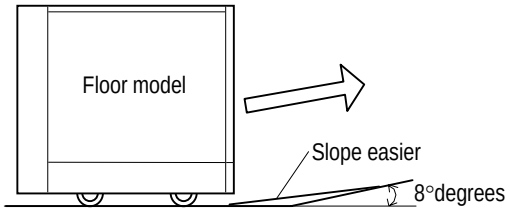
When restarting the subsystem, turn on the main switch after waiting more than one minute after the main switch is turned off (after the POWER LED goes out).

(4) Note on completing a maintenance work

Close all the external covers when a maintenance work is completed.
It is required to make all the external covers closed to operate the subsystem properly.
(Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

(5) Note on moving the Floor Model

The allowable maximum inclination angle at the end of the slope for the Floor Model is eight degrees.
When moving the Floor Model through a slope steeper than the above or across a level difference of the floor, use a gangway, etc. to make the slope easier.

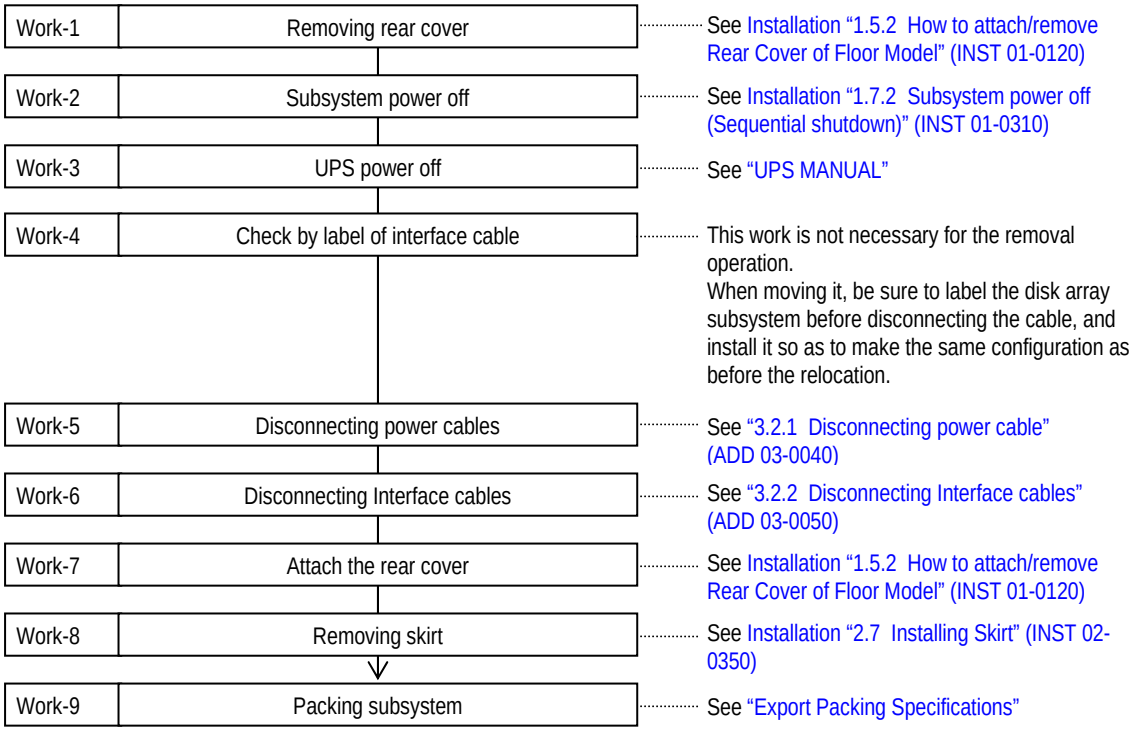


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3.2 Procedure for Relocating or Removing Floor Model

(1) Procedure for relocation from where the subsystem is currently installed

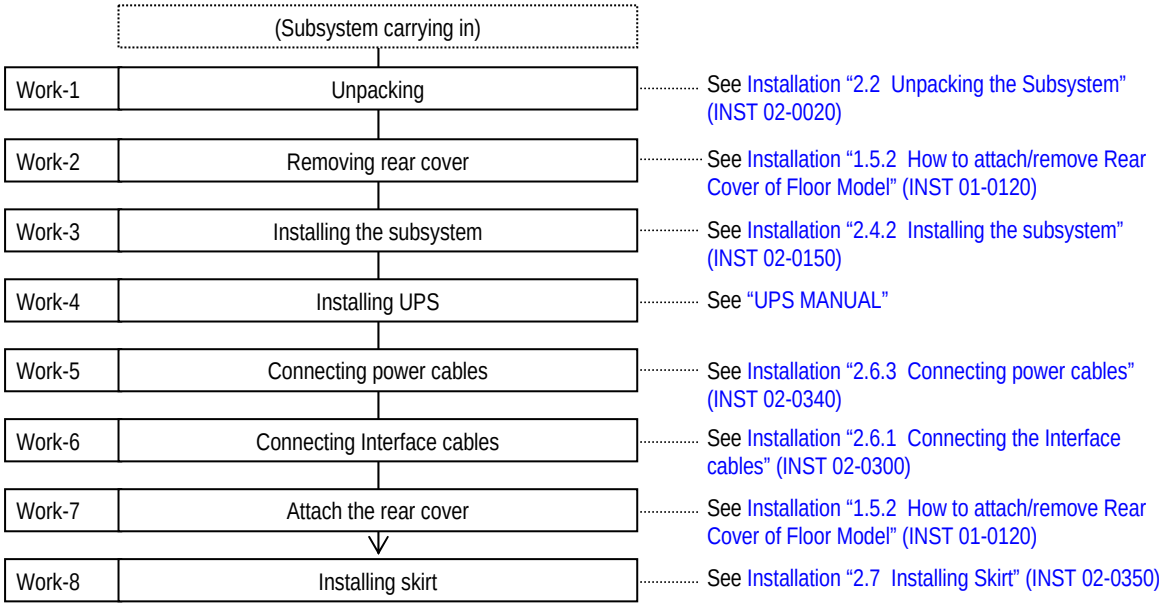
Before performing the relocation from where the subsystem is currently installed, make sure of work items to be done shown below.



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(2) Procedure for installation at a place from where the subsystem is moved

Before performing installation at a place where the subsystem is moved to, make sure of work items to be done shown below.



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3.2.1 Disconnecting power cable

(1) Disconnecting the power cable of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the Power Unit a little, and then perform the cable removal again.

(a) Make sure that AC power input switches (breakers) on the Power Unit have been all turned off.
(b) Remove the power cable to the power outlet.
(c) Remove the power cables.

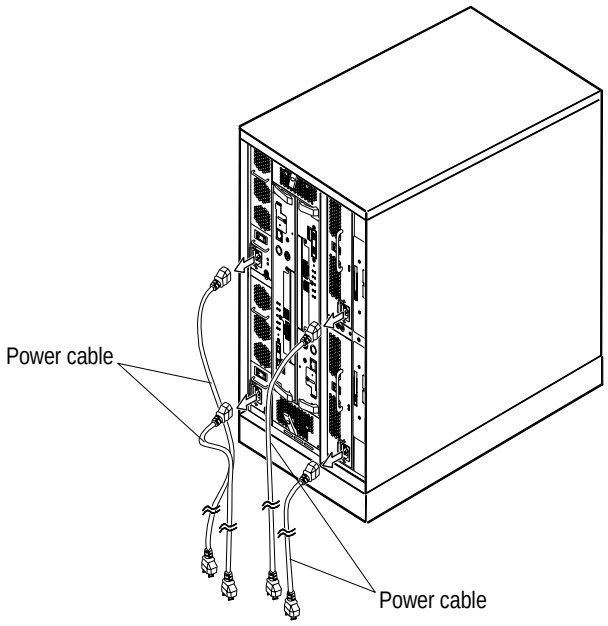


Figure 3.2.1 Disconnecting Power Cable

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3.2.2 Disconnecting Interface cables

(1) Disconnecting Fibre Channel Interface cables

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Remove the Interface cable to the Control Unit.
(b) Remove the Interface cable to the Clamp (Fibre).

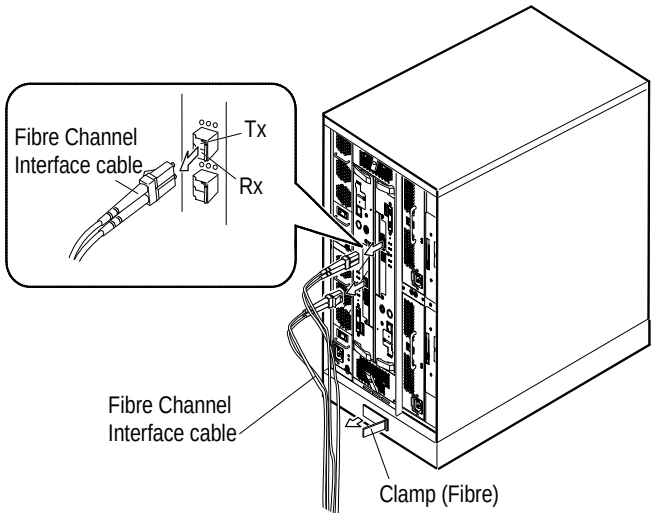


Figure 3.2.2 Disconnecting Fibre Channel Interface Cable

(2) Disconnecting iSCSI Interface cables

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Remove the Interface cable to the Control Unit.
(b) Remove the Interface cable to the Clamp.

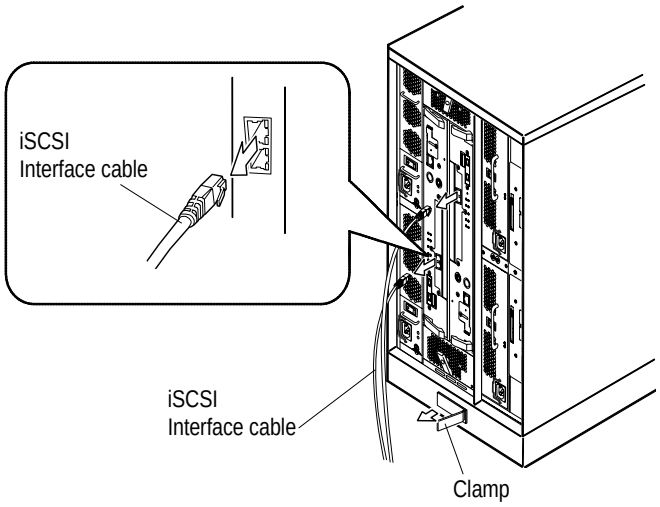


Figure 3.2.3 Disconnecting iSCSI Interface Cable

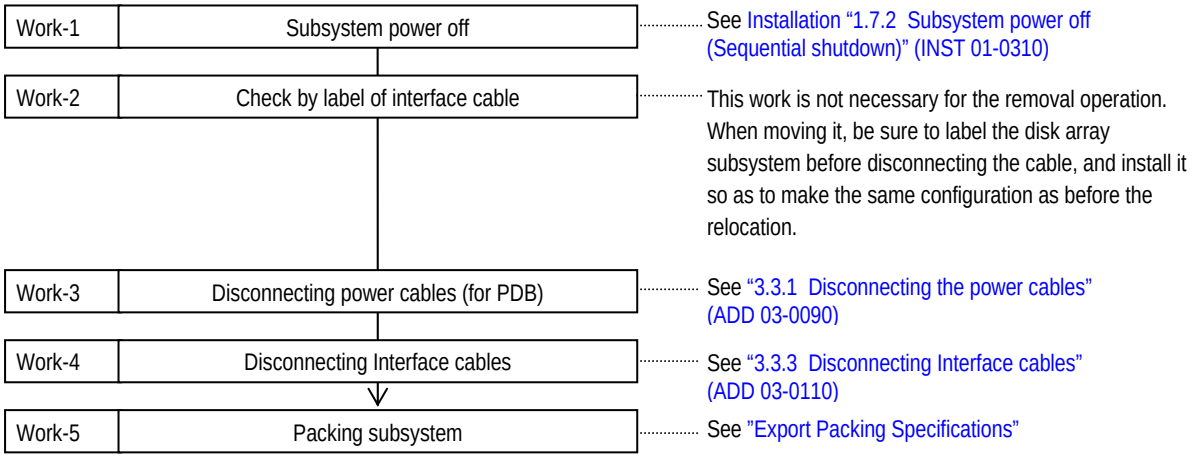
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3.3 Procedure for Relocating or Removing Rackmount Model

(1) When moving the subsystem together with a rack frame

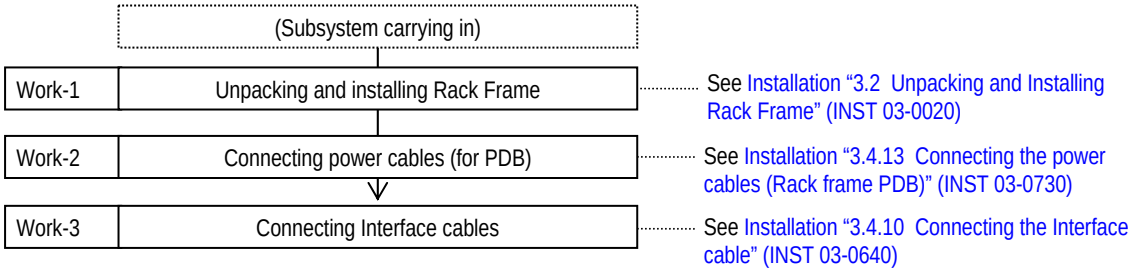
(a) Procedure for removal from where the subsystem is currently installed

Before performing the removal from where the subsystem is currently installed, make sure of work items to be done shown below.



(b) Procedure for installation at a place from where the subsystem is moved

Before performing installation at a place where the subsystem is moved to, make sure of work items to be done shown below.

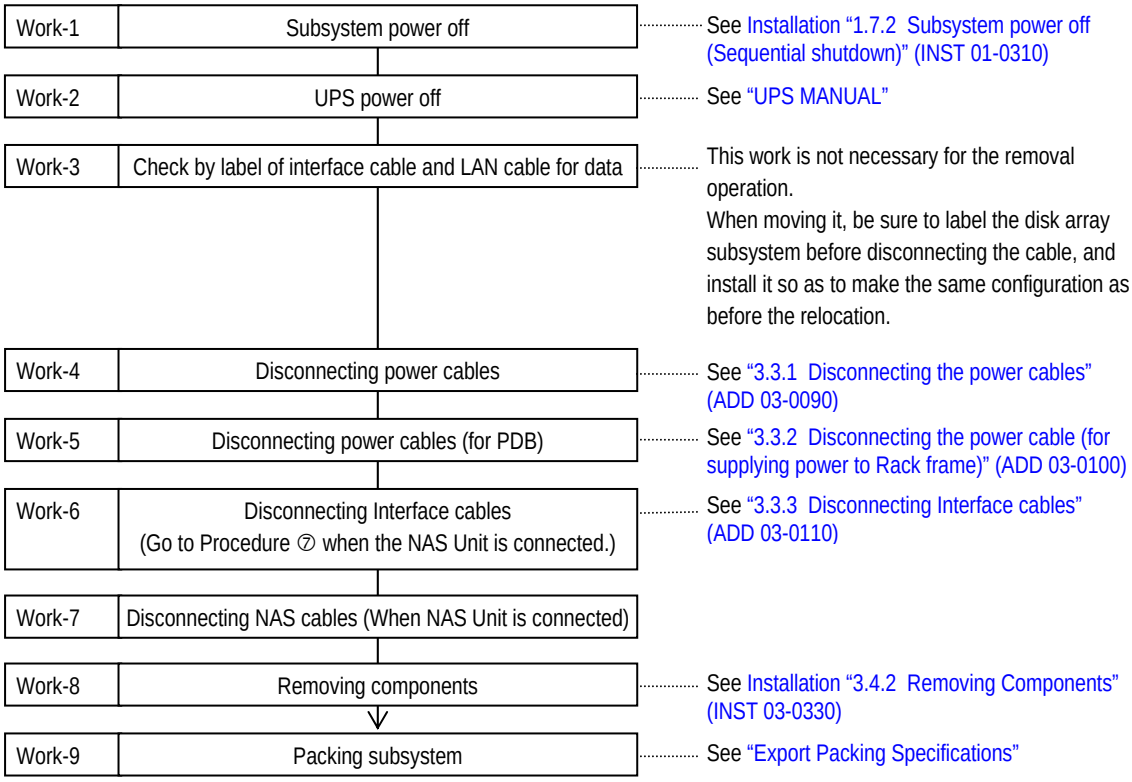


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(2) When moving the subsystem together with removing of parts

(a) Procedure for removal from where the subsystem is currently installed

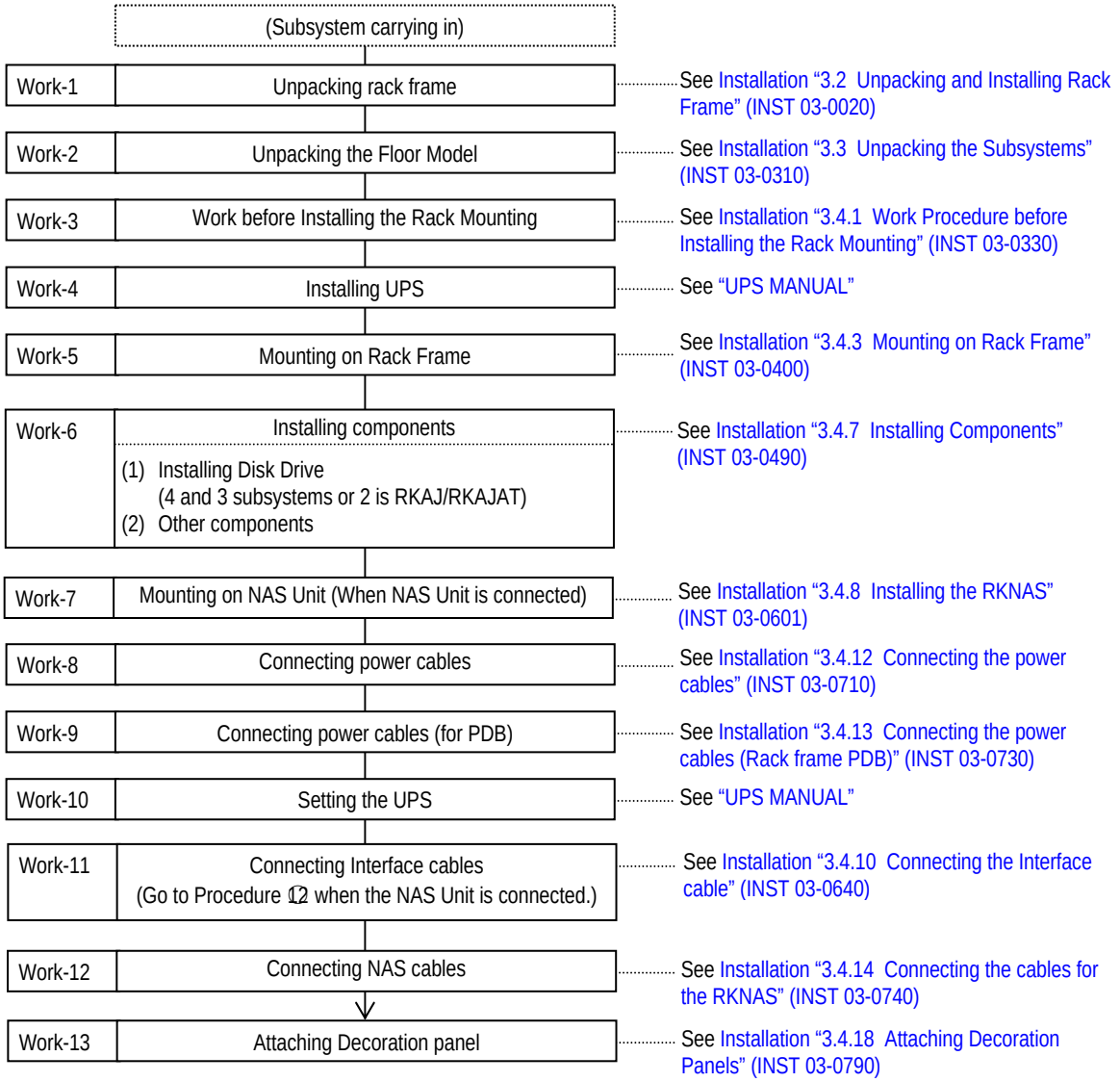
Before performing the removal from where the subsystem is currently installed, make sure of work items to be done shown below.



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(b) Procedure for installation at a place from where the subsystem is moved

Before performing installation at a place where the subsystem is moved to, make sure of work items to be done shown below.



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3.3.1 Disconnecting the power cables

(1) Disconnecting the power cable of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnect the power cable connected to the PDB.
(b) In the case of the RKAJ/RKAJAT, pass Repeat Binders through the cleats removed to the right and left stoppers and fasten the power cable with the Binders.
(c) Disconnect the power cable connected to the Power Unit.

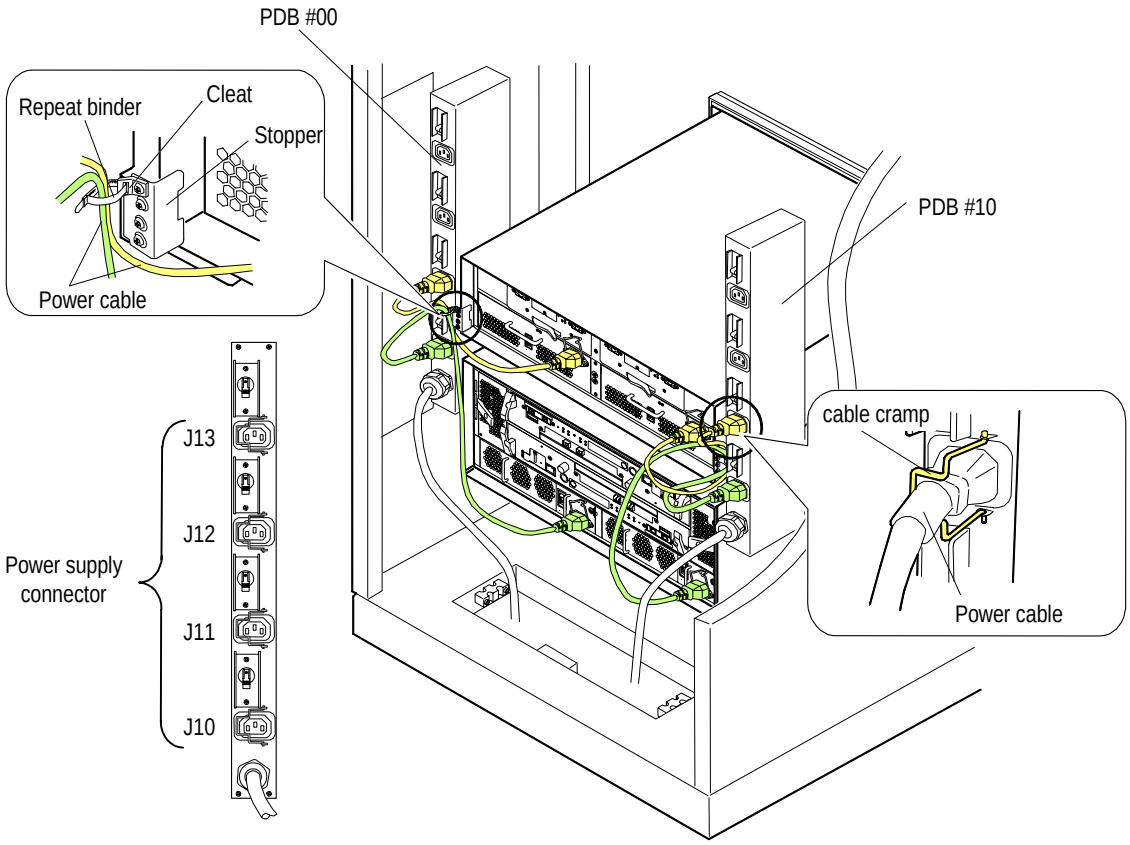


Figure 3.3.1 Disconnecting Power Cables

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3.3.2 Disconnecting the power cable (for supplying power to Rack frame)

(1) Open the rear door. (See Installation "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)
(2) Remove the cable holders from the rack frame by removing the hexagon socket head. (three places)
(3) Disconnecting the power cable to the consent.
(4) Disconnecting the power cable to the Power input connector.
(5) Return all the removed cable holders as they were before.
(6) Close the rear door.

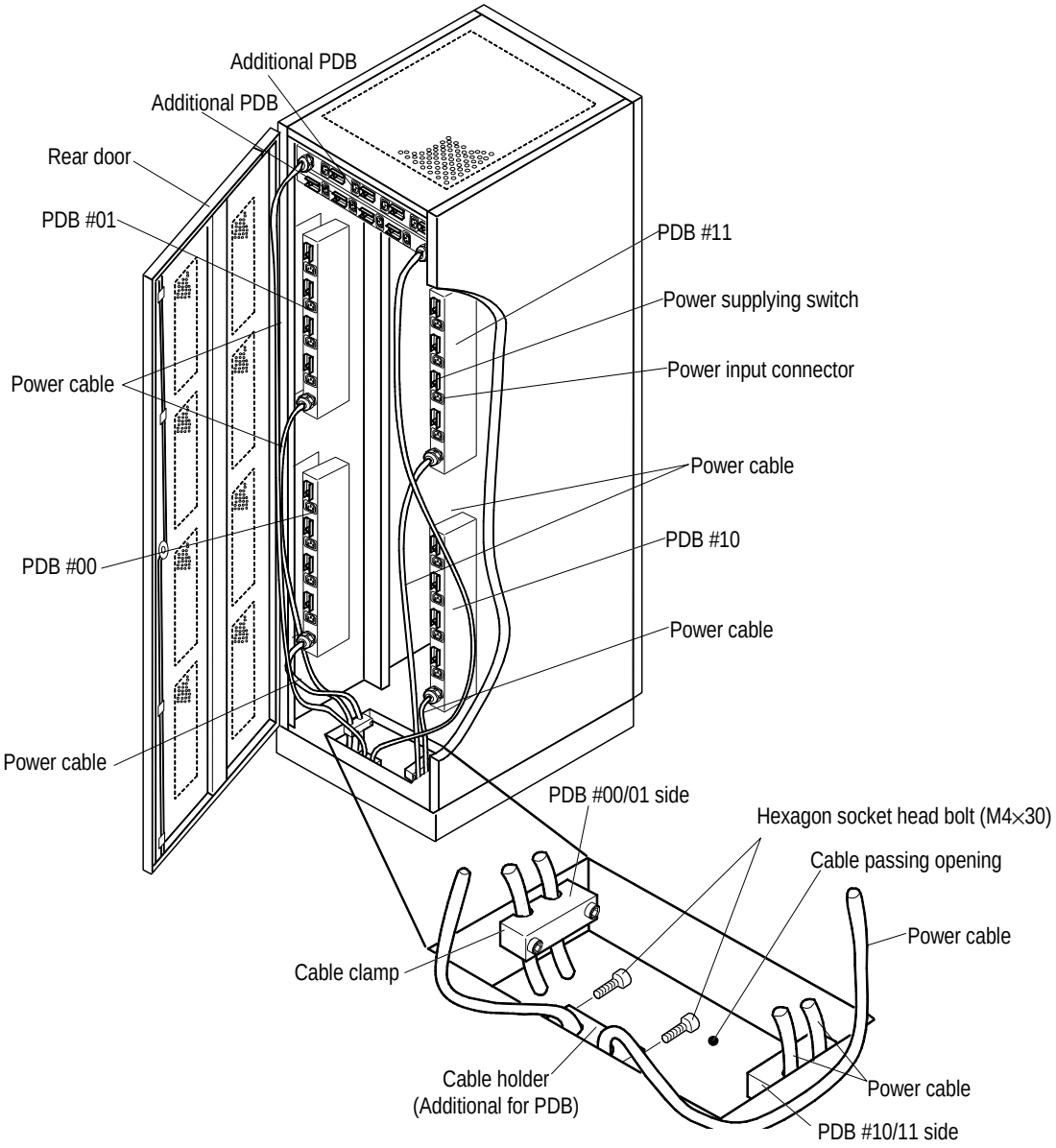


Figure 3.3.2 Disconnecting Power Cables

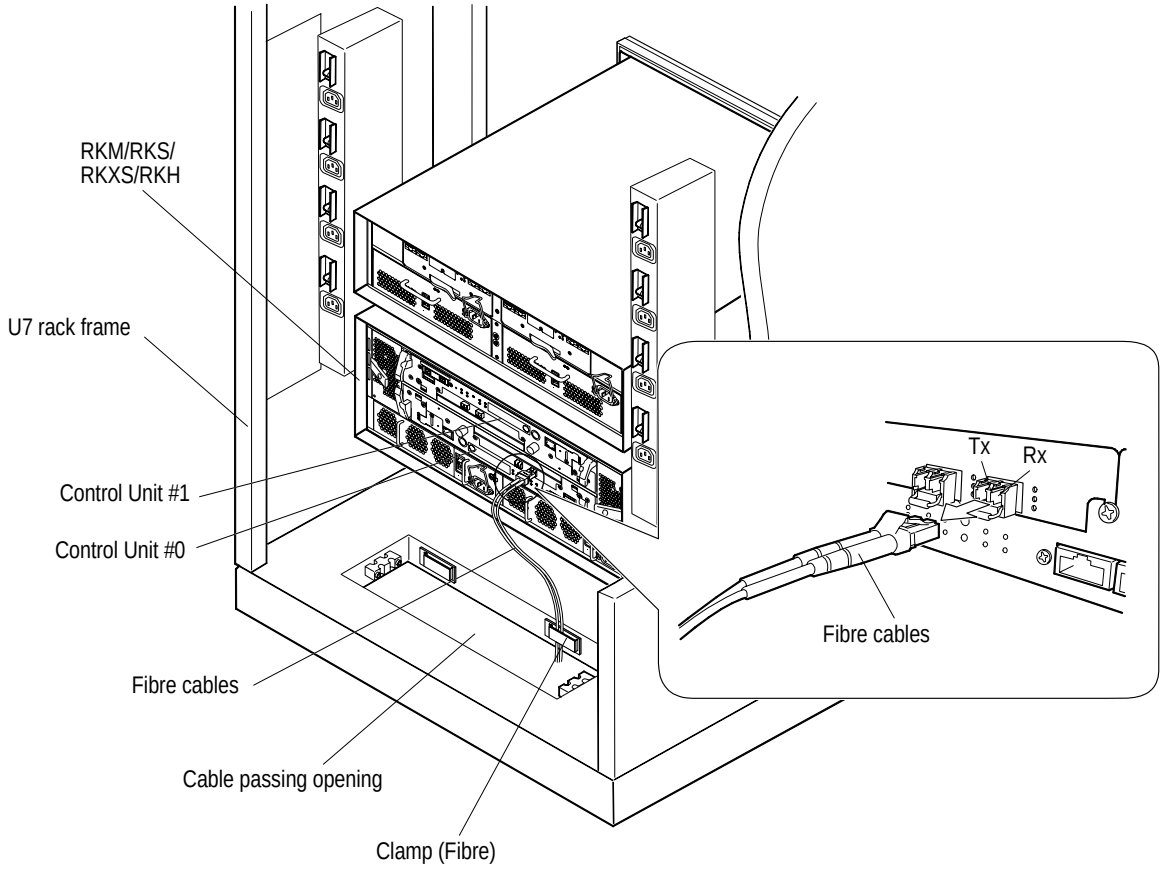
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3.3.3 Disconnecting Interface cables

(1) Disconnecting the Fibre Channel Interface cable

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnecting the Fibre Channel Interface cable to the clamp
(b) Disconnect the Fibre Channel Interface cable connected to the Control Unit.



*1 : The figure shows the RKM.

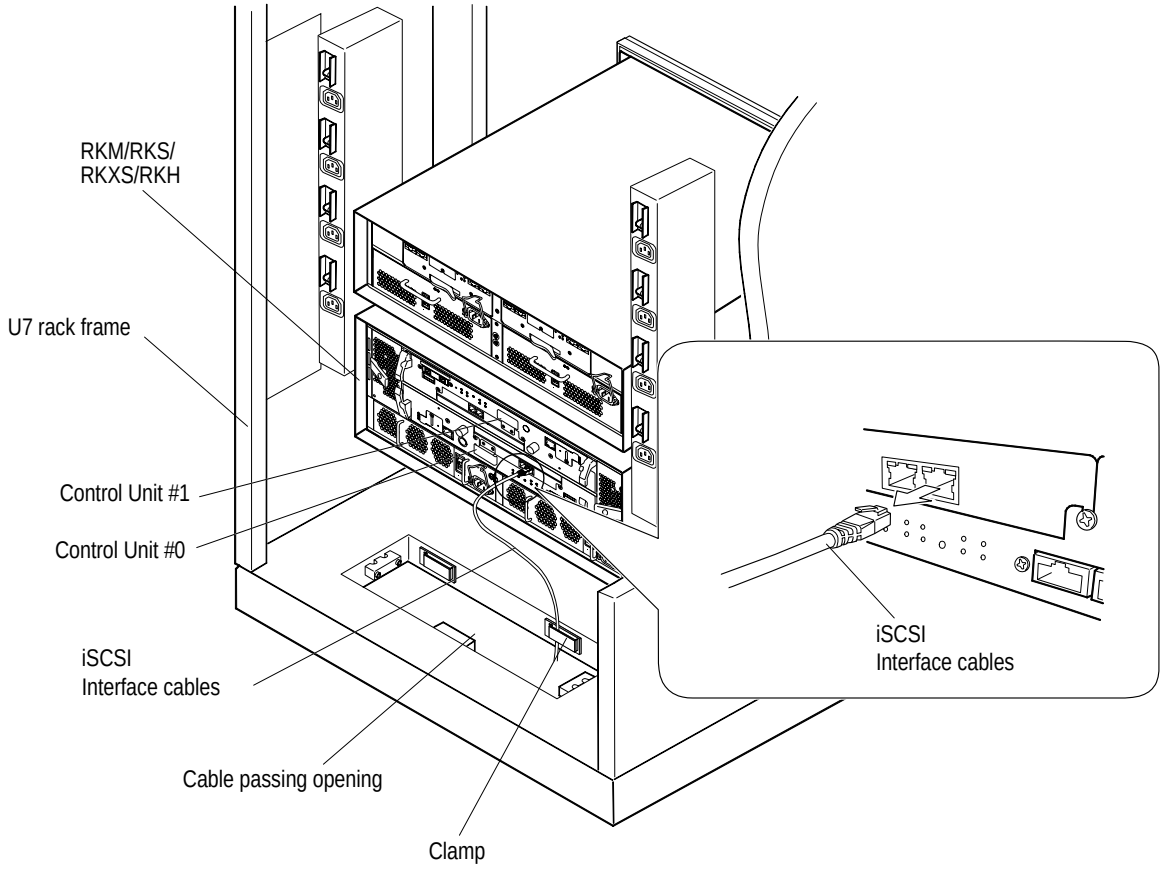
Figure 3.3.2 Disconnecting Interface Cable (RKM/RKS/RKXS/RKH)

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(2) Disconnecting the iSCSI Interface cable

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnecting the iSCSI Interface cable to the clamp
(b) Disconnect the iSCSI Interface cable connected to the Control Unit.



*1 : The figure shows the RKM.

Figure 3.3.3 Disconnecting Interface Cable (RKM/RKS/RKXS/RKH)

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Troubleshooting

Chapter 1. Flowchart for troubleshooting ..... TRBL 01-0000

Chapter 2. Before Maintenance Work ..... TRBL 02-0000

Chapter 3. Before Starting WEB Connection ..... TRBL 03-0000

Chapter 4. Trouble Analysis by WEB connection ..... TRBL 04-0000

Chapter 5. Procedure for Investigating Disk Array Subsystem Regarding Fibre Channel Failure ..... TRBL 05-0000

Chapter 6. Details of Recovery Methods ..... TRBL 06-0000

Chapter 7. Collecting Error Information ..... TRBL 07-0000

Chapter 8. Trouble Analysis by LED Indication ..... TRBL 08-0000

Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.) ..... TRBL 09-0000

Chapter 10. Trouble Analysis by Failure Monitoring Function ..... TRBL 10-0000

Chapter 11. Procedure for Determining Failure of Network Side in NAS System ..... TRBL 11-0000

Chapter 12. Procedure for the iSCSI System Failure Determination on the Disk Array Subsystem Side ..... TRBL 12-0000

Chapter 13 Procedure for Determining Failure of Local Tape in NAS System ..... TRBL 13-0000

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Chapter 1. Flowchart for troubleshooting

This chapter contains information on troubleshooting to be used when failures occur in the unit. Illustrations in this section show cases of the rackmount model. They are the same for the floor model.

The following is the flow of troubleshooting to be used when a failure occurs in the unit.

Failure call accepting

When a failure is detected by SNMP Agent Support Function. Refer to "10.1 Trouble Analysis by SNMP Agent Support Function" (TRBL 10-0000).

When a failure is detected by Storage Navigator Modular. Refer to "10.2 Trouble Analysis by Storage Navigator Modular" (TRBL 10-0080).

When a P.P. failure is detected.
Refer to "Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)" (TRBL 09-0000).

Refer to "ASSIST-PC Manual" when a failure of the failure monitoring program was detected.

When the sense code concerning the subsystem was reported to the log in the host computer. Refer Message "Chapter 9. Failure Analysis by Sense Data" (MSG 09-0000).

When an LU subordinate to the specific path of the disk array subsystem cannot be recognized by the host computer. Refer to "Chapter 5. Procedure for Investigating Disk Array Subsystem Regarding Fibre Channel Failure" (TRBL 05-0000).

When it cannot access the LU under the control of the NAS system from the NAS client PC.
Refer to "Chapter 11 Procedure for Determining Failure of Network Side n NAS System" (TRBL 11-0000).

When the LU under the specific PATH of the disk array subsystem cannot be recognized from the host computer which has the iSCSI interface.
Refer to "Chapter 12 Procedure for the iSCSI System Failure Determination on the Disk Array Subsystem Side" (TRBL 12-0000).

When an error message is displayed during an operation of the Web. Refer to Message "Chapter 7. Web Error Messages" (MSG 07-0000).

When an error message is displayed during an operation of the Storage Navigator Modular.
Refer to Message "Chapter 8. Storage Navigator Modular Error Messages" (MSG 08-0000).

- When a failure is detected from the subsystem (through a beep of a buzzer or a lighting of the ALARM LED, etc.)
- When a host computer detects a subsystem failure
- When a subsystem failure is detected from WEB

follow the following flow.



To TRBL 01-0010

NOTE : Order of Components replacement when two or more failures occurred
When failures occurred in two or more components, replace the corresponding components in the following order.
Be sure to follow this order, or it may repeat the failure.
When failures occur in the two or more RKAJ(s)/RKAJAT(s)/RKA(s), replace the RKAJ/RKAJAT/RKA by N of the subsystem ID# xN is small.
In the case where the RKAJATs are installed, perform the replacement taking notice of the subsystem ID number.
When failures occurs in two or more RKAJs, replace the RKAJs, in ascending order of the device ID numbers. Perform the following part replacement after verifying that the failed part has been recovered normally (for a Disk Drive, after verifying that a recovery has been started).
However, when two or more failures of the NAS Unit related parts (DIMM, PS, Fan) occur, replace the failure parts at the same time.

1. Backup Battery Unit (RKM/RKS/RKXS/RKH)
2. Power Unit (RKM/RKS/RKXS/RKH)
3. Power Unit (RKAJ/RKAJAT/RKA)
4. Fan Assembly (RKM/RKS/RKXS/RKH)
5. Control Unit (RKM/RKS/RKXS/RKH)
6. FC Interface Board/NAS Interface Board/iSCSI Interface Board
7. SENC Unit (RKAJAT/RKA)
8. Disk Drive (RKM/RKS/RKXS)
9. ENC Unit (RKM/RKS/RKXS)
10. Host Connector (RKM/RKS/RKXS/RKH)
11. NAS Unit (RKNAS)
12. NAS Unit related parts (DIMM, PS, Fan)
13. Host connector (for RKNAS)

The following two types of Basic Chassis exist in the SANRISE AMS1000.

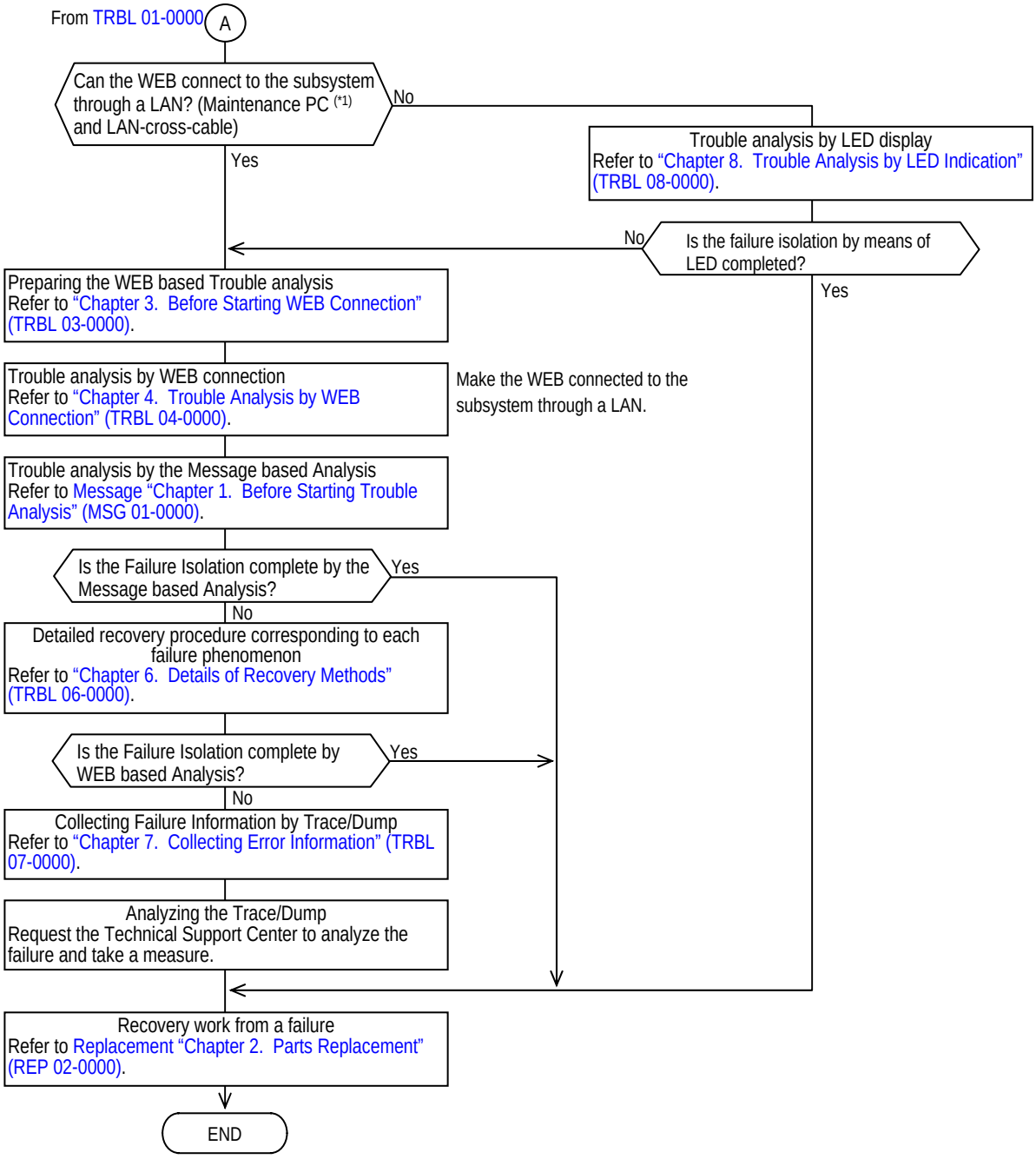
- DF-700-RKH (abbr.: RKH)
- DF-700-RKHE (abbr.: RKHE)

The Control Unit of the RKH and the Control Unit of the RKHE cannot be mixed in this Basic Chassis.
This manual does not describe the RKHE except for the following differences.
When the RKHE is used, it becomes the same procedure as the RKH.
Therefore, read the RKH as the RKHE excluding the part described in parallel and use it.

Differences between the RKH and the RKHE

Chassis Name	Installed Control Unit Model Name	Processor (Control CPU)	Control Memory (L2 Cache Memory)
RKH	DF-F700-F1JH	POWER PC 7447A (1.4GHz)	512 K bytes
RKHE	DF-F700-F2JH	POWER PC 7448 (1.7GHz)	1 M bytes

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*1 : Check the requirements for the service PC at the time of NAS Unit connection.
Refer to DF700 NAS SOFTWARE Maintenance Manual "2.5.2 Service PC" (NAS 02-0100) and "8.1 Construction of Service PC" (NAS 08-0000).

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Chapter 2. Before Maintenance Work

2.1 Precautions

(1) Note on restarting

When restarting the subsystem, turn on the main switch after waiting more than one minute after the main switch is turned off (after the POWER LED goes out).

If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.

When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

(2) Notes while the array subsystem is being started

Because the status where the array subsystem is being started is in the middle of the transition to the status of the subsystem power turned on (Ready status) from the status of the subsystem power turned off, do not perform the following work while the array subsystem is being started.

- Isolating the Fibre system failure in the disk array subsystem side
- Trouble analysis by LED indication
- Isolating the network system failure in the NAS system
- Isolating the iSCSI system failure in the disk array subsystem side
- Part replacement
- Data collection when a failure occurs in Program Product (P.P.)
- Troubleshooting of the failure of the failure monitoring program
- Troubleshooting of the WEB error message

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Also, the setting function or the reference function using the Storage Navigator Modular cannot be executed to the array subsystem which is being started.

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2.2 Confirming and setting RTC (Real Time Clock)

RTC (Real Time Clock) is a built-in clock in the Controller. It is used to record the time information of messages and trace/dump when an error occurred. Even if the RTC is out of order, the host system may not be affected. However, the time information of messages and trace/dump is not correct. Accordingly, the failure analysis with synchronizing to the host may be affected.

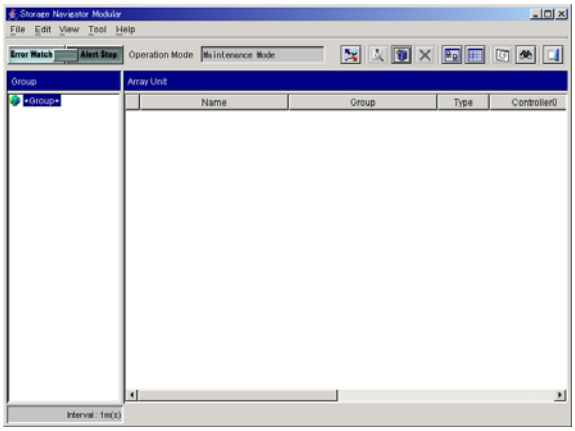
In the following cases, check the RTC and reset it if it varies.

- When the controller was replaced while the subsystem power was turned off.
- When there is something wrong with the time on messages, traces and dump.

Set the time on the Japanese Standard Time basis

If you wish to use Storage Navigator Modular to set the RTC, please refer to the System Parameter "1.1 Procedure for connecting Storage Navigator Modular with the subsystem" (SYSPR 01-0010).
The setting of RTC can be made without rebooting the array unit.

(1) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time. Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

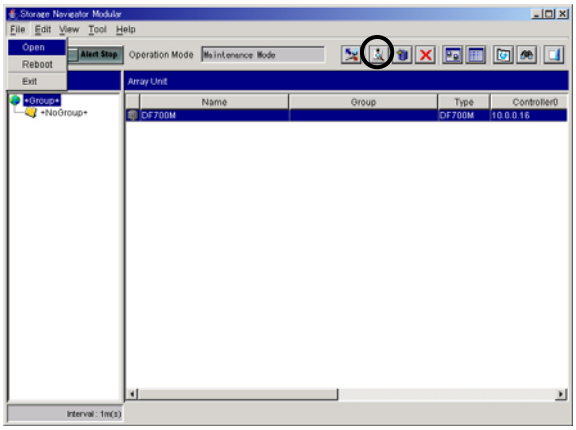


(2) Click the DF700 icon for setting parameters in the main window.

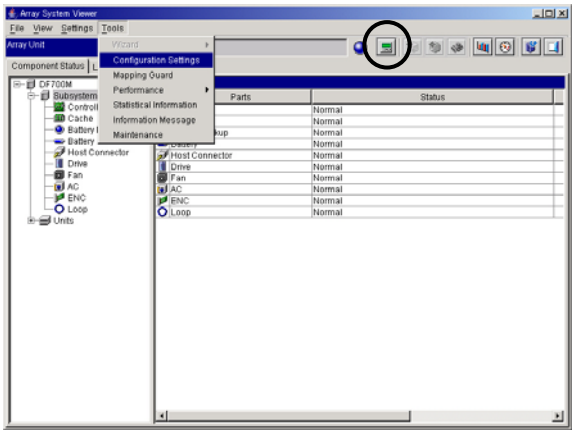
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

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(3) Click the icon of an array unit on the Main window, and then select the [File] – [Open]. Or, click the [ : Open]button in the tool bar.

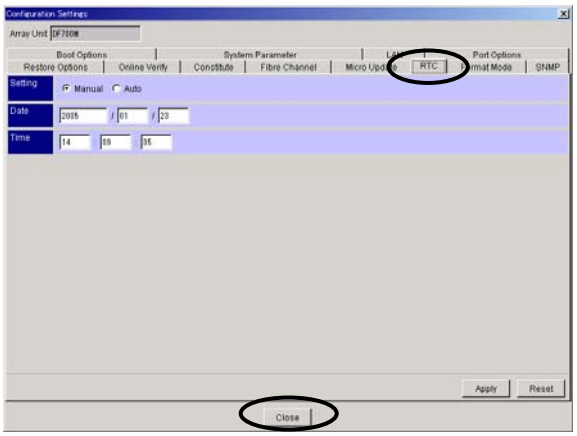


(4) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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(5) Click the [RTC] tab.



(6) Set the RTC.

Setting : Select Manual or Auto.

Manual : Sets the date and time.

Auto : Sets the time of the PC or Server/Workstation executing the Storage Navigator Modular.

Date : Displays date.

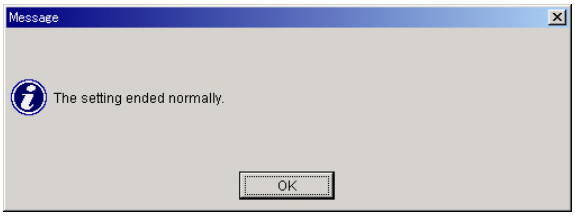
Time : Displays time.

(7) Click the [Apply] button.

(8) The confirmation window is display. Click the [OK] button.



(9) A message appears, stating that the setting is complete. Click the [OK] button.



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2.3 Indications and their Functions

(1) Indication positions and their functions of RKM

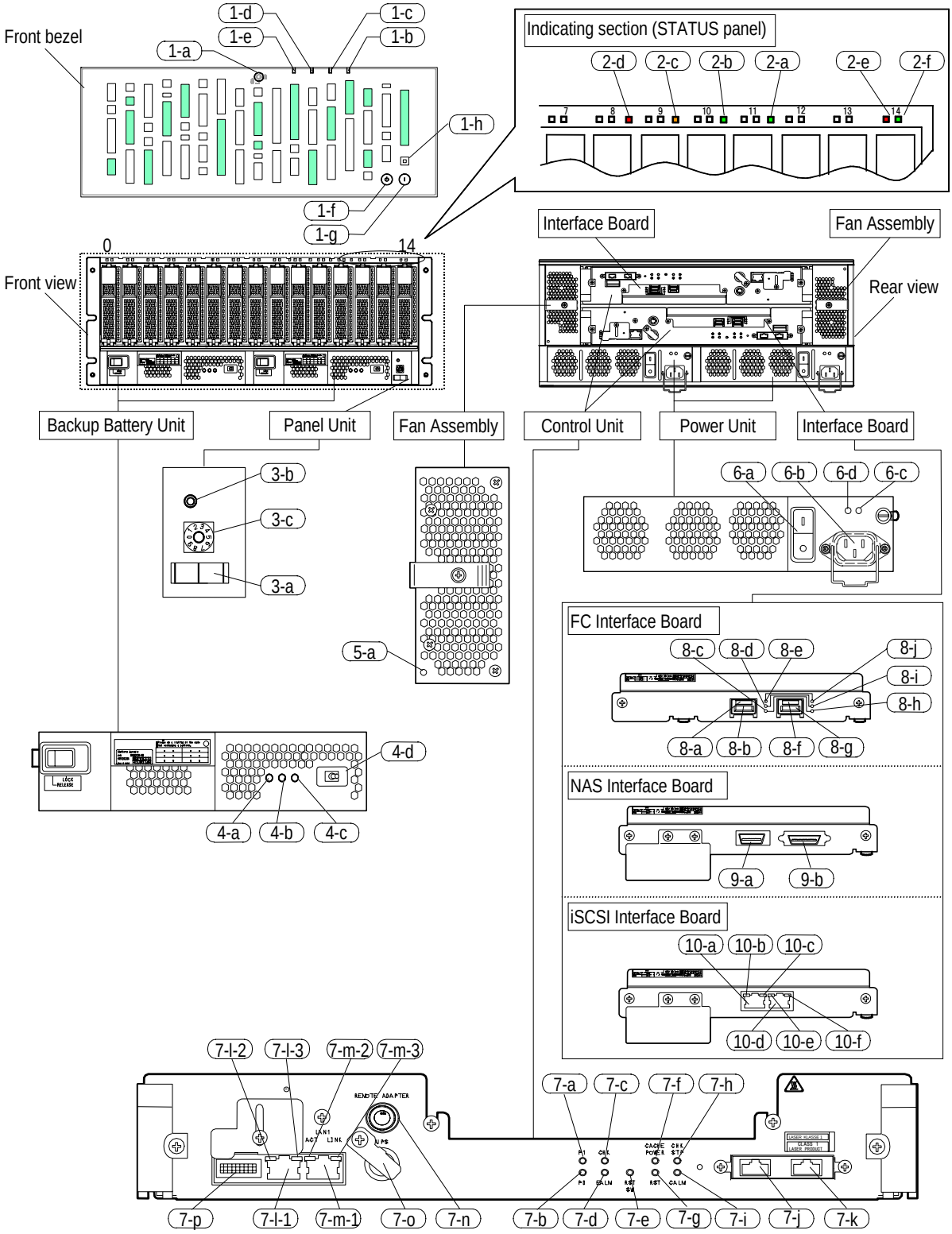


Figure 2.3.1 Indication Locations of Functional Components

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Table 2.3.1 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to the subsystem.
1-c		READY	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
1-d		WARNING	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in unit (It must be detected with WEB).
1-e		ALARM	LED	Red	Lighting Indicates that a failure, which does not allow the subsystem to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
1-f		Main switch (OFF)	Switch	—	OFF : Presses off the power.
1-g		Main switch (ON)	Switch	—	ON : Presses on the power.
1-h		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*1)
2-a	STATUS Panel (RKM)	PWR (POWER)	LED	Green	Indicates that the power supply is supplied to the subsystem.
2-b		RDY (READY)	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
2-c		WARN (WARNING)	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the subsystem to operate, occurred. (It must be detected with WEB).

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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<table>
<tr><th>No.</th><th>Section</th><th>Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>2-d</td><td>STATUS Panel (RKM)</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lighting
Indicates that a failure occurred which makes the subsystem unable to operate.
Blinking
Low-speed blinking :
Indicates that a serious failure occurred while power on.</td></tr>
<tr><td>2-e</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Indicates that a failure which makes the unable to operate occurred.</td></tr>
<tr><td>2-f</td><td></td><td>ACTIVE</td><td>LED</td><td>Green</td><td><table><tr><th>No.</th><th>LED status</th><th>Meaning</th></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Disk Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state.</td></tr><tr><td>3</td><td>Off</td><td>Spin down state.</td></tr></table></td></tr>
<tr><td>3-a</td><td>Panel Unit</td><td>Main switch</td><td>Switch</td><td>—</td><td>Turns on/off the power.
| : Power on
⏻ : Power off</td></tr>
<tr><td>3-b</td><td></td><td>BUZZER OFF SW</td><td>Switch</td><td>—</td><td>Pressing of this switch while the buzzer sounds stops the beep. (*1)</td></tr>
<tr><td>3-c</td><td></td><td>Mode switch</td><td>Switch</td><td>—</td><td>Sets the local/remote mode by the combination of turning on and off of the four mode switches.</td></tr>
<tr><td>4-a</td><td>Backup Battery Unit</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Backup Battery unit is in trouble.
• The BATTERY switch is turned off
• Battery voltage is abnormal.
• Battery temperature abnormal.</td></tr>
<tr><td>4-b</td><td></td><td>CHARGE</td><td>LED</td><td>Orange</td><td>Charging Battery (On)</td></tr>
<tr><td>4-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the state of the battery.
On : Battery is in the normal condition.
Blinking : Charged up when start-up
Off : Abnormal
• The battery switch is turned off.
• The battery is not installed.
• Battery voltage is abnormal.
• Temperature of the battery is abnormal.</td></tr>
<tr><td>4-d</td><td></td><td>BATTERY Switch (There is no switch in the battery of REV. C.)</td><td>Switch</td><td>—</td><td>Turns on/off of the battery power.
When this switch is set to the off, the WARNING LED comes on and the buzzer sounds.
ON: Power on
OFF : Power off</td></tr>
<tr><td>5-a</td><td>Fan Assembly</td><td>ALM</td><td>LED</td><td>Red</td><td>Shows the state of the Fan Assembly
On : Abnormal
Off : Normal</td></tr>
<tr><td>6-a</td><td>Power Unit</td><td>AC Power Unit Switch</td><td>Switch</td><td>—</td><td>Controls the power applied to the subsystem.
| : Power on
○: Power off</td></tr>
<tr><td>6-b</td><td></td><td>Receptor (J1)</td><td>Connector</td><td>—</td><td>Connector on the subsystem side to connect the power cable.</td></tr>
<tr><td>6-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the operation state of the Power Unit.
On : Normal operation
Off : Abnormal operation or out of operation</td></tr>
<tr><td>6-d</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Power Unit is in trouble.</td></tr>
</table>

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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No.	Section	Name		Classification	Color	Function
7-a	Control Unit	P1		LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.
7-b		P0		LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.
7-c		CHK (CHECK)		LED	Red	Shows error factors by means of a number of times of blinking. Once : Drive +5 V voltage is abnormal. Twice : Drive +12 V voltage is abnormal. Five times : Battery is abnormal. Six times : Voltage on the Controller is abnormal. (Reset of the Controller is not canceled.) Seven times : BS12V voltage is abnormal. Nine times : Fans are abnormal. The following blinking is fast because ENC microprogram detects CUDG error. Once : SRAM error. Twice : ENC hard error. Three times : Microprogram error in flash memory. Not blinking : BOOT section error of ENC microprogram, RAM error, or ENC hard configuration error.
7-d		EALM		LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC in the Control Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
7-e		RST SW		Switch	—	Used to perform a Full Dump.
7-f		CACHE POWER		LED	Green	You can check whether the Cache memory is being backed up through indication of this LED. This LED is effective when the AC Power Unit Switch is turned on On : Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Off : The Cache memory is not backed up.
7-g		RST		LED	Orange	Indicates that the Controller is being reset. • During power-on reset • During reset for doing a dump • During reset for a reboot at the time of a microprogram down load • The DC-DC converter or the reset circuit on the Control Unit fails.
7-h		CHKSTP		LED	Red	A failure occurred at Controller and it became not operational.
7-i		CALM		LED	Red	• Indicates that a failure which makes in the Controller unable to operate occurred in it. • Does not light up when the Control Unit is in the reset status.
7-j		PATH0		Connector	—	Connection connector for ENC cable (PATH 0 side).
7-k		PATH1		Connector	—	Connection connector for ENC cable (PATH 1 side).
7-l-1		LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
7-l-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
7-l-2			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.

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No.	Section	Name		Classification	Color	Function
7 m-1	Control Unit	LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
7-m-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
7-m-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.
7-n		Connector for connecting the Remote adapter (J8)		Connector	—	Used to connect the Remote adapter.
7-o		Connector for connecting the UPS interlocking cable (J5)		Connector	—	Used to connect the UPS for the DF700.
7-p		Jumper Connector		Connector	—	There are two cases where the numbers of pins are 8 and 20 respectively depending on the revision of the PCB. (The switch has nothing to do with maintenance because it is used for evaluation.)
8-a	FC Interface Board	Port 0A-0/ Port 1A-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-b			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-c			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-d			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-e			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0 is in trouble.
8-f		Port 0B-0/ Port 1B-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-g			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-h			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-I			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-j			HALM	LED	Red	Lights when the Port 0B-0/Port 1B-0 is in trouble.
9-a	NAS Interface Board	PCI-E		Connector	—	Connection connector for PCI-Express cable
9-b		CTRL		Connector	—	Connection connector for CTRL cable
10-a	iSCSI Interface Board	Port A	iSCSI	Connector	—	Connects the iSCSI cable (Port A side). (For maintenance)
10-b			Active	LED	Yellow	Indicates that data is being transferred via a Port A side.
10-c			Link	LED	Green	Indicates that the link status of the Port A side is normal.
10-d		Port B	iSCSI	Connector	—	Connects the iSCSI cable (Port B side). (For User Management)
10-e			Active	LED	Yellow	Indicates that data is being transferred via a Port B side.
10-f			Link	LED	Green	Indicates that the link status of the Port B side is normal.

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(2) Indication positions and their functions of RKS

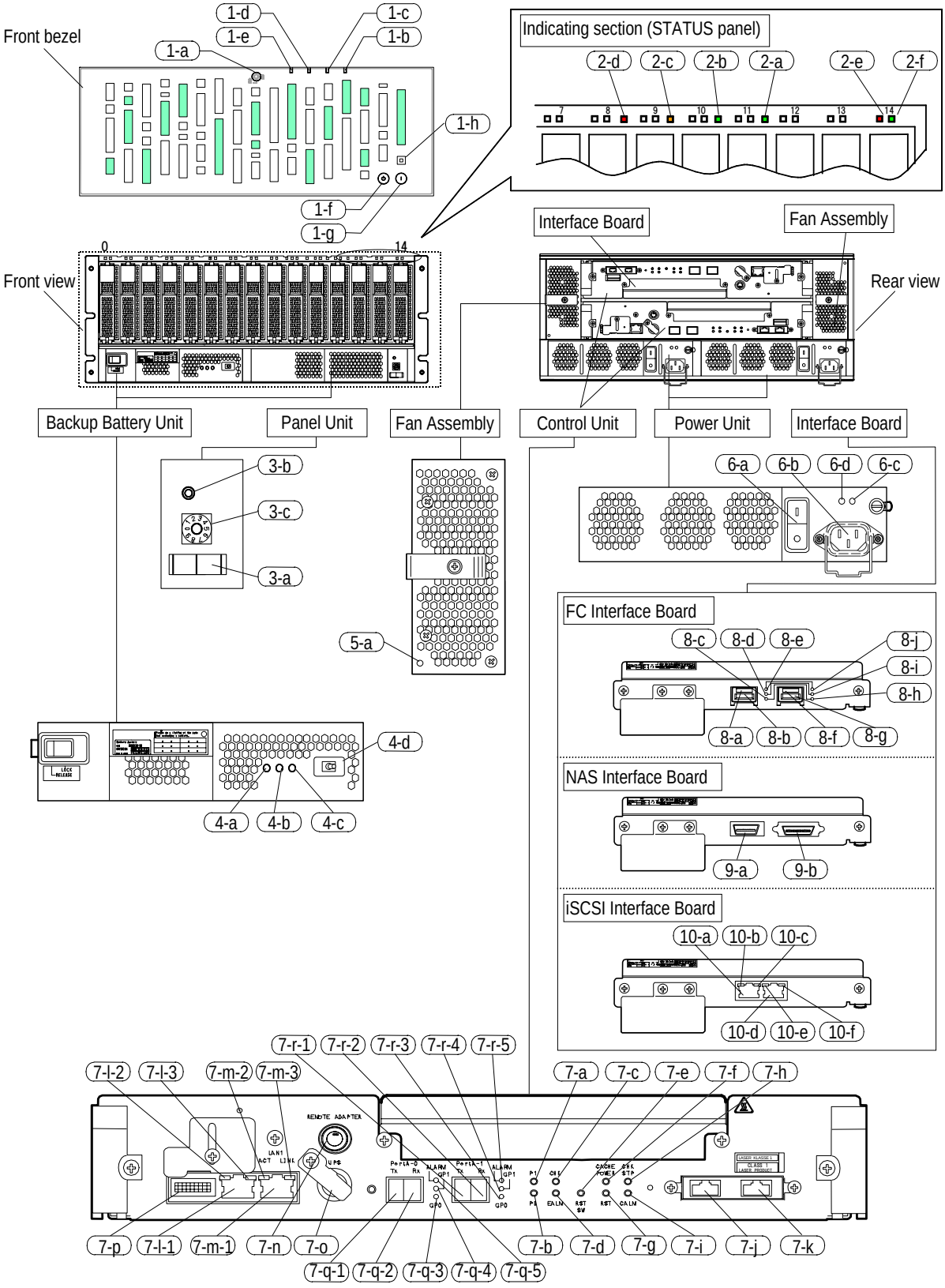


Figure 2.3.2 Indication Locations of Functional Components

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Table 2.3.2 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to the subsystem.
1-c		READY	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
1-d		WARNING	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in unit (It must be detected with WEB).
1-e		ALARM	LED	Red	Lighting Indicates that a failure, which does not allow the subsystem to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
1-f		Main switch (OFF)	Switch	—	OFF : Presses off the power.
1-g		Main switch (ON)	Switch	—	ON : Presses on the power.
1-h		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*1)
2-a	STATUS Panel (RKS)	PWR (POWER)	LED	Green	Indicates that the power supply is supplied to the subsystem.
2-b		RDY (READY)	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
2-c		WARN (WARNING)	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the subsystem to operate, occurred. (It must be detected with WEB).

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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<table>
<tr><th>No.</th><th>Section</th><th>Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>2-d</td><td>STATUS Panel (RKS)</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lighting
Indicates that a failure occurred which makes the subsystem unable to operate.
Blinking
Low-speed blinking :
Indicates that a serious failure occurred while power on.</td></tr>
<tr><td>2-e</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Indicates that a failure which makes the unable to operate occurred.</td></tr>
<tr><td>2-f</td><td></td><td>ACTIVE</td><td>LED</td><td>Green</td><td><table><tr><th>No.</th><th>LED status</th><th>Meaning</th></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Disk Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state.</td></tr><tr><td>3</td><td>Off</td><td>Spin down state.</td></tr></table></td></tr>
<tr><td>3-a</td><td>Panel Unit</td><td>Main switch</td><td>Switch</td><td>—</td><td>Turns on/off the power.
| : Power on
⏻ : Power off</td></tr>
<tr><td>3-b</td><td></td><td>BUZZER OFF SW</td><td>Switch</td><td>—</td><td>Pressing of this switch while the buzzer sounds stops the beep. (*1)</td></tr>
<tr><td>3-c</td><td></td><td>Mode switch</td><td>Switch</td><td>—</td><td>Sets the local/remote mode by the combination of turning on and off of the four mode switches.</td></tr>
<tr><td>4-a</td><td>Backup Battery Unit</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Backup Battery unit is in trouble.
• The BATTERY switch is turned off
• Battery voltage is abnormal.
• Battery temperature abnormal.</td></tr>
<tr><td>4-b</td><td></td><td>CHARGE</td><td>LED</td><td>Orange</td><td>Charging Battery (On)</td></tr>
<tr><td>4-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the state of the battery.
On : Battery is in the normal condition.
Blinking : Charged up when start-up
Off : Abnormal
• The battery switch is turned off.
• The battery is not installed.
• Battery voltage is abnormal.
• Temperature of the battery is abnormal.</td></tr>
<tr><td>4-d</td><td></td><td>BATTERY Switch (There is no switch in the battery of REV. C.)</td><td>Switch</td><td>—</td><td>Turns on/off of the battery power.
When this switch is set to the off, the WARNING LED comes on and the buzzer sounds.
ON: Power on
OFF : Power off</td></tr>
<tr><td>5-a</td><td>Fan Assembly</td><td>ALM</td><td>LED</td><td>Red</td><td>Shows the state of the Fan Assembly
On : Abnormal
Off : Normal</td></tr>
<tr><td>6-a</td><td>Power Unit</td><td>AC Power Unit Switch</td><td>Switch</td><td>—</td><td>Controls the power applied to the subsystem.
| : Power on
○: Power off</td></tr>
<tr><td>6-b</td><td></td><td>Receptor (J1)</td><td>Connector</td><td>—</td><td>Connector on the subsystem side to connect the power cable.</td></tr>
<tr><td>6-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the operation state of the Power Unit.
On : Normal operation
Off : Abnormal operation or out of operation</td></tr>
<tr><td>6-d</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Power Unit is in trouble.</td></tr>
</table>

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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No.	Section	Name		Classification	Color	Function
7-a	Control Unit	P1		LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.
7-b		P0		LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.
7-c		CHK (CHECK)		LED	Red	Shows error factors by means of a number of times of blinking. Once : Drive +5 V voltage is abnormal. Twice : Drive +12 V voltage is abnormal. Five times : Battery is abnormal. Six times : Voltage on the Controller is abnormal. (Reset of the Controller is not canceled.) Seven times : BS12V voltage is abnormal. Nine times : Fans are abnormal. The following blinking is fast because ENC microprogram detects CUDG error. Once : SRAM error. Twice : ENC hard error. Three times : Microprogram error in flash memory. Not blinking : BOOT section error of ENC microprogram, RAM error, or ENC hard configuration error.
7-d		EALM		LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC in the Control Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
7-e		RST SW		Switch	—	Used to perform a Full Dump.
7-f		CACHE POWER		LED	Green	You can check whether the Cache memory is being backed up through indication of this LED. This LED is effective when the AC Power Unit Switch is turned on On : Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Off : The Cache memory is not backed up.
7-g		RST		LED	Orange	Indicates that the Controller is being reset. • During power-on reset • During reset for doing a dump • During reset for a reboot at the time of a microprogram down load
7-h		CHKSTP		LED	Red	A failure occurred at Controller and it became not operational.
7-i		CALM		LED	Red	Indicates that a failure which makes in the Controller unable to operate occurred in it.
7-j		PATH0		Connector	—	Connection connector for ENC cable (PATH 0 side).
7-k		PATH1		Connector	—	Connection connector for ENC cable (PATH 1 side).
7-l-1		LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
7-l-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
7-l-2			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.
7-m-1		LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
7-m-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
7-m-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.

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No.	Section	Name		Classification	Color	Function
7-n	Control Unit	Connector for connecting the Remote adapter (J8)		Connector	—	Used to connect the Remote adapter.
7-o		Connector for connecting the UPS interlocking cable (J5)		Connector	—	Used to connect the UPS for the DF700.
7-p		Voltage Check Connector		Connector	—	There are two cases where the numbers of pins are 8 and 20 respectively depending on the revision of the PCB. (The switch has nothing to do with maintenance because it is used for evaluation.)
7-q-1		Port 0A-0/ Port 1A-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
7-q-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
7-q-3			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
7-q-4			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
7-q-5			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0 is in trouble.
7-r-1		Port 0A-1/ Port 1A-1	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-1/Port 1A-1 side.
7-r-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-1/Port 1A-1 side.
7-r-3			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-1/Port 1A-1 side.
7-r-4			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-1/Port 1A-1 side.
7-r-5			HALM	LED	Red	Lights when the Port 0A-1/Port 1A-1 is in trouble.
8-a	FC Interface Board	Port 0A-0/ Port 1A-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-b			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-c			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-d			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-e			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0 is in trouble.
8-f		Port 0B-0/ Port 1B-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-g			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-h			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-I			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-j			HALM	LED	Red	Lights when the Port 0B-0/Port 1B-0 is in trouble.
9-a	NAS Interface Board	PCI-E		Connector	—	Connection connector for PCI-Express cable
9-b		CTRL		Connector	—	Connection connector for CTRL cable
10-a	iSCSI Interface Board	Port A	iSCSI	Connector	—	Connects the iSCSI cable (Port A side). (For maintenance)
10-b			Active	LED	Yellow	Indicates that data is being transferred via a Port A side.
10-c			Link	LED	Green	Indicates that the link status of the Port A side is normal.
10-d		Port B	iSCSI	Connector	—	Connects the iSCSI cable (Port B side). (For User Management)
10-e			Active	LED	Yellow	Indicates that data is being transferred via a Port B side.
10-f			Link	LED	Green	Indicates that the link status of the Port B side is normal.

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(3) Indication positions and their functions of RKXS

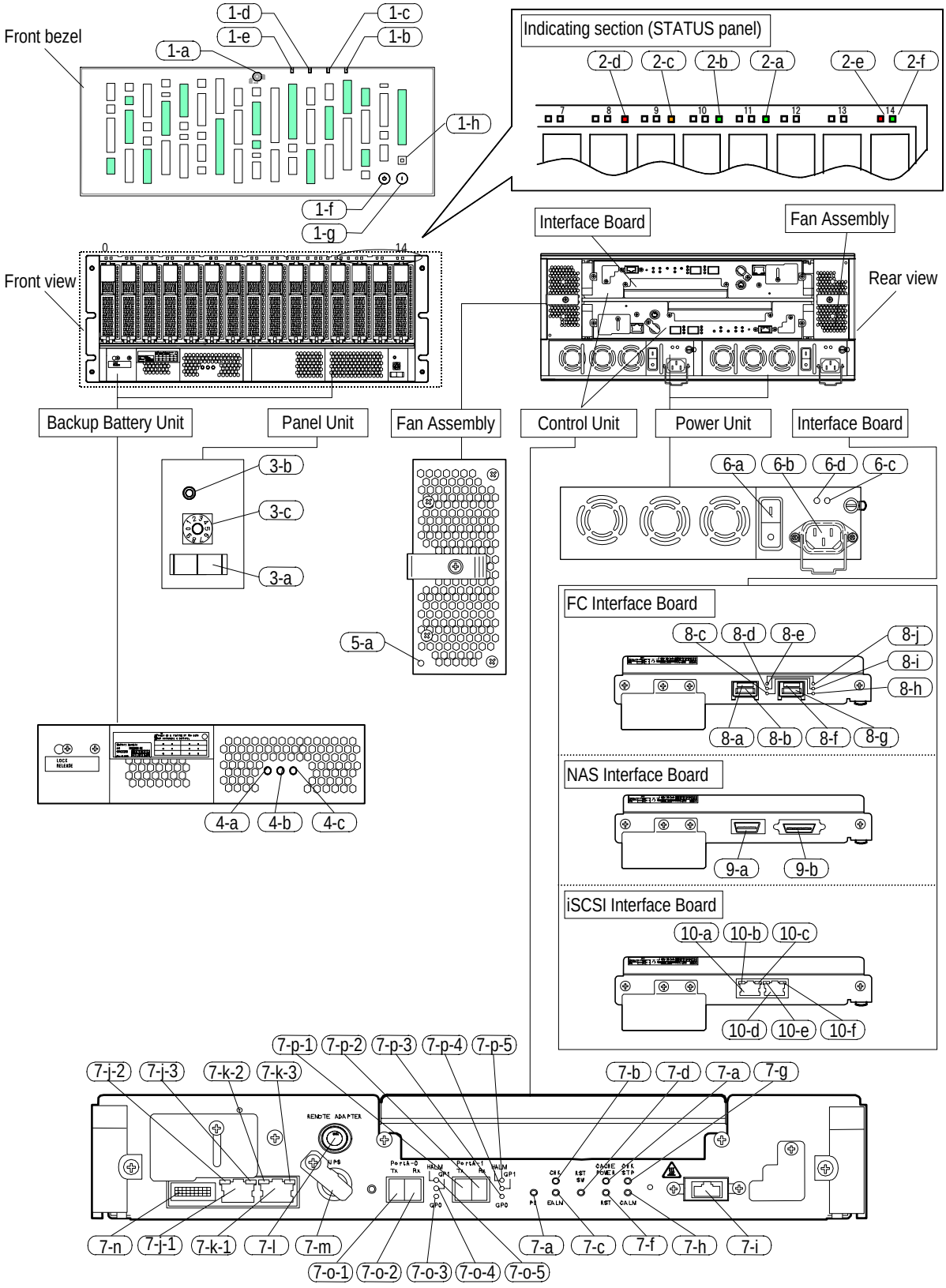


Figure 2.3.3 Indication Locations of Functional Components

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Table 2.3.3 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to the subsystem.
1-c		READY	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
1-d		WARNING	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in unit (It must be detected with WEB).
1-e		ALARM	LED	Red	Lighting Indicates that a failure, which does not allow the subsystem to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
1-f		Main switch (OFF)	Switch	—	OFF : Presses off the power.
1-g		Main switch (ON)	Switch	—	ON : Presses on the power.
1-h		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*1)
2-a	STATUS Panel (RKXS)	PWR (POWER)	LED	Green	Indicates that the power supply is supplied to the subsystem.
2-b		RDY (READY)	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
2-c		WARN (WARNING)	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the subsystem to operate, occurred. (It must be detected with WEB).

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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<table>
<tr><th>No.</th><th>Section</th><th>Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>2-d</td><td>STATUS Panel (RKXS)</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lighting
Indicates that a failure occurred which makes the subsystem unable to operate.
Blinking
Low-speed blinking :
Indicates that a serious failure occurred while power on.</td></tr>
<tr><td>2-e</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Indicates that a failure which makes the unable to operate occurred.</td></tr>
<tr><td>2-f</td><td></td><td>ACTIVE</td><td>LED</td><td>Green</td><td><table><tr><th>No.</th><th>LED status</th><th>Meaning</th></tr><tr><td>1</td><td>Blinking</td><td>Shows that the Disk Drive is being accessed.</td></tr><tr><td>2</td><td>On</td><td>Spin up state.</td></tr><tr><td>3</td><td>Off</td><td>Spin down state.</td></tr></table></td></tr>
<tr><td>3-a</td><td>Panel Unit</td><td>Main switch</td><td>Switch</td><td>—</td><td>Turns on/off the power.
| : Power on
⏻ : Power off</td></tr>
<tr><td>3-b</td><td></td><td>BUZZER OFF SW</td><td>Switch</td><td>—</td><td>Pressing of this switch while the buzzer sounds stops the beep. (*1)</td></tr>
<tr><td>3-c</td><td></td><td>Mode switch</td><td>Switch</td><td>—</td><td>Sets the local/remote mode by the combination of turning on and off of the four mode switches.</td></tr>
<tr><td>4-a</td><td>Backup Battery Unit</td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Backup Battery unit is in trouble.
• Battery voltage is abnormal.
• Battery temperature abnormal.</td></tr>
<tr><td>4-b</td><td></td><td>CHARGE</td><td>LED</td><td>Orange</td><td>Charging Battery (On)</td></tr>
<tr><td>4-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the state of the battery.
On : Battery is in the normal condition.
Blinking : Charged up when start-up
Off : Abnormal
• The battery is not installed.
• Battery voltage is abnormal.
• Temperature of the battery is abnormal.</td></tr>
<tr><td>5-a</td><td>Fan Assembly</td><td>ALM</td><td>LED</td><td>Red</td><td>Shows the state of the Fan Assembly
On : Abnormal
Off : Normal</td></tr>
<tr><td>6-a</td><td>Power Unit</td><td>AC Power Unit Switch</td><td>Switch</td><td>—</td><td>Controls the power applied to the subsystem.
| : Power on
○ : Power off</td></tr>
<tr><td>6-b</td><td></td><td>Receptor (J1)</td><td>Connector</td><td>—</td><td>Connector on the subsystem side to connect the power cable.</td></tr>
<tr><td>6-c</td><td></td><td>READY</td><td>LED</td><td>Green</td><td>Shows the operation state of the Power Unit.
On : Normal operation
Off : Abnormal operation or out of operation</td></tr>
<tr><td>6-d</td><td></td><td>ALARM</td><td>LED</td><td>Red</td><td>Lights when the Power Unit is in trouble.</td></tr>
</table>

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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No.	Section	Name		Classification	Color	Function
7-a	Control Unit	P0		LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.
7-b		CHK (CHECK)		LED	Red	Shows error factors by means of a number of times of blinking. Five times : BATTERY is abnormal. Six times : Voltage on the Controller is abnormal. (Reset of the Controller is not canceled.) Seven times : BS12V voltage is abnormal. Eight times : ENC part FAN monitoring circuit is abnormal. Nine times : Fans are abnormal. The following blinking is fast because ENC microprogram detects CUDG error. On : RAM error detected by ENC microprogram. ENC hard configuration error. Twice : ENC hard error. Five times : CUDG error detected by ENC microprogram (BOOT section). Six times : Significant surface error in ENC FLASH. Seven times : SUM check error in ENC FLASH.
7-c		EALM		LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC in the Control Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
7-d		RST SW		Switch	—	Used to perform a Full Dump.
7-e		CACHE POWER		LED	Green	You can check whether the Cache memory is being backed up through indication of this LED. This LED is effective when the AC Power Unit Switch is turned on On : Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Off : The Cache memory is not backed up.
7-f		RST		LED	Orange	Indicates that the Controller is being reset. • During power-on reset • During reset for doing a dump • During reset for a reboot at the time of a microprogram down load • The DC-DC converter or the reset circuit on the Control Unit fails.
7-g		CHKSTP		LED	Red	A failure occurred at Controller and it became not operational.
7-h		CALM		LED	Red	• Indicates that a failure which makes in the Controller unable to operate occurred in it. • Does not light up when the Control Unit is in the reset status.
7-i		PATH0		Connector	—	Connection connector for ENC cable (PATH 0 side).
7-j-1		LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
7-j-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
7-j-2			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.
7-k-1		LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
7-k-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
7-k-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.

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No.	Section	Name		Classification	Color	Function
7-l	Control Unit	Connector for connecting the Remote adapter (J8)		Connector	—	Used to connect the Remote adapter.
7-m		Connector for connecting the UPS interlocking cable (J5)		Connector	—	Used to connect the UPS for the DF700.
7-n		Voltage Check Connector		Connector	—	There are two cases where the numbers of pins are 8 and 20 respectively depending on the revision of the PCB. (The switch has nothing to do with maintenance because it is used for evaluation.)
7-o-1		Port 0A-0/ Port 1A-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
7-o-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
7-o-3			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
7-o-4			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
7-o-5			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0 is in trouble.
7-p-1		Port 0A-1/ Port 1A-1	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-1/Port 1A-1 side.
7-p-2			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-1/Port 1A-1 side.
7-p-3			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-1/Port 1A-1 side.
7-p-4			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-1/Port 1A-1 side.
7-p-5			HALM	LED	Red	Lights when the Port 0A-1/Port 1A-1 is in trouble.
8-a	FC Interface Board	Port 0A-0/ Port 1A-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-b			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0 side.
8-c			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-d			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0 side.
8-e			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0 is in trouble.
8-f		Port 0B-0/ Port 1B-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-g			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0 side.
8-h			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-l			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0 side.
8-j			HALM	LED	Red	Lights when the Port 0B-0/Port 1B-0 is in trouble.
9-a	NAS Interface Board	PCI-E		Connector	—	Connection connector for PCI-Express cable
9-b		CTRL		Connector	—	Connection connector for CTRL cable
10-a	iSCSI Interface Board	Port A	iSCSI	Connector	—	Connects the iSCSI cable (Port A side). (For maintenance)
10-b			Active	LED	Yellow	Indicates that data is being transferred via a Port A side.
10-c			Link	LED	Green	Indicates that the link status of the Port A side is normal.
10-d		Port B	iSCSI	Connector	—	Connects the iSCSI cable (Port B side). (For User Management)
10-e			Active	LED	Yellow	Indicates that data is being transferred via a Port B side.
10-f			Link	LED	Green	Indicates that the link status of the Port B side is normal.

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(4) Indication positions and their functions of RKH

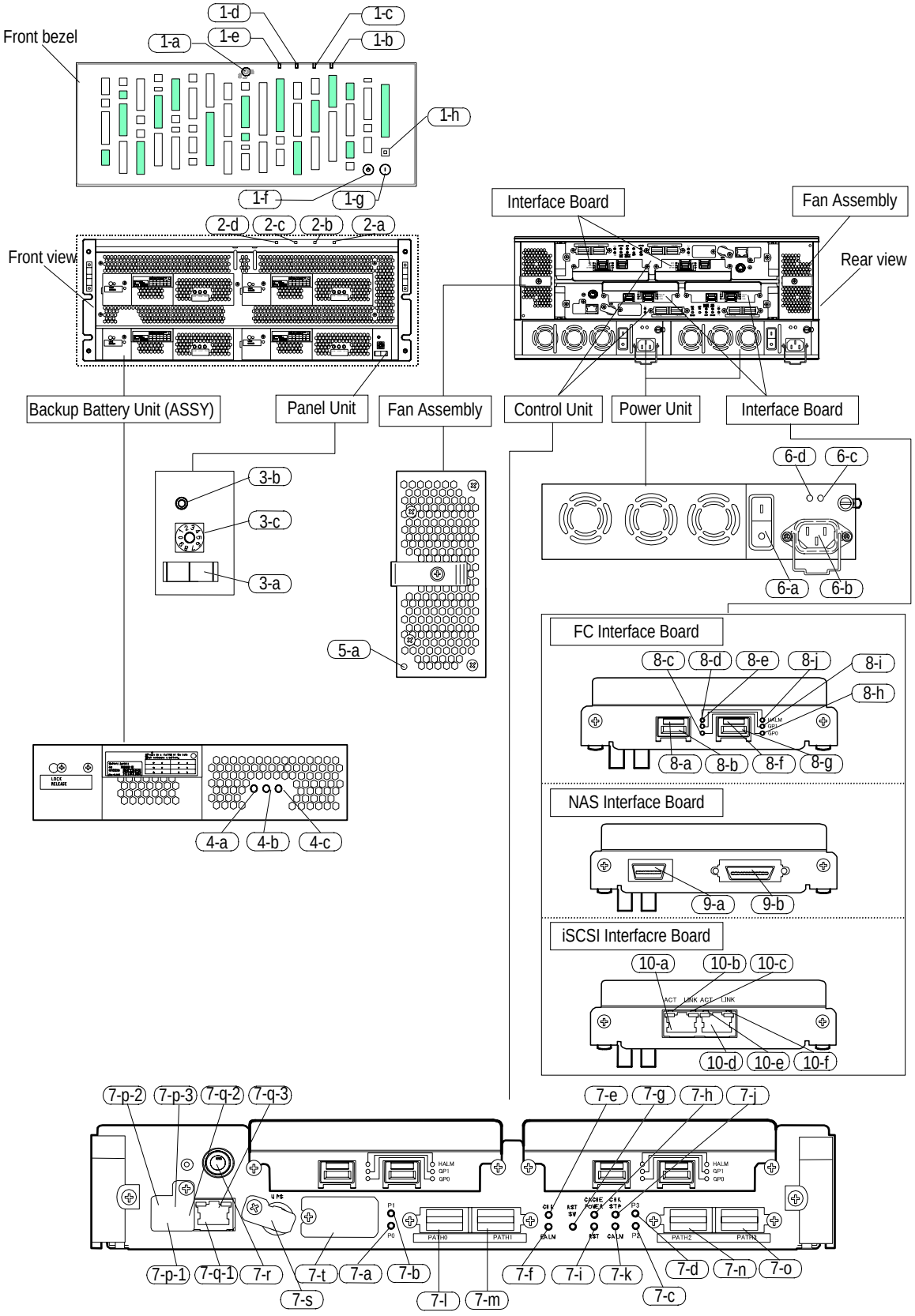


Figure 2.3.3.1 Indication Locations of Functional Components

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Table 2.3.3.1 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to the subsystem.
1-c		READY	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.
1-d		WARNING	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which does not stop operation occurred in unit (It must be detected with WEB).
1-e		ALARM	LED	Red	Lighting Indicates that a failure, which does not allow the subsystem to operate, occurred. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
1-f		Main switch (OFF)	Switch	—	OFF : Presses off the power.
1-g		Main switch (ON)	Switch	—	ON : Presses on the power.
1-h		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*1)
2-a	STATUS Panel (RKH)	PWR (POWER)	LED	Green	Indicates that the power supply is supplied to the subsystem.
2-b		RDY (READY)	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the automatic download of the ENC/SENC firmware is being executed in the dual controller configuration. Low-speed blinking : Indicates that the download processing of the ENC/SENC firmware is completed online.

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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No.	Section	Name	Classification	Color	Function
2-c	STATUS Panel (RKH)	WARN (WARNING)	LED	Orange	Lighting Indicates that a failure, which allows the subsystem to operate, occurred. Blinking High-speed blinking : Indicates that the most recent revision maintenance function of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Low-speed blinking : Indicates that a failure, which allows the subsystem to operate, occurred. (It must be detected with WEB).
2-d		ALARM	LED	Red	Lighting Indicates that a failure occurred which makes the subsystem unable to operate. Blinking Low-speed blinking : Indicates that a serious failure occurred while power on.
3-a	Panel Unit	Main switch	Switch	—	Turns on/off the power. | : Power on ⏻ : Power off
3-b		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*1)
3-c		Mode switch	Switch	—	Sets the local/remote mode by the combination of turning on and off of the four mode switches.
4-a	Backup Battery Unit	ALARM	LED	Red	Lights when the Backup Battery unit is in trouble. • Battery voltage is abnormal. • Battery temperature abnormal.
4-b		CHARGE	LED	Orange	Charging Battery (On)
4-c		READY	LED	Green	Shows the state of the battery. On : Battery is in the normal condition. Blinking : Charged up when start-up Off : Abnormal • The battery is not installed. • Battery voltage is abnormal. • Temperature of the battery is abnormal.
5-a	Fan Assembly	ALM	LED	Red	Shows the state of the Fan Assembly On : Abnormal Off : Normal
6-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on ○ : Power off
6-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
6-c		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
6-d		ALARM	LED	Red	Lights when the Power Unit is in trouble.

*1 : In case of a serious failure of hardware (Electrical surges of both power supplies and so on), the buzzer does not stop even if you push the button to call attention. In this case, perform the appropriate recovery procedure depending on each cause.

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No.	Section	Name	Classification	Color	Function
7-a	Control Unit	P0	LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.
7-b		P1	LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.
7-c		P2	LED	Green	Indicates that the link status of the FC-AL (loop 2 side) is normal.
7-d		P3	LED	Green	Indicates that the link status of the FC-AL (loop 3 side) is normal.
7-e		CHK (CHECK)	LED	Red	Shows error factors by means of a number of times of blinking. Once : Drive +5 V voltage is abnormal. Twice : Drive +12 V voltage is abnormal. Five times : Battery is abnormal. Six times : Voltage on the Controller is abnormal. (Reset of the Controller is not canceled.) Seven times : BS12V voltage is abnormal. Nine times : Fans are abnormal. The following blinking is fast because ENC microprogram detects CUDG error. Once : SRAM error. Twice : ENC hard error. Three times : Microprogram error in flash memory. Not blinking : BOOT section error of ENC microprogram, RAM error, or ENC hard configuration error.
7-f		EALM	LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC in the Control Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
7-g		RST SW	Switch	—	Used to perform a Full Dump.
7-h		CACHE POWER	LED	Green	You can check whether the Cache memory is being backed up through indication of this LED. This LED is effective when the AC Power Unit Switch is turned on On : Indicates that the cache is being backed up. (The power is supplied from the battery to the Cache memory.) Off : The Cache memory is not backed up.
7-i		RST	LED	Orange	Indicates that the Controller is being reset. • During power-on reset • During reset for doing a dump • During reset for a reboot at the time of a microprogram down load • The DC-DC converter or the reset circuit on the Control Unit fails.
7-j		CHKSTP	LED	Red	A failure occurred at Controller and it became not operational.
7-k		CALM	LED	Red	• Indicates that a failure which makes in the Controller unable to operate occurred in it. • Does not light up when the Control Unit is in the reset status.
7-l		PATH0	Connector	—	Connection connector for ENC cable (PATH 0 side).
7-m		PATH1	Connector	—	Connection connector for ENC cable (PATH 1 side).
7-n		PATH2	Connector	—	Connection connector for ENC cable (PATH 2 side).
7-o		PATH3	Connector	—	Connection connector for ENC cable (PATH 3 side).

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No.	Section	Name		Classification	Color	Function
7-p-1	Control Unit	LAN0	LAN0	Connector	—	Connects the LAN0 cable. (For maintenance)
7-p-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 0.
7-p-3			LINK	LED	Green	Indicates that the link status of the LAN 0 is normal.
7-q-1		LAN1	LAN1	Connector	—	Connects the LAN1 cable. (For User Management)
7-q-2			ACT	LED	Yellow	Indicates that data is being transferred via a LAN 1.
7-q-3			LINK	LED	Green	Indicates that the link status of the LAN 1 is normal.
7-r		Connector for connecting the Remote adapter (J8)		Connector	—	Used to connect the Remote adapter.
7-s		Connector for connecting the UPS interlocking cable (J5)		Connector	—	Used to connect the UPS for the DF700.
7-t		Voltage Check Connector		Connector	—	Voltage Check Connector of 16 pins. (The switch has nothing to do with maintenance because it is used for evaluation.)
8-a	FC Interface Board	Port 0A-0/ Port 1A-0/ Port 0C-0/ Port 1C-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0/Port 0C-0/Port 1C-0 side.
8-b			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0A-0/Port 1A-0/Port 0C-0/Port 1C-0 side.
8-c			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0/Port 0C-0/Port 1C-0 side.
8-d			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0A-0/Port 1A-0/Port 0C-0/Port 1C-0side.
8-e			HALM	LED	Red	Lights when the Port 0A-0/Port 1A-0/Port 0C-0/Port 1C-0 is in trouble.
8-f		Port 0B-0/ Port 1B-0/ Port 0D-0/ Port 1D-0	Tx	Connector	—	Connector on the signal output side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0/Port 0D-0/Port 1D-0 side.
8-g			Rx	Connector	—	Connector on the signal input side to connect the Fibre Channel interface cable in the Port 0B-0/Port 1B-0/Port 0D-0/Port 1D-0 side.
8-h			GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0/Port 0D-0/Port 1D-0 side.
8-I			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port 0B-0/Port 1B-0/Port 0D-0/Port 1D-0 side.
8-j			HALM	LED	Red	Lights when the Port 0B-0/Port 1B-0/Port 0D-0/Port 1D-0 is in trouble.
9-a	NAS Interface Board	PCI-E		Connector	—	Connection connector for PCI-Express cable
9-b		CTRL		Connector	—	Connection connector for CTRL cable
10-a	iSCSI Interface Board	Port A	iSCSI	Connector	—	Connects the iSCSI cable (Port A side). (For maintenance)
10-b			Active	LED	Yellow	Indicates that data is being transferred via a Port A side.
10-c			Link	LED	Green	Indicates that the link status of the Port A side is normal.
10-d		Port B	iSCSI	Connector	—	Connects the iSCSI cable (Port B side). (For User Management)
10-e			Active	LED	Yellow	Indicates that data is being transferred via a Port B side.
10-f			Link	LED	Green	Indicates that the link status of the Port B side is normal.

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(5) Indication positions and their functions of RKAJ

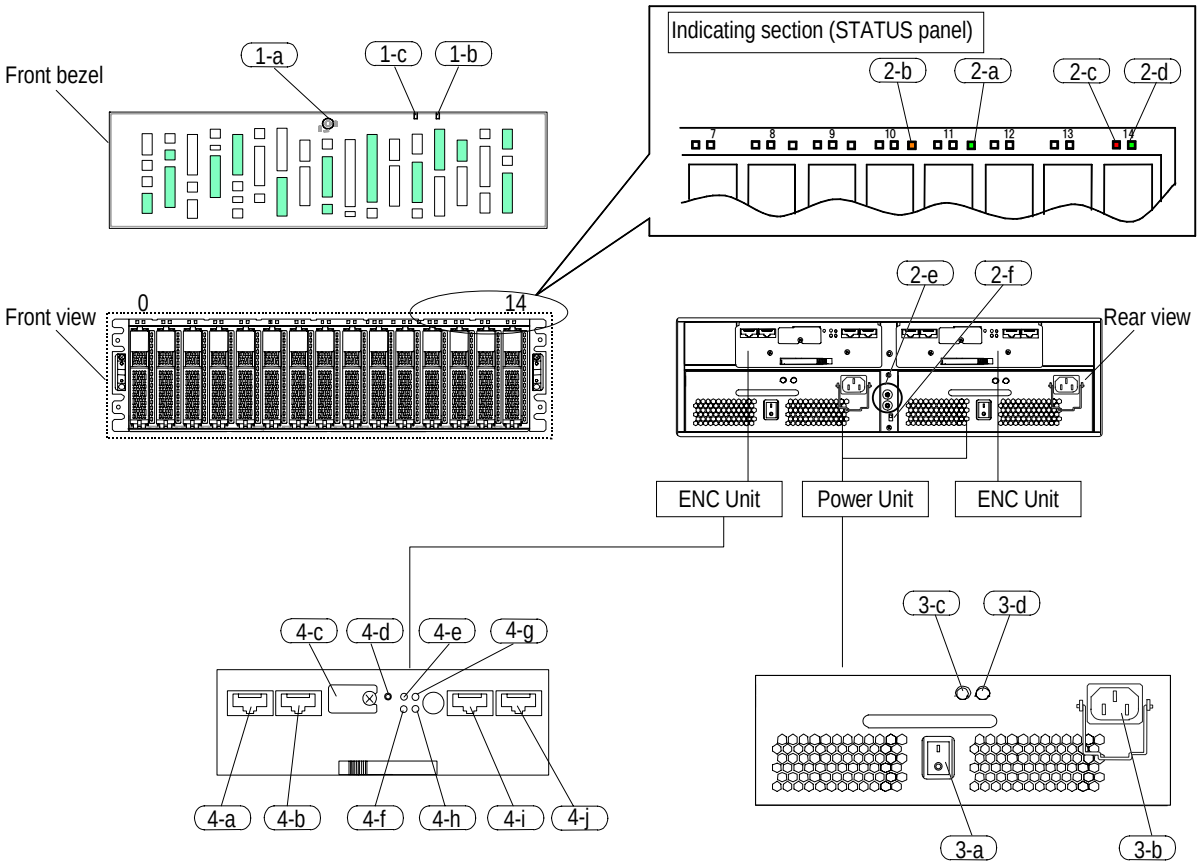


Figure 2.3.4 Indication Locations of Functional Components

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Table 2.3.4 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to RKAJ.
1-c		WARNING	LED	Orange	Indicates that a failure, which allows RKAJ to operate, occurred.
2-a	STATUS Panel (RKAJ)	PWR (POWER)	LED	Green	Indicates that the power is supplied to the RKAJ/RKAJAT.
2-b		WARN (WARNING)	LED	Orange	Indicates that a failure which allows the RKAJ/RKAJAT operation occurred.
2-c		ALARM	LED	Red	Indicates that a failure which makes the unable to operate occurred.
2-d		ACTIVE	LED	Green	No. / LED status / Meaning 1 / Blinking / Shows that the Disk Drive is being accessed. 2 / On / Spin up state. 3 / Off / Spin down state.
2-e		Device ID	Switch	—	Sets the device ID (*1) of the RKAJ/RKAJAT.
2-f		Subsystem identification	Switch	—	Sets the basic subsystem to be connected. M : RKH/RKM S : RKS
3-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on ○: Power off
3-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
3-c		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
3-d		ALARM	LED	Red	Lights when the Power Unit is in trouble.
4-a	ENC Unit	PATH0 (IN side)	Connector	—	Connection (for input) connector for ENC cable (PATH0 side).
4-b		PATH1 (IN side)	Connector	—	Connection connector (for input) for ENC cable (PATH1 side).
4-c		Jumper Connector (J30 : RKAJ)	Connector	—	Type : Four pins (The switch has nothing to do with maintenance because it is used for evaluation.)
4-d		SW	Switch	—	Not used (The switch has nothing to do with maintenance because it is used for evaluation.)
4-e		P1	LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.
4-f		P0	LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.
4-g		CHK	LED	Red	ENC Unit It indicates error factors by means of number of times of blinking. Low-speed blinking: Once : Logic +5 V voltage is abnormal. Twice : Logic +12 V voltage is abnormal. Six times : Logic + 2.5V voltage of the ENC Unit is abnormal. CUDG error detected by ENC microprogram. Lighting: CUDG error detected by ENC microprogram (BOOT section) RAM error detected by ENC microprogram ENC hard configuration error High-speed blinking: Once : SRAM error. Twice : CUDG error in ENC hard. Three times : Microprogram error in flash memory.

*1 : When the basic chassis is the RKM/RKS, the device ID #0 is fixedly assigned to the RKM/RKS.

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No.	Section	Name		Classification	Color	Function
4-h	ENC Unit	ALM		LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
4-i		PATH0	(OUT side)	Connector	—	Connection connector (for output) for ENC cable (PATH 0 side).
4-j		PATH1		Connector	—	Connection connector (for output) for ENC cable (PATH 1 side).

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(6) Indication positions and their functions of RKAJAT/RKAJATL

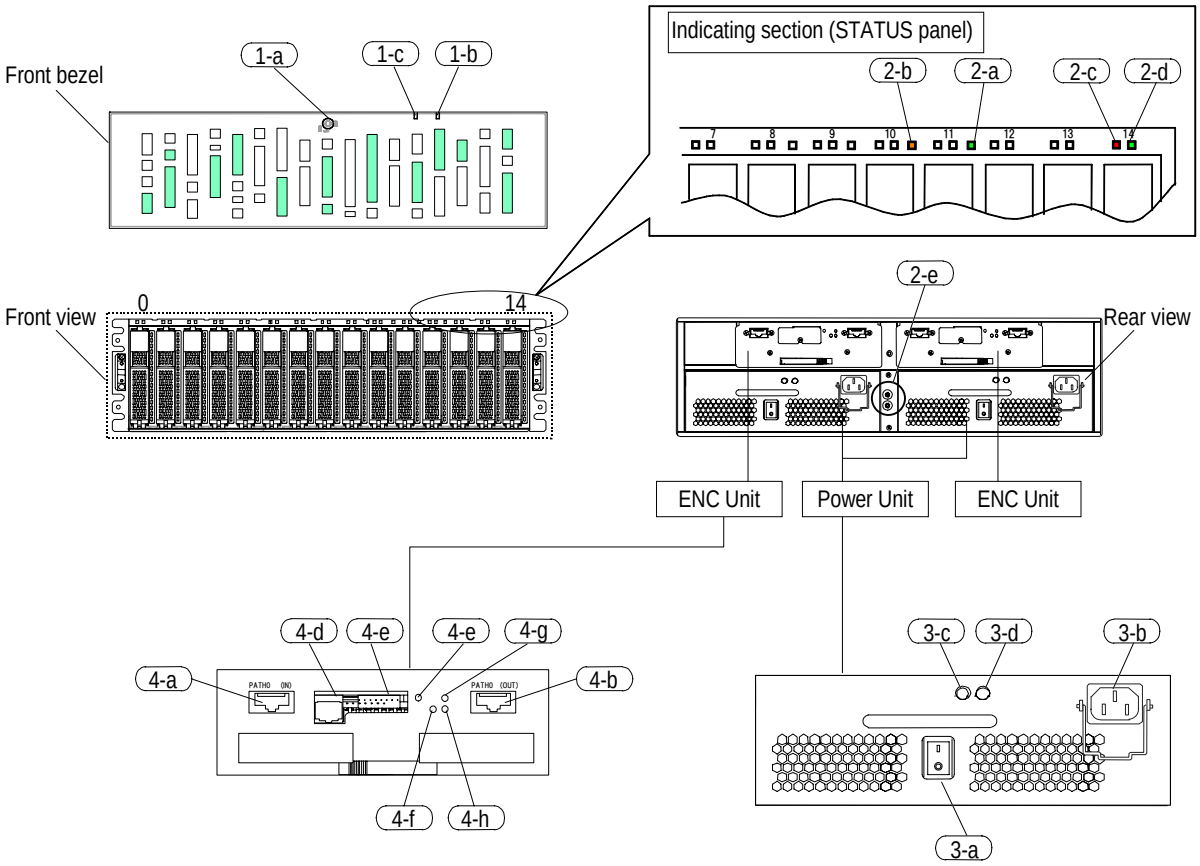


Figure 2.3.5 Indication Locations of Functional Components

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Table 2.3.5 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to RKAJAT/RKAJATL(*1).
1-c		WARNING	LED	Orange	Indicates that a failure, which allows RKAJAT/RKAJATL(*1) to operate, occurred.
2-a	STATUS Panel (RKAJAT/ RKAJATL(*1))	PWR (POWER)	LED	Green	Indicates that the power is supplied to the RKAJ/RKAJAT/ RKAJATL(*1).
2-b		WARN (WARNING)	LED	Orange	Indicates that a failure which allows the RKAJ/RKAJAT/ RKAJATL(*1) operation occurred.
2-c		ALARM	LED	Red	Indicates that a failure which makes the unable to operate occurred.
2-d		ACTIVE	LED	Green	No. 1: LED status Blinking: Shows that the Disk Drive is being accessed. No. 2: LED status On: Spin up state. No. 3: LED status Off: Spin down state.
2-e		Device ID	Switch	—	Sets the device ID (*2) of the RKAJ/RKAJAT/RKAJATL(*1).
2-f			Switch	—	M : RKM S : RKS
3-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on ○: Power off
3-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
3-c		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
3-d		ALARM	LED	Red	Lights when the Power Unit is in trouble.
4-a	SENC Unit	PATH0 (IN side)	Connector	—	Connection (for input) connector for ENC cable (PATH0 side).
4-b		PATH1 (IN side)	Connector	—	Connection connector (for input) for ENC cable (PATH1 side).
4-c		Voltage Check Connector	Connector	—	Not used (The switch has nothing to do with maintenance because it is used for evaluation.)
4-d		Connector for connecting a processor	Connector	—	To be used when connecting the console cable of a processor. (For setup before shipment)
4-e		SW	Switch	—	Not used (The switch has nothing to do with maintenance because it is used for evaluation.)
4-f		P1	LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.

*1 : RKAJATL can be only connected to RKXS.

*2 : When the basic chassis is the RKM/RKS, the device ID #0 is fixedly assigned to the RKM/RKS.

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No.	Section	Name	Classification	Color	Function
4-g	SENC Unit	CHK	LED	Red	SENC Unit (RKAJAT) The CHK LED (Red) lights on (for about 10 seconds) while the CUDG is being executed. Also, it indicates error factors in the subsystem by the number of times of blinking. Low-speed blinking: Twice : CUDG error in SENC Eight times : Fan selector circuit error. Lighting: CUDG error in BOOT section of SENC High-speed blinking: Five times : Fixed data error in flash memory. Six times : Significant surface error in flash memory Seven times : SUM check error in flash memory
4-h		ALM	LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)

*1 : RKAJATL can be only connected to RKXS.

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(7) Indication positions and their functions of RKA

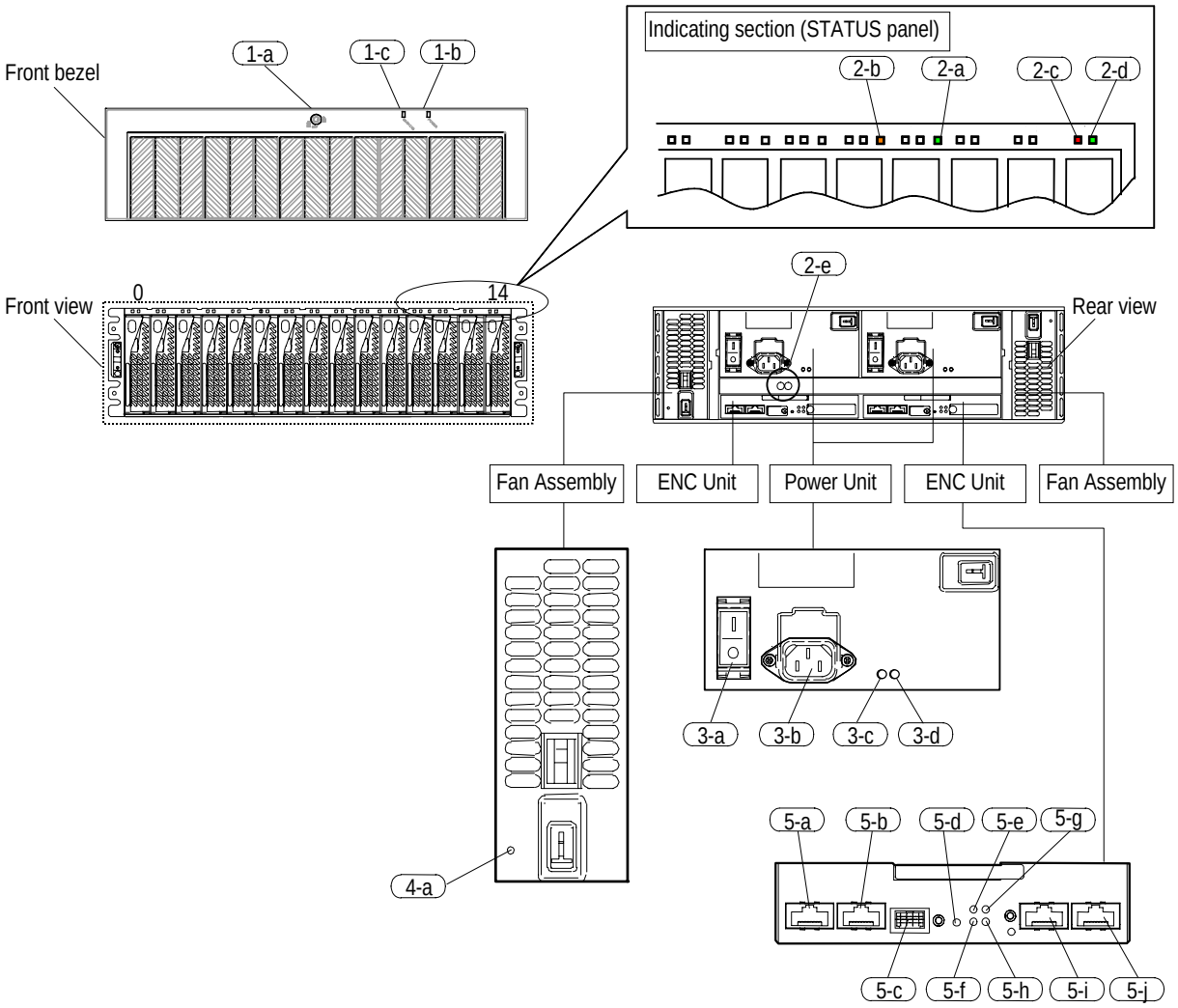


Figure 2.3.6 Indication Locations of Functional Components

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Table 2.3.6 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	KEY	Key	—	Locks the front bezel.
1-b		POWER	LED	Green	Indicates that the power supply is supplied to RKA.
1-c		WARNING	LED	Orange	Indicates that a failure, which allows RKA to operate, occurred.
2-a	STATUS Panel (RKA)	PWR (POWER)	LED	Green	Indicates that the power is supplied to the RKA.
2-b		WARN (WARNING)	LED	Orange	Indicates that a failure which allows the RKA operation occurred.
2-c		FAIL	LED	Red	Indicates that a failure which makes the unable to operate occurred.
2-d		ACTIVE	LED	Green	No. / LED status / Meaning 1 / Blinking / Shows that the Disk Drive is being accessed. 2 / On / Spin up state. 3 / Off / Spin down state.
2-e		Device ID	Switch	—	Sets the device ID (*1) of the RKA.
3-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on ○: Power off
3-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
3-c		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
3-d		ALARM	LED	Red	Lights when the Power Unit is in trouble.
4-a	Fan Assembly	ALM	LED	Red	Shows the state of the Fan Assembly On : Abnormal Off : Normal
5-a	ENC Unit	PATH0 (IN side)	Connector	—	Connection (for input) connector for ENC cable (PATH0 side).
5-b		PATH1	Connector	—	Connection connector (for input) for ENC cable (PATH1 side).
5-c		Voltage Check Connector	Connector	—	Not used (The switch has nothing to do with maintenance because it is used for evaluation.)
5-d		SW	Switch	—	Not used (The switch has nothing to do with maintenance because it is used for evaluation.)
5-e		P1	LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal.
5-f		P0	LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal.

*1 : "0" is used for the subsystem in default.

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No.	Section	Name		Classification	Color	Function
5-g	ENC Unit	CHK		LED	Red	ENC Unit It indicates error factors by means of number of times of blinking. Low-speed blinking: Once : Logic +5 V voltage is abnormal. Twice : Drive +12 V voltage is abnormal. Seven times : BS 1.8 V, BS 3.3 V, or BS 12 V voltage is abnormal. Eight times : Two or more fans in both fan units (#0, #1) rotates abnormally. CUDG error detected by ENC microprogram. Lighting: CUDG error detected by ENC microprogram (BOOT section) RAM error detected by ENC microprogram ENC hard configuration error High-speed blinking: Once : SRAM error. Twice : CUDG error in ENC hard. Three times : Microprogram error in flash memory.
5-h	ENC Unit / SENC Unit	ALM		LED	Red	Indicates error factors by means of lighting or blinking. Lighting Indicates that a failure, which makes the ENC Unit /SENC Unit unable to operate, occurred. Blinking Normal blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. High-speed blinking (CHK LED is on) : An exceptional process error detected by the ENC microprogram. (stack over) Normal blinking (CHK LED is off) : Indicates that FLASH write is performed during the ENC microprogram download. (It is not in the abnormal status.)
5-I		PATH0	(OUT side)	Connector	—	Connection connector (for output) for ENC cable (PATH0 side).
5-j		PATH1		Connector	—	Connection connector (for output) for ENC cable (PATH1 side).

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(8) Indication positions and their functions of RKNAS

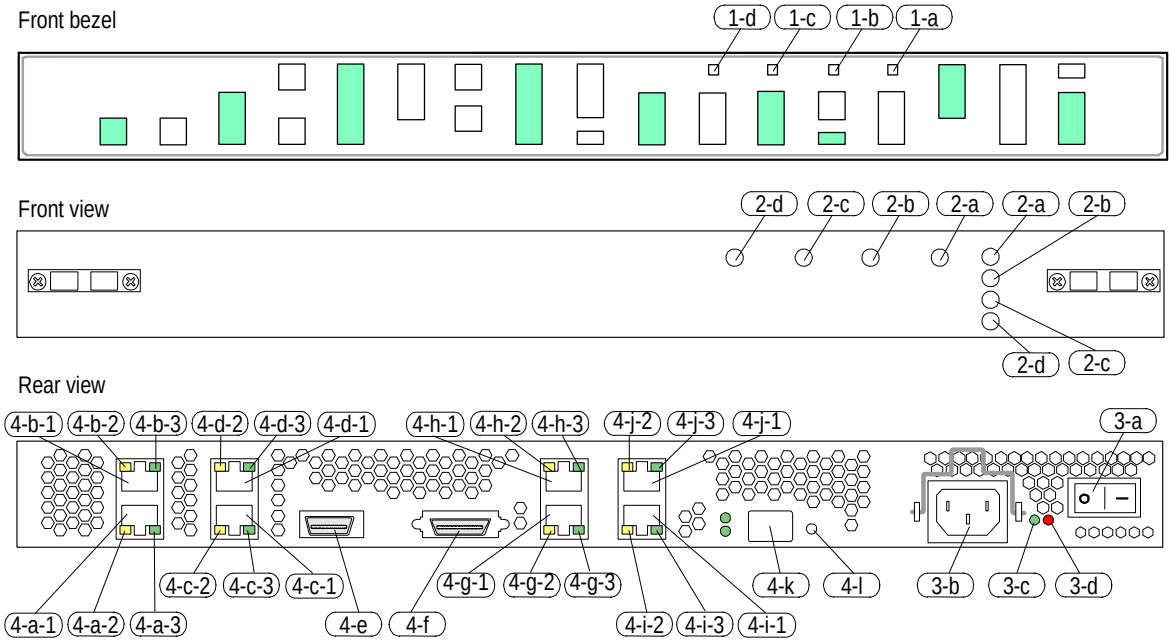


Figure 2.3.7 Indication Locations of Functional Components

Table 2.3.7 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	Front Bezel	POWER	LED	Green	Indicates that the power supply is supplied to RKNAS.
1-b		READY	LED	Green	Indicates that the RKNAS can be operated. (*1)
1-c		WARNING	LED	Orange	Indicates that a failure, which allows RKNAS to operate, occurred.
1-d		ALARM	LED	Red	Indicates that a failure, which cannot be operated, occurs in the RKNAS.
2-a	STATUS Panel (RKANAS)	POWER	LED	Green	Indicates that the power is supplied to the RKNAS.
2-b		READY	LED	Green	Indicates that the RKNAS can be operated. (*1)
2-c		WARNING	LED	Orange	Indicates that a failure, which allows RKNAS to operate, occurred.
2-d		ALARM	LED	Red	Indicates that a failure, which cannot be operated, occurs in the RKNAS.
3-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the RKNAS. | : Power on O: Power off
3-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
3-c		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
3-d		ALARM	LED	Red	Lights when the Power Unit is in trouble.

*1 : There is the case that READY LED of RKNAS illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition. (Refer to "4.2 (d) NNC (NAS Unit)" (TRBL 04-0090).)

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No.	Section	Name		Classification	Color	Function
4-a-1	RKNAS (Rear view)	gbe4	gbe4	Connector	—	A connector for connecting the gbe4 side cable
4-a-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the gbe4. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-a-3			10/100/1000	LED	Green/ Yellow	Indicates the transfer speed of the gbe4. Off: 10M Green : 100M Yellow : 1000M
4-b-1		gbe3	gbe3	Connector	—	Connects the gbe3 cable.
4-b-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the gbe3. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-b-3			10/100/1000	LED	Green/ Yellow	Indicates the transfer speed of the gbe3. Off : 10M Green : 100M Yellow : 1000M
4-c-1		gbe2	gbe2	Connector	—	Connects the gbe2 cable.
4-c-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the gbe2. Green: Indicates that it is in the link status. Yellow: Indicates that it is in the data transfer.
4-c-3			10/100/1000	LED	Green/ Yellow	Indicates the transfer speed of the gbe2. Off : 10M Green : 100M Yellow : 1000M
4-d-1		gbe1	gbe1	Connector	—	Connects the gbe1 cable.
4-d-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the gbe1. Green: Indicates that it is in the link status. Yellow: Indicates that it is in the data transfer.
4-d-3			10/100/1000	LED	Green/ Yellow	Indicates the transfer speed of the gbe1. Off : 10M Green : 100M Yellow : 1000M
4-e		PCI-E		Connector	—	A connector for connecting the PCI-Express cable
4-f		CTRL		Connector	—	A connector for connecting the CTRL cable
4-g-1		mng1 (MAN LAN)	mng1 (MAN LAN)	Connector	—	A connector for connecting the LAN cable for the user control
4-g-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the LAN for the control. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-g-3			10/100/1000	LED	Green/ Yellow	Indicates the transfer speed of the LAN for the control. Off : 10M Green : 100M Yellow : 1000M

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No.	Section	Name		Classification	Color	Function
4-h-1	RKNAS (Rear view)	Other NNC (NAS)	LAN	Connector	—	At the time of the cluster configuration A connector for connecting the LAN cable to the other RKNAS
4-h-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of another LAN. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-h-3			10/100	LED	Green	Indicates the transfer speed of another LAN. Off : 10M Green : 100M
4-i-1		Disk ARRAY	LAN	Connector	—	A connector for connecting it to the maintenance LAN port of the Control Unit. (For maintenance)
4-i-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of another LAN. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-i-3			10/100	LED	Green	Indicates the transfer speed of another LAN. Off : 10M Green : 100M
4-j-1		mtp1 (MNT PC)	mtp1 (MNT PC)	Connector	—	A connector for connecting the LAN for the maintenance
4-j-2			LINK/ACT	LED	Green/ Yellow	Indicates that it is in the link status/data transfer of the LAN for the maintenance. Green : Indicates that it is in the link status. Yellow : Indicates that it is in the data transfer.
4-j-3			10/100	LED	Green	Indicates the transfer speed of the LAN for the maintenance. Off : 10M, Green : 100M
4-k		FC PORT		Connector	—	A connector for connecting the backup subsystem
4-l		RESET SW		Switch	—	Is used to reset the RKNAS.

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Chapter 3. Before Starting WEB Connection

3.1 Procedure to WEB connection

(1) Points to be confirmed before connecting WEB

Unless the subsystem is activated, the subsystem cannot be connected to WEB.
Confirming the following LEDs before connecting to WEB.

• Confirming the power status (POWER LED).

Check if the POWER LED on the Front Bezel lights up.
If the Power LED does not light up, see "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000).

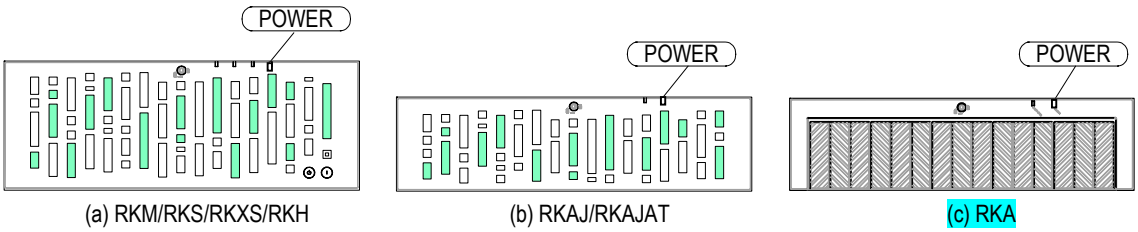


Figure 3.1.1 Locations and Name of LED

• Confirming the CHKSTP LED of the Control Unit

Check if the CHKSTP LED on the Control Unit lights up.
If CHKSTP LED is on, replace Control Unit of which CHKSP LED is on. Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) for replacing a Control Unit.

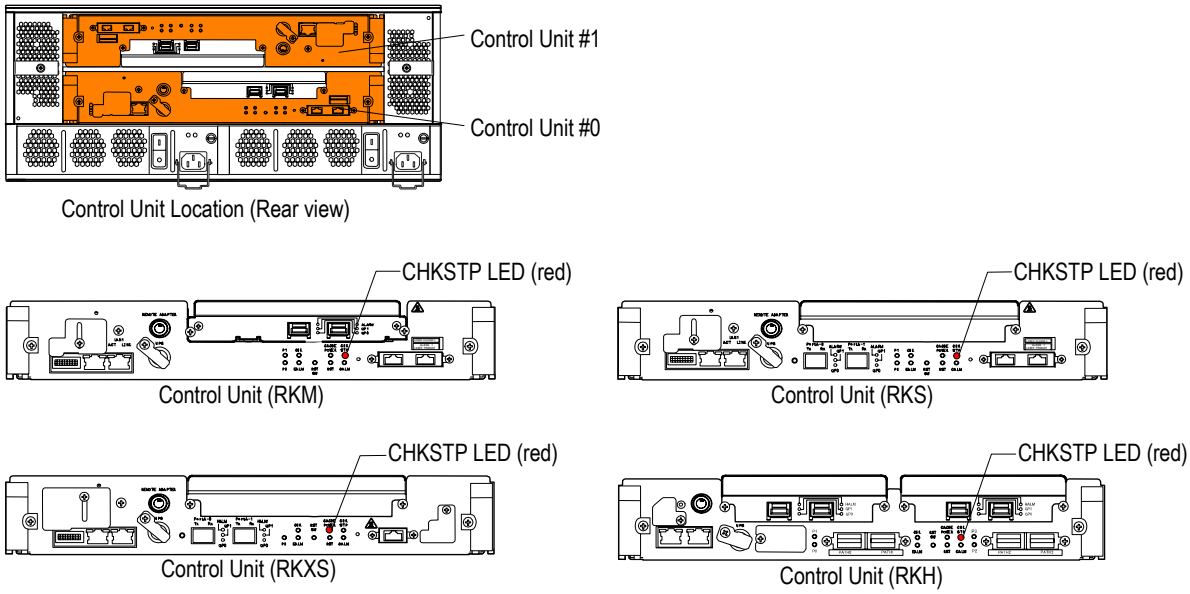


Figure 3.1.2 Locations and Name of LED

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(2) Preparation of maintenance terminal to be used

Table 3.1.1 Decision and Preparation of Maintenance Terminal

Item	Customer's environment	Maintenance terminal used	Preparation	Connection procedure reference destination
1	Using LAN connectors for maintenance of the Control Unit	Connect the portable Maintenance PC via a LAN.	• PC for maintenance(*1) • LAN cross cable	"3.1 (4) Procedure to connect portable maintenance PC to WEB" (TRBL 03-0010).

*1 : Refer to "3.3 Note on WEB connecting" (TRBL 03-0060) for recommended PC.

(3) Control Unit to be connection

If a system has a dual Control Unit, connect to either Control Unit to connect to the WEB. First, connect to Control Unit#0.

If Control Unit #0 is blocked, however, information after the blockage of Control Unit #0 is referenced on only Control Unit #1 side. Accordingly, if Control Unit #0 is blocked, connect to Control Unit #1.

(4) Procedure to connect portable maintenance PC to WEB

(a) Remove the cover on the Control Unit. Connect the LAN-Connecter for maintenance and the LAN-Connecter of Maintenance PC with a LAN-cross-cable.

At the time of the RKNAS connection, remove the cover of the LAN connector for the maintenance in the RKNAS (rear side), and connect the LAN connector for the maintenance and the LAN connector of the Maintenance PC.

NOTE : At the time of the NAS connection, connect it to the LAN connector for the maintenance of the NAS Unit. In such case, check that the AC Input Power of the NAS Unit is turned on. If it is turned off, turn on the AC Input Power of the NAS Unit. (Refer to Installation "1.7 Power On/Off Procedure" (INST 01-0290).)

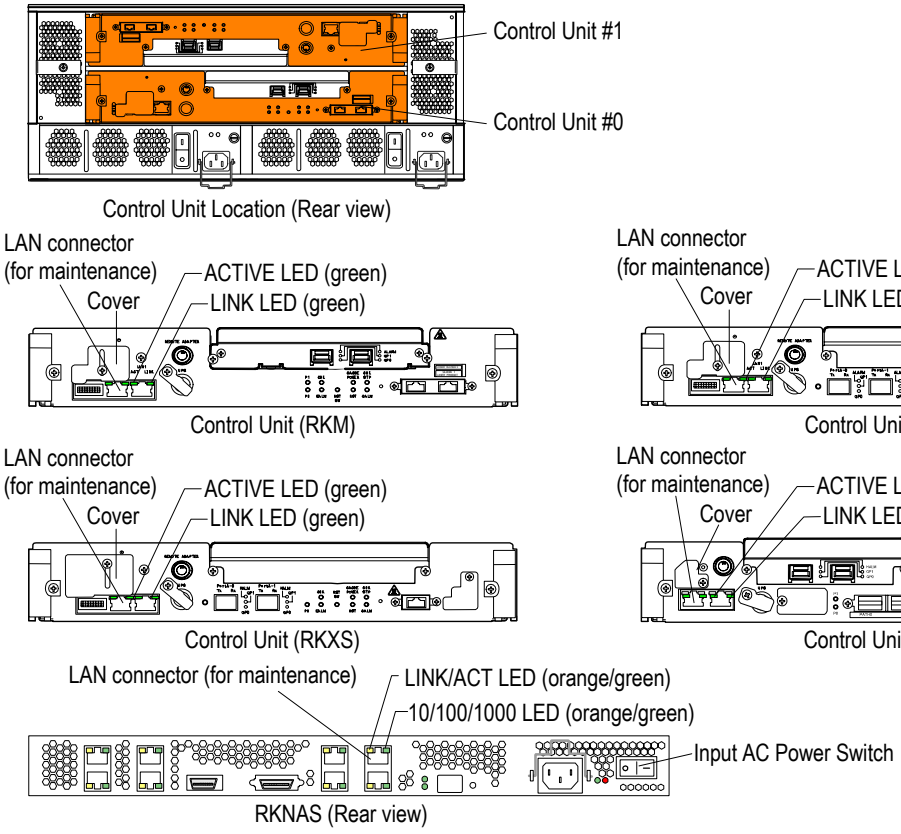


Figure 3.1.3 LAN Connector Position

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(b) Start up the maintenance PC.

(c) Change the IP address of the network parameter for the maintenance PC.
For the maintenance PC, set the IP address shown in No. 1 in Table 3.1.2 below.
When it cannot be connected, specify the connectable value and perform the WEB connection by setting the values of No.2 to No.5 in order.
If not connected yet, refer to "3.4 Procedure for specifying maintenance port IP address" (TRBL 03-0100).

Table 3.1.2 Operational Environment

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1:172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1:10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

• Manual change of the network parameter of the Maintenance port
When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.
Therefore, the LAN port for the maintenance when performing the WEB connection is set as any value of No.1 to No.5 in Table 3.1.2 on the work other than the installation of the subsystem at the time of the shipment.

NOTE : However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
If this is the case, set network address other than maintenance port in the LAN device which is connected via the Gateway in the extension of the User management port, or set maintenance port other than the network address of LAN device which is connected via the Gateway. (Refer to System Parameter "4.2 (4) Setting Maintenance of LAN"(SYSPR 04-0100).)

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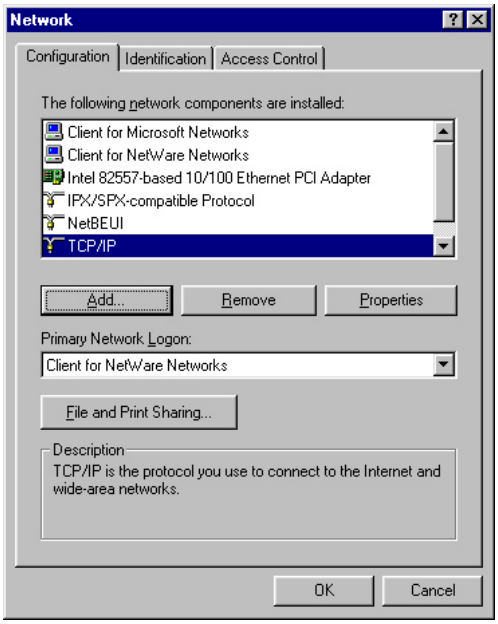
(5) Setting method of IP Address on Windows 95

The procedure for setting an IP Address of the PC in Windows 95 is shown below.

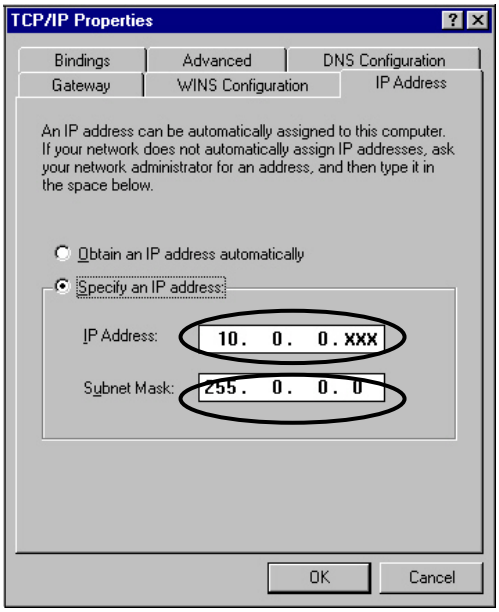
Also in Windows 98, Widows 2000 and Windows XP, the IP Address of the PC can be set by the similar operation.

(a) Select [Start]-[Set]-[Control Panel]-[Network].

(b) Select [Configuration]-[The following network components are installed]-[TCP/IP] and click the [Properties] button to open [TCP/IP].

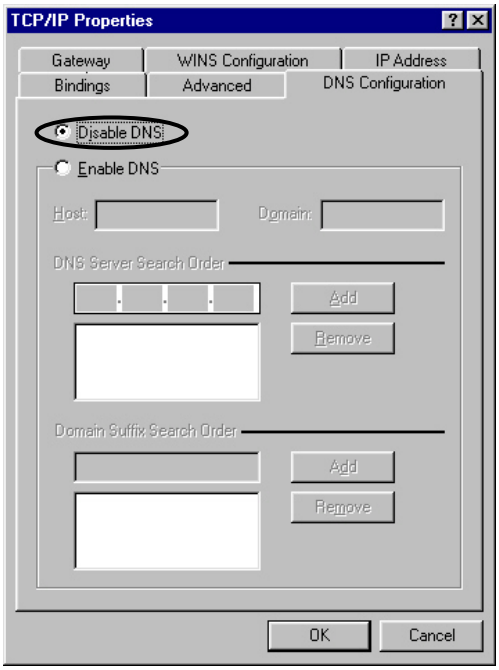


(c) Select [TCP/IP Properties]-[IP Address]-[Specify an IP address] and set the [IP Address] and press the [OK] button.



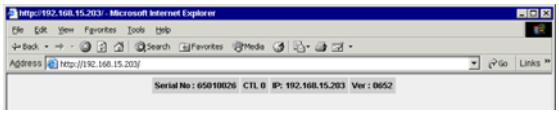
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(d) Set the TCP/IP to "Disable DNS" because the connection takes a long time when the TCP/IP of the network is set to the condition in which the DNS is used.
For the setting procedure, refer to the instruction manual of the PC to be used.



(e) When confirming message appears whether to reboot the Maintenance PC, press [OK].
(f) The maintenance PC is rebooted and the changed IP Address and Subnet Mask become effective.
(g) Start up the Browser. Enter the URL window with the IP address of maintenance port to which the maintenance PC is connected. When WEB screen appears, the connection is complete.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.



(h) Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used.
To make sure the setting, refer to the instruction manual of the browser to be used.
If you cannot connect, the negotiation of Maintenance PC may be changed.
Refer to "(6) Procedure for setting negotiation" (TRBL 03-0041), and set negotiation of Maintenance PC to auto negotiation.

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(6) Procedure for setting negotiation

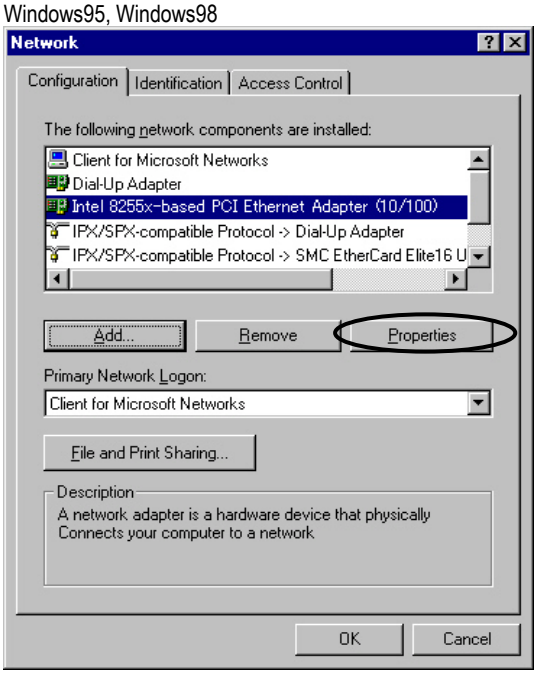
The procedure for setting negotiation of the PC is shown below.

(a) Select [Start]-[Set]-[Control Panel]-[Network].

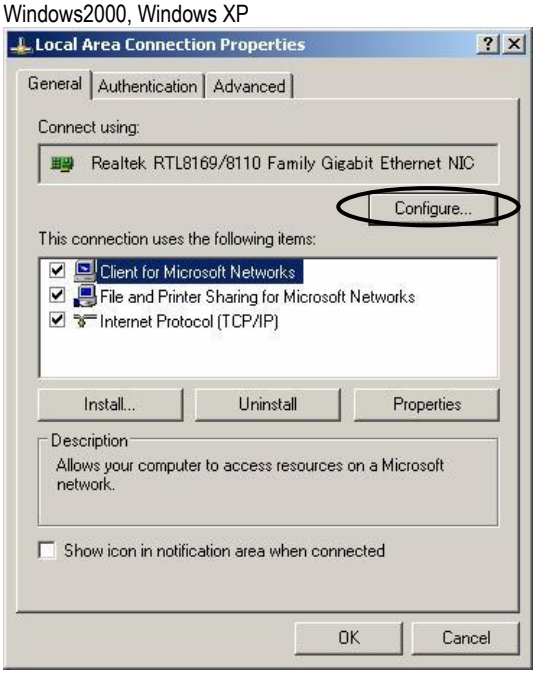
(b) If Windows 95 or Windows 98, select [Configuration]-[The following network components are installed]-Network Interface Card, and click the [Properties] button to open Network Interface Card.

If Windows 2000 or Windows XP, click the [Configure] button in [Connect using]

Windows95, Windows98

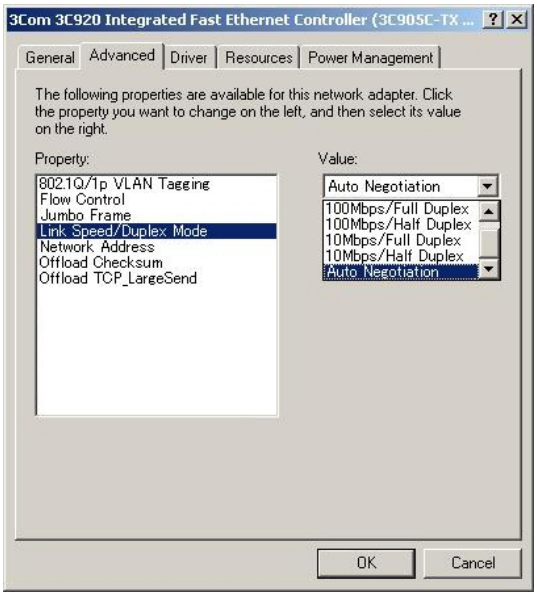


Windows2000, Windows XP



(c) Select [Advanced] tab, click Link speed and duplex mode in [Property].

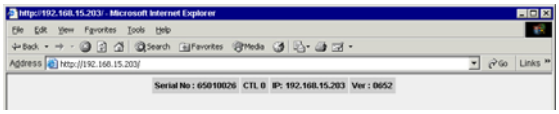
And set [Value] to auto negotiation.



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(d) After reboot maintenance PC, start up the Browser. Enter the URL window with the IP address of maintenance port to which the maintenance PC is connected. When WEB screen appears, the connection is complete.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

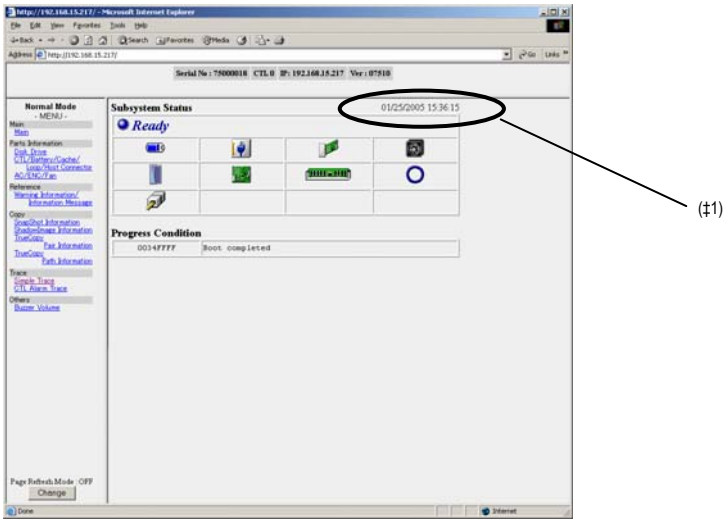


(e) Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used.
To make sure the setting, refer to the instruction manual of the browser to be used.
If you cannot connect, change the LAN-cross-cable.

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3.2 When the WEB has already been connected

If the WEB has been connected, information displayed before may be still displayed.
Before starting trouble analysis based on the WEB connection, [Refresh] the WEB window.
The time when the WEB window is displayed is referenced as shown below.
Window display differs depending on microprogram revision.



‡1 : The time determined by the Device Controller RTC (Real Time Clock) is indicated here. (It is not consistent with the main PC clock.)
For setting the Device Controller RTC, refer to "2.2 Confirming and setting RTC (Real Time Clock)" (TRBL 02-0010).

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3.3 Note on WEB connecting

(1) Note on WEB using

(a) The LAN function may become temporarily unable to be connected when the update of the WEB display is repeated frequently. In this case, wait for a short time (at least one minute), then update again.

(b) When connecting the WEB of DF700, use the following browsers.

Table3.3.1 Recommended WEB hardware

No.	Item	Description	Remark
1	OS	Microsoft Windows 98, NT 4.0, 2000, XP, 2003, Solaris8, IRIX6.5, AIX4.3, 5.1	—
2	PC	Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended)	—
3	WS	Turbo Sparc 170 M Hz, Memory 256 M bytes or more R10000 195 M Hz, Memory 128 M bytes or more	—
4	Disk requirement	• 60 M bytes, under ordinary maintenance work • 1.2 G bytes per one Controller, under Full Dump collection(*1) { Storing temporary file of Browser : 600 M bytes Storing Full Dump: 600 M bytes }	• Data compression tool is required for Full Dump. • Refer to WEB "3.5.3 Collecting Full Dump" (WEB 03-0370) or WEB "3.5.4 Collecting Full Dump (Full Dump(SnapShot/TCE))" (WEB 03-0400) for the capacity of Full Dump when it is uncompressed.

*1 : Full Dump collection may be requested by the Technical Support Center at the time of a tough failure.

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Table3.3.2 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		Supported or not supported	Java Applet supported or not supported (*2) (*3)
		Type	Ver.	Type	Ver.(*1)		
1	WS	IRIX	6.5	Netscape Navigator	4.76	○	×
		Solaris	2.6	Netscape Navigator	4.76	○	×
			8	Netscape Navigator	4.76	○	×
		AIX (*4)	4.3	Mozilla (*4)	1.5	○	×
			5.1	Mozilla (*4)	1.7	○	×
2	PC	Windows	98	Internet Explorer	6.0	○	○
			NT/2000	Internet Explorer	6.0	○	○
			XP	Internet Explorer	6.0	○	×
			2003 (IA32)	Internet Explorer	6.0	○	○
			2003 (IA64)	Internet Explorer	6.0	○	×
					6.0 (32 Bit)	○	○
		Windows	98	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×
			NT/ 2000/XP	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×
			2003 (IA32/IA64)	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the Maintenance PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Applet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.
*4 : It supports from the microprogram revision 0720/A-S.

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Notices on (restriction of) the support browser

In the case of Windows2003, because the strict data security is the default setting, the Web function cannot work.

In order to solve the above problem, change the setting of the browser as follows.

- Select [Tools] - [Internet Options …] - [Security] - [Custom Level …] - [Custom Setting Reset] of the browser in this order and select the setting of the security level from Medium or lower and click the "Reset" button.

  The making of the setting as Medium solves the problem. However, if you want to use Win2003 leaving the security level as High, make the following settings for the detailed items of the [Custom Level …].

  - Enable the [Active scripting] of the [Scripting].
  - Enable the [Allow META REFRESH] of the [Miscellaneous].
  - Enable the [File download] of the [Downloads].
  - Enable the [Run ActiveX controls and plug-ins] of the [ActiveX controls and plug-ins].

- There may be a case where a new line is started in a window depending on a setting of the browser. In such a case, make the character size smaller.

  < Method of character size change >

  In the case of IE

  Select "Middle" or smaller size for the "Character Size" in the "Display".

  In the case of Netscape

  Select the "Reduction of Font Size" in the "Display" and keep it being selected until paragraphs become easy to be read.

- There may be a case where an empty dialogue box is displayed during operation in the Maintenance mode. In such a case, close the window by clicking on the mark of "X" in the upper left corner of the dialogue box, restart the browser, and then make a retry from the entry of the URL.
- When a window size is changed while a page is displayed by Netscape, the succeeding operation in the Refresh mode may not be done normally. In such a case, display the page over again by clicking the Re-Display button.
- In the case of using Netscape

  Memory cache: 1024 kbytes (default) or larger

  Disk cache: 7680 kbytes (default) or larger

  < Method of cache size setting >

  Select the "Edition", "Setting", "Details", and "Cache" in this order.

  Specify sizes of the memory cache and disk cache.

- When obtaining trace information etc. with Netscape, there are cases that a sub-screen to specify the file download destination does not automatically close.

  In such a case, press a close button at the upper right corner of the sub-screen to close the sub-screen after download complete.

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- When using Netscape Navigator 7.x, select [Edit]-[Preference...]-[Advanced]-[HTTP Networking], and set "Use HTTP 1.0" in the "Direct Connection Options" and "Proxy Connection Options".
  When this setting is not made, the summary window is not displayed correctly.
- When collecting Full Dump using Netscape Navigator 4.7x, pay attention to free space in PC because information to be downloaded won't be compressed.

	Installed cache of the subsystem	Free Capacity needed on PC
RKM	1 G bytes (Minimum)	853 M bytes
	4 G bytes (Maximum)	2,970 M bytes
RKS	1 G bytes (Minimum)	720 M bytes
	2 G bytes (Maximum)	1,496 M bytes
RKXS	512 M bytes (Minimum)	405 M bytes
	1 G bytes (Maximum)	758 M bytes
RKH	2 G bytes (Minimum)	1,926 M bytes
	8 G bytes (Maximum)	5,820 M bytes

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(2) The procedure for connecting to another subsystem having the same IP address via a LAN.
In the case of connecting and maintaining two or more controllers, whose IP addresses are the same, using a Maintenance PC and cross cable of a LAN, when one of the Controllers is connected to the PC, the PC memorizes the IP address and physical address of the Controller making a pair of them. Therefore, if another Controller is connected to the PC via a LAN, the IP address is not accepted because the physical address is different.
To make the above connection via a LAN, execute the following command from the MS-DOS prompt of Windows PC in order too delete the information on the IP address stored in the arp table in the PC.

```
arp  -d  IP address
```

- IP address : IP address stored in the arp table

Example : When deleting an IP address 10.0. 0.16 (default) from the table

```
arp  -d  10.0. 0.16
```

To make sure that the IP address stored in the arp table has been deleted, execute the following command from the MS-DOS prompt of Windows PC.

```
arp  -a
```

The IP address has been deleted when a message, "No ARP Entries Found" or the one informing that the specified IP address could not be found is returned from the subsystem.

(3) User authentication when connecting the Web
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

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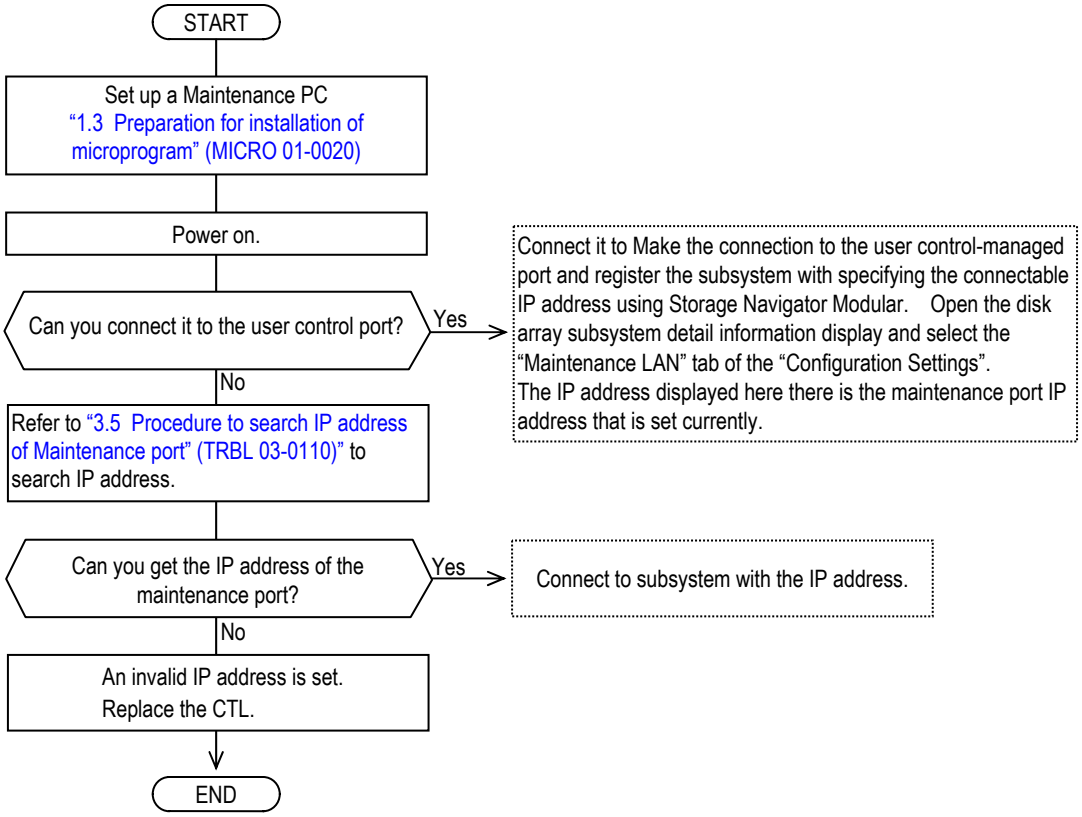
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3.4 Procedure for specifying maintenance port IP address

When the connection cannot be made even with the five patterns of the maintenance port IP addresses, the host address of the maintenance port IP address may have been changed.
In this case, specify the maintenance port IP address as shown below.

NOTE : When the subsystem can not communicate with Storage Navigator Modular, (for example, the controller is blockade, the subsystem is in Maintenance Mode and so on), this procedure is can not work.



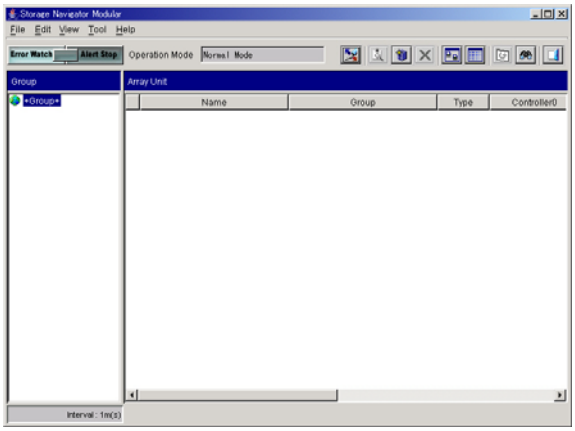
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3.5 Procedure to search IP address of Maintenance port

(1) Activating the Storage Navigator Modular

(a) Execute the batch file or shell script for activating the Storage Navigator Modular.
In the case of Windows, activate the batch file, startsnm.bat.

(b) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed(‡1).



In the case of Windows, the prompt window is also displayed.
The prompt window has nothing to do with operation of Storage Navigator Modular. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.
You can execute the display of the Storage Navigator Modular Operation Mode and state of the failure monitoring and the following functions in the main window.
For the operation of each function, refer to the page explaining each function.

- Registration of the disk array subsystem (registration, deletion, change, and properties display)
- Execution of the failure monitoring and setting of the failure monitoring option
- Change of the Operation Mode
- Display of the version

‡1 : The mode change cannot be done at the time of the initial activation of the Storage Navigator Modular. A registration of a password validates the mode change.

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(2) Changing the Maintenance Mode

Storage Navigator Modular has three Active Modes, that is, the Normal Mode, Management Mode, and Maintenance Mode. In the Normal Mode, the program displays the configuration and statuses of the disk array. In the Management or Maintenance Mode, it can set the configuration of the disk array in addition to the function in the Normal Mode.

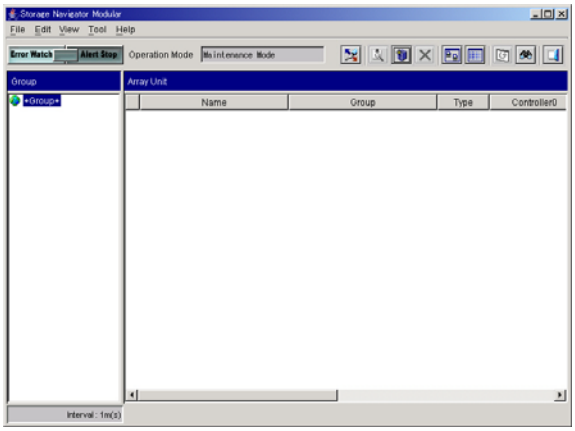
(a) Changing the Normal Mode to the Maintenance Mode

Change the Operation Mode from the Normal Mode to the Maintenance Mode.

When the log-in has been made in the Normal Mode, [Normal Mode] is displayed as a detailed information of the [Operation Mode] in the upper part of the main window.

(i) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.

Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

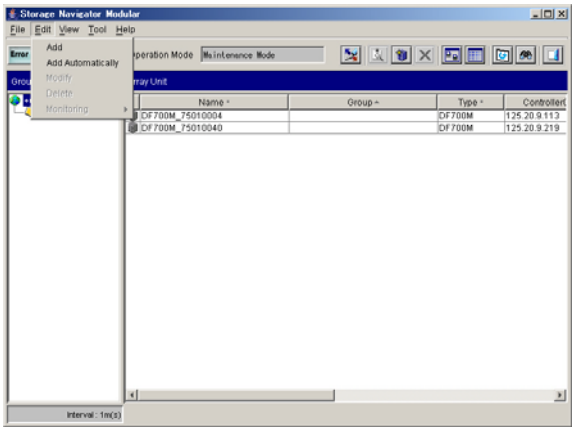


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(3) Searching for IP address of the disk array subsystem

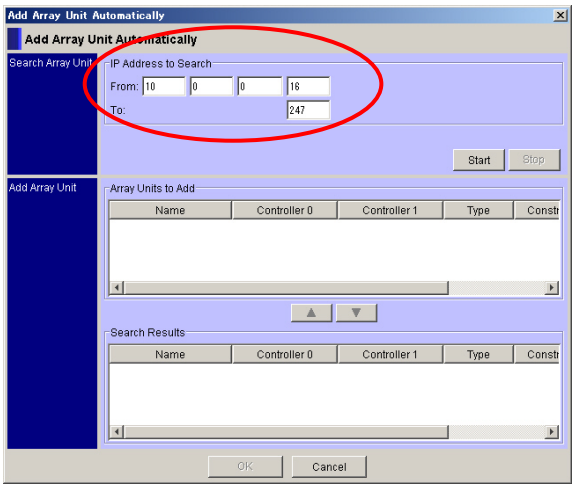
Search for IP address of the disk array subsystem to be operated in order to operate it from the Storage Navigator Modular.

(a) Select [Add Automatically] in the main window.



(b) Input the range of IP address to search.

Firstly, Input combination of #1 in Table 3.5.1.



[From] : Input a start IP address of the search range

[To] : Input a end IP address (only host address) of the search range

In the textbox of [From] and [To], Input following combination in Table 3.5.1.

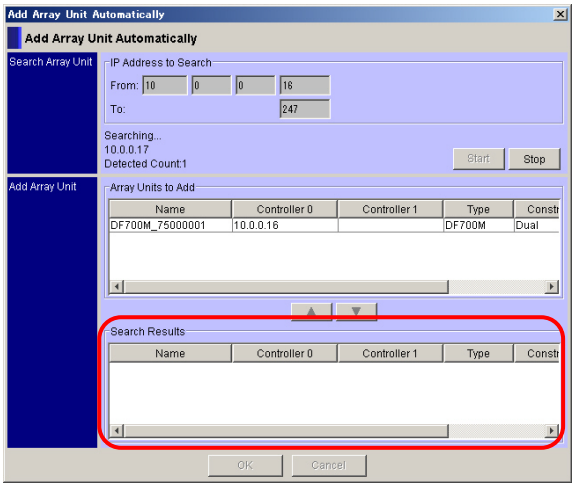
Table 3.5.1 Combination of Input to Search IP Address

No.	From				To
1	10	0	0	16	247
2	192	168	0	16	247
3	192	168	233	16	247
4	172	23	211	16	247
5	10	197	181	16	247

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(c) Press [Start], and the searching is start.

(d) The result of searching is displayed in “Search Results”.
If IP address is not displayed, retry searching with another combination in Table 3.5.1. (When you retry, change network setting of maintenance PC.)



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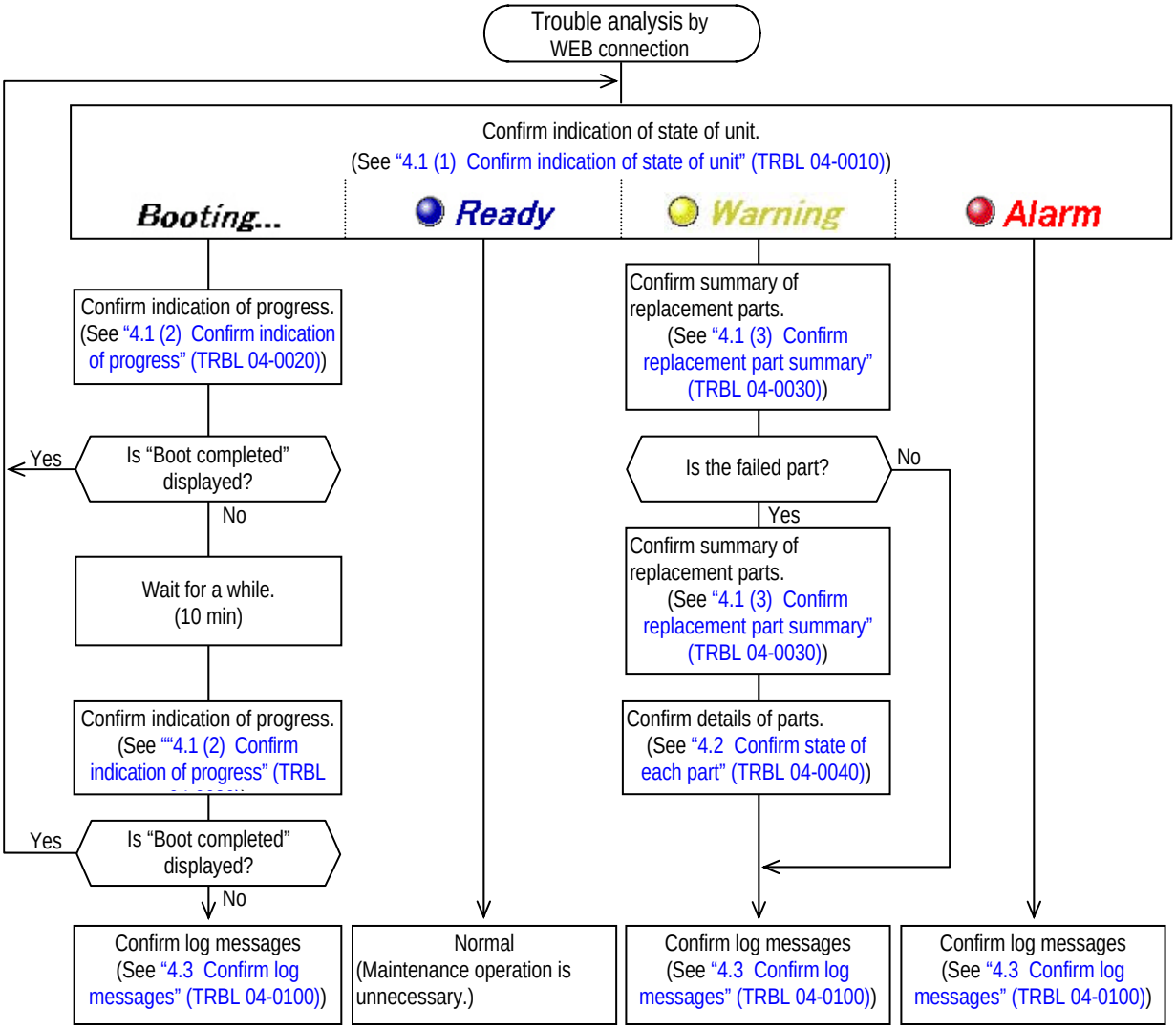
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Chapter 4. Trouble Analysis by WEB Connection

Trouble analysis by WEB connection to locate a failed part in the unit and how to repair that trouble are shown below.

The flow of the trouble analysis by WEB connection is as follows.

Determine the failed part following the procedure below.



NOTE : When the log messages are checked while the WARNING LED (orange) on the front of the Basic Chassis is blinking at low speed, the WARNING LED (orange) goes out if the subsystem is not in the Warning status. If the subsystem is in the Warning status, the WARNING LED (orange) lights up.
While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed.
The WARNING LED (orange) on the front of the Basic Chassis goes off in the maximum of 30 to 85 minutes, and the READY LED (green) lights up.

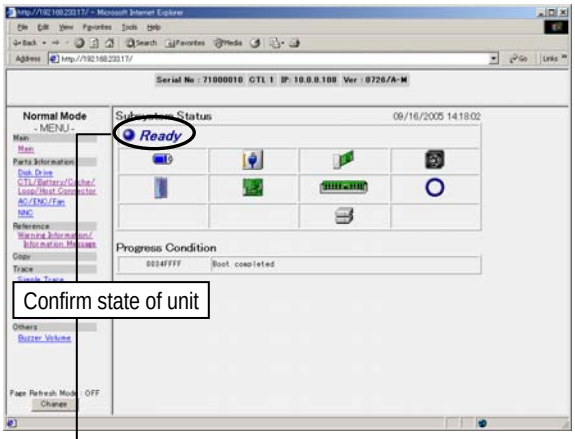
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4.1 Confirm state of unit

Check the failed part of the unit on the main window in the normal mode of the WEB.
For the replacement of the parts and recovery method, see the log messages ("4.3 Confirm log messages" (TRBL 04-0100)).

(1) Confirm indication of state of unit

The state of the unit can be confirmed in the following window.



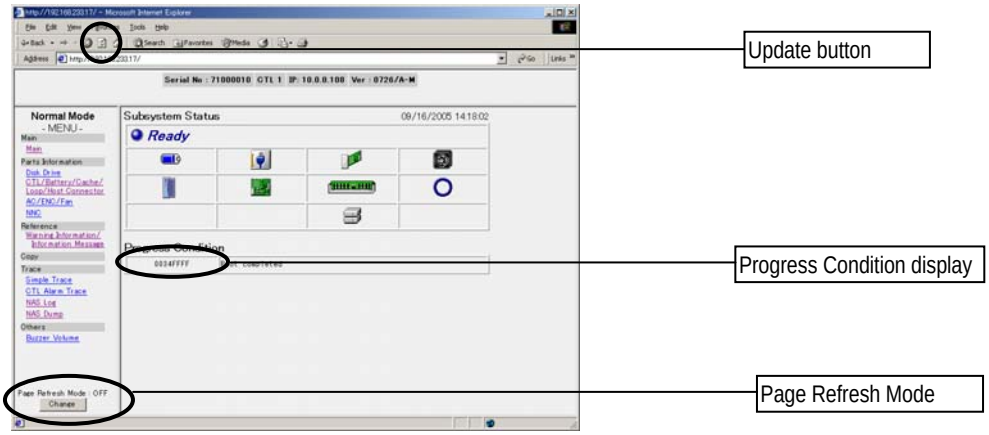
Booting	Ready	Warning	Alarm
Booting... (Black)	Ready (Blue)	Warning (Yellow)	Alarm (Red)

Figure 4.1.1 Main Window in the Normal Mode

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(2) Confirm indication of progress

If "Booting···" is indicated in the window of (1) (the Controller is being started up), the progress of start-up operation can be confirmed according to the following procedure.



(a) Turn on the page refresh mode (Click the [Change] button).

The window is updated automatically at the interval of 5 seconds. (If the [ON] button of the page refresh mode is indicated, the above operation is not necessary.)

If the page refresh mode is not indicated in the main window, press the update button of the browser to update the window.

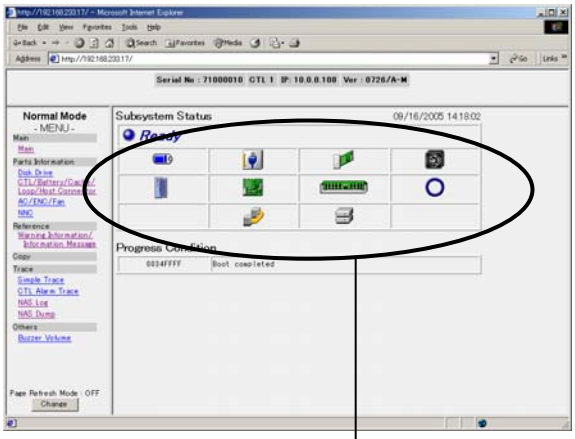
(b) See the indication of progress of the window.

If the start-up operation is completed, "Boot completed" is indicated in this part.

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(3) Confirm replacement part summary

The state of each replacement parts can be confirmed with the replacement part summary.



Backup Battery Unit	Power Unit	ENC Unit	SENC Unit	Fan Assembly
Disk Drive (FC)	Disk Drive (S-ATA)	Control Unit	Cache Unit	Loop
Host Connector	Remote Path	NNC (NAS Unit)		

If any part fails, its summary becomes red.

If the red part summary is clicked, the state confirmation window of the part appears and the position of the failed part is confirmed more in detail. (See "4.2 Confirm state of each part" (TRBL 04-0040))

Also, when the menu frame "Warning Information" is clicked, status of each component is displayed (See "4.2 Confirm state of each part" (TRBL 04-0040)) and the status of each component can be checked.

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4.2 Confirm state of each part

When checking the status of a component through an image, a clicking on each component of the "Summary of replacement component statuses" in the main window changes the window to that shown in Item (1) below and a detailed component status is displayed.
In this case, the window is changed in the state in which the selected (clicked) component is positioned at the top of the window. Also, a clicking on the "Parts Information" menu in the main window changes the window.
When checking the status of a component through a message, a clicking on the "Warning Information" of the menu frame in the main window changes the window to that shown in Item "(2) Procedure of the Status checking by messages" (TRBL 04-0092) and displays a detailed component status as a message. In this case, detailed status of each component can be checked. For the replacement for maintenance or recovery procedure, refer to a log message (See "4.3 Confirm log messages" (TRBL 04-0100)) and perform a recovery action following the procedure given by the each log message.

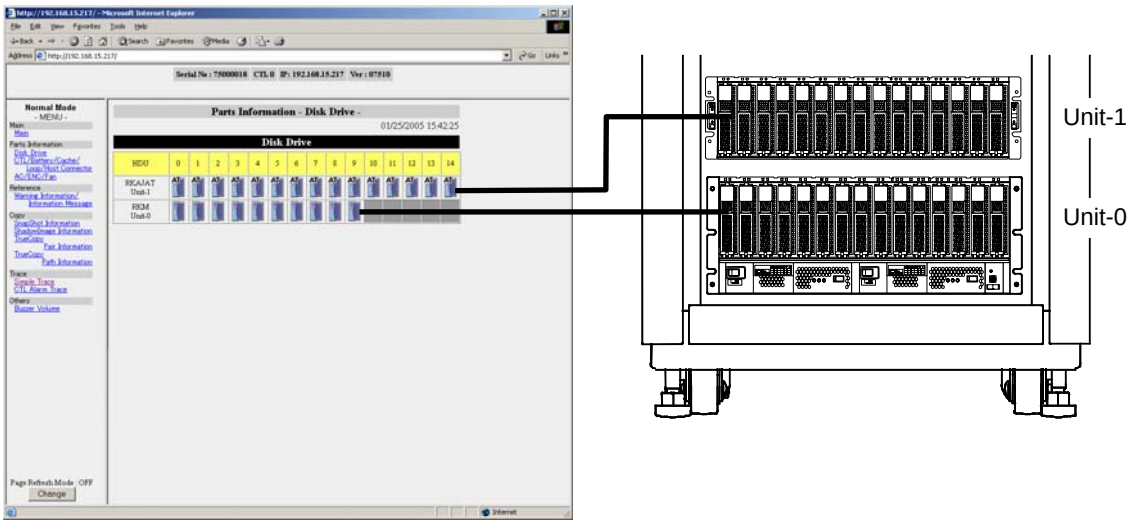
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(1) Checking the status through an image

The display screen of exchange part status displays the status of the Disk Drive, Control Unit, Cache Unit, Fan Assembly, Backup Battery Unit, Power Unit, ENC Unit (SENC Unit), Fiber Loop, NNC (NAS Unit) that are implemented. Furthermore, this is not displayed, if it is not implemented.

Also, the exchange part of abnormal status displays a red image. The Parts Information screen is shown below.

(a) Disk Drive

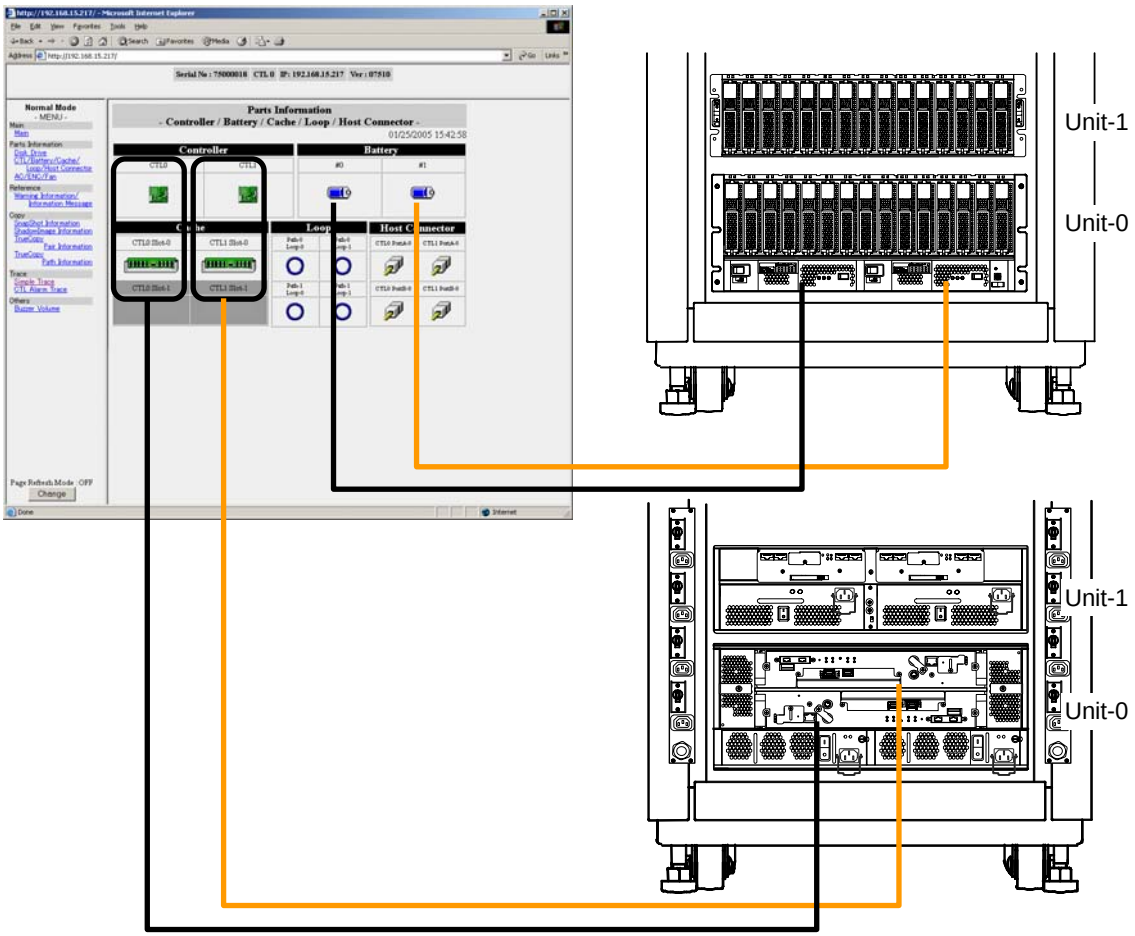


• Disk Drive

Image		Status
Disk Drive (FC)	Disk Drive (SATA)	
Blue	Blue	• Normal
Red	Red	• Fault has occurred to the Disk Drive
Red and Black	Red and Black	• Disk Drive port that the fault occurred is not implementing the Disk Drive
No display		• Disk Drive is not implemented (Except for the status where the Disk Drive that the fault occurred was drawn out)

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(b) Controller/Battery/Cache/Loop/Host Connector



• Control Unit

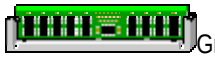
Image	Status
Green	• Normal
Red	• Shutdown of the Control Unit (Status where it is not implemented with the setting of the dual system configuration is included)
Yellow	• Fault of the battery backup circuit
No display	• Even the fault has not occurred without being implemented with the setting of single system configuration

• Backup Battery Unit

Image	Status
Green	• Normal
Red	• There is a fault or not implemented

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• Cache Unit

Image	Status
 Green	• Normal
 Red	• Fault (Status where is not implemented and extracted the fault cache memory is included)
No display	• It is not implemented and there is not a fault

• Loop

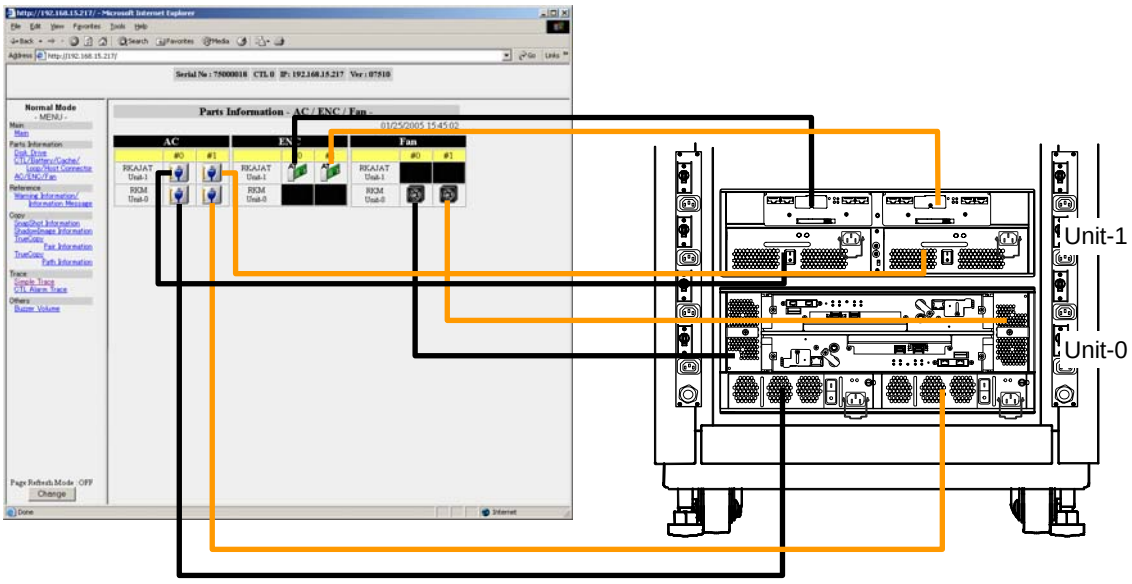
Image	Status
 Blue	• Normal
 Red	• Fault

• Host Connector

Image	Status
 Gray	• Normal
 Red	• Fault

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(c) AC/ENC/Fan



• Power Unit

Image	Status
Blue	• Normal
Red	• It is fault occurred or not implemented

• ENC Unit

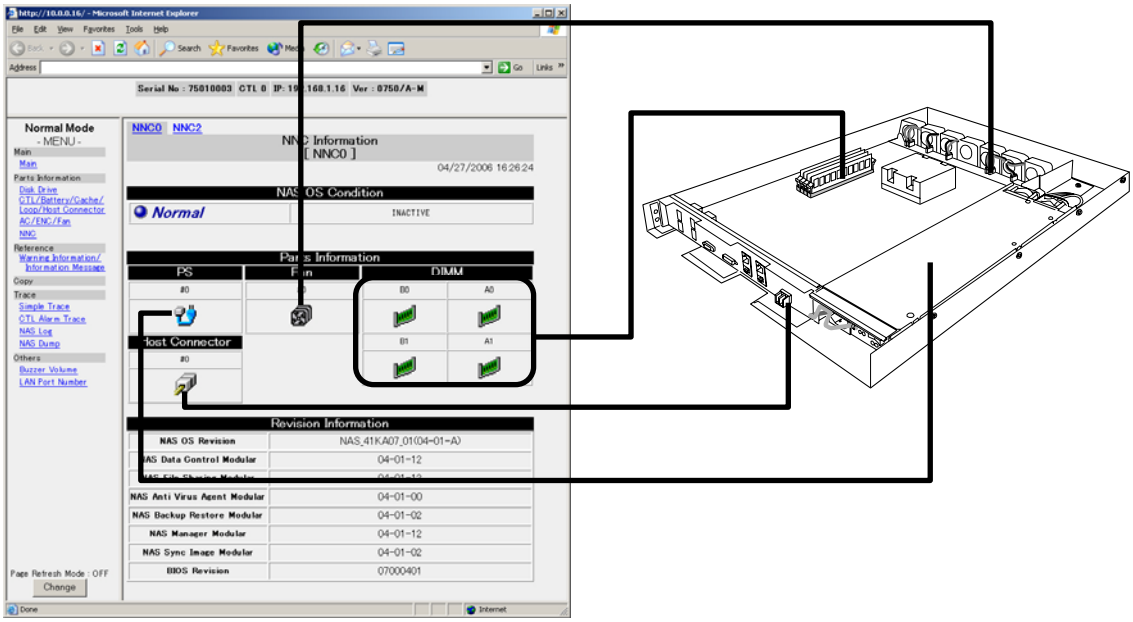
Image		Status
ENC Unit	SENC Unit	
Green	Green	• Normal
Red	Red	• It is fault occurred or not implemented

• Fan Assembly

Image	Status
Black	• Normal
Red	• There is a fault or not implemented

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(d) NNC (NAS Unit)



• NAS OS Condition (Patrol Lamp)

Image	Status
Normal Blue	• Normal
Warning Yellow	• Warning status
Alarm Red	• Alarm status

• NAS OS Condition (Status Display)

Image	Status
NEW	• The NAS OS is not installed.
INST	• The NAS OS is in installation process.
ACTIVE	• The NAS OS is in operation and the Node is in operation.
STOP	• The NAS OS is normally stopped
DOWN	• The NAS OS is abnormally stopped
BOOT	• The NAS OS is in start process.
SHUTDOWN	• The NAS OS is in stop process.
INACTIVE	• The NAS OS is in operation and the Node is stopped.
DUMP	• A NAS Dump is being collected.
HUNGUP	• The NAS OS is hung-up.
WARN	• The NAS Manager is not installed, or the NAS OS is in operation and the status of the Node is unknown.
DISUSE	• The Control Unit is blocked, so the NAS OS of the NNC concerned cannot be used.

• Host Connector

Image	Status
Gray	• Normal
Red	• There is a fault or not implemented

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• DIMM

Image	Status
 Green	• Normal
 Red	• There is a fault or not implemented

• PS

Image	Status
 Blue	• Normal
 Red	• There is a fault or not implemented

• Fan

Image	Status
 Black	• Normal
 Red	• There is a fault or not implemented

• Revision Information

① [NAS OS Revision] : A NAS OS Revision can be displayed.
② [NAS Data Control Modular] : A NAS Data Control Modular can be displayed.
③ [NAS File Sharing Modular] : A NAS File Sharing Modular can be displayed.
④ [NAS Anti Virus Agent Modular] : A NAS Anti Virus Agent Modular can be displayed.
⑤ [NAS Backup Restore Modular] : A NAS Backup Restore Modular can be displayed.
⑥ [NAS Manager Modular] : A NAS Manager Modular can be displayed.
⑦ [NAS Sync Image Modular] : A NAS Sync Image Modular can be displayed.
⑧ [BIOS Revision] : A BIOS Revision can be displayed.

Microprogram Version is 0735/x or less.

Revision Information	
NAS OS Revision	04-00-04
BIOS Revision	07000400

Microprogram Version is 0740/x or more.
Microprogram Version is less than 0751/x.

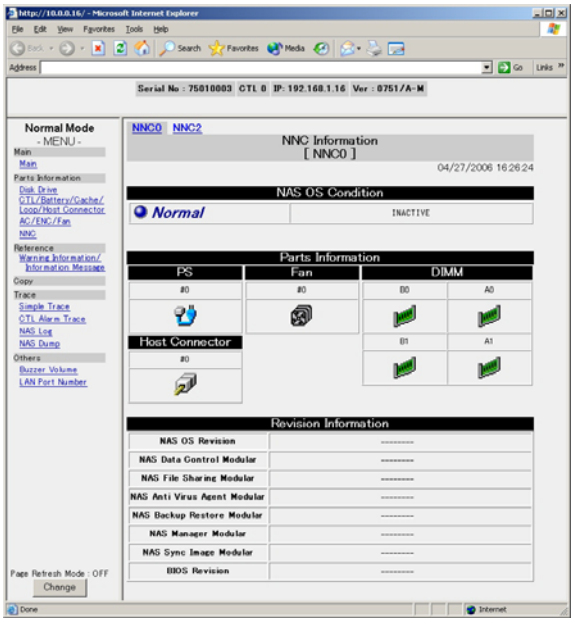
Revision Information	
NAS OS Revision	NAS_41K008-1_01(04-01)
BIOS Revision	07000400

Microprogram Version is 0751/x or more.

Revision Information	
NAS OS Revision	NAS_41KA07_01(04-01-A)
NAS Data Control Modular	04-01-12
NAS File Sharing Modular	04-01-12
NAS Anti Virus Agent Modular	04-01-00
NAS Backup Restore Modular	04-01-02
NAS Manager Modular	04-01-12
NAS Sync Image Modular	04-01-02
BIOS Revision	07000401

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When the NAS OS is uninstalled (NEW), being installed (INST), in the middle of the start processing (BOOT), or the NAS OS installation fails, the following window is displayed.

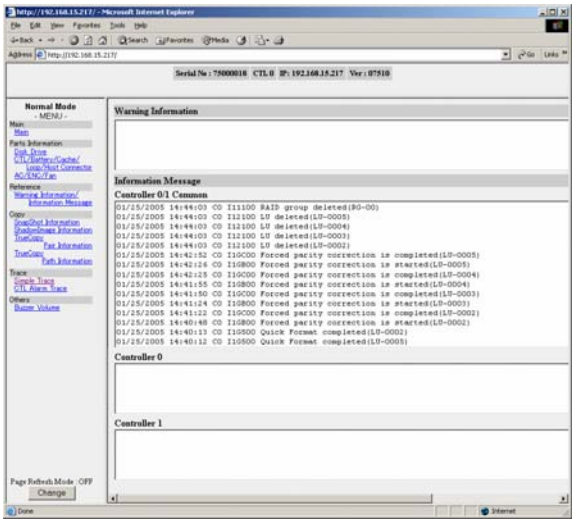


(2) Procedure of the Status checking by messages

A warning message about the failed part is displayed.

Refer to "4.3 Confirm log messages" (TRBL 04-0100) for the details of the warning messages.

When checking the status of a component through a message, a clicking on the "Warning Information" of the menu frame in the main window changes the screen to the one shown below and a detailed message explaining the component status is displayed.



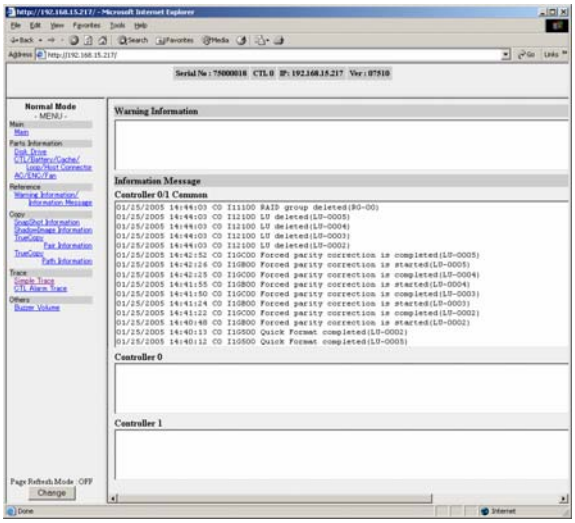
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4.3 Confirm log messages

(1) Procedure for confirming log messages

Click the [Information Message] menu in the main window, and the "Information Message window" appears.

In the "Information Message window", you can identify the cause of the failure and confirm the recovery method.



The information on the failures which were detected during operation of the unit and state of the unit s indicated in the above window.

The information on the failures and state after the unit starts up is indicated in the [Controller 0/1 Common] box.

The information on the failures and state at the time of start-up of the unit is indicated for each Controller in the [Controller 0] and [Controller 1] boxes.

The contents of each message are shown below.

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(a) CUDG (Self-test at power-on) detection message

(i) Indicated message

The CUDG detection message is indicated in the [Controller 0] or [Controller 1] box as shown below.

```
Controller x
MM/DD/YYYY HH:MM:SS Cx   C0 ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx   B0 ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆ ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx   A0 △△△△△△△△ △△△△△△△△ △△△△△△△△ △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx   90 △△△△△△△△ △△△△△△△△ △△△△△△△△ △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx   80 △△△△△△△△ △△△△△△△△ △△△△△△△△ △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx   70 △△△△△△△△ △△△△△△△△ △△△△△△△△ △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx   60 □□□□□□□□ Y Y M M D D—— H H M M S S — ————————
MM/DD/YYYY HH:MM:SS Cx   ○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○
MM/DD/YYYY HH:MM:SS Cx   CTLx
```

MM/DD/YYYY : Date of occurrence
HH:MM:SS : Time of occurrence
Cx : # of Controller in which failure is detected
◆◆◆◆◆◆◆◆ : PCI Config information
△△△△△△△△ : Detailed information
□□□□□□□□ : Message code
○○○○○○○○○○ : Message text (Any number of letters)
Y Y M M D D : Date of occurrence
H H M M S S : Time of occurrence
———— : Reservation area
CTLx : CUDG executing controller #

(ii) Recovery method

Recover from the failure according to the recovery method for each message code.
(For the recovery method for each message, see Message “Chapter 2. CUDG Detected Messages” (MSG 02-0000).)

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(b) Flash/RAM micro detection message

(i) Indicated message

The Flash/RAM micro detection message is indicated in the [Controller 0/1 Common], [Controller 0], or [Controller 1] box as shown below.
The latest one is indicated at the top line.

NOTE : As the date and time of occurrence indicated by the message, the RTC set in the detection controller is used.
If the RTC is different from one control to another, the indicated time of occurrence may be different from one message to another (the message on the upper line is indicated earlier than the one on the lower line).
In this case, the actually latest message is indicated at the top, too.

```
MM/DD/YYYY HH:MM:SS Cx □□□□□□□ ○○○○○○○○○○○○○   : △△△△△△△/◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx □□□□□□□ ○○○○○○○○○○○○○   : △△△△△△△/◆◆◆◆
                                    :
```

MM/DD/YYYY : Confirmed date
HH:MM:SS : Confirmed times
Cx : Error detected Controller#
□□□□□□□□ : Message Code(‡1)
Hxxxxx : Failure messages (See Message “Chapter 3. Failure Messages” (MSG 03-0000))
Ixxxxx : Progress messages (See Message “Chapter 4. Progress Message” (MSG 04-0000))
Rxxxxx : Flash detected messages (See Message “Chapter 5. Flash Detected Messages” (MSG 05-0000))
Wxxxxx : Warning messages (See Message “Chapter 6. Warning Messages” (MSG 06-0000))
○○○○○○○○○○○○ : Message text (Optional font number)
△△△△△△△△ : Recovery method code (see (ii))
◆◆◆◆ : Collecting failure information code (see (ii))

‡1 : For the message in which no recovery method is written, follow the recovery method shown in another message issued at the same time.

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(ii) Recovery method

① Collect the failure information according to " (◆◆◆◆)".

Table 4.3.1 Collecting Failure Information List

Display code	Error information you must collect
STRC	Collect Simple Trace
CTRC	Collect CTL Alarm Trace
FDMP	Collect Full Dump
NLOG	Collect NAS Log and Simple Trace
NDMP	Collect NAS Dump
PLOG	Collect Service PC Log, NAS Log, and Simple Trace
No display	None

Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000) for the details.

② Recover from the failure according to "Recovery method code (△△△△△△△△)".
Refer to the Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000) for the details of the messages.

Table 4.3.2 Recovery Method Code List

Display code	Recovery methods	Reference page
CTL	① Replace the Control Unit, the CALM LED of which is on. ② If the system is still abnormal, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
BAT	Replace the Backup Battery Unit.	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
CACHE	Replace the Cache Unit indicated in the message text.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
ENC	Replace the ENC Unit/SENC Unit indicated in the message text.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
FAN	Replace the Fan Assembly.	Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)
HDU	Replace the Disk Drive indicated in the message text.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
MANUAL	Refer to the manual, and recover from the failure according to the recovery methods for each message code. Hxxxxx : Failure messages (See Message "Chapter 3. Failure messages (MSG 03-0000)) Ixxxxx : Progress messages (See Message "Chapter 4. Progress messages (MSG 04-0000)) Rxxxxx : Flash detected messages (See Message "Chapter 5. Flash detected messages (MSG 05-0000)) Wxxxxx : Warning messages (See Message "Chapter 6. Warning messages (MSG 06-0000))	Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)
PON	Turn on the power again.	—
PS	Replace the Power Unit indicated in the message text.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)

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Display code	Recovery methods	Reference page
RETRY	① Retry the operation. ② If the same failure still occurs, refer to the message list in the manual, and recover from the failure according to the recovery methods for each message code.	Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000)
SYSPM	Set the system parameter in the WEB maintenance mode correctly.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
UPS	When a UPS is connected, take a recovery action referring to the UPS manual.	—
NNC	Replace the NNC Unit displayed in the message text.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
NNCFAN	Replace the FAN Assembly of the NNC Unit displayed in the message text.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
NNCPS	Replace the Power Unit of the NNC Unit displayed in the message text.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
NNCDIM	Replace the Memory (DIMM) of the NNC Unit displayed in the message text.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10)" (NAS 07-0120)
NNCHCN	Replace the host connector of the NNC Unit displayed in the message text.	Replacement "2.3 Replacing the RKNAS parts" (REP 02-1050)
NNCHBD	Replace the interface board of the NNC Unit displayed in the message text.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
No display	This is not a problem. Recovery operation is not necessary.	—

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(iii) How to read failure information

- The history of the unit after it is turned on is indicated in the Information Message.
- The message of Subsystem is Ready indicates the time when the unit is ready. The messages made after the power is turned on until the unit is ready are indicated before this message. The messages made after the unit is ready are indicated after this message.
- Particularly pay attention to Wxxxxx (Warning message), Hxxxxx (Failure messages), and Rxxxxx (Flash detection message).
- The following messages are indicated when failures occur and when they are solved. (See Table 2.2.3.)
  If the recovery message is indicated after a failure occurrence message, the failure has been solved and you do not need to solve it.

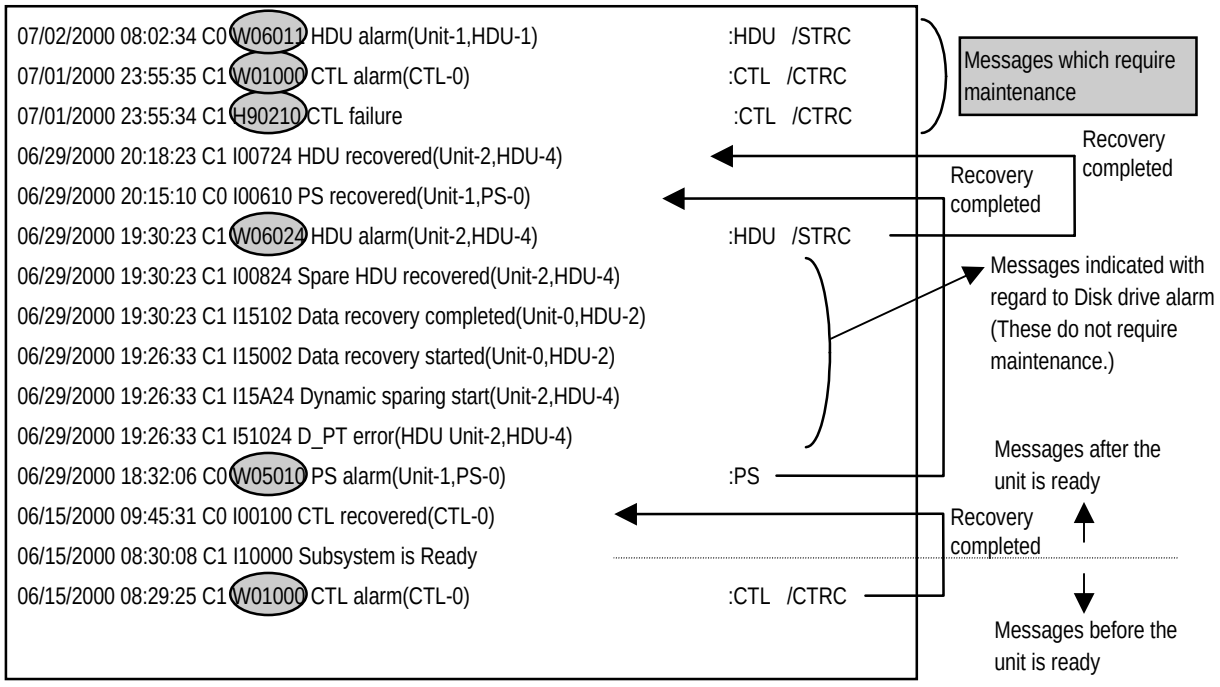
Table 4.3.3 Failure Message List

No.	Description	Failure detected messages		Failure recovery messages	
1	Controller error/recovery	W00100	CTL alarm (CTL-x)	I0010x	CTL recovered (CTL-x)
2	Battery error/recovery	W03000 W0300x	Battery alarm	I00300 I0030x	Battery recovered Battery recovered (Battery-x)
		W03100 W0310x	Battery removed		
		W03200 W0320x	Battery SW off		
		W03300 W0330x	Battery Thermal alarm		
3	Battery backup circuit error/ recovery	W0340x	Battery backup circuit alarm (CTL-x)	I0040x	Battery backup circuit recovered (CTL-x)
4	Fan error/recovery	W040xy W042HH	FAN alarm (Unit-x, FAN-y)	I005xy I005HH	FAN recovered (Unit-x, FAN-y)
		W04100	FAN alarm (CTL-Unit, FAN-x)	I00500	FAN recovered (CTL-Unit, FAN-x)
5	Power supply error/ recovery	W050xy W052HH	PS alarm (Unit-x, PS-y)	I006xy I006HH	PS recovered (Unit-x, PS-y)
		W0G400	PS alarm [RKA] (Unit-x, PS-y)		
		W0G500	PS alarm [RKAAT] (Unit-x, PS-y)		
		W0G600	PS alarm [RKAJ] (Unit-x, PS-y)		
		W0G700	PS alarm [RKAJAT] (Unit-x, PS-y)		
		W05100	PS alarm (CTL-Unit, PS-x)	I00600	PS recovered (CTL-Unit, FAN-x)
6	Disk Drive error/recovery	W060AT	SATA HDU alarm (Unit-x, HDU-y)	I007xy I007HH	HDU recovered (Unit-x, HDU-y)
		W060xy W060HH	HDU alarm (Unit-x, HDU-y)		
		W0GG00	HDU alarm [RKA] (Unit-x, HDU-y)		
		W0GH00	HDU alarm [RKAJ] (Unit-x, HDU-y)		
7	Spare Disk error/recovery	W061AT	SATA Spare HDU alarm (Unit-x, HDU-y)	I009xy I009HH	Spare HDU recovered (Unit-x, HDU-y)
		W061xy W061HH	Spare HDU alarm (Unit-x, HDU-y)		
		W0GJ00	Spare HDU alarm [RKA] (Unit-x, HDU-y)		
		W0GK00	Spare HDU alarm [RKAJ] (Unit-x, HDU-y)		
8	Loop error/recovery	W080xy	Loop alarm (Path-x, Loop-y)	I00Axy	Loop recovered (Path-x, Loop-y)
9	ENC Unit error/SENC Unit error/recovery	W090AT	SENC alarm (Unit-x, ENC-y)	I00Bxy I00BHH	ENC recovered (Unit-x, ENC-y)
		W090xy W090HH	ENC alarm (Unit-x, ENC-y)		
		W0GA00	ENC alarm [RKA] (Unit-x, ENC-y)		
		W0GB00	SENC alarm [RKAAT] (Unit-x, ENC-y)		
		W0GC00	ENC alarm [RKAJ] (Unit-x, ENC-y)		
		W0GD00	SENC alarm [RKAJAT] (Unit-x, ENC-y)		

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No.	Description	Failure detected messages		Failure recovery messages	
10	UPS	W0C000	UPS alarm (UPS-x)	I00D00	UPS recovered (UPS-x)
11	Path failure (detachment)/ recovery	W0F0xy	Path alarm (Remote-x, Path-y)	I030xy	Path recovered by web operation (Remote-x, Path-y)
				I031xy	Path recovered automatically
12	Occurrence/ rectification of an incomplete writing	W0G0xy	Unreadable PIN detected (Unit-x, HDU-y)	I04000	Unreadable PIN recovered
		W0G100	Unreadable PIN detected (Unit-*, HDU-*)		
13	Issue/callback of a resident LU off warning	W440xy	Permanent LU warning (CTL-x, ERR-y)	I1A2xy	Permanent LU warning recovered (CTL-x, ERR-y)
14	Excess/rectification of the threshold value of the number of pinned sub-segments	W49100	PIN is over directory threshold [write through] (DIR-x)	I6EG00	PIN over recovered [directory threshold] (DIR-x)
		W49300	PIN is over partition threshold [write through] (DIR-x, PTT-y)	I6EH00	PIN over recovered [partition threshold] (DIR-x, PTT-y)
		W49500	PIN is over RAID group threshold [write through] (DIR-x, RG-y)	I6EJ00	PIN over recovered [RAID group threshold] (DIR-x, RG-y)
15	The DM-LU failure/recovery	W49700	DM-LU write disable (LU-x)	I6EM00	DM-LU recovered (LU-x)
		W49800	All DM-LU write disabled		
16	The host connector failure/recovery	W0G300	Host connector alarm (Portxy-z)	I53A00	Host connector recovered (Portxy-z)
17	NNC (NAS Unit) failure and recovery	W5000x	NNC alarm (NNC-x)	IA1V0x	NNC recovered (NNC-x)
18	NNC (NAS Unit) partial failure and recovery	W5010x	NNC partial alarm (NNC-x)	IA1U0x	NNC recovered from partial alarm (NNC-x)
19	Occurrence and release of the limit of the priced option, Power Saving	W0GM00	SENC which may attach restrictions on Power Saving function was detected	I54C00	Power Saving function became possible to work without the limit by SENC

Example of message analysis :



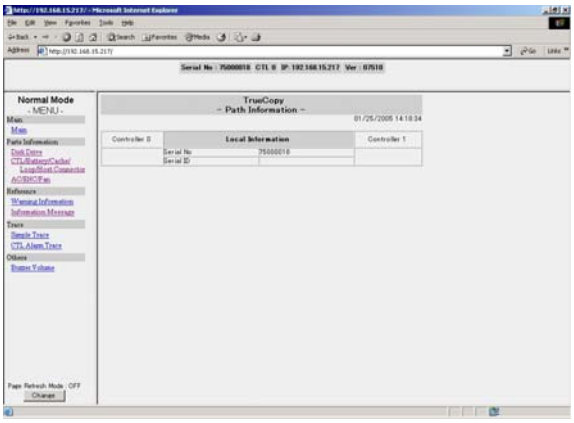
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4.4 TrueCopy remote replication/TrueCopy Extended Distance path confirm state

(1) Procedure for confirming log messages

By clicking the path of [Summary of the replacement parts state] in the main window, the window is changed to the following one. And the details about the path state are displayed. Also by clicking [TrueCopy Path Information] on the menu frame in the main screen, the window is changed to the following window. And the details about the path state are displayed.

Perform the maintenance operation for replacement and the recovery operation referring to "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360).



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4.5 The Priority Error Messages when "W0100x CTL alarm" is displayed

When the "W0100x CTL alarm" message is displayed, if the following message is displayed before "W0100x CTL alarm" message, follow the recovery method of the message.

(1) CUDG Detected Messages (Refer to Message "Chapter 2 CUDG Detected Messages" (MSG 02-0000) for the recovery method.)

Message code	Message text
01824010	TWSI CACHE#0 information error [OWN_CTL]
01824011	TWSI CACHE#1 information error [OWN_CTL]
0184A101	DCTL HP#00 transfer error [OWN_CTL]
0184A102	DCTL HP#00 transfer time out error [OWN_CTL]
0184A103	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A104	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A201	DCTL HP#00 transfer error [OWN_CTL]
0184A202	DCTL HP#00 transfer time out error [OWN_CTL]
0184A203	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A204	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A205	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A206	DCTL HP#00 transfer data compare error [OWN_CTL]
0184A601	DCTL HP#01 transfer error [OWN_CTL]
0184A602	DCTL HP#01 transfer time out error [OWN_CTL]
0184A603	DCTL HP#01 transfer data compare error [OWN_CTL]
0184A604	DCTL HP#01 transfer data compare error [OWN_CTL]
0184A701	DCTL HP#01 transfer error [OWN_CTL]
0184A702	DCTL HP#01 transfer time out error [OWN_CTL]
0184A703	DCTL HP#01 transfer data compare error [OWN_CTL]
0184A704	DCTL HP#01 transfer data compare error [OWN_CTL]
0184A705	DCTL HP#01 transfer data compare error [OWN_CTL]
0184A706	DCTL HP#01 transfer data compare error [OWN_CTL]
0184B101	DCTL HP#10 transfer error [OWN_CTL]
0184B102	DCTL HP#10 transfer time out error [OWN_CTL]
0184B103	DCTL HP#10 transfer data compare error [OWN_CTL]
0184B104	DCTL HP#10 transfer data compare error [OWN_CTL]
0184B601	DCTL HP#11 transfer error [OWN_CTL]
0184B602	DCTL HP#11 transfer time out error [OWN_CTL]
0184B603	DCTL HP#11 transfer data compare error [OWN_CTL]
0184B604	DCTL HP#11 transfer data compare error [OWN_CTL]

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Message code	Message text
0184xxC1	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC2	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC3	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC4	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC5	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC6	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]

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Message code	Message text
0184xxC7	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC8	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxC9	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxCA	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxCB	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxCC	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxCD	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]

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Message code	Message text
0184xxCE	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
0184xxCF	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]
01851101	CACHE#0 implementation check error in MP access [OWN_CTL]
01851201	CACHE#0 implementation check error in Shadow image [OWN_CTL]
01851202	CACHE#0 implementation check error in Shadow image [OWN_CTL]
01851211	CACHE#1 implementation check error in Shadow image [OWN_CTL]
01851212	CACHE#1 implementation check error in Shadow image [OWN_CTL]
01851401	CACHE#0 implementation check error in Shadow image & TWSI [OWN_CTL]
01851411	CACHE#1 implementation check error in Shadow image & TWSI [OWN_CTL]
01851501	CACHE#0 data line error [OWN_CTL]
01851502	CACHE#0 data line error [OWN_CTL]
01851511	CACHE#1 data line error [OWN_CTL]
01851512	CACHE#1 data line error [OWN_CTL]
01851601	CACHE#0 address line error [OWN_CTL]
01851611	CACHE#1 address line error [OWN_CTL]
01851701	CACHE#0 data compare error [OWN_CTL]
01851711	CACHE#1 data compare error [OWN_CTL]
01851B01	CACHE#0 data compare error [OWN_CTL]
01851B02	CACHE#0 data compare error [OWN_CTL]
01851B03	CACHE#0 data compare error [OWN_CTL]
01851C01	CACHE#0/1 size mismatch [OWN_CTL]
01851C02	CACHE#2/3 size mismatch [OWN_CTL]
01851D01	CACHE#0 data compare error [OWN_CTL]
01851D02	CACHE#0 data compare error [OWN_CTL]
01851D03	CACHE#0 data compare error [OWN_CTL]
01851D11	CACHE#1 data compare error [OWN_CTL]
01851D12	CACHE#1 data compare error [OWN_CTL]
01851D13	CACHE#1 data compare error [OWN_CTL]
01852101	CACHE#0 ECC R/W data compare error [OWN_CTL]
01852201	CACHE#0 ECC circuit error [OWN_CTL]
01852202	CACHE#0 ECC circuit error [OWN_CTL]
01852203	CACHE#0 ECC circuit error [OWN_CTL]
01852204	CACHE#0 ECC circuit error [OWN_CTL]
01852205	CACHE#0 ECC circuit error [OWN_CTL]
01852209	CACHE#0 ECC circuit error [OWN_CTL]

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Message code	Message text
0185220A	CACHE#0 ECC circuit error [OWN_CTL]
0185220B	CACHE#0 ECC circuit error [OWN_CTL]
0185220C	CACHE#0 ECC circuit error [OWN_CTL]
0185220D	CACHE#0 ECC circuit error [OWN_CTL]
01852211	CACHE#0 ECC circuit error [OWN_CTL]
01852212	CACHE#0 ECC circuit error [OWN_CTL]
01852213	CACHE#0 ECC circuit error [OWN_CTL]
01852214	CACHE#0 ECC circuit error [OWN_CTL]
01852215	CACHE#0 ECC circuit error [OWN_CTL]
01852219	CACHE#0 ECC circuit error [OWN_CTL]
0185221A	CACHE#0 ECC circuit error [OWN_CTL]
0185221B	CACHE#0 ECC circuit error [OWN_CTL]
0185221C	CACHE#0 ECC circuit error [OWN_CTL]
0185221D	CACHE#0 ECC circuit error [OWN_CTL]
01852301	CACHE#0 ECC circuit error [OWN_CTL]
01852302	CACHE#0 ECC circuit error [OWN_CTL]
01852303	CACHE#0 ECC circuit error [OWN_CTL]
01852304	CACHE#0 ECC circuit error [OWN_CTL]
01852305	CACHE#0 ECC circuit error [OWN_CTL]
01852311	CACHE#0 ECC circuit error [OWN_CTL]
01852312	CACHE#0 ECC circuit error [OWN_CTL]
01852313	CACHE#0 ECC circuit error [OWN_CTL]
01852314	CACHE#0 ECC circuit error [OWN_CTL]
01852315	CACHE#0 ECC circuit error [OWN_CTL]
01852401	CACHE#0 ECC circuit error [OWN_CTL]
01852402	CACHE#0 ECC circuit error [OWN_CTL]
01852403	CACHE#0 ECC circuit error [OWN_CTL]
01852404	CACHE#0 ECC circuit error [OWN_CTL]
01852405	CACHE#0 ECC circuit error [OWN_CTL]
01852406	CACHE#0 ECC circuit error [OWN_CTL]
01852407	CACHE#0 ECC circuit error [OWN_CTL]
01852408	CACHE#0 ECC circuit error [OWN_CTL]
01852409	CACHE#0 ECC circuit error [OWN_CTL]
01852411	CACHE#0 ECC circuit error [OWN_CTL]
01852412	CACHE#0 ECC circuit error [OWN_CTL]
01852413	CACHE#0 ECC circuit error [OWN_CTL]
01852414	CACHE#0 ECC circuit error [OWN_CTL]
01852415	CACHE#0 ECC circuit error [OWN_CTL]
01852416	CACHE#0 ECC circuit error [OWN_CTL]
01852417	CACHE#0 ECC circuit error [OWN_CTL]
01852418	CACHE#0 ECC circuit error [OWN_CTL]
01852419	CACHE#0 ECC circuit error [OWN_CTL]
01852501	CACHE#0 ECC circuit error [OWN_CTL]
01852502	CACHE#0 ECC circuit error [OWN_CTL]
01852503	CACHE#0 ECC circuit error [OWN_CTL]
01852504	CACHE#0 ECC circuit error [OWN_CTL]
01852505	CACHE#0 ECC circuit error [OWN_CTL]
01852506	CACHE#0 ECC circuit error [OWN_CTL]

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Message code	Message text
01852511	CACHE#0 ECC circuit error [OWN_CTL]
01852512	CACHE#0 ECC circuit error [OWN_CTL]
01852513	CACHE#0 ECC circuit error [OWN_CTL]
01853121	CACHE#2 unsupported [OWN_CTL]
01853131	CACHE#3 unsupported [OWN_CTL]
01853221	CACHE#2 unsupported [OWN_CTL]
01853231	CACHE#3 unsupported [OWN_CTL]
01853321	CACHE#2 data line error [OWN_CTL]
01853322	CACHE#2 data line error [OWN_CTL]
01853331	CACHE#3 data line error [OWN_CTL]
01853332	CACHE#3 data line error [OWN_CTL]
01853421	CACHE#2 address line error [OWN_CTL]
01853431	CACHE#3 address line error [OWN_CTL]
01853521	CACHE#2 data compare error [OWN_CTL]
01853531	CACHE#3 data compare error [OWN_CTL]
01853921	CACHE#2 data compare error [OWN_CTL]
01853922	CACHE#2 data compare error [OWN_CTL]
01853923	CACHE#2 data compare error [OWN_CTL]
01853931	CACHE#3 data compare error [OWN_CTL]
01853932	CACHE#3 data compare error [OWN_CTL]
01853933	CACHE#3 data compare error [OWN_CTL]
01D57101	HFPC#0 MADDR error [OWN_CTL]
01D57301	HFPC#0 register data compare error [OWN_CTL]
01D57302	HFPC#0 register data compare error [OWN_CTL]
01D57303	HFPC#0 hard status error [OWN_CTL]
01D57401	HFPC#0 transfer data compare error [OWN_CTL]
01D57402	HFPC#0 transfer data compare error [OWN_CTL]
01D57601	HFPC#1 MADDR error [OWN_CTL]
01D57801	HFPC#1 register data compare error [OWN_CTL]
01D57802	HFPC#1 register data compare error [OWN_CTL]
01D57803	HFPC#1 hard status error [OWN_CTL]
01D57901	HFPC#1 transfer data compare error [OWN_CTL]
01D57902	HFPC#1 transfer data compare error [OWN_CTL]
01D58101	HFPC#2 MADDR error [OWN_CTL]
01D58301	HFPC#2 register data compare error [OWN_CTL]
01D58302	HFPC#2 register data compare error [OWN_CTL]
01D58303	HFPC#2 hard status error [OWN_CTL]
01D58401	HFPC#2 transfer data compare error [OWN_CTL]
01D58402	HFPC#2 transfer data compare error [OWN_CTL]
01D58601	HFPC#3 MADDR error [OWN_CTL]
01D58801	HFPC#3 register data compare error [OWN_CTL]
01D58802	HFPC#3 register data compare error [OWN_CTL]
01D58803	HFPC#3 hard status error [OWN_CTL]
01D58901	HFPC#3 transfer data compare error [OWN_CTL]
01D58902	HFPC#3 transfer data compare error [OWN_CTL]

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Message code	Message text
01D5xxC1	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC2	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC3	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC4	HFPC#S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC5	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC6	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC7	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC8	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxC9	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]

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Message code	Message text
01D5xxCA	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxCB	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxCC	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxCD	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxCE	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]
01D5xxCF	HFPC #S1 loop back transfer error [OWN_CTL]
	HFPC #0 loop back transfer error [OWN_CTL]
	HFPC #1 loop back transfer error [OWN_CTL]
	HFPC#2 loop back transfer error [OWN_CTL]
	HFPC#3 loop back transfer error [OWN_CTL]

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Message code	Message text
01xxxxB1	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB2	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB3	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB4	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB5	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB6	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]

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Message code	Message text
01xxxxB7	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB8	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxB9	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxBA	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxBB	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2loop initialize error [OWN_CTL]
	HFPC#3loop initialize error [OWN_CTL]
01xxxxBC	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]

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Message code	Message text
01xxxxBD	DFPC#0 loop initialize error [OWN_CTL]
	DFPC#1 loop initialize error [OWN_CTL]
	HFPC#S1 loop initialize error [OWN_CTL]
	HFPC#0 loop initialize error [OWN_CTL]
	HFPC#1 loop initialize error [OWN_CTL]
	HFPC#2 loop initialize error [OWN_CTL]
	HFPC#3 loop initialize error [OWN_CTL]
01xxxxD1	DFPC#0 soft reset error [OWN_CTL]
	DFPC#1 soft reset error [OWN_CTL]
	HFPC#S1 soft reset error [OWN_CTL]
	HFPC#0 soft reset error [OWN_CTL]
	HFPC#1 soft reset error [OWN_CTL]
	HFPC#2 soft reset error [OWN_CTL]
	HFPC#3 soft reset error [OWN_CTL]
01xxxxD2	DFPC#0 soft reset error [OWN_CTL]
	DFPC#1 soft reset error [OWN_CTL]
	HFPC#S1 soft reset error [OWN_CTL]
	HFPC#0 soft reset error [OWN_CTL]
	HFPC#1 soft reset error [OWN_CTL]
	HFPC#2 soft reset error [OWN_CTL]
	HFPC#3 soft reset error [OWN_CTL]
01xxxxD3	DFPC#0 soft reset error [OWN_CTL]
	DFPC#1 soft reset error [OWN_CTL]
	HFPC#S1 soft reset error [OWN_CTL]
	HFPC#0 soft reset error [OWN_CTL]
	HFPC#1 soft reset error [OWN_CTL]
	HFPC#2 soft reset error [OWN_CTL]
	HFPC#3 soft reset error [OWN_CTL]
01xxxxD4	DFPC#0 soft reset error [OWN_CTL]
	DFPC#1 soft reset error [OWN_CTL]
	HFPC#S1 soft reset error [OWN_CTL]
	HFPC#0 soft reset error [OWN_CTL]
	HFPC#1 soft reset error [OWN_CTL]
	HFPC#2 soft reset error [OWN_CTL]
	HFPC#3 soft reset error [OWN_CTL]
01xxxxD5	DFPC#0 soft reset error [OWN_CTL]
	DFPC#1 soft reset error [OWN_CTL]
	HFPC#S1 soft reset error [OWN_CTL]
	HFPC#0 soft reset error [OWN_CTL]
	HFPC#1 soft reset error [OWN_CTL]
	HFPC#2 soft reset error [OWN_CTL]
	HFPC#3 soft reset error [OWN_CTL]
01xxxxE2	CACHE#2 ECC uncorrectable error [OWN_CTL]
01xxxxE3	CACHE#3 ECC uncorrectable error [OWN_CTL]
01xxxxE6	CACHE#2 ECC correctable error [OWN_CTL]
01xxxxE7	CACHE#3 ECC correctable error [OWN_CTL]

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(2) Failure Messages (Refer to Message "Chapter 3. Failure Messages" (MSG 03-0000) for the recovery method.)

Message code	Message text
H20Q00	DCTL CACHE ECC uncorrectable error [REG82001238, Bit29] (CTL-x, CACHE-y)
H21700	EDC error (Port-xy)
H3030x	ECC uncorrectable error (CACHE-x)
H3050x	ECC uncorrectable error (CTL-x)
H307xy	DCTL CACHE ECC uncorrectable error [REG82001238, Bit29](CTL-x, CACHE-y)
H3080x	DCTL ECC correction failed [MPU] [REG82001238, Bit28] (CTL-x)
H30B0x	CACHE uncorrectable ERR [OTH_CTL] (CTL-x)
H30Bxy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)
H30Gxy	ECC uncorrectable error (CACHE-x/y)
H30Ixy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)
H30Jxy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)
H90320	Watch-dog time-out
HB0Cxx	H-FPC is not detected (Port-xy)
HD220x	CACHE error over (CACHE-x) [CRECT]
HE020x	Backend down [NO SES-HDU BKW] (Unit-x)
HE050x	Backend down [Unit# ERR] (Unit-x)
HE200x	ENC recovery failed (CTL-x)
HE21xy	I/F board type error (CTL-x, I/F board-y)
HF0100	Data transfer check error [SEGPOSERR]
HF0103	Data transfer check error [RDSEGERR]
HF0105	Data transfer check error [WSEGPDEV]
HF0106	Data transfer check error [WSEGLOCK]
HF0107	Data transfer check error [CCPLUNERR]
HF0108	Data transfer check error [CCPLBAERR]
HF0109	Data transfer check error [PARLUNERR]
HF010A	Data transfer check error [PARLBAERR]
HF010B	Data transfer check error [QUEUEERR]
HF010C	Data transfer check error [COWDRVERR]
HF010E	Data transfer check error [DSTPOSERR]
HF010F	Data transfer check error [SEGPOSOTH]
HF0117	Data transfer check error [BUFSGQATERR]
HF0118	Data transfer check error [WRBUFTODTY]
HF020x	Directory check error (CTL-x)
HF0300	Data transfer check error [STGLUNERR]
HF0400	Data transfer check error [NTMPRD]
HH0E0x	CACHE access error (CACHE-x) [PON]
HH270x	I/F Board is not installed (CTL-x)
HH2900	Cache capacity reduced although copy function enable
HH4Gxy	TWSI access error in NAS IF Board (CTL x-y)
HH7C0x	H-IPC firmware boot up failed (CTL-x)
HH7Gxy	H-IPC soft reset has ended in failure (Port-xy)
HH7Hxy	H-IPC hardware error (Port-xy)
HH7I0x	iSCSI firmware load failed (CTL-x)
HH7J00	H-IPC is not detected (Port-xy)
HH7K00	H-IPC is not detected (Port-xA/xB)

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Message code	Message text
HH7Mxy	NAS IF board is not detected (CTL-x)
HH7N00	H-IPC PCI STS REG error [OPE]
HH7P00	H-IPC PCI STS REG error [ILE]
HH7Q00	H-IPC PCI STS REG error [ICE]
HH7R00	H-IPC PCI STS REG error [OCE]
HH7S00	H-IPC PCI STS REG error [DPE]
HH7U00	H-IPC PCI ECC error
HH8A00	NNC PCI Express error detected between NNC and NAS I/F board (CTL-x, NNC-y)
HH8B00	NNC CTL reset was executed caused by PCI Express error
HH8C00	Host transfer NAS-DMA error (CTL-x, NNC-y)
HJ3800	Backend down [Path switch status error] (Unit-x, ENC-y)
HJ3Axy	Unsupported CACHE detected (CTL-x, CACHE-y)
HNA30x	PCDG error [NAS IF Board, CTL] (CTL-x)
HNA4xy	PCDG error [NNC, PCI Express, NAS IF Board] (CTL-x, NNC-y)
HNA5xy	PCDG error [NNC, SMBUS, NAS IF Board] (CTL-x, NNC-y)
HZ0300	Not enough Cache memory to use QuickShadow function
HZ0H0x	Directory reinitialization failed (CTL-x)
HZ0Pxx	Cache capacity reduced although Cache Partition Manager enable

(3) Progress Messages (Refer to Message "Chapter 4. Progress Message" (MSG 04-0000) for the recovery method.)

Message code	Message text
I5FE00	Connectivity path failure of SENC occurred

(4) Flash Detected Messages (Refer to Message "Chapter 5. Flash Detected Messages" (MSG 05-0000) for the recovery method.)

Message code	Message text
R20M00	DCTL CACHE uncorrectable ERR [REG82001238, Bit29](CTL-x, CACHE-y)
R302xy	DCTL CACHE uncorrectable error [REG82001238, Bit29] (CTL-x, CACHE-y)
R312xy	ECC uncorrectable error (CTL-z)
RA30xy	CACHE size mismatch b/w. CTL (CACHE-x/y)
RA7700	CTL unit type cache size over
RA780x	Unsupported CACHE (CACHE-x)
RA7A00	CACHE installation error (CACHE-0/1)
RA7B0x	CACHE size get error (CACHE-x)
RB0B0x	CACHE property error (CACHE-x)
RB0Cxy	CACHE pair check error (CACHE-x/y)

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4.6 Message check when NNC alarm or NNC partial alarm is displayed

When the following message code is displayed before "W5000x NNC alarm" or "W5010x NNC partial alarm", follow that recovery method. (Refer to Message "Chapter 4 Progress Message " (MSG 04-0000) for the recovery method.)

Message code	Message text
HH8A00	NNC PCI Express error detected between NNC and NAS I/F board (CTL-x, NNC-y)
HH8B00	NNC CTL reset was executed caused by PCI Express error
HH8C00	Host transfer NAS-DMA error (CTL-x, NNC-y)
HNA4xy	PCDG error [NNC, PCI Express, NAS IF Board] (CTL-x, NNC-y)
HNA5xy	PCDG error [NNC, SMBUS, NAS IF Board] (CTL-x, NNC-y)
I53B00	NNC 1000BASE-T Ethernet Card failure detected (NNC-x, Extension Slot-y)
I53C0x	NNC Fibre Channel Card failure detected (NNC-x, Extension Slot2)
I53D0x	NNC PCI-Express Card failure detected (NNC-x, Extension Slot3)
I53E00	NNC 1000BASE-SX Ethernet Card failure detected (NNC-x, Extension Slot-y)
I53F00	NNC Host connector failure detected (NNC-x, y)
I54100	NNC FAN failure detected (NNC-x, FAN-y)
I54200	NNC PS failure detected (NNC-x, PS-y)
I5430x	PCDG error [DIMM-C0] (NNC-x)
I5440x	PCDG error [DIMM-D0] (NNC-x)
I545xy	PCDG error [1000BASE-T Ethernet Card] (NNC-x, Extension Slot-y)
I546xy	PCDG error [1000BASE-SX Ethernet Card] (NNC-x, Extension Slot-y)
I5470x	PCDG error [Fibre Channel Card] (NNC-x, Extension Slot-y)
I548xy	PCDG error [PS] (NNC-x, PS-y)
I549xy	PCDG error [FAN] (NNC-x, FAN-y)
I54A0x	PCDG error [mis-configuration of Extension Card] (NNC-x)
I54B00	PCDG error [Host Connector] (NNC-x, y)
I6EW0x	NNC the version of Data Control Modular to be installed is not supported (NNC-x)
I6EX0x	NNC NAS unit type does not match the other NAS unit type in the cluster (NNC-x)
I6F00x	NNC Start-up process of NAS Dump collection failed (NNC-x)
I6F100	NNC Stop the NAS OS because the resource group might be going illegal [xy] (NNC-z)
IA1E00	Host transfer NAS-DMA error (NNC-x)
IA1F0x	PCDG error [miss configuration of NNC DIMM] (NNC-x)
IA1H0x	PCDG error [DIMM-A0] (NNC-x)
IA1I0x	PCDG error [DIMM-A1] (NNC-x)
IA1J0x	PCDG error [DIMM-B0] (NNC-x)
IA1K0x	PCDG error [DIMM-B1] (NNC-x)
IA1L0x	PCDG error [Host Connector] (NNC-x)
IA1M00	NNC PCI Express error occurred caused by power failure of NNC (CTL-x, NNC-y)
IA1N00	Host transfer NAS-DMA split error (CTL-x, NNC-y)
IA1X0x	NNC Host Connector failure detected (NNC-x)
IA1Y00	NNC DIMM failure detected (NNC-x, DIMM-y)
IA1Z0x	NNC FAN failure detected (NNC-x)
IA2A00	NNC ECC correctable error detected (NNC- x, DIMM-y)
IA2B0x	NNC BIOS initialization failed (NNC-x)
IA2C0x	NNC Shutdown time-out (NNC-x)
IA2D0x	NNC No Response to Heart beat (NNC-x)
IA2Fxy	NNC Power on time-out (CTL-x, NNC-y)
IA2G0x	NNC OS boot time-out (NNC-x)
IA2H00	NNC Hardware failure detected [x] (NNC-y)
IA2I00	NNC ECC correctable error detected [x] (NNC-y)

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Message code	Message text
IA2J0x	NNC OS installation failed (NNC-x)
IA2K0x	NNC OS installation time-out (NNC-x)
IA2Q00	NNC NAS OS error [xy] (NNC-z)
IA2T00	NNC Some PCI Express link failed [x] (NNC-y)
IA2U00	NNC Some PCI Express link failed [x] (CTLy-z)
IA2V00	NNC Some integrated link of Data LAN failed [xy] (NNC-z)
IA2X00	NNC Internal process for NAS Dump download failed [xy] (NNC-z)
IA2Y00	NNC Download of NAS Log failed [xy] (NNC-z)
IA2Z00	NNC Setting of Management LAN Port failed [xy] (NNC-z)
IA3000	NNC can not synchronize with NTP server [xy] (NNC-z)
IA3100	NNC Command I/O error detected in transaction to NAS IF Board [xy] (NNC-z)
IA3200	NNC NAS OS detected hardware error [xy] (NNC-z)
IA3300	NNC Fibre Channel failure detected in backup interface [xy] (NNC-z)
IA3400	NNC I/O error detected in backup interface [xy] (NNC-z)
IA3500	NNC Fail-over started [xy] (NNC-z)
IA3600	NNC Fail-over ended in abnormal [xy] (NNC-z)
IA3900	NNC Link down in Data LAN [xy] (NNC-z)
IA3A00	NAS OS boot incomplete [NAS System LU data lost]
IA3C0x	NNC PS failure detected (NNC-x)
IAPM00	NNC Boot time-out [post xx, yy] (NNC-z)
IAPN00	NNC BIOS firmware installation time-out [post xx, yy] (NNC-z)
IB1I0x	The Installed version of Data Control Modular is not supported (NNC-x)
IB1Z00	NNC Boot time-out [TUR] [post xxxx, yyyy] (NNC-z)
IB2000	NNC Boot time-out [BIOS] [post xxxx, yyyy] (NNC-z
IB2100	NNC Boot time-out [PXE] [post xxxx, yyyy] (NNC-z)
IB2200	NNC Boot time-out [BIOS_LOAD] [post xxxx, yyyy] (NNC-z)
IB230x	NNC BIOS firmware installation failed [check sum error] (NNC-x)
IB240x	NNC BIOS firmware installation failed [download error] (NNC-x)
IB250x	NNC Boot stopped because NAS BIOS firmware update has not been completed (NNC-x)

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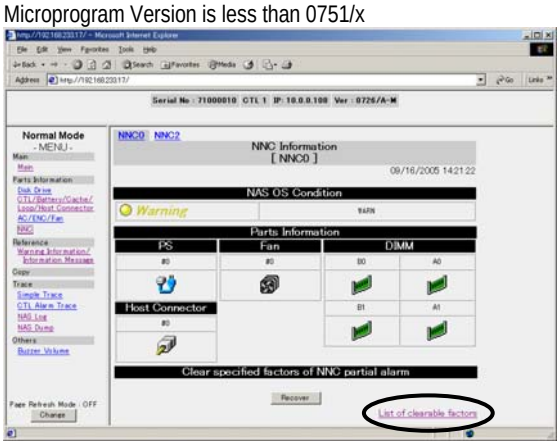
4.7 The function of the “Clear specified factors of NNC partial alarm”

There is a case where the Warning status of the Control Unit is not released and the WARNING LEDs on the array subsystem and the NAS unit are lighting up even though the recovery work for some specific NNC partial alarms.
Release the Warning status of the Control Unit and turn off each WARNING LED according to the following procedures.
The operation of the “Clear specified factors of NNC partial alarm” can be executed only to the NNC (NAS unit) connected to the Control Unit.

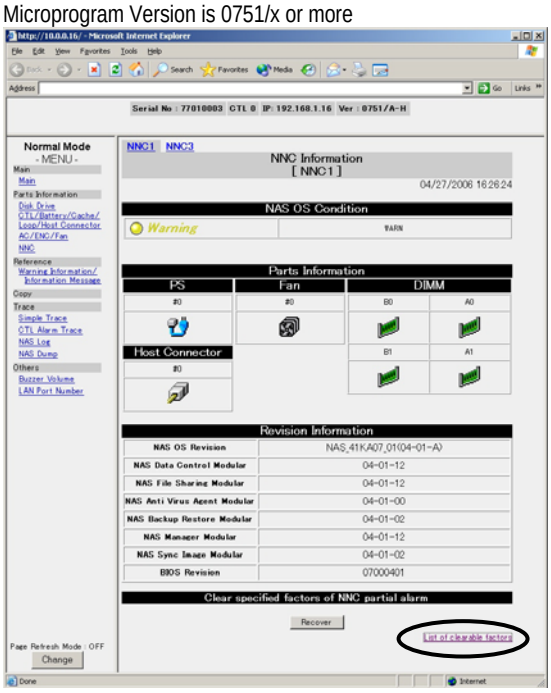
(1) Before operating “Clear specified factors of NNC partial alarm”.

(a) Click the [List of clearable factors].

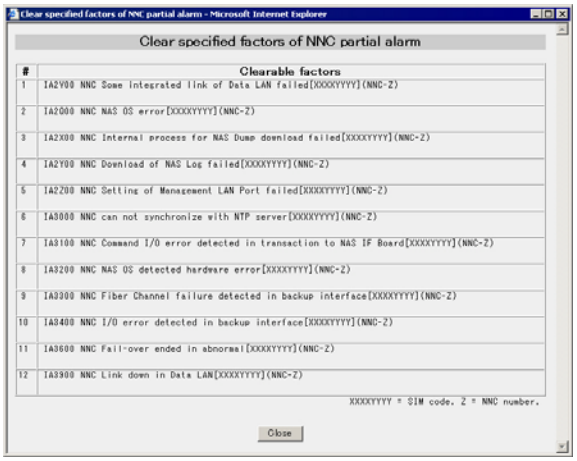
Microprogram Version is less than 0751/x



Microprogram Version is 0751/x or more



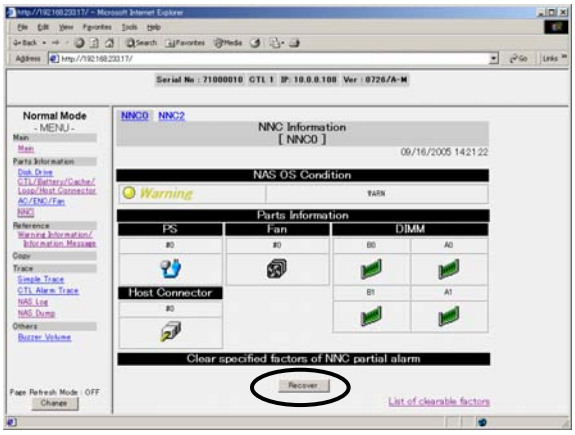
(b) Check that it is either of the lists of which the failure factors are displayed.



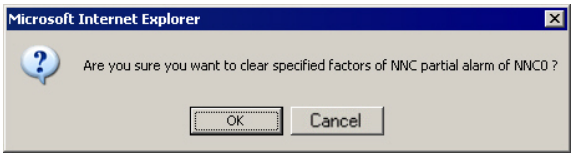
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(2) Clear specified factors of NNC partial alarm.

(a) Click the [Recover] button.

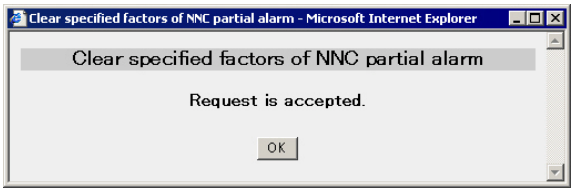


(b) A message asking you to verify the setting is displayed. Click the [OK] button.



(3) Checking the NNC partial alarm recovery.

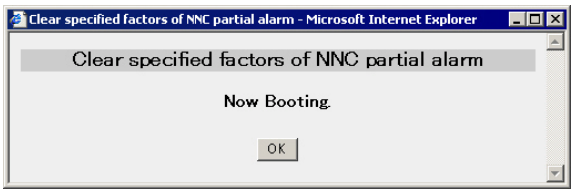
(a) When the "Clear specified factors of NNC partial alarm" is completed normally.



Click the [OK] button.

Click Warning Information on the menu window, and check that the indication of the partial alarm is turned off.

(b) When the array subsystem was booting at the time of clicking the [Recover] button.



Click the [OK] button.

Execute it again in the procedure (1) after the array subsystem becomes the READY status.

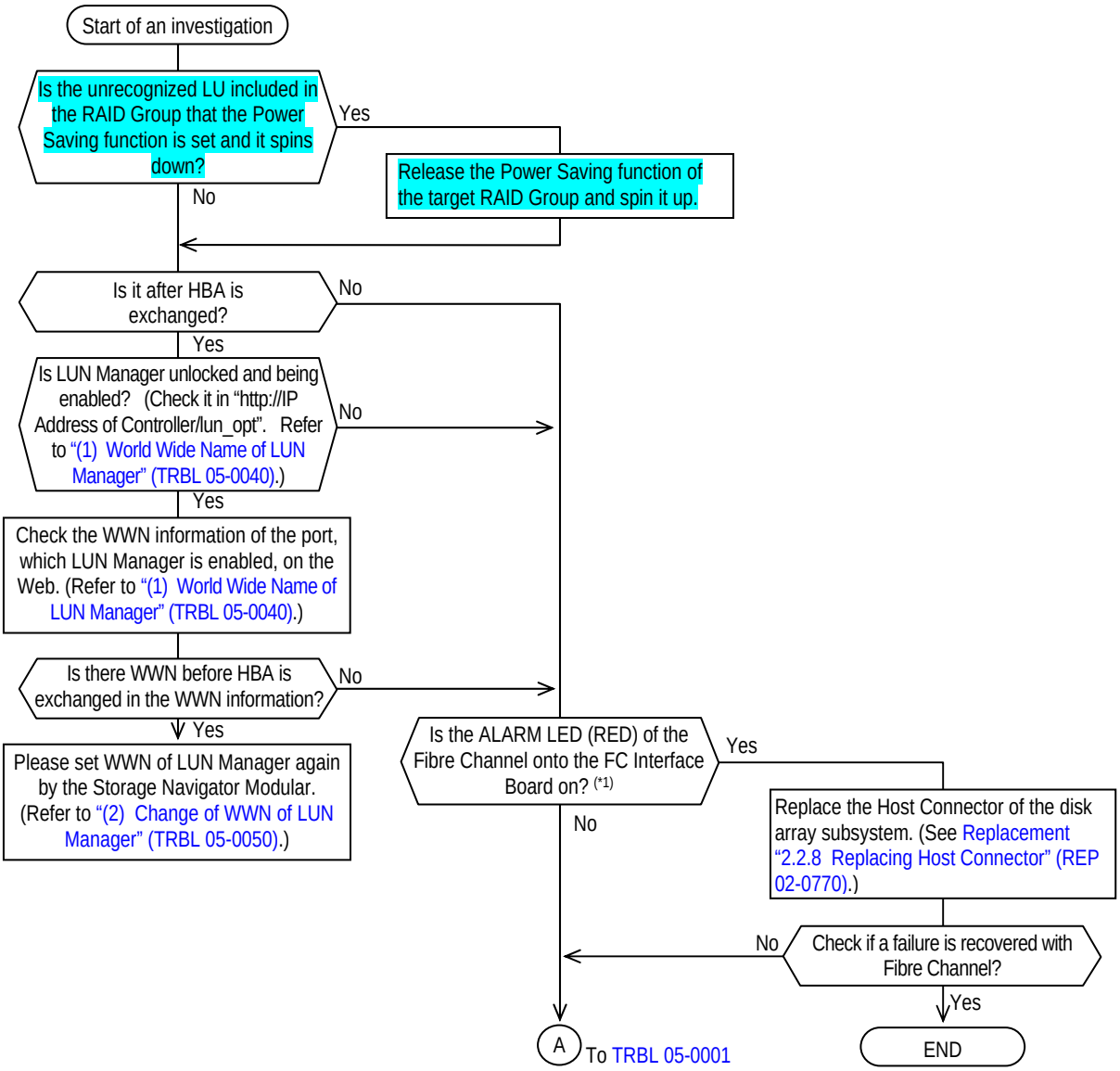
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Chapter 5. Procedure for Investigating Disk Array Subsystem Regarding Fibre Channel Failure

When a failure occurs in a Fibre Channel Link between a host computer and the subsystem, judge whether or not the failure has occurred in the interface portion of the subsystem following the flowchart shown below.

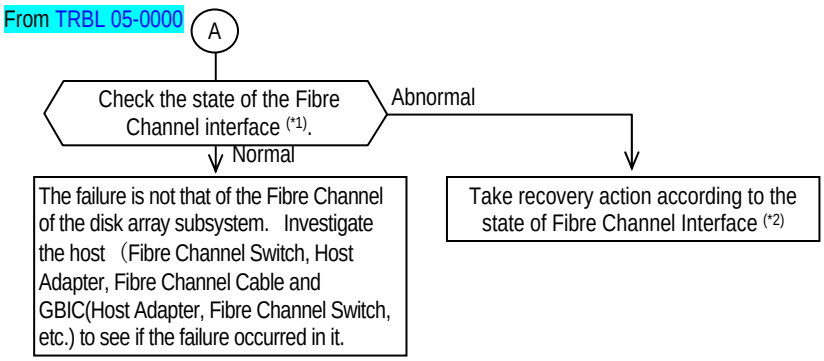
- "< When the Basic Chassis is RKH/RKM, and when the FC Interface Board is installed in RKS/RKXS >" (TRBL 05-0000)
- "< When the Basic Chassis is RKS/RKXS and the FC Interface Board is not installed >" (TRBL 05-0010)

< When the Basic Chassis is RKH/RKM, and when the FC Interface Board is installed in RKS/RKXS >



*1 : This is the status of No. 8 in Table 8.2.8 of "8.2 (6) LED Indication Patterns on FC Interface Board" (TRBL 08-0260).

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*1 : Refer to Table 8.2.8 of "8.2 (6) LED Indication Patterns on FC Interface Board" (TRBL 08-0260).

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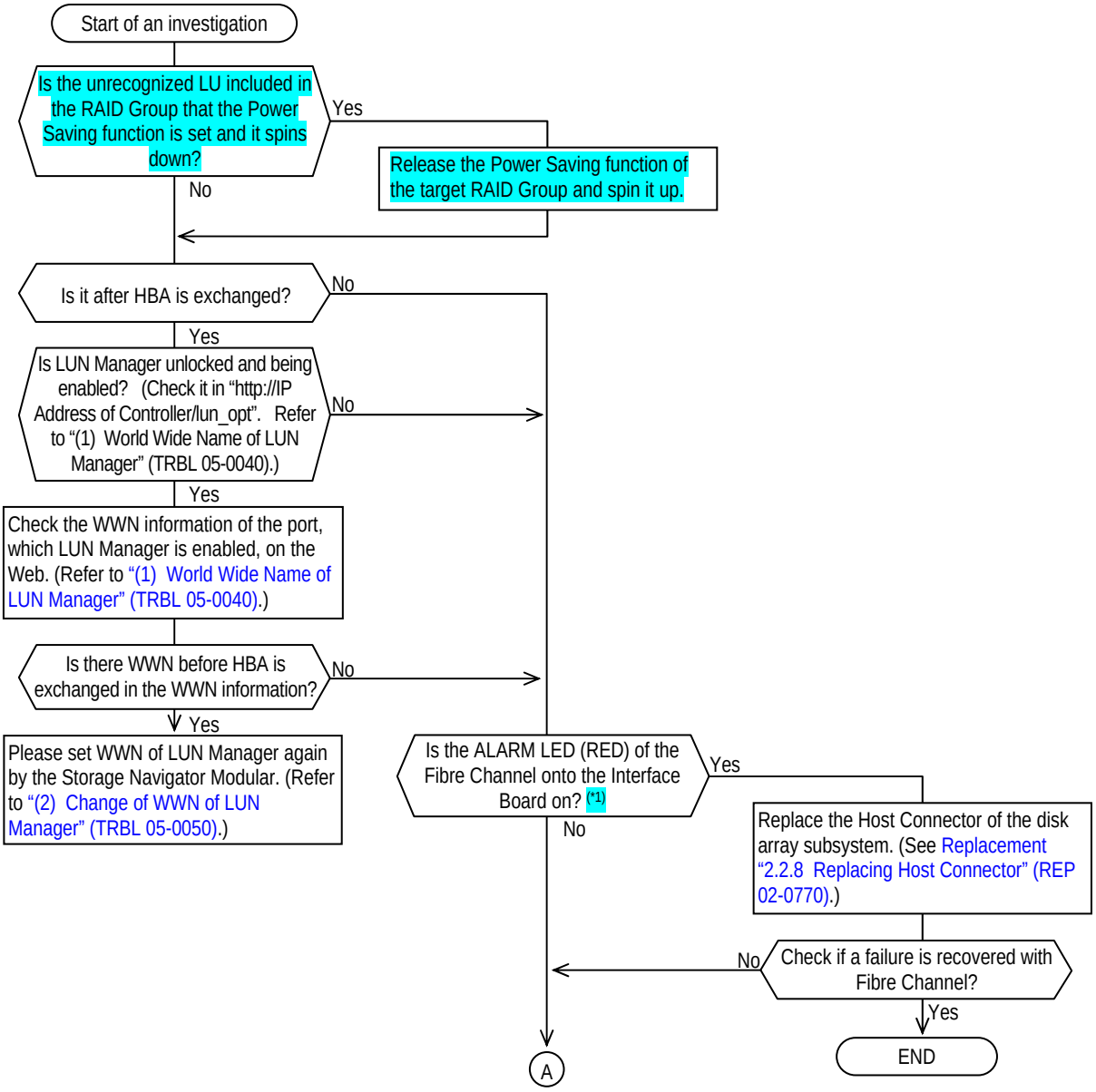
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< When the Basic Chassis is RKS/RKXS and the FC Interface Board is not installed >

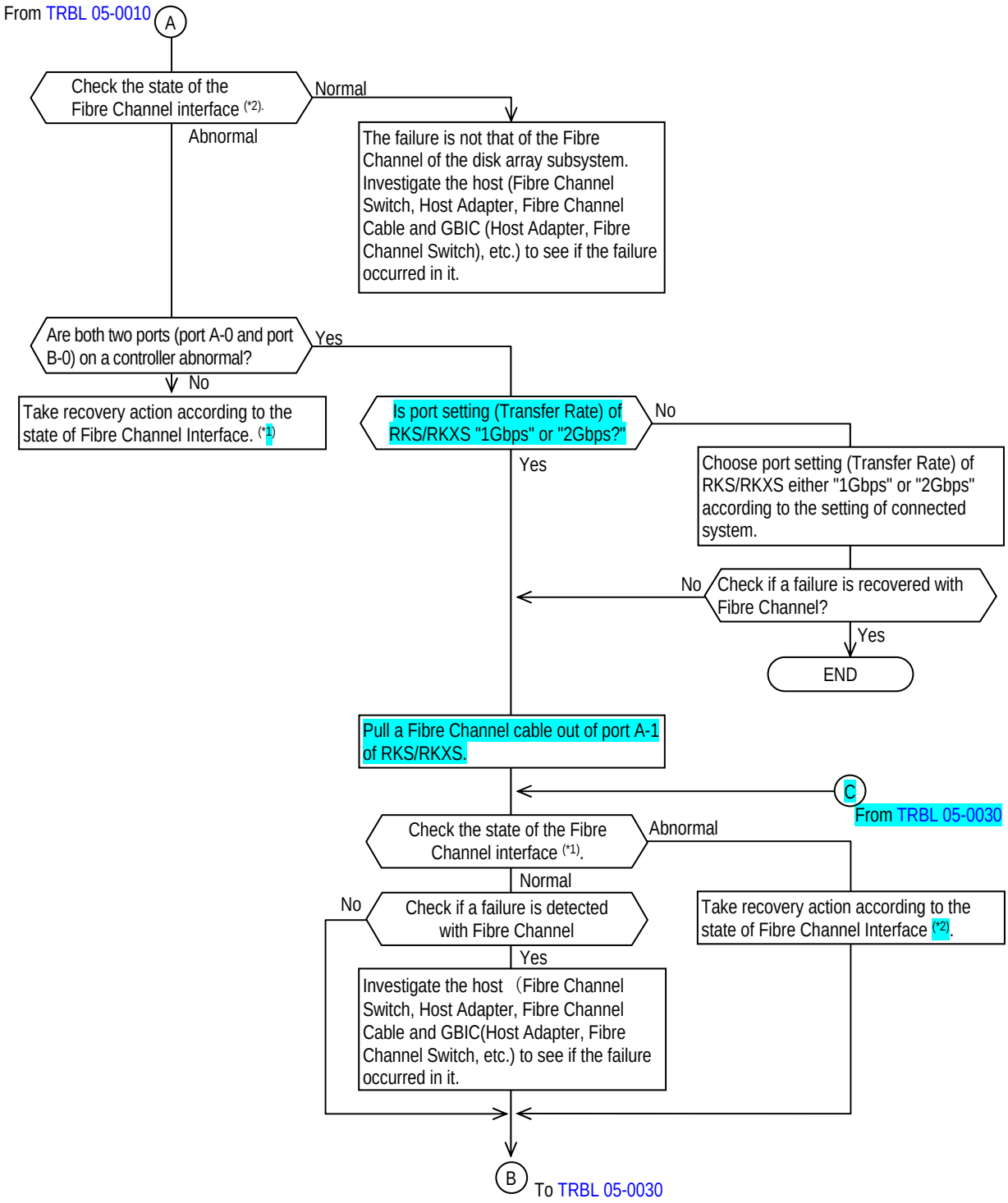
Preparations before the procedure for investigating RKS/RKXS regarding Fibre Channel failure
In this investigation, change the doubtful parts step by step and check interface is in Link Up state stably. While this investigation, the Host computer connected to controller of PATH that a failure occurs cannot be used. So, before start this investigation, ask a customer for the following steps.

(1) If customer's system uses Alternate Path system, ask a customer to change a path to the controller of PATH that a failure does not occur. Then, ask the customer not to fail back path automatically till this investigation is finished.
(2) If customer's system doesn't uses Alternate Path system, ask a customer to stop using a host computer connected to the controller of PATH that a failure occurs.



*1 : This is the status of No. 8 in Table 8.2.7 of "8.2 (5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)" (TRBL 08-0230).

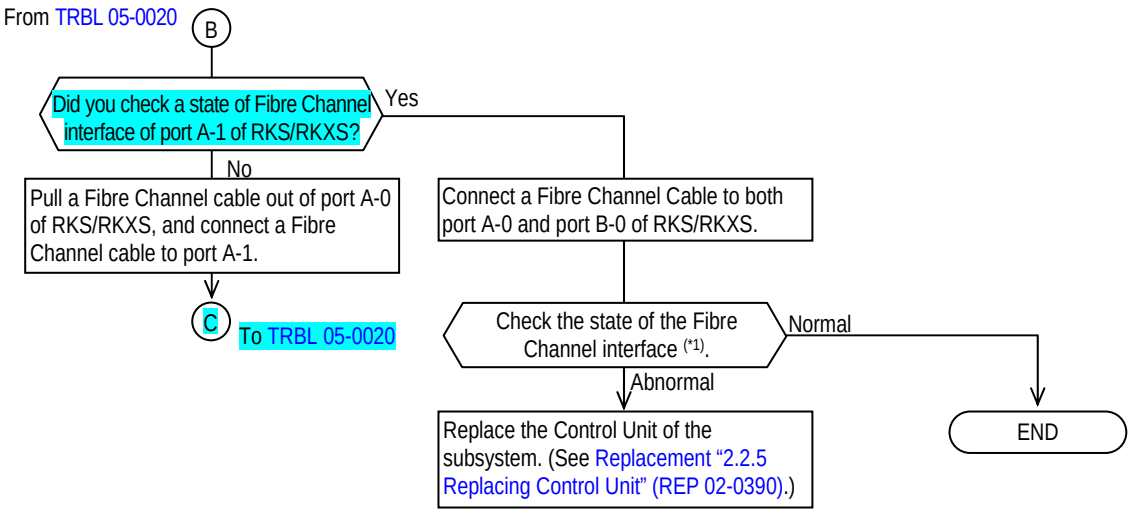
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*1 : Refer to Table 8.2.7 of “8.2 (5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)” (TRBL 08-0230).

*2 : Refer to Table 8.2.7 of “8.2 (5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)” (TRBL 08-0230).

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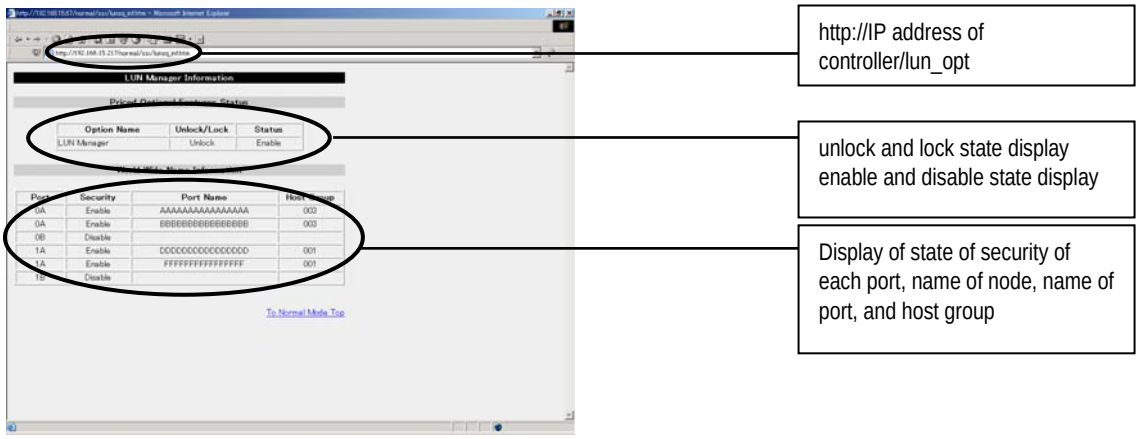


*1 : This is the status of No. 8 in Table 8.2.7 of "8.2 (5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)" (TRBL 08-0230).

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(1) World Wide Name of LUN Manager

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].



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(2) Change of WWN of LUN Manager

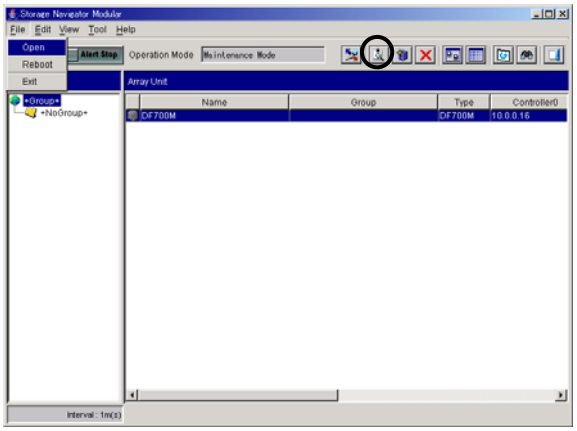
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

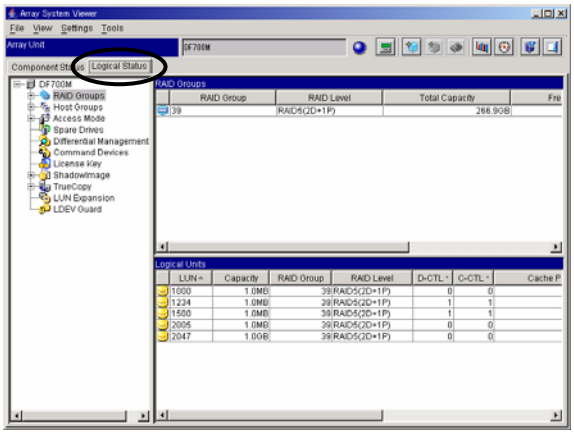
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



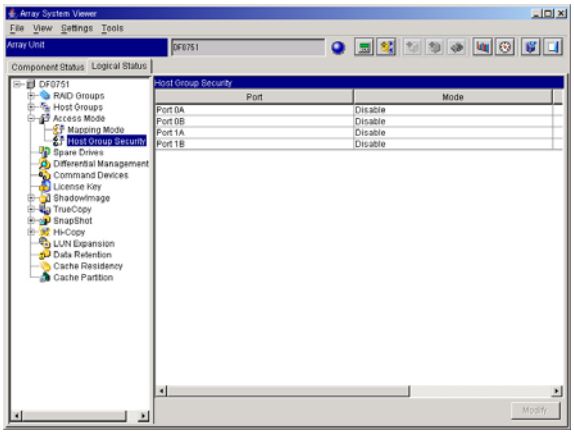
(d) On the unit window, click the [Logical Status] tab.



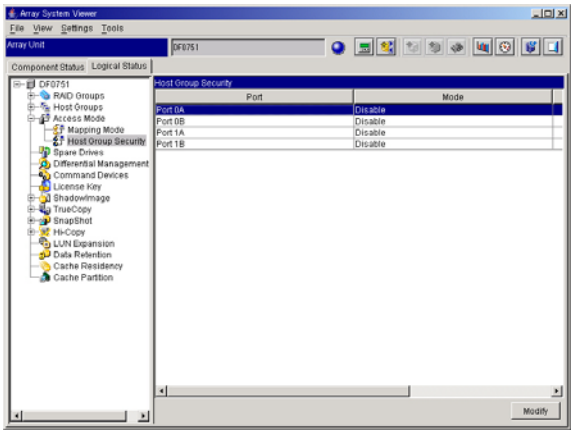
‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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(e) Select the [Access Mode] from the tree in the unit window by double clicking it and select the [Host Group Security].



(f) Select a port, for which the WWN information is to be changed, from the [Host Group Security] displayed on the right side of the window.



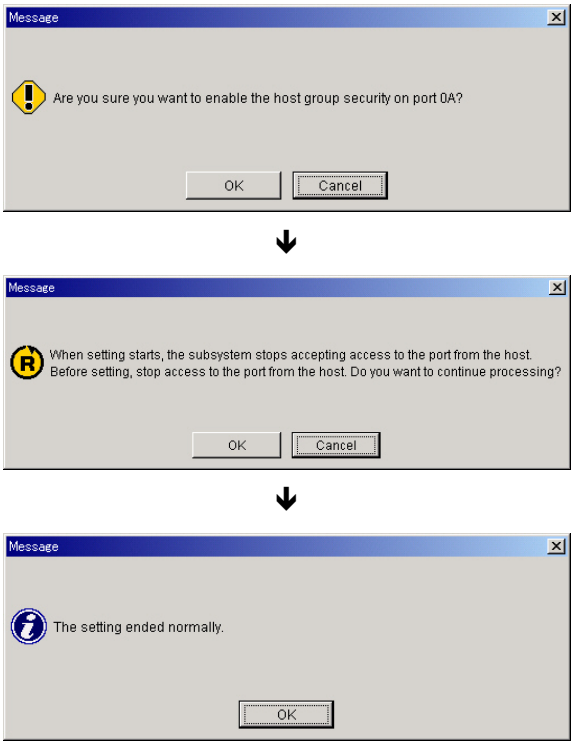
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(g) Click the [Modify] button that is displayed at the lower right part of the window.

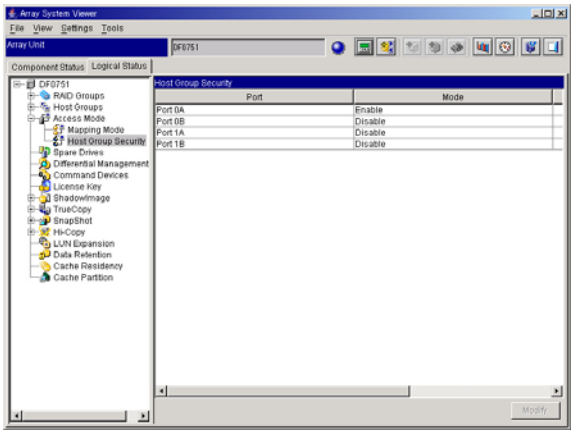
(h) Since the Modify Host Group Security dialog box is displayed, select [Enable] for the [Host Group Security] and click the [OK] button.



(i) The confirmation window is display. Click the [OK] button.

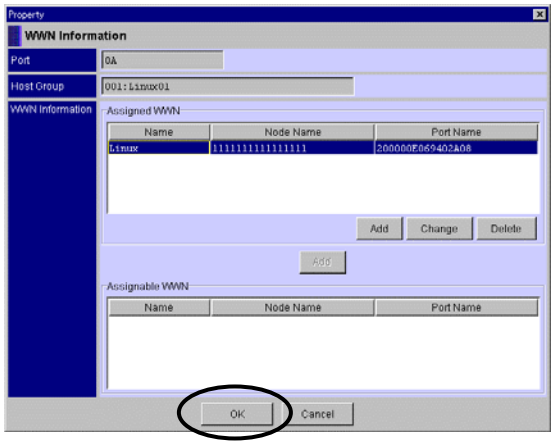


(j) Make sure that the host group security of the specified port was changed to [Enable].



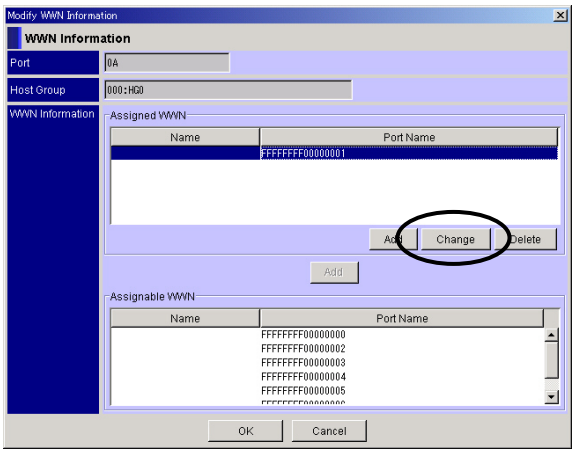
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(k) Double click the [Host Groups] in the tree, and then double click the port for which you have validated the host group security. Select [WWN] by clicking the [000:G000].

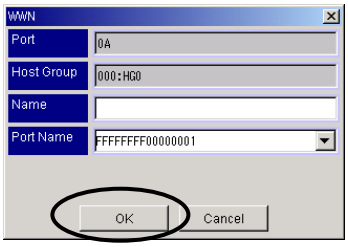


(l) Click the [Modify WWN Information] button that is displayed at the lower right part of the window.

(m) Select a Name to be changed, and click the [Change] button.



(n) Enter the [Name], the [Port Name]. Then click the [OK] button.



① Name : Enter the name with half size alphabetic characters and/or numerals.
(Excluding \, /, : , , , ;, *, ?, ", <, >, | and ')
Spaces at the top or end are ignored.
An identical name cannot be used in an identical Port.

② Port Name : Enter the Port Name with sixteen hexadecimal numerals

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(o) Click the [OK] button on WWN Information Property.

(p) The confirmation window is display. Click the [OK] button.

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Chapter 6. Details of Recovery Methods

6.1 Error recovery methods

Table 6.1.1 shows error recovery methods(‡1). Errors are classified into power-on errors, operation errors, data recovery errors, and power-off errors.

Table 6.1.1 Error Recovery Methods for Each Error

No.	Classification	Description	Reference page
1	The subsystem goes down.	Both controllers are blocked in the dual controller configuration. Only one controller is blocked in the single or dual controller configuration.	"6.1.1 System down" (TRBL 06-0020)
2		POWER LED on the subsystem lighted off because a Drive short-circuit failure (on the Basic Chassis or the Additional Chassis) occurred.	"Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000)
3	The subsystem does not become ready.	A loading of information from a Disk Drive failed.	"6.1.2 The subsystem does not become ready : Case 1 (Loading failure)" (TRBL 06-0050)
4		POWER LED on the subsystem lighted off because a Drive short-circuit failure (on the Basic Chassis or the Additional Chassis) occurred.	"Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000)
5	The failure occurred immediately after being ready.	The user data in the cache memory was lost because data stored in the cache memory volatilized. (A forced parity correction is required(*1).)	"6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
6	The power cannot be turned off.	Planned shutdown cannot be performed because the number of PIN data is too large. (due to Disk Drive and Controller error.)	"6.1.4 The power cannot be turned off : Case 1 (The number of PIN data is too large)" (TRBL 06-0420)
7		An attempt was made to save PIN data to the Disk Drive during planned shutdown but failed because a hardware error occurred.	"6.1.5 The power cannot be turned off : Case 2 (Hardware failure)" (TRBL 06-0450)
8		Planned shutdown cannot be performed because all the Disk Drives to which inheritance information is to be saved disappeared due to a DMA double error or a Disk Drive quintuple error.	"6.1.6 The power cannot be turned off : Case 3 (Control Unit failure)" (TRBL 06-0470)
9		Planned shutdown cannot be performed because PIN data cannot be saved due to a Cache memory error, etc.	"6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)" (TRBL 06-0490)
10	Data recovery does not terminate normally.	Forced recovery was performed because a RD error occurred in the copy source during a correction copy.	"6.1.8 Data recovery does not terminate normally : Case 1 (Read error)" (TRBL 06-0510)
11		Data recovery terminated abnormally because a Disk Drive error occurred in the copy source during a correction copy.	"6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)" (TRBL 06-0520)
12		Data recovery terminated abnormally because a Spare Disk error occurred during a copyback.	"6.1.10 Data recovery does not terminate normally : Case 3 (Spare Disk Drive failure)" (TRBL 06-0540)

*1 : When user data is lost because of volatilization of data in the cache memory, restore it in the procedure given in No.5.

‡1 : • Since the latest state of the unit is always referenced in this recovery operation, turn on the Page Refresh Mode of the WEB. (Click the [ON] button to indicate [OFF].)
• If the power is turned on again in the recovery operation, the WEB connection between the unit and browser is cut out, make it again. (Press the update button of the browser.)

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No.	Classification	Description	Reference page
13	A failure occurred during operation.	The number of PIN segments exceeded its threshold value. (Actions to be taken when PIN OVER occurs)	"6.1.11 A failure occurred during operation : Case 1 (PIN over)" (TRBL 06-0550)
14		Data containing a LA/LRC error was detected.	"6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
15		Actions to be taken when a LU blockade occurs.	"6.1.13 A failure occurred during operation : Case 3 (LU blockade)" (TRBL 06-0590)
16		A loop failure occurred, however, the failed part cannot be located.	"6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
17		The command for reassignment was sent from a host computer to an LU of RAID 0.	"6.1.15 A failure occurred during operation : Case 5 (Incomplete writing)" (TRBL 06-1110)
18	The incomplete write area was registered in the restored VOL.	• The incomplete write area was registered in the P-VOL because there was the unreadable area in the pool LU durint restoring the P-VOL of Copy-on-write SnapShot. • The incomplete write was registered in the S-VOL because there was the unreadable area in the pool LU when restoring the S-VOL due to S-VOL-Takeover as a result of executing the [horctakeover] command with TrueCopy Extended Distance.	"6.1.16 The incomplete write area was registered in the restored VOL" (TRBL 06-1120)
19	A failure in SES access occurs.	Monitoring of the disk array unit became impossible because the SES access to the both ENC Units became impossible.	"6.1.17 A failure in SES access occurs" (TRBL 06-1140)
20	At the time of the NAS unit connection, the LU failure occurred (Disk Drive dual failure, user data failure, etc.)	Recovery method of the failure LU at the time of the NAS unit connection	"6.1.18 Recovery method of the failure LU at the time of the NAS unit connection" (TRBL 06-1180)
21		Recovery method of the NAS system LU failure	"6.1.19 Recovery method of the NAS system LU failure" (TRBL 06-1200)
22	A failure of the fail-over occurred at the time of NAS connection.	Recovery method at the time of the NAS system fail-over failure	"6.1.20 Recovery method at the time of the NAS system fail-over failure" (TRBL 06-1220)
23	A failure occurred at the time of controller reboot, controller replacement or micro-program replacement.	Actions to be taken when ENC cable connection was illegal or controller failure occurred.	"6.1.21 Recovery method when illegal ENC cable connection or controller failure is detected" (TRBL 06-1230)
24	A failure occurred at the time of ENC firmware replacement or ENC/SENC Unit replacement.	Actions to be taken when ENC cable connection was illegal or ENC/SENC unit failure occurred.	"6.1.22 Recovery method when illegal ENC cable connection or ENC/SENC unit failure is detected" (TRBL 06-1260)
25	A failure occurred at the time of an addition of Additional Subsystem with the subsystem power on.	Actions to be taken when ENC cable connection was illegal or Additional subsystem failure occurred.	"6.1.23 Recovery method when illegal ENC cable connection or Additional subsystem failure is detected" (TRBL 06-1290)

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No.	Classification	Description	Reference page
26	The start of the NAS Unit after installing the NAS OS timed out.	Recovery method when the start of the NAS Unit timed out after installing the NAS OS due to the failure between the PXE-DHCP servers or between the PXE-FTP servers.	"6.1.24 Recovery method of the NAS Unit starting time-out after installing the NAS OS due to the failure between the PXE-DHCP servers or between the PXE-FTP servers" (TRBL 06-1311)
27	The Control Unit was blocked because it tried to operate with the microprogram of the old revision to which the Control Unit does not correspond due to the Control Unit replacement or the microprogram installation.	• Recovery method when the Control Unit is blocked or the subsystem goes down because the microprogram of the revision less than 0760/A and the Control Unit of the DF-F700-F2JH are mixed in the subsystem due to the installation of the Control Unit of the DF-F700-F2JH in the subsystem. • Recovery method when the Control Unit is blocked or the subsystem goes down because the microprogram of the revision less than 0760/A and the Control Unit of the DF-F700-F2JH are mixed in the subsystem due to the installation of the microproram of the revision less than 0760/A in the subsystem.	"6.1.25 Recovery method when the Control Unit whose microprogram is not supporting was detected" (TRBL 06-1313)
28	The Modular Volume Migration terminated abnormally.	One Modular Volume Migration or two or more Modular Volume Migrations terminated abnormally.	"6.1.26 Recovery method of the Modular Volume Migration which terminated abnormally" (TRBL 06-1320)
29	The subsystem became the warning status while using the Power Saving function of the priced option.	The SENC that may set the limit to the Power Saving function of the priced option was detected.	"6.1.27 Recovery method when the subsystem becomes the warning status while using the Power Saving function of the priced option" (TRBL 06-1332)

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6.1.1 System down

[WEB Information Message display]

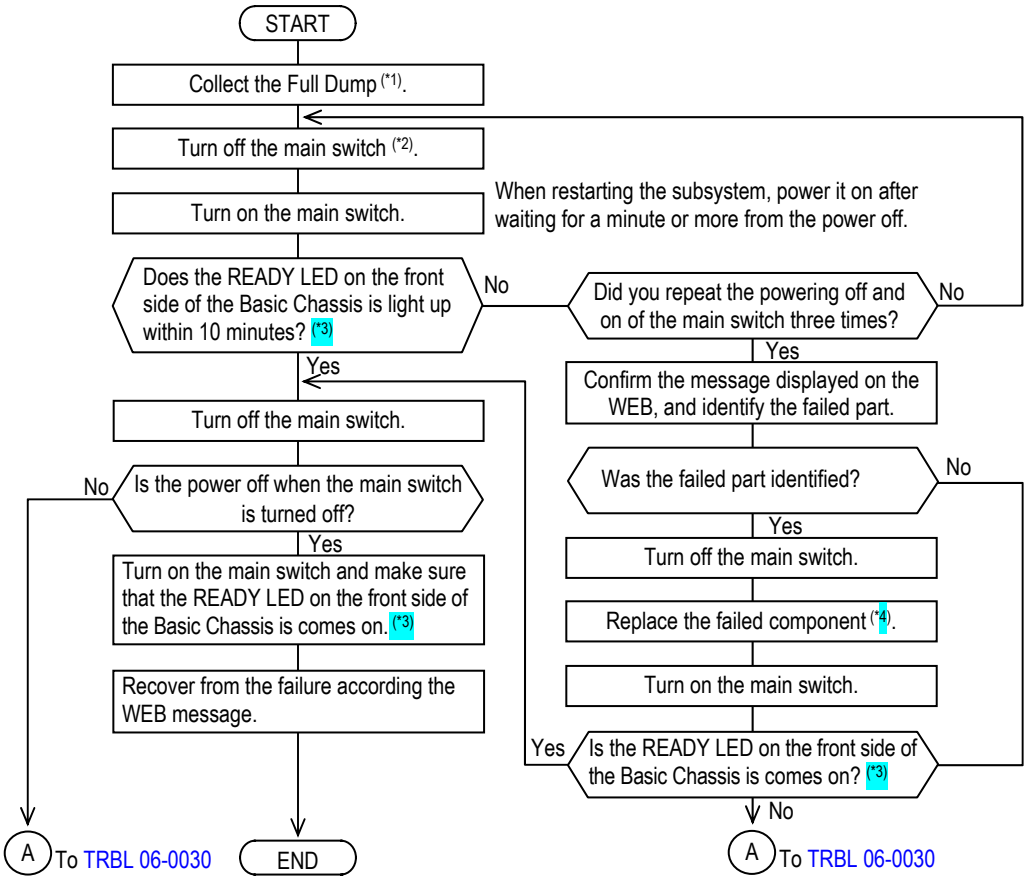
MM/DD/YYYY HH:MM:SS Cx Hxxxxxx ○○○○○○○ : △△△△△△/□□□□

Date Time Detect Controller#

xxxxx, ○○○○○○○ : △△△△△△/□□□□ Optional

NOTE : • When the READY LED on the front side of the Basic Chassis is lights off, refer to "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000) to recover the failures.
• The recovery method shown below is for the case where blockades of both Controllers in a dual Controller configuration occur.
• The ALARM LED on the front side of the Basic Chassis comes on and the both controllers are detached. As to the CALM LED on the controller PCBA, only the CALM LED on one of the controllers, in which the failure was detected earlier, comes on.
Make sure on which controller the CALM LED is on because the recovery work is to be done starting from the controller whose CALM LED is on.

[Recovery method]



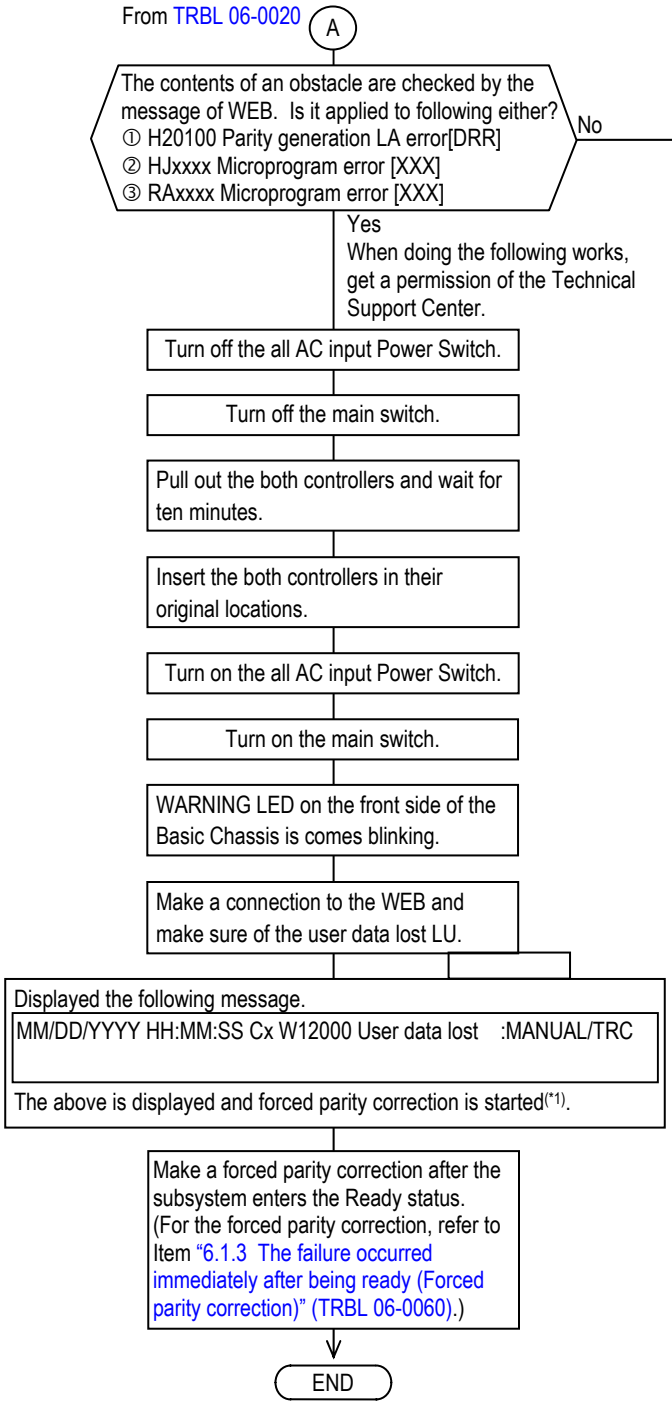
*1 : For the collection Full Dump, refer to "7.5 Collecting Full Dump" (TRBL 07-0130).

*2 : When the ALARM LED on the front side of the Basic Chassis does not go out five minutes or longer after the main switch is turned off, turn off the AC input power switch.

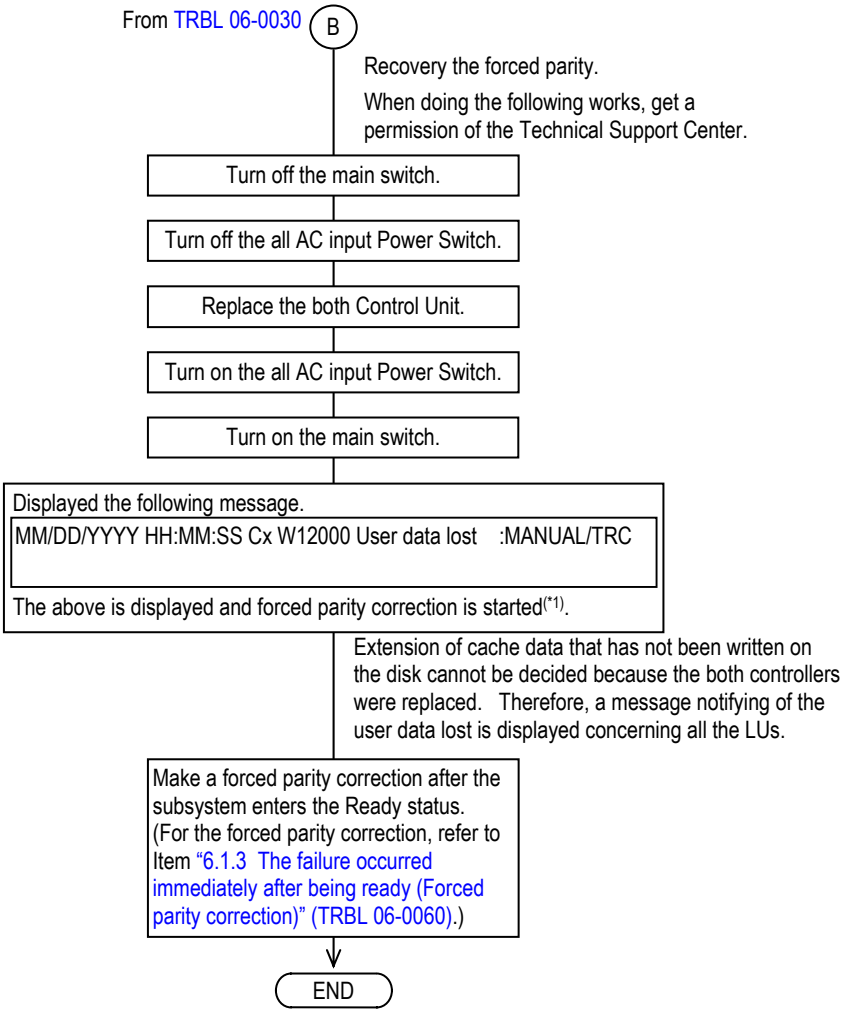
*3 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

*4 : For the replacement of the failed component, refer to Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

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6.1.2 The subsystem does not become ready : Case 1 (Loading failure)

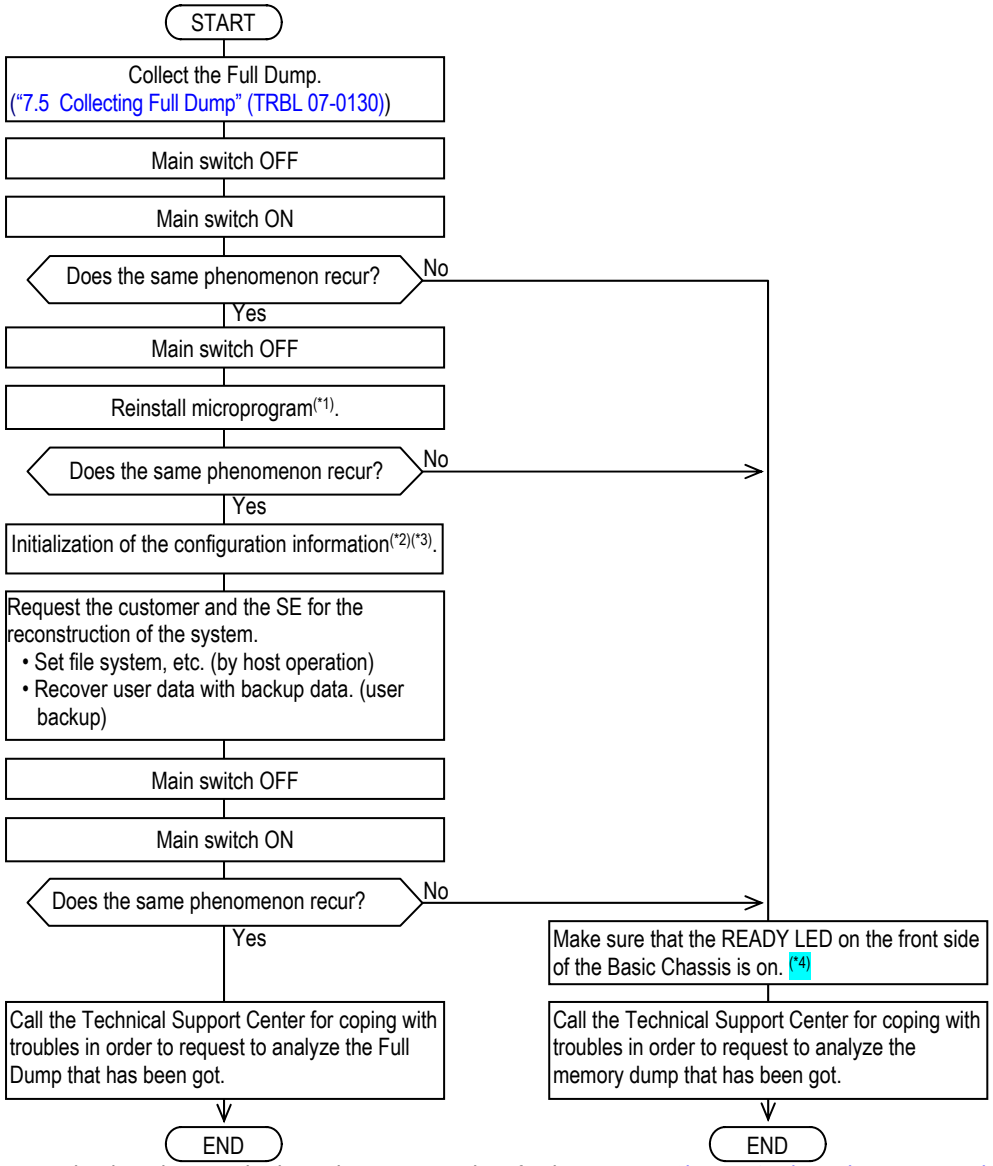
(Information could not be loaded from the Disk Drive.)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx RB8400 Download fail :MANUAL

Date Time Detect Controller#

[Recovery method]



*1 : Make the subsystem in the maintenance mode referring to WEB "Chapter 3 The Maintenance Mode Operation Procedure" (WEB 03-0000), and refer to WEB "3.3.1 Microprogram" (WEB 03-0280) for the installation procedure of the microprogram.

*2 : If this operation is executed, all the data in the Disk Drive are deleted (the RAID group and LU definition are initialized).

*3 : For initialization of the information on configuration, refer to "6.2 Initialization procedure for configuration information" (TRBL 06-1340).

*4 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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6.1.3 The failure occurred immediately after being ready (Forced parity correction)

A failure occurred immediately after the subsystem had been started up. The user data in the cache memory was lost because data stored in the cache memory volatilized.

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx xxxxxx Forced parity correction LU is detected :MANUAL
Date Time Detect Controller#

< Explanation >

A forced parity correction is made in order to synchronize parities in the disk array subsystem when data is lost because of volatilization of data in the cache memory caused by a power failure, etc. (when the subsystem cannot execute the deliberate shutdown).

The forced parity correction is made for each LU. Each LU can be in the following statuses. There are the actions to be taken of "Execution of the Forced Parity Correction" and "Skip of the Forced Parity Correction" for the LU that the subsystem determined the need for the forced parity correction.

Execute the forced parity correction basically for the LU that the subsystem determined the need for the forced parity correction.

However, the forced parity correction can be skipped in the following cases.

- In the case where the customer /SE can recognize that the system does not access the LU concerned, so that there is no data loss for the LU concerned even if the data on the Cache memory is volatilized.
- In the case where the backup data of the customer is restored in the subsystem after discarding the data of this LU at the time when the LU format is executed for the LU concerned or the LU is once deleted and recreated.
- In the case where the status of the forced parity correction of the LU concerned is "Uncorrected 2" and the drive restoration of the blocked Disk Drive which configures this LU is completed normally afterwards (the consistency of the parity data of this LU is assured due to the drive restoration, so that if the forced parity correction is skipped after completing the drive restoration normally, the status of the forced parity correction of this LU is changed to "Restored").(‡1)

‡1 : When the status of the forced parity correction of the LU concerned is "Uncorrected 2", the consistency of the parity data is assured at the time when the drive restoration of the blocked Disk Drive which configures this LU is completed normally, and the status of the forced parity correction is changed to "Restored". However, this LU can be accessed by the host computer at the time of skipping the forced parity correction for the LU, so that the host computer may access the data whose consistency of the parity data is not taken (the data generated only from the data part and the data generated including the parity data may differ, so that the read data which the subsystem returns to the host computer may be changed when the host computer reads this area).

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< Notes on making forced parity correction >

- The restoration is made using the maintenance function of Storage Navigator Modular. For the procedure concerned, refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).
- For a failure of a part other than the drive that occurs during forced parity correction, refer to the Replacement "2.1 Locations of Replacement Components" (REP 02-0000). For a drive failure, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).
- The dynamic sparing cannot be instructed in the Storage Navigator Modular during the forced parity correction. When the dynamic sparing is required because the threshold value is exceeded, the dynamic sparing is not performed but the correction copy is made through a detachment of the drive concerned.
- The copy back cannot be instructed in the Storage Navigator Modular during the forced parity correction. When the copy back is required, the copy back is started automatically after the forced parity correction is completed.
- When a drive failure, PIN Over or incomplete write occurs during the forced parity correction, the data check and the operation using the Storage Navigator Modular are required again.
- For the LU status or its transfer in the forced parity correction described in the maintenance operation flow, refer to "< Change of the status in the forced parity correction >" (TRBL 06-0380). Also, for the standard time required for the recovery, refer to "< Standard time required for the forced parity correction >" (TRBL 06-0400).
- The forced parity correction recovers one LU per Control Unit. Therefore, if the LU needs multiple forced parity correction, the order of the forced parity correction should be determined by checking the Control Unit in charge of each LU (Refer to "(e) Execution of forced parity correction" (TRBL 06-0260)).
- If the data on the Cache memory is volatilized due to a power failure within one minute after performing the following work, all LUs may be required for the forced parity correction.
  ① Setting of the configuration information such as the system parameter by the Storage Navigator Modular
  ② The pair operation by RAID Manager
- When there is the LU executing the forced parity correction, if the data on the Cache memory is volatilized due to the power failure, all the LUs become the target of the forced parity correction afterwards.
- If the data on the Cache memory is volatilized due to a power failure within one minute after performing the setting of such as the system parameter configuration information in the Storage Navigator Modular, the set contents may not be reflected. Check the configuration. Be sure to check the configuration when a power failure occurs. If the configuration is not reflected, set the configuration information again.

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(1) Data reading/writing instructed by a host
- The LU whose status of the forced parity correction is "Correcting", "Waiting", or "Waiting Disk Drive Recovery" can read from and write to the host, but the host performance may be deteriorated during the forced parity correction.
- When an LU, a status of which concerning the forced parity correction is "Being Restored", exists in the disk array subsystem, performance of host I/Os is lowered.

(2) Relations between statuses of forced parity correction and operations of the other functions
- The operation of other functions for the LU concerned is partially restricted depending on the status of the LU which is performing the forced parity correction.

No.	Instruction function	Status of forced parity correction		
		Correcting / Waiting/ Waiting Disk Drive Recovery	Uncorrected / Uncorrected 1 / Uncorrected 2	Skip / Restored
1	The delete of LU	×	×	○
2	LU Unification	×	×	○
3	The change of the controller in charge of a default LU	○	○	○
4	Instruction to make an LU resident	○	○	○
5	LU mapping	○	○	○
6	Setting a prefetch size	○	○	○
7	ShadowImage in-system replication pair formation	○(*1)	×	○
8	ShadowImage in-system replication pair restoration	○(*2)	×	○
9	TrueCopy remote replication pair formation	○(*1)	×	○
10	TrueCopy Extended Distance pair formation	○(*1)	×	○
11	TrueCopy remote replication pair restoration	○(*2)	×	○
12	TrueCopy Extended Distance pair formation	○(*2)	×	○
13	Copy-on-write SnapShot pair formation(*3)	○	×	○
14	Copy-on-write SnapShot pair restoration(*4)	×	×	○
15	Command device registration	○	×	○
16	LUN Manager setting	○	○	○
17	Password protection	○	○	○
18	Format instruction	×	×	○
19	Hot replacement of the microprogram	×	×	○
20	Pseudo deliberate shutdown	○	○	○
21	Data Retention Utility	○	○	○
22	Instruction to make forced parity correction	×	○(*5)	○
23	Instruction to skip forced parity correction	×	○	○
24	Instruction to abort forced parity correction	○	×	×
25	The delete of RAID Group	×	×	○

*1 : When a status of an LU concerning the forced parity correction for a secondary LU is On Standby or Being Restored, a pair cannot be formed.

*2 : When a status of an LU concerning the forced parity correction for a primary LU is On Standby or Being Restored, a pair cannot be formed.

*3 : When a status of either a P-VOL or a POOL (when two or more P-VOLs/POOLs exist, any one of them) is Unrestored or Unrestored 2, a pair cannot be formed.
When a POOL (when two or more POOLs exist, any one of them) is in the On Standby or Being Restored status, a pair cannot be formed.

*4 : The restoration cannot be made unless a status of a P-VOL and a POOL (when two or more P-VOLs/POOLs exist, all of them) is Skip or Restored.

*5 : For "Uncorrected 2".

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- A part of the execution of the forced parity correction to the LU and the instruction of the skip is restricted while the other functions are operating or depending on the status of the LU.

No.	Function in operation	Possibility of forced parity correction	Description
1	Unification LU	Partially impossible	Though an instruction to make the restoration for a child LU cannot be issued, the restoration instructed to be made for a parent LU is also applied to a child LU.
2	Format instruction	Impossible	An instruction to make the restoration cannot be issued to an LU being formatted.
3	Microprogram hot replacement	Impossible	An instruction to make the parity correction cannot be issued during replacement of the microprogram.
4	Pseudo deliberate shutdown	Impossible	An instruction to make the restoration cannot be issued because the disk array subsystem is shut down deliberately.
5	Unformatted	Impossible	The execution of the forced parity correction and the instruction of the skip cannot be performed to the unformatted LU.
6	V-VOL of Copy-on-write SnapShot	Impossible	The execution of the forced parity correction and the instruction of the skip cannot be performed to the V-VOL of Copy-on-write SnapShot.

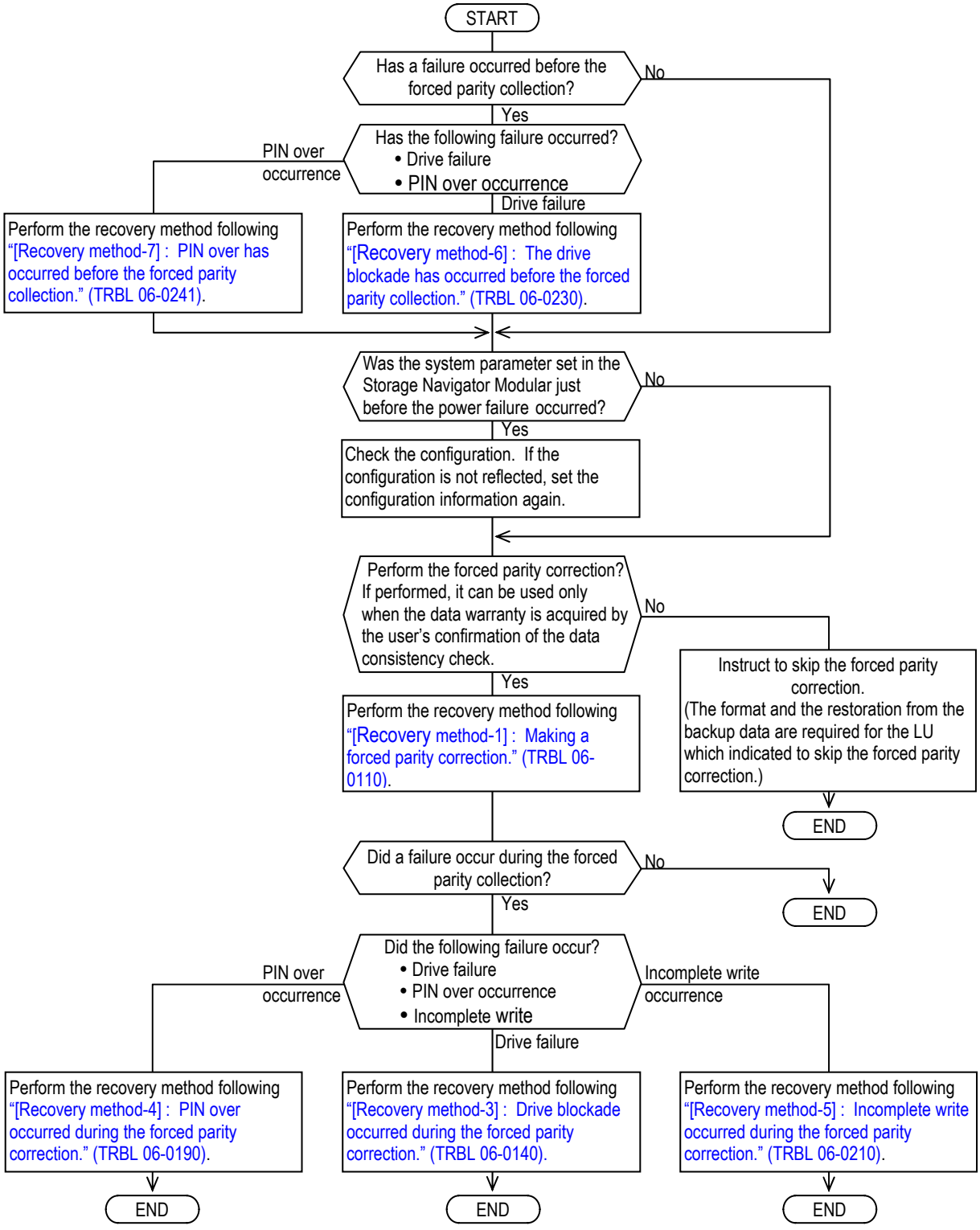
(3) Process of forced parity correction

- When the subsystem cannot perform the planned shutdown again due to the power failure, etc., the subsystem power is turned off, and the data on the Cache memory volatilizes during the forced parity correction, all LUs become the target of the forced parity correction.
- When a failure occurs in a Control Unit that is making the forced parity correction, the restoration is taken over by a mate Control Unit and continued. However, when the mate Control Unit is making the forced parity correction, it stands by for the restoration taken over. Also, when the Control Unit is recovered, perform the parity processing with the recovered Control Unit.

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< Forced Parity Collection Maintenance Flow >

Perform the maintenance operation for the forced parity collection following the flow shown below.

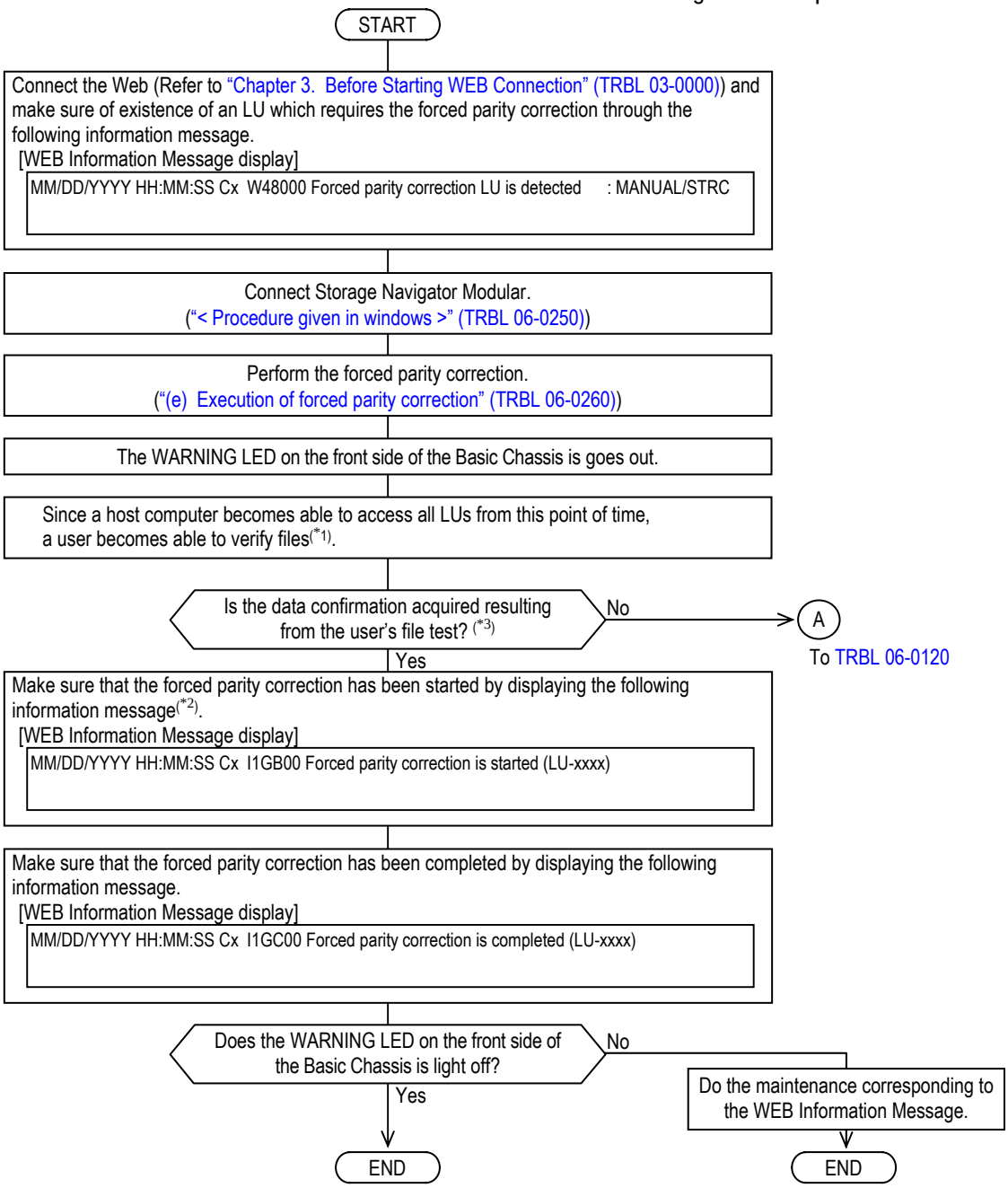


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[Recovery methods]

[Recovery method-1] : Making a forced parity correction.

The forced parity correction resynchronizes data in Disk Drives, however, it cannot restore the data completely. Ask a user to verify the data and restore data that could not be restored using the backup data.

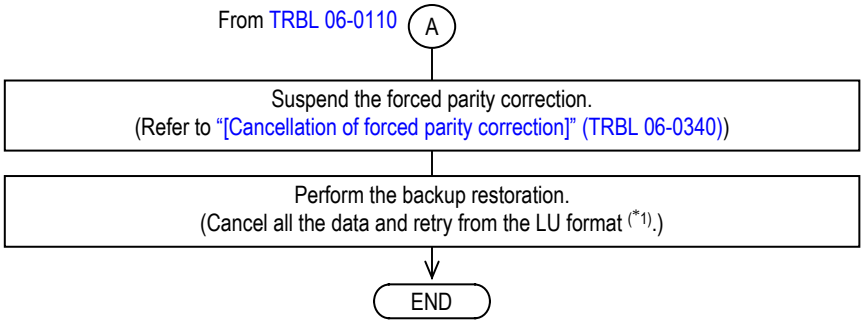


*1 : When a drive detachment, pin over, or incomplete writing occurs during a period from the verification of files by a user to the completion of the forced parity correction, the verification of files by the user must be done again. When a failure occurs, take recovery actions referring to "[Recovery method-3] : Drive blockade occurred during the forced parity correction." (TRBL 06-0140), "[Recovery method-4] : PIN over occurred during the forced parity correction." (TRBL 06-0190), "[Recovery method-5] : Incomplete write occurred during the forced parity correction." (TRBL 06-0210).

*2 : For a standard time required for the forced parity correction, refer to "< Standard time required for the forced parity correction >" (TRBL 06-0400).

*3 : Request the customer and the SE for the work.

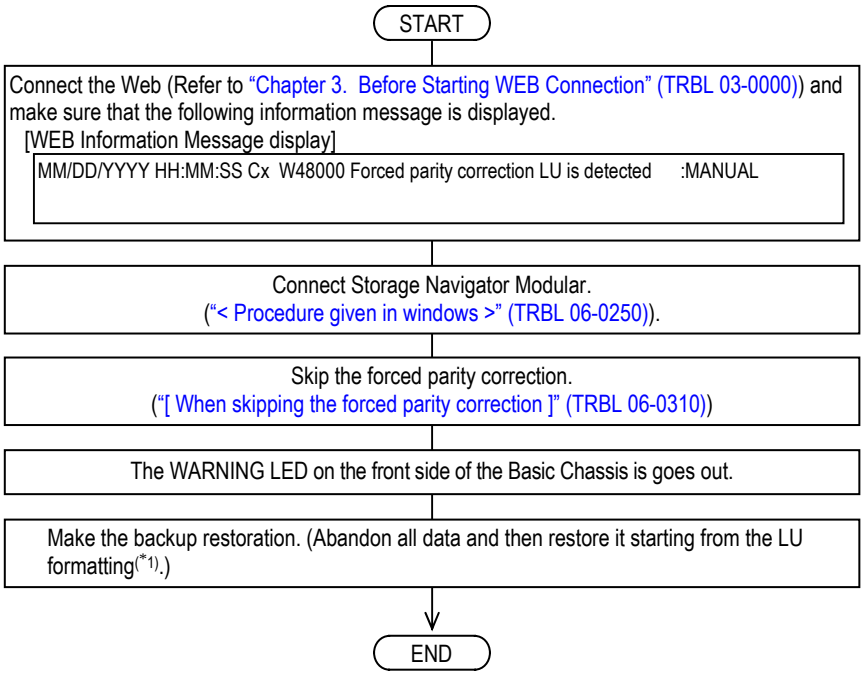
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*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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[Recovery method-2] : A forced parity correction is not made (a forced parity correction is skipped).
Because a forced parity correction is not made, data in a Disk Drive are not synchronized and an LA error, etc. may occur. Issue an instruction to skip the forced parity correction from Storage Navigator Modular, format the LU, and then make a backup restoration.



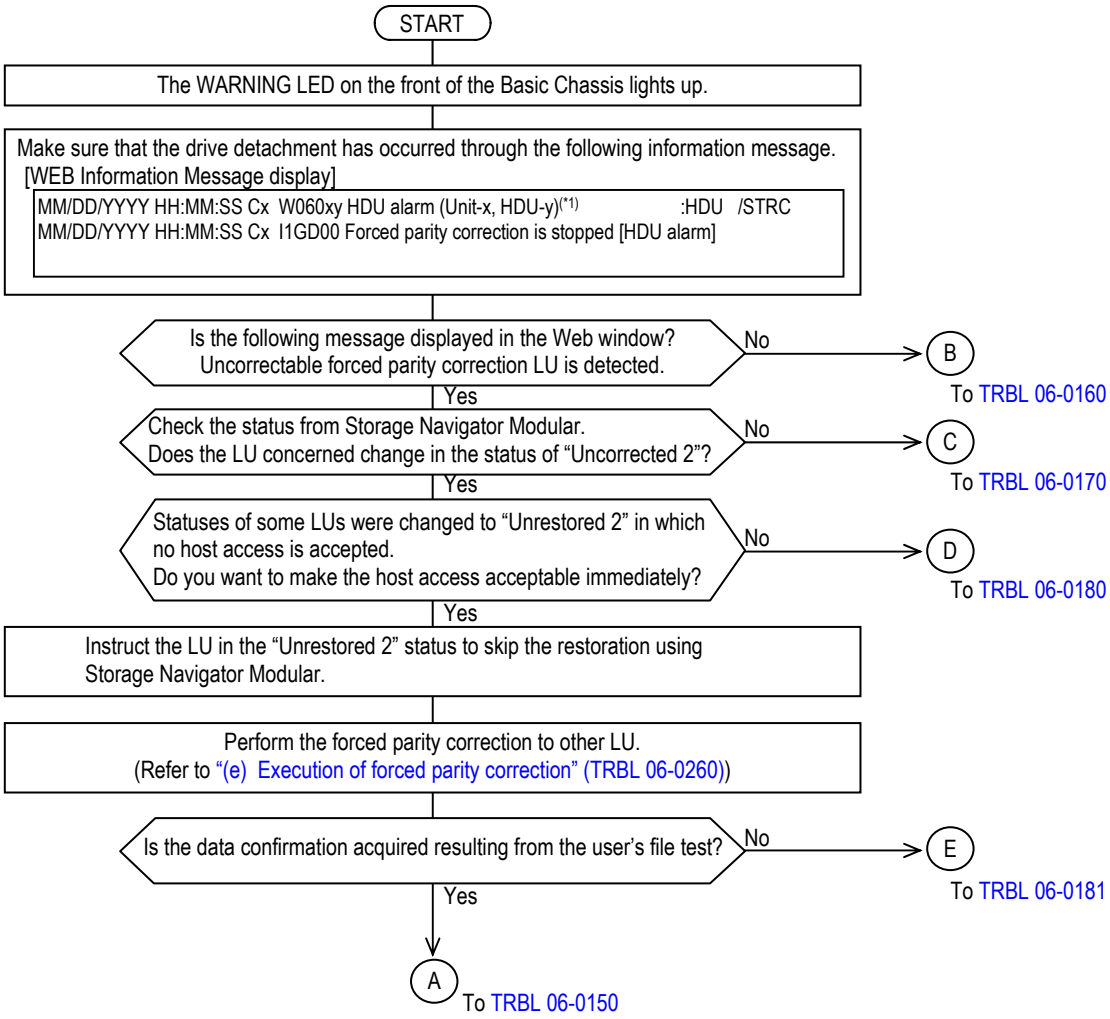
*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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[Recovery method-3] : Drive blockade occurred during the forced parity correction.
When a Disk Drive is detached during forced parity correction, the restoration is interrupted and a drive recovery action is taken.
When the Disk Drive including the LU that performs the forced parity correction instruction is blocked in the RAID Group, the status of the LU concerned changes to "Uncorrected 1" or "Uncorrected 2".
The status is also changes for the LU that unifies the LU including the blocked Disk Drive in the RAID Group. The status is not changed for the LU other than this.

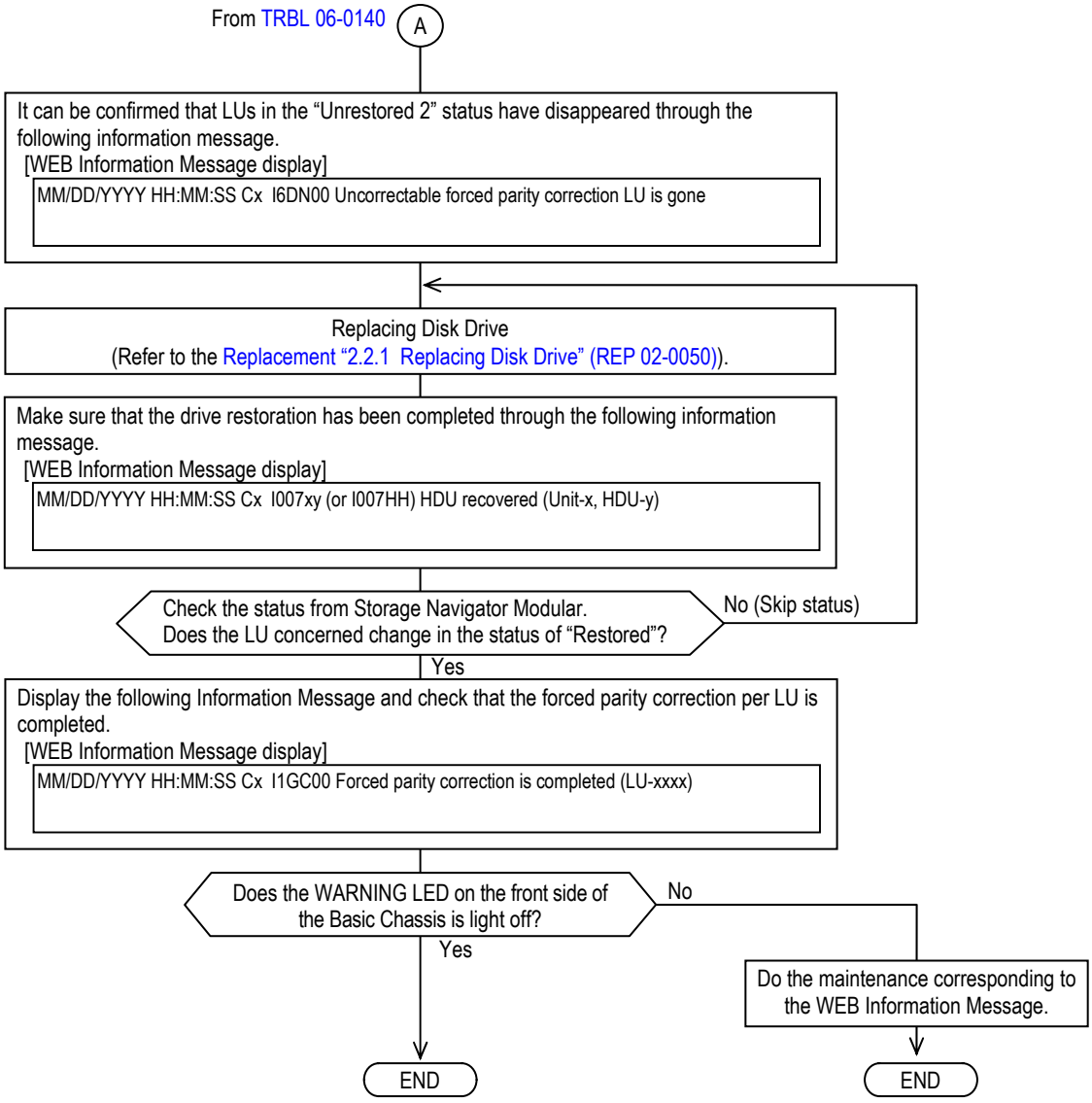
[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W060xy HDU alarm (Unit-x, HDU-y)(*1) :HDU /STRC
Date Time Detect Controller#

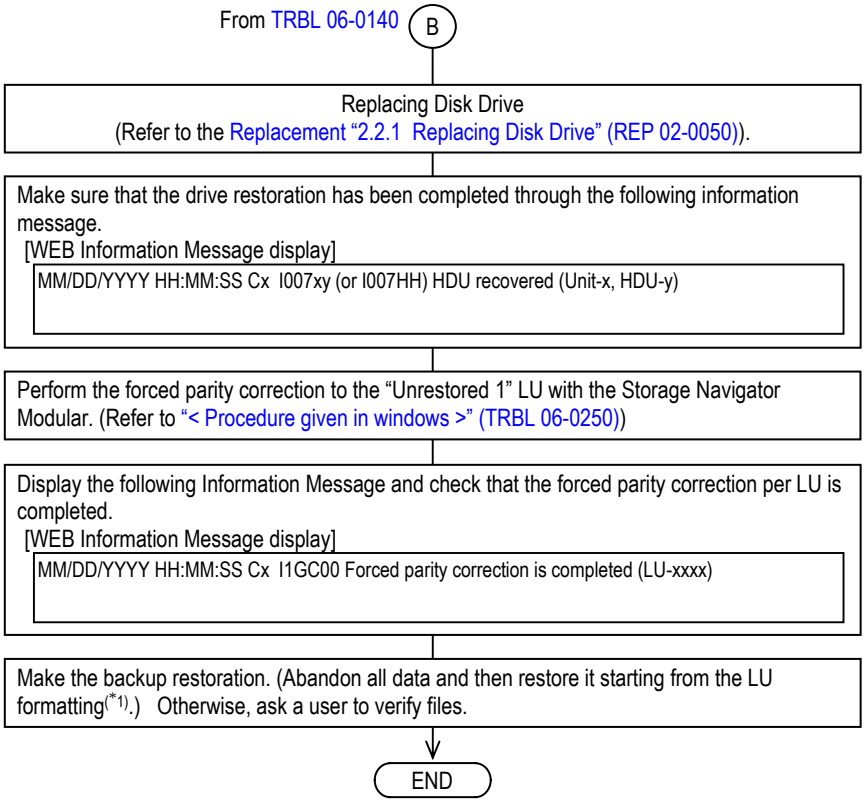


*1 : Any of W060AT, W060HH, W0GG00 and W0GH00 may be displayed other than W060xy. Also, when the Spare Disk Drive in use is blocked, any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed.

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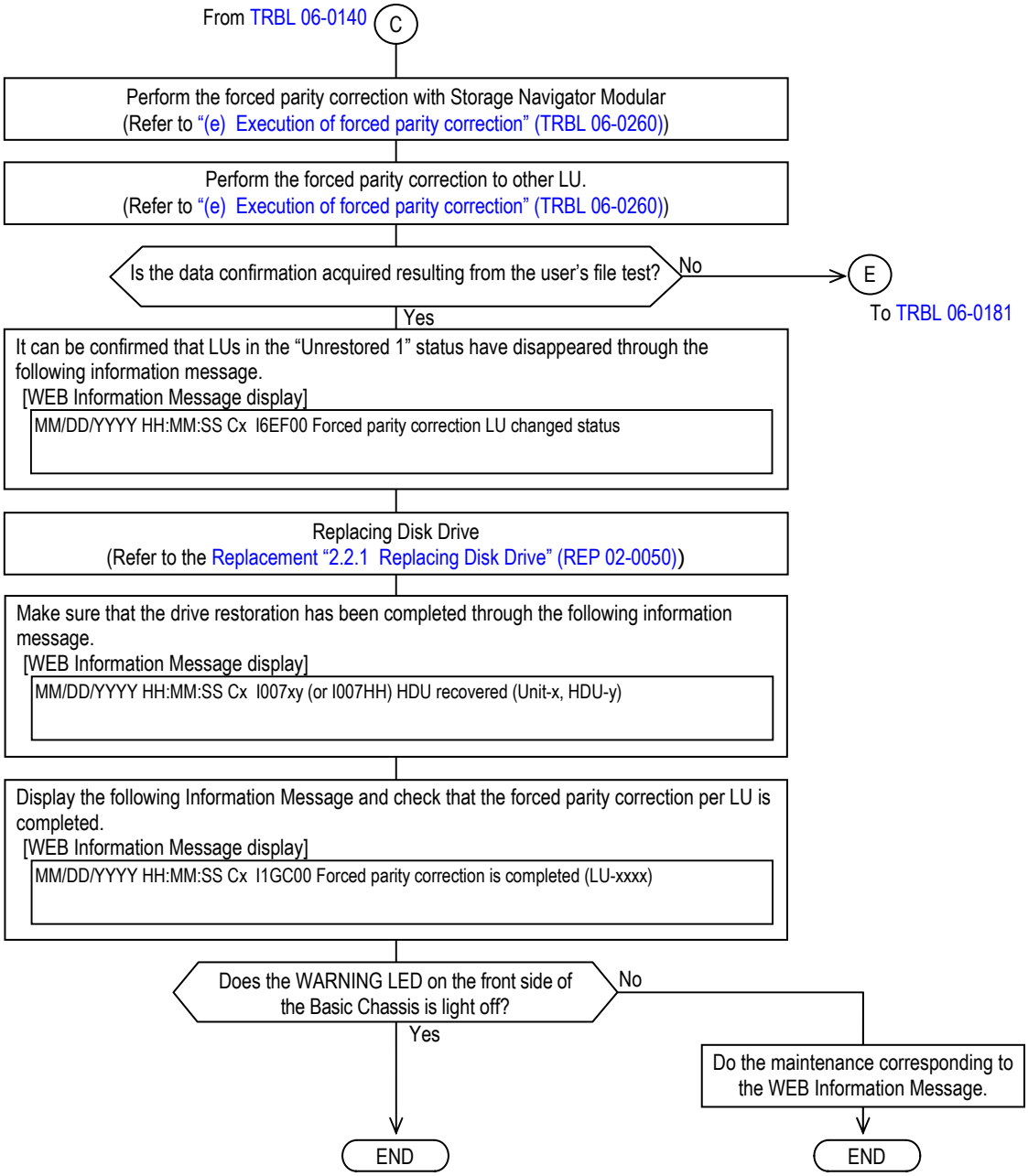


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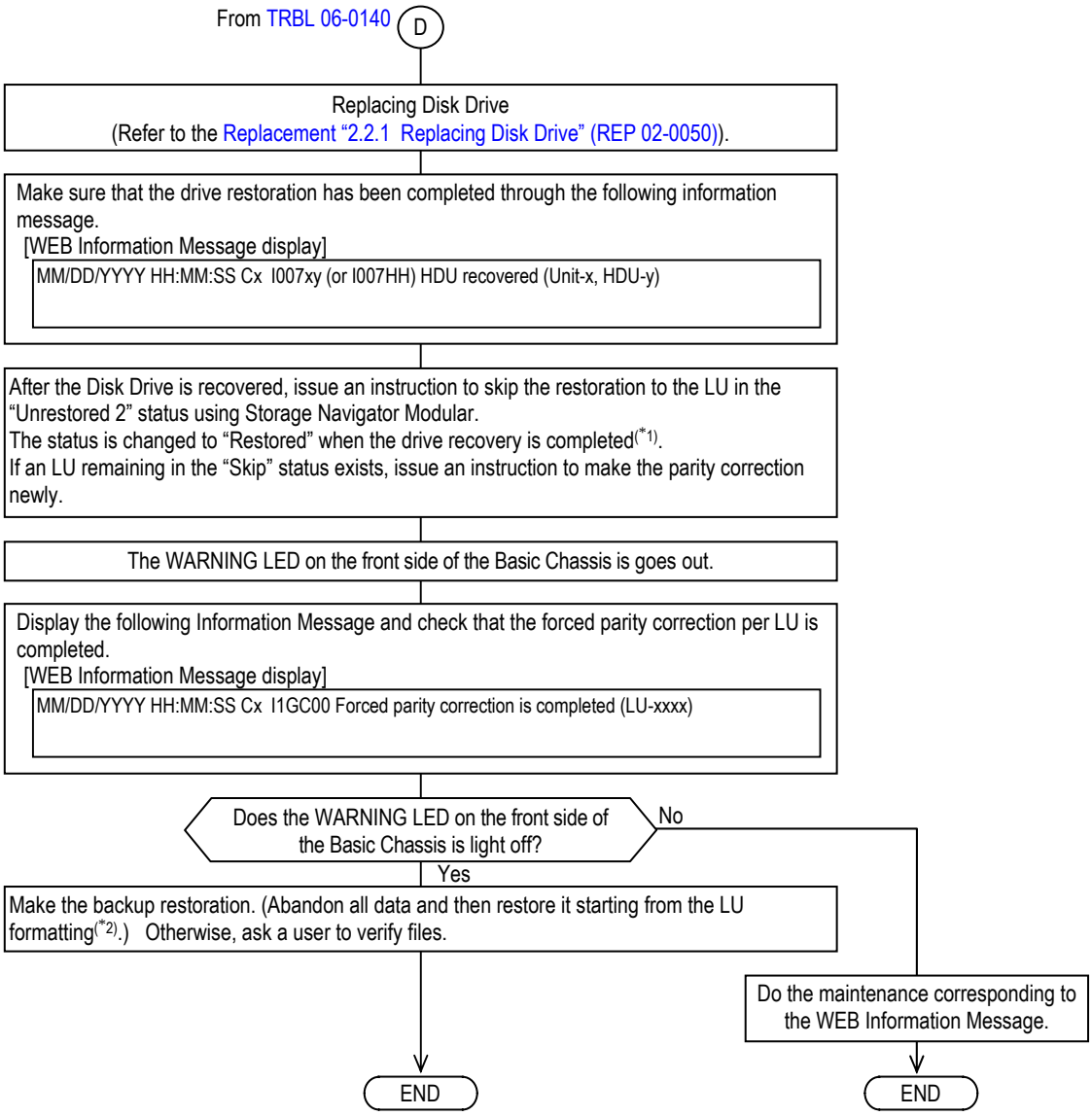


*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)). Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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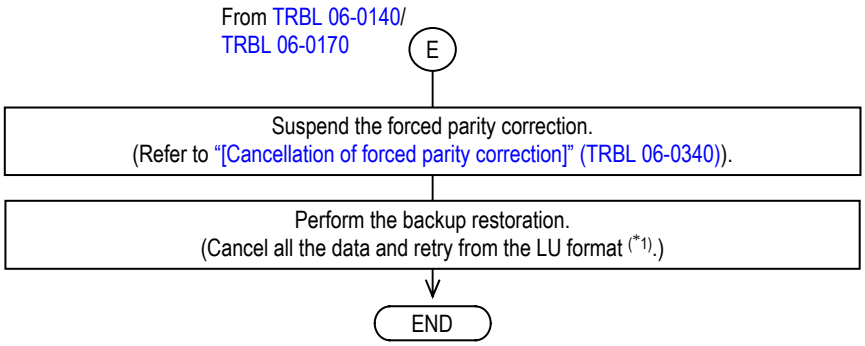
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*1 : An LU that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Skip" status.
If an LU remaining in the "Skip" status exists, issue an instruction to make the forced parity correction newly.
- An LU of RAID 1+0, RAID 6.
- A unified LU a part of which is included in a RAID group having a drive detachment
- An LU whose parity group is deeper than 1

*2 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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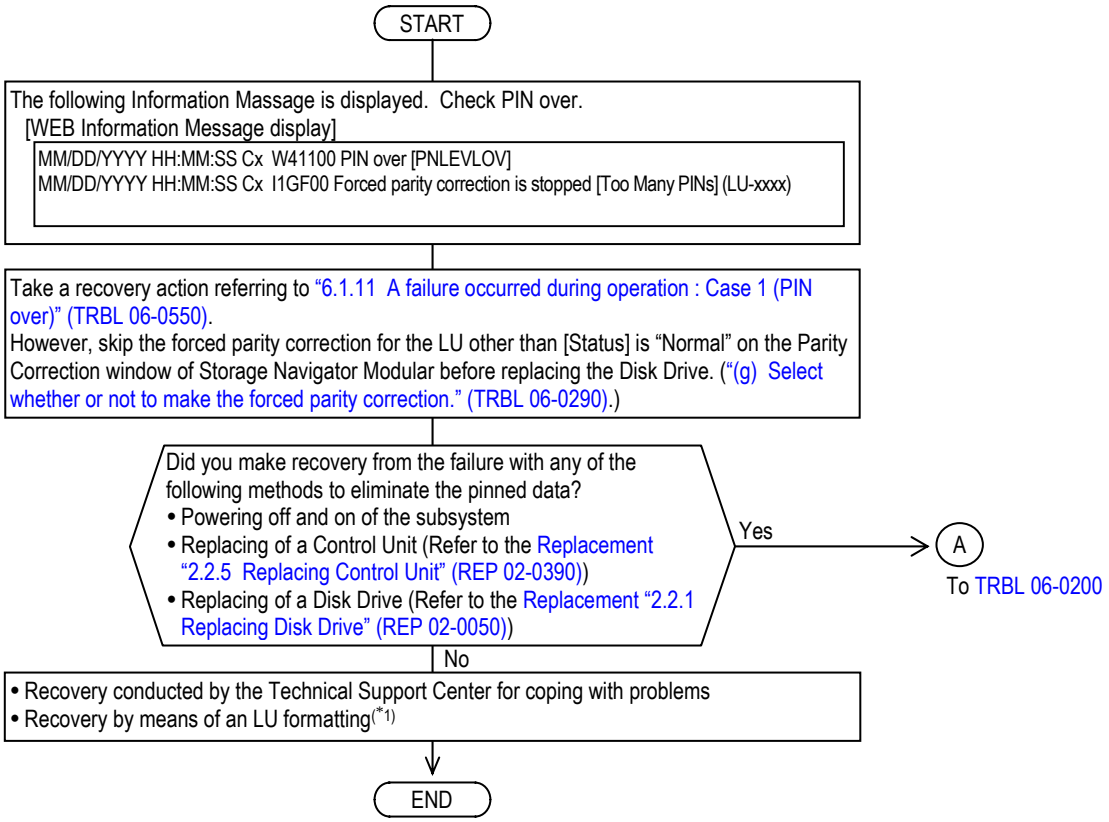
[Recovery method-4] : PIN over occurred during the forced parity correction.
When a pin over occurs, the status of the LU, the forced parity correction for which has been instructed to be made, is changed to "Unrestored".

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W41100 PIN over [PNLEVLOV]

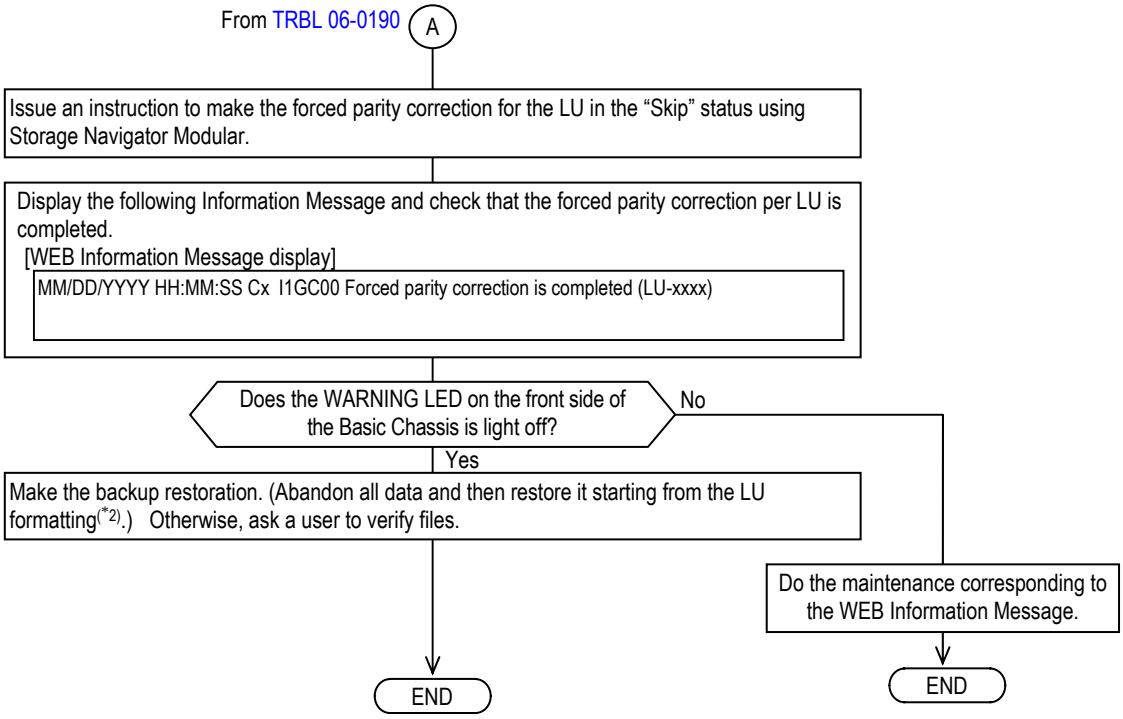
MM/DD/YYYY HH:MM:SS Cx Ixxxxx Forced Parity correction stopped [Too Many PINs] (LU-xxxx)

Date Time Detect Controller#



*1 : To perform recovery by the LU format, skip the LU which is in the "not performed" status in the Storage Navigator Modular before the LU format.

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*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

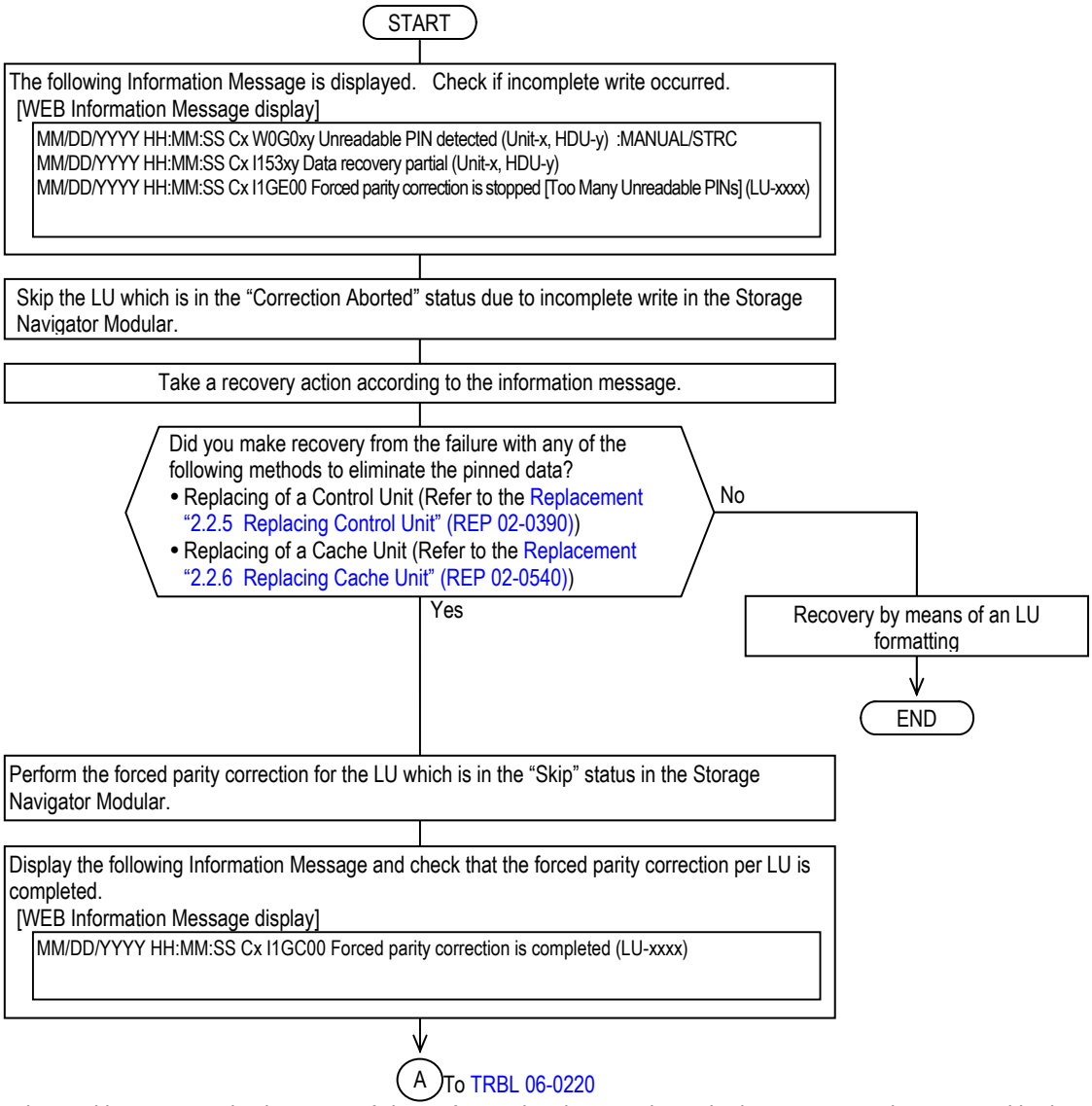
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[Recovery method-5] : Incomplete write occurred during the forced parity correction.
When an incomplete writing occurs, the status of the LU, the forced parity correction for which has been instructed to be made, is changed to “Unrestored 2”.

[WEB Information Message display]

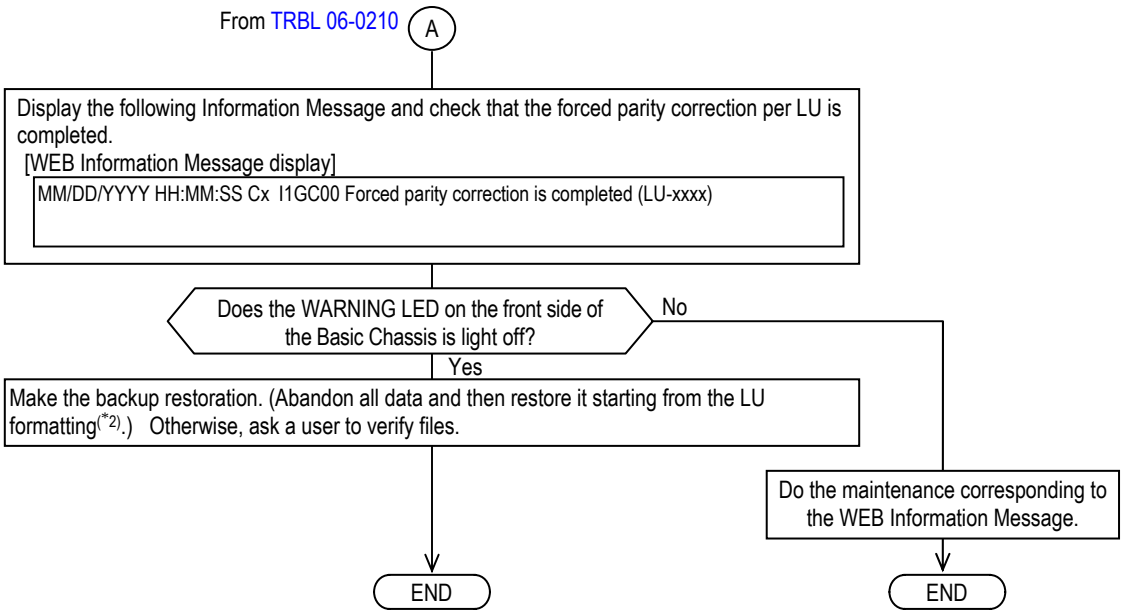
MM/DD/YYYY HH:MM:SS Cx I1GE00 Forced parity correction is stopped [Too Many Unreadable PINs] (LU-xxxx)

Date Time Detect Controller#



*1 : When making a restoration by means of the LU formatting, instruct the LU in the “Uncorrected” status to skip the parity correction using Storage Navigator Modular before formatting the LU.

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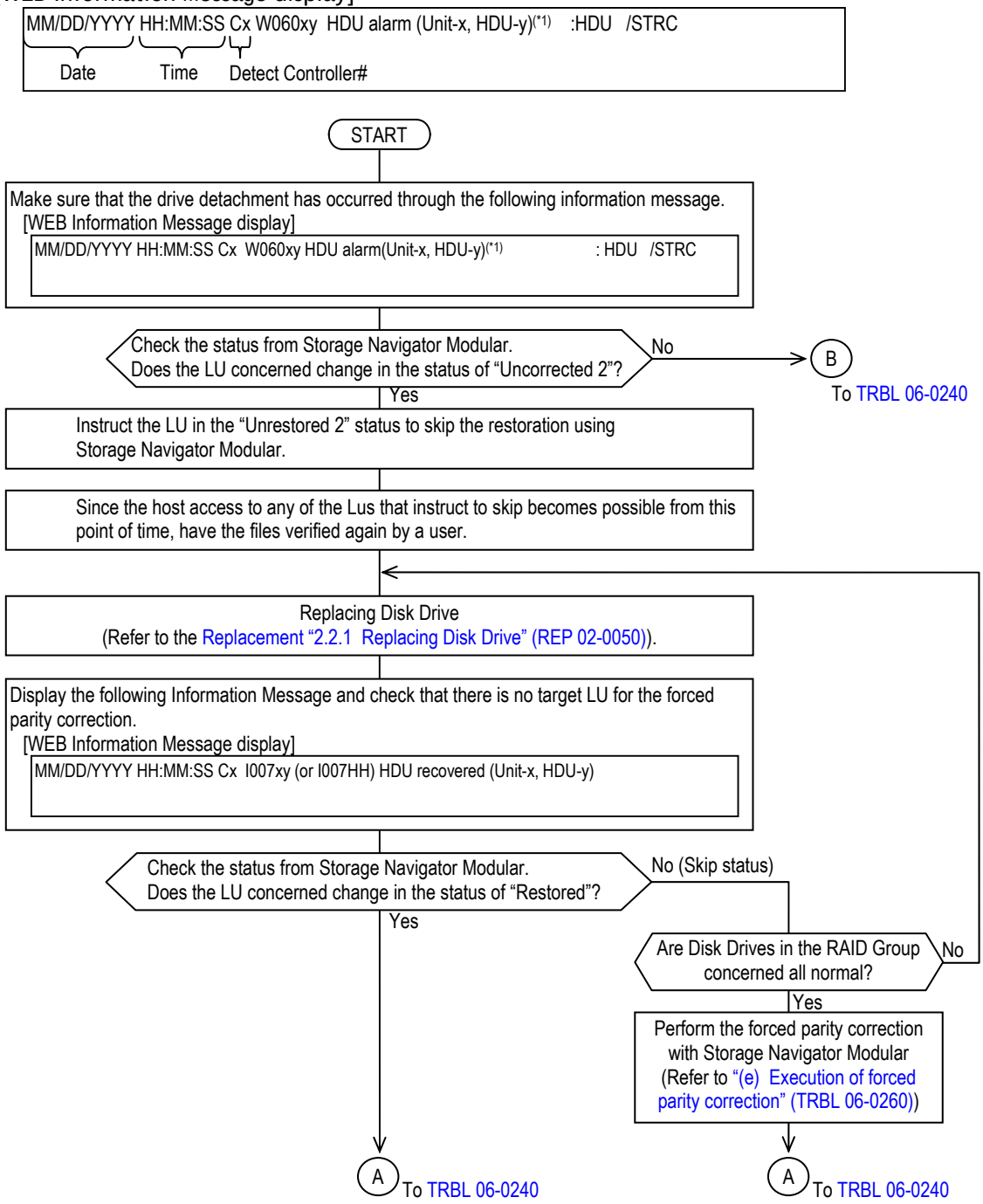


*1 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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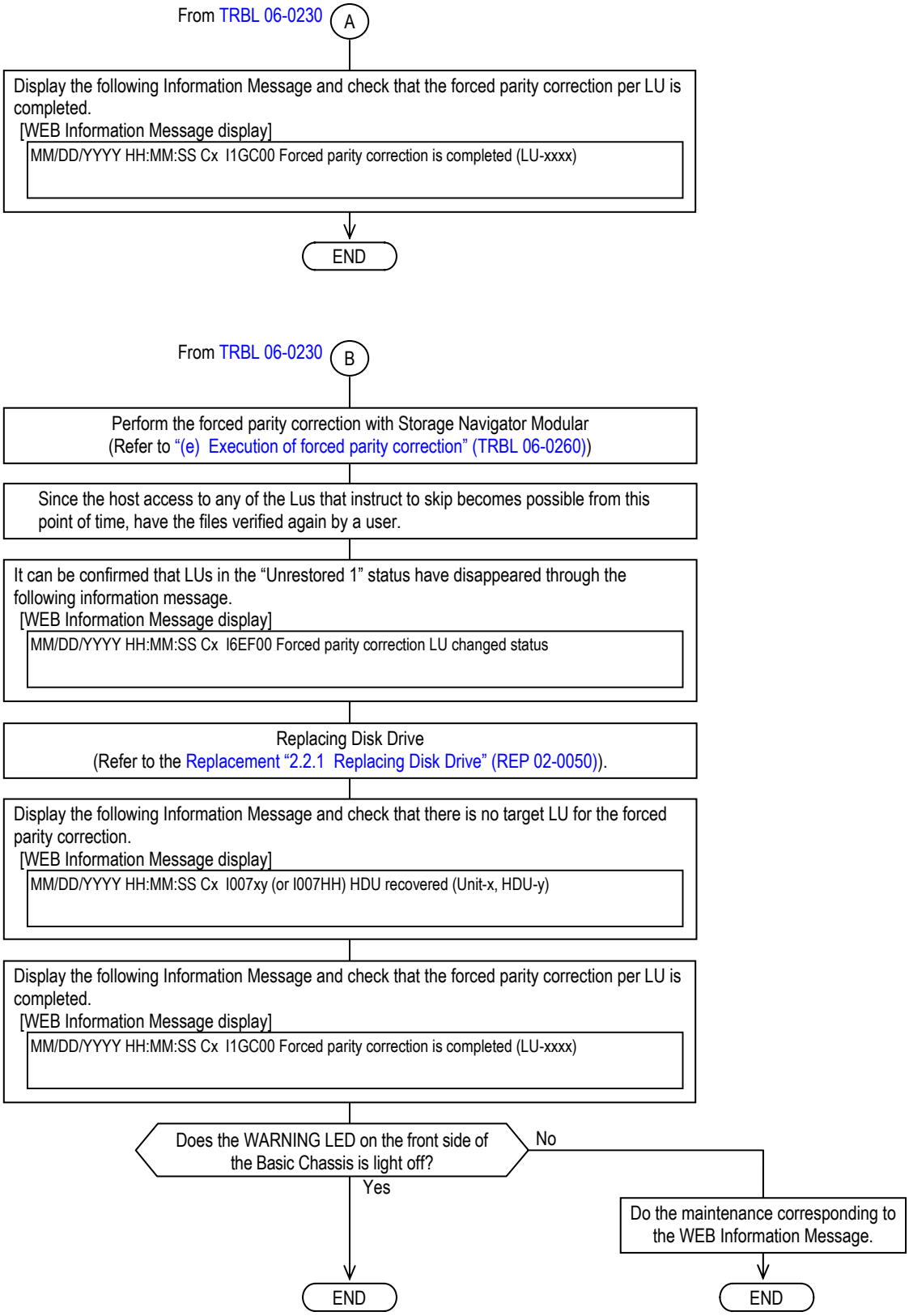
[Recovery method-6] : The drive blockade has occurred before the forced parity collection.
If the Disk Drive has been blocked before the forced parity collection, the drive restoration is already operated.
The LU status in which the drive restoration has already operated is changed to “not performed 2”. The other LU status is changed to “not performed”.

[WEB Information Message display]



*1 : Any of W060AT, W060HH, W0GG00 and W0GH00 may be displayed other than W060xy. Also, when the Spare Disk Drive in use is blocked, any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed.

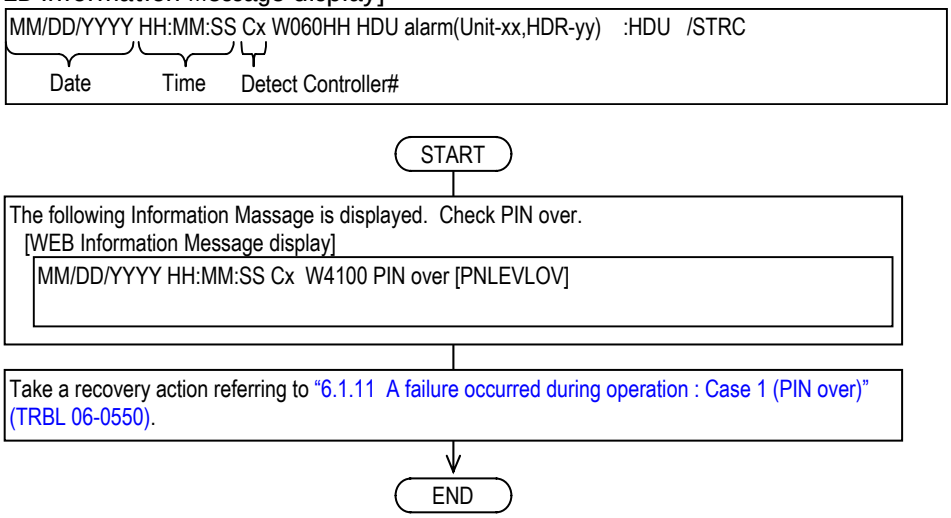
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[Recovery method-7] : PIN over has occurred before the forced parity collection.
If PIN over occurred, change the LU in which PIN over occurred to “not performed” status.

[WEB Information Message display]



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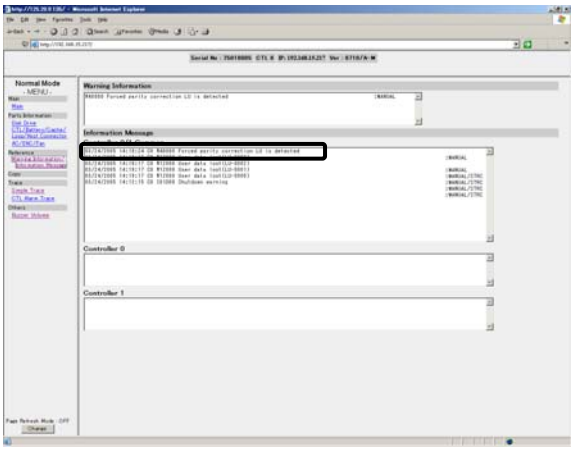
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< Procedure given in windows >

(a) Connect the Web. (Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)

(b) Check that there is LU for which the forced parity correction is necessary by the "W48000" message in the WEB window.



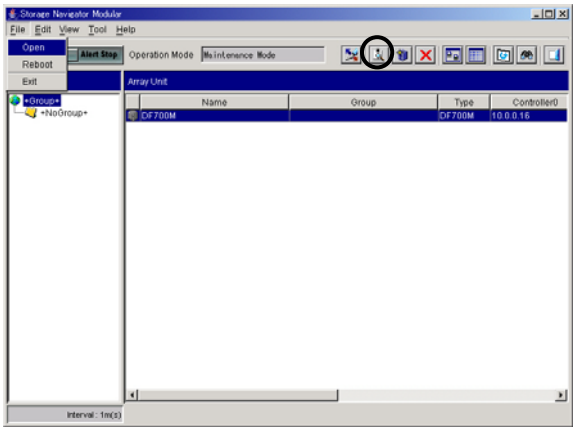
(c) Connect Storage Navigator Modular.

(i) Start the Storage Navigator Modular and set the operation mode in the "Management Mode".
For details of the setting method, refer to the System Parameter "1.1 (3)-(b) Changing the Maintenance Mode" (SYSPR 01-0050).

(ii) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

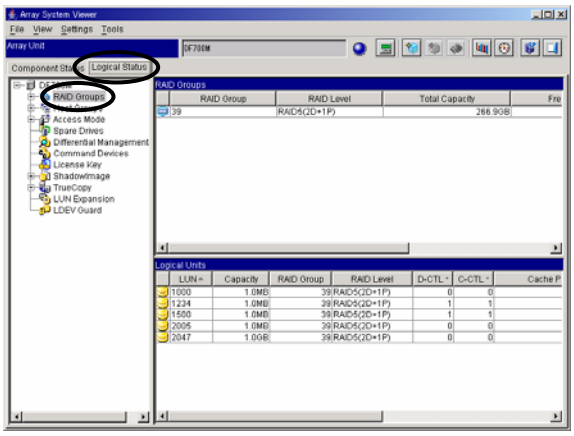
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



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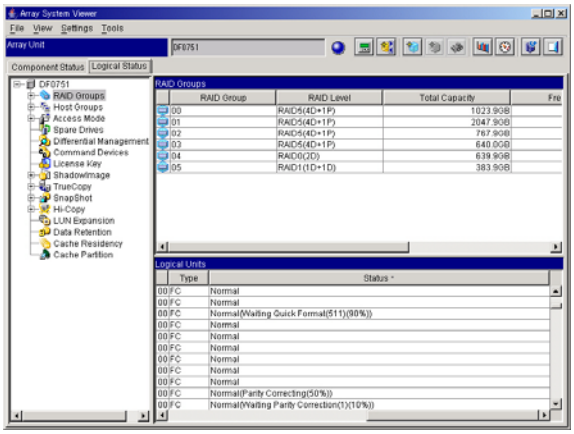
(d) Click the [RAID Groups] tab after Clicking the [Logical Status] tab in the unit window.



(e) Execution of forced parity correction

Since the LU required for the forced parity correction is displayed, execute the forced parity correction.

Select [Settings] – [Logical Unit] – [Parity Correction] in this order.



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Status Symbol of Storage Navigator Modular	Meaning	Status seen from a host	Recovery method
Uncorrected	A status in which the subsystem is waiting for an instruction to make or skip the forced parity correction issued by Storage Navigator Modular.	A status in which a host cannot instruct the LU to read or write.	Perform the forced parity correction or skip in the Storage Navigator Modular according to < Procedure given in windows > (TRBL 06-0250).
Parity Correcting (n%)	A status in which Storage Navigator Modular has issued an instruction to make the forced parity correction and the restoration is in progress.	A status in which a host can instruct the LU to read or write.	–
Waiting Parity Correction(o) (n%)	A status in which Storage Navigator Modular has issued an instruction to make the forced parity correction and is waiting for making of the restoration.	A status in which a host can instruct the LU to read or write.	–
Waiting Drive Reconstruction	Waiting Disk Drive Recovery : The forced parity correction is instructed from Storage Navigator Modular, and waiting for the replacement of the Disk Drive.	Reading and writing data from the host are enabled.	① Connect WEB (Refer to "Chapter 3 Before Starting WEB Connection" (TRBL 03-0000).) ② Replace the blocked Disk Drive referring to the Information Message on WEB (refer to Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).).
Correction Skipped	A status in which Storage Navigator Modular has issued an instruction to skip the forced parity correction.	A status in which a host can instruct the LU to read or write.	Make an LU formatting (refer to System Parameter "[Procedure ③-F]Formatting LU (SYSPR 03-0280".) and backup restoration.
–	Restored : A status in which Storage Navigator Modular issued an instruction to make the forced parity correction and the restoration has been completed.	A status in which a host can instruct the LU to read or write.	–
Uncorrected and Drive Detached	The forced parity recovery is aborted due to the Disk Drive blockade although the forced parity recovery was instructed from Storage Navigator Modular. However, the forced parity recovery is required.	Reading and writing data from the host are disabled.	① Connect the WEB (refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).). ② Replace the blocked Disk Drive referring to the Information Message on the WEB (refer to Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).). ③ Skip the forced parity correction according to < Procedure given in windows > (TRBL 06-0250) (refer to "[When skipping the forced parity correction]" (TRBL 06-0310).).

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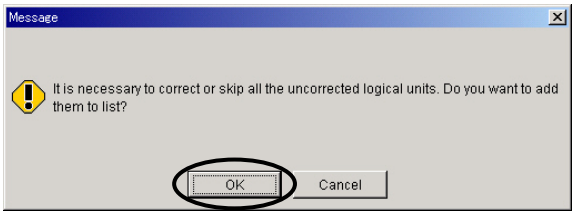
Status Symbol of Storage Navigator Modular	Meaning	Status seen from a host	Recovery method
Correction Aborted	A status in which the forced parity correction is interrupted because of a drive detachment although Storage Navigator Modular has issued an instruction to make the restoration.	A status in which a host cannot instruct the LU to read or write.	① Connect the WEB (refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).). ② Replace the blocked Disk Drive referring to the Information Message on the WEB (refer to Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).). ③ Skip the forced parity correction according to < Procedure given in windows > (TRBL 06-0250) (refer to "[When skipping the forced parity correction]" (TRBL 06-0310).). ④ Execute the forced parity correction according to < Procedure given in windows > (TRBL 06-0250).

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(f) Status checking of the logical unit for the forced parity correction.

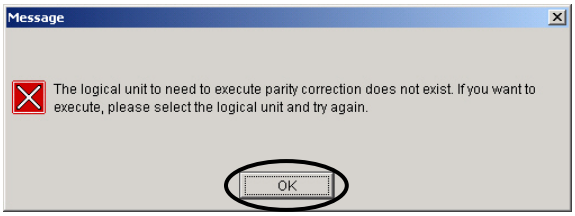
• When the status of the logical unit is “Uncorrected”

(i) Because the dialog, indicating that the LU which needs the forced parity correction exists, is displayed, click the [OK] button. The parity correction process is interrupted by clicking the [Cancel] button.

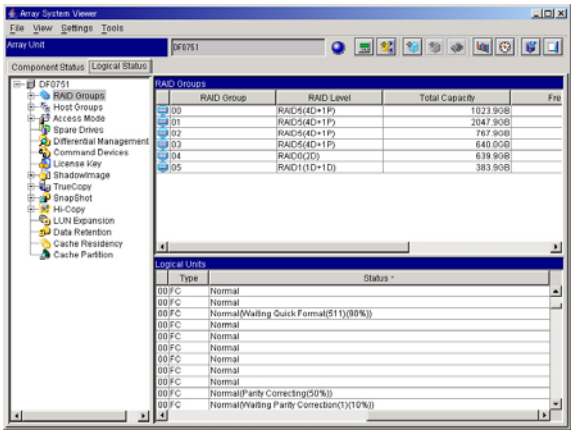


• When the status of the logical unit is other than “Uncorrected”

(i) Because the dialog, indicating that the logical unit for the forced parity correction target does not exist, is displayed, click the [OK] button.

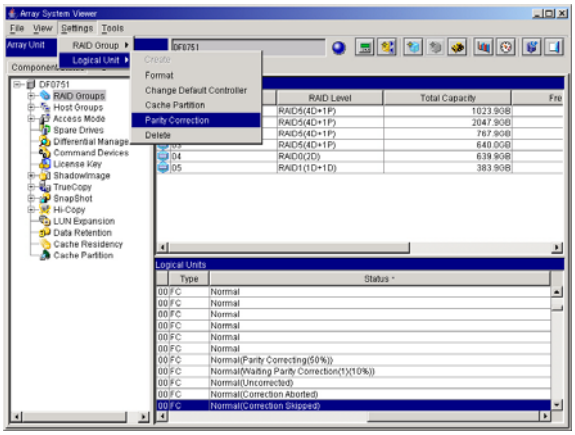


(ii) Check the LU which needs to execute the forced parity correction referring to the status of the logical unit.



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(iii) When there is the LU to be executed by the forced parity correction, select [Setting] – [Logical Unit] – [Parity Correction] after specifying the logical unit of the target.



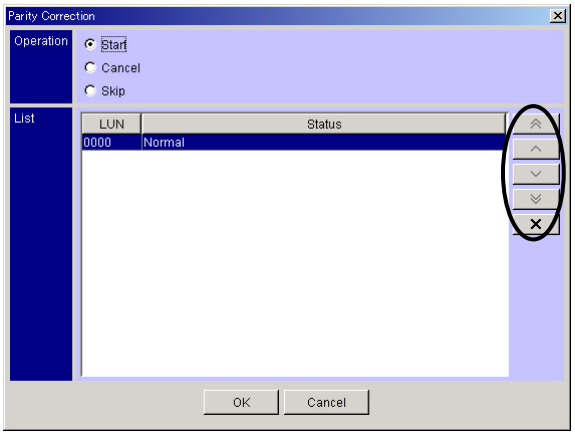
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(g) Select whether or not to make the forced parity correction.

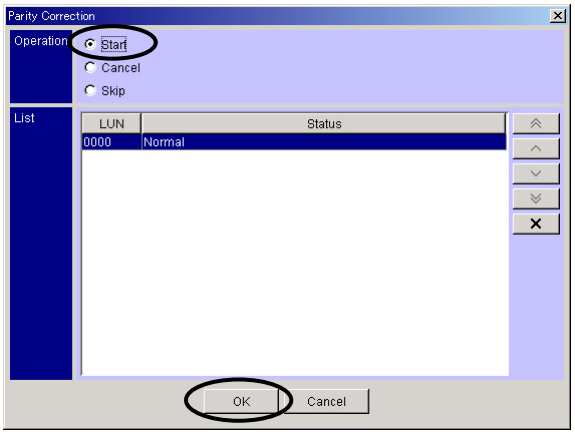
[When making the forced parity correction]

When aborting the forced parity correction while it is in progress, refer to "[Cancellation of forced parity correction]" (TRBL 06-0340).

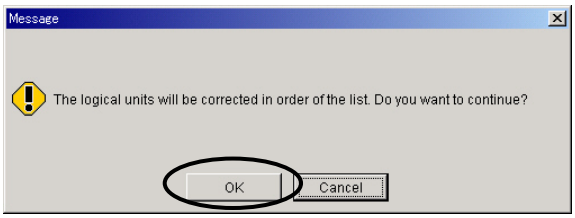
(i) Sort the LUs in order of making forced parity correction.(‡1)(‡2)



(ii) When the sort is completed, select the [Start] radio button and click the [OK] button.



(iii) Click the [OK] button.

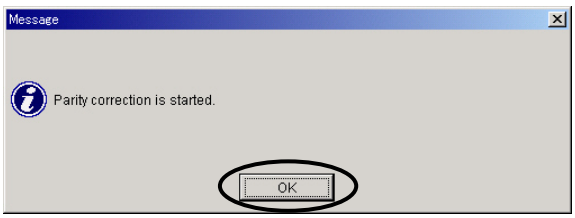


‡1 : The forced parity correction operates LU one by one in order for each Control Unit in charge of LU. Therefore, the Control Unit in charge of the LU which performs the forced parity correction should be considered to decide the sorting order.

‡2 : The forced parity correction is performed in order of the sorted LU.
However, if the LU belongs in the same RAID Group, it may not be executed in the sorted order because the process is not performed in each Control Unit.
If the forced parity correction order of the LU which belongs in the same RAID Group needs to be assured, select one LU following (g). For the remaining LU, follow the procedure for the indication of the forced parity correction from 'skip' status or 'completion of correction', and indicate the addition of the forced parity correction LU.

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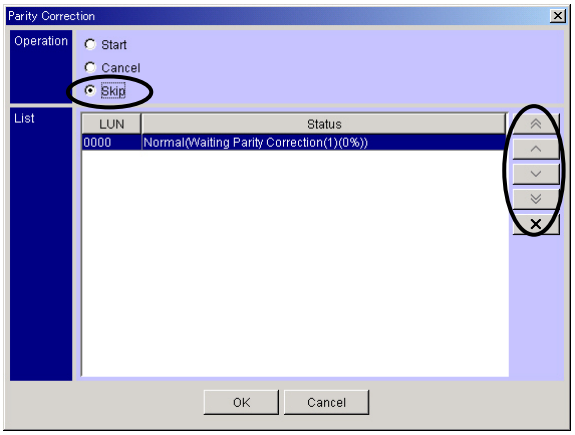
(iv) Click the [OK] button.



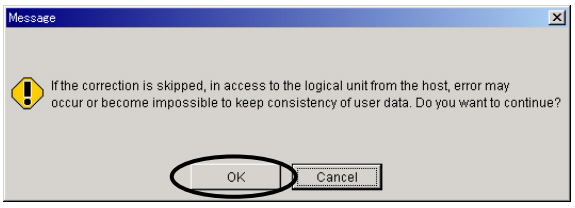
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[When skipping the forced parity correction]

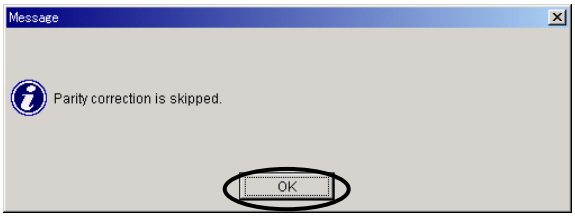
(i) Select the [Skip] radio button and click the [OK] button.



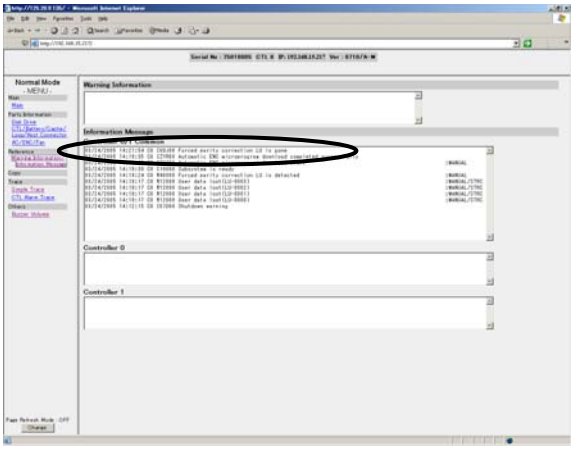
(ii) Click the [OK] button.



(iii) Click the [OK] button.



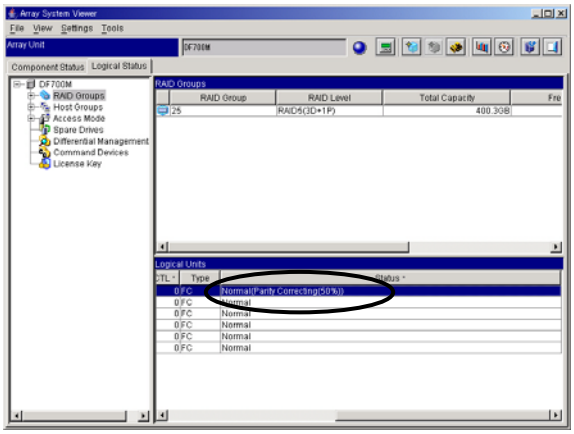
(h) Refer to a message in the Web window.



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(i) Displaying a progress rate of the forced parity correction

For the LU, the forced parity correction for which has been instructed to be made, rate of progress of the restoration is displayed in the "Status" column of the LU concerned.

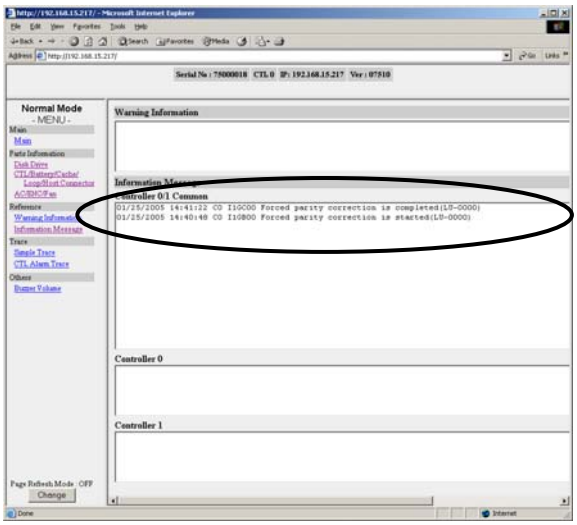


LU statuses concerning a forced parity correction and display of statuses by Storage Navigator Modular.

#	Status	Display by Storage Navigator Modular	Remarks
1	Being Restored	Parity Correction (n%)	n: Progress rate
2	On Standby	Waiting Parity Correction(o) (n%)	o: Waiting order n: Rate of progress
3	Waiting Disk Drive Recovery	Waiting Drive Reconstruction	—
4	Unrestored	Uncorrected	—
5	Unrestored 1	Uncorrected and Drive Detached	—
6	Unrestored 2	Correction Aborted	—
7	Restored	(No display)	—
8	Skip	Correction Skipped	—

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(j) Make sure that the forced parity correction has been completed in the Web window.



When making the forced parity correction for an LU in the "Skip" or "Restored" status, refer to "[Instruction to make a forced parity correction for an LU in the "Waiting Parity Correction" or "Restored" status]" (TRBL 06-0360).

(k) Make sure that the WARNING LED on the front side of the Basic Chassis has gone out.

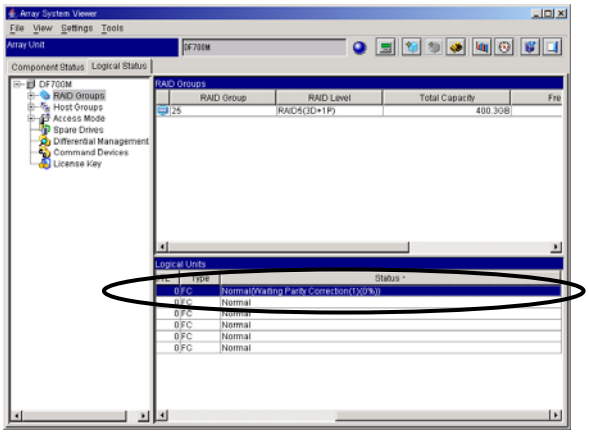
(l) Make the backup restoration. (Abandon all data and then restore it starting from the LU formatting.) Otherwise, ask a user to verify files.

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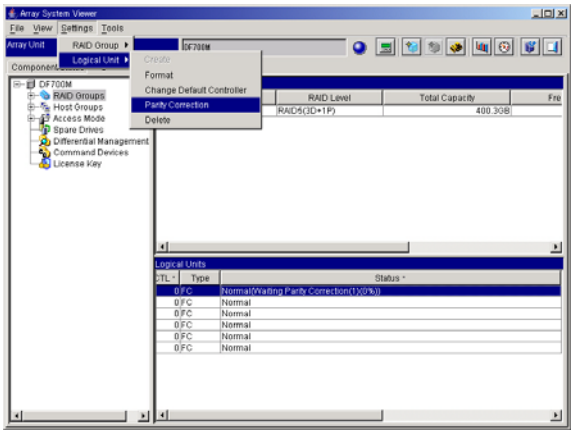
[Cancellation of forced parity correction]

The forced parity correction can be cancelled while the LU is in progress or after the correction is instructed.

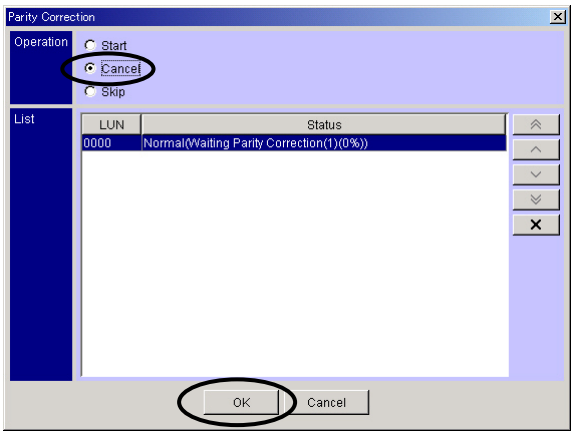
(a) Select an LU whose status displayed in the Logical unit status column is Parity Correcting or Waiting Parity Correction.



(b) Select [Settings], [Logical Unit], and [Parity Correction] in this order.

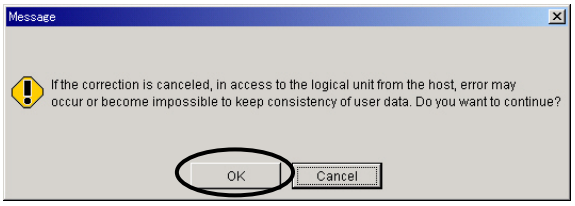


(c) Select [Cancel] and press the [OK] button.

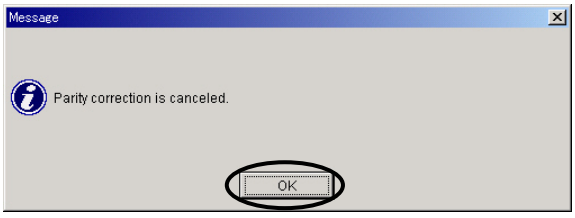


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(d) Click the [OK] button.



(e) Click the [OK] button.

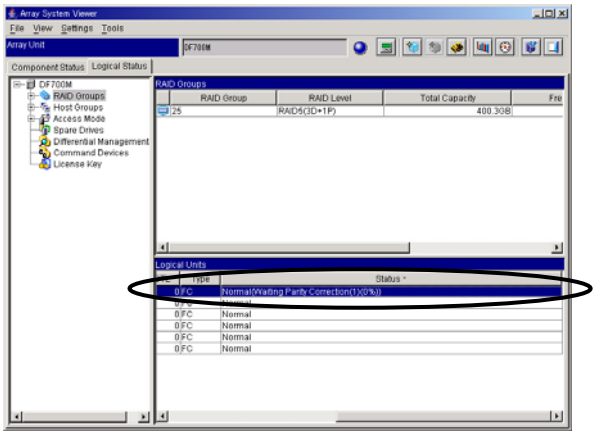


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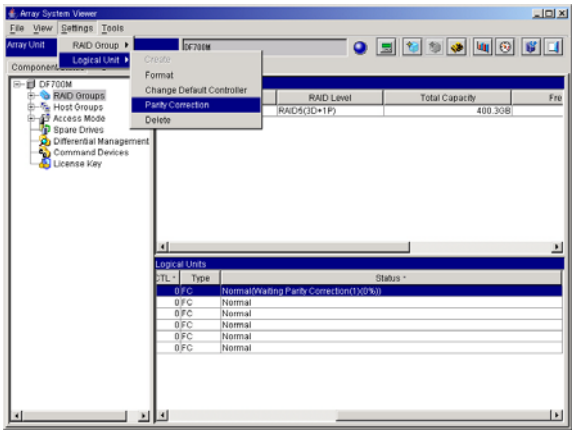
[Instruction to make a forced parity correction for an LU in the “Waiting Parity Correction” or “Restored” status]

A forced parity correction can be made for an LU in the “Waiting Parity Correction” status or for an LU for which the forced parity correction has been made.

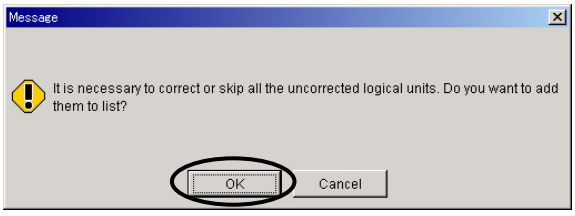
(a) Select an LU for which the “Waiting Parity Correction” status is displayed in the column of the logical unit state.



(b) In the state in which the selection above is made, select [Settings], [Logical Unit], and [Parity Correction] in this order.

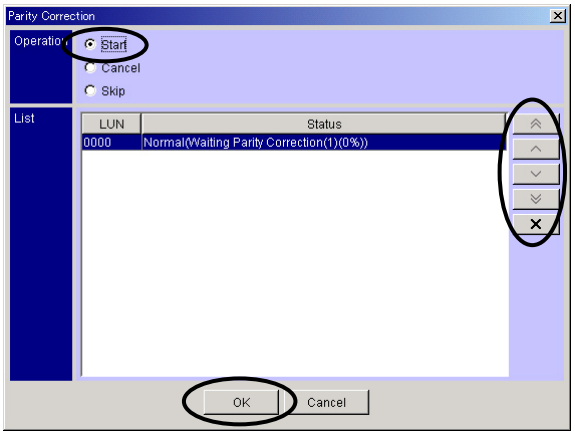


(c) Click the [OK] button.

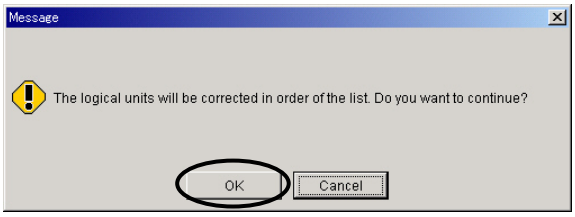


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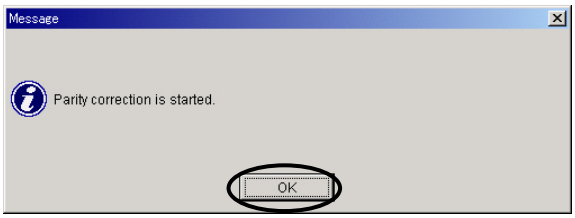
(d) Select [Start], specify an order of making the forced parity correction, and press the [OK] button.



(e) Click the [OK] button.



(f) Click the [OK] button.

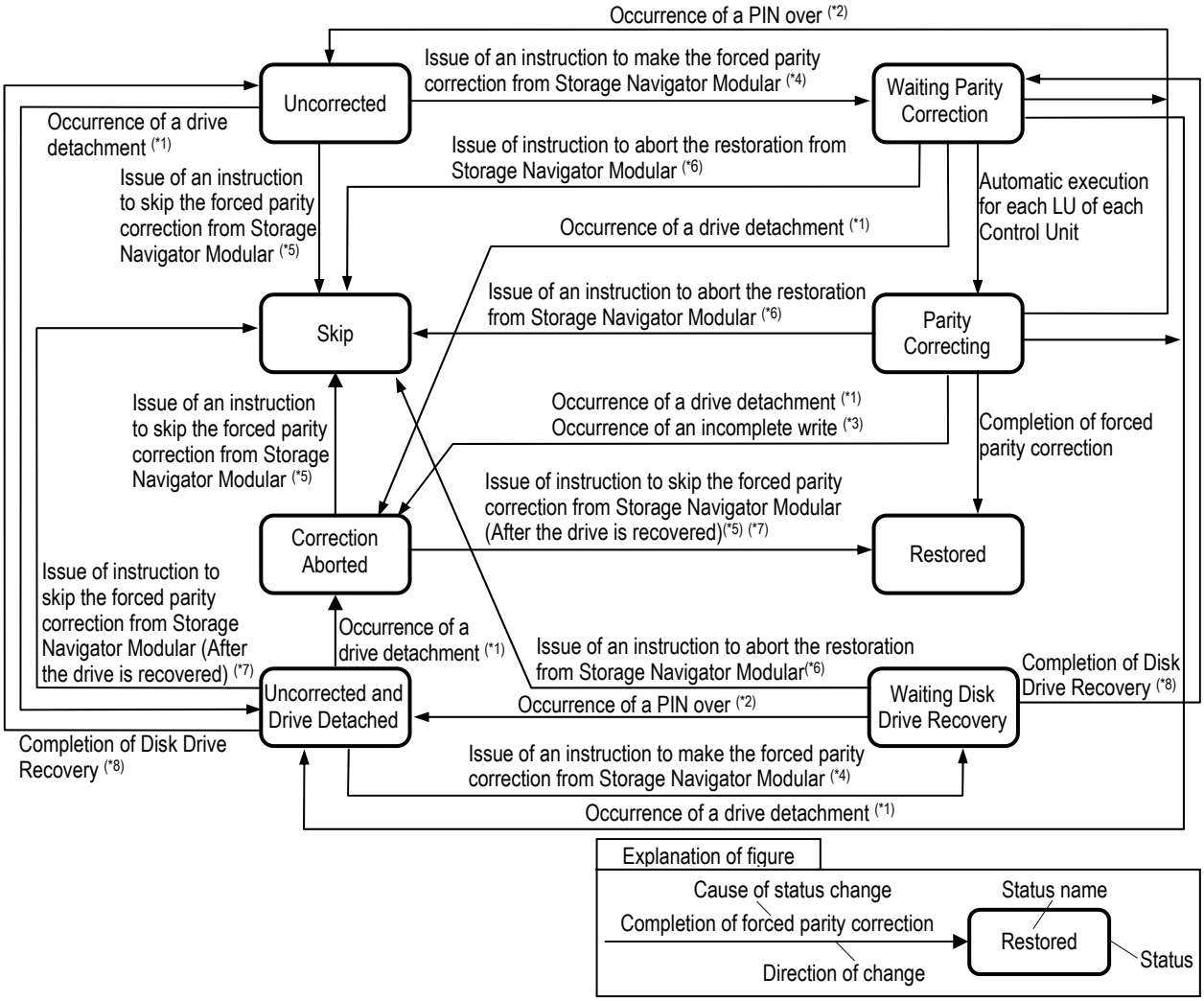


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< Change of the status in the forced parity correction >

The status of the forced parity correction changes as shown below. The status and progress rate of the restoration can be referred to for each LU using Storage Navigator Modular.

(a) Change of the status after user data is lost



*1 : Refer to "[Recovery method-3] : Drive blockade occurred during the forced parity correction." (TRBL 06-0140).

*2 : Refer to "[Recovery method-4] : PIN over occurred during the forced parity correction." (TRBL 06-0190).

*3 : Refer to "[Recovery method-5] : Incomplete write occurred during the forced parity correction." (TRBL 06-0210).

*4 : Refer to "(e) Execution of forced parity correction" (TRBL 06-0260).

*5 : Refer to "[When skipping the forced parity correction]" (TRBL 06-0310)

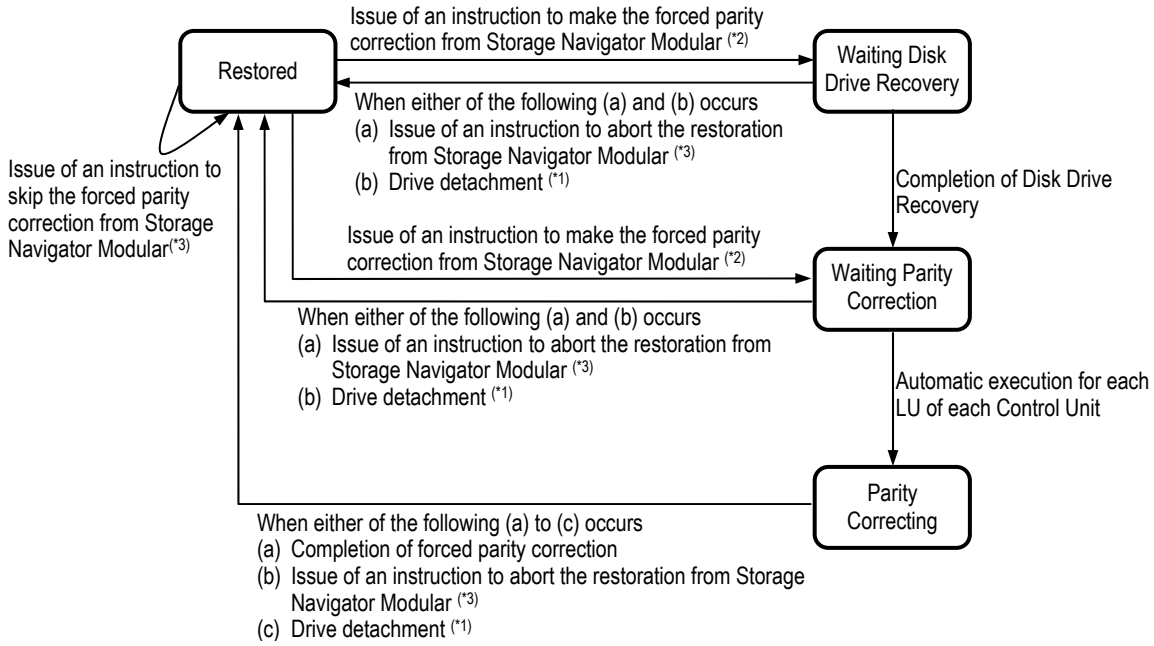
*6 : Refer to "[Cancellation of forced parity correction]" (TRBL 06-0340).

*7 : An LU that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Skip" status.
In this case, issue an instruction to skip the forced parity correction and then issue an instruction to make the restoration.
- An LU of RAID 1+0, RAID 6
- A unified LU a part of which is included in a RAID group having a drive detachment
- An LU whose parity group is deeper than 1

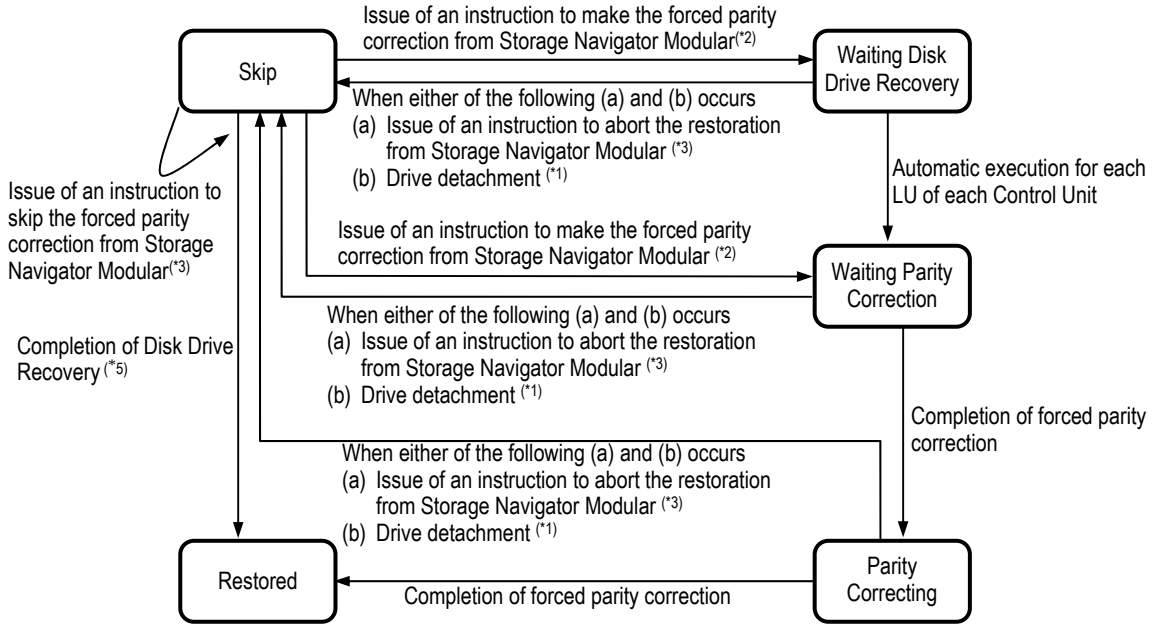
*8 : The LU concerned to any of the following conditions does not change to "Disk Drive Restored". In this case, instruct the force parity correction.
- LU whose Disk Drive of a part of the unified LU is blocked and included in the RAID Group
- LU whose depth of the parity group is larger than one

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(b) Forced parity correction for an LU in the "Restored" status



(c)Forced parity correction for an LU in the "Skip" status



*1 : Refer to "[Recovery method-3] : Drive blockade occurred during the forced parity correction." (TRBL 06-0140).

*2 : Refer to "(e) Execution of forced parity correction" (TRBL 06-0260).

*3 : Refer to "[When skipping the forced parity correction]" (TRBL 06-0310)

*4 : Refer to "[Cancellation of forced parity correction]" (TRBL 06-0340).

*5 : An LU that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Skip" status.

- An LU of RAID 1+0
- A unified LU a part of which is included in a RAID group having a drive detachment
- An LU whose parity group is deeper than 1

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< Standard time required for the forced parity correction >

A forced parity correction takes a long time from start to completion. (Refer to Table 6.1.2, Table 6.1.3, and Table 6.1.4.)

Standard times required for the forced parity correction are shown below.

NOTE : The data above are standard times required for a forced parity correction for one or two RAID groups.

Further, the times required for the restoration vary depending on the Disk Drive capacity, number of Disk Drives, and RAID configuration.

Also, the time when the forced parity correction processing takes becomes short about 10 to 20 % depending on the type even by the Disk Drives of the same capacity.

The forced parity correction operates one LU at a time per Control Unit. Therefore, when one Control Unit recovered the parity of two or more LUs (n LUs), the time that it takes to complete recovering all the parities of the n LUs becomes n times the standard time.

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Table 6.1.2 Standard Times Required for Forced Parity Correction for one RAID group (When No Host I/O Is Executed) (‡1)

Unit : min

Item		Disk Drives (G byte) (*1)		71.3	143.3	245.7	287.6	393.4	491.9
AMS500 AMS200	4 Disk Drives	RAID 6	(2D+2P)	50	75	190	190	290	370
	6 Disk Drives		(4D+2P)	70	120	270	280	410	520
	10 Disk Drives		(8D+2P)	120	190	450	460	630	830
	14 Disk Drives		(12D+2P)	170	280	560	700	890	1120
	18 Disk Drives		(16D+2P)	240	400	770	980	1250	1510
	30 Disk Drives		(28D+2P)	370	610	1030	1540	2050	2200
	3 Disk Drives	RAID 5	(2D+1P)	45	70	160	170	230	260
	5 Disk Drives		(4D+1P)	65	100	250	250	340	400
	9 Disk Drives		(8D+1P)	110	170	410	420	590	670
	11 Disk Drives		(10D+1P)	130	210	510	530	720	830
	13 Disk Drives		(12D+1P)	150	250	480	620	760	960
	16 Disk Drives		(15D+1P)	190	320	570	780	930	1120
	4 Disk Drives	RAID 1+0	(2D+2D)	65	85	210	230	360	420
	8 Disk Drives		(4D+4D)	130	180	410	470	650	870
	16 Disk Drives		(8D+8D)	300	390	800	1090	1300	1900
	2 Disk Drives	RAID 1	(1D+1D)	40	50	130	95	220	210
WMS100	4 Disk Drives	RAID 6	(2D+2P)	-	-	200	-	320	400
	6 Disk Drives		(4D+2P)	-	-	280	-	450	560
	10 Disk Drives		(8D+2P)	-	-	450	-	700	870
	14 Disk Drives		(12D+2P)	-	-	620	-	990	1240
	18 Disk Drives		(16D+2P)	-	-	860	-	1390	1720
	30 Disk Drives		(28D+2P)	-	-	1390	-	2250	2740
	3 Disk Drives	RAID 5	(2D+1P)	-	-	160	-	250	280
	5 Disk Drives		(4D+1P)	-	-	250	-	380	430
	9 Disk Drives		(8D+1P)	-	-	410	-	650	720
	11 Disk Drives		(10D+1P)	-	-	500	-	800	880
	13 Disk Drives		(12D+1P)	-	-	530	-	840	1030
	16 Disk Drives		(15D+1P)	-	-	630	-	1030	1270
	4 Disk Drives	RAID 1+0	(2D+2D)	-	-	230	-	360	460
	8 Disk Drives		(4D+4D)	-	-	450	-	720	980
	16 Disk Drives		(8D+8D)	-	-	890	-	1450	2300
	2 Disk Drives	RAID 1	(1D+1D)	-	-	120	-	210	230

*1 : All Disk Drive capacities were calculated on the condition of 1 Gbyte =1,000,000,000 bytes. They are different from those calculated on the condition of 1 kbytes =1,024 bytes, which are actually displayed on PCs that you are using

‡1 : The standard of the forced parity correction time when the parity of one LU was recovered.

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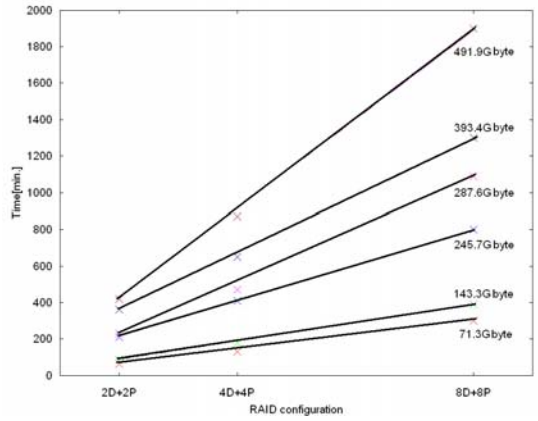
Unit : min

Item			Disk Drives (G byte) (*1)	71.3	143.3	245.7	287.6	393.4	491.9
AMS1000	4 Disk Drives	RAID 6	(2D+2P)	30	50	150	120	230	280
	6 Disk Drives		(4D+2P)	45	70	210	160	310	390
	10 Disk Drives		(8D+2P)	70	120	320	250	500	620
	14 Disk Drives		(12D+2P)	80	170	430	290	710	860
	18 Disk Drives		(16D+2P)	95	210	500	340	840	1030
	30 Disk Drives		(28D+2P)	180	280	610	550	1030	1210
	3 Disk Drives	RAID 5	(2D+1P)	30	45	120	110	170	220
	5 Disk Drives		(4D+1P)	45	70	180	180	250	330
	9 Disk Drives		(8D+1P)	60	110	290	230	420	550
	11 Disk Drives		(10D+1P)	70	140	350	260	560	680
	13 Disk Drives		(12D+1P)	75	160	400	280	650	790
	16 Disk Drives		(15D+1P)	90	190	470	300	790	950
	4 Disk Drives	RAID 1+0	(2D+2D)	40	60	200	150	310	370
	8 Disk Drives		(4D+4D)	95	120	390	370	600	730
	16 Disk Drives		(8D+8D)	170	250	840	620	1090	1570
	2 Disk Drives	RAID 1	(1D+1D)	20	40	95	80	150	180

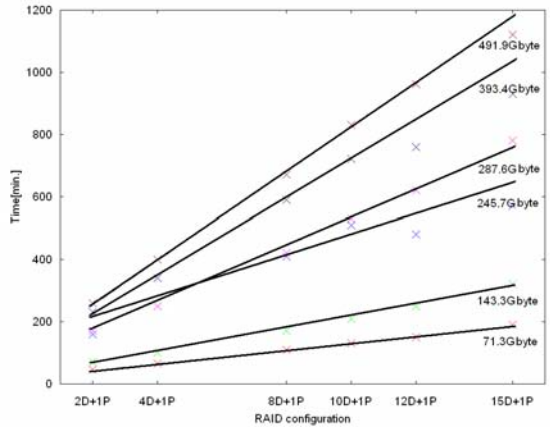
*1 : All Disk Drive capacities were calculated on the condition of 1 Gbyte =1,000,000,000 bytes. They are different from those calculated on the condition of 1 kbytes =1,024 bytes, which are actually displayed on PCs that you are using

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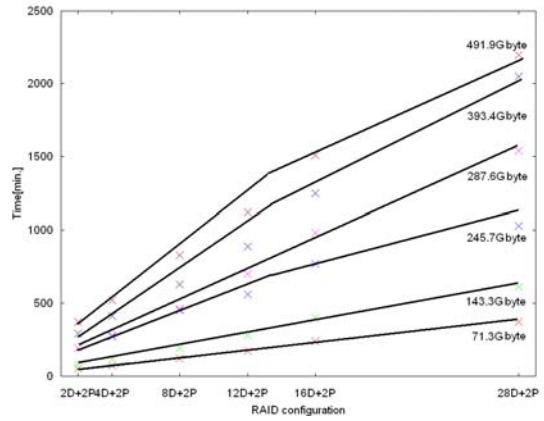
AMS 200/500 (RAID 1+0)



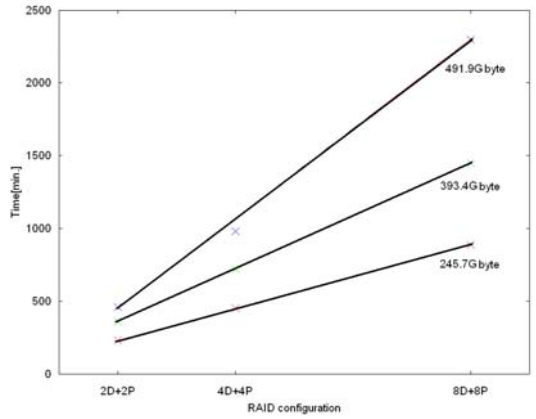
AMS 200/500 (RAID 5)



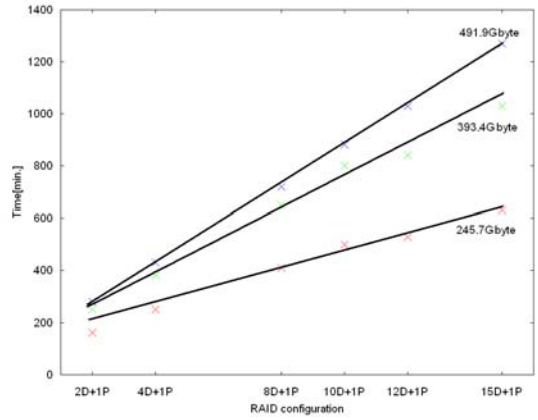
AMS 200/500 (RAID 6)



WMS 100 (RAID 1+0)



WMS 100 (RAID 5)



WMS 100 (RAID 6)

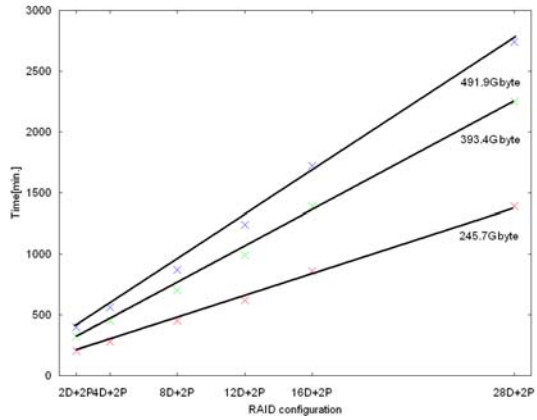
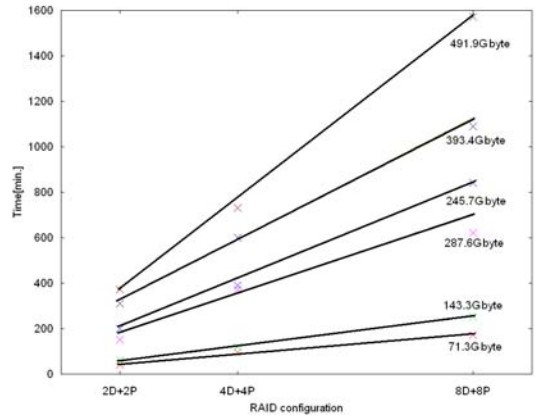


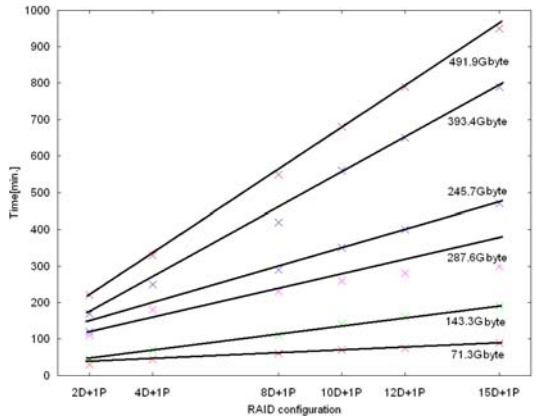
Figure 6.1.1 Forced Parity Correction (without host I/O, one RAID Group) Time Graph

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AMS 1000 (RAID 1+0)



AMS 1000 (RAID 5)



AMS 1000 (RAID 6)

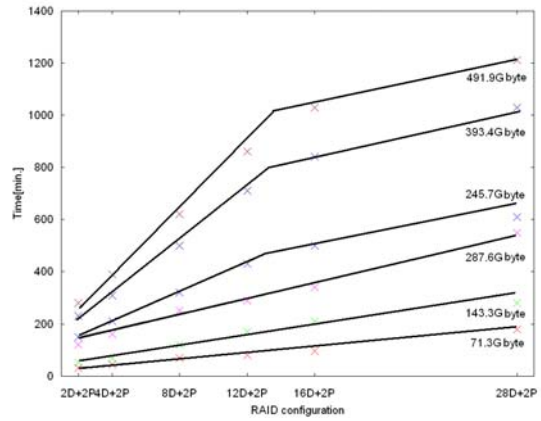


Figure 6.1.2 Forced Parity Correction (without host I/O, one RAID Group) Time Graph

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Table 6.1.3 Standard Times Required for Forced Parity Correction for two RAID groups(‡1) (without host I/O, two RAID Group))

Unit : min

Item			Disk Drives (G byte) (*1)	71.3	143.3	245.7	287.6	393.4	491.9
AMS500 AMS200	4 Disk Drives x2	RAID 6	(2D+2P)x2	60	95	200	240	330	330
	6 Disk Drives x2		(4D+2P)x2	70	120	290	280	460	470
	10 Disk Drives x2		(8D+2P)x2	120	190	460	470	630	730
	14 Disk Drives x2		(12D+2P)x2	180	300	640	730	1150	1030
	18 Disk Drives x2		(16D+2P)x2	250	420	790	1060	1600	1270
	30 Disk Drives x2		(28D+2P)x2	390	640	1030	1600	2050	1630
	3 Disk Drives x2	RAID 5	(2D+1P)x2	45	70	160	170	260	260
	5 Disk Drives x2		(4D+1P)x2	65	100	250	250	400	410
	9 Disk Drives x2		(8D+1P)x2	110	170	430	420	740	680
	11 Disk Drives x2		(10D+1P)x2	130	220	530	530	1060	920
	13 Disk Drives x2		(12D+1P)x2	160	260	620	630	900	830
	16 Disk Drives x2		(15D+1P)x2	200	330	710	810	1090	1150
	4 Disk Drives x2	RAID 1+0	(2D+2D)x2	70	90	260	240	350	420
	8 Disk Drives x2		(4D+4D)x2	150	190	430	510	700	880
	16 Disk Drives x2		(8D+8D)x2	300	390	870	1090	1390	1930
	2 Disk Drives x2	RAID 1	(1D+1D)x2	40	50	130	95	220	210
WMS100	4 Disk Drives x2	RAID 6	(2D+2P)x2	-	-	230	-	360	440
	6 Disk Drives x2		(4D+2P)x2	-	-	320	-	510	620
	10 Disk Drives x2		(8D+2P)x2	-	-	560	-	700	970
	14 Disk Drives x2		(12D+2P)x2	-	-	780	-	1270	1510
	18 Disk Drives x2		(16D+2P)x2	-	-	1030	-	1660	1990
	30 Disk Drives x2		(28D+2P)x2	-	-	1630	-	2600	3100
	3 Disk Drives x2	RAID 5	(2D+1P)x2	-	-	180	-	290	350
	5 Disk Drives x2		(4D+1P)x2	-	-	280	-	440	540
	9 Disk Drives x2		(8D+1P)x2	-	-	520	-	820	980
	11 Disk Drives x2		(10D+1P)x2	-	-	660	-	1060	1170
	13 Disk Drives x2		(12D+1P)x2	-	-	620	-	990	1210
	16 Disk Drives x2		(15D+1P)x2	-	-	750	-	1210	1480
	4 Disk Drives x2	RAID 1+0	(2D+2D)x2	-	-	250	-	380	460
	8 Disk Drives x2		(4D+4D)x2	-	-	480	-	770	980
	16 Disk Drives x2		(8D+8D)x2	-	-	960	-	1540	2300
	2 Disk Drives x2	RAID 1	(1D+1D)x2	-	-	130	-	230	230

*1 : All Disk Drive capacities were calculated on the condition of 1 Gbyte =1,000,000,000 bytes. They are different from those calculated on the condition of 1 kbytes =1,024 bytes, which are actually displayed on PCs that you are using

‡1 : Two RAID groups = one RAID group/controller0 and one RAID group/controller1.

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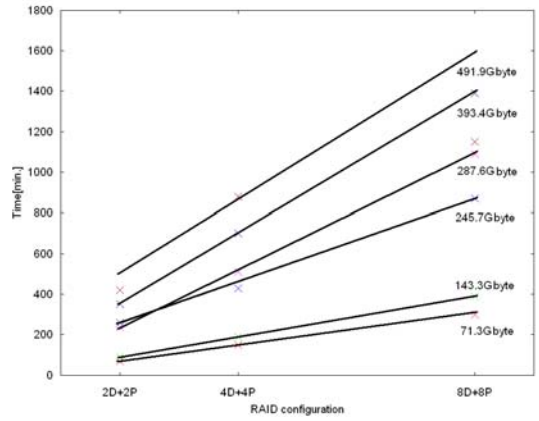
Unit : min

Item	Disk Drives (G byte) (*1)			71.3	143.3	245.7	287.6	393.4	491.9
AMS1000	4 Disk Drives x2	RAID 6	(2D+2P)x2	30	50	150	120	190	300
	6 Disk Drives x2		(4D+2P)x2	45	70	210	160	300	390
	10 Disk Drives x2		(8D+2P)x2	65	120	320	250	510	640
	14 Disk Drives x2		(12D+2P)x2	80	180	440	310	710	880
	18 Disk Drives x2		(16D+2P)x2	110	230	510	380	840	1000
	30 Disk Drives x2		(28D+2P)x2	150	280	630	570	1030	1240
	3 Disk Drives x2	RAID 5	(2D+1P)x2	30	50	120	110	170	220
	5 Disk Drives x2		(4D+1P)x2	40	70	180	180	250	330
	9 Disk Drives x2		(8D+1P)x2	60	120	290	240	430	560
	11 Disk Drives x2		(10D+1P)x2	70	150	360	280	570	690
	13 Disk Drives x2		(12D+1P)x2	80	160	410	310	660	800
	16 Disk Drives x2		(15D+1P)x2	95	190	490	300	780	940
	4 Disk Drives x2	RAID 1+0	(2D+2D)x2	40	60	200	150	280	370
	8 Disk Drives x2		(4D+4D)x2	80	120	390	300	550	750
	16 Disk Drives x2		(8D+8D)x2	160	250	840	630	1090	1600
	2 Disk Drives x2	RAID 1	(1D+1D)x2	20	45	95	80	160	180

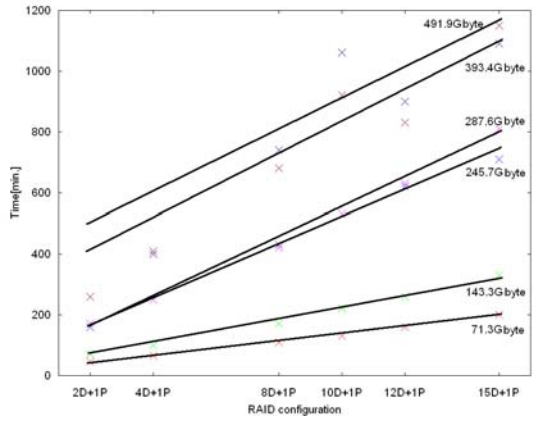
*1 : All Disk Drive capacities were calculated on the condition of 1 Gbyte =1,000,000,000 bytes. They are different from those calculated on the condition of 1 kbytes =1,024 bytes, which are actually displayed on PCs that you are using

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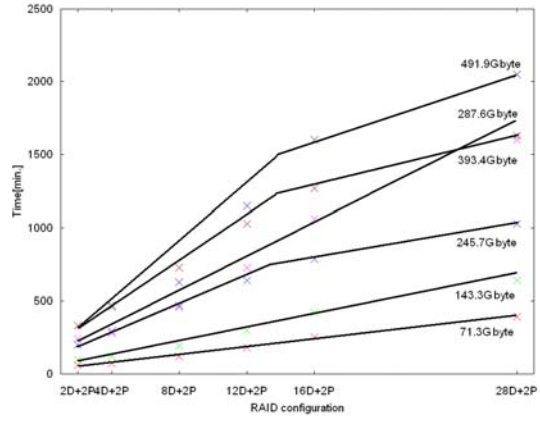
AMS 200/500 (RAID 1+0)



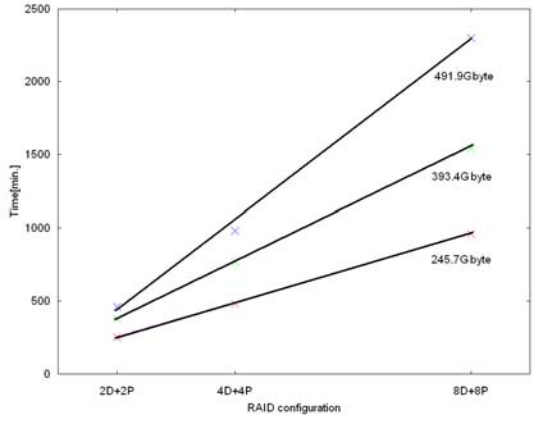
AMS 200/500 (RAID 5)



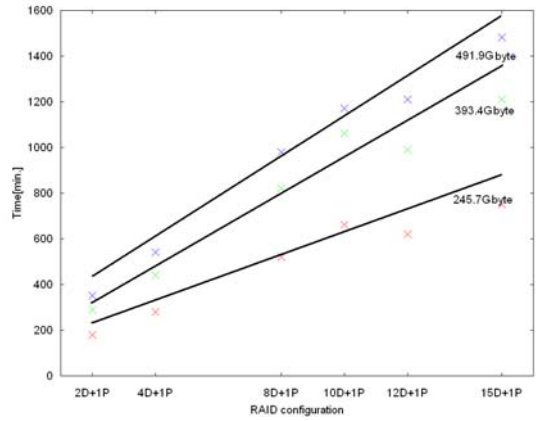
AMS 200/500 (RAID 6)



WMS 100 (RAID 1+0)



WMS 100 (RAID 5)



WMS 100 (RAID 6)

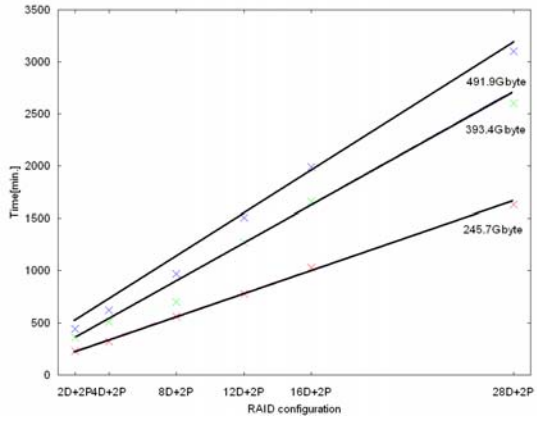
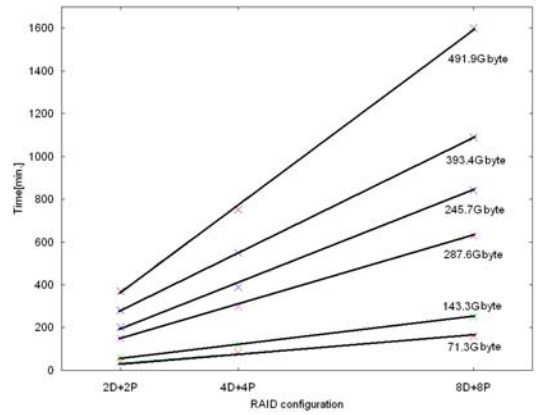


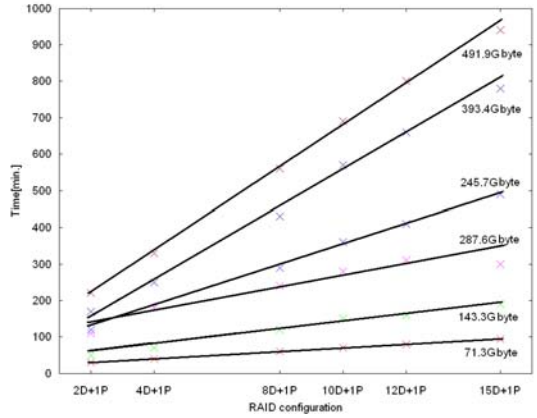
Figure 6.1.3 Forced Parity Correction (without host I/O, two RAID Group) Time Graph

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AMS 1000 (RAID 1+0)



AMS 1000 (RAID 5)



AMS 1000 (RAID 6)

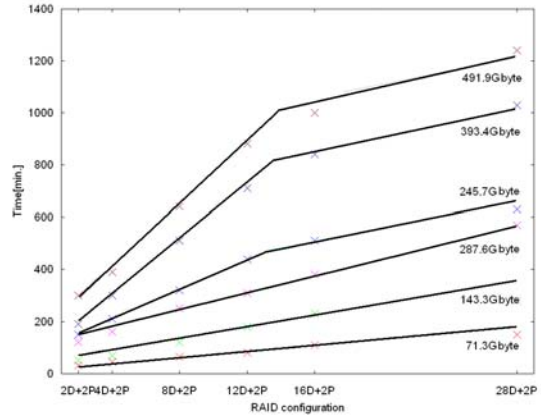


Figure 6.1.4 Forced Parity Correction (without host I/O, two RAID Group) Time Graph

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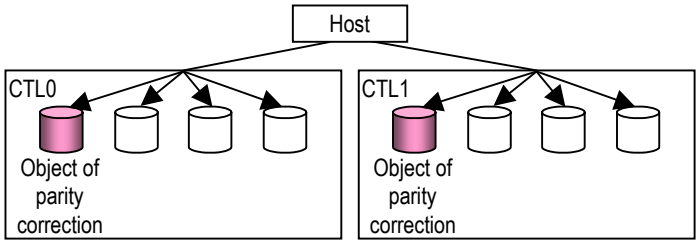
Table 6.1.4 Standard Times Required for Forced Parity Correction for two RAID groups(‡1) (When Host I/Os Are Executed)

	RAID level		Capacity(*1)	Host performance	Parity correction
AMS500 AMS200 (143.3 Gbytes HDU used)	RAID 6	(4D+2P)x2	533.8 Gbytes	840 IOPS	360 min
		(28D+2P)x2	3736.8 Gbytes	740 IOPS	770 min
	RAID 5	(4D+1P)x2	533.8 Gbytes	760 IOPS	330 min
		(15D+1P)x2	2001.9 Gbytes	770 IOPS	510 min
	RAID 1+0	(2D+2D)x2	266.9 Gbytes	770 IOPS	310 min
		(8D+8D)x2	1067.7 Gbytes	840 IOPS	810 min
	RAID 1	(1D+1D)x2	133.4 Gbytes	750 IOPS	180 min
AMS500 AMS200 (245.7 Gbytes HDU used)	RAID 6	(4D+2P)x2	915.3 Gbytes	690 IOPS	1010 min
		(28D+2P)x2	6407.1 Gbytes	800 IOPS	1780 min
	RAID 5	(4D+1P)x2	915.3 Gbytes	680 IOPS	850 min
		(15D+1P)x2	3432.3 Gbytes	780 IOPS	1150 min
	RAID 1+0	(2D+2D)x2	457.7 Gbytes	620 IOPS	850 min
		(8D+8D)x2	1830.6 Gbytes	790 IOPS	1580 min
	RAID 1	(1D+1D)x2	228.8 Gbytes	420 IOPS	1280 min
WMS100 (245.7 Gbytes HDU used)	RAID 6	(4D+2P)x2	915.3 Gbytes	470 IOPS	1120 min
		(28D+2P)x2	6407.1 Gbytes	500 IOPS	2200 min
	RAID 5	(4D+1P)x2	915.3 Gbytes	460 IOPS	940 min
		(15D+1P)x2	3432.3 Gbytes	540 IOPS	1270 min
	RAID 1+0	(2D+2D)x2	457.7 Gbytes	470 IOPS	940 min
		(8D+8D)x2	1830.6 Gbytes	550 IOPS	1750 min
	RAID 1	(1D+1D)x2	228.8 Gbytes	350 IOPS	1420 min

*1 : All Disk Drive capacities were calculated on the condition of 1 Gbyte =1,000,000,000 bytes. They are different from those calculated on the condition of 1 kbytes =1,024 bytes, which are actually displayed on PCs that you are using

Conditions of measurement of a time required for the forced parity correction are as follows.

- Each of all LUs belongs to different RAID group.
- Only one LU per CTL is restored and an host I/O of random reading (75%) and writing (25%) of 4-kbyte data TAG8 is executed for all the LUs.



‡1 : two RAID groups = one RAID group/controller0 and one RAID group/controller1

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6.1.4 The power cannot be turned off : Case 1 (The number of PIN data is too large)

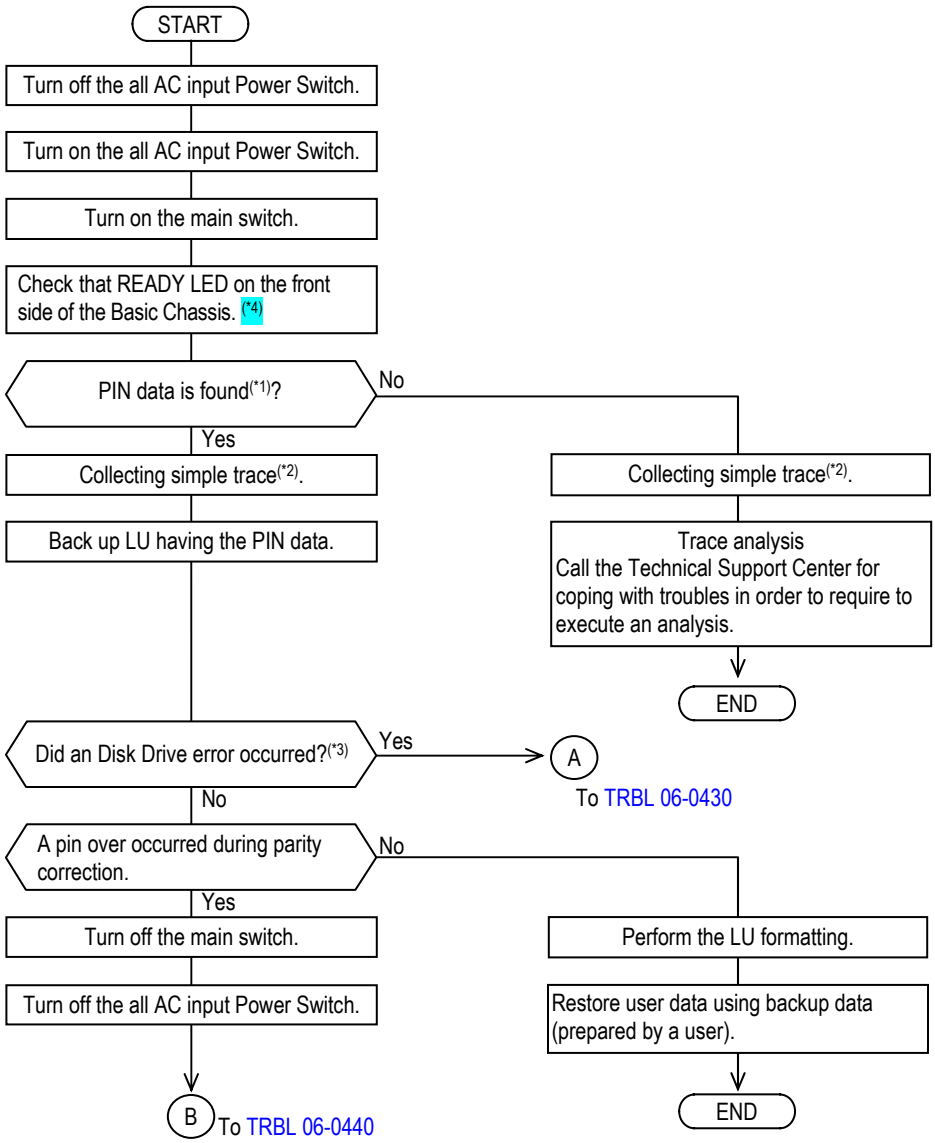
(The planned shutdown cannot be performed due to the Disk Drive/Control Unit failure)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx HI0600 PS OFF failed [PIN] :MANUAL/CTRC

Date Time Detect Controller#

[Recovery method]



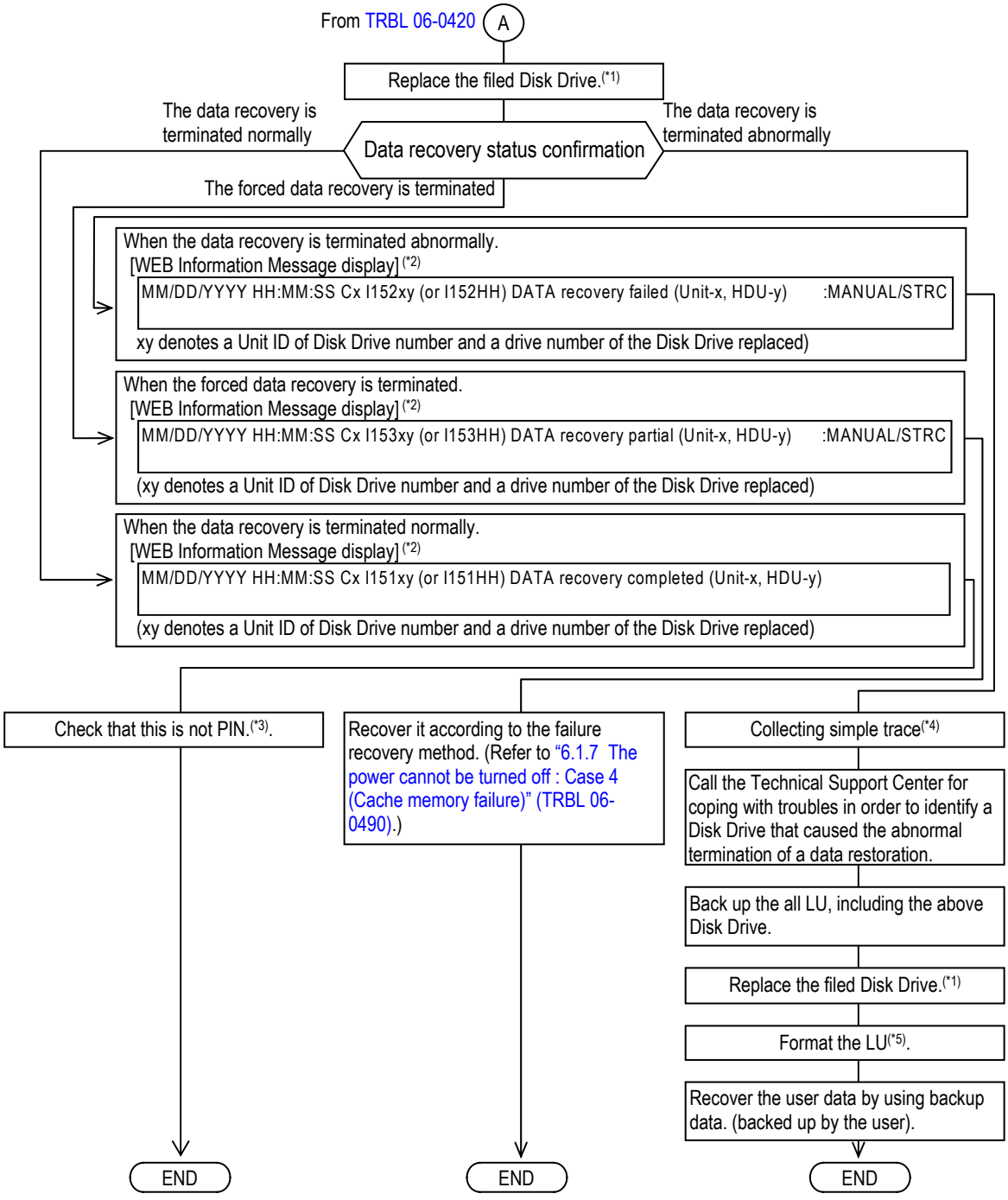
*1 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*2 : For the collection simple trace, refer to "7.3 Collecting simple trace" (TRBL 07-0040).

*3 : For checking a Disk Drive error, refer to "8.2 (2) Trouble analysis based on LED indication of Disk Drive" (TRBL 08-0160) or "Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000).

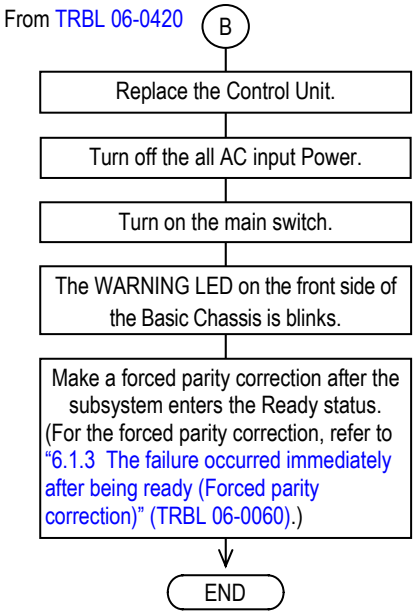
*4 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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*1 : For the replacement of the Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).
*2 : For the connection of the WEB, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).
*3 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).
*4 : For the Collection simple trace, refer to "7.3 Collecting simple trace" (TRBL 07-0040).
*5 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (Refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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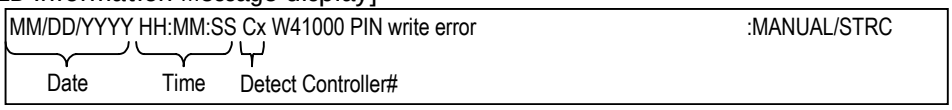


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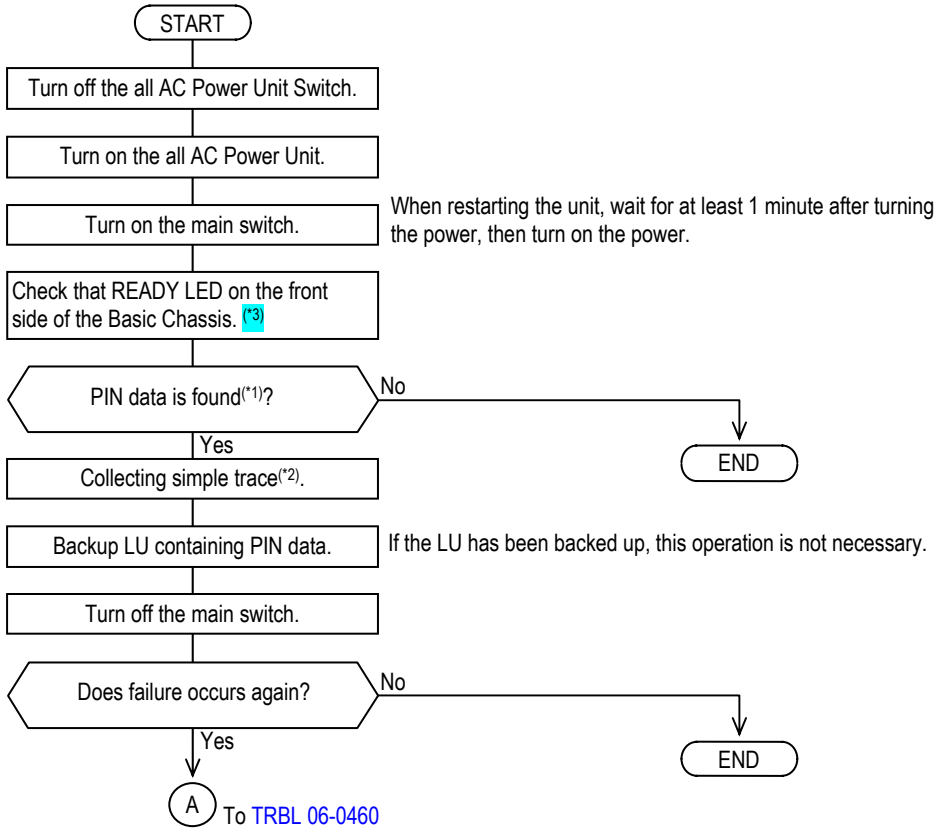
6.1.5 The power cannot be turned off : Case 2 (Hardware failure)

(It tried to store the PIN data in the Disk Drive at the time of the planned shutdown, but it cannot POWER OFF because a hardware failure occurred)

[WEB Information Message display]



[Recovery method]

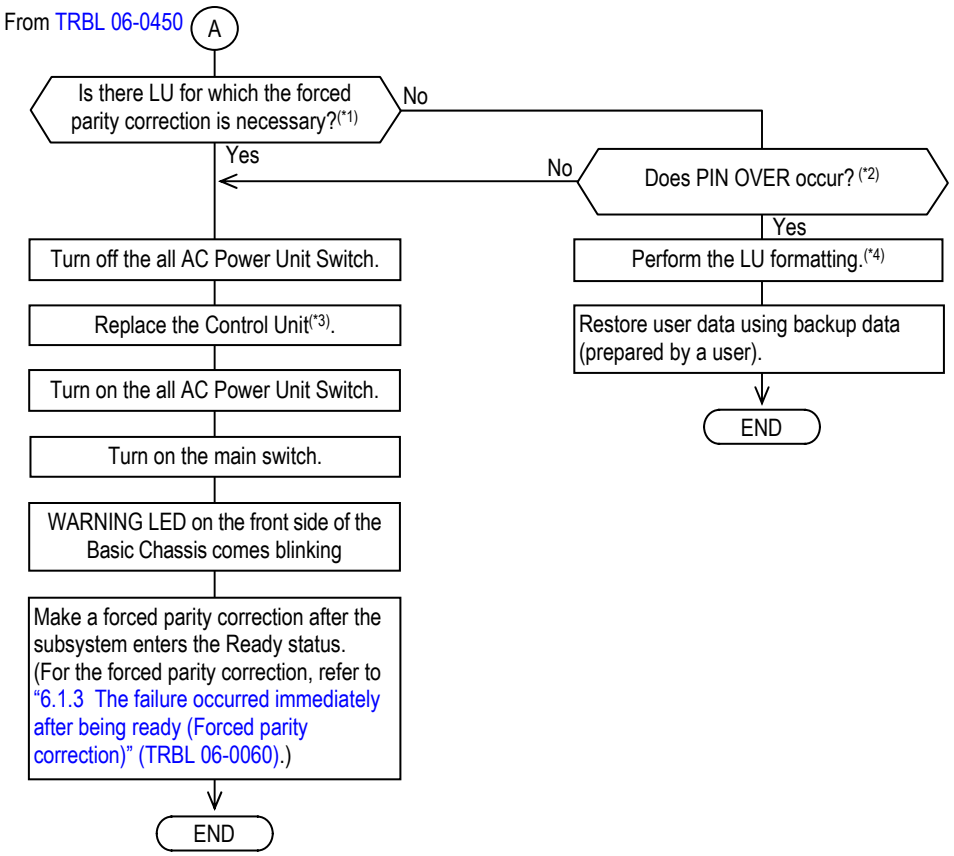


*1 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*2 : For the Collection simple trace, refer to "7.3 Collecting simple trace" (TRBL 07-0040).

*3 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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*1 : The message code "W48000 Forced parity correction LU is detected" is displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Basic Chassis (front side of the subsystem) lights on or blinks.

*2 : The message codes "W41100", "W49100", "W49200", "W49300", "W49400", "W49500" and "W49600" are displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Basic Chassis (front side of the subsystem) lights on or blinks.

*3 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

*4 : For the LU format, refer to the System Paramter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280).

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6.1.6 The power cannot be turned off : Case 3 (Control Unit failure)

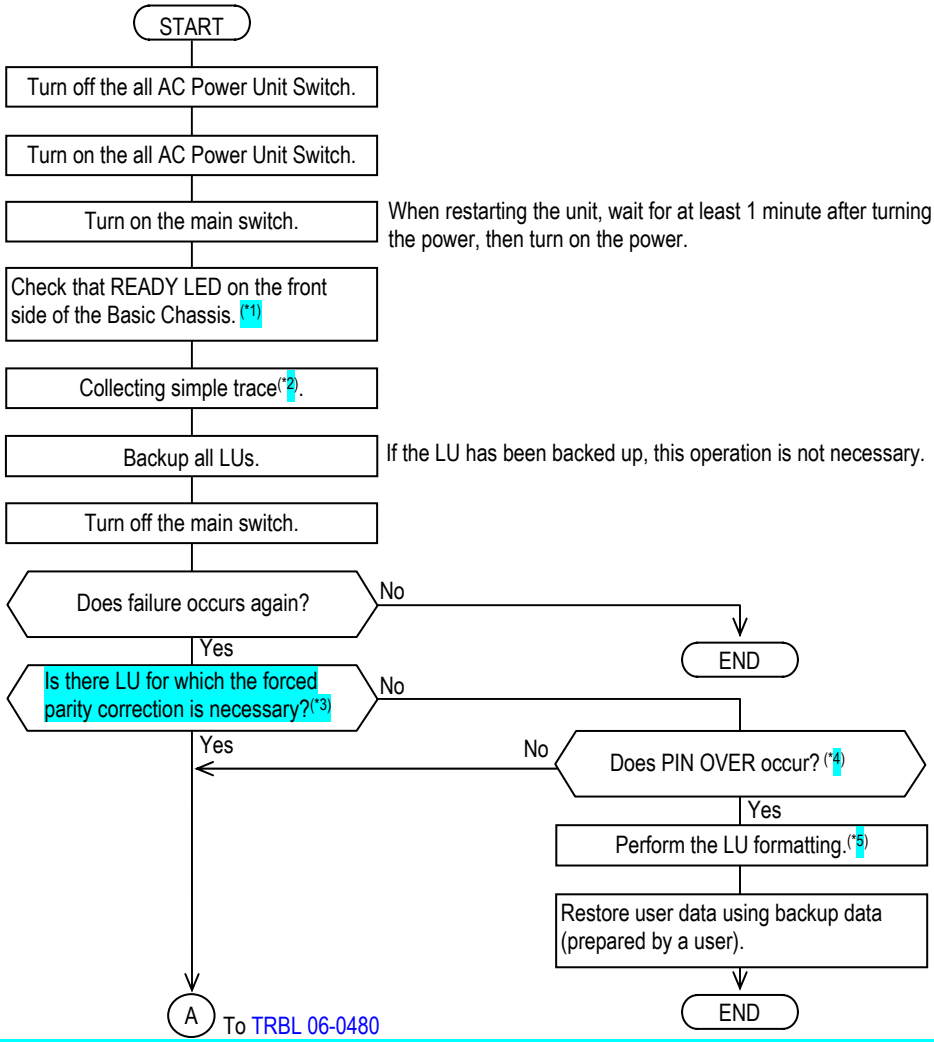
(Planned shutdown cannot be performed because all the Disk Drives to which inheritance information is to be saved disappeared due to a DMA double error or a disk quintuple error.)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W22000 PS OFF failed [NO HDU] :MANUAL/STRC

Date Time Detect Controller#

[Recovery method]



*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

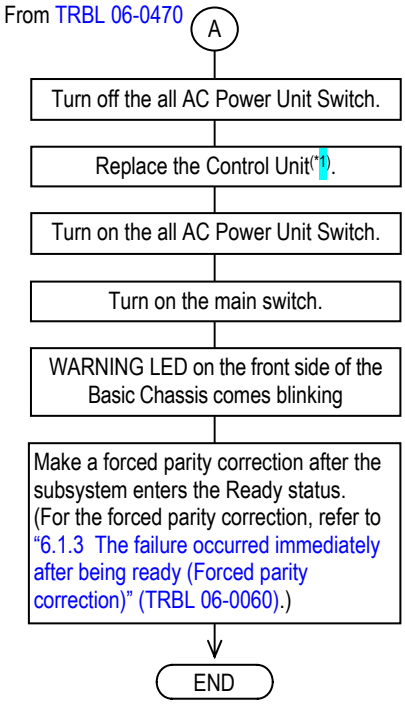
*2 : For the Collection simple trace, refer to"7.3 Collecting simple trace" (TRBL 07-0040).

*3 : The message code "W48000 Forced parity correction LU is detected" is displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Basic Chassis (front side of the subsystem) lights on or blinks.

*4 : The message codes "W41100", "W49100", "W49200", "W49300", "W49400", "W49500" and "W49600" are displayed in the Information Message on the WEB, and the WARNING LED (orange) on the Basic Chassis (front side of the subsystem) lights on or blinks.

*5 : For the LU format, refer to the System Paramter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280).

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*1 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)

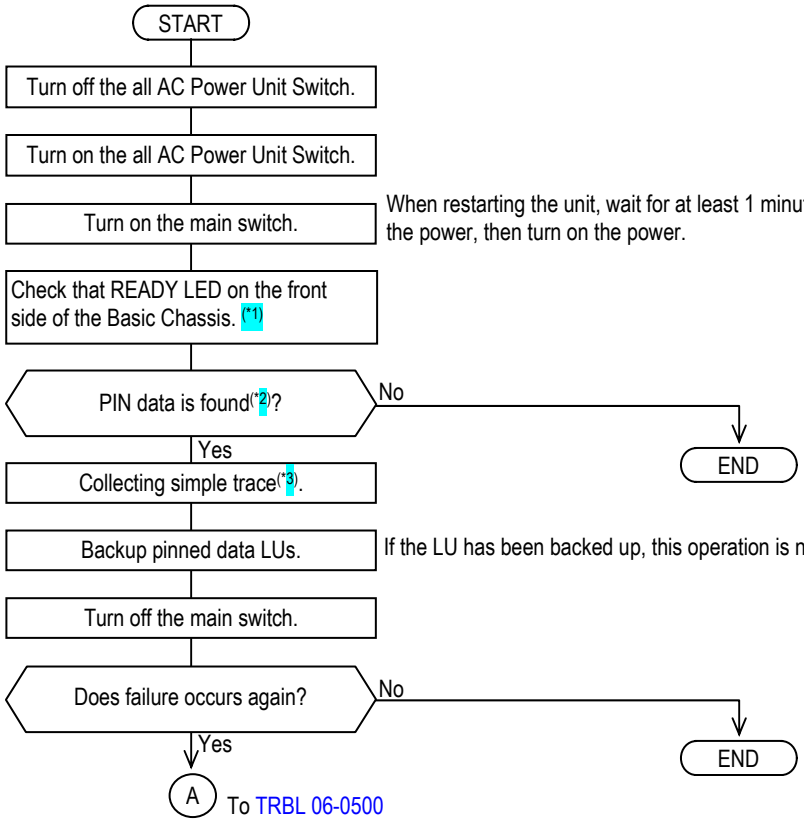
(The PIN data cannot be saved because a Cache memory or other failure occurs, and the planned shutdown cannot be performed)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W23000 PS OFF failed [CACHE ERR] :MANUAL/STRC

Date Time Detect Controller#

[Recovery method]

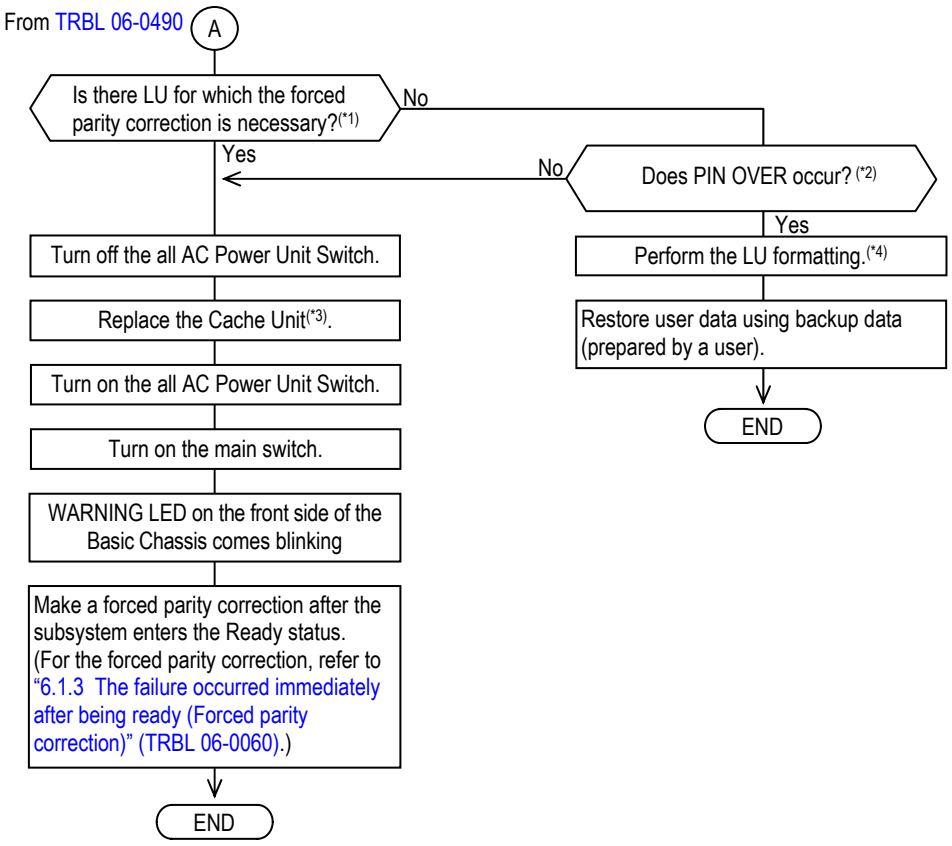


*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

*2 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*3 : For the Collection simple trace, refer to "7.3 Collecting simple trace" (TRBL 07-0040).

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*1 : The message code "W48000 Forced parity correction LU is detected" is displayed in the Information Message on the WEB, and the Warning LED (orange) on the basic chassis (front side of the subsystem) lights on or blinks.

*2 : The message codes "W41100", "W49100", "W49200", "W49300", "W49400", "W49500" and "W49600" are displayed in the Information Message on the WEB, and the Warning LED (orange) on the basic chassis (front side of the subsystem) lights on or blinks.

*3 : For the replacement of the Cache Unit, refer to the Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540).

*4 : For the LU format, refer to the System Paramter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280).

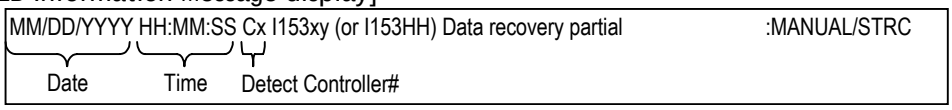
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6.1.8 Data recovery does not terminate normally : Case 1 (Read error)

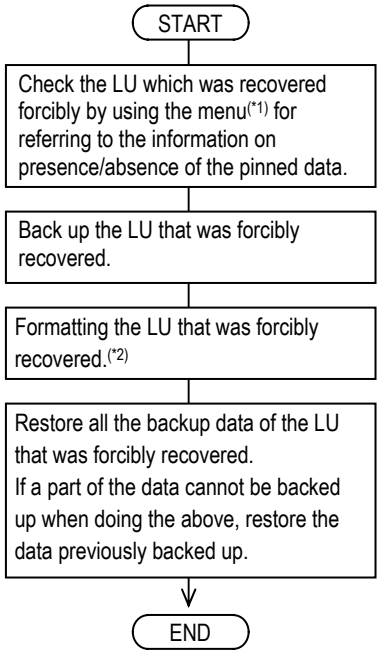
(Forced recovery was performed because a read error occurred in the copy source during a correction copy)

Forced recovery ····· When attempting to read the data which was recovered forcibly, it is reported as a read error.

[WEB Information Message display]



[Recovery method]



*1 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*2 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)). Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

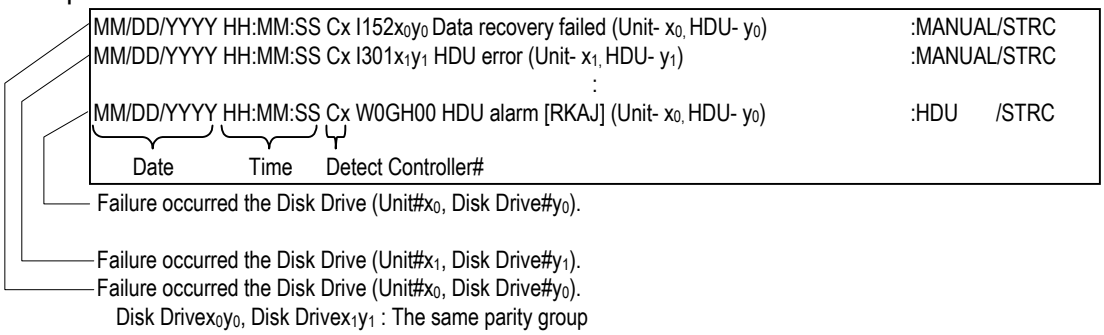
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6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)

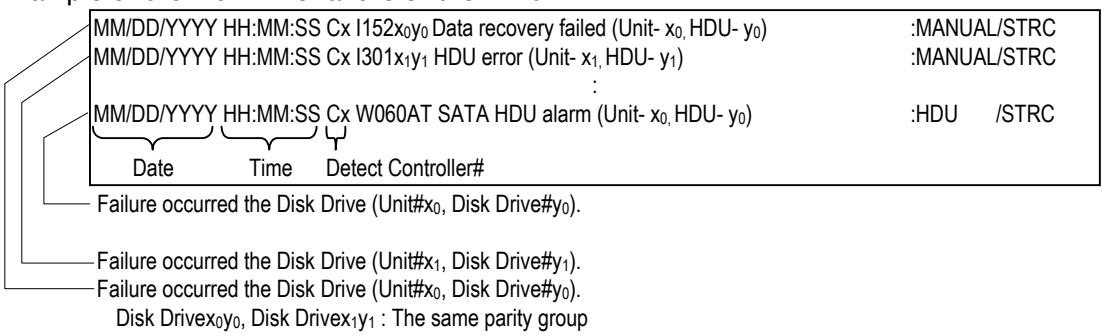
(The Disk Drive failures (two Disk Drive failures in the same parity group line, and three Disk Drive failures in case of the parity group of the RAID level 6) occurred in the Disk Drives of the copy source during the correction copy or the copy back, and the data restoration was terminated abnormally.)

[WEB Information Message display]

(a) Example of the Disk Drive failure of the RKAJ.

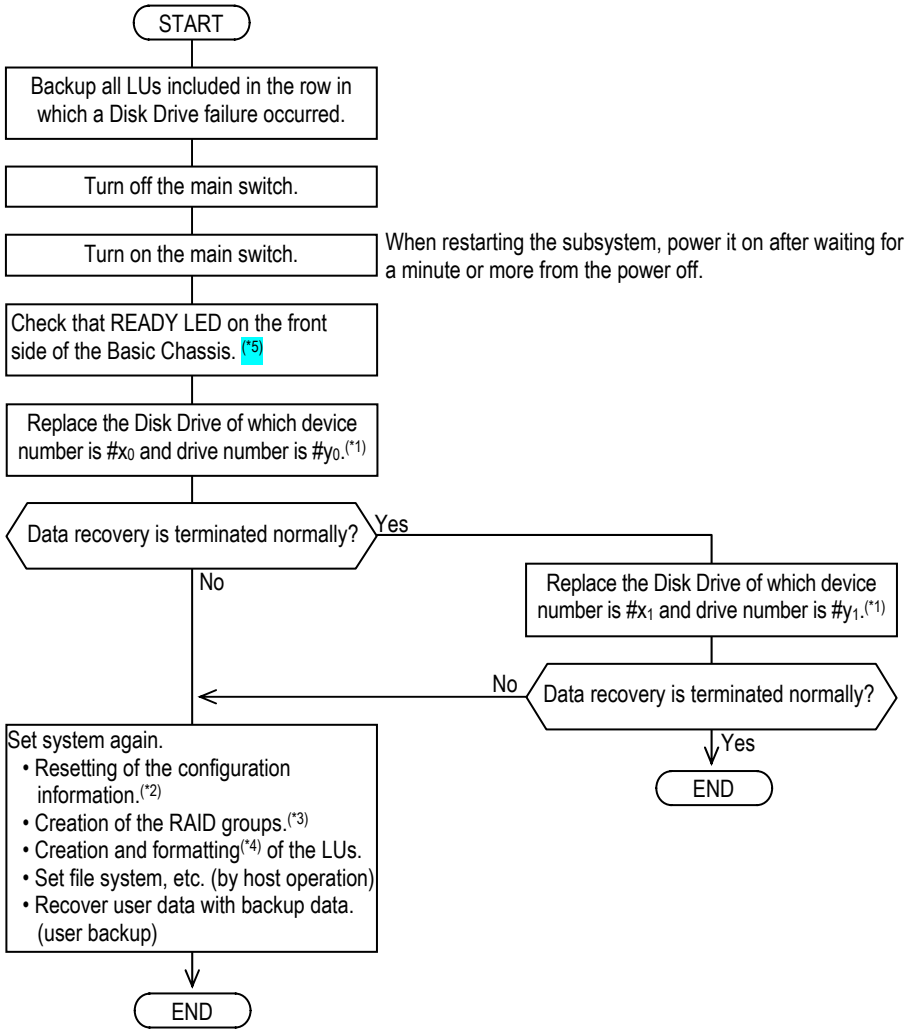


(b) Example of the Disk Drive failure of the RKAJAT.



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[Recovery method]



*1 : Any of W060xy, W060AT, W060HH, W0GG00 and W0GH00 is displayed as the message code of the Disk Drive failure. Also, when a failure occurs in the Spare Disk Drive in use, any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed as the message code. Refer to Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

*2 : Refer to System Parameter "4.2 Setting the subsystem configuration information" (SYSPR 04-0020).

*3 : Refer to System Parameter "3.2 RAID group setting" (SYSPR 03-0050).

*4 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)). Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

*5 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

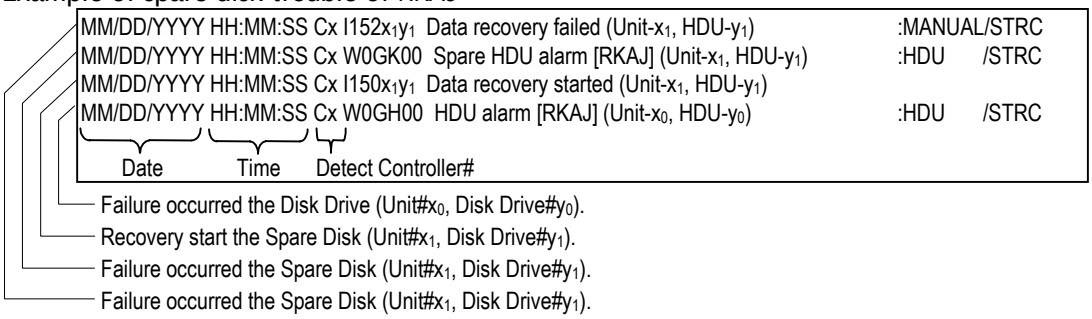
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6.1.10 Data recovery does not terminate normally : Case 3 (Spare Disk Drive failure)

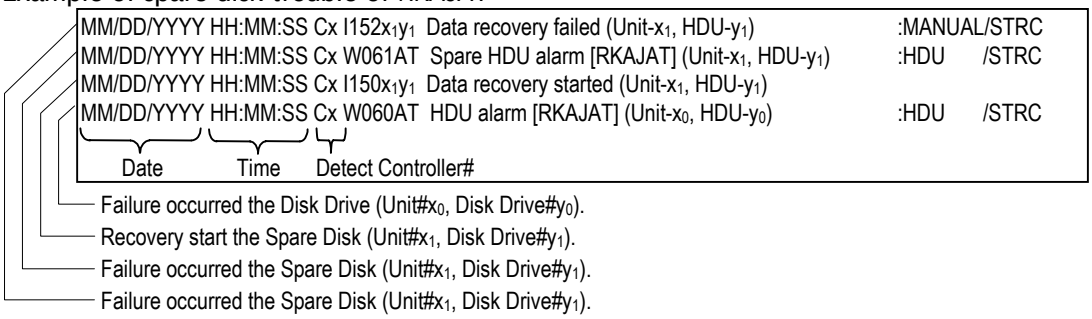
(A Spare Disk failure occurred while the correction is copied and the recovery failed.)

[WEB Information Message display]

(a) Example of spare disk trouble of RKAJ

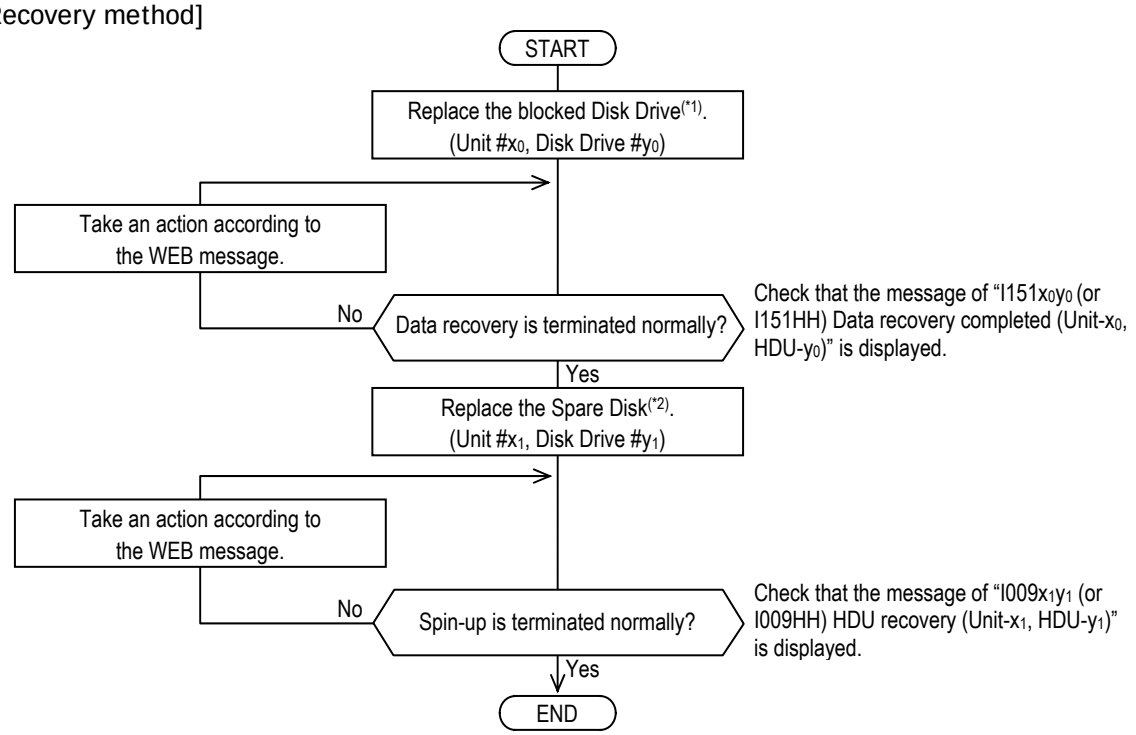


(b) Example of spare disk trouble of RKAJAT



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[Recovery method]



*1 : Any of W060xy, W060AT, W060HH, W0GG00 and W0GH00 is displayed as the message code of the Disk Drive failure. Also, when a failure occurs in the Spare Disk Drive in use, any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed as the message code. For the replacement of the Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

*2 : Any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed as the message code of the Spare Disk Drive failure. For the replacement of the Spare Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

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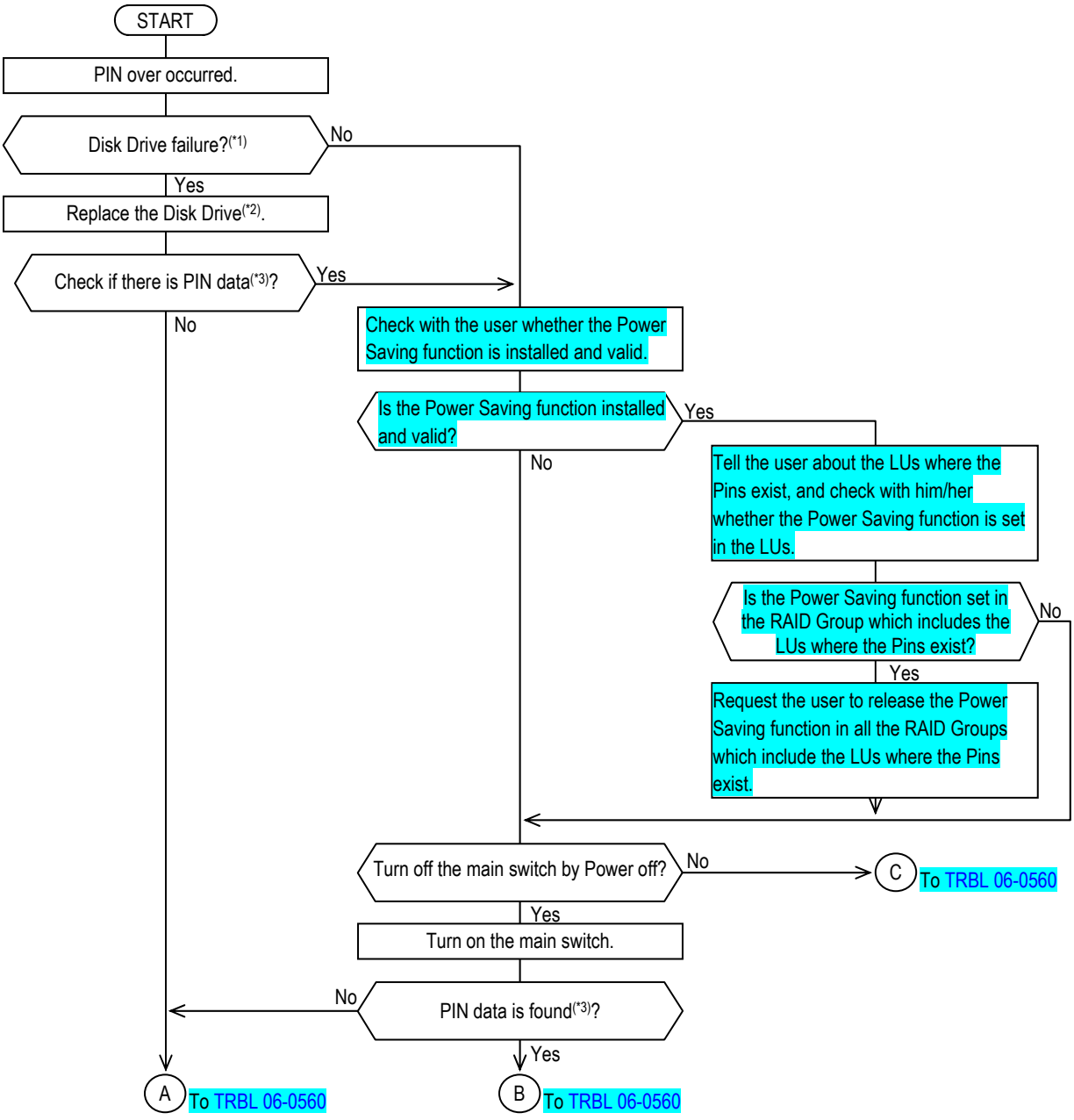
6.1.11 A failure occurred during operation : Case 1 (PIN over)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W41100 PIN over[PNLEVLOV] :MANUAL/STRC

Date Time Detect Controller#

[Recovery method]

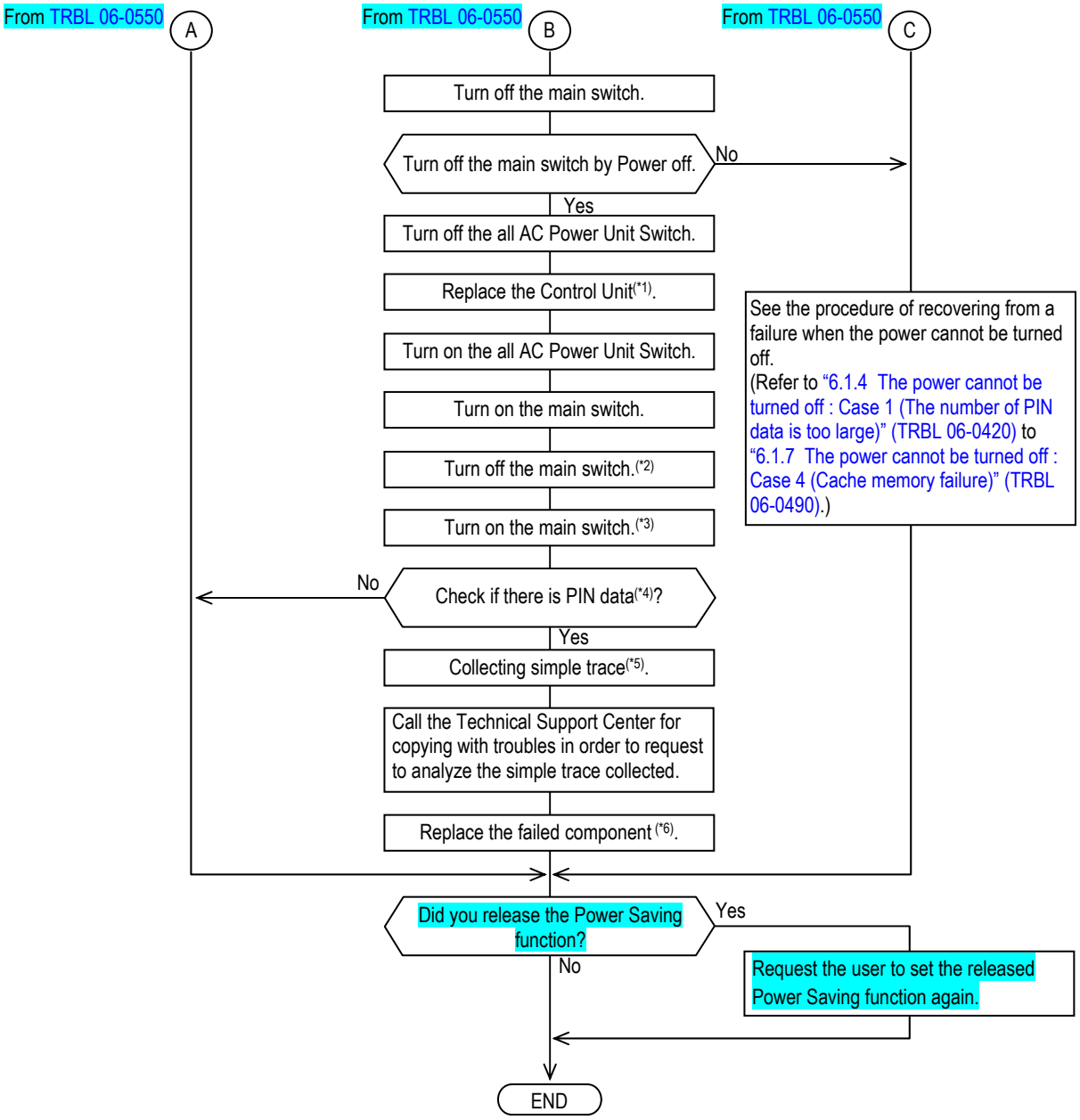


*1 : For checking a Disk Drive error, refer to "8.2 (2) Trouble analysis based on LED indication of Disk Drive" (TRBL 08-0160) or "Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000).

*2: For the replacement of the failed component, refer to the Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

*3 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

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*1: For the replacement of the failed component, refer to the Replacement "Chapter 2. Parts Replacement" (REP 02-0000)

*2 : To write pinned data on a drive, replace the Control Unit, and then execute the deliberate shutdown.

*3 : When restarting the subsystem, power it on after waiting for a minute or more from the power off.

*4 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*5 : For the Collection simple trace, refer to "7.3 Collecting simple trace" (TRBL 07-0040).

*6 : For the replacement of the failed component, refer to the Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

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6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)

[WEB Information Message display]

Any one of the following is displayed.

MM/DD/YYYY HH:MM:SS Cx W320xy LA error [errcode:LUN] (D-PT-00,CTL=x,TRNS-y)	:MANUAL/STRC
MM/DD/YYYY HH:MM:SS Cx W321xy LA error [errcode:LUN] (D-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W322xy LA error [errcode:LBA] (H-PT-00,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W323xy LA error [errcode:LBA] (H-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W324xy LA error [errcode:LUN] (D-PT-00,CTL=x,TRNS-y)	:MANUAL/STRC
MM/DD/YYYY HH:MM:SS Cx W325xy LA error [errcode:LUN] (D-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W326xy LA error [errcode:LBA] (H-PT-00,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W327xy LA error [errcode:LBA] (H-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W328xy LA error [errcode:LUN] (D_PT-02, CTL-x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY HH:MM:SS Cx W329xy LA error [errcode:LUN] (D_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W32Axy LA error [errcode:LBA] (D_PT-02, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W32Bxy LA error [errcode:LBA] (D_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W32Cxy LA error [errcode:LUN] (H_PT-02, CTL-x, TRNS-y)	:MANUAL/STRC
MM/DD/YYYY HH:MM:SS Cx W32Dxy LA error [errcode:LUN] (H_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W32Exy LA error [errcode:LBA] (H_PT-02, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W32Fxy LA error [errcode:LBA] (H_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W330xy LRC error [errcode:LUN] (D-PT-00,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W331xy LRC error(D-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W332xy LRC error (D_PT-02, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W333xy LRC error (D_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W334xy LRC error (H_PT-02, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W335xy LRC error (H_PT-03, CTL-x, TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W340xy LRC error(H-PT-00,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W341xy LRC error(H-PT-01,CTL=x,TRNS-y)	:MANUAL/ STRC
MM/DD/YYYY HH:MM:SS Cx W3360x Data transfer check error [SEGPOSERR] (CTL-x)	:MANUAL/DMP

Date Time Detect Controller#

x : Controller# (0-1)
y : Transfer direction (R : Read, W : Write)
xx : DMA#(0-1)

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[WEB Information Message display]

Any one of the following is displayed.

MM/DD/YYYY HH:MM:SS Cx W0G20x Parity generation LA error [DRR] (CTL-x)	:MANUAL/DMP
MM/DD/YYYY HH:MM:SS Cx HF0100 Data transfer check error [SEGPOSERR]	:MANUAL/DMP
MM/DD/YYYY HH:MM:SS Cx H20100 Parity generation LA error [DRR]	:MANUAL/DMP
MM/DD/YYYY HH:MM:SS Cx HD21xx Host transfer DMA error over (DMA-xx)	:MANUAL/DMP
MM/DD/YYYY HH:MM:SS Cx HD27xx Drive transfer DMA error over (DMA-xx)	:MANUAL/DMP

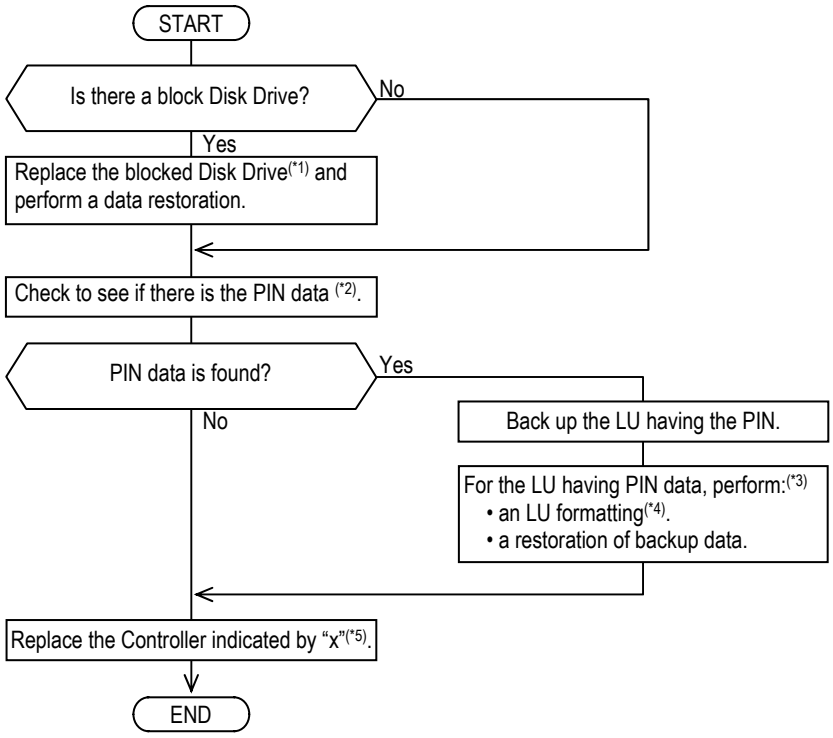
Date Time Detect Controller#

x : Controller# (0-1)

y : Transfer direction (R : Read, W : Write)

xx : DMA#(0-1)

[Recovery method]



*1 : For the replacement of the Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

*2 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*3 : This operation is required because an LA/LRC error occurs even after the controller has been replaced if the LA/LRC data remains in the cache as PIN data.

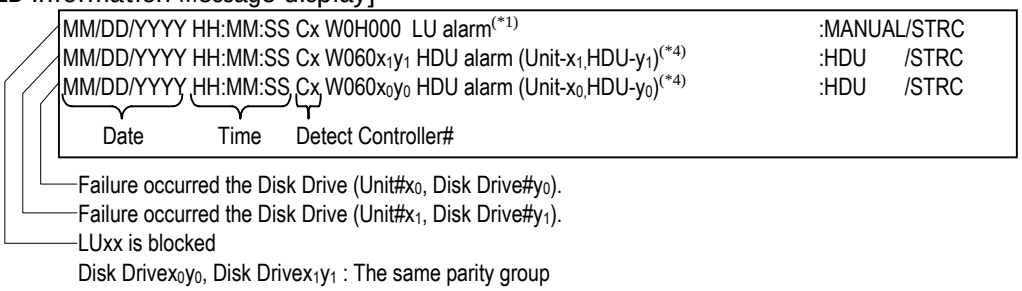
*4 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F] Formatting LU" (SYSPR 03-0280)). Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

*5 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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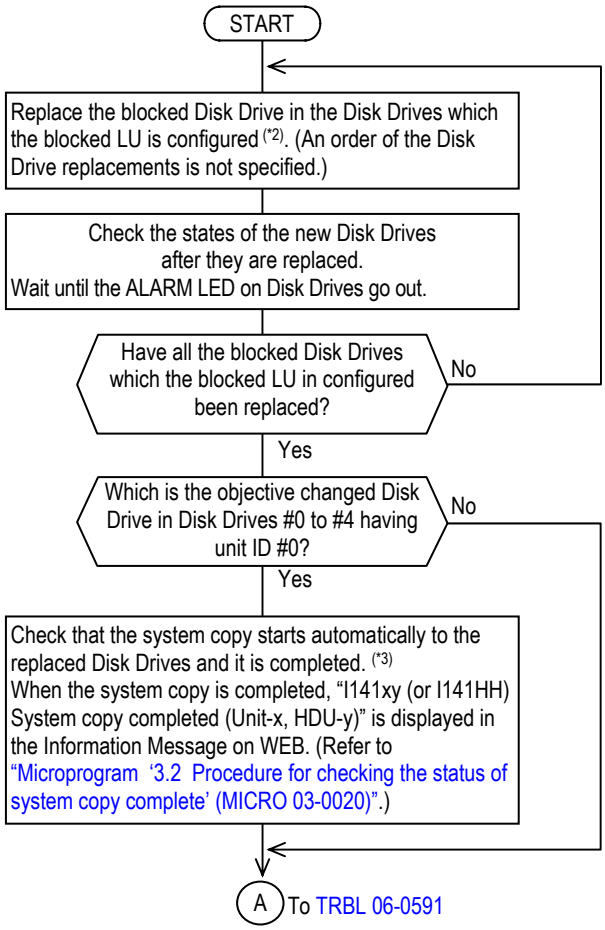
6.1.13 A failure occurred during operation : Case 3 (LU blockade)

[WEB Information Message display]



[Recovery method]

- The recovery operation must be reformed with the subsystem power turned on.



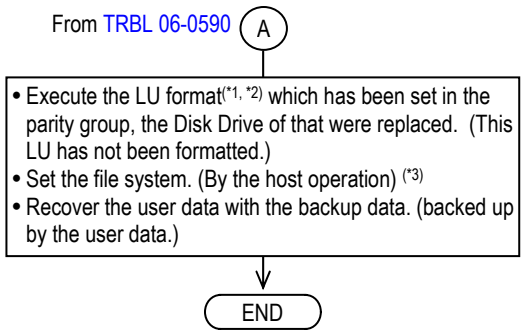
*1 : The blocked LU number is not displayed, with the message code "W0H000 LU alarm". Check the blocked LU in the Storage Navigator Modular.

*2 : For the replacement of the Disk Drive, refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).

*3 : The system copy is completed in approximately 1 minute 30 seconds for each Disk Drive.
Select [Tool] - [Configuration Setting] – [Restore Options] in the Array System Viewer window of Storage Navigator Modular, and if [Disk Drive Restore Options] is manual, the system copy must be executed manually. In this case, check that the system copy is completed after performing the restoration of the system information. Recover the system information with the maintenance function of the Storage Navigator Modular. For the operating procedure, refer to the Addition/Subtraction/Relocation "1.4.3 (5) Restoring the system information" (ADD 01-0360).

*4 : Any of W060AT, W060HH, W0GG00 and W0GH00 may be displayed other than W060xy. Also, when the Spare Disk Drive in use is blocked, any of W061xy, W061AT, W061HH, W0GJ00 and W0GK00 is displayed.

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*1 : For the operating procedure, refer to the System Parameter "3.3 Setting of LU" (SYSPR 03-0140).

*2 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU Procedure ③-F Formatting LU" (SYSPR 03-0280)).
Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

*3 : Request the customer and the SE for the work.

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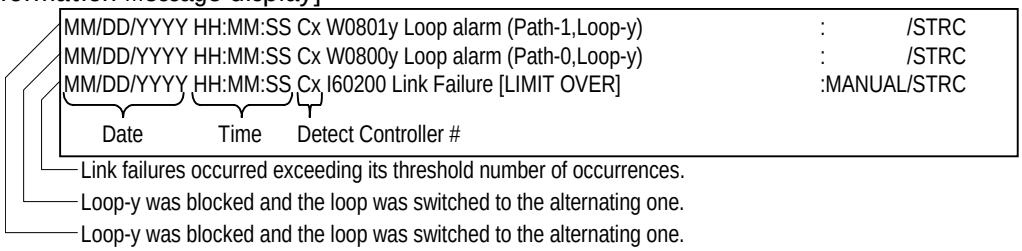
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6.1.14 A failure occurred during operation : Case 4 (Loop failure)

A loop failure occurred, however, the failed part cannot be located

[WEB Information Message display]



When the codes, W080xy and I5Y400 to I5Y700, are indicated in the above messages, follow "(4) Actions to be taken when one of the message codes I5Y400 through I5Y700 is displayed" (TRBL 06-1090) for the maintenance.

When error messages other than W080xy Loop alarm (Path-x, Loop-y) occur at the same time, give priority to the recovery methods of those messages for the maintenance.

When the failed part cannot be identified because the above message is not displayed, go to Step "(1) Procedure for Recovery from Loop Failure" (TRBL 06-0680) and take a recovery action explained in it. When a subsystem down has occurred in the case of the dual controller configuration, go to Step "(2) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the dual controller configuration)" (TRBL 06-0830). When a subsystem down has occurred in the case of the single controller configuration, go to Step "(3) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)" (TRBL 06-1020) and take a recovery action explained in it.

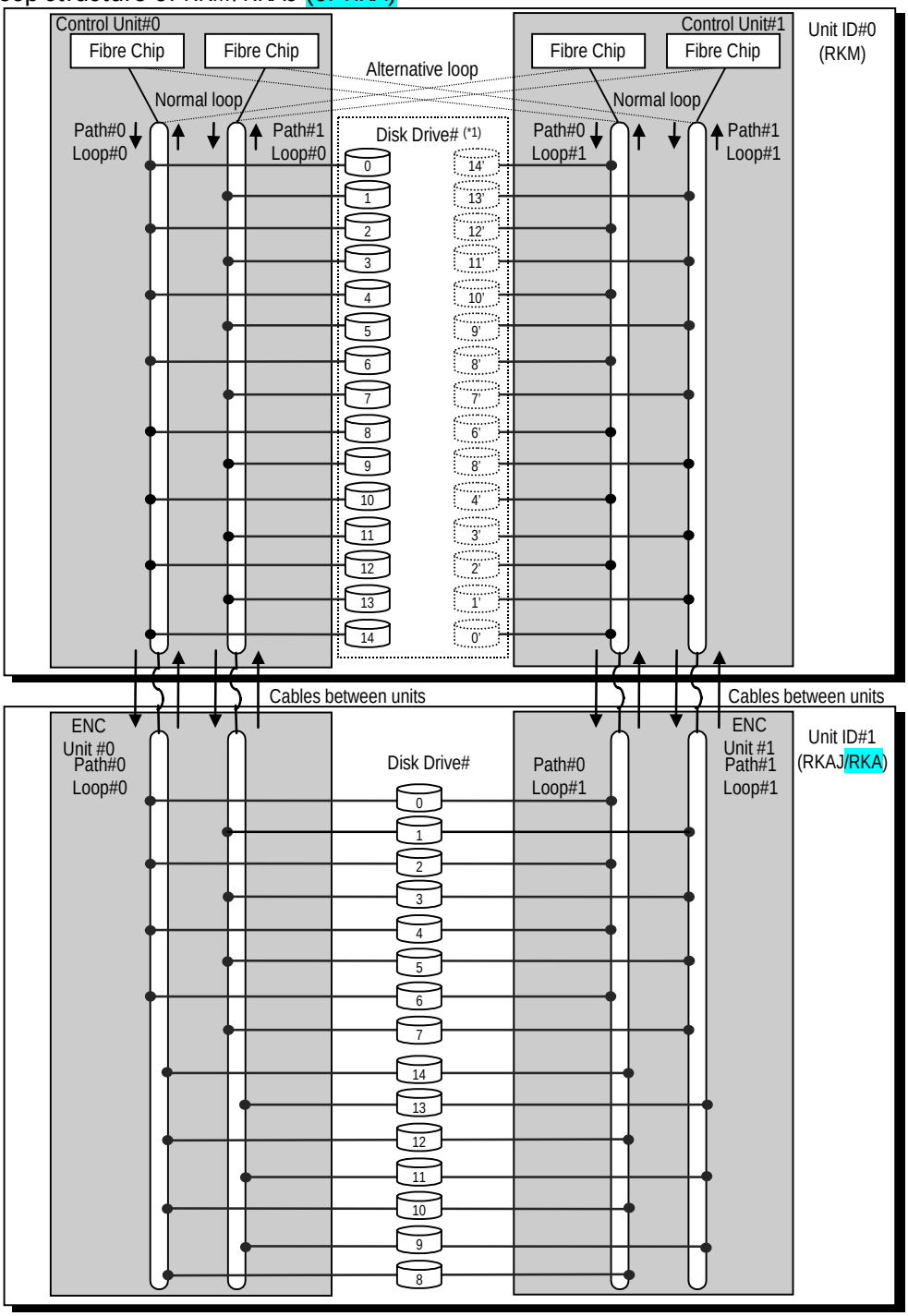
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- Explanation of a Fibre Channel interface failure between a Control Unit and HDDs
  The Fibre Channel interface between a Control Unit and HDDs connects three points, that is, a controller, ENCs and HDDs. These three points compose a big loop.

	Control Unit to be used normally	Usage of loop (For HDDs)	RKM+RKAJ/RKA × 14	RKM+RKAJ AT× 14
			Number of HDDs in the same loop	
LOOP #0	Control Unit #0	Path #0	Max. 120	Max. 113
		Path #1	Max. 105	Max. 112
LOOP #1	Control Unit #1	Same as the above	Same as the above	Same as the above
	Control Unit to be used normally	Usage of loop (For HDDs)	RKS+RKAJ × 6	RKS+RKAJAT × 6
			Number of HDDs in the same loop	
LOOP #0	Control Unit #0	Path #0	Max. 56	Max. 53
		Path #1	Max. 49	Max. 52
LOOP#1	Control Unit #1	Same as the above	Same as the above	Same as the above
	Control Unit to be used normally	Usage of loop (For HDDs)	RKXS+RKAJAT × 6	
			Number of HDDs in the same loop	
LOOP #0	Control Unit #0	Path #0	Max. 105	
LOOP#1	Control Unit #1	Same as the above	Same as the above	
	Control Unit to be used normally	Usage of loop (For HDDs)	RKH+RKAJ/RKA × 30	RKH+RKAJ/RKA × 2+RKAJAT × 28
			Number of HDDs in the same loop	
LOOP #0	Control Unit #0	Path #0	Max. 120	Max. 113
		Path #1	Max. 105	Max. 112
		Path #2	Max. 120	Max. 113
		Path #3	Max. 105	Max. 112
LOOP#1	Control Unit #1	Same as the above	Same as the above	Same as the above

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- Loop structure of RKM/RKAJ (or RKA)



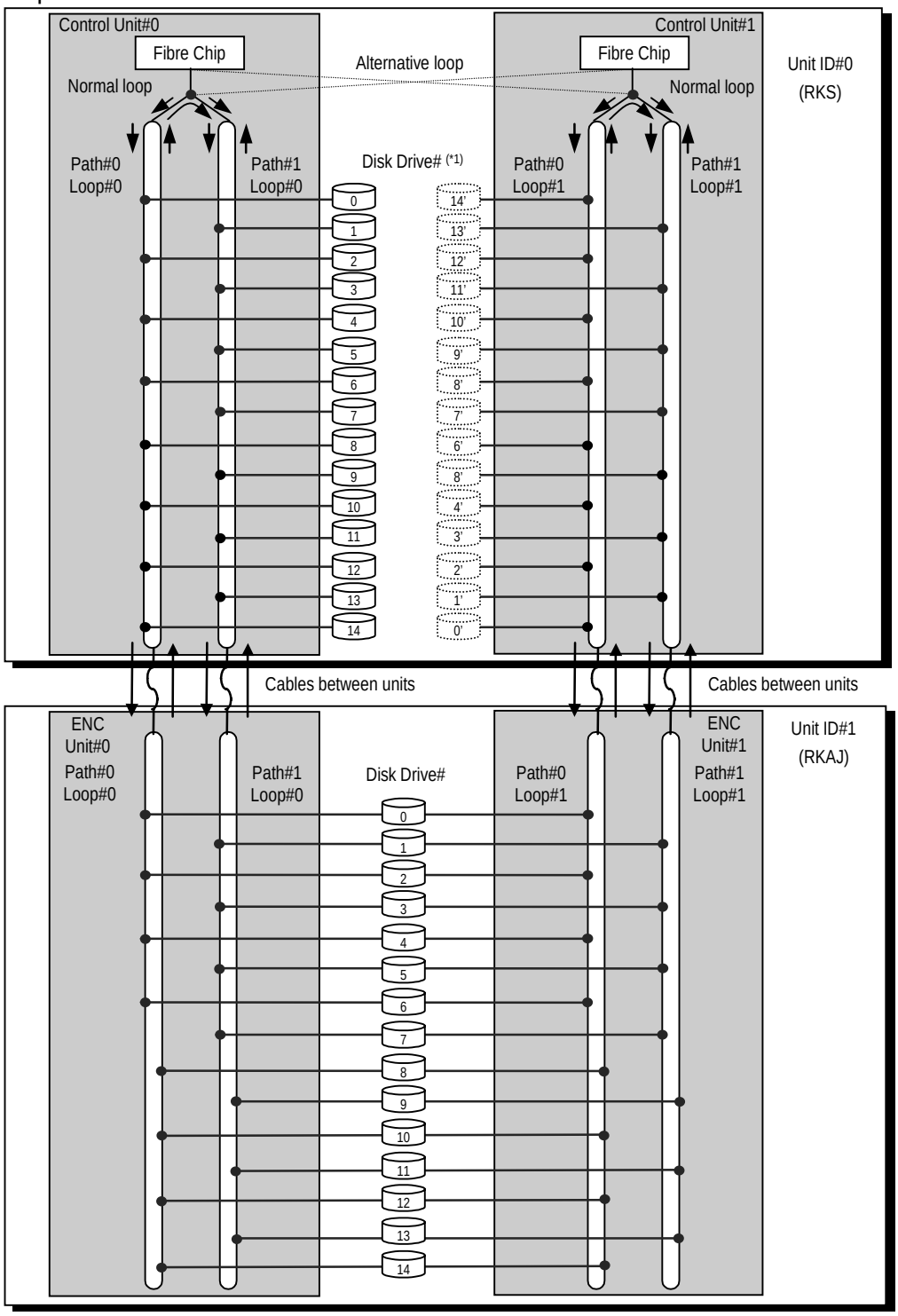
*1 : The Disk Drive #0 and the Disk Drive #0' is the same Disk Drive (the Disk Drive #1 to #14 and the Disk Drive #1' to #14' are also the same).

*2 : The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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- Loop structure of RKS/RKAJ



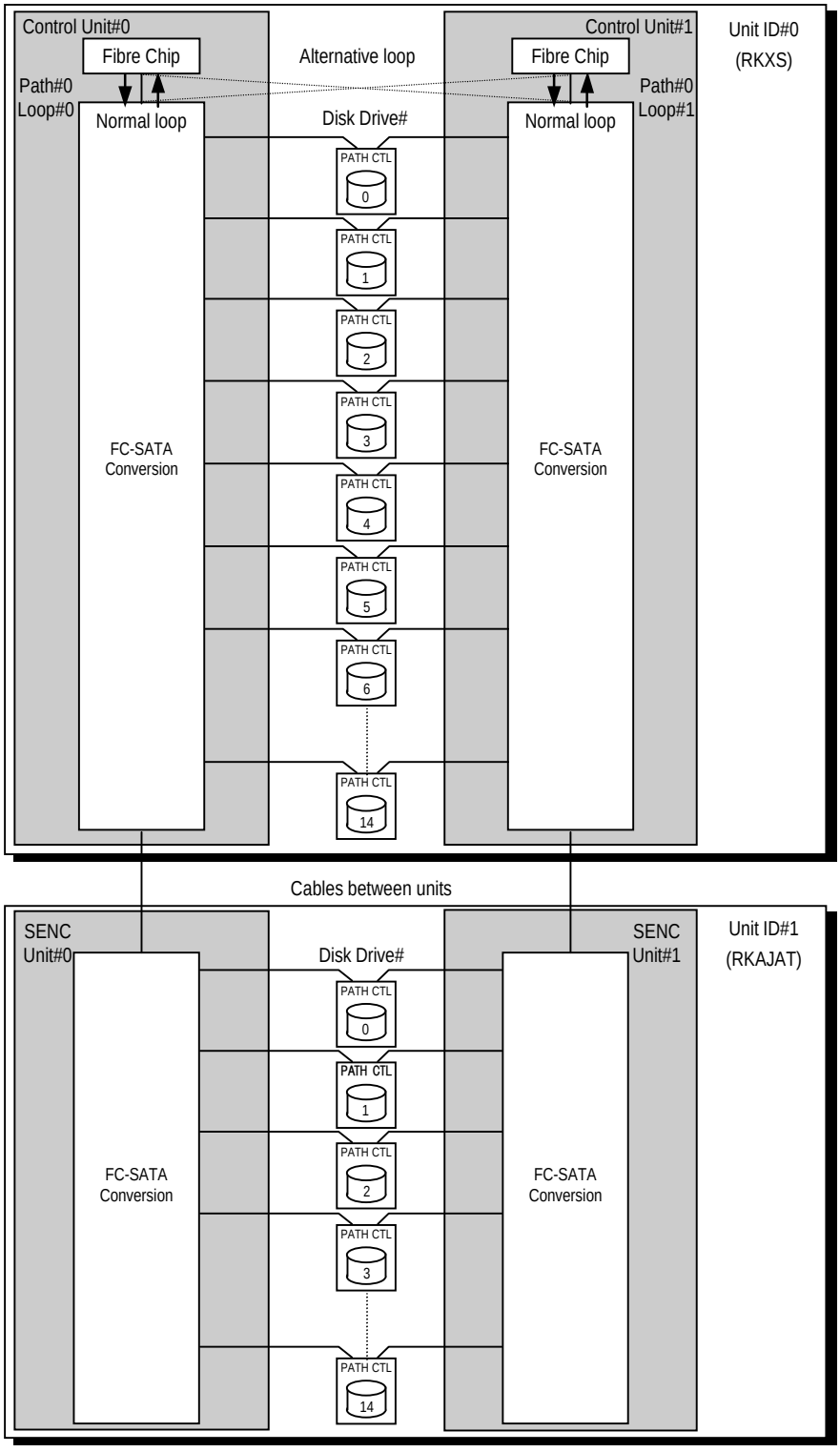
*1 : The Disk Drive #0 and the Disk Drive #0' is the same Disk Drive (the Disk Drive #1 to #14 and the Disk Drive #1' to #14' are also the same).

*2 : The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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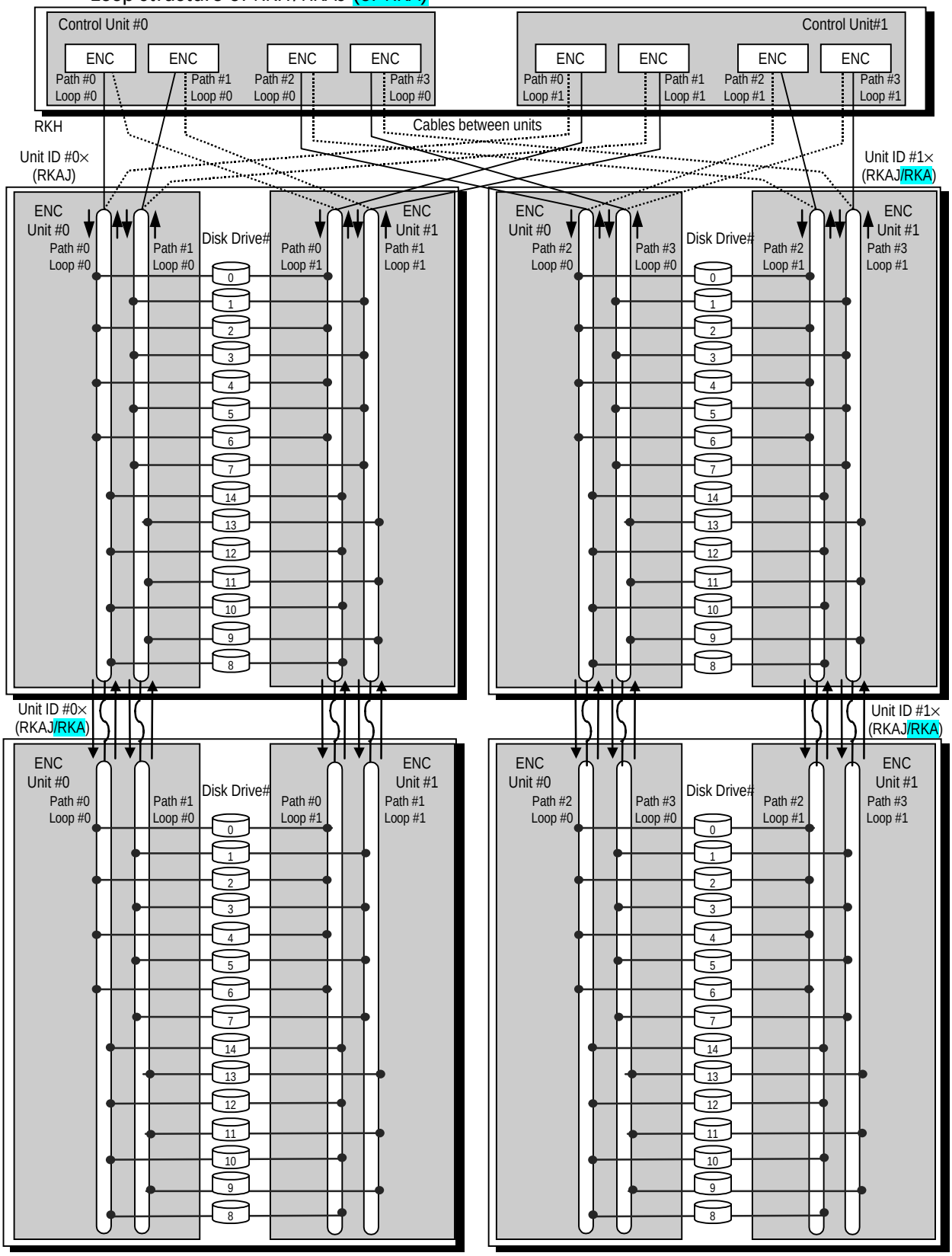
- Loop structure of RKXS/RKAJAT



At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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- Loop structure of RKH/RKAJ (or RKA)



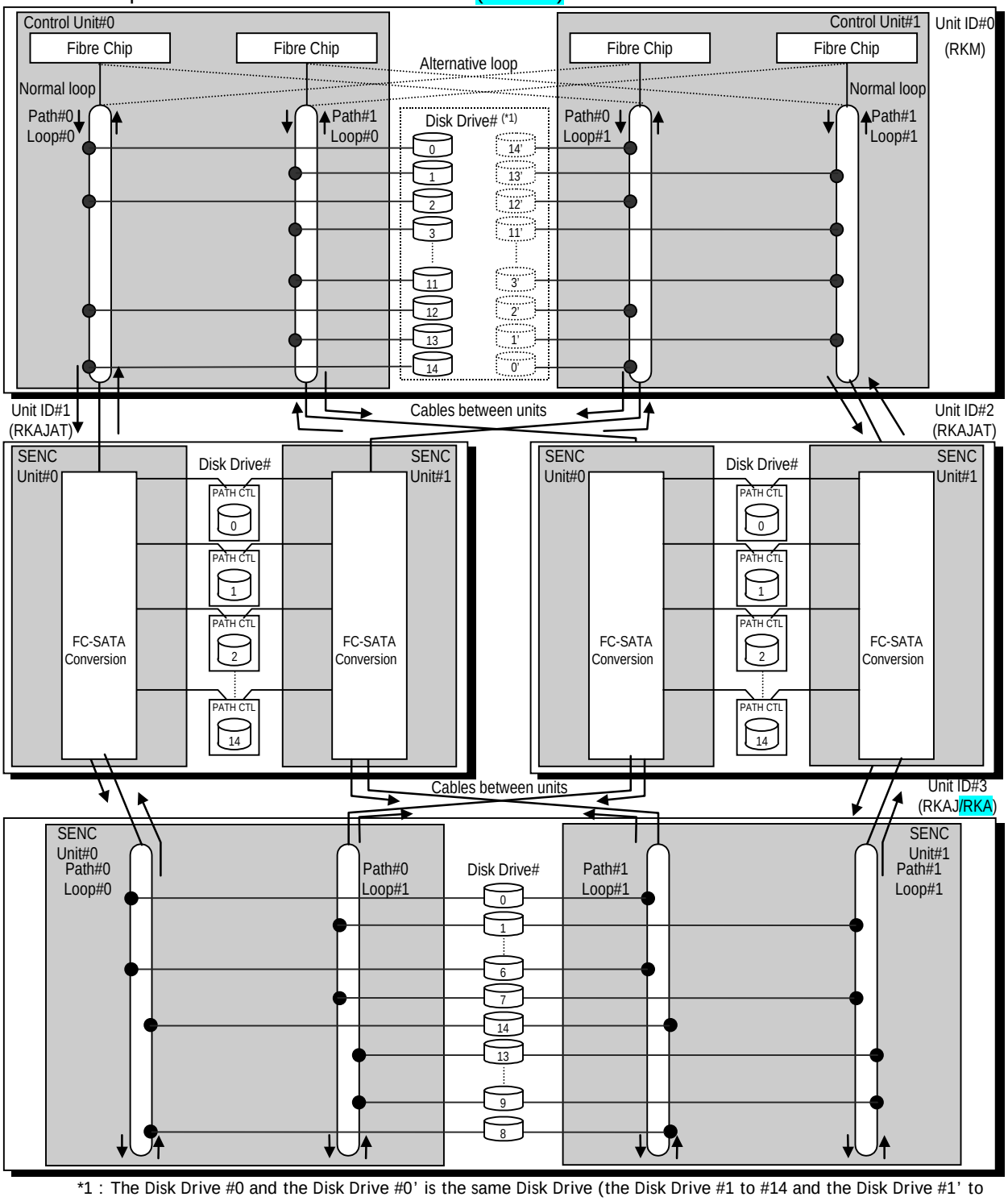
*1 : The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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- Loop structure of RKM+RKAJATs+RKAJs (or RKAs)



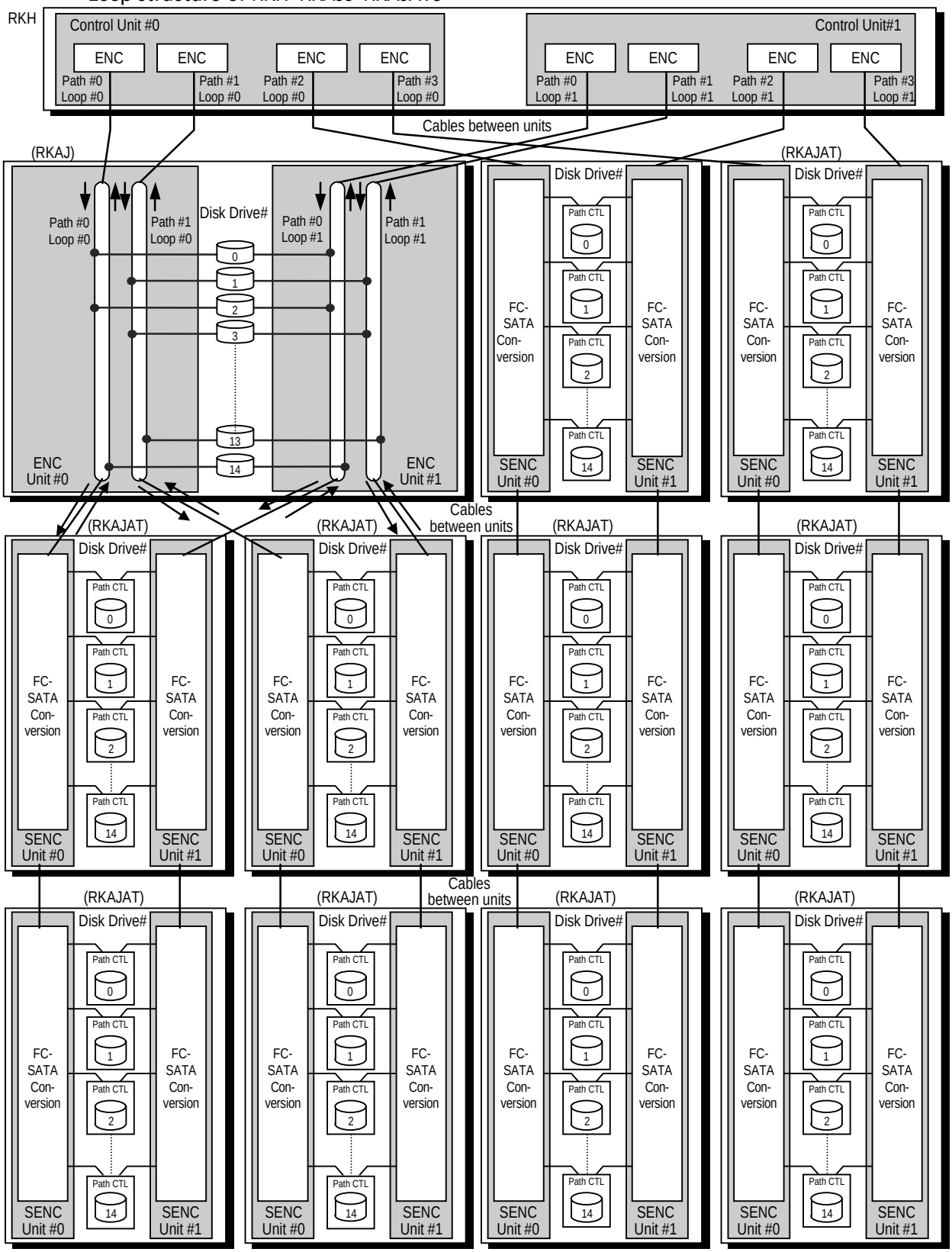
*1 : The Disk Drive #0 and the Disk Drive #0' is the same Disk Drive (the Disk Drive #1 to #14 and the Disk Drive #1' to #14' are also the same).

*2 : The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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- Loop structure of RKH+RKAJs+RKAJATs



*1 : The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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At the time of the Loop failure occurrence, the Control Unit, which detected the failure, uses the PATH used in another system Control Unit (it is the PATH of Loop #1 when seeing from the Control Unit #0, and Loop #0 when seeing from the Control Unit #1) as the alternate PATH.

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When a Fibre Channel interface failure occurs, all of these components are suspected. Therefore, identify the failed part by means of a Web message.

[Display of the WEB Information Message window]

MM/DD/YYYY HH:MM:SS Cx I1C1xy Loop diagnostic end (PATH-x, LOOP-y)	An automatic diagnosis of a failed part in the loop (Path-x, Loop-y), in which the failure occurred, was completed.
MM/DD/YYYY HH:MM:SS Cx I603xy Obstacle part unknown (PATH-x, LOOP-y)	The failed part could not be identified though an automatic diagnosis of the loop (Path-x, Loop-y), in which the failure occurred, was done.
MM/DD/YYYY HH:MM:SS Cx I1C0xy Loop diagnostic start (PATH-x, LOOP-y)	An automatic diagnosis of a failed part in the loop (Path-x, Loop-y), in which the failure occurred, was started.
MM/DD/YYYY HH:MM:SS Cx W0801y Loop alarm (PATH-1, LOOP-y)	Detach the Loop-y and change the loop to the alternating loop.
MM/DD/YYYY HH:MM:SS Cx W0800y Loop alarm (PATH-0, LOOP-y	Detach the Loop-y and change the loop to the alternating loop.
MM/DD/YYYY HH:MM:SS Cx I60200 Link Failure [LIMIT OVER]	Link failures have occurred more than its threshold value.

It diagnoses automatically in the Loop test after W080xy Loop alarm. Then the path in which the loop failure occurred is shown in the message (I1C0xy/I1C1xy).

Example:

```
MM/DD/YYYY HH:MM:SS C0 I1C110 Loop diagnostic end (Path-1,Loop-0)
MM/DD/YYYY HH:MM:SS C0 I60310 Obstacle part unknown (Path-1,Loop-0)   :MANUAL/STRC   } ①
MM/DD/YYYY HH:MM:SS C0 I1C010 Loop diagnostic start (Path-1,Loop-0)
MM/DD/YYYY HH:MM:SS C0 W06013 HDU alarm (Unit-1,HDU-3)               :HDU     /STRC   ②
MM/DD/YYYY HH:MM:SS C0 W08000 Loop alarm (Path-0,Loop-0)             :MANUAL/STRC
MM/DD/YYYY HH:MM:SS C0 W08010 Loop alarm (Path-1,Loop-0)             :MANUAL/STRC
```

In this case, a loop failure occurred in the loop, Loop-0 and Path-1 (on the CTL-0 side, for HDDs with odd numbers), shown in ①.

When error messages other than W080xy Loop alarm (Path-x, Loop-y) occur at the same time, give priority to the recovery methods of those messages for the maintenance.

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(1) Procedure for Recovery from Loop Failure

If a loop failure (W080xy) occurs, you can open the diagnostic window of the Loop Failure Detection Function using a Web browser and execute the loop failure detection function to identify the failed HDU(s).

(a) Conditions for and notes on executing the Loop Failure Detection Function

(i) Do not execute the Loop Failure Detection Function while an LU formatting is in progress.

(ii) Do not perform the LU formatting while the Loop Failure Detection Function is being executed.

(iii) Do not pull out/insert a replacement component while the Loop Failure Detection Function is being executed.

Replace failure parts when single execution of the Loop Failure Detection Function is completed.

(Replacement failure parts: Disk Drive (Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)), Backup Battery Unit (Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)), Power Unit (Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)), Fan Assembly (Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)), Control Unit (Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)), ENC Unit (Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)), and SENC Unit (Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830))

(iv) Procedure for recovery from a new failure occurs while the recovery operation using the Loop Failure Detection Function is in progress.

Make a recovery from the new failure preferentially. Execute the maintenance work of the Loop Failure Detection Function again from the start after another failure is recovered.

[Occurrence of a new failure]

- Interrupt the recovery operation by means of the Loop Failure Detection Function once.
- Perform a recovery action against the new failure (usual recovery procedure).
- Perform the recovery operation by means of the Loop Failure Detection Function again from the beginning.

(v) Time required to execute the Loop Failure Detection Function (Required time per HDU diagnosis)

Normally, single execution of the Loop Failure Detection Function finishes in ten seconds.

(vi) Use of the "Check List for Failed HDU Isolation".

When performing the recovery operation using the Loop Failure Detection Function, do it recording execution results of the Loop Failure Detection Function in the "(f) Check List #1 for Failed HDU Isolation" (TRBL 06-0980) and "(g) Check List #2 for Failed HDU Isolation (for all HDUs)"(TRBL 06-0990) appended to the Maintenance Manual.

To use the Check List #1 and #2 for Failed HDU Isolation, make as many copies of it as necessary for the recovery operation.

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(vii) Result of Loop Failure Detection Function Execution.

- The diagnostic results by the loop failure detection function appear as shown below in the upper right of the diagnostic window of the Loop Failure Detection Function or in the Information Message field.
  When the diagnosis result is OK : I5Z5xy Failure check OK (Path-x, Loop-y)
  When the diagnosis result is not OK : I5Z6xy Failure check NG (Path-x, Loop-y)
- When the result of the execution of the Loop Failure Detection Function is shown as "check OK", check the [OK] check box of the "Check List for Failed HDU Isolation".

(viii) When error messages other than W080xy Loop alarm (Path-x, Loop-y) occur at the same time, give priority to the recovery methods of those messages for the maintenance. Execute the maintenance work of the Loop Failure Detection Function again from the start after another failure is recovered.

(ix) Do not turn off the AC Power Unit Switch of the subsystem while the Loop Failure Detection Function is being executed.
If the AC Power Unit Switch of the subsystem is turned off while the Loop Failure Detection Function is being executed, turn off the AC Power Unit Switch of the added RKAJ/RKAJAT/RKA one, turn it on again, then turn on the AC Power Unit Switch of the subsystem.

(b) How to open the "Loop Failure Detection Function"

(i) Connect a PC and subsystem via a LAN (in order to use the WEB function). (System Parameter "1.1 (2) Connecting the LAN cross cable" (SYSPR 01-0030))

(ii) Connect to the website, http://subsystem IP address(‡1)/drvdiag.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

‡1 : As for the IP address of the subsystem, refer to "3.1 (4) Procedure to connect portable maintenance PC to WEB" (TRBL 03-0010).

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(c) Procedure for executing the Loop Failure Detection Function

(c-1) Confirming occurrence of a loop failure / Identifying a failed component using the Loop Failure Detection Function

- Make sure that "W080xy Loop Alarm (Path # xx, Loop # xx) (Loop failure)" is displayed in the "Information Message" window. Enter the Path # and Loop # shown in the message in the check list.
- Execute each procedure for identifying the failed component by means of the Loop Failure Detection Function twice to make the identification of the failed component certain. (Sets of two check boxes, the 1st diagnosis result and 2nd diagnosis result, are prepared in the Check List for Failed HDU Isolation.)

(i) Identifying Failed Loops and Paths

① Identify the failed loop in which the failed HDU is installed by executing the Loop Failure Detection Function for each Path # and Loop # in the state in which all the HDUs are connected to the loop.

② Execute the Loop Failure Detection Function for both of the Loop-0 and Loop-1 of the path observed to have the loop failure.

Diagnosis for Loop Failure Detection Function window	When "Wxxxx Loop Alarm (Path #0, Loop #0)" is displayed.
• Specify the [PATH Number] and [LOOP Number]. • Click the [Check ALL] button. (All the HDUs are connected within the Loop.) • Click the [Diagnosis Start] button.	• Specify the [PATH Number] as [PATH 0]. • Specify the [LOOP Number] as [LOOP 0].

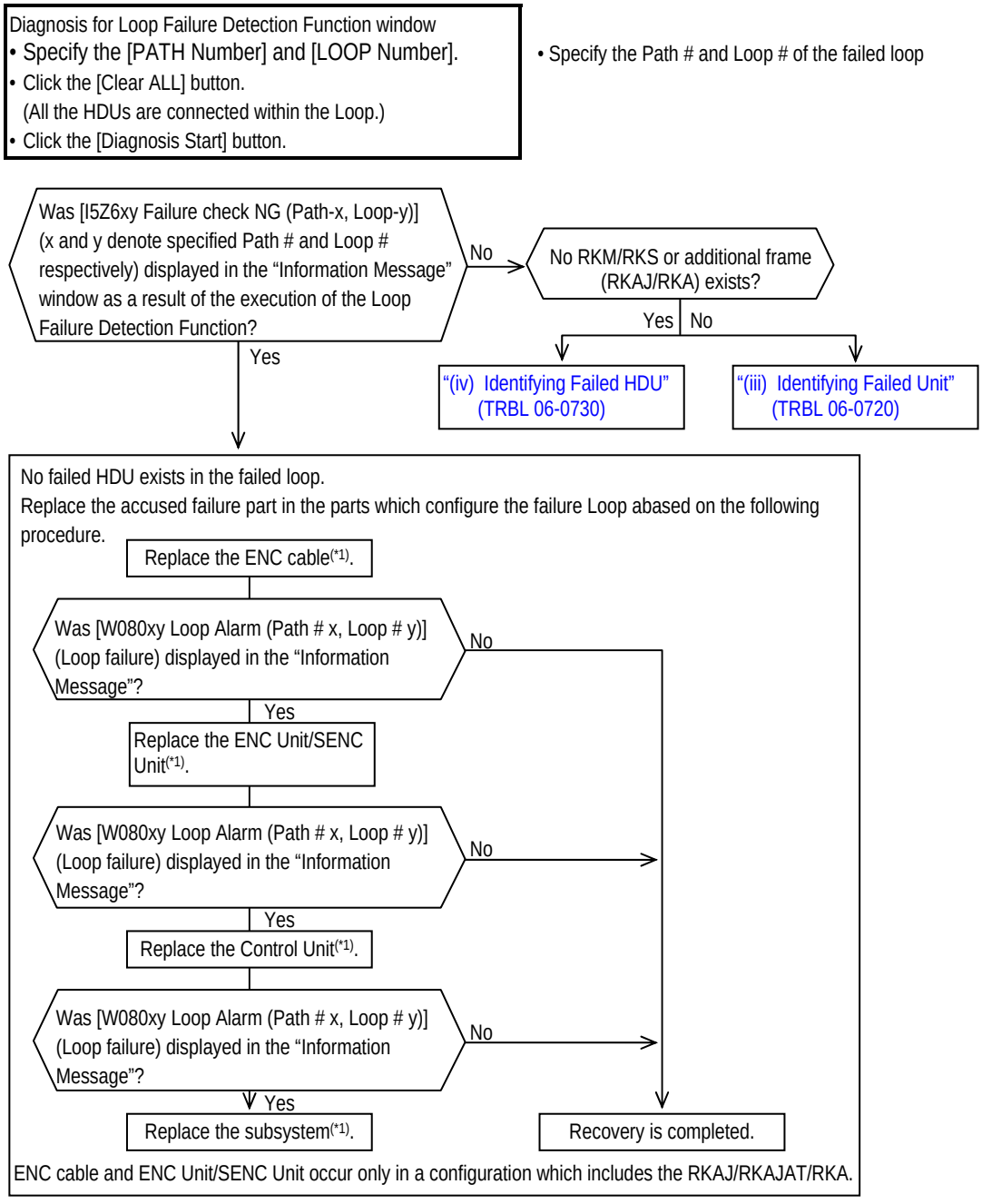
③ When [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window as a result of the execution of the Loop Failure Detection Function, the Path # and Loop # shown in parentheses represent the failed loop. Enter the failed loop identified in the check sheet.

NOTE : When the failed loop cannot be identified, identify the failed HDU by executing the Loop Failure Detection Function for all the HDU following the procedure explained in Step "(c-2) (i) Identifying Failed HDU" (TRBL 06-0750). (When doing that, use the Check List #2 for Failed HDU Isolation (For checking all HDUs).)

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(ii) Judging whether or not the HDU caused the failure

① Confirm that the failed HDU exists in the failed loop concerned by executing the Loop Failure Detection Function bypassing all the HDUs in the failed loop (separating them from the loop).



*1 : For the replacement of the failed component, refer to the Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

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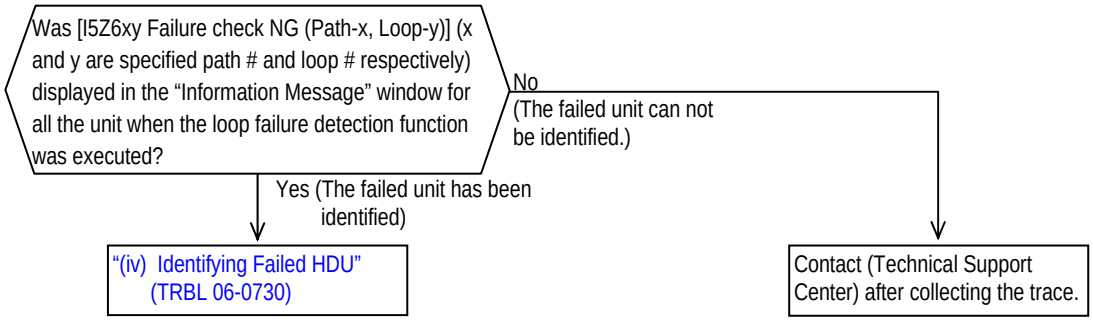
(iii) Identifying Failed Unit

① Identify the unit in which the failed HDU is installed by executing the Loop Failure Detection Function for each of all the units.

- Execute the Loop Failure Detection Function for each unit once at a time
- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button. (Clear the conditions for the preceding check.)
- Check all the HDU# check boxes of the Unit-x.
- Click the [Diagnosis Start] button

• Specify the Path # and Loop # of the failed loop.

② Enter the unit number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet. (It is determined that the failed component exists in the failed unity.)



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(iv) Identifying Failed HDU

① Identify a failed HDD by applying the loop failure detection function to each HDD in the failed unit, which was identified in Step (iii), one by one.

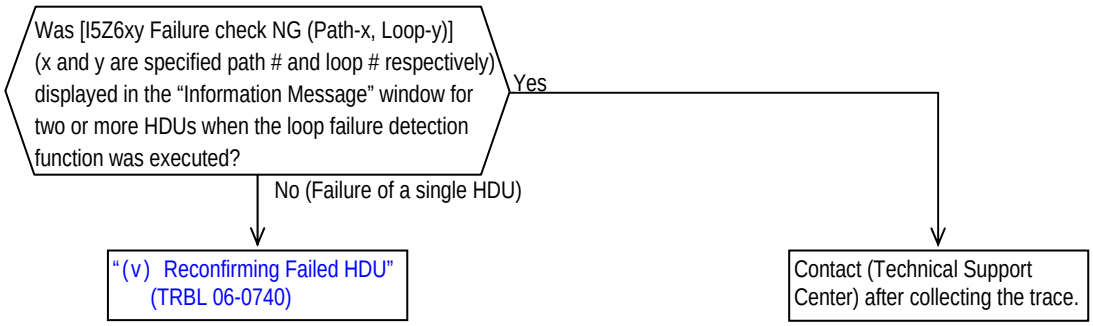
- Execute the Loop Failure Detection Function for all the HDUs of the Unit-x.

Diagnosis for Loop Failure Detection Function window

- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button.
  (Clear the conditions for the preceding check.)
- Check the HDU# check box of the Unit-x.
- Click the [Diagnosis Start] button.

• Specify the Path # and Loop # of the failed loop.

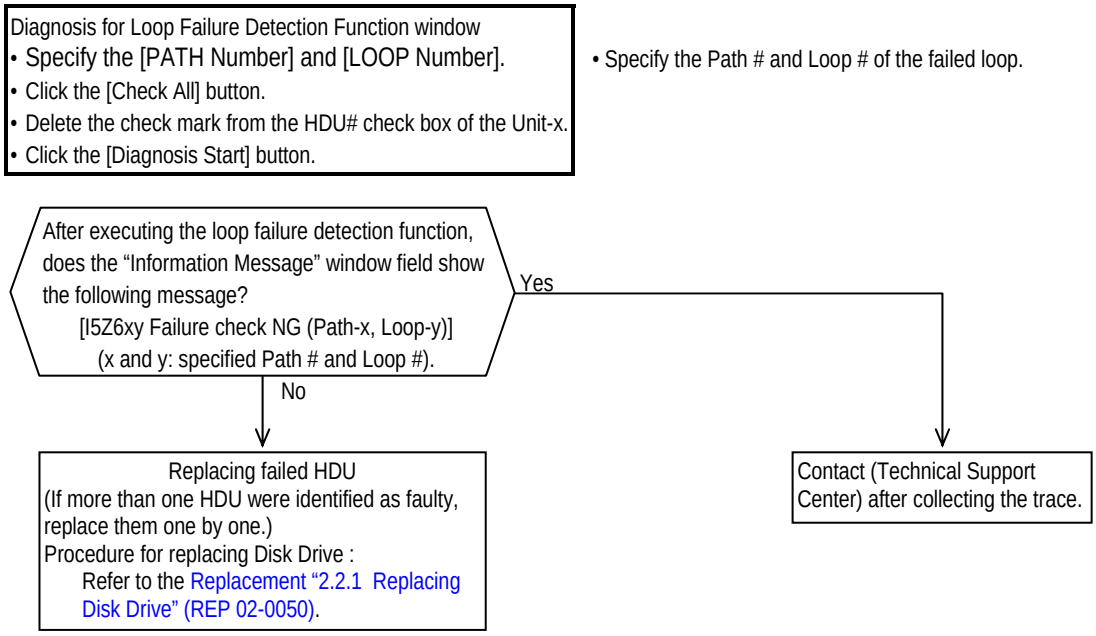
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet.



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(v) Reconfirming Failed HDU

① Execute the loop failure detection function in the state in which only the HDU, which was identified as a cause of the failure in Step (iv), is disconnected from the loop and verify that no error occurs.



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(c-2) Confirming occurrence of a loop failure / Specifying a failed component using the Loop Failure Detection Function (Failed loop could not identified)

- When the failed loop could not identified although the operation was performed according to "(c-1) (i) Identifying Failed Loops and Paths" (TRBL 06-0700), "Confirming occurrence of a loop failure/Identifying a failed component using the Loop Failure Detection Function", identify the failed component by executing the Loop Failure Detection Function for each of all the HDUs.

(i) Identifying Failed HDU

① Identify the failed HDU by executing the Loop Failure Detection Function for each HDU.

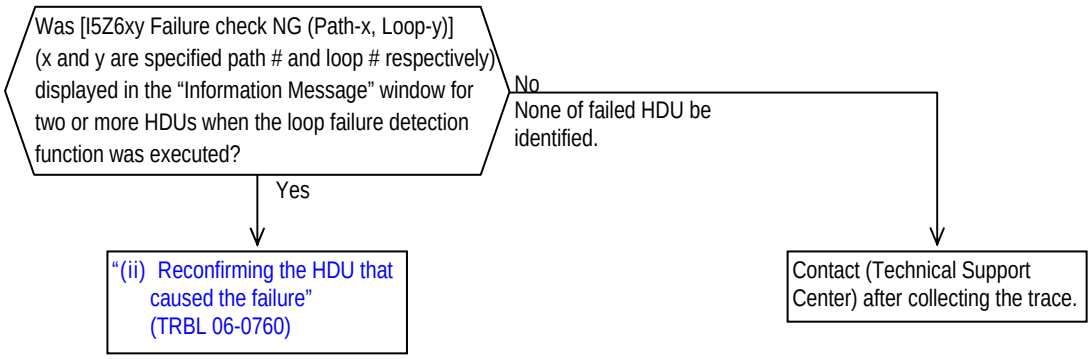
- Execute the Loop Failure Detection Function respectively and individually for all the Disk Drives of each subsystem.

Diagnosis for Loop Failure Detection Function window

- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button.
  (Clear the conditions for the preceding check.)
- Check the HDU # check box of the Unit-x.
- Click the [Diagnosis Start] button.

---> Execute it in the Path #0 and Path #1 or both of Path #2 and Path #3 of the Loop where[W080xy] occurred in "Information Message".

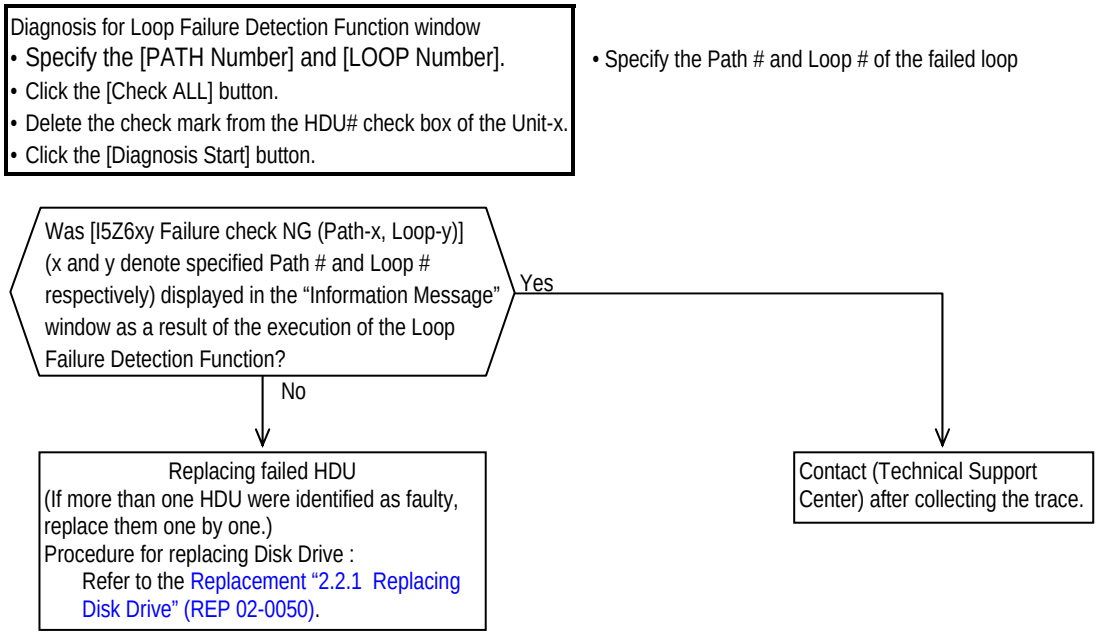
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet.



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(ii) Reconfirming the HDU that caused the failure

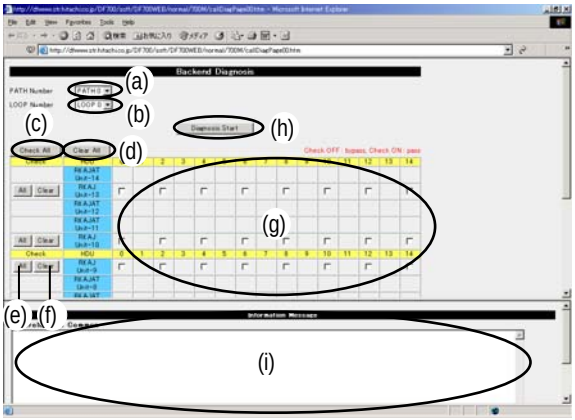
① Execute the Loop Failure Detection Function in the state in which only the identified HDU is separated in order to verify the failed HDU.



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(d) WEB window of the Loop Failure Detection Function

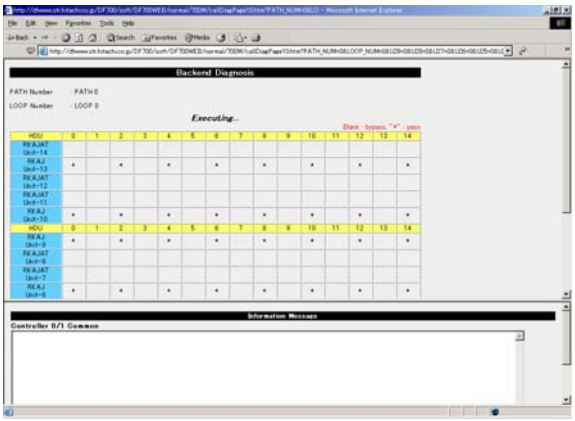
(i) Window for instructing the Loop Failure Detection Function



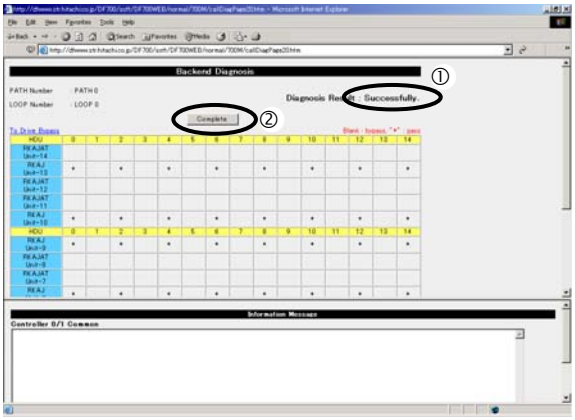
	Element in the window	Description
(a)	A list for selecting a path number	To be used to select a path number of a loop to be diagnosed.
(b)	A list for selecting a loop number	To be used to select a loop number of a loop to be diagnosed.
(c)	“Check All” button	Makes all check boxes selected.
(d)	“Clear All” button	Makes all check boxes unselected.
(e)	“All” button	Makes all check boxes selected for each unit.
(f)	“Clear” button	Makes all check boxes unselected for each unit.
(g)	Each check box	To be used to specify whether to link the drive concerned to a selected loop. The check box is not displayed when no frame exists or no drive is installed.
(h)	“Diagnosis Start” button	Starts a diagnosis.
(i)	Information Message	Displays information on the entire system. Result of a diagnosis is also displayed here.

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(ii) Window displayed during execution of the Loop Failure Detection Function



(iii) Window displayed when the Loop Failure Detection Function ends



	Element in the window	Description
①	Display of a summary of a diagnosis result	Displays a result of a diagnosis.
②	“Complete” button	Changes a window to that of a diagnosis by the Loop Failure Detection Function.

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(e) Check List #1 for Failed HDU Isolation

NOTE : To use this check list, make as many copies of it as necessary for the recovery operation.

Data _____ Maintenance execution time _____ to _____
End user's name _____ Service person's name _____
Subsystem serial No.: _____ Subsystem IP addres _____
Failed and Path#,Loop#： Path[ ],Loop[ ] ／ Path[ ],Loop[ ]

CL#1

1. Identifying a failed loop and path

PATH Number( ) LOOP Number( ) With All HDUs connected ☐ → 1st diagnosis result 2nd diagnosis result
(with [Check ALL] clicked) OK NG OK NG
☐ ☐ ☐ ☐

PATH Number( ) LOOP Number( ) With All HDUs connected ☐ → 1st diagnosis result 2nd diagnosis result
(with [Check ALL] clicked) OK NG OK NG
☐ ☐ ☐ ☐

Failed Loop: PATH ( ), LOOP( )

2. Isolating an HDU that caused the failure

PATH Number( ) LOOP Number( ) With All HDUs bypass ☐ → 1st diagnosis result 2nd diagnosis result
(with [Clear ALL] clicked) OK NG OK NG
☐ ☐ ☐ ☐

3. Identifying a failed unit

PATH Number( ) LOOP Number( )

Unit-0 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-1 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-2 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-3 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-4 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-5 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-6 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-7 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-8 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-9 with all☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-10 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-11 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-12 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-13 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Unit-14 with all ☐ → 1st diagnosis result 2nd diagnosis result
HDUs Connected OK NG OK NG
☐ ☐ ☐ ☐

Failed Unit : Unit( ), (Unit( ), Unit( ))

4. Identifying an HDU that caused the failure

PATH Number( ) LOOP Number( )
(with [Clear] clicked)

With HDU-0 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-1 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-2 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-3 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-4 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-5 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-6 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-7 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-8 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-9 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-10 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-11 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-12 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-13 ☐ → 1st diagnosis result 2nd diagnosis result
Connected OK NG OK NG
☐ ☐ ☐ ☐

With HDU-14 ☐ → 1st diagnosis result 2nd diagnosis result 結
Connected OK NG OK NG
☐ ☐ ☐ ☐

Failed HDU : HDU( ), (HDU( ), HDU( ))

5. Confirming the HDU that caused the failure

PATH Number( ) LOOP Number( )
(with [Chek ALL] clicked)
With the failed HDU separated ☐ → 1st diagnosis result 2nd diagnosis result
OK NG OK NG
☐ ☐ ☐ ☐

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(f) Check List #2 for Failed HDU Isolation (for all HDUs)

NOTE : To use this check list, make as many copies of it as necessary for the recovery operation.

CL#2-1

1. Identifying an HDU that caused the failure [Path ( ) Loop ( )]

Unit (0) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (1) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (2) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (3) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (4) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (5) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG		OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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CL#2-2

Unit (6) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (7) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (8) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (9) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (10) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (11) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (12) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

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Unit (13) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (14) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (15) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (16) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (17) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (18) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (19) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

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Unit (20) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (21) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (22) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (23) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (24) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (25) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

Unit (26) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →		☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →		☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →		☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →		☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →		☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →		☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →		☐	☐	☐
With HDU-14 connected →	☐	☐	☐					

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Unit (27) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (28) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (29) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

2. Confirming the HDU that caused the failure
   PATH Number( ) LOOP Number( )
   (with [Chek ALL] clicked)
   With the failed HDU separated ☐ → 1st diagnosis result 2nd diagnosis result

OK	NG	OK	NG
☐	☐	☐	☐

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(2) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the dual controller configuration)

If the subsystem went down due to a loop failure (W080xy), you can open the diagnostic window of the Loop Failure Detection Function using a Web browser and execute the loop failure detection function to identify the failed HDU(s).

(a) Conditions for and notes on executing the Loop Failure Detection Function

(i) Do not pull out/insert a replacement component while the Loop Failure Detection Function is being executed.

Replace failure parts when single execution of the Loop Failure Detection Function is completed.

(Replacement failure parts: Disk Drive, Backup Battery Unit, Power Unit, Fan Assembly, and Control Unit, ENC Unit, SENC Unit)

(ii) Procedure for recovery from a new failure occurs while the recovery operation using the Loop Failure Detection Function is in progress.

Make a recovery from the new failure preferentially. Execute the maintenance work of the Loop Failure Detection Function again from the start after another failure is recovered.

[Occurrence of a new failure]
- Interrupt the recovery operation by means of the Loop Failure Detection Function once.
- Perform a recovery action against the new failure (usual recovery procedure).
- Perform the recovery operation by means of the Loop Failure Detection Function again from the beginning.

(iii) Time required to execute the Loop Failure Detection Function (Required time per HDU diagnosis)

Normally, single execution of the Loop Failure Detection Function finishes in ten seconds.

Use of the "Check List for Failed HDU Isolation".

When performing the recovery operation using the Loop Failure Detection Function, do it recording execution results of the Loop Failure Detection Function in the "(f) Check List #1 for Failed HDU Isolation" (TRBL 06-0980) or "(g) Check List #2 for Failed HDU Isolation (for all HDUs)" (TRBL 06-0990) appended to the Maintenance Manual.

To use the Check List #1 and #2 for Failed HDU Isolation, make as many copies of it as necessary for the recovery operation.

(iv) Result of Loop Failure Detection Function Execution.

- The diagnostic results by the loop failure detection function appear as shown below in the upper right of the diagnostic window of the Loop Failure Detection Function or in the Information Message field.

  When the diagnosis result is OK : I5Z5xy Failure check OK (Path-x, Loop-y)

  When the diagnosis result is not OK : I5Z6xy Failure check NG (Path-x, Loop-y)
- When the result of the execution of the Loop Failure Detection Function is shown as "check OK", check the [OK] check box of the "Check List for Failed HDU Isolation".

(v) When error messages other than W080xy Loop alarm (Path-x, Loop-y) occur at the same time, give priority to the recovery methods of those messages for the maintenance.

Execute the maintenance work of the Loop Failure Detection Function again from the start after another failure is recovered.

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(vi) Do not turn off the AC Power Unit Switch of the subsystem while the Loop Failure Detection Function is being executed.
If the AC Power Unit Switch of the subsystem is turned off while the Loop Failure Detection Function is being executed, turn off the AC Power Unit Switch of the added RKAJ/RKAJAT/RKA one, turn it on again, then turn on the AC Power Unit Switch of the subsystem.

(vii) If the failure occur in all of the four loops, the Loop Failure Detection function cannot be used. In this case, contact the Technical Support Center.

(viii) When an instruction to isolate two or more HDUs in the same RAID group is given using the Failed HDU Isolation function, user data will be lost.

(ix) When a failure has occurred in a loop of the Path #0 and Loop #0 in the case of the single controller configuration, the Loop Failure Detection Function cannot be used.
Take a recovery action according to Step "(3) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)" (TRBL 06-1020).

(b) How to start the loop failure detection function

(i) Connect the PC and the subsystem via the LAN (for using the Web function). (System Parameter "1.1 (2) Connecting the LAN cross cable" (SYSPR 01-0030))

(ii) Press the RST SW on the both controllers to enter the Web maintenance mode.
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

(iii) Connect to the website, http://subsystem IP address(‡1)/drvdiag.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

(iv) In the startup mode window (Boot Up Mode Backend Diagnostic), select Enable and then choose the OK button.

(v) In the startup mode window, choose the Reboot button to restart the device.

(vi) Check the READY LED on the front side of the Basic Chassis.
- If the READY LED is Low-speed blinking, connect to http://device-IP-address/drvdiag, and then open the loop failure detection function window.
- In a case other than that where the READY LED is Low-speed blinking, retry the operation in (b).
  If the READY LED is not Low-speed blinking after the retry, contact the (Technical Support Center) (for replacing the subsystem).

‡1 : As for the IP address of the subsystem, refer to "3.1 (4) Procedure to connect portable maintenance PC to WEB" (TRBL 03-0010).

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(c) Procedure for executing the Loop Failure Detection Function

(c-1) Confirming occurrence of a loop failure / Identifying a failed component using the Loop Failure Detection Function

- Execute each procedure for identifying the failed component by means of the Loop Failure Detection Function twice to make the identification of the failed component certain. (Sets of two check boxes, the 1st diagnosis result and 2nd diagnosis result, are prepared in the Check List for Failed HDU Isolation.)

(i) Identifyng Failed Loops and Paths

① Identify the failed loop in which the failed HDU is installed by executing the Loop Failure Detection Function for each Path # and Loop # in the state in which all the HDUs are connected to the loop.

② Execute the Loop Failure Detection Function for both of the Loop-0 and Loop-1 of the path observed to have the loop failure.

Diagnosis for Loop Failure Detection Function window	When "Wxxxx Loop Alarm (Path #0, Loop #0)" is displayed.
• Specify the [PATH Number] and [LOOP Number]. • Click the [Check ALL] button. (All the HDUs are connected within the Loop.) • Click the [Diagnosis Start] button.	• Specify the [PATH Number] as [PATH 0]. • Specify the [LOOP Number] as [LOOP 0].

③ When [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window as a result of the execution of the Loop Failure Detection Function, the Path # and Loop # shown in parentheses represent the failed loop. Enter the failed loop identified in the check sheet.

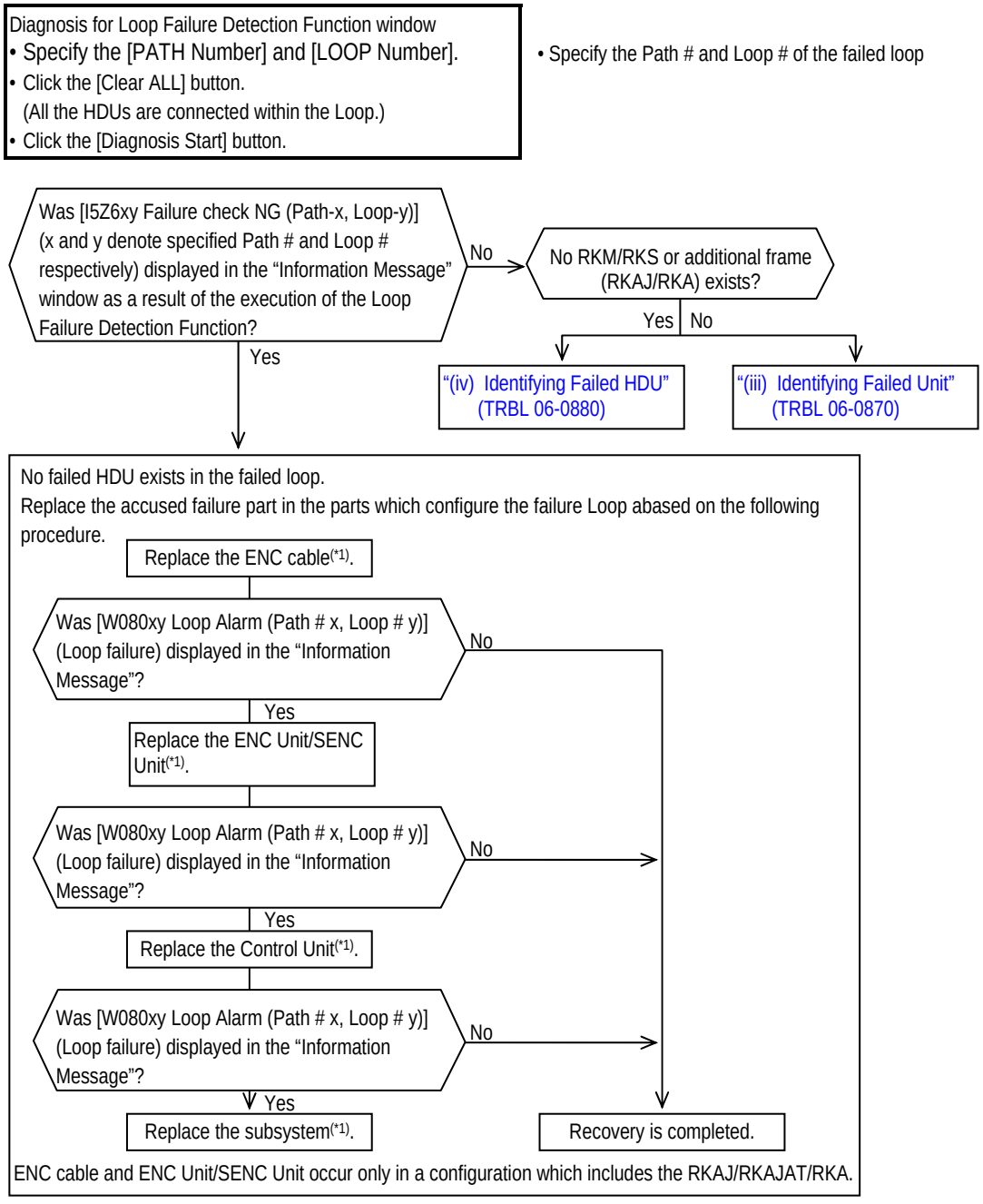
④ Perform the procedures from "(ii) Judging whether or not the HDU caused the failure" (TRBL 06-0860) to "(v) Reconfirming Failed HDU" (TRBL 06-0890), and identify the failed HDU for each one of the failed loops.

NOTE : When the failed loop cannot be identified, identify the failed HDU by executing the Loop Failure Detection Function for all the HDU following the procedure explained in Step "(c-2) (i) Identifying Failed HDU" (TRBL 06-0910). (When doing that, use the Check List #2 for Failed HDU Isolation (For checking all HDUs).)

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(ii) Judging whether or not the HDU caused the failure

① Confirm that the failed HDU exists in the failed loop concerned by executing the Loop Failure Detection Function bypassing all the HDUs in the failed loop (separating them from the loop).



*1 : For the replacement of the failed component, refer to the Replacement "Chapter 2. Parts Replacement" (REP 02-0000).

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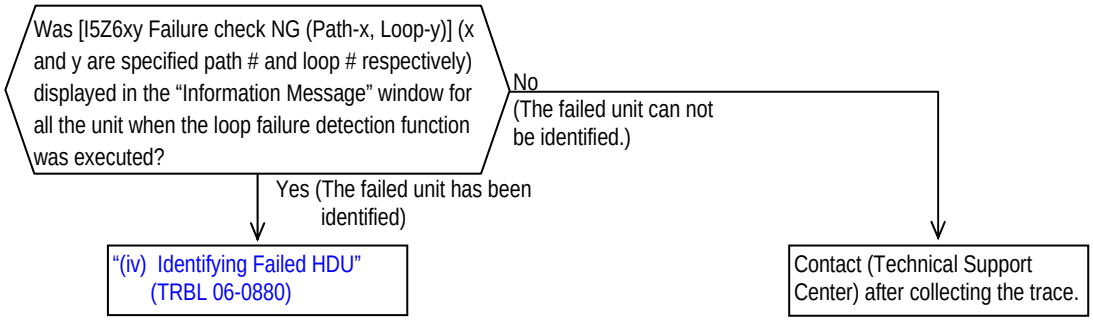
(iii) Identifying Failed Unit

① Identify the unit in which the failed HDU is installed by executing the Loop Failure Detection Function for each of all the units.

- Execute the Loop Failure Detection Function for each unit once at a time
- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button.
  (Clear the conditions for the preceding check.)
- Check all the HDU# check boxes of the Unit-x.
- lick the [Diagnosis Start] button.

• Specify the Path # and Loop # of the failed loop.

② Enter the unit number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet. (It is determined that the failed component exists in the failed unit.)



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(iv) Identifying Failed HDU

① Identify a failed HDD by applying the loop failure detection function to each HDD in the failed unit, which was identified in Step (iii), one by one.

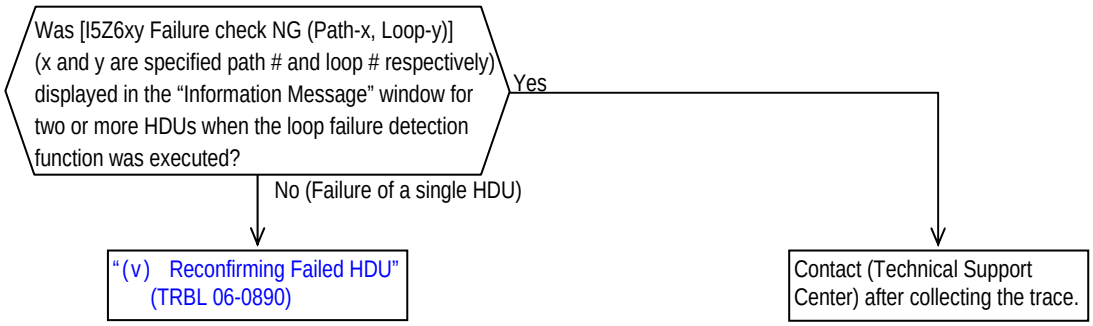
- Execute the Loop Failure Detection Function for all the HDUs of the Unit-x.

Diagnosis for Loop Failure Detection Function window

- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button.
  (Clear the conditions for the preceding check.)
- Check the HDU# check box of the Unit-x.
- Click the [Diagnosis Start] button.

• Specify the Path # and Loop # of the failed loop.

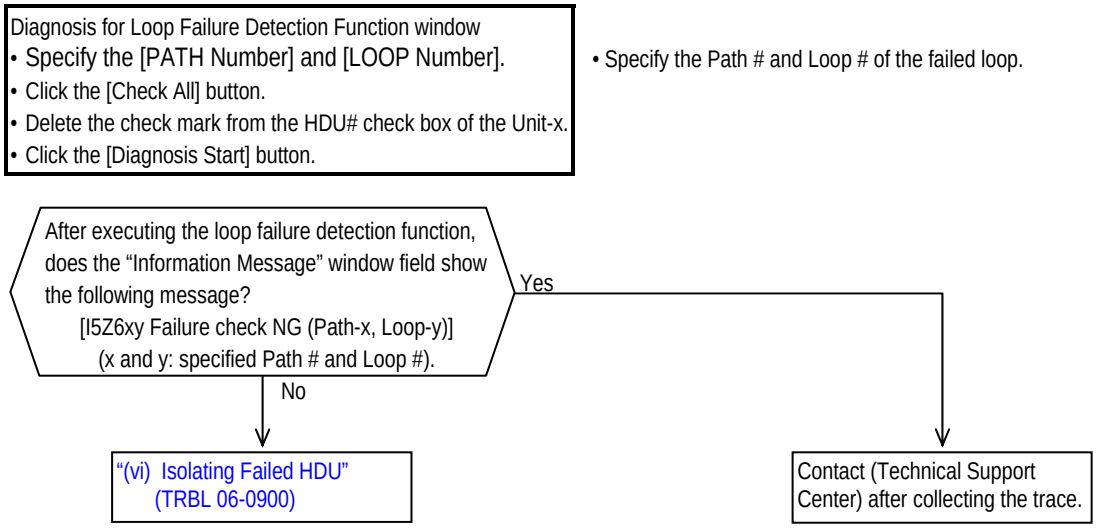
② Enter the HDU number for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet.



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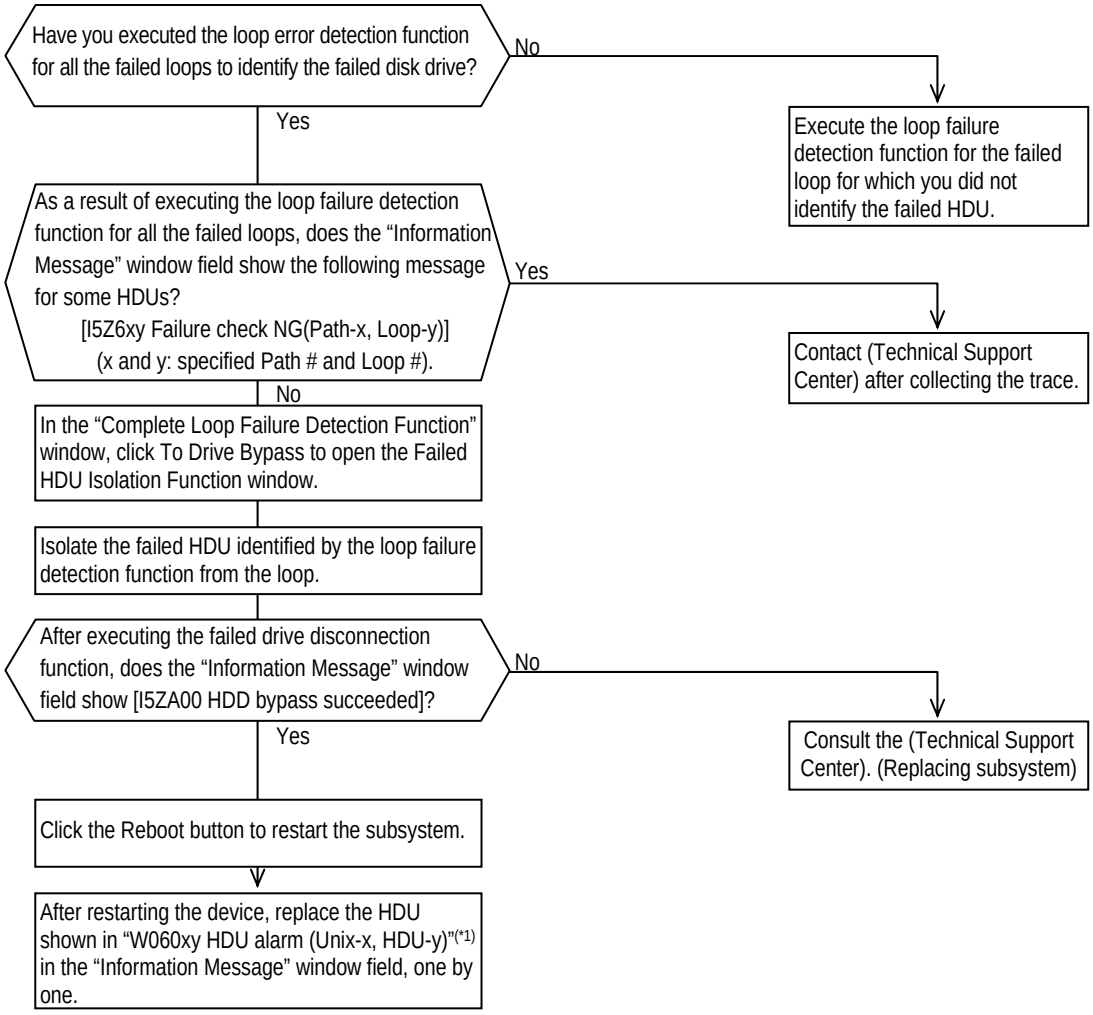
(v) Reconfirming Failed HDU

① Execute the loop failure detection function in the state in which only the HDU, which was identified as a cause of the failure in Step (iv), is disconnected from the loop and verify that no error occurs.



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(vi) Isolating Failed HDU



NOTE : If you isolated multiple HDU in the same RAID group from the loop, restarting the subsystems deletes the user data.

*1 : Any of W060AT, W060HH, W061xy, W061AT, W061HH, W0GG00, W0GH00, W0GJ00 and W0GK00 may be displayed other than W060xy.

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(c-2) Confirming occurrence of a loop failure / Specifying a failed component using the Loop Failure Detection Function (Failed loop could not identified)

- When the failed loop could not identified although the operation was performed according to "(c-1) (i) Identifyng Failed Loops and Paths" (TRBL 06-0850), "Confirming occurrence of a loop failure/Identifying a failed component using the Loop Failure Detection Function", identify the failed component by executing the Loop Failure Detection Function for each of all the HDUs.

(i) Identifying Failed HDU

① Identify the failed HDU by executing the Loop Failure Detection Function for each HDU.

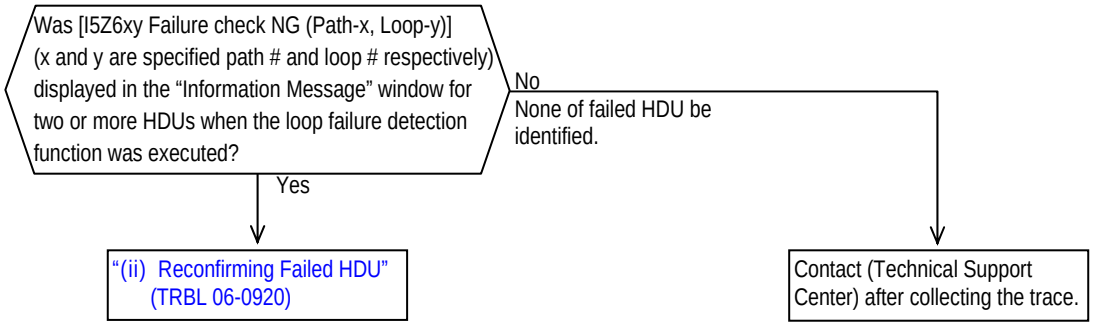
- Execute the Loop Failure Detection Function for all the HDUs of the each unit.

Diagnosis for Loop Failure Detection Function window

- Specify the [PATH Number] and [LOOP Number].
- Click the [Clear All] button.
  (Clear the conditions for the preceding check.)
- Check the HDU# check box of the Unit-x.
- Click the [Diagnosis Start] button.

---> Execute it in the Path #0 and Path #1 or both of Path #2 and Path #3 of the Loop where [W080xy] occurred in "Information Message".

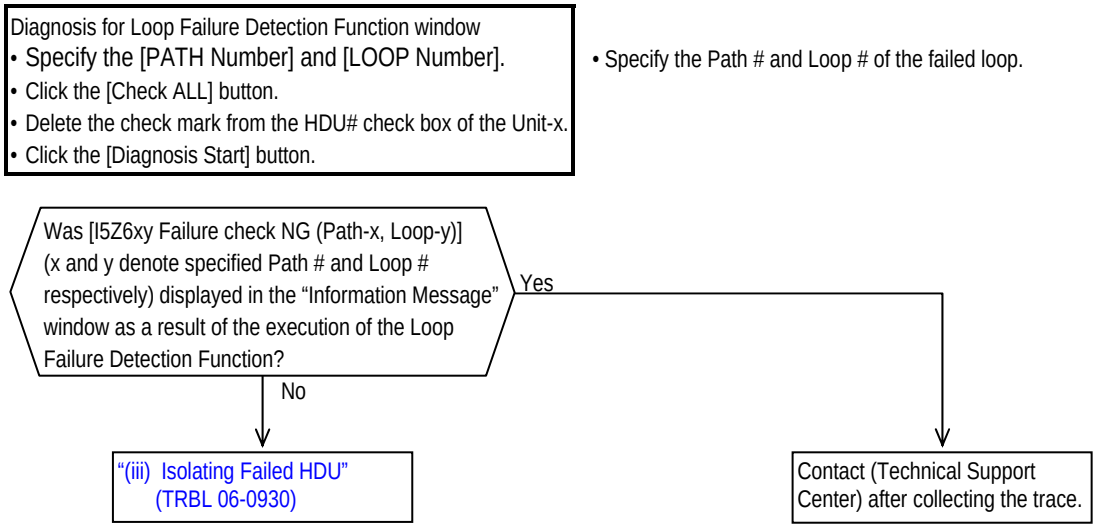
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the "Information Message" window, in the check sheet.



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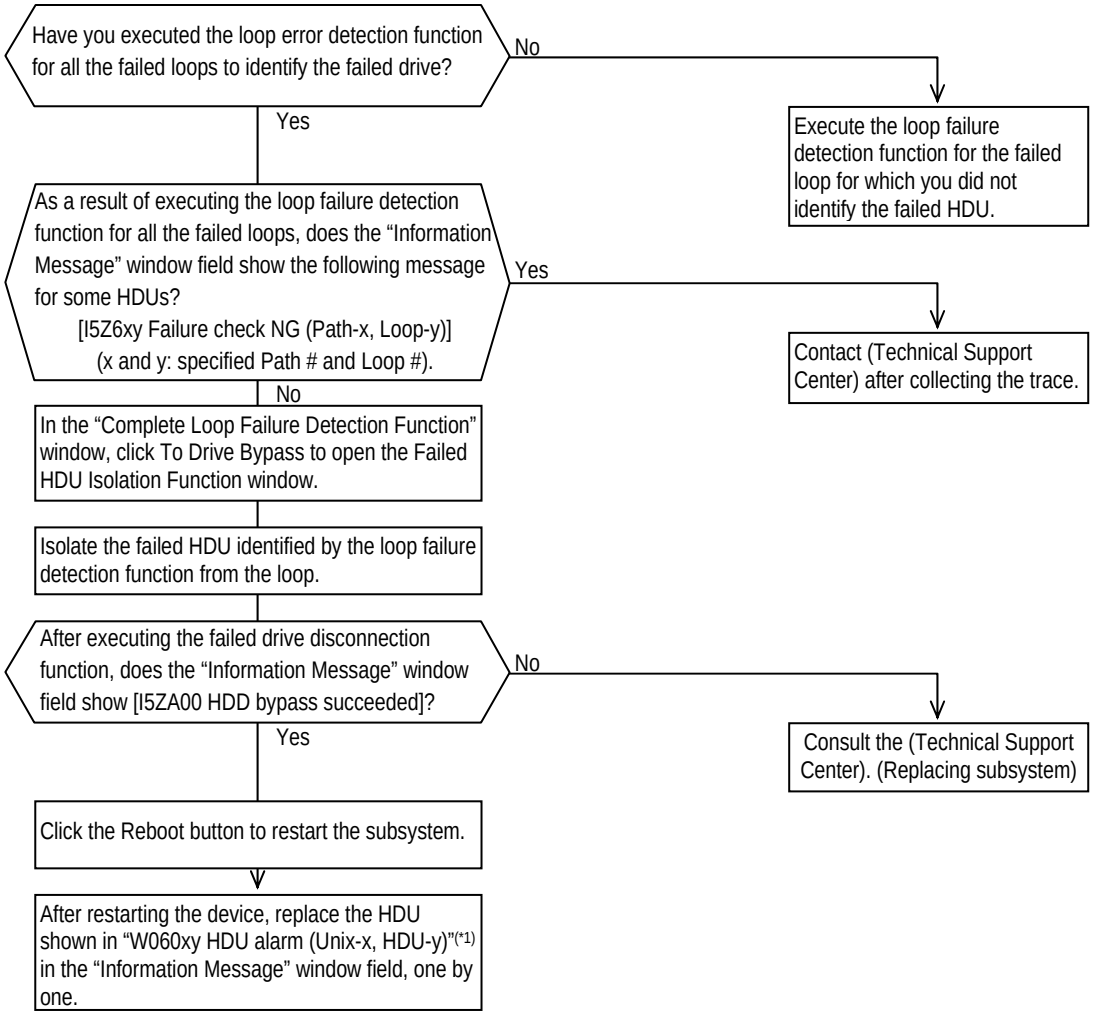
(ii) Reconfirming Failed HDU

① Execute the Loop Failure Detection Function in the state in which only the identified HDU is separated in order to verify the failed HDU.



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(iii) Isolating Failed HDU

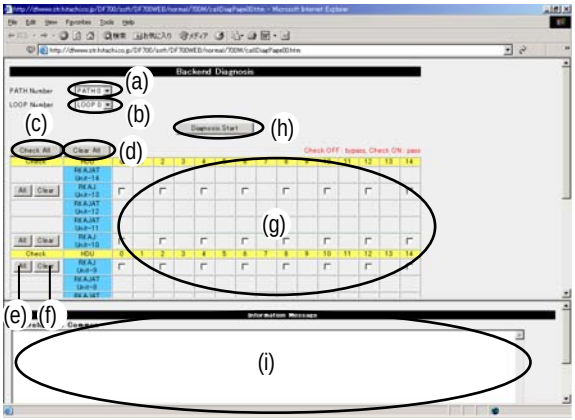


*1 : Any of W060AT, W060HH, W061xy, W061AT, W061HH, W0GG00, W0GH00, W0GJ00 and W0GK00 may be displayed other than W060xy.

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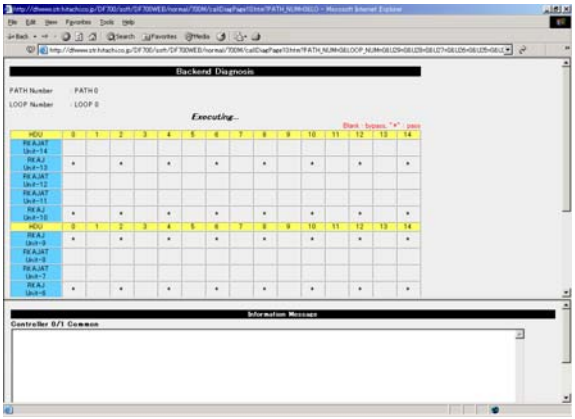
(d) WEB window of the Loop Failure Detection Function

(i) Window for instructing the Loop Failure Detection Function



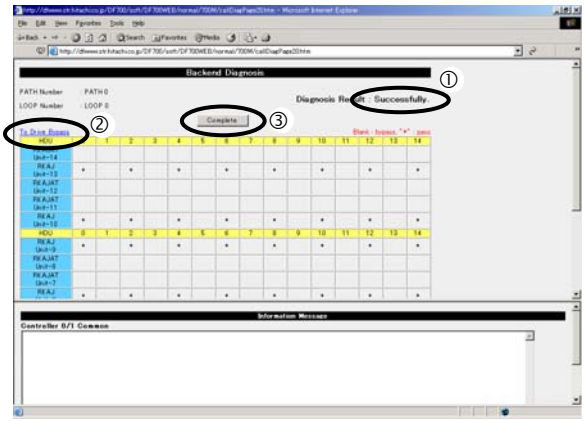
	Element in the window	Description
(a)	A list for selecting a path number	To be used to select a path number of a loop to be diagnosed.
(b)	A list for selecting a loop number	To be used to select a loop number of a loop to be diagnosed.
(c)	“Check All” button	Makes all check boxes selected.
(d)	“Clear All” button	Makes all check boxes unselected.
(e)	“All” button	Makes all check boxes selected for each unit.
(f)	“Clear” button	Makes all check boxes unselected for each unit.
(g)	Each check box	To be used to specify whether to link the drive concerned to a selected loop. The check box is not displayed when no frame exists or no drive is installed.
(h)	“Diagnosis Start 2” button	Starts a diagnosis.
(i)	Information Message	Displays information on the entire system. Result of a diagnosis is also displayed here.

(ii) Window displayed during execution of the Loop Failure Detection Function



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(iii) Window displayed when the Loop Failure Detection Function ends

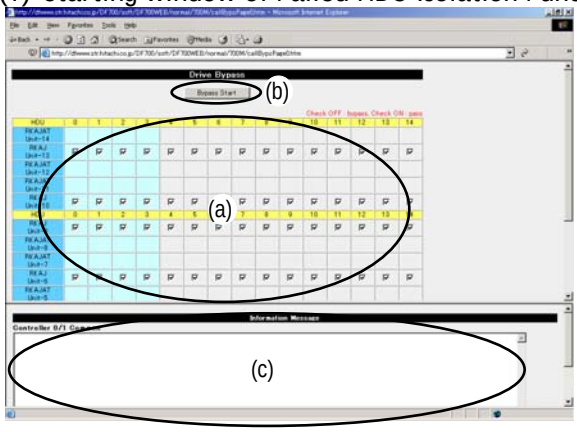


	Element in the window	Description
①	Display of a summary of a diagnosis result	Displays a result of a diagnosis.
②	A linkage with the Failed HDU Disconnection function	Change a window to that of the Failed HDU Disconnection function.
③	"Complete" button	Changes a window to that of a diagnosis of the Loop Failure Detection functions.

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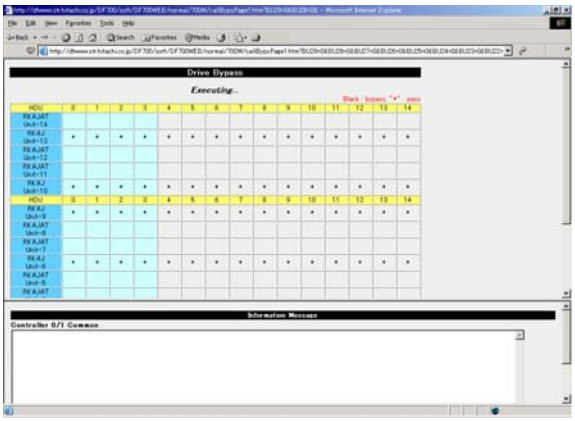
(e) WEB window of the Failed HDU Isolation Function

(i) Starting window of Failed HDU Isolation Function



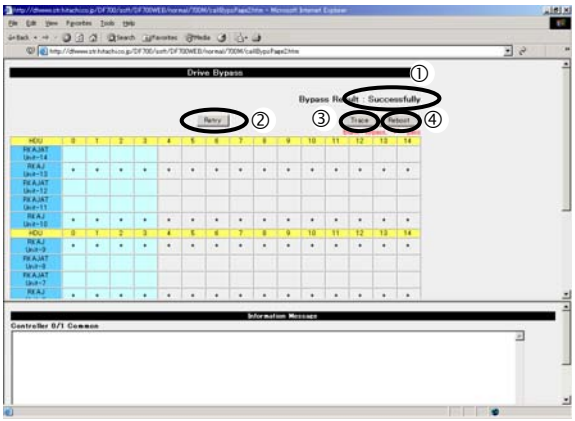
	Element in the window	Description
(a)	Each check box	To be used to specify whether to bypass the drive concerned (whether to remove the check mark).
(b)	"Bypass Start" button	Starts the bypassing operation.
(c)	Information Message	Displays progress of the bypassing operation.

(ii) Window showing a running state of the Failed HDU Isolation Function



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(iii) Completion window of the Failed HDU Isolation Function



	Element in the window	Description
①	Display of a summary of a diagnosis result	Displays a result of the diagnosis.
②	"Retry" button	Changes a window to that for disconnecting a failed HDU.
③	"Trace" button	Starts a collection of a trace.
④	"Reboot" button	Restarts the subsystem.

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(f) Check List #1 for Failed HDU Isolation

NOTE : To use this check list, make as many copies of it as necessary for the recovery operation.

Data _____ Maintenance execution time _____ to _____
End user's name _____ Service person's name _____
Subsystem serial No.: _____ Subsystem IP addres _____
Failed and Path#,Loop# : Path[ ],Loop[ ] ／ Path[ ],Loop[ ]

CL#1
1. Identifying a failed loop and path

		1st diagnosis result		2nd diagnosis result	
PATH Number(0) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(0) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(1) LOOP Number(0)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(1) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(2) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(2) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(3) LOOP Number(0)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐
PATH Number(3) LOOP Number(1)	With All HDUs connected (with [Check ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐

Failed Loop: PATH ( ), LOOP( ) Failed Loop: PATH ( ), LOOP( ) Failed Loop: PATH ( ), LOOP( )

2. Isolating an HDU that caused the failure

		1st diagnosis result		2nd diagnosis result	
PATH Number( ) LOOP Number( )	With All HDUs bypass (with [Clear ALL] clicked)	OK	NG	OK	NG
		☐	☐	☐	☐

3. Identifying a failed unit
PATH Number( ) LOOP Number( )

	1st diagnosis result		2nd diagnosis result	
Unit-0 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-1 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-2 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-3 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-4 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-5 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-6 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-7 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-8 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-9 with all☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-10 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-11 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-12 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-13 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐
Unit-14 with all ☐ → HDUs Connected	OK	NG	OK	NG
	☐	☐	☐	☐

Failed Unit : Unit( ), (Unit( ), Unit( ))

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4. Identifying an HDU that caused the failure
PATH Number( ) LOOP Number( )
(with [Clear] clicked)

		1st diagnosis result		2nd diagnosis result	
With HDU-0	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-1	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-2	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-3	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-4	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-5	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-6	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-7	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-8	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-9	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-10	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-11	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-12	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-13	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐
With HDU-14	→	OK	NG	OK	NG
Connected		☐	☐	☐	☐

Failed HDU : HDU( ), (HDU( ), HDU( ))

5. Confirming the HDU that caused the failure
PATH Number( ) LOOP Number( )
(with [Chek ALL] clicked)

		1st diagnosis result		2nd diagnosis result	
With the failed HDU separated	→	OK	NG	OK	NG
		☐	☐	☐	☐

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(g) Check List #2 for Failed HDU Isolation (for all HDUs)

NOTE : To use this check list, make as many copies of it as necessary for the recovery operation.

CL#2-1

1. Identifying an HDU that caused the failure [Path ( ) Loop ( )]

Unit (0) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐

Unit (1) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (2) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (3) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (4) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

Unit (5) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			OK	NG
With HDU-0 connected →	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐					

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Unit (6) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (7) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (8) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (9) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (10) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (11) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

Unit (12) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG			Installation	OK	NG	
With HDU-0 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-1 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-2 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-3 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-4 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-5 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-6 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-7 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-8 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-9 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-10 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-11 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-12 connected →	☐	☐	☐	OK ☐ NG ☐	With HDU-13 connected →	☐	☐	☐	OK ☐ NG ☐
With HDU-14 connected →	☐	☐	☐	OK ☐ NG ☐					

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Unit (13) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (14) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (15) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (16) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (17) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (18) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (19) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

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Unit (20) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (21) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (22) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (23) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (24) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (25) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (26) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

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CL#2-5

Unit (27) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (28) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

Unit (29) with all HDUs separated (with Clear clicked) ☐

	Installation	OK	NG	OK	NG		Installation	OK	NG	OK	NG
With HDU-0 connected →	☐	☐	☐	☐	☐	With HDU-1 connected →	☐	☐	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	☐	☐	With HDU-3 connected →	☐	☐	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	☐	☐	With HDU-5 connected →	☐	☐	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	☐	☐	With HDU-7 connected →	☐	☐	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	☐	☐	With HDU-9 connected →	☐	☐	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	☐	☐	With HDU-11 connected →	☐	☐	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	☐	☐	With HDU-13 connected →	☐	☐	☐	☐	☐
With HDU-14 connected →	☐	☐	☐	☐	☐						

2. Confirming the HDU that caused the failure

PATH Number( ) LOOP Number( )

(with [Chek ALL] clicked)

With the failed HDU separated ☐ → 1st diagnosis result 2nd diagnosis result

OK	NG	OK	NG
☐	☐	☐	☐

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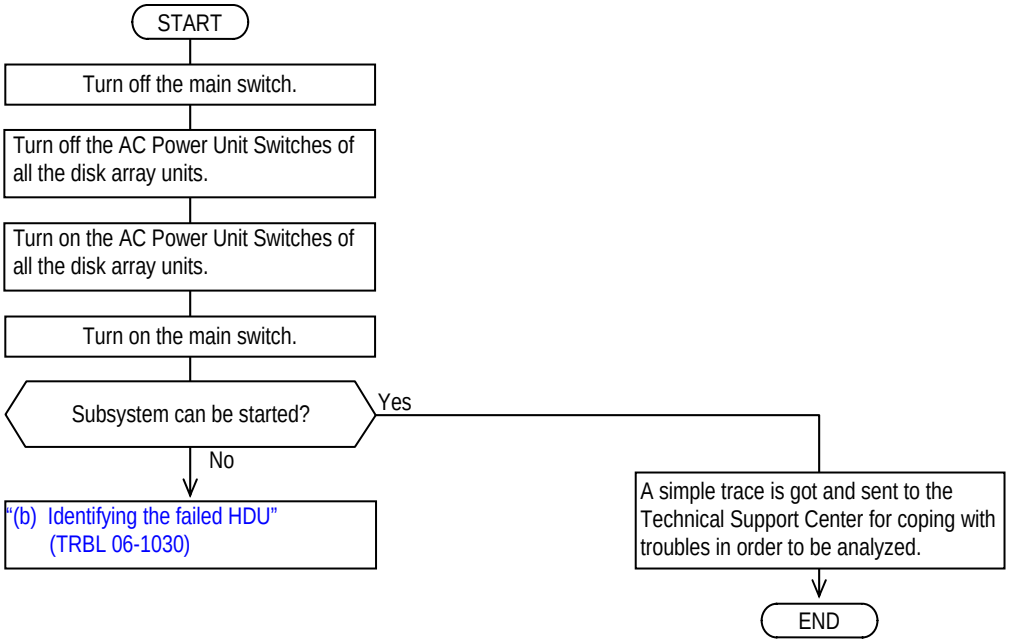
(3) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)

The Loop Failure Detection Function cannot be used because it is impossible to start the subsystem. Therefore, identify the failed HDU following the procedure below.

NOTE : Execute the procedure recording the history of locating the failed part on the "(e) Check List #3 for Failed HDU Isolation (for all HDUs)" (TRBL 06-1060).

(a) Turn off/on the subsystem.

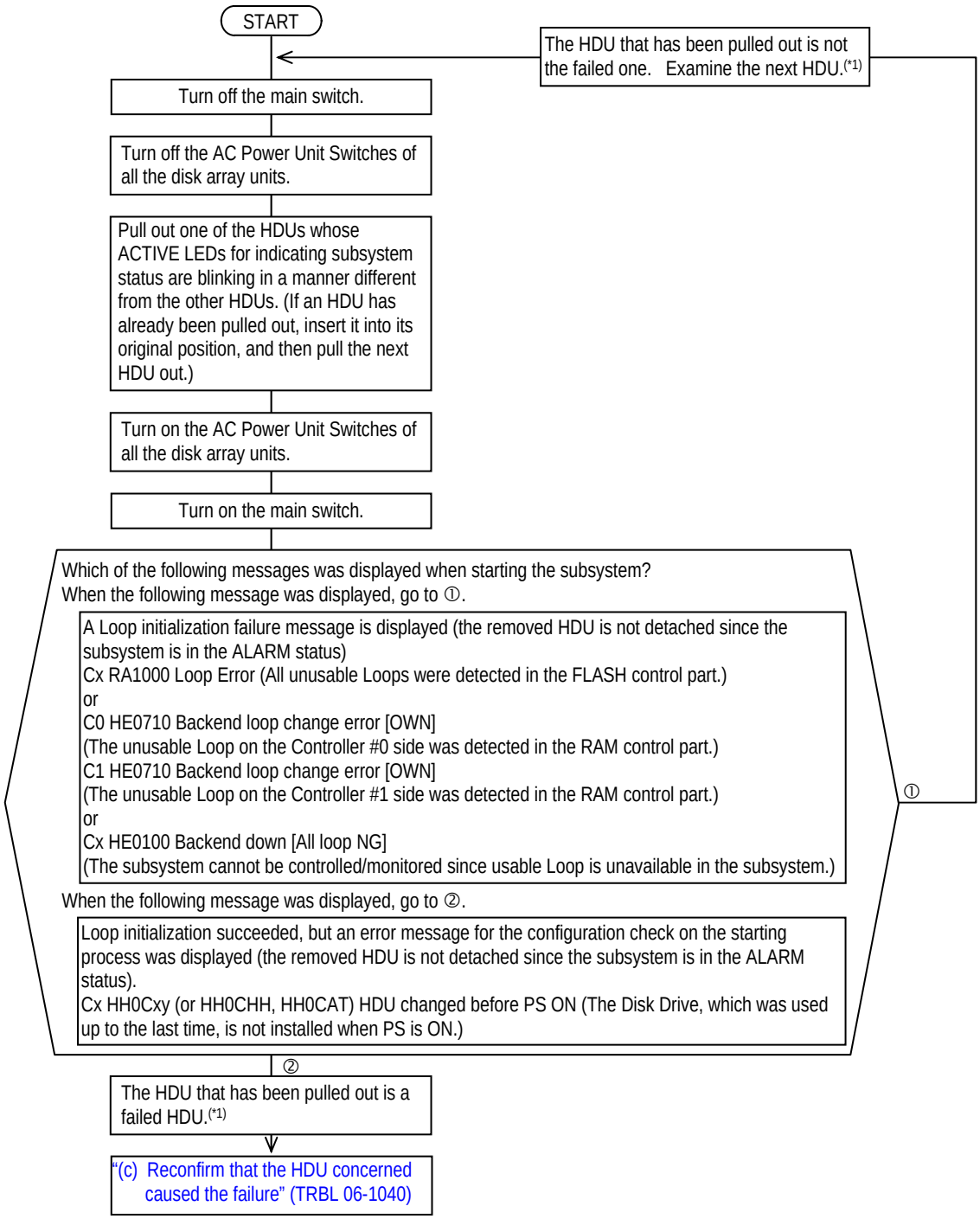
Check if the subsystem recovers from a starting failure.



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(b) Identifying the failed HDU

Start the subsystem in the status that the HDU is isolated from the subsystem, and identify the HDU causing a starting failure.

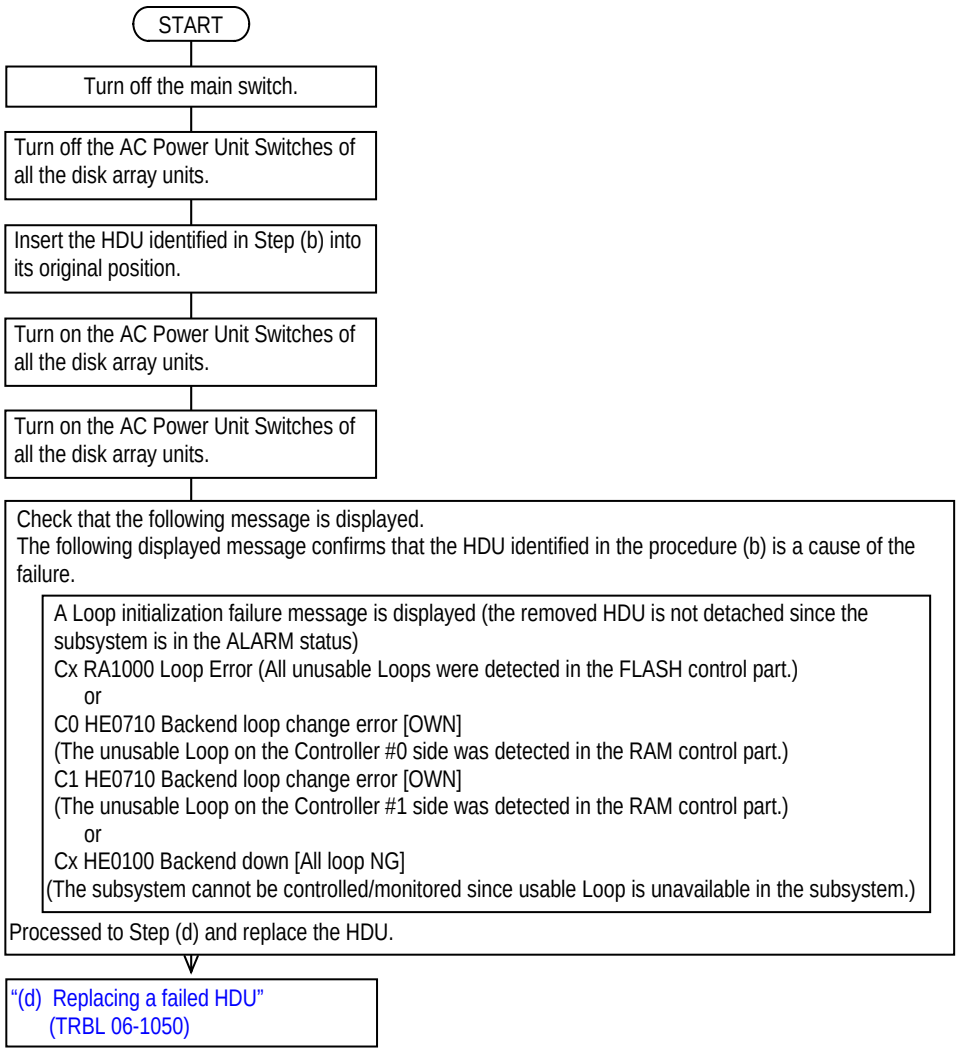


*1 : Because the recovery actions are started automatically when the Spare Disk exists, it is necessary to wait for completion of the Disk Drive recovery twice.

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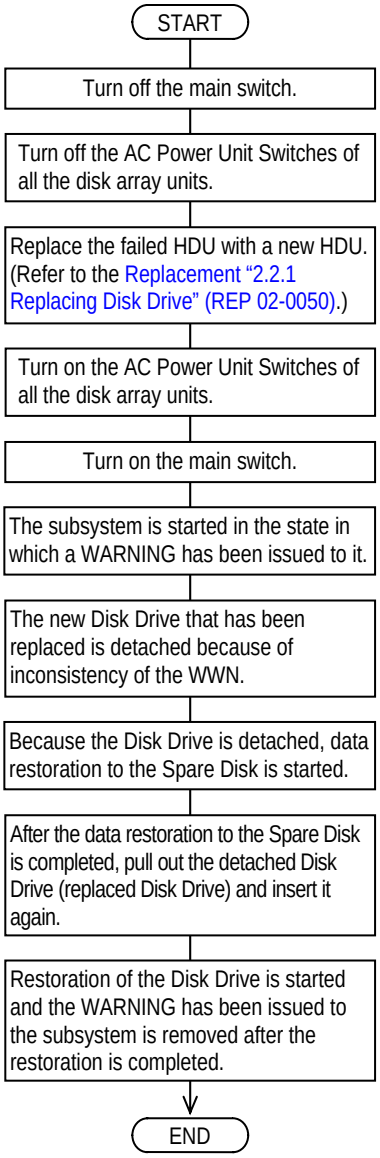
(c) Reconfirm that the HDU concerned caused the failure

Install the specified HDU in the original location, start the subsystem and check that the error occurs again.



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(d) Replacing a failed HDU



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(e) Check List #3 for Failed HDU Isolation (for all HDUs)

NOTE : To use this check list, make as many copies of it as necessary for the recovery operation.

CL#3-1

Unit (0)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (1)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (2)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (3)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (4)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (5)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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CL#3-2

Unit (6)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (7)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (8)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (9)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (10)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (11)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (12)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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CL#3-3

Unit (13)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (14)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (15)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (16)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (17)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (18)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (19)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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Unit (20)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (21)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (22)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (23)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (24)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (25)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (26)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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Unit (27)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (28)

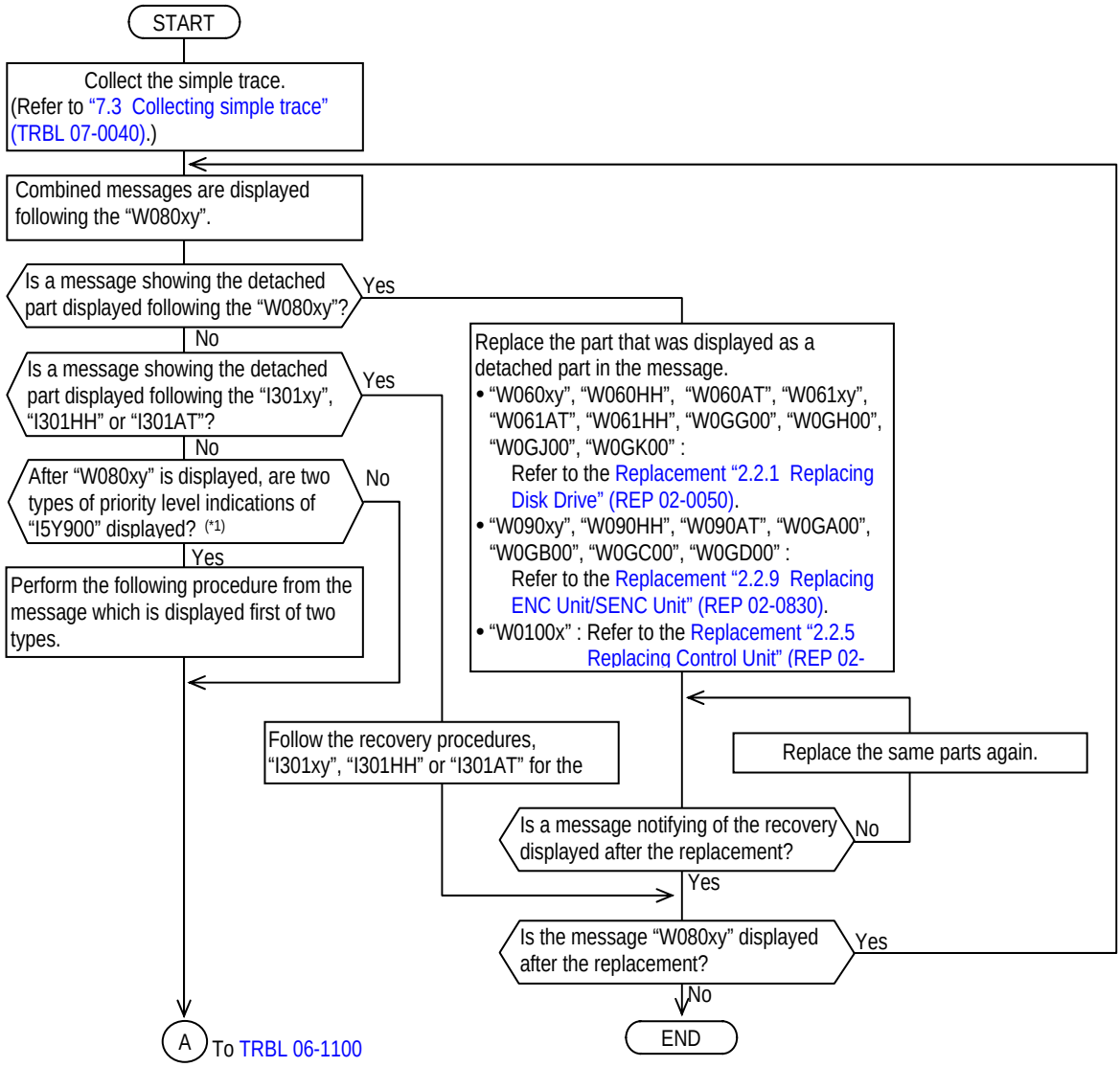
	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

Unit (29)

	Installation	OK	NG		Installation	OK	NG
With HDU-0 connected →	☐	☐	☐	With HDU-1 connected →	☐	☐	☐
With HDU-2 connected →	☐	☐	☐	With HDU-3 connected →	☐	☐	☐
With HDU-4 connected →	☐	☐	☐	With HDU-5 connected →	☐	☐	☐
With HDU-6 connected →	☐	☐	☐	With HDU-7 connected →	☐	☐	☐
With HDU-8 connected →	☐	☐	☐	With HDU-9 connected →	☐	☐	☐
With HDU-10 connected →	☐	☐	☐	With HDU-11 connected →	☐	☐	☐
With HDU-12 connected →	☐	☐	☐	With HDU-13 connected →	☐	☐	☐
With HDU-14 connected →	☐	☐	☐				

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(4) Actions to be taken when one of the message codes I5Y400 through I5Y700 is displayed
[Recovery method]



*1 : The example of displayed two types of priority level indications of "I5Y900" is described as follows.

I5Y000 Obstacle HDU search start

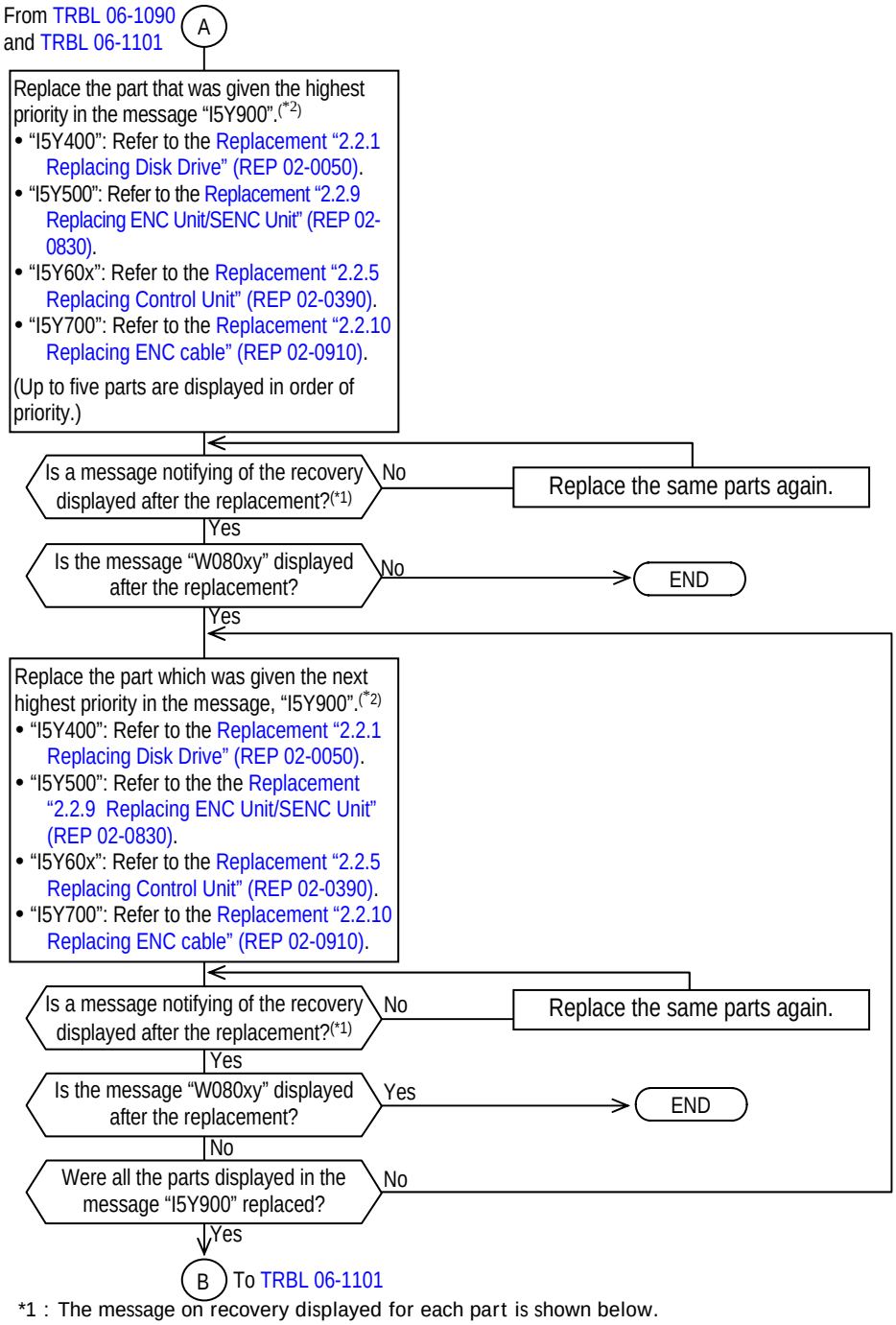
I5Y900 Part change priority (number-1)	:MANUAL	
I5Y500 BKE diagnostic result (Unit-02,ENC-1)	:ENC /STRC	First type
I5Y900 Part change priority (number-2)	:MANUAL	
I5Y500 BKE diagnostic result (Unit-01,ENC-1)	:ENC /STRC	
I5Y900 Part change priority (number-3)	:MANUAL	
I5Y700 BKE diagnostic result (Unit-01-02,ENC-1)	:MANUAL/STRC	

I5Y900 Part change priority (number-1)	:MANUAL	
I5Y500 BKE diagnostic result (Unit-03,ENC-1)	:ENC /STRC	Second type
I5Y900 Part change priority (number-2)	:MANUAL	
I5Y500 BKE diagnostic result (Unit-02,ENC-1)	:ENC /STRC	
I5Y900 Part change priority (number-3)	:MANUAL	
I5Y700 BKE diagnostic result (Unit-02-03,ENC-1)	:MANUAL/STRC	

I5Y100 Obstacle HDU search end

*2 : Replace parts according to the order of priority shown in the message "I5Y900" displayed after the first detachment of the loop. Though a message of the same kind may be displayed repeatedly, neglect it.

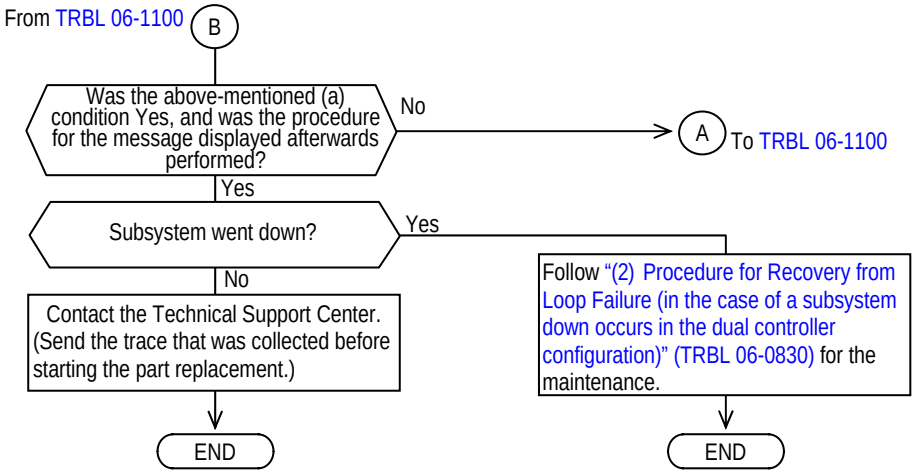
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*1 : The message on recovery displayed for each part is shown below.
"I007xy", "I007HH", "I009xy", "I009HH": Disk Drive
"I00Bxy", "I00BHH": ENC Unit or ENC cable
"I0010x": Control Unit
In the same way, the message on failure displayed for each part is shown below. If any of the following messages is displayed, replace the same part again.
"W073xy", "W073HH": Disk Drive
"I605xy", "I605HH", "W0B0xy": ENC Unit or ENC cable
"W0100x": Control Unit

*2 : Replace parts according to the order of priority shown in the message "I5Y900" displayed after the first detachment of the loop. Though a message of the same kind may be displayed repeatedly, neglect it.

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6.1.15 A failure occurred during operation : Case 5 (Incomplete writing)

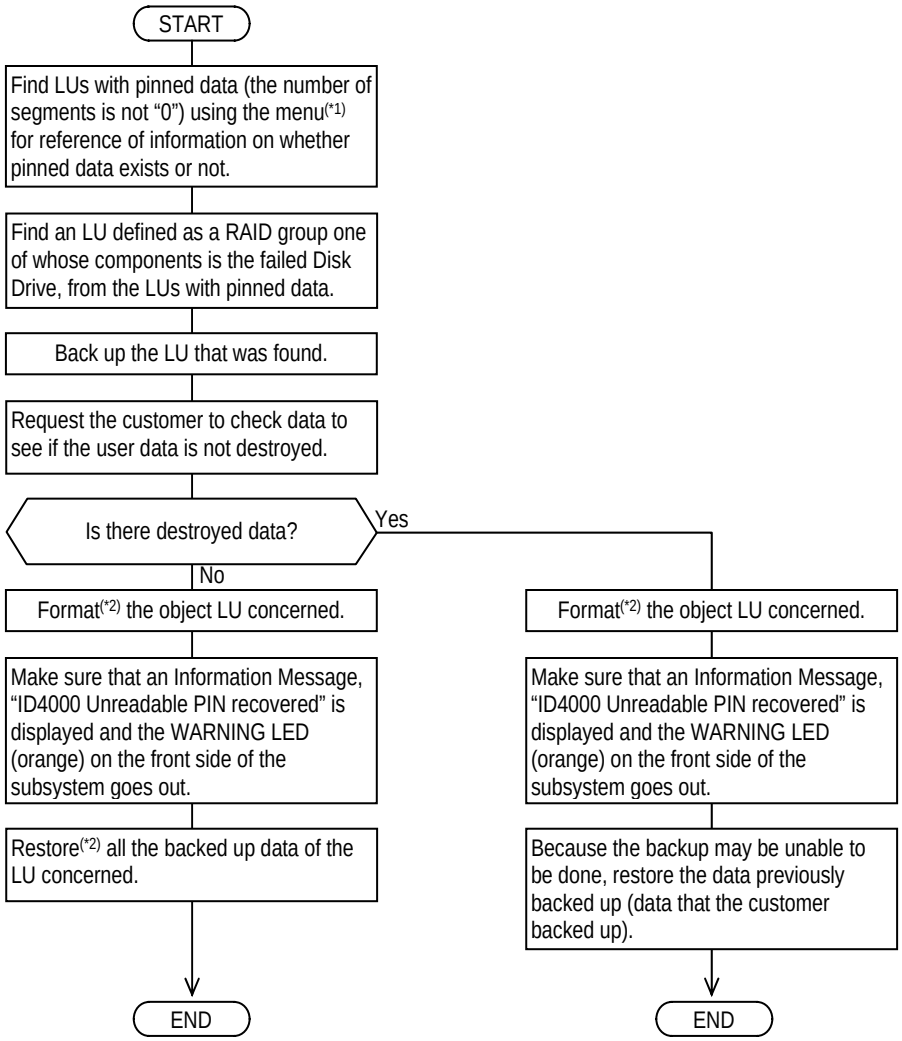
(The command for reassignment was sent from a host computer to an LU of RAID 0)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W0G0xy Unreadable PIN detected (Unit-x, HDU-y) :MANUAL/STRC

Date Time Detect Controller #

[Recovery method]



*1 : Checking the presence of PIN data is performed by the Maintenance function of Storage Navigator Modular. Refer to "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250).

*2 : Concerning the backup and restoration, request the customer to do them.

*3 : There may be a case that the LU formatting fails. In this case, request a user to check if a sense code is reported in the log of a host computer. When the reported sense code is "05-9552" or "05-9577", the LU concerned is an object of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot. Therefore, request a user to release the pair and execute the LU formatting again after it is released (refer to System Parameter "3.3 Setting of LU [Procedure ③-F]Formatting LU" (SYSPR 03-0280)). Also, the backup restoration cannot be done for the LU whose access attribute is set as other than Read/Write by Data Retention Utility because it cannot be formatted or written.

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6.1.16 The incomplete write area was registered in the restored VOL

(The write incomplete area was registered in the P-VOL because there was the unreadable area in the pool LU during the restoration of the P-VOL of Copy-on-write SnapShot. Or the incomplete write area was registered in the S-VOL because there was the unreadable area in the pool LU when restoring the S-VOL due to S-VOL-Takeover as a result of executing the horctakeover command with TrueCopy Extended Distance.)

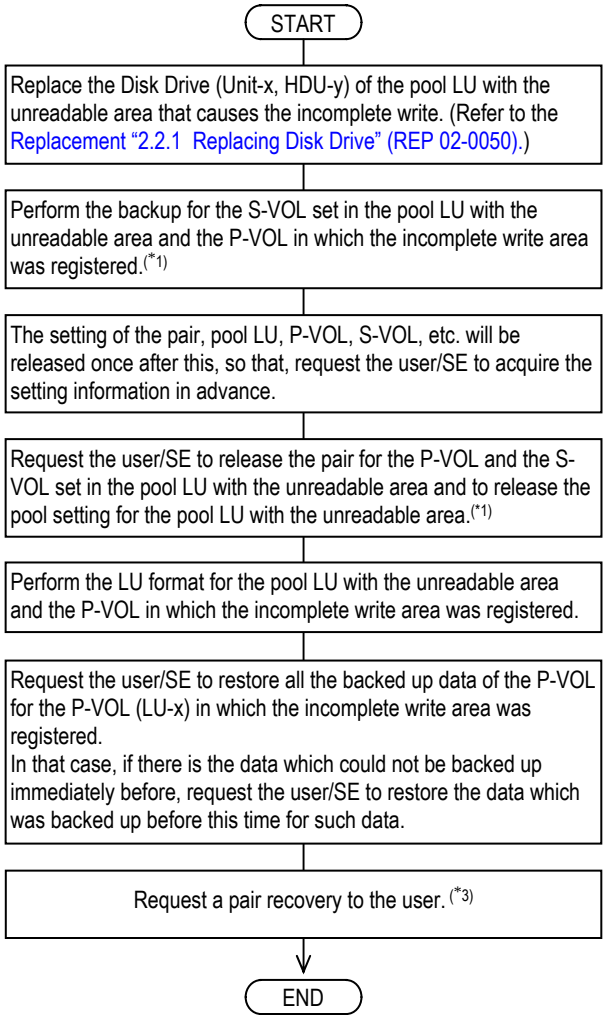
(1) In case of the failure with Copy-on-write SnapShot

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx I6D300 Unreadable PIN resisted (Unit-x, HDU-y, LU-z) :MANUAL/STRC

Date Time Detect Controller# Pool LU Disk Drive(*1) Primary VOL (*2)

[Recovery method]



*1 : If the pair release is performed, the data of the S-VOL is lost. Therefore, be sure to execute the backup of the S-VOL before performing the pair release.

*2 : For the LU format, refer to the System Paramter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280).

*3 : The secondary VOL data backed up and the primary VOL have the same capacity. Therefore, do not restore the secondary VOL data backed up for the secondary VOL, which executed pair setting again. Also, execute ①setting of the pool, ②setting of the P-VOL, ③setting of the V-VOL and ④pair formation to restore the pair.

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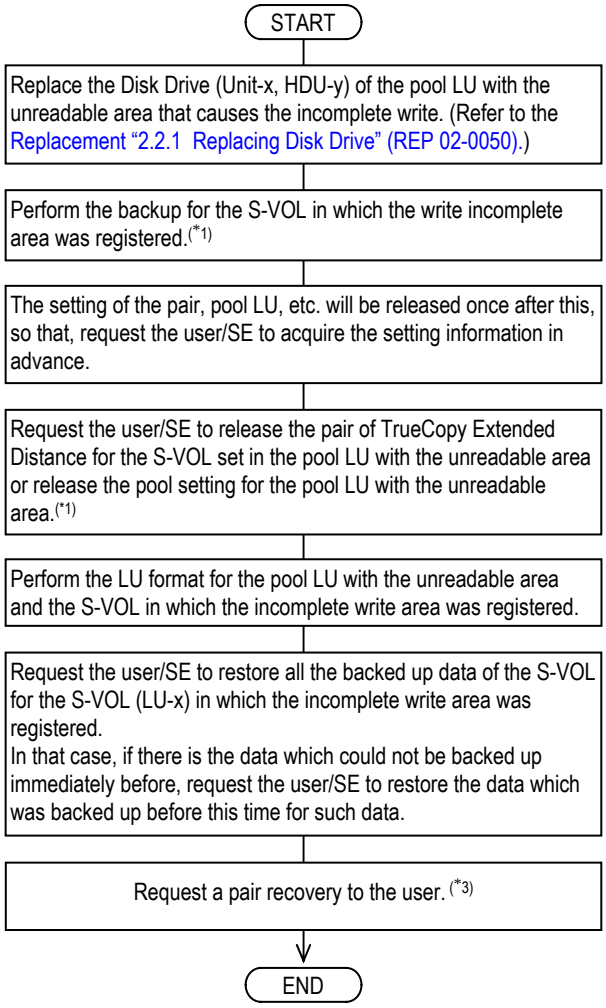
(2) In case of the failure with TrueCopy Extended Distance

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx I6D300 Unreadable PIN resisted (Unit-x, HDU-y, LU-z) :MANUAL/STRC

Date Time Detect Controller# Pool LU Disk Drive(*1) Primary VOL (*2)

[Recovery method]



*1 : If the pair release is performed, the data of which the previous cycle was determined and saved in the pool LU was lost. Therefore, be sure to execute the backup of the S-VOL before performing the pair release.

*2 : For the LU format, refer to the System Paramter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280).

*3 : Execute ① setting of the pool LU and ② pair formation to restore the pair.

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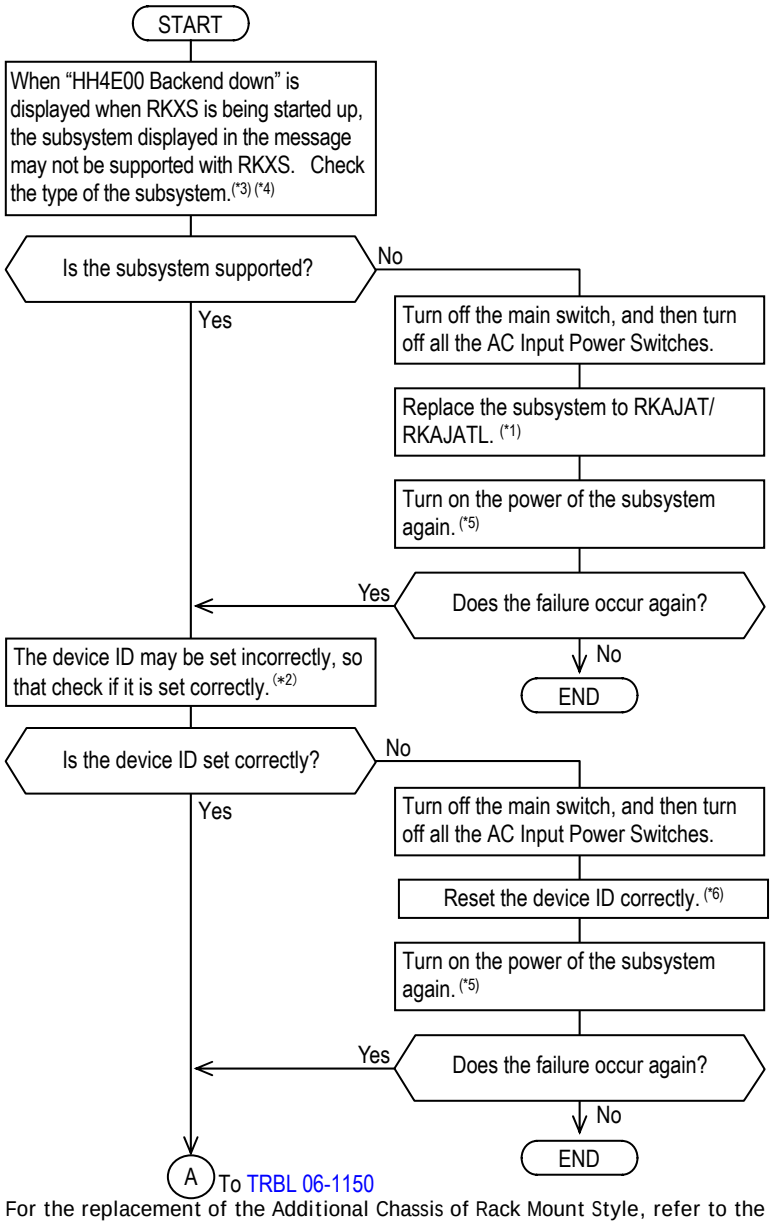
6.1.17 A failure in SES access occurs

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx HH4E00Backend down [SES access error BKW] (Unit-x) :MANUAL/STRC

Date Time Detect Controller#

[Recovery method]



*1 : For the replacement of the Additional Chassis of Rack Mount Style, refer to the Replacement "2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990).

*2 : Refer to Installation "1.6.2 Checking methods of device ID and ENC cable connection when mounting the newly introduced rack (INST 01-0180)" for checking the device ID.

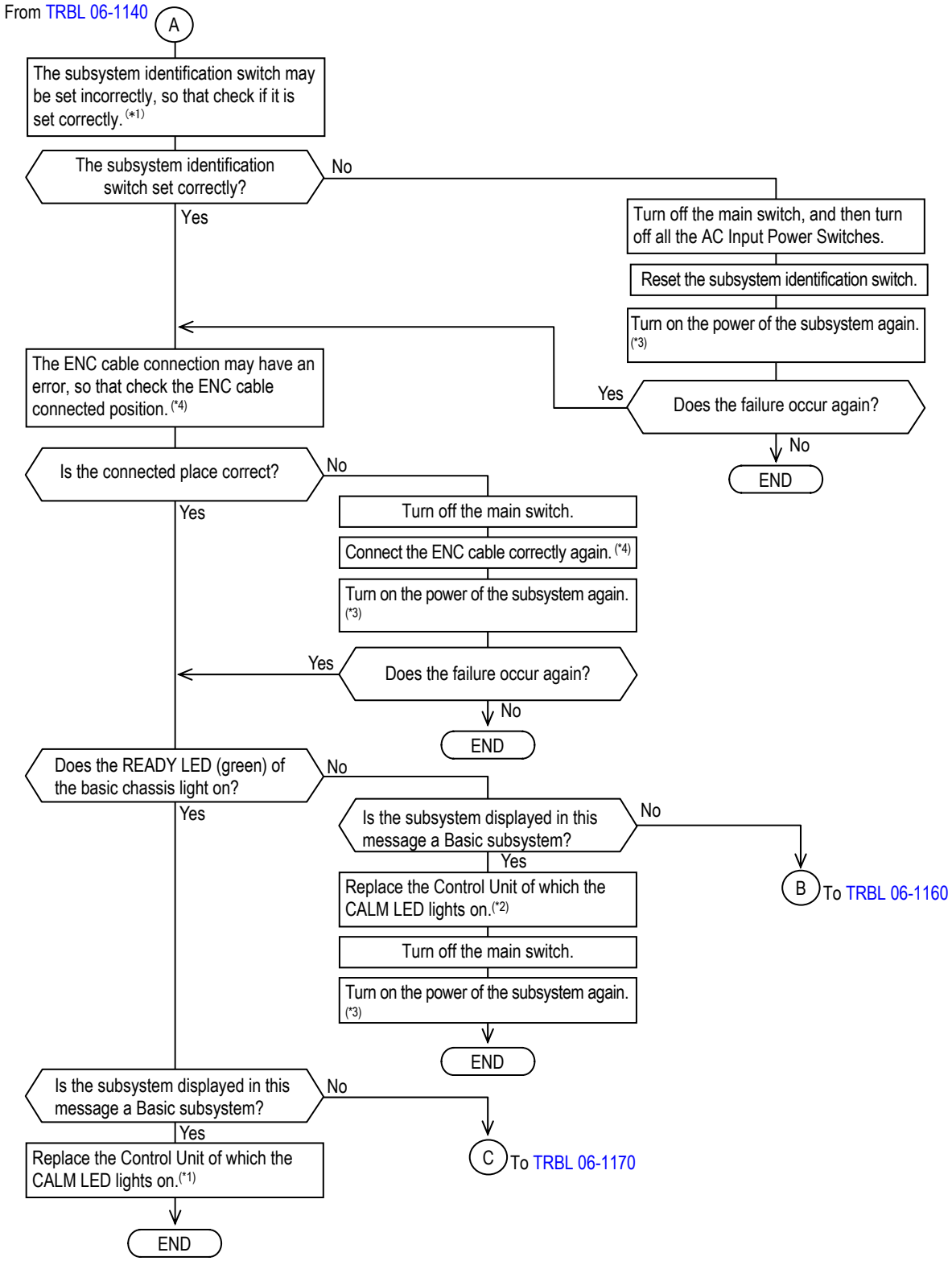
*3 : The additional chassis supported by the WMS100 are the DF700-RKAJAT and the DF600-RKAJAT.

*4 : Refer to Theory "Figure 2.3.6 Major Components of the RKAJ, RKAJAT" (THEO 02-0140).

*5 : Refer to Installation "1.7.1 Subsystem power on" (INST 01-0290).

*6 : Refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

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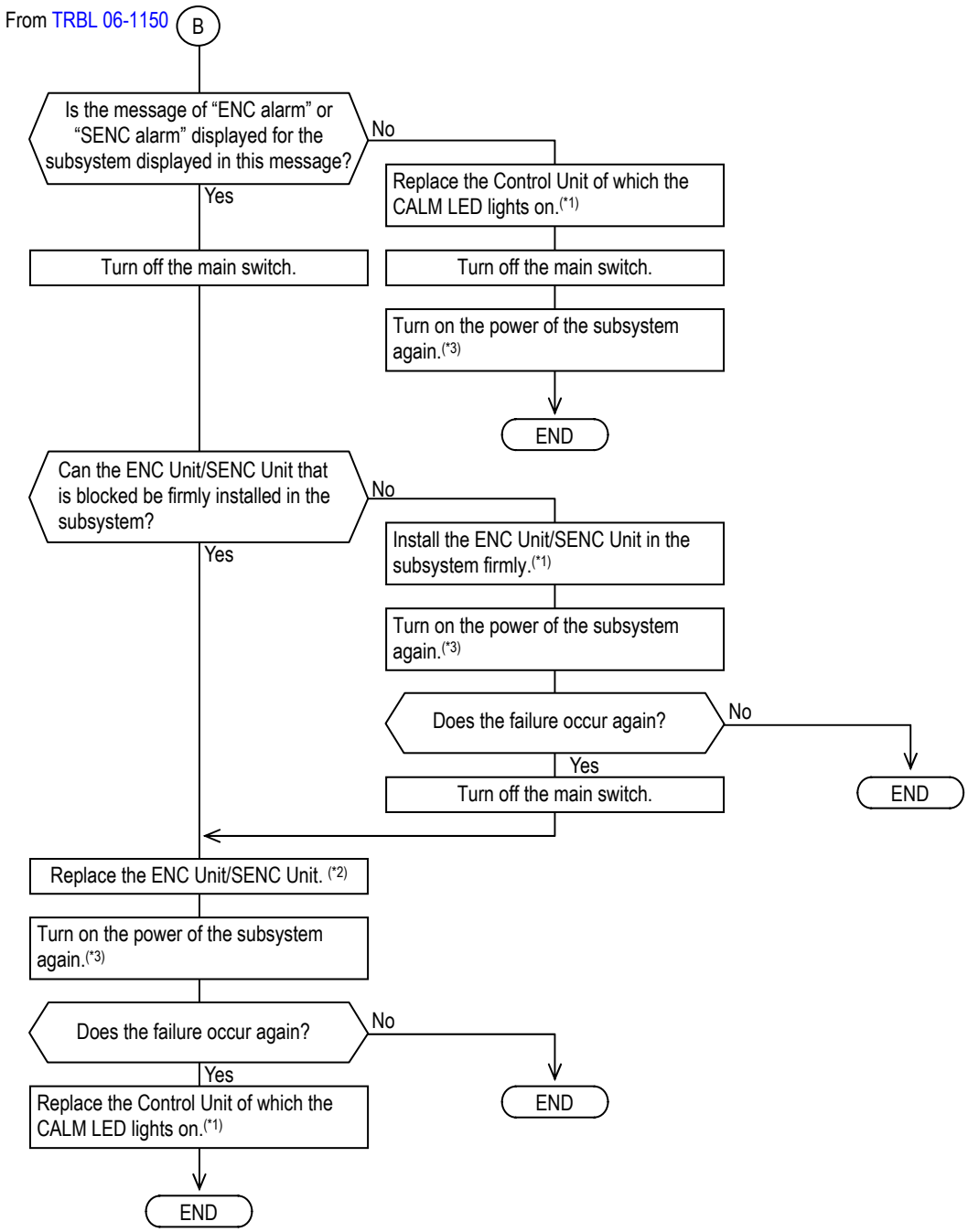
*1 : Refer to Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521) for setting the subsystem identification switch.

*2 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

*3 : Refer to Installation "1.7.1 Subsystem power on" (INST 01-0290).

*4 : Refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

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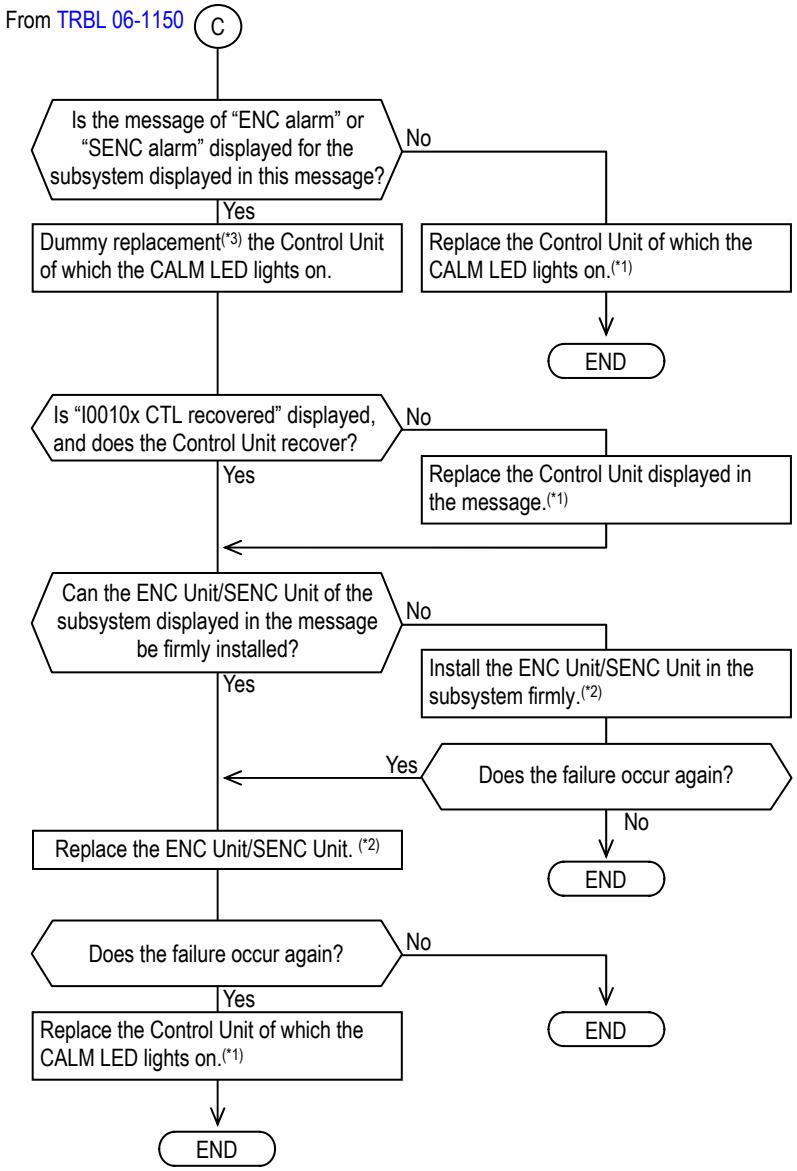


*1 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit (REP 02-0390).

*2 : For the replacement of the ENC Unit/SENC Unit, refer to the Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830).

*3 : Refer to Installation "1.7.1 Subsystem power on" (INST 01-0290).

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*1 : For the replacement of the Control Unit, refer to the Replacement "2.2.5 Replacing Control Unit (REP 02-0390).

*2 : For the replacement of the ENC Unit/SENC Unit, refer to the Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830).

*3 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection

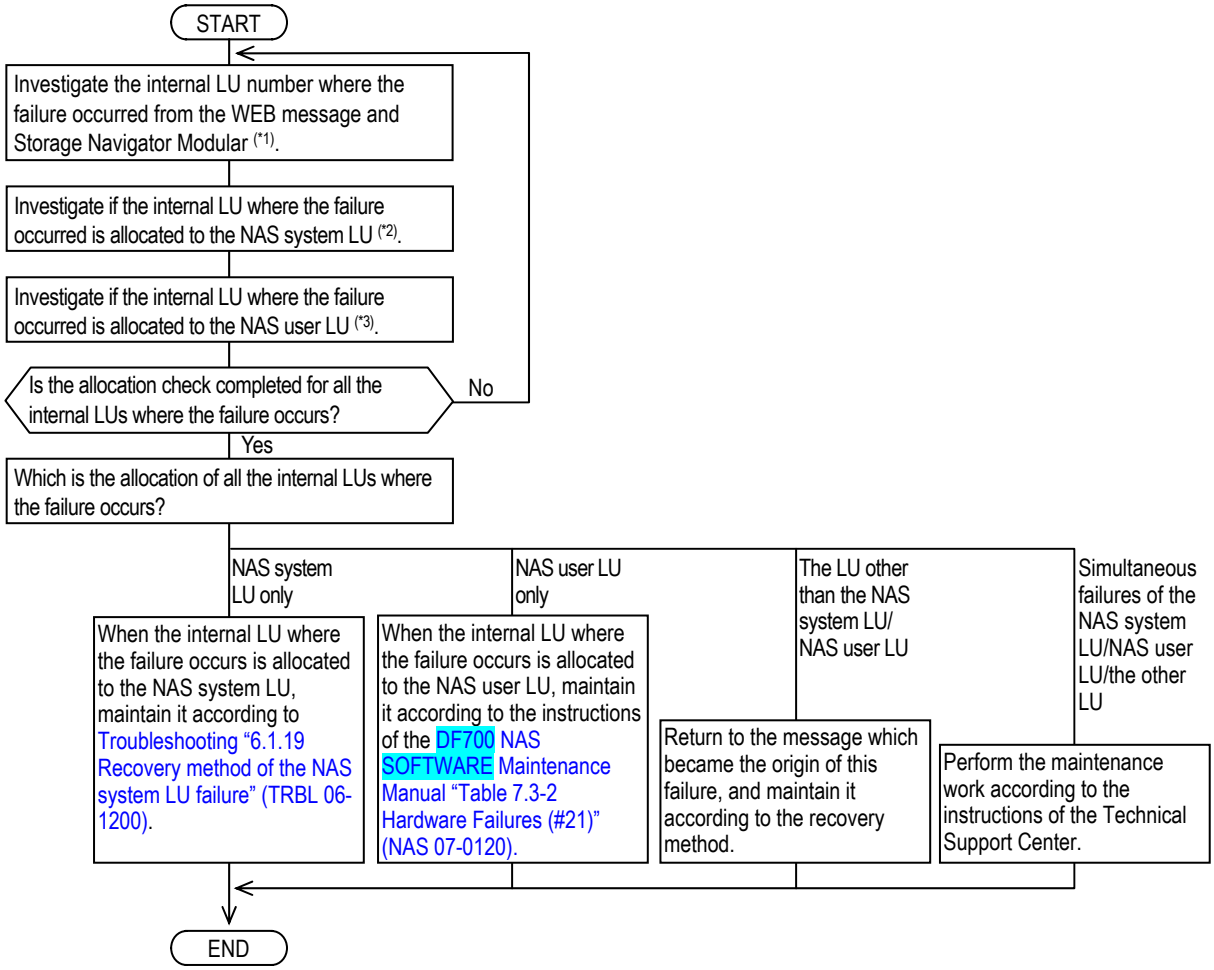
If the LU failure (Disk Drive dual failure, user data failure, etc.) occurred at the time of the NAS unit connection, recover it according to each recovery procedure after checking that the allocation of the internal LU where the failure occurs is either of the following, according to the flow shown below.

- It is allocated to the NAS system LU.
- It is allocated to the NAS user LU.
- It is allocated to neither the NAS system LU nor the NAS user LU.

NOTE : When the NAS system LU, the NAS user LU, and the other LU become failures at the same time, the recovery work is performed in the following order, but be sure to perform it according to the instructions of the Technical Support Center.

① Recover of the NAS system LU failure
② Recover of the NAS user LU failure
③ Recover of the LU failure other than the above-mentioned

[Checking method]



*1: Refer to "(1) Method of determining the failure LU" (TRBL 06-1190) for the method of determining the internal LU number where the failure occurs.

*2: Refer to System Parameter "3.7.1 Setting, change or deletion the system LU allocation"(SYSPR 03-0440) to refer to the current setting of the NAS system LU.
The list of the NAS system LU can be checked without performing "setting, change or deletion".

*3: Refer to System Parameter "3.7.2 Setting, change or deletion the user LU allocation" (SYSPR 03-0480) to refer to the current setting of the NAS user LU.
The list of the NAS user LU can be checked without performing "setting, change or deletion".

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(1) Method of determining the failure LU

The method of determining the internal LU of the failure LU differs depending on the message which detected the failure. Determine the internal LU number of the LU where the failure occurs according to the procedures shown below.

Massage code	Method of determining the failure LU	Reference page
I152xy I152HH	The RAID Group # is acquired from the blocked Disk Drive, and the degeneration LU (displayed in pink) of the target RAID Group # is targeted.(*1)	Storage Navigator Modular (for GUI) User's Guide "4.1 Displaying a RAID Group/Logical Unit Definition" (88 page)
I1GU00	All LUs in which the PIN information is displayed are targeted.	"10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0050)
I301AT I301xy I301HH	The RAID Group # is acquired from the blocked Disk Drive, and the degeneration LU (displayed in pink) of the target RAID Group # is targeted.(*2)	Storage Navigator Modular (for GUI) User's Guide "4.1 Displaying a RAID Group/Logical Unit Definition" (88 page)
W0G0xy W0G100	All LUs in which the PIN information is displayed are targeted.	"10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0050)
W0G20x	It becomes similar to I1GU00.(*3)	It becomes similar to I1GU00.
W0H000	The unformatted LU (displayed in gray) is targeted from the Storage Navigator Modular.	Storage Navigator Modular (for GUI) User's Guide "4.1 Displaying a RAID Group/Logical Unit Definition" (88 page)
W12000	The LU number displayed in the message text is targeted.	–
W320xy W321xy W322xy W323xy W324xy W325xy W326xy W327xy W328xy W329xy W32Axy W32Bxy W32Cxy W32Dxy W32Exy W32Fxy W330xy W331xy W332xy W333xy W334xy W335xy W3360x	If it could not be determined in the similar procedure to I1GU00, determine it in the procedure of I152xy/I152HH.	It becomes similar to I1GU00 and I152xy/I152HH.

*1 : The Disk Drive is not detached in RAID 0, so that it does not become the degeneration LU status. For RAID 0, target all LUs of the target RAID Group.

*2 : The Disk Drive is not detached in RAID 0, so that it does not become the degeneration LU status. For RAID 0, target all LUs of the target RAID Group. The Disk Drive is not detached.

*3 : Perform it after recovering the detached Control Unit.

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Massage code	Method of determining the failure LU	Reference page
W33700	If it could not be determined in the similar procedure to I1GU00, determine it in the procedure of I152xy/I152HH.	It becomes similar to I1GU00 and I152xy/I152HH.
W33800		
W33900		
W33A00		
W33B00		
W33C00		
W33D00		
W33E00		
W33F00		
W340xy		
W341xy		
W34200		
W34300		
W34400		
W41000		
W41100		
W49100		
W49200		
W49300		
W49400		
W49500		
W49600		

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6.1.19 Recovery method of the NAS system LU failure

When a NAS system LU failure occurred at the time of NAS unit connection, maintain it according to the flow of the recovery method shown below.

NOTE : For the notation of the NAS system LU, the display of the GUI window of the Storage Navigator Modular and the correspondence of the notation of "DF700 NAS SOFTWARE Maintenance Manual" are as follows.

Display of the GUI window of the Storage Navigator Modular	Notation of "DF700 NAS SOFTWARE Maintenance Manual"
System Disk(CTLx)	NAS OSLU
System Common Volume	NAS Cluster Management LU
Backup Volume for Common	Backup LU of NAS Cluster Management LU
Volume for Dump(CTL0)	Dump LU
Working Area for Dump	Error information LU
Command Device	Command device

[Checking method]

When an obstacle occurs in a plurality of NAS system LU simultaneously, please according to follows.

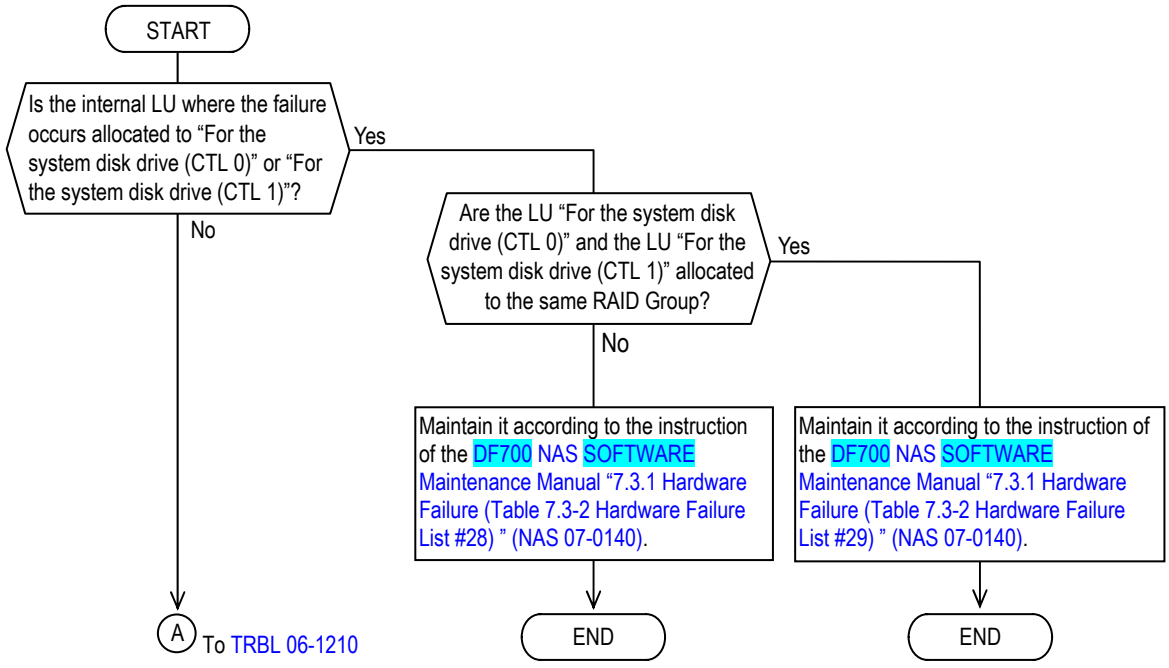
① When an obstacle occurs in both "For the system disk drive (CTL 0)" and "For the volume for the dump storage (CTL 0)", please conserve according to a procedure of "For the system disk drive (CTL 0)".

② When an obstacle occurs in both "For the system disk drive (CTL 1)" and "For the volume for the dump storage (CTL 1)", please conserve according to a procedure of "For the system disk drive (CTL 1)".

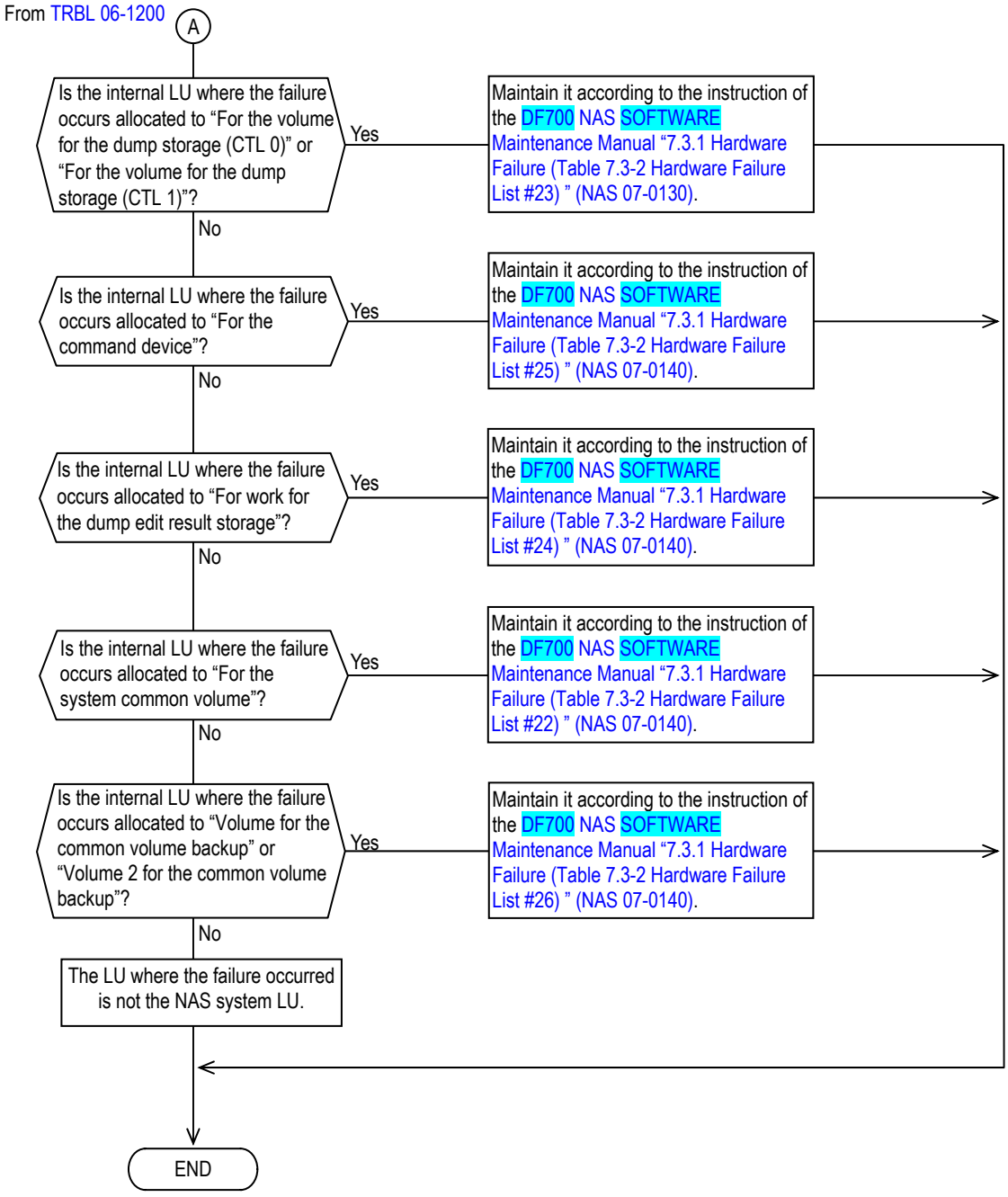
③ When an obstacle occurs in all of "For the system common volume", "For work for the dump edit result storage" and "For the command device", please conserve according to a procedure of "For the system common volume".

④ When an obstacle occurs in both "Volume for the common volume backup" and "Volume 2 for the common volume backup", please conserve according to a procedure of" Volume for the common volume backup".

⑤ Please conserve by instructions of Technical Support Center in a case aside from ① to ④.



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6.1.20 Recovery method at the time of the NAS system fail-over failure

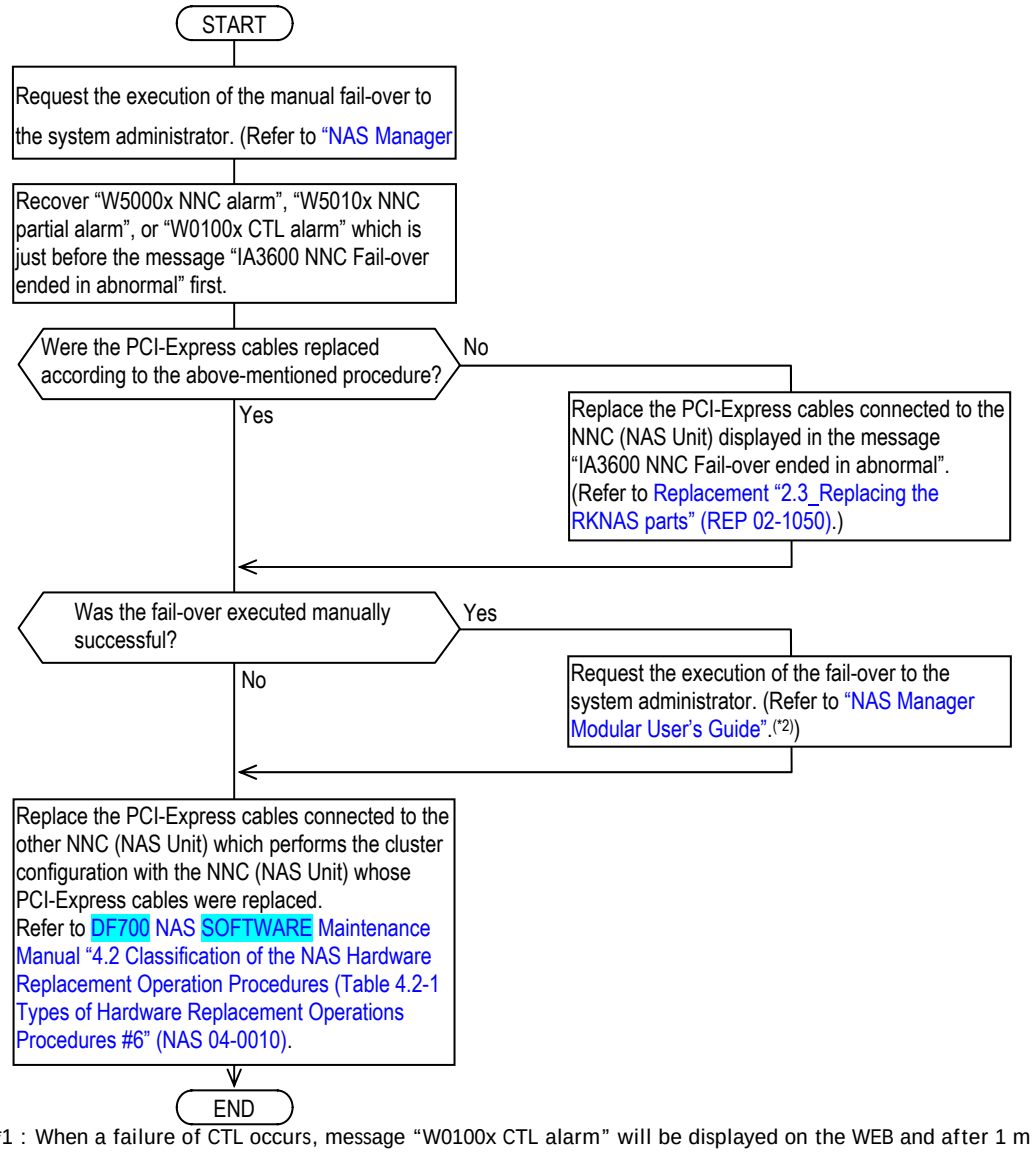
When the fail-over of the NAS Unit failed, recover it according to the following procedure.

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx IA3600 NNC Fail-over ended in abnormal [xy] (NNC-z) :MANUAL/NLOG

Date Time Detect Controller#

[Checking method]



*1 : When a failure of CTL occurs, message "W0100x CTL alarm" will be displayed on the WEB and after 1 minute (typically) message "IA3500 NNC Fail-over started" will be appear on the WEB.
But depending on the failure cause, message "IA3500 NNC Fail-over started" wouldn't appear though the fail over process is in progress. In that case, please ask the system administrator to check (1) whether failure message KAQG7210-E has issued and (2) the status of the resources, in order to confirm the fail over is in progress.

*2 : Please ask the system administrator not to carry out the failback when the I/O load is heavy. (e.g. during the execution of the COPY series command (paircreate, pairresync etc.) of TrueCopy remote replication, TrueCopy Extended Distance, ShadowImage in-system replication, Copy-on-write SnapShot)
When such COPY series command is in progress, there are possibility to fail the failback. In that case, please ask the system administrator to retry the failback after the completion of the COPY series command execution.

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6.1.21 Recovery method when illegal ENC cable connection or controller failure is detected

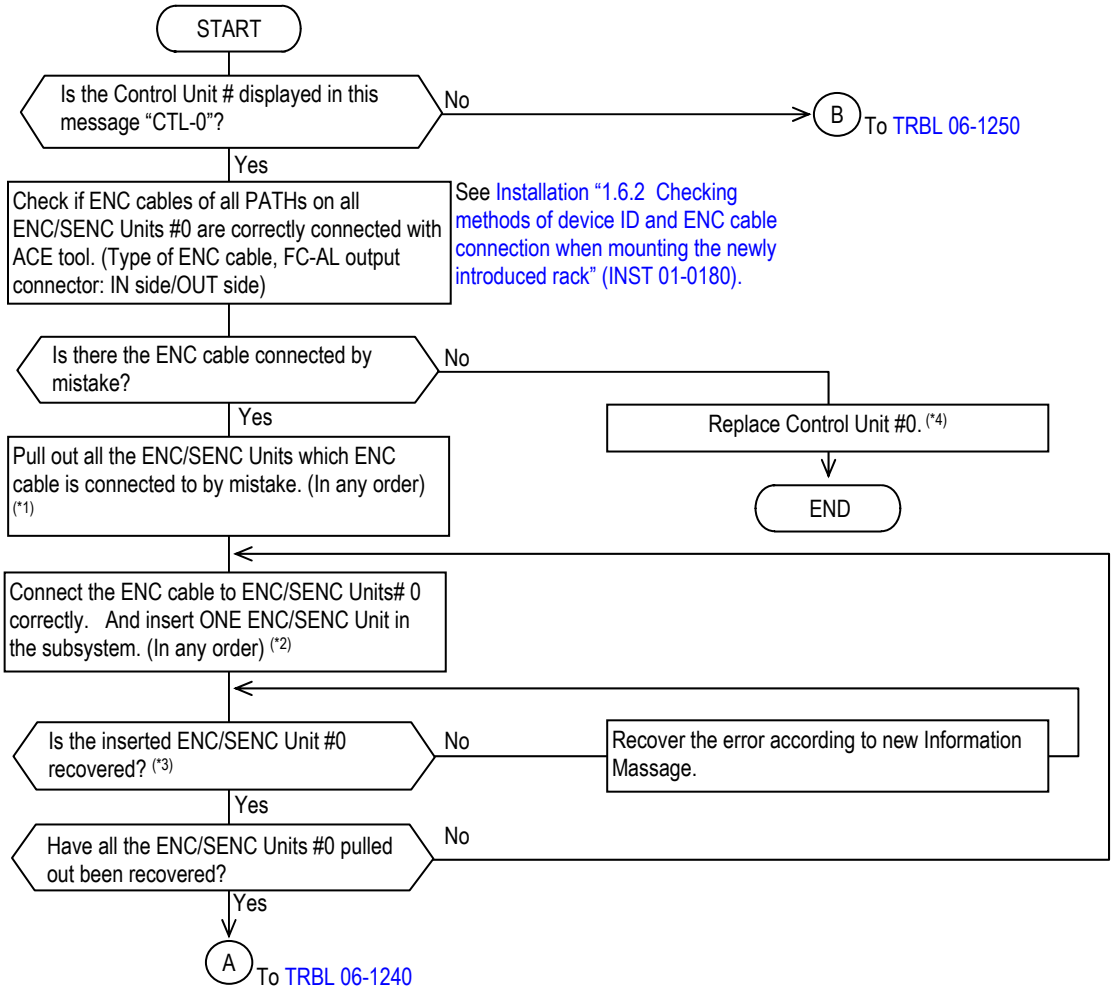
[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx HE200x ENC recovery failed(CTL-x) :MANUAL/STRC

Date Time Detect Controller#

When this message is displayed, there is illegal ENC cable connection or controller failure occurs. Recover the error it according to the flow shown bellow.

[Recovery method]



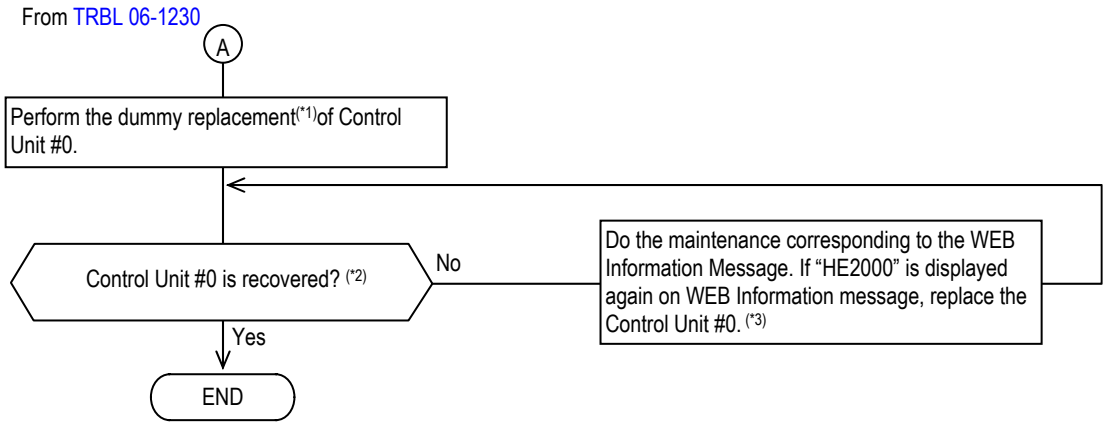
*1 : Do Not pull out ENC/SENC unit#1 or Control Unit#1. If ENC/SENC Unit#1 or Control Unit#1 is pulled out, subsystem down occurs.

*2 : Even if there are some ENC/SENC Units#0 pulled out, recover the ENC/SENC Units one by one.

*3 : ALM LED (red) of ENC/SENC Unit #0 turns off the lights. Information Message "I00Bx0 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-0)" is displayed on WEB.

*4 : See Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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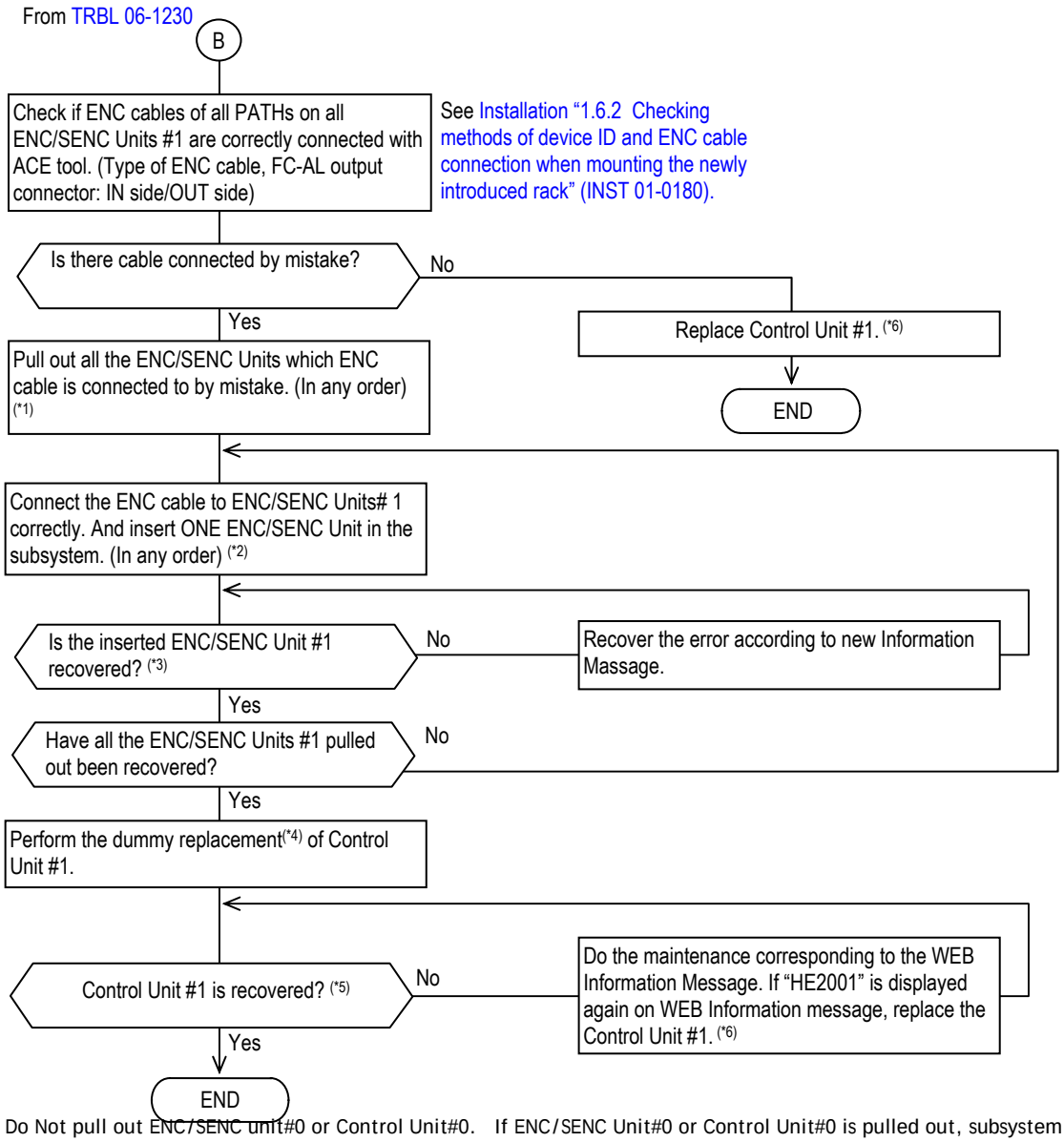


*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

*2 : CALM LED (red) of Control Unit #0 turn off. "I00100 CTL recovered (CTL-0)" is indicated on WEB Information Message. At the time of the NAS Unit connection, "IA1V0x NNC recovered (NNC-x)" is displayed on WEB Information Message after starting the NAS OS. When the remote adaptor is connected, the LED of the remote adaptor connected to the Control Unit turn on.

*3 : See Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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*1 : Do Not pull out ENC/SENC unit#0 or Control Unit#0. If ENC/SENC Unit#0 or Control Unit#0 is pulled out, subsystem down occurs.
*2 : Even if there are some ENC/SENC Units#1 pulled out, recover the ENC/SENC Units one by one.
*3 : ALM LED (red) of ENC/SENC Unit #1 turns off the lights. Information Message "I00Bx1 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-1)" is displayed on WEB.
*4 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.
*5 : CALM LED (red) of Control Unit #1 turn off. "I00101 CTL recovered (CTL-1)" is indicated on WEB Information Message. At the time of the NAS Unit connection, "IA1V0x NNC recovered (NNC-x)" is displayed on WEB Information Message after starting the NAS OS. When the remote adaptor is connected, the LED of the remote adaptor connected to the Control Unit turn on.
*6 : See Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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6.1.22 Recovery method when illegal ENC cable connection or ENC/SENC unit failure is detected

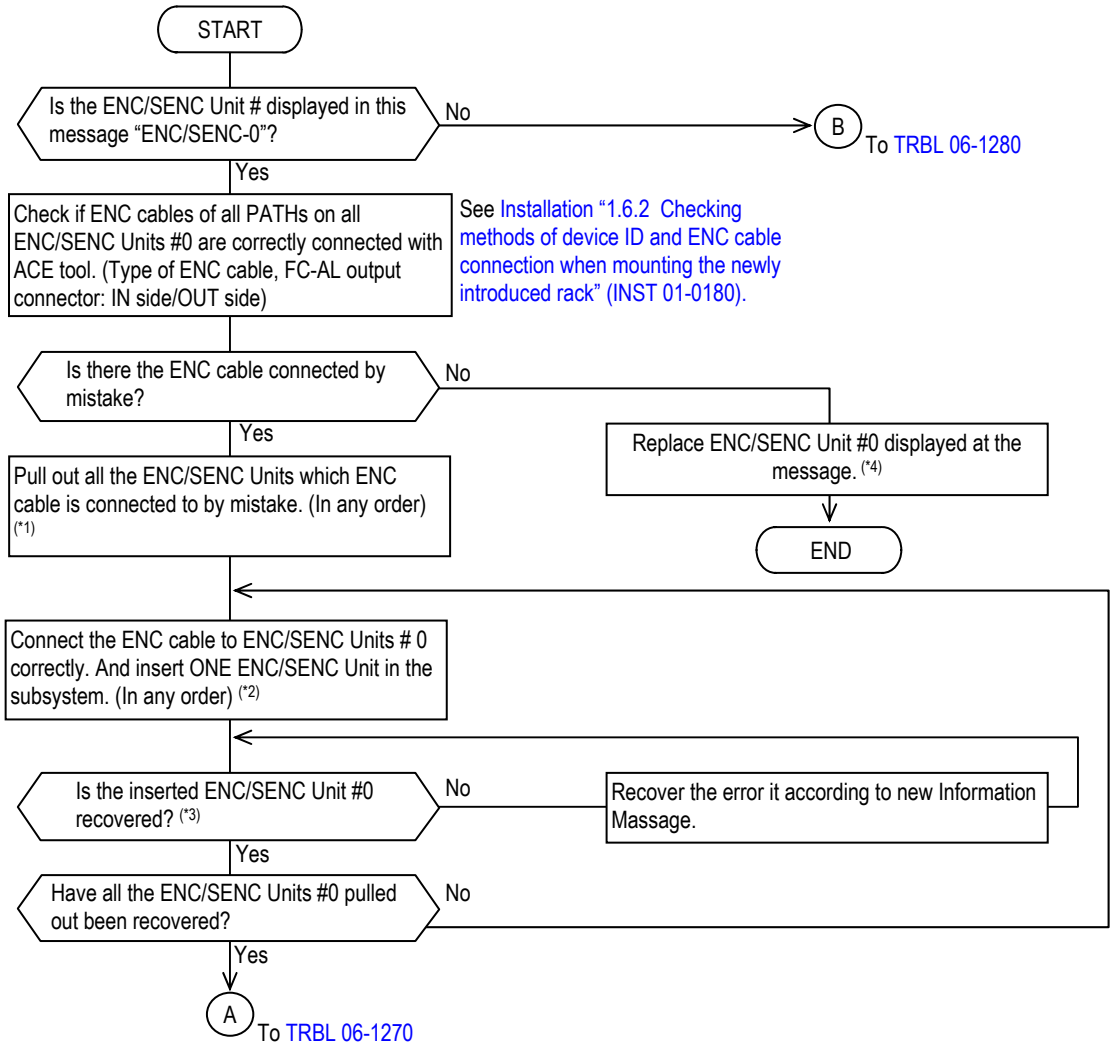
[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx I540xy ENC recovery failed(Unit-x, ENC-y) :MANUAL/STRC

Date Time Detect Controller#

When this message is displayed, there is illegal ENC cable connection or ENC/SENC Unit failure occurs. Recover the error it according to the flow shown bellow.

[Recovery method]



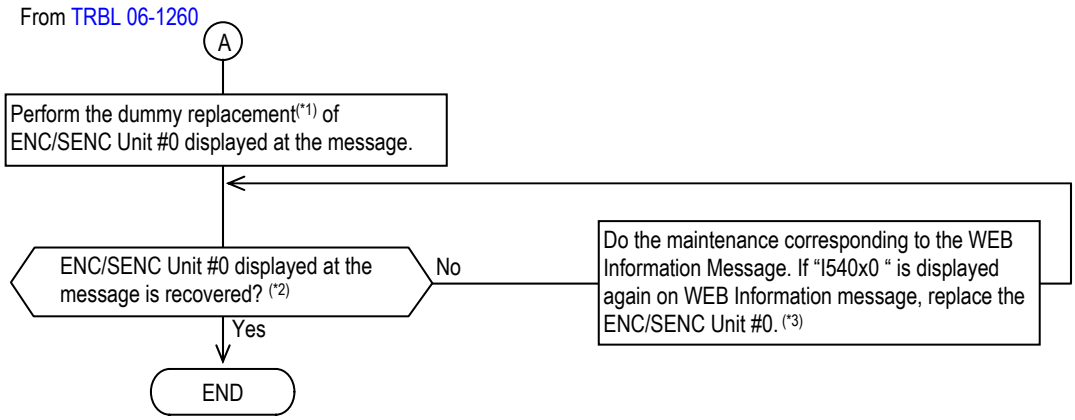
*1 : Do Not pull out ENC/SENC unit#1 or Control Unit#1. If ENC/SENC Unit#1 or Control Unit#1 is pulled out, subsystem down occurs.

*2 : Even if there are some ENC/SENC Units#0 pulled out, recover the ENC/SENC Units one by one.

*3 : ALM LED (red) of ENC/SENC Unit #0 turns off the lights. Information Message "I00Bx0 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-0)" is displayed on WEB.

*4 : See Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830).

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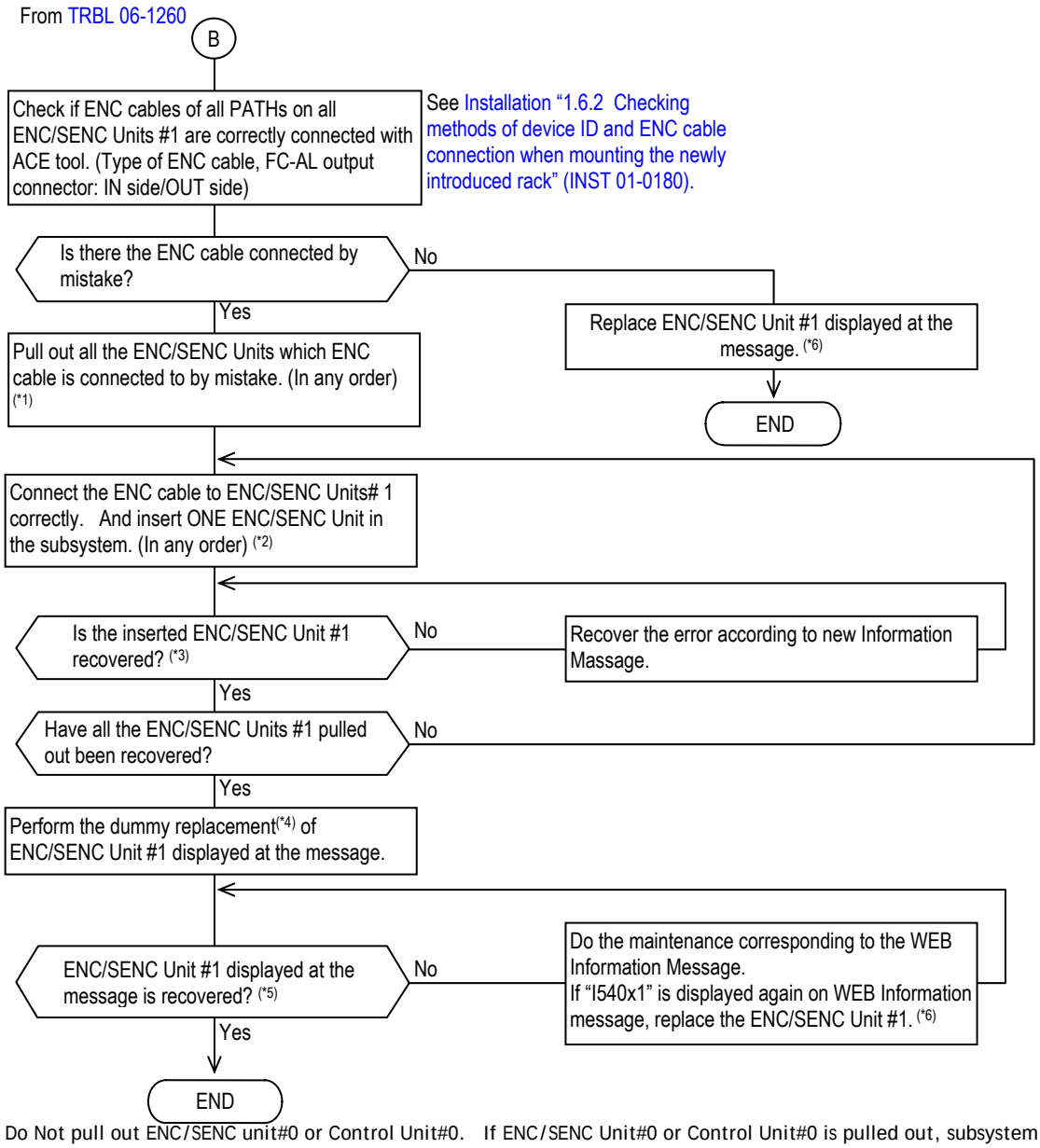


*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

*2 : ALM LED (red) of ENC/SENC Unit #0 turns off the lights. Information Message "I00Bx0 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-0)" is displayed on WEB.

*3 : See Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830).

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*1 : Do Not pull out ENC/SENC unit#0 or Control Unit#0. If ENC/SENC Unit#0 or Control Unit#0 is pulled out, subsystem down occurs.
*2 : Even if there are some ENC/SENC Units#1 pulled out, recover the ENC/SENC Units one by one.
*3 : ALM LED (red) of ENC/SENC Unit #1 turns off the lights. Information Message "I00Bx1 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-1)" is displayed on WEB.
*4 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.
*5 : ALM LED (red) of ENC/SENC Unit #1 turns off the lights. Information Message "I00Bx1 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-1)" is displayed on WEB.
*6 : See Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830).

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6.1.23 Recovery method when illegal ENC cable connection or Additional subsystem failure is detected

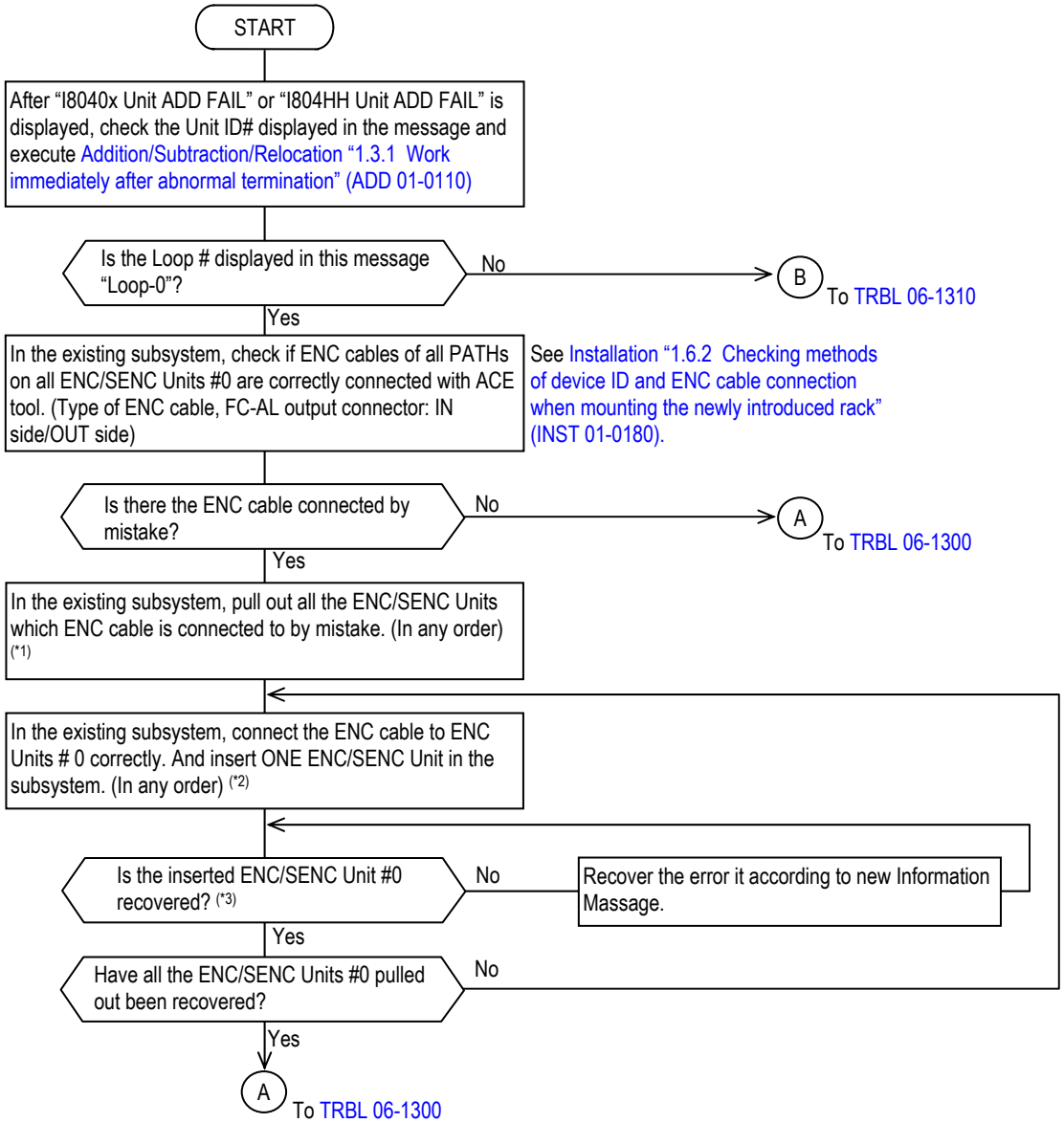
[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx I5YH00 Unit ADD Connect error (Unit-x, Loop-y): MANUAL/STRC

Date Time Detect Controller#

When this message is displayed, there is illegal ENC cable connection or controller failure occurs. Recover the error it according to the flow shown bellow.

[Recovery method]

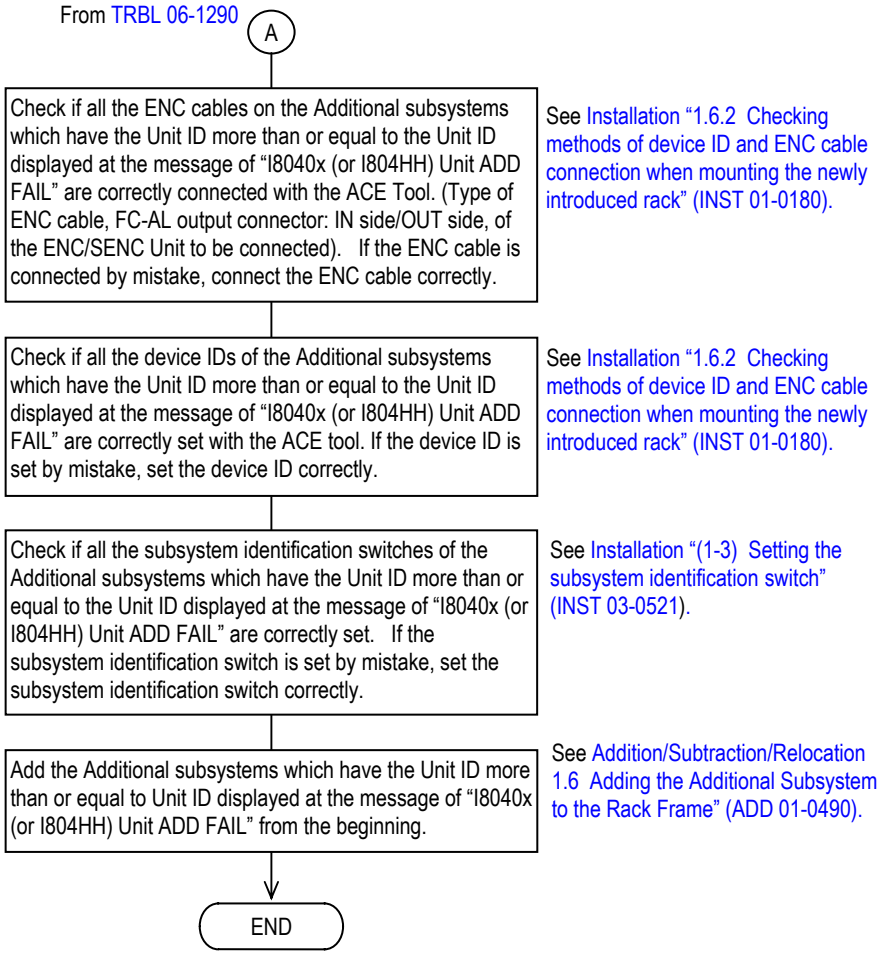


*1 : Do Not pull out ENC/SENC unit#1 or Control Unit#1. If ENC/SENC Unit#1 or Control Unit#1 is pulled out, subsystem down occurs.

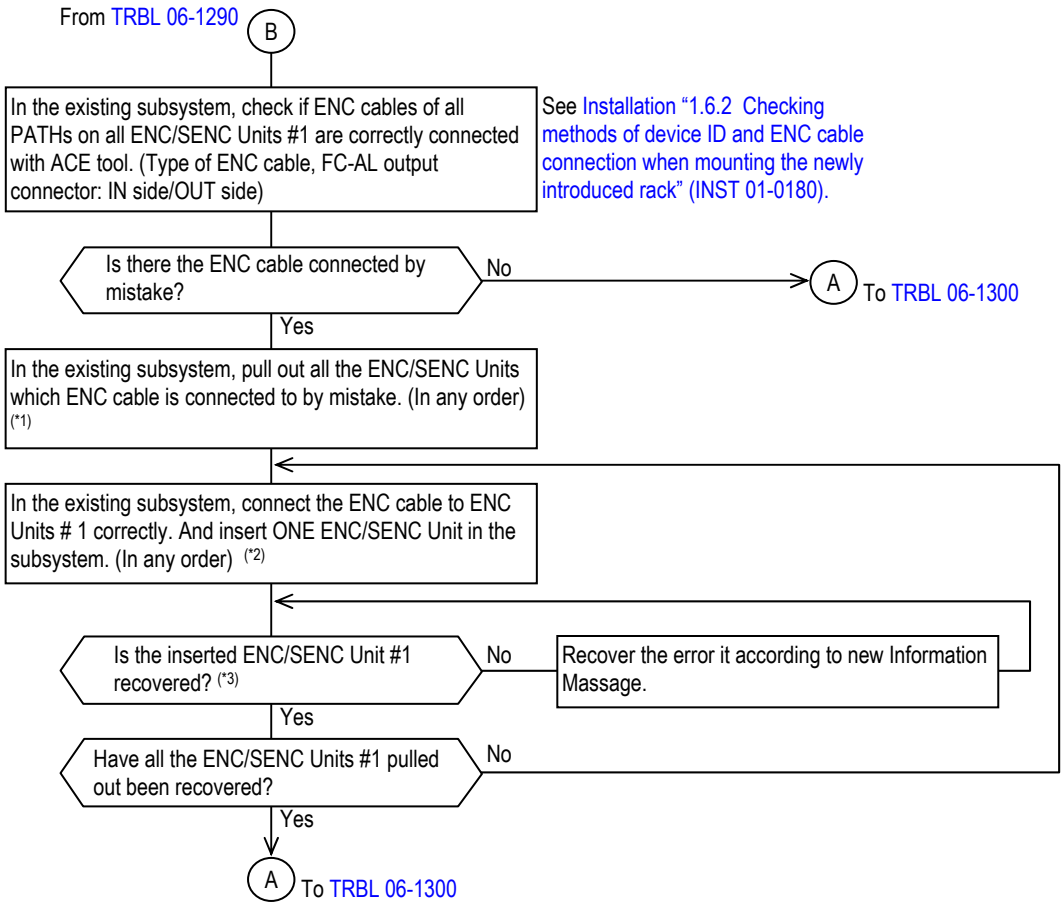
*2 : Even if there are some ENC/SENC Units#0 pulled out, recover the ENC/SENC Units one by one.

*3 : ALM LED (red) of ENC/SENC Unit #0 turns off the lights. Information Message "I00Bx0 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-0)" is displayed on WEB.

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*1 : Do Not pull out ENC/SENC unit#0 or Control Unit#0. If ENC/SENC Unit#0 or Control Unit#0 is pulled out, subsystem down occurs.

*2 : Even if there are some ENC/SENC Units#1 pulled out, recover the ENC/SENC Units one by one.

*3 : ALM LED (red) of ENC/SENC Unit #1 turns off the lights. Information Message "I00Bx1 (or I00BHH) ENC/SENC recovered (Unit-x, ENC-1)" is displayed on WEB.

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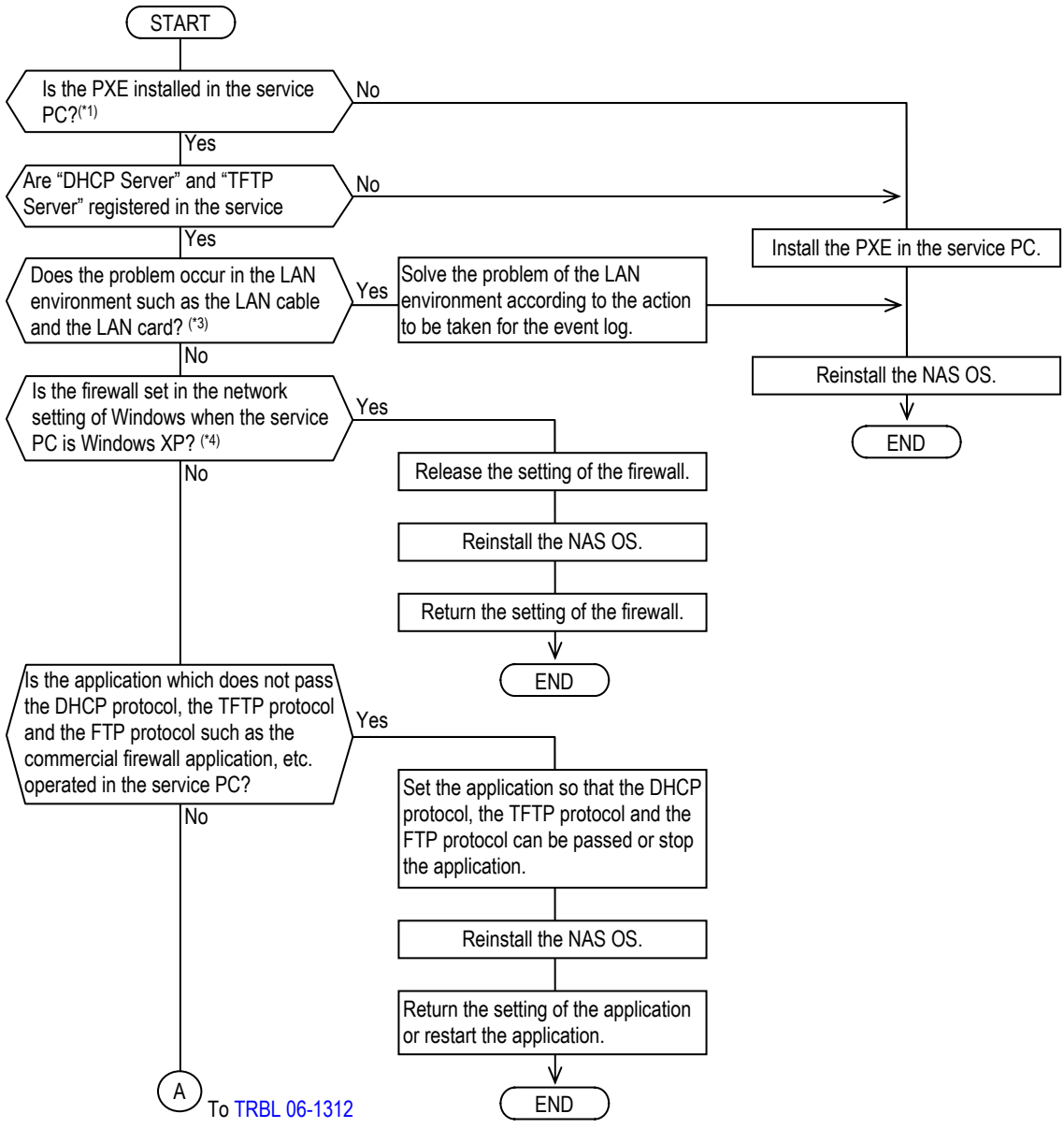
6.1.24 Recovery method of the NAS Unit starting time-out after installing the NAS OS due to the failure between the PXE-DHCP servers or between the PXE-FTP servers

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx IB2100 NNC Boot time-out [PXE] [post xxxx, yyyy] (NNC-z) :MANUAL/STRC

Date Time Detect Controller#

[Recovery method]



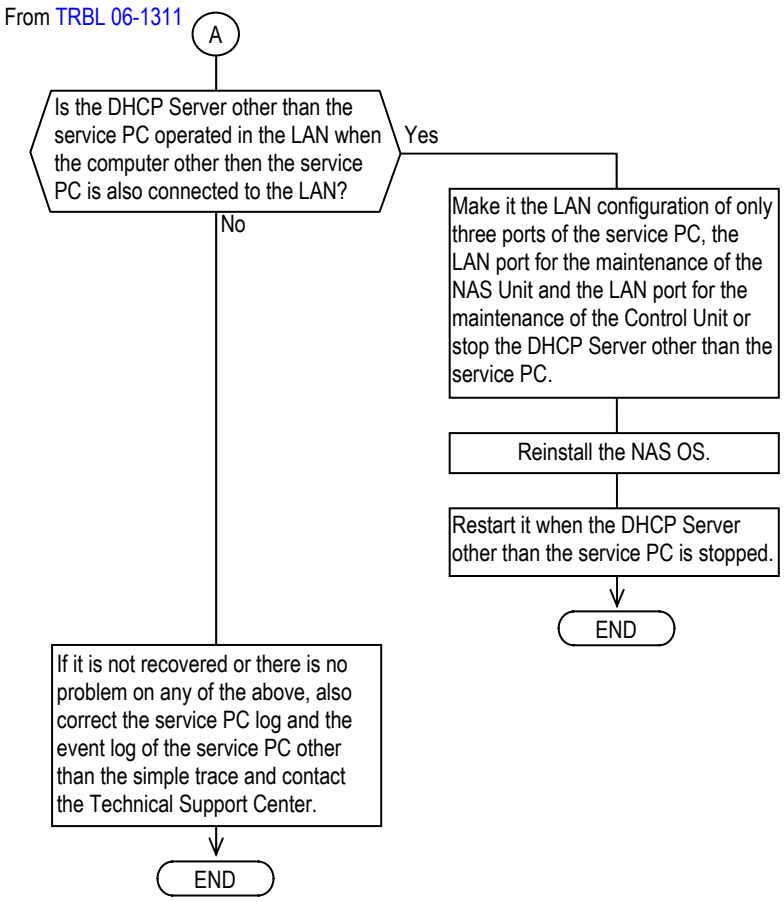
*1 : Check that "PXE Server Suite" is displayed referring to [Control Panel] – [Addition and Deletion of Application] of Windows.

*2 : Check that "DHCP Server" and "TFTP Server" are registered referring to [Control Panel] – [Management Tool] – [Service] of Windows.

*3 : Check if the error of the DHCP server and the TFTP server occurs in the event log.

*4 : Check if the [Internet Connection Firewall] check box is checked in [Control Panel] – [Network Connection] – [Local Area Connection] – [Property] – [Detail Setting] of Windows XP.

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6.1.25 Recovery method when the Control Unit whose microprogram is not supporting was detected

When "R5230x" is displayed, the update installation of the microprogram which is supporting the Control Unit of the new model name is not performed, or the model name of the installed Control Unit is incorrect. Therefore, perform the maintenance according to the following procedure.
Check the adaptable microprogram revision referring to Microprogram "1.9 Adaptable microprogram revision" (MICRO 01-0360).

(1) A failure occurs at the time of power-on
[Concrete phenomenon]
- When all the Control Units were replaced to the Control Units of the DF-F700-F2JH in the status where the power of the subsystem of the microprogram revision less than 0760/A is turned off, and then the subsystem power is turned on, the replaced Control Unit was blocked and the subsystem became Ready.
- When all the Control Units were replaced to the Control Units of the DF-F700-F2JH in the status where the power of the subsystem of the microprogram revision less than 0760/A is turned off, and then the subsystem power is turned on, all the Control Units were blocked and the subsystem went down.
- When the subsystem in which the Control Unit of the DF-F700-F2JH is installed was changed to the maintenance mode, the microprogram of the revision less than 0760/A was installed, and the subsystem was restored to the normal mode, all Control Units were blocked and the subsystem went down.
- When the system start attribute of the subsystem configured with the single controller and in which the microprogram of the revision less than 0760/A is installed was changed to the dual active mode and the Control Unit of the DF-F700-F2JH was added, the added Control Unit was blocked.

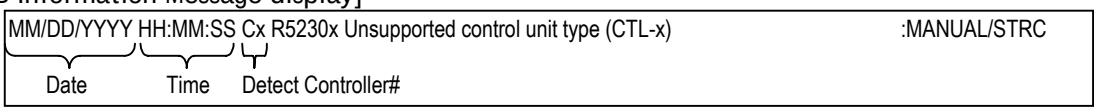
(2) A failure occurred when one Control Unit is inserted in the Basic Chassis in the status where the other Control Unit is operating.
[Concrete phenomenon]
- When one Control Unit is replaced to the Control Unit of the DF-F700-F2JH in the status where the subsystem configured with the dual controller and in which the microprogram of the revision less than 0760/A is installed is Ready, the replaced Control Unit did not recover.

(3) A failure occurred when the microprogram was replaced by the Storage Navigator Modular.
[Concrete phenomenon]
- When the microprogram of one Control Unit was replaced to the microprogram of the revision less than 0760/A in the status where the subsystem in which the Control Unit of the DF-F700-F2JH is installed is Ready, the Control Unit whose microprogram was replaced was blocked.

Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram

Model Name of Control Unit	Revision of Microprogram
DF-F700-F1JH	0732/A-H or more
DF-F700-F2JH	0760/A-H or more

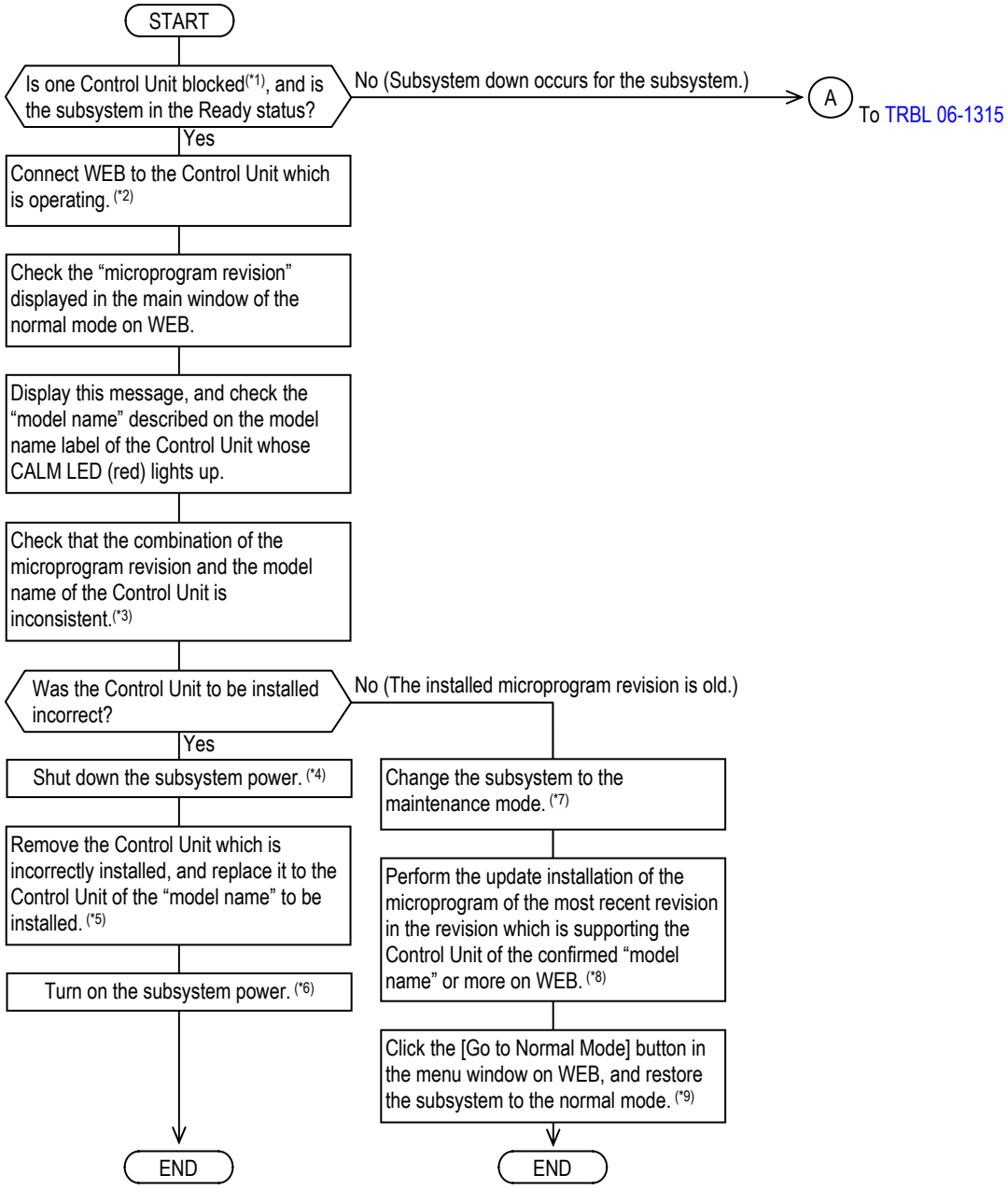
[WEB Information Message display]



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[Recovery method]

[Recovery method-1] : When a failure occurred at the time of power-on



*1 : "R5230x Unsupported control unit type (CTL-x)" is displayed in the Control Unit individual information of the Information Message on WEB for the blocked Control Unit, and the CALM LED (red) lights up.

*2 : Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

*3 : Refer to "Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram" (TRBL 06-1313).

*4 : Refer to Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310).

*5 : Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

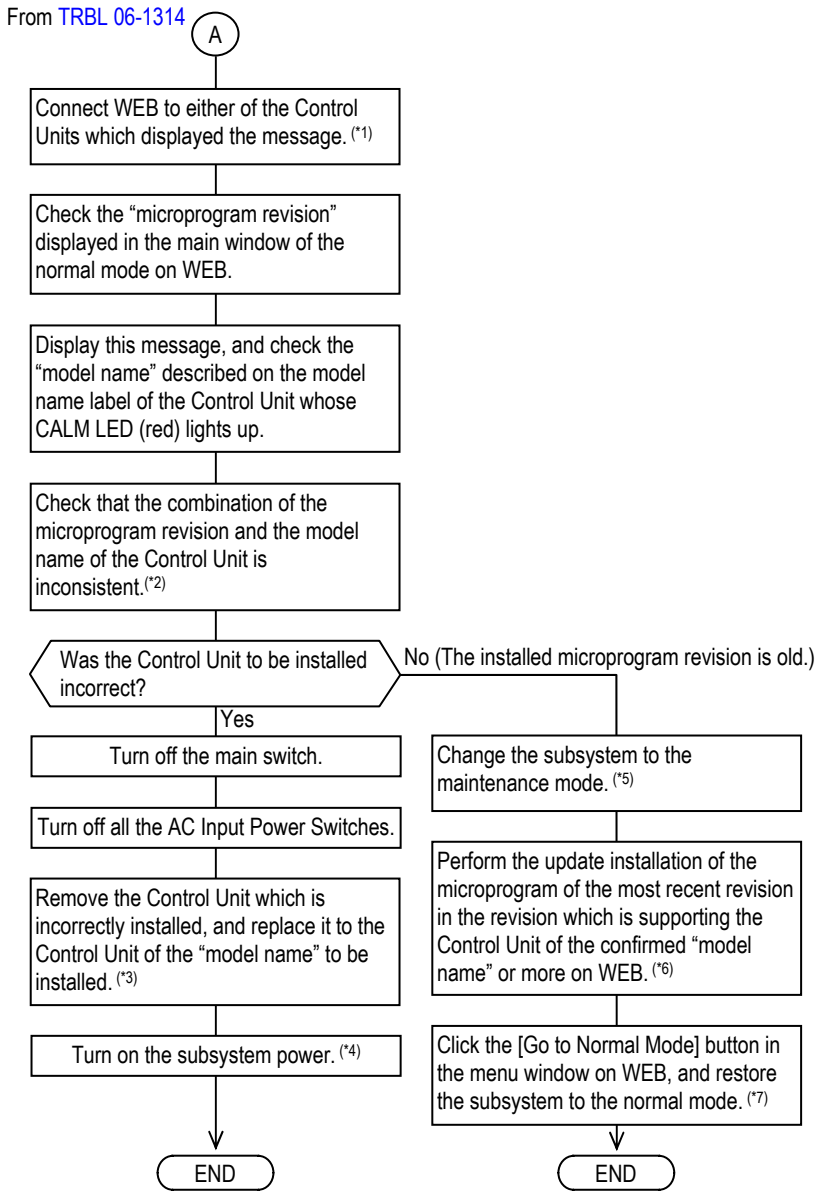
*6 : Refer to Installation "1.7.1 Subsystem power on" (INST 01-0290).

*7 : Refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

*8 : Refer to WEB "3.3.1 Microprogram" (WEB 03-0280).

*9 : Refer to WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440).

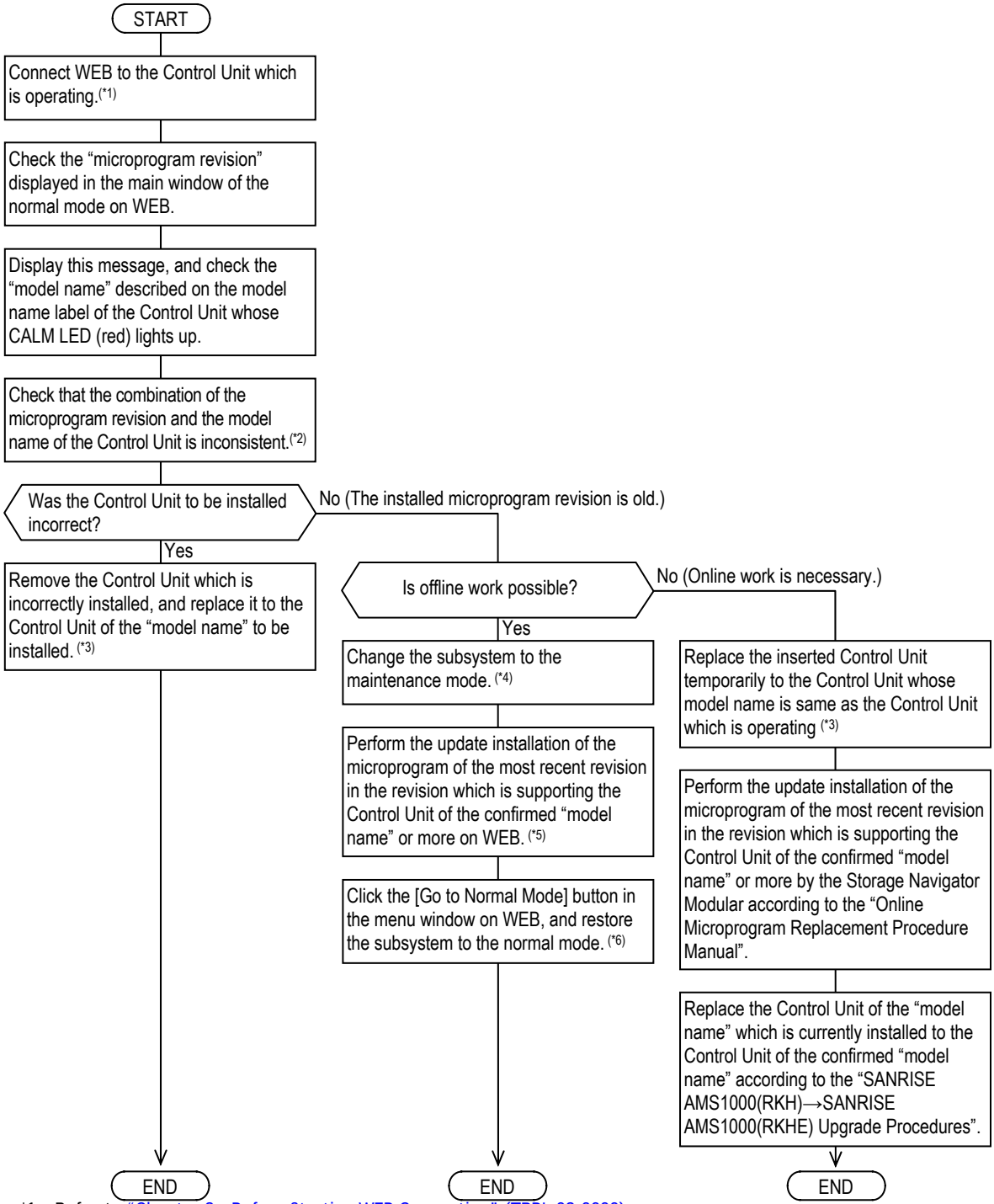
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*1 : Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).
*2 : Refer to "Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram" (TRBL 06-1313).
*3 : Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).
*4 : Refer to Installation "1.7.1 Subsystem power on" (INST 01-0290).
*5 : Refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).
*6 : Refer to WEB "3.3.1 Microprogram" (WEB 03-0280).
*7 : Refer to WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440).

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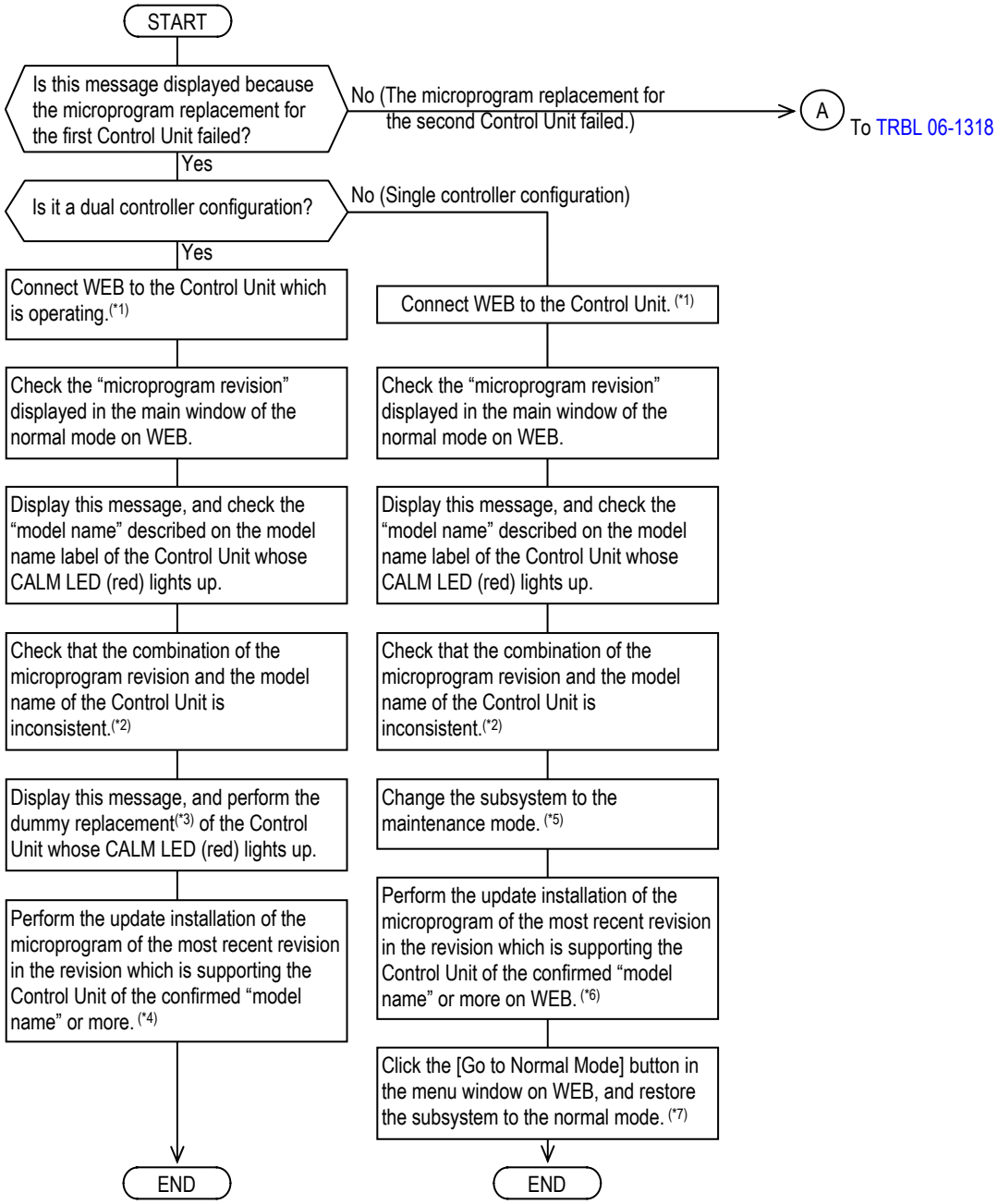
[Recovery method-2] : When a failure occurred at the time when the Control Unit was inserted in the Basic Chassis



*1 : Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).
*2 : Refer to "Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram" (TRBL 06-1313).
*3 : Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).
*4 : Refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).
*5 : Refer to WEB "3.3.1 Microprogram" (WEB 03-0280).
*6 : Refer to WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440).

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[Recovery method-3] : When a failure occurred at the time when the microprogram was replaced



*1 : Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).

*2 : Refer to "Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram" (TRBL 06-1313).

*3 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

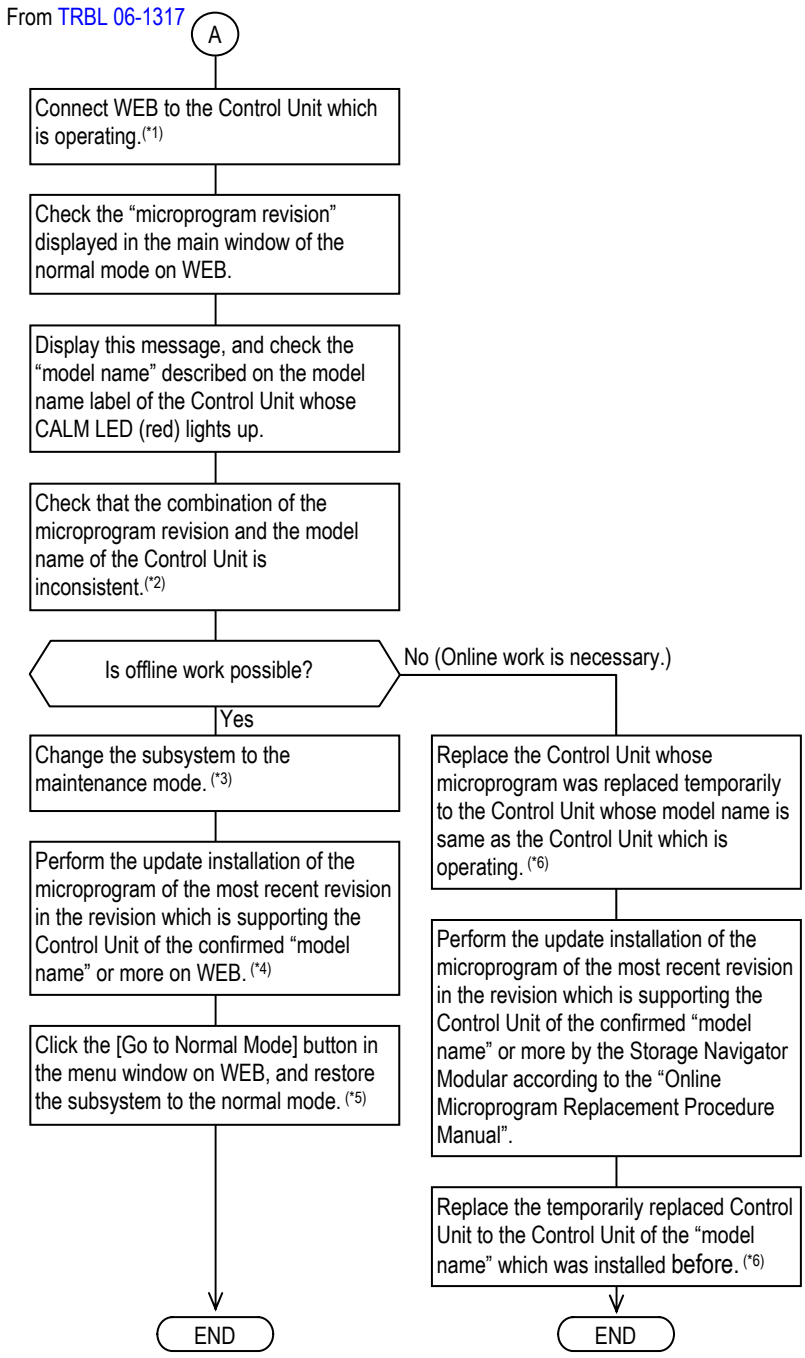
*4 : Refer to Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000).

*5 : Refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

*6 : Refer to WEB "3.3.1 Microprogram" (WEB 03-0280).

*7 : Refer to WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440).

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*1 : Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).
*2 : Refer to "Table 6.1.5 Consistency of the Model Name of the Control Unit and the Revision of the Microprogram" (TRBL 06-1313).
*3 : Refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).
*4 : Refer to WEB "3.3.1 Microprogram" (WEB 03-0280).
*5 : Refer to WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440).
*6 : Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).

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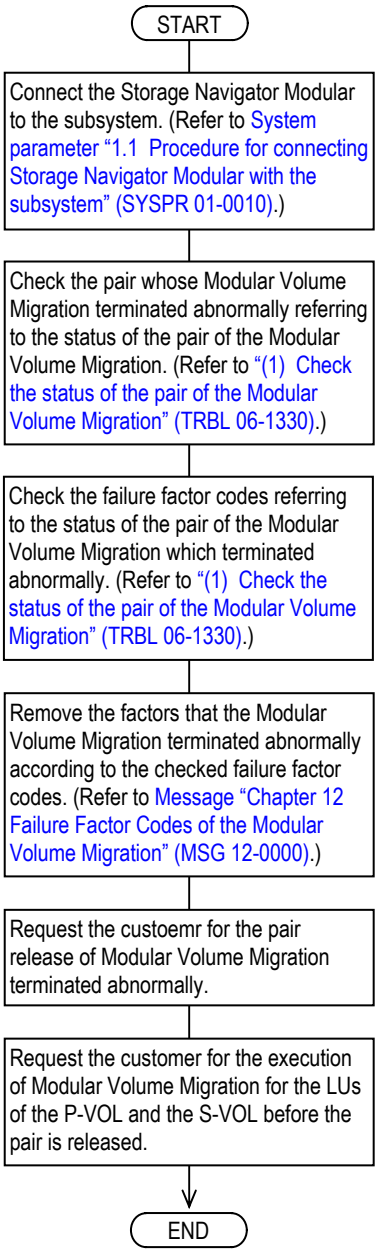
6.1.26 Recovery method of the Modular Volume Migration which terminated abnormally

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx I6ER00 Modular Volume Migration failed (LU-x/y) :MANUAL/STRC
MM/DD/YYYY HH:MM:SS Cx I6ES00 Modular Volume Migration failed

Date Time Detect Controller#

[Recovery method]



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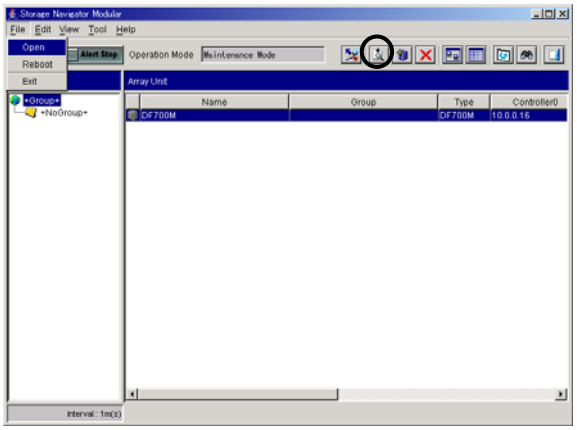
(1) Check the status of the pair of the Modular Volume Migration

(a) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to System Parameter "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050), "Registering the newly introduced DF in the Storage Navigator Modular" in Subsection 1.1.

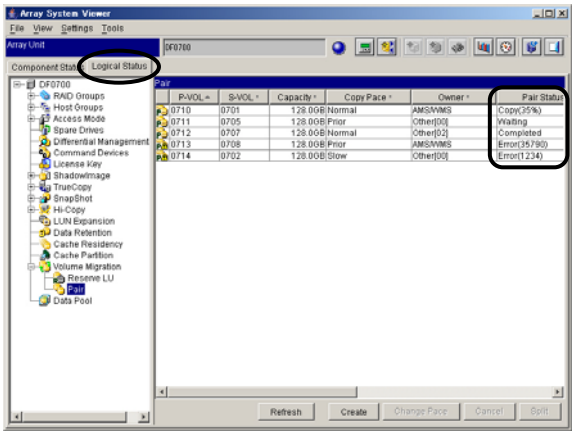
(b) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100).)



(c) On the unit window, click the [Logical Status] tab.



(d) Click [Volume Migration] of the tree view.

(e) Click [Pair] of [Volume Migration] of the tree view.
The list of the pairs and the information of each pair are displayed in the list view.

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(f) When the Modular Volume Migration terminated abnormally and the pair changed to PSUE, "Error (failure factor code)" is displayed in [Pair Status]. The pair displayed [Error] in [Pair Status] is the pair whose Modular Volume Migration terminated abnormally.

(g) Check the failure factor code for each pair whose Modular Volume Migration terminated abnormally referring to [Pair Status]. (Refer to Message "Chapter 12 Failure Factor Codes of the Modular Volume Migration" (MSG 12-0000) for the details.)

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6.1.27 Recovery method when the subsystem becomes the warning status while using the Power Saving function of the priced option

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W0GM00 SENC which may attach restrictions on Power Saving function was detected :MANUAL/STRC

Date Time Detect Controller#

[Opportunities]

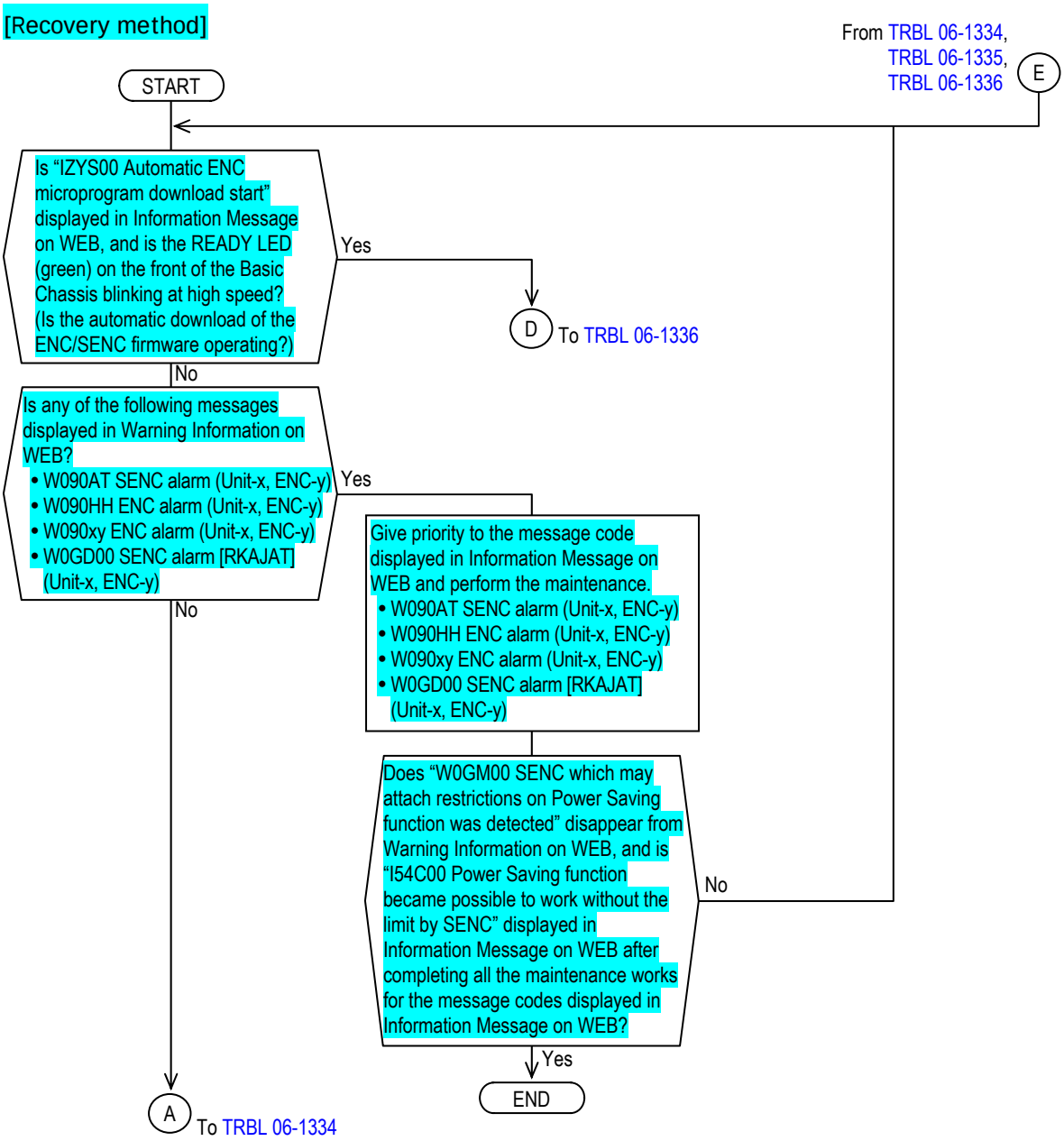
When this message is displayed in Warning Information on WEB, the WARN LED (orange) on the front of the Basic Chassis is lighting up or blinking, and the subsystem is in the Warning status.

When the Power Saving function of the priced option is enabled, this message may be displayed in Warning Information on WEB in the following opportunities.

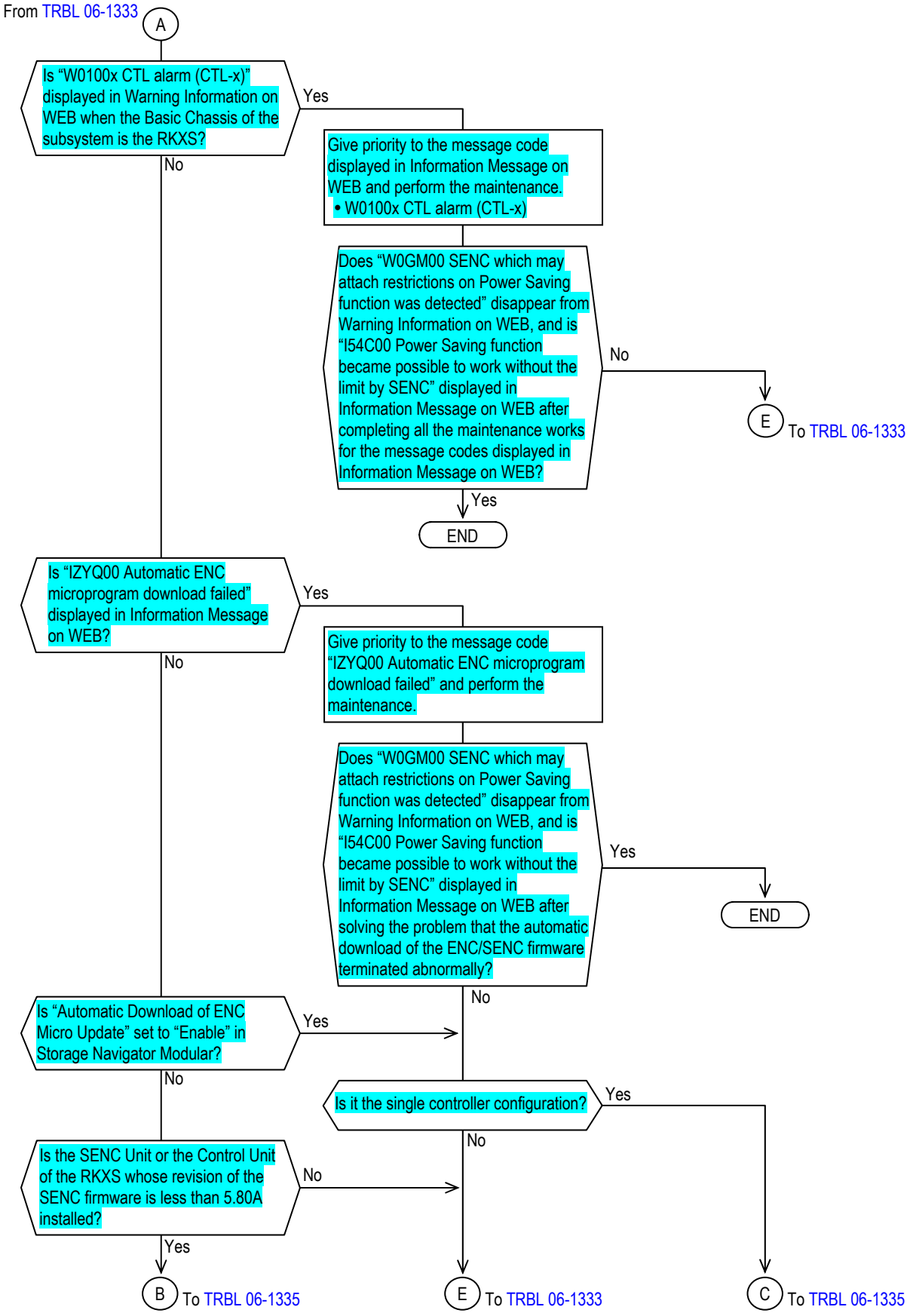
1. When the Control Unit of the RKXS is blocked
2. When the SENC Unit is blocked
3. When the SENC Unit of the RKAJAT is replaced to the SENC Unit whose revision of the SENC firmware is less than 5.80A with the subsystem power turned off, and then the subsystem power is turned on and the subsystem becomes the Ready status
4. When the Control Unit of the RKXS is replaced to the Control Unit whose revision of the SENC firmware is less than 5.80A with the subsystem power turned off, and then the subsystem power is turned on and the subsystem becomes the Ready status
5. When the subsystem downloads the SENC firmware whose revision is less than 5.80A offline, and then the subsystem reboots and the subsystem becomes the Ready status
6. When the RKAJAT installing the SENC Unit whose revision of the SENC firmware is less than 5.80A is added to the subsystem online and the addition is completed
7. When the RKAJAT installing the SENC Unit whose revision of the SENC firmware is less than 5.80A is added to the subsystem with the subsystem power turned off, and then the subsystem power is turned on and the subsystem becomes the Ready status
8. When the SENC Unit installing the SENC firmware whose revision is less than 5.80A is installed in the RKAJAT and Power Saving of the priced option is unlocked
9. When the SENC Unit installing the SENC firmware whose revision is less than 5.80A is installed in the RKAJAT and Power Saving of the priced option is set from “Disable” to “Enable”
10. When the subsystem is the dual controller configuration, the Control Unit of the RKXS installing the SENC firmware whose revision is less than 5.80A is installed in the RKXS, and Power Saving of the priced option is unlocked
11. When the subsystem is the dual controller configuration, the Control Unit of the RKXS installing the SENC firmware whose revision is less than 5.80A is installed in the RKXS, and Power Saving of the priced option is set from “Disable” to “Enable”
12. When the Control Unit of the RKXS installing the SENC firmware whose revision is less than 5.80A is added to the RKXS with the subsystem power turned off to change the RKXS from the single mode to the dual active mode, and then the subsystem power is turned on and the subsystem becomes the Ready status

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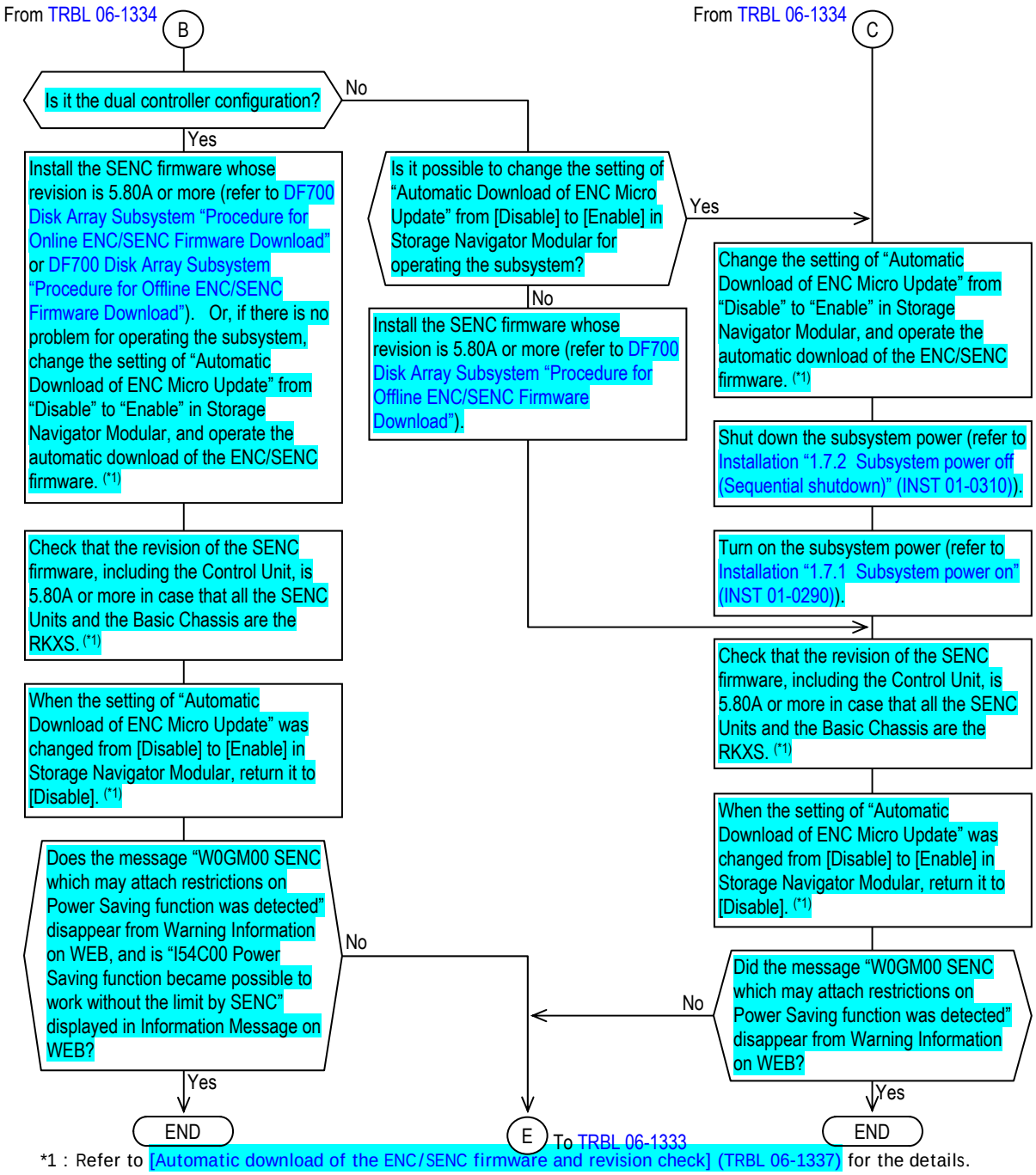
[Recovery method]



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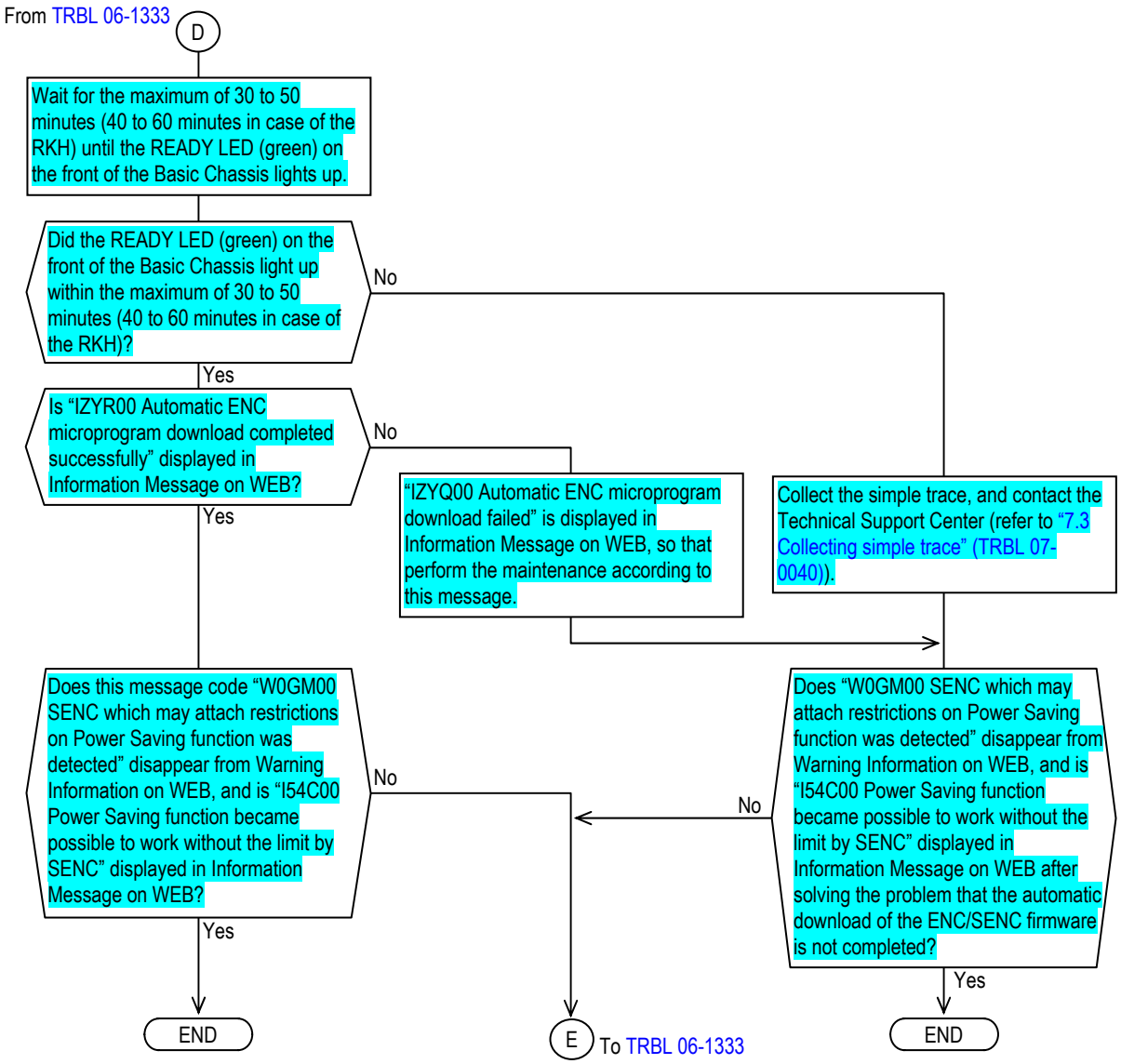


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*1 : Refer to [Automatic download of the ENC/SENC firmware and revision check] (TRBL 06-1337) for the details.

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[Automatic download of the ENC/SENC firmware and revision check]

(1) Display of the [ENC Micro Update] tab

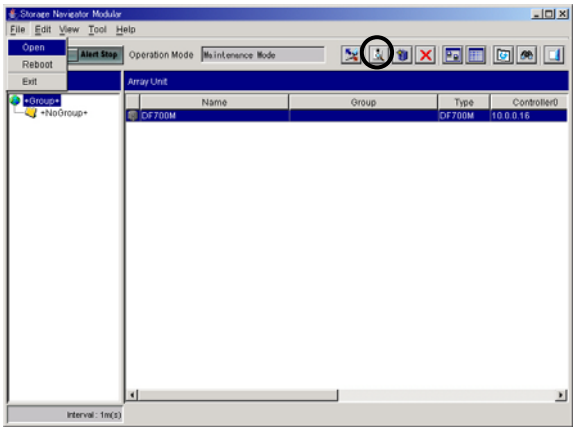
(a) Start the Storage Navigator Modular and set the Operation Mode in the "Maintenance Mode". For the procedure for changing to the Maintenance mode, refer to "1.1 (3)(b) Changing the Maintenance Mode" (SYSPR 01-0050), "Registering the newly introduced DF in the Storage Navigator Modular" in Subsection 1.1.

(b) Click an icon of the disk array subsystem you want to set in the main window.

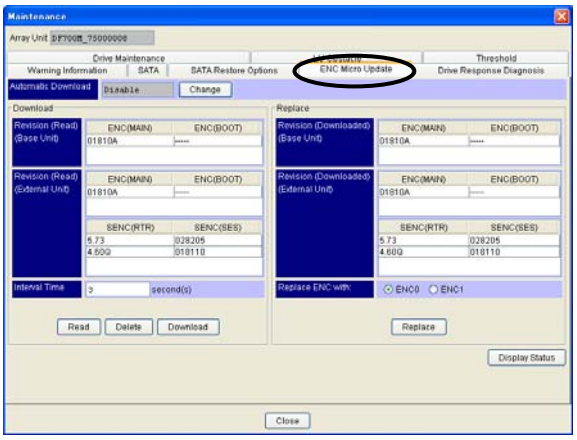
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



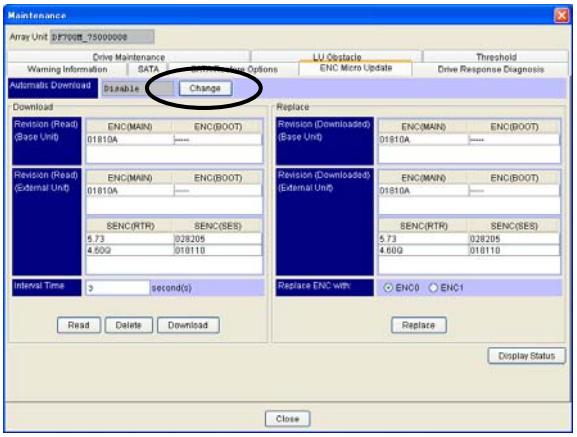
(c) Select the "ENC Micro Update" tab in the Storage Navigator Modular maintenance window.



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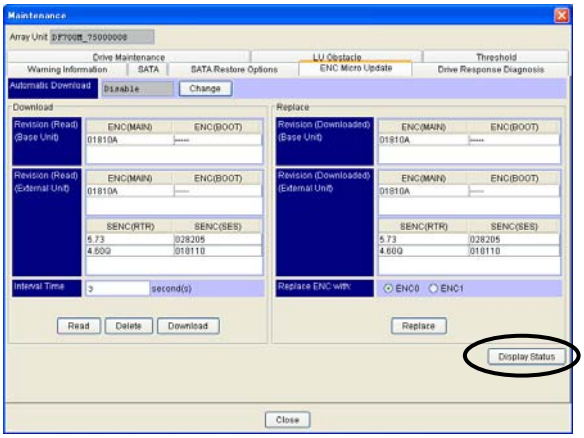
(2) Setting of the automatic download

(a) Press the [Change] button of the automatic download and set [Disable] or [Enable].

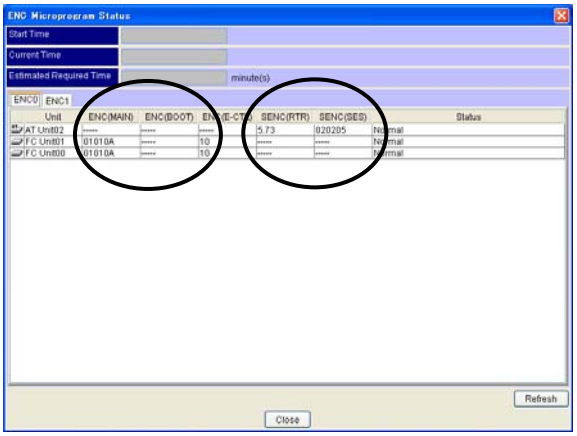


(3) Checking the revision

(a) Display the revision of the current ENC/SENC firmware by selecting the [Display Status] button.



(b) Check the revision of the current ENC/SENC firmware.



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6.2 Initialization procedure for configuration information

NOTE : Be careful that the whole data on the disk will be erased (RAID groups and LU definitions will be initialized.) when this operation is performed.
Even if the configuration information is initialized, the Boot Options and the System Parameter maintain the present setting value.

NOTE : Be careful that if there is a LU whose access attribute is set by Data Retention Utility, initialization of configuration information is not possible.

(1) Turn on the main switch of the subsystem.

(2) Entering the Maintenance mode by WEB is required to initialize Configuration Information.
The method for entering the Maintenance mode varies depending on statuses of the READY LED (green) and ALARM LED (red) on the front side of the Basic Chassis.
- When the READY LED (green) is on, proceed to the procedure starting from the step (4).
- When the ALARM LED (red) is on, wait for three minutes after making sure of the lighting of it, proceed to the procedure starting from the step (4).
- Also proceed to the procedure starting from the step (3) in the case where the READY LED (green) and ALARM LED (red) do not come on after waiting for ten minutes when the power is turned on. (Refer to Figure 6.2.1.)

(3) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

(4) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed. When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed.

(5) Changing the Maintenance Mode.
- Single Controller
  Press the RST SW of the single Control Unit. (While pressing RST SW, the RST LED is on.)
  Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).
- Dual Controller

(a) Press the RST SW of the Control Unit #0. (While pressing RST SW, the RST LED is on.)
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

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(b) Press RST SW on Controller No.1, right after CALM LED turned on (within ten (10) seconds after CALM LED turned on).
(Sometimes the buzzer may beeps when the RST SW is pressed, however, you do not have to stop it until these operations are completed.)
When the CALM LED of the Control Unit #0 does not go out in spite of the above operation, power off the subsystem, return to step (1) without pulling out nor insert the Controller, and execute the procedure over again.

NOTE : Because the Control Unit is shutdown status for the Maintenance Mode, the command from the host is impossible execution. Please change it to the Maintenance Mode after the confirmation of separation of the device from the host or shutdown of the host.

When CALM LED on Control Unit #0 turns off and READY LED on the front side of the Basic Chassis is turns off, it transfers to Maintenance mode.

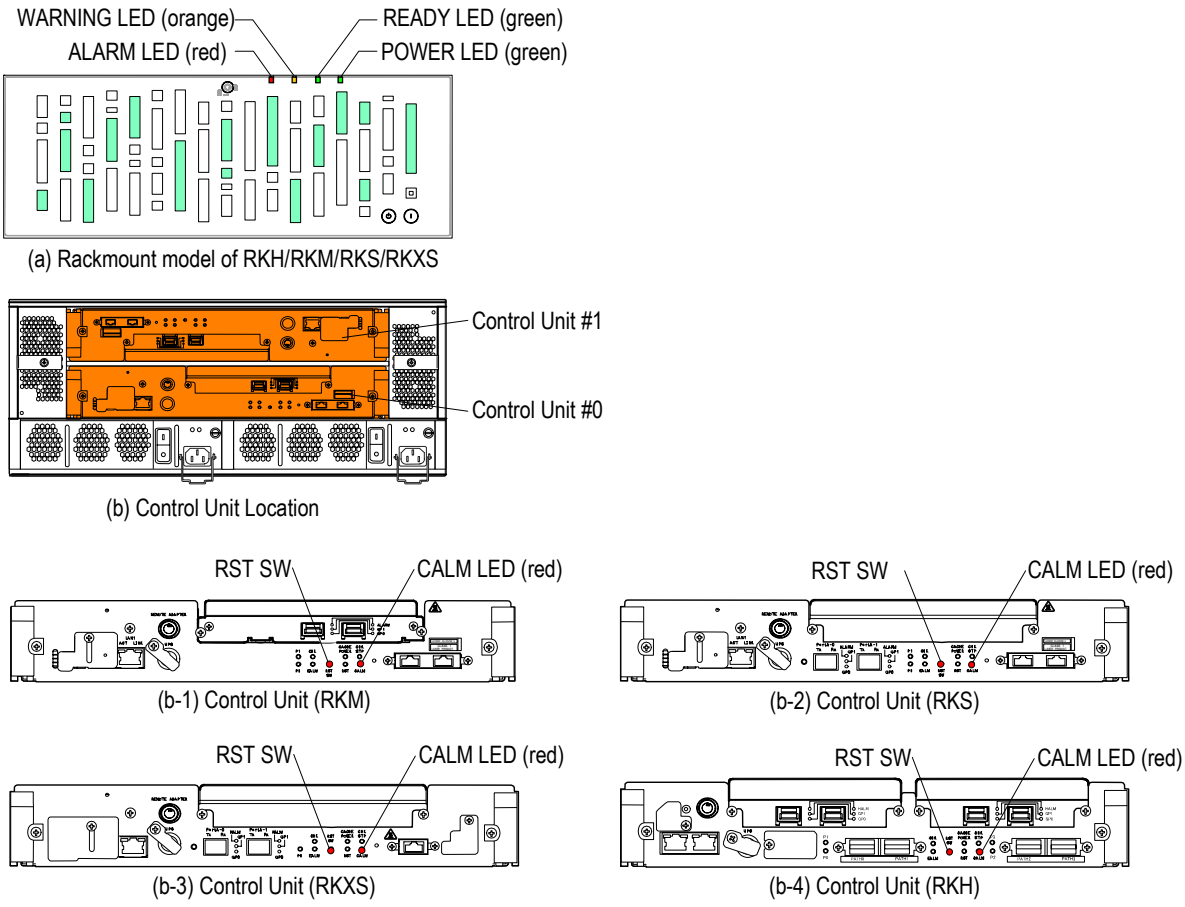
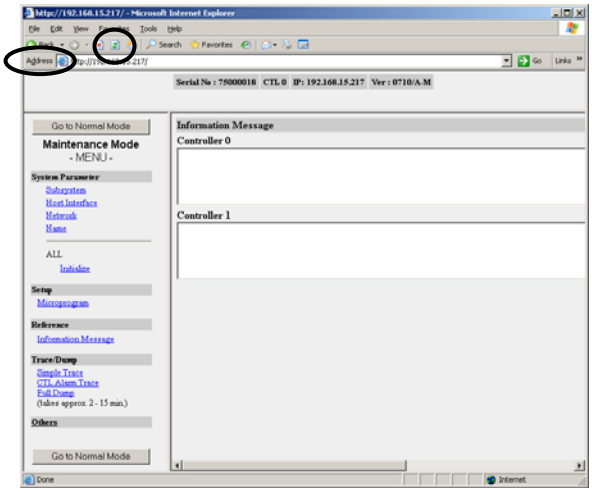


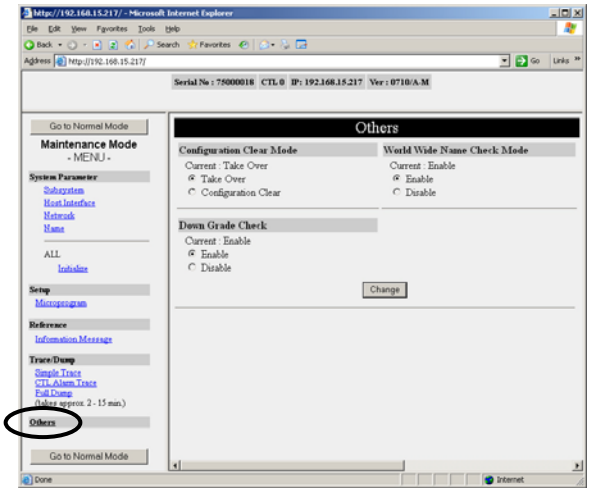
Figure 6.2.1 Indication Locations of LED

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(6) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].



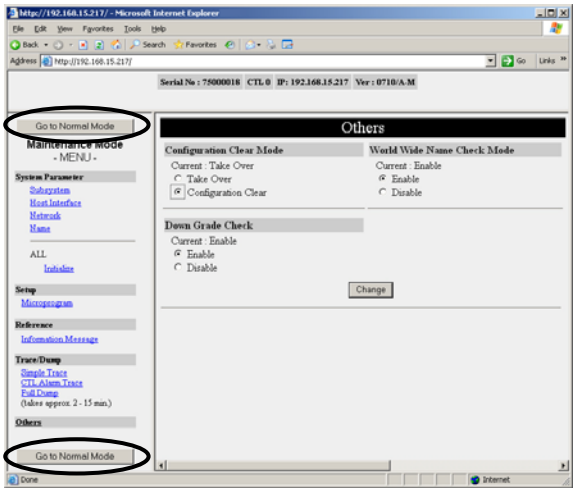
(7) Click "Others" in the menu frame.
The following window appears.



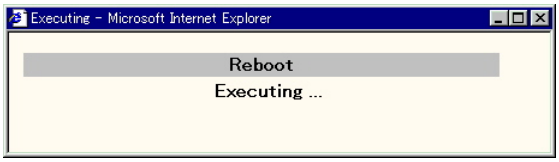
(8) Select the "Configuration Clear" radio button of [Configuration Clear Mode], then click the "Change" button.
"Current" of the "Configuration Clear Mode" is displayed as "Configuration Clear."

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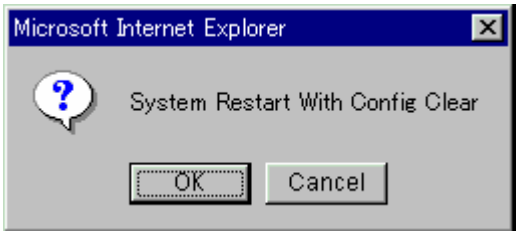
(9) Click “Go To Normal Mode”. There are two “Go To Normal Mode” buttons, one at the top of the menu frame and the other at the bottom. Select either of them.



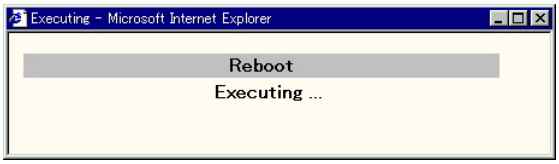
The following window is displayed while the above operation is executed.



(10) The following confirmation message is displayed at the later time for a while. Please click [OK] for the continuation.



The following window is displayed while the above operation is executed.



(11) If rebooting is finished, the subsystem is ready. (It usually takes about four minutes to become the READY status (about five minutes in case of the RKH).)
At this time, check that the READY LED (green) lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the RKH) when the READY LED (green) is blinking at high speed, or waiting for the maximum of 30 to 85 minutes when the WARNING LED (orange) is blinking at high speed.

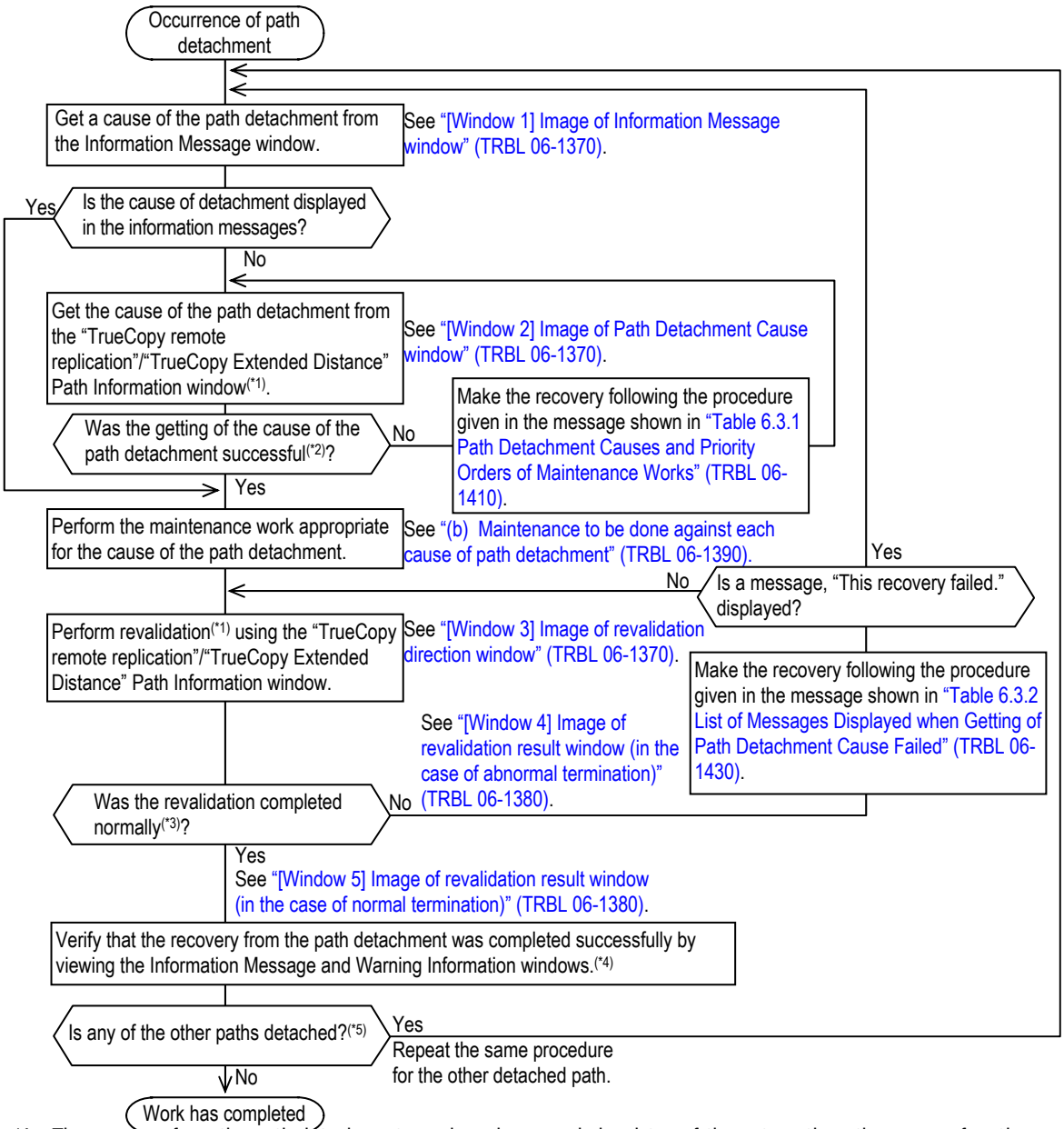
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6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used

When the pair of TrueCopy remote replication and the pair of TrueCopy Extended Distance share the Path, the Path blockade can be recovered by satisfying the recovery condition of each program product.

(1) Procedure for recovery from path detachment

(a) General flowchart of procedure for recovery from path detachment



*1 : The recovery from the path detachment may have been made by virtue of the automatic path recovery function. When a message informing of the completion of the recovery is displayed in the Information Message window, no revalidation is necessary. If the recovery has not been made, be sure to perform the revalidation.

*2 : For the message when the acquisition of the cause of the path detachment was unsuccessful, refer to "Table 6.3.1 Path Detachment Causes and Priority Orders of Maintenance Works" (TRBL 06-1410).

*3 : For the message when the revalidation is performed, refer to "Table 6.3.3 List of Messages Displayed when Path Is Revalidated" (TRBL 06-1440).

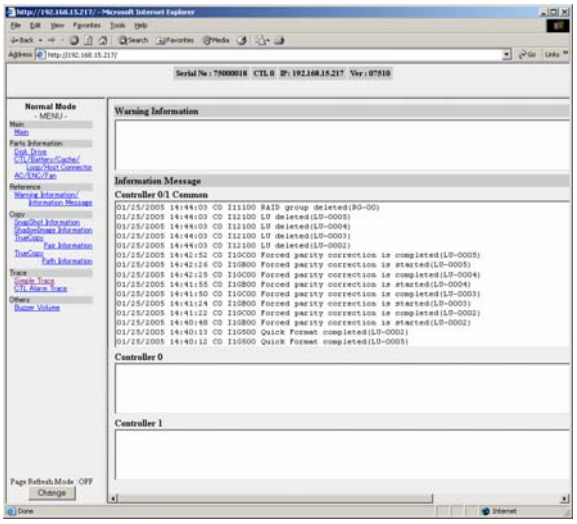
*4 : When the PATH blockade recovers, "I030xy Path recovered by web operation (Remote-x, Path-y)", or "I031xy Path recovered automatically (Remote-x, Path-y)" is displayed in the Information Message on WEB, and the display of "W0F0xy Path alarm (Remote-x, Path-y) disappears from the Warning Information on WEB.

*5 : Other system PATH indicates Path-1 when the PATH which recovered the PATH blockade is Path-0, and Path-0 when the PATH which recovered the PATH blockade is Path-1.

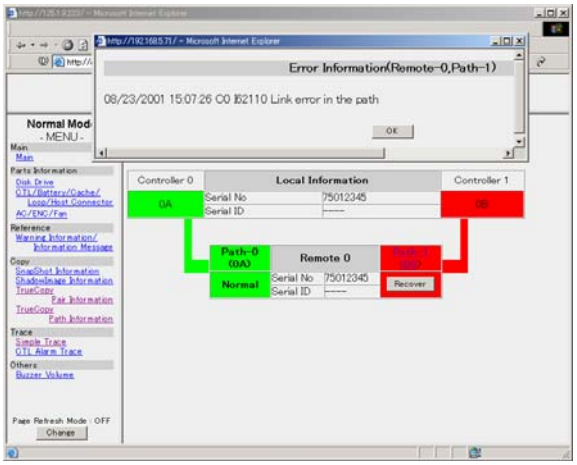
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The example of the WEB window when the PATH blockade of TrueCopy remote replication occurs is shown below.

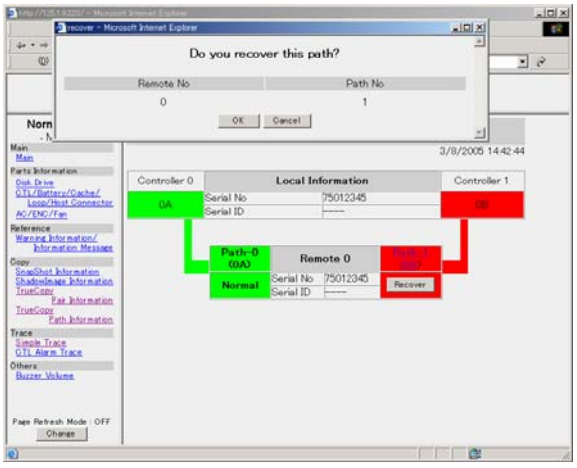
[Window 1] Image of Information Message window



[Window 2] Image of Path Detachment Cause window

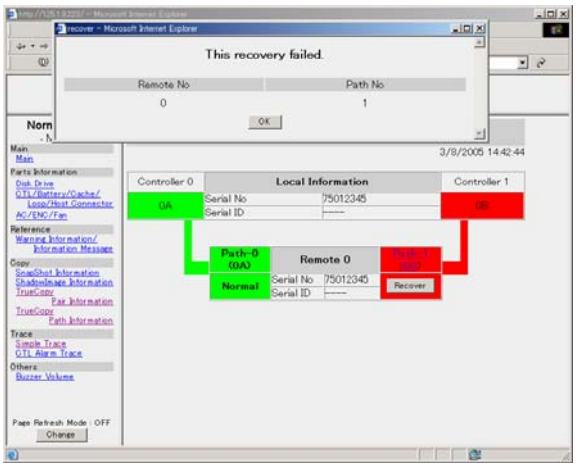


[Window 3] Image of revalidation direction window

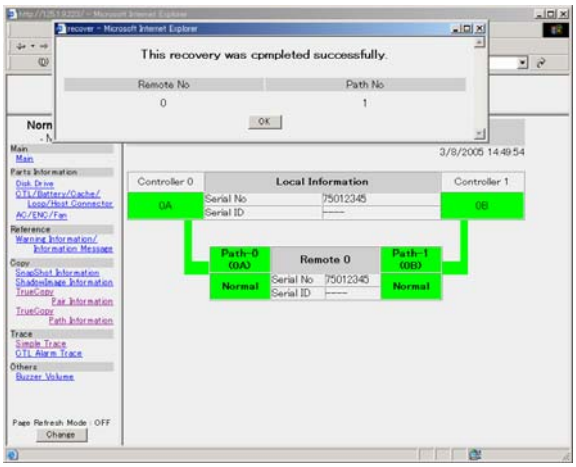


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[Window 4] Image of revalidation result window (in the case of abnormal termination)



[Window 5] Image of revalidation result window (in the case of normal termination)



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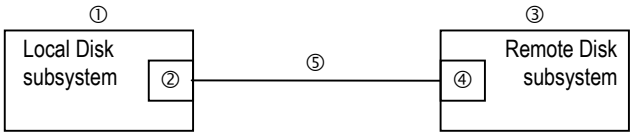
(b) Maintenance to be done against each cause of path detachment

The failed part cannot be ascertained depending on the type of the failure because the path detachment is a route failure.

Therefore, this manual only defines zones where a failure occurs for each path connection form and make the priority order of the zones and parts within the each zone clear.

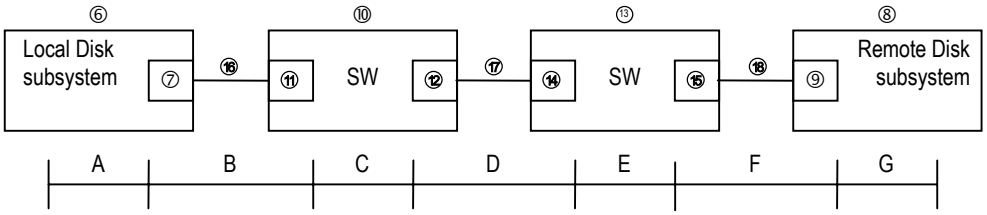
[Procedure 1] Make sure of the path connection form.

Direct connection



① : Local Disk subsystem main body
② : Local Disk subsystem interface
③ : Remote Disk subsystem main body
④ : Remote Disk subsystem interface
⑤ : Connecting cable between the Disk subsystem's

Connection via SW



⑥ : Local Disk subsystem main body
⑦ : Local Disk subsystem interface
⑧ : Remote Disk subsystem main body
⑨ : Remote Disk subsystem interface
⑩ : Local side SW
⑪ : Local side GBIC of the local side SW
⑫ : Remote side GBIC of the local side SW
⑬ : Remote side SW
⑭ : Local side GBIC of the remote side SW
⑮ : Remote side GBIC of the remote side SW
⑯ : Connection cable between the local Disk subsystem and the local side SW
⑰ : Connection cable between the local side SW and the remote side SW
⑱ : Connection cable between the remote Disk subsystem and the remote side SW

Zone A : ⑥
Zone B : ⑦⑪⑯
Zone C : ⑩
Zone D : ⑫⑭⑰
Zone E : ⑬⑮⑱
Zone F : ⑨
Zone G : ⑧

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[Procedure 2] Perform a maintenance work referring to the priority order of zones and parts shown in Table 6.3.1 according to a cause of the path detachment.

NOTE : • Every time when a part is replaced from the order with a high priority, go to "[Procedure 3]" (TRBL 06-1430), and perform the revalidation in the TrueCopy Path Information window of the WEB following "6.3 (1) (a) General flowchart of procedure for recovery from path detachment" (TRBL 06-1360).

• The maintenance method varies depending on the reference number (① to ⑱) that represents each part.

The maintenance method corresponding to each number is shown below.

①③⑥⑧ → Since a failure of some kind has occurred in each DF700 subsystem, perform a maintenance work according to the LED indications or a WEB message.

②④⑦⑨ → Replacement of the I/F portion is required.
When replacing the I/F portion, an entire CTL must be replaced in the case of the part of the basic port (Port #0) because the part is integrated with the CTL, whereas only the Interface Board is to be replaced in the case of the part of the added port (Port #1).

Other than the above → Replacement the SW main body, the GBIC, or the cable.

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Table 6.3.1 Path Detachment Causes and Priority Orders of Maintenance Works

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
1	Link error in the attached link (Port-x)	The threshold value of the route failure counter on the local side was exceeded.	• A link down was detected. • A link failure was detected.	Direct : ② → ④ → ⑤ SW : B → C	• The path revalidation from the WEB must be done.
2	Link error in the path	The threshold value of the path route failure counter was exceeded.	• An illegal transferred data length was detected.	Direct : ② → ④ → ⑤ SW : B → F → D → C → E	
3	Link down time-out (Port-x)	The link down time of the path set for the port concerned elapsed longer than 15 seconds.	• The link down time of the port for which a path has already been set elapsed longer than 15 seconds.	Direct : ② → ④ → ⑤ SW : B → C	• Automatic recovery
4	Path not connected	The remote Disk subsystem concerned is not connected.	• No remote Disk subsystem, for which a path was to be set, existed on the loop though a log-in was requested. • The WWN which has been set was not registered in the SW. <In the case of RKS/RKXS configuration> At either following condition, the path was detached. - The microprogram version less than 0760/A on remote DF(RKS/RKXS) was applied. - The 4Gbps FC Interface Board on remote or local DF(RKS/RKXS) was not added.	Direct : a → ④ → ③ → ② → ⑤ SW : a → G → F →D → E → C a : Firstly, check if the remote Disk subsystem is connected and if the connection is correctly made.	
5	Path login failed	The log-in to the path concerned failed.	• Though a log-in to a port expected to exist was attempted, it failed because allowable number of retrials were not successful.	Direct : ④ → ② → ⑤ SW : G → F → D → B → E → C (F : ⑨ → ⑮ → ⑱)	• The path revalidation from the WEB must be done.
6	Path login resource shortage	Resource of the path concerned was insufficient.	• Insufficiency(*2) of the resource was reported in a response made at the time of the log-in.	Direct : ④ SW : ⑨ The system configuration is illegal. (Propriety of the system configuration must be checked by an SE or a user.)	• The path revalidation from the WEB must be done.

*1 : A numeral and alphabetic character denote a part and zone respectively.

• Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ⑪ → ⑦ → ⑯

Zone D : ⑫ → ⑭ → ⑰

Zone F : ⑲ → ⑨ → ⑱

*2 : The insufficient resource means that 128 log-in's have already been made for the port when 128 log-in's per port are allowed.

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No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
7	Fabric connection failed (Port-x)	Switch trouble	• The FLOGI sequence terminated abnormally. (Sending and response of FLOGI/ PLOGI/ RCS_ID/ RFT_ID/ PRT_ID/ SCR/RSCN terminated abnormally.)	Direct : None SW : B → C	• The path revalidation from the WEB must be done.
8	RSP not ready (Key [02], Code [xxyy])	Command RSP failure (Failure of the command issued from a Disk subsystem to another Disk subsystem)	Not Ready	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done.
9	RSP medium error (Key [03], Code [xxyy])		Medium Error	Direct : ③ SW : ⑧	
10	RSP hard error (Key [04], Code [xxyy])		Hard Error	Direct : ③ SW : ⑧	
11	RSP illegal request (Key [05], Code [xxyy])		Illegal Request	Direct : ① → ③ SW : ⑥ → ⑧	
12	RSP abort command P (Key [0B], Code [xxyy])		Aborted Command (path)	Direct : ④ → ② → ⑤ SW : F → B → D → E → C	
13	RSP abort command C (Key [0B], Code [xxyy])		Aborted Command (CTL)	Direct : ③ SW : ⑧	
14	RSP miscompare (Key [0E], Code [xxyy]) RSP status error [xx] RSP other field error RSP etc. (Key [xx])		Others	Direct : ① → ③ SW : ⑥ → ⑧	
15	Command time out	Command time-out (Failure of the command issued from a Disk subsystem to another Disk subsystem)	• Two or more times of time-out were detected in execution of the same command.	Direct : ④ → ② → ⑤ SW : G → F → D → B → E → C (F : ⑨ → ⑮ → ⑱)	• The path revalidation from the WEB must be done.
16	Remote sequence number error	Inconsistency of the remote Disk subsystem sequence No.	• The sequence No. of the remote Disk subsystem is inconsistent.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done.
17	Path alarm for CTL alarm (Remote-x, Path-y)	CTL detachment	• A detachment of the own controller occurred.	Direct : ① SW : ⑥	• Automatic recovery
18	Port un-mounting error	Non-installation of the port	• The port is not installed.	Direct : ② SW : ⑦	• The path revalidation from the WEB must be done.
19	Remote option disable [TrueCopy Basic]	Locking of the remote Disk subsystem [TrueCopy remote replication]	• The [TrueCopy remote replication] priced optional function of the remote Disk subsystem is locked.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done
20	Remote option disable [TrueCopy Extended Distance]	Locking of the remote Disk subsystem [TrueCopy Extended Distance] (*2)	• The [TrueCopy Extended Distance] (*2) priced optional function of the remote Disk subsystem is locked.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done

*1 : A numeral and alphabetic character denote a part and zone respectively.

• Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ⑪ → ⑦ → ⑯

Zone D : ⑫ → ⑭ → ⑰

Zone F : ⑮ → ⑨ → ⑱

*2 : The insufficient resource means that 128 log-in's have already been made for the port when 128 log-in's per port are allowed.

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No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery method
21	Remote pate setting unsupported on the remote Subsystem	The function for setting paths between subsystems of different models is not supported.	• The function for setting paths between subsystems with different system settings is not supported.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done • Update the microprogram of the remote subsystem to revision 0760/A or later.

*1 : A numeral and alphabetic character denote a part and zone respectively.

• Priority order of failed parts in each zone (a zone contains more than one part) is shown below.

Zone B : ⑪ → ⑦ → ⑯

Zone D : ⑫ → ⑭ → ⑰

Zone F : ⑮ → ⑨ → ⑱

*2 : The insufficient resource means that 128 log-in's have already been made for the port when 128 log-in's per port are allowed.

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[Procedure 3] Proceed to the procedure subsequent to "6.3 (1) (a) General flowchart of procedure for recovery from path detachment" (TRBL 06-1360).

When the getting of the path detachment cause has failed or the revalidation has terminated abnormally, perform a maintenance work following the recovery procedure shown in Table 6.3.2 and Table 6.3.3 according to the message displayed.

Table 6.3.2 List of Messages Displayed when Getting of Path Detachment Cause Failed

No.	Sub-window message	Meaning of message	Recovery method
1	Cannot get alarm information because specified function is lock.	The cause cannot be get because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is locked.	Unlock and validate the [TrueCopy remote replication] or [TrueCopy Extended Distance] function and get the cause of the path detachment again.
2	Cannot get alarm information because it is booting now.	The cause cannot be get because the subsystem is being booted.	Get the cause of the path detachment again after the subsystem enters the Ready status.
3	Cannot get alarm information because it does not register for remote equipment.	The cause cannot be get because the specified remote DF number is illegal.	Update the browser. If the path is still detached, get the cause of the path detachment again.
4	Cannot get alarm information because specified function is disable.	The cause cannot be get because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is invalid although it is unlocked.	Validate the [TrueCopy remote replication] or [TrueCopy Extended Distance]function and get the cause of the path detachment again.
5	Cannot get alarm information because it does not register for this path.	The cause cannot be get because the specified path does not exist.	Update the browser. If the path is still detached, get the cause of the path detachment again.
6	Cannot get alarm information because this path's status is normally.	The cause cannot be get because the specified path has already become normal.	Update the browser. If the path is still detached, get the cause of the path detachment again.

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Table 6.3.3 List of Messages Displayed when Path Is Revalidated

No.	Sub-window message	Meaning of message	Recovery method
1	Do you recover this path?	Do you want to revalidate the specified path?	—
2	Executing...	The revalidation of the specified path is being executed.	—
3	This recovery was completed successfully.	The revalidation of the specified path was completed normally.	—
4	This recovery failed.	The revalidation of the specified path terminated abnormally.	It is presumed that the path was detached owing to another cause or the replaced part was not correct. Perform a maintenance work again following the procedure against the path detachment.
5	Cannot recover this path because specified function is lock.	The path revalidation cannot be done because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is locked.	Unlocked and validate the [TrueCopy remote replication] or [TrueCopy Extended Distance] function and execute the path revalidation again.
6	Cannot recover this path because it is booting now.	The path revalidation cannot be done because the subsystem is being booted.	Execute the path revalidation again after the subsystem enters the Ready status.
7	Cannot recover this path because it does not register for this remote equipment.	The path revalidation cannot be done because the specified remote DF number is illegal.	Execute the path revalidation again after updating the browser.
8	Cannot recover this path because CTL is alarm.	The path revalidation cannot be done because the controller is detached.	Execute the path revalidation again after recovering the controller from the detachment.
9	Cannot recover this path because specified function is disable.	The path revalidation cannot be done because the [TrueCopy remote replication] or [TrueCopy Extended Distance] function is invalid though it is unlocked.	Execute the path revalidation again after validating the [TrueCopy remote replication] or [TrueCopy Extended Distance] function.
10	Cannot recover this path because it does not register for this path.	The path revalidation cannot be done because the specified path does not exist.	Execute the path revalidation again after updating the browser.
11	Cannot recover this path because this path's status is normally.	The path revalidation cannot be done because the specified path has already become normal.	Execute the path revalidation again after updating the browser.
12	Cannot recover this path because it is executing LU Format.	The path revalidation cannot be done because an LU formatting is being executed.	Execute the path revalidation again after the LU formatting is completed.
13	Cannot recover this path because it is executing Synchronized cache.	The path revalidation cannot be done because the SyncCache command is being executed.	Execute the path revalidation again after the execution of the SyncCache command is completed.
14	Cannot recover this path because it is executing Array unit shutdown.	The path revalidation cannot be done because the pseudo-deliberate shutdown is being executed.	Execute the path revalidation again after the pseudo-deliberate shutdown has been completed.
15	Cannot recover this path because Power OFF>	The path revalidation cannot be done because the deliberate shutdown is being executed.	Execute the path revalidation again after starting up the subsystem.

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Chapter 7. Collecting Error Information

When any failure occurs, the information on it saved in the Control Unit can be collected. The purpose of this function is to facilitate pursuit of factors of failures and shorten the time consumed for analysis of them.
The failure information is collected by the following three methods.

(1) Collection Simple Trace

Use the normal or maintenance mode using a Web browser to download the trace information and configuration information from the controller to the browser terminal.
You can collect a simple trace while the device is running. You can also collect it when the ALARM LED is lit on the device.
For details of the procedure for the collection, refer to "7.3 Collecting Simple Trace" (TRBL 07-0040).

(2) Collecting CTL Alarm Trace

The controller contains information about the time when the controller is shut down. Use the normal or maintenance mode using a Web browser to download this information from the controller to the browser terminal.
The CTL alarm trace can be collected after recovering the blocked controller.
For details of the procedure for the collection, refer to "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080).

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

(3) Collecting Full Dump

The information saved in the Controller is downloaded to the browser terminal by using the maintenance mode of WEB.

Controller 0/1 Common

```
MM/DD/YYYY HH:MM:SS Cx □□□□□□ ○○○○○○○○○○○○  : △△△△△△/◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx □□□□□□ ○○○○○○○○○○○○  : △△△△△△/◆◆◆◆
                          :
```

For details of the procedure for the collection, refer to "7.5 Collecting Full Dump" (TRBL 07-0130).

The failure information is collected by different methods, depending on the configuration and condition of the unit.
Collect the failure information securely according to "7.2 Judge collection of failure information" (TRBL 07-0020).

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(4) NAS Log collection

The log information on the NAS OS stored in the disk is downloaded to the browser terminal by using the normal mode of WEB.

The NAS Log can be collected while the NAS Unit is operating, but when the ALARM LED lights on, it cannot be collected. Also, when the Control Unit connected to the NAS Unit on the collected side is blocked, the NAS log cannot be collected.

Because the access information between the clusters is necessary for the analysis work, collect the NAS Logs for both NAS Units in the cluster.

Also, collect "Full Mode" uniformly unless otherwise instructed.

Refer to "7.6 NAS log collection" (TRBL 07-0230) for the details of the collection method.

(5) NAS Dump collection

The full memory information on the NAS stored in the disk is downloaded to the browser terminal by using the normal mode of WEB.

The NAS Dump can be collected after the recovery of the NAS Unit which was generated in the Disk Drive at the failure occurrence opportunity or had the generation instruction executed manually.

Refer to "7.7 NAS dump collection" (TRBL 07-0280) for the details of the collection method.

(6) Maintenance PC log collection

The Maintenance PC log indicates the log file of Storage Navigator Modular installed in the Maintenance PC and the log file of NAS Setup. The collection method is the same as that of the log file of Storage Navigator Modular.

Refer to "9.1.3 (1)② Collecting log files" (TRBL 09-0030) for the details of the collection method.

7.1 Time to collect failure information

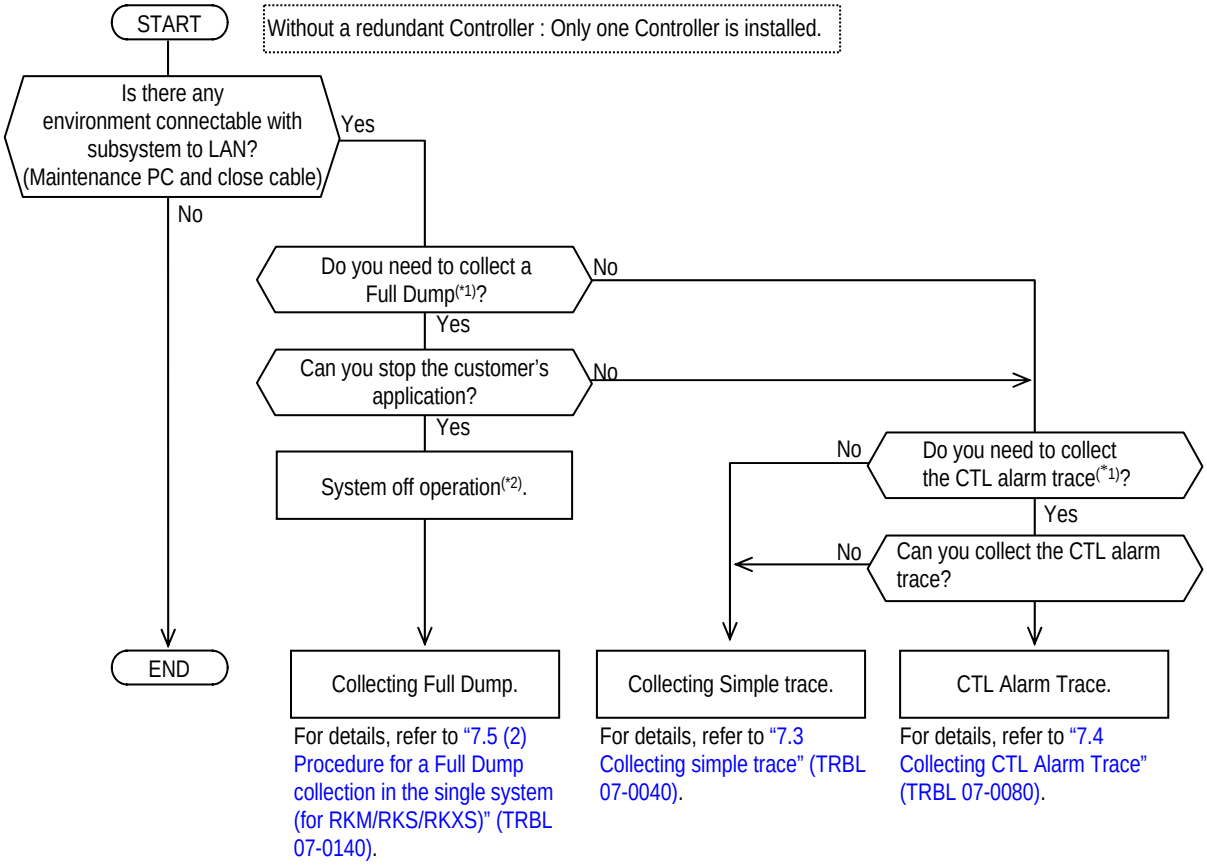
Collect the failure information in the following cases.

(1) A failure was reported to the work-station server, client for maintenance, WEB browser, or Storage Navigator Modular.
(2) The WARNING LED (orange) on the front of the Basic Chassis blinked or lit up.
(3) The ALARM LED (red) on the front of the Basic Chassis lit up.
(4) The slow down of the NAS OS occurred in the NAS system.
(Refer to "Chapter 11 Procedure for Determining Failure of Network Side in NAS System" (TRBL 11-0000) for the procedure for determining the NAS OS slow down.)

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7.2 Judge collection of failure information

(1) Flow of judgment of collection of failure information for system having single Controller (without a redundancy Controller)



*1 : How to determine whether you need to collect the Full Dump and controller shutdown trace for a log message

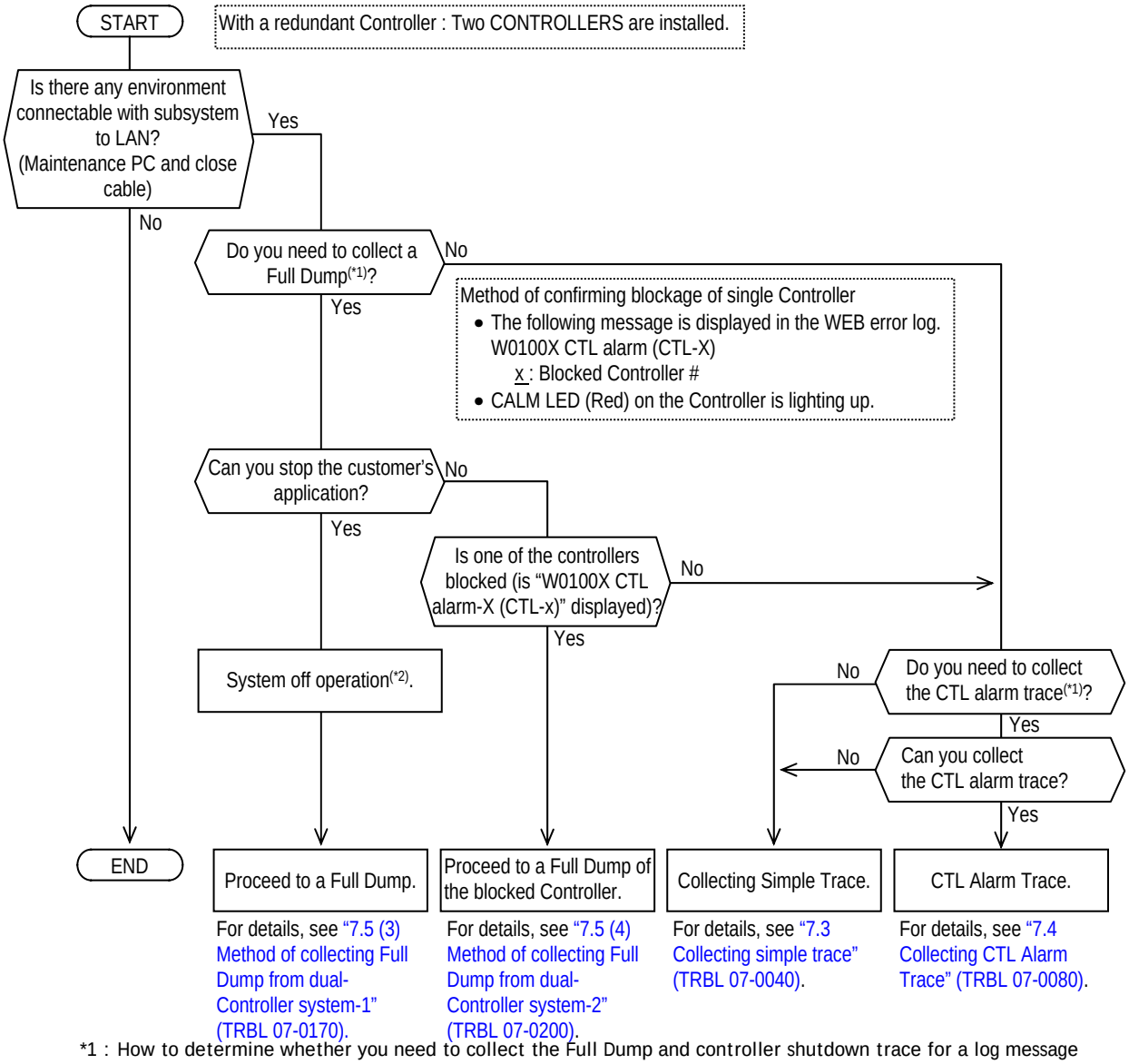
① See the last five characters (124th to 128th characters) in the log message.
(For details about the log messages, refer to "4.3 Confirm log messages" (TRBL 04-0100).)

② /STRC : You need to collect the Simple Trace.
/CTRC : You need to collect the CTL Alarm Trace.
/FDMP : You need to collect the Full Dump.

*2 : When the power control mode is Remote (when the rotary switch is set to 2, 4, 5, 6, or 8), take care that the subsystem power is also turned off if the host computer is powered off. (Refer to the Installation "1.8 Setting the Power Control Mode (Local/Remote Mode)" (INST 01-0380). When the subsystem is powered off, a Full Dump cannot be done.)
When the mode is Remote, perform the Full Dump in the state in which no access (I/O) from the host computer is made. (Refer to "7.5 Collecting Full Dump" (TRBL 07-0130).)

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(2) Flowchart for determining to produce a memory dump in the case of the dual configuration. (with the redundant Controller.)



*1 : How to determine whether you need to collect the Full Dump and controller shutdown trace for a log message

① See the last five characters (124th to 128th characters) in the log message.
(For details about the log messages, refer to "4.3 Confirm log messages" (TRBL 04-0100).)

② /STRC : You need to collect the Simple Trace.
/CTRC : You need to collect the CTL Alarm Trace.
/FDMP : You need to collect the Full Dump.
/NLOG : Needs the NAS Log and the simple trace collection.
/NDMP : Needs the NAS Dump collection.
/PLOG : Needs the log of the Maintenance PC Log, the NAS Log, and the simple trace collection.

*2 : When the power control mode is Remote (when the rotary switch is set to 2, 4, 5, 6, or 8), take care that the subsystem power is also turned off if the host computer is powered off. (Refer to the Installation Installation "1.8 Setting the Power Control Mode (Local/Remote Mode)" (INST 01-0380). When the subsystem is powered off, a Full Dump cannot be done.)
When the mode is Remote, perform the Full Dump in the state in which no access (I/O) from the host computer is made. (Refer to "7.5 Collecting Full Dump" (TRBL 07-0130).)

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7.3 Collecting simple trace

Using Simple Trace Collection, the trace information stored in the controller and the configuration information are collected.

The method of collecting the simple trace is shown below.

(1) Before collecting the simple trace

(a) Items to be prepared

Collection is performed using the normal mode of WEB or Maintenance mode.
For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary.
For collecting the simple trace, disk space of 520 M bytes is required. (260 M bytes for temporary data and 260 M bytes for Full Dump data)
Under ordinary maintenance works, disk space of no less than 5 M bytes is required.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN-cross-cable.
At the time of the RKNAS connection, remove the cover of the LAN connector for the maintenance in the RKNAS (rear side), and connect the LAN connector for the maintenance and the LAN connector of the Maintenance PC.

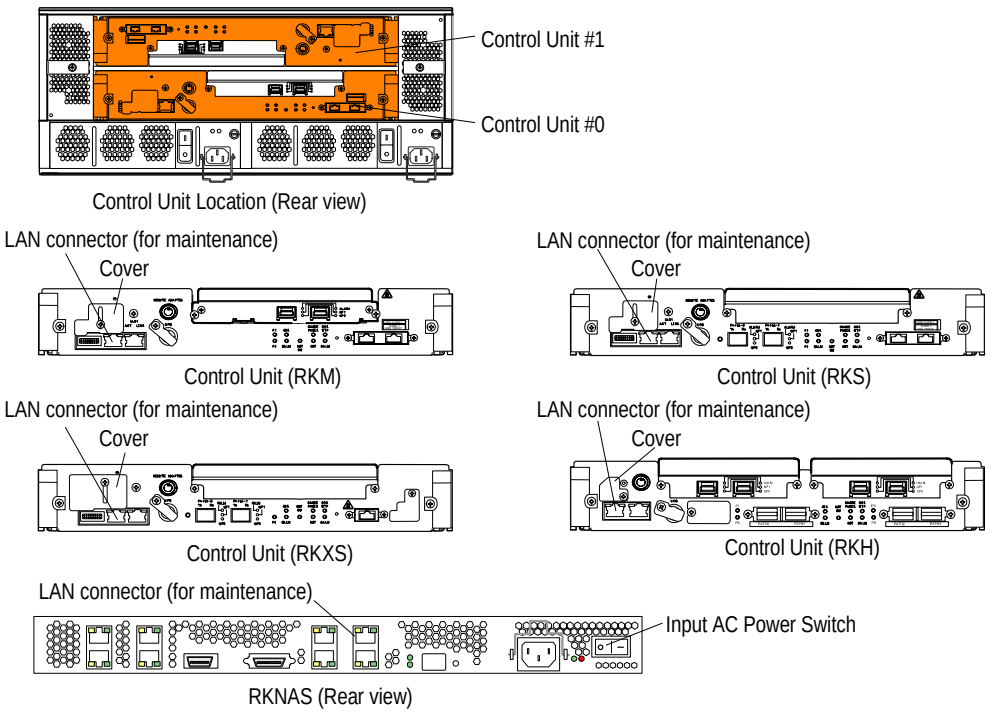


Figure 7.3.1 LAN Connector Position

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(c) With Simple Trace Collection, the information of both controllers can be collected from one controller. Therefore, this function does not need to be performed from both Controllers. (As a file name during the collection, "smpl_trc0.dat" is provided for the collection from Control Unit #0, and "simpl_trc1.dat" for the collection from Control Unit #1".)

(d) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

(e) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed.
When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

(f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] - [Cache] - [Clear Cache] in this order.

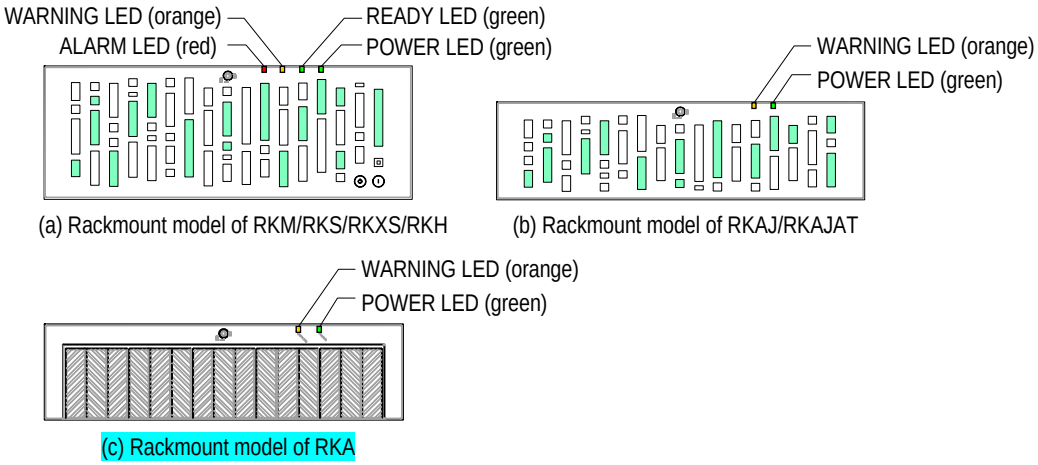
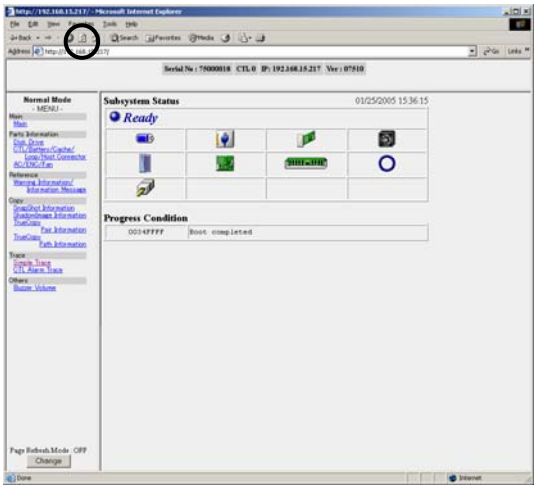


Figure 7.3.2 Indication Locations and Names of LED (Front Bezel)

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(2) Procedure for a simple trace collection

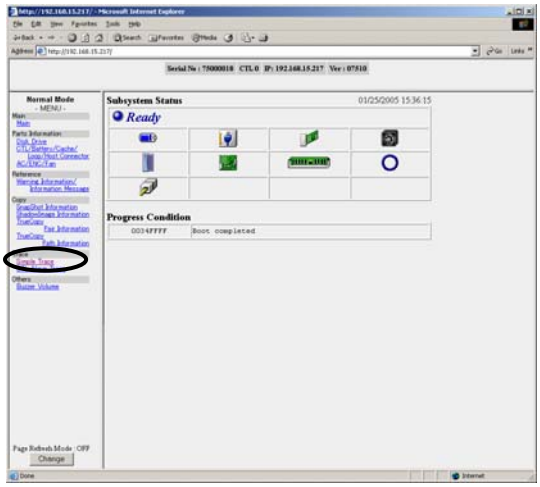
(a) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)



(b) When Windows XP Service Pack2 or Windows 2003 Service Pack1 is used in the OS of the maintenance PC, collect the simple trace after changing the setting of the following Internet Explorer.

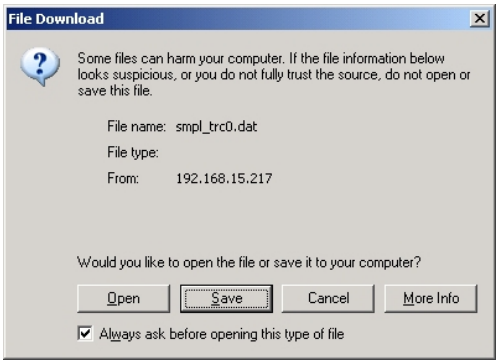
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
- Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
- Select [OK] button in the [Internet Options] window.

(c) Collect the simple trace according to the WEB and the following procedure.
Click "Trace" in the menu frame of "Simple Trace".

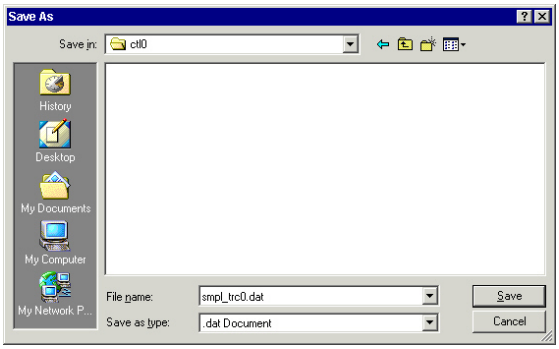


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(d) The following dialog is displayed.
Click the [Save] button.



(e) Select the place to save the file and file name (Default file name: CTL#0:smpl_trc0.dat, CTL#1: smpl_trcl.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed.
When the down-loading completes, the progress indicating message window is closed.

In this procedure Simple trace is collected by WEB Normal mode. Similarly, Simple trace can be collected by WEB Maintenance mode through Menu Frame.
For entering Maintenance mode, refer to the WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

When the USB memory needs to store the simple trace information, refer to "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300).

‡1 : There may be a case where the default file name is given as "ctla_trc0.dat..dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

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7.4 Collecting CTL Alarm Trace

Through the CTL Alarm Trace collection, detailed information (the CTL Alarm Trace) on the immediately previous Controller blockage stored in the Controller is collected.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

Since the above-mentioned CTL Alarm Trace information is taken over from the blocked Control Unit to the replaced Control Unit, it can be collected after the Control Unit is recovered from the failure. If the Control Unit is blocked while collecting the CTL ALARM TRACE may not be collected normally. Therefore, in this case, collect the CTL ALARM TRACE again.

The method of collecting the CTL ALARM TRACE is shown below.

(1) Before collecting the CTL ALARM TRACE

(a) Items to be prepared

The CTL Alarm Trace is collected in the normal mode or the maintenance mode of the WEB. For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary. For collecting the CTL ALARM TRACE, disk space of 520 M bytes per one Control Unit is required. (260 M bytes for temporary data and 260 M bytes for Full Dump data)

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable. At the time of the RKNAS connection, remove the cover of the LAN connector for the maintenance in the RKNAS (rear side), and connect the LAN connector for the maintenance and the LAN connector of the Maintenance PC.

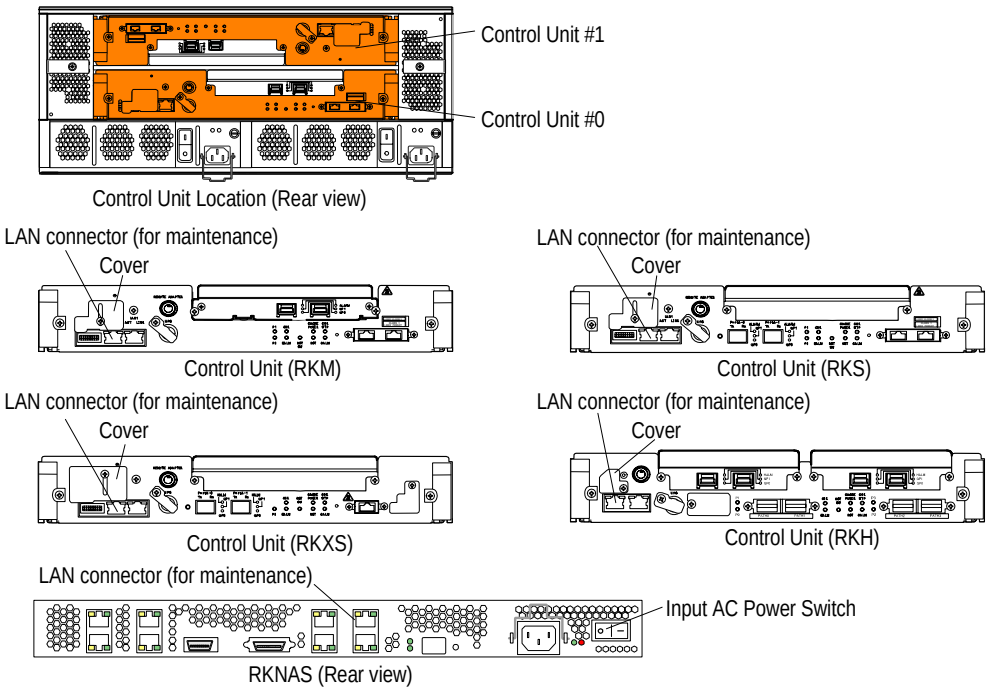


Figure 7.4.1 LAN Connector Position

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(c) Collect the CTL Alarm Trace information from each Control Unit.
Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

(d) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

(e) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed.
When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

(f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

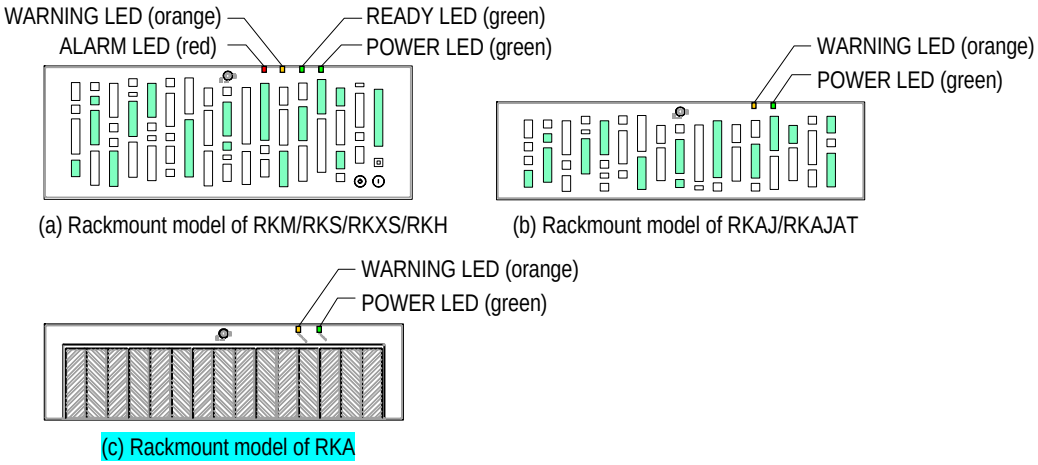
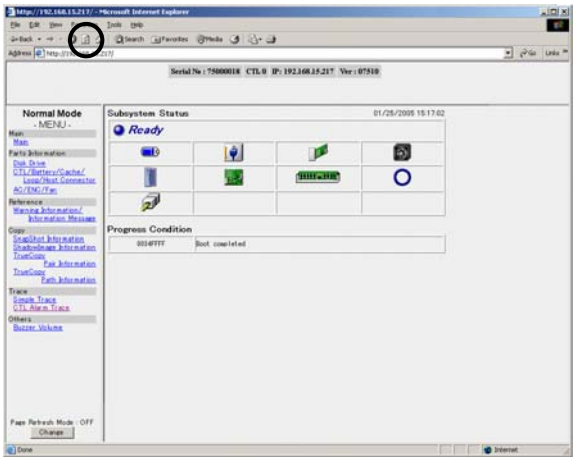


Figure 7.4.2 Indication Locations and Names of LED (Front Bezel)

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(2) Procedure for collecting a CTL Alarm Trace

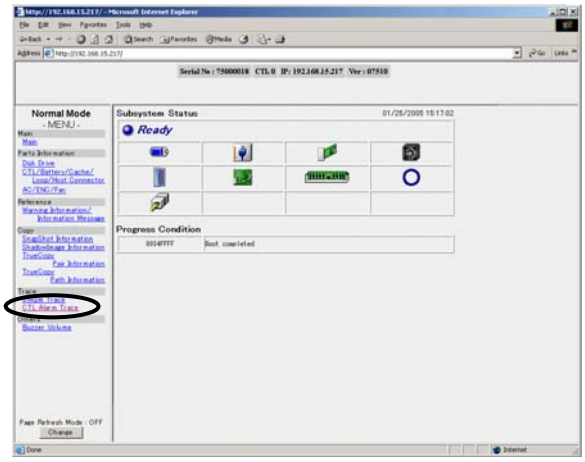
(a) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)



(b) When Windows XP Service Pack2 or Windows 2003 Service Pack1 is used in the OS of the maintenance PC, collect the CTL ALARM Trace after changing the setting of the following Internet Explorer.

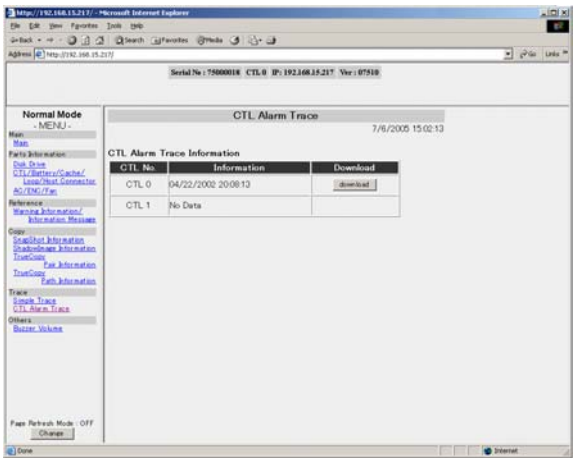
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
- Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
- Select [OK] button in the [Internet Options] window.

(c) Collect the memory dump according to the WEB and the following procedure.
Click "CTL Alarm Trace" in the menu frame of "Trace".



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If CTL Alarm Trace exists, the CTL Alarm Trace information window is displayed.



Description of information

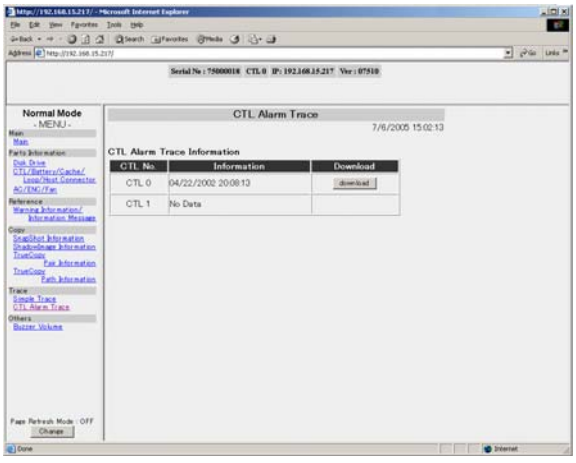
"Not Ready" ····· Indicates the situation where the trace area is not established in the device.

"No Data" ····· CTL Alarm Trace information does not exist or while information is being created.

"MM/DD/20YY hh:mm:ss" ····· CTL Alarm Trace information exists.

NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL Alarm Trace may not be collected normally. Therefore, collect the Simple Trace.
If Simple Trace cannot be obtained through detached Control Unit, connect the Maintenance PC to the Control Unit at the opposite side, and collect the Simple Trace.

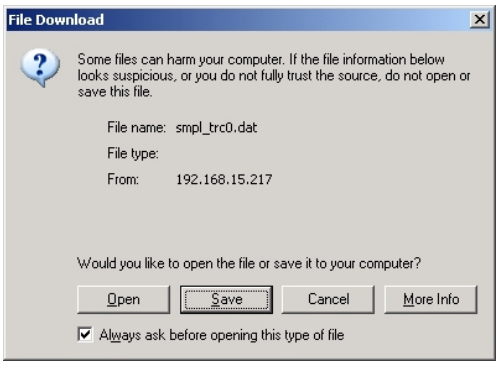
(d) Press the "Download" button on the Control Unit side to be collected in "CTL Alarm Trace information".(‡1)



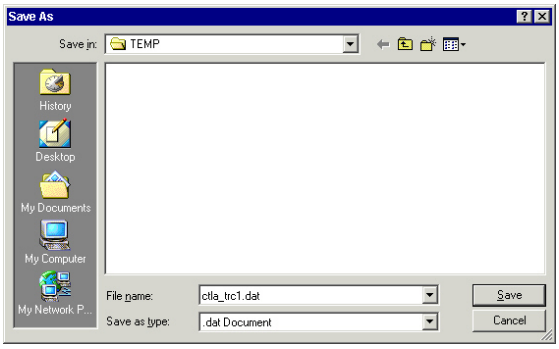
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

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(e) The following dialog is displayed. Click the [Save] button.



(f) Select the place to save the file and file name (Default file name: ctla_trc0.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed.

In this procedure is collected by WEB Normal mode. Similarly, CTL Alarm Trace can be collected by WEB Maintenance mode through Menu Frame.
For entering Maintenance mode refer to WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

‡1 : There may be a case where the default file name is given as "ctla_trc0.dat.dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

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7.5 Collecting Full Dump

The method of collecting the Full Dump is shown below.

(1) Before collecting the Full Dump

(a) Items to be prepared

The Full Dump is collected in the maintenance mode of the WEB.
For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary.
For collecting the Full Dump, disk space of 3.6 G bytes per one Control Unit is required. (1.8 G bytes for temporary data and 1.8 G bytes for Full Dump data)

(b) Remove the cover on the Device Control Unit. Connect the LAN-Connecter for maintenance and the LAN-Connecter of Maintenance PC with a LAN-cross-cable.
At the time of the RKNAS connection, remove the cover of the LAN connector for the maintenance in the RKNAS (rear side), and connect the LAN connector for the maintenance and the LAN connector of the Maintenance PC.

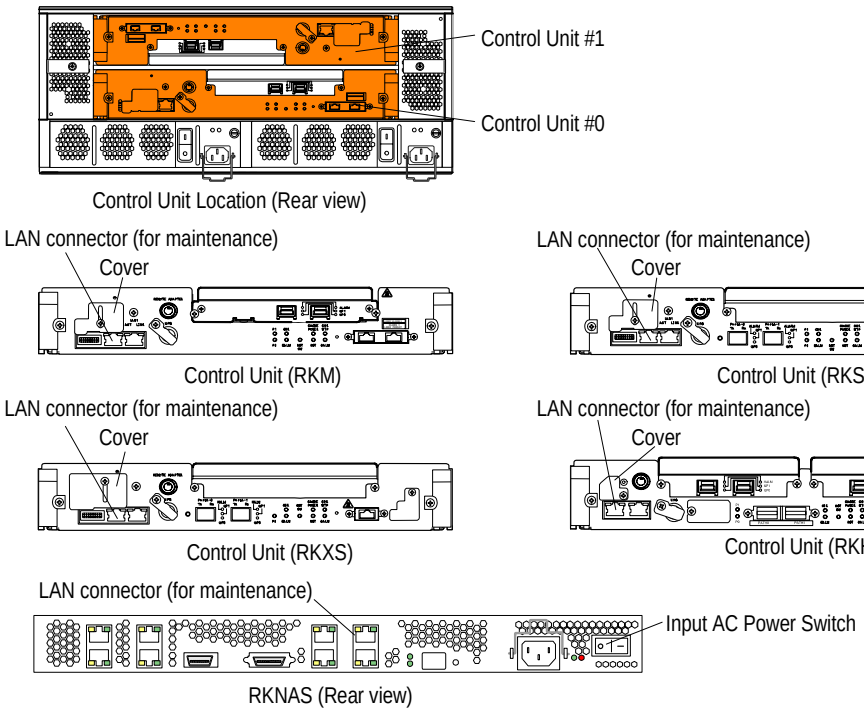


Figure 7.5.1 LAN Connector Location

(c) Collect the Full Dump information from each Control Unit.
Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

(d) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 60 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

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(e) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed.
When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

(f) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - and [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] - [Cache] - [Clear Cache] in this order.

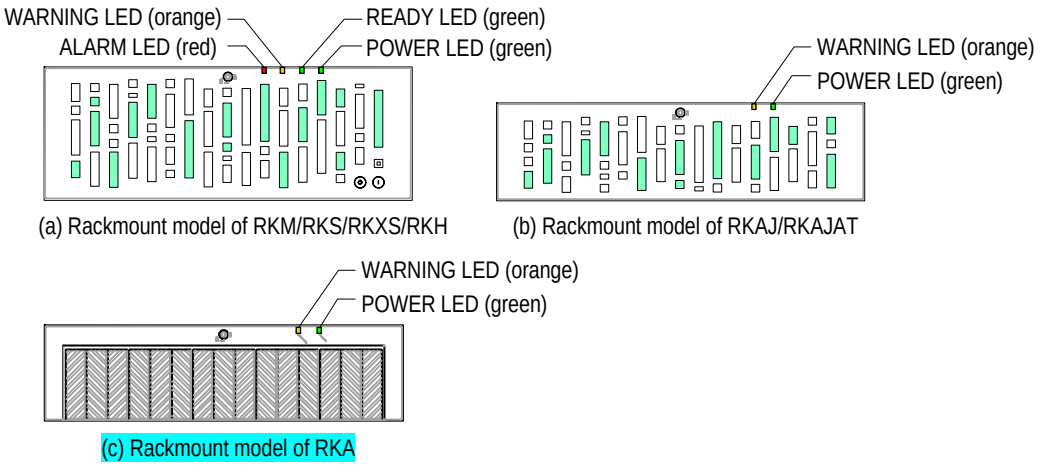


Figure 7.5.2 Indication Locations and Names of LED (Front Bezel)

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(2) Procedure for a Full Dump collection in the single system (for RKM/RKS/RKXS)

(a) Please push the RST SW of Control Unit. (While pressing RST SW, the RST LED is on.)
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter). (The Controller enters the WEB maintenance mode.)

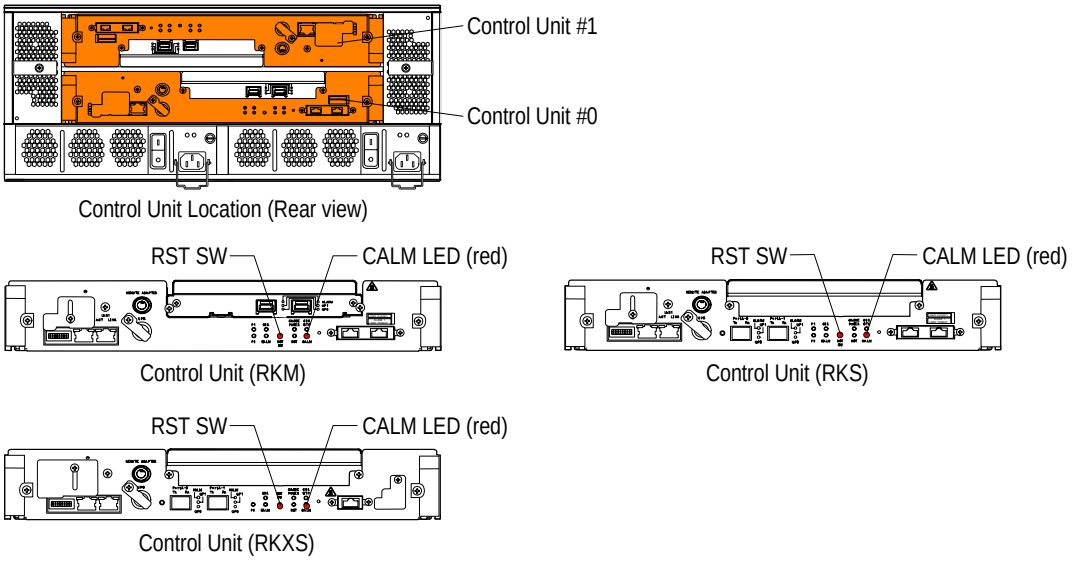
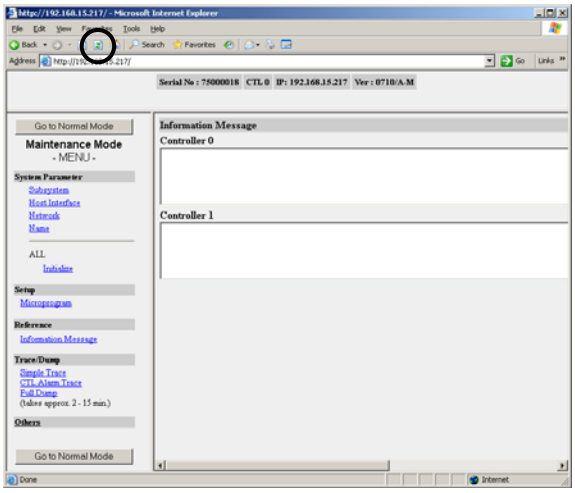


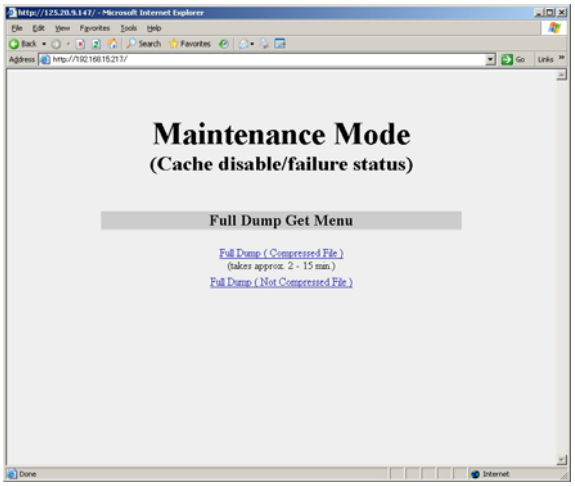
Figure 7.5.3 Indication Locations of Control Unit

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(b) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Refresh button or click the [View] – [Refresh]. (For the procedure for connecting the Web, refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).) A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

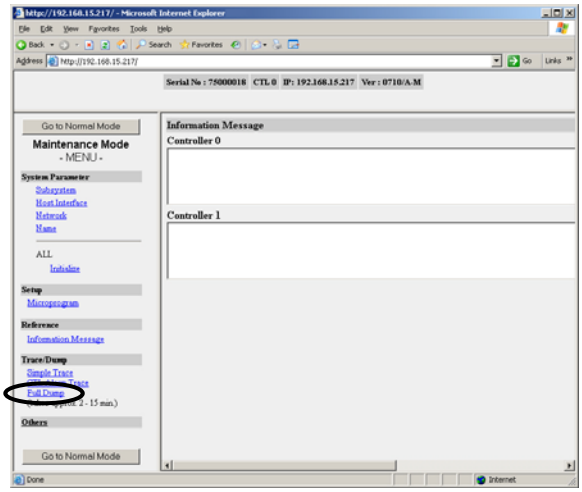


The cache memory access failure occurs when the following window is displayed. Refer to WEB "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).

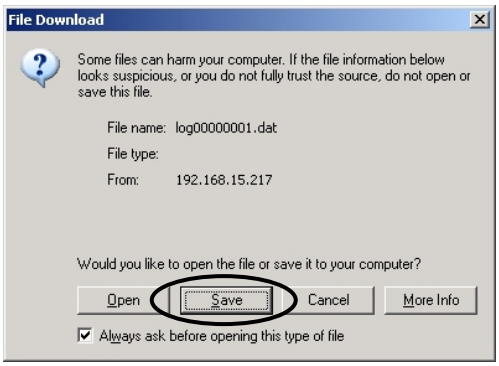


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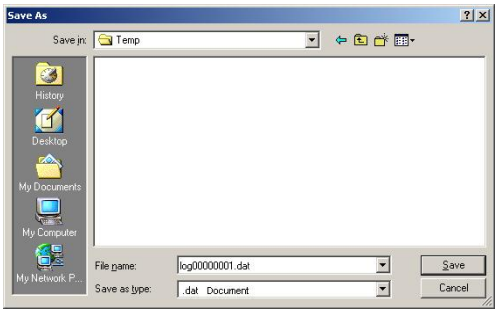
(c) Collect the Full Dump according to the WEB and the following procedure.
Click "Full Dump" in the menu frame of "Trace/Dump".



The following dialog is displayed. Click the [Save] button.



Select the place to save the file and file name (Default file name: logx.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed. There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

‡1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logx.dat" or any other name. (x: Controller serial numbers)

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(3) Method of collecting Full Dump from dual-Controller system-1

Interrupting the customer operation and collecting Full Dump information of the both Control Units under dual system configuration

NOTE : When the Full Dump is collected with the Control Unit blocked, it is necessary to collect the Full Dump from the Control Unit that is blocked.

(a) Press the RST SW of the blocked Control Unit. (If both Control Units are normal or blocked, press the RST SW of either one.) (While pressing RST SW, the RST LED is on.)

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

Wait for a while (about ten seconds) and check that the CALM LED of the Control Unit lights up.

Within ten seconds after the CALM LED lights up, press the RST SW of the other Control Unit. (Sometimes the buzzer may beeps when the RST SW is pressed, however, you do not have to stop it until these operations are completed.)

When ten seconds or longer pass after the CALM LED of the Control Unit concerned comes on, return to the beginning of the step (a) and execute the procedure over again. (When the above procedure is executed, the both Control Units enter the Maintenance mode of the WEB.)

The CALM LED on the Control Unit of which RST SW was pressed first goes off, and READY LED on the Front Bezel goes off.

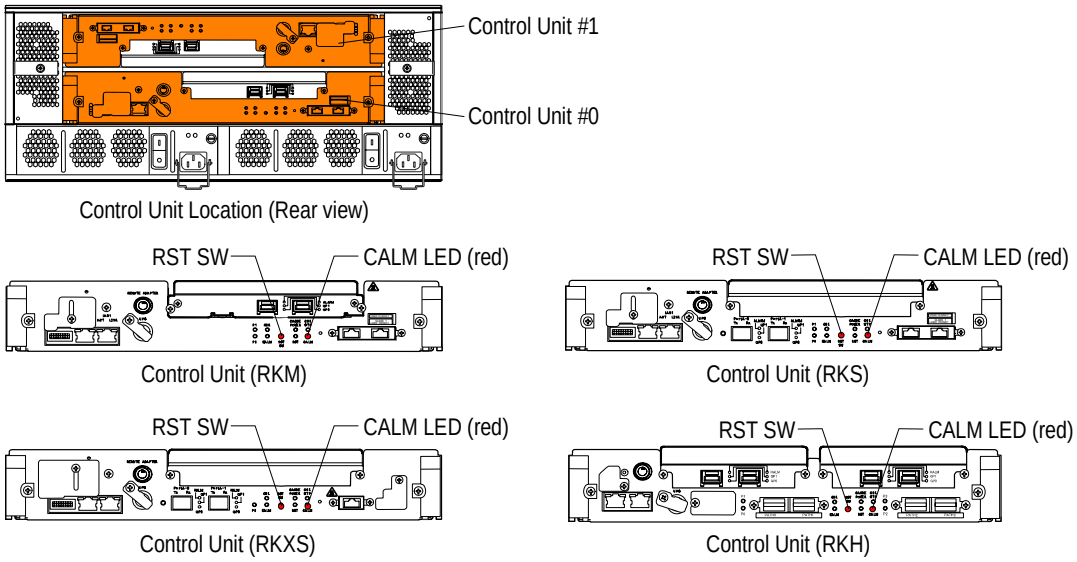
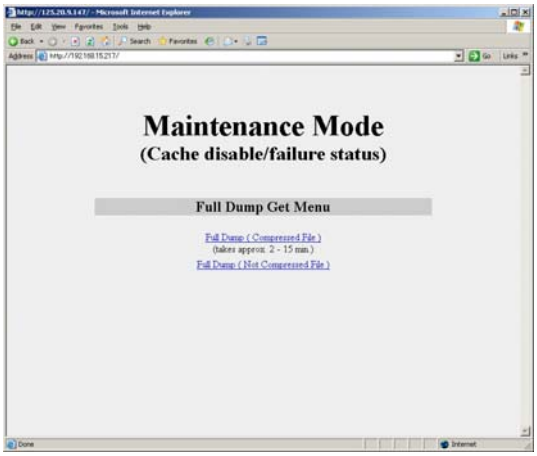


Figure 7.5.4 Indication Locations of Control Unit

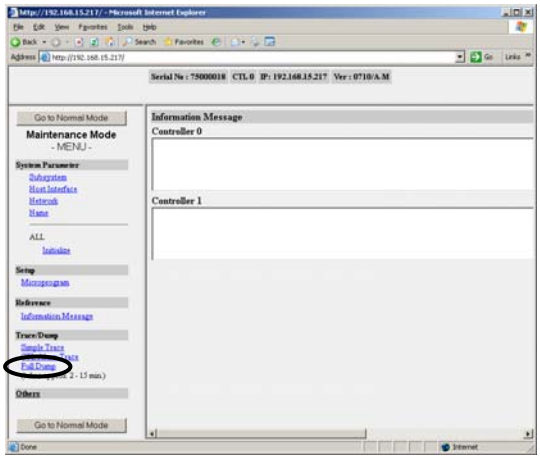
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(b) Input the IP address of the controller from which the Full Dump will be collected, through the browser. If the system has been connected to the WEB, press the "Refresh" button to update the page.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

The cache memory access failure occurs when the following window is displayed. Refer to WEB "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).

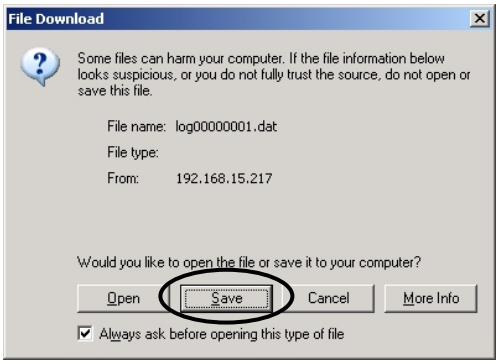


(c) Collect the Full Dump according to the WEB and the following procedure.
Click "Full Dump" in the menu frame of "Trace/Dump".

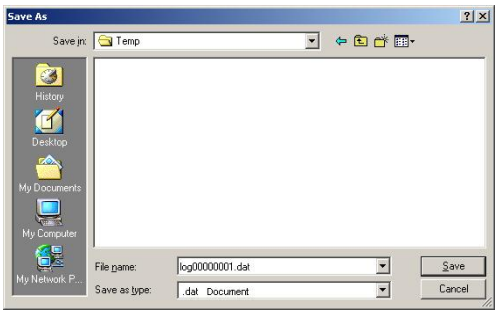


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The following dialog is displayed. Click the [Save] button.



Select the place to save the file and file name (Default file name: logx.dat <x:Controller serial numbers>) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed.
When the down-loading completes, the progress indicating message window is closed.
There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

(d) Return to (b) and collect the Full Dump from the other Control Unit.
(Save the Full Dump files collected from different Control Units into different directories or put different names to them so that you will see from which controller they were collected.)

‡1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logx.dat" or any other name.

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(4) Method of collecting Full Dump from dual-Controller system-2

Collecting Full Dump information of detached Control Unit under dual system configuration

NOTE : Collect the Full Dump from only the blocked Control Unit. (The CALM LED (red) of the blocked controller is lighting up.)

(a) Press the RST SW of the blocked Control Unit. (While pressing RST SW, the RST LED is on.)
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).
(The Control Unit will be set in the maintenance mode of the WEB.)

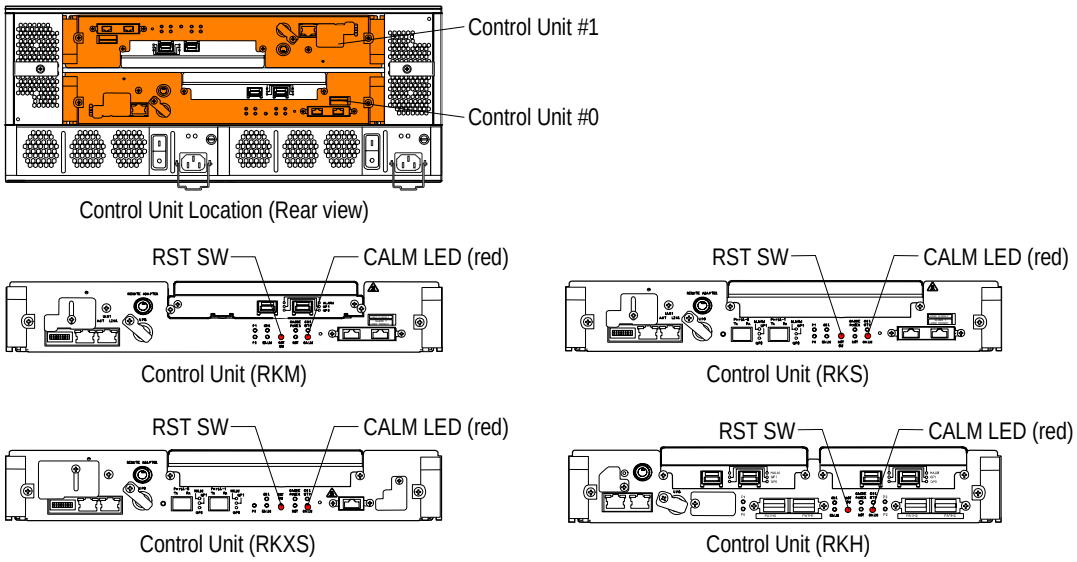


Figure 7.5.5 Indication Locations of Control Unit

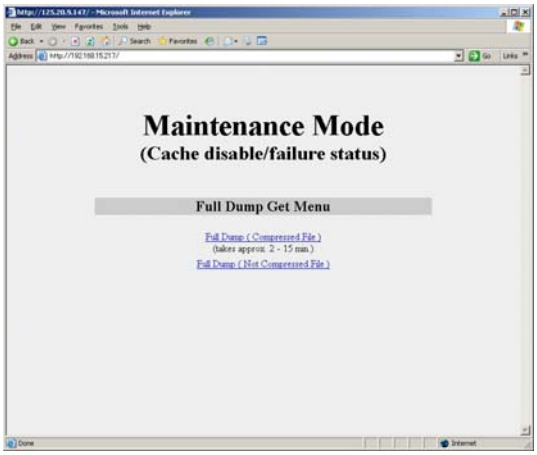
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(b) Input the IP address of the Control Unit from which the blocked Control Unit, through the browser.

If the system has been connected to the WEB, press the update button to update the page.

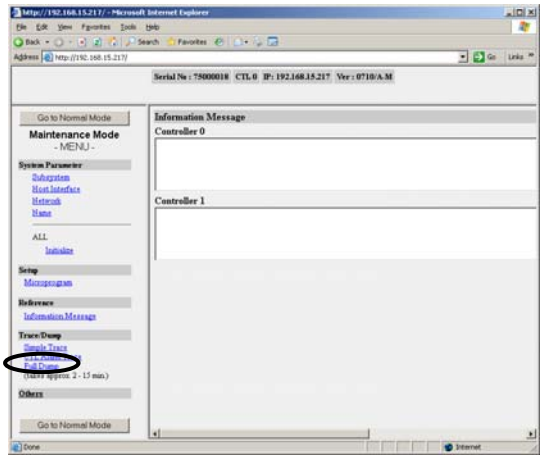
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

The cache memory access failure occurs when the following window is displayed. Refer to WEB "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).



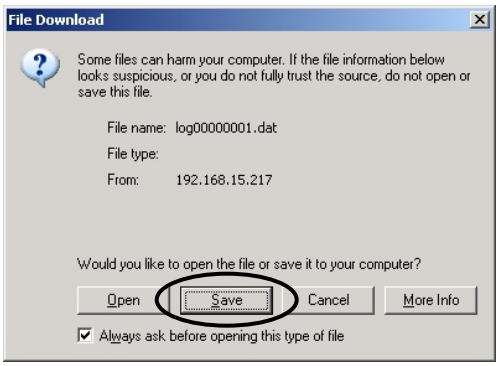
(c) Collect the Full Dump according to the WEB and the following procedure.

Click "Full Dump" in the menu frame of "Trace/Dump".

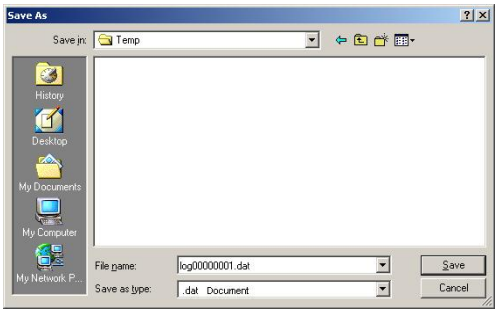


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The following dialog is displayed. Click the [Save] button.
If the following dialog is not displayed even after five minutes passed, click the [Close] button on the upper right of the browser and close the browser. After that, open the browser again and retry from the procedure (b).



Select the place to save the file and file name (Default file name: logx.dat <x:Controller serial numbers>) and click [Save](‡1).
When the download is not completed(‡2) or the message window is not displayed even after five minutes passed, click the [Close] button on the upper right of the browser and close the browser. After that, open the browser again and retry from the procedure (b).



The down-loading is started and the progress indicating message window is displayed.
When the down-loading completes, the progress indicating message window is closed.
There is no problem although it is displayed that the presumption remaining time is uncertain in the dialog box during the download.

‡1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logx.dat" or any other name.
‡2 : Refer to the content displayed in "Full Dump" in "Trace/Dump" listed in the menu frame of WEB for the standard at time that the download of the Full Dump is completed.

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7.6 NAS Log collection

In the NAS Log collection, the NAS OS log information on the NAS OS stored in the disk is collected.

Next, the collection method of the NAS is displayed.

(1) Before collecting the NAS log

(a) Item to be prepared

The collection uses the normal mode of WEB.

For connecting to WEB, the terminal in which a browser is installed is necessary. Also, the Disk Drive with the available disk space of 150 M bytes or more is necessary for the NAS Log collection.

(b) Remove the cover of the LAN connector for the maintenance of the RKNAS (rear side), and connect the LAN connector for the maintenance and that for the service PC with the LAN cross cable.

NOTE : When the NAS Log is acquired from the PC connected to the LAN for control, it is required to access both of the user control port of the Disk Array subsystem and the control port of the NAS Unit from the PC. (It is recommended that both IP addresses are the same segments.)

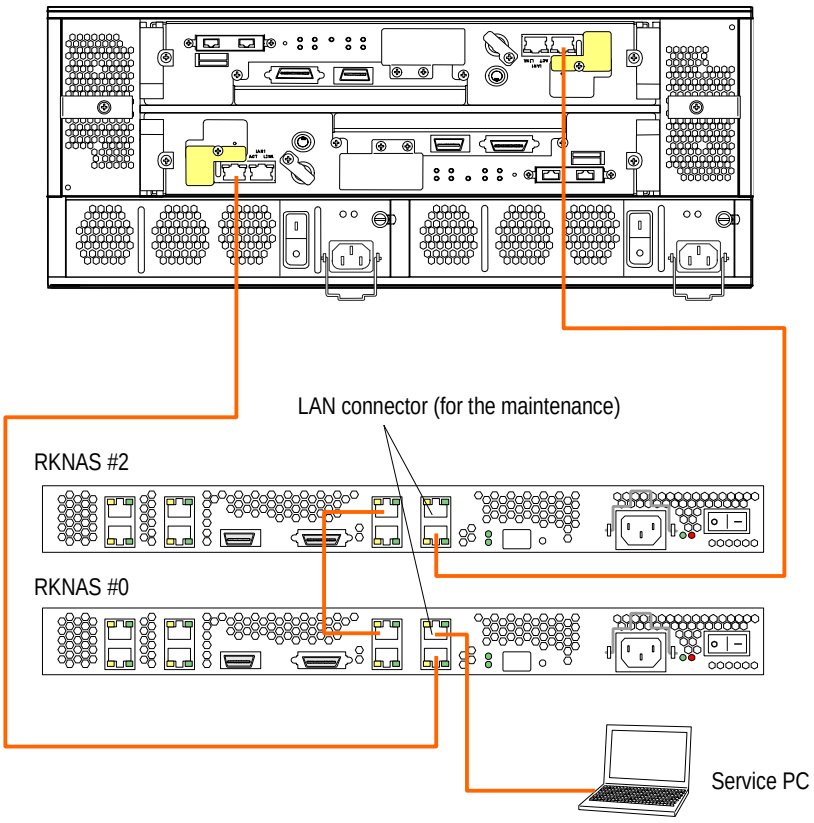


Figure 7.6.1 Connecting LAN Cables for NAS

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(c) The NAS Log collects information on each NAS Unit.
Because the access information between the clusters is required for the analysis work, collect the NAS Log for both NAS Units in the cluster.
Store it by changing the directory or file name of each NAS Unit, so that the collected file may distinguish the NAS Unit.

NOTE : The NAS Log of both NAS Unit can be collected from the Maintenance PC connected to one of the NAS Unit, but in this case, connect it to WEB after inputting the IP address of the Control Unit connecting to the NAS Unit.

(d) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 60 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

(e) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed.
When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

(f) Clear the Cache of the browser according to the following procedure as not to store the old data collected last time.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

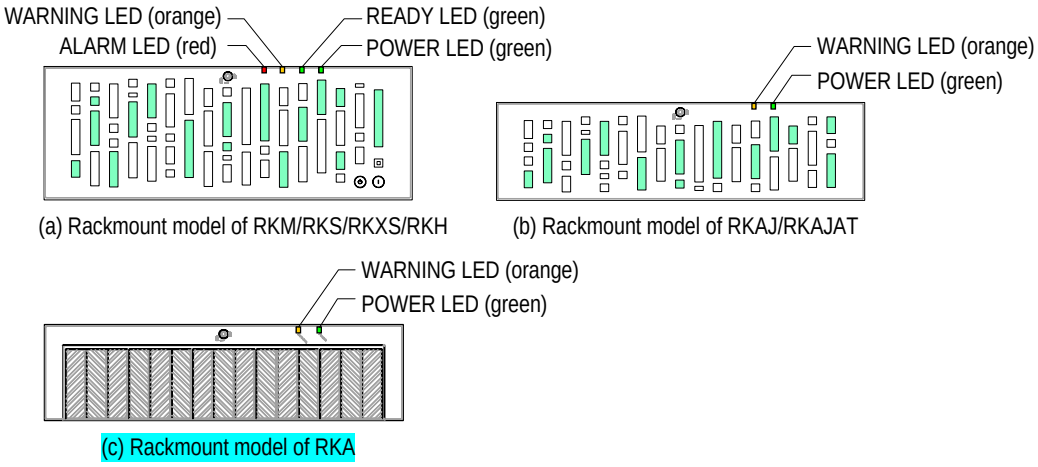


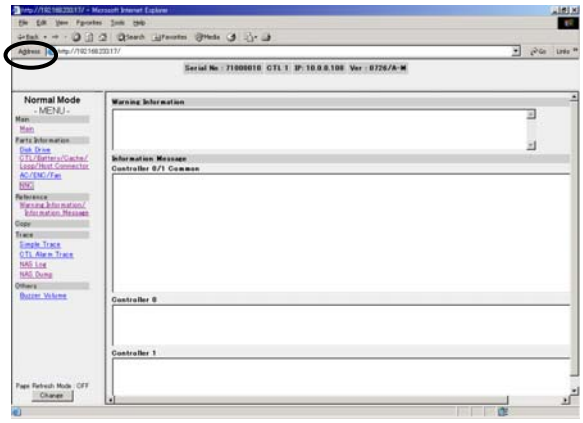
Figure 7.6.2 Indication Locations and Names of LED (Front Bezel)

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(2) Collection method of the NAS Log

NOTE : Do not perform the next NAS Log collection in one Control Unit until the NAS Log collection processing ends.
The operation when executing the NAS Log collection from two or more WEB and external application at the same time is not guaranteed.

(a) Input the IP address of the Control Unit to which the NAS Unit is connected from the browser. Update the page by clicking the update button or [Display] – [Update to latest information] when having connected it to WEB (refer to "Chapter 3 Before Starting WEB Connection" (TRBL 03-0000)).
In the case of WEB connection or WEB operation, [User name] and [Password] may be requested.
In that case, input the user name "maintenance" and the password "hoshu9500".

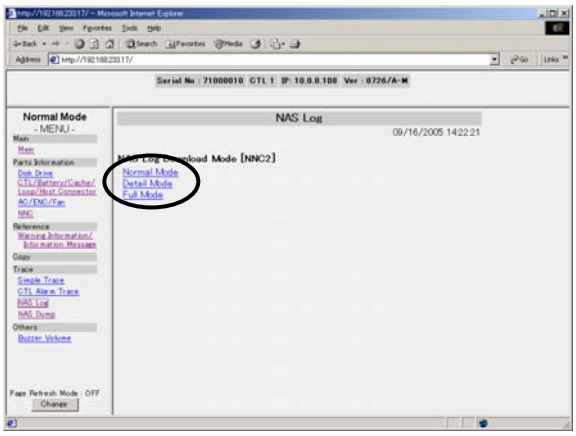


(b) Collect the memory dump in the following procedure according to WEB.
Click "NAS Log" in "Trace" of the menu frame.

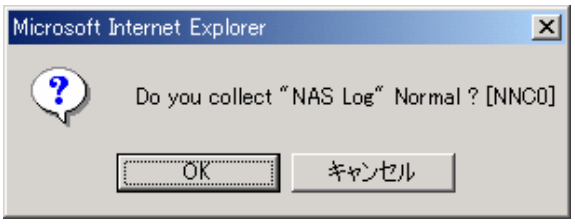
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(c) Select the collection mode in “NAS Log”, and click it.

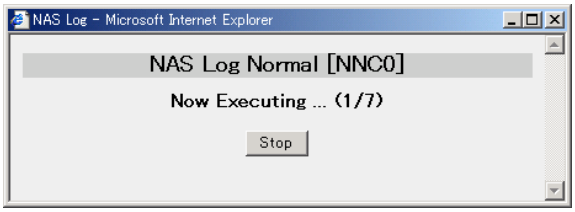
Collection mode	Use	Capacity (standard)	Collection time (standard)
Normal Mode	Collect it only when there is a special instruction. (It is limited to when the remote collection of “Full Mode” and ”Detail Mode” are impossible on the capacity side.)	About 4 M bytes (One NNC)	About 1 minute (One NNC)
Detail Mode	Collect it only when there is a special instruction. (It is limited to when the remote collection of “Full Mode” is impossible on the capacity side.)	About 12 M bytes (One NNC)	About 1 minute (One NNC)
Full Mode	If there is no special instruction, collect all in “Full Mode”.	About 150 M bytes (One NNC)	About 4 minutes (One NNC)



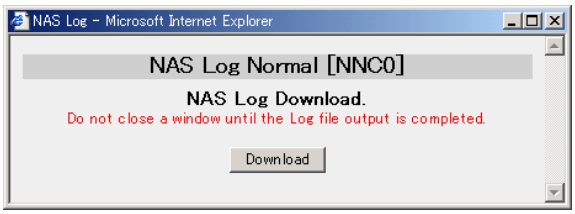
(d) The confirmation message is displayed. Click the [OK] button.



The following dialog is displayed.



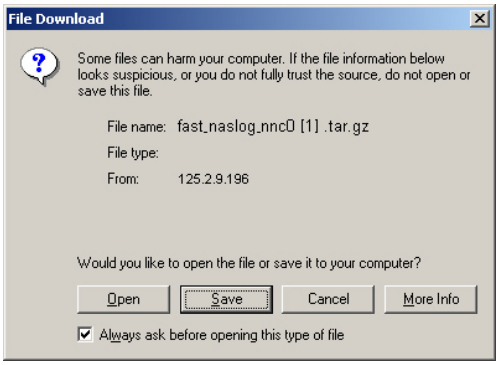
(e) The following dialog is displayed when ending. Click the [Download] button.



NOTE : Do not close this dialog while you download the NAS Log into the service PC. The NAS Log may not be able to be collected when closing it.

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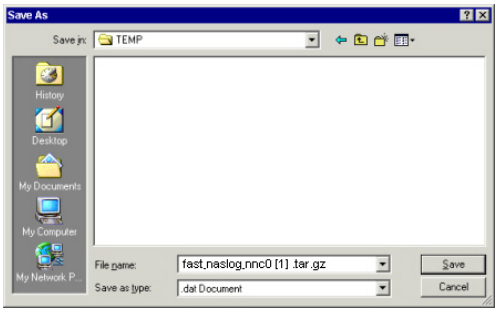
(f) The following dialog is displayed. Click [Save].



(g) Specify the storage location of the file and the file name, and click [Save](‡1).
A default file name is as follows in the collection mode.

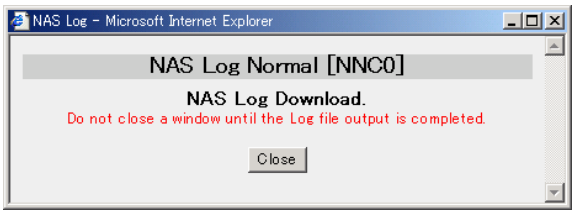
Item	Collection Mode		
	Normal Mode	Detail Mode	Full Mode
NNC 0	fast_naslog_nnc0[1].tar.gz	naslog_nnc0[1].tar.gz	full_naslog_nnc0[1].tar.gz
NNC 1	fast_naslog_nnc1[1].tar.gz	naslog_nnc1[1].tar.gz	full_naslog_nnc1[1].tar.gz
NNC 2	fast_naslog_nnc2[1].tar.gz	naslog_nnc2[1].tar.gz	full_naslog_nnc2[1].tar.gz
NNC 3	fast_naslog_nnc3[1].tar.gz	naslog_nnc3[1].tar.gz	full_naslog_nnc3[1].tar.gz

NOTE : There may be the cases where the numerical value of "[1]" of the file name is not 1 and "[1]" part is not attached depending of the browser environment.



The down-loading is started and the progress indicating message window is displayed.
When the down-loading completes, click [Close] button.

(h) Click [Close] button.



‡1 : A file name can be changed to "optional file name.tar.gz".

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7.7 NAS Dump collection

Collect the full memory information on the NAS Unit stored in the disk for the NAS Dump collection.

(1) Before collecting the NAS Dump

(a) Item to be prepared

The collection uses the normal mode of WEB.

The PC terminal in which the browser and the FTP server (IIS) are installed is necessary to connect it to WEB (Refer to DF700 NAS SOFTWARE Maintenance Manual "8.1.2 Installing a PXE Server Suite and FTP Server" (NAS 08-0000) for the procedure for installing the FTP server). Moreover, the initial setting is required for the FTP server (IIS) (Refer to DF700 NAS SOFTWARE Maintenance Manual "8.1.3 Configuring an FTP Server" (NAS 08-0090) for the detail). Also, the Disk Drive with the available disk space of 800 M bytes or more is necessary for the NAS Dump collection.

(b) Remove the cover of the LAN connector for the maintenance of the RKNAS (rear side), and connect the LAN connector for the maintenance and that for the service PC with the LAN cross cable.

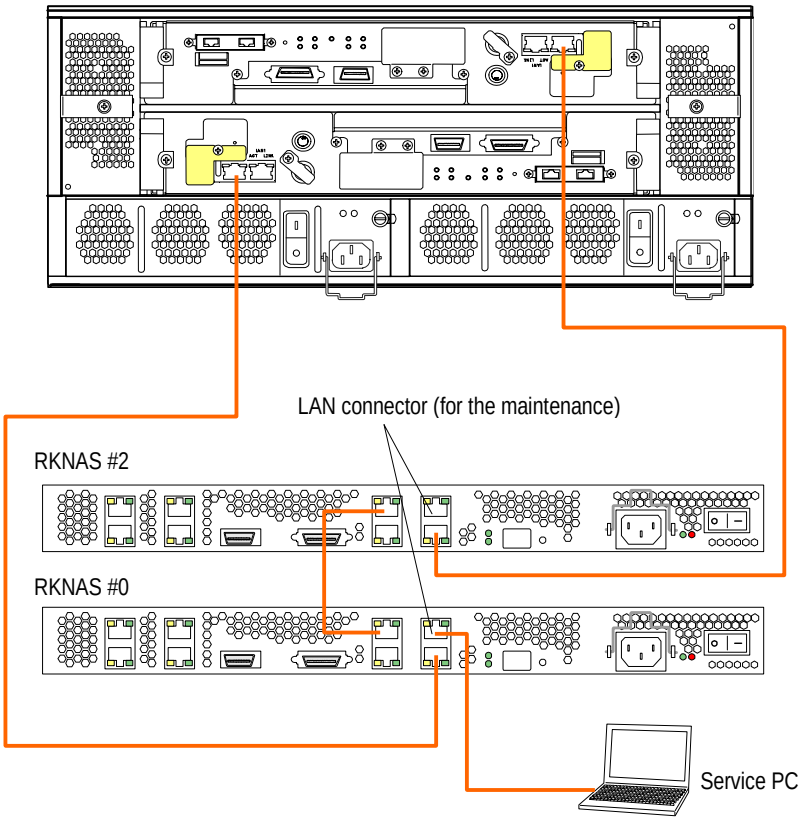


Figure 7.7.1 Connecting LAN Cables for NAS

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(c) The NAS Dump collects information on each NAS Unit.
Store it by changing the directory or file name of each NAS Unit, so that the collected file may distinguish the NAS Unit.

(d) Check that the READY LED (green) on the front of the Basic Chassis is not blinking at high speed.
When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 60 minutes (or 40 to 60 minutes in case of the RKH) until the READY LED (green) lights up because the automatic download of the ENC/SENC firmware is being executed.

(e) Check that the WARNING LED (orange) on the front of the Basic Chassis (RKM/RKS/RKXS/RKH) is not blinking at high speed.
When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, wait for the maximum of 30 to 85 minutes until the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. There is no problem if it blinks slowly (at intervals of one second).

(f) Clear the Cache of the browser according to the following procedure as not to store the old data collected last time.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

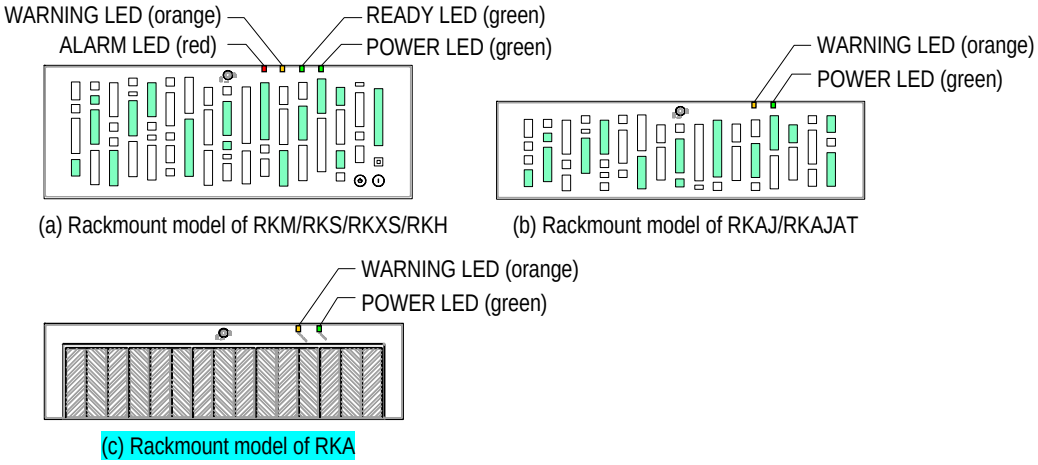


Figure 7.7.2 Indication Locations and Names of LED (Front Bezel)

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(2) Collection method of the NAS Dump

The operation of the NAS Dump collection consists of two steps as shown below.

(a) NAS Dump generation instruction

The full memory information of the NAS Unit is generated in the volume for the dump storage (Disk Drive). (Refer to DF700 NAS SOFTWARE Maintenance Manual "3.4.7 Obtaining NAS Dump" (NAS 03-0490) for the detailed procedure.)

(b) Download of the dump file

The dump file transferred to the volume for the dump storage is downloaded in the service PC. (Refer to DF700 NAS SOFTWARE Maintenance Manual "3.4.10 Downloading Dump Files" (NAS 03-0650) for the detailed procedure.)

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7.8 Storing simple trace information in the USB memory

Insert the USB memory in a Maintenance PC and give procedure to store the collected Simple Trace in the USB memory.

(1) The USB memory outline

Data read/write is enabled only by inserting the USB memory in the USB port in the Maintenance PC.

(a) How to use the USB memory

NOTE : When using the USB memory in Windows XP/2000 for the first time, the USB memory is automatically recognized and the driver is installed.

(i) Remove the USB memory cap and insert the memory in the USB port in the Maintenance PC.

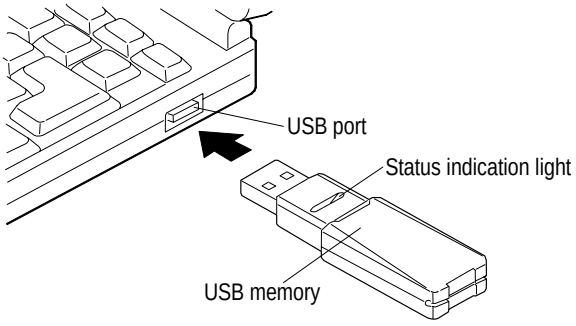


Figure 7.8.1 USB Memory Insertion

(ii) The "Removal Disk" icon is added to the "My Computer".

(iii) The added icon indicates the USB memory.

(iv) Data read/write is enabled as well as the hard disk.

(b) The status indication light identifies the USB memory operation

The status indication light can identify the USB memory operation status inserted in the Maintenance PC. Handle the USB memory with care depending on the operation status.

- Fast blink: during read/write operation
  Do not remove the USB memory.
- Slow blink: waiting
  It can be removed following the procedure "when removing".

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(2) Procedure for storing in the USB memory

(a) Store simple trace in the USB memory.

Store the simple trace information collected in "7.3 Collecting simple trace" (TRBL 07-0040) in the USB memory by copying and pasting.

(b) How to remove the USB memory

Perform the following procedure when removing the memory in the status that the Maintenance PC power is on.

The following procedure is not necessary when removing the memory with the Maintenance PC power turned off.

(i) Click the [ icon] in the task tray.

(ii) Click the displayed message.

(iii) Click the [OK] button if the message is displayed.

(iv) Check that the status indication light is slowly blinking (waiting) or lighting off before removing the memory.

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Chapter 8. Trouble Analysis by LED Indication

8.1 Trouble Analysis by LED Indication of Front Bezel

(1) LED positions on Front Bezel

The positions on LED's are shown below. Refer to "8.2 (9) Trouble analysis based on LED indication of NAS Unit" (TRBL 08-0340)for the NAS Unit.

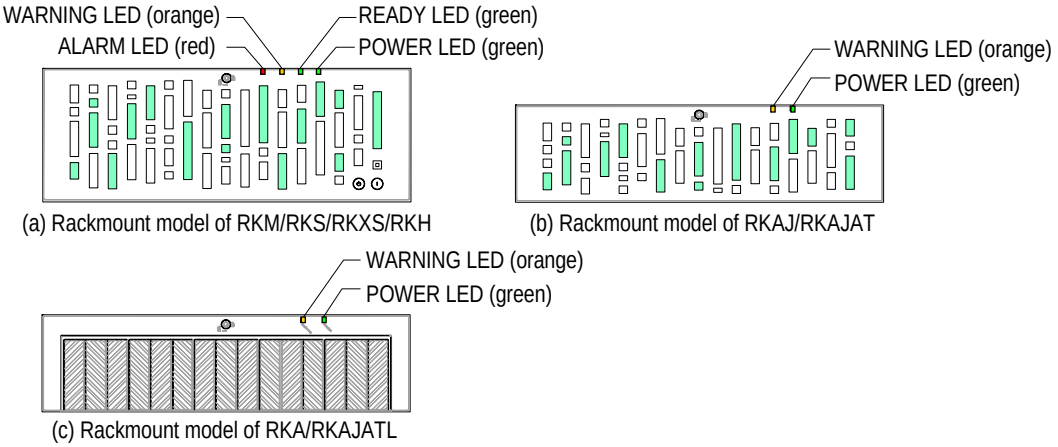


Figure 8.1.1 Locations and Name of LED

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(2) Trouble analysis procedure

The states of the units indicated by the LED indication patterns of the Front Bezel and the actions to take against them are shown below.

Table 8.1.1 LED Indication Patterns on Front Bezel

(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	Basic subsystem				Additional subsystem				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
1(*1)	×	×	○	○	○	×	Normal.	Recovery operation is not necessary.	—
2	×	×	×	×	—	×	Power is turned off, or failures of the Power Unit, two Fan Assemblies or short-circuit of each part occurs.	Analyze the failure following "8.1 (3) (a) Trouble analysis on the indication on the POWER LED of Basic subsystem. (When the POWER LED is not on)" (TRBL 08-0040).	Parts failure: (Basic subsystem) Drive failure: (Basic subsystem)
	○	×	×	○	×	×		Analyze the failure following "8.1 (3) (b) Trouble analysis on the indication on the POWER LED of Additional subsystem. (Not POWER LED on)" (TRBL 08-0100).	Parts failure: (Additional subsystem) Drive failure: (Additional subsystem)
3	○	×	×	×	×	×	Power Unit, Control Unit or ENC Unit/ SENC Unit has dual failed.	1. Check that power cable is connected correctly. 2. Check LED indication of Power Unit. (Refer to "Table 8.2.3 LED Indication Patterns on Power Unit" (TRBL 08-0171).) 3. Check LED indication of Control Unit. (Refer to "Table 8.2.5 LED Indication Pattern-1 on Control Unit" (TRBL 08-0200)", "Table 8.2.6 LED Indication Pattern-2 on Control Unit" (TRBL 08-0210).) 4. Check LED indication of ENC Unit/SENC Unit. (Refer to "Table 8.2.9 LED Indication Patterns on ENC Unit" (TRBL 08-0290), "Table 8.2.10 LED Indication Patterns on SENC Unit" (TRBL 08-0310).)	Parts failure.

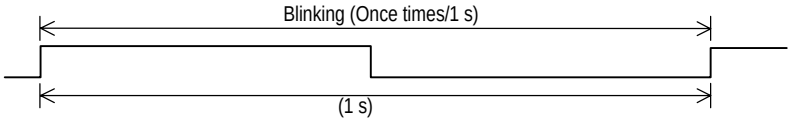
*1 : This is not a failure status

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(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	Basic subsystem				Additional subsystem				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
4	×	×	×	○	—	—	A failure occurred during power-on process.	1. Check LED indication of Control Unit. (Refer to "Table 8.2.7 LED Indication Pattern-3 on Control Unit" (TRBL 08-0230).) 2. If CALM LED of one Control Unit or more does not light up, wait READY LED to light up (for at least 10 min). 3. Proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and then detect a failure with WEB.	Parts failure. (Basic subsystem) Failure must be detected with WEB.
5	✧(*1) (Slowly blinking)	×	×	○	—	—	A serious failure occurred while power on. Example: User data was lost.	Proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.
6	○	×	×	○	—	—	A failure occurred during self-test at time when power is turned on.	Check LED indication of Control Unit. (Refer to "Table 8.2.7 LED Indication Pattern-3 on Control Unit" (TRBL 08-0230).)	Parts failure. (Basic subsystem)

*1 : Slowly blinking

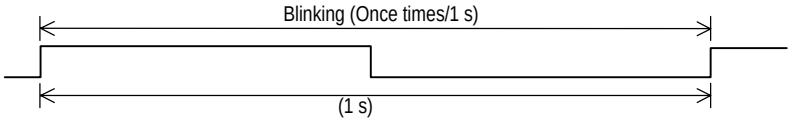


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(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	Basic subsystem				Additional subsystem				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
7	×	○	○	○	○	×	A failure which does not stop operation occurred in Basic subsystem.	Check LED indication of each Basic subsystem part. (Refer to "8.2 Trouble Analysis by LED Indication of Each Part" (TRBL 08-0150)).	Parts error. (Basic subsystem)
					○	○	A failure which does not stop operation occurred in Additional subsystem. (*2)	Check LED indication of each Additional subsystem part. (Refer to "8.2 Trouble Analysis by LED Indication of Each Part" (TRBL 08-0150).)	Parts error. (Additional subsystem)
8	×	✧(*1) (Slowly blinking)	○	○	—	—	A failure which does not stop operation occurred in unit (It must be detected with WEB).	Proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.
9	○	✧(*1) (Slowly blinking)	×	○	—	—	A failure which does not stop operation occurred in unit.	Proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and then detect a failure with WEB.	Failure must be detected with WEB.
10	—	✧(*3) (Fast blinking)	—	—	—	—	Latest revision maintenance function of flash program is executed.	Wait until fast blinking stops.	No error.

*1 : Slowly blinking



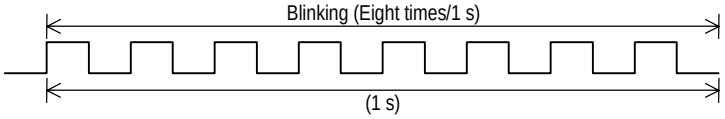
*2 : Under the following conditions, Additional subsystem WARNING LED could not light up. However, the each part's ALARM LED or ALM LED lights up. (Excluding the condition (2) below.)

(1) When the ALM LED of the ENC Unit/SENC Unit came on before the subsystem became ready during startup of the subsystem.

(2) When the ALM LED of the ENC Unit/SENC Unit came on and the ENC Unit/SENC Unit was pulled out.

(3) When the failed ENC Unit/SENC Unit was replaced and the ALM LED of the ENC Unit/SENC Unit came on after that (However, the ALM LED is on immediately after the ENC Unit/SENC Unit is inserted. If the ALM LED does not go out after one minute elapses, the replaced ENC Unit/SENC Unit should be judged out of order.)

*3 : Fast blinking

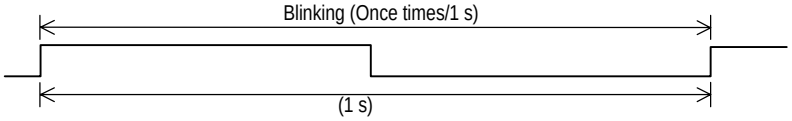


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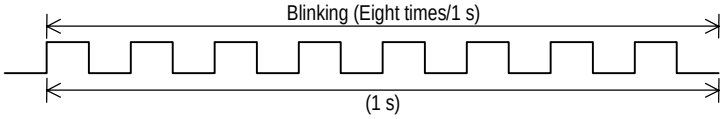
(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	Basic subsystem				Additional subsystem				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
11	×	✧(*3) (Fast blinking + Slowly blinking)	○	○	—	—	The most recent revision maintenance function of the flash program is being executed, and the failure (it must be detected with WEB), which allows the subsystem to operate, occurs.	Wait until fast blinking stops. Then, proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and detect the failure with WEB.	Failure must be detected with WEB.
12	×	×	✧(*1) (Slowly blinking)	○	—	—	The ENC/SENC firmware download or Drive firmware download process is completed.	Restart a device.(*4)	—
13	×	○	✧(*1) (Slowly blinking)	○	—	—	The ENC/SENC firmware download or Drive firmware download process is terminated abnormally.	Proceed to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000), and detect a failure with WEB.	Failure must be detected with WEB.
14	×	×	✧(*2) (Fast blinking)	○	—	—	The ENC/SENC firmware is being automatic downloaded.	Wait as it is until there is no high-speed blinking (for the maximum of 30 to 50 minutes, but for the maximum of 40 to 60 minutes in case of the RKH).	—

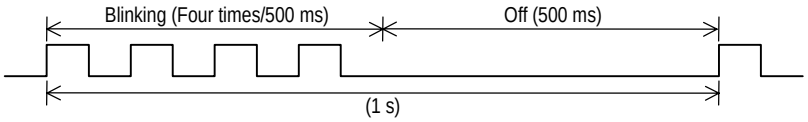
*1 : Slowly blinking



*2 : Fast blinking



*3 : Fast blinking + Slowly blinking



*4 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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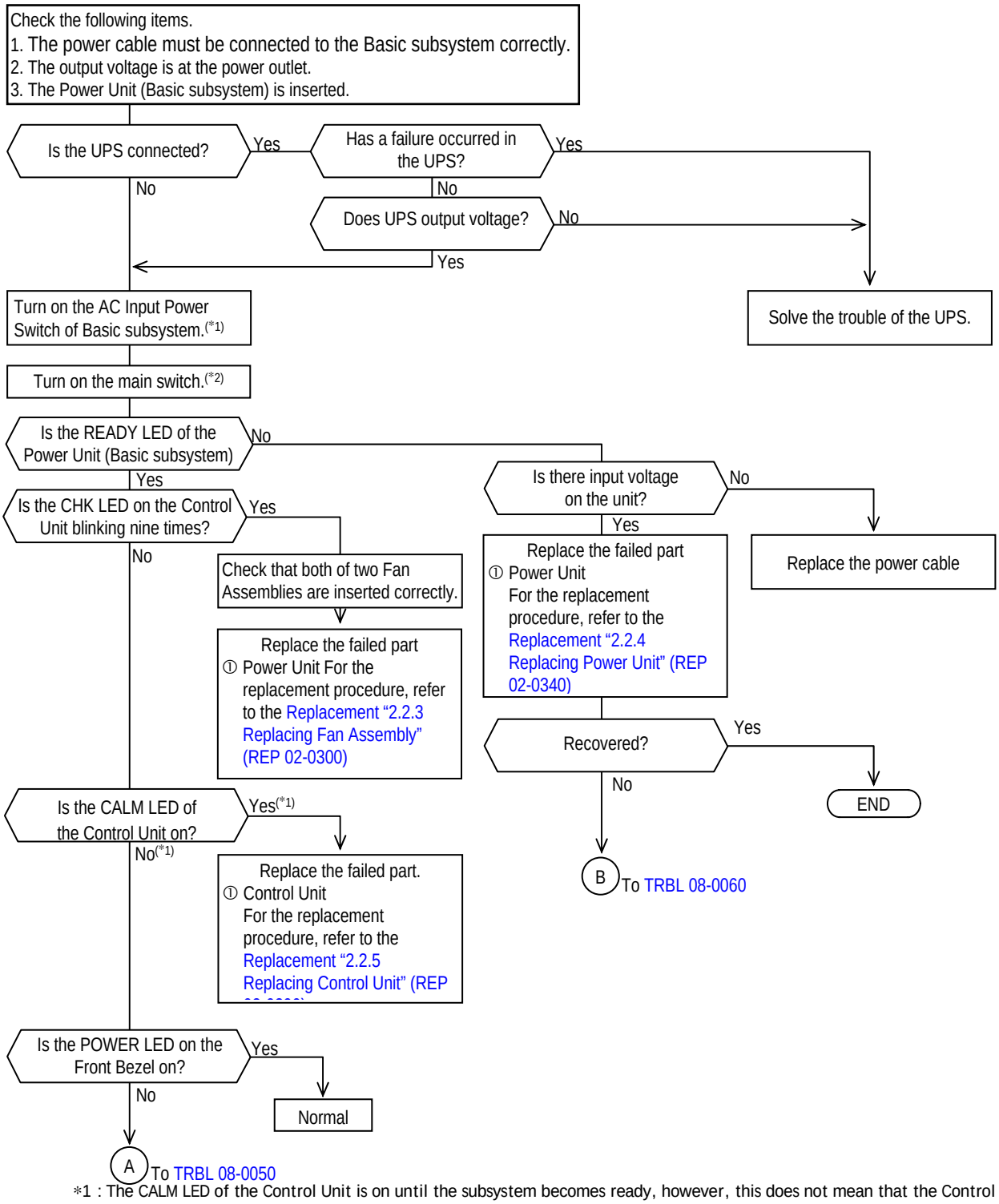
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(3) Trouble analysis by the indication of the POWER LED

Analyze the cause of the POWER LED failure following the flowchart.

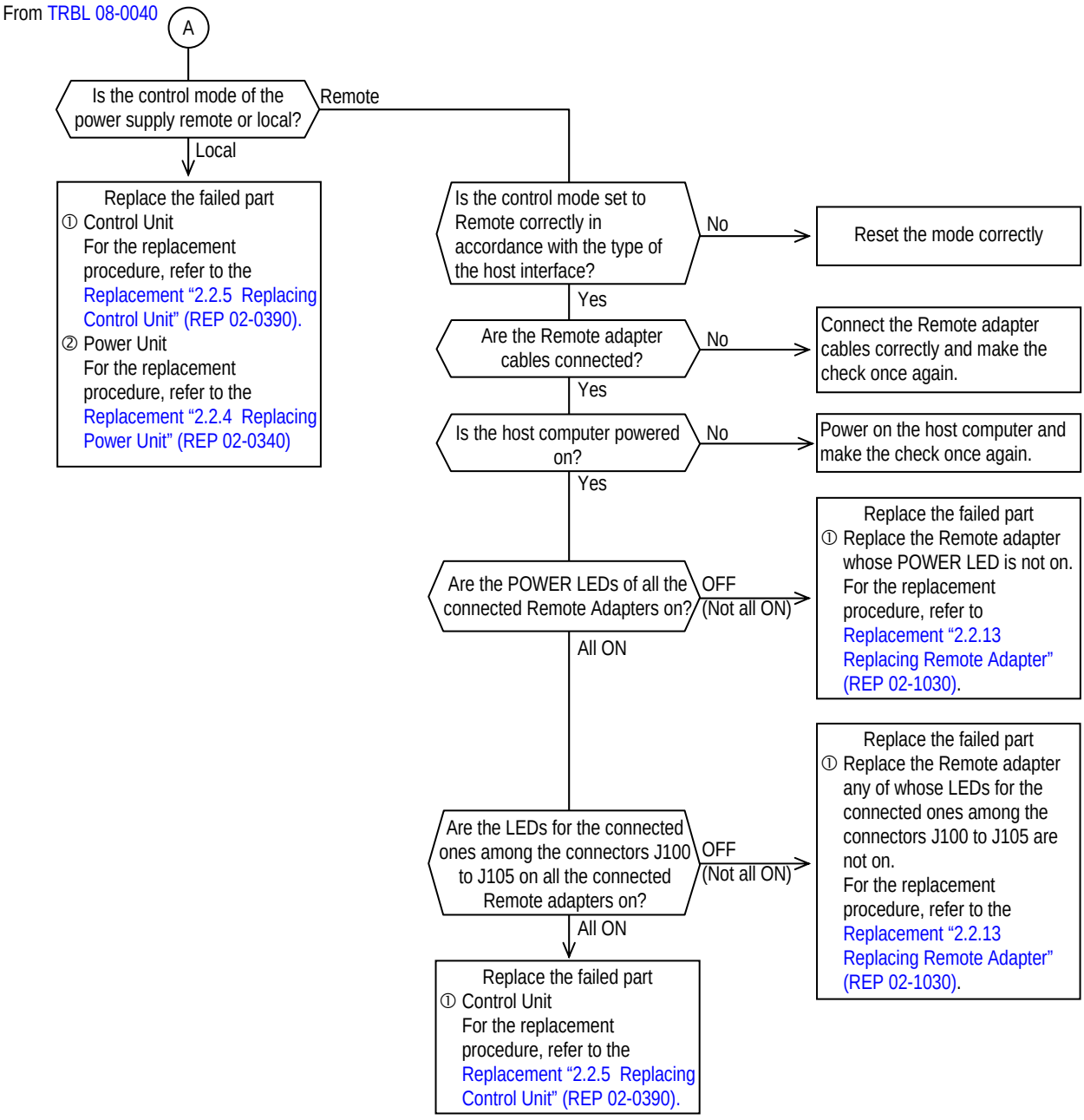
(a) Trouble analysis on the indication on the POWER LED of Basic subsystem. (When the POWER LED is not on)



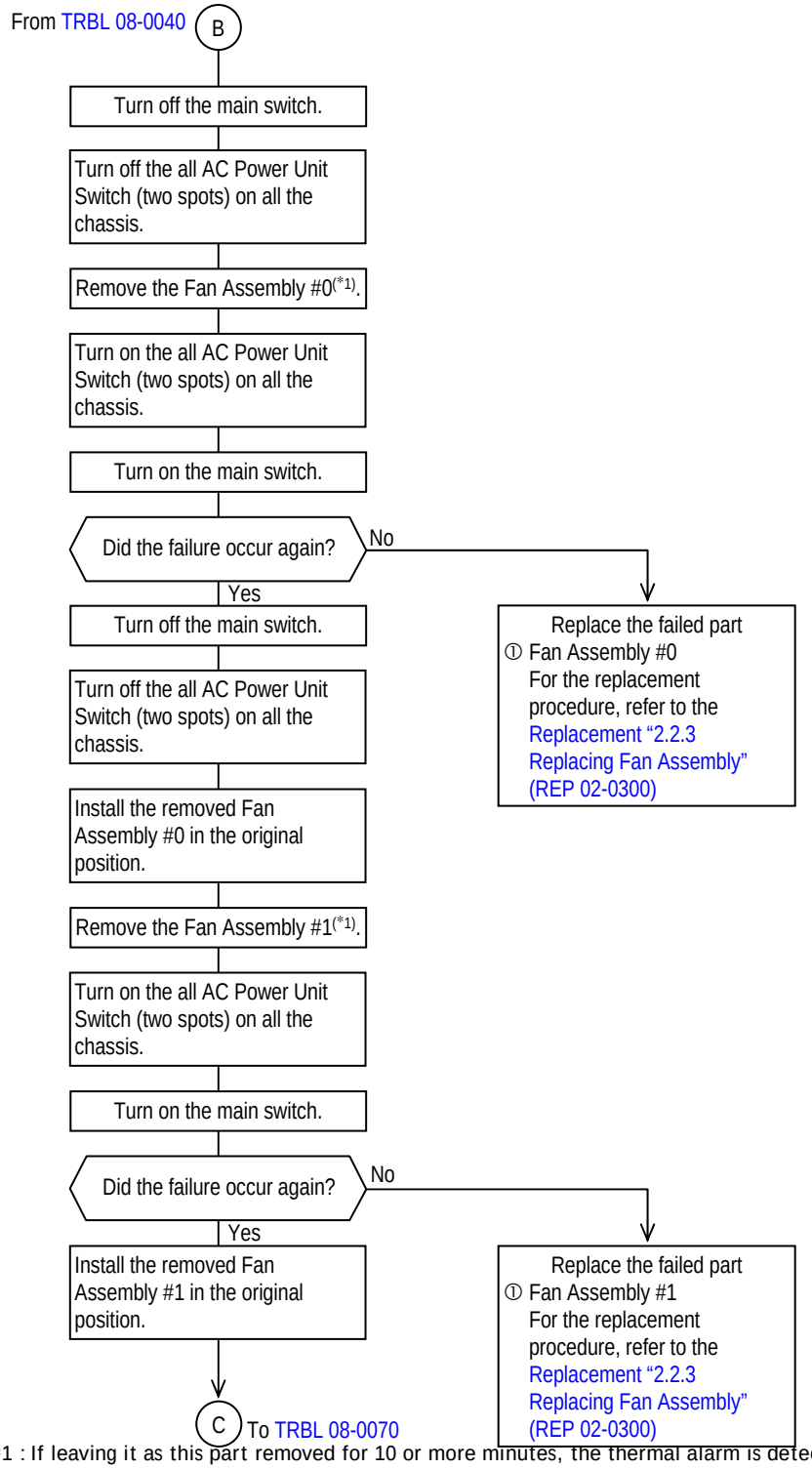
*1 : The CALM LED of the Control Unit is on until the subsystem becomes ready, however, this does not mean that the Control Unit is faulty. If the CALM LED does not go out after the subsystem has become ready, replace the Control Unit.

*2 : This operation is not needed when the AC Power Unit Switch and the main switch have already been turned on.

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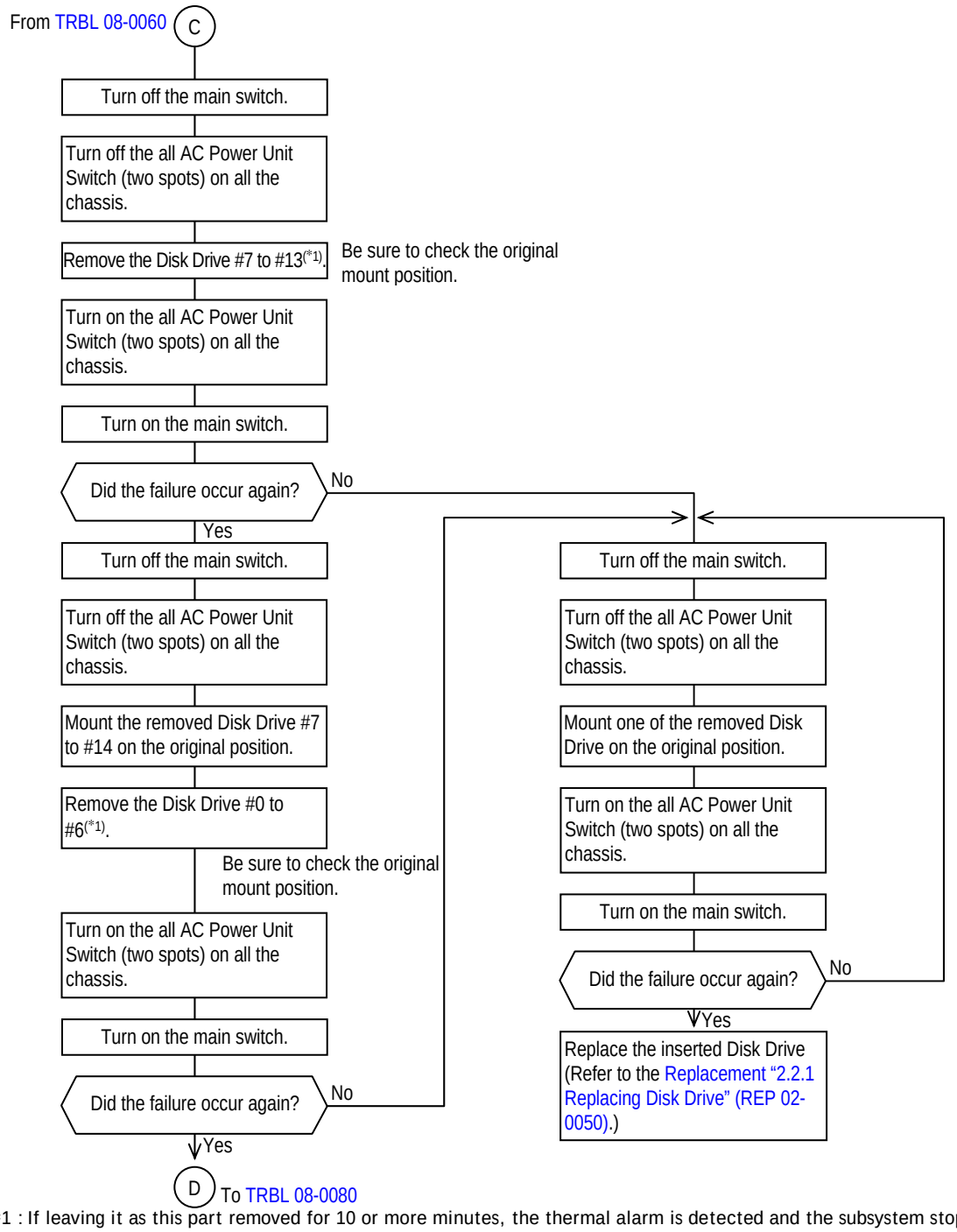


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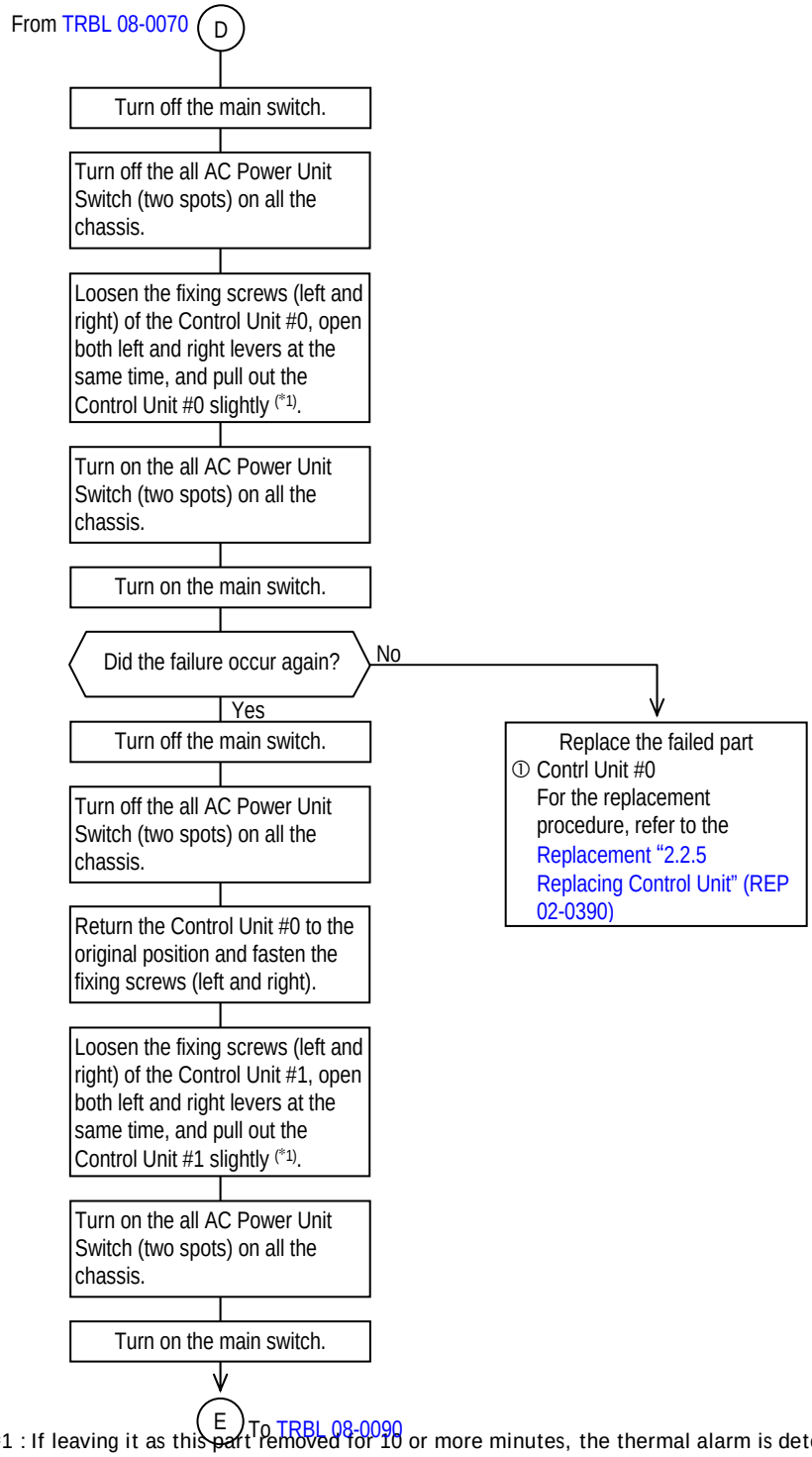
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

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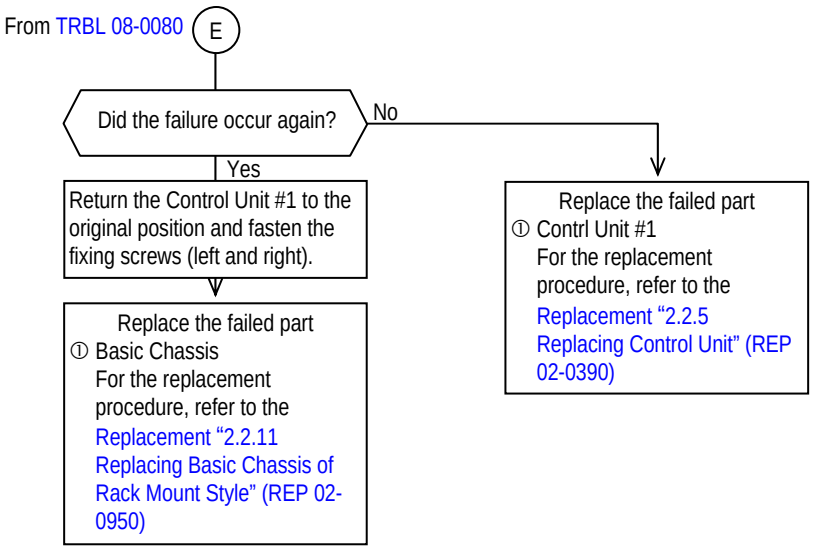
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

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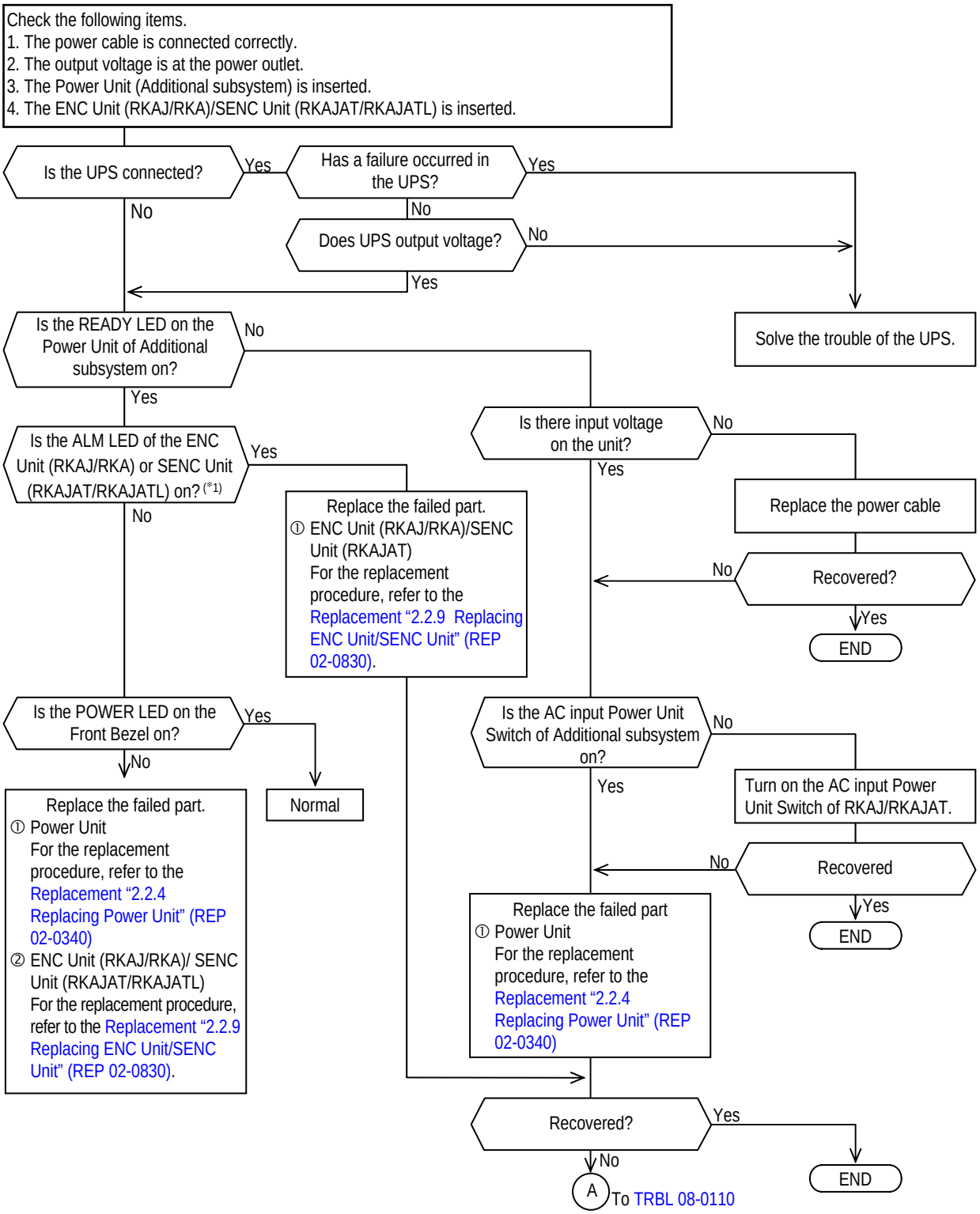
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

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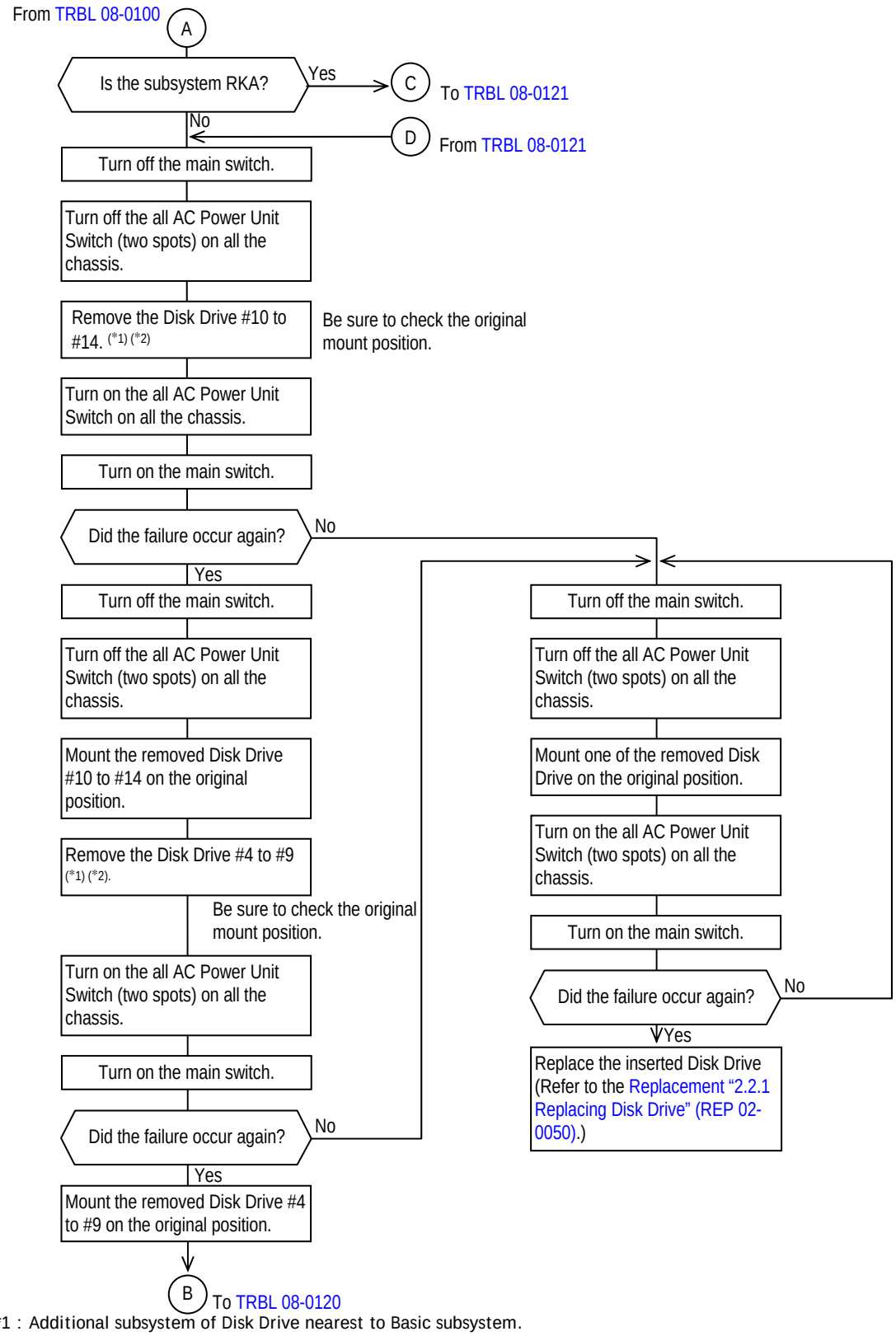
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(b) Trouble analysis on the indication on the POWER LED of Additional subsystem. (Not POWER LED on)



*1 : The ALM LED of the ENC Unit/SENC Unit is on until the subsystem becomes ready, however, this does not mean that the ENC Unit/SENC Unit is faulty. If the ALM LED of the subsystem which has become ready does not go out, replace the ENC Unit/ SENC Unit.

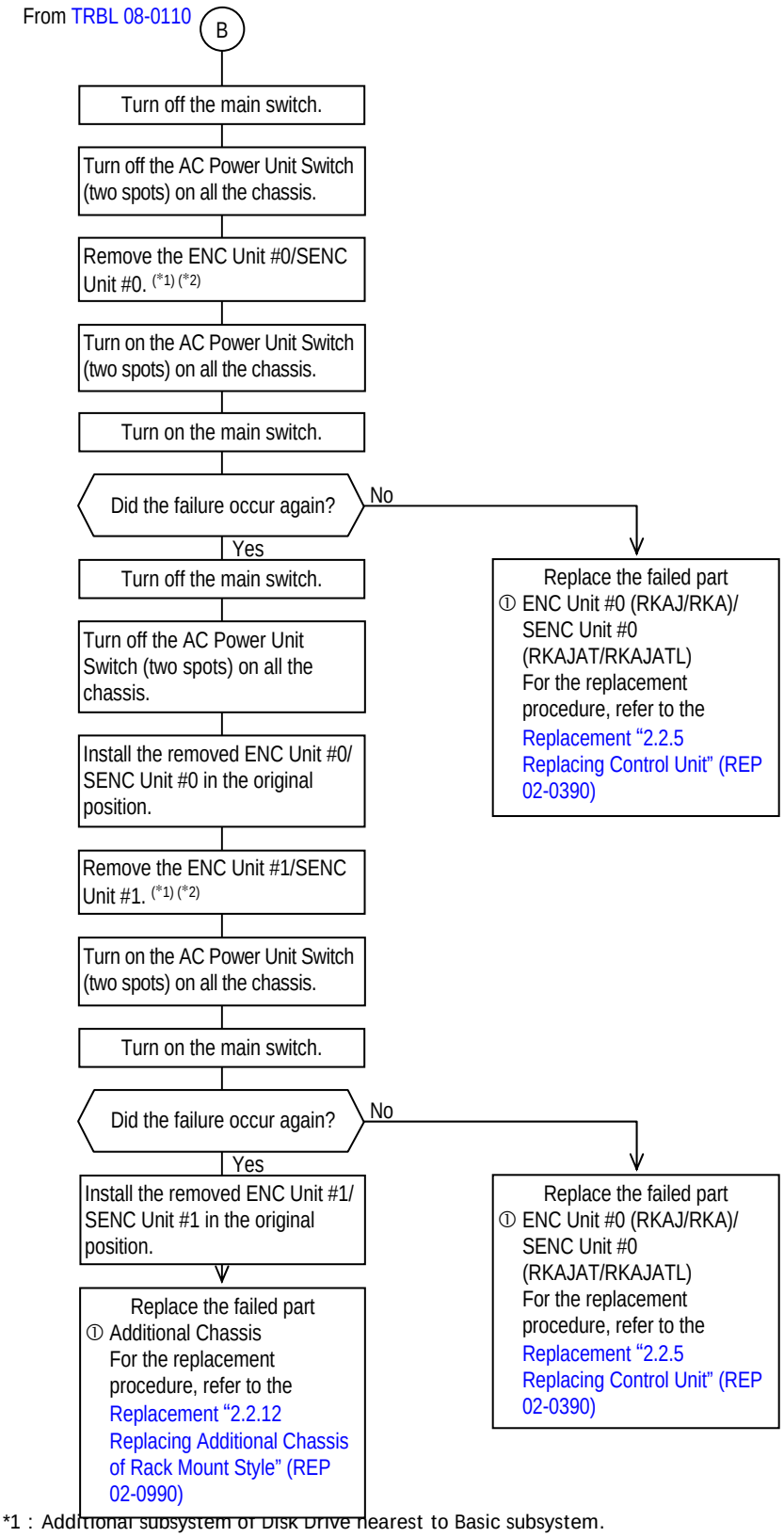
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*1 : Additional subsystem of Disk Drive nearest to Basic subsystem.

*2 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

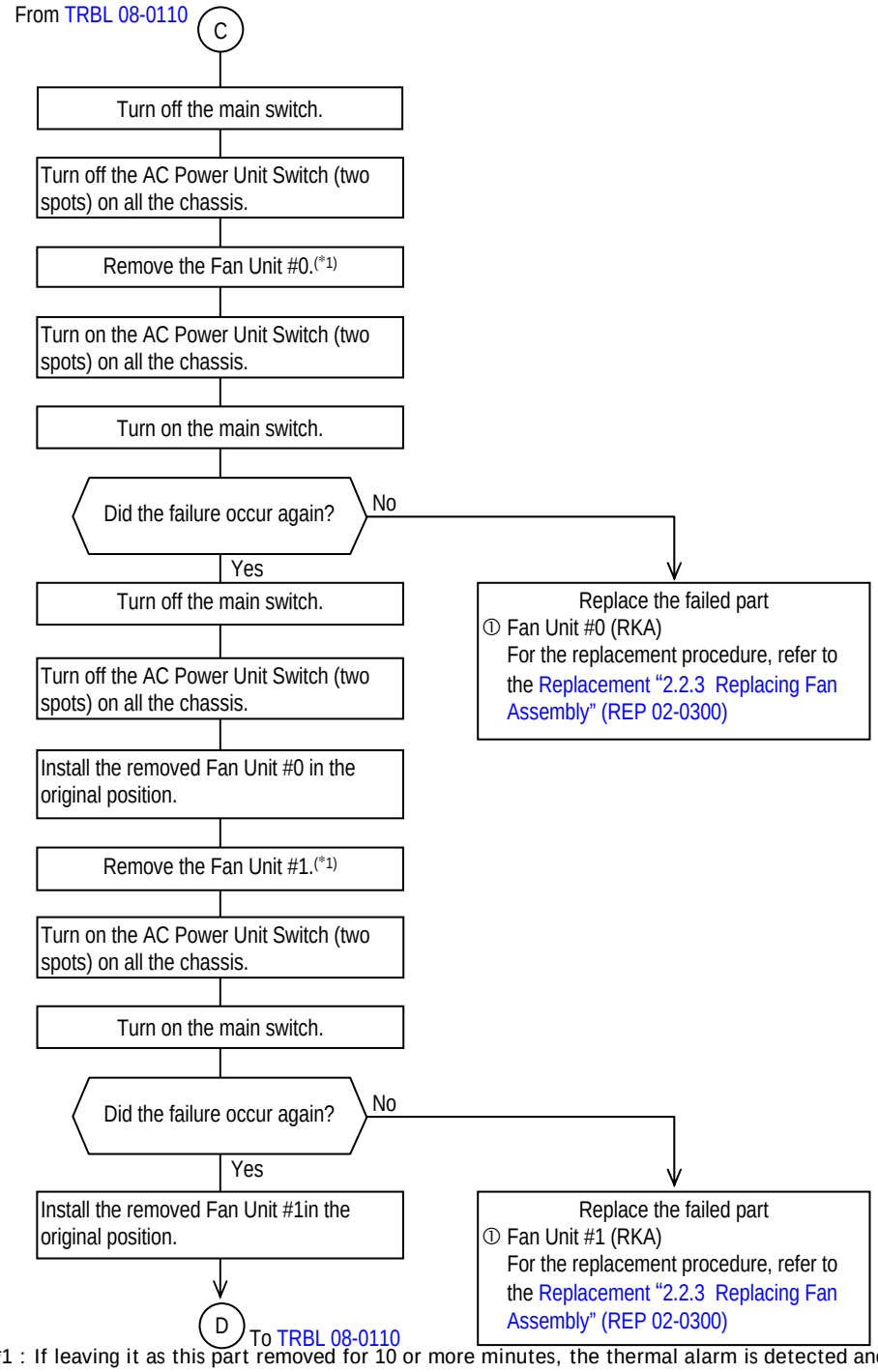
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*1 : Additional subsystem of Disk Drive nearest to Basic subsystem.

*2 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

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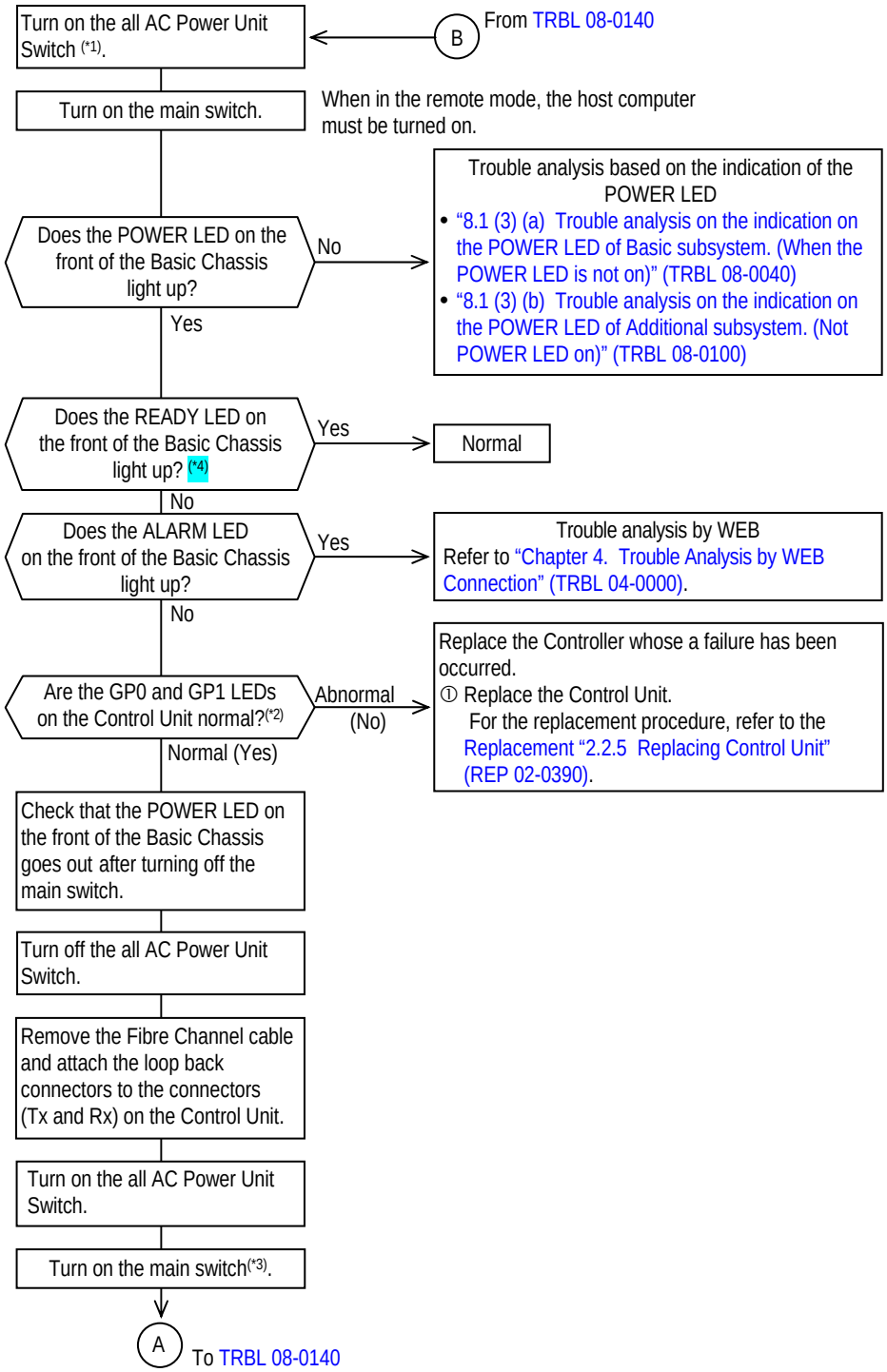
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

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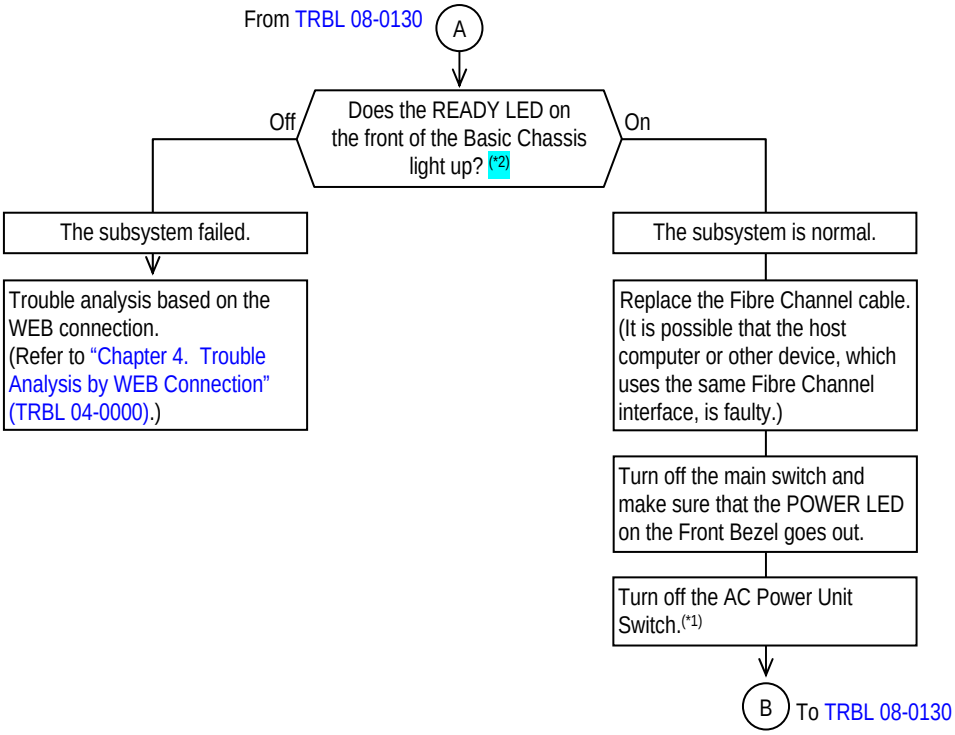
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(4) Trouble analysis based on the indication of READY LED (When in the Fibre Channel interface)
Analyze the cause of the READY LED failure following the flowchart.



*1 : This operation is not needed when the AC Power Unit Switch and the main switch have already been turned on.
*2 : Refer to "Table 8.2.7 LED Indication Pattern-3 on Control Unit" (TRBL 08-0230) in "8.2 (5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)" (TRBL 08-0230).
*3 : When the mode is Remote, change it to Local.
*4 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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*1 : Return the Remote/Local setting as it was. It may take three minutes at the longest until the READY LED comes on after the main switch is turned on. For the setting of the Remote/Local mode, refer to the Installation "1.8 Setting the Power Control Mode (Local/Remote Mode)" (INST 01-0380).

*2 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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8.2 Trouble Analysis by LED Indication of Each Part

Check whether a failure has occurred in each part or not.

(1) Trouble analysis based on LED indication of Backup Battery Unit

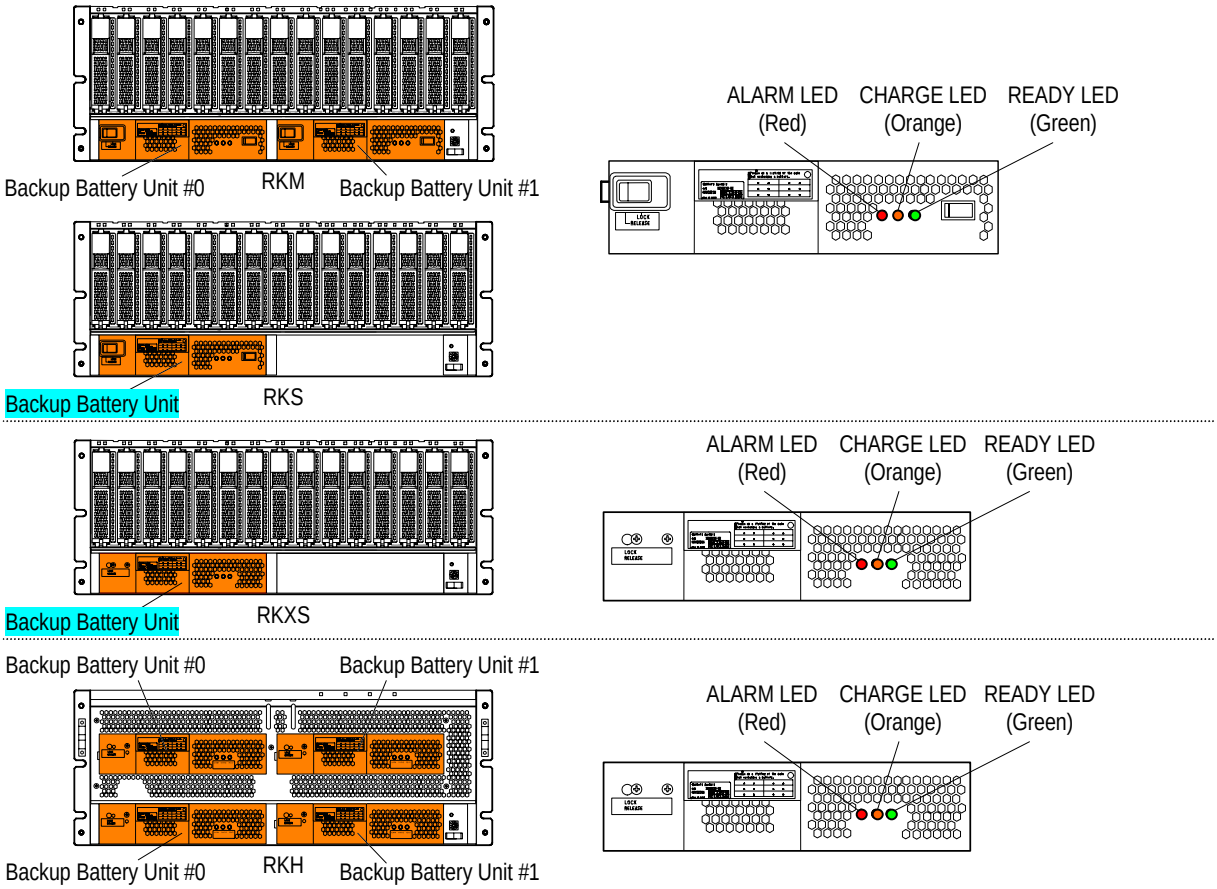


Table 8.2.1 LED Indication Patterns on Backup Battery Unit

(○ : On ✧ : Blinking × : Off —: Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	ALARM (Red)	CHARGE (Orange)	READY (Green)			
1 (*1) (*2)	×	×	○	Normal.	Recovery operation is unnecessary	—
2 (*1) (*2)	×	○	○	Under periodical charge.		
3 (*1)	×	○	✧	Under initial charge. (up to six hours)		

*1 : This is not a failure status.
*2 : Backup time is 24 hours in the state of 1 or 2.

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	ALARM (Red)	CHARGE (Orange)	READY (Green)			
4	✧	×	×	The microcomputer termination is in progress in the Backup Battery Unit (within 10 seconds).	Recovery operation is unnecessary	—
5	○(*1)	×	×	1. Battery voltage is abnormal. 2. Battery temperature abnormal. 3. The Backup Battery Unit is in the state of the over discharge.	Replace the Backup Battery Unit.	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)

*1 : If the ALARM LED on the Backup Battery Unit (ASSY) lights on, be sure to replace the Backup Battery Unit (it cannot be recharged).

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(2) Trouble analysis based on LED indication of Disk Drive

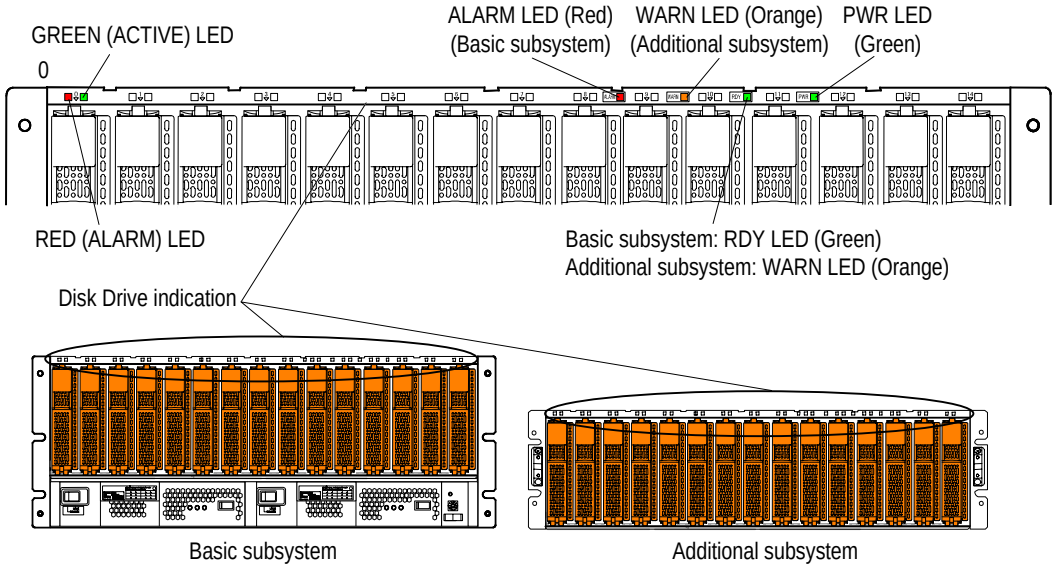


Table 8.2.2 LED Indication Patterns on Disk Drive

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Green (ACTIVE)	Red (ALARM)			
1 (*1)	✧	—	The Disk Drive is being accessed/spun up.	This is not a problem.	—
2 (*1)	○	×	Completed spin up.	This is not a problem.	—
3 (*1)	×	—	Spin down state.	This is not a problem.	—
4	—	○	A failure that makes the Disk Drive of lighting LED unable to operate occurred in it.	1. When the WARN LED of Basic subsystem is blinking, refer to the LOG Message by WEB connection, and check the backup status to the Spare Disk.(*2). 2. Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)

*1 : This is not a failure status.

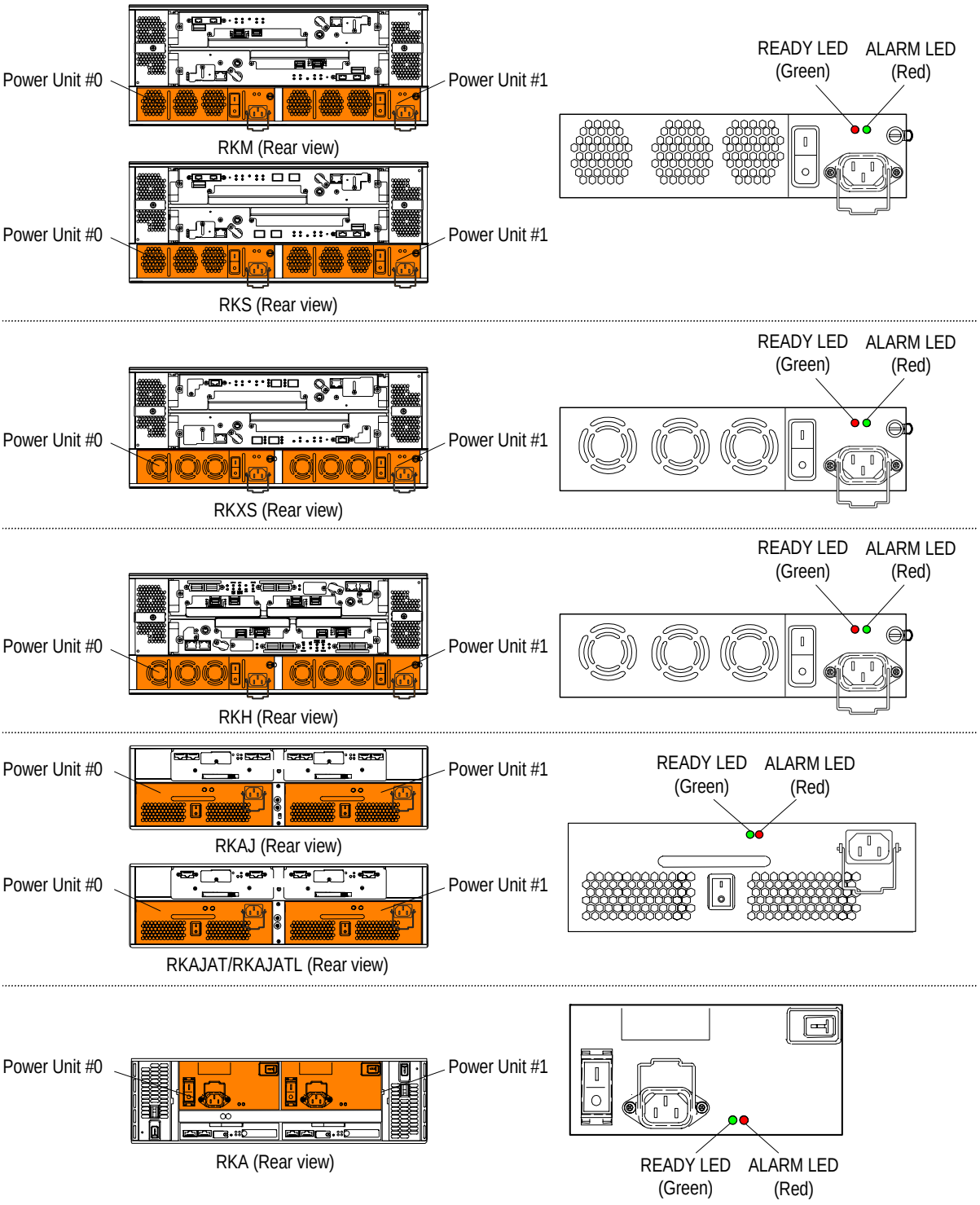
*2 : In the case of the recovery failure to the Spare Disk Drive, the recovery failure to the replacement Disk Drive, or the write incomplete recovery, the WARN LED (orange) on the front of the Basic Chassis blinks. The WARN LED (orange) on the front of the Basic Chassis lights up referring to the log message on WEB.

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(3) Trouble analysis based on LED indication of Power Unit

(a) Power Unit

NOTE : When the READY LED is off, it shows that a failure has occurred even if the fan rotating.



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Table 8.2.3 LED Indication Patterns on Power Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	READY (Green)	ALARM (Red)			
1 (*1)	○	×	This shows the normal operation of the Power Unit.	This is not a problem.	—
2	×	×	In resting.	Make sure that the AC Power Unit Switch is turned on. 1. If the READY LED is kept off when the AC Power Unit Switch is turned on, replace the Power Unit.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
3	×	○	In trouble.	Replace the Power Unit.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
4	○	○			

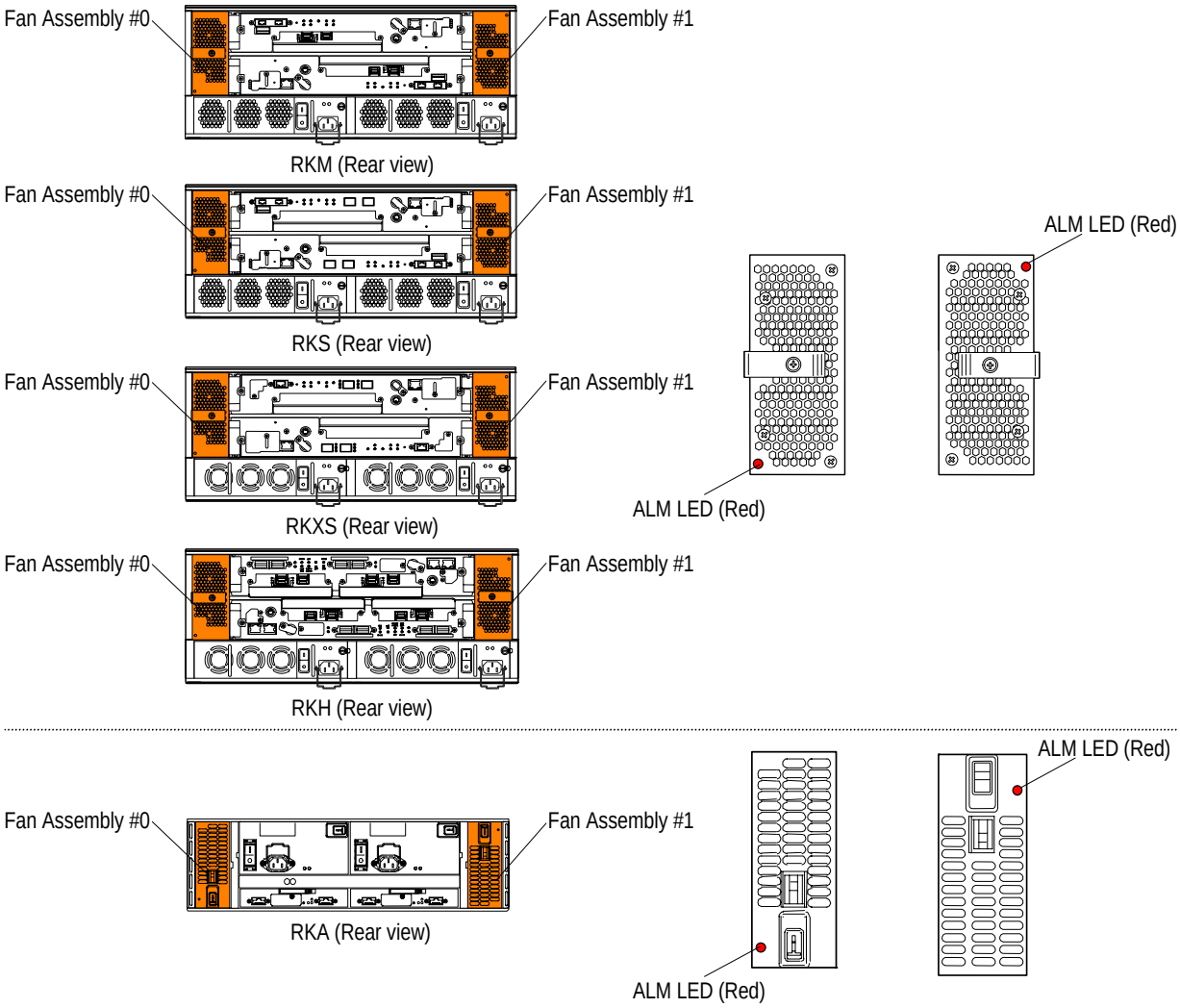
*1 : This is not a failure status.

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(4) Trouble analysis based on LED indication of Fan Assembly



NOTE : While the ALM LED of a Fan Assembly is on, when a Control Unit has been blocked (the CALM LED or EALM LED is on), be sure to correct the Control Unit blockade failure first.

Table 8.2.4 LED Indication Patterns on Fan Assembly

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LED ALM (Red)	Cause or status	Action(s) to be taken	Reference age
1 (*1)	×	This shows that the Fan Assemblies are normal.	This is not a problem.	—
2	○	This shows that there is a trouble in the Fan Assemblies.	Replace the Fan Assembly.	Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)

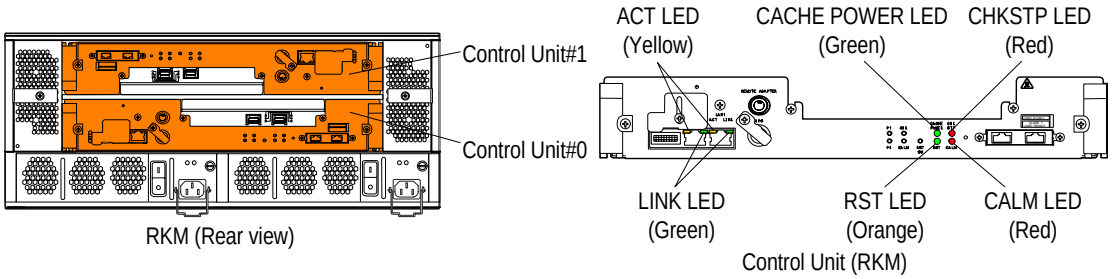
*1 : This is not a failure status.

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(5) Trouble analysis based on LED indication of Control Unit

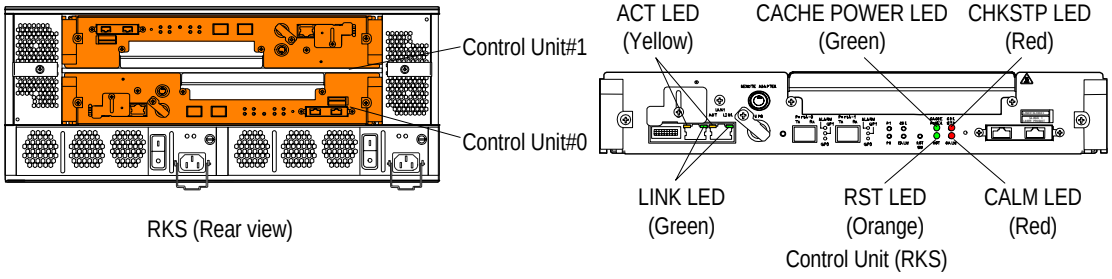
(5-1) LED Indication Pattern on Control Unit (Cache memory, CPU, LAN) (RKM/RKS/RKXS/RKH)

NOTE : If all the LEDs on the Control Unit are turned off, connect to WEB (Refer to "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000)) and check if the control unit is blocked. If the Control Unit is blocked, replace the blocked Control Unit (Refer to the Replacement "2.2.5 Replacing Control Unit" (REP 02-0390).)



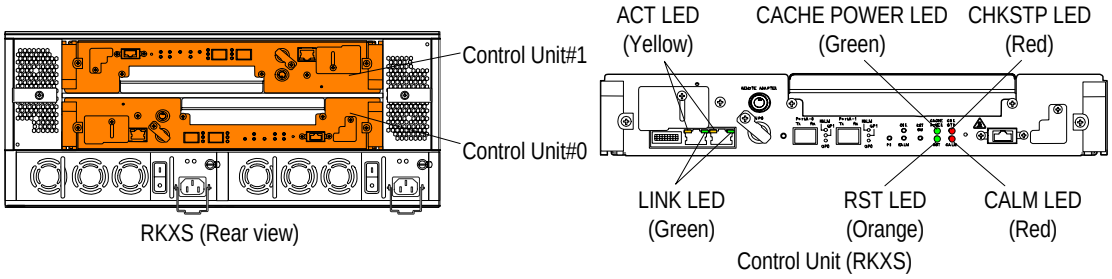
RKM (Rear view)

Control Unit (RKM)



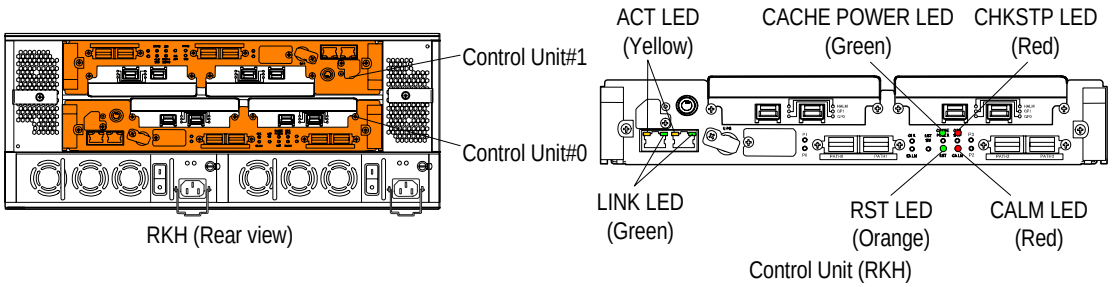
RKS (Rear view)

Control Unit (RKS)



RKXS (Rear view)

Control Unit (RKXS)



RKH (Rear view)

Control Unit (RKH)

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Table 8.2.5 LED Indication Pattern-1 on Control Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CACHE POWER (Green)	CALM (Red)	CHK STP (Red)	RST (Orange)	LINK (Green)	ACT (Yellow)			
1 (*1)	○	—	—	—	—	—	It is shown that the Cache memory is being backed up because a sequential shutdown was not executed normally.	Cancel the cache backing up. (Refer to the procedure for canceling the backing up of the Cache memory on page.)	Replacement "1.1.2 Checking cache memory in the back-up state" (REP 01-0030)
2 (*1)	×	—	—	—	—	—	This shows that the Cache memory is not being backed up.	This is not a problem.	—
3 (*1)	—	—	—	○	—	—	The LED comes on when the controller is being reset in the following cases. • During power-on reset • During reset for WEB maintenance mode • During reboot process	This is not a problem.	—
4							The LED comes on when the controller is being reset in the following cases. • DC-DC converter failure • Reset circuit failure	Connect it to WEB (Refer to "Chapter 3 Before Starting WEB Connection" (TRBL 03-0000)), and replace the Control Unit if the Control Unit blockade message is displayed. However, this message is not displayed when it is the single controller. Replace the Control Unit concerned.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
5 (*1)	—	—	—	—	○	—	This shows that the linkage of LAN is normal.	This is not a problem.	—
6 (*1)	—	—	—	—	—	○	This shows that data is being transferred via LAN.	This is not a problem.	—
7	—	—	○	—	×	—	The LINK LED does not light on though the iSCSI cable in the active status is connected.	Check the LAN cable. If it is normal, replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : This is not a failure status.

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CACHE POWER (Green)	CALM (Red)	CHK STP (Red)	RST (Orange)	LINK (Green)	ACT (Yellow)			
8	—	○	—	—	—	—	A failure that makes the Control Unit unable to operate occurred in it.	Connect PC to WEB and check the message, then follow the instruction. (Refer to the Message "Chapter 1. Before Starting Trouble Analysis" (MSG 01-0000).) 1. Replace the Control Unit. If the operation is not recovered, replace the following items in order. 2. Replace the Cache Unit.	 Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
9	—	—	○	—	—	—	A failure that makes the Control Unit unable to operate occurred in it.	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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(5-2) LED Indication Pattern-2 on Control Unit (Power supply, ENC/SENC) (RKM/RKS/RKXS/RKH)

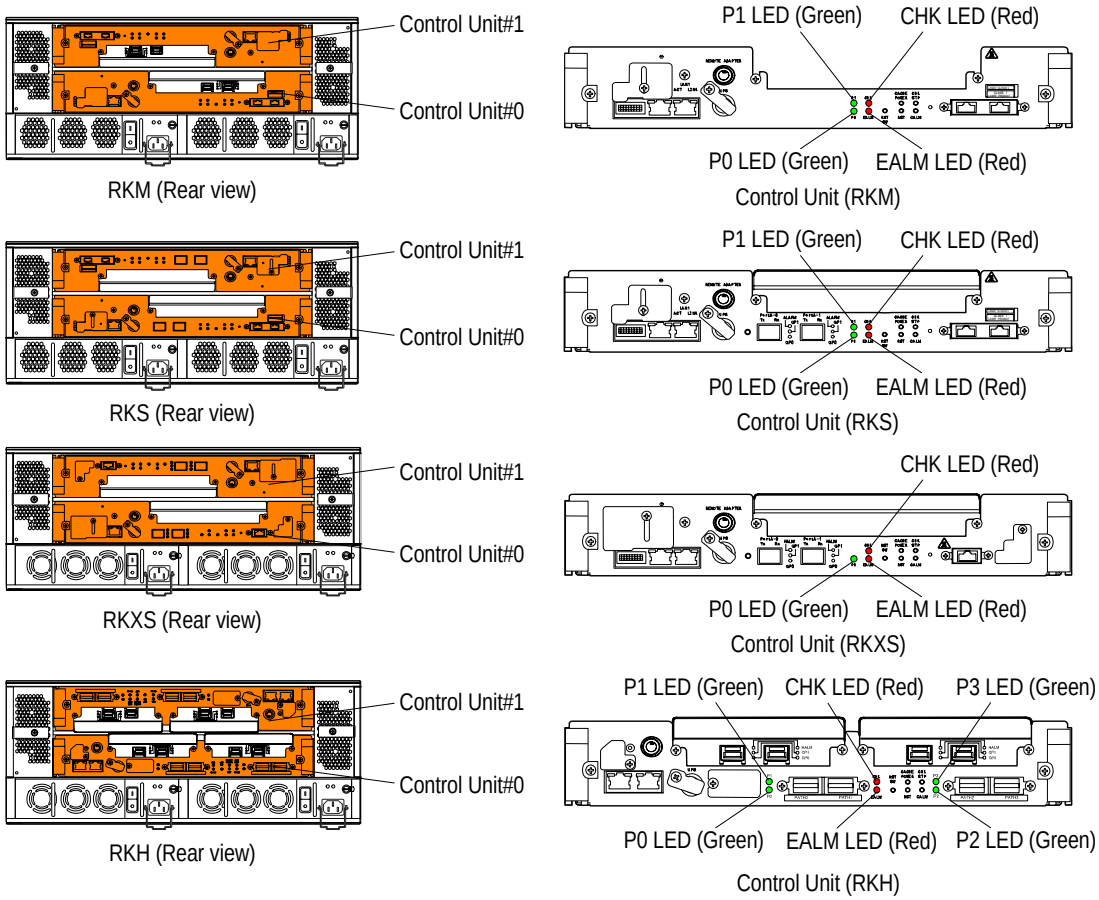
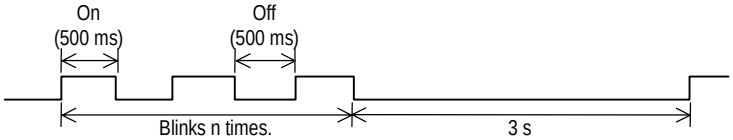


Table 8.2.6 LED Indication Pattern-2 on Control Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CHK (Red)	EALM (Red)	P0 (Green)	P1 (*2) (Green)	P2 (*3) (Green)	P3 (*3) (Green)			
1 (*4)	✧ (*1) (Once)	—	—	—	—	—	This shows a trouble in the Power Unit. Drive +5 V voltage is abnormal.	Replace the Power Unit on which the same READY as that of Control Unit is turned off.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
2 (*4)	✧ (*1) (Twice)	—	—	—	—	—	This shows a trouble in the Power Unit. Drive +12 V voltage is abnormal.		

*1 : Indication of status with LED.



*2 : The RKXS has not P1.

*3 : It is the LED of only the RKH.

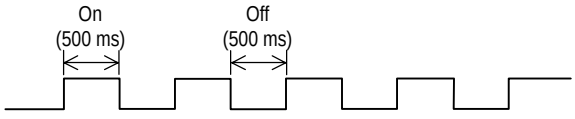
*4 : The RKH and RKXS have not No.1, No.2.

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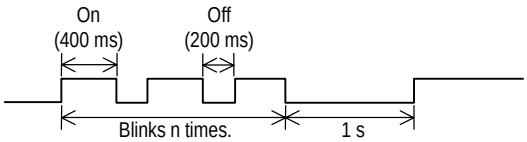
(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CHK (Red)	EALM (Red)	P0 (Green)	P1 (*3) (Green)	P2 (*4) (Green)	P3 (*4) (Green)			
3	✧(*1) (Five)	—	—	—	—	—	Battery is abnormal	Confirm the LED indication on the Backup Battery Unit.	"Table 8.2.1 LED Indication Patterns on Backup Battery Unit" (TRBL 08-0150)
4	✧(*1) (Six)	—	—	—	—	—	Voltage on the controller is abnormal. (Resetting of the Control Unit cannot be cancelled.)	1. Clean it when the air vent of the subsystem is clogged. 2. If there is a thing in front of the Front Bezel, move it. 3. Perform the dummy replacement.(*6) 4. When it is not released even if the dummy replacement is performed, replace the Control Unit.	Replacement "Chapter 3. Periodic Maintenance" (REP 03-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
5(*5)	✧(*1) (Seven)	—	—	—	—	—	This shows a trouble in the Power Unit. BS12V voltage is abnormal.	Replace the Power Unit.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
6(*7)	✧(*1) (Eight)	—	—	—	—	—	ENC part FAN monitoring circuit is abnormal.	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
7	✧(*1) (Nine)	—	—	—	—	—	Rotation failure in two or more fans of both Fan Assemblies.	Replace the Fan Assembly.	Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)
8	○	—	—	—	—	—	ENC Unit CUDG error is occurred. • BOOT section of ENC microprogram • RAM error • ENC Unit configuration error	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : Indication of status with LED.



*2 : Indication of status with LED.



*3 : The RKXS has not P1.

*4 : It is the LED of only the RKH.

*5 : The RKH has not No.5.

*6 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

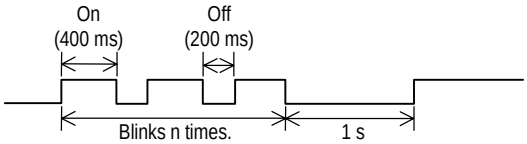
*7 : It is the LED of only the RKXS.

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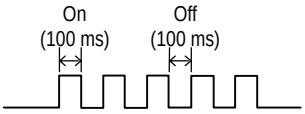
(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CHK (Red)	EALM (Red)	P0 (Green)	P1(*3) (Green)	P2(*4) (Green)	P3(*4) (Green)			
9(*5)	✧(*1) (Once)	—	—	—	—	—	ENC Unit CUDG error is occurred. • SRAM error	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
10	✧(*1) (Twice)	—	—	—	—	—	ENC Unit CUDG error is occurred. • ENC Unit error		
11 (*5)	✧(*1) (Three)	—	—	—	—	—	ENC Unit CUDG error is occurred. • Microprogram error in flash memory.		
12 (*6)	✧(*1) (Five)	—	—	—	—	—	CUDG error detected by ENC microprogram (BOOT section).		
13 (*6)	✧(*1) (Six)	—	—	—	—	—	Significant surface error in ENC FLASH.		
14 (*6)	✧(*1) (Seven)	—	—	—	—	—	SUM check error in ENC FLASH.		
15	—	○	—	—	—	—	A failure that makes the ENC Unit unable to operate occurred in it.		
16	○	✧(*2)	—	—	—	—	An exceptional process error detected by the ENC microprogram.		
17	○	✧(*2)	—	—	—	—	An exceptional process error detected by the ENC microprogram. (Stack over)		

*1 : Indication of status with LED.



*2 : Indication of status with LED.



*3 : The RKXS has not P1.

*4 : It is the LED of only the RKH.

*5 : The RKXS has not No.9 and No.11.

*6 : It is the LED of only the RKXS.

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(○ : On ✧ : Blinking × : Off — : Not depend)

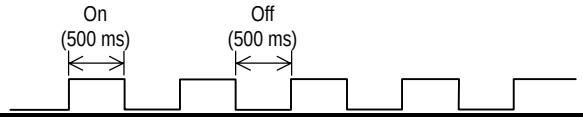
No.	LEDs						Cause or status	Action(s) to be taken	Reference page
	CHK (Red)	EALM (Red)	P0 (Green)	P1(*2) (Green)	P2(*3) (Green)	P3(*3) (Green)			
18 (*1)	—	✧(*4)	—	—	—	—	Indicates that FLASH write is performed during the ENC microprogram download.	Recovery operation is unnecessary.	—
19	—	—	×	—	—	—	The input on loop PATH-0 side is abnormal.	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
20	—	—	—	×	—	—	The input on loop PATH-1 side is abnormal.		
21	—	—	—	—	×	—	The input on loop PATH-2 side is abnormal.		
22	—	—	—	—	—	×	The input on loop PATH-3 side is abnormal.		

*1 : This is not a failure status.

*2 : The RKXS has not P1.

*3 : It is the LED of only the RKH.

*4 : Indication of status with LED.



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(5-3) LED Indication Patterns on Control Unit (Fibre Channel) (RKS/RKXS)

The case where the FC Interface Board is not installed in the Control Unit of the RKS/RKXS is shown.

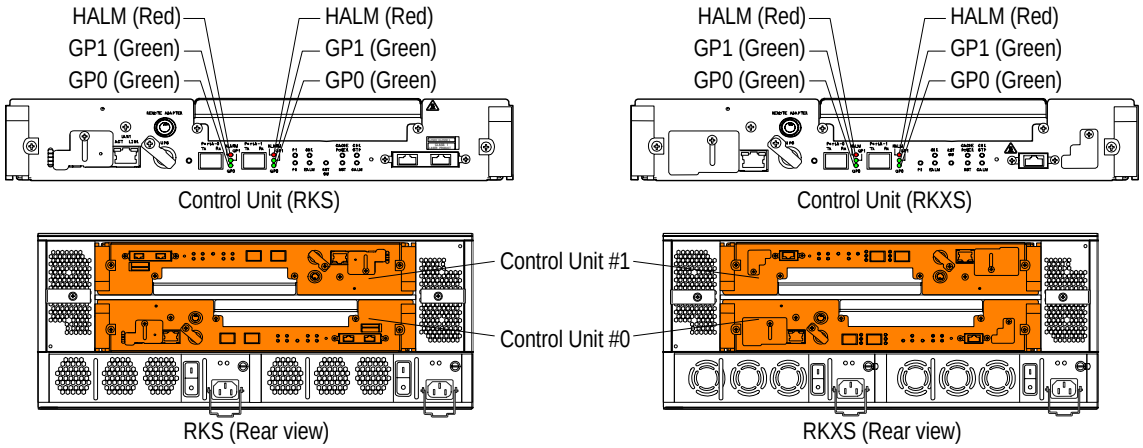


Table 8.2.7 LED Indication Pattern-3 on Control Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
1 (*1)	×	○	○	Link-up state.	This is not a problem.	—
2 (*1)	×	×	×	• Interface is in initial state. • Interface is in reset state. • Loop port is bypassed.	This is not a problem. It shows the status such as the subsystem is starting up. However, it is abnormal if this status continues.	—
3 (*1)	×	○	×	Loop (Link) is being initialized.	This is not a problem. It shows the status such as the host computer is rebooted. However, it is abnormal if this status continues.	—

*1 : This is not a failure status.

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
4	×	×	○	Link failed.	1. There is no problem even if it is in this status when Fibre Channel Cable is not connected. 2. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 3. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected) 4. When the host node is connected to port A-1 of RKS/RKXS, check if the port setting of RKS/RKXS (transfer rate) is “1Gbps” or “2Gbps”. 5. Check if the consistency of the port setting (transfer rate) and the host node setting (transfer rate) of RKS/RKXS is taken. 6. Check if the port setting (Topology) and the host node setting (Topology) of RKS/RKXS are the same. 7. Check if it links up by replacing the equipment listed below sequentially. • Host Connector • Control Unit 8. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected)	System Parameter “4.2 (9) Setting of Fibre Channel” (SYSPR 04-0170)

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
5	×	✧	○	Link failure often occurs.	1. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 2. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected) 3. When the host node is connected to port A-1 of RKS, check if the port setting of RKS (transfer rate) is "1Gbps" or "2Gbps". 4. Check if the consistency of the port setting (transfer rate) and the host node setting (transfer rate) of RKS is taken. 5. Check if the port setting (Topology) and the host node setting (Topology) of RKS are the same. 6. Check if it links up by replacing the equipment listed below sequentially. • Host Connector • Control Unit 7. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected)	System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170)
6	×	○	✧	Loop (Link) is often initialized.		
7	×	✧	✧	• Link failure often occurs. • Loop (Link) is often initialized.		
8	○	—	—	The host connector is defective.	Replace the host connector of which the LED lights on.	Replacement "2.2.8 Replacing Host Connector" (REP 02-0770)

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(6) LED Indication Patterns on Interface Board

(a) FC Interface Board

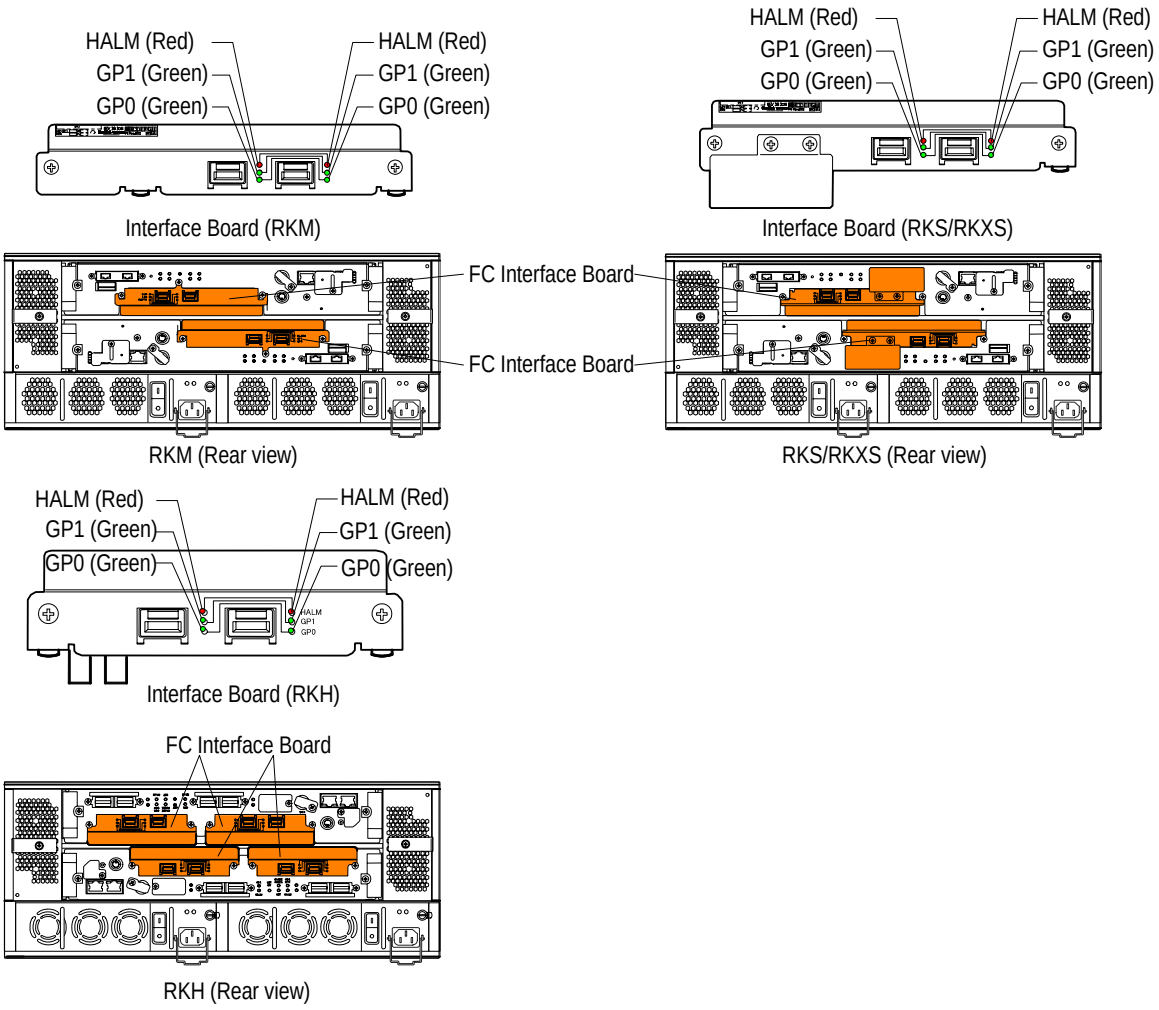


Table 8.2.8 LED Indication Patterns on FC Interface Board

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
1 (*1)	×	○	○	Link-up state.	This is not a problem.	—
2 (*1)	×	×	×	• Interface is in initial state. • Interface is in reset state. • Loop port is bypassed.	This is not a problem. It shows the status such as the subsystem is starting up. However, it is abnormal if this status continues.	—
3 (*1)	×	○	×	Loop (Link) is being initialized.	This is not a problem. It shows the status such as the host computer is rebooted. However, it is abnormal if this status continues.	—

*1 : This is not a failure status.

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
4	×	×	○	Link failed.	1. There is no problem even if it is in this status when Fibre Channel Cable is not connected. 2. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 3. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected) 4. Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent. 5. Check if the port setting (Topology) and the upper node setting (Topology) are the same. 6. Check if it links up by replacing the equipment listed below sequentially. • Host Connector • FC Interface Board 7. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected)	System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170)

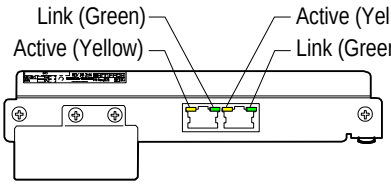
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(○ : On ✧ : Blinking × : Off — : Not depend)

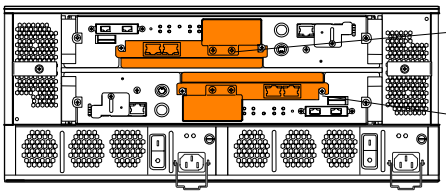
No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	HALM (Red)	GP1 (Green)	GP0 (Green)			
5	×	✧	○	Link failure often occurs.	1. When rebooting the host computer and the like, it is not abnormal even if it becomes this status. 2. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected) 3. Check if the port setting (transfer speed) and the upper node setting (transfer speed) are consistent. 4. Check if the port setting (Topology) and the upper node setting (Topology) are the same. 5. Check if it links up by replacing the equipment listed below sequentially. • Host Connector • FC Interface Board 6. When there is a possibility of a failure on the host node side, replace the equipment listed below sequentially and check if it links up. • Fibre Channel Cable • Fibre Channel Switch • Host Adapter • GBIC (When Host Adapter or Fibre Channel switch is connected)	System Parameter "4.2 (9) Setting of Fibre Channel" (SYSPR 04-0170)
6	×	○	✧	Loop (Link) is often initialized.		
7	×	✧	✧	Link failure often occurs. Loop (Link) is often initialized.		
8	○	—	—	The host connector is defective.	Replace the host connector of which the LED lights on.	Replacement "2.2.8 Replacing Host Connector" (REP 02-0770)

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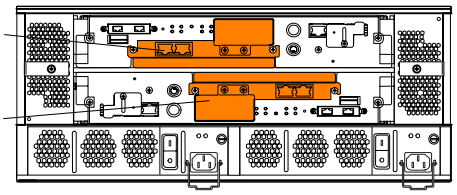
(b) iSCSI Interface Board



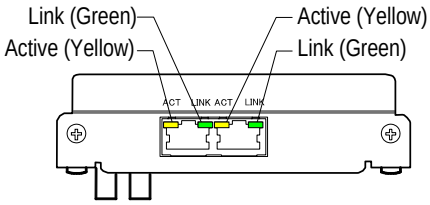
iSCSI Interface Board (RKM/RKS/RKXS)



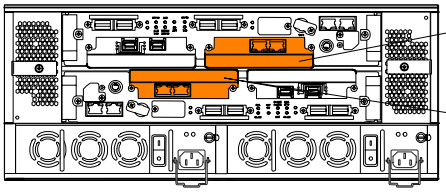
RKM (Rear view)



RKS/RKXS (Rear view)



iSCSI Interface Board (RKH)



RKH (Rear view)

Table 8.2.8.1 LED Indication Patterns on iSCSI Interface Board

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Link (Green)	Active (Yellow)			
1 (*1)	○	—	This indicates that the link status is normal.	This is not a problem.	—

*1 : This is not a failure status.

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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Link (Green)	Active (Yellow)			
2	×	—	The LINK LED does not light on though the iSCSI interface cable in the active status is connected.	Check the LINK LED for every work of ① to ⑤. Terminate the work if the LINK LED lights up. ①Check the power status of the host computer, Switch or NIC, which is connected to the iSCSI Interface Board. When the Power Unit of the host computer, Switch or NIC is turned off, request the customer to turn on the Power Unit.	—
				②Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
				③Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Interface Board, is 1Gbps(*1). If the port transfer speed is other than 1 Gbps(*1), request the customer to make it 1 Gbps(*1).	—
				④Replace the iSCSI Interface Board.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				⑤It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Interface Board, or the iSCSI interface cable. Request the customer to replace the part.	—
3	✧	—	Although the active iSCSI interface cable is connected, the LINK LED blinks.	The status such as the devices connected to the iSCSI Interface Board are being started is shown. However, it is abnormal when this status continues. Check the LINK LED for every work of ① to ④. Terminate the work if the LINK LED lights up. ①Check if the both terminals of the iSCSI interface cable are connected to the connectors. If the iSCSI interface cable connection is loosened, connect it firmly again.	—
				②Check with the customer if the port transfer speed of the HBA, Switch or NIC, which is connected to the iSCSI Interface Board, is 1Gbps(*1). If the port transfer speed is other than 1 Gbps(*1), request the customer to make it 1 Gbps(*1).	—
				③Replace the iSCSI Interface Board.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				④It is thought that there is a problem in the trouble of the HBA, Switch or NIC, which is connected to the iSCSI Interface Board, or the iSCSI interface cable. Request the customer to replace the part.	—

*1 : The HBA, Switch or NIC, whose port transfer speed is other than 1Gbps, cannot be connected to the iSCSI Interface Board.

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(7) Trouble analysis based on LED indication of ENC Unit/SENC Unit

(a) ENC Unit

(i) ENC Unit (RKAJ)

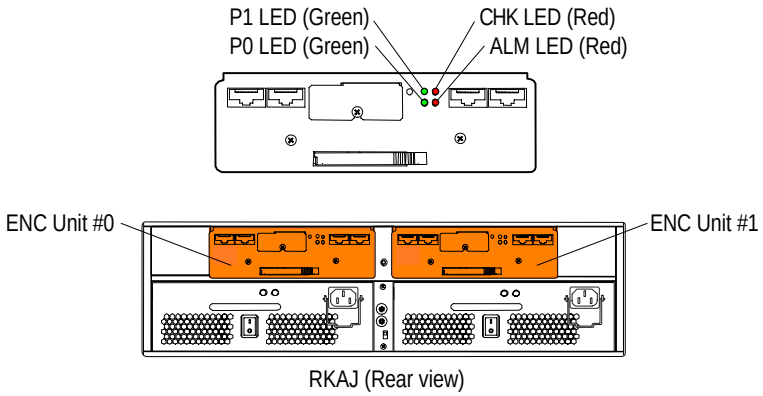


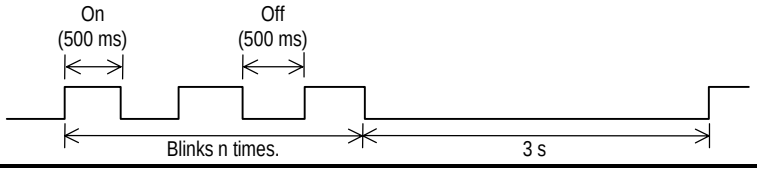
Table 8.2.9 LED Indication Patterns on ENC Unit (RKAJ)

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	ALM (Red)	CHK (Red)	P0 (Green)	P1 (Green)			
1 (*1)	×	×	○	○	Normal.	Recovery operation is unnecessary.	—
2	—	✧(*2) (Once times)	—	—	This shows a trouble in the Power Unit. Logic +5 V voltage error.	Replace the Power Unit on which the same READY LED as that of ENC Unit is turned off.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
3	—	✧(*2) (Twice times)	—	—	This shows a trouble in the Power Unit. Logic +12 V voltage error.		
4	—	✧(*2) (Six times)	—	—	This shows a trouble in the Power Unit. The voltage on the ENC Unit is abnormal. (Logic +2.5 V)	Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)

*1 : This is not a failure status.

*2 : Indication of status with LED.



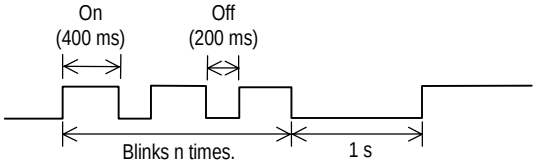
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(○ : On ✧ : Blinking × : Off — : Not depend)

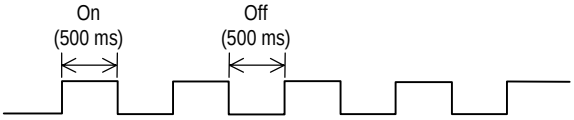
No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	ALM (Red)	CHK (Red)	P0 (Green)	P1 (Green)			
5	—	○	—	—	ENC unit CUDG error is occurred. • BOOT section of ENC microprogram. • RAM error • ENC Unit configuration error.	Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
6	—	✧(*2) (Once time)	—	—	ENC unit CUDG error is occurred. • SRAM error		
7	—	✧(*2) (Twice time)	—	—	ENC unit CUDG error is occurred. • ENC Unit error		
8	—	✧(*2) (Three time)	—	—	ENC unit CUDG error is occurred. • Microprogram error in flash memory.		
9	○	—	—	—	A failure that makes the ENC Unit unable to operate occurred in it.		
10	✧(*3)	○	—	—	An exceptional process error detected by the ENC microprogram.		
11	✧(*4)	○	—	—	An exceptional process error detected by the ENC microprogram. (Stack over)		
12 (*1)	✧(*3)	—	—	—	Indicates that FLASH write is performed during the ENC microprogram download.	Recovery operation is unnecessary.	—
13	—	—	×	—	The input on loop PATH-0 side is abnormal.	Replace the Control Unit whose EALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
14	—	—	—	×	The input on loop PATH-1 side is abnormal.		

*1 : This is not a failure status.

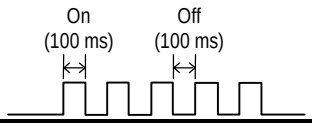
*2 : Indication of status with LED.



*3 : Indication of status with LED.



*4 : Indication of status with LED.



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(ii) ENC Unit (RKA)

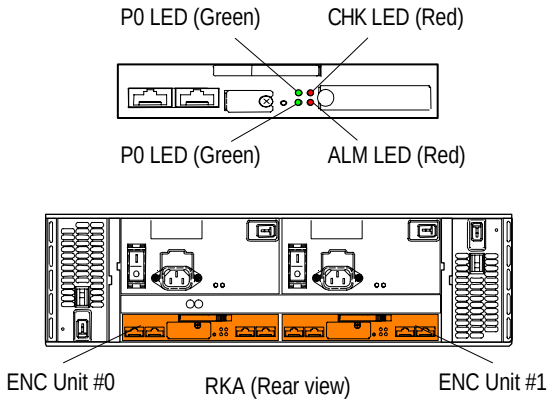


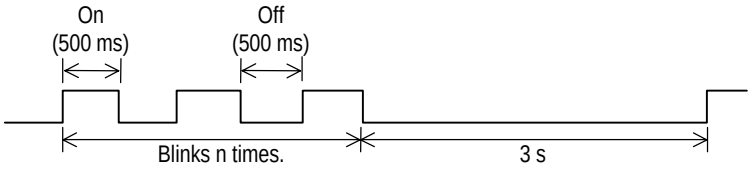
Table 8.2.9.1 LED Indication Patterns on ENC Unit (RKA)

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHK (Red)	P0 (Green)	P1 (Green)			
1 (*1)	×	×	○	○	Normal.	Recovery operation is unnecessary.	—
2	—	✧(*2) (Once times)	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). 1. Logic +5 V voltage error.	Replace the Power Unit on which the same READY LED as that of ENC Unit is turned off.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
3	—	✧(*2) (Twice times)	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). 1. Drive +12 V voltage error.		
4	—	✧(*2) (Seven times)	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). 1. BS1.8V or BS 12 V voltage error.		

*1 : This is not a failure status.

*2 : Indication of status with LED.



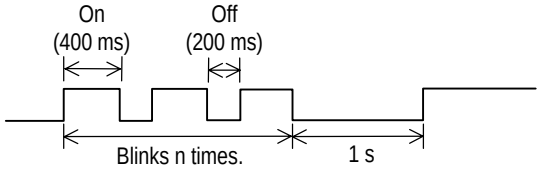
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(○ : On ✧ : Blinking × : Off — : Not depend)

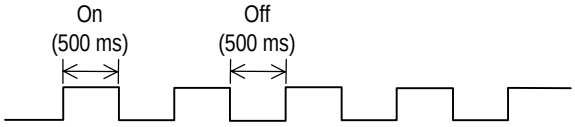
No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHECK (Red)	LINK 0 (Green)	LINK 1 (Green)			
5	—	○	—	—	ENC unit CUDG error is occurred. • BOOT section of ENC microprogram. • RAM error • ENC Unit configuration error.	Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
6	—	✧(*2) (Once time)	—	—	ENC unit CUDG error is occurred. • SRAM error		
7	—	✧(*2) (Twice time)	—	—	ENC unit CUDG error is occurred. • ENC Unit error		
8	—	✧(*2) (Three time)	—	—	ENC unit CUDG error is occurred. • Microprogram error in flash memory.		
9	○	—	—	—	A failure that makes the ENC Unit unable to operate occurred in it.		
10	✧(*3)	○	—	—	An exceptional process error detected by the ENC microprogram.		
11	✧(*4)	○	—	—	An exceptional process error detected by the ENC microprogram. (stack over)		
12 (*1)	✧(*3)	—	—	—	Indicates that FLASH write is performed during the ENC microprogram download.	Recovery operation is unnecessary.	—
13	—	—	×	—	The input on loop PATH-0 side is abnormal.	Replace the Control Unit whose EALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
14	—	—	—	×	The input on loop PATH-1 side is abnormal.		

*1 : This is not a failure status.

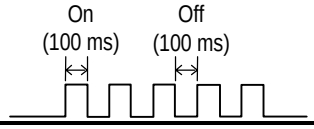
*2 : Indication of status with LED.



*3 : Indication of status with LED.

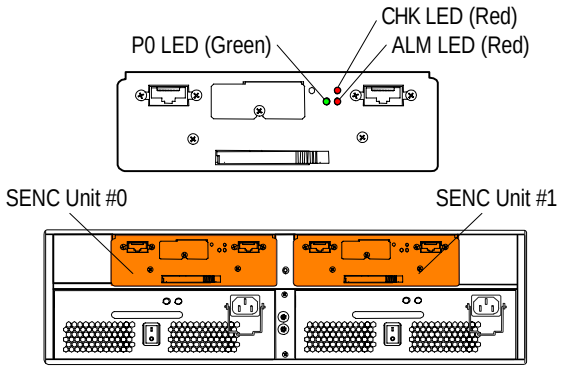


*4 : Indication of status with LED.



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(b) SENC Unit



RKAJAT/RKAJATL (Rear view)

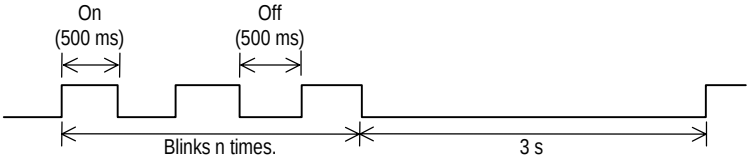
Table 8.2.10 LED Indication Patterns on SENC Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	ALM (Red)	CHK (Red)	P0 (Green)			
1 (*1)	×	×	○	Normal.	Recovery operation is unnecessary.	—
2	—	✧(*2) (Twice times)	—	SENC Unit CUDG error is occurred.	Replace the SENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
3	—	✧(*2) (Eight times)	—	Fan selector circuit error in SENC Unit.		
4	—	○(*3)	—	CUDG error in BOOT section of SENC.		
5	—	✧(*4) (Five times)	—	Fixed data error in flash memory.		

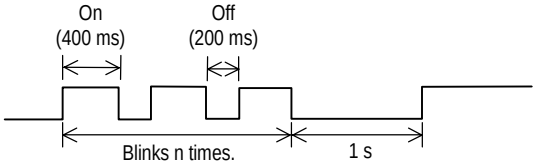
*1 : This is not a failure status.

*2 : Indication of status with LED.



*3 : The CHK LED (Red) lights on for about 10 seconds (while the CUDG is being executed) after the power was turned on, but it is not an error.

*4 : Indication of status with LED.

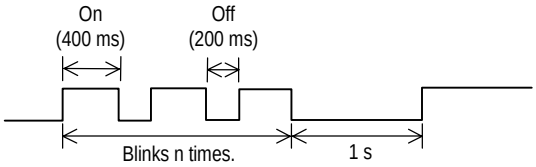


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(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	ALM (Red)	CHK (Red)	P0 (Green)			
6	—	✧(*1) (Six times)	—	Significant surface error in flash memory.	Replace the SENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
7	—	✧(*1) (Seven times)	—	SUM check error in flash memory.		
8	○	—	—	A failure that makes the SENC Unit unable to operate occurred in it.		
9	—	—	×	The input on loop PATH-0/1/2/3 side is abnormal.	Replace the Control Unit whose EALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : Indication of status with LED.



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(8) Trouble analysis based on LED indication of Remote Adapter

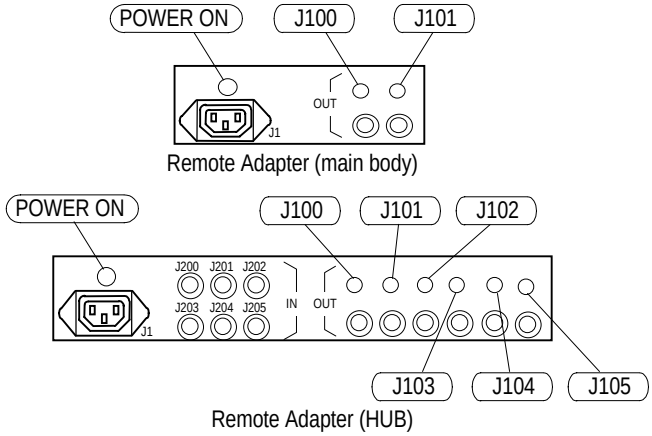


Table 8.2.11 LED Indication Patterns on Remote Adapter

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Power ON (Green)	J100～J105 (Green)			
1 (*1)	○	○	The remote adapter is operable and outputs the Remote On signal.	This is not a trouble.	—
2	○	×	The Remote Adapter is operable in the case where the Remote Adapter cable is not connected.	This is not a trouble.	—
			The Remote On signal is not output in the case where the Remote Adapter cable is connected.	Check the cable connection.	—
3	×	○	The POWER ON LED is out of order.	Replace the Remote Adapter	Replacement "2.2.13 Replacing Remote Adapter" (REP 02-1030)
4	×	×	The remote adapter is not in operation.	Check the connection of the power cable. If the cable is connected, replace the Remote Adapter.	

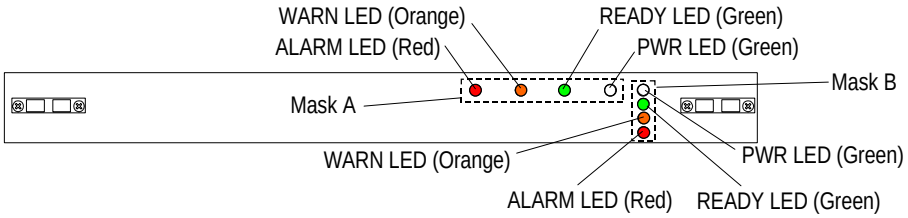
*1 : This is not a failure status.

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(9) Trouble analysis based on LED indication of NAS Unit

(a) RKNAS

NOTE : When the ALARM or WARN on the basic chassis lights on, follow its instruction. It must be assumed that the PWR LED lights on.



RKNAS (Front view)

*1 : Mask A or mask B is pasted.

Table 8.2.12 LED Indication Patterns on NAS Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	PWR (Green)	READY (Green)	ALARM (Red)	WARN (Orange)			
1	○	○	×	×	This indicates the normal operation status of the NAS Unit.	It is not abnormal. (*1)	—
2	○	×	×	×	This indicates that the start or stop sequence is operating.	It is not abnormal.	—
3	○	—	○	×	A failure occurs in the NAS Unit.	Refer to the log message by the WEB connection, and perform the identification of the failed part and its treatment.	"Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000)
4	○	—	×	○	A failure occurs in the NAS Unit.	Refer to the log message by the WEB connection, and perform the identification of the failed part and its treatment.	"Chapter 4. Trouble Analysis by WEB Connection" (TRBL 04-0000)

*1 : There is the case that READY LED of RKNAS illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition. (Refer to "4.2 (d) NNC (NAS Unit)" (TRBL 04-0090).)

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(b) AC Power Unit

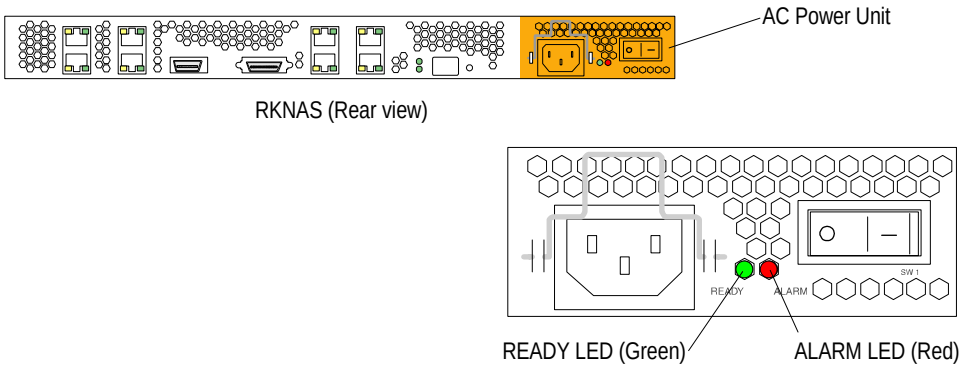


Table 8.2.13 LED Indication Patterns on AC Power Unit

(○ : On ✧ : Blinking × : Off —: Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	READY (Green)	ALARM (Red)			
1 (*1)	○	×	This indicates the normal operation status of the power supply.	It is not abnormal.	—
2	×	×	When it stops	Check that the AC Input Power Switch turns on. 1. Even if you turn it on, when the READY goes out, replace the Power Unit.	Replacement "2.3.1 Replacing the Power Unit" (REP 02-1060)
3	×	○	When it is abnormal	Replace the Power Unit.	Replacement "2.3.1 Replacing the Power Unit" (REP 02-1060)
4	○	○			

*1 : It is not a failure status.

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Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)

9.1 Locating Failed Part

Identify a part which presents the phenomenon using Table 3.1.1 and execute an appropriate procedure. Collect a trace from the DF700 in every case.

Table 9.1.1 Program Product To Be Recovered

No.	Program product	Type	Object for maintenance (*1)	Related part			Related manual
				Basic Microprogram	Host computer	Monitoring	
1	Storage Navigator Modular	P-002D-J301	③	○	–	○	• Storage Navigator Modular (for GUI) User's Guide
2	ShadowImage in-system replication (include RAID Manager)	P-002D-J311/ P-002D-J311W	①,②	○	○	–	• ShadowImage in-system replication User's Guide • Command Control Interface (CCI) User and Reference Guide
3	TrueCopy remote replication (include RAID Manager)	P-002D-J312/ P-002D-J312W	①,②	○	○	–	• TrueCopy remote replication User's Guide • Command Control Interface (CCI) User and Reference Guide
4	TrueCopy Extended Distance (*2) (include RAID Manager)	P-002D-J315	①,②	○	○	–	• TrueCopy Extended Distance User's Guide • Command Control Interface (CCI) User and Reference Guide
5	Copy-on-write SnapShot (include RAID Manager)	P-002D-J310/ P-002D-J310W	①,②	○	○	–	• Copy-on-write SnapShot User's Guide • Command Control Interface (CCI) User and Reference Guide
6	Data Retention Utility (include RAID Manager)	P-002D-J309/ P-002D-J309W	①,②	○	○	–	• Data Retention Utility User's Guide • Command Control Interface (CCI) User and Reference Guide
7	LUN Manager	P-002D-J308/ P-002D-J308W	①	○	–	–	• LUN Manager User's Guide
8	Cache Residency Manager	P-002D-J305	①	○	–	–	• Cache Residency Manager User's Guide
9	SNMP Agent Support Function	P-002D-J303	①	○	–	–	• SNMP Agent Support Function User's Guide
10	LUN Expansion	P-002D-J304	①	○	–	–	• LUN Expansion Function User's Guide
11	Password Protection	P-002D-J302	①	○	–	–	• Password Protection User's Guide

*1 : ①: DF700 main body (Refer to "9.1.1 When a failure occurs in the DF700 main body" (TRBL 09-0020).)
②: Host system server connected to the DF700 (Refer to "9.1.2 When a failure occurs in a host system server" (TRBL 09-0020).)
③: Server for monitoring and setting connected to the DF700 (Refer to "9.1.3 When a failure occurs in a server for monitoring and setting" (TRBL 09-0030).)
*2 : This is supported in the microprogram revision 0735/A or more.

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No.	Program product	Type	Object for maintenance (*1)	Related part			Related manual
				Basic Microprogram	Host computer	Monitoring	
12	Performance Monitor	P-002D-J306	①	○	–	–	• Performance Monitor User's Guide
13	Cache Partition Manager	P-002D-J307	①	○	–	–	• Cache Partition Manager User's Guide
14	In-System Replication Bundle	P-002D-J313/ P-002D-J313W	①	○	–	–	• ShadowImage in-system replication User's Guide • Copy-on-write SnapShot User's Guide • Command Control Interface (CCI) User and Reference Guide
15	NAS Backup Restore Modular	P-9P13-J8D004/ P-9P13-J8D014/ P-9P13-J8D024/ P-9P13-J8D034	④	○	–	–	• NAS Manager Modular User's Guide
16	NAS Anti Virus Agent Modular	P-9P13-J8D005/ P-9P13-J8D015/ P-9P13-J8D025/ P-9P13-J8D035	④	○	–	–	• NAS Manager Modular User's Guide
17	NAS Manager Modular_1000 Suite	P-9P13-J8D00S	④	○	–	–	• NAS Manager Modular User's Guide • NAS Sync Image User's Guide
18	NAS Manager Modular_500 Suite	P-9P13-J8D01S	④	○	–	–	
19	NAS Manager Modular_200 Suite	P-9P13-J8D02S	④	○	–	–	
20	NAS Manager Modular_100 Suite	P-9P13-J8D03S	④	○	–	–	
21	Modular Volume Migration (*2)	P-002D-J316/ P-002D-J316W	①,②	○	○	–	• Modular Volume Migration User's Guide • Command Control Interface (CCI) User and Reference Guide
22	Account Authentication (*2)	P-002D-J317	①	○	–	–	• Account Authentication User's Guide
23	Audit Logging (*2)	P-002D-J318	①	○	–	–	• Audit Logging User's Guide
24	Power Saving (*3)	P-002D-J319	①	○	–	–	• Power Saving User's Guide

*1 : ①: DF700 main body (Refer to "9.1.1 When a failure occurs in the DF700 main body" (TRBL 09-0020).)
②: Host system server connected to the DF700 (Refer to "9.1.2 When a failure occurs in a host system server" (TRBL 09-0020).)
③: Server for monitoring and setting connected to the DF700 (Refer to "9.1.3 When a failure occurs in a server for monitoring and setting" (TRBL 09-0030).)
④: The main body of the DF700 or NNC (Refer to 9.1.1 to 9.1.3).
*2 : This is supported in the microprogram revision 0760/A or more.
*3 : This is supported in the microprogram revision 0770/A or more.

In the cases of a difficult failure that has a complicated relation with the system configuration, also collect information on configurations of the system and the DF700 and types of program products being used because they may be important.

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9.1.1 When a failure occurs in the DF700 main body

Take recovery actions referring to "Chapter 1. Flowchart for troubleshooting" (TRBL 01-0000) in the Maintenance Manual for Maintenance.

9.1.2 When a failure occurs in a host system server

(1) In the case of RAID Manager

① If a failure has occurred in the DF700, give priority to investigation of it (see "Troubleshooting").

② Getting an error message
In the case where an error occurs when a command is input, an error cord and an error message are output in the following line.
A format of a set of an error cord and message is shown below.
[EX-xxxxxx] error message text
Refer to Section 5.2, "Command Control Interface (CCI) User and Reference Guide".
Refer to an error message and recovery measures given based on the error code.

③ Collecting the SYS log
Check the system log because an error message may be written in it.
Since information on the error code, [HORM-xxx], is related to Command Control Interface (CCI) User and Reference Guide, refer to Section 5.2, "System Log and Command Error Message" and follow instructions given in it.

④ For the log peculiar to the product, refer to Appendix B, "Log File for Maintenance and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide" and collect the information.

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9.1.3 When a failure occurs in a server for monitoring and setting

(1) In the case of Storage Navigator Modular

① Taking an action following an error message

Since an error message is displayed when an error occurs in operation of Storage Navigator Modular, take a recovery action following the message.

② Collecting log files

Collect log files of Storage Navigator Modular

Get all files that are subordinate to the log directory under the program installation directory of Storage Navigator Modular together with the log directory.

When no log directory exists under the program installation directory of Storage Navigator Modular, get all files that are subordinate to the log directory under the directory, for which the environmental variable is specified as STONAVM_HOME, together with the log directory.

③ Getting operation environment

Get a version number, operation environment (OS and model) and operation of Storage Navigator Modular.

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9.2 List of Data to Be Collected when a P.P. Failure Occurs

Table 9.2.1 List of Data of Program Product (to Be Recovered) to Be Collected

Legend: ○: Collection is needed.

No.	Program product (P.P.)	Subsystem main body trace	Information needed to be collected			
			P.P LOG	SYS LOG	P.P message	Getting of operation environment
1	Storage Navigator Modular	○	Get all files that are subordinate to the following log directories together with the log directories. The storage directory A log directory under the program installation directory of Storage Navigator Modular. When the directory described above does not exist, a log directory under the directory for which the environmental variable is specified as STONAVM_HOME.	–	○	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
2	ShadowImage in-system replication (include RAID Manager)	○	(See Table 9.2.2)			
3	TrueCopy remote replication (include RAID Manager)	○				
4	TrueCopy Extended Distance (*1) (include RAID Manager)	○				
5	Copy-on-write SnapShot (include RAID Manager)	○				
6	Data Retention Utility (include RAID Manager)	○				
7	LUN Manager	○	–	○	–	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
8	Cache Residency Manager	○	–	–	–	–
9	SNMP Agent Support Function	○	–	–	–	–
10	LUN Expansion	○	–	–	–	–
11	Password Protection	○	–	–	–	–
12	Performance Monitor	○	–	○	–	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
13	Cache Partition Manager	○	–	○	–	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details

*1 : This is supported in the microprogram revision 0735/A or more.

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Legend: ○: Collection is needed.

No.	Program product (P.P.)	Subsystem main body trace	Information needed to be collected			
			P.P LOG	SYS LOG	P.P message	Getting of operation environment
14	NAS Data Control Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
15	NAS File Sharing Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
16	NAS Manager Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
17	NAS Sync Image Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
18	NAS Backup Restore Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
19	NAS Anti Virus Agent Modular	○(*1)	–	–	–	P.P. version Connection configuration diagram Operation details
20	Modular Volume Migration (*2)	○	(See Table 9.2.2)			
21	Account Authentication (*2)	○	–	–	–	–
22	Audit Logging (*2)	○	–	–	–	–
23	Power Saving (*3)	○	–	–	–	–

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.
*2 : This is supported in the microprogram revision 0760/A or more.
*3 : This is supported in the microprogram revision 0770/A or more.

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Table 9.2.2 List of collection information on Program Prodact related to RAID Manager

No.	Program product	Information to be collected	Collection method/Storage	
1	ShadowImage in-system replication (include RAID Manager)	Trace (dump) of subsystem	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set," "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user	
		Host OS revision	Request of a user	
2	TrueCopy remote replication (include RAID Manager)	Trace (dump) of two units of subsystem which make-up a pair	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set," "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user.	
		Host OS revision	Request of a user.	

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No.	Program product	Information to be collected	Collection method/Storage	
3	TrueCopy Extended Distance (*1) (include RAID Manager)	Trace (dump) of two units of subsystem which make-up a pair	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set," "set HORC," etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user.	
		Host OS revision	Request of a user.	
4	Copy-on-write SnapShot (include RAID Manager)	Trace (dump) of subsystem	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user	
		Host OS revision	Request of a user	

*1 : This is supported in the microprogram revision 0735/A or more.

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No.	Program product	Information to be collected	Collection method/Storage	
5	Data Retention Utility (include RAID Manager)	Trace (dump) of subsystem	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user	
		Host OS revision	Request of a user	
6	Modular Volume Migration(*1) (include RAID Manager)	Trace (dump) of subsystem	Refer to "Chapter 7. Collecting Error Information" (TRBL 07-0000).	
		RAID Manager log	Collect all the files under the directory specified with the following environmental variables for each operation process/instance. The environmental variables can be referred to using the set or echo command. $HORCM_LOG (operation log, error log, trace, core) $HPRCC_LOG (command log) $HPRCC_LOGS (start log) < Examples of reference to the environmental variable > Unix family: "set", "echo $HORCM_LOG", etc. Windows family: "set", "set HORC", etc. When the environmental variable above is not specified, collect all files under the following directories will be collected. /HORCM/log* *: Instance number /HORCM/log/curlog For the details, refer to Appendix B, "Log File and Trace Function" in the "Command Control Interface (CCI) User and Reference Guide".	
		Configuration definition file	UNIX family	/etc/horcm*conf *: Instance number
			Windows family	Windows installation drive, \WINNT\horcm*conf *: Instance number
		System log file (PP failure message)	UNIX family	Syslog
			Windows family	Eventing
		System configuration diagram	Request of a user	
		Host OS revision	Request of a user	

*1 : This is supported in the microprogram revision 0760/A or more.

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Chapter 10. Trouble Analysis by Failure Monitoring Function

10.1 Trouble Analysis by SNMP Agent Support Function

The SNMP Agent Support Function notifies a network monitoring personal computer or workstation, in which the SNMP manager program is installed, of failures of the disk array subsystem via the SNMP (Simple Network Management Protocol). This section explains the trouble analysis operation to be performed when the SNMP Agent Support Function is used.

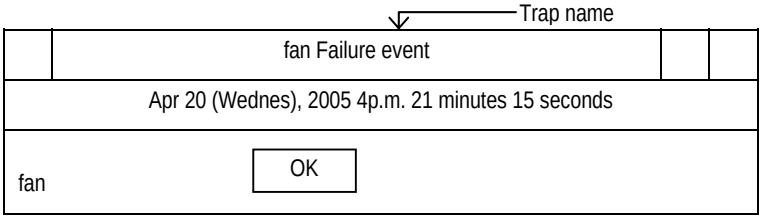
10.1.1 Maintenance with TRAP Codes

(1) Ascertaining failure information

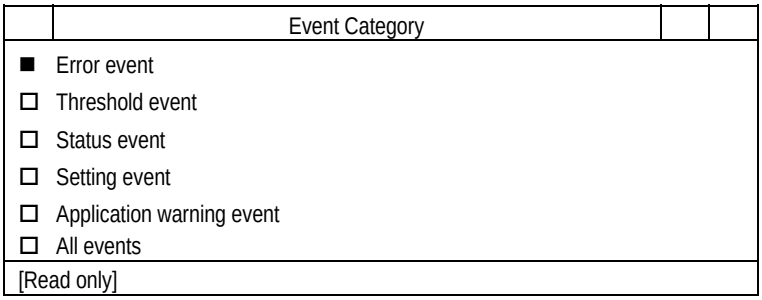
An example of an output bay the TRAP issued by the disk array subsystem. (a) is an example of output by HP OpenView/NetM*COMET. (b) is an example of output by SunNet Manager.

(a) Example of trapped output by HP OpenView/NetM*COMET

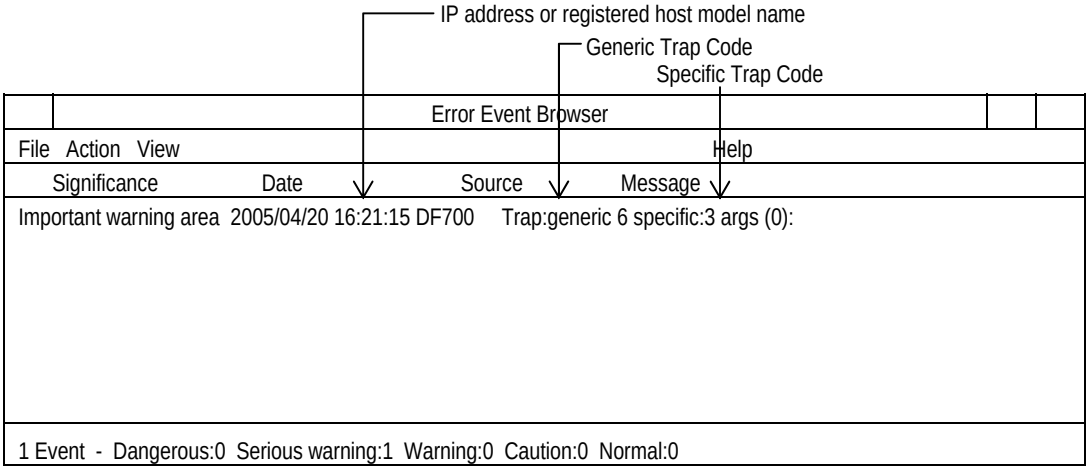
If an error occurs, the following screen is popped up.



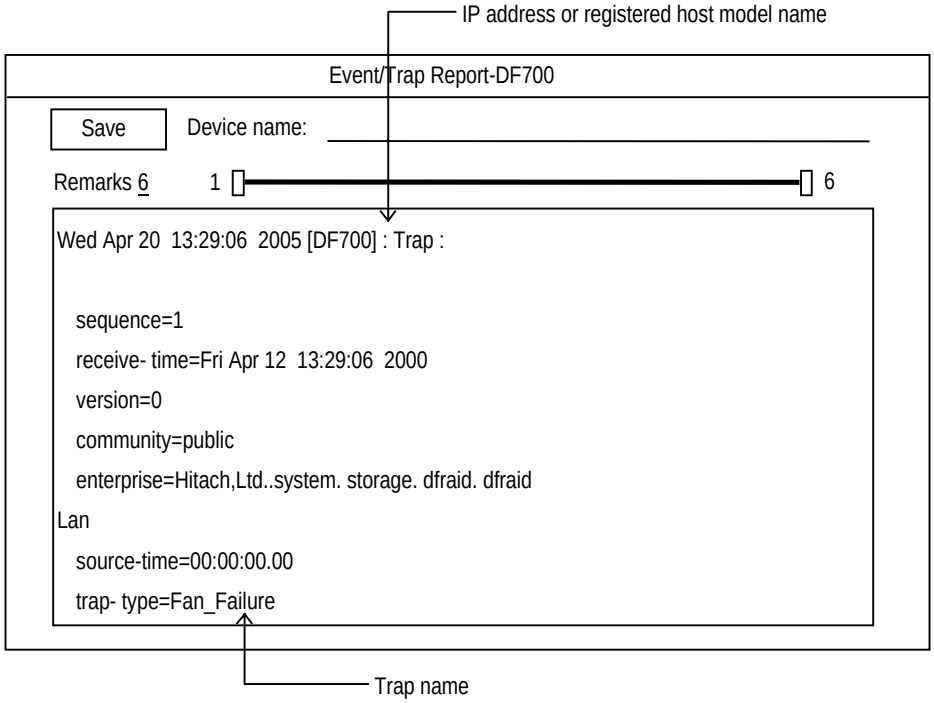
"Error event" in the "Event Category" box changes to "■". Double-clicking this box displays an Error Event browser. For detailed information refer to the browser.



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(b) Example of trapped output by SunNet Manager



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(2) Trouble analysis method

Perform maintenance referring to the output examples in (1) and according to Table 10.1.1, "Recovery Method for Each Trap Code". (Refer to Message "Chapter 6. Warning Messages" (MSG 06-0000).)

Table 10.1.1 Recovery Method for Each Trap Code

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
1	0	0	coldStart	Power-on, Unlocking the SNMP Agent Support Function or changing the setting of the SNMP Agent Support Function by rebooting the subsystem	This is not an error. Recovery operation is not necessary.
2	1	0	warmStart	Changing the setting of the SNMP Agent Support Function in the status that the subsystem power is turned on	This is not an error. Recovery operation is not necessary.
3	4	0	authentication-Failure	Invalid SNMP access (The community name set for the subsystem differs from the community name accessed by the SNMP manager)	Change the community name set for the subsystem or the community name accessed by the SNMP manager so that they match. When changing the community name set for the subsystem, refer to "SNMP Agent Support Function User's Guide". When changing the community name accessed by the SNMP manager, refer to the manual of each manager.
4	6	1	subsystemDown	Controller down	It is shown that a failure occurred and the subsystem stopped. For the detailed failure information, refer to the display of the WEB log message of the subsystem.
5	6	2	driveFailure	Disk shutdown	It is shown that any of the failures occurred. Message code : W060xy, W060HH, W00GG00, W0GH00 The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
6	6	3	fanFailure	Fan failure	It is shown that any of the failures occurred. Message code : W040xy, W04100, W042HH The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.

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No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
7	6	4	powerSupply-Failure	Power supply failure	It is shown that any of the failures occurred. Message code : W050xy, W0G400, W0G600, W0G700, W05100, W05200 The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
8	6	5	batteryFailure	Battery voltage error	It is shown that any of the failures occurred. Message code : W03000, W0300x, W03100, W0310x, W03200, W0320x, W03300, W0330x The information corresponding to x is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
9	6	7	upsFailure	UPS error	Perform the maintenance instructed. Message code : W0C00x The information corresponding to x is not notified regarding the trap.
10	6	9	backupCircuit-Failure	Battery circuit failure	Perform the maintenance instructed. Message code : W0340x The information corresponding to x in the manual is not notified regarding the trap. Refer to the display of the WEB log message of the subsystem.
11	6	10	other-controller-Failure	Another side controller blockade (For dual configuration only)	Perform the maintenance instructed. Message code : W0100x The information corresponding to x in the manual is not notified regarding the trap. Refer to the display of the WEB log message of the subsystem. When this trap is displayed following the No.14 “microprogram Replacement executed”, it does not mean a failure because it is reported owing to the microprogram replacement.
12	6	11	warning	A warning was issued in the disk array subsystem.	It is shown that a failure indicated by a message code with “W” at the top. For the detailed failure information, refer to the display of the WEB log message of the subsystem. Perform the maintenance instructed for message code W#####. “#####” is optional.

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No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
13	6	12	spareDrive-Failure	Spare Disk blockade	It is shown that any of the failures occurred. Message code : W061HH, W061xy, W0GJ00, W0GK00 The information corresponding to xy in the manual is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
14	6	13	microprogram-Replacement-executed	A micro program replacement executed (For dual configuration only)	Perform the maintenance instructed. Message code : W4600x Message text : Online Micro-update started (CTL-x) The message is the one informing that the microprogram replacement has been started as shown below, therefore, no maintenance work is necessary.
15	6	14	encFailure	ENC failure	It is shown that any of the failures occurred. Message code : W090xy, W090HH, W0GA00, W0GC00 The information corresponding to xy in the manual is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
16	6	15	loopFailure	Loop failure	Perform the maintenance instructed. Message code : W080xy The information corresponding to xy in the manual is not notified regarding the trap. Refer to the display of the WEB log message of the subsystem.
17	6	16	PathFailure	Path detachment	Perform the maintenance instructed. Message code : W0F0xy The information corresponding to xy in the manual is not notified regarding the trap. Refer to the display of the WEB log message of the subsystem.
18	6	17	sataDriveFailure	SATA Disk Drive blockade	It is shown that any of the failures occurred. Message code : W060xy, W060AT, W060HH The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.

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No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery methods
19	6	18	sataSpareDrive-Failure	SATA Spare Disk Drive blockade	It is shown that any of the failures occurred. Message code : W061xy, W061AT, W061HH The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
20	6	19	sencFailure	SENC failure	It is shown that any of the failures occurred. Message code : W090xy, W090AT, W090HH, W0GD00 The information corresponding to xy is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
21	6	20	hostConnector-Failure	Host connector blockade	Perform the maintenance instructed. Message code : W0G300 Refer to the display of the WEB log message of the subsystem.
22	6	203	nncWarning	NNC warning status	It is shown that any of the failures occurred. Message code : W5000x, W5010x The information corresponding to x in the manual is not notified regarding the trap. Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.

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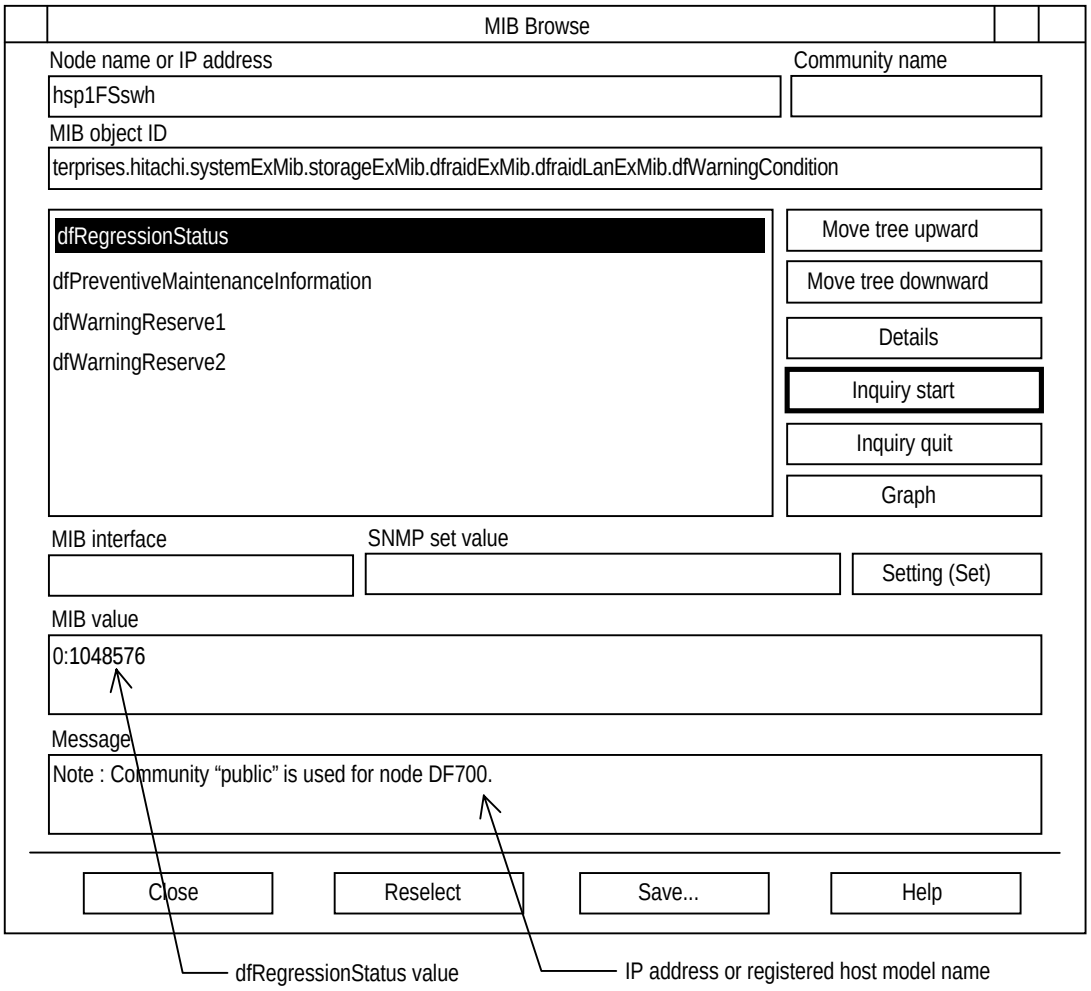
10.1.2 Maintenance with MIB (df Regression) Values

(1) Confirming error information

Examples of output caused by a trap issued by the subsystem are shown below. (a) is an example of output by HP OpenView/NetM*COMET. (b) is an example of output by SunNet Manager.

For MIB values, refer to "Table 10.1.3 dfRegressionStatus Value Corresponding to Each Failure" (TRBL 10-0070).

(a) Example of MIB value output by HP OpenView/NetM*COMET



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(b) Example of MIB value output by SunNet Manager

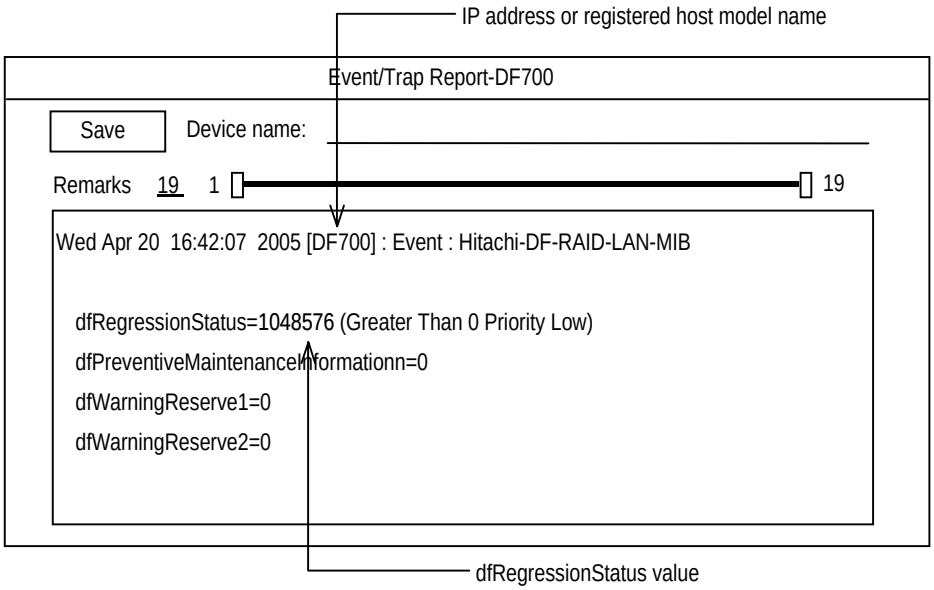


Table 10.1.2 Format of dfRegressionStatus

Byte \ Bit	7	6	5	4	3	2	1	0
0	0	0	NNC Warning	Host Connector	SENC	SATA D-Drive	SATA S-Drive	Cache
1	0	0	0	Fan	BK	A.C.PS	D.C.PS	Battery
2	0	0	NAS UPS	NAS PATH	NAS Server	PATH	Loop	UPS
3	CTL	Warning	0	0	ENC	D-Drive	S-Drive	Drive

When a regression is applied to the part concerned, turn on the corresponding bit. Value of the object corresponding to each failure status is shown in "Table 10.1.3 dfRegressionStatus Value Corresponding to Each Failure" (TRBL 10-0070).

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Table 10.1.3 dfRegressionStatus Value Corresponding to Each Failure

No.	Bit location		Object value (in decimal)	Description
	Byte	Bit		
1	—	—	0	The disk array is normal.
2	3	0	1	Disk Drive (data disk or Spare Disk) detachment.
3	3	1	2	Disk Drive (Spare Disk) detachment.
4	3	2	4	Disk Drive (data Disk) detachment.
5	3	3	8	ENC error.
6	3	6	64	Warning is raised in the disk array.
7	3	7	128	Mate controller blockade.
8	2	0	256	UPS error.
9	2	1	512	Loop error.
10	2	2	1024	Path detachment.
11	2	3	2048	NAS server failure.
12	2	4	4096	NAS path failure.
13	2	5	8192	NAS UPS failure.
14	1	0	65536	Battery error.
15	1	1	131072	Power Unit (DC) abnormality.
16	1	2	262144	Power Unit (AC) failure.
17	1	3	524288	Battery circuit error.
18	1	4	1048576	Fan error.
19	0	0	16777216	Cache partial blockade.
20	0	1	33554432	SATA disk drive blockade (spare disk).
21	0	2	67108864	SATA disk drive blockade (data disk).
22	0	3	134217728	SENC failure.
23	0	4	268435456	Host Connector failure.
24	0	5	536870912	NNC warning status.

When two or more failed parts exist, the object value is the sum of each object value.

Example : When failures occur in the battery and the fan, the object value is "1114112 (65536+1048576)".

The object value converted into binary form corresponds to the format shown in "Table 10.1.2 Format of dfRegressionStatus" (TRBL 10-0060).

(2) Troubleshooting procedure

Perform a maintenance by associating the item in the description column in "Table 10.1.3 dfRegressionStatus Value Corresponding to Each Failure" (TRBL 10-0070) with the contents of "Table 10.1.1 Recovery Method for Each Trap Code" (TRBL 10-0020).

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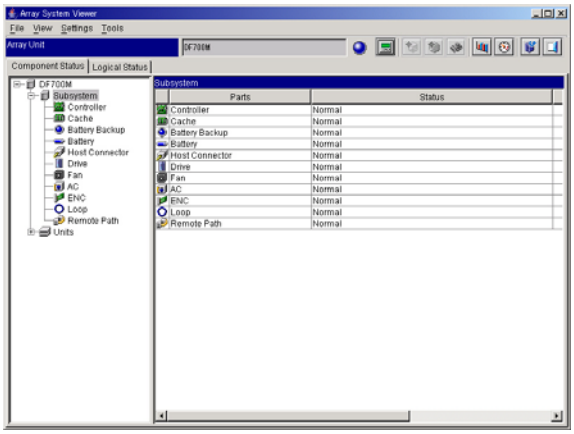
10.2 Trouble Analysis by Storage Navigator Modular

The Storage Navigator Modular notifies of failures of the disk array subsystem by the failure monitoring function.
This section explains the trouble analysis operation to be performed when the Storage Navigator Modular is used.

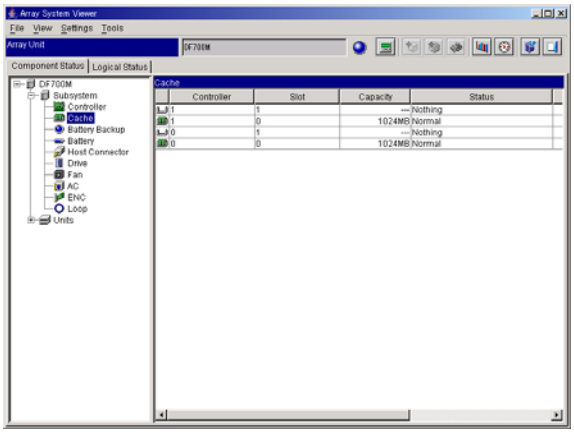
10.2.1 Maintenance with the Storage Navigator Modular (GUI version)

(1) Display of subsystem status

A screen which indicates the status of components of Array device under Storage Navigator Modular is shown below.

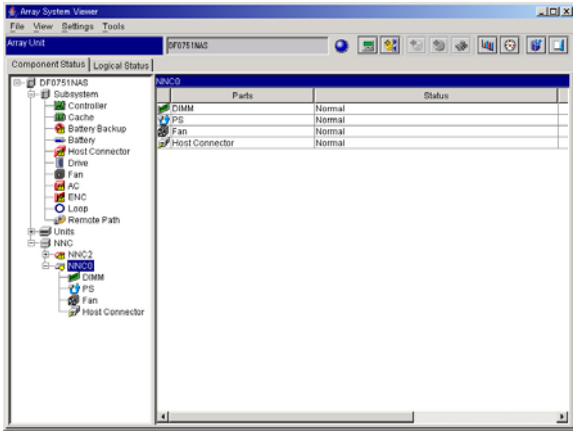


An example of the window for referring to the information on installation and capacities of the Cache Units is shown below.



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The example of the status confirmation window of the configuration parts of the NNC is shown below.



When a failure occurs in the array subsystem, the part concerned is displayed by the icon of "Red".

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(2) Trouble analysis method

Perform maintenance referring to the display examples in (1) and according to Table 10.2.1, "Recovery Method for Each Error Display" (Refer to Message "Message" (MSG 00-0000).).

Table 10.2.1 Recovery Method for Each Error Display (1)

No.	Error Display	Description	Recovery methods
1	 : Red	• Busy or Disk Drive detached for Restoring/Waiting for Restore • Inserted Disk Drive did not spin-up (RAID group defined)	It is shown that any of the failures occurred. Message code : W060xy, W060HH, W0GG00, W0GH00 Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
2	 : Red + Black	• The Disk Drive is blocked and uninstalled	
3	 : Red	• Busy or Spare Disk detached for Restoring/Waiting for Restore	It is shown that any of the failures occurred. Message code : W061xy, W061HH, W0GJ00, W0GK00 Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
4	 : Red + Black	• Though the disk array subsystem is set to use a Spare Disk, but the Spare Disk is not installed	
5	 : Red	• Busy or Disk Drive detached for Restoring/Waiting for Restore • Inserted Disk Drive did not spin-up (RAID group defined)	It is shown that any of the failures occurred. Message code : W060xy, W060AT, W060HH Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
6	 : Red + Black	• The Disk Drive is blocked and uninstalled	
7	 : Red	• Busy or Spare Disk detached for Restoring/Waiting for Restore	It is shown that any of the failures occurred. Message code : W061xy, W061AT, W061HH Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
8	 : Red + Black	• Though the disk array subsystem is set to use a Spare Disk, but the Spare Disk is not installed	
9	 : Yellow	• A cache backup circuit error occurred	Perform the maintenance instructed. Message code : W0340x
10	 : Red	• Controller down	Issuance of this trap indicates that an error beginning with message code "H" occurred. For detailed error information, see the WEB log message display of the subsystem. Perform the maintenance instructed. Message code H#####. "#####" is optional.
11	 : Red	• Fan error	It is shown that any of the failures occurred. Message code : W040xy, W04100, W042HH
12	 : Red	• Power Unit error	It is shown that any of the failures occurred. Message code : W050xy, W0G400, W0G600, W0G700, W05100, W05200 Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.

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No.	Error Display	Description	Recovery methods
13	 : Red	• Battery voltage error	It is shown that any of the failures occurred. Message code : W03000, W0300x, W03100, W0310x, W03200, W0320x, W03300, W0330x Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
14	 : Red	• ENC error	It is shown that any of the failures occurred. Message code : W090xy, W090HH, W0GA00, W0GC00 Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
15	 : Red	• SENC error	It is shown that any of the failures occurred. Message code : W090xy, W090AT, W090HH, W0GD00 Perform the maintenance corresponding to the message code referring to the WEB log message of the subsystem for the details.
16	 : Red	• Loop error	Perform the maintenance instructed. Message code : W080xy
17	 : Red	• Path detachment	Perform the maintenance instructed. Message code : W0F0xy
18	 : Red	• NNC blockade	Perform the maintenance instructed. Message code : W5000x
19	 : Red	• Memory (DIMM) failure	Perform the maintenance corresponding to the message code referring to the WEB information message of the subsystem for the details.
20	 : Gray	• Memory (DIMM) not installed	Perform the maintenance corresponding to the message code referring to the WEB information message of the subsystem for the details.
21	 : Red	• PS failure	Perform the maintenance corresponding to the message code referring to the WEB information message of the subsystem for the details.
22	 : Red	• Fan failure	Perform the maintenance corresponding to the message code referring to the WEB information message of the subsystem for the details.
23	 : Red	• Host connector failure	Perform the maintenance corresponding to the message code referring to the WEB information message of the subsystem for the details.

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10.2.2 Storage Navigator Modular Maintenance Function

Maintenance functions of the Storage Navigator Modular are listed in Table 10.2.2.

Table 10.2.2 Storage Navigator Modular Maintenance Function List

No	Classification	Function name	Outline of function	Notes
1	Display of statistical information	Display of state of the controller operation	Statistical information is displayed by selecting an item.	An array unit not supported is displayed in half tone and cannot be selected.
		Display of number of host command receptions		
		Display of state of command execution		
		Display of state of the cache load		
		Display number of drive restoration starting		
		Display of cache memory failures statistical information		
		Display of drive failures statistical information		
		Display of drive DMA failures statistical information		
		Display of host DMA failures statistical information		
		Display of DUAL I/F system failures statistical information		
		Display of preventive maintenance failures statistical information		
2	Display of logical unit failure data information	Display of logical unit failure data information	The segments for each logical unit are displayed.	–
3	Setting a prefetch size	Setting prefetch information	It sets a prefetch staging size by the RAID levels, a next starting opportunity and host data transfer access size.	Prefetch information is set at an optimum value on shipment. If the setting is changed unpreparedly, it will affect performance and may interfere with operation:
4	Setting a threshold	Setting a threshold for preventive maintenance	It sets a threshold for the number of failures of a disk controlled by preventive maintenance.	–
5	Drive maintenance	Detach	Blocks a specified drive forcibly.	–
		Data reconstruction	When the drive restoration option was set automatically, reconstruct the data in the Disk Drive by specifying the drive position of the Disk Drive after replacing the failed Disk Drive.	–
		Copyback	Copies data from a spare drive to a specified drive.	–
		Dynamic sparing	Copies data forcibly from a specified drive to a spare drive, and then blocks the specified drive.	–
		System copy	Copies the system area of a system drive from another system drive.	–

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No	Classification	Function name	Outline of function	Notes
6	Setting a mode for reporting to the host	Setting a mode for reporting to the host using an SSB	This setting specifies a mode for reporting an SSB to the host when a trouble such as a failure in a part of the disk array subsystem occurs.	–
7	System Upgrade	System Upgrade	When upgrading a subsystem, with reference to the variety of information of partner equipment, the information is set as self-equipment.	–
8	Setting SATA Drive Options	SATA Drive Options	Refer to or set up the Sweep function and the SMART function, which are the SATA options.	–
9	Setting SATA Drive Restore Options	SATA Drive Restore Options	Refer to or set up the restoration size of the SATA correction copy.	–
10	Replacing the Online ENC/SENC Firmware	Download and replacing of ENC/SENC Firmware.	Download the ENC/SENC firmwareto the array subsystem, and replacce it.	–
11	Drive Performance Delay Diagnostic Function	Drive Performance Delay Diagnostic Function	If it is clear that the performance delay problem is caused by the drive, setting this function notifies the drive number of which caused the problem through the message and executes the dynamic sparing.	–

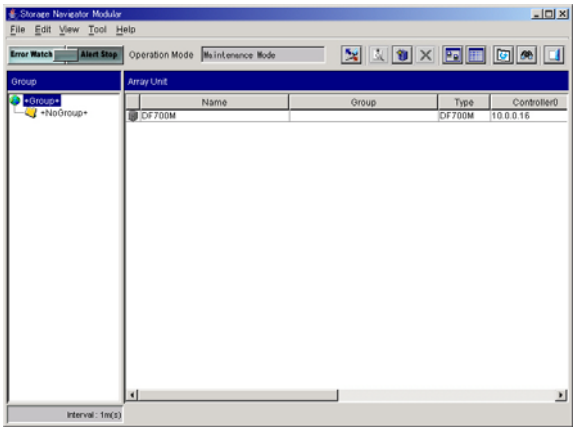
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10.2.3 Displaying Statistical Information

You can display the statistical information in the array unit.

(1) Start the Storage Navigator Modular.

(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.

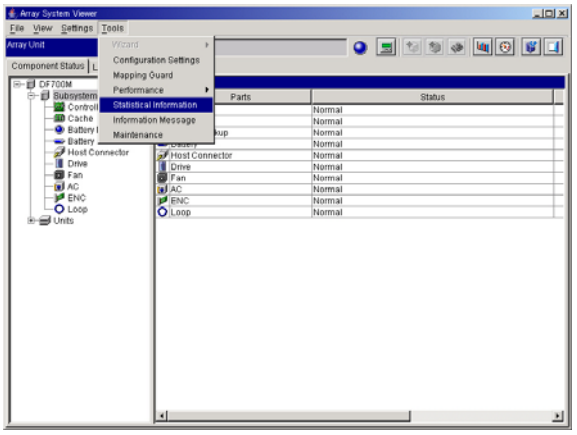


Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

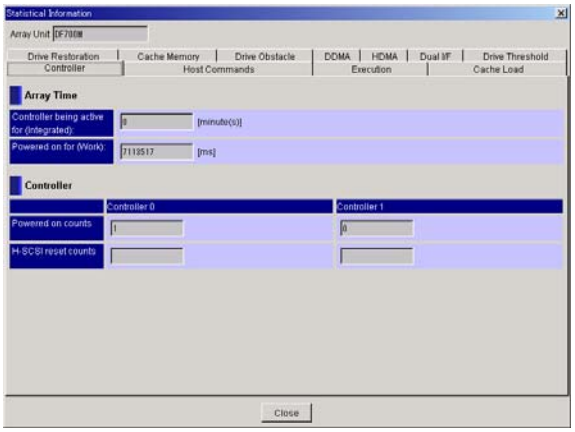
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

(4) On the View menu select [Tools] – [Statistical Information] or click : Statistical Information in the tool bar.



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The Statistical Information dialogue box is displayed.



- Statistical Information : Type of statistical information

  Controller : State of the controller operation----------
  "(a) Displaying the Controller Use Condition" (TRBL 10-0170)

  Host Commands : Number of host command receptions----------
  "(b) Displaying the Numbers of Host Commands Received" (TRBL 10-0170)

  Execution : State of command execution----------
  "(c) Displaying the Command Execution Condition" (TRBL 10-0180)

  Cache Load : State of the cache load ----------
  "(d) Displaying the Cache Load Condition" (TRBL 10-0180)

  Drive Restorations : Number of drive restoration starting ----------
  "(e) Displaying Number of Drive Restoration Starting" (TRBL 10-0190)

  Cache Memory : Cache memory failures statistical information----------
  "(f) Displaying Cache Memory Failures Statistical Information" (TRBL 10-0190)

  Drive Obstacle : Drive failures statistical information ----------
  "(g) Displaying Drive Failures Statistical Information" (TRBL 10-0200)

  DDMA : Drive DMA failures statistical information ----------
  "(h) Displaying Drive DMA failures statistical information" (TRBL 10-0210)

  HDMA : Host DMA failures statistical information ----------
  "(i) Displaying Host DMA Failures Statistical Information" (TRBL 10-0210)

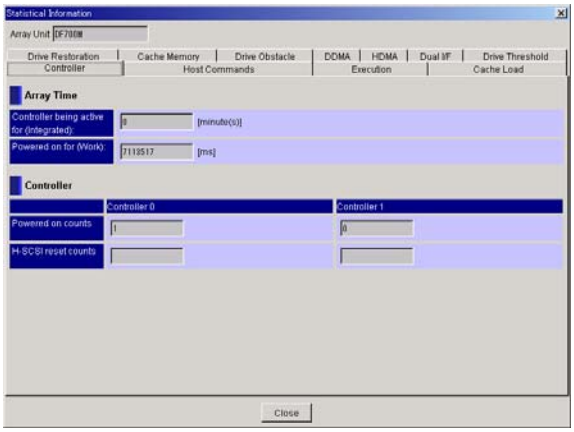
  DUAL I/F : DUAL I/F system failures statistical information----------
  "(j) Displaying DUAL I/F System Failures Statistical Information" (TRBL 10-0220)

  Drive Threshold : Preventive maintenance failures statistical information ----------
  "(k) Displaying Preventive Maintenance Failures Statistical Information" (TRBL 10-0230)

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(a) Displaying the Controller Use Condition

Click the Controller tab.



- Array Time:

  Controller being active for (Integrated) : The accumulated power distribution time from turning on the power supply of the array subsystem to doing the planned stop is displayed in minutes. When the planned stop is not executed after the power supply of the array subsystem is turned on, 0 (minute) is displayed.

  Power on for (Work) : The progress time from turning on the power supply of the array subsystem to the present is displayed in milliseconds.

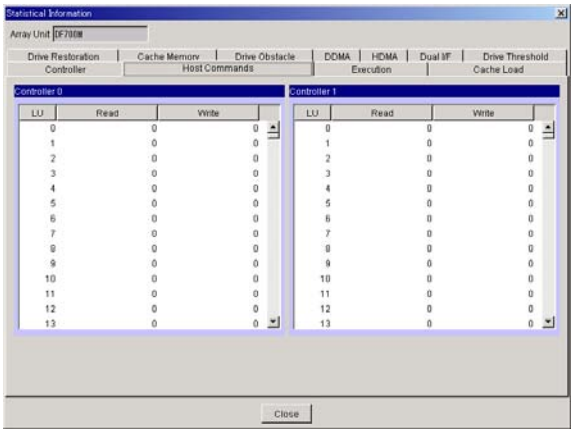
- Controller:

  Powered on counts : Integrated number of power ON times (at interruption) of the controller.

  H-SCSI reset counts : An accumulated number of SCSI bus resets received from a host computer is displayed.

(b) Displaying the Numbers of Host Commands Received

Click the Host Commands tab.

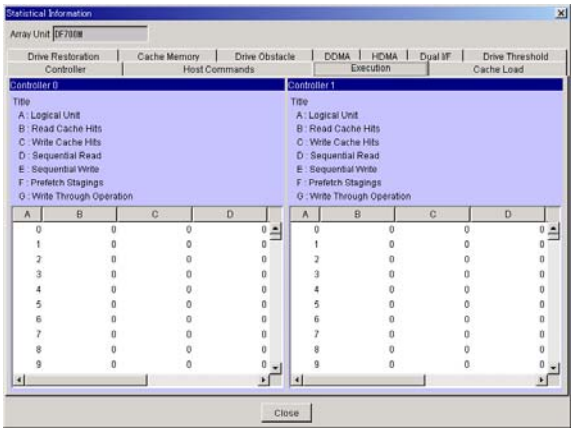


- LU : Logical unit number
- Read : Accumulated number of received read commands in each logical unit
- Write : Accumulated number of received write commands in each logical unit

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(c) Displaying the Command Execution Condition

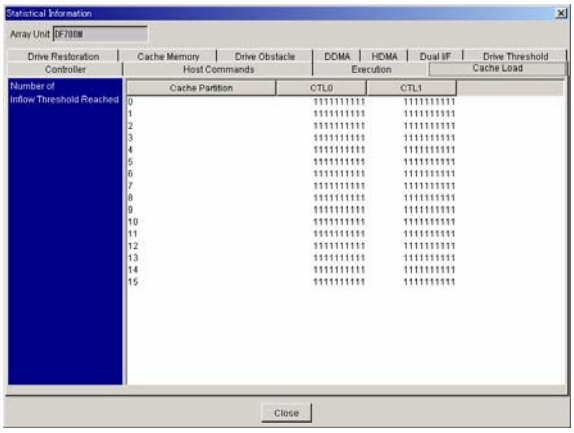
Click the Execution tab.



- A:Logical Unit : Logical unit number
- B:Read Cache Hits : Total of READ commands (hitting cache or partially hitting cache)
- C:Write Cache Hits : Total of WRITE commands (cache read hits)
- D:Sequential Read : Total of READ commands (recognized as sequential reading)
- E:Sequential Write : Total of WRITE commands (recognized as sequential writing)
- F:Prefetch Strings : Total of prefetch jobs executed
- G:Write Through Operation : Total of WRITE or WRITE & VERIFY commands (substituted by Write-Through operations)

(d) Displaying the Cache Load Condition

Click the Cache Load tab.



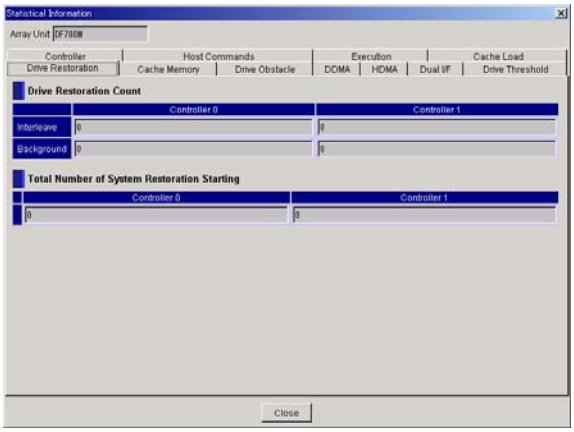
- Number of Inflow Threshold Reached : Total number of occurrences of inflow limitations.

This equipment manages the amount of data in cache as an inflow limit. When the host tries to write data exceeding this limit, an inflow limitation occurs. In this case, the write request from the host waits until part of write data is transferred to the drive.

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(e) Displaying Number of Drive Restoration Starting

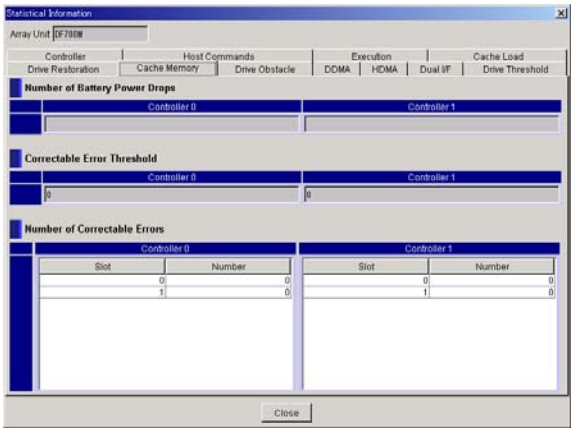
Click the Drive Restoration tab.



- Drive Restoration Count:
  Interleave : Accumulated number of starting of drive restoration using interleave
  Background : Accumulated number of starting of drive restoration performed in the background
- Total Number of System Restoration Starting : Accumulated number of system restoration starts

(f) Displaying Cache Memory Failures Statistical Information

Click the Cache Memory tab.

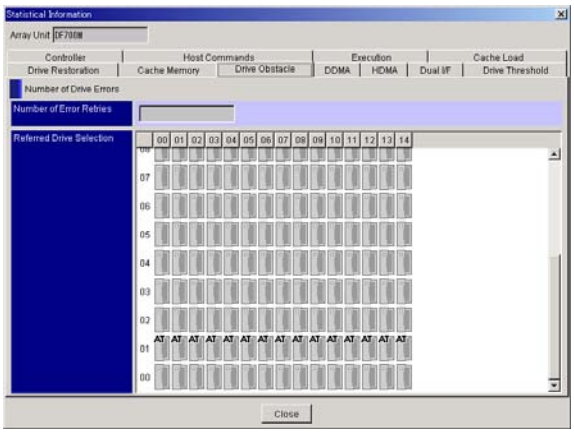


- Number of Battery Power Drops : Accumulated number of cache battery voltage drops
- Correctable Error Threshold : Threshold number of correctable errors
- Number of Correctable Errors : Accumulated number of correctable errors per cache slot

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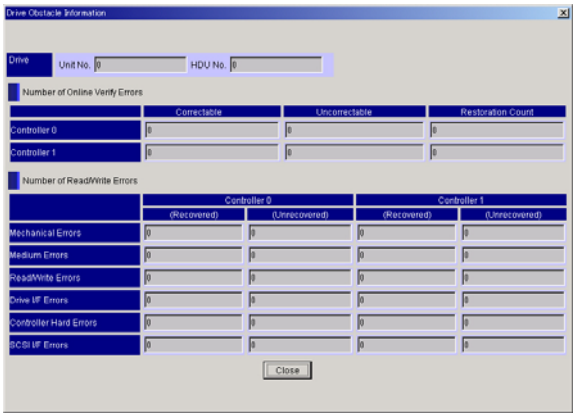
(g) Displaying Drive Failures Statistical Information

Click the Drive Obstacle tab.



Double-click on the drive icon you want to display.

Drive Obstacle information dialogue box is displayed.



- Drive:
  Unit No. : Unit No. of the selected drive.
  HDU No. : HDU No. of the selected drive.
- Number of Online Verify Errors : Accumulated number of errors that occurred when executing the read/write operations.
  The accumulated number of errors is not cleared even if the power supply of the subsystem is turned off (the subsystem performs the planned shutdown).
  Correctable : Accumulated number of correctable errors occurred in on-line verify execution.
  Uncorrectable : Accumulated number of uncorrectable errors occurred in on-line verify execution.
  Restoration Count : Accumulated number of restorations occurred in on-line verify execution
- Number of Read/Write Errors : Accumulated number of errors that occurred when executing the read/write operations.
  Mechanical Errors : Accumulated number of mechanism-related errors.
  Medium Errors : Accumulated number of medium-related errors.

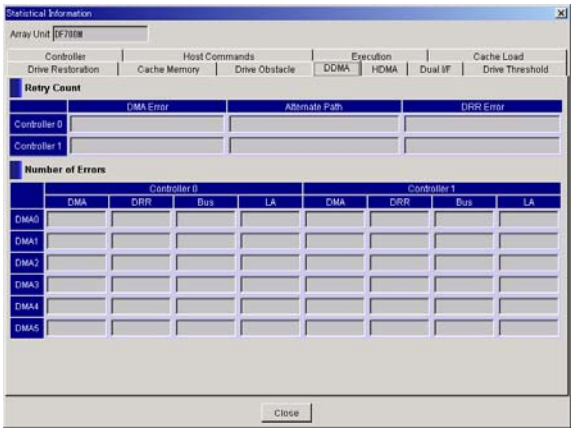
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Read/Write Errors : Accumulated number of read/write-related errors.
Drive I/F Errors : Accumulated number of drive interface errors.
Controller Hard Errors : Accumulated number of controller hardware errors.
SCSI I/F Errors :Accumulated number of SCSI interface errors.

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(h) Displaying Drive DMA failures statistical information

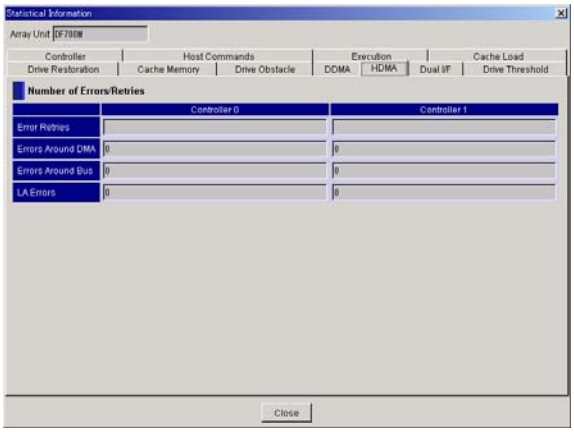
Click the DDMA tab.



- Retry Count:
  DMA Error : Number of DMA error retries
  Alternate Path : Number of alternate path retries against DMA errors
  DRR Error : Number of DRR error retries
- Number of Errors : Number of DMA, DRR, Bus, and LA errors per DMA occurred in the controller 0 and controller 1

(i) Displaying Host DMA Failures Statistical Information

Click the HDMA tab.

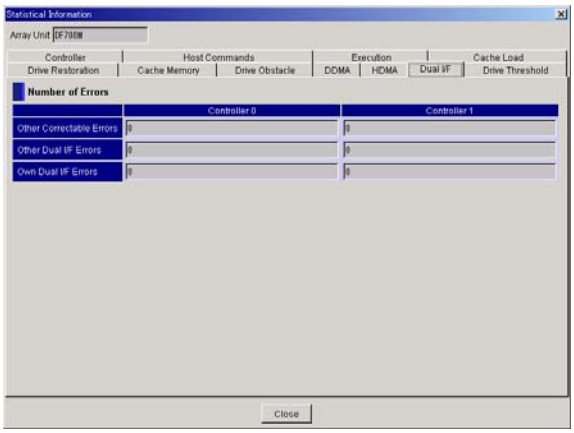


- Error Retries : Number of DMA error retries
- Errors Around DMA : Accumulated number of DMA-related errors
- Errors Around Bus : Accumulated number of bus-related errors
- LA Errors : Accumulated number of LA errors

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(j) Displaying DUAL I/F System Failures Statistical Information

Click the Dual I/F tab.

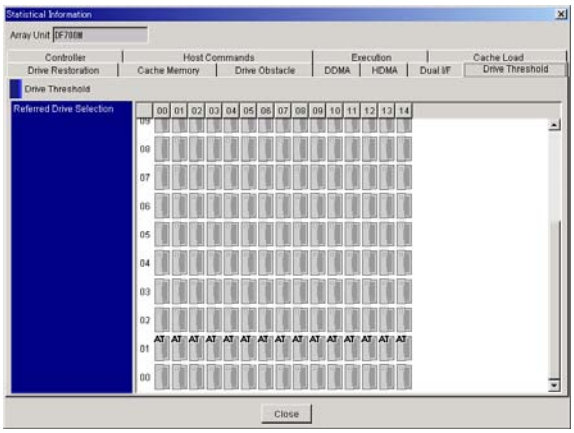


- Other Correctable Errors : Accumulated number of correctable errors occurred in the controller of another system
- Other Dual I/F Errors : Accumulated number of Dual I/F errors occurred in the controller of another system
- Own Dual I/F Errors : Accumulated number of Dual I/F errors occurred in the controller of own system

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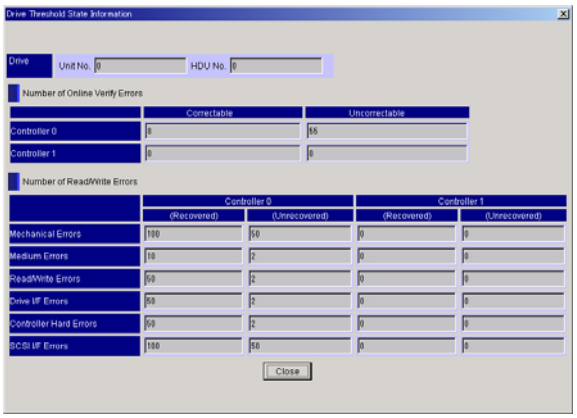
(k) Displaying Preventive Maintenance Failures Statistical Information

Click the Drive Threshold tab.



Double-click on the drive icon you want to display.

Drive Threshold state information dialog box is displayed.



- Drive:
  Unit No. : Unit No. of the selected drive.
  HDU No. : HDU No. of the selected drive.
- Number of Online Verify Errors : Accumulated number of errors that occurred when executing the read/write operations.
  The accumulated number of errors is not cleared even if the power supply of the subsystem is turned off (the subsystem performs the planned shutdown).
  Correctable : Accumulated number of correctable errors occurred in on-line verify execution.
  Uncorrectable : Accumulated number of uncorrectable errors occurred in on-line verify execution.
  Restoration Count : Accumulated number of restorations occurred in on-line verify execution
- Number of Read/Write Errors : Accumulated number of errors that occurred when executing the read/write operations.
  Mechanical Errors : Accumulated number of mechanism-related errors.
  Medium Errors : Accumulated number of medium-related errors.

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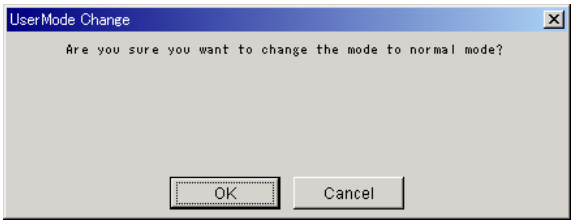
Read/Write Errors : Accumulated number of read/write-related errors.
Drive I/F Errors : Accumulated number of drive interface errors.
Controller Hard Errors : Accumulated number of controller hardware errors.
SCSI I/F Errors : Accumulated number of SCSI interface errors.

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(5) On the Mode menu, click the Exit. The Main screen is displayed.

(6) Click  : Change Mode in the tool bar on the Main screen.

(7) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

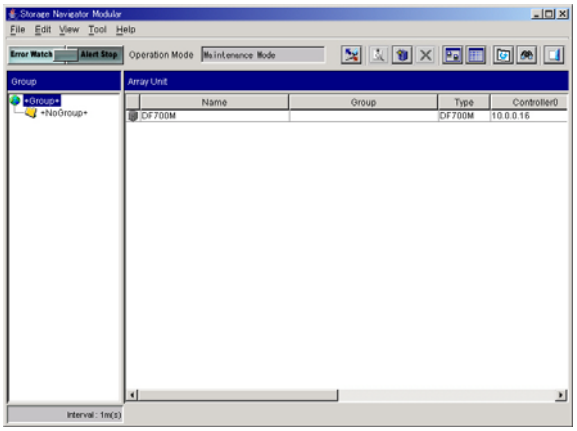
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10.2.4 Displaying Logical Unit Failure Data Information

The PIN information of each logical unit is displayed.

(1) Start the Storage Navigator Modular.

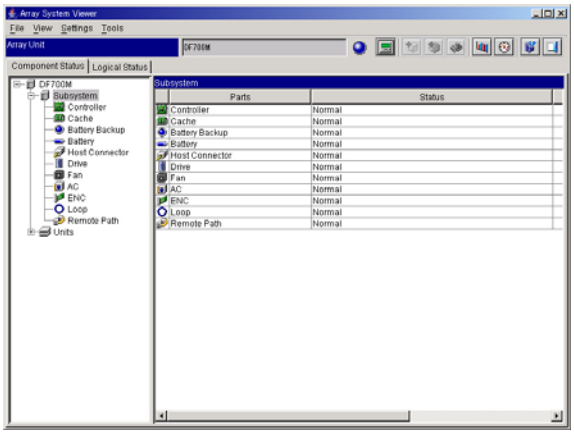
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

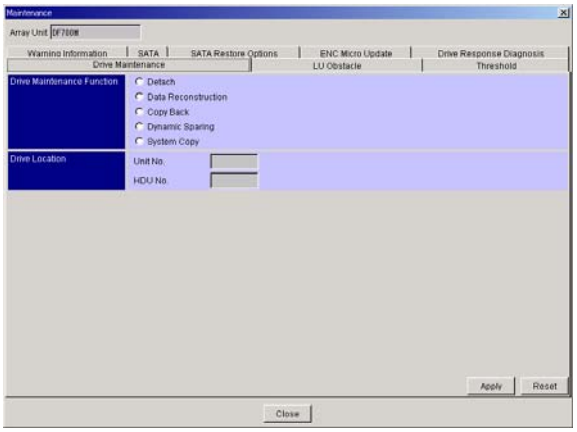
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

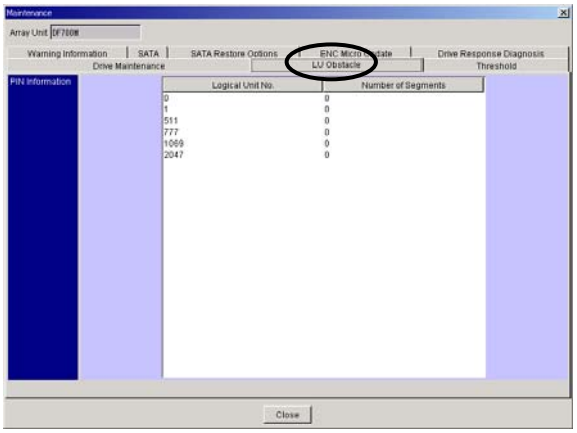


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(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



(5) Click the LU Obstacle tab on the Maintenance dialogue box.

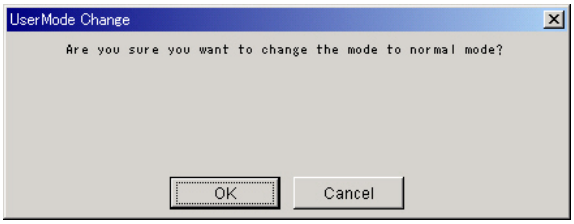


The number of segments, including PIN, in each logical unit is displayed.

(6) On the Mode menu, click the Exit. The Main screen is displayed.

(7) Click  : Change Mode in the tool bar on the Main screen.

(8) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

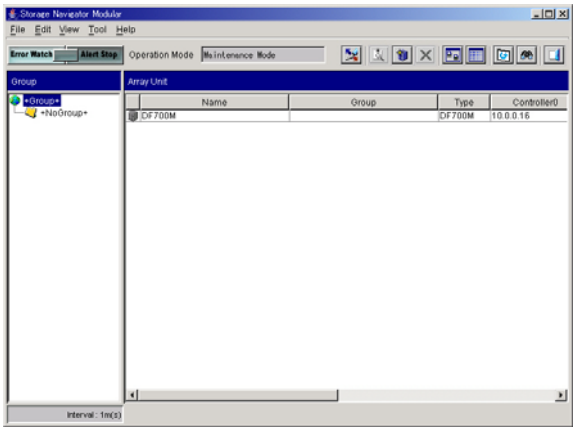
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10.2.5 Setting Pre-fetch Information

A prefetch staging size for each RAID level, next starting opportunity and host data transfer access size are set.

(1) Start the Storage Navigator Modular.

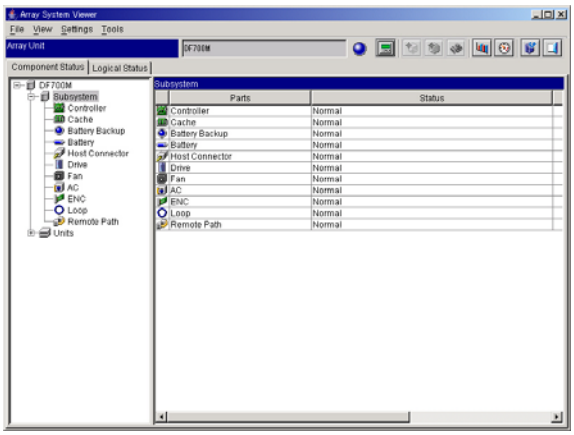
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

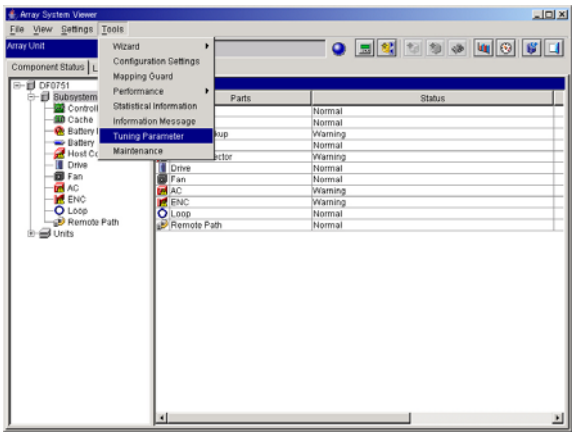
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

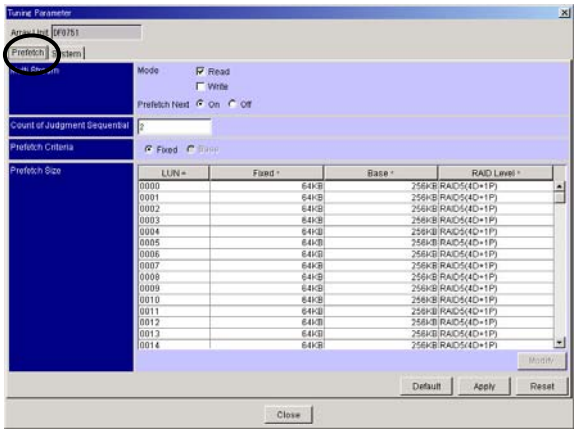


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(4) Select [Tools] – [Tuning Parameter] in the unit window.



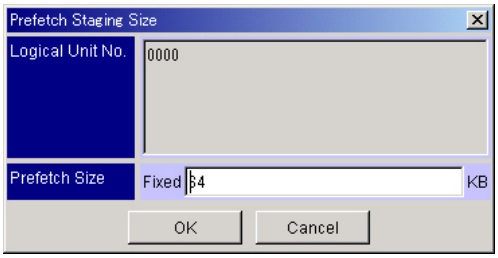
(5) Click the Prefetch tab on the Tuning Parameter dialogue box.



NOTE : The prefetch staging size, next starting opportunity and host data transfer access size are set at optimum values. If the setting is changed unpreparedly, it will affect performance and may interfere with operation. When changing them, contact the manufacturer in advance.

(6) Select the LUN you want to modify the prefetch size, click the [Modify] button.

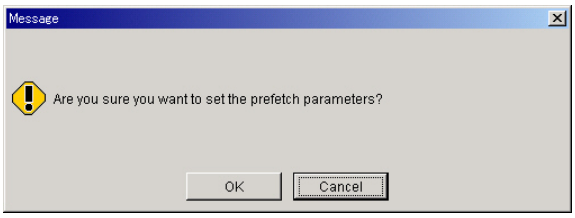
(7) Specify the Prefetch Size, click the [OK] button.



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(8) Check if the settings that have been made are correct and click the [Apply] button.

(9) A message asking you to verify the setting is displayed. Click the [OK] button.



(10) When the setting is completed, the following message is displayed. Click the [OK] button.



(11) Click the [Close] button on the Tuning Parameter dialogue box.

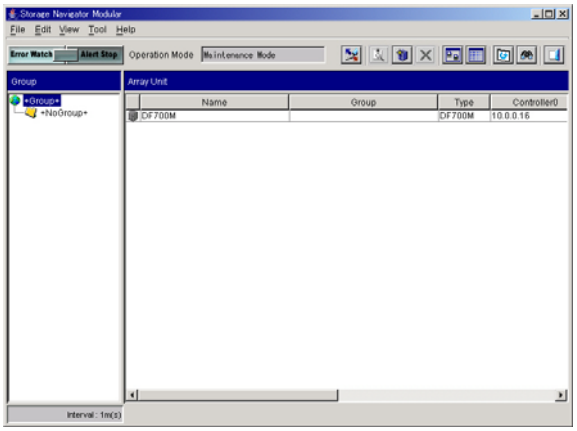
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10.2.6 Setting a Threshold for Preventive Maintenance

A threshold for the number of drive failure managed in preventive maintenance is set.

(1) Start the Storage Navigator Modular.

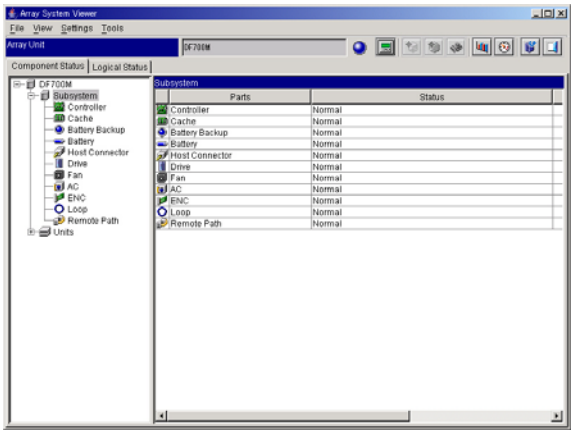
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

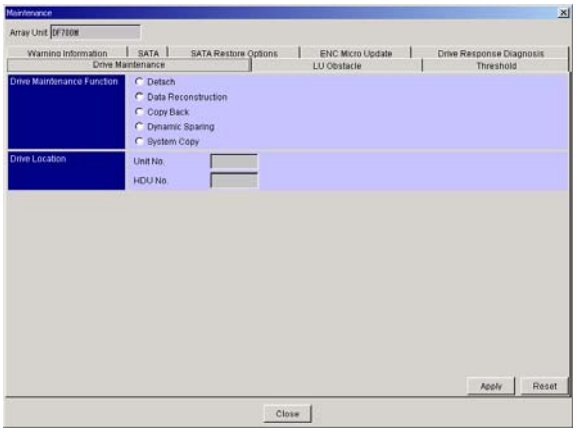
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

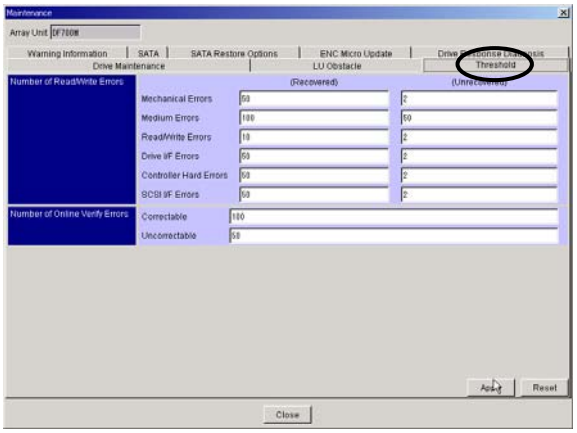


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(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



(5) Click the Threshold tab on the Maintenance dialogue box.



- Number of Read/Write Errors :Specifies a threshold of a read/write error.
  Mechanical Errors : Accumulated number of mechanical error occurrences
  Medium Errors : Accumulated number of medium error occurrences
  Read/Write Errors : Accumulated number of read/write error occurrences
  Drive I/F Errors : Accumulated number of drive interface error occurrences
  Controller Hard Errors : Accumulated number of controller hardware error occurrences
  SCSI I/F Errors : Accumulated number of SCSI interface error occurrences
- Number of Online Verify Errors : Specifies a threshold of a read/write error.
  Correctable : Accumulated number of occurrences of correctable error in on-line verify execution
  Uncorrectable : Accumulated number of occurrences of uncorrective error in on-line verify execution

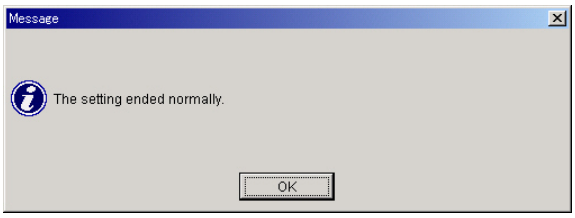
A threshold is specified in the range of 1 to 65,535 with 1 as a unit. If you specify 0, it will not be an object of preventive maintenance.

NOTE : A threshold is set at an optimum value : If the setting is changed unpreparedly, it may perform preventive maintenance operation outside the range of it or may not operate even though there is an object for it: When changing it, contact the manufacturer in advance.

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(6) Change the value and click the Apply button.

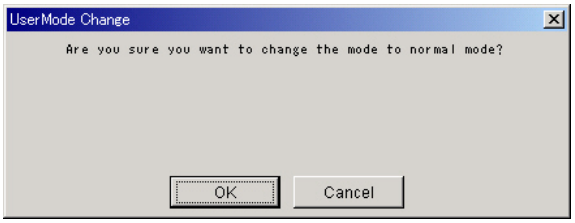
(7) A confirming message appears. Click the [OK] button.



(8) On the Mode menu, click the Exit. The Main screen is displayed.

(9) Click  : Change Mode in the tool bar on the Main screen.

(10) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

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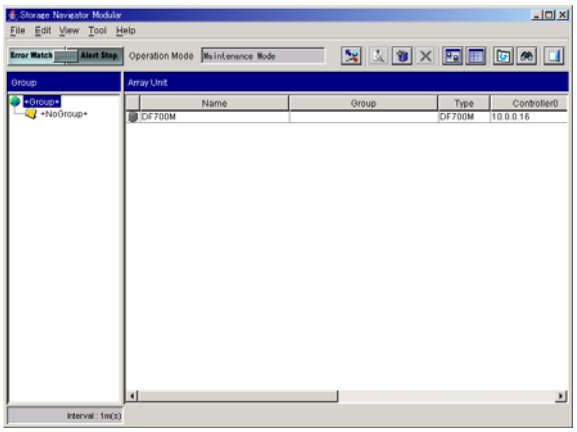
10.2.7 Drive Maintenance

Performs maintenance functions on drives mounted in array units such as blocking a drive forcibly and instructing to restore.

NOTE : The data reconstruction, the copy back and the dynamic sparing are not executed for the Disk Drives in the RAID Group to which the Power Saving function is set.

(1) Start the Storage Navigator Modular.

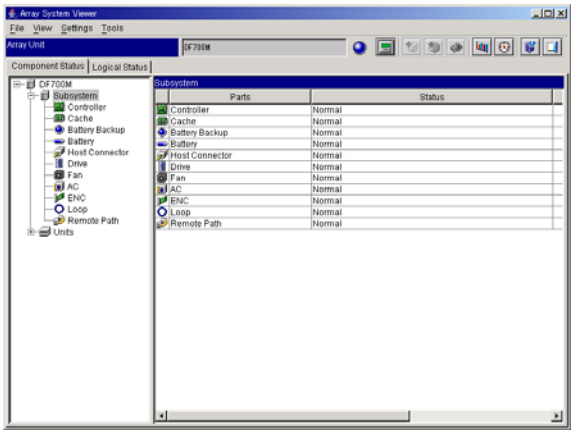
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

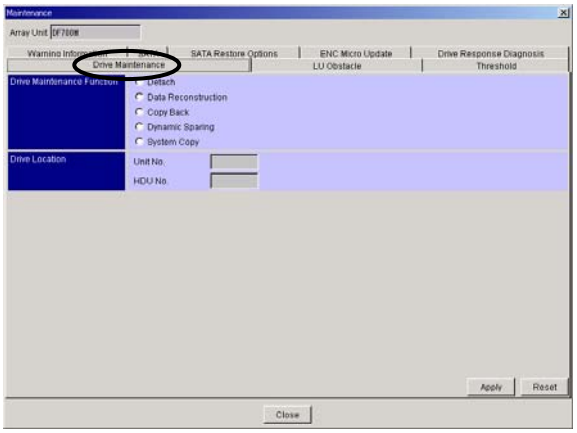
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



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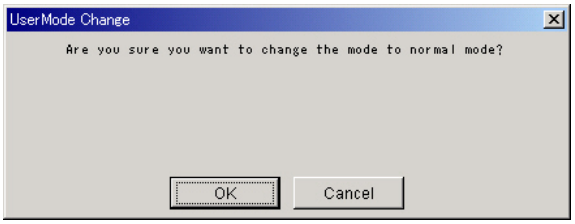
(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed. Click the Drive Maintenance tab on the Maintenance dialogue box.



- Drive Maintenance Function:
  Detach : Blocks a drive specified in the Drive Location box forcibly.
  Data Reconstruction : When the drive restoration option was set automatically, reconstruct the data in the Disk Drive by specifying the drive position of the Disk Drive after replacing the failed Disk Drive. Execute the data reconstruction by specifying the replaced Disk Drive position after replacing the Disk Drive. (refer to the Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050).)
  When executing it without replacing the Disk Drive, the correction copy operates in the Spare Disk Drive where the data is recoverable, and if there is no such Spare Disk Drive, the execution command will become an error, and the data reconstruction cannot be executed. Also, when specifying the Spare Disk Drive or the normal Disk Drive to [Drive Position] or when the correction copy, copy back, dynamic sparing and system copy are already operating, the execution demand becomes an error, and the data reconstruction cannot be executed.
  Copy Back : Copies data from a spare drive to a drive specified in the Drive Location box.
  Dynamic Sparing : Copies data forcibly from a drive specified in the Drive Location box to a spare drive.
  System Copy : Copies the system area from the current system drive to a system drive specified in the Drive Location box.
- Drive Location:
  Unit No. : Unit No. of a drive on which to perform a maintenance function
  HDU No. : HDU No. of a drive on which to perform a maintenance function

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(5) Select the Drive Maintenance Function to perform, and specifies the Drive Location of a drive on which to perform a selected function.
(6) If you click the Apply button, a selected function will be performed.
(7) On the Mode menu, click the Exit. The Main screen is displayed.
(8) Click [ : Change Mode] in the tool bar on the Main screen.
(9) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

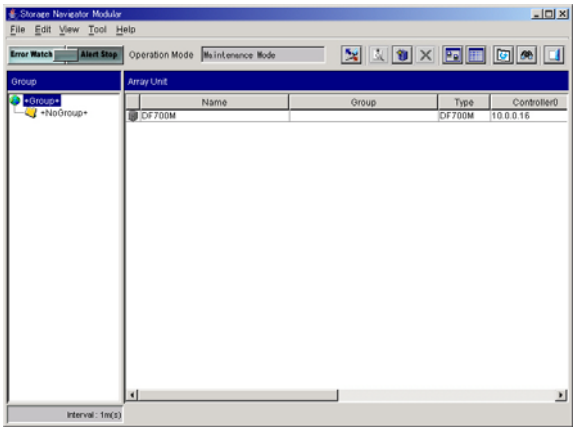
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10.2.8 Setting a Mode for Reporting to the Host Using an SSB

This setting specifies a mode for reporting an SSB to the host when a trouble such as a failure in a part of the disk array subsystem occurs.

(1) Start the Storage Navigator Modular.

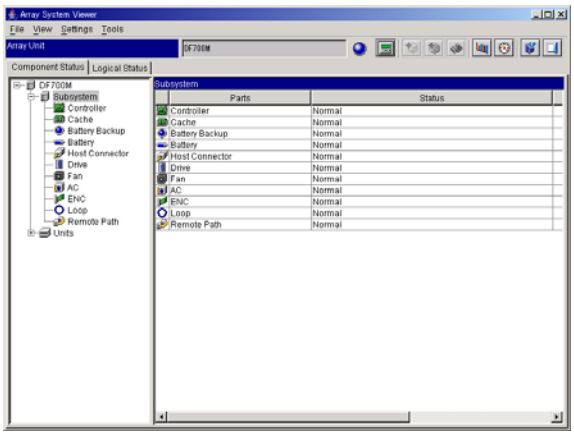
(2) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

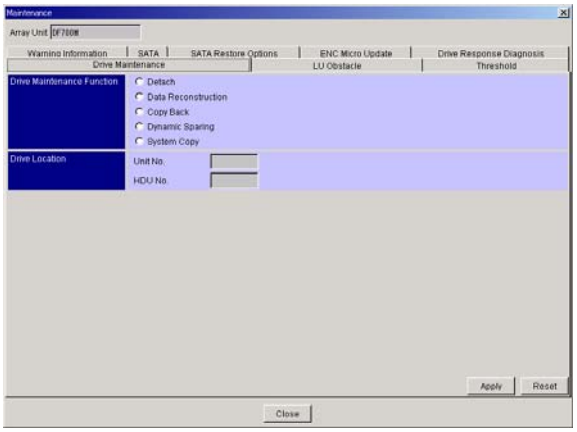
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

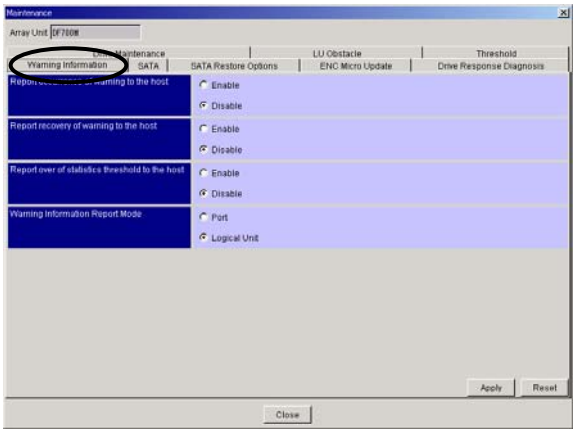


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(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



(5) Click the Warning Information tab on the Maintenance dialogue box.

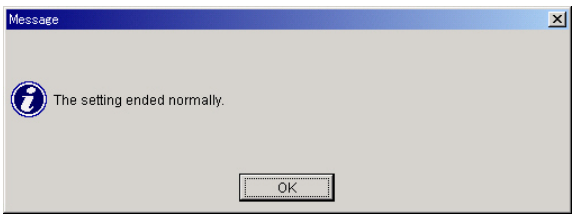


- Report occurrence of warning to the host : Reporting an SSB to the host when a failure that causes a warning occurs.
- Report recovery of warning to the host : Reporting an SSB to the host when the subsystem recovers from a failure which caused a warning.
- Report over of statistics threshold to the host : Reporting an SSB to the host when any of the statistical data exceeds its threshold value.
- Warning Information Report Mode:
  Port : Reports the failure information of the port.
  Logical Unit : Reports the failure information of the port, initiator, and logical unit.

(6) Click on an item you want to set to validate it, and then click the Apply button.

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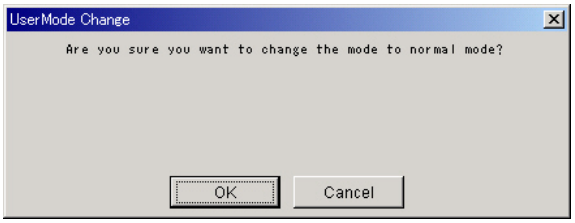
(7) A confirming message appears. Click the [OK] button.



(8) On the Mode menu, click the Exit. The Main screen is displayed.

(9) Click  : Change Mode in the tool bar on the Main screen.

(10) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

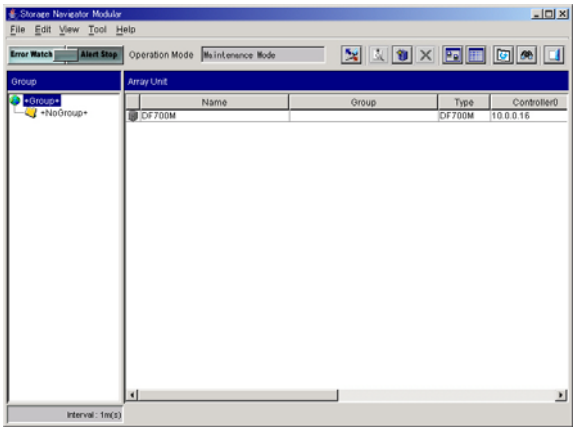
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10.2.9 Setting SATA Drive Options

Refer to or set the SATA drive option.

(1) Start the Storage Navigator Modular.

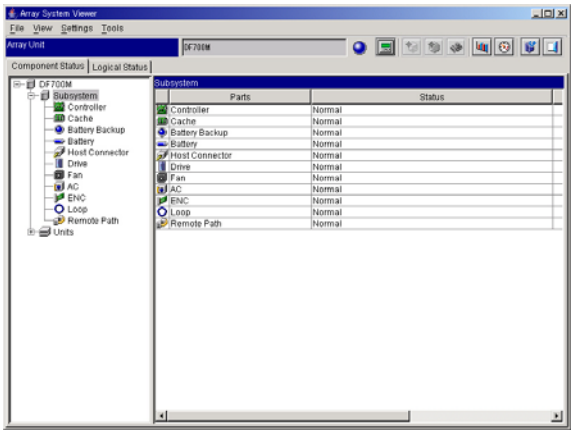
(2) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

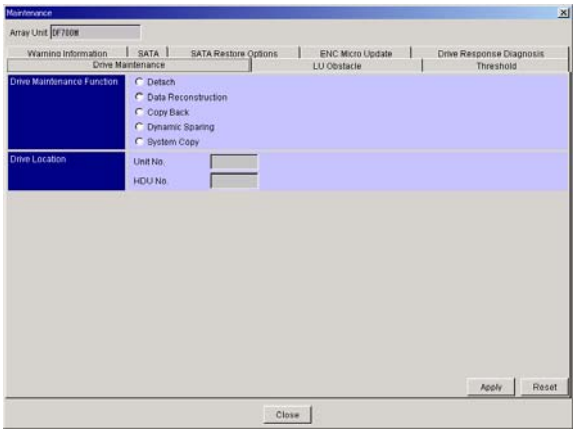
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

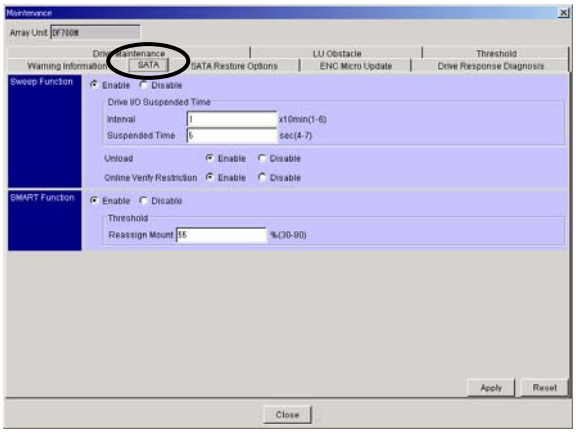


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(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



(5) Click the SATA tab on the Maintenance dialogue box.

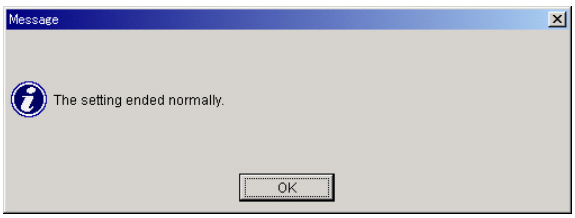


- Sweep Function:
  Enable/Disable : Make a selection whether to enable or disable the Sweep Function.
  Drive I/O Suspended Time : Specify the drive I/O Suspended Time for the SATA drive with Interval and Suspended Time.
  Unload : Make a selection whether to enable or disable the Unload Function.
  Online Verify Restriction : Make a selection whether to enable or disable the Online Verify Restriction for the SATA drive. When you selected Enable, the operating rate of online verification of a SATA drive will be controlled to 1/6 times of FC drive. When you selected Disable, it will be made the same as FC drive.
- SMART Function:
  Enable/Disable : Make a selection whether to enable or disable the SMART Function.
  Threshold : Specify the threshold value of the Reassign Mount to start the dynamic sparing.

(6) Change the value and click the [Apply] button.

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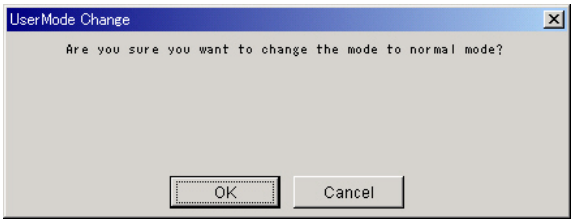
(7) A confirming message appears. Click [OK] button.



(8) On the Mode menu, click the Exit. The Main screen is displayed.

(9) Click  : Change Mode in the tool bar on the Main screen.

(10) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

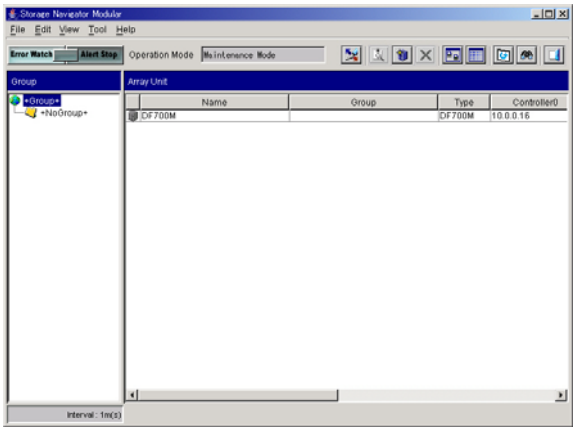
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10.2.10 Setting SATA Drive Restore Options

Refer to or set the SATA drive restore option.

(1) Start the Storage Navigator Modular.

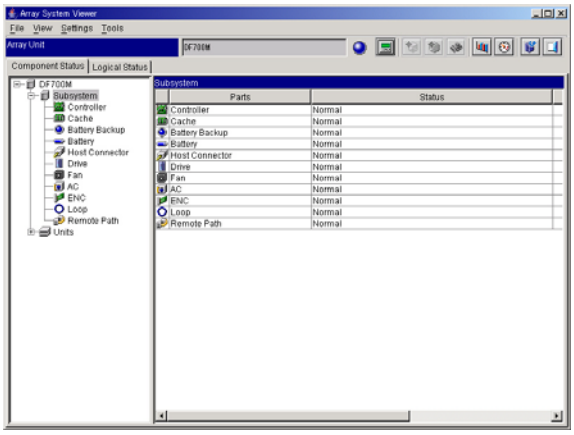
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

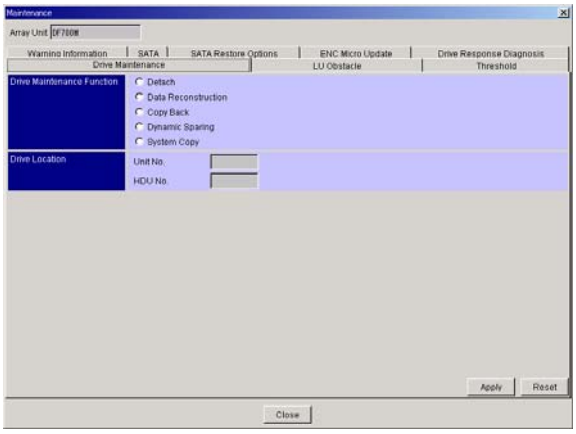
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

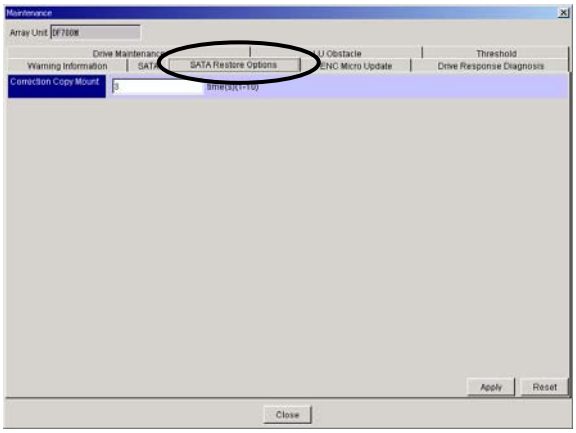


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(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

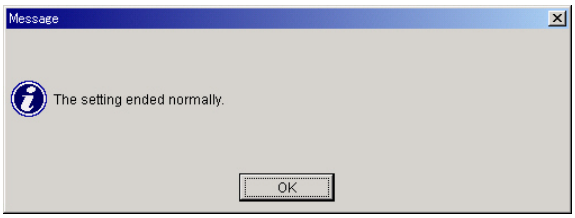


(5) Click the SATA Restore Options tab on the Maintenance dialogue box.



- Correction Copy Mount : Specify the size of data to be restored at a time with by means of a correction copy as a multiple n of the FC drive capacity.

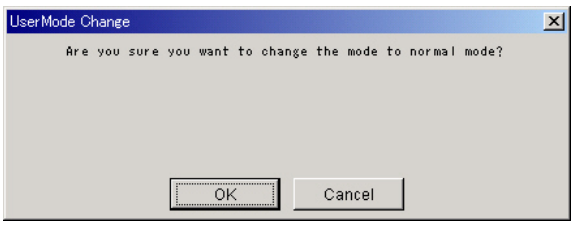
(6) Change the value and click the [Apply] button.
(7) A confirming message appears. Click [OK] button.



(8) On the Mode menu, click the Exit. The Main screen is displayed.
(9) Click  : Change Mode in the tool bar on the Main screen.

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(10) A confirming message appears. Click the [OK] button.



Storage Navigator Modular enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

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10.2.11 Replacing the Online ENC/SENC Firmware

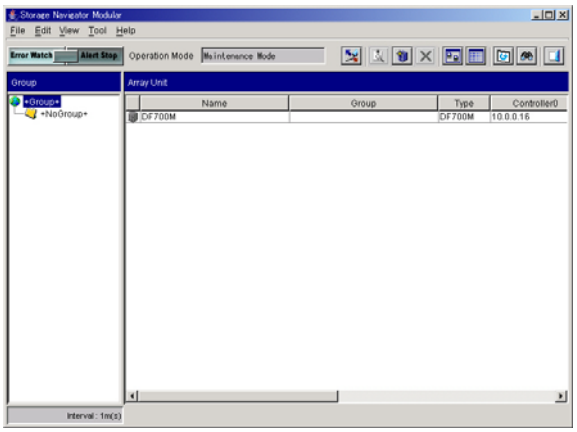
The function downloads and replaces the ENC/SENC Firmware in the array unit. When replacing the ENC/SENC Firmware, download it, and then replace it.

Perform the replacement work of the ENC/SECN firmware referring to the following manual.

- HT-4064 Disk Array Subsystem Procedure for Online ENC/SENC Firmware Download

(a) Start the Storage Navigator Modular.

(b) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.

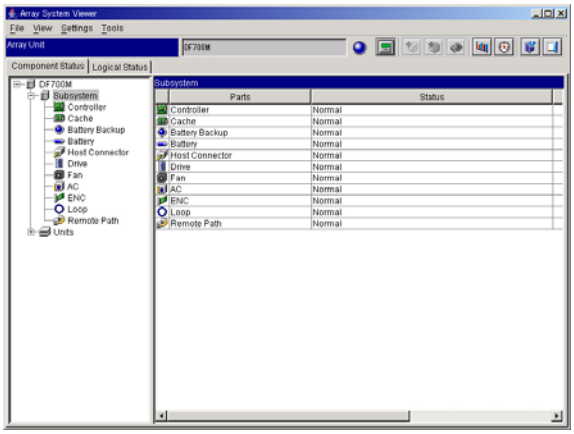


Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

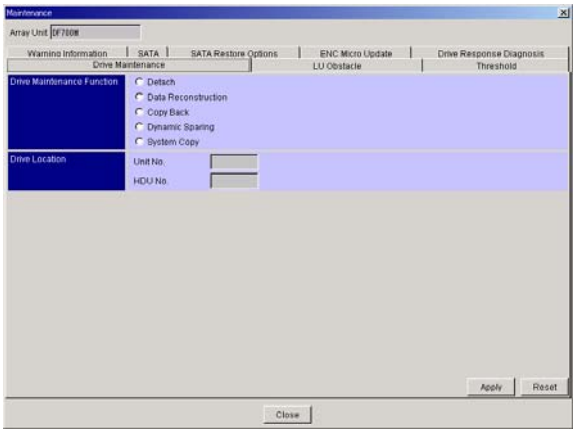
Copyright © 2005, Hitachi, Ltd.

(c) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

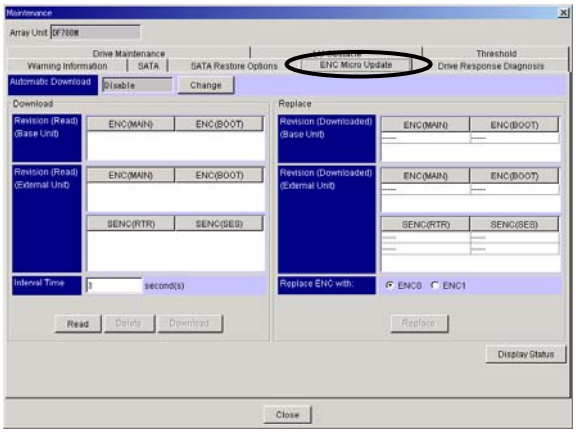


(d) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



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(e) Click the ENC Micro Update tab on the Maintenance dialogue box.



- Automatic Download : Specify whether or not to download the ENC/SENC Firmware automatically. When you replace the ENC/SENC Firmware manually, make the automatic downloading invalid using the changing button.
- Revision (Read) (Base Unit) : A base unit revision stored in the computer in which the Storage Navigator Modular is installed. When the base unit revision is not read, a blank is displayed.
- Revision (Read) (External Unit) : An external unit revision stored in the computer in which the Storage Navigator Modular is installed. When the external unit revision is not read, a blank is displayed.
- Interval Time : Interval time for download. Specify the time between one second and 60 seconds. For the LAN connection, when the interval time is specified as 3 seconds, the download requires approximately 9 minutes. The time required for the execution varies with the network status and depends on the I/Os issued by the host. When the interval time is specified as one second longer, the time required for the download is prolonged by 3 minutes. This function can be used during execution of the I/O instructed by the host. However, when the download function is executed, I/O performance of the host is reduced. To enhance performance, specify a longer interval time.
- Revision (Downloaded) (Base Unit) : A base unit revision downloaded in the subsystem. When the base unit revision is not downloaded, a blank is displayed.
- Revision (Downloaded) (External Unit) : An external unit revision downloaded in the subsystem. When the external unit revision is not downloaded, a blank is displayed.
- Replace ENC with: : Specify the ENC whose firmware is to be replaced.

When no firmware is read, the Delete and Download buttons are displayed in gray and cannot be selected.

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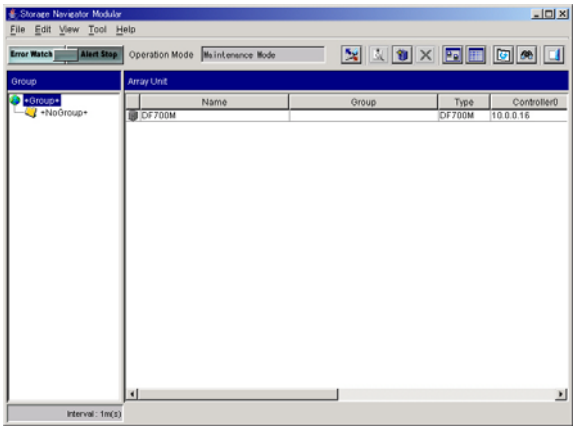
10.2.12 Drive Performance Delay Diagnostic Function

If it is clear that the performance delay problem is caused by the drive, setting this function notifies the drive number of which caused the problem through the message and executes the dynamic sparing.

(1) Setting the drive performance delay diagnostic function in the Storage Navigator Modular.

(a) Start the Storage Navigator Modular.

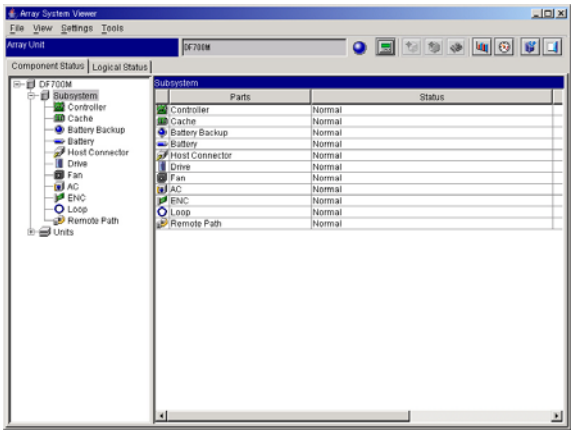
(b) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

(c) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).

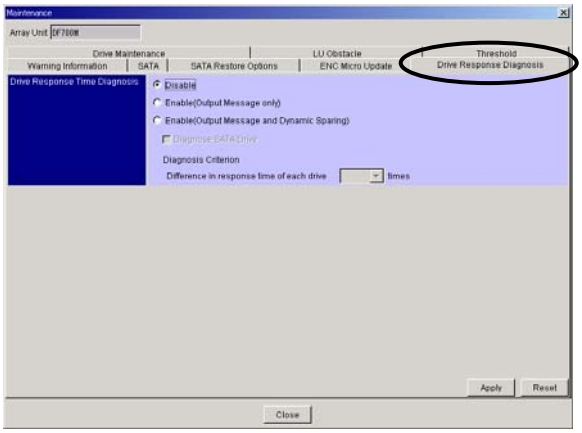


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(d) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

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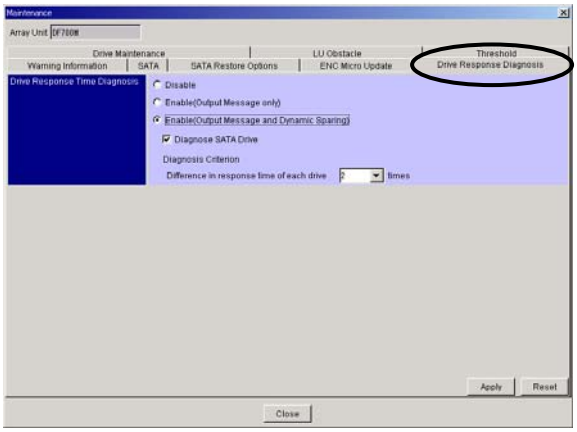
(e) Click the Drive Response Diagnosis tab on the Maintenance dialogue box.



- Disable : The drive response time is not diagnosed.
- Enable (Output Message only):
  The drive response time is diagnosed and a number of the drive that caused the response delay is displayed in a message.
  Diagnose SATA Drive:
  Fill the check box when you want to diagnose the SATA drives.
  Difference in response time of each drive :
  The response time difference of the normal drive and the delay drive to specify the delay drive in the same RAID group.

  NOTE : Specify 2 for the value of Difference in response time of each drive. If setting the value other than 2, contact the Technical Support Center.

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- Enable (Output Message and Dynamic Sparing):
  The drive response time is diagnosed, a number of the drive that caused the response delay is displayed in a message, and the dynamic sparing is executed.
  Diagnose SATA Drive:
    Fill the check box when you want to diagnose the SATA drives.
  Difference in response time of each drive :
    The response time difference of the normal drive and the delay drive to specify the delay drive in the same RAID group.

      NOTE : Specify 2 for the value of Difference in response time of each drive. If setting the value other than 2, contact the Technical Support Center.

(f) Click the [Apply] button.

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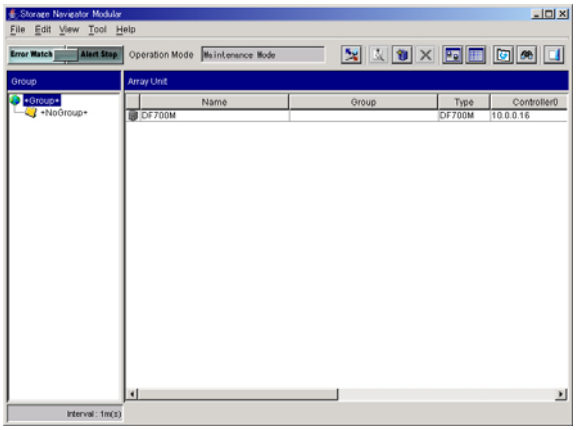
10.2.13 Function to release the pair of Modular Volume Migration

Modular Volume Migration can be executed even if either RAID Manager or Storage Navigator Modular is used, but Modular Volume Migration executed from RAID Manager can only operate it from RAID Manager and Modular Volume Migration executed from Storage Navigator Modular can only operate it from Storage Navigator Modular. However, when the server in which RAID Manager is installed is removed remaining the pair of Modular Volume Migration executed from RAID Manager, it can operate only the pair release by using Storage Navigator Modular made the maintenance mode.

This section explains the method to release the pair of Modular Volume Migration executed from RAID Manager by using Storage Navigator Modular.

(1) Start the Storage Navigator Modular.

(2) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.

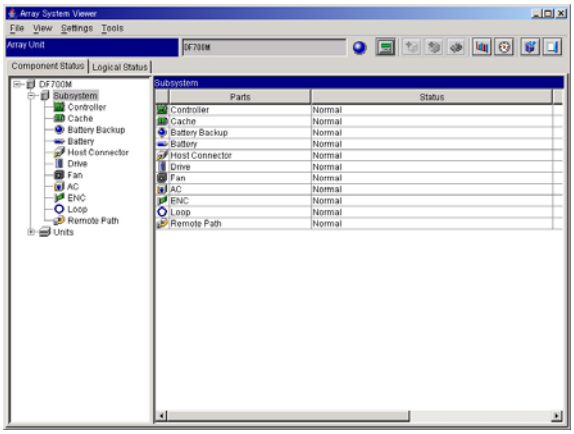


Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

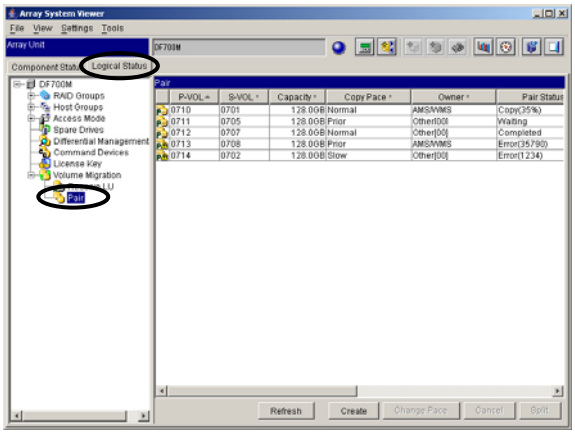
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(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (refer to System Parameter "1.2 Setting the LAN Port Number" (SYSPR 01-0100)).



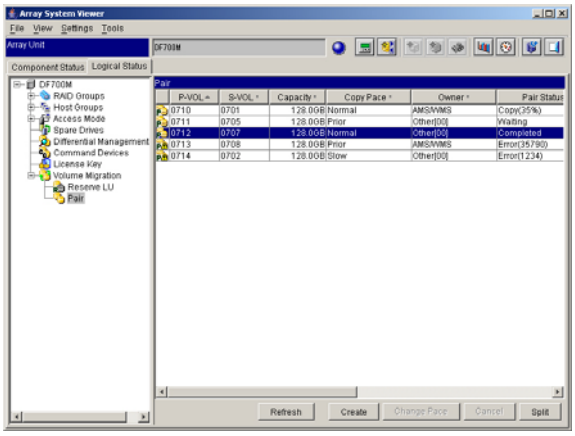
(4) Click the [Logical Status] tab in the unit window, and click the [Pair] icon in the [Volume Migration] icon. The pair of Modular Volume Migration which is currently being executed is displayed.



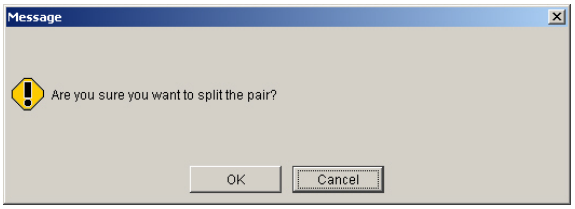
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(5) Specify the pair to be released, and click the [Release] button.

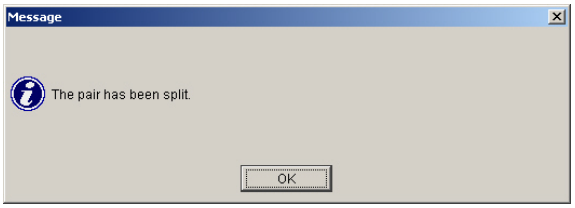
NOTE : The owner is displayed as Other [00] for the pair executed from RAID Manager.
Only the pair whose pair status is error or completed can be released.



(6) A confirming message appears. Click [OK] button.



(7) The message that the pair was released is displayed, so that click the [OK] button.

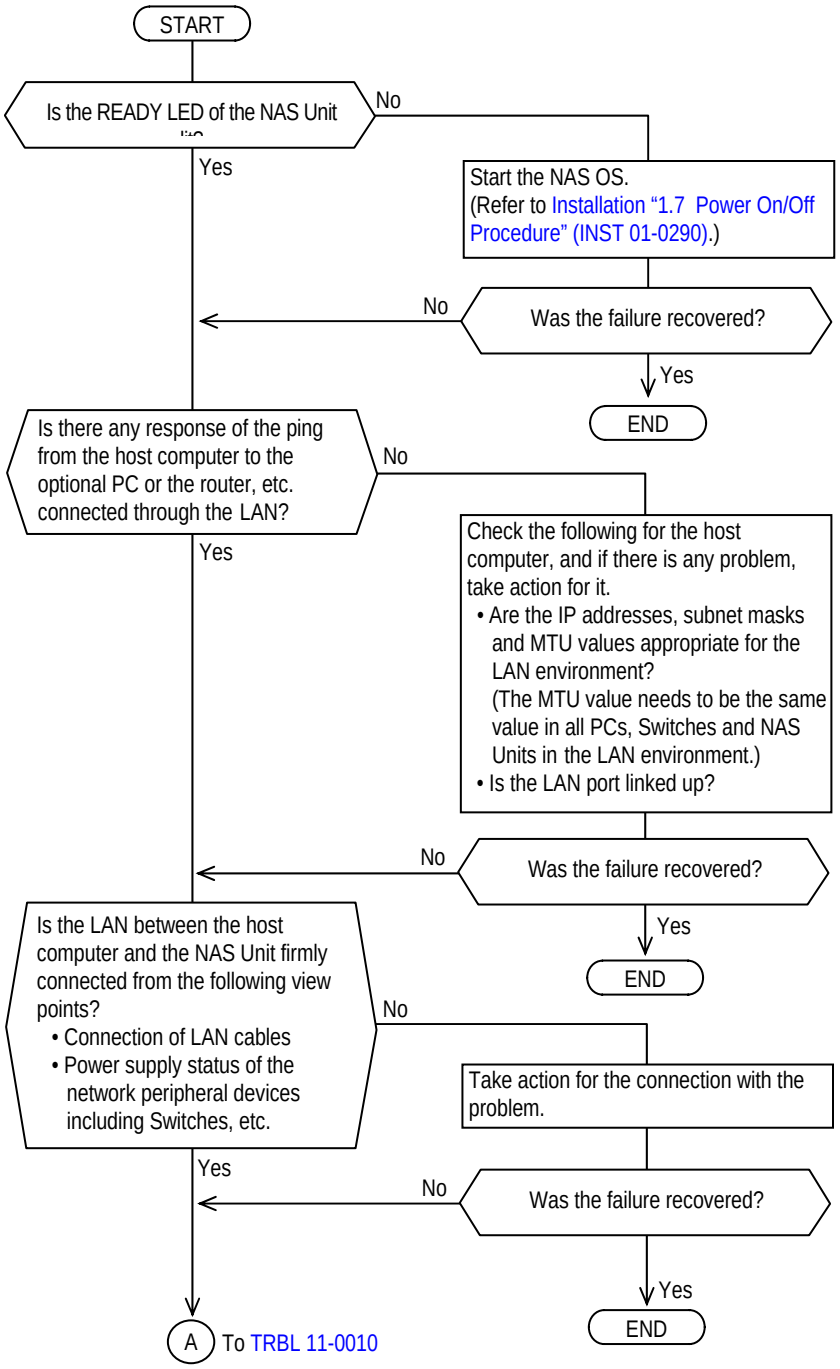


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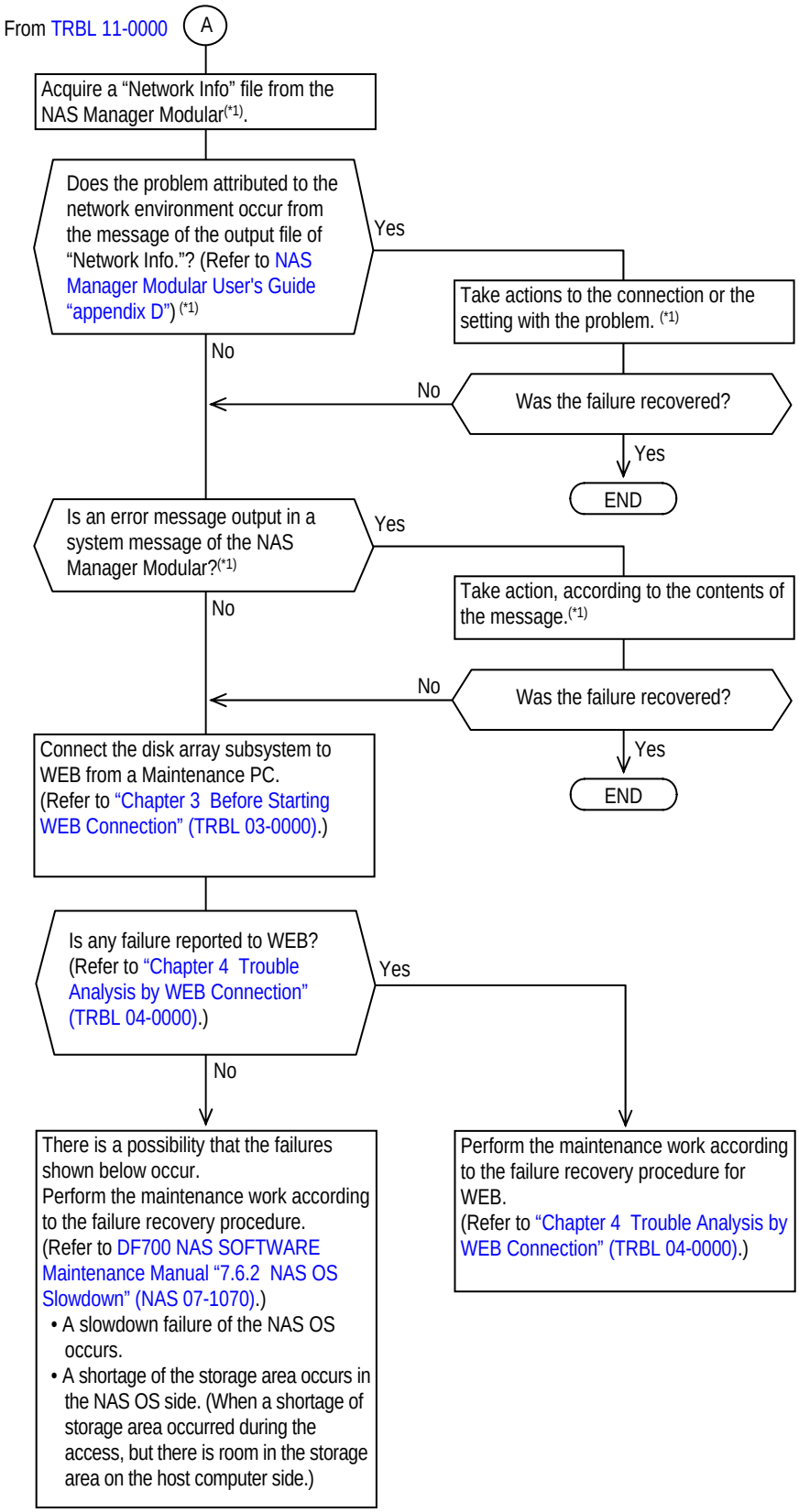
.

Chapter 11. Procedure for Determining Failure of Network Side in NAS System

When a failure occurs in the LAN environment between the host computer and the NAS Modular subsystem, or the NAS Modular subsystem, it is determined whether there is a failure in the NAS Modular subsystem according to the following flow.



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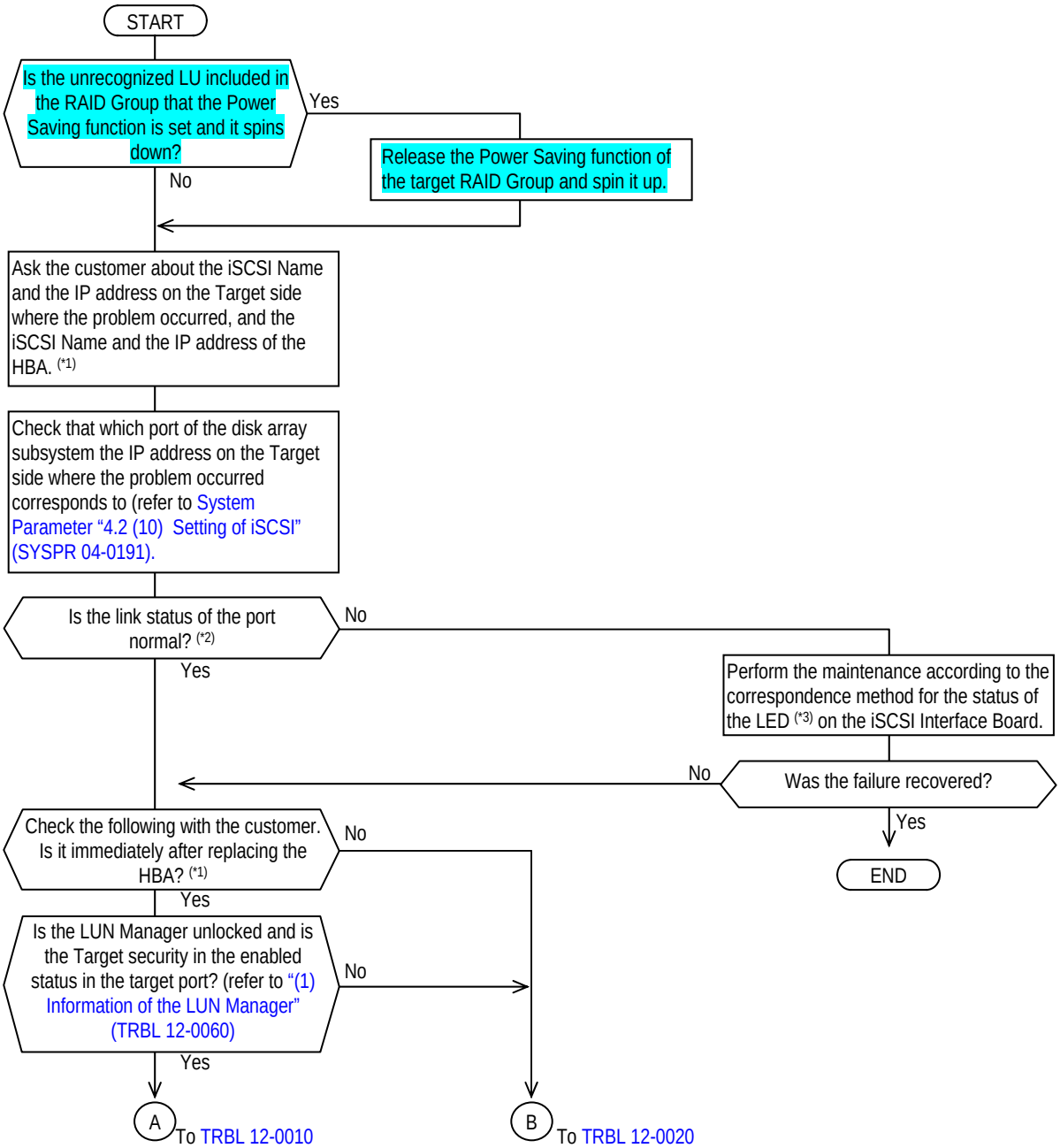
*1 : Work to use NAS Manager Modular becomes charge of the system administrator. The maintenance member must cooperate with the system administrator.

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Chapter 12. Procedure for the iSCSI System Failure Determination on the Disk Array Subsystem Side

When a failure occurs in the communication by the iSCSI protocol between the host computer and the disk array subsystem, determine if there is a failure in the host interface part of the disk array subsystem according to the following flow.

Use the Storage Navigator Modular of Ver.3.00 or more.

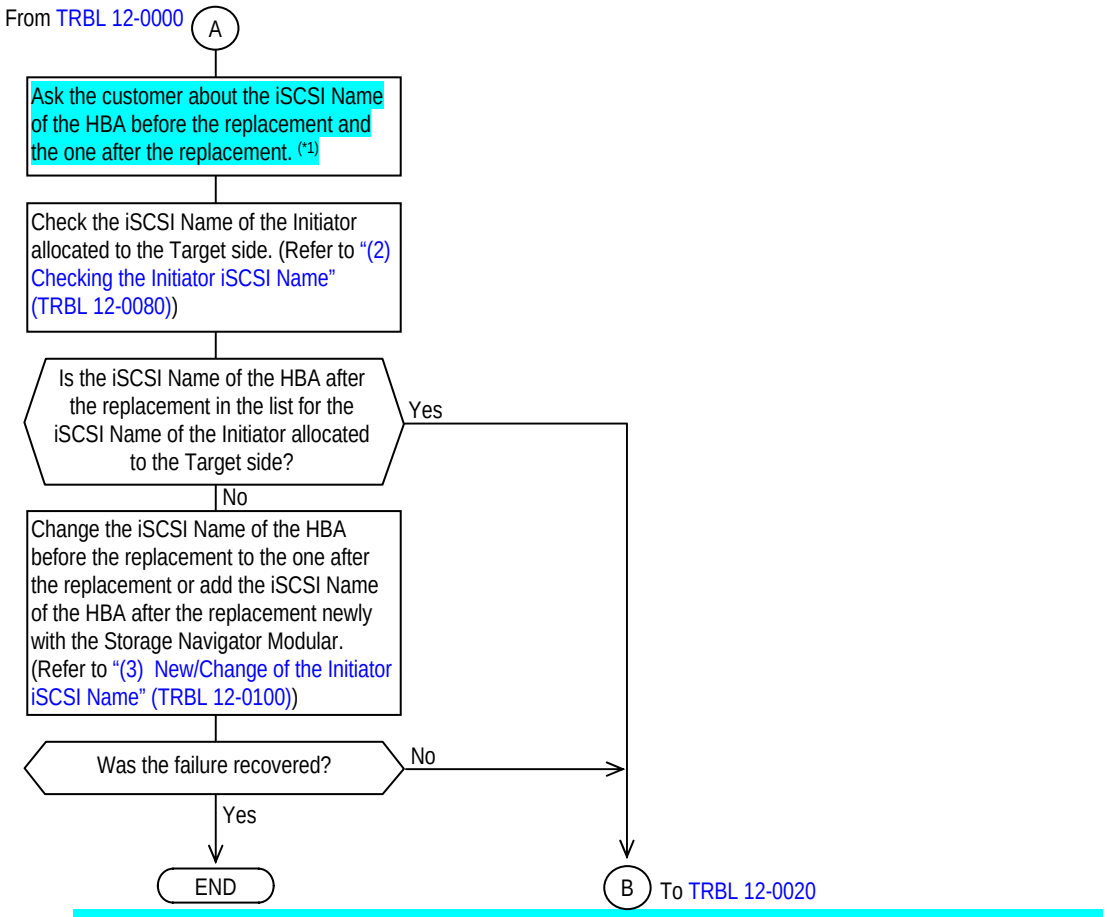


*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

*2 : It is in the status of Item 1 on Table 8.2.8.1 in "8.2. (6) (b) iSCSI Interface Board" (TRBL 08-0281).

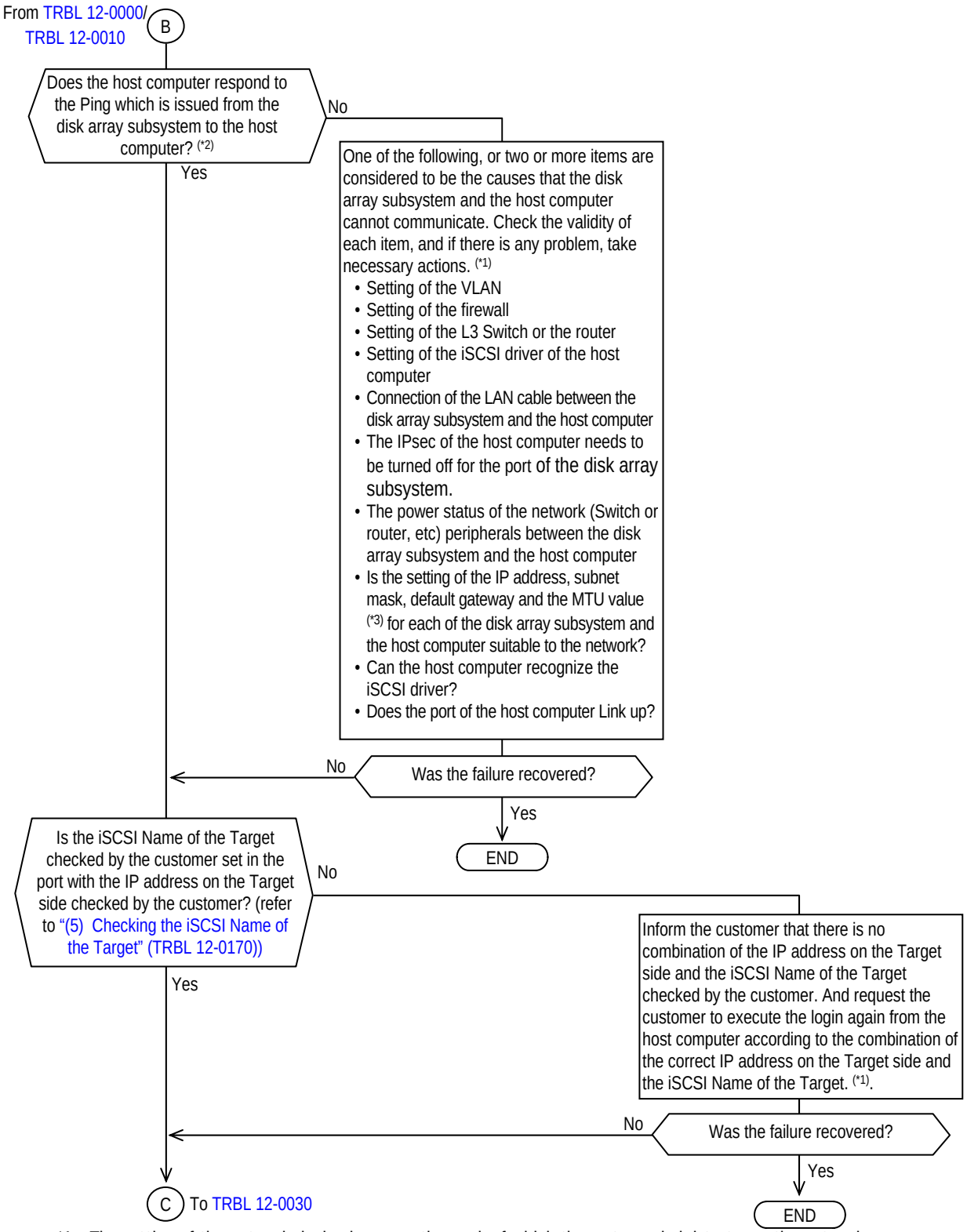
*3 : It is in the status of Item 2 on Table 8.2.8.1 in "8.2. (6) (b) iSCSI Interface Board" (TRBL 08-0281).

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*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

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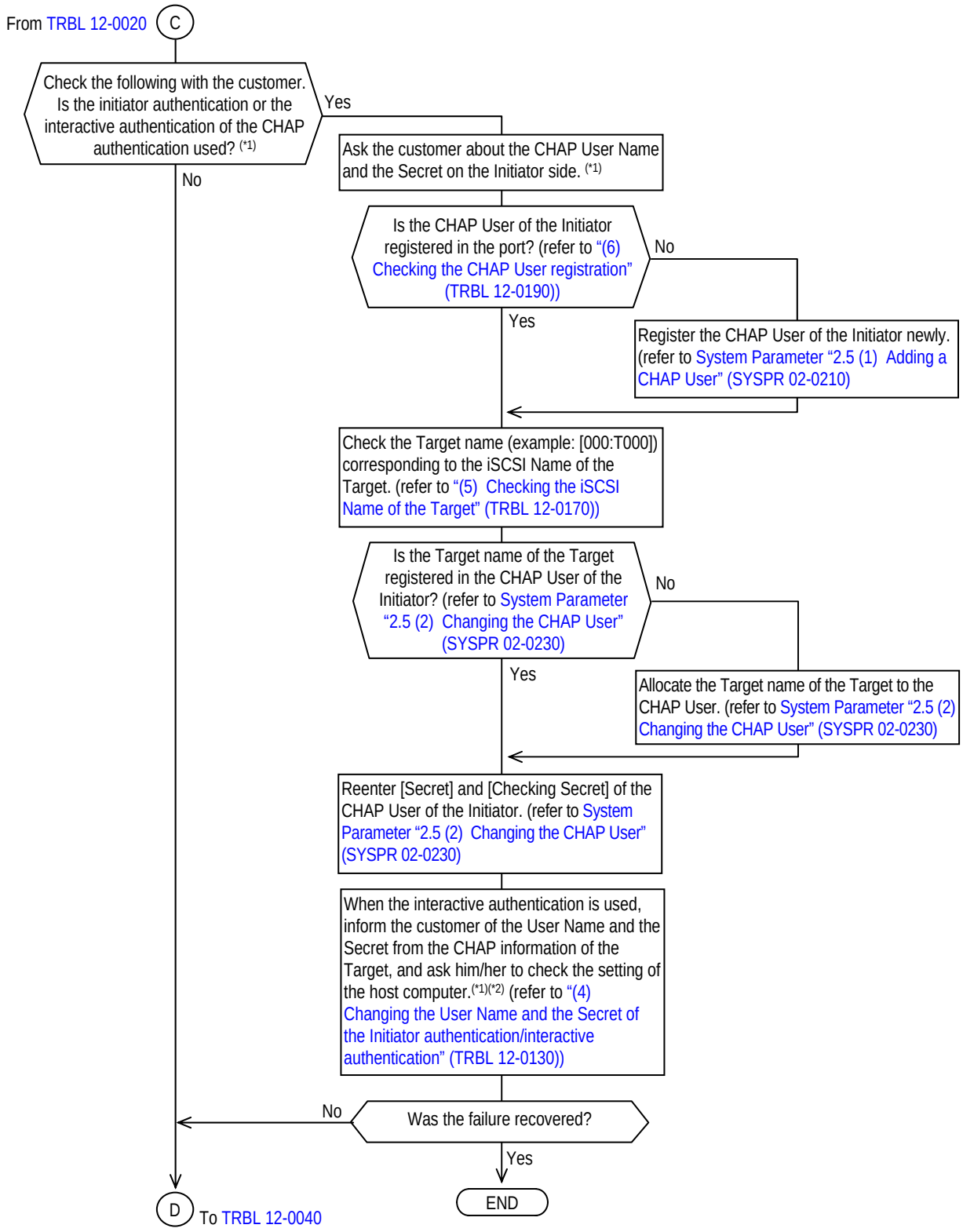


*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

*2 : Refer to System Parameter "4.2 (19) Sending Ping" (SYSPR 04-0370) for the confirmation method of the Ping.

*3 : The MTU value needs to be set as the same value for all the devices (host computer, Switch, disk array subsystem, etc.) in the LAN network environment. However, the DF700 cannot be set. (refer to System Parameter "4.2 (10) Setting of iSCSI" (SYSPR 04-0191).

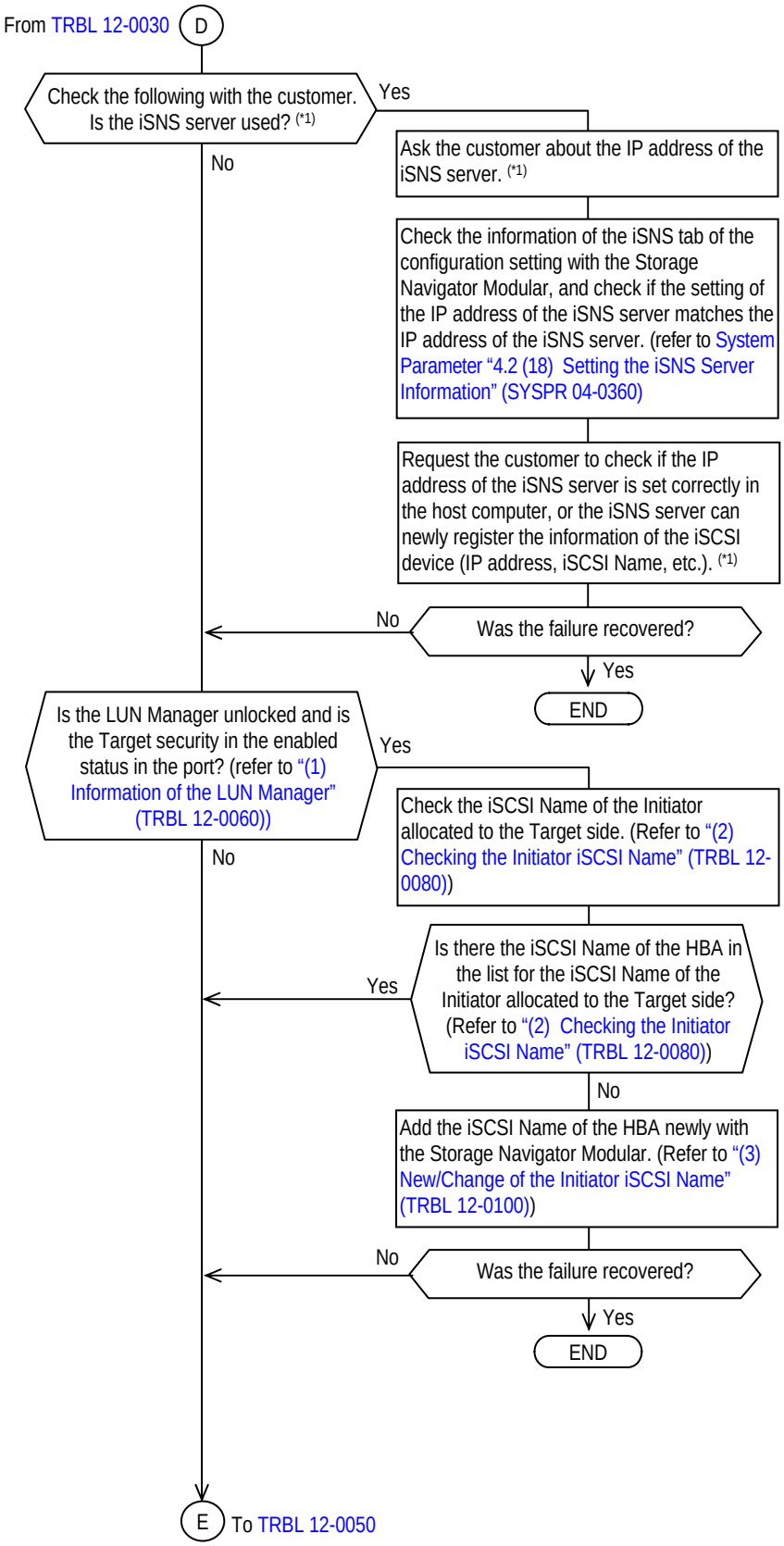
Copyright © 2005, Hitachi, Ltd.



*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

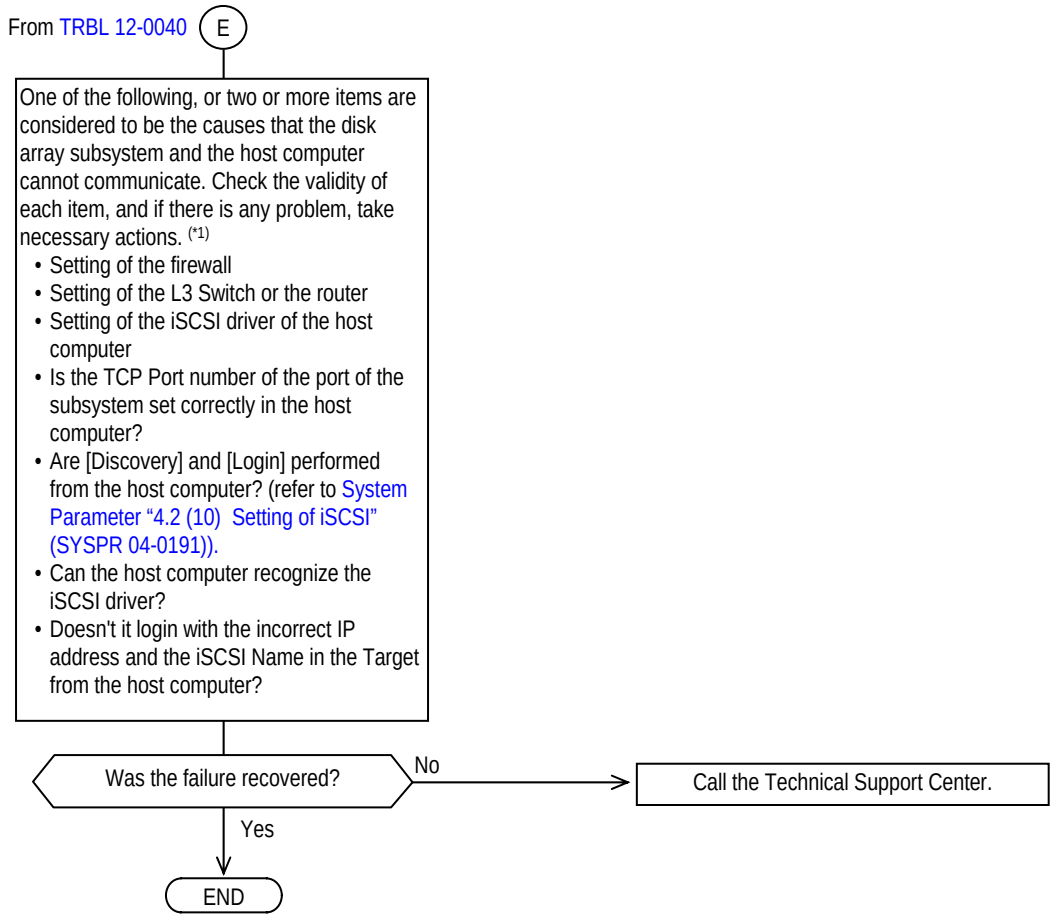
*2 : When the Microsoft iSCSI Software initiator is used, it is not necessary to check the User Name of the Target on the Initiator side.

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*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

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*1 : The setting of the network device becomes the work of which the system administrator or the network administrator takes charge.

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(1) Information of the LUN Manager

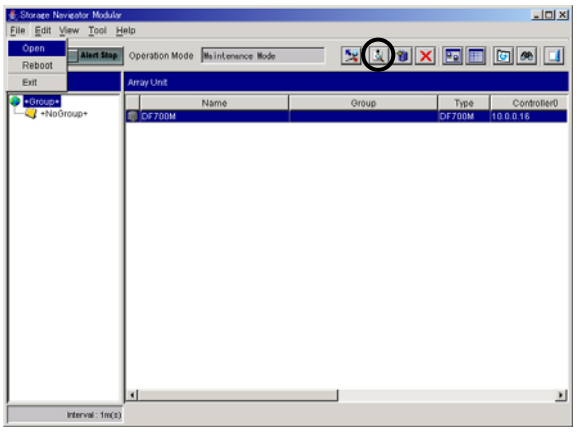
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

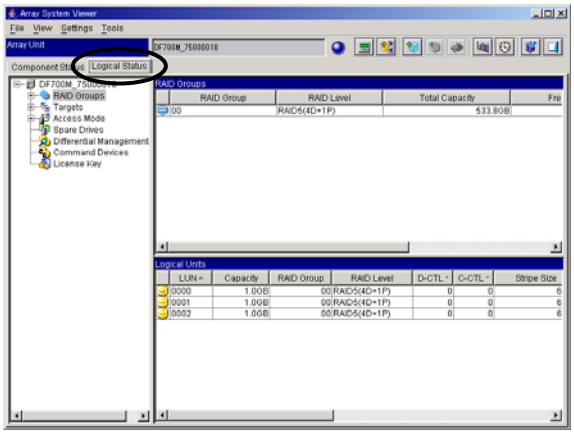
(c) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



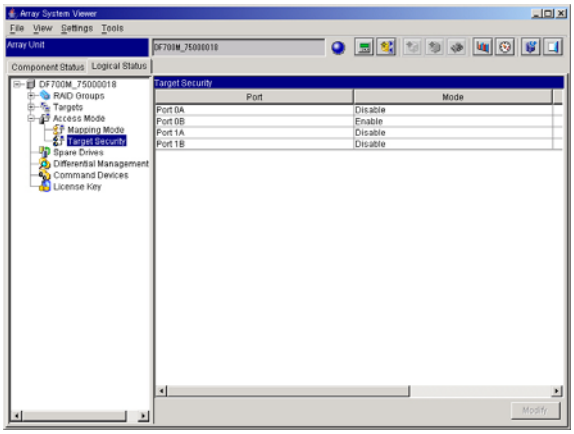
(d) On the unit window, click the [Logical Status] tab.



‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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(e) Double click [Access Mode] from the tree in the unit window, and select [Target Security]. If the mode of the Target security is enabled, the LUN Manager is unlocked and enabled.



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(2) Checking the Initiator iSCSI Name

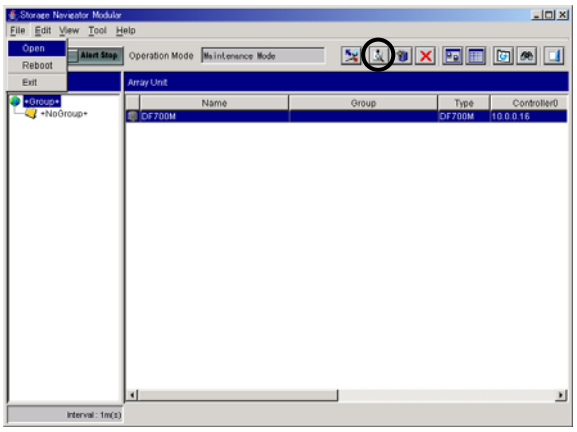
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

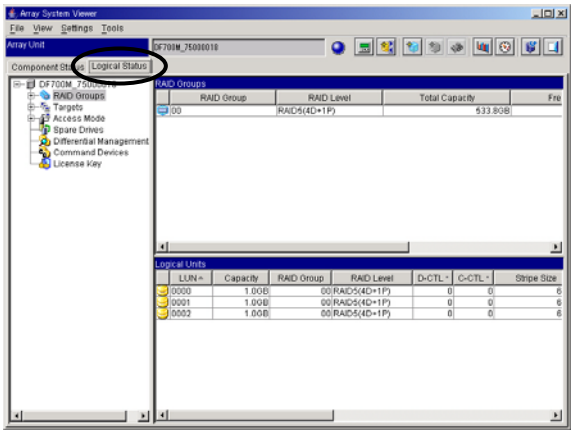
(c) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]



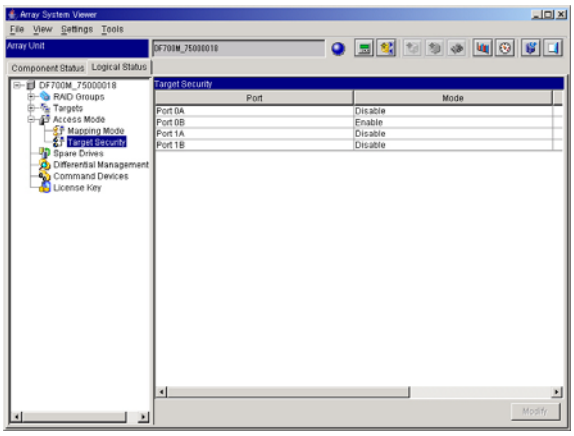
(d) On the unit window, click the [Logical Status] tab.



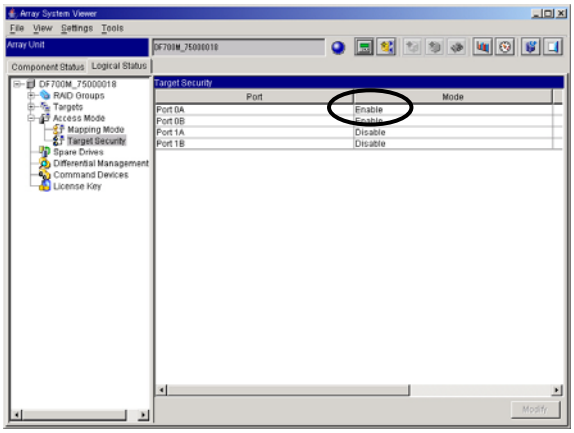
‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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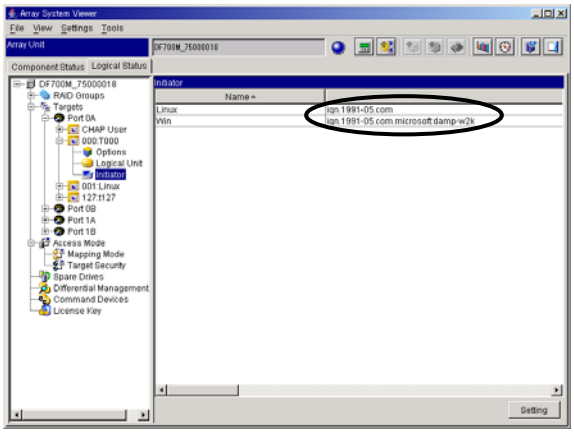
(e) Double click [Access Mode] from the tree in the unit window, and select [Target Security].



(f) Check that the target security of the specified port is [Enable].



(g) Double click [Targets] from the tree, and double click the port which enabled the target security. Click [000:T000], and select [Initiator].
Check the iSCSI Name.



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(3) New/Change of the Initiator iSCSI Name

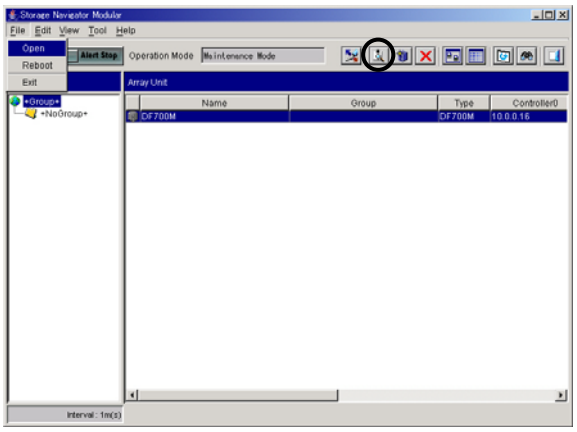
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

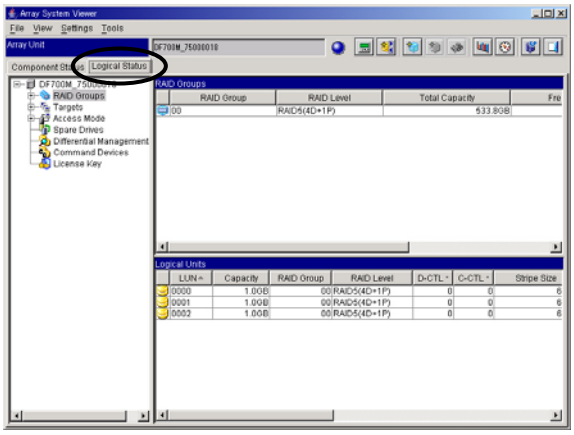
(c) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]



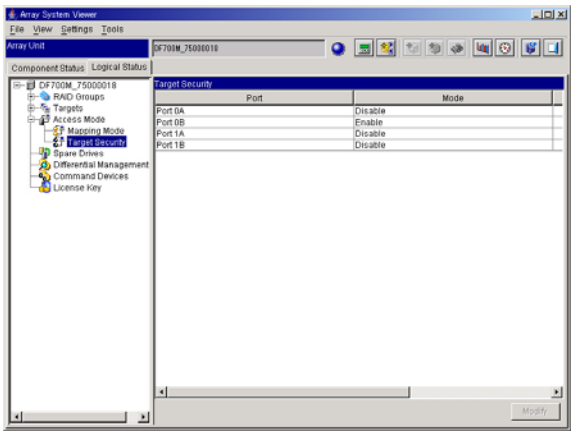
(d) On the unit window, click the [Logical Status] tab.



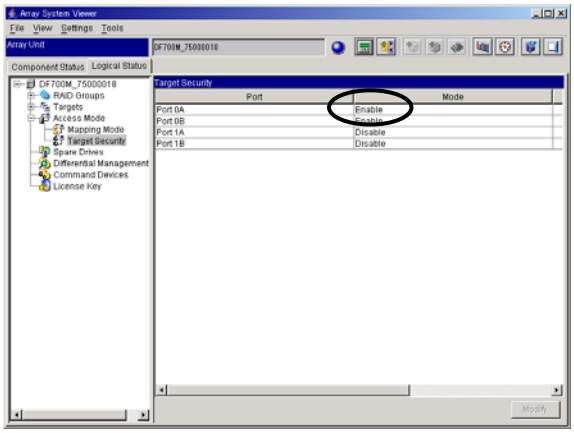
‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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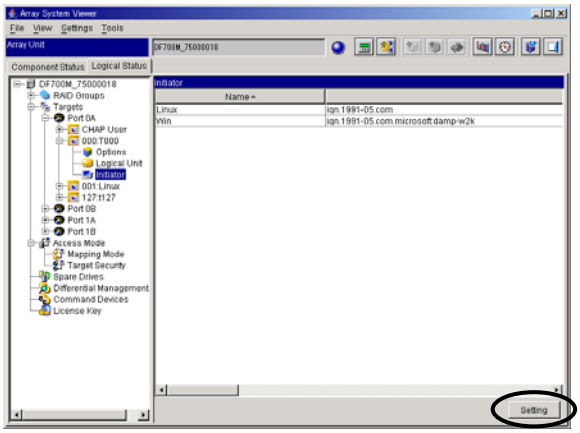
(e) Double click [Access Mode] from the tree in the unit window, and select [Target Security].



(f) Check that the target security of the specified port became [Enable].



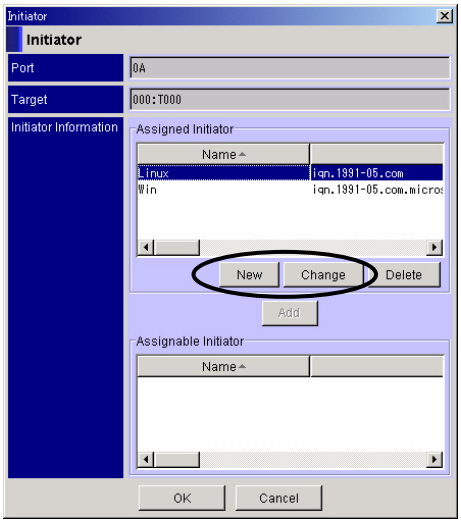
(g) Double click [Targets] from the tree, and double click the port which enabled the target security. Click [000:T000], and select [Initiator].



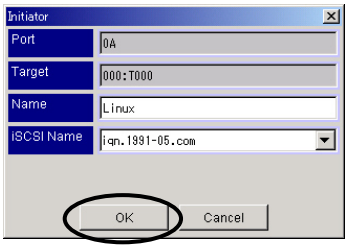
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(h) Click the [Set] button.

(i) Select the name to be changed, and click the [Change] button.
If it is new, click the [New] button.



(j) Enter [Name] and [iSCSI Name], and click the [OK] button.



① Name : Enter the name with the half size alphabetic characters and numerals within 32 characters (excluding \, /, :, ,, ;, *, ?, ", <, >, |, and '). The spaces at the top and the end are disregarded. The same name cannot be used in the same port.

② iSCSI Name : Enter the port name with the hexadecimal number of 16 digits

(k) Click the [OK] button in the Initiator dialog box.

(l) The confirmation message is displayed. Click the [OK] button.

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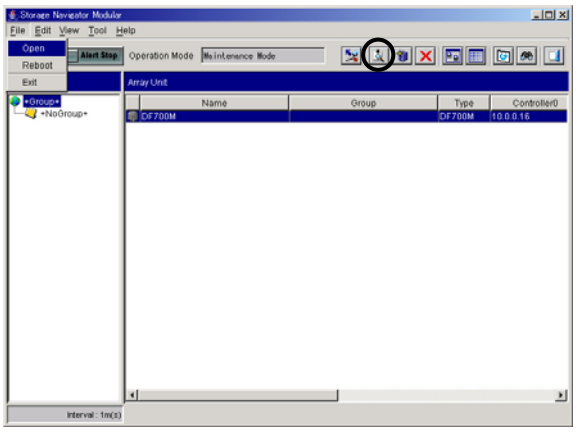
(4) Changing the User Name and the Secret of the Initiator authentication/interactive authentication

(a) Turn on the power supply.

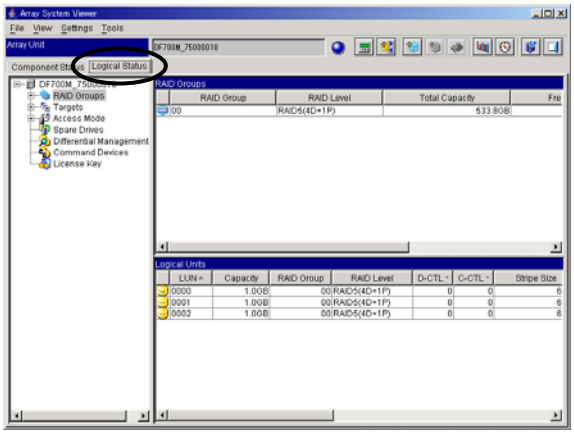
(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



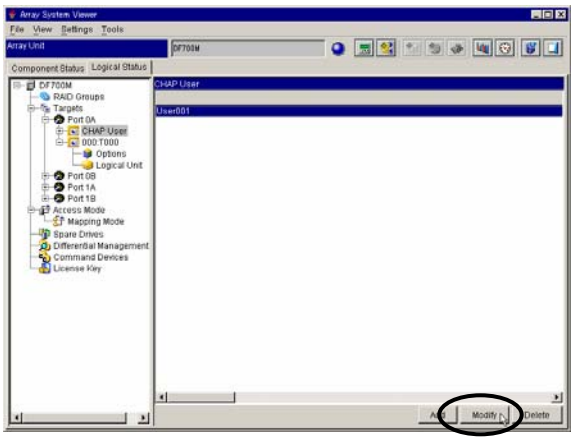
(d) On the unit window, click the [Logical Status] tab.



‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

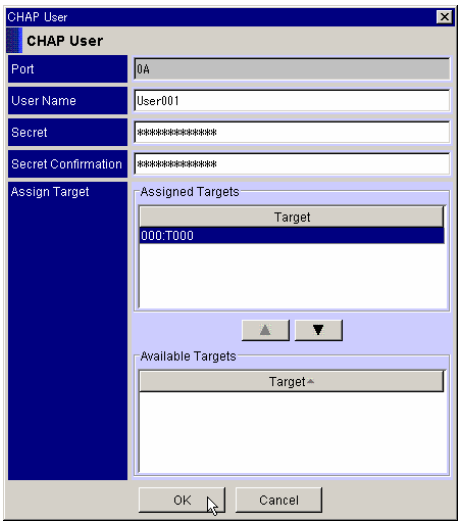
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(e) Double click the port which changes the CHAP User, and select [CHAP User].

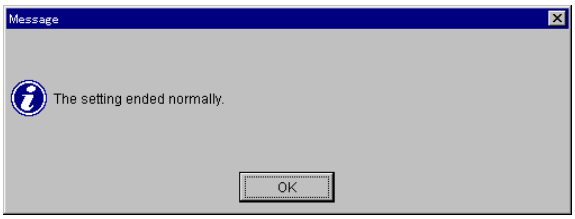


(f) Select [CHAP User] to be changed from the CHAP User list, and click the [Change] button. The CHAP User dialog is displayed.

(g) Enter "User Name" and "Secret" which are the same with those on the host computer side in [User Name], [Secret] and [Secret Confirmation] in the CHAP User dialog, and click the [OK] button.

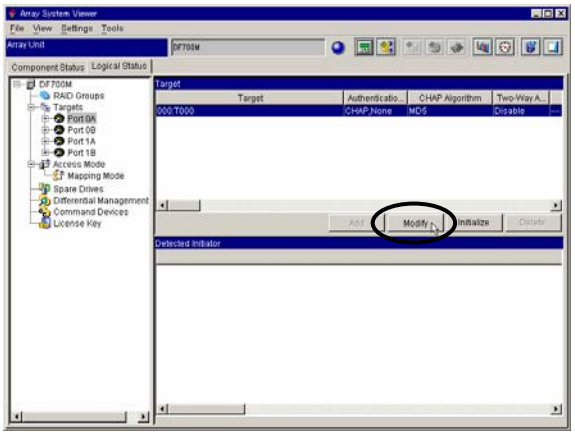


(h) The confirmation window is displayed. Click the [OK] button.

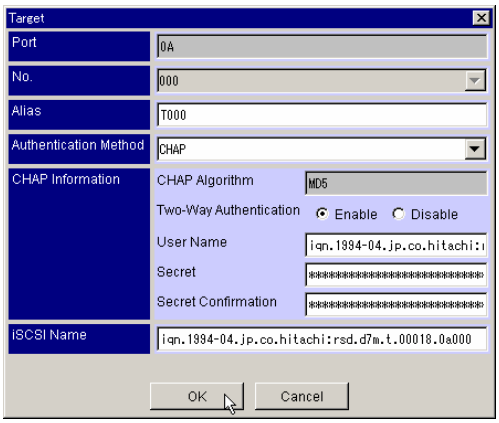


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(i) Select [000:T000] by double clicking the port which changes the information of the interactive authentication, and click the [Change] button.
The Target dialog is displayed.



(j) When the interactive authentication is [Enable], change “User Name” and “Secret” which are the same with those on the host computer to [User Name] and [Secret].



① User Name : Enter the User Name with the half size alphabetic characters and numerals within 256 characters.
The following signs can be used「.」,「-」,「+」,「@」,「_」,「=」,「:」,「/」,「「」、「」」,「~」, and space).

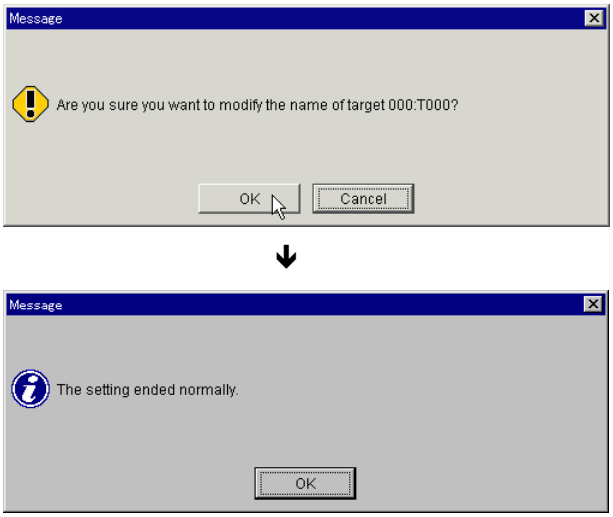
② Secret : Enter the half size alphabetic characters and numerals of 12 characters or more and within 32 characters in the Secret.
The following symbols can be used. (「.」,「-」,「+」,「@」,「_」,「=」,「:」,「/」,「「」、「」」,「~」, and space)

③ Secret Confirmation : Enter the characters entered in the Secret.

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(k) Click the [OK] button.

(l) The confirmation window is displayed. Click the [OK] button.



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(5) Checking the iSCSI Name of the Target

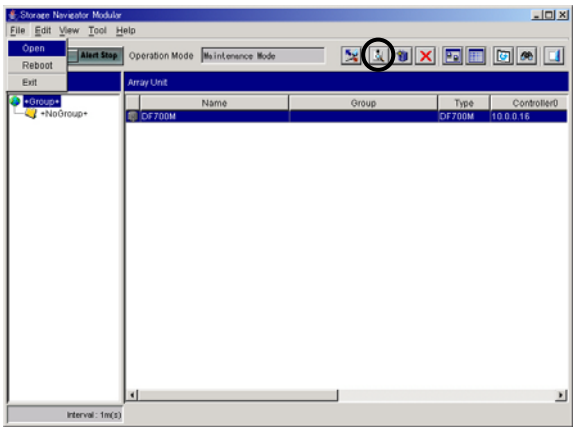
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

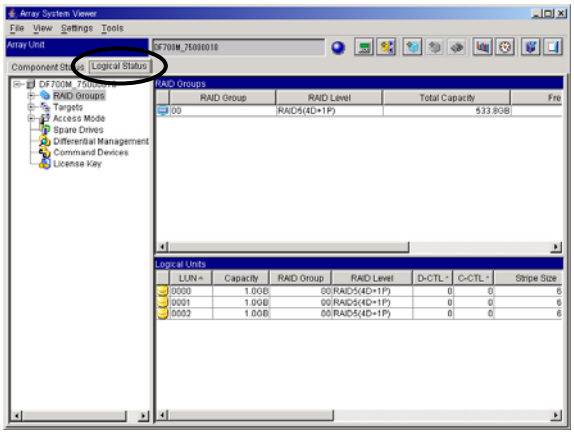
(c) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



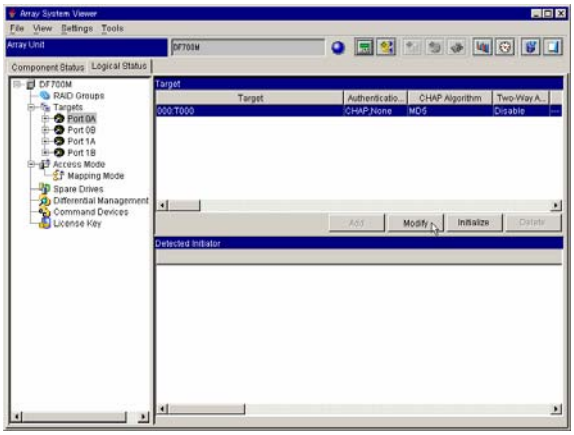
(d) On the unit window, click the [Logical Status] tab.



‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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(e) Double click [Targets] from the tree, and select the port.
Check the iSCSI Name of the Target.



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(6) Checking the CHAP User registration

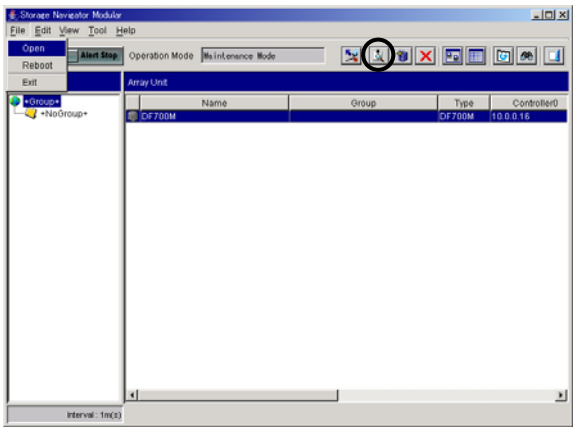
(a) Turn on the power supply.

(b) Start the Storage Navigator Modular and set the Active Mode in the "Maintenance Mode"(‡1).

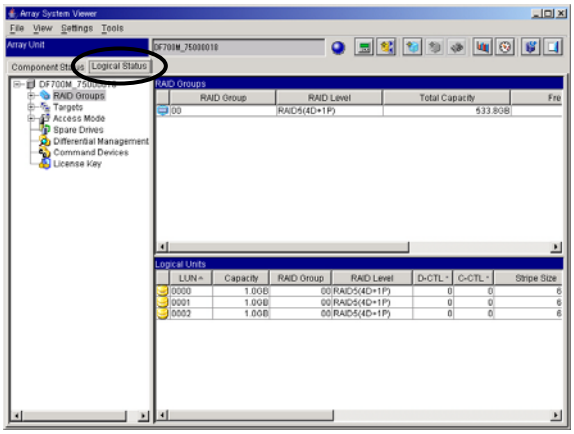
(c) Click an icon of the disk array subsystem you want to set in the main window.

There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



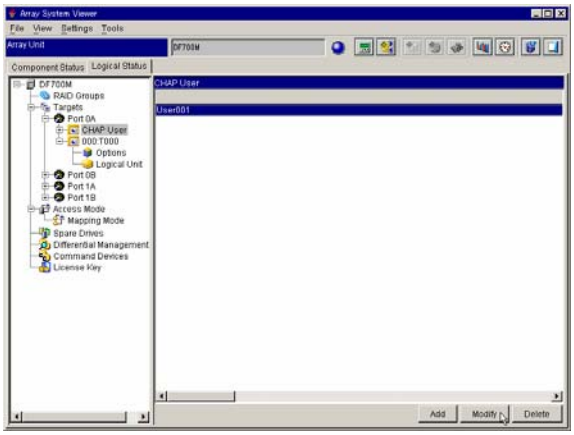
(d) On the unit window, click the [Logical Status] tab.



‡1 : For details of the setting method, refer to the System Parameter "1.1 (3) (b) Changing the Maintenance Mode" (SYSPR 01-0050).

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(e) Double click [Targets] from the tree, and double click the port.
Check that there is the list of the CHAP User by clicking [CHAP User].



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Chapter 13. Procedure for Determining Failure of Local Tape in NAS System

When a failure occurs between the NAS Unit and the Local tape, and between the NAS Unit and the Backup server, it is determined according to the following flow.
Check that the user setting is performed correctly on the Backup server before starting the determination.

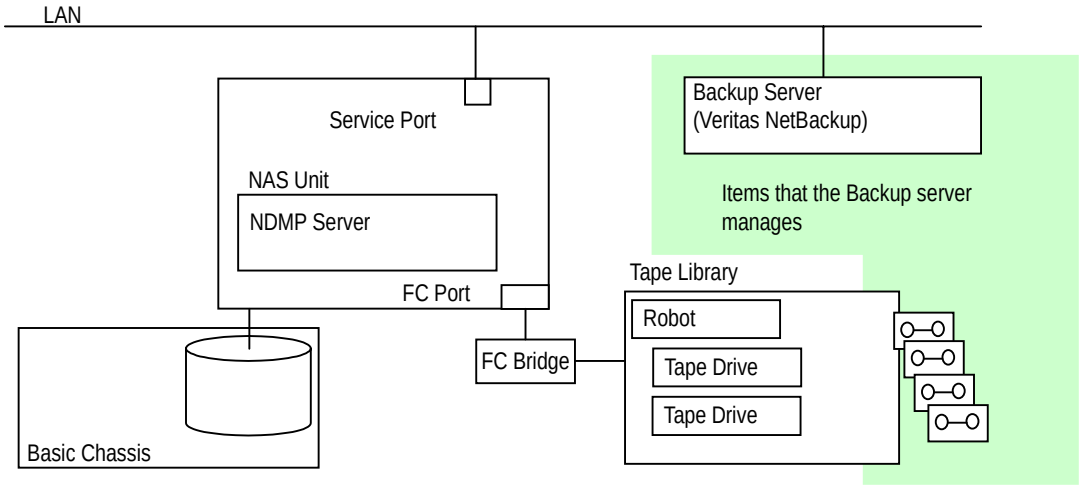
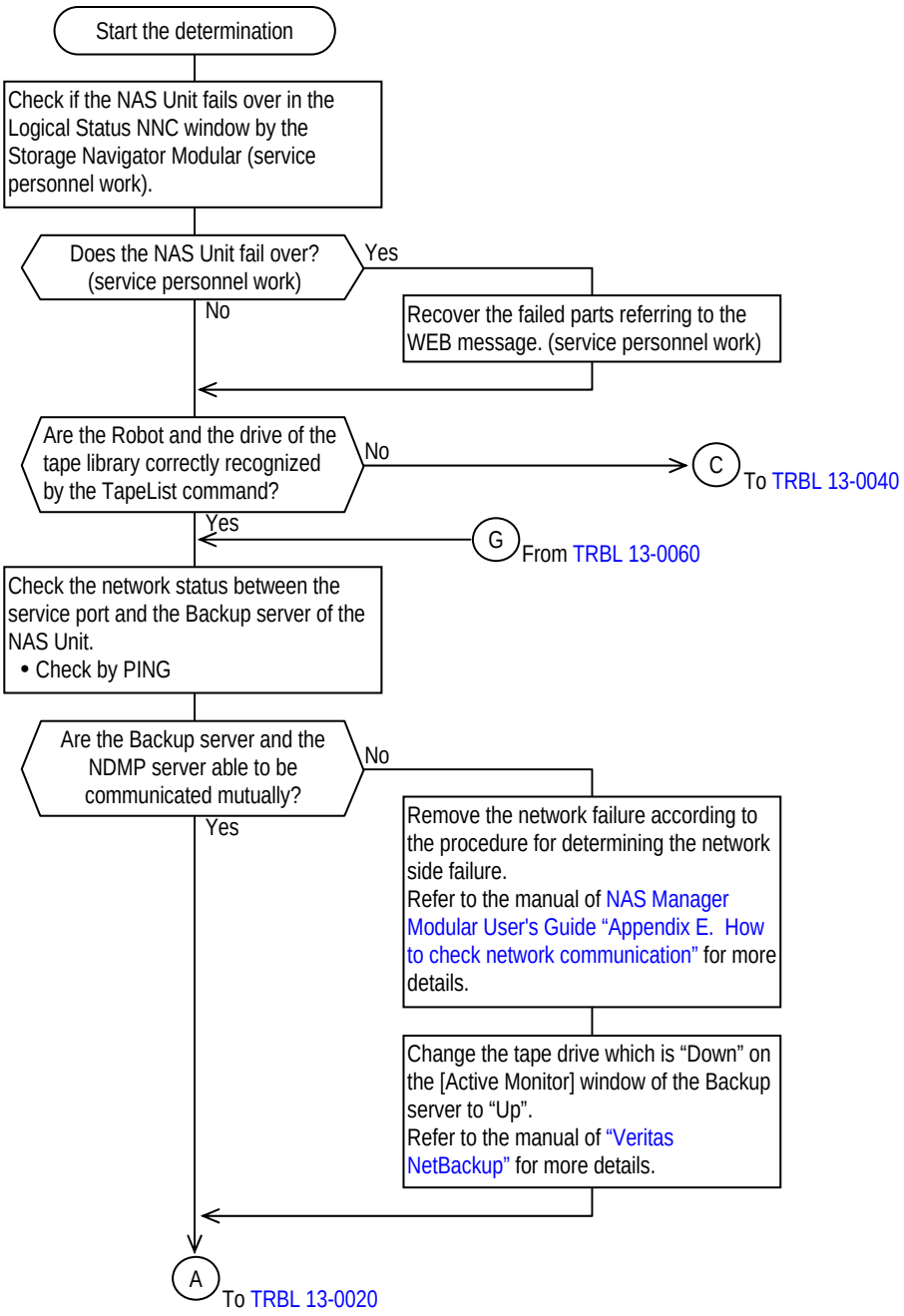


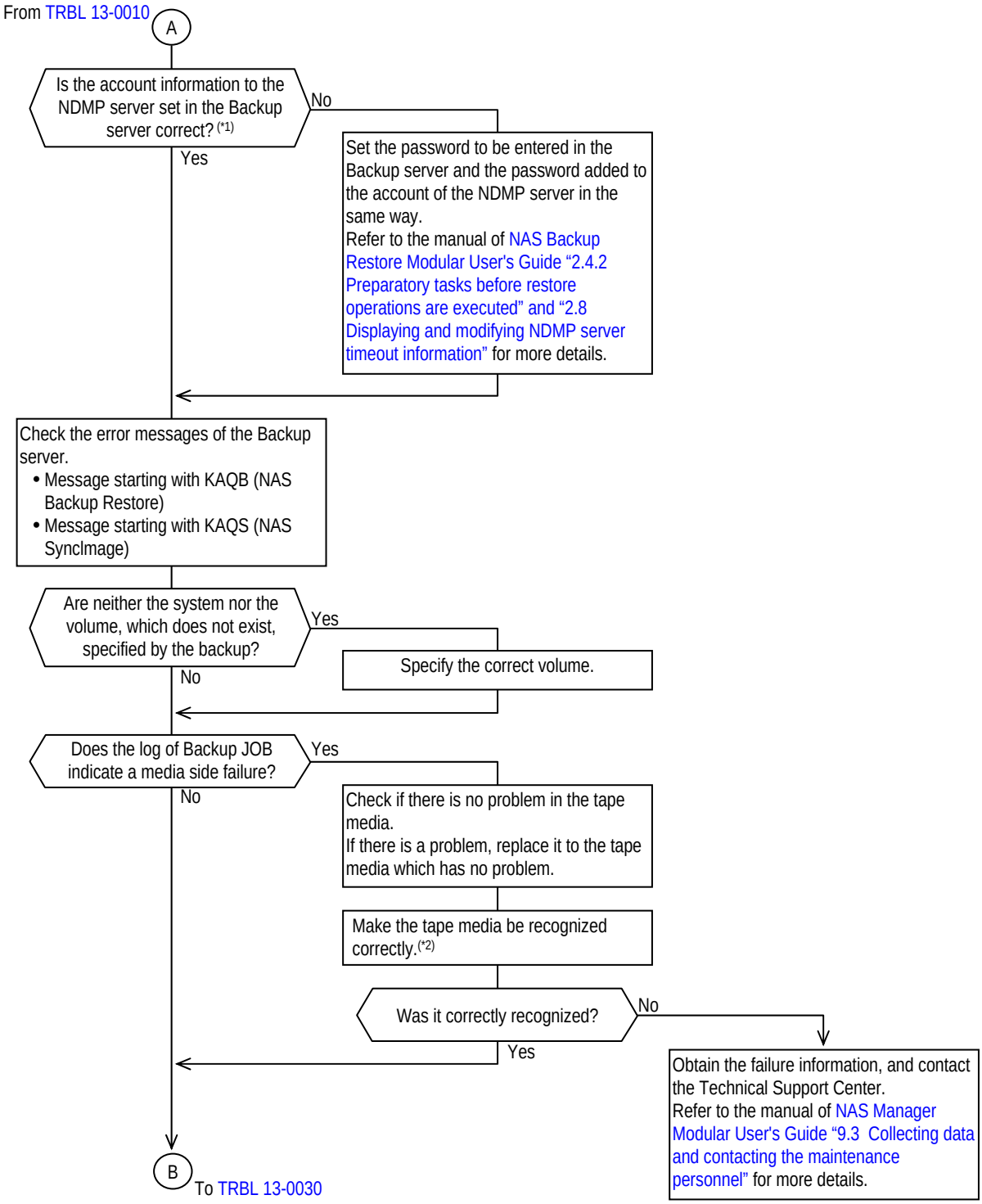
Figure 13.1.1 Configuration Diagram

Request a customer or an SE from the service personnel to check the following determination procedure and perform the work together. However, the service personnel must perform the parts described as “service personnel work” in the flow.

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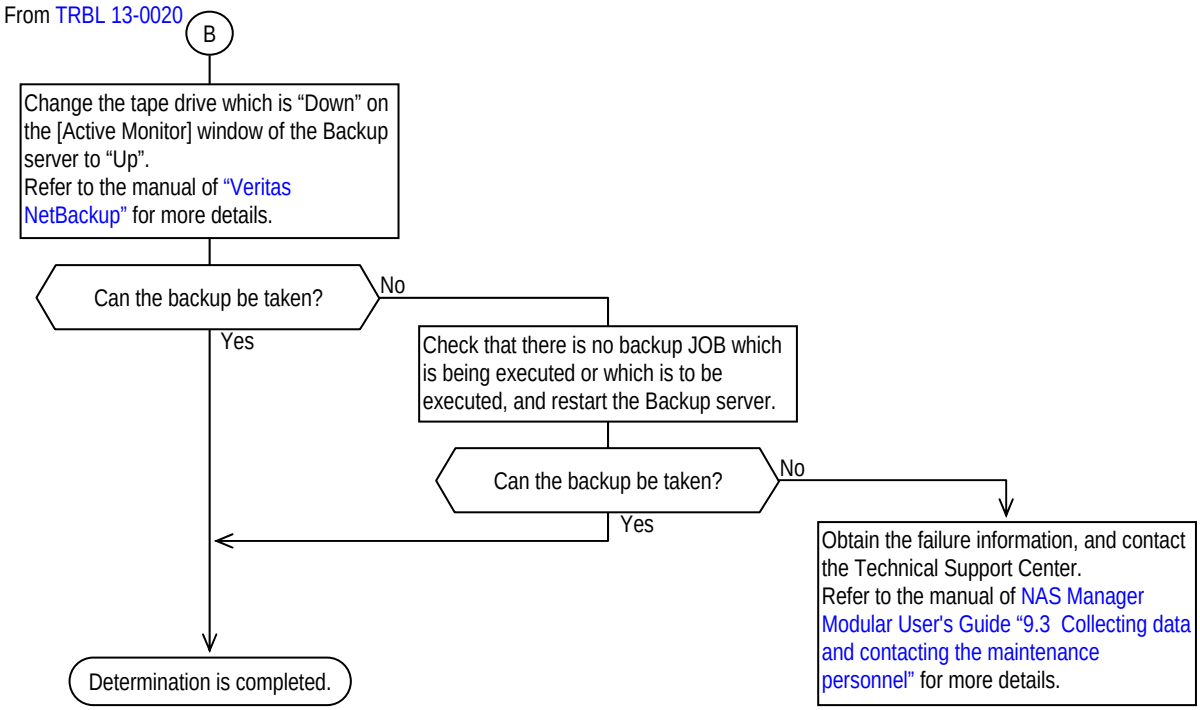
Copyright © 2006, Hitachi, Ltd.



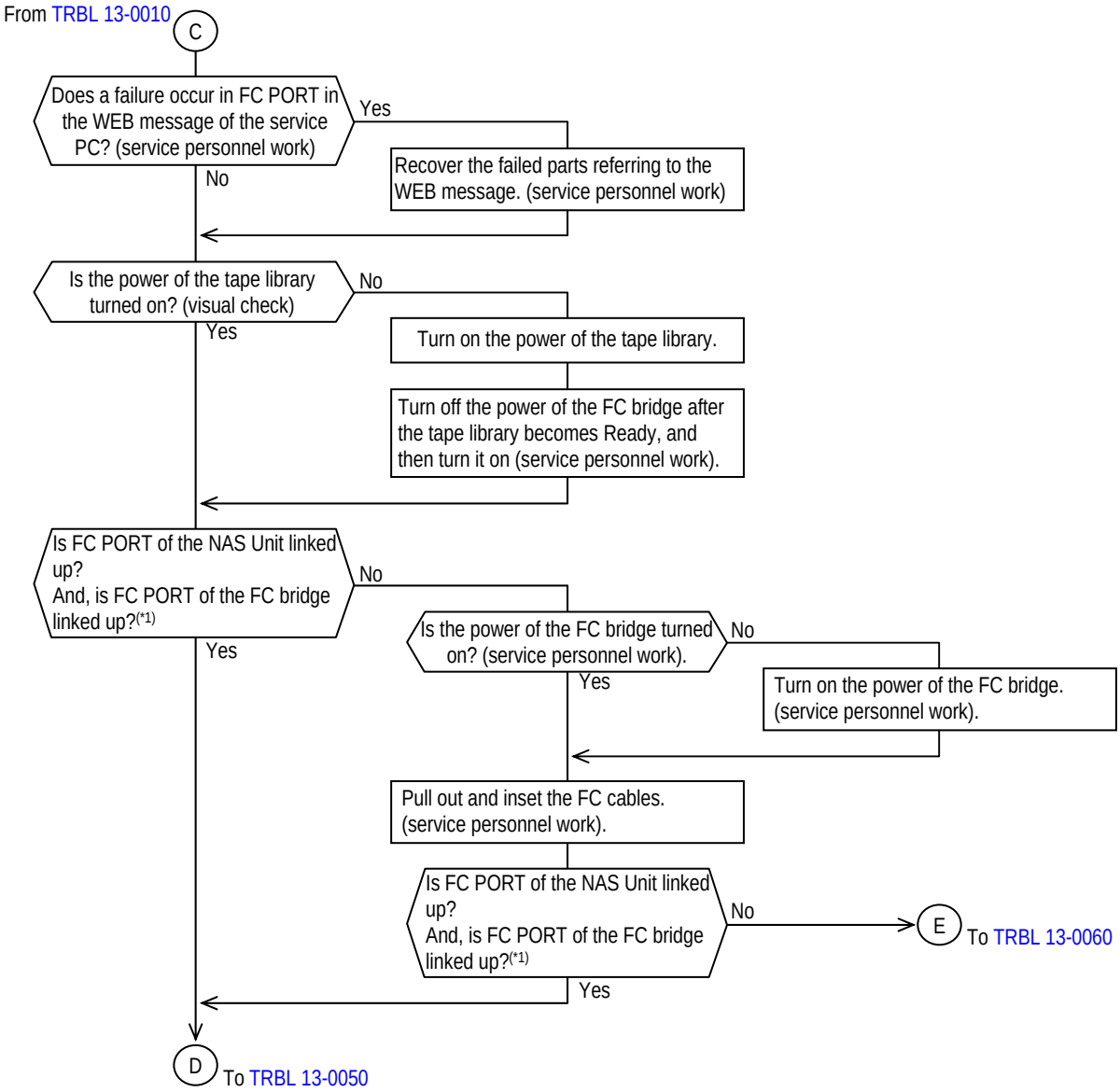
*1 : The account information is correct if "set_ndmp_attr-verify<NDMP server name>" is executed in the CLI operation of NetBackup and "Login was successful" is displayed.

*2 : Select [Update volume configuration] of [Robot Inventory] registered in the Backup server (Veritas NetBackup), and click the [Start] button.

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*1 : The conditions that the FC link is normal are (1) and (2) as shown below.

(1) The LED on FC PORT of the FC bridge lights up.

(2) FC PORT links up from the following (refer to the NAS Manager Modular User's Guide).

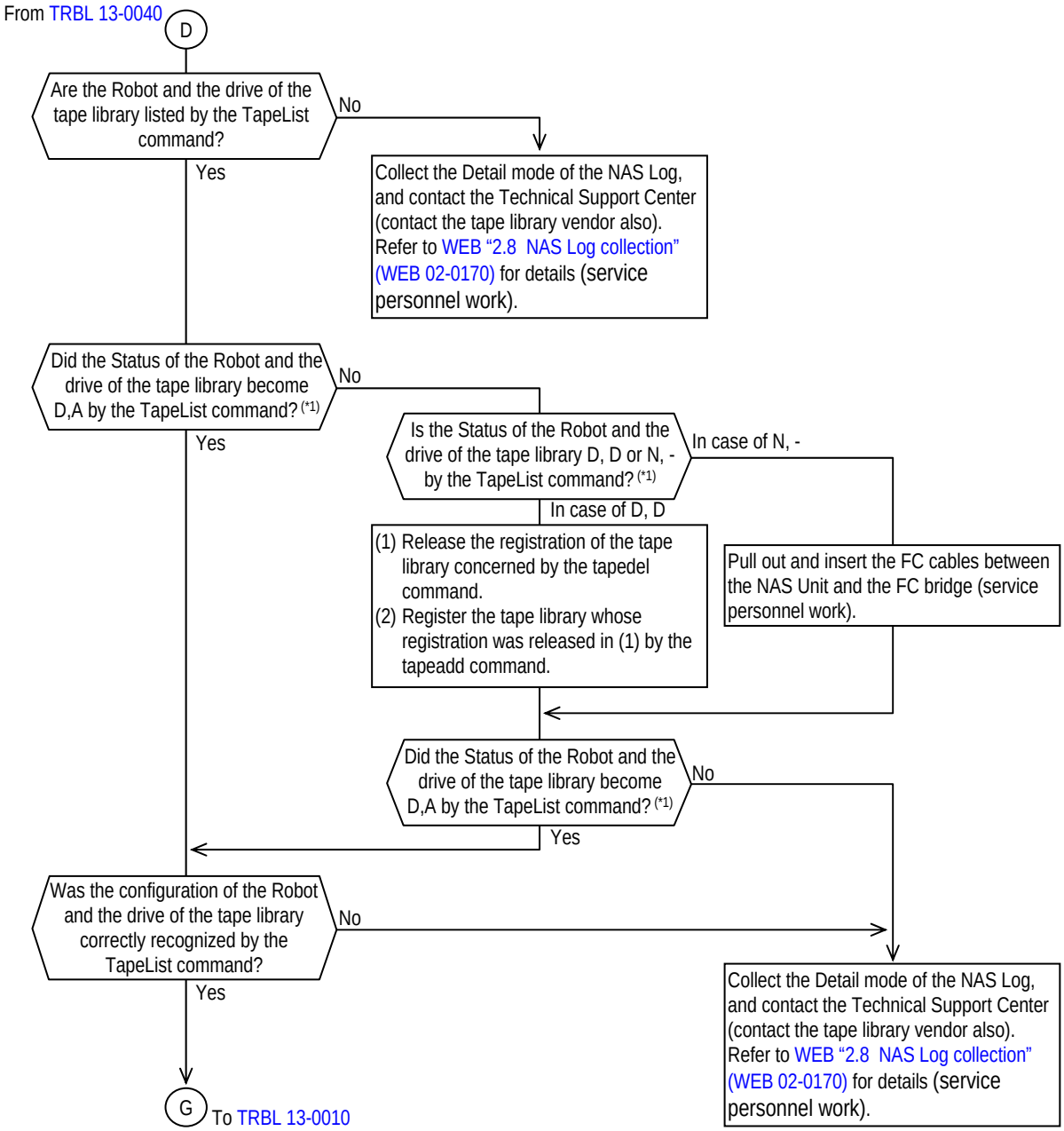
(a) "List of RAS Information (List of Message)" is displayed from [Main Menu] ⇒ [RAS Management]

(b) Check the most recent one whose "Message ID" is the following.

KAQG35060-I: Connection of the FC port linked up.

KAQG35061-W: Connection of the FC port linked down.

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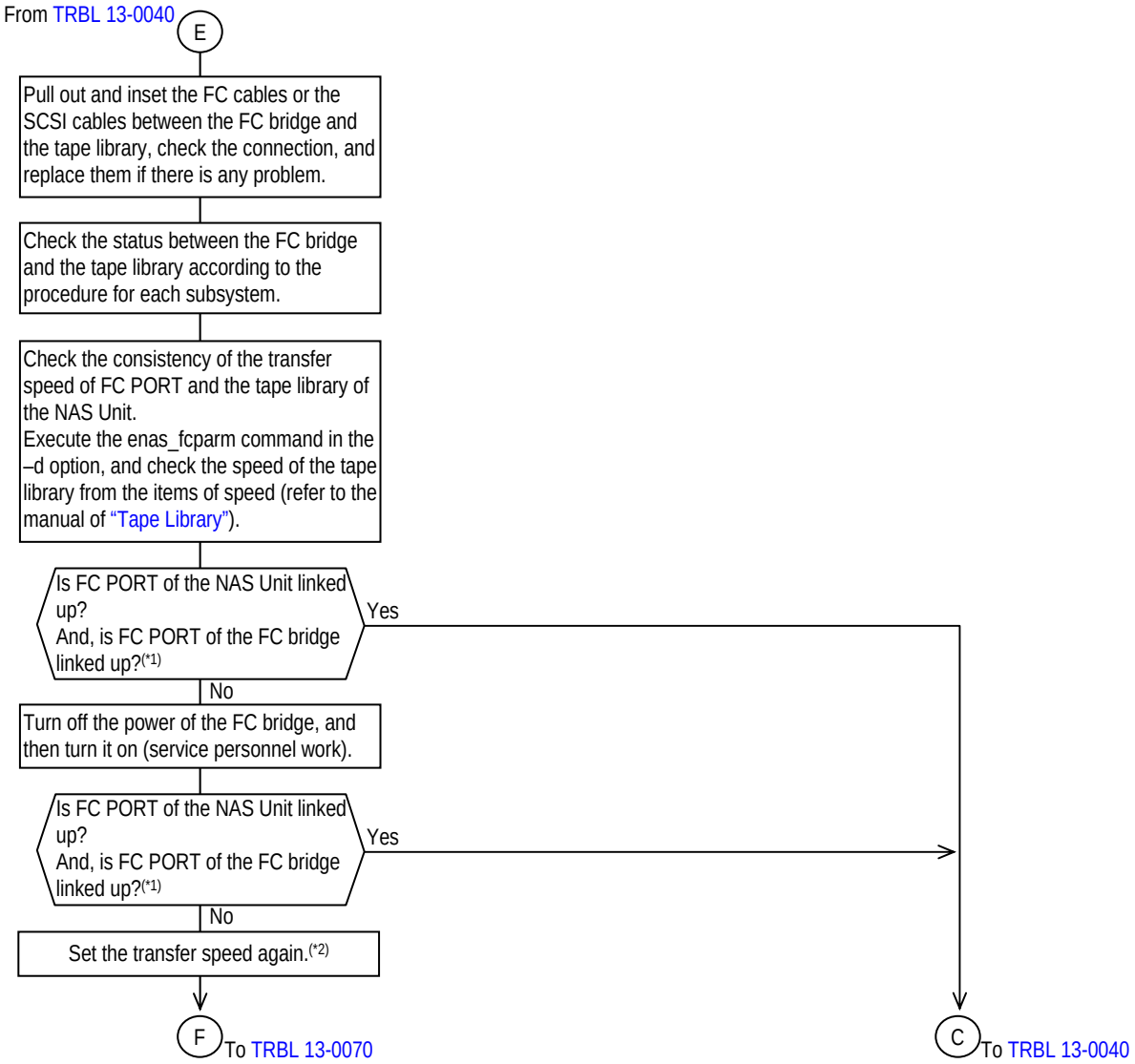


*1 : Check the "Status" part of the following list.

It is correct if each subsystem is visible and the Status becomes D,A.

```
nasroot@D710001515:~$ sudo tapelist
Mar 23 11:58:56 KAQB11500-I tapelist command execution has started.
Mar 23 11:58:56 KAQB12225-I The list of tape device information will now be displayed.
LUN Model          Type             Status Path
--------------------------------------------------------------------------------
  0 L40            Medium Changer   D,A    /dev/enas/100000e00202d78e/sg00
  1 Ultrium 2-SCSI Sequential-Access D,A   /dev/enas/100000e00202d78e/nst01
  2 Ultrium 2-SCSI Sequential-Access D,A   /dev/enas/100000e00202d78e/nst02
  3 Ultrium 2-SCSI Sequential-Access D,A   /dev/enas/100000e00202d78e/nst03
  4 Ultrium 2-SCSI Sequential-Access D,A   /dev/enas/100000e00202d78e/nst04
Mar 23 11:58:56 KAQB11501-I tapelist command has finished.
nasroot@D710001515:~$
```

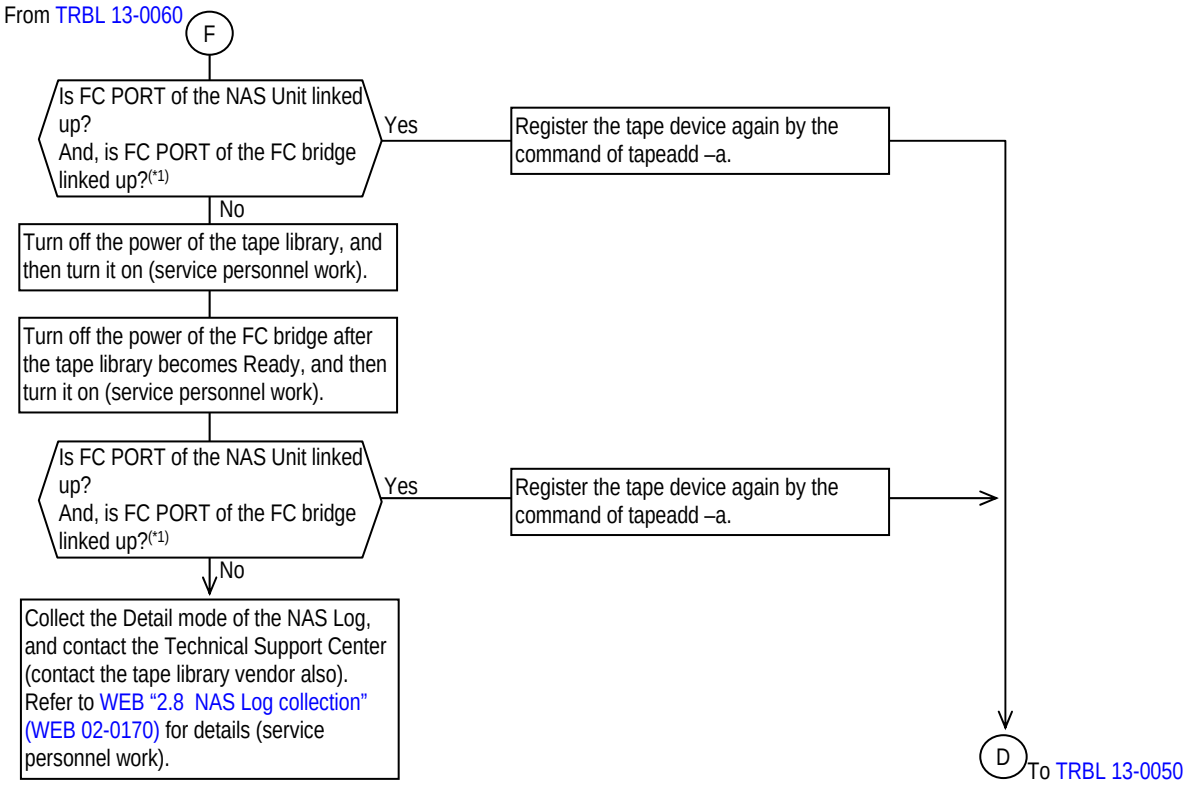
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*1 : The conditions that the FC link is normal are (1) and (2) as shown below.
(1) The LED on FC PORT of the FC bridge lights up.
(2) FC PORT links up from the following (refer to the NAS Manager Modular User's Guide).
(a) "List of RAS Information (List of Message)" is displayed from [Main Menu] ⇒ [RAS Management]
(b) Check the most recent one whose "Message ID" is the following.
KAQG35060-I: Connection of the FC port linked up.
KAQG35061-W: Connection of the FC port linked down.

*2 : Perform the input to the NAS Manager Modular by ssh.
(1) Delete all the registered tape drives by the tapedel command.
(2) Revise the speed setting of FC PORT to 2Gb/s by the enas_fcparm –s 2 command, and restart FC PORT.
When the speed of the tape is 1Gb/s in the above-mentioned, it is enas_fcparm –s 1.
(3) Check if the speed setting was reflected by the command of enas_fcparm -d.

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*1 : The conditions that the FC link is normal are (1) and (2) as shown below.

(1) The LED on FC PORT of the FC bridge lights up.

(2) FC PORT links up from the following (refer to the NAS Manager Modular User's Guide).

(a) "List of RAS Information (List of Message)" is displayed from [Main Menu] ⇒ [RAS Management]

(b) Check the most recent one whose "Message ID" is the following.

KAQG35060-I: Connection of the FC port linked up.

KAQG35061-W: Connection of the FC port linked down.

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Message

Chapter 1. Before Starting Trouble Analysis ..... MSG 01-0000
Chapter 2. CUDG Detected Messages ..... MSG 02-0000
Chapter 3. Failure Messages ..... MSG 03-0000
Chapter 4. Progress Message ..... MSG 04-0000
Chapter 5. Flash Detected Messages ..... MSG 05-0000
Chapter 6. Warning Messages ..... MSG 06-0000
Chapter 7. Web Error Messages ..... MSG 07-0000
Chapter 8. Storage Navigator Modular Error Messages ..... MSG 08-0000
Chapter 9. Failure Analysis by Sense Data ..... MSG 09-0000
Chapter 10. ACE Tool Error Message ..... MSG 10-0000
Chapter 11. List of the NAS BIOS POST Codes and the Subcodes ..... MSG 11-0000
Chapter 12. Failure Factor Codes of the Modular Volume Migration ..... MSG 12-0000

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Chapter 1. Before Starting Trouble Analysis

A message reports the contents of the failures detected during the operation.
The failures detected during operation after the main switch of this unit is turned on and the state of the unit are reported.
The failed part of the failure in the Fibre Channel of the drive interface is on the PATH or the Loop.

① The following messages are indicated.
- CUDG detected message ··· : 018××××× (“Chapter 2. CUDG Detected Messages” (MSG 02-0000))
- Failure messages ····· : H××××· (“Chapter 3. Failure Messages” (MSG 03-0000))
- Progress messages ····· : I××××· (“Chapter 4. Progress Message” (MSG 04-0000))
- Flash detected messages··· : R××××· (“Chapter 5. Flash Detected Messages” (MSG 05-0000))
- Warning messages····· : W××××· (“Chapter 6. Warning Messages” (MSG 06-0000))
- WEB messages ····· : (“Chapter 7. Web Error Messages” (MSG 07-0000))
- Storage Navigator Modular messages : (“Chapter 8.Storage Navigator Modular Error Messages” (MSG 08-0000))
- Sense Data····· : (“Chapter 9.Failure Analysis by Sense Data” (MSG 09-0000))
- ACE Tool Error Message ···· : (“Chapter 10. ACE Tool Error Message” (MSG 10-0000))

② Message text : Message text is indicated.

③ Description : Contents of failure are described concretely.

④ Collection of errors

	Collect the error	
	Simple Trace	

Simple trace · : Collect Simple Trace (Troubleshooting “7.3 Collecting simple trace” (TRBL 07-0040))

CTL Trace ···· : Collect CTL Alarm Trace (Troubleshooting “7.4 Collecting CTL Alarm Trace” (TRBL 07-0080))

Full Dump····· : Collect Full Dump (Troubleshooting “7.5 Collecting Full Dump” (TRBL 07-0130))

NAS Log ····· : Collect NAS Log (Troubleshooting “7.6 NAS Log collection” (TRBL 07-0230))

NAS Dump ···· : Collect NAS Dump (Troubleshooting “7.7 NAS Dump collection” (TRBL 07-0280))

Space····· : Does not need to be collected.

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⑤ Recovery methods ‥ : How to recover from failure is indicated.
①,②… ･: Recovery method number.
When "-" is written here, no recovery operation is required.
When another message other than this message is displayed, execute that trouble analysis also.
Because the status where the array subsystem is being started is in the middle of the transition to the status of the subsystem power turned on (Ready status) from the status of the subsystem power turned off, do not perform the recovery work which affects the operation of the array subsystem while the array subsystem is being started.
Also, the setting function or the reference function using the Storage Navigator Modular cannot be executed to the array subsystem which is being started.

⑥ Reference page‥ : No. of page in which the recovery methods are described.

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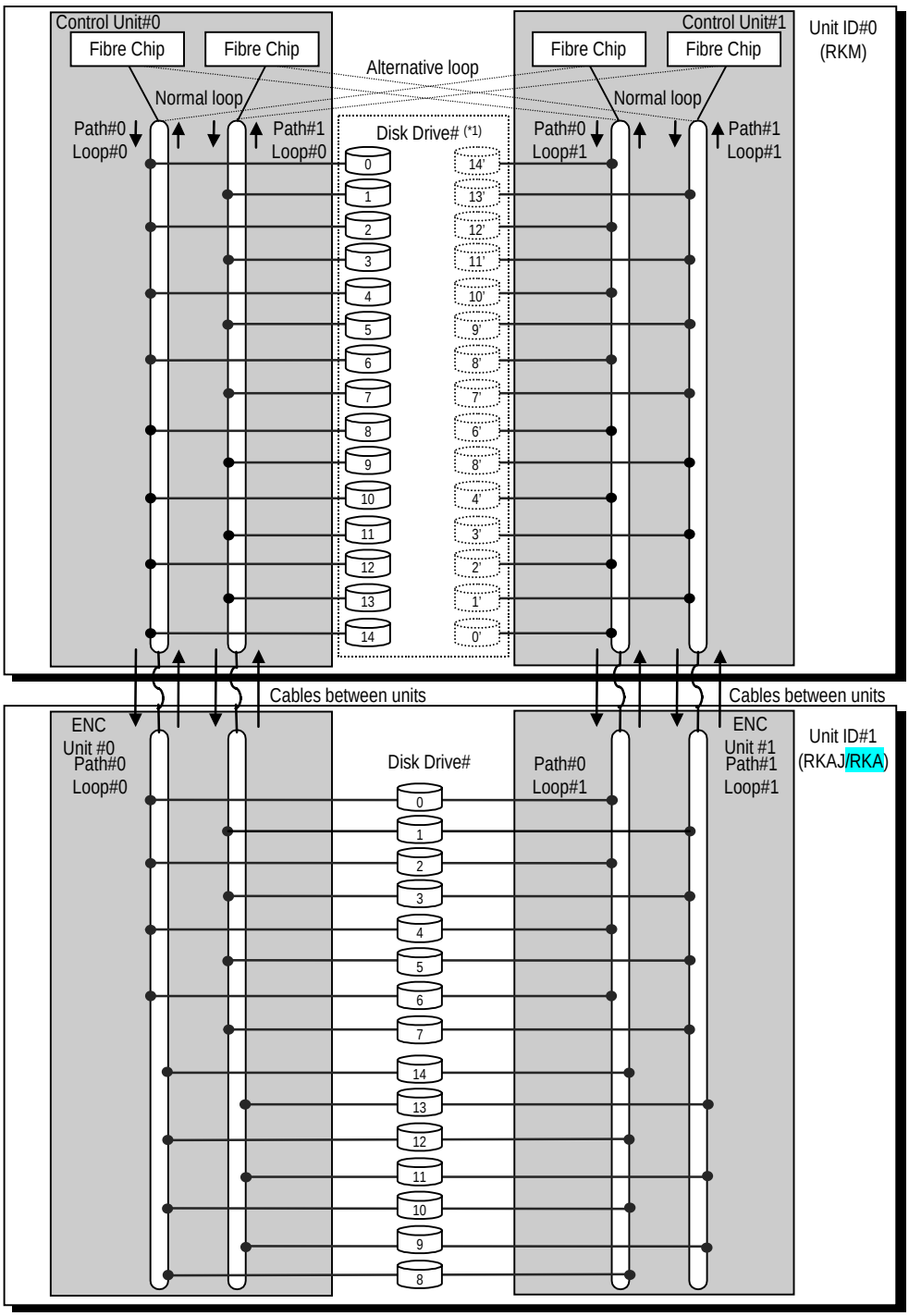
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1.1 Failed parts of the internal Fibre Channel

The failed parts of the internal Fibre Channel of DF700 are classified into the path and loop. The respective configurations of these items are shown below.

- In the case of RKM/RKAJ (or RKA)



*1: The Disk Drive #0 and the Disk Drive #0' is the same Disk Drive (the Disk Drive #1 to #14 and the Disk Drive #1' to #14' are also the same).

*2: The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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RKM (RKM + RKAJ) has four loops at the back end, which have the following names.

- Path#0, Loop#0
- Path#1, Loop#0
- Path#0, Loop#1
- Path#1, Loop#1

The paths and loops have the following meanings.

Path

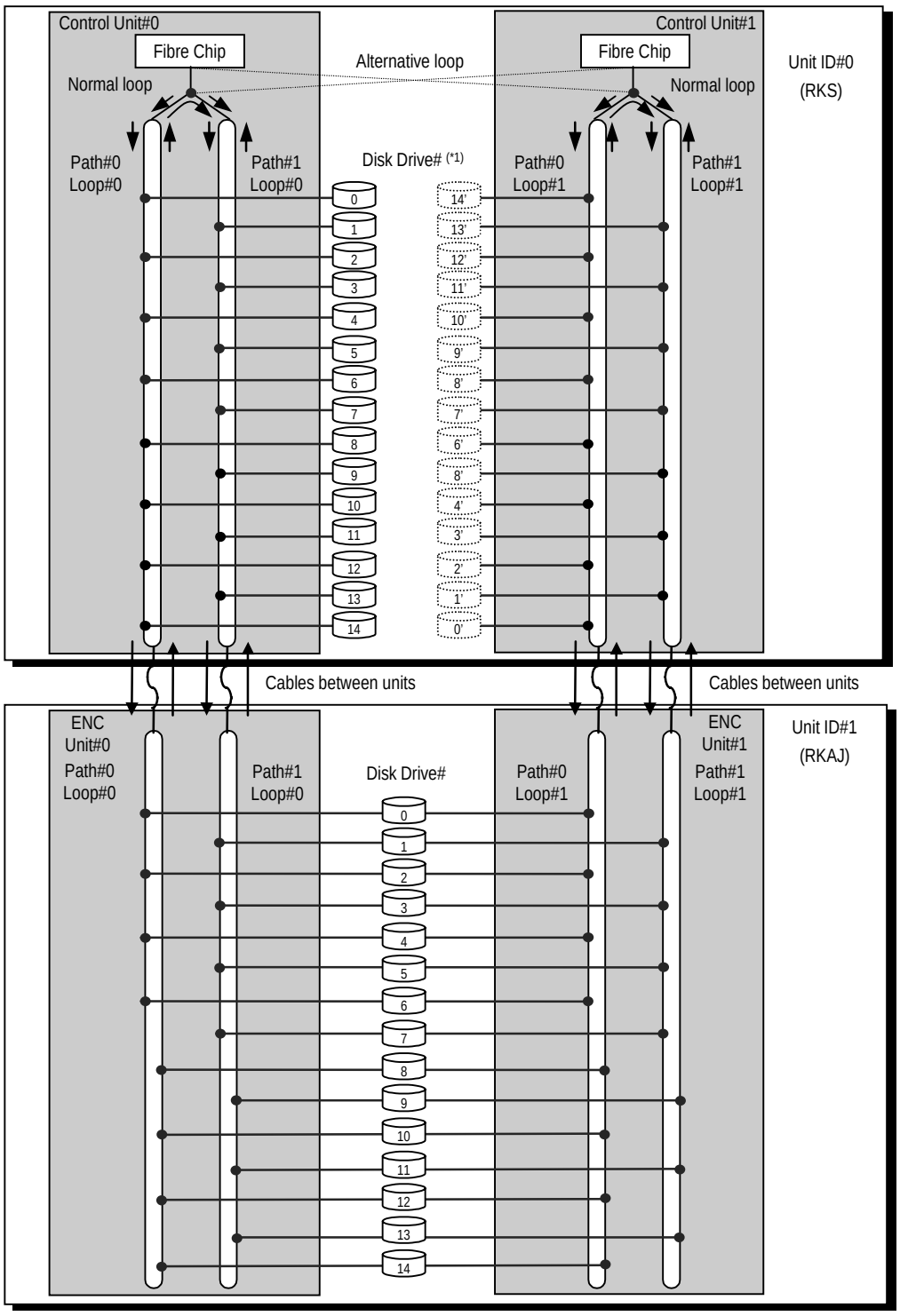
Path	Meaning
Path#0	2 Fibre lines connected to Disk Drive of even number
Path#1	2 Fibre lines connected to Disk Drive of odd number

Loop

Loop	Meaning
Loop#0	2 Fibre lines on Control Unit #0 and ENC Unit #0
Loop#1	2 Fibre lines on Control Unit #1 and ENC Unit #1

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- In the case of RKS/RKAJ



*1: The Disk Drive #0 and the Disk Drive #0' is the same Disk Drive (the Disk Drive #1 to #14 and the Disk Drive #1' to #14' are also the same).

*2: The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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RKS (RKS + RKAJ) has two loops at the back end, which have the following names.

- Path#0, Loop#0
- Path#1, Loop#0
- Path#0, Loop#1
- Path#1, Loop#1

The paths and loops have the following meanings.

Path

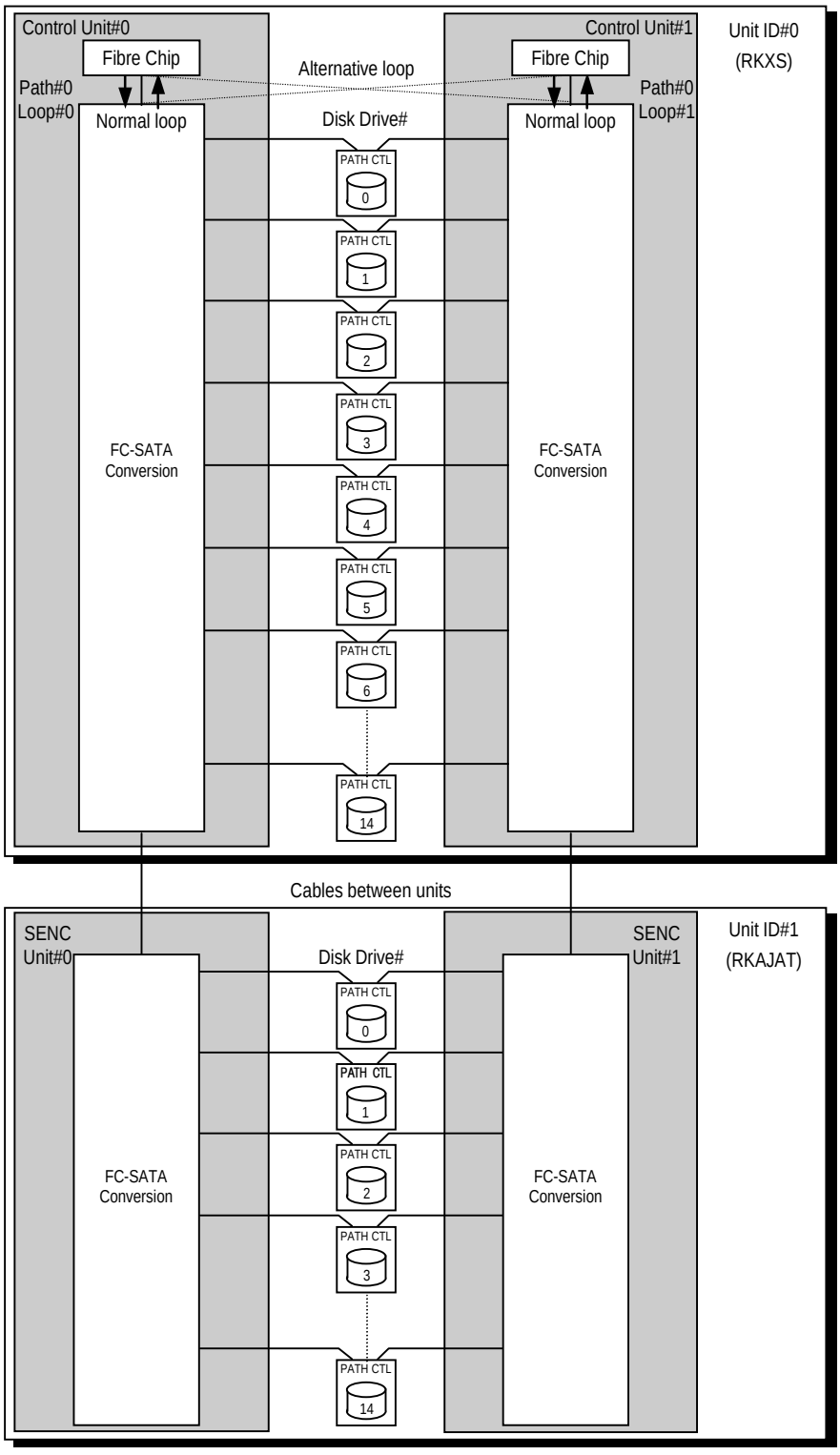
Path	Meaning
Path#0	2 Fibre lines connected to Disk Drive of even number
Path#1	2 Fibre lines connected to Disk Drive of odd number

Loop

Loop	Meaning
Loop#0	2 Fibre lines on Control Unit #0
Loop#1	2 Fibre lines on Control Unit #1

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- In the case of RKXS/RKAJAT



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RKXS (RKXS + RKAJAT) or RKAJAT has two loops at the back end, which have the following names.

- Path# 0, Loop#0
- Path# 0, Loop#1

The paths and loops have the following meanings.

Path

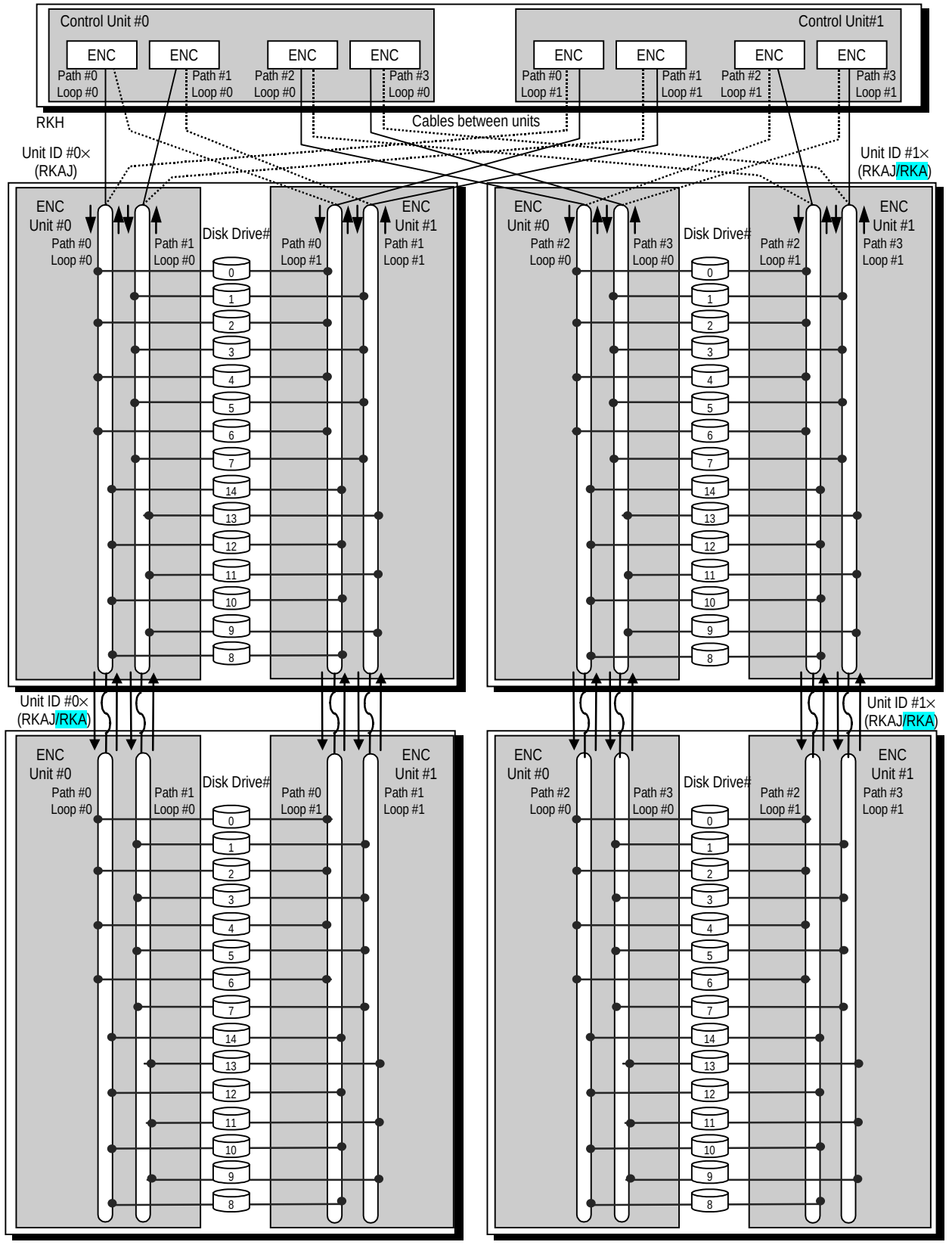
Path	Meaning
Path# 0	A Fibre line connected to the FC-SATA converter

Loop

Loop	Meaning
Loop# 0	A Fibre line on the Control Unit #0 and SENC Unit #0 (through which the FC-SATA converter is connected to the Fibre line)
Loop# 1	A Fibre line on the Control Unit #1 and SENC Unit #1 (through which the FC-SATA converter is connected to the Fibre line)

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- In the case of RKH/RKAJ (or RKA)



*1: The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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RKAJ, RKAJAT has two loops at the back end, which have the following names.

- Path#0, Loop#0
- Path#1, Loop#0
- Path#2, Loop#0
- Path#3, Loop#0
- Path#0, Loop#1
- Path#1, Loop#1
- Path#2, Loop#1
- Path#3, Loop#1

The paths and loops have the following meanings.

Path

Path	Meaning
Path#0	Two Fibre lines connected to Disk Drives with even numbers on the device ID #0x side
Path#1	Two Fibre lines connected to Disk Drives with odd numbers on the device ID #0x side
Path#2	Two Fibre lines connected to Disk Drives with even numbers on the device ID #1x side
Path#3	Two Fibre lines connected to Disk Drives with odd numbers on the device ID #1x side

Loop

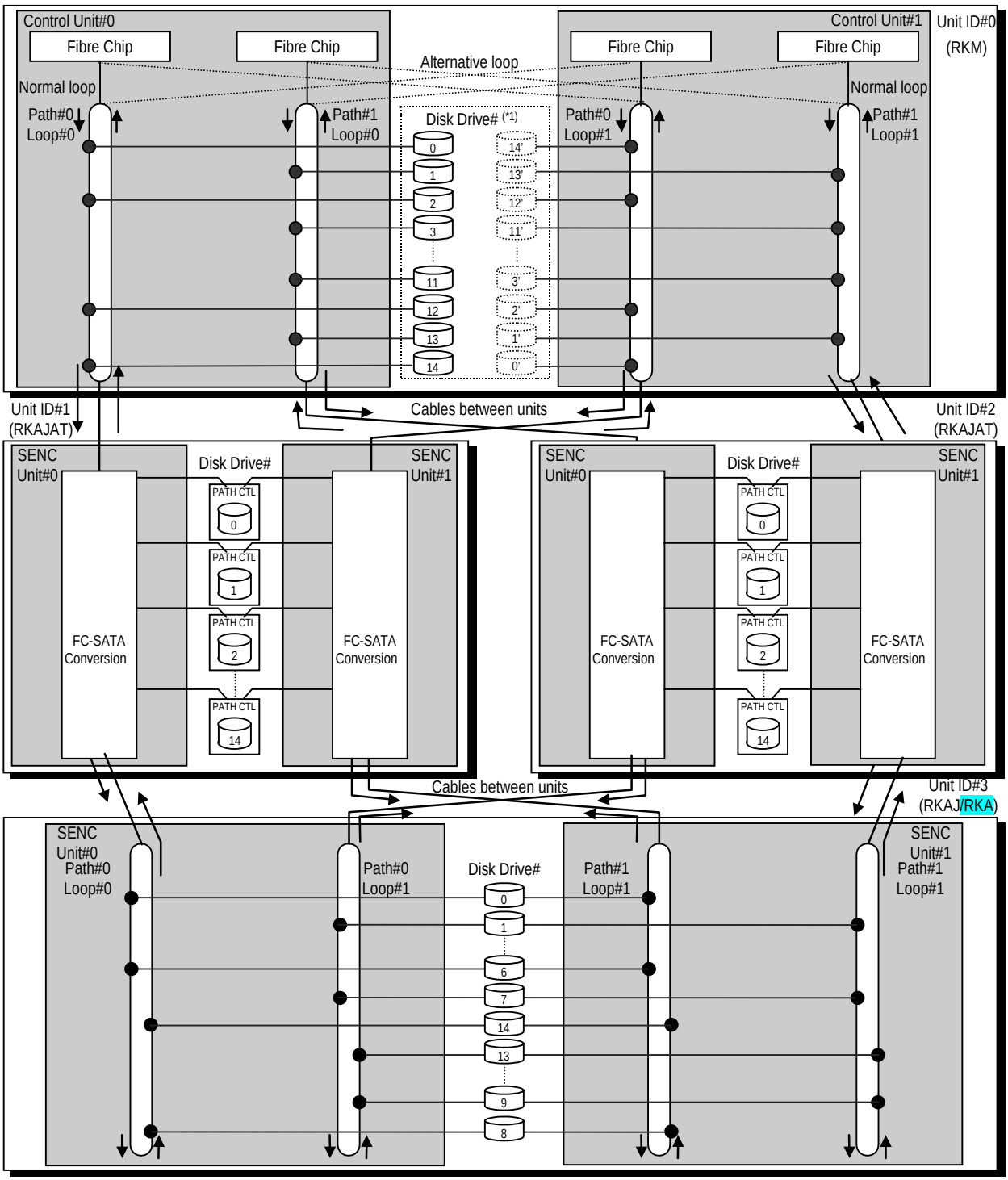
Loop	Meaning
Loop#0	Four Fibre lines on the Control Unit #0, ENC Unit #0, and SENC Unit #0.
Loop#1	Four Fibre lines on the Control Unit #1, ENC Unit #1, and SENC Unit #1.

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- A case where the RKM+RKAJATs+RKAJs (or RKAs) are connected



*1: The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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RKM, RKAJ, RKAJAT has four loops at the back end, which have the following names.

- Path#0, Loop#0
- Path#1, Loop#0
- Path#0, Loop#1
- Path#1, Loop#1

The paths and loops have the following meanings.

Path

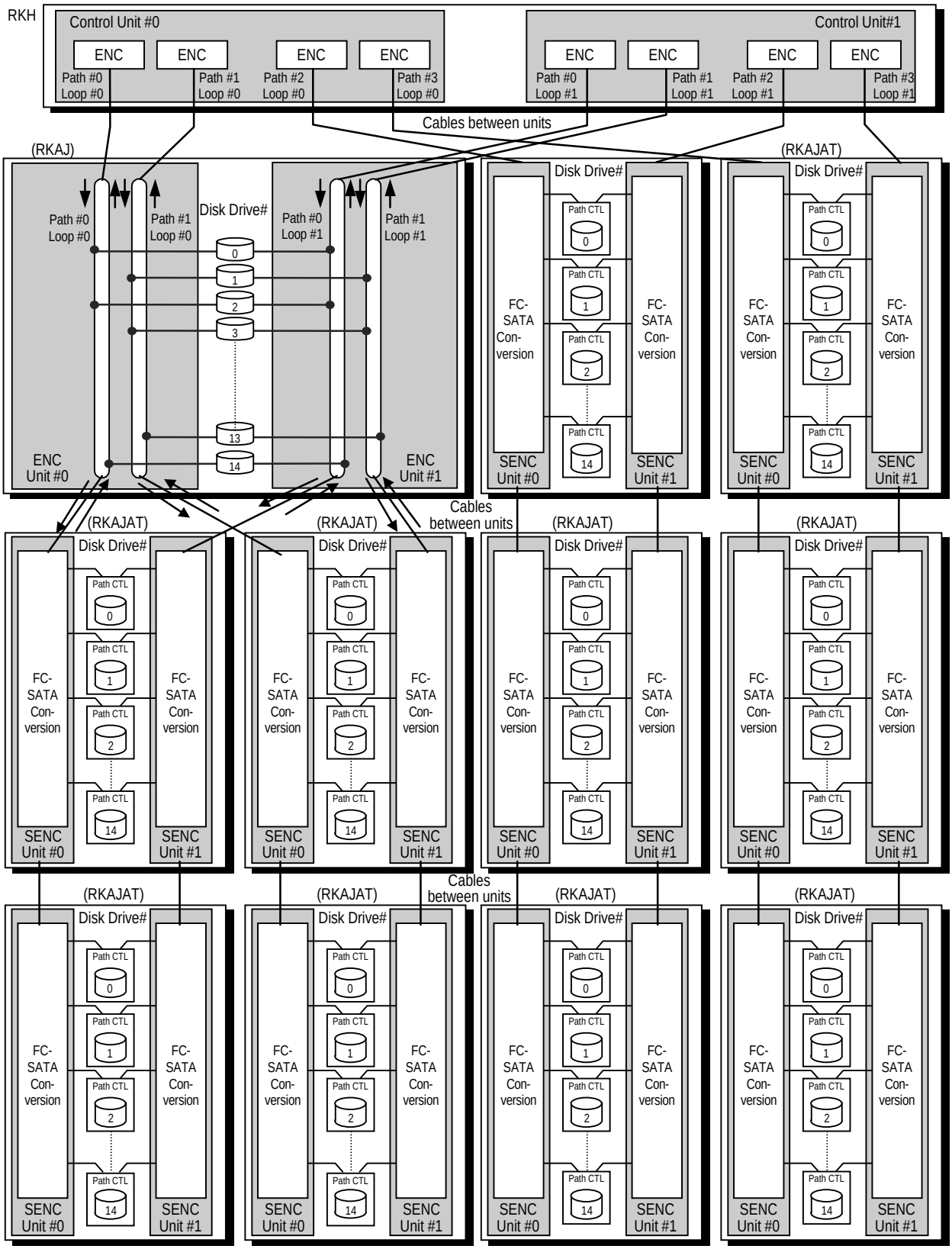
Path	Meaning
Path#0	Two Fibre lines connected to Disk Drives with even numbers, or two Fibre lines connected to the FC-SATA converter on the device ID #2x side in the case of a connection to the RKAJAT.
Path#1	Two Fibre lines connected to Disk Drives with odd numbers, or two Fibre lines connected to the FC-SATA converter on the device ID #3x side in the case of a connection to the RKAJAT.

Loop

Loop	Meaning
Loop#0	Two Fibre lines on the Control Unit #0, ENC Unit #0, and SENC Unit #0. (In the case of the RKAJAT, the FC-SATA converter is connected to the Fibre lines.)
Loop#1	Two Fibre lines on the Control Unit #1, ENC Unit #1, and SENC Unit #1. (In the case of the RKAJAT, the FC-SATA converter is connected to the Fibre lines.)

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- A case where the RKH+RKAJs+RKAJATs are connected



*1: The sequence of the Disk Drives is described in order of the signal of the Fibre Channel Loop on the Disk Drive side flowing, and it is not necessarily corresponding to the physical arrangement.

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RKAJ, RKAJAT has two loops at the back end, which have the following names.

- Path#0, Loop#0
- Path#1, Loop#0
- Path#2, Loop#0
- Path#3, Loop#0
- Path#0, Loop#1
- Path#1, Loop#1
- Path#2, Loop#1
- Path#3, Loop#1

The paths and loops have the following meanings.

Path

Path	Meaning
Path#0	Two Fibre lines connected to Disk Drives with even numbers on the device ID #0x side, or two Fibre lines connected to the FC-SATA converter on the device ID #2x side in the case of a connection to the RKAJAT.
Path#1	Two Fibre lines connected to Disk Drives with odd numbers on the device ID #0x side, or two Fibre lines connected to the FC-SATA converter on the device ID #3x side in the case of a connection to the RKAJAT.
Path#2	Two Fibre lines connected to Disk Drives with even numbers on the device ID #1x side, or two Fibre lines connected to the FC-SATA converter on the device ID #4x side in the case of a connection to the RKAJAT.
Path#3	Two Fibre lines connected to Disk Drives with odd numbers on the device ID #1x side, or two Fibre lines connected to the FC-SATA converter on the device ID #5x side in the case of a connection to the RKAJAT.

Loop

Loop	Meaning
Loop#0	Four Fibre lines on the Control Unit #0, ENC Unit #0, and SENC Unit #0. (In the case of the RKAJAT, the FC-SATA converter is connected to the Fibre lines.)
Loop#1	Four Fibre lines on the Control Unit #1, ENC Unit #1, and SENC Unit #1. (In the case of the RKAJAT, the FC-SATA converter is connected to the Fibre lines.)

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Chapter 2. CUDG Detected Messages

Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01801101	DUAL register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the dual register R/W test of the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01801102	DUAL register data compare error [ALL_CTL]	Inconsistency between write and read data was detected in the dual register R/W test of the data transfer control LSI.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01801201	DUAL IORDY status error [OWN_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump	③ If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	
01801202	DUAL IORDY status error [OWN_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump		
01801301	DUAL DESKEW status error [OWN_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01801302	DUAL DESKEW status error [OWN_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01802101	FM1 SEL Check SUM1 error [OWN_CTL]	The SUM1 of the Flash Memory SEL was inconsistent with the calculated SUM1.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01802102	FM1 SEL Check SUM2 error [OWN_CTL]	The SUM2 of the Flash Memory SEL was inconsistent with the calculated SUM2.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01803101	FM1 MAIN SEL Check SUM1 error [OWN_CTL]	The SUM1 of the Flash Memory MAIN was inconsistent with the calculated SUM1.	Full Dump		
01803102	FM1 MAIN SEL Check SUM2 error [OWN_CTL]	The SUM2 of the Flash Memory MAIN was inconsistent with the calculated SUM2.	Full Dump		
01804101	FM1 INS SEL Check SUM1 error [OWN_CTL]	The SUM1 of the Flash Memory INS was inconsistent with the calculated SUM1.	Full Dump		
01804102	FM1 INS SEL Check SUM2 error [OWN_CTL]	The SUM2 of the Flash Memory INS was inconsistent with the calculated SUM2.	Full Dump		
01805101	CSDS data line error [OWN_CTL]	Inconsistency between the write and read data was detected in the data line test of the local memory (CSDS).	Full Dump		
01805201	CSDS address line error [OWN_CTL]	Inconsistency between the write and read data was detected in the address line test of the local memory (CSDS).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01805301	CSDS ECC circuit error [OWN_CTL]	The ECC error could not be detected in the ECC Circuit test of the local memory (CSDS).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01805401	CSDS 4byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 4byte R/W test of the local memory (CSDS).	Full Dump		
01805501	CSDS 2byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 2byte R/W test of the local memory (CSDS).	Full Dump		
01805601	CSDS 1byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 1byte R/W test of the local memory (CSDS).	Full Dump		
01806101	L1 data cache error [OWN_CTL]	Inconsistency between the write and read data was detected in the R/W test of the L1 data cache in the CPU.	Full Dump		
01806201	L1 instruction cache error [OWN_CTL]	The instruction was executed incorrectly in the instruction test of the L1 instruction cache in the CPU.	Full Dump		
01807101	L2 cache error [OWN_CTL]	Inconsistency between the write and read data was detected in the R/W test of the L2 cache in the CPU.	Full Dump		
01807201	L2 cache error [OWN_CTL]	Inconsistency between the write and read data was detected in the R/W test of the L2 cache in the CPU.	Full Dump		
0180C001	CSDS 4byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 4byte R/W test of the local memory (CSDS).	Full Dump		
01804201	FM1 INS Check SUM1 error [OWN_CTL]	The SUM1 of the Flash Memory INS was inconsistent with the calculated SUM1.	Full Dump		
01804202	FM1 INS Check SUM2 error [OWN_CTL]	The SUM2 of the Flash Memory INS was inconsistent with the calculated SUM2.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01812101	CSDS 4byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 4byte R/W test of the local memory (CSDS).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01823001	Bridge SRAM data line error [OWN_CTL]	Inconsistency between the write and read data was detected in the data line test of the SRAM in the Bridge.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01823002	Bridge SRAM address line error [OWN_CTL]	Inconsistency between the write and read data was detected in the address line test of the SRAM in the Bridge.	Full Dump		
01823003	Bridge SRAM address line error [OWN_CTL]	Inconsistency between the write and read data was detected in the address line test of the SRAM in the Bridge.	Full Dump		
01823004	Bridge SRAM address line error [OWN_CTL]	Inconsistency between the write and read data was detected in the address line test of the SRAM in the Bridge.	Full Dump		
01823005	Bridge SRAM ECC circuit error [OWN_CTL]	The ECC error could not be detected in the ECC circuit test of the SRAM in the Bridge.	Full Dump		
01823006	Bridge SRAM 4byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 4byte R/W test of the SRAM in the Bridge.	Full Dump		
01823007	Bridge SRAM 2byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 2byte R/W test of the SRAM in the Bridge.	Full Dump		
01823008	Bridge SRAM 1byte data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the 1byte R/W test of the SRAM in the Bridge.	Full Dump		
01824001	TWSI CTL number information error [OWN_CTL]	The CTL number information that was got via the TWSI (Two Wired Serial Interface) was incorrect.	Full Dump		
01824002	TWSI unit type information error [OWN_CTL]	The Unit type information that was got via the TWSI (Two Wired Serial Interface) was incorrect.	Full Dump		
01824003	TWSI host I/F type information error [OWN_CTL]	The Interface Board information that was got via the TWSI (Two Wired Serial Interface) was incorrect.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01824010	TWSI CACHE#0 information error [OWN_CTL]	Getting of information on the cache memory of the DIMM slot #0 via the TWSI (Two Wired Serial Interface) was attempted, but the getting failed.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
01824011	TWSI CACHE#1 information error [OWN_CTL]	Getting of information on the cache memory of the DIMM slot #1 via the TWSI (Two Wired Serial Interface) was attempted, but the getting failed.	Full Dump	② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot.	
				③ If not recovered, replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01825101	IDMA data transfer error [OWN_CTL]	A transfer failed in the IDMA transfer test.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01825102	IDMA data transfer time out [OWN_CTL]	A time-out of transfer occurred in the IDMA transfer test.	Full Dump		
01825103	IDMA data compare error [OWN_CTL]	Data that was transferred in the IDMA transfer test was inconsistent with the test data of the sender.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01826101	LAN register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the LAN register.	Full Dump		
01826102	LAN register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the LAN register.	Full Dump		
01826201	LAN loop back transfer time out [OWN_CTL]	A transfer failed in the LAN loop back transfer test.	Full Dump		
01826202	LAN loop back transfer status error [OWN_CTL]	A time-out of transfer occurred in the LAN loop back transfer test.	Full Dump		
01826203	LAN loop back transfer data compare error [OWN_CTL]	Data that was transferred in the LAN loop back transfer test was inconsistent with the test data of the sender.	Full Dump		
01831101	MCTL register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the MCTL register in the data transfer control LSI.	Full Dump		
01831102	MCTL register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the MCTL register in the data transfer control LSI.	Full Dump		
01831103	MCTL status error [OWN_CTL]	An illegal error status occurred in the R/W test of the MCTL register in the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01833101	MCTL CTC CH0 stop [OWN_CTL]	The CTC CH0 was out of operation in the MCTL CTC CH0 test in the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01833201	MCTL CTC CH0 count error [OWN_CTL]	The CTC CH0 count was incorrect in a test of the MCTL CTC CH0 in the data transfer control LSI.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01833202	MCTL CTC CH0 parity error [OWN_CTL]	A parity error of the CTC CH0 occurred in a test of the MCTL CTC CH0 in the data transfer control LSI.	Full Dump		
01833203	MCTL CTC CH0 count check timeout error [OWN_CTL]	The CTC CH0 count was incorrect in a test of the MCTL CTC CH0 in the data transfer control LSI.	Full Dump		
01833501	MCTL CTC CH1 count error [OWN_CTL]	The CTC CH1 count was incorrect in a test of the MCTL CTC CH1 in the data transfer control LSI.	Full Dump		
01833502	MCTL CTC CH1 parity error [OWN_CTL]	A parity error of the CTC CH1 occurred in a test of the MCTL CTC CH1 in the data transfer control LSI.	Full Dump		
01833503	MCTL CTC CH1 count check timeout error [OWN_CTL]	The CTC CH1 count was incorrect in a test of the MCTL CTC CH1 in the data transfer control LSI.	Full Dump		
01834101	MCTL error force NG [OWN_CTL]	The Read Only Register Write Error did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump		
01834102	MCTL error force NG [OWN_CTL]	The MPCTL1 Input Data Parity Error did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump		
01834103	MCTL error force NG [OWN_CTL]	The INVDIN Input Data Parity Error did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump		
01834104	MCTL error force NG [OWN_CTL]	The MPCTL1 CTCCH0 Parity Error did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump		
01834105	MCTL error force NG [OWN_CTL]	The CTCCH1 Parity Error Test did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01834106	MCTL error force NG [OWN_CTL]	The MPCTL1 WCDGCNT Parity Error did not occurred in the MCTL force test in the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01835101	Backend path#0 control error [OWN_CTL]	The setting of the Path #0 was not reflected on the TWSI (Two Wired Serial Interface) GPI0 in the backend path control test.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01835102	Backend path#1 control error [OWN_CTL]	The setting of the Path #1 was not reflected on the TWSI (Two Wired Serial Interface) GPI0 in the backend path control test.	Full Dump		
01835103	Backend path#2 control error [OWN_CTL]	The setting of the Path #2 was not reflected on the TWSI (Two Wired Serial Interface) GPI0 in the backend path control test.	Full Dump		
01835104	Backend path#3 control error [OWN_CTL]	The setting of the Path #3 was not reflected on the TWSI (Two Wired Serial Interface) GPI0 in the backend path control test.	Full Dump		
01844101	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844102	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844103	DCTL status error [OWN_CTL]	An illegal error status occurred in the system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844201	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the own system dual register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844202	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the own system dual register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844203	DCTL status error [OWN_CTL]	An illegal error status occurred in the own system dual register R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01844301	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the primary PCI buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01844302	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the primary PCI buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01844303	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the primary PCI buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844304	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the primary PCI buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844401	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the Drive PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844402	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the Drive PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844403	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the Drive PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844404	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Drive PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844501	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the Drive PCI #1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844502	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the Drive PCI #1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844503	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the Drive PCI #1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844504	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Drive PCI #1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01844601	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the Host PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01844602	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the Host PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01844603	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the Host PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844604	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Host PCI #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844801	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the MDMA buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844802	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the MDMA buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844803	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the MDMA buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844804	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the MDMA buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844901	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the own system dual buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844902	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the own system dual buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844903	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the own system dual buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01844904	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the own system dual buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01845101	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the DMA #0 system register buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01845102	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the DMA #0 system register buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01845103	DCTL status error [OWN_CTL]	An illegal error status occurred in the DMA #0 system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845201	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port system register buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845202	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845203	DCTL status error [OWN_CTL]	An illegal error status occurred in the D_Port system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845301	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845302	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845303	DCTL status error [OWN_CTL]	An illegal error status occurred in the H_Port system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845401	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the DMA #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845402	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the DMA #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01845403	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the DMA #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01845404	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the DMA #0 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01845501	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the D_Pprt #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845502	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the D_Pprt #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845503	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the D_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845504	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845601	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the D_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845602	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the D_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845603	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the D_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845604	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845701	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the D_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845702	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the D_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01845703	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the D_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01845704	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01845801	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the D_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845802	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the D_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845803	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the D_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845804	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the D_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845901	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the H_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845902	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the H_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845903	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the H_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845904	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port #00 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01845A01	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the H_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01845A02	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the H_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01845A03	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the H_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845A04	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port #01 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845B01	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the H_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845B02	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the H_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845B03	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the H_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845B04	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port #10 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845C01	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the H_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845C02	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the H_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845C03	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the H_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845C04	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port #11 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01845D01	DCTL buffer write time out [OWN_CTL]	A write time-out occurred in the H_Port #S1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01845D02	DCTL buffer read time out [OWN_CTL]	A read time-out occurred in the H_Port #S1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01845D03	DCTL buffer parity error [OWN_CTL]	A parity error occurred in the H_Port #S1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845D04	DCTL buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the H_Port #S1 buffer R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845E01	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the NAS system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845E02	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the NAS system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845E03	DCTL status error [OWN_CTL]	An illegal error status occurred in the NAS system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845F01	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Monitor system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845F02	DCTL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Monitor system register R/W test of the data transfer control LSI (DCTL).	Full Dump		
01845F03	DCTL status error [OWN_CTL]	An illegal error status occurred in the Monitor system register R/W test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01846101	DUAL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the other system dual register R/W test of the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①. ③ If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01846102	DUAL register data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the other system dual register R/W test of the data transfer control LSI.	Full Dump		
01846103	DUAL status error [OWN_CTL]	An illegal error status occurred in the other system dual register R/W test of the data transfer control LSI.	Full Dump		
01846141	DUAL register data compare error [ALT_CTL]	Inconsistency between the write and read data was detected in the other system dual register R/W test of the data transfer control LSI.	Full Dump		
01846142	DUAL register data compare error [ALT_CTL]	Inconsistency between the write and read data was detected in the other system dual register R/W test of the data transfer control LSI.	Full Dump		
01846143	DUAL status error [ALT_CTL]	Inconsistency between the write and read data was detected in the other system dual register R/W test of the data transfer control LSI.	Full Dump		
01846201	DUALS buffer write time out [OWN_CTL]	A write time-out occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846202	DUALS buffer read time out [OWN_CTL]	A read time-out occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846203	DUALS buffer parity error [OWN_CTL]	A parity error occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846204	DUALS buffer data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846241	DUALS buffer write time out [ALT_CTL]	A write time-out occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01846242	DUALS buffer read time out [ALT_CTL]	A read time-out occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①. ③ If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01846243	DUALS buffer parity error [ALT_CTL]	A parity error occurred in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846244	DUALS buffer data compare error [ALT_CTL]	Inconsistency between the write and read data was detected in the other system dual buffer R/W test of the data transfer control LSI.	Full Dump		
01846301	DUALM error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846302	DUALM error force NG [OWN_CTL]	The WDT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846303	DUALM error force NG [OWN_CTL]	The WRDY_TIME_OUT did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846304	DUALM error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846305	DUALM error force NG [OWN_CTL]	The RRDY_TIME_OUT did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846306	DUALM error force NG [OWN_CTL]	The RDT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846341	DUALM error force NG [ALT_CTL]	The ADR_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846342	DUALM error force NG [ALT_CTL]	The WDT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846343	DUALM error force NG [ALT_CTL]	The WRDY_TIME_OUT did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01846344	DUALM error force NG [ALT_CTL]	The CNT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ②Replace the Control Unit of which the CALM LED lights on except for ①. ③If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01846345	DUALM error force NG [ALT_CTL]	The RRDY_TIME_OUT did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846346	DUALM error force NG [ALT_CTL]	The RDT_PTY_ERR did not occur in the own system dual force test of the data transfer control LSI.	Full Dump		
01846401	DUAL IORDY status error [OWN_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump		
01846402	DUAL DESKEW status error [OWN_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01846441	DUAL IORDY status error [ALT_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump		
01846442	DUAL DESKEW status error [ALT_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01846901	DUALS error force NG [OWN_CTL]	The WDT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846902	DUALS error force NG [OWN_CTL]	The WDT_PTY_ERR (peculiar to the MP) did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846903	DUALS error force NG [OWN_CTL]	The MP_CAC_RD_PERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846904	DUALS error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846905	DUALS error force NG [OWN_CTL]	The CA_WDT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846906	DUALS error force NG [OWN_CTL]	The CA_ECC_GEN_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01846907	DUALS error force NG [OWN_CTL]	The CMD_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①. ③ If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01846908	DUALS error force NG [OWN_CTL]	The CA_RD_ECC_COR_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846909	DUALS error force NG [OWN_CTL]	The CA_RD_ECC_COR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
0184690A	DUALS error force NG [OWN_CTL]	The CA_RD_ECC_UNCOR_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
0184690B	DUALS error force NG [OWN_CTL]	The CA_RD_RCLK_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846941	DUALS error force NG [ALT_CTL]	The WDT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846942	DUALS error force NG [ALT_CTL]	The WDT_PTY_ERR (peculiar to the MP) did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846943	DUALS error force NG [ALT_CTL]	The MP_CAC_RD_PERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846944	DUALS error force NG [ALT_CTL]	The CNT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846945	DUALS error force NG [ALT_CTL]	The CA_WDT_PTY_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846946	DUALS error force NG [ALT_CTL]	The CA_ECC_GEN_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846947	DUALS error force NG [ALT_CTL]	The CMD_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		
01846948	DUALS error force NG [ALT_CTL]	The CA_RD_ECC_COR_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01846949	DUALS error force NG [ALT_CTL]	The CA_RD_ECC_COR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184694A	DUALS error force NG [ALT_CTL]	The CA_RD_ECC_UNCOR_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184694B	DUALS error force NG [ALT_CTL]	The CA_RD_RCLK_ERR did not occur in the other system dual force test of the data transfer control LSI.	Full Dump	③If not recovered, replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	
01846A01	DUAL IORDY status error [OWN_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump		
01846A02	DUAL DESKEW status error [OWN_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01846A41	DUAL IORDY status error [ALT_CTL]	DUAL IORDY status error of the data transfer control LSI was detected.	Full Dump		
01846A42	DUAL DESKEW status error [ALT_CTL]	DESKEW status error of the data transfer control LSI was detected.	Full Dump		
01847101	DCTL DMA0 transfer error [OWN_CTL]	A transfer failed in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01847102	DCTL DMA0 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01847103	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected parity generation data (data part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01847104	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected parity generation data (LA part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01847105	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected parity generation data (LRC part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01847106	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected FILL data (data part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01847107	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected FILL data (LA part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01847108	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected FILL data (LRC part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01847109	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (data part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184710A	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (LA part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184710B	DCTL DMA0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (LRC part) in the DMA #0 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848101	DCTL DP#00 transfer error [OWN_CTL]	A transfer failed in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848102	DCTL DP#00 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848103	DCTL DP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01848104	DCTL DP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01848201	DCTL DP#00 transfer error [OWN_CTL]	A transfer failed in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01848202	DCTL DP#00 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848203	DCTL DP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (data part) in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848204	DCTL DP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (check code part) in the D_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848601	DCTL DP#01 transfer error [OWN_CTL]	A transfer failed in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848602	DCTL DP#01 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848603	DCTL DP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848604	DCTL DP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01848701	DCTL DP#01 transfer error [OWN_CTL]	A transfer failed in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01848702	DCTL DP#01 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01848703	DCTL DP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (data part) in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01848704	DCTL DP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (check code part) in the D_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849101	DCTL DP#10 transfer error [OWN_CTL]	A transfer failed in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849102	DCTL DP#10 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849103	DCTL DP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849104	DCTL DP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849201	DCTL DP#10 transfer error [OWN_CTL]	A transfer failed in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849202	DCTL DP#10 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849203	DCTL DP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (data part) in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01849204	DCTL DP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (check code part) in the D_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01849601	DCTL DP#11 transfer error [OWN_CTL]	A transfer failed in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01849602	DCTL DP#11 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849603	DCTL DP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849604	DCTL DP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849701	DCTL DP#11 transfer error [OWN_CTL]	A transfer failed in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849702	DCTL DP#11 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849703	DCTL DP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (data part) in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
01849704	DCTL DP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected LA replacement data (check code part) in the D_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184A101	DCTL HP#00 transfer error [OWN_CTL]	A transfer failed in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message. ② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on. ③ If not recovered, replace the Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184A102	DCTL HP#00 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A103	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A104	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A201	DCTL HP#00 transfer error [OWN_CTL]	A transfer failed in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A202	DCTL HP#00 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A203	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (data part) in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A204	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (check code part) in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A205	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (data part) in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A206	DCTL HP#00 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (check code part) in the H_Port #00 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184A601	DCTL HP#01 transfer error [OWN_CTL]	A transfer failed in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message. ② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on. ③ If not recovered, replace the Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184A602	DCTL HP#01 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A603	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A604	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the H_Port #01transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A701	DCTL HP#01 transfer error [OWN_CTL]	A transfer failed in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A702	DCTL HP#01 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A703	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (data part) in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A704	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (check code part) in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A705	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (data part) in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184A706	DCTL HP#01 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (check code part) in the H_Port #01 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184B101	DCTL HP#10 transfer error [OWN_CTL]	A transfer failed in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message. ② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on. ③ If not recovered, replace the Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184B102	DCTL HP#10 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B103	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B104	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B201	DCTL HP#10 transfer error [OWN_CTL]	A transfer failed in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B202	DCTL HP#10 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B203	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (data part) in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B204	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (check code part) in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B205	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (data part) in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B206	DCTL HP#10 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (check code part) in the H_Port #10 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184B601	DCTL HP#11 transfer error [OWN_CTL]	A transfer failed in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message. ② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on. ③ If not recovered, replace the Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184B602	DCTL HP#11 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B603	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B604	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B701	DCTL HP#11 transfer error [OWN_CTL]	A transfer failed in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B702	DCTL HP#11 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B703	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (data part) in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B704	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (check code part) in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B705	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (data part) in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184B706	DCTL HP#11 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (check code part) in the H_Port #11 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184BB01	DCTL HP#S1 transfer error [OWN_CTL]	A transfer failed in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184BB02	DCTL HP#S1 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184BB03	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (data part) of the sender in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BB04	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the test data (check code part) of the sender in the H_Port #S1transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC01	DCTL HP#S1 transfer error [OWN_CTL]	A transfer failed in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC02	DCTL HP#S1 transfer time out error [OWN_CTL]	A time-out of transfer occurred in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC03	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (data part) in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC04	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected primary data (check code part) in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC05	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (data part) in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		
0184BC06	DCTL HP#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with the expected secondary data (check code part) in the H_Port #S1 transfer test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D101	DCTL MP access error force NG [OWN_CTL]	The ECC_WR_PTY ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D102	DCTL MP access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D103	DCTL MP access error force NG [OWN_CTL]	The ECC_UNCORE did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D104	DCTL MP access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D105	DCTL MP access error force NG [OWN_CTL]	The DBF_BYTE_WR_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D106	DCTL MP access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D107	DCTL MP access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D108	DCTL MP access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D109	DCTL MP access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D10A	DCTL MP access error force NG [OWN_CTL]	The CADROV_MP did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D10B	DCTL MP access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D10C	DCTL MP access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D10D	DCTL MP access error force NG [OWN_CTL]	The DUMY_AREA_WR_ERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D10E	DCTL MP access error force NG [OWN_CTL]	The DBF_BYTE_WR (blk) did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D10F	DCTL MP access error force NG [OWN_CTL]	The PBF_SEL_CNT_PERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D110	DCTL MP access error force NG [OWN_CTL]	The CBF_SEL_CNT_PERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D111	DCTL MP access error force NG [OWN_CTL]	The REFCNT_PTY_PERR did not occur in the MP force test of the data transfer control LSI (DCTL).	Full Dump		
0184D601	DCTL MDMA access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D602	DCTL MDMA access error force NG [OWN_CTL]	The ECC_WPTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D603	DCTL MDMA access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D604	DCTL MDMA access error force NG [OWN_CTL]	The ECC_UNCORE did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D605	DCTL MDMA access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D606	DCTL MDMA access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D607	DCTL MDMA access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D608	DCTL MDMA access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D609	DCTL MDMA access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D60A	DCTL MDMA access error force NG [OWN_CTL]	The DBF_BYTE_WR_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D60B	DCTL MDMA access error force NG [OWN_CTL]	The BWACNT_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D60C	DCTL MDMA access error force NG [OWN_CTL]	The BRACNT_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D60D	DCTL MDMA access error force NG [OWN_CTL]	The WADRCNT_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D60E	DCTL MDMA access error force NG [OWN_CTL]	The RADRCNT_PTY_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D60F	DCTL MDMA access error force NG [OWN_CTL]	The CADROV did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D610	DCTL MDMA access error force NG [OWN_CTL]	The DUMY_AREA_WR_ERR did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D611	DCTL MDMA access error force NG [OWN_CTL]	The DBF_BYTE_WR (blk) did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D612	DCTL MDMA access error force NG [OWN_CTL]	The ECC_CORECT did not occur in the MDMA force test of the data transfer control LSI (DCTL).	Full Dump		
0184D701	DCTL DMA0 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D702	DCTL DMA0 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D703	DCTL DMA0 access error force NG [OWN_CTL]	The CADROV did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D704	DCTL DMA0 access error force NG [OWN_CTL]	The BUF_WDT_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D705	DCTL DMA0 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D706	DCTL DMA0 access error force NG [OWN_CTL]	The LIST_DT_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D707	DCTL DMA0 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D708	DCTL DMA0 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D709	DCTL DMA0 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70A	DCTL DMA0 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70B	DCTL DMA0 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70C	DCTL DMA0 access error force NG [OWN_CTL]	The ECC_UNCORE did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70D	DCTL DMA0 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70E	DCTL DMA0 access error force NG [OWN_CTL]	The VERIFY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D70F	DCTL DMA0 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D710	DCTL DMA0 access error force NG [OWN_CTL]	The VERIFYQ_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D711	DCTL DMA0 access error force NG [OWN_CTL]	The ADR_CNT_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D712	DCTL DMA0 access error force NG [OWN_CTL]	The LBA_CNT_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D713	DCTL DMA0 access error force NG [OWN_CTL]	The CNT_CNT_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D714	DCTL DMA0 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D715	DCTL DMA0 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D716	DCTL DMA0 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D720	DCTL DMA0 transfer error [OWN_CTL]	The DMA #0 transfer failed in the DMA #0 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D801	DCTL DP#00 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D802	DCTL DP#00 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D803	DCTL DP#00 access error force NG [OWN_CTL]	The CADROV did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D804	DCTL DP#00 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D805	DCTL DP#00 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D806	DCTL DP#00 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D807	DCTL DP#00 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D808	DCTL DP#00 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D809	DCTL DP#00 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D80B	DCTL DP#00 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D80C	DCTL DP#00 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D80D	DCTL DP#00 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D80E	DCTL DP#00 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D80F	DCTL DP#00 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D810	DCTL DP#00 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D811	DCTL DP#00 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D812	DCTL DP#00 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D813	DCTL DP#00 access error force NG [OWN_CTL]	The WR_SEQ_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D814	DCTL DP#00 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D815	DCTL DP#00 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D816	DCTL DP#00 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D817	DCTL DP#00 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D818	DCTL DP#00 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D819	DCTL DP#00 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D81A	DCTL DP#00 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D81B	DCTL DP#00 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the D_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D901	DCTL DP#01 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D902	DCTL DP#01 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D903	DCTL DP#01 access error force NG [OWN_CTL]	The CADROV did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D904	DCTL DP#01 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D905	DCTL DP#01 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D906	DCTL DP#01 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D907	DCTL DP#01 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D908	DCTL DP#01 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D909	DCTL DP#01 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D90B	DCTL DP#01 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D90C	DCTL DP#01 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D90D	DCTL DP#01 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D90E	DCTL DP#01 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D90F	DCTL DP#01 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184D910	DCTL DP#01 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184D911	DCTL DP#01 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184D912	DCTL DP#01 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D913	DCTL DP#01 access error force NG [OWN_CTL]	The WR_SEQ_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D914	DCTL DP#01 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D915	DCTL DP#01 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D916	DCTL DP#01 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D917	DCTL DP#01 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D918	DCTL DP#01 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D919	DCTL DP#01 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D91A	DCTL DP#01 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184D91B	DCTL DP#01 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the D_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DA01	DCTL DP#10 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DA02	DCTL DP#10 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DA03	DCTL DP#10 access error force NG [OWN_CTL]	The CADROV did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA04	DCTL DP#10 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA05	DCTL DP#10 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA06	DCTL DP#10 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA07	DCTL DP#10 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA08	DCTL DP#10 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA09	DCTL DP#10 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA0B	DCTL DP#10 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA0C	DCTL DP#10 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA0D	DCTL DP#10 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DA0E	DCTL DP#10 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DA0F	DCTL DP#10 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DA10	DCTL DP#10 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA11	DCTL DP#10 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA12	DCTL DP#10 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA13	DCTL DP#10 access error force NG [OWN_CTL]	The WR_SEQ_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA14	DCTL DP#10 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA15	DCTL DP#10 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA16	DCTL DP#10 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA17	DCTL DP#10 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA18	DCTL DP#10 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DA19	DCTL DP#10 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DA1A	DCTL DP#10 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DA1B	DCTL DP#10 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the D_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DB01	DCTL DP#11 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB02	DCTL DP#11 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB03	DCTL DP#11 access error force NG [OWN_CTL]	The CADROV did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB04	DCTL DP#11 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB05	DCTL DP#11 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB06	DCTL DP#11 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB07	DCTL DP#11 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB08	DCTL DP#11 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB09	DCTL DP#11 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB0B	DCTL DP#11 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DB0C	DCTL DP#11 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DB0D	DCTL DP#11 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DB0E	DCTL DP#11 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB0F	DCTL DP#11 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB10	DCTL DP#11 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB11	DCTL DP#11 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB12	DCTL DP#11 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB13	DCTL DP#11 access error force NG [OWN_CTL]	The WR_SEQ_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB14	DCTL DP#11 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB15	DCTL DP#11 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB16	DCTL DP#11 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB17	DCTL DP#11 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DB18	DCTL DP#11 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DB19	DCTL DP#11 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DB1A	DCTL DP#11 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DB1B	DCTL DP#11 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the D_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC01	DCTL primary PCI error force NG [OWN_CTL]	The D_PERR did not occur in the primary PCI bridge (on the data transfer control LSI (DCTL) side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC02	DCTL primary PCI error force NG [OWN_CTL]	The S_T_ABORT did not occur in the primary PCI bridge (on the data transfer control LSI (DCTL) side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC03	DCTL primary PCI error force NG [OWN_CTL]	The DSCON_CNT_PTYERR did not occur in the primary PCI bridge (on the data transfer control LSI (DCTL) side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC04	DCTL primary PCI error force NG [OWN_CTL]	The D_PERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC05	DCTL primary PCI error force NG [OWN_CTL]	The R_SERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC06	DCTL primary PCI error force NG [OWN_CTL]	The R_M_ABORT did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC07	DCTL primary PCI error force NG [OWN_CTL]	The R_T_ABORT did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DC08	DCTL primary PCI error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DC09	DCTL primary PCI error force NG [OWN_CTL]	The DPERR_D did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DC0A	DCTL primary PCI error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC0B	DCTL primary PCI error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC0C	DCTL primary PCI error force NG [OWN_CTL]	The CMD_PTY_ERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC0D	DCTL primary PCI error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC0E	DCTL primary PCI error force NG [OWN_CTL]	The TIME_OUT did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC0F	DCTL primary PCI error force NG [OWN_CTL]	The SPC_TIME_OUT did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC10	DCTL primary PCI error force NG [OWN_CTL]	The SPC_ERR_MSG did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DC11	DCTL primary PCI error force NG [OWN_CTL]	The UNEXPECT_SPC did not occur in the Primary PCI Bridge (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DD01	DCTL drive PCI0 error force NG [OWN_CTL]	The D_PERR did not occur in the Drive PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DD02	DCTL drive PCI0 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Drive PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DD03	DCTL drive PCI0 error force NG [OWN_CTL]	The DSCON_CNT_PTYERR did not occur in the Drive PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD04	DCTL drive PCI0 error force NG [OWN_CTL]	The D_PERR did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD05	DCTL drive PCI0 error force NG [OWN_CTL]	The R_SERR did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD06	DCTL drive PCI0 error force NG [OWN_CTL]	The R_M_ABORT did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD07	DCTL drive PCI0 error force NG [OWN_CTL]	The R_T_ABORT did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD08	DCTL drive PCI0 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD09	DCTL drive PCI0 error force NG [OWN_CTL]	The DPERR_D did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DD0A	DCTL drive PCI0 error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the Drive PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DD0B	DCTL drive PCI0 error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DD0C	DCTL drive PCI0 error force NG [OWN_CTL]	The CMD_PTY_ERR did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD0D	DCTL drive PCI0 error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the Drive PCI Bridge #0(Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD0E	DCTL drive PCI0 error force NG [OWN_CTL]	The TIME_OUT did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD0F	DCTL drive PCI0 error force NG [OWN_CTL]	The SPC_TIME_OUT did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD10	DCTL drive PCI0 error force NG [OWN_CTL]	The SPC_ERR_MSG did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DD11	DCTL drive PCI0 error force NG [OWN_CTL]	The UNEXPECT_SPC did not occur in the Drive PCI Bridge#0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DE01	DCTL drive PCI1 error force NG [OWN_CTL]	The D_PERR did not occur in the Drive PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DE02	DCTL drive PCI1 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Drive PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DE03	DCTL drive PCI1 error force NG [OWN_CTL]	The DSCON_CNT_PTYERR did not occur in the Drive PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE04	DCTL drive PCI1 error force NG [OWN_CTL]	The D_PERR did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE05	DCTL drive PCI1 error force NG [OWN_CTL]	The R_SERR did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE06	DCTL drive PCI1 error force NG [OWN_CTL]	The R_M_ABORT did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE07	DCTL drive PCI1 error force NG [OWN_CTL]	The R_T_ABORT did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE08	DCTL drive PCI1 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE09	DCTL drive PCI1 error force NG [OWN_CTL]	The DPERR_D did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184DE0A	DCTL drive PCI1 error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the Drive PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184DE0B	DCTL drive PCI1 error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184DE0C	DCTL drive PCI1 error force NG [OWN_CTL]	The CMD_PTY_ERR did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE0D	DCTL drive PCI1 error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE0E	DCTL drive PCI1 error force NG [OWN_CTL]	The TIME_OUT did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE0F	DCTL drive PCI1 error force NG [OWN_CTL]	The SPC_TIME_OUT did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE10	DCTL drive PCI1 error force NG [OWN_CTL]	The SPC_ERR_MSG did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184DE11	DCTL drive PCI1 error force NG [OWN_CTL]	The UNEXPECT_SPC did not occur in the Drive PCI Bridge#1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E101	DCTL HP#00 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E102	DCTL HP#00 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E103	DCTL HP#00 access error force NG [OWN_CTL]	The CADROV did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E104	DCTL HP#00 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E105	DCTL HP#00 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E106	DCTL HP#00 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E107	DCTL HP#00 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E108	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E109	DCTL HP#00 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E10B	DCTL HP#00 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E10C	DCTL HP#00 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E10D	DCTL HP#00 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E10E	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E10F	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E110	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E111	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E112	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E114	DCTL HP#00 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E115	DCTL HP#00 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E116	DCTL HP#00 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E117	DCTL HP#00 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E118	DCTL HP#00 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E119	DCTL HP#00 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E11A	DCTL HP#00 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E11B	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E11C	DCTL HP#00 access error force NG [OWN_CTL]	The EDC_LUN_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E11D	DCTL HP#00 access error force NG [OWN_CTL]	The EDC_LBA_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E11E	DCTL HP#00 access error force NG [OWN_CTL]	The EDC_CRC_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E11F	DCTL HP#00 access error force NG [OWN_CTL]	The CRC_GEN_ERR did not occur in the H_Port #00 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E201	DCTL HP#01 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E202	DCTL HP#01 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E203	DCTL HP#01 access error force NG [OWN_CTL]	The CADROV did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E204	DCTL HP#01 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E205	DCTL HP#01 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E206	DCTL HP#01 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E207	DCTL HP#01 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E208	DCTL HP#01 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E209	DCTL HP#01 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E20B	DCTL HP#01 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E20C	DCTL HP#01 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E20D	DCTL HP#01 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E20E	DCTL HP#01 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E20F	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E210	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E211	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E212	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E214	DCTL HP#01 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E215	DCTL HP#01 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E216	DCTL HP#01 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E217	DCTL HP#01 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E218	DCTL HP#01 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E219	DCTL HP#01 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21A	DCTL HP#01 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21B	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21C	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_LUN_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21D	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_LBA_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21E	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_CRC_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E21F	DCTL HP#01 access error force NG [OWN_CTL]	The CRC_GEN_ERR did not occur in the H_Port #01 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E301	DCTL HP#10 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E302	DCTL HP#10 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E303	DCTL HP#10 access error force NG [OWN_CTL]	The CADROV did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E304	DCTL HP#10 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E305	DCTL HP#10 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E306	DCTL HP#10 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E307	DCTL HP#10 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E308	DCTL HP#10 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E309	DCTL HP#10 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E30B	DCTL HP#10 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E30C	DCTL HP#10 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E30D	DCTL HP#10 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E30E	DCTL HP#10 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E30F	DCTL HP#10 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E310	DCTL HP#10 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E311	DCTL HP#10 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E312	DCTL HP#10 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E314	DCTL HP#10 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E315	DCTL HP#10 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E316	DCTL HP#10 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E317	DCTL HP#10 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E318	DCTL HP#10 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E319	DCTL HP#10 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E31A	DCTL HP#10 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E31B	DCTL HP#10 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E31C	DCTL HP#10 access error force NG [OWN_CTL]	The EDC_LUN_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E31D	DCTL HP#10 access error force NG [OWN_CTL]	The EDC_LBA_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E31E	DCTL HP#10 access error force NG [OWN_CTL]	The EDC_CRC_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E31F	DCTL HP#10 access error force NG [OWN_CTL]	The CRC_GEN_ERR did not occur in the H_Port #10 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E401	DCTL HP#11 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E402	DCTL HP#11access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E403	DCTL HP#11 access error force NG [OWN_CTL]	The CADROV did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E404	DCTL HP#11 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E405	DCTL HP#11 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E406	DCTL HP#11 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E407	DCTL HP#11 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E408	DCTL HP#11 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E409	DCTL HP#11 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E40B	DCTL HP#11 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E40C	DCTL HP#11 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E40D	DCTL HP#11 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E40E	DCTL HP#11 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E40F	DCTL HP#11 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E410	DCTL HP#11 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E411	DCTL HP#11 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E412	DCTL HP#11 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E414	DCTL HP#11 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E415	DCTL HP#11 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E416	DCTL HP#11 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E417	DCTL HP#11 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E418	DCTL HP#11 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E419	DCTL HP#11 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41A	DCTL HP#11 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41B	DCTL HP#11 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41C	DCTL HP#11 access error force NG [OWN_CTL]	The EDC_LUN_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41D	DCTL HP#11 access error force NG [OWN_CTL]	The EDC_LBA_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41E	DCTL HP#11 access error force NG [OWN_CTL]	The EDC_CRC_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E41F	DCTL HP#11 access error force NG [OWN_CTL]	The CRC_GEN_ERR did not occur in the H_Port #11 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E501	DCTL HP#S1 access error force NG [OWN_CTL]	The RCTL_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E502	DCTL HP#S1 access error force NG [OWN_CTL]	The RCLK_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E503	DCTL HP#S1 access error force NG [OWN_CTL]	The CADROV did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E504	DCTL HP#S1 access error force NG [OWN_CTL]	The BLEN0_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E505	DCTL HP#S1 access error force NG [OWN_CTL]	The WORDCNT_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E506	DCTL HP#S1 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E507	DCTL HP#S1 access error force NG [OWN_CTL]	The 512_ADR_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E508	DCTL HP#S1 access error force NG [OWN_CTL]	The LRC_GEN_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E509	DCTL HP#S1 access error force NG [OWN_CTL]	The PCI_ADR_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E50B	DCTL HP#S1 access error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E50C	DCTL HP#S1 access error force NG [OWN_CTL]	The LUN_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E50D	DCTL HP#S1 access error force NG [OWN_CTL]	The LBA_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E50E	DCTL HP#S1 access error force NG [OWN_CTL]	The LRC_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E50F	DCTL HP#S1 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E510	DCTL HP#S1 access error force NG [OWN_CTL]	The ECC_GEN_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E511	DCTL HP#S1 access error force NG [OWN_CTL]	The ECC_UNCORRECT did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E512	DCTL HP#S1 access error force NG [OWN_CTL]	The ECC_COR_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E514	DCTL HP#S1 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E515	DCTL HP#S1 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E516	DCTL HP#S1 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E517	DCTL HP#S1 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E518	DCTL HP#S1 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E519	DCTL HP#S1 access error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E51A	DCTL HP#S1 access error force NG [OWN_CTL]	The WLEN_PTY_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E51B	DCTL HP#S1 access error force NG [OWN_CTL]	The ECC_CORRECT did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E51C	DCTL HP#S1 access error force NG [OWN_CTL]	The EDC_LUN_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E51D	DCTL HP#S1 access error force NG [OWN_CTL]	The EDC_LBA_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E51E	DCTL HP#S1 access error force NG [OWN_CTL]	The EDC_CRC_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E51F	DCTL HP#S1 access error force NG [OWN_CTL]	The CRC_GEN_ERR did not occur in the H_Port #S1 force test of the data transfer control LSI (DCTL).	Full Dump		
0184E601	DCTL host PCI0 error force NG [OWN_CTL]	The D_PERR did not occur in the Host PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E602	DCTL host PCI0 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Host PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E603	DCTL host PCI0 error force NG [OWN_CTL]	The DSCON_CNT_PTYERR did not occur in the Host PCI Bridge #0 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E604	DCTL host PCI0 error force NG [OWN_CTL]	The D_PERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E605	DCTL host PCI0 error force NG [OWN_CTL]	The R_SERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E606	DCTL host PCI0 error force NG [OWN_CTL]	The R_M_ABORT did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E607	DCTL host PCI0 error force NG [OWN_CTL]	The R_T_ABORT did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E608	DCTL host PCI0 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E609	DCTL host PCI0 error force NG [OWN_CTL]	The DPERR_D did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60A	DCTL host PCI0 error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60B	DCTL host PCI0 error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60C	DCTL host PCI0 error force NG [OWN_CTL]	The CMD_PTY_ERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60D	DCTL host PCI0 error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60E	DCTL host PCI0 error force NG [OWN_CTL]	The TIME_OUT did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E60F	DCTL host PCI0 error force NG [OWN_CTL]	The SPC_TIME_OUT did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E610	DCTL host PCI0 error force NG [OWN_CTL]	The SPC_ERR_MSG did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E611	DCTL host PCI0 error force NG [OWN_CTL]	The UNEXPECT_SPC did not occur in the Host PCI Bridge #0 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E701	DCTL host PCI1 error force NG [OWN_CTL]	The D_PERR did not occur in the Host PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E702	DCTL host PCI1 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Host PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E703	DCTL host PCI1 error force NG [OWN_CTL]	The DSCON_CNT_PTYERR did not occur in the Host PCI Bridge #1 (Cache access side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E704	DCTL host PCI1 error force NG [OWN_CTL]	The D_PERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E705	DCTL host PCI1 error force NG [OWN_CTL]	The R_SERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E706	DCTL host PCI1 error force NG [OWN_CTL]	The R_M_ABORT did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E707	DCTL host PCI1 error force NG [OWN_CTL]	The R_T_ABORT did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E708	DCTL host PCI1 error force NG [OWN_CTL]	The S_T_ABORT did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184E709	DCTL host PCI1 error force NG [OWN_CTL]	The DPERR_D did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
0184E70A	DCTL host PCI1 error force NG [OWN_CTL]	The ADR_PTY_ERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
0184E70B	DCTL host PCI1 error force NG [OWN_CTL]	The DRD_PTY_ERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E70C	DCTL host PCI1 error force NG [OWN_CTL]	The CMD_PTY_ERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E70D	DCTL host PCI1 error force NG [OWN_CTL]	The CNT_PTY_ERR did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E70E	DCTL host PCI1 error force NG [OWN_CTL]	The TIME_OUT did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E70F	DCTL host PCI1 error force NG [OWN_CTL]	The SPC_TIME_OUT did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E710	DCTL host PCI1 error force NG [OWN_CTL]	The SPC_ERR_MSG did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		
0184E711	DCTL host PCI1 error force NG [OWN_CTL]	The UNEXPECT_SPC did not occur in the Host PCI Bridge #1 (Bridge side) force test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC1	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC2	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The INT of the DFPC #0 did not occur in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The INT of the DFPC #1 did not occur in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The INT of the DFPC #2 did not occur in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The INT of the DFPC #3 did not occur in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The INT of the HFPC #S1 did not occur in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The INT of the HFPC #0 did not occur in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The INT of the HFPC #1 did not occur in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The INT of the HFPC #2 did not occur in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The INT of the HFPC #3 did not occur in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	

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				③If not recovered, replace Control Unit.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC3	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC4	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The expected completion message of the DFPC #0 was not got in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The expected completion message of the DFPC #1 was not got in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The expected completion message of the DFPC #2 was not got in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The expected completion message of the DFPC #3 was not got in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The expected completion message of the HFPC #S1 was not got in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The expected completion message of the HFPC #0 was not got in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The expected completion message of the HFPC #1 was not got in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The expected completion message of the HFPC #2 was not got in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The expected completion message of the HFPC #3 was not got in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC5	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the DFPC #0 in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the DFPC #1 in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the DFPC #2 in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the DFPC #3 in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the HFPC #S1 in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the HFPC #0 in the H_Port #00 transfer of the data transfer control LSI x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the HFPC #1 in the H_Port #01 transfer of the data transfer control LSI x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the HFPC #2 in the H_Port #10 transfer of the data transfer control LSI x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the HFPC #3 in the H_Port #11 transfer of the data transfer control LSI x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC6	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC7	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The INT of the DFPC #0 did not occur in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The INT of the DFPC #1 did not occur in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The INT of the DFPC #2 did not occur in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The INT of the DFPC #3 did not occur in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The INT of the HFPC #S1 did not occur in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The INT of the HFPC #0 did not occur in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The INT of the HFPC #1 did not occur in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The INT of the HFPC #2 did not occur in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The INT of the HFPC #3 did not occur in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC8	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxC9	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The expected completion message of the DFPC #0 was not got in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The expected completion message of the DFPC #1 was not got in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The expected completion message of the DFPC #2 was not got in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The expected completion message of the DFPC #3 was not got in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The expected completion message of the HFPC #S1 was not got in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The expected completion message of the HFPC #0 was not got in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The expected completion message of the HFPC #1 was not got in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The expected completion message of the HFPC #2 was not got in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The expected completion message of the HFPC #3 was not got in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCA	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The ERQ consumer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCB	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The INT of the DFPC #0 did not occur in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The INT of the DFPC #1 did not occur in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The INT of the DFPC #2 did not occur in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The INT of the DFPC #3 did not occur in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The INT of the HFPC #S1 did not occur in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The INT of the HFPC #0 did not occur in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The INT of the HFPC #1 did not occur in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The INT of the HFPC #2 did not occur in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The INT of the HFPC #3 did not occur in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCC	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #0 was not upped in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #1 was not upped in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #2 was not upped in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the DFPC #3 was not upped in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #S1 was not upped in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #0 was not upped in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #1 was not upped in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #2 was not upped in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The IMQ producer index of the HFPC #3 was not upped in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCD	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The expected completion message of the DFPC #0 was not got in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The expected completion message of the DFPC #1 was not got in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The expected completion message of the DFPC #2 was not got in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The expected completion message of the DFPC #3 was not got in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The expected completion message of the HFPC #S1 was not got in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The expected completion message of the HFPC #0 was not got in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The expected completion message of the HFPC #1 was not got in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The expected completion message of the HFPC #2 was not got in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The expected completion message of the HFPC #3 was not got in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCE	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	The FCP_RSP of the DFPC #0 was not transferred in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	The FCP_RSP of the DFPC #1 was not transferred in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	The FCP_RSP of the DFPC #2 was not transferred in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	The FCP_RSP of the DFPC #3 was not transferred in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	The FCP_RSP of the HFPC #S1 was not transferred in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	The FCP_RSP of the HFPC #0 was not transferred in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	The FCP_RSP of the HFPC #1 was not transferred in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	The FCP_RSP of the HFPC #2 was not transferred in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	The FCP_RSP of the HFPC #3 was not transferred in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
0184xxCF	DCTL DP#00-DFPC#0 transfer error [OWN_CTL]	An error occurred in the DFPC #0 in the D_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DCTL DP#01-DFPC#1 transfer error [OWN_CTL]	An error occurred in the DFPC #1 in the D_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL DP#10-DFPC#2 transfer error [OWN_CTL]	An error occurred in the DFPC #2 in the D_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL DP#11-DFPC#3 transfer error [OWN_CTL]	An error occurred in the DFPC #3 in the D_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#S1-HFPC#S1 transfer error [OWN_CTL]	An error occurred in the HFPC #S1 in the H_Port #S1 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
	DCTL HP#00-HFPC#0 transfer error [OWN_CTL]	An error occurred in the HFPC #0 in the H_Port #00 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#01-HFPC#1 transfer error [OWN_CTL]	An error occurred in the HFPC #1 in the H_Port #01 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DCTL HP#10-HFPC#2 transfer error [OWN_CTL]	An error occurred in the HFPC #2 in the H_Port #10 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	DCTL HP#11-HFPC#3 transfer error [OWN_CTL]	An error occurred in the HFPC #3 in the H_Port #11 transfer of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01851101	CACHE#0 implementation check error in MP access [OWN_CTL]	The cache memory of the DIMM Slot #0 is not installed. (It was found through the MP access examination.)	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01851201	CACHE#0 implementation check error in Shadow image [OWN_CTL]	A failure occurred during an examination of a size of the cache memory in the DIMM Slot #0.	Full Dump		
01851202	CACHE#0 implementation check error in Shadow image [OWN_CTL]	The size of the cache memory in the DIMM Slot #0 was that which could not be controlled by the data transfer control LSI (DCTL).	Full Dump		
01851211	CACHE#1 implementation check error in Shadow image [OWN_CTL]	A failure occurred during an examination of a size of the cache memory in the DIMM Slot #1.	Full Dump		
01851212	CACHE#1 implementation check error in Shadow image [OWN_CTL]				
01851401	CACHE#0 implementation check error in Shadow image & TWSI [OWN_CTL]	The result of an examination of a size of the cache memory in the DIMM Slot #0 was different from the size information written in the cache memory.	Full Dump		
01851411	CACHE#1 implementation check error in Shadow image & TWSI [OWN_CTL]	The result of an examination of a size of the cache memory in the DIMM Slot #1 was different from the size information written in the cache memory.	Full Dump		
01851501	CACHE#0 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #0.	Full Dump		
01851502	CACHE#0 data line error [OWN_CTL]				
01851511	CACHE#1 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #1.	Full Dump		
01851512	CACHE#1 data line error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01851601	CACHE#0 address line error [OWN_CTL]	Inconsistency between write and read data was detected in the address line test of the cache memory in the DIMM Slot #0.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01851611	CACHE#1 address line error [OWN_CTL]	Inconsistency between write and read data was detected in the address line test of the cache memory in the DIMM Slot #1.	Full Dump		
01851701	CACHE#0 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the cache memory in the DIMM Slot #0.	Full Dump		
01851711	CACHE#1 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the cache memory in the DIMM Slot #1.	Full Dump		
01851B01	CACHE#0 data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the RMW address switching R/W test of the cache memory in the DIMM Slot #0.	Full Dump		
01851B02	CACHE#0 data compare error [OWN_CTL]				
01851B03	CACHE#0 data compare error [OWN_CTL]				
01851C01	CACHE#0/1 size mismatch [OWN_CTL]	The size of SLOT #0 and SLOT #1 are inconsistent in the Cache pair installation check.	Full Dump		
01851C02	CACHE#2/3 size mismatch [OWN_CTL]	The size of SLOT #2 and SLOT #3 are inconsistent in the Cache pair installation check.	Full Dump		
01851D01	CACHE#0 data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Data Write Mask R/W test of the cache memory in the DIMM Slot #0.	Full Dump		
01851D02	CACHE#0 data compare error [OWN_CTL]				
01851D03	CACHE#0 data compare error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01851D11	CACHE#1 data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the Data Write Mask R/W test of the cache memory in the DIMM Slot #1.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01851D12	CACHE#1 data compare error [OWN_CTL]				
01851D13	CACHE#1 data compare error [OWN_CTL]				
01852101	CACHE#0 ECC R/W data compare error [OWN_CTL]	Inconsistency between the write and read data was detected in the ECC R/W test of the cache memory in the DIMM Slot #0.	Full Dump		
01852201	CACHE#0 ECC circuit error [OWN_CTL]	The ECC correctable error was not detected in the ECC circuit test of the cache memory in the DIMM Slot #0.	Full Dump		
01852202	CACHE#0 ECC circuit error [OWN_CTL]				
01852203	CACHE#0 ECC circuit error [OWN_CTL]				
01852204	CACHE#0 ECC circuit error [OWN_CTL]				
01852205	CACHE#0 ECC circuit error [OWN_CTL]				
01852209	CACHE#0 ECC circuit error [OWN_CTL]				
0185220A	CACHE#0 ECC circuit error [OWN_CTL]				
0185220B	CACHE#0 ECC circuit error [OWN_CTL]				
0185220C	CACHE#0 ECC circuit error [OWN_CTL]				
0185220D	CACHE#0 ECC circuit error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01852211	CACHE#0 ECC circuit error [OWN_CTL]	The ECC correctable error was not detected in the ECC circuit test of the cache memory in the DIMM Slot #0.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01852212	CACHE#0 ECC circuit error [OWN_CTL]				
01852213	CACHE#0 ECC circuit error [OWN_CTL]				
01852214	CACHE#0 ECC circuit error [OWN_CTL]				
01852215	CACHE#0 ECC circuit error [OWN_CTL]				
01852219	CACHE#0 ECC circuit error [OWN_CTL]				
0185221A	CACHE#0 ECC circuit error [OWN_CTL]				
0185221B	CACHE#0 ECC circuit error [OWN_CTL]				
0185221C	CACHE#0 ECC circuit error [OWN_CTL]				
0185221D	CACHE#0 ECC circuit error [OWN_CTL]				
01852301	CACHE#0 ECC circuit error [OWN_CTL]				
01852302	CACHE#0 ECC circuit error [OWN_CTL]				
01852303	CACHE#0 ECC circuit error [OWN_CTL]				
01852304	CACHE#0 ECC circuit error [OWN_CTL]				
01852305	CACHE#0 ECC circuit error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01852311	CACHE#0 ECC circuit error [OWN_CTL]	The ECC correctable error was not detected in the ECC circuit test of the cache memory in the DIMM Slot #0.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01852312	CACHE#0 ECC circuit error [OWN_CTL]				
01852313	CACHE#0 ECC circuit error [OWN_CTL]				
01852314	CACHE#0 ECC circuit error [OWN_CTL]				
01852315	CACHE#0 ECC circuit error [OWN_CTL]				
01852401	CACHE#0 ECC circuit error [OWN_CTL]				
01852402	CACHE#0 ECC circuit error [OWN_CTL]				
01852403	CACHE#0 ECC circuit error [OWN_CTL]				
01852404	CACHE#0 ECC circuit error [OWN_CTL]				
01852405	CACHE#0 ECC circuit error [OWN_CTL]				
01852406	CACHE#0 ECC circuit error [OWN_CTL]				
01852407	CACHE#0 ECC circuit error [OWN_CTL]				
01852408	CACHE#0 ECC circuit error [OWN_CTL]				
01852409	CACHE#0 ECC circuit error [OWN_CTL]				
01852411	CACHE#0 ECC circuit error [OWN_CTL]				
01852412	CACHE#0 ECC circuit error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01852413	CACHE#0 ECC circuit error [OWN_CTL]	The ECC correctable error was not detected in the ECC circuit test of the cache memory in the DIMM Slot #0.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01852414	CACHE#0 ECC circuit error [OWN_CTL]				
01852415	CACHE#0 ECC circuit error [OWN_CTL]				
01852416	CACHE#0 ECC circuit error [OWN_CTL]				
01852417	CACHE#0 ECC circuit error [OWN_CTL]				
01852418	CACHE#0 ECC circuit error [OWN_CTL]				
01852419	CACHE#0 ECC circuit error [OWN_CTL]				
01852501	CACHE#0 ECC circuit error [OWN_CTL]				
01852502	CACHE#0 ECC circuit error [OWN_CTL]				
01852503	CACHE#0 ECC circuit error [OWN_CTL]				
01852504	CACHE#0 ECC circuit error [OWN_CTL]				
01852505	CACHE#0 ECC circuit error [OWN_CTL]				
01852506	CACHE#0 ECC circuit error [OWN_CTL]				
01852511	CACHE#0 ECC circuit error [OWN_CTL]				
01852512	CACHE#0 ECC circuit error [OWN_CTL]				
01852513	CACHE#0 ECC circuit error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01852514	CACHE#0 ECC circuit error [OWN_CTL]	The ECC uncorrectable error was not detected in the ECC circuit test of the cache memory in the DIMM Slot #0.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01852515	CACHE#0 ECC circuit error [OWN_CTL]				
01852516	CACHE#0 ECC circuit error [OWN_CTL]				
01852601	CACHE#0 ECC circuit error [OWN_CTL]				
01852602	CACHE#0 ECC circuit error [OWN_CTL]				
01852603	CACHE#0 ECC circuit error [OWN_CTL]				
01852611	CACHE#0 ECC circuit error [OWN_CTL]				
01852612	CACHE#0 ECC circuit error [OWN_CTL]				
01852613	CACHE#0 ECC circuit error [OWN_CTL]				
01852701	CACHE#0 ECC circuit error [OWN_CTL]				
01852702	CACHE#0 ECC circuit error [OWN_CTL]				
01852703	CACHE#0 ECC circuit error [OWN_CTL]				
01852711	CACHE#0 ECC circuit error [OWN_CTL]				
01852712	CACHE#0 ECC circuit error [OWN_CTL]				
01852713	CACHE#0 ECC circuit error [OWN_CTL]				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01853101	CACHE#0 unsupported [OWN_CTL]	The peculiar code of the cache memory in the DIMM Slot #0 was illegal.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
01853111	CACHE#1 unsupported [OWN_CTL]	The peculiar code of the cache memory in the DIMM Slot #1 was illegal.	Full Dump		
01853121	CACHE#2 unsupported [OWN_CTL]	The peculiar code of the cache memory in the DIMM Slot #2 was illegal.	Full Dump		
01853131	CACHE#3 unsupported [OWN_CTL]	The peculiar code of the cache memory in the DIMM Slot #3 was illegal.	Full Dump		
01853201	CACHE#0 unsupported [OWN_CTL]	The capacity of the cache memory in the DIMM Slot #0 is not supported.	Full Dump	③ If not recovered, replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01853211	CACHE#1 unsupported [OWN_CTL]	The capacity of the cache memory in the DIMM Slot #1 is not supported.	Full Dump		
01853221	CACHE#2 unsupported [OWN_CTL]	The capacity of the cache memory in the DIMM Slot #2 is not supported.	Full Dump		
01853231	CACHE#3 unsupported [OWN_CTL]	The capacity of the cache memory in the DIMM Slot #3 is not supported.	Full Dump		
01853311	CACHE#1 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #1.	Full Dump		
01853312	CACHE#1 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #1.	Full Dump		
01853321	CACHE#2 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #2.	Full Dump		
01853322	CACHE#2 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #2.	Full Dump		
01853331	CACHE#3 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #3.	Full Dump		
01853332	CACHE#3 data line error [OWN_CTL]	Inconsistency between write and read data was detected in the data line test of the cache memory in the DIMM Slot #3.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01853411	CACHE#1 address line error [OWN_CTL]	Inconsistency between write and read data was detected in the address line test of the cache memory in the DIMM Slot #1.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01853421	CACHE#2 address line error [OWN_CTL]	Inconsistency between write and read data was detected in the address line test of the cache memory in the DIMM Slot #2.	Full Dump		
01853431	CACHE#3 address line error [OWN_CTL]	Inconsistency between write and read data was detected in the address line test of the cache memory in the DIMM Slot #3.	Full Dump		
01853511	CACHE#1 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the cache memory in the DIMM Slot #1.	Full Dump		
01853521	CACHE#2 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the cache memory in the DIMM Slot #2.	Full Dump		
01853531	CACHE#3 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the cache memory in the DIMM Slot #3.	Full Dump		
01853911	CACHE#1 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #1.	Full Dump		
01853912	CACHE#1 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #1.	Full Dump		
01853913	CACHE#1 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #1.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01853921	CACHE#2 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #2.	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01853922	CACHE#2 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #2.	Full Dump		
01853923	CACHE#2 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #2.	Full Dump		
01853931	CACHE#3 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #3.	Full Dump		
01853932	CACHE#3 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #3.	Full Dump		
01853933	CACHE#3 data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the data write mask R/W test of the cache memory in the DIMM Slot #3.	Full Dump		
01864101	RTC memory data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the R/W test of the RTC memory.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01875101	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the PCI force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875102	ECTL error force NG [OWN_CTL]	An error expected in the PCI force Test of the ENCLOSURE part control LSI (ECTL) has not occurred.	Full Dump		
01875103	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the PCI force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875201	ECTL register data compare error [OWN_CTL]	The Write value and the Read value are inconsistent in the register R/W Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01875241	ECTL status error [OWN_CTL]	An illegal Error Status occurred in the resister R/W Test of the ENCLOSURE part control LSI (ECTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01875301	ECTL RAM data line error [OWN_CTL]	The Write value and the Read value are inconsistent in the internal RAM Data Line Test of the ENCLOSURE part control LSI (ECTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01875302	ECTL RAM address line error [OWN_CTL]	The Write value and the Read value are inconsistent in the internal RAM Address Line Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875303	ECTL RAM fixed value error [OWN_CTL]	The fixed value of the internal RAM of the ENCLOSURE part control LSI (ECTL) is inconsistent with the value at the normal time.	Full Dump		
01875341	ECTL status error [OWN_CTL]	An illegal Error Status occurred in the internal RAM Data Line Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875342	ECTL status error [OWN_CTL]	An illegal Error Status occurred in the internal RAM Address Line Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875401	ECTL command counter error [OWN_CTL]	The value of the counter after executing the counting up was illegal in the command counter Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875402	ECTL command counter error [OWN_CTL]	An illegal Error Status occurred after executing the counting up in the command counter Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875403	ECTL command counter error [OWN_CTL]	The abnormality of the interruption signal line was detected in the command counter Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875404	ECTL command counter error [OWN_CTL]	The abnormality of the interruption signal line was detected in the command counter Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01875501	ECTL error force NG [OWN_CTL]	The READ_AREA_WRITE_ ERR has not occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01875502	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01875503	ECTL error force NG [OWN_CTL]	The D_CMD_PERR or CNT_PERR has not occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875504	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875505	ECTL error force NG [OWN_CTL]	The ECTL_RAM_PERR has not occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875506	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875507	ECTL error force NG [OWN_CTL]	The MEM_ADRESS_PERR has not occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875508	ECTL error force NG [OWN_CTL]	An illegal Error Status occurred in the internal force Test of the ENCLOSURE part control LSI (ECTL).	Full Dump		
01875601	ECTL ENC I/F error [OWN_CTL]	The data which did Write in the I/F Test between the ENC microprograms of the ENCLOSURE part control LSI (ECTL) was not reflected on the Read area in the default time.	Full Dump		
01875641	ECTL status error [OWN_CTL]	An illegal Error Status occurred in the I/F Test between the ENC microprograms of the ENCLOSURE part control LSI (ECTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D05101	DFPC#0 MADDR error [OWN_CTL]	The MADDR value of the DFPC #0 was illegal.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01D05301	DFPC#0 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #0.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01D05302	DFPC#0 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #0.	Full Dump		
01D05303	DFPC#0 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the DFPC #0.	Full Dump		
01D05401	DFPC#0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #0.	Full Dump		
01D05402	DFPC#0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #0.	Full Dump		
01D05601	DFPC#1 MADDR error [OWN_CTL]	The MADDR value of the DFPC #1 was illegal.	Full Dump		
01D05801	DFPC#1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #1.	Full Dump		
01D05802	DFPC#1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #1.	Full Dump		
01D05803	DFPC#1 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the DFPC #1.	Full Dump		
01D05901	DFPC#1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #1.	Full Dump		
01D05902	DFPC#1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #1.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D06101	DFPC#2 MADDR error [OWN_CTL]	The MADDR value of the DFPC #2 was illegal.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01D06301	DFPC#2 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #2.	Full Dump		
01D06302	DFPC#2 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #2.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01D06303	DFPC#2 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the DFPC #2.	Full Dump		
01D06401	DFPC#2 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #2.	Full Dump		
01D06402	DFPC#2 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #2.	Full Dump		
01D06601	DFPC#3 MADDR error [OWN_CTL]	The MADDR value of the DFPC #3 was illegal.	Full Dump		
01D06801	DFPC#3 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #3.	Full Dump		
01D06802	DFPC#3 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the DFPC #3.	Full Dump		
01D06803	DFPC#3 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the DFPC #3.	Full Dump		
01D06901	DFPC#3 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #3.	Full Dump		
01D06902	DFPC#3 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the DFPC #3.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D0xxC1	DFPC#0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxC2	DFPC#0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxC3	DFPC#0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D0xxC4	DFPC#0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxC5	DFPC#0 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the DFPC#0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the DFPC#1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the DFPC#2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the DFPC#3. x : Diagnostic item code	Full Dump		
01D0xxC6	DFPC#0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D0xxC7	DFPC#0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxC8	DFPC#0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxC9	DFPC#0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D0xxCA	DFPC#0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxCB	DFPC#0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxCC	DFPC#0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D0xxCD	DFPC#0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxCE	DFPC#0 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		
01D0xxCF	DFPC#0 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the DFPC #0. x : Diagnostic item code	Full Dump		
	DFPC#1 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the DFPC #3. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D57101	HFPC#0 MADDR error [OWN_CTL]	The MADDR value of the HFPC #0 was illegal.	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
01D57301	HFPC#0 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #0.	Full Dump		
01D57302	HFPC#0 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #0.	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
01D57303	HFPC#0 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the HFPC #0.	Full Dump	③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01D57401	HFPC#0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #0.	Full Dump		
01D57402	HFPC#0 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #0.	Full Dump		
01D57601	HFPC#1 MADDR error [OWN_CTL]	The MADDR value of the HFPC #1 was illegal.	Full Dump		
01D57801	HFPC#1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #1.	Full Dump		
01D57802	HFPC#1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #1.	Full Dump		
01D57803	HFPC#1 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the HFPC #1.	Full Dump		
01D57901	HFPC#1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #1.	Full Dump		
01D57902	HFPC#1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #1.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D58101	HFPC#2 MADDR error [OWN_CTL]	The MADDR value of the HFPC #2 was illegal.	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message. ② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on. ③ If not recovered, replace Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01D58301	HFPC#2 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #2.	Full Dump		
01D58302	HFPC#2 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #2.	Full Dump		
01D58303	HFPC#2 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the HFPC #2.	Full Dump		
01D58401	HFPC#2 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #2.	Full Dump		
01D58402	HFPC#2 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #2.	Full Dump		
01D58601	HFPC#3 MADDR error [OWN_CTL]	The MADDR value of the HFPC #3 was illegal.	Full Dump		
01D58801	HFPC#3 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #3.	Full Dump		
01D58802	HFPC#3 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #3.	Full Dump		
01D58803	HFPC#3 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the HFPC #3.	Full Dump		
01D58901	HFPC#3 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #3.	Full Dump		
01D58902	HFPC#3 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #3.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D59101	HFPC#S1 MADDR error [OWN_CTL]	The MADDR value of the HFPC #S1was illegal.	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01D59301	HFPC#S1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #S1.	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01D59302	HFPC#S1 register data compare error [OWN_CTL]	Inconsistency between write and read data was detected in the register R/W test of the HFPC #S1.	Full Dump		
01D59303	HFPC#S1 hard status error [OWN_CTL]	An illegal error status occurred in the register R/W test of the HFPC #S1.	Full Dump		
01D59401	HFPC#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #S1.	Full Dump		
01D59402	HFPC#S1 transfer data compare error [OWN_CTL]	The transferred data was inconsistent with test data of a sender in the test of transfer between the local memories (CSDSs) of the HFPC #S1.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC1	HFPC #S1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC2	HFPC #S1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC3	HFPC #S1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC4	HFPC#S1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC5	HFPC #S1 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The FCP_CMND was not stored in the SFQ area of the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC6	HFPC #S1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC7	HFPC #S1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC8	HFPC #S1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxC9	HFPC #S1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCA	HFPC #S1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The ERQ consumer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCB	HFPC #S1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The INT did not occur in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCC	HFPC #S1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The IMQ producer index was not upped in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCD	HFPC #S1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The expected completion message was not got in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCE	HFPC #S1 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	The FCP_RSP was not transferred in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01D5xxCF	HFPC #S1 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the HFPC #S1. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #0 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the HFPC #0. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #1 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the HFPC #1. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC #2 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the HFPC #2. x : Diagnostic item code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC #3 loop back transfer error [OWN_CTL]	An error occurred in the loop back transfer of the HFPC #3. x : Diagnostic item code	Full Dump	②In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DA02xx	ISPC#0 Execute Firmware status error [OWN_CTL]	A failure was detected by executing the Firmware. x : Detailed error code	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the iSCSI Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
01DA03xx	ISPC#0 Local RAM status error [OWN_CTL]	A failure was detected by the read/write Test of the Local RAM (DDR). x : Detailed error code	Full Dump	②In a case other than ①, replace the iSCSI Interface Board #0 of the Control Unit whose CALM LED is on.	
01DA04xx	ISPC#0 RISC RAM status error [OWN_CTL]	A failure was detected by the Test of the RISC RAM (SSRAM). x : Detailed error code	Full Dump		

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01DA05xx	ISPC#0 NVRAM status error [OWN_CTL]	A failure was detected by the Test of the NVRAM. x : Detailed error code	Full Dump	③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DA06xx	ISPC#0 Mailbox register test status error [OWN_CTL]	A failure was detected by the Mailbox register Test. x : Detailed error code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DA09xx	ISPC#0 About Firmware status error [OWN_CTL]	A failure was detected by the version information acquisition Test of the Firmware. x : Detailed error code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the iSCSI Interface Board #0 of the Control Unit pointed out in the message. ② In a case other than ①, replace the iSCSI Interface Board #0 of the Control Unit whose CALM LED is on. ③ If not recovered, replace Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DA25xx	ISPC#0 Write Flash ROM status error [OWN_CTL]	A failure was detected by the Write Flash ROM of the Firmware. x : Detailed error code	Full Dump		
01DA60xx	ISPC#0 Initialize Firmware status error [OWN_CTL]	A failure was detected by Initialize of the Firmware. x : Detailed error code	Full Dump		
01DA63xx	ISPC#0 Set DDE status error [OWN_CTL]	A failure was detected by the Set Device Database Entry. x : Detailed error code	Full Dump		
01DAFAxx	ISPC#0 Firmware boot status error [OWN_CTL]	A failure was detected by the boot of the Firmware. x : Detailed error code	Full Dump		
01DAFFxx	ISPC#0 No operation status error [OWN_CTL]	A failure was detected by the isolation status acquisition Test. x : Detailed error code	Full Dump		
01DDA101	DCTL HP#00 transfer error [OWN_CTL]	The transfer failed in the H_Port#00 Transfer Test of the data transfer control LSI (DCTL).	Full Dump		
01DDA102	DCTL HP#00 transfer time out error [OWN_CTL]	The transfer became a time-out in the H_Port#00 Transfer Test of the data transfer control LSI (DCTL).	Full Dump		
01DDA103	DCTL HP#00 transfer data compare error [OWN_CTL]	The data transferred in the H_Port #00 Transfer Test of the Data transfer control LSI (DCTL) was not corresponding to the expected correct data (data part).	Full Dump		
01DDA104	DCTL HP#00 transfer data compare error [OWN_CTL]	The data transferred in the H_Port #00 Transfer Test of the Data transfer control LSI (DCTL) was not corresponding to the expected correct data (data part).	Full Dump		
01DDA121	DCTL HP#00-ISPC#0 transfer error [OWN_CTL]	The transfer failed in the ISPC#0 Transfer Test from the H_Port#00 of the data transfer control LSI (DCTL).	Full Dump		
01DDA601	DCTL HP#01 transfer error [OWN_CTL]	The transfer failed in the H_Port#01 Transfer Test of the data transfer control LSI (DCTL).	Full Dump		
01DDA602	DCTL HP#01 transfer time out error [OWN_CTL]	The transfer became a time-out in the H_Port#01 Transfer Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDA603	DCTL HP#01 transfer data compare error [OWN_CTL]	The data transferred in the H_Port #01 Transfer Test of the Data transfer control LSI (DCTL) was not corresponding to the expected correct data (data part).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, replace the iSCSI Interface Board #0 of the Control Unit pointed out in the message. ②In a case other than ①, replace the iSCSI Interface Board #0 of the Control Unit whose CALM LED is on.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
01DDA604	DCTL HP#01 transfer data compare error [OWN_CTL]	The data transferred in the H_Port #01 Transfer Test of the Data transfer control LSI (DCTL) was not corresponding to the expected correct data (data part).	Full Dump		
01DDA621	DCTL HP#01-ISPC#1 transfer error [OWN_CTL]	The transfer failed in the ISPC#1 Transfer Test from the H_Port#01 of the data transfer control LSI (DCTL).	Full Dump	③If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE101	DCTL HP#00 access error force NG [OWN_CTL]	The RCTL_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ②Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE102	DCTL HP#00 access error force NG [OWN_CTL]	The RCLK_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE103	DCTL HP#00 access error force NG [OWN_CTL]	The CADROV does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE104	DCTL HP#00 access error force NG [OWN_CTL]	The BLEN0_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE105	DCTL HP#00 access error force NG [OWN_CTL]	The WORDCNT_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE106	DCTL HP#00 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE107	DCTL HP#00 access error force NG [OWN_CTL]	The 512_ADR_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE108	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_GEN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE109	DCTL HP#00 access error force NG [OWN_CTL]	The PCI_ADR_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE10B	DCTL HP#00 access error force NG [OWN_CTL]	The DRD_PTY_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE10C	DCTL HP#00 access error force NG [OWN_CTL]	The LUN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE10D	DCTL HP#00 access error force NG [OWN_CTL]	The LBA_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE10E	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE10F	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
0DDE110	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_GEN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE111	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_UNCORRECT does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE112	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_COR_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE114	DCTL HP#00 access error force NG [OWN_CTL]	The DRD_PTY_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE115	DCTL HP#00 access error force NG [OWN_CTL]	The LUN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE116	DCTL HP#00 access error force NG [OWN_CTL]	The LBA_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE117	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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01DDE118	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE119	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_GEN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump	①When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE11A	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_UNCORRECT does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE11B	DCTL HP#00 access error force NG [OWN_CTL]	The ECC_COR_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE11C	DCTL HP#00 access error force NG [OWN_CTL]	The DRD_PTY_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE11D	DCTL HP#00 access error force NG [OWN_CTL]	The LUN_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE11E	DCTL HP#00 access error force NG [OWN_CTL]	The LBA_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE11F	DCTL HP#00 access error force NG [OWN_CTL]	The LRC_ERR does not occur in the H_Port#00 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE201	DCTL HP#01 access error force NG [OWN_CTL]	The RCTL_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE202	DCTL HP#01 access error force NG [OWN_CTL]	The RCLK_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE203	DCTL HP#01 access error force NG [OWN_CTL]	The CADROV_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE204	DCTL HP#01 access error force NG [OWN_CTL]	The BLEN0_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE205	DCTL HP#01 access error force NG [OWN_CTL]	The WORDCNT_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE206	DCTL HP#01 access error force NG [OWN_CTL]	The DBF_BYTE_WR (Block) does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE207	DCTL HP#01 access error force NG [OWN_CTL]	The 512_ADR_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE208	DCTL HP#01 access error force NG [OWN_CTL]	The LRC_GEN_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE209	DCTL HP#01 access error force NG [OWN_CTL]	The PCI_ADR_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE20B	DCTL HP#01 access error force NG [OWN_CTL]	The DRD_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE20C	DCTL HP#01 access error force NG [OWN_CTL]	The LUN_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE20D	DCTL HP#01 access error force NG [OWN_CTL]	The LBA_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE20E	DCTL HP#01 access error force NG [OWN_CTL]	The LRC_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE20F	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_WR_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE210	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_GEN_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE211	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_UNCORRECT does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE212	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_COR_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE214	DCTL HP#01 access error force NG [OWN_CTL]	The BLKCNT_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE215	DCTL HP#01 access error force NG [OWN_CTL]	The WORDCNT_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE216	DCTL HP#01 access error force NG [OWN_CTL]	The ADRCNT_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE217	DCTL HP#01 access error force NG [OWN_CTL]	The LBACNT_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE218	DCTL HP#01 access error force NG [OWN_CTL]	The CTLCNT_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE219	DCTL HP#01 access error force NG [OWN_CTL]	The ADR_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21A	DCTL HP#01 access error force NG [OWN_CTL]	The WLEN_PTY_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21B	DCTL HP#01 access error force NG [OWN_CTL]	The ECC_CORRECT does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21C	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_LUN_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21D	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_LBA_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21E	DCTL HP#01 access error force NG [OWN_CTL]	The EDC_CRC_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE21F	DCTL HP#01 access error force NG [OWN_CTL]	The CRC_GEN_ERR does not occur in the H_Port#01 Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE601	DCTL host PCI0 error force NG [OWN_CTL]	The D_PERR does not occur in the Host PCI Bridge#0 (Cache access side) Force Test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE602	DCTL host PCI0 error force NG [OWN_CTL]	The S_T_ABORT does not occur in the Host PCI Bridge#0 (Cache access side) Force Test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE603	DCTL host PCI0 error force NG [OWN_CTL]	The DSCON_CNT_PTYERR does not occur in the Host PCI Bridge#0 (Cache access side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE604	DCTL host PCI0 error force NG [OWN_CTL]	The D_PERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE605	DCTL host PCI0 error force NG [OWN_CTL]	The R_SERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE606	DCTL host PCI0 error force NG [OWN_CTL]	The R_M_ABORT does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE607	DCTL host PCI0 error force NG [OWN_CTL]	The R_T_ABORT does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE608	DCTL host PCI0 error force NG [OWN_CTL]	The S_T_ABORT does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE609	DCTL host PCI0 error force NG [OWN_CTL]	The DPERR_D does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE60A	DCTL host PCI0 error force NG [OWN_CTL]	The ADR_PTY_ERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE60B	DCTL host PCI0 error force NG [OWN_CTL]	The DRD_PTY_ERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE60C	DCTL host PCI0 error force NG [OWN_CTL]	The CMD_PTY_ERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01DDE60D	DCTL host PCI0 error force NG [OWN_CTL]	The CNT_PTY_ERR does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
01DDE60E	DCTL host PCI0 error force NG [OWN_CTL]	The TIME_OUT does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01DDE60F	DCTL host PCI0 error force NG [OWN_CTL]	The SPC_TIME_OUT does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE610	DCTL host PCI0 error force NG [OWN_CTL]	The SPC_ERR_MSG does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01DDE611	DCTL host PCI0 error force NG [OWN_CTL]	The UNEXPECT_SPC does not occur in the Host PCI Bridge#0 (Bridge side) Force Test of the data transfer control LSI (DCTL).	Full Dump		
01xxxxA0	TWSI read access error [OWN_CTL]	The TWSI (Two Wired Serial Interface) read access failed. x : Diagnostic item code	Full Dump		
01xxxxA1	TWSI read access error [OWN_CTL]	The TWSI (Two Wired Serial Interface) read access failed. x : Diagnostic item code	Full Dump		
01xxxxA8	CSDS data path parity error [OWN_CTL]	A data path parity error occurred in the local memory (CSDS). x : Diagnostic item code	Full Dump		
01xxxxA9	CSDS 2bit ECC error [OWN_CTL]	A 2-bit ECC error occurred in the local memory (CSDS). x : Diagnostic item code	Full Dump		
01xxxxAA	CSDS 1bit ECC error [OWN_CTL]	A 1-bit ECC error occurred in the local memory (CSDS). x : Diagnostic item code	Full Dump		
01xxxxAC	Bridge SRAM 2bit ECC error [OWN_CTL]	The 2-bit ECC error occurred in the SRAM in the bridge. x : Diagnostic item code	Full Dump		
01xxxxAD	Bridge SRAM 1bit ECC error [OWN_CTL]	The 1-bit ECC error occurred in the SRAM in the bridge. x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB1	DFPC#0 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the DFPC #0, the INT did not occur. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the DFPC #1, the INT did not occur. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the DFPC #2, the INT did not occur. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the DFPC #3, the INT did not occur. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the HFPC #S1, the INT did not occur. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the HFPC #0, the INT did not occur. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	Though the loop initialize instruction was issued in the loop initialization of the HFPC #1, the INT did not occur. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	Though the Loop Initialize instruction was issued in the loop initialize of the HFPC #2, the INT did not occur. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	Though the loop initialize instruction was issued in the loop initialization of the HFPC #3, the INT did not occur. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	

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				③ If not recovered, replace Control Unit.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB2	DFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB3	DFPC#0 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The expected completion message could not be got in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB4	DFPC#0 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The expected Frame Manager Status could not be got in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB5	DFPC#0 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The INT did not occur in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB6	DFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB7	DFPC#0 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB8	DFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The IMQ producer index was not upped in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxB9	DFPC#0 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The expected frame manager status was not got in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxBA	DFPC#0 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The SFQ producer index was not upped in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxBB	DFPC#0 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The loop map was incorrect in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxBC	DFPC#0 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	The expected Frame Manager status could not be got in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxBD	DFPC#0 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 loop initialize error [OWN_CTL]	An error occurred in the loop initialize of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxD1	DFPC#0 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the DFPC #1. x : Diagnostic item code	Full Dump		
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the HFPC #1. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 soft reset error [OWN_CTL]	The NPT was incorrect in the soft reset of the HFPC #3. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxD2	DFPC#0 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the DFPC #1. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 soft reset error [OWN_CTL]	The SRO was incorrect in the soft reset of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxD3	DFPC#0 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the DFPC #1. x : Diagnostic item code	Full Dump		
	DFPC#2 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the DFPC #2. x : Diagnostic item code	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#3 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the HFPC #1. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 soft reset error [OWN_CTL]	The OFFLINE was incorrect in the soft reset of the HFPC #3. x : Diagnostic item code	Full Dump	② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxD4	DFPC#0 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the DFPC #1. x : Diagnostic item code	Full Dump		
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the HFPC #1. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 soft reset error [OWN_CTL]	The SSDR was incorrect in the soft reset of the HFPC #3. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxD5	DFPC#0 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the DFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
	DFPC#1 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the DFPC #1. x : Diagnostic item code	Full Dump		
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	DFPC#2 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the DFPC #2. x : Diagnostic item code	Full Dump		
	DFPC#3 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the DFPC #3. x : Diagnostic item code	Full Dump		
	HFPC#S1 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the HFPC #S1. x : Diagnostic item code	Full Dump		
	HFPC#0 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the HFPC #0. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #0 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#1 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the HFPC #1. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #0 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
	HFPC#2 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the HFPC #2. x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, replace the FC Interface Board #1 of the Control Unit pointed out in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
	HFPC#3 soft reset error [OWN_CTL]	The RCS was incorrect in the soft reset of the HFPC #3. x : Diagnostic item code	Full Dump		
				② In a case other than ①, replace the FC Interface Board #1 of the Control Unit whose CALM LED is on.	
				③ If not recovered, replace Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxE0	CACHE#0 ECC uncorrectable error [OWN_CTL]	An ECC uncorrectable error occurred in the cache memory of the DIMM Slot #0. x : Diagnostic item code	Full Dump	① Check whether a cache memory is installed in the cache slot #0 of the Control Unit whose CALM LED is on. If it is not installed, install a cache memory in the cache slot #0. ② When the cache memory is installed firmly, replace it. If not, install it firmly in the cache memory slot. ③ If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01xxxxE1	CACHE#1 ECC uncorrectable error [OWN_CTL]	An ECC uncorrectable error occurred in the cache memory of the DIMM Slot #1. x : Diagnostic item code	Full Dump		
01xxxxE2	CACHE#2 ECC uncorrectable error [OWN_CTL]	An ECC uncorrectable error occurred in the cache memory of the DIMM Slot #2. x : Diagnostic item code	Full Dump		
01xxxxE3	CACHE#3 ECC uncorrectable error [OWN_CTL]	An ECC uncorrectable error occurred in the cache memory of the DIMM Slot #3. x : Diagnostic item code	Full Dump		
01xxxxE4	CACHE#0 ECC correctable error [OWN_CTL]	An ECC correctable error occurred in the cache memory of the DIMM Slot #0. x : Diagnostic item code	Full Dump		
01xxxxE5	CACHE#1 ECC correctable error [OWN_CTL]	An ECC correctable error occurred in the cache memory of the DIMM Slot #1. x : Diagnostic item code	Full Dump		
01xxxxE6	CACHE#2 ECC correctable error [OWN_CTL]	An ECC correctable error occurred in the cache memory of the DIMM Slot #2. x : Diagnostic item code	Full Dump		
01xxxxE7	CACHE#3 ECC correctable error [OWN_CTL]	An ECC correctable error occurred in the cache memory of the DIMM Slot #3. x : Diagnostic item code	Full Dump		
01xxxxEA	DCTL error MP_ERROR [OWN_CTL]	An error status occurred in the MP_ERROR register of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01xxxxEE	MCTL error MPINT [OWN_CTL]	An error status occurred in the MPINT register of MCTL in the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxF1	Bridge PCI0 status error [OWN_CTL]	An error status occurred in the bridge PCI0. x : Diagnostic item code	Full Dump		
01xxxxF2	Bridge PCI1 status error [OWN_CTL]	An error status occurred in the bridge PCI1. x : Diagnostic item code	Full Dump		
01xxxxF3	DCTL primary PCI status error [OWN_CTL]	An error status occurred in the primary PCI of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
01xxxxF4	DCTL primary PCI status error [OWN_CTL]	An error status occurred in the primary PCI of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
01xxxxF5	DCTL host PCI0 status error [OWN_CTL]	An error status occurred in the Host PCI0 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxF6	DCTL host PCI0 status error [OWN_CTL]	An error status occurred in the Host PCI0 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxF7	DCTL host PCI1 status error [OWN_CTL]	An error status occurred in the Host PCI1 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxF8	DCTL host PCI1 status error [OWN_CTL]	An error status occurred in the Host PCI1 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxF9	DCTL drive PCI0 status error [OWN_CTL]	An error status occurred in the Drive PCI0 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxFA	DCTL drive PCI0 status error [OWN_CTL]	An error status occurred in the Drive PCI0 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxFB	DCTL drive PCI1 status error [OWN_CTL]	An error status occurred in the Drive PCI1 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxFC	DCTL drive PCI1 status error [OWN_CTL]	An error status occurred in the Drive PCI1 of the data transfer control LSI (DCTL). x : Diagnostic item code	Full Dump		
01xxxxFD	ECTL PCI status error [OWN_CTL]	An error status occurred in the Drive PCI1 of the ENCLOSURE control LSI (ECTL). x : Diagnostic item code	Full Dump		

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Chapter 3. Failure Messages

Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H00200	MCTL data parity error [DP3] [REG80000014, Bit15]	A parity error was detected in data bits 31 to 24 during readout from the M-CTL register.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H00300	MCTL data parity error [DP2] [REG80000014, Bit14]	A parity error was detected in data bits 23 to 16 during readout from the M-CTL register.	CTL Alarm Trace		
H00400	MCTL data parity error [DP1] [REG80000014, Bit13]	A parity error was detected in data bits 15 to 08 during readout from the M-CTL register.	CTL Alarm Trace		
H00500	MCTL data parity error [DP0] [REG80000014, Bit12]	A parity error was detected in data bits 07 to 00 during readout from the M-CTL register.	CTL Alarm Trace		
H00600	MCTL REG access error [RDRGWR] [REG80000014, Bit11]	A writing was done on the read-only register of the M-CTL.	CTL Alarm Trace		
H00700	CTC parity error (CH-0) [REG80000014, Bit5]	A parity error was detected in the timer CH0 of the M-CTL	Simple Trace		
H00800	CTC parity error (CH-1) [REG80000014, Bit4]	A parity error was detected in the timer CH1 of the M-CTL	Simple Trace		
H00900	Watchdog-timer counter parity error [REG80000014, Bit0]	A parity error occurred in the counter for the watchdog timer.	Simple Trace		
H10N0x	DCTL PPCI data parity error [REG8200127C, Bit31] (CTL-x)	The parity error was detected in the DCTL (PPCI). x : Control Unit # (0-1)	Full Dump		
H10P00	DCTL PPCI system error [REG8200127C, Bit30]	A system error was detected in the DCTL (PPCI).	Simple Trace		
H10Q00	DCTL PPCI master abort [REG8200127C, Bit29]	A master abortion was received in the DCTL (PPCI).	Simple Trace		
H10R00	DCTL PPCI received target abort [REG8200127C, Bit28]	A target abortion was received in the DCTL (PPCI).	Simple Trace		
H10S00	DCTL PPCI signaled target abort [REG8200127C, Bit27]	The target abortion was executed in the DCTL (PPCI).	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H10T00	DCTL PPCI PERR detected [REG8200127C, Bit24]	The data buffer controller LSI (D-CTL) asserted or received at the PERR when the bus master was used. (PPCIERR)	Simple Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H10U0x	DCTL PPCI ADR parity error [REG8200127C, Bit23] (CTL-x)	An address parity error was detected in the DCTL. (PPCIERR) x : Control Unit # (0-1)	Full Dump	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H10V00	DCTL PPCI data read parity error [REG8200127C, Bit22]	A parity error was detected in the DCTL in the data read from the data FIFO. (PPCIERR)	Simple Trace		
H10W00	DCTL PPCI CMD parity error [REG8200127C, Bit21]	A parity error was detected in the DCTL (PPCI) when the ADR/CMD was read from the CMD buffer.	Simple Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H10X00	DCTL PPCI CNT parity error [REG8200127C, Bit20]	A parity error was detected in the DCTL (PPCI) during counting by the FIFO control counter.	Simple Trace		
H10Y00	DCTL PPCI target data response time-out [REG8200127C, Bit19]	A data response time-out of a target was detected in the DCTL (PPCI) in the case of the DCTL master.	Simple Trace		
H11000	DCTL H0PCI parity error [REG82001280, Bit31]	The parity error was detected in the DCTL (H#0).	Simple Trace		
H11100	DCTL H0PCI system error [REG82001280, Bit30]	A system error was detected in the DCTL (H#0).	Simple Trace		
H11200	DCTL H0PCI master abort [REG82001280, Bit29]	A master abortion was received in the DCTL (H#0).	Simple Trace		
H11300	DCTL H0PCI received target abort [REG82001280, Bit28]	A target abortion was received in the DCTL (H#0).	Simple Trace		
H11400	DCTL H0PCI signaled target abort [REG82001280, Bit27]	The target abortion was executed in the DCTL (H#0).	Simple Trace		
H11500	DCTL H0PCI PERR detected [REG82001228, Bit24]	The data buffer controller LSI (D-CTL) asserted or received at the PERR when the bus master was used. (H#0)	Simple Trace		
H11600	DCTL H0PCI ADR parity error [REG82001280, Bit23]	An address parity error was detected in the DCTL (H#0).	Simple Trace		
H11700	DCTL H0PCI DRD parity error [REG82001280, Bit22]	A parity error was detected in the DCTL (H#0) in the data read from the data FIFO.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H11800	DCTL H0PCI CMD parity error [REG82001280, Bit21]	A parity error was detected in the DCTL (H#0) when the ADR/CMD was read from the CMD buffer.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H11900	DCTL H0PCI CNT parity error [REG82001280, Bit20]	A parity error was detected in the DCTL (H #0) during counting by the FIFO control counter.	Simple Trace		
H11A00	DCTL H0PCI target data response time-out [REG82001280, Bit19]	A data response time-out of a target was detected in the DCTL (H #0) in the case of the DCTL master.	Simple Trace		
H11C00	DCTL D0PCI parity error [REG82001288, Bit31]	The parity error was detected in the DCTL (D #0).	Simple Trace		
H11D00	DCTL D0PCI system error [REG82001288, Bit30]	A system error was detected in the DCTL (D #0).	Simple Trace		
H11E00	DCTL D0PCI master abort [REG82001288, Bit29]	A master abortion was received in the DCTL (D #0).	Simple Trace		
H11F00	DCTL D0PCI received target abort [REG82001288, Bit28]	A target abortion was received in the DCTL (D #0).	Simple Trace		
H11G00	DCTL D0PCI signaled target abort [REG82001288, Bit27]	The target abortion was executed in the DCTL (D #0).	Simple Trace		
H11H00	DCTL D0PCI PERR detected [REG82001288, Bit24]	The data buffer controller LSI (D-CTL) asserted or received at the PERR when the bus master was used (D #0).	Simple Trace		
H11I00	DCTL D0PCI ADR parity error [REG82001288, Bit23]	An address parity error was detected in the DCTL (D #0).	Simple Trace		
H11J00	DCTL D0PCI DRD parity error [REG82001288, Bit22]	A parity error was detected in the DCTL (D #0) in the data read from the data FIFO.	Simple Trace		
H11K00	DCTL D0PCI CMD parity error [REG82001288, Bit21]	A parity error was detected in the DCTL (D #0) when the ADR/CMD was read from the CMD buffer.	Simple Trace		
H11L00	DCTL D0PCI CNT parity error [REG82001288, Bit20]	A parity error was detected in the DCTL (D #0) during counting by the FIFO control counter.	Simple Trace		
H11M00	DCTL D0PCI target data response time-out [REG82001288, Bit19]	A data response time-out of a target was detected in the DCTL (D #0) in the case of the DCTL master.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H20000	DCTL data parity error [DRDPTYERR] [REG82001238, Bit23]	A data parity error was detected during an output from the data buffer to the PCI bus.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20100	Parity generation LA error [DRR]	Illegal LA was detected when the (DRR Failure)	CTL Alarm Trace	① See Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
H2020x	DCTL byte write error [REG82001238, Bit27] (CTL-x)	Writing access beyond the 4-byte boundary was detected. x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H203A0	DCTL time-out [H_PORT]	D-CTL finish time-out was detected.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H204A1	DCTL time-out [D_PORT]	D-CTL finish time-out was detected.	CTL Alarm Trace		
H205B0	DMA forced stop failed	Forced stopping of DMA failed.	CTL Alarm Trace		
H206B1	DMA#0 hard error end reset failed	Resetting of factors after hardware error end of DRR failed.	CTL Alarm Trace		
H2070x	DCTL dummy area access error [REG82001238, Bit17] (CTL-x)	Access, which was done to the access restricted area in the area for 4-byte dummy data addition of the cache, was detected. x : Control Unit # (0-1)	Full Dump		
H20800	DCTL REF counter parity error [REG82001238, Bit1]	A parity error was detected in the counter for the cache memory refreshment.	Simple Trace		
H2091x	CACHE address over [OTH_CTL] (CTL-x)	A cache address over error occurred in another Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace		
H20A0x	DCTL CACHE address over [MPU] [REG82001238, Bit21] (CTL-x)	The cache address over was detected when the MPU accessed the cache. (MP) x : Control Unit # (0-1)	Full Dump		
H20B0x	DCTL address parity error [MPU] [REG82001238, Bit20] (CTL-x)	An address parity error was detected in the transfer address received by the cache Control Unit. x : Control Unit # (0-1)	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H20C0x	DCTL LEN parity error [REG82001238, Bit19] (CTL-x)	A word length parity error was detected in the transfer word length received by the cache Control Unit. x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20D00	DCTL address over [DMA] [REG82001238, Bit18]	The Cache address over was detected when any of H_Port, D_Port, DMA #0 or MDMA of the data transfer control LSI accessed the Cache.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20E00	DCTL D0PCI unexpected SPC detected [REG82001288, Bit12]	The invalid split completion message was detected (D #0).	Simple Trace		
H20F00	DCTL D0PCI SPC error message [REG82001288, Bit13]	The split completion message that informs of an occurrence of an error was detected (D #0).	Simple Trace		
H20G00	DCTL D0PCI SPC time-out [REG82001288, Bit13]	The data buffer controller LSI (D-CTL) detected time-out of waiting for the split completion (D #0).	Simple Trace		
H20H00	DCTL D0PCI SPC ADB error [REG82001288, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message (D #0).	Simple Trace		
H20J00	DCTL D0PCI master ADB disconnection error [REG82001288, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave (D #0).	Simple Trace		
H20K00	DCTL PPCI ADB error [REG8200127C, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave (PPCIERR).	Simple Trace		
H20L00	DCTL PPCI SPC ADB error [REG8200127C, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message. (PPCIERR)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H20M00	DCTL PPCI SPC time-out [REG8200127C, Bit14]	The data buffer controller LSI (D-CTL) detected time-out of waiting for the split completion (PPCIERR).	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20N00	DCTL PPCI SPC error message [REG8200127C, Bit13]	The split completion message that informs of an occurrence of an error was detected (PPCIERR).	Simple Trace		
H20P00	DCTL PPCI unexpected SPC detected [REG8200127C, Bit12]	The invalid split completion message was detected (PPCIERR).	Simple Trace		
H20Q00	DCTL CACHE ECC uncorrectable error [REG82001238, Bit29] (CTL-x, CACHE-y)	During a reading from the cache, an ECC error of two or more bits occurred in the two cache memory boards (MP). x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Full Dump	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
H20R0x	DCTL DBUF byte write error [REG82001238, Bit16] (CTL-x)	Writing to the outside of the 4-byte boundary was detected in the ByteCnt in the PCI attribute (MP). x : Control Unit # (0-1)	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20S0x	DCTL PBUF SELCNT parity error [REG82001238, Bit15] (CTL-x)	A parity error was detected in the counter for the input pointer of a buffer for writing to the cache (MP). x : Control Unit # (0-1)	Full Dump		
H20T0x	DCTL CBUF SELCNT parity error [REG82001238, Bit14] (CTL-x)	A parity error was detected in the counter for the output pointer of a buffer for writing to the cache (MP). x : Control Unit # (0-1)	Full Dump		
H20U0x	DCTL register wait parity error [REG82001238, Bit13] (CTL-x)	A parity error was detected in the counter of the waiting time of the SEQ for writing to the register (MP). x : Control Unit # (0-1)	Full Dump		
H20V0x	DCTL RCLK error [REG82001238, Bit25] (CTL-x)	No response with the RCLK (CACHE-IF) signal, which was a clock signal for taking in the read data, was made to the cache controller (MP). x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20W0x	DCTL RCLK error [REG82001238, Bit24] (CTL-x)	No response with the RCTL (CACHE-IF) signal, which showed a read response, was made to the cache controller (MP). x : Control Unit # (0-1)	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H20Y00	DCTL H0PCI unexpected SPC detected [REG82001280, Bit12]	The invalid split completion message was detected (H #0).	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H20Z00	DCTL H0PCI SPC error message [REG82001280, Bit13]	The split completion message that informs of an occurrence of an error was detected (H #0).	Simple Trace		
H21000	DCTL address over [DMA#0]	The cache address over occurred.	Simple Trace		
H21100	DCTL address over [D_PORT]	The cache address over occurred.	Simple Trace		
H21200	DCTL address over [H_PORT]	The cache address over occurred.	Simple Trace		
H21400	DCTL H0PCI SPC time-out [REG82001280, Bit14]	The data buffer controller LSI (D-CTL) detected time-out of waiting for the split completion (H #0).	Simple Trace		
H21500	DCTL H0PCI master ADB disconnection error [REG82001280, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave (H #0).	Simple Trace		
H21600	DCTL H0PCI SPC ADB error [REG82001280, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message (H #0).	Simple Trace		
H21700	EDC error (Port-xy)	A number of the EDC errors exceeded its threshold value. x : Control Unit # (0-1) y : Port # (A-D)	Simple Trace	① Replace the Control Unit whose CALM LED is on and the iSCSI Interface Board installed in it.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H3000x	DCTL ECC write parity error [REG82001238, Bit31] (CTL-x)	A parity error was detected in the ECC adding part during a writing on the cache. x : Control Unit # (0-1)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H301xx	ECC write parity error (DMA-x)	A parity error was detected during writing of data from the cache memory. x : DMA # (00,10-13, 20-23)	CTL Alarm Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H302xx	ECC generate error (DMA-x)	An error was detected in the ECC generation during writing of data from the cache memory. x : DMA # (00,10-13, 20-23)	CTL Alarm Trace		
H3030x	ECC uncorrectable error (CACHE-x)	An error that was uncorrectable with the ECC was detected during a reading from the cache memory. x : Cache memory slot # (0-3)	CTL Alarm Trace	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H304xx	ECC correction failed (DMA -x)	An error was detected in the ECC correction during a reading from the cache memory. x : DMA # (00,10-13, 20-23)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H3050x	ECC uncorrectable error (CTL-x)	Processing cannot be continued because of uncorrectable ECC error. x : No. of the Control Unit which cannot continue processing. (0-1)	CTL Alarm Trace	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H3060x	DCTL ECC generate error [REG82001238, Bit30] (CTL-x)	An ECC generation error was detected in the ECC adding part during a writing on the cache. x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H307xy	DCTL CACHE ECC uncorrectable error [REG82001238, Bit29] (CTL-x, CACHE-y)	During a reading from the cache, an EC error of two or more bits occurred in a single cache memory board. x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Full Dump	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H3080x	DCTL ECC correction failed [MPU] [REG82001238, Bit28] (CTL-x)	A correction inconsistency of the ECC was detected during a readout from the cache. x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H3090x	CACHE read BUS ERR [OTH_CTL] (CTL-x)	A bus error occurred during a readout from the cache. x : Control Unit # (0-1)	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H30A0x	CACHE read DCTL access error [OTH_CTL] (CTL-x)	A DCTL access error occurred during a readout from the cache. x : Control Unit # (0-1)	Full Dump		
H30B0x	CACHE uncorrectable ERR [OTH_CTL] (CTL-x)	Cache uncorrectable error x : Control Unit # (0-1)	Full Dump	① Replace the Cache Unit. ② If not recovered, replace the above Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H30Bxy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)	A Cache uncorrectable error occurred. x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Full Dump	① Replace the Cache Unit displayed in the message. When the Cache Memory number displayed is "*", replace all the Cache Memories mounted on the Controller designated.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
H30C0x	CAHCE read DCTL hard error [OTH_CTL] (CTL-x)	A DCTL hardware error occurred during a readout from the cache. x : Control Unit # (0-1)	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H30D0x	CACHE write BUS ERR [OTH_CTL] (CTL-x)	A bus error occurred during a writing on the cache. x : Control Unit # (0-1)	Full Dump		
H30E0x	CACHE write DCTL access error [OTH_CTL] (CTL-x)	A DCTL access error occurred during a writing on the cache. x : Control Unit # (0-1)	Full Dump		
H30F0x	CACHE write DCTL hard error [OTH_CTL] (CTL-x)	A DCTL hardware error occurred during a writing on the cache. x : Control Unit # (0-1)	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H30Gxy	ECC uncorrectable error (CACHE-x/y)	An ECC uncorrectable error was detected during reading from the cache memory. (Trouble of two Cache memories installed in the slot number displayed in the message.) x/y : Cache memory slot # (0/1, 0/2, 0/3, 1/2, 1/3, 2/3)	Simple Trace	① Replace both of two Cache memories displayed in the message. ② If it is not recovered, replace all the Cache memories installed in the Control Unit where the failure occurred. ③ If it is not recovered yet, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H30Ixy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)	A Cache uncorrectable error occurred. (The slot concerned cannot be specified.) x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Full Dump	① Replace the Cache Units displayed in the message in pairs. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H30Jxy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y)	A Cache uncorrectable error occurred. x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Full Dump	① Replace the Cache Unit displayed in the message. When the Cache Memory number displayed is "*", replace all the Cache Memories mounted on the Controller designated. ② If not recovered, replace the above Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40200	DUAL I/F address parity error [INT/HP#00] [REG82001444, Bit31]	An address parity error was detected when the HP #00 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40300	DUAL I/F write data parity error [INT/HP#00] [REG82001444, Bit30]	A data parity error was detected when the HP #00 wrote on a certain part in another system.	CTL Alarm Trace		
H40400	DUAL I/F write ready time-out [INT/HP#00] [REG82001444, Bit29]	A ready time-out was detected when the HP #00 wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40500	DUAL I/F CNT parity error [INT/HP#00] [REG82001444, Bit28]	A CNT parity error was detected when the HP #00 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40700	DUAL I/F address parity error [INT/HP#01] [REG82001444, Bit23]	An address parity error was detected when the HP #01 wrote on a certain part in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H40800	DUAL I/F write data parity error [INT/HP#01] [REG82001444, Bit22]	A data parity error was detected when the HP #01 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40900	DUAL I/F write ready time-out [INT/HP#01] [REG82001444, Bit21]	A ready time-out was detected when the HP #01 wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40A00	DUAL I/F CNT parity error [INT/HP#01] [REG82001444, Bit20]	A CNT parity error was detected when the HP #01 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40C00	DUAL I/F address parity error [INT/DP#00] [REG82001440, Bit31]	An address parity error was detected when the DP #00 wrote on a certain part in another system.	CTL Alarm Trace		
H40D00	DUAL I/F write data parity error [INT/DP#00] [REG82001440, Bit30]	A data parity error was detected when the DP #00 wrote on a certain part in another system.	CTL Alarm Trace		
H40E00	DUAL I/F write ready time-out [INT/DP#00] [REG82001440, Bit29]	A ready time-out was detected when the DP #00 wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40F00	DUAL I/F CNT parity error [INT/DP#00] [REG82001440, Bit28]	A CNT parity error was detected when the DP #00 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40H00	DUAL I/F address parity error [INT/DP#01] [REG82001440, Bit23]	An address parity error was detected when the DP #01 wrote on a certain part in another system.	CTL Alarm Trace		
H40I00	DUAL I/F write data parity error [INT/DP#01] [REG82001440, Bit22]	A data parity error was detected when the DP #01 wrote on a certain part in another system.	CTL Alarm Trace		
H40J00	DUAL I/F write ready time-out [INT/DP#01] [REG82001440, Bit21]	A ready time-out was detected when the DP #01 wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40K00	DUAL I/F CNT parity error [INT/DP#01] [REG82001440, Bit20]	A CNT parity error was detected when the DP #01 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H40L00	DUAL I/F clock error [INT/DMA#0] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system (DMA #0).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40M00	DUAL I/F address parity error [INT/DMA#0] [REG82001448, Bit31]	An address parity error was detected when the DMA #0 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40N00	DUAL I/F write data parity error [INT/DMA#0] [REG82001448, Bit30]	A data parity error was detected when the DMA #0 wrote on a certain part in another system.	CTL Alarm Trace		
H40P00	DUAL I/F write ready time-out [INT/DMA#0] [REG82001448, Bit29]	A ready time-out was detected when the DMA #0 wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40Q00	DUAL I/F CNT parity error [INT/DMA#0] [REG82001448, Bit28]	A CNT parity error was detected when the DMA #0 wrote on a certain part in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H40S00	DUAL I/F address parity error [INT/MP] [REG82001448, Bit15]	An address parity error was detected when the MP wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40T00	DUAL I/F write data parity error [INT/MP] [REG82001448, Bit14]	A data parity error was detected when the MP wrote on a certain part in another system.	CTL Alarm Trace		
H40U00	DUAL I/F write ready time-out [INT/MP] [REG82001448, Bit13]	An ADR sending ready time-out was detected when the MP wrote/read on/from a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40V00	DUAL I/F CNT parity error [INT/MP] [REG82001448, Bit12]	A CNT parity error was detected when the MP wrote on a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40W00	DUAL I/F read data parity error [INT/MP] [REG82001448, Bit11]	A data parity error was detected when the MP read from a certain part in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H40X00	DUAL I/F read data ready time-out [INT/MP] [REG82001448, Bit10]	A data ready time-out was detected when the MP read from a certain part in another system.	CTL Alarm Trace		
H40Z00	DUAL I/F clock error [EXT/HP#00] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H41000	DUAL I/F address parity error [EXT/HP#00] [REG82001820, Bit0]	A parity error was detected in the address used for access by each port to another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41100	DUAL I/F write data parity error [EXT/HP#00] [REG82001824, Bit31]	A parity error was detected in write data when the HP #00 wrote on a certain part in another system.	CTL Alarm Trace	② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H41200	DUAL I/F ECC write parity error [EXT/HP#00] [REG82001824, Bit30]	An ECC write parity error was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41300	DUAL I/F ECC GEN error [EXT/HP#00] [REG82001824, Bit29]	An ECC_GEN error was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41400	DUAL I/F CACHE address parity error [EXT/HP#00] [REG82001824, Bit27]	A cache address parity error was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41500	DUAL I/F WLEN parity error [EXT/HP#00] [REG82001824, Bit26]	A WLEN parity error was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41600	DUAL I/F CNT parity error [EXT/HP#00] [REG82001824, Bit21]	A counter parity error was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41700	DUAL I/F address over [EXT/HP#00] [REG82001824, Bit25]	A cache address over was detected when the HP #00 wrote on the cache in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41800	DUAL I/F clock error [EXT/HP#01] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system.	CTL Alarm Trace	② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H41900	DUAL I/F address parity error [EXT/HP#01] [REG82001820, Bit0]	A parity error was detected in an address of each port to which the other system accesses.	CTL Alarm Trace		
H41A00	DUAL I/F write data parity error [EXT/HP#01] [REG82001824, Bit15	A parity error was detected in write data when the HP #01 wrote on a certain part in another system.	CTL Alarm Trace		
H41B00	DUAL I/F ECC write parity error [EXT/HP#01] [REG82001824, Bit14	An ECC write parity error was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41C00	DUAL I/F ECC GEN error [EXT/HP#01] [REG82001824, Bit13]	An ECC_GEN error was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H41D00	DUAL I/F CACHE address parity error [EXT/HP#01] [REG82001824, Bit11]	A cache address parity error was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41E00	DUAL I/F WLEN parity error [EXT/HP#01] [REG82001824, Bit10]	A WLEN parity error was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41F00	DUAL I/F CNT parity error [EXT/HP#01] [REG82001824, Bit5]	A counter parity error was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41G00	DUAL I/F address over [EXT/HP#01] [REG82001824, Bit9]	A cache address over was detected when the HP #01 wrote on the cache in another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41H00	DUAL I/F clock error [EXT/DP#00] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system.	CTL Alarm Trace	② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H41I00	DUAL I/F address parity error [EXT/DP#00] [REG82001820, Bit0]	A parity error was detected in the address used for access by each port to another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41J00	DUAL I/F write data parity error [EXT/DP#00] [REG8200182C, Bit31]	A parity error was detected in write data when the DP #00 wrote on a certain part in another system.	CTL Alarm Trace		
H41K00	DUAL I/F ECC write parity error [EXT/DP#00] [REG8200182C, Bit30]	An ECC write parity error was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41L00	DUAL I/F ECC GEN error [EXT/DP#00] [REG8200182C, Bit29]	An ECC_GEN error was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41M00	DUAL I/F CACHE address parity error [EXT/DP#00] [REG8200182C, Bit27]	A cache address parity error was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41N00	DUAL I/F WLEN parity error [EXT/DP#00] [REG8200182C, Bit26]	A WLEN parity error was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41P00	DUAL I/F CNT parity error [EXT/DP#00] [REG8200182C, Bit21]	A counter parity error was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		
H41Q00	DUAL I/F address over [EXT/DP#00] [REG8200182C, Bit25]	A cache address over was detected when the DP #00 wrote on the cache in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H41R00	DUAL I/F clock error [EXT/DP#01] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H41S00	DUAL I/F address parity error [EXT/DP#01] [REG82001820, Bit0]	A parity error was detected in the address used for access by each port to another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H41T00	DUAL I/F write data parity error [EXT/DP#01] [REG8200182C, Bit15]	A parity error was detected in write data when the DP#01 wrote on a certain part in another system.	CTL Alarm Trace		
H41U00	DUAL I/F ECC write parity error [EXT/DP#01] [REG8200182C, Bit14]	An ECC write parity error was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41V00	DUAL I/F ECC GEN error [EXT/DP#01] [REG8200182C, Bit13]	An ECC_GEN error was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41W00	DUAL I/F CACHE address parity error [EXT/DP#01] [REG8200182C, Bit11]	A cache address parity error was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41X00	DUAL I/F WLEN parity error [EXT/DP#01] [REG8200182C, Bit10]	A WLEN parity error was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41Y00	DUAL I/F CNT parity error [EXT/DP#01] [REG8200182C, Bit5]	A counter parity error was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		
H41Z00	DUAL I/F address over [EXT/DP#01] [REG8200182C, Bit9]	A cache address over was detected when the DP #01 wrote on the cache in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H42000	DUAL I/F clock error [EXT/DMA#0] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H42100	DUAL I/F address parity error [EXT/DMA#0] [REG82001820, Bit0]	A parity error was detected in the address used for access by each port to another system.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H42200	DUAL I/F write data parity error [EXT/DMA#0] [REG82001834, Bit31]	A parity error was detected in write data when the DMA #0 wrote on a certain part in another system.	CTL Alarm Trace		
H42300	DUAL I/F ECC write parity error [EXT/DMA#0] [REG82001834, Bit30]	An ECC write parity error was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		
H42400	DUAL I/F ECC GEN error [EXT/DMA#0] [REG82001834, Bit29]	An ECC_GEN error was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		
H42500	DUAL I/F CACHE address parity error [EXT/DMA#0] [REG82001834, Bit27]	A cache address parity error was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		
H42600	DUAL I/F WLEN parity error [EXT/DMA#0] [REG82001834, Bit26]	A WLEN parity error was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		
H42700	DUAL I/F CNT parity error [EXT/DMA#0] [REG82001834, Bit21]	A counter parity error was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		
H42800	DUAL I/F address over [EXT/DMA#0] [REG82001834, Bit25]	A cache address over was detected when the DMA #0 wrote on the cache in another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H42A00	DUAL I/F address parity error [EXT/MP] [REG82001820, Bit0]	When each port accessed a register of the other one of the dual Control Unit, the data buffer controller LSI (D-CTL) detected a parity error in the address phase.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) –
H42B00	DUAL I/F CACHE address over [EXT/DMA] [REG82001838, Bit18]	The D-CTL detected a margin error when it acquired data from the other one of the dual Control Unit.	CTL Alarm Trace		
H42C00	DUAL I/F read data parity error [EXT/MP] [REG82001838, Bit19]	A data parity error was detected when the MP read from a certain part in another system.	CTL Alarm Trace		
H42D00	DUAL I/F ECC correction error [EXT/MP] [REG82001838, Bit28]	An ECC_COR error was detected when the MP read from a certain part in another system.	CTL Alarm Trace		
H42E00	DUAL I/F ECC uncorrectable error [EXT/MP] [REG82001838, Bit24]	An ECC_UNCORRE error was detected when the MP read from a certain part in another system.	CTL Alarm Trace		
H42F00	DUAL I/F write parity error [EXT/MP] [REG82001838, Bit31]	A parity error was detected in write data when the MP wrote on a certain part in another system.	CTL Alarm Trace		
H42G00	DUAL I/F ECC write parity error [EXT/MP] [REG82001838, Bit30]	An ECC write parity error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42H00	DUAL I/F ECC GEN error [EXT/MP] [REG82001838, Bit29]	An ECC_GEN error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42I00	DUAL I/F CACHE address parity error [EXT/MP] [REG82001838, Bit27]	A cache address parity error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42J00	DUAL I/F WLEN parity error [EXT/MP] [REG82001838, Bit26]	A WLEN parity error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42K00	DUAL I/F counter parity error [EXT/MP] [REG82001838, Bit21]	A counter parity error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42L00	DUAL I/F CACHE address over [EXT/MP] [REG82001838, Bit25]	A cache address over error was detected when the MP wrote on the cache in another system.	CTL Alarm Trace		
H42N00	DUAL I/F error [MDTDCHK] [REG82001228, Bit17]	An error was detected when the MP accessed another system.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H42Q00	DUAL I/F address parity error [INT/DP#02] [REG82001440, Bit15]	An address parity error was detected during a writing into another system performed via the DP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H42R00	DUAL I/F write data parity error [INT/DP#02] [REG82001440, Bit14]	A data parity error was detected during a writing into another system performed via the DP #02.	CTL Alarm Trace		
H42S00	DUAL I/F write ready time-out [INT/DP#02] [REG82001440, Bit13]	A ready time-out was detected during a writing into another system performed via the DP #02.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H42T00	DUAL I/F CNT parity error [INT/DP#02] [REG82001440, Bit12]	A CNT parity error was detected during a writing into another system performed via the DP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H42V00	DUAL I/F address parity error [INT/DP#03] [REG82001440, Bit7]	An address parity error was detected during a writing into another system performed via the DP #03.	CTL Alarm Trace		
H42W00	DUAL I/F write data parity error [INT/DP#03] [REG82001440, Bit6]	A data parity error was detected during a writing into another system performed via the DP #03.	CTL Alarm Trace		
H42X00	DUAL I/F write ready time-out [INT/DP#03] [REG82001440, Bit5]	A ready time-out was detected during a writing into another system performed via the DP #03.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H42Y00	DUAL I/F CNT parity error [INT/DP#03] [REG82001440, Bit4]	A CNT parity error was detected during a writing into another system performed via the DP #03.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H42Z00	DUAL I/F clock error [EXT/DP#02] [REG82001810, Bit1]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (DP #02)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H43000	DUAL I/F address parity error [EXT/DP#02] [REG82001820, Bit0]	An address parity error was detected during DUAL access. (DP #02)	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H43100	DUAL I/F write data parity error [EXT/DP#02] [REG82001830, Bit31]	A parity error was detected in write data during a writing into another system performed via the DP #02.	CTL Alarm Trace		
H43200	DUAL I/F ECC write data parity error [EXT/DP#02] [REG82001830, Bit30]	An ECC write parity error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43300	DUAL I/F ECC GEN error [EXT/DP#02] [REG82001830, Bit29]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43400	DUAL I/F CACHE address parity error [EXT/DP#02] [REG82001830, Bit27]	A cache address parity parity error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43500	DUAL I/F WLEN parity error [EXT/DP#02] [REG82001830, Bit26]	A WLEN parity error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43600	DUAL I/F CNT parity error [EXT/DP#02] [REG82001830, Bit21]	A CNT parity error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43700	DUAL I/F address over [EXT/DP#02] [REG82001830, Bit25]	A cache address over error was detected during a writing onto a cache of another system performed via the DP #02.	CTL Alarm Trace		
H43800	DUAL I/F clock error [EXT/DP#03] [REG82001810, Bit1]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (DP #03)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H43900	DUAL I/F address parity error [EXT/DP#03] [REG82001820, Bit0]	An address parity error was detected during DUAL access. (DP #03)	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H43A00	DUAL I/F write data parity error [EXT/DP#03] [REG82001830, Bit15]	A parity error was detected in write data during writing into another system performed via the DP #03.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H43B00	DUAL I/F ECC write data parity error [EXT/DP#03] [REG82001830, Bit14]	An ECC write parity error was detected during a writing onto a cache of another system performed via the DP #03.	CTL Alarm Trace		
H43C00	DUAL I/F ECC GEN error [EXT/DP#03] [REG82001830, Bit13]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the DP #03.	CTL Alarm Trace		
H43D00	DUAL I/F CACHE address parity error [EXT/DP#03] [REG82001830, Bit11]	A cache address parity error was detected during a writing onto a cache of another system performed via the DP #03.	CTL Alarm Trace		
H43E00	DUAL I/F WLEN parity error [EXT/DP#03] [REG82001830, Bit10]	A WLEN parity error was detected during a writing onto a cache of another system performed via the DP #03.	CTL Alarm Trace		
H43F00	DUAL I/F CNT parity error [EXT/DP#03] [REG82001830, Bit5]	A CNT parity error was detected during a writing onto a cache of another system performed via the DP#03.	CTL Alarm Trace		
H43G00	DUAL I/F address over [EXT/DP#03] [REG82001830, Bit9]	A cache address over error was detected during a writing onto a cache of another system performed via the DP# 03.	CTL Alarm Trace		
H43J00	DUAL I/F address parity error [INT/HP#02] [REG82001444, Bit15]	An address parity error was detected during a writing into another system performed via the HP #02.	CTL Alarm Trace		
H43K00	DUAL I/F address parity error [INT/HP#03] [REG82001444, Bit7]	An address parity error was detected during writing into another system performed via the HP #03.	CTL Alarm Trace		
H43L00	DUAL I/F write data parity error [INT/HP#02] [REG82001444, Bit14]	A data parity error was detected during a writing into another system performed via the HP #02.	CTL Alarm Trace		
H43M00	DUAL I/F write data parity error [INT/HP#03] [REG82001444, Bit6]	A data parity error was detected during a writing into another system performed via the HP #03.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H43N00	DUAL I/F write ready time-out [INT/HP#02] [REG82001444, Bit13]	A ready time-out was detected during a writing into another system performed via the HP #02.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H43P00	DUAL I/F write ready time-out [INT/HP#03] [REG82001444, Bit5]	A ready time-out was detected during a writing into another system performed via the HP #03.	CTL Alarm Trace		
H43Q00	DUAL I/F CNT parity error [INT/HP#02] [REG82001444, Bit12]	A CNT parity error was detected during a writing into another system performed via the HP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H43R00	DUAL I/F CNT parity error [INT/HP#03] [REG82001444, Bit4]	A CNT parity error was detected during a writing into another system performed via the HP #03.	CTL Alarm Trace		
H43S00	DUAL I/F address parity error [EXT/HP#02] [REG82001820, Bit0]	An address parity error was detected during DUAL access. (DP #02)	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H43T00	DUAL I/F address parity error [EXT/HP#03] [REG82001820, B0it0]	An address parity error was detected during DUAL access. (DP #02)	CTL Alarm Trace	② If not recovered, replace the other Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H43U00	DUAL I/F write data parity error [EXT/HP#02] [REG82001828, Bit31]	A parity error was detected in write data during a writing into another system performed via the HP #02.	CTL Alarm Trace		
H43V00	DUAL I/F write data parity error [EXT/HP#03] [REG82001828, Bit15]	A parity error was detected in write data during a writing into another system performed via the HP #03.	CTL Alarm Trace		
H43W00	DUAL I/F ECC write data parity error [EXT/HP#02] [REG82001828, Bit30]	An ECC write parity error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H43X00	DUAL I/F ECC write data parity error [EXT/HP#03] [REG82001828, Bit14]	An ECC write parity error was detected during a writing onto a cache of another system performed via the HP #03.	CTL Alarm Trace		
H43Y00	DUAL I/F ECC GEN error [EXT/HP#02] [REG82001828, Bit29]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace		
H43Z00	DUAL I/F ECC GEN error [EXT/HP#03] [REG82001828, Bit13]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H44000	DUAL I/F CACHE address parity error [EXT/HP#02] [REG82001828, Bit27]	A cache address parity error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H44100	DUAL I/F CACHE address parity error [EXT/HP#03] [REG82001828, Bit11]	A cache address parity error was detected during a writing onto a cache of another system performed via the HP #03.	CTL Alarm Trace		
H44200	DUAL I/F WLEN parity error [EXT/HP#02] [REG82001828, Bit26]	A WLEN parity error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace		
H44300	DUAL I/F WLEN parity error [EXT/HP#03] [REG82001828, Bit10]	A WLEN parity error was detected during a writing onto a cache of another system performed via the HP #03.	CTL Alarm Trace		
H44400	DUAL I/F CNT parity error [EXT/HP#02] [REG82001828, Bit21]	A CNT parity error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace		
H44500	DUAL I/F CNT parity error [EXT/HP#03] [REG82001828, Bit5]	A CNT parity error was detected during a writing onto a cache of another system performed via the HP #03.	CTL Alarm Trace		
H44600	DUAL I/F address over [EXT/HP#02] [REG82001828, Bit25]	A cache address over error was detected during a writing onto a cache of another system performed via the HP #02.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H44700	DUAL I/F address over [EXT/HP#03] [REG82001828, Bit9]	A cache address over error was detected during a writing onto a cache of another system performed via the HP #03.	CTL Alarm Trace	② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H44800	DUAL I/F ready error [INT/MP] [REG82001454, Bit21]	The EXT_IORDY became 0.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H44900	DUAL I/F write ready error [INT/HP#00] [REG82001454, Bit21]	A ready time-out was detected in the HP #00 when the DCTL of the other system was reset.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H44A00	DUAL I/F write ready error [INT/HP#01] [REG82001454, Bit21]	A ready time-out was detected in the HP #01 when the DCTL of the other system was reset.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H44B00	DUAL I/F write ready error [INT/HP#02] [REG82001454, Bit21]	A ready time-out was detected in the HP #02 when the DCTL of the other system was reset.	CTL Alarm Trace		
H44C00	DUAL I/F write ready error [INT/HP#03] [REG82001454, Bit21]	A ready time-out was detected in the HP #03 when the DCTL of the other system was reset.	CTL Alarm Trace		
H44D00	DUAL I/F write ready error [INT/DP#00] [REG82001454, Bit21]	A ready time-out was detected in the DP #00 when the CTL of the other system was reset.	CTL Alarm Trace		
H44E00	DUAL I/F write ready error [INT/DP#01] [REG82001454, Bit21]	A ready time-out was detected in the DP #01 when the CTL of the other system was reset.	CTL Alarm Trace		
H44F00	DUAL I/F write ready error [INT/DP#02] [REG82001454, Bit21]	A ready time-out was detected in the DP #02 when the CTL of the other system was reset.	CTL Alarm Trace		
H45000	DUAL I/F write ready error [INT/DP#03] [REG82001454, Bit21]	A ready time-out was detected in the DP #03 when the CTL of the other system was reset.	CTL Alarm Trace		
H45100	DUAL I/F write ready error [INT/DMA#0] [REG82001454, Bit21]	A ready time-out was detected in the DMA #0 when the CTL of the other system was reset.	CTL Alarm Trace		
H46000	DUAL I/F write ready error [INT/DMA#00] [REG82001428, Bit21]	A time-out was detected during the impedance adjustment of the Control Unit in the other system (HP #00).	CTL Alarm Trace		
H46100	DUAL I/F write ready error [INT/HP#01] [REG82001428, Bit21]	A time-out was detected during the impedance adjustment of the Control Unit in the other system (HP #01).	CTL Alarm Trace		
H46200	DUAL I/F write ready error [INT/HP#02] [REG82001428, Bit21]	A time-out was detected during the impedance adjustment of the Control Unit in the other system (HP #02).	CTL Alarm Trace		
H46300	DUAL I/F write ready error [INT/HP#03] [REG82001428, Bit21]	A time-out was detected during the impedance adjustment of the Control Unit in the other system (HP #03).	CTL Alarm Trace		
H46900	DUAL I/F SELF_IORDY changed RDY into NotRDY [INT/MP] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (MP).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H46A00	DUAL I/F EXT_IORDY changed RDY into NotRDY [INT/MP] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (MP).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H46B00	DUAL I/F MRGN error [INT/MP] [REG82001484, Bit2]	The data buffer controller LSI (D-CTL) detected a margin error when it acquired data from the other one of the dual Control Unit.	CTL Alarm Trace		
H46C00	DUAL I/F SEQ error [INT/MP] [REG82001484, Bit1]	The control signal when data buffer controller LSI (D-CTL) takes data from the other one of the dual Control Unit was not a regular procedure.	CTL Alarm Trace		
H46D00	DUAL I/F DCNT error [INT/MP] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element.	CTL Alarm Trace		
H46E00	DUAL I/F RCLK error [EXT/MP] [REG82001838, Bit23]	The RCLK error was detected during a reading from the cache of the other one of the dual Control Unit of the MP.	CTL Alarm Trace		
H46F00	DUAL I/F RCTL error [EXT/MP] [REG82001838, Bit22]	The RCTL error was detected during a reading from the cache of the other one of the dual Control Unit of the MP.	CTL Alarm Trace		
H46G00	DUAL I/F SLV error [INT/MP] [REG82001484, Bit3]	An error in the other one of the dual Control Unit was reported.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H50200	BRG CPU address out of range [REGF1000140, Bit0]	A CPU address out of range occurred. [BRG]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50300	BRG CPU bad address parity detected [REGF1000140, Bit1]	The CPU-PCI bridge LSI detected an illegal parity in the address phase.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50400	BRG CPU transfer type violation [REGF1000140, Bit2]	A transfer type violation occurred. [BRG]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50500	BRG CPU transfer type violation [REG14000140, Bit2]	The CPU-PCI bridge LSI detected a contravention of the transfer type.	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50600	BRG CPU write to a write protected region [REGF1000140, Bit4]	A writing on a write-protected region occurred. [BRG CPU]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50700	BRG CPU read from a caching protected region [REGF1000140, Bit5]	A readout from a caching-protected region occurred. [ERG CPU]	CTL Alarm Trace		
H5080x	BRG CPU bad write data parity detected [REGF1000140, Bit6] (CTL-x)	The "bad write data parity" was detected. [BRG CPU] x : Control Unit # (0-1)	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H5090x	BRG CPU bad read data parity detected [REGF1000140, Bit7] (CTL-x)	The "bad read data parity" was detected. [BRG CPU] x : Control Unit # (0-1)	CTL Alarm Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H50A00	BRG PCI0 PCI transaction generated while master is disabled [REGF1001D58, Bit10]	The PCI transaction was generated while the master PCI was disabled. [BRG CPU0]	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50B0x	BRG PCI0 PCI slave detected bad write data parity [REGF1001D58, Bit1] (CTL-x)	The PCI slave detected the bad write data parity. [BRG PCI0] x : Control Unit # (0-1)	Full Dump		
H50C0x	BRG PCI0 PERR response to read data driven by PCI slave [REGF1001D58, Bit2] (CTL-x)	The "PERR response to read data" by the PCI slave occurred. [BRG PC10] x : Control Unit # (0-1)	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50D00	BRG PCI0 slave detected read error in Split Completion transaction [REGF1001D58, Bit23]	The PCI slave detected a read error in a transfer of the "split completion".	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50E00	BRG PCI0 PERR response to write data driven by the PCI master [REG14001D58, Bit5]	The CPU-PCI bridge detected that the transfer of write data output by the PCI master being responded with the "PERR".	CTL Alarm Trace		
H50F0x	BRG PCI0 bad data parity detected during a PCI master read [REGF1001D58, Bit6] (CTL-x)	A "Bad data parity" was detected when the PCI master was being read. [BRG PCIO] x : Control Unit # (0-1)	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50G00	BRG PCI0 the PCI master generated master abort [REG14001D58, Bit8]	The PCI master generated the master abort. [BGR PCIO]	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50H00	BRG PCI0 the PCI master detected target abort [REG14001D58, Bit9]	The PCI master detected the target abort. [BRG PCIO]	CTL Alarm Trace		
H50I00	BRG PCI0 PCI master received incorrect split completion [REGF1001D58, Bit13]	The PCI master received the "split completion" the length of which (number of bytes) does not conform to the original requirement.	CTL Alarm Trace		
H50J00	BRG PCI0 the PCI master reached retry counter limit [REG14001D58, Bit11]	The CPU-PCI bridge detected the number of retries made by the PCI master reaching the limit.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H50K00	BRG PCI0 PCI master split completion discard timer expired [REGF1001D58, Bit12]	The CPU-PCI bridge detected the split completion discard timer of the PCI master exceeding the time limit	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H50L00	BRG PCI0 the PCI slave terminates a transaction with target abort [REG14001D58, Bit17]	The PCI slave generated the target abort.	CTL Alarm Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50P00	BRG PCI0 a PCI slave read buffer discard timer expired [REG14001D58, Bit20]	The CPU-PCI bridge detected the read buffer discard timer of the PCI slave exceeding the time limit.	CTL Alarm Trace		
H50Q00	BRG PCI0 internal PCI arbiter detection of a broken master [REG14001D58, Bit21]	The internal PCI arbiter detected the PCI master being out of order.	CTL Alarm Trace		
H50R00	BRG PCI0 PCI BIST interrupt [REGF1001D58, Bit24]	A PCI BIST interrupt occurred. [BRG PCIO]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H50S00	BRG PCI0 PCI power management interrupt [REGF1001D58, Bit25]	A PCI Power Management Interrupt occurred. [BRG PCIO]	Simple Trace		
H50T00	BRG PCI0 PCI reset assert [REGF1001D58, Bit26]	A PCI Reset Assert occurred. [BRG PCIO]	Simple Trace		
H50X00	BRG PCI1 the PCI slave detected bad write data parity [REGF1001DD8, Bit1]	The PCI slave detected a bad write data parity. [BRG PCI1]	Simple Trace		
H50Y00	BRG PCI1 PERR response to read data driven by PCI master [REGF1001DD8, Bit2]	The PERR response to address made by the PCI slave occurred. [BRG PCI1]	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H51000	BRG PCI1 PERR response to write data driven by the PCI master [REGF1001DD8, Bit5]	The PERR response to write data made by the PCI master occurred. [BRG PCI1]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H51100	BRG PCI1 bad data parity detected during the PCI master read [REGF1001DD8, Bit6]	A bad data parity was detected during a reading performed by the PCI master. [BRG PCI1]	Simple Trace		
H51200	BRG PCI1 the PCI master generated master abort [REGF1001DD8, Bit8]	The master abort occurred in the PCI master. [BRG PCI1]	Simple Trace		
H51300	BRG PCI the PCI master detected target abort [REGF1001DD8, Bit9]	The PCI master detected the target abort. [BRG PCI1]	Simple Trace		
H51500	BRG PCI1 the PCI master reached retry counter limit [REGF1001DD8, Bit11]	The threshold value of the retry counter was exceeded in the PCI master. [BRG PCI1]	Simple Trace		
H51700	BRG PCI1 the PCI slave terminates a transaction with target abort [REGF1001DD8, Bit17]	The PCI slave terminated a transaction with the target abort. [BRG PCI1]	Simple Trace		
H51A00	BRG PCI1 a PCI slave read buffer discard timer expired [REGF1001DD8, Bit20]	The read buffer discard timer expired occurred in the PCI slave. [BRG PCI1]	Simple Trace		
H51B00	BRG PCI1 internal PCI arbiter detection of a broken master [REGF1001DD8, Bit21]	The "Internal PCI arbiter detection of a "broken" master" occurred. [BRG PCI1]	Simple Trace		
H51C00	BRG PCI1 PCI BIST interrupt [REGF1001DD8, Bit22]	The PCI BIST interrupt occurred. [BRG PCI1]	Simple Trace		
H51D00	BRG PCI1 power management interrupt [REGF1001DD8, Bit23]	The PCI Power Management Interrupt occurred. [BRG PCI1]	Simple Trace		
H51E00	BRG PCI1 reset assert [REGF1001DD8, Bit24]	The PCI Reset Assert occurred. [BRG PCI1]	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H51F00	BRG PCI0 DWORD boundary error [REGF1001D58, Bit4]	It was detected that CPU-PCI bridge LSI attempts to issue the transfer exceeding the DWORD boundary.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H51G0x	BRG PCI0 internal data path error in the PCI interface [REGF1001D58, Bit0] (CTL-x)	An internal data path error was detected in the PCI interface. x : Control Unit # (0-1)	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H51H0x	BRG CPU punit internal data path parity error detected [REGF1000140, Bit8] (CTL-x)	An internal data path parity error was detected in the CPU interface. x : Control Unit # (0-1)	Full Dump		
H51J00	BRG PCI0 slave as a completer detected target abort [REGF1001D58, Bit18]	The PCI slave detected the target abort as a completer of the data transfer.	CTL Alarm Trace		
H51K00	BRG PCI0 slave generated master abort as a completer [REGF1001D58, Bit16]	The PCI slave generated the master abort as a completer of the data transfer.	CTL Alarm Trace		
H51L00	BRG PCI0 retry counter of a PCI slave reached its limit [REGF1001D58, Bit22]	The number of retries made by the PCI slave reached its limit when the PCI slave was about to generate the split completion.	CTL Alarm Trace		
H51M00	BRG PCI0 master received message error [REGF1001D58, Bit14]	The PCI master received a message error.	CTL Alarm Trace		
H51N00	BRG PCI0 master generated target abort for split completion [REGF1001D58, Bit7]	The PCI master generated the target abort in response to the split completion.	CTL Alarm Trace		
H51P00	DUAL I/F address parity error [INT/HP#S1] [REG82001440, Bit7]	An address parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51Q00	DUAL I/F write data parity error [INT/HP#S1] [REG82001440, Bit6]	A data parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H51R00	DUAL I/F write ready time-out [INT/HP#S1] [REG82001440, Bit5]	A read time-out was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H51S00	DUAL I/F CNT parity error [INT/HP#S1] [REG82001440, Bit4]	A CNT parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
H51T00	DUAL I/F write data parity error [EXT/HP#S1] [REG82001830, Bit15]	A parity error was detected in write data when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace	② Replace the Control Unit of which the CALM LED lights on except for ①. ③ If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H51U00	DUAL I/F ECC write parity error [EXT/HP#S1] [REG82001830, Bit14]	An ECC write parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51V00	DUAL I/F ECC GEN error [EXT/HP#S1] [REG82001830, Bit13]	An ECC generation error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51W00	DUAL I/F CACHE address parity error [EXT/HP#S1] [REG82001830, Bit11]	A Cache address parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51X00	DUAL I/F WLEN parity error [EXT/HP#S1] [REG82001830, Bit10]	A write length parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51Y00	DUAL I/F CNT parity error [EXT/HP#S1] [REG82001830, Bit5]	A CNT parity error was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		
H51Z00	DUAL I/F address over [EXT/HP#S1] [REG82001830, Bit9]	A Cache address over was detected when the HP#S1 port of the data buffer controller LSI made write access to another Control Unit.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H70000	E-CTL access error [READ_AREA_ WRITE_ERR] [REGF0002009, Bit7]	Write access to a read area occurred.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H70100	E-CTL MEM address parity error [REGF0002009, Bit6]	An address parity error occurred when the ECTL internal RAM was accessed.	CTL Alarm Trace		
H70200	E-CTL SH detected time-over [REGF000202E, Bit4]	An excess of time occurred when the ECTL internal RAM was accessed from the SH microprogram.	CTL Alarm Trace		
H70300	E-CTL SH CNT parity error [REGF000202E, Bit3]	An error occurred in the CMD counter on the SH microprogram side.	CTL Alarm Trace		
H70400	E-CTL SH MEM read data parity error [REGF000202E, Bit2]	A read data parity error occurred during a reading from the ECTL internal RAM performed by the SH microprogram.	CTL Alarm Trace		
H70500	E-CTL SH MEM address parity error [REGF000202E, Bit1]	A address parity error occurred during a reading from the ECTL internal RAM performed by the SH microprogram.	CTL Alarm Trace		
H70600	E-CTL SH access error [SH_READ_AREA_ WRITE_ERR] [REGF000202E, Bit0]	The SH microprogram made write access to a read area of the ECTL internal RAM (write area of the main microprogram).	CTL Alarm Trace		
H70700	E-CTL D_CMT parity error [REGF0002009, Bit3]	A parity error occurred in a counter that detects difference between data of the main microprogram CMD counter and the counter on the SH side.	CTL Alarm Trace		
H70800	E-CTL CNT parity error [REGF0002009, Bit2]	A parity error occurred in the CMD counter.	CTL Alarm Trace		
H70900	E-CTL access error [CMD_OVWT] [REGF0002009, Bit1]	The CMD information was overwritten throughout.	CTL Alarm Trace		
H70A00	E-CTL RAM parity error [REGF0002009, Bit0]	A parity error occurred during a reading from the ECTL internal RAM.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
H90210	CTL failure	The Control Unit was blocked	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
H90320	Watch-dog time-out	A watchdog time-out occurred.	CTL Alarm Trace	① Because it is possible that the cache memory has become out of order, replace it according to a judgment to be made through the following operation. Make the operation mode Maintenance mode and connect Storage Navigator Modular to the subsystem. Display the cache memory failure statistical information by selecting the Cache Memory tab on the "Statistical Information" panel displayed in the "Array System View" window through the sequential selections of "Tool" and "Statistical Information" in the window. Then get the total number of occurrence of correctable errors. • When the accumulated occurrence number of correctable errors is not "0": Replace the Control Unit of which CALM LED lights on and the Cache memory on the Control Unit concerned. • When the accumulated occurrence number of correctable errors is "0": Replace the Control Unit of which CALM LED lights on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
H90330	Connection unit excess	The number of connected units exceeded limit.	CTL Alarm Trace	① Check that five or more units are not connected.	–
H90400	Obstacle is detected by two or more SENC	Failures were detected in the two or more SENCs.		① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HA0100	CUDG error	A CUDG error was detected during the start-up operation. (RAM CUDG)	Simple Trace	① Solve the failure according to the CUDG detection message indicated before the message.	Message "Chapter 2. CUDG Detected Messages" (MSG 02-0000)
HA020x	RTC alarm (CTL-x)	A RTC failure occurred or the RTC battery was used up. x : Control Unit # (0-1)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HA0310	IDMA transfer time-out	IDMA transfer time-out occurred. (2 msec)	CTL Alarm Trace		
HA0311	IDMA retry error	IDMA failed in retry.	CTL Alarm Trace		
HA0312	IDMA multiple run	The system was running when IDMA was started.	CTL Alarm Trace		
HA0313	IDMA stop time-out	IDMA forced stop time-out occurred. (2 msec)	CTL Alarm Trace		
HA042x	FLASH write error (FM1-x)	Writing in flash memory failed. x : Chip information that caused the error (0=FM1-0, 1=FM1-1, 2=FM both chips)	CTL Alarm Trace		
HA0531	SOCKET open error	An OPEN error was caused by the socket.	CTL Alarm Trace	① 1. Replace the LAN cable.	–
HA0532	ACCEPT open error	An OPEN error was caused by the accept.	CTL Alarm Trace	2. Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HB0210	Target abort INT status error	The target abortion INT status is illegal.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HB0421	H-FPC PCI STS REG error [RMA]	The master abort occurred when the Fibre Channel Protocol Controller (H-FPC) LSI on the host side made the master access to the PCI.	CTL Alarm Trace		
HB0522	H-FPC PCI STS REG error [DPE]	A parity error of data occurred when the Fibre Channel Protocol Controller (H-FPC) LSI on the host side made the master access to the PCI	CTL Alarm Trace		
HB0623	H-FPC PCI INT STS REG err [UBE]	To the register of the Fibre Channel Protocol Controller (H-FPC) LSI on the host side that must be accessed in units of four bytes, access was made in the other manner.	CTL Alarm Trace		
HB0800	Command end INI INT status error	An illegal operation, in which an interruption to terminate the execution of the command issued from the local DF to the remote DF occurred though there was no table concerned, occurred.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HB0900	Target abort INI INT status error	Inconsistency of termination statuses of a command issued from the local system to the remote system occurred. (The Fibre Channel Protocol Controller (H-FPC) LSI on the host side detected the target abort but the DMA did not.)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HB0A0x	H-FPC hardware error (Port-x)	Unexpected operations of the Fibre Channel Protocol Controller (H-FPC) LSI on the host side occurred exceeding the threshold value. x : Port # (A-D)	CTL Alarm Trace		
HB0B0x	H-FPC soft reset has ended in failure (Port-x)	The software reset of the Fibre Channel Protocol Controller (H-FPC) LSI on the host side failed. x : Port # (A-D)	Simple Trace		
HB0Cxy	H-FPC is not detected (Port-xy)	The Fibre Channel Protocol Controller (H-FPC) LSI on the host side cannot be recognized on the PCI though the FC Interface Board is installed. x : Control Unit # (0-1) y : Code z : Object port # (multiple ports available) (y : z) = (1 : A) (2 : B) (3 : A, B) (4 : C) (5 : A, C) (6 : B, C) (7 : A, B, C) (8 : D) (9 : A, D) (A : B, D) (B : A, B, D) (C : C, D) (D : A, C, D) (E : B, C, D) (F : A, B, C, D)	CTL Alarm Trace	① Replace the FC Interface Board installed in the Control Unit displayed in the message. ② If it is not recovered, replace the Control Unit in which the replaced FC Interface Board is installed.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HB0Dyy	FPC is not detected (CTL-x)	The detection of the Fibre Channel Protocol Controller (FPC) LSI failed. x : Control Unit # (0-1) y : Code z : Chip error code (y:z) = (01 : Path-0) (02 : Path-1) (03 : Path-0/1) (04 : Path-2) (05 : Path-0/2) (06 : Path-1/2) (07 : Path-0/1/2) (08 : Path-3) (09 : Path-0/3) (0A : Path-1/3) (0B : Path-0/1/3) (0C : Path-2/3) (0D : Path-0/2/3) (0E : Path-1/2/3) (0F : Path-0/1/2/3) (10 : Port-0A) (11 : Path-0/PortA)	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD0100	DFPC error over [DFPCINM]	The Control Unit was detached because the number of errors of the Fibre Channel Protocol Controller (D-FPC) LSI on the drive side exceeded the threshold value.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD020x	D-FPC hardware error (Path-x, Code-y)	The software reset of the Fibre Channel Protocol Controller (D-FPC) LSI on the drive side failed. x : Path # (0-3) y : Detailed code	CTL Alarm Trace		
HD0300	D-FPC detected PCI error	The Fibre Channel Protocol Controller (D-FPC) LSI on the drive side detected the PCI error.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD1100	HDU CDB check code error [RETRY]	The Control Unit was blocked since the retry NG occurred in the drive check code.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD1200	HDU CDB check code error [OVER]	The Control Unit was blocked since the drive check code exceeded the threshold value.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD21xx	Host transfer DMA error over (DMA-x)	The number of DMA hardware failure occurrences exceeded its threshold value in the host transfer. [CTL blockade factor] x : DMA # (20-23)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD220x	CACHE error over (CACHE-x) [CRECT]	The number of cache correctable error occurrences exceeded its threshold value in the DMA transfer. (during the dual system operation) x : Cache memory slot # (0-3)	CTL Alarm Trace	① Replace the Cache Unit. ② If not recovered, replace the above Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD230x	Buffer to Cache copy failed (CTL-x)	A failure occurred in a copying between the buffer and cache. x : Control Unit # (0-3)	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD2400	DRR time-out	A time-out of the waiting for DRR completion occurred.	CTL Alarm Trace		
HD250x	Data pool init error other (CTL-x)	An error occurred in a CTL in the other system owing to a pool initialization by the DMA. x : Control Unit # (0-3)	CTL Alarm Trace		
HD260x	Data pool init error self (CTL-x)	An error occurred in a CTL in the self system owing to a pool initialization by the DMA. x : Control Unit # (0-3)	CTL Alarm Trace		
HD27xx	Drive transfer DMA error over (DMA-x)	Number of DMA hardware failures concerning data transfer to a drive exceeded the threshold value. x : DMA # (10-13)	CTL Alarm Trace	① See Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
HD2800	DUAL I/F SELF_IORDY changed to NotRDY [INT/HP#00] [REG82001428, Bit28]	The I/O Not Ready of the self system was detected (HP #00).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) –
HD2900	DUAL I/F SELF_IORDY changed to NotRDY [INT/HP#01] [REG82001428, Bit28]	The I/O Not Ready of the self system was detected (HP #01).	CTL Alarm Trace		
HD2A00	DUAL I/F SELF_IORDY changed to NotRDY [INT/HP#02] [REG82001428, Bit28]	The I/O Not Ready of the self system was detected (HP #02).	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD2B00	DUAL I/F SELF_IORDY changed to NotRDY [INT/HP#03] [REG82001428, Bit28]	The I/O Not Ready of the self system was detected (HP #03).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) –
HD2C00	DUAL I/F EXT_IORDY changed to NotRDY [INT/HP#00] [REG82001428, Bit26]	The I/O Not Ready of the other system was detected (HP #00).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD2D00	DUAL I/F EXT_IORDY changed to NotRDY [INT/HP#01] [REG82001428, Bit26]	The I/O Not Ready of the other system was detected (HP #01).	CTL Alarm Trace		
HD2E00	DUAL I/F EXT_IORDY changed to NotRDY [INT/HP#02] [REG82001428, Bit26]	The I/O Not Ready of the other system was detected (HP #02).	CTL Alarm Trace		
HD2F00	DUAL I/F EXT_IORDY changed to NotRDY [INT/HP#03] [REG82001428, Bit26]	The I/O Not Ready of the other system was detected (HP #03).	CTL Alarm Trace		
HD3000	DUAL I/F MRGN error [INT/HP#00] [REG82001484, Bit2]	After the Control Unit in the other system adjusted the data input timing while it was sending/receiving data to/from the Control Unit in the self system, the Control Unit in the self system detected a margin error. (HP #00) [Failure in the bus between the CTLs]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) –
HD3100	DUAL I/F MRGN error [INT/HP#01] [REG82001484, Bit2]	After the Control Unit in the other system adjusted the data input timing while it was sending/receiving data to/from the Control Unit in the self system, the Control Unit in the self system detected a margin error. (HP #01) [Failure in the bus between the CTLs]	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD3200	DUAL I/F MRGN error [INT/HP#02] [REG82001484, Bit2]	After the Control Unit in the other system adjusted the data input timing while it was sending/receiving data to/from the Control Unit in the self system, the Control Unit in the self system detected a margin error. (HP #02) [Failure in the bus between the CTLs]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) –
HD3300	DUAL I/F MRGN error [INT/HP#03] [REG82001484, Bit2]	After the Control Unit in the other system adjusted the data input timing while it was sending/receiving data to/from the Control Unit in the self system, the Control Unit in the self system detected a margin error. (HP #03) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD3400	DUAL I/F SEQ error [INT/HP#00] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (HP #00) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD3500	DUAL I/F SEQ error [INT/HP#01] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (HP #01) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD3600	DUAL I/F SEQ error [INT/HP#02] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (HP #02) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD3700	DUAL I/F SEQ error [INT/HP#03] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (HP #03) [Failure in the bus between the CTLs]	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD3800	DUAL I/F DCNT error [INT/HP#00] [REG82001484, Bit0]	A delay counter error in de-skew control of the other system was detected (HP #00).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD3900	DUAL I/F DCNT error [INT/HP#01] [REG82001484, Bit0]	A delay counter error in de-skew control of the other system was detected (HP #01).	CTL Alarm Trace		
HD3A00	DUAL I/F DCNT error [INT/HP#02] [REG82001484, Bit0]	A delay counter error in de-skew control of the other system was detected (HP #02).	CTL Alarm Trace		–
HD3B00	DUAL I/F DCNT error [INT/HP#03] [REG82001484, Bit0]	A delay counter error in de-skew control of the other system was detected (HP #03).	CTL Alarm Trace		
HD3C00	DUAL I/F SLV error [INT/HP#00] [REG82001484, Bit3]	A de-skew error in the other system was detected (HP #00).	CTL Alarm Trace		
HD3D00	DUAL I/F SLV error [INT/HP#01] [REG82001484, Bit3]	A de-skew error in the other system was detected (HP #01).	CTL Alarm Trace		
HD3E00	DUAL I/F SLV error [INT/HP#02] [REG82001484, Bit3]	A de-skew error in the other system was detected (HP #02).	CTL Alarm Trace		
HD3F00	DUAL I/F SLV error [INT/HP#03] [REG82001484, Bit3]	A de-skew error in the other system was detected (HP #03).	CTL Alarm Trace		
HD4000	DUAL I/F SELF_IORDY changed to NotRDY [INT/DMA#0] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (DMA #0).	CTL Alarm Trace		
HD4100	DUAL I/F EXT_IORDY change to NotRDY [INT/DMA#0] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (DMA #0).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD4200	DUAL I/F SLV error [INT/DMA#0] [REG82001484, Bit3]	An error was reported from the other Control Unit (DMA #0).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.) ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD4300	DUAL I/F MRGN error [INT/DMA#0] [REG82001484, Bit2]	After the Control Unit in the other system adjusted the data input timing while it was sending/receiving data to/from the Control Unit in the self system, the Control Unit in the self system detected a margin error. (DMA #0) [Failure in the bus between the CTLs]	CTL Alarm Trace		–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD4400	DUAL I/F SEQ error [INT/DMA#0] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (DMA #0) [Failure in the bus between the CTLs]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD4500	DUAL I/F DCNT error [INT/DMA#0] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element (DMA #0).	CTL Alarm Trace		
HD4600	DUAL I/F SELF_IORDY change to NotRDY [INT/DP#00] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (DP #00).	CTL Alarm Trace		
HD4700	DUAL I/F SELF_IORDY change to NotRDY [INT/DP#01] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (DP #01).	CTL Alarm Trace		
HD4800	DUAL I/F SELF_IORDY change to NotRDY [INT/DP#02] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (DP #02).	CTL Alarm Trace		
HD4900	DUAL I/F SELF_IORDY changed to NotRDY [INT/DP#03] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY (DP #3).	CTL Alarm Trace		
HD4A00	DUAL I/F EXT_IORDY changed to NotRDY [INT/DP#00] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (DP #00).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD4B00	DUAL I/F EXT_IORDY changed to NotRDY [INT/DP#01] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (DP #01).	CTL Alarm Trace		
HD4C00	DUAL I/F EXT_IORDY changed to NotRDY [INT/DP#02] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (DP #02).	CTL Alarm Trace		
HD4D00	DUAL I/F EXT_IORDY changed to NotRDY [INT/DP#03] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY (DP #03).	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD4E00	DUAL I/F SLV error [INT/DP#00] [REG82001484, Bit3]	An error was reported from the other Control Unit (DP #00).	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD4F00	DUAL I/F SLV error [INT/DP#01] [REG82001484, Bit3]	An error was reported from the other Control Unit (DP #01).	CTL Alarm Trace		
HD5000	DUAL I/F SLV error [INT/DP#02] [REG82001484, Bit3]	An error was reported from the other Control Unit (DP #02).	CTL Alarm Trace		
HD5100	DUAL I/F SLV error [INT/DP#03] [REG82001484, Bit3]	An error was reported from the other Control Unit (DP #03).	CTL Alarm Trace		
HD5200	DUAL I/F MRGN error [INT/DP#00] [REG82001484, Bit2]	When the Control Unit in the other system adjusted the data input timing during data sending/reception to/from the Control Unit in the self system, it detected a margin error. (DP #00) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5300	DUAL I/F MRGN error [INT/DP#01] [REG82001484, Bit2]	When the Control Unit in the other system adjusted the data input timing during data sending/reception to/from the Control Unit in the self system, it detected a margin error. (DP #01) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5400	DUAL I/F MRGN error [INT/DP#02] [REG82001484, Bit2]	When the Control Unit in the other system adjusted the data input timing during data sending/reception to/from the Control Unit in the self system, it detected a margin error. (DP #02) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5500	DUAL I/F MRGN error [INT/DP#03] [REG82001484, Bit2]	When the Control Unit in the other system adjusted the data input timing during data sending/reception to/from the Control Unit in the self system, it detected a margin error. (DP #03) [Failure in the bus between the CTLs]	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD5600	DUAL I/F SEQ error [INT/DP#00] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (DP #00) [Failure in the bus between the CTLs]	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HD5700	DUAL I/F SEQ error [INT/DP#01] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (DP #01) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5800	DUAL I/F SEQ error [INT/DP#02] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (DP #02) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5900	DUAL I/F SEQ error [INT/DP#03] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. (DP #03) [Failure in the bus between the CTLs]	CTL Alarm Trace		
HD5A00	DUAL I/F DCNT error [INT/DP#00] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element (DP #00).	CTL Alarm Trace		
HD5B00	DUAL I/F DCNT error [INT/DP#01] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element (DP #01).	CTL Alarm Trace		
HD5C00	DUAL I/F DCNT error [INT/DP#02] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element (DP #02).	CTL Alarm Trace		
HD5D00	DUAL I/F DCNT error [INT/DP#03] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element (DP #03).	CTL Alarm Trace		
HD5Exx	Host transfer DMA error (DMA-x)	A DMA hardware failure occurred by the data transfer between the host computer and the Cache Unit. [D-CTL failure] x : DMA # (00,10-13, 20-23, FF)	CTL Alarm Trace	① Maintain it refering to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HD5G00	DCTL hard error [OTH ER CTL]	An error occurred in the Control Unit in the other system during the DMA process for the Control Unit restoration.	CTL Alarm Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HD5F00	DCTL hard error [OWN CTL]	An error occurred in the Control Unit in the own system during the DMA process for the Control Unit restoration.	CTL Alarm Trace	②Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE0100	Backend down [All Loop NG]	Backend blockage: The subsystem cannot be controlled/monitored since usable LOOP is unavailable in the subsystem.	CTL Alarm Trace	①1. Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	–
				2. When an alarm has been issued to the subsystem, refer to Troubleshooting Chapter 6 "Details of Recovery Procedures".	Troubleshooting "Chapter 6. Details of Recovery Methods" (TRBL 06-0000)
				3. If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
HE020x	Backend down [NO SES-HDU BKW] (Unit-x)	The back end was blocked : Since there are no usable SES Disk Drives in the unit, the unit cannot be the unit cannot be controlled or monitored. x : Unit ID# (0-14)	CTL Alarm Trace	①1. Check if the subsystem identification switches of all the RKAJs are set as "M" for the RKH/RKM of the Basic Chassis and "S" for the RKS.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
HE02HH	Backend down [NO SES-HDU BKW] (Unit-x)	The back end was blocked : Since there are no usable SES Disk Drives in the unit, the unit cannot be the unit cannot be controlled or monitored. x : Unit ID# (0-29)	CTL Alarm Trace	2. When the setting of the subsystem identification switch is incorrect, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Set the subsystem identification switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				4. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				5. Check that the ENC Unit is installed firmly in the subsystem displayed in this message. When the ENC Unit is installed loosely, install the ENC Unit firmly.	–
				6. Replace the Control Unit indicated by "W0100x CTL alarm" displayed after this message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				7. When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit which shows this message.	
HE030x	Backend down [NO SES-HDU BKD] (Unit-x)	The back end was blocked : Since there are no usable SES Disk Drives in the unit, the unit cannot be controlled or monitored. x : Unit ID # (0-14)	CTL Alarm Trace	① 1. ENC cable may have been misconnected. Check the ENC cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				2. Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	–
HE03HH	Backend down [NO SES-HDU BKD] (Unit-x)	The back end was blocked : Since there are no usable SES Disk Drives in the unit, the unit cannot be controlled or monitored. x : Unit ID # (0-29)	CTL Alarm Trace	3. If the Unit is 0, replace the Control Unit for which the CALM LED is lit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				4. If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE050x	Backend down [Unit# ERR] (Unit-x)	The back end was blocked : Abnormality in the connection order of the units or a wrong ID of a unit was detected. x : Unit ID # (1-14)	CTL Alarm Trace	①1. Check if the Power Unit is firmly installed in the subsystem displayed in the message. When no Power Unit is installed, turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
HE05HH	Backend down [Unit# ERR] (Unit-x)	The back end was blocked : Abnormality in the connection order of the units or a wrong ID of a unit was detected. x : Unit ID # (0-29)	CTL Alarm Trace	2. Install two Power Units after turning off all the AC Input Power Switches.	
				3. When the Power Unit is loosely installed, install the Power Unit firmly again after turning off the main switch and turning off all the AC Input Power Switches.	
				4. Turn on the power of the subsystem again.	
				②1. Check if the AC Input Power Switch of the subsystem displayed in this message is turned on. When the AC Input Power Switch is turned off, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn on the power of the subsystem again.	
				③1. Check if the READY LED on the Power Unit of the subsystem displayed in this message lights up. Check if the power cable is firmly connected to the connector when the READY LED on the Power Unit does not light up.	–
				2. When the power cable is loosely connected to the connector, connect the power cable to the connector firmly, and check that the READY LED on the Power Unit lights up.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. If the READY LED on the Power Unit does not light up yet or there is no problem on the connection of the power cable, check that the power supply can be supplied to the Power Unit.	–
				4. Turn off the main switch, and then turn off all the AC Input Power Switches after checking that the READY LED on the Power Unit lights up.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				5. Turn on the power of the subsystem again.	
				④1. Check if the ENC cable is firmly connected to the connector. When the ENC cable is connected to the connector loosely, turn off the main switch, and turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Connect the ENC cable to the connector firmly.	
				3. Turn on the power of the subsystem again.	
				⑤1. Check if the device ID is set correctly. If the device ID is set incorrectly, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Set the device ID correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				3. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				⑥ 1. Check if the subsystem identification switches of all the RKAJs are set as "M" for the RKH/RKM of the Basic Chassis and "S" for the RKS.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				2. When the setting of the subsystem identification switch is incorrect, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Set the subsystem identification switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				4. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑦ 1. Turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Replace the ENC Unit #0 of the subsystem displayed in this message. However, when the subsystem displayed in this message is the Basic Chassis, replace the Control Unit #0.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				3. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑧ 1. If the subsystem # displayed in the message this time differs from the one displayed in the message last time, return to ⑦ and maintain it.	–
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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. If the subsystem # displayed in the message this time is the same as the one displayed in the message last time, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Replace the ENC Unit #1 of the subsystem displayed in the message. However, when the subsystem displayed in this message is the Basic Chassis, replace the Control Unit #1.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				4. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑨If it is not recovered yet, perform the trouble analysis for the subsystem displayed in this message according to "8.1.Trouble Analysis by LED Indication of Front Bezel".	Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" (TRBL 08-0000)
HE06xy	Backend down [AL_PA] (Path-x, Loop-y)	The back end was blocked: Abnormality was detected in AL-PA of the drive connected to the loop. x : Path # (0-3) y : Loop # (0-1)	CTL Alarm Trace	①Check if the subsystem is connected in the correct device connection order.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				②Check if the device ID of the subsystem is set correctly.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE0710	Backend loop change error [OWN]	The loop switch was changed and the newly selected loop had a failure, too.	CTL Alarm Trace	①When a message, "I5YG00 Unit # ERR" is displayed, take a recovery action according to the message.	–
				②When an alarm has been issued to the subsystem, refer to see Troubleshooting "6.1.1 System down".	Troubleshooting "6.1.1 System down" (TRBL 06-0020)
				③When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x "CTL alarm" • W060xy, W060HH, W0GG00, W0GH00 "HDU alarm" • W060AT "SATA HDU alarm" • W061xy, W061HH, W0GJ00, W0GK00 "Spare HDU alarm" • W061AT "SATA Spare HDU alarm" • W090xy, W090HH, W0GA00, W0GC00 "ENC alarm" • W090AT, W0GB00, W0GD00 "SENC alarm" • I301xy, I301HH "HDU error" • I301AT "SATA HDU error"	–
				④When the subsystem failed to start, turn off the main switch, and perform the maintenance after turning off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑤Turn on the power of the subsystem.	
				⑥Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)"	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				⑦Refer to Troubleshooting Chapter 8. "Trouble Analysis by LED Indication".	Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000)
HE0711	Backend loop change error [OTH]	The loop switch was changed and the newly selected loop had a failure, too	CTL Alarm Trace	①When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x "CTL alarm" • W060xy, W060HH, W0GG00, W0GH00 "HDU alarm" • W060AT "SATA HDU alarm" • W061xy, W061HH, W0GJ00, W0GK00 "Spare HDU alarm" • W061AT "SATA Spare HDU alarm" • W090xy, W090HH, W0GA00, W0GC00 "ENC alarm" • W090AT, W0GB00, W0GD00 "SENC alarm" • I301xy, I301HH "HDU error" • I301AT "SATA HDU error"	–
				②When the subsystem failed to start, turn off the main switch, and perform the maintenance after turning off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③Turn on the power of the subsystem.	
				④Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)"	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
				⑤Refer to Troubleshooting Chapter 8. "Trouble Analysis by LED Indication".	Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE082x	CTL loop failure (CTL-x)	A loop failure occurred in the Control Unit of the system or the other system. x : Control Unit # (0-1)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE0930	BKD job time-out	Back end diagnosis job time-out occurred.	CTL Alarm Trace		
HE0A31	BKW job time-out	Back end monitoring job finish waiting time-out occurred.	CTL Alarm Trace	① Check if the subsystem identification switches of all the RKAJs are set as "M" for the RKM/RKH of the Basic Chassis and "S" for the RKS.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				② When the setting of the subsystem identification switch is incorrect, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③ Set the subsystem identification switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				④ Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑤ Replace the Control Unit indicated by "W0100x CTL alarm" displayed after this message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				⑥ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit which shows this message.	
HE0Bxy	ENC thermal alarm [PSOFF] (Unit-x, ENC-y)	The sequential shutdown was executed because a temperature error was detected in the ENC. (Additional Chassis) x : Unit ID # (0-14) y : ENC Unit # (0-1)	Simple Trace	① 1. Check if the environment is set in accordance with the specifications.	–
				2. Turn the power on and check if the fan is not in the state in which it has been given an alarm.	
HE0BHH	ENC thermal alarm [PSOFF] (Unit-x, ENC-y)	The sequential shutdown was executed because a temperature error was detected in the ENC. (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit # (0-1)	Simple Trace	3. Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE0B0x	ENC thermal alarm [PSOFF] (CTL-x)	The sequential shutdown was executed because a temperature error was detected in the ENC. (Basic Chassis) x : Control Unit # (0-1)	Simple Trace	①1. Check if the environment is set in accordance with the specifications. 2. Turn the power on and check if the fan is not in the state in which it has been given an alarm. 3. Replace the Control Unit whose CALM LED is on.	– Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE0C00	Controller thermal alarm [OWN]	The Control Unit of own system was blocked because a temperature error was detected in the Control Unit.	Simple Trace	①1. Check if the environment is set in accordance with the specifications. 2. Check if the fan is not in the state in which it has been given an alarm. 3. Replace the Control Unit whose CALM LED is on.	– Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE0D00	Controller thermal alarm [OTH]	The Control Unit of another system was blocked because a temperature error was detected in the Control Unit.	Simple Trace		
HE0E00	Controller thermal alarm [PSOFF]	The sequential shutdown was executed because a temperature error was detected in the Control Unit.	Simple Trace	①1. Check if the environment is set in accordance with the specifications. 2. Turn the power on and check if the fan is not in the state in which it has been given an alarm. 3. Replace the Control Unit whose CALM LED is on.	– Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE0Fxy	Backend down [Cable ERR] (Unit-x, ENC-y)	The back end was blocked : Abnormality in the connection order of the cables was detected. x : Unit ID # (1-14) y : ENC Unit # (0-1)	CTL Alarm Trace	①Check that the connection order of the unit cables is correct. (Check that a connector and a cable of the same color are connected together.)	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
HE0FHH	Backend down [Cable ERR] (Unit-x, ENC-y)	The back end was blocked : Abnormality in the connection order of the cables was detected. x : Unit ID # (0-29) y : ENC Unit # (0-1)	CTL Alarm Trace		
HE100x	ENC error [ENC NG] (CTL-x)	An error (SW malfunction) occurred in the ENC part of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE110x	ENC error [NO SES HDU] (CTL-x)	An error (unusable SES drive) occurred in the ENC part of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE120x	ENC error [ENC check NG] (CTL-x)	An error (an abnormal link or a failure in the ENC part) occurred in the ENC part of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HE200x	ENC recovery failed (CTL-x)	It failed in the insertion of the Control Unit. (Basic Chassis) x : Control Unit # (0-1)	Simple Trace	① See Troubleshooting "6.1.21 Recover method when illegal ENC cable connection or controller failure is detected".	Troubleshooting "6.1.21 Recover method when illegal ENC cable connection or controller failure is detected" (TRBL 06-1230)
HE21xy	I/F board type error (CTL-x, I/F board-y)	An illegal value was detected when the installation status of the Interface Board was acquired with TWSI. Or unsupported Interface Board was installed. x : Control Unit # (0-1) y : Interface Board # (0-1)	Simple Trace	① Check if the Interface Board displayed in the message is the one that supported by the microprogram installed in the subsystem.	–
				② When the Interface Board that is not supported is installed, replace it with the supported Interface Board.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				③ Check if the types of the Interface Boards are unified between the Control Units or the installation statuses are not different. When the types are different or the installation statuses are inconsistent, unify the Interface Boards.	–
				④ In case of the RKH, check if the installation position of the Interface Board is correct. If it is installed in the incorrect position, reinstall the Interface Board in the correct position.	Installation "3.4.7 (4) Installing the Control Unit, Cache Unit and Interface Board (c) In the case of RKH" (INST 03-0581)
				⑤ If not recovered, check if the Interface Board displayed in the message is not loosening. When it is loosening, reinstall the Interface Board.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				⑥ If the failure is not recovered, replace the Interface Board displayed in the message.	
				⑦ If not recovered yet, replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HE220x	The SENC intermittent error was over the threshold (CTL-x)	The intermittent failure of the SENC exceeded the threshold value. [CTL blockade factor] x : Control Unit # (0-1)	CTL Alarm Trace	① Maintain it according to "W0100x CTL alarm" displayed after this message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HF0100	Data transfer check error [SEGPOSERR]	(Data assurance check) An illegal cache writing segment position was detected.	CTL Alarm Trace	① Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
HF0101	Data transfer check error [WRNODTYBK]	(Data assurance check) A block which was not dirty was written in the Disk Drive.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0102	Data transfer check error [RDDTYBLK]	(Data assurance check) Data were read into a dirty block.	CTL Alarm Trace		
HF0103	Data transfer check error [RDSEGERR]	(Input/Output data assurance check) An illegal segment to be read was detected.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the Cache Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0104	Data transfer check error [WSGQATERR]	(Data assurance check) Contradiction occurred in the queue attribute of the write segment.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0105	Data transfer check error [WSEGPDEV]	(Input/Output data assurance check) An illegal Disk Drive to be written was detected.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on. ② If not recovered, replace the all Cache Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0106	Data transfer check error [WSEGLOCK]	(Input/Output data assurance check) An illegal Disk Drive to be written was detected.	CTL Alarm Trace		
HF0107	Data transfer check error [CCPLUNERR]	(Data assurance check) An illegal LUN was detected when data were copied between Cache memories.	CTL Alarm Trace		
HF0108	Data transfer check error [CCPLBAERR]	(Data assurance check) An illegal LBA was detected when data were copied between Cache memories.	CTL Alarm Trace		
HF0109	Data transfer check error [PARLUNERR]	(Data assurance check) An illegal LUN was detected when parity was generated.	CTL Alarm Trace		
HF010A	Data transfer check error [PARLBAERR]	(Data assurance check) An illegal LBA was detected when parity was generated.	CTL Alarm Trace		
HF010B	Data transfer check error [QUEUEERR]	(Data assurance check) Contradiction occurred in transfer of the queue.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HF010C	Data transfer check error [COWDRVERR]	(Data assurance check) Data to be written together are dispersed in multiple Disk Drives.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on. ②If not recovered, replace the all Cache Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF010D	Data transfer check error [LACHEKMOD]	(Data assurance check) Contradiction occurred in specification of LA check.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF010E	Data transfer check error [DSTP0SERR]	(Data assurance check) An illegal writing position was detected during destaging.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF010F	Data transfer check error [SEGP0SOTH]	(Data assurance check) An illegal cache writing segment position was detected.	CTL Alarm Trace	②If not recovered, replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0110	Data transfer check error [CMPNGHE]	(Data assurance check) A duplex compare of SGCB was detected. (Non-specialized writing)	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on. ②If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0111	Data transfer check error [CMPNGSP]	Data assurance check) A duplex compare of SGCB was detected. (Specialized writing)	CTL Alarm Trace		
HF0112	Data transfer check error [CMPNGSP]	Data assurance check) A duplex compare of SGCB was detected. (Generation of parity)	CTL Alarm Trace		
HF0113	Data transfer check error [CMPNGCP]	Data assurance check) A duplex compare of SGCB was detected. (Copying between Cache memories)	CTL Alarm Trace		
HF0114	Data transfer check error [CMPNGDC]	Data assurance check) A duplex compare of SGCB was detected. (Transfer from disk to Cache memory)	CTL Alarm Trace		
HF0115	Data transfer check error [CMPNGCD]	Data assurance check) A duplex compare of SGCB was detected. (Transfer from Cache memory to disk)	CTL Alarm Trace		
HF0116	Data transfer check error [SSGQATERR]	(Data assurance check) An illegal segment queue attribute was detected in the intermediate skip mode.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0117	Data transfer check error [BUFSGQATERR]	A contradiction in the queue attribute of the buffer segment occurred.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0118	Data transfer check error WRBUFTODTY]	(Data assurance check) A writing of data in a buffer segment into a dirty block was attempted.	CTL Alarm Trace	②If not recovered, replace the all Cache Units.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0119	Data transfer check error [MAPERR]	(Data assurance check) An illegal operation, in which a transfer of a block with no data was attempted, was detected.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HF011A	Data transfer check error [LOCLUERR]	(Data assurance check) An illegal operation, in which a transfer of a segment of a different LU was attempted, was detected.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF011B	Data transfer check error [RMTLUERR]	(Data assurance check) An illegal operation, in which a specification of a transfer destination LU was wrong, was detected.	CTL Alarm Trace		
HF011C	Data transfer check error [PAIRERR]	(Data assurance check) An illegal operation, in which a data transfer was attempted although the status of the TrueCopy remote replication/ TrueCopy Extended Distance pair did not allow it, was detected.	CTL Alarm Trace		
HF020x	Directory check error (CTL-x)	An uncorrectable contradiction was detected in a cache directory. x : Control Unit # (0-1)	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HF0300	Data transfer check error [STGLUNERR]	(Data assurance check) A LUN error was detected during a staging.	CTL Alarm Trace	②If not recovered, replace the Cache Units.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0400	Data transfer check error [NTMPRD]	(Data assurance check) A LUN error was detected during a staging.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				②If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HF0500	Data transfer check error [DTYMPERR]	(Data assurance check) An incorrect dirty map was detected.	Simple Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HG0100	CTL communication send time-out	Communication receiving waiting time-out occurred.	CTL Alarm Trace		
HG0210	OTH CTL Response time-out [CMDFMWR]	Time-out occurred in communication of request for updating the flash memory of the other system. (CMD)	CTL Alarm Trace		
HG0311	OTH CTL Response time-out [OFW]	Communication waiting time-out occurred in the other system during off-line monitoring.	CTL Alarm Trace		
HG0312	Resource release time-out	General resource release waiting time-out occurred.	CTL Alarm Trace		
HG0413	Data share job time-out	Job time-out occurred for request for share.	CTL Alarm Trace		
HG0514	LU-CTL change time-out	Time-out occurred while LU was changed.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HGA000	Staging job time-out	A time-out occurred because a staging job was not completed within a certain period.	Simple Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HGA100	Data staging time-out	A time-out of waiting for staging completion occurred during the Copy-on-write SnapShot restoration copy job.	CTL Alarm Trace		
HGA200	Data pool copy time-out	A time-out of waiting for Copy-on-write SnapShot copy completion occurred during the Copy-on-write SnapShot restoration control job.	CTL Alarm Trace		
HGA300	Data restore time-out	A time-out of waiting for restore copy completion occurred during the Copy-on-write SnapShot restoration control job.	CTL Alarm Trace		
HGA400	Data pool wait time-out	A time-out of waiting for the pool resource ensuring occurred during the Copy-on-write SnapShot restoration control job.	CTL Alarm Trace		
HH010x	System parameter undefined (CTL-x)	A system parameter is not set. x : Control Unit # (0-1)	CTL Alarm Trace	①Set the system parameter correctly in the WEB maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
HH020x	Flash revision mismatch (CTL-x)	A Control Unit which the currently installed microprogram could not operate was detected. x : Control Unit # (0-1)	CTL Alarm Trace	①Check setting of the system parameter in the WEB maintenance mode to see if a function which the currently installed microprogram cannot operate is set.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				②If setting is correct, replace the Control Unit, the CALM LED of which is lighting up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH030x	FLASH-RAM program I/F error (CTL-x)	Illegal interface between the flash boot program and RAM program was detected. x : Control Unit # (0-1)	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH0400	Unsupported function enabled	A function which the system did not support was set.	CTL Alarm Trace	①Set the system parameter correctly in the WEB maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
HH0510	Task make error [INMTSKERR]	Generation of the initial setting task failed.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH0620	JOB make error	Generation of a job at start up failed.	CTL Alarm Trace		
HH0930	No system HDU	The system area of the all Disk Drives became unavailable.	CTL Alarm Trace	①Contact the Technical Support Center.	–
HH0931	No system HDU	Information on takeover in the system area for all Disk Drives became unusable.	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH0A40	System HDU access error	Since access could not be made to the system area of the all Disk Drives because of a system area access error, the Control Unit was blocked.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH0Cxy	HDU removed before PS ON (Unit-x, HDU-y)	The Disk Drive used until previous operation is not mounted when P/S is turned on. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	①When this message is displayed during identifying the failed Disk Drive, perform the maintenance according to Troubleshooting "6.1.14 (3) (b) Identifying the failed HDU".	Troubleshooting "6.1.14 (3) (b) Identifying the failed HDU" (TRBL 06-1030)
HH0CHH	HDU removed before PS ON (Unit-x, HDU-y)	The Disk Drive used until previous operation is not mounted when P/S is turned on. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
HH0CAT	SATA HDU removed before PS ON (Unit-x, HDU-y)	The Disk Drive used until previous operation is not mounted when P/S is turned on. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	②Turn off the main switch except for ①. ③Turn off all the AC Input Power Switches. ④When the Disk Drive is not installed in the installation position of the Disk Drive displayed in the message, install the Disk Drive of the same model name as the Disk Drive installed in the Ready status. When it is installed, replace the Disk Drive. ⑤Turn on the power of the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290) Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Installation "1.7 Power On/Off Procedure" (INST 01-0290)
HH0E0x	CACHE access error (CACHE-x) [PON]	A cache access error (unrecoverable) occurred when P/S was turned on. x : Cache Unit slot # (0-3)	CTL Alarm Trace	①Replace the Cache Unit. ②If not recovered, replace the above Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH0Fxx	RKAJ removed before PS ON (Unit-x)	The additional frame which the Disk Drive used last time belonged to was not connected when the power was turned on. x : Unit ID # (1-14)	Simple Trace	①Make sure that the Additional Chassis is installed and connected, and then start up the subsystem again. ②Analyze the failure following Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" for the Unit # concerned.	– Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" (TRBL 08-0000)
HH1070	PIN segment error [PINSEGOV]	Cache segments are insufficient for recovery of the PIN data of the information taken over.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH1180	DCTL hard error [PS ON]	A DMA hardware failure occurred while PS is turned on.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
HH1290	System down selected [USRDATLST]	When data were lost, system shutdown was selected by the user.	CTL Alarm Trace	①See Troubleshooting “6.1.2 The subsystem does not become ready : Case 1 (Loading failure)”.	Troubleshooting “6.1.2 The subsystem does not become ready : Case 1 (Loading failure)” (TRBL 06-0050)
HH12A0	Forced parity correction time-out	Time-out occurred during forced parity correction operation while P/S is turned on.	CTL Alarm Trace	①Replace the Disk Drive. When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement “1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive”.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive” (REP 01-0100)
				②Replace the Control Unit whose CALM LED is on.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
HH13B0	System change failed [PIN]	The upgrade cannot be made because a pinned segment exists in the state in which the system change has not been made normally.	CTL Alarm Trace	①Return the Disk Drive to the subsystem of the lower grade model and reboot the subsystem.	Installation “1.7.1 Subsystem power on” (INST 01-0290)
				②Make the upgrade again after eliminating the pinned segment.	–
HH13B1	System change failed [PSOFF]	The upgrade cannot be made because the system change has not been made normally.	CTL Alarm Trace	①Return the Disk Drive to the subsystem of the lower grade model and reboot the subsystem.	Installation “1.7.1 Subsystem power on” (INST 01-0290)
				②Make the upgrade again after performing the deliberate shutdown.	Installation “1.7.2 Subsystem power off (Sequential shutdown)” (INST 01-0310)
HH16D0	CTL recovery failed [DRR ERR]	The DRR failure was detected when the Control Unit was inserted in the state in which the subsystem power was on, and then the cache memory of the inserted Control Unit was being restored.	CTL Alarm Trace	①Replace the Control Unit whose CALM LED is on.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH17xx	Unit which cannot be managed (Unit-x)	A frame with no drive installed was detected in the powering on diagnosis. x : Unit ID # (1-14)	CTL Alarm Trace	① Check that the number of the Additional Chassis connected is six or less for RKXS or RKS, 14 or less for RKM and 30 or less for RKH.	–
HH17HH	Unit which cannot be managed (Unit-x)	A frame with no drive installed was detected in the powering on diagnosis. x : Unit ID # (1-29)	CTL Alarm Trace	② When abnormality is found, turn off the power supply, connect the Additional Chassis correctly, and then turn on the power supply.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③ Make sure of installation of Disk Drives in the frame concerned and start up the subsystem again.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				④ ENC cable may have been misconnected. Check the ENC cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
HH19xy	ENC alarm (Unit-x, ENC-y)	An ENC failure occurred in the back end diagnostic mode. (Additional Chassis) x : Unit ID # (0-14) y : ENC Unit/SENC Unit # (0-1)	CTL Alarm Trace	① Turn off the AC Input Power Switch of the added RKAJ.	Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310)
				② Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
HH19HH	ENC alarm (Unit-x, ENC-y)	An ENC failure occurred in the back end diagnostic mode. (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	CTL Alarm Trace	③ Then execute the back end diagnosis again	–
HH190x	ENC alarm (CTL-x)	An ENC failure occurred in the back end diagnostic mode. (Basic Chassis) x : Control Unit # (0-1)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				② Then execute the back end diagnosis again	–
HH1Axy	ENC recovery NG HDD-NG (Unit-x, HDU-y or z)	Though recovery of the Control Unit (in the basic frame) was attempted, it failed because a failure occurred in the Disk Drive (y or z) connected to the ENC. x : Unit ID # (0/2, 1/3) y or z : Disk Drive # (0-14)	CTL Alarm Trace	① Insert the Control Unit again after making the recovery by replacing the Disk Drive (y or z).	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH1AHH	ENC recovery NG HDD-NG (Unit-x, HDU-y or z)	Though recovery of the Control Unit (in the basic frame) was attempted, it failed because a failure occurred in the Disk Drive (y or z) connected to the ENC. x : Unit ID # (0-29) y or z : Disk Drive # (0/2, 1/3)	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH1B0x	ENC recovery NG HDD-NG (CTL-x)	Though recovery of the Control Unit (in the Basic Chassis) was attempted, it failed because a failure occurred in the ENC. x : Control Unit # (0-1)	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH1J00	ENC error inf. [CUDG ECTLREGERR]	The Control Unit was detached because an CUDG ECTL register error occurred in the ENC.	CTL Alarm Trace		
HH1K00	ENC error inf. [CUDG ENC RDYTOV]	A ready time-out of the ENC in another system was detected.	CTL Alarm Trace		
HH1L00	ENC error inf. [CUDG SRAMERR]	The Control Unit was detached because an CUDG SRAM Parity error occurred in the ENC.	CTL Alarm Trace		
HH1M00	ENC error inf. [CUDG ENCCOMERR]	The Control Unit was detached because an CUDG ENCCOMERR error occurred in the ENC.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH1N00	ENC error inf. [ENCCOMERR]	The Control Unit was detached because an CUDG ENCCOMERR error occurred in the ENC.	CTL Alarm Trace	② If not recovered yet, contact the Technical Support Center. (*1)	–
HH1P00	ENC error inf. [ECTL force test]	The Control Unit was detached because an parity error occurred in the ENC.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH1Q00	SES error inf. [SES-HDU error]	The Control Unit was detached because both of the two SES drives could not access the ENC.	CTL Alarm Trace		
HH1W00	ENC inf. [REGPERR]	REGPERR occurred in ENC and the corresponding CTL was detached.	CTL Alarm Trace		
HH1X00	ENC inf. [RAMPERR]	RAMPERR occurred in ENC and the corresponding CTL was detached.	CTL Alarm Trace		
HH1Y00	ENC inf. [WDTCNTPERR]	WDTCNTPERR occurred in ENC and the corresponding CTL was detached.	CTL Alarm Trace		
HH1Z0x	ENC recovery NG Loop-NG (CTL-x,)	An ENC recovery failure (Basic Chassis) x : Control Unit # (0-1)	Simple Trace	① Collect Simple trace and contact the Technical Support Center.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : If CALM LED lights on, and the same message is displayed again in spite of replacing the Control Unit in ①, the Control Unit on the opposite side may have a failure. Replace the Control Unit on the opposite side with the power turned off after checking with the customer.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH2000	DUAL I/F SELF_IORDY error [REG82001428, Bit22]	A failure of the impedance adjustment circuit of own system occurred during a readjustment of the impedance.	Simple Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ②Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2100	DUAL I/F EXT_IORDY error [REG82001428, Bit21]	A failure of the impedance adjustment circuit of another system occurred during a readjustment of the impedance.	Simple Trace	①Replace the Control Unit whose CALM LED is on. ②When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2200	DUAL I/F DUAL_IORDY error [REG82001428, Bit29]	A failure of the impedance adjustment circuit of own system occurred during a readjustment of the impedance.	Simple Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ②Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH250x	Rotary switch number is not supported	The not supported rotary switch number is set. x : Rotary switch (7 or 8 =1, other=0)	Simple Trace	①Confirm the setting of the rotary switch.	Installation "1.8 Setting the Power Control Mode (Local/Remote Mode)" (INST 01-0380).
HH270x	Interface Board is not installed (CTL-x)	The Interface Board is not installed. x : Control Unit # (0-1)	CTL Alarm Trace	①Install at least one Interface Board in this Control Unit.	Installation "3.4.7 (4) Installing the Control Unit, Cache Unit and Interface Board" (INST 03-0550)
HH2900	Cache capacity reduced although copy function enable	The cache capacity was reduced in the state in which any one of the copy functions (TrueCopy remote replication, TrueCopy Extended Distance, ShadowImage in-system replication, Copy-on-write SnapShot, and Modular Volume Migration) was valid.	Full Dump	①Return the cache capacity to that at the time when the power was turned off.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HH2A00	Single or Hot Stand-by although QuickShadow enable	The Single mode was set although the Copy-on-write SnapShot function was enabled when the subsystem was started up.	Full Dump	①Return the system parameters of the subsystem to those for the Dual Active mode and restart the subsystem.	System Parameter "Chapter 3. Setting the RAID/LU/Spare Disk" (SYSPR 03-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH2B00	Upgrade failed [PSOFF]	The upgrade from the lower grade model to the higher grade model cannot be made because the deliberate shutdown has not been performed.	Simple Trace	①1. Do the upgrading installation of the microprogram for the lower grade model after disabling the installation guard.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
				2. Power off the subsystem after the updating installation is completed.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				3. Return the hardware configuration to that of the lower grade model.	–
				4. Perform the deliberate shutdown of the subsystem after booting it while it is the lower grade model.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				5. Execute the procedure for the upgrade from the lower grade model to the higher grade model.	–
HH2C00	Upgrade failed [Single]	The upgrade from the lower grade model to the upper grade model could not be made because the "System Startup Attribute" was set as the "Single Mode".	Simple Trace	①1. Do the upgrading installation of the microprogram for the lower grade model after disabling the installation guard.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
				2. Power off the subsystem after the updating installation is completed.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				3. Return the hardware configuration to that of the lower grade model.	–
				4. Change the mode to the Maintenance mode after booting the subsystem while it is the lower grade model.	WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000)
				5. Execute the "Go to Normal Mode" after setting the "System Setup Attribute" as the "Dual Active Mode".	WEB "3.2.1 Subsystem" (WEB 03-0060)
				6. Boot the subsystem.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				7. Execute the procedure for the upgrade from the lower grade model to the higher grade model.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH2D00	Upgrade failed [Microprogram revision]	The upgrade from the lower grade model to the higher grade model cannot be made because the versions of their microprograms are different from each other.	Simple Trace	①Install the microprogram of the higher grade model, whose system revision is the same as that of the microprogram of the lower model, in the Disk Drive.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
HH2F00	Downgrade failed [Subsystem can not take over the user data]	The subsystem start-up of the lower model failed because it tried to downgrade from the upper model to the lower model.	Simple Trace	①Execute the initial setup to the subsystem that is the hardware configuration of the lower model, and start up the subsystem when operating the subsystem as a lower model. ②Turn on all the AC input power supply switches of the subsystem after returning the hardware configuration of the subsystem to the status that is upgraded to the upper model, and start up the subsystem of the upper model when operating the subsystem as an upper model.	–
HH2I00	DUAL I/F stabilization error in an impedance adjustment [REG82001428, Bit24, Bit25]	When the impedance of the I/O buffer was going to be readjusted, it was found that the impedance was not fixed in the preceding adjustment.	Simple Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ②Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2J00	DUAL I/F DESKEW is not completed	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, a time-out occurred.	Simple Trace	①When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ②If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2K00	DUAL I/F SLV error [INT/MP] [REG82001484, bit3]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it received an error report from the Control Unit in the other system.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH2L00	DUAL I/F SEQ error [INT/MP] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error.	Simple Trace	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2M00	DUAL I/F DESKEW is not completed	Though the inserted Control Unit attempted to adjust the data input timing when it was sending/receiving data to/from a Control Unit not blocked, the adjustment was not completed within the time limit.	Simple Trace		
HH2N00	DUAL I/F SLV error [INT\MP] [REG82001484, Bit3]	When the inserted Control Unit was adjusting the data input timing while it was sending/receiving data to/from a Control Unit not blocked, it received an error report from the Control Unit not blocked.	Simple Trace	① 1. Replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.) 2. When this message is displayed again after the replacement of the Control Unit, replace the Control Unit that has been inserted in the state in which the subsystem power is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH2P00	DUAL I/F SEQ error [INT/MP] [REG 82001484, Bit1]	When the inserted Control Unit was adjusting the data input timing while it was sending/receiving data to/from a Control Unit not blocked, it detected a sequence error.	Simple Trace		
HH2Q00	CTL recovery failed [time-out]	When rebooting the Control Unit, the time-out was detected by the communication between the Control Units while the data of the Cache Unit was recovering.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH30xx	Obstacle HDU search failed	Automatic diagnosis of backend loop cannot be continued. (Both system are blocked) x : Optional code	Full Dump	①When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x “CTL alarm” • W060xy, W060HH, W0GG00, W0GH00 “HDU alarm” • W060AT “SATA HDU alarm” • W061xy, W061HH, W0GJ00, W0GK00 “Spare HDU alarm” • W061AT “SATA Spare HDU alarm” • W090xy, W090HH, W0GA00, W0GC00 “ENC alarm” • W090AT, W0GB00, W0GD00 “SENC alarm” • I301xy, I301HH “HDU error” • I301AT “SATA HDU error”	–
HH31xx	Backend loop change error [OWN]	Automatic diagnosis of backend loop cannot be continued. (Own system is blocked) x : Optional code	CTL Alarm Trace	②1. When the subsystem failed to start, turn off the main switch, and perform the maintenance after turning off all the AC Input Power Switches.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Turn on the power of the subsystem.	
				3. See Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)”.	Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)” (TRBL 06-0600)
				4. See Troubleshooting “Chapter 8. Trouble Analysis by LED Indication”.	Troubleshooting “Chapter 8. Trouble Analysis by LED Indication” (TRBL 08-0000)
HH3200	ENC error inf. [CMPERR]	The write data is not reflected on the read side of the cache after it has been written onto the ENC of the DKC frame.		① Replace the Control Unit whose CALM LED is on.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH3300	ENC error inf. [WTTOUT]	The write operation is not completed though 1.2 seconds have passed after the write instruction was issued to the ENC of the DKC frame.		① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH3400	ENC error inf. [RENEWERR]	Though 40 ms have passed after the data update request bit was turned on, the bit is not turned off.			
HH3500	ENC error inf. [DARAERR]	The SES information that was read was incorrect.			
HH3600	Unit-00 removed before PS ON	The number of installed frames was zero when the subsystem was started up.		① Check the connection of the ENC cable between the controller unit and the Unit 00, and then restart the subsystem.	–
HH3700	ENC error inf. [BKD CMPERR]	The Write data is not reflected on the Read side after it was written in the ENC.		① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH3800	ENC error inf. [BKD ECTLERR]	The read SES information was incorrect. (ECTLERROR)			
HH3900	ENC error inf. [BKD SWCUDGERR]	The read SES information was incorrect. (SWCUDGERR)			
HH3A00	ENC error inf. [BKD ENCCOMERR]	The read SES information was incorrect. (ENCCOMERR)		① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				③ If not recovered, replace the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	
HH3B00	ENC error inf. [BKD FIXEDNG]	The read SES information was incorrect. (FIXEDNG)		① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH3C00	ENC error inf. [BKD IDMODENG]	The read SES information was incorrect. (IDMODENG)			
HH3D00	ENC error inf. [BKD REVREGNG]	The read SES information was incorrect. (REVREGNG)			
HH3E0x	Obstacle ENC detected (CTL-x)	A part (CLT), in which the back end loop failure occurred, was identified. x : Control Unit # (0-1)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH3F00	Unsupported unit is connected [RKA] (Unit-x)	An unsupported frame was detected when the subsystem was booted. x : Unit ID # (1-14)		① Since the subsystem went down because an unsupported frame was connected, disconnect the unsupported frame and reboot the subsystem.	–
HH4000	Unsupported unit is connected [RKAAT] (Unit-x)	An unsupported frame was detected when the subsystem was booted. x : Unit ID # (1-14)			
HH4100	All HDUs in the Unit missing (Unit-x)	All drives in both of the Loop-0 and Loop-1 in the RKAJ no longer exist in the position map. (The system goes down after this message is issued. Though a message, W0100x, is displayed following this message in the case of the dual configuration, neglect it. x : Unit ID # (1-29)	CTL Alarm Trace	① Perform the failure analysis on the unit with the number displayed in the message according to Troubleshooting "8.1 Trouble Analysis by LED indication of Front Bezel".	Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" (TRBL 08-0000)
				② Check if the ENC cable, which is connected to the unit with the number displayed in the message, is correctly connected.	–
HH420x	Disk initialization error (CTL-x)	A Disk initialization error in the SENC section of the Control Unit occurred. x : Control Unit # (0-1)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH430x	SENC logic error (CTL-x)	The logical contradiction of SENC occurred. x : Control Unit # (0-1)	CTL Alarm Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH440x	SENC error over (CTL-x)	The SENC failure exceeded the threshold. x : Control Unit # (0-1)	CTL Alarm Trace		
HH450x	SENC errorS1 (CTL-x)	The PDEV time-out exceeded the SENC failure threshold due to the breakdown of the SENC section of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace		
HH460x	BAD_ALPA error (CTL-x)	The Bad ALPA failure exceeded the SENC failure threshold due to the breakdown of the SENC section of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace		
HH480x	SENC error [Communication Path] (CTL-x)	The Communication Path failure exceeded the loop failure threshold. x : Control Unit # (0-1)	CTL Alarm Trace		
HH490x	SENC error [Queue Full] (CTL-x)	Queue Full occurred in the SENC section of the Control Unit. x : Control Unit # (0-1)	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH4A0x	CDB check code error (CTL-x)	The code error was detected, and the error exceeded the CDB check code error threshold. x : Control Unit # (0-1)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH4B00	CPU/PCI BRG error [CPU/PCI0]	Abnormality was detected by the CPU/PCI Bridge (CPU Slave, PCI0 Master) diagnosis.	Full Dump	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH4C00	CPU/PCI BRG error [CPU/PCI1]	Abnormality was detected by the CPU/PCI Bridge (PCI1 Master) diagnosis.	Full Dump		
HH4D00	CPU/PCI BRG error [CPU/SDRAM]	Abnormality was detected by the CPU/PCI Bridge (SDRAM Slave) diagnosis.	Full Dump		
HH4E00	Backend down [SES access error BKW] (Unit-x)	Monitoring of the disk array unit became impossible because the SES access to the both ENC Units became impossible. x : Unit ID # (0-29)	CTL Alarm Trace	① See Troubleshooting "6.1.17 A failure in SES access occurs".	Troubleshooting "6.1.17 A failure in SES access occurs" (TRBL 06-1140)
HH4F00	CPU/PCI BRG error [PCI0/CSDS]	Abnormality was detected by the CPU/PCI Bridge (PCI0 Slave) diagnosis.	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH4Gxy	TWSI access error in NAS IF Board (CTL x-y)	The TWSI (Two Wired Serial Interface) access error occurred in the NAS Interface Board. x : Control Unit # (0-1) y : NAS Interface Board # (0-1)	Simple Trace	① Replace the Control Unit displayed in the message and the NAS Interface Board installed in it.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5000	ENC error inf. [BKD SWCUDG]	An SWCUDG failure was detected by the SES information acquired from the Control Unit.		① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH5100	ENC error inf. [BKD ENCCOM ERR]	An ENCCOM error was detected by the SES information acquired from the Control Unit.		② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5200	ENC error inf. [BKD SWPK]	An ENC/SENC failure was detected by the SES information acquired from the Control Unit.			
HH5300	ENC error inf. [BKD TWSI ERR]	A TWSI failure was detected by the SES information acquired from the Control Unit.			
HH5400	ENC error inf. [BKD ENCMPUREV]	It was detected that the SES information (ENCMPUREV) acquired from the Control Unit was illegal.			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH550x	CTL recovery failed by loop alarm (CTL-x)	The recovery of the loop on the Control Unit which is not blocked failed when performing the insertion of the Control Unit or the update installation of the microprogram with the subsystem power turned on. x : Control Unit # (0-1)	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5600	DCTL H1PCI parity error [REG82001284, Bit31]	The D-CTL LSI detected a parity error.	Simple Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
HH5700	DCTL H1PCI system error [REG82001284, Bit30]	The D-CTL LSI detected the assert of the SERR.	Simple Trace		
HH5800	DCTL H1PCI master abort [REG82001284, Bit29]	The D-CTL LSI executed the master abort.	Simple Trace	② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH5900	DCTL H1PCI received target abort [REG82001284, Bit28]	The D-CTL LSI received the target abort.	Simple Trace	③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5A00	DCTL H1PCI signaled target abort [REG82001284, Bit27]	The D-CTL LSI executed the target abort.	Simple Trace		
HH5B00	DCTL H1PCI PERR detected [REG82001284, Bit24]	The D-CTL LSI asserted or received the PERR at the time of the master of the PCI-X bus.	Simple Trace		
HH5C00	DCTL H1PCI Address parity error [REG82001284, Bit23]	The D-CTL LSI detected a parity error of the address.	Simple Trace		
HH5D00	DCTL H1PCI Read data parity error [REG82001284, Bit22]	The D-CTL LSI detected a parity error by the data read from the FIFO.	Simple Trace		
HH5E00	DCTL H1PCI Command parity error [REG82001284, Bit21]	The D-CTL LSI detected a parity error when reading Address/Command from the Command buffer.	Simple Trace		
HH5F00	DCTL H1PCI Counter parity error [REG82001284, Bit20]	The FIFO control counter of the D-CTL LSI detected a parity error at counting.	Simple Trace		
HH5G00	DCTL H1PCI target data response time-out [REG82001284, Bit19]	The D-CTL LSI detected that the data response of the target of the PCI performed a time-out at the time of the master of the PCI.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH5H00	DCTL H1PCI master ADB disconnection error [REG82001284, Bit18]	The D-CTL LSI detected that the PCI transfer with the address other than the ADB (Allowable Disconnect Boundary) was suspended at the time of the target of the PCI.	Simple Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
HH5I00	DCTL H1PCI Split Completion ADB error [REG82001284, Bit15]	The D-CTL LSI detected that the PCI transfer with the address other than the ADB (Allowable Disconnect Boundary) was suspended at the time of receiving Split Completion.	Simple Trace	② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5J00	DCTL H1PCI Split Completion time-out [REG82001284, Bit14]	The D-CTL LSI detected a time-out of Split Completion.	Simple Trace		
HH5K00	DCTL H1PCI Split Completion error message [REG82001284, Bit13]	The D-CTL LSI detected an error response with Split Completion	Simple Trace		
HH5L00	DCTL H1PCI unexpected Split Completion detected [REG82001284, Bit12]	The D-CTL LSI detected invalid Split Completion.	Simple Trace		
HH5M00	DCTL D1PCI parity error [REG8200128C, Bit31]	The D-CTL LSI detected a parity error.	Simple Trace		
HH5N00	DCTL D1PCI system error [REG8200128C, Bit30]	The D-CTL LSI detected the assert of the SERR.	Simple Trace		
HH5P00	DCTL D1PCI master abort [REG8200128C, Bit29]	The D-CTL LSI executed the master abort.	Simple Trace		
HH5Q00	DCTL D1PCI received target abort [REG8200128C, Bit28]	The D-CTL LSI received the target abort.	Simple Trace		
HH5R00	DCTL D1PCI signaled target abort [REG8200128C, Bit27]	The D-CTL LSI executed the target abort.	Simple Trace		
HH5S00	DCTL D1PCI PERR detected [REG8200128C, Bit24]	The D-CTL LSI asserted or received the PERR at the time of the master of the PCI bus.	Simple Trace		
HH5T00	DCTL D1PCI Address parity error [REG8200128C, Bit23]	The D-CTL LSI detected a parity error of the address.	Simple Trace		
HH5U00	DCTL D1PCI Read data parity error [REG8200128C, Bit22]	The D-CTL LSI detected a parity error by the data read from the FIFO.	Simple Trace		
HH5V00	DCTL D1PCI Command parity error [REG8200128C, Bit21]	The D-CTL LSI detected a parity error when reading Address/Command from the Command buffer.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH5W00	E-CTL access error [READ_AREA_WRITE_ERR] [REGE4002009, Bit7]	The E-CTL LSI detected a write access to the read area of the resistor.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH5X00	E-CTL RAM address parity error [REGE4002009, Bit6]	An address parity error occurred when the E-CTL LSI accessed the internal RAM.	CTL Alarm Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH5Y00	E-CTL SH time-out [REGE400202E, Bit4]	A time-out occurred when the SH firmware accessed the internal RAM of the E-CTL LSI.	CTL Alarm Trace		
HH5Z00	E-CTL SH counter parity error [REGE400202E, Bit3]	The E-CTL LSI detected a parity error in the command counter part on the SH firmware side.	CTL Alarm Trace		
HH6A00	E-CTL SH RAM read data parity error [REGE400202E, Bit2]	The E-CTL LSI detected a read data parity error at the internal RAM.	CTL Alarm Trace		
HH6B00	E-CTL SH RAM address parity error [REGE400202E, Bit1]	The E-CTL LSI detected an address parity error at the internal RAM.	CTL Alarm Trace		
HH6C00	E-CTL SH access error [SH_READ_AREA_WRITE_ ERR] [REGE400202E, Bit0]	The SH firmware executed a write access to the read area of the internal RAM of the E-CTL LSI.	CTL Alarm Trace		
HH6D00	E-CTL counter parity error [REGE4002009, Bit2]	The E-CTL LSI detected a parity error in the command counter part.	CTL Alarm Trace		
HH6E00	E-CTL access error [CMD_OVERWRITE] [REGE4002009, Bit1]	It was detected that the E-CTL LSI lapped the cue of the unprocessed command information, and overwrote it.	CTL Alarm Trace		
HH6F00	E-CTL RAM parity error [REGE4002009, Bit0]	A parity error was detected when the E-CTL LSI read the internal RAM.	Simple Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
				② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH6G00	E-CTL D_CMT parity error [REGE4002009, Bit3]	The E-CTL LSI detected a parity error in the command counter of the microprogram and the differential detection counter D-CMT (Difference-command number counTer) of the SH firmware counter.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH6H00	DCTL D1PCI Counter parity error [REG8200128C, Bit20]	The FIFO control counter of the D-CTL LSI detected a parity error at counting.	Simple Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
HH6I00	DCTL D1PCI target data response time-out [REG8200128C, Bit19]	The D-CTL LSI detected that the data response of the target of the PCI performed a time-out at the time of the master of the PCI.	Simple Trace	② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH6J00	DCTL D1PCI master ADB disconnection error [REG8200128C, Bit18]	The D-CTL LSI detected that the PCI transfer with the address other than the ADB (Allowable Disconnect Boundary) was suspended at the time of the target of the PCI.	Simple Trace	③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH6K00	DCTL D1PCI Split Completion ADB error [REG8200128C, Bit15]	The D-CTL LSI detected that the PCI transfer with the address other than the ADB (Allowable Disconnect Boundary) was suspended at the time of receiving Split Completion.	Simple Trace		
HH6L00	DCTL D1PCI Split Completion time-out [REG8200128C, Bit14]	The D-CTL LSI detected a time-out of Split Completion.	Simple Trace		
HH6M00	DCTL D1PCI Split Completion error message [REG8200128C, Bit13]	The D-CTL LSI detected an error response with Split Completion.	Simple Trace		
HH6N00	DCTL D1PCI unexpected Split Completion detected [REG8200128C, Bit12]	The D-CTL LSI detected invalid Split Completion.	Simple Trace		
HH6P00	DCTL microprogram access error [PNDIRECTEN] [REG8200218C, Bit30]	The D-CTL LSI detected the logical violation because the PNDIRECTEN bit was OFF and it tried to execute the direct memory access.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH6Q00	DCTL microprogram access error [NPDIRECTEN] [REG8200218C, Bit26]	The D-CTL LSI detected the logical violation because the NPDIRECTEN bit was OFF and it tried to execute the direct memory access.	Simple Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH6R00	BRG PCI1 internal data path error in the PCI interface [REGF1001DD8, Bit0]	The PCI bridge LSI detected an internal data path failure with the PCI interface.	Simple Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
HH6S00	BRG PCI1 DWORD boundary error [REGF1001DD8, Bit4]	It was detected that the PCI bridge LSI tries to issue the PCI transfer which exceeds the DWORD boundary.	Simple Trace	② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HH6T00	BRG PCI1 master generated target abort for split completion [REGF1001DD8, Bit7]	The PCI master generated the target abort for split completion.	Simple Trace	③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH6U00	BRG PCI1 transaction generated while master is disabled [REGF1001DD8, Bit10]	It was detected that the PCI bridge tries to generate the PCI transfer when the PCI master is invalid.	Simple Trace		
HH6V00	BRG PCI1 split completion discard timer expired [REGF1001DD8, Bit12]	The PCI mater detected that the cancellation time of split completion was exceeded.	Simple Trace		
HH6W00	BRG PCI1 master received incorrect split completion [REGF1001DD8, Bit13]	The PCI master received split completion, but the number of bytes did not correspond to the original demand.	Simple Trace		
HH6X00	BRG PCI1 master received message error [REGF1001DD8, Bit14]	The PCI master received a message failure.	Simple Trace		
HH6Y00	BRG PCI1 slave generated master abort [REGF1001DD8, Bit16]	The PCI slave generated the master abort as the completion side of the PCI transfer.	Simple Trace		
HH6Z00	BRG PCI1 slave detected target abort [REGF1001DD8, Bit18]	The PCI slave detected the target abort as the completion side of the PCI transfer.	Simple Trace		
HH7A00	BRG PCI1 retry counter of a PCI slave reached its limit [REGF1001DD8, Bit22]	The number of times of retry of the PCI slave reached the limit when the PCI slave tried to generate split completion	Simple Trace		
HH7B00	BRG PCI1 master detected read error in Split completion [REGF1001DD8, Bit23]	The PCI master detected the split completion transfer from the BAR space where the prefetch is impossible.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH7C0x	H-IPC firmware boot up failed (CTL-x)	A start of the iSCSI firmware failed. x : Control Unit # (0-1)	Simple Trace	① Replace the iSCSI Interface Board installed in the Control Unit displayed in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				② If it is not recovered, replace the Control Unit in which the replaced iSCSI Interface Board is installed.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH7Dxy	Microprogram error [ISM]	Logical illegality was detected in the microprogram. (iSCSI Sequence Manager) x : Detailed code y : Detailed code	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH7Exy	Microprogram error [ILM]	Logical illegality was detected in the microprogram. (iSCSI login control) x : Detailed code y : Detailed code	CTL Alarm Trace		
HH7Fxy	Microprogram error [ISD]	Logical illegality was detected in the microprogram. (iSCSI driver) x : Detailed code y : Detailed code	CTL Alarm Trace		
HH7Gxy	H-IPC soft reset has ended in failure (Port-xy)	A soft reset of the H-IPC (Host iSCSI Protocol Controller) LSI failed. x : Control Unit # (0-1) y : Port # (A, B, C, D)	Simple Trace	① Replace the iSCSI Interface Board installed in the Control Unit displayed in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				② If it is not recovered, replace the Control Unit in which the replaced iSCSI Interface Board is installed.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH7Hxy	H-IPC hardware error (Port-xy)	The number of times, which the H-IPC (Host iSCSI Protocol Controller) LSI operated outside assumption, exceeded the threshold value. x : Control Unit # (0-1) y : Port # (A, B, C, D)	Simple Trace		
HH7I0x	iSCSI firmware load failed (CTL-x)	Loading of the iSCSI firmware failed. x : Control Unit # (0-1)	Simple Trace		
HH7J00	H-IPC is not detected (Port-xy)	The iSCSI Interface Board is installed, but the H-IPC (Host iSCSI Protocol Controller) LSI cannot be recognized on the PCI. x : Control Unit # (0-1) y : Port # (A, B, C, D)	CTL Alarm Trace		
HH7K00	H-IPC is not detected (Port-xA/xB)	The iSCSI Interface Board is installed, but the H-IPC (Host iSCSI Protocol Controller) LSI cannot be recognized on the PCI. x : Control Unit # (0-1)	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH7Mxy	NAS IF board is not detected (CTL-x)	The NAS Interface Board is installed, but it cannot be recognized on the PCI. x : Control Unit # (0-1)	CTL Alarm Trace	①Replace the NAS Interface Board displayed in the message.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				②If it is not recovered, replace the Control Unit in which the replaced iSCSI Interface Board is installed.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HH7N00	H-IPC PCI STS REG error [OPE]	A parity error was detected when the H-IPC LSI accessed the internal Cache.	CTL Alarm Trace	①There is no problem when the CALM LED does light up because the internal retry processing was executed in the Control Unit.	–
HH7P00	H-IPC PCI STS REG error [ILE]	A parity error was detected when the H-IPC LSI accessed the internal RAM.	CTL Alarm Trace		
HH7Q00	H-IPC PCI STS REG error [ICE]	A parity error was detected when the H-IPC LSI accessed the internal RAM.	CTL Alarm Trace	②When the CALM LED on the Control Unit displayed in the message does not light up, replace the iSCSI Interface Board installed in the Control Unit.	Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
HH7R00	H-IPC PCI STS REG error [OCE]	A Cache parity error was detected when the H-IPC LSI accessed the external local RAM.	CTL Alarm Trace	①There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
HH7S00	H-IPC PCI STS REG error [DPE]	A data parity error was detected when it accessed the PCI as the PCI master.	CTL Alarm Trace	②When "W0100x CTL alarm" is displayed after this message, replace the Control Unit and the iSCSI Interface Board installed in the Control Unit, which are instructed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
				③When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit displayed in the message and the iSCSI Interface Board installed in the Control Unit whose CALM LED lights up.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH7T00	Offline backend diagnosis is not initiated because of CTL alarm	The “Offline Loop Failure Detection Function” could not be executed due to the Control Unit blockade.	Full Dump	①1. Check if the system start attribute of the Boot option is in the single mode.	–
				2. When it is in the single mode, isolate the failed part of the Loop failure according to the “Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)”.	Troubleshooting “6.1.14 (3) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)” (TRBL 06-1020)
				3. When the system start attribute of the Boot option is in the duel active mode and one Control Unit is removed, install all the Control Units.	–
				4. Execute the “Offline Loop Failure Detection Function” again.	Troubleshooting “6.1.14 (2) Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the dual controller configuration)” (TRBL 06-0830)
				5. Replace the Control Unit whose CALM LED lights up.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				6. Executed the “Offline Loop Failure Detection Function” again.	
HH7U00	H-IPC PCI ECC error	The number of times of the ECC error, which was detected when the H-IPC LSI accessed the internal RAM, exceeded the threshold value.	CTL Alarm Trace	①Replace the iSCSI Interface Board which is installed in the Control Unit shown by “W0100x CTL alarm” displayed after this message.	Replacement “2.2.7 Replacing Interface Board” (REP 02-0660)
				②When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the iSCSI Interface Board installed in the Control Unit displayed in the message.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH7V00	The Additional Chassis removed before PS ON (Unit-x)	Subtract the subsystem in which the Disk Drive to configure the formatted logical unit or the Spare Disk Drive storing the recovered data is installed, then turn on the subsystem power. x : Unit ID # (1-29)	Simple Trace	①1. Turn off the main switch.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Return the subtracted subsystem to the subsystem configuration before the subtraction.	–
				4. Turn on the subsystem power.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				5. If there is the Spare Disk Drive in use in the subsystem to be subtracted, replace the blocked Disk Drive.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050)
				6. Check that the copy back operates and the status of the Spare Disk Drive becomes ready.	–
				7. If there is the Disk Drive which configures the formatted logical unit in the subsystem to be subtracted, check with the user if the data of the logical unit is necessary. If the data is necessary, request the user to backup the data.	–
				8. Delete the logical unit.	System Parameter “[Procedure ③-D]Deleting LU” (SYSPR 03-0230)
				9. Subtract the subsystem again.	Addition/Subtraction/ Relocation “2.3 Subtracting Additional Subsystem on Rack Frame” (ADD 02-0120)
				10. When the subsystem of the unit ID# displayed in the message is connected, perform Troubleshooting “8.1 Trouble Analysis by LED Indication of Front Bezel”.	Troubleshooting “8.1 Trouble Analysis by LED Indication of Front Bezel” (TRBL 08-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH8A00	NNC PCI Express error detected between NNC and NAS I/F board (CTL-x, NNC-y)	A failure of the PCI-Express interface was detected between the Control Unit and the NNC (NAS Unit). x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	CTL Alarm Trace NAS Log	①1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	–
				3. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				4. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
				5. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
				②1. If not recovered, replace the NAS Chassis displayed in the message. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				To be continued to the next page	

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				3. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
				4. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
				③If it is not yet recovered, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				④If it is not recovered, replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				⑤1. If it is not yet recovered, replace the PCI-Express cable connecting between the NNC (NAS Unit) and the Control Unit displayed in the message. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
				2. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				To be continued to the next page	

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
				4. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
HH8B00	NNC CTL reset was executed caused by PCI Express error	Because a PCI Express failure occurred due to the power-off of the NNC (NAS Unit), the Control Unit was reset.	Simple Trace	① The internal reset processing occurred in the Control Unit. There is no problem. However, when "W0100x CTL alarm" is displayed after this message, perform the dummy replacement(*1) of the Control Unit concerned.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				② Check that "IA1E00 Host transfer NAS-DMA error" is displayed before this message, and maintain it according to the message.	–

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HH8C00	Host transfer NAS-DMA error (CTL-x, NNC-y)	A DMA hardware failure occurred in the NAS data transfer (the D-CTL and the NNC cannot be isolated, but both the NNC (NAS Unit) and the Control Unit were blocked because the power of the NNC (NAS Unit) is turned on in the interface failure between the NNC (NAS Unit) and the Control Unit). x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	CTL Alarm Trace NAS Log	①1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	–
HH8D00	NNC Boot time-out caused by NNC I/F error [post xx, yy] (CTL-0, NNC-z)	A boot time-out occurred due to the failure between the NNC (NAS Unit) and the NAS Interface Board. x : POST code y : Sub code z : NNC (NAS Unit) # (0-3) (Refer to "Chapter 11 List of the NAS BIOS POST Codes and the Subcodes" for the list of the POST codes and the subcodes.)	CTL Alarm Trace	3. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				4. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
HH8D01	NNC Boot time-out caused by NNC I/F error [post xx, yy] (CTL-1, NNC-z)	A boot time-out occurred due to the failure between the NNC (NAS Unit) and the NAS Interface Board. x : POST code y : Sub code z : NNC (NAS Unit) # (0-3) (Refer to "Chapter 11 List of the NAS BIOS POST Codes and the Subcodes" for the list of the POST codes and the subcodes.)	CTL Alarm Trace	5. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
				②1. If not recovered, replace the NAS Chassis displayed in the message. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				2. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				To be continued to the next page	

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
				4. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
				③If it is not yet recovered, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				④If it is not recovered, replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				⑤1. If it is not yet recovered, replace the PCI-Express cable connecting between the NNC (NAS Unit) and the Control Unit displayed in the message. (At this moment, "IA1V0x NNC recovered" is not displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS does not light up.)	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
				2. Perform the dummy replacement(*1) of the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				3. Check that the CALM LED (red) on the Control Unit goes out, and "I0010x CTL recovered" is displayed in the Information Message on WEB.	–
				To be continued to the next page	

*1 : To remove the part concerned once, and then to reinstall it (after waiting for 20 seconds).

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Message code	Message text	Description	Collect the error		Recovery methods	Reference page
					4. Check that "IA1V0x NNC recovered" is displayed in the Information Message on WEB, and the READY LED (green) on the RKNAS lights up.	–
HH8E00	Single Mode although copy function enable	The subsystem could not be started because System Startup Attribute was set to Single Mode even though Copy-on-write SnapShot or TrueCopy Extended Distance of the priced option was effective.	Simple Trace	①	1. Change the subsystem to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
					2. Change [System Startup Attribute] of System Parameter to [Dual Active Mode] from WEB.	WEB "3.2.1 Subsystem" (WEB 03-0060)
					3. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
HH8F00	Not enough Cache memory to use copy function	The subsystem did not start because the capacity of the Cache memory to use Copy-on-write SnapShot or TrueCopy Extended Distance was insufficient due to the upgrade of the model.	Simple Trace	①	1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
					2. Turn off all the AC Input Power Switches.	
					3. Add the Cache memory in the capacity that the upgrade of the model is possible.	Addition/Subtraction/ Relocation "1.4.4 Adding a Cache Unit" (ADD 01-0380)
					4. Turn on the power of the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
HH8G00	Single Mode although Modular Volume Migration enable	The subsystem could not be started because System Startup Attribute was set to Single Mode even though Modular Volume Migration of the priced option was effective.	Simple Trace	①	1. Change the subsystem to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
					2. Change [System Startup Attribute] of System Parameter to [Dual Active Mode] from WEB.	WEB "3.2.1 Subsystem" (WEB 03-0060)
					3. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HI0100	PS OFF failed [DSTG HUNG]	Hang-up of destaging processing of the other system was detected when the plan was stopped.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HI0201	PS OFF failed [POFNONCLD]	When PS is turned off, the information taken over is not set in the COLD state.	CTL Alarm Trace		
HI0202	PS OFF failed [POFNOJOB]	When PS is turned off, the plan stopping job has not been executed.	CTL Alarm Trace		
HI0310	OTHPS OFF time-out	Time-out in waiting for communication of the other system occurred while the plan was being stopped.	CTL Alarm Trace		
HI0420	System down selected [PS OFF]	When the plan could not be stopped, system shutdown was selected by the user.	CTL Alarm Trace	① See Troubleshooting "6.1.2 The subsystem does not become ready : Case 1 (Loading failure)".	Troubleshooting "6.1.2 The subsystem does not become ready : Case 1 (Loading failure)" (TRBL 06-0050)
HI050x	CACHE access error (CACHE-x) [POFF]	When the plan was stopped, system shutdown was caused by a cache access error. (unrecoverable) x : Cache memory slot # (0-1)	CTL Alarm Trace		
HI0600	PS OFF failed [PIN]	The sequential shutdown could not be done because of the too much pinned data.	CTL Alarm Trace		
HJ01xx	Microprogram error [INM]	Logical illegality was detected in the microprogram. (Initial setting) x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ02xx	Microprogram error [POF]	Logical illegality was detected in the microprogram. (Stop of plan) x : Optional code	CTL Alarm Trace		
HJ03xx	Microprogram error [RST]	Logical illegality was detected in the microprogram. (Reset) x : Optional code	CTL Alarm Trace		
HJ04xx	Microprogram error [SCK]	Logical illegality was detected in the microprogram. (Kernel) x : Optional code	CTL Alarm Trace		
HJ050x	Microprogram error [CIT]	Logical illegality was detected in the microprogram. (Interruption) x : Optional code	CTL Alarm Trace		
HJ06xx	Microprogram error [RSM]	Logical illegality was detected in the microprogram. (Resource control) x : Optional code	CTL Alarm Trace		
HJ07xx	Microprogram error [FTD]	Logical illegality was detected in the microprogram. (Tachyon driver control) x : Optional code	CTL Alarm Trace		
HJ08xx	Microprogram error [FSM]	Logical illegality was detected in the microprogram. (Sequence Manager) x : Optional code	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ09xx	Microprogram error [LSM]	Logical illegality was detected in the microprogram. (Link service control) x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ0Axx	Microprogram error [HSC]	Logical illegality was detected in the microprogram. x : Optional code	CTL Alarm Trace		
HJ0Bxx	Microprogram error [NCR]	Logical illegality was detected in the microprogram. (NCR) x : Optional code	CTL Alarm Trace		
HJ0Dxx	Microprogram error [SCP]	Logical illegality was detected in the microprogram. (SCP control) x : Optional code	CTL Alarm Trace		
HJ0Exx	Microprogram error [CMD]	Logical illegality was detected in the microprogram. (Command) x : Optional code	CTL Alarm Trace		
HJ0Fxx	Microprogram error [PRS]	Logical illegality was detected in the microprogram. (Reading first) x : Optional code	CTL Alarm Trace		
HJ10xx	Microprogram error [COW]	Logical illegality was detected in the microprogram. (Writing together) x : Optional code	CTL Alarm Trace		
HJ11xx	Microprogram error [RCH]	Logical illegality was detected in the microprogram. (Cache control) x : Optional code	CTL Alarm Trace		
HJ12xx	Microprogram error [RAD]	Logical illegality was detected in the microprogram. (RAID control) x : Optional code	CTL Alarm Trace		
HJ13xx	Microprogram error [DSC]	Logical illegality was detected in the microprogram. (Execution of input/output) x : Optional code	CTL Alarm Trace		
HJ14xx	Microprogram error [DMA]	Logical illegality was detected in the microprogram. (Data transfer control) x : Optional code	CTL Alarm Trace		
HJ15xx	Microprogram error [ERR]	Logical illegality was detected in the microprogram. (Assistance in failure processing) x : Optional code	CTL Alarm Trace		
HJ16xx	Microprogram error [RCF]	Logical illegality was detected in the microprogram. (Configuration control) x : Optional code	CTL Alarm Trace		
HJ17xx	Microprogram error [DRC]	Logical illegality was detected in the microprogram. (Recovery of Disk Drive) x : Optional code	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ18xx	Microprogram error [OFW]	Logical illegality was detected in the microprogram. (Off-line monitoring) x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ19xx	Microprogram error [ONW]	Logical illegality was detected in the microprogram. (On-line monitoring) x : Optional code	CTL Alarm Trace		
HJ1Axx	Microprogram error [DST]	Logical illegality was detected in the microprogram. (Emergency destaging) x : Optional code	CTL Alarm Trace		
HJ1Bxx	Microprogram error [CPR]	Logical illegality was detected in the microprogram. (Forced recovery of parity) x : Optional code	CTL Alarm Trace		
HJ1Cxx	Microprogram error [COM]	Logical illegality was detected in the microprogram. (Common function) x : Optional code	CTL Alarm Trace		
HJ1Dxx	Microprogram error [SV1]	Logical illegality was detected in the microprogram. (SVP I/F) x : Optional code	CTL Alarm Trace		
HJ1Exx	Microprogram error [LUC]	Logical illegality was detected in the microprogram. (Common function) x : Optional code	CTL Alarm Trace		
HJ1Fxx	Microprogram error [PR0]	Logical illegality was detected in the microprogram. (Communication between Control Units) x : Optional code	CTL Alarm Trace		
HJ20xx	Microprogram error [BKW]	Logical illegality was detected in the microprogram. (Back end control) x : Optional code	CTL Alarm Trace		
HJ21xx	Microprogram error [BKD]	Logical illegality was detected in the microprogram. (Back end diagnosis) x : Optional code	CTL Alarm Trace		
HJ22xx	Microprogram error [CCP]	Logical illegality was detected in the microprogram. (Coupling copy job) x : Optional code	CTL Alarm Trace		
HJ23xx	Microprogram error [MDU]	A logical illegality of the microprogram was detected (during an execution of drive firmware renewal job). x : Optional code	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ24xx	Microprogram error [SDW]	A logical illegality of the microprogram was detected (Takeover writing job). x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ25xx	Microprogram error [RVD]	A logical illegality of the microprogram was detected (RVR data transfer job). x : Optional code	CTL Alarm Trace		
HJ26xx	Microprogram error [RVP]	A logical illegality of the microprogram was detected (RVR communication job). x : Optional code	CTL Alarm Trace		
HJ27xx	Microprogram error [RVM]	A logical illegality of the microprogram was detected (RVR management). x : Optional code	CTL Alarm Trace		
HJ28xx	Microprogram error [STG]	A logical illegality of the microprogram was detected (Staging job). x : Optional code	CTL Alarm Trace		
HJ29xx	Microprogram error [SPL]	Logical incorrectness of microprogram was detected (mistake specializing control). x : Optional code	CTL Alarm Trace		
HJ2Axx	Microprogram error [SML]	Logical incorrectness (in the SendMail control) of the microprogram was detected. x : Optional code	CTL Alarm Trace		
HJ2Bxx	Microprogram error [SNP]	A logical error occurred. (Copy-on-write SnapShot job) x : Optional code	CTL Alarm Trace		
HJ2Cxx	Microprogram error [POM]	A logical error occurred. (Pool management) x : Optional code	CTL Alarm Trace		
HJ2Dxx	Microprogram error [SNR]	A logical error occurred. (Copy-on-write SnapShot restoration control) x : Optional code	CTL Alarm Trace		
HJ2Exx	Microprogram error [SAM]	A logical error occurred. (S-Vol area management control) x : Optional code	CTL Alarm Trace		
HJ2Fxx	Microprogram error [QFM]	Self contradiction of Format. x : Optional code	CTL Alarm Trace		
HJ30xx	Microprogram error [SMR]	A logical error occurred. (SMART control) x : Optional code	CTL Alarm Trace		
HJ31xx	Microprogram error [DRF]	A logical error occurred. (Drive flash control) x : Optional code	CTL Alarm Trace		
HJ32xx	Microprogram error [OPR]	Contradiction of the forced parity correction. x : Optional code	CTL Alarm Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ33xx	Microprogram error [MPC]	Logical illegality of the microprogram was detected. (Multi-protocol management control) x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ34xx	Microprogram error [JSD]	Logical illegality of the microprogram was detected. (Job support driver) x : Optional code	CTL Alarm Trace		
HJ35xy	Microprogram error [NSM]	A logical incorrectness of the microprogram was detected. (NAS Sequence Manager control) x : Detailed code y : Detailed code	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ36xy	Microprogram error [PAD]	The restart of the disk array subsystem was performed in the status where the planned shutdown of the disk array subsystem was not completed normally. Or a logical incorrectness of the microprogram was detected. (PPA driver control) x : Detailed code y : Detailed code	CTL Alarm Trace	① 1. Turn off the AC Input Power Switch of the NNC (NAS Unit) connected to the Control Unit which the ALARM LED on the front side of the Basic Chassis lights up.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn it on again after completing the turning off.	
				3. Perform the dummy replacement (*1) of the Control Unit which the ALARM LED (red) on the front side of the Basic Chassis lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				② If it is not recovered, when "W0100x CTL alarm" is displayed after this message, follow the message and maintain it.	"Chapter 6. Warning Messages" (MSG 06-0000)
				③ When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ37xx	Microprogram error [DMI]	Logical illegality of the microprogram was detected (DDCB management information R/W job) x : Optional code	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ3800	Backend down [Path switch status error] (Unit-x, ENC-y)	Abnormality of the chassis mode setting was detected. x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simple Trace	①1. Check if the subsystem identification switches of all the RKAJs are set as "M" for the RKH/RKM of the Basic Chassis and "S" for the RKS.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				2. When the setting of the subsystem identification switch is incorrect, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Set the subsystem identification switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				4. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				②1. If it is not recovered, replace the ENC Unit displayed in this message after turning off the main switch and turning off all the AC Input Power Switches.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				2. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③1. If it is not recovered yet, replace the additional subsystem displayed in this message after turning off the main switch and turning off all the AC Input Power Switches.	Replacement "2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990)
				2. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
HJ3900	Backend down [Unit type error] (Unit-x, ENC-y)	Abnormality of the connected chassis was detected. x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simple Trace	①1. Replace it to the chassis that can connect the Unit concerned.	Replacement "2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990)
				2. Start up the subsystem again.	Installation "1.7.1 Subsystem power on" (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HJ3Axy	Unsupported CACHE detected (CTL-x, CACHE-y)	It was detected that the unsupported Cache memory is installed. x : Control Unit # (0-1) y : Cache memory slot # (0-3)	Simple Trace	① Replace the memory to be installed in the Control Unit to the Cache memory in 1G bytes.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HJ3Bxy	Microprogram error [MAP]	Logical illegality was detected in the microprogram (intermediate LU mapping management). x : Optional code y : Optional code	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HJ3Cxy	Microprogram error [LMG]	Logical illegality was detected in the microprogram (Modular Volume Migration management). x : Optional code y : Optional code	CTL Alarm Trace		
HL0000	Other CTL workQPanic	The processing became unable to be continued because a capacity of the task control queue became full.	CTL Alarm Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HL010x	Machine check occurred (CTL-x) [200]	Machine check occurred. (Internal bus parity error, ECC error.) x : Control Unit # (0-1)	CTL Alarm Trace	① There is no problem when the CALM LED does not light up because the internal retry processing was executed in the Control Unit.	–
				② When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				③ Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HN0000	NAS-DMA forced stop failed	The forced interruption of the NAS-DMA transfer failed.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HN0100	NAS-DMA error (NAS-0, SPL, NNC-CACHE)	After the NAS-DMA failure (NAS#0 special transfer, Transfer direction: From NNC (NAS Unit) to cache memory of the Control Unit), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump	① Collect Full Dump from the Control Unit indicated by "W0100x CTL alarm" which is displayed after this message.	Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130)
HN0200	NAS-DMA error (NAS-0, SPL, CACHE-NNC)	After the NAS-DMA failure (NAS#0 special transfer, Transfer direction: From cache memory of the Control Unit to NNC (NAS Unit)), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HN0300	NAS-DMA error (NAS-1, SPL, NNC-CACHE)	After the NAS-DMA failure (NAS#1 special transfer, Transfer direction: From NNC (NAS Unit) to cache memory of the Control Unit), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump	① Collect Full Dump from the Control Unit indicated by "W0100x CTL alarm" which is displayed after this message.	Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130)
HN0400	NAS-DMA error (NAS-1, SPL, CACHE-NNC)	After the NAS-DMA failure (NAS#1 special transfer, Transfer direction: From cache memory of the Control Unit to NNC (NAS Unit)), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		
HN0500	NAS-DMA error (NAS-0, HC, CACHE-NNC)	After the NAS-DMA failure (NAS #0 non-specialized transfer (Transfer direction: From cache memory of the Control Unit to NNC (NAS Unit)), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		
HN0600	NAS-DMA error (NAS-0, HC, NNC-CACHE)	After the NAS-DMA failure (NAS #0 non-specialized transfer (Transfer direction: From NNC (NAS Unit) to cache memory of the Control Unit), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		
HN0700	NAS-DMA error (NAS-1, HC, NNC-CACHE)	After the NAS-DMA failure (NAS #1 non-specialized transfer (Transfer direction: From cache memory of the Control Unit to NNC (NAS Unit)), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		
HN0800	NAS-DMA error (NAS-1, HC, CACHE-NNC)	After the NAS-DMA failure (NAS #1 non-specialized transfer (Transfer direction: From NNC (NAS Unit) to cache memory of the Control Unit), both Control Units of the dual system were forced to be detached by the debug option.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HNA10x	Host transfer NAS-DMA error (CTL-x, NNC-y)	A DMA hardware error occurred in the NAS data transfer. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HNA20x	PCDG error [CTL] (CTL-x)	A hardware error of the Control Unit was detected in the PCDG process. x : Control Unit # (0-1)	Simple Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HNA30x	PCDG error [NAS IF Board, CTL] (CTL-x)	A hardware error that occurred between the NAS Interface Board and Control Unit was detected in the PCDG process during a boot of the NNC (NAS Unit). x : Control Unit # (0-1)	Simple Trace	① 1. Check if the CTRL cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the CTRL cable firmly again.	–
				3. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				4. Replace the Control Unit displayed in the message and the NAS Interface Board installed in it.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.7 Replacing Interface Board" (REP 02-0660)
HNA4xy	PCDG error [NNC, PCI Express, NAS IF Board] (CTL-x, NNC-y)	The hardware error of the PCI-Express protocol was detected between the NNC (NAS Unit) and the NAS Interface Board by the PCDG processing during NNC (NAS Unit) starting. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again.	–
				3. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				② If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				④ If not recovered yet, replace the PCI-Express cable which connects between the NNC (NAS Unit) displayed in the message and the NAS Interface Board installed in the Control Unit.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
HNA5xy	PCDG error [NNC, SMBUS, NAS IF Board] (CTL-x, NNC-y)	The hardware error of the SMBUS was detected between the NNC (NAS Unit) and the NAS Interface Board by the PCDG processing during NNC (NAS Unit) starting. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Check if the NAS control cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the CTRL cable firmly again.	–
				3. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				② If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				③ If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				④ If not recovered yet, replace the CTRL cable which connects between the NNC (NAS Unit) displayed in the message and the NAS Interface Board installed in the Control Unit.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HSA000	DFPC error detect [SYSTEM DOWN]	The PDEV time-out occurred frequently in the screening or self heat-run system	Full Dump	① Execute full dumps from all the Control Units and contact the department for coping with troubles.	Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130)
HZ0200	Sink error	When the Down mode was set for the RAM in order to perform a debug, a command was detected that was not executed at all during the specified period (three seconds in default).	CTL Alarm Trace	① Get a trace of the Control Unit detachment.	Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080)
HZ0300	Not enough Cache memory to use QuickShadow function	The capacity of the cache memory is not sufficient to use the Copy-on write SnapShot function.	CTL Alarm Trace	① Enlarge the capacities of cache memories of the both Control Units to those sufficient for the higher grade model.	Addition/Subtraction/ Relocation "1.4.4 Adding a Cache Unit" (ADD 01-0380)
HZ040x	BRG DRAM internal data path parity error detected [REGF10014D0, Bit2] (CTL-x)	The Dunit internal data path parity error was detected. x : Control Unit # (0-1)	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ050x	BRG SRAM double bit ECC error detected [REGF1000388, Bit1] (CTL-x)	The SRAM two-bit ECC error was detected. x : Control Unit # (0-1)	Full Dump		
HZ060x	BRG DRAM double bit ECC error detected [REGF10014D0, Bit1] (CTL-x)	The DRAM two-bit ECC error was detected. x : Control Unit # (0-1)	Full Dump		
HZ0700	BRG DRAM single bit ECC threshold expired [REGF10014D0, Bit0]	The number of the DRAM single bit ECC errors reached the threshold value.	Simple Trace	–	–
HZ0A00	BRG SRAM single bit ECC error threshold expired [REGF1000388, Bit0]	The number of the SRAM single bit ECC errors reached the threshold value.	CTL AlarmTrace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ0B0x	CTL recovery failed [TWSI ERR] (CTL-x)	The recovery of the Control Unit failed not because of the TWSI failure of the Control Unit inserted during the recovery of it performed while the subsystem power is on but because of the TWSI failure of the other Control Unit. x : Control Unit # (0-1)	Simple Trace	① Replace not the inserted Control Unit but the other Control Unit. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HZ0C00	TWSI access error [Read, XX-YY-AA-BB]	An error was detected during the I2C reading. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ0D00	TWSI access error [Write, XX-YY-AA-BB]	An error was detected during the I2C writing. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace		
HZ0E00	TWSI access error [3 times reading, XX]	The triple reading error was detected during the I2C reading. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted	Simple Trace		
HZ0H0x	Directory reinitialization failed (CTL-x)	Writing to the cache memory failed when the directory was reinitialized after the other one of the dual Control Unit was detached while the subsystem was being booted. x : Control Unit # (0-1)	Simple Trace	① Replace the Control Unit shown in this message. Besides, take appropriate actions against the detachment of the other one of the dual Control Unit. ② If the trouble is not solved, replace all the cache memories in the Control Unit displayed in this message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HZ0J00	TWSI access error [Configuration register write, XX-YY-AA-BB]	A writing error occurred in the TWSI initialization (setting of the TWSI-GPIO I/O attribute) at the time of the subsystem boot. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ0K00	TWSI access error [Polarity inversion register write, XX-YY-AA-BB]	A write error occurred in the TWSI initialization (setting of the TWSI-GPIO polarity inversion) at the time of the subsystem start. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace		
HZ0Lxx	DSC detected IOLIST error	An illegal transition status of the I/O request list queue was detected by the I/O execution control.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
HZ0M00	DM-LU write failed	When the deliberate shutdown was performed, writing to the DM-LU failed owing to a trouble such as a drive error.	CTL Alarm Trace	① 1. Reboot the subsystem and replace the Disk Drive pointed out in the message, "HDU alarm".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				2. Perform the deliberate shutdown again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
HZ0N0x	Kernel processing error (CTL-x)	The Kernel of the Control Unit's OS stopped illegally. x : Control Unit # (0-1)	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ0Pxx	Cache capacity reduced although Cache Partition Manager enable	The cache memory capacity was reduced though Cache Partition Manager was valid (causing detachment of the both Control Units). x : The original cache memory capacity per Control Unit (G bytes) (01-08)	Simple Trace	① 1. Return the cache memory capacity to the original one.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				2. Reboot the disk array unit.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
HZ0Q00	DCTL micro access error [PNDIRECTEN] [REG82001D8C, Bit30]	Logical illegality was detected because it tried to execute the direct memory access without turning on the PNDIRECTEN bit.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
HZ0R00	DCTL micro access error [NPDIRECTEN] [REG82001D8C, Bit26]	Logical illegality was detected because it tried to execute the direct memory access without turning on the NPDIRECTEN bit.	CTL Alarm Trace		
HZ0S00	Not enough Cache memory to use Cache Partition Manager	The Cache capacity to use Cache Partition Manager was insufficient due to the upgrade of the model.	Simple Trace	① Add the Cache memory in the capacity to be able to upgrade the model.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
HZ0T00	Changing to Single Mode failed as Cache Partition Manager is enable	The system start attribute was changed although the Cache partition management function was effective.	Simple Trace	① Restore the system start attribute.	System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0040)
	Changing to Dual Active Mode failed as Cache Partition Manager is enable			② Restart the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)

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Chapter 4. Progress Message

Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I0010x	CTL recovered (CTL-x)	The Control Unit recovered by replacing the Control Unit in the status of the subsystem powering on. x : Control Unit # (0-1)		–	–
I00300	Battery recovered	The battery voltage became normal.		–	–
I0030x	Battery recovered (Battery-x)	The battery voltage became normal. x : Backup Battery Unit # (0-3)		–	–
I0040x	Battery backup circuit recovered (CTL-x)	The battery charging circuit recovered. x : Control Unit # (0-1)		① When “W0100x CTL alarm” is displayed before this message, disregard “I0040x Battery backup circuit recovered”.	–
I00500	FAN recovered (CTL-Unit, FAN-x)	The fan failure was recovered. x : FAN Assembly # (0-1)		–	–
I005xy	FAN recovered (Unit-x, FAN-y)	The fan failure was recovered. x : Unit ID # (0-14) y : FAN Assembly # (0-1)		–	–
I005HH	FAN recovered (Unit-x, FAN-y)	The fan failure was recovered. x : Unit ID # (0-29) y : FAN Assembly # (0-1)		–	–
I00600	PS recovered (CTL-Unit, FAN-x)	The Power Unit (CTL/DRV PS) voltage became normal. x : Power Unit # (0-1)		–	–
I006xy	PS recovered (Unit-x, PS-y)	The Power Unit (CTL/DRV PS) voltage became normal. x : Unit ID # (0-14) y : Power Unit # (0-1)		–	–
I006HH	PS recovered (Unit-x, PS-y)	The Power Unit (CTL/DRV PS) voltage became normal. x : Unit ID # (0-29) y : Power Unit # (0-1)		–	–
I007xy	HDU recovered (Unit-x, HDU-y)	The Disk Drive was recovered. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I007HH	HDU recovered (Unit-x, HDU-y)	The Disk Drive was recovered. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I008xy	Data recovery to spare HDU (Unit-x, HDU-y)	Data was recovered to the Spare Disk. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I008HH	Data recovery to spare HDU (Unit-x, HDU-y)	Data was recovered to the Spare Disk. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I009xy	Spare HDU recovered (Unit-x, HDU-y)	The Spare Disk was recovered. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I009HH	Spare HDU recovered (Unit-x, HDU-y)	The Spare Disk was recovered. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I00Axy	Loop recovered (PATH-x, LOOP-y)	The loop recovered. x : Path # (RKM/RKS=0-3) y : Loop # (0-1)		–	–
I00Bxy	ENC recovered (Unit-x, ENC-y)	An ENC/SENC failure was solved. x : Unit ID # (0-14) y : ENC Unit/SENC Unit # (0-1)		–	–
I00BHH	ENC recovered (Unit-x, ENC-y)	An ENC/SENC failure was solved. x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)		–	–
I00D0x	UPS recovered (UPS-x)	The UPS was recovered. x : UPS # (0-1)		–	–
I00E00	Battery removed	The Backup Battery Unit was removed from the subsystem when a battery failure had occurred.		① Replace the Backup Battery Unit concerned, and then install the battery unit in the subsystem.	Replacement “2.2.2 Replacing Backup Battery Unit” (REP 02-0240)
I00E0x	Battery removed (Battery-x)	The Backup Battery Unit was removed from the subsystem when a battery failure had occurred. x : Backup Battery Unit # (0-3)			
I00F00	Battery SW OFF	The switch of the Backup Battery Unit was turned off when a battery failure had occurred.		① Replace the Backup Battery Unit concerned, and then turn on the switch of the battery unit that has been inserted.	Replacement “2.2.2 Replacing Backup Battery Unit” (REP 02-0240)
I00F0x	Battery SW OFF (Battery-x)	The switch of the Backup Battery Unit was turned off when a battery failure had occurred. x : Backup Battery Unit # (0-3)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I01000	Battery Thermal alarm	Abnormal temperature was detected in the battery.		① Replace the Backup Battery Unit concerned.	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
I0100x	Battery Thermal alarm (Battery-x)	Abnormal temperature was detected in the battery. x : Backup Battery Unit # (0-3)			
I02000	Battery alarm	A battery voltage error or a battery charging circuit error occurred when a battery failure had occurred.			
I0200x	Battery alarm (Battery-x)	A battery voltage error or a battery charging circuit error occurred when a battery failure had occurred. x : Backup Battery Unit # (0-3)			
I02100	FAN status (CTL-Unit, FAN-x, Code-y)	Detailed information at the time of the fan module failure. x : FAN Assembly # (0-1) y : Detail code		–	–
I021xy	FAN status (Unit-x, FAN-y, Code-z)	Detailed information at the time of the fan module failure. x : Unit ID # (0-14) y : FAN Assembly # (0-1) z : Detail code		–	–
I021HH	FAN status (Unit-x, FAN-y, Code-z)	Detailed information at the time of the fan module failure. x : Unit ID # (0-29) y : FAN Assembly # (0-1) z : Detail code		–	–
I030xy	Path recovered by web operation (Remote-x, Path-y)	The path was recovered by an operation from the Web. x : Remote DF # (0) y : Path # (0-3)		–	–
I031xy	Path recovered automatically (Remote-x, Path-y)	The path recovered automatically. x : Remote DF # (0) y : Path # (0-3)		–	–
I04000	Unreadable PIN recovered	Data has been restored due to recovery of the drives from the unreadable PIN.		–	–
I10000	Subsystem is ready	The unit is ready.		–	–
I11000	All raid group initialized	All RAID groups were deleted.		–	–
I111xx	RAID group deleted (RG-x)	All LUs were deleted. x : RAID group # (0-89)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I12000	ALL LU initialized	All LUs were deleted. (This is also displayed when the LU #0 is created.)		–	–
I12100	LU deleted (LU-x)	LUs were deleted. x : LU # (0-4095)		–	–
I12200	LU format completed (LU-x)	LU formatting was completed. x : LU # (0-4095)		–	–
I12300	LU format failed (LU-x)	LU formatting stopped abnormally. x : LU # (0-4095)	Simple Trace	① When one of the following messages is displayed at the same time, follow the recovery procedure given by the message. • W060xy HDU alarm • W060HH HDU alarm • W0GG00 HDU alarm • W0GH00 HDU alarm • W060AT SATA HDU alarm ② A Confirm that a Disk Drive to which the objective LU is allotted is mounted. ③ If it is confirmed in the step ② that all the Disk Drives are installed and no failure has occurred in them, format the object LU again.	–
I12400	LU format start (LU-x)	An LU formatting was started. x : LU # (0-4095)		–	–
I12500	Unified LUs separated (UNI:LU-x)	Dissolution of all LU unification (to dissolve unification of all the unified LUs and to split them into internal LUs) was executed. x : An internal LU # of a unified LU to be spitted. (0-4094)		–	–
I12600	Last LU separated from unified LU (UNI:LU-x)	A separation of a final LU of a unified LU (to separate the last one of the internal LUs which have been combined with a unified LU) was executed. x : An internal LU # of a unified LU to be spitted. (0-4094)		–	–
I12700	LU reappeared (LU-x)	An internal LU(s) was validated again through splitting of an unified LU separation of a final LU. x : An LU # of an internal LU which has been separated and validated. (0-2047)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I130xy	Spare HDU defined (Unit-x, HDU-y)	A Spare Disk is registered. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I130HH	Spare HDU defined (Unit-x, HDU-y)	A Spare Disk is registered. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I131xy	Spare HDU deleted (Unit-x, HDU-y)	Registration of a disk is called off. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I131HH	Spare HDU deleted (Unit-x, HDU-y)	Registration of a disk is called off. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I140xy	System copy started (Unit-x, HDU-y)	System copy was started. x : Unit ID # (0) y : Disk Drive # (0-4)		① Do not change the configuration during the system copy. Because of copying the system information after the configuration change, if the operations for changing the system configuration (LU creation, format, LU owner right change) are overlapped, the message may be displayed multiple times. Also, when the microprogram was replaced online after changing the system configuration, the message may be displayed two or more times, but it is not a problem.	–
I140HH	System copy started (Unit-x, HDU-y)	System copy was started. x : Unit ID # (0) y : Disk Drive # (0-4)			
I141xy	System copy completed (Unit-x, HDU-y)	System copy terminated normally. x : Unit ID # (0) y : Disk Drive # (0-4)		–	–
I141HH	System copy completed (Unit-x, HDU-y)	System copy terminated normally. x : Unit ID # (0) y : Disk Drive # (0-4)		–	–
I142xy	System copy failed (Unit-x, HDU-y)	System copy failed. x : Unit ID # (0) y : Disk Drive # (0-4)	Simple Trace	① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I142HH	System copy failed (Unit-x, HDU-y)	System copy failed. x : Unit ID # (0) y : Disk Drive # (0-4)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I150xy	Data recovery started (Unit-x, HDU-y)	Data recovery was started. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I150HH	Data recovery started (Unit-x, HDU-y)	Data recovery was started. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I151xy	Data recovery completed (Unit-x, HDU-y)	Data recovery terminated normally. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I151HH	Data recovery completed (Unit-x, HDU-y)	Data recovery terminated normally. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I152xy	Data recovery failed (Unit-x, HDU-y)	Data recovery failed. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
I152HH	Data recovery failed (Unit-x, HDU-y)	Data recovery failed. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	② When one of the following messages is displayed before this message,, refer to Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error)". • I301xy HDU error • I301HH HDU error • I301AT SATA HDU error When one of the following messages is displayed before this message, refer to Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)". • W061xy Spare HDU alarm • W061HH Spare HDU alarm • W061AT SATA Spare HDU alarm • W0GJ00 Spare HDU alarm [RKA] • W0GK00 Spare HDU alarm [RKAJ]	Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error)" (TRBL 06-0510) Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)" (TRBL 06-0520).

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I153xy	Data recovery partial (Unit-x, HDU-y)	A part of the data could not be recovered, and the data restoration was completed by managing the data as it is not possible to read. (Incomplete writing is registered.) x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① See Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error).	Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error)" (TRBL 06-0510)
I153HH	Data recovery partial (Unit-x, HDU-y)	A part of the data could not be recovered, and the data restoration was completed by managing the data as it is not possible to read. (Incomplete writing is registered.) x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
I15Axy	Dynamic sparing start (Unit-x, HDU-y) [z]	Dynamic sparing started. x : Unit ID # (0-14) y : Disk Drive # (0-14) z : Detailed code		–	–
I15AHH	Dynamic sparing start (Unit-x, HDU-y) [z]	Dynamic sparing started. x : Unit ID # (0-29) y : Disk Drive # (0-14) z : Detailed code		–	–
I160xx	FLASH other revision edit (REV-x)	When the Control Unit was inserted in the state in which the subsystem power was on, the version up of the flash was detected. x : Micro (Rev.)		–	–
I18000	PIN-over recovered	The PIN threshold value lowered.		–	–
I19000	Online micro-update completed	The hot replacement of the microprogram was completed.		–	–
I1A00x	Permanent LU disable (Default CTL-x)	LU residence is not changed. x : Default Control Unit # (0-2) (In case of 2, it is applied to both Control Units.)		① Set the unit in the ready state and turn off the power, then turn on the power again.	–
I1A10x	Permanent LU deleted (Default CTL-x)	LU residence is deleted. (When RAID group/LU is deleted) x : Default Control Unit # (0-2)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1A2xy	Permanent LU warning recovered (CTL-x, ERR-y)	LU residence OFF warning was called off. x : Default Control Unit # (0-1) y : Factor code 0: Too large LU 1: Cache access error 2: Regression of Control Unit 3: Abnormal battery voltage 4: Abnormal battery charging circuit 5: Larger than PIN threshold value		–	–
I1A30x	Permanent LU enable (Default CTL-x)	The Turbo LU residence function was turned on. x : Default Control Unit # (0-1)		–	–
I1B000	Forced parity correction started	Forced parity correction processing was started.		–	–
I1B100	Forced parity correction completed	Forced parity correction processing was finished.		–	–
I1C0xy	Loop diagnostic start (Path-x, Loop-y)	Loop diagnosis was started. x : Path # (0-3) y : Loop # (0-1)		–	–
I1C1xy	Loop diagnostic end (Path-x, Loop-y)	Loop diagnosis was finished. x : Path # (0-3) y : Loop # (0-1)		–	–
I1E000	Online verify completed [odd unit]	Check of the frames with odd numbers was completed in the online verification.		–	–
I1E100	Online verify completed [even unit]	Check of the frames with even numbers was completed in the online verification.		–	–
I1E200	LU access enable [QuickShadow pair canceled] (LU-x)	Read/Write to P-VOL enabled. x : LU # (0-4095)	Simple Trace	–	–
I1E300	LU access disable [QuickShadow restore failed] (LU-x)	Read/Write to P-VOL disabled. x : LU # (0-4095)	Simple Trace	① Cancel all the pairs of the V-VOL in the P-VOL.	–
I1F000	Data pool load failed	The loading of pool information failed.	Simple Trace	–	–
I1G00x	PSUE occurred [QuickShadow] (Data pool-x)	All pairs in the data pool changed to PSUE status. x : Data pool # (0-1)	Simple Trace	① Cancel the pair being PSUE once, and then make a pair again.	–
I1G100	PSUE occurred (LU-x)	All pairs to which P-VOL belongs changed to PSUE status. x: LU # (0-4095)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1G200	PSUE occurred (ShadowImage)	A pair, whose status was changed to PSUE, exists.	Simple Trace	① Refer to Troubleshooting "Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)".	Troubleshooting "Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)" (TRBL 09-0000)
I1G300	CTL recovery start (CTL-x)	Because the recovery operation has been started, do not pull out the Control Unit. x : Control Unit # (0-1)		–	–
I1G400	Quick Format started (LU-x)	The Quick Format started a job that executes a formatting in the background. x : LU # (0-4095)		–	–
I1G500	Quick Format completed (LU-x)	A formatting of the whole area in the LU was completed. x : LU # (0-4095)		–	–
I1G600	QuickFormat Suspended	QuickFormat was suspended since power shutdown and battery lost occurred, and the map controlling the formatted area was lost.		① User data may be lost. Confirm the situation to user. And execute format again. Afterwards, restore the backup data.	System Parameter "3.3 Setting of LU" (SYSPR 03-0140)
I1G70x	FC I/F ports remain offline (CTL-x)	The Fibre Channel interface board was made offline according to the instruction issued by Storage Navigator Modular at the time of the microprogram hot replacement. x : Control Unit # (0-1)		① When Storage Navigator Modular completes execution of the procedure for hot replacement of the microprogram, the Fibre Channel interface port becomes online.	–
I1G80x	FC I/F ports change to online (CTL-x)	The Fibre Channel interface board was made online according to the instruction issued by Storage Navigator Modular at the time of the microprogram hot replacement. x : Control Unit # (0-1)		–	–
I1G900	SATA HDU limit over [Self-monitoring] (Unit-x, HDU-y)	The count of drive errors exceeded its threshold value. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I1GA00	Forced parity correction is stopped [user directions]	The forced parity correction was suspended because the Storage Navigator Modular instructed for the suspension during the forced parity correction process.		–	–
I1GB00	Forced parity correction is started (LU-x)	The forced parity correction was started. x : LU # (0-4095)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1GC00	Forced parity correction is completed (LU-x)	The forced parity correction was completed. x : LU # (0-4095)		–	–
I1GD00	Forced parity correction is stopped [HDU alarm]	The forced parity correction was stopped because of a drive detachment.		–	–
I1GE00	Forced parity correction is stopped [Too Many Unreadable PINs] (LU-x)	The forced parity correction was stopped because a number of registered unwritten data per LU exceeded a certain value. x : LU # (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.3 [Recovery method-5] : Incomplete write occurred during the forced parity correction.".	Troubleshooting "6.1.3 [Recovery method-5] : Incomplete write occurred during the forced parity correction." (TRBL 06-0210)
I1GG00	HDU changed to spare (Unit-x, HDU-y)	The configuration information was changed as follows. The data drive, which had been restored in the Active Spare mode, was changed to a Spare Drive. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	–	–
I1GH00	Forced parity correction stopped by too many PINs (RG-x, LU-y)	The forced parity correction of the target LU was suspended because the PIN over for each RAID group became near. x : RAID group # (0-89) y : LU # (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.3 [Recovery method-4] : PIN over occurred during the forced parity correction".	Troubleshooting "6.1.3 [Recovery method-4] : PIN over occurred during the forced parity correction." (TRBL 06-0190)
I1GJ00	Forced parity correction stopped by too many PINs (PTT-x, LU-y)	The forced parity correction of the target LU stopped because PIN-over for each partition became close. x : Partition # (0-31) y : LU # (0-4095)	Simple Trace		
I1GK00	Forced parity correction stopped by too many PINs (DIR-x, LU-y)	The forced parity correction of the target LU stopped because PIN-over for each DIR became close. x : Directory # (0 or 1) y : LU # (0-4095)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1GT00	All DM-LU canceled	Only one DM-LU was defined and the system released DM-LU in WARNING with write of all DM-LU disabled.		–	–
I1GU00	Modification of Cache Partition skipped (PIN or Unreadable PIN)	The setting of cache partitions could not be changed because pinned data existed.	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ② or later.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
				② Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
				③ When either of the following messages is displayed before this message, take recovery actions according to the message. • W0G0xy Unreadable PIN detected • W0G100 Unreadable PIN detected"	–
				④ Check whether pinned data exist or not. When the pinned data exist, refer to Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)".	Troubleshooting "10.2.4 Displaying Logical Unit Failure Data Information" (TRBL 10-0250) Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)" (TRBL 06-0550)
				⑤ Boot the subsystem after executing the deliberate shutdown in order to change the setting of cache partitions.	Installation "1.7.1 Subsystem power on" (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1GV00	Modular Volume Migration completed (LU-x/y)	One Modular Volume Migration is completed. x : Internal LU # of the P-VOL (0-4095) y : Internal LU # of the S-VOL (0-4095)		–	–
I1GW00	Modular Volume Migration stopped (LU-x/y)	Modular Volume Migration was cancelled because the instruction of cancellation was received or the pair was changed to PSUE. x : Internal LU # of the P-VOL (0-4095) y : Internal LU # of the S-VOL (0-4095)		–	–
I1GX00	Modular Volume Migration started (LU-x/y)	One Modular Volume Migration started. x : Internal LU # of the P-VOL (0-4095) y : Internal LU # of the S-VOL (0-4095)		–	–
I1GY00	The request of spin up of disk drives is accepted (RG-x)	The spin-up was instructed by Storage Navigator Modular to the Disk Drive which was made to spin down for the power saving. x : RAID group # (0-89)		–	–
I1GZ00	The spin up of disk drives completed (RG-x)	The Disk Drive which was made to spin-down for the power saving spun-up. x : RAID group # (0-89)		–	–
I1H000	The request of spin down of disk drives is accepted (RG-x)	The spin-down was instructed to the Disk Drive for the power saving from Storage Navigator Modular. x : RAID group # (0-89)		–	–
I1H100	The spin down of disk drives completed (RG-x)	The Disk Drive set to the power saving spin-down. x : RAID group # (0-89)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I1H200	The recovery for the disk drives of power saving started (RG-x)	Because a failure occurred in the Disk Drives to which the spin-down of the power saving was set, all the Disk Drives in the RAID Group displayed in the message were spin up, and the post-processing of the failure started. x : RAID group # (0-89)		–	–
I1H300	The recovery for the disk drives of power saving completed (RG-x)	The post-processing of the failure of the Disk Drives to which the spin-down of the power saving was set was completed. And, the Disk Drives of the RAID Group displayed in the message were spin-down again according to the setting of the power saving. x : RAID group # (0-89)		–	–
I1H400	Automatic health check of disk drives started (RG-x)	The health check (it confirms that the adhesion of the head and the disk is prevented and the spindle motor rotates) started in the Disk Drive which was made to spin-down for the power saving started. x : RAID group # (0-89)		–	–
I1H500	Automatic health check of disk drives completed (RG-x)	The health check (it confirms that the adhesion of the head and the disk is prevented and the spindle motor rotates) of the Disk Drive which was made to spin-down for the power saving was completed. x : RAID group # (0-89)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I301xy	HDU error (Unit-x, HDU-y)	PDEV should be blocked because of an error, but it is not blocked since redundancy is insufficient. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
I301HH	HDU error (Unit-x, HDU-y)	PDEV should be blocked because of an error, but it is not blocked since redundancy is insufficient. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	② Refer to Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)".	Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)" (TRBL 06-0520)
I301AT	SATA HDU error (Unit-x, HDU-y)	PDEV should be blocked because of an error, but it is not blocked since redundancy is insufficient. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
I30200	System HDU error	There is a drive which cannot handle the system before the system is ready.	Simple Trace	① Solve the failure according to "I142xy System copy failed" or "I142HH System copy failed" indicated before the message.	(MSG 04-0040)
I303xy	HDU read capacity failed (Unit-x, HDU-y)	The insertion of the Disk Drive failed because the capacity of the replaced Disk Drive was small. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace it with the Disk Drive of the same capacity or more as the Disk Drive before the replacement.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I303HH	HDU read capacity failed (Unit-x, HDU-y)	The insertion of the Disk Drive failed because the capacity of the replaced Disk Drive was small. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I304xy	HDU spin up failed (Unit-x, HDU-y)	An insertion of a Disk Drive failed because of a Disk Drive failure. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Pull out the Disk Drive and insert it again.(*1) ② If the trouble is not solved in spite of the above operation, replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I304HH	HDU spin up failed (Unit-x, HDU-y)	An insertion of a Disk Drive failed because of a Disk Drive failure. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

*1 : If this message is issued frequently, it is suspected that one of the following cases have occurred.

- Symptom : Spin-up operation repeats interruption and restart because of contention with the RAID Manager command in the case where the ShadowImage in-system replication function is used.
  Corrective action : Contact the system manager. If RAID Manager command is issued by polling in a short period, check the manual and change the value to be appropriate.
- Symptom : A spin up operation repeats an interruption and restart because LU switchings occur frequently.
  Corrective action : Check the setting of the owner right to the LU and change it so that the LU switching does not occur owing to an I/O command issued by a host.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I305xy	HDU read capacity failed (Unit-x, HDU-y)	An insertion of a Disk Drive failed because of an illegal read capacity. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Pull out the Disk Drive and insert it again.(*1) ② If the trouble is not solved in spite of the above operation, replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I305HH	HDU read capacity failed (Unit-x, HDU-y)	An insertion of a Disk Drive failed because of an illegal read capacity. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I30900	HDU startup diag failed	Insertion of the Disk Drive failed when it was inserted with the power turned on.	Simple Trace	① Replace the blocked Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I410xy	HDU error over (Unit-x, HDU-y) [HDRVC]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered mechanism system. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I410HH	HDU error over (Unit-x, HDU-y) [HDRVC]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered mechanism system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I411xy	HDU error over (Unit-x, HDU-y) [HDUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered mechanism system. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I411HH	HDU error over (Unit-x, HDU-y) [HDUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered mechanism system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

*1 : If this message is issued frequently, it is suspected that one of the following cases have occurred.

- Symptom : Spin-up operation repeats interruption and restart because of contention with the RAID Manager command in the case where the ShadowImage in-system replication function is used.
  Corrective action : Contact the system manager. If RAID Manager command is issued by polling in a short period, check the manual and change the value to be appropriate.
- Symptom : A spin up operation repeats an interruption and restart because LU switchings occur frequently.
  Corrective action : Check the setting of the owner right to the LU and change it so that the LU switching does not occur owing to an I/O command issued by a host.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I412xy	HDU error over (Unit-x, HDU-y) [MDRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered medium system. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I412HH	HDU error over (Unit-x, HDU-y) [MDRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered medium system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I413xy	HDU error over (Unit-x, HDU-y) [MDUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered medium system. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I413HH	HDU error over (Unit-x, HDU-y) [MDUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered medium system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I414xy	HDU error over (Unit-x, HDU-y) [RWRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered R/W system. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I414HH	HDU error over (Unit-x, HDU-y) [RWRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered R/W system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I415xy	HDU error over (Unit-x, HDU-y) [RWUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered R/W system. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I415HH	HDU error over (Unit-x, HDU-y) [RWUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered R/W system. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I416xy	HDU error over (Unit-x, HDU-y) [IFRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered disk I/F. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I416HH	HDU error over (Unit-x, HDU-y) [IFRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered disk I/F. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I417xy	HDU error over (Unit-x, HDU-y) [IFUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered disk I/F. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I417HH	HDU error over (Unit-x, HDU-y) [IFUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered disk I/F. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I418xy	HDU error over (Unit-x, HDU-y) [CHRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered hardware. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I418HH	HDU error over (Unit-x, HDU-y) [CHRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered hardware. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I419xy	HDU error over (Unit-x, HDU-y) [CHUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered hardware. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I419HH	HDU error over (Unit-x, HDU-y) [CHUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered hardware. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I41Axy	HDU error over (Unit-x, HDU-y) [SCRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered SCSI I/F. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I41AHH	HDU error over (Unit-x, HDU-y) [SCRCV]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the recovered SCSI I/F. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I41Bxy	HDU error over (Unit-x, HDU-y) [SCUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered SCSI I/F. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I41BHH	HDU error over (Unit-x, HDU-y) [SCUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an error in the un-recovered SCSI I/F. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I41Cxy	HDU error over (Unit-x, HDU-y) [ONVRCV]	The disk at the position indicated with x and y exceeds the threshold value because of a correctable error in the on-line verification. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I41CHH	HDU error over (Unit-x, HDU-y) [ONVRCV]	The disk at the position indicated with x and y exceeds the threshold value because of a correctable error in the on-line verification. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I41Dxy	HDU error over (Unit-x, HDU-y) [ONVUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an uncorrectable error in the on-line verification. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I41DHH	HDU error over (Unit-x, HDU-y) [ONVUNR]	The disk at the position indicated with x and y exceeds the threshold value because of an uncorrectable error in the on-line verification. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I41Exy	HDU error over (Unit-x, HDU-y) [ONVHER]	In the disk located at a position shown as xy, the error count exceeded its threshold value owing to hardware errors (errors other than recovered error and media error) occurred in an online verification. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I41EHH	HDU error over (Unit-x, HDU-y) [ONVHER]	In the disk located at a position shown as xy, the error count exceeded its threshold value owing to hardware errors (errors other than recovered error and media error) occurred in an online verification. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I41Fxy	HDU error over (Unit-x,HDU-y) [REAOV]	An excess over the threshold value of the reassignment execution count occurred. x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I41FHH	HDU error over (Unit-x,HDU-y) [REAOV]	An excess over the threshold value of the reassignment execution count occurred. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I4200x	Online micro-update (CTL-x)	The microprogram of the Control Unit was replaced in the state in which the subsystem power was on. x : Control Unit # (0-1)		–	–
I430xy	HDU byte check error (Unit-x, HDU-y)	A failure was detected by the disk drive diagnosis. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	①Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I430HH	HDU byte check error (Unit-x, HDU-y)	A failure was detected by the disk drive diagnosis. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace		
I501xy	ENC change Info (Unit-x, ENC-y)	Report on ENC/SENC to be replaced. (Additional Chassis) x : Unit ID # (0-14) y : ENC Unit/SENC Unit # (0-1)		①Replace the ENC Unit on which the EALM LED lights up.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
I501HH	ENC change Info (Unit-x, ENC-y)	Report on ENC/SENC to be replaced. (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)			
I5010x	ENC change Info (CTL-x)	Report on ENC/SENC to be replaced. (Basic Chassis) x : Control Unit # (0-1)		①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I502xy	HDU change Info (Unit-x, HDU-y)	Report on a drive to be replaced. x : Unit ID # (0-14) y : Disk Drive # (0-14)		①Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I502HH	HDU change Info (Unit-x, HDU-y)	Report on a drive to be replaced. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I5030x	Change Info (CTL-x)	Report on CTL to be replaced. x : Control Unit # (0-1)		①Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I510xy	D_PT error (HDU Unit-x, HDU-y)	A drive port failure. x : Unit ID # (0-14) y : Disk Drive # (0-14)		①Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I510HH	D_PT error (HDU Unit-x, HDU-y)	A drive port failure. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I511xy	D_PT error 1 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 1) x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I511HH	D_PT error 1 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 1) x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I512xy	D_PT error 2 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 2) x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I512HH	D_PT error 2 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 2) x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I513xy	D_PT error 3 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 3) x : Unit ID # (0-14) y : Disk Drive # (0-14)			
I513HH	D_PT error 3 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 3) x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I515xy	D_PT error 5 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 5) x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I515HH	D_PT error 5 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 5) x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I516xy	D_PT error 6 (HDU Unit-x, HDU-y)	Drive port failure 6 occurred. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
I516HH	D_PT error 6 (HDU Unit-x, HDU-y)	Drive port failure 6 occurred. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
I51700	D_PT error 7 (HDU Unit-x, HDU-y)	Drive port failure 7 occurred. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① When the message "W060AT SATA HDU alarm" is displayed at the same time, follow the recovery method.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I520xy	Loop error2 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 2 (command rejection, inconsistent transferred data length, frame time-out, ABTS rejection, PLOG/PRLI time-out, and log-in error) count (Threshold value: 9) x : Path # (0-3) y : Loop # (0-1)		–	–
I521xy	Loop error3 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 3 (illegal frame reception and ABTS/PRQ time-out) count (Threshold value: 34) x : Path # (0-3) y : Loop # (0-1)		–	–
I522xy	Loop error4 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 4 (intermittent failure of the PDEV time-out) count (Threshold value: 34) x : Path # (0-3) y : Loop # (0-1)		–	–
I523xy	Loop error5 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 4. x : Path # (0-3) y : Loop # (0-1)		–	–
I524xy	HDU response timeout (Unit-x, HDU-y)	A Disk Drive failure was detected by frame sending diagnosis. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I524HH	HDU response timeout (Unit-x, HDU-y)	A Disk Drive failure was detected by frame sending diagnosis. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
I525xy	Loop error7 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 7. x : Path # (0-3) y : Loop # (0-1)		① When the message "W080xy Loop alarm" is displayed at the same time, follow the recovery method.	–
I530xy	ENC error [ENC NG] (Unit-x, ENC-y)	An ENC Unit error (SW malfunction) occurred. x : Unit ID # (1-14) y : ENC Unit # (0-1)		–	–
I530HH	ENC error [ENC NG] (Unit-x, ENC-y)	An ENC Unit error (SW malfunction) occurred. x : Unit ID # (0-29) y : ENC Unit # (0-1)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I532xy	ENC error [ENC check NG] (Unit-x, ENC-y)	An ENC Unit error (detection of a link trouble or request for the ENC Unit replacement) occurred. x : Unit ID # (1-14) y : ENC Unit # (0-1)		–	–
I532HH	ENC error [ENC check NG] (Unit-x, ENC-y)	An ENC Unit error (detection of a link trouble or request for the ENC Unit replacement) occurred. x : Unit ID # (0-29) y : ENC Unit # (0-1)		–	–
I533xy	ENC error [CBL not connect] (Unit-x, ENC-y)	An ENC Unit error (ENC cable non-connection) occurred. x : Unit ID # (1-14) y : ENC Unit # (0-1)		–	–
I533HH	ENC error [CBL not connect] (Unit-x, ENC-y)	An ENC Unit error (ENC cable non-connection) occurred. x : Unit ID # (0-29) y : ENC Unit # (0-1)		–	–
I534xy	ENC error [ENC CABLE OUT] (Unit-x, ENC-y)	An ENC Unit error (ENC detachment owing to ENC cable disconnection) occurred. x : Unit ID # (1-14) y : ENC Unit # (0-1)		–	–
I534HH	ENC error [ENC CABLE OUT] (Unit-x, ENC-y)	An ENC Unit error (ENC detachment owing to ENC cable disconnection) occurred. x : Unit ID # (0-29) y : ENC Unit # (0-1)		–	–
I53500	PSUE occurred [QuickShadow]	When Copy-on-write SnapShot was executed, it was moved to PSUE.	Simple Trace	① Refer to Troubleshooting "Chapter 9 Data Collection when a Failure Occurs in Program Product (P.P.)" to collect necessary information.	Troubleshooting "Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)" (TRBL 09-0000)
I53600	ENC error Inf. [LPF0]	The other ENC Unit was detached because the LPFO was detected.		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I53700	ENC error Inf. [MPF]	The ENC Unit was detached because the LPF was detected.			
I53800	ENC error Inf. [SPF]	The ENC Unit was detached because the SPF was detected.			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5390x	The CTL type different from the other CTL was detected (CTL-0 xxxx, CTL-1 yyyy)	It was detected that the Control Units of the RKH and the RKHE were mixed. The Control Units to be installed in the AMS1000 must be unified to the Control Units of the RKH or the RKHE. xxxx, yyyy : Indicates either of the RKH or the RKHE.	Simple Trace	① There is no problem if this message is displayed before “I0010x CTL recovered” after replacing one Control Unit by the upgrade from the RKH to the RKHE. Perform the upgrade work continuously.	–
				② The Control Unit displayed as “RKH” in the message is a Control Unit of the RKH if this message is displayed before “I0010x CTL recovered” or “I10000 Subsystem is ready” after replacing the second Control Unit by the upgrade from the RKH to the RKHE. Replace the Control Unit to a Control Unit of “RKHE”.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				③ The Control Unit displayed as “RKHE” in the message is a Control Unit of the RKHE if this message is displayed before “I0010x CTL recovered” or “I10000 Subsystem is ready” after replacing the second Control Unit to return the configuration of the Control Unit to the RKH by the upgrade from the RKH to the RKHE. Replace the Control Unit to a Control Unit of “RKH”.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				④ The model name of the replaced Control Unit is different from the other Control Unit if this message is displayed before “I0010x CTL recovered” or “I1000 Subsystem is ready” after replacing the Control Unit in the status that the upgrade from the RKH to the RKHE is not performed. Replace the other Control Unit to the Control Unit of a correct model name so that both Control Units to be installed are Control Units of the RKHE or the RKH.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I53A00	Host connector recovered (Portxy-z)	The Host Connector was recovered from a failure. x : Control Unit # (0-1) y : Port # (A-D) z : Host Connector # (0-1)		–	–
I53B00	NNC 1000BASE-T Ethernet Card failure detected (NNC-x, Extension Slot-y)	NNC (NAS Unit) detected a 1000BASE-T Ethernet card failure. x : NNC (NAS Unit) # (0-3) y : Extension Slot # (0-1)	NAS Log	① Replace the 1000BASE-T Ethernet card of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I53C0x	NNC Fibre Channel Card failure detected (NNC-x, Extension Slot2)	NNC (NAS Unit) detected a Fibre Channel card failure. x : NNC (NAS Unit) # (0-3)	NAS Log	① Replace the Fibre Channel card of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I53D0x	NNC PCI-Express Card failure detected (NNC-x, Extension Slot3)	NNC (NAS Unit) detected a PCI-Express card failure. x : NNC (NAS Unit) # (0-3)	NAS Log	① Replace the PCI-Express card of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I53E00	NNC 1000BASE-SX Ethernet Card failure detected (NNC-x, Extension Slot-y)	NNC (NAS Unit) detected a 1000BASE-SX Ethernet card failure. x : NNC (NAS Unit) # (0-3) y : Extension Slot # (0-1)	NAS Log	① Replace the 1000BASE-SX Ethernet card of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I53F00	NNC Host connector failure detected (NNC-x, y)	NNC (NAS Unit) detected a host connector failure. x : NNC (NAS Unit) # (0-3) y : Failed part	NAS Log	① Replace the host connector of Data LAN Port or Fibre Channel I/F Port of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I540xy	ENC recovery failed (Unit-x, ENC-y)	The insertion of the ENC Unit failed (Additional Chassis) x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simple Trace	① See Troubleshooting "6.1.22 Recover method when illegal ENC cable connection or ENC/SENC unit failure is detected".	Troubleshooting "6.1.22 Recover method when illegal ENC cable connection or ENC/SENC unit failure is detected" (TRBL 06-1260)
I540HH	ENC recovery failed (Unit-x, ENC-y)	The insertion of the ENC Unit failed (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit # (0-1)	Simple Trace		
I54100	NNC FAN failure detected (NNC-x, FAN-y)	NNC (NAS Unit) detected a FAN failure. x : NNC (NAS Unit) # (0-3) y : FAN # (0-2)	NAS Log	① Replace the FAN Assembly of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I54200	NNC PS failure detected (NNC-x, PS-y)	NNC (NAS Unit) detected a Power Unit failure. x : NNC (NAS Unit) # (0-3) y : PS # (0-1)	NAS Log	① Replace the Power Unit of NNC (NAS Unit) displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I5430x	PCDG error [DIMM-C0] (NNC-x)	A hardware error of DIMM (C0) of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the memory (DIMM) of slot C0 of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10)" (NAS 07-0120)
I5440x	PCDG error [DIMM-D0] (NNC-x)	A hardware error of DIMM (D0) of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the memory (DIMM) of slot D0 of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10)" (NAS 07-0120)
I545xy	PCDG error [1000BASE-T Ethernet Card] (NNC-x, Extension Slot-y)	A hardware error of 1000BASE-T Ethernet Card of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : Extension Slot # (0-1)	Simple Trace	① Replace the 1000BASE-T Ethernet Card installed in Extension Slot displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I546xy	PCDG error [1000BASE-SX Ethernet Card] (NNC-x, Extension Slot-y)	A hardware error of 1000BASE-SX Ethernet Card of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : Extension Slot # (0-1)	Simple Trace	① Replace the 1000BASE-SX Ethernet Card installed in Extension Slot displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5470x	PCDG error [Fibre Channel Card] (NNC-x, Extension Slot-y)	A hardware error of Fibre Channel Card of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : Extension Slot # (2-3)	Simple Trace	① Replace the Fibre Channel Card installed in Extension Slot displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I548xy	PCDG error [PS] (NNC-x, PS-y)	A hardware error in the Power Unit of NNC (NAS Unit) was detected while starting NNC (NAS Unit). NNC (NAS Unit) is blocked when the Power Unit breaks down and there is no Power Unit that operates normally. When two Power Units are installed in NNC (NAS Unit), and if one of the Power Units breaks down but the other operates normally, NNC (NAS Unit) is partly blocked. x : NNC (NAS Unit) # (0-3) y : PS # (0-1)	Simple Trace	① Replace the Power Unit displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I549xy	PCDG error [FAN] (NNC-x, FAN-y)	A hardware error of the FAN Assembly of NNC (NAS Unit) was detected while starting NNC (NAS Unit). When one FAN breaks down, NNC (NAS Unit) is partly blocked. When two or more FANs break down, NNC (NAS Unit) is blocked. x : NNC (NAS Unit) # (0-3) y : FAN # (0-2)	Simple Trace	① Replace the FAN Assembly displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I54A0x	PCDG error [mis-configuration of Extension Card] (NNC-x)	It was detected that one or more Extension Cards are installed in another Extension Slots even though the Extension Slots to be installed are decided according to the types of the Extension Cards. x : NNC (NAS Unit) # (0-3)	Simple Trace	① Install the Extension Card, which is installed in NNC (NAS Unit) displayed in the message, in the correct Extension Slot again.	–
I54B00	PCDG error [Host Connector] (NNC-x, y)	A hardware error of the Host Connector of NNC (NAS Unit) was detected while starting NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : Failed part	Simple Trace	① Replace the Host Connector displayed in the message of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I54C00	The restrictions on Power Saving function by SENC was removed	The Power Saving function of the priced option became operable without the limit by the SENC.		–	–
I54Dxy	The SENC intermittent error was over the threshold (Unit-x, ENC-y)	The intermittent failure of the SENC exceeded the threshold value. [SENC blockade factor] x : Unit ID # (0-15) y : ENC Unit # (0-1)	Simple Trace	① Replace the SENC Unit displayed in the message.	–
I54DHH	The SENC intermittent error was over the threshold (Unit-x, ENC-y)	The intermittent failure of the SENC exceeded the threshold value. [SENC blockade factor] x : Unit ID # (0-29) y : ENC Unit # (0-1)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5F100	FAN speed error [Too low despite Middle-speed setting] (Unit-x, FAN-y)	Abnormality occurred in the rotational number of the FAN of the subsystem. x : Unit ID # (0-29) y : Fan Assembly 00 : Fan Assembly #0(*), FAN #0 01 : Fan Assembly #0(*), FAN #1 02 : Fan Assembly #0, FAN #2 10 : Fan Assembly #1(*), FAN #0 11 : Fan Assembly #1(*), FAN #1 12 : Fan Assembly #1, FAN #2 (* : Power Unit for the Additional Chassis)		① Since one of the following messages is displayed after this message, take recovery actions according to the message. • W040xy FAN alarm • W042HH FAN alarm • W050xy PS alarm • W052HH PS alarm • W0G400 PS alarm [RKA] • W0G500 PS alarm [RKAAT] • W0G600 PS alarm [RKAJ] • W0G700 PS alarm [RKAJAT]	–
I5F200	FAN speed error [Too high despite Middle-speed setting] (Unit-x, FAN-y)				
I5F300	FAN speed error [Too low despite High-speed setting] (Unit-x, FAN-y)				
I5F400	FAN speed error [Too low despite Low-speed setting] (Unit-x, FAN-y)				
I5F500	FAN speed error [Too high despite Low-speed setting] (Unit-x, FAN-y)				
I5F600	FAN speed error [Too low despite Middle-speed setting] (CTL-Unit, FAN-y)	Abnormality occurred in the rotational number of the FAN of the RKH. x : Unit ID # (0-29) y : Fan Assembly 00 : Fan Assembly #0, FAN #0 01 : Fan Assembly #0, FAN #1 02 : Fan Assembly #0, FAN #2 10 : Fan Assembly #1, FAN #0 11 : Fan Assembly #1, FAN #1 12 : Fan Assembly #1, FAN #2		① Maintain it according to the message displayed after this message. • W04100 FAN alarm	–
I5F700	FAN speed error [Too high despite Middle-speed setting] (CTL-Unit, FAN-y)				
I5F800	FAN speed error [Too low despite High-speed setting] (CTL-Unit, FAN-y)				
I5F900	FAN speed error [Too low despite Low-speed setting] (CTL-Unit, FAN-y)				
I5FA00	FAN speed error [Too high despite Low-speed setting] (CTL-Unit, FAN-y)				
I5FC00	ENC error inf. [BKD ENCMPUREV]	It was detected that the SES information (ENCMPUREV) acquired from the Control Unit was illegal.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5FD00	ENC microprogram download info. [No SES HDU sxists] (Unit-x, ENC-y)	The ENC microprogram could not be executed for this ENC because two SES drives of the ENC displayed in this message are not installed at the time of the ENC microprogram download.		①1. Install the Disk Drive #0 or #2 for the ENC Unit #0. Install the Disk Drive #1 or #3 for the ENC Unit #1. 2. Execute the ENC microprogram download.	—
I5FE00	Connectivity path failure of SENC occurred	A Connectivity path failure occurred in the RKXS.	CTL Alarm Trace	① When "W0100x CTL alarm" is displayed before this message, replace the blocked Control Unit. ② If it is not recovered, replace the Control Unit after collecting the simple trace from the other Control Unit (it cannot be replaced with the subsystem power tuned on).	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I5FF0x	Obstacle HDU search end	Automatic diagnosis of backend loop terminated. x : Optional code		–	–
I5Y000	Obstacle HDU search start	Automatic diagnosis of backend loop started. When this message appears, please restart the maintenance work which interrupted after the maintenance work is temporarily interrupted, and the message code of "I5Y100" appears.		–	–
I5Y100	Obstacle HDU search end	Automatic diagnosis of backend loop terminated.		–	–
I5Y2xy	Obstacle HDU bypassed (HDU Unit-x, HDU-y)	Failed part (HDU) of backend loop was identified. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Take recovery actions according to the following message. • W060xy HDU alarm • W060HH HDU alarm • W061xy Spare HDU alarm • W061HH Spare HDU alarm • W0GG00 HDU alarm • W0GH00 HDU alarm • W0GJ00 Spare HDU alarm • W0GK00 Spare HDU alarm • I301xy HDU error • I301HH HDU error	–
I5Y2HH	Obstacle HDU bypassed (HDU Unit-x, HDU-y)	Failed part (HDU) of backend loop was identified. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5Y300	Obstacle HDU search retry	Automatic Loop failure isolation diagnosis is retried.		–	–
I5Y400	BKE diagnostic result (Unit-x, HDU-y)	It is possible that the loop failure was caused by a drive. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	① Follow the recovery measure Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" for the maintenance.	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5Y500	BKE diagnostic result (Unit-x, ENC-y)	It is possible that the loop failure was caused by an ENC Unit. x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace		
I5Y60x	BKE diagnostic result (CTL-x)	It is possible that the loop failure was caused by a Control Unit. x : Control Unit # (0-1)	Simple Trace		
I5Y700	BKE diagnostic result (Unit-CTU-x, ENC-y)	It is possible that the loop failure was caused by an ENC cable. x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace		
	BKE diagnostic result (Unit-x-y, ENC-z)	It is possible that the loop failure was caused by an ENC cable. x, y : Unit ID # (0-29) z : ENC Unit/SENC Unit # (0-1)	Simple Trace		
I5Y800	BKE diagnostic result (unknown)	Failed part cannot be identified.		① Collect Simple trace and contact the Technical Support Center.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
I5Y900	Part change priority (number-x)	Indicates priorities of failed parts to be replaced. x : Priorities # (1-8)		① Follow the recovery measure Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" for the maintenance.	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5YA00	SENC error over (Unit-x, ENC-y)	The count of SENC errors exceeded its threshold value. x : Unit ID # (1-29) y : SENC Unit # (0-1)		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I5YB00	Loop S1 error (Path-x, Loop-y)	The error count of LOOP S1 exceeded its threshold value. x : Path # (0-3) y : Loop # (0-1)		–	–
I5YC00	Obstacle ENC detected (Unit-x, ENC-y)	Failed part of backend loop (SENC) was identified. x : Unit ID # (1-29) y : ENC Unit/SENC Unit # (0-1)		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I5YD00	ENC Error [LPF0 occurred]	A fail-over of the SENC internal path occurred.			
I5YE00	ENC Error [SPF occurred]	A SATA port failure occurred.			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5YF00	ENC Error [MPF occurred]	A SATA management port failure occurred.		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I5YG00	Unit# ERR (Unit-x, Loop-y)	An incorrect order of connecting the subsystems (in one of the systems) x : Unit ID # (0-29) y : Loop # (0-1)		① 1. Check if the Power Unit is firmly installed in the subsystem displayed in the message. When no Power Unit is installed, turn off the main switch. 2. Install two Power Units after turning off all the AC Input Power Switches. 3. When the Power Unit is loosely installed, install the Power Unit firmly again after turning off the main switch and turning off all the AC Input Power Switches. 4. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				② 1. Check if the AC Input Power Switch of the subsystem displayed in this message is turned on. When the AC Input Power Switch is turned off, turn off the main switch, and then turn off all the AC Input Power Switches. 2. Turn on the power of the subsystem again.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③ 1. Check if the READY LED on the Power Unit of the subsystem displayed in this message lights up. Check if the power cable is firmly connected to the connector when the READY LED on the Power Unit does not light up.	–
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. When the power cable is loosely connected to the connector, connect the power cable to the connector firmly, and check that the READY LED on the Power Unit lights up.	–
				3. If the READY LED on the Power Unit does not light up yet or there is no problem on the connection of the power cable, check that the power supply can be supplied to the Power Unit.	–
				4. Turn off the main switch, and then turn off all the AC Input Power Switches after checking that the READY LED on the Power Unit lights up.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				5. Turn on the power of the subsystem again.	
				④ 1. Check if the ENC cable is firmly connected to the connector. When the ENC cable is connected to the connector loosely, turn off the main switch, and turn off all the AC Input Power Switches.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Connect the ENC cable to the connector firmly.	
				3. Turn on the power of the subsystem again.	
				⑤ 1. Check if the device ID is set correctly. If the device ID is set incorrectly, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Set the device ID correctly again.	Installation “3.4.7 (1-3) Setting the subsystem identification switch” (INST 03-0521)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Turn on the power of the subsystem again.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				⑥ 1. Check if the subsystem identification switches of all the RKAJs are set as “M” for the RKH/RKM of the Basic Chassis and “S” for the RKS.	Installation “3.4.7 (1-3) Setting the subsystem identification switch” (INST 03-0521)
				2. When the setting of the subsystem identification switch is incorrect, turn off the main switch, and then turn off all the AC Input Power Switches.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				3. Set the subsystem identification switch correctly again.	Installation “3.4.7 (1-3) Setting the subsystem identification switch” (INST 03-0521)
				4. Turn on the power of the subsystem again.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				⑦ Replace the ENC Unit on the Unit ID # and the Loop # side displayed in this message.	Replacement “2.2.9 Replacing ENC Unit/SENC Unit” (REP 02-0830)
				⑧ If it is not recovered yet, perform the trouble analysis for the subsystem displayed in this message according to Troubleshooting “8.1.Trouble Analysis by LED Indication of Front Bezel”.	Troubleshooting “8.1 Trouble Analysis by LED Indication of Front Bezel” (TRBL 08-0000)
I5YJ00	ENC error [SES access error] (Unit-x, ENC-y)	An ENC Unit error (unusable SES drive) occurred. x : Unit ID # (0-29) y : ENC Unit # (0-1)		① When one of the following messages is displayed at the same time, follow the recovery procedure given by the message. • W090xy ENC alarm • W090HH ENC alarm • W090AT SENC alarm • W0GA00 ENC alarm • W0GB00 SENC alarm • W0GC00 ENC alarm • W0GD00 SENC alarm	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5YH00	Unit ADD Connect error (Unit-x, Loop-y)	An incorrect order of connecting the subsystems (Occurred during addition of a subsystem made in the state in which the subsystem power was on.) x : Unit ID # (0-29) y : Loop # (0-1)		① See Troubleshooting "6.1.23 Recover method when illegal ENC cable connection or Additional subsystem failure is detected".	Troubleshooting "6.1.23 Recover method when illegal ENC cable connection or Additional subsystem failure is detected" (TRBL 06-1290)
I5YL00	ENC microprogram download info. [SENC] (Unit-x, ENC-y)	A drive error (5/2x00) was detected when performing the firmware download of the SENC. x : Unit ID # (0-29) y : SENC Unit # (0-1)		① Replace the SENC Unit displayed in the message. However, when the unit ID is "0" and the Basic Chassis is the RKXS, replace the Control Unit on the SENC Unit side displayed in the message (the Control Unit cannot be replaced online).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I5YM00	ENC microprogram download info. [Revision Check NG x] (CTL-y)	Replacement of the ENC firmware was completed normally, however, the microprogram that replaced was not the expected one. x : Download type # (1or7) 1 : SH (MAIN) firmware 7 : SH (BOOT) firmware y : Control Unit # (0-1)		① Replace the Control Unit displayed in the message (the Control Unit cannot be replaced online).	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I5YP00	ENC microprogram download info. [Revision Check NG] (Unit-x, ENC-y)	Replacement of the ENC firmware was completed normally, however, the microprogram that replaced was not the expected one. x : Unit ID # (0-29) y : ENC Unit # (0-1)		① Replace the ENC Unit displayed in the message. However, when the unit ID is "0" and the Basic Chassis is the RKS or the RKM, replace the Control Unit on the ENC Unit side displayed in the message (the Control Unit cannot be replaced online).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I5YPAT	ENC microprogram download info. [SENC] [Revision Check NG] (Unit-x, ENC-y)	Replacement of the SENC firmware was completed normally, however, the microprogram that replaced was not the expected one. x : Unit ID # (0-29) y : SENC Unit # (0-1)		① Replace the ENC Unit displayed in the message. However, when the unit ID is "0" and the Basic Chassis is the RKXS, replace the Control Unit on the SENC Unit side displayed in the message (the Control Unit cannot be replaced online).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5YQ00	Loop errorS1 (Path-x, Loop-y)	Number of the loop S1 errors exceeded its threshold value. x : Path # (0-3) y : Loop # (0-1)		① Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)".	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5YR00	D_PT errorS1 (Unit-x, HDU-y)	Number of the drive S1 errors exceeded its threshold value. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I5YT00	BAD_ALPA error (Unit-x, ENC-y)	The SENC was blocked due to the BAD_ALPA failure. x : Unit ID # (1-29) y : ENC Unit/SENC Unit # (0-1)		① When the message "W090AT SENC alarm" is displayed at the same time, follow the recovery method.	–
I5YU00	SENC errorS1 (Unit-x, ENC-y)	The SENC was blocked due to the PDEV time out failure. x : Unit ID # (1-29) y : SENC Unit # (0-1)			
I5YV00	ENC error inf [CUDG ECTLREGERR, code-x]	The ENC Unit concerned was detached because an ECTL register error occurred during the CUDG of the ENC. x : Reading of the register on the ENC that shows details of an error.		① Since one of the following messages is displayed after this message, take recovery actions according to the message. • W090xy ENC alarm • W090HH ENC alarm • W0GA00 ENC alarm [RKA] • W0GC00 ENC alarm [RKAJ]	–
I5YW00	ENC error inf [ENCCOMERR, code-x]	The ENC Unit concerned was detached because an ENCCOMERR occurred in the ENC. x : Reading of the register on the ENC that shows details of an error.		① When one of the following messages is displayed before this message, take recovery actions according to the message. • W090xy ENC alarm • W090HH ENC alarm • W0GA00 ENC alarm [RKA] • W0GC00 ENC alarm [RKAJ]	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5YX00	ENC error inf [I2CERR code-x]	The ENC Unit concerned was detached because the I2C failure occurred during the CUDG of the ENC. x : Reading of the register on the ENC that shows details of an error.		① Since one of the following messages is displayed after this message, take recovery actions according to the message. • W090xy ENC alarm • W090HH ENC alarm • W0GA00 ENC alarm [RKA] • W0GC00 ENC alarm [RKAJ]	–
I5YY00	ENC error inf [PKERR code-x]	The ENC Unit concerned was detached because a PK failure occurred during the CUDG of the ENC. x : Reading of the register on the ENC that shows details of an error.			
I5YZ0x	CTL recovery failed [TWSI ERR] (CTL-x)	The recovery of the Control Unit failed not because of the TWSI failure of the Control Unit inserted during the recovery operation performed in the state in which the subsystem power was on but because of the TWSI failure of the Control Unit. x : Control Unit # (0-1)	Simpel Trace	① Replace a Control Unit on the opposite side of the Control Unit that was inserted. (The replacement cannot be done when the subsystem power is on.)	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I5Z1xy	Fail bypassed (Path-x, Loop-y)	Loop test terminated normally. x : Path # (0-3) y : Loop # (0-1)		–	–
I5Z2xy	Fail remains (Path-x, Loop-y)	Loop test failed. x : Path # (0-3) y : Loop # (0-1)		–	–
I5Z3xy	Failure search start (Path-x, Loop-y)	The failed part isolation started. x : Path # (0-3) y : Loop # (0-1)		① Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)".	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5Z4xy	Failure search end (Path-x, Loop-y)	The failed part isolation terminated. x : Path # (0-3) y : Loop # (0-1)			
I5Z5xy	Failure check OK (Path-x, Loop-y)	The diagnosis terminated normally (without a failed part). x : Path # (0-3) y : Loop # (0-1)			
I5Z6xy	Failure check NG (Path-x, Loop-y)	The diagnosis terminated abnormally (with a failed part). x : Path # (0-3) y : Loop # (0-1)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I5Z70x	Failure search aborted [NOSES] (Unit-x)	The SES drive cannot be used during the diagnosis. x : Unit ID # (0-14)		① Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)".	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5Z7HH	Failure search aborted [NOSES] (Unit-x)	The SES drive cannot be used during the diagnosis. x : Unit ID # (0-29)			
I5Z8xy	Failure check impossible (Path-x, Loop-y)	The diagnosis for the loop specified could not be done. (That was because the diagnosis was attempted to be done for the undetached loop when either of the main and alternating loops was detached. x : Path # (0-3) y : Loop # (0-1)		① Select the detached loop correctly and execute the diagnosis for it. Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" for the maintenance.	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)
I5Z900	HDD bypass start	HDD bypass start		–	–
I5ZA00	HDD bypass succeeded	HDD bypass succeeded		–	–
I5ZB00	HDD bypass failed	Abnormal termination of a failed drive bypassing		–	–
I5ZD0x	HDD bypass aborted [NO SES] (Unit-xx)	The SES drive was disabled during a bypassing. x : Unit ID # (0-14)		–	–
I5ZDHH	HDD bypass aborted [NO SES] (Unit-xx)	The SES drive was disabled during a bypassing. x : Unit ID # (0-29)		–	–
I5ZE00	HDD bypass end	The failed drive bypassing ended.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6010x	LAN failure (CTL-x)	The LAN state is invalid. x : Control Unit # (0-1)		① Confirm the LAN cable.	–
				② A Replace the Control Unit of the No. indicated with x.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I60200	Link failure [LIMIT OVER]	Link failures were detected more than the threshold value.	Simple Trace	① When the failure occurs during addition of the RKAJ made in the state in which the subsystem power is on, make sure of the procedure referring to Addition/Subtraction/Relocation "1.6 Adding the Additional Subsystem to the Rack Frame".	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				② When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x "CTL alarm" • W060xy, W060HH, W0GG00, W0GH00 "HDU alarm" • W060AT "SATA HDU alarm" • W061xy, W061HH, W0GJ00, W0GK00 "Spare HDU alarm" • W061AT "SATA Spare HDU alarm" • W090xy, W090HH, W0GA00, W0GC00 "ENC alarm" • W090AT, W0GB00, W0GD00 "SENC alarm" • I301xy, I301HH "HDU error" • I301AT "SATA HDU error"	–
				③ Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)".	Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I603xy	Obstacle part unknown (Path-x, Loop-y)	Failed part was not identified by Loop diagnosis. x : Path # (0-3) y : Loop # (0-1)	Simple Trace	① When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x “CTL alarm” • W060xy, W060HH, W0GG00, W0GH00 “HDU alarm” • W060AT “SATA HDU alarm” • W061xy, W061HH, W0GJ00, W0GK00 “Spare HDU alarm” • W061AT “SATA Spare HDU alarm” • W090xy, W090HH, W0GA00, W0GC00 “ENC alarm” • W090AT, W0GB00, W0GD00 “SENC alarm” • I301xy, I301HH “HDU error” • I301AT “SATA HDU error”	–
				② Refer to Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)”.	Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)” (TRBL 06-0600)
I604xy	ENC recovery NG HDU-NG (Unit-x, HDU-y or z)	Since a Disk Drive (y or z) connected to an ENC to be recovered had a failure, this ENC was not recovered. (Additional Chassis) x : Unit ID # (1-14) y or z : Disk Drive # (0/2, 1/3)	Simple Trace	① Replace the Disk Drive (y or z) to recover it, then insert the ENC Unit again.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050)
I604HH	ENC recovery NG HDU-NG (Unit-x, HDU-y or z)	Since a Disk Drive (y or z) connected to an ENC to be recovered had a failure, this ENC was not recovered. (Additional Chassis) x : Unit ID # (0-29) y or z : Disk Drive # (0-14)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I605xy	ENC recovery NG ENC-NG (Unit-x, ENC-y)	Since an ENC to be recovered had a failure, it was not recovered. (Additional Chassis) x : Unit ID # (1-14) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	① Replace the ENC Unit on which the EALM LED lights up.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I605HH	ENC recovery NG ENC-NG (Unit-x, ENC-y)	Since an ENC to be recovered had a failure, it was not recovered. (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace		
I6050x	ENC recovery NG ENC-NG (CTL-x)	Since an ENC to be recovered had a failure, it was not recovered. (Basic Chassis) x : Control Unit # (0-1)	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I606xy	ENC Thermal alarm (Unit-x, ENC-y)	Because a temperature error was detected in the ENC of the extended subsystem, the ENC concerned was blocked. x : Unit ID # (1-14) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	① Check if the environment is set in accordance with the specifications. ② Check if the fan is not in the state in which it has been given an alarm. ③ Replace the ENC Unit whose EALM LED is on.	–
I606HH	ENC Thermal alarm (Unit-x, ENC-y)	Because a temperature error was detected in the ENC of the extended subsystem, the ENC concerned was blocked. x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace		Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I6070x	CACHE error over (CACHE-x) [CRECT]	The number of cache correctable error occurrences exceeded its threshold value in the DMA transfer. (during the single system operation.) x : Cache Unit slot # (0-3)		① Remove the Cache Unit in which the failure occurred after the sequential shutdown.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
I60800	LU change over	The LU switching occurred frequently.		① Check the access paths from the host computer to each LU again and make accesses to the each LU done by the Control Unit having the owner right.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I609xy	ENC cable error (Unit-x, ENC-y)	The cable disconnection caused a blockade of the corresponding ENC. x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simple Trace	① Insert the ENC cable again, and then remove and insert the blocked ENC.	–
I609HH	ENC cable error (Unit-x, ENC-y)	The cable disconnection caused a blockade of the corresponding ENC. x : Unit ID # (0-29) y : ENC Unit # (0-1)	Simple Trace		
I60D0x	Data pool enough free (Data pool-x)	The use rate of the pool went down below the PFUS cancellation threshold value specified by the user. x : pool # （0, 1）	Simple Trace	–	–
I61000	ENC error inf. [parity error]	Because a parity error occurred in the ENC, the ENC concerned was blocked.		–	–
I61700	ENC error inf. [CUDG ECTLREGERR]	Because a CUDG ECTL register error occurred in the ENC, the ENC concerned was blocked.		–	–
I61800	ENC error inf. [CUDG SRAMERR]	Because a CUDG SRAM parity error occurred in the ENC, the ENC concerned was blocked.		–	–
I61900	ENC error inf. [CUDG ENCCOMERR]	Because a CUDG ENCCOM error occurred in the ENC, the ENC concerned was blocked		–	–
I61A00	ENC error inf. [ENCCOMERR]	Because an ENCCOM error occurred in the ENC, the ENC concerned was blocked.		① When one of the following messages is displayed at the same time, follow the recovery procedure given by the message. • W0GA00 ENC alarm • W0GB00 SENC alarm • W0GC00 ENC alarm • W0GD00 SENC alarm	–
I61B00	ENC error inf. [ECTL force test]	Because a parity error occurred in the ENC, the ENC concerned was blocked.		–	–
I61C00	SES error inf. [SES-HDU error]	The ENC was blocked because both of the two SES drives became unable to access the ENC.		–	–
I61D00	Shutdown Warning	The cache volatilized because the previous sequential shutdown had not been executed.		① From the next time on, turn off the power using the main switch.	–
I61E00	PIN-over [Forced parity correction]	A parity correction was terminated because an amount of pinned data exceeded its threshold value.	Simpel Trace	–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I61F00	ENC error inf. [CUDG ENC RDYTOV]	A ready time-out of the ENC in another system was detected.		–	–
I6200x	Link error in the attached link (Port-x)	Link failures occurred more times than the threshold value in the link, to which the port concerned is connected, within a certain period. x : Port # (A-D)	Simpel Trace	① Refer to the Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I621xy	Link error in the path	The illegal transferred data length occurred more times than the threshold value within a certain period caused by a failure that had occurred in the path concerned. x : Path # (0-3) y : Target ID (0)	Simpel Trace		
I6220x	Link down time-out (Port-x)	A state in which no link up is done has kept on longer than the regulated time at the port for which a path has been set. x: Port # (A-D)	Simpel Trace		
I62300	Path not connected	<In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW. <In the case of RKS/RKXS configuration > At either following condition, the path was detached. • The microprogram version less than 0760/A on remote DF (RKS/RKXS) was applied. • The 4Gbps FC Interface Board on remote or local DF (RKS/RKXS) was not added.	Simple Trace		
I62400	Path login resource shortage	Insufficiency of a resource of the remote DF was reported in a response from the PLOGI when a log-in to the set path was done.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6250x	Fabric connection failed (Port-x)	The sending and response of FLOGI, PLOGI, RSCN, etc. to the SW terminated abnormally when a log-in to the set path was done in the case of the connection via the SW. x : Port # (A-D)	Simple Trace	① Refer to the Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I62600	Path login failed	Sending and response of PLOGI and PRLI done at the time of a log-in to the set path terminated abnormally.	Simple Trace		
I62700	Link down time-out [Path]	To a port for which a path has been set but no link up to the path has been done for longer than the regulated time, a setting of another path was requested.	Simple Trace		
I62800	Path alarm for CTL alarm	The path was detached as a result of the CTL detachment.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I62900	Remote equipment ID error	Path detach occurred due to inconsistency of remote equipment IDs.	Simple Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I62B00	Port un-mounting error	A path detachment occurred because the port was not installed.	Simple Trace		
I62D00	Remote option disable [TrueCopy Basic]	A path detachment occurred because the optional TrueCopy remote replication function of the remote DF was locked.	Simple Trace		
I63000	Write uncompleted block detected	An incomplete writing was detected at the time of the staging in a data copying from the primary LU to the secondary LU.	Simple Trace	① Reformat the LU concerned.	System Parameter "3.3 [Procedure ③-F] Formatting LU" (SYSPR 03-0280)
I64000	Simple trace failed	The simple trace failed because an RAM disk was not created.		① Perform the deliberate shutdown. ② Then power on the subsystem and collect the simple trace again after the subsystem becomes ready.	– –
I64100	Simple trace interrupt	The simple trace was interrupted because an automatic dump was performed.	Simple Trace	① Wait for a while (about ten minutes) and collect the simple trace again.	–
I69000	E-Mail parameter set failed	A setting of the E-mail parameters failed when making initial settings of the E-mail.	Simple Trace	① Check the E-mail parameters and make the setting again.	–
I69100	E-Mail send failed	A sending of a mail for informing of a failure occurrence failed.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6A000	ENC error inf. [REGPERR]	The ENC concerned was detached because a REGPERR occurred in the ENC.		–	–
I6A100	ENC error inf. [RAMPER]	The ENC concerned was detached because a RAMPER occurred in the ENC.		–	–
I6A200	ENC error inf. [WDTCNTPERR]	The ENC concerned was detached because a WDTCNTPERR occurred in the ENC.		–	–
I6B0xy	ENC recovery NG Loop-NG (Unit-x, ENC-y)	An ENC recovery failure (Additional Chassis) x : Unit ID # (1-14) y : ENC Unit # (0-1)		① Collect Simple trace and contact the Technical Support Center.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
I6B0HH	ENC recovery NG Loop-NG (Unit-x, ENC-y)	An ENC recovery failure (Additional Chassis) x : Unit ID # (0-29) y : ENC Unit # (0-1)			
I6D00x	Data pool no free (Data pool-x)	The free capacity of the pool ran short. x : pool # (0, 1)	Simple Trace	–	–
I6D10x	Data pool threshold over (Data pool-x)	The use rate of the pool exceeded its threshold value specified by the user. x : pool # (0, 1)	Simple Trace	① Secure the data pool free capacity	–
I6D300	Unreadable PIN resisted (Unit-x, HDU-y, LU-z)	The write incomplete area was registered in the P-VOL because there was the unreadable area in the pool LU during the restoration of the P-VOL of Copy-on-write SnapShot. Or the incomplete write was registered in the S-VOL because there was the unreadable area in the pool LU when restoring the S-VOL due to S-VOL-Takeover as a result of executing the [horctakeover] command with TrueCopy Extended Distance. x : Unit ID # (0-29) y : Disk Drive # (0-14) z : LU # (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.16 The incomplete write area was registered in the restored VOL".	Troubleshooting "6.1.16 The incomplete write area was registered in the restored VOL" (TRBL 06-1120)
I6D400	Remote path setting unsupported on the remote Subsystem	The version of the microprogram on the secondary side does not support to make a path extending over subsystems of different models.	Simple Trace	① The configuration is not supported by the Microrevision installed in the subsystem. Check the configuration again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6D500	PSUE occurred [TrueCopy Basic]	The subsystem was started up with the cache that had volatilized owing to a power failure when a TrueCopy remote replication pair is in the status other than SMPL.	Simple Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I6D600	SENC error [Queue Full] (Unit-x, ENC-y)	The Queue Full occurred and the count of SENC errors exceeded its threshold value. x : Unit ID # (1-29) y : SENC Unit # (0-1)		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I6D700	SENC error [Communication Path] (Unit-x, ENC-y)	The SENC was detached because of a communication path failure. x : Unit ID # (1-29) y : SENC Unit # (0-1)		① Replace the SENC Unit concerned whose EALM LED is on. ② If the failure is not solved, replace the SENC Unit on the opposite side. ③ If not recovered yet, call the Technical Support Center for coping with troubles.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I6D800	Disk initialization error (Unit-x, ENC-y)	The Disk initialization error occurred and the count of SENC errors exceeded its threshold value. x : Unit ID # (1-29) y : SENC Unit # (0-1)		① Replace the SENC Unit concerned whose EALM LED is on.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I6D900	SENC logic error (Unit-x, ENC-y)	SENC self contradiction. x : Unit ID # (1-29) y : SENC Unit # (0-1)			
I6DA00	CDB check code error (Unit-x, ENC-y)	The Check code error occurred and the SENC was detached. x : Unit ID # (1-29) y : SENC Unit # (0-1)			
I6DB00	Unit Type Error (Unit-x)	A unit of inappropriate FC/SATA type was added. x : Unit ID # (1-29)		① Check the type and connection of the unit.	–
I6DC00	ENC error inf. [SES access error]	SES access to the ENC concerned resulted in an error.		–	–
I6DD00	HDU error over (Unit-x, HDU-y) [LNKTO]	The error count of a disk at a location shown as xy exceeded its threshold value because of a drive link error (time-out) of online verification. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6DE00	HDU error over (Unit-x, HDU-y) [LNKUT]	The error count of a disk at a location shown as xy exceeded its threshold value because of a drive link error (other than a time-out) of online verification. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
I6DF00	HDU error over (Unit-x, HDU-y) [ONVLNKTO]	The error count of a disk at a location shown as xy exceeded its threshold value because of a drive link error (time-out) of online verification. x : Unit ID # (1-29) y : Disk Drive # (0-14)			
I6DG00	HDU error over (Unit-x, HDU-y) [ONVLNKUT]	The error count of a disk at a location shown as xy exceeded its threshold value because of a drive link error (time-out) of online verification. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I6DH00	Staging failed [Forced parity correction] (LU-x)	The correction cannot be made because the forced parity correction is in progress. x : LU # (0-4095)	Simple Trace	① Get the simple trace after the forced parity correction is completed and contact the department for coping with troubles.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
I6DJ00	Forced parity correction LU is gone	The LU that required the forced parity correction disappeared.		–	–
I6DK00	Incomplete differential data detected	An incomplete DDCB was detected in the cascade connection of Copy-on-write SnapShot with TrueCopy remote replication/TrueCopy Extended Distance.	Simple Trace	① Split the TrueCopy remote replication/TrueCopy Extended Distance pair. When forming the pair again, form a Copy-on-write SnapShot pair first and then form a TrueCopy remote replication/TrueCopy Extended Distance pair.	–
I6DL00	P-VOL read failed [TrueCopy Basic]	The P-VOL became unable to be read.			
I6DM00	QuickShadow SMPL command received [TrueCopy Basic]	Copy-on-write SnapShot received a command to split its pair.			
I6DN00	Uncorrectable forced parity correction LU is gone	The LU, the forced restoration for which by means of parity could not be continued, disappeared.		–	–
I6DP00	Bitmap Data Error [TrueCopy Basic]	Data of a TrueCopy remote replication pair may have been lost.		① Split a pair whose LU, which is in RAID 1 or RAID 1+0 TC and has a capacity of 1 T bytes or larger, is in the PSUE status. If an LU next to the LU concerned is in the PSUE status, split it also.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6DQ00	Unit ADD start FAIL [Online micro-update]	The start of the addition of the Additional Chassis with the subsystem power turned on failed because the microprogram replacement is being executed with the subsystem power turned on.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Complete the replacement of the microprogram with the subsystem power tuned on.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I6DR00	Unit ADD start FAIL [cable error] (Loop-x)	The addition of the RKAJ/RKA with the subsystem power turned on failed because the ENC cables necessary for adding the loop displayed in the message are not connected. x : Loop # (0-1)		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Check the connection method to connect two ENC cables necessary for adding the loop displayed in the message correctly.	Addition/Subtraction/ Relocation "1.6.2 (2) Connecting ENC cables (on the Loop #0 side)" (ADD 01-0650)
				3. Replace the ENC cables when there is no error in the connection method of the ENC cables.	Replacement "2.2.10 Replacing ENC cable "(REP 02-0910)
				4. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I6DS00	Cable connection detected (Unit-x, ENC-y, Path-z)	The ENC cable was connected to the ENC Unit path of the subsystem. x : Unit ID # (1-29) y : SENC Unit # (0-1) z : Path # (0-3)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6DY00	Drive Response Diag NG (Unit-x, HDU-y)	Drive response time delay was detected. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	–	–
I6DZ00	Unit missing (Unit-x, Loop-y)	Position mapping mismatch was detected (the subsystem unit was missing). x : Unit ID # (0-29) y : Loop # (0 or 1)		①If this message is displayed for both loops of the same Unit #, perform ②, ③ and ④. If it is displayed for only one loop, perform ④.	–
				②Analyze the failure following Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" for the Unit # concerned.	Troubleshooting "8.1 Trouble Analysis by LED Indication of Front Bezel" (TRBL 08-0000)
				③Check the mounting and connecting conditions of the subsystem.	–
				④Follow the recovery method of "W080xy Loop alarm".	–
I6E000	Unit ADD ENC INIT data error [PRESESWRERR, code-x]	The SES Write error occurred in the ENC initial setting during addition of the RKAJ made in the state in which the subsystem power was on. x : Reading of the register on the ENC that shows details of an error.		①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I6E100	Unit ADD ENC INIT data error [SHERR, code-x]	The SES Read error occurred in the ENC initial setting during addition of the RKAJ made in the state in which the subsystem power was on. x : Reading of the register on the ENC that shows details of an error.		2. Replace the ENC Units corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the RKAJ again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6E200	ENC error inf [PRESESWRERR, code-x]	The SES Write failure occurred during the CUDG on the ENC. x : Reading of the register on the ENC that shows details of an error.		① Do maintenance work following the message displayed after this message. • W090xy ENC alarm • W090HH ENC alarm • W0GA00 ENC alarm [RKA] • W0GC00 ENC alarm [RKAJ]	–
I6E300	ENC error inf [SHERR, code-x]	The SES Read failure occurred during the CUDG on the ENC. x : Reading of the register on the ENC that shows details of an error.			
I6E400	Ownership change by LU failed (LU-x)	The change of the LU unit failed because of the heavy I/O load given by a host computer. x : LU # (0-4095)	Simpel Trace	① Try again after giving some pause to operation of Storage Navigator Modular or RAID Manager. ② When operation of RAID Manager failed, a pair status of TrueCopy remote replication, TrueCopy Extended Distance, ShadowImage in-system replication, or Copy-on-write SnapShot has been changed to PSUE. Therefore, change the status from PSUE first. ③ When the operation is not successful after trying it twice, stop the job and then perform the operation.	–
I6E500	TWSI access error [Read, XX-YY-AA-BB]	An error was detected during the I2C reading. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simpel Trace	–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6E600	TWSI access error [Write, XX-YY-AA-BB]	An error was detected during the I2C writing. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simpel Trace	–	–
I6E700	TWSI access error [3 times reading, XX]	The triple reading error was detected during the I2C reading. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted	Simple Trace	–	–
I6E800	Unit ADD ENC INIT data error [ENCCOMERR, code-x]	During addition of the RKAJ that was made in the state in which the subsystem power was on, the ENCCOMERR occurred in the ENC of it. x : Reading of the register on the ENC that shows details of an error.	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I6E900	Unit ADD ENC INIT data error [CUDGECTLREG, code-x]	The SWCUDG error (E-CTL Register error) occurred in the ENC initial setting during addition of the RKAJ that was made in the state in which the subsystem power was on. x : Reading of the register on the ENC that shows details of an error.	Simple Trace	2. Replace the ENC Units corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
I6EA00	Unit ADD ENC INIT data error [TWSIERR, code-x]	The TWSI error occurred in the ENC initial setting during addition of the RKAJ that was made in the state in which the subsystem power was on. x : Reading of the register on the ENC that shows details of an error.	Simple Trace	3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6EB00	Unit ADD ENC INIT data error [PKERR, code-x]	The PK error occurred in the ENC initial setting during addition of the RKAJ that was made in the state in which the subsystem power was on. x : Reading of the register on the ENC that shows details of an error.	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Units corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I6EE01	PS status (Unit-x, PS-y) [PS]	Detailed information on the trouble in the AC/DC Power Unit is shown. x : Unit ID # (0-29) y : Power Unit # (0 or 1)		① Since one of the following messages is displayed after this message, take recovery actions according to the message. • W050xy PS alarm • W05100 PS alarm • W052HH PS alarm • W0G400 PS alarm • W0G500 PS alarm • W0G600 PS alarm • W0G700 PS alarm	–
I6EE02	PS status (Unit-x, PS-y) [FAN0]				
I6EE03	PS status (Unit-x, PS-y) [PS, FAN0]				
I6EE04	PS status (Unit-x, PS-y) [FAN1]				
I6EE05	PS status (Unit-x, PS-y) [PS, FAN1]				
I6EE06	PS status (Unit-x, PS-y) [FAN0, FAN1]				
I6EE07	PS status (Unit-x, PS-y) [PS, FAN0, FAN1]				
I6EE08	PS status (Unit-x, PS-y)				

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6EF00	Forced parity correction LU changed status	Because the forced parity correction was executed or skipped, the LU that was in the forced parity correction status of Unrestored 1 (which indicates that an instruction to execute or skip the forced parity correction is required), no longer exists.		–	–
I6EG00	PIN over recovered [directory threshold] (DIR-x)	The excess of the threshold value of pinned data in each directory was solved. (Directory: Unit of cache domain management) x : Directory # (0 or 1)		–	–
I6EH00	PIN over recovered [partition threshold] (DIR-x, PTT-y)	The excess of the threshold value of pinned data in each partition was solved. x : Directory # (0 or 1) y : Partition # (0-31)		–	–
I6EJ00	PIN over recovered [RAID group threshold] (DIR-x, RG-y)	The excess of the threshold value of pinned data in a RAID group was solved. x : Directory # (0 or 1) y : RAID group # (0-89)		–	–
I6EK00	DM-LU canceled (LU-x)	The write disabled DM-LU was cancelled (Display of the DM-LU cancellation message). x : LU # (0-4095)		–	–
I6EL00	DM-LU read failed	When the subsystem was booted, reading from the DM-LU failed owing to a trouble such as a drive error.	Simple Trace	① Replace the Disk Drive pointed out in the message, "HDU alarm. (Resolve the pair and reform it.)	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
I6EM00	DM-LU recovered (LU-x)	The DM-LU was recovered from the trouble. x : LU # (0-4095)		–	–
I6EN00	DM-LU write enable	The deliberate shutdown was enabled because the DM-LU, which was accessible for writing, was created.		–	–
I6EP00	Changing to Single Mode failed as Cache Partition Manager is enable	The system start attribute was changed although the Cache partition management function was effective.	Simple Trace	① Restore the system start attribute.	System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0040)
	Changing to Dual Active Mode failed as Cache Partition Manager is enable			② Restart the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6EQ00	HDU path error (Unit-x, HDU-y)	The SENC Unit was detached in order to switch the path because the Path CTL error was detected. x : Unit ID # (0-29) y : Disk Drive # (0-14)		① When "W060AT SATA HDU alarm" or "W061AT SATA Spare HDU alarm" is displayed before this message, replace the Disk Drive displayed in the message.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				② Perform the dynamic sparing to the Disk Drive displayed in this message after performing ①.	Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330)
				③ Replace the Disk Drive which the dynamic sparing was performed.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				④ Replace the SENC Unit pointed out in a message displayed following this message. • W090xy ENC alarm • W090HH ENC alarm • W090AT SENC alarm • W0GB00 SENC alarm [RKAAT] • W0GD00 SENC alarm [RKAJAT]	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
I6ER00	Modular Volume Migration failed (LU-x/y)	One Modular Volume Migration terminated abnormally. x : Internal LU # of the P-VOL (0-4095) y : Internal LU # of the S-VOL (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.26 Recovery method of the Modular Volume Migration which terminated abnormally".	Troubleshooting "6.1.26 Recovery method of the Modular Volume Migration which terminated abnormally" (TRBL 06-1320)
I6ES00	Modular Volume Migration failed	One or more Modular Volume Migrations terminated abnormally.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6ET0x	DRAM error over [ECC 1 bit error] [REGF10014D0, Bit0] (CTL-x)	The number of occurrences of the correctable errors in DRAM exceeded the threshold value. x : Control Unit # (0-1)	Simple Trace	①1. In case where the subsystem is a dual controller system, if the Control Unit number displayed in this message is “0”, the loop#0 is blocked, and if the Control Unit number is “1”, the loop#1 is blocked, so that recover those loops first. A trigger that the loop is blocked is any of the Control Unit blockade, the ENC blockade and the loop failure whose failed part is difficult to be determined. The message corresponding to each is displayed, so that perform the maintenance according to the message. • In case of the Control Unit blockade “W0100x CTL alarm” • In case of the ENC blockade ”W090xy ENC alarm” ”W090HH ENC alarm” ”W090AT SENC alarm” • In case of the loop failure ”W080xy Loop alarm”	–
				2. Replace the Control Unit displayed in this message.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				②1. In case where the subsystem is a single controller system, execute the planned shutdown of the subsystem. The subsystem is operating, so that decide the opportunity to execute the planned shutdown of the subsystem consulting with the customer/SE.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Replace the Control Unit.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				3. Turn on the power of the subsystem.	Installation “1.7.1 Subsystem power on” (INST 01-0290)
I6EU0x	SRAM error over [ECC 1 bit error] [REGF1000388, Bit0] (CTL-x)	The number of occurrences of the correctable errors in SRAM exceeded the threshold value. x : Control Unit # (0-1)	Simple Trace	①1. In case where the subsystem is a dual controller system, if the Control Unit number displayed in this message is “0”, the loop#0 is blocked, and if the Control Unit number is “1”, the loop#1 is blocked, so that recover those loops first. A trigger that the loop is blocked is any of the Control Unit blockade, the ENC blockade and the loop failure whose failed part is difficult to be determined. The message corresponding to each is displayed, so that perform the maintenance according to the message. • In case of the Control Unit blockade “W0100x CTL alarm” • In case of the ENC blockade ”W090xy ENC alarm” ”W090HH ENC alarm” ”W090AT SENC alarm” • In case of the loop failure ”W080xy Loop alarm”	–
				2. Replace the Control Unit displayed in this message.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				② 1. In case where the subsystem is a single controller system, execute the planned shutdown of the subsystem. The subsystem is operating, so that decide the opportunity to execute the planned shutdown of the subsystem consulting with the customer/SE.	–
				2. Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				3. Turn on the power of the subsystem.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
I6EV0x	Drive spin down canceled [ERR-x] (RG-y)	The instruction of the spin-down of the Disk Drive to aim at the power saving was accepted from Storage Navigator Modular. x : Factor code 1 : Failure due to the I/O from the host 2 : Failure due to the copy system PP command existed 3 : Failure due to the I/O from the host and the copy system PP command existed 4 : Failure due to the failure occurrence y : RAID group # (0-89)	Simple Trace	① 1. When the factor code is one, a command is issued from the initiator for the LUs created in the RAID Group displayed in the message, so that stop all the operations which use these LUs, and request the customer/SE to change the customer's system to the status that the command is not issued to these LUs.	–
				2. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				② 1. When the factor code is two, the operation of the copy system function (one of Modular Volume Migration, TrueCopy Extended Distance, TrueCopy remote replication, copy-on-write SnapShot and ShadowImage in-system replication, or two or more functions) of the priced option is being executed from RAID Manager for the LUs created in the RAID Group displayed in the message, so that wait for the maintenance work until the processing of the copy system function for these LUs is completed.	–
				2. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	–
				③ 1. When the factor code is three, the operation of the copy system function (one of Modular Volume Migration, TrueCopy Extended Distance, TrueCopy remote replication, copy-on-write SnapShot and ShadowImage in-system replication, or two or more functions) of the priced option is being executed from RAID Manager for the LUs created in the RAID Group displayed in the message, so that wait for the maintenance work until the processing of the copy system function for these LUs is completed.	–
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. A command is issued from the initiator for the LUs created in the RAID Group displayed in the message, so that stop all the operations which use these LUs, and request the customer/SE to change the customer's system to the status that the command is not issued to these LUs.	–
				3. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	–
				④ 1. When the factor code is four, one of the following message codes is displayed in the Information Message of WEB. Perform the maintenance according to the recovery method of the message code. • I301xy HDU error (Unit-x, HDU-y) • I301HH HDU error (Unit-x, HDU-y) • W0G0xy Unreadable PIN detected (Unit-x, HDU-y) • W0G100 Unreadable PIN detected (Unit-*, HDU-*) • W12000 User data lost (LU-x) • W49100 PIN is over directory threshold [write through] (DIR-x) • W49300 PIN is over partition threshold [write through] (DIR-x, PTT-y) • W49500 PIN is over RAID group threshold [write through] (DIR-x, RG-y)	–
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	–
I6EW0x	NNC the version of Data Control Modular to be installed is not supported (NNC-x)	The NAS OS of NNC (NAS Unit) displayed in the message does not support Data Control Modular of the version to be installed. x : NNC (NAS Unit) # (0-3)	Simple Trace	① Install the Data Control Modular of the latest version (05-00 or later) supported by the NAS OS of NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "Chapter 3 NAS installation" (NAS 03-0000)
I6EX0x	NNC NAS unit type does not match the other NAS unit type in the cluster (NNC-x)	It failed to start because the model name of NNC (NAS Unit) displayed in the message is different from that of the other NNC (NAS Unit) of the cluster. x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the NAS Chassis so that the model names of NNCs (NAS Units) match between the clusters.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
I6EY00	Power saving recovery failed and power saving of the disk drives was canceled (RG-x)	The post-processing of the failure of the Disk Drives to which the spin-down of the power saving was set terminated abnormally. Therefore, the spin-down setting of the power saving for the RAID Group displayed in the message was cancelled. x : RAID group # (0-89)	Simple Trace	① 1. When the factor code is four, one of the following message codes is displayed in the Information Message of WEB. At first, remove the PIN segment according to the recovery method of the message code. • W49100 PIN is over directory threshold [write through] (DIR-x) • W49300 PIN is over partition threshold [write through] (DIR-x, PTT-y) • W49500 PIN is over RAID group threshold [write through] (DIR-x, RG-y) • W0G0xy Unreadable PIN detected (Unit-x, HDU-y) • W0G100 Unreadable PIN detected (Unit-*, HDU-*)	–
				2. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6EZ00	Health check failed and power saving of the disk drives was canceled (RG-x)	The health check for the power saving Disk Drives which were spin-down terminated abnormally due to the drive failure. Therefore, the spin-down setting of the power saving for the RAID Group displayed in the message was cancelled. x : RAID group # (0-89)	Simple Trace	①1. When the factor code is four, one of the following message codes is displayed in the Information Message of WEB. At first, remove the PIN segment according to the recovery method of the message code. • W49100 PIN is over directory threshold [write through] (DIR-x) • W49300 PIN is over partition threshold [write through] (DIR-x, PTT-y) • W49500 PIN is over RAID group threshold [write through] (DIR-x, RG-y) • W0G0xy Unreadable PIN detected (Unit-x, HDU-y) • W0G100 Unreadable PIN detected (Unit-*, HDU-*) 2. Request the customer/SE to execute the spin down of the Disk Drive to aim at the power saving from Storage Navigator Modular again.	– –

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6F00x	NNC Start-up process of NAS Dump collection failed (NNC-x)	The instruction to collect the NAS Dump was issued to the NNC (NAS Unit), but there was no response from the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	NAS Log	① 1. Check if the PCI-Express cable and the CTRL cable connecting the NNC (NAS Unit) displayed in this message and the NAS Interface Board are firmly connected.	–
				2. If they are not connected firmly, connect the PCI-Express cable and the CTRL cable firmly again.	–
				3. Collect the NAS Dump again.	Troubleshooting “7.7 NAS Dump collection” (TRBL 07-0280)
				② 1. Replace all the NAS Interface Board, the PCI-Express cable, the CTRL cable and the NNC (NAS Unit) because a communication failure between the NAS Interface Board and the NNC or an NNC failure is considered.	•Replacement “2.2.7 Replacing Interface Board” (REP 02-0660) •Replacement “2.3.5 Replacing the NAS Interface cable” (REP 02-1200) •DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
I6F100	NNC Stop the NAS OS because the resource group might be going illegal [xy] (NNC-z)	Stop the NAS OS because there is fear that the resource group may become an illegal status. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	NAS Log	①Maintain it according to the instruction of the “DF700 NAS SOFTWARE Maintenance Manual”.	DF700 NAS SOFTWARE Maintenance Manual “7.6.22 ” (NAS 07-1810)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6F20x	NNC NAS OS cannot be installed because there is no NAS System LU (NNC-x)	The NAS system LU, which is necessary for installing the NAS OS, is not set. x : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Set the NAS system LU. 2. Install the NAS OS.	System Parameter "3.7 Allocation of the system LU/user LU of the NAS" (SYSPR 03-0440) DF700 NAS SOFTWARE Maintenance Manual "3. NAS Installation" (NAS 03-0000)
I6F300	NNC Extension card type is not the same in the cluster (Slot-v, NNCw-x, NNCy-z)	The type of the interface card installed in the extended slot of the NNC (NAS Unit) displayed in the message is different between the clusters. v : Extended slot # (0-2) w-x : NNC (NAS Unit) # ww : Own NNC (NAS Unit) # (0-1) xx : Another NNC (NAS Unit) # (2-3) y-z : Interface card type # yy : Card type of own NNC (NAS Unit) zz : Card type of another NNC (NAS Unit) (The card type is converted into the following character strings.) 0 : Space, 1 : ECS, 2 : ECT, 3 : FCC	Simple Trace	① 1. Request the execution of the fail-over to the customer. 2. Stop the NAS OS of the NNC (NAS Unit) in which the wrong type of the Extension card is installed. 3. Install the correct type of the Extension card again in the extended slot of the NNC (NAS Unit) which stopped the NAS OS. 4. Restart the NAS OS of the NNC (NAS Unit) in which the Extension card was installed again.	NAS Manager Modular User's Guide Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320) DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120) Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
I6F400	NNC It takes time for a while to collect NAS Dump [xy] (NNC-z)	It takes time to store the NAS Dump in the Dump LU because the load of the Control Unit is heavy. This message is output every 10 minutes since it started to store the NAS Dump in the Dump LU, and indicates that the internal processing continues without hang-up. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		① 1. If this message is displayed when downloading the NAS Dump, wait until the message code "I6F500 NNC NAS Dump had been collected and stored in Dump LU [xy] (NNC-z)" is displayed. 2. Collect the NAS Dump when the NAS Dump is specified by acquiring the failure information on the message code corresponding to the failure that became the factor of NNC alarm or NNC partial alarm.	– Troubleshooting "7.7 NAS Dump collection" (TRBL 07-0280)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I6F500	NNC NAS Dump had been collected and stored in Dump LU [xy] (NNC-z)	The NAS Dump was created and stored in the Dump LU. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		① Collect the NAS Dump when the NAS Dump is specified by acquiring the failure information on the message code corresponding to the failure that became the factor of NNC alarm or NNC partial alarm.	Troubleshooting "7.7 NAS Dump collection" (TRBL 07-0280)
I6F6xy	NNC The power cable is not connected to the Power Unit (NNC-x, PS-y)	The power cable is not connected to the Power Unit of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : PS # (0-1)		① Connect the power cable to the Power Unit of the NNC (NAS Unit).	Installation "3.4.17 Connecting the power cable for the NAS" (INST 03-0770)
I6F7xy	NNC The power cable was connected to the Power Unit (NNC-x, PS-y)	The power cable was connected to the Power Unit of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3) y : PS # (0-1)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I70000	Path switch status error (Unit-x, ENC-y)	Abnormality was detected in the PATH information of the Additional Chassis. x : Unit ID # (1-29) y : ENC Unit # (0-1)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Check if the subsystem recognition switch of the RKAJ displayed in the message is set correctly. Also, check it for all the RKAJs to be added. When the subsystem recognition switch is set incorrectly, set it correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit displayed in the message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the Additional Chassis displayed in the message.	Replacement "2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I70100	Backend down [Path switch status error] (Unit-x, ENC-y)	Abnormality was detected in the setting of the PATH information in the Additional Chassis at the time of turning on the subsystem power. x : Unit ID # (1-29) y : ENC Unit # (0-1)	Simpel Trace	① 1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Check if the subsystem identification switch of the added RKAJ is set to"M" when the Basic Chassis is the RKH/RKM and "S"when it is the RKS. When the setting of the subsystem recognition switch is incorrect, set the subsystem recognition switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				4. Turn on the subsystem power.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				② 1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Replace the ENC Unit #0 of the RKAJ which failed the addition.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				4. Turn on the subsystem power.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				③ 1. Turn off the main switch.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. When the unit# displayed in the message this time and the unit# displayed in the previous message differ, return to ② and maintain it.	–
				4. When the unit# displayed in the message this time and the unit# displayed in the previous message are the same, replace the ENC Unit #1 of the RKAJ which the addition failed.	Replacement “2.2.9 Replacing ENC Unit/ SENC Unit” (REP 02-0830)
				5. Turn on the subsystem power.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				④ 1. Turn off the main switch.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Replace the RKAJ in which the addition failed.	Replacement “2.2.12 Replacing Additional Chassis of Rack Mount Style” (REP 02-0990)
				4. Turn on the subsystem power.	Installation “1.7 Power On/Off Procedure” (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I70200	Backend down [Unit type error] (Unit-x, ENC-y)	Abnormality of the connected frame was detected. x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simpel Trace	① Replace the frame having the unit number concerned with a connectable frame and restart the new frame.	Replacement "2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990)
I70300	Unit type error (Unit-x, ENC-y)	A unsupported subsystem was detected during addition of a Additional Chassis that was made in the state in which the subsystem power was on. x : Unit ID # (1-29) y : ENC Unit/SENC Unit # (0-1)	Simpel Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the frame having the Unit ID# concerned with a connectable frame.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I70400	CTL recovery failed [DESKEW is not completed]	Though the Control Unit not blocked attempted to adjust the data input timing when it was sending/receiving data to/from an inserted Control Unit, the adjustment was not completed within the time limit. [Failure in the bus between the CTLs]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I70500	CTL recovery failed [SLV ERR]	When the Control Unit not blocked was adjusting the data input timing while it was sending/receiving data to/from the inserted Control Unit, it received an error report from the inserted Control Unit. [Failure in the bus between the CTLs]	Simple Trace		
I70600	CTL recovery failed [MRGN ERR]	After the inserted Control Unit adjusted the data input timing while it was sending/receiving data to/from a Control Unit not blocked, the Control Unit not blocked detected a margin error. [Failure in the bus between the CTLs]	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I70700	CTL recovery failed [SEQ ERR]	When the Control Unit not blocked was adjusting the data input timing while it was sending/receiving data to/from the inserted Control Unit, it detected a sequence error. [Failure in the bus between the CTLs]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
I70800	CTL recovery failed [DCNT ERR]	When the inserted Control Unit was adjusting the data input timing while it was sending/receiving data to/from a Control Unit not blocked, the Control Unit not blocked detected a failure in the delay counter. [Failure in the bus between the CTLs]	Simple Trace		
I70900	Unsupported unit is connected [RKA] (Unit-x)	Though addition of the RKA was attempted, the addition that was made in the state in which the subsystem power was on failed because the subsystem concerned did not support the RKA. x : Unit ID # (1-29)	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I70A00	Unsupported unit is connected [RKAAT] (Unit-x)	Though addition of the RKAAT was attempted, the addition that was made in the state in which the subsystem power was on failed because the subsystem concerned did not support the RKAAT. x : Unit ID # (1-29)	Simple Trace	2. Replace the subsystem (RKAJ or RKAJAT) to be added.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I8000x	Unit ADD start (Unit-x)	The processing of the addition of the Additional Chassis with the subsystem power turned on started. x : Unit ID # (1-14)		–	–
I800HH	Unit ADD start (Unit-x)	The processing of the addition of the Additional Chassis with the subsystem power turned on started. x : Unit ID # (1-29)		–	–
I8010x	Unit ADD start (Loop-x)	The addition of the loop of the Additional Chassis started. x : Loop # (0-1)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I8020x	Unit ADD complete (Unit -x)	The addition of the Additional Chassis with the subsystem power turned on was completed normally. x : Unit ID # (1-14)		–	–
I802HH	Unit ADD complete (Unit -x)	The addition of the Additional Chassis with the subsystem power turned on was completed normally. x : Unit ID # (1-29)		–	–
I8030x	Unit ADD complete (Loop-x)	The addition of the loop of the Additional Chassis was completed normally. x : Loop # (0 or 1)		–	–
I8040x	Unit ADD FAIL (Unit -x)	The addition of the Additional Chassis with the subsystem power turned on was terminated abnormally. x : Unit ID # (1-14)		① 1. Check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I804HH	Unit ADD FAIL (Unit -x)	The addition of the Additional Chassis with the subsystem power turned on was terminated abnormally. x : Unit ID # (1-29)		2. The cause of failing in the addition is displayed by another message. Perform the maintenance following the message.	–
I8050x	Unit ADD FAIL (Loop-x)	The addition of the loop of the Additional Chassis was terminated abnormally. x : Loop # (0 or 1)		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. The cause of failing in the addition is displayed by another message. Perform the maintenance following the message.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I806xy	Unit ADD ENC INIT FAIL (Unit-x, ENC-y)	ENC/SENC abnormality was detected in the initial setting and the EALM LED lights-out of the ENC Unit/SENC Unit of the added Additional Chassis. x : Unit ID # (1-14) y : ENC Unit SENC Unit # (0-1)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I806HH	Unit ADD ENC INIT FAIL (Unit-x, ENC-y)	ENC/SENC abnormality was detected in the initial setting and the EALM LED lights-out of the ENC Unit/SENC Unit of the added Additional Chassis. x : Unit ID # (1-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	2. Replace the ENC Unit/SENC Unit.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ① and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I807xy	Unit ADD ENC INIT FAIL (Unit-x, HDU-y/z)	SES HDU abnormality was detected in the initial setting and the EALM LED lights-out of the ENC Unit/SENC Unit of the added Additional Chassis. x: Unit ID # (1-14) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I807HH	Unit ADD ENC INIT FAIL (Unit-x, HDU-y/z)	SES HDU abnormality was detected in the initial setting and the EALM LED lights-out of the ENC Unit/SENC Unit of the added Additional Chassis. x: Unit ID # (1-29) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	2. Replace either one of the Disk Drives displayed.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the other Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I8080x	Unit ADD start FAIL (Unit-x)	The addition of the Additional Chassis with the subsystem power turned on cannot be performed. x : Unit ID # (1-14)		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I808HH	Unit ADD start FAIL (Unit-x)	The addition of the Additional Chassis with the subsystem power turned on cannot be performed. x : Unit ID # (1-29)		2. A cause of the addition failure is displayed in another message. Take a recovery action following the message.	–
I80900	Unit ADD start FAIL (Command)	The addition of the Additional Chassis with the subsystem power turned on cannot be performed because the Format/SyncCache command from the host computer is being executed.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Wait until the Format/SyncCache command from the host computer is completed or suspend the Format/SyncCache command from the host computer.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I80A0x	Unit ADD start FAIL [Loop] (Loop-x)	Although the addition of the Additional Chassis was tried with the subsystem power turned on, the addition cannot be started because Loop abnormality occurred. x : Loop # (0-1)		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Recover the Loop failure by checking another message. If the message to indicate the Loop failure is not displayed, contact the Technical Support Center, and recover the Loop failure.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I80Bxy	Unit ADD FAIL no SES (Unit-x, HDU-y/z)	No SES drive (Disk Drive # 0 to 3) was found. x : Unit ID # (1-14) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I80BHH	Unit ADD FAIL no SES (Unit-x, HDU-y/z)	No SES drive (Disk Drive # 0 to 3) was found. x : Unit ID # (1-29) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	2. Check if the device identification switch of the RKAJ pointed out in the message is set correctly. Check the above on all the RKAJs to be added. When the subsystem recognition switch was set incorrectly, set it correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation “1.6 Adding the Additional Subsystem to the Rack Frame” (ADD 01-0490)
				② 1. After “I8040x Unit ADD FAIL” or “I804HH Unit ADD FAIL” was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination”.	Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination” (ADD 01-0110)
				2. Replace the Disk Drive.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation “1.6 Adding the Additional Subsystem to the Rack Frame” (ADD 01-0490)
				③ 1. After “I8040x Unit ADD FAIL” or “I804HH Unit ADD FAIL” was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination”.	Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination” (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit corresponding to the Unit number and the HDU number in the message (ENC-0/SENC-0 in the case of HDU #0, #2, and ENC-1/SENC-1 in the case of HDU #1, #3).	Replacement “2.2.9 Replacing ENC Unit/SENC Unit” (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation “1.6 Adding the Additional Subsystem to the Rack Frame” (ADD 01-0490)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				④ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ③ and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I80C0x	Unit ADD FAIL [Loop alarm] (Loop-x)	The loop was blocked during the addition of the Additional Chassis. x : Loop # (0 or 1)	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit corresponding to the Unit number and the Loop number referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" displayed before this message and the Loop number in this message (ENC-0/SENC-0 in the case of Loop #0 and ENC-1/SENC-1 in the case of Loop #1).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation “1.6 Adding the Additional Subsystem to the Rack Frame” (ADD 01-0490)
				② 1. After “I8040x Unit ADD FAIL” or “I804HH Unit ADD FAIL” was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination”.	Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination” (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ① and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement “2.2.9 Replacing ENC Unit/SENC Unit” (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation “1.6 Adding the Additional Subsystem to the Rack Frame” (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I80D0x	Unit ADD FAIL [cable off] (Loop-x)	Loop pull-out was detected during the addition of the additional chassis. x : Loop # (0 or 1)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC cable corresponding to the Unit number and the Loop number referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" displayed before this message and the Loop number in this message (ENC-0/SENC-0 in the case of Loop #0 and ENC-1/SENC-1 in the case of Loop #1).	Replacement "2.2.10 Replacing ENC cable "(REP 02-0910)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Replace the ENC Unit/SENC Unit corresponding to the Unit number and the Loop number referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" displayed before this message and the Loop number in this message (ENC-0/SENC-0 in the case of Loop #0 and ENC-1/SENC-1 in the case of Loop #1).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ② and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I80E00	Unit ADD warning [HDU number over]	The one other than the SES drive is installed. The additional processing may not be completed within the specified time (five minutes). Even so, do not pull out the Disk Drive while the Additional Chassis is recognized. There is fear that the addition of the Additional Chassis may terminate abnormally or the subsystem may go down.		①1. Perform the maintenance following the recovery method of No.2 or later only when “I8040x Unit ADD FAIL” or “I804HH Unit ADD FAIL” was displayed. While "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" is not displayed, the recognition processing of the Additional Chassis is operating, so that wait until “I8040x Unit ADD FAIL”, “I804HH Unit ADD FAIL”, “I8020x Unit ADD complete” or “I802HH Unit ADD complete” is displayed.	–
				2. After “I8040x Unit ADD FAIL” or “I804HH Unit ADD FAIL” was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination”.	Addition/Subtraction/ Relocation “1.3.1 Work immediately after abnormal termination” (ADD 01-0110)
				3. When no other thing than the SES drive (HDU #0 to #3) is installed in the Unit ID# of “I8000x Unit ADD start” or “I800HH Unit ADD start” displayed before this message, check that the Device ID# is not set incorrectly for the Unit ID# larger than the Unit ID#. When the device ID# is set incorrectly, set it correctly again.	Installation “1.6 Device ID Setting and ENC Cable Connection” (INST 01-0160)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				4. Check that it does not exceed the maximum connectable chassis number. When it exceeded the maximum chassis number, review the configuration of the subsystem, perform the setting of the Device ID# correctly again, or check the connection method to connect the ENC cables correctly.	Addition/Subtraction/ Relocation "1.6.2 (2) Connecting ENC cables (on the Loop #0 side)" (ADD 01-0650)
				5. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I80F00	Unit ADD FAIL [Command]	The Format/SyncCache command from the host computer was executed while the Additional Chassis is added with the subsystem power turned on.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Wait until the Format/SyncCache command from the host computer is completed or suspend the Format/SyncCache command from the host computer.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I81700	Unit ADD ENC INIT data error [CUDGECTLR]	SWCUDG (E-CTL Register error) was detected in the ENC initial setting while the RKAJ/RKA is added with the subsystem power turned on.	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I81800	Unit ADD ENC INIT data error [CUDGECTLF]	SWCUDG (E-CTL Force Test error) was detected in the ENC initial setting while the RKAJ/RKA is added with the subsystem power turned on.	Simple Trace		
I81900	Unit ADD ENC INIT data error [CUDGSRAM]	SWCUDG (SRAM Test error) was detected in the ENC initial setting while the RKAJ/RKA is added with the subsystem power turned on.	Simple Trace	2. Replace the ENC Unit corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I81A00	Unit ADD ENC INIT data error [CUDGENCCOM]	SWCUDG (ENCCON RS232C Test error) was detected in the ENC initial setting while the RKAJ/RKA is added with the subsystem power turned on.	Simple Trace		
I81B00	Unit ADD ENC INIT data error [ENCCOMERR]	ENCCOMERR was detected in the ENC initial setting while the RKAJ/RKA is added with the subsystem power turned on.	Simple Trace	3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I82000	Unit ADD Unit number over	The number of the Additional Chassis to be connected is in excess.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Connection disabled. Confirm how many subsystems are connected.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I8210x	Unit ADD Loop error (Loop-x)	Abnormality was detected in the loop (Loop-x) during the addition of the Additional Chassis. x : Loop number (0-1)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Recover the Loop failure by checking another message. If the message to indicate the Loop failure is not displayed, contact the Technical Support Center, and recover the Loop failure.	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I8220x	Unit ADD cable error (Loop-x)	Abnormality of the ENC cable connection was detected in Loop-x at the time of adding the Additional Chassis. x : Loop # (0-1)		①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Check that there is no problem for the connection procedure of the ENC cables (if the connectors or the cables of the same color are connected).	–
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I8230x	Unit ADD HDU nothing (Unit-x)	The Disk Drive does not exist in Loop-x of the added Additional Chassis. x : Unit ID # (1-14)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I823HH	Unit ADD HDU nothing (Unit-x)	The Disk Drive does not exist in Loop-x of the added Additional Chassis. x : Unit ID # (1-29)	Simple Trace	2. Check the connection positions of the ENC cables because there is possibility that the ENC cables were connected incorrectly.	Installation "3.4.11 Connecting the ENC cables" (INST 03-0670)
				3. Check if the device ID is correct. When the device ID was set to the incorrect value, reset it to the correct value.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				4. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Replace the Disk Drive corresponding to the Unit number and the Loop number (Disk Drive #0 and #2 in case of Loop #0 and Disk Drive #1 and #3 in case of Loop #1) referring to the Unit number in this message and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/ SENC Unit corresponding to the Unit number and the Loop number (ENC-0/SENC-0 in case of Loop #0 and ENC-1/ SENC-1 in case of Loop #1) referring to the Unit number in this message and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				④ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ③ and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I824xy	Unit ADD ENC DIAG FAIL (Unit-x, ENC-y)	Abnormality of the ENC/SENC was detected by the diagnosis of the ENC/SENC of the added Additional Chassis. x : Unit ID # (1-14) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I824HH	Unit ADD ENC DIAG FAIL (Unit-x, ENC-y)	Abnormality of the ENC/SENC was detected by the diagnosis of the ENC/SENC of the added Additional Chassis. x : Unit ID # (1-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	2. Check the procedure referring to Addition/ Subtraction/Relocation "1.6 Adding the Additional Subsystem to the Rack Frame".	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				② 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/ SENC Unit.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ② and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I825xy	Unit ADD ENC DIAG FAIL (Unit-x, HDU-y/z)	Abnormality of the Disk Drive was detected by the diagnosis of the ENC/SENC of the added Additional Chassis. x : Unit ID # (1-14) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	①1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I825HH	Unit ADD ENC DIAG FAIL (Unit-x, HDU-y/z)	Abnormality of the Disk Drive was detected by the diagnosis of the ENC/SENC of the added Additional Chassis. x : Unit ID # (1-29) y, z : Disk Drive # (0/2, 1/3)	Simple Trace	2. Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				②1. If this message is displayed again, check the Unit ID # displayed in "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" after these are displayed, and perform Addition/Subtraction/Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit corresponding to the Unit number and the HDU number in this message (ENC-0/SENC-0 in the case of HDU #0, #2 and ENC-1/SENC-1 in the case of HDU #1, #3).	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit replaced in ② and the ENC Unit/SENC Unit in the existing subsystem side connected through the ENC cables.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I82600	Unit ADD ENC DIAG data error [ENCCOMERR]	ENCCOMERR was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I82C00	Unit ADD DIAG data error [RAMPERR]	RAMPERR was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace		
I82E00	Unit ADD DIAG data error [CUDGECTLR]	CUDGECTLR was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace		
I82F00	Unit ADD DIAG data error [CUDGECTLF]	CUDGCTLF was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace	2. Replace the ENC Unit corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
				3. Execute the addition of the RKAJ/RKA again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I83000	Unit ADD DIAG data error [CUDGSRAM]	CUDGSRAM was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I83100	Unit ADD DIAG data error [CUDGENCCOM]	CUDGENCCOM was detected at the time of the diagnosis of the ENC of the added Additional Chassis.	Simple Trace		
I83200	Unit ADD ENC INIT data error [CUDGRDYTOV]	The ENC of the added Additional Chasses detected READY TIMEOUT of the other ENC of the same Additional Chassis.		2. Replace the ENC Unit corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I83300	Unit ADD ENC INIT data error [REGPERR]	REGPERR occurred in the ENC of the added Additional Chassis.			
I83400	Unit ADD ENC INIT data error [RAMPERR]	RAMPERR occurred in the ENC of the added Additional Chassis.			
I83500	Unit ADD ENC INIT data error [WDTCNTPERR]	WDTCNTPERR occurred in the ENC of the added Additional Chassis.			
I83600	Unit ADD ENC DIAG data error [REGPERR]	E-CTL Register Parity Error was detected by the diagnosis of the ENC of the added Additional Chassis.		3. Execute the addition of the RKAJ/RKA again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I83700	Unit ADD ENC DIAG data error [WDTCNTPERR]	Watch Dog Timer Counter Parity Error was detected by the diagnosis of the ENC of the added Additional Chassis.			
I83900	Unit ADD ENC DIAG data error [SWCUDGERR]	The SWCUDGERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I83A00	Unit ADD ENC DIAG data error [ENCCOMERR]	The ENCCOMERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace	① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I83B00	Unit ADD ENC DIAG data error [TWSIERR]	The TWSIERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace		
I83C00	Unit ADD ENC DIAG data error [PKERR]	The PKERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace	2. Replace the ENC Unit corresponding to the Unit number and the Loop number (ENC-0 for Loop #0 and ENC-1 for Loop #1) referring to the Unit number in "I8000x Unit ADD start" or "I800HH Unit ADD start" and the Loop number in "I8010x Unit ADD start" displayed before this message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I83D00	Unit ADD ENC DIAG data error [PRESESWRERR]	The PRESESWRERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace		
I83E00	Unit ADD ENC DIAG data error [SHERR]	The SHERR was detected through a diagnosis of the ENC during addition of the RKA that was made in the state in which the subsystem power was on.	Simple Trace	3. Execute the addition of the RKAJ/RKA again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I83F00	ENC error inf. [BKD SWCUDGERR]	The ENCCUDG occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace	① Replace the detached ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I840xy	Unit ADD no SES HDU (Unit-x, HDU-y)	Uninstalled error of SES HDU (Disk Drive #0 to #3) of the Additional Chassis to be added. x : Unit ID # (1-14) y : Disk Drive # (0-3)		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
I840HH	Unit ADD no SES HDU (Unit-x, HDU-y)	Uninstalled error of SES HDU (Disk Drive #0 to #3) of the Additional Chassis to be added. x : Unit ID # (1-29) y : Disk Drive # (0-3)			
I841xy	Unit ADD SES spinup error (Unit-x, HDU-y)	Spin up error of SES HDU (Disk Drive #0 to #3) of the Additional Chassis to be added. x : Unit ID # (1-14) y : Disk Drive # (0-3)	Simple Trace	2. Check if the Disk Drive displayed in the message is installed. If the Disk Drive is not installed, install it.	Addition/Subtraction/ Relocation "1.4.3 Adding a Disk Drive" (ADD 01-0190)
I841HH	Unit ADD SES spinup error (Unit-x, HDU-y)	Spin up error of SES HDU (Disk Drive #0 to #3) of the Additional Chassis to be added. x : Unit ID # (1-29) y : Disk Drive # (0-3)	Simple Trace	3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				② 1. Apply the following recovery method only when "I80Bxy Unit ADD FAIL no SES" or "I80BHH Unit ADD FAIL no SES" is displayed after this message.	–
				2. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				3. Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				4. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. Replace the ENC Unit/SENC Unit corresponding to the Unit number and the HDU number in the message (ENC-0/SENC-0 in the case of HDU #0, #2, and ENC-1/SENC-1 in the case of HDU #1, #3).	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				3. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I84200	ENC error inf. [BKD ENCCOMERR]	The ENCCOMERR occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace	① Replace the detached ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
I84300	ENC error inf. [BKD TWSIERR]	The TWSIERR occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace		
I84400	ENC error inf. [BKD PKERR]	The PKERR occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace		
I84500	ENC error inf. [BKD PRWSESWRERR]	The PRESESWRERR occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace		
I84600	ENC error inf. [BKD SHERR]	The SHERR occurred in the ENC Unit. Therefore, the ENC Unit concerned cannot be used normally.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I84700	Unit ADD FAIL info. [CTLALARM]	The Control Unit was detached during addition of the RKAJ/RKA/RKAJAT that was made in the state in which the subsystem power was on.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. When a message, "I8000x Unit ADD start" or "I800HH Unit ADD start" is not displayed, replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				3. When a message, "I8000x Unit ADD start" or "I800HH Unit ADD start" is displayed, take recovery actions according to messages that follow it.	–
				4. Execute the addition of the Additional Chassis again for the Additional Chassis which the addition is not completed.	Addition/Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
I84800	Unit ADD FAIL info. [CHK1]	An internal retrying operation occurred in the Control Unit during the addition of the RKAJ/RKA/RKAJAT that was made in the state in which the subsystem power was on.		① 1. After "I8040x Unit ADD FAIL" or "I804HH Unit ADD FAIL" was displayed, check the unit ID# displayed in the message, and perform Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination".	Addition/Subtraction/ Relocation "1.3.1 Work immediately after abnormal termination" (ADD 01-0110)
				2. When a message, "I8000x Unit ADD start" or "I800HH Unit ADD start" is not displayed, perform the addition of the Additional Chassis again from the check of the prerequisites.	Addition/ Subtraction/ Relocation "1.6 Adding the Additional Subsystem to the Rack Frame" (ADD 01-0490)
				3. When a message, "I8000x Unit ADD start" or "I800HH Unit ADD start" is displayed, take recovery actions according to messages that follow it.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I900xx	RSP abort command P (Key [OB], Code [xy])	The response failure (Aborted Command Path) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simple Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I90100	Command time out	The time-out exceeds the threshold value in an execution of a command issued from the local DF to the remote DF.	Simple Trace		
I902xx	RSP abort command C (Key [OB], Code [xy])	The response failure (Aborted Command CTL) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simple Trace		
I903xx	RSP etc. (Key [x])	The response failure (off-range sense key) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Sense key	Simpel Trace		
I904xx	RSP hard error (Key [04, Code [xy])	The response failure (Hard Error) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simpel Trace		
I905xx	RSP medium error (Key [03], Code [xy])	The response failure (Medium Error) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simpel Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
I906xx	RSP illegal request (Key [05], Code [xy])	The response failure (Illegal Request) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simpel Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
I907xx	RSP miscompare (Key [0E], Code [xy])	The response failure (Miscompare) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simpel Trace		
I908xx	RSP not ready (Key [02], Code [xy])	The response failure (Not Ready) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : Upper two figures of a sense code y : Lower two figures of a sense code	Simple Trace		
I909xx	RSP status error [x]	The SCSI status error in a response exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. x : SCSI status			
I90A00	RSP other field error	The field error in a response exceeds the threshold value in an execution of a command issued from the local DF to the remote DF.			
IA0000	Coupling started (LU-x/y)	An initial copy was started. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IA100x	NNC power on (NNC-x)	The NNC (NAS Unit) was powered on. x : NNC (NAS Unit) # (0-3)		–	–
IA110x	NNC boot started (NNC-x)	The boot of the NNC (NAS Unit) was started. x : NNC (NAS Unit) # (0-3)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA120x	NNC is ready (NNC-x)	The NNC (NAS Unit) entered the Ready status. x : NNC (NAS Unit) # (0-3)		–	–
IA130x	NNC shutdown started (NNC-x)	The shutdown of the NNC (NAS Unit) was started. x : NNC (NAS Unit) # (0-3)		–	–
IA140x	NNC shutdown completed (NNC-x)	The shutdown of the NNC (NAS Unit) was completed. x : NNC (NAS Unit) # (0-3)		–	–
IA150x	NNC power off (NNC-x)	The NNC (NAS Unit) was powered off. x : NNC (NAS Unit) # (0-3)		–	–
IA1E00	Host transfer NAS-DMA error (NNC-x)	A DMA hardware error occurred in the NNC (NAS Unit) data transfer. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Check if the PCI Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again.	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				② If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				③ If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				④ If not recovered yet, replace the PCI-Express cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA1F0x	PCDG error [miss configuration of NNC DIMM] (NNC-x)	An inappropriate capacity of the installed Memory (DIMM) was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Install the Memory (DIMM) in the NNC (NAS Unit). • RKH/RKM : 4 slot • RKS/RKXS : 2 slot	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
IA1G0x	PCDG error [NNC] (NNC-x)	A hardware error of the NNC (NAS Unit) was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IA1H0x	PCDG error [DIMM-A0] (NNC-x)	A hardware error of the Memory (DIMM) A0 was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the Memory (DIMM) A0 of the NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10)" (NAS 07-0120)
IA1I0x	PCDG error [DIMM-A1] (NNC-x)	A hardware error of the Memory (DIMM) A1 was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the Memory (DIMM) A1 of the NNC (NAS Unit).	
IA1J0x	PCDG error [DIMM-B0] (NNC-x)	A hardware error of the Memory (DIMM) B0 was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the Memory (DIMM) B0 of the NNC (NAS Unit).	
IA1K0x	PCDG error [DIMM-B1 (NNC-x)	A hardware error of the Memory (DIMM) B1 was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the Memory (DIMM) B1 of the NNC (NAS Unit).	
IA1L0x	PCDG error [Host Connector] (NNC-x)	A hardware error of the host connector of the NNC (NAS Unit) was detected in the PCDG process during a boot of the NNC (NAS Unit). x : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the Host Connector of the NNC (NAS Unit).	Replacement "2.3 Replacing the RKNAS parts" (REP 02-1050)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA1M00	NNC PCI Express error occurred caused by power failure of NNC (CTL-x, NNC-y)	A PCI-Express failure occurred between the NNC (NAS Unit) and the NAS Interface Board. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Check if the AC Power Input Switch of the NNC (NAS Unit) is turned on. If it is off, turn it on, and then start the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				2. Replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				② If not recovered, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				③ If not recovered yet, replace the PCI-Express cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA1N00	Host transfer NAS-DMA split error (CTL-x, NNC-y)	The DMA split error was detected in the NNC (NAS Unit) data transfer. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again.	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				② If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				③ If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				④ If not recovered yet, replace the PCI-Express cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				⑤ If not recovered yet, replace the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
IA1P0x	NNC NAS OS installation completed (NNC-x)	The installation of the NAS OS in the NNC (NAS Unit) was completed. x : NNC (NAS Unit) # (0-3)		–	–
IA1Q0x	NNC NAS OS installation started (NNC-x)	The installation of the NAS OS in the NNC (NAS Unit) was started. x : NNC (NAS Unit) # (0-3)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA1R0x	NNC NAS Dump process completed (NNC-x)	Getting of the NAS dump was completed. x : NNC (NAS Unit) # (0-3)	NAS Dumo	① Download the NAS dump.	DF700 NAS SOFTWARE Maintenance Manual "3.4.10 Downloading Dump Files" (NAS 03-0650)
IA1S0x	NNC NAS OS not found (NNC-x)	The NNC (NAS Unit) was started in the state in which the NAS OS was not installed. x : NNC (NAS Unit) # (0-3)		① Install the NAS OS.	DF700 NAS SOFTWARE Maintenance Manual "3. NAS Installation" (NAS 03-0000)
IA1T0x	NNC NAS Dump process started (NNC-x)	Getting of the NAS dump was started. x : NNC (NAS Unit) # (0-3)		① When the PCI-Express cable and the CTRL cable are not connected normally, the NAS Dump process terminates abnormally. Connect the PCI-Express cable and the CTRL cable firmly again.	–
IA1U0x	NNC recovered from partial alarm (NNC-x)	The NNC (NAS Unit) was recovered from the detachment. x : NNC (NAS Unit) # (0-3)		–	–
IA1V0x	NNC recovered (NNC-x)	The NNC (NAS Unit) was recovered from the partial detachment. x : NNC (NAS Unit) # (0-3)		–	–
IA1W0x	NNC AC Power Unit Switch is not ON (NNC-x)	Because the AC Input Power Switch of the NNC (NAS Unit) was not turned on, the start of the NNC (NAS Unit) failed. x : NNC (NAS Unit) # (0-3)		① 1. Turn on the AC Input Power Switch of the NNC (NAS Unit). 2. Start the NAS OS.	Installation "1.7 Power On/Off Procedure" (INST 01-0290) Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
IA1X0x	NNC Host Connector failure detected (NNC-x)	The NNC (NAS Unit) detected a host connector x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Replace the Host Connector of the NNC (NAS Unit).	Replacement "2.3 Replacing the RKNAS parts" (REP 02-1050)
IA1Y00	NNC DIMM failure detected (NNC-x, DIMM-y)	The NNC (NAS Unit) detected a Memory (DIMM) failure. x : NNC (NAS Unit) # (0-3) y : Memory (DIMM) # (A0, A1, B0, B1, B0-A0, D0-C0)	Simple Trace NAS Log	① Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual". ② If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10)" (NAS 07-0120) DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA1Z0x	NNC FAN failure detected (NNC-x)	The NNC (NAS Unit) detected a FAN Assembly failure. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Replace the FAN Assembly of the NNC (NAS Unit).	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
IA2A00	NNC ECC correctable error detected (NNC- x, DIMM-y)	The NNC (NAS Unit) detected an error, which was correctable with the ECC, in the Memory (DIMM). x : NNC (NAS Unit) # (0-3) y : Memory (DIMM) # (A0, A1, B0, B1, B0-A0, D0-C0)	Simple Trace NAS Log	① Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #8)" (NAS 07-0120)
IA2B0x	NNC BIOS initialization failed (NNC-x)	The initialization of the NNC (NAS Unit) BIOS terminated abnormally x : NNC (NAS Unit) # (0-3)	Simple Trace	① Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #3)" (NAS 07-0120)
IA2C0x	NNC Shutdown time-out (NNC-x)	The shutdown of the NAS OS was not completed after the monitoring time elapsed. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #38)" (NAS 07-0170)
IA2D0x	NNC No Response to Heart beat (NNC-x)	No heartbeat response was made from the NNC (NAS Unit) to the Control Unit. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① When another "Ixxxxx" or "Wxxxxx" message is displayed just before this message, maintain it according to the instructions of the message.	–
				② Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #32)" (NAS 07-0170)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2E0x	NNC Detach request received from the other NNC (NNC-x)	A request to make detachment was received from the mate NNC (NAS Unit) in the cluster. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. When another "Ixxxxx" message is displayed just before this message, maintain it according to the instructions of the message.	–
				② 1. Restart the NAS OS of the NNC (NAS Unit) whose ALARM LED lights on.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				2. After completing the start of the NAS OS, request the user to perform the fail-back.	–
				3. If this message is displayed again, replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #1)" (NAS 07-0170)
IA2Fxy	NNC Power on time-out (CTL-x, NNC-y)	A DMA split error was detected in the NNC (NAS Unit) data transfer. x : Control Unit # (0-1) y : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Check if the CTRL cable, which connects the NNC (NAS Unit) and the Control Unit displayed in the message, is connected firmly.	–
				2. When the CTRL cable is not connected firmly, reconnect it firmly.	–
				3. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				4. Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				② 1. If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				③ 1. If not recovered, replace the CTRL cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
				2. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
IA2G0x	NNC OS boot time-out (NNC-x)	The start of the NNC OS was not completed after the monitoring time elapsed. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #37)" (NAS 07-0170)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2H00	NNC Hardware failure detected [x] (NNC-y)	The NNC (NAS Unit) detected a hardware failure. x : Failed part y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	When "XEON" is displayed in x.	
				①1. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #10A)" (NAS 07-0120)
				When "SMBUS-DF" is displayed in x.	
				①1. When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				2. In the case other than ①, replace the Control Unit whose CALM LED lights on.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				When "SMBUS-NASIBD" is displayed in x.	
				①1. Check if the CTRL cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the CTRL cable firmly again.	–
				3. Replace the NAS Interface Board connected to the NNC (NAS Unit) displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				4. Replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				5. Replace the CTRL cable connected to the NNC (NAS Unit) displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				When “BUS1” is displayed in x.	
				① 1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again.	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				② If not recovered yet, replace the NAS Interface Board installed in the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				③ If not recovered, replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				④ If not recovered yet, replace the PCI-Express cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				When “SMBUS-NNC” is displayed in x.	
				① 1. Check if the CTRL cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the CTRL cable firmly again.	–
				3. Replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				4. Replace the NAS Interface Board connected to the NNC (NAS Unit) displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				5. Replace the CTRL cable connected to the NAS Interface Board displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				When character strings other than the above are displayed in x	
				① 1. Check if the PCI-Express cable and the CTRL cable connecting the NNC (NAS Unit) displayed in this message and the NAS Interface Board are firmly connected.	–
				2. If they are not connected firmly, connect the PCI-Express cable and the CTRL cable firmly again.	–
				3. Replace the NAS Chassis displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2I00	NNC ECC correctable error detected [x] (NNC-y)	An error, which was correctable with the ECC, occurred in the NCC (NAS Unit). x : Failed part y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	When “MCH-B” or “PXH” is displayed in x	
				① Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				When “MCH-A” is displayed in x.	
				① 1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again. (When “IA2100 NNC ECC correctable error detected [Lanai]” is displayed after this message, disregard it.)	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				4. Replace the NAS Interface Board displayed in the message. (When “IA2100 NNC ECC correctable error detected [Lanai]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				5. Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up. (When “IA2100 NNC ECC correctable error detected [Lanai]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				6. Replace the PCI-Express cable connected to the NAS Interface Board displayed in the message. (When “IA2100 NNC ECC correctable error detected [Lanai]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				When “Lanai” is displayed in x.	
				① 1. Check if the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in this message is connected firmly.	–
				2. When it is not connected firmly, connect the PCI-Express cable firmly again. (When “IA2100 NNC ECC correctable error detected [MCH-A]” is displayed after this message, disregard it.)	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				4. Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up. (When “IA2100 NNC ECC correctable error detected [MCH-A]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				5. Replace the NAS Interface Board connected to the NNC (NAS Unit) displayed in the message. (When “IA2100 NNC ECC correctable error detected [MCH-A]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)” (NAS 07-0130)
				6. Replace the PCI-Express cable connecting the NNC (NAS Unit) and the NAS Interface Board displayed in the message. (When “IA2100 NNC ECC correctable error detected [MCH-A]” is displayed after this message, disregard it.)	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				To be continued to the next page	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				When character strings other than the above are displayed in x. ①Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2J0x	NNC OS installation failed (NNC-x)	The installation of the NAS OS failed. x : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace NAS Log	①1. Check if the maintenace PC is correctly connected to the NNC (NAS Unit) displayed in this message.	–
IA2K0x	NNC OS installation time-out (NNC-x)	The installation of the NAS OS was not completed after the monitoring time elapsed. x : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace NAS Log	2. If it is not connected correctly, reconnect it correctly.	–
				3. Execute the installation of the NAS OS over again.	DF700 NAS SOFTWARE Maintenance Manual “3. NAS Installation” (NAS 03-0000)
				②1. Check if the PCI-Express cable, which connects the NNC (NAS Unit) and the Control Unit displayed in the message, is connected firmly.	–
				2. When the PCI-Express cable is not connected firmly, reconnect it firmly.	–
				3. Restart the NAS OS.	Installation “1.7.3 Stop/Start/Restart of the NAS OS” (INST 01-0320)
				4. Execute the installation of the NAS OS over again.	DF700 NAS SOFTWARE Maintenance Manual “3. NAS Installation” (NAS 03-0000)
				③1. Replace the NAS Chassis displayed in this message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)” (NAS 07-0120)
				2. Execute the installation of the NAS OS over again.	DF700 NAS SOFTWARE Maintenance Manual “3. NAS Installation” (NAS 03-0000)
				④1. If not recovered yet, replace the PCI-Express cable that connects the NNC (NAS Unit) and the Control Unit displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual “7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)” (NAS 07-0120)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				2. Execute the installation of the NAS OS over again.	DF700 NAS SOFTWARE Maintenance Manual "3. NAS Installation" (NAS 03-0000)
IA2L0x	NNC NAS Dump time-out (NNC-x)	Getting of the NAS dump by the NNC (NAS Unit) was not completed after the monitoring time elapsed. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①Replace the NNC (NAS Unit) whose ALARM LED lights on.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IA2M0x	NNC TWSI access error (NNC-x)	The TWSI (Two Wired Serial Interface) access to the NNC (NAS Unit) resulted in an error. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log		
IA2N0x	NNC LED access error (NNC-x)	The access to the LED of the NNC (NAS Unit) resulted in an error. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IA2P00	NNC Detail code received [xy] (NNC-z)	The detail SIM code was received from the NNC (NAS Unit). x : SIM detail code (Four figures of the first half) y : SIM detail code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up. However, if "IA3700 NNC Fail-over is completed [xy] (NNC-z)" is displayed just before it, disregard this message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IA2Q00	NNC NAS OS error [xy] (NNC-z)	A SIM of the NAS OS error was received from the NNC (NAS Unit). x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message.	–
				2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.4 Identifying Troubleshooting Procedures from Failure Phenomena" (NAS 07-0220)
				3. Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm"" (TRBL 04-0280)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2R00	NNC PCI Express link recovered [x] (NNC-y)	The link of the NNC (NAS Unit) PCI Express was restored. x : Failed part y : NNC (NAS Unit) # (0-3)		–	–
IA2S00	NNC Some PCI Express link failed [x] (NNC-y)	Some of the links of the NNC (NAS Unit) PCI Express became out of order. x : Failed part y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IA2T00	NNC Some PCI Express link failed [x] (NNC-y)	Some of the links of the NNC (NAS Unit) PCI Express became out of order. x : Failed part y : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Check if the PCI-Express cable, which connects the NNC (NAS Unit) displayed in this message and the NAS Interface Board, is connected firmly.	–
				2. When the PCI-Express cable is not connected firmly, reconnect it firmly.	–
				3. Request the execution of the fail-over to the customer.	NAS Manager Modular User's Guide
				4. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				5. Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				6. Replace the NAS Interface Board connected to the NNC (NAS Unit) displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				7. Replace the PCI-Express cable that connects the NNC (NAS Unit) displayed in this message and the NAS Interface Board.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA2U00	NNC Some PCI Express link failed [x] (CTLy-z)	Some of the links of the NNC (NAS Unit) PCI Express became out of order. x : Failed part y : Control Unit # (0-1) z : NAS Interface Board # (0-1)	Simple Trace NAS Log	① 1. Check if the PCI-Express cable, which connects the NNC (NAS Unit) displayed in this message and the NAS Interface Board, is connected firmly.	–
				2. When the PCI-Express cable is not connected firmly, reconnect it firmly.	–
				3. Request the execution of the fail-over to the customer.	NAS Manager Modular User's Guide
				4. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				5. Replace the NAS Interface Board displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0130)
				6. Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				7. Replace the PCI-Express cable connected to the NAS Interface Board displayed in the message.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
IA2V00	NNC Some integrated link of Data LAN failed [xy] (NNC-y)	Part of the integrated link of the data LAN of the NNC (NAS Unit) failed. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message.	–
				2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #15)" (NAS 07-0130)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				3. Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm" (TRBL 04-0280)
IA2W00	NNC Failed intergrated link of Data LAN recovered [xy] (NNC-z)	The failed link of the NNC (NAS Unit) data LAN was restored. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		–	–
IA2X00	NNC Internal process for NAS Dump download failed [xy] (NNC-z)	The internal processing before downloading the NAS Dump failed. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message.	–
				2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #44)" (NAS 07-0180)
IA2Y00	NNC Download of NAS Log failed [xy] (NNC-z)	Downloading of the NNC (NAS Unit) NAS log failed. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace NAS Log	3. Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm" (TRBL 04-0280)
IA2Z00	NNC Setting of Management LAN Port failed [xy] (NNC-z)	It failed in the setting of the LAN port for the Management of the NNC (NAS Unit). x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Get the NAS Dump.	Troubleshooting "7.7 NAS Dump collection" (TRBL 07-0280)
				2. Replace the NAS Chassis of which the WARNING LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
				3. Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm" (TRBL 04-0280)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA3000	NNC can not synchronize with NTP server [xy] (NNC-z)	The time of the NNC (NAS Unit) could not be synchronized with that of the NTP server because the NNC (NAS Unit) could not communicate with the NTP server. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message. 2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual". 3. Perform the processing of the "Clear specified factors of NNC partial alarm".	– DF700 NAS SOFTWARE Maintenance Manual "7.3.2 Software Failures (Table 7.3-3 Software Failures #42)" (NAS 07-0180) Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm"" (TRBL 04-0280)
IA3100	NNC Command I/O error detected in transaction to NAS IF Board [xy] (NNC-z)	The NNC (NAS Unit) detected a command I/O error that occurred between the NNC (NAS Unit) and the NAS Interface Board x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① 1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message. 2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual". 3. Perform the processing of the "Clear specified factors of NNC partial alarm".	– DF700 NAS SOFTWARE Maintenance Manual "7.4 Identifying Troubleshooting Procedures from Failure Phenomena" (NAS 07-0220) Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm"" (TRBL 04-0280)
IA3200	NNC NAS OS detected hardware error [xy] (NNC-z)	The NAS OS detected a hardware error. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA3300	NNC Fibre Channel failure detected in backup interface [xy] (NNC-z)	A Fibre Channel failure occurred in the backup interface of the NNC (NAS Unit). x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Check if the backup device is firmly connected to the NNC (NAS Unit) displayed in this message.	–
				2. If the backup device is not connected firmly, reconnect it firmly.	–
IA3400	NNC I/O error detected in backup interface [xy] (NNC-z)	An I/O error occurred in the backup interface of the NNC (NAS Unit). x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	② If not recovered yet, call the Technical Support Center for coping with troubles. Perform ③ after the recovery.	–
				③ Perform the processing of the “Clear specified factors of NNC partial alarm”.	Troubleshooting “4.7 The function of the “Clear specified factors of NNC partial alarm”” (TRBL 04-0280)
IA3500	NNC Fail-over started [xy] (NNC-z)	A fail-over of the NNC (NAS Unit) occurred. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		① When this fail-over is not manual and the failure message is not displayed just before this message, check the lighting status of the WARNING LED and the ALARM LED on the NNC (NAS Unit) in the fail-over source. Also, check to the user if the error message is reported to the NAS Manager Modular.	–
				② When the WARNING LED and the ALARM LED on the NNC (NAS Unit) in the fail-over source are not lighting up or the error message of “KAQK10011-E” is reported to the NAS Manager Modular, the failure may have occurred in the Control Unit connected to the fail-over source. Collect the Full Dump of the Control Unit and contact the Technical Support Center.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message.	–
				④ Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.4 Identifying Troubleshooting Procedures from Failure Phenomena" (NAS 07-0220)
				⑤ For anything else, disregard this message.	–
IA3600	NNC Fail-over ended in abnormal [xy] (NNC-z)	The fail-over of the NNC (NAS Unit) failed. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Refer to Troubleshooting "6.1.20 Recovery method at the time of the NAS system fail-over failure". Perform ② after the recovery.	Troubleshooting "6.1.20 Recovery method at the time of the NAS system fail-over failure" (TRBL 06-1220)
				② Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm"" (TRBL 04-0280)
IA3700	NNC Fail-over is completed [xy] (NNC-z)	The fail-over of the NNC (NAS Unit) was completed x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		–	–
IA3800	NNC Information of abnormal end command [xy] (NNC-z)	Information on a command, execution of which had terminated abnormally, was received from the NNC (NAS Unit) during a backing up. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA3900	NNC Link down in Data LAN [xy] (NNC-z)	Link down of the data LAN port of the NNC (NAS Unit) occurred. x : SIM code (Four figures of the first half) y : SIM code(Four figures in the latter half) z : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Record the SIM code displayed in this message and the SIM detailed code of "IA2P00 NNC Detail code received" displayed after this message.	–
				2. Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #13)" (NAS 07-0130)
				3. Perform the processing of the "Clear specified factors of NNC partial alarm".	Troubleshooting "4.7 The function of the "Clear specified factors of NNC partial alarm"" (TRBL 04-0280)
IA3A00	NAS OS boot incomplete [NAS System LU data lost]	The NAS OS did not start because the NAS system LU assumed the data loss when the power supply of the subsystem was turned on.		①1. Perform the forced parity correction for the NAS system LU that assumed the data loss.	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
				2. Reinstall the NAS OS.	DF700 NAS SOFTWARE Maintenance Manual "3. NAS Installation" (NAS 03-0000)
IA3C0x	NNC PS failure detected (NNC-x)	The NNC (NAS Unit) detected a Power Unitfailure.	Simple Trace NAS Log	①Replace the Power Unit of the NNC (NAS Unit).	Replacement "2.3 Replacing the RKNAS parts" (REP 02-1050)
IA3D0x	NNC Creation of NAS Dump failed by Dump LU unformat of failure (NNC-x)	Because the volume for the Dump storage was unformatted or data lost, the generation of the NAS Dump failed. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①When the volume for the Dump storage is unformatted, execute the format, and then collect the NAS Dump.	System Parameter "3.3 Setting of LU [Procedure ③-F]Formatting LU" (SYSPR 03-0280)
				②When the volume for the Dump storage is assumed to be the data lost, execute the parity correction, and then collect the NAS Dump.	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ 1. When the volume for the dump storage is the logical unit which is already formatted and there is no data lost for that volume, wait until "I6F500 NNC NAS Dump had been collected and stored in Dump LU [xy] (NNC-z)" and "IA120x NNC is ready (NNC-x)" are displayed in WEB Information Message and the status of the NAS OS becomes ACTIVE.	–
				2. Download the dump file of the NAS Dump. When generating a new NAS Dump, download the NAS Dump which is already generated currently, and then execute it.	DF700 NAS SOFTWARE Maintenance Manual "3.4.10 Downloading Dump Files" (NAS 03-0650)
IA3E00	Pair cache partition(s) changed to auto selection mode	The setting of the pair Cache partition whose segment size of the Cache partition is not corresponding among the pair Cache partition set to LU was changed to the Auto setting.	Simple Trace	① 1. Check if the segment size of the pair Cache partition corresponds to the segment size of the Cache partition of the LU for the LU belongs to the Cache partition which changed the segment size.	–
				2. If it is necessary for the customer's system environment, set the segment size of the Cache partition which is not corresponding to the same value as the segment size of the Cache partition of the LU, or reset the pair Cache partition of the LU.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IA4A0x	NNC AC Power Unit Switch is turned off (NNC-x)	The AC Input Power Switch was turned off during the NNC (NAS Unit) operation. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①1. Turn on the AC Input Power Switch of the NNC (NAS Unit) displayed in the message.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Start the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				3. When the AC Input Power Switch of the NNC (NAS Unit) is turned on, replace the Power Unit of the NAS Unit.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #2)" (NAS 07-0120)
IA4B0x	NNC Instantaneous power failure (NNC-x)	The power supply was powered off in the NAS Unit during the NNC (NAS Unit) operation. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	①Start the NAS OS for the NNC (NAS Unit) displayed in the message.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
IAPM00	NNC Boot time-out [post xx, yy] (NNC-z)	The boot of the NNC (NAS Unit) BIOS was not completed after the monitoring time elapsed. x : POST code y : Sub code z : NNC (NAS Unit) # (0-3) (Refer to "Chapter 11 List of the NAS BIOS POST Codes and the Subcodes" for the list of the POST codes and the subcodes.)	Simple Trace	①1. Check if the PCI-Express cable and the CTRL cable connecting the NNC (NAS Unit) displayed in this message and the NAS Interface Board are firmly connected.	–
				2. If they are not connected firmly, connect the PCI-Express cable and the CTRL cable firmly again.	–
IAPN00	NNC BIOS firmware installation time-out [post xx, yy] (NNC-z)	The installation of the BIOS firmware to the NNC (NAS Unit) was not completed after the monitoring time elapsed. x : POST code y : Sub code z : NNC (NAS Unit) # (0-3) (Refer to "Chapter 11 List of the NAS BIOS POST Codes and the Subcodes" (MSG 11-0000) for the list of the POST codes and the subcodes.)	Simple Trace	3. When the installation of the NAS OS is not completed, perform the dummy replacement(*1) of the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				4. Restart the NAS OS.	Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320)
				②Maintain it according to the instruction of the "DF700 NAS SOFTWARE Maintenance Manual".	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #3)" (NAS 07-0120)

*1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB0000	Coupling completed (LU- x/y)	An initial copy completed normally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IB100x	SNMP function recovered (CTL-x)	The SNMP function recovered from the warning status by the setting change. x : Control Unit # (0-1)		–	–
IB110x	SNMP error cleared by stopping SNMP Agent Support Function (CTL-x)	The warning status of the SNMP function was cancelled because the SNMP Agent Support Function was locked or disabled. x : Control Unit # (0-1)		–	–
IB1200	SNMP Task error	The task processing of the SNMP function failed.	Simple Trace	①Replace the Control Unit displayed in "W6000x SNMP error occurred in the SNMP function".	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
IB1300	SNMP configuration	It was detected that the configuration of the SNMP was illegal.	Simple Trace	①1. Load CONFIG.TXT from the Storage Navigator Modular.	–
				2. If it is not recovered, check if the character string entered in CONFIG.TXT is not 256 characters or more. In the case of 256 or more characters, change to the character string of 255 characters or less.	–
				②1. Load CONFIG.TXT from the Storage Navigator Modular again.	–
				2. If it is not recovered yet, check if there is any error in the format of CONFIG.TXT. If there is any error, correct the format.	–
				③Load CONFIG.TXT from the Storage Navigator Modular again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1400	SNMP agent detected the error	The SNMP agent detected an error.	Simple Trace	① 1. Check if the character string entered in CONFIG.TXT is not 256 characters or more. In the case of 256 or more characters, change to the character string of 255 characters or less.	–
				2. Load CONFIG.TXT from the Storage Navigator Modular again.	–
				3. If it is not recovered, check if there is any error in the format of CONFIG.TXT. If there is any error, correct the format.	–
				② 1. Load CONFIG.TXT from the Storage Navigator Modular again.	–
				2. If it is not recovered yet, replace the Control Unit displayed in “W6000x SNMP error occurred in the SNMP function”.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
IB1500	SNMP IP address error	The SNMP agent cannot start because the IP address of the LAN port for the user is “0”.	Simple Trace	① Set the IP address of the LAN port for the user.	–
				② Disable the SNMP Agent Support Function from the Storage Navigator Modular.	–
				③ Enable the SNMP Agent Support Function from the Storage Navigator Modular.	–
				④ If it is not recovered, repeat ① again.	–
				⑤ If it is not recovered yet, replace the Control Unit displayed in “W6000x SNMP error occurred in the SNMP function”.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1600	SNMP Initialization error	The initialization of the SNMP function failed	Simple Trace	① Disable the SNMP Agent Support Function from the Storage Navigator Modular.	–
				② Enable the SNMP Agent Support Function from the Storage Navigator Modular.	–
				③ If it is not recovered, repeat ① again.	–
				④ If it is not recovered yet, replace the Control Unit displayed in "W6000x SNMP error occurred in the SNMP function".	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
IB1700	SNMP RAM Device allocation error for SNMP	Securing the SNMP information to the RAM failed.	Simple Trace	① Replace the Control Unit displayed in "W6000x SNMP error occurred in the SNMP function".	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
IB1900	Remote copy failed (CTG-x)	The instruction of the pair formation or the resynchronization of TrueCopy Extended Distance was accepted, and the data transfer failed while the status of the pair was the copy (this message may be displayed even if the message "IB1B00 Remote copy started" which started the copy is not displayed in advance). x : Consistency Group # (0-15)	Simple Trace	① Execute the initial copy or the resynchronization again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1A00	Remote resync started (LU-x/y, CTG-z)	The resynchronization of the TrueCopy Extended Distance pair started. x : Internal LU # of Primary LU (0-4095) y : Internal LU # of Secondary LU (0-4095) z : Consistency Group # (0-15)		–	–
IB1B00	Remote copy started (LU-x/y, CTG-z)	An initial copy of the TrueCopy Extended Distance pair started. x : Internal LU # of Primary LU (0-4095) y : Internal LU # of Secondary LU (0-4095) z : Consistency Group # (0-15)		–	–
IB1D00	Remote copy completed (CTG-x, y/z)	The initial copy or the resynchronization of the pair of TrueCopy Extended Distance was completed (z of the message text “CTG-x, y/z” may not be consistent with the number of the message “IB1B00 Remote copy started” which started the copy). x : Consistency Group # (0-15) y : The number of LUs that the copy was completed (1-2046) z : The number of all LUs during the copy in the consistency group (1-2046)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1E00	Remote option disable [TrueCopy Extended Distance]	It detected that the TrueCopy Extended Distance license of the remote side subsystem is locked. [path blockade factor].	Simple Trace	①Unlock the TrueCopy Extended Distance license of the remote side subsystem.	–
IB1F00	PSUE occurred [Snapshot] (CTG-x, MU-y)	The "pairsplit-mscas" command was not completed because "pairsplit" in the pair of Copy-on-write SnapShot of the remote side subsystem could not be executed due to the internal processing waiting of the remote disk subsystem. [PSUE factor of the pair of Copy-on-write SnapShot] x : Consistency Group # (0-63) y : Mirroring # of Copy-on-write SnapShot (0-13)	Simple Trace	①Release the Copy-on-write SnapShot pair cascaded to the S-Vol of the pair of TrueCopy Extended Distance by indicating "pairsplit-mscas", and form the pair again.	–
IB1G00	Pair status changed by the error (CTG-x)	The pair of TrueCopy Extended Distance changed in the abnormal status because a failure occurred. x : Consistency Group # (0-15)	Simple Trace	①When the message code "IB1M00 The change of the remote pair status failed" is displayed immediately before it, perform the maintenance according to the message.	–
IB1H00	Pair status changed by no available data pool (CTG-x)	The pair of TrueCopy Extended Distance changed in the abnormal status because the usage rate of the data pool exceeded the threshold value. x : Consistency Group # (0-15)	Simple Trace	②Remove the failure which changed it in the abnormal status for the pair of TrueCopy Extended Distance in the consistency group referring to "RAID Manager System Administrator Guide".	"RAID Manager System Administrator Guide"
				③Reform the pair of TrueCopy Extended Distance. The method of the pair reformation differs depending on the status of the pair.	–
				④Execute the resynchronization for the pair which changed to PSUE and PFUS. Or form the pair again after releasing it. Reform the pair after releasing it for the pair which changed to PSUS (R/W impossible).	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1I0x	The Installed version of Data Control Modular is not supported (NNC-x)	It tried to install the Data Control Modular of the unsupported revision 04-00-03 in the RKH. x : NNC (NAS Unit) # (0-3)	Simple Trace	① Install the Data Control Modular of the most recent revision after the revision 04-00-04 or more.	–
IB1J0x	NNC PCI Express error occurred by hardware failure of NNC (NNC-x)	A PCI-Express failure occurred between the NNC (NAS Unit) and the NAS Interface Board. x : NNC (NAS Unit) # (0-3)	Simple Trace	① Follow "W5000x NNC alarm" displayed after this message for the maintenance.	–
IB1K0x	Online verify completed [odd unit]	A check of the chassis with odd numbers was completed by the online verify (the online verify of SATA-HDU operates at the execution cycle 0, and the online verify of FC HDU always operates). x : Execution Cycle (0-5)		–	–
IB1L0x	Online verify completed [even unit]	A check of the chassis with even numbers was completed by the online verify (the online verify of SATA-HDU operates at the execution cycle 0, and the online verify of FC HDU always operates). x : Execution Cycle (0-5)		–	–
IB1M00	The change of the remote pair status failed (LU-x/y, code-z)	The change of the pair status on the remote side failed in the resynchronization of TrueCopy Extended Distance. x : LU# of the pair of the local side subsystem (0-4095) y : The number of LUs of the pair of the remote side subsystem (0-4095) z : Error detailed code	Simple Trace	① Perform the resynchronization of the pair of TrueCopy Extended Distance again after recovering the error factor indicated by the error detailed code referring to the "RAID Manager System Administrator Guide".	"RAID Manager System Administrator Guide"
IB1N00	P-VOL read failed [TrueCopy]	The P-VOL became unable to be read.		① Split the TrueCopy remote replication pair. When forming the pair again, form a Copy-on-write SnapShot pair first and then form a TrueCopy remote replication pair.	–
IB1P00	SnapShot SMPL command received [TrueCopy]	Copy-on-write SnapShot received a command to split its pair.			
IB1Q00	LU access enable [SnapShot pair canceled] (LU-x)	Read/Write to P-VOL enabled. x : LU # (0-4095)	Simple Trace	–	–
IB1R00	LU access disable [SnapShot restore failed] (LU-x)	Read/Write to P-VOL disabled. x : LU # (0-4095)	Simple Trace	① Cancel all the pairs of the V-VOL in the P-VOL.	–
IB1S0x	PSUE occurred [SnapShot] (Data pool-x)	All pairs in the data pool changed to PSUE status. x : Data pool # (0-1)	Simple Trace	① Cancel the pair being PSUE once, and then make a pair again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1T00	PSUE occurred [TrueCopy] (LU-xP/yS)	The local side subsystem (this subsystem) of TrueCopy remote replication changed the pair status of the P-VOL to PSUE. x : LU# (0-4095) of the P-VOL of the local side subsystem (this subsystem) y : LU# (0-4095) of the S-VOL of the remote side subsystem	Simple Trace	①1. Recover the failure which caused PSUE referring to the "RAID Manager System Administrator Guide". 2. Perform the resynchronization for the pair which displayed the message.	"RAID Manager System Administrator Guide" –
IB1U00	PSUE occurred [TrueCopy] (LU-xS/yP)	The local side subsystem (this subsystem) of TrueCopy remote replication changed the pair status of the S-VOL to PSUE. x : LU# (0-4095) of the S-VOL of the local side subsystem (this subsystem) y : LU# (0-4095) of the P-VOL of the remote side subsystem	Simple Trace	①1. Collect a simple trace from the remote side subsystem (subsystem of the communication partner). 2. Recover the failure which caused PSUE referring to the "RAID Manager System Administrator Guide". 3. Perform the resynchronization for the pair which displayed the message.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040) "RAID Manager System Administrator Guide" –
IB1V00	PSUE occurred [TrueCopy]	The status of the pair of TrueCopy remote replication changed the pair status of the LU to PSUE for all the LUs other than SMPL.	Simple Trace	①When the status of the path with the remote side subsystem (subsystem of the communication partner) is not normal, recover the path to normal referring to the "RAID Manager System Administrator Guide". ②When the status of the path with the remote side subsystem (subsystem of the communication partner) is normal, perform the resynchronization for the pair.	"RAID Manager System Administrator Guide" –
IB1W00	Remote option disable [TrueCopy]	The license key of TrueCopy remote replication of the remote side subsystem (subsystem of the communication partner) is locked.	Simple Trace	①The license key of TrueCopy remote replication of the remote side subsystem (subsystem of the communication partner) is unlocked.	–
IB1Y00	Audit logs were cleared	The monitoring log was initialized.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB1Z00	NNC Boot time-out [TUR] [post xxxx, yyyy] (NNC-z)	The start of the BIOS of the NNC (NAS Unit) timed out because the Control Unit was not able to detect the good response of test unit ready from the NNC (NAS Unit). x : POST code y : Sub code z : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IB2000	NNC Boot time-out [BIOS] [post xxxx, yyyy] (NNC-z)	The start of the BIOS of the NNC timed out because the Control Unit was not able to detect the completion of the start of the BIOS from the NNC (NAS Unit). x : POST code y : Sub code z : NNC (NAS Unit) # (0-3)	Simple Trace	① 1. Check if the number of the blocked Disk Drives which configure the LU of the NAS OS per one parity group is one in case of RAID 0, two in case of RAID 1/RAID 1+0/RAID 5, and three or more in case of RAID 6 using the Storage Navigator Modular. 2. When the number or more of the Disk Drives which configure the LU of the NAS OS indicated in ①-1 is blocked, recover the LU of the NAS OS, and start the NNC (NAS Unit). 3. When less then the number of the Disk Drives which configure the LU of the NAS OS indicated in ①-1 is blocked, replace the NAS chassis where the ALARM LED (red) light up.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180) DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
IB2100	NNC Boot time-out [PXE] [post xxxx, yyyy] (NNC-z)	The start of the NNC (NAS Unit) after installing the NAS OS timed out due to the failure between the PXE-DHCP servers or between the PXE-FTP servers. x : POST code y : Sub code z : NNC (NAS Unit) # (0-3)	Simple Trace	① Perform the maintenance following the Troubleshooting "6.1.24 Recover method when the start of the NAS Unit timed out after installing the NAS OS".	Troubleshooting "6.1.24 Recover method when the start of the NAS Unit timed out after installing the NAS OS" (TRBL 06-1311)
IB2200	NNC Boot time-out [BIOS_LOAD] [post xxxx, yyyy] (NNC-z)	The update of the BIOS became a time-out because the upload demand of the BIOS was not notified from the NNC (NAS Unit). x : POST code y : Sub code z : NNC (NAS Unit) # (0-3)	Simple Trace	① Replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IB230x	NNC BIOS firmware installation failed [check sum error] (NNC-x)	A failure of the data of the BIOS firmware to be installed was detected. x : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace	① 1. Check the event log of the service PC if problems occur in the LAN environment such as LAN cables and LAN cards, etc. When LAN failures occur, solve the problems in the LAN environment according to the actions to be taken for the event log of the service PC.	–
				2. Install the BIOS firmware again.	DF700 NAS SOFTWARE Maintenance Manual “4.2.1 (9) Updating the BIOS Firmware (Preventive Upgrade)” (NAS 04-0270)
				② 1. Collect the event log of the service PC, and contact the Technical Support Center.	–
IB240x	NNC BIOS firmware installation failed [download error] (NNC-x)	A transfer of the BIOS firmware from the service PC to the subsystem failed in the installation of the BIOS firmware. x : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace	① 1. Check the event log of the service PC if problems occur in the LAN environment such as LAN cables and LAN cards, etc. When LAN failures occur, solve the problems in the LAN environment according to the actions to be taken for the event log of the service PC.	–
				2. Install the BIOS firmware again.	DF700 NAS SOFTWARE Maintenance Manual “4.2.1 (9) Updating the BIOS Firmware (Preventive Upgrade)” (NAS 04-0270)

To be continued to the next page.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				② 1. Check if the service PC in use satisfies the conditions (PC should not be a low-performance device). When the service PC does not satisfy the conditions, prepare a service PC which satisfies the conditions.	–
				2. Install the BIOS firmware again.	DF700 NAS SOFTWARE Maintenance Manual "4.2.1 (9) Updating the BIOS Firmware (Preventive Upgrade)" (NAS 04-0270)
				③ 1. Collect the event log of the service PC, and contact the Technical Support Center.	–
IB250x	NNC Boot stopped because NAS BIOS firmware update has not been completed (NNC-x)	The installation of the NAS BIOS firmware was terminated without being completed because a failure occurred on the way to rewrite the NAS BIOS firmware, the start of the NAS Unit (start of the subsystem, restart of the NAS Unit or installation of the NAS OS) was cancelled. x : NNC (NAS Unit) # (0-3)	maintenance PC Log Simple Trace	① 1. When the cause that the installation of the NAS BIOS firmware was terminated halfway is the power outage or the power-off, check the energization. When the cause is the factor of the Information Message "IPAN00 NNC BIOS firmware installation timeout" on WEB, check that the maintenance for the message was performed. If the maintenance for the message is not yet performed, give priority to that maintenance and executed it.	–
				2. Update the NAS BIOS.	–
				3. Perform the work which became a trigger for starting the NAS Unit (start of the subsystem, start of the NAS Unit or installation of the NAS OS) again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IC0000	Coupling failed (LU- x/y)	An initial copy terminated abnormally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		① Define the pair of the ShadowImage in-system replication again.	–
ID0000	Resync started (LU- x/y)	A resynchronization was started. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IE0000	Resync completed (LU- x/y)	A resynchronization completed normally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IF0000	Resync failed (LU- x/y)	A resynchronization terminated abnormally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		① Define the pair of the ShadowImage in-system replication again.	–
IG0000	PSUE occurred (LU- x/y)	The pair status was changed to PSUE when the Shadow Image function was being used. x : Primary LU # (0-4095) y : Secondary LU # (0-4095)	Simple Trace	① Make a recovery from the failure already occurred. Refer to Troubleshooting "Chapter 9 Data Collection when a Failure Occurs in Program Product (P.P.)" to collect necessary information.	Troubleshooting "Chapter 9. Data Collection when a Failure Occurs in Program Product (P.P.)" (TRBL 09-0000)
IH0000	LU unified (UNI : LU-x,M : LU-x, S : LU-y)	LUs were unified. x : LU # of the unified LU after the unification and a Main LU (0-4095) y : LU # of a Sub LU before the unification (0-4095)		–	–
IQ0000	Remote copy started (LU- x/y)	The TrueCopy remote replication/TrueCopy Extended Distance initial copy was started. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IR0000	Remote copy completed (LU- x/y)	The initial copy by the TrueCopy remote replication/TrueCopy Extended Distance was completed normally. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)		–	–
IS0000	Remote copy failed (LU- x/y)	The initial copy by the TrueCopy remote replication/TrueCopy Extended Distance terminated abnormally. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)	Simple Trace	① Define the pair of the TrueCopy remote replication/TrueCopy Extended Distance again.	–
IT0000	Remote resync started (LU- x/y)	The re-synchronization by the S TrueCopy remote replication/ TrueCopy Extended Distance RC was started. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)		–	–
IU0000	Remote resync completed (LU- x/y)	The re-synchronization by the TrueCopy remote replication/ TrueCopy Extended Distance was completed normally. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)		–	–
IV0000	Remote resync failed (LU- x/y)	The re-synchronization by the TrueCopy remote replication/ TrueCopy Extended Distance terminated abnormally. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)	Simple Trace	① Perform the re-synchronization using the TrueCopy remote replication/TrueCopy Extended Distance again.	–
IW0000	Remote PSUE occurred (LU-xP/yS)	In the local DF (this subsystem) controlled by the TrueCopy remote replication/TrueCopy Extended Distance, the pair status of the primary LU was changed to PSUE. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)	Simple Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IX0000	SRC PSUE occurred (LU-xS/yP)	In the local DF (this subsystem) controlled by the TrueCopy remote replication/TrueCopy Extended Distance, the pair status of the secondary LU was changed to PSUE. x : Number of an internal LU of the local DF (0-4095) y : Number of an internal LU of the remote DF (0-4095)	Simple Trace	① Refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)
IXX000	SELF HEATRUN: Began self heatrun	The self heatrun was started.		–	–
IXX100	SELF HEATRUN: The number of defined LU is x	The defined LUN (self heatrun execution target LU) was displayed. x : LU # (0-4095)		–	–
IXX200	SELF HEATRUN: Finished self heatrun	The execution of the self heatrun was completed.		–	–
IXX300	SELF HEATRUN: Began loop test [loop (x)]	The loop test was started. x : Loop # (0-1)		–	–
IXX400	SELF HEATRUN: Finished loop test [loop (x)]	The loop test was completed. x : Loop # (0-1)		–	–
IXX500	SELF HEATRUN: Began the test pattern FC-[x]	The execution of the test pattern for Fibre Channel was started. x : Test pattern number		–	–
IXX600	SELF HEATRUN: Began the test pattern SATA-[x]	The execution of the test pattern for SATA was started. x : Test pattern number		–	–
IXX700	SELF HEATRUN: Began the test pattern [x]	The execution of the test pattern of the input file was started. x : Test pattern number		–	–
IXX800	SELF HEATRUN: Finished the test pattern [x]	The execution of the test pattern was completed. x : Test pattern number		–	–
IXX900	SELF HEATRUN: execution time [x:y:z]	The time required for the test was displayed. x : Execution time (hh) y : Execution time (mm) z : Execution time (ss)		–	–
IXXA00	SELF HEATRUN: HDU alarm (Unit-x, HDU-y)	The drive failure occurred. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	① Analyze the failure of the Disk Drive displayed in this message.	–
IXXB00	SELF HEATRUN: Online verify stopped	The online verify was stopped.		–	–
IXXC00	SELF HEATRUN: Online verify started	The online verify was started.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IXXD00	SELF HEATRUN: started the collection of statistical information (Time takes 85~300sec.)	The statistical information collection was started.		–	–
IXXE00	SELF HEATRUN: finished the collection of statistical information	The statistical information collection was completed.		–	–
IXXF00	LBA = x	LBA was detected when the drive failure occurred. x : Logical block address		–	–
IXXG00	Key/Code = x/y	The sense key/sense code was detected when the drive failure occurred. x : sense key y : sense code		–	–
IXXH00	Cmd/Len(blk) =x/y	The operation code and the number of transfer blocks were detected when the drive failure occurred. x : Operation code y : Number of transfer blocks		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY00xy	HDU error report (Unit-x, HDU-y) [z-z]	Drive detachment because of a failure (bad ALPA) drive error report receipt x : Unit ID # (0-14) y : Disk Drive # (0-14) z-z : Detail code		–	–
IY00HH	HDU error report (Unit-x, HDU-y) [z-z]	Drive detachment because of a failure (bad ALPA) drive error report receipt x : Unit ID # (0-29) y : Disk Drive # (0-14) z-z : Detail code		–	–
IY01xy	DFPC error detect (Unit-x, HDU-y) [Bad ALPA]	Drive detachment because of a failure (bad ALPA) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY01HH	DFPC error detect (Unit-x, HDU-y) [Bad ALPA]	Drive detachment because of a failure (bad ALPA) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY02xy	DFPC error detect (Unit-xx, HDU-y) [NO HDU]	Drive detachment because of a failure (drive non-installation) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY02HH	DFPC error detect (Unit-xx, HDU-y) [NO HDU]	Drive detachment because of a failure (drive non-installation) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY03xy	DFPC error detect (Unit-x, HDU-y) [WWN NG]	Drive detachment because of a failure (WWN inconsistency) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① The message concerned is output when the Disk Drive is replaced while the subsystem power is turned off. Pull out and then insert the Disk Drive concerned to check it out.	–
IY03HH	DFPC error detect (Unit-x, HDU-y) [WWN NG]	Drive detachment because of a failure (WWN inconsistency) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		② If the Disk Drive is not recovered in spite of the above operation, replace the Disk Drive because it is considered to be out of order. ③ Check if the subsystem is connected in the correct device connection order. ④ Check if the device ID of the subsystem is set correctly. ⑤ ENC cable may have been misconnected. Check the ENC cable connection.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY04xy	DFPC error detect (Unit-x, HDU-y) [HDU BUSY]	Drive detachment because of a failure (Drive busy status) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY04HH	DFPC error detect (Unit-x, HDU-y) [HDU BUSY]	Drive detachment because of a failure (Drive busy status) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY05xy	DFPC error detect (Unit-x, HDU-y) [QUEUE FULL]	Drive detachment because of a failure (Drive queue full status) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY05HH	DFPC error detect (Unit-x, HDU-y) [QUEUE FULL]	Drive detachment because of a failure (Drive queue full status) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY06xy	DFPC error detect (Unit-x, HDU-y) [HDU TIME OUT]	Drive detachment because of a failure (PDEV time-out) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY06HH	DFPC error detect (Unit-x, HDU-y) [HDU TIME OUT]	Drive detachment because of a failure (PDEV time-out) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY07xy	DFPC error detect (Unit-x, HDU-y) [LOGOUT]	Drive detachment because of a failure (Exceeded drive log-out threshold value) detected by the DFPC. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY07HH	DFPC error detect (Unit-x, HDU-y) [LOGOUT]	Drive detachment because of a failure (Exceeded drive log-out threshold value) detected by the DFPC. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY08xy	HDU online verify error (Unit-x, HDU-y) [04-3200]	Drive detachment owing to detection of sector exhaustion in the online verification. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY08HH	HDU online verify error (Unit-x, HDU-y) [04-3200]	Drive detachment owing to detection of sector exhaustion in the online verification. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY09xy	HDU removed (Unit-x, HDU-y)	Drive detachment because of pulling out of the drive. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY09HH	HDU removed (Unit-x, HDU-y)	Drive detachment because of pulling out of the drive. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Axy	HDU detach command receive (Unit-x, HDU-y)	Drive detachment instructed by the Mode Select command. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0AHH	HDU detach command receive (Unit-x, HDU-y)	Drive detachment instructed by the Mode Select command. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Bxy	Dynamic sparing command receive (Unit-x, HDU-y)	Drive detachment owing to a dynamic sparing instructed by the Mode Select command. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0BHH	Dynamic sparing command receive (Unit-x, HDU-y)	Drive detachment owing to a dynamic sparing instructed by the Mode Select command. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Cxy	Staging error (Unit-x, HDU-y)	Drive detachment because of a staging failure. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0CHH	Staging error (Unit-x, HDU-y)	Drive detachment because of a staging failure. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY0Dxy	HDU intermittent error over (Unit-x, HDU-y)	Drive detachment because of the exceeded threshold value of the HDU intermittent failure count. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0DHH	HDU intermittent error over (Unit-x, HDU-y)	Drive detachment because of the exceeded threshold value of the HDU intermittent failure count. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Exy	Dynamic sparing error (Unit-x, HDU-y) [MEDIUM]	Drive detachment because of the exceeded threshold value of media error count occurs in the dynamic sparing. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0EHH	Dynamic sparing error (Unit-x, HDU-y) [MEDIUM]	Drive detachment because of the exceeded threshold value of media error count occurs in the dynamic sparing. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Fxy	LA error [errcode:LUN] (Unit-x, HDU-y)	Drive detachment because of an LA error. (LUN) x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0FHH	LA error [errcode:LUN] (Unit-x, HDU-y)	Drive detachment because of an LA error. (LUN) x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Gxy	LA error [errcode:LBA] (Unit-x, HDU-y)	Drive detachment because of an LA error. (LBA) x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0GHH	LA error [errcode:LBA] (Unit-x, HDU-y)	Drive detachment because of an LA error. (LBA) x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Hxy	LRC error (Unit-x, HDU-y)	Drive detachment because of an LRC error. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0HHH	LRC error (Unit-x, HDU-y)	Drive detachment because of an LRC error. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY0Ixy	Backend diagnostic error (Unit-x, HDU-y) [HDU ERROR]	Drive detachment because of a backend diagnostic error. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0IHH	Backend diagnostic error (Unit-x, HDU-y) [HDU ERROR]	Drive detachment because of a backend diagnostic error. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Jxy	Backend diagnostic error (Unit-x, HDU-y) [DUAL PORT]	Drive detachment because of a dual port failure of a drive x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0JHH	Backend diagnostic error (Unit-x, HDU-y) [DUAL PORT]	Drive detachment because of a dual port failure of a drive x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Kxy	HDU inquiry failed (Unit-x, HDU-y)	Drive detachment because of a failure of the Inquiry command at the time of the drive start-up x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0KHH	HDU inquiry failed (Unit-x, HDU-y)	Drive detachment because of a failure of the Inquiry command at the time of the drive start-up x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Lxy	HDU read capacity failed (Unit-x, HDU-y)	Drive detachment because of a failure of the ReadCapacity command at the time of the drive start-up x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IY0LHH	HDU read capacity failed (Unit-x, HDU-y)	Drive detachment because of a failure of the ReadCapacity command at the time of the drive start-up x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IY0Mxy	Forced party correction PIN-over (Unit-x, HDU-y)	The drive was detached owing to a PIN-over during a forced parity correction. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement “1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive”.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive” (REP 01-0100)
IY0MHH	Forced party correction PIN-over (Unit-x, HDU-y)	The drive was detached owing to a PIN-over during a forced parity correction. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY0Nxy	HDU intermittent error over due to rash of media errors (Unit-x, HDU-y)	The drive was detached because of a PDEV time-out caused by frequent occurrences of media error. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
IY0NHH	HDU intermittent error over due to rash of media errors (Unit-x, HDU-y)	The drive was detached because of a PDEV time-out caused by frequent occurrences of media error. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
IY0P00	HDU error outside of regulation [SMR] (Unit-x, HDU-y)	Detachment of the drive under the SMART control because of its nonstandard head x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
IY0Q00	HDU error time-out [SMR] (Unit-x, HDU-y)	Detachment of a drive under the SMART control because of a time-out of a response to a command. x : Unit ID # (1-29) y : Disk Drive # (0-14)			
IY0R00	HDU error status [SMR] (Unit-x, HDU-y)	Detachment of a drive under the SMART control because of an abnormal state of the heads. x : Unit ID # (1-29) y : Disk Drive # (0-14)			
IY0S00	HDU SES detection error (Unit-x, HDU-y)	The drive was detached because the ENC Unit detected a trouble of a drive. x : Unit ID # (1-29) y : Disk Drive # (0-14)			
IY0T00	Write and compare error occurred (Unit-x, HDU-y)	The drive was detached because a comparison error occurred during the write and compare operation of the writing assurance function. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
IY0U00	SMART sequence error over [SMR] (Unit-x, HDU-y)	Detachment of a drive under the SMART control. x : Unit ID # (1-29) y : Disk Drive # (0-14)			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY0V00	P-VOL HDU error [ShadowImage]	A double failure of drives (a failure of a single drive in the case of RAID 0) occurred in a ShadowImage in-system replication P-VOL.		① Refer to Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)" and ""6.1.10 Data recovery does not terminate normally: Case 3 (Spare Disk Drive failure)".	Troubleshooting "6.1.9 Data recovery does not terminate normally : Case 2 (Disk Drive failure)" (TRBL 06-0520) Troubleshooting "6.1.10 Data recovery does not terminate normally : Case 3 (Spare Disk Drive failure)" (TRBL 06-0540)
IY0W00	HDU intermittent error over 3 (Unit-x, HDU-y)	Drive blockade 3 due to the exceeded threshold value of the HDU intermittent failure. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① When the message "I301xy HDU error", "I301HH HDU error" or "I301AT SATA HDU error" is displayed at the same time, follow the recovery method.	–
				② When the message, "I301xy HDU error", "I301HH HDU error" or "I301AT SATA HDU error"is not displayed, replace a Disk Drive that is pointed out in this message. When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
IY0X00	Data recovery restarted over by HDU alarm (Unit-x, HDU-y)	Because drive detachment of a RAID group of RAID 6 occurred during the correction operation of it, the correction operation was restarted from the beginning. x : Unit ID # (1-29) y : Disk Drive # (0-14)		–	–
IY0Y00	WR SEQ error (Unit-x, HDU-y)	Drive detachment owing to an error (Error code: WR_SEQ). x : Unit ID # (1-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY0Z00	Unsupported HDU inserted (Unit-x, HDU-y)	The inserted Disk Drive was blocked because it was outside the support. x : Unit ID # (1-29) y : Disk Drive # (0-14)		① Take a recovery action according to the message, "W060AT SATA Spare HDU alarm" or "W061AT SATA Spare HDU alarm (Unit-x, HDU-y)" displayed following this message. When doing that, replace the Disk Drive with the one that is supported.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
IY1000	HDU write/read error (Unit-x, HDU-y)	A Disk Drive failure was detected in the Disk Drive diagnosis. x : Unit ID # (1-29) y : Disk Drive # (0-14)	Simple Trace	① Since one of the following messages is displayed after this message, take recovery actions according to the message. • W060xy, W060HH, W0GG00, W0GH00 "HDU alarm" • W061xy, W0GJ00, W0GK00 "Spare HDU alarm"	–
IY11xy	The spin up of the disk drive failed (Unit-x, HDU-y)	The spin-up of the Disk Drive which was spin-down for the power saving failed. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① Perform the maintenance according to "HDU alarm" displayed after this message. • W060xy HDU alarm • W060HH HDU alarm • W0GG00 HDU alarm • W0GH00 HDU alarm • W060AT SATA HDU alarm	–
IY11HH	The spin up of the disk drive failed (Unit-x, HDU-y)	The spin-up of the Disk Drive which was spin-down for the power saving failed. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
IY12xy	The spin down of the disk drive failed (Unit-x, HDU-y)	The spin-down of the Disk Drive for the power saving failed. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace		
IY12HH	The spin down of the disk drive failed (Unit-x, HDU-y)	The spin-down of the Disk Drive for the power saving failed. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY13xy	The error in the inquiry data of the disk drive was detected (Unit-x, HDU-y)	It was detected that the Inquiry data of the Disk Drive displayed in the message was different before the spin-down due to the power saving and after the spin-up of this time. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① Perform the maintenance according to "HDU alarm" displayed after this message. • W060xy HDU alarm • W060HH HDU alarm • W0GG00 HDU alarm • W0GH00 HDU alarm • W060AT SATA HDU alarm	–
IY14xy	The error in the read capacity data of the disk drive was detected (Unit-x, HDU-y)	It was detected that the Read capacity data of the Disk Drive displayed in the message was different before the spin-down due to the power saving and after the spin-up of this time. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace		
IY2000	Restore started (LU-x/y)	The restoration copy started. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IY2100	Restore completed (LU-x/y)	The restoration copy terminated normally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)		–	–
IY2200	Restore failed (LU-x/y)	The restoration copy terminated abnormally. x : Copy source LU # (0-4095) y : Copy destination LU # (0-4095)	Simple Trace	① Restore the data using the backup data after splitting the pair.	–
IY3000	Subsystem is going to re-boot to recognize additional Units	The SES access could not be made to the ENC of the subsystem pointed out in the message issued at the time when the subsystem was started. Both of the Control Units are to be rebooted now in order to retry the SES access.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IY3100	The copy function is not effective when Single mode for CTL is set	It was detected that the priced option of Copy-on-write SnapShot or Truecopy Extended Distance is valid although the system start attribute is set to the single mode.	Simple Trace	① 1. When using the system start attribute in [Single Mode], lock the priced option of Copy-on-write SnapShot or TrueCopy Extended Distance.	System Parameter "Chapter 6. Setting an Extra-cost Optional Feature" (SYSPR 06-0000)
				② 1. When you want to use the function of Copy-on-write SnapShot or TrueCopy Extended Distance, lock the priced option.	System Parameter "Chapter 6. Setting an Extra-cost Optional Feature" (SYSPR 06-0000)
				2. Set the system start attribute to [Dual Active Mode].	System Parameter "4.2 (1) Setting Boot Options" (SYSPR 04-0040)
				3. Unlock the priced option.	System Parameter "Chapter 6. Setting an Extra-cost Optional Feature" (SYSPR 06-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZ0000	HDU firmware download start	An updating of the drive firmware was started.		–	–
IZ0100	HDU firmware download end	An updating of the drive firmware was completed.		① Turn off the subsystem power, and turn it on again.	–
IZ02xy	HFWD completed (Unit-x, HDU-y)	An updating of the drive firmware was completed normally. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IZ02HH	HFWD completed (Unit-x, HDU-y)	An updating of the drive firmware was completed normally. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IZ03xy	HDU update failed (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing abnormally. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① 1. Turn off the main switch after a rewriting of the drive firmware or a process of the physical format utility is completed (after a message, "IZ0100 HDU firmware download end" is displayed and the READY LED (green) on the front side of the subsystem blinks slowly (once/second)).	–
IZ03HH	HFWD failed (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing abnormally. x : Unit ID # (0-29) y : Disk Drive # (0-14)	CTL Alarm Trace	2. Turn off all the AC Power Unit Switches of the subsystems that are installed.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Power on the subsystem. (Check that the READY LED (green) on the front of the Basic Chassis lights up after four minutes usually (five minutes in case of the RKH).)	–
				4. When the ALARM LED (red) or WARNING LED (orange) on the front side of the subsystem is on, maintain it according to the Information message.	–
				5. Replace a Disk Drive pointed out in the message.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				6. Execute the drive firmware update of the physical format utility again (refer to "Drive Firmware Replacement User's Guide" when replacing the drive firmware).	Drive Firmware Replacement User's Guide
IZ0600	HFWD no target HDU	When an attempt is made to update the drive firmware, the target drive does not exist. However, there is no problem if this message appears when the target Disk Drive already has the latest version of firmware.		① Check whether the specified drive firmware is correct or not. If it is wrong, replace the drive firmware again by specifying the correct one.	–
IZ07xy	HFWD no redundancy [PG] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of a parity group. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IZ07HH	HFWD no redundancy [PG] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of a parity group. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IZ08xy	HFWD no redundancy [SYS] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of the system drive. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IZ08HH	HFWD no redundancy [SYS] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of the system drive. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZ09xy	HFWD no redundance [SES] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of the SES drive. x : Unit ID # (0-14) y : Disk Drive # (0-14)		–	–
IZ09HH	HFWD no redundance [SES] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be updated, the updating was aborted because it was impossible to preserve redundancy of the SES drive. x : Unit ID # (0-29) y : Disk Drive # (0-14)		–	–
IZ0Axy	HDU update failed by CTL alarm (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing failed due to the Control Unit blockade. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	①Make sure that “W0100x CTL alarm” is displayed in the Information message or the CLAL LED on the Control Unit is lit.	–
IZ0AHH	HFWD aborted [CTL] (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing failed due to the Control Unit blockade. x : Unit ID # (0-29) y : Disk Drive # (0-14)		②Search a cause of the failure by referring to (recording) a statement displayed in the Information message. ③Turn off the main switch after a rewriting of the drive firmware or a process of the physical format utility is completed (“IZ0100 HDU firmware download end” is displayed and the READY LED (green) on the front side of the subsystem blinks slowly (once/second)). ④Turn off all the AC Power Unit Switches of the subsystems that are installed. ⑤Power on the subsystem. (Check that the READY LED (green) on the front of the Basic Chassis lights up after four minutes usually (five minutes in case of the RKH).)	Installation “1.7 Power On/Off Procedure” (INST 01-0290) Installation “1.7 Power On/Off Procedure” (INST 01-0290)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				⑥When the ALARM LED (red) or WARNING LED (orange) on the front side of the subsystem is on, maintain it according to the Information message.	–
				⑦Execute the drive firmware update of the physical format utility again (refer to "Drive Firmware Replacement User's Guide'" when replacing the drive firmware).	Drive Firmware Replacement User's Guide'
IZ0B00	CACHE destage check error	Execution is impossible because unsaved information remains on the cache.	Full Dump	①Perform the regular sequential shutdown.	Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310)
				②Power on the subsystem. (Make sure that the READY LED (green) comes on four minutes later normally.)	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				③When the ALARM LED (red) or WARNING LED (orange) on the front side of the subsystems is on, maintain it according to the Information message.	–
				④Execute the drive firmware update of the physical format utility again (refer to "Drive Firmware Replacement User's Guide'" when replacing the drive firmware).	Drive Firmware Replacement User's Guide'

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZ0Cxy	HDU update failed by Loop alarm (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing failed due to the Loop failure. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Make sure that the Fibre Channel loop is detached through a message, "W080xy Loop alarm" in the Information message.	–
IZ0CHH	HFWD aborted [Loop] (Unit-x, HDU-y)	The drive firmware updating or the physical format utility processing failed due to the Loop failure. x : Unit ID # (0-29) y : Disk Drive # (0-14)		② Search a cause of the detachment by referring to (recording) a statement on the Fibre Channel loop detachment in the Information message.	
				③ Turn off the main switch after a rewriting of the drive firmware or a process of the physical format utility is completed ("IZ0100 HDU firmware download end" is displayed and the READY LED (green) on the front side of the subsystem blinks slowly (once/second)).	
				④ Turn off all the AC Power Unit Switches of the subsystems that are installed.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				⑤ Power on the subsystem. (Check that the READY LED (green) on the front of the Basic Chassis lights up after four minutes usually (five minutes in case of the RKH).)	
				⑥ When the ALARM LED (red) or WARNING LED (orange) on the front side of the subsystem is on, maintain it according to the Information message.	–
				⑦ When the recovery method given in Step ① ("W080xy Loop alarm") was not executed in Step⑥, maintain it following the recovery method that was got in Step ②.	
				⑧ Execute the drive firmware update of the physical format utility again (refer to "Drive Firmware Replacement User's Guide'" when replacing the drive firmware).	Drive Firmware Replacement User's Guide'

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZ0D00	HFWD SENC microprogram revision check NG (Unit-x, ENC-y)	The rewriting of the drive firmware was suspended because it is the revision that the SENC firmware is not supporting the rewriting function of the SATA drive firmware. x : Unit ID # (0-29) y : SENC Unit # (0-1)	Simple Trace	①1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Turn on the power of the subsystem again.	
				4. Select [Tool] – [Maintenance] from the menu bar on the unit window of the Storage Navigator Modular, and open the Maintenance window.	–
				5. Select the [ENC Micro Update] tab on the Maintenance window.	–
				6. Click the [Change] button of the automatic download, select [Enable], and then click the [OK] button.	–
				7. Turn off the subsystem power.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				8. Turn on the subsystem power again.	
				9. Check that "IXYR00 Automatic ENC microprogram download completed successfully" is displayed in the Information Message on WEB. (*1)	–
				10. Perform the drive firmware replacement again.	Drive Firmware Replacement User's Guide

*1 : When the Ready LED (green) on the front of the basic chassis is blinking at high speed, it may take 30 to 50 minutes at the maximum (40 to 60 minutes at the maximum in the case of the RKH) until this message is displayed. Also, when the WARNING LED (orange) on the front of the basic chassis is blinking at high speed, it may take 30 to 85 minutes at the maximum until this message is displayed.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZY000	ENC microprogram download start	An ENC microprogram downloading was started.		–	–
IZY100	ENC microprogram download complete	An ENC microprogram downloading was completed.		–	–
IZY20x	ENC#x microprogram download start	An ENC microprogram downloading was started. x : ENC Unit/SENC Unit # (0-1)		–	–
IZY40x	ENC#x microprogram download complete	An ENC microprogram downloading was completed. x : ENC Unit/SENC Unit # (0-1)		–	–
IZY5xy	ENC microprogram download info. (Unit-x, ENC-y)	A failure was detected in the ENC during an ENC downloading. x : Unit ID # (0-14) y : ENC Unit # (0-1)		① Replace the ENC Unit.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
IZY5HH	ENC microprogram download info. (Unit-x, ENC-y)	A failure was detected in the ENC during an ENC downloading. x : Unit ID # (0-29) y : ENC Unit # (0-1)		① Replace the ENC Unit.	
IZY5AT	ENC microprogram download Info.[SENC] (Unit-x, ENC-y)	A SENC microprogram downloading failed. x : Unit ID # (0-29) y : SENC Unit # (0-1)		① Replace the ENC Unit.	
IZY6xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A job timeout was detected during an ENC downloading. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Perform replacement of components in the following order to specify the failed component. •Disk Drive replacement •Control Unit replacement •ENC Unit replacement	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
IZY6HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A job timeout was detected during an ENC downloading. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
IZY6AT	ENC microprogram download Info.[SENC] (SES Unit-x)	A job timeout was detected during an SENC downloading. x : Unit ID # (0-29)		① Perform replacement of components in the following order to specify the failed component. •Control Unit replacement •SENC Unit replacement	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390) Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZY7xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (other than xx/35xx) was detected during an ENC downloading. x : Unit ID # (1-14) y : Disk Drive # (0-14)		① Perform replacement of components in the following order to specify the failed component. •Disk Drive replacement •Control Unit replacement •ENC Unit replacement	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “2.2.5 Replacing Control Unit” (REP 02-0390) Replacement “2.2.9 Replacing ENC Unit/ SENC Unit” (REP 02-0830)
IZY7HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (other than xx/35xx) was detected during an ENC downloading. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
IZY7AT	ENC microprogram download Info.[SENC] (SES Unit-x, HDU-y)	A drive error (other than xx/35xx) was detected during an SENC downloading. x : Unit ID # (0-29) y : Disk Drive # (0-14)		① Perform replacement of components in the following order to specify the failed component. •Disk Drive replacement •Control Unit replacement •SENC Unit replacement	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “2.2.5 Replacing Control Unit” (REP 02-0390) Replacement “2.2.9 Replacing ENC Unit/ SENC Unit” (REP 02-0830)
IZY8xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (incorrect post) was detected during an ENC downloading. x : Unit ID # (1-14) y : Disk Drive # (0-14)		① Perform replacement of components in the following order to specify the failed component. •Disk Drive replacement •Control Unit replacement •ENC Unit replacement	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “2.2.5 Replacing Control Unit” (REP 02-0390) Replacement “2.2.9 Replacing ENC Unit/ SENC Unit” (REP 02-0830)
IZY8HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (incorrect post) was detected during an ENC downloading. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
IZY8AT	ENC microprogram download Info.[SENC] (SES Unit-x, HDU-y)	A drive error (incorrect post) was detected during an SENC downloading. x : SES Unit ID # (0-29) y : Disk Drive # (0-14)		① Perform replacement of components in the following order to specify the failed component. •Disk Drive replacement •Control Unit replacement •SENC Unit replacement	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050) Replacement “2.2.5 Replacing Control Unit” (REP 02-0390) Replacement “2.2.9 Replacing ENC Unit/ SENC Unit” (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZY9xy	ENC microprogram download info. (ENC microprogram Unit-x, ENC-y)	A sum check error occurred in execution of the Status Read command during an ENC downloading. x : Unit ID # (0-14) y : ENC Unit # (0-1)		① Replace the data file and the ENC Unit in this order to specify the failed part.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
IZY9HH	ENC microprogram download info. (ENC microprogram Unit-x, ENC-y)	A sum check error occurred in execution of the Status Read command during an ENC downloading. x : Unit ID # (0-29) y : ENC Unit # (0-1)			
IZY9AT	ENC microprogram download Info. [SENC] (ENC microprogram Unit-x, ENC-y)	A sum check error occurred in execution of the Status Read command during an SENC downloading. x : Unit ID # (0-29) y : SENC Unit # (0-1)		① Replace the data file and the SENC Unit in this order to specify the failed part.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
IZYA00	ENC microprogram download CACHE destage check error	Unsaved information remained in the cache.		① Retry after shutdown.	–
IZYB00	ENC microprogram file open error [xxxxxxxxxxxx]	A display file open error occurred to the Ramsdisk. xxxxxxxxxxxx : Error replacement file name		① Replace the ENC microfile in the service PC.	–
IZYB01	ENC microprogram file read error [xxxxxxxxxxxx]	A display file read error occurred to the Ramsdisk. xxxxxxxxxxxx : Error replacement file name			
IZYB02	ENC microprogram file size over [xxxxxxxxxxxx]	The display file size exceeds the specified value. xxxxxxxxxxxx : Error replacement file name			
IZYB03	ENC microprogram file size mismatch [xxxxxxxxxxxx]	The display file size and the designated value are mismatched. xxxxxxxxxxxx : Error replacement file name			
IZYB04	ENC microprogram read data error [xxxxxxxxxxxx]	A contents error in the file occurred. xxxxxxxxxxxx : Error replacement file name			
IZYE00	ENC microprogram download info. [Data transfer time-out x] (CTL-y)	CTL-Unit ENC microgram download time out occurred. x : Internal classification of the ENC microprogram (0-7) y : Control Unit # (0-1)	Full Dump	① Retry the download after powering off and on. ② If the same message appears again, replace the Control Unit remaining.	– Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZYF00	ENC microprogram download info. [Write data found x] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because unprocessed data existed in the write area. x : Internal classification of the ENC microprogram (0-7) y : Control Unit # (0-1)	Full Dump	① Retry the download after powering off and on. ② If the same message appears again, replace the Control Unit remaining.	– Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
IZYG00	ENC microprogram download info. [Start bit clear NG x] (CTL-y)	When a down load of the microprogram was attempted, the download could not be done because the start bit could not be cleared. x : Internal classification of the ENC microprogram (0-7) y : Control Unit # (0-1)	Full Dump		
IZYH00	ENC microprogram download info. [Status error x] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because of a status error. x : Internal classification of the ENC microprogram (0-7) y : Control Unit # (0-1)	Full Dump		
IZYI00	ENC microprogram download info. [Data write error x] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because of a write error. x : Internal classification of the ENC microprogram (0-7) y : Control Unit # (0-1)	Full Dump		
IZYJ00	ENC microprogram download info. [Download file error x]	The file to be downloaded is illegal. x : Internal classification of the ENC microprogram (0-7)	Full Dump	① Check the file to be downloaded.	–
IZYK00	Read command response time over	50 or more read commands, which were instructed by a host and took longer than 100 ms for the drive to respond, were detected.		–	–
IZYL00	Write command response time over	50 or more write commands, which were instructed by a host and took longer than 100 ms for the drive to respond, were detected.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZYM0x	ENC microprogram download error detected (Unit-x)	An ENC microprogram downloading failed. x : Unit ID # (1-14)		–	–
IZYMHH	ENC microprogram download error detected (Unit-x)	An ENC microprogram downloading failed. x : Unit ID # (0-29)		–	–
IZYM00	ENC microprogram download error detected (CTL-Unit)	An ENC microprogram downloading failed.		–	–
IZYN00	ENC microprogram download info. [other SES error] (Unit-x, ENC-y)	When a download of the microprogram was attempted, the SES of the ENC in another system was in the unusable status. x : Unit ID # (0-29) y : ENC Unit #/SENC Unit # (0-1)	Simple Trace	① Download the ENC microprogram again.	–
IZYQ00	Automatic ENC microprogram download failed	The automatic ENC microprogram downloading terminated abnormally.	Simple Trace	① Make sure that the "IZY20x ENC#x microprogram download start" and "IZYM0x (IZYMHH) ENC microprogram download error detected (Unit-x)" were displayed before this message. ② Take recovery actions following messages displayed between the "IZY20x ENC#x microprogram download start" and "IZYM0x (IZYMHH) ENC microprogram download error detected (Unit-x)".	–
IZYR00	Automatic ENC microprogram download completed successfully	The automatic ENC microprogram downloading was completed normally.		–	–
IZYS00	Automatic ENC microprogram download start	The automatic ENC microprogram downloading was started.		–	–
IZZ000	HFWD file open error [x]	A file open error was detected. x : A name of the file concerning the error		① Copy the drive firmware file from the supplied medium to the PC and replace the drive firmware again. ② If not recovered yet, call the Technical Support Center for coping with troubles.	–
IZZ001	HFWD file read error [x]	A file read error was detected. x : A name of the file concerning the error			
IZZ002	HFWD file size over [x]	A file size over occurred. x : A name of the file concerning the error			

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
IZZ003	HFWD read data over [x]	Data read from the file was illegal. x : A name of the file concerning the error		① Copy the drive firmware file from the supplied medium to the PC and replace the drive firmware again. ② If not recovered yet, call the Technical Support Center for coping with troubles.	–
IZZ004	HFWD file size mismatch [x]	A file size is different from the estimated one. x : A name of the file concerning the error			

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Chapter 5. Flash Detected Messages

Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R00200	MCTL data parity error [DP3] [REG80000014, Bit15]	A parity error was detected in data bits 31 to 24 during a readout from the M-CTL internal register.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R00300	MCTL data parity error [DP2] [REG80000014, Bit14]	A parity error was detected in data bits 23 to 16 during a readout from the M-CTL internal register.	Simple Trace		
R00400	MCTL data parity error [DP1] [REG80000014, Bit13]	A parity error was detected in data bits 15 to 08 during a readout from the M-CTL internal register.	Simple Trace		
R00500	MCTL data parity error [DP0] [REG80000014, Bit12]	A parity error was detected in data bits 07 to 00 during a readout from the M-CTL internal register.	Simple Trace		
R00600	MCTL REG access error [RDRGWR] [REG80000014, Bit11]	A writing was attempted on the read-only register of the M-CTL internal register.	Simple Trace		
R00700	CTC parity error (CH-0) [REG80000014, Bit5]	A parity error occurred in the timer CH0.	Simple Trace		
R00800	CTC parity error (CH-1) [REG80000014, Bit4]	A parity error occurred in the timer CH1.	Simple Trace		
R00900	Watchdog-timer counter parity error [REG80000014, Bit0]	A parity error occurred in the counter for the watchdog timer.	Simple Trace		
R100yy	FPC is not detected (CTL-x)	The detection of the FPC failed. x : Control Unit# (0-1) y : Chip error code (y:z) = (01 : Path-0) (02 : Path-1) (03 : Path-0/1) (04 : Path-2) (05 : Path-0/2) (06 : Path-1/2) (07 : Path-0/1/2) (08 : Path-3) (09 : Path-0/3) (0A : Path-1/3) (0B : Path-0/1/3) (0C : Path-2/3) (0D : Path-0/2/3) (0E : Path-1/2/3) (0F : Path-0/1/2/3) (10 : Port-0A) (11 : Path-0/PortA)	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R20000	DCTL byte write error [REG82001238, Bit27]	A writing done beyond the 4-byte boundary was detected.	Simple Trace	① When "W0100x CTL alarm" is displayed following this message, take recovery actions according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20100	DCTL data read parity error [REG82001238, Bit23]	A data parity error was detected during an output from the data buffer to the PCI bus.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20300	DCTL address over [MPU] [REG82001238, Bit21]	A CADROV was detected when the MPU accessed the cache.	Simple Trace		
R20400	DCTL address parity error [MPU] [REG82001238, Bit20]	An address parity error was detected in the transfer address received by the cache.	Simple Trace		
R20500	DCTL LEN parity error [REG82001238, Bit19]	An LEN parity error was detected in the transfer word length received by the cache.	Simple Trace		
R20600	DCTL address over [DMA] [REG82001238, Bit18]	The Cache address over was detected when any of H_Port, D_Port, DMA #0 or MDMA of the data transfer control LSI accessed the Cache.	Simple Trace		
R20700	DCTL dummy area access error [REG82001238, Bit17]	Access, which was done to the access restricted area in the area for 4-byte dummy data addition of the cache, was detected.	Simple Trace		
R20800	DCTL REF counter parity error [REG82001238, Bit1]	A parity error was detected in the counter for the cache memory refreshment timing.	Simple Trace		
R20900	DCTL PPCI parity error [REG8200127C, Bit31]	A parity error was detected.	Simple Trace		
R20A00	DCTL PPCI system error [REG8200127C, Bit30]	An assertion of a system error was detected.	Simple Trace		
R20B00	DCTL PPCI master abort [REG8200127C, Bit29]	A master abortion was executed.	Simple Trace		
R20C00	DCTL PPCI received target abort [REG8200127C, Bit28]	A target abortion was received.	Simple Trace		
R20D00	DCTL PPCI signaled target abort [REG8200127C, Bit27]	A target abortion was executed.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R20E00	DCTL PPCI PERR assert or reception [REG8200127C, Bit24]	The data buffer controller LSI (D-CTL) asserted or received at the PERR when the bus master was used.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20F00	DCTL PPCI ADR parity error [REG8200127C, Bit23]	An address parity error was detected.	Simple Trace		
R20G00	DCTL PPCI DRD parity error [REG8200127C, Bit22]	A parity error was detected in the data read from the data FIFO.	Simple Trace		
R20H00	DCTL PPCI CMD parity error [REG8200127C, Bit21]	A parity error was detected when the ADR/CMD was read from the CMD buffer.	Simple Trace		
R20I00	DCTL PPCI CNT parity error [REG8200127C, Bit20]	A parity error was detected during counting by the FIFO control counter.	Simple Trace		
R20J00	DCTL PPCI target data response time-out [REG8200127C, Bit19]	A data response time-out (caused by 216 times of access) of a target was detected in the case of the DCTL master.	Simple Trace		
R20K00	DCTL PPCI target illegal termination [REG8200127C, Bit18]	An illegal termination of a target was detected in the case of the DCTL master. (The DEVSEL and STOP were negated at the same time in the data phase.)	Simple Trace		
R20L00	DUAL I/F DUAL_IORDY error [REG82001428, Bit29]	A failure in the impedance adjustment circuit in the self system. (DUAL_IORDY)	Full Dump		
R20M00	DCTL CACHE uncorrectable ERR [REG82001439, Bit29] (CTL-x, CACHE-y)	During a reading from the cache, the ECC error of two or more bits occurred in the two cache memory boards (MP). x : Control Unit# (0-1) y : Cache memory slot# (0,1,2,3,*) (* means the detection of all.)	Simple Trace	① Replace the Cache Unit. ② If not recovered, replace the above Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20N00	Hard register error [A_CTLIN]	The error is A_CTLIN=1 (The Control Unit of the other system is not installed.) of the I2C GPIO#1 register and it is also EXT_IORDY=1 (Impedance adjustment in the other system was completed.) of the impedance adjustment_1 register.	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20P00	Vector registration failure [KEYINT]	The vector registration of the KEYINTSTS interrupt failed.	Full Dump		
R20Q00	Vector registration failure [OFFREQ]	The vector registration of the OFFREQ interrupt failed.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R20R00	Vector registration failure [DCTLERR]	The vector registration of the DCTLERR interrupt failed.	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R20S00	Vector registration failure [DRAMERR]	The vector registration of the DRAMERR interrupt failed.	Full Dump		
R20T00	Vector registration failure [SRAMERR]	The vector registration of the SRAMERR interrupt failed.	Full Dump		
R20U00	Vector registration failure [PCI0ERR]	The vector registration of the PCI0ERR interrupt failed.	Full Dump		
R20V00	Vector registration failure [PCI1ERR]	The vector registration of the PCI1ERR interrupt failed.	Full Dump		
R20W00	Vector registration failure [CPUERR]	The vector registration of the CPUERR interrupt failed.	Full Dump		
R20Y00	DCTL D0PCI unexpected SPC detected [REG82001288, Bit12]	The invalid split completion message was detected (D #0).	Simple Trace		
R20Z00	DCTL D0PCI SPS error message [REG82001288, Bit13]	The split completion message that informs of an occurrence of an error was detected (D #0).	Simple Trace		
R21000	DCTL D0PCI split completion time-out [REG82001288, Bit14]	The data buffer controller LSI (D-CTL) detected time-out of waiting for the split completion (D #0).	Simple Trace		
R21100	DCTL D0PCI master ADB disconnection error [REG82001288, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message (D #0).	Simple Trace		
R21200	DCTL D0PCI SPC ADB error [REG82001288, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave (D #0).	Simple Trace		
R21300	DCTL D0PCI data response time-out [REG82001288, Bit19]	Data response time-out of the target was detected at the time of the DCTL master.	Simple Trace		
R21400	DCTL D0PCI counter parity error [REG82001288, Bit20]	A parity error was detected when the FIFO counter was counting.	Simple Trace		
R21500	DCTL D0PCI command parity error [REG82001288, Bit21]	A parity error was detected when an address/command was read from the command buffer.	Simple Trace		
R21600	DCTL D0PCI data parity error [REG82001288, Bit22]	A parity error was detected in the data that was read from the data FIFO.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R21700	DCTL D0PCI address parity error [REG82001288, Bit23]	A parity error of an address was detected.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R21800	DCTL D0PCI PERR detected [REG82001288, Bit24]	The PERR was asserted at the time of the bus master.	Simple Trace		
R21900	DCTL D0PCI single target abort [REG82001288, Bit27]	The target abort was executed.	Simple Trace		
R21A00	DCTL D0PCI target abort received [REG82001288, Bit28]	The target abort was received.	Simple Trace		
R21B00	DCTL D0PCI master abort [REG82001288, Bit29]	The master abort was executed.	Simple Trace		
R21C00	DCTL D0PCI system error [REG82001288, Bit29]	An assert of the SERR was detected.	Simple Trace		
R21D00	DCTL D0PCI parity error [REG82001288, Bit29]	A parity error was detected.	Simple Trace		
R21E00	DCTL PPCI ADB error [REG8200127C, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave.	Simple Trace		
R21F00	DCTL PPCI SPC ADB error [REG8200127C, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message.	Simple Trace		
R21G00	DCTL PPCI SPC time-out [REG8200127C, Bit14]	The data buffer controller LSI (D-CTL) detected time-out of waiting for the split completion.	Simple Trace		
R21H00	DCTL PPCI SPC error message [REG8200127C, Bit13]	The split completion message that informs of an occurrence of an error was detected.	Simple Trace		
R21J00	DCTL PPCI unexpected SPC detected [REG8200127C, Bit12]	The invalid split completion message was detected	Simple Trace		
R21K00	DCTL CBUF SELCNT parity error [REG82001238, Bit14]	A parity error was detected in the counter for the output pointer of a buffer for writing to the cache	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R21L00	DCTL PBUF SELCNT parity error [REG82001238, Bit14]	A parity error was detected in the counter for the input pointer of a buffer for writing to the cache	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R21M00	DCTL DBUF byte write error [REG82001238, Bit16]	Writing to the outside of the 4-byte boundary was detected in the ByteCnt in the PCI attribute	Simple Trace		
R21N00	DCTL register wait counter parity error [REG82001238, Bit13]	A parity error was detected in the counter of the waiting time of the SEQ for writing to the register	Simple Trace		
R21P00	DCTL RCTL error [REG82001238, Bit25]	No response with the RCTL (CACHE-IF) signal, which showed a read response, was made to the cache controller.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
R21Q00	DCTL RCTL error [REG82001238, Bit24]	No response with the RCLK (CACHE-IF) signal, which was a clock signal for taking in the read data, was made to the cache controller.	Simple Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R21R00	DCTL D1PCI unexpected SPC detected [REG8200128C, Bit12]	The invalid split completion message was detected.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R21S00	DCTL D1PCI SPC error message [REG8200128C, Bit13]	The split completion message that informs of an occurrence of an error was detected.	Simple Trace		
R21T00	DCTL D1PCI SPC time-out [REG8200128C, Bit14]	Time-out of the split completion response was detected.	Simple Trace		
R21U00	DCTL D1PCI SPC ADB error [REG8200128C, Bit15]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it received the split completion message.	Simple Trace		
R21V00	DCTL D1PCI master ADB disconnection error [REG8200128C, Bit18]	The data buffer controller LSI (D-CTL) detected that the PCI transfer was disconnected at an address other than the ADB (allowable disconnect boundary) when it was a PCI slave.	Simple Trace		
R21W00	DCTL D1PCI data response time-out [REG8200128C, Bit19]	Data response time-out of the target was detected at the time of the DCTL master.	Simple Trace		
R21Y00	DCTL D1PCI counter parity error [REG8200128C, Bit20]	A parity error was detected when the FIFO counter was counting.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R21Z00	DCTL D1PCI command parity error [REG8200128C, Bit21]	A parity error was detected when an address/command was read from the command buffer.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R22000	DCTL D1PCI data read parity error [REG8200128C, Bit22]	A parity error was detected in the data that was read from the data FIFO.	Simple Trace		
R22100	DCTL D1PCI address parity error [REG8200128C, Bit23]	A parity error of an address was detected.	Simple Trace		
R22200	DCTL D1PCI PERR detected [REG8200128C, Bit24]	The data buffer controller LSI (D-CTL) asserted or received at the PERR when the bus master was used.	Simple Trace		
R22300	DCTL D1PCI signal target abort [REG8200128C, Bit27]	The target abort was executed.	Simple Trace		
R22400	DCTL D1PCI received target abort [REG8200128C, Bit28]	The target abort was received.	Simple Trace		
R22500	DCTL D1PCI master abort [REG8200128C, Bit29]	The master abort was executed.	Simple Trace		
R22600	DCTL D1PCI system error [REG8200128C, Bit30]	An assert of the SERR was detected.	Simple Trace		
R22700	DCTL D1PCI data parity error [REG8200128C, Bit31]	A parity error was detected.	Simple Trace		
R30000	DCTL ECC write parity error [REG82001238, Bit31]	A parity error was detected in the ECC adding part during a writing on the cache.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
R30100	DCTL ECC generate error [REG82001238, Bit30]	An ECC generation error was detected in the ECC adding part during a writing on the cache.	Simple Trace	② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R302xy	DCTL CACHE uncorrectable ERR [REG82001238, Bit29] (CTL-x, CACHE-y)	During a reading from the cache, an EC error of two or more bits occurred in a single cache memory board. x : Control Unit # (0-1) y : Cache memory slot # (0,1,2,3,*) (* means the detection of all.)	Simple Trace	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R3030x	DCTL ECC correction failed [REG82001238, Bit28] (CTL-x)	An inconsistent correction of the ECC was detected during a readout from the cache. x : Control Unit # (0-1)	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message. ② Replace the Control Unit of which the CALM LED lights on except for ①.	"Chapter 6. Warning Messages" (MSG 06-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R312xy	ECC uncorrectable error (CTL-z)	The ECC uncorrectable error occurred while the hardware error interrupt was being suppressed. x : Code (1 : LDR) (2 : MNT) (3 : INS) (4 : COM) y : Detail code # z : Control Unit # (0-1)	Full Dump	① Replace all the cache memories installed in the Control Unit. ② If not recovered, replace the Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40100	DUAL I/F address parity error [INT/MP] [REG82001448, Bit15]	An address parity error was detected when the MP wrote on a certain part in another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40200	DUAL I/F write data parity error [INT/MP] [REG82001448, Bit14]	A data parity error was detected when the MP wrote on a certain part in another system.	Simple Trace		
R40300	DUAL I/F write ready time-out [INT/MP] [REG82001448, Bit13]	An ADR sending ready time-out was detected when the MP wrote/read on/from a certain part in another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40400	DUAL I/F CNT parity error [INT/MP] [REG82001448, Bit12]	A count parity error was detected when the MP wrote on a certain part in another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40500	DUAL I/F read data parity error [INT/MP] [REG82001448, Bit11]	A data parity error was detected when the MP read from a certain part in another system.	Simple Trace		
R40600	DUAL I/F read data ready time-out [INT/MP] [REG82001448, Bit10]	A data ready time-out was detected when the MP read from a certain part in another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40900	DUAL I/F address parity error [EXT/MP] [REG82001820, Bit0]	A parity error was detected in the address used for access by each port to another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R40A00	DUAL I/F CACHE address over [EXT/DMA] [REG82001838, Bit18]	A CADROV was detected when the DMA wrote on the cache in another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40B00	DUAL I/F read data parity error [EXT/MP] [REG82001838, Bit19]	A data parity error was detected when the MP read from a certain part in another system.	Simple Trace		
R40C00	DUAL I/F ECC correction error [EXT/MP] [REG82001838, Bit28]	An ECC_COR error was detected when the MP read from a certain part in another system.	Simple Trace		
R40D00	DUAL I/F ECC uncorrectable error [EXT/MP] [REG82001838, Bit24]	An ECC_UNCORRE error was detected when the MP read from a certain part in another system.	Simple Trace		
R40E00	DUAL I/F write parity error [EXT/MP] [REG82001838, Bit31]	A parity error was detected in write data when the MP wrote on a certain part in another system.	Simple Trace		
R40F00	DUAL I/F ECC write parity error [EXT/MP] [REG82001838, Bit30]	An ECC_WPTY error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40G00	DUAL I/F ECC GEN error [EXTMP] [REG82001838, Bit29]	An ECC_GEN error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40H00	DUAL I/F CACHE address parity error [EXT/MP] [REG82001838, Bit27]	A cache address parity error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40I00	DUAL I/F WLEN parity error [EXT/MP] [REG82001838, Bit26]	A WLEN parity error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40J00	DUAL I/F counter parity error [EXT/MP] [REG82001838, Bit21]	A counter parity error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40K00	DUAL I/F CACHE address over [EXT/MP] [REG82001838, Bit25]	A CARDOV error was detected when the MP wrote on the cache in another system.	Simple Trace		
R40M00	DUAL I/F error [MDTDCHK] [REG82001228, Bit17]	An error was detected when the MP accessed another system.	Simple Trace		
R40N00	DUAL I/F SELF_IORDY error [REG82001428, Bit22]	A failure of the impedance adjustment circuit in the own system was detected.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R40P00	DUAL I/F SELF_IORDY error [REG82001428, Bit21]	A failure of the impedance adjustment circuit in another system was detected.	Simple Trace	① Replace the Control Unit whose CALM LED is on. ② When the CALM LED does not light up, check the WEB message, and replace the Control Unit displayed in the message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40Q00	DUAL I/F SELF_IORDY changed RDY into NotRDY [INT/MP] [REG82001428, Bit28]	The SELF_IORDY changed from RDY to NotRDY.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R40R00	DUAL I/F EXT_IORDY changed RDY into NotRDY [INT/MP] [REG82001428, Bit26]	The EXT_IORDY changed from RDY to NotRDY.	Simple Trace		
R40S00	DUAL I/F MRGN error [INT/MP] [REG82001484, Bit2]	The data buffer controller LSI (D-CTL) detected a margin error when it acquired data from the other one of the dual Control Unit.	Simple Trace		
R40T00	DUAL I/F SEQ error [INT/MP] [REG82001484, Bit1]	When the Control Unit in the self system adjusted the data input timing during data sending/reception to/from the Control Unit in the other system, it detected a sequence error. [Failure in the bus between the CTLs]	Simple Trace		
R40U00	DUAL I/F SLV error [INT/MP] [REG82001484, Bit3]	An error was reported from the other Control Unit.	Simple Trace		
R40V00	DUAL I/F DCNT error [INT/MP] [REG82001484, Bit0]	The delay counter exceeded the allowable delay limit of the delay element.	Simple Trace		
R40W00	DUAL I/F RCLK error [EXT/MP] [REG82001838, Bit23]	The RCLK error was detected when the other one of the dual Control Unit of the MP was reading from the cache.	Simple Trace		
R40Y00	DUAL I/F RCLK error [EXT/MP] [REG82001838, Bit22]	The RCLK error was detected during a reading from the cache of the other one of the dual Control Unit of the MP.	Simple Trace		
R50200	BRG CPU address out of range [REGF1000140, Bit0]	The "CPU address out of range" was detected. [BRG CPU]	Simple Trace		
R50300	BRG CPU bad address parity detected [REGF1000140, Bit1]	The "Bad Address Parity" was detected. [BRG CPU]	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R50400	BRG CPU transfer type violation [REGF1000140, Bit2]	The “transfer type violation” was detected. [BRG CPU]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement “2.2.5 Replacing Control Unit” (REP 02-0390)
R50500	BRG CPU access to a protected region [REGF1000140, Bit3]	Access to a protected region was detected. [BRG CPU]	Simple Trace		
R50600	BRG CPU write to a write protected region [REGF1000140, Bit4]	A writing on a write-protected region occurred. [BRG CPU]	Simple Trace		
R50700	BRG CPU read from a caching protected region [REGF1000140, Bit5]	A readout from a caching-protected region occurred. [BRG CPU]	Simple Trace		
R50800	BRG CPU bad write data parity detected [REGF1000140, Bit6]	The “bad write data parity” was detected. [BRG CPU]	Simple Trace		
R50900	BRG CPU bad read data parity detected [REGF1000140, Bit7]	The “bad read data parity” was detected. [BRG CPU]	Simple Trace		
R50B00	BRG PCI0 the PCI slave detected bad write data parity [REGF1001D58, Bit1]	The PCI slave detected the “bad write data parity”. [BRG CPU]	Simple Trace		
R50C00	BRG PCI0 PERR response to read data driven by PCI slave [REGF1001D58, Bit2]	The “PERR response to read data” by the PCI slave occurred. [BRG PCIO]	Simple Trace		
R50D00	BRG PCI0 PERR response to address driven by the PCI master [REG14001D58, Bit4]	The “PERR response to address” by the PCI master occurred. [BRG PCIO]	Simple Trace		
R50E00	BRG PCI0 PERR response to write data driven by the PCI master [REGF1001D58, Bit5]	The “PERR response to write data” by the PCI master occurred. [BRG PCIO]	Simple Trace		
R50F00	BRG PCI0 bad data parity detected during the PCI master read [REGF1001D58, Bit6]	The “bad data parity” was detected during a readout by the PCI master. [BRG PCIO]	Simple Trace		
R50G00	BRG PCI0 the PCI master generated master abort [REGF1001D58, Bit8]	A master abortion occurred in the PCI master. [BRG PCIO]	Simple Trace		
R50H00	BRG PCI0 the PCI master detected target abort [REGF1001D58, Bit9]	The PCI master detected a target abortion. [BRG PCIO]	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R50I00	BRG PCI0 generate transaction while master is not enabled [REG14001D58, Bit10]	The slave PCI terminated the process because of a target abortion. [BRG PCIO]	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R50J00	BRG PCI0 the PCI master reached retry counter limit [REGF1001D58, Bit11]	The threshold value of the retry counter was exceeded in the PCI master. [BRG PCIO]	Simple Trace		
R50L00	BRG PCI0 the PCI slave terminates a transaction with Target Abort [REGF1001D58, Bit17]	The PCI slave terminated the process because of a target abortion. [BRG PCIO]	Simple Trace		
R50P00	BRG PCI0 a PCI slave read buffer discard timer expired [REGF1001D58, Bit20]	The "read buffer discard timer expired" occurred in the PCI slave. [BRG PCIO]	Simple Trace		
R50Q00	BRG PCI0 Internal PCI arbiter detection of a broken master [REGF1001D58, Bit21]	The "internal PCI arbiter detection of a "broken" master" occurred. [BRG PCIO]	Simple Trace		
R50R00	BRG PCI0 PCI BIST interrupt [REGF1001D58, Bit24]	The "PCI BIST interrupt" occurred. [BRG PCIO]	Simple Trace		
R50S00	BRG PCI0 PCI power management interrupt [REGF1001D58, Bit25]	The "PCI power management interrupt" occurred. [BRG PCIO]	Simple Trace		
R50T00	BRG PCI0 PCI reset assert [REGF1001D58, Bit26]	The "PCI reset assert" occurred. [BRG PCIO]	Simple Trace		
R50V00	BRG CPU internal data path parity error detected [REGF1000140, Bit8]	An internal data path parity error was detected in the CPU interface unit.	Simple Trace		
R50W00	BRG DRAM internal data path parity error [REGF10014D0, Bit2]	The Dunit internal data path parity error was detected.	Simple Trace		
R50Y00	BRG DRAM double bit ECC error detected [REGF10014D0, Bit1]	The DRAM two-bit ECC error was detected.	Simple Trace		
R50Z00	BRG DRAM single bit ECC threshold expired [REGF10014D0, Bit0]	The number of the DRAM single bit ECC errors reached the threshold value.	Simple Trace		
R51000	BRG SRAM double bit ECC error detected [REGF10014D0, Bit0]	The SRAM two-bit ECC error was detected.	Simple Trace		
R51100	BRG SRAM single bit ECC error threshold expired [REGF10014D0, Bit0]	The number of the SRAM single bit ECC errors reached the threshold value.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R51200	BRG PCI0 master generated target abort for split completion [REGF1001D58, Bit7]	The PCI master generated the target abort for the split completion.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
R51300	BRG PCI0 slave SPC transaction terminated with an abort [REGF1001D58, Bit23]	The PCI slave terminated the transaction with the target abort.	Simple Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R51400	BRG PCI0 slave reached the retry counter limit [REGF1001D58, Bit22]	The excess of the threshold value of the retry counter occurred in the PCI slave when generation of the split completion was attempted.	Simple Trace		
R51500	BRG PCI0 slave as a completer detected target abort [REGF1001D58, Bit18]	The PCI slave detected the target abort as a Completer.	Simple Trace		
R51600	BRG PCI0 slave generated master abort as a completer [REGF1001D58, Bit16]	The master abort occurred in the PCI slave as a Completer.	Simple Trace		
R51700	BRG PCI0 master received message error [REGF1001D58, Bit14]	The PCI master received a message error.	Simple Trace		
R51800	BRG PCI0 master received incorrect split completion [REGF1001D58, Bit3]	The PCI master received the Split Completion with a size (number of bytes) that does not meet the requirement.	Simple Trace		
R51900	BRG PCI0 master split completion discard timer expired [REGF1001D58, Bit12]	The time when the PCI master discards the Split Completion has come.	Simple Trace		
R51A00	BRG PCI0 transaction generated while master is disabled [REGF1001D58, Bit10]	The PCI transaction was generated while the master PCI was disabled.	Simple Trace		
R51B00	BRG PCI0 internal data path error in the PCI interface [REGF1001D58, Bit0]	An internal data path error was detected in the PCI interface.	Simple Trace		
R51C00	BRG PCI0 DWORD boundary error [REGF1001D58, Bit4]	An issue of an I/O instruction beyond the DWORD boundary was attempted.	Simple Trace		
R51D00	BRG PCI1 internal data path error in the PCI interface [REGF1001DD8, Bit0]	The CPU-PCI bridge detected an internal data path error in the PCI1 interface.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R51E00	BRG PCI1 the PCI slave detected bad write data parity [REGF1001DD8, Bit1]	The PCI slave detected an illegal parity of the write data.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
R51F00	BRG PCI1 PERR response to read data driven by PCI slave [REGF1001DD8, Bit2]	The CPU-PCI bridge detected the PERR response to the read data that the PCI slave transferred.	Simple Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R51G00	BRG PCI1 DWORD boundary error [REGF1001DD8, Bit4]	The CPU-PCI bridge detected the I/O which exceeds the DWORD boundary.	Simple Trace		
R51H00	BRG PCI1 PERR response to write data driven by the PCI master [REGF1001DD8, Bit5]	The CPU-PCI bridge detected the PERR response to the write data that the PCI master transferred.	Simple Trace		
R51J00	BRG PCI1 bad data parity detected during the PCI master read [REGF1001DD8, Bit6]	The CPU-PCI bridge detected an illegal parity of the data while the PCI master read the data.	Simple Trace		
R51K00	BRG PCI1 master generated target abort for split completion [REGF1001DD8, Bit7]	The PCI master generated the target abort as split completion.	Simple Trace		
R51L00	BRG PCI1 the PCI master generated master abort [REGF1001DD8, Bit8]	The PCI master generated the master abort.	Simple Trace		
R51M00	BRG PCI1 the PCI master detected target abort [REGF1001DD8, Bit9]	The PCI master detected the target abort.	Simple Trace		
R51N00	BRG PCI1 transaction generated while master is disabled [REGF1001DD8, Bit10]	The PCI transfer occurred while the PCI master is disabled.	Simple Trace		
R51P00	BRG PCI1 the PCI master reached retry counter limit [REGF1001DD8, Bit11]	The retry of the PCI master exceeded the threshold value of the retry counter.	Simple Trace		
R51Q00	BRG PCI1 master split completion discard timer expired [REGF1001DD8, Bit12]	The time when the PCI master is waiting for split completion reached at the split completion cancellation time.	Simple Trace		
R51R00	BRG PCI1 master received incorrect split completion [REGF1001DD8, Bit13]	The PCI master received split completion of the number of bytes which does not suit the demand.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R51S00	BRG PCI1 master received message error [REGF1001DD8, Bit14]	The PCI master received a message error.	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
R51T00	BRG PCI1 slave generated master abort as a completer [REGF1001DD8, Bit16]	The PCI slave generated the master abort as the completion side.	Simple Trace	② When the ALARM LED (red) on the front side of the Basic Chassis lights up, replace the Control Unit whose CALM LED lights up.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
R51U00	BRG PCI1 the PCI slave terminates a transaction with Target Abort [REGF1001DD8, Bit17]	The PCI slave terminated the transfer by the target abort.	Simple Trace		
R51V00	BRG PCI1 slave as a completer detected target abort [REGF1001DD8, Bit18]	The PCI slave detected the target abort as the completion side.	Simple Trace		
R51W00	BRG PCI1 a PCI slave read buffer discard timer expired [REGF1001DD8, Bit20]	The data waiting time for the read buffer of the PCI slave exceeded the cancellation time of the data.	Simple Trace		
R51X00	BRG PCI1 Internal PCI arbiter detection of a broken master [REGF1001DD8, Bit21]	The internal PIC arbiter detected the troubled PCI master.	Simple Trace		
R51Y00	BRG PCI1 slave reached the retry counter limit [REGF1001DD8, Bit22]	When split completion was to be generated, the retry of the PCI slave exceeded the threshold value of the retry counter.	Simple Trace		
R51Z00	BRG PCI1 slave SPC transaction terminated with an abort [REGF1001DD8, Bit23]	Split completion of the PCI slave terminated with the master abort or the target abort.	Simple Trace		
R52000	BRG PCI1 PCI BIST interrupt [REGF1001DD8, Bit24]	The PCI BIST interrupt occurred.	Simple Trace		
R52100	BRG PCI1 PCI power management interrupt [REGF1001DD8, Bit25]	The PCI Power Management interrupt occurred.	Simple Trace		
R52200	BRG PCI1 PCI reset assert [REGF1001DD8, Bit26]	The assert of the PCI reset occurred.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R5230x	Unsupported control unit type (CTL-x)	The Control Unit, which the microprogram stored in the system disk is not supporting, was detected. x : Control Unit # (0-1)	Simple Trace	① Refer to Troubleshooting "6.1.25 Recovery method when the Control Unit whose microprogram is not supporting was detected".	Troubleshooting "6.1.25 Recovery method when the Control Unit whose microprogram is not supporting was detected" (TRBL 06-1313)
R52400	Subsystem Identification Switch error (Unit-x)	Abnormality of the subsystem identification switch was detected at the time of turning on the power of the subsystem. x : Unit ID# (0-29)	Full Dump	① 1. Check if the setting of the subsystem identification switch is not incorrect for all the Additional Chassis.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				2. If it is incorrect, turn off the main switch, and then turn off the AC Input Power Switches of all the subsystems.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				3. Set the subsystem identification switch correctly again.	Installation "3.4.7 (1-3) Setting the subsystem identification switch" (INST 03-0521)
				4. Turn on the subsystem power.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				② 1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. Replace the ENC Unit #0 of the subsystem displayed in the message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				4. Turn on the subsystem power.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				③ 1. Turn off the main switch.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Turn off all the AC Input Power Switches.	
				3. When this error message is displayed again in the same unit ID and the subsystem goes down, replace the ENC Unit #1. When this error message is displayed in the different unit ID and the subsystem goes down, return to ② and perform the maintenance.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
				4. Turn on the subsystem power.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)

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Message code	Message text	Description	Collect the error		Recovery methods	Reference page
R52500	Down grade install NG [TrueCopy Extended Distance feature is unlocked]	Because the license key of TrueCopy Extended Distance is unlocked, the update installation cannot be performed for the version downgrade to the microprogram which is not supporting the TrueCopy Extended Distance function.	Simple Trace	①	1. Click [Go to Normal Mode] in the menu frame on WEB, and start the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
					2. Check that the subsystem becomes Ready.	–
					3. Delete all the pairs created by the TrueCopy Extended Distance function referring to "TrueCopy Extended Distance User's Guide".	–
					4. Lock the license key of TrueCopy Extended Distance.	–
					5. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
					6. Perform the update installation of the microprogram again for the version downgrade.	WEB "3.3.1 Microprogram" (WEB 03-0280
R52600	Down grade install NG [need reboot]	Because the subsystem was changed to the maintenance mode without restarting, the update installation for the version downgrade cannot be performed although the setting for which the restart of the subsystem is necessary was executed.	Simple Trace	①	1. Click [Go to Normal Mode] in the menu frame on WEB, and start the subsystem.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
					2. Check that the subsystem becomes Ready.	–
					3. Perform the regular sequential shutdown.	Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310)
					4. Start up the subsystem again.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
					5. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
					6. Perform the update installation of the microprogram again for the version downgrade.	WEB "3.3.1 Microprogram" (WEB 03-0280

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R52700	Down grade install NG [iSCSI Target(s) or CHAP User(s) is not initialized]	Because Target other than Target #0 of the iSCSI is defined, CHAP User is defined or Target #0 is not initialized, the upgrade installation of the microprogram of the revision, which is not supporting the extension function of the number of the iSCSI connection hosts (The number of host connections is 129 or more and 255 or less, the number of iSCSI targets is 129 or more and 255 or less, the number of CHAP User definitions is 257 or more and 512 or less, and the number of mappings of the iSCSi initiator of the LUN Manager is 129 or more and 256 or less.), cannot be performed.	Simple Trace	① 1. Start the subsystem by clicking [Go to Normal Mode] in the menu of the maintenance mode window on WEB.	Installation "1.7 Power On/Off Procedure" (INST 01-0290)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Perform the update installation of the microprogram whose version is to be downgraded referring to Microprogram "1.7 Procedure of the version downgrade of the microprogram".	Microprogram "1.7 Procedure of the version downgrade of the microprogram" (MICRO 01-0290)
R52800	Down grade install NG [Some P-VOL of ShadowImage has the MU number other than 0]	The update installation of the microprogram of the revision which is not supporting ShadowImage 1:3 cannot be performed because the P-VOL that has the MU number other than 0 among the P-VOLs of ShadowImage in-system replication exists.	Simple Trace	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Release the pair that the MU number of the P-VOLs is other than 0 referring to ShadowImage in-system replication User's Guide "4.5 Releasing ShadowImage Pairs (pairsplit –S)". The data of the S-VOL will be deleted. Therefore, request the customer to backup the data of the S-VOL in advance if needed.	ShadowImage in-system replication User's Guide "4.5 Releasing ShadowImage Pairs (pairsplit –S)"

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				4. Change it to the maintenance mode.	WEB “Chapter 3. The Maintenance Mode Operation Procedure” (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB “3.6 Other” (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to “Disable”.	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB “3.3.1 Microprogram” (WEB 03-0280)
				8. Click “To Maintenance Mode Top” of the “Microprogram Setup” window on WEB.	
				9. Return the subsystem to the normal mode by clicking the “Go to Normal Mode” button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
				10. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R52900	Down grade install NG [Some P-VOL of SnapShot has the MU number 14 or above]	The update installation of the microprogram of the revision which is not supporting SnapShot 1:15 cannot be performed because the P-VOL that has the MU number of 14 or more among the P-VOLs of Copy-on-write SnapShot exists.	Simple Trace	①1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Release the pair that the MU number of the P-VOLs is 14 or more referring to Copy-on-write SnapShot User's Guide "4.4 Releasing SnapShot Pairs (pairsplit –S)". When releasing the pair which retains the data of SnapShot, the data of the SnapShot will be deleted. Therefore, request the customer to backup the data in advance if needed.	Copy-on-write SnapShot User's Guide "4.4 Releasing SnapShot Pairs (pairsplit –S)"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				9. Return the subsystem to the normal mode by clicking the "Go to Normal Mode" button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
R52A00	Down grade install NG [The total V-VOL count for one P-VOL of SnapShot exceeded 15]	The update installation of the microprogram of the revision which is not supporting SnapShot 1:15 cannot be performed because 15 or more V-VOLs are created for one P-VOL of Copy-on-write SnapShot.	Simple Trace	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Delete the V-VOLs to be within 14 for one P-VOL referring to Copy-on-write SnapShot User's Guide '3.5 Setting P-VOL and SnapShot Image (V-VOL)". When deleting the V-VOL in use, the data of SnapShot of the V-VOL will be deleted. Therefore, request the customer to backup the data in advance if needed.	Copy-on-write SnapShot User's Guide '3.5 Setting P-VOL and SnapShot Image (V-VOL)"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				6. Set [Down Grade Check] of the [Others] window to “Disable”.	WEB “3.6 Other” (WEB 03-0430)
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB “3.3.1 Microprogram” (WEB 03-0280)
				8. Click “To Maintenance Mode Top” of the “Microprogram Setup” window on WEB.	
				9. Return the subsystem to the normal mode by clicking the “Go to Normal Mode” button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
				10. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R52B00	Down grade install NG [TureCopy/ TrueCopy Extended Distance pair of NAS user LUs exists]	The update installation of the microprogram whose revision is not supporting TrueCopy remote replication/TrueCopy Extended Distance in the pair of the NAS user LU cannot be performed because the pair of TrueCopy remote replication or TrueCopy Extended Distance configured in the NAS user LU exists.	Simple Trace	①1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Release the pair of the NAS User LU referring to "Releasing TrueCopy Pairs (pairsplit -S)" in "TrueCopy remote replication User's Guide" or "TrueCopy Extended Distance User's Guide". If the pair is released, the data of the S-VOL will be deleted. Therefore, request the customer/SE to backup the data of the S-VOL in advance if needed.	"Releasing TrueCopy Pairs (pairsplit -S)" in "TrueCopy remote replication User's Guide" or "TrueCopy Extended Distance User's Guide"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
R52C00	Down grade install NG [Modular Volume Migration feature is installed]	The update installation cannot be performed for the microprogram of the revision which is not supporting the Modular Volume Migration function because the priced option of the Modular Volume Migration function is unlocked.	Simple Trace	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Lock the priced option of the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration".	Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				8. Click “To Maintenance Mode Top” of the “Microprogram Setup” window on WEB.	WEB “3.3.1 Microprogram” (WEB 03-0280)
				9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
				10. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–
R52D00	Down grade install NG [Modular Volume Migration has already taken place]	The update installation cannot be performed for the microprogram of the revision which is not supporting the Modular Volume Migration function because the LU that the Modular Volume Migration is executed exists in the subsystem with the Modular Volume Migration function.	Simple Trace	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
				2. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–
				3. When the Modular Volume Migration function of the priced option is locked, unlock the Modular Volume Migration function referring to Modular Volume Migration User’s Guide “3.1.1 Installing Volume Migration”. However, when the Modular Volume Migration function of the priced option is expired, unlock it with the Emergency Key, etc.	Modular Volume Migration User’s Guide “3.1.1 Installing Volume Migration”

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				4. When the Modular Volume Migration function is disabled, enable the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.3 Enabling or Disabling Volume Migration".	Modular Volume Migration User's Guide "3.1.3 Enabling or Disabling Volume Migration"
				5. Check if the LU whose intermediate LU number and the internal LU number do not match exists by the maintenance mode of the Storage Navigator Modular.	–
				6. When there is the LU whose intermediate LU number and the internal LU number do not match, perform the Modular Volume Migration so that the intermediate LU number and the internal LU number match referring to the "Modular Volume Migration User's Guide". In that case, the data of the LUs may have to be backed up as needed.	"Modular Volume Migration User's Guide"
				7. Lock the priced option of the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration".	Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration"
				8. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				9. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				10. Set [Down Grade Check] of the [Others] window to "Disable".	
				11. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				12. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				13. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				14. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R52E00	Down Grade Install NG [TrueCopy remote replication feature is installed]	The update installation cannot be performed for the microprogram of the revision which is not supporting the TrueCopy remote replication function because the priced option of TrueCopy remote replication is unlocked.	Simple Trace	①1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Lock the priced option of the TrueCopy remote replication function referring to TrueCopy remote replication User's Guide "3.1.2 Uninstallation".	TrueCopy remote replication User's Guide "3.1.2 Uninstallation"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
R52F00	Down Grade Install NG [Account Authentication feature is installed]	The update installation of the microprogram of the revision which is not supporting Account Authentication cannot be performed because the priced option of Account Authentication is unlocked.	Simple Trace	① 1. Check that the revision of the microprogram to be installed is the revision to be originally installed.	–
				2. When the micorprogram to be installed is wrong, perform the update installation of the microprogram to be originally installed again.	WEB “3.3.1 Microprogram” (WEB 03-0280)
				② 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
				2. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–
				3. Lock the priced option of the Account Authentication function referring to Account Authentication User’s Guide “3.2 Un-installation”.	Account Authentication User’s Guide “3.2 Un-installation”
				4. Change it to the maintenance mode.	WEB “Chapter 3. The Maintenance Mode Operation Procedure” (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB “3.6 Other” (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to “Disable”.	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB “3.3.1 Microprogram” (WEB 03-0280)
				8. Click “To Maintenance Mode Top” of the “Microprogram Setup” window on WEB.	
				To be continued to the next page.	

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
R53000	Down Grade Install NG [Power Saving Feature is Installed]	The update installation of the microprogram of the revision which is not supporting Power Saving cannot be performed because the priced option of Power Saving is unlocked.	Simple Trace	① 1. Check that the revision of the microprogram to be installed is the revision to be originally installed.	–
				2. When the microprogram to be installed is wrong, perform the update installation of the microprogram to be originally installed again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				② 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Lock the priced option of the Power Saving function referring to Power Saving User's Guide "3.2 Uninstalling".	Power Saving User's Guide "3.2 Uninstalling"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
RA00xx	Microprogram error [FLS]	A system shutdown occurred because of a logical contradiction. x : Any code	Full Dump	① Turn on the power again.	–
RA01xy	Microprogram error [COM]	Logical illegality of the microprogram was detected. (common function). xy : Any code	Full Dump	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA0410	Host name delete error	The network download function failed to delete the host name.	Full Dump	① Check the directory, in which the main system is stored, entered in the WEB window.	–
RA0411	NFS unmount error	An NFS unmounting resulted in an error during operation of the network download function.	Full Dump		
RA0412	NFS mount error	An NFS mounting resulted in an error during operation of the network download function.	Full Dump	② Replace the Control Unit if the error recurs.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA0413	Host name add error	The network download function failed to add the host name.	Full Dump	① Check if the directory, in which the main system is stored, entered in the Web window and the files stored in it are correct.	–
RA0414	NFS file open error	A file opening resulted in an error during operation of the network download function.	Full Dump		
RA0415	System file error	An error was detected in a file in the directory storing the system during operation of the network download function.	Full Dump	② Replace the Control Unit if the error recurs.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA1000	Loop error	A system shutdown occurred because of a loop failure.	Full Dump	① 1. Collect and analyze Full Dump and specify the failed part. 2. Refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)".	Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130) Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA30xy	CACHE size mismatch b/w. CTL (CACHE-x)	A cache mounting error occurred. x : Cache memory slot # (0-3)		① 1. Check if the Cache Unit is installed in a correct location by referring to the location of the corresponding Cache Unit on the normal mate Control Unit.	Troubleshooting "10.2.1 Maintenance with the Storage Navigator Modular (GUI version)"(TRBL 10-0080)
				2. Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
RA4000	CTL synchronized error	Synchronization failed.	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA4100	CTL initial synchronized error	Time-out occurred in another system because of an initial synchronization.			
RA4200	Maintenance mode synchronized error	A synchronization error occurred in maintenance mode.			
RA6000	CTL number mismatch	The single mode is set in the system parameter but dual mode is selected actually.		① Set the system parameter correctly in the WEB maintenance mode.	For WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
RA6100	System parameter undefined	System parameter information (common) is not set.			
RA7000	Microprogram revision mismatch	The systems drive-loaded between Control Units are mismatched.		① Turn the power off, then turn it on again.	–
RA7600	CTL unit type mismatch	Inconsistency of Control Unit type was detected.	Simple Trace	① Check types of the two Control Units and replace the wrong Control Unit with a correct one.	–
RA7700	CTL unit type cache size over	A unsupported cache memory capacity size (larger then 1GB) was detected in the DF700 RKS.	Simple Trace	① Check the cache capacity and replace the cache memory with that supported by the DF700 RKS.	–
RA780x	Unsupported CACHE (CACHE-x)	When starting the subsystem, the authentication of the Cache memory displayed in the message failed. x : Cache memory # (0-3)	Simple Trace	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA7900	System HDU spin up failed	Spin-up of the system drive failed.	Simple Trace	① Replace the part in which the failure occurred, and then turn on the power again.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA7A00	CACHE installation error (CACHE-0/1)	Cache memories are not installed in both of the Slots #0 and #1.	Simple Trace	① Install the cache memories in both of the Slots #0 and #1.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
RA7B0x	CACHE size get error (CACHE-x)	Acquisition of the cache capacity failed. x : Cache memory slot # (0-3)	Simple Trace	① Replace a cache memory inserted in the cache slot whose number was shown in the message.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA7C00	Unsupported unit is connected	An unsupported disk array unit is connected.	Simple Trace	① When the RKAJAT is mounted, disconnect the connected RKAJ.	–
RA7D00	MAC address error [usrport]/[mntport]	MAC address is illegal	Simple Trace	① Because a controller detachment is caused by the MAC address error, replace a controller whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA7E0x	CTL unit type error detected (CTL-x)	An illegal Frame type was detected. x : Control Unit # (0-1)	Simple Trace	① When "W0100x CTL alarm" is displayed after this message, maintain it according to the message.	"Chapter 6. Warning Messages" (MSG 06-0000)
				② Replace the Control Unit of which the CALM LED lights on except for ①.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA7F00	TWSI access error [Read, XX-YY-AA-BB]	An error was detected during the I2C reading in the flash operation. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace	–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA8000	TWSI access error [Write, XX-YY-AA-BB]	An error was detected during the I2C writing in the flash operation. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace	–	–
RA8100	TWSI access error [3 times reading, X]	The triple reading error was detected during the I2C reading in the flash operation. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted	Simple Trace	–	–
RA8200	DUAL I/F DESKEW is not completed	Though the Control Unit in the self system attempted to adjust the data input timing when it was sending/receiving data to/from the Control Unit in the other system, the adjustment was not completed within the time limit. [Failure in the bus between the CTLs]	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA8300	CACHE sleep termination time-out	A time-out error occurred because the status in which the cache was sleeping status was not removed.	Full Dump		
RA8400	PONCNT parity error	PONCNT parity error.	Full Dump		
RA8500	DDR2 I/O buffer error	An impedance adjustment failure of the DDR2 I/O buffer was detected.	Full Dump		
RA8600	The setting of CACHE control mode failed	The setting of the cache control mode failed.	Full Dump		
RA8700	The setting of CACHE terminate failed	The setting of the cache memory termination value failed.	Full Dump		
RA8800	CTL number error	The Slot# bit failure of the TWSI GPIO#1 register was detected.	Full Dump		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA8900	DCTL register error [EMACIN/A_CTLIN]	When the Control Unit of the other system requested the DCTL_MODE register to be detached (EMACIN=1), it was detected that the Control Unit of the other system of the TWSI GPO#1 register was not installed (A_CTLIN=1).	Full Dump	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA8A00	DCTL EMACIN not detected	The EMACIN bit error occurred during insertion of the Control Unit performed in the state in which the subsystem power was on.	Full Dump		
RA8B00	TWSI access error [Configuration register read, XX-YY-AA-BB]	A reading error occurred in the TWSI initialization (setting of the TWSI-GPIO I/O attribute) at the time of the subsystem boot. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace		
RA8C00	TWSI access error [Configuration register write, XX-YY-AA-BB]	A writing error occurred in the TWSI initialization (setting of the TWSI-GPIO I/O attribute) at the time of the subsystem boot. XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted YY : Sequence number (2 to 7) of the step in which an error occurred during the access via the TWSI AA : Expected termination status in the case of access via the TWSI BB : Actual termination status in the case of access via the TWSI	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RA8D00	TWSI access error [Configuration register 3 times, XX]	The triple reading error occurred in the TWSI initialization (setting of the TWSI-GPIO I/O attribute) at the time of the subsystem boot XX : Register ID number (0 to 0x45) of the access to which via the TWSI was attempted	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RA9000	Task make error	Generation of a task or a semaphore failed.	Full Dump		
RAA000	CUDG skip	CUDG skip was made.		–	–
RAA100	Remote reboot execute	A remote rebooting was done.		–	–
RAA200	Option data initialized	The unlocking information was initialized owing to an occurrence of a sumcheck error in the take-over information area (FM) in which the unlocking information is stored.		–	–
RB0000	Upload system error	An incorrect microprogram (with an incorrect file and/or directory configuration) was specified during a upload.	Simple Trace	① Check the microprogram you want to install and install it over again.	–
RB0100	File remove error	Deletion of a file on the RAM disk failed.	Simple Trace	① Turn on the power again.	–
				② If the problem is not solved in spite of the above operation, replace the Control Unit on which the CALM LED is lit	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RB0400	System parameter update error	Update of the system parameters failed at the time of start-up. (The threshold value concerning the system parameter update was exceeded.)	Simple Trace	① Reset the system parameters correctly in the Maintenance mode of the Web.	–
				② If the system is still abnormal, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RB0500	System parameter load failed	Reading of the system parameter information from the system area failed.	Simple Trace		
RB0600	No micro program	No microprogram is present in the system drive.	Simple Trace	① Install the microprogram newly.	–
RB0700	NO micro program	No system parameter information is present in the system drive.	Simple Trace	① Reset the system parameters correctly in the Maintenance mode of the Web.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RB0800	System parameter update failed	Writing on all drives failed.	Simple Trace	① Reset the system parameters correctly in the Maintenance mode of the Web.	–
				② If it is not recovered yet, replace the Disk Drives #0 to #4 of the RKM/RKS/RKXS or the Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID#0 connected to the RKH.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
RB0900	System parameter update partially complete	Writing on one to four system drives failed.	Simple Trace	① Turn on the power again. ② If the system is still abnormal, reset the system parameters correctly in the Maintenance mode of the Web.	–
RB0A00	Upload file SUM check error	A sum check error occurred in a read file during a upload.	Simple Trace	① Check the microprogram you want to install and install it over again.	–
RB0B0x	CACHE property error (CACHE-x)	Cache property error (A unsupported cache is installed.) x : Cache memory slot # (0-3)	Simple Trace	① Check if the capacity of the cache installed is 512 Mbytes or 1024 Mbytes.	–
RB0Cxy	CACHE pair check error (CACHE-x/y)	Cache pair check error (Caches installed in the Slot #0, Slot #1, Slot#2 and Slot#3 are different each other.) x : Cache memory slot # (0-3)	Simple Trace	① Make the caches in the two slots the same.	–
RB0D00	RAM disk create failed	Creation of the RAM disk failed.	Full Dump	① Turn on the power again.	–
				② If the problem is not solved in spite of the above operation, replace the Control Unit on which the CALM LED is lit	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RB0G00	Initial setup of microprogram failed	New installation of the microprogram was attempted though the guard against microprogram installation was disabled.	Simple Trace	① Perform the updating installation of the microprogram of the lower grade model.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RB0I00	Bad LBA detected in START70M.DAT	Illegal write LBA owing to illegal contents of the uploading file.	Simple Trace	① Get the microprogram again and then reinstall it.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RB0J00	Bad LBA detected START70S.DAT	Illegal write LBA owing to illegal contents of the uploading file.	Simple Trace		
RB3000	File size error	An error was detected in file size.	Simple Trace	① Check the microprogram you want to install	–
RB3100	File open error	Opening of file failed.	Simple Trace		
RB3200	File read error	Reading of file failed.	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RB3500	Bad block ID	An illegal block ID was detected.	Simple Trace	① Check the microprogram you want to install	–
RB7000	Program size too large	The program is too large in size.			
RB8000	Old microprogram exists	There was another system when installation was started.		① If installation may be continued (In this case, all the data in the Disk Drive are deleted (The RAID group and LU deformation are initialized)), insert the next FD and continue installation. ② When the data in the Disk Drive need to be saved, stop the work and perform update installation.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RB8100	Install failed	Installation failed.	Full Dump	① The cause of the failure is indicated under the message. Solve the failure according to the procedure indicated under the message.	–
RB8200	Install partially complete	Installation failed in a part of the drive.	Full Dump	① See [Procedure of locating failed part when the message of "Install partially complete" is output].	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RB8300	Empty system retry full install	Update installation cannot be executed since a system does not exist in the Disk Drive.		① Execute new installation.	–
RB8400	Download failed	Drive-loading failed.	Simple Trace	① Refer to Troubleshooting "6.1.2 The subsystem does not become ready : Case 1 (Loading failure)".	Troubleshooting "6.1.2 The subsystem does not become ready : Case 1 (Loading failure)" (TRBL 06-0050)
RB8500	Microprogram extract error	Depression of main microprogram failed.		① Execute update installation. ② If not recovered, replace the Control Unit whose CALM LED is on.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RBA000	Down grade check NG	Although the version down of the microprogram was attempted, the update installation terminated abnormally because Down Grade Check was not Disable.		① Change the setting of the downgrade check to Disable, and then updating installation of the microprogram again.	WEB "3.3 Setup" (WEB 03-0280)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RBC000	No drive available	There is not a Disk Drive to install.	Simple Trace	① Check if the subsystem of the unit ID #0 is the RKAJ for the AMS1000. If it is not so, install the subsystem again so that the subsystem of the unit ID #0 may become the RKAJ. ② Replace the Disk Drives #0 to #4 of the subsystem of the unit ID #0 one at a time.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
RBC10x	Drive block size error (Unit-0, HDU-x)	The value of the block size of the capacity data reported from the Disk Drive was other than the specified value. x : Disk Drive# (0-4)		① Replace the Disk Drive. Check the model name of the Disk Drive or the drive firmware revision.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
RBC20x	Unknown drive (Unit-0, HDU-x)	The value of the logical block address of the capacity data reported from the Disk Drive was equal to or less than the size of the system area. x : Disk Drive# (0-4)			
RBC2HH	Unknown drive (Unit-0, HDU-x)	The value of the logical block address of the capacity data reported from the Disk Drive was equal to or less than the size of the system area. x : Disk Drive# (0-4)			
RBE00x	Flash memory write error (FM-x)	Writing in the flash memory failed. x : Chip information that caused the error (0=FM1-0, 1=FM1-1, 2=FM both chips)	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RBE100	Flash memory SUM check error	A sum check error is detected in the flash memory.	Full Dump		
RBE200	Flash program update error	When the FM microprogram which failed in maintenance of the flash version is updated, its version is not matched to the version of the main microprogram.		① Perform the installation upgrade. ② If not recovered, replace the Control Unit whose CALM LED is on.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RBE300	Flash program update start	Updating of the FM1 flash program was started by the latest REV maintenance function of the flash program.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RBE301	Flash program update end	Updating of the FM1 flash program was started by the latest REV maintenance function of flash program.		–	–
RBE500	Initial setup error by LU access restriction	The Initial setup failed because access to the LU was restricted.	Simple Trace	① The Initial setup is impossible. To update the microprogram, do it by means of the update installation.	–
RBE600	Config clear restart error by LU access restriction	The Config clear restart failed because access to the LU was restricted.	Simple Trace	① The Config clear restart is impossible. To reboot, specify the TakeOver (takeover reboot).	–
RBE900	Upgrade failed [the installed microprogram is incorrect]	The upgrade failed because the microprogram, installation of which was attempted, was incorrect.	Simple Trace	① Select the unified version directory, whose version is a unified version same as that of the microprogram of the lower grade model, and install the microprogram in the subsystem of the higher grade model for the purpose of upgrade.	For Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RBEA00	Downgrade failed [the installed microprogram is incorrect]	The Downgrade failed because the microprogram, installation of which was attempted, was incorrect.	Simple Trace	① Select the unified version directory, whose version is a unified version of the microprogram of the higher grade model already installed, and install the microprogram in the subsystem of the higher grade model for the purpose of update.	
RBED00	System HDU spin up failed [unsupported Unit is connected Unit-00]	The type of the system drive is illegal. (The Unit #0 is not the FC disk array unit.)	Simple Trace	① Assign an FC disk array unit to the Unit #0, or make sure of the rule of the connection.	–
RBEG00	Download failed [unsupported Unit is connected]	The startup failed because the microprogram did not support the S-ATA disk array unit.	Simple Trace	① Install the microprogram that supports the S-ATA disk array unit after changing the mode to Maintenance, or start up the subsystem after removing the S-ATA disk array unit from the configuration.	For Installation "Chapter 3. Installing Rackmount Model" (INST 03-0000), Addition/Subtraction/ Relocation "Chapter 1. Adding Optional Components" (ADD 01-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RBEN00	Installation of the other CTL detected on install mode	The start-up could not be made because the FM mode was the installation mode (for emergency) at the time of the installation of a Control Unit of the other system.	Full Dump	①When the FM MODE is the installation mode, pull out the JP and make the start-up again.	–
				②If not recovered, replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
RBEP00	Bad LBA in START70X.DAT	Invalid write LBA by the content of the upload file was detected.	Simple Trace	①Reinstall the microprogram after acquiring the microprogram because abnormality was detected in the START70X.DAT file.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RBEQ00	Down grade install NG [Going to Maintenance Mode procedure is abnormal]	The downgrade installation of the microprogram cannot be performed because it entered the maintenance mode before the subsystem starts.	Simple Trace	①1. Start the subsystem by clicking [Go to Normal Mode] in the menu frame on WEB.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				2. Install the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
RBER00	Down grade install NG [RAID6 RGs exist.]	Because the RAID group of RAID 6 exists, the downgrade cannot be performed to the microprogram which does not support RAID 6.	Simple Trace	①1. Start the subsystem by clicking [Go to Normal Mode] in the menu frame on WEB.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				2. Delete the RAID group of RAID 6.	System Parameter "[Procedure ②-D]Deleting RAID group" (SYSPR 03-0100)
				3. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				4. Perform the downgrade installation of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280
RBES00	Down grade install NG [FLASH program revision mismatch]	Because the FLASH Micro version is not consistent between the Control Units, the microprogram downgrade installation cannot be performed.	Simple Trace	①1. Start the subsystem by clicking [Go to Normal Mode] in the menu frame on WEB.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
				2. Install the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RBET00	Check sum error detected in all system drives	Check sum error was detected in all system drives during installing the microprogram update.	Simple Trace	①1. Turn off the main switch.	Installation “1.7.2 Subsystem power off (Sequential shutdown)” (INST 01-0310)
				2. Turn on the main switch again after 20 seconds or more elapsed after turning it off.	Installation “1.7.1 Subsystem power on” (INST 01-0290)
				3. Change it to the maintenance mode after the READY LED (green) lights on or “RB8400 Download failed” is displayed on the Information Message of WEB and the subsystem goes down.	WEB “Chapter 3. The Maintenance Mode Operation Procedure” (WEB 03-0000)
				4. Update the microprogram again.	WEB “3.3.1 Microprogram” (WEB 03-0280
				5. When the microprogram is updated, if this message is displayed and this failure occurs even if the above-mentioned recovery method is repeated three times, perform new installation.	
RBEU00	Bad LBA in START70H. DAT	The write LBA in the uploaded file is illegal.	Simple Trace	①Acquire the microprogram from the CD-R again, and reinstall the microprogram.	Microprogram “Chapter 1. Installation of Microprogram” (MICRO 01-0000)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
RBEV00	Down grade install NG [LU with stripe size other than 64KB exists.]	The update installation of the microprogram, which is not supporting the LU of the stripe size other than 64 Kbytes, cannot be performed because the LU of the stripe size other than 64 Kbytes exists.	Simple Trace	①1. Click [Go to Normal Mode] in the menu frame on the WEB window and start the subsystem.	–
				2. Request the customer to backup the data of the LU other than 64 Kbytes of the stripe size.	–
				3. Acquire the configuration copy information file of the RAID Group/Logical Unit and the Port/Host Group information.	System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150)
				4. Delete the LU other than 64 Kbytes of the stripe size once, and re-create the deleted LU for the LU of 64 Kbytes of the stripe size referring to the configuration copy information file acquired in ③.	System Parameter "3.3 Setting of LU" (SYSPR 03-0140)
				5. Request the customer to restore the backup data in the LU recreated by the setting change to 64 Kbytes of the stripe size.	–
				6. Move it to the maintenance mode.	–
				7. Perform the update installation of the version downgrade of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280
RBEW00	Down grade install NG [Cache partition with size of 64KB or more is defined]	The update installation of the microprogram, which is not supporting the Cache partition of 64 kbytes or more, cannot be performed because the Cache partition of 64 kbytes or more is used.	Simple Trace	①1. Click [Go to Normal Mode] in the menu frame on the WEB window and start the subsystem.	–
				2. Change the Cache partition of 64 kbytes or more to the one with 16 kbytes or less, or delete it referring to the "Cache Partition Manager User's Guide".	–
				3. Move it to the maintenance mode.	–
				4. Perform the update installation of the version downgrade of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280

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Chapter 6. Warning Messages

Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0100x	CTL alarm (CTL-x)	The Control Unit was regressed (It had a failure or was not connected), or a failure was detected in the Control Unit of another system during the initial setting operation. x : Control Unit # (0-1)	CTL Alarm Trace	① When "I19000 Online micro-update completed" is displayed before this message, it shows that no Control Unit failure has occurred.	–
				② When the ALARM LED is lit, take a recovery action according to in Troubleshooting "6.1.1 System down".	Troubleshooting "6.1.1 System down" (TRBL 06-0020)
				③ Take the recovery actions according to the messages listed in Troubleshooting "4.5 The Priority Error Messages when "W0100x CTL alarm" is displayed".	Troubleshooting "4.5 The Priority Error Messages when "W0100x CTL alarm" is displayed" (TRBL 04-0180)
				④ If only "H90210 CTL failure" is displayed besides this message, connect the Control Unit on which the CALM LED is illuminating to the Web, and follow the recovery instruction message displayed on the Web.	–
				⑤ Replace the Control Unit whose CALM LED is on. However, go to ⑥ for the Control Unit which is connected to the NNC (NAS Unit).	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
				⑥ Replace the Control Unit whose CALM LED is on.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #19)" (NAS 07-0120)
W02000	Other CTL removed	A shutdown occurred in MPU on the Control Unit of another system.	Simple Trace	① Replace the Control Unit whose CALM LED is on.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W03000	Battery alarm	Abnormal battery voltage or a failure in the battery charging circuit was detected.		① Check that the Disk Drives executing the spin-up command are all spin-up, and then remove the inserted Backup Battery Unit (ASSY) from the chassis once and insert it again after 20 seconds or more passed. (*1) ② Replace the Backup Battery Unit. (*2)	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
W0300x	Battery alarm (Battery-x)	Abnormal battery voltage or a failure in the battery charging circuit was detected. x : Backup Battery Unit # (0-3)			
W03100	Battery removed	A Backup Battery Unit has been removed from an subsystem.		① Attach a Backup Battery Unit to a subsystem.	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
W0310x	Battery removed (Battery-x)	A Backup Battery Unit has been removed from an array unit. x : Backup Battery Unit # (0-3)			
W03200	Battery SW OFF	The switch of a Backup Battery Unit has been set to OFF.		① Set the switch of a Backup Battery Unit to ON.	–
W0320x	Battery SW OFF (Battery-x)	The switch of a Backup Battery Unit has been set to OFF. x : Backup Battery Unit # (0-1)			
W03300	Battery Thermal alarm	The battery thermal failed.		① Replace the Backup Battery Unit.	Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
W0330x	Battery Thermal alarm (Battery-x)	The battery thermal failed. x : Backup Battery Unit # (0-3)			
W0340x	Battery back up circuit alarm (CTL-x)	The battery backup circuit failed. x : Control Unit # (0-1)		① When any one of the following messages is displayed, follow the recovery procedure given by it. • W03000 Battery alarm • W0300x Battery alarm • W03100 Battery removed • W0310x Battery removed • W03200 Battery SW OFF • W0320x Battery SW OFF • W03300 Battery Thermal alarm • W0330x Battery Thermal alarm	–
				② If only "W0340x Battery back up circuit alarm" is displayed, replace a Control Unit that has the number "x".	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

*1 : If the part was replaced at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the part may not recover normally.

*2 : If this massage is displayed and the ALARM LED on the Battery Unit (ASSY) lights on, be sure to replace the Battery Unit (it cannot be recharged).

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W040xy	FAN alarm (Unix-x, FAN-y)	The Fan Assembly failed. x : Unit ID # (0-14) y : FAN Assembly # (0-1)		① Check that the Disk Drives executing the spin-up command are all spin-up, and then remove the inserted Fan Assembly from the chassis once and insert it again after 20 seconds or more passed. (*1)	Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)
W04100	FAN alarm (CTL-Unit, FAN-x)	The Fan Assembly failed. x : FAN Assembly # (0-1)			
W042HH	FAN alarm (Unit-x, FAN-x)	The Fan Assembly failed. x : Unit ID # (0-29) (In the case of the Basic Chassis, "Unit-x" is displayed as "CTL-Unit".) y : FAN Assembly # (0-1)		② Replace the Fan Assembly immediately since the subsystem can go down because of thermal alarm if the subsystem is left in this state.	
W050xy	PS alarm (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (0-14) y : Power Unit # (0-1)		① Check that the Disk Drives executing the spin-up command are all spin-up, and then remove the inserted Power Unit from the chassis once and insert it again after 20 seconds or more passed. (*1)	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
W05100	PS alarm (CTL-Unit, PS-x)	The Power Unit failed. x : Power Unit # (0-1)			
W052HH	PS alarm (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (0-29) (In the case of the Basic Chassis, "Unit-x" is displayed as "CTL-Unit".) y : Power Unit # (0-1)		② When one of the following messages is displayed at the same time, follow the recovery procedure given by the message. • "W040xy FAN alarm" • W04100 FAN alarm • W042HH FAN alarm	–
				③ Replace the Power Unit.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)

*1 : If the part was replaced at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the part may not recover normally.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W060xy	HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① Replace the Disk Drive.(*1) When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
W060HH	HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
W060AT	SATA HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace	① Replace the Disk Drive.(*1) When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive"(REP 01-0100)
				② If the trouble is not solved in spite of the above operation, replace the SENC Unit in which the blocked Disk Drive is installed. Replace the SENC Unit #0 in which the blocked Disk Drive is installed for the Disk Drive with an even number or the SENC Unit #1 in which the blocked Disk Drive is installed for the Disk Drive with an odd number.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
W061xy	Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① Replace the Disk Drive.(*1) When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
W061HH	Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		
W061AT	SATA Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID # (0-29) y : Disk Drive # (0-14)	Simple Trace		

*1 : The sequential shutdown may be failed if the Disk Drive is in the blocked status. Maintain the blocked Disk Drive before executing the sequential shutdown.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W071xy	HDU inquiry error (Unit-x, HDU-y)	An inquiry error occurred in a Disk Drive inserted with the power turned on. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① Replace the Disk Drive.(*1) When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
W071HH	HDU inquiry error (Unit-x, HDU-y)	An inquiry error occurred in a Disk Drive inserted with the power turned on. x : Unit ID # (0-29) y : Disk Drive # (0-14)			
W073xy	HDU replace failed (Unit-x, HDU-y)	Insertion of a Disk Drive failed when it was inserted with the power turned on. x : Unit ID # (0-14) y : Disk Drive # (0-14)		① When "HDU alarm" is displayed following this message, replace the Disk Drive (FC Disk Drive). ② When "S-ATA HDU alarm" is displayed following this message, insert the Disk Drive (S-ATA Disk Drive) again. If the failure is not solved in spite of this operation, replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
W073HH	HDU replace failed (Unit-x, HDU-y)	Insertion of a Disk Drive failed when it was inserted with the power turned on. x : Unit ID # (0-29) y : Disk Drive # (0-14)			

*1 : The sequential shutdown may be failed if the Disk Drive is in the blocked status. Maintain the blocked Disk Drive before executing the sequential shutdown.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W080xy	Loop alarm (Path-x, Loop-y)	Since the Fibre Channel loop failed, the operation is continued with the alternative loop. x : Path # (0-3) y : Loop # (0-1)	Simple Trace	① When one of the following messages is displayed before this message, take recovery actions according to the message. • W0100x “CTL alarm” • W060xy, W060HH, W0GG00, W0GH00, “HDU alarm” • W060AT “SATA HDU alarm” • W061xy, W061HH, W0GJ00, W0GK00, “Spare HDU alarm” • W061AT “SATA Spare HDU alarm” • W090xy, W090HH, W0GA00, W0GC00 “ENC alarm” • W090AT “SENC alarm” • W0GB00 “SENC alarm [RKAAT]” • W0GD00 “SENC alarm [RKAJAT]” • I301xy, I301HH “HDU error” • I301AT “SATA HDU error” • I5YG00 “Unit# ERR”	–
				② Refer to Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)”.	Troubleshooting “6.1.14 A failure occurred during operation : Case 4 (Loop failure)” (TRBL 06-0600)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W090xy	ENC alarm (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID # (1-14) y : ENC Unit # (0-1)	Simple Trace	① When the "ENC alarm" is given at the same time as the "HDU alarm" or "SATA HDU alarm", replace the Disk Drive before replacing the ENC Unit.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
W090HH	ENC alarm (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID # (0-29) y : ENC Unit # (0-1)	Simple Trace	② When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	–
				③ When "I5YG00 Unit# ERR (Unit-x, Loop-y)" is displayed at the same time with this message, take recovery actions according to it.	–
				④ Replace the ENC Unit or SENC Unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
W090AT	SENC alarm (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID # (0-29) y : SENC Unit # (0-1)		① When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	–
				② When the "I6EQ00 HDU Path error" message is displayed before this message, perform the recovery method of the message first.	–
				③ Replace the SENC unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
W0B0xy	ENC recovery failed (Unit-x, ENC-y)	The ENC Unit was inserted but recovery failed. x : Unit ID # (0-29) y : ENC Unit/SENC Unit # (0-1)	Simple Trace	① The cause of failure in recovery is indicated by another message. Maintain according to that message.	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0C00x	UPS alarm (UPS-x)	Abnormality occurred in the UPS. Or it detected that the UPS interlock cable could not be connected to the UPS. x : UPS # (0-1)		① When the interlock of the UPS is not used, check the setting of the rotary switch. • When the remote adaptor is used, the rotary switch is "2". • When the remote adaptor is not used, the rotary switch is "0".	Installation "1.8 (2) Setting the Rotary switch" (INST 01-0390)
				② Check if the UPS interlock cable is connected firmly to the Control Unit and the UPS. If it is connected loosely, connect the UPS interlock cable firmly.	–
				③ The take a recovery action referring to the UPS manual.	–
W0D0xy	CACHE alarm (CTL-x, CACHE-y)	A cache access error occurred. (unrecoverable) x : Control Unit # x=0 : Control Unit #0 x=1 : Control Unit #1 x=2 : Control Unit #0 and #1 y : Cache slot # (0-3)	Simple Trace	① Replace the Cache Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
				② If not recovered, replace the above Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
W0E000	LU alarm (LU-x)	LU was blocked. x : LU # (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.13 A failure occurred during operation : Case 3 (LU blockade)".	Troubleshooting "6.1.13 A failure occurred during operation : Case 3 (LU blockade)" (TRBL 06-0590)
W0F0xy	Path alarm (Remote-x, Path-y)	A detachment of the path between the DF's occurred. x : Remote DF # (0) y : Path # (0-3)		① Check whether the power supply of the remote subsystem as a pair turns on or not. Turn on if the power off.	–
				② Check whether the remote equipment is in the Ready status and the path blockage is recovered or not.	
				③ If it has not recovered, refer to Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used".	Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0G0xy	Unreadable PIN detected (Unit-x, HDU-y)	An unreadable PIN with a failed drive identified has occurred. x : Unit ID # (0-14) y : Disk Drive # (0-14)	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ② or later.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W0G100	Unreadable PIN detected (Unit-*, HDU-*)	An unreadable PIN without a failed drive identified has occurred. * : This denotes that the failed drive, which caused the incomplete writing, could not be specified.	Simple Trace	② When "H20100 Parity generation LA error" is displayed after this message and the ALARM LED (red) on the Front Bezel lights on, perform Troubleshooting "6.1.1 System down".	Troubleshooting "6.1.1 System down" (TRBL 06-0020)
				③ When "W48000 Forced parity correction LU is detected" is displayed before this message and the forced parity correction is in progress, take recovery actions according to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)".	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
				④ When the message cord, "H20100 Parity generation LA error" is displayed following this message, refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
				⑤ When this message is displayed during a restoration of the drive and the code "I153xy Data recovery partial" or "I153HH Data recovery partial" is displayed at the time when the drive restoration is completed, take an action following Procedure Troubleshooting "6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)".	Troubleshooting "6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)" (TRBL 06-0490)

To be continued to the next page.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
				⑥When this message is displayed during a restoration of the drive and the code "I152xy Data recovery failed" or "I152HH Data recovery failed" is displayed at the time when the drive restoration is completed, take an action following Procedure Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error)".	Troubleshooting "6.1.8 Data recovery does not terminate normally : Case 1 (Read error)" (TRBL 06-0510)
				⑦When "I6D300 Unreadable PIN resisted" is displayed at the same time with this message, take recovery actions according to it.	–
				⑧When a RAID level of the RAID group, one of whose components is the failed Disk Drive, is RAID 0, refer to Troubleshooting "6.1.15 A failure occurred during operation: Case 5 (Incomplete writing)".	Troubleshooting "6.1.15 A failure occurred during operation : Case 5 (Incomplete writing)" (TRBL 06-1110).
W0G20x	Parity generation LA error [DRR] (CTL-x)	An LA error occurred during the parity generation. (DRR failure) x : Control Unit # (0-1)	Simple Trace	①At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
				②Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0G300	Host connector alarm (Portxy-z)	A trouble occurred in the Host Connector. x : Control Unit # (0-1) y : Port # (A-D) z : Host Connector # (0-1)	Simple Trace	① When the Host Connector has come off, reconnect it. ② Replace the Host Connector.	Replacement "2.2.8 Replacing Host Connector" (REP 02-0770)
W0G400	PS alarm [RKA] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (1-29) y : Power Unit # (0-1)		① Check that the Disk Drives executing the spin-up command are all spin-up, and then remove the inserted Power Unit from the chassis once and insert it again after 20 seconds or more passed. (*1)	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
W0G500	PS alarm [RKAAT] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (1-29) y : Power Unit # (0-1)			
W0G600	PS alarm [RKAJ] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (1-29) y : Power Unit # (0-1)			
W0G700	PS alarm [RKAJAT] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID # (1-29) y : Power Unit # (0-1)		② When one of the following messages is displayed at the same time, follow the recovery procedure given by the message. • "W040xy FAN alarm" • W04100 FAN alarm • W042HH FAN alarm	–
				③ Replace the Power Unit.	Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
W0GA00	ENC alarm [RKA] (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID # (1-29) y : ENC Unit # (0-1)	Simple Trace	① When the "ENC alarm" is given at the same time as the "HDU alarm", replace the Disk Drive before replacing the ENC Unit.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				② When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				③ Replace the ENC unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)

*1 : If the part was replaced at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the part may not recover normally.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0GB00	SENC alarm [RKAAT] (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID # (1-29) y : SENC Unit # (0-1)	Simple Trace	① When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				② When the "I6EQ00 HDU Path error" message is displayed before this message, perform the recovery method of the message first.	–
				③ Replace the SENC unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
W0GC00	ENC alarm [RKAJ] (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID # (1-29) y : ENC Unit # (0-1)	Simple Trace	① When the "ENC alarm" is given at the same time as the "HDU alarm", replace the Disk Drive before replacing the ENC Unit.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
				② When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				③ When "I5YG00 Unit# ERR (Unit-x, Loop-y)" is displayed at the same time with this message, take recovery actions according to it.	–
				④ Replace the ENC unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)
W0GD00	SENC alarm [RKAJAT] (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID # (1-29) y : SENC Unit # (0-1)	Simple Trace	① When this message is displayed at the time of the subsystem startup, the ENC cable may also have a connection error. Check the cable connection.	Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160)
				② When the "I6EQ00 HDU Path error" message is displayed before this message, perform the recovery method of the message first.	–
				③ Replace the SENC unit pointed out in the message.	Replacement "2.2.9 Replacing ENC Unit/ SENC Unit" (REP 02-0830)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W0GG00	HDU alarm [RKA] (Unit-x, HDU-y)	A blockade of a Disk Drive occurred. x : Unit ID # (1-29) y : Disk Drive # (0-14)	Simple Trace	① Replace the Disk Drive pointed out in the message(*1). When you want to know a model name of the Disk Drive or a revision of the drive firmware, refer to Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive".	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050) Replacement "1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive" (REP 01-0100)
W0GH00	HDU alarm [RKAJ] (Unit-x, HDU-y)	A blockade of a Disk Drive occurred. x : Unit ID # (1-29) y : Disk Drive # (0-14)	Simple Trace		
W0GJ00	Spare HDU alarm [RKA] (Unit-x, HDU-y)	A blockade of a Spare Disk Drive occurred. x : Unit ID # (1-29) y : Disk Drive # (0-14)	Simple Trace		
W0GK00	Spare HDU alarm [RKAJ] (Unit-x, HDU-y)	A blockade of a Spare Disk Drive occurred. x : Unit ID # (1-29) y : Disk Drive # (0-14)	Simple Trace		
W0H000	LU alarm	LU blockage occurred.	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
				② Refer to Troubleshooting "6.1.13 A failure occurred during operation : Case 3 (LU blockade)".	Troubleshooting "6.1.13 A failure occurred during operation : Case 3 (LU blockade)" (TRBL 06-0590)
W0GM00	SENC which may attach restrictions on Power Saving function was detected	The SENC that may set the limit to the Power Saving function of the priced option was detected.	Simple Trace	① Refer to Troubleshooting "6.1.27 Recovery method when the subsystem becomes the warning status while using the Power Saving function of the priced option".	Troubleshooting "6.1.27 Recovery method when the subsystem becomes the warning status while using the Power Saving function of the priced option" (TRBL 06-1332)

*1 : The sequential shutdown may be failed if the Disk Drive is in the blocked status. Maintain the blocked Disk Drive before executing the sequential shutdown.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W12000	User data lost (LU-x)	The user data were lost since the Cache memory was volatilized. (*2) x : LU # (0-4095)	Simple Trace	① Refer to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)".	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
				② At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W22000	PS OFF failed [NO HDU]	The plan was not stopped since there was not a Disk Drive to save the information to be taken over.	Simple Trace	① Refer to Troubleshooting "6.1.6 The power cannot be turned off : Case 3 (Control Unit failure)".	Troubleshooting "6.1.6 The power cannot be turned off : Case 3 (Control Unit failure)" (TRBL 06-0470)
W23000	PS OFF failed [CACHE ERR]	The plan was not stopped since a cache failure occurred and the PIN data could not be saved.	Simple Trace	① Refer to Troubleshooting "6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)".	Troubleshooting "6.1.7 The power cannot be turned off : Case 4 (Cache memory failure)" (TRBL 06-0490)

*1 : The sequential shutdown may be failed if the Disk Drive is in the blocked status. Maintain the blocked Disk Drive before executing the sequential shutdown.

*2 : When "LU-0000" is displayed, the LU #0 data or the configuration information on the subsystem is lost. Check the LU #0 status in the Storage Navigator Modular, and if LU #0 has errors, follow the recovery methods ①. If it is normal, the recovery operation is not needed.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W310xx	DMA error (DMA-x)	DMA failed. x : DMA # (00,10-13, 20-23, FF)	Simple Trace	① Control Unit of the No. indicated by "Cx" (x: Control Unit #) in the log message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
W320xy	LA error [errcode:LUN] (D_PT-00, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Drive Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W321xy	LA error [errcode:LUN] (D_PT-01,CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Drive Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	② Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W322xy	LA error [errcode:LUN] (H PT-00, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W323xy	LA error [errcode:LUN] (H PT-01, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Host Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W324xy	LA error [errcode:LBA] (D_PT-00, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Drive Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W325xy	LA error [errcode:LBA] (D_PT-01, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Drive Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W326xy	LA error [errcode:LBA] (H PT-00, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	② Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W327xy	LA error [errcode:LBA] (H PT-01, CTL-x, TRNS-y)	An LA error (including a LUN error) occurred in the Drive Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W328xy	LA error [errcode:LUN] (D_PT-02, CTL-x, TRNS-y)	A LUN error occurred. (D_PORT #2) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W329xy	LA error [errcode:LUN] (D_PT-03, CTL-x, TRNS-y)	A LUN error occurred. (D_PORT #3) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W32Axy	LA error [errcode:LBA] (D_PT-02, CTL-x, TRNS-y)	A LBA error occurred. (D_PORT #2) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W32Bxy	LA error [errcode:LBA] (D_PT-03, CTL-x, TRNS-y)	A LBA error occurred. (D_PORT #3) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W32Cxy	LA error [errcode:LUN] (H_PT-02, CTL-x, TRNS-y)	A LUN error occurred. (H_PORT #2) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W32Dxy	LA error [errcode:LUN] (H_PT-03, CTL-x, TRNS-y)	A LUN error occurred. (H_PORT #3) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W32Exy	LA error [errcode:LBA] (H_PT-02, CTL-x, TRNS-y)	A LBA error occurred. (H_PORT #2) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W32Fxy	LA error [errcode:LBA] (H_PT-03, CTL-x, TRNS-y)	A LBA error occurred. (H_PORT #3) x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	② Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W330xy	LRC error (D_PT-00, CTL-x, TRNS-y)	A LRC error (including a LUN error) occurred in the Drive Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W331xy	LRC error (D_PT-01, CTL-x, TRNS-y)	A LRC error (including a LUN error) occurred in the Drive Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W332xy	LRC error (D_PT-02, CTL-x, TRNS-y)	A LRC error occurred in the Drive Port #02. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W333xy	LRC error (D_PT-03, CTL-x, TRNS-y)	A LRC error occurred in the Drive Port #03. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W334xy	LRC error (H_PT-02, CTL-x, TRNS-y)	A LRC error occurred in the Host Port #02. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W335xy	LRC error (H_PT-03, CTL-x, TRNS-y)	A LRC error occurred in the Host Port #03. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	①At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W3360x	Data transfer check error [SEGPOSERR] (CTL-x)	(Data assurance check) An illegal cache writing segment position was detected. x : Control Unit # (0-1)	Simple Trace		
W33700	EDC LA error [error code : LUN] (H_PT-00, CTL-x, TRANS-y)	An EDC_LUN error occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	②Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W33800	EDC LA error [error code : LUN] (H_PT-01, CTL-x, TRANS-y)	An EDC_LUN error occurred in the Host Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W33900	EDC LA error [error code : LUN] (H_PT-02, CTL-x, TRANS-y)	An EDC_LUN error occurred in the Host Port #02. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W33A00	EDC LA error [error code : LUN] (H_PT-03, CTL-x, TRANS-y)	An EDC_LUN error occurred in the Host Port #03. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W33B00	EDC LA error [error code : LBA] (H_PT-00, CTL-x, TRANS-y)	An EDC_LBA error occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W33C00	EDC LA error [error code : LBA] (H_PT-01, CTL-x, TRANS-y)	An EDC_LBA error occurred in the Host Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W33D00	EDC LA error [error code : LBA] (H_PT-02, CTL-x, TRANS-y)	An EDC_LBA error occurred in the Host Port #02. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W33E00	EDC LA error [error code : LBA] (H_PT-03, CTL-x, TRANS-y)	An EDC_LBA error occurred in the Host Port #03. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W33F00	EDC LA error [error code : CRC] (H_PT-00, CTL-x, TRANS-y)	An EDC_CRC error occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace	② Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W340xy	LRC error (H PT-00, CTL-x, TRNS-y)	A LRC error (including a LUN error) occurred in the Host Port #00. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W341xy	LRC error (H PT-01, CTL-x, TRNS-y)	A LRC error (including a LUN error) occurred in the Host Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W34200	EDC LA error [error code : CRC] (H_PT-01, CTL-x, TRANS-y)	An EDC_CRC error occurred in the Host Port #01. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W34300	EDC LA error [error code : CRC] (H_PT-02, CTL-x, TRANS-y)	An EDC_CRC error occurred in the Host Port #02. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		
W34400	EDC LA error [error code : CRC] (H_PT-03, CTL-x, TRANS-y)	An EDC_CRC error occurred in the Host Port #03. x : Control Unit # (0-1) y : Transfer direction R : Read direction W : Write direction	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W41000	PIN write error	PIN data were not saved in the Disk Drive since a hardware error occurred.	Simple Trace	①At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W41100	PIN over [PNLEVLOV]	The number of the PIN segments exceeded the threshold value PIN.	Simple Trace		
				②Refer to Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)".	Troubleshooting "6.1.12 A failure occurred during operation : Case 2 (LA/LRC error)" (TRBL 06-0570)
W4200x	SNMP invalid (CTL-x) [Config]	There is not SNMP information but SNMP information has not been introduced. The SNMP function has not started up. x : Control Unit # (0-1)		①Install the information for SNMP.	–
W43000	SNMP invalid [RAM Device MAKE ERR]	When SNMP was initialized, making of a RAM device failed.	Simple Trace	①Control Unit of the No. indicated by "Cx" (x: Control Unit #) in the log message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
W43100	SNMP invalid [RAM Device INIT ERR]	When SNMP was initialized, initialization of a RAM device failed.	Simple Trace		
W43200	SNMP invalid [RAM Device CREATE ERR]	When SNMP was initialized, generation of a RAM device failed.	Simple Trace		
W43300	SNMP invalid [RAM Device WRITE ERR]	When SNMP was initialized, writing in a RAM device failed.	Simple Trace		
W43400	SNMP failure [APL ERR]	An application error of SNMP was detected.	Simple Trace	①Control Unit of the No. indicated by "Cx" (x: Control Unit #) in the log message.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W440xy	Permanent LU warning (CTL-x, ERR-y)	Residence OFF warning occurred in the LU residence mode. x : Default Control Unit # (0-1) y : Factor code 0 : Too large LU 1 : Cache access error 2 : Regression of Control Unit 3 : Abnormal battery voltage 4 : Abnormal battery charging circuit 5 : Larger than PIN threshold value	Simple Trace	①y=0 : Return the configuration of Cache memory. (Add cache memory.) y=1 : Perform maintenance described in message code “W0D0x0 CACHE alarm”. To resume the LU cache resident function after recovering from a cache failure, turn off and then on an array unit. y=2 : Perform maintenance described in message code “W0100x CTL alarm”. y=3 : Perform maintenance described in message code“W03000 Battery alarm”, “W0300x Battery alarm”, “W03100 Battery removed”,. “W0310x Battery removed”,. “W03200 Battery SW OFF”, “W0320x Battery SW OFF”, “W03300 Battery Thermal alarm” and “W0330x Battery Thermal alarm”. y=4 : Perform maintenance described in message code“W0340x Battery back up circuit alarm”. y=5 : Perform maintenance described in message code “W41100 PIN over”.	–
W4500x	Online micro-update executing (CTL-x)	The microprogram of a Control Unit has not been replaced with the power turned on. x : Control Unit # (0-1) This message is indicated to warn that microprogram of a Control Unit is being replaced with the power turned on. If replacement of the microprogram is finished, this warning disappears.		–	–

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W4600x	Online micro-update started (CTL-x)	The Control Unit was blocked falsely to replace the microprogram with the power turned on, or the Control Unit of another system was blocked falsely. x : Control Unit # (0-1)		–	–
W4700x	Serial number error [WWN] (CTL-x)	WWW could not be set since the serial number of the subsystem was set incorrectly. x : Control Unit # (0-1)		① Check if the serial number of the subsystem is set correctly.	System Parameter "4.2 Setting the subsystem configuration information" (SYSPR 04-0020)
W48000	Forced parity correction LU is detected	An LU, which required the forced parity correction, was detected.		① Refer to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)".	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)
W48100	Uncorrectable forced parity correction LU is detected	An LU, the forced restoration for which by means of parity could not be continued, was detected.		① Check the LU information using the Storage Navigator Modular. ② Have the LU, the forced restoration for which by means of parity cannot be continued, skip the restoration by issuing an instruction to skip the restoration using the Storage Navigator Modular.(*1) The warning is removed after all the LUs, the forced restoration for which by means of parity cannot be continued, receive an instruction to skip the restoration.	–
W49000	Forced parity correction LU is detected by HDU alarm	Drive detachment occurred in a RAID group whose RAID level was 6 and an LU, which was in the forced parity correction status of Unrestored 1, was detected.		① Refer to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)". ② Select whether to execute the forced parity correction or skip it after any of the following messages was displayed. • I007xy HDU recovered • I007HH HDU recovered • I009xy Spare HDU recovered • I009HH Spare HDU recovered	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060) Troubleshooting "6.1.3 < Procedure given in windows >" (TRBL 06-0250)

*1 : When there is an LU which is not executing the forced parity correction, the dynamic sparing is suppressed and the data recovery is always executed by the correction copy. Also, the copy back from the Spare Disk Drive does not operate. In this case, perform the "Skip" instruction for all the LUs that the LU status is "Uncorrected 2" after the data recovery to the Spare Disk Drive. The dynamic sparing and the copy back can be executed now by this operation.

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W49100	PIN is over directory threshold [write through] (DIR-x)	The number of pinned sub-segments in the directory (that is, unit of cache domain management) exceeded the threshold value of performing the write through operation. x : Directory # (0 or 1)	Simple Trace	① At the time of the NAS connection, determine the internal LU where the failure occurs, and perform the recovery according to each recovery procedure. If it is neither the NAS system LU nor the NAS user LU, perform ②.	Troubleshooting "6.1.18 Recovery method of the failure LU at the time of the NAS Unit connection" (TRBL 06-1180)
W49200	PIN is over directory threshold [write will not run] (DIR-x)	The number of PIN sub-segments in the directory (unit of the Cache area management) exceeded the threshold for the check condition to respond to the write command. x : Directory # (0 or 1)	Simple Trace	② Refer to Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)".	Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)" (TRBL 06-0550)
W49300	PIN is over partition threshold [write through] (DIR-x, PTT-y)	The number of pinned sub-segments in the partition exceeded the threshold value of performing the write through operation. x : Directory # (0 or 1) y : Partition # (0-31)	Simple Trace		
W49400	PIN is over partition threshold [write will not run] (DIR-x, PTT-y)	The number of PIN sub-segments in the partition exceeded the threshold for the check condition to respond to the write command. x : Directory # (0 or 1) y : Partition # (0-31)	Simple Trace		
W49500	PIN is over RAID group threshold [write through] (DIR-x, RG-y)	The number of pinned sub-segments in the RAID group exceeded the threshold value of performing the write through operation. x : Directory # (0 or 1) y : RAID group # (0-89)	Simple Trace		
W49600	PIN is over RAID group threshold [write will not run] (DIR-x, RG-y)	The number of PIN sub-segments in the RAID group exceeded the threshold to execute the write command. x : Directory # (0 or 1) y : RAID group # (0-89)	Simple Trace		

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W49700	DM-LU write disable (LU-x)	Write to DM-LU disabled was detected. x : LU # (0-4095)	Simple Trace	①1. Replace the detached Disk Drive pointed out in the message, "HDU alarm" referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)".	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060) Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
W49800	All DM-LU write disabled	The planned shutdown became unable to be executed because it was detected that the write to all the DM-LUs was impossible and the following one or more conditions were satisfied. • A pair that the pair status of ShadowImage in-system replication is COPY or PSUS exists. • A pair that the pair status of TrueCopy remote replication is COPY, PSUS or PSUE exists. • The key of Copy-on-write SnapShot is enabled. • The key of TrueCopy Extended Distance is enabled. • A pair that the pair status of Modular Volume Migration is COPY or PSUS exists.	Simple Trace	2. Format DM-LU.	–
W5000x	NNC alarm (NNC-x)	The NNC (NAS Unit) was detached. x : NNC (NAS Unit) # (0-3)	Simple Trace NAS Log	① Follow the recovery method of the message displayed in Troubleshooting "Message check when NNC alarm or NNC partial alarm is displayed".	Troubleshooting "4.6 Message check when NNC alarm or NNC partial alarm is displayed" (TRBL 04-0270)
				② When it does not correspond to ①, replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)
W5010x	NNC partial alarm (NNC-x)	The NNC (NAS Unit) was partially detached. x : NNC (NAS Unit) # (0-3)		① Follow the recovery method of the message displayed in Troubleshooting "Message check when NNC alarm or NNC partial alarm is displayed".	Troubleshooting "4.6 Message check when NNC alarm or NNC partial alarm is displayed" (TRBL 04-0270)
				② When it does not correspond to ①, replace the NAS Chassis of which the ALARM LED on the NNC (NAS Unit) lights up.	DF700 NAS SOFTWARE Maintenance Manual "7.3.1 Hardware Failures (Table 7.3-2 Hardware Failures #1)" (NAS 07-0120)

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Message code	Message text	Description	Collect the error	Recovery methods	Reference page
W6000x	SNMP error occurred in the SNMP function (CTL-x)	The SNMP function detected an error. x : Control Unit # (0-1)	Simple Trace	① Do maintenance work following the message displayed after this message. • IB1200 SNMP Task error • IB1300 SNMP configuration • IB1400 SNMP agent detected the error • IB1500 SNMP IP address error • IB1600 SNMP Initialization error • IB1700 SNMP RAM Device allocation error for SNMP	–

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Chapter 7. Web Error Messages

7.1 Web error messages (Uploading Function)

Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End AT xxxx ******** Upload System Error	The number of areas is other than either of one and two.	①Make sure of the system to be installed and execute the installation again. (The START600. DAT is illegal.)	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Bad Block ID	The block ID is illegal.	①Make sure of the system to be installed and execute the installation again.	
-	Abnormal End Bad LBA In START70H.DAT 0x******** xxxx	LBA is abnormal at the storage destination by the illegal content of "START70H.DAT".	①Check the upload system, and install it again. (START70H.DAT may have been broken).	
-	Abnormal End Bad LBA In START70M.DAT 0x******** xxxx	LBA is abnormal at the storage destination by the illegal content of "START70M.DAT".	①Check the upload system, and install it again. (START70M.DAT may have been broken).	
-	Abnormal End Bad LBA In START70S.DAT 0x******** xxxx	LBA is abnormal at the storage destination by the illegal content of "START70S.DAT".	①Check the upload system, and install it again. (START70S.DAT may have been broken).	
-	Abnormal End Bad LBA In START70X.DAT 0x******** xxxx	LBA is abnormal at the storage destination by the illegal content of "START70X.DAT".	①Check the upload system, and install it again. (START70X.DAT may have been broken).	
-	Abnormal End Check sum error detected in all system drives	Check sum error was detected in all the system drives while the update installation of the microprogram is performed.	①1. Turn off the main switch, and turn on the main switch again after 20 seconds or more passed. 2. Change it to the maintenance mode after the RDY LED (green) lights up or "RB8400 Download failed" is displayed in the Information Message on WEB, and the subsystem goes down. 3. Perform the update installation of the microprogram again. ②If this failure still occurs even if ① is repeated three times, execute the new installation.	– WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000) Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Config Clear Restart Error by LU Access Restriction	Config clear restart failed due to the LU access restriction.	①Config clear restart cannot be done. Select Take Over from Configuration Clear Mode and restart(*1).	–
-	Abnormal End Downgrade Failed (The Installed Microprogram is Incorrect) Uploaded Microprogram Revision:XXXX/X Installed Microprogram Revision:XXXX/X	The downgrade in the DF700M/H chassis failed.	①Install the DF700S/M microprogram whose system revision is the same as that of the microprogram in the Disk Drive.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Check NG	Although the version down of the microprogram was attempted, the update installation terminated abnormally because Down Grade Check was not Disable.	①Change the setting of the downgrade check to Disable, and then updating installation of the microprogram again.	WEB "3.3 Setup" (WEB 03-0280)
-	Abnormal End Down Grade Install NG (Account Authentication Feature is Installed)	The update installation of the microprogram of the revision which is not supporting Account Authentication cannot be performed because the priced option of Account Authentication is unlocked.	①1. Check that the revision of the microprogram to be installed is the revision to be originally installed.	–
			2. When the micorprogram to be installed is wrong, perform the update installation of the microprogram to be originally installed again	WEB "3.3.1 Microprogram" (WEB 03-0280)
			②1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Lock the priced option of the Account Authentication function referring to Account Authentication User's Guide "3.2 Un-installation".	Account Authentication User's Guide "3.2 Un-installation"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
			9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (Cache Partition with Size of 64KB or more is Defined)	It cannot be installed in the microprogram which is not supporting the Cache partition of 64 Kbytes or more because the Cache partition of 64 Kbytes or more is used.	①1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Change the Cache partition of 64 Kbytes or more to 16Kbytes or less, or delete it following the procedure of "Cache Partition Manager User's Guide".	"Cache Partition Manager User's Guide"
			3. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			4. Execute the downgrade installation of the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Down Grade Install NG (FLASH Program Revision Mismatch)	The downgrade installation of the microprogram cannot be performed because the FLASH microprogram versions are not matched between the Control Units.	①Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			②Check that the subsystem becomes Ready, and execute the downgrade installation of the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Down Grade Install NG (Going to Maintenance Mode Procedure is Abnormal.)	The downgrade installation of the microprogram cannot be performed because it is changed to the maintenance mode while the subsystem is starting.		
-	Abnormal End Down Grade Install NG (iSCSI Target(s) or CHAP User(s) is not Initialized)	The update installation of the microprogram whose revision is not supporting the extension of the iSCSI connection host number cannot be performed because the Traget other than Target #0 of the iSCSI is defined, CHAP User is defined, or Target #0 is not initialized.	①1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Perform the update installation of the microprogram whose version is to be downgraded referring to Microprogram "1.7 Procedure of the version downgrade of the microprogram".	Microprogram "1.7 Procedure of the version downgrade of the microprogram" (MICRO 01-0290) Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (LU with Stripe Size 64KB Other Than Exist.)	It cannot be installed in the microprogram which is not supporting the LU of the stripe size other than 64 Kbytes because the LU of the stripe size other than 64 Kbytes exists.	① 1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Delete the LU of the stripe size other than 64 Kbytes once, and create the LU of 64 Kbytes again.	System Parameter "3.3 Setting of LU" (SYSPR 03-0140)
			3. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			4. Execute the downgrade installation of the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Down grade install NG [Modular Volume Migration feature is installed]	The update installation cannot be performed for the microprogram of the revision which is not supporting the Modular Volume Migration function because the priced option of the Modular Volume Migration function is unlocked.	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Lock the priced option of the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration".	Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down grade install NG [Modular Volume Migration has already taken place]	The update installation cannot be performed for the microprogram of the revision which is not supporting the Modular Volume Migration function because the LU that the Modular Volume Migration is executed exists in the subsystem with the Modular Volume Migration function.	①1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. When the Modular Volume Migration function of the priced option is locked, unlock the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.1 Installing Volume Migration". However, when the Modular Volume Migration function of the priced option is expired, unlock it with the Emergency Key, etc.	Modular Volume Migration User's Guide "3.1.1 Installing Volume Migration"
			4. When the Modular Volume Migration function is disabled, enable the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.3 Enabling or Disabling Volume Migration".	Modular Volume Migration User's Guide "3.1.3 Enabling or Disabling Volume Migration"
			5. Check if the LU whose intermediate LU number and the internal LU number do not match exists by the maintenance mode of the Storage Navigator Modular.	–
			6. When there is the LU whose intermediate LU number and the internal LU number do not match, perform the Modular Volume Migration so that the intermediate LU number and the internal LU number match referring to the "Modular Volume Migration User's Guide". In that case, the data of the LUs may have to be backed up as needed.	"Modular Volume Migration User's Guide"
			7. Lock the priced option of the Modular Volume Migration function referring to Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration".	Modular Volume Migration User's Guide "3.1.2 Uninstalling Volume Migration"
			8. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			To be continued to the next page	

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Message code	Message text	Description	Recovery methods	Reference page
			9. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			10. Set [Down Grade Check] of the [Others] window to "Disable".	
			11. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			12. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			13. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			14. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
-	Abnormal End Down Grade Install NG (Need Reboot)	The update installation for the version downgrade cannot be executed because it is changed to the maintenance mode without restarting the subsystem although the necessary setting for restarting the subsystem was performed.	①-1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Check that the subsystem becomes Ready.	–
			3. Perform the planned shutdown.	Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310)
			4. Restart the subsystem.	Installation "1.7.1 Subsystem power on" (INST 01-0290)
			5. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (Power Saving Feature is Installed)	The update installation of the microprogram of the revision which is not supporting Power Saving cannot be performed because the priced option of Power Saving is unlocked.	① 1. Check that the revision of the microprogram to be installed is the revision to be originally installed.	–
			2. When the microprogram to be installed is wrong, perform the update installation of the microprogram to be originally installed again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			② 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Lock the priced option of the Power Saving function referring to Power Saving User's Guide "3.2 Uninstalling".	Power Saving User's Guide "3.2 Uninstalling"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
			9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (RAID6 RGs exist.)	It cannot be downgraded to the microprogram which is not supporting RAID6 because the RAID group of RAID6 exists.	① 1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Delete the RAID group of RAID6.	System Parameter "3.2 [Procedure ②-D]Deleting RAID group" (SYSPR 03-0100)
			3. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			4. Execute the downgrade installation of the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Down Grade Install NG (Some P-VOL of ShadowImage has the MU Number Other Than 0)	The update installation of the microprogram of the revision which is not supporting ShadowImage 1:3 cannot be performed because the P-VOL that has the MU number other than 0 among the P-VOLs of ShadowImage in-system replication exists.	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Release the pair that the MU number of the P-VOLs is other than 0 referring to ShadowImage in-system replication User's Guide "4.5 Releasing ShadowImage Pairs (pairsplit –S)". The data of the S-VOL will be deleted. Therefore, request the customer to backup the data of the S-VOL in advance if needed.	ShadowImage in-system replication User's Guide "4.5 Releasing ShadowImage Pairs (pairsplit –S)"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	

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Message code	Message text	Description	Recovery methods	Reference page
			9. Return the subsystem to the normal mode by clicking the "Go to Normal Mode" button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
-	Abnormal End Down Grade Install NG (Some P-VOL of SnapShot has the MU Number 14 or Above)	The update installation of the microprogram of the revision which is not supporting SnapShot 1:15 cannot be performed because the P-VOL that has the MU number of 14 or more among the P-VOLs of Copy-on-write SnapShot exists.	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Release the pair that the MU number of the P-VOLs is 14 or more referring to Copy-on-write SnapShot User's Guide "4.4 Releasing SnapShot Pairs (pairsplit –S)". When releasing the pair which retains the data of SnapShot, the data of the SnapShot will be deleted. Therefore, request the customer to backup the data in advance if needed.	Copy-on-write SnapShot User's Guide "4.4 Releasing SnapShot Pairs (pairsplit –S)"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
			9. Return the subsystem to the normal mode by clicking the "Go to Normal Mode" button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)

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Message code	Message text	Description		Recovery methods	Reference page
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
-	Abnormal End Down Grade Install NG (The Total V-VOL Count for One P-VOL of SnapShot Exceeded 15)	The update installation of the microprogram of the revision which is not supporting SnapShot 1:15 cannot be performed because 15 or more V-VOLs are created for one P-VOL of Copy-on-write SnapShot.	①	1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
				3. Delete the V-VOLs to be within 14 for one P-VOL referring to Copy-on-write SnapShot User's Guide '3.5 Setting P-VOL and SnapShot Image (V-VOL)". When deleting the V-VOL in use, the data of SnapShot of the V-VOL will be deleted. Therefore, request the customer to backup the data in advance if needed.	Copy-on-write SnapShot User's Guide '3.5 Setting P-VOL and SnapShot Image (V-VOL)"
				4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
				5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
				6. Set [Down Grade Check] of the [Others] window to "Disable".	
				7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
				8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	
				9. Return the subsystem to the normal mode by clicking the "Go to Normal Mode" button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
				10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (TrueCopy/TrueCopy Extended Distance Pair of NAS User LUs Exists)	The update installation of the microprogram whose revision is not supporting TrueCopy remote replication/TrueCopy Extended Distance in the pair of the NAS user LU cannot be performed because the pair of TrueCopy remote replication or TrueCopy Extended Distance configured in the NAS user LU exists.	①1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
			2. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–
			3. Release the pair of the NAS User LU referring to “Releasing TrueCopy Pairs (pairsplit -S)” in “TrueCopy remote replication User’s Guide” or “TrueCopy Extended Distance User’s Guide”. If the pair is released, the data of the S-VOL will be deleted. Therefore, request the customer/SE to backup the data of the S-VOL in advance if needed.	“Releasing TrueCopy Pairs (pairsplit -S)” in “TrueCopy remote replication User’s Guide” or “TrueCopy Extended Distance User’s Guide”
			4. Change it to the maintenance mode.	WEB “Chapter 3. The Maintenance Mode Operation Procedure” (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB “3.6 Other” (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to “Disable”.	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB “3.3.1 Microprogram” (WEB 03-0280)
			8. Click “To Maintenance Mode Top” of the “Microprogram Setup” window on WEB.	
			9. Return the subsystem to the normal mode by clicking the “Go to Normal Mode” button in the menu frame of the maintenance mode window on WEB.	WEB “3.7 Return Method to the Normal Mode” (WEB 03-0440)
			10. Check that the “I10000 Subsystem is ready” is displayed in the Information Message of the normal mode window on WEB.	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End Down Grade Install NG (TrueCopy Extended Distance Feature is Unlocked)	The update installation for the version downgrade to the microprogram which is not supporting the TrueCopy Extended Distance function cannot be performed because the priced option of TrueCopy Extended Distance is unlocked.	① 1. Click [Go to Normal Mode] of the menu frame in the WEB window, and start the subsystem.	–
			2. Lock the priced option of TrueCopy Extended Distance by deleting all the pairs created with the TrueCopy Extended Distance function referring to "TrueCopy Extended Distance User's Guide".	"TrueCopy Extended Distance User's Guide"
			3. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			4. Perform the update installation of the microprogram again for the version downgrade.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Down Grade Install NG [TrueCopy remote replication feature is installed]	The update installation cannot be performed for the microprogram of the revision which is not supporting the Modular Volume Migration function because the priced option of the Modular Volume Migration function is unlocked.	① 1. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			2. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
			3. Lock the priced option of the TrueCopy remote replication function referring to TrueCopy remote replication User's Guide "3.1.2 Uninstallation".	TrueCopy remote replication User's Guide "3.1.2 Uninstallation"
			4. Change it to the maintenance mode.	WEB "Chapter 3. The Maintenance Mode Operation Procedure" (WEB 03-0000)
			5. Click [Others] in the menu frame of the maintenance mode window on WEB.	WEB "3.6 Other" (WEB 03-0430)
			6. Set [Down Grade Check] of the [Others] window to "Disable".	
			7. Execute the upgrade installation (version downgrade) of the microprogram again.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			8. Click "To Maintenance Mode Top" of the "Microprogram Setup" window on WEB.	WEB "3.3.1 Microprogram" (WEB 03-0280)
			To be continued to the next page	

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Message code	Message text	Description	Recovery methods	Reference page
			9. Return the subsystem to the normal mode by clicking the [Go to Normal Mode] button in the menu frame of the maintenance mode window on WEB.	WEB "3.7 Return Method to the Normal Mode" (WEB 03-0440)
			10. Check that the "I10000 Subsystem is ready" is displayed in the Information Message of the normal mode window on WEB.	–
-	Abnormal End Drive Block Size Error AT CDEV **	The drive block size is other than 520 bytes.	①Replace a Disk Drive whose unit ID number is 0 and Disk Drive number is **.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
-	Abnormal End Empty System Retry Full Install	The updating installation cannot be done because the old microprogram does not exist in the system Disk Drive.	①When it is evident that the old microprogram does not exist in the system Disk Drive, install the microprogram newly.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
			②Execute the updating installation again after making sure that the system copy has been completed through the Information Message of the Web. • "I140xy System copy started" or "I140HH System copy started" is not displayed. • "I140xy System copy started" or "I140HH System copy started" and "I141xy System copy completed" or "I141HH System copy completed" are displayed consecutively. When the system copy is being made, turn off the main switch and then turn it on again later than 20 seconds. In the following case, the system copy is being made. • While "I140xy System copy started" or "I140HH System copy started" is displayed, "I141xy System copy completed" or "I141HH System copy completed" is not displayed successively. Execute the updating installation again after making sure that the READY LED (green) comes on and then the system copy is completed.	
-	Abnormal End File Open Error	File open error	①Make sure of the system to be installed and execute the installation again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End File Read Error	File read error		

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Message code	Message text	Description	Recovery methods	Reference page
-	Abnormal End File Remove Failed	File elimination error	①Execute the utility program load after restarting(*1) the subsystem.	–
-	Abnormal End Install Failed	All the drives became abnormal after the installation had been completed.	①Make sure of the system to be installed and the system drive, and then execute the installation again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Initial Setup Error by LU Access Restriction	Initial Setup failed due to the LU access restriction.	①Initial Setup cannot be done. Execute update installation for updating the microprogram.	
-	Abnormal End Initial Setup of Microprogram Failed	Initial Setup was done when the installation check on the microprogram for DF700S/M was "Disable".	①Execute installation after changing the installation classification to "Update".	–
-	Abnormal End Loop Error	A loop failure occurred.	①Execute the installation again after making sure of the ENC and the loop.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End No Drives Available	No normal drive is available.	①Replace the system drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
-	Abnormal End PGMS **** Too Large	The program size is larger than the allowable limit.	①Make sure of the system to be installed and execute the installation again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Unknown Drive AT CDEV **	The system area capacity is larger than the drive capacity.	①Replace a Disk Drive whose unit ID number is 0 and Disk Drive number is **.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
-	Abnormal End Upgrade Failed (The Installed Microprogram is Incorrect) Uploaded Microprogram Revision:XXXX/X Installed Microprogram Revision:XXXX/X	The upgrade from DF700S to DF700M failed. Or the upgrade from DF700S/M to DF700H failed.	①Install the DF700M/H microprogram whose system revision is the same as that of the DF700S/M microprogram.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
-	Abnormal End Upload File SUM Check Error	Read file sum check error	①Make sure of the system to be installed and execute the installation again.	
-	Abnormal End Upload System Error	The "PRGMAG. DAT" file does not exist. The "START70*. DAT" file does not exist. The "END DAT" file does not exist. The file required does not exist.		

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text	Description	Recovery methods	Reference page
-	Cannot Execute Upload	Java Applet cannot be activated.	①Check if the Java Plug-in is installed. ②Check if it is validated through the setting of Java Plug-in on the operator panel. ③(IE) Check if the setting of ActiveX is validated. ④Check if the (NN) Java plug-in setting is valid.	–
-	Complete MICRO REV:********	The installation was completed normally.	–	–
-	Drive firmware download start	The drive firmware (microprogram) downloading of the firmware was started.	–	–
-	ENC microprogram download start	A microprogram downloading for replacing the microprogram was started.	–	–
-	File open error [file name]	File open error	①Make sure of the system to be installed.	–
-	File read data err [file name]	File read data error		
-	File read err [file name]	File read error		
-	File size mismatch [file name]	File size inconsistency		
-	File size over [file name]	File size error		
-	If you execute "Initial Setup", the subsystem erase all user data. Are you sure you want to execute this operation? If you wish to execute this operation, please mark the "OK to execute" checkbox and press OK.	The confirmation and the agreement demand of all user data being erased when Initial Setup is executed	–	–
-	If you execute "System Reboot with Configuration Clear", the subsystem erase all user data. Are you sure you want to execute this operation? If you wish to execute this operation, please mark the "OK to execute"	Confirmation dialog message at the time of starting configuration clear	–	–
-	Install revision	Display of a revision of the installed program	–	–
-	Initial Setup (Config and System Parameter Clear) Install Microprogram Rev.********	Make sure that the initial setting up has been done.	–	–

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Message code	Message text	Description	Recovery methods	Reference page
-	Microprogram download ENC#	Microprogram replacement was started. [ENC number]	–	–
-	Microprogram download of ENC# in update mode	The start of the update mode of the ENC microprogram download is checked.	–	–
-	Microprogram download of ENC# in overwrite mode This download may cause a downgrade of ENC microprogram for any ENCs.	The start of the overwrite mode of the ECN microprogram download is checked.	–	–
-	Micro Update Install Microprogram Rev.********	Make sure that the update installation of the microprogram has been done.	–	–
-	Old System Exists	• There is an existing system of when it was newly installed or when it was installed through LAN. (Microprogram less than Ver.7.0) • There is an existing system when the LAN is installed. (Microprogram Ver.7.0 or more)	–	–
-	Partially Completed MICRO REV:********	The installation was terminated abnormally.	①Refer to the procedure for finding a cause of a Disk Drive failure to be used when a message, "Install partially complete," is output.	–
-	System parameter update failed	All the drives do not accept a read instruction.	①Reset the system parameters. ②If the trouble recurs, replace the system drive.	System Parameter (SYSPR 00-0000) Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050)
-	System Restart With Config Clear	Confirmation dialog message at the time of rebooting the utility mode.	–	–
-	Target HDU not found	The target HDU is not found.	①Make sure of the drive to be rewritten.	–
-	Utility start	The processing of the utility function was started.	–	–
1003	Cannot Upload File.	Write error of the RAM disk.	①Perform the operation over again from the software reset.	–
1004	System is Other Boot Up Mode.	Inconsistency of statuses of Applet and the subsystem (Example: The subsystem has started an installation of drive firmware, whereas Applet is loading the utility.)	①Reload the page. ②If the correct page is not displayed, perform the operation over again from the software reset.	–
1005	Booting. Please Retry Again.	The subsystem is being started up.	①Operate over again after waiting for a while.	–
1006	System is Executing Other Event.	The subsystem is already executing the process.	①Make sure of the information message or reload the page.	–
1007	System is Executing Main Process.	The utility is being processed. The drive firmware is being replaced.	①Reload the page.	–
1008	System is Down.	The subsystem cannot execute the process (it has gone down).	①Perform the operation over again from the software reset.	–

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Message code	Message text	Description	Recovery methods	Reference page
1009	Please. Retry Again.	The subsystem stands ready to start the microprogram installation.	① Install the microprogram over again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
1010	Please. Retry Again on Other CTL.	Have the controller in another system re-execute the process.	① Have the controller in another system re-execute the process.	–
1011	Please Confirm Information Message.	Make sure of the information message.	① Make sure of the information message.	–
1200	The Java Plug-in version in use is not supported. Confirm the Java Plug-in version.	Java Applet was activated with Java Plug-in of a version not supported.	① Activate Java Applet again after making sure of the version of Java Plug-in currently used.	–
1202	A path to the Microprogram isn't being input. Specify a path.	The path to the microprogram to be installed is not specified.	① Specify the path to the microprogram.	–
1204	A specified file doesn't exist. Confirm elements of designation.	The specified file does not exist.	① Make sure that the path to the directory of the microprogram to be installed is specified correctly.	–
1206	A specified path is not a normal file. Specify a file.	A file other than the normal file was specified when the normal file must be specified.	① Check if the specification is correct.	–
1207	A specified path is not a directory. Specify a directory.	A file other than the directory file was specified when the directory file must be specified.		
1210	A specified file is not possible to read. Confirm the condition of the file.	The specified file cannot be read.	① Make sure of a status of the specified file.	—
1212	Access to the specified file was rejected. Confirm the setup of the security policy.	Access to the specified file was rejected according to the security policy.	① Set up the service PC again.	–
1213	Access to the specified directory was rejected. Confirm the setup of the security policy.	Access to the specified directory was rejected according to the security policy.		
1214	An error occurred during the file I/O. Confirm the status of the specified file.	An error occurred during an I/O operation to/from the specified file.	① Make sure of a status of the specified file.	–
1215	A runtime permission wrong matter occurred. Confirm the setup of the security policy.	A request for access to the java.lang.RuntimePermission object was rejected.	① Set up the service PC again.	–
1216	Access to the property information was rejected. Confirm the setup of the security policy.	A request for access to the java.util.OropertyPermission object was rejected.		
1217	A security wrong matter occurred. Confirm the setup of the security policy.	A security trouble occurred.		

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Message code	Message text	Description	Recovery methods	Reference page
1218	An invalid response was received from the subsystem. Confirm the subsystem status and the LAN environment, and then try again.	Communication with the subsystem failed.	①Make sure of the subsystem status and the LAN environment, and then retry.	–
1219	An error occurred during the communication with the subsystem. Confirm the subsystem status and the LAN environment.	An error occurred during the communication with the subsystem.	①Make sure of the subsystem status and the LAN environment, press the Software Reset button, and retry.	–
1220	A path to the Utility Program isn't being input. Specify a path.	The path to the utility program to be installed is not specified.	①Specify the path to the utility program.	–
1221	A path to the Utility Parameter Files isn't being input. Specify a path.	The path to the parameter file to be installed is not specified.	①Specify the path to the utility parameter file.	–
1222	A path to the Drive Firmware Program isn't being input. Specify a path.	The path to the drive firmware program to be installed is not specified.	①Specify the path to the drive firmware program.	–
1223	A HTTPClient library isn't found. Confirm the execution environment.	The HITTPClient library is not found.	①Activate the browser again after setting up the service PC, and then re-execute the microprogram installation.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
1224	A path to the ENC Microprogram isn't being input. Specify a path.	The path to the ENC microprogram to be installed is not specified.	①Specify the path to the ENC microprogram.	–
2000	File upload was cancelled.	The installation of the file was interrupted (artificially).	①Re-execute the installation after activating the browser again.	–
2001	Microprogram installation was cancelled.	The installation of the microprogram was interrupted (artificially).	①Re-execute the microprogram installation after activating the browser again.	–

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7.2 Web error messages (Simple Trace)

Message code	Message text	Description	Recovery methods	Reference page
-	Executing [Simple Trace]	The simple trace is already being executed.	ⓘ Perform maintenance after making sure of the subsystem status.	–
-	Not Ready	When the result of a check done at the time of the simple trace execution was illegal	ⓘ Retry after making sure of the subsystem status.	–
-	Simple trace failed	The simple trace could not be executed because the subsystem status was abnormal.	ⓘ Make sure of the subsystem status.	–
-	Simple trace interrupt	The simple trace was interrupted (because the automatic dump operation was done).	ⓘ Perform maintenance after making sure of the subsystem status.	–

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7.3 Web error messages (Web Control Management)

Message code	Message text	Description	Recovery methods	Reference page
-	Booting. Please Retry Again.	A boot is in progress.	①Retry after making sure of the subsystem status.	–
-	CTL Alarm.	CTL detachment	①Replacing the Control Unit.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
-	Executing [Simple Trace]	The simple trace is being executed.	①Retry after making sure of the subsystem status.	–
-	"Invalid machine status."	Illegal status	①Restart the subsystem.	–
-	Invalid Parameter.	When the restriction placed on inputting is not followed.	①Reset the parameter.	–
-	Not Ready	When the drive separating function exclusive check and the trace collection check are abnormal.	①Retry after making sure of the subsystem status.	–
-	Subsystem is Executing Other Event. [OWN]	The process is being executed in the self system.	①Retry after making sure of the subsystem status.	–
-	"Web Task" is executing other request.	The Web task is executing another request.	①Retry after making sure of the subsystem status.	–
-	Web Task Booting..	The Web task is being booted.	①Retry after making sure of the subsystem status.	–
-	Web Task Down!	The Web task cannot be executed.	①Restart the subsystem.	–
1003	Cannot Upload File.	Write error of the RAM disk	①Perform the operation over again from the software reset.	–
1004	System is Other Boot Up Mode.	Inconsistency of statuses of Applet and the subsystem (Example: The subsystem has started an installation of drive firmware, whereas Applet is loading the utility.)	①Reload the page.	–
			②If the correct page is not displayed, perform the operation over again from the software reset.	–
1005	Booting. Please Retry Again.	The subsystem is being started up.	①Operate over again after waiting for a while.	–
1006	System is Executing Other Event.	The subsystem is already executing the process.	①Make sure of the information message or reload the page.	–
1007	System is Executing Main Process.	The utility is being processed. The drive firmware is being replaced.	①Reload the page.	–
1008	System is Down.	The subsystem cannot execute the process (it has gone down).	①Perform the operation over again from the software reset.	–
1009	Please. Retry Again.	The subsystem stands ready to start the microprogram installation.	①Install the microprogram over again.	–
1010	Please. Retry Again on Other CTL.	Have the CTL in another system re-execute the process.	①Have the controller in another system re-execute the process.	–
1011	Please Confirm Information Message.	Make sure of the information message.	①Make sure of the information message.	–

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7.4 Web error messages (NAS Log)

Message code	Message text	Description	Recovery methods	Reference page
-	Not Ready(*1)	The subsystem is not Ready.	①Wait until the subsystem becomes Ready.	-
-	The NAS log download is already executing. Wait a while, and then try again.	The NAS Log collection is being executed.	①Wait until the collection processing of the NAS Log is completed.	-
-	NAS Log collection was interrupted.	The NAS Log collection was canceled.	①Press the [OK] button, and close the sub window.	-
-	(*2)	The NNC (NAS Unit) terminated abnormally.	①Perform the maintenance according to the contents of the message. (The details of the contents of the message are shown by the NNC (NAS Unit).)	-
-	NAS Log collection is being executed.	It terminated abnormally because the NAS Log is being downloaded.	①Wait until the download of the NAS Log file is completed.	-
-	The NAS Log download was interrupted because a timeout occurred during program processing.	A time-out occurred at normal time.	①Check the Information Message if the NNC (NAS Unit) has no abnormality.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100)
-		A time-out occurred at cancellation.		
-	NAS Log collection is already finished.	The NAS Log collection was completed.	①Press the [OK] button, and close the sub window.	-
-	The NAS Log download was interrupted because a timeout occurred during program processing.	A time-out occurred in a part of the processing in process of the download processing by the NAS Log collection processing.	①Execute the NAS Log collection again. ②If the above-mentioned ① failed, request the collection of All Log from the NAS Manager Modular to the system administrator.	-
-	The NAS Log download was interrupted for some reason.	A mismatch occurred in the one-time password or the internal setting parameter in process of the download processing by the NAS Log collection processing.	①Check the NAS Log collection processing procedure, and execute the NAS Log collection again. ②If the above-mentioned ① failed, request the collection of All Log from the NAS Manager Modular to the system administrator.	-
-	The NAS Log download failed because an execution error occurred during program processing.	An internal error occurred in process of the download processing by the NAS Log collection processing.	①Execute the NAS Log collection again. ②If the above-mentioned ① failed, request the collection of All Log from the NAS Manager Modular to the system administrator.	-

*1 : When an invalid argument was specified in the URL to the CGI program, or when an undefined value is returned from the progress rate acquisition function, "Not Ready" is displayed as well as the simple trace.

*2 : The text of the message changes according to the error factor.

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7.5 Web error messages (NAS Dump)

Message code	Message text	Description	Recovery methods	Reference page
-	Do you collect the “NAS Dump”?	Is “NAS Dump” collected?	①It transits by pressing the [OK] or [Cancel] on the window.	-
-	Collection of the NAS Dump might take up to 90 minutes. This processing will be forced to stop the NAS OS immediately, regardless of the NAS OS processing. Are you sure you want to continue the processing?	The acquisition of the NAS Dump takes a maximum of ninety minutes. Also, when this processing is executed, the NAS OS is forcibly terminated regardless of the status of the NAS OS. Is the processing continued?	①It transits by pressing the [OK] or [Cancel] on the window.	-
-	Collection of the NAS Dump is in process (NNC-x)	The NAS Dump collection is currently processing. x : NNC (NAS Unit) # (0-3)	①It transits by pressing the [OK] on the window.	-
-	The collection operation for the NAS Dump was rejected. The collection of the NAS Dump has been in process already.	The operation of the NAS Dump collection was rejected. The NAS Dump collection has already executed	①It transits by pressing the [OK] on the window.	-
-	Please select the NNC number to cancel collection of the NAS Dump.	Select the NNC (NAS Unit) number, and cancel the NAS Dump collection.	①It transits by pressing the [Set] or [Cancel] on the window.	-
-	Do you cancel collection of the "NAS Dump"?	Is the “NAS Dump” collection canceled?	①It transits by pressing the [OK] or [Cancel] on the window.	-
-	The collection of the NAS Dump was canceled (NNC-x)	The NAS Dump collection was canceled. x : NNC (NAS Unit) # (0-3)	①It transits by pressing the [OK] on the window.	-
-	The cancel operation for collection of the NAS Dump was rejected. The collection of the NAS Dump is not running.	The interruption operation for the NAS Dump collection was rejected. The NAS Dump collection is not being executed.	①It transits by pressing the [OK] on the window.	-
-	Password entry complete.	The password registration was completed.	①It transits by pressing the [OK] on the window.	-
-	Invalid value! Please re-enter password.	It is an invalid value. Enter the password again.	①The window is closed by pressing [OK] on the window.	-
-	Wrong old password. Please re-enter "NAS Dump".	It is the wrong old password. Enter “Old Password” again.	①It transits by pressing the [OK] on the window.	-
-	Wrong new password or re-enter new password. Please re-enter "New Password" and "Re-enter New Password".	It is the wrong new password or the reentered password. Enter “New Password” and “Re-enter New Password” again.	①It transits by pressing the [OK] on the window.	-
-	The current password setting will be cleared and will return to default password it this reset operation is executed.	When this reset operation is executed, the current password setting is cleared and returned to the default password.	①It transits by pressing the [Rest] or [To Normal Mode top] on the window.	-
-	Do you reset the password?	Is the password reset?	①It transits by pressing the [OK] or [Cancel] on the window.	-

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Message code	Message text	Description	Recovery methods	Reference page
-	The password reset operation was completed.	The password reset operation was completed.	① It transits by pressing the [To Normal Mode top] on the window.	-
-	Not Ready(*1)	It is not ready.	① Wait until the subsystem becomes Ready.	-

*1 : As an indication factor of Not Ready, it is displayed when the status of the NNC (NAS Unit) has not decided, or when an invalid argument to the CGI is specified, and the like. It is unified by the NAS Log collection function and the same message.

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Chapter 8. Storage Navigator Modular Error Messages

Table 8.1 Storage Navigator Modular error messages

Message code	Message text/Recovery methods
DMEA000001	Busy status was reported from the subsystem. Please retry after waiting for a while.
DMEA000002	The Queue Full status was reported from the subsystem. Please retry after waiting for a while.
DMEA000003	LU0 is reserved by another host. Please retry after the reservation is canceled.
DMEA000004	An error was detected in the data received from the subsystem. Confirm the subsystem status and the LAN environment, and then try again.
DMEA000005	An error occurred while communicating with the subsystem. Confirm the subsystem status and the LAN environment, and then try again.
DMEA000006	Failed to connect with the subsystem. Confirm the subsystem status and the LAN environment, and then try again.
DMEA000007	An invalid response was received from the subsystem. Confirm the subsystem status and the LAN environment, and then try again.
DMEA000008	An unexpected error was reported from the subsystem. Please retry after waiting for a while.
DMEA00000A	The CHECK CONDITION status was reported from the subsystem, but the details could not be acquired. Please retry after waiting for a while.
DMEA00000B	Failed to transfer data. Confirm the subsystem status and the LAN environment, and then try again.
DMEA00000C	Failed to issue the SCSI command. Confirm the subsystem status and the LAN environment, and then try again.
DMEA00000D	Insufficient memory. Terminate other programs and then try again.
DMEA00000E	An internal program error occurred. Wait for a while and then try again. If the problem cannot be solved, contact the maintenance personnel.
DMEA000201	The specified user ID or password is incorrect.
DMEA001000	The information file for the subsystem cannot be opened. Confirm the execution environment.
DMEA001001	The information file for the subsystem is invalid. Confirm the execution environment.
DMEA001002	The specified subsystem name is already registered. Specify another name.
DMEA001003	The specified subsystem name is not registered.
DMEA001004	The registered information does not match the status of the subsystem. Correct the information and then try again.
DMEA001005	The number of registered subsystems has reached the maximum. Delete unnecessary information and then try again.
DMEA001006	Invalid parameter.
DMEA001007	The specified controller is incorrect.
DMEA001008	Failed to open the specified file. Confirm the file name and then try again.
DMEA001009	The contents of the file are invalid. Confirm the file and then try again.
DMEA00100A	Failed to connect with the server. Confirm the registered information and the LAN environment, and then try again.
DMEA00100B	The password is not specified.
DMEA00100C	The password is corrupted. Delete the password file and then try again.
DMEA00100D	The specified logical unit is not defined. Specify a defined logical unit.
DMEA00100E	Formatting failed. Confirm the subsystem status and the LAN environment, and then try again.
DMEA00100F	The file for e-mail setting contains an error.
DMEA001010	The e-mail information is not set up.
DMEA001011	The parameter for e-mail setting is invalid.
DMEA001012	An error was detected while connecting to the mail server. Confirm the mail server and then try again.
DMEA001013	An internal program error occurred. Wait for a while and then try again. If the problem cannot be solved, contact the maintenance personnel.
DMEA001014	The connection type is invalid.
DMEA001015	The microprogram revision is not supported. Confirm the subsystem status.
DMEA001016	Failed to start the specified application program. Confirm the path to the specified application and the operational environment.

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Message code	Message text/Recovery methods
DMEA001017	An error occurred during the file I/O. Please check the permission and available capacity.
DMEA001018	The specified directory path is invalid. Please specify a right directory path.
DMEA001019	The process cannot be performed because the microprogram on the subsystem does not support the function.
DMEA001020	Could not finish replacing the micro program. Please see if there are any alarms or warnings in the subsystem.
DMEA001021	The number of groups reached the maximum. Specify an already registered group or delete an unnecessary group and try again.
DMEA001022	Hardware error occurred. Confirm the subsystem.
DMEA001023	The process cannot be performed because the current subsystem does not support the function.
DMEA001024	Environment variable: STONAVM_HOME is not defined. Specify STONAVM_HOME.
DMEA001025	The controller in charge of the LU is not registered. Register the controller and then try again.
DMEA001026	The specified information does not match the configuration of the subsystem. Confirm the configuration information.
DMEA001027	The JRE (Java Runtime Environment) version in use is not supported. Confirm the JRE version.
DMEA001028	Failed to restart the subsystem.
DMEA001029	Environment variable: STONAVM_HOME does not match. Confirm STONAVM_HOME.
DMEA00102A	The JRE (Java Runtime Environment) version in use is not supported. Confirm the JRE version.
DMEA00102B	The process cannot be performed because the current controller in charge of the specified LU is different. Retry from the current controller for the LU.
DMEA001030	The parameter for System Startup Attribute or the item name is invalid.
DMEA001031	The parameter for Spare Disk or the item name is invalid.
DMEA001032	The parameter for Host Connection Mode or the item name is invalid.
DMEA001033	The parameter for Serial Number or the item name is invalid.
DMEA001034	The parameter for Drive Capacity or the item name is invalid.
DMEA001035	The parameter for Option 1 or the item name is invalid.
DMEA001036	The parameter for Option 2 or the item name is invalid.
DMEA001037	The parameter for Data Striping Size or the item name is invalid.
DMEA001038	The parameter for Buzzer or the item name is invalid.
DMEA001039	The parameter for LU Size Report to the Host or the item name is invalid.
DMEA00103A	The parameter for SCSI Reset/LIP Mode for all Ports or the item name is invalid.
DMEA00103B	The parameter for Operation if the Processor failures Occurs or the item name is invalid.
DMEA00103C	The parameter for INQUIRY Information or the item name is invalid.
DMEA00103D	The parameter for Cache Mode or the item name is invalid.
DMEA00103E	The parameter for Target ID or the item name is invalid.
DMEA00103F	The parameter for Port Type or the item name is invalid.
DMEA001040	The parameter for ROM Pseudo-response command processing or the item name is invalid.
DMEA001041	The parameter for Save Data Pointer response or the item name is invalid.
DMEA001042	The parameter for Controller Identifier or the item name is invalid.
DMEA001044	The parameter for Write & Verify Execution Mode or the item name is invalid.
DMEA001045	The parameter for LAN CONST or the item name is invalid.
DMEA001046	The parameter for SYNC CONTROL or the item name is invalid.
DMEA001047	There is no file header.
DMEA001048	The present drive configuration for the subsystem cannot support the drive configuration information of the specified file.
DMEA001049	The RAID configuration data is invalid.
DMEA00104A	The LU configuration data is invalid.
DMEA00104B	The drive configuration data is invalid.
DMEA00104D	The password length is invalid. Use 12 or fewer characters.
DMEA00104E	The process failed because the function is disabled.
DMEA00104F	Failed to obtain the controller failure dump information. Retry after 10 minutes.
DMEA001050	The parameter for Web Title or the item name is invalid.

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Message code	Message text/Recovery methods
DMEA001051	The parameter for Delay Planned Shutdown or the item name is invalid.
DMEA001052	The additional information file cannot be opened. Confirm the execution environment.
DMEA001053	The additional information file is invalid. Confirm the execution environment.
DMEA001054	The mail additional information length is invalid.
DMEA001055	The number of registered mail additional information reached the maximum. Delete unnecessary information and then try again.
DMEA001056	An e-mail information cannot be saved. Please check the permission and available capacity of the install directory.
DMEA001070	This program is not installed correctly.
DMEA001071	The function cannot be executed because the LU has already been reserved.
DMEA001072	The specified path name is over 250 characters.
DMEA001073	Failed to create a log directory. Confirm the execution environment.
DMEA001074	The specified path name is incorrect.
DMEA001075	The specified path does not exist, or no effective files exist under the specified path.
DMEA001076	The micro program in the specified path does not exist. Please confirm whether the micro program is stored in the path or the specified path is right.
DMEA001077	Failed to create a micro file directory. Confirm the execution environment.
DMEA001078	The specified key was not found. Confirm the file and then try again.
DMEA001079	Cannot use this function for the specified device.
DMEA00107A	The micro program replacement of the specified controller cannot be performed. Please replace the micro program of the other controller first.
DMEA00107B	The micro program cannot be read. Please check the permission and available capacity of the install directory.
DMEA00107C	The micro program is not read.
DMEA001080	Cannot set the LU mapping in case of mapping mode is off.
DMEA001081	Failed to get drive information.
DMEA001083	The parameter for PortOption or the item name is invalid.
DMEA001084	The parameter for HostGroupInformation or the item name is invalid.
DMEA001085	The parameter for HostGroupOption or the item name is invalid.
DMEA001086	The parameter for LuMapping or the item name is invalid.
DMEA001087	The parameter for FibreSecurityInformation or the item name is invalid.
DMEA001088	The parameter for Common Information or the item name is invalid.
DMEA001089	Failed to set up a Mapping Mode. Confirm the setting file and then try again.
DMEA001090	The CTL Header is invalid.
DMEA001091	The PORT Header is invalid.
DMEA001092	Illegal option set.
DMEA001093	The function cannot be used because it is not installed, locked, or disabled.
DMEA001094	The specified host group is already defined. Confirm the name or number, and specify a new host group.
DMEA001095	The specified host group is not defined. Confirm the name or number, and specify a defined host group.
DMEA001096	The host group security on the specified port is set on disable. Set host group security to enable and then try again.
DMEA001097	The function cannot be executed because host group 0 is specified. Specify other than host group 0 and try again.
DMEA001098	The specified host group name or WWN name is invalid. Confirm the name and try again.
DMEA001099	The specified host group number is invalid. Confirm the number and try again.
DMEA001100	The specified node name is invalid. Confirm the name and try again.
DMEA001101	The specified port name is invalid. Confirm the name and try again.
DMEA001102	The parameter for LUN Manager Information or the item name is invalid.
DMEA001103	The same host group name exists in a port. Confirm the setting file and then try again.
DMEA001104	The same WWN name exists in a port. Confirm the setting file and then try again.
DMEA001105	The same port name exists in a port. Confirm the setting file and then try again.
DMEA001106	The same host group number exists in a port. Confirm the setting file and then try again.

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Message code	Message text/Recovery methods
DMEA001107	The information of the host group number 0 is not in a setting file. Confirm the information on the host group number 0 for every port and then try again.
DMEA001108	The specified Web Title is invalid. Confirm the Web Title and try again.
DMEA001109	In the installed micro program revision, a setup of the Read Frame Min 128 Byte Mode cannot be performed. Please update to the micro program which can set up the Read Frame Min 128 Byte Mode.
DMEA00110A	The process cannot be performed because the micro program on the subsystem does not support the function.
DMEA00110B	There is no parameter to change the data pool information.
DMEA00110C	The specified RAID groups and logical units cannot be created because the drive type is different.
DMEA00110D	The parameter for Options or the item name is invalid.
DMEA00110E	The process cannot be performed because the specified RAID level is not supported.
DMEA00110F	The system LU configuration data is invalid.
DMEA00112C	In the installed micro program revision, a setup of the HostSystemConfiguration cannot be performed. Please update to the micro program which can set up the HostSystemConfiguration.
DMEA00112D	The parameter for HostSystemConfiguration or the item name is invalid.
DMEA00112E	The process cannot be performed because the attribute is not Read/Write. Please change the attribute to Read/Write and then try again.
DMEA00112F	The specified LU is not set retention term. Confirm the LU status.
DMEA001130	The specified RAID group is already defined. Specify a new RAID group.
DMEA001131	The specified RAID group is not defined. Specify a defined RAID group.
DMEA001132	Failed to create a file. Confirm the execution environment.
DMEA001133	The file cannot be outputted. Because the performance statistics acquisition failed.
DMEA001134	The retention term cannot be shortened. Specify the retention term is equal to or more than current value and try again.
DMEA001135	The ENC micro program download and replacement cannot be performed in the single-controller system.
DMEA001136	The directory for storing the ENC micro program cannot be created. Please check the permission of the install directory.
DMEA001137	The ENC micro program cannot be read. Please check the permission and available capacity of the install directory.
DMEA001138	The ENC micro program is not read.
DMEA001139	The ENC micro program of the specified subsystem is not read.
DMEA001140	The ENC micro program in the specified path does not exist. Please confirm whether the ENC micro program is stored in the path or the specified path is right.
DMEA001141	The ENC micro program cannot be read. Please confirm the file and then try again.
DMEA001142	The contents of the ENC micro program are invalid. Please confirm the file and then try again.
DMEA001143	Incorrect character in the group name.
DMEA001144	Incorrect character in the array unit name.
DMEA001145	The character length of the array unit name or group name is incorrect.
DMEA001146	The specified path name of the directory for storing the management file is over 250 characters, or there is not sufficient memory. Please specify the pass name of 250 or less characters, or terminate other programs and then try again.
DMEA001147	The directory for storing the management file cannot be created. Please check the permission and available capacity of the directory.
DMEA001148	The specified path name for storing the management file is over 250 characters. Please specify the pass name of 250 or less characters and then try again.
DMEA001149	Failed to write the management file. Please check the permission and available capacity of the directory.
DMEA00114A	Failed to open the management file. Confirm the file name and then try again.
DMEA00114B	The contents of the management file are invalid. Confirm the file and then try again.
DMEA00114C	The specified path name for the file is over 250 characters. Please specify the pass name of 250 or less characters and then try again.
DMEA00114D	Failed to write the file. Please check the permission and available capacity of the directory.
DMEA00114E	Failed to open the file. Confirm the file name and then try again.
DMEA001110	The user LU configuration data is invalid.

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Message code	Message text/Recovery methods
DMEA001150	The specified time of output CSV file is incorrect.
DMEA001151	The specified path name for storing the CSV file is over 250 characters. Please specify the pass name of 250 or less characters and then try again.
DMEA001152	Failed to write the CSV file. Please check the permission and available capacity of the directory.
DMEA001153	Failed to open the CSV file. Confirm the file name and then try again.
DMEA001154	The specified path name of the directory for storing the CSV file is over 250 characters, or there is not sufficient memory. Please specify the pass name of 250 or less characters, or terminate other programs and then try again.
DMEA001155	The specified path name for the management file is over 250 characters. Please specify the pass name of 250 or less characters and then try again.
DMEA001156	The specified path name of the deletion file is over 250 characters. Please specify the pass name of 250 or less characters and then try again.
DMEA001157	The monitoring data cannot be read because the data version is new. Confirm the version of this program and then try again.
DMEA001158	The specified number of output CSV file is incorrect.
DMEA001159	The process cannot be performed because the mapping guard LU exists.
DMEA00115A	Failed to open the management file. Confirm the file name and then try again.
DMEA00115B	The contents of the management file are invalid. Confirm the file and then try again.
DMEA00115C	Failed to connection. Confirm the connection and then try again.
DMEA00115D	A response without subsystem was received. Confirm the connection and then try again.
DMEA00115E	The process cannot be performed because there is not free area in the specified RAID group.
DMEA001160	The logical unit cannot be defined in the specified area.
DMEA001161	The process cannot be performed because the logical unit is already defined in the first area of the specified RAID group.
DMEA001162	The process cannot be performed because there is not free area in the specified area.
DMEA001163	The value received from the subsystem is invalid.
DMEA001164	The specified IP address is incorrect. Please specify a right IP address.
DMEA001165	The specified subnet mask is incorrect. Please specify a right subnet mask.
DMEA001166	The specified default gateway address is incorrect. Please specify a right default gateway address.
DMEA001167	The information can not be set because the Environment Setting File is over 4096 Bytes. Please confirm the specified file.
DMEA001168	The information can not be set because the Array Unit Name Setting File is over 255 Bytes. Please confirm the specified file.
DMEA001169	The process cannot be performed because the term of the temporary key or emergency key is expired.
DMEA001170	The character length of the serial number is incorrect.
DMEA001171	The contents of the license key file are invalid. Please confirm the file and then try again.
DMEA001172	The contents of the license key file are invalid. Please confirm the file and then try again.
DMEA001173	The process cannot be performed because the number of license key is over 50. Please confirm the file and then try again.
DMEA001175	Could not finish replacing the micro program. Please see if there are any alarms or warnings in the subsystem.
DMEA001176	The process cannot be performed because NNC is physically unequipped. Confirm the NNC status and try again.
DMEA001177	The specified NNC cannot be performed because it is physically unequipped or unconnectable. Please confirm the NNC status and try again.
DMEA001178	The specified application program does not exist. Please confirm whether the specified application program is stored.
DMEA001179	Failed to start the specified application program. Confirm the path to the specified application and the operational environment.
DMEA00117A	The contents of the NNC BIOS firmware are invalid. Please confirm the file and then try again.
DMEA00117B	The NNC BIOS firmware is not read.
DMEA00117C	The directory for storing the NNC BIOS firmware cannot be created. Please check the permission of the install directory.
DMEA00117D	The NNC BIOS firmware in the specified path does not exist. Please confirm whether the NNC BIOS firmware is stored in the path or the specified path is right.
DMEA00117E	The NNC BIOS firmware cannot be read. Please check the permission and available capacity of the install directory.
DMEA00117F	The process cannot be performed because Fibre Channel Port is physically unequipped. Confirm the subsystem status and try again.

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Message code	Message text/Recovery methods
DMEA001180	The process cannot be performed because the same address is specified as the NTP server 1 and the NTP server 2. Specify the different address and try again.
DMEA001181	The process cannot be performed because the controller of the NNC is not registered. Register the controller of the NNC and then try again.
DMEA001182	The process cannot be performed because the connection with controller of the NNC failed. Confirm the subsystem status and the LAN environment, and then try again.
DMEA001183	The function cannot be executed because some port is invalid or unequipped. Please confirm the subsystem.
DMEA001184	The process cannot be performed because the port is not connected to the maintenance port. Please confirm the port of connection and try again.
DMEA001185	The process cannot be performed because the port is not connected to the management LAN. Please confirm the port of connection and try again.
DMEA001186	The process cannot be performed because iSCSI port is physically unequipped. Please confirm the subsystem status and try again.
DMEA001187	The specified target is already defined. Please confirm the name or number and specify a new target.
DMEA001188	The specified target is not defined. Please confirm the name or number and specify a defined target.
DMEA001189	The function cannot be executed because Target 0 is specified. Please specify other than target 0 and try again.
DMEA001190	The specified alias is invalid. Please confirm alias and try again.
DMEA001191	The specified initiator name is invalid. Please confirm initiator name and try again.
DMEA001192	The specified iSCSI name is invalid. Please confirm iSCSI name and try again.
DMEA001193	The specified user name is invalid. Please confirm user name and try again.
DMEA001194	The specified secret is invalid. Please confirm secret and try again.
DMEA001195	The parameter for Port or the item name is invalid.
DMEA001196	The specified KeepAliveTimer value is invalid. Confirm the value and try again.
DMEA001197	The parameter for iSCSIPortInformation or the item name is invalid.
DMEA001198	The parameter for iSNS Information or the item name is invalid.
DMEA001199	The specified Port number is invalid. Confirm the number and try again.
DMEA00119A	The specified Target number is invalid. Confirm the number and try again.
DMEA00119B	The parameter for TargetInformation or the item name is invalid.
DMEA00119C	The same Target number exists in a port. Confirm the setting file and then try again.
DMEA00119D	The parameter for Target Security or the item name is invalid.
DMEA00119E	The parameter for Initiator or the item name is invalid.
DMEA00119F	There is no file version.
DMEA0011A0	There is no start separator.
DMEA0011A1	The user name is invalid.
DMEA0011A2	The secret is invalid.
DMEA0011A3	The alias is invalid.
DMEA0011A4	The number of target is invalid.
DMEA0011A5	There is no end separator.
DMEA0011A6	There is no port separator.
DMEA0011A7	The information of the target number 0 is not in a setting file. Confirm the information on the target number 0 for every port and then try again.
DMEA0011A8	The same alias exists in a port. Confirm the setting file and then try again.
DMEA0011A9	The same iSCSI Name exists in a port. Confirm the setting file and then try again.
DMEA0011AA	The same Initiator Name exists in a port. Confirm the setting file and then try again.
DMEA0011AB	The specified MTU value is invalid. Confirm the value and try again.
DMEA0011AC	The file version is invalid.
DMEA0011AD	The user name reach the maximum.
DMEA0011AE	The target is not defined.

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Message code	Message text/Recovery methods
DMEA0011B1	The specified path name for storing the log file is over 255 characters. Please specify the pass name of 255 or less characters and then try again.
DMEA0011B2	The path name for storing the log file is over 255 characters. Please specify the pass name and then try again.
DMEA0011B3	Failed to write the log file. Please check the permission and available capacity of the directory.
DMEA0011B4	The internal log is empty.
DMEA0011B5	The User LAN Parameter Header is invalid.
DMEA0011B6	The CTL Parameter Header is invalid.
DMEA0011B7	The parameter for User LAN Parameter or the item name is invalid.
DMEA0011B8	The Maintenance LAN Parameter Header is invalid.
DMEA0011B9	The parameter for Maintenance LAN Parameter or the item name is invalid.
DMEA0011BA	The process cannot be performed because NNC is equipped. Please confirm the port type and try again.
DMEA0011BB	The process cannot be performed because the DHCP setting is different between the subsystem and input file. Please confirm the DHCP setting and try again.
DMEA0011BC	The process cannot be performed because the DHCP is enabled. Please set the DHCP to disable and try again.
DMEA0011BD	The process cannot be performed because the User LAN port of subsystem is being used by other applications. Refer to [netstat.inf] file in the directory where Storage Navigator Modular is installed, close applications using User LAN port of subsystem, and then try again.
DMEA0011BE	The process cannot be performed because the owner ID is different. Please split the pair using the application that created the pair.
DMEA002000	Rebooting might have failed, because an error occurred while communicating with the subsystem. Please confirm that the subsystem was rebooted by referring the Information Message of WEB. When not rebooted yet, please reboot once again(*1).
DMEA002001	The specified password is invalid. Please confirm the password and try again.
DMEA002002	The process cannot be performed because account is disabled. Please confirm the account status and try again.

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Message code	Message text/Recovery methods
DMEC002000	Cannot write the directory specified STONAVM_HOME.
DMEC002003	Essential option/parameter not enough.
DMEC002006	No entry.
DMEC002015	No information displayed.
DMEC002016	Illegal option set.
DMEC002017	Cannot execute the command for the array unit of current microprogram revision.
DMEC002018	Could not execute the function, because the array unit does not support the password protection function.
DMEC002019	No array units registered for error alert.
DMEC002020	Cannot add Send to address, because 20 addresses are already defined.
DMEC002021	The function cannot be executed because option is locked, or disabled.
DMEC002022	The function cannot be executed because the target mode of connected controller is not M-TID,M-LUN.
DMEC002023	The additional information was not registered to the specified subsystem.
DMEC002024	The specified RAID group cannot be deleted because it contains an already defined LU.
DMEC002025	Cannot delete the logical unit, because no logical units defined.
DMEC002026	Failed to open the manual file.
DMEC002027	The specified drive is not defined.
DMEC002028	Cannot use this command for the specified device.
DMEC002029	Cannot use this function for the specified device of this configuration.
DMEC002030	The function cannot be executed because mapping mode is off.
DMEC002031	Insufficient memory. Terminate other programs and then try again.
DMEC002032	The specified port is not available because its host group security is disabled. Enable the host group security and try again.
DMEC002033	The specified host group is already defined. Try with another name or number.
DMEC002034	The specified host group is not defined. Confirm the name or number, and specify a defined host group.
DMEC002035	The specified WWN name is already defined. Specify a new WWN name.
DMEC002036	The specified WWN is not defined. Specify a defined WWN.
DMEC002037	The specified WWN is already assigned to a host group. Specify a WWN that is not assigned to any of the host groups.
DMEC002038	The specified WWN is not assigned to any of the host groups. Specify a WWN that is already assigned to a host group.
DMEC002039	The number of registered WWNs reached the maximum. Delete unnecessary information and then try again.
DMEC002040	The number of registered host group reached the maximum. Delete unnecessary information and then try again.
DMEC002041	The specified WWN has not been logged in. Specify a WWN that is logged in.
DMEC002042	The function cannot be executed because host group 0 is specified. Specify except host group 0 and try again.
DMEC002043	The specified port name is already defined. Specify a new port name.
DMEC002044	No option entry.
DMEC002045	The number of defined logical unit reached the maximum. Delete unnecessary logical units and then try again.
DMEC002046	The specified logical unit capacity is not reallocated.
DMEC002047	The specified logical unit number is already defined. Specify a new logical unit.
DMEC002048	The specified logical unit is not defined. Specify a defined logical unit.
DMEC002049	The function cannot be executed because the password protection function is enabled.
DMEC002050	The function cannot be executed because the format mode is not queue.
DMEC002051	The specified logical unit(s) contain sub logical unit. Confirm the logical unit status and try again.
DMEC002052	The specified logical unit(s) contain invalid logical unit. Confirm the logical unit status and try again.
DMEC002053	The information on the specified logical unit cannot be displayed.
DMEC002054	The number of logical units have reached the maximum. Delete unnecessary logical units and then try again.
DMEC002055	The specified logical unit is not a Snapshot image. Specify a Snapshot image.
DMEC002056	The process cannot be performed because the number of logical units in the data pool reached the maximum. Delete unnecessary logical units and then try again.
DMEC002057	The data pool cannot be used. Please restart(*1) the subsystem.
DMEC002058	The process cannot be performed because no logical units is in the data pool. Add a logical unit to the data pool and try again.
DMEC002059	When changing the attribute to Read/Write, the retention term cannot be specified.

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Message code	Message text/Recovery methods
DMEC002060	The process cannot be performed because there are some uncorrected logical units. Start or skip parity correction and try again.
DMEC002061	Cannot execute the option for the array unit of current micro program revision.
DMEC002062	The specified logical unit number is already defined as a command device. Specify another logical unit number.
DMEC002063	The command device is not registered. Register the command device and try again.
DMEC002065	The specified logical unit number is not defined as a command device. Specify a logical unit that is already defined to a command device.
DMEC002066	The Cache Residency function cannot be used because it is not installed, locked, or disabled.
DMEC002067	The specified RAID group is not defined. Specify a defined RAID group.
DMEC002068	The logical unit cannot be created because there is not free area in the specified RAID group.
DMEC002069	The logical unit cannot be created because the specified area does not exist. Confirm the free area of the RAID group, and try again.
DMEC002070	The number of registered subsystems has reached the maximum. Delete unnecessary information and then try again.
DMEC002071	The number of spare drives reach the maximum. Confirm the specified spare drives, and try again.
DMEC002072	The number of DM-LU have reached the maximum. Release unnecessary DM-LU and then try again.
DMEC002073	The specified logical unit number is not defined as a DM-LU. Specify a logical unit that is already defined to a DM-LU.
DMEC002074	The specified logical unit is not Main logical unit. Specify a Main logical unit.
DMEC002075	The manual file of specified command is not found.
DMEC002076	The number of spare drives have reached the maximum. Delete unnecessary spare drives and then try again.
DMEC002077	The logical units are undefined. Please confirm logical units definition and try again.
DMEC002078	The RAID groups are undefined. Please confirm RAID groups definition and try again.
DMEC002079	The number of cache partition have reached the maximum. Delete unnecessary cache partition and then try again.
DMEC002080	The CTL0 cannot be specified because the cache partition to set up is not deleted. When specifying the CTL0, please restart(*1) and then try again.
DMEC002081	The CTL1 cannot be specified because the cache partition to set up is not deleted. When specifying the CTL1, please restart(*1) and then try again.
DMEC002083	Specify the option is equal to or more than 1.
DMEC002084	Cannot execute the command for the array unit of current micro program revision.
DMEC002086	The process cannot be performed because the time zone does not have daylight saving time. Please confirm the time zone.
DMEC002087	The process cannot be performed because NNC is unequipped. Please confirm the port status and try again.
DMEC002088	The process cannot be performed because all ports are used for NAS. Please confirm the port type and try again.
DMEC002089	The process cannot be performed because fibre channel port is unequipped. Please confirm the port status and try again.
DMEC002090	The specified port is NAS port. Please confirm the port type and try again.
DMEC002091	The specified port is not fibre channel port. Please confirm the port type and try again.
DMEC002092	The host address cannot be changed. Please specify the same host address as a setting value.
DMEC002093	The process cannot be performed because the port is not connected the user port. Please confirm the port of connection and try again.
DMEC002094	The process cannot be performed because the specified H-LUN or LUN is already setted the user LU. Please confirm the setting of user LU and try again.
DMEC002095	The process cannot be performed because the specified H-LUN or LUN is not setted the user LU or is already setted the another user LU. Please confirm the setting of user LU and try again.
DMEC002096	The port is unequipped. Confirm the port status and try again.
DMEC002097	Cannot specify the parameter for this array unit.
DMEC002098	Cannot execute the option for the array unit of current micro program revision.
DMEC002099	The function cannot be executed because some port is invalid or unequipped. Please confirm the subsystem.

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Message code	Message text/Recovery methods
DMEC002100	The specified port is not available because it is physically unequipped. Confirm the port status and try again.
DMEC002101	The specified LU is not invalid. Specify the invalid LU and try again.
DMEC002102	The collection of performance statistics information is not started. Please start it.
DMEC002103	The directory does not exit.
DMEC002104	The specified target is already defined. Try with another alias or number.
DMEC002105	The specified iSCSI name is already defined. Specify a new iSCSI name.
DMEC002106	The specified target is not defined. Confirm the name or numbers, and specify a defined target.
DMEC002107	The function cannot be executed because target 000 is specified. Specify except target 000 and try again.
DMEC002108	The specified iSCSI name is not defined. Specify a defined iSCSI name.
DMEC002109	The specified initiator name is not defined. Specify a defined initiator name.
DMEC002110	The specified initiator is not defined. Specify a defined initiator.
DMEC002112	The specified initiator is not assigned to the target. Please specify already assigned initiator.
DMEC002114	The specified initiator name is already defined. Specify a new initiator name.
DMEC002115	The number of registered initiators reached the maximum. Delete unnecessary initiator and then try again.
DMEC002116	The specified user name is not defined. Specify a defined user name.
DMEC002117	The number of registered CHAP users reached the maximum. Delete unnecessary CHAP user and then try again.
DMEC002118	The specified user name is already defined. Specify a new user name.
DMEC002119:	The specified user name is not defined. Specify a defined user name.
DMEC002120	The specified target is not assigned to any of the CHAP user. Specify a target that is already assigned to a CHAP user.
DMEC002121	The process cannot be performed because the specified H-LUN or LUN is not map or is already map to the another H-LUN or LUN. Please confirm the mapping and try again.
DMEC002122	The process cannot be performed because the specified H-LUN or LUN is already map. Please confirm the mapping and try again.
DMEC002123	The specified user name is already defined. Specify a new user name.
DMEC002124	The specified initiator is already assigned. Please specify an initiator that is not assigned.
MEC002125	The process cannot be performed because the iSNS server is not used.
DMEC002126	The process cannot be performed because iSCSI port is unequipped. Please confirm the port type and try again.
DMEC002127	The specified port is not iSCSI port. Please confirm the port type and try again.
DMEC002128	The specified port is not available because its target security is disabled. Enable the target security and try again.
DMEC002129	The number of registered target reached the maximum. Delete unnecessary information and then try again.
DMEC002130	The process cannot be performed because the Read Mode is disabled. Please set the Read Mode to enable then try again.
DMEC002131	The specified parameter cannot be set because the Read Mode is enabled. Please set the Read Mode to disable then try again.
DMEC002132	The process cannot be performed because fibre channel port and iSCSI port are unequipped. Please confirm the port type and try again.
DMEC002133	The process cannot be performed because the scope is not the LU.
DMEC002134	The process cannot be performed because the DHCP is enabled.
DMEC002136	The process cannot be performed because the IP address of syslog server1 is not defined. Please define the IP address and then try again.
DMEC002137	The process cannot be performed because the syslog server transfer is disabled. Please set the syslog server transfer to enable then try again.
DMEC002138	The process cannot be performed because the syslog server2 is not used. Please set the syslog server2 to used then try again.
DMEC002139	The process cannot be performed because the IP address of syslog server2 is not defined. Please define the IP address and then try again.
DMEC002140	The process cannot be performed because the option of '-syslogsrv' is disabled.
DMEC002141	The process cannot be performed because the option of '-srv2' is disabled.

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Message code	Message text/Recovery methods
DMED010001	The same host group name exists in a port. Confirm the host group name and then try again.
DMED010002	The same WWN name exists in a port. Confirm the WWN name and then try again.
DMED010003	WWN cannot be assigned to an undefined host group. Specify a defined host group and try again.
DMED010004	The function cannot be executed because host group security on some port is set to enabled. Set host group security to disable on all ports and try again.
DMED010005	The process cannot be performed because the target security on some port is set to enabled. Please set the target security to disable on all ports and try again.
DMED010006	The process cannot be performed because the specified name is default name of host group 0. Please confirm the name and try again.
DMED020001	The value of Dirty Data Opportunity is outside the effective range. Specify the value in the effective range and try again.
DMED020002	The value of Dirty Data Stop Opportunity is outside the effective range. Specify the value in the effective range and try again.
DMED020003	The value of Dirty Data Opportunity is equal to or less than value of Dirty Data Stop Opportunity. Specify the value and try again.
DMED020004	Prefetch Starting Opportunity is outside the effective range. Specify the value of effective range and try again.
DMED020005	LU number is outside the effective range. Specify the LU number of effective range and try again.
DMED020006	Reserved Random Simple Buffer Size is outside the effective range. Specify the value of effective range and try again.
DMED020007	The process failed due to an invalid parameter of Random Simple Buffer Size 0% Mode. Confirm the specified parameter.
DMED020008	Prefetch Count is outside the effective range. Specify the value in the effective range and try again.
DMED020009	Prefetch Size is outside the effective range. Specify the value in the effective range and try again.
DMED02000A	The process failed due to an invalid parameter of Next Prefetch Opportunity Mode. Confirm the specified parameter.
DMED020010	Count of Judgment Sequential is outside the effective range. Specify the value in the effective range and try again.
DMED020011	Prefetch Size of Base is outside the effective range. Specify the value in the effective range and try again.
DMED020012	Prefetch Size of Fixed is outside the effective range. Specify the value in the effective range and try again.
DMED030001	The specified LU is already invalid. Confirm the LU status and try again.
DMED030002	The number of LU reached the maximum. Delete unnecessary LUs and try again.
DMED030003	The specified LU is not invalid. Specify the invalid LU and try again.
DMED030004	The specified LU capacity is equal to or more than the capacity of original LU. Confirm the LU capacity and try again.
DMED030006	The specified LU is not invalid. Specify the invalid LU and try again.
DMED030007	The specified LU is unformatted. Specify the formatted LU and try again.
DMED030008	The number of LU reached the maximum. Delete unnecessary LUs and try again.
DMED030009	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED03000A	The specified LU capacity is equal to or less than the minimum capacity of an LU. Specify a larger capacity than the minimum capacity and try again.
DMED03000B	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write and set S-VOL mode to enable, then try again.
DMED040001	The specified LUs contain Sub LU. Confirm the LU status and try again.
DMED040003	The specified LUs contain regressed or detached LU. Confirm the LU status and try again.
DMED040004	The specified LUs contain an un-mounted drive. Confirm the drive status and try again.
DMED040005	The specified LUs contains an invalid LU. Confirm the LU status and try again.
DMED040006	Someone already logged in. Set password protection function to disabled and try again.
DMED040007	There is no LU entered to format.
DMED040008	Format of the logical unit cannot be performed under drive blockage mode. Please turn off the drive blockade mode system parameter.
DMED040009	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write and set S-VOL mode to enable, then try again.
DMED050001	The process cannot be performed, because the specified LU is having PIN data or is in a PIN exceeded state. Restore PIN data and try again.
DMED050002	The process cannot be performed because cache segment is insufficient. Wait for a while and then try again.

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Message code	Message text/Recovery methods
DMED050003	The process cannot be performed because the specified LU is receiving the Write command continuously from the host. Wait for a while and then try again.
DMED050004	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED050005	The process cannot be performed because the partition of necessary conditions for LU changing does not exist. Please confirm the partition definition and try again.
DMED050006	The process cannot be performed because the directory configuration is changing. Please wait for a while and then try again.
DMED050007	The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.
DMED050008	The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.
DMED050009	The LU change could not be performed.
DMED05000A	The process cannot be performed because the controller is detached. Please recover the controller status and then try again.
DMED070002	The specified IP address is incorrect. Please specify a right IP address.
DMED070006	When the ShadowImage pair of a S-VOL Switch status exists the ShadowImage I/O Switch Mode cannot be disabled. Please retry after solving the error.
DMED070007	The configuration of single or dual controller system cannot be changed because Cache Partition Manager is enabled. Please change Cache Partition Manager to de-installed or disabled and try again.
DMED070008	The process cannot be performed because the specified port number is outside the effective range. Please confirm the port number.
DMED070009	The port number of other controller cannot be set up. Please confirm the controller number.
DMED080001	The data pool cannot be used. Please restart(*1) the subsystem.
DMED080002	The process cannot be performed because the logical unit under restoration. Wait for a while and try again.
DMED080003	The process cannot be performed because the logical unit added to the data pool is not specified.
DMED080004	The process cannot be performed because the same logical unit number has been specified more than twice. Confirm the logical unit number and try again.
DMED080005	The specified logical unit number is outside of the effective range. Specify the logical unit number within the range and try again.
DMED080006	The process cannot be performed because the specified logical unit is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.
DMED080007	The process cannot be performed because the RAID level or HDU combination of the specified logical unit is not supported. Confirm the RAID level and the HDU combination currently supported and try again.
DMED080008	The process cannot be performed because the number of logical units in the data pool reached the maximum. Delete the logical units in the data pool and then try again.
DMED080009	The process cannot be performed because the specified logical unit is a unified LU. Separate the unified LU and try again.
DMED08000A	The process cannot be performed because the specified logical unit is a part of ShadowImage pair. Cancel the ShadowImage pair and try again.
DMED08000B	The process cannot be performed because the specified logical unit is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.
DMED08000C	The process cannot be performed because the specified logical unit is a command device. Cancel the command device and try again.
DMED08000D	The process cannot be performed because the specified logical unit has been invalidated. Restore the logical unit and try again.
DMED08000E	The process cannot be performed because the specified logical unit is a part of Snapshot pair. Cancel the Snapshot pair and try again.
DMED08000F	The process cannot be performed because the specified logical unit is defined as a Snapshot image. Specify another logical unit and try again.

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Message code	Message text/Recovery methods
DMED080010	The process cannot be performed because the specified logical unit is added to a data pool. Specify another logical unit and try again.
DMED080012	The process cannot be performed because the owner controller is different between the specified logical unit and the data pool. Confirm the logical unit owner controller and try again.
DMED080013	The process cannot be performed because the specified logical unit has been receiving the Write command continuously from the hosts. Wait for a while and then try again.
DMED080014	The process cannot be performed because other logical unit is changing the Default Controller. Wait for a while and then try again.
DMED080015	The process cannot be performed because the specified logical unit is in the PIN exceeded state. Restore PIN data and try again.
DMED080016	The process cannot be performed because the specified logical unit is not enough for sufficient cache blocks. Specify another logical unit and try again.
DMED080017	The process cannot be performed because no logical units in data pool.
DMED080018	The process cannot be performed because the Snapshot pair exists in the specified data pool. Cancel the Snapshot pair and try again.
DMED080019	The process cannot be performed because data pool deleted is not specified.
DMED08001A	The process cannot be performed because the threshold of usage rate in the data pool is not specified.
DMED08001B	The specified threshold is outside of the effective range. Specify the value of effective range and try again.
DMED08001C	The process cannot be performed because the specified logical unit is capacity equal to or less than 2GB. Specify the logical unit of bigger capacity than 2GB and try again.
DMED08001D	The process cannot be performed because S-VOL mode of the specified logical unit is disabled. Set S-VOL mode to enable then try again.
DMED08001F	The number of specified logical units is over 64. Please specify the logical units in 64 or less.
DMED080020	The process cannot be performed because the drive type of specified logical unit is different from the data pool. Please confirm the drive type and try again.
DMED080021	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED080022	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED080023	The logical units in the data pool cannot be mixed with ones in Unit0 or in the latter units.
DMED080024	The process cannot be performed because DM-LU is not defined. Please define DM-LU and then try again.
DMED080025	The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please specify another logical unit and try again.
DMED090001	The logical unit number of specified P-VOL is outside of the effective range. Specify the logical unit number of effective range and try again.
DMED090003	The logical unit number of specified Snapshot image is outside of the effective range. Specify the logical unit number of effective range and try again.
DMED090004	The process cannot be performed because the logical unit number of the Snapshot image created or deleted is not specified.
DMED090005	The process cannot be performed because the same logical unit number has been specified as a Snapshot image more than twice. Confirm the logical unit number and try again.
DMED090006	The process cannot be performed because the specified logical unit of the P-VOL is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.
DMED090007	The process cannot be performed because no logical unit exists in the data pool by the side of the controller of specified P-VOL. Add the logical unit to the data pool and try again.
DMED090008	The process cannot be performed because the RAID level or HDU combination of the specified logical unit differs from the logical unit is not supported. Confirm the RAID level and the HDU combination currently supported and try again.
DMED090009	The process cannot be performed because the number of created Snapshot Image for the specified P-VOL has reached its maximum. Delete unnecessary Snapshot Image and try again.
DMED09000A	The logical unit number has already been defined. Specify a new number.
DMED09000B	The process cannot be performed because the specified P-VOL is a unified LU. Separate the unified LU and try again.

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Message code	Message text/Recovery methods
DMED09000C	The process cannot be performed because the specified P-VOL is a part of ShadowImage pair. Cancel the ShadowImage pair and try again.
DMED09000D	The process cannot be performed because the specified P-VOL is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.
DMED09000E	The process cannot be performed because the specified P-VOL is a part of Snapshot pair. Cancel the Snapshot pair and try again.
DMED09000F	The process cannot be performed because the specified P-VOL is a command device. Cancel the command device and try again.
DMED090010	The process cannot be performed because the specified P-VOL is invalid. Restore the LU and try again.
DMED090011	The process cannot be performed because the specified P-VOL has already been added to a data pool. Specify another LU number and try again.
DMED090012	The process cannot be performed because the specified P-VOL is not enough for sufficient cache capacity. Check cache capacity and try again.
DMED090013	The process cannot be performed because the HDU combination of the specified P-VOL differs from registered logical units to the data pool. Confirm the HDU combination and try again.
DMED090014	The process cannot be performed because the specified P-VOL has been receiving the Write command continuously from the hosts. Wait for a while and then try again.
DMED090015	The process cannot be performed because other logical unit is changing the Default Controller. Wait for a while and then try again.
DMED090016	The process cannot be performed because the specified P-VOL is in the PIN exceeded state. Restore PIN data and try again.
DMED090017	The process cannot be performed because the specified P-VOL is not defined. Specify a defined logical unit and try again.
DMED090018	The process cannot be performed because the specified Snapshot image has been creating the pair. Cancel the Snapshot pair and try again.
DMED090019	The process cannot be performed because P-VOL is under deletion. Wait for a while and then try again.
DMED09001A	The process cannot be performed because the specified set of P-VOL and Snapshot image is not a pair. Confirm the pair status and try again.
DMED09001B	The process cannot be performed because the number of Snapshot pair reached the maximum. Delete unnecessary Snapshot pair(s) and try again.
DMED09001C	The process cannot be performed because the unified LU is composed of 17 or more sub logical units. Specify another logical unit and try again.
DMED09001D	The process cannot be performed because the unified LU contains a sub logical unit whose size is less than 1GB. Specify another logical unit and try again.
DMED09001E	The process cannot be performed because a management area of Snapshot is shortage. Delete unnecessary Snapshot pair(s) and try again.
DMED09001F	The process cannot be performed because the drive type of specified logical unit is different from the V-VOL. Please confirm the drive type and try again.
DMED090020	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED090021	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED090022	The process cannot be performed because the specified Snapshot image is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.
DMED090023	The process cannot be performed because the specified Snapshot image is a part of Hi-Copy pair. Cancel the Hi-Copy pair and try again.
DMED090024	The process cannot be performed because the P-VOL of specified Snapshot image is reserved for cache partition modification. Please retry after cache partition modification is completed.
DMED0A0001	The process cannot be performed because the specified LU is invalid. Restore the LU and try again.
DMED0A0002	The process cannot be performed because the specified LU is a Sub LU of the unifying LUs. Separate the unified LU and try again.

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Message code	Message text/Recovery methods
DMED0A0003	The process cannot be performed because the specified LU is S-VOL of ShadowImage. Specify another logical unit and try again.
DMED0A0004	The process cannot be performed because the specified LU is S-VOL of TrueCopy. Specify another logical unit and try again.
DMED0A0005	The process cannot be performed because the specified LU is Snapshot image. Specify another logical unit and try again.
DMED0A0006	The process cannot be performed in the retention term. The retention term expires and try again.
DMED0A0007	The process cannot be performed because ShadowImage is in progress. Please wait a moment and then try again.
DMED0A0008	The process cannot be performed because SnapShot is in progress. Please wait a moment and then try again.
DMED0A0009	The retention term cannot be shortened. Specify the retention term is equal to or more than current value and try again.
DMED0A000A	The process cannot be performed because expiration lock is enabled. Set expiration lock to disable and try again.
DMED0A000B	The process cannot be performed because the status of ShadowImage pair is not SMPL or PSUS. Please retry after changing the status of pair.
DMED0A000C	The process cannot be performed because the status of TrueCopy pair is not SMPL or PSUS. Please retry after changing the status of pair.
DMED0A000D	The process cannot be performed because the status of Snapshot pair is not PSUS. Please retry after changing the status of pair.
DMED0B0001	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED0C0001	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED0C0002	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED0C0003	The unification cannot be performed because the drive type is different. Please confirm the drive type and try again.
DMED0C0004	The logical unit in Unit0 cannot be unified with the latter units.
DMED0C0005	The process cannot be performed because the unified LU reached the maximum.
DMED0C0006	The unification cannot be performed because the cache partition is different. Please confirm the cache partition of the specified logical unit.
DMED0C0007	The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please retry after changing the cache partition, or specify another logical unit.
DMED0D0001	The process cannot be performed because the access level is set up to ReadOnly or Protect. Please change the attribute to Read/Write, and try again.
DMED0D0002	The process cannot be performed because the temporary key cannot be used for the next 180 days after it is locked or expired.
DMED0D0003	The specified function has already been unlocked.
DMED0E0001	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED0F0001	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED0F0002	The process cannot be performed because the drives of Unit0 and the latter units are contained within the range of the specified RAID group.
DMED0F0003	The process cannot be performed because the non-supported drive on this subsystem are contained within the range of the specified RAID group.
DMED0F0005	The process cannot be performed because the number of drive is incorrect. Please confirm the mounted drive and try again.
DMED0F0007	The number of defined RAID group reached the maximum. Delete unnecessary RAID groups and then try again.
DMED100001	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED100002	The process cannot be performed because the RAID level of the specified logical unit is not supported. Confirm the RAID level currently supported and try again.
DMED100003	The process cannot be performed because the specified logical unit is a unified LU. Separate the unified LU and try again, or please execute online/offline formatting.

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Message code	Message text/Recovery methods
DMED100004	The process cannot be performed because the specified logical unit is extended and not formatted. Please execute online/offline formatting.
DMED100005	The preparations of quick formatting are incomplete. Please retry after waiting for a while.
DMED100006	The process cannot be performed because the specified logical unit contain an un-mounted drive or a blocked drive. Confirm the drive status and try again.
DMED100007	Format of the logical unit cannot be performed under drive blockage mode. Please turn off the drive blockade mode system parameter.
DMED110001	The mapping mode cannot be changed because the mapping guard LU exists.
DMED110002	The mapping information cannot be changed because the mapping guard LU exists.
DMED120001	The specified drive cannot be defined as a spare drive because it is not supported on this subsystem.
DMED130001	The process cannot be performed because the specified remote path is not set up.
DMED130002	The process cannot be performed because the specified port is iSCSI port. Please confirm the port type and try again.
DMED130004	The process cannot be performed because the specified Timeout Period is outside the effective range. Please confirm the Timeout Period and try again.
DMED140001	The process cannot be performed because the term of the temporary key or emergency key is expired.
DMED140002	The process cannot be performed because the DM-LU has already been set. Please cancel the DM-LU and try again.
DMED150001	The process cannot be performed because the cache partition is not initial status. Please change the cache partition to initial status and try again.
DMED150004	The process cannot be performed because the cache partition is less than minimum size. Please confirm the cache partition size and try again.
DMED150005	The process cannot be performed because the PIN is exceeded state. Please restore PIN data and try again.
DMED150006	The segment size of cache partition (0 or 1) cannot be changed.
DMED150007	The process cannot be performed because ShadowImage is in use. Please cancel the ShadowImage pair and try again.
DMED150009	The process cannot be performed because SnapShot is in use. Please cancel the SnapShot pair and try again.
DMED15000B	The process cannot be performed because process of Write command from the hosts is not completed. Please wait for a while and then try again, or delete the logical unit.
DMED15000C	The function cannot be executed because a Cache Residency LU or a reserved one exists. Disable the LU, and then try again.
DMED15000D	The specified segment size is incorrect. Please confirm the segment size and try again.
DMED15000E	The process cannot be performed because the LU change is in progress. Please wait a moment and try again.
DMED15000F	The specified cache partition number is incorrect. Please confirm the cache partition number and try again.
DMED150010	The controller of current cache partition cannot be changed. Please delete the cache partition, and set up again.
DMED150011	The process cannot be performed because the total size of cache partition is over the cache capacity. Please confirm the cache partition size and try again.
DMED150012	The cache partition with which the logical unit is set up, or the cache partition of 0 or 1 cannot be deleted. Please confirm the cache partition number.
DMED150013	The process cannot be performed because the specified cache partition is not defined. Please specify a defined cache partition and try again.
DMED150014	The process cannot be performed because the stripe size of logical unit is not 64KB. Please delete the logical unit and try again.
DMED150015	The process cannot be performed because the specified logical unit is a part of pair(TCE). Please cancel the pair(TCE) and try again.
DMED160002	The process cannot be performed because the specified logical unit is a Sub LU of the unifying LUs. Please separate the unified LU and try again.
DMED160011	The logical unit cannot be allocated the specified cache partition. Please specify another cache partition number and try again.
DMED160012	The process cannot be performed because the Cache Partition Manager is not installed, locked, or disabled.
DMED160013	The process cannot be performed because the specified logical unit is Snapshot image. Please specify another logical unit number and try again.

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Message code	Message text/Recovery methods
DMED160014	The process cannot be performed because the specified cache partition is not defined. Please confirm the cache partition and try again.
DMED160015	The process cannot be performed because Cache Partition Manager is not installed, locked, or disabled. Please install Cache Partition Manager and try again.
DMED160016	The process cannot be performed because the specified cache partition is not defined. Please confirm the cache partition and try again.
DMED160017	The process cannot be performed because the specified cache partition is set to the different controller. Please confirm the cache partition and try again.
DMED160018	The process cannot be performed because the combination of stripe size and segment size does not match. Please confirm the stripe size or the cache partition, and try again.
DMED160019	The process cannot be performed because the specified cache partition size is insufficient. Please confirm the cache partition and try again.
DMED16001E	The process cannot be performed because the pair cache partition and the cache partition are set to the same controller. Please confirm the cache partition and try again.
DMED16001F	The process cannot be performed because the segment size does not match. Please confirm the segment size of cache partition and try again.
DMED160020	The process cannot be performed because the specified cache partition size is insufficient. Please confirm the cache partition and try again.
DMED160021	The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.
DMED160022	The process cannot be performed because PIN data exists. Please restore PIN data and try again.
DMED170001	The process cannot be performed because the specified logical unit is capacity less than 5GB. Specify the logical unit is equal to or more than 5GB and try again.
DMED170002	The process cannot be performed because the specified logical unit is RAID level 0. Specify another logical unit and try again.
DMED170003	The process cannot be performed because the specified logical unit is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.
DMED170004	The process cannot be performed because the specified logical unit is a unified LU. Separate the unified LU and try again.
DMED170005	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED170006	The process cannot be performed because the specified logical unit is a command device. Cancel the command device and try again.
DMED180001	The specified logical unit cannot be set as Cache Residency LU because its cache partition is not 0 or 1. Please try again after changing a cache partition into 0 or 1, or specify the logical unit of the cache partition 0 or 1.
DMED190001	The specified IP address is incorrect. Please specify a correct IP address.
DMED190002	The same IP address as the management LAN cannot be set up. Please specify a correct IP address.
DMED190003	The process cannot be performed because NNC or subsystem is in progress. Please wait a moment and then try again.
DMED190004	The same IP address as the maintenance LAN cannot be set up. Please specify a correct IP address.
DMED190005	The process cannot be performed because the controller is detached. Please recover the controller status and then try again.
DMED190006	The process cannot be performed because NNC or subsystem is in progress. Please wait a moment and then try again.
DMED190007	The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.
DMED190008	The same IP address as the NNC LAN cannot be set up. Please specify a correct IP address.
DMED190011	The process cannot be performed because the maintenance LAN automatic change mode is enabled. Please set this mode to disable and try again.
DMED1A0001	The process cannot be performed because NNC is not connected. Please connect NNC and try again.
DMED1A0002	The specified logical unit is not defined. Please specify a defined logical unit.
DMED1A0003	The process cannot be performed because the specified logical unit is less than minimum size of System LU. Please confirm the logical unit size and try again.
DMED1A0004	The process cannot be performed because the specified logical unit is already assigned. Please specify a logical unit that is not assigned and try again.
DMED1A0005	The process cannot be performed because the specified logical unit is S-VOL of ShadowImage. Please specify another logical unit and try again.

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Message code	Message text/Recovery methods
DMED1A0006	The process cannot be performed because the specified logical unit is S-VOL of TrueCopy. Please specify another logical unit and try again.
DMED1A0007	The process cannot be performed because the specified logical unit is defined as a Snapshot image. Please specify another logical unit and try again.
DMED1A0008	The process cannot be performed because the specified logical unit is added to a data pool. Please specify another logical unit and try again.
DMED1A0009	The process cannot be performed because the specified logical unit is a Sub LU of the unifying LUs. Please specify another logical unit and try again.
DMED1A000A	The process cannot be performed because the specified logical unit is the mapping guard LU. Please specify another logical unit and try again.",
DMED1A000B	The process cannot be performed because the specified logical unit is a command device. Please specify another logical unit and try again.
DMED1A000C	The specified logical unit is not defined as a command device. Please specify a logical unit that is already defined to a command device.
DMED1A000D	The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.
DMED1A000E	The process cannot be performed because the specified logical unit is DM-LU. Please specify another logical unit and try again.
DMED1A000F	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED1A0010	The process cannot be performed because all ports are used for NAS. Please confirm the port type.
DMED1A0020	The process cannot be performed because system LU exists.
DMED1A0021	The process cannot be performed because user LU exists.
DMED1A0022	The process cannot be performed because the specified logical unit is system LU. Please release system LU and try again.
DMED1A0023	The process cannot be performed because the specified logical unit is user LU. Please specify another logical unit and try again.
DMED1A0024	The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.
DMED1A0025	The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.
DMED1A0026	The specified port is used for NAS. Please specify another port.
DMED1A0027	The unification cannot be performed because the stripe size does not match. Please confirm the stripe size of logical unit and try again.
DMED1A0028	The process cannot be performed because the specified logical unit is P-VOL or V-VOL of SnapShot. Please specify another logical unit and try again.
DMED1A0029	The process cannot be performed because the access level is set up. Please change the attribute to Read/Write. When the mode is set up, please reset the mode using RAID Manager. And try again.
DMED1A002A	The process cannot be performed because the specified logical unit is being used as ShadowImage pair with more than 2 S-VOL. Please delete S-VOL and make the pair into one-to-one relation, or cancel the pair, and then try again.
DMED1A0030	The Command Device(secondary) cannot set to the NNCtype1.
DMED1A0031	The Working Area for Dump cannot set to this NNCtype2.
DMED1A0032	The process cannot be performed because the Command Device is not set by system LU. Please set the Command Device and try again.
DMED1A0033	The process cannot be performed because the Command Device(secondary) is set by system LU. Please release the Command Device(secondary) and try again.
DMED1A0034	The process cannot be performed because the equipped NNC is unknown or mixture.
DMED1A0070	The process cannot be performed because the equipped NNC is NNCtype2.
DMED1A0071	The process cannot be performed because the NAS OS is not installed. Please install the NAS OS and try again.
DMED1A0072	The process cannot be performed because the controller is detached. Please recover the controller status and then try again.
DMED1A0073	The process cannot be performed because the NNC is not stopped. Please stop the NNC and try again.
DMED1A0074	The process cannot be performed because the equipped NNC is NNCtype1.
DMED1A0075	The process cannot be performed because the system LU is not backed up.
DMED1A0076	The process cannot be performed because the NNC is not stopped or detached.
DMED1A0077	The process cannot be performed because the system LU is not backed up.

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Message code	Message text/Recovery methods
DMED1B0001	The specified IP address is incorrect. Please specify a correct IP address.
DMED1B0002	It is impossible to change to specified IP address. Please specify a correct IP address.
DMED1B0003	The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.
DMED1B0004	The process cannot be performed because the controller is detached. Please recover the controller status and then try again.
DMED1B0005	The process cannot be performed because the DHCP is enabled. Please set the DHCP to disable and try again.
DMED1B0006	The process cannot be performed during the maintenance LAN setting. Please wait a moment and then try again.
DMED1B0008	The process cannot be performed because the DHCP is enabled. Please set the DHCP to disable and try again.
DMED1B0009	The process cannot be performed because NNC is equipped. Please confirm the port type and try again.
DMED1B000A	The process cannot be performed because the same address is specified as the maintenance LAN and the management LAN. Please specify the different address and try again.
DMED1C0001	The process cannot be performed because iSCSI port is physically unequipped. Please confirm the port type and try again.
DMED1C0002	The process cannot be performed because the authentication method is not specified. Please confirm the authentication method and try again.
DMED1C0003	The process cannot be performed because the specified alias format is invalid. Please confirm the alias and try again.
DMED1C0004	The process cannot be performed because the same alias exists in a port. Please confirm the alias and try again.
DMED1C0005	The process cannot be performed because the specified iSCSI Name format is invalid. Please confirm iSCSI Name and try again.
DMED1C0006	The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.
DMED1C0007	The process cannot be performed because the specified target is not defined. Please confirm the target and try again.
DMED1C0008	The process cannot be performed because the specified name format is invalid. Please confirm the name and try again.
DMED1C0009	The process cannot be performed because the same name exists in a port. Please confirm the name and try again.
DMED1C000A	The process cannot be performed because the specified iSCSI Name format is invalid. Please confirm iSCSI Name and try again.
DMED1C000B	The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.
DMED1C000C	The process cannot be performed because the term of the temporary key or emergency key is expired.
DMED1C000D	The process cannot be performed because the invalid character is specified. Please confirm the user name and try again.
DMED1C000E	The process cannot be performed because the invalid character is specified. Please confirm the secret and try again.
DMED1C000F	The process cannot be performed because the character length of user name is outside the effective range. Please confirm the user name and try again.
DMED1C0010	The process cannot be performed because the character length of secret is outside the effective range. Please specify the secret of 12 to 32 characters and try again.
DMED1C0011	The process cannot be performed because the specified IP address is incorrect. Please specify a correct IP address.
DMED1C0012	The process cannot be performed because the specified port number is incorrect. Please specify a correct port number.
DMED1C0013	The process cannot be performed because Keep Alive Timer is outside the effective range. Please specify Keep Alive Timer of 30 to 64800 and try again.
DMED1C0014	The process cannot be performed because the specified port number is incorrect. Please specify a correct port number.
DMED1C0015	The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.
DMED1C0017	The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.
DMED1C0018	The process cannot be performed because the invalid character is specified. Please confirm iSCSI Name and try again.
DMED1C0019	The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.
DMED1C001A	The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.
DMED1C001B	The process cannot be performed because the controller is detached. Please recover the controller status and then try again.
DMED1C001C	The process cannot be performed because the specified IP address is incorrect. Please specify a correct IP address.
DMED1C001D	The process cannot be performed because the ping is executing. Please try again after the ping is completed.
DMED1C001E	The process cannot be performed because the specified CHAP algorithm is incorrect. Please specify a correct CHAP algorithm and try again.
DMED1C001F	The process cannot be performed because the character length of secret is outside the effective range. Please specify the secret of 12 to 32 characters and try again.

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Message code	Message text/Recovery methods
DMED1C0020	The process cannot be performed because the invalid character is specified. Please confirm the secret and try again.
DMED1C0021	The process cannot be performed because the invalid character is specified. Please confirm the user name and try again.
DMED1C0022	The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.
DMED1C0023	The process cannot be performed because the LUN Manager is not installed, locked, or disabled. Please install the LUN Manager and then try again.
DMED1C0024	The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.
DMED1C0025	The process cannot be performed because the character length of alias is outside the effective range. Please confirm the alias and try again.
DMED1C0026	The process cannot be performed because the invalid character is specified. Please confirm the alias and try again.
DMED1C0027	The process cannot be performed because the character length of name is outside the effective range. Please confirm the name and try again.
DMED1C0028	The process cannot be performed because the invalid character is specified. Please confirm the name and try again.
DMED1C0029	The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.
DMED1C002A	The process cannot be performed because the specified target is not defined. Please confirm the target and try again.
DMED1C002B	The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.
DMED1C003A	The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.
DMED1C003B	The process cannot be performed because the specified alias is default name of Target 0. Please confirm the alias and try again.
DMED1C003C	The process cannot be performed because the specified iSCSI Name is default name of Target 0. Please confirm iSCSI Name and try again.
DMED1C003D	The process cannot be performed because the same alias exists in a port. Please confirm the alias and try again.
DMED1C003E	The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.
DMED1C003F	The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.
DMED1C0040	The process cannot be performed because the specified host group or target is outside the effective range. Please confirm the host group or target and try again.
DMED1C0041	The information cannot be obtained because iSCSI port is physically unequipped. Please confirm the port status and try again.
DMED1D0001	The process cannot be performed during the SNMP setting. Please wait a moment and then try again.
DMED1E0001	The process cannot be performed because the cycle time is out of range. Please specify the cycle time of 30 to 3600 and try again.
DMED1E0002	The process cannot be set because the specified cycle time is less than the minimum value. Please confirm the cycle time and try again.
DMED1E0010	The process cannot be performed because the pair(TCE) exists. Please cancel the pair(TCE) and try again.
DMED1E0011	The process cannot be performed during the pair(TCE) deleting. Please wait a moment and then try again.
DMED1E0012	The process cannot be performed because the specified logical unit is a part of pair(TCE). Please specify another logical unit and try again.
DMED1E0013	The process cannot be performed because the deallocation of cache blocks for SnapShot is in progress. Please wait a moment and then try again.
DMED1E0014	The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance is installed. Please restart the subsystem and then try again(*1).
DMED1E0015	The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance or SnapShot is installed. Please restart the subsystem and then try again(*1).
DMED1E0016	The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance or SnapShot is de-installed. Please restart the subsystem and then try again(*1).
DMED1E0017	The process cannot be performed because the status of pair(TCE) is improper. Please confirm the status of pair and try again.

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text/Recovery methods
DMED1F0001	The Spare Drive Operation Mode is fixed and the Applying No Copy Back Mode on All the Units is enabled. This combination is not possible to specify. Please confirm the operation and try again.
DMED1F0010	The process failed due to an invalid parameter. Please confirm the specified value.
DMED1F0011	The process cannot be performed because the specified IP address is incorrect. Please confirm the IP address and try again.
DMED1F0012	The process cannot be performed because the same IP address is specified to Syslog Server 1 and Syslog Server 2. Please confirm the IP address and try again.
DMED1F0013	The process failed due to an invalid parameter. Please confirm the specified value.
DMED1F0014	The process cannot be performed because the internal log is disabled. Please set the internal log to enable and try again.
DMED1F0015	The process cannot be performed because the internal log is being exported. Please wait a moment and then try again.
DMED1F0017	The process cannot be performed because the log export failed. Please wait a moment and then try again.
DMED1F0018	The process failed due to an invalid parameter. Please confirm the specified value.
DMED1F0019	The process cannot be performed because the internal log is using. Please confirm the internal log status and try again.
DMED1F0020	The user ID is too short. Please confirm the user ID.
DMED1F0021	The invalid character is specified in user ID. Please confirm the user ID.
DMED1F0022	The current login session is expired, Please login again.
DMED1F0023	You have no permission. Please contact the Account Administrator and confirm your permission.
DMED1F0024	The specified user ID has already been registered. Please specify another user ID.
DMED1F0025	The specified user ID is not registered. Please confirm the user ID.
DMED1F0026	The role is not assigned. Please assign one or more roles.
DMED1F0027	The process cannot be performed for logged in user.
DMED1F0028	The process cannot be performed for Built-in account.
DMED1F0029	You have no permission to modify. Please contact the Account Administrator and confirm your permission.
DMED1F002A	The logged in user reached the maximum. Please wait a moment and then try again.
DMED1F002B	The specified password does not match. Please specify password again.
DMED1F002C	You cannot login because account status is disabled. Please contact Account Administrator, and confirm the account status.
DMED1F002D	The specified password does not match. Please confirm the password.
DMED1F002E	The account reached the maximum. Please delete unnecessary account and try again.
DMED1F002F	The specified password length is less than minimum. Please confirm the password length.
DMED1F0030	Password Protection and Account Authentication cannot be used together.
DMED1F0031	Account Authentication cannot be installed or be enabled, because NNC is equipped. Please change the subsystem into Fibre or iSCSI configuration, and try again.
DMED1F0040	The process cannot be performed because the term of the temporary key or emergency key is expired.
DMED1F0041	The process cannot be performed because the ShadowImage pair is contained.
DMED1F0042	The process cannot be performed because the TrueCopy pair is contained.
DMED1F0043	The process cannot be performed because the TrueCopy Extended Distance pair is contained.
DMED1F0044	The process cannot be performed because the SnapShot pair is contained.
DMED1F0045	The process cannot be performed because the Volume Migration pair is contained.
DMED1F0048	The process cannot be performed because formatting is now occurring. Please try again after it is completed.
DMED1F0049	The process cannot be performed because parity correction is not completed. Please try again after it is completed.
DMED1F004A	The process cannot be performed because the data pool is contained. Please delete the data pool and try again.
DMED1F004B	The process cannot be performed because the DM-LU is contained. Please cancel the DM-LU and try again.
DMED1F004C	The process cannot be performed because the command device is contained. Please cancel the command device and try again.
DMED1F004D	The process cannot be performed because the system LU is contained. Please cancel the system LU and try again.
DMED1F004E	The process cannot be performed because the LU change is in progress. Please try again after it is completed.
DMED1F0051	The process cannot be performed because the system drives is contained.
DMED1F0052	The process cannot be performed because the write uncompleted LU is contained. Please recover and then try again.
DMED1F0053	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.

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Message code	Message text/Recovery methods
DMED1F0054	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.
DMED1F0055	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.
DMED1F0056	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please wait for a while and try again.
DMED1F0057	The specified RAID group is not defined. Please specify a defined RAID group.
DMED1F0058	The process cannot be performed because the drive recovery is in progress. Please try again after it is completed.
DMED1F0059	The process cannot be performed because the health checking is in progress. Please try again after it is completed.
DMED1F005A	The process cannot be performed because the user LU is contained. Please cancel the user LU and try again.
DMED1F005B	The process cannot be performed because the SES drives is contained.
DMED200001	The process cannot be performed because cache memory size 1GB or less. Please increase the cache memory and try again.
DMED200002	This function is unsupported in the single-controller system.
DMED200003	SnapShot cannot be installed because Cache Partition Manager is enabled. Please change Cache Partition Manager to de-installed or disabled and try again.
DMED200004	Cache Partition Manager cannot be installed because the subsystem is not restarted after SnapShot is installed. Please restart(*1) the subsystem, and then try again.
DMED200005	The option cannot be installed or enabled because cache memory size is 512MB or less. Please increase the cache memory and then try again.
DMED200011	The process cannot be performed because the specified logical unit is not the reserve LU. Please specify the reserve LU and try again.
DMED200012	The process cannot be performed because the specified logical unit is the reserve LU. Please delete the reserve LU or specify another logical unit and try again.
DMED200013	The process cannot be performed because the capacity is different between the specified P-VOL and S-VOL. Please specify the logical unit of the same capacity and try again.
DMED200014	The process cannot be performed because the owner controller is different between the specified P-VOL and S-VOL. Please specify the logical unit of the same owner controller and try again.
DMED200015	The process cannot be performed the specified P-VOL and S-VOL have same logical unit number. Please specify the different logical unit number.
DMED200016	The process cannot be performed because the Volume Migration pair reached the maximum. Please cancel or split the unnecessary Volume Migration pair and try again.
DMED200017	The process cannot be performed because the specified P-VOL and S-VOL belong to the same RAID group. Please specify the logical units of different RAID group.
DMED200018	The specified pair cannot be canceled because the pair status is not waiting or copying.
DMED200019	The specified pair cannot be split because the pair status is not completed or error.
DMED20001A	The process cannot be performed because the specified P-VOL and S-VOL are not in pairs. Please specify the P-VOL and S-VOL in pairs and try again.
DMED20001B	The process cannot be performed because the reserve LU reached the maximum. Please delete the unnecessary reserve LU and try again.
DMED20001C	The process cannot be performed because the specified logical unit is the S-VOL of the Volume Migration pair. Please specify another logical unit and try again.
DMED20001D	The process cannot be performed because the specified logical unit is not the reserve LU. Please specify the reserve LU and try again.
DMED20001E	The process cannot be performed because the P-VOL or S-VOL of the Volume Migration pair is contained. Please split the pair and try again.
DMED20001F	The process cannot be performed because the reserve LU is contained. Please delete the reserve LU and try again.

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text/Recovery methods
DMED200020	The process cannot be performed because the P-VOL or S-VOL of the Volume Migration pair or the reserve LU is contained. Please split the pair or delete the reserve LU and try again.
DMED200021	The process cannot be performed because the owner ID is different. Please cancel the pair using the application that created the pair.
DMED200022	The process cannot be performed because the owner ID is different. Please split the pair using the application that created the pair.
DMED200023	The process cannot be performed because the specified owner ID is not supported.
DMED200024	The process cannot be performed because the reserve LU exists. Please delete the reserve LU and try again.
DMED200025	The process cannot be performed because the Volume Migration pair exists. Please cancel or split the pair and try again.
DMED200026	The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please restart the subsystem and then try again(*1).
DMED200027	The process cannot be performed because a management area is shortage. Please delete the unnecessary pair(s) and try again.
DMED200028	The process cannot be performed because the specified logical unit is not the Volume Migration pair. Please specify another logical unit and try again.
DMED200029	The process cannot be performed because the specified logical unit is Volume Migration pair and is copying. Please retry after copy is completed.
DMED20002A	The copy pace of specified pair cannot be changed because the pair status is not waiting or copying.
DMED20002B	The process cannot be performed because the specified owner ID is not supported.
DMED20002C	The process cannot be performed because the specified logical unit is not the P-VOL or S-VOL of the Volume Migration pair. Please specify the P-VOL or S-VOL of the Volume Migration pair and try again.
DMED300001	The serial number or equipment ID cannot be changed because the path and pair information does not exist.
DMED300002	The serial number or equipment ID cannot be changed because the path and pair information does not exist.
DMED300005	The specified serial number or equipment ID is incorrect. Please specify it in 0-9.
DMED300006	The specified serial number is incorrect. Please specify a right serial number.
DMED300007	The specified serial number is incorrect. Please specify a right serial number.
DMED300008	0 is specified as 6 figures of low order of the serial number. Please specify a right serial number.
DMED300009	The same serial number as a self subsystem is specified. Please specify the serial number of connected subsystem.
DMED30000A	The same equipment ID as a self subsystem is specified. Please specify the equipment ID of connected subsystem.
DMED30000B	The process cannot be performed because the fibre channel port is not equipped. Please confirm the port type and try again.
DMED3B0011	The micro program cannot be downgraded because the interface board of iSCSI is equipped. Please change the interface boards to fibre channel and try again.
DMED3B0012	The micro program cannot be downgraded because the segment size of 64KB or more is set up. Please confirm the cache partition and try again.
DMED3B0013	The micro program cannot be downgraded because the stripe size other than 64KB is set up. Please confirm the stripe size of logical unit and try again.
DMED3B0014	The micro program cannot be downgraded because TrueCopy Extended Distance is installed. Please change TrueCopy Extended Distance to de-installed and try again.
DMED3B0015	The micro program cannot be downgraded because the subsystem is not restarted after the option using data pool is unlocked or enabled. Please restart the subsystem and then try again(*1).
DMED3B0016	The micro program cannot be downgraded because the target(s) or CHAP user(s) is not initialized. Please initialize the target(s) and CHAP user(s) and try again.
DMED3B0018	The micro program cannot be downgraded because the pair with MU number other than 0 exists in S-VOL of ShadowImage. Please cancel the pair with MU number other than 0 and try again.
DMED3B0019	The micro program cannot be downgraded because the pair with MU number of 14 or more exists in Snapshot image. Please cancel the pair with MU number of 14 or more and try again.

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text/Recovery methods
DMED3B001A	The micro program cannot be downgraded because P-VOL with 15 or more Snapshot image exists. Please delete Snapshot image to 14 or less, and try again.
DMED3B001B	The micro program cannot be downgraded because the user LU is being used as the pair of TrueCopy or TrueCopy Extended Distance. Please cancel the pair and try again.
DMED3B001C	The micro program cannot be downgraded because the migrated logical unit exists. Please migrate again.
DMED3B001D	The micro program cannot be downgraded because Volume Migration is installed. Please de-install the option and try again.
DMED3B001E	The micro program cannot be downgraded because TrueCopy is unlocked. Please lock the option and try again.
DMED3B001F	The micro program cannot be downgraded because Account Authentication is installed. Please de-install the option and try again.
DMED3B0020	The micro program cannot be downgraded because Power Saving is installed. Please de-install the option and try again.
DMED400001	The process cannot be performed because the specified logical units contain an unformatted LU. Confirm the logical unit status and try again.
DMED400002	The process cannot be performed because the specified logical units contain V-VOL of Snapshot. Confirm the logical unit status and try again.
DMED400003	The process cannot be performed because some logical units are under quick formatting. Confirm the logical unit status and try again.
DMED400004	The process cannot be performed because the specified logical units contain a Sub LU of the unifying Lus. Confirm the logical unit status and try again.
DMED400005	The process cannot be performed because the specified logical units contain an invalid LU. Confirm the logical unit status and try again.
DMED400006	The specified LUs contain regressed LU. Confirm the LU status and try again.
DMED400007	The process cannot be performed because ShadowImage, TrueCopy, or SnapShot is in progress. Please wait a moment and then try again.
DMED400007	The process cannot be performed because ShadowImage in-system replication, TrueCopy remote replication, or Copy-on-write Snapshot is performed. Please wait a moment and then try again.
DMED400008	The operation of 'start' or 'skip', and 'cancel' is specified at the same time. Confirm the operation and try again.
DMED400009	The process cannot be performed because the specified logical units contain an undefined LU. Confirm the logical unit status and try again.
DMED400011	The process cannot be performed because parity correction is not completed. Please try again, after it is completed.
DMED400012	The process cannot be performed because parity correction is not executed or is aborted. Please try again, after it is completed.
DMED400013	The process cannot be performed because parity correction is not completed. Please try again, after it is completed.
DMED400014	The process cannot be performed because parity correction is not completed. Please try again, after it is completed.
DMED400015	The process cannot be performed because parity correction is not executed or is aborted. Please try again, after it is completed.
DMED400021	The 'cancel' operation cannot be specified to the uncorrected logical units. Confirm the parity correction status and try again.
DMED400022	The 'start' operation cannot be specified to the aborted logical units. Confirm the parity correction status and try again.
DMED400023	The 'cancel' operation cannot be specified to the aborted logical units. Confirm the parity correction status and try again.
DMED400024	The 'start' operation cannot be specified to the correcting logical units. Confirm the parity correction status and try again.
DMED400025	The 'skip' operation cannot be specified to the correcting logical units. Confirm the parity correction status and try again.
DMED400026	The 'start' operation cannot be specified to the waiting logical units. Confirm the parity correction status and try again.
DMED400027	The 'skip' operation cannot be specified to the waiting logical units. Confirm the parity correction status and try again.
DMED400028	The 'cancel' operation cannot be specified to the skipped logical units. Confirm the parity correction status and try again.
DMED400029	The 'cancel' operation cannot be specified to the corrected logical units. Confirm the parity correction status and try again.
DMED500001	The command device is not registered. Please register the command device and try again.
DMED600001	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMED700001	The specified logical unit is not defined. Specify a defined logical unit.
DMED700002	The process cannot be performed because the status of pair is SMPL. Confirm the LU status and try again.

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Message code	Message text/Recovery methods
DMED800002	A parameter error occurred. Please confirm the specified parameter.
DMED800004	The specified NNC number is not NAS port. Please confirm the port type.
DMED800005	The process cannot be performed because BIOS is being updated. The updating is completed, then try again.
DMED800006	The process cannot be performed because NAS OS is not ready or booting, or it is not in shutdown process. Please confirm NAS OS status and then try again.
DMED800007	The process cannot be performed because BIOS is being updated. The updating is completed, then try again.
DMED800008	The process cannot be performed because the install of the NAS OS is not completed. Please try again after install is completed.
DMED800009	The process cannot be performed because the alternative NNC is not active. Please confirm NNC status and try again.
DMED800011	The process cannot be performed because NAS OS is loading. Please stop NAS OS, then try again.
DMED800013	The process cannot be performed because NAS OS is in shutdown process. Shutdown process is completed, then try again.
DMED800014	The process cannot be performed because NAS dump is being collected. The collection is completed, then try again.
DMED800015	The process cannot be performed because System LU is not defined. Please define System LU and then try again.
DMED800016	The time out occurred during install. Please turn off NNC breaker and turn on it, then try again.
DMED800017	The time out occurred during install. Please turn off NNC breaker and turn on it, then try again.
DMED800019	The process cannot be performed because NAS OS is not in stopped state. Please stop NAS OS, then try again.
DMED80001A	The process cannot be performed because BIOS is being updated. The updating is completed, then try again.
DMED80001B	The process cannot be performed because NAS OS is detached. Please recover NAS OS status and then try again.
DMED800020	The specified IP address is incorrect. Please specify a correct IP address.
DMED800021	The specified number is incorrect. Please specify a correct number.
DMED800022	The specified MTU is incorrect. Please specify a correct MTU.
DMED800023	The specified negotiation is incorrect. Please specify a correct negotiation.
DMED800024	The process cannot be performed because NAS OS is not ready. Please confirm NAS OS status and then try again.
DMED800025	The process cannot be performed during NNC LAN setting. Please confirm NAS OS status and then try again.
DMED800026	The same IP address as the management LAN of the subsystem cannot be set up. Please specify a correct IP address.
DMED800027	The specified time zone does not have daylight saving time. Please confirm the time zone.
DMED800029	The process cannot be performed because the MTU value of NNC does not match. Please set up the same MTU value.
DMED800030	The process cannot be performed because specified IP address is same as the current IP address of alternative NNC. Please specify another IP address and try again.
DMED800099	The error occurred during install. Please reboot NAS Setup, then try again.

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Message code	Message text/Recovery methods
DMEG000101	The IP address of syslog server XXX is not specified. Please specify the IP address.
DMEG000102	The IP address of the syslog server XXX is too long. Please specify the valid IP address.
DMEG000103	The multi-byte character is contained in the IP address of syslog server XXX. Please specify the IP address using the ASCII-character code.
DMEG000201	Please specify the user ID.
DMEG000203	The user ID is too long. Please specify the valid user ID.
DMEG000204	The password is too long. Please specify the valid password.
DMEG000205	You cannot login. Please specify the user ID and password.
DMEG000206	The units for testing are not selected. Please select the units.
DMEG000207	The old password is too long. Please specify the valid old password.
DMEG000208	The new password is too long. Please specify the valid new password.
DMEG000209	The new password does not match the confirmed password.
DMEG000210	The role is not assigned. Please assign the role.
DMEG000211	You have no permission. Please confirm your permission.
DMEG000212	The current login session is expired. If you are displaying the subsystem window, please close the window and login again.

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Message code	Message text/Recovery methods
DMEN03490W	Another task is initializing the error information LU.
DMEN03491W	Another task is initializing the NAS shared LU.
DMEN03492W	Another task is initializing the error information LU and NAS shared LU.
DMEN03493W	NAS Cluster Management LU: initialize, error information LU: - Initialization of the specified LU will now be performed. This might affect the NAS system currently providing a service. Is this OK?
DMEN03494W	NAS Cluster Management LU: -, error information LU: initialize Initialization of the specified LU will now be performed. This might affect the NAS system currently providing a service. Is this OK?
DMEN03495W	NAS Cluster Management LU: initialize, error information LU: initialize Initialization of the specified LUs will now be performed. This might affect the NAS system currently providing the service. Is this OK?
DMEN03496W	Initialization of the specified NAS Cluster Management LU will now be performed. This might affect the NAS system currently providing a service. Is this OK?
DMEN03497W	X will now be uninstalled. Is this OK?
DMEN03498W	An update installation will now be performed for the NAS OS. Is this OK? [Yes]: Perform the update installation [No]: Perform a new installation [Cancel]: Do not perform an installation
DMEN03499W	A new installation will now be performed for the NAS OS. If a program product is installed in the specified NAS package, it will be cleared. Is this OK?
DMEN03501E	The argument is invalid. The specified command is x. Please check the argument, and then retry the operation.
DMEN03502E	This PC does not have a CD-ROM drive. Change to a maintenance PC that has a CD-ROM drive.
DMEN03503E	Storage Navigator Modular is less than Ver.5.00. Memory for the maintenance PC is insufficient. If the problem cannot be resolved even after restarting the maintenance PC, change the maintenance PC.
	Storage Navigator Modular is Ver.5.00 or more. Memory in the maintenance PC is insufficient. Restart the maintenance PC, and then retry the operation. If this message is displayed repeatedly, acquire the NAS logs, the simple trace logs, and the maintenance PC logs, and then contact the troubleshooting group.(*1)
DMEN03504W	Another dialog box remains open. Close any other remaining dialog boxes, and then close the main dialog box.

*1 :
- For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
- For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
- For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03505E	Storage Navigator Modular is less than Ver.5.00. The file (x) could not be opened. If the problem cannot be resolved even after restarting the maintenance PC, change the maintenance PC.
	Storage Navigator Modular is Ver.5.00 or more. The target file (x) could not be opened. Restart the maintenance PC, and then retry the operation. If this message is displayed repeatedly, acquire the NAS logs, the simple trace logs, and the maintenance PC logs, and then contact the troubleshooting group. (*1)
DMEN03506E	Storage Navigator Modular is less than Ver.5.00. An I/O error occurred on the maintenance PC. If the problem cannot be resolved even after restarting the maintenance PC, change the maintenance PC.
	Storage Navigator Modular is Ver.5.00 or more. A file I/O error occurred in SVP. Restart the maintenance PC, and then retry the operation. If this message is displayed repeatedly, acquire the NAS logs, the simple trace logs, and the maintenance PC logs, and then contact the troubleshooting group. (*1)
DMEN03507E	The file is invalid. File name: x Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03508E	An unregistered error occurred. (error code = x) Retry the operation. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03509E	An NNC has not been installed. Install an NNC.
DMEN03514E	A communication error occurred. (x) Perform a recovery by carrying out the following procedure: (1) Check the connections for the LAN cards and cables. (2) Check the settings for the IP address of the maintenance PC. (3) Restart the maintenance PC, and then retry the same operation. (4) Restart the NAS OS on the target NNC. (take care) (5) Change the maintenance PC, and then retry the same operation.
DMEN03515E	A timeout error occurred. Retry the same operation. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03516E	An error occurred on the NAS OS. (code = x) Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03517E	Installation of NAS Setup is being performed. Wait until installation finishes, and then try again.
DMEN03519E	A parameter error occurred on the maintenance PC. (code = x) Restart the maintenance PC. If the problem still cannot be resolved, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)

*1 :
- For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
- For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
- For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03520E	An internal processing error occurred on the maintenance PC. (code = x) Restart the maintenance PC. If the problem still cannot be resolved, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03521E	Storage Navigator Modular is less than Ver.5.00.
	The configuration information is invalid. (code = x) Restart the maintenance PC. If the problem cannot be resolved even after restarting the maintenance PC, change the maintenance PC.
	Storage Navigator Modular is Ver.5.00 or more.
	The configuration information is invalid. (Code = x) If this message is displayed repeatedly, acquire the NAS logs, the simple trace logs, and the maintenance PC logs, and then contact the troubleshooting group. (*1)
DMEN03522E	An unexpected error occurred on the maintenance PC. (error code = x) Retry the operation. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03523E	his function is not supported. (code = x) Do not use this function.
DMEN03524E	A communication timeout occurred between the maintenance PC and disk array device. (code = x) Perform a recovery by carrying out the following procedure: (1) Check the connections for the LAN cards and cables. (2) Check the settings for the IP address of the maintenance PC. (3) Check whether an error status is displayed in the main window for Web. (4) Restart the maintenance PC, and then retry the same operation. (5) Change the maintenance PC, and then retry the same operation.
DMEN03525E	An NNC has not been installed. (code =x) Install an NNC.
DMEN03526E	A logical contradiction occurred on the maintenance PC. (code = x) Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03527E	Internal processing on the disk array device has ended abnormally. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03528E	Storage Navigator Modular is less than Ver.5.00.
	An LU is blocked. Check the status of the LU, resolve the problem, and then try again.
	Storage Navigator Modular is Ver.5.00 or more.
	The LU is blocked. Check and restore the LU status, and then retry the operation.
DMEN03529E	The NAS OS LU has not been defined. Define a system LU, and then try again.
DMEN03531E	An error occurred during processing to transmit a file. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)

*1 : • For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
• For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
• For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03532E	The file-transmission server was not found. Perform a recovery by carrying out the following procedure: (1) Restart the maintenance PC. (2) Check the connections for the LAN cards and cables. (3) Check the IP address of the maintenance PC. (4) Change the maintenance PC. (5) Restart the NAS OS on the target NNC. (take care)
DMEN03533E	An error occurred during file processing. heck the following, and then try again: (1) Check whether the NAS installation CD has been set. (2) Check whether there is any dirt on or damage to the CD. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03534E	The file could not be saved. Retry the operation. If the problem cannot be resolved even after trying again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03535E	The file-transmission server is busy. Wait for the other installation to finish, and then try again.
DMEN03536E	An unexpected error occurred during processing to transmit a file. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03554E	Storage Navigator Modular is less than Ver.4.00. The service (x) cannot start. Check the service, and then try again. Storage Navigator Modular is Ver.4.00 or more. The following functions cannot be used because the service (x) could not be started: x If you want to use these functions, make sure that the service is installed. If the service has already been installed, remove the cause of the failure to start the service, and then restart NAS Setup Tool.
DMEN03556E	An error occurred in NAS Manager. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03557E	An error occurred in NAS Manager. (code = x) Restart the target NAS OS. (take care) If the problem still cannot be resolved, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03558W	Downgrading this product version is not supported. Install a newer version than the version already installed.
DMEN03559W	Storage Navigator Modular is less than Ver.5.00. You cannot uninstall the correction patch only. Please uninstall the product of the regular or correction version. Storage Navigator Modular is Ver.5.00 or more. You cannot uninstall the patch only. Please uninstall the product of the regular or correction version.
DMEN03563W	The NAS OS is starting up. Wait until the startup processing completes, and then try again.
DMEN03564W	The NAS OS is stopping. Wait until the stop processing completes, and then try again.

*1 : • For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
• For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
• For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03565W	A NAS dump is being acquired.
DMEN03569W	It takes a maximum of x minutes to acquire a NAS dump. Do you want to acquire it?
DMEN03570W	The NAS dump acquisition will now be stopped. Is this OK?
DMEN03571W	Are you sure you want to reset the NNC?
DMEN03578W	The list of installed products cannot be displayed because the NAS OS has stopped.
DMEN03583W	This is the first NAS OS installation for this subsystem, so the NAS Cluster Management LU will be forcibly initialized. Is this OK ?
DMEN03588E	The entry (x) is invalid.
DMEN03592W	Storage Navigator Modular is less than Ver.5.00.
	X cannot be changed because the cluster has not been defined.
	Storage Navigator Modular is Ver.5.00 or more.
	X could not be changed because a cluster configuration is already defined.
DMEN03596E	An error occurred on the NAS OS. (code = x) A NAS dump is being acquired. Contact the Support Center.
DMEN03597W	Storage Navigator Modular is less than Ver.5.00.
	The specified product is a patch version. This product cannot be installed because a regular or corrected version of the product is not installed.
	Storage Navigator Modular is Ver.5.00 or more.
	The specified product is a patch. This product cannot be installed because a regular or corrected version of the product is not installed.
DMEN03598W	If you continue this processing, the NAS OS will immediately be forcibly stopped regardless of the NAS OS status. Do you want to continue this processing ?
DMEN03599W	Contact the system administrator to check whether a related service has switched to an alternative node or the service has stopped. Do you want to continue the processing ?
DMEN03609W	The cluster status could not be acquired. Click [Cancel], and then retry this operation. If this message appears again, click [OK] to forcibly continue the processing. [OK]: Continues the processing. [Cancel]: Cancels the processing.
DMEN03610W	The relevant node is operating. Switch the service to an alternative node, and then contact the system administrator to stop the relevant node. To forcibly continue the processing, click [OK]. [OK]: Continues the processing. [Cancel]: Cancels the processing.
DMEN03611W	If this operation continues, a cluster system might be affected. Do you still want to continue the processing?
DMEN03612W	To execute a new installation, stop all of the NAS OSs that configure the cluster. However, if the NAS OS LU is being recovered, the NAS OSs do not need to be stopped. Do you want to continue the installation?
DMEN03617W	To use this function, at least one NNC, which has the NAS OS version x or later installed, must be running.
DMEN03618W	The NAS OS version could not be checked. The NAS OS version of the specified x might be earlier than 04-00 or a communication error might have occurred. Check the NAS OS version from 'Program Install' to determine whether a communication error has occurred or the version is old.
DMEN03633W	There is no saved data in the specified x.
DMEN03634W	There is no saved data for the NAS Cluster Management LU.

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Message code	Message text/Recovery methods
DMEN03635W	This is not a state in which processing can be executed. Perform the operation when the status is Normal.
DMEN03636W	Processing was stopped because the NAS OS LU or NAS Cluster Management LU is being saved.
DMEN03637W	Processing cannot continue because the NAS OS LU or NAS Cluster Management LU is being recovered.
DMEN03638W	Processing cannot continue because the NAS OS LU or NAS Cluster Management LU is being recovered.
DMEN03639W	X cannot recover the NAS Cluster Management LU because the NAS OS version is old. Stop these NAS OSs, and then try again.
DMEN03640E	An attempt to recover the NAS Cluster Management LU has failed. (1) Stop the cluster in the disk subsystem: x (2) Recover the NAS Cluster Management LU: x (3) Cancel the cluster definition in the disk subsystem: x Contact the Support Center.
DMEN03643W	A dump file does not exist, or is being created, in the specified x. If this occurred immediately after startup, a dump file might be being created. Wait a while (maximum of x minutes), and then try again.
DMEN03645E	Storage Navigator Modular is less than Ver.5.00.
	A dump file cannot be downloaded because the capacity of the x drive is insufficient.
	Storage Navigator Modular is Ver.5.00 or more.
	An attempt to download the dump files has failed because the capacity of the x drive is insufficient. Delete unnecessary files to increase the capacity of the drive, and then retry the operation.
DMEN03647E	An error occurred while downloading a dump file of x. Cause code: x Retry the operation. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03648E	A timeout was detected while downloading a dump file of x. Re-open and then close this window again to make sure that Download Status becomes Normal. After that, retry the operation. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03650W	The LU for backing up the NAS Cluster Management LU has not been defined. Define the LU for backing up the NAS Cluster Management LU.
DMEN03653W	The specified program cannot be installed because x does not satisfy the prerequisites. Check the prerequisites for the specified program.
DMEN03690W	The operation will cause fatal damage to the subsystem. To continue processing, click OK. [OK]: Continues processing. [Cancel]: Cancels processing.
DMEN03691W	This is not a state in which this operation can be executed. Close the window, and then check the NNC status.
DMEN03742W	If this operation continues, the services being provided might be affected. Contact the system administrator to stop the cluster services. To continue the processing, click [OK]. [OK]: Continues the processing. [Cancel]: Cancels the processing.
DMEN03784E	Installation will now stop because the NAS Setup program does not suit the disk subsystem. Check the target disk subsystem, and then try again.

*1 : • For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
• For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
• For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03801E	Storage Navigator Modular is less than Ver.5.00. Startup of NAS Setup will now stop because the NAS OS version installed on the disk subsystem is newer than the NAS Setup version. Install the latest version of the NAS Setup program, and then restart the system.
	Storage Navigator Modular is Ver.5.00 or more. Startup of NAS Setup will now stop because the NAS OS version installed on the disk subsystem is newer than the NAS Setup version. Install the latest version of the Storage Navigator Modular, and then restart the system.
DMEN03802W	Storage Navigator Modular is less than Ver.5.00. The NAS OS version is newer than the version of the NAS Setup program. If a dialog box that indicates processing is in progress appears, wait until processing finishes, and then close all of the dialog boxes. Then, finish the NAS Setup program and update it to the latest version.
	Storage Navigator Modular is Ver.5.00 or more. The NAS OS version is newer than the version of the NAS Setup program. If a dialog box that indicates processing is in progress appears, wait until processing finishes, and then close all of the dialog boxes. Then, finish the NAS Setup program and update the Storage Navigator Modular to the latest version.
DMEN03803E	Storage Navigator Modular is less than Ver.5.00. Installation will now stop because an attempt was made to install an NAS OS version that is newer than the version for the NAS Setup program. Update the NAS Setup program to the latest version before performing the installation.
	Storage Navigator Modular is Ver.5.00 or more. An attempt is being made to install a product whose version is newer than the version of the NAS Setup program. The installation will now stop. Update the Storage Navigator Modular to the latest version, and then retry the operation.
DMEN03804E	An attempt to acquire the version of a program on the product CD has failed. The file for program product information on the CD might be invalid. Make sure that the product CD is correct, and then contact the Support Center.
DMEN03807E	An attempt to start the NAS OS has failed. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03813E	An attempt to set routing information has failed. Check the network settings and entered contents, and then try again. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03814E	An attempt to delete routing information has failed. Target: x Netmask: x Gateway: x The selected routing information might have already been deleted. To continue the processing, click [OK]. [OK]: Continues the processing [Cancel]: Cancels the processing If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)

*1 : • For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
• For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
• For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN03815E	An attempt to delete routing information has failed. Target: x Netmask: x Gateway: x The selected routing information might have already been deleted. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03817W	Routing information will now be deleted. Is this OK?
DMEN03818W	Routing information will now be deleted. If this operation continues, the services being provided might be affected. Contact the system administrator to stop the deletion-target services that are being provided by the network interface. To continue the processing, click [OK]. [OK]: Continues the processing [Cancel]: Cancels the processing
DMEN03819E	The specified routing information has already been registered.
DMEN03820E	Processing cannot continue because the NNC status is x. Recover the status, and then try again. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03823E	An attempt to set network information has failed. Check the entered contents, and then try again. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03828E	A communication error occurred. (code = x) Check the following, and then perform the recovery procedure again starting from the step for NAS OS installation: (1) Check the network settings. (2) Check the connections for the LAN cards and cables. (3) Check whether an error status is displayed in the main window for Web. If this message appears again, acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03829W	Before recovering the NAS Cluster Management LU, click the [Reboot all] button to restart all NAS OSs in the disk subsystem. If they have already been restarted, click [OK]. [OK]: Continues processing. [Cancel]: Cancels processing.
DMEN03830W	All NAS OSs will now restart. Is this OK?
DMEN03832E	The restart failed. NNC that failed to restart: x NNC that has not restarted: x Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03833E	The number of routing information has reached the maximum.
DMEN03847W	Processing was canceled because a NAS dump will now be acquired.
DMEN03850E	Processing will now stop because a hardware error was detected. Acquire the NAS logs, simple trace logs, and maintenance PC logs, and then contact the Support Center.(*1)
DMEN03851W	An attempt to acquire a NAS dump has failed. Wait a while, and then try again.

*1 : • For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
• For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
• For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN04001E	Installation was canceled because the maintenance PC is running on batteries. Make sure that the AC power cable is correctly connected.
DMEN04002E	NAS Setup was started from a program other than Storage Navigator Modular. Start NAS Setup from Storage Navigator Modular.
DMEN04003E	An attempt to initialize NAS Setup has failed. NAS Setup has finished.
DMEN04004E	NAS Setup does not support the specified device.
DMEN04005E	NAS Setup does not support the OS currently being used. Execute NAS Setup in a Windows 2000 or Windows XP environment.
DMEN04006E	NAS Setup is operating for another device. Finish NAS Setup, and then restart it.
DMEN04007E	Storage Navigator Modular is less than Ver.5.00.
	This security patch cannot be applied to the installed NAS OS version. Refer to the SUT manual to install a NAS OS version to which this security patch can be applied, and then install the security patch.
	Storage Navigator Modular is Ver.5.00 or more.
	This patch cannot be applied to the installed NAS OS version. Refer to the SUT manual to install a NAS OS version to which this patch can be applied, and then install the security patch.
DMEN04008E	Storage Navigator Modular is less than Ver.5.00.
	The product file of the security patch is in an invalid format. Retry the operation. If this message is displayed repeatedly, collect all of the NAS logs, simple trace logs, and PC maintenance logs, and then contact the support center.(*1)
	Storage Navigator Modular is Ver.5.00 or more.
	The product file of the patch is in an invalid format. Retry the operation. If this message is displayed repeatedly, acquire the all of the NAS logs, simple trace logs, and PC maintenance logs, and then contact the support center. (*1)
DMEN04009W	Perform the following operations before executing installation. x If the operation has already been performed, click the [OK] button. [OK] : Continues processing [Cancel] : Cancels processing
DMEN04011E	A product cannot be installed when the NAS OS is stopped. Start the NAS OS, and then try again. To forcibly install a product, select the [Forcibly Install] checkbox, and then execute installation.
DMEN04013E	Storage Navigator Modular is less than Ver.5.00.
	There is processing that needs to be performed before installing this security patch. Follow the procedure in the SUT manual to perform the installation.
	Storage Navigator Modular is Ver.5.00 or more.
	There is processing that needs to be performed before installing this patch. Follow the procedure in the SUT manual to perform the installation.
DMEN04014E	Storage Navigator Modular is less than Ver.5.00.
	A conflict occurred during internal processing. Collect all of the NAS logs, simple trace logs, and PC maintenance logs, and then contact the support center.(*1)
	Storage Navigator Modular is Ver.5.00 or more.
	A conflict occurred during internal processing. Acquire the all of the NAS logs, simple trace logs, and PC maintenance logs, and then contact the support center. (*1)

*1 :
- For the NAS Log is collected, refer to Troubleshooting "7.6 NAS Log collection" (TRBL 07-0230).
- For the Simple Trace is collected, refer to Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040).
- For the NAS Log is collected, refer to No.1 in Table9.2.1 Troubleshooting "9.2 List of Data to Be Collected when a P.P. Failure Occurs" (TRBL 09-0040).

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Message code	Message text/Recovery methods
DMEN04015W	You are attempting to install certain products only. Is this OK? (We recommend that all products be selected.) [OK]: Executes installation [Cancel]: Cancels installation
DMEN04016E	Internal subsystem status is under maintenance(x). No maintenance can be performed now.
DMEN04017E	The configuration information could not be acquired. Wait a while, and then try again.
DMEN04018E	An error occurred while downloading the x dump file. Make sure of the following, and then try again: (1) The FTP service is running. (2) The account for logging in to the FTP service has been correctly set up. (3) There is sufficient free space in the drive to which the file will be downloaded.
DMEN04019E	After the node on which the OS is being installed completes the installation, re-install the OS.
DMEN04020W	This operation will delete the data collected the previous time. To continue processing, click OK. [OK]: Continues processing. [Cancel]: Cancels processing.

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Message code	Message text/Recovery methods
DMES000000	Please retry.
DMES010200	Please retry.
DMES010600	Please retry.
DMES010802	Please retry.
DMES010900	Please retry.
DMES011300	Please retry.
DMES011401	Please retry.
DMES011501	Please retry.
DMES011502	Please retry.
DMES011700	Please retry.
DMES011701	Please retry.
DMES011702	Please retry.
DMES011703	Please retry.
DMES011800	Please retry.
DMES011801	Please retry.
DMES011802	Please retry.
DMES011902	Please retry.
DMES011903	Please retry.
DMES013200	Please retry.
DMES013201	Please retry.
DMES015B00	Please retry.
DMES015B02	Please retry.
DMES015B03	Please retry.
DMES018A03	Please retry.
DMES018A04	Please retry.
DMES018B01	Please retry.
DMES019621	A reboot(*1) is required to confirm a setup.
DMES019625	The Account Authentication is enabled successfully.
DMES019626	The Account Authentication is disabled successfully.
DMES019627	The Account Authentication is installed successfully.
DMES019628	The Account Authentication is de-installed successfully.
DMES01EA05	The micro program has been downloaded to the system drives, but some system drives could not be used. The subsystem can be used.
DMES020400	The process cannot be performed because formatting is now occurring, or LU is unformatted. Please confirm the LU status and try again.
DMES020401	Please retry.
DMES020402	Please retry.
DMES020404	The process cannot be performed because formatting is now occurring. Retry after formatting completes.
DMES020484	The subsystem is under shutdown process. Retry when the subsystem is in Ready status.
DMES020500	Please retry.
DMES023E00	Please retry.
DMES029500	The process cannot be performed because the subsystem is under shutdown process. Please wait a moment and restart(*1) the subsystem, then try again.
DMES029501	The process cannot be performed because the subsystem is under shutdown. Please restart(*1) the subsystem and then try again.

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text/Recovery methods
DMES02959A	Please retry.
DMES02959B	Please retry.
DMES030C02	Please retry.
DMES031000	Please retry.
DMES031102	Please retry.
DMES031104	Please retry.
DMES031200	Please retry.
DMES031300	Please retry.
DMES031401	Please retry.
DMES031501	Please retry.
DMES031502	Please retry.
DMES031902	Please retry.
DMES031903	Please retry.
DMES031C01	Please retry.
DMES031C02	Please retry.
DMES031D00	Please retry.
DMES033100	Please retry.
DMES033101	Formatting ended abnormally. Please retry after waiting for a while.
DMES033180	The specified LU is unformatted. Specify a formatted LU and try again.
DMES033181	Please retry.
DMES033201	Please retry.
DMES038E01	Please retry.
DMES039300	Please retry.
DMES03F000	Please retry.
DMES03F100	Please retry.
DMES03F200	Please retry.
DMES03F300	Please retry.
DMES040100	Please retry.
DMES040200	Please retry.
DMES040300	Please retry.
DMES040600	Please retry.
DMES040700	Please retry.
DMES040800	Please retry.
DMES040801	Please retry.
DMES040802	Please retry.
DMES040900	Please retry.
DMES041B00	Please retry.
DMES043200	Please retry.
DMES044400	Please retry.
DMES0444A0	Please retry.
DMES044C00	Please retry.
DMES048A01	Please retry.
DMES048A02	Please retry.
DMES049000	Please retry.
DMES049001	Please retry.
DMES049100	Please retry.
DMES049101	Please retry.
DMES049502	The requested operation cannot be performed. Please confirm there are any alarms or warnings in the subsystem.
DMES049599	Please retry.
DMES049900	Please retry.

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Message code	Message text/Recovery methods
DMES04A000	Please retry.
DMES04E400	Please retry.
DMES04EA01	Please retry.
DMES04EA02	Please retry.
DMES04EA10	An error was detected in micro program downgrade check. Please retry by using another micro program.
DMES04EA11	The specified micro program could not be installed on to the RKL type because the micro program version is old.
DMES04EB00	The information could not be set because the backup floppy disk is not inserted.
DMES04EB01	The backup information could not be written on to the FD because the FDD is in use or an error occurred in the FDD on the subsystem.
DMES04EB02	An error occurred while writing on to the floppy disk.
DMES04EB03	The SCSI ID could not be set online due to other controller blockage.
DMES04F400	Please retry.
DMES04F610	Please retry.
DMES04F611	Please retry.
DMES04F620	Please retry.
DMES04F621	Please retry.
DMES04F630	Please retry.
DMES04F631	Please retry.
DMES04F640	Please retry.
DMES04F641	Please retry.
DMES04F650	Please retry.
DMES04F651	Please retry.
DMES04F660	Please retry.
DMES04F661	Please retry.
DMES04F670	Please retry.
DMES04F671	Please retry.
DMES04F800	Please retry.
DMES04F801	Please retry.
DMES04F802	Please retry.
DMES04F803	Please retry.
DMES04F804	Please retry.
DMES04F805	Please retry.
DMES04F807	Please retry.
DMES04F808	Please retry.
DMES04F809	Please retry.
DMES04F8F0	Please retry.
DMES04F900	Please retry.
DMES04F901	Please retry.
DMES04F902	Please retry.
DMES04F903	Please retry.
DMES04F904	Please retry.
DMES04F905	Please retry.
DMES04F906	Please retry.
DMES04F907	Please retry.
DMES04F908	Please retry.
DMES04F909	Please retry.
DMES04F9F0	Please retry.
DMES050000	Please retry.
DMES051A00	Please retry.

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Message code	Message text/Recovery methods
DMES052000	Please retry.
DMES052100	Please retry.
DMES052400	Please retry.
DMES052500	The process cannot be performed because the LU is undefined or cannot be recognized from a host.
DMES052580	Failed to allocate LU. Confirm the specified value.
DMES052581	The RAID group is not defined. Please specify an existing RAID group.
DMES052583	The Cache Residency function cannot be enabled.
DMES052584	The last LBA in the RAID group defined at RAID1+0 full mapping does not match the current value.
DMES052590	The LU non-owner controller received an LU replacement command (for TRESPASS mode only).
DMES0525A0	Please retry.
DMES052600	The process failed due to an invalid parameter. Confirm the specified value.
DMES052601	The process failed due to an unsupported parameter. Confirm the specified value.
DMES052602	The process failed due to an invalid parameter. Confirm the specified value.
DMES052604	It failed in release of Persistent Reservation because the type of the Persistent Reserve command was different.
DMES055504	It is impossible to register over 32 LU Reservation Keys.
DMES058C01	Please retry.
DMES059401	Please retry.
DMES059510	The process cannot be performed because the microprogram is being replaced.
DMES059511	The process cannot be performed because the SVP is being replaced.
DMES059520	The specified function cannot be performed because the subsystem is in an incorrect status for execution. Please confirm there are no alarms/warnings in the subsystem, or the configuration is changed.
DMES059530	The specified User ID is not registered.
DMES059531	Could not execute the function, because another user is already logged in.
DMES059532	The specified User ID is already registered.
DMES059533	Failed in registration, because 20 users have already been registered.
DMES059534	Specified password is not confirmed.
DMES059535	Another user already logged in.
DMES059536	The function cannot be used because it is not installed, locked, or disabled.
DMES059537	The function cannot be executed because you haven't logged in.
DMES059540	A spare disk is defined within the range of the specified RAID group. Please specify the range which does not contain a spare disk.
DMES059541	The drive capacity of RAID group is invalid, or the RAID group capacity is too large.
DMES059542	The specified drive cannot be used as a spare drive.
DMES059543	The number of spare drives has reached the maximum.
DMES059544	The specified drive is already defined as a spare drive, or is already being used in the RAID group.
DMES059545	The specified drive capacity is smaller than that of the RAID group.
DMES059546	The specified drive is not defined as a spare drive.
DMES059547	The specified spare drive cannot be released because it is in use.
DMES059548	The specified function has already been unlocked.
DMES059549	The specified function has already been locked.
DMES05954A	Invalid key code.
DMES05954B	The RAID group cannot be defined because the drive is not mounted, or a blocked drive exists.
DMES05954C	The specified drive cannot be defined as a spare drive because it is not mounted or is in blocked status.
DMES05954D	The process cannot be performed because the target mode is not M-TID, M-LUN.
DMES05954E	The process cannot be performed because the addition of target information required but changed or deleted information exist.
DMES059550	The function cannot be executed because of write prohibition.
DMES059551	The function cannot be executed because concealment mode is enabled.
DMES059552	The function cannot be executed because the coupling LU or command device exists.
DMES059554	The function cannot be executed because the command device is not registered.

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Message code	Message text/Recovery methods
DMES059555	The function cannot be executed because the stripe size is not 64KB.
DMES059558	The process cannot be performed because the specified LU is a unified LU, or unified LUs exist.
DMES059559	The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.
DMES05955A	The unification cannot be performed because the controllers in charge of the LUs do not match.
DMES05955B	The unification cannot be performed because the controller in charge of LU is reserved to be changed. Cancel the reservation and then try again.
DMES05955C	The LU of RAID0 cannot be unified. Specify an LU which the RAID level is not RAID0.
DMES05955D	The unification cannot be performed because the size of the unified LU will exceed 4294967295 blocks.
DMES05955E	The separation cannot be performed because the specified LU is not a unified LU. Specify a unified LU and then try again.
DMES059560	The process cannot be performed because the target mode is not M-TID, M-LUN.
DMES059561	The process cannot be performed because the target mode is M-TID, M-LUN, but target information have already been set.
DMES059562	The unification cannot be performed because the specified Sub LU is a unified LU. Specify a non-unified LU for Sub LU and then try again.
DMES059563	The unification or separation cannot be performed because the specified LU is a Sub LU. Specify a Main LU (unified LU) and then try again.
DMES059564	LU0 cannot be specified as a Sub LU. Specify an LU other than LU0 for Sub LU and then try again.
DMES059565	The unification (LU concatenation) cannot be performed because the status of the LU is not normal (a disk might have failed). Specify an LU where the status is normal, and then try again.
DMES059566	The process cannot be performed because the LU number is over max LU number. Specify a number under max LU number and then try again.
DMES059568	The specified RAID group cannot be deleted because it contains LU0, and Lus exists in other RAID groups.
DMES059569	The specified LU cannot be deleted because it is not the last defined LU.
DMES05956A	Cannot define the specified LU because LU0 is not yet defined. Define LU0 first, and then try again.
DMES059571	Failed to set the path. Please confirm the conditions required for a path setup are met.
DMES059572	Failed to delete the path. Please confirm the conditions required for path deletion are met.
DMES059573	The option which cannot be specified at the same time is unlocked.
DMES059574	The process cannot be performed because TrueCopy is in progress.
DMES059575	The option cannot be locked or disabled because the path has already been set.
DMES059577	The process cannot be performed because the pair creation is in progress.
DMES05957A	The process cannot be performed because the status of pair is suspend. Please retry after solving the error.
DMES05957B	The process cannot be performed under 'pair' status. Please retry after splitting the pair.
DMES05957C	The process cannot be performed because the pair has been created in other subsystem.
DMES05957D	The process cannot be performed because the subsystem is over the inflow threshold.
DMES05957E	The process cannot be performed because the status of ShadowImage pair is incorrect.
DMES05957F	The option cannot be unlocked because it is in use in the fibre channel subsystem.
DMES059580	The process cannot be performed because the RAID Manager is doing a conflicting process. Please wait a moment and then try again.
DMES059590	The process cannot be performed because the subsystem is for the exclusive use of 128 Lus.
DMES059591	The process cannot be performed because the number of ShadowImage pairs reached the maximum.
DMES059596	Please retry.
DMES059600	The process cannot be performed. Wait for a while and then try again.
DMES059601	The specified host group number is invalid.
DMES059602	The process cannot be performed because the specified option is a fee-basis option.
DMES059603	The process cannot be performed because the specified size of LU is over max LU size.
DMES059606	The specified LU is invalid. Specify a valid LU and try again.
DMES059607	The function cannot be executed because the pair LU already exists.
DMES05960A	The function cannot be executed because there already exists logical units added to the data pool.
DMES059612	The process cannot be performed because quick formatting is now occurring. Retry after quick formatting is completed.

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Message code	Message text/Recovery methods
DMES059615	The process cannot be performed because the specified logical unit is a part of Snapshot pair. Cancel the Snapshot pair and try again.
DMES059617	The process cannot be performed because the specified RAID level is not supported. Specify the RAID level currently supported and try again.
DMES05961A	The process cannot be performed because parity correction is not completed. Please try again, after It is completed.
DMES05961D	The RAID group cannot be created because the different drives are specified within the range of a RAID group. Please confirm the drive type and try again.
DMES05961E	One internal LUN cannot be mapped to two or more host LUN in a port. Please confirm the mapping information and try again.
DMES05961F	The function cannot be executed because the Hi-Copy pair LU already exists. Cancel the Hi-Copy pair and try again.
DMES05EA03	Failed to download the micro program. Please confirm the combination of the specified micro program and the subsystem.
DMES05EA04	Failed to replace the microprogram. Confirm the subsystem.
DMES05EA10	An error was detected in micro program downgrade check. Please retry by using another micro program.
DMES05EA12	It is impossible to change from the 128LU version micro program to the 64LU version micro program.
DMES05EA15	The micro program cannot be downgraded because the Random Simple Buffer Size 0% Mode is enabled. Please set the Random Simple Buffer Size 0% Mode to disable then try again.
DMES05EA16	The micro program cannot be downgraded on this current spare drive configuration. Please release all spare drives then try again.
DMES05EA17	The micro program cannot be downgraded because the units are intermixed. Please remove the AT units then try again.
DMES05EA18	The micro program cannot be downgraded because the ShadowImage I/O Switch Mode is enabled. Please set the ShadowImage I/O Switch Mode to disable then try again
DMES05EA19	The micro program cannot be downgraded because SnapShot and Cache Residency are unlocked together or not restarted the subsystem after locked. Please lock either option and restart(*1) the subsystem, and then try again.
DMES05EA1A	Cannot download, because the micro program does not match to this subsystem. Please retry by using another micro program.
DMES05EA1B	The micro program cannot be downgraded because the RAID group of RAID6 exists. Please retry after deleting it or by using another micro program.
DMES05EA1C	The micro program cannot be downgraded because the non-supported units are connected. Please retry after removing the units or by using another micro program.
DMES05EA1D	The micro program cannot be downgraded because the non-supported cache is connected. Please retry after removing the cache or by using another micro program.
DMES05EA1E	The process cannot be performed because the NNC connected to the specified controller is not shutdown status. Please shutdown the NNC and try again.
DMES05EA1F	The process cannot be performed because the NNC is not shutdown status. Please shutdown the NNC and try again.
DMES05EA20	The subsystem cannot be restarted.
DMES05EA30	The ENC micro program download and replacement cannot be performed because there is an error in the loop. Please retry after solving the error.
DMES05EA31	The process cannot be performed because the ENC micro program is being replaced. Please retry after replacement completes.
DMES05EA32	Failed to download the ENC micro program. Please confirm the combination of the specified ENC micro program and the subsystem.
DMES05EA33	The ENC micro program of this revision cannot be downloaded. Please retry by using another ENC micro program.
DMES05EA34	The sum check error of the ENC micro program occurred. Please retry by using another ENC micro program.
DMES05EA35	The ENC micro program is not downloaded. Please try again after downloading.
DMES05EA36	Failed to replace the ENC micro program. Please confirm the subsystem.
DMES05EA40	The process cannot be performed because the Automatic Download is enabled. Please set the Automatic Download to disable then try again.
DMES05EA41	The process cannot be performed because the ENC micro program is being replaced. Please retry after replacement completes.
DMES05EB04	The FDD on the subsystem could not be diagnosed because the FDD is in use.

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Message code	Message text/Recovery methods
DMES062900	Please retry.
DMES062A00	Please retry.
DMES062A03	About LU, all Reservation Keys and Persistent Reservations were cleared by the Clear service action of the Persistent Reserve command.
DMES062A04	By register of the Persistent Reserve command or Register & Ignore Key service action, the Reservation Key was cleared, and Persistent Reservation was released.
DMES062A05	Reservation Key was cleared by Preempt of the Persistent Reserve command, or the Preempt & Abort service action.
DMES062F00	Please retry.
DMES063F01	The microprogram is downloaded.
DMES068200	Please retry.
DMES068201	Please retry.
DMES068202	Please retry.
DMES068210	Please retry.
DMES068211	Please retry.
DMES068212	Please retry.
DMES068213	Please retry.
DMES068214	Please retry.
DMES068215	Please retry.
DMES068216	Please retry.
DMES068217	Please retry.
DMES068218	Please retry.
DMES068219	Please retry.
DMES06821A	Please retry.
DMES068300	Please retry.
DMES068400	Please retry.
DMES079578	The process cannot be performed because the data is being copied.
DMES079595	Please retry.
DMES079597	Please retry.
DMES079598	Please retry.
DMES0B3D00	Please retry.
DMES0B4300	Please retry.
DMES0B4500	Please retry.
DMES0B4700	Please retry.
DMES0B4800	Please retry.
DMES0B4900	Please retry.
DMES0B4A00	Please retry.
DMES0B4B00	Please retry.
DMES0B4E00	Please retry.
DMES0B9531	Could not execute the function, because another user is already logged in.
DMES0BC000	Please retry.
DMES0BC001	Please retry.
DMES0BC002	Please retry.
DMES0BC100	Please retry.
DMES0BC200	Please retry.
DMES0BDA00	The process cannot be performed because the drive recovery is in progress. Please retry after waiting for a while.
DMES0BFD00	The process cannot be performed due to LU replacement. Connect to the controller with owner permission and try again.
DMES0BFD01	The process for LU replacement is suspended. Please retry after waiting for a while.

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Chapter 9. Failure Analysis by Sense Data

In case of Fibre Channel, when an error occurs Sense Data is stored in Payload of FCP_RSP and transferred to Host Computer.

9.1 Details of sense code

The details of Sense Code are shown below.

Sense key	Sense code	Description	Recovery methods	Reference page
0/5	00 00	There is no valid additional sense information.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	01 00	The INDEX signal cannot be detected. The SECTOR signal cannot be detected.		
1/4	02 00	Seek operation in the Disk Drive cannot be executed correctly.		
4	03 00	A Write Fault was detected in the Disk Drive.		
2	04 00	The LU connected cannot execute a command because LUs are being formatted.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
2	04 01	The Disk Drive will soon become ready although it is currently not ready.		
2	04 02	The Disk Drive is currently not ready; it has not been spun-up.		
2	04 03	The host I/O cannot be executed because the Disk Drive is spin-down with the Power Saving function.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
2	04 04	The logical unit is currently not ready. (It is executing the formatting command.)	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
2	04 84	A sequential shutdown is in progress.		
2	05 00	An error occurred in the drive interface in the logical unit.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
1/4	06 00	The positioning to Track 0 failed.		
4	07 00	Two or more Disk Drives were selected at the same time.		
4	08 00	An error occurred in the drive interface in the logical unit.		
4	08 01	A time-out error occurred in the drive interface in the logical unit.		
1/4	08 02	A parity error occurred in the drive interface in the logical unit.		
1/4	09 00	A track positioning failed.		
3	0C 02	An automatic allocation was executed against the write error but failed.		
3	0C FF	Write processing time exceeded Recovery Time Limit, write processing was terminated.		
3	10 00	A CRC error occurred in the ID field.		

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Sense key	Sense code	Description	Recovery methods	Reference page
3	11 00	An error occurred in the data field.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
3	11 01	Reading of the data field was retried but the error was not recovered. (An error correction was not applied.)		
3	11 02	The read error in the data field could not be corrected by means of the ECC.		
3	11 04	An automatic reallocation was executed against the recoverable error but failed		
3	11 FF	Read or Verify processing time exceeded Recovery Time Limit, read or verify processing was terminated.		
3	12 00	The address mark of the ID field could not be detected.		
1/3	13 00	The address mark of the data field could not be detected.		
1/3	14 01	The block with the identical ID field could not be detected.		
1/4	15 01	A seek error occurred.		
1/4	15 02	The seek operation terminated normally but the head was positioned at an address not intended.		
1	17 00	The error was recovered by a retry.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
1	17 01	The error was recovered by a retry (without a head offset).		
1	17 02	The error was recovered by a retry with a head offset in the positive direction.		
1	17 03	The error was recovered by a retry with a head offset in the negative direction.		
1	18 00	The error was recovered by the ECC (without a retry).		
1	18 01	The error was recovered by the ECC applied in a retry.		
1	18 02	Data was recovered by an automatic reallocation.		
1/3	19 02	An error occurred during an access to the Primary (P) list.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
1/3	19 03	An error occurred during an access to the Grown (G) list.		
5	1A 00	The parameter list length is illegal.		
4	1B 00	A synchronous data transfer error occurred in a data transfer.		
3	1C 01	The positioning to the Primary (P) list failed.		
3	1C 02	The positioning to the Primary (P) list failed.		
3	1D 00	A data compare error occurred during write or read buffer verify processing.		

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Sense key	Sense code	Description	Recovery methods	Reference page
5	20 00	The operation code is invalid.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	21 00	An attempt was made to access beyond the logical block address reported with Read Capacity (PMI bit=0).	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	22 00	The Read command could not be executed because the access level had been set with Data Retention Utility.	–	–
5	24 00	There is an invalid field in the CDB. Ex.: RESERVED Bit/VALUE ≠ ZERO	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	25 00	The LUN shown by the CDB or Identify message is not supported.		
5	25 80	The logical unit allocation failed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	25 81	The RAID group (RG) is not defined.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
5	25 83	P The Turbo LU specification was rejected by the specification condition check.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	25 84	The current value of the Row Last LBA in the RAID group is different from that when RAID 1+0 full mapping was defined.		
5	25 90	The controller with no LU owner right received a command to switch the LU (in the case of the Trespass mode).	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
5	25 A0	The divisional transfer failed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	26 00	There is an invalid field in the parameter list.		
5	26 01	An unsupported parameter was received.		
5	26 02	The parameter value is invalid.		
5	26 04	The release from the Persistent Reservation failed because the type of the Persistent Reserve command was different.		
7	27 00	The write command could not be executed because the access level had been set with Data Retention Utility.	–	–
6	29 00	• A Power On Reset occurred. • An internal reset occurred owing to a serious hardware error.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)

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Sense key	Sense code	Description	Recovery methods	Reference page
6	2A 00	• The Mode Select parameter was changed. • Another system received the SCSI Reset in the dual configuration. Ex,: A parameter was changed by the Mode Select command.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
6	2A 03	The Reservation Key and Persistent Reservation of the LU concerned were all cleared by the Clear service action of the Persistent Reserve command.		
6	2A 04	The Reservation Key was deleted and the Persistent Reservation was cancelled by the Register or Resister &Ignre Key service action of the Persistent Reserve command.		
6	2A 05	The Reservation Key was deleted by the Preempt or Preempt & Abort service action of the Persistent Reserve command.		
6	2F 00	The command was cleared according to the Clear Queue message from another initiator or owing to an occurrence of the CA status in the initiator.		
3	31 00	The medium is not formatted correctly; it must be reformatted by the Format Unit command	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
3	31 01	The Format command terminated abnormally; it must be reformatted by the Format Unit command.		
3	31 80	The data format for the disk array is not established.		
3	31 81	• The format command cannot be executed because the Disk Drive configuration is incomplete (i.e., the data or parity drive is detached). • An attempt was made to execute the format command beyond the actual disk capacity.		
1/4	32 00	The reallocation cannot be done because the alternative area is insufficient.		
1/3	32 01	The update of the Grown (G) list failed.		
5	35 01	An ENC time-out (FC) or an illegal frame was sent (SATA).		
1	37 00	The processing was executed with the parameter value rounded because it could not be executed with the original value.	–	–
B	3D 00	An invalid bit was detected in the Identify message.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
2	3E 00	The self- configuration of the Disk Drive is not established yet.		
6	3F 01	The microprogram was downloaded.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	

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Sense key	Sense code	Description	Recovery methods	Reference page
B	43 00	The operation cannot be continued because the message was rejected or an error occurred in the Message phase.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	44 00	A hardware or firmware error was detected in the Controller during the command execution.		
4	44 00	A abnormal end of the Formatting job generated by the read command was detected.		
4	44 00	A abnormal end of the Formatting job generated by the write command was detected.		
4	44 A0	No sector to be reassigned cannot be detected.		
B	45 00	A Select/ Reselect time-over was detected. An invalid selection was detected.		
B	47 00	A Fibre Channel bus on CRC error occurred.		
B	48 00	The Initiator Detected Error message was received from the initiator.		
B	49 00	• An invalid message was detected.		
		• The communication via a LAN was not done normally because of a LAN failure.		
B	4A 00	An error occurred during accepting of the command.		
B	4B 00	An error occurred during data transfer.		
4	4C 00	A loading of a microcode or parameter failed when starting up the controller.		
B	4E 00	• Two commands with no tag was issued to the same I-T-L. • Commands with and without tags were issued to the same I-T-L. (When this code is reported, all the commands queuing for the I-T-L concerned are cleared.)		
5	55 04	A registration of 32 or more Reservation Keys in an LU was attempted.		
1	5B 00	An exceptional log in the Disk Drive was detected.		
1	5B 02	The log counter in the Disk Drive reached its maximum value.		
1	5B 03	All log list codes in the Disk Drive were used up.		
1/6	5C 02	A synchronous withdrawal failure or an off-synchronization after a passing synchronization was detected.	–	–

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Sense key	Sense code	Description	Recovery methods	Reference page
6	82 00	The disk recovery by means of a drive recovery completed normally(*1).	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
6	82 01	Unrecoverable data was generated although the disk recovery by means of a drive recovery completed normally.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
6	82 02	The Disk Drive recovery by means of a Disk Drive recovery completed normally. But the configuration status was not changed to that in which the recovery had completed because a unrecoverable error occurred(*1).		
6	82 10	The Disk Drive recovery was forcibly terminated by an operator instruction(*1).	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
6	82 11	The Disk Drive recovery was forcibly terminated because a media error was detected in the Disk Drive recovery source disk during the drive recovery(*1).	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
6	82 12	The Disk Drive recovery was forcibly terminated because a media error was detected in the Disk Drive recovery destination disk during the drive recovery(*1).		
6	82 13	The Disk Drive recovery was forcibly terminated because a hardware error was detected in the Disk Drive recovery source disk during the drive recovery(*1).		
6	82 14	The Disk Drive recovery was forcibly terminated because a hardware error was detected in the Disk Drive recovery destination Disk Drive during the drive recovery(*1).		
6	82 15	The Disk Drive recovery was forcibly terminated because the Disk Drive recovery source disk was blocked during the Disk Drive recovery(*1).		
6	82 16	The Disk Drive recovery was forcibly terminated because the Disk Drive recovery destination Disk Drive was blocked during the drive recovery(*1).		
6	82 17	The Disk Drive recovery was forcibly terminated because a hardware error was detected in an inter-cache control during the Disk Drive recovery.(*1).		
6	82 18	The Disk Drive recovery was forcibly terminated because the status of the configuration information changed (*1).		
6	82 19	The Disk Drive could not be started because data for write-after remains in the recovery destination Spare Disk(*1).		

*1 : The sense code is not reported to the host. (It is reported as the Sense Information on Mode Sense page 34_H.)

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Sense key	Sense code	Description	Recovery methods	Reference page
6	82 1A	The Disk Drive recovery was forcibly terminated because an time-out occurred in an internal process(*1).	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
B	83 00	The dump information was changed because another controller was blocked during a collection of the Send Diag drive dump.		
4	8A 01	A parity error was detected during a medium parity consistency check.		
4	8A 02	A parity error was detected during a medium LA consistency check.		
1	8A 03	Intermediate pinned data and dirty data were found during a parity consistency check.		
1	8A 04	Remaining intermediate or physical dirty data and pinned data were found during an LA consistency check of a medium.		
1	8B 01	An inoperable command was issued to the blocked logical unit.		
5	8C 01	Parity check was required in the Regression mode.		
3	8E 01	An instruction to read or verify was given to the block on which a writing has not completed.		
3	8E 02	Reading on the V-Vol was attempted it could not be done because of the incomplete DDCB.		
3	8E 03	Writing on the V-Vol was attempted it could not be done because of the incomplete DDCB.		
3	8E 04	An intermediate or logical dirty pinned data was found to be left in an LU consistency check of a medium.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
3	8E 05	A copy or restore by a general purpose ASYNC job was not completed in execution of Copy-on-write SnapShot.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
4	90 00	An unrecoverable data error occurred during a data recovery with parity disk data.		
3/4	90 01	An unrecoverable data error occurred during operation in the Regression mode.		
4	91 00	Data could not be reconstructed because an unrecoverable error was detected during an automatic allocation		
4	91 01	The alternative block could not be reallocated in an automatic reallocation.		
3	93 00	A parity adjustment error occurred in the Cache memory.		
5	94 01	The Control Unit with no LU owner right received a command to switch the LU (in the case of the Alternate Paths 1 and 2).	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	

*1 : The sense code is not reported to the host. (It is reported as the Sense Information on Mode Sense page 34_H.)

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Sense key	Sense code	Description	Recovery methods	Reference page
2	95 00	The pseudo sequential shutdown is in progress.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
2	95 01	The pseudo sequential shutdown terminated normally.		
4	95 02	The pseudo sequential shutdown terminated abnormally.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	95 10	The command cannot be executed because the microprogram is being replaced.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
5	95 20	The Mode Select/Mode Sense $3E_H$ (extended code $03_H/04_H/05_H/06_H$) was received in the state in which no command could be executed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
4	95 36	The priced option function is in the unsupported status.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
5	95 40	A Spare Disk has been defined within a range of the designated RG (at the time of the RG setting).	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	
5	95 41	The Disk Drive capacity is illegal (when the RG is set). The cause may be one the following. 1. The capacity of the data disk exceeds that of the Spare Disk. 2. When the RG was expanded, the Disk Drive capacity of the added portion was smaller than that of the Disk Drive that had already been defined.		
5	95 42	The designated Disk Drive is that which cannot be defined as a Spare Disk (at the time of the Spare Disk designation).		
5	95 43	The number of the specified Spare Disks exceeds maximum definable value (at the time of the Spare Disk designation).		
5	95 44	The designated drive has already been defined as a Spare Disk or an RG (at the time of the Spare Disk specification).		
5	95 45	The value of the designated Last LBA is less than the maximum Last LBA of the RG (at the time of the Spare Disk designation). (The cases where the drive is blocked or uninstalled are excluded.)		
5	95 46	An instruction to release a drive of a Spare Disk was issued to the Disk Drive which was not designated as a Spare Drive (at the time of the Spare Disk release).		
5	95 47	The Spare Disk is being used though it was specified to be released of the Spare Disk.	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	
5	95 48	An unlocking instruction was given to the drive which was not locked.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	

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Sense key	Sense code	Description	Recovery methods	Reference page
5	95 49	A locking instruction was given to the drive which was already locked.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	95 4A	The pricing key code is invalid.		
5	95 4B	The RAID group cannot be set because the uninstalled or blocked Disk Drive is included in the specified Disk Drive.	Select the installed Disk Drive, and set the RAID group. Or, set the RAID group again after replacing the blocked Disk Drive.	System Parameter "Chapter 3. Setting the RAID/LU/Spare Disk" (SYSPR 03-0000) Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
5	95 4D	The process cannot be performed because the target mode is mode is not M-TID, M-LUN. (Mapping mode)	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	95 4E	The process cannot be performed because the target information are changed or deleted.		
5/7	95 50	Command not execute for write prohibition.		
5	95 51	Command not execute for concealment mode.		
5	95 52	Command not execute for coupling LU or Command Device exist.		
5	95 53	Ap distinction number is full.		
5	95 54	Command response can not be done because command device is not set.		
5	95 56	The command cannot be executed because a failure occurred during the reverse resynchronization or the I/O switch operation.		
5	95 57	• (LU Size Non-Rounding mode is off) A pair cannot be formed because the primary and secondary LU sizes (host LU size = rounded LU size) are not the same. • (LU Size Non-Rounding mode is on) A pair cannot be formed because the primary and secondary LU sizes (either or both of the host LU sizes and rounded LU sizes) are not the same.		
5	95 58	The command cannot be issued because LU unification is in progress.		
5	95 59	LU unification, a dissolution of LU unification, or a separation of a final LU could not be done because an internal LU to have been used for the operation above was a Turbo LU or a reserved Turbo LU.		
5	95 5A	The LU unification could not be done because Controllers that control LUs to be unified were not the same.		

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Sense key	Sense code	Description	Recovery methods	Reference page
5	95 5B	The LU unification could not be done because a Controller that controls the LUs to be unified was being changed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	95 5C	The LU unification could not be done because a RAID level of the LUs to be unified was RAID 0.		
5	95 5D	The LU unification could not be done because an LU size after the unification would be larger than 2 Tbytes.		
5	95 5E	A dissolution of LU unification or a separation of a final LU could not be done because the LU concerned was not a unified LU.		
5	95 62	The LU unification could not be done because a unified LU was selected as a Sub LU to be unified.		
5	95 63	LU unification, a dissolution of a unified LU or a separation of a final LU could not be done because a Sub LU had been selected.		
5	95 64	The LU unification could not be done because the LU #0 was selected as the Sub LU.		
7	95 65	The LU unification could not be done because an LU status was other than normal or regression.		
5	95 66	The LU unification could not be done because the number of the internal LU that configures the unified LU exceeded 2047.		
5	95 67	LU unification, a dissolution of an LU unification, or a expansion of a final LU could not be done because the LU unifying function (enhancing function) was not validated.		
5	95 69	The final LU could not be deleted because it was not specified.		
5	95 6B	Because the differential bit could not be assigned, the pair forming command of the MRCF-Lite could not be executed.		
5	95 71	The path could not be set.		
5	95 72	The path could not be deleted.		
5	95 73	Since a function that cannot coexist with the function was being used in the system, the key for the extra-cost option could not be open.		
5	95 74	The command could not be executed because the remote copy function was being used.		
5	95 75	The command could not be executed because the path was already defined.		
5	95 76	The pair operation command from RAID Manager could not be executed.		
5	95 77	The command (host or Storage Navigator Modular) could not be executed because the pair was being generated.		
7	95 78	The host command could not be executed because data copy was on progress.		

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Sense key	Sense code	Description	Recovery methods	Reference page
5	95 79	The host command could not be executed because the primary volume was write-protected.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting “7.3 Collecting simple trace” (TRBL 07-0040)
5	95 7A	The host command could not be executed because the pair status is PSUE (suspended due to failure).		
5	95 7B	The command could not be executed between the devices because the pair status was invalid.		
5	95 7C	The command could not be executed between the devices because the remote device was already paired with another device.		
5	95 7D	The command issued by a DF to another DF cannot be executed because the limit of the inflow has been exceeded.		
5	95 7E	The command issued by a DF to another DF cannot be executed because a status of the pair formed by the ShadowImage in-system replication is invalid.		
5	95 80	The command cannot be executed because the command from RAID Manager is being received.		
B	95 81	Any further processing cannot be executed because the SEL command is received consecutively.	Execute it again after waiting for a while.	–
5	95 91	The setting of or reference to the pairs, number of which exceeds the allowable maximum value, was attempted.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting “7.3 Collecting simple trace” (TRBL 07-0040)
7	95 95	The write command could not be executed because the fence level was data.		
5	95 96	The read command could not be executed because the concealment mode was turned on for the remote copy function.		
7	95 97	The write command could not be executed because the secondary volume was in the paired status in the remote copy function.		
7	95 98	The write command could not be executed due to the restriction on the secondary volume access in the remote copy function.		
4	95 99	The pair status transited to PSUE because the write command failed duplicate write.		
2	95 9A	The vendor unique command cannot be executed in order to avoid a deadlock owing to a duplex writing.		
2	95 9B	The read/write command cannot be executed because the read access mode is “Enable” when the fence level is "data."		
5	96 00	Storage Navigator Modular command sequence error (Another command is being executed in the disk array subsystem.)		
5	96 01	The setting was made for a host group other than 0.		

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Sense key	Sense code	Description	Recovery methods	Reference page
5	96 02	The command could not be executed because locking or unlocking operation for the feature other than purchasable optional features was attempted.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	96 03	The command could not be executed because locking or unlocking operation for the feature other than purchasable optional features was attempted.		
5	96 04	Writing of the system parameters on five drives failed.		
5	96 05	The execution could not be done because the LU concerned was concealed.		
5	96 07	The execution could not be done because the pair was a Copy-on-write SnapShot pair.		
5	96 08	The pair operation command issued by RAID Manager could not be executed.		
2	96 09	The pair operation command cannot be executed from RAID Manager. (Waiting for a command to be retried from RAID Manager.)		
5	96 0A	The command could not be executed because the LU was that in the pool filed.		
5	96 0B	The pool management filed is invalid.		
5	96 0C	The command could not be executed because a reading was prohibited.		
5	96 0D	A reading in an S-VOL was attempted when the pair status was special PSUE, however, it failed.		
5	96 11	The access level could not be changed.		
5	96 12	The execution was impossible because the Format was in progress.		
5	96 13	The execution was impossible because the access level had been specified.		
7	96 14	The write command could not be executed because the LU forming the Copy-on-write SnapShot pair was in the status in which writing to it was prohibited.		
7	96 15	The LU could not be formatted because it formed a Copy-on-write SnapShot pair.		
5	96 16	No pair formation enabled because more than 33 pairs existed in the same group ID with the specified group ID.		
5	96 17	The RG (RAID group) could not be defined because a RAID level specified for the RG was RAID 0.	Specify a RAID level other than RAID 0.	–
5	96 18	The execution was impossible because the status of the LU concerning the parity correction was Unrestored or Unrestored 2.	Retry after issuing an instruction to make or skip the parity correction using the Storage Navigator Modular.	–
5	96 19	The command of the Juke Box function could not be executed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)

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Sense key	Sense code	Description	Recovery methods	Reference page
5	96 1A	The execution was impossible because the restoration for the LU by means of parity was undone, undone 2, in progress, or on standby.	Issue an instruction to make or skip the parity correction using the Storage Navigator Modular and retry after the restoration for the LU by means of parity is completed or skipped.	Troubleshooting "< Procedure given in windows >" (TRBL 06-0250)
7	96 1B	A command was issued to an inaccessible area while the forced parity correction, which was made with the subsystem power turned on, was in progress.	Execute the forced parity correction or skip it.	
5	96 1C	The ShadowImage in-system replication pair operation could not be executed.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	96 1D	The RG (RAID group) could not be defined because the specified RG included both of the FC and SATA drives.	Make sure of the operation and try again.	–
B	96 1E	A response with a notification that the status had been changed to special PSUE was made during execution of the R/W command.	Retry the execution of the command.	–
5	96 1F	It cannot be executed due to the Hi-Copy pair.	Execute it again after releasing the Hi-Copy pair.	–
5	96 20	The Hi-Copy operation cannot be executed.	Check the status of the subsystem on the other side.	–
1	96 25	The priced option of "Modular Volume Migration" became enabled from disabled.	–	–
1	96 26	The priced option of "Modular Volume Migration" became disabled from enabled.	–	–
1	96 27	The locked priced-option of "Modular Volume Migration was unlocked.	–	–
1	96 28	The priced option of "Modular Volume Migration", which was unlocked and enabled, was locked.	–	–
1	96 29	A copy of the Modular Volume Migration started from the RAID Manager but it could not be executed.	–	–
4	97 00	A copy job of Copy-on-write SnapShot terminated abnormally.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	97 01	A restoration job of Copy-on-write SnapShot terminated abnormally.		
4	97 02	The status of the Copy-on-write SnapShot pair was changed to PSUE.		
4	97 03	The status of the Copy-on-write SnapShot pair was changed to PSUE because the restoration failed.		
4	99 00	Data in the cache cannot be written on the drive in a synchronized cache.		
5	99 01	The command (R.M command) was issued to the remote subsystem by the command of the RAID Manager, but the time-out of the retry of the command occurred.	Execute it again after waiting for a while.	
4	9A 01	The DMA (DRR) hardware error was detected during a diagnosis of Disk Drives.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)

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Sense key	Sense code	Description	Recovery methods	Reference page
5	9F FF	A sense key and sense code to be used exclusively for responding to Storage Navigator Modular and RAID Manager.	Take a recovery action referring to "9.2List of detail codes of sense code (05/9FFF)".	"9.2 List of detail codes of sense code (05/9FFF)" (MSG 09-0190)
4	A0 00	A failure occurred in the cache circuit.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
B	A1 00	An invalid boundary error occurred during DMA transfer.		
B	C0 00	A time-out occurred during an internal processing or data transfer.		
B	C0 01	A time-out occurred during a data transfer between a host computer.		
B	C0 02	A time-out occurred during communication between the Controllers.		
B	C0 03	A time-out occurred during a data transfer between a host computer.		
B	C0 04	A time-out of the Formatting job generated by the read command was detected.		
B	C0 04	A time-out of the Formatting job generated by the write command was detected.		
B	C0 05	The command was terminated abnormally due to another Control Unit failure.		
B	C0 06	A segment securing waiting time-out occurred.	–	–
B	C0 0A	A CRC error occurred during a data transfer between a host computer.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
B	C1 00	The cache necessary for the formatting cannot be assigned.		
B	C2 00	The system current drive was changed		
B	DA 00	The new data recovery request cannot be accepted because another Disk Drive is being recovered		
6	E0 00	The Cache battery voltage decreased.	–	–
6	E2 00	FAN STOP		
4	E4 00	The system area overflowed(*1). (Pinned data management area)	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
6	E5 00	Abnormality of the power supply section occurred.	–	–
6	E5 01	The DC voltage decreased.		
6	EA 00	There was a Disk Drive on which the take-over information could not be written.		
4	EA 01	The program size which the write buffer received was larger than that of the program area.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	EA 02	The take-over information size which the write buffer received was larger than that of the take-over information of the system.		

*1 : In the case where WAR = 1 in the Mode Select command when reporting the sense code to a host, Sense key: 4/ Code: "F8 04_H" are also reported.

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Sense key	Sense code	Description	Recovery methods	Reference page
5	EA 03	A microprogram download error was detected.	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
5	EA 04	An error was detected when the hot replacement of the microprogram was directed.		
1	EA 05	A microprogram installation is in the state in which it has been partially completed.		
4	EA 10	An error in the microprogram downgrade check.		
5	EA 13	An error in the microprogram upgrade check.		
5	EA 15	A downgrade was made though a specification for the random simple buffer size as 0% was validated.		
5	EA 16	Downgrade of the microprogram was performed when 16 or more Spare Disk Drives were used.	Reduce the number of the spare disk drives to 15 or less.	–
5	EA 17	Downgrade of the microprogram was performed when the FC and SATA disk array units coexisted.	Make the system configuration have the FC disk array unit only. (A configuration with the SATA disk array unit only is not supported.)	–
5	EA 1A	A system version check error occurred in the microprogram download.	Use the microprogram corresponding to the subsystem and do the update installation of the microprogram again.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
5	EA 1B	Because RAID 6 is defined, the downgrade to lower than microprogram version 0720 cannot be performed.	Delete RAID 6 when downgrading to lower than microprogram version 0720.	–
5	EA 1C	Because the DF700 chassis is connected, the downgrade to lower than microprogram version 0720 cannot be performed.	Remove the DF700 chassis when downgrading to lower than microprogram version 0720.	–
5	EA 1D	Because 2 G bytes DIMM is installed, the downgrade to lower than microprogram version 0720 cannot be performed.	Remove 2 G bytes DIMM when downloading to lower than microprogram version 0720.	–
5	EA 1E	Because the NAS OS is operating, the microprogram cannot be replaced by the update installation.	Replace the microprogram after stopping the NAS OS.	Microprogram "Chapter 1. Installation of Microprogram" (MICRO 01-0000)
5	EA 1F	Because the NAS OS is operating, the command with the reboot of the Control Unit cannot be executed.	Execute the operation again after stopping all NAS OS.	–
5	EA 30	The online ENC firmware downloading or online ENC firmware replacement cannot be executed because of the loop trouble or the Single mode.	Execute the online ENC firmware downloading or online ENC firmware replacement after the loop trouble is solved.	–
5	EA 31	The command cannot be executed because the online ENC firmware replacement is in progress.	Execute the command after the online ENC firmware replacement is completed.	–
5	EA 32	The online ENC firmware downloading cannot be done.	Execute the online ENC firmware downloading again.	–
5	EA 33	A revision check error of the online ENC firmware downloading occurred.	Check the revision of the ENC firmware again and re-execute the online ENC firmware downloading.	–

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Sense key	Sense code	Description	Recovery methods	Reference page
5	EA 34	A sum check error of the online ENC firmware downloading occurred.	Check the ENC firmware again and re-execute the online ENC firmware downloading.	–
5	EA 35	The online ENC firmware replacement cannot be made because the online ENC firmware downloading has not been done yet.	Make the online firmware replacement after executing the online ENC firmware downloading.	–
5	EA 36	The parameter of the online ENC firmware replacement is incorrect.	Make the online ENC firmware replacement again.	–
5	EA 40	Since the automatic ENC microprogram download function is enabled, the command cannot be executed.	Disable the option and execute the command again.	–
5	EA 41	Since the automatic ENC microprogram download is executing, the command cannot be executed.	Execute the command at the time of the automatic download.	–
5	EB 10	The information on the traceability cannot be set.	–	–
4	F4 00	The cache module was blocked because a Cache memory error occurred.	Replace the Cache Unit.	Replacement “2.2.6 Replacing Cache Unit” (REP 02-0540)
4	F6 10	A Disk Drive emerged in which the number of recovered mechanical errors exceeded the threshold value(*1).	Replace the Disk Drive.	Replacement “2.2.1 Replacing Disk Drive” (REP 02-0050)
4	F6 11	A Disk Drive emerged in which the number of unrecovered mechanical errors exceeded the threshold value(*1).		
4	F6 20	A Disk Drive emerged in which the number of recovered medium errors exceeded the threshold value(*1).		
4	F6 21	A Disk Drive emerged in which the number of unrecovered medium errors exceeded the threshold value(*1).		
4	F6 30	A Disk Drive emerged in which the number of recovered R/W errors exceeded the threshold value(*1).		
4	F6 31	A Disk Drive emerged in which the number of unrecovered R/W errors exceeded the threshold value(*1).		
4	F6 40	A Disk Drive emerged in which the number of recovered interface errors exceeded the threshold value(*1).		
4	F6 41	A Disk Drive emerged in which the number of unrecovered interface errors exceeded the threshold value(*1).		
4	F6 50	A Disk Drive emerged in which the number of recovered hardware errors exceeded the threshold value(*1).		
4	F6 51	A Disk Drive emerged in which the number of unrecovered hardware errors exceeded the threshold value(*1).		

*1 : In the case where WAR = 1 in the Mode Select command when reporting the sense code to a host, Sense key: 4/ Code: “F8 04_H” are also reported.

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Sense key	Sense code	Description	Recovery methods	Reference page
4	F6 70	A Disk Drive emerged in which the number of correctable errors in the online verify exceeded the threshold value(*1).	Replace the Disk Drive.	Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
4	F6 71	A Disk Drive emerged in which the number of uncorrectable errors in the online verify exceeded the threshold value(*1).		
4	F8 00	Battery failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Backup Battery Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
4	F8 01	Fan failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Fan Assembly.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.3 Replacing Fan Assembly" (REP 02-0300)
4	F8 02	DC failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Power Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)
4	F8 03	Drive failure (regression)(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Disk Drive.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
4	F8 04	Pin data over(*1)	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	F8 05	Module blockade(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Cache Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
4	F8 07	AC LINE/INBOX failure	Specify a part to be replaced by checking the log message of the subsystem and replace the Power Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.4 Replacing Power Unit" (REP 02-0340)

*1 : In the case where WAR = 1 in the Mode Select command when reporting the sense code to a host, Sense key: 4/ Code: "F8 04_H" are also reported.

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Sense key	Sense code	Description	Recovery methods	Reference page
4	F8 08	UPS failure	Specify a part to be replaced by checking the log message of the subsystem. When the UPS is connected, take a recovery action referring the UPS manual. (If a sense code, "FB F2", is displayed at the same time, take an action following the recovery procedure corresponding to it first.)	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.1 Locations of Replacement Components" (REP 02-0000)
4	F8 09	Battery backup circuit failure	Specify a part to be replaced by checking the log message of the subsystem and replace the Backup Battery Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
4	F8 0A	ENC blockade	Specify a part to be replaced by checking the log message of the subsystem and replace the ENC Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
4	F8 0B	Loop failure	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	F8 0C	A path detachment occurred.	Replace the LOOP.	
4	F8 0D	SATA Drive failure (regression)	Specify a part to be replaced by checking the log message of the subsystem and replace the Disk Drive.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.1 Replacing Disk Drive" (REP 02-0050)
4	F8 0E	SENC failure	Specify a part to be replaced by checking the log message of the subsystem and replace the ENC Unit/SENC Unit.	Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100) Replacement "2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
4	F8 F0	The controller of another system was blocked(*1).	Get the CTL alarm trace of the detached Control Unit and replace the Control Unit.	Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080) Refer to Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
4	F8 F1	Host connector failure	Collect Simple trace and request the Technical Support Center to analyze the failure and take a measure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)

*1 : The sense code is reported to the host only when WAR = 1 in the Mode Select command (page35$_H$).

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Sense key	Sense code	Description	Recovery methods	Reference page
4	F9 00	Battery failure recovery(*1)	This is not failure. If this error code frequently appears, collect Simple trace and request the Technical Support Center to analyze the failure.	Troubleshooting "7.3 Collecting simple trace" (TRBL 07-0040)
4	F9 01	Fan failure recovery(*1)		
4	F9 02	DC failure recovery(*1)		
4	F9 03	Drive failure (regression) recovery(*1)		
4	F9 04	Pin data over recovery(*1)		
4	F9 05	Module blockade release(*1)		
4	F9 06	Own Controller recovery(*1)		
4	F9 07	AC LINE/INBOX recovery		
4	F9 08	UPS failure recovery		
4	F9 09	Battery backup circuit failure recovery		
4	F9 0A	ENC failure recovery		
4	F9 0B	Loop failure recovery		
4	F9 0C	The path recovered from the detachment.		
4	F9 0D	SATA Drive failure (regression) recovery		
4	F9 0E	SENC failure recovery		
4	F9 F0	Another system Controller failure recovery(*1)		
4	F9 F1	Host connector failure recovery		
B	FD 00	Command execution was disabled because the LU was switched.		
B	FD 01	The command execution was interrupted owing to an LU switching.		

*1 : The sense code is reported to the host only when WAR = 1 in the Mode Select command (page35$_H$).

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9.2 List of detail codes of sense code (05/9FFF)

Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
010001	DMED010001: The same host group name exists in a port. Confirm the host group name and then try again.	Check if the host group name that has been entered is correct.	–
010002	DMED010002: The same WWN name exists in a port. Confirm the WWN name and then try again.	Check if the WWN nickname that has been entered is correct.	–
010003	DMED010003: WWN cannot be assigned to an undefined host group. Specify a defined host group and try again.	Check if the host group name to which the WWN has been assigned is actually the same as that to which you want to assign the WWN.	–
010004	DMED010004: The function cannot be executed because host group security on some port is set to enabled. Set host group security to disable on all ports and try again.	Disable the host group security of the LUN Manager function for all ports, and then lock or disable the LUN Manager function.	–
010005	DMED010005: The process cannot be performed because the target security on some port is set to enabled. Please set the target security to disable on all ports and try again.	Lock the LUN Manager function or disable the status after disabling all the Enable/Disable flags of the LUN Manager per iSCSI port in the LUN Manager function.	–
010006	DMED010006: The process cannot be performed because the specified name is default name of host group 0. Please confirm the name and try again.	Give the name other than G000 to the host group 1 or later.	–
020001	DMED020001: The value of Dirty Data Opportunity is outside the effective range. Specify the value in the effective range and try again.	Specify the trigger for de-staging dirty data as one of integers ranging from 1 to 50 and smaller than a trigger for stopping the de-staging of the dirty data.	–
020002	DMED020002: The value of Dirty Data Stop Opportunity is outside the effective range. Specify the value in the effective range and try again.	Specify the trigger for stopping the de-staging of dirty data as one of integers ranging from 0 to 49 and larger than a trigger for de-staging the dirty data.	–
020003	DMED020003: The value of Dirty Data Opportunity is equal to or less than value of Dirty Data Stop Opportunity. Specify the value and try again.	Specify the trigger for de-staging dirty data as an integer larger than the trigger for stopping the de-staging of the dirty data.	–
020004	DMED020004: Prefetch Starting Opportunity is outside the effective range. Specify the value of effective range and try again.	Specify the trigger for starting the pre-fetch as one of integers ranging from 0 to 100.	–
020005	DMED020005: LU number is outside the effective range. Specify the LU number of effective range and try again.	Specify the default LUN of the performance tuning parameter as one of integers ranging from 0 to 2047.	–
020006	DMED020006: Reserved Random Simple Buffer Size is outside the effective range. Specify the value of effective range and try again.	Specify the size of the Reserved Random Simple Buffer as one of integers ranging from 0 to 100.	–
020007	DMED020007: The process failed due to an invalid parameter of Random Simple Buffer Size 0% Mode. Confirm the specified parameter.	Specify the size within the effective range.	–
020008	DMED020008: Prefetch Count is outside the effective range. Specify the value in the effective range and try again.	Specify the size within the effective range.	–
020009	DMED020009: Prefetch Size is outside the effective range. Specify the value in the effective range and try again.	Specify the size within the effective range.	–
02000A	DMED02000A: The process failed due to an invalid parameter of Next Prefetch Opportunity Mode. Confirm the specified parameter.	Specify the size within the effective range.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
020010	DMED020010: Count of Judgment Sequential is outside the effective range. Specify the value in the effective range and try again.	Specify a value that falls within a valid range.	–
020011	DMED020011: Prefetch Size of Base is outside the effective range. Specify the value in the effective range and try again.	Specify a value that falls within a valid range.	–
020012	DMED020012: Prefetch Size of Fixed is outside the effective range. Specify the value in the effective range and try again.	Specify a value that falls within a valid range.	–
040001	DMED040001: The specified LUs contain Sub LU. Confirm the LU status and try again.	When formatting the unified LU, specify the Main LU.	–
050001	DMED050001: The process cannot be performed, because the specified LU is having PIN data or is in a PIN exceeded state. Restore PIN data and try again.	The processing cannot be executed because PIN exists or the number of PIN segments exceeded the PIN threshold value. Execute the processing again after deleting the PIN segments of the specified LUs.	–
050002	MED050002: The process cannot be performed because cache segment is insufficient. Wait for a while and then try again.	Perform the same operation again after waiting for a while.	–
050003	DMED050003: The process cannot be performed because the specified LU is receiving the Write command continuously from the host. Wait for a while and then try again.	Perform the same operation again after waiting for a while.	–
050004	DMED050004: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Retry after eliminating the Turbo or reserved Turbo LU.	–
050005	DMED050005: The process cannot be performed because the partition of necessary conditions for LU changing does not exist. Please confirm the partition definition and try again.	Check the partition number that was specified. Check if the capacity of the specified partition is larger than that of the LU. Check if the segment size is the same. Retry after eliminating the pinned segment of the specified LU or the partition to which the switching was made referring to Troubleshooting “Chapter 6 Details of Recovery Procedures”.	Troubleshooting “Chapter 6. Details of Recovery Methods” (TRBL 06-0000)
050006	DMED050006: The process cannot be performed because the directory configuration is changing. Please wait for a while and then try again.	Perform the operation again after determining the Cache partition change (the re-start-up).	–
050007	DMED050007: The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.	Perform the operation again.	–
050008	DMED050008: The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.	Perform the operation again	–
050009	DMED050009: The LU change could not be performed.	Perform the same operation again after waiting for a while.	–
05000A	DMED05000A: The process cannot be performed because the controller is detached. Please recover the controller status and then try again.	Perform the operation again	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
070002	DMED700002: The specified IP address is incorrect. Please specify a right IP address	Set a correct IP address.	–
070006	DMED070006: When the ShadowImage pair of a S-VOL Switch status exists the ShadowImage I/O Switch Mode cannot be disabled. Please retry after solving the error.	Turn off the ShadowImage I/O Switching mode after the pair in the special PSUE status disappears.	–
070007	DMED070007: The configuration of single or dual controller system cannot be changed because Cache Partition Manager is enabled. Please change Cache Partition Manager to de-installed or disabled and try again.	Perform the operation after invalidating or locking the of Cache Partition Manager which is an onerous option.	–
070008	DMED070008: The process cannot be performed because the specified port number is outside the effective range. Please confirm the port number.	Specify the correct (enable) TCP/IP port number.	–
070009	DMED070009: The port number of other controller cannot be set up. Please confirm the controller number.	Connect it to the Control Unit side which wants to be updated, and execute it again.	–
080001	DMED080001: The data pool cannot be used. Please restart the subsystem.	Restart(*1) the disk array subsystem.	–
080005	DMED080005: The specified logical unit number is outside of the effective range. Specify the logical unit number within the range and try again.	Specify an integer within the range of 0 to 2047 for the number of the LU to be assigned to the data pool.	–
080006	DMED080006: The process cannot be performed because the specified logical unit is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.	The status of the specified LU is neither normal nor regressed. Correct the status of the specified LU, and then assign the LU to the data pool.	–
080007	DMED080007: The process cannot be performed because the RAID level or HDU combination of the specified logical unit is not supported. Confirm the RAID level and the HDU combination currently supported and try again.	Make sure of the RAID level of the specified LU and assign an LU, whose RAID level is other than RAID 0, to the data pool.	–
080008	DMED080008: The process cannot be performed because the number of logical units in the data pool reached the maximum. Delete the logical units in the data pool and then try again.	The 64 LUs have been assigned to the data pool. Make the assignment over again after canceling the assignment of all the LUs to the data pool.	–
080009	DMED080009: The process cannot be performed because the specified logical unit is a unified LU. Separate the unified LU and try again.	Dissolve the unification of the specified LU, and then assign the LU to the data port.	–
08000A	DMED08000A: The process cannot be performed because the specified logical unit is a part of ShadowImage pair. Cancel the ShadowImage pair and try again.	Split the specified LU from the ShadowImage in-system replication pair, and then assign it to the data pool.	–
08000B	DMED08000B: The process cannot be performed because the specified logical unit is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.	Split the specified LU from the TrueCopy remote replication or TrueCopy Extended Distance pair, and then assign it to the data pool.	–
08000C	DMED08000C: The process cannot be performed because the specified logical unit is a command device. Cancel the command device and try	Release the specified LU from the command device, and then assign it to the data pool.	–
08000D	DMED08000D: The process cannot be performed because the specified logical unit has been invalidated. Restore the logical unit and try again.	Restoration the specified LU, and then assign it to the data pool.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
08000E	DMED08000E: The process cannot be performed because the specified logical unit is a part of Snapshot pair. Cancel the SnapShot pair and try again.	Split the specified LU from the Copy-on-write SnapShot pair, and then assign it to the data pool.	–
080010	DMED080010: The process cannot be performed because the specified logical unit is added to a data pool. Specify another logical unit and try again.	The specified LU has already been assigned to the data pool. Check the LU structure.	–
080012	DMED080012: The process cannot be performed because the owner controller is different between the specified logical unit and the data pool. Confirm the logical unit owner controller and try again.	Change the controller that controls the specified LU, and then assign the LU to the data pool again.	–
080016	DMED080016: The process cannot be performed because the specified logical unit is not enough for sufficient cache blocks. Specify another logical unit and try again.	The size of the specified LU is too large. Check the LU structure and specify an LU whose size is appropriate and enables the LU to be assigned to the data pool.	–
080017	DMED080017: The process cannot be performed because no logical units in data pool.	Check if the specified data pool is the one from which you want to eliminate all the Lus. Also check whether all the Lus have already been eliminated from it or not.	–
080018	DMED080018: The process cannot be performed because the Snapshot pair exists in the specified data pool. Cancel the Snapshot pair and try again.	Perform the elimination after eliminating all the Snapshot images.	–
08001B	DMED08001B: The specified threshold is outside of the effective range. Specify the value of effective range and try again.	Specify the threshold value for the data pool as an integer within a range of 50 to 80 %.	–
08001D	DMED08001D: The process cannot be performed because S-VOL mode of the specified logical unit is disabled. Set S-VOL mode to enable then try again.	Invalidate the S-Vol disable mode and make the setting again.	–
08001F	DMED08001F: The number of specified logical units is over 64. Please specify the logical units in 64 or less.	Specify Lus less than the maximum number 64 of the pool Lus.	–
080020	DMED080020: The process cannot be performed because the drive type of specified logical unit is different from the data pool. Please confirm the drive type and try again.	Specify the LU on the drive of the same type and execute it again.	–
080021	DMED080021: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Release the Turbo LU of the LU specified for the pool LU, and execute it again.	–
080022	DMED080022: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Release the Turbo LU of the LU specified for the pool LU, and execute it again.	–
080024	DMED080024: The process cannot be performed because DM-LU is not defined. Please define DM-LU and then try again.	Retry after setting the DM-LU.	–
080025	DMED080025: The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please specify another logical unit and try again.	Retry after settling the cache partition change (rebooting the subsystem).	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
090001	DMED090001: The logical unit number of specified P-VOL is outside of the effective range. Specify the logical unit number of effective range and try again.	Specify the LUN for the P-VOL as an integer within a range of 0 to 2047.	–
090003	DMED090003: The logical unit number of specified Snapshot image is outside of the effective range. Specify the logical unit number of effective range and try again.	Specify the LUN for the Snapshot image as an integer within a range of 0 to 2047.	–
090006	DMED090006: The process cannot be performed because the specified logical unit of the P-VOL is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.	A status of the LU assigned to the P-VOL is neither normal or regressed. Correct the status of the LU, and then assign the LU to the P-VOL.	–
090007	DMED090007: The process cannot be performed because no logical unit exists in the data pool by the side of the controller of specified P-VOL. Add the logical unit to the data pool and try again.	Set the Snapshot image again after changing the Controller that controls the LU assigned to the P-VOL.	–
090008	DMED090008: The process cannot be performed because the RAID level or HDU combination of the specified logical unit differs from the logical unit is not supported. Confirm the RAID level and the HDU combination currently supported and try again.	Check the RAID level of the LU assigned to a P-Vol and specify an LU whose RAID level is other than RAID 0.	–
090009	DMED090009: The process cannot be performed because the number of created Snapshot Image for the specified P-VOL has reached its maximum. Delete unnecessary Snapshot Image and try again.	Check the structure of the Snapshot images, eliminate unnecessary ones of Snapshot images, and then retry.	–
09000A	DMED09000A: The logical unit number has already been defined. Specify a new number.	The specified LUN already exists. Check the LU structure, and set the Snapshot image.	–
09000B	DMED09000B: The process cannot be performed because the specified P-VOL is a unified LU. Separate the unified LU and try again.	Dissolve the unification of the LU assigned to the P-VOL, and then set the Snapshot image.	–
09000C	DMED09000C: The process cannot be performed because the specified P-VOL is a part of ShadowImage pair. Cancel the ShadowImage pair and try again.	Split the LU assigned to the P-VOL from the ShadowImage in-system replication pair, and then set the Snapshot image.	–
09000E	DMED09000E: The process cannot be performed because the specified P-VOL is a part of Snapshot pair. Cancel the Copy-on-write Snapshot pair and try again.	Split the LU assigned to the P-VOL from the Snapshot pair, and then set the Snapshot image.	–
09000F	DMED09000F: The process cannot be performed because the specified P-VOL is a command device. Cancel the command device and try again.	Release the LU assigned to the P-VOL from the command device, and then set the Snapshot image.	–
090010	DMED090010: The process cannot be performed because the specified P-VOL is invalid. Restore the LU and try again.	Set the Snapshot image after restoring the LU assigned to the P-VOL.	–
090011	DMED090011: The process cannot be performed because the specified P-VOL has already been added to a data pool. Specify another LU number and try again.	Check the LU structure and specify an LU that has not been assigned to the data pool as the P-VOL.	–
090012	DMED090012: The process cannot be performed because the specified P-VOL is not enough for sufficient cache capacity. Check cache capacity and try again.	A size of the LU assigned to the P-VOL is too large. Check the LU structure and specify an LU whose size is appropriate and enables the LU to be assigned to the P-VOL.	–
090018	DMED090018: The process cannot be performed because the specified Snapshot image has been creating the pair. Cancel the SnapShot pair and try again.	Split the pair of the specified Snapshot image, and then perform the elimination again.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
090019	DMED090019: The process cannot be performed because P-VOL is under deletion. Wait for a while and then try again.	Eliminate the Snapshot image again after waiting for a while.	–
09001B	DMED09001B: The process cannot be performed because the number of Snapshot pair reached the maximum. Delete unnecessary Snapshot pair(s) and try again.	Check the number of pairs (number of P-Vols), dissolve unnecessary pairs, and set the Snapshot image again.	–
09001C	DMED09001C: The process cannot be performed because the unified LU is composed of 17 or more sub logical units. Specify another logical unit and try again.	Specify a unified LU number of whose sub-LUs is 16 or less.	–
09001D	DMED09001D: The process cannot be performed because the unified LU contains a sub logical unit whose size is under 1GB.	Specify a unified LU consisting of main and sub-LUs whose respective size is 1 Gbyte or larger.	–
09001E	DMED09001E: The process cannot be performed because a management area of Snapshot is shortage. Delete unnecessary Snapshot pair(s) and try again.	Delete V-VOL after performing pairsplit-S when VOL, which is using the differential bit map, is a Copy-on-write SnapShot pair. Perform pairsplit-S when VOL, which is using the differential bit map, is ShadowImage in-system replication, TrueCopy remote replication or TrueCopy Extended Distance.	–
090020	DMED090020: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Release the Turbo LU of the LU specified for the P-VOL, and execute it again.	–
090021	DMED090021: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Release the Turbo LU of the LU specified for the P-VOL, and execute it again.	–
090022	DMED090022: The process cannot be performed because the specified Snapshot image is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.	Execute it again after canceling the TrueCopy remote replication or TrueCopy Extended Distance pair.	–
090024	DMED090024: The process cannot be performed because the P-VOL of specified Snapshot image is reserved for cache partition modification. Please retry after cache partition modification is completed.	Retry after settling the cache partition change (rebooting the subsystem).	–
0A0001	DMED0A0001: The process cannot be performed because the specified LU is invalid. Restore the LU and try again.	Specify a correct (valid) LU.	–
0A0002	DMED0A0002: The process cannot be performed because the specified LU is a Sub LU of the unifying LUs. Separate the unified LU and try again.	Specify a correct (valid) LU.	–
0A0003	DMED0A0003: The process cannot be performed because the specified LU is S-VOL of ShadowImage. Specify another logical unit and try again.	Specify a correct (valid) LU.	–
0A0004	DMED0A0004: The process cannot be performed because the specified LU is S-VOL of TrueCopy. Specify another logical unit and try again.	Specify a correct (valid) LU.	–
0A0005	DMED0A0005: The process cannot be performed because the specified LU is Snapshot image. Specify another logical unit and try again.	Specify a correct (valid) LU.	–
0A0006	DMED0A0006: The process cannot be performed in the retention term. The retention term expires and try again.	Make the setting of the access level again after canceling the setting of the retention period.	–
0A0007	DMED0A0007: The process cannot be performed because ShadowImage is in progress. Please wait a moment and then try again.	Make the setting of the access level again after the reverse resynchronization is completed.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
0A0008	DMED0A0008: The process cannot be performed because Snapshot is in progress. Please wait a moment and then try again.	Make the setting of the access level again after the restore is completed.	–
0A0009	DMED0A0009 : The retention term cannot be shortened. Specify the retention term is equal to or more than current value and try again.	Make the setting of the access level again after specifying the correct retention period.	–
0A000A	DMED0A000A : The process cannot be performed because expiration lock is enabled. Set expiration lock to disable and try again.	Make the setting of the access level again after invalidating the Audit Lock.	–
0A000B	DMED0A000B: The process cannot be performed because the status of ShadowImage pair is not SMPL or PSUS. Please retry after changing the status of pair.	Specify the correct (enable) LU.	–
0A000C	DMED0A000C: The process cannot be performed because the status of TrueCopy pair is not SMPL or PSUS. Please retry after changing the status of pair.	Specify the correct (enable) LU.	–
0A000D	DMED0A000D: The process cannot be performed because the status of Snapshot pair is not PSUS. Please retry after changing the status of pair.	Specify the correct (enable) LU.	–
0B0001	DMED0B0001: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Make the Command device registration again after changing the access level to the normal mode.	–
0C0001	DMED0C0001: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Make the integration of LU again after changing the access level to the normal mode.	–
0C0002	DMED0C0002: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Make the separation of LU again after changing the access level to the normal mode.	–
0C0003	DMED0C0003: The unification cannot be performed because the drive type is different. Please confirm the drive type and try again.	Specify the LU on the drive of the same type and execute it again.	–
0C0005	DMED0C0005: The process cannot be performed because the unified LU reached the maximum.	The number of unified LUs cannot be more the 128.	–
0C0006	DMED0C0006: The unification cannot be performed because the cache partition is different. Please confirm the cache partition of the specified logical unit.	LUs that belongs to different partitions cannot be unified.	–
0C0007	DMED0C0007: The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please retry after changing the cache partition, or specify another logical unit.	Perform the operation after fixing a partition to which the logical unit belongs.	–
0D0001	DMED0D0001: The process cannot be performed because the access level is set up to ReadOnly or Protect. Please change the attribute to Read/Write, and try again.	Make the setting of Priced Optional Features again after changing the access level to the normal mode.	–

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0D0002	DMED0D0002: The process cannot be performed because the temporary key cannot be used for the next 180 days after it is locked or expired.	Retry 180 days later.	–
0D0003	DMED0D0003: The specified function has already been unlocked.	The unlocking cannot be done with the temporary key.	–
0E0001	DMED0E0001: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Retry after changing the access level to the normal mode.	–
0F0001	DMED0F0001: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Make the delete of RAID group again after changing the access level to the normal mode.	–
0F0002	DMED0F0002: The process cannot be performed because the drives of Unit0 and the latter units are contained within the range of the specified RAID group.	Execute again by specifying the drive of the same type.	–
0F0003	DMED0F0003: The process cannot be performed because the non-supported drive on this subsystem are contained within the range of the specified RAID group.	Specify the drive for the subsystem concerned.	–
0F0004	DMED0F0004: The function cannot be used because it is not installed, locked, or disabled.	Retry after opening or unlocking the key of RAID 6.	–
0F0005	DMED0F0005: The process cannot be performed because the number of drive is incorrect. Please confirm the mounted drive and try again.	Retry after specifying the RAID width as the number of installed drives.	–
0F0006	DMED0F0006: The RAID group is already defined in the specified drive. Please specify another drive and try again.	Retry after specifying a number of a drive for which a RAID group has not been defined.	–
0F0007	DMED0F0007: The number of defined RAID group reached the maximum. Delete unnecessary RAID groups and then try again.	No more RAID groups can be defined because the number of defined RAID groups has reached the maximum.	–
100001	DMED100001: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	Retry after changing the access level to the normal mode.	–
100005	DMED100005:The preparations of quick formatting are incomplete. Please retry after waiting for a while.	Retry after waiting for a while.	–
100006	DMED100006: The process cannot be performed because the specified logical unit contain an un-mounted drive or a blocked drive. Confirm the drive status and try again.	Execute the quick format after installing or normalizing the drive in the RAID Group belonging to the specified LU.	–
100007	DMED100007: Format of the logical unit cannot be performed under drive blockage mode. Please turn off the drive blockade mode system parameter.	Execute the quick format after turning off the drive blockade mode of the system parameter.	–
110001	DMED100001: The mapping mode cannot be changed because the mapping guard LU exists.	When changing the mapping mode to OFF, take all the LU mapping guards OFF.	–
110002	DMED100002: The mapping information cannot be changed because the mapping guard LU exists.	Change the LU mapping after the LU mapping guard is taken OFF.	–
120001	DMED120001: The specified drive cannot be defined as a spare drive because it is not supported on this subsystem.	Specify the drive for the subsystem concerned.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
130001	DMED130001: The process cannot be performed because the path is not set up.	Set the time-out value after the path is defined.	–
130002	DMED130002: The process cannot be performed because the specified port is iSCSI port. Please confirm the port type and try again.	Specify the FC port.	–
130004	DMED130004: The process cannot be performed because the specified Timeout Period is outside the effective range. Please confirm the Timeout Period and try again.	Check the other's serial number of the subsystem and set a time-out value within the support range.	–
140001	MED140001: The process cannot be performed because the term of the temporary key or emergency key is expired.	Unlock with the permanent key.	–
140002	DMED140002: The process cannot be performed because the DM-LU has already been set. Please cancel the DM-LU and try again.	Retry after specifying an LU other than the DM-LU.	–
150001	DMED150001: The process cannot be performed because the cache partition is not initial status. Please change the cache partition to initial status and try again.	Retry after returning the partition into the initial status.	–
150004	DMED150004: The process cannot be performed because the cache partition is less than minimum size. Please confirm the cache partition size and try again.	Change the partition size to an appropriate one.	–
150005	MED150005: The process cannot be performed because the PIN is exceeded state. Please restore PIN data and try again.	Retry after eliminating a pinned segment of the specified LU referring to Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)".	Troubleshooting "6.1.11 A failure occurred during operation : Case 1 (PIN over)" (TRBL 06-0550)
150006	DMED150006: The segment size of cache partition (0 or 1) cannot be changed.	A segment size of the master partition cannot be changed.	–
150007	DMED150007: The process cannot be performed because ShadowImage is in use. Please cancel the ShadowImage pair and try again.	Retry after dissolving the pair.	–
150009	DMED150009: The process cannot be performed because SnapShot is in use. Please cancel the SnapShot pair and try again.	Retry after dissolving the pair.	–
15000B	DMED15000B: The process cannot be performed because process of Write command from the hosts is not completed. Please wait for a while and then try again, or delete the logical unit.	Retry after eliminating the unwritten LU(s).	–
15000C	DMED15000C: The function cannot be executed because a Cache Residency LU or a reserved one exists. Disable the LU, and then try again.	Cancel the specification of the LU residence.	–
15000D	DMED15000D: The specified segment size is incorrect. Please confirm the segment size and try again.	Check the specified segment size.	–
15000E	DMED15000E: The process cannot be performed because the LU change is in progress. Please wait a moment and try again.	Retry after the change of the LU unit is completed.	–
15000F	DMED15000F: The specified cache partition number is incorrect. Please confirm the cache partition number and try again.	Specify Dir 0 for the partition #0 and Dir 1 for the partition #1.	–
150010	DMED150010: The controller of current cache partition cannot be changed. Please delete the cache partition, and set up again.	Define the LU again after eliminating it.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
150011	DMED150011: The process cannot be performed because the total size of cache partition is over the cache capacity. Please confirm the cache partition size and try again.	Change the partition size to an appropriate one.	–
150012	DMED150012: The cache partition with which the logical unit is set up, or the cache partition of 0 or 1 cannot be deleted. Please confirm the cache partition number.	Change the partition size to an appropriate one.	–
150013	DMED150013: The process cannot be performed because the specified cache partition is not defined. Please specify a defined cache partition and try again.	Specify a partition that exists.	–
150014	DMED150014: The process cannot be performed because the stripe size of logical unit is not 64KB. Please delete the logical unit and try again.	Execute it again after deleting the LU concerned.	–
150015	DMED150015: The process cannot be performed because the specified logical unit is a part of pair(TCE). Please cancel the pair(TCE) and try again.	Retry after dissolving the pair.	–
160002	DMED160002: The process cannot be performed because the specified logical unit is a Sub LU of the unifying LUs. Please separate the unified LU and try again.	A partition to which a sub-LU of a unified LU belongs cannot be changed.	–
160011	DMED160011: The logical unit cannot be allocated the specified cache partition. Please specify another cache partition number and try again.	Check a number of the specified partition. A capacity of the partition is smaller than that of the LU.	–
160012	DMED160012: The process cannot be performed because the Cache Partition Manager is not installed, locked, or disabled.	Execute it again after unlocking the PP.	–
160014	DMED160014: The process cannot be performed because the specified cache partition is not defined. Please confirm the cache partition and try again.	Specify the enable partition.	–
160015	DMED160015: The process cannot be performed because Cache Partition Manager is not installed, locked, or disabled. Please install Cache Partition Manager and try again.	Execute it again after unlocking the PP.	–
160016	DMED160016: The process cannot be performed because the specified cache partition is not defined. Please confirm the cache partition and try again.	Specify the enable partition.	–
160017	DMED160017: The process cannot be performed because the specified cache partition is set to the different controller. Please confirm the cache partition and try again.	Match the directory number.	–
160018	DMED160018: The process cannot be performed because the combination of stripe size and segment size does not match. Please confirm the stripe size or the cache partition, and try again.	Change it to the partition to which the stripe size or the segment size adapts.	–
160019	DMED160019: The process cannot be performed because the specified cache partition size is insufficient. Please confirm the cache partition and try again.	Change it to the partition whose partition size is sufficient.	–
16001E	DMED16001E: The process cannot be performed because the pair cache partition and the cache partition are set to the same controller. Please confirm the cache partition and try again.	Change the directory number.	–
16001F	DMED16001F: The process cannot be performed because the segment size does not match. Please confirm the segment size of cache partition and try again.	Change it to the partition whose segment size is equal.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
160020	DMED160020: The process cannot be performed because the specified cache partition size is insufficient. Please confirm the cache partition and try again.	Change it to the partition whose partition size is sufficient.	–
160021	DMED160021: The process cannot be performed because the LU change is in progress. Please wait for a while and then try again.	Execute it again after completing the LU unit switching.	–
160022	DMED160022: The process cannot be performed because PIN data exists. Please restore PIN data and try again.	Execute it again after deleting the PIN segment of the specified LU referring to "Troubleshooting Chapter 6 Details of Recovery Methods".	Troubleshooting "Chapter 6. Details of Recovery Methods" (TRBL 06-0000)
170001	DMED170001: The process cannot be performed because the specified logical unit is capacity less than 5GB. Specify the logical unit is equal to or more than 5GB and try again.	Specify an LU whose capacity is 5 Gbytes or larger.	–
170002	DMED170002: The process cannot be performed because the specified logical unit is RAID level 0. Specify another logical unit and try again.	Retry after specifying an LU whose RAID level is other than RAID 0.	–
170003	DMED170003: The process cannot be performed because the specified logical unit is neither in normal nor in regressed state. Specify the logical unit of normal or regressed state and try again.	Set the specified LU as an object of the differential control after relieving it of command device.	–
170004	DMED170004: The process cannot be performed because the specified logical unit is a unified LU. Separate the unified LU and try again.	Specify an LU other than a unified LU.	–
170005	DMED170005: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Specify an LU other than a Turbo LU (reserved Turbo LU).	–
170006	DMED170006: The process cannot be performed because the specified logical unit is a command device. Cancel the command device and try again.	Specify an LU that is not a command device.	–
180001	DMED180001: The specified logical unit cannot be set as Cache Residency LU because its cache partition is not 0 or 1. Please try again after changing a cache partition into 0 or 1, or specify the logical unit of the cache partition 0 or 1.	Retry after specifying an LU that belongs to the master partition or changing the specified LU to the master partition.	–
190001	DMED190001: The specified IP address is incorrect. Please specify a correct IP address.	Specify a correct IP address.	–
190002	DMED190002: The same IP address as the management LAN cannot be set up. Please specify a correct IP address.	Specify a correct IP address.	–
190003	DMED190003: The process cannot be performed because NNC or subsystem is in progress. Please wait a moment and then try again.	Make the setting again after waiting for a while.	–
190004	DMED190004: The same IP address as the maintenance LAN cannot be set up. Please specify a correct IP address.	Specify a correct IP address.	–
190005	DMED190005: The process cannot be performed because the controller is detached. Please recover the controller status and then try again.	Execute the process again after restoring the Control Unit of the other system.	–
190006	DMED190006: The process cannot be performed because NNC or subsystem is in progress. Please wait a moment and then try again.	Make the setting again after waiting for a while.	–
190007	DMED190007: The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.	Make the setting again after waiting for a while.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
190008	DMED190008: The same IP address as the NNC LAN cannot be set up. Please specify a correct IP address.	Specify a correct IP address.	–
190011	DMED190011: The process cannot be performed because the maintenance LAN automatic change mode is enabled. Please set this mode to disable and try again.	Turn off the "Maintenance Port IP Address Automatic Change Mode", and execute it again.	System Parameter "4.2 Setting the subsystem configuration information (3) Setting of LAN" (SYPR 04-0090)
1A0001	DMED1A0001: The process cannot be performed because NNC is not connected. Please connect NNC and try again.	Check the Interface Board.	–
1A0002	DMED1A0002: The specified logical unit is not defined. Please specify a defined logical unit.	Specify an LU that has been defined.	–
1A0003	DMED1A0003: The process cannot be performed because the specified logical unit is less than minimum size of System LU. Please confirm the logical unit size and try again.	Specify an LU whose size is larger than the minimum indispensable size to the system LU.	–
1A0004	DMED1A0004: The process cannot be performed because the specified logical unit is already assigned. Please specify a logical unit that is not assigned and try again.	Specify an LU that has not been mapped.	–
1A0005	DMED1A0005: The process cannot be performed because the specified logical unit is S-VOL of ShadowImage. Please specify another logical unit and try again.	Specify an LU other than the S-VOL of the ShadowImage in-system replication.	–
1A0006	DMED1A0006: The process cannot be performed because the specified logical unit is S-VOL of TrueCopy. Please specify another logical unit and try again.	Specify an LU other than the S-VOL of the TrueCopy remote replication or TrueCopy Extended Distance.	–
1A0007	DMED1A0007: The process cannot be performed because the specified logical unit is defined as a Snapshot image. Please specify another logical unit and try again.	Specify an LU other than the V-VOL of the Copy-on-write SnapShot.	–
1A0008	DMED1A0008: The process cannot be performed because the specified logical unit is added to a data pool. Please specify another logical unit and try again.	Specify an LU other than the POOL of the Copy-on-write SnapShot.	–
1A0009	DMED1A0009: The process cannot be performed because the specified logical unit is a Sub LU of the unifying LUs. Please specify another logical unit and try again.	Specify an LU other than the sub-LU of a unified LU.	–
1A000A	DMED1A000A: The process cannot be performed because the specified logical unit is the mapping guard LU. Please specify another logical unit and try again.	Specify an LU that is not guarded from the mapping.	–
1A000B	DMED1A000B: The process cannot be performed because the specified logical unit is a command device. Please specify another logical unit and try again.	Specify an LU other than the command device.	–
1A000C	DMED1A000C: The specified logical unit is not defined as a command device. Please specify a logical unit that is already defined to a command device.	For the system LU, HLU5, specify an LU other than the command device.	–
1A000D	DMED1A000D: The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.	Check the status of the NAS OS.	–
1A000E	DMED1A000E: The process cannot be performed because the specified logical unit is DM-LU. Please specify another logical unit and try again.	Specify an LU other than the DM-LU.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1A000F	DMED1A000F: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write, and set S-VOL mode to enable. When the mode is set up, please reset the mode using RAID Manager. And try again.	For the system LU, specify an LU whose access level is the normal mode.	–
1A0010	DMED1A0010: The process cannot be performed because all ports are used for NAS. Please confirm the port type.	Check the Interface Board.	–
1A0020	DMED1A0020: The process cannot be performed because System LU exists.	Specify an LU other than the system LU.	–
1A0021	DMED1A0021: The process cannot be performed because User LU exists.	Specify an LU other than the user LU.	–
1A0022	DMED1A0022: The process cannot be performed because the specified logical unit is System LU. Please release System LU and try again.	Perform an LU unification/dissolution after removing the LU from being the system LU.	–
1A0023	DMED1A0023: The process cannot be performed because the specified logical unit is User LU. Please specify another logical unit and try again.	Specify an LU other than the user LU for the sub-LU.	–
1A0024	DMED1A0024: The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.	Check the status of the NAS OS.	–
1A0025	DMED1A0025: The process cannot be performed because NAS OS is in progress. Please confirm NAS OS status and then try again.	Check the status of the NAS OS.	–
1A0026	DMED1A0026: The specified port is used for NAS. Please specify another port.	Specify an LU other than the NAS Port.	–
1A0027	DMED1A0027: The unification cannot be performed because the stripe size does not match. Please confirm the stripe size of logical unit and try again.	Specify the LU of the same stripe size.	–
1A0028	DMED1A0028: The process cannot be performed because the specified logical unit is P-VOL or V-VOL of SnapShot. Please specify another logical unit and try again.	Specify the LU other than the P-VOL or the V-VOL of the Copy-on-write SnapShot.	–
1A0029	DMED1A0029: The process cannot be performed because the access level is set up. Please change the attribute to Read/Write. When the mode is set up, please reset the mode using RAID Manager. And try again.	Specify the LU of the normal mode and S-VOL Disable of the access level for the user LU.	–
1A002A	DMED1A002A: The process cannot be performed because the specified logical unit is being used as ShadowImage pair with more than 2 S-VOL. Please delete S-VOL and make the pair into one-to-one relation, or cancel the pair, and then try again.	Execute it again after setting the number of mirrors of the S-VOL to 1.	–
1A0030	DMED1A0030: The Command Device(secondary) cannot set to the NNCtype1.	Check the types of the NAS heads.	–
1A0031	DMED1A0031: The Working Area for Dump cannot set to this NNCtype2.	Check the types of the NAS heads.	–
1A0032	DMED1A0032: The process cannot be performed because the Command Device is not set by system LU. Please set the Command Device and try again.	Check the setting status of the NAS Command Device, and then set the NAS Command Device (secondary).	–
1A0033	DMED1A0033: The process cannot be performed because the Command Device(secondary) is set by system LU. Please release the Command Device(secondary) and try again.	Release it from the NAS Command Device (secondary).	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1A0034	DMED1A0034: The process cannot be performed because the equipped NNC is unknown or mixture.	Check the configuration status of the connection NAS heads.	–
1A0070	DMED1A0070: The process cannot be performed because the equipped NNC is NNCtype2.	Check the configuration status of the connection NAS heads.	–
1A0071	DMED1A0071: The process cannot be performed because the NAS OS is not installed. Please install the NAS OS and try again.	Check the installation status of the NAS OS.	–
1A0072	DMED1A0072: The process cannot be performed because the controller is detached. Please recover the controller status and then try again.	Recover the Control Unit, and then execute it again.	–
1A0073	DMED1A0073: The process cannot be performed because the NNC is not stopped. Please stop the NNC and try again.	Put the NNC status of both NNCs (NAS Units) into the stop status, and then execute it again.	–
1A0074	DMED1A0074: The process cannot be performed because the equipped NNC is NNCtype1.	Check the configuration status of the connection NAS heads.	–
1A0075	DMED1A0075: The process cannot be performed because the system LU is not backed up.	A version downgrade instruction cannot be performed.	–
1A0076	DMED1A0076: The process cannot be performed because the NNC is not stopped or detached.	Put the NNC status of both NNCs (NAS Units) into the stop status (blocked status), and then execute it again.	–
1A0077	DMED1A0077: The process cannot be performed because the system LU is not backed up.	An instruction to release the version downgrade cannot be performed.	–
1B0001	DMED1B0001: The specified IP address is incorrect. Please specify a correct IP address.	Specify the correct (enabled) IP address.	–
1B0002	DMED1B0002: It is impossible to change to specified IP address. Please specify a correct IP address.	Specify the correct (enabled) IP address.	–
1B0003	DMED1B0003: The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.	Execute it again after waiting for a while.	–
1B0004	DMED1B0004: The process cannot be performed because the controller is detached. Please recover the controller status and then try again.	Check the status of the subsystem.	–
1B0005	DMED1B0005: The process cannot be performed because the DHCP is enabled. Please set the DHCP to disable and try again.	Turn off the DHCP mode.	System Parameter “4.2 Table 4.2.1 The menu items of setting parameter” (SYSPR 04-0020)
1B0006	DMED1B0006: The process cannot be performed during the maintenance LAN setting. Please wait a moment and then try again.	Execute it again after waiting for a while.	–
1B0008	DMED1B0008: The process cannot be performed because the DHCP is enabled. Please set the DHCP to disable and try again.	Turn off the “DHCP Mode”, and execute it again.	System Parameter “4.2 Setting the subsystem configuration information (3) Setting of LAN” (SYPR 04-0090)
1B0009	DMED1B0009: The process cannot be performed because NNC is equipped. Please confirm the port type and try again.	Make all the ports the FC port configuration, and execute it again.	–
1B000A	DMED1B000A: The process cannot be performed because the same address is specified as the maintenance LAN and the management LAN. Please specify the different address and try again.	Specify different addresses for the IP addresses of the user port and the maintenance port.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1C0001	DMED1C0001: The process cannot be performed because iSCSI port is physically unequipped. Please confirm the port type and try again.	Specify the iSCSI port.	–
1C0002	DMED1C0002: The process cannot be performed because the authentication method is not specified. Please confirm the authentication method and try again.	Specify the authentication method.	–
1C0003	DMED1C0003: The process cannot be performed because the specified alias format is invalid. Please confirm the alias and try again.	Specify the correct TargetNickname.	–
1C0004	DMED1C0004: The process cannot be performed because the same alias exists in a port. Please confirm the alias and try again.	Specify the unique TargetNickname in the port.	–
1C0005	DMED1C0005: The process cannot be performed because the specified iSCSI Name format is invalid. Please confirm iSCSI Name and try again.	Specify the correct Target iSCSI Name.	–
1C0006	DMED1C0006: The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.	Specify the unique Target iSCSI Name in the port.	–
1C0007	DMED1C0007: The process cannot be performed because the specified target is not defined. Please confirm the target and try again.	Specify the correct Target ID.	–
1C0008	DMED1C0008: The process cannot be performed because the specified name format is invalid. Please confirm the name and try again.	Specify the correct InitiatorNickname.	–
1C0009	DMED1C0009: The process cannot be performed because the same name exists in a port. Please confirm the name and try again.	Specify the unique InitiatorNickname in the port.	–
1C000A	DMED1C000A: The process cannot be performed because the specified iSCSI Name format is invalid. Please confirm iSCSI Name and try again.	Specify the correct Initiator iSCSI name.	–
1C000B	DMED1C000B: The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.	Specify the unique Initiator iSCSI name in the port.	–
1C000C	DMED1C000C: The process cannot be performed because the term of the temporary key or emergency key is expired.	Unlock it with the permanent key.	–
1C000D	DMED1C000D: The process cannot be performed because the invalid character is specified. Please confirm the user name and try again.	Specify the InitiatorUserName with the characters which can be used.	–
1C000E	DMED1C000E: The process cannot be performed because the invalid character is specified. Please confirm the secret and try again.	Specify the InitiatorSecret with the characters which can be used.	–
1C000F	DMED1C000F: The process cannot be performed because the character length of user name is outside the effective range. Please confirm the user name and try again.	Specify the InitiatorUser Name with the correct number of characters.	–
1C0010	DMED1C0010: The process cannot be performed because the character length of secret is outside the effective range. Please specify the secret of 12 to 32 characters and try again.	Specify the InitiatorSecret Name with the correct number of characters.	–
1C0011	DMED1C0011: The process cannot be performed because the specified IP address is incorrect. Please specify a correct IP address.	Specify the correct value.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1C0012	DMED1C0012: The process cannot be performed because the specified port number is incorrect. Please specify a correct port number.	Specify the correct value.	–
1C0013	DMED1C0013: The process cannot be performed because Keep Alive Timer is outside the effective range. Please specify Keep Alive Timer of 30 to 64800 and try again.	Specify the correct value.	–
1C0014	DMED1C0014: The process cannot be performed because the specified port number is incorrect. Please specify a correct port number.	Specify the correct value.	–
1C0015	DMED1C0015: The process cannot be performed because subsystem is in progress. Please wait a moment and then try again.	Execute it again after waiting for a while.	–
1C0017	DMED1C0017: The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.	Specify it with the correct number of characters.	–
1C0018	DMED1C0018: The process cannot be performed because the invalid character is specified. Please confirm iSCSI Name and try again.	Specify it with the characters which can be used.	–
1C0019	DMED1C0019: The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.	Specify it with the correct number of characters.	–
1C001A	DMED1C001A: The process cannot be performed because the character length of iSCSI Name is outside the effective range. Please confirm iSCSI Name and try again.	Specify it with the characters which can be used.	–
1C001B	DMED1C001B: The process cannot be performed because the controller is detached. Please recover the controller status and then try again.	Specify the correct Port number.	–
1C001C	DMED1C001C: The process cannot be performed because the specified IP address is incorrect. Please specify a correct IP address.	Specify the correct IP address.	–
1C001D	DMED1C001D: The process cannot be performed because the ping is executing. Please try again after the ping is completed.	Execute it after completing Ping.	–
1C001E	DMED1C001E: The process cannot be performed because the specified CHAP algorithm is incorrect. Please specify a correct CHAP algorithm and try again.	Specify the correct Target authentication algorithm.	–
1C001F	DMED1C001F: The process cannot be performed because the character length of secret is outside the effective range. Please specify the secret of 12 to 32 characters and try again.	Specify it with the correct number of Target Secret characters.	–
1C0020	DMED1C0020: The process cannot be performed because the invalid character is specified. Please confirm the secret and try again.	Specify it with the characters which can be used.	–
1C0021	DMED1C0021: The process cannot be performed because the invalid character is specified. Please confirm the user name and try again.	Specify it with the characters which can be used.	–
1C0022	DMED1C0022: The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.	Specify the unique Target User Name in the port.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1C0023	DMED1C0023: The process cannot be performed because the LUN Manager is not installed, locked, or disabled. Please install the LUN Manager and then try again.	Execute it again after unlocking or enabling the LUN Management priced option.	–
1C0024	DMED1C0024: The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.	Execute it again after enabling the port security of the PORT concerned.	–
1C0025	DMED1C0025: The process cannot be performed because the character length of alias is outside the effective range. Please confirm the alias and try again.	Specify it with the correct number of characters.	–
1C0026	DMED1C0026: The process cannot be performed because the invalid character is specified. Please confirm the alias and try again.	Specify it with the characters which can be used.	–
1C0027	DMED1C0027: The process cannot be performed because the character length of name is outside the effective range. Please confirm the name and try again.	Specify it with the correct number of characters.	–
1C0028	DMED1C0028: The process cannot be performed because the invalid character is specified. Please confirm the name and try again.	Specify it with the characters which can be used.	–
1C0029	DMED1C0029: The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.	Specify the unique Initiator User Name in the port.	–
1C002A	DMED1C002A: The process cannot be performed because the specified target is not defined. Please confirm the target and try again.	Check the status of the Target.	–
1C002B	DMED1C002B: The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.	Enable the security.	–
1C003A	DMED1C003A: The process cannot be performed because the target security is disabled. Please set the target security to enable and try again.	Enable the LUNManager of the port.	–
1C003B	DMED1C003B: The process cannot be performed because the specified alias is default name of Target 0. Please confirm the alias and try again.	Specify other Nickname.	–
1C003C	DMED1C003C: The process cannot be performed because the specified iSCSI Name is default name of Target 0. Please confirm iSCSI Name and try again.	Specify other iSCSI name.	–
1C003D	DMED1C003D: The process cannot be performed because the same alias exists in a port. Please confirm the alias and try again.	Specify the unique Target Nick name in the port including the Target which cannot be seen because the security is OFF.	–
1C003E	DMED1C003E: The process cannot be performed because the same iSCSI Name exists in a port. Please confirm iSCSI Name and try again.	Specify the unique Target iSCSI name in the port including the Target which cannot be seen because the security is OFF.	–
1C003F	DMED1C003F: The process cannot be performed because the same user name exists in a port. Please confirm the user name and try again.	Specify the unique Target User name in the port including the Target which cannot be seen because the security is OFF.	–
1C0040	DMED1C0040: The process cannot be performed because the specified host group or target is outside the effective range. Please confirm the host group or target and try again.	Execute it again after checking the specified Target group numbers.	–
1C0041	DMED1C0041: The information cannot be obtained because iSCSI port is physically unequipped. Please confirm the port status and try again.	Specify the iSCSI port.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1D0001	DMED1D0001: The process cannot be performed during the SNMP setting. Please wait a moment and then try again.	Retry after waiting for a while.	–
1E0001	DMED1E0001: The process cannot be performed because the cycle time is out of range. Please specify the cycle time of 30 to 3600 and try again.	Set the value within the range.	–
1E0002	DMED1E0002: The process cannot be set because the specified cycle time is less than the minimum value. Please confirm the cycle time and try again.	Check the number of the consistency groups (CTGs), and specify the minimum cycle time or more.	–
1E0010	DMED1E0010: The process cannot be performed because the pair(TCE) exists. Please cancel the pair(TCE) and try again.	Check whether the TrueCopy Extended Distance pair is released or there is no error in the specified LU number, and execute it again.	–
1E0011	DMED1E0011: The process cannot be performed during the pair(TCE) deleting. Please wait a moment and then try again.	Retry after waiting for a while.	–
1E0012	DMED1E0012: The process cannot be performed because the specified logical unit is a part of pair(TCE). Please specify another logical unit and try again.	Release the TrueCopy Extended Distance pair or specify a different LU.	–
1E0013	DMED1E0013: The process cannot be performed because the deallocation of cache blocks for SnapShot is in progress. Please wait a moment and then try again.	Retry after waiting for a while.	–
1E0014	DMED1E0014: The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance is installed. Please restart the subsystem and then try again.	Restart the subsystem, and execute it again(*1).	–
1E0015	DMED1E0015: The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance or SnapShot is installed. Please restart the subsystem and then try again.	Restart the subsystem, and execute it again(*1).	–
1E0016	DMED1E0016: The process cannot be performed because the subsystem is not restarted after TrueCopy Extended Distance or SnapShot is de-installed. Please restart the subsystem and then try again.	Restart the subsystem, and execute it again(*1).	–
1E0017	DMED1E0017: The process cannot be performed because the status of pair(TCE) is improper. Please confirm the status of pair and try again.	Execute it again after checking the pair status of TrueCopy Extended Distance.	–
1F0001	DMED1F0001: The Spare Drive Operation Mode is fixed and the Applying No Copy Back Mode on All the Units is enabled. This combination is not possible to specify. Please confirm the operation and try again.	Execute it by specifying the Spare Disk Drive Active Mode to variable.	–
1F0010	DMED1F0010: The process failed due to an invalid parameter. Please confirm the specified value.	Specify the correct value.	–
1F0011	DMED1F0011: The process cannot be performed because the specified IP address is incorrect. Please confirm the IP address and try again.	Specify the correct IP address.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1F0012	DMED1F0012: The process cannot be performed because the same IP address is specified to Syslog Server 1 and Syslog Server 2. Please confirm the IP address and try again.	Check the IP address and specify a different IP address.	–
1F0013	DMED1F0013: The process failed due to an invalid parameter. Please confirm the specified value.	Specify the correct value.	–
1F0014	DMED1F0014: The process cannot be performed because the internal log is disabled. Please set the internal log to enable and try again.	Check “Internal Log” of the Audit Logging option.	–
1F0015	DMED1F0015: The process cannot be performed because the internal log is being exported. Please wait a moment and then try again.	Retry after waiting for a while.	–
1F0017	DMED1F0017: The process cannot be performed because the log export failed. Please wait a moment and then try again.	Retry after waiting for a while.	–
1F0018	DMED1F0018: The process failed due to an invalid parameter. Please confirm the specified value.	Specify the correct value.	–
1F0019	DMED1F0019: The process cannot be performed because the internal log is using. Please confirm the internal log status and try again.	Check “Internal Log” of the Audit Logging option.	–
1F0020	DMED1F0020: The user ID is too short. Please confirm the user ID.	Specify it with the correct number of characters.	–
1F0021	DMED1F0021: The invalid character is specified in user ID. Please confirm the user ID.	Specify it with the characters which can be used.	–
1F0022	DMED1F0022: The current login session is expired, Please login again.	Execute it again after logging in.	–
1F0023	DMED1F0023: You have no permission. Please contact the Account Administrator and confirm your permission.	Check the authority	–
1F0024	DMED1F0024: The specified user ID has already been registered. Please specify another user ID.	The user concerned is already registered.	–
1F0025	DMED1F0025: The specified user ID is not registered. Please confirm the user ID.	Register the user and execute it again.	–
1F0026	DMED1F0026: The role is not assigned. Please assign one or more roles.	Check the role information and execute it again.	–
1F0027	DMED1F0027: The process cannot be performed for logged in user.	The account cannot be changed.	–
1F0028	DMED1F0028: The process cannot be performed for Built-in account.	The built-in account cannot be changed.	–
1F0029	DMED1F0029: You have no permission to modify. Please contact the Account Administrator and confirm your permission.	Check the authority.	–
1F002A	DMED1F002A: The logged in user reached the maximum. Please wait a moment and then try again.	It cannot log in because it exceeded the number of users who can log in.	–
1F002B	DMED1F002B: The specified password does not match. Please specify password again.	Check the password.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1F002C	DMED1F002C: You cannot login because account status is disabled. Please contact Account Administrator, and confirm the account status.	Check it with the account administrator.	–
1F002D	DMED1F002D: The specified password does not match. Please confirm the password.	Check the password before the change.	–
1F002E	DMED1F002E: The account reached the maximum. Please delete unnecessary account and try again.	Check the account information.	–
1F002F	DMED1F002F: The specified password length is less than minimum. Please confirm the password length.	Check the number of characters of the set password.	–
1F0030	DMED1F0030: Password Protection and Account Authentication cannot be used together.	The option which cannot be effective at the same time with the specified option is already effective. Execute it again after locking or invalidating.	–
1F0031	DMED1F0031: Account Authentication cannot be installed or be enabled, because NNC is equipped. Please change the subsystem into Fibre or iSCSI configuration, and try again.	Execute it again after making the subsystem the FC or iSCSI configuration.	–
1F0040	The process cannot be performed because the term of the temporary key or emergency key is expired.	Check the pair status.	–
1F0041	The process cannot be performed because the ShadowImage pair is contained.	Check the pair status.	–
1F0042	The process cannot be performed because the TrueCopy pair is contained.	Check the pair status.	–
1F0043	The process cannot be performed because the TrueCopy Extended Distance pair is contained.	Check the pair status.	–
1F0044	The process cannot be performed because the SnapShot pair is contained.	Check the pair status.	–
1F0045	The process cannot be performed because the Volume Migration pair is contained.	Check the pair status.	–
1F0048	The process cannot be performed because formatting is now occurring. Please try again after it is completed.	Execute it again after completing the quick format.	–
1F0049	The process cannot be performed because parity correction is not completed. Please try again after it is completed.	Execute it again after the parity correction.	–
1F004A	The process cannot be performed because the data pool is contained. Please delete the data pool and try again.	Release the pool LU and execute it again.	–
1F004B	The process cannot be performed because the DM-LU is contained. Please cancel the DM-LU and try again.	Release the DM-LU and execute it again.	–
1F004C	The process cannot be performed because the command device is contained. Please cancel the command device and try again.	Release the command device LU and execute it again.	–
1F004D	The process cannot be performed because the system LU is contained. Please cancel the system LU and try again.	Release the NAS system LU and execute it again.	–
1F004E	The process cannot be performed because the LU change is in progress. Please try again after it is completed.	Execute it again after completing the LU unit switching.	–
1F0051	The process cannot be performed because the system drives is contained.	Check the specified RAID Group.	–
1F0052	The process cannot be performed because the write uncompleted LU is contained. Please recover and then try again.	Execute it again after the recovery according to the maintenance procedure of the incomplete write.	Troubleshooting “6.1.15 A failure occurred during operation : Case 5 (Incomplete writing)” (TRBL 06-1110)

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
1F0053	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.	Make it in the normal status and execute it again.	–
1F0054	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.	Make it in the normal status and execute it again.	–
1F0055	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please spin up the RAID groups and try again.	Make it in the normal status and execute it again.	–
1F0056	The process cannot be performed because the RAID groups in state of Power Saving are existing. Please wait for a while and try again.	Execute it again after it becomes the normal status.	–
1F0057	The specified RAID group is not defined. Please specify a defined RAID group.	Check the specified RAID Group.	–
1F0058	The process cannot be performed because the drive recovery is in progress. Please try again after it is completed.	Make it in the normal status and execute it again.	–
1F0059	The process cannot be performed because the health checking is in progress. Please try again after it is completed.	Make it in the normal status and execute it again.	–
1F005A	The process cannot be performed because the user LU is contained. Please cancel the user LU and try again.	Release the NAS user LU and execute it again.	–
1F005B	The process cannot be performed because the SES drives is contained.	Check the specified RAID Group.	–
200002	DMED200002: This function is unsupported in the single-controller system	Review the system configuration.	–
200003	DMED200003: SnapShot cannot be installed because Cache Partition Manager is enabled. Please change Cache Partition Manager to de-installed or disabled and try again.	Execute it again after locking or invalidating the key of the Cache partition.	Addition/Subtraction/ Relocation “1.4.4 Adding a Cache Unit” (ADD 01-0380)
200004	DMED200004: Cache Partition Manager cannot be installed because the subsystem is not restarted(*1) after SnapShot is installed. Please restart the subsystem, and then try again.	Retry after executing a reboot.	–
200005	DMED200005: The option cannot be installed or enabled because cache memory size is 512MB or less. Please increase the cache memory and then try again.	Make the Cache capacity more than 512 M bytes.	Addition/Subtraction/ Relocation “1.4.4 Adding a Cache Unit” (ADD 01-0380)
200011	DMED200011: The process cannot be performed because the specified logical unit is not the reserve LU. Please specify the reserve LU and try again.	Specify the reserved LU.	–
200012	DMED200012: The process cannot be performed because the specified logical unit is the reserve LU. Please delete the reserve LU or specify another logical unit and try again.	Specify the normal LU.	–
200013	DMED200013: The process cannot be performed because the capacity is different between the specified P-VOL and S-VOL. Please specify the logical unit of the same capacity and try again.	Specify the P-VOL and the S-VOL of the same size.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
200014	DMED200014: The process cannot be performed because the owner controller is different between the specified P-VOL and S-VOL. Please specify the logical unit of the same owner controller and try again.	Specify the P-VOL and the S-VOL of the same owner DIR.	–
200015	DMED200015: The process cannot be performed the specified P-VOL and S-VOL have same logical unit number. Please specify the different logical unit number.	Specify different LUs for the P-VOL and the S-VOL.	–
200016	DMED200016: The process cannot be performed because the Volume Migration pair reached the maximum. Please cancel or split the unnecessary Volume Migration pair and try again.	Execute it again after releasing the unnecessary Volume Migration or the SI pair.	–
200017	DMED200017: The process cannot be performed because the specified P-VOL and S-VOL belong to the same RAID group. Please specify the logical units of different RAID group.	Specify the P-VOL and the S-VOL which belong to different RAID Groups.	–
200018	DMED200018: The specified pair cannot be canceled because the pair status is not waiting or copying.	Execute the Volume Migration suspension instruction while the pair status is waiting or migrating.	–
200019	DMED200019: The specified pair cannot be split because the pair status is not completed or error.	Execute the Volume Migration pair release instruction while the pair status is completed or failed.	–
20001A	DMED20001A: The process cannot be performed because the specified P-VOL and S-VOL are not in pairs. Please specify the P-VOL and S-VOL in pairs and try again.	Specify the P-VOL and the S-VOL which create the same pair.	–
20001B	DMED20001B: The process cannot be performed because the reserve LU reached the maximum. Please delete the unnecessary reserve LU and try again.	Execute it again after deleting the reserved LU.	–
20001C	DMED20001C: The process cannot be performed because the specified logical unit is the S-VOL of the Volume Migration pair. Please specify another logical unit and try again.	Specify the LU other than the S-VOL.	–
20001D	DMED20001D: The process cannot be performed because the specified logical unit is not the reserve LU. Please specify the reserve LU and try again.	Specify the reserved LU.	–
20001E	DMED20001E: The process cannot be performed because the P-VOL or S-VOL of the Volume Migration pair is contained. Please split the pair and try again.	Specify the LU which is not creating the Volume Migration pair (P-VOL/S-VOL).	–
20001F	DMED20001F: The process cannot be performed because the reserve LU is contained. Please delete the reserve LU and try again.	Specify the LU other than the reserved LU.	–
200020	DMED200020: The process cannot be performed because the P-VOL or S-VOL of the Volume Migration pair or the reserve LU is contained. Please split the pair or delete the reserve LU and try again.	Release the Volume Migration pair or the reserved LU.	–
200021	DMED200021: The process cannot be performed because the owner ID is different. Please cancel the pair using the application that created the pair.	Check the owner ID and execute it again from the owner ID concerned.	–
200022	DMED200022: The process cannot be performed because the owner ID is different. Please split the pair using the application that created the pair.	Check SNM or the owner ID and execute it again from the owner ID concerned.	–
200023	DMED200023: The process cannot be performed because the specified owner ID is not supported.	Execute it again from SNM or HiCommand.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
200024	DMED200024: The process cannot be performed because the reserve LU exists. Please delete the reserve LU and try again.	Execute it again after deleting the LU in the reserved status.	–
200025	DMED200025: The process cannot be performed because the Volume Migration pair exists. Please cancel or split the pair and try again.	Execute it again after releasing the LU in the pair status.	–
200026	DMED200026: The process cannot be performed because the specified logical unit is reserved for cache partition modification. Please restart the subsystem and then try again(*1).	Execute it again after determining (restarting) the Cache partition change.	–
200027	DMED200027: The process cannot be performed because a management area is shortage. Please delete the unnecessary pair(s) and try again.	When the VOL using the differential bit map is the SnapShot pair, delete the V-VOL after performing pairsplit –S. When the VOL using the differential bit map is ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Volume Migration, perform the pair release from RAID Manager using pairsplit –S or from SNM.	–
200028	DMED200028: The process cannot be performed because the specified logical unit is not the Volume Migration pair. Please specify another logical unit and try again.	Specify the Volume Migration pair and execute it again.	–
200029	DMED200029: The process cannot be performed because the specified logical unit is Volume Migration pair and is copying. Please retry after copy is completed.	Execute it again after completing the copy of Volume Migration.	–
20002A	DMED20002A: The copy pace of specified pair cannot be changed because the pair status is not waiting or copying.	Execute it while the pair status of the Volume Migration pair is waiting or migrating.	–
20002B	DMED20002B: The process cannot be performed because the specified owner ID is not supported.	The copy priority change instruction of the Volume Migration pair is only supported by SNM. Execute the change of the copy priority from SNM.	–
20002C	DMED20002C: The process cannot be performed because the specified logical unit is not the P-VOL or S-VOL of the Volume Migration pair. Please specify the P-VOL or S-VOL of the Volume Migration pair and try again.	Specify the P-VOL or S-VOL of the Volume Migration pair and execute it again.	–
300001	DMED300001: The serial number or equipment ID cannot be changed because the path and pair information does not exist.	Serial number or device ID changes are not required.	–
300002	DMED300002: The serial number or equipment ID cannot be changed because the path and pair information does not exist.	Serial number or device ID changes are not required.	–
300005	DMED300005: The specified serial number or equipment ID is incorrect. Please specify it in 0-9.	Specify the range between zero and nine.	–
300006	DMED300006: The specified serial number is incorrect. Please specify a right serial number.	Specify the serial number for the other system.	–
300007	DMED300007: The specified serial number is incorrect. Please specify a right serial number.	Specify the serial number for the other system.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
300008	DMED300008: 0 is specified as 6 figures of low order of the serial number. Please specify a right serial number.	Specify the serial number for the other system.	–
300009	DMED300009: The same serial number as a self subsystem is specified. Please specify the serial number of connected subsystem.	Specify the serial number for the other system.	–
30000A	DMED30000A: The same equipment ID as a self subsystem is specified. Please specify the equipment ID of connected subsystem.	Specify the equipment ID for the other system.	–
30000B	DMED30000B: The process cannot be performed because the fibre channel port is not equipped. Please confirm the port type and try again.	Check the subsystem environment.	–
3B0011	DMED3B0011: The micro program cannot be downgraded because the interface board of iSCSI is equipped. Please change the interface boards to fibre channel and try again.	Execute it again after changing the Interface Board to the FC Interface Board.	–
3B0012	DMED3B0012: The micro program cannot be downgraded because the segment size of 64KB or more is set up. Please confirm the cache partition and try again.	Execute it again after checking the configuration of the Cache partition.	–
3B0013	DMED3B0013: The micro program cannot be downgraded because the stripe size other than 64KB is set up. Please confirm the stripe size of logical unit and try again.	Execute it again after checking the configuration of the stripe size.	–
3B0014	DMED3B0014: The micro program cannot be downgraded because TrueCopy Extended Distance is installed. Please change TrueCopy Extended Distance to de-installed and try again.	Execute it again in the status that the TrueCopy Extended Distance function is not used.	–
3B0015	DMED3B0015: The micro program cannot be downgraded because the subsystem is not restarted after the option using data pool is unlocked or enabled. Please restart the subsystem and then try again.	Execute the downgrade again after restarting(*1) the subsystem.	–
3B0016	DMED3B0016: The micro program cannot be downgraded because the target(s) or CHAP user(s) is not initialized. Please initialize the target(s) and CHAP user(s) and try again.	Execute it again after outputting the port configuration information and initializing all the iSCSI targets and the CHAP users referring to the manual.	–
3B0018	DMED3B0018: The micro program cannot be downgraded because the pair with MU number other than 0 exists in S-VOL of ShadowImage. Please cancel the pair with MU number other than 0 and try again.	Execute it again after releasing the pairs whose MU number of the S-VOL of ShadowImage in-system replication is other than 0.	–
3B0019	DMED3B0019: The micro program cannot be downgraded because the pair with MU number of 14 or more exists in Snapshot image. Please cancel the pair with MU number of 14 or more and try again.	Execute it again after releasing the pairs whose MU number of the V-VOL of Copy-on-write SnapShot is 14 or more.	–
3B001A	DMED3B001A: The micro program cannot be downgraded because P-VOL with 15 or more Snapshot image exists. Please delete Snapshot image to 14 or less, and try again.	Execute it again after deleting the V-VOL so that the V-VOLs for one P-VOL of Copy-on-write SnapShot are within 14.	–
3B001B	DMED3B001B: The micro program cannot be downgraded because the user LU is being used as the pair of TrueCopy or TrueCopy Extended Distance. Please cancel the pair and try again.	Execute it again after releasing the NAS user LU pairs of the pairs of TrueCopy remote replication or TrueCopy Extended Distance.	–

*1 : If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
3B001C	DMED3B001C: The micro program cannot be downgraded because the migrated logical unit exists. Please migrate again.	Make the different intermediate LU number and the internal LU number to the same value by executing Volume Migration again.	–
3B001D	DMED3B001D: The micro program cannot be downgraded because Volume Migration is installed. Please de-install the option and try again.	Lock the priced option of Volume Migration.	–
3B001E	DMED3B001E: The micro program cannot be downgraded because TrueCopy is unlocked. Please lock the option and try again.	Lock the priced option of TrueCopy remote replication.	–
3B001F	DMED3B001F: The micro program cannot be downgraded because Account Authentication is installed. Please de-install the option and try again.	Lock the account authentication priced option.	–
3B0020	DMED3B0020: The micro program cannot be downgraded because Power Saving is installed. Please de-install the option and try again.	Lock the priced option of the Power Saving function.	–
400001	DMED400001: The process cannot be performed because the specified logical units contain an unformatted LU. Confirm the logical unit status and try again.	None (No forced parity correction is required.)	–
400002	DMED400002: The process cannot be performed because the specified logical units contain V-VOL of Snapshot. Confirm the logical unit status and try again.	Retry it specifying a POOL LU.	–
400003	DMED400003: The process cannot be performed because some logical units are under quick formatting. Confirm the logical unit status and try again.	None (No forced parity correction is required.)	–
400004	DMED400004: The process cannot be performed because the specified logical units contain a Sub LU of the unifying LUs. Confirm the logical unit status and try again.	Instruct again to make a parity correction specifying a parent LU of a unified LU.	–
400006	DMED400006: The specified LUs contain regressed LU. Confirm the LU status and try again.	Issue an instruction to make the parity correction after the drive is recovered.	–
400007	DMED400007: The process cannot be performed because ShadowImage, TrueCopy, or Snapshot is in progress. Please wait a moment and then try again.	Instruct again to make a parity correction after forming and resynchronizing a pair.	–
400008	DMED400008: The operation of 'start' or 'skip', and 'cancel' is specified at the same time. Confirm the operation and try again.	Give instructions to restore, skip, and abort separately.	–
400009	DMED400009: The process cannot be performed because the specified logical units contain an undefined LU. Confirm the logical unit status and try again.	Retry it specifying a correct LU.	–
400011	DMED400011: The process cannot be performed because parity correction is not completed. Please try again, after it is completed.	As to an LU for which the parity correction is being made or standing by, instruct to wait for the completion of the restoration or abort the restoration. As to an LU the restoration for which by means of parity is undone or undone 2, instruct to skip the restoration or make the parity correction and wait for completion of the restoration. Retry after performing the operation above.	–
400012	DMED400012: The process cannot be performed because parity correction is not executed or is aborted. Please try again, after it is completed.	Instruct to skip the restoration or make the parity correction and wait for completion of the restoration.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
400013	DMED400013: The process cannot be performed because parity correction is not completed. Please try again, after it is completed.	Issue an instruction to make or skip the parity correction and wait for completion of the restoration. Retry after performing the operation above.	–
400014	DMED400014: The process cannot be performed because parity correction is not completed. Please try again, after it is completed.	Issue an instruction to make or skip the parity correction and wait for completion of the restoration. Retry after performing the operation above.	–
400015	DMED400015: The process cannot be performed because parity correction is not executed or is aborted. Please try again, after it is completed.	Issue an instruction to make or skip the parity correction and wait for completion of the restoration. Retry after performing the operation above.	–
400021	DMED400021: The 'cancel' operation cannot be specified to the uncorrected logical units. Confirm the parity correction status and try again.	Instruct to make a parity correction or skip the restoration.	–
400022	DMED400022: The 'start' operation cannot be specified to the aborted logical units. Confirm the parity correction status and try again.	None (Only a skip can be instructed.)	–
400023	DMED400023: The 'cancel' operation cannot be specified to the aborted logical units. Confirm the parity correction status and try again.	None (Only a skip can be instructed.)	–
400024	DMED400024: The 'start' operation cannot be specified to the correcting logical units. Confirm the parity correction status and try again.	Instruct again to make the parity correction after an instruction to abort has been given.	–
400025	DMED400025: The 'skip' operation cannot be specified to the correcting logical units. Confirm the parity correction status and try again.	Give an instruction to abort.	–
400026	DMED400026: The 'start' operation cannot be specified to the waiting logical units. Confirm the parity correction status and try again.	Instruct again to make the parity correction after an instruction to abort has been given.	–
400027	DMED400027: The 'skip' operation cannot be specified to the waiting logical units. Confirm the parity correction status and try again.	Instruct again to make the parity correction after an instruction to abort has been given.	–
400028	DMED400028: The 'cancel' operation cannot be specified to the skipped logical units. Confirm the parity correction status and try again.	None (No instruction to abort is required.)	–
400029	DMED400029: The 'cancel' operation cannot be specified to the corrected logical units. Confirm the parity correction status and try again.	None (No instruction to abort is required.)	–
500001	DMED500001: The command device is not registered. Please register the command device and try again.	Set up the command device.	–
600001	DMED600001: The process cannot be performed because the specified LU is a Cache Residency LU or a reserved one. Disable the LU, and then try again.	Specify the correct (enable) LU.	–
700001	DMED700001: The specified logical unit is not defined. Specify a defined logical unit.	Specify the correct (enable) LU.	–
700002	DMED700002: The process cannot be performed because the status of pair is SMPL. Confirm the LU status and try again.	Specify the correct (enable) LU.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
800002	DMED800002: A parameter error occurred. Please confirm the specified parameter.	Contact the Technical Support Center.	–
800004	DMED800004: The specified NNC number is not NAS port. Please confirm the port type.	Check if the NAS interface has been set.	–
800005	DMED800005: The process cannot be performed because BIOS is being updated. The updating is completed, then try again.	Wait until the update of the BIOS is completed.	–
800006	DMED800006: The process cannot be performed because NAS OS is not ready or booting, or it is not in shutdown process. Please confirm NAS OS status and then try again.	Wait until the NNC (NAS Unit) becomes the operation status.	–
800007	DMED: The process cannot be performed because BIOS is being updated. The updating is completed, then try again.	Wait until the update of the BIOS is completed.	–
800008	DMED800008: The process cannot be performed because the install of the NAS OS is not completed. Please try again after install is completed.	When the NAS OS is being installed, wait until the installation is completed. If it is after the installation of the NAS OS failed, reinstall it, and execute it again after the installation is completed.	–
800009	DMED800009: The process cannot be performed because the alternative NNC is not active. Please confirm NNC status and try again.	Wait until the other node will be in the ACTIVE status.	–
800011	DMED800011: The process cannot be performed because NAS OS is loading. Please stop NAS OS, then try again.	Retry after stopping the NNC (NAS Unit).	–
800013	DMED800013: The process cannot be performed because NAS OS is in shutdown process. Shutdown process is completed, then try again.	Retry after waiting for completion of the shutdown.	–
800014	DMED800014: The process cannot be performed because NAS dump is being collected. The collection is completed, then try again.	Retry after waiting for the completion of the NAS Dump collection.	–
800015	DMED800015: The process cannot be performed because System LU is not defined. Please define System LU and then try again.	Retry after defining the system LU.	–
800016	DMED800016: The time out occurred during install. Please turn off NNC breaker and turn on it, then try again.	① Turn off the AC Input Power Switch of the NNC (NAS Unit). ② Retry after turning it on again.	–
800017	DMED800017: The time out occurred during install. Please turn off NNC breaker and turn on it, then try again.	① Turn off the breaker of the NNC (NAS Unit). ② Retry after turning it on again.	–
800019	DMED800019: The process cannot be performed because NAS OS is not in stopped state. Please stop NAS OS, then try again.	Retry after stopping the NNC (NAS Unit).	–
80001A	DMED80001A: The process cannot be performed because BIOS is being updated. The updating is completed, then try again.	Wait until the update of the BIOS is completed.	–
80001B	DMED80001B: The process cannot be performed because NAS OS is detached. Please recover NAS OS status and then try again.	Retry after releasing the OS from the detachment.	–
800020	DMED800020: The specified IP address is incorrect. Please specify a correct IP address.	Specify a correct IP address.	–
800021	DMED800021: The specified number is incorrect. Please specify a correct number.	Specify the number of the time zone correctly.	–
800022	DMED800022: The specified MTU is incorrect. Please specify a correct MTU.	Specify the correct MTU.	–

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Detail code	Storage Navigator Modular indication	Recovery methods	Reference page
800023	DMED800023: The specified negotiation is incorrect. Please specify a correct negotiation.	Specify the number of the negotiation correctly.	–
800024	DMED800024: The process cannot be performed because NAS OS is not ready. Please confirm NAS OS status and then try again.	Check the status of the NAS OS.	–
800025	DMED800025: The process cannot be performed during NNC LAN setting. Please confirm NAS OS status and then try again.	Check the status of the NAS OS.	–
800026	DMED800026: The same IP address as the management LAN of the subsystem cannot be set up. Please specify a correct IP address.	Specify a correct IP address.	–
800027	DMED800027: The specified time zone does not have daylight saving time. Please confirm the time zone.	Make sure whether the daylight saving time is used or not.	–
800029	DMED800029: The process cannot be performed because the MTU value of NNC does not match. Please set up the same MTU value.	Specify the same MTU value in the NNC (NAS Unit) 0 side and the NNC (NAS Unit) 2 side (or the NNC <NAS Unit> 1 and the NNC <NAS Unit> 3).	–
800030	DMED800030: The process cannot be performed because specified IP address is same as the current IP address of alternative NNC. Please specify another IP address and try again.	Check the IP address and specify a different IP address.	–
800099	DMED800099: The error occurred during install. Please reboot NAS Setup, then try again.	① Stop the NAS Setup. ② Retry after restarting the NAS. ③ If not recovered yet, contact the Technical Support Center.	–

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Chapter 10. ACE Tool Error Message

No.	Message	Description	Recovery methods
101	Saved as X successfully.	The saving of the configuration information file succeeded. x : File name	–
102	It has not been saved.	The saving of the configuration information file failed, or it was canceled.	Check the free capacity in the PC in which the file is to be saved and retry the saving.
103	Please select a proper file name.	The reading of the configuration information file failed.	Check the specification of the file and retry the saving.
104	Loaded from X successfully.	The reading of the configuration information file succeeded. x : File name	–
105	It has not been loaded.	The reading of the configuration information file failed, or it was canceled.	Check the specification of the file and retry the saving.
106	The format of this file is different.	The reading of the configuration information file failed.	
107	X already exists. Does it overwrite?	The reading of the configuration information file failed. x : File name	
111	This model is not supported.	The model not supported was read.	
301	Please be sure to input one or more numerical values into Fibre Unit.	In the window for entering the number of the disk units, zero was entered as the number of the Fibre disk units.	Change the number to one or more and make the entry again.
302	It exceeds the maximum number of Units.	In the window for entering the number of the disk units, a number larger than the maximum allowable one was entered.	Make the number of the disk units smaller than the maximum allowable one and make the entry again.
304	One or more Units on the PATH0 are skipped.	Disk units were set for Path 0 leaving an empty space for one or more disk units.	Set the disk units in regular order starting from the bottom without leaving an empty space.
305	One or more Units on the PATH1 are skipped.	Disk units were set for Path 1 leaving an empty space for one or more disk units.	
306	More Units to PATH1 than PATH0 are installed.	More disk units were set for Path 1 than those for Path 0.	Check if the setting is correct.
307	Two or more Units to PATH0 than PATH1 are installed.	The disk units set for Path 1 were more than those set for Path 0 by two or more.	
308	It exceeds the number of Units which can be carried on a rack.	When the physical configuration was derived from the logical configuration, disk units more than those mountable on a rack were set.	Check if the number of the disk units on each rack is correct.
309	It is carried on the RackX exceeding the number of maximum Units.	When the logical configuration was derived from the physical configuration, disk units more than those mountable on a rack were set. x : Rack number (1 - 3)	
310	Please install SATA Unit by two Units.	The FC disk units were set on and under the one SATA disk unit.	When setting the FC disk units on and under the SATA disk unit(s), set the two SATA disk units.
311	It exceeds the number of Units which can be carried on a physical rack.	When the number of the disk units was entered, the number was larger than the maximum allowable one.	Check if the setting is correct.

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No.	Message	Description	Recovery methods
501	Clear a logic composition figure?	The Edit button of the physical configuration diagram was pressed	–
502	Clear a physical composition figure?	The Edit button of the logical configuration diagram was pressed.	–
503	Please save before exit. Exit?	The End button was pressed.	–
504	A logic composition figure is under edit.	When the logical configuration diagram was being made, the Edit button of the logical configuration diagram was pressed.	–
505	A physical composition figure is under edit.	When the physical configuration diagram was being made, the Edit button of the physical configuration diagram was pressed.	–
506	Clear a physical composition figure and a physical composition figure?	The Clear button was pressed.	–

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Chapter 11. List of the NAS BIOS POST Codes and the Subcodes

The POST (Power-On-Self-Test) codes of the NAS BIOS and the subcodes are the error codes to output what processing was executed when the failure occurred for the troubleshooting of the failures that occurs at the time of the NAS BIOS operation.
The codes are shown in order according to the starting sequence of the NAS Unit as follows.

No.	POST code	Sub code	Description
1	0000h	0000h	NAS Boot Start
2	0087h	00E0h	PCI Status Clear
3	0087h	00E1h	Initializing the doorbell resister (NNC (NAS Unit) ⇒ DF)
4	0087h	00E5h	PCI Minimun Config (NNC (NAS Unit) ⇒ DF)
5	0087h	00E3h	Waiting for receiving the kick mode instruction doorbell (DF ⇒ NNC (NAS Unit))
6	0087h	00E4h	Clearing the kick mode instruction doorbell (NNC (NAS Unit) ⇒ DF)
7	0038h	0001h	Checking the installation memory specifications (size and spec)
8	0038h	0002h	Initializing the CPU
9	0038h	0004h	Memory Test
10	0038h	0005h	Initializing the Super I/O
11	0038h	00D2h	Acquiring the maintenance LAN port MAC address
12	0098h	00C1h	PCI Full Config (NNC (NAS Unit) ⇒ DF)
13	0098h	00C4h	Setting the chip set custom (DF ⇒ NNC (NAS Unit))
14	0098h	00FFh	Completing the PCI initialization. The CUDG processing is not performed in the second boot.
15	0098h	0083h	Issuing the CUDG_LOAD doorbell (NNC (NAS Unit) ⇒ DF)
16	0098h	0084h	Waiting for clearing the CUDG_LOAD doorbell. The DMA transfer of the PCDG is performed between them. (DF ⇒ NNC (NAS Unit))
17	0098h	0085h	Waiting for receiving the CUDG_READY doorbell (DF ⇒ NNC (NAS Unit))
18	0098h	0086h	Clearing the CUDG_READY doorbell (NNC (NAS Unit) ⇒ DF)
19	0098h	0089h	Starting the CUDG execution
20	0098h	008Ah	Completing the CUDG execution
21	0098h	00FFh	Completing the CUDG processing and executing the NNC (NAS Unit) reset
22	00xxh	00C6h	Initializing the Disk Command Queue
23	00xxh	00C7h	Issuing the Com Enable doorbell (NNC (NAS Unit) ⇒ DF)
24	00xxh	00C8h	Waiting for receiving the Com Enable Reply doorbell (DF ⇒ NNC (NAS Unit))
25	0013h	00C9h	Issuing the Disk Reset command
26	0013h	00CAh	Issuing the Read Capacity (LU0) command
27	0013h	00CBh	Issuing the Read Capacity (LU1) command
28	00xxh	00CDh	Storing the RTC (Time setting)
29	00xxh	00CEh	Performing the initial setting of the environment monitoring IC
30	00C0h	00FFh	Issuing the BIOS completion notification doorbell (NNC (NAS Unit) ⇒ DF)

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Chapter 12. Failure Factor Codes of the Modular Volume Migration

Failure factor codes	Factors of the abnormal termination	Recovery method	Reference page
258	A hardware failure of the Control Unit was detected during the execution of the Modular Volume Migration.	ⓘ Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
260	The incomplete write was detected in the P-VOL during the execution of the Modular Volume Migration.	ⓘ 1. Check that the message, "W0G0xy (or W0G100) Unreadable PIN detected", "I153xy (or I153HH) Data recovery partial" or "I63000 Write uncompleted block detected", is displayed.	–
		2. Remove the incomplete write according to the recovery method of the displayed message code.	–
262	The access to the Disk Drive timed out during the execution of the Modular Volume Migration.	ⓘ Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
263	The DMA transfer timed out during the execution of the Modular Volume Migration.	ⓘ Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
265	The DMA transfer terminated abnormally in the generation of the parity data during the execution of the Modular Volume Migration.	ⓘ 1. Replace the Cache memory installed in the blocked Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540)
		2. Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
268	The LU executing the Modular Volume Migration was blocked. Or one Disk Drive which configures the LU executing the Modular Volume Migration was blocked in the case other than RAID 6, two were blocked in the case of RAID 6, and another one became a Disk Drive failure among the Disk Drives which configure the same RAID Group, so that R/W to the LU became difficult.	ⓘ 1. Check if the LU of the P-VOL or the S-VOL is blocked (two Disk Drives which configure the LU are blocked in the case other than RAID 6 and three are blocked in the case of RAID 6).	–
		2. When the LU of the P-VOL or the S-VOL was blocked, recover the LU to "Formatted Logical Unit" referring to Troubleshooting "6.1.13 A failure occurred during operation: Case 3 (LU blockade)".	Troubleshooting "6.1.13 A failure occurred during operation: Case 3 (LU blockade)" (TRBL 06-0590)
		② 1. Check that one Disk Drive which configures the LU of the P-VOL or the S-VOL is blocked in the case other than RAID 6, two are blocked in the case of RAID 6, and another one becomes a Disk Drive failure "I301xy (or I301HH, I301AT) HDU error" among the Disk Drives which configure the same RAID Group.	–
		2. Recover the failure of the Disk Drive referring to Troubleshooting "6.1.9 Data recovery does not terminate normally: Case 2 (Disk Drive failure)".	Troubleshooting "6.1.9 Data recovery does not terminate normally: Case 2 (Disk Drive failure)" (TRBL 06-0520)

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Failure factor codes	Factors of the abnormal termination	Recovery method	Reference page
269	The Control Unit was blocked because the internal processing timed out unjustly during the execution of the Modular Volume Migration.	① Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
513	The subsystem shut down during the execution of the Modular Volume Migration.	① The cause that the executing Modular Volume Migration terminated abnormally is because the subsystem shut down during the execution of the Modular Volume Migration. There is no failed part.	–
514	The Control Unit was blocked during the execution of the Modular Volume Migration.	① Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
515	The internal retry processing occurred in the Control Unit during the execution of the Modular Volume Migration.	① The cause that the executing Modular Volume Migration terminated abnormally is because the internal retry processing was executed in the Control Unit. There is no failed part.	–
516	A time-out occurred in the DMA transfer during the execution of the Modular Volume Migration.	① Replace the blocked Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
517	The DMA transfer terminated abnormally during the execution of the Modular Volume Migration.	① Replace the Control Unit where a failure occurred.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
518	The DMA transfer terminated abnormally in the generation of the parity data during the execution of the Modular Volume Migration.	① 1. Replace the Cache memory installed in the blocked Control Unit. 2. If it is not recovered yet, replace the blocked Control Unit.	Replacement "2.2.6 Replacing Cache Unit" (REP 02-0540) Replacement "2.2.5 Replacing Control Unit" (REP 02-0390)
769	The number of sub-segments of PIN exceeded the threshold to execute the write through during the execution of the Modular Volume Migration.	① 1. Check that the message, "W49100 (or W49200) PIN is over directory threshold", "W49300 (or W49400) PIN is over partition threshold" or "W49500 (or W49600) PIN is over RAID group threshold", is displayed. 2. Recover the PIN over referring to Troubleshooting "6.1.12 A failure occurred during operation: Case 2 (LA/LRC error)".	– Troubleshooting "6.1.12 A failure occurred during operation: Case 2 (LA/LRC error)" (TRBL 06-0570)
1025	The subsystem shut down during the execution of the Modular Volume Migration, and the data on the Cache memory was lost.	① Recover the consistency of the parity of the LU or execute the restoration of the user data referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)".	Troubleshooting "6.1.3 The failure occurred immediately after being ready (Forced parity correction)" (TRBL 06-0060)

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Failure factor codes	Factors of the abnormal termination	Recovery method	Reference page
1026	The LU executing the Modular Volume Migration was blocked. Or one Disk Drive which configures the LU executing the Modular Volume Migration was blocked in the case other than RAID 6, two were blocked in the case of RAID 6, and another one became a Disk Drive failure among the Disk Drives which configure the same RAID Group, so that R/W to the LU became difficult.	①-1. Check if the LU of the P-VOL or the S-VOL is blocked (two Disk Drives which configure the LU are blocked in the case other than RAID 6 and three are blocked in the case of RAID 6).	–
		①-2. When the LU of the P-VOL or the S-VOL was blocked, recover the LU to "Formatted Logical Unit" referring to Troubleshooting "6.1.13 A failure occurred during operation: Case 3 (LU blockade)".	Troubleshooting "6.1.13 A failure occurred during operation: Case 3 (LU blockade)" (TRBL 06-0590)
		②-1. Check that one Disk Drive which configures the LU of the P-VOL or the S-VOL is blocked in the case other than RAID 6 and two are blocked in the case of RAID 6, and another one becomes a Disk Drive failure "I301xy (or I301HH, I301AT) HDU error" among the Disk Drives which configure the same RAID Group.	–
		②-2. Recover the failure of the Disk Drive referring to Troubleshooting "6.1.9 Data recovery does not terminate normally: Case 2 (Disk Drive failure)".	Troubleshooting "6.1.9 Data recovery does not terminate normally: Case 2 (Disk Drive failure)" (TRBL 06-0520)
1027	The data of the DM-LU could not be read because the Disk Drive was blocked at the time of the subsystem start.	①-1. Check that "I6EL00 DM-LU read failed" is displayed in the Information Message on WEB.	–
		①-2. Remove the cause that the reading of the DM-LU fails according to the recovery method of the message code "I6EL00 DM-LU read failed".	"Chapter 4. Progress Message" (MSG 04-0000)
1028	Because the Disk Drive which configures the LU was blocked after executing the Modular Volume Migration for the LU during the execution of the forced parity correction, the status of the forced parity correction changed to "Uncorrected 1" or "Uncorrected 2".	①-1. Check that the status of the LU of the P-VOL or the S-VOL is "Uncorrected and Drive Detached" or "Correction Aborted" from the Storage Navigator Modular.	–
		①-2. Recover the consistency of the parity of the LU or execute the restoration of the user data corresponding to the status of the LU checked in ①-1 referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >".	Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >" (TRBL 06-0100)
1793	Because the Disk Drive which configures the LU was blocked after executing the Modular Volume Migration for the LU during the execution of the forced parity correction, the status of the forced parity correction changed to "Uncorrected 1" or "Uncorrected 2".	①-1. Check that the status of the LU of the P-VOL or the S-VOL is "Uncorrected and Drive Detached" or "Correction Aborted" from the Storage Navigator Modular.	–
		①-2. Recover the consistency of the parity of the LU or execute the restoration of the user data corresponding to the status of the LU checked in ①-1 referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >".	Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >" (TRBL 06-0100)

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Failure factor codes	Factors of the abnormal termination	Recovery method	Reference page
1794	Because only the number that PIN in the LU was near the threshold was detected after executing the Modular Volume Migration for the LU during the execution of the forced parity correction, the forced parity correction was cancelled.	① 1. Check that "I1GH00 (or I1GJ00, I1GK00) Forced parity correction stopped by too many PINs" is displayed in the Information Message on WEB.	–
		2. Recover the PIN over, recover the consistency of the parity of the LU or restore the user data referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >" and Troubleshooting "6.1.3 The failure occurred immediately after being ready [Recovery method-4] Pin over occurred during the forced parity correction".	Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >" (TRBL 06-0100) Troubleshooting "6.1.3 The failure occurred immediately after being ready [Recovery method-4] Pin over occurred during the forced parity correction" (TRBL 06-0190)
1795	The incomplete write was detected after executing the Modular Volume Migration for the LU executing the forced parity correction.	① 1. Check that "I1GE00 Forced parity correction is stopped [Too many Unreadable PINs" is displayed in the Information Message on WEB.	–
		2. Recover the incomplete write, recover the consistency of the parity of the LU or restore the user data referring to Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >"" and Troubleshooting "6.1.3 The failure occurred immediately after being ready [Recovery method-5] Incomplete write occurred during the forced parity correction".	Troubleshooting "6.1.3 The failure occurred immediately after being ready < Forced Parity Collection Maintenance Flow >" (TRBL 06-0100) Troubleshooting "6.1.3 The failure occurred immediately after being ready [Recovery method-5] Incomplete write occurred during the forced parity correction" (TRBL 06-0210)
2049	The internal processing to switch the owner right of the LU between the Control Unit operated during the execution of the Modular Volume Migration, but the internal processing timed out because the load of I/O to the LU was heavy.	① The cause that the executing Modular Volume Migration terminated abnormally is because the internal processing timed out the heavy load of I/O to the LU of the pair. There is no failed part.	–
		② If the Modular Volume Migration repeatedly terminates abnormally due to this factor, execute the Modular Volume Migration to the LU before releasing the pair when the load of I/O to the LU of the pair becomes light.	–

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Replacement

Chapter 1. Before Starting Maintenance Work ..... REP 01-0000
Chapter 2. Parts Replacement ..... REP 02-0000
Chapter 3. Periodic Maintenance ..... REP 03-0000
Chapter 4. Maintenance Tools ..... REP 04-0000
Chapter 5. Recycling ..... REP 05-0000

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Chapter 1. Before Starting Maintenance Work

This chapter explains procedures for replacing parts which is specified as maintenance parts and identified as failed parts through troubleshooting, etc..

1.1 Before Starting Maintenance Work

1.1.1 Cautionary Notes

(1) Note at the time of the unpacking

- Unpack it indoor.
  Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rainwater.
- Work on the unpacking in the place where a rapid difference of temperature does not occur.
  It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(2) Perform the powering on/off operation correctly.

The power supplying condition applicable to the parts replacement varies depending on the part to be replaced. The powering on/off procedure also varies depending on the power supplying condition.

Perform the powering on/off operation following the procedure specified for each part replacement work. It is feared that user data is lost if the powering on/off operation is not done following the procedure correctly.

Since the power supplying system is duplicated, operate AC Power Unit Switch of the both systems when turning on/off the Power Unit.

⚠ CAUTION

- Do not disassemble or remodel parts for maintenance. Otherwise, a failure or a serious accident may be caused. Be sure to replace parts in units of formally defined maintenance part.
- When replacing the power supply, do it in haste after preparing a replacement power supply and arranging cables, etc. so that they do not disturb the replacement.

⚠ CAUTION

- When doing a hot replacement of a part, do not wear metallic accessories or a watch so as to avoid an electric shock. Be careful not to touch any of live parts with a screwdriver, etc.

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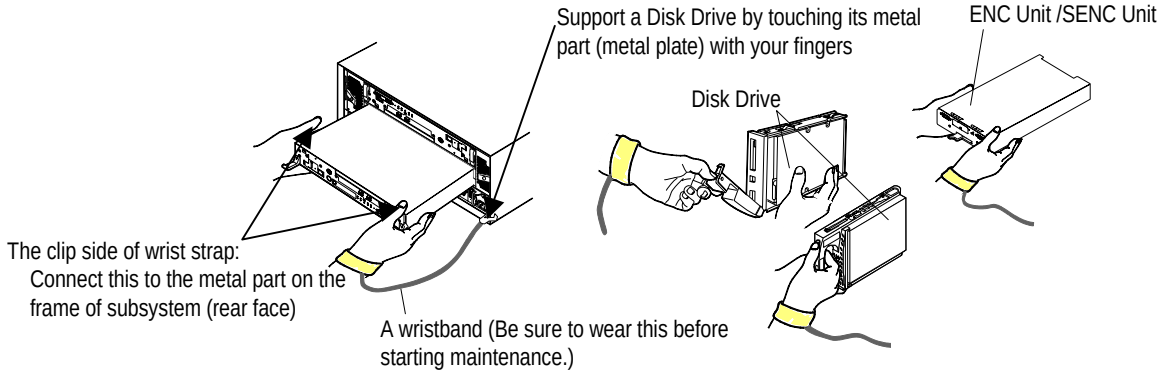
(3) Notes when Unpacking, Installing or Removing the Parts

For installing or removing the parts, do not apply any shock as the precise parts are installed. Be sure to wear a wrist strap connected to the chassis frame before starting the work and do not take it off until it is finished.

For installing the Disk Drive, Control Unit, ENC Unit, or SENC Unit, support it as touching the metal part at the side with the fingers of the hand that wears a wrist strap.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate



(4) Notes on cable routing

(a) Handling of cables placed on the installation floor

- Protect the cables, which cannot be accommodated by the subsystem and thus laid on the floor or cross a passage, with the cable protection duct.
- For cables that relay between the subsystems, lay them on the floor and do not leave them from the floor.

(b) Handling of under floor cables when the subsystem is installed on the free access floor.

- Give extra lengths to cables routed under the floor and do not make them float in the air.

(c) Routing method

- Give a room for routing as earthquake and the like are considered.
- Give a room for routing not to disturb the part replacement for maintenance.
- Make the AC cables apart from each other and when they should be adjacent, do not make them in parallel but make them cross at right angle.
- When using a cable protection duct, be careful not to damage or cut cables by catching them.

(d) Hold the connector to insert or pull out a cable. If the cable part is pulled, it may cause a failure.

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(e) For connecting the FC I/F cable or the FC (ENC) cable, bend it with a long radius (not less than 30mm) and do not give the load to the cable and the connector.

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(5) Note on restarting

When restarting the subsystem, turn off the main switch (after the POWER LED lights off), and then turn on the main switch after waiting for one minute or more.

If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS. If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops. When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

(6) Note on completing the work

Close all the external covers when the work is completed.
(The cover is to maintain the performance of the subsystem (radio wave noise suppression and others), so that be sure to keep all the external covers closed to operate the subsystem normally.)

(7) Backup user data.

Backup user data in the subsystem by the operation on the host computer side.

(8) When replacing a Disk Drive, Control Unit, Cache Unit, Interface Board, Backup Battery Unit, an ENC Unit/SENC Unit, a Fan Assembly, and an Power Unit while an array unit is powered on, replace those units 20 seconds or more after their respective failed units are removed.

(9) When replacing the Disk Drive, Control Unit, Cache Unit, Interface Board, Backup Battery Unit, ENC Unit/SENC Unit, Fan Assembly, and Power Unit while the subsystem power is turned on, complete the replacement within five minutes. Otherwise, a powering off (subsystem down) may occur because of an abnormal temperature rise. Perform the part replacement in haste.

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(10) When the Power Unit and another module fail at the same time, replace the Power Unit first, duplicate the power supply again, and then replace the module. Otherwise, a powering off (subsystem down) may occur because of an abnormal temperature rise.

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(11) When inserting a component, do it completely to the end and quickly. If the insertion is made incompletely or extremely slowly, it is possible that the recovery from the error fails.

(12) When an allowable time limit for part replacement is specified in the replacement procedure, observe the time limit.

(13) With only the main switch power off, BS power supply is supplied. In this situation, do not leave the components removed from the subsystem for a long time. Because of an abnormal temperature, the power supply alarm can be given.

(14) Do not make the maintenance work when the READY LED (green) on the front of the Basic Chassis is blinking at high speed. When it is high-speed blinking, the ENC/SENC firmware is being downloaded. Perform the maintenance work after checking that the READY LED (green) on the front of the Basic Chassis lights up after waiting for the maximum of 30 to 50 minutes (or 40 to 60 minutes in case of RKH).

(15) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the maintenance work. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the maintenance work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up in the maximum of 30 to 85 minutes.

(16) Back end LOOP automatic operation diagnosis is being executed, and interrupt the maintenance work even of the diagnosis end, please when "I5Y000 Obstacle HDU search start" is displayed on "Information Message" of WEB. Please restart the maintenance work after confirming diagnosis end message (I5Y100 Obstacle HDU search end). Please execute the maintenance work according to the instruction when an abnormal device and another trouble message have been generated the diagnosis and after the diagnosis ends.

(17) When the buzzer sound rumbles in the maintenance work, back end LOOP automatic operation diagnosis might be executed by another trouble occurrence. Please reconfirm the state of the disk array device (device LED and WEB, etc.) after the maintenance work is temporarily interrupted, and it waits for one minute or more.

(18) Notes while the array subsystem is being started
Because the status where the array subsystem is being started is in the middle of the transition to the status of the subsystem power turned on (Ready status) from the status of the subsystem power turned off, do not replace the parts while the array subsystem is being started.
Replace the parts after the array subsystem become the Ready status.

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1.1.2 Checking cache memory in the back-up state

Before turning off the power, be sure to check the state of the cache memory backup, and perform the work in the state that the cache backup mode is canceled.

The Cache memory installed in the subsystem is controlled with a write-after method.
When the power is turned off, the subsystem automatically writes data in the Cache Unit left unwritten onto the Disk Drive. This operation is called a destaging.
When process is completed, the POWER LED goes out and the power supplied to each section installed is turned off.
However, when the destaging cannot be completed when the power is turned off owing to the unexpected power failure or by the operation of the circuit breaker, the Cache Unit enters the cache backup mode in which the power is supplied by the battery to secure the data.
If the backup is not done normally, configuration information may be lost and user data may be destroyed.

- Confirming state of the Cache Unit backup
  You can confirm whether the subsystem is in the cache backup state by viewing the indication of the CACHE POWER LED (green) on the Control Unit.
  The state of the cache backup can be confirmed in the following procedure. The location of components referred to in the flow chart is shown in "Figure 1.1.3 Indication Name (Basic subsystem)" (REP 01-0051), "Figure 1.1.3.1 Indication Name (Additional subsystem)" (REP 01-0052), "Figure 1.1.4 Indication Name (Floor Model)" (REP 01-0060), and "Figure 1.1.4.1 Indication Name (Floor Model)" (REP 01-0061).

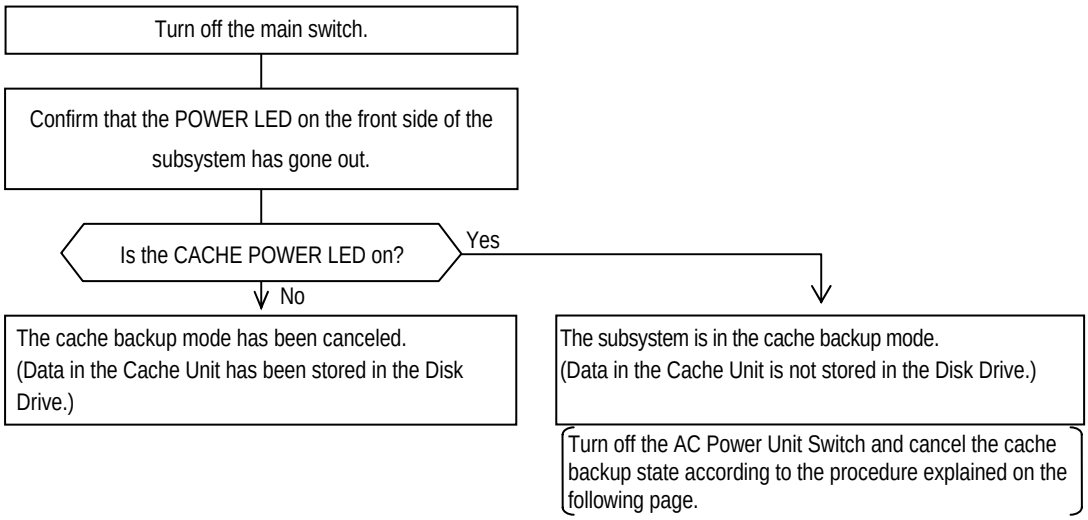
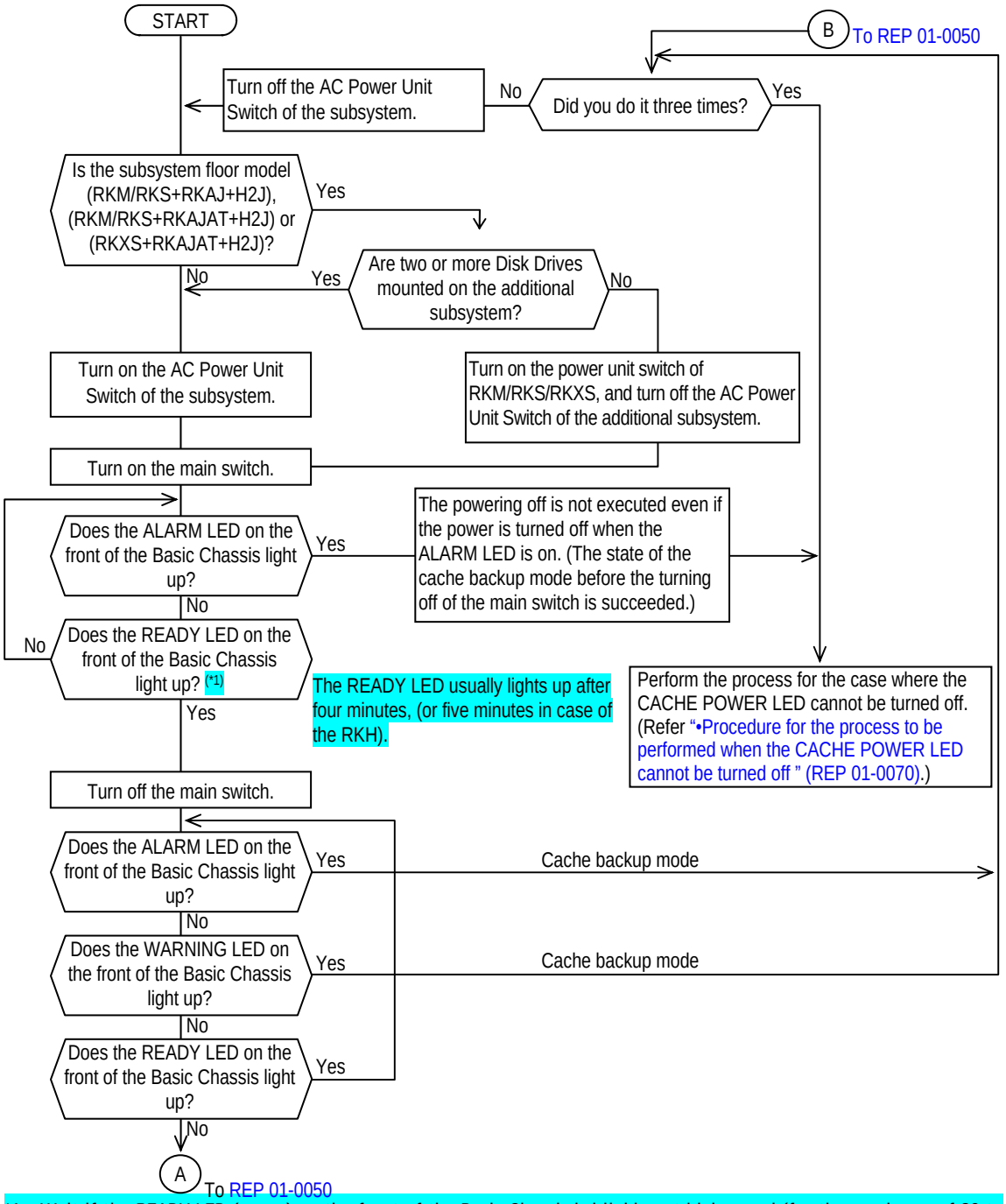


Figure 1.1.1 Procedure for Confirming State of Cache Backup

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- Procedure for canceling the cache backup state of the Cache memory
  Follow the powering off procedure shown below to cancel the cache backup state of the Cache memory. The location of components referred to in the flow chart is shown in "Figure 1.1.3 Indication Name (Basic subsystem)" (REP 01-0051), "Figure 1.1.3.1 Indication Name (Additional subsystem)" (REP 01-0052), "Figure 1.1.4 Indication Name (Floor Model)" (REP 01-0060), and "Figure 1.1.4.1 Indication Name (Floor Model)" (REP 01-0061).



*1 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

Figure 1.1.2 Procedure for Canceling the Cache Backup Mode of the Cache Memory (1/2)

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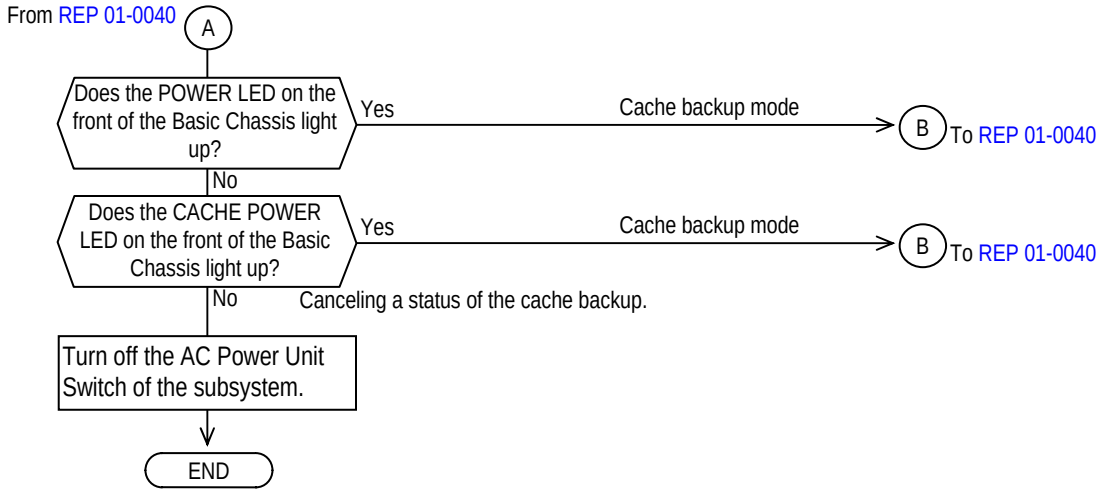


Figure 1.1.2 Procedure for Canceling the Cache Backup Mode of the Cache Memory (2/2)

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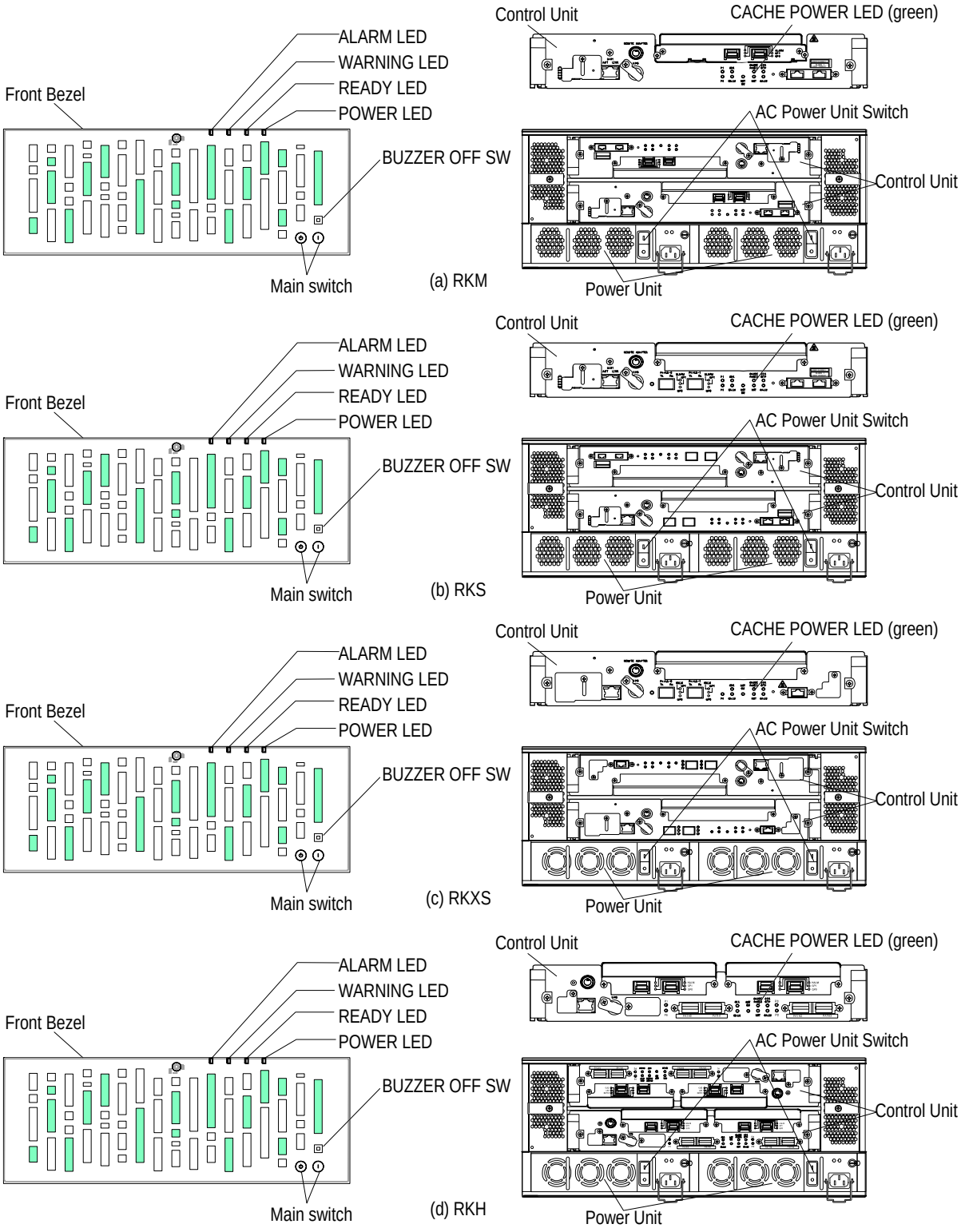


Figure 1.1.3 Indication Name (Basic subsystem)

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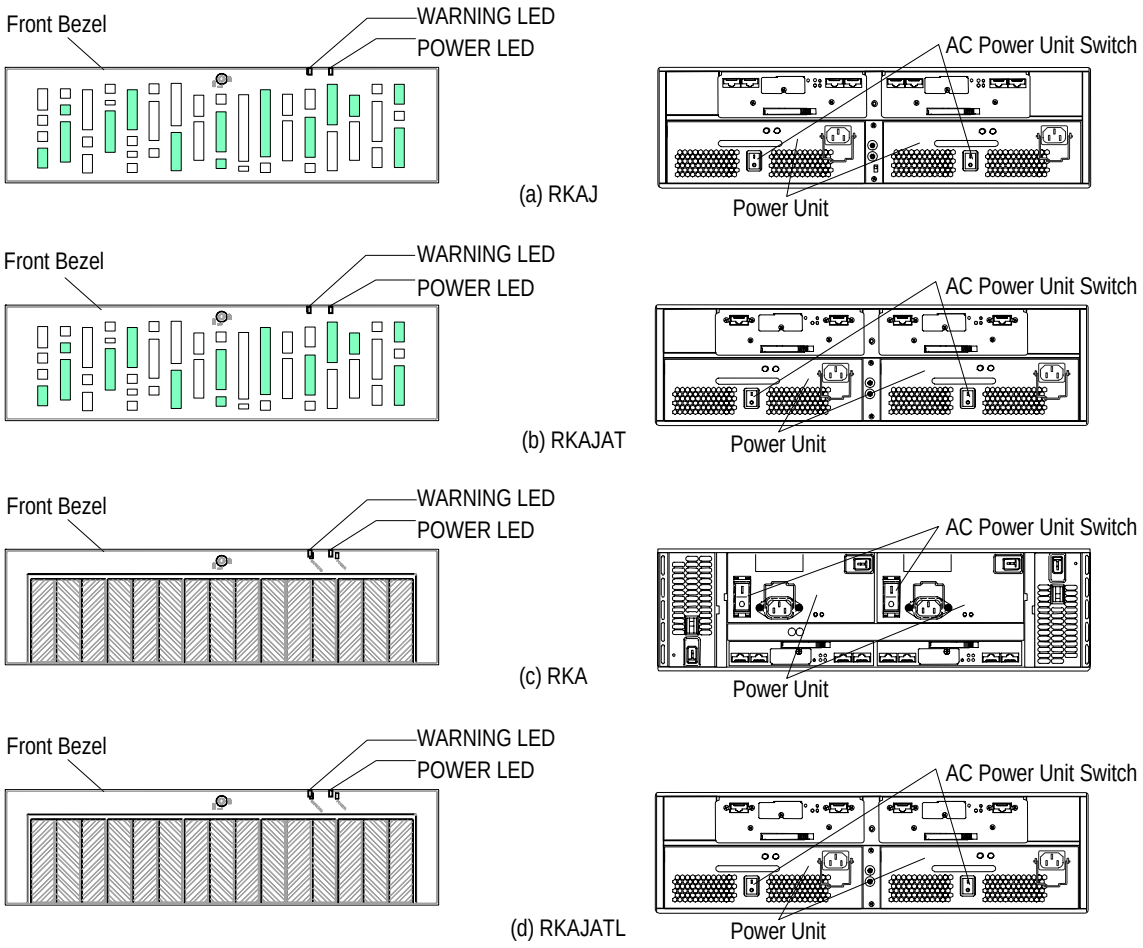


Figure 1.1.3.1 Indication Name (Additional subsystem)

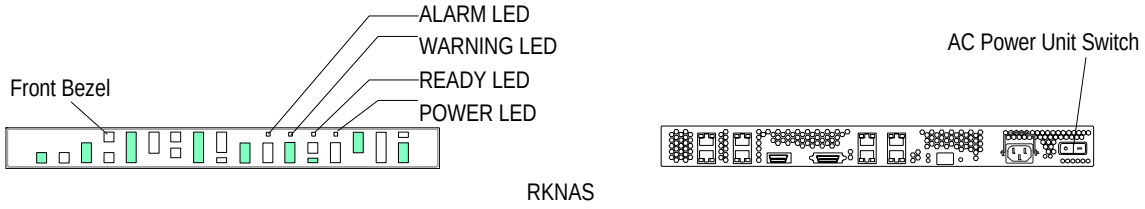


Figure 1.1.3.2 Indication Name (NAS Model)

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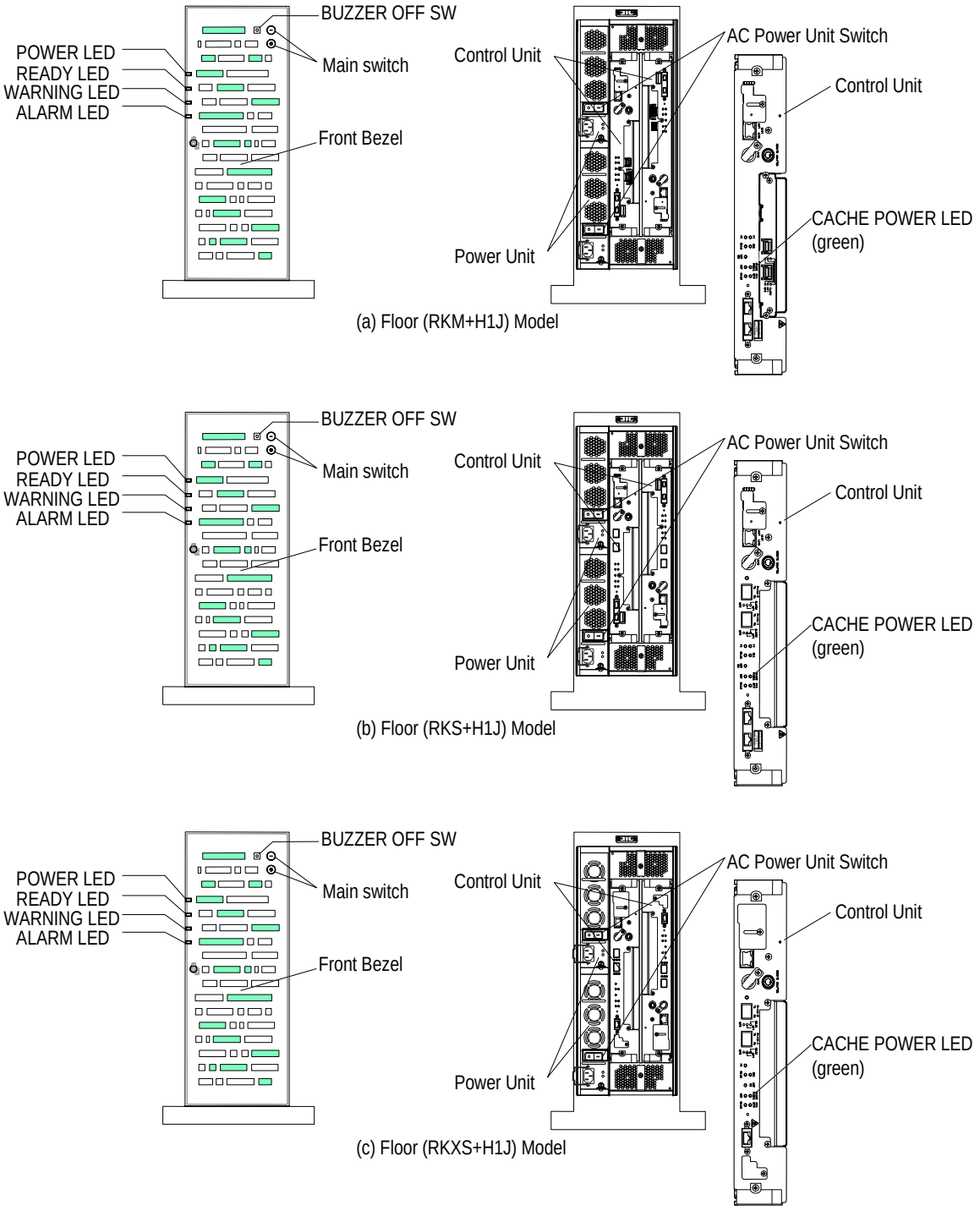


Figure 1.1.4 Indication Name (Floor Model)

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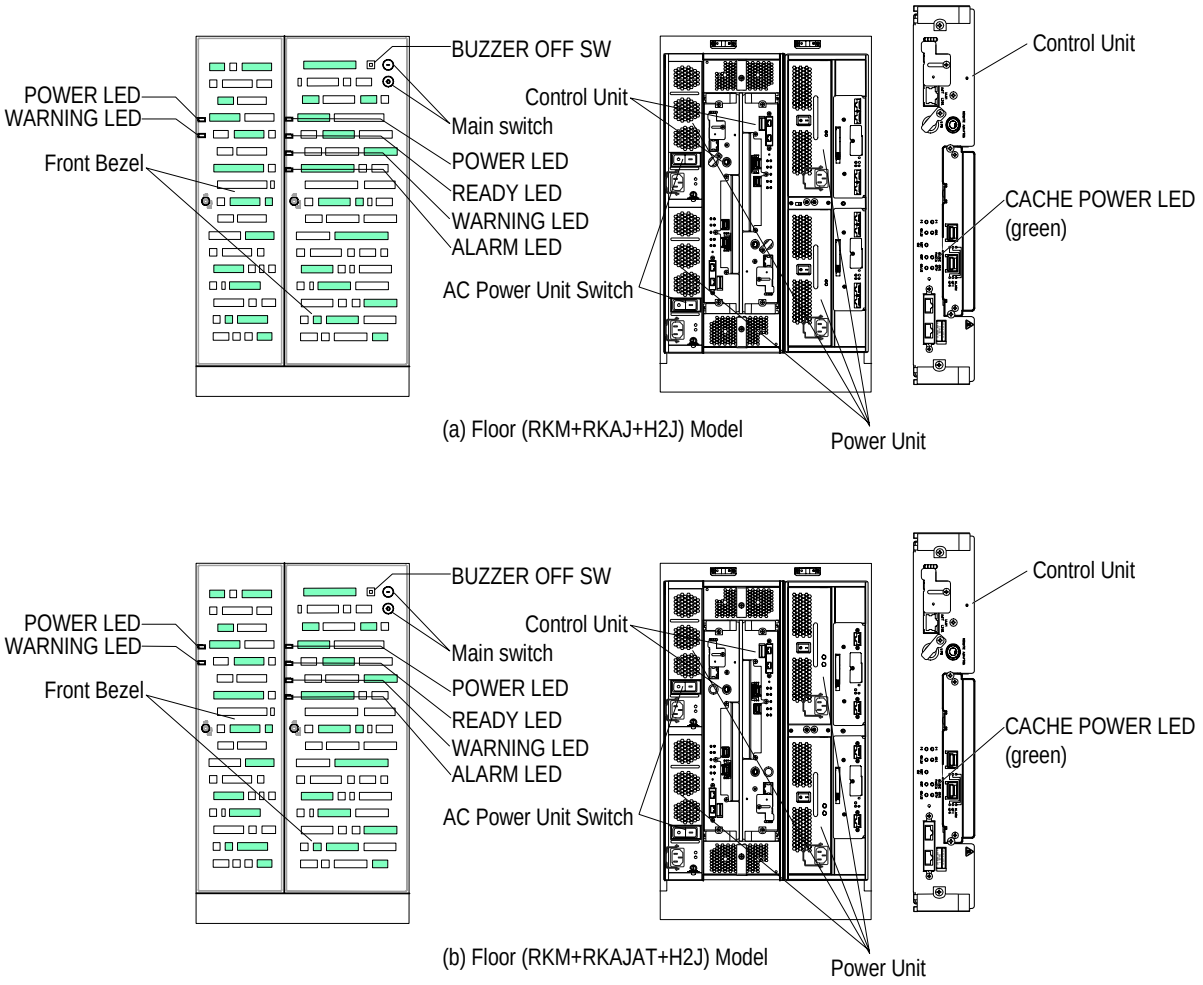


Figure 1.1.4.1 Indication Name (Floor Model) 1

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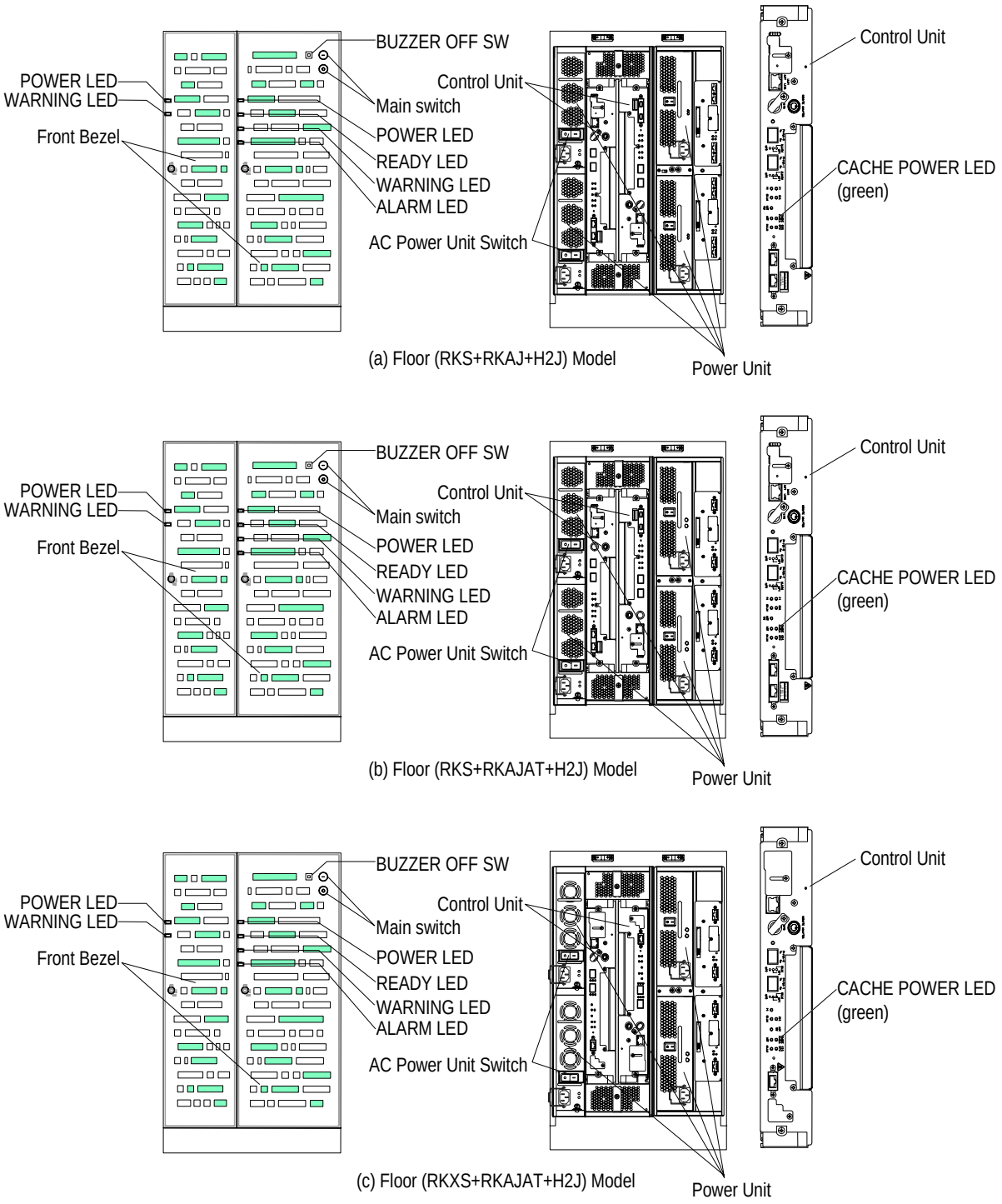


Figure 1.1.4.2 Indication Name (Floor Model) 2

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- Procedure for the process to be performed when the CACHE POWER LED cannot be turned off
  - ■ Items to be informed or asked the customer before starting the work
    - Inform that user data in the cache memory will be lost owing to the replacement of the Cache memory.
    - Ask whether backup data exists or not.
    - Ask whether it is permitted to erase user data entirely and restore it using user's backup data.
    - Inform that data recovery and verification will be required.
  - ■ Effect

    User data in the Cache memory which has not been written onto the Disk Drive will be lost owing to the replacement of the Controller.
  - ■ Processing procedures

    Either of the two procedures is used; a procedure using the forced parity correction(‡1) or that in which the data is entirely erased once, and then recovered.

    (1) Procedure using the forced parity correction

    It takes long times at the longest from start to completion of the process to execute the forcible parity correction.

    For a standard time required for the forced parity correction, refer to Troubleshooting "< Standard time required for the forced parity correction >" (TRBL 06-0400).

‡1 : A process to ensure the Disk Drive data consistency which has been lost owing to a loss of cache data. It cannot recover the data unwritten onto the Disk Drive completely when an error occurs, therefore, verification of user data and restoration of backup data are necessary.

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(2) Procedure not using the forced parity correction
When the forced parity correction takes a long time depending on the system configuration, it is faster to restore data using the backup data after erasing and resetting configuration information than to do it by executing the procedure in (1).

NOTE : When not performing Forced Parity Correction, be sure to format the LU. (Refer to System Parameter "[Procedure ③-F] Formatting LU" (SYSPR 03-0280))
If formatting is not performed, parity consistency is lost and data inconsistency may occur.

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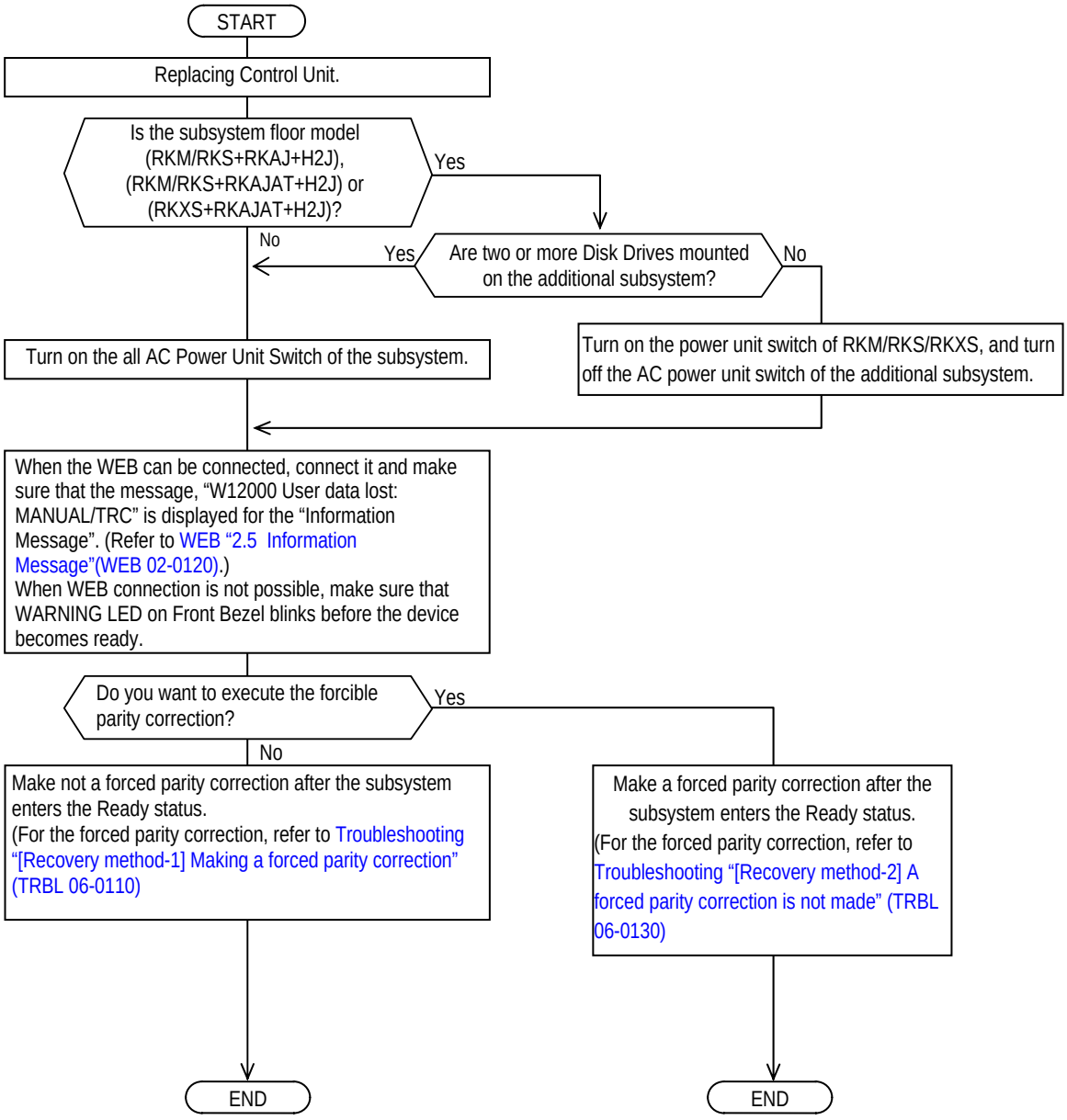


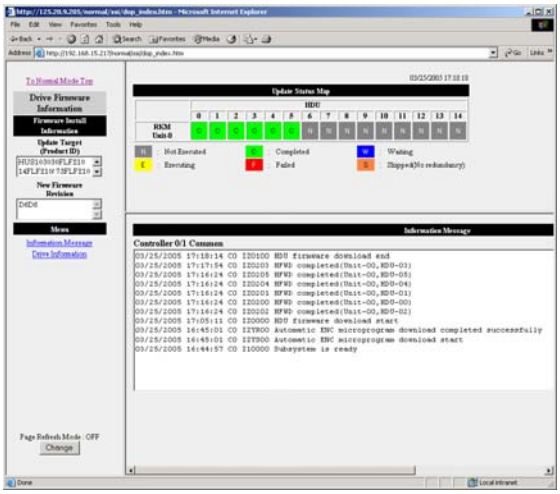
Figure 1.1.5 Procedure for the Process to be Performed when the BACK UP LED cannot be turned off

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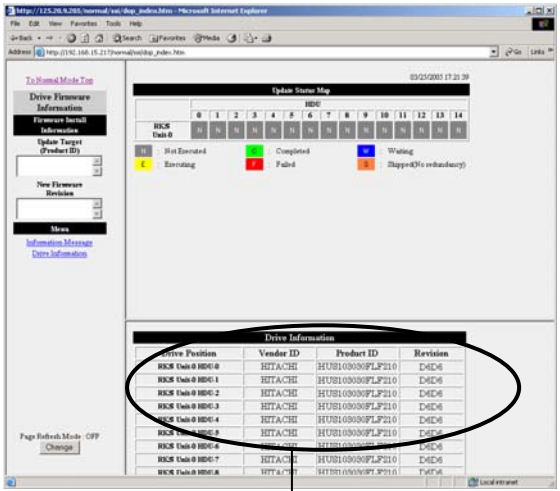
1.1.3 Procedure for making sure of model name and drive firmware of Disk Drive

When it is required to make sure of a model name and/or drive firmware of the Disk Drive in the case of Disk Drive replacement, etc., make sure of them following the procedure shown below.

(1) Displaying the reference window
To display the reference window, enter "http://(IP address)/drvfirm" in the [Address] of the WEB browser.
In the case of the dual system configuration, enter an IP address of any one of the control units. When the connection is made, the following window is displayed.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].



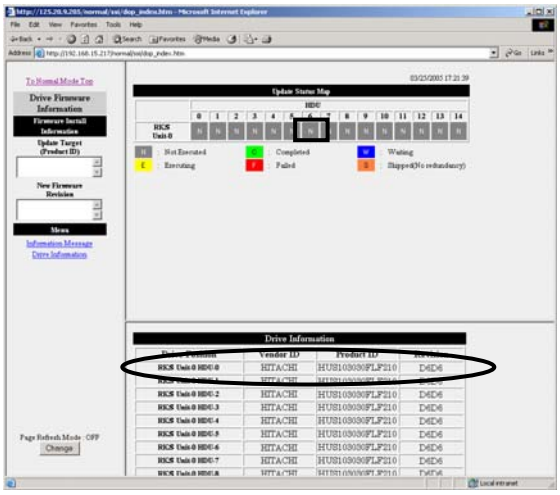
(2) Displaying the list of model names and drive firmware revisions of Disk Drives click [Drive Information] in the [Menu] of the [Drive Firmware Information].



List of model names and drive firmware revisions of the Disk Drives.
Product ID : Disk Drive Model name.
Revision : Drive firmware revision.

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(3) Making sure of a model name and drive firmware revision of the Disk Drive concerned
Since information on the Disk Drive concerned is displayed at the top of the list when the position of the Disk Drive concerned is clicked, make sure of the model name and drive firmware revision of the Disk Drive concerned. (The following figure shows an example in which HDU-6 are selected.)



When the two or more Disk Drives concern, make sure of the necessary information by clicking each position of them.

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Chapter 2. Parts Replacement

2.1 Locations of Replacement Components

Floor model is installed on the floor in combination with the dedicated kit to RKM/RKS/RKXS, RKM/RKS+RKAJ, and RKXS+RKAJAT.
The RKAJAT has no floor model.

Check the installed parts and the power supply status at the time of replacement in Table 2.1.1 and replace the parts.

Table 2.1.1 Locations of the parts to be replaced and power supply status

	No.	Part name	Part No.	Model	Status of the host/subsystem(*1)			Reference section
					With I/O	Without I/O		
					On line	On line	Off line	
Parts	1	Disk Drive (71.3 G bytes) (RKM/RKS/RKAJ)	3272219-A	DF-F700-AGF72	○	○	×	"2.2.1 Replacing Disk Drive" (REP 02-0050)
		Disk Drive (71.3 G bytes) (RKM/RKS/RKAJ)	3272219-B	DF-F700-AGH72	○	○	×	
		Disk Drive (71.3 G bytes) (RKA)	5507353-2	DF-F600-AEF72	○	○	×	
		Disk Drive (71.3 G bytes) (RKA)	5507353-3	DF-F600-AEH72	○	○	×	
		Disk Drive (143.3 G bytes) (RKM/RKS/RKAJ)	3272219-C	DF-F700-AGF146	○	○	×	
		Disk Drive (143.3 G bytes) (RKM/RKS/RKAJ)	3272219-D	DF-F700-AGH146	○	○	×	
		Disk Drive (143.3 G bytes) (RKA)	5507353-4	DF-F600-AEF146	○	○	×	
		Disk Drive (143.3 G bytes) (RKA)	5507353-5	DF-F600-AEH146	○	○	×	
		Disk Drive (287.6 G bytes) (RKM/RKS/RKAJ)	3272219-E	DF-F700-AGF300	○	○	×	
		Disk Drive (287.6 G bytes) (RKA)	5507353-79	DF-F600-AEF300	○	○	×	
		Disk Drive (245.7 G bytes) (RKXS/RKAJAT)	3272215-A	DF-F700-ATE250R	○	○	×	
		Disk Drive (245.7 G bytes) (RKAJAT)	3272215-A	DF-F600-ATE250R	○	○	×	
		Disk Drive (245.7 G bytes) (RKAJATL)	3272215-C	DF-F600-ATE250LR	○	○	×	
		Disk Drive (393.4 G bytes) (RKAJATL)	3272215-D	DF-F600-ATE-400LR	○	○	×	
		Disk Drive (393.4 G bytes) (RKXS/RKAJAT)	3272215-B	DF-F700-ATE400R	○	○	×	
		Disk Drive (393.4 G bytes) (RKAJAT)	3272215-B	DF-F600-ATE400R	○	○	×	
		Disk Drive (491.9 G bytes) (RKXS/RKAJAT)	3272215-E	DF-F700-ATE500R	○	○	×	

*1 : The status definitions of the host and the subsystem are as shown below.
- With I/O: Status that there is I/O from the host
- Without I/O: Status that there is no I/O from the host
- Online: Status of the subsystem powering on
- Off-line: Status of the subsystem powering off

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	No.	Part name	Part No.	Model	Status of the host/subsystem(*1)			Reference section
					With I/O	Without I/O		
					On line	On line	Off-line	
Parts	2	Backup Battery Unit	3272172-B	–	○	○	○	"2.2.2 Replacing Backup Battery Unit" (REP 02-0240)
		Backup Battery Unit (RKXS)	3274576-A	–	○	○	○	
		Backup Battery Unit (RKH)	3274669-A	–	○	○	○	
	3	Fan Assembly (RKM/RKS/RKXS/RKH)	3272172-C	–	○	○	○	"2.2.3 Replacing Fan Assembly" (REP 02-0300)
		Fan Assembly (RKA)	5507353-14	–	○	○	○	
	4	Power Unit (RKM/RKS)	3272172-A	–	○	○	○	"2.2.4 Replacing Power Unit" (REP 02-0340)
		Power Unit (RKXS/RKH)	3274575-A	–	○	○	○	
		Power Unit (RKAJ)	3272170-A	–	○	○	○	
		Power Unit (RKAJAT/RKAJATL)	3272170-A	–	○	○	○	
		Power Unit (RKA)	5507353-73	–	○	○	○	
	5	Control Unit (RKM)	3272218-A	DF-F700-F1JM	○(*2)	○(*2)	○(*3)	"2.2.5 Replacing Control Unit" (REP 02-0390)
		Control Unit (RKS)	3272218-B	DF-F700-F1JS	○(*2)	○(*2)	○(*3)	
		Control Unit (RKXS)	3274551-A	DF-F700-F1JXS	○(*2)	○(*2)	○(*3)	
		Control Unit (RKH)	3274670-A	DF-F700-F1JH	○(*2)	○(*2)	○(*3)	
		Control Unit (RKHE)	3274922-A	DF-F700-F2JH	○(*2)	○(*2)	○(*3)	
	6	Cache Unit (1,024 M bytes)	3272218-F	DF-F700-C1GJ	○(*4)	○(*4)	○	"2.2.6 Replacing Cache Unit" (REP 02-0540)
		Cache Unit (2,048 M bytes)	3272218-Q	DF-F700-C2GJ	○(*4)	○(*4)	○	
		Cache Unit (512 M bytes)	3274559-A	DF-F700-C512JX	○(*4)	○(*4)	○	
	7	FC Interface Board (RKM)	3272218-C	DF-F700-DJ4G2	○(*4)	○(*4)	○	"2.2.7 Replacing Interface Board" (REP 02-0660)
		FC Interface Board for addition (RKS/RKXS)	3274812-A	DF-F700-DJ4G2W	○(*4)	○(*4)	○	
		FC Interface Board (RKH)	3274783-A	DF-F700-DJ4G2H	○(*4)	○(*4)	○	
		NAS Interface Board (RKM/RKS/RKXS)	3272218-E	DF-F700-DJNAS	○(*4)	○(*4)	○	
		NAS Interface Board (RKH)	3274785-A	DF-F700-DJNASH	○(*4)	○(*4)	○	
		iSCSI Interface Board(RKM/RKS/RKXS)	3272218-D	DF-F700-DJSC2	○(*4)	○(*4)	○	
		iSCSI Interface Board (RKH)	3274784-A	DF-F700-DJSC2H	○(*4)	○(*4)	○	
	8	Host Connector (2 G bps)	3272218-G	–	○(*5)	○(*5)	○	"2.2.8 Replacing Host Connector" (REP 02-0770)
		Host Connector (4 G bps)	3272218-H	–	○(*5)	○(*5)	○	
	9	ENC Unit (RKAJ)	3272170-B	–	○	○	○	"2.2.9 Replacing ENC Unit/SENC Unit" (REP 02-0830)
		ENC Unit (RKA)	5507353-12	DF-F600-Y1HA	○	○	○	
	10	SENC Unit (RKAJAT/RKAJATL)	3272170-C	–	○	○	○	
	11	ENC Cable (5 m) (RKAJ/RKAJAT)	3272185-K	DF-F700-K5B	○	○	○	"2.2.10 Replacing ENC cable" (REP 02-0910)
		ENC Cable (1 m) (RKAJ/RKAJAT)	3272185-A	–	○	○	○	
		ENC Cable (0.75 m) (RKAJAT)	5507353-20	DF-F600-K075B	○	○	○	
		ENC Cable (0.5 m) (RKA)	5507353-15	–	○	○	○	

*1 : The status definitions of the host and the subsystem are as shown below.
- With I/O: Status that there is I/O from the host
- Without I/O: Status that there is no I/O from the host
- Online: Status of the subsystem powering on
- Off-line: Status of the subsystem powering off

*2 : The power can be on as long as the Power Unit is duplicated.
*3 : When Web cannot be connected, Control Unit, which is powering off in the dual controller configuration, cannot be replaced.
*4 : The power can be off if the Control Unit is duplicated.
*5 : The power can be off if the Control Unit is duplicated.

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	No.	Part name	Part No.	Model	Status of the host/subsystem(*1)			Reference section
					With I/O	Without I/O		
					On line	On line	Off-line	
Parts	12	Basic Chassis of Rack Mount Style	–	DF-700-RKM	×	×	○	"2.2.11 Replacing Basic Chassis of Rack Mount Style" (REP 02-0950)
			–	DF-700-RKS	×	×	○	
			–	DF-700-RKXS	×	×	○	
			–	DF-700-RKH	×	×	○	
	13	Additional Chassis of Rack Mount Style	–	DF-700-RKAJ	×	×	○	"2.2.12 Replacing Additional Chassis of Rack Mount Style" (REP 02-0990)
			–	DF-700-RKAJAT	×	×	○	
			5507353-36	DF-600-RKA	×	×	○	
			5523443-D	DF-600-RKAJAT	×	×	○	
			5523234-34	DF-600-RKAJATL	×	×	○	
	14	Remote Adapter	3274538-A	DF-F700-VR4A (Main unit)	○(*2)	○(*2)	○	"2.2.13 Replacing Remote Adapter" (REP 02-1030)
			3274538-B	DF-F700-VR4H (Hub)	○(*2)	○(*2)	○	
	15	Front Bezel (RKM/RKS/RKXS/RKH)	3274852-A	–	○	○	○	"2.2.14 Replacing Front Bezel" (REP 02-1041)
		Front Bezel (RKAJ/RKAJAT)	3274515-B	–	○	○	○	

*1 : The status definitions of the host and the subsystem are as shown below.
- With I/O: Status that there is I/O from the host
- Without I/O: Status that there is no I/O from the host
- Online: Status of the subsystem powering on
- Off-line: Status of the subsystem powering off

*2 : The power can be on as long as the Power Unit is duplicated.

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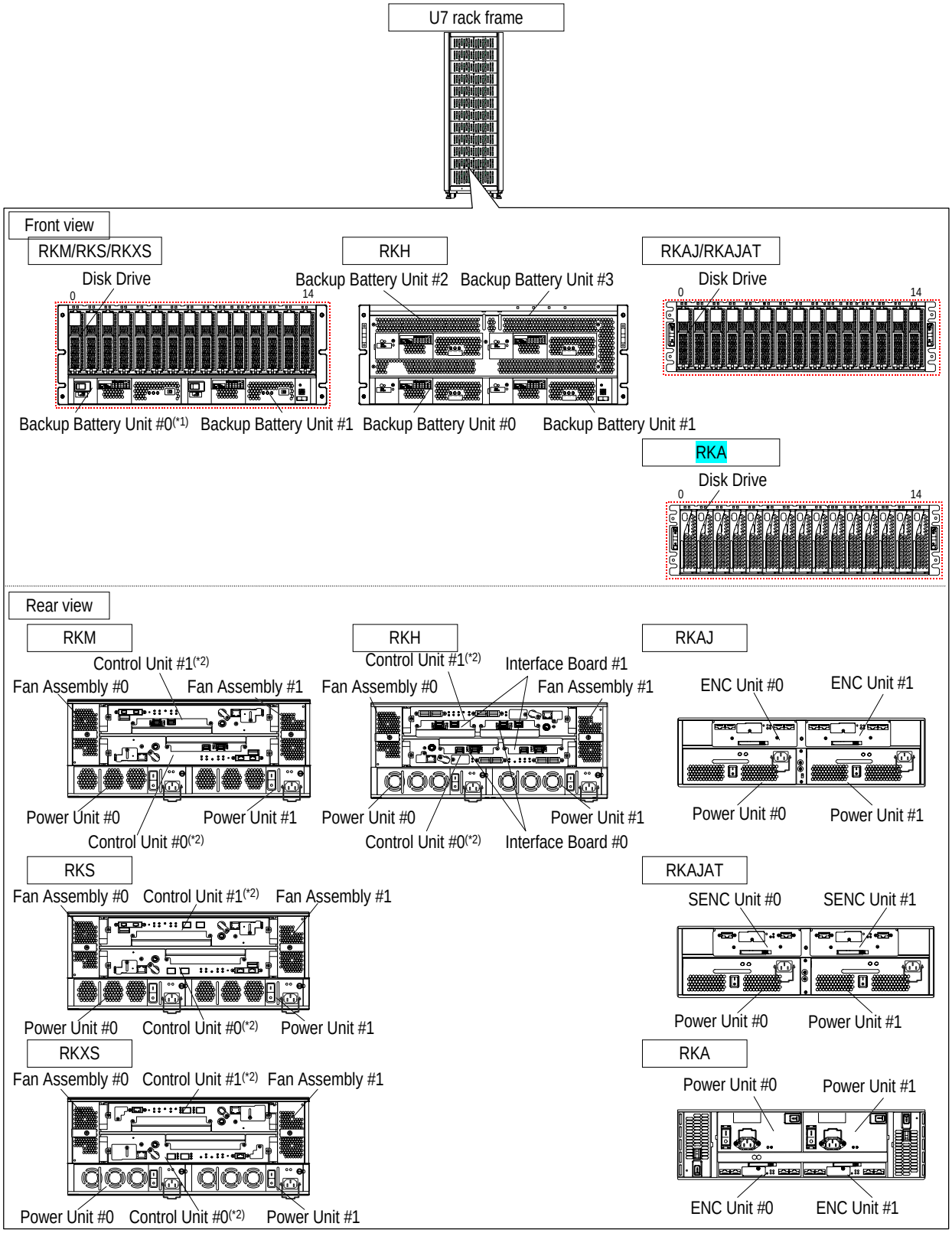
Table 2.1.1.1 Locations of the parts to be replaced and power supply status (for NAS Unit)

	No.	Part name	Part No.	Model	Status of the host/subsystem(*1)			Reference section
					With I/O	Without I/O		
					On line	On line	Off-line	
Parts (for NAS Unit)	1	Power Unit (RKNAS)	3274667-B	–	×	×	○	"2.3.1 Replacing the Power Unit" (REP 02-1060)
	2	Replacing the Fan Assembly (RKNAS)	3274700-A	–	×	×	○	"2.3.2 Replacing the Fan Assembly" (REP 02-1090)
	3	Memory (DIMM) (1,024 M bytes)	3274689-A	–	×	×	○	"2.3.3 Replacing the Memory (DIMM)" (REP 02-1120)
	4	Host Connector (RKNAS)	3272218-G	–	○	○	○	"2.3.4 Replacing the Host Connector" (REP 02-1140)
	5	NAS Interface cable (PCI-Express)	3274707-A	–	×	×	○	"2.3.5 Replacing the NAS Interface cable" (REP 02-1200)
		NAS Interface cable (CTRL)	3274707-B	–	×	×	○	
	6	NAS Chassis (RKNAS)	3274718-B	–	×	×	○	"2.3.6 Replacing the NAS Chassis" (REP 02-1210)
	7	Front Bezel	3274717-A	–	○	○	○	"2.3.7 Replacing Front Bezel of RKNAS" (REP 02-1240)

*1 : The status definitions of the host and the subsystem are as shown below.
- With I/O: Status that there is I/O from the host
- Without I/O: Status that there is no I/O from the host
- Online: Status of the NAS Unit powering on
- Off-line: Status of the NAS Unit powering off

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2.1.1 Part Locations of Rackmount Model



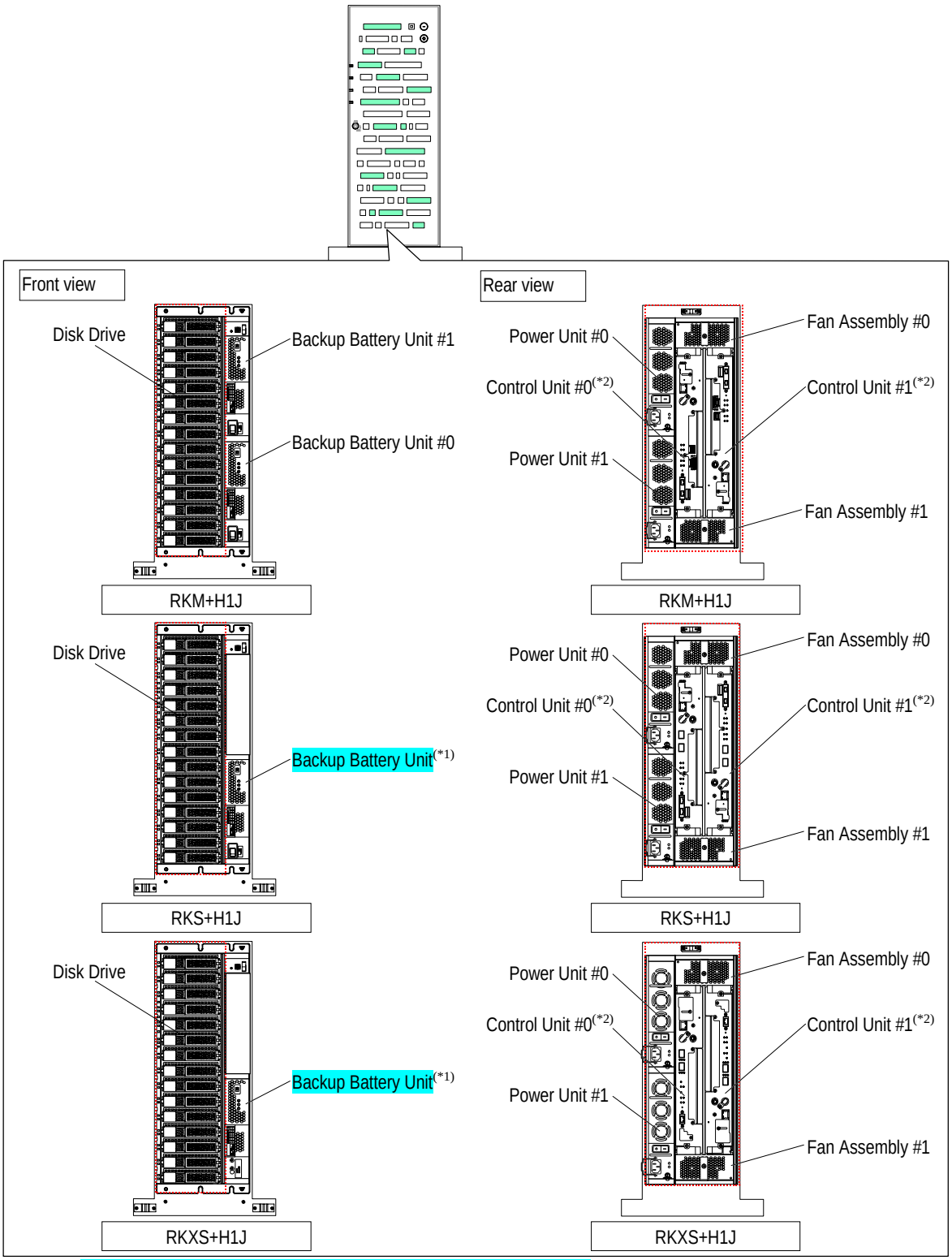
*1 : Only one battery is installed in RKS/RKXS on the left side of the subsystem viewing from the front side.
*2 : Cache Memory and Interface Board are installed in the Control Unit.

Figure 2.1.1 Replaceable Part Locations of Rackmount Model

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2.1.2 Part Locations of Floor Model

(1) Floor (H1J) Model

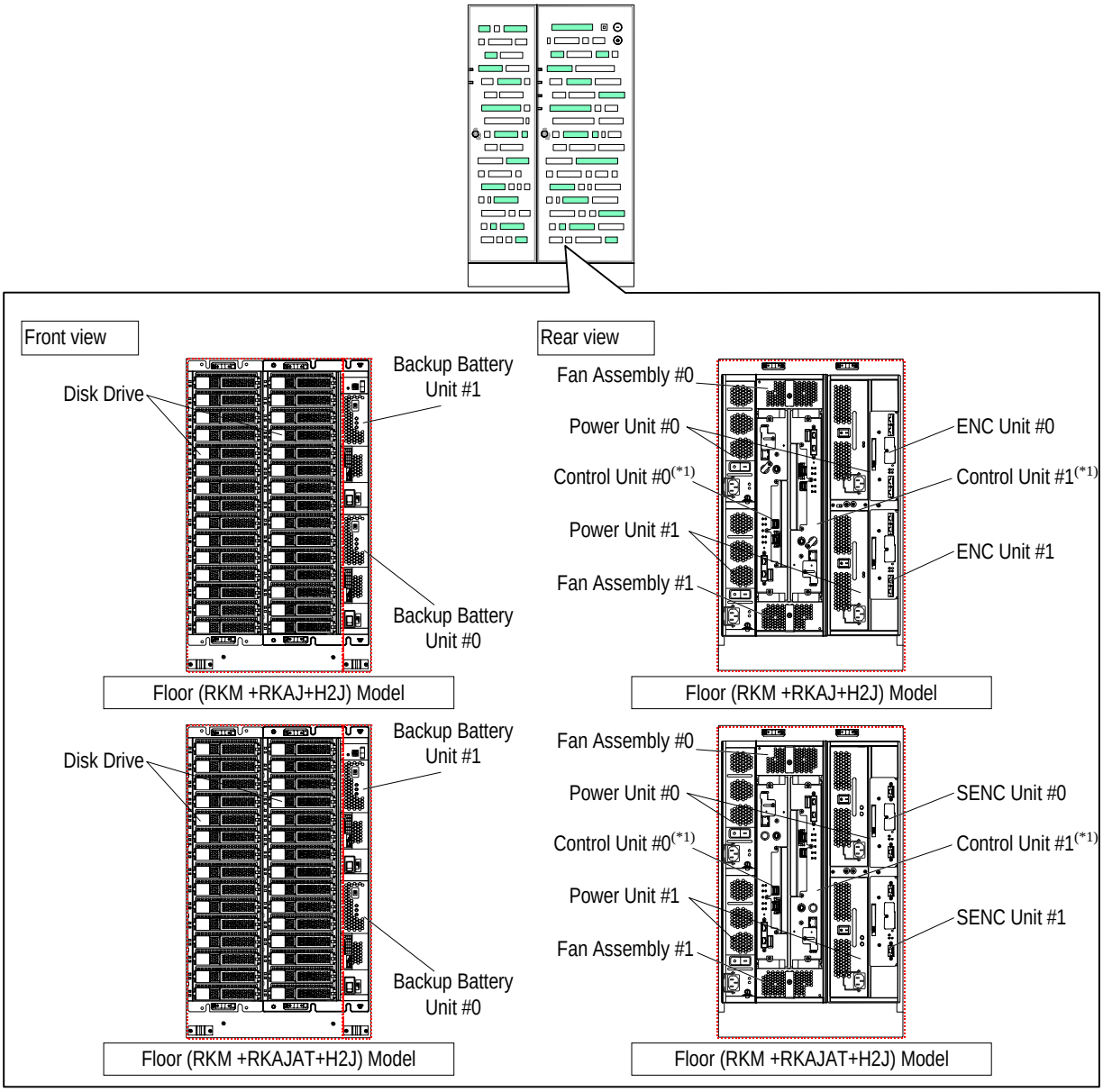


*1 : Only one Backup Battery Unit (ASSY) is installed in the RKS/RKXS.
*2 : Cache Memory and Interface Board are installed in the Control Unit.

Figure 2.1.2 Replaceable Part Locations of Floor Model (H1J)

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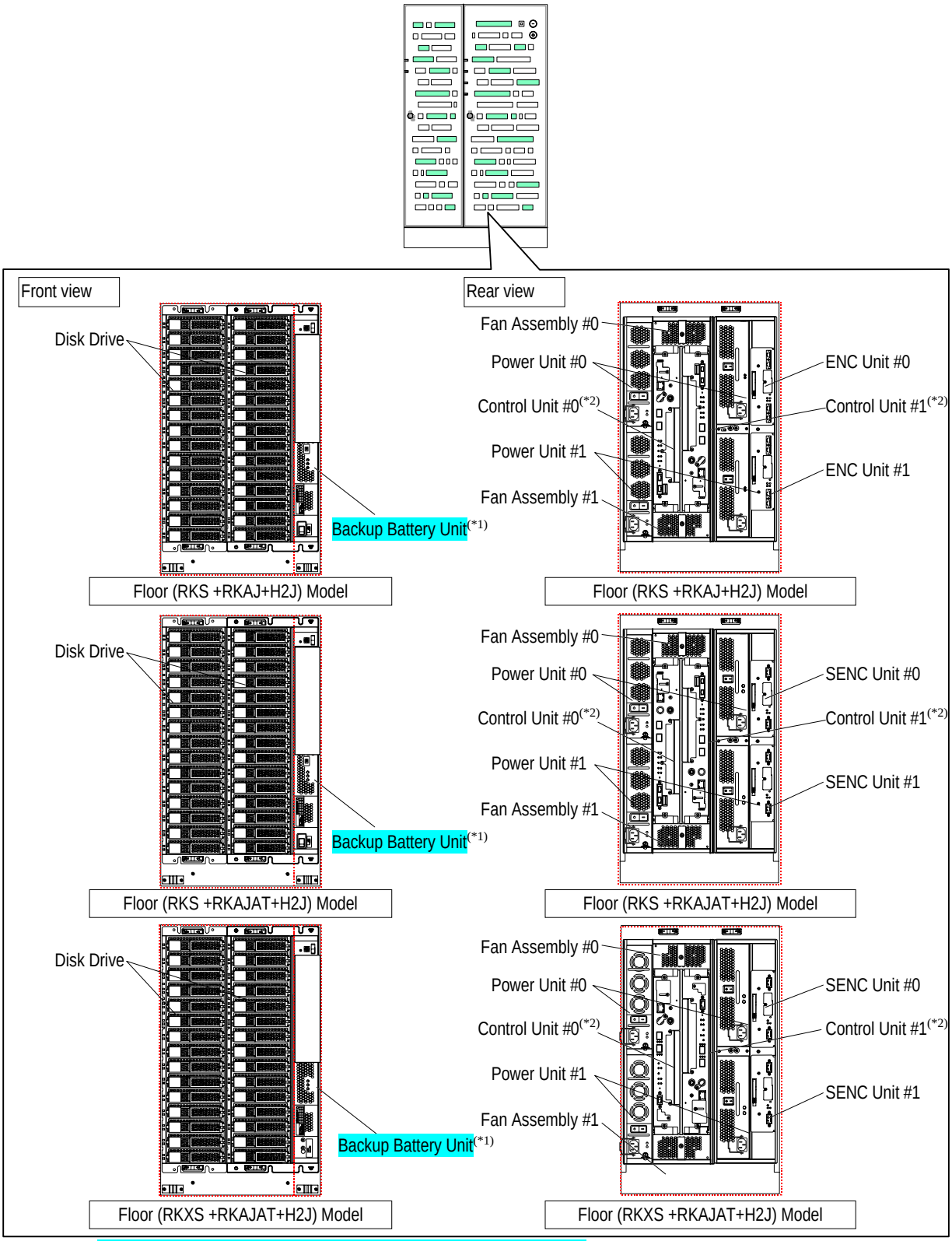
(2) Floor (H2J) Model



*1 : Cache Memory and Interface Board are installed in the Control Unit.

Figure 2.1.3 Replaceable Part Locations of Floor Model (H2J) 1

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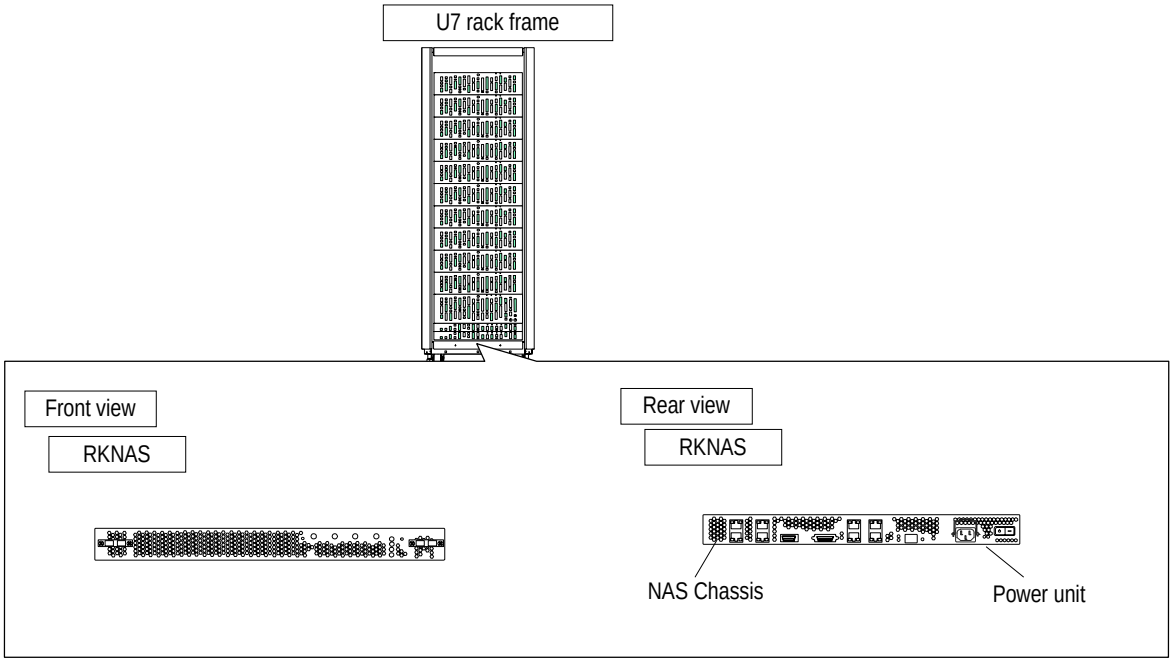
*1 : Only one Backup Battery Unit (ASSY) is installed in the RKS/RKXS.

*2 : Cache Memory and Interface Board are installed in the Control Unit.

Figure 2.1.3.1 Replaceable Part Locations of Floor Model (H2J)

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2.1.3 Part Locations of NAS Unit



*1 : Memory (DIMM) is installed in the NAS Chassis.

Figure 2.1.3.2 Replaceable Part Locations of NAS Unit

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2.2 Replacement of Components

The parts replacements here are illustrated using a rackmount model. For floor model, install each part in the vertical position.

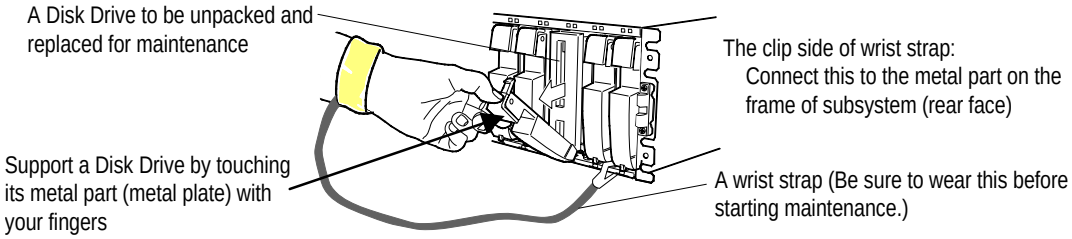
Where to install a component is shown in "2.1 Locations of Replacement Components" (REP 02-0000).

2.2.1 Replacing Disk Drive

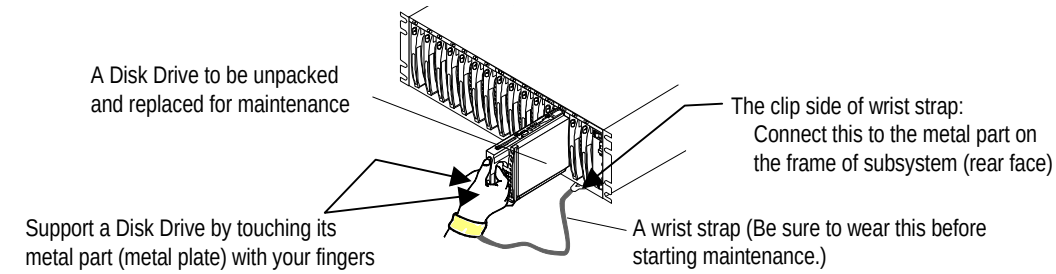
The replacement procedure for the Disk Drive differs depending on the spare disk setting, RAID configuration, data recovery setting mode, or the spare drive operation mode (‡1) (variable or fixed).
Perform the replacement following the procedure shown below.
The Disk Drive is a precision machine that may have troubles because of electrostatic discharge. Be sure to put on the wristband before star Sting work in order to protect Disk Drives from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.

- In the case of RKM/RKS/RKXS/RKAJ/RKAJAT/RKAJATL



- In the case of RKA



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‡1 : Spare Drive : Set whether to make the Copy backless function enable or disable. (Refer to Theory “4.6 (3) Operation after replacing the failed Disk Drive” (THEO 04-0240).)

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(a) Locations and numbers of Disk Drives

The installation position of a Disk Drive is specified in the combination of a device number (device ID) and a Disk Drive number.

Set #0 for the device ID of RKM/RKS/RKXS and set the device ID of additional subsystem as follows.

Set the device ID of the RKAJ/RKA as #0x for PATH#0, #1 and #1x for PATH#2, #3.

Set #2x for the device ID of RKAJAT connected to PATH #0, set #3x for the device ID of RKAJAT connected to PATH #1, set #4x for the device ID of RKAJAT connected to PATH #2 and set #5x for the device ID of RKAJAT connected to PATH #3.

Set #2x for the device ID of RKAJAT/RKAJATL to be connected to RKXS.

There is no device ID for the RKH.

NOTE : Set x in ascending order in PATH #0 and #1 without the distinction of RKAJ/RKAJAT/RKAJATL/RKA.

For details of the device ID setting, refer to Installation "1.6 Device ID Setting and ENC Cable Connection" (INST 01-0160).

Set the subsystem identification switch for the RKAJ.

When the basic subsystem to be connected is the RKH/RKM, set it in the M side, and when it is the RKS, set it in the S side.

The Disk Drive number is #0 to #14 from the left sequentially seen sideways (for the floor model, it is #0 to #14 from the bottom).

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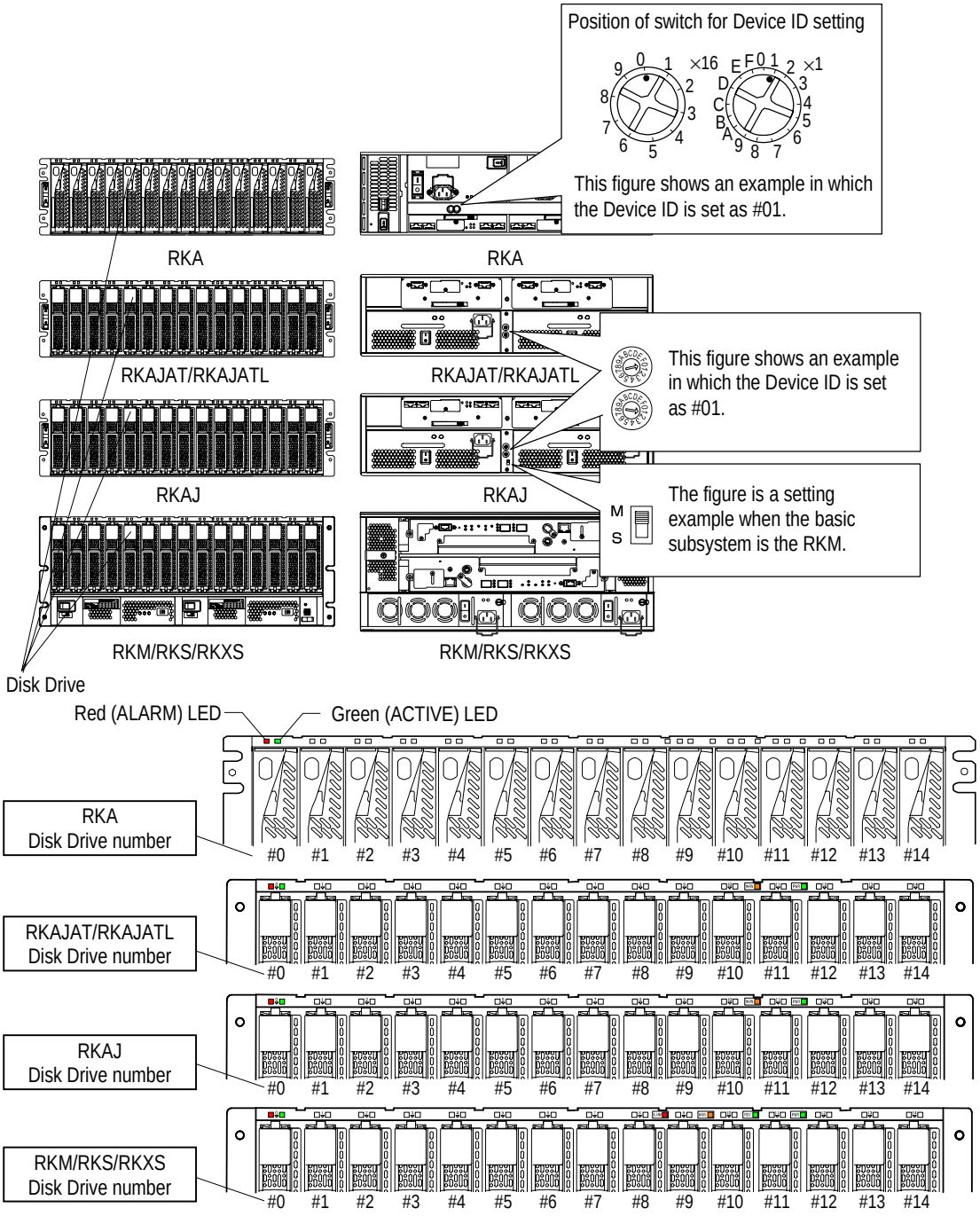


Figure 2.2.1 Disk Drive Mounting Location

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(1) Replacing Disk Drive

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.
- For the system Disk Drives (The Disk Drives #0 to #4 of the RKM/RKS/RKXS or the Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID#0 connected to the RKH) regardless of the data Disk Drives, the Spare Drives and the Disk Drives which do not configure the RAID group, do not remove the Disk Drives #0 and #1 at the same time with the subsystem power turned on.
  There is a possibility of downing the subsystem if removing them.
- When only two Disk Drives (the Disk Drives #0 and #1) are installed in the RKM/RKS or the RKAJ corresponding to the unit ID#0 connected to the RKH, do not remove these two at the same time.
  Be careful of the subsystem down if removing them.
- For RKXS in which only three Disk Drives (Disk Drive #0 to #2) are installed, do not remove these three at the same time. Be careful that the subsystem may go down if they are removed.

NOTE : • Back end LOOP automatic operation diagnosis is being executed, and interrupt the maintenance work even of the diagnosis end, please when "I5Y000 Obstacle HDU search start" is displayed on "Information Message" of WEB. Please restart the maintenance work after confirming diagnosis end message (I5Y100 Obstacle HDU search end). Please execute the maintenance work according to the instruction when an abnormal device and another trouble message have been generated the diagnosis and after the diagnosis ends.

• When the buzzer sound rumbles in the maintenance work, back end LOOP automatic operation diagnosis might be executed by another trouble occurrence. Please reconfirm the state of the disk array device (device LED and WEB, etc.) after the maintenance work is temporarily interrupted, and it waits for one minute or more.

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Select a procedure from the following and execute it.

No.	Power status during the replacement	Restrictions	RAID level		Reference section
1	Replacement with the power turned on (hot replacement)	1. Replaceable only while power is on 2. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 3. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 4. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	The Spare Disk is set	RAID 0(*1) RAID 1, RAID 5, RAID 6, and RAID 1+0	When the red (ALARM) LED on the disk drive to be replaced is on. See "(a-1) When the red (ALARM) LED on the Disk Drive to be replaced is on." (REP 02-0090). When the red (ALARM) LED on the disk drive to be replaced is off. See "(a-2) When the red (ALARM) LED on the Disk Drive to be replaced is off." (REP 02-0130).
			The Spare Disk is not set or there is no Spare Disk that can be used	RAID 0(*1)	See "(b-3) Replacement of Disk Drive under RAID 0 configuration" (REP 02-0180).
				RAID 1, RAID 5, RAID 6, and RAID 1+0	When the red (ALARM) LED on the disk drive to be replaced is on. See "(b-1) Replacing Disk Drive in RAID 1, 5, 6, or 1+0 configuration (When the red (ALARM) LED is on)" (REP 02-0150). When the red (ALARM) LED on the disk drive to be replaced is off. See "(b-2) Replacing a Disk Drive in the RAID 1, 5, 6, or RAID 1+0 configuration " (REP 02-0170).
2	Replacement with the power turned off	Not applicable			—

*1 : Be sure to backup the user data before replacing a Disk Drive in RAID 0 configuration. When the set RAID group and LU are deleted or formatted, related user data will be lost.
(A backing up and restoration of user data are operations to be performed by users.)

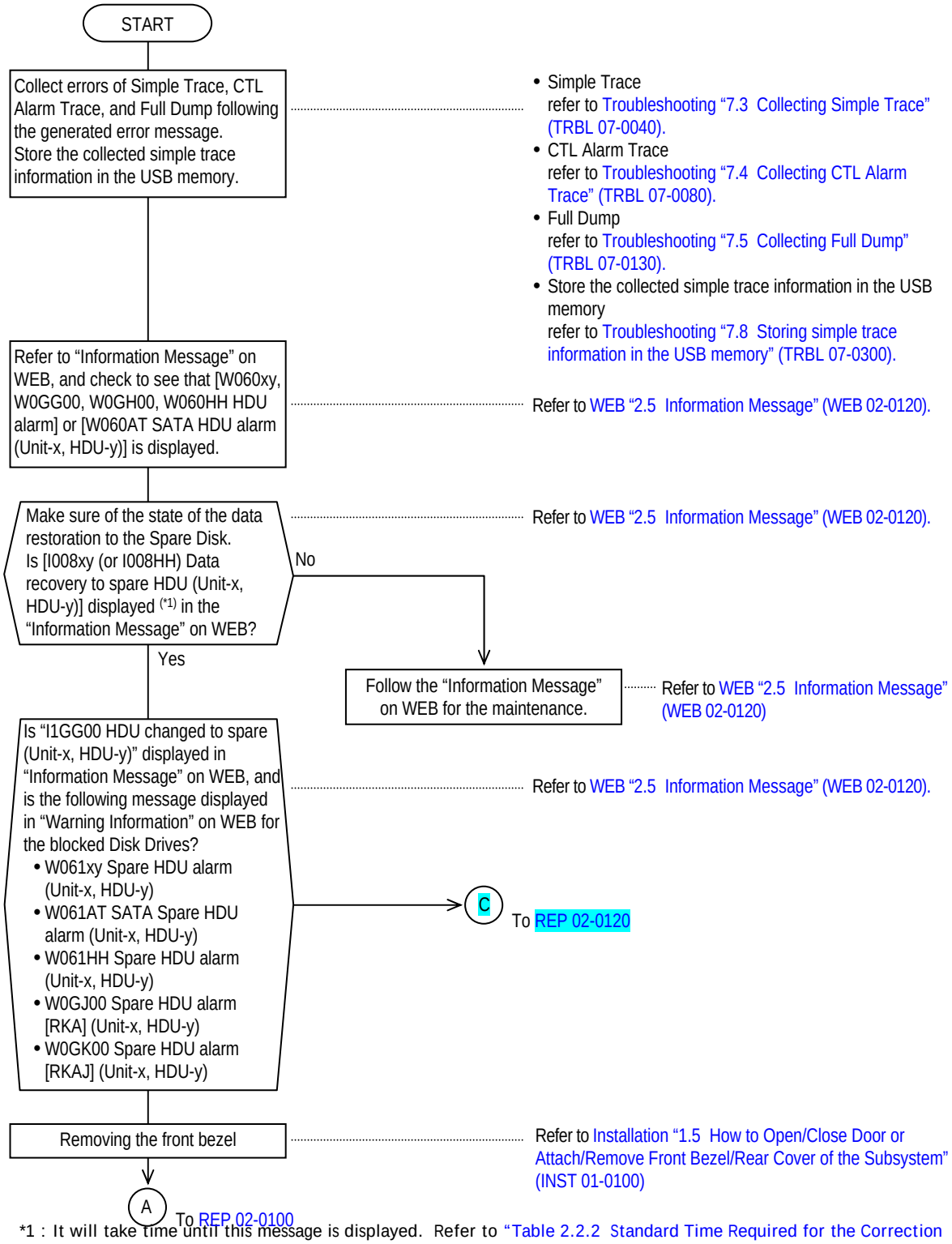
*2 : You can replace the Disk Drive using the procedure (a) for the case of RAID 0 with a Spare Disk only when the data migration to the Spare Disk by means of the dynamic sparing has terminated normally.
When the data migration to the Spare Disk has failed, replace the Disk Drive using the procedure (b-2) for the case of RAID 0 without Spare Disk.

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If no Spare Disk is provided, go to (b).

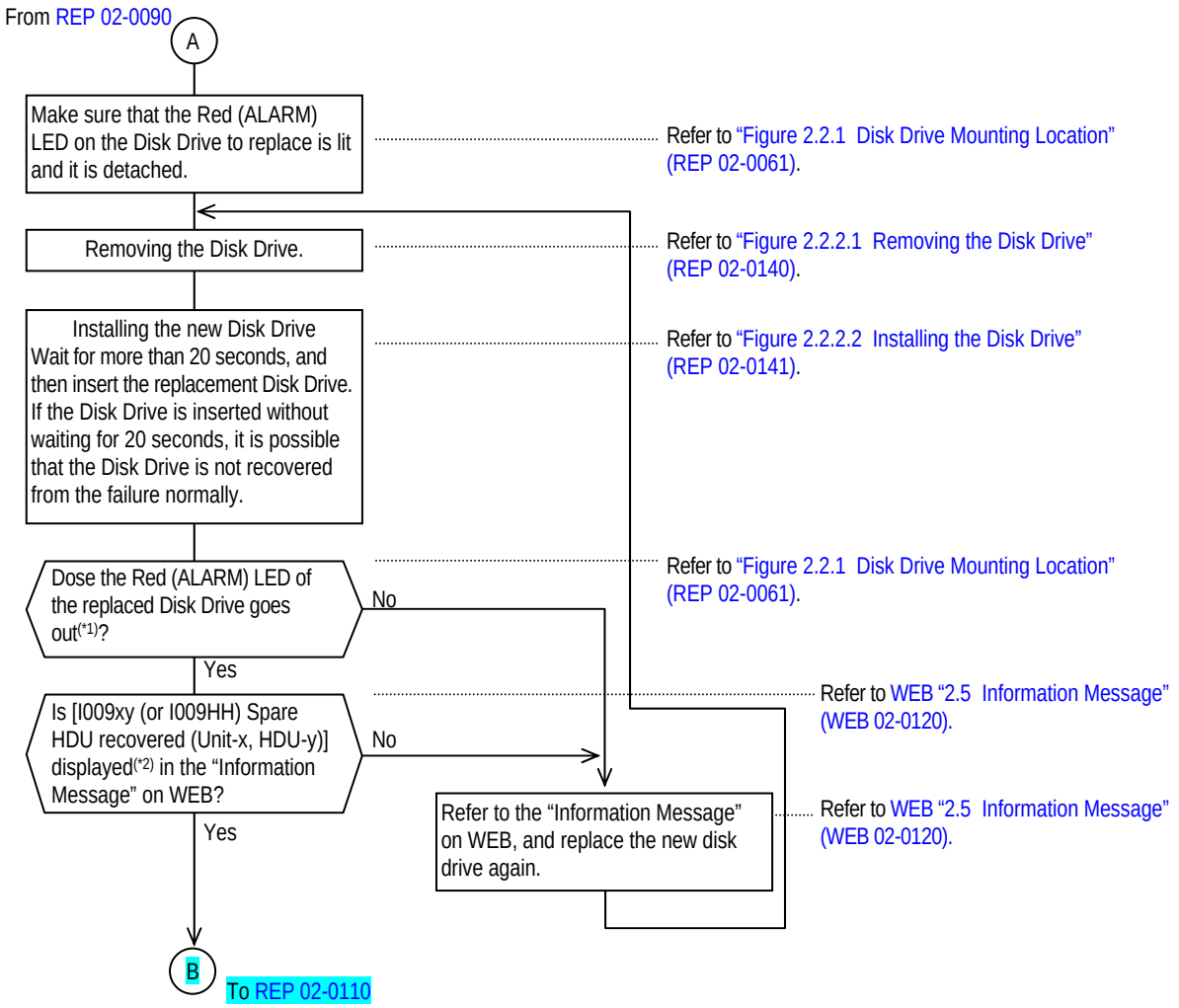
(a) The Spare Disk is set

(a-1) When the red (ALARM) LED on the Disk Drive to be replaced is on.



*1 : It will take time until this message is displayed. Refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" (REP 02-0231) for the standard of the time required.

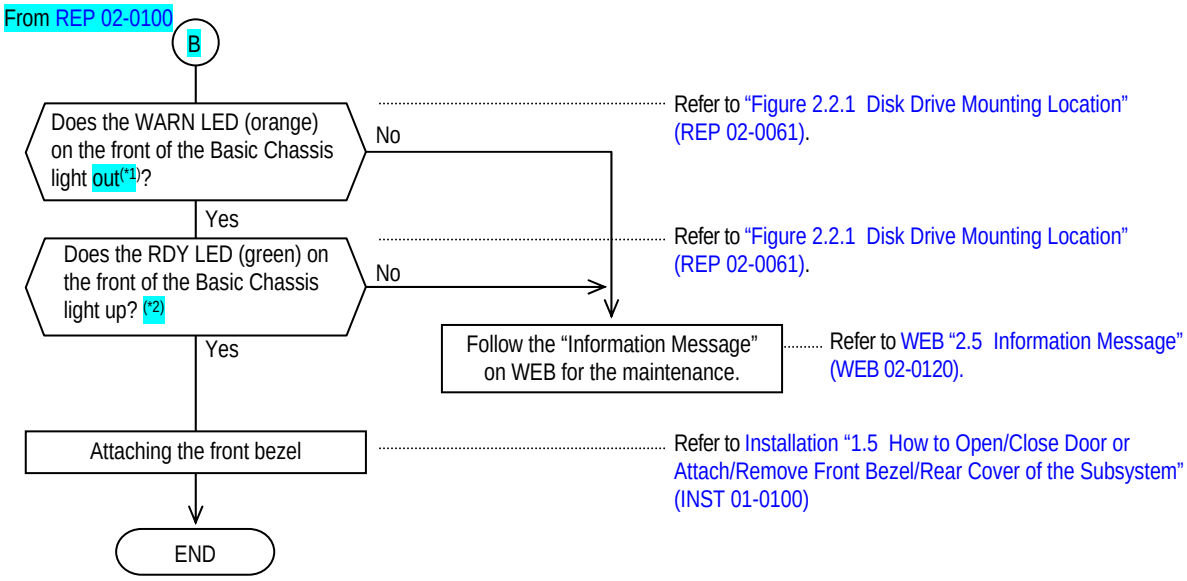
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*1 : The red (ALARM) LED of the Disk Drive lights off within about five minutes after the Disk Drive is inserted.
When the Red (ALARM) LED is not turned off, remove the inserted Disk Drive from the chassis, and insert it again after 20 seconds or more passed.
However, if the Disk Drive is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced Disk Drive may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Disk Drive from the chassis once and insert it again after 20 seconds or more passed.

*2 : This message is displayed within about five minutes after the red (ALARM) LED of the Disk Drive lights off.

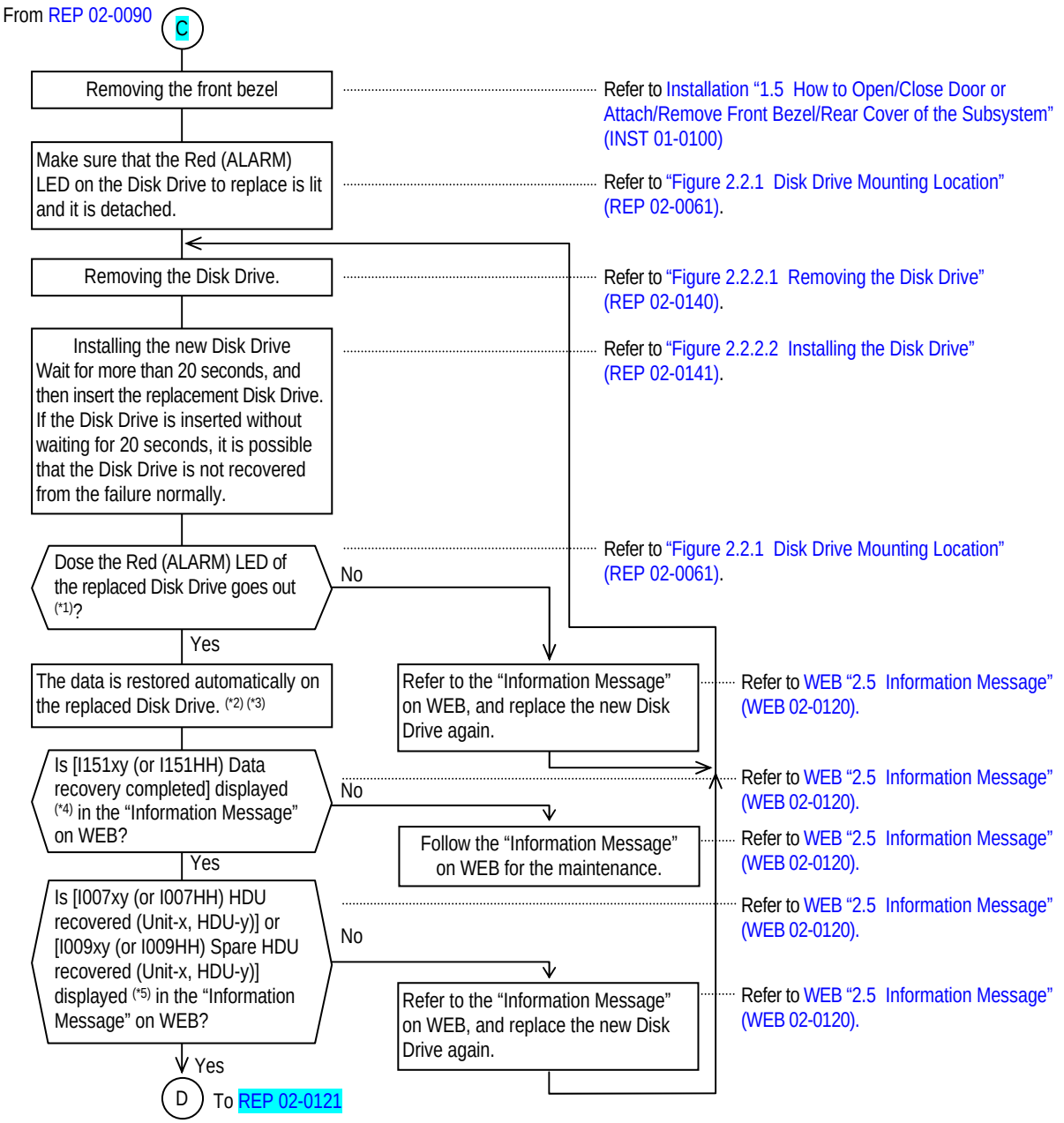
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*1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

*2 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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*1 : The red (ALARM) LED of the Disk Drive lights off within about five minutes after the Disk Drive is inserted. When the Red (ALARM) LED is not turned off, remove the inserted Disk Drive from the chassis, and insert it again after 20 seconds or more passed.
However, if the Disk Drive is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced Disk Drive may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Disk Drive from the chassis once and insert it again after 20 seconds or more passed.

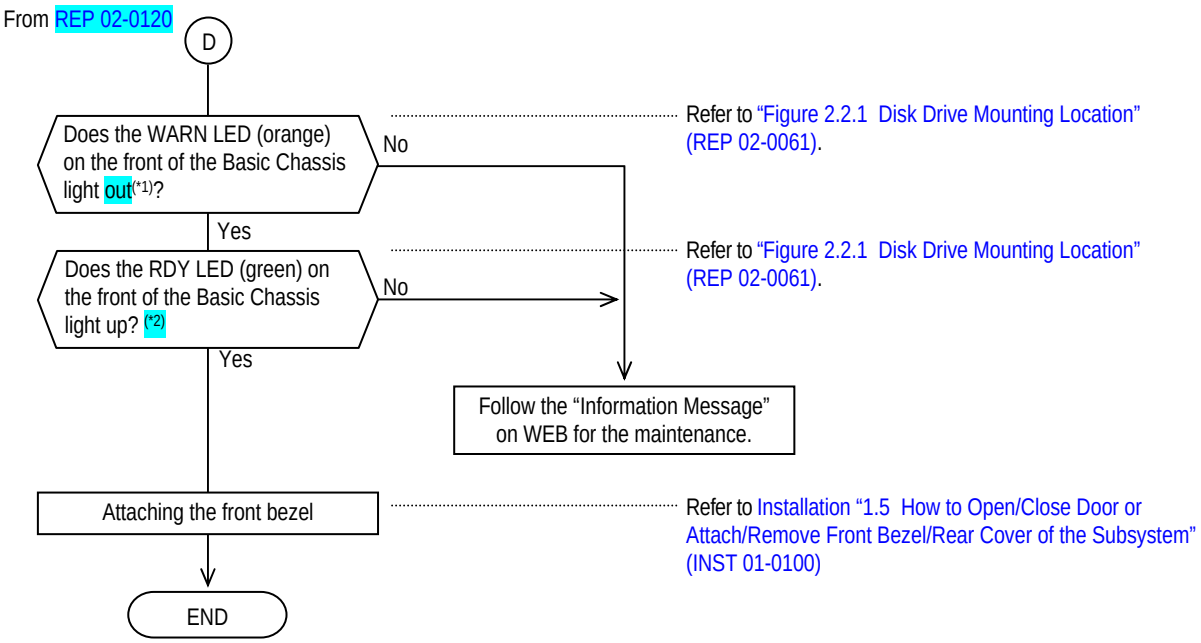
*2 : In case of it is set to automatic recovery mode.

*3 : Open the Unit screen in the Storage Navigator Modular. Double click the Disk Drive under recovery procedure (indicated in yellow) in the Component Status Tag, then the progress of data recovery can be checked. (For detail, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

*4 : It will take time until this message is displayed. Refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" (REP 02-0231) for the standard of the time required.

*5 : This message is displayed within about five minutes after "I151xy (or I151HH) Data recovery completed" is displayed in the "Information Message" on WEB.

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*1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

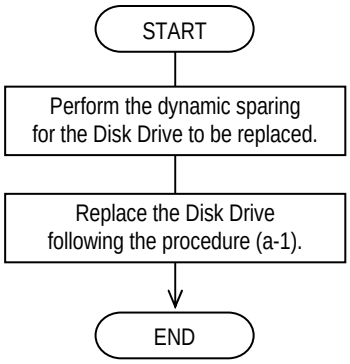
*2 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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(a-2) When the red (ALARM) LED on the Disk Drive to be replaced is off.

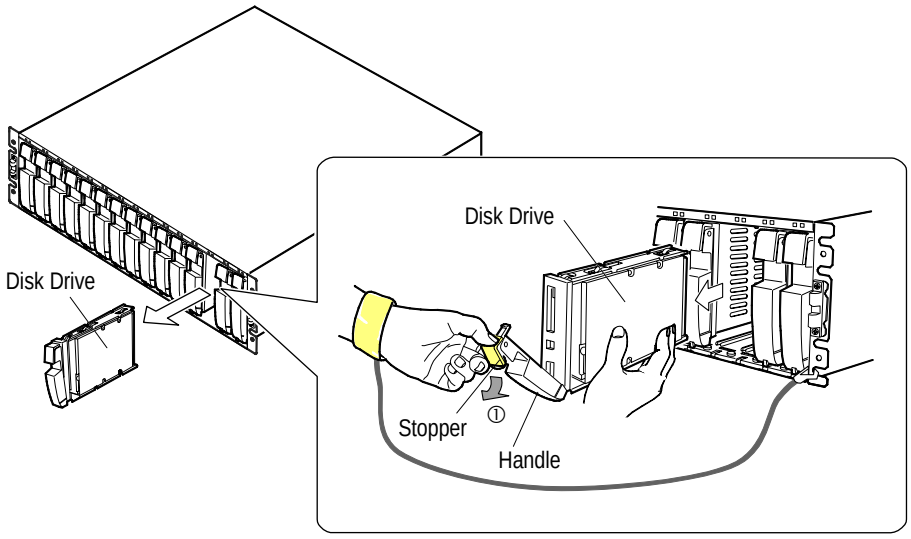


Refer to Troubleshooting "10.2.7 Drive Maintenance" (TRBL 10-0330).

Refer to "(a-1) When the red (ALARM) LED on the disk drive to be replaced is on." (REP 02-0090).

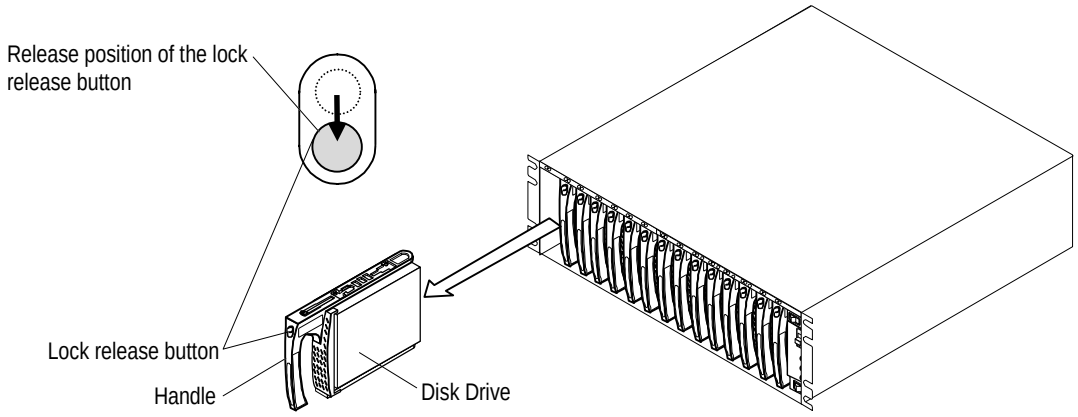
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- Disk Drive for RKM/RKS/RKXS/RKAJ/RKAJAT/RKAJATL



① Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the dummy (Disk Drive) by pulling it.

- Disk Drive for RKA

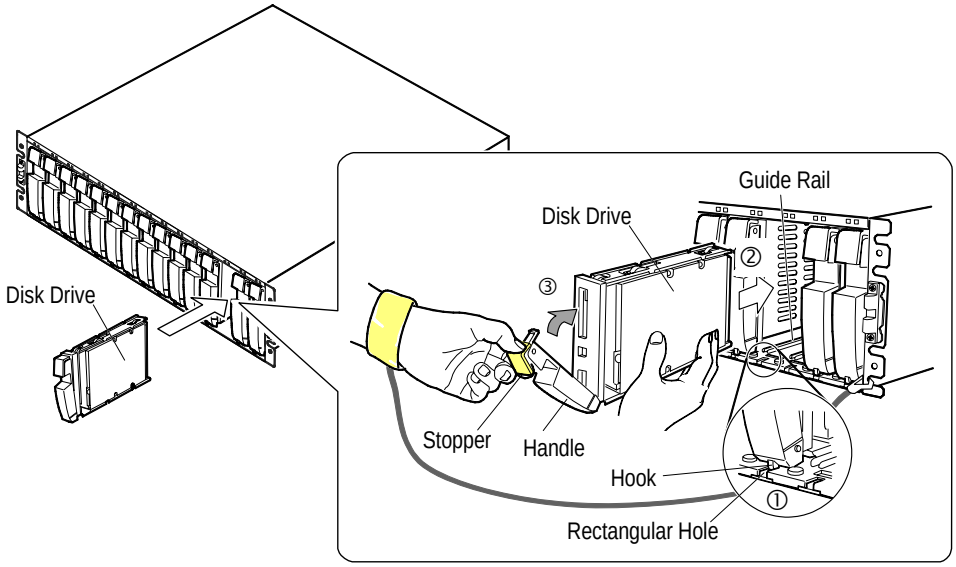


① Hold the handle and insert the Disk Drive without applying another operation to it. Insert it until the lock release button is latched at the locking position.

Figure 2.2.2.1 Removing the Disk Drive

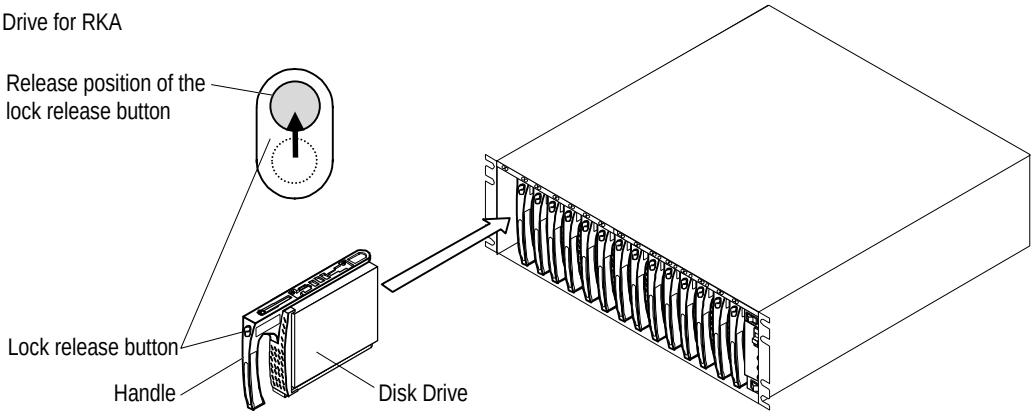
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- Disk Drive for RKM/RKS/RKXS/RKAJ/RKAJAT/RKAJATL



① Slide the Disk Drive following the guide rail to the direction of the arrow without adding an impact.
② Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the disk array unit.
③ Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.
If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

- Disk Drive for RKA



① You can remove the Disk Drive by shifting the lock release button in the arrow direction (downward) and holding it there, and then pulling the handle toward you.

Figure 2.2.2.2 Installing the Disk Drive

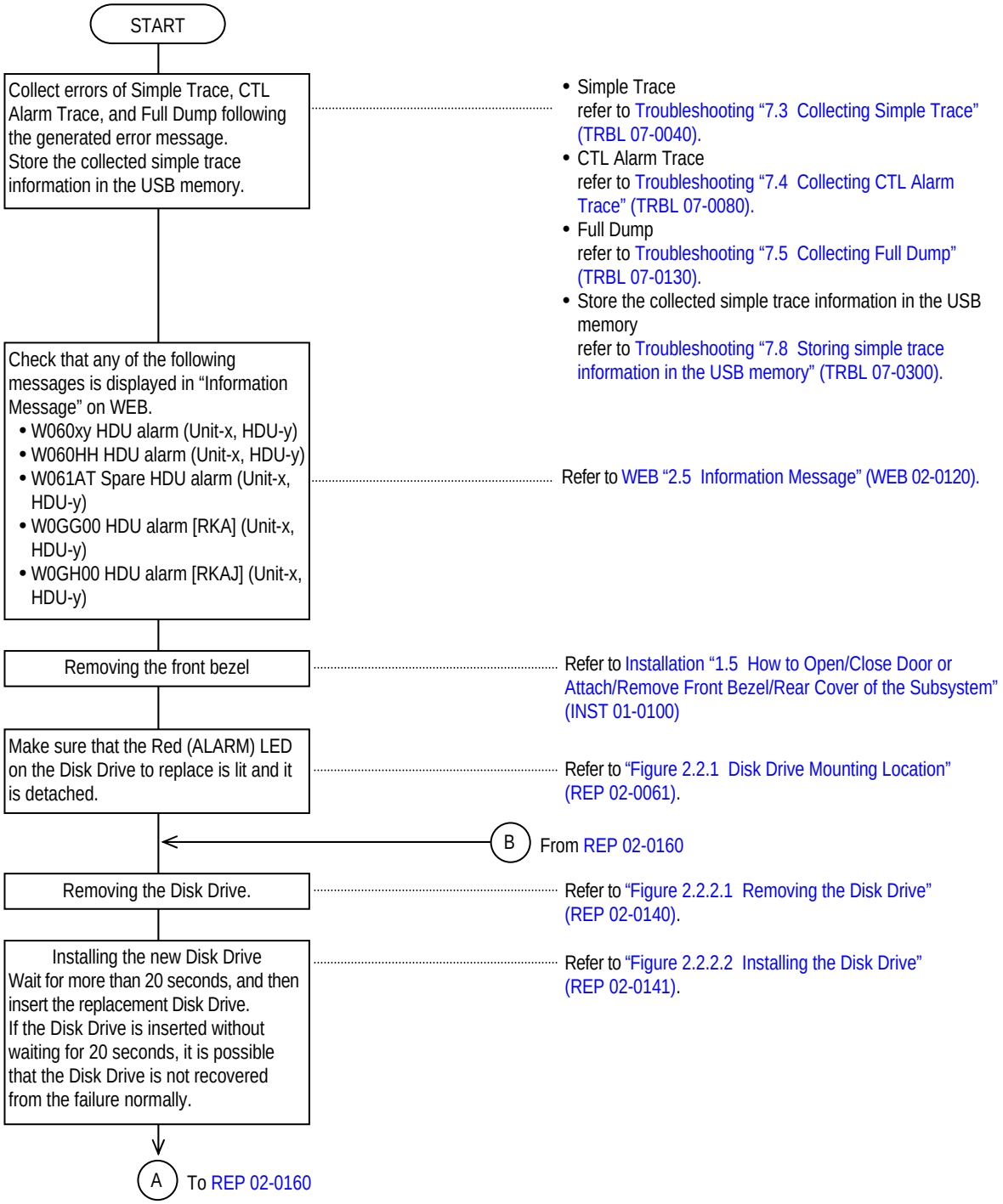
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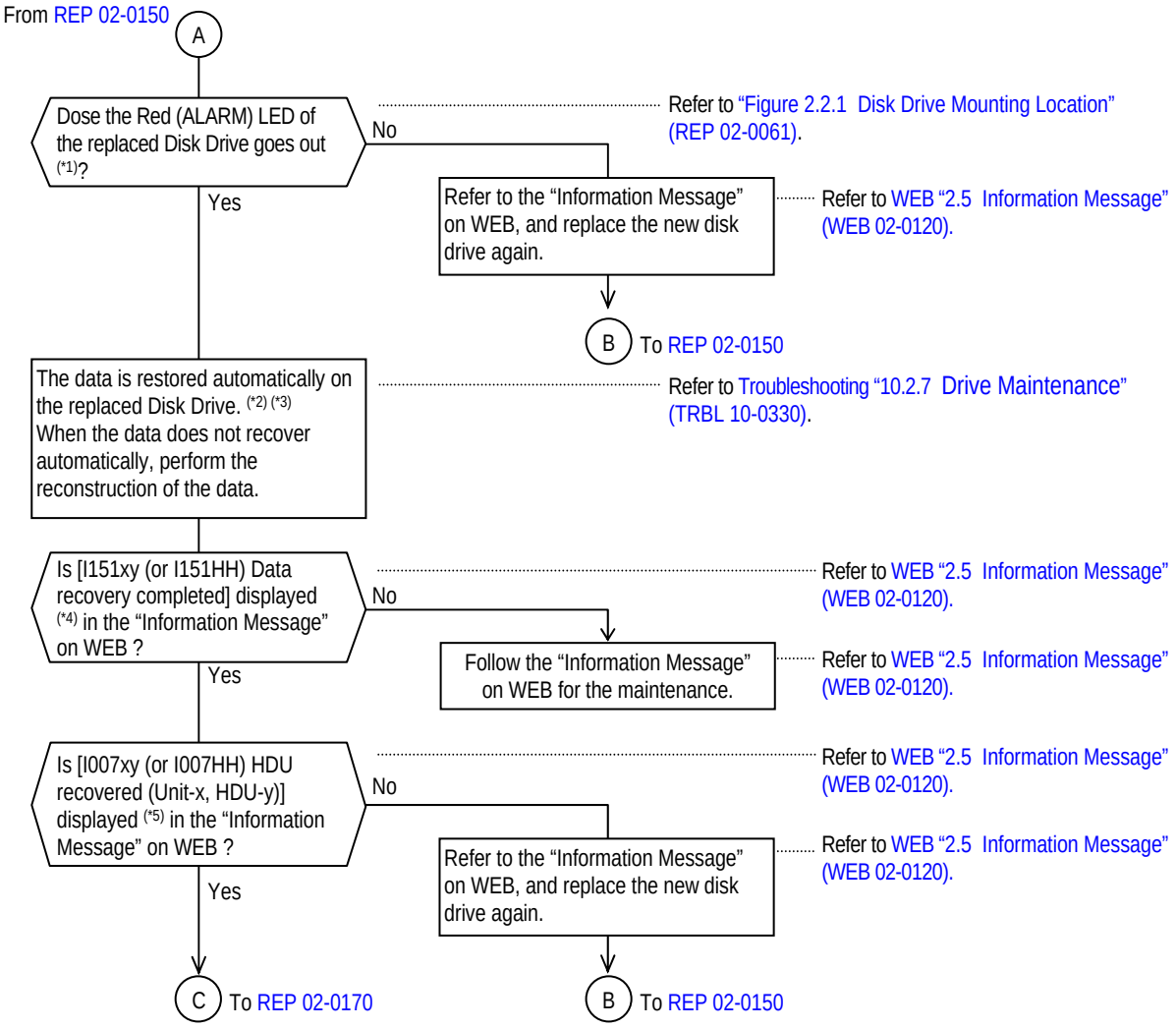
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(b) The Spare Disk is not set or there is no Spare Disk that can be used

(b-1) Replacing Disk Drive in RAID 1, 5, 6, or 1+0 configuration
(When the red (ALARM) LED is on)



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*1 : The red (ALARM) LED of the Disk Drive lights off within about five minutes after the Disk Drive is inserted.
When the Red (ALARM) LED is not turned off, remove the inserted Disk Drive from the chassis, and insert it again after 20 seconds or more passed.
However, if the Disk Drive is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced Disk Drive may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Disk Drive from the chassis once and insert it again after 20 seconds or more passed.

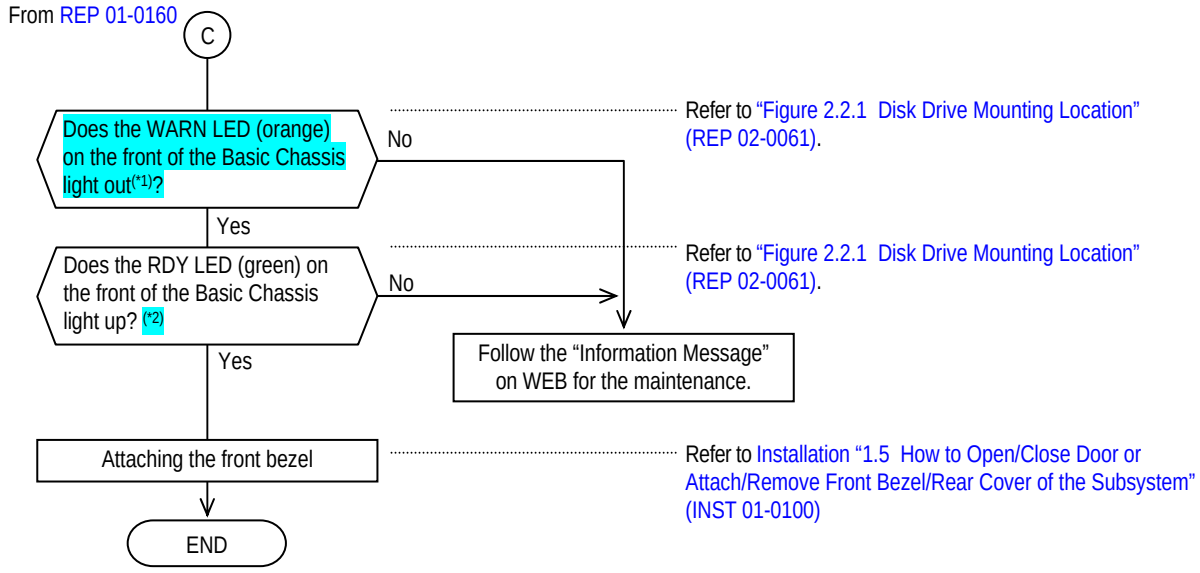
*2 : In case of it is set to automatic recovery mode.

*3 : Open the Unit screen in the Storage Navigator Modular. Double click the Disk Drive under recovery procedure (indicated in yellow) in the Component Status Tag, then the progress of data recovery can be checked. (For detail, refer to System Parameter "3.5 Checking the status of Disk Drive" (SYSPR 03-0400).)

*4 : It will take time until this message is displayed. Refer to "Table 2.2.2 Standard Time Required for the Correction copy or Copy back" (REP 02-0231) for the standard of the time required.

*5 : This message is displayed within about five minutes after "I151xy (or I151HH) Data recovery completed" is displayed in the "Information Message" on WEB.

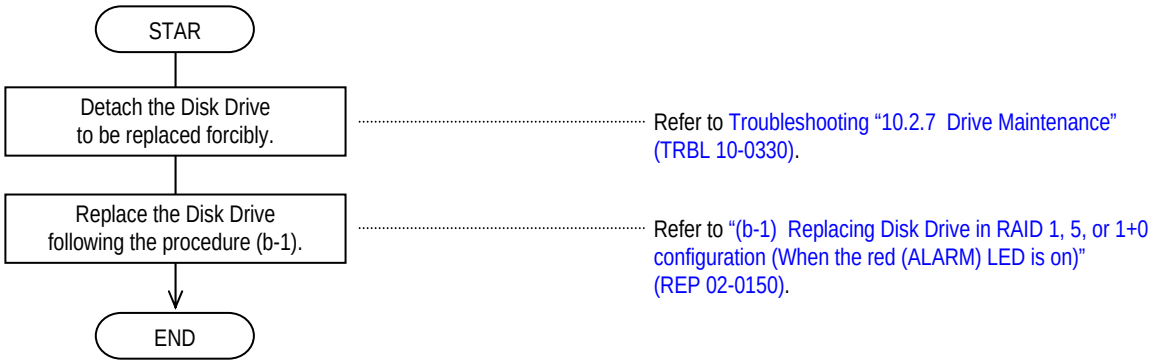
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*1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

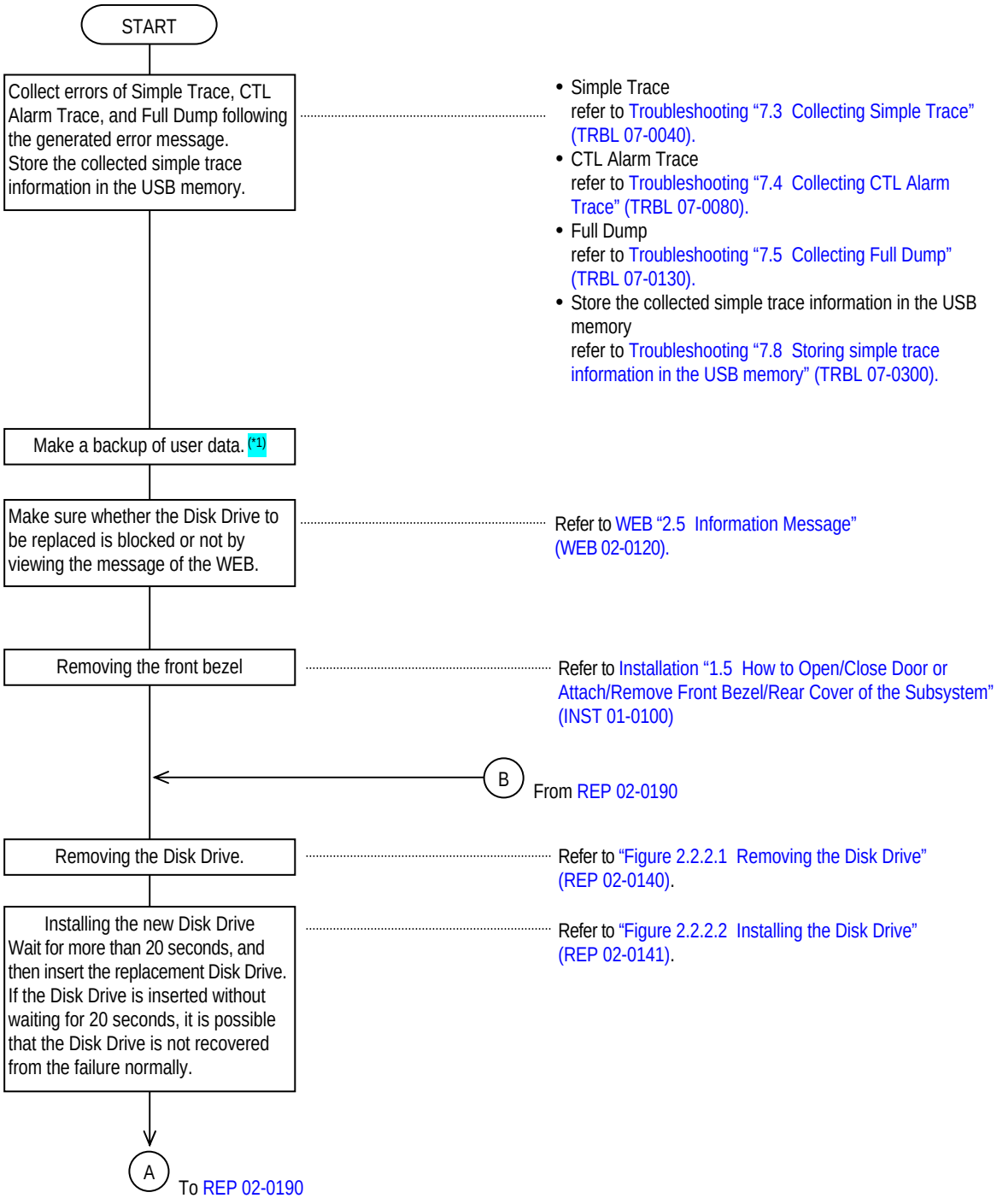
*2 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

(b-2) Replacing a Disk Drive in the RAID 1, 5, 6, or RAID 1+0 configuration (when the red (ALARM) LED is off)



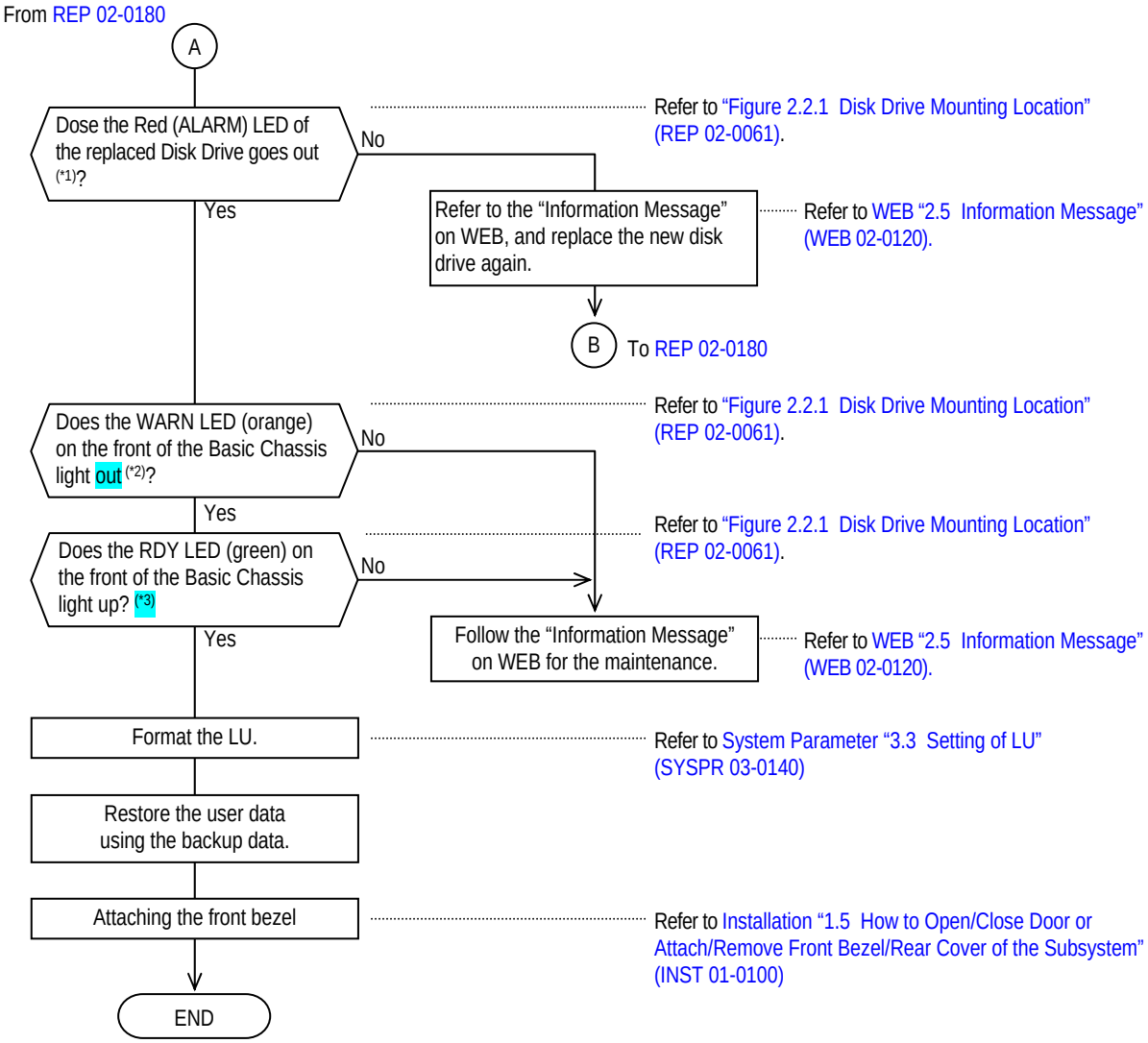
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(b-3) Replacement of Disk Drive under RAID 0 configuration



*1 : The user data cannot be backed up when a Disk Drive targeted for the replacement is blocked or when there is a blocked Disk Drive in the RAID Group to which the Disk Drive targeted for the replacement belongs.

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*1 : The red (ALARM) LED of the Disk Drive lights off within about five minutes after the Disk Drive is inserted. When the Red (ALARM) LED is not turned off, remove the inserted Disk Drive from the chassis, and insert it again after 20 seconds or more passed.
However, if the Disk Drive is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced Disk Drive may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Disk Drive from the chassis once and insert it again after 20 seconds or more passed.

*2 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

*3 : Wait if the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

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(2) Disk Drive threshold

Errors counted in this subsystem and default threshold values are listed below.
The dynamic sparing functions when the error count threshold value is exceeded. After the dynamic sparing operation is completed, the failed Disk Drive is detached.

Table 2.2.1 Error and threshold value

No.	Kind of error	Threshold (Default) (Once/24 hours)			
		The Spare Disk is set		The Spare Disk is not set	
		FC	SATA	FC	SATA
1	Disk mechanical error. (Recovered)	50	50	50	50
2	Disk mechanical error. (Un-recovered)	2	2	2	2
3	A Disk Drive failure that becomes a factor to execute reassignment • Disk medium error. (Recovered) • Disk medium error. (Un-recovered) • Collectable errors in online verify. • Un-correctable errors in online verify.	25	50	200	100
4	Disk R/W error. (Recovered)	10	10	10	10
5	Disk R/W error. (Un-recovered)	2	2	2	2
6	Disk I/F error. (Recovered)	50	50	50	50
7	Disk I/F error. (Un-recovered)	2	2	2	2
8	Disk hardware error. (Recovered)	50	50	50	50
9	Disk hardware error. (Un-recovered)	2	2	2	2
10	Disk SCSI I/F error. (Recovered)	50	50	50	50
11	Disk SCSI I/F error. (Un-recovered)	2	2	2	2

There threshold values above can be referred to and updated from the Storage Navigator Modular (‡1).
However, the recovered or un-recovered disk media errors and the correctable or uncorrectable errors in online verify operations are count up together in the reassigned count, so that the threshold value can be updated but it is not effective.
The accumulated number of errors is not cleared even if the power supply of the subsystem is turned off (the subsystem performs the planned shutdown).

‡1 : For the details of the Storage Navigator Modular, refer to the "Storage Navigator Modular (for GUI) User's Guide".

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(3) Transition of WEB of spare recovery operation of the [Information Message]

When the recovery completes normally, the "Information Message" from the WEB (WEB "2.5 Information Message" (WEB 02-0120)) change successively as shown below.

(a) Data recover (Data recovery onto the Spare Disk when a disk blocked is detected)

W060xy (or W060HH) HDU alarm
W060AT SATA HDU alarm
W0GG00 HDU alarm [RKA] (Unit-x, HDU-y)
W0GH00 HDU alarm [RKAJ] (Unit-x, HDU-y)
..... : Data Disk blocked

I150xy Data recovery started / I150HH Data recovery started
..... : Start of data area recovery

I151xy Data recovery completed / I151HH Data recovery completed
..... : Completion of data area recovery

I008xy Data recovery to spare HDU / I008HH Data recovery to spare HDU
..... : Completion of recovery onto Spare Disk

I1GG00 HDU changed to spare (Unit-x, HDU-y)
..... : The blocked data disk is changed to the spare disk, and the spare disk before the failure is changed to the data disk. (‡1)

W061xy (or W061HH) Spare HDU alarm(Unit-x, HDU-y)
W061AT SATA Spare HDU alarm (Unit-x, HDU-y)
W0GJ00 Spare HDU alarm [RKA] (Unit-x, HDU-y)
W0GK00 Spare HDU alarm [RKAJ] (Unit-x, HDU-y)
..... : Spare Disk blocked(‡1) (‡2)

‡1 : In the microprogram revision less than 0740/C, this message has set "Spare Drive" of "Configuration Settings" – "Restore Options" of the Storage Navigator Modular to variable (default value), and it is displayed after the Disk Drive restoration is completed only when the capacity and the rotational speed of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination are matched and both of them are not the Disk Drives of the RKA.
In the microprogram revision 0740/C or more, this message has set "Spare Drive" of "Configuration Settings" – "Restore Options" of the Storage Navigator Modular to variable (default value), and it is displayed after the Disk Drive restoration is completed if the capacity and the rotational speed of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination are matched and both of them are not the Disk Drives of the RKA when "Applying No Copy Back Mode on All the Units" is set to disable. Also, this message is displayed after the Disk Drive restoration is completed if the Disk Drive capacity of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination is matched when "Spare Disk Drive Active Mode" is variable and "Applying No Copy Back Mode on All the Units" is set to enable.
However, when the Power Saving function is installed and enabled, if the Spare Disk setting is made for the Disk Drives #0 to #4 of the RKM/RKS/RKXS, the Disk Drives #0 to #4 corresponding to unit ID#0 connected to the RKH, or the Disk Drives #0 to #3 of the Additional Chassis (RKAJ or RKA), the Copy backless does not operate during the data recovery to the Disk Drive set as a Spare Drive, and the Copy back surely operates after changing the Disk Drive.

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‡2 : This message is displayed in the Warning Information.

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(b) Data recover (Dynamic sparing from data disk to Spare Disk)

I15Axy Dynamic sparing start / I15AHH Dynamic sparing start
…… : Start of Dynamic sparing

I150xy Data recovery started / I150HH Data recovery started
…… : Start of disk recovery

I151xy Data recovery completed / I151HH Data recovery completed
…… : Completion of data recovery

I008xy Data recovery to spare HDU / I008HH Data recovery to spare HDU
…… : Completion of recovery onto Spare Disk

I1GG00 HDU changed to spare (Unit-x, HDU-y)
…… : The blocked data disk is changed to the spare disk, and the spare disk before the failure is changed to the data disk. (‡1)

W060xy (or W060HH) HDU alarm
W060AT SATA HDU alarm
W0GG00 HDU alarm [RKA] (Unit-x, HDU-y)
W0GH00 HDU alarm [RKAJ] (Unit-x, HDU-y)
…… : Data Disk blocked(‡2)

W061xy (or W061HH) Spare HDU alarm(Unit-x, HDU-y)
W061AT SATA Spare HDU alarm (Unit-x, HDU-y)
W0GJ00 Spare HDU alarm [RKA] (Unit-x, HDU-y)
W0GK00 Spare HDU alarm [RKAJ] (Unit-x, HDU-y)
…… : Spare Disk blocked(‡3) (‡4)

‡1 : This message is displayed in the Warning Information.

‡2 : This message is displayed only when "I1GG00 HDU changed to spare(Unit-x, HDU-y)" is not displayed before this.

‡3 : In the microprogram revision less than 0740/C, this message has set "Spare Drive" of "Configuration Settings" – "Restore Options" of the Storage Navigator Modular to variable (default value), and it is displayed after the Disk Drive restoration is completed only when the capacity and the number of rotation of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination are matched and both of them are not the Disk Drives of the RKA. In the microprogram revision 0740/C or more, this message has set "Spare Drive" of "Configuration Settings" – "Restore Options" of the Storage Navigator Modular to variable (default value), and it is displayed after the Disk Drive restoration is completed if the capacity and the number of rotation of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination are matched and both of them are not the Disk Drives of the RKA when "Applying No Copy Back Mode on All the Units" is set to disable. Also, this message is displayed after the Disk Drive restoration is completed if the Disk Drive capacity of the blocked Disk Drive and the Spare Disk Drive at the data recovery destination is matched when "Spare Disk Drive Active Mode" is variable and "Applying No Copy Back Mode on All the Units" is set to enable.

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‡4 : This message is displayed only when “I1GG00 HDU changed to spare(Unit-x, HDU-y)” is displayed before this.

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(c) Copy back

I140xy System copy started / I140HH System copy started

..... : Start of system area recovery(‡1)

I141xy System copy completed / I141HH System copy completed

..... : Completion of system area recovery(‡1)

I150xy Data recovery started / I150HH Data recovery started

..... : Start of data area recovery

I151xy Data recovery completed / I151HH Data recovery completed

..... : Completion of data area recovery

When the recovery terminates abnormally, whichever [I142xy System copy failed (Unit-x, HDU-y)] or [I142HH System copy failed (Unit-x, HDU-y)] or [I152xy Data recover failed (Unit-x, HDU-y)] or [I152HH Data recover failed (Unit-x, HDU-y)] is displayed. Take a recovery action following the messages.

(4) Confirming completion of data recovery or copy back

Select "Information Message" from the WEB (WEB "2.5 Information Message" (WEB 02-0120)) and make sure that the data recovery is completed normally.

Table 2.2.2 shows the standard of the time required of the Correction copy and the Copy back when selecting optional numbers of the Disk Drives which configure the RAID Group. The time required of the Correction copy and the Copy back also increases as the number of the FC or S-ATA Disk Drives that configures the RAID Group increases. Figure 2.2.2.2 shows the graph where the standard of the time required of the Correction copy can be confirmed in the case of all the numbers. A horizontal axis corresponds to the number of the Disk Drives, and the vertical axis corresponds to the time required of the Correction copy.

The correction copy, copy back and dynamic sparing do not operate mutually at the same time and also they do not operate at the same time for two or more Disk Drives. Therefore, when the data of two or more Disk Drives (n Disk Drives) was recovered, the time that it takes to complete recovering all the data of the n Disk Drives becomes n times the standard time.

‡1 : This message is displayed only when the Disk Drives, including the Disk Drives #0 to #4 of the RKM/RKS/RKXS or the Disk Drives #0 to #4 of the RKAJ corresponding to the unit ID#0 connected to the RKH, are replaced.

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Table 2.2.2 Standard Time Required for the Correction copy or Copy back(‡1)

Unit : min

Item		Disk Drive (G byte)(*1)			71.3	143.3	245.7	287.6	393.4	491.9
Correction copy(*2)	AMS500 AMS200	4 Disk Drives	RAID 6	(2D+2P)	25	45	250	90	390	430
		6 Disk Drives		(4D+2P)	30	55	260	120	410	430
		10 Disk Drives		(8D+2P)	50	100	350	210	560	620
		14 Disk Drives		(12D+2P)	80	170	500	330	800	890
		18 Disk Drives		(16D+2P)	110	210	570	420	910	1030
		30 Disk Drives		(28D+2P)	190	370	750	750	1210	1390
		3 Disk Drives	RAID 5	(2D+1P)	25	45	250	85	390	430
		5 Disk Drives		(4D+1P)	30	60	260	120	410	430
		9 Disk Drives		(8D+1P)	55	110	350	210	560	620
		11 Disk Drives		(10D+1P)	70	140	440	290	700	770
		13 Disk Drives		(12D+1P)	85	170	510	330	810	900
		16 Disk Drives		(15D+1P)	100	200	570	400	900	1060
		4 Disk Drives	RAID 1+0	(2D+2D)	25	45	260	75	420	430
		16 Disk Drives		(8D+8D)	30	45	240	75	380	420
		2 Disk Drives	RAID 1	(1D+1D)	25	45	250	75	390	430
	WMS100	4 Disk Drives	RAID 6	(2D+2P)	-	-	250	-	400	440
		6 Disk Drives		(4D+2P)	-	-	270	-	430	460
		10 Disk Drives		(8D+2P)	-	-	440	-	600	670
		14 Disk Drives		(12D+2P)	-	-	630	-	1030	950
		18 Disk Drives		(16D+2P)	-	-	800	-	1300	1210
		30 Disk Drives		(28D+2P)	-	-	1150	-	1840	2100
		3 Disk Drives	RAID 5	(2D+1P)	-	-	250	-	400	500
		5 Disk Drives		(4D+1P)	-	-	280	-	410	530
		9 Disk Drives		(8D+1P)	-	-	440	-	690	840
		11 Disk Drives		(10D+1P)	-	-	540	-	860	1060
		13 Disk Drives		(12D+1P)	-	-	630	-	1030	1240
		16 Disk Drives		(15D+1P)	-	-	760	-	1240	1480
		4 Disk Drives	RAID 1+0	(2D+2D)	-	-	250	-	390	440
		16 Disk Drives		(8D+8D)	-	-	250	-	390	440
		2 Disk Drives	RAID 1	(1D+1D)	-	-	250	-	390	440

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

*2 : The time shown above is a general guideline of a recovery time for a case where no I/O operation is requested by a host computer. If an I/O operation is requested by a host computer, the time becomes longer.

‡1 : It is the standard of the correction copy time when data of one Disk Drive was recovered.

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Unit : min

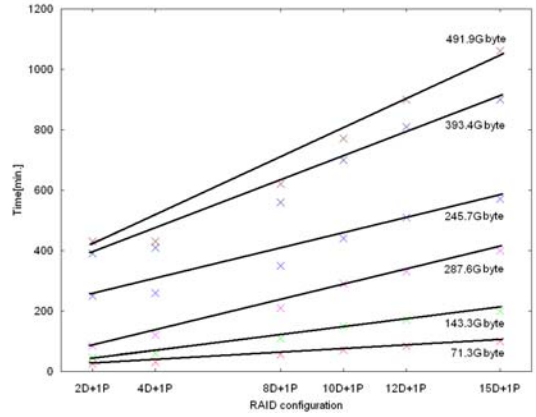
Item		Disk Drive (G byte)(*1)			71.3	143.3	245.7	287.6	393.4	491.9
Correction copy(*2)	AMS1000	4 Disk Drives	RAID 6	(2D+2P)	20	40	220	60	350	430
		6 Disk Drives		(4D+2P)	25	45	220	85	350	450
		10 Disk Drives		(8D+2P)	40	70	280	150	440	540
		14 Disk Drives		(12D+2P)	45	100	380	170	610	760
		18 Disk Drives		(16D+2P)	55	130	430	210	650	840
		30 Disk Drives		(28D+2P)	130	240	740	400	850	1090
		3 Disk Drives	RAID5	(2D+1P)	20	40	220	65	350	430
		5 Disk Drives		(4D+1P)	25	45	230	85	350	430
		9 Disk Drives		(8D+1P)	35	65	240	95	380	540
		11 Disk Drives		(10D+1P)	40	85	330	150	530	660
		13 Disk Drives		(12D+1P)	45	100	390	170	610	760
		16 Disk Drives		(15D+1P)	60	130	420	220	680	880
		4 Disk Drives	RAID1+0	(2D+2D)	25	40	220	100	350	430
		16 Disk Drives		(8D+8D)	25	45	210	95	330	400
		2 Disk Drives	RAID1	(1D+1D)	20	40	220	80	350	430
Copy back(*2)	AMS500 AMS200	6 Disk Drives	RAID 6	(4D+2P)	35	50	250	100	400	430
		30 Disk Drives		(28D+2P)	40	50	230	130	360	390
		5 Disk Drives	RAID 5	(4D+1P)	35	50	250	100	400	430
		16 Disk Drives		(15D+1P)	35	50	230	110	370	460
		4 Disk Drives	RAID 1+0	(2D+2D)	35	50	250	95	390	430
		16 Disk Drives		(8D+8D)	35	50	240	95	380	420
		2 Disk Drives	RAID 1	(1D+1D)	35	50	250	95	390	430
	WMS100	6 Disk Drives	RAID 6	(4D+2P)	-	-	260	-	400	440
		30 Disk Drives		(28D+2P)	-	-	240	-	370	400
		5 Disk Drives	RAID 5	(4D+1P)	-	-	250	-	390	440
		16 Disk Drives		(15D+1P)	-	-	250	-	400	440
		4 Disk Drives	RAID 1+0	(2D+2D)	-	-	250	-	400	430
		16 Disk Drives		(8D+8D)	-	-	250	-	390	440
		2 Disk Drives	RAID 1	(1D+1D)	-	-	260	-	390	430
	AMS1000	6 Disk Drives	RAID 6	(4D+2P)	25	40	220	80	350	420
		30 Disk Drives		(28D+2P)	25	40	170	120	320	330
		5 Disk Drives	RAID5	(4D+1P)	20	40	220	110	350	420
		16 Disk Drives		(15D+1P)	20	40	190	90	340	370
		4 Disk Drives	RAID1+0	(2D+2D)	25	40	230	100	360	430
		16 Disk Drives		(8D+8D)	20	40	210	80	350	400
		2 Disk Drives	RAID1	(1D+1D)	25	40	220	100	360	430

*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

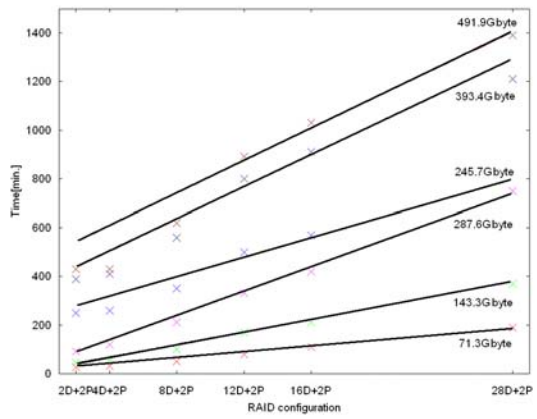
*2 : The time shown above is a general guideline of a recovery time for a case where no I/O operation is requested by a host computer. If an I/O operation is requested by a host computer, the time becomes longer.

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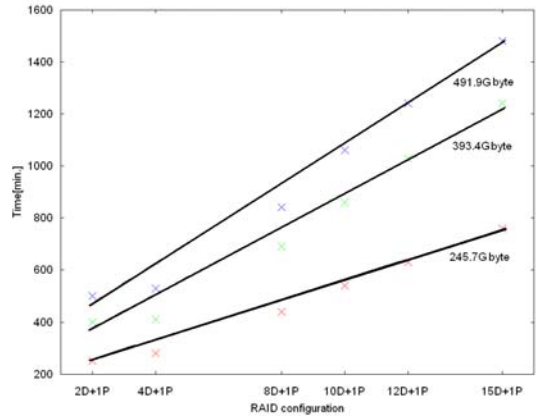
AMS 200/500 (RAID 5)



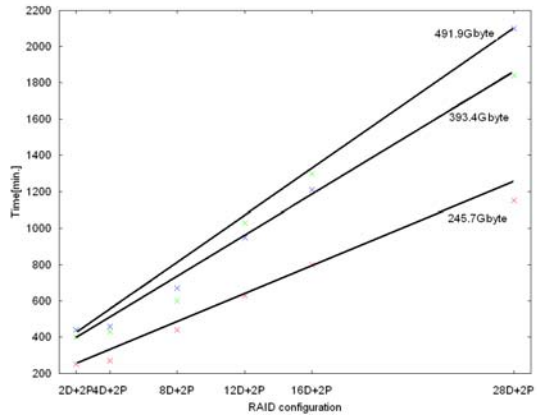
AMS 200/500 (RAID 6)



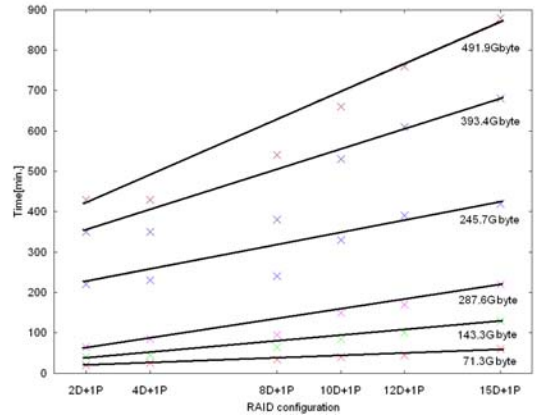
WMS 100 (RAID 5)



WMS 100 (RAID 6)



AMS 1000 (RAID 5)



AMS 1000 (RAID 6)

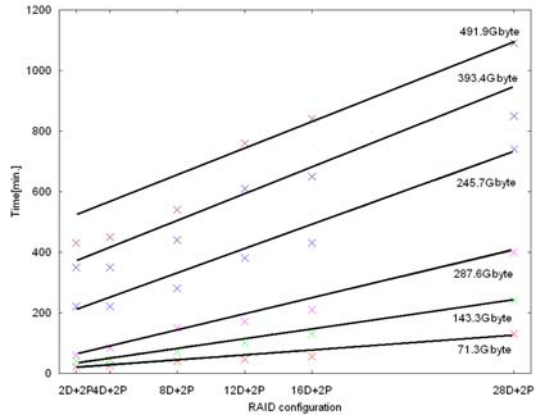


Figure 2.2.2.2 Standard Time Required for the Correction copy

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2.2.2 Replacing Backup Battery Unit

The replacement of the Backup Battery Unit is work of a basic subsystem (RKM/RKS/RKXS/RKH). Select a procedure from the following and execute it.
The Backup Battery Unit differs respectively in RKM/RKS/RKXS and /RKH. Be careful not to make a mistake in part model names.

NOTE : • Only one Backup Battery Unit (ASSY) is installed in the RKS/RKXS. Replace the Backup Battery Unit (ASSY) #0 side. This Backup Battery Unit is not installed in #1 side.
• There is no battery switch in the Backup Battery Unit (ASSY) of Rev. C to be installed in the RKM/RKS.
• There is no battery switch of RKXS/RKH.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement) (In the case of RKM/RKS/RKXS/RKH)	1. When the power is turned off during the replacement, user data on the cache that has not been written on a disk is not backed up because the power is not supplied from the battery. 2. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 3. When replacing two Backup Battery Units at the same time (replacing Backup Battery Unit for the RKS/RKXS, replacing four Backup Battery Units at the same time for the RKH), the Cache is changed to the Write-Through mode (*1) and the R/W performance is somewhat deteriorated, so that replace them quickly. Also, if the Backup Battery Units (ASSY) are all removed from the Basic Chassis, the subsystem becomes the WARNING status. However, when the Backup Battery Units are all recovered normally, the WANING status of the subsystem is released. 4. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the preventive replacement after the LED lights on. 5. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	Refer to "(1) Procedure for replacement with the power turned on " (REP 02-0250).
2	Replacement with the power turned off	—	Refer to "(2) Procedure for replacement with the power turned off " (REP 02-0270).

*1 : The Write-Through means the operation to write the write data to the Disk Drive and respond to the host computer immediately after the subsystem received the write data from the host computer.
Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through. Refer to Theory "4.3.1 Command execution" (THEO 04-0070) for the conditions to execute the Write-Through.

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CAUTION

- A closed type nickel-hydrogen battery can cause an electric shock or explosion if it is handled wrongly. Observe the following requirements for handling.
  - Do not disassemble or remake the battery.
  - Do not deform the battery.
  - Do not connect plus and minus poles with a metallic article such as a wire.
  - Do not reverse the connections of plus and minus poles.
  - Do not peel off the covering tube.
  - Do not connect the battery directly to the outlet.
  - Do not connect the battery to anything other than this subsystem for charging/discharging.
  - Do not leave the battery in a hot place. Store it in a dark and cool place.
  - Do not discard a used battery at the site where it was removed for replacement.

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(1) Procedure for replacement with the power turned on
(Refer to "Figure 2.2.3 Replacing Backup Battery Unit" (REP 02-0260).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100).)

(b) Turn off the battery switch of the Backup Battery Unit to be replaced.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(c) Shift the latch on the Battery Units to the Release position and pull the Battery Unit toward you until the latch pin comes out (to release the Unit).
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, loosen the screw that is fixing the latch of the Backup Battery Unit, set the latch to the Release position, and then pull out the Backup Battery Unit forward.

NOTE : Handle the Battery Unit carefully because its depth is shallow (150mm) and weight is heavy (3.0kg).

(d) Take out the Battery Unit holding its main body by your both hands.

(e) Make sure that the Battery switch on the new Backup Battery Unit has been turned off.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(f) Wait for more than 20 seconds, in the case of RKM/RKS, insert the new Backup Battery Unit in the specified location in the subsystem to the position where it is completely fixed until latch moves to Lock side (‡1).
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, shift the latch (fixing screw) of the new Backup Battery Unit to the Release position, and insert the subsystem. Shift the latch (fixing screw) of the Backup Battery Unit to the Lock position, tighten the latch (fixing screw).
If the Backup Battery Unit is inserted without waiting for 20 seconds, it is possible that the Backup Battery Unit is not recovered from the failure normally (‡2).

(g) Turn on the battery switch of the Backup Battery Unit.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(h) Charge the battery after the READY LED (green) on the Backup Battery Unit blinks until it changes to lighting. (Although the READY LED (green) on the Backup Battery Unit blinks during the charge, it changes to lighting when the charge is completed. It is about six hours at the maximum.)

‡1 : If the Backup Battery Unit (ASSY) is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Backup Battery Unit (ASSY) may not recover normally.

‡2 : Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Backup Battery Unit (ASSY) from the chassis once and insert it again after 20 seconds or more passed.

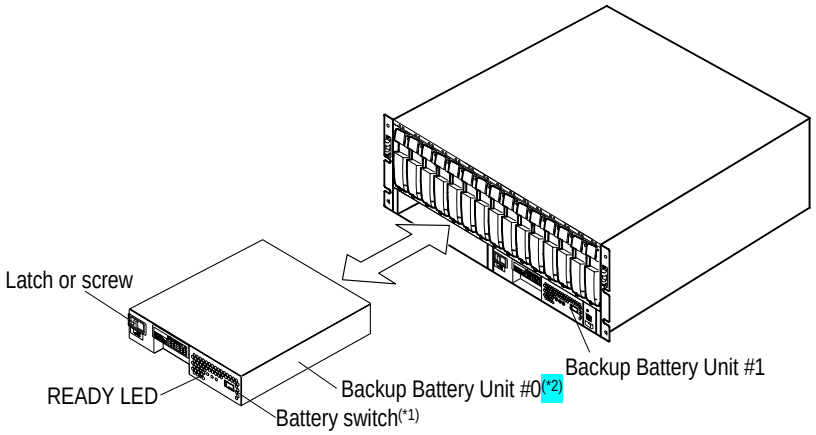
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(i) Check that the READY LED (green) on the Backup Battery Unit is on.
Check that the RDY LED (green) on the front of the Basic Chassis is on and the ALARM and WARN LEDs are off(‡1).
The RDY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

(j) Refer to "Information Message" on WEB, and check to see that [I00300 Battery recovered] or [I0030x Battery recovered (Battery-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of Backup Battery Unit has completed.

(k) Attach the front bezel.

(l) Dispose of recycling the battery in the removed Backup Battery Unit. For recycling, refer to "Chapter 5. Recycling" (REP 05-0000).



*1 : In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS, there is no battery switch. Also, the latch is fixed with a screw.
*2 : Only one Backup Battery Unit (ASSY) is installed in the RKS/RKXS.
*3 : The figure shows RKM.

Figure 2.2.3 Replacing Backup Battery Unit (RKM/RKS/RKXS)

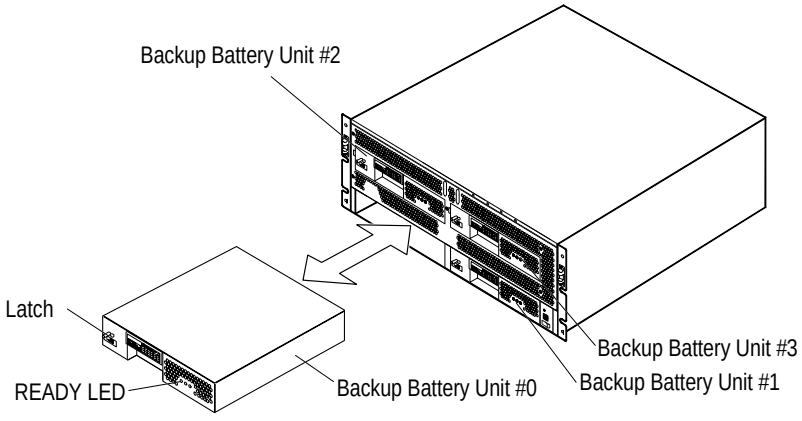


Figure 2.2.3.1 Replacing Backup Battery Unit (RKH)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2) Procedure for replacement with the power turned off
(Refer to "Figure 2.2.3 Replacing Backup Battery Unit" (REP 02-0260).)
Check the state of Device main switch at first.
- When main switch is on ·····(2-1)
- When main switch is off ····· (2-2)

(2-1) When main switch is on
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch
(b) Check to see that PWR LED (green) on the Front Bezel turns off (POWER OFF).
If it does not go POWER OFF, connect the Maintenance PC to WEB (Refer to Troubleshooting "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).), and analyze the cause of failure.
(c) After turning off the main switch, check to see that CACHE POWER LED (green) on the Controller is off.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.
If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)

(d) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(e) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))
(f) Turn off the battery switch of the Backup Battery Unit to be replaced.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.
(g) Shift the latch of the Battery Unit to the Release position and pull out the unit toward you.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, loosen the screw that is fixing the latch of the Backup Battery Unit, set the latch to the Release position, and then pull out the Backup Battery Unit forward.

NOTE : Since the depth of a battery unit is as short as 150mm and it is as heavy as about 3.0kg, please pull out carefully.

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(h) Remove the Backup Battery Unit you holding the Backup Battery Unit main body.
(i) Make sure that the Battery switch on the new Backup Battery Unit has been turned off.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.
(j) In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, insert the new Backup Battery Unit in the specified location in the subsystem to the position where it is completely fixed until latch moves to Lock side.
In the case of RKXS/RKH, shift the latch (fixing screw) of the new Backup Battery Unit to the Release position, and insert the subsystem. Shift the latch (fixing screw) of the Backup Battery Unit to the Lock position, tighten the latch (fixing screw).
(k) Turn on the battery switch of the Backup Battery Unit.
In case of the Backup Battery Unit of REV.C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.
(l) Turn on the AC Power Unit Switch of the both Power Units.
(m) Turn on the main switch (the subsystem usually recovers in about five minutes).
(n) Charge the battery after the READY LED (green) on the Backup Battery Unit blinks until it changes to lighting. (Although the READY LED (green) on the Backup Battery Unit blinks during the charge, it changes to lighting when the charge is completed. It is about six hours at the maximum.)
(o) Check that the READY LED (green) on the Backup Battery Unit is on.
(p) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
(q) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).
(r) Attach the Front Bezel.
(s) Recycle the removed battery. For the recycling procedure, refer to "Chapter 5. Recycling" (REP 05-0000).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2-2) When main switch is off

(a) Check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))

(d) Turn off the battery switch of the Backup Battery Unit to be replaced.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(e) Shift the latch of the Battery Unit to the Release position and pull out the unit toward you.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, loosen the screw that is fixing the latch of the Backup Battery Unit, set the latch to the Release position, and then pull out the Backup Battery Unit forward.

NOTE : Since the depth of a battery unit is as short as 150mm and it is as heavy as about 3.0kg, please pull out carefully.

(f) Remove the Backup Battery Unit you holding the Backup Battery Unit main body.

(g) Make sure that the Battery switch on the new Backup Battery Unit has been turned off.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(h) Insert the new Backup Battery Unit in the specified location in the subsystem to the position where it is completely fixed until latch moves to Lock side.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, shift the latch (fixing screw) of the new Backup Battery Unit to the Release position, and insert the subsystem. Shift the latch (fixing screw) of the Backup Battery Unit to the Lock position, tighten the latch (fixing screw).

(i) Turn on the battery switch of the Backup Battery Unit.
In case of the Backup Battery Unit of REV. C to be installed in the RKM/RKS and the Backup Battery Unit to be installed in the RKXS/RKH, this work is unnecessary because there is no battery switch.

(j) Turn on the AC Power Unit Switch of the both Power Units.

(k) Turn on the main switch (the subsystem usually recovers in about five minutes).

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(l) Charge the battery after the READY LED (green) on the Backup Battery Unit blinks until it changes to lighting. (Although the READY LED (green) on the Backup Battery Unit blinks during the charge, it changes to lighting when the charge is completed. It is about six hours at the maximum.)

(m) Check that the READY LED (green) on the Backup Battery Unit is on.

(n) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

(o) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

(p) Attach the Front Bezel.

(q) Recycle the removed battery. For the recycling procedure, refer to "Chapter 5. Recycling" (REP 05-0000).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.3 Replacing Fan Assembly

⚠ CAUTION

Since each fan is rotating with high-speed, be careful not to be caught by it.

Select a procedure from the following and execute it.

CAUTION

- The replacement of the component is restricted in time. This operation requires referring to the manual. If the subsystem is left with this component removed for more than 10 minutes, it will stop by detecting the thermal alarm.
- When the CALM LED on the Control Unit is on while the ALM LED of the Fan Assembly is on, be sure to solve the trouble of the Control Unit first.
- When replacing the Fan Assembly, do it in haste after preparing a replacement Fan Assembly and arranging cables, etc. so that they do not disturb the replacement.

The same parts are used for both of the left and right (upper and lower) Fan Assemblies of the subsystem. However, care should be taken when installing them because each of them must face a peculiar direction (up or down, or left or right).

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes and restart the fans of the Fan Assembly to rotate. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. Be sure to replace the Power Unit first when the Power Unit and the Fan Assembly fail at the same time. 3. Replace them with the power turned off in case of failures of two fans. 4. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 5. The array subsystem becomes a planned shutdown and the power supply is turned off, so that, work so not to pull out two Fan Assemblies. 6. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	See "(1) Procedure for replacement with the power turned on" (REP 02-0310)

To be continued to the next page.

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No.	Power status during the replacement	Restriction	Reference section
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	See "(2) Procedure for replacement with the power turned off" (REP 02-0330)

(1) Procedure for replacement with the power turned on
(In the case of the RKM/RKS/RKXS/RKH, refer to "Figure 2.2.5 Replacing Fan Assembly (RKM/RKS/RKXS/RKH)" (REP 02-0320).)
(In the case of the RKA, refer to "Figure 2.2.5.1 Replacing Fan Assembly (RKA)" (REP 02-0320).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Make sure that the ALM LED (red) on the Fan Assembly is on.
(b) In the case of the RKM/RKS/RKXS/RKH, loosen the screw which is fixing the lever of the Fan Assembly, open the lever, and move it forward.
In the case of the RKA, insert the key (for latch) into the latch of the Fan Assembly, slide the key to the Release position, and shift the Fan Assembly toward you holding a finger grip until the latch pin comes out (the latch is released).
(c) Remove the Fan Assembly by pulling it out holding its main body with your both hands.
(d) In the case of the RKM/RKS/RKXS/RKH, after waiting for longer than 20 seconds, and then insert the new Fan Unit into the specified position in the subsystem, raise it by fitting the hook of the lever to the cutout of the subsystem, and tighten it with the fixing screw (‡1).
In the case of the RKA, after waiting for longer than 20 seconds, push in the new Fan Assembly until it clicks the latch (‡1).
If the Fan Assembly is inserted without waiting for 20 seconds, it is possible that the Fan Assembly is not recovered from the failure normally (‡2).

NOTE : • Do not catch a ENC cable, when the Fan Assembly for the inserted.
• Place the same Fan Assembly in the right and left of the subsystem facing them in the reverse direction.

‡1 : If the Fan Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Fan Unit may not recover normally.
‡2 : Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Fan Unit from the chassis once and insert it again after 20 seconds or more passed.

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(e) Check that the status of the ALM LED (red) on the Fan Assembly changes from on to off.
(f) Check if the fans of the mounted Fan Assembly are rotating.
(g) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
(h) Refer to "Information Message" on WEB, and check to see that [I00500 FAN recovered (CTL-Unit, FAN-x)] or [I005xy (or I005HH) FAN recovered (Unit-x, FAN-y)] is indicated. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Fan Assembly has completed.

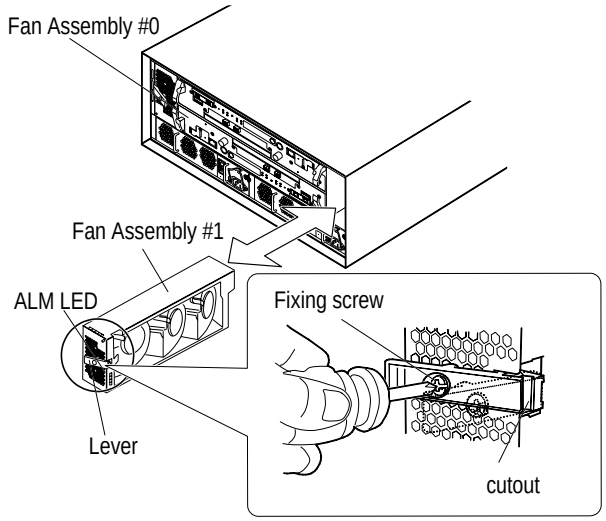


Figure 2.2.5 Replacing Fan Assembly (RKM/RKS/RKXS/RKH)

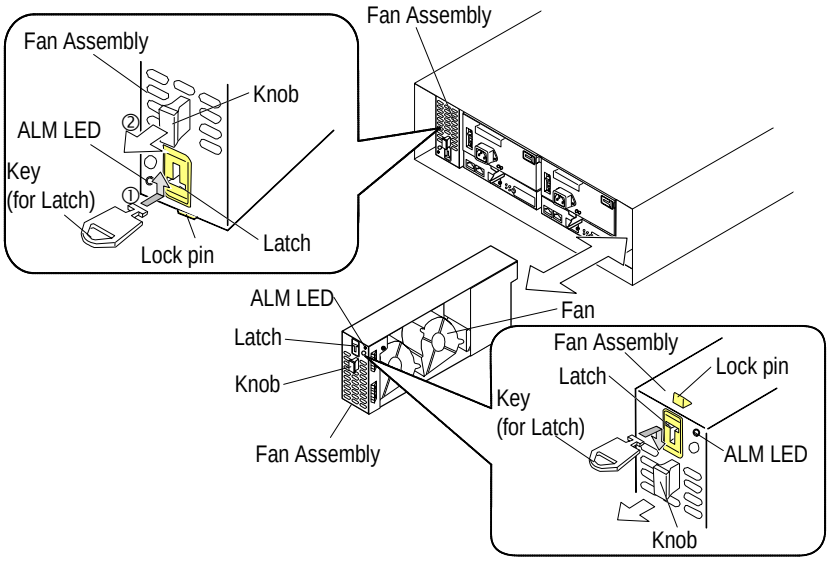


Figure 2.2.5.1 Replacing Fan Assembly (RKA)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2) Procedure for replacement with the power turned off

(In the case of the RKM/RKS/RKXS/RKH, refer to "Figure 2.2.5 Replacing Fan Assembly (RKM/RKS/RKXS/RKH)" (REP 02-0320).)

(In the case of the RKA, refer to "Figure 2.2.5.1 Replacing Fan Assembly (RKA)" (REP 02-0320)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch.

Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the WEB.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch .

(c) In the case of the RKM/RKS/RKXS/RKH, loosen the screw which is fixing the lever of the Fan Assembly, open the lever, and move it forward.
In the case of the RKA, insert the key (for latch) into the latch of the Fan Assembly, slide the key to the Release position, and shift the Fan Assembly toward you holding a finger grip until the latch pin comes out (the latch is released).

(d) Remove the Fan Assembly by pulling it out holding its main body with your both hands.

(e) In the case of the RKM/RKS/RKXS/RKH, insert the new Fan Unit into the specified position in the subsystem, raise it by fitting the hook of the lever to the cutout of the subsystem, and tighten it with the fixing screw.
In the case of the RKA, push in the new Fan Assembly until it clicks the latch.

NOTE : • Do not catch a ENC cable, when the Fan Assembly for the inserted.
• Place the same Fan Assembly in the right and left of the subsystem facing them in the reverse direction.

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(f) Turn on the AC Power Unit Switch of the both Power Units.
(g) Turn on the main switch (the subsystem usually recovers in about five minutes).
Check that the status of the ALM LED (red) changes from on to off.
(h) Check if the fans of the mounted Fan Assembly are rotating.
(i) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
(j) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.4 Replacing Power Unit

The Power Unit differs respectively in RKM/RKS, RKXS/RKH, RKXS/RKAJAT/RKAJATL and RKA. Be careful not to install wrong ones by checking their part model names.

CAUTION

- The replacement of the component is restricted in time. This operation requires referring to the manual. If the subsystem is left with this component removed for more than 10 minutes, it will stop by detecting the thermal alarm.
- When a trouble of the Power Unit is detected due to a trouble of the Fan Assembly, the Power Unit does not need to be replaced.
  When a trouble of the Power Unit is detected during replacement of the Fan Assembly, pull out and then insert the Power Unit.
- When replacing the Power Unit, do it in haste after preparing a replacement Power Unit and arranging cables, etc. so that they do not disturb the replacement.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes. 2. When the Power Unit and another module fail at the same time, replace the Power Unit first. Otherwise, a powering off (subsystem down) may occur because of an abnormal temperature rise. 3. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 4. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	Refer to "(1-1) Procedure for replacement with the power turned on (Be sure to perform the following operations (a) to (j) within 10 minutes.)" (REP 02-0350)
		When both of the two power supplies are required to be replaced, be sure to replace each one of them at a time, or replace them while the power is turned off.	Refer to "(1-1) Procedure for replacement with the power turned on (Be sure to perform the following operations (a) to (j) within 10 minutes.)" (REP 02-0350)

To be continued to the next page.

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No.	Power status during the replacement	Restriction	Reference section
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	Refer to "(1-2) Procedure for replacement with the power turned off" (REP 02-0370)

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(1-1) Procedure for replacement with the power turned on

(Be sure to perform the following operations (a) to (j) within 10 minutes.)

(Refer to "Figure 2.2.6 Replacing Power Unit" (REP 02-0360).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

(a) Check that ALARM LED (Red) of the Power Unit to be replaced is on.
Check that READY LED (Green) of the Power Unit not to be replaced is on.

NOTE : When the ALARM LEDs of Power Unit of the both systems are on, replace the Power Unit in the state in which the power is turned off.

(b) Turn on the AC Power Unit Switch of the Power Unit to be replaced.

(c) Disconnect all the power cables connected to the Power Unit to be replaced.

(d) In the case of the RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKAJATL, loosen the screw which is fixing the latch of the Power Unit, shift the latch (fixing screw) to the Release position, and move it forward by holding the handle.
In the case of the RKA, insert the key (for latch) into the latch of the Fan Assembly, slide the key to the Release position, and shift the fan unit toward you holding a handle until the latch pin comes out (the latch is released).

(e) Remove the Power Unit by pulling it out holding its main body with your both hands.

(f) Check that the AC Power Unit Switch of the new Power Unit is turned off.

(g) In the case of the RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKAJATL, after waiting for 20 seconds or more, shift the latch (fixing screw) of the new Power Unit (RKM/RKS/RKXS/RKH) to the Release position, insert it slowly into the sheet metal slit part at the top of the Power Unit (‡1), and then push it to the end.
In the case of the RKA, push the unit in until the latch makes with a click.
If you insert the Power Unit without waiting for more than 20 seconds, Power Unit may not be recovered (‡2).

NOTE : Do not catch a ENC cable, when the Power Unit for the inserted.

‡1 : If the Power Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Power Unit may not recover normally.

‡2 : Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Power Unit from the chassis once and insert it again after 20 seconds or more passed.

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(h) Connect all the removed cables.

(i) Turn on the AC Power Unit Switch of the installed Power Unit.
Check that the READY LED (green) of the Power Unit is on.

(j) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.

(k) Refer to "Information Message" on WEB, and check to see that [I006xy (or I006HH) PS recovered (Unit-x, PS-y)] or [I00600 PS recovered (CTL-Unit, PS-x)] is indicated. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Power Unit has completed.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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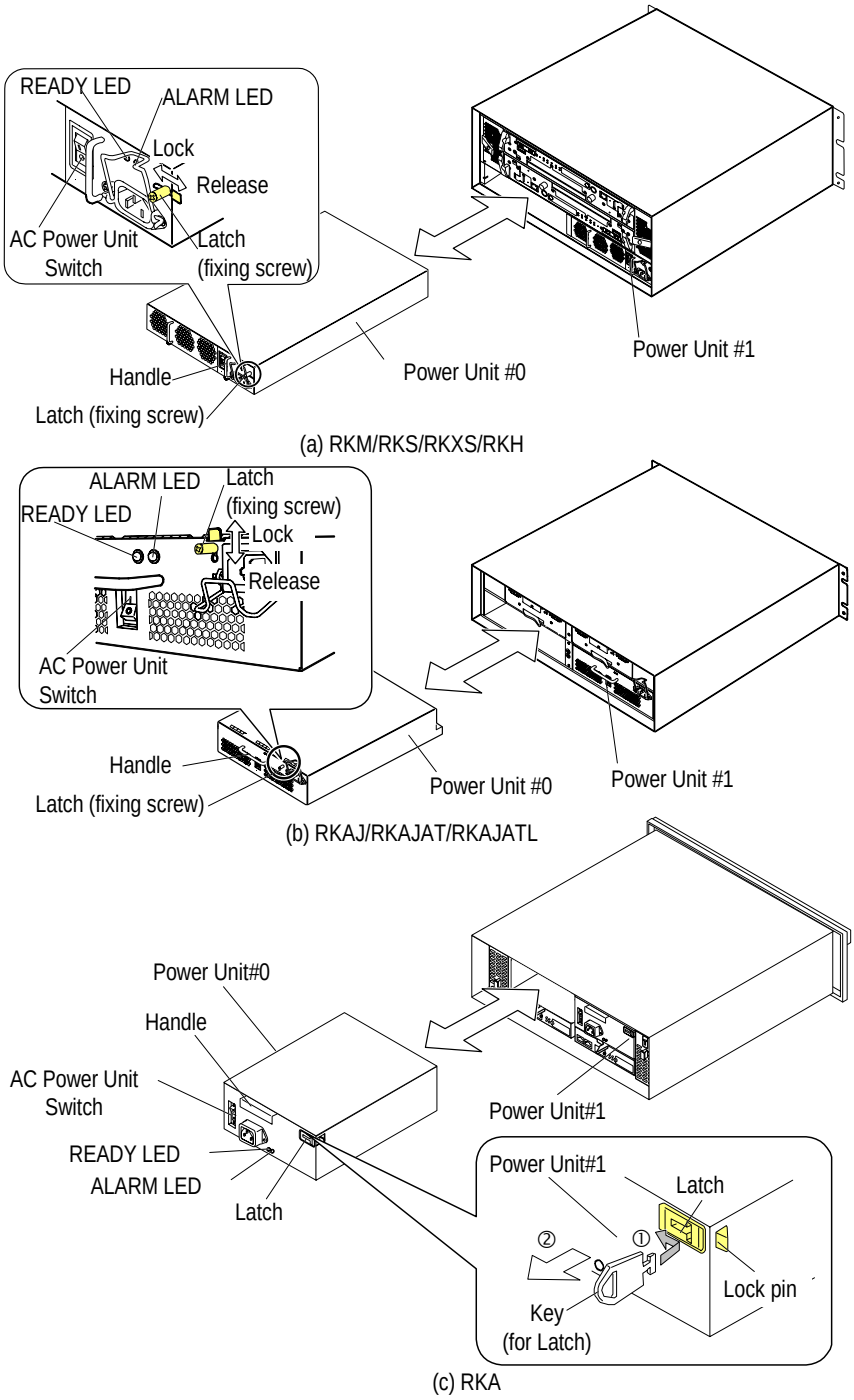


Figure 2.2.6 Replacing Power Unit

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(1-2) Procedure for replacement with the power turned off
(Refer to "Figure 2.2.6 Replacing Power Unit" (REP 02-0360).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

(a) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the WEB.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.
(c) Remove the all cables connected to the Power Unit to be replaced.
(d) In the case of the RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKAJATL, loosen the screw which is fixing the latch of the Power Unit, shift the latch (fixing screw) to the Release position, and move it forward by holding the handle.
In the case of the RKA, insert the key (for latch) into the latch of the Fan Assembly, slide the key to the Release position, and shift the fan unit toward you holding a handle until the latch pin comes out (the latch is released).
(e) Remove the Power Unit by pulling it out holding its main body with your both hands.
(f) Make sure that the AC Power Unit Switch on the Power Unit is off.
(g) In the case of the RKM/RKS/RKXS/RKH/RKAJ/RKAJAT/RKAJATL, shift the latch (fixing screw) of the new Power Unit (RKM/RKS/RKXS/RKH) to the Release position, insert it slowly into the sheet metal slit part at the top of the Power Unit, and then push it to the end.
In the case of the RKA, push the unit in until the latch makes with a click.

NOTE : Do not catch a ENC cable, when the AC Power Unit for the inserted.

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(h) Connect the all cables as they were before.

(i) Turn on the AC Power Unit Switch of the both Power Units, and then turn on the main switch. Check that the READY LEDs (green) of the both Power Units are on (the subsystem usually recovers in about five minutes).

(j) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

(k) When the remote adapter is connected, check that the LED of the Remote Adapter connected is on.

(l) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.5 Replacing Control Unit

When replacing it online while the NAS unit is connected, check the fail over of the NAS Unit (NNC) before the performance, and check the fail back after the replacement(Refer to the DF700 NAS SOFTWARE Maintenance Manual "Table 7.3-2 Hardware Failures" (NAS 07-0120) (#19)).

The following two types of Basic Chassis exist in the SANRISE AMS1000.

- DF-700-RKH (abbr.: RKH)
- DF-700-RKHE (abbr.: RKHE)

The Control Unit of the RKH and the Control Unit of the RKHE cannot be mixed in this Basic Chassis.
This manual does not describe the RKHE except for the following differences.
When the RKHE is used, it becomes the same procedure as the RKH. Therefore, read the RKH as the RKHE excluding the part described in parallel and use it.

Differences between the RKH and the RKHE

Chassis Name	Installed Control Unit Model Name	Processor (Control CPU)	Control Memory (L2 Cache Memory)
RKH	DF-F700-F1JH	POWER PC 7447A (1.4GHz)	512 K bytes
RKHE	DF-F700-F2JH	POWER PC 7448 (1.7GHz)	1 M bytes

CAUTION

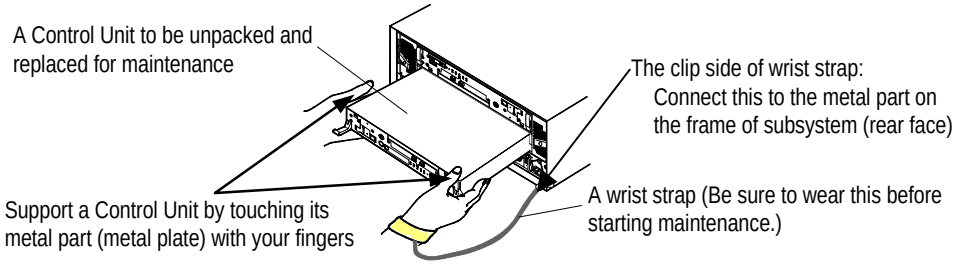
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. The procedure varies depending on whether the CALM LED, EALM LED or RST LED is on or off. 3. Replace the Control Unit after blocking the Control Unit to be replaced. 4. When replacing Control Unit of both systems (CTL 0 and CTL 1), power off the subsystem before the replacement. 5. In the case of the single Controller configuration, perform the replacement after turning off the power. 6. In the case of Preventive replacement, there may be an error report in the host computer depending on the operating conditions of the host computer. The prior contact to the customer is required. 7. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 8. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	When the CALM LED is on • In the case of the RKM/RKS : See "(1-1) When the CALM LED, EALM LED or RST LED of the RKM/RKS/RKXS/RKH is on" (REP 02-0410). When the CALM LED is off (Preventive replacement) • In the case of the RKM/RKS : See "(1-2) When the CALM LED, EALM LED or RST LED of the RKM/RKS/RKXS/RKH is off"" (REP 02-0460).
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	"(2) Procedure for replacement with the power turned off" (REP 02-0500).
3	Replacement to be made with the power turned off (with the cache memory data volatilized forcibly)	1. Make the replacement after getting a permission of the Technical Support Center because user data in the cache will be lost. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 3. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	"(3) Procedure for replacement with the power turned off (with the cache memory data volatilized forcibly)" (REP 02-0520).

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(1) Procedure for replacement with the power turned on (for the case of the dual Controller configuration only)

(1-1) When the CALM LED, EALM LED or RST LED of the RKM/RKS/RKXS is on
(Refer to "Figure 2.2.7 Control Unit replacement and LED locations (RKS/RKXS)" (REP 02-0440), "Figure 2.2.7.3 Control Unit replacement and LED locations (RKM)" (REP 02-0450) and "Figure 2.2.7.5 Control Unit replacement and LED locations (RKH)" (REP 02-0451).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

NOTE :
- Do not replace the Control Unit which operates normally.
  Before replacing the Control Unit, confirm that it is the CALM LED (red), EALM LED (red) or RST LED (orange) in on.
- When replacing the Control Unit while the subsystem power is turned on, be sure to replace them one by one. When replacing the Control Unit of the both systems (Control Unit#0 and Control Unit#1) at the same time, follow the procedure explained in "(2) Procedure for replacement with the power turned off" (REP 02-0500).
- System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually is required.
- When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
- Replace the Control Unit after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) Make sure that the CALM LED (red), EALM LED (red) or RST LED (orange) on the Control Unit to be replaced is on.

(b) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit to be replaced is installed.

(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(d) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.

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(e) Remove the all cables connected to the Control Unit. (When the Additional Chassis of Rack Mount Style is connected, disconnect the ENC cable also.)

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) When the Interface Board is not installed in the removed Control Unit, remove the host connector.
(h) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(i) Remove the Cache Unit mounted on the Control Unit.
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Cache Unit temporarily in the place where the anti-static measures are taken.

(j) When the Interface Board is installed in the removed Control Unit, remove that Interface Board.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was removed, loosen the screws of the connector cover for the maintenance of the Control Unit and remove the Panel.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover of the new Control Unit, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

NOTE : Use the Control Unit whose model name is the DF-F700-F1JH for the RKH.
Use the Control Unit whose model name is the DF-F700-F2JH for the RKHE.

(l) Be sure to install the removed Cache memory in the position with the same slot number as before in the new Control Unit.
(m) When the Interface Board was removed from the removed Control Unit, install the Interface Board fitting it to the positioning pin of the new Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was installed, loosen the screws of the connector cover for the maintenance of the new Control Unit, attach the removed Panel, and fix it by tightening the screws.

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(n) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

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(o) Connect the removed interlocking cable to the new Control Unit when the special UPS is connected.
(p) When the host connector was removed from the removed Control Unit, install that host connector in the new Control Unit.
(q) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out.
(r) When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (s).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(s) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.
(t) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next (‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if “I1G300 CTL recovery start” is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB.
(There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When pushing the levers at the same time in the direction shown by the arrows (⟵), perform this operation within one minute. If it has taken more than one minute to perform the operation, it may not be recovered. In this case, execute the replacement procedure again. Nevertheless, if it is not recovered, perform the Control Unit replacement since the failure may be caused in the Control Unit.

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until “I1GZ00 The spin up of disk drives completed” is displayed for the RAID Group that “I1GY00 The request of spin up of disk drives is accepted” is displayed in “Information Message” on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off (“I1G300 CTL recovery start” is not displayed in “Information Message” on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(u) Make sure that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1). (The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)

(v) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(w) Check that the READY LED (green) on the front of the Basic Chassis is on. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
In case of the RKXS, when the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.

(x) Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Control Unit has completed.
Check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to the Information Message on WEB when the Basic Chassis is the RKH/RKHE. (‡2)

(y) Check that the LED of the remote adaptor connected to the Control Unit is installed lights on when the remote adaptor is connected.

(z) Check that the maintenance port IP address is set correctly.
When the maintenance port IP address is displayed as "0.0.0.0", set it.
Refer to System Parameter "4.2 (4) Setting of Maintenance LAN" (SYSPR 04-0100).

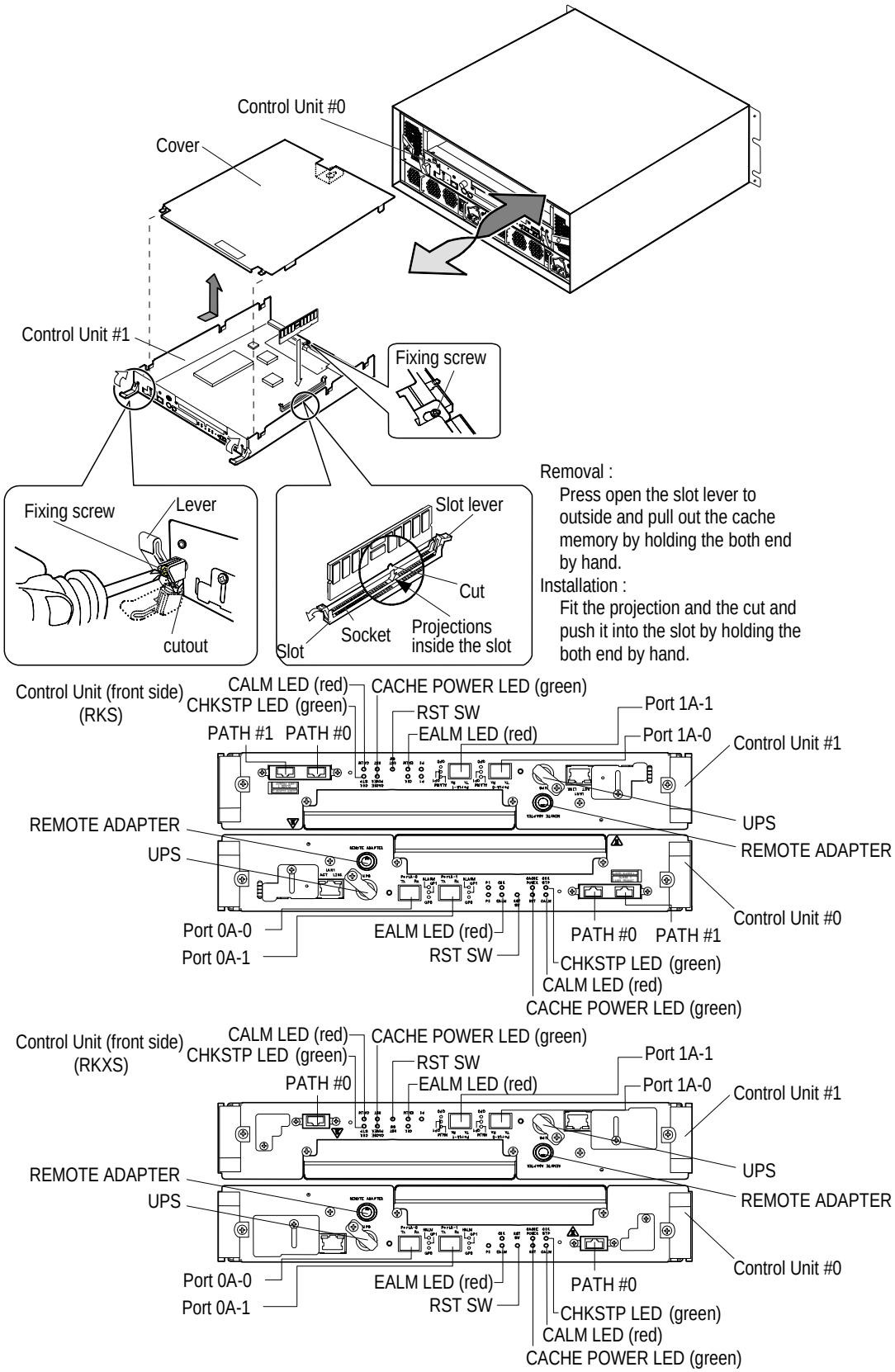
‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

‡2 : Perform the maintenance referring to the recovery method of this message when "I5390x The CTL type different from the other CTL was detected" is displayed while the Control Unit is upgraded from the RKH to the RKHE.

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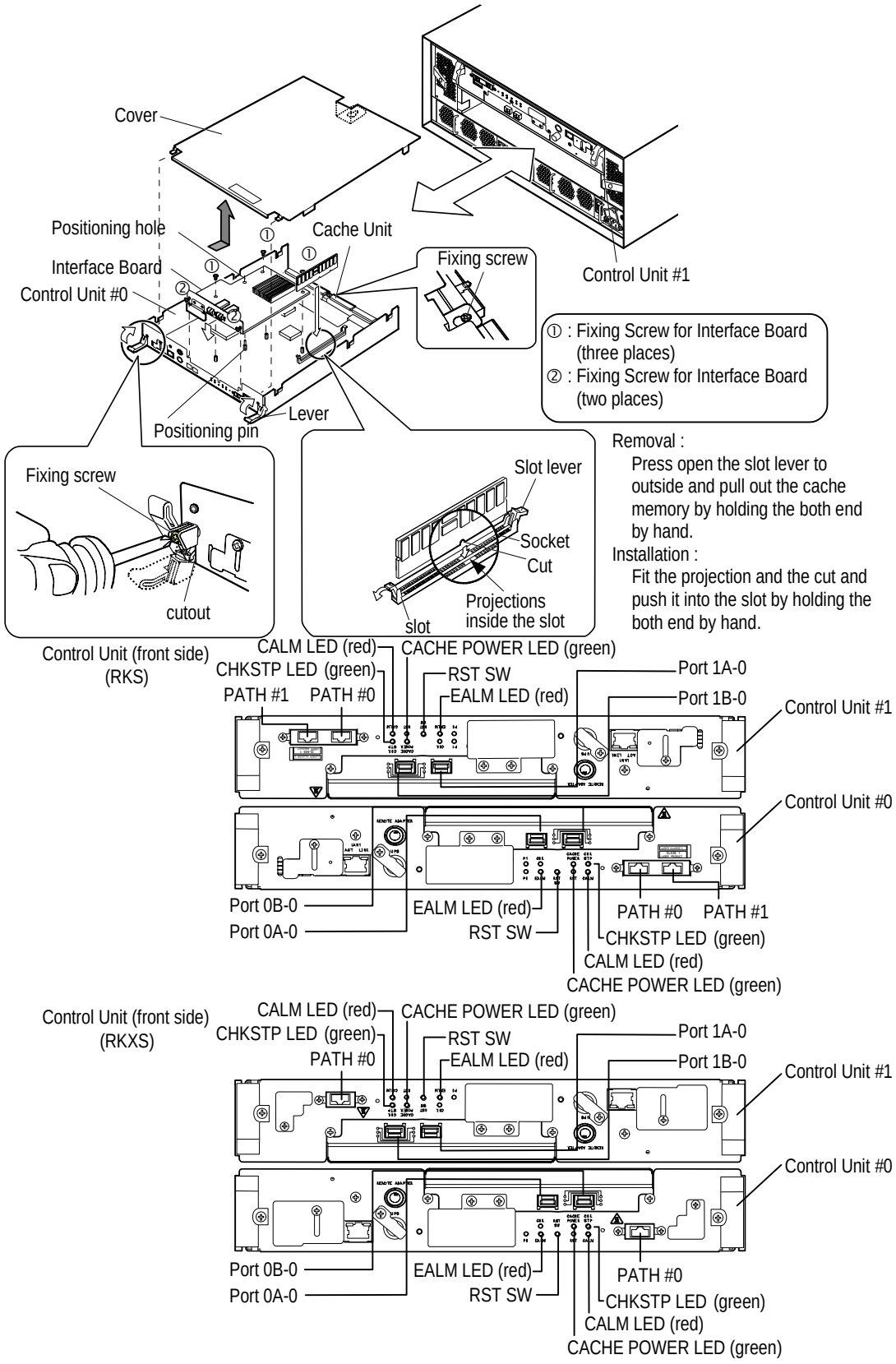
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*1 : The figure shows the case where the FC Interface Board is not installed in the Control Unit of the RKS/RKXS.

Figure 2.2.7 Control Unit replacement and LED locations (RKS/RKXS)

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKS/RKXS.

Figure 2.2.7.1 Control Unit replacement and LED locations (RKS/RKXS)

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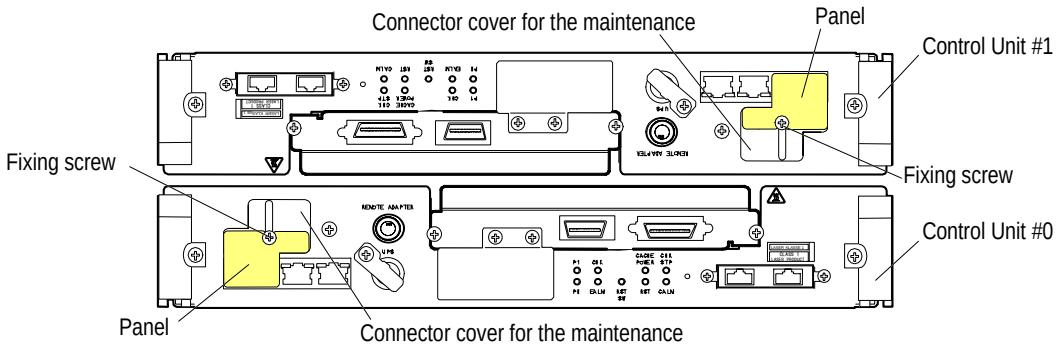
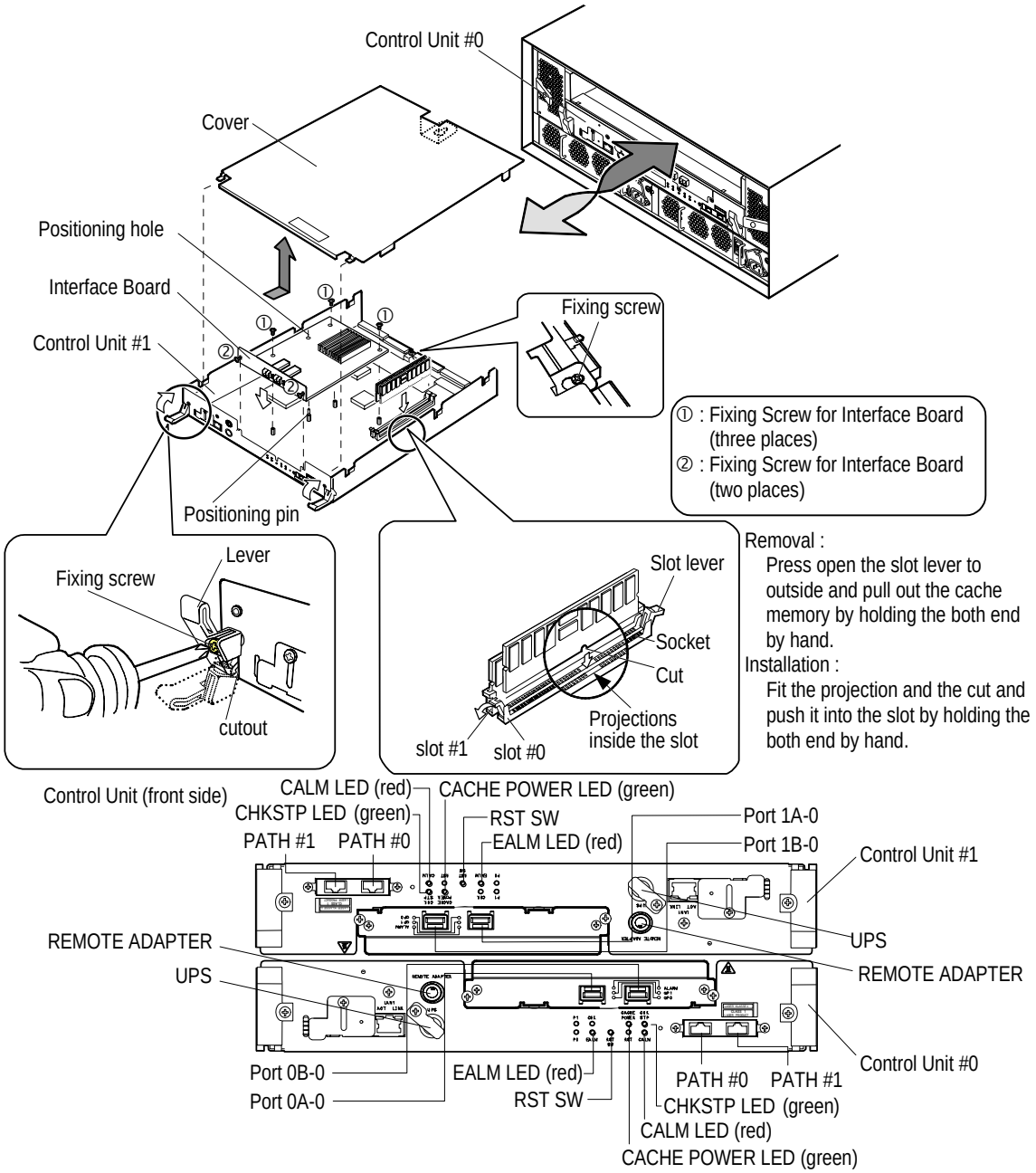


Figure 2.2.7.2 Installation position of Panel when NAS Interface Board is installed

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit of the RKM.

Figure 2.2.7.3 Control Unit replacement and LED locations (RKM)

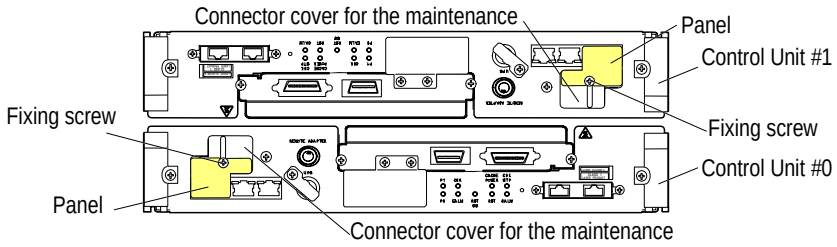


Figure 2.2.7.4 Installation position of Panel when NAS Interface Board is installed

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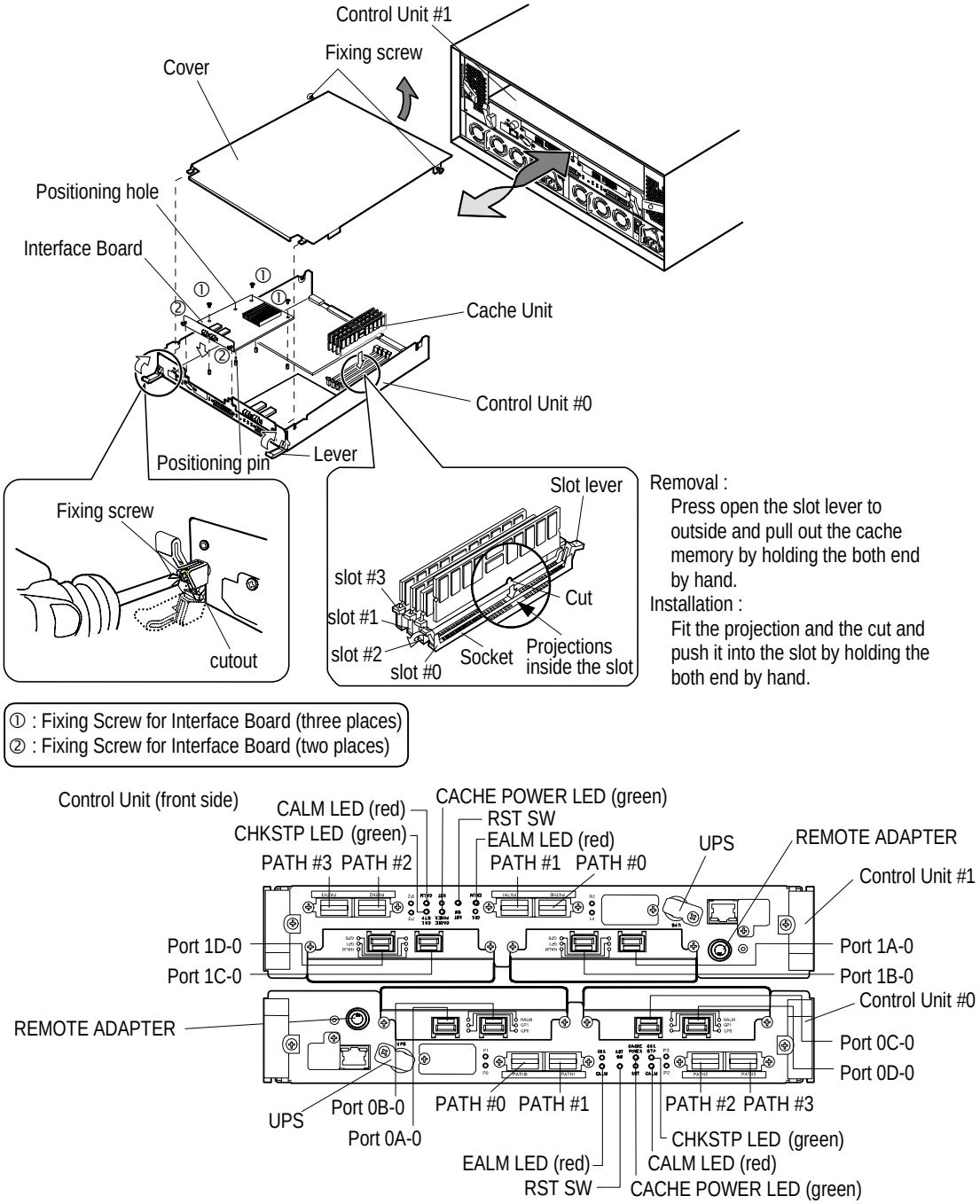


Figure 2.2.7.5 Control Unit replacement and LED locations (RKH)

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(1-2) When the CALM LED, EALM LED or RST LED of the RKM/RKS/RKXS is off
(Refer to "Figure 2.2.7 Control Unit replacement and LED locations (RKS/RKXS)" (REP 02-0440), "Figure 2.2.7.3 Control Unit replacement and LED locations (RKM)" (REP 02-0450) and "Figure 2.2.7.5 Control Unit replacement and LED locations (RKH)" (REP 02-0451).)

NOTE : • When replacing the Control Unit while the subsystem power is turned on, be sure to replace them one by one. When replacing the Control Unit of the both systems (Control Unit #0 and Control Unit #1) at the same time, follow the procedure explained in "(2) Procedure for replacement with the power turned off" (REP 02-0500).
• System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.
• When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
• There may be an error report in the host computer depending on the operating conditions of the host computer.
The prior contact to the customer is required.
• Replace the Control Unit after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) For preventive detaching of the Control Unit, press RST SW.
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).
Make sure that the CALM LED (red), EALM LED (red) or RST LED (orange) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.
(b) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit to be replaced is installed.
(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.
(d) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.
(e) Remove the all cables connected to the Control Unit that was blocked for prevention against a failure. (When the Additional Chassis of Rack Mount Style is connected, disconnect the ENC cable also.)

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) When the Interface Board is not installed in the removed Control Unit, remove the host connector.
(h) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(i) Remove the Cache Unit mounted on the Control Unit.
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Interface Board and Cache Unit temporarily in the place where the anti-static measures are taken.

(j) When the interface board is installed in the removed Control Unit, remove that Interface Board.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was removed, loosen the screws of the connector cover for the maintenance of the Control Unit and remove the Panel.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover of the new Control Unit, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

NOTE : Use the Control Unit whose model name is the DF-F700-F1JH for the RKH.
Use the Control Unit whose model name is the DF-F700-F2JH for the RKHE.

(l) Be sure to install the removed Cache memory in the position with the same slot number as before in the new Control Unit.
(m) When the Interface Board was removed from the removed Control Unit, install the Interface Board fitting it to the positioning pin of the new Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was installed, loosen the screws of the connector cover for the maintenance of the new Control Unit, attach the removed Panel, and fix it by tightening the screws.
(n) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(o) Connect the removed interlocking cable to the new Control Unit when the special UPS is connected.
(p) When the host connector was removed from the removed Control Unit, install that host connector in the new Control Unit.

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(q) When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (r).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(r) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.

(s) Wait for more than 20 seconds, and then insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next (‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When pushing the levers at the same time in the direction shown by the arrows (⟵), perform this operation within one minute. If it has taken more than one minute to perform the operation, it may not be recovered. In this case, execute the replacement procedure again. Nevertheless, if it is not recovered, perform the Control Unit replacement since the failure may be caused in the Control Unit.

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off ("I1G300 CTL recovery start" is not displayed in "Information Message" on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.

‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(t) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)
If WARNING LED (orange) is on, replace the Control Unit again.
If WARNING LED (orange) is blinking, make sure WARNING LED (orange) goes off by referring to WEB.

(u) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(v) Make sure that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
In case of the RKXS, when the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.

(w) Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Control Unit has completed.
Check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to the Information Message on WEB when the Basic Chassis is the RKH/RKHE. (‡2)

(x) Check that the LED of the remote adaptor connected to the Control Unit is installed lights on when the remote adaptor is connected.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

‡2 : Perform the maintenance referring to the recovery method of this message when "I5390x The CTL type different from the other CTL was detected" is displayed while the Control Unit is upgraded from the RKH to the RKHE.

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(2) Procedure for replacement with the power turned off

(Refer to "Figure 2.2.7 Control Unit replacement and LED locations (RKS/RKXS)" (REP 02-0440), "Figure 2.2.7.3 Control Unit replacement and LED locations (RKM)" (REP 02-0450) and "Figure 2.2.7.5 Control Unit replacement and LED locations (RKH)" (REP 02-0451).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

(a) Confirm the installation location of the Control Unit whose CALM LED (red), EALM LED (red) or RST LED (orange) is on.

(b) Turn off the main switch.

Make sure that the POWER LED (green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(c) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(d) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(e) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) When the Interface Board is not installed in the removed Control Unit, remove the host connector.
(h) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(i) Remove the Cache Unit mounted on the Control Unit.
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Interface Board and Cache Unit temporarily in the place where the anti-static measures are taken.

(j) When the interface board is installed in the removed Control Unit, remove that Interface Board.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was removed, loosen the screws of the connector cover for the maintenance of the Control Unit and remove the Panel.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover of the new Control Unit, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

NOTE : Use the Control Unit whose model name is the DF-F700-F1JH for the RKH.
Use the Control Unit whose model name is the DF-F700-F2JH for the RKHE.

(l) Be sure to install the removed Cache memory in the position with the same slot number as before in the new Control Unit.
(m) When the Interface Board was removed from the removed Control Unit, install the Interface Board fitting it to the positioning pin of the new Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted. Install the Interface Board making its sheet metal part face inside of the Control Unit. When the NAS Interface Board for the RKM/RKS/RKXS was installed, loosen the screws of the connector cover for the maintenance of the new Control Unit, attach the removed Panel, and fix it by tightening the screws.
(n) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(o) When the host connector was removed from the removed Control Unit, install that host connector in the new Control Unit.

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(p) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(q) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(r) Turn on the AC Power Unit Switch of the both Power Units.
(s) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.)
Check that the WARNING LED (orange) on the front of the Basic Chassis gone out(‡1).
(t) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
In case of the RKXS, when the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.
(u) Check that "I10000 Subsystem is ready" is displayed referring to the Information Message on WEB.
(v) Check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to the Information Message on WEB when the Basic Chassis is the RKH/RKHE. (‡2)

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.
‡2 : Perform the maintenance referring to the recovery method of this message when "I5390x The CTL type different from the other CTL was detected" is displayed while the Control Unit is upgraded from the RKH to the RKHE.

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(w) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

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(3) Procedure for replacement with the power turned off (with the cache memory data volatilized forcibly)
(Refer to "Figure 2.2.7 Control Unit replacement and LED locations (RKS/RKXS)" (REP 02-0440), "Figure 2.2.7.3 Control Unit replacement and LED locations (RKM)" (REP 02-0450) and "Figure 2.2.7.5 Control Unit replacement and LED locations (RKH)" (REP 02-0451).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

NOTE : When doing the following works, get a permission of the Technical Support Center. When replacing the controller with the power turned on (with the cache memory data not volatilized) in a maintenance work, refer to procedure "(2) Procedure for replacement with the power turned off" (REP 02-0500).

(a) Confirm the installation location of the Control Unit whose CALM LED (red), EALM LED (red) or RST LED (orange)is on.
(b) Turn off the AC Power Unit Switch of the both Power Units.
(c) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off
In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.
(d) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.
(e) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) When the Interface Board is not installed in the removed Control Unit, remove the host connector.

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(h) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(i) Remove the Cache Unit.
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the ends of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(j) When the interface board is installed in the removed Control Unit, remove that Interface Board. Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was removed, loosen the screws of the connector cover for the maintenance of the Control Unit and remove the Panel.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover of the new Control Unit, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

NOTE : Use the Control Unit whose model name is the DF-F700-F1JH for the RKH.
Use the Control Unit whose model name is the DF-F700-F2JH for the RKHE.

(l) Be sure to install the removed Cache memory in the position with the same slot number as before in the new Control Unit.

(m) When the Interface Board was removed from the removed Control Unit, install the Interface Board fitting it to the positioning pin of the new Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted. Install the Interface Board making its sheet metal part face inside of the Control Unit.
When the NAS Interface Board for the RKM/RKS/RKXS was installed, loosen the screws of the connector cover for the maintenance of the new Control Unit, attach the removed Panel, and fix it by tightening the screws.

(n) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(o) When the host connector was removed from the removed Control Unit, install that host connector in the new Control Unit.

(p) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE :
- Do not catch a ENC cable, when the Control Unit for the inserted.
- The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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(q) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(r) Turn on the AC Power Unit Switch of the both Power Units.
(s) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.)
(t) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
In case of the RKXS, when the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.
(u) Check that "I10000 Subsystem is ready" is displayed referring to the Information Message on WEB.
(v) Check that "I5390x The CTL type different from the other CTL was detected" is not displayed before "I10000 Subsystem is ready" referring to the Information Message on WEB when the Basic Chassis is the RKH/RKHE. (‡2)
(w) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.
‡2 : Perform the maintenance referring to the recovery method of this message when "I5390x The CTL type different from the other CTL was detected" is displayed while the Control Unit is upgraded from the RKH to the RKHE.

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2.2.6 Replacing Cache Unit

When replacing it online while the NAS is connected, check the fail over of the NAS Unit (NNC) before the performance, and check the fail back after the replacement.
(Refer to the DF700 NAS SOFTWARE Maintenance Manual "7.7 NAS Hardware Replacement When a Failure Occurs")

CAUTION

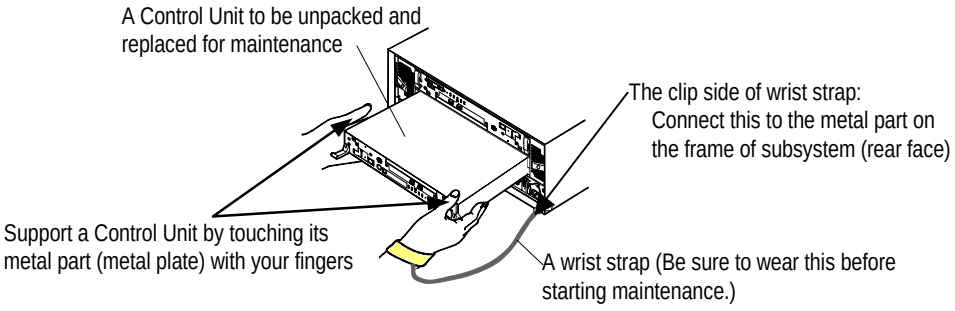
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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Replace the specified slot number only for the Cache memory replacement.

Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. The procedure varies depending on whether the CALM LED or EALM LED is on or off. 3. Replace the Control Unit after blocking the Control Unit to be replaced. 4. When replacing Control Unit of both systems (CTL 0 and CTL 1), power off the subsystem before the replacement. 5. In the case of the single Controller configuration, perform the replacement after turning off the power. 6. In the case of Preventive replacement, there may be an error report in the host computer depending on the operating conditions of the host computer. The prior contact to the customer is required. 7. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 8. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	When the CALM LED is on • In the case of the RKM/RKS : See "(1-1) When the CALM LED of the RKM/RKS/RKXS/ RKH on the Control Unit is on" (REP 02-0560). When the CALM LED is off (Preventive replacement) • In the case of the RKM/RKS : See "(1-2) When the CALM LED of the RKM/RKS/RKXS/ RKH on the Control Unit is off" (REP 02-0610).
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	• In the case of the RKM/RKS : See "(2) Procedure for replacement with the power turned off" (REP 02-0640).

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(1) Procedure for replacement with the power turned on

(1-1) When the CALM LED of the RKM/RKS/RKXS/RKH on the Control Unit is on

(Refer to "Figure 2.2.8 Cache Memory replacement and LED locations (RKS/RKXS)" (REP 02-0590), "Figure 2.2.8.1 Cache Memory replacement and LED locations (RKM)" (REP 02-0600) and "Figure 2.2.8.2 Cache Memory replacement and LED locations (RKH)" (REP 02-0601).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

NOTE :
- Do not replace the Control Unit which operates normally. Before replacing the Control Unit, confirm that it is blocked (the CALM LED (RED) in on).
- System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.
- When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
- Replace the Cache Unit after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) Make sure that CALM LED (RED) on the Control Unit mounting the Cache Unit to be replaced lights up. If it does not light up, remove the Cache memory following "(1-2) When the CALM LED of the RKM/RKS/RKXS/RKH on the Control Unit is off" (REP 02-0610).

(b) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit installing the Cache memory that is not replaced in DF700 are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit in which the Cache memory to be replaced is installed.

(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(d) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.

(e) Remove all the power cables connected to the Control Unit mounting the Cache Unit to be replaced.

NOTE :
- When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
- When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(h) Remove the Cache Unit, in which the failure occurred, after recording its installation location, capacity, and model name.
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed. Install the Interface Board making its sheet steel part face inside of the Control Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(i) Install the new Cache Unit to the Control Unit.

NOTE : • Install the new Cache Unit in the removed slot #.
• Install a new Cache Unit with the same capacity as that of the former one in the same slot
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(j) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(k) Connect the removed interlocking cable to the Control Unit when the special UPS is connected.
(l) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out. If the controller is inserted before 20 seconds has elapsed, the Control Unit may not be recovered normally.
(m) When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (n).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(n) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.

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(o) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next(‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When returning the levers in the arrow directions (⟶) at the same time, operate them within one second. If the operation takes longer than one second, the Control Unit may not be recovered. If it occurs, execute the recovery procedure once again. If the Control Unit is not recovered in spite of the re-execution, replace the Control Unit because it may be faulty.

(p) Check that the CALM LED (red) on the Control Unit is off.
(q) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡3).
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off ("I1G300 CTL recovery start" is not displayed in "Information Message" on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.
‡3 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(r) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(s) Check that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.

(t) Check that "I0010x CTL recovered (CTL-x)" is displayed referring to the Information Message window on WEB. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Cache Unit has completed.

(u) Check that the LED of the remote adaptor connected to the Control Unit in which the replaced Cache memory is installed lights on when the remote adaptor is connected.

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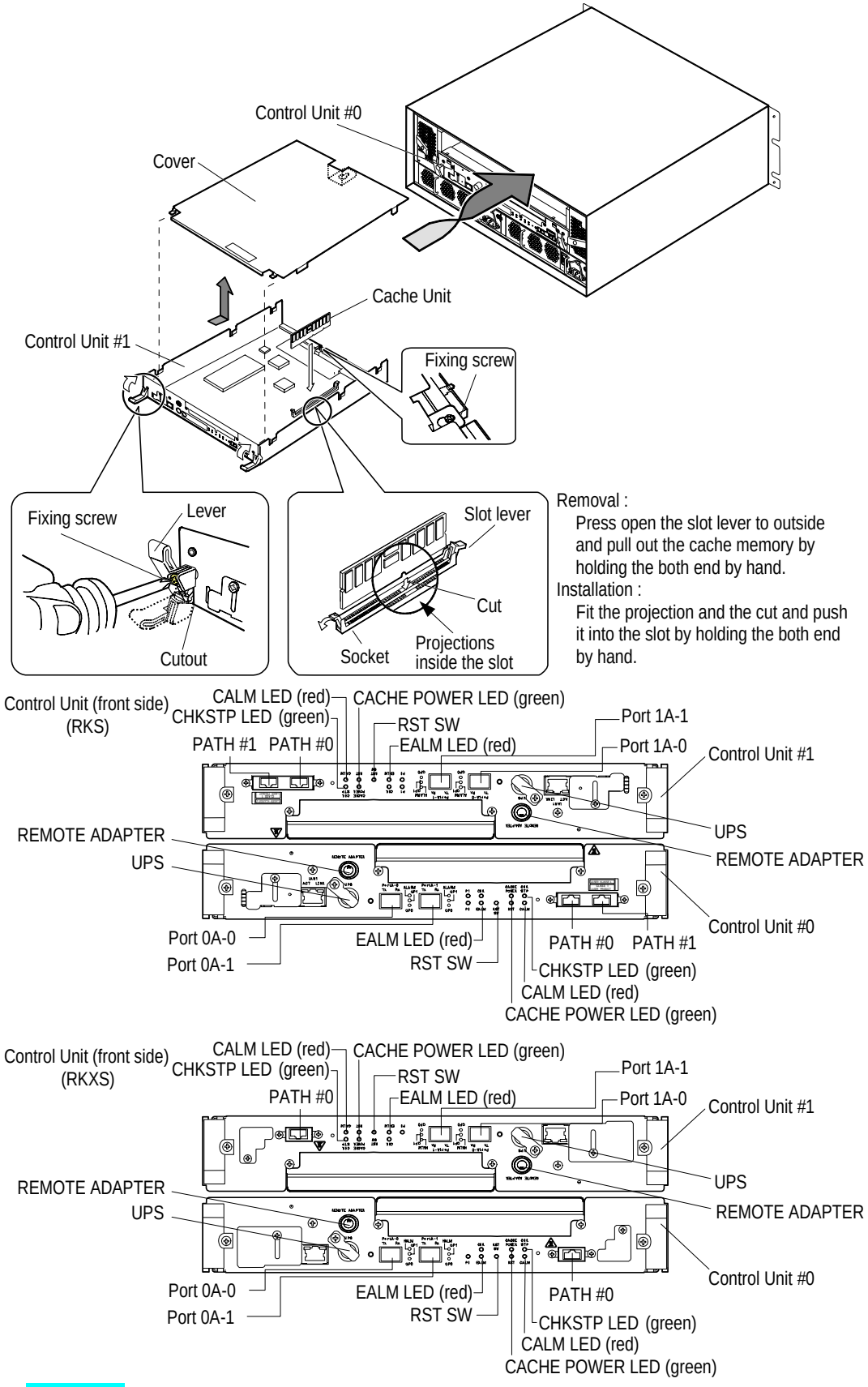


Figure 2.2.8 Cache Memory replacement and LED locations (RKS/RKXS)

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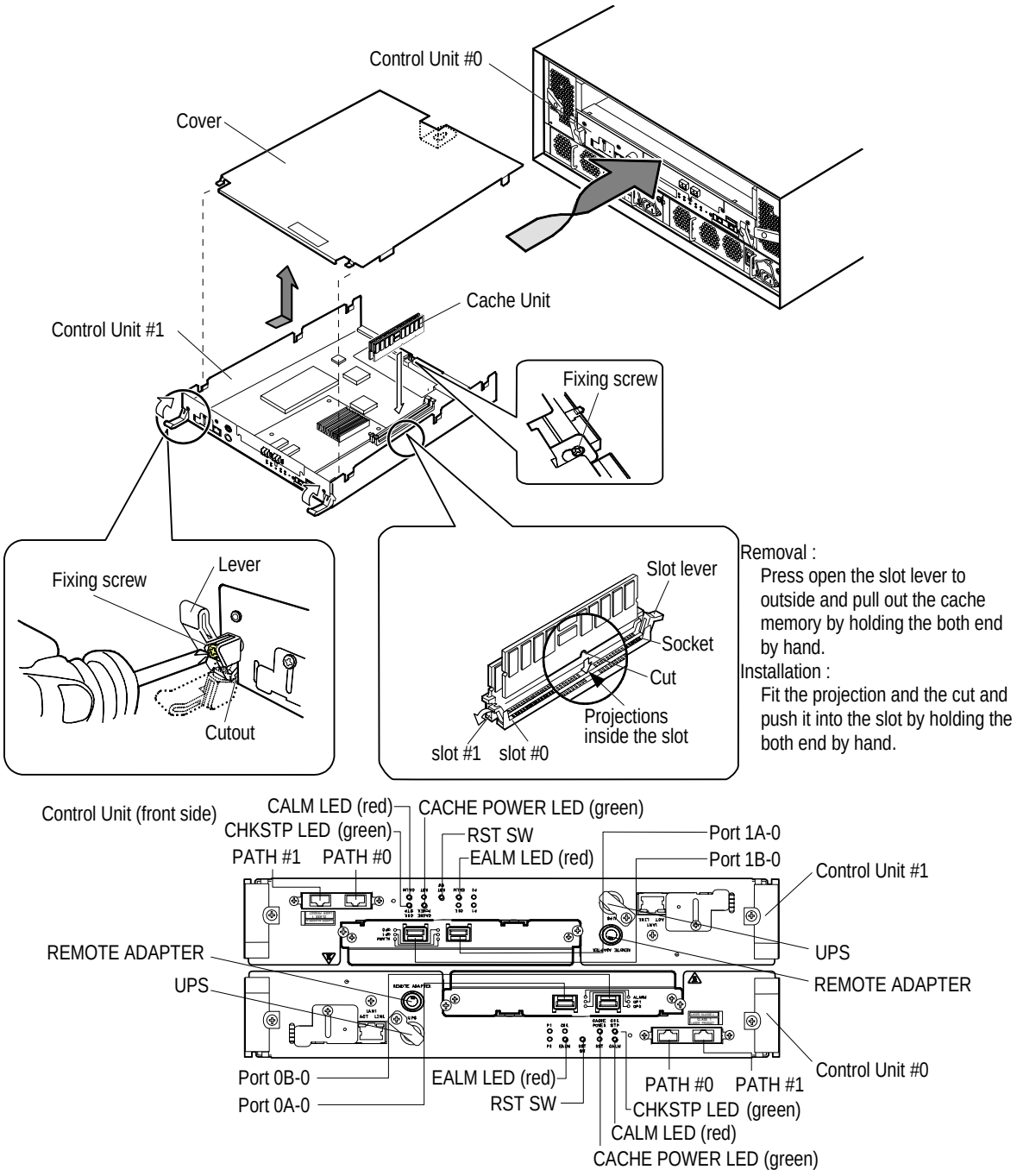
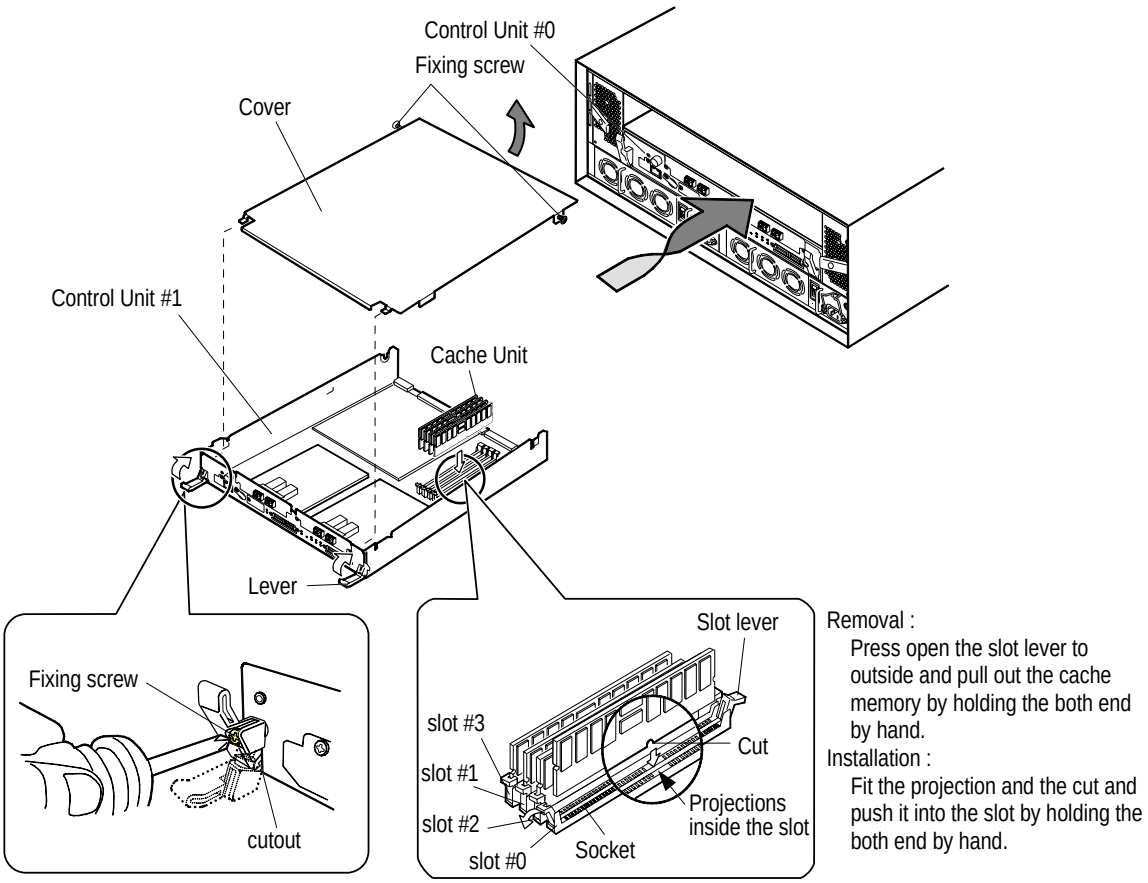


Figure 2.2.8.1 Cache Memory replacement and LED locations (RKM)

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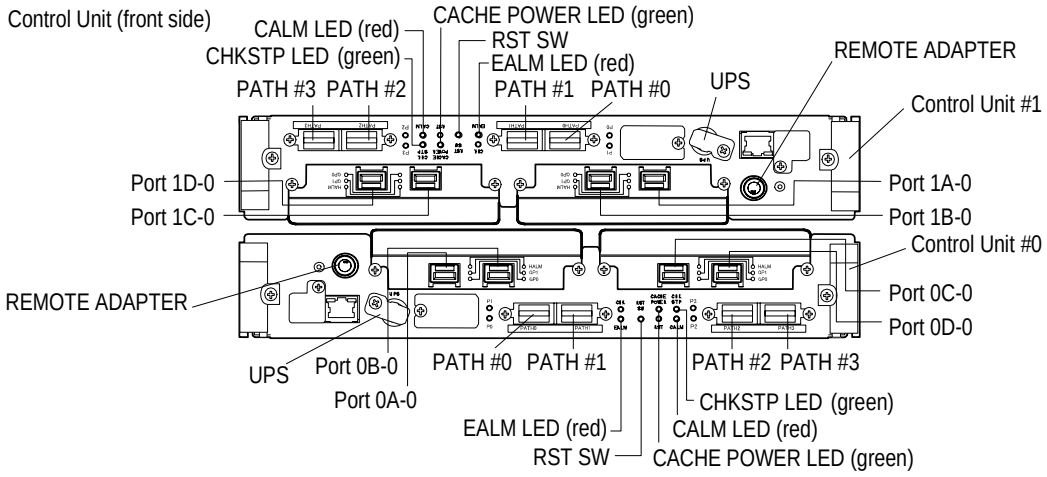


Figure 2.2.8.2 Cache Memory replacement and LED locations (RKH)

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(1-2) When the CALM LED of the RKM/RKS/RKXS/RKH on the Control Unit is off
(Refer to "Figure 2.2.8 Cache Memory replacement and LED locations (RKS/RKXS)" (REP 02-0590), "Figure 2.2.8.1 Cache Memory replacement and LED locations (RKM)" (REP 02-0600) and "Figure 2.2.8.2 Cache Memory replacement and LED locations (RKH)" (REP 02-0601).)

NOTE : • System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.
• When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
• There may be an error report in the host computer depending on the operating conditions of the host computer.
The prior contact to the customer is required.
• Replace the Cache Unit after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) Press the RST SW on the Control Unit, in which the Cache Unit to be replaced is installed, and make sure that the CALM LED (red) comes on. Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter). If not, remove the Cache Unit following the "(2) Procedure for replacement with the power turned off" (REP 02-0640).
(b) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit installing the Cache memory that is not replaced in DF700 are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit in which the Cache memory to be replaced is installed.
(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.
(d) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.
(e) Remove the all cables connected to the Control Unit on which the Cache Unit to be replaced is mounted.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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(f) Remove the Control Unit by pulling it out toward you.

(g) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(h) Remove the Cache Unit to be replaced for the purpose of preventive maintenance after recording its installation location, capacity, and model name. Install the Interface Board making its sheet steel part face inside of the Control Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(i) Install the Cache Unit in the Control Unit.

NOTE : • Install the new Cache Unit in the removed slot #.
• Install a new Cache Unit with the same capacity as that of the former one in the same slot
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(j) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(k) Connect the removed interlocking cable to the Control Unit when the special UPS is connected.

(l) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out. If the controller is inserted before 20 seconds has elapsed, the Control Unit may not be recovered normally.

(m)When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (n).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(n) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.

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(o) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next(‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When returning the levers in the arrow directions (⟶) at the same time, operate them within one second. If the operation takes longer than one second, the Control Unit may not be recovered. If it occurs, execute the recovery procedure once again. If the Control Unit is not recovered in spite of the re-execution, replace the Control Unit because it may be faulty.

(p) Check that the CALM LED (red) on the Control Unit is off.
(q) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡3).
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)
(r) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off ("I1G300 CTL recovery start" is not displayed in "Information Message" on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.
‡3 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(s) Check that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.

(t) Check that "I0010x CTL recovered (CTL-x)" is displayed referring to the Information Message window on WEB. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Cache Unit has completed.

(u) Check that the LED of the remote adaptor connected to the Control Unit in which the replaced Cache memory is installed lights on when the remote adaptor is connected.

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(2) Procedure for replacement with the power turned off
(Refer to "Figure 2.2.8 Cache Memory replacement and LED locations (RKS/RKXS)" (REP 02-0590), "Figure 2.2.8.1 Cache Memory replacement and LED locations (RKM)" (REP 02-0600) and "Figure 2.2.8.2 Cache Memory replacement and LED locations (RKH)" (REP 02-0601).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(d) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(e) Remove the Control Unit by pulling it out toward you.

(f) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(g) Remove the Cache Unit, in which the failure occurred, after recording its installation location, capacity, and model name. Install the Interface Board making its sheet steel part face inside of the Control Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

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(h) Install the Cache Unit in the Control Unit.

NOTE : • Install the new Cache Unit in the removed slot #.
• Install a new Cache Unit with the same capacity as that of the former one in the same slot
• For the RKH, install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively, and make the capacity and the installation position of the Control Unit #0 and the Control Unit #1 the same.

(i) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(j) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(k) Connect the removed all cables to the Control Unit.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(l) Turn on the AC Power Unit Switch of the both Power Units.
(m) Turn on the main switch (the subsystem usually recovers in about five minutes).
(n) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
(o) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.7 Replacing Interface Board

When replacing it online while the NAS unit is connected, check the fail over of the NAS Unit (NNC) before the performance, and check the fail back after the replacement.
(Refer to the DF700 NAS SOFTWARE Maintenance Manual "Table 7.3-2 Hardware Failures" (NAS 07-0120) (#19))

⚠ CAUTION

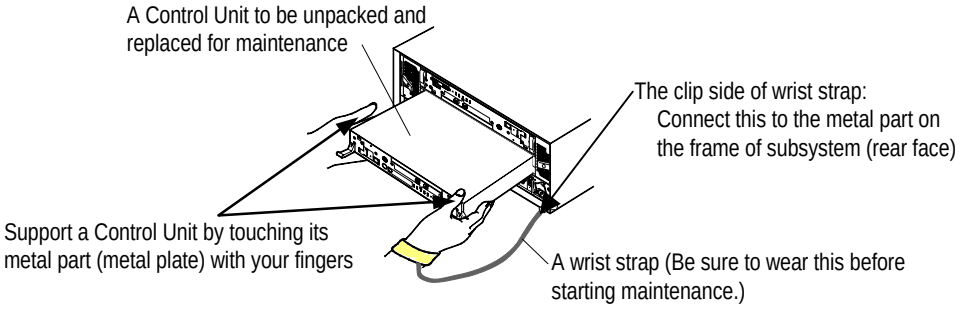
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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Select a procedure from the following and execute it.

NOTE : Be careful that the position to install the Interface Board is determined. (Refer to Table 2.2.3).

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. The procedure varies depending on whether the CALM LED or EALM LED is on or off. 3. Replace the Control Unit after blocking the Control Unit to be replaced. 4. When replacing Control Unit of both systems (CTL 0 and CTL 1), power off the subsystem before the replacement. 5. In the case of Preventive replacement, there may be an error report in the host computer depending on the operating conditions of the host computer. The prior contact to the customer is required. 6. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 7. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	When the CALM LED is on • See "(1-1) When the CALM LED on the Control Unit is on" (REP 02-0680). When the CALM LED is off (Preventive replacement) • See "(1-2) When the CALM LED on the Control Unit is off" (REP 02-0720).
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	See "(2) Procedure for replacement with the power turned off" (REP 02-0750).

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Table 2.2.3 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	–	NAS Interface Board
3	iSCSI Interface Board	–
4	FC Interface Board	FC Interface Board
5	FC Interface Board	NAS Interface Board
6	iSCSI Interface Board	FC Interface Board
7	iSCSI Interface Board	NAS Interface Board

(1) Procedure for replacement with the power turned on

(1-1) When the CALM LED on the Control Unit is on

(Refer to "Figure 2.2.8.4 Replacing Interface Board (RKM/RKS/RKXS)" (REP 02-0711) and "Figure 2.2.8.5 Replacing Interface Board (RKH)" (REP 02-0712).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

NOTE : • Do not replace the Control Unit which operates normally. Before replacing the Control Unit, confirm that it is blocked (the CALM LED (RED) in on).
- System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.
- When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
- Replace the Interface Board after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) Collect Simple Trace and Constitution Information (Port Information). (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : If you change the interface board different type, all the following information is cleared. So please collect simple trace and constitute information to keep constitution information before change.

- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information / iSCSI port setting information
- CHAP security information (iSCSI)

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(b) Make sure that CALM LED (RED) on the Control Unit mounting the Interface Board to be replaced lights up. If it does not light up, remove the Interface Board following "(1-2) When the CALM LED on the Control Unit is off" (REP 02-0720).

(c) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit installing the Interface Board that is not replaced in DF700 are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit in which the Interface Board to be replaced is installed.

(d) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(e) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.

(f) Remove all the power cables connected to the Control Unit mounting the Interface Board to be replaced.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(g) Remove the Control Unit by pulling it out toward you.

(h) Remove the Host Connector. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)

(i) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.

(j) Remove the Interface Board mounted on the Control Unit.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Install the new Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : Install the new Interface Board in the removed position.

(l) Install the removed Host Connector in the new Control Unit. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)

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(m) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(n) Connect the removed interlocking cable to the Control Unit when the special UPS is connected.
(o) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out. If the controller is inserted before 20 seconds has elapsed, the Control Unit may not be recovered normally.
(p) When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (q).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(q) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.
(r) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next(‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When returning the levers in the arrow directions (⟶) at the same time, operate them within one second. If the operation takes longer than one second, the Control Unit may not be recovered. If it occurs, execute the recovery procedure once again. If the Control Unit is not recovered in spite of the re-execution, replace the Control Unit because it may be faulty.

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off ("I1G300 CTL recovery start" is not displayed in "Information Message" on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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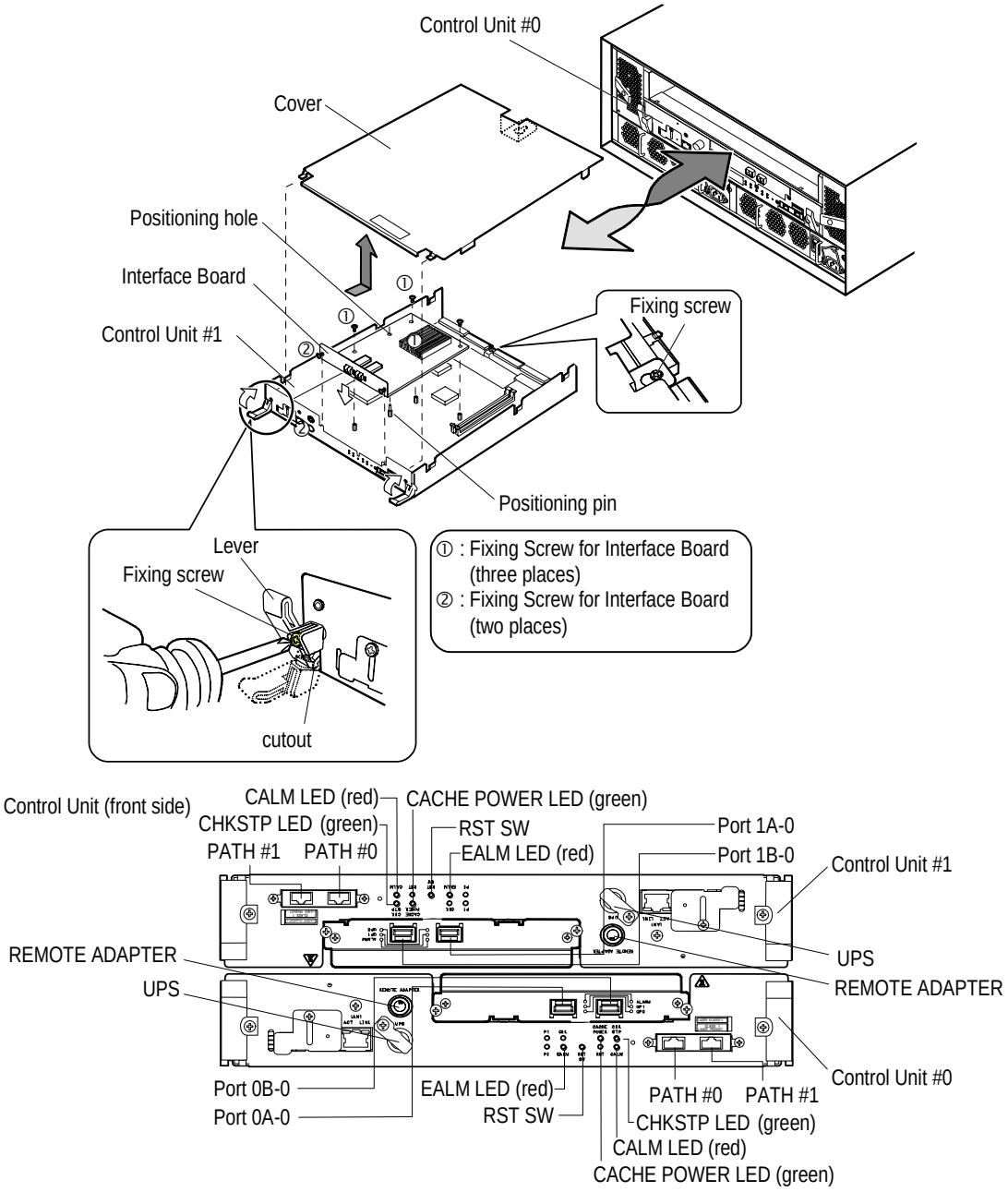
(s) Check that the CALM LED (red) on the Control Unit is off.
(t) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)
(u) Reconnect all cables that were disconnected.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(v) Check that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
(w) Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Interface Board has completed.
(x) Check that the LED of the remote adaptor connected to the Control Unit in which the replaced Interface Board is installed lights on when the remote adaptor is connected.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : The figure shows the case where the FC Interface Board is installed in the Control Unit .

Figure 2.2.8.4 Replacing Interface Board (RKM/RKS/RKXS)

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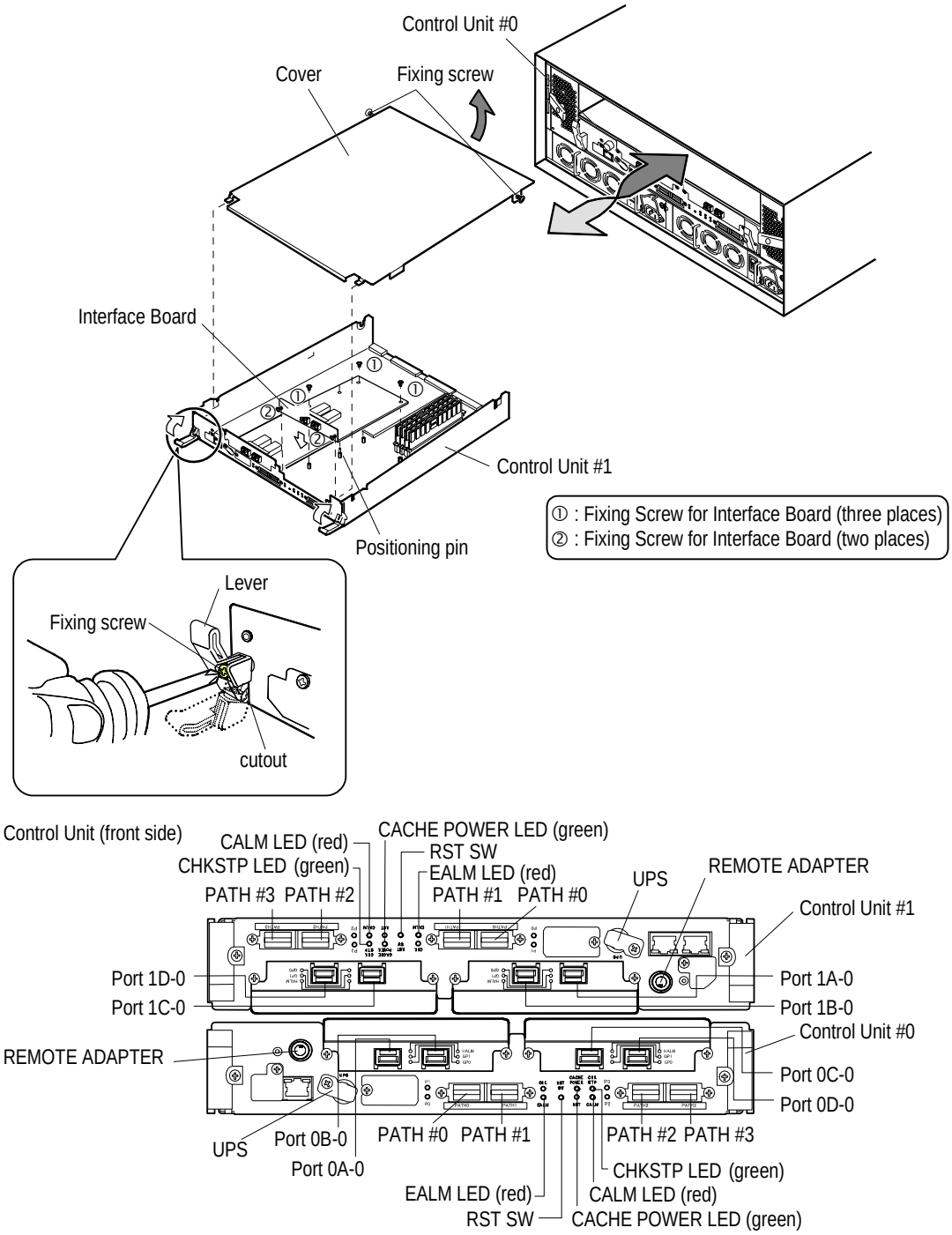


Figure 2.2.8.5 Replacing Interface Board (RKH)

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(1-2) When the CALM LED on the Control Unit is off
(Refer to "Figure 2.2.8.4 Replacing Interface Board (RKM/RKS/RKXS)" (REP 02-0711) and "Figure 2.2.8.5 Replacing Interface Board (RKH)" (REP 02-0712).)

NOTE : • System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.
• When the Control Unit is replaced while the LU of the subsystem is being formatted, restoration of the Control Unit which is inserted may be delayed until the LU formatting is completed.
• There may be an error report in the host computer depending on the operating conditions of the host computer.
The prior contact to the customer is required.
• Replace the Interface Board after recovering the UPS when the special UPS is connected and a failure occurs in the UPS.

(a) Collect Simple Trace and Constitution Information (Port Information). (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : If you change the interface board different type, all the following information is cleared. So please collect simple trace and constitute information to keep constitution information before change.
• Host Group Information / Target Information
• Host Group Option / Target Option
• Mapping Information
• Fibre Channel Information Port Setting Information/ NAS Connection Information / iSCSI port setting information
• CHAP security information (iSCSI)

(b) Press the RST SW on the Control Unit, in which the Interface Board to be replaced is installed, and make sure that the CALM LED (red) comes on. Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter). If not, remove the Interface Board following the "(2) Procedure for replacement with the power turned off" (REP 02-0750).

(c) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit installing the Interface Board that is not replaced in DF700 are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit in which the Interface Board to be replaced is installed.

(d) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(e) At the time of the NAS Unit connection, turn off the AC Input Power Switch of the NAS Unit.

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(f) Remove the all cables connected to the Control Unit on which the Interface Board to be replaced is mounted.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(g) Remove the Control Unit by pulling it out toward you.
(h) Remove the Host Connector. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)
(i) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(j) Remove the Interface Board mounted on the Control Unit.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Install the new Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : Install the new Interface Board in the removed position.

(l) Install the removed Host Connector in the new Control Unit. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)
(m) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(n) Connect the removed interlocking cable to the Control Unit when the special UPS is connected.
(o) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out. If the controller is inserted before 20 seconds has elapsed, the Control Unit may not be recovered normally.

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(p) When the RKAJ/RKAJAT/RKA is connected, connect the ENC cable. When the RKAJ/RKAJAT/RKA is not connected, go to Step (q).

NOTE : • When the RKAJ/RKAJAT/RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(q) At the time of the NAS Unit connection, connect the NAS interface cables (PCI-Express cable and CTRL cable). Also, turn on the AC Input Power Switch of the NAS Unit.

(r) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next(‡1).
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡2) of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When returning the levers in the arrow directions (⟶) at the same time, operate them within one second. If the operation takes longer than one second, the Control Unit may not be recovered. If it occurs, execute the recovery procedure once again. If the Control Unit is not recovered in spite of the re-execution, replace the Control Unit because it may be faulty.

(s) Check that the CALM LED (red) on the Control Unit is off.

‡1 : If the Control Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the EALM LED (red) and the CALM LED (red) may not be turned off ("I1G300 CTL recovery start" is not displayed in "Information Message" on WEB).
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted Control Unit from the chassis once and insert it again after 20 seconds or more passed.

‡2 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(t) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out(‡1).
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)

(u) Reconnect all cables that were disconnected.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(v) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.

(w) Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
At the time of the NAS Unit connection, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message window on WEB after starting the NAS OS. (Refer to WEB "2.5 Information Message"(WEB 02-0120).)
When this is indicated, the replacement of Interface Board has completed.

(x) Check that the LED of the remote adaptor connected to the Control Unit in which the replaced Interface Board is installed lights on when the remote adaptor is connected.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2) Procedure for replacement with the power turned off

(Refer to "Figure 2.2.8.4 Replacing Interface Board (RKM/RKS/RKXS)" (REP 02-0711) and "Figure 2.2.8.5 Replacing Interface Board (RKH)" (REP 02-0712).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Collect Simple Trace and Constitution Information (Port Information). (refer to Troublelshooting "7.3 Collecting simple trace" (TRBL 07-0040) and System Parameter "4.2 (8) Setting of Constitute" (SYSPR 04-0150).)

NOTE : If you change the interface board different type, all the following information is cleared. So please collect simple trace and constitute information to keep constitution information before change.
- Host Group Information / Target Information
- Host Group Option / Target Option
- Mapping Information
- Fibre Channel Information Port Setting Information/ NAS Connection Information / iSCSI port setting information
- CHAP security information (iSCSI)

(b) Turn off the main switch.

Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Interface Board is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(c) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(d) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

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(e) Remove the all cables connected to the Control Unit.

NOTE : • When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(f) Remove the Control Unit by pulling it out toward you.
(g) Remove the Host Connector. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)
(h) Loosen the fixing screw (two fixing screws for the RKH) for the cover at the back of the cover, slide the cover (do not slide it for the RKH) in the direction shown by the arrow (⟶), and remove it.
(i) Remove the Interface Board mounted on the Control Unit.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit.

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(j) Install the new Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places). At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : Install the new Interface Board in the removed position.

(k) Install the removed Host Connector in the new Control Unit. (This procedure is unnecessary for the NAS Interface Board and iSCSI Interface Board.)
(l) Slide the cover (do not slide it for the RKH) in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(m) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit #0 and #1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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(n) Reconnect all cables that were disconnected.

NOTE : • When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(o) Turn on the AC Power Unit Switch of the both Power Units.
(p) Turn on the main switch (the subsystem usually recovers in about five minutes).
(q) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1).
The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
(r) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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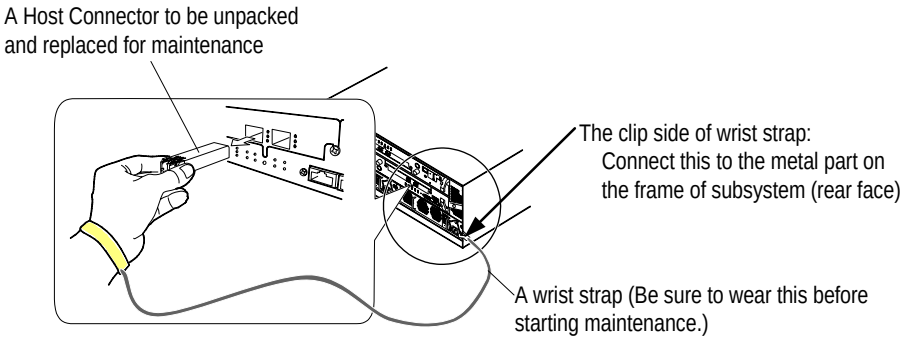
2.2.8 Replacing Host Connector

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Host Connector against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



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Refer to the figure below for the Host Connector replacement work. Host Connector can be replaced with the power turned on.
When the SNMP Agent Support Function is enabled, the SNMP Trap is sent if the host connector is blocked or removed.

NOTE : Host Connector can be Type1and Type2. When removing or installing a Host Connector, work according to each type.

Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. The procedure varies depending on whether the ALARM LED is on or off. 2. In the case of Preventive replacement, there may be an error report in the host computer depending on the operating conditions of the host computer. The prior contact to the customer is required. 3. The host connectors different from each other are installed in the RKM and RKS/RKXS/RKH respectively. When replacing each of them, be careful not to use a wrong one. ① RKM/RKH 4G bps Host connector ② RKS/RKXS which installs the Interface Board 4G bps Host connector ③ RKS/RKXS which installs the Interface Board 2G bps Host connector	When the CALM LED is on • See "(1-1) When the ALARM LED on the Host Connector is on" (REP 02-0790) When the CALM LED is off (Preventive replacement) • See "(1-2) When the ALARM LED on the Host Connector is off" (REP 02-0810).
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	See "(2) Procedure for replacement with the power turned off" (REP 02-0820).

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(1) Procedure for replacement with the power turned on

(1-1) When the ALARM LED on the Host Connector is on
(Refer to "Figure 2.2.8.6 Replacing Host Connector" (REP 02-0800).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

NOTE : Do not replace the Host Connector which operates normally.
Before replacing the Host Connector, confirm that it is blocked (the ALARM LED (RED) in on).

(a) Make sure that ALARM LED (RED) on the Host Connector to be replaced lights up. If it does not light up, remove the Host Connector following "(1-2) When the ALARM LED on the Host Connector is off" (REP 02-0810).

(b) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(c) Remove the Host Connector.

- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(d) Make sure that 20 seconds or longer has elapsed after the Host Connector was taken out. If the Host Connector is inserted before 20 seconds has elapsed, the Host Connector may not be recovered normally.

(e) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.

(f) Connect the Fibre Channel Interface cables.

(g) If the port LED does not light on, the other failure may be considered, so that restore it following Troubleshooting "Chapter 1. Flowchart for troubleshooting" (TRBL 01-0000).

(h) Refer to "Information Message" on WEB, and check to see that [I53A00 Host Connector recovered (Port xy-z)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of Host Connector has completed.

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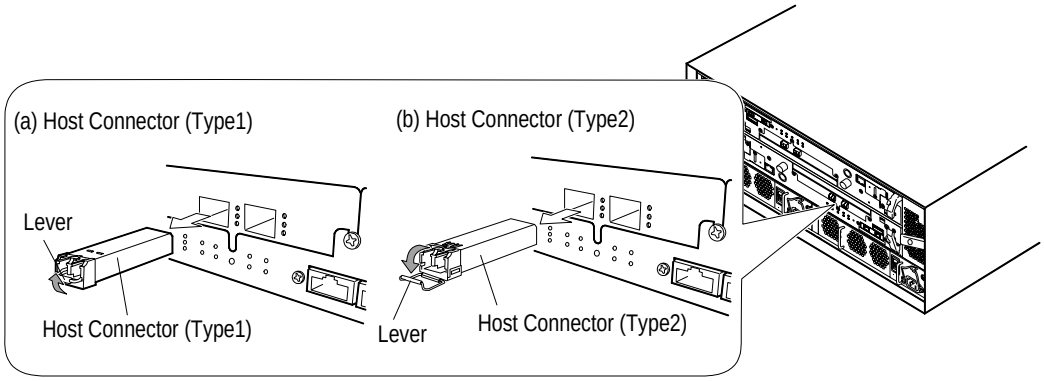


Figure 2.2.8.6 Replacing Host Connector

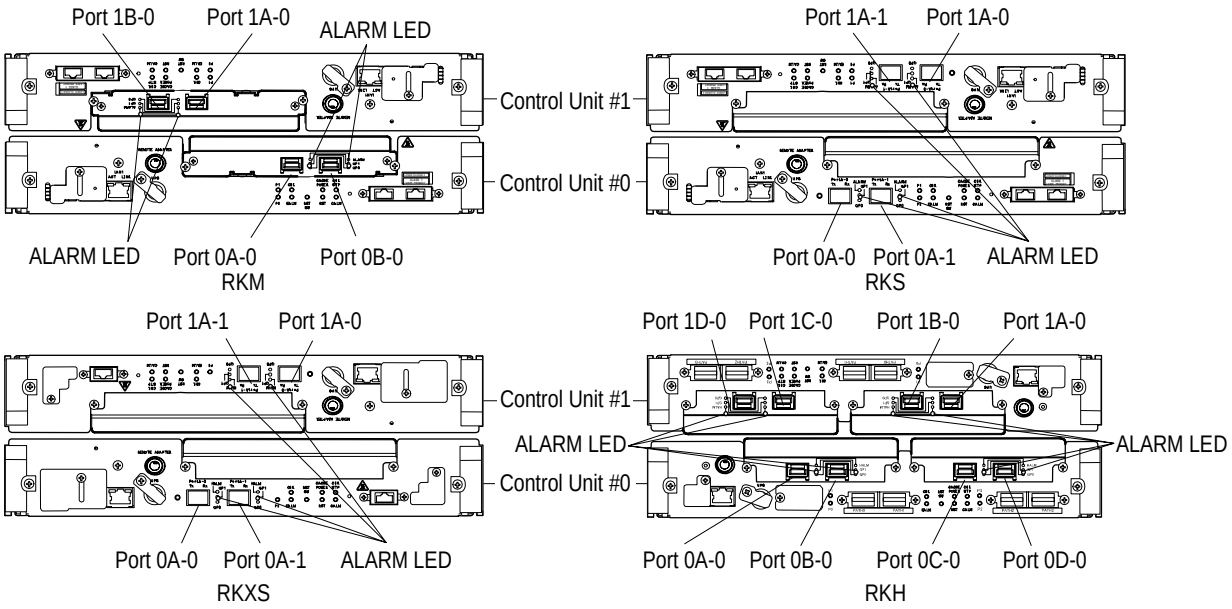


Figure 2.2.8.7 Port and ALARM LED

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(1-2) When the ALARM LED on the Host Connector is off
(Refer to "Figure 2.2.8.6 Replacing Host Connector" (REP 02-0800).)

NOTE : There may be an error report in the host computer depending on the operating conditions of the host computer.
The prior contact to the customer is required.

(a) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(b) Remove the Host Connector.
- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(c) Make sure that 20 seconds or longer has elapsed after the Host Connector was taken out. If the Host Connector is inserted before 20 seconds has elapsed, the Host Connector may not be recovered normally.

(d) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.

(e) Connect the Fibre Channel Interface cables.

(f) If the port LED does not light on, the other failure may be considered, so that restore it following Troubleshooting "Chapter 1. Flowchart for troubleshooting" (TRBL 01-0000).

(g) Refer to "Information Message" on WEB, and check to see that [I53A00 Host Connector recovered (Port xy-z)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of Host Connector has completed.

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(2) Procedure for replacement with the power turned off
(Refer to "Figure 2.2.8.6 Replacing Host Connector" (REP 02-0800).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache Unit data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(d) Remove the Host Connector.
- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(e) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.
(f) Connect the Fibre Channel Interface cables.
(g) Turn on the AC Power Unit Switch of the both Power Units.
(h) Turn on the main switch (the subsystem usually recovers in about five minutes).

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(i) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

(j) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

(k) If the port LED does not light on, the other failure may be considered, so that restore it following Troubleshooting "Chapter 1. Flowchart for troubleshooting" (TRBL 01-0000).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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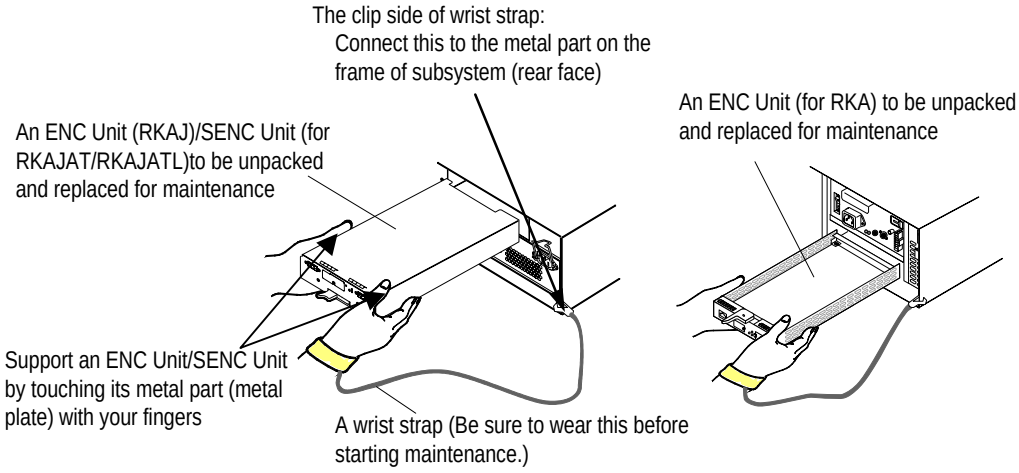
2.2.9 Replacing ENC Unit/SENC Unit

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install an ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. By so doing, you can discharge the static electricity from your body may change the parts.

The ENC Unit/SENC Unit is a precision machine that may have troubles because of electrostatic discharge. Be sure to put on the wristband before starting work in order to protect ENC Units/SENC Units from electrostatic discharge.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert an ENC Unit/SENC Unit into the subsystem, support the ENC Unit/SENC Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. When replacing the ENC Unit/SENC Unit, the subsystem must be in the status shown below. • The microprogram is not being performed. • The Control Unit is not being replaced. • Any part other than the above is not being replaced. 3. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 4. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	When the ALM LED (red) of the ENC Unit/ SENC Unit to be replaced is on Refer to "(1-1) When the ALM LED of the ENC Unit/SENC Unit to be replaced is on" (REP 02-0850) When the ALM LED (red) of the ENC Unit/ SENC Unit to be replaced is off (Preventive replacement) Refer to "(1-2) When the ALM LED of the ENC/SENC Unit to be replaced is off" (REP 02-0870)
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	Refer to "(2) Procedure for replacement with the power turned off" (REP 02-0890)

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NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

- When two or more ENC Units/SENC Units need to be replaced on the same Loop, replace the Control Unit of the RKH/RKM/RKS/RKXS first, and then replace the ENC Unit/SENC Unit of the additional chassis. Also, when replacing the ENC Units/SENC Units of two or more additional chassis, replace the additional chassis that N of the subsystem ID# xN is smaller.
- When a failure of the battery system (whose message code is W03000, W0300x, W03100, W0310x, W03200, W0320x, W03300, W0330x, or W0340x) has occurred, recover the subsystem from the battery system failure before replacing the ENC Unit/SENC Unit.
- When the subsystem power is turned off because of an ENC Unit/SENC Unit failure using an improper procedure such as an operation of a breaker in the case where the interlocking with the UPS is in use, the subsystem power may not be turned on after that. In such a case, power on the subsystem after turning off and on the output from the UPS.
  If the UPS cannot be turned off and on, power off the subsystem after removing the cable for interlocking with the UPS. (When the cable is removed, a warning will be issued.)

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(1) Procedure for replacement with the power turned on

(1-1) When the ALM LED of the ENC Unit/SENC Unit to be replaced is on
(Refer to "Figure 2.2.9 Replacing of ENC Unit/SENC Unit" (REP 02-0860).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

(a) Make sure that the ALM LED (Red) of the ENC Unit/SENC Unit to be replaced is lit.
When ALM LED (red) on the ENC Unit/SENC Unit is off, remove the ENC Unit/SENC Unit following "(1-2) When the ALM LED of the ENC/SENC Unit to be replaced is off" (REP 02-0870).

(b) Raise the lever on the ENC Unit/SENC Unit in the direction shown by the arrow ① (←) and pull out the ENC Unit/SENC Unit a little way toward you.

(c) Remove the ENC cable connected to the ENC Unit/SENC Unit to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(d) Remove the ENC Unit/SENC Unit by pulling it out toward you.

(e) After waiting for 20 seconds or longer, insert a new ENC Unit/SENC Unit into the specified location with its lever raised. When doing this, do not insert the ENC Unit/SENC Unit completely.
If the ENC Unit/SENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit/SENC Unit is not recovered from the failure normally(‡1).

NOTE : Do not catch a ENC cable, when the ENC Unit/SENC Unit is inserted.

(f) Connect the ENC cable to new ENC Unit/SENC Unit.

(g) Return the levers in the direction shown by the arrows ② (·····>).

NOTE : When returning the both levers in the directions shown by the arrows ② (·····>) at the same time, operate the levers within one second.
If the returning of the levers takes longer time, it is possible that the recovery from the error fails. When this happens, execute the replacement procedure again.
If the subsystem is not recovered from the failure nevertheless, replace the ENC Unit/SENC Unit because the ENC Unit/SENC Unit is considered to have failed.
For the SENC Unit, the CHK LED (Red) lights on for about 10 seconds (while the CUDG is being executed) after the SENC Unit has been inserted.

(h) Make sure that the ALM LED (red) on the ENC Unit/SENC Unit is off(‡2).

‡1 : Remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : If the ENC Unit/SENC Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced ENC Unit/SENC Unit may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.

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(i) Check that the READY LED (green) on the front of the Basic Chassis is on and the ALARM LED (red) and WARNING LED (orange) goes out(‡1). The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
When the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.

(j) Refer to "Information Message" on WEB, and check to see that [I00Axy Loop recovered (Path-x, Loop-y)] and [I00Bxy (or I00BHH) ENC recovered (Unit-x, ENC-y)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of ENC Unit/SENC Unit has completed.

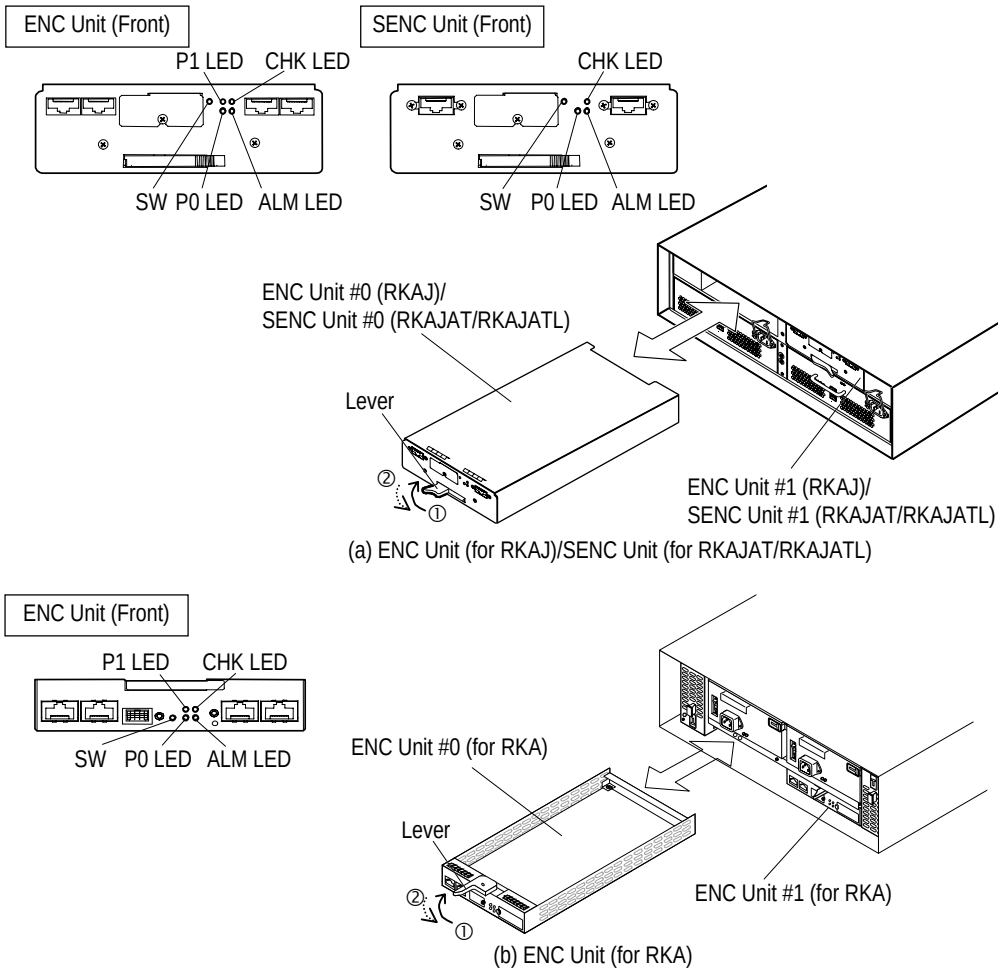


Figure 2.2.9 Replacing of ENC Unit/SENC Unit

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(1-2) When the ALM LED of the ENC/SENC Unit to be replaced is off
(Refer to "Figure 2.2.9 Replacing of ENC Unit/SENC Unit" (REP 02-0860).)

(a) Raise the lever on the ENC Unit/SENC Unit in the direction shown by the arrow ① (←) and pull out the ENC Unit/SENC Unit a little way toward you.

NOTE : When raising the lever on the ENC Unit/SENC Unit in the directions shown by the arrows ① (←) at the same time, operate the levers within one second.

(b) Remove the ENC cable connected to the ENC Unit/SENC Unit to be replaced.
(c) Remove the ENC Unit/SENC Unit by pulling it out toward you.
(d) After waiting for 20 seconds or longer, insert a new ENC Unit/SENC Unit into the specified location with its lever raised. When doing this, do not insert the ENC Unit/SENC Unit completely.
If the ENC Unit/SENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit/SENC Unit is not recovered from the failure normally(‡1).

NOTE : Do not catch a ENC cable, when the ENC Unit/SENC Unit is inserted.

(e) Connect the ENC cable to new ENC Unit/SENC Unit.
(f) Return the levers in the direction shown by the arrows ② (·····>).

NOTE : When returning the both levers in the directions shown by the arrows ② (·····>) at the same time, operate the levers within one second.
If the returning of the levers takes longer time, it is possible that the recovery from the error fails. When this happens, execute the replacement procedure again.
If the subsystem is not recovered from the failure nevertheless, replace the ENC Unit/SENC Unit because the ENC Unit/SENC Unit is considered to have failed.
For the SENC Unit, the CHK LED (Red) lights on for about 10 seconds (while the CUDG is being executed) after the SENC Unit has been inserted.

(g) Make sure that the ALM LED (red) on the ENC Unit/SENC Unit is off(‡2).
(h) When an ENC Unit/SENC Unit other than that to be replaced is detached in the replacement of the ENC Unit/SENC Unit installed in the RKH/RKM/RKS/RKXS or removal of the ENC cable connected to it, remove the ENC cable connected to the detached ENC Unit/SENC Unit. (You may replace the ENC cables in any order because the ENC Unit/SENC Unit to be replaced is detached. An ENC Unit/SENC Unit other than that to be replaced cannot be detached no matter which cable connected to the front or rear ENC Unit/SENC Unit is removed first.)
Perform a restoration of the detached ENC Unit /SENC Unit following the procedure starting from step (b).
When the ENC Unit/SENC Unit cannot be restored because of a wrong restoration procedure, restore it by performing turning off and on of the subsystem power.

‡1 : Remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.
‡2 : If the ENC Unit/SENC Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced ENC Unit/SENC Unit may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.

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(i) Check that the READY LED (green) on the front of the Basic Chassis is on and the ALARM LED (red) and WARNING LED (orange) goes out(‡1). The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.
When the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.

(j) Refer to "Information Message" on WEB, and check to see that [I00Axy Loop recovered (Path-x, Loop-y)] and [I00Bxy (or I00BHH) ENC recovered (Unit-x, ENC-y)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of ENC Unit/SENC Unit has completed.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2) Procedure for replacement with the power turned off
(Refer to "Figure 2.2.9 Replacing of ENC Unit/SENC Unit" (REP 02-0860).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred. Store the information on the collected simple trace in the USB memory.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))
- For the Store the collected simple trace in the USB memory (refer to Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300))

(a) Turn off the main switch.
Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the WEB.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.
Make sure that the CACHE POWER LED (green) of the Control Unit has gone out.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Raise the lever on the ENC Unit/SENC Unit in the direction shown by the arrow ① (←) and pull out the ENC Unit/SENC Unit a little way toward you.
(d) Remove the cables connected to the ENC Unit/SENC Unit.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(e) Remove the ENC Unit/SENC Unit by pulling it out toward you.
(f) Insert a new ENC Unit/SENC Unit into the specified location with its lever raised. When doing this, do not insert the ENC Unit/SENC Unit completely.

NOTE : Do not catch a ENC cable, when the ENC Unit/SENC Unit is inserted.

(g) Connect the ENC cable to new ENC Unit/SENC Unit.
(h) Return the levers in the direction shown by the arrows ② (·····>).
(i) Turn on the AC Power Unit Switch of the both Power Units.

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(j) Turn on the main switch (the subsystem usually recovers in about five minutes).
Make sure that the ALM LED (red) has not gone out.

NOTE : For the SENC Unit, the CHK LED (Red) lights on for about 10 seconds (while the CUDG is being executed) after the power of the SENC Unit was turned on.

After doing this, make sure that the ALM LED (red) on the ENC Unit/SENC Unit is not on.
When the ENC Unit/SENC Unit is replaced without turning off the AC Power Unit Switch of the Power Unit (Item (c)) by mistake, an unexpected error message may be displayed.

{ Examples of error message:
W03100 Battery removed
W08000 Loop alarm (Path-0, Loop-0) }

If the above occurs, execution of the following procedure will make the recovery.
(a) → (b) → (h) → (i)

(k) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.
When the Power Saving function is enabled, the WARNING LED (orange) may light up or blinking at low speed while executing the ENC/SENC automatic download. If the WARNING LED still lights up or blinking at low speed after completing the ENC/SENC automatic download, refer to Information Message on WEB and perform the maintenance according to the recovery method of the message.

(l) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.10 Replacing ENC cable

CAUTION

To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.

Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on	1. When replacing the ENC Unit/SENC Unit, the subsystem must be in the status shown below. • The microprogram is not being performed. • The Control Unit is not being replaced. • Any part other than the above is not being replaced. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 3. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis usually goes out about 30 seconds later.	Refer to "(1) Procedure for replacement with the power turned on" (REP 02-0920)
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	Refer to "(2) Procedure for replacement with the power turned off" (REP 02-0940)

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NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
• When a failure of the battery system (whose message code is W03000, W0300x, W03100, W0310x, W03200, W0320x, W03300, W0330x, or W0340x) has occurred, recover the subsystem from the battery system failure before replacing the ENC cable.
• When the subsystem power is turned off because of an ENC Unit/ SENC Unit failure using an improper procedure such as an operation of a breaker in the case where the interlocking with the UPS is in use, the subsystem power may not be turned on after that. In such a case, power on the subsystem after turning off and on the output from the UPS.
If the UPS cannot be turned off and on, power off the subsystem after removing the cable for interlocking with the UPS. (When the cable is removed, a warning will be issued.)

(1) Procedure for replacement with the power turned on
(See "Figure 2.2.9.1 Locations of the Lever and LEDs on the ENC Unit/SENC Unit" (REP 02-0930).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
• For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
• For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
• For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Among the ENC/SENC Units which are connected to the ENC cables to be replaced, open the lever, which is attached to the ENC/SENC Unit of the one whose N of the subsystem ID# xN is large, rapidly in the direction of release, and pull it out a little.

NOTE : When raising the lever on the ENC Unit/SENC Unit in the directions shown by the arrows ① (←) at the same time, operate the levers within one second.

(b) Remove the ENC cable to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(c) Connect a new ENC cable. (Refer to Installation "3.4.11 Connecting the ENC cables" (INST 03-0670))

(d) After waiting for 20 seconds or longer, return the lever in the arrow direction ② (--->).
If the ENC Unit/SENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit/SENC Unit is not recovered from the failure normally.(‡1).

NOTE : • When returning the both levers in the directions shown by the arrows ② (·····>) at the same time, operate the levers within one second.
If the returning of the levers takes longer time, it is possible that the recovery from the error fails. When this happens, execute the replacement procedure again. If the subsystem is not recovered from the failure nevertheless, replace the ENC Unit/SENC Unit because the ENC Unit/SENC Unit is considered to have failed.
• Do not catch a ENC cable, when the ENC Unit/SENC Unit is inserted.

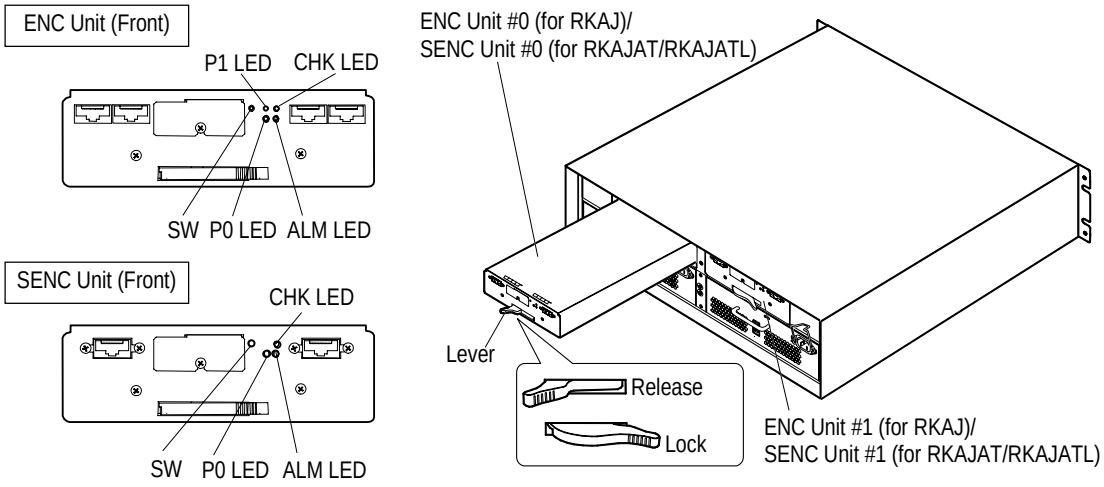
‡1 : Remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.

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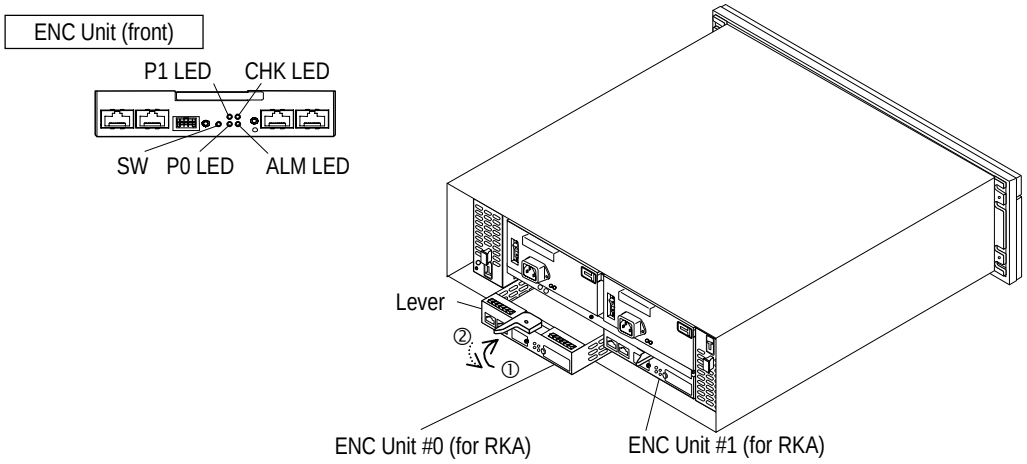
(e) Check that the ALM LED (red) on the ENC Unit/SENC Unit is off(‡1).

(f) Check that the READY LED (green) on the front of the Basic Chassis is on and the ALARM LED (red) and WARNING LED (orange) goes out(‡2). The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) before it lights up.

(g) Refer to "Information Message" on WEB, and check to see that [I00Axy Loop recovered (Path-x, Loop-y)] or [I00Bxy (or I00BHH) ENC recovered (Unit-x, ENC-y)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of ENC cable has completed.



(a) ENC Unit (for RKAJ)/SENC Unit (for RKAJAT/RKAJATL)



(b) ENC Unit (for RKA)

Figure 2.2.9.1 Locations of the Lever and LEDs on the ENC Unit/SENC Unit

‡1 : If the ENC Unit/SENC Unit is removed and then inserted at the time between the execution and the completion of the spin-up of the priced option, Power Saving (until "I1GZ00 The spin up of disk drives completed" is displayed for the RAID Group that "I1GY00 The request of spin up of disk drives is accepted" is displayed in "Information Message" on WEB), the Red (ALARM) LED of the replaced ENC Unit/SENC Unit may not be turned off.
Check that the Disk Drives executing the spin-up command are all spun up, and then remove the inserted the ENC Unit/SENC Unit from the chassis once and insert it again after 20 seconds or more passed.

‡2 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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(2) Procedure for replacement with the power turned off

(See "Figure 2.2.9.1 Locations of the Lever and LEDs on the ENC Unit/SENC Unit" (REP 02-0930).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch.

Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the WEB.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

(b) Turn off the AC Power Unit Switch of the both Power Units.

Make sure that the CACHE POWER LED (green) of the Control Unit has gone out.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Among the ENC/SENC Units which are connected to the ENC cables to be replaced, open the lever, which is attached to the ENC/SENC Unit of the one whose N of the subsystem ID# xN is large, rapidly in the direction of release, and pull it out a little.

(d) Remove the ENC cable to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(e) Connect a new ENC cable. (Refer to Installation "3.4.11 Connecting the ENC cables" (INST 03-0670))

(f) Return the lever in the arrow direction ②.

NOTE : Do not catch a ENC cable, when the ENC Unit/SENC Unit is inserted.

(g) Turn on the AC Power Unit Switch of the both Power Units.

(h) Turn on the main switch (the subsystem usually recovers in about five minutes).

After doing this, make sure that the ALM LED (red) on the ENC Unit/SENC Unit is not on.

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(i) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

(j) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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2.2.11 Replacing Basic Chassis of Rack Mount Style

Perform this work only when an instructed to do so is given by the Technical Support Center for coping with troubles.

⚠ CAUTION

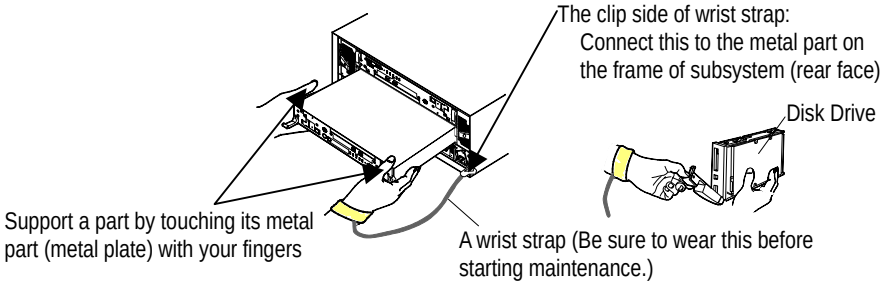
Be sure to perform the operation with two or more workers.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- When you install a Disk Drive or Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Disk Drive or Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive or Control Unit into the subsystem, support the Disk Drive or Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	Not applicable	—
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	Refer to "(1) Procedure for replacement with the power turned off" (REP 02-0960)

(1) Procedure for replacement with the power turned off

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

NOTE : • When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the cache is in the cache backup mode, make the replacement after canceling the mode.
• Write down the serial number of the subsystem before the replacement. Write down the same serial number as the removed subsystem in the new subsystem.

(a) Turn off the main switch. (The POWER LED goes out.)

Make sure that the POWER LED (green) on the Front Bezel goes out. If the power cannot be turned off, have the Web be connected and find out a cause of the trouble

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

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(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))

(d) Remove all the cables connected to the components (Control Unit, and Power Unit).

NOTE : When the cable cannot be removed easily, do not pull it by force. Pull out the Control Unit and Power Unit a little, and then perform the cable removal again. Besides, the cable can be damaged if it is bent upward or downward forcibly.

(e) Remove parts (Disk Drives, Backup Battery Unit, Fan Assembly, Control Unit, Power Unit, and ENC Unit) referring to each removal procedure of them.
Affix labels bearing HDD numbers on the removed Disk Drives and put the drives in the box for temporary storage arranging them in the same order as they were installed in the subsystem.
The Disk Drive is not installed in RKH.

(f) Remove the frame and replace it with a new one. (The weight of the frame whose each part is removed is 13 kg.)
In the case of the Floor Model, refer to Installation "2.3 Installing Floor Stand Kit" (INST 02-0050) in the for Installation.
In the case of the rackmount model, refer to Installation "3.4.3 Mounting on Rack Frame" (INST 03-0400) in the for Installation.

(g) Reinstall the parts. (Refer to "2.2 Replacement of Components" (REP 02-0050).)
Reinstall all the removed parts in the same positions where they were installed before.

(h) Return all the removed cables as they were before.

(i) Turn on the AC Power Unit Switch of the both Power Units.

(j) Turn on the main switch (the subsystem usually recovers in about five minutes).

(k) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

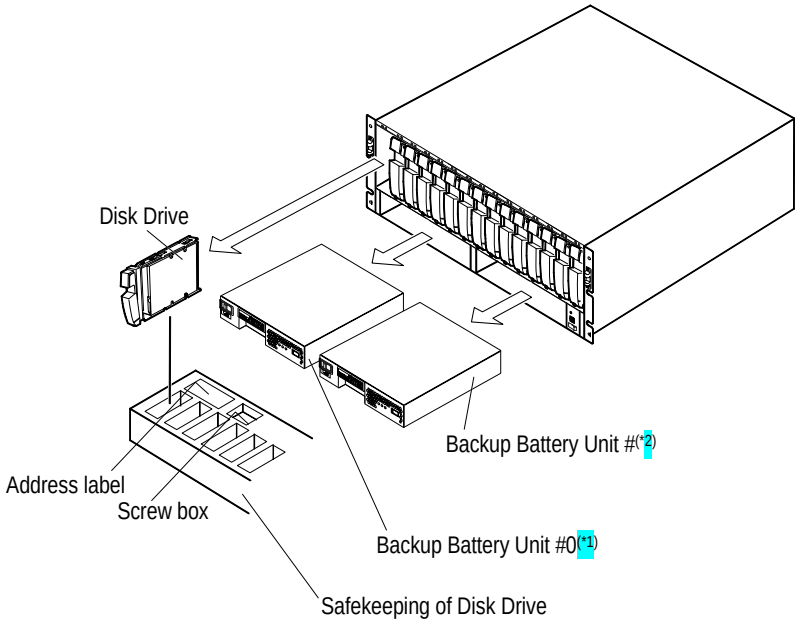
(l) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

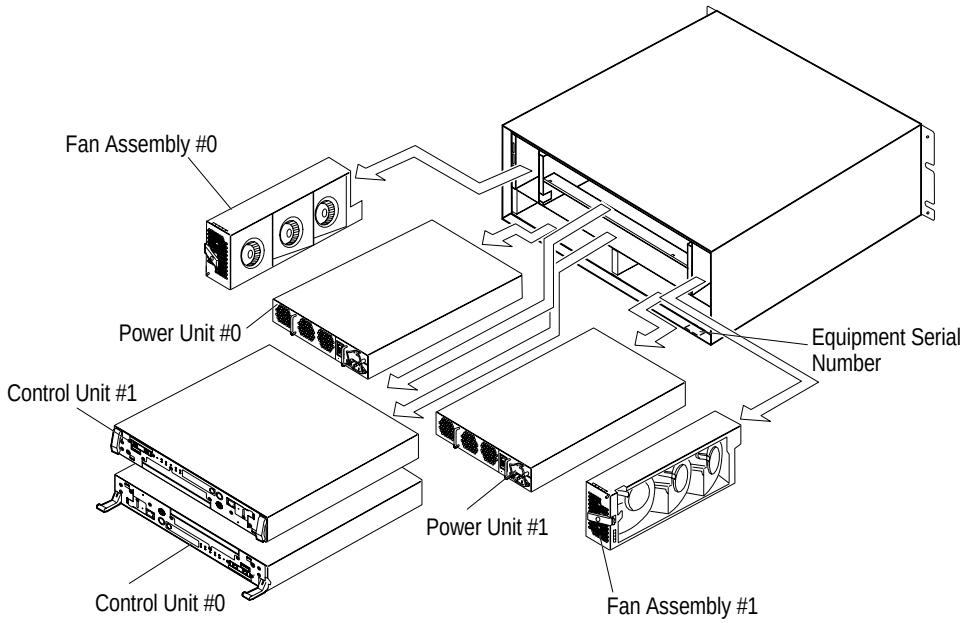
(m) Affix the new subsystem and write down the same serial number as the removed subsystem.

(n) Attach the Front Bezel.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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*1 : Only one Backup Battery Unit (ASSY) is installed in the RKS/RKXS.
*2 : This Backup Battery Unit is not installed in RKS/RKXS.
*3 : The figure shows RKM.

Figure 2.2.10 Replacing Basic Chassis of Rack Mount Style (RKM/RKS/RKXS)

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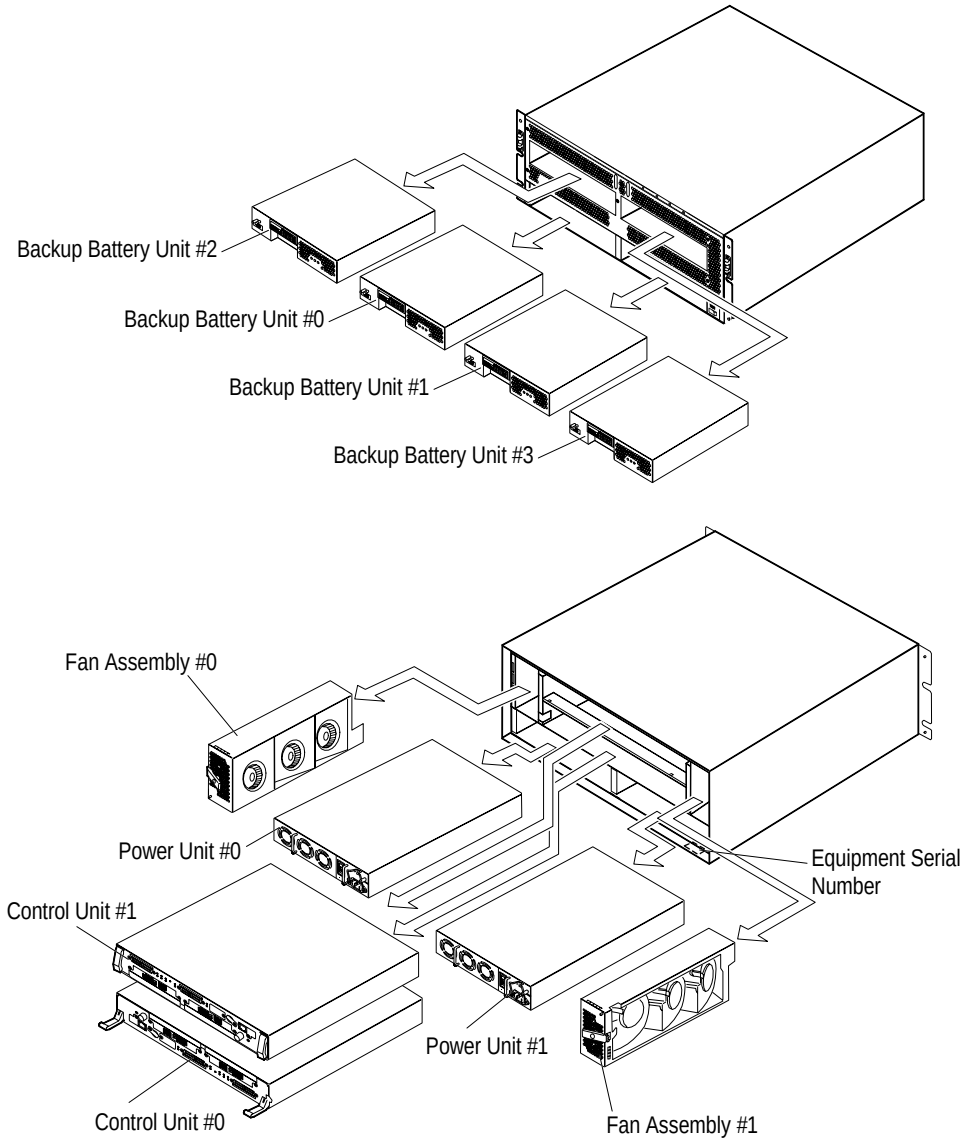


Figure 2.2.10.1 Replacing Basic Chassis of Rack Mount Style (RKH)

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2.2.12 Replacing Additional Chassis of Rack Mount Style

Perform this work only when an instructed to do so is given by the Technical Support Center for coping with troubles.

⚠ CAUTION

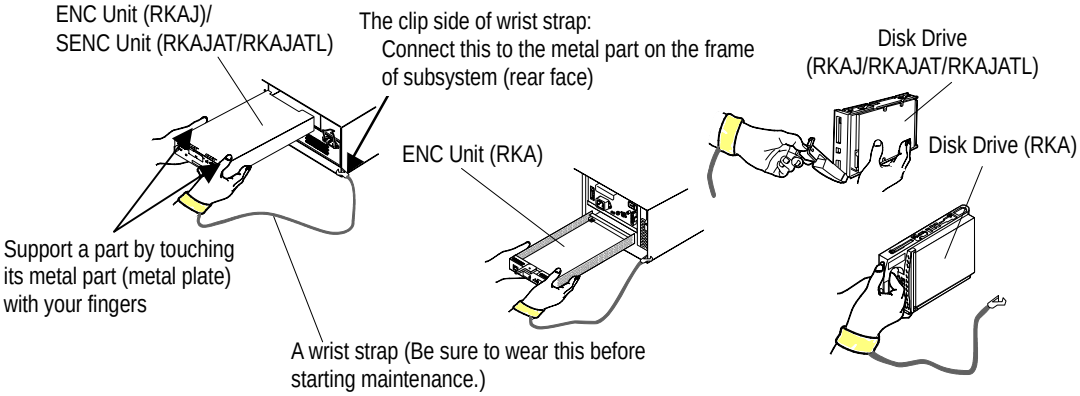
Be sure to perform the operation with two or more workers.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- When you install a Disk Drive or ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Disk Drive and ENC Unit/SENC Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive and ENC Unit/SENC Unit into the subsystem, support the Disk Drive and ENC Unit/SENC Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	Not applicable	—
2	Replacement with the power turned off	1. At the time of the preventive replacement, do not perform the preventive replacement work while the READY LED (green) on the front of the Basic Chassis is blinking at high speed because the automatic download of the ENC/SENC firmware is being executed. Make the replacement after the LED lights on. 2. At the time of the preventive replacement, do not perform the preventive replacement work while the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed because the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the preventive replacement work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out at the maximum of 30 to 85 minutes later and the READY LED (green) lights up.	Refer to "(1) Procedure for replacement with the power turned off" (REP 02-1000)

(1) Procedure for replacement with the power turned off

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

NOTE : When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
When the cache is in the cache backup mode, make the replacement after canceling the mode.

(a) Turn off the main switch. (The POWER LED goes out.)

Make sure that the POWER LED (Green) on the Front Bezel go off. If you cannot turn off the power, troubleshoot the failure by connecting to the Web.

NOTE : If the power has already been turned off, check that Cache memory is not in the back-up state. (To check for the back-up state, refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).)
If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit.

In this case, check that the CACHE POWER LED (Green) on Control Unit is extinguished.

NOTE : If the CACHE POWER LED (Green) is lit, it may be that some of the Cache memory data has not been written into the disk. In this case, removing the Control Unit may cause a loss of user data.

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(b) Turn off the AC Power Unit Switch of the both Power Units.

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch.

(c) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))

(d) Remove all the cables connected to the components (Control Unit, Power Unit, and ENC Unit/SENC Unit).

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the Control Unit, Power Unit, and ENC Unit/SENC Unit a little, and then perform the cable removal again.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(e) Remove parts (Disk Drives, Fan Assembly(‡1), Power Unit, and ENC Unit/SENC Unit) referring to each removal procedure of them.
Affix labels bearing HDD numbers on the removed Disk Drives and put the drives in the box for temporary storage arranging them in the same order as they were installed in the subsystem.

(f) Remove the frame and replace it with a new one. (The weight of the frame whose each part has been removed is 13 kg.)
In the case of the Floor Model, refer to Installation "2.3 Installing Floor Stand Kit" (INST 02-0050) in the Maintenance Manual for Installation.
In the case of the rackmount model, refer to Installation "3.4.3 Mounting on Rack Frame" (INST 03-0400) in the Maintenance Manual for Installation.

(g) Install all the removed parts in the same positions as before in the new chassis.
(Refer to "2.2 Replacement of Components" (REP 02-0050).)

(h) Return all the removed cables as they were before.

(i) Turn on the AC Power Unit Switch of the both Power Units.

(j) Turn on the main switch (the subsystem usually recovers in about five minutes).

(k) Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡2). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

(l) When the RKNAS is connected, check that the READY LED (green) on the NAS Unit lights on about another three minutes later.
However, there is the case that READY LED (green) on the NAS Unit illuminates, and cannot access from a host computer. A NAS system accepts access from a host computer only in case of "ACTIVE" NAS OS Condition (Refer to Installation "1.7.3 Stop/Start/Restart of the NAS OS" (INST 01-0320).).

(m) Attach the Front Bezel.

‡1 : Fan Assembly is for RKA only.

‡2 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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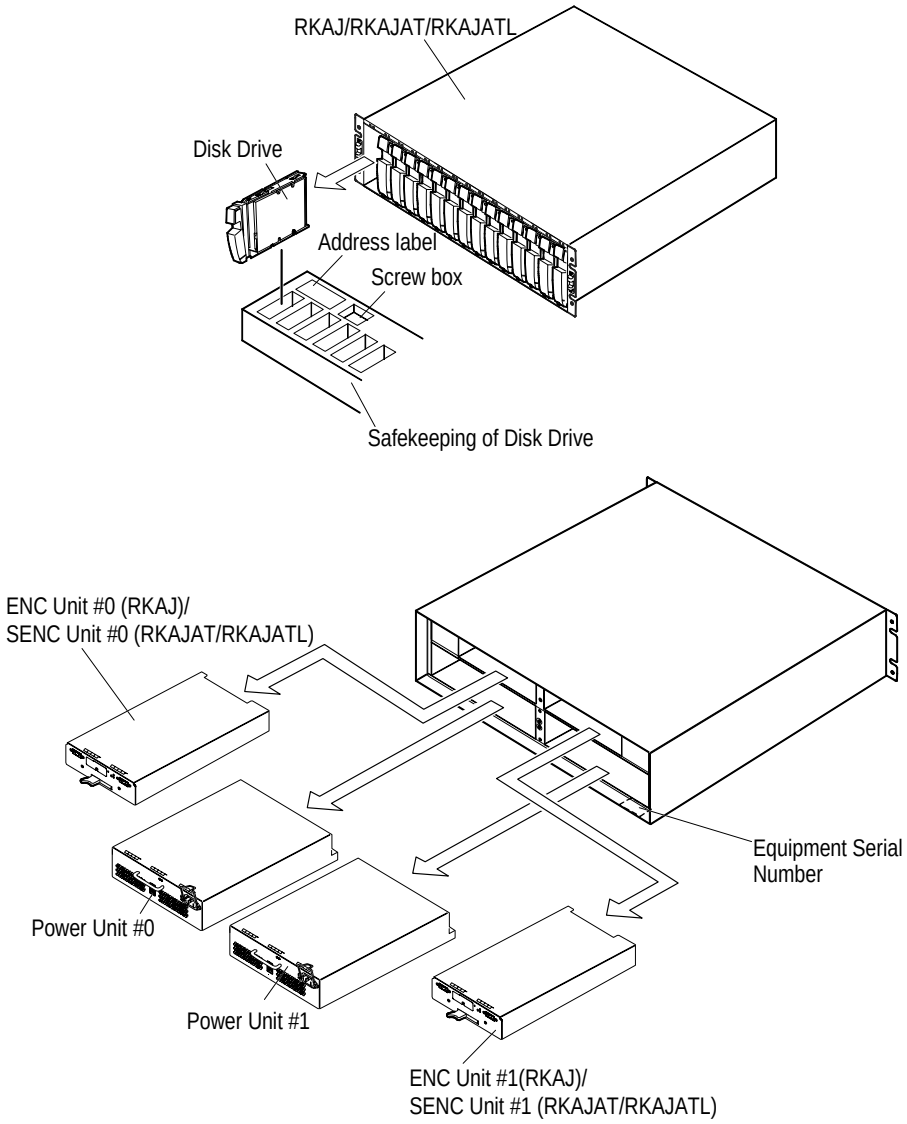


Figure 2.2.11 Replacing Additional Chassis of Rack Mount Style (RKAJ/RKAJAT/RKAJATL)

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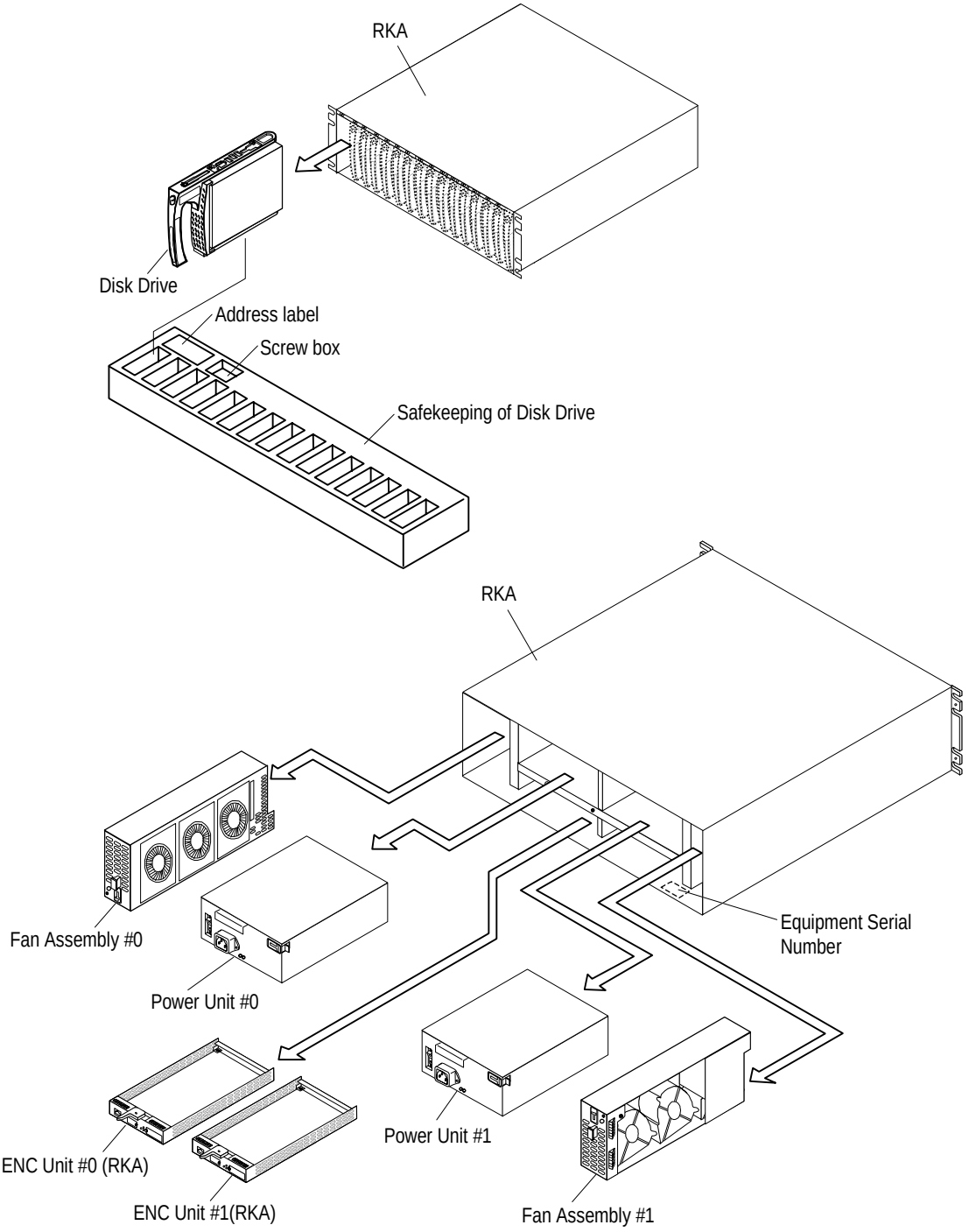


Figure 2.2.11.1 Replacing Additional Chassis of Rack Mount Style (RKA)

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2.2.13 Replacing Remote Adapter

Select a procedure from the following and execute it.

No.	Remote adapter condition at the time of replacement	Restriction	Reference for replacement procedure
1	One Remote adapter	The replacement cannot be done in the state in which the subsystem power is on.	See "(1) Replacement procedure with the one Remote Adapter" (REP 02-1030).
2	When the Remote adapter is duplicated.	If both of the two remote adapters are required to be replaced, be sure to replace them one by one, or replace them in the state in which the subsystem power is turned off.	See "(2) Replacement procedure to be used when the Remote Adapter is duplicated" (REP 02-1040).

(1) Replacement procedure with the one Remote Adapter

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the main switch of the subsystem connected to the Remote Adapter to be replaced.

NOTE : Make sure that the subsystem is not in the Cache Backup mode. (Refer to "1.1.2 Checking cache memory in the back-up state" (REP 01-0030).) When the subsystem is in the Cache Backup mode, perform the replacement after canceling the mode.

(b) Turn off the AC Power Unit Switch of the Power Units.

(c) Remove all the remote and power cables from the Remote adapter.

(d) Replacing the new Remote Adapter

(e) Connect the removed remote cable and power cable.

(f) Turn on the AC Power Unit Switch of the Power Units.
Make sure that the READY LEDs (green) of the both Power Units are on.

(g) Turn on the main switch.

(h) Make sure that the following LEDs on the Remote Adapter are on.

- POWER LED
- LEDs for the connectors among the J100 to J105 to which the remote cables are connected.

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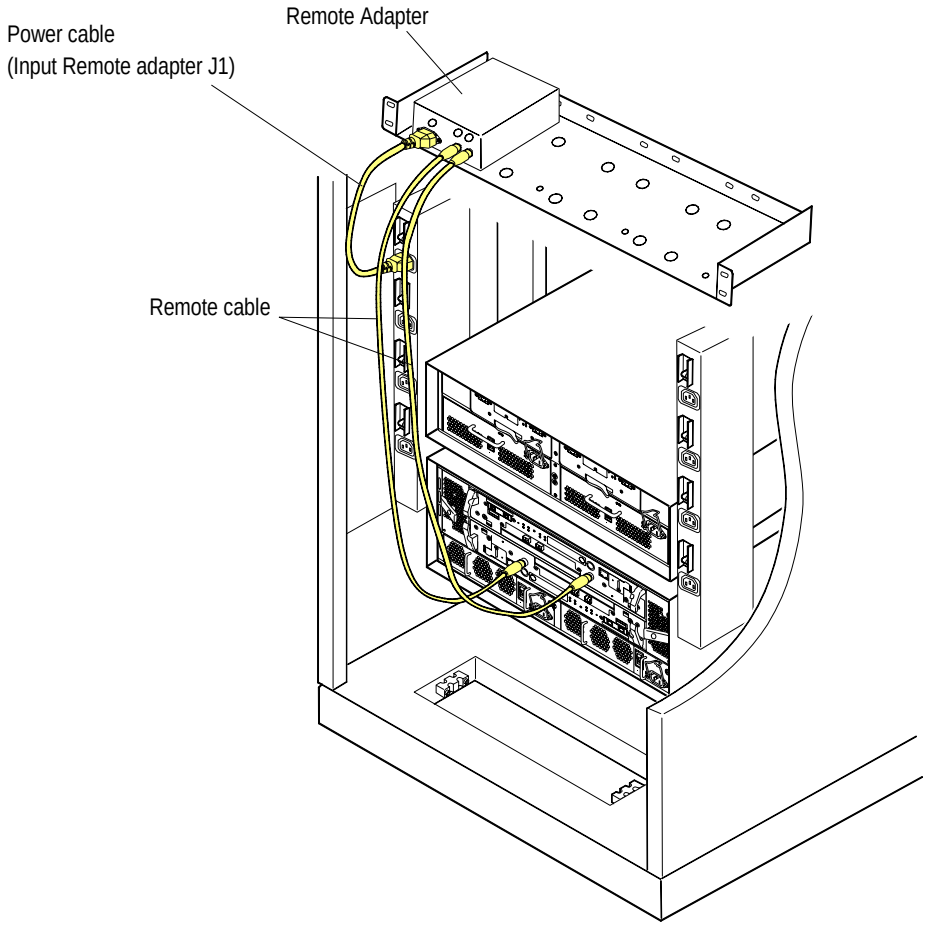


Figure 2.2.12 Replacing Remote Adapter

(2) Replacement procedure to be used when the Remote Adapter is duplicated

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Make sure that all the LEDs of the Remote Adapter not to be replaced are on.

(b) Remove the remote and power cables from the Remote Adapter to be replaced.

(c) Replacing the new Remote Adapter

(d) Connect the removed remote cable and power cable.

(e) Make sure that the following LEDs on the Remote Adapter are on.

- POWER LED
- LEDs for the connectors among the J100 to J105 to which the remote cables are connected.

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2.2.14 Replacing Front Bezel

(1) How to replace Front Bezel of Floor Model

CAUTION

Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

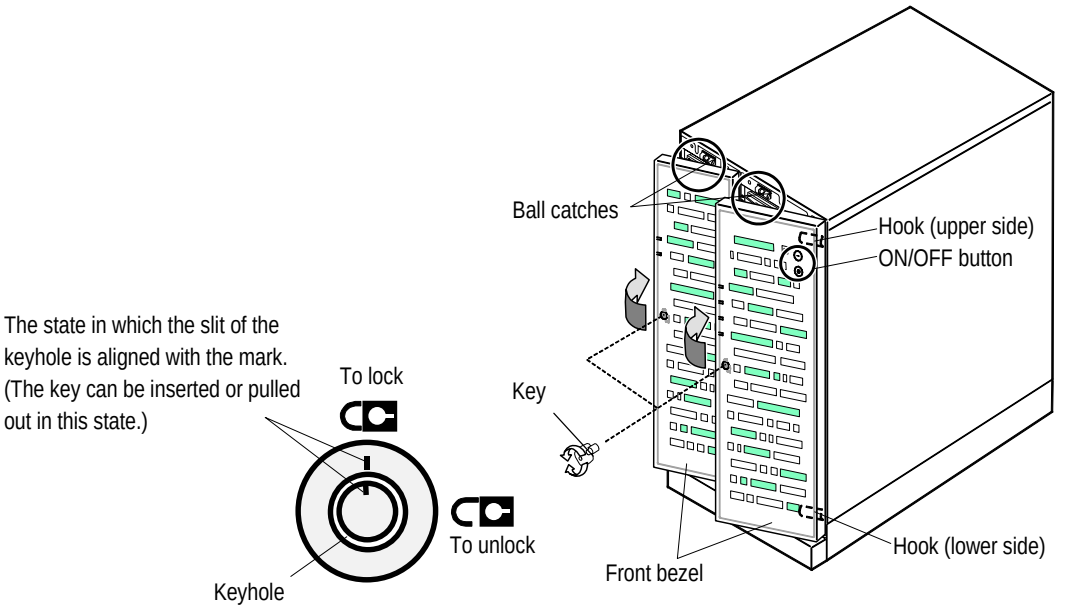
CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Since front bezels of the RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.
- When installing or removing the Front Bezel, try not to operate the main switch incorrectly with the hook or the ON/OFF button of the Front Bezel.

A key is necessary to attach or remove the Front Bezel.

(a) Insert the key into the keyhole on the replacing Front Bezel and release the Lock of the Front Bezel.
(b) Pull the replacing Front Bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the replacing Front Bezel from the slots on the subsystem main body by shifting the bezel to the left and remove the bezel.
(d) Hold the side of new Front Bezel with your both hands.
(e) Hang the hook of the new Front Bezel (lower side) on the hole in the bottom right part of the subsystem.
(f) Hang the hook of the new Front Bezel (upper side) on the hole in the top right part of the subsystem.
(g) After making the hooks of the new Front bezel engaged, press the bezel against the main body until it is stopped.
(h) Fix the attached Front Bezel by turning the key.

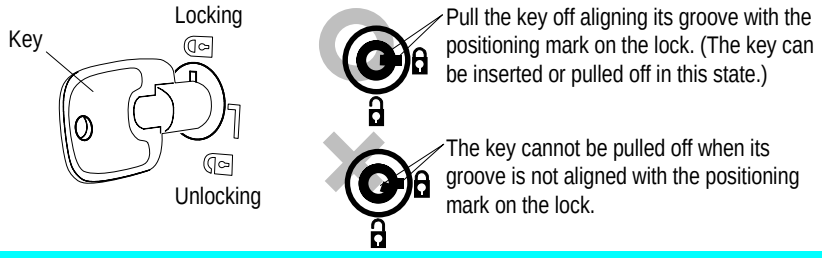
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The floor (RKM+RKAJ+H2J) model is shown as an example.

Figure 2.2.13 Procedure for Replacing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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(2) How to replace Front Bezel of the Rackmount Model

CAUTION

Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Since front bezels of the RKH/RKM/RKS/RKXS and the RKAJ/RKAJAT are different with each other in their size.
- When installing or removing the Front Bezel, try not to operate the main switch incorrectly with the hook or the ON/OFF button of the Front Bezel.

A key is necessary to attach or remove the Front Bezel.

(a) Insert the key into the keyhole on the replacing Front Bezel and release the Lock of the Front Bezel.
(b) Pull the replacing Front Bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the replacing Front Bezel from the slots on the subsystem main body by shifting the bezel to the right and remove the bezel.
(d) Hold the side of new Front Bezel with your both hands.
(e) Hang the hook of the new Front Bezel (left side) on the hole in the bottom left part of the subsystem.
(f) Hang the hook of the new Front Bezel (right side) on the hole in the bottom right part of the subsystem.
(g) After making the hooks of the new Front Bezel engaged, press the bezel against the main body until it is stopped.
(h) Fix the attached Front Bezel by turning the key.

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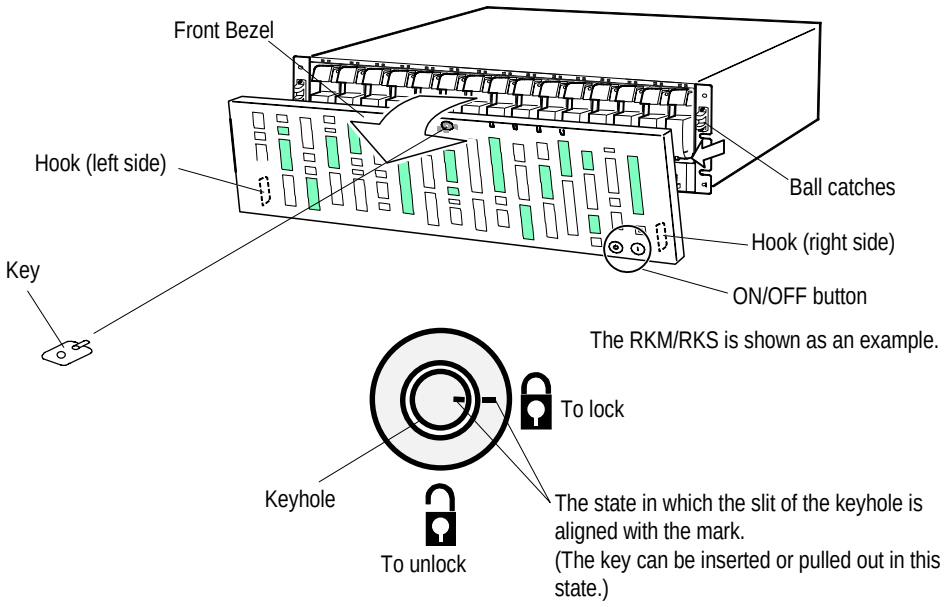
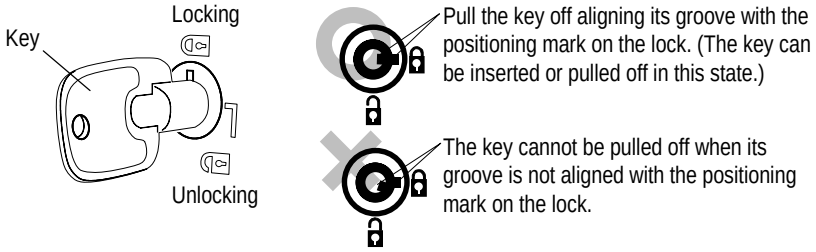


Figure 2.2.14 Procedure for Replacing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



- When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
- When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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2.3 Replacing the RKNAS parts

Perform the following procedures before replacing the parts of the RKNAS.

NOTE : When replacing the host connector, the following procedures are unnecessary.

(1) Stop the NAS OS of the RKNAS targeted for the replacement (refer to Installation "1.7.3 Stop/Start/Restart of the NAS" (INST 01-0320)).
(2) Turn off the AC Input Power Switch of the RKNAS.
(3) Remove the Front Bezel of the RKNAS ("refer to Installation "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130)).

NOTE : When replacing the interface cables, do not remove the Front Bezel.

(4) Remove the RKNAS from the rack frame. Remove it in the reverse procedures referring to Installation "3.4.8 Installing the RKNAS" (INST 03-0601).

CAUTION

Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

NOTE : When replacing the interface cables, do not remove the RKNAS from the rack frame.

(5) Refer to the procedure for replacing each part.
- Replacing the Power Unit ····· "2.3.1 Replacing the Power Unit" (REP 02-1060)
- Replacing the Fan Assembly ····· "2.3.2 Replacing the Fan Assembly" (REP 02-1090)
- Replacing the memories (DIMM) ····· "2.3.3 Replacing the memories (DIMM)" (REP 02-1120)
- Replacing the Host Connector ····· "2.3.4 Replacing the Host Connector" (REP 02-1140)
- Replacing the Interface cable ····· "2.3.5 Replacing the Interface cable" (REP 02-1200)
- Replacing the NAS Chassis ····· "2.3.6 Replacing the NAS Chassis" (REP 02-1210)
- Replacing Front Bezel of RKNAS ····· "2.3.7 Replacing Front Bezel of RKNAS" (REP 02-1240)

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2.3.1 Replacing the Power Unit

⚠ CAUTION

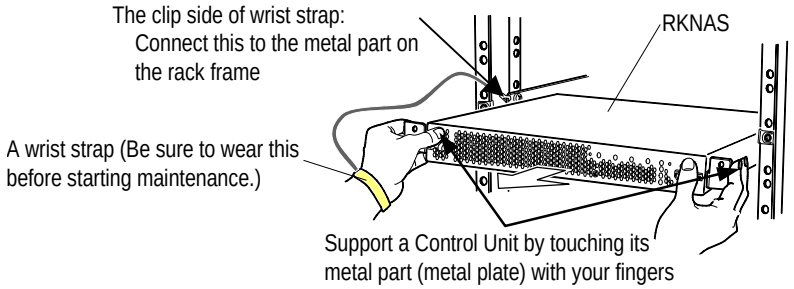
- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.
- Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are RKNAS, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



NOTE : Check that the fans of the FAN Assembly have stopped.

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Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(1) Remove the cover.
Remove the four fixing screws (two each at right and left) which are fixing the cover, and remove the cover by pulling it up after sliding it.

(2) Remove the separator.
Loosen the screws (at two places) of the separator and slide it to the arrow ① (·····>) direction, and remove the separator.

(3) Remove the power cables. Remove them by holding the housings of the power cables connected to the main board (two places).

NOTE : Do not pull the power cables to remove them.

(4) Remove the Power Unit.
Remove the screws (two places) of the Power Unit, and then remove it by lifting it up with your hands.

(5) Install the new Power Unit.
Install the new Power Unit at the original position, and fix it by fastening the screws (two places).

(6) Connect the power cables (at two places) to the Main Board.

NOTE : Connect the power cables to the Main Board through the separator.

(7) Fix the cables of a thin bundle by the Cable Clamp.

(8) Attach the separator.
Attach the separator by sliding it to the arrow ② (<·····) direction and fix the screws (at two places) by fastening them.

(9) Attach the cover.
Attach the cover by sliding it, and fix the four screws (two each at right and left) by fastening them.

(10) Install the RKNAS in the rack frame (refer to Installation "3.4.8 Installing the RKNAS" (INST 03-0601)).

(11) Connect all the removed cables.

(12) Attach the Front Bezel (refer to Installation "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130)).

(13) Turn on all the AC Input Power Switches of the RKNAS.
The READY LED (green) on the RKNAS does not light up at this timing. Check the lighting of the READY LED (green) on the RKNAS after starting the NAS OS. Also, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message on WEB in the window after starting the NAS OS (refer to WEB "2.5 Information Message" (WEB 02-0120)).

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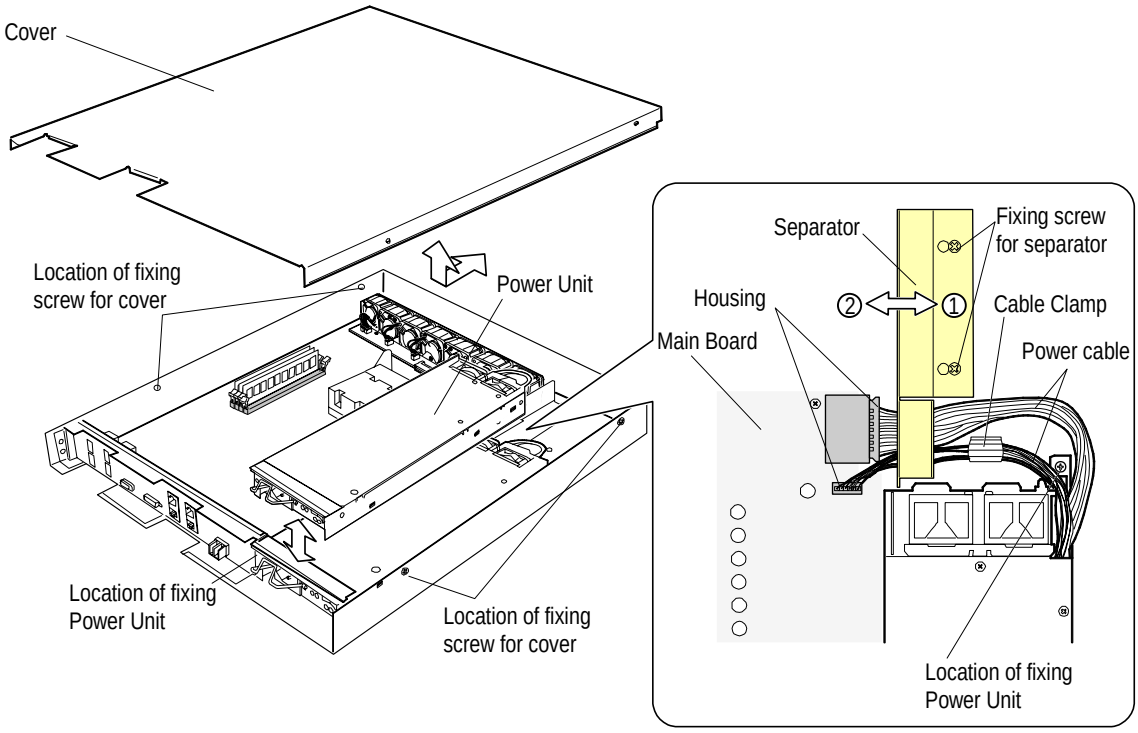


Figure 2.3.1 Replacing Power Unit

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2.3.2 Replacing the Fan Assembly

⚠ CAUTION

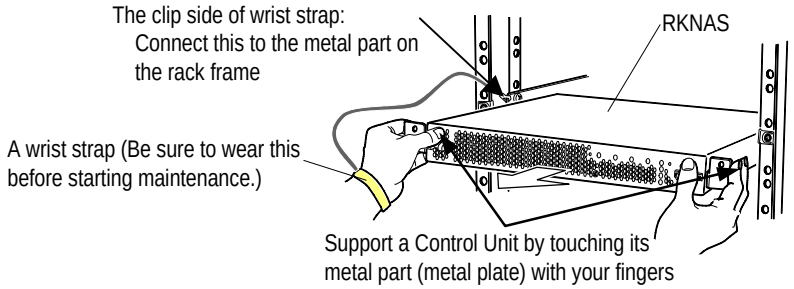
- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.
- Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are RKNAS, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



NOTE : Check that the fans of the FAN Assembly have stopped.

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Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(1) Remove the cover.
Remove the four fixing screws (two each at right and left) which are fixing the cover, and remove the cover by pulling it up after sliding it.

(2) Loosen the screws (at two places) of the separator and slide it to the arrow ① (·····>) direction.

(3) Remove the Fan Assembly.
Remove the screws (at two places) of the Fan Assembly, slide the Fan Assembly to the arrow ③ (·····>) direction, and then remove it by pulling the connector from the Main Board.

NOTE : Place the removed Fan Assembly in the place where anti-static measures are taken.

(4) Install the new Fan Assembly.
Slide the Fan Assembly to the arrow ④ (<·····)direction, connect the connector to the Main Board, and then fix the screws (at two places) of the Fan Assembly by fastening them.

NOTE : Install the FAN Assembly after confirming there is the insulting paper on the flat cable for the LED.

(5) Slide the separator to the arrow ② (<·····) direction and fix the screws (at two places) by fastening them.

(6) Attach the cover.
Attach the cover by sliding it, and fix the four screws (two each at right and left) by fastening them.

(7) Install the RKNAS in the rack frame (refer to Installation "3.4.8 Installing the RKNAS" (INST 03-0601)).

(8) Connect all the removed cables.

(9) Attach the Front Bezel (refer to Installation "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130)).

(10) Turn on all the AC Input Power Switches of the RKNAS.
The READY LED (green) on the RKNAS does not light up at this timing. Check the lighting of the READY LED (green) on the RKNAS after starting the NAS OS. Also, check that "IA1U0x NNC recovered from partial alarm (NNC-x)" or "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message on WEB in the window after starting the NAS OS (refer to WEB "2.5 Information Message" (WEB 02-0120)).

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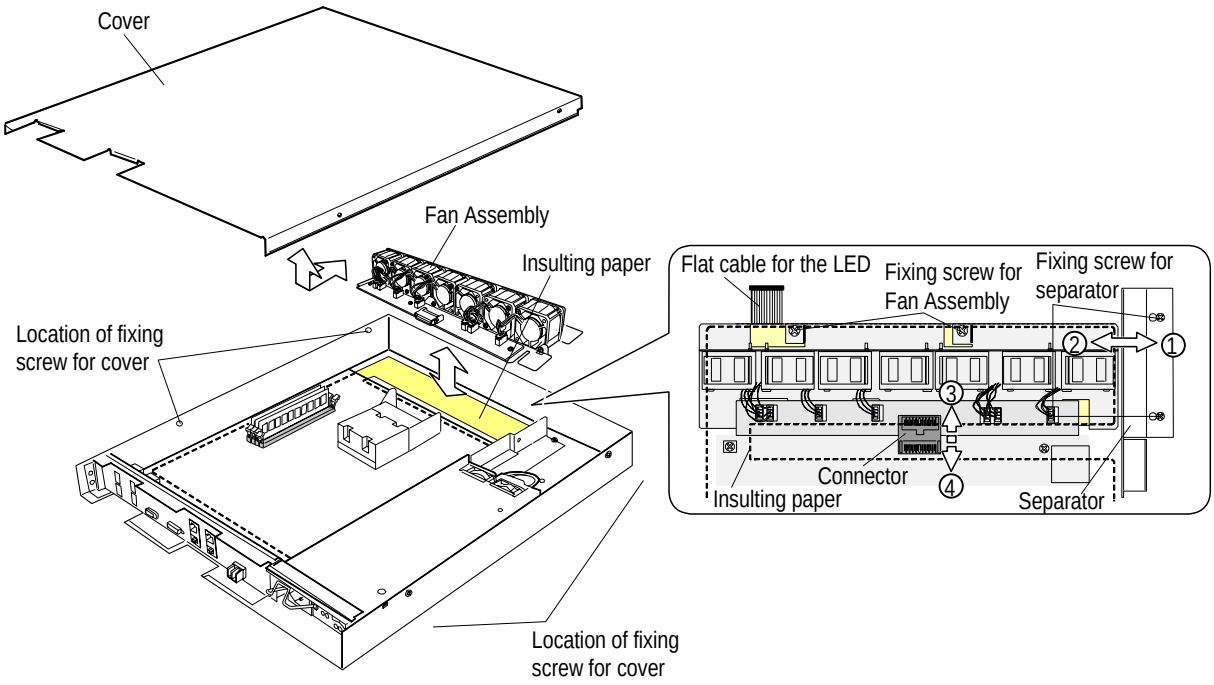


Figure 2.3.2 Replacing Fan Assembly

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2.3.3 Replacing the Memory (DIMM)

⚠ CAUTION

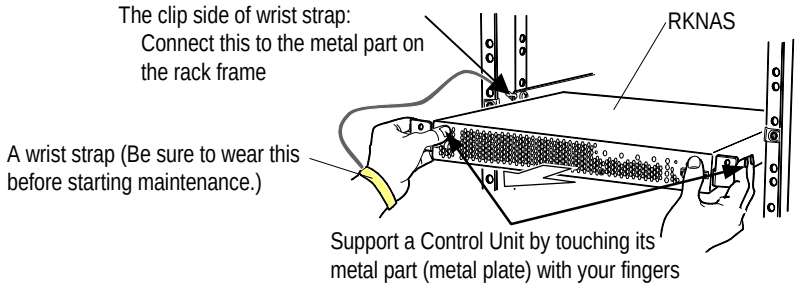
- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.
- Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are RKNAS, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



NOTE : Check that the fans of the FAN Assembly have stopped.

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

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(1) Remove the cover.
Remove the four fixing screws (two each at right and left) which are fixing the cover, and remove the cover by pulling it up after sliding it.

(2) Remove the memories (DIMM) in which a failure occurred after recording the installation position, capacity and the model name of the memories (DIMM).

NOTE : Place the removed memories (DIMM) temporarily at the place where the electrostatic measures were done.

(3) Install the new memories (DIMM).
Install the memories (DIMM) of the same capacity with the removed memories (DIMM).

NOTE : Install the memories (DIMM) in the slot A0 and the slot B0 for the RKNAS2G.

(4) Attach the cover.
Attach the cover by sliding it, and fix the four screws (two each at right and left) by fastening them.

(5) Install the RKNAS in the rack frame (refer to Installation "3.4.8 Installing the RKNAS" (INST 03-0601)).

(6) Connect all the removed cables.

(7) Attach the Front Bezel (refer to Installation "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130)).

(8) Turn on all the AC Input Power Switches of the RKNAS. The READY LED (green) on the RKNAS does not light up at this timing. Check the lighting of the READY LED (green) on the RKNAS after starting the NAS OS. Also, check that "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message on WEB in the window after starting the NAS OS (refer to WEB "2.5 Information Message" (WEB 02-0120)).

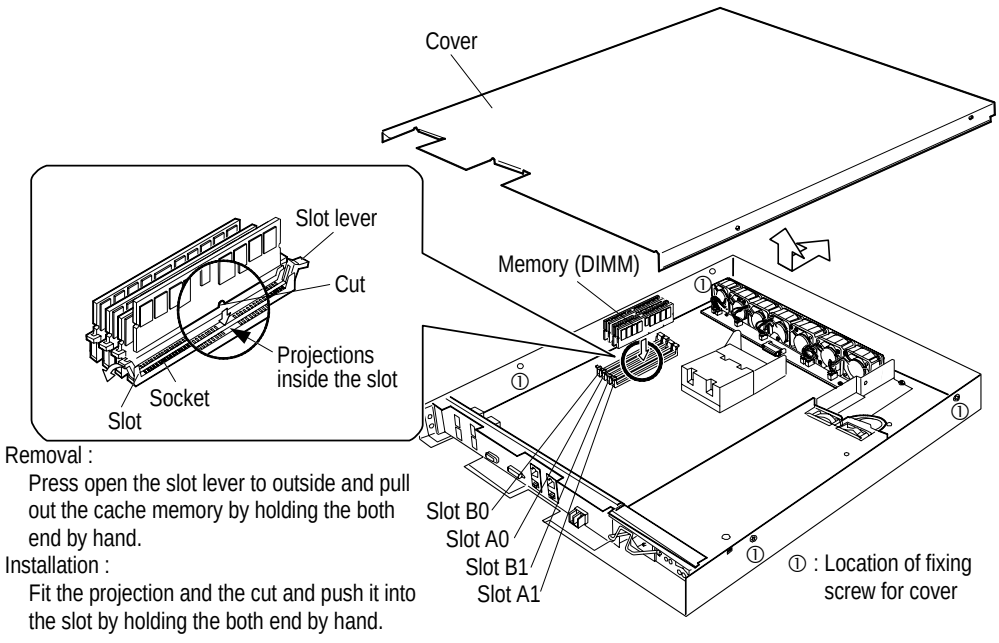


Figure 2.3.3 Replacing Memory (DIMM)

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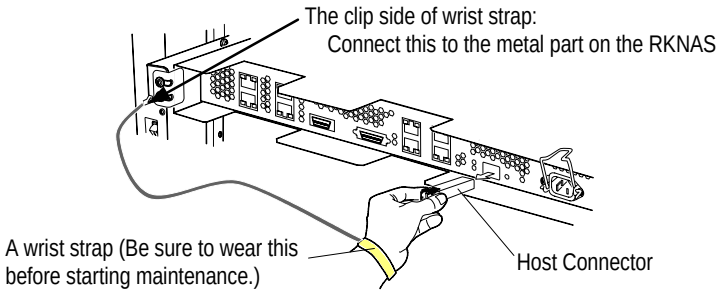
2.3.4 Replacing the Host Connector

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



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Refer to the figure below for the Host Connector replacement work. Host Connector can be replaced with the power turned on.
When SNMP Agent Support Function is enabled, if the host connector is installed or the unblocked host connector is removed, SNMP Trap is transmitted.

NOTE : Host Connector can be Type1and Type2. When removing or installing a Host Connector, work according to each type.

Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. The procedure varies depending on whether the WARNING LED of RKNAS is on or off. 2. In the case of Preventive replacement, there may be an error report in the host computer depending on the operating conditions of the host computer. The prior contact to the customer is required.	When the WARNING LED of NAS is on • See "(1-1) When the WARNING LED of RKNAS is on" (REP 02-1160). When the WARNING LED is off (Preventive replacement) • See "(1-2) When the WARNING LED of RKNAS is off" (REP 02-1180).
2	Replacement with the power turned off	—	See "(2) Procedure for replacement with the power turned off" (REP 02-1190).

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(1) Procedure for replacement with the power turned on

(1-1) When the WARNING LED of RKNAS is on

(Refer to "Figure 2.3.4 Replacing Host Connector" (REP 02-1170).)

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Make sure that WARNING LED (orange) of RKNAS lights up. If it does not light up, remove the Host Connector following "(1-2) When the WARNING LED of RKNAS is off" (REP 02-1180).

(b) Refer to "Information Message" on WEB, and check to see that [IA1X0x NNC Host Connector failure detected (NNC-x)] or [IA1L0x PCDG error [Host Connector] (NNC-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)

(c) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.

(d) Remove the Host Connector.

- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(e) Make sure that 20 seconds or longer has elapsed after the Host Connector was taken out. If the Host Connector is inserted before 20 seconds has elapsed, the Host Connector may not be recovered normally.

(f) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.

(g) Connect the Fibre Channel Interface cables.

(h) Refer to "Information Message" on WEB, and check to see that [IA1U0x NNC recovered from partial alarm (NNC-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)

When this is indicated, the replacement of Host Connector has completed.

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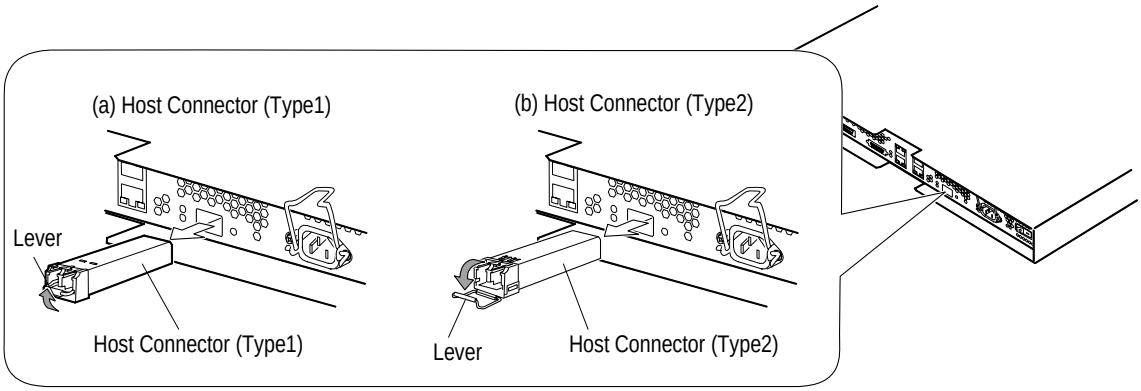


Figure 2.3.4 Replacing Host Connector

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(1-2) When the WARNING LED of RKNAS is off
(Refer to "Figure 2.3.4 Replacing Host Connector" (REP 02-1170).)

NOTE : There may be an error report in the host computer depending on the operating conditions of the host computer.
The prior contact to the customer is required.

(a) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(b) Remove the Host Connector.
- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(c) Make sure that 20 seconds or longer has elapsed after the Host Connector was taken out. If the Host Connector is inserted before 20 seconds has elapsed, the Host Connector may not be recovered normally.

(d) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.

(e) Connect the Fibre Channel Interface cables.

(f) Refer to "Information Message" on WEB, and check to see that [IA1U0x NNC recovered from partial alarm (NNC-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of Host Connector has completed.

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(2) Procedure for replacement with the power turned off
(Refer to "Figure 2.3.4 Replacing Host Connector" (REP 02-1170).)
Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.
- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(a) Turn off the AC Power Unit Switch of the RKNAS.
(b) Remove the Fibre Channel cables connected to the Control Unit mounting the Host Connector to be replaced.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

(c) Remove the Host Connector.
- In the case of Host Connector (Type1), pull out the Host Connector after pushing down the Lever to the forward.
- In the case of Host Connector (Type2), pull out the Host Connector after raising the Lever.

(d) Check the insertion direction of the Host Connector and inset the Host Connector in the port until it clicks.
(e) Connect the Fibre Channel Interface cables.
(f) Turn on the AC Power Unit Switch of the RKNAS.
(g) Make sure that the READY LED (green) on the RKNAS comes on.
(h) Refer to "Information Message" on WEB, and check to see that [IA1U0x NNC recovered from partial alarm (NNC-x)] is indicated. (Refer to WEB "2.5 Information Message" (WEB 02-0120).)
When this is indicated, the replacement of Host Connector has completed.

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2.3.5 Replacing the NAS Interface cable

Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(1) When replacing the PCI-Express cable or the CTRL cable, remove the repeat binder which bundling the NAS Interface Cable (PCI-Express cable and the CTRL cable) to be replaced.

(2) Remove the NAS Interface cable to be replaced.
Remove the NAS Interface cable which is connecting between the RKNAS and the RKNAS, and the RKNAS and the basic subsystem.
Remove the PCI-Express cable by pulling out the Lever.

NOTE : When the cable cannot be removed, do not pull it forcibly. If you bend the cable up and down forcibly, it may be damaged.

(3) Connect the new NAS Interface cable.
Connect between the RKNAS and the RKNAS, and the RKNAS and the basic subsystem with the new NAS Interface cable.
When the PCI-Express cable or the CTRL cable was replaced, bundle the connected PCI Express cable and the CTRL cable with the repeat binder (at the position of approximately 150mm from the tip of the table).

(4) Turn on all the AC Input Power Switches of the RKNAS.
The READY LED (green) on the RKNAS does not light up at this timing. Check the lighting of the READY LED (green) on the RKNAS after starting the NAS OS. Also, check that "IA1U0x NNC recovered from partial alarm (NNC-x)" or "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message on WEB in the window after starting the NAS OS (refer to WEB "2.5 Information Message" (WEB 02-0120)).

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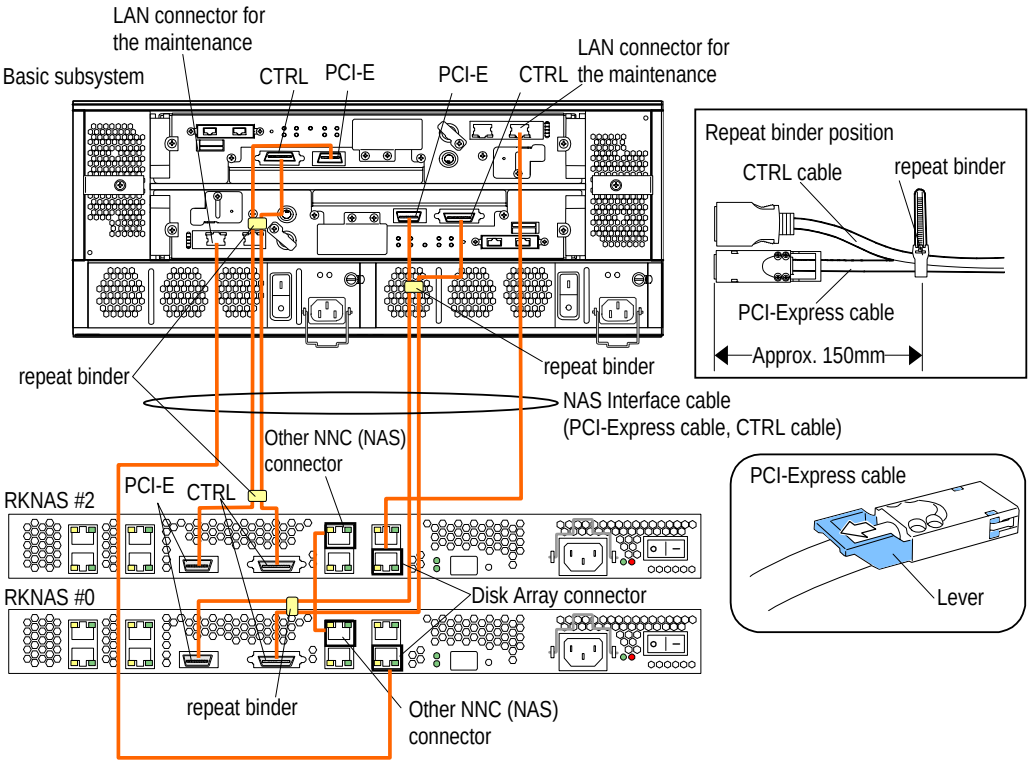


Figure 2.3.5 Replacing NAS Interface cable

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2.3.6 Replacing the NAS Chassis

The Main Board is included in the NAS Chassis.

⚠ CAUTION

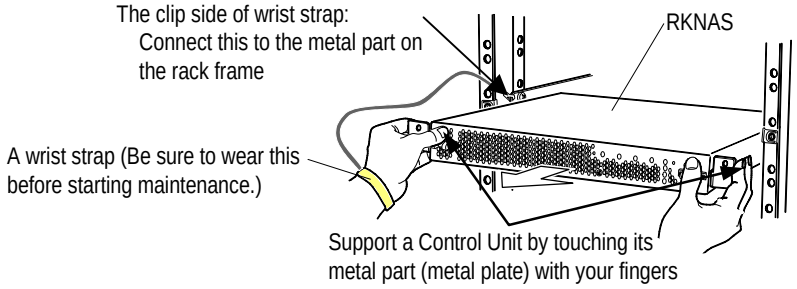
- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.
- Use care with the top cover of NAS chassis (around the warning label), otherwise you can get burned.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are RKNAS, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

A failure may be caused by the electric shock since the RKNAS is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).



NOTE : Check that the fans of the FAN Assembly have stopped.

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Perform the replacement work in the following procedure after collecting the simple trace, the Control Unit blockade trace, and the Full Dump error according the message of the error occurred.

- For the Simple Trace (Troubleshooting "7.3 Collecting Simple Trace" (TRBL 07-0040))
- For the CTL Alarm Trace (Troubleshooting "7.4 Collecting CTL Alarm Trace" (TRBL 07-0080))
- For the Full Dump (Troubleshooting "7.5 Collecting Full Dump" (TRBL 07-0130))

(1) Remove the cover.
Remove the four fixing screws (two each at right and left) which are fixing the cover, and remove the cover by pulling it up after sliding it.
(2) Remove the torque screws, and remove the Brand Plate from the NAS Chassis.
(3) Remove each parts (Power Unit, Fan Assembly, Memory (DIMM), Host Connector, and Interface cable) from the NAS Chassis (refer to "2.3 Replacing the NAS parts" (REP 02-1050).
(4) Install the removed parts (Power Unit, Fan Assembly, Memory (DIMM), Host Connector, and Interface cable) in the new NAS Chassis (refer to "2.3 Replacing the NAS parts" (REP 02-1050). Install all the removed parts in the same position.

NOTE : Install the memory (DIMM) after removing the dust cover from the memory slot of the new NAS chassis.

(5) Attach the removed Brand Plate on the new NAS Chassis, and fix it by tightening the torque screws.
(6) Attach the cover.
Attach the cover by sliding it, and fix the four screws (two each at right and left) by fastening them.
(7) Install the RKNAS in the rack frame (refer to Installation "3.4.8 Installing the RKNAS" (INST 03-0601)).
(8) Connect all the removed cables.
(9) Attach the Front Bezel (refer to Installation "1.5.3 How to attach/remove Front Bezel of the Rackmount Model" (INST 01-0130)).
(10) Turn on all the AC Input Power Switches of the RKNAS.
The READY LED (green) on the RKNAS does not light up at this timing. Check the lighting of the READY LED (green) on the RKNAS after starting the NAS OS. Also, check that "IA1U0x NNC recovered from partial alarm (NNC-x)" or "IA1V0x NNC recovered (NNC-x)" is displayed referring to the Information Message on WEB in the window after starting the NAS OS (refer to WEB "2.5 Information Message" (WEB 02-0120)).

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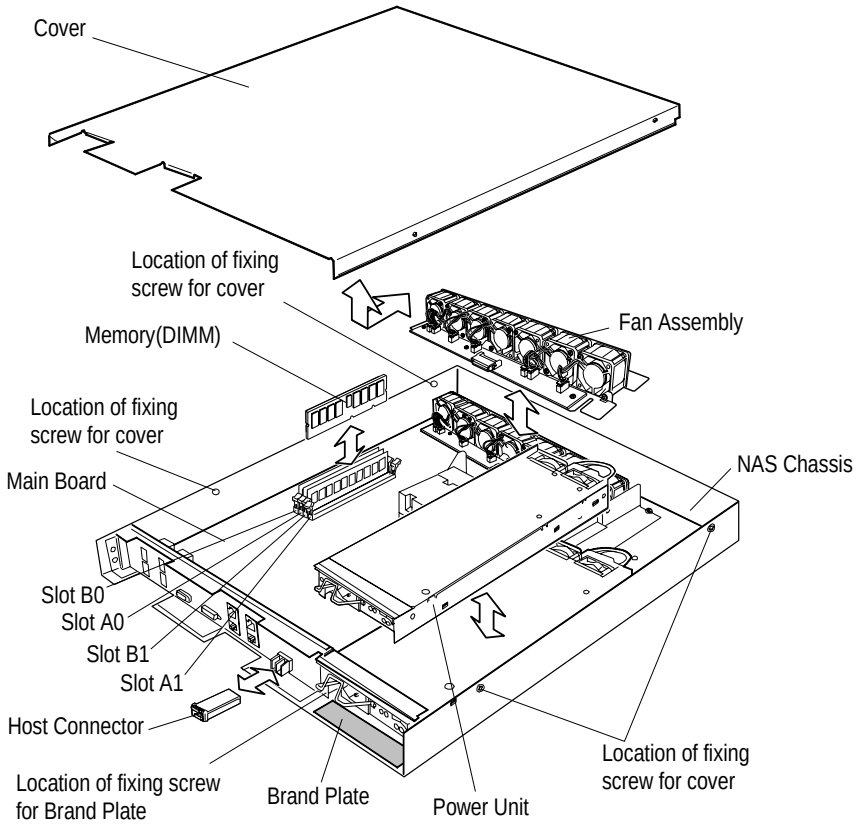


Figure 2.3.6 Replacing NAS Chassis

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2.3.7 Replacing Front Bezel of RKNAS

(1) How to replace Front Bezel of RKNAS

CAUTION

Attach or remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.

(a) Pull the replacing Front Bezel toward you holding its sides to disengage it from the ball catches.
(b) Hold the side of new Front Bezel with your both hands.
(c) After making the hooks of the new Front Bezel engaged, press the bezel against the main body until it is stopped.

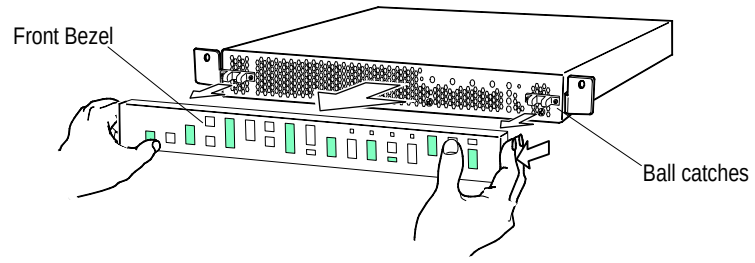


Figure 2.3.7 Procedure for Replacing Front Bezel

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Chapter 3. Periodic Maintenance

This chapter contains information on items of periodical maintenance which is performed to prevent failures of the subsystem from occurring and to maintain operation performance.

3.1 Periodic Maintenance Items

Table 7.1.1 shows periodical maintenance items of the subsystem. Inspect and clean the subsystem regularly according to the operation environment.

Table 3.1.1 Periodic Maintenance Items

No.	Item			Interval (*1)	Inspection item for each model			Standard time required (*2)
					Floor Model		Rackmount Model	
					RKM+H1J/ RKS+H1J/ RKXS+H1J	RKM+RKAJ+H2J/ RKM+RKAJAT+H2J/ RKS+RKAJ+H2J/ RKS+RKAJAT+H2J/ RKXS+RKAJAT+H2J	Rackmount Model (U7)	
1	Inspection	Inspecting FANs	Fan Assembly	Y1	"3.2.1 Inspecting fans" (REP 03-0020)	"3.2.1 Inspecting fans" (REP 03-0020)	"3.3.1 Inspecting fans" (REP 03-0040)	5 min
2	Cleaning	Cleaning the subsystem	Front bezel	Y1	"3.2.2 Cleaning the subsystem" (REP 03-0030)	"3.2.2 Cleaning the subsystem" (REP 03-0030)	"3.3.2 Cleaning the subsystem" (REP 03-0060)	5 min
			Rear cover	Y1	"3.2.2 Cleaning the subsystem" (REP 03-0030)	"3.2.2 Cleaning the subsystem" (REP 03-0030)	–	5 min
			Rear door	Y1	–	–	"3.3.2 Cleaning the subsystem" (REP 03-0060)	5 min
3	Replacement of periodical replacement part		Battery	Y2	"3.4.1 Replacing Battery Unit" (REP 03-0070)	"3.4.1 Replacing Battery Unit" (REP 03-0070)	"3.4.1 Replacing Battery Unit" (REP 03-0070)	10 min

*1 : The maintenance intervals were set on the assumption that the average operation hours of the subsystem is 400 hours/month. Therefore, in the following cases, consult the customer to decide whether to change the intervals or not taking the actual operation hours in consideration. (See Table 3.1.2.)

*2 : Working hours change by the case where one RKH/RKM/RKS/RKXS/RKNAS is checked, and the number of RKAJ/RKAJAT/RKA.

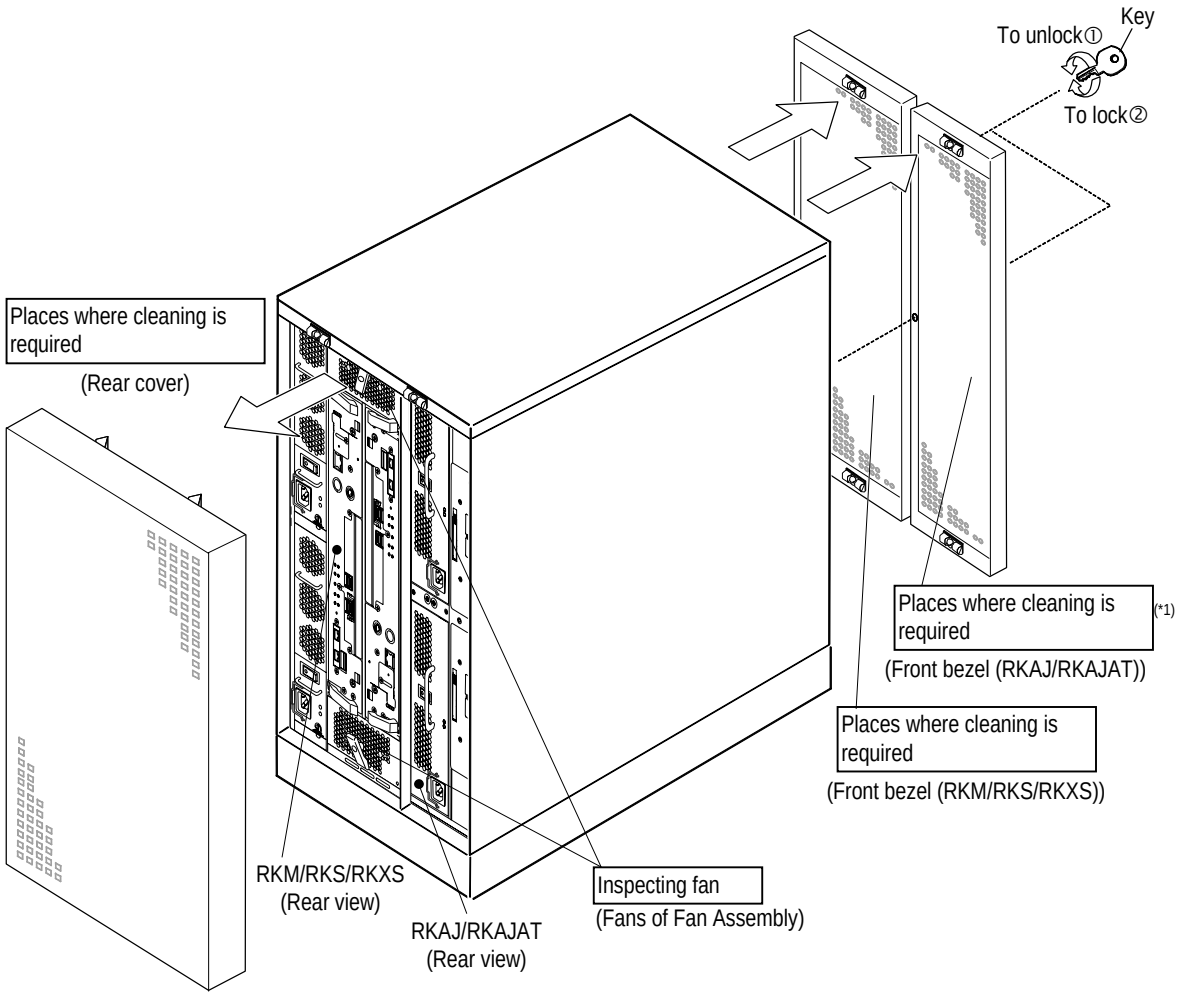
Table 3.1.2 Change of Maintenance Interval

Object item	Factors requiring change of maintenance interval		Remarks
	Case of shortening the interval	Case of lengthening the interval	
• Inspection of fans • Cleaning of the subsystem	• Operation hours are long. • Installation environment is bad. • To fit the interval for user's operation schedule. • To improve service for user • Necessity to shorten the interval is recognized for other reason.	• Operation hours are short. • Installation environment is excellent.	Also examine items to be added to the factors shown on the left such as the frequency of the subsystem failure occurrence and items common to the subsystem and a connected system.

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3.2 Inspecting and Cleaning Floor Model

Perform the inspection and cleaning periodically. Parts of the floor models to be inspected and cleaned are shown in Figure 3.2.1 (for the RKM+H1J/RKS+H1J/RKXS+H1J, RKM+RKAJ+H2J/RKM+RKAJAT+H2J/RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J).



*1 : The floor model (RKM+H1J/RKS+H1J/RKXS+H1J) does not have this part.

Figure 3.2.1 Inspecting and Cleaning of Floor Model

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3.2.1 Inspecting fans

Inspect the fans while the subsystem powered on.

⚠ CAUTION

Since each fan is rotating with high-speed, be careful not to be caught by it.

(1) In the case of the Floor (RKM+H1J/RKS+H1J/RKXS+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J /RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J) Model, remove the rear cover.
(2) Make sure that fans of the Fan Assembly on the rear side of the subsystem are rotating.
(3) In the case of the Floor (RKM+H1J/RKS+H1J/RKXS+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J /RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J) Model, reinstall the rear cover after the inspection and cleaning are completed.

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3.2.2 Cleaning the subsystem

To clear the subsystem, check whether or not air vents are clogged by dust. If they are clogged, remove the dust with a vacuum cleaner or wipe the dust out from it with a dry cloth.

⚠ CAUTION

- Be sure to keep the front bezel and rear panel clean.
  Or else, the ventilation is deteriorated so that the temperature inside the subsystem may rise causing a failure or even a fire.
- Be careful not to move the subsystem during cleaning.

⚠ CAUTION

If you touch a live part, it is feared that you receive an electric shock.

(1) Clean the outside of the Front Bezel.
(2) Insert the key in the Front Bezel and turn it in the direction shown by the arrow ① (⟶) to unlatch the bezel.
(3) Remove the Front Bezel. (See Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100))
(4) Clean the internal surfaces of the Front Bezel.
(5) Attach the Front Bezel.
(6) Turn the key in the direction shown by the allow ② (<·····) to latch the front bezel.
(7) In the case of the Floor (RKM+H1J/RKS+H1J/RKXS+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J /RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J) Model, remove the rear cover.
(8) Clean the outer and inner sides of the rear cover.
(9) In the case of the Floor (RKM+H1J/RKS+H1J/RKXS+H1J/RKM+RKAJ+H2J/RKM+RKAJAT+H2J /RKS+RKAJ+H2J/RKS+RKAJAT+H2J/RKXS+RKAJAT+H2J) Model, reinstall the rear cover after the inspection and cleaning are completed.

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3.3 Inspecting and Cleaning Rackmount Model with U7 Rack Frame

3.3.1 Inspecting fans

This work is for the RKM/RKS/RKXS/RKH only.
Perform the inspection of the fans with the power turned on.

⚠ CAUTION

Since each fan is rotating with high-speed, be careful not to be caught by it.

(1) Open the rear door. To open it, insert an Allen wrench into the keyhole on the door, turn it in the direction shown by the arrow ① (⟶), and open the door leaving the wrench as it is. (See Figure 3.3.1.)
(2) Make sure that the fans of the Fan Assembly in the rear of the mounted unit are rotating.
(3) Fit the Allen wrench in the key socket on the door turn it in the direction shown by the arrow ① (⟶), and close the door leaving the wrench as it is.

When the RKNAS is installed, inspect the fans of the RKNAS as follows.
Perform the inspection of the fans with the power turned on.

(1) Remove the Front Bezel of the RKNAS. (Refer to Installation "1.5.3 (1-2) NAS Unit" (INST 01-0141).)
(2) Check that the fans of the FAN Assembly in the front of the RKNAS are rotating.
(3) Attach the Front Bezel of the RKNAS.

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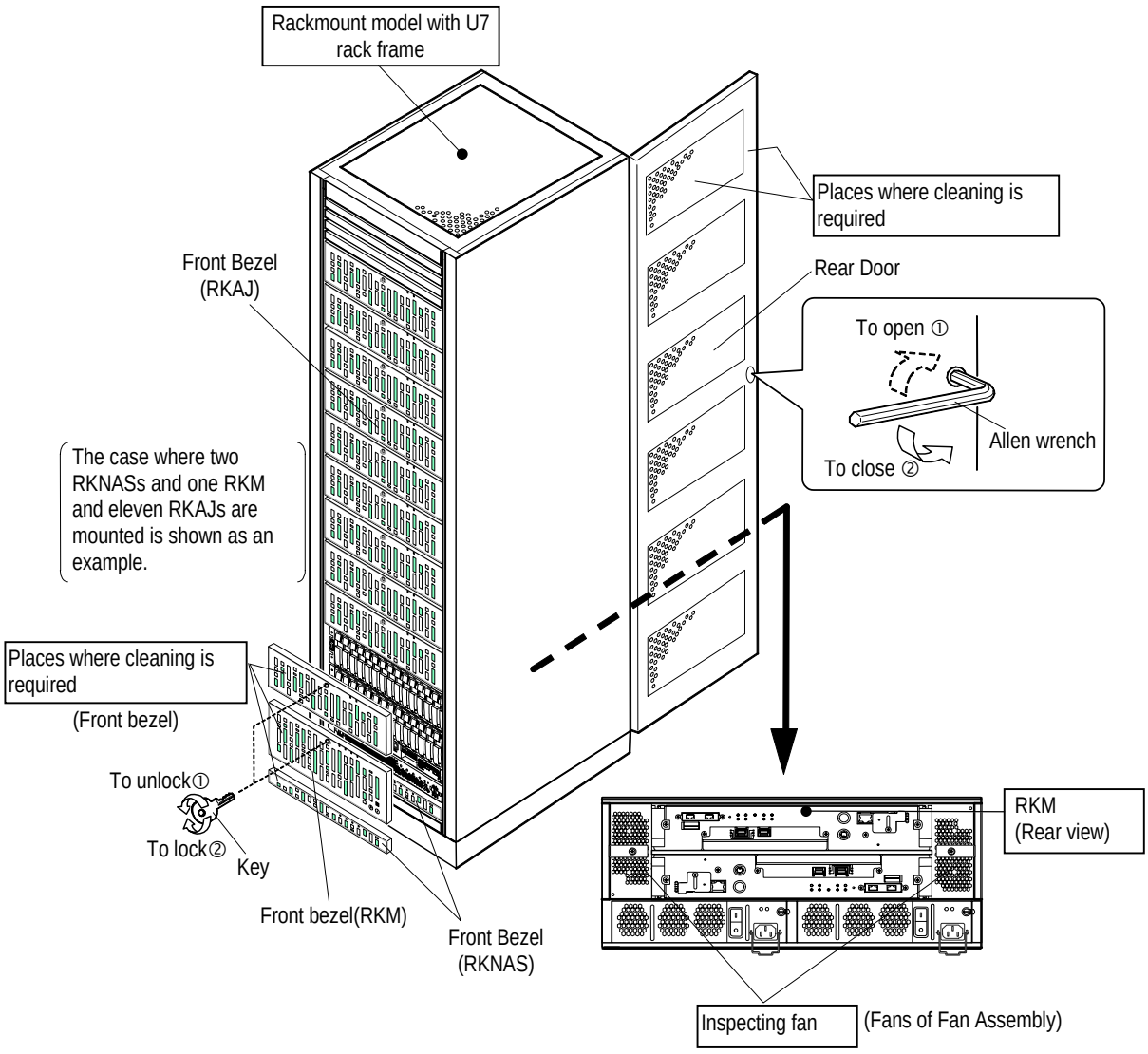


Figure 3.3.1 Inspecting and Cleaning Rackmount Mode with U7 Rack Frame

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3.3.2 Cleaning the subsystem

To clear the subsystem, check whether or not air vents are clogged by dust. If they are clogged, remove the dust with a vacuum cleaner or wipe the dust out from it with a dry cloth.

CAUTION

- Be sure to keep the front bezel and rear panel clean.
  Or else, the ventilation is deteriorated so that the temperature inside the subsystem may rise causing a failure or even a fire.
- Be careful not to move the subsystem during cleaning.

CAUTION

If you touch a live part, it is feared that you receive an electric shock.

(1) Clean the outside of the Front Bezel.
(2) Insert the key in the Front Bezel and turn it in the direction shown by the arrow ① (⟶) to unlatch the bezel. (This work is unnecessary for RKNAS.)

CAUTION

Attach or remove the front bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(3) Remove the Front Bezel. (Installation "1.5 How to Open/Close Door or Attach/Remove Front Bezel/Rear Cover of the Subsystem" (INST 01-0100).)
(4) Clean the internal surfaces of the Front Bezel.
(5) Attach the Front Bezel.
(6) Turn the key in the direction shown by the allow ② (·····>) to latch the Front Bezel. (This work is unnecessary for RKNAS.)
(7) Clean the external surfaces of the rear door.
(8) Open the rear doors. (Installation "1.5.4 How to open/close the Rear Door of U7 rack frame" (INST 01-0150).)
(9) Clean the internal surfaces of the rear door.
(10) Close the rear door. To close it, insert the Allen socket wrench into the keyhole on the door, turn it in the direction shown by the arrow ① (⟵), and close the door leaving the wrench as it is.

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3.4 Replacing Periodical Replacement Parts

In the subsystem, a battery, which is a part with limited life, is used and it must be replaced periodically. To replace the battery, replace the Backup Battery Unit containing the battery. The battery has a usable period. Confirm the time limit and do not use the battery which passed the time limit.
When replacing two Backup Battery Units at the same time (one Backup Battery Unit is replaced for the floor model of the RKS/RKXS) or replacing four at the same time, it can be performed during the operation (being used for the customer's business), but the Cache becomes the write through mode and the R/W performance is slightly deteriorated.

3.4.1 Replacing Battery Unit

⚠ CAUTION

- Do not disassemble the battery, or a burn or electric shock may be caused.
- If a battery is handled wrongly, it is feared that an explosion is caused.

CAUTION

- When a device is kept with power-off for more than three months, the battery may be excessively discharged, and it may cause an unrecoverable damage for RKM/RKS. In such a storing condition, either charge the battery at least once every three months for more than six (6) hours, or switch off the battery. Even though the battery is switched off, to prevent damages from natural discharge, the battery must be charged once every six months for more than six (6) hours. When the battery without the switch is installed, charge it once every six months for more than six (6) hours.
- When a device is kept with power-off for more than six months, the battery may be excessively discharged, and it may cause an unrecoverable damage for RKXS/RKH. In such a storing condition, the battery must be charged once every six months for more than six (6) hours.

(1) Procedure for replacing a Disk Drive is "2.2.2 Replacing Backup Battery Unit" (REP 02-0240).
(2) For disposing and keeping the used battery, refer to "Chapter 5. Recycling" (REP 05-0000).

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Chapter 4. Maintenance Tools

4.1 Maintenance Tools for Hardware

Names and usages of maintenance tools to be used for installation and maintenance are shown below.

No.	Tool name	Specification	Usage
1	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
2	Phillips screwdriver	No.2	General use
3	Slotted screwdriver	No.1	For Device ID Setting Switch
4	Allen wrench	No.3	For installing floor stand kit
5	Allen wrench	No.4	For fastening of AC power cable.
6	Allen wrench	No.6	For opening/closing doors (of rack frame)
7	Spanner	No.22	For adjusting leveling bolt (of U7 rack frame)
8	USB memory	–	For storing simple trace information
9	Wrist strap	–	For discharge static electricity
10	Torque screwdriver	No.T10	For installing the Brand Plate to the NAS Chassis

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4.2 Maintenance Tools for Software

Maintenance tool consists of Storage Navigator Modular or Subsystem's built-in Web, trace analysis tool (TDCONV), and back-end diagnostic tool.

The following describes the outline of each maintenance tool.

(1) Storage Navigator Modular
Storage Navigator Modular is operated on the terminal device (RC and WEB etc) connected through a LAN with Array unit. This program enables you to perform the operation for Array unit such as referencing the state of Array unit and setting a configuration.
For details, refer to "Storage Navigator Modular (for GUI) User's Guide".

(2) Subsystem's built-in WEB
By having WEB function in Array unit, you can access the Array unit from the terminal device connected through a LAN using a WEB browser. Subsystem's built-in WEB enables you to perform the maintenance operations such as confirming a failure status of the subsystem, referencing a error message, installing the microprogram, and collecting failure information.
For details, refer to "Maintenance manual for WEB".

(3) Back-end diagnostic tool
When Loop Failure (W080xy) occurs, Back-end diagnostic tool performs the Loop Failure Detection Function from Diagnosis for Loop Failure Detection Function window in Subsystem's built-in WEB, and identifies the failed Disk Drive.
For details, refer to Troubleshooting "6.1.14 A failure occurred during operation : Case 4 (Loop failure)" (TRBL 06-0600).

Connection of maintenance tools for software is shown in Figure 4.2.1.

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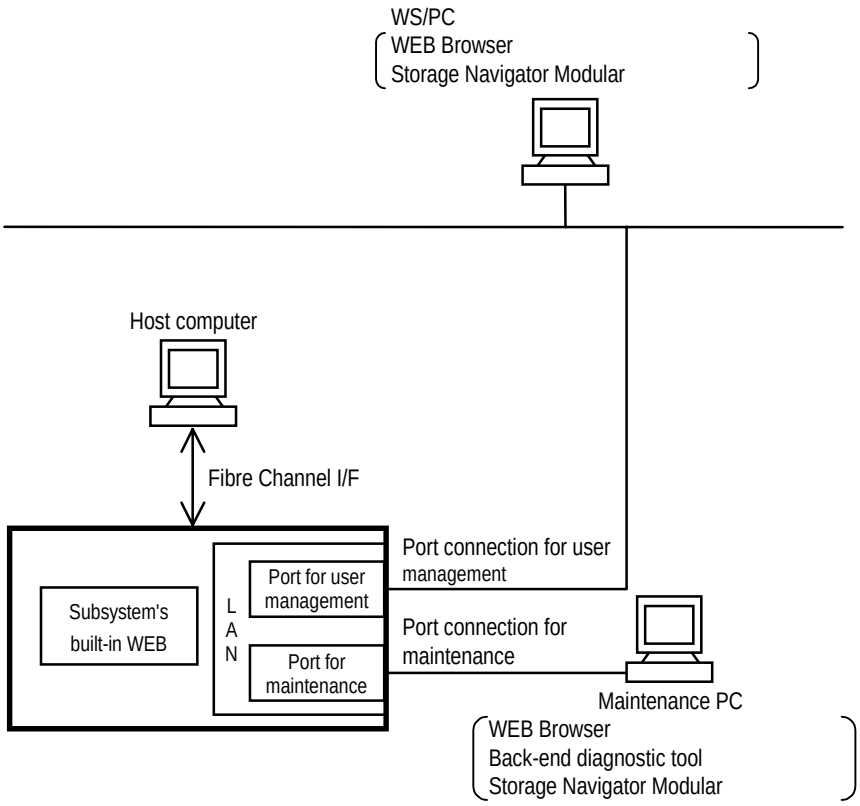


Figure 4.2.1 Connection of maintenance tool for software

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Chapter 5. Recycling

(1) Parts to be recycled

The battery used in the subsystem is a sealed Nickel-hydride rechargeable battery. The lead battery is a valuable resource which can be recycled.
When you replace it or dispose of a used subsystem, please cooperate in the recycling. How to dispose of the battery or Backup Battery Unit which becomes useless owing to replacement etc. is shown below.

⚠ DANGER

- Do not disassemble the case, do not modify it, or do not peel off the label. There are high voltage parts inside: If you attempt any of these actions, you may get an electrical shock or burn.
- Do not disassemble the battery; this may cause short circuits inside or outside of the battery. If the components are exposed to the air, the battery may cause overheat, burst or ignite. Disassembling the battery may expose you to its alkaline solution, which can be dangerous.
- Do not cut the output cable. Do not modify the connector. If you attempt any of these actions, you may get an electrical shock or burn. A short-circuit may cause abnormal chemical reactions inside the battery which leads to overheating, bursting or ignition.
- Follow the instructions when you recharge the battery pack. If you recharge it in a way different from specified here, it may cause the following problems: The battery may become charged excessively; excessive current may be produced; or the battery cannot be recharged. As a result, the battery may leak, become overheated, burst, or ignite.
- Do not use excessive force when you connect the battery pack to the charger or other devices. If you cannot connect it easily, check the positive and negative are correct for the connector. If you connect the battery in reverse, it will be charged incorrectly and abnormal chemical reactions may occur inside. As a result, the battery may become overheated, burst or ignite.
- Do not connect the battery to a power receptacle. If you apply an excessive amount of voltage to the battery, it may produce excessive current making the battery overheat, burst or ignite.
- Do not use or leave the battery where the temperature can become high, such as, near a fire or a heating element. High temperatures may damage the battery's separator, which may cause short circuit, making it overheat, burst or ignite.
- Do not incinerate the battery pack or heat it. If you do so, the insulator may melt, the safety fuse/
  mechanism may be damaged, or the electrolyte may gush out. As a result, the battery may become burst, explode or ignite.

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- Do not connect the negative terminal to the positive with metal wire. Do not carry or store the battery with other metal parts. This may cause a short circuit or produce excessive current which can cause the battery to leak, overheat, burst or ignite.
- Do not let the battery become wet by soaking it in the water or seawater. If the battery gets wet, a short circuit may occur and an excessive amount of current may be produced causing abnormal chemical reactions inside. As a result, the battery may become overheated, burst or ignite.
- Do not nail the battery, hit it with a hammer, or stamp on it. The battery may be broken or dented and a short circuit may occur inside. As a result, the battery may become overheated, burst or ignite.
- Do not solder directly to the battery. If you do so, heat will melt the insulator and damage the safety fuse/mechanism. As a result, the battery may leak or may become overheated, burst or ignite.
- Do not recharge the battery where there is a high temperature, such as near a fire.

  This may cause abnormal chemical reactions inside the battery and it may become overheated, burst or ignite. High temperatures may also cause deterioration of performance/life of the battery.

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⚠ WARNING

- Do not place the battery pack in the microwave oven or under high pressure. Either of these actions will rapidly heat the battery or break its seals: As a result, the battery may become overheated, burst or ignite.
- If you find anything strange or unusual with the battery when you use/carry/store it, remove the battery from the device and stop using it. For example, strange smells, strange colors, or deformation are a sign you must stop using the battery.
- If it takes longer than the specified time to complete recharging, stop recharging the battery: Otherwise, the battery may become overheated, burst or ignite.
- If the battery leaks and gets into your eyes, immediately flush your eyes with clean water (tap water) and do not rub your eye. Then visit the doctor immediately. If you do not seek any treatment for your eyes, problems may occur later. Because the battery uses highly concentrated alkaline as electrolyte, it may burn or you may lose your sight if it contacts your skin or eyes. If the battery's liquid contacts your skin or eyes, you must flush them with plenty of clean water and visit the doctor at once.

(2) Display of recycling mark

The following three-arrow recycling mark shows that the sealed Nickel-hydride rechargeable battery is a part to be recycled. A label bearing the mark is affixed on the battery.



(3) Specifications of lead battery

Table 5.1 Specifications of sealed Nickel-hydride rechargeable battery (RKM/RKS/RKXS/RKH)

No.	Specification	Backup Battery Unit	
		RKM/RKS/RKH	RKXS
1	Manufacturer	Matsushita Battery Industrial Co., Ltd.	Matsushita Battery Industrial Co., Ltd.
2	Model	HHR-33AH15W1	HHR-33AH10W＊ (＊:1 to 9)
3	Voltage (V)	6	6
4	Capacity (mAh)	9600	6400

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(4) Disposal and safety in storage

Before storing a sealed Nickel-hydride rechargeable battery, cover its terminals with electric tape, etc. to prevent a short circuit. Store it separately from batteries of other type such as dry battery.

(5) Method of storage

Table 5.3 Storage method

No.	Item	Requirement
1	Storage method	Store a Backup Battery Unit being packed in the following conditions. • Do not apply it any unusual vibration or shock. • Do not put it on its side. • Keep it in a place where the temperature is within a range of 0 to 35 °C.
2	Allowable storage term	The expiration date of the storage able term is a date indicated on the usable term label.
3	Stock management(*1)	Manage stored batteries or Backup Battery Units in the way of FIFO. Since a label for entering the usable time limit is affixed on each package, please utilize it.

*1 : When replacing the Backup Battery Unit, check the usable time limit of it following "(6) Checking usable term of maintenance part" (REP 05-0030).

(6) Checking usable term of maintenance part

If the battery is left uncharged for longer than six months, it will discharge excessively and becomes unable to be fully recharged. Therefore, when the Backup Battery Unit is stored as a maintenance part, it must be stored on charge under the following condition, and used within one year. (Concerning the batteries mounted on the subsystem, since they are charged while the subsystem power is on, no problem will occur.)

No.	Items	Conditions
1	Period of Long-term storage	One year
2	Storage temperature	0°~35°
3	Supplemental charge interval	Once per six months

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Parts Catalog

Chapter 1. Parts Catalog..... PARTS 01-0000

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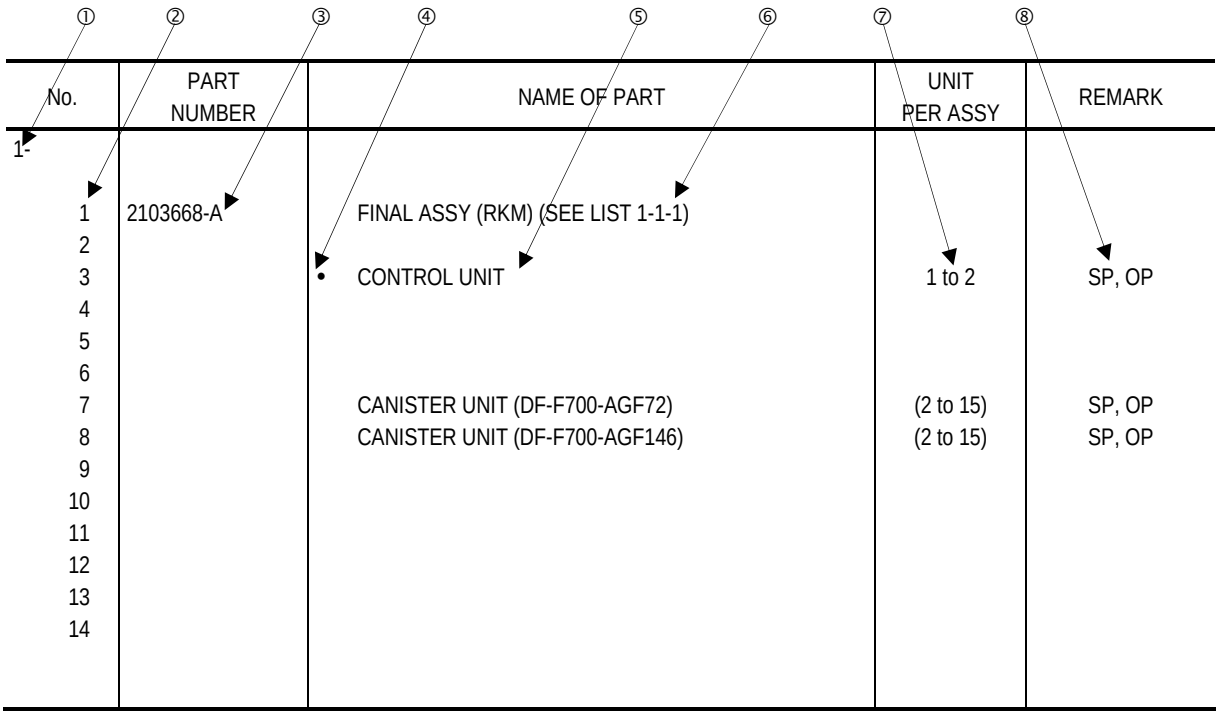
Chapter 1. Parts Catalog

This chapter contains catalogs of the parts of the subsystem and the devices composing the system.

Names and installation locations of parts are shown for the each model and the device.

In addition, classification of parts (into maintenance parts and optional parts) is also contained.

1.1 How to Use this Parts Catalog



① : Indicates a list number of an assembly which is a broad division of the subsystem.

② : Indicates a serial number of a part listed in the above list.

③ : Indicates a part number (drawing number).

④ : Indicates relationship of parts as follows.

No dots: Main assembly

• : Detail part of a main assembly

•• : Detail part of a one-dot subassembly

••• : Detail part of a two-dot subassembly

⑤ : Indicates a part name

⑥ : Indicates a number of a detailed list when it exists. (Ex.: See No. 3-1-1.)

⑦ : Indicates a quantity per assembly.

Number in parentheses indicates the minimum and maximum quantities of the installed parts.

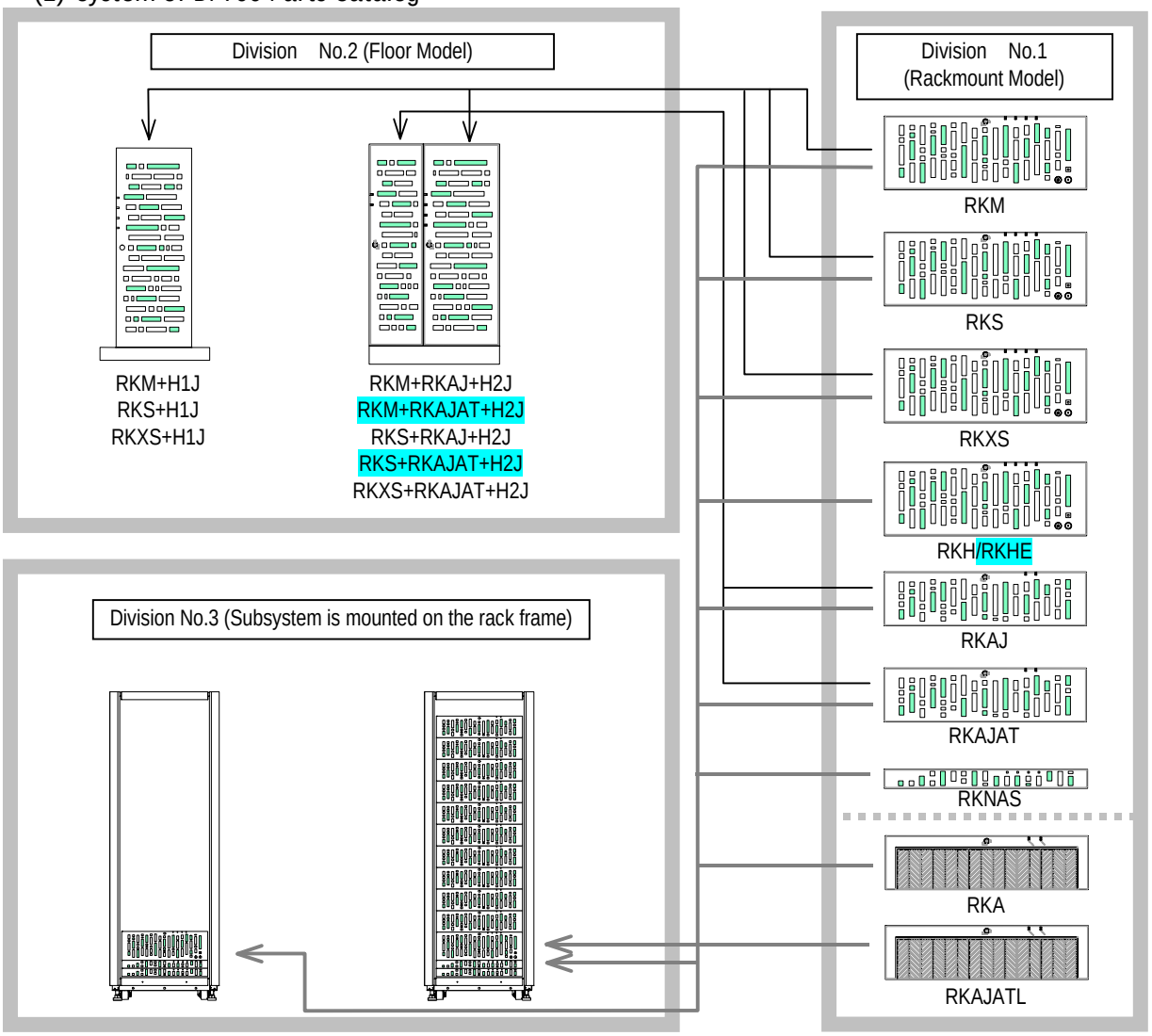
⑧ : SP and OP means maintenance part and optional part respectively.

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1.2 System of Parts Catalog

The parts and devices which composes the system are classified as shown below.

(1) System of DF700 Parts Catalog



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Division	Classification	Name of Part	No.	Sheet No.
1	Rackmount Model	DF700-RKM	1-1	01-0020
		DF700-RKS	1-2	01-0050
		DF700-RKXS	1-3	01-0080
		DF700-RKH/DF700-RKHE	1-4	01-0101
		DF700-RKAJ	1-5	01-0110
		DF700-RKAJAT/DF600-RKAJAT/ DF600-RKAJATL	1-6	01-0140
		DF600-RKA	1-7	01-0170
		DF700-RKNAS	1-8	01-0200
2	Floor Model	Floor (RKM+H1J) model	2-1	01-0210
		Floor (RKM+RKAJ+H2J) model	2-2	01-0230
		Floor (RKM+RKAJAT+H2J) model	2-3	01-0250
		Floor (RKS+H1J) model	2-4	01-0270
		Floor (RKS+RKAJ+H2J) model	2-5	01-0290
		Floor (RKS+RKAJAT+H2J) model	2-6	01-0310
		Floor (RKXS+H1J) model	2-7	01-0330
		Floor (RKXS+RKAJAT+H2J) model	2-8	01-0350
3	Subsystem is mounted on the rack frame	U7 Rack frame	3-1	01-0370

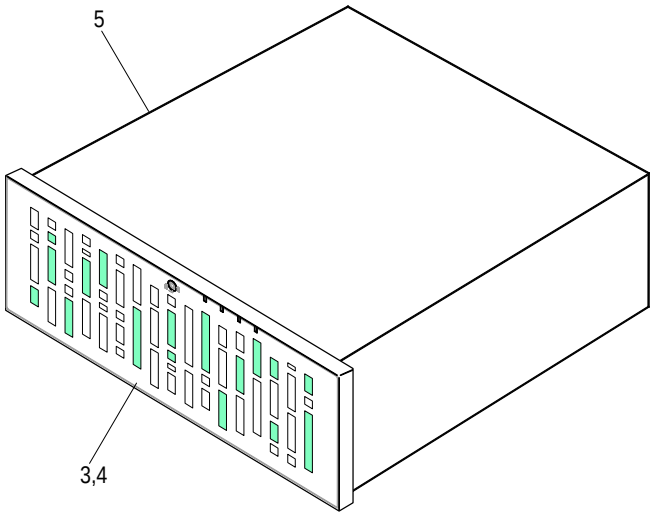
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1.3 Parts Catalog

No. 1-1 DF700-RKM

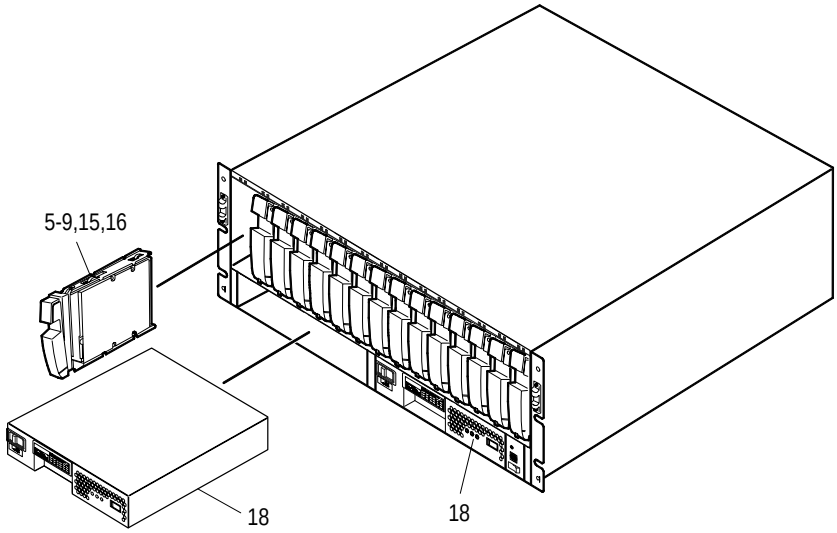


No.1-1 RKM (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF700-RKM		
1				
2				
3	3274852-A	• FRONT BEZEL (UBJ)	1	SP
4	3274849-A	• FRONT BEZEL (UBJHDS)	1	SP
5		• EXCHANGE CHASSIS (RKM)	1	

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No. 1-1 DF700-RKM

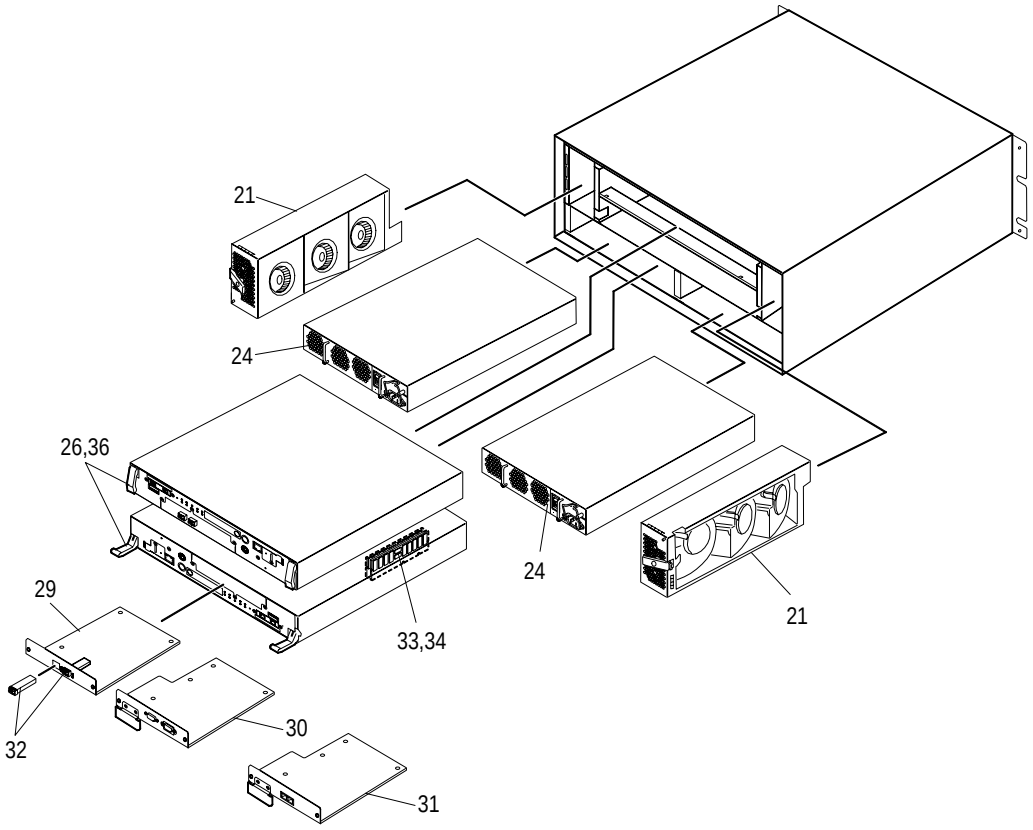


No.1-1 RKM (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF700-RKM		
5	3272219-A	CANISTER UNIT (DF-F700-AGF72)	2 to 15	SP, OP
6	3272219-B	CANISTER UNIT (DF-F700-AGH72)	2 to 15	SP, OP
7	3272219-C	CANISTER UNIT (DF-F700-AGF146)	2 to 15	SP, OP
8	3272219-D	CANISTER UNIT (DF-F700-AGH146)	2 to 15	SP, OP
9	3272219-E	CANISTER UNIT (DF-F700-AGF300)	2 to 15	SP, OP
10				
11				
12				
13				
14				
15	1508441-001	• DUMMY (DISK DRIVE)	0 to 13	
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17				
18	3272172-B	• BACKUP BATTERY UNIT	1 to 2	SP
19				
20				

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No. 1-1 DF700-RKM

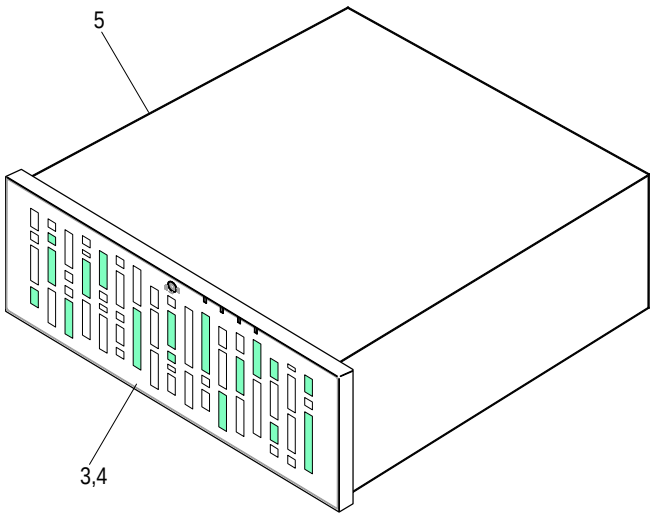


No.1-1 RKM (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF700-RKM		
21	3272172-C	• FAN ASSEMBLY	2	SP
22				
23				
24	3272172-A	• POWER UNIT	2	SP
25				
26	3272218-A	• CONTROL UNIT (RKM : DF-F700-F1JM)	1 to 2	SP, OP
27				
28				
29	3272218-C	•• FC Interface Board (HT-F4064-DJ4G2)	1 to 2	SP, OP
30	3272218-E	•• NAS Interface Board	1 to 2	SP, OP
31	3272218-D	•• iSCSI Interface Board	1 to 2	SP, OP
32	3272218-H	Host Connector (4 G bps)	2 to 4	SP
33	3272218-F	•• CACHE UNIT (DF-F700-C1GJ)	1 to 4	SP, OP
34	3272218-Q	•• CACHE UNIT (DF-F700-C2GJ)	1 to 4	SP, OP
35				
36	3266277-A	• DUMMY (CONTROL UNIT)	0 to 1	

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No. 1-2 DF700-RKS

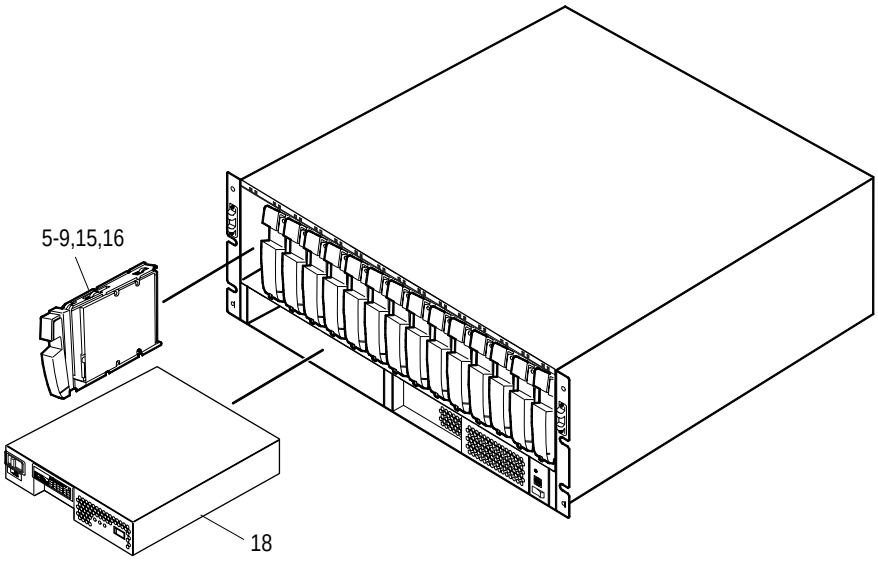


No.1-2 RKS (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF700-RKS		
1				
2				
3	3274852-A	• FRONT BEZEL (UBJ)	1	SP
4	3274849-A	• FRONT BEZEL (UBJHDS)	1	SP
5		• EXCHANGE CHASSIS (RKS)	1	

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No. 1-2 DF700-RKS



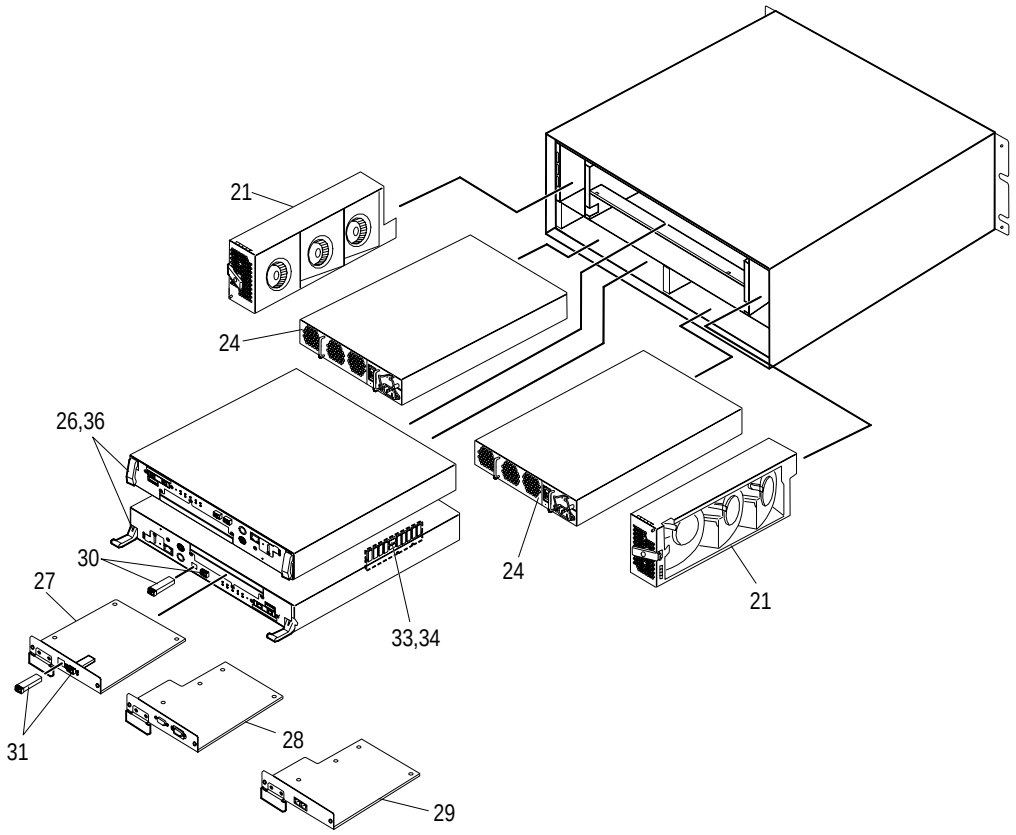
No.1-2 RKS (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF700-RKS		
5	3272219-A	CANISTER UNIT (DF-F700-AGF72)	2 to 15	SP, OP
6	3272219-B	CANISTER UNIT (DF-F700-AGH72)	2 to 15	SP, OP
7	3272219-C	CANISTER UNIT (DF-F700-AGF146)	2 to 15	SP, OP
8	3272219-D	CANISTER UNIT (DF-F700-AGH146)	2 to 15	SP, OP
9	3272219-E	CANISTER UNIT (DF-F700-AGF300)	2 to 15	SP, OP
10				
11				
12				
13				
14				
15	1508441-001	• DUMMY (DISK DRIVE)	0 to 13	
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17				
18	3272172-B	• BACKUP BATTERY UNIT	1(*1)	SP
19				
20				

*1 : BACKUP BATTERY UNIT is mounted of #0 only.

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No. 1-2 DF700-RKS

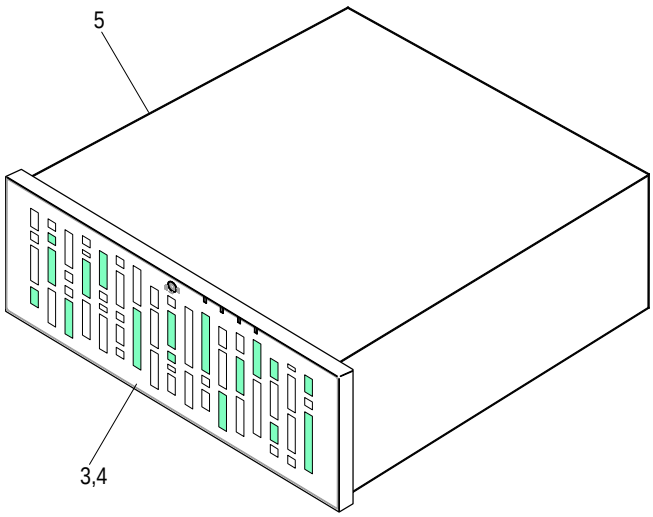


No.1-2 RKS (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF700-RKS		
21	3272172-C	• FAN ASSEMBLY	2	SP
22				
23				
24	3272172-A	• POWER UNIT	2	SP
25				
26	3272218-B	• CONTROL UNIT (RKS : DF-F700-F1JS)	1 to 2	SP, OP
27	3274812-A	•• FC Interface Board (HT-F4064-DJ4G2W)	1 to 2	SP, OP
28	3272218-E	•• NAS Interface Board	1 to 2	SP, OP
29	3272218-D	•• iSCSI Interface Board	1 to 2	SP, OP
30	3272218-G	Host Connector (2 G bps)	2 to 4	SP
31	3272218-H	Host Connector (4 G bps)	2 to 4	SP
32				
33	3272218-F	•• CACHE UNIT (DF-F700-C1GJ)	1 to 4	SP, OP
34	3272218-Q	•• CACHE UNIT (DF-F700-C2GJ)	1 to 2	SP, OP
35				
36	3266277-A	• DUMMY (CONTROL UNIT)	0 to 1	

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No. 1-3 DF700-RKXS

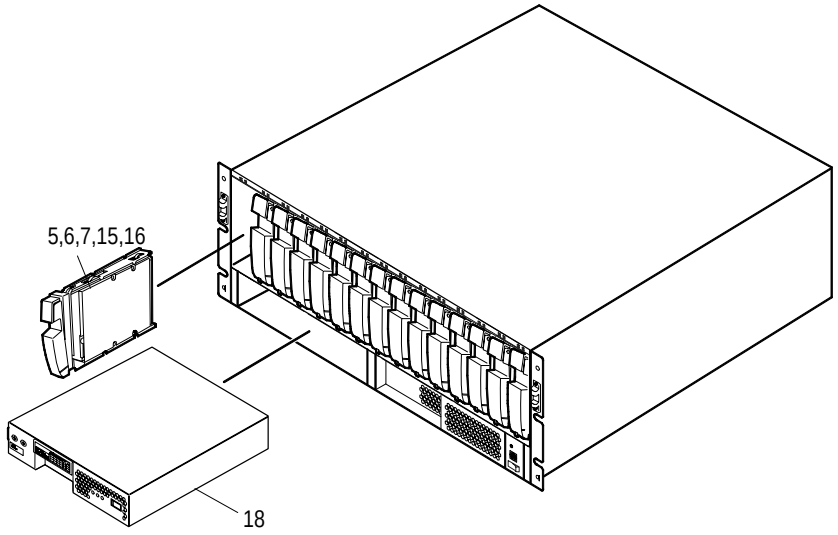


No.1-3 RKXS (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF700-RKXS		
1				
2				
3	3274852-A	• FRONT BEZEL (UBJ)	1	SP
4	3274849-C	• FRONT BEZEL (UBJHDSX)	1	SP
5		• EXCHANGE CHASSIS (RKXS)	1	

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No. 1-3 DF700-RKXS



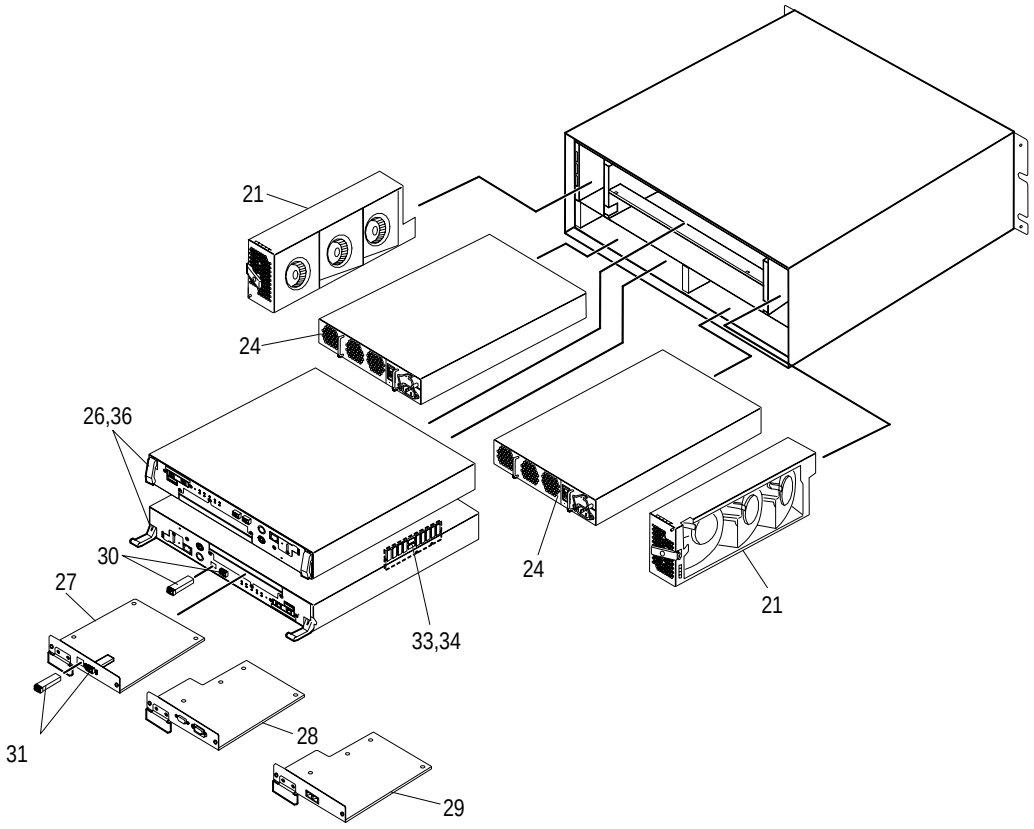
No.1-3 RKXS (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF700-RKXS		
5	3272215-A	CANISTER UNIT (DF-F700-ATE250R)	2 to 15	SP, OP
6	3272215-B	CANISTER UNIT (DF-F700-ATE400R)	2 to 15	SP, OP
7	3272215-E	CANISTER UNIT (DF-F700-ATE500R)	2 to 15	SP, OP
8				
9				
10				
11				
12				
13				
14				
15	1508441-001	• DUMMY (DISK DRIVE)	0 to 13	
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17				
18	3274576-A	• BACKUP BATTERY UNIT	1(*1)	SP
19				
20				

*1 : BACKUP BATTERY UNIT is mounted of #0 only.

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No. 1-3 DF700-RKXS

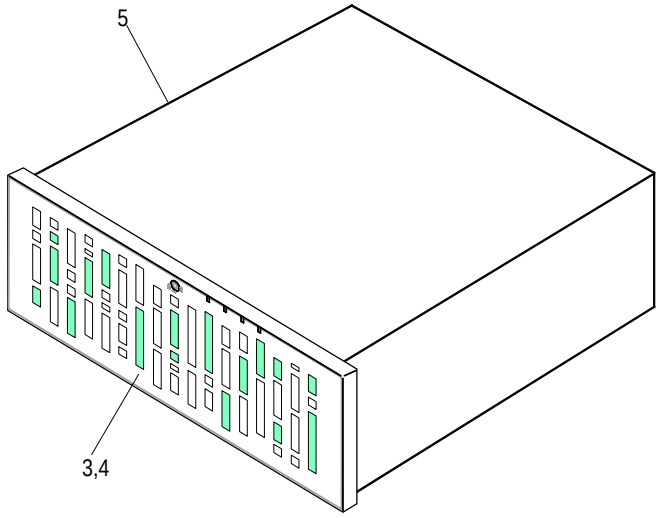


No.1-3 RKXS (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF700-RKXS		
21	3272172-C	• FAN ASSEMBLY	2	SP
22				
23				
24	3274575-A	• POWER UNIT	2	SP
25				
26	3274551-A	• CONTROL UNIT (RKXS : DF-F700-F1JS)	1 to 2	SP, OP
27	3274812-A	•• FC Interface Board (HT-F4064-DJ4G2W)	1 to 2	SP, OP
28	3272218-E	•• NAS Interface Board	1 to 2	SP, OP
29	3272218-D	•• iSCSI Interface Board	1 to 2	SP, OP
30	3272218-G	Host Connector (2 G bps)	2 to 4	SP
31	3272218-H	Host Connector (4 G bps)	2 to 4	SP
32				
33	3274559-A	•• CACHE UNIT (DF-F700-C512JX)	1-2	SP, OP
34	3272218-F	•• CACHE UNIT (DF-F700-C1GJ)	1-2	SP, OP
35				
36	3266277-A	• DUMMY (CONTROL UNIT)	0 to 1	

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No. 1-4 DF700-RKH/DF700-RKHE

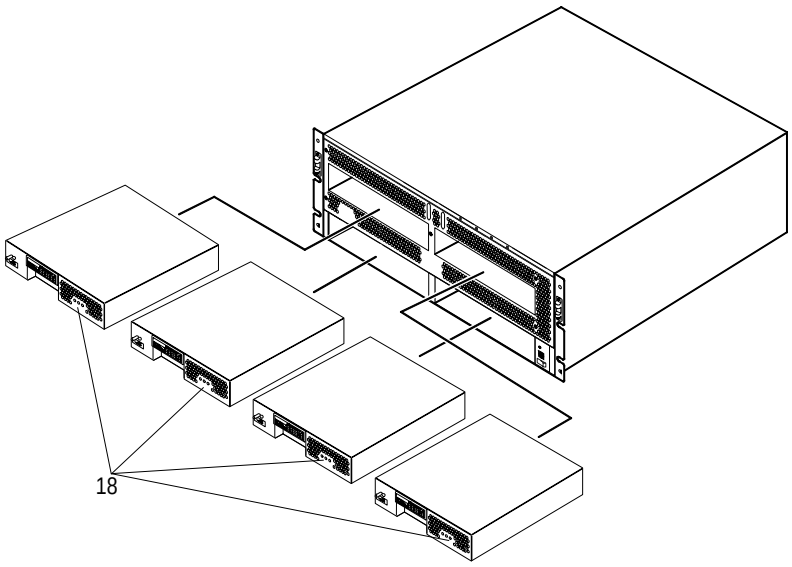


No.1-4 RKH/RKHE (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-4-		DF700-RKH/DF700-RKHE		
1				
2				
3	3274852-A	• FRONT BEZEL (UBJ)	1	SP
4	3274849-A	• FRONT BEZEL (UBJHDS)	1	SP
5		• EXCHANGE CHASSIS (RKH/RKHE)	1	

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No. 1-4 DF700-RKH/DF700-RKH



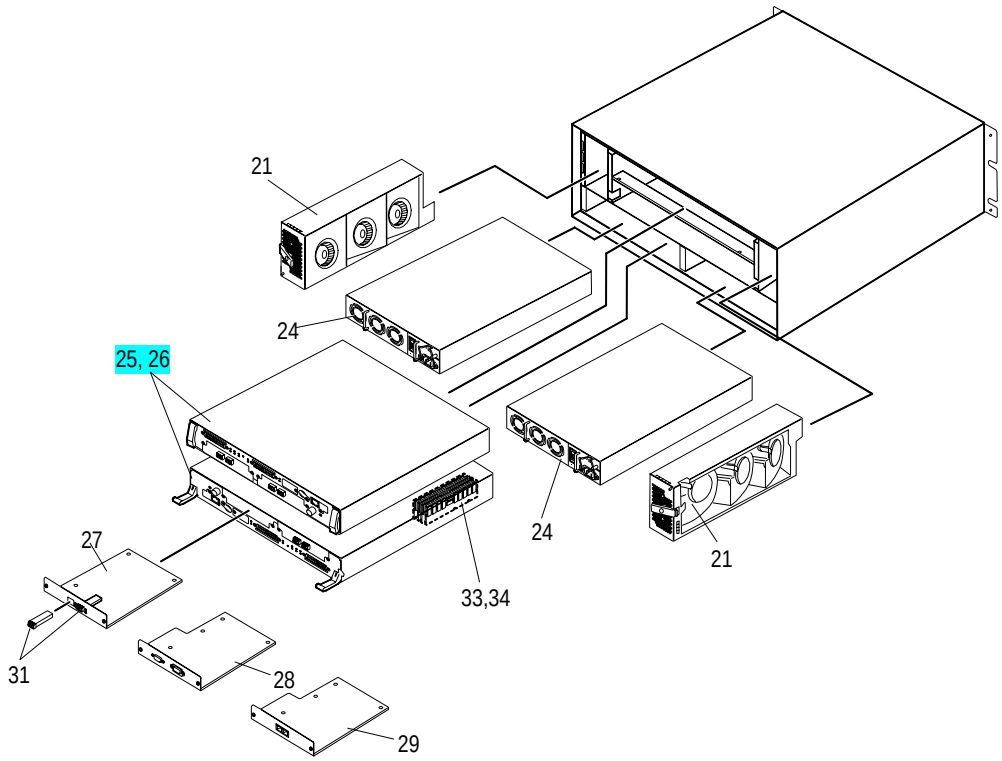
No.1-4 RKH/RKHE (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-4-		DF700-RKH/DF700-RKHE		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18	3274669-A	• BACKUP BATTERY UNIT	4	SP
19				
20				

*1 : BACKUP BATTERY UNIT is mounted of #0 only.

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No. 1-4 DF700-RKH/DF700-RKHE



No.1-4 RKH/RKHE (3)

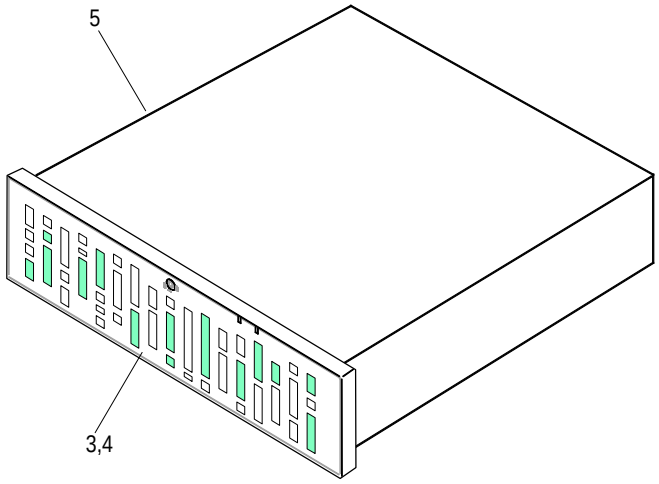
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-4-		DF700-RKH/DF700-RKHE		
21	3272172-C	• FAN ASSEMBLY	2	SP
22				
23				
24	3274575-A	• POWER UNIT	2	SP
25	3274670-A	• CONTROL UNIT (for RKH)	2	SP
26	3274922-A	• CONTROL UNIT (for RKHE)	2	SP
27	3274783-A	•• FC Interface Board	2 to 4	SP, OP
28	3274785-A	•• NAS Interface Board	2	SP, OP
29	3274784-A	•• iSCSI Interface Board	2	SP, OP
30				
31	3272218-H	Host Connector (4 G bps)	4 to 8	SP
32				
33	3272218-F	•• CACHE UNIT (DF-F700-C1GJ)	4 to 8	SP, OP
34	3272218-Q	•• CACHE UNIT (2 G bytes) (DF-F700-C2GJ)	4 to 8	SP, OP
35				
36				

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No. 1-5 DF700-RKAJ

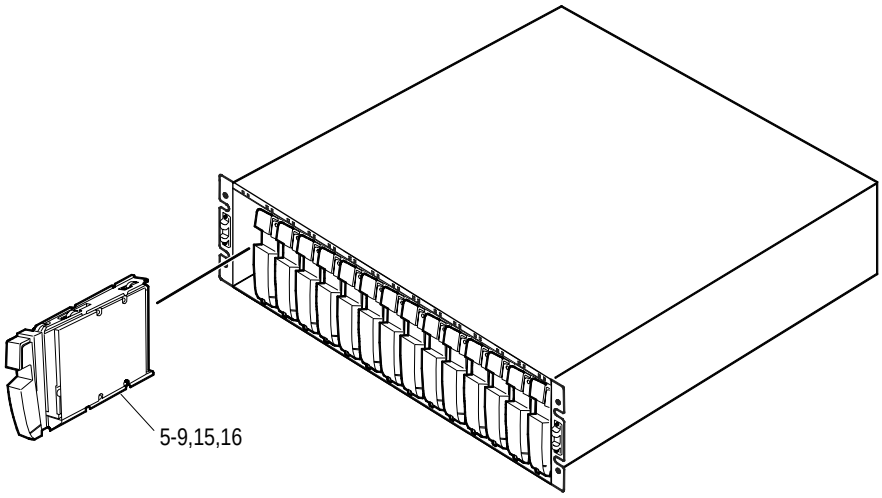


No.1-5 RKAJ (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF700-RKAJ		
1				
2				
3	3274515-B	• FRONT BEZEL (UBJA)	1	SP
4	3274849-B	• FRONT BEZEL (UBJHDSA)	1	SP
5		• EXCHANGE CHASSIS	1	

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No. 1-5 DF700-RKAJ

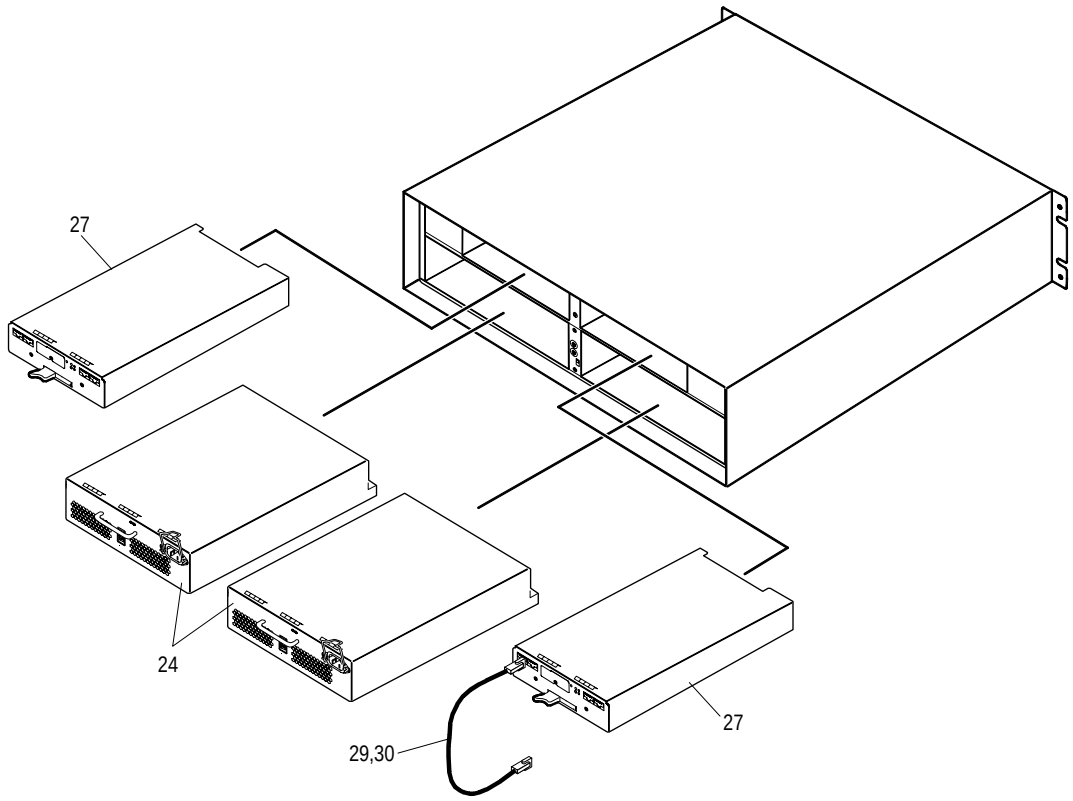


No.1-5 RKAJ (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF700-RKAJ		
5	3272219-A	CANISTER UNIT (DF-F700-AGF72)	2 to 15	SP, OP
6	3272219-B	CANISTER UNIT (DF-F700-AGH72)	2 to 15	SP, OP
7	3272219-C	CANISTER UNIT (DF-F700-AGF146)	2 to 15	SP, OP
8	3272219-D	CANISTER UNIT (DF-F700-AGH146)	2 to 15	SP, OP
9	3272219-E	CANISTER UNIT (DF-F700-AGF300)	2 to 15	SP, OP
10				
11				
12				
13				
14				
15	1508441-001	• DUMMY (DISK DRIVE)	0 to 13	
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

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No. 1-5 DF700-RKAJ



No.1-5 RKAJ (3)

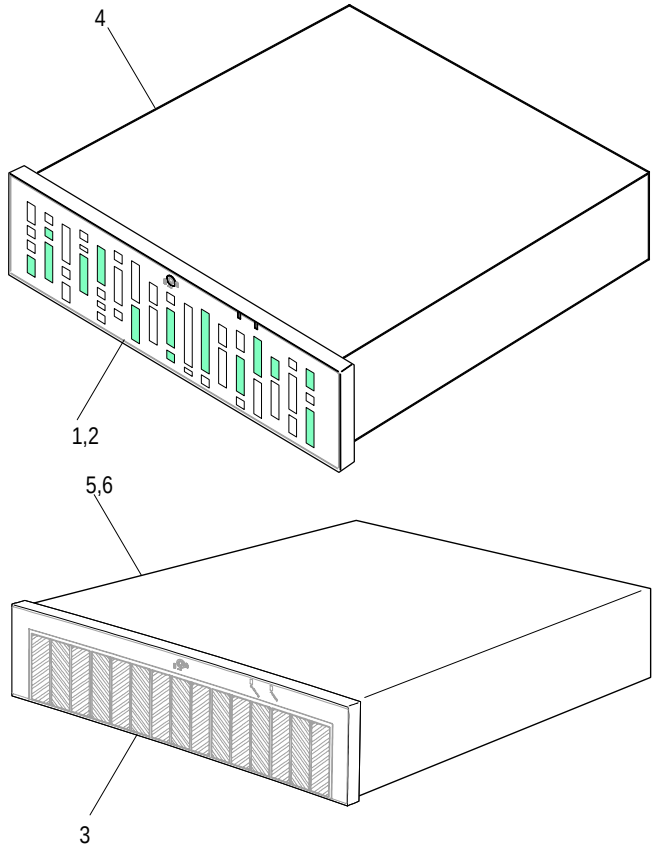
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF700-RKAJ		
21				
22				
23				
24	3272170-A	• POWER UNIT (RKAJ)	2	SP
25				
26				
27	3272170-B	• ENC UNIT	2	SP
28				
29	3272185-A	• ENC CABLE (1 m)	4	SP
30	3272185-K	• ENC CABLE (5 m) (DF-F700-K5B) (*1) (*2)	2	OP
31				
32				
33				
34				
35				

*1 : The ENC cable is manufactured by Hitachi, Ltd. It cannot be used for other products.

*2 : The ENC cable (5 m) can be used only for two places in the system.

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No. 1-6 DF700-RKAJAT/DF600-RKAJAT/DF600-RKAJATL

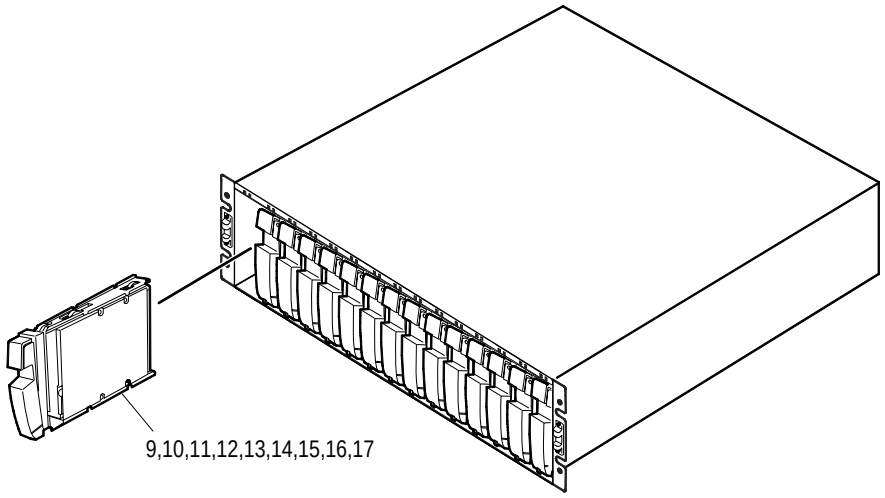


No.1-6 RKAJAT (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF700-RKAJAT DF600-RKAJAT DF600-RKAJATL		
1	3274515-B	• FRONT BEZEL (UBJA)	1	SP
2	3274849-B	• FRONT BEZEL (UBJHDSA)	1	SP
3	5507353-176	• FRONT BEZEL (DF600-RKAJAT/DF600-RKAJATL)	1	SP
4		• EXCHANGE CHASSIS (DF700-RKAJAT)	1	
5	5523443-D	• EXCHANGE CHASSIS (DF600-RKAJAT)	1	
6	5523231-34	• EXCHANGE CHASSIS (DF600-RKAJATL)	1	

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No. 1-6 DF700-RKAJAT/DF600-RKAJAT/DF600-RKAJATL

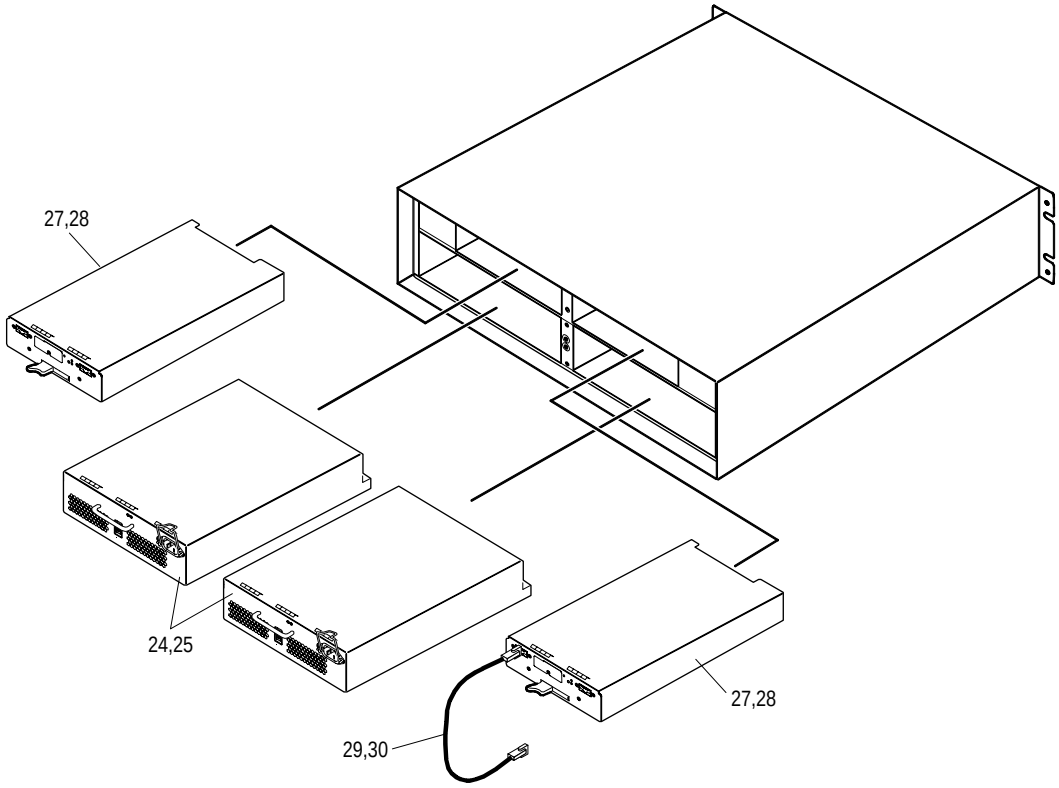


No.1-6 RKAJAT (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF700-RKAJAT DF600-RKAJAT DF600-RKAJATL		
7				
8				
9	3272215-A	CANISTER UNIT (245.7 G bytes) (DF-F700-ATE250R)	2 to 15	SP, OP
10	3272215-B	CANISTER UNIT (393.4 G bytes) (DF-F700-ATE400R)	2 to 15	SP, OP
11	3272215-E	CANISTER UNIT (491.9 G bytes) (DF-F700-ATE500R)	2 to 15	SP, OP
12	3272215-A	CANISTER UNIT (245.7 G bytes) (DF-F600-ATE250R)	2 to 15	SP, OP
13	3272215-B	CANISTER UNIT (393.4 G bytes) (DF-F600-ATE400R)	2 to 15	SP, OP
14	3272215-C	CANISTER UNIT (245.7 G bytes) (DF-F600-ATE250LR)	2 to 15	SP, OP
15	3272215-D	CANISTER UNIT (393.4 G bytes) (DF-F600-ATE400LR)	2 to 15	SP, OP
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17	1508441-001	• DUMMY (DISK DRIVE)	0 to 13	
18				
19				
20				

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No. 1-6 DF700-RKAJAT/DF600-RKAJAT/DF600-RKAJATL



No.1-6 RKAJAT (3)

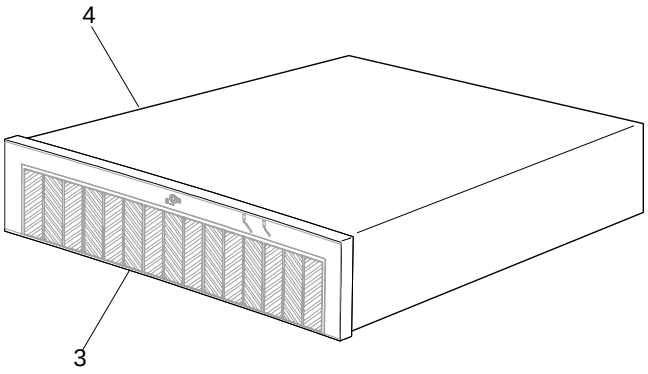
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF700-RKAJAT DF600-RKAJAT DF600-RKAJATL		
21				
22				
23				
24	3272170-A	• POWER UNIT (DF700-RKAJAT)	2	SP
25	3272170-A	• POWER UNIT (DF600-RKAJAT/DF600-RKAJATL)	2	SP
26				
27	3272170-C	• SENC UNIT (DF700-RKAJAT)	2	SP
28	3272170-C	• SENC UNIT (DF600-RKAJAT/DF600-RKAJATL)	2	SP
29	3272185-A	• ENC CABLE (1 m)	2	SP
30	3272185-K	• ENC CABLE (5 m) (DF-F700-K5B) (*1) (*2)	2	OP
31				
32				
33				
34				
35				

*1 : The ENC cable is manufactured by Hitachi, Ltd. It cannot be used for other products.

*2 : The ENC cable (5 m) can be used only for two places in the system.

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No. 1-7 DF600-RKA

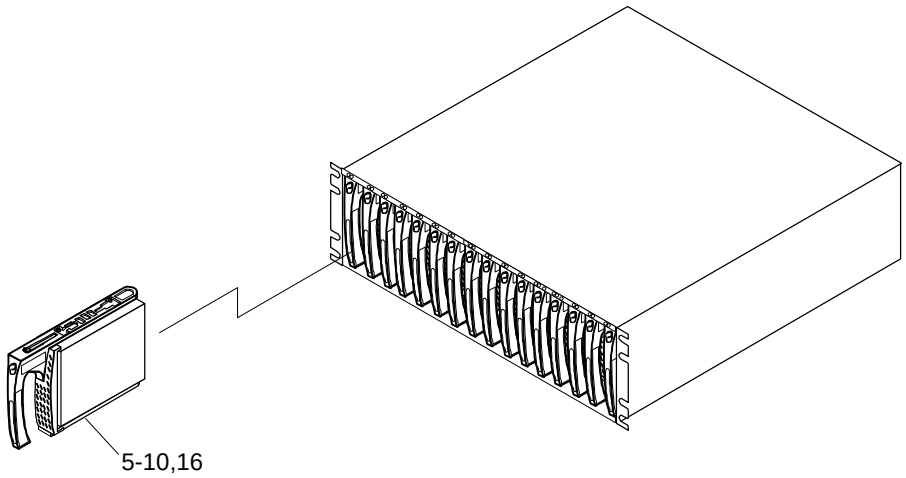


No.1-7 RKA (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKA		
1				
2				
3	5507353-134	• FRONT BEZEL	1	SP
4	5507353-36	• EXCHANGE CHASSIS	1	SP

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No. 1-7 DF600-RKA

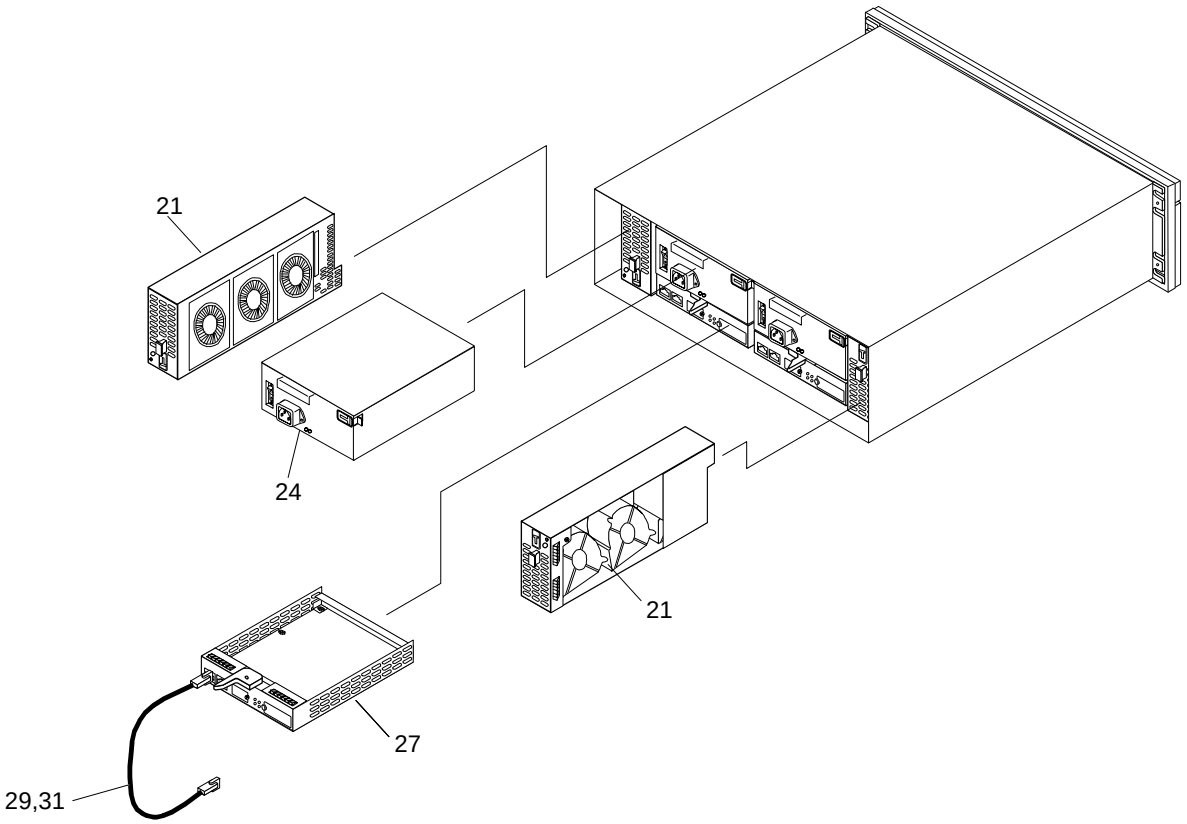


No.1-7 RKA (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKA		
5	5507353-1	CANISTER UNIT (DF-F600-AEH36)	2 to 15	SP, OP
6	5507353-2	CANISTER UNIT (DF-F600-AEF72)	2 to 15	SP, OP
7	5507353-3	CANISTER UNIT (DF-F600-AEH72)	2 to 15	SP, OP
8	5507353-4	CANISTER UNIT (DF-F600-AEF146)	2 to 15	SP, OP
9	5507353-5	CANISTER UNIT (DF-F600-AEH146)	2 to 15	SP, OP
10	5507353-79	CANISTER UNIT (DF-F600-AEF300)	2 to 15	SP, OP
11				
12				
13				
14				
15				
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 3	
17				
18				
19				
20				

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No. 1-7 DF600-RKA



No.1-7 RKA (3)

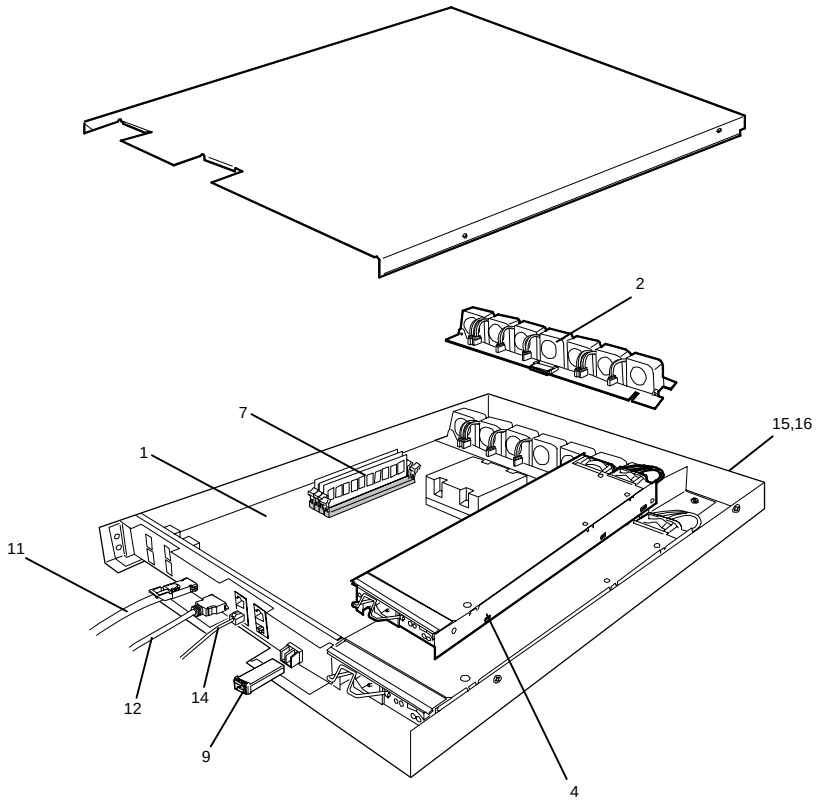
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKA		
21	5507353-14	• FAN ASSEMBLY	2	SP
22				
23				
24	5507353-7	• POWER UNIT (RKA)	2	SP
25				
26				
27	5507353-12	• ENC UNIT (DF-F600-Y1H)	2	SP
28				
29	5507353-15	• ENC CABLE (0.5 m) (*1)	4	SP
30				
31	5507353-55	• ENC CABLE (5 m) (DF-F600-K5B) (*1) (*2)	2	OP
32				
33				
34				
35				

*1 : The ENC cable is manufactured by Hitachi, Ltd. It cannot be used for other products.

*2 : The ENC cable (5 m) can be used only for two places in the system.

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No. 1-8 DF700-RKNAS

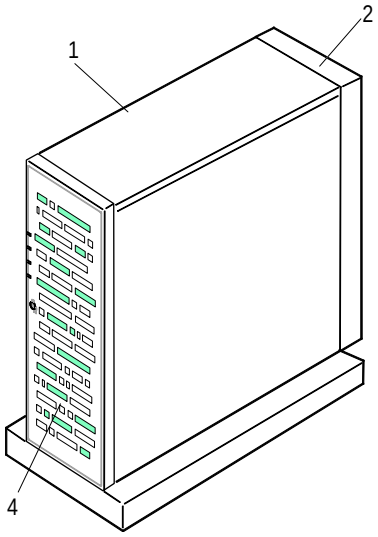


No.1-8 RKNAS (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-8-		DF700-RKNAS		
1	3274718-B	• NAS Chassis	1	SP
2	3274700-A	• FAN ASSEMBLY	1	SP
3				
4	3274667-B	• POWER UNIT (RKNAS)	1	SP
5				
6				
7	3274689-A	•• MEMORY (DIMM) (1 GByte)	1-4	SP
8				
9	3272218-G	• HOST CONNECTOR (2 G bps)	2	SP
10				
11	3274707-A	• NAS INTERFACE CABLE (PCI-Express)	1	SP
12	3274707-B	• NAS INTERFACE CABLE (CTRL)	1	SP
13				
14	3274707-C	• LAN CABLE	2	SP
15	3274717-A	• FRONT BEZEL (UBJN)	1	SP
16	3274717-B	• FRONT BEZEL (UBJHDSN)	1	SP

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No. 2-1 Floor (RKM+H1J) Model

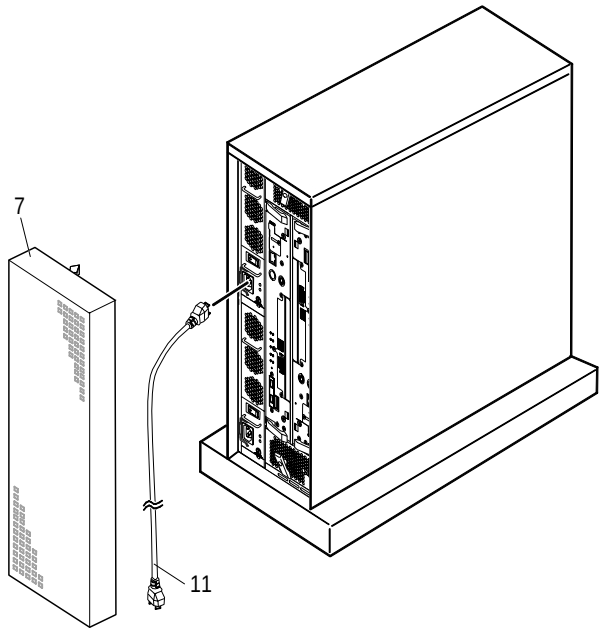


No.2-1 Floor (RKM+H1J) Model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-1-		Floor (RKM+H1J) model		Catalog No.2-1
1		FLOOR STAND KIT	1	
2		• REAR COVER	1	
3				
4		DF700-RKM	1	Catalog No.1-1
5				
6				

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No. 2-1 Floor (RKM+H1J) Model

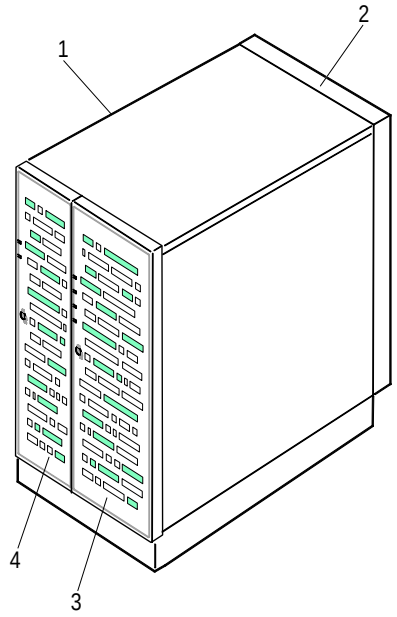


No.2-1 Floor (RKM+H1J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-1-		Floor (RKM+H1J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-2 Floor (RKM+RKAJ+H2J) Model

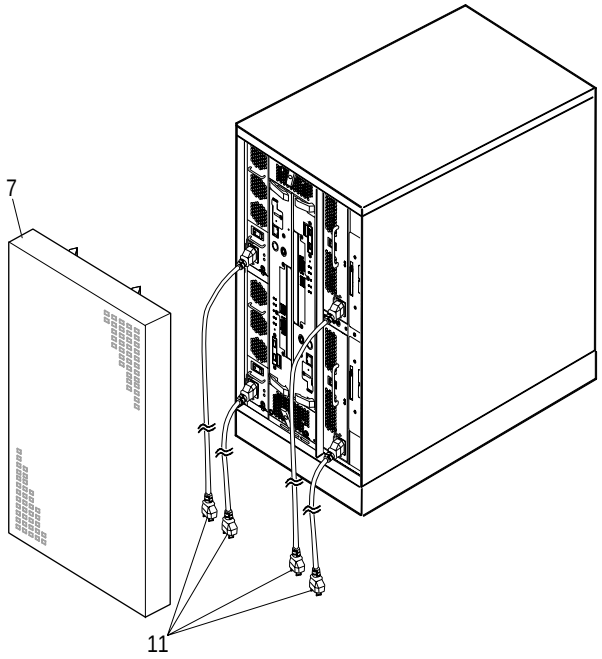


No.2-2 Floor (RKM+RKAJ+H2J) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-2-		Floor (RKM+RKAJ+H2J) Model		
1		FLOOR STAND KIT	1	
2		REAR COVER	1	
3		DF700-RKM	1	Catalog No.1-1
4		DF700-RKAJ	1	Catalog No.1-4

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No. 2-2 Floor (RKM+RKAJ+H2J) Model

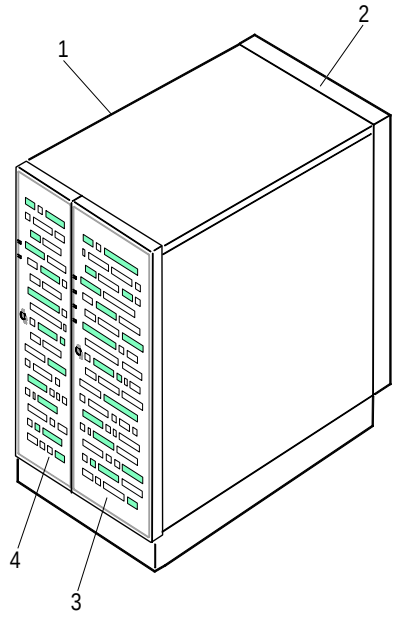


No.2-2 Floor (RKM+RKAJ+H2J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-2-		Floor (RKM+RKAJ+H2J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-3 Floor (RKM+RKAJAT+H2J) Model

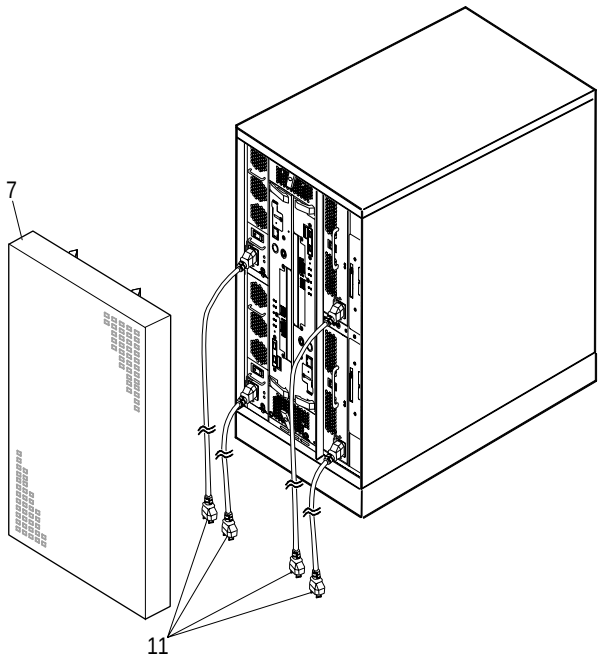


No.2-3 Floor (RKM+RKAJAT+H2J) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-3-		Floor (RKM+RKAJAT+H2J) Model		
1		FLOOR STAND KIT	1	
2		REAR COVER	1	
3		DF700-RKM	1	Catalog No.1-1
4		DF700-RKAJAT	1	Catalog No.1-6

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No. 2-3 Floor (RKM+RKAJAT+H2J) Model

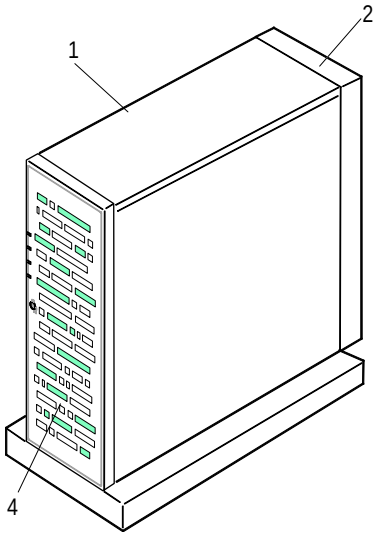


No.2-3 Floor (RKM+RKAJAT+H2J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-3-		Floor (RKM+RKAJAT+H2J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-4 Floor (RKS+H1J) Model

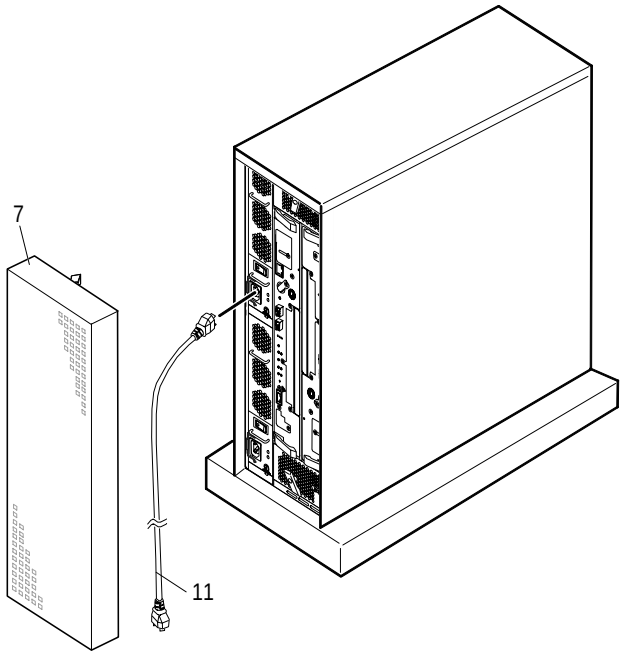


No.2-4 Floor (RKS+H1J) Model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-4-		Floor (RKS+H1J) model		Catalog No.1-2
1		FLOOR STAND KIT	1	
2		• REAR COVER	1	
3				
4		DF700-RKS	1	Catalog No.1-2
5				
6				

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No. 2-4 Floor (RKS+H1J) Model

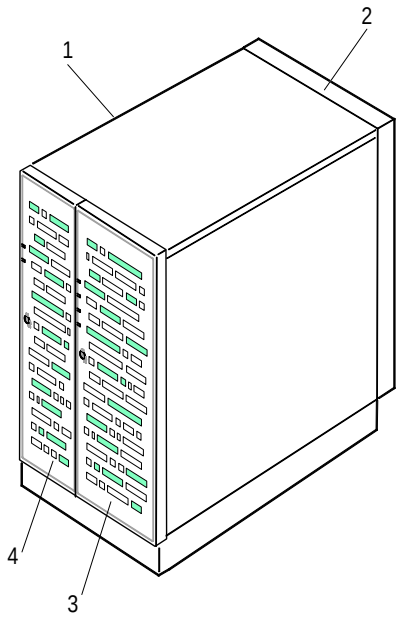


No.2-4 Floor (RKS+H1J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-4-		Floor (RKS+H1J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-5 Floor (RKS+RKAJ+H2J) Model

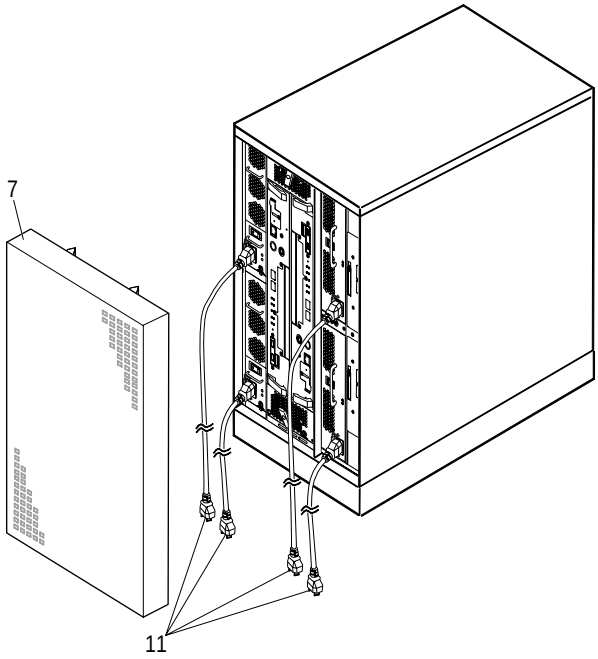


No.2-5 Floor (RKS+RKAJ+H2J) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-5-		Floor (RKS+RKAJ+H2J) Model		
1		FLOOR STAND KIT	1	
2		REAR COVER	1	
3		DF700-RKS	1	Catalog No.1-2
4		DF700-RKAJ	1	Catalog No.1-4

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No. 2-5 Floor (RKS+RKAJ+H2J) Model

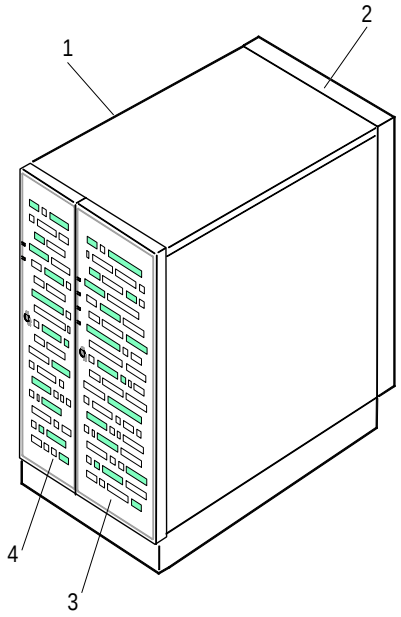


No.2-5 Floor (RKS+RKAJ+H2J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-5-		Floor (RKS+RKAJ+H2J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-6 Floor (RKS+RKAJAT+H2J) Model

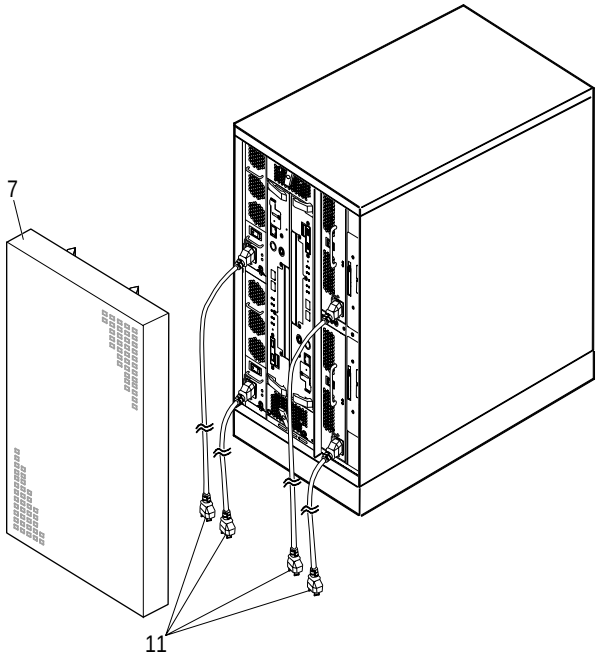


No.2-6 Floor (RKS+RKAJAT+H2J) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-6-		Floor (RKS+RKAJ+H2J) Model		
1		FLOOR STAND KIT	1	
2		REAR COVER	1	
3		DF700-RKS	1	Catalog No.1-2
4		DF700-RKAJAT	1	Catalog No.1-6

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No. 2-6 Floor (RKS+RKAJAT+H2J) Model

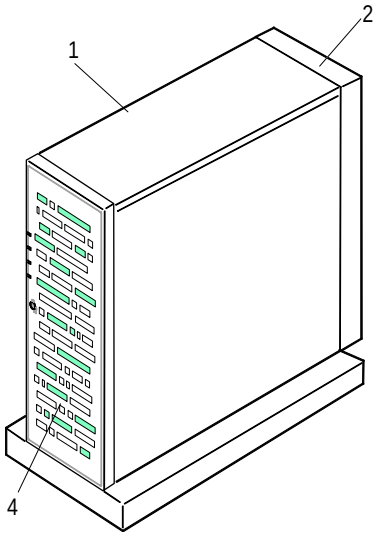


No.2-6 Floor (RKS+RKAJAT+H2J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-6-		Floor (RKS+RKAJAT+H2J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-7 Floor (RKXS+H1J) Model

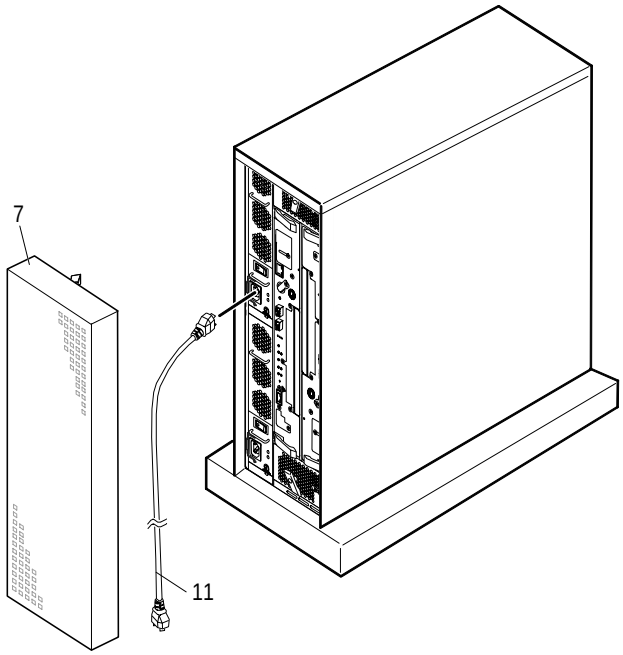


No.2-7 Floor (RKXS+H1J) Model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-7-		Floor (RKXS+H1J) model		Catalog No.1-3
1		FLOOR STAND KIT	1	
2		• REAR COVER	1	
3				
4		DF700-RKXS	1	Catalog No.1-3
5				
6				

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No. 2-7 Floor (RKXS+H1J) Model

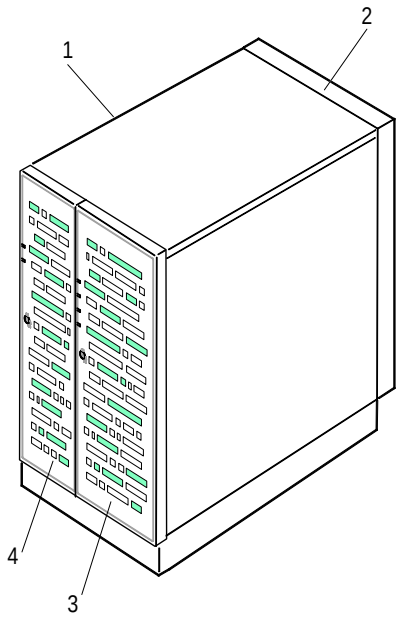


No.2-7 Floor (RKXS+H1J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-7-		Floor (RKXS+H1J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 2-8 Floor (RKXS+RKAJAT+H2J) Model

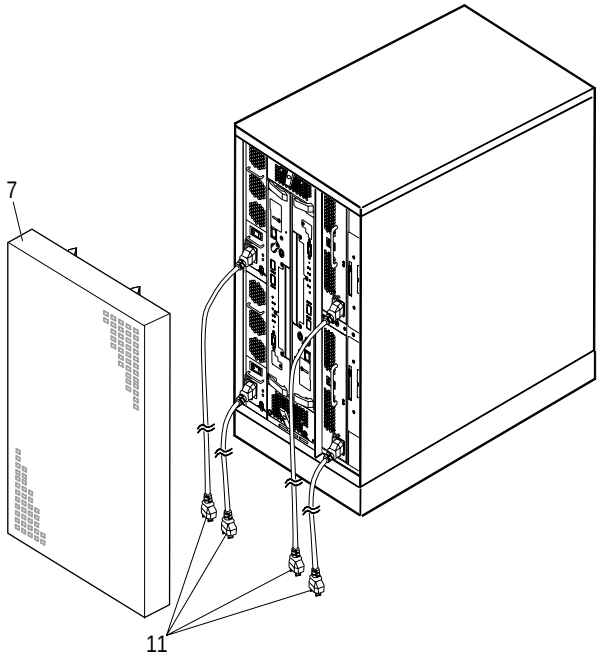


No.2-8 Floor (RKXS+RKAJAT+H2J) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-8-		Floor (RKS+RKAJ+H2J) Model		
1		FLOOR STAND KIT	1	
2		REAR COVER	1	
3		DF700-RKXS	1	Catalog No.1-3
4		DF700-RKAJAT	1	Catalog No.1-6

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No. 2-8 Floor (RKXS+RKAJAT+H2J) Model

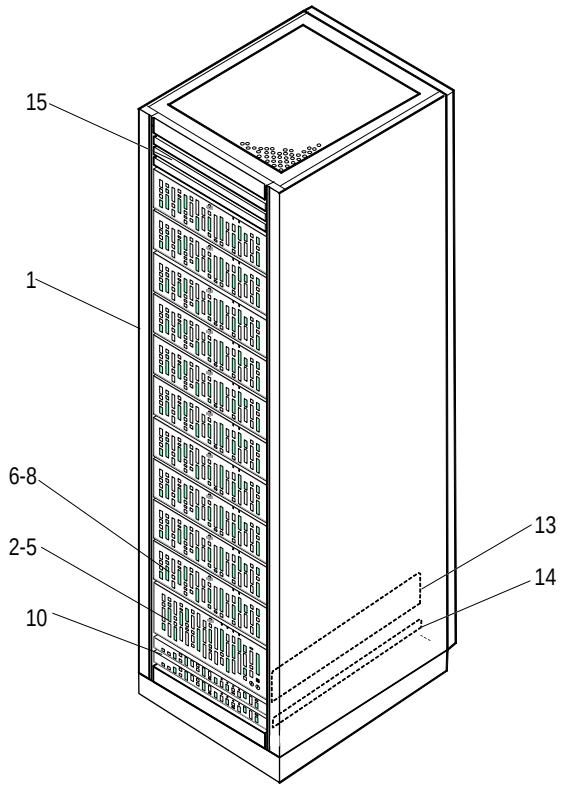


No.2-8 Floor (RKXS+RKAJAT+H2J) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-8-		Floor (RKXS+RKAJAT+H2J) Model		
7		• REAR COVER	1	
8				
9				
10				
11	3272181-A	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

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No. 3-1 Rackmount Model with U7 Rack Frame

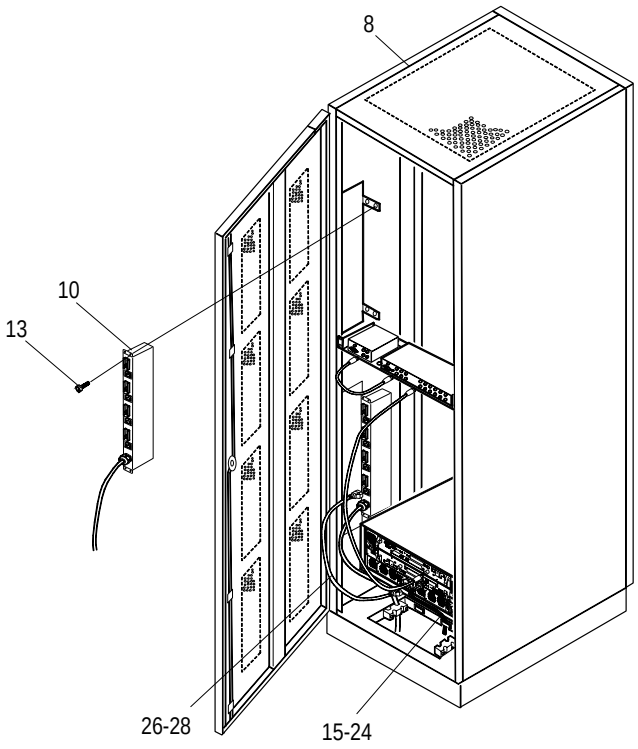


No.3-1 Rackmount Model with U7 Rack Frame (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-1-		U7 RACK FRAME		
1		DF-F700-U7	1	OP
2		DF700-RKM	1 to 6	Catalog No.1-1
3		DF700-RKS	1 to 9	Catalog No.1-2
4		DF700-RKXS	1 to 9	Catalog No.1-3
5		DF700-RKH	1 to 5	Catalog No.1-4
6		DF700-RKAJ	0 to 9	Catalog No.1-5
7		DF700-RKAJAT	0 to 9	Catalog No.1-6
8		DF600-RKA	0 to 9	Catalog No.1-7
9				
10		DF700-RKNAS	0 to 2	Catalog No.1-8
11				
12				
13	3272202-A	RAIL KIT (DF-F700-URHT7)	1-10	OP
14	3274777-A	RAIL KIT (DF-F700-URHTN7)	0-2	OP
15	3274544-A	DECORATION PANEL (DF-F700-U71D) (1U)	0 to 34	OP

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No. 3-1 Rackmount Model With U7 Rack Frame



No.3-1 Rackmount Model with U7 Rack Frame (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-1-		DF-F700-U7		
8		FINAL ASSY (U7)	1	
9				
10	3272222-A	• PDB	4	SP
11				
12				
13		• HEXAGON SOCKET BOLT (M5x8)	16	
14				
15	3272196-A	SC-LC Fibre I/F Cable for Optical (KB5MR : 5 m)	1	OP
16	3272196-B	SC-LC Fibre I/F Cable for Optical (KB10MR : 10 m)	1	OP
17	3272196-C	SC-LC Fibre I/F Cable for Optical (KB20MR : 20 m)	1	OP
18	3272196-D	SC-LC Fibre I/F Cable for Optical (KB50MR : 50 m)	1	OP
19	3272196-E	SC-LC Fibre I/F Cable for Optical (KB1HMR : 100 m)	1	OP
20	3272196-F	LC-LC Fibre I/F Cable for Optical (KC5MR : 5 m)	1	OP
21	3272196-G	LC-LC Fibre I/F Cable for Optical (KC10MR : 10 m)	1	OP
22	3272196-H	LC-LC Fibre I/F Cable for Optical (KC20MR : 20 m)	1	OP
23	3272196-J	LC-LC Fibre I/F Cable for Optical (KC50MR : 50 m)	1	OP
24	3272196-K	LC-LC Fibre I/F Cable for Optical (KC1HMR : 100 m)	1	OP
25				
26	3272181-A	AC Cable (J2H)	1	OP
27	3272181-B	AC Cable (J2H5)	1	OP
28	3272181-C	AC Cable (J2H10)	1	OP

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WEB

Chapter 1. Before Using Web ..... WEB 01-0000
Chapter 2. The Normal Mode Operation Procedure ..... WEB 02-0000
Chapter 3. The Maintenance Mode Operation Procedure ..... WEB 03-0000

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Chapter 1. Before Using Web

Precautions when restarting.

If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.

- The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  The path blockade automatically recovers after restarting.
- When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.

If the array subsystem is restarted unavoidably, restart it after the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is changed to PSUS.

If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

NOTE : When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then restart the subsystem.
If the spin-down fails, execute the spin-down again.

1.1 The Operating Environment

The operating environment where is able to use Web is shown below.

Table 1.1.1 Operating Environment

No.	Item	Description	Remark
1	OS	Microsoft Windows 98, NT 4.0, 2000, XP, 2003, Solaris8, IRIX6.5, AIX4.3, 5.1	—
2	PC	Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended)	—
3	WS	Turbo Sparc 170 M Hz, Memory 256 M bytes or more R10000 195 M Hz, Memory 128 M bytes or more	—
4	Disk requirement	• 60 M bytes, under ordinary maintenance work • 1.2 G bytes per one Controller, under Full Dump collection(*1) {Storing temporary file of Browser : 600 M bytes Storing Full Dump: 600 M bytes}	• Data compression tool is required for Full Dump. • Refer to "3.5.3 Collecting Full Dump" (WEB 03-0370) or "3.5.4 Collecting Full Dump (Full Dump(SnapShot/TCE))" (WEB 03-0400) for the capacity of Full Dump when it is uncompressed.

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*1 : Full Dump collection may be requested by the Technical Support Center at the time of a tough failure.

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1.2 Notices on (restriction of) the support browser

In the case of Windows2003, because the strict data security is the default setting, the Web function cannot work.
In order to solve the above problem, change the setting of the browser as follows.

- Select [Tools] - [Internet Options …] - [Security] - [Custom Level …] - [Custom Setting Reset] of the browser in this order and select the setting of the security level from Medium or lower and click the "Reset" button.

  The making of the setting as Medium solves the problem. However, if you want to use Win2003 leaving the security level as High, make the following settings for the detailed items of the [Custom Level …].
  - Enable the [Active scripting] of the [Scripting].
  - Enable the [Allow META REFRESH] of the [Miscellaneous].
  - Enable the [File download] of the [Downloads].
  - Enable the [Run ActiveX controls and plug-ins] of the [ActiveX controls and plug-ins].

- The WEB function operates normally in other Windows because the security level is being [Medium].
  However, set the following items in [Settings] of [Tools] - [Internet Options …] - [Security] - [Custom Level …] to [Enable].
  - Enable the [Active scripting] of the [Scripting].
  - Enable the [File download] of the [Downloads].
- There may be a case where a new line is started in a window depending on a setting of the browser. In such a case, make the character size smaller.

< Method of character size change >

In the case of IE

Select "Middle" or smaller size for the "Character Size" in the "Display".

In the case of Netscape

Select the "Reduction of Font Size" in the "Display" and keep it being selected until paragraphs become easy to be read.

- There may be a case where an empty dialogue box is displayed during operation in the Maintenance mode. In such a case, close the window by clicking on the mark of "X" in the upper left corner of the dialogue box, restart the browser, and then make a retry from the entry of the URL.
- When a window size is changed while a page is displayed by Netscape, the succeeding operation in the Refresh mode may not be done normally. In such a case, display the page over again by clicking the Re-Display button.
- In the case of using Netscape
  Memory cache: 1024 k bytes (default) or larger
  Disk cache: 7680 k bytes (default) or larger

< Method of cache size setting >

Select the "Edition", "Setting", "Details", and "Cache" in this order.
Specify sizes of the memory cache and disk cache.

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- When obtaining trace information etc. with Netscape, there are cases that a sub-screen to specify the file download destination does not automatically close.
  In such a case, press a close button at the upper right corner of the sub-screen to close the sub-screen after download complete.
- When using Netscape Navigator 7.x, select [Edit]-[Preference...]-[Advanced]-[HTTP Networking], and set "Use HTTP 1.0" in the "Direct Connection Options" and "Proxy Connection Options". When this setting is not made, the summary window is not displayed correctly.
- When collecting Full Dump using Netscape Navigator 4.7x, pay attention to free space in PC because information to be downloaded won't be compressed.

	Installed cache of the subsystem	Free Capacity needed on PC
RKM	1 G bytes (Minimum)	853 M bytes
	4 G bytes (Maximum)	2,970 M bytes
RKS	1 G bytes (Minimum)	720 M bytes
	2 G bytes (Maximum)	1,496 M bytes
RKXS	512 M bytes (Minimum)	405 M bytes
	1 G bytes (Maximum)	758 M bytes
RKH	2 G bytes (Minimum)	1,926 M bytes
	8 G bytes (Maximum)	5,820 M bytes

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1.3 The Characteristic of the Network Function

- LAN interface
  The connector for 10Base-T/100Base-TX is equipped with the Controller. 10Base-T/100Base-TX and half-duplex/full-duplex communication are selected automatically by the automatic negotiation function.

  NOTE : The fixed setting of the negotiation cannot be performed.
  Communicate by setting the device to be connected to the automatic negotiation.

- Network parameter
  The DF700 has the following network parameters, and the User management port of each Control Unit can be set or changed from the WEB browser or the Storage Navigator Modular.

Network parameter	Description	Values set when shipped from the factory				Remark
		Control Unit #0		Control Unit #1		
		Maintenance port < Fixed IP >	User management port <Variable IP>	Maintenance port < Fixed IP >	User management port <Variable IP>	
IP Address	The IP Address is changed/set up.	10.0.0.16	192.168.0.16	10.0.0.17	192.168.0.17	(*1)
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
Default Gateway	The Default Gateway is changed/set up.	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	
DHCP	Enable/Disable of the DHCP function is set up.	OFF	OFF	OFF	OFF	(*2)

*1 : The network connection is possible in the above IP Address (192.168.0.16) for the unchanging from the factory setting value. Please manage the IP Address after the change certainly, if the IP Address is changed from the IP Address of factory setting.

*2 : When DHCP mode is valid, IP address is obtained from the DHCP server.
When the DHCP server has not started up or DHCP function has been miss-set, obtaining the IP address fails and the device IP address remains to be "0.0.0.0". (Storage Navigator Modular or Web cannot be used via LAN.)
In this case, the device IP address can be obtained by starting up the DHCP server or setting DHCP function correctly if necessary.
In the configuration which uses this subsystem as an external disk drive of the DHCP server, when the IP address of this subsystem is acquired using the DHCP function, if the network address of the reserved IP address for the maintenance port is assigned as an IP address, the IP addresses of the port for the user control and the port for the maintenance may not operate normally because they compete.
Request the system administrator that the DHCP server does not assign IP address of "10.0.0.x", "192.168.0.x", "192.168.233.x", "172.23.211.x", "10.197.181.x" to the device.

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- Automatic change of network parameters of the Maintenance port (when the microgram revision is less than 0726/A)
  When setting the network parameters of the User management port, the IP address of the Maintenance port is automatically changed as shown below according to the IP address value of the User management port to be set.
  - When setting the User management port of CTL0 to 10.xxx.xxx.xxx, the Maintenance port of CTL0 is 192.168.0.16.
  - When setting the User management port of CTL0 to other than 10.xxx.xxx.xxx, the Maintenance port of CTL0 is 10.0.0.16.
  - When setting the User management port of CTL1 to 10.xxx.xxx.xxx, the Maintenance port of CTL1 is 192.168.0.17.
  - When setting the User management port of CTL1 to other than 10.xxx.xxx.xxx, the Maintenance port of CTL1 is 10.0.0.17.

- Manual change of network parameters of the Maintenance port (When the microprogram revision is 0726/A or more)
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.
  The following can be set as the fixed values of the network parameters used in the Maintenance port.
  - 10.0.0.xxx
  - 192.168.0.xxx
  - 192.168.233.xxx
  - 172.23.211.xxx
  - 10.197.181.xxx

  NOTE : • For the part of xxx, set 16 to CTL0 except when connecting the Maintenance port to the network (in that case, 17 is automatically set to CTL1).
  • However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
  If this is the case, set network address other than maintenance port in the LAN device which is connected via the Gateway in the extension of the User management port, or set maintenance port other than the network address of LAN device which is connected via the Gateway. (Refer to System Parameter "4.2 (4) Setting Maintenance of LAN"(SYSPR 04-0100).)

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- Automatic change of network parameters of the Maintenance port (when the microgram revision is 0735/B and the microprogram revision is 0740/B or more)
  When setting the network parameters of the User management port, if "Maintenance port IP address automatic change mode" is enabled, the IP address of the Maintenance port is automatically changed as shown below according to the IP address value of the User management port to be set.
  - When setting the User management port of CTL0 to 10.xxx.xxx.xxx, the Maintenance port of CTL0 is 192.168.0.16.
  - When setting the User management port of CTL0 to other than 10.xxx.xxx.xxx, the Maintenance port of CTL0 is 10.0.0.16.
  - When setting the User management port of CTL1 to 10.xxx.xxx.xxx, the Maintenance port of CTL1 is 192.168.0.17.
  - When setting the User management port of CTL1 to other than 10.xxx.xxx.xxx, the Maintenance port of CTL1 is 10.0.0.17.

  When "Maintenance IP address automatic change mode" is disabled, it becomes the same operational specification as the manual change of the network parameters of the Maintenance port.

  NOTE : However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
  If this is the case, set network address other than maintenance port in the LAN device which is connected via the Gateway in the extension of the User management port, or set maintenance port other than the network address of LAN device which is connected via the Gateway. (Refer to System Parameter "4.2 (4) Setting Maintenance of LAN"(SYSPR 04-0100).)

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1.4 Support Browser List

Table 1.1.2 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		Supported or not supported	Java Applet supported or not supported (*2) (*3)
		Type	Ver.	Type	Ver.(*1)		
1	WS	IRIX	6.5	Netscape Navigator	4.76	○	×
		Solaris	2.6	Netscape Navigator	4.76	○	×
			8	Netscape Navigator	4.76	○	×
		AIX (*4)	4.3	Mozilla (*4)	1.5	○	×
			5.1	Mozilla (*4)	1.7	○	×
2	PC	Windows	98	Internet Explorer	6.0	○	○
			NT/2000	Internet Explorer	6.0	○	○
			XP	Internet Explorer	6.0	○	×
			2003 (IA32)	Internet Explorer	6.0	○	○
			2003 (IA64)	Internet Explorer	6.0	○	×
					6.0 (32 Bit)	○	○
		Windows	98	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×
			NT/ 2000/XP	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×
			2003 (IA32/IA64)	Netscape Navigator	7.1 (J)	○	×
					7.2 (E)	○	×

*1 : Service Pack 1 is included.

*2 : When installing the microprogram, the Maintenance PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.

*3 : Java Applet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

*4 : It supports from the microprogram revision 0720/A-S.

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Chapter 2. The Normal Mode Operation Procedure

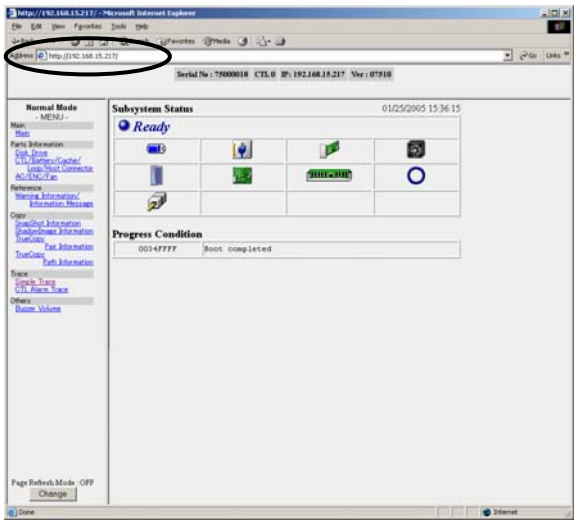
2.1 Transferring to the Normal Mode

For entering Normal mode, input IP address of Maintenance LAN connecter to which the LAN cable is connected into the [address] window of Web Browser.

Under dual system configuration, input one of IP addresses of LAN-Connecter for maintenance. The status of the devices (both Controllers) can be monitored from one controller.
If it is connected, the next screen is displayed.

NOTE : • Set the TCP/IP to "Disable DNS" because the connection takes a long time when the TCP/IP of the network is set to the condition in which the DNS is used. For the setting procedure, refer to the instruction manual of the PC to be used.

• Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used.



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2.2 Screen Outline

If the function of the Normal Mode is shown with the menu form and clicked, the proper function is executed. The main screen outline of the Normal Mode is shown below. Window display differs depending on microprogram revision.

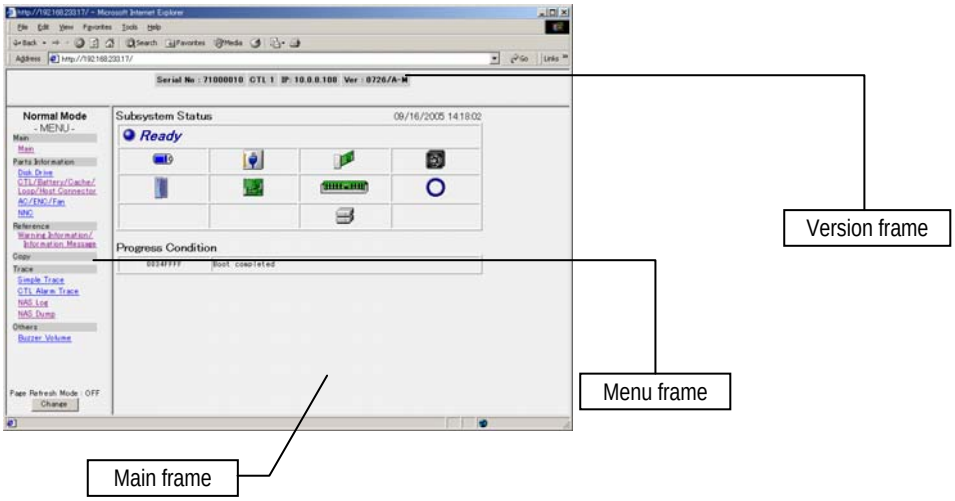


Figure 2.2.1 Main screen outline of the Normal Mode

(1) Version frame

- Web Title

  A Web title set by a user is displayed as it is. When it is not set, nothing is displayed.
- Serial No

  The subsystem serial number is shown.
- CTL

  Shows the number of the Controller to which the Web is connected.
- IP

  The IP Address of the controller where it was connected is shown.
- Ver

  The version of the Microprogram of the device is shown.

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(2) Menu frame

If the function of the Normal Mode is displayed with the menu frame and clicked, the proper function is executed.

- Main
  The Main screen of the Normal Mode is displayed.
- Parts Information
  The status of the exchange parts is displayed.
- Warning Information
  The fault information that was detected during the status of the device information are displayed.
- Information Message
  The fault information that was detected during the device operation and the status of the device information are displayed.
- Simple Trace
  A window for collecting the Simple trace is displayed.
- CTL Alarm Trace
  A window for collecting the CTL Alarm trace is displayed.
- NAS Log
  The window collecting the NAS Log is displayed.
- NAS Dump
  The window generating the NAS Dump is displayed.
- Buzzer Volume
  The screen that the Buzzer Volume is set up is displayed.
- Page Refresh Mode
  The mode for setting turning on or off of the automatic display function is displayed.
  When the [Change] button is clicked, the mode is changed to on or off.
  As the [OFF] display : This is not refreshed.
  As the [ON] display : The screen of the mainframe is refreshed every 5 seconds.
  The time of the latest refreshment (RTC) is displayed in the upper right part of the main frame.

NOTE : When the PC enters the suspension status during operation while the Page Refresh Mode is set to [ON], the Web may not operate correctly after the PC is released from the suspension status.
In the case where the Web is connected for the purpose of status monitoring, etc., set the power management of the PC so that the PC should not enter the suspension status.

(3) Main frame

- Subsystem Status
  The status of the device and the status of the exchange parts are displayed.
- Progress Condition
  The Progress Condition as the device booting is displayed.

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2.3 Main Screen of the Normal Mode

The main screen of the Normal Mode is consisted of the Patrol Lamp, the summary of exchange parts status, the Progress Condition display box.

The Patrol Lamp shows the status of subsystem.

The “summary of exchange parts status” notifies replacement parts errors by turning the parts in red.
If the image of the part is clicked, the details information of the proper part are displayed.

The Main screen of the Normal Mode is shown below.

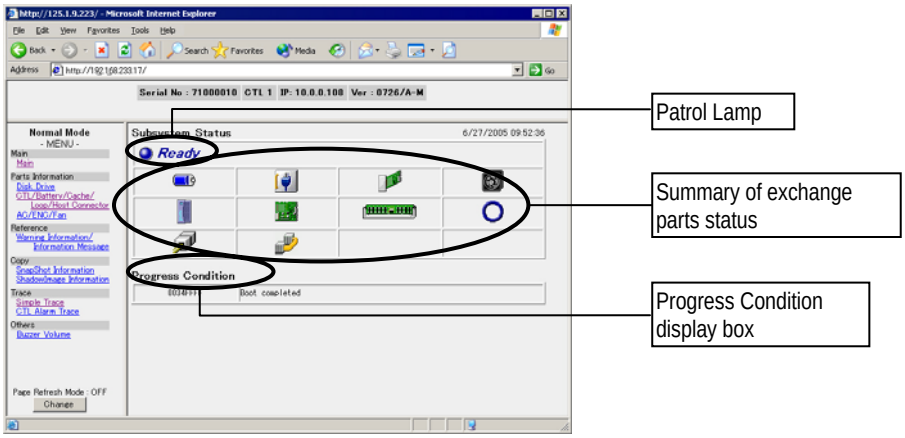


Figure 2.3.1 Main screen of the Normal Mode

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(1) Patrol Lamp

Monitoring the device, the status is displayed. The Status of the Patrol Lamp is shown below

Image	Status
Booting... Black	• During the start
Ready Blue	• Normal
Warning Yellow	• Warning status
Alarm Red	• Alarm status

(2) Display of Progress Condition

The Progress Condition as the device booting is displayed.

(3) Summary of Exchange Parts Status

The condition of the exchange parts is displayed. If the image of the part is clicked, the details of the proper part are displayed. The status of each exchange part is shown below.

Backup Battery Unit

Image	Status
 Blue	• Normal
 Red	• Backup Battery Unit error

Power Unit

Image	Status
 Blue	• Normal
 Red	• Power Unit error

ENC Unit

Image	Status
 Green	• Normal
 Red	• ENC Unit error

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SENC Unit

Image	Status
 Green	• Normal
 Red	• SENC Unit error

Fan Assembly

Image	Status
 Black	• Normal
 Red	• Fan Assembly error

Disk Drive (FC)

Image	Status
 Blue	• Normal
 Red	• Disk Drive error

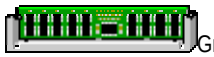
Disk Drive (SATA)

Image	Status
 Blue	• Normal
 Red	• Disk Drive error

Control Unit

Image	Status
 Green	• Normal
 Red	• Control Unit error

Cache Unit

Image	Status
 Green	• Normal
 Red	• Cache Unit error

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Fibre Loop

Image	Status
 Blue	• Normal
 Red	• Fibre Loop error

Path Loop

Image	Status
 Orange	• Normal
 Red	• Path Loop error
 Red	• Fibre Loop error

Host Connector

Image	Status
 Gray	• Normal
 Red	• Host Connector error

Remote Path

Image	Status
 Gray	• Normal
 Red	• Remote Path error

NNC (NAS Unit)

Image	Status
 Gray	• Normal
 Red	• NNC error

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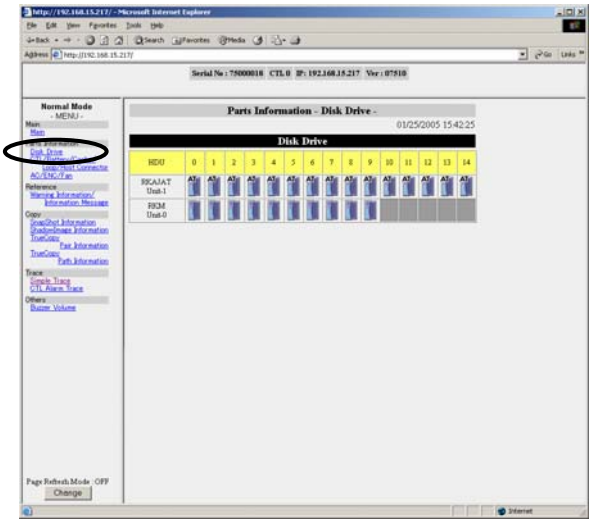
2.4 Display of Exchangeable Parts Status (Parts Information)

(1) Checking the status through an image

The display screen of exchange part status displays the status of the Disk Drive, Control Unit, Cache Unit, Fan Assembly, Backup Battery Unit, Power Unit, ENC Unit (SENC Unit), Fiber Loop, NNC (NAS Unit) that are implemented. Furthermore, this is not displayed, if it is not implemented.

Also, the exchange part of abnormal status displays a red image. The Parts Information screen is shown below.

(a) Disk Drive

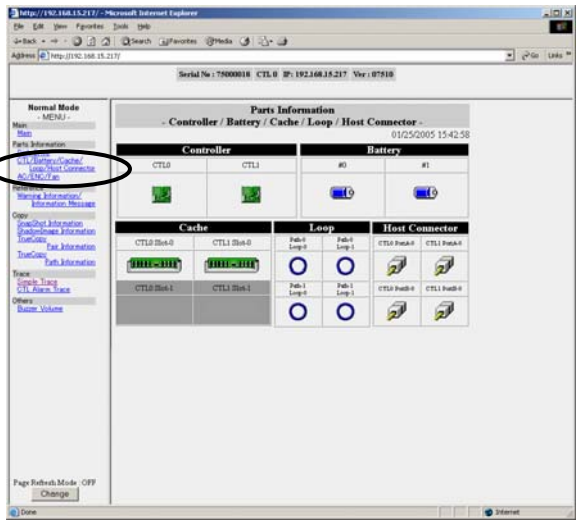


• Disk Drive

Image		Status
Disk Drive (FC)	Disk Drive (SATA)	
Blue	Blue	• Normal
Red	Red	• Fault has occurred to the Disk Drive
Red and Black	Red and Black	• Disk Drive port that the fault occurred is not implementing the Disk Drive
No display		• Disk Drive is not implemented (Except for the status where the Disk Drive that the fault occurred was drawn out)

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(b) CTL/Battery/Cache/Loop/Host Connector



• Control Unit

Image	Status
Green	• Normal
Red	• Shutdown of the Control Unit (Status where it is not implemented with the setting of the dual system configuration is included)
Yellow	• Fault of the battery backup circuit
No display	• Even the fault has not occurred without being implemented with the setting of single system configuration

• Backup Battery Unit

Image	Status
Green	• Normal
Red	• There is a fault or not implemented

• Cache Unit

Image	Status
Green	• Normal
Red	• Fault (Status where is not implemented and extracted the fault cache memory is included)
No display	• It is not implemented and there is not a fault

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• Loop

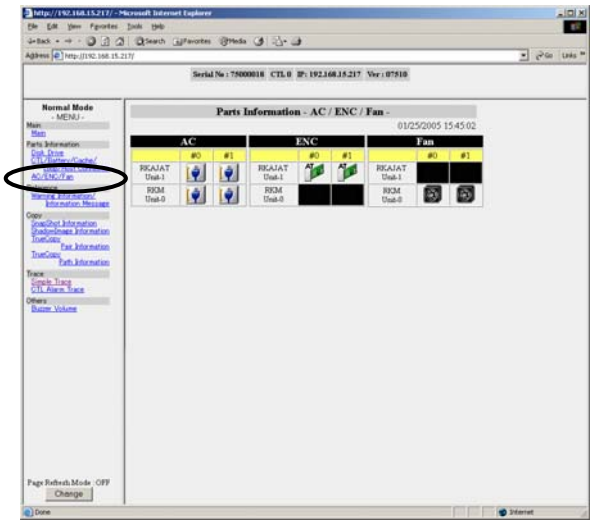
Image	Status
 Blue	• Normal
 Red	• Fault

• Host Connector

Image	Status
 Gray	• Normal
 Red	• Fault

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(c) AC/ENC/Fan



• Power Unit

Image	Status
Blue	• Normal
Red	• It is fault occurred or not implemented

• ENC Unit

Image		Status
ENC Unit	SENC Unit	
Green	Green	• Normal
Red	Red	• It is fault occurred or not implemented

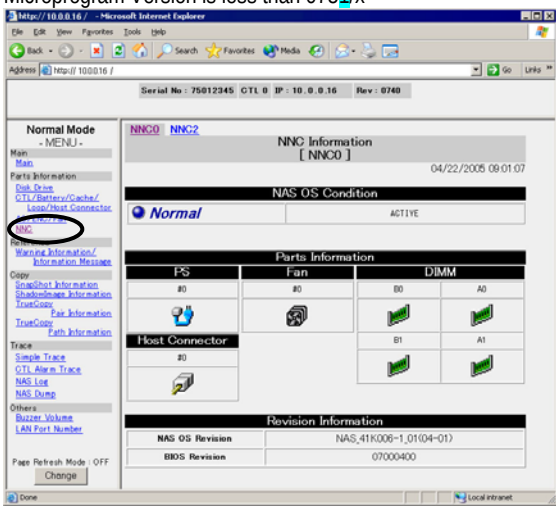
• Fan Assembly

Image	Status
Black	• Normal
Red	• There is a fault or not implemented

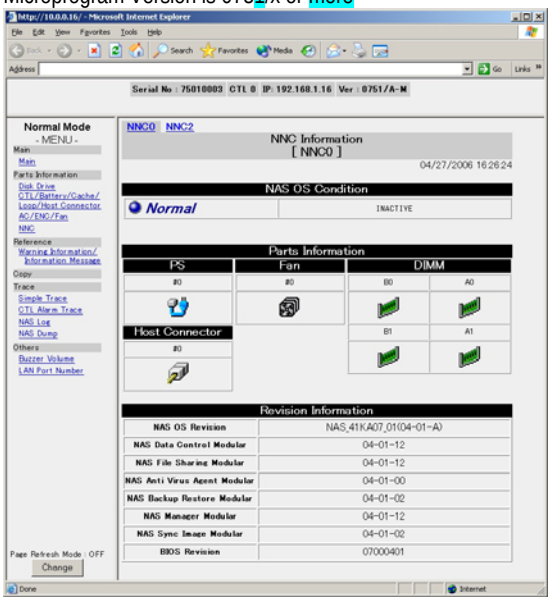
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(d) NNC (NAS Unit)

Microprogram Version is less than 0751/x



Microprogram Version is 0751/x or more



• NAS OS Condition (Patrol Lamp)

Image	Status
Normal Blue	• Normal
Warning Yellow	• Warning status
Alarm Red	• Alarm status

• NAS OS Condition (Status Display)

Image	Status
NEW	• The NAS OS is not installed.
INST	• The NAS OS is in installation process.
ACTIVE	• The NAS OS is in operation and the Node is in operation.
STOP	• The NAS OS is normally stopped
DOWN	• The NAS OS is abnormally stopped
BOOT	• The NAS OS is in start process.
SHUTDOWN	• The NAS OS is in stop process.
INACTIVE	• The NAS OS is in operation and the Node is stopped.
DUMP	• A NAS Dump is being collected.
HUNGUP	• The NAS OS is hung-up.
WARN	• The NAS Manager is not installed, or the NAS OS is in operation and the status of the Node is unknown.
DISUSE	• The Control Unit is blocked, so the NAS OS of the NNC concerned cannot be used. (*1)

*1 : It is necessary to recover the blocked status of the Control Unit connected to the NAS Unit on the side where "DISUSE" is displayed.

• Host Connector

Image	Status
Gray	• Normal
Red	• There is a fault or not implemented

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• DIMM

Image	Status
 Green	• Normal
 Red	• There is a fault or not implemented

• PS

Image	Status
 Blue	• Normal
 Red	• There is a fault or not implemented

• Fan

Image	Status
 Black	• Normal
 Red	• There is a fault or not implemented

• Revision Information

① [NAS OS Revision] : A NAS OS Revision can be displayed.
② [NAS Data Control Modular] : A NAS Data Control Modular can be displayed.
③ [NAS File Sharing Modular] : A NAS File Sharing Modular can be displayed.
④ [NAS Anti Virus Agent Modular] : A NAS Anti Virus Agent Modular can be displayed.
⑤ [NAS Backup Restore Modular] : A NAS Backup Restore Modular can be displayed.
⑥ [NAS Manager Modular] : A NAS Manager Modular can be displayed.
⑦ [NAS Sync Image Modular] : A NAS Sync Image Modular can be displayed.
⑧ [BIOS Revision] : A BIOS Revision can be displayed.

Microprogram Version is 0735/x or less.

Revision Information	
NAS OS Revision	04-00-04
BIOS Revision	07000400

Microprogram Version is 0740/x or more.
Microprogram Version is less than 0751/x.

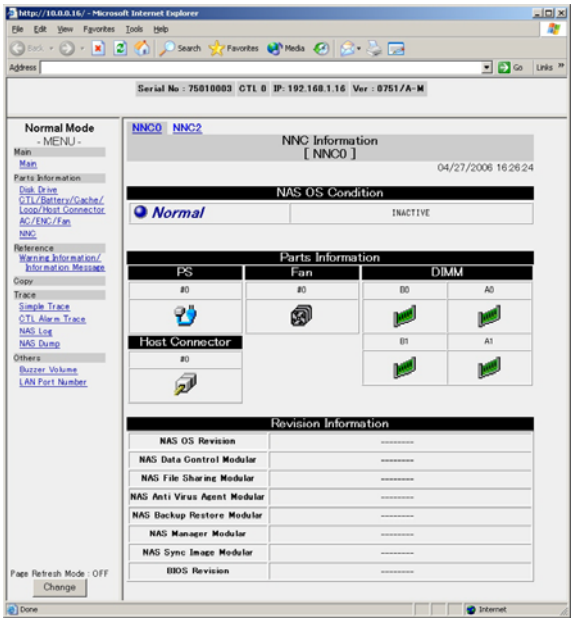
Revision Information	
NAS OS Revision	NAS_41K008-1_01(04-01)
BIOS Revision	07000400

Microprogram Version is 0751/x or more.

Revision Information	
NAS OS Revision	NAS_41KA07_01(04-01-A)
NAS Data Control Modular	04-01-12
NAS File Sharing Modular	04-01-12
NAS Anti Virus Agent Modular	04-01-00
NAS Backup Restore Modular	04-01-02
NAS Manager Modular	04-01-12
NAS Sync Image Modular	04-01-02
BIOS Revision	07000401

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When the NAS OS is uninstalled (NEW), being installed (INST), in the middle of the start processing (BOOT), or the NAS OS installation fails, the following window is displayed.

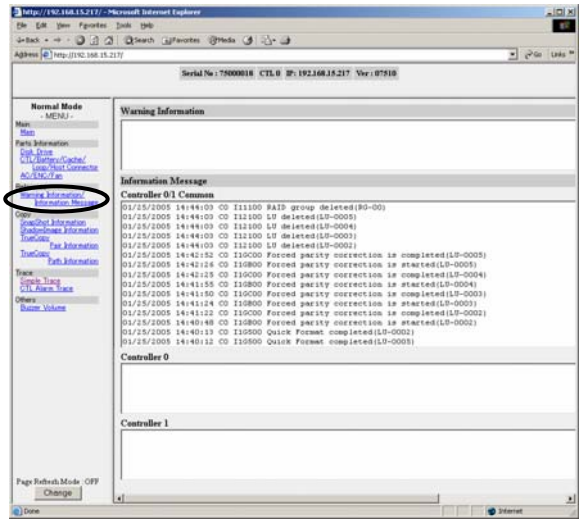


(2) Procedure of the Status checking by messages

A warning message about the failed part is displayed.

Refer to Troubleshooting “4.3 Confirm log messages” (TRBL 04-0100) for the details of the warning messages.

When checking the status of a component through a message, a clicking on the “Warning Information” of the menu frame in the main window changes the screen to the one shown below and a detailed message explaining the component status is displayed.



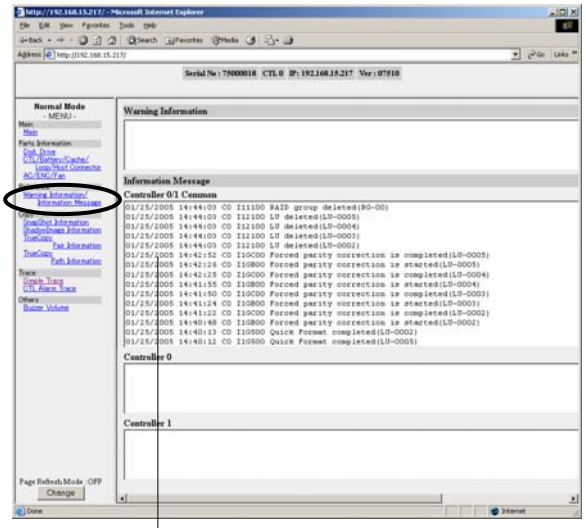
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2.5 Information Message

The fault information and status information of the device that detected it in during the device operation are displayed.

The fault information and status information after the device booting are displayed in the Controller 0/1 Common box.
The fault information and status information as the device booting are displayed in the box of Controller 0 and Controller 1 every the controller.

The Information Message screen is shown below.



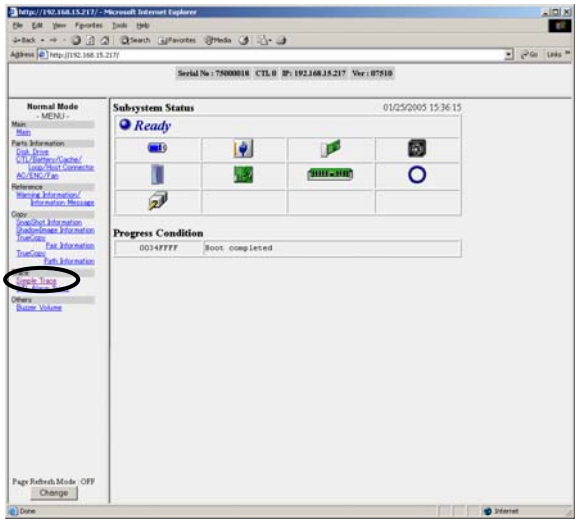
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2.6 Collecting Simple Trace

This is a function to download current trace information.
To perform the down-lord, a free capacity of approximately 30 Mbytes is required in the PC.

Simple Trace of both the Control Units can be collected through one Control Unit.
It is not necessary to collect from both the controllers. (When it is collected from Control Unit #0, File name is "smpl_trc0.dat". When collected from Control Unit #1, file name is "smpl_trc1.dat.")

(1) Click "Simple Trace" in the menu frame.



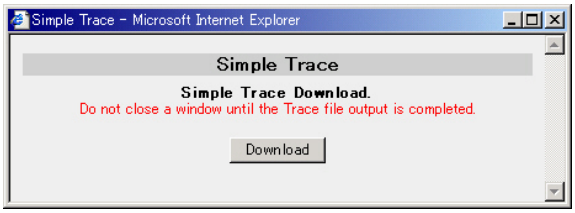
(2) When the "Simple Trace" is clicked, the following window is displayed.



(3) When the [OK] button is clicked, the following window is displayed.

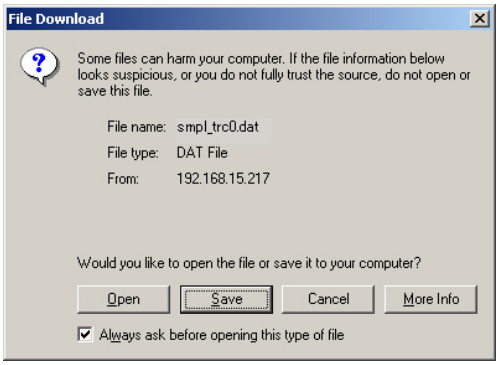


(4) The following window is displayed. Click the [Download] button.

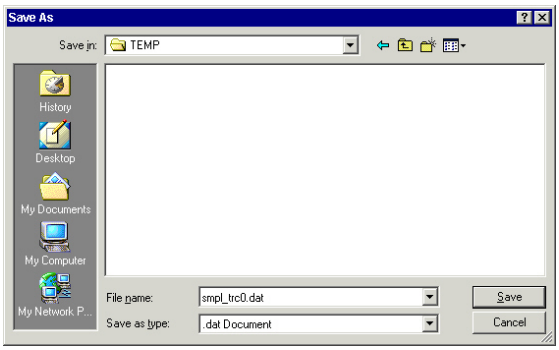


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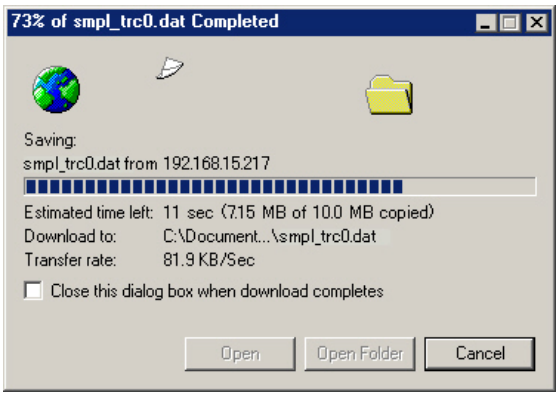
(5) Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



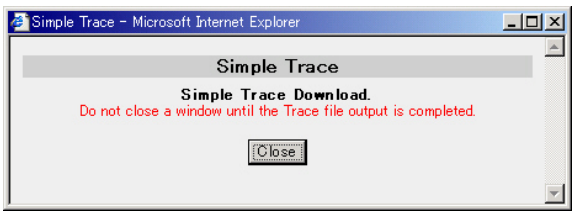
(6) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.(‡1) Please click [Cancel], if it is stopped.



(7) The following window is displayed during execution download.



(8) The [Download] button changes to the [Close] button, so that, click the [Close] button and close the window when the download is completed.



‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

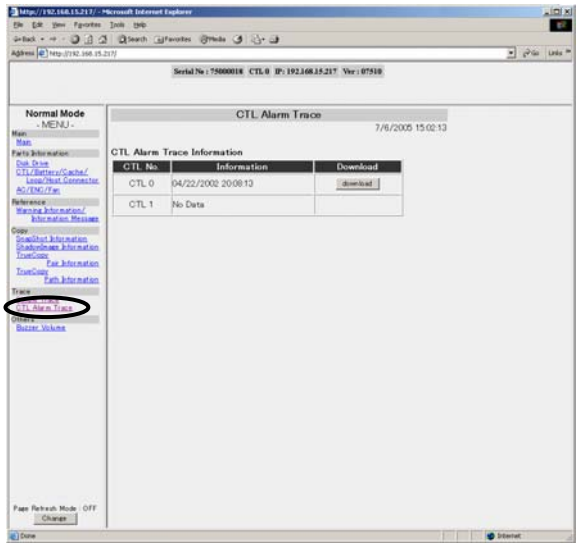
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2.7 Collecting CTL Alarm Trace

This is a function to download CTL Alarm trace information which is saved on the cache when a Controller is detached.
To perform the down-lord, a free capacity of approximately 20 M bytes (When Copy-on-write SnapShot Function is valid: approximately 40 M bytes) is required in the PC.
Collect CTL Alarm Trace from each Control Unit.
In order to distinguish from which Control Unit it is collected, store the collected data in different directories or with different file names.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

(1) Click "CTL Alarm Trace" in the menu frame.
The CTL Alarm Trace Information window is displayed when the CTL alarm trace information is present.



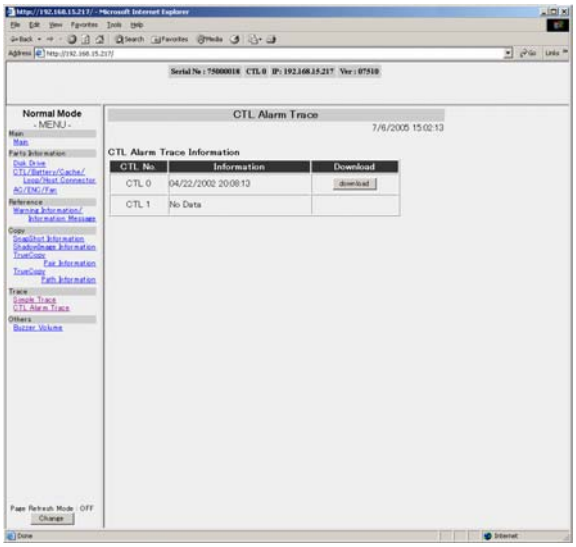
The following is displayed as contents of the information.

[Not Ready] .....: A status in which the trace area is not established in the subsystem
[Not Data] .....: A status in which the CTL Alarm trace information is not present or being generated
[MM/DD/20XY hh:mm:ss] .....: A status in which the CTL alarm trace information is present

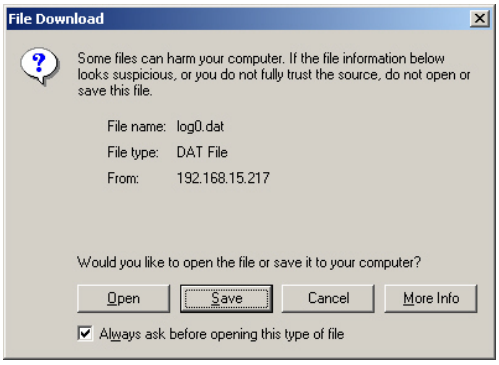
NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL alarm trace may not be collected normally. Connect the Maintenance PC to the LAN port of the blocked Control Unit, and collect the simple trace.
If simple trace cannot be obtained through detached Controller, connect the Maintenance PC to the Controller at the opposite side, and collect the simple trace.

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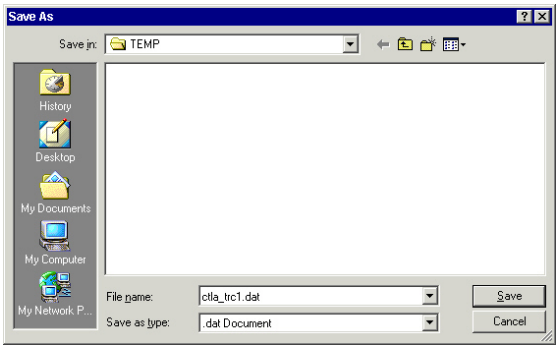
(2) To download the CTL Alarm trace information, press the “Download” button on the Control Unit side to be collected in “CTL Alarm Trace information”.



(3) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.

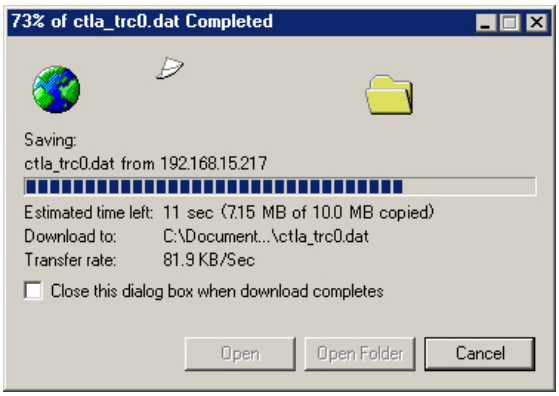


(4) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.(‡1) Please click [Cancel], if it is stopped.



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(5) The following window is displayed during execution download.



(6) The download completes.

‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

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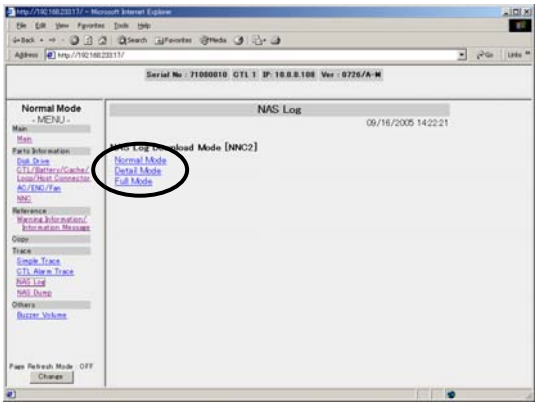
2.8 NAS Log collection

This is a function to download the log information on the present NAS OS.
The free capacity of approximately 4 M bytes in the Normal Mode, 12 M bytes in the Detail Mode and 150 M bytes in the Full Mode is required on the PC for downloading.
The NAS Log can collect only the information on the NNC (NAS Unit) connected to the Control Unit.

NOTE : • Do not perform the next NAS Log collection in one Control Unit until the NAS Log collection processing ends.
The operation when executing the NAS Log collection from two or more WEB and external application at the same time is not guaranteed.
• When the NAS Log is acquired from the PC connected to the LAN for control, it is required to access both of the user control port of the Disk Array subsystem and the control port of the NAS Unit from the PC. (It is recommended that both IP addresses are the same segments.)
• The access information between the clusters is necessary for the analytical work, so that collect the NAS Logs for both NAS Units in the cluster.

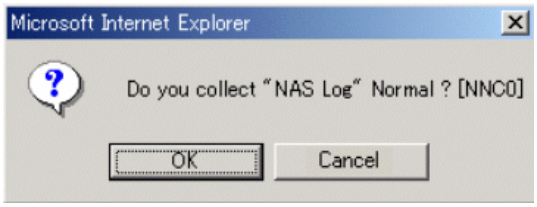
(1) Click "NAS Log" in "Trace" of the menu frame.
(2) Select the collection mode in "NAS Log", and click it.

Collection mode	Use	Capacity (standard)	Collection time (standard)
Normal Mode	Collect it only when there is a special instruction. (It is limited to when the remote collection of "Full Mode" and "Detail Mode" are impossible on the capacity side.)	About 4 M bytes (One NNC)	About 1 minute (One NNC)
Detail Mode	Collect it only when there is a special instruction. (It is limited to when the remote collection of "Full Mode" is impossible on the capacity side.)	About 12 M bytes (One NNC)	About 1 minute (One NNC)
Full Mode	If there is no special instruction, collect all in "Full Mode".	About 150 M bytes (One NNC)	About 4 minutes (One NNC)

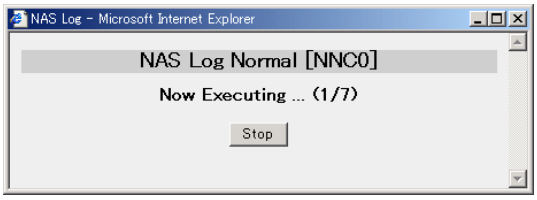


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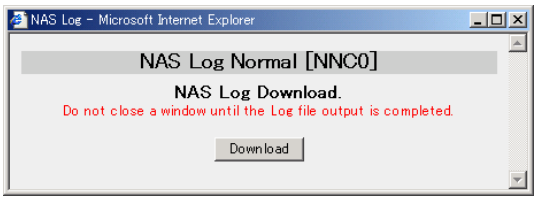
(3) The confirmation message is displayed. Click the [OK] button.



The following dialog is displayed.

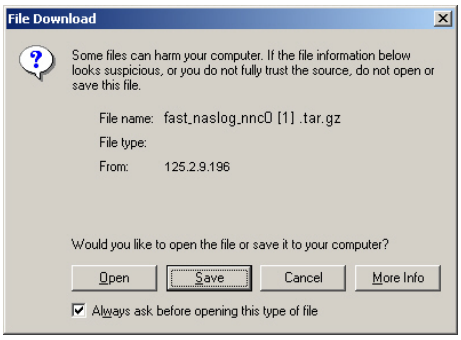


(4) The following dialog is displayed when ending. Click the [Download] button.



NOTE : Do not close this dialog while you download the NAS Log into the service PC. The NAS Log may not be able to be collected when closing it.

(5) The following dialog is displayed. Click [Save].

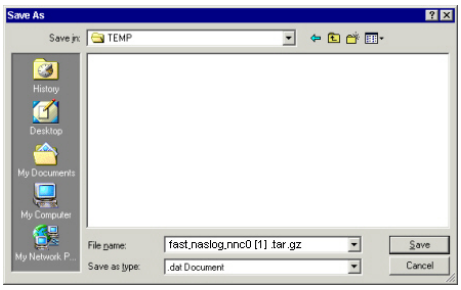


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(6) Specify the storage location of the file and the file name, and click [Save](‡1).
A default file name is as follows in the collection mode.

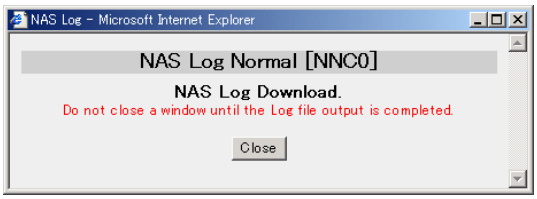
Item	Collection Mode		
	Normal Mode	Detail Mode	Full Mode
NNC 0	fast_naslog_nnc0[1].tar.gz	naslog_nnc0[1].tar.gz	full_naslog_nnc0[1].tar.gz
NNC 1	fast_naslog_nnc1[1].tar.gz	naslog_nnc1[1].tar.gz	full_naslog_nnc1[1].tar.gz
NNC 2	fast_naslog_nnc2[1].tar.gz	naslog_nnc2[1].tar.gz	full_naslog_nnc2[1].tar.gz
NNC 3	fast_naslog_nnc3[1].tar.gz	naslog_nnc3[1].tar.gz	full_naslog_nnc3[1].tar.gz

NOTE : There may be the cases where the numerical value of "[1]" of the file name is not 1 and "[1]" part is not attached depending of the browser environment.



The down-loading is started and the progress indicating message window is displayed.
When the down-loading completes, click [Close] button.

(7) Click [Close] button.



‡1 : A file name can be changed to "optional file name.tar.gz".

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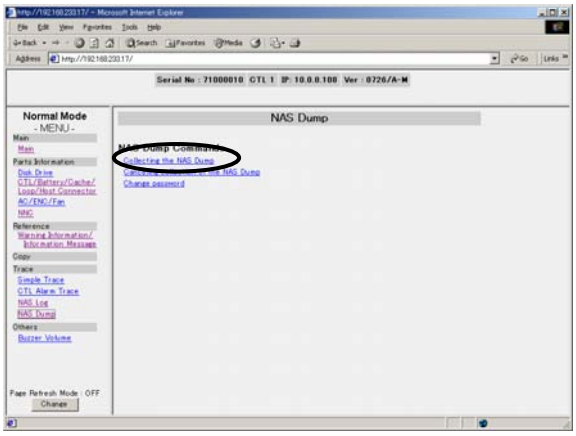
2.9 NAS Dump generation

This is a function to generate the full memory information on the present NNC (NAS Unit) and collect it in the Disk Drive.
The full memory information on the NNC (NAS Unit) is not downloaded in the PC at the NAS Dump generation opportunity.
The generation of the NAS Dump can be executed only in the NNC (NAS Unit) connected to the Control Unit.

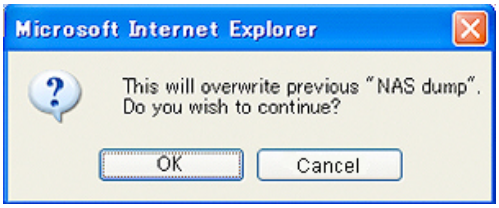
(1) NAS Dump generation

(a) Click "NAS Dump" in "Trace" of the menu frame.

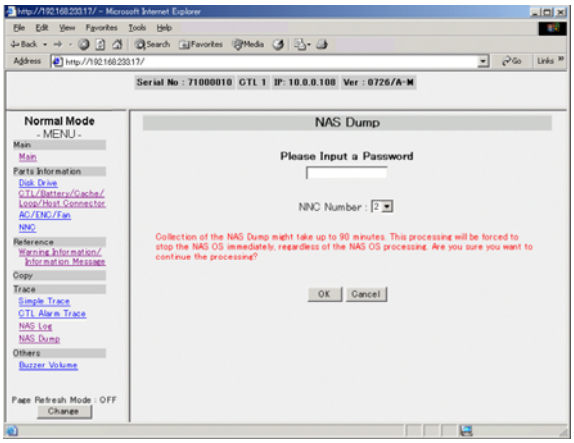
(b) Select the "Collecting the NAS Dump".



(c) The confirmation message is displayed. Click the [OK] button.

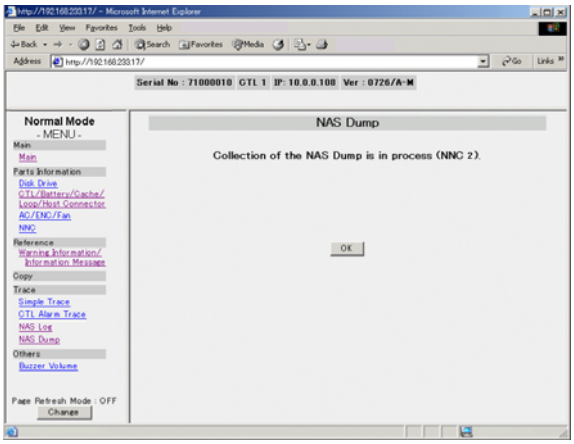


(d) Input the registered password, and click the [OK] button. (The default password is "user=NAS")



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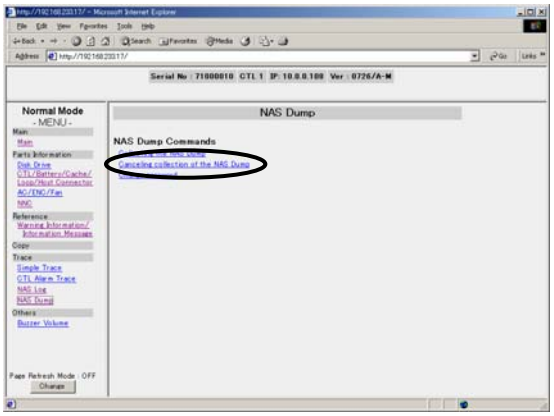
(e) The following window is displayed. Click the [OK] button.



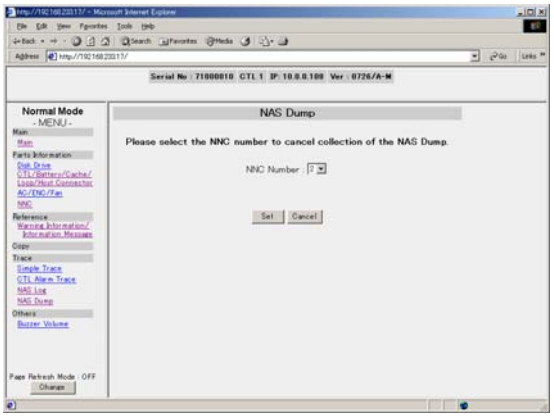
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(2) Suspension of the NAS Dump generation

(a) Select the "Canceling collection of the NAS Dump".



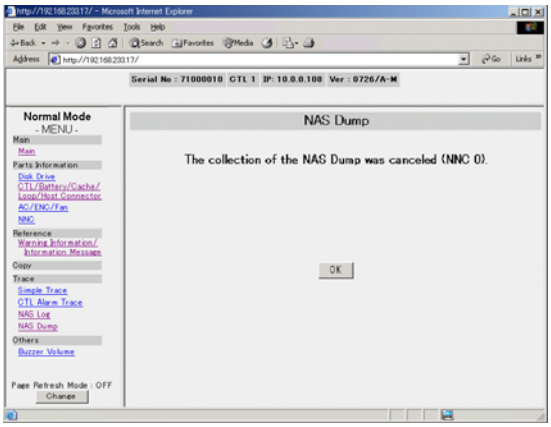
(b) Specify the NNC (NAS Unit), which suspends the NAS Dump flushing, as "NNC Number", and click the [Set] button.



(c) The confirmation message is displayed. Click the [OK] button.



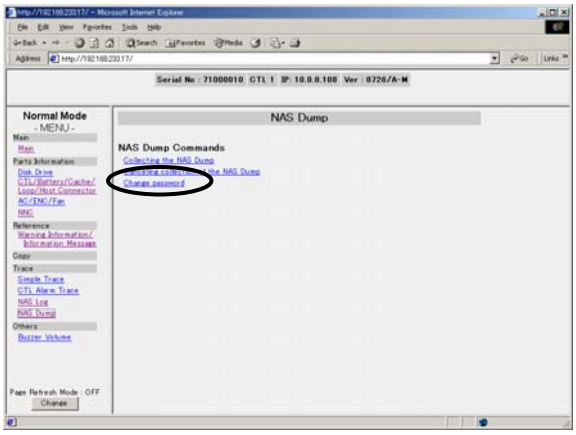
(b) A suspension completion window is displayed. Click the [OK] button.



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(3) Registration and change of the password

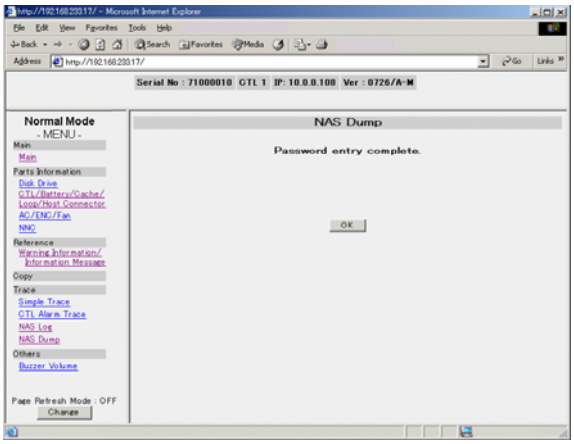
(a) Select the “Change password”.



(b) Input characters (one to eight half size alphanumeric characters) in “Old Password”, “New Password” and “Re-enter New Password”, and then click the [OK] button.



(c) The window, which the password was registered normally, is displayed. Click the [OK] button.

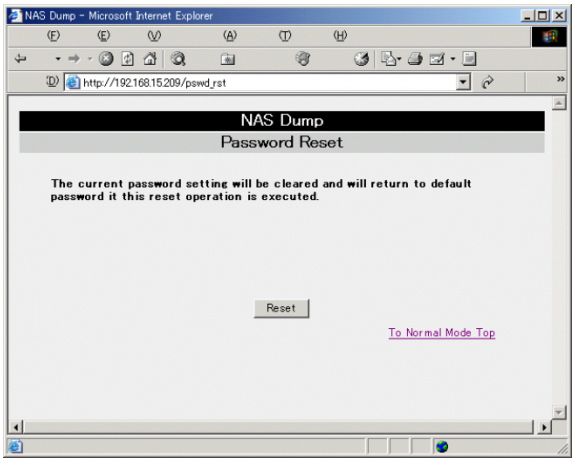


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(4) Password reset

(a) Input "http://IPAddress/pswd_rst" in the address.

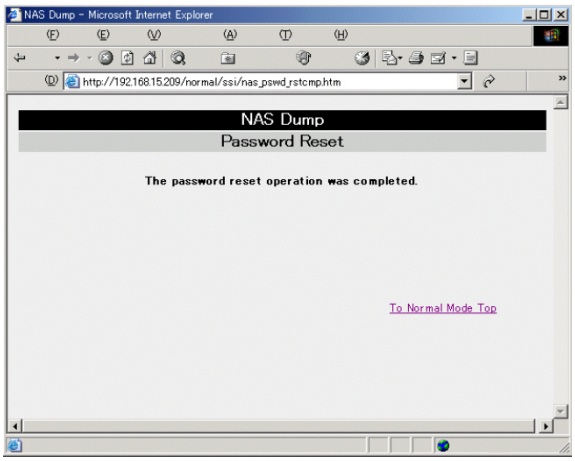
(b) Click the [Reset] button.



(b) The confirmation message is displayed. Click the [OK] button.



(c) The window, which the password reset was completed, is displayed. Click "To Normal Mode Top".



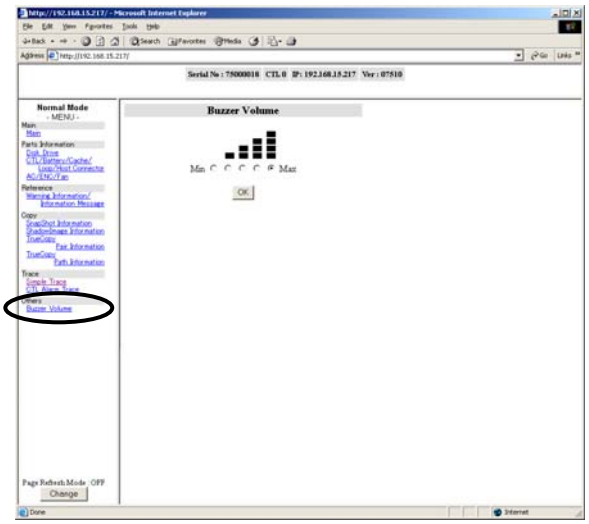
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2.10 Setting of the Buzzer Volume

The Buzzer Volume can be adjusted with 5 stages.

NOTE : Make this setting in the environment in which I/O's from a host computer are not issued while the system is maintained or before the host is started up.

Please click "Buzzer Volume" of menu frame to enter into the Buzzer Volume setting screen. The Buzzer Volume setting screen is shown below.



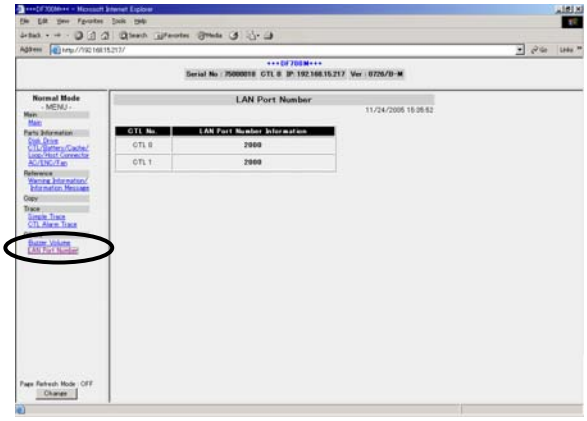
Select buzzer sound volume on the radio button and click [OK]. The buzzer sounds once at the selected volume, and it is recognized the volume is set.

2.11 Setting of the LAN Port Number

The set LAN Port Number is displayed.
Please click "LAN Port Number" of menu frame to enter into the LAN Port Number reference screen.

NOTE : "LAN Port Number" is displayed in microprogram Ver.0726/E or more.

The LAN Port Number reference screen is shown below.



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2.12 Host Command Trace Download

The following conditions are necessary to download the host command trace.

The host command trace information is required to analyze by executing the performance measurement.
If the host command trace exceeds a certain range, the new information is overwritten, so that the old information is deleted and cannot be analyzed.
This function is to collect the command information from the host in the Maintenance PC at a maximum.

Use this function only when the performance analysis is required. Do not use it normally.

- The READY LED (green) on the Front Bezel lights on.
- For MICROPROGRAM "1.3 Preparation for installation of microprogram" (MICRO 01-0020) is performed and the Maintenance PC is set up.

The data size of the host command trace that can be downloaded is affected by environments of the service PC and a LAN.
Therefore, it is recommended to do the downloading in the following environment.

- The downloading is done through the LAN port for maintenance.
- The LAN interface used by the Maintenance PC is 100Base-TX or the superior.

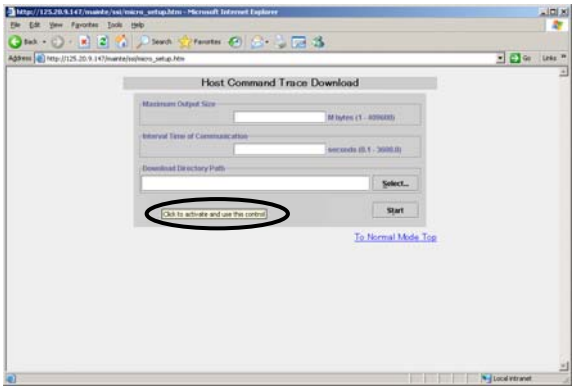
Incidentally, the size of the data that can be downloaded varies depending on the load of I/O's issued to the disk array subsystem.

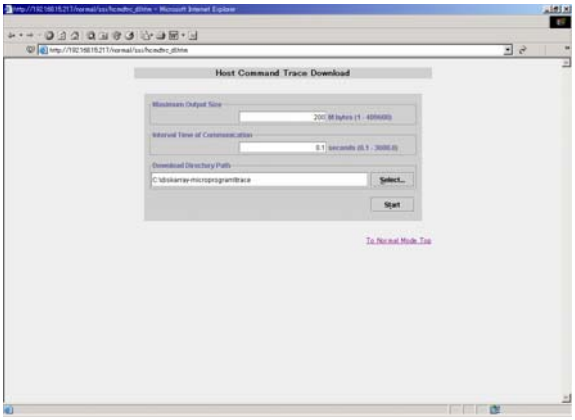
The setting methods to download the host command trace are shown below.

(1) Display in the host command trace download window.
Enter "http://(IP address)/hcmd_trc" in the [Address] of the Web browser.
In the case of the dual system configuration, enter an IP address of any one of the control units. (Only the information of the input IP address is collected. If the information for both Control Units is required, start two Web browsers.)
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

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(2) Input of "Maximum Output Size", "Interval Time of Communication" and "Download Directory Path".
When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.





[Maximum Output Size] : Check the empty drive space of the Maintenance PC and input the maximum output size (the initial value is 200 M bytes).

[Interval Time of Communication] : Input the interval time of downloading the host command trace (the initial value is 0.1 second).

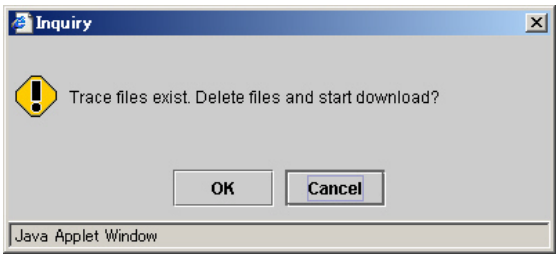
[Download Directory Path] : Input the folder which stores the host command trace (the initial value is "C:¥diskarray-microprogram¥trace" and the folder can be selected by pressing the [Select] button).

- It is required to create the storage folder beforehand.
- The folder can be created only in the "C:¥diskarray-microprogram" folder.
- The collected host command trace is divided into two or more files "hcmdtrc$p#_xxxxx.trc" ($: Control Unit number, #: port number, and xxxxx: following number) and output. When collecting the host command trace two or more times, create the folder in every case.

(3) Click the [Start] button to start the download.

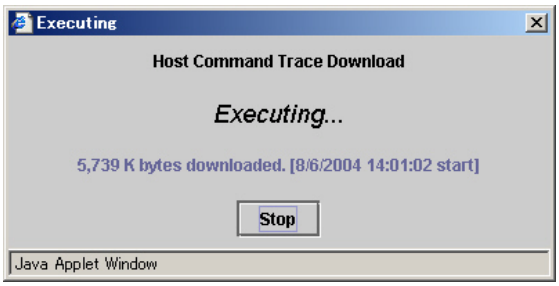
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(4) The following window is displayed when the stored file exists.

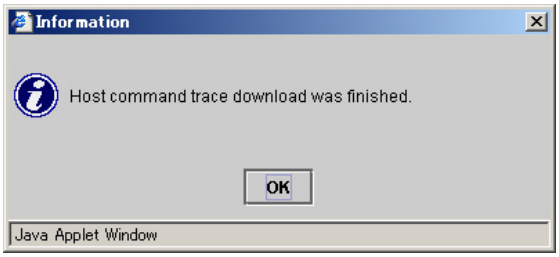


Click the [OK] button.
Click [Cancel] if stopping it.

(5) The following window is displayed when executing the download.



(6) The following window is displayed when the download is completed.



If the [OK] button is clicked, the host command trace download window is displayed.

- Standard of the host command trace collection
  When collecting the host command trace, make the following a standard and set it.
  If the empty drive space of the host decreases, the system becomes unstable. Therefore, set the host command trace collection after checking the empty space.
  Also, when the command issue from the host exceeds the collectable IOPS, all the host commands are not collected.

$$\text{Required disk capacity (M bytes)} = \frac{\text{Host command trace collection time (second)}}{\text{Interval time of communication (second)}} \times 76.8 \text{ (k bytes)}$$

Table 2.12.1 Required disk capacity for host command trace collection (M bytes)

Communication interval (second) and the collectable IOPS / Collection time (second)	0.1 6000	0.2 3000	0.5 1200
1	0.8	0.4	0.2
10	7.7	3.8	1.5
60	46.1	23.0	9.2

The collection time and the disk capacity vary depending on the issue interval of the command from the host.

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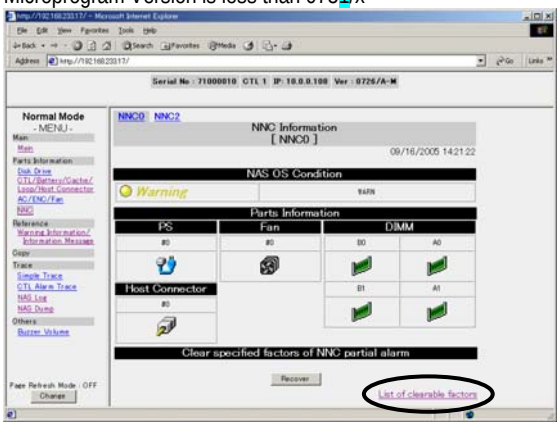
2.13 The function of the “Clear specified factors of NNC partial alarm”

There is a case where the Warning status of the Control Unit is not released and the WARNING LEDs on the array subsystem and the NAS unit are lighting up even though the recovery work for some specific NNC partial alarms.
Release the Warning status of the Control Unit and turn off each WARNING LED according to the following procedures.
The operation of the “Clear specified factors of NNC partial alarm” can be executed only to the NNC (NAS unit) connected to the Control Unit.

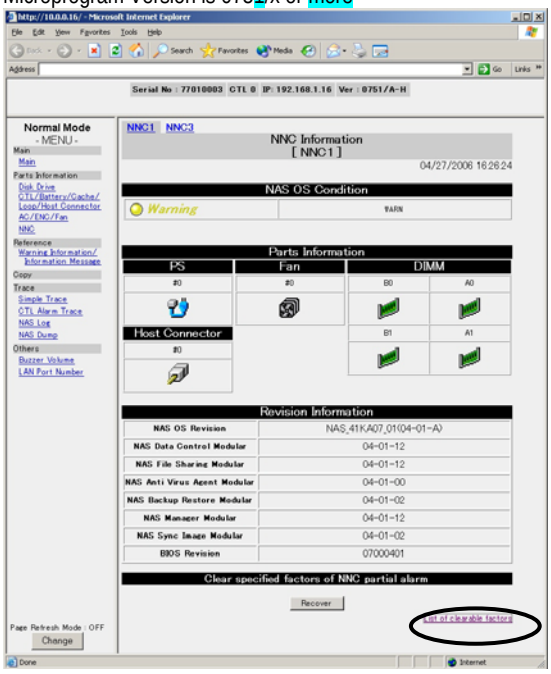
(1) Clear specified factors of NNC partial alarm.

(a) Click the [Recover] button.

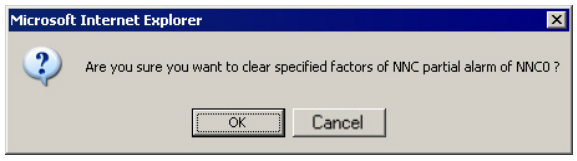
Microprogram Version is less than 0751/x



Microprogram Version is 0751/x or more

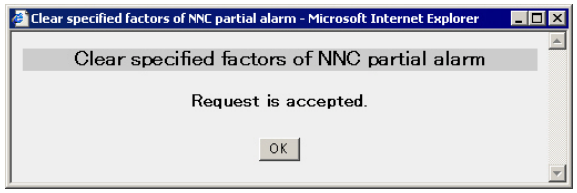


(b) A message asking you to verify the setting is displayed. Click the [OK] button.



(2) Checking the NNC partial alarm recovery.

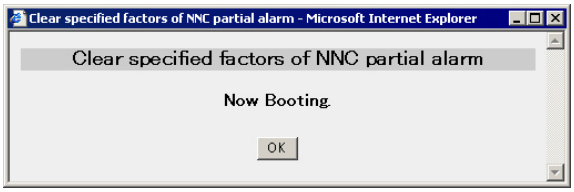
(a) When the “Clear specified factors of NNC partial alarm” is completed normally.



Click the [OK] button.
Click Warning Information on the menu window, and check that the indication of the partial alarm is turned off.

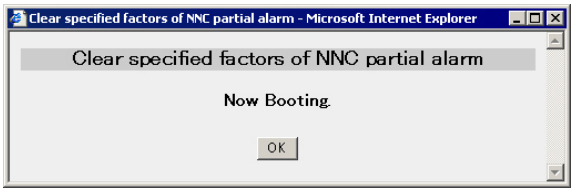
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(b) When the NNC partial alarm was recovered before clicking the [Recover] button.



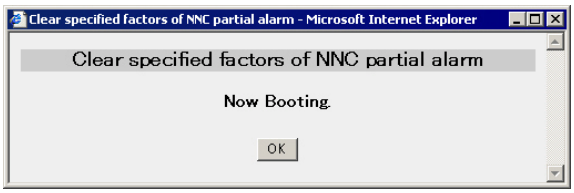
Click the [OK] button.

(c) When the array subsystem was booting at the time of clicking the [Recover] button.



Click the [OK] button.
Execute it again in the procedure (1) after the array subsystem becomes the READY status.

(d) When the NAS unit was not connected to the Control Unit at the time of clicking the [Recover] button.



Click the [OK] button.

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Chapter 3. The Maintenance Mode Operation Procedure

3.1 Transferring to the Maintenance Mode

The method of making the subsystem enter the maintenance mode varies depending on the lighting status of the READY LED (green) and ALARM LED (red) on the front bezel (RKH/RKM/RKS/RKXS).

- Do not make the work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the ENC/SENC firmware is being downloaded. Make the work after making sure that the READY LED (green) lights on after the maximum of 30 to 50 minutes (RKH: for the maximum of 40 to 60 minutes).
- Do not work when the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed. While this WARNING LED (orange) is blinking at high speed, the update of the flash program or the automatic download of the ENC/SENC firmware at the time of turning the power on in the single controller configuration is being executed. Perform the work after checking that this WARNING LED (orange) goes out in the maximum of 30 to 85 minutes, and the READY LED (green) on the front of the Basic Chassis lights up.
- When the READY LED (green) is on, proceed to the procedure starting from the step (2).
- When the ALARM LED (red) is on, wait for three minutes after making sure of the lighting of it, proceed to the procedure starting from the step (2).
- Also proceed to the procedure starting from the step (1) in the case where the READY LED (green) and ALARM LED (red) do not come on after waiting for ten minutes when the power is turned on.

(1) Make sure that the WARNING LED (orange) is not blinking fast. If it is blinking fast, wait for a while (80 seconds at the longest). It will cease to blink fast. There is no problem if it blinks slowly (at intervals of one second).

(2) Changing the maintenance mode.

- Single Controller

  Press the RST SW of the single Control Unit. (While pressing RST SW, the RST LED is on.) Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

- Dual Controller

(a) Press the RST SW of the Control Unit #0. (While pressing RST SW, the RST LED is on.)
Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

(b) Press the RST SW of the Control Unit #1 immediately (within ten seconds) checking the CALM LED (red) of the Control Unit#0 comes on.
(Sometimes the buzzer may beeps when the RST SW is pressed, however, you do not have to stop it until these operations are completed.)
When the CALM LED of the Control Unit #0 does not go out in spite of the above operation, power off the subsystem and then power on the subsystem without pulling out or insert the Control Unit. After that, return to step (1) and execute the procedure over again.

NOTE : Because the Control Unit is shutdown status for the Maintenance Mode, the command from the host is impossible execution. Rebooting of the Control Unit is required for the return.

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When CALM LED on Control Unit#0 turns off and READY LED on Front Bezel turns off, it transfers to Maintenance mode.

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(c) Start the setting after making sure that the subsystem has entered the Ready status.

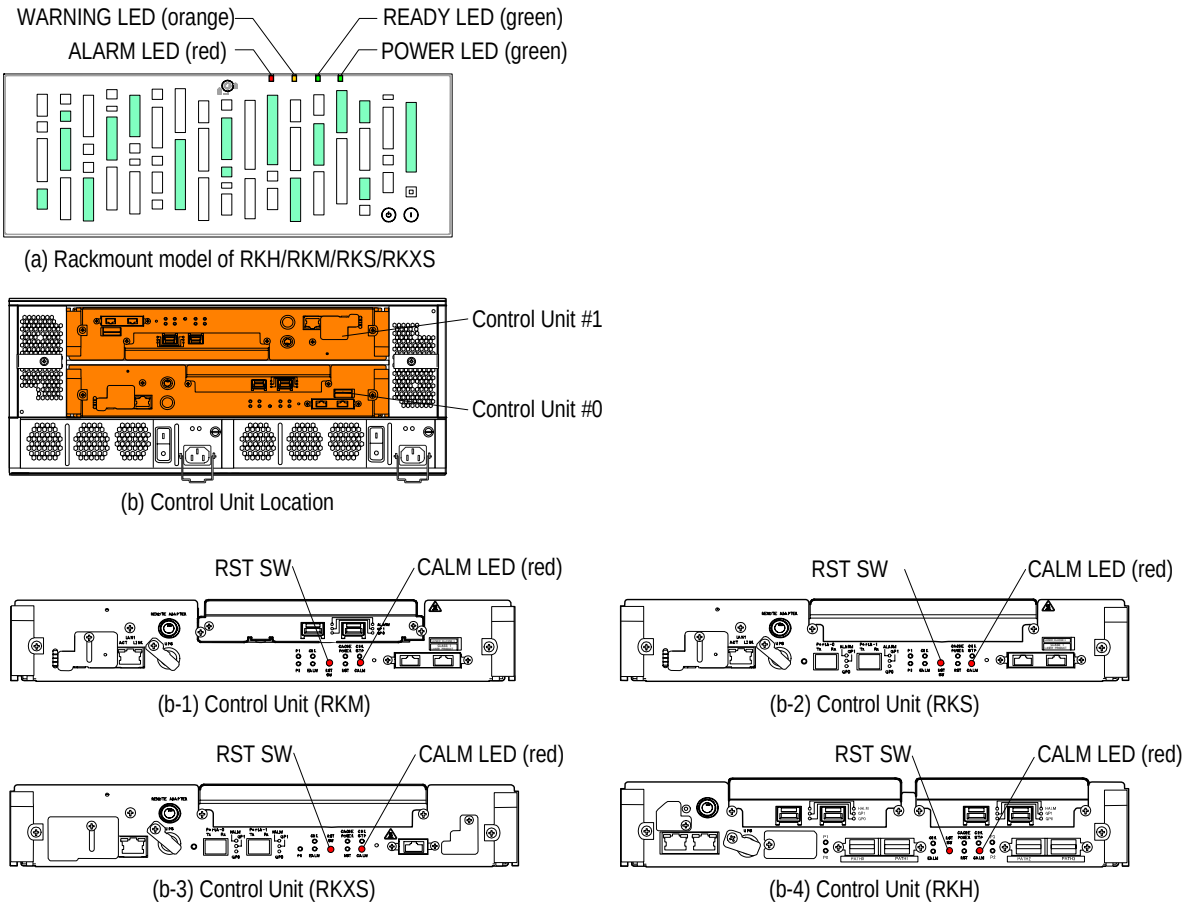


Figure 3.1.1 Indication Position

Illustrations in Figure 3.1.1 show cases of the rackmount model. They are the same for the floor model.

NOTE : • Set the TCP/IP to "Disable DNS" because the connection takes a long time when the TCP/IP of the network is set to the condition in which the DNS is used. For the setting procedure, refer to the instruction manual of the PC to be used.

• Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used.

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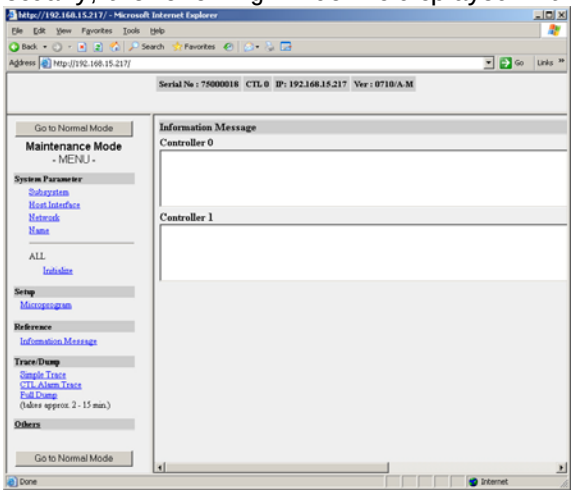
(3) Please input the IP Address of the Control Unit where it was connected with the network to the browser. Please input the page by the update button of the browser if it has already been connected with WEB.

NOTE : The contents that were set up with "System Parameter" and the Microprogram that was installed with "Setup" come into effect after the rebooting of the Control Unit.

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

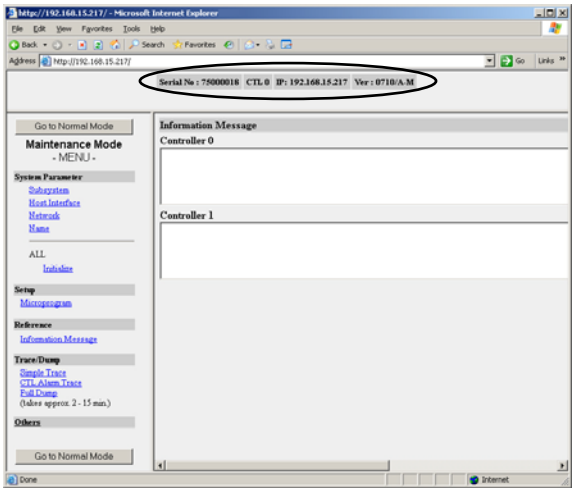


(4) Usually, the following window is displayed in the browser.

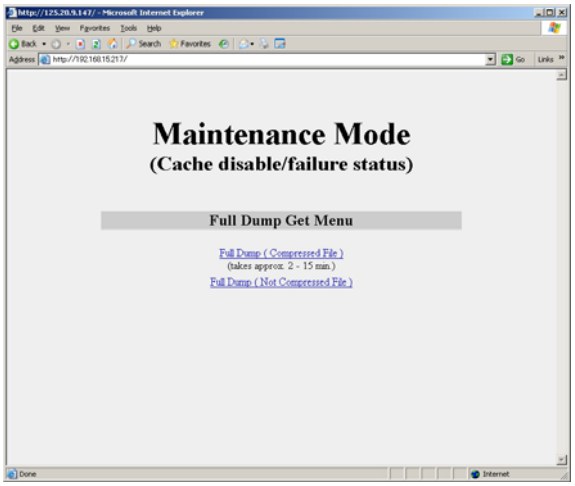


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When this window is displayed in the browser, check if the "Series No", the "CTL number" and the "IP" address, which are displayed in the upper part of the window, match with the device number, the CTL number and the IP address of the subsystem to be connected to WEB. The WEB connection in the maintenance mode is completed when these are matched. If not matched, the specification of the IP address at the WEB connection is incorrect. Enter the correct IP address of the Control Unit to be connected to WEB in the browser again.



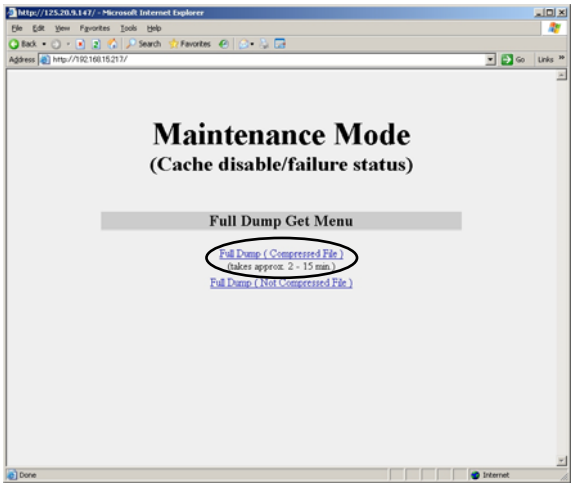
Also, when the Cache memory access failure occurs, in the Control Unit connected to WEB, the following window is displayed in the browser. At this time, refer to "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).



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3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure

The message display and the setting operation do not function during the Cache memory access failure. Select "Full Dump (Compressed File)" on the window, and collect Full Dump. And then, contact the Technical Support Center.



* The time displayed on the window changes by the model or the status of the subsystem.

Also, connect WEB to the other Control Unit, and continue the maintenance work for the dual Control Unit system.

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3.2 Reference/Setting of the System Parameter and Initialize

System Parameter is being classified to the following group and selecting each group executes the reference/setting and Initialize.

(1) Subsystem
Reference and setting of the system parameter regarding the Subsystem is executed (refer to Subsection "3.2.1 Subsystem" (WEB 03-0060)).

(2) Host Interface
Reference and setting of the system parameter regarding the host interfacing are executed (refer to Subsection "3.2.2 Host Interface" (WEB 03-0120)).

(3) Network
Reference and setting of the system parameter regarding the network are executed (refer to Subsection "3.2.3 Network" (WEB 03-0170)).

(4) Name
Reference and setting of the system parameter such as the Vendor ID, Product ID, Controller Name are executed (refer to Subsection "3.2.4 Name" (WEB 03-0220)).

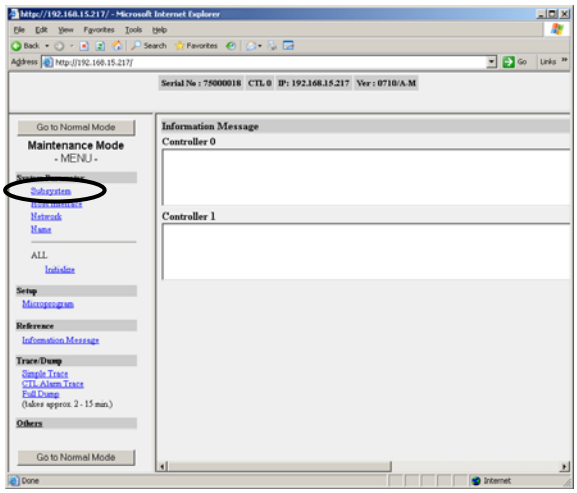
(5) ALL
The system parameter information is initialized. (refer to Subsection "3.2.5 ALL" (WEB 03-0260)).

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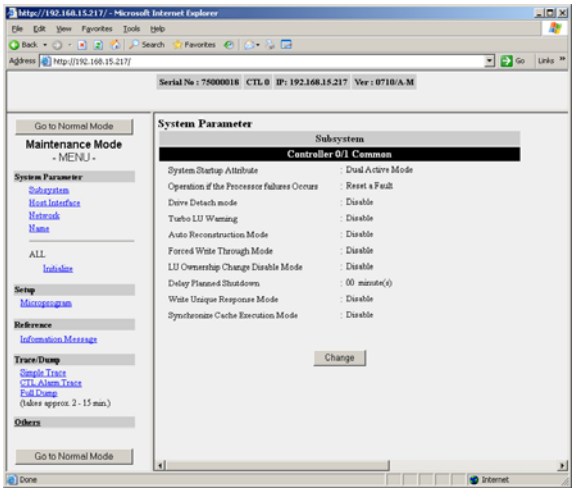
3.2.1 Subsystem

This function sets up/refer to the item regarding the Subsystem in the device.

(1) Please click “Subsystem”.

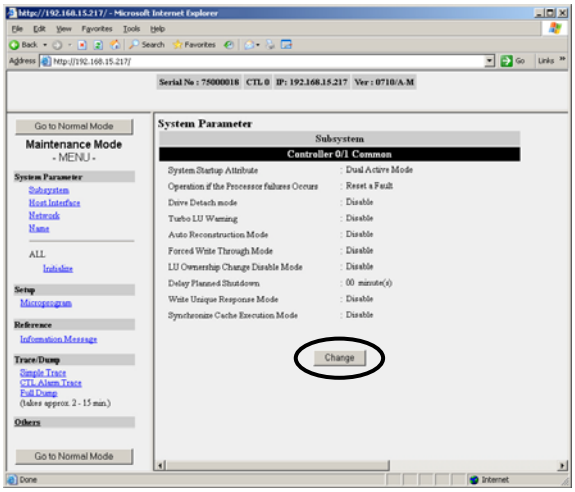


(2) The present setting value (the current value) is displayed.

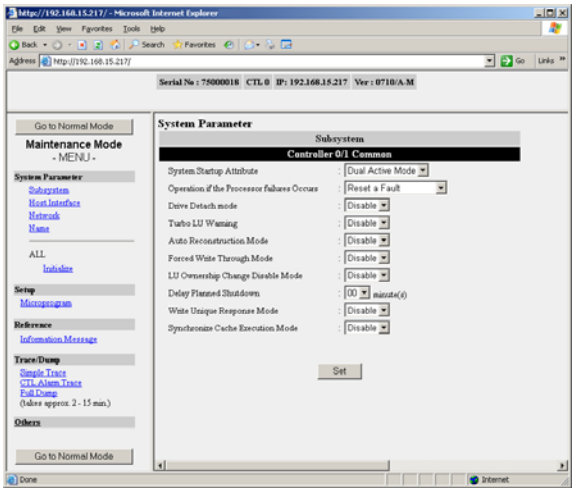


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(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.



(4) Please select the item that is set up from the pull-down menu of the corresponding item that is set up. At this time, please set up the item that is set up all.



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Explanation with regard to each item

[Controller 0/1 Common]

- System Startup Attribute

  The System Operation Attribute is designated.

  [Single Mode](‡1) : This is Single controller configuration. (SANRISE AMS1000 is not supported.)

  [Dual Active Mode] : This is Dual controllers configuration.

- Operation if the Processor failures Occurs

  The operation as the processor fault occurrence is designated.

  [Reset a Fault] : A fault is reset.

  [Shutdown the System] : The controller is shutdown.

- Drive Detach mode

  The Drive Shutdown Mode is designated.

  [Enable] : The Drive Shutdown Mode is effectively.

  [Disable] : The Drive Shutdown Mode is ineffectively.

- Turbo LU Warning

  Suppression of the R/W command operation regarding the LU concerned for the case where the Turbo LU Residence function becomes ineffective is set.

  [Enable] : The operation is suppressed.

  [Disable] : The operation is not suppressed

- Auto Reconstruction Mode

  The Auto Reconstruction Mode (Data restoration to a spare drive to be done when a drive is pulled out) is designated.

  [Enable] : The Auto Reconstruction Mode is effectively.

  [Disable] : The Auto Reconstruction Mode is ineffectively.

- Forced Write Through Mode

  The Forced Write Through Mode is designated.

  [Enable] : The Forced Write Through Mode is effectively.

  [Disable] : The Forced Write Through Mode is ineffectively.

- LU Ownership Change Disable Mode

  The LU Ownership Change Disable Mode (A mode in which no LU switching is done) is designated.

  [Enable] : The LU Ownership Change Disable Mode is effectively.

  [Disable] : The LU Ownership Change Disable Mode is ineffectively.

- Delay Planned Shutdown

  The Delay Planned Shutdown (Time from the power switch turning off to the deliberate shutdown) is designated.

  00 to 60 minute

- Write Unique Response Mode

  Specify this when setting the Write Unique Response Mode.

  [Enable] : The Write Unique Response Mode is effectively.

  [Disable] : The Write Unique Response Mode is ineffectively.

‡1 : The NAS Unit connection configuration does not support “Single mode”. Be sure to select “Dual Active mode”.

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• Synchronize Cache Execution Mode

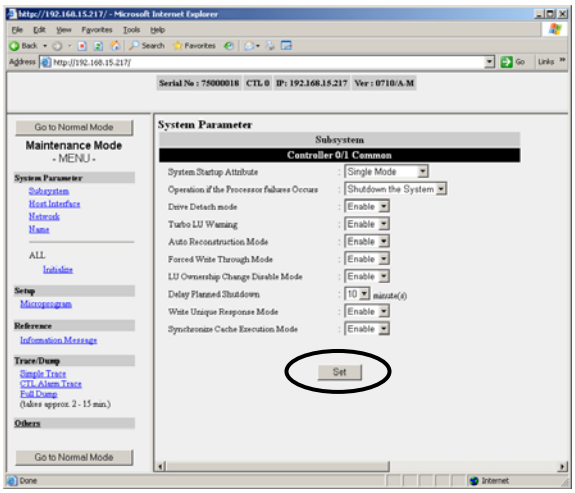
This is specified when the Synchronize Cache command is executed.

[Enable] : The Synchronize Cache Execution Mode is effectively.

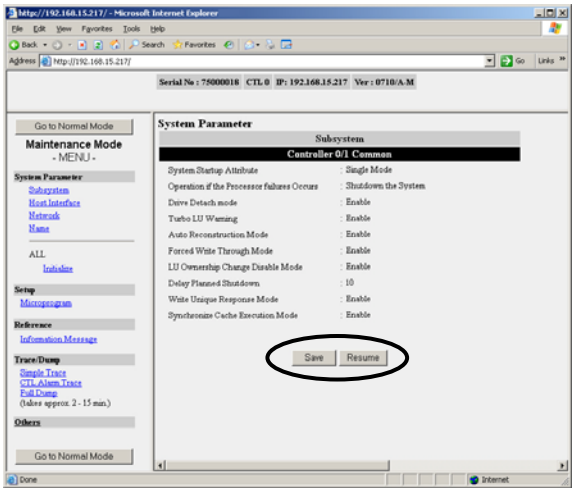
[Disable] : The Synchronize Cache Execution Mode is ineffectively.

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(5) Please click [Set] after setting completion.

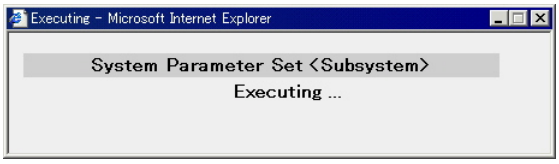


(6) The screen that confirms the following setting contents is displayed.
Please click [Save] if the setting is correct. Please click [Resume] if the setting contents are changed.



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(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



(8) The following window is displayed at the later time for a while.
Please click [OK], if the setting is continued. Please click [Cancel], if the setting is stopped.
If [Cancel] was clicked, the system parameter is not set up.



(9) If [OK] is clicked, the following window is displayed.



(10) If the following window is displayed at the later time for a while, the setting is completion.
If [OK] is clicked, it returns to the menu.

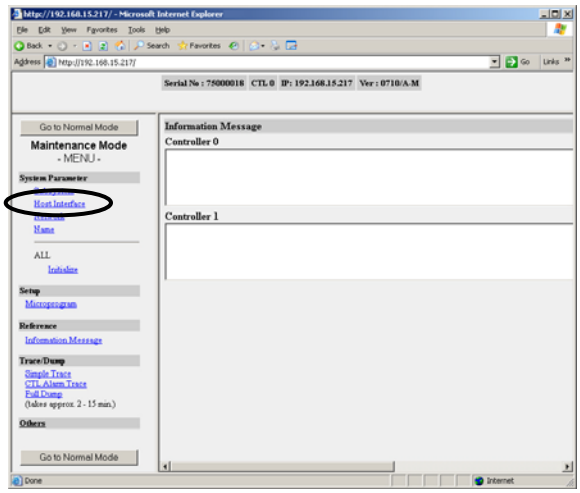


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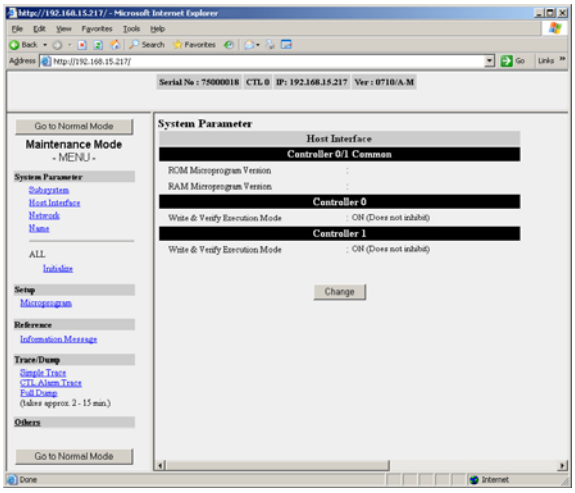
3.2.2 Host Interface

This function sets up/refer to the item regarding the host interfacing of the device.

(1) Please click “Host Interface”.

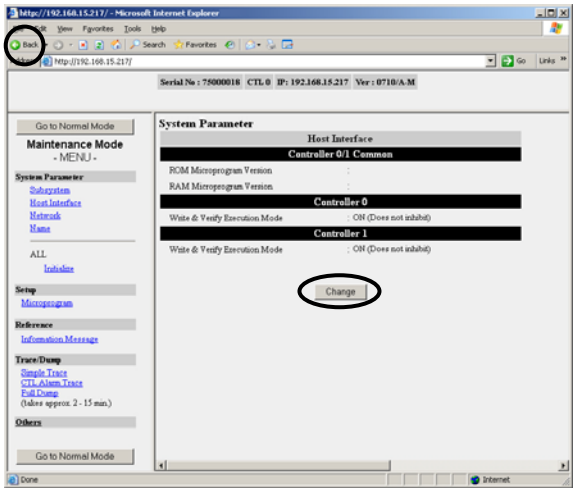


(2) The present setting value (the current value) is displayed.

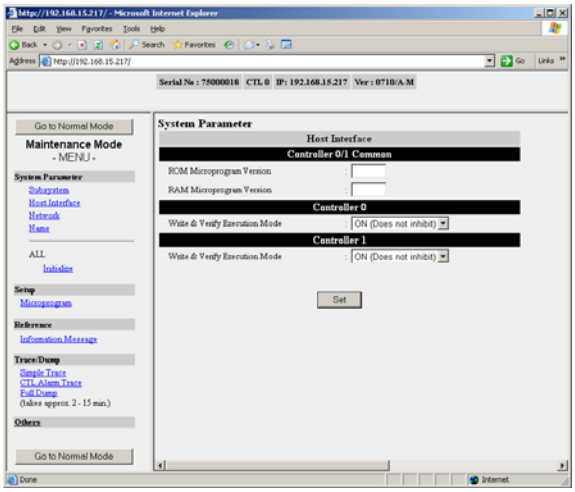


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(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.



(4) Please select the item that is set up from the pull-down menu of the corresponding item that is set up. At this time, please set up the item that is set up all.



Explanation with regard to each item

[Controller 0/1 Common]

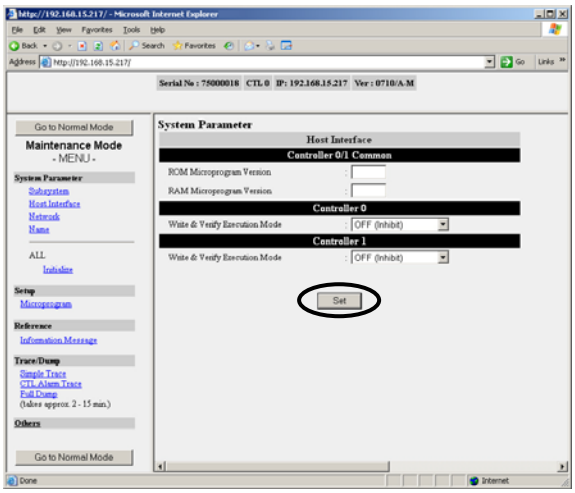
- ROM Microprogram Version :
  The response value of Product Revision Level (ROM Microprogram Version) in the Inquiry command is shown.
- RAM Microprogram Version :
  The response value of Product Revision Level (RAM Microprogram Version) in the Inquiry command is shown.

[Controller]

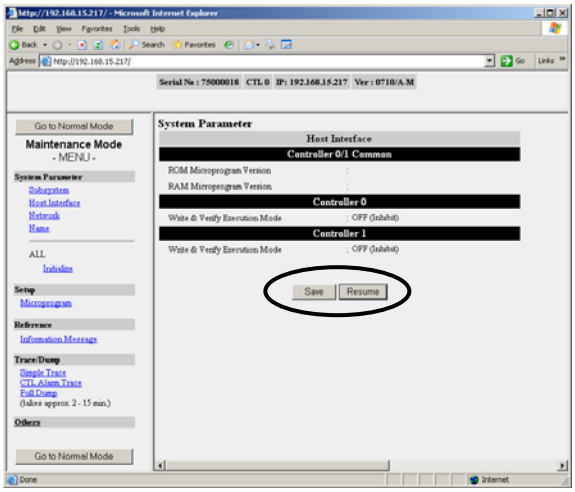
- Write & Verify Execution Mode
  The operations inside the Write & Verify command from the host are shown.
  [ON (Does not inhibit)] : The Write & Verify are executed.
  [OFF (Inhibit)] : This is executed and replace to the Write.

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(5) Please click [Set] after setting completion.



(6) The screen that confirms the following setting contents is displayed.
Please click [Save] if the setting is correct. Please click [Resume] if the setting contents are changed.



(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



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(8) The following window is displayed at the later time for a while.
Please click [OK], if the setting is continued. Please click [Cancel], if the setting is stopped.
If [Cancel] was clicked, the system parameter is not set up.



(9) If [OK] is clicked, the following window is displayed.



(10) If the following window is displayed at the later time for a while, the setting is completion.
If [OK] is clicked, it returns to the menu.



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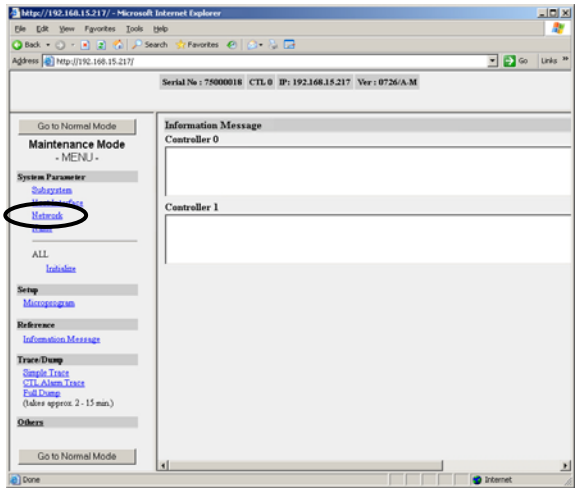
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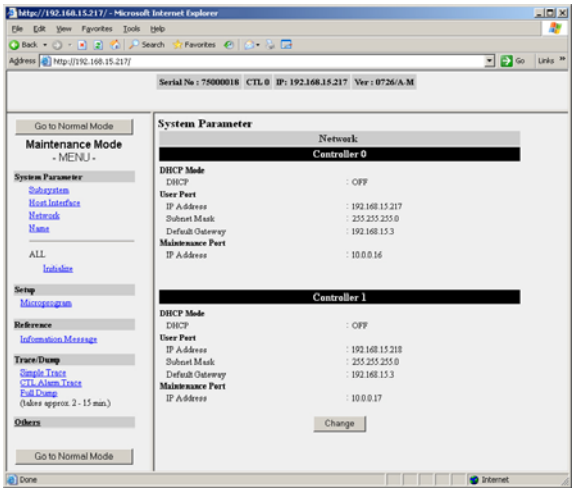
3.2.3 Network

This function sets up/refer to the item regarding the network (Setting the user management LAN port) of the device.

(1) Please click “Network”.

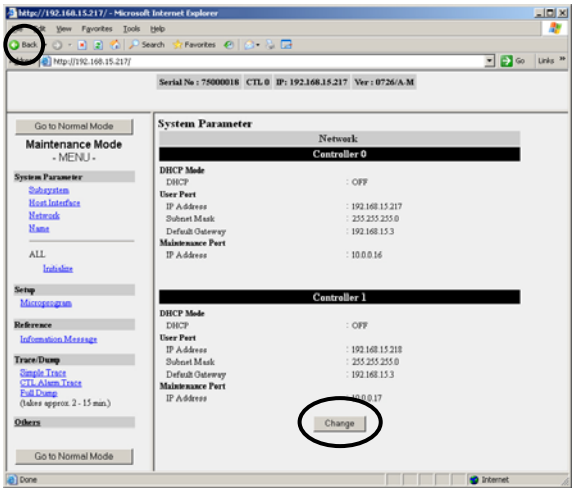


(2) The present setting value (the current value) is displayed.

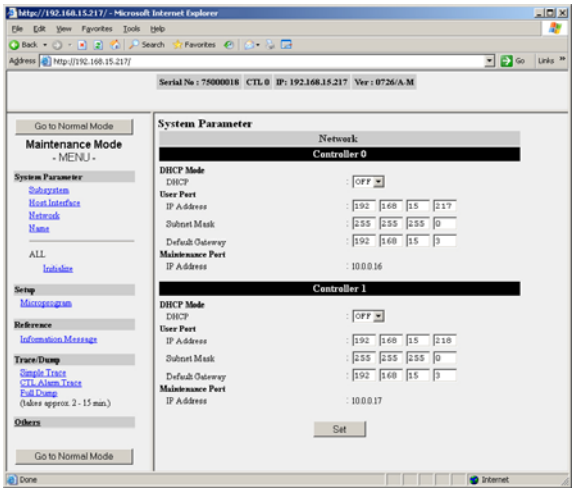


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(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.



(4) Please set up/select the corresponding item that is set up from the pull-down menu or input them.
At this time, please set up the item that is set up all.



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Explanation with regard to each item

[Controller 0]/[Controller 1]

- DHCP Mode

  DHCP : The DHCP function (‡1) is specified.

  [OFF] : Invalid the DHCP mode.

  [ON] : Valid the DHCP mode.

- User Port

  IP Address : Sets the IP ADDRESS.

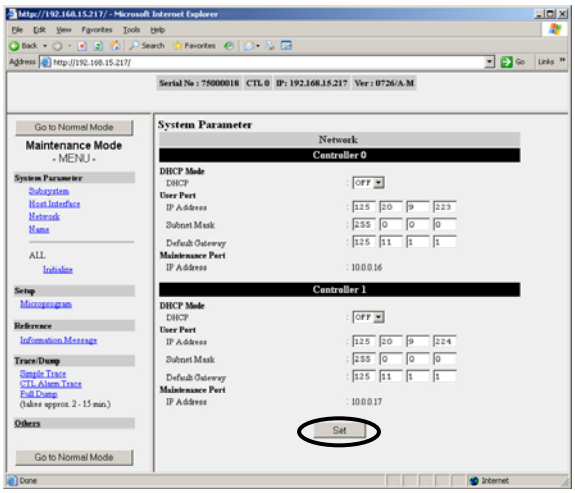
  Subnet Mask : Sets the Subnet Mask.

  Default Gateway : Sets the Default Gateway.

- Maintenance Port

  IP Address(‡2) : The IP address of the maintenance port, which is currently set, is displayed.
  It cannot be changed.

(5) Please click [Set] after setting completion.

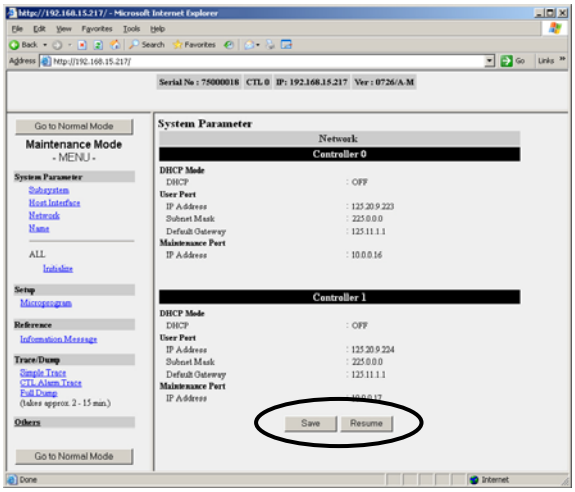


‡1: When DHCP mode is valid, IP address is obtained from the DHCP server.
When the DHCP server has not started up or DHCP function has been miss-set, obtaining the IP address fails and the device IP address remains to be “0.0.0.0”. (Storage Navigator Modular or WEB cannot be used via LAN.)
In this case, the device IP address can be obtained by starting up the DHCP server or setting DHCP function correctly if necessary.
In the configuration which uses this subsystem as an external disk drive of the DHCP server, when the IP address of this subsystem is acquired using the DHCP function, if the network address of the reserved IP address for the maintenance port is assigned as an IP address, the IP addresses of the port for the user control and the port for the maintenance may not operate normally because they compete.
Request the system administrator that the DHCP server does not assign IP address of “10.0.0.x”, “192.168.0.x”, “192.168.233.x”, “172.23.211.x”, “10.197.181.x” to the device.

‡2: The IP address with the same network address as the displayed IP address of the maintenance port cannot be set.
Also, set up the network after restarting the subsystem and setting the IP address of the maintenance port (refer to System Parameter “4.2 (4) Settig of Maintenance LAN” (SYSPR 04-0100)) when the IP address of the maintenance port is displayed as “0.0.0.0”.
If the array subsystem connected to the NAS Unit is restarted, the cluster between the NAS Units stops.
When the array subsystem is unavoidably restarted, execute it after stopping the cluster between the NAS Units and stopping the NAS OS of both NAS Units. Start the cluster between the NAS Units again after completing the restart of the array subsystem.

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(6) The screen that confirms the following setting contents is displayed.
Please click [Save] if the setting is correct. Please click [Resume] if the setting contents are changed.



(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



(8) The following window is displayed.
Please click [OK], if the setting is continued. Please click [Cancel], if the setting is stopped.
If [Cancel] was clicked, the system parameter is not set up.



(9) If [OK] is clicked, the following window is displayed.



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(10) If the following window is displayed at the later time for a while, the setting is completion.
If [OK] is clicked, it returns to the menu.

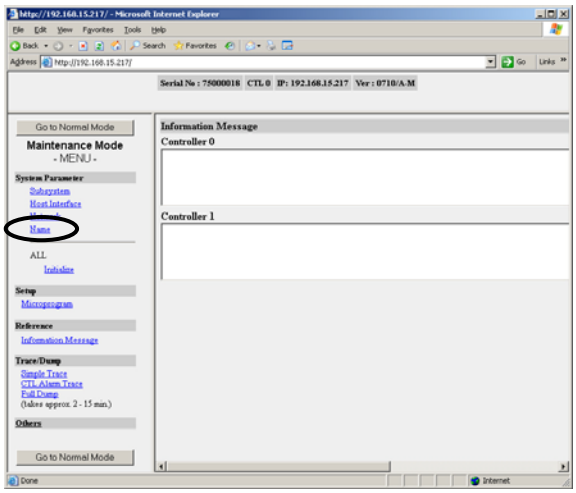


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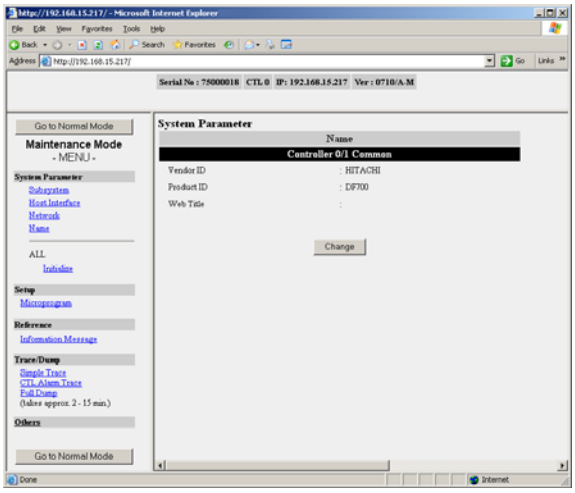
3.2.4 Name

This function can set up/refer to the item of the vendor name, model name etc. of the device.

(1) Please click “Name”.

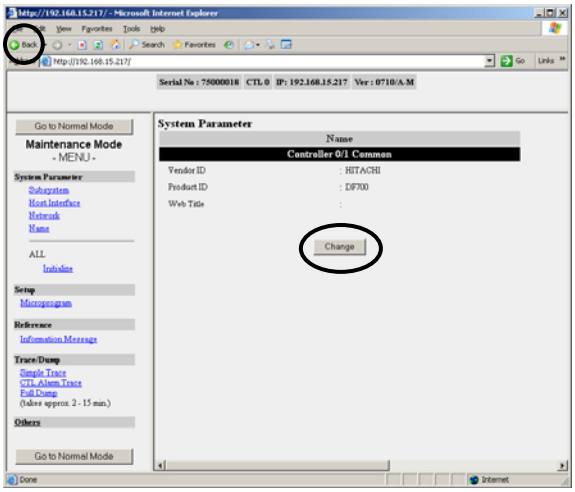


(2) The present setting value (the current value) is displayed.

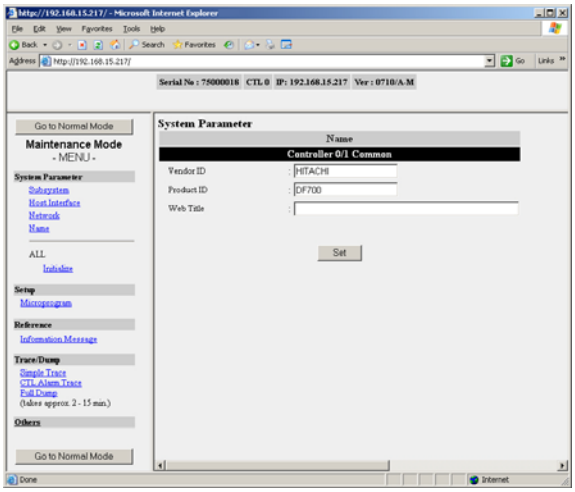


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(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.



(4) Please set up/select the corresponding item that is set up from the pull-down menu or input them.
At this time, please set up the item that is set up all.



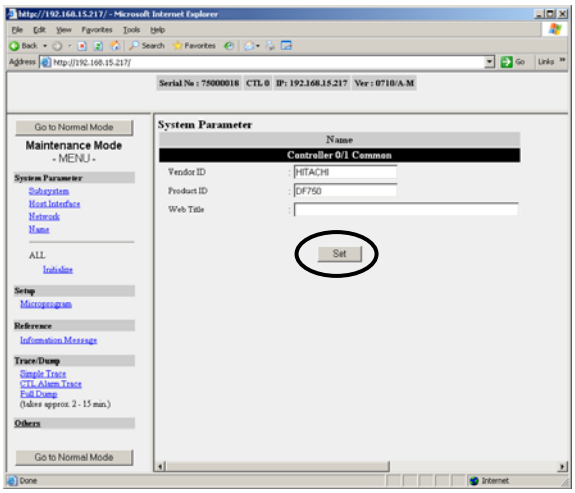
Explanation with regard to each item

[Controller 0/1 Common]

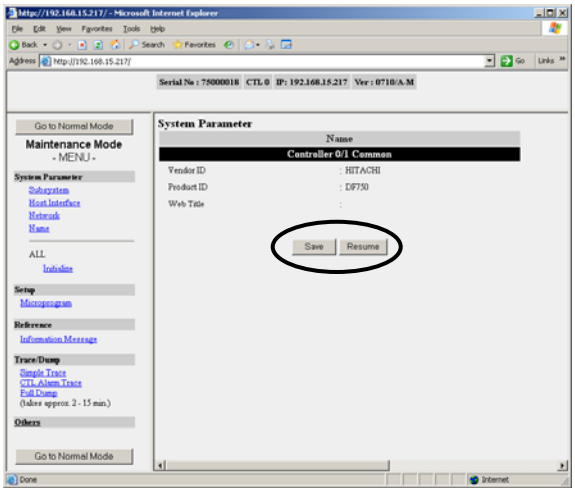
- Vendor ID
  The vendor name that is reported with the Inquiry command is set up.
- Product ID
  The model name that is reported with the Inquiry command is set up.
- Web Title
  Sets the Web Title.

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(5) Please click [Set] after setting completion.



(6) The screen that confirms the following setting contents is displayed.
Please click [Save] if the setting is correct. Please click [Resume] if the setting contents are changed.



(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



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(8) Please click [OK], if the setting is continued. Please click [Cancel], if the setting is stopped. If [Cancel] was clicked, the system parameter is not set up.



(9) If [OK] is clicked, the following window is displayed.



(10) If the following window is displayed at the later time for a while, the setting is completion. If [OK] is clicked, it returns to the menu.



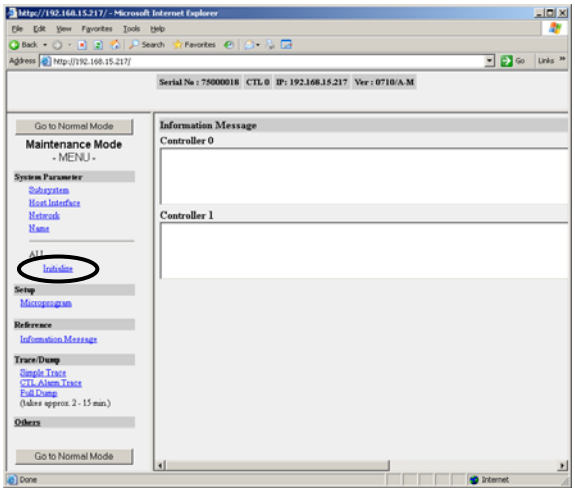
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3.2.5 ALL

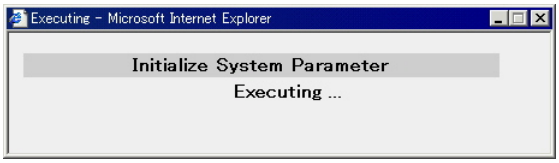
(1) Initialize

This function sets up the system parameter information of the device to the initial state.
If this function was executed, the resetting of the system parameter becomes needed, because the system parameter becomes the initial state.

(a) Please click “Initialize”.



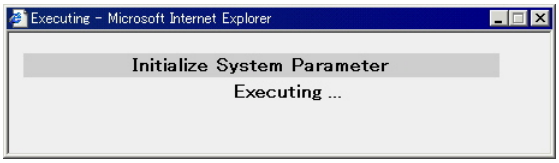
(b) If [Initialize] is clicked, the following window is displayed.



(c) If the following confirmation message is displayed for a while. Please click [OK], if it is continued.



(d) If [OK] is clicked, the following window is displayed.



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(e) The system parameter becomes the initial state, the following window is displayed.
If [OK] is clicked, it returns to the menu.



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3.3 Setup

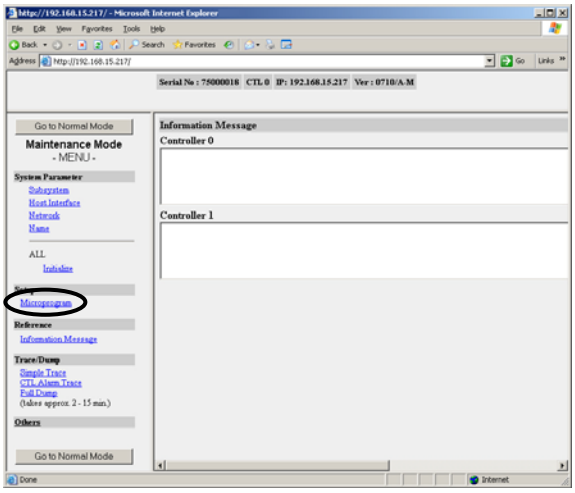
3.3.1 Microprogram

This function installs microprograms of the subsystem. There are two types of installation as shown below.

- Update installation ..... To install the microprograms with configuration information and system parameters taken over
- Initial setting up ..... To install the microprograms with configuration information and system parameters cleared

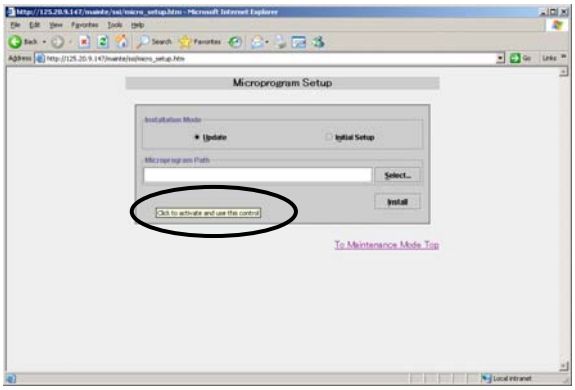
When the version of the microprogram is downgraded, click "Others" of the menu frame beforehand and display the "Others" window, and then check "Down Grade Check" of the displayed main frame for [Disable]. Change "Current" to "Disable" of "Down Grade Check" by clicking the [Change] button. (Refer to "3.6 Others" (WEB 03-0430).)

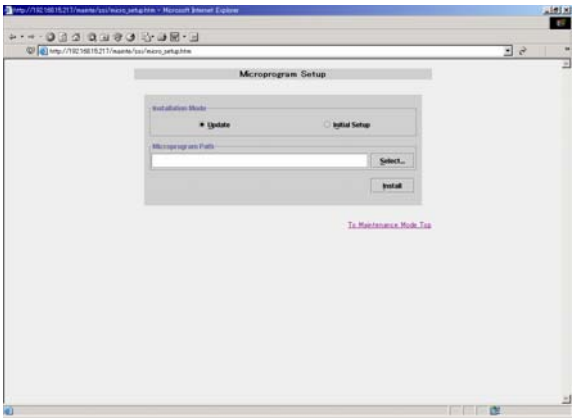
(1) Click "Microprogram".



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(2) When the “Microprogram” is clicked, the following window is displayed.
When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.



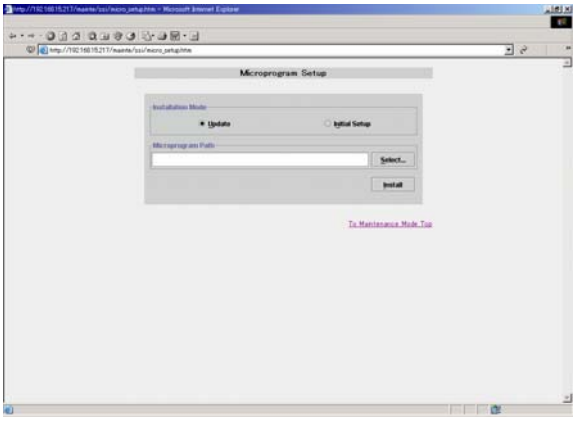


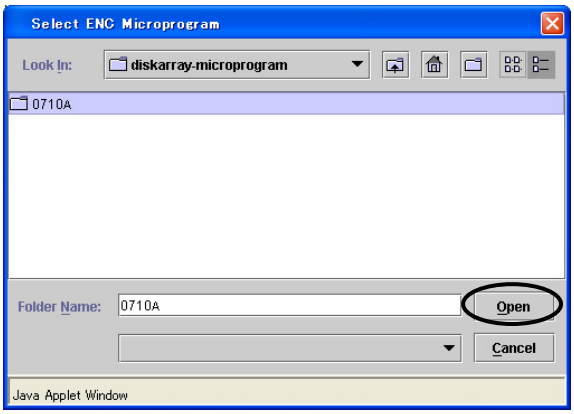
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(3) Select the installation type in the “Install Mode”.

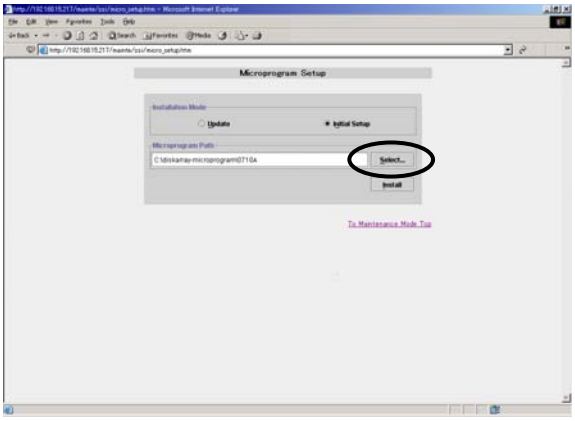
- Update..... Update installation
- Initial Setup..... Initial setting up

In the Microprogram Path field, specify the Unified version directory(‡1) in which the microprogram to be installed is stored.
When the “Select” button is clicked, the “Select Microprogram” window is displayed. Select the Unified version directory in which the microprogram is stored and click the “Open” button.





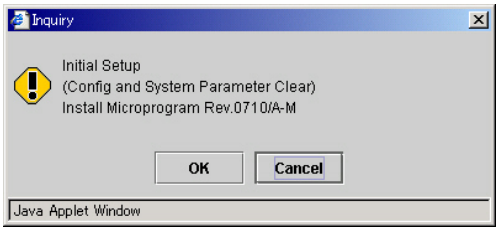
(4) Press the [Install] button.



‡1 : For the unified version directory, refer to “1.3.1 Hierarchy of Microprogram Storage Directories” (MICRO 01-0090).

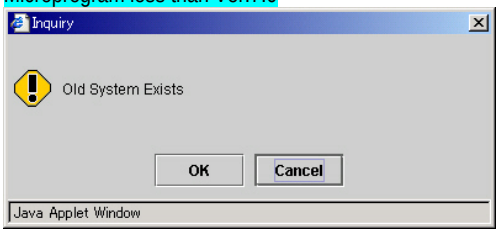
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(5) A dialog box for confirming whether to execute the installation is displayed. Press the [OK] button when you want to install or [Cancel] when you want to abort.

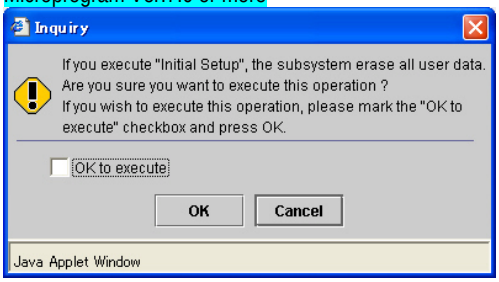


(6) The following dialog box is displayed when the microprogram has already been installed in the subsystem in the case where the initial setting up is specified.

Microprogram less than Ver.7.0



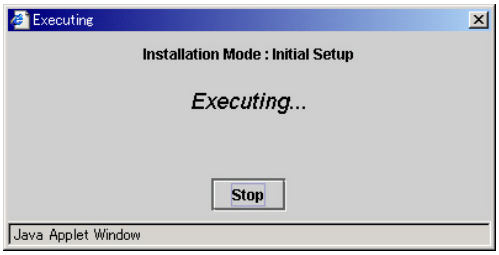
Microprogram Ver.7.0 or more



(7) When you want to continue the installation, press the [OK] button. When you want to abort the installation, press the [Cancel] button.

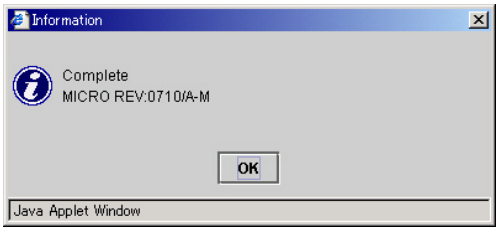
(8) When the installation is started, the following dialog box showing that the installation is in progress is displayed. The installation type and a name of a file being processed is displayed in the dialog box. When you abort the installation, press the [Stop] button.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the window in the procedure (9) was displayed, execute the new installation procedure again from the beginning.



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(9) When the installation is completed, the completion window is displayed. Click the [OK] button.



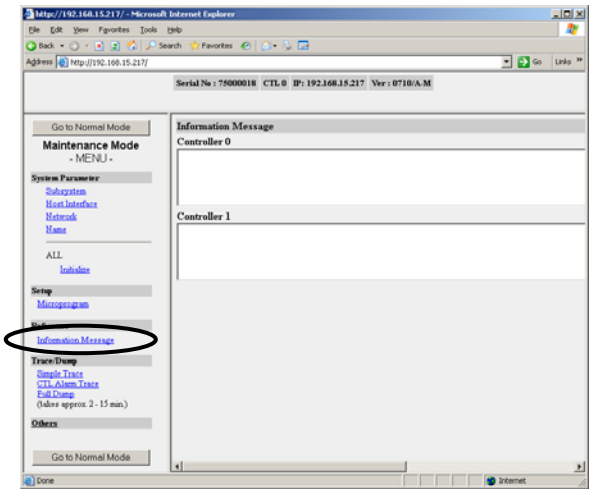
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3.4 Reference

3.4.1 Information Message

If the abnormality occurred to the array device, this function displays the fault information.

The fault information of Controller # 0 is displayed in “Information Message” and the fault information of Controller # 1 is displayed in “Information Message”.



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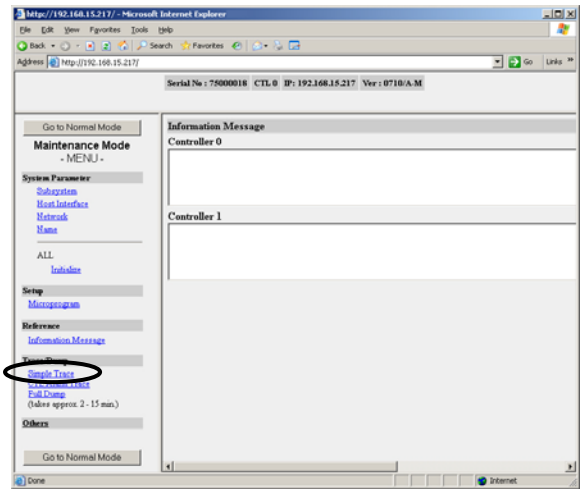
3.5 Trace/Dump

3.5.1 Collecting Simple Trace

This is a function to download current trace information.
To perform the down-load, a free capacity of approximately 30 M bytes is required in the PC.
Simple Trace of both the Controllers can be collected through one Controller. It is not necessary to collect from both the controllers. (When it is collected from Control Unit #0, File name is "smpl_trc0.dat". When collected from Control Unit #1, file name is "smpl_trc1.dat.")

(1) Clear the cache of the browser in the following procedure before collecting the Simple Trace so that the old data collected last time is not saved.
- In the case of Internet Explorer, select the [Tools], [Internet Options], [General], [Temporary Internet files], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

(2) Click "Simple Trace" in the menu frame.



(3) When the "Simple Trace" is clicked, the following window is displayed.

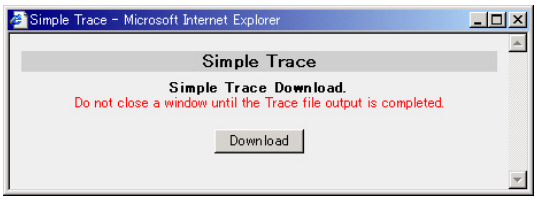


(4) When the [OK] button is clicked, the following window is displayed.



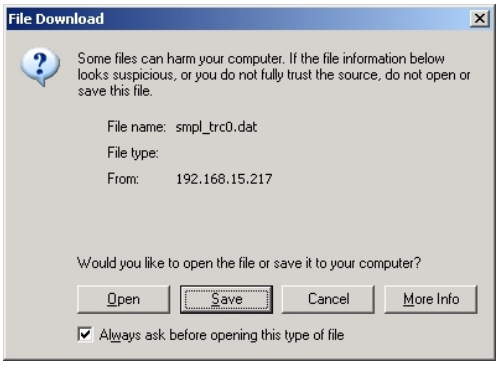
(5) The following window is displayed. Click the [Download] button.

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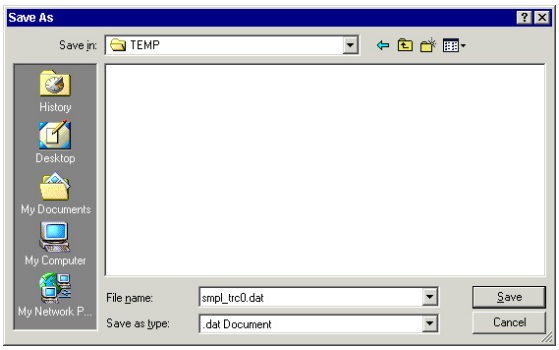


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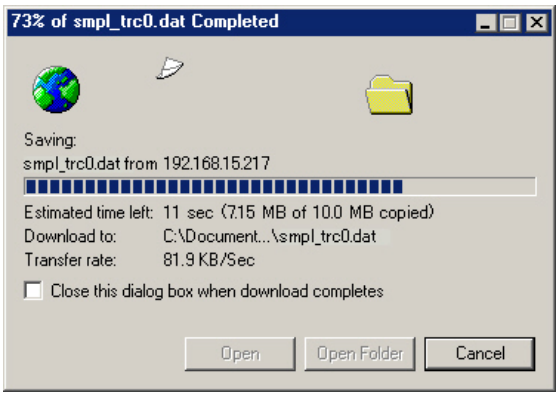
(6) Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



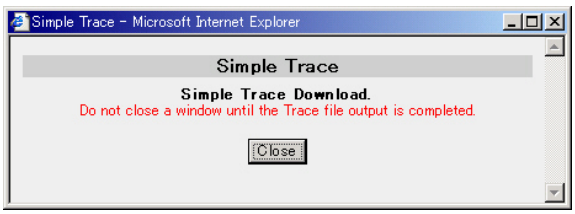
(7) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.(‡1) Please click [Cancel], if it is stopped.



(8) The following window is displayed during execution download.



(9) The [Download] button changes to the [Close] button, so that, click the [Close] button and close the window when the download is completed.



‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

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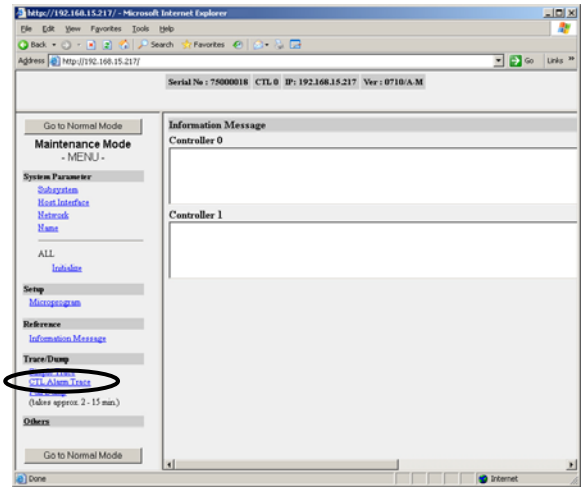
3.5.2 Collecting CTL Alarm Trace

This is a function to download CTL Alarm trace information which is saved on the cache when a Controller is detached.
To perform the down-lord, a free capacity of approximately 20 M bytes (When Copy-on-write SnapShot Function is valid: approximately 40 M bytes) is required in the PC.
Collect CTL Alarm Trace from each Control Unit.
In order to distinguish from which Control Unit it is collected, store the collected data in different directories or with different file names.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

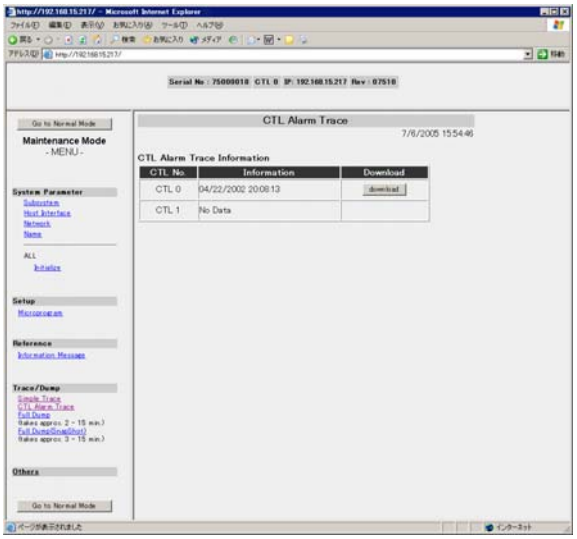
(1) Clear the cache of the browser in the following procedure before collecting the CTL Alarm Trace so that the old data collected last time is not saved.
- In the case of Internet Explorer, select the [Tools], [Internet Options], [General], [Temporary Internet files], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

(2) Click “CTL Alarm Trace” in the menu frame.
The CTL Alarm Trace Information window is displayed when the CTL alarm trace information is present.



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(3) To download the CTL Alarm trace information, press the "Download" button on the Control Unit side to be collected in "CTL Alarm Trace information".(‡1)



The following is displayed as contents of the information.

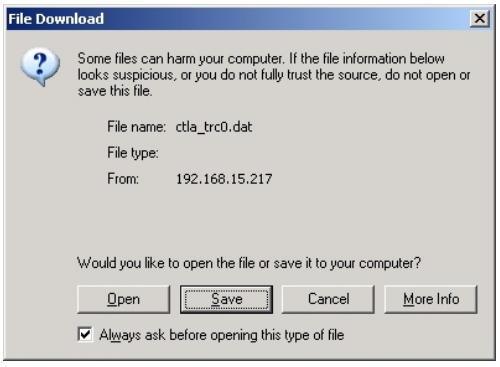
[Not Ready] ..... : A status in which the trace area is not established in the subsystem

[Not Data] ..... : A status in which the CTL Alarm trace information is not present or being generated

[MM/DD/20XY hh:mm:ss] . : A status in which the CTL alarm trace information is present

NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL alarm trace may not be collected normally. Therefore, collect the simple trace.
If simple trace cannot be obtained through detached Controller, connect the Maintenance PC to the Controller at the opposite side, and collect the simple trace.

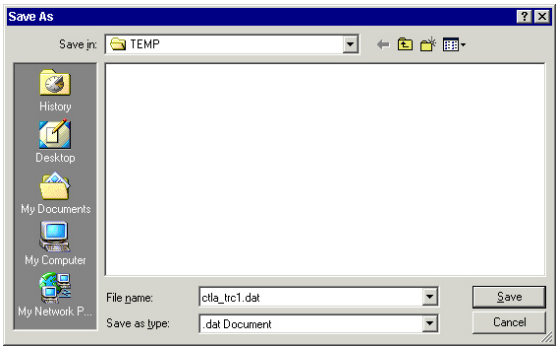
(4) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



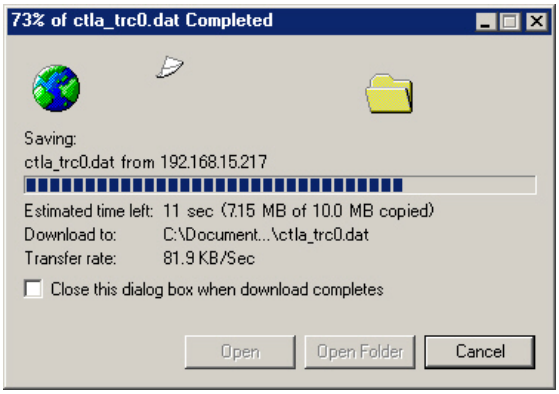
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

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(5) If the following window is displayed. Please click [Save] after file name is setting, if it is continued. Please click [Cancel], if it is stopped.



(6) The following window is displayed during execution download.



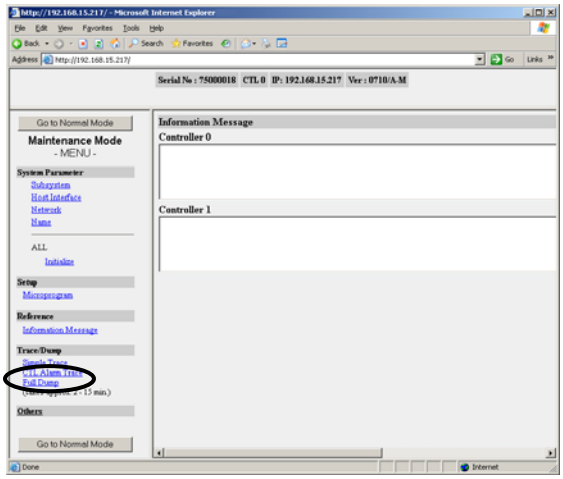
(7) The download completes.

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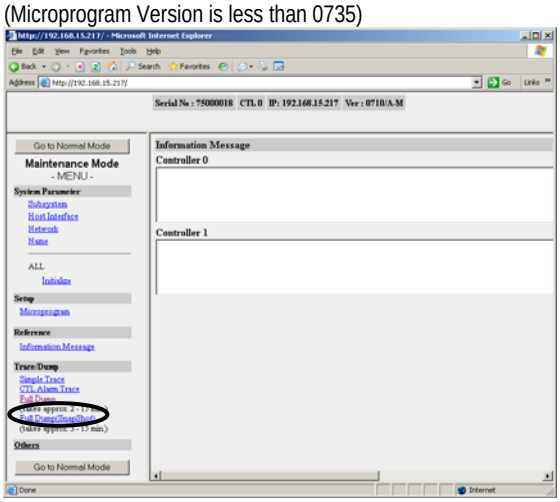
3.5.3 Collecting Full Dump

This function (Full Dump) is to download the logging information of the subsystem. The menu frame differs whether the priced optional feature, "Copy-on-write SnapShot Function", is installed or not.

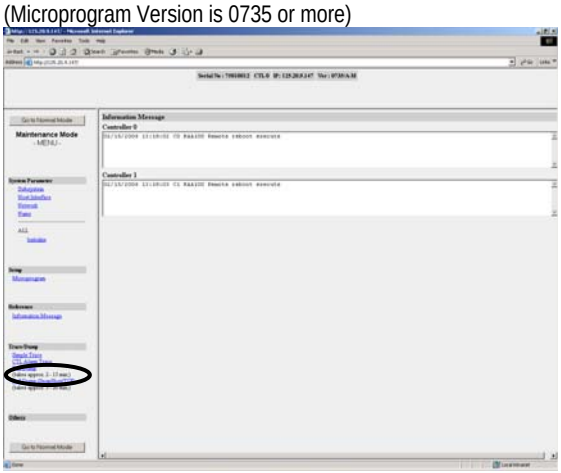
"Copy-on-write SnapShot Function" uninstalled



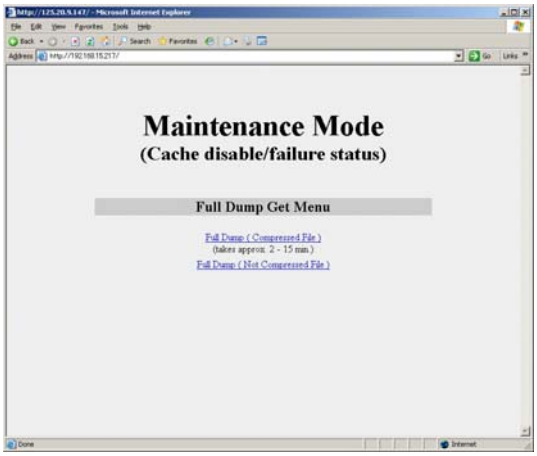
"Copy-on-write SnapShot Function" installed
(Microprogram Version is less than 0735)



"Copy-on-write SnapShot Function" installed
(Microprogram Version is 0735 or more)



The cache memory access failure occurs when the following window is displayed. Refer to "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).



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When Copy-on-write SnapShot Function is installed, the information downloaded by this function (Full Dump) does not include the information in Copy-on-write SnapShot.
Collect Full Dump from each Control Unit.

In order to distinguish from which Control Unit it is collected, store the collected data in different directories or with different file names.
To download, the following free capacity size is needed on PC.

- When Copy-on-write SnapShot Function is not installed

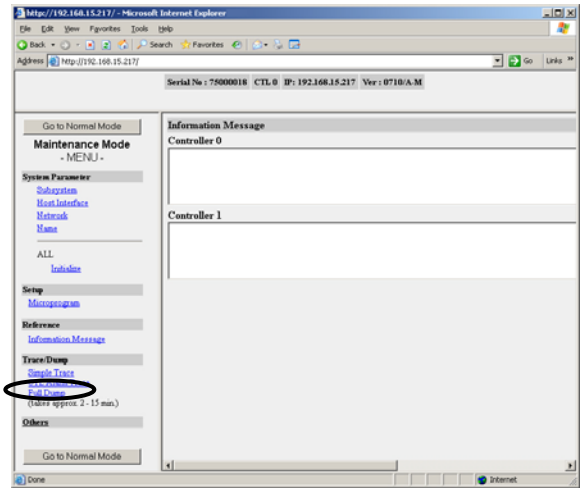
	Installed cache of the subsystem	Free Capacity needed on PC	
		no compression	compression (*1)
RKM	1 G bytes (Minimum)	753 M bytes	75 M bytes
	4 G bytes (Maximum)	922 M bytes	92 M bytes
RKS	1 G bytes (Minimum)	443 M bytes	44 M bytes
	2 G bytes (Maximum)	472 M bytes	47 M bytes
RKXS	512 M bytes (Minimum)	405 M bytes	41 M bytes
	1 G bytes (Maximum)	443 M bytes	44 M bytes
RKH	2 G bytes (Minimum)	1,414 M bytes	141 M bytes
	8 G bytes (Maximum)	1,724 M bytes	172 M bytes

*1 : The value with compression has described the value when the compression rate is 10% as a standard.

NOTE : When this function is used, the menu other than Logging Data comes not to use it. Please enter into the Maintenance Mode again by the reset switch of the Controller, once again, if other menus are used, after this function was used.

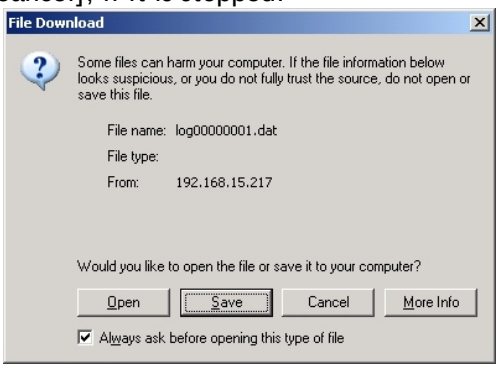
(1) Clear the cache of the browser in the following procedure before collecting the Full Dump so that the old data collected last time is not saved.
- In the case of Internet Explorer, select the [Tools], [Internet Options], [General], [Temporary Internet files], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

(2) Please click “Full Dump”.

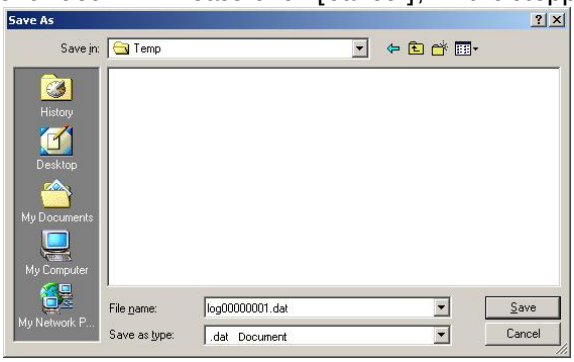


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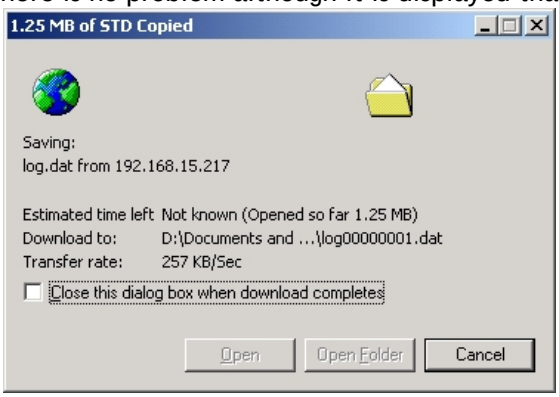
(3) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(4) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.(‡1) Please click [Cancel], if it is stopped.



(5) The following window is displayed during execution download.
There is no problem although it is displayed that the presumption remaining time is uncertain.



(6) The download completes.

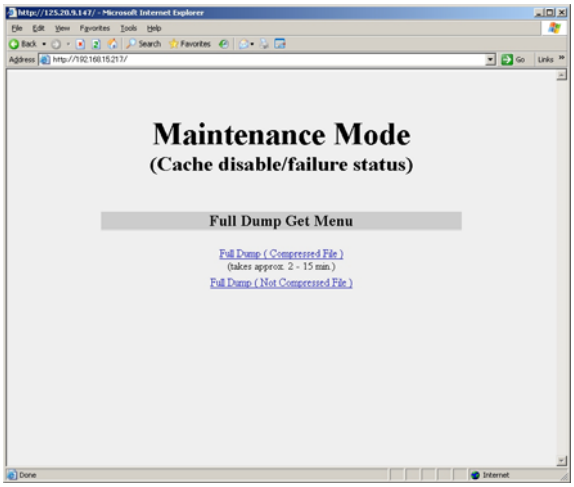
‡1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logx.dat" or any other name. (x: Controller serial numbers)

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3.5.4 Collecting Full Dump (Full Dump(SnapShot/TCE))

This function (Full Dump(SnapShot)) is effective only when the priced optional feature, "Copy-on-write SnapShot Function" or "TrueCopy Extended Distance Function", is installed. If not, this menu frame may not be displayed.

The cache memory access failure occurs when the following window is displayed. Refer to "3.1.1 WEB Operation in the Maintenance Mode during the Cache Memory Access Failure" (WEB 03-0040).



This function (Full Dump(SnapShot)) downloads the logging information of the subsystem. The downloaded information includes the information in Copy-on-write SnapShot.
Collect Full Dump from each Control Unit.
In order to distinguish from which Control Unit it is collected, store the collected data in different directories or with different file names.
To download, the following free capacity size is needed on PC.

	Installed cache of the subsystem	Free Capacity needed on PC	
		no compression	compression (*1)
RKM	1 G bytes (Minimum)	853 M bytes	85 M bytes
	4 G bytes (Maximum)	2,970 M bytes	297 M bytes
RKS	1 G bytes (Minimum)	720 M bytes	72 M bytes
	2 G bytes (Maximum)	1,496 M bytes	150 M bytes
RKXS	512 M bytes (Minimum)	–	–
	1 G bytes (Maximum)	758 M bytes	76 M bytes
RKH	2 G bytes (Minimum)	1,926 M bytes	193 M bytes
	8 G bytes (Maximum)	5,820 M bytes	582 M bytes

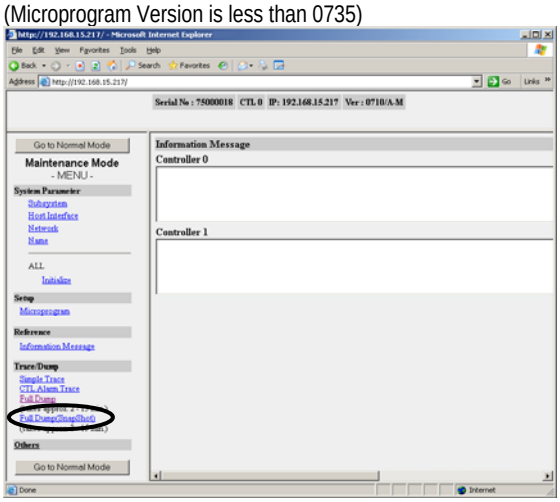
*1 : The value with compression has described the value when the compression rate is 10% as a standard.

NOTE : When this function is used, the menu other than Logging Data comes not to use it. Please enter into the Maintenance Mode again by the reset switch of the Controller, once again, if other menus are used, after this function was used.

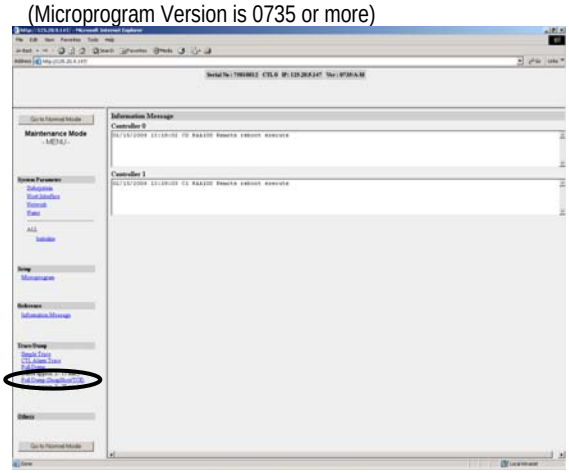
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(1) Please click "Full Dump(SnapShot)" or "Full Dump(SnapShot/TCE)".

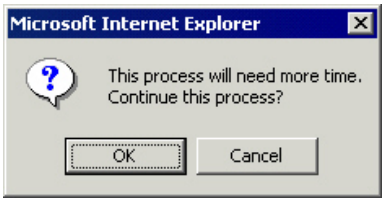
"Copy-on-write SnapShot Function" installed
(Microprogram Version is less than 0735)



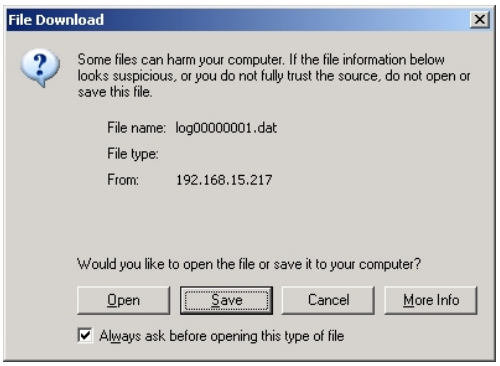
"Copy-on-write SnapShot Function" installed
(Microprogram Version is 0735 or more)



(2) The following window is displayed. Please click [OK], if it is continued. Please click [Cancel], if it is stopped.

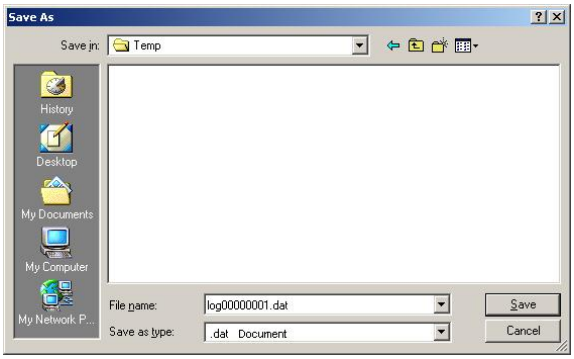


(3) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.

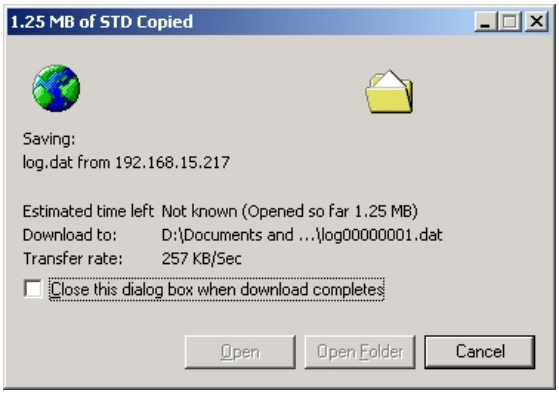


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(4) If the following window is displayed. Please click [Save] after file name is setting, if it is continued.(‡1) Please click [Cancel], if it is stopped.



(5) The following window is displayed during execution download.
There is no problem although it is displayed that the presumption remaining time is uncertain.



(6) The download completes.

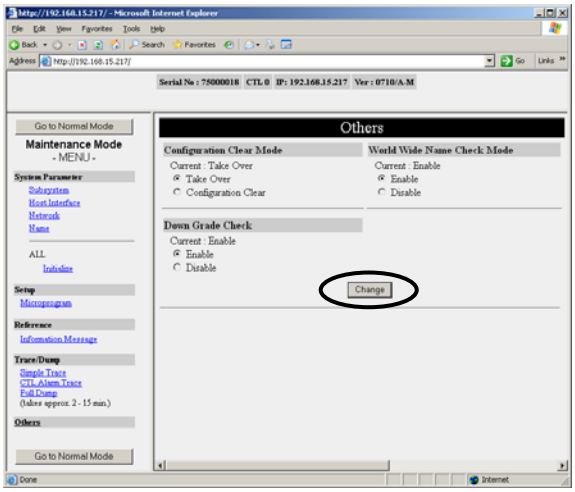
‡1 : There may be a case where the default file name is given as "logx.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logx.dat" or any other name. (x: Controller serial numbers)

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3.6 Other

The others are set up.
The contents that were set up in this function are not taken over and not step over the PS-OFF/ON.

(1) Please confirm the setting value of each item and click the check box of the item that the setting contents are changed. Please click [Change], if the setting contents are updated.



Explanation with regard to each item

- Configuration Clear Mode
  The transfer information initialization as the booting is designated.
  [Take Over] : Transfer booting (default).
  [Configuration Clear] : Default booting.
- World Wide Name Check Mode
  The World Wide Name Check Mode as the booting is designated.
  [Enable] : The WWN Check is executed (default).
  [Disable] : The WWN Check is not executed.
- Data Down Grade Check Mode
  It specifies whether to make the check of the version downgrade of the microprogram enable or disable when performing the update installation of the microprogram by using WEB.
  [Enable] : Guard the version downgrade of the microprogram (default).
  It is specified usually when the version of the microprogram is updated.
  [Disable] : The version downgrade of the microprogram is not checked.
  It is specified before the update installation is performed when the version of the microprogram is downgraded.

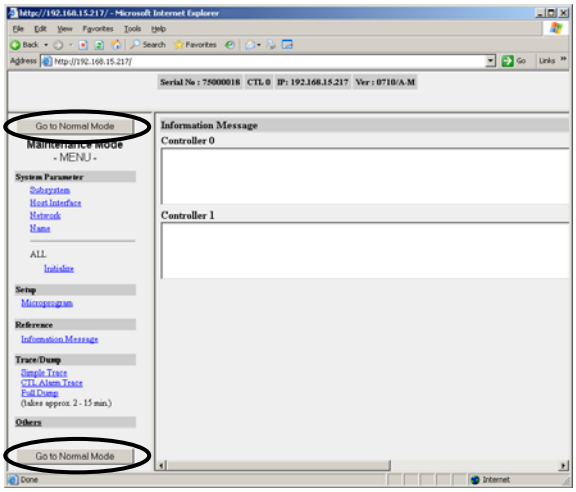
(2) Please confirm that the setting value was updated.

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3.7 Return Method to the Normal Mode

The method that returns from the Maintenance Mode to the Normal Mode is shown.

(1) Please click [Go To Normal Mode]. The button of [Go To Normal Mode] is in the top and down on the menu window. Please select either button.



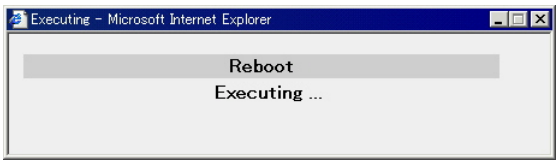
(2) The following window is displayed during execution.



(3) If the following confirmation message is displayed for a while. Please click [OK], if it is continued.



(4) The following window is displayed during execution.



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(5) If the return to the Usually Mode completes, the array device becomes the Ready status. Please confirm that the READY LED of the device entire surface is lighted. (Usually Controller recovers in about four minutes. (about five minutes in case of the RKH))
Check that the READY LED (green) on the front of the Basic Chassis lights up, and the ALARM LED (red) and the WARNING LED (orange) go out(‡1). The READY LED (green) may blink at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH) or the WARNING LED (orange) may blink at high speed (for the maximum of 30 to 85 minutes) before the READY LED (green) on the front of the Basic Chassis lights up.

‡1 : When it is blinking at low speed, perform the maintenance according to the recovery method of the message referring to the Information Message on WEB. If the subsystem is in the WARNING status when the Information Message on WEB was referred to, the WARNING LED (orange) on the front of the Basic Chassis lights up, and if the subsystem is not in the WARNING status, the WARNING LED (orange) goes out.

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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Apr.28.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	Issued	-
1	May.20.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	All pages were re-numbers and correction was changed.	CH/CR
						"Hitachi RAID Manager"→"RAID manager".	CH
						"SPC-2 Mode" was added at Host Connection Mode 2.	AD
						"User Port"→"User Management Port"	CH
						Changed SNM screen.	CH
						A description of "Remote Adapter" in the Addition/ Subtraction/ Relocation was deleted.	DL
						Installation Figure of I/F Board was changed. (Positioning hole/pin)	CH
						Regarding Fibre Channel Failure was changed in Troubleshooting 5.	CH
						Flow chart of 6.1.5, 6.1.6 and 6.1.7 in the Troubleshooting was changed.	CH
						Action(s) to be taken of 8.2 (5-3) and (6) in the Troubleshooting was changed.	CH
						Message code was added. ("HH2B00", "HH2C00", "HH2D00", "HZ0T00", "I0030x", "RBE800", "RBE900")	AD
						Message code was deleted. ("HH2300", "HH2400", "R50000", "R50100")	AD
						Battery switch was changed.	CH
						"(There may be ...installed.)" was added to "Procedure for replacement with the power turned on".	AD
2	Jul.29.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.1 → 2	
					GENE 0020	Description of "RS232C" was deleted.	DL
						Description of "(before removing bezel)" and "• Be sure to keep the wrist band close to the subsystem." were deleted.	DL
					GENE 0040, GENE 0050, GENE 0110	Description of RKXS was added.	AD
					GENE 0050	Table 2. was added.	AD
						Description of RKAATL/RKAJATL was added.	AD
					GENE 0130	System Parameter 3.6 was added.	AD
					GENE 0140, GENE 0150	Description of the additional subsystem of DF600 was added.	AD
					GENE 0170	6.1.17 was added.	AD
					GENE 0180	Page of 7.2 and 7.3 were changed.	CH
					SAFE 0100, SAFE 0110, SAFE 0140, SAFE 0160, SAFE 0170	Description of RKXS was added.	AD
					SAFE 0140	"(before removing bezel)" and "Please be sure to keep a wrist strap near the subsystem." was deleted.	DL
						"• When you install is Control Unit, ..." and "• When you install is ENC Unit, ..." were moved from page SAFE 0150.	AD
					SAFE 0150	"• When you install is Control Unit, ..." and "• When you install is ENC Unit, ..." were moved to page SAFE 0140.	DL
						"• For the system Disk Drives, ..." and "• Do not remove these two at, ..." were moved from page SAFE 0160.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SAFE 0160	"• For the system Disk Drives, ..." and "• Do not remove these two at, ... " were moved to page SAFE 0150.	DL
						"• When a device is kept ..." was moved to page SAFE 0161.	DL
					SAFE 0161	This page was newly added. ("• When a device is kept ..." was moved from page SAFE 0160. Description of two Notes were added.)	AD
					SAFE 0162, SAFE 0182	This page was newly added. (Blank page)	AD
					SAFE 0170, SAFE 0180, SAFE0181, SAFE 0190, SAFE 0200, SAFE 0210, SAFE 0220, SAFE 0230	Warning Labels was changed.	CH
					SAFE 0180, SAFE 0190, SAFE 0200	Number was corrected.	CR
					SAFE 0181	Description of RKXS was added. (New page)	AD
					SAFE 0210	Description of RKXS was added	AD
						RKAJ was moved to page SAFE 0220.	DL
					SAFE 0220	RKAJ was moved from page SAFE 0210.	AD
						RKAJAT was moved to page SAFE 0230.	DL
					SAFE 0230	RKAJAT was moved from page SAFE 0220.	AD
						U7 rack frame was moved to page SAFE 0240.	DL
					SAFE 0240	This page was newly added. (U7 rack frame was moved from page SAFE 0240.)	AD
					THEO 02-0000, THEO 02-0020, THEO 02-0030, THEO 02-0050, THEO 02-0070, THEO 03-0020, THEO 03-0060, THEO 03-0100, THEO 03-0140, THEO 03-0190, THEO 04-0200, THEO 04-0210, THEO 04-0230, THEO 04-0260, THEO 04-0340, THEO 04-0350, THEO 04-0370	Description of RAID 6 was added.	AD
					THEO 02-0020, THEO 02-0040, THEO 02-0050, THEO 02-0060, THEO 02-0080, THEO 02-0090, THEO 02-0100, THEO 02-0110, THEO 02-0120, THEO 02-0130, THEO 02-0140, THEO 02-0150, THEO 02-0160, THEO 02-0170, THEO 02-0180, THEO 02-0190, THEO 02-0210, THEO 02-0230, THEO 02-0240, THEO 02-0250, THEO 02-0270, THEO 02-0280, THEO 02-0290, THEO 03-0010, THEO 03-0090, THEO 03-0130, THEO 04-0000, THEO 04-0010, THEO 04-0020, THEO 04-0030, THEO 04-0040, THEO 04-0160, THEO 04-0260, THEO 04-0290, THEO 05-0010	Description of RKXS was added.	AD
					THEO 02-0050	(3) was moved to page THEO 02-0050.	DL
					THEO 02-0060	(3) was moved from page THEO 02-0050.	AD
					THEO 02-0120, THEO 02-0130	Figure was changed with UPS cover.	CH
					THEO 02-0170, THEO 02-0190	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					THEO 02-0220	Connection line of Connection diagram of Power Supply System was corrected.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0221, THEO 02-0222, THEO 02-0271, THEO 02-0272, THEO 02-0291, THEO 02-0292, THEO 03-0001, THEO 03-0002, THEO 03-0081, THEO 03-0082, THEO 03-0083, THEO 03-0084, THEO 03-0161, THEO 03-0162, THEO 03-0163, THEO 03-0164	These pages were newly added.	AD
					THEO 02-0300, THEO 02-0310, THEO 02-0330	Corrected flash program name. (Fixed part Flash program or Main part Flash program)	CR
					THEO 03-0000, THEO 03-0001, THEO 03-0010	Corrected subsystem figure.	CR
					THEO 03-0040, THEO 03-0080, THEO 03-0110, THEO 03-0150	Corrected Cache Memory capacity.	CR
					THEO 03-0100, THEO 03-0140, THEO 03-0162	The size of the chassis with the U7 rack was changed.	CH
					THEO 04-0340	(d) was added. (The item number is changed afterwards.)	AD
						(e) was moved to page THEO 04-0350.	DL
					THEO 04-0350	"In the case of 2D + 2P to 28D + 2P" of (d) was added.	AD
						(f) was moved to page THEO 04-0370.	DL
					THEO 04-0360	This page was newly added. ((e) was moved from page THEO 04-0340.)	AD
					THEO 04-0370	This page was newly added. ((f) was moved from page THEO 04-0350.)	AD
					INST 01-0000, INST 01-0100, INST 01-0130, INST 02-0200, INST 02-0250, INST 02-0270, INST 02-0330, INST 03-0490	Description of "(before removing bezel)" and "• Be sure to keep the wrist band close to the subsystem." were deleted.	DL
					INST 01-0010	"If the array subsystem used ..." was added to (3).	AD
					INST 01-0020, INST 01-0030, INST 01-0060, INST 01-0080, INST 01-0100, INST 01-0120, INST 01-0130, INST 01-0290, INST 01-0300, INST 01-0310, INST 02-0020, INST 02-0030, INST 02-0040, INST 02-0050, INST 02-0060, INST 02-0100, INST 02-0110, INST 02-0120, INST 02-0140, INST 02-0180, INST 02-0190, INST 02-0210, INST 02-0240, INST 02-0250, INST 02-0290, INST 02-0300, INST 02-0310, INST 02-0320, INST 02-0350, INST 02-0360, INST 03-0310, INST 03-0320, INST 03-0350, INST 03-0360, INST 03-0390, INST 03-0400, INST 03-0420, INST 03-0430, INST 03-0440, INST 03-0500, INST 03-0510, INST 03-0520, INST 03-0530, INST 03-0540, INST 03-0550, INST 03-0600, INST 03-0610, INST 03-0640, INST 03-0650, INST 03-0660, INST 03-0670	Description of RKXS was added.	
					INST 01-0040, INST 01-0050, INST 02-0170	Description of 2G bytes type cache memory was added.	AD
					INST 01-0040, INST 01-0050	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					INST 01-0050	"RKM"→ "RKS"	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0051	Number of Basic subsystem cable was corrected 4 to 2.	CR
					INST 01-0051, INST 01-0091, INST 01-0171, INST 02-0171, INST 02-0331, INST 03-0501, INST 03-0631, INST 03-0701, INST 03-0702	These pages were newly added. (Description of RKXS was added.)	AD
					INST 01-0052, INST 01-0092, INST 01-0172, INST 02-0172, INST 02-0332, INST 03-0502, INST 03-0632	These pages were newly added. (blank page)	AD
					INST 01-0060	Subsystem name was deleted in number 3.	DL
						Description of Upgrade kit and Unit addition support kit were added.	AD
						Description of RKAATL/RKAJATL was added.	AD
						Quantity of U7PDB was changed.	CH
					INST 01-0070	"FC cable assembly for 2 G bps" → "ENC cable"	CH
					INST 01-0160, INST 01-0170, INST 01-0290, INST 01-0300,	Figure was changed with UPS cover.	CH
					INST 01-0180, INST 01-0200, INST 01-0270	"Storage Navigator Modular version is Ver.2.00 or later" was added.	AD
					INST 01-0200, INST 01-0210, INST 01-0280	"NOTE" was added.	AD
					INST 01-0290	"If the array subsystem ..." was added.	AD
						Figure 1.7.1 was moved to INST 01-0300.	CH
					INST 01-0300	Figure 1.7.1 was moved fromINST 01-0300.	AD
					INST 01-0310	"Note" was corrected to "NOTE".	CR
					INST 01-0330	*2 was added to Table 1.8.1.	AD
					INST 02-0010, INST 03-0010	Wrist band was added to the names in the table.	AD
					INST 02-0130	Size of figure was changed.	CH
					INST 02-0170	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					INST 02-0220	(ii) was changed.	CH
					INST 02-0260	Description of SENC Unit was added.	AD
					INST 02-0290	Figure was changed with UPS cover.	CH
						"Check the RKM..." was added to (8).	AD
					INST 02-0310	"The aspect…"was added at NOTE.	AD
					INST 02-0330	Figure title was changed.	CH
						Figure was changed with UPS cover.	CH
					INST 02-0340	Figure 2.6.2 was changed to Figure 2.6.3.	CR
					INST 03-0120, INST 03-0190, INST 03-0240, INST 03-0290, INST 03-0460, INST 03-0470, INST 03-0480	Subsystem name was changed.	CH
					INST 03-0320	Figure 3.3.2 (a) was changed.	CH
					INST 03-0400	Figure 3.4.7 was changed.	CH
					INST 03-0440	Warning Labels was changed.	CH
					INST 03-0500	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					INST 03-0520	"Check the RKM..." was added to (1-3).	AD
					INST 03-0560	Note was added to the figure.	AD
					INST 03-0570	(ii) was changed.	CH
					INST 03-0620, INST 03-0630	Note was added to the figure.	AD
					INST 03-0620, INST 03-0630, INST 03-0680, INST 03-0700	Figure was changed with UPS cover.	CH
					INST 03-0640	"LOCATION" was added to (1).	AD
					INST 03-0660	Figure 3.4.34 was changed.	CH
					INST 03-0670	"According to the cable..." was added.	AD
						(e) was moved to INST 03-0680.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0680	(e) was moved from INST 03-0670.	AD
					INST 03-0690	Description of RKS/RKAJAT were added.	AD
					INST 03-0700	RKAJAT was added to the figure title.	AD
					INST 03-0710	Description style was corrected.	CR
					MICRO 01-0100	"If the array subsystem ..." was added.	AD
					MICRO 01-0140	"Note" was corrected to "NOTE".	CR
					MICRO 01-0211, MICRO 01-0212	These pages were newly added. ((4) was added.)	AD
					MICRO 01-0211	Description of RKAATL/RKAJATL was added.	AD
					MICRO 02-0000	Recovery Procedure of RBA000 was changed.	CH
					SYSPR 01-0000	Reference head in flow was changed. (Chapter 7. → 4.2)	CH
						"Precautions when restarting" was added.	AD
					SYSPR 01-0030, SYSPR 03-0170, SYSPR 03-0290	Description of RKXS was added.	AD
					SYSPR 01-0030	Figure was changed with UPS cover.	CH
					SYSPR 03-0050, SYSPR 03-0060, SYSPR 03-0080, SYSPR 03-0090, SYSPR 03-0100, SYSPR 03-0130, SYSPR 03-0140, SYSPR 03-0150, SYSPR 03-0210, SYSPR 03-0220, SYSPR 03-0230, SYSPR 03-0250, SYSPR 03-0260, SYSPR 03-0270, SYSPR 03-0280, SYSPR 03-0300, SYSPR 03-0320, SYSPR 03-0340	Changed SNM screen.	CH
					SYSPR 03-0060, SYSPR 03-0100, SYSPR 03-0230, SYSPR 03-0260	"Click [RAID Groups] in the unit..." was added.	AD
					SYSPR 03-0070	(g) was changed.	CH
						*1 was deleted.	DL
					SYSPR 03-0081, SYSPR 03-0082	These pages were newly added.	AD
					SYSPR 03-0090, SYSPR 03-0140, SYSPR 03-0220	" Also, click [RAID Groups]" was added.	AD
					SYSPR 03-0170, SYSPR 03-0190	Description of RAID 6 was added.	AD
					SYSPR 03-0180	Size in the table was changed.	CH
					SYSPR 03-0190	(v) was moved to page SYSPR 03-0191.	DL
					SYSPR 03-0191	This page was newly added. ((v) was moved from page SYSPR 03-0190.)	AD
						Description of 71.6 was corrected to 71.3.	CR
					SYSPR 03-0192	This page was newly added.	AD
					SYSPR 03-0280	Table 3.3.4 was moved from page SYSPR 03-0290.	AD
						The item was added to Restriction in Table 3.3.4.	AD
						The description of LAN connection in Table 3.3.4 was deleted.	DL
					SYSPR 03-0290	Table 3.3.4 was moved to page SYSPR 03-0280.	DL
						Specify the formatting was added.	AD
					SYSPR 03-0291	This page was newly added. (<Standard of LU Format Processing Time> was added.)	AD
					SYSPR 03-0292	This page was newly added. (<Standard of LU Format Processing Time> was added.)	AD
					SYSPR 03-0320	Description of (c) and (d) was changed.	CH
						"When the "Quick" is specified" of (d) was deleted.	DL
					SYSPR 03-0420, SYSPR 03-0430	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 04-0030	Description of “Factory setting ⑤” in No.5 was changed.	CH
						② was added to No.11.	AD
					SYSPR 04-0040, SYSPR 04-0150, SYSPR 04-0240	“Note” was corrected to “NOTE”.	CR
					SYSPR 04-0060	Figure was added to (c).	AD
					SYSPR 04-0061, SYSPR 04-0062	These pages were newly added.	AD
					SYSPR 04-0090	(a) was changed.	CH
						(b) was added.	AD
					SYSPR 04-0091, SYSPR 04-0092, SYSPR 04-0231, SYSPR 04-0232	These pages were newly added.	AD
					SYSPR 04-0120	Style of ① was changed.	CH
					SYSPR 04-0200	“Yes” and “No” was added to ④.	CH
					SYSPR 04-0230	Format Data was added.	AD
					SYSPR 04-0250	(b) and (c) were added.	AD
					SYSPR 05-0060	Figure was added to (6).	AD
						“When you choose to restart...” was moved to SYSPR 05-0070	CH
					SYSPR 05-0070	“When you choose to restart...” was moved from SYSPR 05-0060	AD
					SYSPR 06-0000	(1) to (5) were added.	AD
					SYSPR 07-0000	Line of * was deleted.	DL
					SYSPR 07-0010 to SYSPR 07-0050	Line of Host Connection Mode 1 to Host Connection Mode 2 was deleted.	DL
					ADD 01-0000	Description of “(7)” and “(8)” were added.	AD
					ADD 01-0001, ADD 01-0002	These pages were newly added.	AD
					ADD 01-0010, ADD 01-0020, ADD 01-0040, ADD 01-0060, ADD 01-0100, ADD 01-0240, ADD 01-0580, ADD 01-0660, ADD 01-0750, ADD 01-0760, ADD 01-0770, ADD 01-0780, ADD 01-0790, ADD 01-0800, ADD 01-0810, ADD 01-0820, ADD 01-0830, ADD 01-0840, ADD 01-0850, ADD 01-0880, ADD 01-0890, ADD 01-0900, ADD 01-0910, ADD 01-0920, ADD 01-0930, ADD 01-0940, ADD 01-0950, ADD 01-0951, ADD 01-0952, ADD 01-0960, ADD 01-0980, ADD 01-0990, ADD 01-1000, ADD 01-1010, ADD 01-1020, ADD 01-1030, ADD 01-1040, ADD 01-1050, ADD 01-1060, ADD 01-1070, ADD 02-0090, ADD 02-0100, ADD 02-0120, ADD 02-0130, ADD 02-0140	Description of the additional subsystem of DF600 was added.	AD
					ADD 01-0040, ADD 01-0050, ADD 01-0060, ADD 01-0070, ADD 01-0100, ADD 01-0130, ADD 01-0170, ADD 01-0190, ADD 01-0200, ADD 01-0220, ADD 01-0230, ADD 01-0240, ADD 01-0250, ADD 01-0280, ADD 01-0440, ADD 01-0460, ADD 01-0750, ADD 01-0760, ADD 01-0830, ADD 01-0880, ADD 01-0940, ADD 02-0150, ADD 02-0170, ADD 02-0190, ADD 02-0200, ADD 02-0220, ADD 02-0230, ADD 02-0310, ADD 03-0110	Description of RKXS was added.	

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0000, ADD 01-0001, ADD 01-0040, ADD 01-0060, ADD 01-0100, ADD 01-0121, ADD 01-0122, ADD 01-0750, ADD 01-0810, ADD 01-0820, ADD 01-0830, ADD 01-0842, ADD 01-0850, ADD 01-0920, ADD 01-0940, ADD 01-0954 ADD 01-0960, ADD 01-0980	Description of RKAATL/RKAJATL was added.	AD
					ADD 01-0050, ADD 01-0130	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					ADD 01-0060	No. 3 and No. 4 was moved to page ADD 01-00700 as No. 5 and No.6.	DL
						No. 3 and No. 4 was added to (3-3).	AD
					ADD 01-0070	No. 7 and No. 8 were moved to page ADD 01-0071 as No. 9 and No. 10.	DL
						No. 3 and No. 4 were moved from page ADD 01-0060 as No. 5 and No. 6.	AD
					ADD 01-0071	No. 7 and No. 8 were moved from page ADD 01-0070 as No. 9 and No. 10. (New page)	AD
					ADD 01-0072, ADD 01-0442, ADD 01-0792, ADD 01-0842, ADD 01-0954,ADD 01-0952, ADD 01-1012ADD 02-0312	New page was added, (Blank page)	AD
					ADD 01-0080	Wrist band was added to the names in the table.	AD
						Safekeeping box was deleted to the names in the table.	DL
					ADD 01-0140, ADD 01-0210, ADD 01-0410, ADD 02-0160, ADD 02-0210, ADD 02-0280, ADD 03-0000	Description of "(before removing bezel)" and "• Be sure to keep the wrist band close to the subsystem." were deleted.	DL
					ADD 01-0121, ADD 01-0122, ADD 01-0791, ADD 01-0841, ADD 01-0953, ADD 01-1011	Description of the additional subsystem of DF600 was added. (New page)	AD
					ADD 01-0150	(9) was changed.	CH
						Description of dummy was changed.	CH
					ADD 01-0160	Description position of NOTE was changed.	CH
						Description of LAN was added to (22).	AD
						(22) to (28) were changed to (23) to (29).	CH
						Description of Dual system ((17), (23)) was changed.	CH
					ADD 01-0170, ADD 01-0180, ADD 01-0220, ADD 01-0440, ADD 01-0441, ADD 01-0560, ADD 01-0640, ADD 01-0650, ADD 01-0830, ADD 01-0940, ADD 02-0190, ADD 02-0220, ADD 02-0310, ADD 02-0311	Figure was changed with UPS cover.	CH
					ADD 01-0170, ADD 01-0180	Dummy was added to the figure.	AD
					ADD 01-0220, ADD 01-0430, ADD 02-0220, ADD 02-0290, ADD 02-0300	"Note" was corrected to "NOTE".	CR
					ADD 01-0230	*3 was deleted.	DL
					ADD 01-0290, ADD 01-0310	Work-1 and Work 2 were added.	AD
					ADD 01-0300, ADD 01-0320	The Work number was changed.	CH
					ADD 01-0441, ADD 01-0951, ADD 02-0311	Description of RKXS was added. AD (New page)	AD
					ADD 01-0460	Quantity of U7PDB was changed.	CH
					ADD 01-0490	Description of "For five...(ADD 01-0670)" was added to (f).	AD
					ADD 01-0600	Reference page was corrected.	CR
					ADD 01-0630	NOTE was added at (b)-(ii).	AD

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					ADD 01-0680, ADD 01-0690, ADD 01-0700, ADD 01-0990, ADD 01-1000, ADD 01-1011, ADD 01-1020	Corrected Web screen.	CR
					ADD 01-0920	"You can highlight…" was added at (iii).	AD
						Description of DF600 additional subsystem connection condition was added to (2).	AD
					ADD 01-0930	(c) and (d) were corrected.	CR
					ADD 01-0950	"(RKM+RKAJAT)" was added to the figure title.	AD
					ADD 01-1010	"You can highlight…" was added at (2).	AD
					ADD 02-0150	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					ADD 02-0180	Description of single mode was changed (b).	CH
						Description of (g) NOTE was changed.	CH
						Description of dummy was changed.	CH
					ADD 02-0190	Dummy was added to the figure.	AD
					ADD 02-0290	"•If ... in slot #0." was added to the Note.	AD
						"(9)" was moved to page ADD 02-0300.	DL
					ADD 02-0300	"(9)" was moved from page ADD 02-0290.	AD
					ADD 03-0080	Description of RKAJAT was added.	AD
						The error correction of the flow chart was done.	CR
					TRBL 01-0000, TRBL 03-0000, TRBL 03-0010, TRBL 03-0080, TRBL 05-0000, TRBL 05-0010, TRBL 05-0020, TRBL 05-0030, TRBL 06-0030, TRBL 06-0040, TRBL 06-0420, TRBL 06-0450, TRBL 06-0460, TRBL 06-0470, TRBL 06-0480, TRBL 06-0490, TRBL 06-0500, TRBL 06-0550, TRBL 06-0610, TRBL 06-1140, TRBL 07-0050, TRBL 07-0020, TRBL 07-0080, TRBL 07-0090, TRBL 07-0130, TRBL 07-0140, TRBL 07-0170, TRBL 07-0200, TRBL 08-0000, TRBL 08-0010, TRBL 08-0020, TRBL 08-0030, TRBL 08-0040, TRBL 08-0110, TRBL 08-0120, TRBL 08-0130, TRBL 08-0150, TRBL 08-0160, TRBL 08-0170, TRBL 08-0180, TRBL 08-0190, TRBL 08-0210, TRBL 08-0230, TRBL 08-0240, TRBL 09-0000, TRBL 09-0010	Description of RKXS was added.	AD
					TRBL 01-0010	Font of flow was corrected.	CR
					TRBL 02-0000	"If the array subsystem …" was added.	AD
					TRBL 02-0040, TRBL 02-0090	Figure was changed with UPS cover.	CH
					TRBL 02-0060	Section of 2-f was added.	AD
					TRBL 02-0070	7-m was moved from page TRBL 02-0080.	AD
					TRBL 02-0080	7-m was moved to page TRBL 02-0070.	DL
					TRBL 02-0090	7-p- → 7-q-, 7-q- → 7-r-,	CR
					TRBL 02-0100	RKM in the No.2 was corrected to RKS.	CR
					TRBL 02-0110	Section of 2-f was added.	AD
					TRBL 02-0120	7-m was moved from page TRBL 02-0130.	AD
					TRBL 02-0130	7-m was moved to page TRBL 02-0130.	DL
						7-p- → 7-q-, 7-q- → 7-r-,	CR
					TRBL 02-0131 to TRBL 02-0136	There pages were newly added.	AD
					TRBL 02-0140	(3) → (4)	CH
					TRBL 02-0150	Table 2.3.3 → Table 2.3.4	CH
						4-g was moved from page TRBL 02-0160.	AD

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					TRBL 02-0160	4-g was moved to page TRBL 02-0150.	DL
						"Jumper Connector" in the Table was deleted.	DL
					TRBL 02-0170, TRBL 02-0180, TRBL 02-0190, TRBL 02-0230, TRBL 02-0240, TRBL 02-0250	Description of RKAATL/RKAJATL was added.	AD
					TRBL 02-0170	(4) → (5)	CH
					TRBL 02-0180	Table 2.3.4 → Table 2.3.5	CH
					TRBL 02-0200 to TRBL 02-0250	There pages were newly added. ((6) RKA and (7) RKAAT was added.)	AD
					TRBL 03-0010	Figure was changed with UPS cover.	CH
					TRBL 03-0060	Table 3.3.2 was moved from page TRBL 03-0070	AD
						Changed System version at table 3.3.2.	CH
					TRBL 03-0070	Table 3.3.2 was moved to page TRBL 03-0060	DL
						"Notices on (restriction of) …" was moved from page TRBL 03-0080	AD
					TRBL 03-0080	"Notices on (restriction of) …" was moved to page TRBL 03-0060	DL
						"When using Netscape navigator 7.x …" was moved from page TRBL 03-0080	AD
					TRBL 03-0090	"When using Netscape navigator 7.x …" was moved to page TRBL 03-0060	DL
						(2) and (3) were moved from page TRBL 03-0080	AD
					TRBL 03-0100	(2) and (3) were moved to page TRBL 03-0060	DL
						Deleted page.	DL
					TRBL 03-0110	Deleted page.	DL
					TRBL 04-0050	Figure was changed with UPS cover.	CH
					TRBL 04-0180	"0184xxC4" was moved from page TRBL 04-0190.	AD
					TRBL 04-0190	"0184xxC4" was moved to page TRBL 04-0180.	DL
						"0184xxCD" was moved from page TRBL 04-0190.	AD
					TRBL 04-0200	"0184xxCD" was moved to page TRBL 04-0180.	DL
						"01852213" to "0185221D" were moved from page TRBL 04-0210.	AD
					TRBL 04-0210	"01852213" to "0185221D" were moved to page TRBL 04-0200.	DL
						"01D57101" to "01D57902" were moved from page TRBL 04-0220.	AD
					TRBL 04-0220	"01D57101" to "01D57902" were moved to page TRBL 04-0210.	DL
						"01D5xxCC" to "01D5xxCF" were moved from page TRBL 04-0230.	AD
					TRBL 04-0230	"01D5xxCC" to "01D5xxCF" were moved to page TRBL 04-0220.	DL
						"01xxxxB7" to "01xxxxB9" were moved from page TRBL 04-0240.	AD
					TRBL 04-0240	"01xxxxB7" to "01xxxxB9" were moved to page TRBL 04-0230.	DL
						"01xxxxD3" to "01xxxxD5" were moved from page TRBL 04-0250.	AD
					TRBL 04-0250	"01xxxxD3" to "01xxxxD5" were moved to page TRBL 04-0240.	DL
						(2) was moved from page TRBL 04-0260.	AD
					TRBL 04-0260	(2) was moved to page TRBL 04-0250.	DL
						(3) was moved from page TRBL 04-0270.	AD
					TRBL 04-0270	(3) was moved to page TRBL 04-0260.	DL
					TRBL 05-0020	Flow chart was changed.	CH

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					TRBL 05-0040, TRBL 06-0250, TRBL 06-0310, TRBL 06-0770, TRBL 06-0780, TRBL 06-0940, TRBL 06-0950, TRBL 06-0960, TRBL 06-0970, TRBL 07-0100, TRBL 07-0110	Corrected Web screen.	CR
					TRBL 05-0050, TRBL 06-0260, TRBL 10-0180	Changed SNM screen.	CH
					TRBL 06-0010	No.19 was added.	AD
					TRBL 06-0020	"B" was corrected to "A".	CR
					TRBL 06-0030	"B" was corrected to "A". "C" was corrected to "B".	CR
					TRBL 06-0040	"C" was corrected to "B".	CR
					TRBL 06-0080	Description of (1) was changed.	CH
						Item of table was added.	AD
						*5 was added.	AD
					TRBL 06-0100	Reference page of [Recovery method-7] was changed.	CH
					TRBL 06-0110, TRBL 06-0200, TRBL 06-0220	A description of "Does the WARNING LED…" was added to flow chart.	AD
					TRBL 06-0120, TRBL 06-0190, TRBL 06-0210	Flow size was changed.	CH
					TRBL 06-0130	A description of flow chart was changed.	CH
					TRBL 06-0140, TRBL 06-0150, TRBL 06-0160, TRBL 06-0170, TRBL 06-0210, TRBL 06-0230	The content of the WEB Information Message display was changed.	CH
					TRBL 06-0140	Description was added to the text.	AD
						A description of "Check the status from …" was added to flow chart.	AD
					TRBL 06-0150, TRBL 06-0160	Description of Flow chart was changed.	CH
					TRBL 06-0170	"C" was added. (The item number is changed afterwards.)	AD
						"D" was moved to page TRBL 06-0180.	DL
					TRBL 06-0180	"D" was moved from page TRBL 06-0170.	AD
						RAID 6 was added to the *1.	AD
						"E" was moved to page TRBL 06-0181.	DL
					TRBL 06-0181	This page was newly added. ("E" was moved from page TRBL 06-0180.)	AD
					TRBL 06-0182	This page was newly added.	AD
						A description of "Does the WARNING LED…" was added to flow chart.	AD
					TRBL 06-0230	A description of flow chart was changed.	CH
					TRBL 06-0240	"A" and "B" of [Recovery method-6] was added.	AD
						"[Recovery method-7]" was moved to page TRBL 06-0241.	DL
					TRBL 06-0241	This page was newly added. ("[Recovery method-7]" was moved from page TRBL 06-0240.)	AD
					TRBL 06-0242	This page was newly added.	AD
					TRBL 06-0270	Descriptions of "Waiting Drive Reconstruction" and "Uncorrected and Drive Detached" were added to table.	AD
						Correction Aborted in the table was moved to page TRBL 06-0280.	DL
						(f) was moved to page TRBL 06-0281.	DL
					TRBL 06-0280	Correction Aborted in the table was moved from page TRBL 06-0270.	AD
						(i) and (ii) were moved to page TRBL 06-0281.	DL
						(iii) was moved to page TRBL 06-0282.	DL

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					TRBL 06-0281	This page was newly added. ((f) was moved from page TRBL 06-0270. (i) and (ii) were moved from page TRBL 06-0280.)	AD
					TRBL 06-0282	This page was newly added. ((iii) was moved to page TRBL 06-0280.)	AD
					TRBL 06-0320	No.3 and No.5 were added.	AD
					TRBL 06-0380	Flow chart of (a) was changed.	CH
						Reference of (a) was changed to *.	CH
						*1 → *7	CH
						*8 was added.	AD
					TRBL 06-0390	Flow chart of (b) and (c) were changed.	CH
						Reference of (b) and (c) were changed to *.	CH
						*1 → *5	CH
					TRBL 06-0400	NOTE was changed.	CH
					TRBL 06-0401, TRBL 04-0402	These pages were newly added.	AD
					TRBL 06-0410	Table 6.1.4 was added.	AD
					TRBL 06-0590	Description in flow was changed.	CH
						A part of in flow was moved to page TRBL 06-0591.	DL
					TRBL 06-0591	This page was newly added. (A part of in flow was moved from page TRBL 06-0592.)	AD
					TRBL 06-0592	This page was newly added.	AD
					TRBL 06-0630	RKAJ was added to the figure.	AD
					TRBL 06-0640	"RKAJ" was deleted.	DL
						"RKXS" was added.	AD
					TRBL 06-0660	"RKAJ+RKAJAT" was deleted.	DL
					TRBL 06-0690	RKAJAT was added to (ix).	AD
					TRBL 06-0840	Description of (vi) was added.	AD
					TRBL 06-0950	③ was added to the image.	AD
					TRBL 06-0960	The article number in the table was changed.	CH
					TRBL 06-1090	The description was added to the flow.	AD
					TRBL 06-1100	The description was added to the flow.	AD
						Flow was moved to page TRBL 06-1101.	DL
					TRBL 06-1101	This page was newly added. (Flow was moved form page TRBL 06-1100.)	AD
					TRBL 06-1102	This page was newly added.	AD
					TRBL 06-1121, TRBL 06-1122, TRBL 06-1123, TRBL 06-1124	There pages were newly added. (6.1.7 A failure in SES access occurs was added.)	AD
					TRBL 06-1121	Description of RKAATL/RKAJATL was added.	AD
					TRBL 06-1140	(5) was move to page TRBL 06-1150.	DL
					TRBL 06-1140	Figure was changed with UPS cover.	CH
					TRBL 06-1150	(5) was moved form page TRBL 06-1140.	AD
						(8) was move to page TRBL 06-1160.	DL
					TRBL 06-1160	(8) was moved form page TRBL 06-1150.	AD
					TRBL 07-0050, TRBL 07-0080, TRBL 07-0130, TRBL 07-0140, TRBL 07-0170, TRBL 07-0200	Figure was changed with UPS cover.	CH
					TRBL 07-0110	Window was added to (c).	AD
						(d) was moved to page TRBL 07-0120.	DL
					TRBL 07-0120	(d) was moved from page TRBL 07-0110.	AD
					TRBL 07-0130	(e) was move to page TRBL 07-0131.	DL
					TRBL 07-0131	This page was newly added. ((e) was moved form page TRBL 07-0130.)	AD
					TRBL 07-0132	This page was newly added.	AD
					TRBL 07-0140	(b) was move to page TRBL 07-0150.	DL
					TRBL 07-0150	(b) was moved form page TRBL 07-0140.	AD
						(c) was move to page TRBL 07-0160.	DL

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					TRBL 07-0160	(c) was moved form page TRBL 07-0150.	AD
						(e) and (d) were move to page TRBL 07-0161.	DL
					TRBL 07-0161	This page was newly added. ((e) and (d) were moved form page TRBL 07-0160.)	AD
					TRBL 07-0162	This page was newly added.	AD
					TRBL 07-0170	(b) was move to page TRBL 07-0180.	DL
					TRBL 07-0180	(b) was moved form page TRBL 07-0170.	AD
						"The following dialog is displayed. …" " was move to page TRBL 07-0190.	DL
					TRBL 07-0190	"The following dialog is displayed. …"was moved form page TRBL 07-0190.	AD
					TRBL 07-0200	(b) was move to page TRBL 07-0210.	DL
					TRBL 07-0210	(b) was moved form page TRBL 07-0200.	AD
						"The following dialog is displayed. …" " was move to page TRBL 07-0190.	DL
					TRBL 07-0220	"The following dialog is displayed. …"was moved form page TRBL 07-0190.	AD
					TRBL 08-0000, TRBL 08-0100, TRBL 08-0120, TRBL 08-0160, TRBL 08-0170, TRBL 08-0180, TRBL 08-0301, TRBL 08-0302, TRBL 08-0310	Description of RKA/RKAAT was added.	AD
					TRBL 08-0000, TRBL 08-0010, TRBL 08-0020, TRBL 08-0030, TRBL 08-0040, TRBL 08-0100, TRBL 08-0160	Subsystem type was changed to Basic subsystem or Additional subsystem.	CH
					TRBL 08-0000, TRBL 08-0100, TRBL 08-0120, TRBL 08-0170, TRBL 08-0180, TRBL 08-0310	Description of RKAATL/RKAJATL was added.	AD
					TRBL 08-0050	Size of "Replace the failed part" in the Table was changed.	CH
					TRBL 08-0060	Type of Fan Assembly #0 was corrected.	CR
					TRBL 08-0080	Type of Countrol Unit #0 was corrected.	CR
					TRBL 08-0090	Type of Basic Chassis and Countrol Unit #0 were corrected.	CR
					TRBL 08-0100, TRBL 08-0110, TRBL 08-0120, TRBL 08-0130, TRBL 08-0160	Description of subsystem type was changed.	CH
					TRBL 08-0121, TRBL 08-0122	There pages were newly added.	AD
					TRBL 08-0170	No.3 and No.4 were moved to page TRBL 08-0171.	DL
					TRBL 08-0170, TRBL 08-0180, TRBL 08-0190, TRBL 08-0210, TRBL 08-0230, TRBL 08-0260	Figure was changed with UPS cover.	CH
					TRBL 08-0171	This page was newly added. (No.3 and No.4 were moved from page TRBL 08-0170.)	AD
					TRBL 08-0172	This page was newly added.	AD
					TRBL 08-0190	No.2 and No.3 were moved to page TRBL 08-0200.	DL
					TRBL 08-0200	No.2 and No.3 were moved from page TRBL 08-0190.	AD
					TRBL 08-0210	*3 was added.	AD
						No.4 and No.5 were moved to page TRBL 08-0210.	DL
					TRBL 08-0220	No.4 and No.5 were moved from page TRBL 08-0200.	AD
						*5 was added.	AD

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					TRBL 08-0230, TRBL 08-0240, TRBL 08-0250	The content was added to the table 8.2.7.	AD
					TRBL 08-0260, TRBL 08-0270, TRBL 08-0280	The content was added to the table 8.2.8.	AD
					TRBL 08-0290	(i) ENC Unit (RKAJ) was added.	AD
					TRBL 08-0301, TRBL 08-0302	This page was newly added. ((ii) ENC Unit (RKA) was added.)	AD
					TRBL 08-0310	No.6 was moved to page TRBL 08-0320.	DL
					TRBL 08-0320	No.6 was moved from page TRBL 08-0310.	AD
						*4 was corrected to *1.	CR
					MSG 01-0030	Figure was changed.	CH
						Description was moved to page MSG 01-0031	DL
					MSG 01-0031	This page was newly added. (Description was moved from page MSG 01-0030.)	AD
					MSG 01-0032	This page was newly added. (RKXS was added.)	AD
					MSG 01-0033	This page was newly added. (Description of RKXS was added.)	AD
					MSG 01-0034	This page was newly added.	AD
					MSG 03-0040	"Description" of "H20D00" was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0050, MSG 03-0070, MSG 03-0080, MSG 03-0090, MSG 03-0100, MSG 03-0330, MSG 03-0340, MSG 03-0350, MSG 03-0420, MSG 03-0430, MSG 03-0460, MSG 03-0470, MSG 03-0520, MSG 03-0540, MSG 03-0600, MSG 03-0610, MSG 03-0660, MSG 03-0670, MSG 04-0000, MSG 04-0010, MSG 04-0020, MSG 04-0030, MSG 04-0040, MSG 04-0050, MSG 04-0060, MSG 04-0070, MSG 04-0080, MSG 04-0090, MSG 04-0110, MSG 04-0120, MSG 04-0130, MSG 04-0140, MSG 04-0150, MSG 04-0160, MSG 04-0170, MSG 04-0180, MSG 04-0190, MSG 04-0200, MSG 04-0210, MSG 04-0220, MSG 04-0230, MSG 04-0240, MSG 04-0250, MSG 04-0260, MSG 04-0280, MSG 04-0290, MSG 04-0300, MSG 04-0310, MSG 04-0320, MSG 04-0330, MSG 04-0340, MSG 04-0350, MSG 04-0360, MSG 04-0370, MSG 04-0380, MSG 04-0390, MSG 04-0400, MSG 04-0420, MSG 04-0430, MSG 04-0450, MSG 04-0460, MSG 04-0480, MSG 04-0520, MSG 04-0530, MSG 04-0560, MSG 04-0600, MSG 04-0610, MSG 04-0620, MSG 04-0630, MSG 04-0640, MSG 04-0650, MSG 04-0660, MSG 04-0670, MSG 04-0680, MSG 04-0690, MSG 04-0700, MSG 04-0701, MSG 04-0710, MSG 04-0720, MSG 04-0730, MSG 04-0750, MSG 04-0760, MSG 04-0770, MSG 04-0780, MSG 04-0800, MSG 05-0020, MSG 05-0060, MSG 05-0140, MSG 05-0150, MSG 05-0180, MSG 05-0200, MSG 06-0010, MSG 06-0020, MSG 06-0030, MSG 06-0040, MSG 06-0050, MSG 06-0060, MSG 06-0070, MSG 06-0080, MSG 06-0090, MSG 06-0100, MSG 06-0170, MSG 06-0190, MSG 06-0200	Detail (x or y) of “Description” was changed.	CH
					MSG 03-0070	Detail was added to the description of the “H301xx”, “H302xx” and “H304xx”.	AD
					MSG 03-0080	“H308xy” was changed to “H3080x”. “Recovery methods” was changed.	CH
						“Recovery methods” of “H30Bxy” was changed.	CH
					MSG 03-0090	Description of “H30Gxx” was changed.	CH
						“H30Hxx” was deleted.	DL
					MSG 03-0100	“Recovery methods” of “H30Jxy” was changed.	CH
					MSG 03-0120	“Description” of “H40Z00” was changed.	CH
					MSG 03-0130	“Description” of “H41800” was changed.	CH

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					MSG 03-0140	"Description" of "H41H00", "H41I00" and "H41R00" was changed.	CH
					MSG 03-0150	"Description" of "H41S00" was changed.	CH
					MSG 03-0180	"Description" of "H42Z00" was changed.	CH
					MSG 03-0190	"Description" of "H43800" was changed.	CH
					MSG 03-0250	"REG…" for the "Message text" of the "H508x" and "H509x" was deleted.	DL
					MSG 03-0260	"REG…" for the "Message text" of the "H50B0x" was deleted.	DL
					MSG 03-0290	"H51P00" and "H51Q00" were added.	AD
					MSG 03-0291	"H51R00", "H51S00", "H51T00", "H51U00", "H51V00", "H51W00", "H51X00", "H51Y00" and "H51Z00" were added.	AD
					MSG 03-0292	This page was newly added.	AD
					MSG 03-0320	"HA0530" was deleted.	DL
						Description of "HB0421", "HB0522" and "HB0623" was changed.	CH
					MSG 03-0330	Description of "HB0900", "HB0A0x", "HB0B0x" and "HB0Cxx" was changed.	CH
					MSG 03-0340	Description of "HB0Dyy", "HD0100", "HD020x" and "HD0300" was changed.	CH
						"HD21xx" were moved to page MSG 03-0350.	DL
					MSG 03-0350	"HD21xx" were moved from page MSG 03-0340.	AD
						Detail was changed to the description of the "HD21xx" and "HD27xx".	CH
						"Control Unit # (0-1)" was added in the "Description" of "HD250x" and "HD260x".	AD
						"HD2B00" was moved to page MSG 03-0360.	DL
					MSG 03-0360	"HD2B00" was moved from page MSG 03-0350.	AD
						"HD3200" was moved to page MSG 03-0370.	DL
					MSG 03-0370	"HD3200" was moved from page MSG 03-0360.	AD
						"HD3800" and "HD3900" were moved to page MSG 03-0380.	DL
					MSG 03-0380	"HD3800" and "HD3900" were moved from page MSG 03-0370.	AD
						"HD4400" was moved to page MSG 03-0390.	DL
					MSG 03-0390	"HD4400" was moved from page MSG 03-0380.	AD
						"HD4D00", "HD4E00" and "HD4F00" were moved to page MSG 03-0400.	DL
					MSG 03-0400	"HD4D00", "HD4E00" and "HD4F00" were moved from page MSG 03-0390.	AD
					MSG 03-0400	"HD5600" was moved to page MSG 03-0410.	DL
					MSG 03-0410	"HD5600" was moved from page MSG 03-0400.	AD
						"HD5Exx" was added.	AD
					MSG 03-0530	The reference page ② was added concerning the "HH13B1."	AD
						"HH17xx" was moved to page MSG 03-0540.	DL

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					MSG 03-0540	"HH17xx" was moved from page MSG 03-0530.	AD
						The recovery methods ① and ② were added concerning the "HH17xx."	AD
						The recovery methods ① and ② were changed concerning the "HH19xx."	CH
						"HH1J00" to "HH1N00" were moved to page MSG 03-0550.	DL
					MSG 03-0550	"HH1J00" to "HH1N00" were moved from page MSG 03-0540.	AD
						"HH2000" to "HH2900" were moved to page MSG 03-0552.	DL
					MSG 03-0551	This page was newly added. ("HH2000" to "HH2900" were moved from page MSG 03-0551.)	AD
					MSG 03-0552	This page was newly added.	AD
					MSG 03-0580	"HH2Q00" was added.	AD
					MSG 03-0610	"Recovery methods" of "HH4E00" was changed.	CH
						"HH420x" to "HH4B00" were added.	AD
						"HI0100" to "HI0310" were moved to page MSG 03-0611.	DL
					MSG 03-0611	This page was newly added. ("HH4C00", "HH4D00" and "HH4F00" were added. "HI0100" to "HI0310" were moved from page MSG 03-0610. "HI0420", "HI050x" and "HI0600" were moved from page MSG 03-0620.)	AD
					MSG 03-0612	This page was newly added.	AD
					MSG 03-0620	"HI0420", "HI050x" and "HI0600" were moved to page MSG 03-0611.	DL
					MSG 03-0680	"HSA000" and "HZ0200" were added.	AD
						"Recovery methods" of "HZ0300" was changed.	CH
						"HZ040x", "HZ050x" and "HZ060x" were moved to page MSG 03-0690.	DL
					MSG 03-0690	"HZ040x", "HZ050x" and "HZ060x" were moved from page MSG 03-0680.	AD
						The description of "online" in the "HZ0B0x" message was changed.	CH
						Detail was added to the description of the "HZ0C00".	AD
						"HZ0D00" to "HZ0H0x" were moved to page MSG 03-0700.	DL
						"HZ0F00" and "HZ0G0x" were deleted.	DL
					MSG 03-0700	"HZ0D00" to "HZ0H0x" were moved from page MSG 03-0690.	AD
						Details were added to the descriptions of the "HZ0D00" and "HZ0E00".	AD
						"HZ0J00" to "HZ0M0x" were moved to page MSG 03-0710.	DL
						"HZ0N0x" to "HZ0R00" were moved to page MSG 03-0720.	DL
					MSG 03-0710	"HZ0J00" to "HZ0M0x" were moved from page MSG 03-0700.	AD
						"HZ0T00" was moved to page MSG 03-0720.	AD
					MSG 03-0720	This page was newly added. ("HZ0N0x" to "HZ0R00"were moved from page MSG 03-0700. "HZ0T00" was moved from page MSG 03-0710.)	AD
						"HZ0S00" was added.	AD
					MSG 03-0730	This page was newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0050	The recovery method was changed concerning the “I152xy”.	CH
					MSG 04-0150	The description of “online” in the “I4200x” message was changed.	CH
					MSG 04-0200	The recovery method was changed concerning the “I5Y2xy”.	CH
					MSG 04-0230	The description of “online” in the “I5YH00” message was changed.	CH
					MSG 04-0250	The description of “online” in the “I5YZ0x” message was changed.	CH
					MSG 04-0270	“Recovery methods” of “I60200” was changed.	CH
					MSG 04-0350	The description of “online” in the “I6DH00” message was changed.	CH
					MSG 04-0360	The description of “online” in the “I6DQ00” and “I6DR00”” message were changed.	CH
					MSG 04-0370	The description of “online” in the “I6E000” and “I6E100”” message was changed.	CH
					MSG 04-0380	Details were added to the descriptions of the “I6E500” and “I6E600”.	AD
						“I6E700”to “I6EA00” were moved to page MSG 04-0390.	DL
					MSG 04-0390	“I6E700” to “I6EA00” were moved from page MSG 04-0380.	AD
						Detail was added to the description of the “I6E700”.	AD
						The description of “online” in the “I6E800”, “I6E900”, “I6EA00” and “I6EB00”” message was changed.	CH
						“I6EC00” and “I6ED00” was deleted.	DL
						“I6EE01” to “I6EE08” were moved to page MSG 04-0390.	DL
					MSG 04-0400	“I6EE01” to “I6EE08” were moved from page MSG 04-0380.	AD
						The description of “online” in the “I6EF00”” message was changed.	CH
						“I6EL00” to “I6EN00” were moved to page MSG 04-0410.	DL
					MSG 04-0410	“I6EL00” to “I6EN00” were moved from page MSG 04-0400.	AD
						“I6EQ00” was added.	AD
					MSG 04-0430	The description of “online” in the “I70300”” message was changed.	CH
					MSG 04-0450	The description of “online” in the “I70900”, “I70A00”, “I8000x”, “I8020x” and “I8040x” message was changed.	CH
					MSG 04-0460	The description of “online” in the “I8080x”” message was changed.	CH
					MSG 04-0470	The description of “online” in the “I80900” and “I80A0x” message was changed.	CH
					MSG 04-0490	“Recovery methods” of “I80E00” was changed.	CH
					MSG 04-0500	The description of “online” in the “I80F00” to “I81B00” message was changed.	CH
					MSG 04-0520	② of “Recovery methods” in “I824xy” was changed.	CH
					MSG 04-0550	The description of “online” in the “I83900” to “I83E00” message was changed.	CH
					MSG 04-0570	“Description” of “I84700” was changed.	CH
					MSG 04-0580	“Description” of “I84800” was changed.	CH
					MSG 04-0640	Details were added to the descriptions of the “IXXF00”.	AD

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					MSG 04-0700	"IY1000" was added.	AD
						"IY2200" and "IY3000" were moved to page MSG 04-0701.	DL
					MSG 04-0701	This page was newly added. ("IY2200" and "IY3000" were moved from page MSG 04-0700.)	AD
					MSG 04-0702	This page was newly added.	AD
					MSG 04-0760	Details were added to the descriptions of the "IZY20x" and "IZY40x".	AD
					MSG 04-0810	"Recovery methods" in "IZYS00" was changed.	CH
					MSG 05-0010	"Description" of "R20600" was changed.	CH
						"R20E00" was moved to page MSG 05-0020.	DL
					MSG 05-0020	"R20E00" was moved from page MSG 05-0010.	AD
						"R20R00" was moved to page MSG 05-0030.	DL
					MSG 05-0030	"R20R00" was moved from page MSG 05-0020.	AD
						"R21700" was moved to page MSG 05-0040.	DL
					MSG 05-0040	"R21700" was moved from page MSG 05-0030.	AD
						"R21L00" was moved to page MSG 05-0050.	DL
					MSG 05-0050	"R21L00" was moved from page MSG 05-0040.	AD
						"R21Z00" was moved to page MSG 05-0060.	DL
					MSG 05-0060	"R21Z00" was moved from page MSG 05-0050.	AD
						"R3030x" was moved to page MSG 05-0070.	DL
					MSG 05-0070	"R3030x" was moved from page MSG 05-0060.	AD
						"R40C00" and "R40D00" were moved to page MSG 05-0080.	DL
					MSG 05-0080	"R40C00" and "R40D00" were moved from page MSG 05-0070.	AD
						"R40R00" and "R40S00" were moved to page MSG 05-0090.	DL
					MSG 05-0090	"R40R00" and "R40S00" were moved from page MSG 05-0080.	AD
						"R50700" to "R50900" were moved to page MSG 05-0100.	DL
					MSG 05-0100	"R50700" to "R50900" were moved from page MSG 05-0090.	AD
						"R50L00" and "R50P00" were moved to page MSG 05-0110.	DL
					MSG 05-0110	"R50L00" and "R50P00" were moved from page MSG 05-0100.	AD
						"R51400" was moved to page MSG 05-0120.	DL
					MSG 05-0120	"R51400" was moved from page MSG 05-0110.	AD
					MSG 05-0140	"Description" of "RA780x" was changed.	CH
					MSG 05-0150	Details were added to the descriptions of the "RA7F00".	AD
						"RA8000", "RA8100" and "RA8200" were moved to page MSG 05-0160.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 05-0160	"RA8000", "RA8100" and "RA8200" were moved from page MSG 05-0150.	AD
						Details were added to the descriptions of the "RA8000" and "RA8100".	AD
						"RA8900" to "RA8C00" were moved to page MSG 05-0170.	DL
						"RA8D00" were moved to page MSG 05-0180.	DL
					MSG 05-0170	"RA8900" to "RA8C00" were moved from page MSG 05-0160.	AD
						The description of "online" in the "RA8A00" message was changed.	CH
						Details were added to the descriptions of the "RA8B00" and "RA8C00".	AD
						"RA9000" to "RB0600" were moved to page MSG 05-0180.	DL
						"RB0700" was moved to page MSG 05-0181.	DL
					MSG 05-0180	"RA8D00" was moved from page MSG 05-0160	AD
						"RA9000" to "RB0600" were moved from page MSG 05-0170.	AD
						"RB0800" to "RB0J00" were moved to page MSG 05-0182.	DL
					MSG 05-0181	This page was newly added. ("RB0700" was moved from page MSG 05-0170. "RB0G00" was added. "RB0800" to "RB0J00" were moved from page MSG 05-0180)	AD
					MSG 05-0182	This page was newly added.	AD
					MSG 05-0200	Description of "RBA000" was changed.	CH
					MSG 05-0220	"RBEP00", "RBEQ00" and "RBER00" were added.	AD
					MSG 05-0230	"RBET00" and "RBES00" were added.	AD
					MSG 06-0050	② was added in the "Recovery methods" of "W090AT".	AD
						"W0E000" were moved to page MSG 06-0060.	DL
					MSG 06-0060	"W0E000" were moved from page MSG 06-0050.	AD
					MSG 06-0070	Detail was added to the descriptions of the "W0G100".	AD
					MSG 06-0090	② was added in the "Recovery methods" of "W0GB00".	AD
						"W0GC00" was moved to page MSG 06-0100.	DL
					MSG 06-0100	"W0GC00" was moved from page MSG 06-0090.	AD
						② was added in the "Recovery methods" of "W0GD00".	AD
						"W0GJ00" to "W12000" were moved to page MSG 06-0110.	DL
					MSG 06-0110	"W0GJ00" to "W12000" were moved from page MSG 06-0100.	AD
						Detail was added to the descriptions of the "W310xx".	AD
						"W320xy" to "W323xy" were moved to page MSG 06-0120.	DL
					MSG 06-0120	"W320xy" to "W323xy" were moved from page MSG 06-0110.	AD
						"W327xy" to W32Axy "" were moved to page MSG 06-0130.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 06-0130	"W327xy" to "W32Axy" were moved from page MSG 06-0120.	AD
						"W32Fxy" to "W332xy" were moved to page MSG 06-0140.	DL
					MSG 06-0140	"W32Fxy" to "W332xy" were moved from page MSG 06-0130.	AD
						Details were added in the "Description" of "W3360x".	AD
						"W33700" to "W33B00" were moved to page MSG 06-0150.	DL
					MSG 06-0150	"W33700" to "W33B00" were moved from page MSG 06-0140.	AD
						"W33F00" to "W34300" were moved to page MSG 06-0160.	DL
					MSG 06-0160	"W33F00" to "W34300" were moved from page MSG 06-0150.	AD
						"W43000" to "W43400" were moved to page MSG 06-0170.	DL
					MSG 06-0170	"W43000" to "W43400" were moved from page MSG 06-0160.	AD
						"W4500x" was moved to page MSG 06-0180.	DL
					MSG 06-0180	"W4500x" was moved from page MSG 06-0170.	AD
					MSG 06-0190	"Description" of "W49000" was changed.	CH
					MSG 07-0000	Description of "Abnormal End Down Grade Check NG" was changed.	CH
					MSG 07-0030	"Down grade install NG…" was added.	AD
						"Old System …" to "Target HDU …" was moved to page MSG 07-0040.	DL
					MSG 07-0040	"Old System …" to "Target HDU …" was moved from page MSG 07-0030.	AD
						"1206" to "1213" was moved to page MSG 07-0050.	DL
					MSG 07-0050	"1206" to "1213" was moved from page MSG 07-0040.	AD
						"1223" to "2001" was moved to page MSG 07-0060.	DL
					MSG 07-0060	"1223" to "2001" was moved from page MSG 07-0050.	AD
						"7.2" was moved to page MSG 07-0070.	DL
					MSG 07-0070	"7.2" was moved from page MSG 07-0060.	AD
						"7.3" was moved to page MSG 07-0080.	DL
					MSG 07-0080	This page was newly added. ("7.3" was moved from page MSG 07-0070.)	AD
					MSG 07-0090	This page was newly added.	AD
					MSG 08-0010	Description of "RS232C" was deleted.	DL
					MSG 08-0030	"DMEA00110E" was added.	AD
						"DMEA001152" was moved to page MSG 08-0040.	DL
					MSG 08-0040	"DMEA001152" was moved from page MSG 08-0030.	AD
						"DMEA001175" was added.	AD
					MSG 08-0130	"DMED200005" was added.	AD
						"DMED400013" and "DMED400014" were moved to page MSG 08-0140.	DL
					MSG 08-0140	"DMED400013" and "DMED400014" were moved from page MSG 08-0130.	AD
					MSG 08-0200	"DMES05EA1B", "DMES05EA1C" and "DMES05EA1D" were added.	AD
						"DMES068212" to "DMES068217" were moved to page MSG 08-0210.	DL

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					MSG 08-0210	""DMES068212 to "DMES068217" were moved from page MSG 08-0200.	AD
					MSG 09-0120	"Description" of "9A 01" was added.	AD
						"C0 03" was moved to page MSG 09-0130.	DL
					MSG 09-0130	"C0 03" was moved from page MSG 09-0120.	AD
						"Description" of "E0 00", "E2 00", "E5 00" and "E5 01" were added.	AD
						The description of "online" in the "EA 04" message was changed.	CH
						"EA 17" was moved to page MSG 09-0140.	DL
					MSG 09-0140	"EA 17" was moved from page MSG 09-0130.	AD
						"EA 1B", "EA 1C" and "EA 1D" were added.	AD
						The description of "online" in the "EA 30" to "EA 36" message were changed.	CH
						"F4 00" to "F6 20" were moved to page MSG 09-0150.	DL
					MSG 09-0150	"F4 00" to "F6 20" were moved from page MSG 09-0140.	AD
						"F8 00" to "F8 02" were moved to page MSG 09-0160.	DL
					MSG 09-0160	"F8 00" to "F8 02" were moved from page MSG 09-0150.	AD
						*2 was corrected to *1.	CR
						"F8 09" to "F8 0C" were moved to page MSG 09-0170.	DL
					MSG 09-0170	"F8 09" to "F8 0C" were moved from page MSG 09-0160.	AD
						"F9 03" to "F9 0C" were moved to page MSG 09-0180.	DL
					MSG 09-0180	"F9 03" to "F9 0C" were moved from page MSG 09-0170.	AD
					MSG 09-0280	"200005" was added.	AD
					MSG 10-0000	Details were added to the descriptions of the "107".	AD
						"329" were moved to page MSG 10-0010.	DL
					MSG 10-0010	"329" were moved from page MSG 10-0000.	AD
						Details were added to the descriptions of the "329".	AD
					REP 01-0010, REP 01-0070, REP 02-0390, REP 02-0540, REP 02-0660, REP 02-0770, REP 02-0830, REP 02-0910, REP 02-0950, REP 02-0990	Description of "(before removing bezel)" and "• Be sure to keep the wrist band close to the subsystem." were deleted.	DL
					REP 01-0010, REP 01-0040, REP 01-0050, REP 01-0090, REP 02-0000, REP 02-0010, REP 02-0020, REP 02-0050, REP 02-0060, REP 02-0100, REP 02-0110, REP 02-0140, REP 02-0150, REP 02-0180, REP 02-0300, REP 02-0310, REP 02-0320, REP 02-0330, REP 02-0340, REP 02-0350, REP 02-0360, REP 02-0370, REP 02-0380, REP 02-0830, REP 02-0840, REP 02-0850, REP 02-0860, REP 02-0910, REP 02-0930, REP 02-0940, REP 02-0990, REP 02-1010	Description of the additional subsystem of DF600 was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 01-0010	(b) and (c) were moved from REP 01-0020.	AD
					REP 01-0020	(b) and (c) were moved to REP 01-0010.	CH
						"If the array subsystem used ..." was added to (4).	AD
					REP 01-0051, REP 02-0011, REP 02-0061, REP 02-0141, REP 02-0331, REP 02-0941, REP 02-1021	Description of the additional subsystem of DF600 was added. (New page)	AD
					REP 01-0052, REP 01-0062, REP 02-0012, REP 02-0062, REP 02-0142, REP 02-0332, REP 02-0942, REP 02-1022	New page is added. (blank page)	AD
					REP 01-0051	Description of RKAATL/RKAJATL was added.	AD
					REP 01-0030, REP 01-0040, REP 01-0050, REP 01-0060, REP 01-0090, REP 02-0000, REP 02-0020, REP 02-0030, REP 02-0040, REP 02-0060, REP 02-0070, REP 02-0100, REP 02-0120, REP 02-0160, REP 02-0190, REP 02-0220, REP 02-0240, REP 02-0260, REP 02-0300, REP 02-0310, REP 02-0330, REP 02-0340, REP 02-0350, REP 02-0360, REP 02-0370, REP 02-0400, REP 02-0410, REP 02-0420, REP 02-0440, REP 02-0460, REP 02-0470, REP 02-0500, REP 02-0510, REP 02-0520, REP 02-0530, REP 02-0550, REP 02-0560, REP 02-0590, REP 02-0610, REP 02-0640, REP 02-0780, REP 02-0800, REP 02-0840, REP 02-0860, REP 02-0870, REP 02-0880, REP 02-0900, REP 02-0920, REP 02-0940, REP 02-0980, REP 03-0000, REP 03-0010, REP 03-0020, REP 03-0030, REP 05-0020	Description of RKXS was added.	AD
					REP 01-0030, REP 01-0050, REP 01-0060, REP 01-0061	Figure was changed with UPS cover.	CH
					REP 01-0061	Description of RKXS was added. (new page)	AD
					REP 01-0070, REP 01-0080, REP 02-0080, REP 02-0150, REP 02-0170, REP 02-0230	Description of RAID 6 was added.	AD
					REP 01-0080	Table 1.1.1 was deleted.	DL
					REP 01-0100, REP 01-0110	Corrected Web screen.	CR
					REP 02-0000	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					REP 02-0000, REP 02-0010, REP 02-0011, REP 02-0020, REP 02-0050, REP 02-0060, REP 02-0061, REP 02-0140, REP 02-0141, REP 02-0310, REP 02-0320, REP 02-0330, REP 02-0340, REP 02-0350, REP 02-0360, REP 02-0370, REP 02-0830, REP 02-0860, REP 02-0930, REP 02-0990, REP 02-1010, REP 02-1020, REP 02-1021	Description of RKAATL/RKAJATL was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0020, REP 02-0030, REP 02-0040, REP 02-0061, REP 02-0440, REP 02-0450, REP 02-0590, REP 02-0600, REP 02-0710, REP 02-0800	Figure was changed with UPS cover.	CH
					REP 02-0060, REP 02-0430, REP 02-0490, REP 02-0530, REP 02-0580, REP 02-0630, REP 02-0650, REP 02-0700, REP 02-0760	"Note" was corrected to "NOTE".	CR
					REP 02-0230	Table 2.2.2 was changed.	CH
					REP 02-0240, REP 02-0250, REP 02-0270, REP 02-0280, REP 02-0290	Description of Battery Unit for RKXS was added.	AD
					REP 02-0250, REP 02-0270, REP 02-0290	Description of subsystem name was deleted.	DL
					REP 02-0430	Procedure number was changed.	CH
					REP 02-0410, REP 02-0420	Description of UPS was added.	AD
					REP 02-0420, REP 02-0470	(l) was changed.	CH
					REP 02-0440, REP 02-0450	"UPS" was added to the Figure.	AD
					REP 02-0480	Description position of "(There may be a problem on the …)" was changed.	CH
					REP 02-0510, REP 02-0530	(m) was changed.	CH
					REP 02-0460, REP 02-0470	Description of UPS was added.	AD
					REP 02-0480, REP 02-0490	Procedure number was changed.	CH
					REP 02-0560, REP 02-0570	Description of UPS was added.	AD
					REP 02-0570, REP02-0610, REP 02-0640	(g) was changed.	CH
					REP 02-0580, REP02-0620	Description position of (l) "(There may be a problem on the …)" was changed.	CH
					REP 02-0580	Procedure number was changed.	CH
					REP 02-0590, REP 02-0600	"UPS" was added to the Figure.	AD
					REP 02-0610, REP 02-0620	Description of UPS was added.	AD
					REP 02-0630	Procedure number was changed.	CH
					REP 02-0680, REP 02-0690	Description of UPS was added.	AD
					REP 02-0700, REP02-0740	Description position of (n) "(There may be a problem on the …)" was changed.	CH
					REP 02-0700	Procedure number was changed.	CH
					REP 02-0710	"UPS" was added to the Figure.	AD
					REP 02-0720, REP 02-0730	Description of UPS was added.	AD
					REP 02-0740	Procedure number was changed.	CH
					REP 02-0990	Description of Note was corrected.	CR
					REP 02-1000	Description of Note in (a) was corrected.	CR
					REP 03-0050	Description of RKM was added.	AD
						Figure was changed with UPS cover.	CH
					REP 03-0070	"CAUTION" was changed.	CH
					REP 04-0000	Wrist band was added to the names in the table.	AD
					REP 04-0010	Description of "RS232C" was deleted.	DL
					PARTS 01-0010 to PARTS 01-0180	Reedited due to adding the RKS/RKXS.	AD
					PARTS 01-0010, PARTS 01-0200, PARTS 01-0210, PARTS 01-0220	Description of RKAATL/RKAJATL was added.	AD
					PARTS 01-0020	Parts number of No.3 was deleted.	DL
					PARTS 01-0030, PARTS 01-0060, PARTS 01-0120,	Description of DF-F700-AGH72 and DF-F700-AGH146 was added.	AD
					PARTS 01-0040	Parts number of No.34 was added.	AD
					PARTS 01-0050 to PARTS 01-0180	Reedited due to adding the RKS/RKXS.	AD
					PARTS 01-0070	Parts number of No.34 was added.	AD
					PARTS 01-0170 to PARTS 01-0190	No. 1-6 RKA was added.	AD
					PARTS 01-0200 to PARTS 01-0230	No. 1-7 RKAAT was added.	AD
					PARTS 01-0190 to PARTS 01-0360	There pages were newly added.	AD
					WEB 01-0000	"If the array subsystem ..." was added.	AD

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					WEB 01-0020, WEB 03-0010, WEB 03-0380, WEB 03-0400	Description of RKXS was added.	AD
					WEB 01-0050	Changed System version at table 1.1.2.	CH
					WEB 02-0030	Names of Figure 2.3.1 were changed.	CH
					WEB 02-0140	Window of (7) was changed.	CH
					WEB 02-0150	Window was added to (1).	CH
					WEB 02-0160	Window was added to (2).	AD
						(5) and (6) were moved to page WEB 02-0161.	DL
						Window was added to (5).	CH
					WEB 02-0161	This page was newly added. ((5) and (6) were moved from page WEB 02-0160. Window of (5) was changed.)	AD
					WEB 02-0162	This page was newly added.	AD
					WEB 03-0010	Figure was changed with UPS cover.	CH
					WEB 03-0280	"When the version of the microprogram..." was added.	AD
					WEB 03-0290	Description of (3) was changed.	CH
						"Select ENC Microprogram" window was added.	AD
						Window was added to the (4).	AD
						(5) and (6) were moved to page WEB 03-0300.	DL
					WEB 03-0300	(5) and (6) were moved from page WEB 03-0290.	AD
					WEB 03-0330	Window of (8) was changed.	CH
					WEB 03-0350	Window of (3) was changed.	CH
					WEB 03-0360	Window of (6) was changed.	CH
					WEB 03-0430	"・Data Down Grade Check Mode" was changed.	CH
3	Oct.12.2005	N.Higashijima / A.Hirasawa	N.Higashijima / A.Hirasawa	Y.Uchiyama / K.Honda	GENE 0000	Rev.2 → 3	CH
					GENE 0040	"DF700-RKM/RKS/RKXS+RKNAS(×2)+U7" was added.	AD
					GENE 0110	The title of INST1.7.2 was changed.	CH
					GENE 0120	"3.4.8" was added.	AD
						"3.4.14" to "3.4.17" were added.	AD
						""3.4.13 →"3.18", "3.4.14" → "3.4.19"	CH
					GENE 0130	"3.8" was moved to GENE 0140.	DL
					GENE 0140	"3.8" was moved from GENE 0130.	AD
						Page of "1.4.4" was changed.	CH
						"1.4.5" to "1.4.7" were added.	AD
						"1.7.3" was moved to GENE 0150.	DL
					GENE 0150	"1.7.3" was moved from GENE 0140.	AD
						"2.4.5" and "1.4.6" was added.	AD
					GENE 0160	Troubleshooting 3.4, 4.6, 4.7 was added.	AD
					GENE 0170	Title of Section 7.5 was changed.	CH
					GENE 0180	Section 7.4, 4.5 and 2.1.3 were added.	AD
					GENE 0190	Descriptions of NAS page were added.	AD
					GENE 0200	3.5.4, 3.6 and 3.7 was moved to page GENE 0210.	DL
					GENE 0210	3.5.4, 3.6 and 3.7 was moved from page GENE 0200.	AD
					SAFE 0110, SAFE 0130, SAFE 0140, SAFE 0150	Descriptions of NAS page were added.	AD
					SAFE 0170, SAFE 0180, SAFE 0181, SAFE 0190, SAFE 0200, SAFE 0210	"In the European Union Only" is added to the figure.	AD
					SAFE 0231, SAFE0232	These pages were newly added. (4.9)	AD
					SAFE 0240	"4.9" → "4.10"	CH
					THEO 01-0000	1.1 Warranty were deleted.	DL
					THEO 02-0040	Description of (1) was added.	AD
					THEO 02-0050	Description method was changed.	CH
					THEO 02-0060	Description of NAS was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0061, THEO 02-0062	Description of (2) was added. (New page)	AD
					THEO 02-0070	"The FC-AL Topology... " was changed.	CH
					THEO 02-0100	The RKNAS was added to Figure 2.3.1.	AD
					THEO 02-0140	(c) was moved to page THEO 02-0150.	DL
					THEO 02-0150	(c) was added.	AD
						"(c)" →"(d)"	CH
					THEO 02-0170	Description of RKS was deleted.	DL
						Figure was changed. (Two Interface lines)	CH
					THEO 02-0180	Figure of RKS was added. (Figure 2.3.10.1.)	AD
						Figure 2.3.11 was moved to page THEO 02-0190.	DL
					THEO 02-0190	Figure 2.3.11 was moved from page THEO 02-0180.	AD
						Figure 2.3.12 and Figure 2.3.13 were moved to page THEO 02-0191.	DL
					THEO 02-0191, THEO 02-0192, THEO 02-0193, THEO 02-0194	These pages were newly added. (Figure 2.3.12 and Figure 2.3.13 were moved from page THEO 02-0190. Description of (2) was added.)	AD
					THEO 02-0222	Figure 2.4.3 was moved from THEO 02-0230.	AD
					THEO 02-0230	Figure 2.4.3 was moved to THEO 02-0222.	DL
						Figure 2.4.4 was moved from THEO 02-0240.	AD
					THEO 02-0240	Figure 2.4.4 was moved to THEO 02-0230.	DL
						Figure 2.4.5 was added.	AD
					THEO 02-0250, THEO 02-0272, THEO 02-0292, THEO 02-0300, THEO 02-0310	Description of NAS was added.	AD
					THEO 02-0270, THEO 02-0271, THEO 02-0272	Description of Interface Board was added.	AD
					THEO 02-0273, THEO 02-0274	These pages were newly added.	AD
					THEO 02-0280	Figure 2.5.5 → 2.5.8	CH
					THEO 02-0290	Figure 2.5.6 → 2.5.9	CH
					THEO 02-0291	Figure 2.5.7 → 2.5.10	CH
					THEO 02-0293, THEO 02-0294	These pages were newly added. (Description of NAS was added.)	AD
					THEO 03-0000, THEO 03-0001, THEO 03-0010	"Fibre Channel HUB"→" Fibre Channel Switch"	CH
					THEO 03-0011	This page was newly added. (Description of NAS was added.))	AD
					THEO 03-0012	This page was newly added.	AD
					THEO 03-0060, THEO 03-0081, THEO 03-0130, THEO 03-0161	Description of Interface board was added.	AD
					THEO 03-0170	(7) was added.	AD
					THEO 03-0300, THEO 03-0310	Description of NAS was added.	AD
					THEO 03-0320	(5-2) → (7-2), (5-3) → (7-3)	CH
					THEO 04-0050	Description of NAS Unit was added.	AD
					THEO 04-0070, THEO 04-0080, THEO 04-0180	Description of NAS was added.	AD
					THEO 04-0110	"from 4 k bytes to 64 k bytes" → "from 4 k bytes to 16 k bytes"	CR
					THEO 04-0181	Description of NAS was added. (New page)	AD
					THEO 04-0182	New page was added. (Blank page)	AD
					THEO 05-0000	Description of NAS was added.	AD
					THEO 05-0011	Description of NAS was added. (New page)	AD
					INST 01-0010	The sentence was added to (3).	AD
					INST 01-0011, INST 01-0012	These pages were newly added.	AD
					INST 01-0020	"Hub" → "HBA"	CH
						Description of 4G bps Fibre Channel Interface Board was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0030	Description of 4G bps Fibre Channel Interface Board was added.	AD
					INST 01-0040, INST 01-0050, INST 01-0051, INST 01-0060, INST 01-0070	RKNAS was added to Table 1.3.1, Table 1.3.2, Table 1.3.2.1 , Table 1.3.3 and Table 1.3.4.	AD
					INST 01-0060	Description of 4G bps Fibre Channel Interface Board was added.	AD
					INST 01-0080, INST 01-0090, INST 01-0091	The RKNAS was added to Figure 1.4.1, Figure 1.4.2 and Figure 1.4.3.	AD
					INST 01-0130	(1-1) was added.	AD
					INST 01-0141, INST 01-0142	These pages were newly added. ((1-2))	AD
					INST 01-0290	The sentence was added to 1.7.	AD
					INST 01-0300	Figure 1.7.2.1 was added.	AD
					INST 01-0310	Procedure of (2), (3) and (4) were added.	AD
						The title of INST1.7.2 was changed.	CH
					INST 01-0310	(3) and (4) was changed.	CH
					INST 01-0320	1.7.3 was added.	AD
						1.8 was moved to page INST 01-0380.	DL
					INST 01-0330	1.8 (2) was moved to page INST 01-0390.	DL
					INST 01-0340 to INST 01-0390	These pages were newly added.	AD
					INST 01-0360	The title of INST1.7.2 was changed.	CH
					INST 02-0010	The title of INST1.7.2 was changed.	CH
					INST 02-0170	Description of 4G bps Fibre Channel Interface Board was added.	AD
						Table 2.5.2 was moved to INST 02-0171.	DL
					INST 02-0171	Table 2.5.2 was moved from INST 02-0170.	AD
						Description of 4G bps Fibre Channel Interface Board was added.	AD
						Table 2.5.2 and 2.5.3 were moved to INST 02-0172.	DL
					INST 02-0172	Table 2.5.2 and 2.5.3 were moved from INST 02-0171.	AD
						Description of 4G bps Fibre Channel Interface Board was added.	AD
					INST 02-0210	"(a-1)...." was added.	AD
					INST 02-0211	"(a-2)...." was added. (New page)	AD
					INST 02-0212	"Figure 2.5.3.1" was added. (New page)	AD
					INST 02-0220	Procedure of (ii) was changed.	CH
					INST 02-0230	"*1 : ..." was added. Title was changed.	AD/CH
					INST 02-0300	"Hub" → "HBA"	CH
					INST 02-0310	NOTE was changed. Figure of RKS was moved to INST 02-0311.	CH/DL
					INST 02-0311	Figure of RKS was moved from INST 02-0310 as Figure 2.6.1.1.	AD
						Figure 2.6.1.2 was added.	AD
					INST 02-0312	New blank paged was added.	AD
					INST 03-0000, INST 03-0010	Link No. or page was changed.	CH
					INST 03-0010	(2) was moved to page INST 03-0013.	DL
						The title of INST1.7.2 was changed.	CH
					INST 03-0011, INST 03-0012	These pages were newly added.	AD
					INST 03-0012	The title of INST1.7.2 was changed.	CH
					INST 03-0013	(2) was moved from page INST 03-0013. (3) was added.	AD
					INST 03-0014	This page was newly added.	AD
					INST 03-0050	RKNAS was added to Figure 3.2.3.	AD
					INST 03-0320	Description of NAS was added.	AD
					INST 03-0400	Location of EMI gasket was changed.	CH
					INST 03-0500	"HT-F4064-DJNAS" was added to Table 3.4.1 and Table 3.4.2.	AD
						Description of 4G bps Fibre Channel Interface Board was added.	AD
					INST 03-0550	"(a-1)..." was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0560	Title of Figure was changed.	CH
					INST 03-0561	"(a-1)..." was added. (New page)	AD
					INST 03-0562	Figure 3.4.27.1 and Figure 3.4.27.2 were added. (New page)	AD
					INST 03-0570	"When ... screws." was added to (iii).	AD
					INST 03-0580	"*1 : ..." was added. Title of Figure was changed.	AD/CH
						Figure 3.4.28.1 was added.	AD
					INST 03-0601, INST 03-0602, INST 03-0603, INST 03-0604	Description of NAS was added. (New page)	AD
					INST 03-0610	"3.4.8" → "3.4.9"	CH
					INST 03-0640	"3.4.9" → "3.4.10"	CH
						"Hub" → "HBA"	CH
						DF-D700-DJ4G2W was added.	AD
						NOTE was changed.	CH
					INST 03-0650	Figure 3.4.33.1 was added.	AD
						Description of FC Interface Board was added.	AD
					INST 03-0660	Figure of RKS/RKXS was moved to INST 03-0661.	DL
					INST 03-0661	Figure of RKS/RKXS was moved from INST 03-0660 as Figure 3.4.34.1. (New page)	AD
						Figure 3.4.34.2 was added.	AD
					INST 03-0662	New blank page was added.	AD
					INST 03-0670	"3.4.10" → "3.4.11"	CH
					INST 03-0710	"3.4.11" → "3.4.12"	CH
					INST 03-0730	"3.4.12" → "3.4.13"	CH
					INST 03-0740	"3.4.13" was moved to INST 03-0790.	DL
						"3.4.14" was added.	AD
					INST 03-0750	"3.4.14" was moved to INST 03-0800.	DL
						"3.4.15" was added.	AD
					INST 03-0760, INST 03-0770, INST 03-0780	"3.4.16" and "3.4.17" were added.(New page)	AD
					INST 03-0790	"3.4.13" was move from INST 03-0740 as "3.4.18". (New page)	AD
					INST 03-0800	"3.4.14" was move from INST 03-0750 as "3.4.19". (New page)	AD
					MICRO 01-0000, MICRO 01-0010, MICRO 01-0020, MICRO 01-0030, MICRO 01-0050, MICRO 01-0080, MICRO 01-0120, MICRO 01-0160	"Service PC" was corrected to "Maintenance PC".	CR
					MICRO 01-0010	Flow was changed.	CH
					MICRO 01-0090	NAS_BIOS was added.	AD
					MICRO 01-0100	The sentence was added to (1).	AD
						(2) was moved to page MICRO 01-0110.	DL
					MICRO 01-0110	(2) was moved from page MICRO 01-0100.	AD
						(e) was moved to page MICRO 01-0120.	DL
					MICRO 01-0120	(e) was moved from page MICRO 01-0110.	AD
						(g) and (h) were moved to page MICRO 01-0130.	DL
					MICRO 01-0130	(g) and (h) were moved from page MICRO 01-0120.	AD
						(j), (k) and (l) were moved to page MICRO 01-0140.	DL
					MICRO 01-0140	(j), (k) and (l) were moved from page MICRO 01-0130.	AD
						NOTE was added to the (m).	AD
						(3) and (3-1) were moved to page MICRO 01-0140.	DL
					MICRO 01-0150	(3) and (3-1) were moved from page MICRO 01-0130.	AD
						(d) to (g) were moved to page MICRO 01-0160.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MICRO 01-0160	(d) to (g) were moved from page MICRO 01-0150.	AD
						Text of (g) and (h) were moved to page MICRO 01-0170.	DL
					MICRO 01-0170	Text of (g) and (h) were moved to page MICRO 01-0160.	AD
						(i) to (k) were moved to page MICRO 01-0180.	DL
					MICRO 01-0180	(i) to (k) were moved from page MICRO 01-0170.	AD
						Text of (k) and (l) were moved to page MICRO 01-0181.	DL
					MICRO 01-0181	This page was newly added. (Text of (k) and (l) were moved to page MICRO 01-0180.)	AD
					MICRO 01-0182	This page was newly added.	AD
					MICRO 01-0200	Note was added.	AD
					MICRO 01-0210	(3-3) was added.	AD
					MICRO 01-0211	"0726/x or later" was added.	AD
					MICRO 01-0250 to MICRO 01-0290	These pages were newly added. ("1.6" was added)	AD
					SYSPR 01-0000	The sentence was added to Chapter 1.	AD
					SYSPR 01-0010	"Service PC" was corrected to "Maintenance PC".	CR
						The table were added to 3, 4, and 5.	AD
					SYSPR 01-0020	The description matter was changed.	CH
					SYSPR 01-0030	The description of the NAS unit was added to (2).	AD
					SYSPR 01-0031, SYSPR 01-0032	These pages were newly added.	AD
					SYSPR 03-0140	Description of NAS was added.	AD
					SYSPR 03-0141, SYSPR 03-0142, SYSPR 03-0440 to SYSPR 03-0570	These pages were newly added. ("3.7" was added)	AD
					SYSPR 03-0290	The number the link ahead was changed.	CH
					SYSPR 04-0020	No.4 was added.	AD
					SYSPR 04-0030	The article number was changed.	CH
						"Time Zone", "NNC LAN" were added.	AD
					SYSPR 04-0040	Note was added.	AD
					SYSPR 04-0050	*1 was added.	AD
					SYSPR 04-0070	*2 was added.	AD
					SYSPR 04-0080	"Drive Detach Mode" was added.	AD
					SYSPR 04-0090	"The IP address…" was added at [IP Address].	AD
					SYSPR 04-0092	(4) was added.	AD
					SYSPR 04-0093, SYSPR 04-0094	These pages were newly added.	AD
					SYSPR 04-0100	(4) was changed to (5).	CH
					SYSPR 04-0120	(5) was changed to (6).	CH
					SYSPR 04-0140	(6) was changed to (7).	CH
					SYSPR 04-0150	(7) was changed to (8).	CH
					SYSPR 04-0170	(8) was changed to (9).	CH
					SYSPR 04-0200	(9) was changed to (10).	CH
					SYSPR 04-0220	(10) was changed to (11).	CH
					SYSPR 04-0230	(11) was changed to (12).	CH
					SYSPR 04-0240	(12) was changed to (13).	CH
					SYSPR 04-0260 to SYSPR 04-0290	These pages were newly added. ("Time Zone" and "NNC LAN" was added)	AD
					SYSPR 05-0050 to SYSPR 05-0070	Procedure was divided by revision.	AD
					SYSPR 05-0080, SYSPR 05-0090	These pages were newly added.	AD
					SYSPR 06-0000	Note was added.	AD
					SYSPR 06-0010	Description of NAS was added.	AD
					SYSPR 06-0020 to SYSPR 06-0050	These pages were newly added.	AD
					SYSPR 07-0000	No.7 was added.	AD
					ADD 01-0001	(11) was added.	AD
					ADD 01-0010	Link No. or page was changed.	CH
						‡1 was added.	AD
					ADD 01-0020	Link No. or page was changed.	CH
						The title of INST1.7.2 was changed.	CH
						Description of NAS was added.	AD
					ADD 01-0030	Description of NAS was added.	AD
						The title of INST1.7.2 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0050	Description of FC Interface Board was added.	AD
					ADD 01-0070, ADD 01-0190,	*2 was changed.	CH
					ADD01-0200	‡1 was added.	AD
					ADD 01-0080	"3-4" →"3-5"	CH
						Description of NAS(3-4) was added.	AD
						(4) was moved to ADD 01-0081.	DL
					ADD 01-0081	(4) was moved from ADD 01-0080.(New page)	AD
					ADD 01-0082	New page was added. (Blank page)	AD
					ADD 01-0110	CAUTION was added.	AD
					ADD 01-0130	Title of (1) was added.	AD
						Description of FC Interface Board was added.	AD
					ADD 01-0131	(2) was added. (New page)	AD
					ADD 01-0132	New page was added. (Blank page)	AD
					ADD 01-0150	Description of (9) was changed.	CH
					ADD 01-0160	(30) was added.	AD
					ADD 01-0170	"*1 : ..." was added.	AD
					ADD 01-0171	Figure 1.4.1.1 was added. (New page)	AD
					ADD 01-0172	New blank page was added.	AD
					ADD 01-0180	"*1 : ..." was added.	AD
					ADD 01-0240	(2) was changed.	CH
					ADD 01-0250, ADD 01-0300	Link page of (6) was changed.	CH
					ADD 01-0250	‡1 was added.	AD
						Work-5 was changed.	CH
					ADD 01-0260, ADD 01-0310, ADD 01-0320, ADD 01-0530, ADD 01-0540, ADD01-0790, ADD 01-0791,	The title of INST1.7.2 was changed.	CH
					ADD 01-0270	Reference page of 1.8 was changed.	CH
					ADD 01-0280	‡1 was added.	AD
					ADD 01-0290	NOTE was changed.	CH
					ADD01-0300	Work-10 was changed.	CH
						‡1 was added.	AD
					ADD 01-0361	(c) to (f) were moved from ADD 01-0370. (New page)	AD
					ADD 01-0362	(g) to (i) were moved from ADD 01-0380. (New page)	AD
					ADD 01-0370	(c) to (f) were moved to ADD 01-0361.	DL
						(6) was moved from ADD 01-0390.	AD
						(b) was moved from ADD 01-0400	AD
					ADD 01-0380	(g) to (i) were moved to ADD 01-0362.	DL
						1.4.4 was moved from ADD 01-0410.	AD
					ADD 01-0390	(6) was moved to ADD 01-0370.	DL
						Procedure was moved from ADD 01-0420.	AD
					ADD 01-0391	(10) to (15) were moved from ADD 01-0430. (New page)	AD
					ADD 01-0392	Figure 1.4.5 was moved from ADD 01-0440. (New page)	AD
					ADD 01-0393	Figure 1.4.5.1 was moved from ADD 01-0440.(New page)	AD
					ADD 01-0394	New blank page was added.	AD
					ADD 01-0400	(b) was moved to ADD 01-0370	DL
						1.4.5 was added.	AD
					ADD 01-0410	1.4.4 was moved to ADD 01-0380.	DL
						(1) to (10) were added.	AD
					ADD 01-0411	(11) to (17)were added. (New page	AD
					ADD 01-0412	Figure 1.4.6 was added. (New page)	AD
					ADD 01-0420	Procedure was moved to ADD 01-0390.	DL
						1.4.6 was added.	AD
					ADD 01-0430	(10) to (15) were moved to ADD 01-0430	DL
						(1) to (10) were added.	AD
					ADD 01-0431	(11) to (22) were added. (New page)	AD

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					ADD 01-0432	Figure 1.4.7 was added. (New page)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0440	Figure 1.4.5 was moved to ADD 01-0392.	DL
						1.4.7 was added.	AD
					ADD 01-0390	"Fibre Channel HUB" → "Fibre Channel Switch"	CH
					ADD 01-0410	"This ...only" was deleted.	DL
					ADD 01-0440, ADD 01-0441	"Replacing" → "Adding"	CR
					ADD 01-0442	"1.4.5" was added.	AD
					ADD 01-0443, ADD 01-0444, ADD 01-0445, ADD 01-0446	Description of NAS was added. (New page)	AD
					ADD 01-0510, ADD 01-0520, ADD 01-0530	Link No. or page was changed.	CH
					ADD 01-0770, ADD 01-0780, ADD 01-0790	Link No. or page was changed.	CH
					ADD 02-0020, ADD 02-0040, ADD 02-0060, ADD 02-0080	The number the link ahead was changed.	CH
					ADD 02-0090, ADD 02-0100, ADD 02-0140	Link No. or page was changed.	CH
					ADD 02-0100, ADD 02-0110, ADD 02-0130, ADD 02-0250	The title of INST1.7.2 was changed.	CH
					ADD 02-0150	(1) was added.	AD
					ADD 02-0151, ADD 01-0152	These pages were newly added. ((2))	AD
					ADD 02-0180	(m) was added.	AD
					ADD 02-0281	Procedure was moved from ADD 02-0290. (New page)	AD
					ADD 02-0282	(9) to (15) were moved from ADD 02-0300. (New page)	AD
					ADD 02-0283	Figure 2.4.4 was moved from ADD 02-0310. (New page)	AD
					ADD 02-0284	Figure 2.4.4.1 was moved from ADD 02-0311.	AD
					ADD 02-0290	Procedure was moved to ADD 02-0281.	DL
						2.4.5 was added.	AD
					ADD 02-0300	(9) to (15) were moved to ADD 02-0282.	DL
						(1) to (8) were added.	AD
					ADD 02-0301	(9) to (19) were added.	AD
					ADD 02-0302	Figure 2.4.5 was added.	AD
					ADD 02-0310	Figure 2.4.4 was moved to ADD 02-0283.	DL
						2.4.6 was added.	AD
					ADD 02-0311	Figure 2.4.4.1 was moved to ADD 02-0284 and this page was deleted.	DL
					ADD 02-0312	This page was deleted.	DL
					ADD 03-0020, ADD 03-0060, ADD 03-0070	The title of INST1.7.2 was changed.	CH
					ADD 03-0060, ADD 03-0070, ADD 03-0080	Link No. or page was changed.	CH
					ADD 03-0110	"*1 : ..." was added.	AD
					TRBL 00-0000	"Chapter 11" was added.	AD
					TRBL 01-0000	Description of NAS was added.	AD
					TRBL 01-0010	*1 was added.	AD
					TRBL 01-0000, TRBL 02-0040, TRBL 02-0090, TRBL 02-0131, TRBL 02-0130, TRBL 02-0135, TRBL 05-0000, TRBL08-0260	Description of 4 G FC Interface Board was added.	AD
					TRBL 02-0000	The sentence was added to (1).	AD
					TRBL 02-0040, TRBL 02-0080, TRBL 02-0090, TRBL 02-0130, TRBL 02-0131, TRBL 02-0135	Description of NAS was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 02-0070, TRBL 02-0120, TRBL 02-0134, TRBL 03-0060, TRBL 03-0080, TRBL 04-0130, TRBL 06-0020, TRBL 06-0050, TRBL 07-0000, TRBL 07-0020, TRBL 07-0030, TRBL 07-0130, TRBL 07-0140, TRBL 07-0160, TRBL 07-0170, TRBL 07-0180, TRBL 07-0190, TRBL 07-0200, TRBL 07-0210, TRBL 07-0220	"Memory dump" was changed to "Full Dump".	CH
					TRBL 02-0080	"9-a" and "9-b" were added.	AD
					TRBL 02-0260, TRBL 02-0270, TRBL 02-0280	Description of (8) was added. (New page)	AD
					TRBL 02-0290(Blank)	Blank page was added.	AD
					TRBL 03-0010	Description of NAS was added.	AD
					TRBL 03-0010, TRBL 03-0060, TRBL 03-0090,	"Service PC" was corrected to "Maintenance PC".	CR
					TRBL 03-0020	No.3, 4 and 5 were added.	AD
					TRBL 03-0040	"PC" of (e) was corrected to "Maintenance PC".	CR
					TRBL 03-0080	The PC capacity in the table was changed.	CH
					TRBL 03-0100	3.4 was added. (New page)	AD
					TRBL 03-0110	This page was newly added. (Blank page)	AD
					TRBL 04-0010, TRBL 04-0020, TRBL 04-0030	Screen was changed.	CH
					TRBL 04-0091, TRBL 04-0092	These pages were newly added.	
					TRBL 04-0040, TRBL 04-0050, TRBL 04-0060, TRBL 04-0070, TRBL 04-0080, TRBL 04-0090, TRBL 04-0091, TRBL 04-0092	Reedited due to adding the NNC (NAS Unit). (Subsection 2.4)	CH/AD
					TRBL 04-0130, TRBL 04-0140, TRBL 04-0160, TRBL 04-0250	Description of NAS was added.	AD
					TRBL 04-0180, TRBL 04-0250, TRBL 04-0260	Description of Link page was added.	AD
					TRBL 04-0250	"H21700" and "H30Hxx" was deleted.	DL
						"HF0100", "HH4Gxy" to "HH8C00" and "HNA30x" to "HNA5xy" were added.	AD
					TRBL 04-0270	4.6 was added.	AD
					TRBL 04-0280, TRBL 04-0290	These pages were newly added.	AD
					TRBL 05-0000, TRBL 05-0010	Title of flow chart was changed.	CH
					TRBL 05-0020, TRBL 05-0030	Position of flow chart was changed.	CH
					TRBL 06-0010	No.20 and No.21 were added.	AD
					TRBL 06-0280	Title of a table was added.	AD
					TRBL 06-0401	Attribute of a ruled line was corrected.	CR
					TRBL 06-0520	Figure was corrected. (Text location)	CR
					TRBL 06-0590	Flow was changed.	CH
						*3 was changed.	CH
					TRBL 06-0630	Normal loop and Alternative loop in figure was changed.	CH
					TRBL 06-0720, TRBL 06-0730, TRBL 06-0740, TRBL 06-0750, TRBL 06-0760, TRBL 06-0840, TRBL 06-0870, TRBL 06-0880, TRBL 06-0890, TRBL 06-0900, TRBL 06-0910, TRBL 06-0920, TRBL 06-0930	Description of RSD was changed to Technical Support Center.	CH
					TRBL 06-1125, TRBL 06-1126, TRBL 06-1127, TRBL 06-1128, TRBL 06-1161, TRBL 06-1162	These pages were newly added.	AD
					TRBL 06-1130 to TRBL 06-1160	Description page change.	CH
					TRBL 07-0010, TRBL 07-0030, TRBL 07-0050, TRBL 07-0080, TRBL 07-0130, TRBL 07-0230, TRBL 07-0240, TRBL 07-0250	Description of NAS was added.	AD
					TRBL 07-0050	The description of the NAS unit was added to (b).	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 07-0070	Number and page of “7.8” was changed.	CH
					TRBL 07-0080	The description of the NAS unit was added to (b).	AD
					TRBL 07-0130	The description of the NAS unit was added to (b).	AD
					TRBL 07-0170	Description of NOTE was changed.	CH
					TRBL 07-0260 to TRBL 07-0310	These pages were newly added. (“NAS Log collection” and “NAS Dump collection” were added)	AD
					TRBL 08-0000	Description of NAS Unit was added in text.	AD
						(2) was moved to page TRBL 08-0010.	DL
					TRBL 08-0010	(2) was moved from page TRBL 08-0000.	AD
						No.4 was moved to page TRBL 08-0020.	DL
					TRBL 08-0020	No.4 was moved from page TRBL 08-0010.	AD
						No.7 to No.9 was moved to page TRBL 08-0030.	DL
					TRBL 08-0030	No.7 to No.9 was moved from page TRBL 08-0020.	AD
						No.11 to No.13 was moved to page TRBL 08-0031.	DL
					TRBL 08-0031	This page was newly added. (No.11 to No.13 was moved from page TRBL 08-0030.)	AD
					TRBL 08-0032	This page was newly added.	AD
					TRBL 08-0140	Reference page of *1 was changed.	CH
					TRBL 08-0230	Text was added.	AD
					TRBL 08-0240, TRBL 08-0250, TRBL 08-0270, TRBL 08-0280	The number the link ahead was changed.	CH
					TRBL 08-0270	Description of (4) and (5) was changed.	CH
					TRBL 08-0280	Description of (3) and (4) was changed.	CH
					TRBL 08-0340, TRBL 08-0350	There pages were newly added. (Description of (9) was added.)	AD
					TRBL 09-0010	Description of NAS was added.	AD
					TRBL 09-0041, TRBL 09-0042	These pages were newly added.	AD
					TRBL 10-0010	An arrow was corrected.	CR
					TRBL 10-0041, TRBL 10-0042, TRBL 10-0081, TRBL 10-0082	These pages were newly added.	AD
					TRBL 10-0060, TRBL 10-0070, TRBL 10-0080, TRBL 10-0100	Description of NAS was added.	AD
					MSG 01-0000	Description of No.④ was changed.	CH
					MSG 01-0020	RKM (RKM + RKAJ) of text was changed.	CH
					MSG 01-0030	Normal loop and Alternative loop in figure and PATH numbers were changed.	CH
					MSG 01-0031	RKS (RKS + RKAJ) of text and PATH numbers were changed.	CH
					MSG 01-0033	RKXS (RKXS + RKAJ) of text was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 02-0000 to MSG 02-0930	Reedited due to "Collect the error" was changing. • Interface Board → FC Interface Board (0184xxC1, 0184xxC2, 0184xxC3, 0184xxC4, 0184xxC5, 0184xxC6, 0184xxC7, 0184xxC8, 0184xxC9, 0184xxCA, 0184xxCB, 0184xxCC, 0184xxCD, 0184xxCE, 0184xxCF, 01D57101, 01D5xxC1, 01D5xxC2, 01D5xxC3, 01D5xxC4, 01D5xxC5, 01D5xxC6, 01D5xxC7, 01D5xxC8, 01D5xxC9, 01D5xxCA, 01D5xxCB, 01D5xxCC, 01D5xxCD, 01D5xxCE, 01D5xxCF, 01xxxxB1, 01xxxxB2, 01xxxxB3, 01xxxxB4, 01xxxxB5, 01xxxxB6, 01xxxxB7, 01xxxxB8, 01xxxxB9, 01xxxxBA, 01xxxxBB, 01xxxxBC, 01xxxxBD, 01xxxxD1, 01xxxxD2, 01xxxxD3, 01xxxxD4, 01xxxxD5)	CH
					MSG 03-0000 to MSG 03-0750	Reedited due to "Collect the error" was changing • This message was deleted. (H21700) • Description was changed. (H301xx, H302xx, H3030x, H304xx, HJ32xx) • Interface Board → FC Interface Board (HB0Cxy) • Adding the Message. (HD5G00, HD5F00, HH4Gxy, HH8A00, HH8B00, HH8C00, HJ35xy, HJ36xy, HNA10x, HNA20x, HNA30x, HNA4xy, HNA5xy) • Reference title was changed. (HH13B1, HH19xy) • "Recovery methods" was changed. (HE21xy)	CH
					MSG 03-0291, MSG 03-0292, MSG 03-0551, MSG 03-0552, MSG 03-0611, MSG 03-0612	This page was deleted.	DL
					MSG 03-0740, MSG 05-0750, MSG 03-0760, MSG 05-0770	This page was newly added.	AD
					MSG 04-0000 to MSG 04-0850	Reedited due to "Collect the error" was changing. • Adding the Message. (IA100x, IA110x, IA120x, IA130x, IA140x, IA150x, IA1Cxy IA1Dxy, IA1E00, IA1F0x, IA1G0x, IA1H0x, IA1I0x, IA1J0x, IA1K0x, IA1L0x, IA1M0x, IA1N0x, IA1P0x, IA1Q0x, IA1R0x, IA1S0x, IA1T0x, IA1U0x, IA1V0x, IA1W0x, IA1X0x, IA1Y00, IA1Z0x, IA2A00, IA2B0x, IA2C0x, IA2D0x, IA2E0x, IA2Fxy, IA2G0x, IA2H00, IA2I00, IA2J0x, IA2K0x, IA2M0x, IA2N0x, IA2P00, IA2Q00, IA2R00, IA2S00, IA2T00, IA2U00, IA2V00, IA2W00, IA2X00, IA2Y00, IA2Z00, IA3000, IA3100, IA3200, IA3300, IA3400, IA3500, IA3600, IA3700, IA3800, IA3900, IA3A00, IA3C0x, IA3D0x, IA4A0x, IA4B0x, IAPM00, IAPN00) • Description was changed. (I0020x, I152xy, I1GU00, I301AT, I301xy) • Deleted the message. (IA1Cxy, IA1Dxy, IA2A00, IZYP00)	CH/AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0070	Description of I1GB00 and I1GC00one were changed.	CH
					MSG 04-0490	"3.4.10" →"3.4.11"	CH
					MSG 04-0701, MSG 04-0702	There pages were deleted.	DL
					MSG 04-0820 to MSG 04-0950	There pages were newly added.	AD
					MSG 05-0000 to MSG 05-0230	Reedited due to "Collect the error" was changing. "Memory dump" was changed to "Full Dump". (RA1000) The title of INST1.7.2 was changed. (RBET00)	CH
					MSG 05-0181, MSG 05-0182	This page was deleted.	DL
					MSG 05-0240, MSG 05-0250	This page was newly added.	AD
					MSG 06-0000 to MSG 06-0200	Reedited due to "Collect the error" was changing and adding the Message. • Adding the Message. (W5000x, W5010x) • Description was changed. (W0100x, W0G0xy, W0G100, W0G20x, W0H000, W12000, W320xy to W41100, W49100 to W49600)	CH/AD
					MSG 07-0030	Line size of Item was changed.	CH
					MSG 07-0060	Message text was added.	AD
					MSG 07-0090	Section 7.4 was added.	AD
					MSG 07-0100, MSG 07-0110	There pages were newly added. (Section 7.5 was added.)	AD
					MSG 08-0000 to MSG 08-0280	Reedited due to adding the Message and *1. (DMEA001171, DMEA001172, DMEA001173, DMEA001176, DMEA001177, DMEA001178, DMEA001179, DMEA00117A, DMEA00117B, DMEA00117C, DMEA00117D, DMEA00117E, DMEA00117F, DMEA001180, DMEA001181, DMEA001182, DMEA001183, DMEA001184, DMEA001185, DMEC002083, DMEC002084, DMEC002086, DMEC002087, DMEC002088, DMEC002089, DMEC002090, DMEC002091, DMEC002092, DMEC002093, DMEC002094, DMEC002095, DMEC002096, DMEC002097, DMEC002098, DMEC002099, DMED190001, DMED190002, DMED190003, DMED190004, DMED190005, DMED190006, DMED190007, DMED190008, DMED1A0001, DMED1A0002, DMED1A0003, DMED1A0004, DMED1A0005, DMED1A0006, MED1A0007, DMED1A0008, DMED1A0009, MED1A000A, DMED1A000B, DMED1A000C, MED1A000D, DMED1A000E, DMED1A000F, MED1A0010, DMED1A0020, DMED1A0021, MED1A0022, DMED1A0023, DMED1A0024, MED1A0025, DMED1A0026, DMED1B0001, MED1B0002, DMED1B0003, DMED1B0004, MED1B0005, DMED800002, DMED800004, DMED800005, DMED800006, DMED800007, DMED800008, DMED800009, DMED800011, DMED800013, DMED800014, DMED800015, DMED800016, DMED800017, DMED800019, DMED80001A,DMED80001B, DMED800020, DMED800021, DMED800022, DMED800023, DMED800024, DMED800025, DMEC002094, DMED800026, DMED800027, DMED800029, DMED800099, DMEN***** (There messages were all added.), DMES05EA1E, DMES05EA1F)	CH/AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0000 to MSG 08-0280	This message was deleted. (DMEA00112A, DMEA00112B, DMED070001)	DL
					MSG 08-0220 to MSG 08-0310	There pages were newly added.	AD
					MSG 09-0140	"5/EA 1E" and "5/EA 1F" were added.	AD
					MSG 09-0210	*1 is added to "080001".	AD
					MSG 09-0280 to MSG 09- 0330	Reedited due to adding the Message. (190001, 190002, 190003, 190004, 190005, 190006, 190007, 190008, 1A0001, 1A0002, 1A0003, 1A0004, 1A0005, 1A0006, 1A0007, 1A0008, 1A0009, 1A000A, 1A000B, 1A000C, 1A000D, 1A000E, 1A000F, 1A0010, 1A0020, 1A0021, 1A0022, 1A0023, 1A0024, 1A0025, 1A0026, 1B0001, 1B0002, 1B0003, 1B0004, 1B0005, 800002, 800004, 800005, 800006, 800007, 800008, 800009, 800011, 800013, 800014, 800015, 800016, 800017, 800019, 80001A, 80001B, 800020, 800021, 800022, 800023, 800024, 800025, 800026, 800027, 800029, 800099) *1 is added to "200004".	CH/AD
					MSG 09-0320, MSG 09-0350	There pages were newly added.	AD
					REP 01-0020	The sentence was added to (4).	AD
					REP 01-0052	Figure 1.1.3.2 was added.	AD
					REP 01-0080	The reference page was added to NOTE.	AD
					REP 02-0000	FC Interface Board and NAS Interface Board were added.	AD
					REP 02-0012	Table 2.1.1.1 was added.	AD
					REP 02-0041	This page was newly added. (2.1.3)	AD
					REP 02-0042	This page was newly added.	AD
					REP 02-0050	The number the link ahead was changed.	CH
					REP 02-0090, REP 02-0150, REP 02-0180, REP 02-0350, REP 02-0370, REP 02-0410, REP 02-0500, REP 02-0520, REP 02-0850, REP 02-0890	Number and page of "7.8" was changed.	CH
					REP 02-0090, REP 02-0150, REP 02-0180, REP 02-0250, REP 02-0270, REP 02-0310, REP 02-0330, REP 02-0350, REP 02-0370, REP 02-0410, REP 02-0500, REP 02-0520, REP 02-0560, REP 02-0640, REP 02-0680, REP 02-0750, REP 02-0790, REP 02-0820, REP 02-0850, REP 02-0890, REP 02-0920, REP 02-0940, REP 02-0960, REP 02-1000, REP 02-1030, REP 02-1040	"Memory dump" was changed to "Full Dump".	CH
					REP 02-0160	Description of "Drive Maintenance" was added.	AD
					REP 02-0270	(i) was moved to page REP 02-0280.	DL
					REP 02-0280	(i) was moved from page REP 02-0270.	AD
					REP 02-0350	(l) was moved to page REP 02-0360.	DL
					REP 02-0360	(l) was moved from page REP 02-0350.	AD
					REP 02-0390, REP 02-0540, REP 02-0660, REP 02-0770, REP 02-0950, REP 02-0990, REP 02-1060, REP 02-1080, REP 02-1100, REP 02-1120, REP 02-1140	"When replacing …. chassis," was deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0410	(d) was added.	AD
					REP 02-0420	Working procedure of (g), (j), (m) and (p) were changed.	CH
						(r) was moved to REP 02-430.	DL
					REP 02-0430	(r) was moved from REP 02-0420.	AD
						(v), (w), (x) and (y) were moved to REP 02-0431.	DL
						(s) was added.	AD
					REP 02-0431	(v), (w), (x) and (y) were moved from REP 02-0430. (New page)	AD
					REP 02-0432	There pages were newly added.	AD
					REP 02-0440	"*1 : ..." was added.	AD
					REP 02-0441	Figure 2.2.7.1 was added. (New page)	AD
					REP 02-0442	Figure 2.2.7.2 was added. (New page)	AD
					REP 02-0450	"*1 : ..." was added.	AD
						Figure 2.2.74 was added.	AD
					REP 02-0460	(d) was added.	AD
					REP 02-0470	Working procedure of (g), (j), (m) and (p) were changed.	CH
						(q) was moved to REP 02-0480.	DL
					REP 02-0480	(q) was moved from REP 02-0470.	AD
						(r) was added.	AD
					REP 02-0490	The item number was changed.	CH
					REP 02-0500	Working procedure of (g) was changed.	CH
						(h) was moved from REP 02-0510.	AD
					REP 02-0510	Working procedure of (j), (m) and (o) were changed.	CH
						(h) was moved to REP 02-0500.	DL
					REP 02-0520	Working procedure of (g) and (i) were changed.	CH
					REP 02-0530	Working procedure of (j), (m) and (o) were changed.	CH
					REP 02-0540	The description of NAS was added.	AD
					REP 02-0560	(f) and (g) was moved to page REP 02-0570.	DL
						(d) was added.	AD
					REP 02-0570	(f) and (g) was moved from page REP 02-0560.	AD
						(n) was added.	AD
					REP 02-0580	The item number was changed.	CH
					REP 02-0590, REP 02-0600	"Cache Unit" was added to the figure.	AD
					REP 02-0610	(d) was added.	AD
					REP 02-0620	(n) was added.	AD
					REP 02-0630	The item number was changed.	CH
					REP 02-0640	(h) was moved to page REP 02-0650.	DL
					REP 02-0650	(h) was moved from page REP 02-0640.	AD
					REP 02-0660	"This work i...only." was deleted.	DL
						The description of NAS was added.	AD
					REP 02-0680	(f), (g) and (h) were moved to page REP 02-0690.	DL
						(d) was added.	AD
					REP 02-0690	(f), (g) and (h) were moved to page REP 02-0680.	AD
						The description of NAS interface board was added to (g).	AD
						NOTE was added to (i).	AD
						(p) was added.	AD
					REP 02-0700	The item number was changed.	CH
					REP 02-0710	"*1 : ..." was added.	AD
					REP 02-0720	(i) was moved to page REP 02-0730.	DL
						(d) was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0730	(i) was moved from page REP 02-0720.	AD
						NOTE was added to (i).	AD
						The description of NAS interface board was added to (k).	AD
						(p) was added.	AD
					REP 02-0740	The item number was changed.	CH
					REP 02-0750	(h) was moved to page REP 02-0760.	DL
						The description of NAS interface board was added to (f).	AD
					REP 02-0760	(h) was moved from page REP 02-0750.	AD
						NOTE was added to (h).	AD
						The description of NAS interface board was added to (j).	AD
					REP 02-0780	Description of SNMP was changed.	CH
						Description of FC Interface Board was added.	AD
					REP 02-0810	"•" position of (b) was changed.	CH
					REP 02-0920, REP 02-0940	"3.4.10" →"3.4.11"	CH
					REP 02-0940	(g) and (h) were moved to page REP 02-0941.	DL
					REP 02-0941	(g) and (h) were moved from page REP 02-0940.	AD
					REP 02-1050	Description of NAS was added.	AD
					REP 02-1060, REP 02-1070, REP 02-1080, REP 02-1090, REP 02-1100, REP 02-1110, REP 02-1120, REP 02-1130, REP 02-1140, REP 02-1150, REP 02-1160, REP 02-1170, REP 02-1180, REP 02-1190 REP 02-1200, REP 02-1210 REP 02-1220, REP 02-1230	Description of NAS was added. (New page)	AD
					REP 03-0000	It corrected from Figure 7.1.2 to Figure 3.1.2 referring to *1 ahead.	CR
						RKNAS was added to *2.	AD
					REP 03-0040	RKNAS was added to 3.3.1.	AD
					REP 03-0050	RKNAS was added to figure 3.3.1.	AD
					REP 03-0060	RKNAS was added.	AD
					PARTS 01-0010	RKNAS was added.	AD
					PARTS 01-0040	No.30 was added.	AD
					PARTS 01-0070, PARTS 01-0100	No.27 and No.28 were added.	AD
					PARTS 01-0221, PARTS 01-0222	There pages were newly added. (RKNAS)	AD
					PARTS 01-0350	RKNAS was added.	AD
						10 → 3, 11 → 14	CH
					WEB 01-0000	The sentence was added to Chapter 1.	AD
					WEB 01-0000, WEB 01-0020, WEB 03-0380	"Memory dump" was changed to "Full Dump".	CH
					WEB 01-0020	The PC capacity in the table was changed.	CH
					WEB 01-0030	*2 was changed. (IP address etc)	CH
					WEB 01-0040	Table was deleted. NOTE was changed.	DL/CH
					WEB 02-0010, WEB 02-0020, WEB 02-0030, WEB 02-0060, WEB 02-0170, WEB 02-0180, WEB 02-0190, WEB 02-0200, WEB 02-0210	Description of NAS was added.	AD
					WEB 02-0070, WEB 02-0080, WEB 02-0090, WEB 02-0100, WEB 02-0110, WEB 02-0111, WEB 02-0112	Reedited due to adding the NNC (NAS Unit). (Subsection 2.4)	CH/AD
					WEB 02-0111, WEB 02-0112, WEB 02-0220 to WEB 02-0290	These pages were newly added.	AD
					WEB 02-0130	Corrected the screen.	CR
					WEB 03-0080	‡1 was added.	AD
					WEB 03-0170, WEB 03-0180, WEB 03-0200	Screenshot was exchanged.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0190	Screenshot was exchanged.	CH
						*1 was changed. *2 was added.	CH/AD
					WEB 03-0320, WEB 03-0340	Description of (1) was changed.	CH
					WEB 03-0380	The PC capacity in the table was changed.	CH
						Description of (a) was changed.	CH
					WEB 03-0400	The PC capacity in the table was changed.	CH
4	Oct.26.2005	N.Higashijima / A.Hirasawa	N.Higashijima / A.Hirasawa	Y.Uchiyama / K.Honda	GENE 0000	Rev.3 → 4	CH
					GENE 0060	Description of "ACE" of the text was deleted.	DL
					GENE 0070	Chapter 11. was added in for Troubleshooting.	AD
					GENE 0080	Chapter 11. was added in for Message.	AD
					GENE 0180	Chapter 11. was added in for Troubleshooting.	AD
						Chapter 11. was added.	AD
					THEO 04-0180	NAS Manager Modular Suite was added.	AD
					THEO 04-0181	(16) → (13), (17) → (14)	CH
					THEO 05-0011	No.14 to 17 were deleted.	DL
					INST 01-0040, INST 01-0050, INST 01-0051	Model name of Memory (DIMM) was added.	AD
					INST 01-0290	Description of "high speed blinking" and "LED ACTIVE" were added to (9).	AD
					INST 01-0350, INST 01-0370	Description of "LED ACTIVE" was added to (9).	AD
					SYSPR 03-0050	"…set at least two RAID Groups in order to make…" → "…set at least four RAID Groups in order to make…".	CR
					SYSPR 04-0030	"Reference page" of No.15 was changed.	CH
					SYSPR 04-0260	Text was added.	AD
						(d) was moved to page SYSPR 04-0270.	DL
					SYSPR 04-0270	(d) was moved from page SYSPR 04-0260.	AD
						(15) was moved to page SYSPR 04-0280.	DL
						(c) was moved to page SYSPR 04-0290.	DL
					SYSPR 04-0280	(15) was moved from page SYSPR 04-0270.	AD
						(d) was moved to page SYSPR 04-0290.	DL
					SYSPR 04-0290	(c) was moved from page SYSPR 04-0270 and (d) was moved from page SYSPR 04-0280.	AD
					TRBL 07-0230, TRBL 07-0240, TRBL 07-0280, TRBL 07-0290	Corrected was procedure of connected the service PC.	CR
					TRBL 09-0010	No.14 to 17 were deleted.	DL
					MSG 00-0000	Chapter 11. was added.	AD
					MSG 04-0780	"IB0000", "IC0000" and "ID0000" was moved to page MSG 04-0790.	DL
					MSG 04-0790	"IB0000", "IC0000" and "ID0000" was moved from page MSG 04-0780.	AD
						"IR0000" and "IS0000" was moved to page MSG 04-0800.	DL
					MSG 04-0800	"IR0000" and "IS0000" was moved from page MSG 04-0790.	AD
						"IX0000" to "IXX300" was moved to page MSG 04-0810.	DL
					MSG 04-0810	"IX0000" to "IXX300" was moved from page MSG 04-0800.	AD
						"IXXD00" to "IXXH00" was moved to page MSG 04-0820.	DL
					MSG 04-0811	This page was newly added. ("IXXD00" to "IXXH00" was moved from page MSG 04-0810.)	AD
					MSG 04-0812	This page was newly added.	AD

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 11-0000	This page was newly added. (Chapter 11. was added.)	AD
					REP 02-0010	3272047-G → 3272218-Q	CR
					REP 02-0012	Part No was added.	AD
					PARTS 01-0010	DF600-RKNAS → DF700-RKNAS	CR
					PARTS 01-0040, PARTS 01-0070	3272218-0 → 3272218-Q	CR
					PARTS 01-0350	Parts No. of URHTN7 Rail Kit was added.	AD
5	Nov.30.2005	N.Higashijima / A.Hirasawa	N.Higashijima / A.Hirasawa	Y.Uchiyama / K.Honda	GENE 0000	Rev.4 → 5	CH
					GENE 0130	System Parameter 1.2 was added.	AD
					GENE 0140	"1.6.2" was deleted.	DL
						"1.6.3" to "1.6.5" were changed to "1.6.2" to "1.6.4"	CH
					GENE 0200	WEB 2.11 was added.	AD
					SAFE 0150	Two "system down" warning were deleted.	DL
					THEO 04-0210	Corrected Figure 4.6.2(RAID 1+0).	CR
					SYSPR 04-0093	The setting result from 4 to 8 was changed.	CH
					SYSPR 04-0094	The setting result from 9 to 11 was changed.	CH
					INST 01-0180, INST 01-0250, INST 01-0320	Note was added. (LAN Port Number)	AD
					MICRO 01-0150, MICRO 01-0250	Note was added. (LAN Port Number)	AD
					SYSPR 01-0010	Note was added. (LAN Port Number)	AD
					SYSPR 01-0100, SYSPR 01-0110	These pages were newly added.	AD
					SYSPR 02-0000	Note was added. (LAN Port Number)	AD
					SYSPR 03-0030, SYSPR 03-0400, SYSPR 03-0420, SYSPR 03-0440, SYSPR 03-0480, SYSPR 03-0520	Note was added. (LAN Port Number)	AD
					SYSPR 04-0000	Note was added. (LAN Port Number)	AD
					SYSPR 04-0030	No.16 was added.	AD
					SYSPR 04-0300 to SYSPR 04-0350	These pages were newly added.	AD
					SYSPR 05-0000, SYSPR 05-0040	Note was added. (LAN Port Number)	AD
					ADD 01-0010	Procedure 2 and 3 were exchanged.	CH
					ADD 01-0110	"system down" warning was deleted.	DL
						"NOTE" was added.	AD
					ADD 01-0120	Two "system down" warning were deleted in (5) and (6).	DL
						"NOTE" was added to (5).	AD
					ADD 01-0360	Note was added. (LAN Port Number)	AD
					ADD 01-0500	Procedure (k) and (l) were added.	AD
					ADD 01-0510, ADD 01-0520	Procedure flow chart was changed.	CH
					ADD 01-0550, ADD 01-0560, ADD 01-0570, ADD 01-0580	These pages were changed to Blank pages.	CH
					ADD 01-0590	"1.6.3" was changed to "1.6.2".	CH
					ADD 01-0620	Procedure flow chart was changed.	CH
					ADD 01-0640	"Figure 1.6.4" was changed.	CH
					ADD 01-0670	"1.6.4" was changed to "1.6.3".	CH
					ADD 01-0730	"system down" warning was deleted.	DL
						"NOTE" was added.	AD
					ADD 01-0740	"1.6.5" was changed to "1.6.4".	CH
					ADD 01-0760	Procedure (k) and (l) were added.	AD
					ADD 01-0770	"(not including RKAJ)" was added to the title of (1).	AD
					ADD 01-0781, ADD 01-0782	Procedure flow chart (2) was added. (New page)	AD
					ADD 01-0790	"(2)" was changed to "(3)".	CH
					ADD 01-0810	Description of RKAJ was deleted.	DL
					ADD 01-0830	"Figure 1.7.2" was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0840	"Figure 1.7.4" was deleted.	DL
						"Figure 1.7.4.1" was changed to "Figure 1.7.4".	CH
					ADD 01-0841	"Figure 1.7.4.2" and "Figure 1.7.4.3" were changed to "Figure 1.7.4.1" and "Figure 1.7.4.2".	CH
					ADD 01-0842	"Figure 1.7.4.4" was changed to "Figure 1.7.4.3".	CH
					ADD 01-0850	Description of RKAJ was deleted.	DL
					ADD 01-0860	Description of "Example of connection" was changed.	CH
					ADD 01-0870	"Figure 1.7.6" was changed.	CH
					ADD 01-0940	"Figure 1.7.7" was changed.	CH
					ADD 01-1010	Link page was corrected in (2).	CR
					ADD 01-1060	"system down" warning was deleted.	DL
						"NOTE" was added.	AD
					TRBL 02-0010	Note was added. (LAN Port Number)	AD
					TRLB 05-0050	Note was added. (LAN Port Number)	AD
					TRLB 06-0250	Note was added. (LAN Port Number)	AD
					TRLB 10-0150, TRLB 10-0250, TRLB 10-0270, TRLB 10-0300, TRLB 10-0330, TRLB 10-0360, TRLB 10-0390, TRLB 10-0420, TRLB 10-0460, TRLB 10-0480	Note was added. (LAN Port Number)	AD
					TRBL 07-0280	"The PC terminal…for the detail)." was added at (a).	AD
					MSG 03-0680	HJ2Exx was moved from page MSG 03-0690.	AD
					MSG 03-0690	HJ2Exx was moved to page MSG 03-0680.	DL
						"Recovery methods" of the HJ36xy was changed.	CH
						HJ37xx was moved to page MSG 03-0700.	DL
					MSG 03-0700	HJ37xx was moved from page MSG 03-0690.	AD
					MSG 03-0720	"Recovery methods" of the HNA30x was changed.	CH
						"Recovery methods" ④ of the HNA4xy was moved to page MSG 03-0730.	DL
					MSG 03-0730	"Recovery methods" ④ of the HNA4xy was moved from page MSG 03-0720.	AD
						HZ0200 was move to page MSG 03-0740.	DL
					MSG 03-0740	HZ0200 was move from page MSG 03-0730.	AD
					MSG 04-0240	Link page of I60200 was changed.	CH
					MSG 04-0390	Link page of I70000 was changed.	CH
					MSG 04-0400	Link page of I70300 was changed.	CH
					MSG 04-0450	Link page of I80Bxy was changed.	CH
					MSG 04-0490	Link page of I824xy was changed.	CH
					MSG 04-0640	③ and ④ of "Recovery methods" was changed.	CH
					MSG 04-0650	⑤ of "Recovery methods" was changed.	CH
					MSG 04-0660	"Recovery methods" of all was changed.	CH
					MSG 04-0780	"Reference page" ① of IA4A0x was changed.	CH
						"Recovery methods" of the IAPM00 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0812	"MSG 04-0812-05" was corrected to "MSG 04-0812-04".	CR
					MSG 08-0100	"DMED070008"and "DMED070009"were added.	AD
						"DMED080014" and "DMED080015" was moved to page MSG 08-0110.	DL
					MSG 08-0110	"DMED080014" and "DMED080015" was moved form page MSG 08-0100.	AD
						"DMED09000F" was moved to page MSG 08-0120.	DL
					MSG 08-0120	"DMED09000F" was moved form page MSG 08-0110.	AD
						"DMED0A0008" and "DMED0A0009" was moved to page MSG 08-0130.	DL
					MSG 08-0130	"DMED0A0008" and "DMED0A0009" was moved form page MSG 08-0120.	AD
					MSG 09-0210	"070008" and "070009" was added.	AD
						"08000E" was moved to page MSG 09-0220.	DL
					MSG 09-0220	"08000E" was moved form page MSG 09-0210.	AD
					REP 01-0010	Procedure (d) and (e) were moved from REP 01-0020.	AD
					REP 01-0020	Procedure (d) and (e) were moved to REP 01-0010.	DL
						Procedure (14) and (15) were added.	AD
					REP 02-1100, REP 02-1130, REP 02-1200, REP 02-1220	"The READY LED (green) …WEB 02-0120))."was added.	AD
					WEB 02-0240	2.11 was added.	AD
					WEB 02-0250	2.11 → 2.12	CH
					WEB 02-0270	Table 2.11.1 → Table 2.12.1	CH
					WEB 02-0280	2.12 → 2.13	CH
6	Dec.20.2005	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.5→6	CH
					GENE 0050	"*1" of the table was changed to "*1".	CH
						Description of "RKAAT" or "RKAATL" was deleted.	DL
					GENE 0070	TRBL 12-0000 was added.	AD
						Font of "Maintenance Manual - for ..." was changed.	CH
					GENE 0120	Title name of 2.6.1, 3.4.10 was changed.	CH
						Titles were changed. (3.2.2, 3.2.3, 3.2.4)	CH
						"3.2.5" was added.	AD
					GENE 0130	Title was changed at SYSPR 02-0000.	CH
						2.4, 2.5 were added at System Parameter.	AD
					GENE 0140	1.4.7 was added.	AD
					GENE 0150	2.4.6 was added.	AD
					GENE 0170	10.2.6 and 10.2.7 was moved from page GENE 0180.	AD
					GENE 0180	10.2.6 and 10.2.7 was moved to page GENE 0170.	DL
						TRBL 12-0000 was added.	AD
					SAFE 0130, SAFE 0140	Description page number of iSCSI was added.	AD
					SAFE 0130	The page number falling out was added.	AD
					THEO 02-0040, THEO 02-0050, THEO 02-0060, THEO 02-0080, THEO 02-0300, THEO 02-0310, THEO 03-0020, THEO 03-0081, THEO 03-0090, THEO 03-0100, THEO 03-0130, THEO 03-0140, THEO 05-0000, THEO 05-0010, THEO 05-0011	Description of iSCSI was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0050	Sentence contents was changed by a description of Mini-HUB.	CH
						(b) was moved to THEO 02-0060.	DL
					THEO 02-0060	(b) was moved from THEO 02-0050.	AD
						(f), (g) and (h) were moved to THE 02-0061.	DL
					THEO 02-0061	(f), (g) and (h) were moved from THE 02-0060.	AD
						(h) was changed by a description of Mini-HUB.	CH
						(2) was moved to THEO 02-0062.	DL
					THEO 02-0062	(2) was moved form THEO 02-0061.	AD
						(b), (c), (d), (e), (g) and (h) were moved to THEO 02-0063(new page).	DL
					THEO 02-0063	(b), (c), (d), (e), (g) and (h) were moved from THEO 02-0062.	AD
					THEO 02-0064	New page was added. (Blank page)	AD
					THEO 02-0070	Sentence contents was changed by a description of Mini-HUB.	CH
						"Duplicated power supply…" was moved to THEO 02-0080.	DL
					THEO 02-0080	"Duplicated power supply…" was moved from THEO 02-0070.	AD
					THEO 02-0180	"2 port" → "2 connectors"	CH
					THEO 02-0220	Unnecessary line of the figure was deleted.	DL
					THEO 02-0300	"iSCSI chip set" was added.	AD
					THEO 03-0000	"When the subsystem…" was added at (1).	AD
					THEO 03-0001	(2) was added.	AD
					THEO 03-0002	(2)-(b), (c) were added.	AD
					THEO 03-0010	"When the subsystem…" was added at (3).	AD
					THEO 03-0011	"When the subsystem…" was added at (4).	AD
					THEO 03-0012	(5) was added.	AD
					THEO 03-0060, THEO 03-0081, THEO 03-0130, THEO 03-0161	"Number of port" → "Number of Host connector"	CH
						"When the FC Interface Board is not added…" was changed.	CH
						"The case where the FC Interface…" was added.	AD
					THEO 03-0081	Unnecessary line of the table was deleted.	DL
					THEO 03-0110, THEO 03-0150, THEO 03-0163, THEO 03-0170	"Breaking current" was changed. (RKAJ, RKAJAT, RKXS, RKNAS)	CH
					THEO 03-0162	RAID 6 was added.	AD
					THEO 04-0090	The hyperlink at (4) was changed.	CH
					THEO 04-0220	"The data recover…one set at a time." was added at (2).	AD
					THEO 04-0240	"When the model…Figure 4.6.5)." was added at (3).	AD
					THEO 04-0250	Figure 4.6.6 was added.	AD
						"The loop of the drive interface" was added at (4).	AD
					INST 01-0011	Description of "Notes while the array system is being started" was added.	AD
					INST 01-0020	"installed" → "added"	CH
					INST 01-0030	Description of "1.2.3" and "1.2.4" were chagned.	CH
					INST 01-0040, INST 01-0050, INST 01-0051	Description of iSCSI was added.	AD
					INST 01-0050	RSS014F, RSS034F were added.	AD
					INST 01-0051	RXS024F, RXS044F were added.	AD
					INST 01-0060	Description of iSCSI was added.	AD
						Description of "RKAAT" or "RKAATL" was deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0070	Description of “Rack rail (for Chassis)” was added to No.5.	AD
					INST 01-0180	The Table was added to (2).	AD
					INST 01-0200, INST 01-0210, INST 01-0280	Description of “RKAAT” or “RKAATL” was deleted.	DL
					INST 01-0250	“setting” of (1) was changed to “selection methods”	CH
					INST 01-0320	“setting” of (d) was changed to “selection methods”	CH
					INST 01-0390	Description of 0 of “Rotary switch-0” was added.	AD
					INST 02-0000	“Targets” was added at Work-9.	AD
					INST 02-0010	Link title name (2.6.1) was changed.	CH
					INST 02-0170, INST 02-0171, INST 02-0172, INST 02-0312	Description of iSCSI was added.	AD
					INST 02-0211	Description of “Remove procedure” was added to (ii).	AD
					INST 02-0212	“installed” → “added”	CH
					INST 02-0300	Title name of 2.6.1 was changed.	CH
						“Interface cable” → “Fibre Channel Interface cable”	CH
					INST 02-0310	“interface” was corrected to “Interface”.	CR
						Description of the second NOTE was changed.	CH
					INST 02-0311	“installed” → “added”	CH
					INST 03-0000	“Targets” was added at Work-11.	AD
					INST 03-0010	Link title name (3.4.10) was changed.	CH
					INST 03-0011	Title was changed of (b).	CH
						“See” of the work-8 was deleted.	DL
					INST 03-0100, INST 03-0501	Reference page described into the hyperlink was changed.	CH
					INST 03-0150, INST 03-0210, INST 03-0260	Title was changed.	CH
					INST 03-0270	“Figure 3.2.21” → “Figure 3.2.22”	CH
					INST 03-0280	“Figure 3.2.22” → “Figure 3.2.23”	CH
					INST 03-0290	“Figure 3.2.23” → “Figure 3.2.24”	CH
						“Figure 3.2.24” → “Figure 3.2.25”	CH
					INST 03-0301, INST 03-0302, INST 03-0303, INST 03-0304, INST 03-0305	Description of “NSC Rack Frame” was added. (New pages)	AD
					INST 03-0306	New page was added. (Blank page)	AD
					INST 03-0420, INST 03-0520	Figure title was corrected.	CR
					INST 03-0450	“Figure 3.4.12” was chagned.	CH
					INST 03-0481	Description of “NSC Rack Frame” was added. (New pages)	AD
					INST 03-0482	New page was added. (Blank page)	AD
					INST 03-0500, INST 03-0610, INST 03-0632	Description of iSCSI was added.	AD
					INST 03-0562	“installed” → “added”	CH
						Figure of “Removing the Host Connector” was added.	AD
					INST 03-0620, INST 03-0630, INST 03-0631, INST 03-0662	“FC Interface” was added to Figure title.	AD
					INST 03-0640	Title name of 3.4.10 was changed.	CH
						“Interface cable” → “Fibre Channel Interface cable”	CH
						Description of the second NOTE was changed.	CH
					INST 03-0650	The style of procedure number was changed.	CH
						“Interface cable” → “Fibre Channel Interface cable”	CH
					INST 03-0660	“Interface cable” → “Fibre Channel Interface cable”	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0661	"interface board" was corrected to "Interface Board".	CR
						Description of the second NOTE was changed.	CH
					INST 03-0663	Description of iSCSI was added. (New page)	AD
					INST 03-0664	New blank page was added.	AD
					INST 03-0710	"In the case of … ," was deleted from (4).	DL
					MICRO 01-0000	Description of second Note was added.	AD
					MICRO 01-0010, MICRO 01-0212	Reference page described into the hyperlink was changed.	CH
					MICRO 01-0150	"setting" of (c) was changed to "selection methods"	CH
					MICRO 01-0211	Changed table.	CH
						Description of "RKAAT/RKAATL" was deleted.	DL
						"installed" → "added"	CH
					MICRO 01-0210	Format of the hyperlink was changed.	CH
						(f) – (i) were added.	AD
					MICRO 01-0212	Description of iSCSI was added.	AD
					MICRO 01-0250	"setting" of (4) was changed to "selection methods"	CH
					SYSPR 00-0000	"Targets" was added at Chapter 2.	AD
					SYSPR 01-0000	"Targets" was added at Chapter 2 title.	AD
						Description of "The Storage ...Ready status" was added.	AD
					SYSPR 01-0010, SYSPR 01-0100, SYSPR 01-0110	Changed procedure number.	CH
					SYSPR 01-0020	"Port0" → "Maintenance port", "Port1" → "User management port"	CH
					SYSPR 02-0000	"Targets" was added at Chapter 2 title.	AD
						"setting" of (3) was changed to "selection methods"	CH
					SYSPR 02-0010	Description of iSCSI was added.	AD
					SYSPR 02-0020 to SYSPR 02-0090	Changed procedure number.	CH
					SYSPR 02-0091 to SYSPR 02-0098	Description of iSCSI was added. (New page)	AD
					SYSPR 02-0100 to SYSPR 02-0120	Changed procedure number.	CH
					SYSPR 02-0140 to SYSPR 02-0270	Description of iSCSI was added. (New page)	AD
					SYSPR 03-0000, SYSPR 03-0050, SYSPR 03-0080, SYSPR 03-0082, SYSPR 03-0090, SYSPR 03-0140	Reference page described into the hyperlink was changed.	CH
					SYSPR 03-0010	Reference page described into the figure was changed.	CH
					SYSPR 03-0030	"setting" of (2) was changed to "selection methods"	CH
					SYSPR 03-0191	Corrected "Number of blocks".	CR
					SYSPR 03-0291	Figure 3.3.1 was added.	AD
					SYSPR 03-0293, SYSPR 03-0294	These pages were newly added.	AD
					SYSPR 03-0390	"Targets" was added at Chapter 2 title.	AD
					SYSPR 03-0400	"setting" of (1) was changed to "selection methods"	CH
					SYSPR 03-0420	"setting" of (2) was changed to "selection methods"	CH
					SYSPR 03-0440, SYSPR 03-0480, SYSPR 03-0520	"setting" of (c) was changed to "selection methods"	CH
					SYSPR 03-0440, SYSPR 03-0560, SYSPR 05-0020	Placement position of the table header was changed.	CH
					SYSPR 04-0000	"setting" of (3) was changed to "selection methods"	CH
					SYSPR 04-0020, SYSPR 04-0030	Description of iSCSI was added.	AD
					SYSPR 04-0031, SYSPR 04-0032	No.18, 19 were added. (New page)	AD
					SYSPR 04-0060, SYSPR 04-0080, SYSPR 04-0090, SYSPR 04-0094, SYSPR 04-0100, SYSPR 04-0130, SYSPR 04-0140, SYSPR 04-0180, SYSPR 04-0220, SYSPR 04-0231, SYSPR 04-0260, SYSPR 04-0280	"Verify that the settings that…" → "Verify that the changes that…"	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 04-0070	The description of "Kind of parameter" of "Turbo LUN Warning" in the Table was changed.	CH
						The item number was changed.	CH
					SYSPR 04-0080	The item number was changed.	CH
					SYSPR 04-0191 to SYSPR 04-0194	Description of iSCSI was added. (New page)	AD
					SYSPR 04-0300 to SYSPR 04-0330	No.18, 19 were added. (New page)	AD
					SYSPR 05-0000, SYSPR 05-0040	"setting" of (3) was changed to "selection methods"	CH
					SYSPR 05-0020	Kind of line of the table was changed.	CH
					SYSPR 07-0010 to SYSPR 07-0050	"RKM" → "AMS/WMS series"	CH
					ADD 01-0000, ADD 01-0001, ADD 01-0040, ADD 01-0060, ADD 01-0100, ADD 01-0121, ADD 01-0122, ADD 01-0750, ADD 01-0810, ADD 01-0820, ADD 01-0850, ADD 01-0920, ADD 01-0940, ADD 01-0952, ADD 01-0960, ADD 01-0980, ADD 01-1010	Description of "RKAAT" or "RKAATL" was deleted.	DL
					ADD 01-0001	(12), (13) and (14) were added.	AD
					ADD 01-0020	"Targets" was added at Chapter 2 title.	AD
					ADD 01-0050, ADD 01-0130	Description of iSCSI was added.	AD
						Description of "4G bps" was added to the FC Interface Board.	AD
					ADD 01-0080, ADD 01-0131, ADD 01-0440	1.4.7 was changed to 1.4.8.	CH
					ADD 01-0160	Format of the hyperlink was changed.	CH
					ADD 01-0170, ADD 01-0171, ADD 01-0180, ADD 01-0392, ADD 01-0393, ADD 01-0423	Kind of line of the figure was changed.	CH
					ADD 01-0171	"installed" → "added"	CH
					ADD 01-0190, ADD 01-0200	Explanatory note was moved into the table.	CH
					ADD 01-0360	"setting" of (b) was changed to "selection methods"	CH
					ADD 01-0412	Figure of "Removing the Host Connector" was added.	AD
					ADD 01-0420	"replacing" → "adding"	CH
					ADD 01-0421	Description was moved from ADD 01-0430. (New page)	AD
						Description of "Power on procedure" was added to (1).	AD
					ADD 01-0422	Description was moved from ADD 01-0431. (New page)	AD
					ADD 01-0423	Description was moved from ADD 01-0432. (New page)	AD
					ADD 01-0424, ADD 01-0434	New blank page was added.	AD
					ADD 01-0430	Description was moved to ADD 01-0421.	DL
						Description of iSCSI was added.	AD
					ADD 01-0431	Description was moved to ADD 01-0422.	DL
						Description of iSCSI was added.	AD
					ADD 01-0432	Description was moved to ADD 01-0423.	DL
						Description of iSCSI was added.	AD
					ADD 01-0433	Description of iSCSI was added.	AD
					ADD 01-0440, ADD 01-0910, ADD 01-1010	Reference page described into the hyperlink was changed.	CH
					ADD 01-0600	Description of Hyperlink was changed.	CH
					ADD 01-0670	"(1)" → "(1-1)"	CH
						Title of (1) was added.	AD
					ADD 01-0690	"(2)" → "(1-2)", "(3)" → "(1-3)"	CH
					ADD 01-0710	"(4)" → "(2)"	CH
						Title of (2) was added.	AD
						Title of (c) was deleted.	DL
						"(d)" → "(c)"	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0720	"(e)" → "(d)", "(f)" → "(e)", "(g)" → "(f)", "(5)" → "(2-2)"	CH
					ADD 01-0730	"(6)" → "(2-3)"	CH
					ADD 01-0841	Description of "RKAAT" or "RKAATL" was deleted.	DL
						Figure 1.7.4.3 was added.	AD
					ADD 01-0842	This page was changed to Blank page.	CH
					ADD 01-0890, ADD 01-0900, ADD 01-0910, ADD 02-0230, ADD 02-0250	The period t was added to the end of the sentence of the flowchart.	ADD
					ADD 01-0890	Description of Hyperlink was changed.	CH
					ADD 01-0910	Font size of the "When the two or more additional ..." was changed.	CH
					ADD 01-0953	Figure 1.9.7.4 was changed to Figure 1.7.9.3.	CH
					ADD 01-0954	Figure 1.7.9.5 was deleted.	DL
						Figure 1.7.9.4 was added.	DL
					ADD 01-0980	"(1)" → "(1-1)"	CH
						Title of (1) was added.	AD
					ADD 01-1010	"(2)" → "(1-2)", "(3)" → "(1-3)"	CH
					ADD 01-1030	"(4)" → "(2)"	CH
						Title of (2) was added.	AD
						Title of (c) was deleted.	DL
					ADD 01-1040	"(d)" → "(c)", "(e)" → "(d)", "(f)" → "(e)", "(g)" → "(f)"	CH
					ADD 01-1050	"(5)" → "(2-2)"	CH
					ADD 01-1060	"(6)" → "(2-3)"	CH
					ADD 02-0000	(7) was added.	AD
					ADD 02-0100, ADD 02-0130, ADD 02-0230, ADD 02-0250	Font size of the "Do the preparatory works for ..." was changed.	CH
					ADD 02-0130, ADD 02-0230	Reference page described into the hyperlink was changed.	CH
					ADD 02-0140	Description of "NSC Rack Frame" was added.	AD
					ADD 02-0190, ADD 02-0283, ADD 02-0284	Kind of line of the figure was changed.	CH
					ADD 02-0190, ADD 02-0283	Size of the figure was changed.	CH
					ADD 02-0150	Description of iSCSI was added.	AD
					ADD 02-0151, ADD 02-0310	2.4.6 was changed to 2.4.7.	CH
					ADD 02-0291	Description was moved from ADD 02-0300. (New page)	AD
					ADD 02-0292	Description was moved from ADD 02-0301. (New page)	AD
					ADD 02-0293	Description was moved from ADD 02-0302. (New page)	AD
					ADD 02-0294, ADD 02-0304	New blank page was added.	AD
					ADD 02-0300	Description was moved to ADD 02-0291.	DL
						Description of iSCSI was added.	AD
					ADD 02-0301	Description was moved to ADD 02-0292.	DL
						Description of iSCSI was added.	AD
					ADD 02-0302	Description was moved to ADD 02-0293.	DL
						Description of iSCSI was added.	AD
					ADD 02-0303	Description of iSCSI was added.	AD
					ADD 03-0020	Link title name (3.2.2) was changed.	CH
					ADD 03-0030	Link title name (2.6.1) was changed.	CH
					ADD 03-0050	Description of iSCSI was added.	AD
					ADD 03-0060	Link title name (3.3.3, 3.4.10) was changed.	CH
						Arrow of the (b) was changed.	CH
					ADD 03-0070, ADD 03-0110	Link title name (3.3.3) was changed.	CH
					ADD 03-0080	Link title name (3.4.10) was changed.	CH
					ADD 03-0120	Description of iSCSI was added and white paper was added (end chapter).	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 00-0000	Chapter 12 was added.	AD
					TRBL 01-0000	Description of iSCSI was added.	AD
					TRBL 02-0000	(2) was added.	AD
					TRBL 02-0040, TRBL 02-0080, TRBL 02-0090, TRBL 02-0130, TRBL 02-0131, TRBL 02-0135	Description of iSCSI was added.	AD
					TRBL 02-0210	Unnecessary line of the table was deleted.	DL
					TRBL 02-0230	Description of "RKAAT" or "RKAATL" was deleted.	DL
						Description of RKNAS was moved from TRBL 02-0260.	SD
					TRBL 02-0240	Description of "RKAAT" or "RKAATL" was deleted.	DL
						Description of RKNAS was moved from TRBL 02-0270.	SD
					TRBL 02-0250	Description of "RKAAT" or "RKAATL" was deleted.	DL
						Description of RKNAS was moved from TRBL 02-0280.	SD
					TRBL 02-0260, TRBL 02-0270, TRBL 02-0280, TRBL 02-0290	These pages were deleted.	DL
					TRBL 03-0020	"Port0" → "Maintenance port", "Port1" → "User management port"	CH
					TRBL 04-0040	Reference page described into the hyperlink was changed.	CH
					TRBL 04-0250	"H21700", HE020x, "HH7C0x" to "HH7Mxy" were added in (2).	AD
						"HH8A00" to "HZ0Pxx" were moved to page TRBL 04-0260.	DL
					TRBL 04-0260	"HH7N00", "HH7P00", "HH7Q00", "HH7R00", "HH7S00", "HH7U00" and "HJ3800" was added.	AD
						"HH8A00" to "HZ0Pxx" were moved from page TRBL 04-0250.	AD
						(3) was added.	AD
						Item number was changed from (3) to (4).	CH
					TRBL 05-0050	"setting" of (c) was changed to "selection methods"	CH
					TRBL 06-0160	Description was added in the flow chart.	AD
					TRBL 06-0170	"2.2." of the hyperlink was corrected to"2.2.1".	CR
					TRBL 06-0181	Reference page described into the figure was changed.	CH
					TRBL 06-0250	"setting" of (ii) was changed to "selection methods"	CH
					TRBL 06-0520	Description of (a) and (b) were added.	AD
						"Data recovery is terminated normally?" in flow was moved to page TRBL 06-0530.	DL
					TRBL 06-0530	"Data recovery is terminated normally?" in flow was moved from page TRBL 06-0520.	AD
					TRBL 06-1121	Description of "RKAAT" or "RKAATL" was deleted.	DL
					TRBL 06-1122	Description of the subsystem identification switch setting was added.	AD
					TRBL 08-0000, TRBL 08-0100, TRBL 08-0120, TRBL 08-0170, TRBL 08-0180, TRBL 08-0310	Description of "RKAAT" or "RKAATL" was deleted.	DL
					TRBL 08-0010, TRBL 08-0040	Reference page described into the hyperlink was changed.	CH
					TRBL 08-0200	Cause or status of No.6 was changed.	CH
					TRBL 08-0260	(a) was added.	AD

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					TRBL 08-0281, TRBL 08-0282	These pages were newly added. (Description of iSCSI was added.)	AD
					TRBL 08-0290, TRBL 08-0300	P1 LED was added at the figure and table.	AD
					TRBL 10-0510	Last page was changed to blank page.	CH
					TRBL 11-0010	Format of the hyperlink was changed.	CH
					TRBL 12-0000 to TRBL 12-0210	These pages were newly added.	AD
					MSG 01-0000	Description of “Message reports ...operation” was changed.	CH
						Description of “The failed ...the Loop” was changed.	CH
						⑤ and ⑥ were moved to MSG 01-0001.	DL
					MSG 01-0001	⑤ and ⑥ were moved from MSG 01-0000. (New page)	AD
						Description of “array system is being started” was added.	AD
					MSG 01-0002	New page was added. (Blank page)	AD
					MSG 02-0190	“Recovery methods”③ of the 0184A101 was changed.	CH
					MSG 02-0200	“Recovery methods”③ of the 0184A205 was changed.	CH
					MSG 02-0210	“Recovery methods”③ of the 0184A704 was changed.	CH
					MSG 02-0470	Kind of line of the table was changed.	CH
					MSG 02-0800 to MSG 02-1010	Reedited due to adding the Message. • Adding the Message. (01DA02xx, 01DA03xx, 01DA04xx, 01DA05xx, 01DA06xx, 01DA09xx, 01DA25xx, 01DA60xx, 01DA63xx, 01DAFAxx, 01DAFFxx, 01DDA101, 01DDA102, 01DDA103, 01DDA104, 01DDA121, 01DDA601, 01DDA602, 01DDA603, 01DDA604, 01DDA621, 01DAE101, 01DAE102, 01DAE103, 01DAE104, 01DAE105, 01DAE106, 01DAE107, 01DAE108, 01DAE109, 01DAE10B, 01DAE10C, 01DAE10D, 01DAE10E, 01DAE10F, 01DAE110, 01DAE111, 01DAE112, 01DAE114, 01DAE115, 01DAE116, 01DAE117, 01DAE118, 01DAE119, 01DAE11A, 01DAE11B, 01DAE11C, 01DAE11D, 01DAE11E, 01DAE11F, 01DAE201, 01DAE202, 01DAE203, 01DAE204, 01DAE205, 01DAE206, 01DAE207, 01DAE208, 01DAE209, 01DAE20B, 01DAE20C, 01DAE20D, 01DAE20E, 01DAE20F, 01DAE210, 01DAE211, 01DAE212, 01DAE214, 01DAE215, 01DAE216, 01DAE217, 01DAE218, 01DAE219, 01DAE21A, 01DAE21B, 01DAE21C, 01DAE21D, 01DAE21E, 01DAE21F, 01DAE601, 01DAE602, 01DAE603, 01DAE604, 01DAE605, 01DAE606, 01DAE607, 01DAE608, 01DAE609, 01DAE60A, 01DAE60B, 01DAE60C, 01DAE60D, 01DAE60E, 01DAE60F, 01DAE610, 01DAE611)	AD/CH
					MSG 02-0940, MSG 02-0950, MSG 02-0960, MSG 02-0970, MSG 02-0980, MSG 02-0990, MSG 02-1000, MSG 02-1010	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0050 to MSG 03-0110	Reedited due to adding the Message. • Cache memory slot# was changed. (H20Q00, H3030x, H307xy, H302xy, H30Gxx, H30Ixy, H30Jxy) • Adding the Message. (H21700) • "Recovery methods" was changed. (H30Gxx)	CH
					MSG 03-0330	Port # was changed. (HB0A0x, HB0B0x)	CH
					MSG 03-0340	Path # was changed. (HD020x)	CH
					MSG 03-0350	Cache memory slot# was changed. (HD220x)	CH
					MSG 03-0420 to MSG 03-0910	Reedited due to adding the Message. • "Recovery methods" was changed. (HE020x, HE050x, HE0A31, HJ3800) • Adding the Message. (HH5000, HH5100, HH5200, HH5300, HH5400, HH5500, HH5600, HH5700, HH5800, HH5900, HH5A00, HH5B00, HH5C00, HH5D00, HH5E00, HH5F00, HH5G00, HH5H00, HH5I00, HH5J00, HH5K00, HH5L00, HH5M00, HH5N00, HH5P00, HH5Q00, HH5R00, HH5S00, HH5T00, HH5U00, HH5V00, HH5W00, HH5X00, HH5Y00, HH5Z00, HH6A00, HH6B00, HH6C00, HH6D00, HH6E00, HH6F00, HH6G00, HH6H00, HH6I00, HH6J00, HH6K00, HH6L00, HH6M00, HH6N00, HH6P00, HH6Q00, HH6R00, HH6S00, HH6T00, HH6U00, HH6V00, HH6W00, HH6X00, HH6Y00, HH6Z00, HH7A00, HH7B00, HH7C0x, HH7Dxy, HH7Exy, HH7Fxy, HH7Gxy, HH7Hxy, HH7I0x, HH7J00, HH7K00, HH7Mxy, HH7N00, HH7P00, HH7Q00, HH7R00, HH7S00, HH7T00, HH7U00 and all of H***HH) • Path # was changed. (HE06xy) • Cache memory slot# was changed. (HH0E0x, HJ3Axy) • Unit ID# was changed. (HH4100, HH4E00)	AD/CH
					MSG 03-0780, MSG 03-0790, MSG 03-0800, MSG 03-0810, MSG 03-0820, MSG 03-0830, MSG 03-0840, MSG 03-0850, MSG 03-0860, MSG 03-0870, MSG 03-0880, MSG 03-0890, MSG 03-0900, MSG 03-0910	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0000 to MSG 04-1150	Reedited due to adding the Message. • Cache memory slot# was changed. (I0020x, I6070x) • Path # was changed. (I00Axy, I030xy, I031xy, I1C0xy, I1C1xy) • Unit ID# was changed. (I1GG00, I51700, I523xy, I525xy, I530xy to I53500, I540xy, I5F100, I609xy) • Port # was changed. (I520xy, I521xy, I522xy, I53A00, I5YB00, I5Z1xy, I5Z2xy, I5Z3xy, I5Z4xy, I5Z5xy, I5Z6xy, I5Z8xy, I603xy, I6200x, I6220x, I621xy, I6250x, I6DS00) • The message code was added to the "Recovery methods" or "Message text". (I5F100, I5YG00, I5YJ00, I5YU00, I6E200, I6E400, I6EQ00, I70000, I70100, IB100x IB110x IB1200 IB1300, IB1400, IB1500, IB1600, IB1700, IB1800, IXXA00) • Adding the Message. (I5FE00, I5F600 I5F700 I5F800, I5F900 I5FA00 I5FC00, I5FD00, IA3E00, IB1800, IB1900, IB1A00, IB1B00, IB1C00, IB1D00, IB1E00 and all of I****HH) • Loop # was changed. (I8010x)	CH
					MSG 04-0811, MSG 04-0812	These pages were deleted.	DL
					MSG 04-0980, MSG 04-0990, MSG 04-1000, MSG 04-1010, MSG 04-1020, MSG 04-1030 MSG 04-1040, MSG 04-1050, MSG 04-1060, MSG 04-1070 MSG 04-1080, MSG 04-1090, MSG 04-1100, MSG 04-1110, MSG 04-1120, MSG 04-1130, MSG 04-1140, MSG 04-1150	These pages were newly added.	AD
					MSG 05-0020	Cache memory slot# was changed. (R20M00)	CH
					MSG 05-0110 to MSG 05-0290	Reedited due to adding the Message. • "Recovery methods" was changed. (R51200) • Adding the Message. (R51D00, R51E00, R51F00, R51G00, R51H00, R51J00, R51K00, R51L00, R51M00, R51N00, R51P00, R51Q00, R51R00, R51S00, R51T00, R51U00, R51V00, R51W00, R51X00, R51Y00, R51Z00, R52000, R52100, R52200, R5230x, R52400, RBC2HH, RBEU00, RBEV00, RBEW00) • Cache memory slot# was changed. (R302xy, RA30xy, RA780x, RA7B0x, RB0B0x, RB0Cxy)	AD/CH
					MSG 05-0260, MSG 05-0270, MSG 05-0280, MSG 05-0290	These pages were newly added.	AD

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					MSG 06-0010 to MSG 06-0230	Reedited due to adding the Message. • Path # was changed. (W080xy) • Cache memory slot# was changed. (W0D0xy) • "Recovery methods" was changed. (W090xy, W0C00x, W0G700, W0GC00, W49000) • Path # was changed. (W0F0xy) • "Recovery Methods" of the was changed. • Adding the Message. (W042HH, W052HH, W060HH, W061HH, W071HH, W073HH, W090HH, W6000x)	AD/CH
					MSG 06-0220, MSG 06-0230	These pages were newly added.	AD
					MSG 08-0030	Position of "DMEA00110F" was moved.	CH
					MSG 08-0050	Adding the SNM error message. (DMEA001186, DMEA001187, DMEA001188, DMEA001189, DMEA001190, DMEA001191, DMEA001192, DMEA001193, DMEA001194, DMEA001195, DMEA001196, DMEA001197, DMEA001198, DMEA001199, DMEA00119A, DMEA00119B, DMEA00119C, DMEA00119D, DMEA00119E, DMEA00119F, DMEA0011A0, DMEA0011A1, DMEA0011A2, DMEA0011A3, DMEA0011A4, DMEA0011A5, DMEA0011A6, DMEA0011A7, DMEA0011A8, DMEA0011A9, DMEA0011AA, DMEA0011AB, DMEA0011AC, DMEA0011AD, DMEA0011AE)	AD
					MSG 08-0080	Adding the SNM error message. (DMEC002104, DMEC002105, DMEC002106, DMEC002107, DMEC002108, DMEC002109, DMEC002110, DMEC002112, DMEC002114, DMEC002115, DMEC002116, DMEC002117, DMEC002118, DMEC002119, DMEC002120, DMEC002121, DMEC002122, DMEC002123, DMEC002124, DMEC002125, DMEC002126, DMEC002127, DMEC002128, DMEC002129, DMEC002130, DMEC002131, DMEC002132, DMEC002133, DMEC002134)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0090 to MSG 08-0170	Reedited due to adding the SNM error message. (DMED010005, DMED010006, DMED130002, DMED150014, DMED160014, DMED160015, DMED160016, DMED160017, DMED160018, DMED160019, DMED16001E, DMED16001F, DMED160020, DMED160021, DMED160022, DMED1A0027, DMED1A0028, DMED1B0006, DMED1C0001, DMED1C0002, DMED1C0003, DMED1C0004, DMED1C0005, DMED1C0006, DMED1C0007, DMED1C0008, DMED1C0009, DMED1C000A, DMED1C000B, DMED1C000C, DMED1C000D, DMED1C000E, DMED1C000F, DMED1C0010, DMED1C0011, DMED1C0012, DMED1C0013, DMED1C0014, DMED1C0015, DMED1C0017, DMED1C0018, DMED1C0019, DMED1C001A, DMED1C001B, DMED1C001C, DMED1C001D, DMED1C001E, DMED1C001F, DMED1C0020, DMED1C0021, DMED1C0022, DMED1C0023, DMED1C0024, DMED1C0025, DMED1C0026, DMED1C0027, DMED1C0028, DMED1C0029, DMED1C002A, DMED1C002B, DMED1C003A, DMED1C003B, DMED1C003C, DMED1C003D, DMED1C003E, DMED1C003F, DMED1D0001, DMED30000B, DMED3B0011, DMED3B0012, DMED3B0013, DMED3B0014)	CH/AD
					MSG 08-0161, MSG 08-0162	These pages were newly added.	AD
					MSG 08-0250	Description of “DMES020400” was changed.	CH
						“DMES031104” was moved to page MSG 08-0260.	DL
					MSG 08-0260	“DMES031104” was moved from page MSG 08-0250.	AD
					MSG 09-0120	“5/99 01” was added.	AD
						“B/C0 00” to “B/C0 02” was moved to page MNTE 09-0130.	DL
					MSG 09-0130	“B/C0 00” to “B/C0 02” was moved from page MNTE 09-0130.	AD
						Description of “B/C0 00” was changed.	CH
						“0B/C0 00” was deleted.	DL
						“5/EA 15” and “5/EA 16” was moved to page MNTE 09-0140.	DL
					MSG 09-0140	“5/EA 15” and “5/EA 16” was moved from page MNTE 09-0130.	AD
						“5/ EB 10” was moved to page MNTE 09-0150.	DL
					MSG 09-0150	“5/ EB 10” was moved from page MNTE 09-0140.	AD
					MSG 09-0190	“010005” and “010006” were added.	AD
						“020010”, “020011” and “020012” were moved to page MNTE 09-0200.	DL
					MSG 09-0200	“020010”, “020011” and “020012” were moved from page MNTE 09-0190.	AD

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					MSG 09-0260 to MSG 09-0350	Reedited due to adding the Detail code. (130002,150014, 160014, 160015, 160016, 160017, 160018, 160019, 16001E, 16001F, 160020, 160021, 160022, 1A0027, 1A0028, 1B0006, 1C0001, 1C0002, 1C0003, 1C0004, 1C0005, 1C0006, 1C0007, 1C0008, 1C0009, 1C000A, 1C000B, 1C000C, 1C000D, 1C000E, 1C000F, 1C0010, 1C0011, 1C0012, 1C0013, 1C0014, 1C0015, 1C0017, 1C0018, 1C0019, 1C001A, 1C001B, 1C001C, 1C001D, 1C001E, 1C001F, 1C0020, 1C0021, 1C0022, 1C0023, 1C0024, 1C0025, 1C0026, 1C0027, 1C0028, 1C0029, 1C002A, 1C002B, 1C003A, 1C003B, 1C003C, 1C003D, 1C003E, 1C003F, 1D0001, 30000B, 3B0011, 3B0012, 3B0013, 3B0014)	AD
					MSG 09-0360, MSG 09-0370, MSG 09-0380, MSG 09-0390,	These pages were newly added.	AD
					REP 01-0020	(14) and (15) were moved to REP 01-0021.	DL
					REP 01-0021	(14) and (15) were moved from REP 01-0020. (New paged)	AD
						(16) was added.	AD
					REP 01-0022	New page was added. (Blank page)	AD
					REP 01-0051	Description of “RKAAT” or “RKAATL” was deleted.	DL
					REP 02-0000, REP 02-0011, REP 02-0020, REP 02-0050, REP 02-0060, REP 02-0061, REP 02-0140, REP 02-0141, REP 02-0310, REP 02-0320, REP 02-0330, REP 02-0340, REP 02-0350, REP 02-0360, REP 02-0370, REP 02-0830, REP 02-0860, REP 02-0930, REP 02-0990, REP 02-1010, REP 02-1021	Description of “RKAAT” or “RKAATL” was deleted.	DL
					REP 02-0010	iSCSI Interface Board was added in No.7.	AD
						Description of “RKAAT” or “RKAATL” was deleted.	DL
					REP 02-0100, REP 02-0110, REP 02-0120, REP 02-0150, REP 02-0160, REP 02-0190	Reference page described into the hyperlink was changed.	CH
					REP 02-0230	Figure 2.2.2.2 was added.	AD
					REP 02-0231, REP 02-0232	These pages were newly added.	AD
					REP 02-0431	Format of the hyperlink was changed.	CH
					REP 02-0690	Description of iSCSI Interface Board was added in (g) and (f).	AD
					REP 02-0720	Description of iSCSI Interface Board was added in (g).	AD
					REP 02-0730	Description of iSCSI Interface Board was added in (k).	AD
					REP 02-0750	Description of iSCSI Interface Board was added in (f).	AD
					REP 02-0760	Description of iSCSI Interface Board was added in (j).	AD
					REP 02-0780	Description of text was changed.	CH
					REP 03-0040	Format of the hyperlink was changed.	CH
					PARTS 01-0010	Description of “RKAAT” or “RKAATL” was deleted.	DL
					PARTS 01-0020, PARTS 01-0050, PARTS 01-0080, PARTS 01-0110, PARTS 01-0140	Part number of Front Bezel was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					PARTS 01-0040, PARTS 01-0070, PARTS 01-0100	Description of iSCSI Interface Board was added.	AD
					PARTS 01-0200 to PARTS 01-0340	These pages were renumbered.	CH
					PARTS 01-0221, PARTS 01-0222, PARTS 01-0350, PARTS 01-0360	These pages were deleted.	DL
					WEB 01-0030, WEB 01-0040	"Port0" → "Maintenance port", "Port1" → "User management port"	CH
6a	Dec.28.2005	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.6→6a	CH
					INST 03-0760	Description of cable label was added.	AD
					REP 04-0000	No.10 was added.	AD
7	Jan.16.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.6→7	CH
					GENE 0040, GENE 0050	Description of RKH was added.	AD
					GENE 0140	1.6 was deleted.	DL
						1.7 was moved from GENE 0150 as 1.6.	AD
					GENE 0150	1.7 was moved to GENE 0140 as 1.6.	DL
					GENE 0170	Changed title at 6.3.	CH
					SAFE 0110	The mass of RKH was added.	AD
					SAFE 0161	Description of RKH was added in the safety summary of battery.	AD
						Description of REV.C was added.	AD
					SAFE 0170, SAFE 0180, SAFE 0181, SAFE 0190, SAFE 0200, SAFE 0210,	WEEE label was changed.	CH
					SAFE 0211	Description of HKH was added. (New page)	AD
					SAFE 0212	New Blank page was added.	AD
					SAFE 0220, SAFE 0230, SAFE 0231, SAFE 0240	Number was changed for adding RKH.	CH
					THEO 02-0020	The content of 2.1.2 was changed.	CH
					THEO 02-0040, THEO 02-0050	RKH was added.	AD
					THEO 02-0090, THEO 02-0100, THEO 02-0130, THEO 02-0170, THEO 02-0192	Description of RKH was added.	AD
					THEO 02-0170, THEO 02-0190, THEO 02-0194, THEO 02-0260, THEO 02-0270, THEO 02-0270, THEO 02-0272, THEO 02-0273, THEO 02-0274, THEO 02-0280, THEO 02-0290, THEO 02-0291, THEO 02-0293, THEO 02-0294, THEO 02-0295	Descriptions of Drive Interface were added to figure.	AD
					THEO 02-0170, THEO 02-0180, THEO 02-0190, THEO 02-0191, THEO 02-0193, THEO 02-0194, THEO 02-0260, THEO 02-0270, THEO 02-0271, THEO 02-0280, THEO 02-0290, THEO 02-0291	Loop and Disk Drive in the figure was changed.	CH
					THEO 02-0195, THEO 02-0196	These pages were newly added.	AD
					THEO 02-0210	Description of RKH in the (1) was added.	AD
					THEO 02-0222	Figure 2.4.4.2 was added.	AD
						Figure 2.4.3 was moved to page THEO 02-0230.	DL
					THEO 02-0230	Figure 2.4.3 was moved from page THEO 02-0222.	AD
						Figure 2.4.4 was moved to page THEO 02-0230.	DL
					THEO 02-0250	Description of RKH was added.	AD
					THEO 02-0231	This page was newly added. (Figure 2.4.4 was moved from page THEO 02-0230.)	AD
					THEO 02-0232	This page was newly added.	AD
					THEO 02-0274	Figure 2.5.6 and Figure 2.5.7 were moved to page THEO 02-0275.	DL
						Description of RKH was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0275	This page was newly added. (Figure 2.5.6 and Figure 2.5.7 were moved from THEO 02-0274.)	AD
						Connector name of the NAS unit was changed.	CH
					THEO 02-0276	This page was newly added.	AD
					THEO 02-0292	Figure 2.5.11 was moved to THEO 02-0293.	DL
						Description of RKH was added.	AD
					THEO 02-0293	Figure 2.5.12 was moved to THEO 02-0294.	AD
						Figure 2.5.11 was moved from THEO 02-0292.	AD
						Connector name of the NAS unit was changed.	CH
					THEO 02-0294	Figure 2.5.13 was moved to THEO 02-0294.	DL
						Figure 2.5.12 was moved from THEO 02-0293.	AD
						Connector name of the NAS unit was changed.	CH
					THEO 02-0295	Figure 2.5.13 was moved from THEO 02-0294. (New page)	AD
						Connector name of the NAS unit was changed.	CH
					THEO 02-0296	This page was newly added. (Description of RKH was added.)	AD
					THEO 03-0010	Description of (c) was moved to THEO 03-0011.	DL
					THEO 03-0011	Description of (a) and (b) in (4) were moved to THEO 03-0012.	DL
						Description of (c) in (4) was moved to THEO 03-0013.	DL
						Description of (c) was moved from THEO03-0010.	AD
						Description of RKH was added.	AD
					THEO 03-0012	Description of (a) and (b) in (5) were moved to THEO 03-0014.	DL
						Description of (c) in (5) was moved to THEO 03-0015.	DL
						Description of (a) and (b) in (4) were moved from THEO 03-0011.	AD
					THEO 03-0013	Description of (c) in (4) was moved from THEO 03-0011. (New page)	AD
						Description of RKH was added.	AD
					THEO 03-0014	Description of (c) and (d) in (5) was moved from THEO 03-0012. (New page)	AD
					THEO 03-0015	Description of (c) in (5) was moved from THEO 03-0012. (New page)	AD
						Description of RKH was added.	AD
					THEO 03-0016	Blank page was added.	AD
					THEO 03-0020, THEO 03-0060, THEO 03-0090, THEO 03-0130	Description of 15,000 speed Disk Drive was added.	AD
					THEO 03-0040, THEO 03-0080	Description of REV.C was added.	AD
					THEO 03-0110, THEO 03-0150	Description of REV.C was added.	AD
						20.0 → 7.5	CH
					THEO 03-0163	20.0 → 7.5	CH
					THEO 03-0170	Description of "Option" was deleted from "Number of ports"	DL
					THEO 03-0180, THEO 03-0190, THEO 03-0200, THEO 03-0210	Description of RKH was added. (New page)	AD
					THEO 04-0041 to THEO 04-0044	Added (2).	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 04-0110	"16 k bytes, 64 k bytes ,256 k bytes, 512k bytes" were added to (2).	AD
					INST 01-0000	"Note at the time of the unpacking" was added to (1).	AD
					INST 01-0010	(2) to (4) → (3) to (5)	
					INST 01-0040, INST 01-0050, INST 01-0051	Description of DIMM was deleted.	DL
					INST 01-0052, INST 01-0060, INST 01-0172, INST 01-0180, INST 01-0390	Description of RKH was added.	AD
					INST 01-0080	Figure 1.4.1 was moved to INST 01-0090.	DL
						Description of HKH was added.	AD
					INST 01-0090	Figure 1.4.2 was moved to INST 01-0091	DL
						Figure 1.4.1 was moved from INST 01-0090.	AD
					INST 01-0091	Figure 1.4.3 was moved to INST 01-0092	DL
						Figure 1.4.2 was moved from INST 01-0091.	AD
					INST 01-0092	Figure 1.4.3 was moved from INST 01-0091	DL
						Figure 1.4.4was added.	AD
					INST 01-0290	(9) was moved to INST 01-0300.	DL
						Description of REV.C was added.	AD
					INST 01-0300	(9) was moved form INST 01-0290.	AD
						Figure 1.7.1, Figure 1.7.2 were moved to INST 01-0301.	DL
						Figure 1.7.2.1 was moved to INST 01-0302.	DL
					INST 01-0301	Figure 1.7.1and Figure 1.7.2 were moved from INST 01-0301. (New page)	AD
						Description of REV.C was added.	AD
					INST 01-0302	Figure 1.7.2.1 was moved from INST 01-0301. (New page)	AD
					INST 01-0310	Description of REV.C was added.	AD
					INST 01-0320	Support SNM version was added.	AD
					INST 03-0581, INST 03-0582	Description of RKH was added. (New page)	AD
					INST 02-0020	"Note at the time of the unpacking" was added.	AD
					INST 02-0180	Description of REV.C was added.	AD
					INST 03-0030	"Note at the time of the unpacking" was added.	AD
					INST 03-0210, INST 03-0260, INST 03-0301, INST 03-0601, INST 03-0603	Rack rail was changed.	CH
					INST 03-0310, INST 03-0420, INST 03-0430	The mass of RKH was added.	AD
					INST 03-0320, INST 03-0350, INST 03-0360, INST 03-0390, INST 03-0440, INST 03-0501, INST 03-0520, INST 03-0530, INST 03-0540, INST 03-0600, INST 03-0640, INST 03-0650, INST 03-0750,INST 03-0760	Description of RKH was added.	AD
					INST 03-0531, INST 03-0581, INST 03-0582, INST 03-0621, INST 03-0634,INST 03-0703, INST 03-0704,INST 03-0705, INST 03-0706,INST 03-0751, INST 03-0761	Description of RKH was added. (New page)	AD
					INST 03-0532, INST 03-0622, INST 03-0752, INST 03-0762	Blank page was added.	AD
					INST 03-0632	Figure 3.4.32.2 was moved to INST 03-0633.	DL
						Description of RKH was added.	AD
					INST 03-0633	Figure 3.4.32.2 was moved from INST 03-0632 and Figure number was changed to 3.4.32.3. (New page)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0662	Description of (2) was moved to INST 03-0663.	DL
						Description of RKH was added.	AD
					INST 03-0663	Figure 3.4.34.4 was moved to INST 03-0664.	DL
						Description of (2) was moved from INST 03-0662.	AD
					INST 03-0664	Figure 3.4.34.4 was moved from INST 03-0663 and Figure number was changed to 3.4.34.5.	AD
						Description of RKH was added.	AD
					INST 03-0670	Description of RKH was added.	AD
						Description of (ii) and (iii) were moved to INST 03-0680.	DL
					INST 03-0680	Description of (ii) and (iii) were moved from INST 03-0670.	AD
					INST 03-0740, INST 03-0760	Connector name of the NAS unit was changed.	CH
					MICRO 01-0100	"Information Message" was added.	AD
					MICRO 01-0130, MICRO 01-0160	NOTE was added at (g).	AD
					MICRO 01-0140	NOTE was added at (k).	AD
					MICRO 01-0150, MICRO 01-0210, MICRO 01-0250	Support SNM version was added.	AD
					MICRO 01-0200	NOTE was added at (d).	AD
					MICRO 01-0220	Description of (2) was moved from MICRO 01-0230.	AD
					MICRO 01-0230	Description of (2) was moved to MICRO 01-0220.	DL
						Description of (2) was added.	AD
					MICRO 02-0000	RBC1xy and RBC2xy were deleted.	DL
						Recovery procedure of RBC10x and RBC20x was changed.	CH
					MICRO 03-0000	The content of Chapter 3 was changed.	CH
						Flow was changed.	CH
					MICRO 03-0010	I140HH was added.	AD
					MICRO 03-0020	I141HH, I140HH, I142HH and I104HH were added.	AD
						RBC2HH was added	AD
					SYSPR 02-0010	Description of RKH was added.	AD
					SYSPR 02-0010, SYSPR 02-0050, SYSPR 02-0060, SYSPR 02-0080, SYSPR 02-0110, SYSPR 02-0130	Support SNM version was added.	AD
					SYSPR 02-0050, SYSPR 02-0060, SYSPR 02-0080, SYSPR 02-0110, SYSPR 02-0130	Added Note.	AD
					SYSPR 03-0210	(6) was added.	AD
					SYSPR 03-0292	Description of RKH was added.	AD
					SYSPR 03-0293, SYSPR 03-0294	Description of RKH was added at Figure 3.3.1.	AD
					SYSPR 03-0440, SYSPR 03-0480, SYSPR 03-0520, SYSPR 03-0560	Support SNM version was added.	AD
					SYSPR 04-0020	Changed Reference page at No.4.	CH
					SYSPR 04-0090, SYSPR 04-0091	Added (3-1)	AD
					SYSPR 04-0092, SYSPR 04-0093, SYSPR 04-0094	Added (3-2)	AD
					SYSPR 04-0095 to SYSPR 04-0098	These pages were newly added. (Moved the (4))	AD
					SYSPR 04-0260, SYSPR 04-0280	Support SNM version was added.	AD
					SYSPR 05-0050	Changed (b) screen.	CH
					SYSPR 06-0010, SYSPR 06-0030, SYSPR 06-0040	Support SNM version was added.	AD
					ADD 01-0010	"(or I141HH)" was added to Work-7.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0040, ADD 01-0050, ADD 01-0080, ADD 01-0121, ADD 01-0130, ADD 01-0131, ADD 01-0220, ADD 01-0394, ADD 01-0421, ADD 01-0422, ADD 01-0424, ADD 01-0430, ADD 01-0432, ADD 01-0434	Description of RKH was added.	AD
					ADD 01-0060, ADD 01-0070	Description of (3-3) was rewritten.	CH
					ADD 04-0070	I141HH was added to *4.	AD
					ADD 01-0071, ADD 01-0072	Theses pages were deleted.	DL
					ADD 01-0090	"Note at the time of the unpacking" was added.	AD
					ADD 01-0100	Reference of "1.7.1" was deleted.	DL
					ADD 01-0110	I800HH, I802HH and I804HH were added.	AD
					ADD 01-0180	Figure 1.4.1.1 → Figure 1.4.1.2	CH
					ADD01-0190, ADD 01-0200	I141HH was added.	AD
					ADD 01-0230	Reference of "1.7" was deleted.	DL
					ADD 01-0240	I141HH was added.	AD
					ADD 01-0250	I141HH was added to Work-5.	AD
					ADD 01-0280	I141HH was added to (3).	AD
					ADD 01-0300	I141HH was added to Work-10.	AD
					ADD 01-0390	Description of RKH was added.	AD
						(8) and (9) were moved to ADD 01-0391.	DL
					ADD 01-0391	(8) and (9) were moved from ADD 01-0390.	AD
						Description of RKH was added.	AD
					ADD 01-0392, ADD 01-0393	Cache Unit was added to the Figure.	AD
					ADD 01-0410	Description of RKH was added.	AD
						(9) to (11) were moved to ADD 01-0411.	DL
					ADD 01-0411	(9) to (11) were moved from ADD 01-0410.	AD
						Description of RKH was added.	AD
					ADD 01-0412	"(RKM/RKS/RKXS)" was added to the title.	AD
					ADD 01-0413, ADD 01-0414	Description of RKH was added. (New page)	AD
					ADD 01-0490 to ADD 01-0910	Page number was re-set.	CH
					ADD 01-0781, ADD 01-0782, ADD 01-0791, ADD 01-0792, ADD 01-0841, ADD 01-0842, ADD 01-0920, ADD 01-0930, ADD 01-0940, ADD 01-0950, ADD 01-0951, ADD 01-0952, ADD 01-0953, ADD 01-0954, ADD 01-0960, ADD 01-0970, ADD 01-0980, ADD 01-0990, ADD 01-1000, ADD 01-1010, ADD 01-1011, ADD 01-1012, ADD 01-1020, ADD 01-1030, ADD 01-1050, ADD 01-1060	These pages were deleted.	DL
					ADD 01-0810	I800HH was added.	AD
					ADD01-0820, ADD01-0850	I804HH and I800HH were added.	AD
					ADD 01-0840	I802HH and I800HH were added.	AD
					ADD 02-0040, ADD02-0080	I009HH was added.	AD
					ADD 02-0120	Reference page was changed.	CH
					ADD 02-0150, ADD 02-0151	Description of RKH was added.	AD
					ADD 02-0281	(8) was moved to ADD 02-0282.	DL
					ADD 02-0282	(8) was moved to ADD 02-0281	AD
					ADD 02-0283, ADD 02-0284,	"Replacing"→"Subtracting"	CR
					ADD 02-0285	Description of RKH was added. (New page)	AD
					ADD 02-0286	Blank page was added.	AD
					ADD 02-0291	(8) was moved to ADD 02-0292.	DL
						Description of RKH was added.	AD
					ADD 02-0292	(8) was moved from ADD 02-0291.	DL
					ADD 02-0294, ADD 02-0304	Description of RKH was added.	AD
					ADD 02-0301	(8) was moved to ADD 02-0292.	DL
						Description of RKH was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 02-0302	(8) was moved from ADD 02-0291.	DL
					TRBL 01-0000	Description of RKH was added.	AD
					TRBL 02-0040, TBLE 02-0090, TRBL 02-0131, TRBL 02-0136	"1-b" to "1-e" was changed the position.	CH
					TRBL 02-0060, TRBL 02-0110	"During seek on" → "Spin down state"	CH
						Description of REV.C was added.	AD
					TRBL 02-0060, TRBL 02-0110, TRBL 02-0133, TRBL 02-0138	"The BATTERY is not installed" in 4-a was deleted.	DL
					TRBL 02-0080, TRBL 02-0130, TRBL 02-0135	"ALARM" on Control Unit and FC Interface Board was changed to "HLAM"	CH
					TRBL 02-0133, TRBL 02-0150	"During seek on" → "Spin down state"	CH
					TRBL 02-0134	"7-b" was changed.	CH
					TRBL 02-0136	Description of RKH was added.	AD
					TRBL 02-0137, TRBL 02-0138, TRBL 02-0141	Description of RKH was added. (New page)	AD
					TRBL 02-0140	(4) was move to TRBL 02-0142. (New page)	DL
						Description of RKH was added.	AD
					TRBL 02-0142	(4) was moved from TRBL 02-0140. (New page)	AD
						"(4)" → "(5)"	CH
					TRBL 02-0170	"(5)" → "(6)"	CH
					TRBL 02-0180	"4-c" was changed.	CH
					TRBL 02-0190	Table and figure in "4-h" was deleted.	DL
					TRBL 02-0210	Description of "5-c" was changed.	CH
					TRBL 02-0220	"(6)" → "(7)"	CH
						Table and figure in "5-j" was deleted.	DL
					TRBL 02-0230	"(7)" → "(8)"	CH
					TRBL 02-0240, TRBL 02-0250	Connector name of the NAS unit was changed.	CH
					TRBL 03-0000, TRBL 03-0010, TRBL 03-0060, TRBL 03-0080	Description of RKH was added.	AD
					TRBL 04-0150	Failure detected messages and Failure recovery messages were added.	AD
					TRBL 04-0170	Description of RKH was added.	AD
					TRBL 04-0270	IA2D0x was added.	AD
						IAPN00 was moved to page TRBL 04-0271.	DL
					TRBL 04-0271	This page was newly added. (IAPN00 was moved to page TRBL 04-0270. IB1I0x was added.)	AD
					TRBL 04-0272	This page was newly added.	
					TRBL 06-0020, TRBL 06-0030, TRBL 06-0040, TRBL 06-0050, TRBL 06-0080, TRBL 06-0110, TRBL 06-0120, TRBL 06-0130, TRBL 06-0140, TRBL 06-0150, TRBL 06-0160, TRBL 06-0170, TRBL 06-0180, TRBL 06-0181, TRBL 06-0200, TRBL 06-0220, TRBL 06-0240, TRBL 06-0330, TRBL 06-0420, TRBL 06-0430, TRBL 06-0440, TRBL 06-0450, TRBL 06-0460, TRBL 06-0470, TRBL 06-0480, TRBL 06-0490, TRBL 06-0500, TRBL 06-0510, TRBL 06-0520, TRBL 06-0530, TRBL 06-0550, TRBL 06-0580, TRBL 06-0590, TRBL 06-0591, TRBL 06-0710, TRBL 06-0860, TRBL 06-0900, TRBL 06-1110, TRBL 06-1120, TRBL 06-1121, TRBL 06-1122, TRBL 06-1123	Description in flow and text was changed. ("on the front side of the Basic Chassis" etc.)	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-1124, TRBL 06-1140, TRBL 06-1161, TRBL 06-1170	Description in flow and text was changed. ("on the front side of the Basic Chassis" etc.)	CH
					TRBL 06-0401	Description of RKH was added.	AD
					TRBL 06-0430	I152HH, I153HH and I151HH were added.	AD
					TRBL 06-0510	I153HH was added.	AD
					TRBL 08-0160	"During seek on" → "Spin down state"	CH
						Description of HDD#14 was deleted	DL
					TRBL 06-0540	(a) and (b) were added.	AD
					TRBL 06-0590	I141HH was added.	AD
					TRBL 06-0610, TRBL 06-0750, TRBL 06-0820, TRBL 06-0830, TRBL 06-0910, TRBL 06-0980, TRBL 06-1010, TRBL 06-1080, TRBL 06-1150, TRBL 06-1180, TRBL 06-1240, TRBL 06-1250	Description of RKH was added.	AD
					TRBL 06-0620, TRBL 06-0630, TRBL 06-0640, TRBL 06-0650	Disk Drive in the figure was changed and description of text was added.	CH/AD
					TRBL 06-0641, TRBL 06-0642	Description of RKH was added. (New page)	AD
					TRBL 06-0650	RKM and RKAJ of figure were changed.	CH
					TRBL 06-0660	Description of RKH was added.	AD
					TRBL 06-0670, TRBL 06-0770, TRBL 06-0940	Changed sentence.	CH
					TRBL 06-0680, TRBL 06-0690, TRBL 06-0840	Added the reference page.	AD
					TRBL 06-0690	(viii) was changed.	CH
					TRBL 06-0821, TRBL 06-0822, TRBL 06-0981, TRBL 06-0982, TRBL 06-1011, TRBL 06-1012, TRBL 06-1081, TRBL 06-1082	Description of RKH was added. (New page)	AD
					TRBL 06-0830	(v) was changed.	CH
					TRBL 06-0900	W060HH was added.	AD
					TRBL 06-0930	W0600xx was changed to W060xy.	CH
						W090HH was added.	AD
					TRBL 06-1030	HH0C50 was changed to HH0Cxy (or HH0CHH, HH0CAT)	CH
					TRBL 06-1090	I301HH, W060HH and W090 were added.	AD
					TRBL 06-1100	*1 was changed.	CH
					TRBL 06-1126	NO.2 and No.6 were added.	AD
					TRBL 06-1200, TRBL 06-1220, TRBL 06-1230	"DF" → "Disk subsystem".	CH
					TRBL 07-0050, TRBL 07-0080, TRBL 07-0090, TRBL 07-0130, TRBL 07-0131, TRBL 07-0170, TRBL 07-0200, TRBL 07-0240	Description of RKH was added.	AD
					TRBL 07-0060, TRBL 07-0070, TRBL 07-0100, TRBL 07-0110, TRBL 07-0120, TRBL 07-0190, TRBL 07-0220	Changed procedure number .	CH
					TRBL 07-0161, TRBL 07-0162	Deleted the page.	DL
					TRBL 08-0000, TRBL 08-0150, TRBL 08-0170, TRBL 08-0180, TRBL 08-0190, TRBL 08-0210, TRBL 08-0220, TRBL 08-0260	Description of RKH was added.	AD
					TRBL 08-0010	The description of title of Table 8.2.5 and Table 8.2.6 in the Table was changed.	CH
					TRBL 08-0020	The description of title of Table 8.2.7 in the Table was changed.	CH
					TRBL 08-0100	*2 was deleted.	DL
					TRBL 08-0130	*2 was deleted.	DL
						The description of title of Table 8.2.7 of *3 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 08-0150	No.4 and No.5 were moved to page TRBL 0111.	DL
					TRBL 08-0151	This page was newly added. (No.4 and No.5 were moved from page TRBL 0150.)	AD
					TRBL 08-0152	This page was newly added.	AD
					TRBL 08-0190	Description of (5-1) was changed.	CH
						ACT LED (Green) → ACT LED (Orange)	CR
						No.1 was moved to page TRBL 0200.	DL
					TRBL 08-0200	No.1 was moved from page TRBL 0190.	AD
						Title of Table was changed.	CH
					TRBL 08-0210	No.3 was moved to page TRBL 0220	DL
						Description of (5-2) was changed.	CH
						*3 and *4 were added.	AD
					TRBL 08-0220	No.3 was moved from page TRBL 0210.	AD
						*4 was added.	AD
						No.11 to No.16 were moved to page TRBL 0221.	DL
					TRBL 08-0221	This page was newly added. (No.11 to No.16 was moved from page TRBL 08-0220. No.17 and No.18 were added.)	AD
					TRBL 08-0222	This page was newly added.	AD
					TRBL 08-0230	Title of Table was changed.	CH
						ALARM (Green) → HALM (Orange)	CR
					TRBL 08-0240, TRBL 08-0250	ALARM (Green) → HALM (Orange)	CR
					TRBL 08-0260	"ALARM" was changed to "HALM".	CH
						Figure of RKH was added.	AD
					TRBL 08-0270, TRBL 08-0280	"ALARM" was changed to "HALM".	CH
					TRBL 09-0050	The title of Table 9.2.2 was changed.	CH
					TRBL 10-0020, TRBL 10-0030, TRBL 10-0040, TRBL 10-0041	Table 10.1.1 was changed.	CH
					TRBL 10-0090, TRBL 10-0100	Table 10.2.1 was changed.	CH
					MSG 01-0010, MSG 01-0030, MSG 01-0032, MSG 01-0040	Disk Drive in the figure was changed and description of text was added.	CH/AD
					MSG 01-0031	Description of PATH # was corrected.	CR
					MSG 02-0000 to MSG 02-1350	Reedited due to adding the Message.	AD
					MSG 02-1020 to MSG 02-1350	These pages were newly added.	AD
					MSG 03-0090	Cache memory slot # of H30Gxy was changed.	CH
					MSG 03-0430 to MSG 03-0752	Reedited due to adding the *****HH message etc.. • Deleted message. (HE040x and HE04HH, HH0FHH, HH0FAT) • "on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis".(HE020x, HE0A31, HH5000, HH5600, HH5V00, HH5W00, HH6F00, HH6G00, HH6J00, HH6Q00, HH6R00, HH7Dxy, HH7R00, HH7U00, HJ35xy, HJ36xy, HNA10x) • Unit ID# was changed. (HE050x, HE0Fxy, HH0CAT, HH0Fxx, HH17xx, HH17HH,) • "Recovery methods" was changed. (HE0710, HE0711, HE0A31, HH0Cxy, HH0CHH, HH0CAT, HH30xx) • Description "x" of HH1Axy and HH1AHH was changed. • SWPK was changed to ENC/SENC. (HH5200)	CH/AD
					MSG 03-0751 to MSG 02-0752	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0820, MSG 03-0850	"on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis".(HJ35xy, HJ36xy, HNA10x)	CH
					MSG 03-0860	"Recovery methods ③" of HNA30x and HNA4xy were added.	AD
						"Recovery methods ⑥" of HNA4xy was moved to page MSG 03-0870.	DL
					MSG 03-0870	"Recovery methods ⑥" of HNA4xy was moved from page MSG 03-0860.	AD
						HN0300 was moved to page MSG 03-0880.	DL
					MSG 03-0880	HN0300 was moved from page MSG 03-0870.	AD
						HZ0C00 was moved to page MSG 03-0890.	DL
					MSG 03-0890	HZ0C00 was moved from page MSG 03-0880.	AD
					MSG 04-0000 to MSG 04-0120	Reedited due to adding the *****HH message etc.. • Battery unit# was changed. (I0030x, I00E0x, I00F0x, I0100x, I0200x) • Message text of I008xy and I008HH was changed. • SW P/K was changed to ENC/SENC. (I00Bxy, I00BHH) • LU# was changed. (I12100, I12200, I12300, I12400, I12500, I12600, I12700) • Description was changed. (I153xy, I153HH) • Default controller# was added. (I1A2xy) • I306xy, I30700 and I30800 were deleted.	CH/AD
					MSG 04-0180	SW P/K was changed to ENC/SENC. (I501xy, I501HH, I5010x)	CH
					MSG 04-0200	I531xy was deleted.	DL
					MSG 04-0220 to MSG 04-0691	Reedited due to adding the *****HH message etc.. • The description of "if not performed, the system may go down" of the "Recovery methods" was changed. (I5YH00, I6DQ00, I6DR00, I6E00, I6E800, I70000, I70300, I70900, I8040x, I806xy, I807xy, I8080x, I80900, I80A0x, I80Bxy, I80C0x, I80D0x, I80F00, I81700, I82000, I8210, I8220x, I8230x, I824xy, I825xy, I82600, I83900, I840xy, I84700, I84800) • "Unit-x" of I5F600 to I5FA00 was corrected to "CTL-Unit". • "on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis". (I5FC00) • Deleted message. (I5Z0xy, I5Z0HH, I5Z00x, I6A300) • Reference page or title was changed. • Disk drive# was changed. (I604xy) • Collect the error of I606xy and I606HH was added. • LU# was changed. (I6D300)	CH/AD
					MSG 04-0691, MSG 04-0692	These pages were newly added.	AD
					MSG 04-0720	"Recovery methods ①" of IA2D0x was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0720	IA2E0x was moved to page MSG 04-0730.	DL
					MSG 04-0730	IA2E0x was moved from page MSG 04-0720.	AD
						IA2G0x was moved to page MSG 04-0731.	DL
					MSG 04-0731	This page was newly added. (IA2G0x was moved from page MSG 04-0730.)	AD
					MSG 04-0732	This page was newly added.	AD
					MSG 04-0740, MSG 04-0750, MSG 04-0770, MSG 04-0850	"To be continued to the next page" was added.	AD
					MSG 04-0890	"Recovery methods ③" of IAPM00 and IAPN00 were added.	AD
					MSG 04-0910	IB1800 was deleted.	DL
						IB1900 was moved from page MSG 04-0920.	AD
						Description of IB1900 was changed.	CH
					MSG 04-0920	IB1900 was moved to page MSG 04-0910.	DL
						IB1C00 was deleted.	DL
						IB1D00 and IB1E00 were moved from page MSG 04-0930.	AD
						IB1F00 was added.	AD
					MSG 04-0930	IB1D00 and IB1E00 were moved to page MSG 04-0920.	DL
						IB1G00, IB1H00 and IB1I0x were added.	AD
						IF0000 and IG0000 were moved to page MSG 04-0940.	DL
					MSG 04-0940	IF0000 and IG0000 were moved from page MSG 04-0930.	AD
						IU0000 and IV0000 were moved to page MSG 04-0950.	DL
					MSG 04-0950	IU0000 and IV0000 were moved from page MSG 04-0940.	AD
						IXX700, IXX800 and IXX900 were moved to page MSG 04-0960.	DL
					MSG 04-0960	IXX700, IXX800 and IXX900 were moved from page MSG 04-0950.	AD
						IY00HH was moved to page MSG 04-0970.	DL
					MSG 04-0970	IY00HH was moved from page MSG 04-0960.	AD
					MSG 04-1000	"LR" of description of IY0Hxy and IY0HHH was corrected to "LRC".	CR
					MSG 04-1030, MSG 04-1040	The "****HH" message code was added to the "Recovery methods"	AD
					MSG 04-1050	Description of IZ03xy to IZ03HH was added.	AD
						Collect the error of IZ03HH was added.	AD
					MSG 04-1070	Collect the error of IZ0Axy to IZ0AHH was deleted.	DL
						Message text of IZ03HH was changed.	CH
					MSG 04-1080	Reference page was added to the recovery method ① of the IZ0B00.	AD
					MSG 04-1090	Collect the error of IZ0Cxy to IZ0CHH was deleted.	DL
						Message text of IZ0CHH was changed.	CH
					MSG 04-1100, MSG 04-1110, MSG 04-1120	Unit ID# was changed. (IZY5xy, IZY5AT, IZY6xy, IZY6AT, IZY7AT, IZY8AT, IZY9AT)	CH
					MSG 04-1100	"SENC" of recovery methods of IZY5xy and IZY5HH was corrected to "ENC".	CR
						IZY300 and IZY30x were deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 05-0110	"R51200" and "R51300" was moved to page MSG 05-0120.	DL
					MSG 05-0120	"R51200" and "R51300" was moved from page MSG 05-0110.	AD
						"on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis".	CH
						"R51200" and "R51300" was moved to page MSG 05-0130.	DL
					MSG 05-0130	"R51E00" and "R51F00" was moved from page MSG 05-0120.	AD
						"on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis".	CH
						"R51S00 R51T00" and "" was moved to page MSG 05-0140.	DL
					MSG 05-0140	"R51S00" and "R51T00" was moved from page MSG 05-0130.	AD
						"on the Basic Chassis" in the "Recovery methods" was changed to "on the front side of the Basic Chassis".	CH
					MSG 05-0160	R52500 was added.	AD
						RA00xx and RA0414 were moved to page MSG 05-0161.	DL
						RA0415 was moved to page MSG 05-0162.	DL
					MSG 05-0161	This page was newly added. (R52600 was added. RA00xx and RA0414 were moved from page MSG 05-0160.)	AD
					MSG 05-0162	This page was newly added. (RA0415 was moved from MSG 05-0160.)	AD
					MSG 05-0230	"Recovery methods" of RB8400 was changed.	CH
						RBC000 was moved to MSG 05-0240.	DL
					MSG 05-0240	RBC000 was moved from MSG 05-0230.	AD
						"Recovery methods" was changed. (RBC000)	CH
						Description was changed. (RBC10x, RBC20x, RBC2HH)	CH
						RBE700 was deleted.	DL
					MSG 05-0250	RBE301, RBE500 and RBE600 were moved from MSG 05-0240.	AD
					MSG 05-0260	RBEN00 and RBEP00 were moved from MSG 05-0250.	AD
					MSG 06-0020 to MSG 06-0090	Reedited due to adding the *****HH message etc.. • Unit ID# was changed. (W060AT, W061AT, W090AT, W0B0xy, W0E000) • Reference page or title was changed. • "Recovery methods" was changed. (W0G400, W49000)	CH
					MSG 06-0190	"Recovery methods" of was changed.	CH
					MSG 07-0010	"Recovery methods" of "Abnormal End Empty System Retry Full Install" was added to "****HH" message.	AD
					MSG 08-0010	DMEA00104C was deleted.	DL
					MSG 08-0020	DMEA001082 was deleted.	DL
					REP 01-0000	"Note at the time of the unpacking" was added to (1).	AD
					REP 01-0010	(2), (3) → (3), (4)	CH
					REP 01-0020	(4) to (13) → (5) to (14)	CH
					REP 01-0021	(14) to (16) → (15) to (17)	CH
					REP 01-0050	Description of RKH was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0010, REP 02-0011, REP 02-0020, REP 02-0240, REP 02-0250, REP 02-0260, REP 02-0270, REP 02-0280, REP 02-0310, REP 02-0320, REP 02-0330, REP 02-0340, REP 02-0350, REP 02-0360, REP 02-0370, REP 02-0400, REP 02-0410, REP 02-0420, REP 02-0470, REP 02-0460, REP 02-0500, REP 02-0510, REP 02-0520, REP 02-0530, REP 02-0550, REP 02-0560, REP 02-0570, REP 02-0610, REP 02-0640, REP 02-0650, REP 02-0670, REP 02-0680, REP 02-0690, REP 02-0710, REP 02-0720, REP 02-0750, REP 02-0780, REP 02-0800, REP 02-0970	Description of RKH was added.	AD
					REP 02-0060	(a) was changed.	CH
					REP 02-0090	W060HH and I008HH were added.	AD
					REP 02-0100	I009HH was added.	AD
					REP 02-0110	I151HH, I007HH and I009HH were added.	AD
					REP 02-0150	W060HH was added.	AD
					REP 02-0160	I151HH and I007HH was addded.	AD
					REP 02-0220	RKH was added.	AD
					REP 02-0230	Description of RKH was added.	AD
					REP 02-0231	Description of RKH was added.	AD
					REP 02-0232	Description of RKH was added at Figure 2.2.2.2..	AD
					REP 02-0290	Description of RKH was added.	AD
						(n) to (p) → REP 02-0291	DL
					REP 02-0291	REP 02-0290→ (n) to (p) (New page)	AD
					REP 02-0292	Blank page was added.	AD
					REP 02-0310, REP 02-0331	I005HH was added.	AD
					REP 02-0360	(l) was changed.	CH
					REP 02-0380	(m) was changed.	CH
					REP 02-0451, REP 02-0601, REP 02-0711, REP 02-0981	Description of RKH was added. (New page)	AD
					REP 02-0452, REP 02-0602, REP 02-0712, REP 02-0982	Blank page was added.	AD
					REP 02-0610	Procedure (f) to (h) were moved to REP 02-0620	DL
					REP 02-0620	Procedure (o) was moved to REP 02-0630	DL
						Procedure (f) to (h) were moved from REP 02-0610	AD
					REP 02-0630	Procedure (o) was moved from REP 02-0620	AD
					REP 02-0730	NOTE was added to (j).	AD
					REP 02-0790	NOTE was added to (i).	AD
					REP 02-0840	NOTE was changed.	CH
					REP 02-0860, REP 02-0880, REP 02-0900, REP 02-0920, REP 02-0941	I00BHH was added.	AD
					REP 02-0870	RKH was added to (h).	AD
					REP 02-1200	Connector name of the NAS unit was changed.	CH
					REP 03-0040	Description of RKH was added.	AD
					REP 03-0070	Description of RKH was added in the safety summary of battery.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 03-0070	Description of REV.C was added.	AD
					REP 05-0020	Description of RKH was added.	AD
					PARTS 01-0010	Description of RKH was added.	AD
						Table was move to PARTS 01-0011.	DL
					PARTS 01-0011	Table was moved from PARTS 01-0010. (New page)	AD
					PARTS 01-0012, PARTS 01-0104	New page was added. (Blank page)	AD
					PARTS 01-0101, PARTS 01-0102, PARTS 01-0103	Description of RKH was added. (New page)	AD
					PARTS 01-0110, PARTS 01-0120, PARTS 01-0130	"4" → "5"	CH
					PARTS 01-0140, PARTS 01-0150, PARTS 01-0160	"5" → "6"	CH
					PARTS 01-0170, PARTS 01-0180, PARTS 01-0190	"6" → "7"	CH
					PARTS 01-0200	"7" → "8"	CH
					WEB 01-0000, WEB 01-0020	Description of RKH was added.	AD
					WEB 02-0130	Description of RKH was added.	AD
					WEB 03-0000	RKH and RKXS were added to 3.1.	AD
					WEB 03-0010	Figure of RKH was added.	AD
					WEB 03-0080	"AMS100 is not supported" was added.	AD
					WEB 03-0300	NOTE was added at (8).	AD
					WEB 03-0320, WEB 03-0380, WEB 03-0400	Description of RKH was added.	AD
8	Feb.10.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.7→8	CH
					GENE 0100	"3.2 Basic Specifications of the Disk Drive" was added.	AD
					SAFE 0110	"Be sure to install it in order from..." was added as caution.	AD
					SAFE 0211	Figure was changed.	CH
					THEO 01-0000	"four years" → "three years"	CR
						"procurement" → "purchase of the product"	CR
						"(overhaul)" and "(for FC drive)" were deleted.	DL
					THEO 02-0040, THEO 02-0050, THEO 02-0060, THEO 02-0062, THEO 02-0063, THEO 02-0080	Description of RKH was added.	AD
					THEO 02-0130	"Disk Drive " and "Front bezel" described into the figure of RKH were deleted.	DL
					THEO 02-0196	Figure 2.3.13.5 was changed.	CH
					THEO 02-0200, THEO 02-0221, THEO 02-0222, THEO 02-0230, THEO 02-0231	"Connection diagram of Power Supply System" was corrected.	CR
					THEO 02-0210	Description of RKH was added.	AD
					THEO 03-0030, THEO 03-0070, THEO 03-0082, THEO 03-0100, THEO 03-0140, THEO 03-0162	Start-up time of Physical Specifications was changed. (3 → 4)	CH
					THEO 03-0190	Start-up time of Physical Specifications was changed. (3 → 5)	CH
					THEO 03-0220	"3.2 Basic Specifications of the Disk Drive" was added. (New page)	AD
					THEO 03-0230	Blank page was added.	AD
					THEO 04-0110	"64 k bytes ,256 k bytes, 512k bytes" were deleted to (2).	DL
					THEO 04-0180	"NAS SyncImage Modular" → "NAS Sync Image Modular"	CR
						"P-9P13-J8D004/ P-9P13-J8D005/ P-9P13-J8D00S" was added.	AD
					THEO 05-0011	"NAS SyncImage Modular" → "NAS Sync Image Modular"	CR
						"P-9P13-J8D004/ P-9P13-J8D005/ P-9P13-J8D00S" was added.	AD
					INST 01-0050, INST 01-0051	Model was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0080	Number of Disk Drives : "165" → "150" Number of RKAJs : "30" → "29"	CH
					INST 01-0172	Figure was changed.	CH
					INST 01-0290	Description was added to the "or blinking at low speed" in the text.	AD
					INST 01-0300	High-speed blinking time of RKH and description of "Also, when the…" in (9) was added.	AD
					INST 01-0310	Description was added in NOTE.	AD
					INST 01-0320	Note was added at (1).	AD
					INST 01-0330	*3 was added at (g).	AD
					INST 01-0340, INST 01-0350, INST 01-0360	NOTE was changed.	CH
					INST 03-0320	"Inside" was added into the (a) of Figure 3.3.2.	AD
					INST 03-0430	"Be sure to install it in order from..." was added as caution.	AD
					INST 03-0501	"1 to 4" → "2 or 4"	CH
					INST 03-0520	Description of RKH was added.	AD
						Description of (1-3) was moved to INST 03-0521.	DL
					INST 03-00521	Description of (1-3) was moved from INST 03-0521. (New page)	AD
					INST 03-0522	New page was added. (Blank page)	AD
					INST 03-0581	Attaching/Removing procedure of the cover was changed.	CH
						Description of NAS Interface Board location was changed.	CH
					INST 03-0582	Figure 3.4.28.1 and Figure 3.4.28.2 were changed.	CH
					INST 03-0650	Description of NSC rack frame was added.	AD
					INST 03-0660	Figure 3.4.34.1 was moved from INST 03-0661.	AD
					INST 03-0661	Figure 3.4.34.1 was moved to INST 03-0660.	DL
						Figure 3.4.34.3 was moved from INST 03-0662.	AD
					INST 03-0662	Figure 3.4.34.3 was moved to INST 03-0661.	DL
						Description of NSC rack frame was added.	AD
					INST 03-0663	Description of (2) was moved to INST 03-0664.	DL
						Description of NSC rack frame was added.	AD
					INST 03-0664	Figures of U7 rack frame were moved to INST 03-0665.	DL
						Description of (2) was moved from INST 03-0663.	AD
						Procedure of (d) and (e) were changed.	CH
					INST 03-0665	Figures of U7 rack frame were moved from INST 03-0664. (New page)	AD
						Drawing of "Fasten the cable" was added to the Figure.	AD
					INST 03-0666	Description of NSC rack frame was added. (New page)	AD
					INST 03-0710	Description of the form (U7 rack frame) was changed.	CH
					INST 03-0720	Description of U7 rack frame was added to the figure.	AD
					INST 03-0721, INST 03-0722	Description of NSC rack frame was added. (New page)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0751	Figure 3.4.40.1 was changed.	CH
					MICRO 01-0000	Description and High-speed blinking time of NOTE was changed.	CH
					MICRO 01-0010	High-speed blinking time in the flow chart was changed.	CH
					MICRO 01-0100	Description was added in (1).	AD
					MICRO 01-0140	Description of (m) was changed.	CH
					MICRO 01-0150, MICRO 01-0211	Description of "or WRNING LED …" and High-speed blinking time in the NOTE were changed. (30 to 50 → 30 to 85)	CH
					MICRO 01-0220	Description was added to the text of (1).	AD
					MICRO 01-0230	Description of (3) was changed. (30/50 → 30/85)	CH
					MICRO 03-0000	High-speed blinking time in the flow chart was changed.	CH
					SYSPR 01-0030	NOTE was added.	AD
					SYSPR 03-0140	NOTE was added. (three sentences)	AD
					SYSPR 03-0210	(6) was changed.	CH
					SYSPR 03-0560	No.2 was added at Table 3.9.1.	AD
					SYSPR 04-0040, SYSPR 04-0092, SYSPR 04-0095, SYSPR 04-0150, SYSPR 04-0240,	Description and High-speed blinking time of NOTE was changed.	CH
					SYSPR 04-0060	Description of RKH in (d) was added.	AD
					SYSPR 04-0061	(d) → (e)	CH
					SYSPR 04-0092	(a) was moved to page SYSPR 04-0093.	DL
					SYSPR 04-0093	(a) was moved from page SYSPR 04-0092.	AD
						(d) was moved to page SYSPR 04-0094.	DL
					SYSPR 04-0094	(d) was moved from page SYSPR 04-0093.	AD
					SYSPR 04-0095	"(When RKNAS is not…displayed.)" was added at [IP address].	AD
					SYSPR 04-0170	NOTE of ④ was added.	AD
						⑤,⑥ were moved to page SYSPR 04-0180.	DL
					SYSPR 04-0180	⑤,⑥ were moved from page SYSPR 04-0170.	AD
					SYSPR 04-0280	NOTE was added.	AD
					SYSPR 04-0281, SYSPR 04-0282	These pages were newly added.	AD
					SYSPR 04-0290	(e) was added.	AD
					SYSPR 05-0070	Description of RKH in (g) was added.	AD
						(g) → (h)	CH
					SYSPR 06-0010	"NAS SyncImage Modular" → "NAS Sync Image Modular"	CR
					ADD 01-0000	(7) was added.	AD
					ADD 01-0001	Item number was changes.	CH
					ADD 01-0390, ADD 01-0391, ADD 01-0410, ADD 01-0411, ADD 01-0421, ADD 01-0422, ADD 01-0432	Attaching/Removing procedure of the cover was changed.	CH
					ADD 01-0391	Description of (14) and (15) was changed.	CH
					ADD 01-0394	Figure 1.4.5.2 was changed.	CH
					ADD 01-0400	Description of NOTE about RKNAS was added.	AD
					ADD 01-0410	Description of "Collect ..." was added to (1).	AD
						Description of (9) was moved to ADD 01-0411.	DL
					ADD 01-0411	Description of (9) was moved from ADD 01-0410.	AD
						Description of LED was deleted.	DL
						Description of port setting was changed.	CH
					ADD 01-0413	Figure 1.4.6.1 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0414	Description of NAS Interface Board location was changed.	CH
					ADD 01-0421	Description of "Collect ..." was added to (5).	AD
						Description of (9) to (12) were moved to ADD 01-0422.	DL
					ADD 01-0422	Descriptions of (9) to (12) were moved from ADD 01-0421.	AD
						Descriptions of (16) to (23) were moved to ADD 01-0423.	DL
					ADD 01-0423	Figure 1.4.7 was moved to ADD 01-0424.	DL
						Descriptions of (16) to (23) were moved from ADD 01-0422.	AD
						Description of (22) and (23) was changed.	CH
						Description of port setting was changed.	CH
					ADD 01-0424	Figure 1.4.7.1 and Table 1.4.3 were moved to ADD 01-0425.	DL
						Figure 1.4.7 was moved from ADD 01-0423.	AD
					ADD 01-0425	Figure 1.4.7.1 and Table 1.4.3 were moved from ADD 01-0424. (New page)	AD
						Figure 1.4.7.1 was changed.	CH
						Description of NAS Interface Board location was changed.	CH
					ADD 01-0426	New blank page was added.	AD
					ADD 01-0431	Description of "Collect..." was added to (5).	AD
						Descriptions of (7) to (10) were moved to ADD 01-0432.	DL
					ADD 01-0432	Descriptions of (7) to (10) were moved from ADD 01-0431.	AD
						Descriptions of (14) to (21) were moved to ADD 01-0433.	DL
					ADD 01-0433	Figure 1.4.8 was moved to ADD 01-0434.	DL
						Descriptions of (14) to (21) were moved from ADD 01-0432.	AD
						Description of (21) was changed.	CH
						Description of (19) and (23) were added.	AD
					ADD 01-0434	Figure 1.4.8.1 and Table 1.4.4 were moved to ADD 01-0435.	DL
						Figure 1.4.8 was moved from ADD 01-0433.	AD
					ADD 01-0435	Figure 1.4.8.1 and Table 1.4.4 were moved from ADD 01-0434. (New page)	AD
						Figure 1.4.8.1 was changed.	CH
						Description of NAS Interface Board location was changed.	CH
					ADD 01-0436	New blank page was added.	AD
					ADD 01-0440	Descriptions of four items were added after (3).	AD
					ADD 01-0490	"or blinking" was added to the description of the (d).	AD
					ADD 01-0500	(k) was added.	AD
						(2) was moved to page ADD 01-0501.	DL
					ADD 01-0501	This page was newly added. ((2) was moved from page ADD 01-0500. "(2) Procedures for ..." → "(4) Procedures for ...")	AD/CR
					ADD 01-0502	This page was newly added.	AD
					ADD 01-0510	"(1)" → "(3)"	CR
					ADD 01-0530	"(2)" → "(4)"	CR
					ADD 01-0550	"(3)" → "(5)"	CR
					ADD 01-0660	Description of No.5 of the table was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0690	High-speed blinking time in the flow chart was changed.	CH
					ADD 01-0800	"(There is no problem…lighting.)" was added.	AD
					ADD 02-0281, ADD 02-0282, ADD 02-0291, ADD 02-0292, ADD 02-0301, ADD 02-0302	Attaching/Removing procedure of the cover was changed.	CH
					ADD 02-0285	Figure 2.4.4.2 was changed.	CH
					ADD 02-0282	Description of (14) and (15) was changed.	CH
					ADD 02-0292	Description of (18) and (19) was changed.	CH
					ADD 02-0291	Description of "Collect..." was added to (1).	AD
						Description of (8) was moved to ADD 02-0292.	DL
					ADD 02-0292	Description of (8) was moved from ADD 02-0291.	AD
						Descriptions of (19) to (22) were moved to ADD 02-0293.	DL
					ADD 02-0293	Figure 2.4.5 was moved to ADD 02-0294.	DL
						Descriptions of (19) to (22) were moved from ADD 02-0292.	AD
						Descriptions of (20) to (22) were changed.	CH
					ADD 02-0294	Figure 2.4.5.1 and Table 2.4.2 were moved to ADD 02-0295.	DL
						Figure 2.4.5 was moved from ADD 02-0293.	AD
					ADD 02-0295	Figure 2.4.5.1 and Table 2.4.2 were moved from ADD 02-0294. (New page)	AD
						Figure 2.4.5.1 was changed.	CH
						Description of NAS Interface Board location was changed.	CH
					ADD 02-0296	New blank page was added.	AD
					ADD 02-0301	Description of "Collect..." was added to (1).	AD
						Description of (8) was moved to ADD 02-0302.	DL
					ADD 02-0302	Description of (8) was moved from ADD 02-0291.	AD
						Description of (18) to (20) were moved to ADD 02-0303.	DL
					ADD 02-0303	Figure 2.4.6 was moved to ADD 02-0304.	DL
						Descriptions of (18) to (20) were moved from ADD 02-0292.	AD
						Descriptions of (18) and (20) were changed.	CH
					ADD 02-0304	Figure 2.4.6.1 and Table 2.4.3 were moved to ADD 02-0305.	DL
						Figure 2.4.6 was moved from ADD 02-0303.	AD
					ADD 02-0305	Figure 2.4.6.1 and Table 2.4.3 were moved from ADD 02-0304. (New page)	AD
						Figure 2.4.6.1 was changed.	CH
						Description of NAS Interface Board location was changed.	CH
					ADD 02-0306	New blank page was added.	AD
					ADD 02-0302	Description of (17) and (18) was changed.	CH
					ADD 02-0304	Figure 2.4.6.1 was changed.	CH
					ADD 02-0310	"Install" of (3) was corrected to "Remove".	CR
					ADD 03-0110, ADD 03-0120	Description of RKH was added into the figure.	AD
					TRBL 02-0030	Stile of (6) was corrected.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 02-0050	"Function" of 1-c, 1-d, 2-b and 2-c was changed.	CH
						2-d and 2-e were moved to page TRBL 02-0060.	DL
					TRBL 02-0060	2-d and 2-e were moved from page TRBL 02-0050.	AD
					TRBL 02-0070, TRBL 02-0120, TRBL 02-0134, TRBL 02-0140, TRBL 02-0141, TRBL 02-0240, TRBL 02-0250	Description of ACT LIN color was changed from Orange to Yellow.	CH
					TRBL 02-0100	"Function" of 1-c, 1-d, 2-b and 2-c were changed.	CH
						2-d and 2-e were moved to page TRBL 02-0110.	DL
					TRBL 02-0110	2-d and 2-e were moved from page TRBL 02-0100.	AD
					TRBL 02-0131	"7-m-1" → "7-m"	CH
					TRBL 02-0132	"Function" of 1-c, 1-d, 2-b and 2-c was changed.	CH
						2-d and 2-e were moved to page TRBL 02-0133.	DL
					TRBL 02-0133	2-d and 2-e were moved from page TRBL 02-0132.	AD
					TRBL 02-0136	Figures were changed.	CH
					TRBL 02-0137	"Function" of 1-c, 1-d, 2-b and 2-c was changed.	CH
						2-d was moved to page TRBL 02-0138.	DL
					TRBL 02-0138	2-d was moved from page TRBL 02-0137.	AD
					TRBL 02-0180, TRBL 02-0210	"Daring seek on" → "Spin down state"	CH
					TRBL 02-0240, TRBL 02-0250	Extra space of 4-a-3 was deleted.	DL
					TRBL 03-0010	NOTE was added at (4) (a).	AD
					TRBL 03-0040	Description of NOTE was changed.	CH
					TRBL 04-0000	Font in flow was changed.	CH
						Description of NOTE was changed.	CH
					TRBL 04-0090, TRBL 04-0091	It changed to the screen where "Revision Information" had been displayed.	CH
					TRBL 04-0110	Position of "MM/DD/YYYY" was moved.	CH
					TRBL 04-0130	Font of "Recovery methods" of MANUAL was changed.	CH
					TRBL 04-0150	Line of W040xy, W50xy, W060xy, W061xy and W090xy were changed.	CH
						Description of "W0D0xy" was deleted.	DL
						Description of "W03000", "W03100", "W03200" and "W03300" were added.	AD
					TRBL 04-0160	No "11" to "19 "→"9" to "18 "	CH
					TRBL 04-0180 to TRBL 04-0244	Reedited due to adding the 01xxxxxx message.	AD/CH
					TRBL 04-0241, TRBL 04-0242, TRBL 04-0243, TRBL 04-0244	These pages were newly added.	AD
					TRBL 04-0260	HH8D00 and HH8D01 were added.	AD
					TRBL 04-0270	HH8D00 and HH8D01 were added.	AD
						IA3C0x and IAPM00 were moved to page TRBL 04-0271.	DL
					TRBL 04-0271	IA3C0x and IAPM00 were moved from page TRBL 04-0270.	AD
					TRBL 06-0020, TRBL 06-0050, TRBL 06-0420, TRBL 06-0450, TRBL 06-0470, TRBL 06-0490, TRBL 06-0520	High-speed blinking time in the flow chart was changed.	CH
					TRBL 06-0140	"of the Basic Chassis is blinks" in the flow chart was changed to "of the Basic Chassis lights up".	CH

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					TRBL 06-1040, TRBL 06-1125, TRBL 06-1127, TRBL 06-1128, TRBL 06-1130	Font or size in flow was changed.	CH
					TRBL 06-1126	I152xy and I152HH was combination.	CH
					TRBL 06-1130	*1 and *2 were added.	AD
					TRBL 06-1140	Description of (3) was added. (Item number changes followed.)	AD
						(b) of (5) was moved to page TRBL 06-1150.	DL
					TRBL 06-1150	(b) of (5) was moved from page TRBL 06-1140.	AD
					TRBL 06-1161	Description of (10) was changed.	CH
					TRBL 07-0000, TRBL 07-0080	Description of N→OTE was changed.	CH
					TRBL 07-0010	"Detail Mode" → "Full Mode".	CH
						(2) and (3) of Section 7.1 were changed.	CH
					TRBL 07-0080	(c) was moved to page TRBL 07-0090.	DL
					TRBL 07-0090	(c) was moved from page TRBL 07-0080.	AD
					TRBL 07-0130	Description of (d) was added. (Item number changes followed.)	AD
						(e) was moved to page TRBL 07-0131	DL
					TRBL 07-0131	(e) was moved from page TRBL 07-0130.	AD
						Description of (e) was changed.	CH
					TRBL 07-0230	NOTE was added at (b).	AD
					TRBL 07-0240	"Because the access…in the cluster." was added at (c).	AD
						Description of (d) was added. (Item number changes followed.)	AD
						Description of (e) was changed.	CH
					TRBL 07-0250, TRBL 07-0260	"Note" was corrected to "NOTE".	CR
					TRBL 07-0260	"Capacity" and "Collection time" were added at (c).	AD
					TRBL 07-0270	NNC 1 and NNC 3 were added at (g).	AD
					TRBL 07-0290	Reference page of "DF700 NAS SOFTWARE Maintenance Manual" was added.	AD
						Description of (d) was added. (Item number changes followed.)	AD
						Description of (e) was changed.	CH
					TRBL 08-0031	Description of "Actions to take" of the No.13 was changed.	CH
					TRBL 08-0040	Font or size in flow was changed.	CH
					TRBL 08-0130, TRBL 08-0140	High-speed blinking time in the flow chart was changed.	CH
					TRBL 08-0160	Description of *2 was changed.	CH
					TRBL 08-0220	Action(s) to be taken of No.4 was changed.	CH
						No.6 was added.	AD
						No.9 and No.10 were moved to page TRBL 08-0221.	DL
					TRBL 08-0221	No.9 and No.10 were moved from page TRBL 08-0220.	AD
						No.12, No.13 and No.14 were added.	AD
						"Asterisk" numbers were changed. (*)	CH
						No.18 to No.22 were moved to page TRBL 08-0222.	DL
					TRBL 08-0222	No.18 to No.22 were moved from page TRBL 08-0221.	AD
					TRBL 08-0190, TRBL 08-0200	"ACT LED (Green)" → "ACT LED (Yellow)"	CH
					TRBL 09-0010	"P-9P13-J8D004/ P-9P13-J8D005/ P-9P13-J8D00S" was added.	AD
					TRBL 09-0010, TRBL 09-0041	"NAS SyncImage Modular" → "NAS Sync Image Modular"	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 10-0020	W060HH was added in No.3.	AD
					TRBL 10-0030	Table size of No.11 was corrected.	CR
						Description of “W03000”, “W03100”, “W03200” and “W03300” were added.	AD
					TRBL 10-0040	W090xy was moved in No.15.	CH
					TRBL 10-0041	Description position of Message code was changed.	CH
						Description was added to the Recovery Method of the No.22.	AD
					TRBL 10-0090, TRBL 10-0100	Description position of Message code was changed.	CH
					TRBL 10-0100	Description of “W03000”, “W03100”, “W03200” and “W03300” were added.	AD
					TRBL 10-0110, TRBL 10-0120	Table 10.2.1.1 was deleted.	DL
					TRBL 11-0010	Flowchart was corrected.	CR
					MSG 03-0360	Line of “Reference page” was changed.	CH
					MSG 03-0760	“Recovery methods” of the “HH8A00” was changed.	CH
						HH8B00 was moved to page MSG 03-0762.	DL
					MSG 03-0761	This page was newly added. (“Recovery methods” of the “HH8A00” was added.)	AD
					MSG 03-0762	This page was newly added. (HH8B00 was moved from page MSG 03-0760.)	AD
					MSG 03-0770	“Recovery methods” of the “HH8C00” was changed.	CH
						HH8D00 and HH8D01 were added.	AD
						HI0100 to HI0310 were moved to page MSG 03-0772.	DL
					MSG 03-0771	This page was newly added. (“Recovery methods” was added.)	AD
					MSG 03-0772	This page was newly added. (HI0100 to HI0310 were moved to page MSG 03-0770.)	AD
					MSG 03-0870	“Recovery methods ③” of the “HNA5xy” was added.	AD
						HZ0200 was moved to page MSG 03-0880.	DL
					MSG 03-0880	HZ0200 was moved from page MSG 03-0870.	AD
					MSG 04-0680	“Recovery methods ③” of the “IA1E00” was added.	AD
						IA1F0x was moved to page MSG 04-0690.	DL
					MSG 04-0690	IA1F0x was moved from page MSG 04-0680.	AD
					MSG 04-0691	“IA1M0x” was corrected to “IA1M00”.	CR
					MSG 04-0700	“IA1N0x” was corrected to “IA1N00”.	CR
						“Recovery methods ③” of the “IA1N00” was added.	AD
						IA1R0x was moved to page MSG 04-0710.	DL
					MSG 04-0710	IA1R0x was moved from page MSG 04-0700.	AD
						“Recovery methods ②” of the “IA1Y00” was added.	AD
						IA1Z0x was moved to page MSG 04-0720.	DL
					MSG 04-0720	IA1Z0x was moved from page MSG 04-0710.	AD

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					MSG 04-0750	"Recovery methods ③" of the "IA1Y00-BUS1" was added.	AD
						"Recovery methods ②" of SMBUS-NNC was moved to page MSG 04-0760.	DL
					MSG 04-0760	"Recovery methods ②" of SMBUS-NNC was moved from page MSG 04-0750.	AD
					MSG 04-0770	"Recovery methods ③" of the "IA2I00-MCH-A" was added.	AD
					MSG 04-0780	"Recovery methods ③" of the "IA2I00-Lanai" was added.	AD
					MSG 04-0790	"Recovery methods ⑥" of the "IA2J0x, IA2K0x" was added.	AD
					MSG 04-0810	"Recovery methods ③" of the "IA2T00" was added.	AD
					MSG 04-0820	"Recovery methods ③" of the "IA2U00" was added.	AD
					MSG 04-0930	IB1J0x, IB1K0x and IB1L0x were added.	AD
						IC0000, ID0000 and IE0000 were moved to page MSG 04-0940.	DL
					MSG 04-0940	IC0000, ID0000 and IE0000 were moved from page MSG 04-0930.	AD
						IS0000 and IT0000 were moved to page MSG 04-0950.	DL
					MSG 04-0950	IS0000 and IT0000 were moved from page MSG 04-0940.	AD
						IXX200 to IXX600 were moved to page MSG 04-0960.	DL
					MSG 04-0960	IXX200 to IXX600 were moved from page MSG 04-0950.	AD
						IXXH00 and IY00xy were moved to page MSG 04-0961.	DL
					MSG 04-0961	This page was newly added. (IXXH00 and IY00xy were moved from page MSG 04-0960. IY00HH was moved from page MSG 04-0970.)	AD
					MSG 04-0962	This page was newly added.	AD
					MSG 04-0970	IY00HH was moved to page MSG 04-0961.	DL
					MSG 04-1050	"Recovery methods ③" of IZ03xy was changed.	CH
						"Recovery methods ⑥" of IZ03xy was moved to page MSG 04-1060.	DL
					MSG 04-1060	"Recovery methods ⑥" of IZ03xy was moved from page MSG 04-1050.	AD
					MSG 04-1070	"Recovery methods ⑥" of IZ0Axy was moved to page MSG 04-1080.	DL
					MSG 04-1080	"Recovery methods ⑥" of IZ0Axy was moved from page MSG 04-1070.	AD
						"Recovery methods ⑥" of IZ0Axy was changed.	CH
					MSG 04-1090	"Recovery methods ⑤" of IZ0Cxy was changed.	CH
						"Recovery methods ⑧" of IZ0Cxy was moved to page MSG 04-1100.	DL
					MSG 04-1100	"Recovery methods ⑧" of IZ0Cxy was moved from page MSG 04-1090.	AD
					MSG 06-0010	Description of Backup Battery Unit # was changed "(0-1)" to "(0-3)".	CH
						Description of "W03000", "W03100", "W03200" and "W03300" were added.	AD

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					MSG 06-0180	Description of “W03000”, “W03100”, “W03200” and “W03300” were added.	AD
						Description of “W4600x” was moved to MSG 06-0190.	DL
					MSG 06-0190	Description of “W4600x” was moved from MSG 06-0180.	AD
					MSG 08-0180	Description of DMEN03490W, DMEN03491W, DMEN03492W, DMEN03501E, were changed.	CH
					MSG 08-0200	Description of DMEN03559W was changed.	CH
					MSG 08-0210	Description of DMEN03597W was changed.	CH
					MSG 08-0240	Descriptions of DMEN04003E, DMEN04009W were changed.	CH
						Description of DMEN04019E was added.	AD
					REP 01-0020	Style of (5) was changed.	CH
						High-speed blinking time in the flow chart was changed.	CH
					REP 01-0021	Description of (15) was added.	AD
					REP 01-0040	High-speed blinking time in the flow chart was changed.	CH
						“Does the POWER LED …” was moved to page REP 01-0050.	DL
					REP 01-0050	“Does the POWER LED …” was moved from page REP 01-0050.	AD
						Figure 1.1.3 was moved to page REP 01-0051.	DL
					REP 01-0051	Figure 1.1.3 was moved from page REP 01-0051.	AD
						Figure 1.1.3.1 was moved to page REP 01-0052.	DL
					REP 01-0052	Figure 1.1.3.1 was moved from REP 01-0052.	AD
					REP 02-0020	Figure of RKH was changed.	CH
					REP 02-0012	Model name position was changed.	CH
					REP 02-0100	High-speed blinking time in the flow chart was changed.	CH
					REP 02-0120	High-speed blinking time in the flow chart was changed.	CH
					REP 02-0140, REP 02-0141	Font in figure was corrected.	CR
					REP 02-0160	“Does the WARN LED …” was moved to page REP 02-0170.	DL
					REP 02-0170	“Does the WARN LED …” was moved from page REP 02-0160.	AD
						High-speed blinking time in the flow chart was changed.	CH
					REP 02-0190	High-speed blinking time in the flow chart was changed.	CH
					REP 02-0210	“apare” of I1GG00 was corrected to “spare”.	CR
					REP 02-0232	Font was corrected.	CR
					REP 02-0260	Description of (i) was changed. (30/50 → 30 to 60)	CH
					REP 02-0280	Description of (p) was changed.	CH
					REP 02-0290	“Make sure” of (m) was corrected to “Check”.	CH
					REP 02-0291	Description and High-speed blinking time of (n) was changed.	CH
					REP 02-0240, REP 02-0300, REP 02-0340, REP 02-0390	Stile of text was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0300, REP 02-0340	Description was added to “Restriction in” the Table.	AD
					REP 02-0310	Description and High-speed blinking time of (g) was changed.	CH
					REP 02-0331	Description and High-speed blinking time of (i) was changed.	CH
					REP 02-0350	“Power Unit is on.P” of (i) was corrected to “Power Unit is on.”.	CR
						Description and High-speed blinking time of NOTE was changed.	CH
						Description of (j) was changed.	CH
						(k) was moved to page REP 02-0360.	DL
					REP 02-0360	(k) was moved from page REP 02-0350.	AD
					REP 02-0380	Description of (j)to (l) were changed.	CH
						(m) was deleted.	DL
					REP 02-0420, REP 02-0470, REP 02-0500, REP 02-0510, REP 02-0520, REP 02-0530, REP 02-0570, REP 02-0620, REP 02-0640, REP 02-0650, REP 02-0690, REP 02-0720, REP 02-0730, REP 02-0750, REP 02-0760	Attaching/Removing procedure of the cover was changed.	CH
					REP 02-0430	“Front Bezel is off” of (u) was changed to “front of the Basic Chassis goes out”.	CH
					REP 02-0431	Description and High-speed blinking time of (i) was changed.	CH
						Description of (w) was changed.	CH
						Description of NAS Unit connection was added to (x).	AD
					REP 02-0451	Figure 2.2.7.5 was changed.	CH
					REP 02-0490	Description and High-speed blinking time of (v) was changed.	CH
						Description of NAS Unit connection was added to (w).	AD
					REP 02-0510	“Front Bezel is off” of (s) was changed to “front of the Basic Chassis goes out”.	CH
						(q) to (u) were moved to page REP 02-0511.	DL
					REP 02-0511	This page was newly added. ((q) to (u) were moved from page REP 02-0510.)	AD
						Description and High-speed blinking time of (t) was changed.	CH
						Description of NAS Unit connection was added to (u).	AD
					REP 02-0512	This page was newly added.	AD
					REP 02-0530	Description and High-speed blinking time of (t) was changed.	CH
						Description of (s) was changed.	CH
						(t) and (u) were moved to page REP 02-0531.	CH
					REP 02-0531	This page was newly added. ((t) and (u) were moved to page REP 02-0531.)	CH
						Description of NAS Unit connection was added to (u).	AD
					REP 02-0532	This page was newly added.	AD
					REP 02-0580	Description and High-speed blinking time of (s) was changed.	CH
						Description of NAS Unit connection was added to (t).	AD
					REP 02-0601	Figure 2.2.8.2 was changed.	CH

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0630	Description and High-speed blinking time of (s) was changed.	CH
						Description of NAS Unit connection was added to (t).	AD
					REP 02-0650	Description and High-speed blinking time of (n) was changed.	CH
						Description of NAS Unit connection was added to (o).	AD
						(p) was deleted.	DL
					REP 02-0670	Description of NAS Interface Board location was changed.	CH
					REP 02-0700	Description and High-speed blinking time of (u) was changed.	CH
						Description of NAS Unit connection was added to (v).	AD
						(w) was moved to page REP 02-0711.	DL
					REP 02-0630	Description and High-speed blinking time of (s) was changed.	CH
					REP 02-0711	(w) was moved from page REP 02-0710.	AD
						Figure 2.2.8.5 was changed.	CH
					REP 02-0740	Description and High-speed blinking time of (u) was changed.	CH
						(v) and (w) were moved to page REP 02-0741.	DL
					REP 02-0741	This page was newly added. ((v) and (w) were moved from page REP 02-0740.)	AD
						Description of NAS Unit connection was added to (v).	AD
					REP 02-0742	This page was newly added.	AD
					REP 02-0760	Description and High-speed blinking time of (p) was changed.	CH
						Description of NAS Unit connection was added to (q).	AD
						(r) was deleted.	DL
					REP 02-0860, REP 02-0880	Description and High-speed blinking time of (i) was changed.	CH
					REP 02-0900	Description and High-speed blinking time of (k) was changed.	CH
					REP 02-0910	Description was added to “Restriction in” the Table.	AD
					REP 02-0920	Description and High-speed blinking time of (f) was changed.	CH
					REP 02-0941	Description and High-speed blinking time of (i) was changed.	CH
					REP 02-0970	Description and High-speed blinking time of (k) and (l) was changed.	CH
					REP 02-1010	Description and High-speed blinking time of (k) was changed.	CH
					REP 02-1070	Description of checking LED method of (13) was changed.	CH
					PARTS 01-0102, PARTS 01-0103	Figure of RKH was changed.	CH
					WEB 01-0040	“NOTE:” was corrected to “NOTE :”.	CR
					WEB 02-0110, WEB 02-0111	It changed to the screen where “Revision Information” had been displayed.	CH
					WEB 02-0150	Description of NOTE was changed.	CH
					WEB 02-0170	“Capacity” and “Collection time” were added at (2).	AD
					WEB 02-0190	Changed figure at (c).	CH
					WEB 03-0000	Description was added in text.	AD
					WEB 03-0010	Line size of figure was changed.	CH
					WEB 03-0040	“dualControl” was corrected to “dual Control”.	CR
					WEB 03-0190	“Masl” was corrected to “Mask”.	CR

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0340	Description of NOTE was changed.	CH
					WEB 03-0440	(5) was moved to page WEB 03-0450.	DL
					WEB 03-0450	This page was newly added. ((5) was moved from page WEB 03-0450, and description was added.)	AD
9	Feb.27.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.8→9	CH
					GENE 0030	Description of Trademarks was changed.	CH
					GENE 0160	Description of "TrueCopy Extended Distance" was added to title of 4.4.	AD
					THEO 02-0010	Description of the Cache Partition Managed function was added.	AD
					THEO 02-0040	Description of "Also, the RKH …" was added to "The Fibre Channel (Non-OFC) …".	AD
						"• A system which…" was moved to page THEO 02-0050.	DL
					THEO 02-0050	"• A system which…" was moved from page THEO 02-0040.	AD
						Description of (a) was moved to page THEO 02-0060.	DL
					THEO 02-0060	Description of (a) was moved from page THEO 02-0050.	AD
						Descriptions of (c) to (e) were moved to page THEO 02-0061.	DL
					THEO 02-0061	Descriptions of (c) to (e) were moved from page THEO 02-0060.	AD
						Description of (h) was moved to page THEO 02-0062.	DL
					THEO 02-0062	Description of (h) was moved from page THEO 02-0061.	AD
						Descriptions of (2) and (a) were moved to page THEO 02-0063.	DL
					THEO 02-0063	Descriptions of (2) and (a) were moved from page THEO 02-0062.	AD
						Description of "Also, the RKH …" was added to "The interface with …".	AD
						Descriptions of (b) to (h) were moved to page THEO 02-0064.	DL
					THEO 02-0064	Descriptions of (b) to (h) were moved from page THEO 02-0063.	AD
					THEO 02-0070	"It is POWER PC744A…as for the RKH." was added at "Adoption of high-speed RKSC processor".	AD
					THEO 02-0080	Description of "(The DF700-RKM/ …)" was added to "Adoption of NAS Unit".	AD
						Description of "• Two types of the host Interface Boards" was added.	AD
					THEO 02-0170, THEO 02-0180, THEO 02-0193, THEO 02-0194, THEO 02-0260, THEO 02-0270, THEO 02-0271, THEO 02-0274	Description of annotation about the signal of the Fibre Channel Loop.	AD
					THEO 02-0190, THEO 02-0195	Description of the ATA 500MB Disk Drive was added.	AD
					THEO 02-0191,	Description of annotation about the signal of the Fibre Channel Loop.	AD
						Description of the ATA 500MB Disk Drive was added.	AD
					THEO 02-0275, THEO 02-0280, THEO 02-0290, THEO 02-0292, THEO 02-0293, THEO 02-0294, THEO 02-0296	Figure of Loop structure was corrected.	CR
						Description of annotation about the signal of the Fibre Channel Loop.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0192, THEO 02-0196	Description of Program Revision was deleted.	DL
						Description of annotation about the signal of the Fibre Channel Loop.	AD
					THEO 03-0030, THEO 03-0070	"80/125" → "70/115" at Mass.	CR
					THEO 03-0040, THEO 03-0080, THEO 03-0083, THEO 03-0110, THEO 03-0150, THEO 03-0163, THEO 03-0200	Interface Board and Host Connector were added at "Parts to which hot replacement is applicable".	AD
					THEO 03-0081, THEO 03-0090, THEO 03-0130, THEO 03-0161, THEO 03-0180, THEO 03-0220	Description of the ATA 500MB Disk Drive was added.	AD
					THEO 03-0120, THEO 03-0210	Changed table at "SVP".	CH
					THEO 04-0000	RKH and RKA were added at (2).	AD
					THEO 04-0010	RKH and RKA were added at flowchart.	AD
					THEO 04-0080	*1 and *2 were added to the figure.	AD
					THEO 04-0090	Reference item number of (4) was corrected. (4.5 (6) → 4.5 (7))	CR
					THEO 04-0110	Description of the Cache Partition Managed function was added.	AD
					THEO 04-0160	Description of "TrueCopy Extended Distance" was added to (3).	AD
						(3) to (5) → (4) to (6)	CH
						(6) was moved to THEO 04-0170.	DL
					THEO 04-0170	(6) to (10) → (7) to (11)	CH
						(6) was moved from THEO 04-0160.	AD
						(11) was moved to THEO 04-0180.	DL
					THEO 04-0180	(11) and (12) → (12) and (13)	CH
						(11) was moved from THEO 04-0170.	AD
						Description of the Cache Partition Managed function was added.	AD
					THEO 04-0181	(13) and (14) → (14) and (15)	CH
						Description of the microprogram revision was added.	AD
					THEO 04-0260	"Remarks" was changed at Table 4.7.1.	CH
					THEO 04-0270	RKA and RKAJ were added at (2-2).	AD
					THEO 04-0290	RKA was added at (4).	AD
					THEO 05-0010	Description of "TrueCopy Extended Distance" was added to No.4.	AD
						No.4 to 10 → No.5 to 11	CH
						No.10 and 11 were moved to THEO 05-0011.	DL
					THEO 05-0011	No.11 to 19 → No.12 to 20	CH
						No.10 and 11 were moved from THEO 05-0010.	AD
					INST 01-0010, INST 01-0290	Description of "TrueCopy Extended Distance" was added.	AD
					INST 01-0020	Font in the figure was corrected.	CR
					INST 01-0040, INST 01-0050, INST 01-0051, INST 01-0052	Description of the ATA 500MB Disk Drive was added.	AD
					INST 01-0052	"RKM" of No.1 was corrected to "RKH".	CR
					INST 01-0060	The styles of Constitution/Specification of the No.1 to No.7 were changed.	CH
					INST 01-0070	Description of "DF-F700-URRAN7" was added.	AD
					INST 01-0092	Figure size was changed.	CH
					INST 01-0200, INST 01-0210, INST 01-0280	"NOTE:" was corrected to "NOTE :".	CR
					INST 01-0301	Font of "ALARM LED" in the Figure 1.7.2 was corrected.	CR
					INST 02-0172	Description of the ATA 500MB Disk Drive was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 02-0300	Reference item number of text was corrected. (1.1 (2) → 1.1 (3))	CR
					INST 03-0012	Reference pages of (3) of Work-12 and Work-15 were corrected.	CR
					INST 03-0302	Title of Table 3.2.6 of text was changed.	CH
					INST 03-0390, INST 03-0600, INST 03-0601, INST 03-0602, INST 03-0603	Font in the figure was corrected.	CR
					INST 03-0500, INST 03-0501	Description of the ATA 500MB Disk Drive was added.	AD
					INST 03-0501	Reference subsection of No.3 in the Table 3.4.4 and Table 3.4.5 were corrected.	CR
					INST 03-0510	Description of (1-1) was added.	AD
					INST 03-0520, INST 03-0521	Line (style) was corrected.	CR
					INST 03-0581	"slot #0, #2, #1, #3" → "slot #0, #1, #2, #3"	CH
					INST 03-0610, INST 03-0740	Reference item number of text was corrected. (1.1 (2) → 1.1 (3))	CR
					INST 03-0621, INST 03-0632, INST 03-0634	Figure of RKH and line size were changed.	CH
					INST 03-0740, INST 03-0751, INST 03-0761	RKNAS number in the figure was corrected.	CR
					INST 03-0760	Description of "Also, connect between…" of text was changed.	CH
						Description of RKH in (1) was added.	AD
					INST 03-0770	Description of RKH in the NOTE was added.	AD
					MICRO 01-0010	Reference page (SYSPR 04-0092) in flow was changed to (SYSPR 04-0100).	CH
					MICRO 01-0100	Description of "TrueCopy Extended Distance" was added.	AD
					MICRO 01-0150	"Download the … is not replaced." was added at (3-1).	AD
					MICRO 01-0210	Description was added to the NOTE.	AD
						Reference page (SYSPR 04-0092) of (3-3) was changed to (SYSPR 04-0100).	CH
					MICRO 01-0211	Description of the number was changed.	CH
						Description of "0726/A – 0726/E or earlier" was added.	AD
					MICRO 01-0212	Description of "0726/E – 0730/A or earlier", "0731/x" and "0732/x" were added.	AD
						Description of "(4-2)" and "(4-3)" were moved to MICRO 01-0214.	DL
					MICRO 01-0213	Description of "0733/x – 0735/A or earlier" and "0735/A or later" were added.	AD
					MICRO 01-0214	Description of "(4-2)" and "(4-3)" were moved from MICRO 01-0212. (New Page)	AD
					SYSPR 01-0000	Description of "TrueCopy Extended Distance" was added.	AD
					SYSPR 01-0020	Description was added to the NOTE. (If this is the case,…)	AD
					SYSPR 01-0030	Control Unit of RKH and RKNAS were added in the figure.	AD
						Control Unit position in the figure was changed.	CH
					SYSPR 01-0100	"When returning … number to 2000." was changed.	CH
					SYSPR 02-0030, SYSPR 02-0092	Description of "TrueCopy Extended Distance" was added.	AD
					SYSPR 03-0010	Reference page of "Procedure ③–A" was corrected.	CR
					SYSPR 03-0180, SYSPR 03-0190, SYSPR 03-0191	Description of the ATA 500MB Disk Drive was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 03-0290	Reference item number of text was corrected. (4.2 (12) → 4.2 (13))	CR
					SYSPR 04-0000	Description (System Parameter) of NOTE was deleted.	DL
					SYSPR 04-0020	Reference page of No. 4 and No.5 was changed.	CH
						Factory setting of No.4 was changed.	CH
					SYSPR 04-0030	Factory setting of No.10 was added.	AD
						No.16 was moved to SYSPR 04-0031.	DL
					SYSPR 04-0031	No.16 was moved from SYSPR 04-0030.	AD
					SYSPR 04-0080	Description of “Write and verify mode” was changed.	CH
					SYSPR 04-0090 to SYSPR 04-0112	Reedited due to adding the description. • Window of “after V3.50” was added. • Description was added in [Default Gateway]. (When network address…) • Description of “③ [OPTION]” was added. • Description page of (4) and (5) were changed. • Description was added to the NOTE.	AD/CH
					SYSPR 04-0097, SYSPR 04-0098	These pages were deleted.	DL
					SYSPR 04-0101, SYSPR 04-0102, SYSPR 04-0111, SYSPR 04-0112	These pages were newly added.	AD
					SYSPR 04-0130	Changed was [Variable] at ⑥.	CH
					SYSPR 04-0230, SYSPR 04-0231	Description of “TrueCopy Extended Distance” was added.	AD
					SYSPR 04-0250	Under line of “\\Windows”of text was deleted.	DL
					SYSPR 05-0020	Description of “TrueCopy Extended Distance” was added.	AD
					SYSPR 07-0010, SYSPR 07-0030	Description of “TrueCopy Extended Distance” was added.	AD
					SYSPR 07-0020	Description of “TrueCopy Extended Distance” was added.	AD
						Description of annotation about Sun Cluster was added to *4.	AD
					SYSPR 07-0040	Description of “TrueCopy Extended Distance” was added.	AD
						Descriptions of the VCA and the MSCS were added.	AD
					SYSPR 07-0050	Description of “TrueCopy Extended Distance” was added.	AD
						Description of the HDLM was added.	AD
					ADD 01-0001	Description of “TrueCopy Extended Distance” was added to (11).	AD
					ADD 01-0010	“on” in the description of (1) was corrected to “online”.	CR
					ADD 01-0020	Description of (2) was changed.	CH
					ADD 01-0040, ADD 01-0060, ADD 01-0070, ADD 01-0071, ADD 01-0080, ADD 01-0131, ADD 01-0190, ADD 01-0200, ADD 01-0201, ADD 01-0280, ADD 01-0450, ADD 02-0150, ADD 02-0151, ADD 02-0200, ADD 02-0320	Description of “Power offline” or “offline” was added to “with the subsystem power”.	CH
					ADD 01-0050	Description of “Power offline” or “offline” was added to “with the subsystem power”.	CH
						Description of the ATA 500MB Disk Drive was added.	AD
						Description of the Disk rotation speed was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0060, ADD 01-0070, ADD 01-0071, ADD 01-0190, ADD 01-0200, ADD 01-0201, ADD 01-0240, ADD 01-0280, ADD 02-0150, ADD 02-0200	Reference title was changed.	CH
					ADD 01-0070	No.6 and No.7 were moved to page ADD 01-0071.	DL
					ADD 01-0071	This page was newly added. (No.6 and No.7 were moved from page ADD 01-0070.)	AD
					ADD 01-0072	This page was newly added.	AD
					ADD 01-0100	Description of text was changed. (When the Additional Chassis …)	CH
					ADD 01-0050, ADD 01-0130	Description of “Power offline” or “offline” was added to “with the subsystem power”.	CH
						Description of the ATA 500MB Disk Drive was added.	AD
						Description of the Disk rotation speed was added.	AD
					ADD 01-0160	Reference page (SYSPR 04-0092) of (30) was changed to (SYSPR 04-0100).	CH
					ADD 01-0200	No.6 was moved to page ADD 01-0201.	DL
					ADD 01-0201	This page was newly added. (No.6 was moved from page ADD 01-0200.)	AD
					ADD 01-0202	This page was newly added.	AD
					ADD 01-0230	Changed was (c).	CH
					ADD 01-0240	Description of text was changed. (When the Disk Drive …)	CH
					ADD 01-0250	“on” in the description of (2-1) was corrected to “online”.	CR
					ADD 01-0260	Description of (2-2) was changed.	CH
					ADD 01-0290	“on” in the description of (3-1) was corrected to “online”.	CR
					ADD 01-0310	Description of (3-2) was changed.	CH
					ADD 01-0391	Description of ‡1 was changed. (When it is blinking at low speed, …)	CH
						“slot #0, #2, #1, #3” → “slot #0, #1, #2, #3”	CH
					ADD 01-0423, ADD 01-0433	Description of ‡1 was changed. (When it is blinking at low speed, …)	CH
					ADD 01-0422	Reference page of NOTE of (14) was corrected.	CR
						“NOTE:” was corrected to “NOTE :”.	CR
					ADD 01-0432	Reference page of NOTE of (12) was corrected.	CR
					ADD 01-0470	Reference item number of (c) was corrected. (1.1 (2) → 1.1 (3))	CR
					ADD 01-0490	Description of text of the 1.6 was changed. (The procedure for adding …)	CH
						Reference title was added to (d).	AD
					ADD 01-0500	Reference title of (m) was changed.	CH
					ADD 01-0510	“on” in the description of (3) was corrected to “online”.	CR
						Reference page of Work-4 was corrected.	CR
					ADD 01-0530	Description of (4) was changed.	CH
						Reference page of Work-4 was corrected.	CR
					ADD 01-0710	Reference item number of (d) was corrected.	CR
					ADD 01-0830	Reference item number of text of (1-2) was corrected.	CR
					ADD 01-0870	“(addition performed …)” in the description of (d) was changed to “Offline addition …”.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0880	Description of (2-2) was changed. (When you want to subtract …)	CH
					ADD 02-0090	"on" in the description of (1) was corrected to "online".	CR
					ADD 02-0100	Description of (2) was changed.	CH
					ADD 02-0110	Position of reference item was changed.	CH
					ADD 02-0120	No.2 of "Restriction" was changed.	CH
					ADD 02-0130	Description of (1) was changed.	CH
					ADD 02-0150	Description of the ATA 500MB Disk Drive was added.	AD
						Description of the Disk rotation speed was added.	AD
					ADD 02-0180	Reference page (SYSPR 04-0092) of (m) was changed to (SYSPR 04-0100).	CH
					ADD 02-0230	"on" in the description of (2-1) was corrected to "online".	CR
					ADD 02-0250	Description of (2-2) was changed.	CH
					ADD 02-0282,	Description of ‡1 was changed. (When it is blinking at low speed, …)	CH
						"slot #0, #2, #1, #3" → "slot #0, #1, #2, #3"	CH
					ADD 02-0293, ADD 02-0303	Description of ‡1 was changed. (When it is blinking at low speed, …)	CH
					ADD 02-0292, ADD 02-0302	Reference page in the NOTE was corrected.	CR
						"NOTE:" was corrected to "NOTE :".	CR
					ADD 03-0070	Reference item of Work-7 was deleted.	DL
					TRBL 02-0000	Description of "TrueCopy Extended Distance" was added to (1).	AD
					TRBL 02-0230	Front bezel was added.	AD
						Line size was changed.	CH
					TRBL 03-0000, TRBL 03-0010, TRBL 06-1150, TRBL 07-0050, TRBL 07-0080, TRBL 07-0130, TRBL 07-0140, TRBL 07-0170, TRBL 07-0200	Control Unit position in the figure was changed.	CH
					TRBL 03-0010	"NOTE:" was corrected to "NOTE :".	CR
						(b) was move to page TRBL 03-0020.	DL
					TRBL 03-0020	(b) was move from page TRBL 03-0010	AD
						Description was added to the NOTE. (If this is the case,…)	AD
					TRBL 04-0000	Description of NOTE was changed.	CH
					TRBL 04-0090	(d) was added.	AD
					TRBL 04-0170	Description of "TrueCopy Extended Distance" was added to the title of 4.4.	AD
					TRBL 05-0020	Line was changed.	CH
					TRBL 06-0030	Line position of "B" was changed.	CH
					TRBL 06-0050	Reference page of *3 was corrected.	CR
					TRBL 06-0080	Description of "TrueCopy Extended Distance" was added to No.10 and 12.	AD
						No.10 → 11	CH
						No.11 to 23 → No.13 to 25	CH
					TRBL 06-0090	Description of the execution of the forced parity correction was added.	AD
					TRBL 06-0140	*1 was added.	AD
						"It can be confirmed that…" was moved to page TRBL 06-0150.	DL
					TRBL 06-0150	"It can be confirmed that…" was moved from page TRBL 06-0140.	AD
					TRBL 06-0150, TRBL 06-0160, TRBL 06-0170, TRBL 06-0180, TRBL 06-0230, TRBL 06-0240	(I007HH) was added to the I007xy in flow.	AD
					TRBL 06-0160	I009xy of the flow was deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-0230	*1 was added.	AD
					TRBL 06-0400	Note was changed.	CH
					TRBL 06-0520	[Recovery method] was moved to page TRBL 06-0530.	DL
					TRBL 06-0530	[Recovery method] was moved from page TRBL 06-0520.	AD
						Description of *1 was changed.	CH
					TRBL 06-0540	[Recovery method] was moved to page TRBL 06-0530.	DL
					TRBL 06-0541	This page was newly added. ([Recovery method] was moved from page TRBL 06-0520.)	AD
						Description was added to the *1.	AD
						Description of *2, *3 were moved to flow.	DL
						*2 was added.	AD
					TRBL 06-0542	This page was newly added.	AD
					TRBL 06-0590	*4 was added.	AD
					TRBL 06-0620, TRBL 06-0641, TRBL 06-0650, TRBL 06-0660	Figure of Loop structure was corrected.	CR
						Description of annotation about the signal of the Fibre Channel Loop.	AD
					TRBL 06-0630	Figure of Loop structure was corrected, and "*1" was added.	CR/AD
						Description of annotation about the signal of the Fibre Channel Loop.	AD
					TRBL 06-0900, TRBL 06-0930	*1 was added.	AD
					TRBL 06-1090	"W061HH" was added to the replacing Disk Drive of the flow.	AD
					TRBL 06-1122	Reference page of *1 was corrected.	CR
					TRBL 06-1230	The description of the annotation of TrueCopy Extended Distance was added.	AD
					TRBL 07-0050	"(at intervals of 125 ms)" was deleted.	DL
						(e) was moved to page TRBL 07-0051.	DL
					TRBL 07-0051	This page was newly added. ((e) was moved from page TRBL 07-0050.)	AD
					TRBL 07-0052	This page was newly added.	AD
					TRBL 07-0090	"(at intervals of 125 ms)" was deleted.	DL
					TRBL 08-0281	Figure of the iSCSI Interface Bard for RKH was added.	AD
						Description of No.2 in the Table was moved to TRBL 08-0282.	DL
					TRBL 08-0282	Description of No.2 in the Table was moved from TRBL 08-0281.	DL
					TRBL 09-0000	Description of "TrueCopy Extended Distance" was added to No.4.	AD
						No.4 to 12 → No.5 to 13	CH
						No.13 was moved to TRBL 09-0010.	DL
					TRBL 09-0010	No.13 to 19 → No.14 to 20	CH
						No.13 was moved from TRBL 09-0000.	AD
					TRBL 09-0040	Description of "TrueCopy Extended Distance" was added to No.4.	AD
						No.4 to 12 No.5 to 13	CH
					TRBL 09-0041	No.13 to 18 → No.14 to 19	CH
					TRBL 09-0060	Description of "TrueCopy Extended Distance" was added to No.3.	AD
						No.3and 4 → No.4 and 5	CH
						No.5 was moved to TRBL 09-0070.	DL
					TRBL 09-0070	No.5 was moved from TRBL 09-0060.	AD
					MSG 01-0010, MSG 01-0030, MSG 01-0040, MSG 01-0060,	Figure of Loop structure was corrected.	CR
						Description of annotation about the signal of the Fibre Channel Loop.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 01-0070	Revision number was corrected.	CR
					MSG 01-0030	Figure of Loop structure was corrected, and "*1" was added.	CR/AD
					MSG 01-0032	Unit ID #0 of RKAJAT was corrected to #1.	CR
					MSG 02-0030	"slot #0" in the "Description" of 01824011 was corrected to "slot #1".	CR
					MSG 02-0070	"Host PCI #1" in the "Description" of 01844601 to 01844604 were corrected to "Host PCI #0".	CR
					MSG 02-0210	"D_Port #01" in the "Description" of 01849204 was corrected to "D_Port #10".	CR
					MSG 02-0380	"D_Port #11" in the "Description" of 0184DA1A and 0184DA1B were corrected to "D_Port #10". "D_Port #10" in the "Description" of 0184DB02 was corrected to "D_Port #11".	CR
					MSG 02-0630	"D_Port #10" in the "Description" of DFPC#3 was corrected to "D_Port #11".	CR
					MSG 02-0640	DFPC#2 and DFPC#3 were added.	AD
					MSG 02-0690	"D_Port #12 in the "Description" of DFPC#3 was corrected to "D_Port #11".	CR
					MSG 02-0710	Full Dump was added to the Collect the error of the HFPC#3.	AD
					MSG 02-0770	Description and Collect the error of 01851212, 01851502 and 01851512 were deleted.	DL
						"Slot #0" in the "Description" of 01851511 was corrected to "Slot #1".	CR
					MSG 02-0780	Description and Collect the error of 01851B02, 01851B03 and 01851D02 were deleted	DL
						01851D03 was moved from page MSG 02-0780.	AD
					MSG 02-0790	01851D03 was moved to page MSG 02-0780.	DL
						Description and Collect the error of 01851D12 and 01851D13were deleted	DL
						0185220D was moved from page MSG 02-0800.	AD
					MSG 02-0800	0185220D was moved to page MSG 02-0790.	DL
					MSG 02-0870	"RAM Address Data Test" in the "Description" of 01875342 was corrected to "RAM Address Line Test".	CR
					MSG 02-0970	"Recovery methods" was changed.	CH
					MSG 02-1170, MSG 02-1180, MSG 02-1190, MSG 02-1200, MSG 02-1210, MSG 02-1220, MSG 02-1230, MSG 02-1240, MSG 02-1250, MSG 02-1260, MSG 02-1270, MSG 02-1280, MSG 02-1290, MSG 02-1300, MSG 02-1310, MSG 02-1320	Reedited due to changed "Recovery methods" of HFPC#0.	CH
					MSG 02-1220	Full Dump was added to the Collect the error of the HFPC#3.	AD
					MSG 02-1290	Full Dump was added to the Collect the error of the HFPC#3.	AD
					MSG 02-1340	"PCI10" in the "Description" of 01xxxxFB to 018xxxxFD were corrected to "PCI1".	CR
					MSG 03-0420	Reference page of "Recovery methods ①, ③" of HE020x was corrected.	CR
					MSG 03-0450	Reference page of "Recovery methods ⑤-2" of HE050x was corrected.	CR
					MSG 03-0460	Reference page of "Recovery methods ⑥-1, 3" of HE050x was corrected.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0490	Line of “Recovery methods ③” of HE0711 was deleted.	DL
					MSG 03-0500	Reference page of “Recovery methods ①, ③” of HE0A31 was corrected.	CR
					MSG 03-0510	Reedited due to changed “Recovery methods” of HE0Fxy.	CH
					MSG 03-0550, MSG 03-0610	Description of “TrueCopy Extended Distance” was added.	AD
					MSG 03-0830	Reference page of “Recovery methods ①, ③” of HJ3800 corrected.	CR
					MSG 04-0000	Description of “I0020x” was deleted.	DL
						I007xy to I008HH were moved from page MSG 04-0000.	AD
					MSG 04-0010	I007xy to I008HH were moved to page MSG 04-0000.	DL
						I00F00 to I0100x were moved from page MSG 04-0020.	AD
					MSG 04-0020	I00F00 to I0100x were moved to page MSG 04-0010.	DL
						I10000 to I12200were moved from page MSG 04-0030.	AD
					MSG 04-0030	I10000 to I12200were moved to page MSG 04-0020.	DL
						“Recovery methods ①” of the I12300 was changed.	CH
					MSG 04-0040	Description was added to the “Recovery methods ①” of the I142xy and I142HH.	AD
						I142xy to I150HH were moved to page MSG 04-0050.	DL
					MSG 04-0050	I142xy to I150HH were moved from page MSG 04-0040.	AD
					MSG 04-0250	Line size of table title was changed.	CH
					MSG 04-0260	Reference page of “Recovery methods ⑤-2” of I5YG00 was corrected.	CR
					MSG 04-0270	Reference page of “Recovery methods ⑥-1, 3” of I5YG00 was corrected.	CR
					MSG 04-0280	Description was added to the “Recovery methods ①” of the I5YL00 and I5YP00.	AD
					MSG 04-0290	Description was added to the “Recovery methods ①” of the I5YPAT.	AD
						“Description” of the I5YT00 was changed.	CH
					MSG 04-0370	Reedited due to changed “Recovery methods” of I6250x.	CH
					MSG 04-0400, MSG 04-0430	Description of “TrueCopy Extended Distance” was added.	AD
					MSG 04-0470	“Recovery methods ①” of the I6EQ00 was changed.	CH
					MSG 04-0480	Reference page of “Recovery methods ②” of I70000 was corrected.	CR
					MSG 04-0490	Reference page of “Recovery methods ①-3” of I70100 corrected.	CR
						“ENC Unit” of ②-3 was changed to “ENC Unit #0”.	CH
					MSG 04-0500	“ENC Unit” of ③-4 was changed to “ENC Unit #1”.	CH
					MSG 04-0510	“Recovery methods” of ④-3 was changed.	CH
					MSG 04-0560	Reference page of “Recovery methods ①-2” of I80Bxy corrected.	CR
					MSG 04-0570	Reference page of “Recovery methods ②” of I80D0x was corrected.	CR
					MSG 04-0910	“Description” and “Recovery methods” of IB1900 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0910, MSG 04-0920, MSG 04-0940	The name of ""Truecopy Asynchronou" was changed to "TrueCopy Extended Distance".	CH
					MSG 04-0920	"Description" of IB1D00 was changed.	CH
						IB1F00 was moved to page MSG 04-0930.	CH
					MSG 04-0930	IB1F00 was moved from page MSG 04-0920.	CH
						"Recovery method ①"of the IB1G00was added.	AD
						IB1J0x to IB1L0x were moved to page MSG 04-0940.	CH
					MSG 04-0940	IB1J0x to IB1L0x were moved from page MSG 04-0930.	CH
						IB1M00 was added.	AD
						IF0000 to IT0000 were moved to page MSG 04-0950.	CH
					MSG 04-0950	IF0000 to IT0000 were moved from page MSG 04-0940.	CH
						The name of "Truecopy Asynchronou" was changed to "TrueCopy Extended Distance".	CH
						IT0000 to IXX600 was moved to MSG 04-0960.	DL
					MSG 04-0960	IT0000 to IXX600 was moved from MSG 04-0950.	AD
						IXX300 to IXXG00 was moved to MSG 04-0961.	DL
					MSG 04-0961	IXX300 to IXXG00 was moved from MSG 04-0960.	AD
						IXXH00 to IY00HH was moved to MSG 04-0962.	DL
					MSG 04-0962	IXXH00 to IY00HH was moved from MSG 04-0961.	AD
					MSG 04-1030, MSG 04-1040	"y:" was corrected to "y :".	CR
					MSG 05-0150	Reference page of "Recovery methods ①, ③" of R52400 corrected.	CR
					MSG 08-0240	Description of DMEN04009W was changed.	CH
					MSG 09-0130	"B/ C0 06" was added.	AD
						"5/EA 13" was moved to page MSG 09-0140.	DL
					MSG 09-0140	"5/EA 13" was moved from page MSG 09-0130.	AD
						Reference page of the "5/EA 1E" was added.	AD
						"5/ EA 40" and "5/ EA 41" were moved to page MSG 09-0150.	DL
					MSG 09-0150	"5/ EA 40" and "5/ EA 41" were moved from page MSG 09-0140.	AD
					REP 01-0020	Description of "TrueCopy Extended Distance" was added to (5).	AD
					REP 01-0040	Reference page of text was corrected.	CR
					REP 02-0000	Description of the ATA 500MB Disk Drive was added.	AD
						DF-F600-ATE250 was deleted.	DL
					REP 02-0050	Changed was ‡1.	CH
					REP 02-0090	"Removing the front bezel" in flow was moved form page REP 02-0100.	AD
						Description of W061HH, W0GJ00 and W0GK00in the flow were added.	AD
					REP 02-0100	"Removing the front bezel" in flow was moved to page REP 02-0090.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0100, REP 02-0120, REP 02-0170, REP 02-0190, REP 02-0260, REP 02-0280, REP 02-0291, REP 02-0310	Description of ‡3 was changed. (When it is blinking at low speed, …)	CH
					REP 02-0150	Description of W0GG00 and W0GH00in the flow were added.	AD
					REP 02-0160	Description of ‡6 was moved to page REP 02-0170.	DL
					REP 02-0170	Description of ‡6 was moved from page REP 02-0160.	AD
						‡6 → ‡1	CH
					REP 02-0210	Message codes were added in (a).	AD
						(b) was moved to page REP 02-0220.	DL
					REP 02-0220	(b) was moved from page REP 02-0210.	AD
						Message codes were added in (b).	AD
						Asterisk numbers were changed.	CH
					REP 02-0240	Restriction was changed.	CH
						CAUTION was moved to page REP 02-0241.	DL
					REP 02-0241	This page was newly added.	AD
						CAUTION was moved from page REP 02-0240.	AD
					REP 02-0242	This page was newly added.	AD
					REP 02-0270	(g) was moved to page REP 02-0280.	AD
					REP 02-0280	(g) was moved from page REP 02-0270.	DL
					REP 02-0291, REP 02-0310, REP 02-0331, REP 02-0350, REP 02-0380, REP 02-0431, REP 02-0490, REP 02-0511, REP 02-0531, REP 02-0580, REP 02-0630, REP 02-0650, REP 02-0700, REP 02-0740, REP 02-0760, REP 02-0860, REP 02-0880, REP 02-0900, REP 02-0920, REP 02-0941	Description of ‡3 was changed. (When it is blinking at low speed, …)	CH
					REP 02-0280, REP 02-0291, REP 02-0331, REP 02-0380, REP 02-0511, REP 02-0531, REP 02-0650, REP 02-0760, REP 02-0900, REP 02-0941, REP 02-0970, REP 02-1010	The state of the READY LED (green) was changed from “go out” to “lights on”.	CH
					REP 02-0410, REP 02-0460, REP 02-0500, REP 02-0520	“Figure 2.2.7.1” of text was corrected to “Figure 2.2.7.3”.	CR
					REP 02-0430	(u) was moved from page REP 02-0431.	DL
					REP 02-0431	(u) was moved to page REP 02-0430.	AD
						‡2 of (u) was corrected to ‡1.	CR
						Description of ‡1 was added.	AD
						“((Refer to WEB” of (x) was corrected to “(Refer to WEB”.	CR
						Reference page (SYSPR 04-0092) of (z) was changed to (SYSPR 04-0100).	CH
					REP 02-0470, REP 02-0520, REP 02-0690, REP 02-0730, REP 02-0760, REP 02-1130	“NOTE:” was corrected to “NOTE :”	CR
					REP 02-0490, REP 02-0511, REP 02-0531, REP 02-0580, REP 02-0630, REP 02-0650, REP 02-0710,REP 02-0741, REP 02-0761	“((Refer to WEB” in the text was corrected to “(Refer to WEB”.	CR
					REP 02-0500	(g) and (h) were moved to page REP 02-0510.	DL
					REP 02-0510	(g) and (h) were moved from page REP 02-0500.	AD
						(p) was moved to page REP 02-0511.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0511	(p) was moved from page REP 02-0510.	AD
					REP 02-0570, REP 02-0620	"slot #0, #2, #1, #3" → "slot #0, #1, #2, #3"	CH
					REP 02-0580, REP 02-0630	Description of "l0020x" was deleted.	DL
					REP 02-0650	Description of "l0020x" was deleted.	DL
						"slot #0, #2, #1, #3" → "slot #0, #1, #2, #3"	CH
					REP 02-0700	(v) was moved from page REP 02-0710.	DL
					REP 02-0710	(v) was moved to page REP 02-0700.	AD
					REP 02-0760	(q) was moved from page REP 02-0761.	DL
					REP 02-0761	This page was newly added ((q) was moved to page REP 02-0760.)	AD
					REP 02-0762	This page was newly added.	AD
					REP 02-0800	Title of Figure 2.2.8.6 was corrected.	CR
					REP 02-0970	Description of ‡1 was added.	AD
					REP 02-1010	‡1 of (k) was corrected to ‡2.	CR
					REP 03-0000	"RKA" was added to *2 of the Table 3.1.1.	AD
					REP 03-0010, REP 03-0050	Line size was changed.	CH
					REP 03-0050	Corrected was figure.	CR
					PARTS 01-0020, PARTS 01-0050, PARTS 01-0080, PARTS 01-0101, PARTS 01-0110, PARTS 01-0140, PARTS 01-0170, PARTS 01-0200	"SP" was added to REMARK in the table.	AD
					PARTS 01-0030, PARTS 01-0060, PARTS 01-0090, PARTS 01-0120, PARTS 01-0150	Part number of dummy drive was added.	AD
					PARTS 01-0090, PARTS 01-0150	Description of the ATA 500MB Disk Drive was added.	AD
					PARTS 01-0150	DF-F600-ATE250 was deleted. Name of parts were changed.	DL CH
					WEB 01-0000	Description of "TrueCopy Extended Distance" was added.	AD
					WEB 01-0040	Description was added to the NOTE. (If this is the case,…)	AD
					WEB 02-0180	"NNC 1" and "NNC 3" were added.	AD
					WEB 03-0000	"(at intervals of 125 ms)" was deleted.	DL
					WEB 03-0010	Control Unit position in the figure was changed.	CH
					WEB 03-0190	Reference page (SYSPR 04-0092) of ‡2 was changed to (SYSPR 04-0100).	CH
					WEB 03-0400	Description of "TrueCopy Extended Distance" was added.	AD
					WEB 03-0450	Description of ‡1 was added.	AD
						The state of the READY LED (green) was changed from "go out" to "lights on".	CH
10	Mar.28.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.9→10	CH
					GENE 0170	6.1.21 to 6.1.23 were added.	AD
					GENE 0210	"/TCE" was added at 3.5.4.	AD
					SAFE 0130	ADD 01-0421 → ADD 01-0422, ADD 01-0431 → ADD 01-0432	CR
						REP 02-0460 → REP 02-0470 REP 02-0560 → REP 02-0570 REP 02-0680 REP 02-0690	CH
					THEO 02-0062	Description of "When the correction copy ..." was changed.	CH
					THEO 02-0065	This page is newly added "Even if the dynamic sparing ...".	AD
					THEO 02-0066	This page is newly added.	AD
					THEO 04-0240	Description of "Variable" which is operation mode of the Spare Disk was changed.	CH
					THEO 04-0250	Description of "When the dynamic sparing ..." in the Figure 4.6.6 was changed.	CH
						Description of "Drive disk speed" in the Table of (4) was deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0010, INST 01-0290	Description of "Note on restart" was changed.	CH
					INST 01-0050, INST 01-0051	bytes Host Connector→ bps Host Connector	CR
					INST 01-0060	"RKM" was added to No 6 and No 7.	CR
					INST 02-0280	Description of the dummy was added.	AD
					INST 02-0510	Description of the dummy was added.	AD
						Figure 3.4.21 and 3.4.22 were moved to INST 03-0511.	DL
					INST 02-0511	Figure 3.4.21 and 3.4.22 were moved from INST 03-0511. (New page)	AD
						Description of the dummy was added.	AD
					INST 02-0512	New blank page was added.	AD
					INST 03-0610	Table 3.4.4 → Table 3.4.10	CR
					INST 03-0640	Table 3.4.10→ Table 3.4.11	CR
						Table 3.4.5→ Table 3.4.11	CR
					INST 03-0650	Description of annotation of the Fibre Channel interface cable connecting.	AD
					INST 03-0740	Table 3.4.4→ Table 3.4.12	CR
						Table 3.4.6→ Table 3.4.12	CR
					INST 03-0761	The Control Unit was corrected in Figure 3.4.41.1.	CR
					MICRO 01-0100	Description of "Note on restart" was changed.	CH
					SYSPR 01-0000	Description of "Note on restart" was changed.	CH
					SYSPR 03-0291	Description in ‡2 was changed.	CH
					SYSPR 03-0292	Description of SRIZE AMS1000 was changed.	CH
					SYSPR 04-0091, SYSPR 04-0093	Description of "Note on restart" was changed.	CH
					SYSPR 04-0120	③ [Interval Time] was moved from page SYSPR 04-0130.	AD
					SYSPR 04-0130	③ [Interval Time] was moved to page SYSPR 04-0120.	DL
						Description of "Variable" which is operation mode of the Spare Disk was changed.	CH
					ADD 01-0001	Description of "Note on restart" was changed.	CH
					ADD 01-0150	Description of annotation of the Fibre Channel interface cable connecting.	AD
					ADD 01-0160	"(SYSPR 01-0010)))" of (23) was corrected "(SYSOR 01-0010).)".	CR
					ADD 01-0330, ADD 01-0340	Description of the dummy was added.	AD
					ADD 01-0390, ADD 01-0422, ADD 01-0432	Description of annotation of the Fibre Channel interface cable removing.	AD
					ADD 01-0391, ADD 01-0423, ADD 01-0433	Description of annotation of the Fibre Channel interface cable connecting.	AD
					ADD 01-0410	Description of annotation of the Fibre Channel interface cable connecting.	AD
						Description of (8) was moved to ADD 01-0411.	DL
					ADD 01-0411	Description of (8) was moved from ADD 01-0410.	AD
						Description of annotation of the Fibre Channel interface cable connecting.	AD
					ADD 02-0000	Description of (6) was changed.	CH
					ADD 02-0010	Description of "When the Spare Disk Drive Active Mode ..." was changed.	CH
					ADD 02-0180, ADD 02-0281, ADD 02-0291, ADD 02-0301	Description of annotation of the Fibre Channel interface cable connecting.	AD
					ADD 02-0270	Description of the dummy was added.	AD
						Figure 2.4.3 was moved to ADD 02-0271.	DL
					ADD 02-0271	Figure 2.4.3 was moved from ADD 02-	AD

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						0271. (New page)	
						Description of the dummy was added.	AD
					ADD 02-0272	New blank page was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 02-0282, ADD 02-0292, ADD 02-0302	Description of annotation of the Fibre Channel interface cable removing.	AD
					TRBL 02-0000	Description of "Note on restart" was changed.	CH
					TRBL 03-0060	"3.5.4 Collecting Full Dump (Full Dump(SnapShot))" → "3.5.4 Collecting Full Dump (Full Dump(SnapShot/TCE))"	CH
					TRBL 04-0250	HE200x was added.	AD
						HH7Mxy was to page TRBL 04-0260.	DL
					TRBL 04-0260	HH7Mxy was from page TRBL 04-0250.	AD
					TRBL 06-0010	No.23 was added.	AD
					TRBL 06-0011	This page was newly added. (No.24 and No.25 were added.)	AD
					TRBL 06-0012	This page was newly added.	AD
					TRBL 06-0630, TRBL 06-0641	"RKAJ" was added to the title.	AD
					TRBL 06-0640	"RKAJAT" was added to the title.	AD
					TRBL 061131 to TRBL 03-1138	These pages were newly added.	AD
					TRBL 06-1150	Description of Control Unit was changed.	CH
					MSG 01-0034	Description of RKH was added.	AD
					MSG 01-0035	This page was newly added. (Description of RKH was added.)	AD
					MSG 01-0036	This page was newly added.	AD
					MSG 02-0220, MSG 02-0230	The Interface Board of "Recovery methods" was changed to the FC Interface Board.	CH
					MSG 02-0240, MSG 02-0250	The Interface Board #0 of "Recovery methods" was changed to the FC Interface Board #1.	CH
					MSG 02-0620 to MSG 02-0760	Description of Interface Board #1 was added to "Recovery methods".	AD
					MSG 02-0970 to MSG 02-1410	Reedited due to adding the FC Interface Board #1 to "Recovery methods". • The Interface Board #0 of "Recovery methods" was changed to the FC Interface Board #1.	AD/CH
					MSG 02-1360 to MSG 02-1410	These pages were newly added.	AD
					MSG 03-0520	"Recovery methods" of HE2000x was changed.	CH
					MSG 03-0772	HH8E00、HH8F00 was added.	AD
						HI0310 was to page MSG 03-0780.	DL
					MSG 03-0780	HI0310 was from page MSG 03-0772.	AD
						HJ0Bxx was to page MSG 03-0790.	DL
					MSG 03-0790	HJ0Bxx was from page MSG 03-0780.	AD
					MSG 04-0000	Description was added to the "Recovery methods" of the I0040x.	AD
						I008xy and I008HH were moved to page MSG 04-0010.	DL
					MSG 04-0010	I008xy and I008HH were moved from page MSG 04-0000.	AD
						I01000 and I0100x were moved to page MSG 04-0020.	DL
					MSG 04-0020	I01000 and I0100x were moved from page MSG 04-0010.	AD
						I12000, I12100 and I12200were moved to page MSG 04-0030.	DL
					MSG 04-0030	I12000, I12100 and I12200were moved from page MSG 04-0020.	AD
					MSG 04-0050, MSG 04-0100, MSG 04-0110	Title of "Trouble shooting "6.1.18 …" was changed in the "Reference page".	CH
					MSG 04-0220	"Recovery methods" of I540xy and I540H were changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0280	"Recovery methods" of I5YH00 was changed.	CH
						I5YPAT was moved from page MSG 04-0290.	AD
					MSG 04-0290	I5YPAT was moved to page MSG 04-0280.	DL
					MSG 04-0800, MSG 04-0820, MSG 04-0830, MSG 04-0840, MSG 04-0850, MSG 04-0860, MSG 04-0870	Title of "Trouble shooting "4.7 …" was changed in the "Reference page".	CH
					MSG 04-0850	"Recovery methods ③" of IA3500 was moved to page MSG 04-0860.	DL
					MSG 04-0860	"Recovery methods ③" of IA3500 was moved from page MSG 04-0850.	AD
					MSG 04-0920	"the disk subsystem on the remote side" of "Description" of IB1E00 was changed "the remote side subsystem".	CH
					MSG 04-0930	"the remote disk subsystem" of "Description" of IB1F00 was changed "the remote side subsystem".	CH
					MSG 04-0940 to MSG 04-0963	Reedited due to adding the message. • New messages were added. (IB1N00, IB1P00, IB1Q00, I1E300, IB1S0x, IB1T00, IB1U00, IB1V00, IB1W00) • x and y of "Description" of IB1M00 was changed. • "(own DF)" of "Description" of IW0000 IX0000 was changed to (this subsystem) ""	AD/CH
					MSG 04-0963, MSG 04-0964	These pages were newly added.	AD
					MSG 06-0070, MSG 06-0080, MSG 06-0110, MSG 06-0120, MSG 06-0130, MSG 06-0140, MSG 06-0150, MSG 06-0160, MSG 06-0170, MSG 06-0200	Title of "Trouble shooting "6.1.18 …" was changed in the "Reference page".	CH
					REP 01-0020	Description of "Note on restart" was changed.	CH
					REP 02-0050	Description of "Variable" which is operation mode of the Spare Disk was changed.	CH
					REP 02-0210	Description of "‡1" was changed.	CH
					REP 02-0230	AMS1000 of table 2.2.2 was moved to page REP 02-0231.	DL
					REP 02-0231	AMS1000 of table 2.2.2 was moved from page REP 02-0231.	AD
						Description of AMS1000 was changed.	CH
					REP 02- 0420	Description of annotation of the Fibre Channel interface cable removing.	AD
						Description of (o) to (q) were moved to REP 02-0430.	DL
					REP 02- 0430	Description of (o) to (q) were moved from REP 02-0420.	AD
					REP 02- 0431, REP 02- 0490, REP 02- 0511, REP 02- 0530, REP 02- 0580, REP 02- 0630, REP 02- 0650, REP 02- 0700, REP 02- 0740	Description of annotation of the Fibre Channel interface cable connecting.	AD
					REP 02- 0460	Description of annotation of the Fibre Channel interface cable removing.	AD
						Description of the Caution was moved to REP 02-0470.	DL
					REP 02- 0470	Description of the Caution was moved from REP 02-0460.	AD
					REP 02- 0500, REP 02- 0520, REP 02- 0610, REP 02- 0640, REP 02- 0720,	Description of annotation of the Fibre Channel interface cable removing.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02- 0560	Description of annotation of the Fibre Channel interface cable removing.	AD
						Description of the Caution was moved to REP 02-0570.	DL
					REP 02- 0570	Description of the Caution was moved from REP 02-0560.	AD
					REP 02- 0680	Description of annotation of the Fibre Channel interface cable removing.	AD
						Description of the Caution was moved to REP 02-0690.	DL
					REP 02- 0690	Description of the Caution was moved from REP 02-0680.	AD
					REP 02- 0750	Description of annotation of the Fibre Channel interface cable removing.	AD
						(f) and (g) were moved to REP 02-0760	DL
					REP 02- 0760	(f) and (g) were moved from REP 02-0750	AD
						Description of annotation of the Fibre Channel interface cable connecting.	AD
						(p) and annotation were moved to REP 02-0761	DL
					REP 02- 0761	(p) and annotation were moved from REP 02-0760	AD
					REP 02-0790, REP 02-0810, REP 02-0820	"Figure 2.2.8.5" of text was corrected "Figure 2.2.8.6".	CR
					REP 02-0800	Figure 2.2.8.5 → Figure 2.2.8.6 Figure 2.2.8.6 → Figure 2.2.8.7	CR
					WEB 01-0000	"3.5.4 Collecting Full Dump (Full Dump(SnapShot))" → "3.5.4 Collecting Full Dump (Full Dump(SnapShot/TCE))"	CH
						Description of "Note on restart" was changed.	CH
					WEB 03-0010	Description of Control Unit was changed.	CH
					WEB 03-0370, WEB 03-0410	Added was WEB screen at Microprogram Ver.0735 or later.	AD
					WEB 03-0400	"/TCE" was added at 3.5.4.	AD
11	Apr.11.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.10→11	CH
					GENE 0140	"Connecting multiple additional subsystem" and "Install the rest of the Disk Drives" were deleted.	DL
					GENE 0150	"2.4.6 Subtracting a FC Interface Board" was added.	AD
						"2.4.6" → "2.4.7", "2.4.7" → "2.4.8"	CH
					GENE 0170	Title of 6.1.16 was changed.	CH
						Page number of 6.1.17 to 6.3 was changed.	CH
						10.2 to 10.2.7 were moved to page GENE 0180.	DL
					GENE 0180	10.2 to 10.2.7 were moved from page GENE 0170.	AD
						Replacement was moved to page GENE 0190.	DL
					GENE 0190	Replacement was moved from page GENE 0180.	AD
						3.4 to Chapter 5. were moved to page GENE 0200.	DL
					GENE 0200	3.4 to Chapter 5. were moved from page GENE 0180.	AD
						Chapter 3 to 3.1.1 were moved to page GENE 0200.	DL
					GENE 0210	Chapter 3 to 3.1.1 were moved from page GENE 0180.	AD
					SAFE 0100	"Masses of RKM is …58 kg , and …" was corrected to "Masses of RKM is …58 kg, and …".	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SAFE 0130	"ADD 02-0295" and "ADD 02-0296" were added to 3.4.	AD
						"REP 02-0500" was changed to "REP 02-0510".	CH
					SAFE 0140	"ADD 02-0295" was added to 3.6.	AD
					SAFE 0170, SAFE 0180, SAFE 0181, SAFE 0190, SAFE 0200, SAFE 0210, SAFE 0211	Figure was changed.	CH
					THEO 02-0070	"Fabric Topology" → "Point-to-Point Topology".	CH
					THEO 02-0080	The number of SATA for DF600, 209, was deleted.	DL
					THEO 02-0100, THEO 02-0100, THEO 02-0196	Figure size was changed.	CH
					THEO 03-0220	Description of the capacity restriction version Disk Drive was added.	AD
					THEO 04-0020, THEO 04-0030, THEO 04-0040, THEO 04-0041, THEO 04-0042, THEO 04-0043	Figure was moved.	CH
					THEO 04-0300, THEO 04-0310, THEO 04-0320, THEO 04-0340, THEO 04-0350, THEO 04-0360	Reedited figure. (Description of RG0 or RG1 was moved.)	CH
					INST 01-0030	Added "SANRISE NSC".	AD
					INST 01-0040, INST 01-0051, INST 01-0052	Table size was changed. "Disk drive" was corrected to "Disk Drive".	CH/CR
					INST 01-0050	DF700-RSD115F and DF700-RSD135F were added in the RKS.	AD
					INST 01-0090, INST 01-0091	Figure of RKNAS was changed.	CH
					INST 01-0090, INST 01-0091, INST 01-0110	Figure size was changed.	CH
					INST 01-0180	"subsystemin" of NOTE of (2) was corrected to "subsystem in".	CR
					INST 01-0190	Font of (a) to (m) was corrected.	CR
					INST 01-0320	Line was corrected.	CR
						(f) was moved to page INST 01-00330.	DL
					INST 01-0330	(f) was moved from page INST 01-00330.	AD
					INST 02-0050	Font size was corrected.	CR
					INST 02-0060, INST 02-0100	"Masses of RKM is …58 kg , …" of CAUTION was corrected to "Masses of RKM is …58 kg, …".	CR
					INST 02-0170, INST 02-0171, INST 02-0172	"FC Interface Board" of No.5 or No.6 were corrected to "FC Interface Board".	CR
					INST 02-0190, INST 02-0210, INST 02-0212, INST 02-0230, INST 02-0240, INST 02-0260	Figure size was changed.	CH
					INST 02-0250	Position of figure was moved.	CH
					INST 02-0310	Under line of "1.2.2 Mini-HUB" (INST 01-0020)" of NOTE was deleted.	DL
					INST 02-0350, INST 02-0360	Font in figure was corrected.	CR
					INST 03-0604	Font in figure was corrected.	CR
					INST 03-0640	Table item was changed to center.	CH
					INST 03-0650, INST 03-0680, INST 03-0700, INST 03-0702	Figure size was changed.	CH
					INST 03-0670	(i) was moved to page INST 03-0680.	DL
					INST 03-0680	(i) was moved from page INST 03-0670.	AD
					INST 03-0690, INST 03-0701	Line was corrected.	CR
					INST 03-0703, INST 03-0705	RKA was corrected RKAJ	CR
					INST 03-0740	Font size in figure was corrected.	CR
					MICRO 01-0000	"When the subsystem is in the ..." was added into "NOTE".	AD
					MICRO 01-0010	Flow chart was changed.	CH
					MICRO 02-0000	When WARNING LED is Blinking, "Turn off ... the Beginning" was deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MICRO 02-0010	When WARNING LED is not Blinking, the description of referring the WEB was added.	AD
					MICRO 03-0000	*3 was added.	AD
					MICRO 03-0010	Font of “Refer to this place.” was corrected.	CR
					SYSPR 01-0010, SYSPR 01-0100	“NOTE:” was corrected to “NOTE :”.	CR
					SYSPR 01-0070	Font of window name and window size was changed.	CR
					SYSPR 02-0010, SYSPR 02-0090	Added ‡2.	AD
					SYSPR 02-0050, SYSPR 02-0060, SYSPR 02-0080, SYSPR 02-0110, SYSPR 02-0130	Changed ‡1.	AD
					SYSPR 02-0094, SYSPR 02-0095	Added ‡1.	AD
					SYSPR 02-0097	Deleted (v), (vi).	DL
					SYSPR 02-0098	Added (v), (vi).	AD
					SYSPR 02-0190, SYSPR 02-0270	Changed Message screen at (e).	CH
					SYSPR 02-0200	Changed Message screen at (c).	CH
					SYSPR 03-0150, SYSPR 03-0200	Font of window name and window size was changed.	CH
					SYSPR 03-0160	Font in figure was corrected.	CR
					SYSPR 03-0191	Corrected Table 3.3.3.	CR
					SYSPR 03-0290	Added “SANRISE NSC”.	AD
					SYSPR 03-0291, SYSPR 03-0292	491.9 G byte was added in Table 3.3.4.1.	AD
					SYSPR 03-0291	Description of ‡2 was changed.	CH
					SYSPR 03-0293, SYSPR 03-0294	Font of description and window of figure were changed.	CH
					SYSPR 03-0294	Number of figure was changed to Figure 3.3.2.	CH
					SYSPR 03-0560	Table 3.9.2 was moved to SYSPR 03-0570.	DL
					SYSPR 03-0570	Table 3.9.2 was moved from SYSPR 03-0560.	AD
						Description of note was added.	AD
					SYSPR 04-0090	Font of window name and window size was changed.	CH
					SYSPR 04-0092	Added “Click the [OK] button.” at (c).	AD
					SYSPR 04-0093	Position of “When the TrueCopy …” of NOTE was changed.	CH
					SYSPR 04-0150	Line was corrected.	CR
						[System Parameters] was moved to page SYSPR 04-0160.	DL
					SYSPR 04-0160	[System Parameters] was moved from page SYSPR 04-0160.	AD
					SYSPR 04-0170	Added “Also, when connecting it…” at Note.	AD
					SYSPR 04-0180	Added “When connecting it…” at ⑤.	AD
					SYSPR 04-0191	Description position of ① to ⑧ was changed.	CH
					SYSPR 04-0192	Changed Message screen at (d).	CH
					SYSPR 04-0231	Table item was changed to center.	CH
					SYSPR 04-0260	Line was corrected.	CR
					SYSPR 04-0300	Changed (17) and (a).	CH
					SYSPR 04-0310	Added (h) – (n).	AD
					SYSPR 04-0320	Changed procedure number.	CH
					SYSPR 04-0330	Changed (v).	CH
					SYSPR 04-0331, SYSPR 04-0332	These pages were newly added.	AD
					SYSPR 04-0340	Style of text was corrected.	CR
					ADD 01-0110	The annotation of “subsystem down” was added.	AD
						(3) was moved to ADD 01-0120.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0120	The annotation of "subsystem down" was added.	AD
						(3) was moved from ADD 01-0110.	AD
						(4) was deleted. (5), (6) → (4), (5)	DL/CH
					ADD 01-0410	"(Port Information)" was added to (1).	AD
					ADD 01-0490 to ADD 01-0830	Renumbering and the procedure of the adding subsystem was chagned.	CH
					ADD 01-0501, ADD 01-0502, ADD 01-0840, ADD 01-0850, ADD 01-0860, ADD 01-0870, ADD 01-0880, ADD 01-0890, ADD 01-0900, ADD 01-0910	These pages were deleted.	DL
					ADD 01-0660	Text of (2) was changed.	CH
					ADD 01-0690	*1 was added in Figure 1.6.4.	AD
					ADD 01-0700	PTH #2 and PATH #3 were added in figure.	AD
					ADD 01-0710	PTH #2 and PATH #3 were added in Figure 1.6.8.	AD
					ADD 01-0780	Description of (1) was changed.	CH
						Description of (a) was changed. ((The ALM LED (red) on the ….))	CH
					ADD 01-0750, ADD 01-0780, ADD 01-0790, ADD 01-0800	Description was changed.	CH
					ADD 01-0820	Description of (1-3) and (a) were changed.	CH
					ADD 02-0030, ADD 02-0050, ADD 02-0070	Figure size was changed.	CH
					ADD 02-0090	Procedure of "Do the preparatory ... necessary." was moved after Work-2 as Work-3.	CH
						Procedure of "Subtracting the additional subsystem to the rack frame." was deleted.	DL
					ADD 02-0150	Description of "Subtracting a FC Interface Board" was added.	AD
						"2.4.6" → "2.4.7"	CH
					ADD 02-0151	"2.4.7" → "2.4.8"	CH
					ADD 02-0230, ADD 02-0250	Font size of "Further, it is recommended to" in figure was corrected.	CR
					ADD 02-0290, ADD 02-0300	Line of text and NOTE was corrected.	CR
					ADD 02-0292	"2.4.7" → "2.4.8"	CH
						(18) was moved to page ADD 02-0293.	DL
					ADD 02-0293	(18) was moved from page ADD 02-0292.	AD
						Figure 2.4.5 was moved from ADD 02-0294.	AD
					ADD 02-0294	Figure 2.4.5 was moved to ADD 02-0293.	DL
						Figure 2.4.5.1 and Table 2.4.2 were moved from ADD 02-0295.	AD
					ADD 02-0295	Figure 2.4.5.1 and Table 2.4.2 were moved to ADD 02-0294.	DL
						Description of "Subtracting a FC Interface Board" was added.	AD
					ADD 02-0296	Description of "Subtracting a FC Interface Board" was added.	AD
					ADD 02-0297, ADD 02-0298	Description of "Subtracting a FC Interface Board" was added. (New pages)	AD
					ADD 02-0300	"2.4.6" → "2.4.7"	CH
					ADD 02-0310	"2.4.7" → "2.4.8"	CH
					TRBL 04-0090	WEB screen was changed.	CH
					TRBL 04-0091	WEB screen was added.	AD
					TRBL 04-0170	Reference page of text was changed.	CH
					TRBL 04-0250, TRBL 04-0260	"2006" was added in footer.	AD
					TRBL 05-0000, TRBL 05-0010	"FC interface board" was corrected to "FC Interface Board".	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-0010	Description of No.18 was changed.	CH
						Reference page of No.19 to No.22 were changed.	CH
						No.23 was moved to page TRBL 06-0011.	DL
					TRBL 06-0011	No.23 was moved from page TRBL 06-0010.	AD
						Reference page of No.23 to No.25 were changed.	CH
					TRBL 06-0030	"Pull out the …" and "Insert the …" was added to description.	AD
					TRBL 06-0040	"Turn of the …" was added to period.	AD
					TRBL 06-0050	Reference page of *3 was changed.	CH
					TRBL 06-0400	Description was added to NOTE.	AD
					TRBL 06-0401	‡1 was added.	AD
						491.9 G byte was added in Table 6.1.2.	AD
						AMS1000 was moved to page TRBL 06-0402.	DL
					TRBL 06-0402	AMS1000 was moved from page TRBL 06-0401.	AD
						Table 6.1.3 was moved to page TRBL 06-0405.	DL
					TRBL 06-0403	This page was newly added. (Figure 6.1.1 was added.)	AD
					TRBL 06-0404	This page was newly added. (Figure 6.1.2 was added.)	AD
					TRBL 06-0405	This page was newly added. (Table 6.1.3 was moved from page TRBL 06-0402. 491.9 G byte was added in Table 6.1.3.)	AD
					TRBL 06-0406	This page was newly added. (AMS1000 of Table 6.1.3 was added.)	AD
					TRBL 06-0407	This page was newly added. (Figure 6.1.3 was added.)	AD
					TRBL 06-0408	This page was newly added. (Figure 6.1.4 was added.)	AD
					SYSPR 03-0293, SYSPR 03-0294	Font of description and window of figure were changed.	CH
					SYSPR 03-0294	Number of figure was changed to Figure 3.3.2.	CH
					TRBL 06-0641, TRBL 06-0650, TRBL 06-0660	Figure size was changed.	CH
					TRBL 06-0641	"At the time of the Loop failure …" was moved to page TRBL 06-0642.	DL
					TRBL 06-0642	"At the time of the Loop failure …" was moved from page TRBL 06-0641.	AD
					TRBL 06-0660	"At the time of the Loop failure …" was moved to page TRBL 06-0661.	DL
					TRBL 06-0661	This page was newly added. ("At the time of the Loop failure …" was moved from page TRBL 06-0660.)	AD
					TRBL 06-0662	This page was newly added.	AD
					TRBL 06-1120 to TRBL 06-1440	Reedited due to adding the 6.1.21, 6.1.22 and 6.1.23. • Title of 6.1.16 was changed. • (1) and (2) were added in 6.1.15.	AD/CH
					TRBL 06-1121, TRBL 06-1122, TRBL 06-1123, TRBL 06-1124, TRBL 06-1125, TRBL 06-1126, TRBL 06-1127, TRBL 06-1128, TRBL 06-1131, TRBL 06-1132, TRBL 06-1133, TRBL 06-1134, TRBL 06-1135, TRBL 06-1136, TRBL 06-1137, TRBL 06-1138, TRBL 06-1161, TRBL 06-1162	These pages were deleted page.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-1250 to TRBL 06-1440	These pages were newly added.	AD
					TRBL 07-0020, TRBL 07-0030	Font size of "Do you need … " and "Can you collect …" in flow was corrected.	CR
					TRBL 07-0150, TRBL 07-0180, TRBL 07-0210	"refer to …" of text (b) was corrected to "Refer to …".	CR
					TRBL 07-0220	Line was corrected.	CR
					TRBL 07-0260	Table item was changed to center.	CH
					TRBL 07-0270	Item in table was added.	AD
					TRBL 08-0050, TRBL 08-0100, TRBL 08-0110, TRBL 08-0120, TRBL 08-0121	Reedited of flow.	CH
					TRBL 08-0130	Description of "Does the ALARM LED …" in flow was corrected.	CR
					TRBL 08-0280	Description position of "Reference page" was moved.	CH
					TRBL 08-0330	Symbol was changed.	CH
					TRBL 09-0000	Font size of No.4 was corrected.	CR
						No.12 was moved to page TRBL 09-0010.	DL
					TRBL 09-0010	No.12 was moved from page TRBL 09-0000.	AD
					TRBL 09-0040	Font size of No.4 was corrected.	CR
					TRBL 09-0050	Table size was changed.	CH
					TRBL 09-0060	Font size of No.3 was corrected.	CR
					TRBL 10-0020	Reference item was added to text.	AD
					TRBL 10-0020 to TRBL 10-0041	Reedited due to "Remarks" was deleted and table size was changed.	CH/DL
					TRBL 10-0130	Description of "Outline of function" of Drive maintenance was changed.	CH
					TRBL 10-0140	Table size was changed.	CH
					TRBL 10-0340	Description was added to the test of (4).	AD
						Description of "Data Reconstruction" was changed.	CH
					TRBL 10-0350	Number was corrected.	CR
					MSG 01-0034, MSG 01-0040, MSG 01-0060	Figure size was changed.	CH
					MSG 03-0510	"Description" of HE100x and HE110x were changed.	CH
						HE120x was moved to page MSG 03-0520.	DL
					MSG 03-0520	HE120x was moved from page MSG 03-0510.	AD
						"Description" of HE120x and HE200x were changed.	CH
						Reference page of HE200x was changed.	CH
						④ was added to the "Recovery methods" of the HE21xy.	AD
						HF0100, HF0101 and HF0102 were moved to page MSG 03-0530.	DL
					MSG 03-0530	HF0100, HF0101 and HF0102 were moved from page MSG 03-0520.	AD
						HF010D, HF010E and HF010F were moved to page MSG 03-0540.	DL
					MSG 03-0540	HF010D, HF010E and HF010F were moved from page MSG 03-0530.	AD
						HF011A and HF011B were moved to page MSG 03-0550.	DL
					MSG 03-0550	HF011A and HF011B were moved from page MSG 03-0540.	AD
						HGA000 and HGA100 were moved to page MSG 03-0560.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0560	HGA000 and HGA100 were moved from page MSG 03-0550.	AD
						HH0A40 was moved to page MSG 03-0570.	DL
					MSG 03-0570	HH0A40 was moved from page MSG 03-0560.	AD
						HH1180 was moved to page MSG 03-0580.	DL
					MSG 03-0580	HH1180 was moved from page MSG 03-0570.	AD
					MSG 03-0680	Reference page of HH4E00 was changed.	CH
					MSG 04-0050	Reference page for the "Recovery methods ①"of I152xy was changed.	CH
					MSG 04-0100	Reference page for the "Recovery methods ①"of I1GU00 was changed.	CH
					MSG 04-0110	Reference page for the "Recovery methods ①"of I1301xy was changed.	CH
					MSG 04-0120	"Recovery methods" was added to I305xy.	AD
					MSG 04-0220	Reference page of I540xy was changed.	CH
					MSG 04-0280	Reference page of I5YH00 was changed.	CH
					MSG 04-0360	Reference page of I6200x was changed.	CH
					MSG 04-0370	Reference page of I6250x and I62900 were changed.	CH
					MSG 04-0380	"Description" of I6D300 was changed.	CH
					MSG 04-0390	Reference page of I6D500 was changed.	CH
					MSG 04-0480, MSG 04-0510, MSG 04-0560	"1.6.3" → "1.6.2"	CH
					MSG 04-0660	Reference page of I900xx was changed.	CH
					MSG 04-0670	Reference page of I906xx was changed.	CH
					MSG 04-0860	Reference page for the "Recovery methods ①"of IA3600 was changed.	CH
					MSG 04-0961	Reference page of IW0000 was changed.	CH
					MSG 04-0962	Reference page of IX0000 was changed.	CH
					MSG 05-0240	RKA for the "Recovery methods" of RBC000 was deleted.	DL
					MSG 06-0060	Reference page for the "Recovery methods ③"of W0F0xy was changed.	CH
					MSG 06-0070	Reference page for the "Recovery methods ①"of W0G0xy was changed.	CH
					MSG 06-0080	Reference page for the "Recovery methods ①"of W0G20x was changed.	CH
					MSG 06-0110	Reference page for the "Recovery methods ①"of W0H000 was changed.	CH
					MSG 06-0120	Reference page for the "Recovery methods ①"of W320xy was changed.	CH
					MSG 06-0130	Reference page for the "Recovery methods ①"of W325xy was changed.	CH
					MSG 06-0140	Reference page for the "Recovery methods ①"of W32Dxy was changed.	CH
					MSG 06-0150	Reference page for the "Recovery methods ①"of W335xy was changed.	CH
					MSG 06-0160	Reference page for the "Recovery methods ①"of W33D00 was changed.	CH
					MSG 06-0170	Reference page for the "Recovery methods ①"of W41000 was changed.	CH
					MSG 06-0190	*1 was added at "W48100".	AD
					MSG 06-0200	Reference page for the "Recovery methods ①"of W49100 was changed.	CH
					MSG 08-0170	Description of DMED800008 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0180, MSG 08-0190, MSG 08-0200, MSG 08-0220, MSG 08-0230, MSG 08-0240, MSG 08-0241	*1 was added to the description of "If this message appears again, …".	AD
					MSG 08-0180	DMEN03509E was moved to page MSG 08-0190.	DL
					MSG 08-0190	DMEN03509E was moved from page MSG 08-0180.	AD
						DMEN03528E and DMEN03529E were moved to page MSG 08-0200.	DL
					MSG 08-0200	DMEN03528E and DMEN03529E were moved from page MSG 08-0190.	AD
						Message of Ver.4.00 or later were added in DMEN03554E.	AD
						DMEN03564W to DMEN03588E were moved to page MSG 08-0210.	DL
					MSG 08-0210	DMEN03564W to DMEN03588E were moved from page MSG 08-0200.	AD
						"%s" was corrected to "x".	CR
						DMEN03639W to DMEN03645E were moved to page MSG 08-0220.	DL
					MSG 08-0220	DMEN03639W to DMEN03645E were moved from page MSG 08-0210.	AD
						"%s" was corrected to "x".	CR
						DMEN03690W was added.	AD
						DMEN03804E to DMEN03814E were moved to page MSG 08-0230.	DL
					MSG 08-0230	DMEN03804E to DMEN03814E were moved from page MSG 08-0220.	AD
						DMEN03828E to DMEN03832E were moved to page MSG 08-0240.	DL
					MSG 08-0240	DMEN03828E to DMEN03832E were moved from page MSG 08-0230.	AD
						DMEN04011E to DMEN04019E were moved to page MSG 08-0241.	DL
					MSG 08-0241	This page was newly added. (DMEN04011E to DMEN04019E were moved from page MSG 08-0240.)	AD
					MSG 08-0242	This page was newly added.	AD
					MSG 09-0180	"Recovery methods" was changed.	CH
					MSG 09-0370	Description of DMED800008 was changed.	CH
						800014 was moved to page MSG 09-0380.	DL
					MSG 09-0380	800014 was moved from page MSG 09-0370.	AD
					REP 01-0030	Reference item was to text.	AD
						Figure was deleted.	DL
					REP 02-0010	Line of No.11 was changed.	CH
					REP 02-0011	Part No. was changed.	CH
					REP 02-0020, REP 02-0040, REP 02-0440, REP 02-0590, REP 02-0800, REP 02-0860, REP 02-0930, REP 02-1020, REP 02-1021, REP 02-1060, REP 02-1110, REP 02-1120, REP 02-1130, REP 02-1140, REP 02-1210	Figure size was changed.	CH
					REP 02-0090, REP 02-0100, REP 02-0110, REP 02-0120, REP 02-0160, REP 02-0170, REP 02-0190	‡1 → *1 (or ‡ → *)	CR
					REP 02-0141	"disk drive" of ① in figure was corrected to "Disk Drive".	CR
					REP 02-0150	‡1 and ‡2 were deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0200	"disk drive" of text was corrected to "Disk Drive".	CR
					REP 02-0230, REP 02-0280, REP 02-0290, REP 02-0500, REP 02-0520, REP 02-0530, REP 02-0531, REP 02-1130, REP 02-1200	Line was changed.	CH
					REP 02-0230	Description was added to text.	AD
						Table 2.2.2 was moved to page REP 02-0231.	DL
					REP 02-0231	Table 2.2.2 was moved from page REP 02-0231.	AD
						491.9 G byte was added in Table 2.2.2.	AD
						AMS1000 of Correction copy and Copy back was moved to page REP 02-0232.	DL
					REP 02-0232	AMS1000 of Correction copy and Copy back was moved from page REP 02-0231.	AD
						491.9 G byte was added in Table 2.2.2.	AD
						Figure 2.2.2.2 was moved to page REP 02-0233.	DL
					REP 02-0233	This page was newly added. (Figure 2.2.2.2 was moved from page REP 02-0232.)	AD
					REP 02-0234	This page was newly added.	AD
					REP 02-0290	(l) and (m) were moved to page REP 02-0291.	DL
					REP 02-0291	(l) and (m) were moved from page REP 02-0290.	AD
					REP 02-0420	"NOTE:" of (j) was corrected to "NOTE .".	CR
					REP 02-0451	Figure was moved to center.	CH
					REP 02-0500	CAUTION and (f) were moved to page REP 02-510	DL
					REP 02-0510	CAUTION and (f) were moved from page REP 02-0500.	AD
					REP 02-0520	(h) and (i) were moved to page REP 02-0530.	DL
					REP 02-0530	(h) and (i) were moved from page REP 02-0520.	AD
						(q), (r) and (s) were moved to page REP 02-0531.	DL
					REP 02-0531	(q), (r) and (s) were moved from page REP 02-0530.	AD
					REP 02-0580	The description that referred to WEB was added to (t) of the procedure.	AD
					REP 02-0630	(s), (t) and (u) was moved to page REP 02-0631.	DL
					REP 02-0631	This page was newly added. ((s), (t) and (u) was moved from page REP 02-0630.)	AD
						The description that referred to WEB was added to (t) of the procedure.	AD
					REP 02-0632	This page was newly added.	AD
					REP 02-0650	The description that referred to WEB was added to (o) of the procedure.	AD
					REP 02-0680	"Collect Simple Trace" was added as newly (a).	AD
						(c) to (e) were moved to REP 02-0690.	DL
						(a), (b) → (b), (c)	CH
					REP 02-0690	(c) to (e) were moved from REP 02-0680.	AD
						(n) to (p) were moved to REP 02-0700.	DL
						(c) to (m) → (d) to (n)	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0700	(n) to (p) were moved from REP 02-0690.	AD
						(t) and (u) were moved to REP 02-0710.	DL
						(n) to (s) → (o) to (t)	CH
					REP 02-0710	(t) and (u) were moved from REP 02-0700.	AD
						(t) to (w) → (u) to (x)	CH
						Figure 2.2.8.4 was moved to REP 02-0711.	DL
					REP 02-0711	Figure 2.2.8.5 was moved to REP 02-0712.	DL
						Figure 2.2.8.4 was moved from REP 02-0710.	AD
					REP 02-0712	Figure 2.2.8.5 was moved from REP 02-0711.	AD
					REP 02-0720	"Collect Simple Trace" was added as newly (a).	AD
						(f) to (h) were moved to REP 02-0730.	DL
						(a) to (e) → (b) to (f)	CH
					REP 02-0730	(f) to (h) were moved from REP 02-0720.	AD
						(f) to (p) → (g) to (q)	CH
						(p) and (q) was moved to page REP 02-0740.	DL
					REP 02-0740	(p) and (q) was moved from page REP 02-0730.	AD
						(q) to (u) → (r) to (v)	CH
						(t) to (v) was moved to page REP 02-0741.	DL
					REP 02-0741	(t) to (v) was moved from page REP 02-0740.	AD
						(v) and (w) → (w) and (x)	CH
					REP 02-0750	"Collect Simple Trace" was added as newly (a).	AD
						(d) and (e) were moved to REP 02-0760.	DL
						(a) to (c) → (b) to (d)	CH
					REP 02-0760	(d) and (e) were moved from REP 02-0760.	AD
						(m) and (o) were moved to REP 02-0761.	DL
						(d) to (l) → (e) to (m)	CH
					REP 02-0761	(m) to (o) were moved from REP 02-0760.	AD
						(m) to (q) → (n) to (r)	CH
					REP 02-1190	The description of (h) of the procedure was added.	AD
					REP 02-1200	Figure 2.3.5 was moved to page REP 02-1201.	DL
					REP 02-1201	This page was newly added. (Figure 2.3.5 was moved from page REP 02-1200.)	AD
					REP 02-1202	This page was newly added.	AD
					REP 05-0000, REP 05-0010, REP 05-0020	Description position was changed.	CH
					REP 05-0000	"• Do not incinerate the battery pack …" was moved from page REP 05-0010.	AD
					REP 05-0010	"• Do not incinerate the battery pack …" was moved to page REP 05-0000.	DL
					WEB 02-0110	WEB screen was changed.	CH
					WEB 02-0111	WEB screen was added.	AD
					WEB 02-0170, WEB 02-0180 WEB 02-0250, WEB 02-0260	Line was changed.	CH
					WEB 02-0170	Description of NOTE was changed.	CH
						(3) was moved to page WEB 02-0180.	DL
					WEB 02-0180	(3) was moved from page WEB 02-0180.	AD
						(6) and (7) were moved to page WEB 02-0181.	DL
					WEB 02-0181	This page was newly added. ((6) and (7) were moved from page WEB 02-0180.)	AD
					WEB 02-0182	This page was newly added.	AD
					WEB 02-0240	Font of text of 2.11 was corrected.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0120	(2) was moved from page WEB 03-0130.	AD
					WEB 03-0130	(2) was moved to page WEB 03-0120.	DL
						(4) was moved from page WEB 03-0140.	AD
					WEB 03-0140	(4) was moved to page WEB 03-0130.	DL
						(5) and (6) were moved from page WEB 03-0150.	AD
						(7) was moved from page WEB 03-0160.	AD
					WEB 03-0150	(5) and (6) were moved to page WEB 03-0140.	DL
						(8), (9) and (10) were moved from page WEB 03-0160.	AD
					WEB 03-0160	(7) was moved to page WEB 03-0140.	DL
						(8), (9) and (10) were moved to page WEB 03-0150.	DL
					WEB 03-0370, WEB 03-0410	Font of window title was corrected.	CR
12	Apr.14.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.11→12	CH
					GENE 0130	Section 1.7 was added to Microprogram.	AD
						Section 3.7 was moved to page GENE 0140.	DL
					GENE 0140	Section 3.7 was moved from page GENE 0130.	AD
					MICRO 01-0211	Description of Table 1.4.1 was moved to page MICRO 01-0290.	DL
						(4-2) and (4-3) were moved from page MSG 01-0214.	AD
					MICRO 01-0212	Description of Table 1.4.1 was moved to page MICRO 01-0300.	DL
					MICRO 01-0213	Description of Table 1.4.1 was moved to page MICRO 01-0310.	DL
					MICRO 01-0214	(4-2) and (4-3) were moved to page MSG 01-0211.	DL
					MICRO 01-0213, MICRO 01-0214	These pages were deleted page.	DL
					MICRO 01-0290	Section 1.7 and Table 1.7.1 was added. (Table 1.4.1 → Table 1.7.1)	AD
					MICRO 01-0300	This page was newly added. (Table 1.4.1 → Table 1.7.1)	AD
					MICRO 01-0310	This page was newly added. (Table 1.4.1 → Table 1.7.1)	AD
					SYSPR 04-0020	"Maintenance Port IP Address Automatic Change Mode" was added.	AD
					SYSPR 04-0090 to SYSPR 04-0093	"When the microprogram is Ver.0735/B, Ver.0740/B or later and the Storage Navigator modular is Ver.3.53, Ver.4.01 or later" was added.	AD
					SYSPR 04-0094, SYSPR 04-0095, SYSPR 04-0096	"When the microprogram is Ver.0740/A, Ver.0731/A or later, less than Ver.0735/B and the Storage Navigator modular is Ver.4.00, Ver.3.00 or later, less than Ver.3.53" was moved.	AD
					SYSPR 04-0097, SYSPR 04-0098	These pages were newly added.	AD
					SYSPR 04-0100	"If "Maintenance Port IP…04-0090).)" was added at NOTE.	AD
					SYSPR 04-0150	Screen was added of SNM 3.53 or more than 4.01.	AD
					SYSPR 04-0160	NOTE was added.	AD
					MSG 04-0920	"TrueCopy Asynchronous" of IB1E00 was changed to "TrueCopy Extended Distance".	CH
					MSG 04-0963	Line of IXXXH00 was corrected.	CR
					MSG 08-0050	DMEA0011B5 and DMEA0011B6 were added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0051	This page was newly added. (DMEA0011B7, DMEA0011B8, DMEA0011B9, DMEA0011BA, DMEA0011BB and DMEA0011BC were added.)	AD
					MSG 08-0052	This page was newly added.	AD
					MSG 08-0140	DMED150015 was added.	AD
						DMED160015 was moved to page MSG 08-0150.	DL
					MSG 08-0150	DMED160015 was moved from page MSG 08-0140.	AD
						DMED190011 was added.	AD
						DMED1A0007was moved to page MSG 08-0160.	DL
					MSG 08-0160	DMED1A0007was moved from page MSG 08-0150.	AD
						DMED1B0008, DMED1B0009 and DMED1B000A were added.	AD
						DMED1C0009 to DMED1C000D were moved to page MSG 08-0161.	DL
					MSG 08-0161	DMED1C0009 to DMED1C000D were moved from page MSG 08-0160.	AD
						DMED1C003A to DMED1C003E were moved to page MSG 08-0162.	DL
					MSG 08-0162	DMED1C003A to DMED1C003E were moved from page MSG 08-0161.	AD
						DMED1E0001, DMED1E0002, DMED1E0010, DMED1E0011, DMED1E0012, DMED1E0014, DMED1E0015, DMED1E0016, and DMED1E0017 were added.	AD
						DMED3B0011 to DMED400009 were moved to page MSG 08-0170.	DL
					MSG 08-0170	DMED3B0011 to DMED400009 were moved from page MSG 08-0162.	AD
						DMED3B0015 was added.	AD
						DMED800002 to DMED800099 were moved to page MSG 08-0171.	DL
					MSG 08-0171	This page was newly added. (DMED800002 to DMED800099 were moved from page MSG 08-0170. DMED800030 was added.)	AD
					MSG 08-0172	This page was newly added.	AD
					MSG 09-0270 to MSG 09-0390	Reedited due to adding the Message code. • Message code (150015, 190011, 1B0008, 1B0009, 1B000A, 1E0001, 1E0002, 1E0010, 1E0011, 1E0012, 1E0014, 1E0015, 1E0016, 1E0017, 3B0015 and 800030)	AD/CH
					WEB 02-0111	"… is dispayed." of text was corrected to "… is displayed".	CR
13	Apr.26.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.12→13	CH
					GENE 0050	"convering" of text was corrected to "converting".	CR
					GENE 0110	Page number of 1.2.5 was changed.	CH
					SAFE 0040	Description of "Prevention of electric shocks" was changed.	CH
					SAFE 0130	"ADD 02-0301" of "• Touching heat sinks…" was changed to "ADD 02-0302".	CH
					THEO 03-0220	Description of Disk Drive capacity was changed.	CH
					THEO 04-0090	Description of (1) was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0030	Line was changed.	CH
						Subsection 1.2.5 was moved to page INST 01-0031.	DL
					INST 01-0031	This page was newly added. (Subsection 1.2.5 was moved from page INST 01-0030.)	AD
					INST 01-0032	This page was newly added.	AD
					MICRO 01-0110	The description and the image of ActiveX were added to (d).	AD
					MICRO 03-0000	Description of "Is there any blocked Disk Drive …" in the flow was added.	AD
						"Did the system copying start?(*" was moved tp page MICRO 03-0001.	DL
					MICRO 03-0001	This page was newly added. "Did the system copying start?(*" was moved from page MICRO 03-0000.	AD
					MICRO 03-0002	This page was newly added.	AD
					SYSPR 01-0010	Description of (b) was changed. (When it cannot be connected, …)	CH
						Title of Table 1.1.1 was added.	AD
					SYSPR 01-0020	Description is added to the "• Manual change of …".	AD
					SYSPR 03-0000	"LUns" of text was corrected to "LUs".	CR
					SYSPR 03-0120, SYSPR 03-0240, SYSPR 03-0310	Added was "Micro Ver.4.0B or later, SNM V4.03 or later" screen.	AD
					SYSPR 03-0140, SYSPR 03-0440	The numeric value of blocks capacity of system LU was changed.	CH
					SYSPR 03-0440	(1) was moved to page SYSPR 03-0450.	DL
					SYSPR 03-0450	(1) was moved from page SYSPR 03-0440.	AD
						(2) to (b) were moved to page SYSPR 03-0460.	DL
					SYSPR 03-0460	(2) to (b) were was moved from page SYSPR 03-0450.	AD
						(e) was moved to page SYSPR 03-0470.	DL
					SYSPR 03-0470	(e) was moved from page SYSPR 03-0460.	AD
						(3) was moved to page SYSPR 03-0471.	DL
					SYSPR 03-0471	This page was newly added. ((3) was moved from page SYSPR 03-0470.)	AD
					SYSPR 03-0472	This page was newly added.	AD
					SYSPR 04-0060, SYSPR 04-0098	Added was "Micro Ver.4.0B or later, SNM V4.03 or later" screen.	AD
					SYSPR 04-0300	"[When LAN is...]" was added.	AD
						(d) was moved to SYSPR 04-0310.	DL
					SYSPR 04-0310	(d) was moved from SYSPR 04-0300.	AD
					SYSPR 04-0332	A new content was added to the blank page.	AD
					SYSPR 04-0333, SYSPR 04-0334, SYSPR 04-0335, SYSPR 04-0336	These pages were newly added.	AD
					SYSPR 05-0060	Added was "Micro Ver.4.0B or later, SNM V4.03 or later" screen.	AD
					ADD 01-0490	(2) was moved to page ADD 01-0500.	DL
					ADD 01-0500	(2) was moved from page ADD 01-0490.	AD
						(d) was moved to page ADD 01-0510.	DL
					ADD 01-0510	(d) was moved from page ADD 01-0500.	AD
					ADD 01-0580	Link page was corrected. (INST 03-0520 → INST 03-0521)	CR
					ADD 01-0600, ADD 01-0610, ADD 01-0630, ADD 01-0640	Link page was corrected. (AD → ADD)	CR
					ADD 01-0660	Link page was corrected. (ADD 01-0790 → ADD 01-0750)	CR
					ADD 02-0292	Link page was corrected. (ADD 02-0295 → ADD 02-0294)	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 03-0020	Description of (c) was changed. (When it cannot be connected, ….)	CH
						Description is added to the "• Manual change of …".	AD
					TRBL 03-0060	Description of the AIX was added.	AD
						Table 3.3.2 was moved to TRBL 03-0070.	DL
					TRBL 03-0070	Table 3.3.2 was moved from TRBL 03-0070.	AD
						Description of the AIX was added.	AD
						Description of "Notice of ..." was moved to TRBL 03-0080.	DL
					TRBL 03-0080	Description of "Netscape Navigator 7.x..." was moved to TRBL 03-0090.	DL
						Description of "Notice of ..." was moved from TRBL 03-0070.	AD
					TRBL 03-0090	Description of (2) and (3) were moved to TRBL 03-0091.	DL
						Description of "Netscape Navigator 7.x..." was moved from TRBL 03-0090.	AD
					TRBL 03-0091	Description of (2) and (3) were moved from TRBL 03-0090. (This is new page)	AD
					TRBL 03-0092	Blank page was added.	AD
					TRBL 06-0401, TRBL 06-0402, TRBL 06-0405, TRBL 06-0406	"RIAD 6" in the Table was corrected to "RAID 6".	CR
					TRBL 06-1190	Line was changed.	CH
						No.38 to No.56 were moved to page TRBL 06-1191.	DL
					TRBL 06-1191	This page was newly added. (No.38 to No.56 were moved from page TRBL 06-1191.)	AD
					TRBL 06-1192	This page was newly added.	AD
					MSG 08-0160	DMED1A0029 was added.	AD
						DMED1C0007 and DMED1C0008 were moved to page MSG 08-0161.	DL
					MSG 08-0161	DMED1C0007 and DMED1C0008 were moved from page MSG 08-0160.	AD
					MSG 08-0162	DMED1E0013 was added.	AD
					MSG 09-0030	Recovery methods of "5/35 01" was deleted.	DL
					MSG 09-0310 to MSG 09-0410	Reedited due to adding the Message code. • 1A0029 and 1E0013 were added.	AD/CH
					MSG 09-0400, MSG 09-0410	These pages were newly added.	AD
					REP 02-0011	Description of No.14 was corrected.	CR
					REP 02-0012	"3724707-B" of No.5 was corrected to "3274707-B".	CR
						Part No. of No.6 was added.	AD
					REP 02-0090, REP 02-0110, REP 02-0160	Link page was corrected. (REP 02-0230 → REP 02-0231)	CR
					REP 02-0680, REP 02-0720, REP 02-0750	Link page was corrected. (REP 02-0710 → REP 02-0711, REP 02-0711 → REP 02-0712)	CR
					WEB 01-0000, WEB 01-0050	Description of the AIX was added.	AD
					WEB 02-0260	The description and the image of ActiveX were added to (2).	AD
						(4) was moved to WEB 02-0270.	DL
					WEB 02-0270	(4) was moved from WEB 02-0260.	AD
					WEB 03-0080	"[Reset a Faule]" was corrected to "[Reset a Fault]".	CR
					WEB 03-0280	(2) was moved to WEB 03-0281.	DL
					WEB 03-0281, WEB 03-0282	These page were newly added. (The description and the image of ActiveX were added to (2).)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
14	May.19.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.13→14	CH
					GENE 0140	ADD 01-0780 → ADD 01-0770	CH
					GENE 0200	WEB 01-0050 → WEB 01-0060	CH
					THEO 01-0000	"The SATA drive has…to maintain its quality." was deleted.	DL
					THEO 01-0010	"SATA Drive replacement for its limited life" was deleted.	DL
					THEO 04-0240	Description of the Copy backless was added.	AD
					THEO 04-0241, THEO 04-0242, THEO 04-0243, THEO 04-0244, THEO 04-0245, THEO 04-0246	Description of the Copy backless was added. (New page)	AD
					THEO 04-0250	(4) was moved to THEO 04-0254.	DL
						Description of the Copy backless was added.	AD
					THEO 04-0251, THEO 04-0252, THEO 04-0253	Description of the Copy backless was added. (New page)	AD
					THEO 04-0254	(4) was moved from THEO 04-0250. (New page)	AD
					INST 03-0012	(6) and (7) were added into Work-12.	AD
						"The work to require the data..." was moved to page INST 03-0013.	DL
					INST 03-0013	(2) was moved to page INST 03-0014.	DL
						"The work to require the data..." was moved from page INST 03-0012.	AD
					INST 03-0014	(2) was moved from page INST 03-0014.	AD
					INST 03-0100	Reference page of "INST 03-0013" was changed to "INST 03-0014".	CH
					MICRO 01-0010, MICRO 01-0210	Reference page was changed.	CH
					SYSPR 02-0080	Same Node Name Mode of Table 2.2.3 No.2 was changed.	CH
					SYSPR 02-0097	Same Node Name Mode of Table 2.2.6 No.2 was changed.	CH
					SYSPR 04-0020	Reference page of Table4.2.1 No.4 was changed.	CH
					SYSPR 04-0030	⑥ and *2 were added to No.6.	AD
					SYSPR 04-0090	Description of a Web connection and microprogram version were added to NOTE of (3-1).	AD
						NOTE of (a) was moved to SYSPR 04-0091.	DL
					SYSPR 04-0091	NOTE of (a) was moved from SYSPR 04-0090.	AD
					SYSPR 04-0093	"netstat.inf" screen was added.	AD
					SYSPR 04-0094	Description of a Web connection was added to NOTE of (3-2).	AD
					SYSPR 04-0095	This page was moved from SYSPR 04-0094.	AD
					SYSPR 04-0096	This page was moved from SYSPR 04-0095.	AD
					SYSPR 04-0097	This page was moved from SYSPR 04-0096.	AD
					SYSPR 04-0098	This page was moved from SYSPR 04-0097.	AD
					SYSPR 04-0100	This page was moved from SYSPR 04-0098.	AD
					SYSPR 04-0101	This page was changed to blank.	CH
					SYSPR 04-0102	This page was moved from SYSPR 04-0100.	AD
					SYSPR 04-0103	This page was moved from SYSPR 04-0101. (New page)	AD
					SYSPR 04-0104	This page was moved from SYSPR 04-0102. (New page)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 04-0120	Figure was added to (a).	AD
					SYSPR 04-0130	ⓔ was moved to SYSPR 04-0131.	DL
						(b) was moved to SYSPR 04-0132.	DL
					SYSPR 04-0131	ⓔ was moved from SYSPR 04-0130. (This page was newly added.)	AD
						Description of the Copy backless was added.	AD
					SYSPR 04-0132	(b) was moved from SYSPR 04-0130. (This page was newly added.)	AD
						Description of the Copy backless was added.	AD
					ADD 01-0110	(1) was changed.	CH
					ADD 01-0120	(4) was changed.	CH
					ADD 01-0160	Reference page was changed.	CH
					ADD 01-0230	(d) was added.	AD
					ADD 01-0230, ADD 01-0250, ADD 01-0260, ADD 01-0300, ADD 01-0320	"Setting of the Spare Disk Drive Active Mode" was added to "Setting the system information"	AD
					ADD 01-0490	Description of the panel was added.	AD
					ADD 01-0500	(e) to (g) were added.	AD
						(a) to (c) in (3) were moved to ADD 01-0510.	DL
					ADD 01-0510	(a) to (c) in (3) were moved from ADD 01-0500.	AD
						(e) to (i) were moved to ADD 01-0511.	DL
					ADD 01-0511	(e) to (i) were moved from ADD 01-0510. (This is New page)	AD
						(f) to (k) were added.	AD
					ADD 01-0512	(l) to (o) were added. (This is New page)	AD
					ADD 01-0520	(5) → (4)	CH
					ADD 01-0530	(6) → (5)	CH
						(6) was added to Work-9.	AD
					ADD 01-0540	(1) to (8) were added into Work-11.	AD
					ADD 01-0550	(7) → (6)	CH
						Procedure was added to Work-7 and Work-9.	AD
					ADD 01-0560	(1) to (8) were added into Work-15.	AD
					ADD 01-0570	Table 1.6.2 was changed.	CH
					ADD 01-0580 to ADD 01-0810	These pages were renumbered.	CH
					ADD 01-0820, ADD 01-0830	These pages were deleted. (Because of renumbering)	DL
					ADD 02-0000	Description of revision was added to (6).	AD
						Description of the Reference of System Parameter was added to annotation.	AD
					ADD 02-0020, ADD 02-0040, ADD 02-0060, ADD 02-0080	Description of Copy backless was added to annotation.	AD
					ADD 02-0090	(4) to (6) were added to Work-4.	AD
					ADD 02-0100	(4) to (6) were added to Work-5.	AD
					ADD 02-0180	Reference page was changed.	CH
					MSG 08-0051	DMEA0011BD was added.	AD
					MSG 08-0162	DMED1F0001 was added.	AD
						DMED30000A and DMED30000B were moved to page MSG 08-0170.	DL
					MSG 08-0170	DMED30000A and DMED30000B were moved from page MSG 08-0170.	AD
					MSG 09-0350	1F0001 was added.	AD
						200004 was moved to page MSG 09-0360.	DL
					MSG 09-0360	200004 was moved from page MSG 09-0350.	AD
						3B0015, 400001 and 400002 were moved to page MSG 09-0370.	DL
					MSG 09-0370	3B0015, 400001 and 400002 were moved from page MSG 09-0360.	AD
						400021, 400022 and 400023 were moved to page MSG 09-0380.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 09-0380	400021, 400022 and 40002 3were moved from page MSG 09-0370.	AD
						800008, 800009 and 800011 were moved to page MSG 09-0390.	DL
					MSG 09-0390	800008, 800009 and 800011 were moved from page MSG 09-0380.	AD
						800027, 800029 and 800030 were moved to page MSG 09-0400.	DL
					MSG 09-0400	800027, 800029 and 800030 were moved from page MSG 09-0390.	AD
					REP 02-0050	Description of Copy backless was added to annotation.	AD
						"Valiable" and "Fixed" were deleted.	DL
					REP 02-0210	‡1 was changed.	CH
					REP 02-0220	‡2 was changed.	CH
					REP 02-0431	Reference page was changed.	CH
					WEB 01-0030	Description of text was changed.	CH
						NOTE was added.	AD
					WEB 01-0040, WEB 01-0050	Description of automatic changed was added.	AD
					WEB 01-0050	Section 1.4 was moved to page WEB 01-0060.	DL
					WEB 01-0060	This page was newly added. (Section 1.4 was moved from page WEB 01-0050.)	AD
					WEB 01-0070	This page was newly added.	AD
14a	May.31.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.14→14a	CH
					SYSPR 04-0031	Description of "No 20" was added.	AD
					SYSPR 04-0390	Description of "(20)" was added.	AD
15	Jun.16.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.14→15	CH
					GENE 0100	"4.8" and "4.9" were added.	AD
					GENE 0130	1.4.1 to 1.4.4 were added in Microprogram.	AD
						1.7 was added in Microprogram.	AD
						Chapter 3. of System parameter was moved to page GENE 0140.	DL
					GENE 0140	Chapter 3. of System parameter was moved from page GENE 0130.	AD
						1.4.5 to 1..6 of System parameter were moved to page GENE 0150.	DL
					GENE 0150	1.4.5 to 1.6 of Addition/Subtraction…, were moved from page GENE 0140.	AD
					GENE 0160	Section 3.5 was added.	AD
						6.1.13 and 6.1.14 were moved to page GENE 0170.	DL
					GENE 0170	6.1.13 and 6.1.14 were moved from page GENE 0170.	AD
						"NAS unit" of 6.1.18 was corrected to "NAS Unit".	CR
						6.1.24 was added.	AD
						10.1.2 was moved to page GENE 0180.	DL
					GENE 0180	10.1.2 was moved from page GENE 0170.	AD
						Pages of the Chapter 7 of message were changed.	AD
					THEO 02-0010	"two parity groups" of RAID 6 in the Installation of the Write penalty was changed to "one parity group".	CH
					THEO 02-0040	"iSCSI (1000 Base-TX)"→"iSCSI (1000 Base-T)"	CH
					THEO 02-0050	"If the microprogram…to the previous version." was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 02-0060	Description of RKS in (a) was added.	AD
						"With RAID 5…" and "With RAID 6…" was moved to page THEO 02-0061.	DL
					THEO 02-0061	"With RAID 5…" and "With RAID 6…" were moved from page THEO 02-0060.	AD
					THEO 02-0062, THEO 02-0065	"number of rotation" → "rotational speed"	CH
					THEO 02-0063	Description of RKS in (a) was added.	AD
						"The Spare Disk Drives, …" was moved to page THEO 02-0064.	DL
					THEO 02-0064	"By using the …" and "The Spare Disk Drives, …" were moved from page THEO 02-0063.	AD
						(h) was moved to page THEO 02-0065.	DL
					THEO 02-0065	(h) was moved from page THEO 02-0064.	AD
					THEO 02-0080	"microprogram version 0730/A"→"microprogram version 0730/B"	CH
					THEO 02-0275, THEO 02-0293, THEO 02-0294, THEO 02-0295	"gbex (LANx)"→"gbex"	DL
					THEO 03-0020, THEO 03-0060, THEO 03-0081, THEO 03-0090, THEO 03-0130, THEO 03-0161, THEO 03-0180	"iSCSI (1000 Base-TX)"→"iSCSI (1000 Base-T)"	CH
					THEO 03-0220	"Revolution speed" → "Rotational speed"	CH
					THEO 04-0240	"FC Disk Drive" wad added.	AD
					THEO 04-0241	"number of rotation" → "rotational speed"	CH
					THEO 04-0242	(3-1) was moved to THEO 04-0243.	DL
						"Table 4.6.1" was added.	AD
					THEO 04-0243	(3-2) was moved to THEO 04-0244.	DL
						(3-1) was moved from THEO 04-0242.	AD
					THEO 04-0244	(b) was moved to THEO 04-0245.	DL
						(3-2) was moved from THEO 04-0243.	AD
						"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD
					THEO 04-0245	(c) and Table 4.6.2 were moved to THEO 04-0246.	DL
						Table 4.6.3 was moved to THEO 04-0247.	DL
						(b) was moved from THEO 04-0244.	AD
						"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD
					THEO 04-0246	Table 4.6.4 was moved to THEO 04-0247.	DL
						(c) was moved from THEO 04-0245.	AD
						"720 hours/month..." was added.	AD
						Table 4.6.2.1 was added.	AD
					THEO 04-0247	Table 4.6.3 was moved from THEO 04-0245. (New page)	AD
						Table 4.6.4 was moved from THEO 04-0246.	AD
						"720 hours/month..." was added.	AD
						Table 4.6.2.1 was added.	AD
					THEO 04-0248	New blank page was added.	AD
					THEO 04-0250	"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD
					THEO 04-0251	"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD
					THEO 04-0252	Table 4.6.6 was moved to THEO 04-0253.	DL
						Table 4.6.5.1 was added.	AD
						"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 04-0253	Table 4.6.6 was moved from THEO 04-0252.	AD
						"number of rotation" → "rotational speed"	CH
						"720 hours/month..." was added.	AD
					THEO 04-0380, THEO 04-0390, THEO 04-0400	"4.8" was added. (New page)	AD
					THEO 04-0410, THEO 04-0420, THEO 04-0430, THEO 04-0440, THEO 04-0460	"4.9" was added. (New page)	AD
					THEO 04-0470	New blank page was added.	AD
					INST 01-0050	Description of "DF700-RSD015F" and "DF700-RSD035F" were added.	AD
						"No 9" was moved to INST 01-0051.	DL
					INST 01-0051	"Table 1.3.2.1" was moved to INST 01-0052.	DL
						"No 9" was moved from INST 01-0050.	AD
					INST 01-0052	"Table 1.3.2.2" was moved to INST 01-0053.	DL
						"Table 1.3.2.1" was moved from INST 01-0051.	AD
					INST 01-0053	"Table 1.3.2.2" was moved from INST 01-0052. (New page)	AD
					INST 01-0054	Blank page was added. (New page)	AD
					INST 01-0270	Select screen image (Ver.3.10 or later) was added to (6).	AD
					INST 02-0170, INST 02-0171, INST 02-0172	"1" of "Disk Drive" in the Table was changed to "*2".	CH
					INST 03-0000	Description of (a) was changed.	CH
						Reference of Work-11of flow was changed.	CH
					INST 03-0011	Description of the construction of the NAS Modular system was added.	AD
						Description of Work-11 of flow was changed.	CH
						Description of ‡1 was changed.	CH
					INST 03-0012	Reference of the Work-12 of flow was changed.	CH
					INST 03-0013	Work-19 was added.	AD
					INST 03-0014	(2) was moved to page INST 03-0017.	DL
						Description of (c) was added.	AD
					INST 03-0015, INST 03-0016	This page was newly added. (Description of (c) was added.)	AD
					INST 03-0017	This page was newly added. ((2) was moved from page INST 03-0014.)	AD
					INST 03-0018	This page was newly added.	AD
					INST 03-0740, INST 03-0760	"gbex (LANx)"→"gbex"	DL
					MICRO 01-0010	Reference No. of 1.4 was changed.	CH
					MICRO 01-0010, MICRO 01-0210	Link page was corrected. (SYSPR 04-0102 → SYSPR 04-0100)	CR
					MICRO 01-0100	(1) → 1.4.1	CH
					MICRO 01-0110	(2) → 1.4.2	CH
						The item number was changed.	CH
					MICRO 01-0120, MICRO 01-0130, MICRO 01-0140	The item number was changed.	CH
					MICRO 01-0150	(3) → 1.4.3, (3-1) → (1)	CH
						Description of LU status was added to NOTE.	AD
						(c) was moved to MICRO 01-0160	DL
					MICRO 01-0160, MICRO 01-0170, MICRO 01-0180, MICRO 01-0181, MICRO 01-0182	Descriptions of (c) to (l) were relocated.	CH
					MICRO 01-0190	(3-2) → (2)	CH
					MICRO 01-0210	(3-3) → (3)	CH
					MICRO 01-0211	(4) → 1.4.4, (4-1) → (1), (4-2) → (2), (4-3) → (3), (4-4) → (4)	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MICRO 01-0290	Section 1.7 was added.	AD
						"1.8 Restrictions of the version …" was moved to page MICRO 01-0310.	DL
					MICRO 01-0300	Flow of 1.7 was added.	AD
						Table 1.8.1 was moved to page MICRO 01-0320.	DL
					MICRO 01-0310	Table was moved to page MICRO 01-0330.	DL
						"1.8 Restrictions of the version …" was moved from page MICRO 01-0290.	AD
					MICRO 01-0320	This page was newly added. (Table 1.8.1 was moved from page MICRO 01-0300.)	AD
					MICRO 01-0330	This page was newly added. (Table was moved from page MICRO 01-0310.)	AD
						"0735/A or later" → "0735/x – 0750/A or earlier"	CH
					MICRO 01-0340	"0750/A or later" was added.	AD
					SYSPR 01-0020	"(c)" was added.	AD
					SYSPR 02-0180	"(The maximum of … 0750/A or later)" was added at 2.4.	AD
					SYSPR 03-0100, SYSPR 03-0230	Description of LU status was added to NOTE.	AD
					SYSPR 03-0140	Description of "When ... respectively." was added to NOTE.	AD
					SYSPR 03-0280	Description of "When formatting ... download time." was moved from SYSPR 03-0290 to Table 3.3.4.	AD
					SYSPR 03-0290	Description of "When formatting ... download time." was moved to SYSPR 03-0280.	DL
						Description of "Prerequisites" was added.	AD
					SYSPR 03-0440	Description of the command device was added.	AD
					SYSPR 04-0020	⑥ was added to the contents of No.3.	AD
						Reference page of No.2 was changed.	CH
						No.5 was moved to page SYSPR 04-0030.	DL
					SYSPR 04-0030	No.5 was moved from page SYSPR 04-0020.	AD
						No.13, No.14 and No.15 was moved to page SYSPR 04-0031.	DL
					SYSPR 04-0031	No.13, No.14 and No.15 was moved from page SYSPR 04-0030.	AD
					SYSPR 04-0071 to SYSPR 04-0098	Reedited due to adding description of (3). • Table of SYSPR 04-0080 was moved. • Reference page was changed.	AD/CH
					SYSPR 04-0071, SYSPR 04-0072, SYSPR 04-0081, SYSPR 04-0082, SYSPR 04-0083, SYSPR 04-0084, SYSPR 04-0085, SYSPR 04-0086, SYSPR 04-0087, SYSPR 04-0088	These pages were newly added.	AD
					SYSPR 04-0090	It moved from page SYSPR 04-0098.	CH
					SYSPR 04-0091	It moved from page SYSPR 04-0100.	CH
					SYSPR 04-0092	It changed to the blank page.	CH
					SYSPR 04-0093, SYSPR 04-0094, SYSPR 04-0095, SYSPR 04-0096, SYSPR 04-0097, SYSPR 04-0098, SYSPR 04-0103, SYSPR 04-0104	These pages were deleted.	DL
					SYSPR 04-0100	It moved from page SYSPR 04-0102.	CH
					SYSPR 04-0101	It moved from page SYSPR 04-0103.	CH
					SYSPR 04-0102	It moved from page SYSPR 04-0104.	CH
					SYSPR 04-0131	"number of rotation" → "rotational speed"	CH
					SYSPR 04-0170	"④" was moved to SYSPR 04-0180.	DL

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					SYSPR 04-0180	"(c)" , "(d)" and "(e)" were moved to SYSPR 04-0190.	DL
						"④" was moved from SYSPR 04-0170.	AD
						The annotation was added to "④".	AD
					SYSPR 04-0190	"(f)" , "(g)" and "(h)" were moved to SYSPR 04-0191.	DL
						"(c)" , "(d)" and "(e)" were moved from SYSPR 04-0180.	AD
					SYSPR 04-0191	"(f)" , "(g)" and "(h)" were moved from SYSPR 04-0190. (New page)	AD
					SYSPR 04-0192	New blank page was added.	AD
					SYSPR 07-0020	Description of the Combination with Sun Cluster was added to the annotation #4.	AD
					ADD 01-0001	"microprogram version 0730/A"→"microprogram version 0730/B"	CH
					ADD 01-0160	Link page was corrected. (SYSPR 04-0102 → SYSPR 04-0100)	CR
					ADD 01-0230, ADD 01-0512	"number of rotation" → "rotational speed"	CH
					ADD 01-0510	(d) was moved to ADD 01-0511 as (e).	DL
						Description about "Final arrangement of the Disk Drives" was added to as (d).	AD
					ADD 01-0511	(g) was deleted.	DL
						(d) was moved from ADD 01-0510 as (e).	AD
						(e), (f) → (f), (g)	CH
						Description of "the subsystem power turned off" was added to (i).	AD
						(k) was moved to page ADD 01-0512.	DL
					ADD 01-0512	(k) was moved from page ADD 01-0511.	AD
					ADD 02-0020, ADD 02-0040, ADD 02-0060, ADD 02-0080	"number of rotation" → "rotational speed"	CH
					ADD 02-0180	Link page was corrected. (SYSPR 04-0102 → SYSPR 04-0100)	CR
					TRBL 02-0240	"gbex (LANx)"→"gbex"	DL
					TRBL 03-0030	"Widows 2000 and Windows XP" was added.	AD
					TRBL 03-0041, TRBL 03-0042	"(6)" was added. (New pages)	AD
					TRBL 03-0100	NOTE was added.	AD
						Description of flow was changed.	CH
					TRBL 03-0110	Section 3.5 was added.	AD
					TRBL 03-0120 to TRBL 03-0140	This page was newly added. (Description of 3.5 was added.)	AD
					TRBL 03-0150	This page was newly added.	AD
					TRBL 04-0090, TRBL 04-0091, TRBL 04-0092, TRBL 04-0280	Added was screen at Ver.0750/x or later.	AD
					TRBL 04-0271	IB1Z00, IB2000, IB2100 and IB2200 were added.	AD
					TRBL 06-0000	No.10, No.11 and No.12 were moved from page TRBL 06-0010.	AD
					TRBL 06-0010	No.10, No.11 and No.12 were moved to page TRBL 06-0000.	DL
						No.23, No.24 and No.25 were moved from page TRBL 06-0011.	AD
					TRBL 06-0011	No.23, No.24 and No.25 were moved to page TRBL 06-0010.	DL
						No.26 was added.	AD
					TRBL 06-0060	Descriptions of the condition of the forced parity correction were added.	AD
						Descriptions of "<Note...correction>" were moved to TRBL 06-0070.	DL
					TRBL 06-0070	Descriptions of "<Note...correction>" were moved from TRBL 06-0060.	AD
						Description of "When there ... afterwards" was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-1180	"NAS unit" of title was corrected to "NAS Unit".	CR
					TRBL 06-1190	Description of W0G20x and W320xy were changed.	CH
						Reference page was added.	AD
						W33700, W33800 and W33900 were moved to page TRBL 06-1191.	DL
					TRBL 06-1191	W33700, W33800 and W33900 were moved from page TRBL 06-1190.	AD
					TRBL 06-1220	[WEB Information Message display] was added.	AD
					TRBL 06-1311, TRBL 06-1312	These pages were newly added. (Description of 6.1.24 was added.)	AD
					MSG 04-0050, MSG 04-0100, MSG 04-0110	"6.1.18 … NAS unit …" of reference page was corrected to "6.1.18 … NAS Unit …".	CR
					MSG 04-0070, MSG 04-0080, MSG 04-0090, MSG 04-0400, MSG 04-0430, MSG 04-0460, MSG 04-0670, MSG 04-0890, MSG 04-0940, MSG 04-0961, MSG 04-0962, MSG 04-0963, MSG 04-1040	• LU # (0-2047) → LU # (0-4095) • RAID group # (0-44) → RAID group # (0-89) • Partition # (0-15) → Partition # (0-31)	CH
					MSG 04-0410 to MSG 04-0650	Reedited due to changing description of "Description" and "Recovery methods".	CH/AD
					MSG 04-0581, MSG 04-0582, MSG 04-0583, MSG 04-0584, MSG 04-0585, MSG 04-0586, MSG 04-0611, MSG 04-0612, MSG 04-0613, MSG 04-0614, MSG 04-0615, MSG 04-0616	These pages were newly added.	AD
					MSG 04-0890	③ was added to the "Recovery methods" of the IAPM00 and IAPN00.	AD
						IB110x and IB1200 were moved to page MSG 04-0900.	DL
					MSG 04-0900	IB110x and IB1200 were moved from page MSG 04-0890.	AD
						"Recovery methods ④,⑤" of IB1400 was moved to page MSG 04-0910.	DL
					MSG 04-0910	"Recovery methods ④,⑤" of IB1400 was moved from page MSG 04-0900.	AD
						IB1900 was moved to page MSG 04-0920.	DL
					MSG 04-0920	IB1900 was moved from page MSG 04-0910.	AD
						IB1E00 was moved to page MSG 04-0930.	DL
					MSG 04-0930	IB1E00 was moved from page MSG 04-0920.	AD
						IB1I0x was moved to page MSG 04-0940.	DL
					MSG 04-0940	IB1I0x was moved from page MSG 04-0930.	AD
					MSG 04-0950	IB1Y00 was added.	AD
					MSG 04-0960	IB1Z00, IB2000 and IB2100 were added.	AD
						IC0000 to IH0000 were moved to page MSG 04-0961.	DL
						IQ0000 was moved to page MSG 04-0962.	DL
					MSG 04-0961	IB2200 was added.	AD
						IC0000 to IH0000 were moved from page MSG 04-0960.	AD
						IR0000 to IV0000 were moved to page MSG 04-0962.	DL
						IW0000 was moved to page MSG 04-0963.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0962	IQ0000 was moved to page MSG 04-0961.	AD
						IR0000 to IV0000 were moved from page MSG 04-0961.	AD
						IX0000 to IXX900 were moved to page MSG 04-0963.	DL
						IXXA00, IXXB00 and IXXC00 were moved to page MSG 04-0964.	DL
					MSG 04-0963	IW0000 was moved from page MSG 04-0961.	DL
						IX0000 to IXX900 were moved from page MSG 04-0962.	AD
						IXXD00 to IY00HH were moved to page MSG 04-0964.	DL
					MSG 04-0964	IXXA00, IXXB00 and IXXC00 were moved from page MSG 04-0964.	AD
						IXXD00 to IY00HH were moved to page MSG 04-0963.	AD
					MSG 04-1090	"Recovery methods" of IZ0Cxy was moved from page MSG 04-1100.	AD
					MSG 04-1100	"Recovery methods" of IZ0Cxy was moved to page MSG 04-1090.	DL
						IZ0D00 was added.	AD
						IZY000 to IZY6AT were moved to page MSG 04-1110.	DL
					MSG 04-1110	IZY000 to IZY6AT were moved from page MSG 04-1100.	AD
						IZY7xy to IZY8AT were moved to page MSG 04-1120.	DL
					MSG 04-1120	IZY7xy to IZY8AT were moved from page MSG 04-1110.	AD
						IZY9xy to IZYE00 were moved to page MSG 04-1130.	DL
					MSG 04-1130	IZY9xy to IZYE00 were moved from page MSG 04-1120.	AD
						IZYF00 to IZYL00 were moved to page MSG 04-1140.	DL
					MSG 04-1140	IZYF00 to IZYL00 were moved from page MSG 04-1130.	AD
						IZYM0x to IZZ002 were moved to page MSG 04-1150.	DL
					MSG 04-1150	IZYM0x to IZZ002 were moved from page MSG 04-1140.	AD
						IZZ003 and IZZ004 were moved to page MSG 04-1160.	DL
					MSG 04-1160	This page was newly added. (IZZ003 and IZZ004 were moved from page MSG 04-1150.)	AD
					MSG 04-1170	This page was newly added.	AD
					MSG 05-0150	The number of the "Recovery methods" of R52400 was changed.	CH
					MSG 05-0160	The number of the "Recovery methods" of R52400 was changed.	CH
						R52500 was moved to page MSG 05-0161.	DL
					MSG 05-0161	R52500 was moved from page MSG 05-0160.	AD
						The number of the "Recovery methods" of R52500 was changed.	CH
						RA00xx to RA0414 were moved to page MSG 05-0168.	DL
					MSG 05-0162	R52700 and R52800 were added.	AD
						RA0415 was moved to page MSG 05-0168.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 05-0163	This page was newly added. (R52800 of "Recovery methods" was added.)	AD
					MSG 05-0164	This page was newly added. ("Recovery methods" of R52900 was added.)	AD
					MSG 05-0165	This page was newly added. (R52A00 was added.)	AD
					MSG 05-0166	This page was newly added. ("Recovery methods" of R52A00 was added.)	AD
					MSG 05-0167	This page was newly added. (R52B00 was added.)	AD
					MSG 05-0168	This page was newly added. ("Recovery methoda" R52B00 was added. RA00xx to RA0414 were moved from page MSG 05-0161. RA0415 was moved from page MSG 05-0162.)	AD
					MSG 06-0070, MSG 06-0080, MSG 06-0110, MSG 06-0120, MSG 06-0130, MSG 06-0140, MSG 06-0150, MSG 06-0160, MSG 06-0170, MSG 06-0200	"6.1.18 ... NAS unit ..." of reference page was corrected to "6.1.18 ... NAS Unit ...".	CR
					MSG 06-0110, MSG 06-0200, MSG 06-0210	• LU # (0-2047) → LU # (0-4095) • RAID group # (0-44) → RAID group # (0-89) • Partition # (0-15) → Partition # (0-31)	CH
					MSG 07-0000 to MSG 07-0210	Reedited due to adding and deleting message". • Adding message (Abnormal End Bad LBA In …, Abnormal End Bad LBA In START70M.DAT …, Abnormal End Check sum error …, Abnormal End Down Grade Install NG …, Abnormal End Downgrade Failed …, Abnormal End Upgrade Failed …, Microprogram download of ENC# in …) • Deleting message (Abnormal End Bad LBA In START600.DAT …, Abnormal End Program …, Complete Utility Program REV:, Drive mode parameter …, Utility start) • Changing of description (Abnormal End …) • Changing of description of message text (Complete …, Initial Setup …, Micro Update …, Partially Completed …)	CH/AD
					MSG 07-0120, MSG 07-0130, MSG 07-0140, MSG 07-0150, MSG 07-0160, MSG 07-0170, MSG 07-0180, MSG 07-0190	These pages were newly added.	AD
					MSG 08-0130	DMED0F0004 was deleted.	DL
						DMED100004 was moved from page MSG 08-0140.	AD
					MSG 08-0140	DMED100004 was moved to page MSG 08-0130.	DL
						DMED160015 and DMED160016 were moved from page MSG 08-0150.	AD
					MSG 08-0150	DMED160015 and DMED160016 were moved to page MSG 08-0140.	DL
						DMED1A0007 and DMED1A0008 were moved from page MSG 08-0160.	AD
					MSG 08-0160	DMED1A0007 and DMED1A0008 were moved to page MSG 08-0150.	DL
						DMED1A002A was added.	AD
						DMED1C0007 and DMED1C0008 were moved from page MSG 08-0161.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0161	DMED1C0007 and DMED1C0008 were moved to page MSG 08-0160.	DL
						DMED1C003A was moved from page MSG 08-0161.	AD
					MSG 08-0162	DMED1C003A was moved to page MSG 08-0161.	DL
						DMED1C0040 was added.	AD
					MSG 08-0170	DMED3B0016, DMED3B0018, DMED3B0019, DMED3B001A and DMED3B001B were added.	AD
						DMED400025 to DMED700002 were moved to page MSG 08-0171.	DL
					MSG 08-0171	DMED400025 to DMED700002 were moved from page MSG 08-0170.	AD
					MSG 08-0172 to MSG 08-0242	Reedited due to adding and deleting message". • Adding Storage Navigator Modular is Ver.5.00 or later message. (DMEN03503E, DMEN03505E, DMEN03506E, DMEN03521E, DMEN03528E, DMEN03559W, DMEN03592W, DMEN03597W, DMEN03645E, DMEN03801E, DMEN03802W, DMEN03803E, DMEN04007E, DMEN04008E, DMEN04013E and DMEN04014E) • Adding message (DMEN04020W)	AD/CH
					MSG 09-0310	1A002A was added.	AD
						1B0009 was moved to page MSG 09-0320.	DL
					MSG 09-0320	1B0009 was moved from page MSG 09-0310.	AD
					MSG 09-0350	1C0040 was added.	AD
					MSG 09-0370	3B0016, 3B0018, 3B0019, 3B001A and 3B001B were added.	AD
						400011 to 400015 were moved to page MSG 09-0380.	DL
					MSG 09-0380	400011 to 400015 were moved from page MSG 09-0370.	AD
						500001 to 800007 were moved to page MSG 09-0390.	DL
					MSG 09-0390	500001 to 800007 were moved from page MSG 09-0380.	AD
						80001A to 800026 were moved to page MSG 09-0400.	DL
					MSG 09-0400	80001A to 800026 were moved from page MSG 09-0390.	AD
					REP 02-0210	"number of rotation" → "rotational speed"	CH
					REP 02-0431	Link page was corrected. (SYSPR 04-0102 → SYSPR 04-0100)	CR
					WEB 02-0110, WEB 02-0111, WEB 02-0112, WEB 02-0280	Added was screen at Ver.0750/x or later.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
16	Jul.20.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.15→16	CH
					GENE 0050	"Table 3" was added.	AD
					GENE 0070	Chapter 13. was added.	AD
					GENE 0180	Chapter 13. was added.	AD
					SAFE 0140	"Since front bezels…other in their size (INST 01-0130)" was added.	AD
					SAFE 0150	Description of RKH was added to the "For the system Disk Drives …" and "Do not remove these …".	AD
					THEO 02-0010, THEO 02-0040, THEO 02-0050, THEO 02-0060, THEO 02-0063, THEO 02-0070, THEO 02-0080, THEO 04-0110, THEO 04-0160, THEO 04-0180, THEO 04-0181, THEO 04-0241, THEO 04-0244, THEO 04-0250, THEO 04-0260, THEO 04-0400, THEO 04-0440, THEO 04-0450, THEO 04-0460, THEO 05-0010	"or later" was corrected to "or more".	CR
					THEO 02-0040, THEO 02-0050	‡4 was added.	AD
					THEO 02-0060	‡3 was added.	AD
					THEO 02-0063	‡3 was added.	AD
					THEO 02-0210	"RKH" was added.	AD
					THEO 02-0275	"RKAJAT ×2" was added at Figure 2.5.6.	AD
					THEO 04-0070	Description about "Write-Through" was added to the Command execution.	AD
						Figure 4.3.1 was moved to THEO 04-0071.	DL
					THEO 04-0071	Figure 4.3.1 was moved from THEO 04-0070. (New page)	AD
						Description about "Write-Through" was added to the Figure 4.3.1.	AD
					THEO 04-0072	New blank page was added.	AD
					THEO 04-0180	"Function which can…0733/A-x or more." was added.	AD
					THEO 04-0240	Table 4.6.1 was moved to page THEO 04-0241.	DL
					THEO 04-0241	Table 4.6.1 was moved from page THEO 04-0240.	AD
					THEO 04-0290	Description of RKH was added at (4).	AD
					INST 01-0020, INST 01-0180, INST 01-0200, INST 01-0270, INST 01-0320	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR
					INST 01-0020	Changed figure at 1.2.2.	CH
					INST 01-0060	"RKXS" was added at No.4.	AD
					INST 01-0080	"In the case of one U7… and one RKAJ." was changed.	CH
					INST 01-0130	"RKH" was added.	AD
					INST 03-0710	Description of RKH was added at ‡1.	AD
					INST 03-0520, INST 03-0664	"RKH" was added.	AD
					INST 03-0581	Description of RKH was added at NOTE.	AD
					INST 03-0680	"(RKM/RKS+RKAJ)" was added at Figure title.	AD
					INST 03-0700	"(RKM/RKS+RKAJAT)" was added at Figure title.	AD
					INST 03-0740	Description of FC cable for the backup was added.	AD
					INST 03-0770	"RKH" was added at ‡1.	AD
					MICRO 01-0150, MICRO 01-0210, MICRO 01-0250, MICRO 01-0270, MICRO 01-0310, MICRO 01-0320, MICRO 01-0330, MICRO 01-0340	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MICRO 01-0250	(6) was moved to MICRO 01-0260.	DL
						(1) to (5) → (a) to (e)	CH
						(1) was newly added.	AD
					MICRO 01-0260	(10) and (11) were moved to MICRO 01-0270.	DL
						(6) was moved from MICRO 01-0250.	AD
						(6) to (9) → (f) to (i)	CH
					MICRO 01-0270	(14) to (16) were moved to MICRO 01-0280.	DL
						(10) and (11) were moved from MICRO 01-0260.	AD
						(10) to (13) → (j) to (m)	CH
					MICRO 01-0280	(18) to (22) were moved to MICRO 01-0181.	DL
						(14) to (16) were moved from MICRO 01-0270.	AD
						(14) to (17) → (n) to (q)	CH
					MICRO 01-0281	(18) to (22) were moved from MICRO 01-0280. (New page)	AD
						(18) to (22) → (r) to (v)	CH
					MICRO 01-0282	(2) was added. (New page)	AD
					MICRO 01-0290, MICRO 01-0300	LAN → LUN	CR
					SYSPR 01-0010, SYSPR 01-0100, SYSPR 02-0010, SYSPR 02-0050, SYSPR 02-0060, SYSPR 02-0080	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR
					SYSPR 02-0090, SYSPR 02-0094, SYSPR 02-0095, SYSPR 02-0098, SYSPR 02-0110, SYSPR 02-0130, SYSPR 02-0140, SYSPR 02-0180, SYSPR 02-0210	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR
					SYSPR 02-0100	NOTE was added.	AD
					SYSPR 03-0000, SYSPR 03-0010	Reference page of "Preparing of setting LU" was changed.	CH
					SYSPR 03-0080, SYSPR 03-0082, SYSPR 03-0090,	Reference of "When verifying RAID group [OK], . . ." was changed.	CH
					SYSPR 03-0120, SYSPR 03-0240, SYSPR 03-0291, SYSPR 03-0310, SYSPR 03-0440, SYSPR 03-0480, SYSPR 03-0520, SYSPR 03-0560	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR
					SYSPR 03-0140	Description of (1) was added.	AD
						NOTE was moved to SYSPR 03-0141.	DL
						Table and NOTE were moved to SYSPR 03-0142.	DL
					SYSPR 03-0141	Description of (2) was added.	AD
					SYSPR 03-0142	Table and NOTE were moved from SYSPR 03-0140.	AD
						Description of "When ... Host LUN (H-LUN)" was added to NOTE.	AD
						[Procedure ③-A] was moved to page SYSPR 03-0143.	DL
					SYSPR 03-0143	This page was newly added. ([Procedure ③-A] was moved from page SYSPR 03-0142.)	AD
					SYSPR 03-0144	This page was newly added.	AD
					SYSPR 03-0150	Description was added to (2).	AD
					SYSPR 03-0160	(i) was added.	AD
						(b) was moved to page SYSPR 03-0162.	DL
					SYSPR 03-0161	This page was newly added. ((ii) and (iii) were added.)	AD
					SYSPR 03-0162	This page was newly added. ((b) was moved to page SYSPR 03-0160.)	AD
					SYSPR 03-0170	Description of RKH was added at (i).	AD
					SYSPR 03-0290	Description about " during the NAS connection " was added to the prerequisites.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 03-0291	Figure number in the text was changed. (Figure 3.3.1 → Figure 3.3.2)	CH
					SYSPR 03-0293	Figure number was changed. (Figure 3.3.1 → Figure 3.3.2)	CH
					SYSPR 03-0294	Figure number was changed. (Figure 3.3.2 → Figure 3.3.3)	CH
					SYSPR 04-0020, SYSPR 04-0030, SYSPR 04-0031, SYSPR 04-0060, SYSPR 04-0070, SYSPR 04-0071, SYSPR 04-0080, SYSPR 04-0081, SYSPR 04-0082, SYSPR 04-0084, SYSPR 04-0085, SYSPR 04-0091, SYSPR 04-0100, SYSPR 04-0120, SYSPR 04-0130, SYSPR 04-0131, SYSPR 04-0132, SYSPR 04-0150, SYSPR 04-0192, SYSPR 04-0230, SYSPR 04-0260, SYSPR 04-0280, SYSPR 04-0360, SYSPR 04-0370, SYSPR 04-0390, SYSPR 05-0060, SYSPR 05-0080, SYSPR 06-0010, SYSPR 06-0030, SYSPR 06-0040	"or later" was corrected to "or more". "or earlier" was corrected to "or less". "earlier than" was corrected to "less than".	CR
					SYSPR 04-0070	Window of "V2.60 or more" was added.	AD
						Description about the annotation "1 was changed.	CH
					SYSPR 04-0150	Version name of window was corrected.	CR
					SYSPR 04-0160	Description of [LAN Information] was added.	AD
					ADD 01-0001, ADD 01-0230, ADD 01-0421, ADD 01-0431, ADD 01-0500, ADD 01-0512, ADD 02-0000, ADD 02-0020, ADD 02-0040, ADD 02-0060, ADD 02-0080	"or later" was corrected to "or more". "or earlier" was corrected to "or less".	CR
					ADD 01-0010, ADD 01-0040, ADD 01-0060, ADD 01-0070, ADD 01-0080, ADD 01-0190, ADD 01-0200, ADD 01-0240, ADD 01-0250, ADD 01-0280, ADD 01-0300, ADD 01-0391, ADD 01-0460	Description of RKH was added.	AD
					ADD 01-0050, ADD 01-0130	Independent two-port FC Interface Board was added at "RC Interface Board".	AD
					ADD 01-0071	Description of RKH of *2 was changed.	CH
					ADD 01-0201	*2 and *3 were deleted.	DL
					ADD 02-0130, ADD 02-0230, ADD 02-0250	Reference page of the reference item ([Procedure ③-A]) of Work ④ was changed.	CH
					ADD 02-0200, ADD 02-0220, ADD 02-0282, ADD 02-0292	Description of RKH was added.	AD
					TRBL 00-0000	"Chaper 13" was added.	AD
					TRBL 02-0150	*1 was changed.	CH
					TRBL 02-0180	*2 was changed.	CH
					TRBL 02-0210	"ID" → "Device ID"	CH
					TRBL 04-0091, TRBL 04-0280, TRBL 06-1420, TRBL 09-0000, TRBL 09-0040, TRBL 09-0060, TRBL 12-0000	"or later" was corrected to "or more". "or earlier" was corrected to "or less".	CR
					TRBL 04-0091, TRBL 04-0092, TRBL 04-0280	Microprogram Version "0750" → "0751".	CH
					TRBL 04-0271	IB230x and IB240x were added.	AD
					TRBL 04-0290	Recovery → Recover	CR
					TRBL 05-0000	"RKH" was added.	AD
					TRBL 06-1330	"RKH" was added.	AD
					TRBL 07-0290	"RKH" was added.	AD
					TRBL 09-0000, TRBL 09-0010	"Related part" in table was combined.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 13-0000 to TRBL 13-0070	These pages were newly added. (Chapter 13. was added.)	AD
					MSG 03-0420	RKH was added to “Recovery Method ①” of the HE020x.	AD
					MSG 03-0460	RKH was added to “Recovery Method ⑥-1” of the HE050x.	AD
					MSG 03-0830	RKH was added to “Recovery Method ①” of the HJ3800.	AD
					MSG 04-0270	RKH was added to “Recovery Method ⑥-1” of the I5YG00.	AD
					MSG 04-0690	RKH was added to “Recovery Method” of the IA1F0x.	AD
					MSG 04-0940	“or later” was corrected to “or more”.	CR
					MSG 04-0960 to MSG 0970	Reedited due to adding message”. • Adding message (IB230x and IB240x)	AD
					MSG 04-0965, MSG 04-0966	These pages were newly added.	AD
					MSG 05-0220	“Recovery Method ②” of the RB0800 was changed.	CH
						RB3500 and RB7000 were moved to page MSG 05-0230.	DL
					MSG 05-0230	RB3500 and RB7000 were moved from page MSG 05-0220.	AD
					MSG 08-0172, MSG 08-0180, MSG 08-0190, MSG 08-0200, MSG 08-0210, MSG 08-0220, MSG 08-0230, MSG 08-0241	“or later” was corrected to “or more”.	CR
					MSG 10-0010	No.329 was deleted.	DL
					REP 02-0000	Description of RKXS in the text was added.	AD
					REP 02-0060	Description of RKH in the text was added.	AD
					REP 02-0070	Description of RHH was added to the “For the system Disk Drives …” and “Do not remove these …” of the CAUTION.	AD
					REP 02-0210, REP 02-0220	“or later” was corrected to “or more”.	CR
					REP 02-0220	(c) was moved to page REP 02-0230.	DL
					REP 02-0230	(c) was moved from page REP 02-0220.	AD
						Description of RKH in the ‡1 was added.	AD
					REP 02-0240	Description about "Write-Through" was added to the annotation #1.	AD
					REP 03-0000	Description of RKH in the *2 was added.	AD
					PARTS 01-0330	DF700-RKH was added.	AD
					WEB 01-0040, WEB 01-0050, WEB 02-0110, WEB 02-0111, WEB 02-0240, WEB 02-0280, WEB 03-0370, WEB 03-0410	“or later” was corrected to “or more”. “or earlier” was corrected to “or less”.	CR
					WEB 02-0110, WEB 02-0111, WEB 02-0112	Microprogram Version “0750” → “0751”.	CH
					WEB 02-0280	Microprogram Version “0750” → “0751”.	CH
						Recovery → Recover	CR
					WEB 02-0290	Recovery → Recover	CR
					WEB 03-0010	RKH was added to (a).	AD
					WEB 03-0380	Description of (1) was deleted.	DL
						The item number was changed. ((a)→(1))	CH
					WEB 03-0390	The item number was changed. ((c)→(3))	CH
					WEB 03-0400	Description of (1) was deleted.	DL
					WEB 03-0410, WEB 03-0420	The item number was changed. ((a)→(1))	CH
17	Sep.25.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.16 → 17	CH
					GENE 0040	Description of the RKHE was added.	AD
					GENE 0050	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					GENE 0051	Description of the RKHE was added. (New page)	AD
					GENE 0052	New blank page was added.	AD
					GENE 0080	Chapter 12. was added to the Message.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					GENE 0130	"1.9" was added to Microprogram.	AD
						1.4.2 was replaced with 1.4.3, and 1.4.3 was replaced with 1.4.2.	CH
					GENE 0170	Title (Recovery method) of 6.1.20, 6.1.21, 6.1.22, 6.1.23 and 6.1.24 were changed.	CH
						6.1.25 and 6.1.26 were added.	AD
						Page of 6.2 was changed.	CH
						Chapter 10. to 10.1.2 were moved to page GENE 0180.	DL
					GENE 0180	Chapter 10. to 10.1.2 were moved from page GENE 0170.	AD
						Chapter 9. to Chapter 11. were moved to page GENE 0190.	DL
					GENE 0190	Chapter 9. to Chapter 11. were moved from page GENE 0180.	AD
						Chapter 12. was added.	AD
						REP 02-0041→ REP 02-0042	CH
						Chapter 3. to 3.3.2 were moved to page GENE 0200.	DL
					GENE 0200	Chapter 3. to 3.3.2 were moved from page GENE 0190.	AD
						2.11 to 2.13 were moved to page GENE 0210.	DL
					GENE 0210	2.11 to 2.13 were moved from page GENE 0200.	AD
					SAFE 0100, SAFE 0180	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					SAFE 0140	"When ... Front Bezel." was added.	AD
						"When ... plate." was moved to SAFE 0150.	DL
					SAFE 0150	"When ... plate." was moved from SAFE 0140.	AD
						"When ... moving them." was moved to SAFE 0160.	DL
					SAFE 0160	"When ... moving them." was moved from SAFE 0150.	AD
					THEO 02-0040	Description of the RKHE was added.	AD
						Description of RKM/RKS+RKAJAT+H2J was added.	AD
					THEO 02-0050, THEO 02-0060, THEO 02-0063, THEO 02-0070, THEO 02-0080	Description of the RKHE was added.	AD
					THEO 02-0090, THEO 02-0100, THEO 02-0110, THEO 02-0160	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					THEO 02-0120, THEO 02-0121	Description of "Major Components of the Floor Model" was divided to THEO 02-0120 and THEO 02-0121 (New page).	CH
					THEO 02-0122	New blank page was added.	AD
					THEO 03-0000, THEO 03-0001, THEO 03-0002	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					THEO 03-0020, THEO 03-0030, THEO 03-0040, THEO 03-0050	Description of RKM+RKAJAT+H2J was added.	AD
					THEO 03-0030, THEO 03-0070, THEO 03-0082, THEO 03-0100, THEO 03-0140, THEO 03-0162	The specification of the memory for the control was changed.	CH
					THEO 03-0060, THEO 03-0070, THEO 03-0080	Description of RKS+RKAJAT+H2J was added.	AD
					THEO 03-0080	Correction of blank cell.	CR
					THEO 03-0190	Description of the RKHE was added.	AD
					THEO 03-0200	Power requirements when the U7 rack was started were changed.	CH
					THEO 04-0070	"(However,...are excluded.)" was added.	AD
					THEO 04-0130	Description of P-002D-J312W was added to (2).	AD
					THEO 04-0181	(16) and (17) were added.	AD
					THEO 04-0182	(18) was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					THEO 04-0241	A part of Table 4.6.1.1 is deleted.	DL
					THEO 04-0242	A part of Table 4.6.1.1 is added.	AD
						"Operation specification" was changed.	CH
					THEO 05-0010	Description of P-002D-J312W was added to No.3.	AD
					THEO 05-0011	This page was deleted.	DL
					THEO 05-0020	Table was moved from THEO 05-0011. (New page)	AD
						21 to 23 were added to the table.	
					INST 01-0010	(4) → (5)	CH
						"(4) Installation of the adaptable microprogram" was added.	AD
					INST 01-0011	(5) to (7) → (6) to (8)	CH
					INST 01-0040	Description of RKM+RKAJAT+H2J was added.	AD
					INST 01-0050	Description of RKS+RKAJAT+H2J was added.	AD
						4 G bps Fibre Channel Interface Board was added to DF700-RSD1H5F.	AD
					INST 01-0051	No. 9→ No. 10	CH
					INST 01-0053, INST 01-0060	Description of the RKHE was added.	AD
					INST 01-0080, INST 01-0091, INST 01-0120, INST 01-0290	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					INST 01-0100, INST 01-0130	"When ... Front Bezel." was added.	AD
						Procedure for attachment was changed.	CH
					INST 01-0110	Figure 1.5.1 was changed.	CH
					INST 01-0140	Figure 1.5.3 was changed.	CH
					INST 01-0180, INST 01-0270	The screen for RKHE is added.	AD
					INST 01-0300	Descriptions of (10) and (11) were added.	AD
					INST 01-0340	"When stopping ... Storage Navigator Modular." was added to NOTE.	AD
						(c) and (d) were moved to INST 01-0341.	DL
					INST 01-0341	(c) and (d) were moved from INST 01-0340. (New page)	AD
					INST 01-0342	New blank page was added.	AD
					INST 01-0360	"When restarting ... Storage Navigator Modular." was added to NOTE.	AD
					INST 02-0020, INST 02-0030, INST 02-0040, INST 02-0050, INST 02-0171, INST 02-0250, INST 02-0320, INST 02-0360	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					INST 02-0050	Correction of blank cell.	CR
					INST 02-0280	Description of RKAJAT was added.	AD
					INST 02-0290	Description of RKM/RKS was added.	AD
					INST 02-0331	Description of "Floor (RKXS+RKAJAT+H2J) Model" was moved to INST 02-0332.	DL
						Description of "Floor (RKM/RKS+RKAJAT+H2J) Model" was added.	AD
					INST 02-0332	Description of "Floor (RKXS+RKAJAT+H2J) Model" was moved from INST 02-0331.	AD
					INST 03-0020, INST 03-0150, INST 03-0210, INST 03-0260, INST 03-0301, INST 03-0500, INST 03-0601, INST 03-0603	Correction of blank cell.	CR
					INST 03-0150, INST 03-0210, INST 03-0260	Description of the "Comment" and "Remarks" in table was changed.	CH
					INST 03-0601, INST 03-0603,	Description of the "Quantity" and "Comment" in table was changed.	CH
					INST 03-0501, INST 03-0581, INST 03-0640	Description of the RKHE was added.	AD
					MICRO 01-0000	"If new... update installation." was added.	AD
					MICRO 01-0010	Flowchart was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MICRO 01-0100	Added the READY LED blinking time (RKH: for the maximum of 40 to 60 minutes) at RKH.	AD
					MICRO 01-0110 to MICRO 01-0211	1.4.2 was replaced with 1.4.3, and 1.4.3 was replaced with 1.4.2.	CH
					MICRO 01-0171	(c) and (d) were moved from MICRO 01-0180. (new page)	AD
						Added the SNM screen.	AD
					MICRO 01-0172	(e) to (j) were moved from MICRO 01-0181. (new page)	AD
					MICRO 01-0173	(k) and (3) were moved from MICRO 01-0181. (new page)	AD
					MICRO 01-0174	New blank page was added.	AD
					MICRO 01-0180	(c) and (d) were moved to MICRO 01-0171.	DL
						"1.4.3" was moved from MICRO 01-0182.	AD
					MICRO 01-0181	(e) to (j) were moved to MICRO 01-0171.	DL
						(k) and (3) were moved to MICRO 01-0171.	DL
						This page was deleted.	DL
					MICRO 01-0182	"1.4.3" was moved to MICRO 01-0180.	DL
						This page was deleted.	DL
					MICRO 01-0240	Correction of blank cell.	CR
					MICRO 01-0340	Description of "0760/A or more" was added.	AD
					MICRO 01-0360	"1.9" was added. (new page)	AD
					MICRO 01-0370	New blank page was added.	AD
					MICRO 02-0000, MICRO 02-0010	Correction of blank cell.	CR
					SYSPR 02-0070, SYSPR 02-0096	Correction of blank cell.	CR
					SYSPR 03-0100	Description of [Conditions of deletion] was added.	AD
						(1) and (2) was moved to page SYSPR 03-0110.	DL
					SYSPR 03-0110	Description of [Conditions of deletion] was added.	AD
						(1) and (2) was moved from page SYSPR 03-0100.	AD
					SYSPR 03-0130	(d) was corrected to (4).	CR
					SYSPR 03-0142	"ShadowImage" was corrected to "ShadowImage in-system replication".	CR
					SYSPR 03-0170	Correction of blank cell.	CR
					SYSPR 03-0180	The value of "RAID 0" of SATA Drive was changed to hyphen (-).	CH
					SYSPR 03-0230	Description of [Conditions of deletion] was added.	AD
						(1) to (c) were moved to page SYSPR 03-0240.	DL
					SYSPR 03-0240	(1) to (c) were moved from page SYSPR 03-0230.	AD
						"• When there is a formatted LU exists" was moved to page SYSPR 03-0250.	DL
					SYSPR 03-0250	"• When there is a formatted LU exists" was moved from page SYSPR 03-0240.	AD
						(d) was moved to page SYSPR 03-0251.	DL
					SYSPR 03-0251	This page was newly added. ((d) was moved from page SYSPR 03-0250.)	AD
					SYSPR 03-0252	This page was newly added.	AD
					SYSPR 03-0280	"The format data, …6 LUs/Control Unit." and "Even when the…unit in the list view." were added.	AD
						Table 3.3.4 was moved to SYSPR 03-0281.	DL
					SYSPR 03-0281	This page was newly added. (Table 3.3.4 was moved from SYSPR 03-0280. "Prerequisites" was moved from SYSPR 03-0290.)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SYSPR 03-0282	This page was newly added. (NOTE was moved from page SYSPR 03-0290. Descriptions were added.)	AD
					SYSPR 03-0290	Descriptions were added.	AD
						"Prerequisites" was moved to SYSPR 03-0281.	DL
						NOTE was moved to page SYSPR 03-0282.	DL
					SYSPR 03-0560	"ShadowImage" was corrected to "ShadowImage in-system replication".	CR
					SYSPR 03-0570	"ShadowImage" was corrected to "ShadowImage in-system replication".	CR
						*5 was added.	AD
					SYSPR 04-0050	"Kind of parameter" was changed at No3.	CH
					SYSPR 04-0060	Description and NOTE were added to (c).	AD
						(d) was moved to page SYSPT 04-0061.	DL
					SYSPR 04-0061	(d) was moved from page SYSPT 04-0060.	AD
					SYSPR 04-0070	"(However,…are excluded.)" was added at No.2.	AD
					SYSPR 04-0071	"ShadowImage" of No.6 was corrected to "ShadowImage in-system replication".	CR
						"Kind of parameter" was changed at No8.	CH
					SYSPR 04-0130	A part of Table 4.2.2 is added.	AD
					SYSPR 04-0131	A part of Table 4.2.2 is deleted.	DL
						"Restrictions/Notes" was changed.	CH
					SYSPR 04-0230	The explanation was changed.	CH
						Note were moved to SYSPR 04-0231.	DL
					SYSPR 04-0231	"To terminate the setting,…" was deleted at (b).	DL
						Note were moved from SYSPR 04-0230.	AD
						*2 and *3 were added.	AD
					SYSPR 04-0232	Procedure (c), (d) were added.	AD
					SYSPR 05-0050	(d) was moved from page SYSPT 05-0060.	AD
					SYSPR 05-0060	(d) was moved to page SYSPT 05-0050.	AD
						Description was added to (f).	AD
					ADD 01-0001	(16) was added.	AD
					ADD 01-0060, ADD 01-0071	Correction of blank cell.	CR
					ADD 01-0410	The Note of (1) was changed, and annotation 1 was added.	CH/AD
						(6) and (7) were moved to ADD 01-0411.	DL
					ADD 01-0411	(6) and (7) were moved from ADD 01-0410.	AD
						(12) was moved to ADD 01-0412.	DL
					ADD 01-0412	Procedures (16) to (20) were added.	AD
						Figure 1.4.6 was moved to page ADD 01-0413.	DL
						(12) was moved from ADD 01-0411.	AD
					ADD 01-0413	Figure 1.4.6 was moved from page ADD 01-0412.	AD
						Figure 1.4.6.1 was moved to page ADD 01-0415.	DL
					ADD 01-0415	This page was newly added. (Table 1.4.2 was moved from ADD 01-0414)	AD
					ADD 01-0416	This page was newly added.	AD
					ADD 01-0421	The Note of (5) was changed, and annotation 1 was added.	CH/AD
					ADD 01-0431	The Note of (3) was changed, and annotation 1 was added.	CH/AD
					ADD 01-0440	"NOTE :The addition of … the Account Authentication." was added.	AD
					ADD 01-0760	Description of ‡1 was changed.	CH
					ADD 02-0040, ADD 02-0080	Description of ‡4 was changed.	CH
					ADD 02-0070	"itachi" of footer was corrected "Hitachi".	CR
					ADD 02-0150	Correction of blank cell.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 02-0291	The Note of (1) was changed, and annotation 1 was added.	CH/AD
						(7) was moved to ADD 02-0292.	DL
					ADD 02-0292	(7) was moved from ADD 02-0291.	AD
					ADD 02-0296, ADD 02-0301	The Note of (1) was changed, and annotation 1 was added.	CH/AD
					TRBL 01-0000	Description of the RKHE was added.	AD
					TRBL 02-0070	Description were added in the "Function" of 7-g and 7-i.	AD
						7-m-1, 7-m-2 and 7-m-3 were moved to page TRBL 02-0080.	DL
					TRBL 02-0080	7-m-1, 7-m-2 and 7-m-3 were moved from page TRBL 02-0070.	AD
					TRBL 02-0134	Description were added in the "Function" of 7-f and 7-h.	AD
					TRBL 02-0140	Description were added in the "Function" of 7-i and 7-k.	AD
						7-p-1, 7-p-2 and 7-p-3 were moved to page TRBL 02-0141.	DL
					TRBL 02-0141	7-p-1, 7-p-2 and 7-p-3 were moved from page TRBL 02-0140.	AD
					TRBL 02-0271	IB250x was added.	AD
					TRBL 03-0060	Correction of blank cell.	CR
					TRBL 06-0010	Title (Recovery method) of 6.1.20, 6.1.21, 6.1.22and 6.1.23 of "Reference page" were changed.	CH
					TRBL 06-0011	Title (Recovery method) of 6.1.24 of "Reference page" was changed.	CH
						No.27 and No.28 were added.	AD
					TRBL 06-0050	Reference page of *3 was changed.	CH
					TRBL 06-0090	"SnapShot" of No.6 was corrected to "Copy-on-write SnapShot".	CR
					TRBL 06-0320, TRBL 06-1410	Correction of blank cell.	CR
					TRBL 06-1170	Description of *3 was changed.	CH
					TRBL 06-1220	Description of *2 was corrected. ("TrueCopy remote replication" etc..)	CR
					TRBL 06-1230, TRBL 06-1260, TRBL 06-1290, TRBL 06-1311	Title was changed. (Recovery method…)	CH
					TRBL 06-1240, TRBL 06-1270	Description of *1 was changed.	CH
					TRBL 06-1250, TRBL 06-1280	Description of *4 was changed.	CH
					TRBL 06-1313 to TRBL 06-1318	These pages were newly added. (Description of 6.1.25 was added.)	AD
					TRBL 06-1320	Descriptions of 6.1.26 were added.	AD
						Descriptions of 6.2 were moved to page TRBL 06-1340.	DL
					TRBL 06-1330	Descriptions of 6.1.26 were added.	AD
						(b) of 6.2 were moved to page TRBL 06-1350.	DL
					TRBL 06-1331	This page was newly added. (Description of 6.1.26 was added.)	AD
					TRBL 06-1332	This page was newly added.	AD
					TRBL 06-1340	Descriptions of 6.2 were moved from page TRBL 06-1320.	AD
						(5), (6) and (7) were moved to page TRBL 06-1351.	DL
					TRBL 06-1350	(b) of 6.2 were moved from page TRBL 06-1330.	AD
						(8), (9) and (10) were moved to page TRBL 06-1352.	DL
					TRBL 06-1351	This page was newly added. ((5), (6) and (7) were moved from page TRBL 06-1340.)	AD
					TRBL 06-1352	This page was newly added. ((8), (9) and (10) were moved from page TRBL 06-1350.)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-1410	Description of RKS/RKXS was added in the “Failure symptom” of No.4	AD
						No.7 was moved to page TRBL 06-1420.	DL
					TRBL 06-1420	No.7 was moved from page TRBL 06-1410.	AD
					TRBL 06-1421	This page was newly added. (No.21 was added.)	AD
					TRBL 06-1422	This page was newly added.	AD
					TRBL 08-0151, TRBL 08-0320, TRBL 08-0330	Correction of blank cell.	CR
					TRBL 08-0151	*1 was deleted.	DL
					TRBL 08-0200	No.4 was added. (Item number changes followed.)	AD/CH
						No.8 and No.9 were moved to page TRBL 08-0201.	DL
					TRBL 08-0201	This page was newly added. (No.8 and No.9 were moved from page TRBL 08-0202.)	AD
					TRBL 08-0202	This page was newly added.	AD
					TRBL 08-0210	Description of RKXS was added to annotation #4.	AD
					TRBL 08-0220	Description of *6 was changed.	CH
					TRBL 09-0000	Description of P-002D-J312W was added to No.3.	AD
					TRBL 09-0010	21 to 23 were added to the table.	AD
					TRBL 09-0041	20 to 22 were added to the table.	AD
					MSG 00-0000	Chapter 12. was added.	AD
					MSG 03-0090	Description of the “Recovery methods” of H40400 was changed.	CH
					MSG 03-0100	Descriptions of the “Recovery methods” of H40900, H40E00 and H40J00 were changed.	CH
						H40L00 and H40M00 were moved to page MSG 03-0110.	DL
					MSG 03-0110	H40L00 and H40M00 were moved from page MSG 03-0100.	AD
						Descriptions of the “Recovery methods” of H40P00 and H40U00 were changed.	CH
					MSG 03-0170	Descriptions of the “Recovery methods” of H42S00 and H42X00 were changed.	CH
					MSG 03-0200	Descriptions of the “Recovery methods” of H43N00 and H43P00 were changed.	CH
					MSG 03-0210	H44900 was moved from page MSG 03-0220.	AD
						Descriptions of the “Recovery methods” of H44800 and H44900 were changed.	CH
					MSG 03-0220	H44900 was moved to page MSG 03-0210.	DL
						Descriptions of the “Recovery methods” of H44A00 to H46300 were changed.	CH
					MSG 03-0290	Description of the “Recovery methods” of H51R00 was changed.	CH
					MSG 03-0320	Numbers of the “Recovery methods” of HA0531 and HA0532 were changed.	CH
					MSG 03-0360	Descriptions of the “Recovery methods” of HD2C00 to HD2F00 were changed.	CH
					MSG 03-0380	Description of the “Recovery methods” of HD4100 was changed.	CH
					MSG 03-0390	Descriptions of the “Recovery methods” of HD4A00 to HD4D00 were changed.	CH
					MSG 03-0420	Numbers of the “Recovery methods” of HE0100 to HE02HH were changed.	CH
						“Recovery methods⑤” of HE02HH was moved to page MSG 03-0430.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0430	"Recovery methods⑤" of HE02HH was moved to page MSG 03-0430.	DL
						Numbers of the "Recovery methods" of HE030x and HE03HH were changed.	CH
					MSG 03-0500	Numbers of the "Recovery methods" of HE0Bxy and HE0BHH were changed.	CH
					MSG 03-0510	Numbers of the "Recovery methods" of HE0B0x to HE0E00 were changed.	CH
					MSG 03-0520	Title (Recover method …) of the reference item of HE200x was changed.	CH
					MSG 03-0610	Description of the "Recovery methods" of HH2100 was changed.	CH
						"Modular Volume Migration" was added in the "Description" of HH2900.	AD
						HH2B00 was moved to page MSG 03-0620.	DL
					MSG 03-0620	HH2B00 was moved from page MSG 03-0610.	AD
						Numbers of the "Recovery methods" of HH2B00 and HH2C00 were changed.	CH
						HH2D00 was moved to page MSG 03-0630.	DL
					MSG 03-0630	HH2D00 was moved from page MSG 03-0620.	AD
					MSG 03-0640	Numbers of the "Recovery methods" of HH2N00 and HH2P00 were changed.	CH
					MSG 03-0650	Numbers of the "Recovery methods" of HH30xx and HH31xx were changed.	CH
					MSG 03-0690	Line was added in the "Recovery methods" of HH550x	AD
					MSG 03-0751, MSG 03-0752, MSG 03-0761, MSG 03-0762, MSG 03-0771, MSG 03-0772	These pages were deleted.	DL
					MSG 03-0760 to MSG 0970	Reedited due to changing of "Recovery methods" and adding of message. • Changing of Numbers of "Recovery methods" message. (HH7T00, HH7V00, HH8F00, HJ36xy, HJ3800, HJ3900, HNA30x, HNA4xy, HNA5xy, HZ0M00, HZ0Pxx00) • Changing of "Recovery methods" message. (HH8E00, HL010x, • Adding message. (HH8G00, HJ3Bxy, HJ3Cxy • Description of *1 was changed.	CH/AD
					MSG 03-0920, MSG 03-0930, MSG 03-0940, MSG 03-0950, MSG 03-0960, MSG 03-0970	These pages were newly added.	AD
					MSG 04-0090	"Collect the error" and "Recovery methods" of I1GE00 was changed.	CH
					MSG 04-0110	I1GV00, I1GW00 and I1GX00 were added.	AD
						I30200 to I304HH were moved to page MSG 04-0120.	DL
					MSG 04-0120	I30200 to I304HH were moved from page MSG 04-0110.	AD
						I410xy and I410HH were moved to page MSG 04-0130.	DL
					MSG 04-0130	I410xy and I410HH were moved from page MSG 04-0120.	AD
						I413xy and I413HH were moved to page MSG 04-0140.	DL
					MSG 04-0140	I413xy and I413HH were moved from page MSG 04-0130.	AD
						I416xy and I416HH were moved to page MSG 04-0150.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0150	I416xy and I416HH were moved from page MSG 04-0140.	AD
					MSG 04-0210	I53A00 was moved to page MSG 04-0212.	DL
					MSG 04-0211	This page was newly added. (I5390x was added.)	AD
					MSG 04-0212	This page was newly added. (I53A00 was moved from page MSG 04-0210. I540xy and I540HH were moved to page MSG 04-0220.)	AD
					MSG 04-0220	I540xy and I540HH were moved to page MSG 04-0212.	DL
						I5FC00 was moved from page MSG 04-0230.	AD
					MSG 04-0230	I5FC00 was moved to page MSG 04-0220.	DL
						Numbers of the “Recovery methods” of I5FD00 was changed.	CH
						I5FF0x was added	AD
					MSG 04-0280	Title (Recover method …) of the reference item of I5YH00 was changed.	CH
					MSG 04-0350	I61E00 was moved from page MSG 04-0360.	AD
					MSG 04-0360	I61E00 was moved to page MSG 04-0350.	DL
						Description of RKS/RKXS was added in the “Description” of I62300.	AD
					MSG 04-0470	I6ER00 and I6ES00 were added.	AD
						I70000 was moved to page MSG 04-0480.	DL
					MSG 04-0471	This page was newly added. (I6ET0x was added.)	AD
					MSG 04-0472	This page was newly added. (I6EU0x was added.)	AD
					MSG 04-0473	This page was newly added. (“Recovery methods” of I6EU0x was added.)	AD
					MSG 04-0474	This page was newly added.	AD
					MSG 04-0480	I70000 was moved from page MSG 04-0470.	AD
						“Recovery methods ③” of I70000 was moved to page MSG 04-0490.	DL
					MSG 04-0490	“Recovery methods ③” of I70000 was moved from page MSG 04-0480.	AD
						“Recovery methods ③” of I70100 was moved to page MSG 04-0500.	DL
					MSG 04-0500	“Recovery methods ③” of I70100 was moved from page MSG 04-0490.	AD
					MSG 04-0780	Description of footer was corrected to Hitachi, Ltd.	CR
					MSG 04-0790 to MSG 0830	Reedited due to changing of “Recovery methods”. • Changing of Numbers of “Recovery methods” message. (IA2J0x, IA2K0x, IA2V00, IA2X00, IA2Y00, IA2Z00)	CH/AD
					MSG 04-0870	Numbers of the “Recovery methods” of IA3900 and IA3A00 were changed.	CH
					MSG 04-0880	Numbers of the “Recovery methods” of IA4A0x was changed.	CH
					MSG 04-0890	Numbers of the “Recovery methods” of IAPN00 and IAPN00 were changed.	CH
						Description of *1 was changed.	CH
					MSG 04-0930	“SnapShot” of IB1F00 was corrected to “Copy-on-write SnapShot”.	CR
					MSG 04-0950	Numbers of the “Recovery methods” of IB1T00 and IB1U00 were changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0960	Title (Recover method …) of the reference item of IB2100 was changed.	CH
					MSG 04-0962	IB250x was added.	AD
						IC0000 to IG0000 were moved to page MSG 04-0963.	DL
					MSG 04-0963	IC0000 to IG0000 were moved from page MSG 04-0962.	AD
						IR0000 to IU0000 were moved to page MSG 04-0964.	DL
					MSG 04-0964	IR0000 to IU0000 were moved from page MSG 04-0963.	AD
						IX0000 to IXX700 were moved to page MSG 04-0965.	DL
					MSG 04-0965	IX0000 to IXX700 were moved from page MSG 04-0964.	AD
						IXXD00 to IXXH00 were moved to page MSG 04-0966.	DL
					MSG 04-0966	IXXD00 to IXXH00 were moved from page MSG 04-0965.	AD
					MSG 04-1040	IY3000 was moved to page MSG 04-1041.	DL
					MSG 04-1041	This page was newly added (IY3000 was moved from page MSG 04-1040. IY3100 was added.)	AD
					MSG 04-1042	This page was newly added	AD
					MSG 04-1050	Numbers of the “Recovery methods” of IZ03xy and IZ03HH were changed.	CH
					MSG 04-1060	Numbers of the “Recovery methods ①-6” of IZ03xy and IZ03HH were changed.	CH
					MSG 04-1070	“Recovery methods ⑤” of IZ0Axy and IZ0AHH was deleted. Item number changes followed.	DL/CH
					MSG 04-1080	“Recovery methods” of IZ0Axy and IZ0AHH was item number changes.	CH
					MSG 04-1150, MSG 04-1160, MSG 04-1170	“itachi” of footer was corrected “Hitachi”.	CR
					MSG 05-0020	Correction of blank cell.	CR
					MSG 05-0070 to MSG 05-0110	Reedited due to changing of “Recovery methods”. • Changing of “Recovery methods” message. (R40300, R40600, R40P00)	CH
					MSG 05-0150 to MSG 05-0430	Reedited due to adding of message and changing of “Recovery methods”. • Changing of “Recovery methods” message. (R5230x) • Adding message. (R52C00, R52D00, R52E00, R52F00) • Changing of Numbers of “Recovery methods” message. (RBEQ00, RBER00, RBES00, RBET00, RBEV00, RBEW00)	CH/AD
					MSG 05-0161, MSG 05-0162, MSG 05-0163, MSG 05-0164, MSG 05-0165, MSG 05-0166, MSG 05-0167, MSG 05-0168	These pages were deleted.	DL
					MSG 05-0300 to MSG 05-0430	These pages were newly added.	AD
					MSG 06-0070	Correction of blank cell.	CR
					MSG 06-0210	“Description” of W49800 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 07-0000 to MSG 07-0014	Reedited due to adding of message and *1. • Adding message. (“Abnormal End Down grade install NG (Account Authentication Feature is Installed)”, “Abnormal End Down grade install NG [Modular Volume Migration feature is installed]”, “Abnormal End Down grade install NG [Modular Volume Migration has already taken place]”) • *1 was added to Abnormal End Config Clear. …	AD/CH
					MSG 07-0011, MSG 07-0012, MSG 07-0013, MSG 07-0014	These pages were newly added.	AD
					MSG 07-0070 to MSG 07-0090	Reedited due to adding of message and *1. • Adding message. (“Abnormal End Down Grade Install NG [TrueCopy remote replication feature is installed]”) • *1 was added to Abnormal End File Remove Failed.	AD/CH
					MSG 07-0071, MSG 07-0072	These pages were newly added.	AD
					MSG 08-0050 to MSG 08-0174	Reedited due to adding of message and changing of description. • Adding message. (DMEA0011B1, DMEA0011B2, DMEA0011B3, DMEA0011B4, DMEA0011BE, DMEA002000, DMEA002001, DMEA002002, DMEC002136, DMEC002137, DMEC002138, DMEC002139, DMEC002140, DMEC002141, DMED130004, DMED1C0041, DMED1F0010, DMED1F0011, DMED1F0012, DMED1F0013, DMED1F0014, DMED1F0015, DMED1F0017, DMED1F0018, DMED1F0019, DMED1F0020, DMED1F0021, DMED1F0022, DMED1F0023, DMED1F0024, DMED1F0025, DMED1F0026, DMED1F0027, DMED1F0028, DMED1F0029, DMED1F002A, DMED1F002B, DMED1F002C, DMED1F002D, DMED1F002E, DMED1F002F, DMED1F0030, DMED1F0031, DMED200011, DMED200012, DMED200013, DMED200014, DMED200015, DMED200016, DMED200017, DMED200018, DMED200019, DMED20001A, DMED20001B, DMED20001C, DMED20001D, DMED20001E, DMED20001F, DMED200020, DMED200021, DMED200022, DMED200023, DMED200024, DMED200025, DMED200026, DMED200027, DMED200028, DMED200029, DMED20002A, DMED20002B, DMED20002C, DMED3B0014, DMED3B001C, DMED3B001D, DMED3B001E, DMED3B001F DMEG000101, DMEG000102, DMEG000103, DMEG000201, DMEG000203, DMEG000204, DMEG000205)	AD/CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 08-0050 to MSG 08-0174	Reedited due to adding of message and changing of description. • Adding message. (DMEG000206, DMEG000207, DMEG000208, DMEG000209, DMEG000210, DMEG000211, DMEG000212, DMES019625, DMES019626, DMES019627, DMES019628) • Changing description message.. (DMED050001, DMED070007, DMED0B0001, DMED0C0001, DMED0C0002, DMED0D0001, DMED0E0001, DMED0F0001, DMED100001,) DMED1A000F, DMED1A0029, DMED1E0014, DMED1E0015, DMED1E0016)	AD/CH
					MSG 08-0163, MSG 08-0164, MSG 08-0173, MSG 08-0174	These pages were newly added.	AD
					MSG 08-0250	DMES019625, DMES019626, DMES019627 and DMES019628 were added.	AD
						DMES02959A to DMES031102 were moved to page MSG 08-0260.	DL
					MSG 08-0260	DMES02959A to DMES031102 were moved from page MSG 08-0250.	AD
						DMES04A000 to DMES04EA02 were moved to page MSG 08-0270.	DL
					MSG 08-0270	DMES04A000 to DMES04EA02 were moved from page MSG 08-0260.	AD
						DMES052000 to DMES052500 were moved to page MSG 08-0280.	DL
					MSG 08-0280	DMES052000 to DMES052500 were moved from page MSG 08-0270.	AD
						DMES059555 to DMES059559 were moved to page MSG 08-0290.	DL
					MSG 08-0290	DMES059555 to DMES059559 were moved from page MSG 08-0280.	AD
						DMES059615 to DMES059617 were moved to page MSG 08-0300.	DL
					MSG 08-0300	DMES059615 to DMES059617 were moved from page MSG 08-0290.	AD
					MSG 09-0080	"Description" of 95 56 was changed.	CH
					MSG 09-0120 to MSG 09-0180	Reedited due to adding of sense code and changing "Recovery methods". • Adding sense code. (96 25, 96 26, 96 27, 96 28 and 96 29)	AD/CH
					MSG 09-0200 to MSG 09-0370	Reedited due to adding of message and changing of description. • Changing SNM indication message. (050001, 070007, 0B0001, 0C0001, 0C0002, 0D0001, 0E0001, 0F0001, 100001, 1A000F, 1A0029, 1E0014, 1E0015, 1E0016, 200003, 200004, 200005, 3B0014) • Changing of "Recovery methods" message. (08000A, 08000B, 08000E, 09000C, 09001E, 090022) • Adding message. (130004, 1C0041, 1F0010, 1F0011, 1F0012, 1F0013, 1F0014, 1F0015, 1F0017, 1F0018, 1F0019, 1F0020, 1F0021, 1F0022, 1F0023, 1F0024, 1F0025, 1F0026, 1F0027, 1F0028, 1F0029, 1F002A, 1F002B, 1F002C, 1F002D, 1F002E, 1F002F, 1F0030, 1F0031, 200011)	AD/CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 09-0200 to MSG 09-0370	Reedited due to adding of message and changing of description. • Adding message. (200012, 200013, 200014, 200015, 200016, 200017, 200018, 200019, 20001A, 20001B, 20001C, 20001D, 20001E, 20001F, 200020, 200021, 200022, 200023, 200024, 200025, 200026, 200027, 200028, 200029, 20002A, 20002B, 20002C, 3B001C, 3B001D, 3B001E, 3B001F)	AD/CH
					MSG 09-0300	Description of "Recovery methods" of 1A0028 was changed.	CH
					MSG 09-0310	Description of "Recovery methods" of 1A0005, 1A0006, 1A0007 and 1A0008 were changed.	CH
					MSG 09-0351, MSG 09-0352, MSG 09-0353, MSG 09-0354	These pages were newly added.	AD
					MSG 11-0010	This page was newly added.	AD
					MSG 12-0000 to MSG 12-0030	These pages were newly added. (Descriptions of Chapter 12. were added.)	AD
					REP 01-0040, REP 01-0090	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					REP 01-0061, REP 01-0062	Description of "Indication Name (Floor Model)" was divided to REP 01-0061 and REP 01-0062.	CH
					REP 02-0010, REP 02-0390, REP 02-0420, REP 02-0470, REP 02-0510, REP 02-0530 REP 02-0010, REP 02-0390, REP 02-0420, REP 02-0470, REP 02-0510, REP 02-0530	Description of the RKHE was added.	AD
					REP 02-0011	F700 → 700, F600 → 600	CR
						Correction of blank cell.	CR
					REP 02-0040, REP 02-0041	Description of "Replaceable Part Locations of Floor Model (H2J)" was divided to REP 02-0040 and REP 02-0042.	CH
					REP 02-0041	Description of "2.1.3" was moved to REP 02-0042.	DL
					REP 02-0042	Description of "2.1.3" from moved to REP 02-0041.	AD
					REP 02-0280	Description about the recovering was added to (m).	AD
						Description of (q) was changed to the description of the RKNAS connection.	CH
					REP 02-0290	Description about the recovering was added to (k).	AD
					REP 02-0291	Description of (o) was changed to the description of the RKNAS connection.	CH
					REP 02-0331	Description about the recovering was added to (g).	AD
						Description of (j) was changed to the description of the RKNAS connection.	CH
					REP 02-0380	Description about the recovering was added to (i).	AD
						Description of (l) was changed to the description of the RKNAS connection.	CH
					REP 02-0400	Description of RST LED was added in the No.2 of "Restriction".	AD
						Title of (1-1) and (1-2) was changed.	CH
					REP 02-0410, REP 02-0460	Description of RST LED was added.	AD
					REP 02-0430, REP 02-0480, REP 02-0580, REP 02-0630, REP 02-0700, REP 02-0740	Description of *1 was changed.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0431, REP 02-0490	Description of RKH was added.	AD
					REP 02-0500, REP 02-0520	Description of EALM LED and RST LED in the (a) was added.	AD
					REP 02-0511, REEP 02-0531	(v) → (w)	CH
						Descriptions of (u) and (w) were added.	AD
						Description of (w) was changed to the description of the RKNAS connection.	CH
					REP 02-0650	Description about the recovering was added to (l).	AD
						Description of (o) was changed to the description of the RKNAS connection.	CH
					REP 02-0761	Description about the recovering was added to (p).	AD
						Description of (r) was changed to the description of the RKNAS connection.	CH
					REP 02-0820	(i) and (j) were moved to REP 02-0821.	DL
						Description about the recovering was added to (h).	AD
					REP 02-0821	(i) and (j) were moved from REP 02-0820 (New page was added).	AD
						Description of (i) was changed to (k).	CH
						Description of (i) was added.	AD
						Description of (j) was changed to the description of the RKNAS connection.	CH
					REP 02-0822	New blank page was added.	AD
					REP 02-0900	Description about the recovering was added to (j).	AD
						Description of (l) was changed to the description of the RKNAS connection.	CH
					REP 02-0940	Description about the recovering was added to (h).	AD
					REP 02-0941	Description of (j) was changed to the description of the RKNAS connection.	CH
					REP 02-0970	Description of LED was added to (k).	AD
						Description of (k) was changed to (n).	CH
						Description of (l) was changed to the description of the RKNAS connection.	CH
					REP 02-1010	Description about the recovering was added to (j).	AD
						Description of (l) was changed to the description of the RKNAS connection.	CH
					REP 03-0000, REP 03-0010, REP 03-0020, REP 03-0030	Description of RKM/RKS+RKAJAT+H2J was added.	AD
					REP 04-0000	Correction of blank cell.	CR
					PARTS 01-0010, PARTS 01-0011	Description of the RKHE was added.	AD
						Description of RKM/RKS+RKAJAT+H2J was added.	AD
					PARTS 01-0101, PARTS 01-0102, PARTS 01-0103	Description of the RKHE was added.	AD
					PARTS 01-0130	The number of ENC cables (1m) was changed.	CH
					PARTS 01-0190	Remarks of FAN ASSEMBLY were added.	AD
						The number of ENC cables (0.5m) was changed.	CH
					PARTS 01-0250, PARTS 01-0260, PARTS 01-0270, PARTS 01-0280, PARTS 01-0290, PARTS 01-0300, PARTS 01-0310, PARTS 01-0320, PARTS 01-0330, PARTS 01-0340, PARTS 01-0350, PARTS 01-0360, PARTS 01-0370, PARTS 01-0380	Description of RKM/RKS+RKAJAT+H2J was added and pages were renumbered. (PARTS 01-0350 to PARTS 01-0380 were new pages.)	AD/CH
					WEB 01-0000	Correction of blank cell.	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0000	Added the READY LED blinking time (RKH: for the maximum of 40 to 60 minutes) at RKH.	AD
					WEB 03-0190	Description was added to ‡2.	AD
17a	Oct.27.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.17 → 17a	CH
					GENE 0180	10.2.13 was added.	AD
					THEO 04-0181	Type of P-002D-J316W was added.	AD
					THEO 05-0020	Type of P-002D-J316W was added.	AD
					ADD 01-0110	The attention sentence of the work procedure was changed.	CH
					ADD 02-0090	It was changed since Work-5 to "Subtracting optional components" and "Installing host computer".	CH
					ADD 02-0120	The under line was added to the annotation.	CH
					TRBL 09-0010	Type of P-002D-J316W was added.	AD
					TRBL 09-0070	"Modular Volume Migration" of No.6 was added.	AD
					TRBL 10-0510	Descriptions of 10.2.13 were added.	AD
					TRBL 10-0520, TRBL 10-0530	These pages were newly added. (Descriptions of 10.2.13 were added.)	AD
18	Dec.26.2006	N.Higashijima /A.Hirasawa	N.Higashijima /A.Hirasawa	Y.Uchiyama /M.Sato	GENE 0000	Rev.17a → 18	CH
					GENE 0130	Page of 1.4.4 of Microprogram was changed.	CH
					GENE 0150	Pages of 2.4.5, 2.4.6, 2.4.7, 2.4.8, 2.5, 2.5.1 and 2.5.2 were changed.	CH
					GENE 0170	6.1.27 was added.	AD
						9.1.3 and 9.2 were moved to page GENE 0180.	DL
					GENE 0180	9.1.3 and 9.2 were moved from page GENE 0170.	AD
					GENE 0190	2.2.14 and 2.3.7 were added.	AD
					SAFE 0090	REP 02-1041, REP 02-1043 and REP 02-1240 were added.	AD
					SAFE 0130, SAFE 0150	Subtracting pages were changed.	CH
					SAFE 0140	Subtracting pages were changed.	CH
						REP 02-1041, REP 02-1043 and REP 02-1240 were added.	AD
					THEO 02-0040	Description of the RKA was added in ‡2.	AD
					THEO 02-0063, THEO 02-0090, THEO 02-0192, THEO 02-0193, THEO 02-0196, THEO 02-0200, THEO 02-0210, THEO 02-0250, THEO 02-0310	Description of the RKA was added.	AD
					THEO 02-0100, THEO 02-0170, THEO 02-0191, THEO 02-0260, THEO 02-0275, THEO 02-0280, THEO 02-0293	RKA was added to the figure.	AD
					THEO 02-0180, THEO 02-0190, THEO 02-0194, THEO 02-0195, THEO 02-0221	"Backup Battery Unit #0" of the contents of figure was changed to "Backup Battery Unit (ASSY)".	CR
					THEO 02-0192, THEO 02-0196	Number was added to the "Backup Battery Unit" in the figure.	AD
					THEO 02-0300	Numbers were changed on the Figure.	CH
					THEO 03-0010	Description of the RKA was added to (a).	AD
					THEO 03-0011	Description of the RKA was added to (d).	AD
					THEO 03-0012	Description of the RKA was added to (a).	AD
					THEO 03-0013	Description of the RKA was added to (d).	AD
					THEO 03-0014	Description of the RKA was added to (a).	AD
					THEO 03-0015	Description of the RKA was added to (d).	AD
					THEO 03-0090, THEO 03-0100, THEO 03-0110, THEO 03-0180, THEO 03-0190, THEO 03-0200	Description of the RKA was added.	AD

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					THEO 04-0020, THEO 04-0030, THEO 04-0040, THEO 04-0041, THEO 04-0042, THEO 04-0043	Description of the RKA was added.	AD
					THEO 04-0182	(19) was added.	AD
					THEO 04-0220	Description of ""The data... completed." was added to (2).	AD
					THEO 04-0241, THEO 04-0242, THEO 04-0244, THEO 04-0250	Description of Power Saving function was added.	AD
					THEO 04-0260	(2-1) was moved to THEO 04-0270	DL
						Description of create the RAID Group was added to (2).	AD
					THEO 04-0270	(2-1) was moved from THEO 04-0260	AD
						"Assignment" → "Selection"	CH
					THEO 05-0020	No.24 was added.	AD
					INST 01-0010, INST 01-0290, INST 01-0310	Description of Power Saving was added.	AD
					INST 01-0300	Description of (13) was added.	AD
					MICRO 01-0000, MICRO 01-0110, MICRO 01-0202, MICRO 01-0210	Description of the "blinking at high speed" of NOTE was changed.	CH
					MICRO 01-0010	*1 was added.	AD
					MICRO 01-0020	Description of the JAVA error code reference was added to (3).	AD
					MICRO 01-0050, MICRO 01-0060, MICRO 01-0070, MICRO 01-0080	Description of un-installation procedure was added to (a)	AD
						Procedure (a) to (j) were changed to (b) to (k).	CH
					MICRO 01-0100	Description of the "When the READY LED (green) on…" of 1.4.1 was changed.	CH
						Description of "When newly installing,…", "Check with Information Message,…" and "Both of the TrueCopy …" were changed.	CH
						"If the array…" was moved to MICRO 01-0101.	DL
					MICRO 01-0101	"If the array…" was moved from MICRO 01-0100. (New page)	AD
						Description of Power Saving was added.	AD
					MICRO 01-0102	New blank page was added.	AD
					MICRO 01-0173	Description of (4) and (5) were added.	AD
					MICRO 01-0190	Description of (7) was changed.	CH
					MICRO 01-0200	Descriptions of (8) to (10) were changed. (Item number changes followed.)	CH
						Window of the "Microprogram Ver.7.0 or more" was added in (8).	AD
						(12) was moved to page MICRO 01-0201.	DL
					MICRO 01-0201	This page was newly added. ((12) was moved from page MICRO 01-0201. (13) and (14) were moved from page MICRO 01-0210.)	AD
					MICRO 01-0202	This page was newly added. ((15) and (16) were moved from page MICRO 01-0210. Description of (16) was changed. Description of (17) and (18) were added.)	AD
					MICRO 01-0203	This page was newly added. (Description of (19) was added.)	AD
					MICRO 01-0204	This page was newly added.	AD
					MICRO 01-0210	(13) and (14) were moved to page MICRO 01-0201.	DL
						(15) and (16) were moved to page MICRO 01-0202.	DL
						Subsection 1.4.4 was moved from page MICRO 01-0211.	AD

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					MICRO 01-0211	Subsection 1.4.4 was moved to page MICRO 01-0210.	DL
					MICRO 01-0211, MICRO 01-0212	These pages were deleted.	DL
					MICRO 01-0220	Description of "Validation of Power Saving with…" was added to (2).	AD
					MICRO 01-0340, MICRO 01-0350	Description of Rev.0770/A was added.	AD
					MICRO 03-0000	*1 was added.	AD
					SYSPR 01-0000	"If the array..." was moved to SYSPR 01-0001.	DL
					SYSPR 01-0001	"If the array..." was moved from SYSPR 01-0000. (New page)	AD
						Description of Power Saving was added.	AD
					SYSPR 01-0002	New blank page was added.	AD
					SYSPR 03-0050, SYSPR 03-0142	"DF700 NAS Software …" of NOTE was corrected to "DF700 NAS SOFTWARE …".	CR
					SYSPR 03-0070	Description of "NOTE" was added to (d).	AD
					SYSPR 03-0110, SYSPR 03-0140, SYSPR 03-0281, SYSPR 03-0350, SYSPR 03-0450, SYSPR 03-0480	Description of Power Saving function was added.	AD
					SYSPR 04-0040, SYSPR 04-0100, SYSPR 04-0150, SYSPR 04-0240	Description of the "blinking at high speed" of NOTE was changed.	CH
					SYSPR 04-0081, SYSPR 04-0086, SYSPR 04-0088	Description of the "blinking at high speed" of NOTE was changed.	CH
						Description of Power Saving was added.	AD
					SYSPR 04-0087	(e) was moved from page SYSPR 04-0088.	DL
					SYSPR 04-0088	(e) was moved to page SYSPR 04-0087.	AD
					SYSPR 04-0100	Description of [Setting] was moved to page SYSPR 04-0101.	DL
					SYSPR 04-0101, SYSPR 04-0102	"NAS Unit" was corrected to "NAS Chassis".	CR
						"Actions to be taken" of No.6 to 10 were changed.	CH
					SYSPR 04-0101	Description of [Setting] was moved from page SYSPR 04-0100.	AD
						No.8 in the table was moved to page SYSPR 04-0101.	DL
					SYSPR 04-0102	No.8 in the table was moved from page SYSPR 04-0102.	AD
						(e) was moved to page SYSPR 04-01013	DL
					SYSPR 04-0103	This page was newly added. ((e) was moved from page SYSPR 04-0102.)	AD
					SYSPR 04-0104	This page was newly added.	AD
					SYSPR 04-0130	The annotation was moved from SYSPR 04-0131.	AD
					SYSPR 04-0131	The annotation was moved to SYSPR 04-0130.	DL
						Description of Power Saving function was added.	AD
					SYSPR 04-0140	Description of Power Saving function was added.	AD
					SYSPR 04-0281	"NAS Unit" was corrected to "NAS Chassis".	CR
						"Actions to be taken" of No.5 to 9 were changed.	CH
					ADD 01-0000	Description of (7) was changed.	CH
					ADD 01-0001	Description of Power Saving was added.	AD
					ADD 01-0000, ADD 01-0391, ADD 01-0423, ADD 01-0433, ADD 01-0490	Description of blink at high speed of READY LED was changed.	CH
					ADD 01-0392	Figure 1.4.5 was moved to ADD 01-0396.	DL
						Description of "Cache partition" was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					ADD 01-0393	Figure 1.4.5.1 was moved to ADD 01-0397.	DL
						Description of “Cache partition” was added.	AD
					ADD 01-0394	Figure 1.4.5.2 was moved to ADD 01-0398.	DL
						Description of “Cache partition” was added.	AD
					ADD 01-0395	Description of “Cache partition” was added. (New page was added)	AD
					ADD 01-0396	Figure 1.4.5 was moved from ADD 01-0392. (New page was added)	AD
					ADD 01-0397	Figure 1.4.5.1 was moved from ADD 01-0393. (New page was added)	AD
					ADD 01-0398	Figure 1.4.5.2 was moved from ADD 01-0394. (New page was added)	AD
					ADD 01-0440	Description of the “blinking at high speed” of (7) was changed.	CH
						(g) to (j) were moved to page ADD 01-0441.	DL
					ADD 01-0441	This page was newly added. ((g) to (j) were moved from page ADD 01-0440.)	AD
					ADD 01-0442	This page was newly added.	AD
					ADD 01-0490	Description of (d) was changed.	CH
					ADD 01-0520	Description of (p) was added.	AD
					ADD 01-0630	Description of *1 and *2 were added.	AD
					ADD 02-0150	Reference pages of 2.4.6 and 2.4.7 were changed.	CH
					ADD 02-0151	Reference pages of 2.4.5 and 2.4.8 were changed.	CH
					ADD 02-0281, ADD 02-0282, ADD 02-0283, ADD 02-0284, ADD 02-0285, ADD 02-0286, ADD 02-0291, ADD 02-0292, ADD 02-0293, ADD 02-0294, ADD 02-0295, ADD 02-0296, ADD 02-0297, ADD 02-0298, ADD 02-0301, ADD 02-0302, ADD 02-0303, ADD 02-0304, ADD 02-0305, ADD 02-0306	These pages were deleted, because pages were renumbered.	DL
					ADD 02-0290, ADD 02-0300, ADD 02-0310, ADD 02-0320, ADD 02-0330	Description of “Cache partition” was added and pages were renumbered.	AD/CH
					ADD 02-0340, ADD 02-0350, ADD 02-0360, ADD 02-0370, ADD 02-0380, ADD 02-0390, ADD 02-0400, ADD 02-0410, ADD 02-0420, ADD 02-0430, ADD 02-0440, ADD 02-0450, ADD 02-0460, ADD 02-0470, ADD 02-0480, ADD 02-0490, ADD 02-0500, ADD 02-0510, ADD 02-0520, ADD 02-0530, ADD 02-0540, ADD 02-0550, ADD 02-0560, ADD 02-0570	These pages were added, because pages were renumbered.	AD
					ADD 02-0350, ADD 02-0420, ADD 02-0510	Description of blink at high speed of READY LED was changed.	CH
					TRBL 01-0000	Description of the RKA was added.	AD
					TRBL 01-0010	“DF700 NAS Software …” of *1 was corrected to “DF700 NAS SOFTWARE …”.	CR
					TRBL 02-0000	Description of Power Saving was added.	AD
					TRBL 02-0137	Description of “High-speed blinking” of 1-c, 1-d and 2-b were changed.	CH
						2-c was moved to page TRBL 02-0138.	DL
					TRBL 02-0138	2-c was moved from page TRBL 02-0138.	AD
						Description of “High-speed blinking” of 2-c was changed.	
					TRBL 03-0000	RKA was added to the figure.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 04-0000	Description of NOTE was changed.	CH
					TRBL 04-0140	Reference page of "NNC" to "NNCIBD" of "Display code" were changed.	CH
					TRBL 04-0160	No.19 was added.	AD
					TRBL 04-0270	I53B00, I53C0x, I53D0x, I53E00, I53F00, I54100, I54200, I5430x, I5440x, I545xy, I546xy, I5470x, I548xy, I549xy, I54A0x, I54B00, I6EW0x, I6EX0x, I6F00x and I6F100 were added.	AD
						IA2J0x to IAPM00 were moved to page TRBL 04-0271.	DL
					TRBL 04-0271	IA2J0x to IAPM00 were moved from page TRBL 04-0270.	AD
					TRBL 05-0000	Description of the Power Saving was added in the flow chart.	AD
						Description following after "Check the state of the Fibre Channel interface" was moved to page TRBL 05-0001.	DL
					TRBL 05-0001	This page was newly added. (Description following after "Check the state of the Fibre Channel interface" was moved from page TRBL 05-0000.)	AD
					TRBL 05-0002	This page was newly added.	AD
					TRBL 05-0010	Description of the Power Saving was added in the flow chart.	AD
						"Is the ALARM LED (RED) …" and *1 were moved from page TRBL 05-0020.	AD
					TRBL 05-0020	"Is the ALARM LED (RED) …" and *1 were moved to page TRBL 05-0010.	DL
						"Is port setting (Transfer Rate) …" and *2 were moved from page TRBL 05-0030.	AD
					TRBL 05-0030	"Is port setting (Transfer Rate) …" and *2 were moved to page TRBL 05-0020.	DL
					TRBL 06-0011	No.29 was added.	AD
					TRBL 06-0020	Description of *3 was added.	AD
					TRBL 06-0050	Description of *4 was added.	AD
					TRBL 06-0420	Description of *4 was added.	AD
					TRBL 06-0450	Description of *3 was added.	AD
					TRBL 06-0460	"Warning LED" of *1 and *2 was corrected to "WARNING LED".	AD
					TRBL 06-0470	Description of *1, *3, *4 and *5 were added.	AD
						Following after "Is there LU for which…" was moved from page TRBL 06-0480.	AD
					TRBL 06-0480	Following after "Is there LU for which…" was moved to page TRBL 06-0470.	DL
					TRBL 06-0490	Description of *1 was added.	AD
					TRBL 06-0530	Description of *5 was added.	AD
					TRBL 06-0550	Description of the Power Saving was added in the flow chart.	AD
						The description following after "Turn off the main switch." were moved to page TRBL 06-0560.	DL
					TRBL 06-0560	The description following after "Turn off the main switch." were moved from page TRBL 06-0550.	AD
						Description of the Power Saving was added in the flow chart.	AD
					TRBL 06-0610	Description of the RKA was added.	AD
					TRBL 06-0620, TRBL 06-0641, TRBL 06-0650	RKA was added to the figure.	AD
					TRBL 06-1180, TRBL 06-1200, TRBL 06-1210, TRBL 06-1220	"NAS Software …" in this page was corrected to "DF700 NAS SOFTWARE …".	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					TRBL 06-1332	Descriptions of 6.1.27 were added.	AD
					TRBL 06-1333, TRBL 06-1334, TRBL 06-1335, TRBL 06-1336, TRBL 06-1337, TRBL 06-1338	These pages were newly added. (Descriptions of 6.1.27 were added.)	AD
					TRBL 06-1340, TRBL 06-1352	Description of blink at high speed of READY LED was changed.	CH
					TRBL 06-1351	Number was corrected. ((5) → (6) etc)	CR
					TRBL 06-1352	Number was corrected. ((9) → (11) etc)	CR
					TRBL 07-0040	(1) and Figure 7.3.1 were moved from page TRBL 07-0050.	AD
					TRBL 07-0050, TRBL 07-0090, TRBL 07-0131, TRBL 07-0240, TRBL 07-0290	RKA was added to the figure.	AD
					TRBL 07-0050	(1) and Figure 7.3.1 were moved to page TRBL 07-0040.	DL
						Description of (d) was added.	AD
						Description of (e) was changed.	CH
						(f) and Figure 7.3.2 were moved from page TRBL 07-0051.	AD
					TRBL 07-0051	(f) and Figure 7.3.2 were moved to page TRBL 07-0050.	DL
					TRBL 07-0051, TRBL 07-0052	These pages were deleted.	DL
					TRBL 07-0090	Description of (d) was added.	AD
						Description of (e) was changed.	CH
					TRBL 07-0130	Description of blink at high speed of READY LED was changed in the (d).	CH
					TRBL 07-0131	Description was added in the (d).	AD
					TRBL 07-0240, TRBL 07-0290	Description of blink at high speed of READY LED was changed in the (d).	CH
						Description was added in the (d).	AD
					TRBL 07-0240	Description of NOTE was deleted.	DL
					TRBL 07-0280	"DF700 NAS Software …" of (a) was corrected to "DF700 NAS SOFTWARE …".	CR
					TRBL 07-0290	(2) was moved to page TRBL 07-0291.	DL
					TRBL 07-0291	This page was newly added. ((2) was moved from page TRBL 07-0290.)	AD
					TRBL 07-0292	This page was newly added.	AD
					TRBL 08-0030	Figure of *3 was changed.	CH
					TRBL 08-0031	No.11 was added.	AD
					TRBL 08-0130	Description of *4 was added.	AD
					TRBL 08-0140	Description of *2 was added.	AD
						*3 was changed to *4.	CH
					TRBL 08-0150	"Backup Battery Unit #0" of the RKS and RKXS of figure was changed to "Backup Battery Unit".	CR
					TRBL 08-0200	Description was added in the "Action(s) to be taken" of No.4.	AD
					TRBL 09-0010	No.24 was added.	AD
					TRBL 09-0041	No.23 was added.	AD
					TRBL 10-0200, TRBL 10-0230	Description of ""The accumulated... shutdown)." was added.	AD
					TRBL 10-0330	Description of Power Saving function was added.	AD
					TRBL 12-0000	Description of the Power Saving was added in the flow chart.	AD
						"Ask the customer …" and *1 were moved to page TRBL 05-0020.	DL
					TRBL 12-0010	"Ask the customer about …" and *1 were moved from page TRBL 05-0030.	AD
					MSG 01-0010, MSG 01-0034, MSG 01-0040	RKA was added to the figure.	AD
					MSG 03-0170	"An CNT …" of Description of H42T00 was corrected to "A CNT …".	CR

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 03-0530	HE220x was added.	AD
						HF010C was moved to page MSG 03-0540.	DL
					MSG 03-0540	HF010C was moved from page MSG 03-0530.	AD
					MSG 04-0110	I1GY00, I1GZ00 I1H000 and I1H100 were added.	AD
						I301xy, I301HH and I301AT were moved to page MSG 04-0120.	DL
					MSG 04-0111	This page was newly added. (I1H200, I1H300, I1H400 and I1H500 were added.)	AD
					MSG 04-0112	This page was newly added.	AD
					MSG 04-0120	I301xy, I301HH, I301AT were moved from page MSG 04-0110.	AD
						I304xy to I30900 were moved to page MSG 04-0130.	DL
					MSG 04-0130	I304xy to I30900 were moved to page MSG 04-0120.	AD
						I412xy and I412HH were moved to page MSG 04-0140.	DL
					MSG 04-0140	I412xy and I412HH were moved to page MSG 04-0130.	AD
						I415xy and I415HH were moved to page MSG 04-0150.	DL
					MSG 04-0150	I415xy and I415HH were moved to page MSG 04-0140.	AD
						I419xy and I419HH were moved to page MSG 04-0160.	DL
					MSG 04-0160	I419xy and I419HH were moved to page MSG 04-0150.	AD
					MSG 04-0212	I53B00, I53C0x, I53D0x, I53E00 and I53F00 were added.	AD
						I540xy and I540HH were moved to page MSG 04-0213.	DL
					MSG 04-0213	This page was newly added. (I540xy and I540HH were moved from page MSG 04-0212. I54100, I54200, I5430x, I5440x, I545xy and I546xy were added.)	AD
					MSG 04-0214	This page was newly added. (I5470x, I548xy, I549xy, I54A0x and I54B00 were added.)	AD
					MSG 04-0215	This page was newly added. (I54C00, I54Dxy and I54DHH were added.)	AD
					MSG 04-0216	This page was newly added.	AD
					MSG 04-0473	I6EV00 was added.	AD
					MSG 04-0474	"Recovery methods" of I6EV00 was added.	AD
					MSG 04-0475	This page was newly added. ("Recovery methods" of I6EV00 was added.)	AD
					MSG 04-0476	This page was newly added. (I6EW0x, I6EX0x and I6EY00 were added.)	AD
					MSG 04-0477	This page was newly added. (I6EZ00 was added.)	AD
					MSG 04-0478	This page was newly added. (I6F00x and I6F100 were added.)	AD
					MSG 04-0480	I6F20x, I6F300 and I6F400 were added.	AD
						I70000 was moved to page MSG 04-0490.	DL
					MSG 04-0481	This page was newly added. (I6F500, I6F6xy and I6F7xy were added.)	AD
					MSG 04-0482	This page was newly added.	AD
					MSG 04-0490	I70000 was moved from page MSG 04-0480.	AD
						"Recovery methods③" of I70000 and I70100 were moved to page MSG 04-0500.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0500	"Recovery methods③" of I70000 and I70100 were moved from page MSG 04-0490.	AD
						"Recovery methods③ to ④" of I70100 were moved to page MSG 04-0501.	DL
					MSG 04-0501	This page was newly added. ("Recovery methods③ to ④" of I70100 were moved from page MSG 04-0500.)	AD
					MSG 04-0502	This page was newly added.	AD
					MSG 04-0680	Numbers of the "Recovery methods" of IA1E00 was changed.	CH
					MSG 04-0690	Reference page was changed.	CH
					MSG 04-0691	Numbers of the "Recovery methods" of IA1M00 was changed.	CH
					MSG 04-0700	Numbers of the "Recovery methods" of IA1N00 was changed.	CH
					MSG 04-0710	Numbers of "Recovery methods" of IA1W0x was changed.	CH
						Description was added to the "Description (y)" of the IA1Y00.	AD
					MSG 04-0720	Description was added to the "Description (y)" of the IA2A00.	AD
					MSG 04-0730	The numbers of the recovery methods of IA2E0x and IA2Fxy were changed.	CH
					MSG 04-0731	The numbers of the recovery methods of IA2Fxy were changed.	CH
					MSG 04-0740	Numbers of the "Recovery methods" of IA2H00 was changed.	CH
						"Detailed code" of "Description" of IA2H00 was corrected to "Failed part".	CR
					MSG 04-0750, MSG 04-0760	Numbers of the "Recovery methods" of IA2H00 was changed.	CH
					MSG 04-0770	Numbers of the "Recovery methods" of IA2I00 was changed.	CH
						"Detailed code" of "Description" of IA2I00 was corrected to "Failed part".	CR
					MSG 04-0780	Numbers of the "Recovery methods" of IA2I00 was changed.	CH
						"Recovery methods" of IA2I00 was moved to page MSG 04-0781.	DL
					MSG 04-0781	This page was newly added. ("Recovery methods" of IA2I00 was moved from page MSG 04-0780.)	AD
					MSG 04-0782	This page was newly added.	AD
					MSG 04-0790	IA2J0x and IA2K0x of "Recovery methods④-1" were moved from page MSG 04-0800.	AD
					MSG 04-0800	IA2J0x and IA2K0x of "Recovery methods④-1" were moved to page MSG 04-0790.	DL
						Numbers of "Recovery methods" of IA2Q00 was changed.	CH
						IA2Q00 of "Recovery methods①-3" was moved from page MSG 04-0810.	AD
					MSG 04-0810	IA2Q00 of "Recovery methods①-3" was moved to page MSG 04-0800.	DL
						"Detailed code" of "Description" of IA2R00, IA2S00 and IA2T00 were corrected to "Failed part".	CR
						"Recovery methods①-3" of IA2T00 was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-0820	"Recovery methods①-3" of IA2U00 was added.	AD
						"Detailed code" of "Description" of IA2U00 was corrected to "Failed part".	CR
						IA2V00 of "Recovery methods①-3" was moved to page MSG 04-0830.	DL
					MSG 04-0830	IA2V00 of "Recovery methods①-3" was moved from page MSG 04-0820.	AD
						"Recovery methods ②" of IA2X00 to IA2Z00 were changed.	CH
						Reference page of "Recovery methods ①" of IA2Z00 was added.	AD
					MSG 04-0840	Numbers of "Recovery methods" of IA3000 to IA3200 were changed.	CH
					MSG 04-0850	Numbers of "Recovery methods" of IA3300 and IA3400 were changed.	CH
					MSG 04-0870	"To be continued…" was added to the IA3D0x.	AD
					MSG 04-0880	"Recovery methods③" of IA3D0x was added.	AD
						Numbers of "Recovery methods" of IA3E00 was changed.	CH
						IA4A0x and IA4B0x were moved to page MSG 04-0890.	DL
					MSG 04-0890	IA4A0x and IA4B0x were moved from page MSG 04-0880.	AD
						IB0000 and IB100x were moved to page MSG 04-0900.	DL
					MSG 04-0900	IB0000 and IB100x were moved from page MSG 04-0890.	AD
						Numbers of "Recovery methods" of IB1300 was changed.	CH
						IB1400 was moved to page MSG 04-0910.	DL
					MSG 04-0910	IB1400 was moved from page MSG 04-0900.	AD
						Numbers of "Recovery methods" of IB1400 was changed.	CH
						IB1600 and IB1700 were moved to page MSG 04-0911.	DL
					MSG 04-0911	This page was newly added. (IB1600 and IB1700were moved from page MSG 04-0910. IB1900 was moved from page MSG 04-0920.)	AD
					MSG 04-0912	This page was newly added.	AD
					MSG 04-0920	IB1900 was moved to page MSG 04-0911.	DL
					MSG 04-0930	Description of was added in the "Reference page" of IB1G00.	AD
					MSG 04-0940	Description of was added in the "Reference page" of IB1M00.	AD
					MSG 04-1040	IY11xy, IY11HH, IY12xy and IY12HH were added.	AD
						IY2000, IY2100 and IY2200 were moved to page MSG 04-1041.	DL
					MSG 04-1041	IY13xy and IY14xy were added.	AD
						IY2000, IY2100 and IY2200 were moved from page MSG 04-1040.	AD
						IY3100 was moved to page MSG 04-1042.	DL
					MSG 04-1042	IY3100 was moved from page MSG 04-1042.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 04-1150	"Recovery methods" of IZYQ00 was changed.	CH
						"Description" of IZZ000 and IZZ002 were changed.	CH
					MSG 05-0070	"(CTL-zx)" of "Message text" of R312xy was corrected to "(CTL-z)".	CR
					MSG 05-0130	"…drived…" of "Message text" of R312xy was corrected to "…driven…".	CR
					MSG 05-0300	R53000 was added.	AD
						RA00xx to RA0412 were moved to page MSG 05-0301.	DL
						RA0413 to RA1000 were moved to page MSG 05-0302.	DL
					MSG 05-0301	This page was newly added. ("Recovery methods" of R53000 was added. RA00xx to RA0412 were moved from page MSG 05-0300.)	AD
					MSG 05-0302	This page was newly added. (RA0413 to RA1000 were moved from page MSG 05-0300.)	AD
					MSG 05-0320	"A unsupported …" of "Description" of RA7C00 was corrected to "An unsupported …".	CR
					MSG 06-0010	Description of ① was added in the recovery method of W03000.	AD
						W040xy, W04100 and W042HH were moved to page MSG 06-0020.	DL
					MSG 06-0020	W040xy, W04100 and W042HH were moved from page MSG 06-0010.	AD
						Descriptions of ① were added in the recovery method of W040xy and W050xy.	AD
						W060xy, W060HH and W060AT were moved to page MSG 06-0030.	DL
					MSG 06-0030	W060xy, W060HH and W060AT were moved from page MSG 06-0020.	AD
						W071xy to W073HH were moved to page MSG 06-0031.	DL
					MSG 06-0031	This page was newly added. (W071xy to W073HH were moved from page MSG 06-0030.)	AD
					MSG 06-0032	This page was newly added.	AD
					MSG 06-0070	"A unreadable …" of "Description" of W0G0xy and W0G100 were corrected to "An unreadable …".	CR
					MSG 06-0090	Description of ① was added in the recovery method of W0G400.	AD
						W0GB00 was moved to page MSG 06-0100.	DL
					MSG 06-0100	W0GB00 was moved from page MSG 06-0090.	AD
						W0GG00, W0GH00 and W0GJ00 were moved to page MSG 06-0110.	DL
					MSG 06-0110	W0GG00, W0GH00 and W0GJ00 were moved from page MSG 06-0100.	AD
						W0GM00 was added.	AD
						W12000 and W22000 were moved to page MSG 06-0111.	DL
					MSG 06-0111	This page was newly added. (W12000 and W22000 were moved from page MSG 06-0110. W23000 was moved from page MSG 06-0120.)	AD
					MSG 06-0112	This page was newly added.	AD
					MSG 06-0120	W23000 was moved to page MSG 06-0111.)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 06-0140	"An LRC error" of "Description" of W32Fxy and W330xy were corrected to "A LRC error".	CR
					MSG 06-0150, MSG 06-0160	"A EDC …" of "Description" were corrected to "An EDC …".	CR
					MSG 06-0160	"An LRC error" of "Description" were corrected to "A LRC error".	CR
					MSG 07-0000 to MSG 07-0130	Reedited due to adding and moving. • Moving message. ("Abnormal End Downgrade Failed …", "Abnormal End Down Grade Install NG (RAID6 RGs exist.)") • Changing of Numbers of "Recovery methods" message. ("Abnormal End Down Grade Install NG (Cache Partition …)", "Abnormal End Down Grade Install NG (LU with Stripe Size …)," "Abnormal End Down Grade Install NG (Need Reboot", "Abnormal End Down Grade Install NG (TrueCopy Extended Distance …)",) • Adding message. ("Abnormal End Down Grade Install NG (Power Saving …)", If you execute …, "System Restart With Config Clear") • Changing of "Description" message. (Old System Exists)	AD/CH
					MSG 07-0071, MSG 07-0072	These pages were deleted.	DL
					MSG 08-0160 to MSG 08-0173	Reedited due to adding. • Adding message. (DMED1A0030, DMED1A0031, DMED1A0032, DMED1A0033, DMED1A0034, DMED1A0070, DMED1A0071, DMED1A0072, DMED1A0073, DMED1A0074, DMED1A0075, DMED1A0076, DMED1A0077, DMED1F0040, DMED1F0041, DMED1F0042, DMED1F0043, DMED1F0044, DMED1F0045, DMED1F0048, DMED1F0049, DMED1F004A, DMED1F004B, DMED1F004C, DMED1F004D, DMED1F004E, DMED1F0051, DMED1F0052, DMED1F0053, DMED1F0054, DMED1F0055, DMED1F0056, DMED1F0057, DMED1F0058, DMED1F0059, DMED1F005A, DMED1F005B, DMED3B0020)	AD
					MSG 09-0000	2/04 03 was added.	AD
					MSG 09-0310 to MSG 09-0470	Reedited due to adding. • Adding message. (1A0030, 1A0031, 1A0032, 1A0033, 1A0034, 1A0070, 1A0071, 1A0072, 1A0073, 1A0074, 1A0075, 1A0076, , 1A0077, 1F0040, 1F0041, 1F0042, 1F0043, 1F0044, 1F0045, 1F0048, 1F0049, 1F004A, 1F004B, 1F004C, 1F004D, 1F004E, 1F0051, 1F0052, 1F0053, 1F0054, D1F0055, 1F0056, 1F0057, 1F0058, 1F0059, 1F005A, 1F005B, 3B0020)	AD/CH
					MSG 09-0351, MSG 09-0352, MSG 09-0353, MSG 09-0354	These pages were deleted.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MSG 09-0420, MSG 09-0430, MSG 09-0440, MSG 09-0450, MSG 09-0460, MSG 09-0470	These pages were newly added.	AD
					REP 01-0020	(11) to (14) were moved to page REP 01-0021.	DL
						Description of Power Saving was added.	AD
					REP 01-0021	(11) to (14) were moved from page REP 01-0020.	AD
						Description of the “blinking at high speed” of (14) was changed.	CH
						Description of (15) was changed.	CH
					REP 01-0040	Description of *1 was added.	AD
					REP 02-0011, REP 02-0012	Description of Front Bezel was added to The Table.	AD
					REP 02-0020	RKA was added to the figure.	AD
					REP 02-0030, REP 02-0041	“Backup Battery Unit #0” of figure was changed to “Backup Battery Unit”.	CR
						Description of *1 was changed.	CH
					REP 02-0080	No.4 of “Restriction” was added.	AD
					REP 02-0090, REP 02-0100, REP 02-0110, REP 02-0120, REP 02-0121, REP 02-0122	Reedited due to description of the Power Saving was adding.	AD
					REP 02-0121, REP 02-0122	These pages were newly added.	AD
					REP 02-0160	Description of the Power Saving was added.	AD
					REP 02-0170	Description of *2 was added.	AD
					REP 02-0180	Description of *1 was added.	AD
					REP 02-0190	Description of the Power Saving was added.	AD
						Description of *3 was added.	AD
					REP 02-0200	Description of ““The accumulated… shutdown).” was added.	AD
					REP 02-0210	Description of Power Saving function was added.	AD
					REP 02-0240	Description of NOTE was added.	AD
						No.5 of “Restriction” was added.	AD
					REP 02-0250	Description of the Power Saving was added.	AD
					REP 02-0260	Descriptions of *2 and *3 were added to Figure 2.2.3.	AD
					REP 02-0260, REP 02-0280, REP 02-0291, REP 02-0320, REP 02-0331, REP 02-0350, REP 02-0380, REP 02-0431, REP 02-0490, REP 02-0511, REP 02-0531, REP 02-0590, REP 02-0631, REP 02-0650, REP 02-0710, REP 02-0741, REP 02-0761, REP 02-0821, REP 02-0860, REP 02-0880, REP 02-0900, REP 02-0930, REP 02-0941, REP 02-0970, REP 02-1010	Description of blink at high speed of READY LED was changed.	CH
					REP 02-0300	No.2 of “Restriction” was changed.	CH
						No.3, No.6 of “Restriction” were added.	AD
						No.2 in the table was moved to page REP 02-0310.	DL
					REP 02-0300, REP 02-0340, REP 02-0910	“…because the automatic download of…” of “Restriction” was changed to “…because the update of the flash program or…”.	CH
					REP 02-0310	No.2 in the table was moved from page REP 02-0300.	AD
						(e) to (h) were moved to page REP 02-0320.	DL
						Description of the Power Saving was added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0320	(e) to (h) were moved from page REP 02-0310.	AD
					REP 02-0340	No.4 of “Restriction” was added.	AD
						No.2 in the table was moved to page REP 02-0341.	DL
					REP 02-0341	This page was newly added. (No.2 in the table was moved from page REP 02-0340.)	AD
					REP 02-0342	This page was newly added.	AD
					REP 02-0350	(h) to (j) were moved to REP 02-0360.	DL
						Description of the Power Saving was added.	AD
					REP 02-0360	(h) to (j) were moved from REP 02-0350.	AD
						Description of (k) was deleted. ((l) → (k))	DL/CH
						Figure 2.2.6 was moved to REP 02-0361.	DL
					REP 02-0361	Figure 2.2.6 was moved from REP 02-0360. (New page)	AD
					REP 02-0362	New blank page was added.	AD
					REP 02-0400	Descriptions were added in the No.1, No.2 and No.3 of “Restriction”.	AD
					REP 02-0430	Description of the RKA was added to (r).	AD
						Description of the Power Saving was added.	AD
					REP 02-0431	Description of (w) was added.	AD
					REP 02-0480	Description of the RKA was added to (q).	AD
						Description of the Power Saving was added.	AD
					REP 02-0490	Description of (v) was added.	AD
					REP 02-0511	Description of (t) was added.	AD
						(w) was moved to page REP 02-0512.	DL
					REP 02-0512	(w) was moved from page REP 02-0511.	AD
					REP 02-0531	Description of (t) was added.	AD
					REP 02-0550	Description of No.8 was added in the No.1 of “Restriction”. Description was added in the No.2 of “Restriction	AD
					REP 02-0570, REP 02-0620	Description of the RKA was added to (m).	AD
					REP 02-0580	(r) to (u) were moved to page REP 02-0590.	DL
						Description of the Power Saving was added.	AD
					REP 02-0590	(r) to (u) were moved from page REP 02-0580.	AD
						Figure 2.2.8 was moved to page REP 02-0600.	DL
					REP 02-0600	Figure 2.2.8 was moved from page REP 02-0590.	AD
						Figure 2.2.8.1 was moved to page REP 02-0601.	DL
					REP 02-0601	Figure 2.2.8.1 was moved from page REP 02-0600.	AD
						Figure 2.2.8.2 was moved to page REP 02-0602.	DL
					REP 02-0602	Figure 2.2.8.2 was moved from page REP 02-0601.	AD
					REP 02-0630	Description of the Power Saving was added.	AD
					REP 02-0670	Description of No.7 was added in the No.1 of “Restriction”. Description was added in the No.2 of “Restriction	AD
						Table 2.2.3 was moved to page REP 02-0680.	DL
					REP 02-0680	Table 2.2.3 was moved from page REP 02-0670.	AD
						(b) and (c) were moved to page REP 02-0690.	DL

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-0690	(b) and (c) were moved to page REP 02-0680.	AD
						(m) and (n) were moved to page REP 02-0700.	DL
					REP 02-0700	(m) and (n) were moved to page REP 02-0690.	AD
						Description of the RKA was added to (p).	AD
						Description of the Power Saving was added.	AD
					REP 02-0740	Description of the RKA was added to (p).	AD
						Description of the Power Saving was added.	AD
					REP 02-0780	Description was added in the No.2 of "Restriction".	AD
					REP 02-0840	Description was added in the No.2 of "Restriction".	AD
						NOTE was moved to page REP 02-0841.	DL
					REP 02-0841	This page was newly added. (NOTE was moved from page REP 02-0840.)	AD
					REP 02-0842	This page was newly added.	AD
					REP 02-0850	(h) was moved from REP 02-0860.	AD
						Description of the Power Saving was added.	AD
					REP 02-0860	(h) was moved to REP 02-0850.	DL
						Description of (i) was added.	AD
					REP 02-0870	Description of the Power Saving was added.	AD
					REP 02-0880	Description of (i) was added.	AD
					REP 02-0900	Description of (k) was added.	AD
					REP 02-0910	Description was added in the No.2 of "Restriction".	AD
						NOTE was moved to page REP 02-0920.	DL
					REP 02-0920	NOTE was moved from page REP 02-0910.	AD
						(e), (f) and (g) were moved to page REP 02-0930.	DL
						‡1 was added.	AD
					REP 02-0930	(e), (f) and (g) were moved from page REP 02-0920.	AD
						Description of the Power Saving was added.	AD
					REP 02-0950	Table was moved to page REP 02-0960.	DL
					REP 02-0960	Table was moved from page REP 02-0950.	AD
						Description was added in the No.2 of "Restriction".	AD
						(b), (c) and (d) were moved to page REP 02-0970.	DL
					REP 02-0970	(b), (c) and (d) were moved from page REP 02-0960.	AD
					REP 02-0980	Description of *1 and *3 were added.	AD
					REP 02-0990	Table was moved to page REP 02-1000.	DL
					REP 02-1000	Table was moved from page REP 02-0960.	AD
						Description was added in the No.2 of "Restriction".	AD
						(b), (c) and (d) were moved to page REP 02-1010.	DL
					REP 02-1010	(b), (c) and (d) were moved from page REP 02-1000.	AD
					REP 02-1041, REP 02-1042, REP 02-1043, REP 02-1044	Descriptions of 2.2.14 were added. (New pages)	AD
					REP 02-1050	2.3.7 was added.	AD
					REP 02-1220	"2.3 Replacing the NAS parts" of (3) and (4) were corrected to "Replacing the RKNAS parts".	CR
					REP 02-1240	Description of 2.3.7 was added. (New pages)	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					REP 02-1250	New blank page was added.	AD
					WEB 01-0000	Description of Power Saving was added.	AD
					WEB 03-0282	(3) and (4) were moved from page WEB 03-0290.	AD
					WEB 03-0290	(3) and (4) were moved to page WEB 03-0282.	DL
						(5) to (8) were moved from page WEB 03-0300.	AD
						Window of the “Microprogram Ver.7.0 or more” was added in (6).	AD
					WEB 03-0300	(5) to (8) were moved to page WEB 03-0290.	DL
						Description of (9) was changed.	CH
					WEB 03-0450	Description of blink at high speed of READY LED was changed in the (5).	CH

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Hitachi TagmaStore®
AMS 200™ to AMS 500™
Upgrade Procedures

REV.8

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Chapter 1. Outline

This procedure manual describes the work procedure for upgrading the array subsystem from Hitachi TagmaStore® AMS 200™ to Hitachi TagmaStore® AMS 500™ while the customer data of the disk drive used is maintained.

The procedures about the whole system, such as configuration change of the system, and the procedures of addition/subtraction of option parts and the setting of the priced option are not included.

In this procedures, the basic disk array unit of the Hitachi TagmaStore® AMS 200™ (Model name: DF700-RKS) is described as "RKS". In the same way, the basic disk array unit of the Hitachi TagmaStore® AMS 500™ (Model name: DF700-RKM) and the additional disk array unit (Model name: DF700-RKAJ/RKAJAT/DF600-RKA) are described as "RKM" and "RKAJ/RKAJAT/RKA" respectively.

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Chapter 2. Components and Tools Required for Upgrade(Hard)

Model names of components required for the upgrade are shown below.

Table 2.1 Components to Be Ordered for Upgrade

No.	Detail of upgrade	Model	Unit per Assy	Components
1	RKS(Single controller) to RKM(Single controller)	DF-F700-RSUPS(*2)	1	Frame (1), Power unit (RKM) (2), Fan assembly (2), Backup battery unit (2), Control unit (1), Interface board (1) (Host connector (2))(*1), AC cable J2H (2), Microprogram for Hitachi TagmaStore® AMS 500™ of the latest revision (0712/A-M or later) (CD-R), Microprogram for Hitachi TagmaStore® AMS 200™ which is the same revision (0712/A-S or later) with the one for Hitachi TagmaStore® AMS 500™ (CD-R), Upgrade Procedures (1)
2	RKS(Dual controller) to RKM(Dual controller)	DF-F700-RSUPD(*2)	1	Frame (1), Power unit (RKM) (2), Fan assembly (2), Backup battery unit (2), Control unit (2), Interface board (2) (Host connector (4))(*1), AC cable J2H (2), Microprogram for Hitachi TagmaStore® AMS 500™ of the latest revision (0712/A-M or later) (CD-R), Microprogram for Hitachi TagmaStore® AMS 200™ which is the same revision (0712/A-S or later) with the one for Hitachi TagmaStore® AMS 500™ (CD-R), Upgrade Procedures (1)

*1 : When the Hitachi TagmaStore® AMS200 is the system configuration of the iSCSI Interface Board, the FC Interface Board and the host connector become unnecessary.

*2 : It is necessary to arrange the Cache memory additionally depending on the use condition of the priced option. (see "Table 3.3.1 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is usedTable" (SUP 03-0030), and "3.3.2 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used" (SUP 03-0030).)

Note: Transfer the disk drives, cache memories, and Front Bezel, which were used in the RKS, to the RKM that has been upgraded.

The following tools are required for the upgrade procedures.

Table 2.2 Tools Required (for Floor Model)

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
	Phillips screwdriver	No.2	For general works
	Slotted screwdriver	No.1	For Device ID Setting Switch
	Allen wrench	No.3	For installing the floor standing kits (H1J and H2J)
Tool of other	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended)
	Wrist strap	-	

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Table 2.3 Tools Required (for Rackmount Model)

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
	Phillips screwdriver	No.2	Installation of skirts and securing the subsystem.
	Slotted screwdriver	No.1	For Device ID Setting Switch
	Allen wrench	No.3	Securing of cable cramps
	Allen wrench	No.4	Securing of rail and connection of power cable.
	Allen wrench	No.6	Opening/closing of doors; removal of stabilizers
	Spanner	No.22	Adjustment of leveling bolts
Tool of other	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended)
	Wrist strap	-	

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Chapter 3. Upgrade Work

3.1 Prerequisites

- The upgrade operation is the offline work.
- The Hitachi TagmaStore® AMS 200™ to be upgraded must be in the state in an error free state or condition prior to performing the upgrade.
- Be sure to execute an deliberate shutdown before starting the hardware upgrade.
- Stop host computers from accessing the subsystem before starting the upgrade.
- Use the latest version (Ver.1.00 or later) of Storage Navigator Modular.
- For upgrading, all the Disk Drives mounted on the existing Hitachi TagmaStore® AMS 200™ are transferred.
- When TrueCopy remote replication is enabled and the array subsystem to be upgraded to the Hitachi TagmaStore® AMS 500™ is the remote Disk Drive subsystem, perform it after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.
  However, if the upgrade operation is performed, the path blockade occurs. This path blockade recovers automatically by turning on the power of the array subsystem after performing the upgrade operation.
  Return the pair status (S-VOL) of TrueCopy remote replication to the original status (PAIR, etc.) after completing the upgrade operation.
  Also, if the upgrade operation is performed, the following phenomenon occurs.
  - Both paths of the TrueCopy remote replication are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.
- When Hitachi TagmaStore® AMS 200TM is made as Boot disk, or rootdg of VxVM is installed in Hitachi TagmaStore® AMS 200TM, the upgrade cannot be performed because the device file name which the host recognizes is changed in the case of upgrading to Hitachi TagmaStore® AMS 500TM.
- The downgrade from Hitachi TagmaStore® AMS 500TM to Hitachi TagmaStore® AMS 200TM is not supported.
- The upgrade from Hitachi TagmaStore® WMS 100TM to Hitachi TagmaStore® AMS 500TM is not supported.
- The upgrade from Hitachi TagmaStore® AMS 200TM of the NAS system configuration to Hitachi TagmaStore® AMS 500TM is not supported.
- It is required to stop and reboot the host because the setting of the host needs to be changed.

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3.2 Before Starting Upgrade Work

(1) Check whether the host interface of the Hitachi TagmaStore® AMS 200™ is the Fibre Channel or the iSCSI, and prepare the Interface Board of the same kind for the Hitachi TagmaStore® AMS 500™ by the day of the upgrade work.

(2) Confirm the customer whether to use the priced option, which was used in the Hitachi TagmaStore® AMS 200™, in the Hitachi TagmaStore® AMS 500™ also. If it is used, prepare the license key of the Hitachi TagmaStore® AMS 500™ by the day of the upgrade work. The license key of the priced-option is issued to the subsystem, so that if the priced option used in the Hitachi TagmaStore® AMS 200™ is also used in the Hitachi TagmaStore® AMS 500™, it is required to purchase the license key as the Hitachi TagmaStore® AMS 500™.

(3) When any of Cache Residency Manager, Copy-on-write SnapShot and Cache Partition Manager is used in the Hitachi TagmaStore® AMS 200™ and it is also continued to be used in the Hitachi TagmaStore® AMS 500™, the Cache Unit may have to be added depending on the setting or the configuration of the Hitachi TagmaStore® AMS 200™.
Refer to "3.3 Notes" (SUP 03-0020) for the details.
When the addition is required, prepare the necessary Cache Unit by the day of the upgrade work.

(4) As for the upgrade work, settings of the subsystem must be changed through operation of a maintenance PC connected via a LAN. Besides, the microprogram must be installed from a CD-ROM. Make the following preparations before starting upgrade work.
- Prepare a PC in which Storage Navigator Modular of the latest revision is installed.
  The PC must fit the LAN environment and have a CD-ROM drive.
- LAN cross cable
- The CD-ROM for installation of the Hitachi TagmaStore® AMS 500™ microprogram of the latest revision (0712/A-M or later).
- Microprogram for Hitachi TagmaStore® AMS 200™ which is the same revision (0712/A-S or later) with the one for Hitachi TagmaStore® AMS 500™.

(5) Back up the user data by the day of the upgrade work to prepare for emergency. Be sure to perform this work.
If you fail to operate the upgrade work, you may lose the user data on the array subsystem. Back up the user data on the array subsystem by the operation on the host computer side.

(6) Check that Hitachi TagmaStore® AMS 200™ to be upgraded is connected as an external storage of SANRISE Universal Storage Platform (USP)/SANRISE Network Storage Controller (NSC). If it is connected as an external storage as a result of the check, perform the upgrade following the procedure for the maintenance manual of SANRISE USP/NSC (refer to EXTERNAL STORAGE MAINTENANCE SECTION "2. Maintenance for External Storage").

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3.3 Notes

- When executing updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.
- When executing updating installation of the microprogram, use the microprogram whose revision is 0712/A-x or later.
- Since configurations of the Hitachi TagmaStore® AMS 200™ and the Hitachi TagmaStore® AMS 500™ are different from each other, works such as an installation of the Control Unit for the Hitachi TagmaStore® AMS 500™ in the RKM, shifts of the Disk Drives and Cache Memory installed in the RKM of the Hitachi TagmaStore® AMS 200™.
- When upgrading the Disk Array subsystem, do not upgrade two or more Disk Array subsystem at the same time to avoid the disk drive replacement operation error.
- When the Hitachi TagmaStore® AMS200 to be upgraded is the Fibre Channel interface system configuration, do not change the port which connects the Fibre Channel interface cable before and after the upgrade.
- When the Hitachi TagmaStore® AMS200 to be upgraded is the Fibre Channel interface system configuration, if the serial number of the array subsystem changes in the upgrade work, the WWN also changes. Therefore, it is necessary to change the setting of the host computer, the peripherals, the application software, etc. depending on the case. For the setting change, refer to "5.1 For Setting Changes in Host Computer and Others" (SUP 05-0000).
- When the Hitachi TagmaStore® AMS 200™ to be upgraded is the system configuration of the iSCSI interface, the Target iSCSI Name of the Hitachi TagmaStore® AMS 500™ succeeds the value before the upgrade. However, when the default iSCSI Name of the Target was used in the array subsystem before the upgrade, it is required to change the Target iSCSI Name of the Hitachi TagmaStore® AMS 500™ to a unique value in the network. If the Hitachi TagmaStore® AMS 500™ is used without changing the Target iSCSI Name and when the array subsystem before the upgrade is configured with the system of the iSCSI interface again after using the Hitachi TagmaStore® AMS 500™ , the iSCSI Name of both array subsystems is duplicated in the network, and trouble is caused to the iSCSI protocol.
- The IP address of the LAN port for the user control or maintenance of the Control Unit succeeds the value before the upgrade. Reset it as occasion demands.
- The license key of the priced-option is issued to the subsystem. When the customer used the priced-option, which was used in the Hitachi TagmaStore® AMS 200™, even after upgrading to the Hitachi TagmaStore® AMS 500™, it is required to purchase the license key of the priced-option of the Hitachi TagmaStore® AMS 500™.
- When using the SNMP Agent Support Function, which is an optional feature, is used, the SNMP environment information file may have to be reviewed.
- When using the Cache Residency Manager, which is an optional feature, there may be a case where the use is not allowed depending on a capacity of the cache memory. Refer to the following Table 3.3.1 and, if the capacity of the cache memory is found to be insufficient, make addition to the cache memory or use the LU as a non-Cache Residency Manager. However, when the Cache Residency Manager is enabled after the upgrade in the case where the LU is used as a non-Cache Residency Manager, the subsystem will be placed in a state in which a warning is kept issued.
  It is necessary to add the Cache memory to be installed at the upgrade work when it is used together with Copy-on-write SnapShot or Cache Partition Manager, so that refer to Table 3.3.2.

Deleted: • When executing a updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.¶

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Table 3.3.1 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is used

Capacity of Turbo LU	Capacity of cache memory installed in Hitachi TagmaStore® AMS 200™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 500™ after upgrade (M bytes/controller)	Remark
1 to 302,400	1,024	1,024 or more	-
	2,048	2,048 or more	
302,401 to 463,680	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	3,072 or more	
463,681 to 1,048,320	2,048	2,048 or more	-
1,048,321 to 1,370,880		3,072 or more	It is necessary to add the Cache memory.

- When Copy-on-write SnapShot and Cache Partition Manager of the priced options are used continuously after the upgrade, it is necessary to add the Cache memory to be installed as shown below.

Table 3.3.2 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used

Condition of upgrade	Capacity of cache memory installed in Hitachi TagmaStore® AMS 200™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 500™ after upgrade (M bytes/controller)
When Copy-on-write SnapShot is used continuously after the upgrade	1,024	2,048 or more
	2,048	3,072 or more
When Cache Partition Manager is used continuously after the upgrade	1,024	2,048 or more
	2,048	3,072 or more

- When the upgrade operation is performed leaving Copy-on-write SnapShot valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When the upgrade operation is performed leaving ShadowImage in-system replication valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When the upgrade operation is performed leaving TrueCopy remote replication valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When making the upgrade leaving Hitachi TrueCopy remote replication enabled, do not upgrade both of the local and remote subsystems at the same time for security. However, if the splits of the pairs on both local side and remote side are confirmed, there is no problem to execute the upgrade at the same time.
- When upgrading one of the two disk array subsystems paired by Hitachi TrueCopy remote replication which is left enabled, the deliberate shutdown must be executed for one of the two disk array subsystems to be upgraded but it is not necessary for the other disk array subsystem not to be upgraded.

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- When performing the upgrade operation with TrueCopy remote replication enabled, it is required to change the management information on the other array subsystem side which becomes a pair (not the array subsystem performing the upgrade but the one used as other pair) because TrueCopy remote replication manages the information of the array subsystem which becomes a pair.
  For example, when the "B" shown in Figure 3.3.1 is upgraded, update of the microprogram and a change of the management information are also required for the "A".

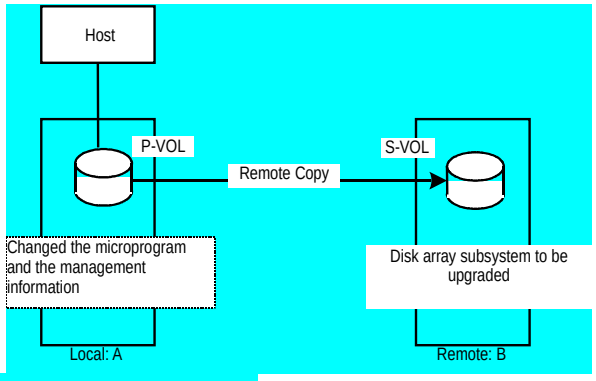


Figure 3.3.1 Paired Disk Array Subsystems

- When the Hitachi TagmaStore® AMS200 to be upgraded is the iSCSI interface system configuration, do not change the port which connects the iSCSI interface cable before and after the upgrade.
- It is required to change the setting of the host computer, the peripherals, the application software and the like in some cases because if the serial number of the array subsystem is changed in the upgrade work, WWN (iSCSI Name in case of iSCSI connection) is also changed at the same time. Refer to "5.1 For Setting Changes in Host Computer and Others" (SUP 05-0000) for the setting changes.
- When Hitachi TagmaStore® AMS 200™ to be upgraded is an external storage of SANRISE Universal Storage Platform (USP)/SANRISE Network Storage Controller (NSC), the serial number of the subsystem and WWN of the Fibre Channel I/F of upgraded Hitachi TagmaStore® AMS 500™ are changed, so that SANRISE USP/NSC cannot recognize the LU of Hitachi TagmaStore® AMS 500™. Therefore, when upgrading Hitachi TagmaStore® AMS 200™, which is an external storage of SANRISE USP/NSC, perform the upgrade work following the procedure for the SANRISE USP/NSC maintenance manual (refer to EXTERNAL STORAGE MAINTENANCE SECTION "2. Maintenance for External Storage") before upgrading.
- When Power Saving of the priced option is used, if you perform the upgrade after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host after replacing the microprogram and starting the array subsystem. Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then perform the upgrade.
  If the spin-down fails, execute the spin-down again.

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3.4 Upgrade Work

⚠ CAUTION

Touching heat sinks or ICs may cause injury. Be sure to handle with care.

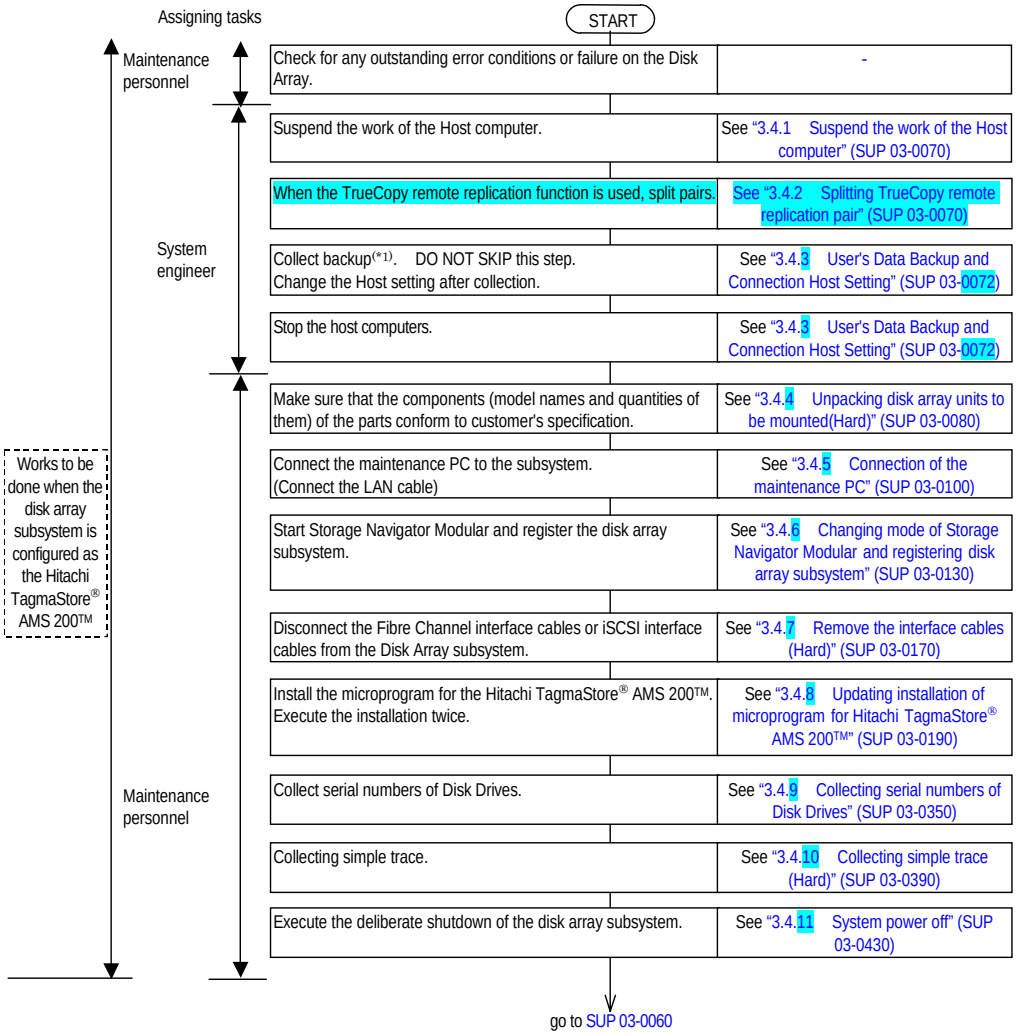
CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts. Otherwise, the static electrical charge on your body may damage the parts.

NOTE : Make the upgrade with the power turned off irrespective of whether the system (host computer) is powered on or off.

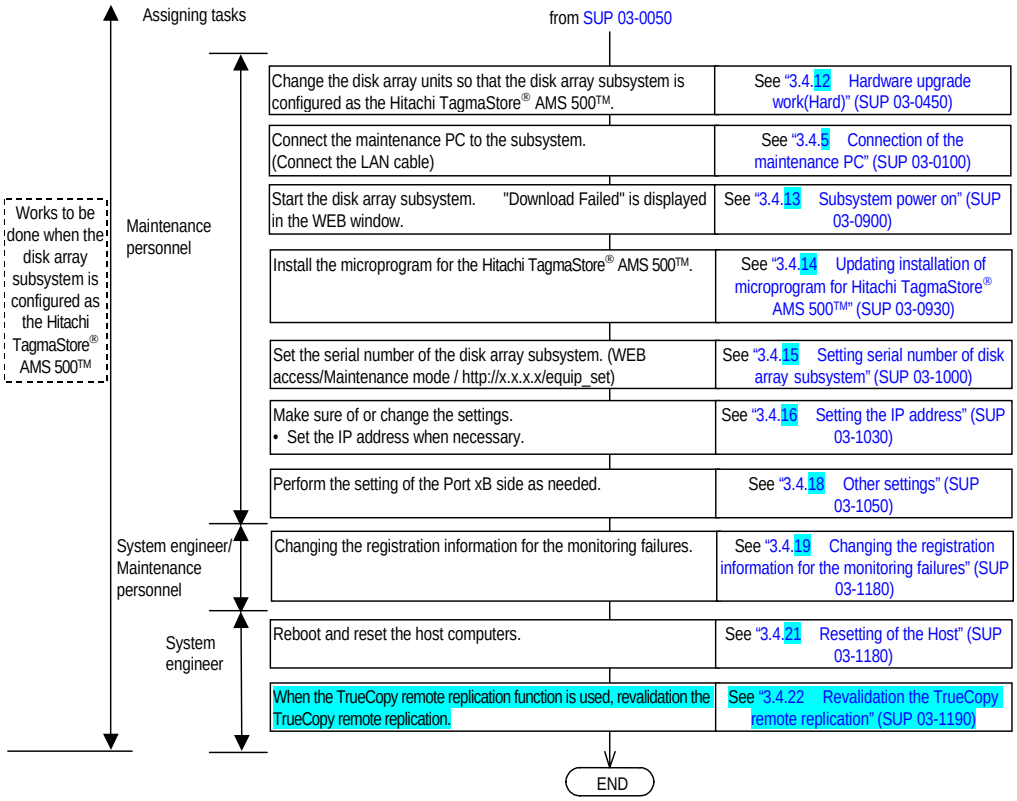
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The procedure for upgrading the Hitachi TagmaStore® AMS 200™ to the Hitachi TagmaStore® AMS 500™ is shown below.
Execute the procedure after making sure of the work to be done in each step.



*1 : Maintenance personnel should check if customer has executed user data backups. Without the backups, the upgrade cannot be executed.

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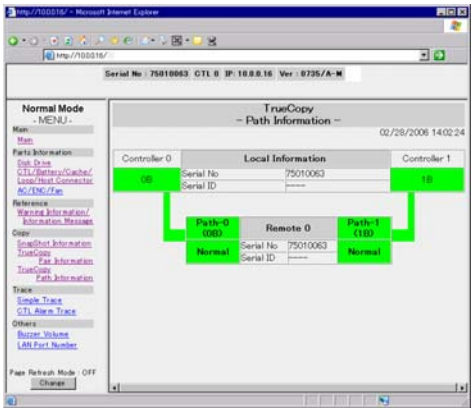
3.4.1 Suspend the work of the Host computer

Suspend the work of the Host computer.

3.4.2 Splitting TrueCopy remote replication pair

This operation is not required when Hitachi TrueCopy remote replication is not used.
When making the upgrade leaving TrueCopy remote replication enabled, a pair splitting must be done before executing the deliberate shutdown of the disk array subsystem.
The procedure is shown below.

(1) Check if the path status is normal using the WEB.
Procedure for Confirming Log Messages:
It switched to the following window by clicking the path of [Summary of Exchangeable Part Statuses] on the main window, and the details of the path status are displayed.
It also switches to the following window by clicking [TrueCopy Path Information] of the menu frame on the main window, and the details of the path status are displayed.
For the maintenance operation for replacement and the recovery method, perform the recovery according to (Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170)).



(2) Execute the Pairsplit command, perform the pair split, and check that the change to PSUS/SSUS is completed.
It explains the method to split the pair of TrueCopy remote replication.
(a) Set the group name in the configuration definition file as "vg01." Split the TrueCopy remote replication pair in the PAIR status with the pairsplit command.

```
c:¥horcm¥etc>pairsplit –g vg01
```

Figure 3.4.1 Example of Pairsplit Command Entry

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(b) Make sure of the status and configuration of the pair that has been split by executing the pairsplit command.

```
c:¥horcm¥etc>pairdisplay –g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)      (CL1-A , 1,   1)    174       1..P-VOL PSUS NEVER ,   175       2   -
vg01     oradb1(R)      (CL1-B , 1,   2)    175       2..S-VOL SSUS NEVER ,-----        1   -
```

The pair of TrueCopy remote replication could be split. Refer to Chapter 4 of "RAID Manager System Administrator's Guide (TagmaStore® WMS/AMS series)" for the details of the pairsplit command and the option.

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3.4.3 User's Data Backup and Connection Host Setting

There is the possibility of loss of user data if the upgrade procedures fail. To prepare for an emergency, all the Disk Drive data mounted on Hitachi TagmaStore® AMS 200™ should be backed up.

NOTE : Maintenance personnel must check if customers have executed users' data backups.

After the backup is completed, execute the Host setting change.
For notes to set each Host, refer to "5.1 For Setting Changes in Host Computer and Others" (SUP 05-0000).
Please stop the host computers.

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3.4.4 Unpacking disk array units to be mounted(Hard)

Unpack the RKM to be mounted to compose the configuration of the Hitachi TagmaStore® AMS 500™. The procedure is shown below.

CAUTION

- The unpacking should be done by two or more personnel to prevent turning over of the subsystem or being caught under the subsystem.
- Work carefully because the weight of the single RKM is about 58 kg.

(1) Unpacking the RKM.

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rain water.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

Figure 3.4.2 shows the subsystem within the outer package.

(a) Remove the outer package and packing materials.
(b) Take the subsystem out of the polyethylene bag.
(c) Remove tapes, etc. applied to the subsystem.
(d) Remove desiccating agent from the lower of the subsystem.
(e) Check the exterior of the subsystem visually for distortion or damage owing to the transport.

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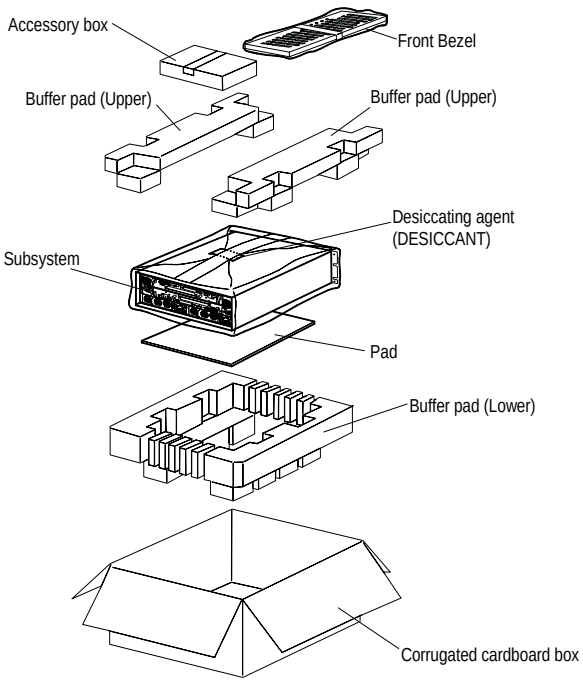


Figure 3.4.2 Packed Subsystem

(2) Check the contents of the package

(a) Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

(b) The key for the front bezel supplied with the subsystem must be kept by service personnel in order to prevent users from maintaining the subsystem. (The key for Front Bezel is used to mount and dismount Front Bezel.)

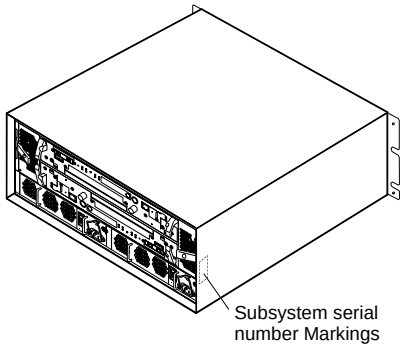


Figure 3.4.3 Locations of Subsystem Serial Number Markings

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3.4.5 Connection of the maintenance PC

Connect the maintenance PC to the disk array subsystem.
The procedure is shown below.

(1) Checking the LAN environment setting

(a) Make sure that the Storage Navigator Modular has been installed. (Make sure that the activation file startsnm.bat exists.)

(b) Check the LAN environment setting for the PC

- Make sure that the following settings have been made, or change the settings to the following.
  For the maintenance PC, set the IP address to 10.0.0.xxx as shown in No. 1.
  If the maintenance PC cannot establish a connection, set the value to 192.168.0.xxx as shown in No.2 to 5.
  If not connected yet, refer to Maintenance Manual Troubleshooting "3.4 Procedure for specifying maintenance port IP address" (TRBL 03-0100).

No.	Subsystem (LAN maintenance port)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL0 : 192.168.233.16 CTL1 : 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL0 : 172.23.211.16 CTL1 : 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL0 : 10.197.181.16 CTL1 : 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

- Manual change of the network parameter of the Maintenance port
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

NOTE: However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
The network address set to the maintenance port cannot be used for the LAN device to be connected to the User management port via the Gateway.
Therefore, use a network address other than that set for the maintenance port.

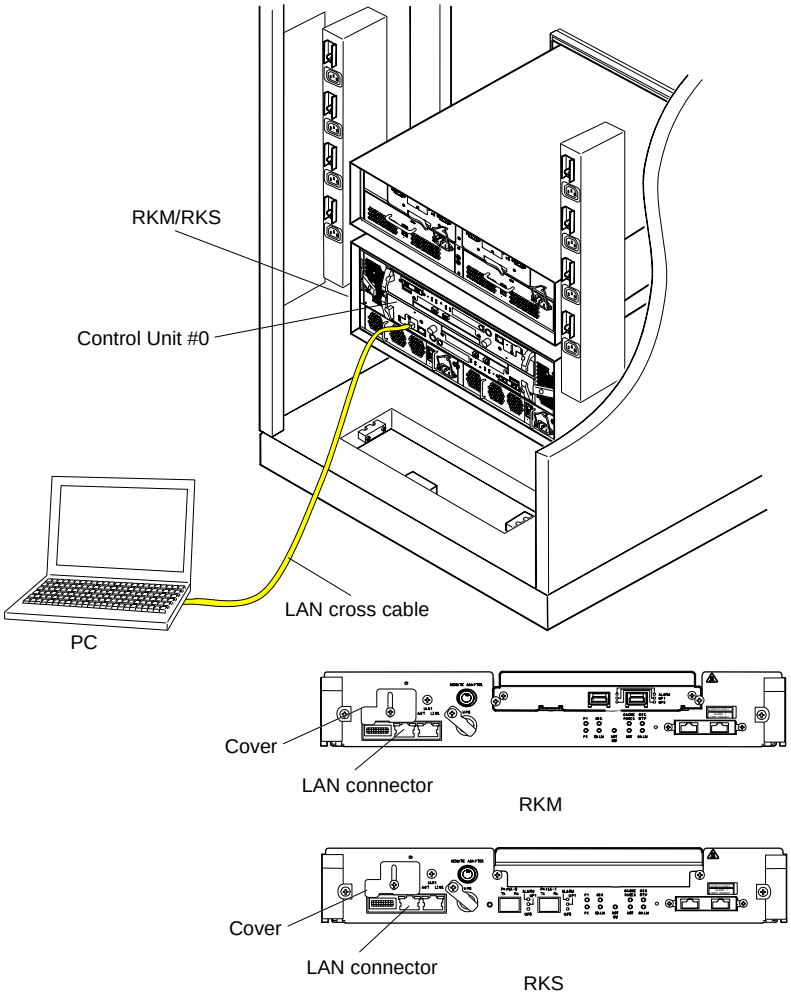
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(2) Connecting the LAN cross cable0

Remove the LAN Cover of the Control Unit #0 in the RKS and connect the PC and the subsystem with the LAN cross cable.



*1 : The rackmount model (system configuration of the Fibre Channel interface) is shown as an example.

Figure 3.4.4 Connecting the LAN Cross Cable

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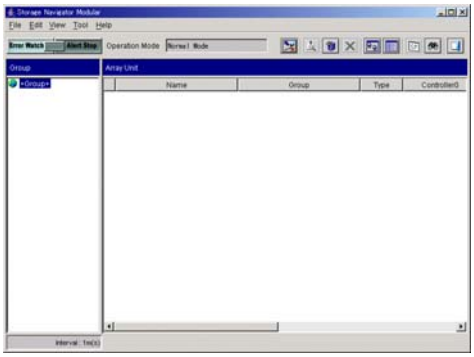
3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem

Register the disk array subsystem using Storage Navigator Modular.
The procedure is shown below.

(1) Activating the Storage Navigator Modular

(a) Execute the batch file or shell script for activating the Storage Navigator Modular.
In the case of Windows®, activate the batch file, startsnm.bat.

(b) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed(‡1).



In the case of Windows®, the prompt window is also displayed.
The prompt window has nothing to do with operation of Storage Navigator Modular. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.

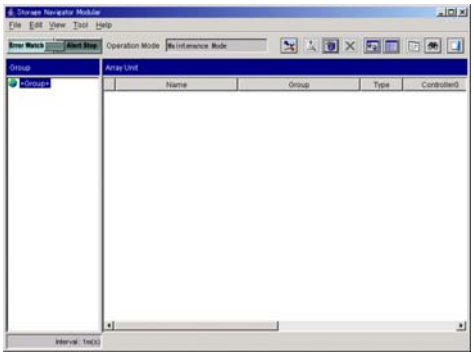
‡1 : The mode change cannot be done at the time of the initial activation of the Storage Navigator Modular. A registration of a password validates the mode change.

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(2) Change the Operation Mode from the Normal Mode to the Maintenance Mode.

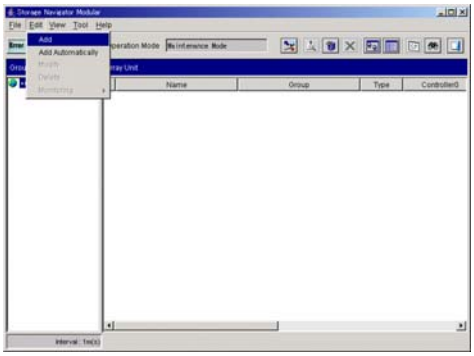
(a) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.

Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.



(3) Registering the disk array subsystem

(a) Select [Add] in the main window or click [: Add].

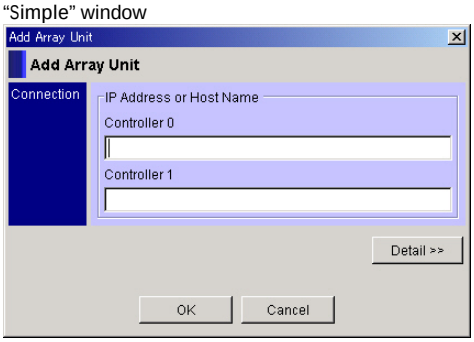


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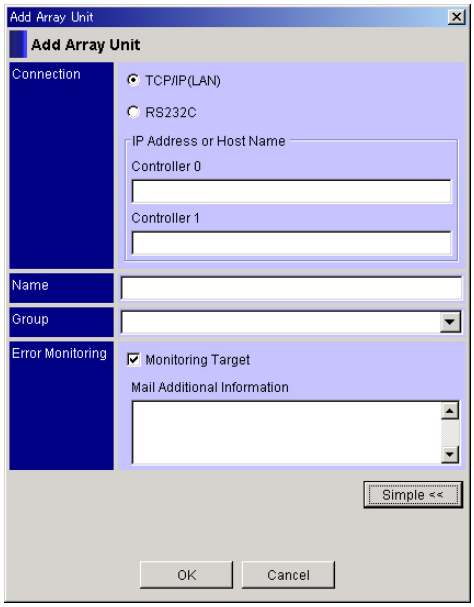
(b) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.
• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select TCP/IP (LAN) connection to be used for the disk array subsystem. RS232C is not supported in DF700.

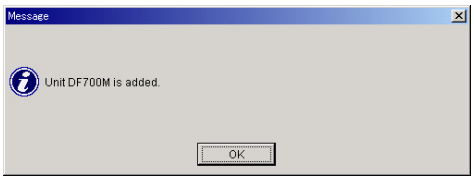
[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _). The maximum number of the groups allowed to be registered is 200. The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

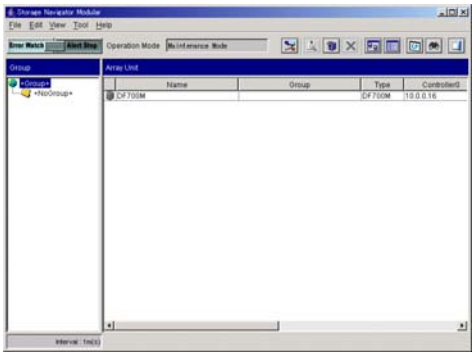
[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

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(c) When a message informing of a completion of the registration is displayed, click the [OK] button.



(d) The updated main window is displayed.



When an entry has been made in [Group Name], the group name is displayed in the tree diagram on the right side of the window. A clicking on the group name displays an icon(s) of the disk array subsystem(s) registered in the group.
There are two types of icon of the disk array subsystem as shown below: an icon for the dual system and that for the single system.

• Icon for the dual system : 

• Icon for the single system : 

The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

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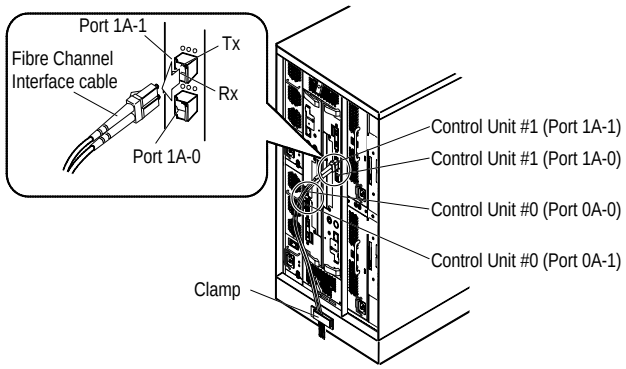
3.4.7 Remove the interface cables (Hard)

To execute the subsequent operation, Fibre Channel Interface cables and iSCSI cables should be disconnected. If connected, the other connected devices may be affected whenever the Disk Array subsystem reboots.
Disconnect all the Fibre Channel interface cables and iSCSI cables connected to the Disk Array subsystem (on the side of connecting to the Control Unit only).

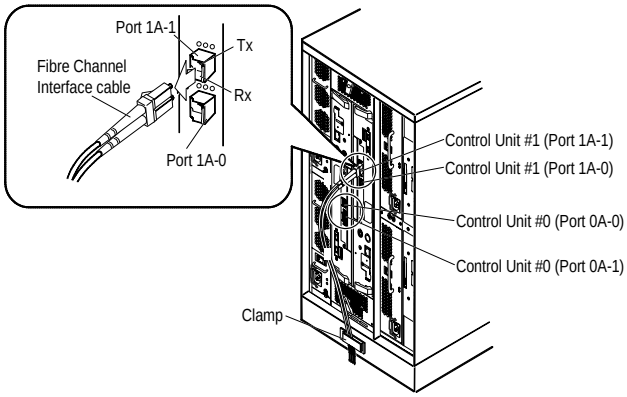
NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

- Floor Model(When the Hitachi TagmaStore® AMS 200™ is the system configuration of the Fibre Channel interface)

(a) Remove the interface cable to the Clamp (Fibre). When removing the Fibre Channel interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.



*1 : The figure shows the case where the FC Interface Board is not added in the Control Unit of the RKS.



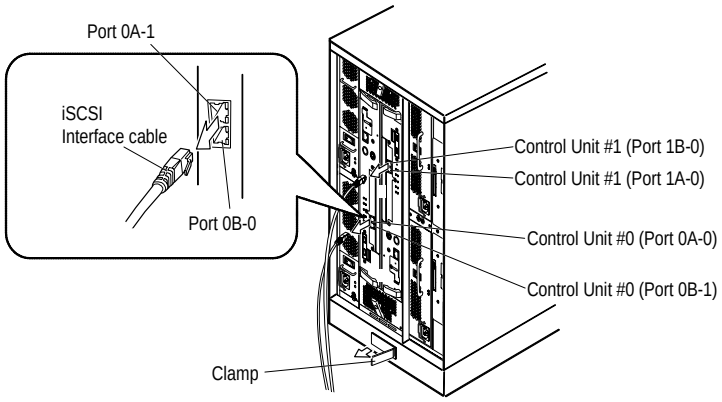
*1 : The figure shows the case where the FC Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (1)

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- Floor Model(When the Hitachi TagmaStore® AMS 200™ is the system configuration of the iSCSI interface)

(a) Remove the interface cable to the Clamp.



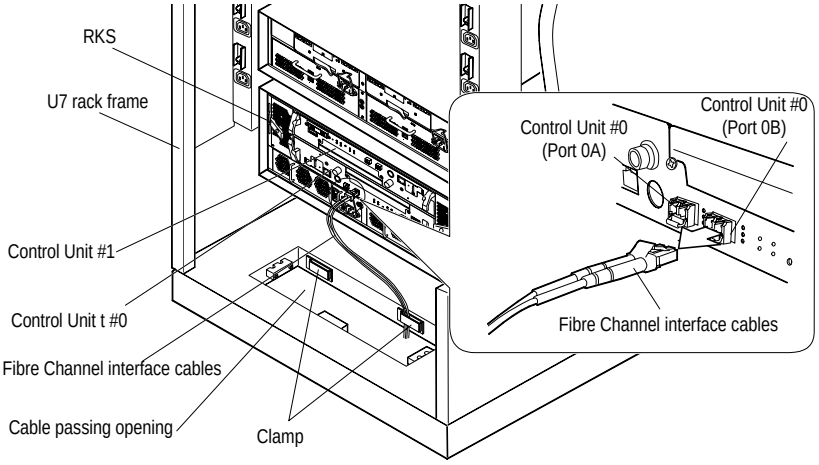
*1 : The figure shows the case where the iSCSI Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (2)

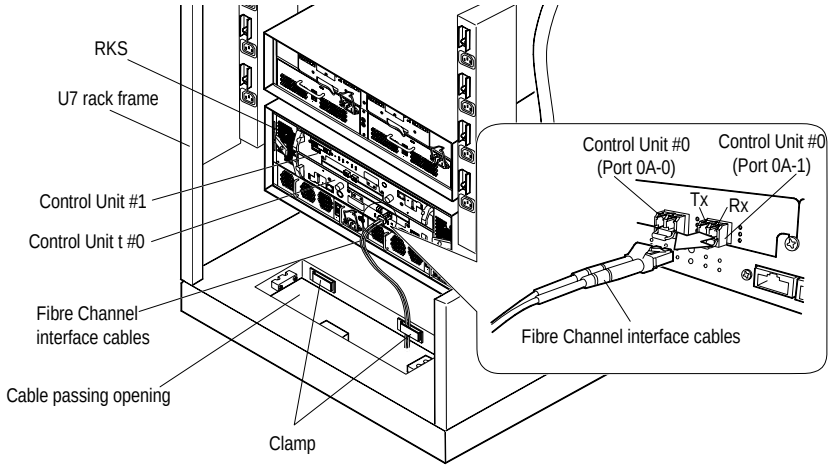
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- Rackmount Model(When the Hitachi TagmaStore® AMS 200™ is the system configuration of the Fibre Channel interface)

(a) Disconnect the Fibre Channel interface cable connected to the Control Unit(RKS). When removing the Fibre Channel interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.



*1 : The figure shows the case where the FC Interface Board is not added in the Control Unit of the RKS.



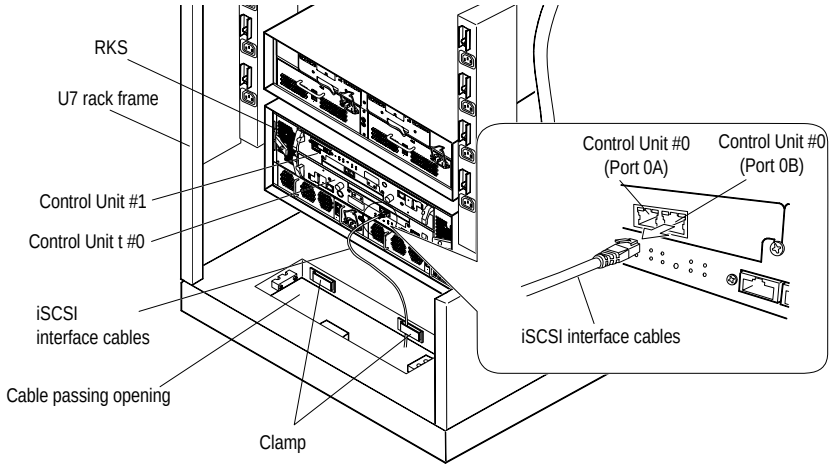
*1 : The figure shows the case where the FC Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (3)

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- Rackmount Model(When the Hitachi TagmaStore® AMS 200™ is the system configuration of the iSCSI interface)

(a) Disconnect the iSCSI interface cable connected to the Control Unit(RKS).



*1 : The figure shows the case where the iSCSI Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (4)

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3.4.8 Updating installation of microprogram for Hitachi TagmaStore® AMS 200™

Install the microprogram for the Hitachi TagmaStore® AMS 200™ (same revision with the one for Hitachi TagmaStore® AMS 500™) using the Storage Navigator Modular.
Check if the microprogram revision is 0712/A-S or later.
The updating installation must be executed twice in order to completely change information of the microprograms of two generations.
The procedure is shown below.

(1) Preparation for update installation of microprogram

(a) Set up the maintenance PC before starting the update installation.

The setting up is completed when the installer stored in the CD-ROM of the microprogram is executed.
Outline of the setting up is shown below.

- Installation of the JRE 1.3.1_03
- Setting of the security policy file
- Copying of the microprogram from the CD-ROM for the microprogram installation to the maintenance PC

(b) Prerequisites for setting up of a maintenance PC

Prerequisites concerning the user ID of Windows® are as follows.

- The user ID of Windows® at the time when the microprogram is installed in the maintenance PC must be identical with that at the time when a maintenance work is done.

A prerequisite of a drive for booting the OS of the maintenance PC

- The drive for booting the OS must be the C drive.

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(2) Hierarchy of Microprogram Storage Directories

The hierarchical structure of Microprogram storage directories is shown below.
The structure of directories of the CD-ROM for installing the Microprogram is the same as that shown below.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:\diskarray-microprogram\microprogram."
When installing the Microprogram, specify the unified version directory.

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The Microprogram becomes unable to be installed if the directory name is changed.

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(a) Java error codes displayed at the time of update installation and actions for coping with them.

When the PC does not satisfy the prerequisite shown in Item (2)(b), a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

Table 3.4.1 Java error codes

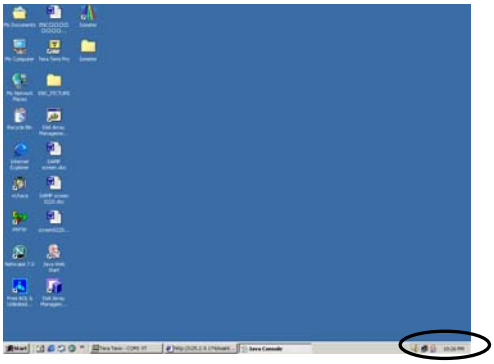
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram is selected. Cause estimated • A drive for booting the OS is not the c drive. • The user name of Windows® at the time when the microprogram was installed in the maintenance PC is not identical with that at the time when the microprogram is updated, or two-byte characters (full size characters or Japanese characters) are used to define the user name	① Check if the drive for booting the OS is the c drive. (Refer to the (i) of (2) in Subsection 3.4.7) In the case of the dual boot, boot Windows® using the c drive and perform the installation again. ② Check if the user name of Windows® at the time when the microprogram is installed in the maintenance PC is identical with that at the time when the microprogram is updated and if two-byte characters (such as full size characters and Japanese characters) are not used. If an illegal specification has been made, perform the logon over again using an appropriate user name and perform the installation again after connecting the browser.
1219	An error occurred during the communication with the subsystem. Confirm the subsystem status and the LAN environment.	Time when the error occurs • The error occurs when the resource for the LAN cannot be ensured. Cause estimated • The error occurs because the resource (memory) of the maintenance PC is insufficient.	① Reboot the subsystem and the maintenance PC and quit unnecessary application programs. Make sure that the subsystem is in the READY status, place the subsystem in the Maintenance mode, and perform the installation again. ② If the error recurs in spite of the operations above, replace the maintenance PC and perform the installation over again from the beginning. Use a PC whose memory capacity is as large as possible.

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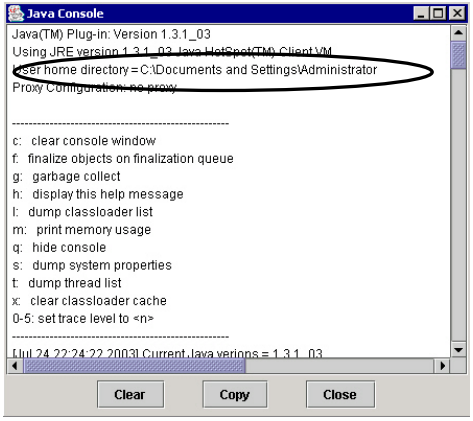
(i) Method for checking the drive for booting the OS

A method for checking the boot drive when the Java message (message code: 1216) is issued is shown below.

① Double click the [: Java icon]on the task tray at the bottom right in the Service PC window.



② Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: *****…).



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(d) Procedure for setting up the maintenance PC

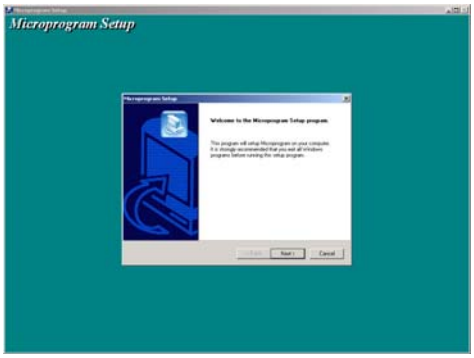
(i) Double click the "Program\micro upload\micro setup\Setup.exe" of the CD-ROM for microprogram installation.

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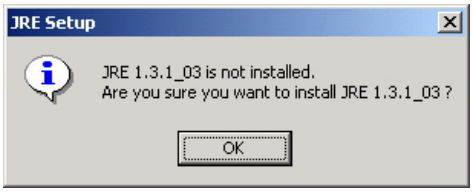
Deleted: ??

Deleted: ??

(ii) The initial window of the setting up appears.
When the [Next] button is pressed, the JRE 1.3.1_03 installer is activated in the case where the JRE 1.3.1_03 is not installed yet.
In the case where the JRE 1.3.1_03 has been installed, windows® shown in Steps (iii) to (vii) are not displayed.

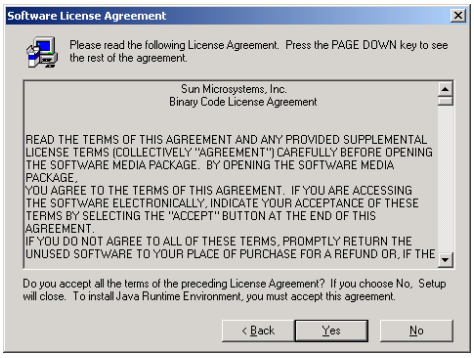


(iii) A dialog box for asking confirmation of starting the JRE 1.3.1_03 installer. Click the [OK] button.

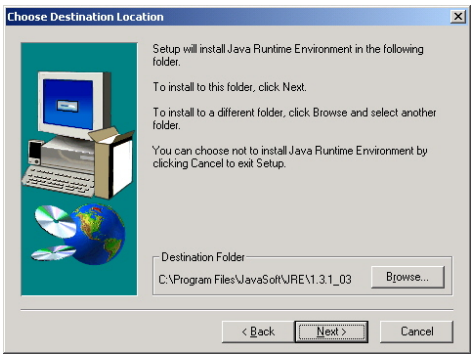


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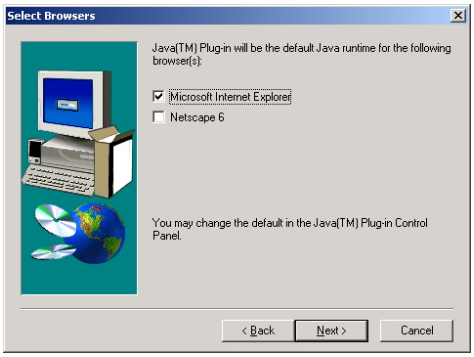
(iv) A window of product licensing contract is displayed. Click the [Yes] button.



(v) A window for selecting a directory in which the JRE 1.3.1_03 is to be installed. Select the directory for the installation and click the [Next] button.

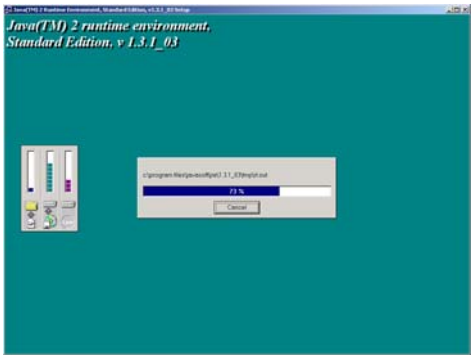


(vi) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



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(vii) Installation of the JRE 1.3.1_03 is started.



(viii)After the installation of the JRE 1.3.1_03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.

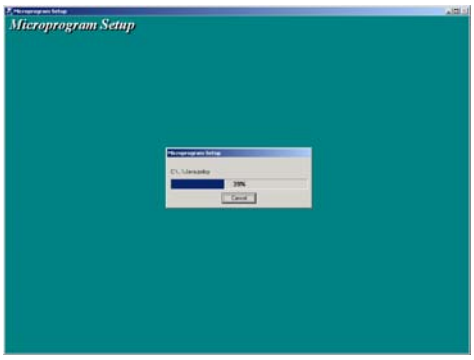




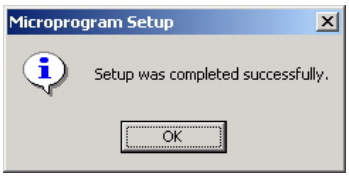
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(ix) The microprogram is copied on the maintenance PC.

Create a directory to which the microprogram is to be copied directly under the "C:\diskarray-microprogram\microprogram" for each microprogram revision and copy the microprogram file with the subdirectories (DF700M, DF700S, ENC, ---) into the directory.



(x) The setting up is completed. Press the [OK] button.



NOTE : • Note that the settings of the security policy file is changed when the maintenance PC is set up.
• If the microprogram is transferred to a directory other than "C:\diskarray-microprogram\microprogram" which is a directory copied by the installer, the installation cannot be done. Therefore, care should be taken.
• Do not change a name of the unified version directory(‡1) or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

‡1 : For the unified version directory, refer to "3.4.8 (2) Hierarchy of Microprogram Storage Directories" (SUP 03-0200).

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(3) Install the microprogram for the Hitachi TagmaStore® AMS 200™.

(3-1) Procedure for download

(a) Matters to be made sure of before starting update installation.

Make sure of the following before starting the update installation.

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem. (refer to Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).)
- Check that the READY LED (green) on the Front Bezel of the Basic Chassis lights up. When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 50 minutes until it lights up because the automatic download of the ENC/SENC firmware is being executed. When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 85 minutes until the READY LED (green) on the front of the Basic Chassis lights up because the automatic download of the ENC/SENC firmware or the update of the flash program is being executed.
  Also, check that the WARNING LED (orange) on the Front Bezel does not light up.
- Also, check that the WARNING LED (yellow) on the Front Bezel does not light up or blink at low-speed. When it lights up or blinks at low-speed, connect it to WEB, and perform the maintenance according to the information message on WEB. After the recovery is made, install the microprogram in order to update it.
- Make sure that the system copy is not being executed through the information message (I140xy System copy started (x: Unit number, y: HDU number)) of the WEB.
  If it is in the middle of system copy, please wait until that is completed and update installation of microprogram.

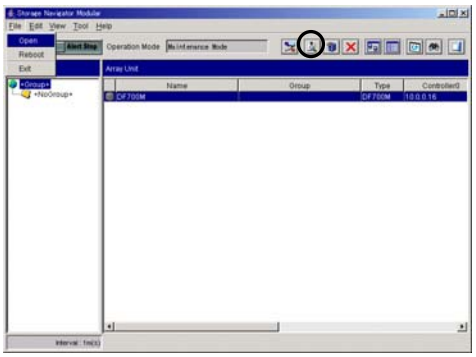
(b) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

(c) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

(d) Click an icon of the disk array subsystem you want to set in the main window.

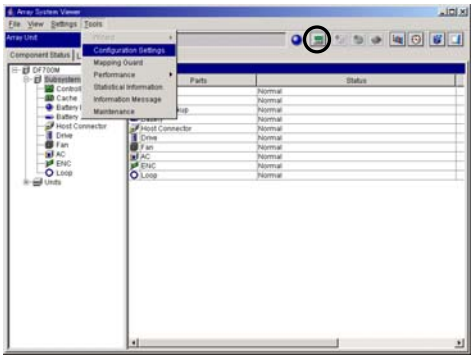
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

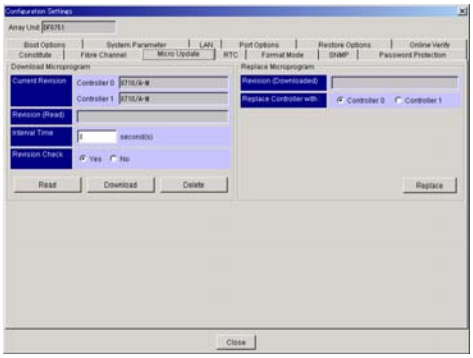


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(e) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



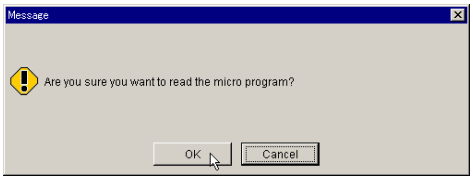
(f) Click the [Micro Update] tab.



(g) Read in the microprogram to the service PC in which Storage Navigator Modular is installed. Click the [Read] button.
When a microprogram revision is displayed in the [Revision(Read)] box, the microprogram has already been read in. When only the Unified version directory(‡1) storing the microprogram is specified, the whole microprogram is read in automatically.

(h) Since a message asking for confirmation whether or not to read in the microprogram, click the [OK] button.

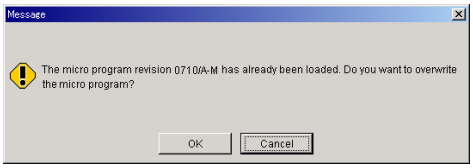
NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the download of the microprogram again from the beginning.



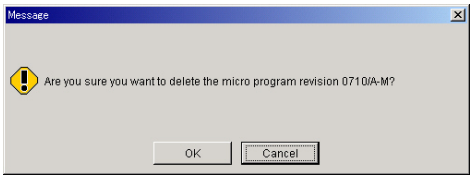
‡1 : For the unified version directory, refer to "3.4.8 (2) Hierarchy of Microprogram Storage Directories" (SUP 03-0200).

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In the case where the microprogram has already been read in, the message asking for the confirmation is displayed. When you click the [OK] button, the microprogram is overwritten. When you abort the reading in, click the [Cancel] button.



When you eliminate the microprogram that has already been read in to the computer, click the [Delete] button. Since the message asking for confirmation is displayed, click the [OK] button.



(i) Since a window for specifying the directory in which the microprogram to be read in is stored is displayed, specify the Unified version directory(‡1) . When you click the [OK] button, reading in of the microprogram is started.
Examples of the path entry are shown below.

When using Windows®:

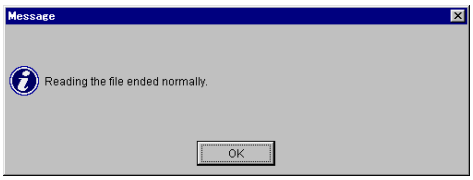
c:/diskarray-microprogram/microprogram/micro/0710A

Unified version directory in the hard disk in which the micro program is copied.

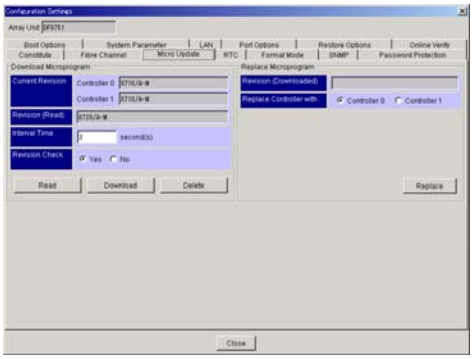
‡1 : For the unified version directory, refer to "3.4.8 (2) Hierarchy of Microprogram Storage Directories" (SUP 03-0200).

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(j) Since a message is displayed when the reading in of the microprogram is completed, click the [OK] button.

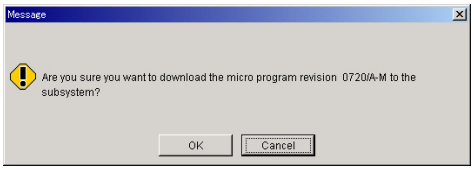


The revision of the microprogram that has been read in is displayed in the [Revision(Read)] box.



(k) Click the [Download] tab.

(l) The confirmation window is display. Click the [OK] button.

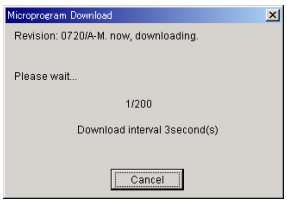


The confirmation window is display. Click the [Yes] button.

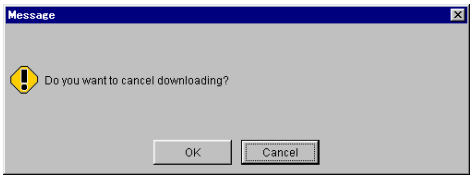


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The download of the microprogram starts by clicking the [Yes] button, and the dialog is displayed.



When you abort the downloading, click the [Cancel] button.
A message asking for confirmation is displayed. When you click the [OK] button, the downloading is aborted.
When you click the [Cancel] button, the downloading is continued.



(m) Since a message is displayed when the downloading is completed normally, click the [OK] button.



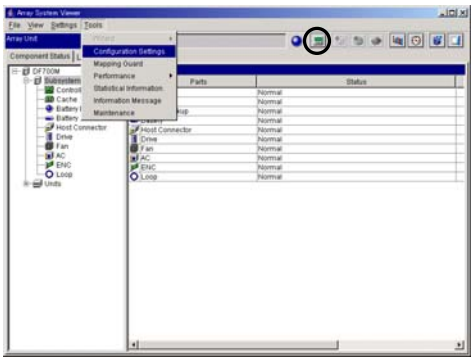
NOTE : After the microprogram is downloaded, be sure to restart the disk array subsystem or replace the microprogram. If the Control Unit board is replaced in the online mode before restarting the disk array subsystem or replacing the microprogram, the replaced Control Unit may be detached. When the subsystem is burdened with a heavy I/O load by a host at the time of the downloading, the downloading may be terminated abnormally. Perform the downloading again.

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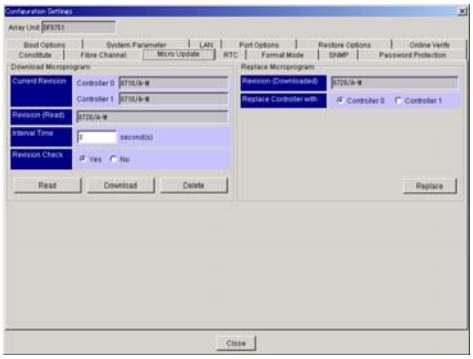
(3-2) Replacing the microprogram

Replace the microprogram that was downloaded to the disk array subsystem with the microprogram installed in the Control Unit. When making replacement, be sure to replace the microprograms of the both Control Units 0 and 1. When the microprogram of one of the Control Units is replaced and the unit window of Storage Navigator Modular is closed, the unit window may be opened no more. When the unit window is not opened, replace the microprogram after changing the subsystem configuration by eliminating the IP address of the Control Unit whose microprogram has been replaced using an IP address of the Control Unit whose microprogram is not replaced yet.

(a) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

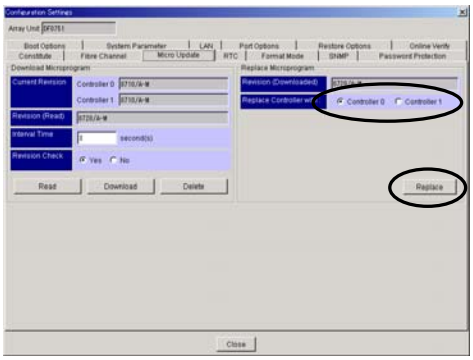


(b) Click the [Micro Update] tab.



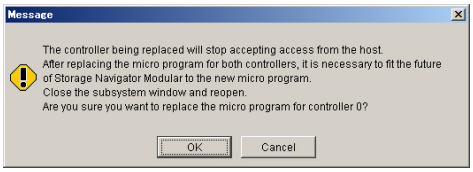
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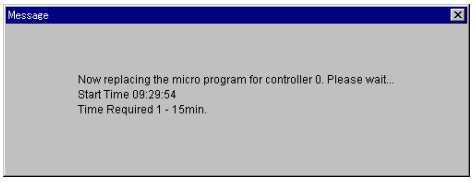
(c) Select the Control Unit whose microprogram is to be replaced and click the [Replace] button.



(d) The confirmation window is display. Check if the selected Control Unit is correctly displayed and click the [OK] button.

NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the replace of the microprogram again from the beginning.





Click the [OK] button according to the dialog message.



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(e) When the replacement of the microprogram terminates normally, a completion message is displayed. When the [OK] button is clicked, the revision of the replaced microprogram is updated and the window is displayed.



NOTE : When making the access from the host accepted by the instruction from Storage Navigator Modular, the following message may be displayed if it is not operated for 20 minutes or more in the case where Account Authentication is valid, and it may not be completed normally. Perform the dummy replacement (‡1) of the Control Unit whose microprogram was replaced to make the access from the host accepted.
If the access from the host is made accepted when the replacement of the microprogram is completed, the dummy replacement (‡1) is unnecessary.



(f) Replace the microprogram in the other Control Unit according to the procedure (c) to (e). When replacement of the both Control Units is terminated normally, the microprogram replacement of the disk array subsystem is completed.

NOTE : When the replacement of the microproram is made for only one of the dual Control Unit, the disk array subsystem is put in the status in which a warning is issued. The warning is called off when the other one of the dual Control Unit is replaced. When you replace the microprogram, be sure to make the replacement for the both Control Units continuously.

‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(g) Because the microprogram is managed by two generations, return to the procedure (3) reference place, and perform the update installation of the microprogram again.

NOTE : Because TrueCopy remote replication manages information stored in paired disk array subsystems, the path of the mate disk subsystem (not the subsystem being upgraded but the other one of the paired subsystems) is detached when TrueCopy remote replication is used.
When the subsystem "B" shown in Figure 3.4.6 is upgraded, the path of the subsystem "A" is detached.
The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
This is because the "A" becomes unable to access the "B" as a result that the "B" is placed in the Maintenance mode. Therefore, this is not a problem.
However, when the pair status is changed to PSUE, there may have been a mistake in operations that have been made. Recover the pair from the PSUE status referring to Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).

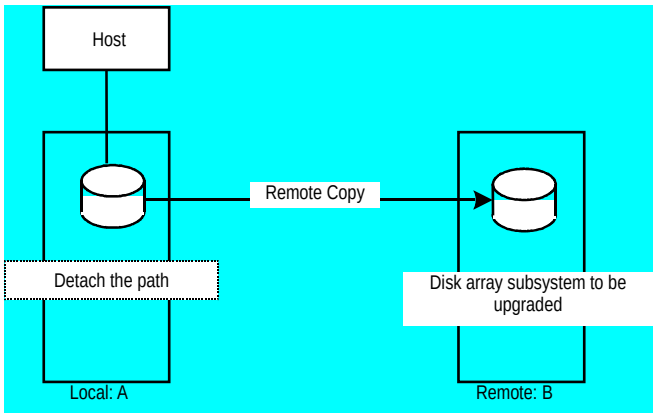


Figure 3.4.6 Paired Disk Array Subsystems (TrueCopy remote replication)

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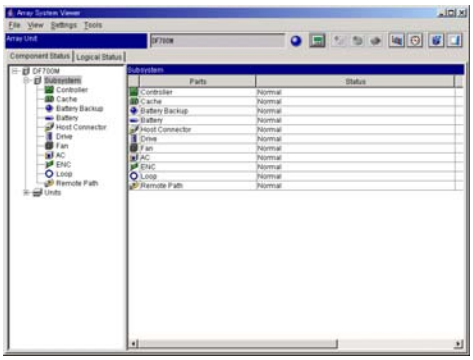
3.4.9 Collecting serial numbers of Disk Drives

A work to reinstall the Disk Drives at the same locations as those in the Hitachi TagmaStore® AMS 200™ is required as one of the hardware upgrade works ("3.4.12 Hardware upgrade work(Hard)" (SUP 03-0450)) included in the procedure for upgrading to the Hitachi TagmaStore® AMS 500™. Therefore, information on installation locations of the Disk Drives in the Hitachi TagmaStore® AMS 200™ must be got and recorded. Collect the serial numbers of the Disk Drives using Storage Navigator Modular.

(1) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular. ("3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120))

(2) Set the operation mode of Storage Navigator Modular as Maintenance mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130))

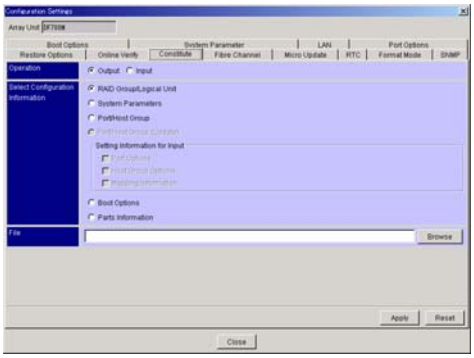
(3) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.



(4) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

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(5) Click the [Constitute] tab.



(6) Click the [System Parameter] radio button and [Output] radio button in the [Select Configuration Information] box.
(7) Check the [RAID Group/Logical Unit] radio button in the [Select Configuration Information] box.
(8) Click the [Browse] button, and specify the directory and file name to output the file of the configuration.
(9) Click the [Apply] button.

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(10) Open the configuration information file that has been got in Step (9) and make sure that the following information is output.

```
Array unit configuration information list.

DF Name : 174-175
Date : 2003/12/02 21:12:31
Micro Program Revision : 0710/A-S
Array Unit Type : DF700S
Serial Number : 73010055

---- RAID Configuration ----
RAID    RAID    Start Location          Number of HDU      Number of       Free Capacity
Group   Level   [Unit No.   HDU No.]  in parity group   parity group        [block]
 0       5          0           0              5                1             525680640

-- End

---- LU Configuration ----
     LU    Capacity  Status                    Staging  C-CTL   D-CTL   RG RAID      Capacity
      0     2097152  Normal                        512   0         0     0   5           1.0 GB

-- End

---- Drive Configuration ----
Location        Vendor ID   Product ID          Revision   Capacity    Status      Serial Number
Unit0 ,HDU0     HITACHI   HUS103073FLF210        D6D6       72GB        Normal     305B4910
Unit0 ,HDU1     HITACHI   HUS103073FLF210        D6D6       72GB        Normal     305B9100
Unit0 ,HDU2     HITACHI   HUS103073FLF210        D6D6       72GB        Normal     30532706
Unit0 ,HDU3     HITACHI   HUS103073FLF210        D6D6       72GB        Normal     305C5571
Unit0 ,HDU4     HITACHI   HUS103073FLF210        D6D6       72GB        Normal     30542348
Unit0 ,HDU5     HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     30545271
Unit0 ,HDU6     HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305C5229
Unit0 ,HDU7     HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305B6777
Unit0 ,HDU8     HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305B3188
Unit0 ,HDU9     HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305L1373
Unit0 ,HDU10    HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     30575398
Unit0 ,HDU11    HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305N2858
Unit0 ,HDU12    HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     305K8917
Unit0 ,HDU13    HITACHI   HUS103073FLF210        D6D6       72GB      Undefine     30575348

-- End

～～～～
(abbr.)
```

① [Drive Configuration]

[Location]: Shows a location where a Disk Drive is installed.

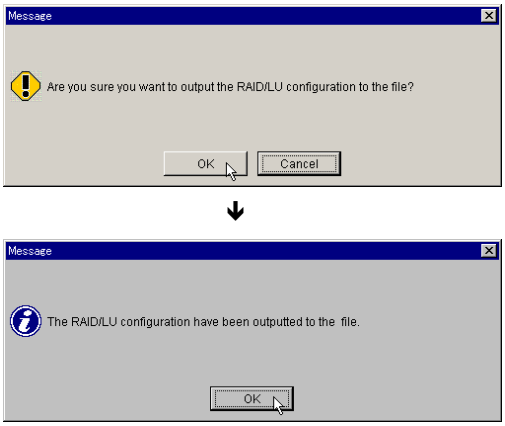
[Unit]: Unit ID#

[HDU]: Disk Drive#

[Serial Number]: Serial # (Disk Drive)

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(11) A message appears, confirming that the system parameter information is output with the specified file name. Click the [OK] button.



System parameter information is saved in the form of a text file with the specified file name.

NOTE : Store the file carefully because it will be required when the upgrade work is done.

(12) Return the window to the unit window by clicking the [Close] button.

(13) Close the unit window. Quit Storage Navigator Modular by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

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3.4.10 Collecting simple trace (Hard)

Collect the simple trace and keep it so that in case of failure. It can be investigated.
Collect the simple trace using the WEB.
The procedure is shown below.

(1) Before collecting the simple trace

(a) Items to be prepared

Collection is performed using the normal mode of WEB or Maintenance mode.
For connecting to the WEB, a PC terminal with Browser installed is necessary.
For collecting the simple trace, a Disk Drive with a space of 20 M bytes at least is necessary.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN-cross-cable.

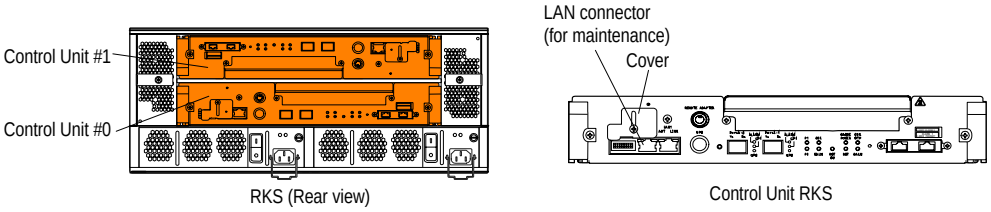


Figure 3.4.7 LAN Connector Position

(c) With Simple Trace Collection, the information of both controllers can be collected from one controller. Therefore, this function does not need to be performed from both Controllers. (As a file name during the collection, "smpl_trc0.dat" is provided for the collection from Control Unit #0, and "simpl_trc1.dat" for the collection from Control Unit #1".)

(d) Make sure that the WARNING LED (orange) on the Front Bezel is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)

(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] - [Cache] - [Clear Cache] in this order.

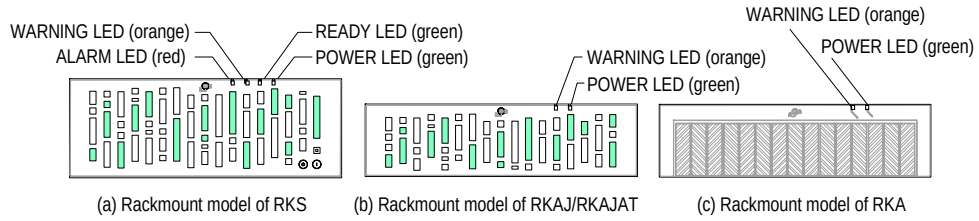


Figure 3.4.8 Indication Locations and Names of LED (Front Bezel)

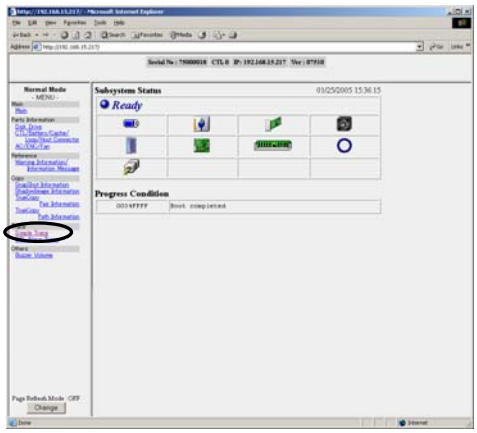
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(2) Procedure for a simple trace collection

(a) Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser. When the WEB has already been connected, update the page by pressing the Update button. (For the procedure for connecting the WEB, refer to DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)



(b) Collect the simple trace according to the WEB and the following procedure.
Click "Trace" in the menu frame of "Simple Trace".



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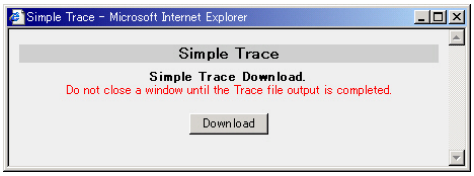
(c) When the “Simple Trace” is clicked, the following window is displayed.



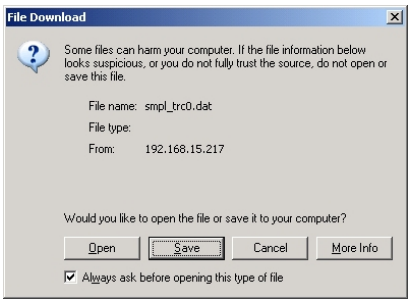
(d) When the [OK] button is clicked, the following window is displayed.



(e) The following window is displayed. Click the [Download] button.

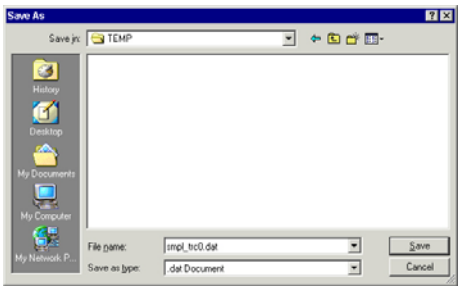


(f) The following dialog is displayed.
Click the [Save] button.



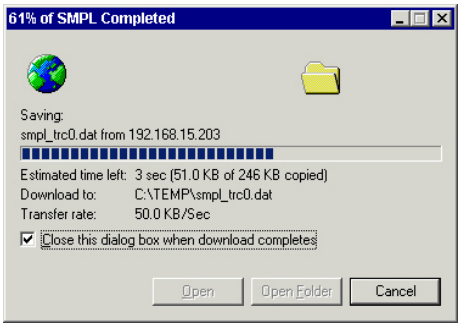
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(g) Select the place to save the file and file name (Default file name: CTL#0:smpl_trc0.dat, CTL#1: smpl_trcl.dat) and click [Save][‡1].

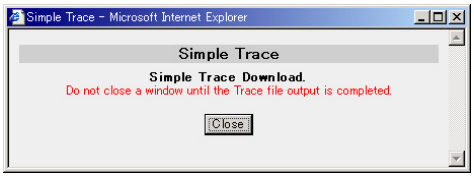


The down-loading is started and the progress indicating message window is displayed.

(h) The following window is displayed during execution download.



(i) The [Download] button changes to the [Close] button, so that, click the [Close] button and close the window when the download is completed.



In this procedure Simple trace is collected by WEB Normal mode. Similarly, Simple trace can be collected by WEB Maintenance mode through Menu Frame.
For entering Maintenance mode, refer to the DF700 Disk Array Subsystem Maintenance Manual WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

When the USB memory needs to store the simple trace information, refer to DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "7.6 Storing simple trace information in the USB memory" (TRBL 07-0230).

‡1 : There may be a case where the default file name is given as "ctla_trc0.dat..dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

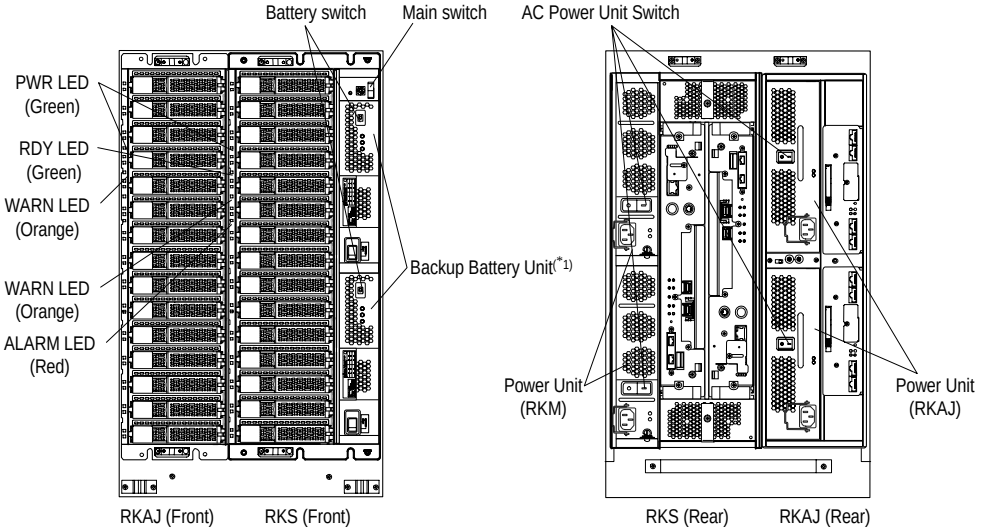
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3.4.11 System power off

Execute the deliberate shutdown of the disk array subsystem.
The procedure is shown below.

NOTE : Do not perform the planned shutdown (power-off) while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes).

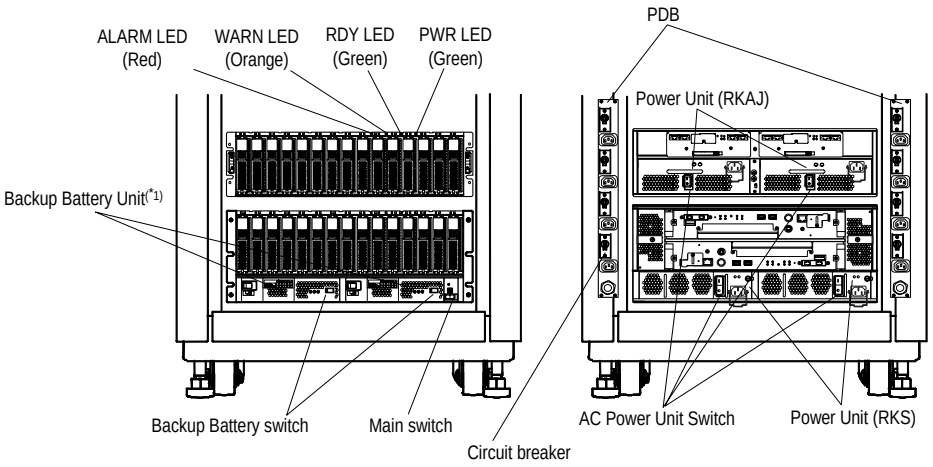
(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the front of the subsystem is off.
(3) All turn off the AC Power Unit Switch of the Power Unit.
(4) Turn off the battery switch of the Backup Battery Unit.
(5) All turn off the circuit breaker of the PDB.



*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the lower side of the subsystem.

Figure 3.4.9 Location of Switches for Power On (Floor Model)

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(a) RKS+RKAJ

*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the left side of the subsystem.

Figure 3.4.10 Locations of Switches for Power On (Rackmount Model)

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NOTE : Because TrueCopy remote replication manages information stored in paired disk array subsystems, the path of the mate disk subsystem (not the subsystem being upgraded but the other one of the paired subsystems) is detached when TrueCopy remote replication is used.
When the subsystem "B" shown in Figure 3.4.11 is upgraded, the path of the subsystem "A" is detached.
The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
This is because the "A" becomes unable to access the "B" as a result that the "B" is placed in the Maintenance mode. Therefore, this is not a problem.
However, when the pair status is changed to PSUE, there may have been a mistake in operations that have been made. Recover the pair from the PSUE status referring to Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).

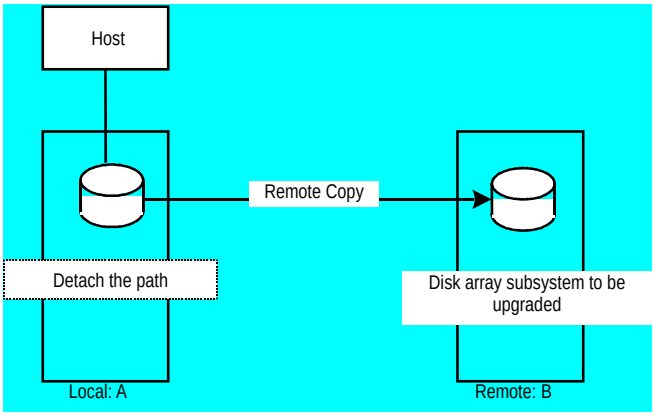


Figure 3.4.11 Paired Disk Array Subsystems (TrueCopy remote replication)

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3.4.12 Hardware upgrade work(Hard)

Replace some components with those for upgrading the disk array subsystem to the Hitachi TagmaStore® AMS 500™. Make the replacement above and have the customer keep the components that become unused because they are used in the configuration of the Hitachi TagmaStore® AMS 200™ only.
The procedure is shown below.

(1) Note on hardware upgrade works

(a) Perform the powering on/off operation correctly.

It is feared that user data is lost if the powering on/off operation is not done following the procedure correctly.
Since the power supplying system is duplicated, operate AC Power Unit Switch of the both systems when turning on/off the Power Unit.

⚠ CAUTION

Hazard exists that can cause an electric shock.
Start the work after making sure that the breaker in the power distribution box has been turned off.

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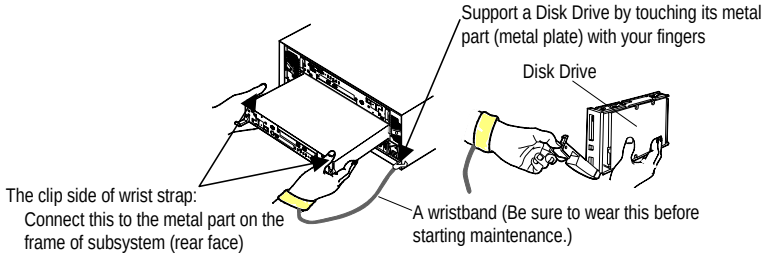
(b) Notes when Unpacking, Installing or Removing the Parts

For installing or removing the parts, do not apply any shock as the precise parts are installed. Be sure to wear a wrist strap connected to the chassis frame before starting the work and do not take it off until it is finished.

For installing the Disk Drive, Cache Memory, support it as touching the metal part at the side with the fingers of the hand that wears a wrist strap.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.
- When you install the Control Unit or a cache memory in the Control Unit, do the installation holding it by its sheet steel part with your hand(s) wearing the ESD grounding wrist band. The electrostatic charge can be discharged through your touch to the sheet steel part.



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(c) Notes on cable routing

(i) Handling of cables placed on the installation floor

- Protect the cables, which cannot be accommodated by the subsystem and thus laid on the floor or cross a passage, with the cable protection duct.
- For cables that relay between the subsystems, lay them on the floor and do not leave them from the floor.

(ii) Handling of under floor cables when the subsystem is installed on the free access floor.

- Give extra lengths to cables routed under the floor and do not make them float in the air.

(iii) Routing method

- Give a room for routing as earthquake and the like are considered.
- Give a room for routing not to disturb the part replacement for maintenance.
- Make the AC cables apart from each other and when they should be adjacent, do not make them in parallel but make them cross at right angle.
- When using a cable protection duct, be careful not to damage or cut cables by catching them.

(iv) Hold the connector to insert or pull out a cable. If the cable part is pulled, it may cause a failure.

(v) For connecting the Fibre Channel interface cable, the FC (ENC) cable, or iSCSI interface cable, bend it with a long radius (not less than 30mm) and do not give the load to the cable and the connector.

(d) Note on completing the work

Close all the external covers when the work is completed.

(The cover is to maintain the performance of the subsystem (radio wave noise suppression and others), so that be sure to keep all the external covers closed to operate the subsystem normally.)

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(2) Removing the Front Bezels and rear covers
In the case of the Floor Model, remove all the Front Bezels and rear covers. In the case of the Rackmount Model, remove the Front Bezel of the RKS that is installed only.

• Floor Model (Front Bezel)
A key is necessary to attach or remove the Front Bezel.

CAUTION

Remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.
(b) Pull the Front Bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the Front Bezel from the slots on the subsystem main body by shifting the bezel to the left and remove the bezel.

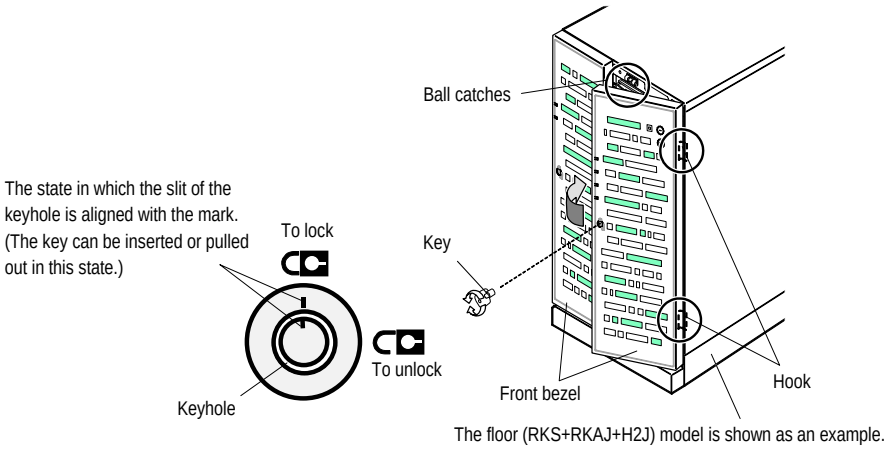
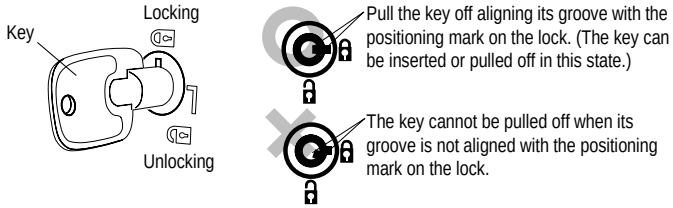


Figure 3.4.12 Procedure for Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

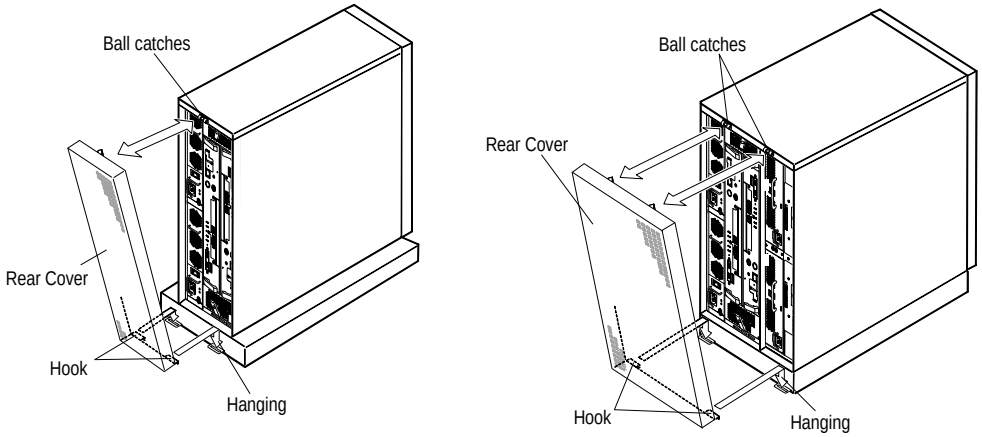
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- Floor Model (Rear Cover)

CAUTION

Remove the Rear Cover carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(a) Hold the rear cover with your both hands.
(b) When you disengage the rear cover from a ball catch by pulling the upper part of it toward you, you can remove the rear cover.



(a) Floor (RKS+H1J) Model (b) Floor (RKS+RKAJ+H2J) Model

Figure 3.4.13 Procedure for Removing Rear Cover

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• Rackmount Model (Front Bezel)

A key is necessary to attach or remove the Front Bezel.

CAUTION

Remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.
(b) Pull the front bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the front bezel from the slots on the subsystem main body by shifting the bezel to the right and remove the bezel.

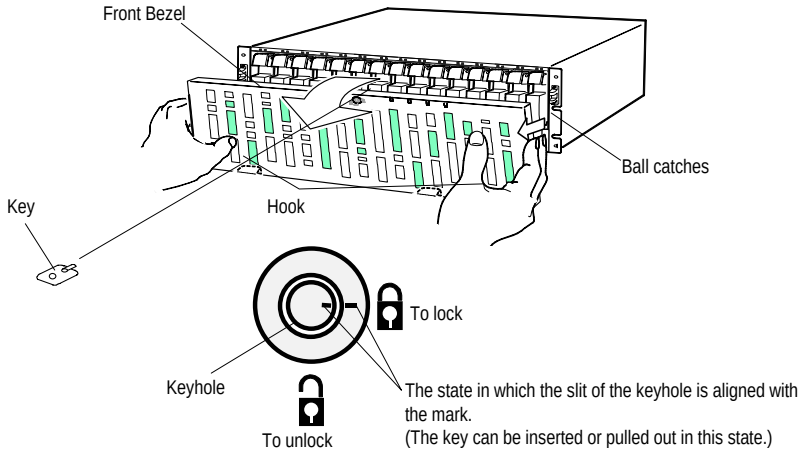
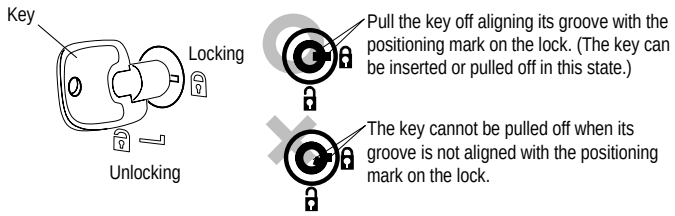


Figure 3.4.14 Procedure for Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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(3) Open the Rear Door of U7 rack frame. (This work is required for the Rackmount Model only)

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

(a) Fit an Allen wrench in the key socket on the rear door, turn the Allen wrench in the direction shown by the arrow (⟶), and open the rear door slowly leaving the wrench as it is.

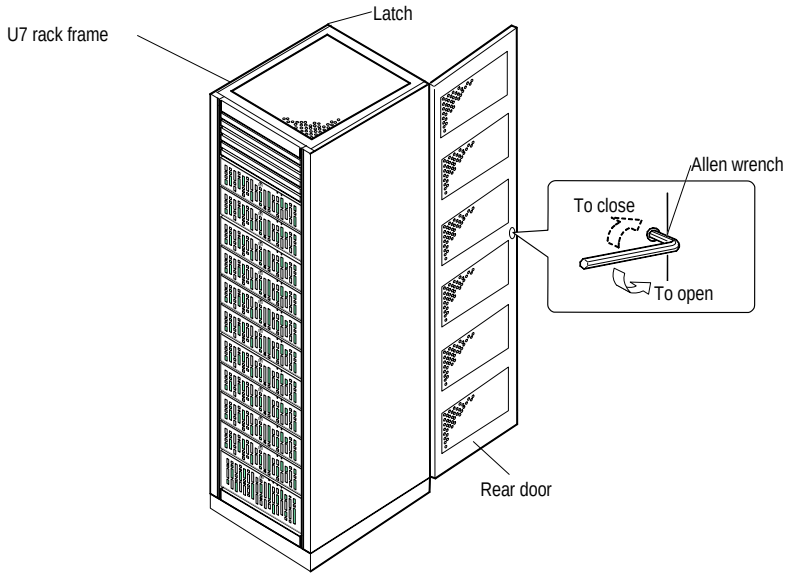


Figure 3.4.15 Procedure for Opening Rear Door

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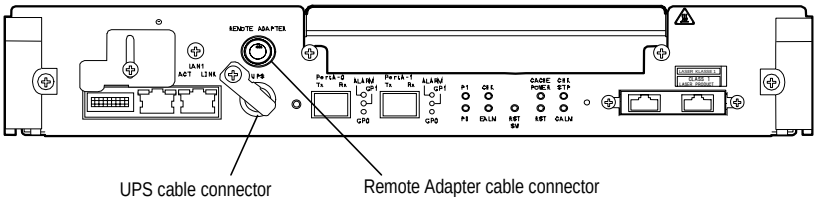
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(4) When the Remote Adapter is connected, remove all of them.
When the UPS is connected, remote all of them.



(5) In the case of the Floor Model, remove all the power cables connected to the RKS's. In the case of the Rackmount Model, disconnect only the connector, which is connected to the AC/DC Power Unit (RKS), of the power cable connected to the RKS.

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnect the power cable connected to the RKS.

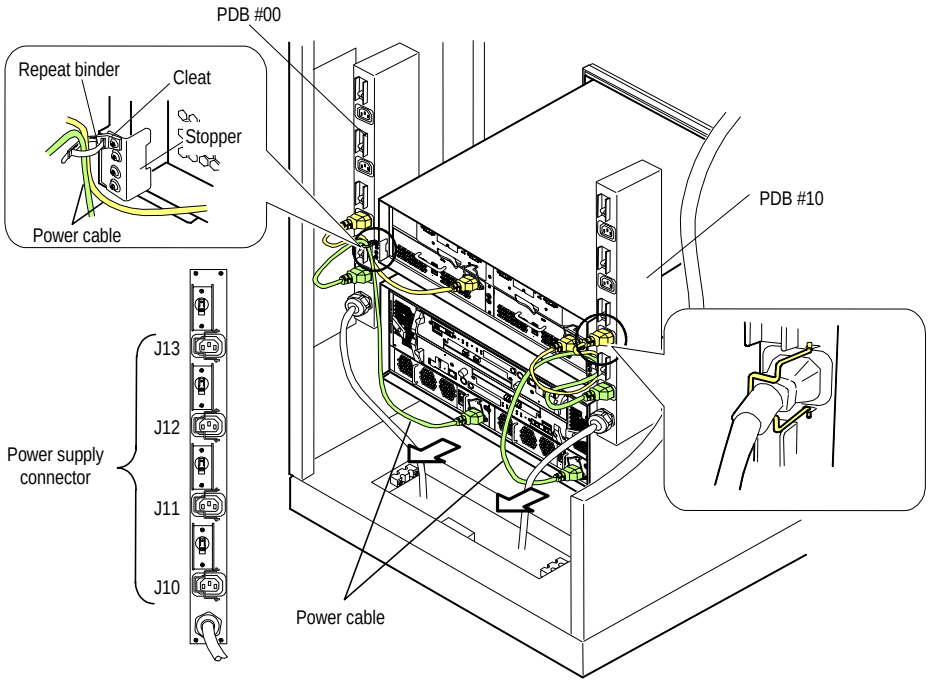


Figure 3.4.16 Disconnecting Power Cables

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(6) Remove the ENC cables connected to the RKS.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

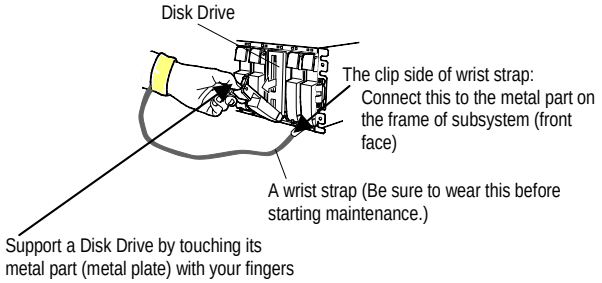
(a) Remove Repeat Binders securing the ENC cable to the stopper.
(b) Remove all the ENC cables connecting the RKS.

(7) Remove the disk drives installed in the RKS.

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.

NOTE : Before replacing, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



(a) Affix labels with the HDD numbers to all the Disk Drives that were installed in the RKS.

Deleted:

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(b) Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.
Store a removed Disk Drive or a dummy (Disk Drive) safekeeping box at the same position of address label.
Keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

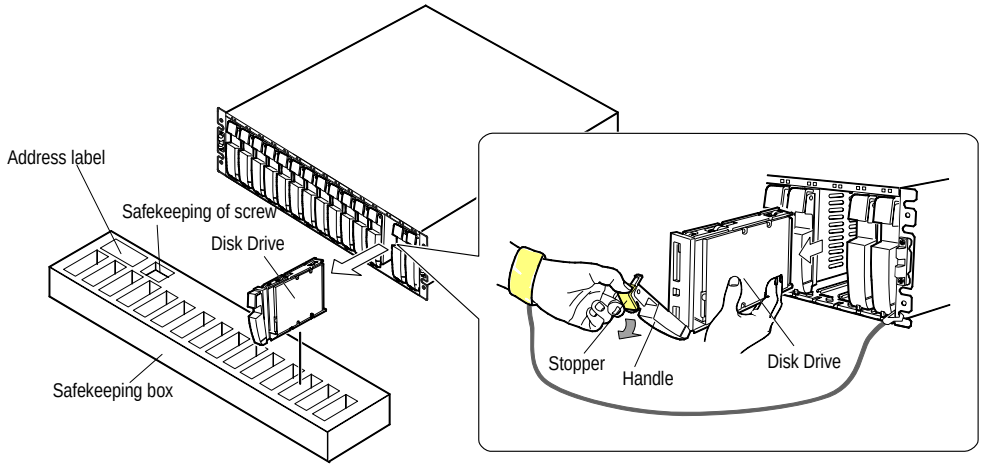


Figure 3.4.17 Remove the Disk Drive

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(8) Remove the cache memory from the Control Unit installed in the RKS.
In the case of the dual controller configuration, remove all the cache memories from the both Control Units.

⚠ CAUTION

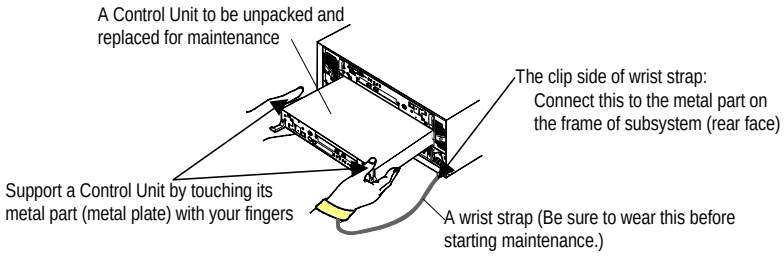
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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- When the Hitachi TagmaStore® AMS 200™ is the system configuration of the Fibre Channel interface

(a) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

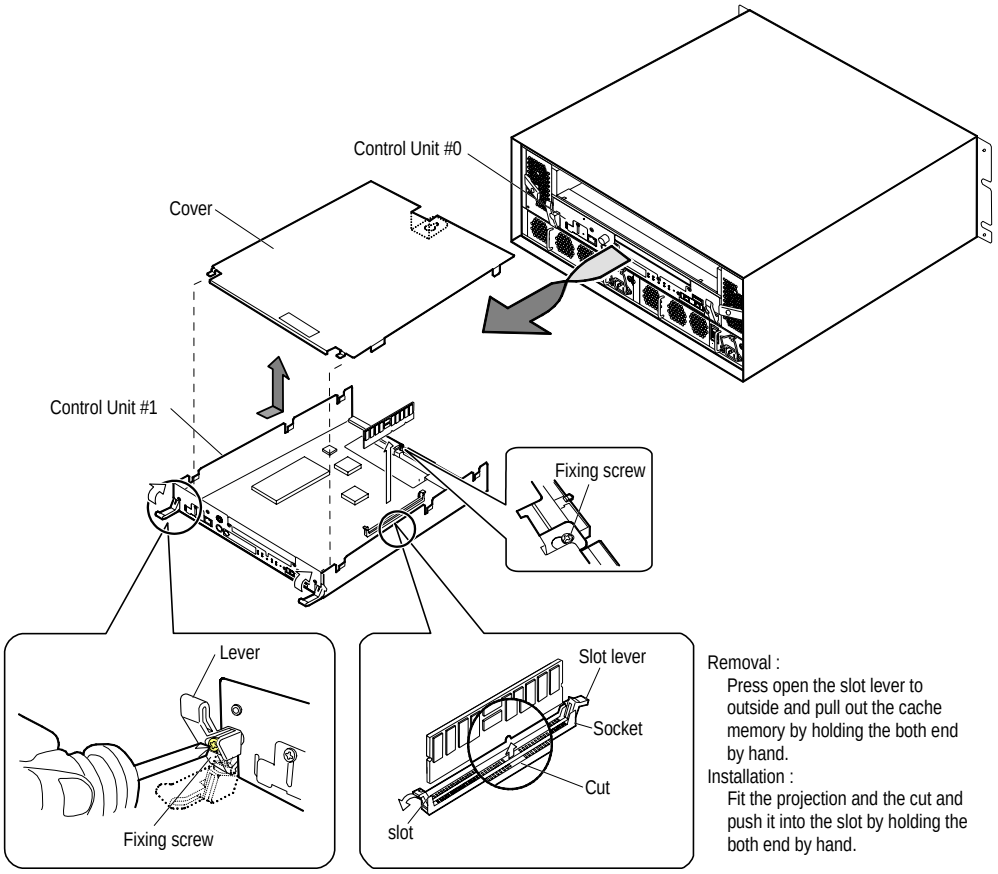
⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(b) Remove the Control Unit by pulling it out toward you.
(c) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.
(d) Replace the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(e) In the case of the dual controller configuration, remove the cache memories from the other Control Unit by repeating Steps (a) to (d).



*1 : The figure shows the case where the FC Interface Board is not added in the Control Unit of the RKS.

Figure 3.4.18 Cache Memory Replacement and LED Locations

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- When the Hitachi TagmaStore® AMS 200™ is the system configuration of the iSCSI interface

(a) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(b) Remove the Control Unit by pulling it out toward you.
(c) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.
(d) Replace the Cache Unit. (refer to "Figure 3.4.18 Cache Memory Replacement and LED Locations (1)" (SUP 03-0580))

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(e) In the case of the dual controller configuration, remove the cache memories from the other Control Unit by repeating Steps (a) to (d).

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(9) Replace the RKS with the RKM. (This work is for the Floor Model only. In the case of the Rackmount Model, go to Step (10).)

(a) Remove the skirt.

Remove the front skirt by pulling it out toward you. Then, pull the side skirt forward and remove it.

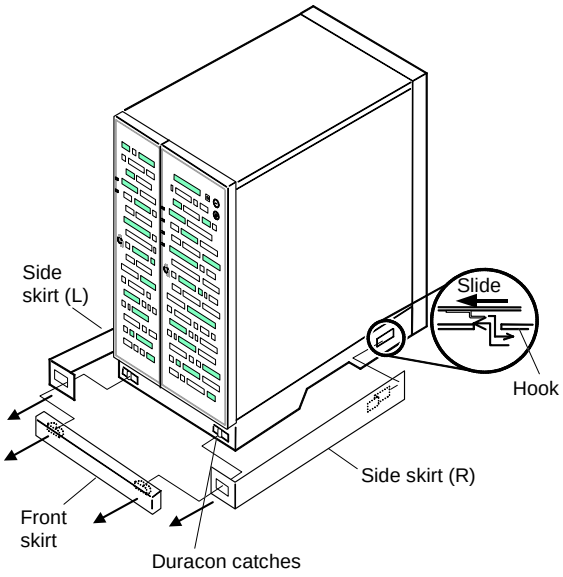


Figure 3.4.19 Removing Skirt

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(b) Detach the top cover

Remove the washer and hexagonal socket head bolts on the front side (six places) and the rear side (two places), and remove the top cover.

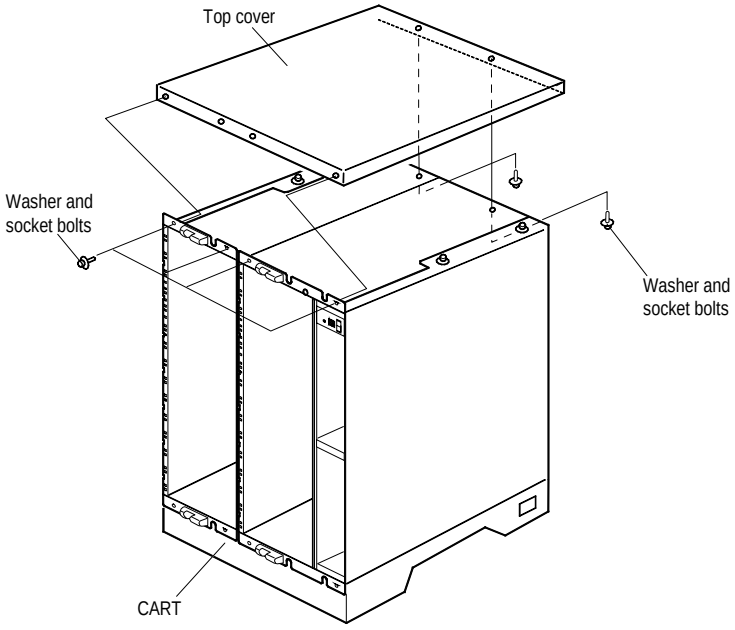


Figure 3.4.20 Detach the Top Cover

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(c) Detach the side cover

(i) Remove the washer and hexagonal socket head bolts ① at two places.

(ii) Pull out the side cover (R) from the slots for receiving the claws, and remove it.

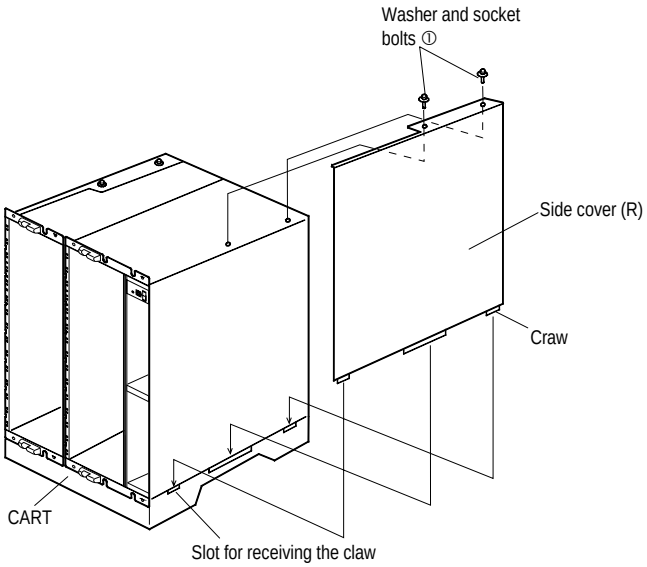


Figure 3.4.21 Detach the Side Cover

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(d) Detach the CART

CAUTION

- Masses of RKM is approximately 58 kg , RKS is approximately 56 kg. When raising or pull down each of them, take measures to prevent it from slipping because the slipping may cause a personnel injury owing to a pinching.
- When raising or pull down the subsystem, it is dangerous to do it by using the handles. Be sure to raise the subsystem by holding its front and rear portions made of sheet metal.

(i) Remove the washer and hexagonal socket head bolts (four places) on the front and rear sides of RKS.

(ii) Hold the handle, and pull it down from the CART so that the upper surface of RKS becomes the right side, by taking care not to give any shocks.

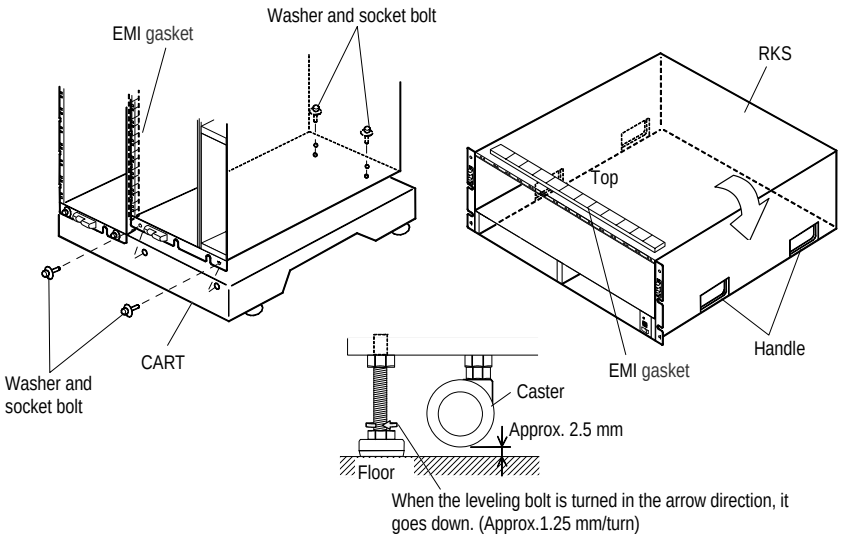


Figure 3.4.22 Un-mounting the RKS

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(iii) Lock the cart to the floor.
Turn the leveling bolts in the direction shown by the arrow so that each clearance between the caster and the floor becomes about 2.5 mm.
(iv) Stick the EMI gasket on the front side surface of the RKM.
(v) Fix the left side handle of RKM with the label (handle).
(vi) Raise the RKM making its upside turn to the left using its handle and place it on a cart.
(vii) Fasten front and rear sides of the RKM to the CART each with four washer and socket bolts.

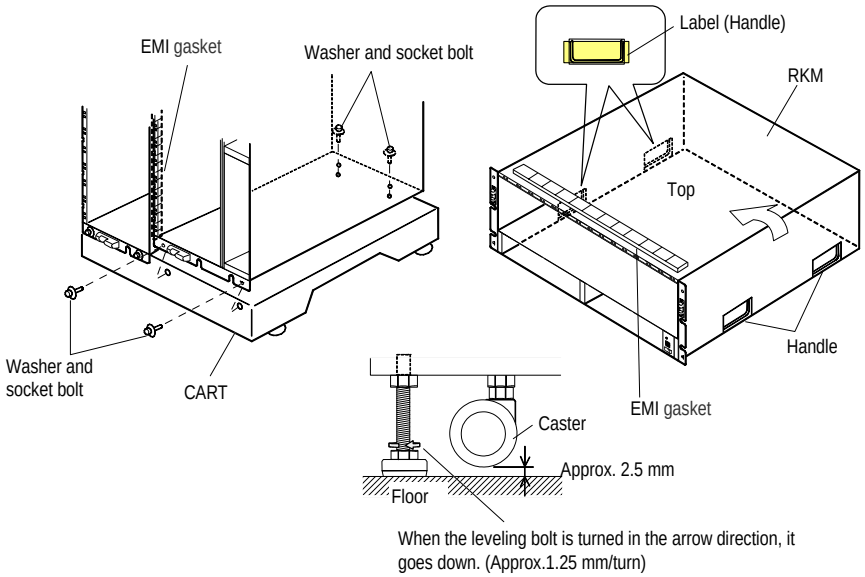


Figure 3.4.23 Mounting the RKM

(e) Attach the side cover (R) to the subsystem by executing the procedure "3.4.12 (9) (c) Detach the side cover" (SUP 03-0610) in reverse order.

(f) Attach the top cover to the subsystem by executing the procedure "3.4.12 (9) (b) Detach the top cover" (SUP 03-0600) in reverse order.

(g) Attach the skirts to the subsystem by executing the procedure "3.4.12 (9) (a) Remove the skirt" (SUP 03-0590) in reverse order.

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(10) Replace the RKS with the RKM. (This work is for the Rackmount Model only)

(a) External appearance of the external lifter.

Figure 3.4.24 shows external appearance of the external lifter.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Be sure to perform the operation with two or more workers.

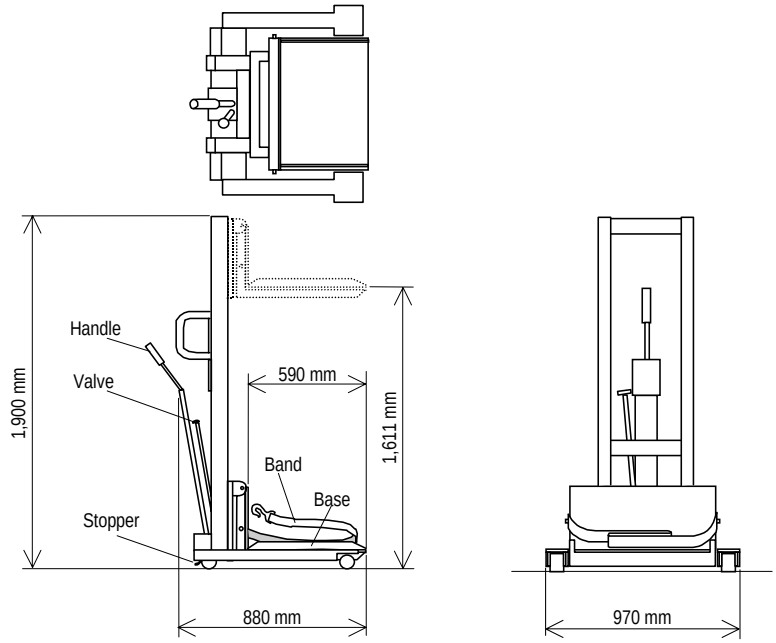


Figure 3.4.24 External Lifter

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(b) Remove the front side of the RKS

(i) Remove the RKS to the rack frame with the four M5×10 binding screws.

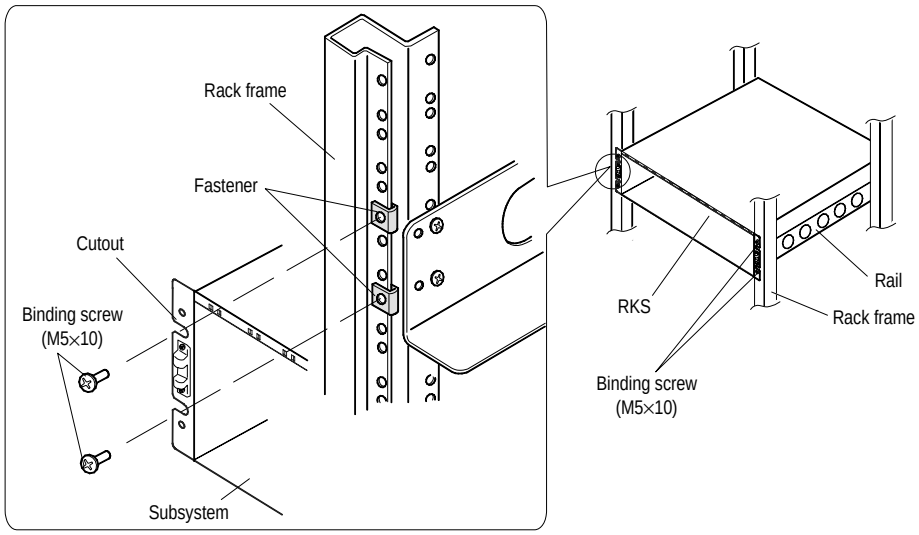


Figure 3.4.25 Fastening Front Side of the Subsystem

(c) Remove rear side of the subsystem

(i) Remove the binding screws.

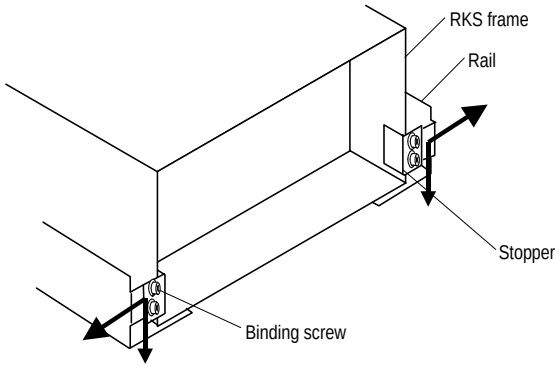


Figure 3.4.26 Securing Rear Side of the Subsystem

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(d) Demount the RKS from the U7 rack frame.

(i) Adjust the position of the rack frame, and apply the brake to the lifter.

(ii) Move the pumping handle of the external lifter to the right and left repeatedly to lift the RKS up to the height suitable for the unloading.

WARNING

If the RKS falls when the elevator of the lifter is at a high position, a personal injury will be caused.
Perform the positioning, fastening, or other handlings very carefully.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.
- Work carefully because the mass of the single RKM is about 58 kg, RKS is about 56 kg.

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(iii) Shift the RKS onto the elevating base of the external lifter. Shift the RKS gently until it hits the backboard of the elevating base.

⚠ CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKS enters the base across the end of it.
Otherwise, falling of the RKS may be caused.

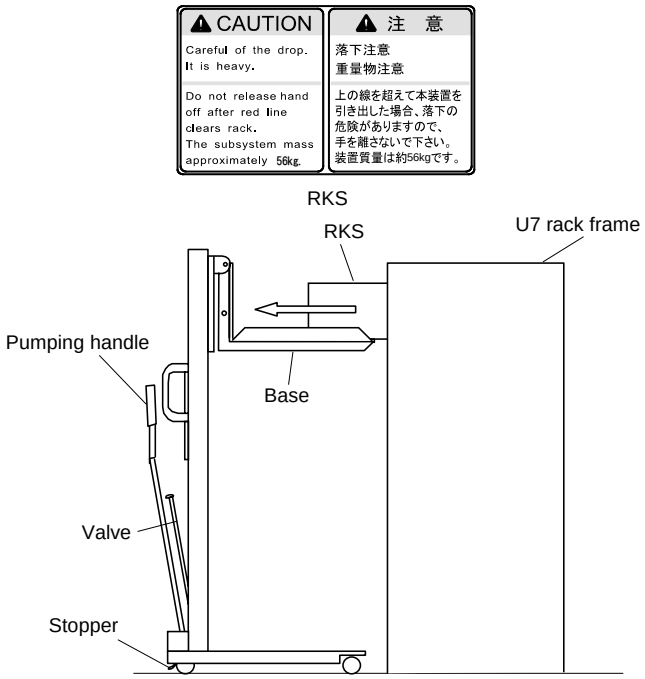


Figure 3.4.27 Mounting RKS on Eternal Lifter

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(iv) Secure the RKS to the lifter with a band of the lifter.
Bind the RKS with the band tightly by fitting the length of the belt to the RKS.

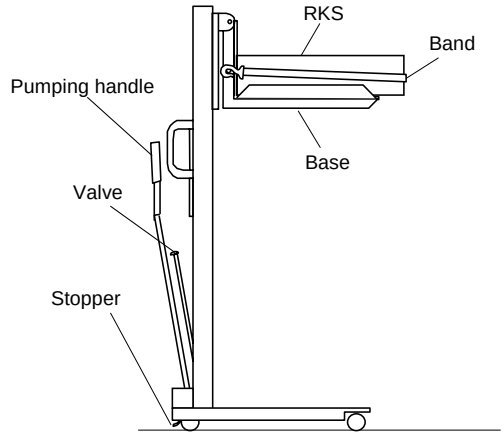


Figure 3.4.28 Secure the RKS

(v) After securing the RKS to the elevating base, open the up/down valve of the external lifter gently and lower the elevating base to the lowermost position.
(vi) Take off the brake of the external lifter, move the lifter away from the U7 rack frame, and take down the RKS after loosening the belt.
(vii) Move the external lifter to the place where the lifter does not disturb the following works.
(viii) Packing the RKS. (See "Export Packing Specifications")

(e) Sticking EMI gasket
Stick the EMI gasket supplied with the rack rail on the top of the RKM frame.
(i) Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.
(ii) Stick the EMI gasket by aligning it with the front end of the top of the frame.
(iii) Stick the EMI gasket by aligning it with the back end of the top of the frame.

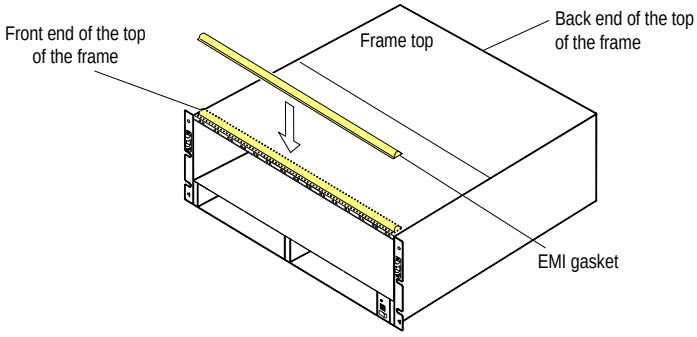


Figure 3.4.29 Position for Sticking EMI Gasket

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(f) Mounting lifter on rack frame

(i) Bring the lifter close to the subsystem to be mounted and apply the brake to the lifter.

NOTE : When putting the subsystem on the lifter, be sure to remove the front bezel beforehand.

(ii) Put the RKM on the lifter.
Put the RKM with its front bezel removed on the lifter.

(iii) Secure the RKM to the lifter with a band of the lifter.
Bind the RKM with the band tightly by fitting the length of the belt to the RKM.

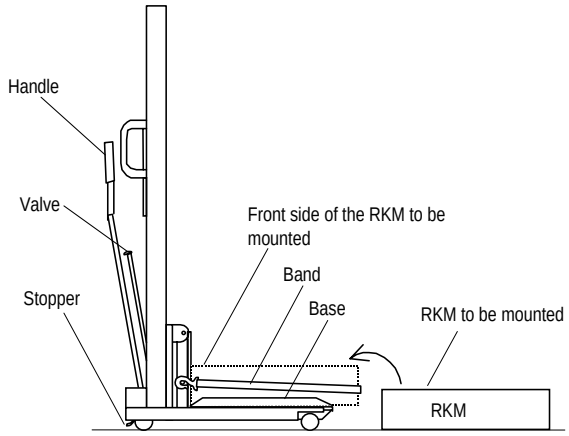


Figure 3.4.30 Putting the RKM on Lifter

(iv) Take off the brake of the lifter on which the RKM has been put, and move the lifter close to the rack frame.

(v) Adjust the position of the RKM so that it is seated in the center of the rack frame.

(vi) Move the pumping handle of the lifter to the right and left repeatedly to lift the RKM up to the height suitable for the mounting.
Be careful not to lift the elevating base too high. If you lift it too high, lower it by opening the up/down valve gently.

(vii) Remove the band and adjust the position of the RKM so that the RKM comes in the center in front of the rack frame. If the RKM is positioned off-centered, a screw contacts the front bezel preventing the bezel from being opened or closed.

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(viii) Shift the RKM onto the rails in the rack frame. When shifting the RKM, push it in to the end gently.

CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKM enters the rack frame across the end of it. Otherwise, falling of the RKM may be caused.



RKM

(ix) After mounting the RKM on the rack frame, lower the elevating base to the lowermost position by gently opening the up/down valve of the external lifter and take off the brake of the lifter.

(x) Move the lifter to the place where the lifter does not disturb the following works.

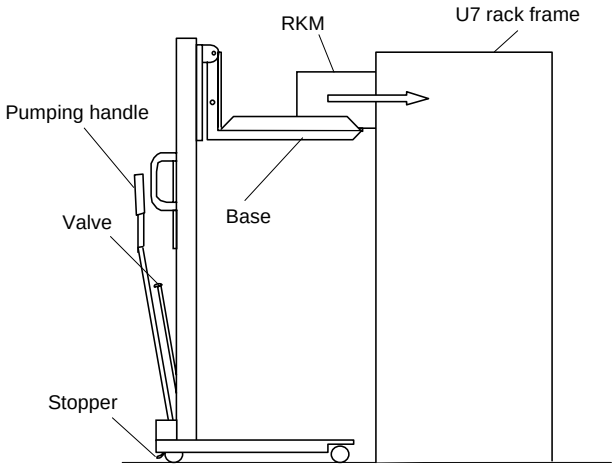


Figure 3.4.31 Mounting RKM on Rack Frame

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(g) Fastening the front side of the RKM

(i) Fasten the RKM to the rack frame with the four M5×10 binding screws.

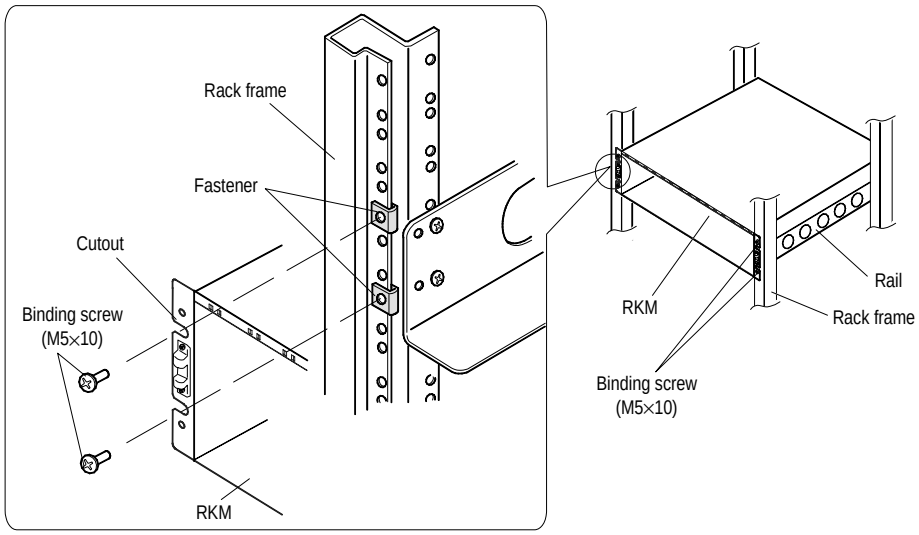


Figure 3.4.32 Fastening Front Side of the RKM

(h) Fastening rear side of the RKM

(i) Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.

(ii) Tighten the binding screws.

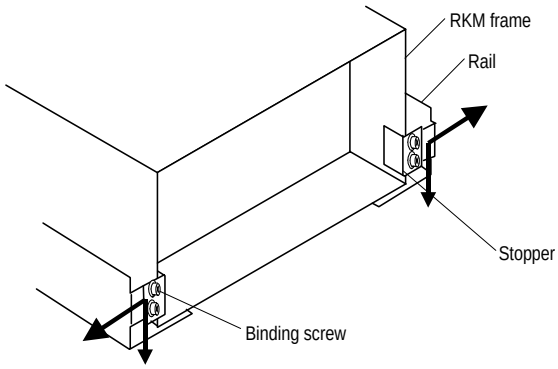


Figure 3.4.33 Securing Rear Side of the RKM

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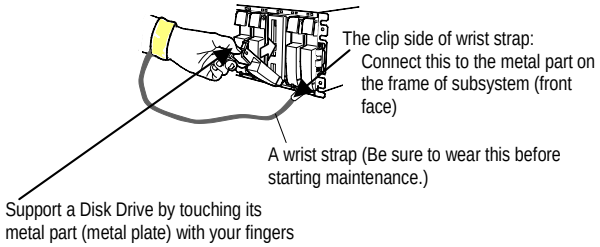
(11) Install the disk drives, which were removed from the RKS, in the RKM.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.
  Please be sure to keep a wrist strap near the subsystem.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

NOTE : • The Disk Drive is a precision machine. Never apply a shock or vibration to it.

• Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.
(b) Insert the Disk Drive into the position (address) where it was by holding it with the handle.
(i) Fit the Disk Drive in the guide rail of the RKM and slide it in the direction shown by the arrow.
(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the RKM.
(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.
(d) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.

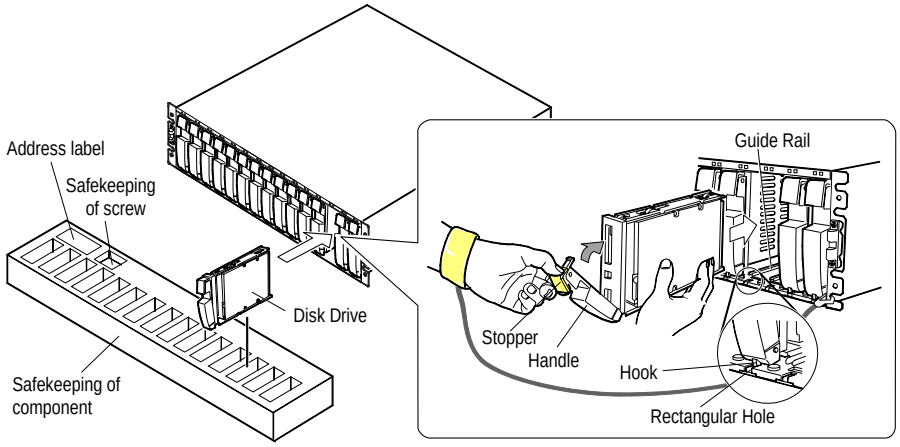


Figure 3.4.34 Installing of Disk Drive

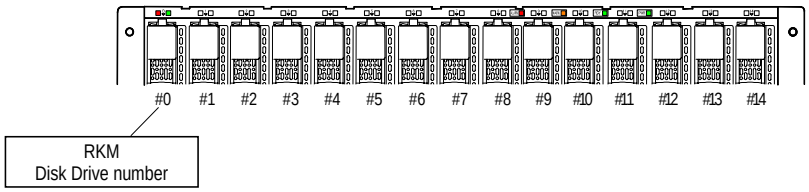


Figure 3.4.35 Disk Drive Mounting Location

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(12) When the RKAJ is connected to the RKM, make the setting of the device identification switches of all the RKAJs.
Set only the RKAJ.
Since the basic device to be connected is the RKM, set the each switch to the M position.

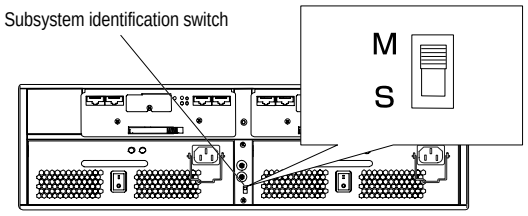


Figure 3.4.36 Position of Switch for Device ID Setting

(13) Install the Cache Memory, which were removed from the RKS, in the RKM.
In the case of the dual controller configuration, install the cache memories in the both Control Units.
When using Copy-on-write SnapShot, Cache Partition Manager and Cache Residency Manager with the Hitachi TagmaStore® AMS 200™ and using them continuously even after upgrading it to the Hitachi TagmaStore® AMS 500™, install the Cache memory for the necessary capacity referring to "3.3 Notes" (SUP 03-0020).

- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 500™

(a) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.
(b) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • For the dual Control Unit, install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Insert the Cache Units in the cache slots in regular order starting from the slot #0.
• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

(c) Make sure that the Cache Unit is firmly installed.
(d) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.
(e) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
In the case of dual Control Unit, Insert it into the position in the Control Unit #1 too.

NOTE : The installation direction is different in the Control Unit #0 and #1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(f) In the case of the dual controller configuration, Install the cache memories from the other Control Unit by repeating Steps (a) to (e).

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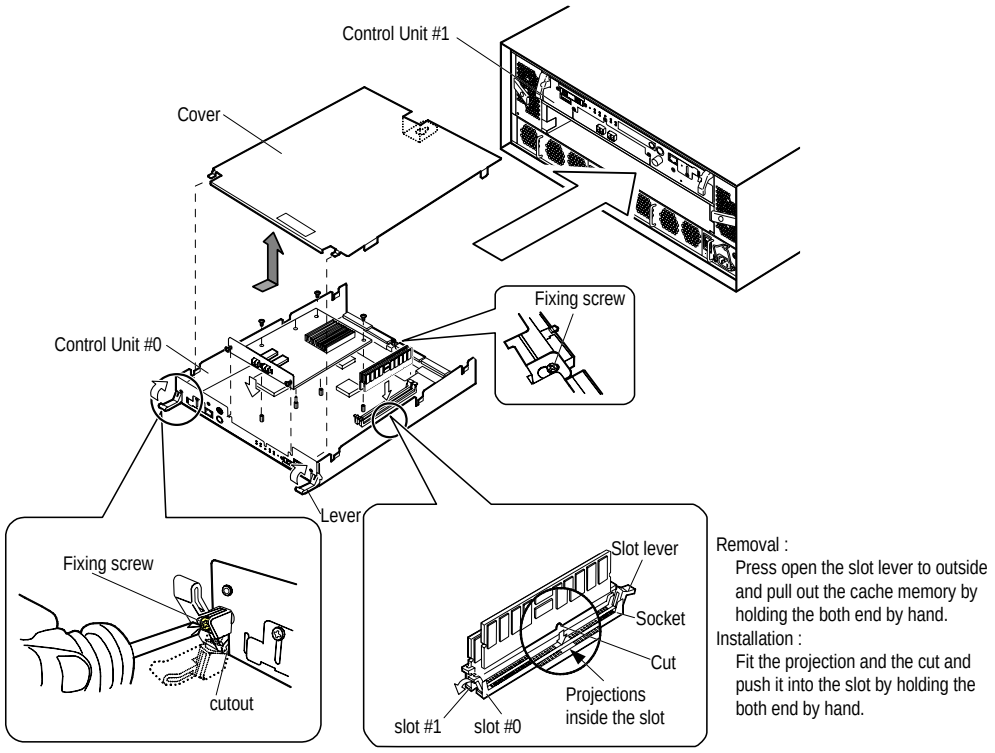


Figure 3.4.37 Installing Cache Memory

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- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 500™

(a) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(b) Be sure to install the removed Cache memory in the position with the same slot number as before in the new Control Unit. (refer to "Figure 3.4.37 Installing Cache Memory (1)" (SUP 03-0750))

(c) Make sure that the Cache Unit is firmly installed.

(d) Slide the cover in the opposite direction of which it was removed, attach it, and tighten the fixing screw for the cover at the back of the cover.

(e) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.

NOTE : The installation direction is different in the Control Unit #0 and #1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(f) In the case of the dual controller configuration, Install the cache memories from the other Control Unit by repeating Steps (a) to (e).

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(14) Connecting Cables

- Floor Model

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "3.4.12 (1) (c) Notes on cable routing" (SUP 03-0470).

The figures in this chapter are drawn for the procedure of Floor model (RKM/RKS+RKAJ+H2J). The cable connection procedure of other Floor model is similar to the case shown in the figures here.

(a) Connecting ENC cables

In the case of the Floor (RKM+RKAJ+H2J) model with both of the RKM/RKAJ, it is required to connect the Control Unit (RKM) and the ENC Unit (RKAJ) with the ENC cables.

NOTE :
- When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses .
- Connect the two (Loop #0 and Loop #1) systems of each of the Control Unit and the ENC Unit with the ENC cables.
  Parts of the Loop #0 and Loop #1 systems are discriminated from each other by means of color markings in milk white and yellow respectively.
  When connecting the left and right sets of the Control Unit and ENC Unit with the ENC cables, be sure to connect each of the cables to the sets of adjacent connectors of the same kind, that is, the PATH #0 (marked in milk white) and the PATH #1 (marked in yellow) of the ENC Unit and the Control Unit.

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(i) Remove the rubber cap on the Control Unit.
(ii) Connect the ENC cable to the Control Unit.
① To the PATH #0 (marked in milky white on the RKM side), connect the ENC cable marked in milky white.
② To the PATH #1 (marked in yellow on the RKM side), connect the ENC cable marked in yellow.
(iii) Connect the ENC cable to the ENC Unit.
① To the PATH #0 (on the ENC Unit) side and marked in milk white), connect the ENC cable (marked in milk white) led from the PATH #0 (on the Control Unit) side and marked in milk white).
② To the PATH #1 (on the ENC Unit side and marked in yellow), connect the ENC cable (marked in yellow) led from the PATH #1 (on the Control Unit) side and marked in yellow).
(iv) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder, and put it inside the subsystem.

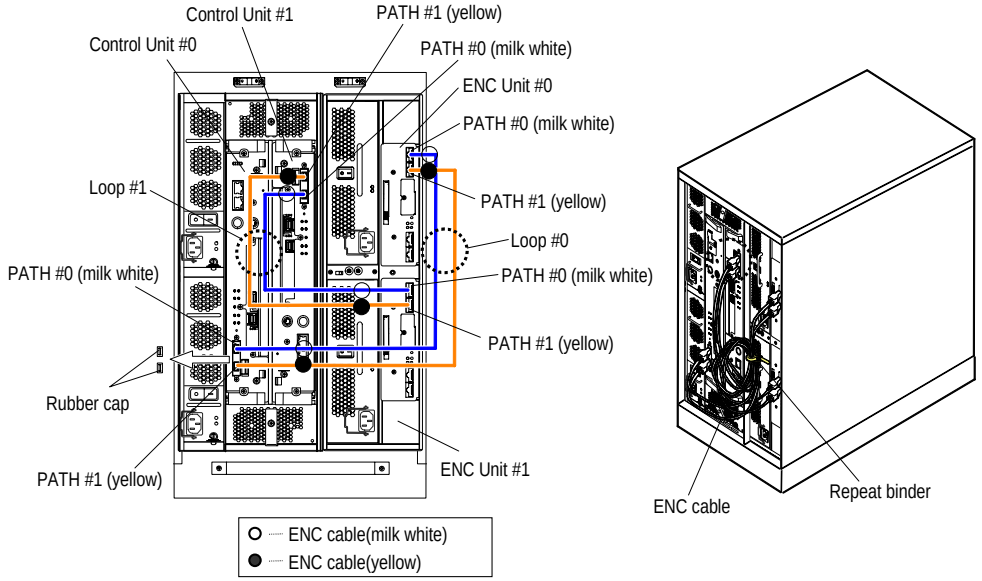


Figure 3.4.38 ENC Cable Connection

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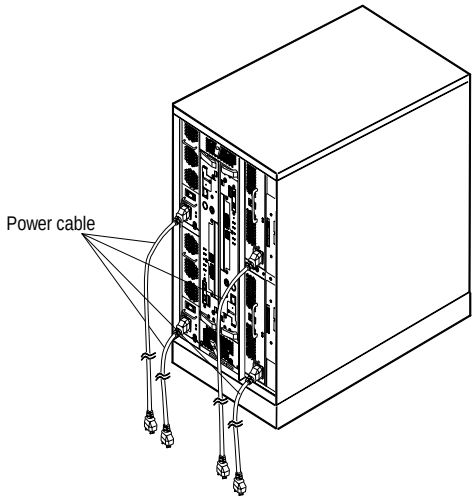
(b) Connecting the power cables of Power Unit

CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : • Connect the power cable to the two systems, Power Unit #0 and Power Unit #1.
• Although the subsystem has a dual power-system, each Power Unit is required to have capacity for the whole subsystem to cope with one power-system failure. Accordingly the facility power source for each Power Unit is also required to have capacity for the whole subsystem.

(i) Make sure that all the Power Unit AC Power Unit switches are turned off.
(ii) Connect the connectors (Power Unit side) of the power cables (white, yellow) to the receptacle of the Power Unit.
(iii) Connect the power cable to the power outlet.



*1 : The Floor (RKM+RKAJ+H2J) Model is shown as an example.

Figure 3.4.39 Power Cable Connection

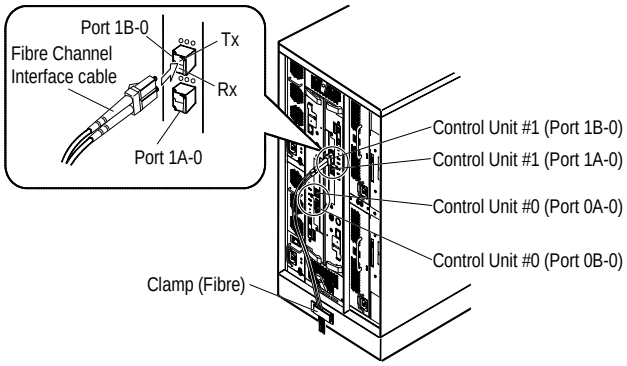
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(c) Connecting Fibre Channel interface cables

- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 500™

Connect the Fibre Channel interface cables after making sure of the ports to be connected the label. Route the Fibre Channel interface cable to the Clamp (Fibre).
When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

NOTE : When bending the Fibre Channel interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.



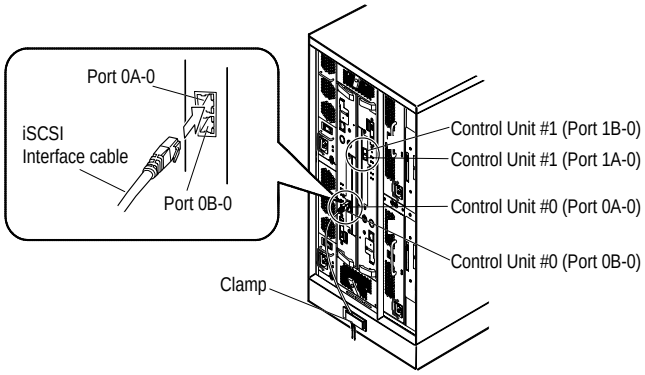
*1 : The Floor (RKM+RKAJ+H2J) Model is shown as an example.

Figure 3.4.40 Port Layout of Fibre Channel (1)

- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 500™

Connect the Fibre Channel interface cables after making sure of the ports to be connected the label. Route the Fibre Channel interface cable to the Clamp.

NOTE : When bending the iSCSI interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.



*1 : The Floor (RKM+RKAJ+H2J) Model is shown as an example.

Figure 3.4.40 Port Layout of Fibre Channel (2)

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- Rackmount Model

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "3.4.12 (1) (c) Notes on cable routing" (SUP 03-0470).

NOTE : Power supply system of the RKM/RKAJ/RKAJAT/RKA is duplicated.
It is recommended to connect each system to outlet of one of the two power sources independent of each other.

The cable routing for the subsystem which is mounted on the rack frame is shown in Figure 3.4.41, Figure 3.4.42, Figure 3.4.43.

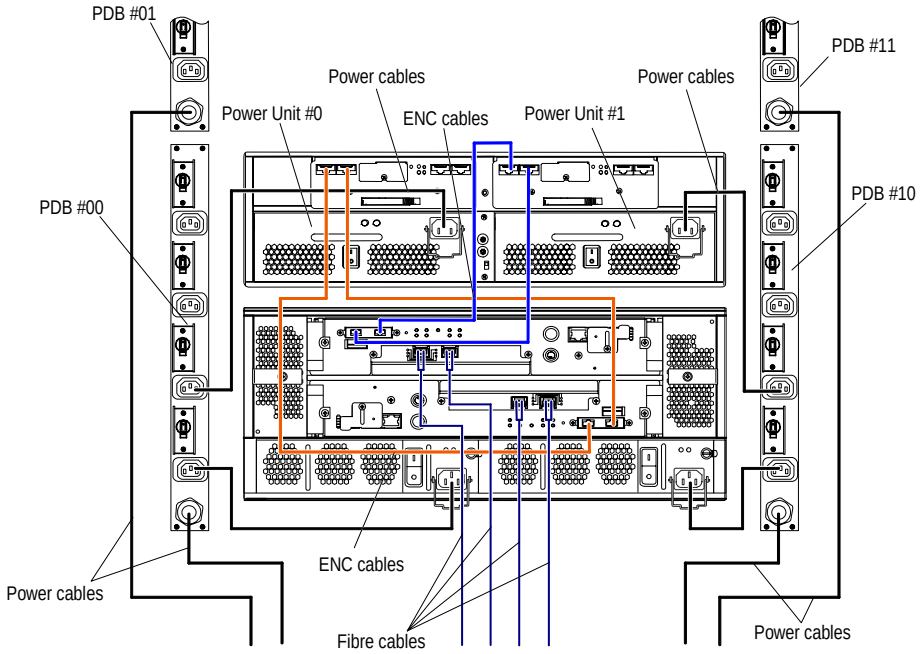


Figure 3.4.41 Cable Routing for the Subsystem (RKM/RKAJ)

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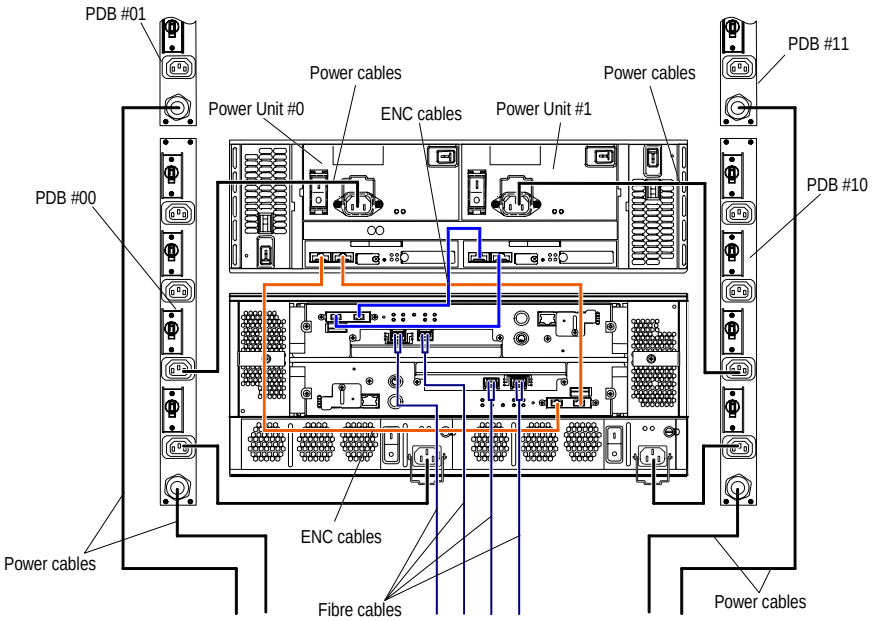


Figure 3.4.42 Cable Routing for the Subsystem (RKM/RKA)

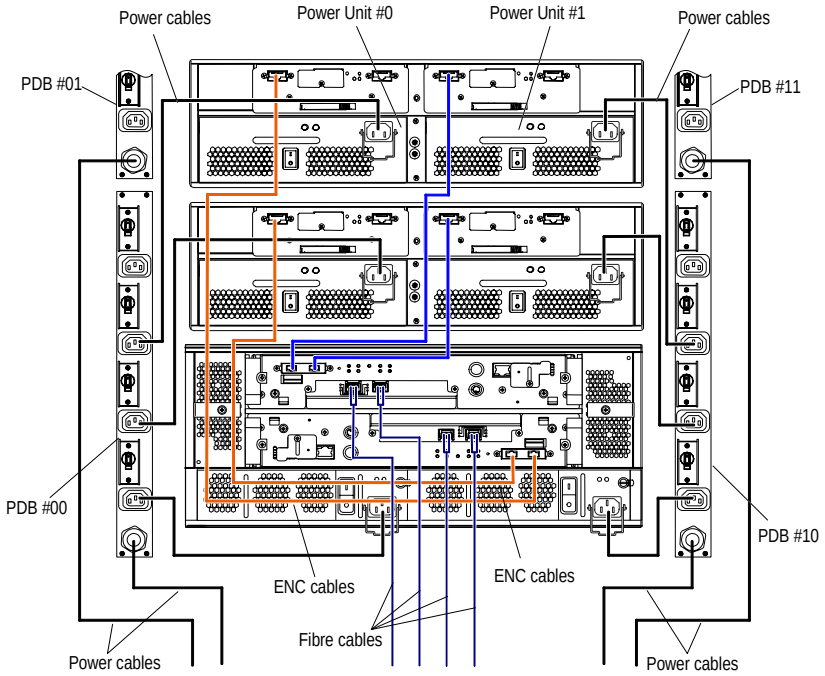


Figure 3.4.43 Cable Routing for the Subsystem (RKM/RKAJAT)

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(a) Connecting ENC cables

- When connecting the RKM and RKAJ/RKA

In the case of the RKAJ/RKA with both of the Control Unit of RKM/RKAJ/RKA, it is required to connect the Control Unit (RKM) and the ENC Unit with the ENC cables.

NOTE : When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

Execute the following referring to Figure 3.4.44, Figure 3.4.45.

(i) Remove the rubber cap on the Control Unit.

(ii) Connect the ENC cable to the Control Unit.

(iii) Connect the ENC cable to the ENC Unit of the RKAJ/RKA.

NOTE : Connect the Control Unit #0 of the RKM with the ENC Unit #0 of the RKAJ/RKA and the Control Unit #1 of the RKM with the ENC Unit 1 of the RKAJ/RKA. Connect two Path #0 connectors (with milk white indication) using the ENC cable and also connect two Path #1 connectors (with yellow indication) using another ENC cable.

① To the PATH #0 (marked in milky white on the RKM side), connect the ENC cable marked in milky white.

② To the PATH #1 (marked in yellow on the RKM side), connect the ENC cable marked in yellow.

(iv) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

NOTE : Do not fix the ENC cable and the power cable together.

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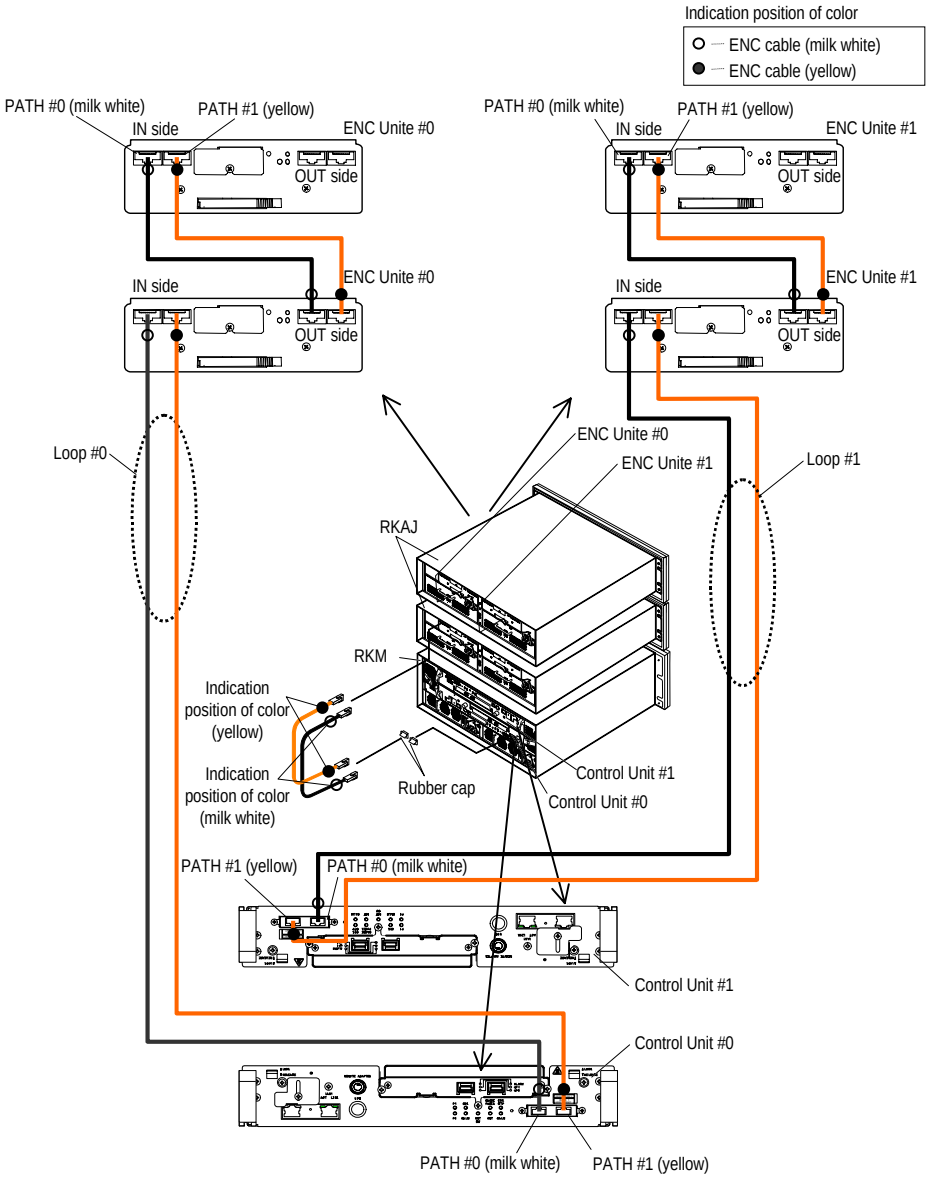


Figure 3.4.44 Connecting ENC Cables(RKM+RKAJ)

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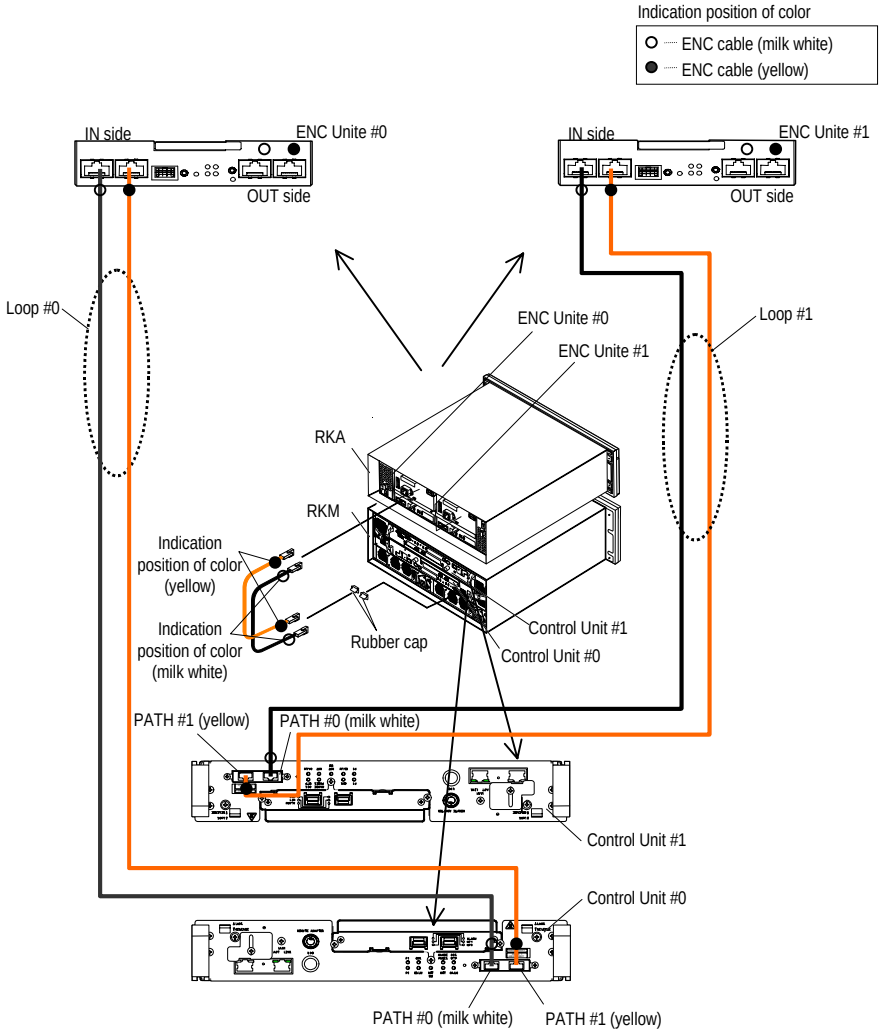


Figure 3.4.45 Connecting ENC Cables(RKM+RKA)

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- When connecting the RKM and RKAJ/RKAJAT

  In the case of the RKAJ/RKAJAT with both of the Control Unit of RKM, it is required to connect the Control Unit (RKM) and the ENC Unit/SENC Unit with the ENC cables.

  NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.
  • The IN and OUT connectors of the SENC unit of the RKAJAT have indications by means of blue and green labels respectively.

Execute the following referring to Figure 3.4.46.

(i) Attach milk white or yellow Mini-Binders to the ENC cable.

(ii) Remove the rubber cap on the Control Unit.

(iii) Connect the ENC cable to the Control Unit.

(iv) Connect the ENC cable to the ENC Unit/SENC Unit of the RKAJ/RKAJAT.

NOTE : Connect the Control Unit #0 of the RKM with the ENC Unit #0/SENC Unit #0 of the RKAJ/RKAJAT and the Control Unit #1 of the RKM with the ENC Unit #1/SENC Unit #1 of the RKAJ/RKAJAT.

① Connect the cable marked in milky white from PATH #0 (marked in milky white) of RKM to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID #1).

② Connect the cable marked in yellow from PATH #1 (marked in yellow) of RKM to the IN side (Blue Label) of the SENC Unit of RKAJAT (Unit ID #2).

(v) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

NOTE : Do not fix the ENC cable and the power cable together.

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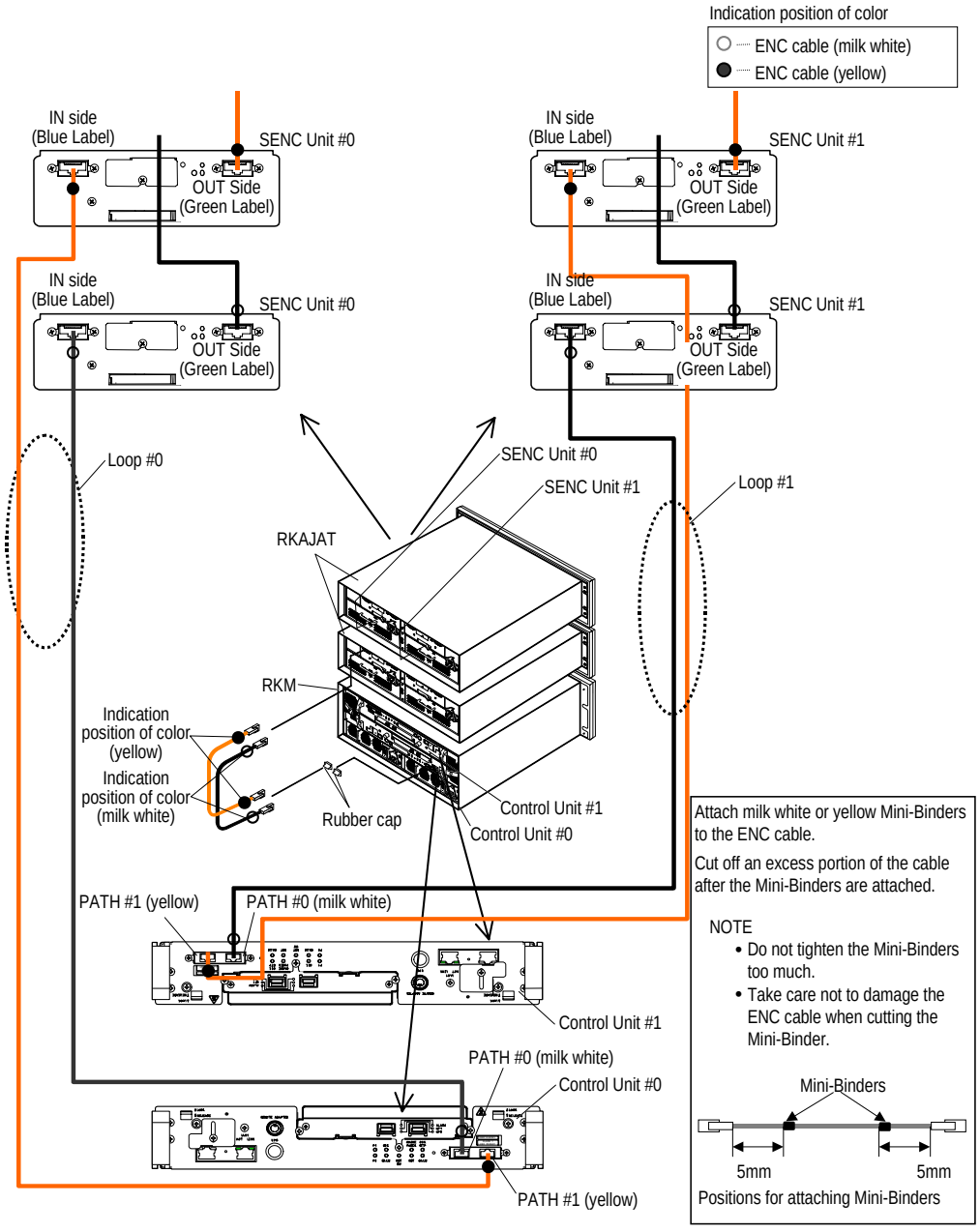


Figure 3.4.46 Connecting ENC Cables (RKM+RKAJAT)

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(b) Connecting the power cables of Power Unit

CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

(i) Make sure that the breaker of the each PDB has been turned off.
(ii) Make sure that the AC Power Unit Switch of the each Power Unit has been turned off.
(iii) Insert the power cable plug into the receptacle on the each Power Unit.

NOTE : Limit the total current output from the outlets J10 to J13 so that it does not exceed 20 amperes.

(iv) Route the power cables.
(v) Push in the plug of the power cable which has been inserted into the PDB again. It may be loosened owing to a routing.

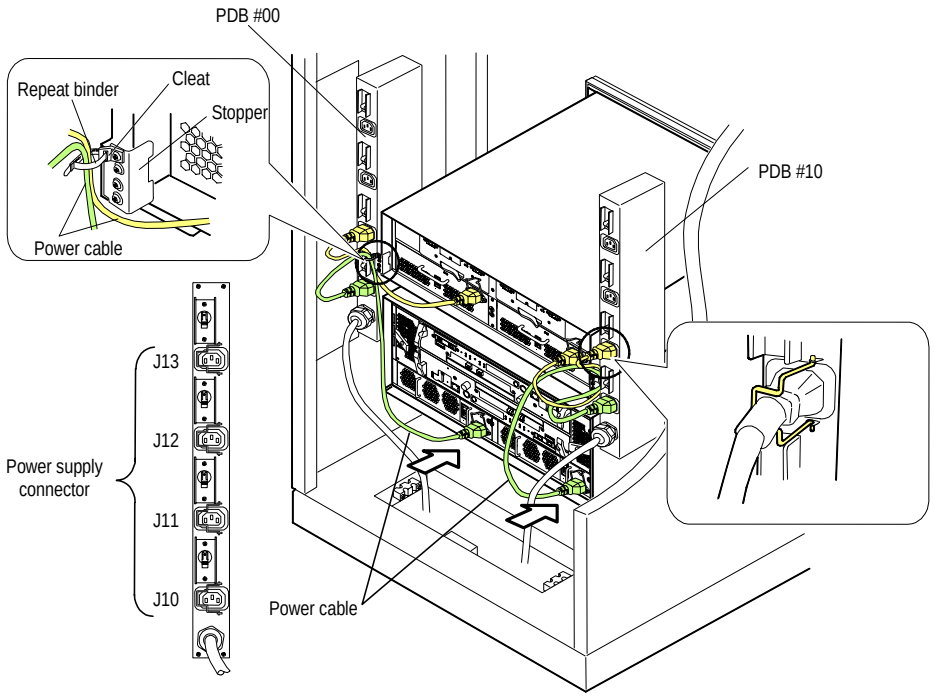


Figure 3.4.47 Routing Power Cables to the Mounted Subsystem

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(c) Connecting interface cables

(i) Connect the interface cables after making sure of the ports to be connected the label. (Refer to Figure 3.4.48.)

NOTE : When bending the interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(ii) Pull all the interface cables into the rack frame passing them through an opening for cables on the bottom plate of the rack frame.

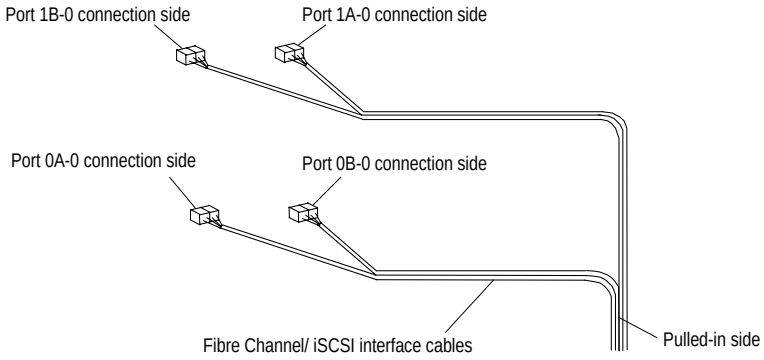


Figure 3.4.48 Binding Interface Cables

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- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 500™

(iii) Fasten the Fibre Channel interface cables to the rack frame at the cable passing opening on the he bottom plate giving them excessive lengths so that they will not be pulled. When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

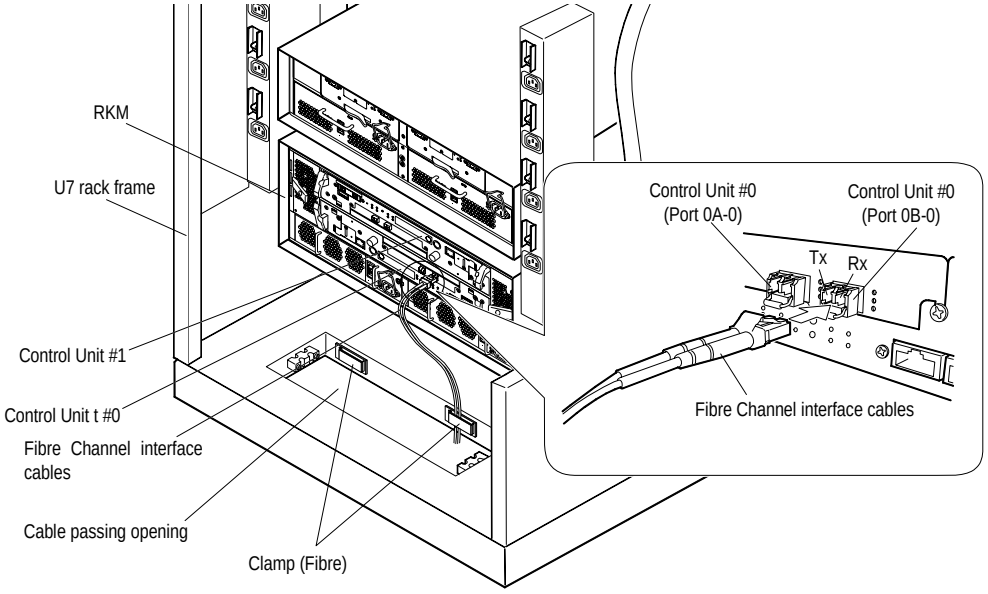


Figure 3.4.49 Routing Interface Cables (1)

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- When upgrading the Hitachi TagmaStore® AMS 200™, which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 500™

(iii) Fasten the iSCSI interface cables to the rack frame at the cable passing opening on the he bottom plate giving them excessive lengths so that they will not be pulled.

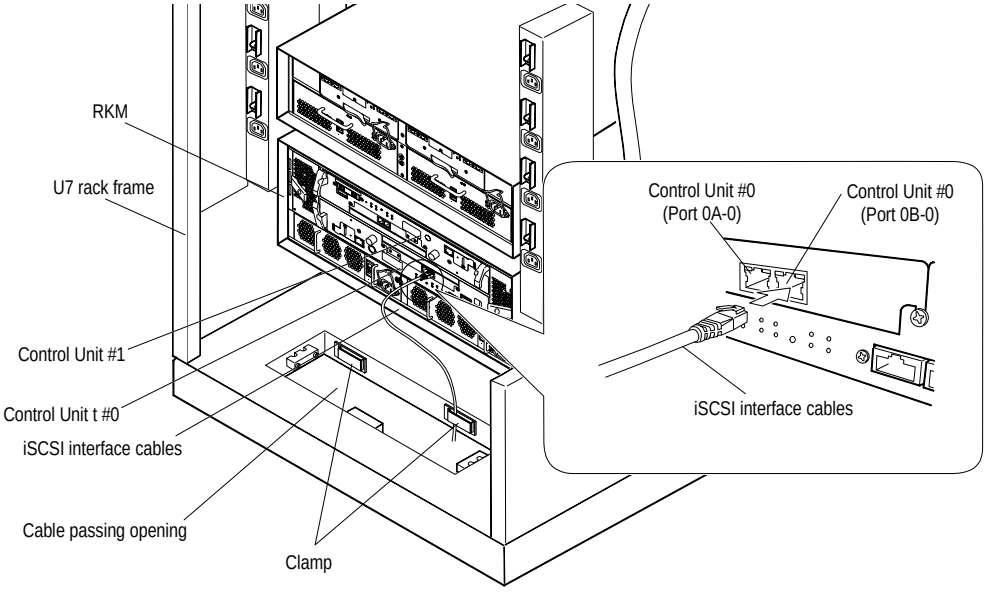


Figure 3.4.50 Routing Interface Cables (2)

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(15) Connecting the Remote adapter/UPS

(a) When connecting the Remote adapter/UPS to the RKM, connect the Connector in the Control Unit.

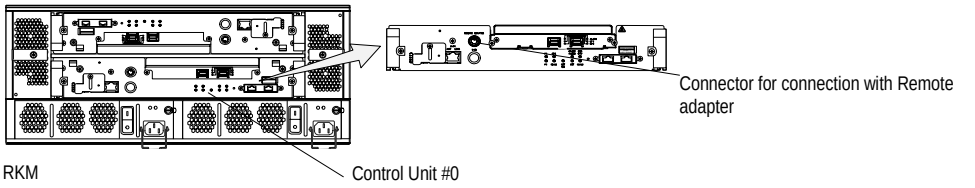


Figure 3.4.51 Physical Location of Connector on Subsystems for Remote Adapter/UPS Connection

(b) Setting the Rotary switch.

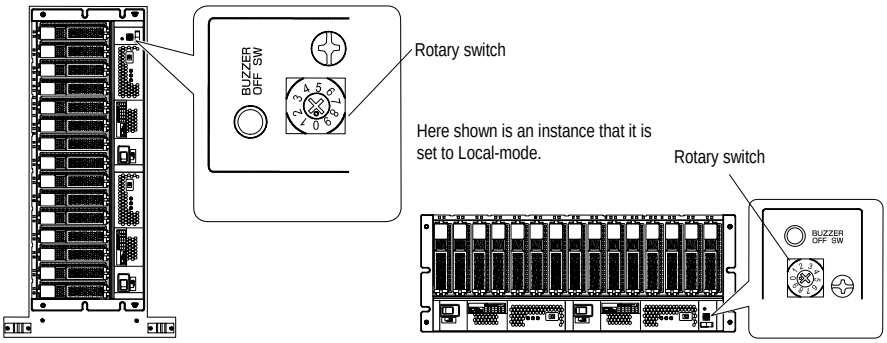
Set the mode of power control. Either Local mode or Remote mode is set by the Rotary switch. Local/Remote mode settings and corresponding operation modes are shown below.

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment. When the remote adaptor is not used.)
1	—	—
2	REMOTE	Remote mode by means of the HOST AC (using a remote adapter)
3	—	—
4	UPS Interlock mode 1	Interlock mode 1 with an UPS exclusive for the subsystem To set the mode, connect AC#0 and AC#1 to the UPS and an external and an external AC power supply or the PDB of the U7 rack frame respectively.
5	UPS Interlock mode 2	Interlocking mode 2 with an UPS exclusive for the subsystem To set the mode connect AC#0 and AC#1 to the one UPS.(*1)
6	UPS Interlock mode 3	Interlocking mode 3 with an UPS exclusive for the subsystem To set the mode, connect each of AC#0 and AC#1 to the different UPSs.(*2)
7	—	—
8	—	—
9	—	—

: Do not make this setting when the UPS is not connected.

*1 : The duplication of the power supply system becomes unable to be done.

*2 : This cannot be used in the case of the single controller configuration.



(a) Floor Model (b) Rackmount Model

Figure 3.4.52 Location of Rotary Switch for Setting Power Control Mode

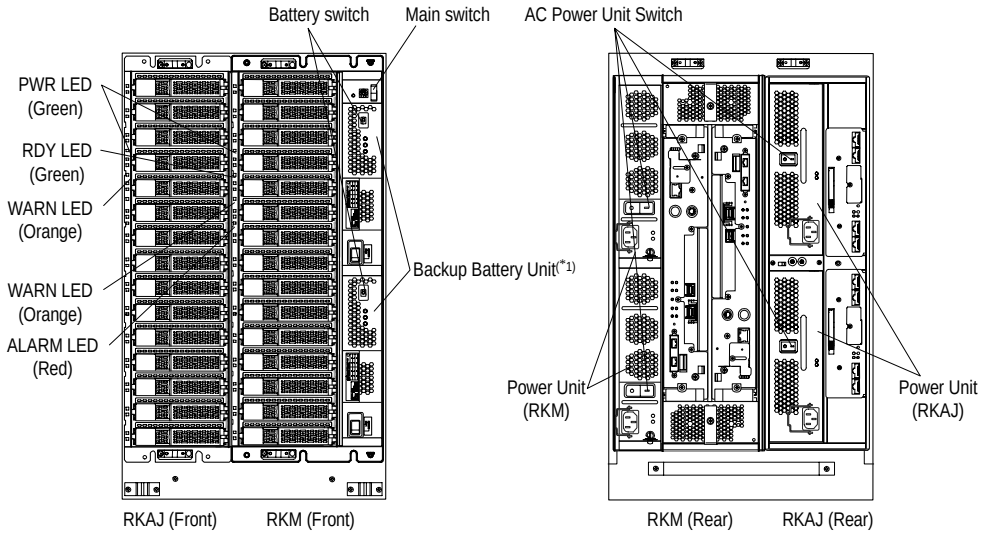
(16) Connect the maintenance PC to the disk array subsystem.

Connect the maintenance PC to the RKM referring to Step "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

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3.4.13 Subsystem power on

(1) In the case of Floor model, make sure that the AC Power Unit Switch of the Power Unit is turned off.
In the case of Rackmount model, make sure that the circuit breaker is turned off.
(2) Make sure that the main switch is turned off.
(3) All turn on the battery switch of the Backup Battery Unit on the front of the subsystem.
(4) In the case of Rackmount model, turn on the circuit breaker of the PDB.
(5) Turn on the AC Power Unit Switch of the Power Unit. (‡1)
(6) Turn on the main switch.
(7) Make sure that the ALARM LED (red) on the Front Bezel of the RKM comes on.
At this time, the Disk Drive, which was spun down due to the power saving of the priced option, also spins up in SANRISE AMS200. When the array subsystem finally becomes a ready status as SANRISE AMS500, the Disk Drive set tot the power saving spins down.
(8) Check if the CALM LEDs (red) on the both Control Units light on.

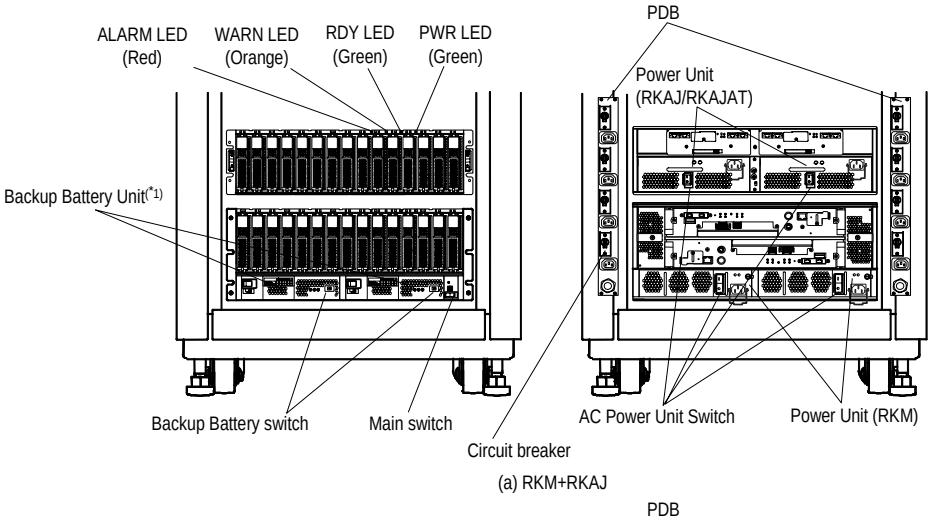


*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the lower side of the subsystem.

Figure 3.4.53 Location of Switches for Power On (Floor Model)

‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKAJ).

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(a) RKM+RKAJ

*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the left side of the subsystem.

Figure 3.4.54 Locations of Switches for Power On (Rackmount Model)

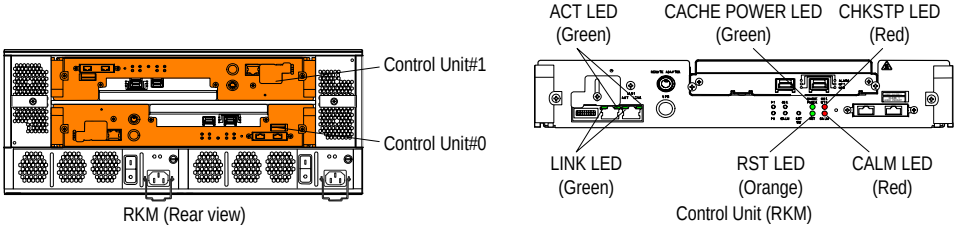


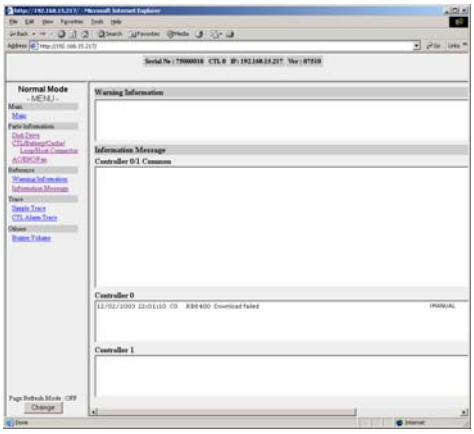
Table 3.4.55 LED Indication on Control Unit

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(9) Connect the WEB by connecting the LAN cross cable to the LAN connector for maintenance on the disk array subsystem. (“3.4.5 (2) Connecting the LAN cross cable” (SUP 03-0120))

(10) Select the [Information Message].

(11) Check that [RB8400 Download failed] message is displayed in [Information Message], and move on to the next operation.



NOTE : When the checked contents in the operation (7), (8) , (11) are not shown as above, the operation so far may have errors. Refer to “Chapter 4. Trouble Shooting” (SUP 04-0000) to solve the problem.

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3.4.14 Updating installation of microprogram for Hitachi TagmaStore® AMS 500™

Install the microprogram for the Hitachi TagmaStore® AMS 500™ (latest revision) using the WEB.

Check if the microprogram revision is 0710/A-M or later.

(1) The point to be checked before installation

Make sure of the following before starting installation

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem. (refer to Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).)

(2) Procedure for installation

(a) Press the RST SW of the Control Unit #0. (While pressing RST SW, the RST LED is on.)

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

(b) Press the RST SW of the Control Unit #1 immediately (within ten seconds) checking the CALM LED (red) of the Control Unit#0 comes on.

(Sometimes the buzzer may beeps when the RST SW is pressed, however, you do not have to stop it until these operations are completed.)

When the CALM LED on the Control Unit #0 does not go out after that, turn off the subsystem power and then turn it on without pulling out and inserting the Control Unit. Then, return to Step (1) and do all the works over again.

NOTE : Because the Control Unit is shutdown status for the Maintenance Mode, the command from the host is impossible execution.

When CALM LED on Control Unit #0 turns off and READY LED on Front Bezel turns off, it transfers to Maintenance mode.

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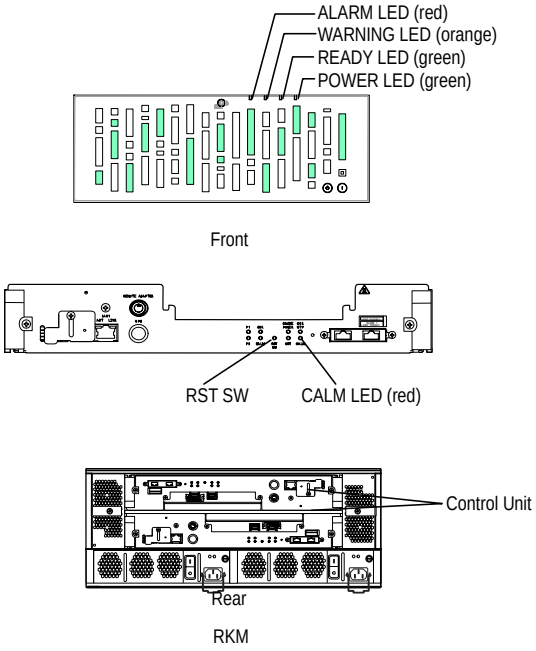


Figure 3.4.56 Indication Position

Illustrations in Figure 3.4.56 show cases of the rackmount model. They are the same for the floor model.

NOTE : • Set the TCP/IP to "Disable DNS" because the connection takes a long time when the TCP/IP of the network is set to the condition in which the DNS is used. For the setting procedure, refer to the instruction manual of the PC to be used.
• Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used.

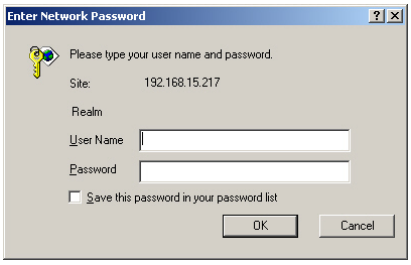
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(c) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web.

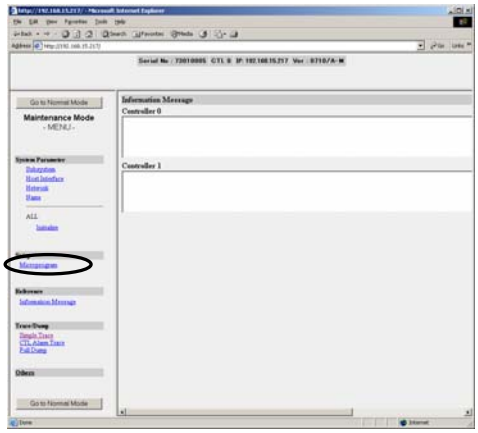
(d) Please input the IP Address of the Control Unit where it was connected with the network to the browser. Please input the page by the update button of the browser if it has already been connected with WEB.

NOTE : The contents that were set up with "System Parameter" and the Microprogram that was installed with "Setup" come into effect after the rebooting of the Control Unit.

A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

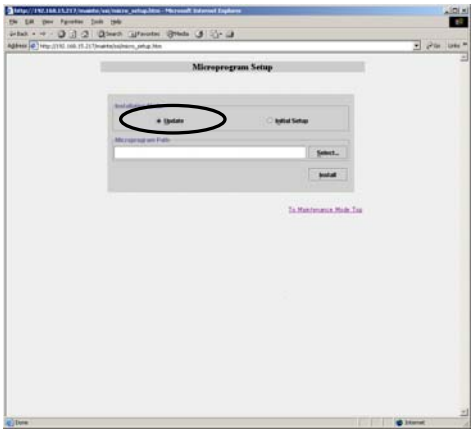


(e) Click "Maintenance", "Setup", and "Microprogram" in this order in the Web window.



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(f) When the Microprogram Setup window is displayed, check the "Update" radio button of the "Installation Mode."



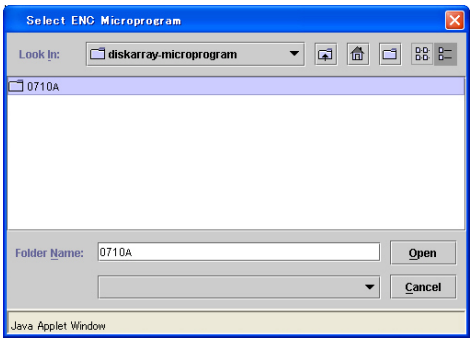
(g) Set the microprogram path.

Specify the Unified version directory(‡1) in which the microprogram that has been copied to the service PC is stored.

When the "Select" button is clicked, the "Select Microprogram" window is displayed.

Select the Unified version directory in which the microprogram is stored and click the "Open" button.

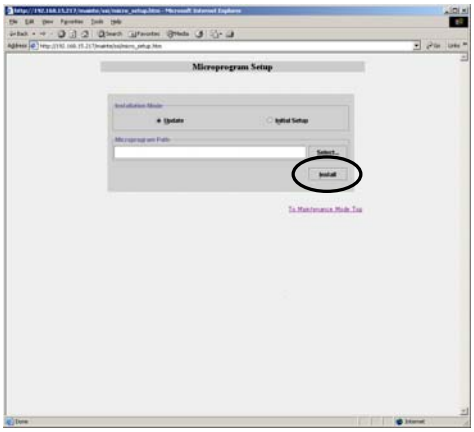
NOTE : If the window is not displayed, the JRE 1.3.1 03 may have not been installed or the installation of it may have failed.
Perform the installation of the JRE 1.3.1 03 (See Refer to the (i) of (3) in Subsection 3.4.7) again.



‡1 : For the unified version directory, refer to "3.4.8 (2) Hierarchy of Microprogram Storage Directories" (SUP 03-0200).

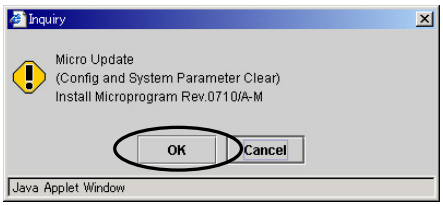
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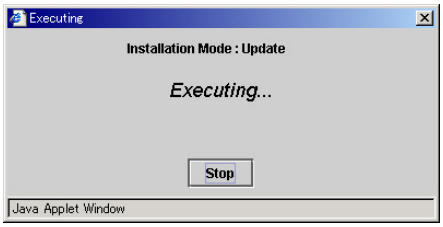
(h) Click the [Install] button to install the microprogram.



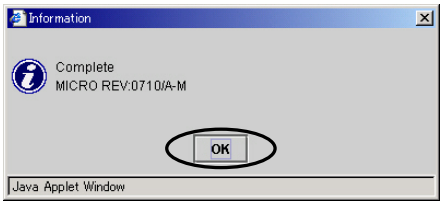
(i) The following window that asks for confirmation is displayed. When the [OK] button in the window is clicked, the installation is started.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the window in the procedure (j) was displayed, execute the update installation procedure again from the beginning.



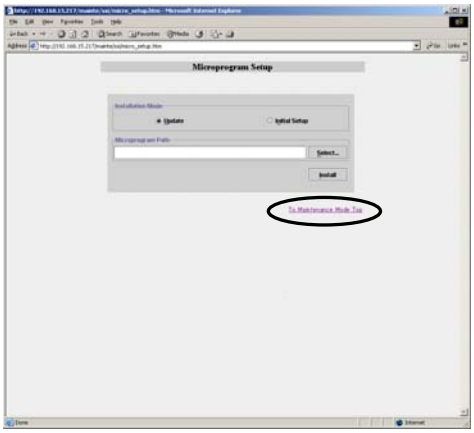


(j) When the installation is completed, the completion window is displayed. Click the [OK] button.

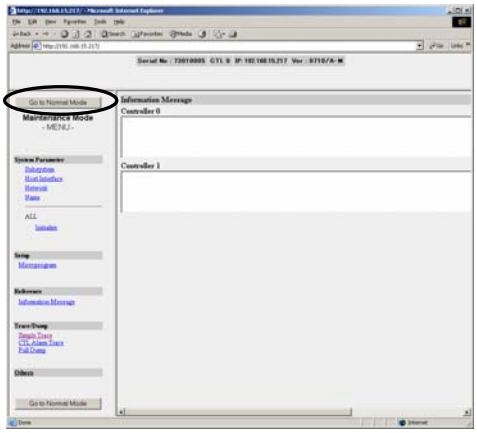


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(k) Go to the "Maintenance Mode" window by clicking "To Maintenance Mode Top" in the Microprogram Setup" window.

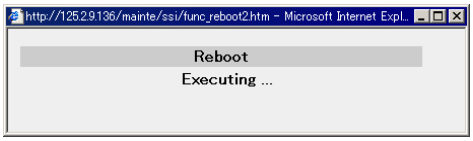


(l) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.



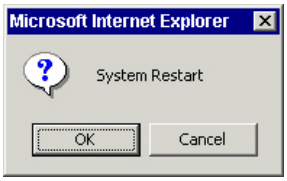
(m) When the [Go to Normal Mode] button is clicked, the following window is displayed.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the display of the following window disappears, click [View] – [Refresh] of the menu bar or the [Refresh] button of the tool bar, and then update the page of WEB.
After that, click the [Go to Normal Mode] button when the main window is displayed.



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(n) Click the [OK] button.



(o) The subsystem becomes ready in about four minutes.
Make sure that the READY LED of the front bezel is on.
If the READY LED does not come on, the installation may have failed. Perform the installation over again.

NOTE : • When [Abnormal End Empty System Retry Full Install] is displayed, refer to the recovery procedure, "4.2 When Abnormal End Empty System Retry Full Install occurs" (SUP 04-0050).
• After the updating installation is executed, the configuration of the disk array subsystem becomes unable to be returned to that of the Hitachi TagmaStore® AMS 200™ at the time when the subsystem enters the Ready status.

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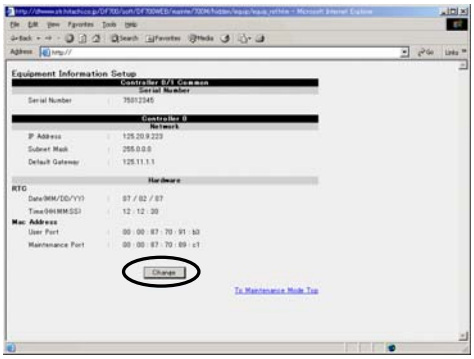
3.4.15 Setting serial number of disk array subsystem

Change the serial number of the disk array subsystem through the hidden WEB window using the serial number setting up function.
The procedure is shown below.

(1) Set the operation mode in the Maintenance Mode. (“3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem” (SUP 03-0130))

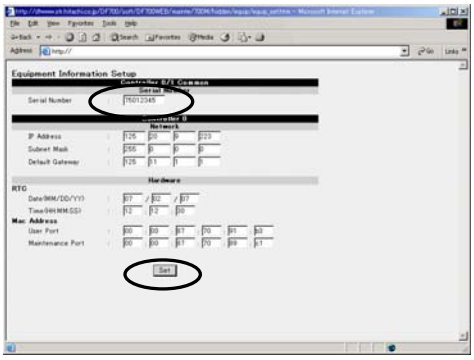
(2) Enter “http://(IP address of the disk array subsystem)/equip_set” in the [Address].
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

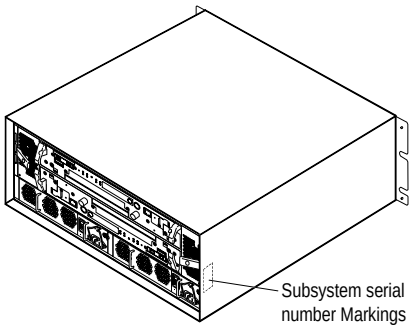
(3) Displayed the [Equipment Information Setup].
Click the [Change] button.



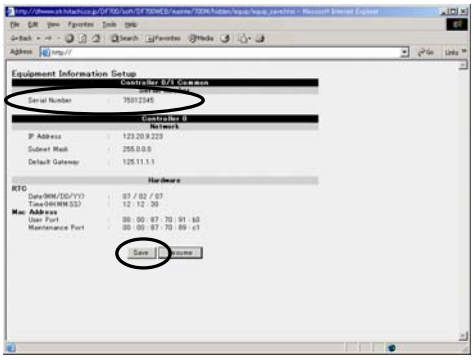
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(4) Enter a serial number in the [Serial Number] box and click the [Set] button.
The serial number is an eight figure number indicated in the section for the serial number in Figure.





(5) After making sure that the change to be made is correct, click the [Save] button.

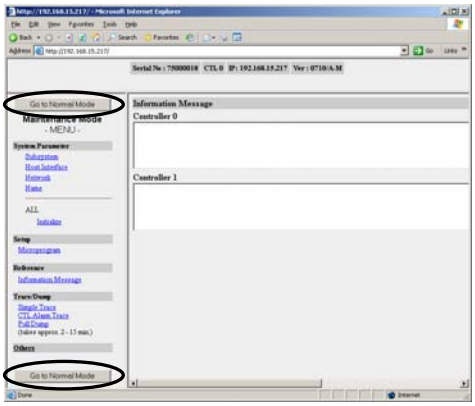


The subsystem serial number is changed.

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(6) Enter "http://(IP address of the disk array subsystem)/" in the [Address].

(7) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.



When the [Go to Normal Mode] button is clicked, the following window is displayed.



(8) Click the [OK] button.



(9) The subsystem becomes ready in about 4 to 15 minutes.
Make sure that the RDY LED of the RKM is on.

(10) Quit the WEB.

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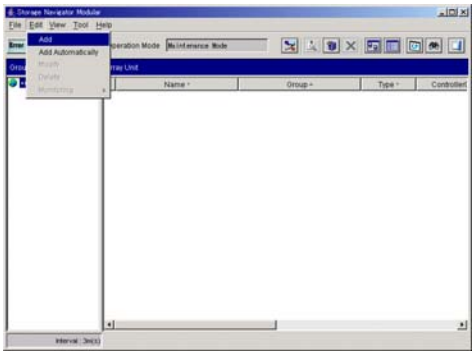
3.4.16 Registration of Hitachi TagmaStore® AMS 500™

Register the Hitachi TagmaStore® AMS 500™ that does the up-grade to Storage Navigator Modular.
The procedure is shown below.

(1) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular. ("3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120))

(2) Set the operation mode of Storage Navigator Modular as Maintenance mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130))

(3) Click the icon of an array unit on the Main screen. On the [Edit] menu, click [Add].

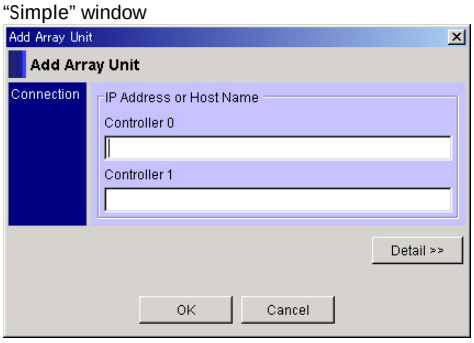


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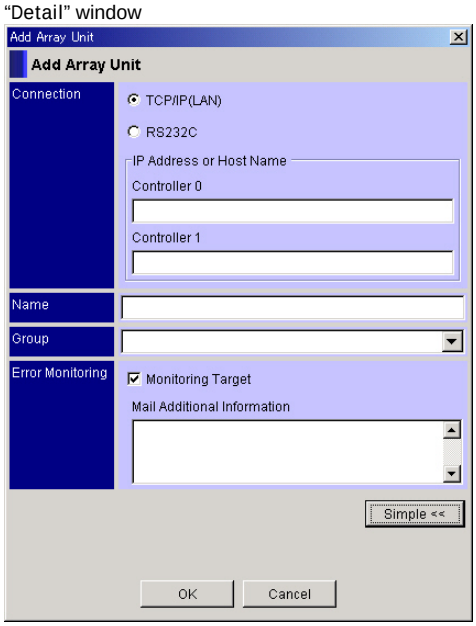
(4) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. [Array Unit Type] is used to select a type of the subsystem to be connected. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.
• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select TCP/IP (LAN) connection to be used for the disk array subsystem.
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).
The maximum number of the groups allowed to be registered is 200. The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

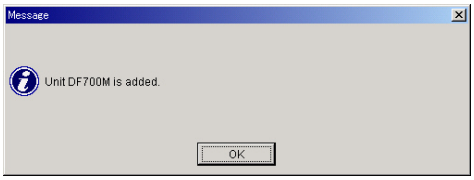
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[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

(5) When a registration completion message appears, click the [OK] button.



The Main screen is updated and then displayed.

(6) When the property window is open, click the [Close] button.
(7) Close the unit window. Quit Storage Navigator Modular by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

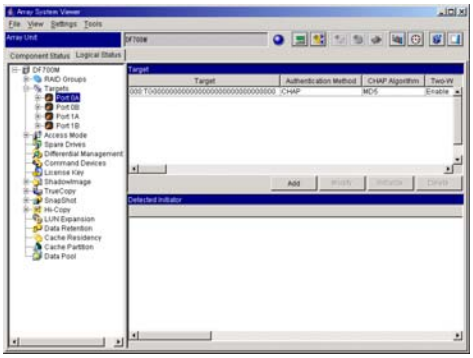
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3.4.17 iSCSI Name change of Target

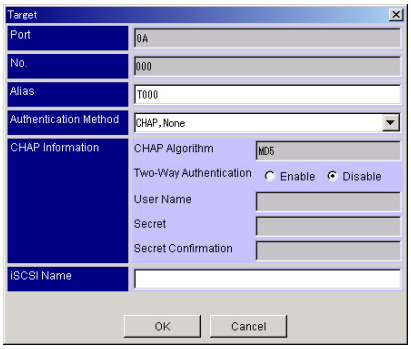
The procedure to upgrade the Hitachi TagmaStore® AMS 200™, which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 500™ is shown.
For Targets, only the "000:T000" is supported.

NOTE : Up to 128 targets can be set when the LUN Manager, which is an extra cost optional feature, is used.
In that case, change all the Target iSCSI Names.

(1) Click the [Logical Status] tab in the unit screen.
(2) Double-click the port which changes the information on the two-way authentication, select [000:T000], and click the [Modify] button.



(3) The "Target" dialog is displayed.
Change the "iSCSI Name".

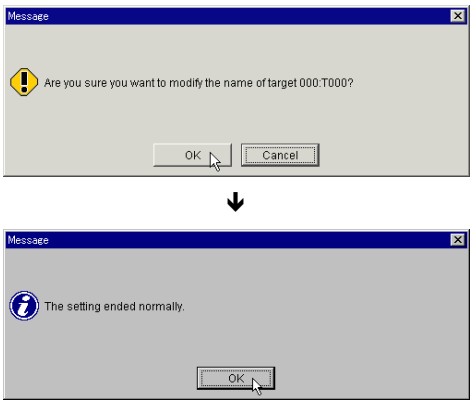


① [iSCSI Name] : Enter the name of the iSCSI Name with 233 or less alphanumeric character. A period (.), hyphen (-), and colon (:) can be used.

(4) Click the [OK] button.

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(5) The confirmation message is displayed. Select the [OK] button.



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3.4.18 Other settings

The procedure to upgrade the Hitachi TagmaStore® AMS 200™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 500™ is shown. When the RKS, which was using the Mini-HUB, was upgraded to the RKM, perform the following settings of (1) to (5) as needed.

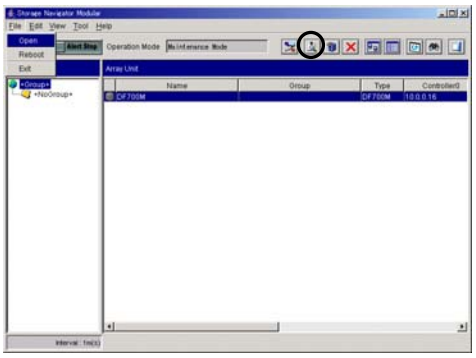
(1) Setting the Port Options

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

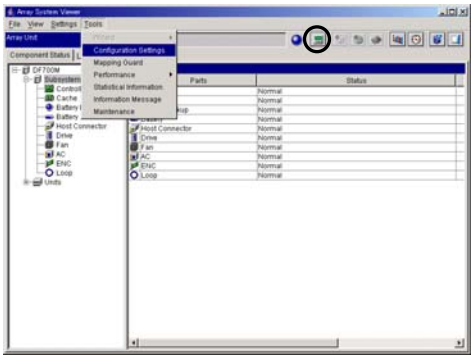
(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]



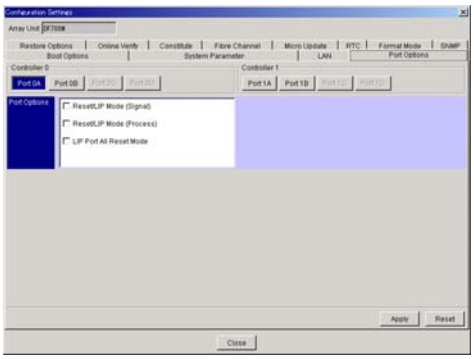
(d) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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(e) Click the [Port Options] tab. The window for setting the "Port Options" is displayed.

(f) Click the [Port 0A] button.

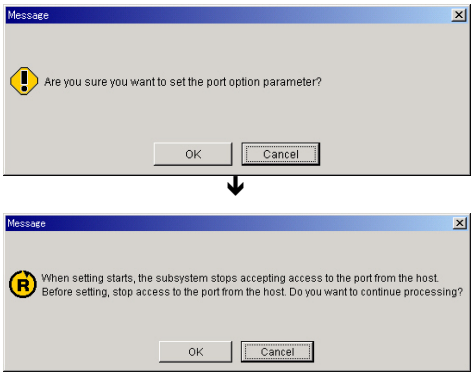


(g) Check the set contents.

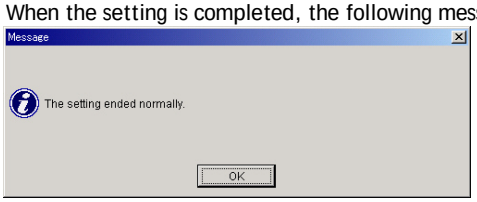
(h) Specify a port options. Select an option you want to set by clicking its check box.

(i) When the setting is completed, click the [Apply] button at lower right corner of the window.

(j) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.



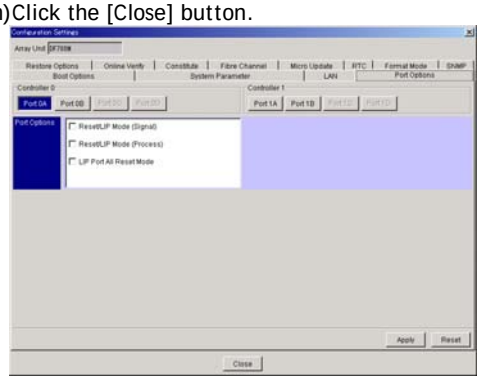
(k) When the setting is completed, the following message is displayed. Click the [OK] button.



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(l) The setting/verification of the port 0A is completed. Do the same for the other ports.

(m) Click the [Close] button.



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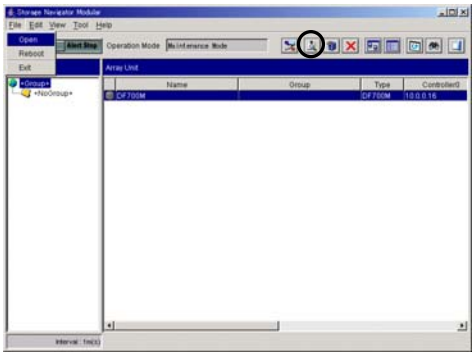
(2) Setting the Fibre Channel

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

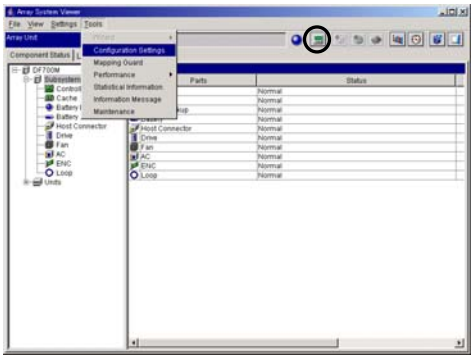
(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]



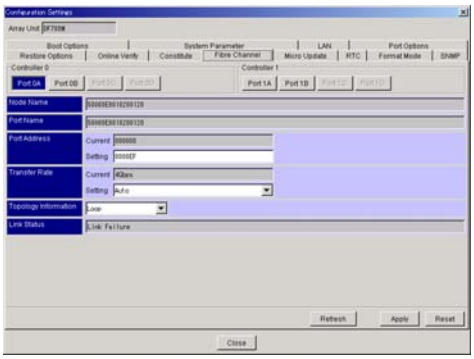
(d) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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(e) Click the [Fibre Channel] tab. The window for setting the "Fibre Channel" is displayed.

(f) Click the [Port 0A] button.

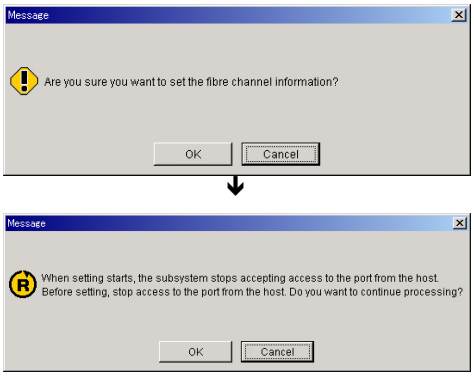


(g) Check the set contents.

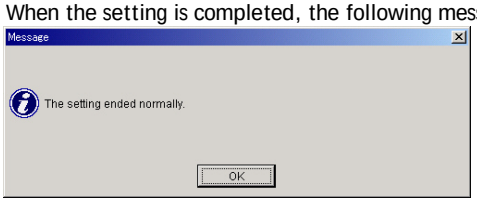
(h) Setting value of [Port Address], [Transfer Rate] and [Topology Information].

(i) When the setting is completed, click the [Apply] button at lower right corner of the window.

(j) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.

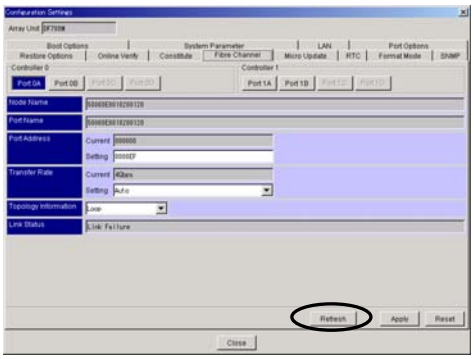


(k) When the setting is completed, the following message is displayed. Click the [OK] button.



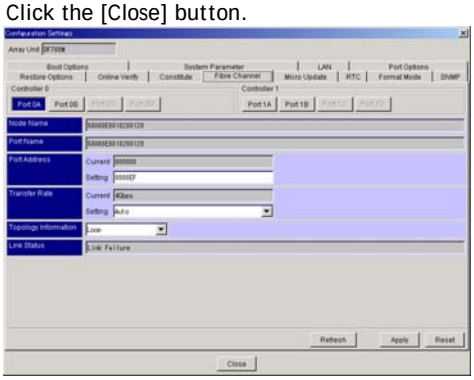
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(l) Click the [Refresh] button at the lower right part of the window to check if the setting is reflected on the display.



(m) The setting /verification for the Port 0A is completed. Do the same for the other ports.

(n) Click the [Close] button.



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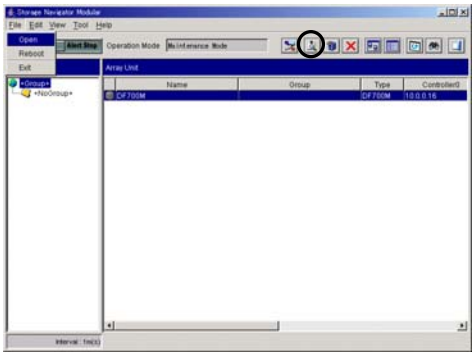
(3) Setting the Host Group Options

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

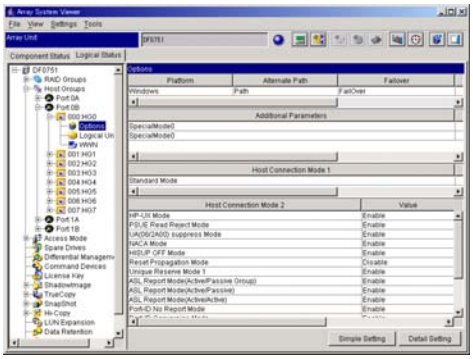
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

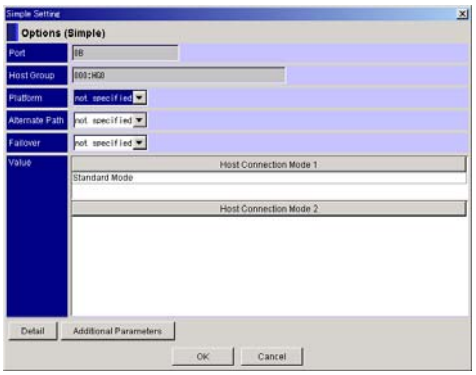
(e) Display the [000: G000] by double clicking the [Port XX] for which you want to set the mode for connecting a host after double clicking the [Host Groups].
Display the option and logical unit by double clicking the [000: G000], and then click the [Options].



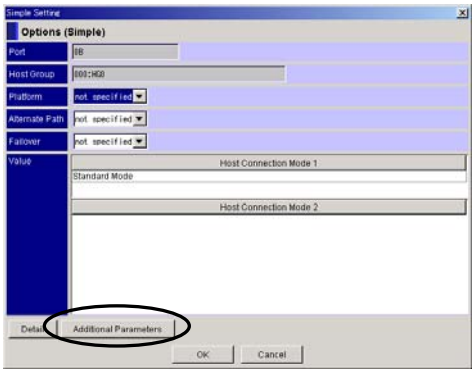
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(f) Click the [Simple Setting] button that is displayed at the lower right part of the window.

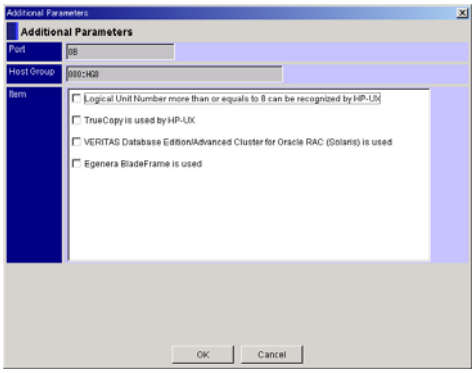
(g) "Option (Simple)"Property window is opened.
Select [Platform], [Alternative Path], and [Failover] that conform to the environment of a host to be connected.



(h) Click the [Additional Parameters] button.



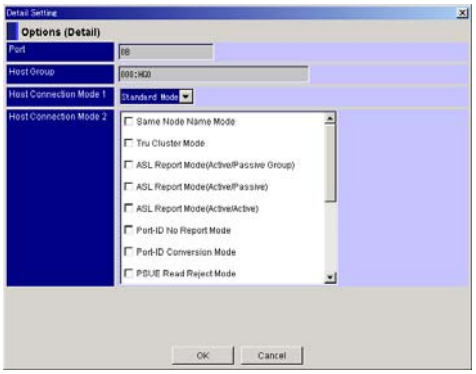
(i) The "Additional Parameters" window is opened. Select the [Item] as occasion demands and click the [OK] button.



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(j) Click the [Detail] button as occasion demands.

(k) Select [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.



(l) Click the [OK] button in the "Option (Simple)" window.



(m) The setting that has been made is displayed.

Make sure that the selected host environment (platform, alternate path, and failover) and the Additional Parameter are reflected in the display. Besides, when you have set the host connection mode 1 and 2 directly, make sure that the mode that has been set is reflected in the display.

(n) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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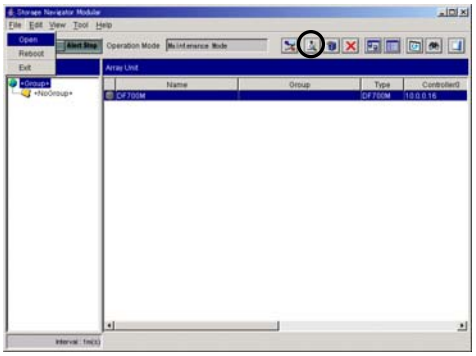
(4) Setting the LU mapping

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

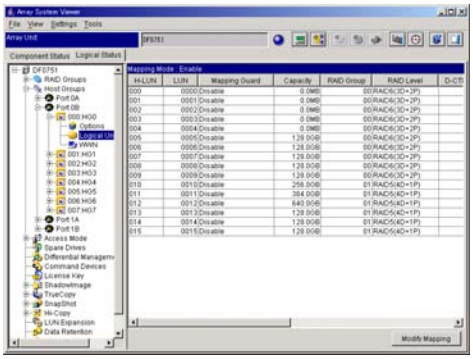
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

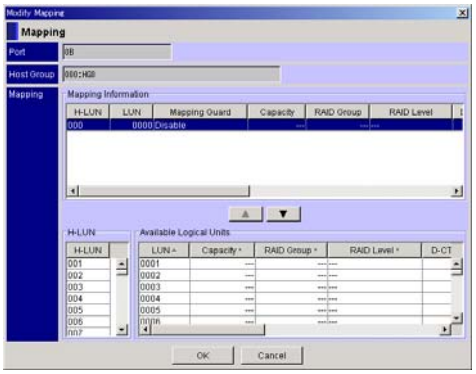
(e) In the unit window, display [000: G000] by double clicking the [Port XX] to be specified after double clicking the [Host Groups].
Display the [Option] and [Logical Unit] by clicking the [000:G000], and then click the [Option].



(f) Click the [Modify Mapping] button that is displayed at the lower right part of the window.

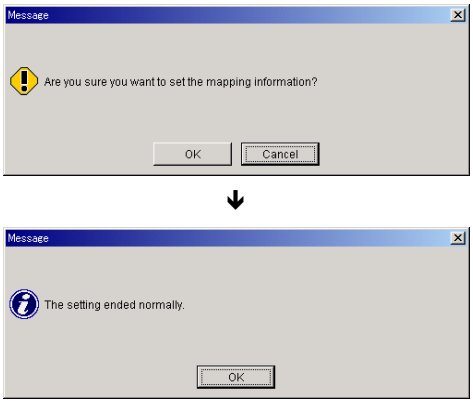
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(g) Select one H-LUN from the [H-LUN] list of the mapping. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [▲] button.



The H-LUN and LUN that were selected are moved to the [Mapping Information] list.
Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



(i) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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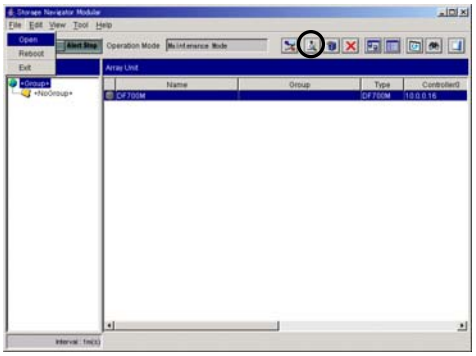
(5) Setting the Host Group Security

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130).)

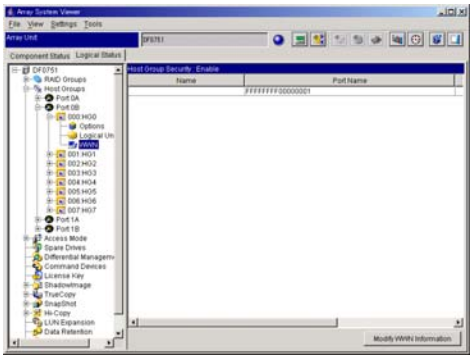
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

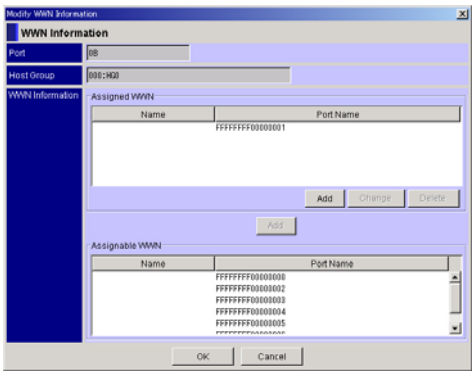
(e) Double click the [Host Groups] in the tree, and then double click the port for which you have validated the host group security. Select [WWN] by clicking the [000:G000].



(f) Click the [Modify WWN Information] button that is displayed at the lower right part of the window.

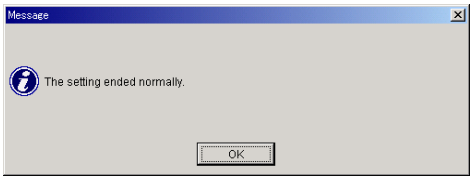
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(g) Select WWN Information in the [Assignable WWN] list and select the [Add] button.
The WWN moves from the [Assignable WWN] list to the [Assigned WWN] list.
When the WWN to be assigned to a Host Group is not listed in the [Assignable WWN] list, input and add the WWN.



Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



(i) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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3.4.19 Changing the registration information for the monitoring failures

Change the device model name of the SNMP Agent Support Function from the RKS to the RKM.

3.4.20 Works to be done after the upgrade is completed

When all the upgrade works are completed, do the works such as removal of the maintenance PC.
The procedure is shown below.

(1) Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Step "3.4.5 (2) Connecting the LAN cross cable" (SUP 03-0120).

(2) Attach the Front Bezels to the RKM by executing the procedure "3.4.12 (2) Removing the Front Bezels and rear covers" (SUP 03-0480) in reverse order.

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

(3) Close the rear door referring to the instruction given in Step "3.4.12 (3) Open the Rear Door of U7 rack frame" (SUP 03-0510).
Make sure that the rear door is latched and cannot be opened.

3.4.21 Resetting of the Host

Reboot the connecting Host and execute the setting.
For notes, refer to "5.1 For Setting Changes in Host Computer and Others" (SUP 05-0000).

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3.4.22 Revalidation the TrueCopy remote replication

This operation is not required when TrueCopy remote replication is not used.
Perform the revalidation
For example, even when the remote disk array subsystem is upgraded as shown in Figure 3.4.57, the microprogram of the local disk array subsystem must be updated.

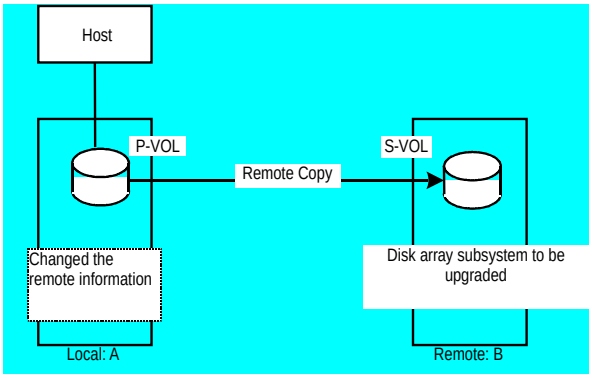


Figure 3.4.57 Change the Remote Information

The procedure is shown below.

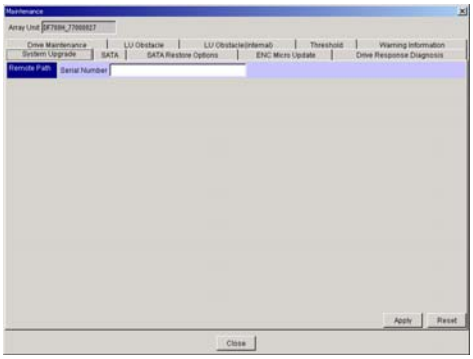
(1) Connect the service PC to the other one of the two subsystems paired by TrueCopy remote replication.
(2) Start Storage Navigator Modular and register the other one of the two subsystems paired by TrueCopy remote replication.
(3) Changing settings of the disk array subsystem
It is required to change remote information of the disk array subsystem that has not been upgraded. Make the change as shown below.
(a) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular.
(b) Set the operation mode of Storage Navigator Modular as Maintenance mode.
(c) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.
(d) Select [Tools] and [Maintenance] in this order in the unit window.
(e) Click the [System Upgrade] tab.
Take down notes of the displayed serial number in the following blank lines.

Serial Number: _____

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(e) Change the serial number.

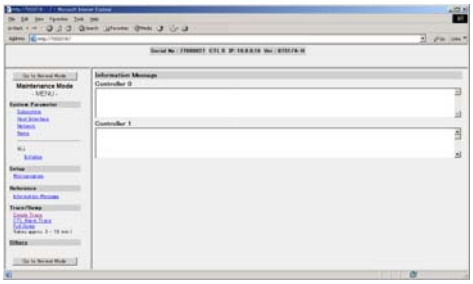
Enter the serial number of the disk array subsystem that has been upgraded.



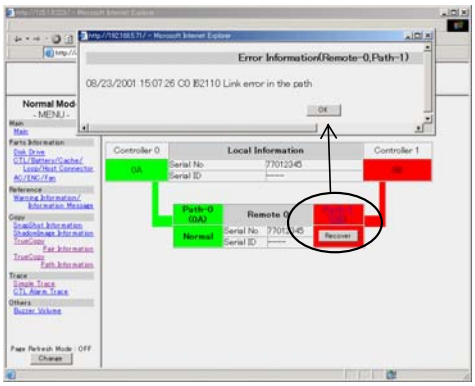
(4) Revalidate the path using the Web.

Perform the revalidation through the "TrueCopy Path Information" window.

Screen 1: Image of the "Information Message" window

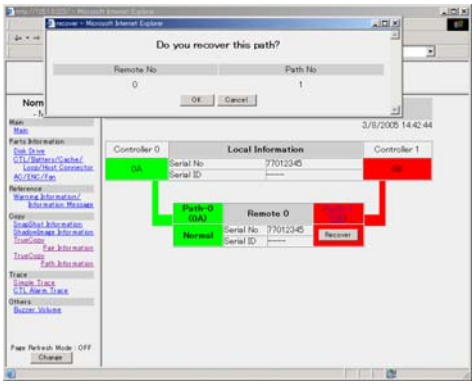


Screen 2: Image of the "Path Detachment Factors" window

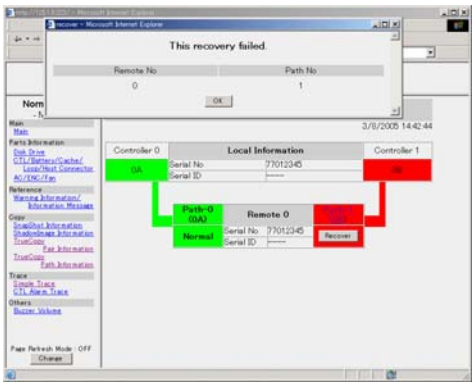


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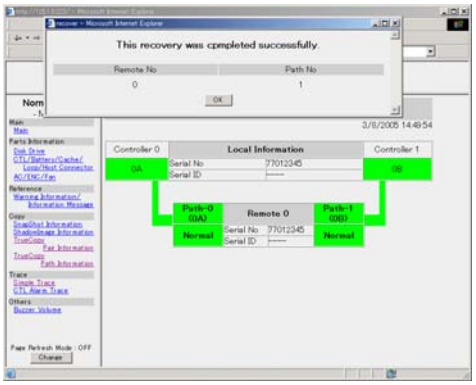
Screen 3: Image of the "Revalidation Instruction" window



Screen 4: Image of the "Revalidation Result" window (for the case where the operation terminated abnormally)



Screen 5: Image of the "Revalidation Result" window (for the case where the operation terminated normally)



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(5) Restart RAID Manager. Start the HORCM using the "horcmstart" command.
It is necessary to set an environmental variable (for TrueCopy) of the environment in which the command is executed. This example of the setting is premised on a configuration in which two instances in the same server (Windows NT®/Windows® 2000) use the same command device.

(a) Set an environmental variable that shows the each instance number. Enter the following via the command prompt window.

```
c:¥horcm¥etc>set HORCMINST=0
```

(b) Execute the horcm starting script, and then make sure of the configuration by executing the pairdisplay command.

```
c:¥horcm¥etc>horcmstart 0 1
starting HORCM inst 0
HORCM inst 0 starts successfully.
starting HORCM inst 1
HORCM inst 1 starts successfully.

Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)    (CL1-A , 1,   1)    174      1..P-VOL PSUS NEVER ,   175      2   -
vg01     oradb1(R)    (CL1-B , 1,   2)    175      2..S-VOL SSUS NEVER ,-----       1   -
```

A preparation for starting TrueCopy has been completed.

(6) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
The method for resynchronizing a TrueCopy remote replication pair is explained below.

(a) Set the group name in the configuration definition file as "vg01".
Resynchronize a TrueCopy remote replication pair, which has been split, using the pairresync command. When doing this, be sure to set the value of the -c option, which specifies the copy speed, as 15. Furthermore, make sure that the status of each volume becomes PAIR by executing the pairevtwait command.

```
c:¥horcm¥etc>pairresync –g vg01 –c 15
c:¥horcm¥etc>pairevtwait –g vg01 –s pair –t 300 10
pairevtwait : Wait status done.
```

Figure 3.4.58 Examples of Input and Output Results of Pairresync Command

(b) Make sure of the status and configuration of the resynchronized pair by executing the pairdisplay command.

```
c:¥horcm¥etc>pairdisplay -g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)    (CL1-A , 1,   1)    174      1..P-VOL PAIR NEVER , 174        2   -
vg01     oradb1(R)    (CL1-B , 2,   2)    175      2..S-VOL PAIR NEVER ,-----       1   -
```

The TrueCopy remote replication pair has been resynchronize. For details of the pairsplit command and its options, refer to Chapter 4 in the "RAID Manager System Administrator's Guide (Hitachi TagmaStore® AMS Series)".

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Chapter 4. Trouble Shooting

4.1 Error Messages

4.1.1 Flash detected messages

Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
RB0G00	Initial setup of microprogram failed	It tried to install the microprogram newly although the installation guard of the microprogram was set to “Disable”.	Gather			① Perform the update installation of the microprogram of the lower grade model.
RBE900	Upgrade failed [the installed microprogram is incorrect]	The upgrade failed because the microprogram, installation of which was attempted, was incorrect.	Gather			① Select the unified version directory, whose version is a unified version same as that of the microprogram of the lower grade model, and install the microprogram in the subsystem of the higher grade model for the purpose of update.
RBEA00	Downgrade failed [the installed microprogram is incorrect]	The downgrade failed because the microprogram, installation of which was attempted, was incorrect.	Gather			① Select the unified version directory, whose version is a unified version same as that of the microprogram of the higher grade model already installed, and install the microprogram in the subsystem of the higher grade model for the purpose of update.

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4.1.2 Failure messages

Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
HH13B0	System change failed [PIN]	The upgrade cannot be made because the system change has not been made normally and a pinned segment exists.		Gather		① Return the Disk Drives to the lower grade model, restart the subsystem, clear the pinned segment, and then make the upgrade again.
HH13B1	System change failed [PSOFF]	The upgrade cannot be made because the system change has not been made normally.		Gather		① Return the Disk Drives to the lower grade model, restart the subsystem, execute the deliberate shutdown, and then make the upgrade again.
HH2B00	Upgrade failed [PSOFF]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the deliberate shutdown had not been executed.	Gather			① Set the downgrade check as Disable, and then install the lower grade model microprogram to update it. ② After the updating installation is completed, turn off the AC Power Unit Switches of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the lower grade model. ③ Turn on the AC Power Unit Switches of all the disk array units and execute the deliberate shutdown after the disk array units become ready. ④ Make the upgrade from the lower grade model to the higher grade model again.
HH2C00	Upgrade failed [Single]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the System Startup Attribute was set as the Single mode.	Gather			① Do the upgrading installation of the microprogram for the lower grade model after disabling the installation guard. ② Power off the subsystem after the updating installation is completed. ③ Return the hardware configuration to that of the lower grade model. ④ Change the mode to the Maintenance mode after booting the subsystem while it is the lower grade model. ⑤ Execute the “Go to Normal Mode” after setting the “System Setup Attribute” as the “Dual Active Mode”. ⑥ Boot the subsystem. ⑦ Execute the procedure for the upgrade from the lower grade model to the higher grade model.
HH2D00	Upgrade failed [microprogram revision]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the microprogram revisions of the lower grade model and higher grade model were not the same.	Gather			① Install the higher grade model microproram revision, which is the same as the lower grade model microprogram revision in the drive.

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Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
HH2F00	Downgrade failed [Subsystem can not take over the user data]	The subsystem start-up of the lower model failed because it tried to downgrade from the upper model to the lower model.	Gather			① Execute the initial setup to the subsystem that is the hardware configuration of the lower model, and start up the subsystem when operating the subsystem as a lower model. ② Turn on all the AC input power supply switches of the subsystem after returning the hardware configuration of the subsystem to the status that is upgraded to the upper model, and start up the subsystem of the upper model when operating the subsystem as an upper model.
HZ0300	Not enough Cache memory to use QuickShadow function	The capacity of the cache memory is not sufficient to use the Copy-on write SnapShot function.		Gather		① Increase the cache memory capacity to 2 Gbytes per controller.
HZ0S00	Not enough Cache memory to use Cache Partition Manager	The Cache capacity to use Cache Partition Manager was insufficient due to the upgrade of the model.	Gather			① Add the Cache memory in the capacity to be able to upgrade the model.

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4.1.3 WEB error messages

Message code	Message text	Description	Recovery measures
—	Abnormal End Empty System Retry Full Install	The updating installation of the microprogram cannot be done because the old microprogram does not exist in the system disk drive.	① In the case where this message is displayed when the microprogram is installed in the subsystem of the higher grade model for the purpose of update during the upgrade from the lower grade model to the higher grade model, take recovery actions according to Section "4.2 When Abnormal End Empty System Retry Full Install occurs" (SUP 04-0050). ② When it is evident that the old microprogram does not exist in the system disk drive, install the microprogram newly. ③ When this message is displayed in a case other than the case ① or ②, execute the updating installation again after making sure that the system copy has been completed through the Information Message of the Web. In either of the following cases, the system copy has been completed. • "I140xy (or I140HH) System copy started" is not displayed. • "I140xy (or I140HH) System copy started" and "I141xy (or I141HH) System copy completed" are displayed consecutively. When the system copy is being made, turn off the main switch and then turn it on again later than 20 seconds. In the following case, the system copy is being made. (refer to Maintenance Manual Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310), Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).) • While "I140xy (or I140HH) System copy started" is displayed, "I141xy (or I141HH) System copy completed" is not displayed successively. Execute the updating installation again after making sure that the RDY LED (green) comes on and then the system copy is completed.
1204	A specified file doesn't exist. Confirm elements of designation.	The specified file does not exist.	① Make sure that the path to the directory of the microprogram to be installed is specified correctly.
—	Abnormal End Down Grade Check NG	Though a version down of the microprogram was attempted, the updating installation terminated abnormally because the Down Grade Check was not disabled.	① Change the mode of the Down Grade Check to Disable. (Refer to "4.4.2 Procedure for removing downgrade check" (SUP 04-0100)) Then execute the updating installation again.

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4.1.4 Error messages issued during upgrade made when TrueCopy remote replication is enabled

This operation is not required when TrueCopy remote replication is not used.

Message code	Message text	Description	Recovery measures
I62300	Path not connected	<In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW.	① Refer to Maintenance Manual Troubleshooting Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).
		A serial number that does not exist was entered.	① Enter a correct serial number referring to "4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 500™" (SUP 04-0130).
I62D00	Remote option disable [TrueCopy Basic]	A path detachment occurred because the TrueCopy remote replication of the remote DF was locked.	① Refer to Maintenance Manual Troubleshooting Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).
		A serial number of another subsystem was entered by mistake. The onerous option of the TrueCopy remote replication in the subsystem was invalid.	① Enter a correct serial number referring to "4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 500™" (SUP 04-0130).

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NOTE : During the upgrade made when Hitachi TrueCopy remote replication is left enabled, one of the following messages is sure to be displayed even in the normal state.

Message code	Message text	Recovery measures
I6220x	Link down time-out (Port-x)	① A state in which no link up is done has kept on longer than the regulated time at the port for which a path has been set. x: Port #
I62300	Path not connected	① <In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW.
I6250x	Path login failed	① The sending and response of FLOGI, PLOGI, RSCN, etc. to the SW terminated abnormally when a log-in to the set path was done in the case of the connection via the SW. x : Port #
I62600	Fabric connection failed (Port-x)	① Sending and response of PLOGI and PRLI done at the time of a log-in to the set path terminated abnormally.

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4.1.5 Other messages

When a message other than the above is displayed, be sure to check the configuration first. Check whether the Disk Drive locations are correct, whether the settings of the unit ID and device ID are correct, whether the cable connections are correct, and so on following the procedure.
To check the Disk Drive locations, refer to Section "4.3 When a Disk Drive was inserted in a wrong location" (SUP 04-0060).

Example)

- RA7900 System HDU spin up failed:
  Spin-up of the system drive failed.
- HE05HH Backend down [Unit# ERR] (Unit-01):
  The back end was blocked : Abnormality was detected in the connection order of the array subsystem, the setting of the device ID, or the setting of the subsystem identification switch.
- HH1Q00 SES error inf. [SES-HDU error]:
  The Control Unit was detached because both of the two SES drives could not access the ENC.
- W080xy Loop alarm (Path-x, Loop-y):
  Since the Fibre Channel loop failed, the operation is continued with the alternative loop.

When one of the following messages is displayed, there may be a mistake in the Disk Drive location, the unit ID, or some other matter. Check if the configuration is correct.

When a problem is found in the configuration related to the upgrade, correct the configuration. When no problem is found in the configuration and the operation, take some recovery action referring to the Maintenance Manual.

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4.1.6 Collecting CTL Alarm Trace

Through the CTL Alarm Trace collection, detailed information (the CTL Alarm Trace) on the immediately previous Controller blockage stored in the Controller is collected.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

Since the above-mentioned CTL Alarm Trace information is taken over from the blocked Control Unit to the replaced Control Unit, it can be collected after the Control Unit is recovered from the failure. If the Control Unit is blocked while collecting the CTL ALARM TRACE may not be collected normally. Therefore, in this case, collect the CTL ALARM TRACE again.

The method of collecting the CTL ALARM TRACE is shown below.

(1) Before collecting the CTL ALARM TRACE

(a) Items to be prepared

The CTL Alarm Trace is collected in the normal mode or the maintenance mode of the WEB.
For connecting to the WEB, a PC terminal with Browser installed is necessary.
For collecting the CTL Alarm Trace, a Disk Drive with a space of 10 M bytes at least is necessary.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable.

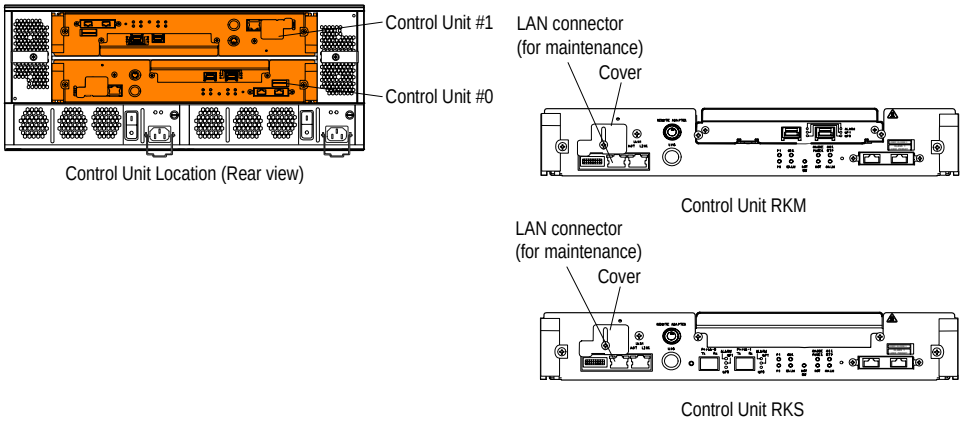


Figure 4.1.1 LAN Connector Position

(c) Collect the CTL Alarm Trace information from each Control Unit.

Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

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(d) Make sure that the WARNING LED (orange) on the Front Bezel of RKM/RKS is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)

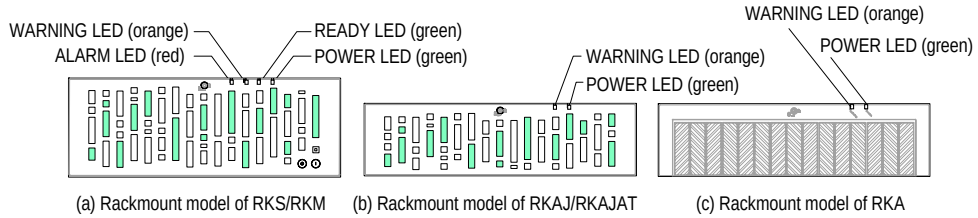


Figure 4.1.2 Indication Locations and Names of LED (Front Bezel)

(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

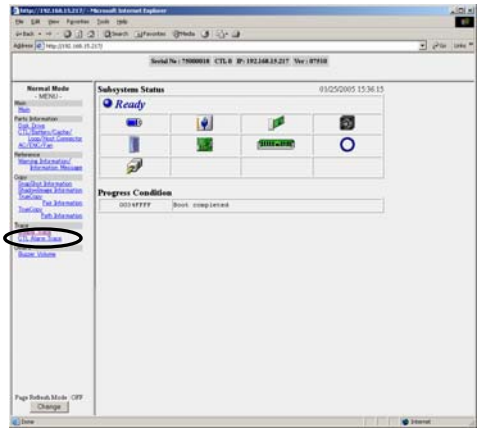
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(2) Procedure for collecting a CTL Alarm Trace

(a) Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button.

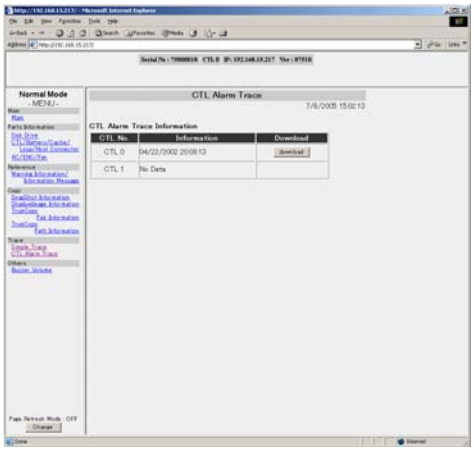


(b) Collect the memory dump according to the WEB and the following procedure.
Click “CTL Alarm Trace” in the menu frame of “Trace”.



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If CTL Alarm Trace exists, the CTL Alarm Trace information window is displayed.



Description of information

"Not Ready" ····· Indicates the situation where the trace area is not established in the device.

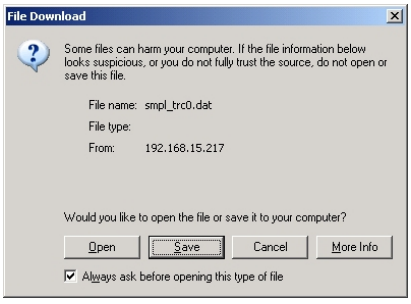
"No Data" ····· CTL Alarm Trace information does not exist or while information is being created.

"MM/DD/20YY hh:mm:ss" ····· CTL Alarm Trace information exists.

NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL Alarm Trace may not be collected normally. Therefore, collect the Simple Trace.
If Simple Trace cannot be obtained through detached Control Unit, connect the Maintenance PC to the Control Unit at the opposite side, and collect the Simple Trace.

(c) Press the "Download" button on the Control Unit side to be collected in "CTL Alarm Trace information".(‡1)

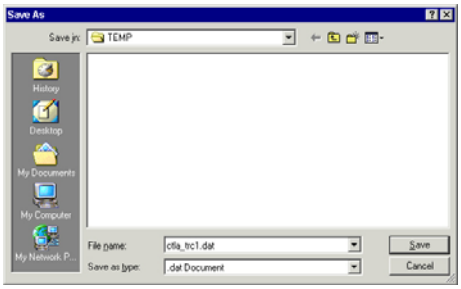
(d) The following dialog is displayed. Click the [Save] button.



‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

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(e) Select the place to save the file and file name (Default file name: ctla_trc0.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed.

In this procedure is collected by WEB Normal mode. Similarly, CTL Alarm Trace can be collected by WEB Maintenance mode through Menu Frame.

‡1 : There may be a case where the default file name is given as "ctla_trc0.dat.dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

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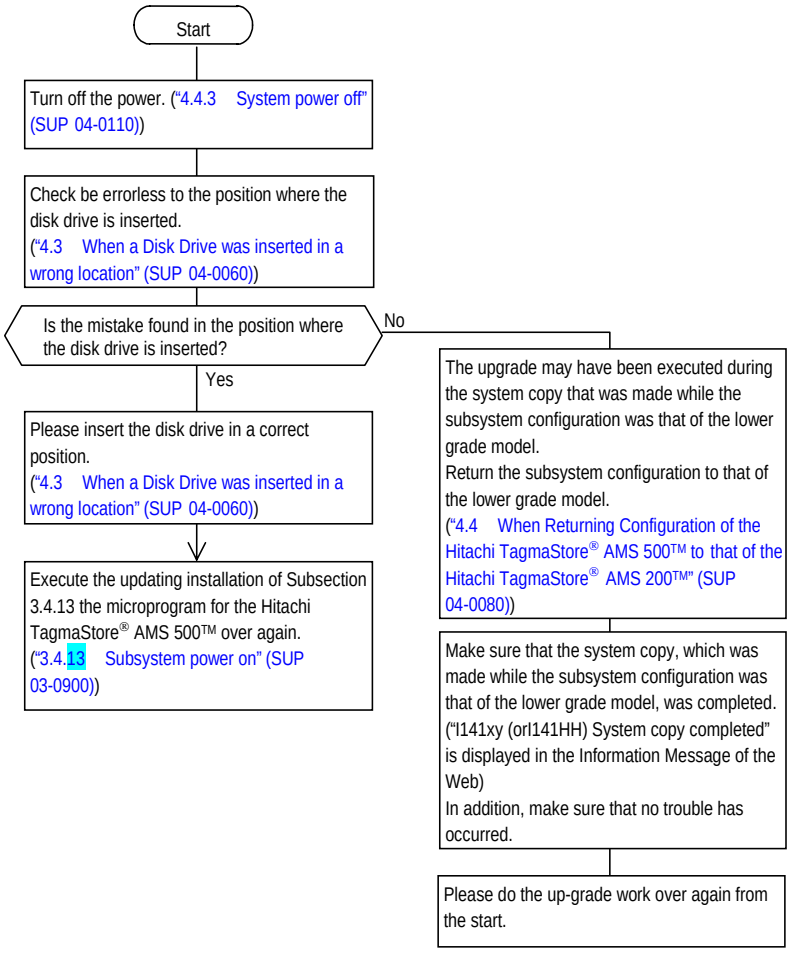
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4.2 When Abnormal End Empty System Retry Full Install occurs

The procedure for troubleshooting and actions to be taken when the Abnormal End Empty System Retry Full Install occurs are shown below.

Make a recovery from the failure following the procedure for troubleshooting.



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4.3 When a Disk Drive was inserted in a wrong location

The recovery procedure to be used when a Disk Drive was inserted in a wrong location is shown below.

(1) Check the following information referring to the configuration information collected according to Subsection "3.4.9 Collecting serial numbers of Disk Drives" (SUP 03-0350).

```
Array unit configuration information list.

DF Name : 174-175
Date : 2003/12/02 21:12:31
Micro Program Revision : 0710/A-S
Array Unit Type : DF700S
Serial Number : 73010055

---- RAID Configuration ----
RAID    RAID    Start Location          Number of HDU     Number of       Free Capacity
Group   Level   [Unit No.   HDU No.]  in parity group  parity group        [block]
 0       5          0          0              5                1             525680640

-- End

---- LU Configuration ----
     LU    Capacity   Status                    Staging   C-CTL   D-CTL   RG RAID      Capacity
      0    2097152    Normal                        512   0         0          0   5          1.0 GB

-- End

---- Drive Configuration ----
Location        Vendor ID    Product ID              Revision   Capacity    Status      Serial Number
Unit0 ,HDU0     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305B4910
Unit0 ,HDU1     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305B9100
Unit0 ,HDU2     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    30532706
Unit0 ,HDU3     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305C5571
Unit0 ,HDU4     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    30542348
Unit0 ,HDU5     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   30545271
Unit0 ,HDU6     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305C5229
Unit0 ,HDU7     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305B6777
Unit0 ,HDU8     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305B3188
Unit0 ,HDU9     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305L1373
Unit0 ,HDU10    HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   30575398
Unit0 ,HDU11    HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305N2858
Unit0 ,HDU12    HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305K8917
Unit0 ,HDU13    HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   30575348

-- End

～～～～
(abbr.)
```

① [Drive Configuration]

[Location]: Shows a location where a Disk Drive is installed.

[Unit]: Unit ID#

[HDU]: Disk drive#

[Serial Number]: Serial# (Disk Drive)

(2) Remove Disk Drives from the RKM replaced and keep them in the safekeeping container.

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(3) Take out a Disk Drive from the safekeeping container and read the serial number indicated on the side of the Disk Drive.
For serial#, refer to Figure 4.3.1.

NOTE : For the serial# of the Disk Drive manufactured by HITACHI, the last 8 digit values recorded on the side of the Disk Drive are displayed in the "Serial Number" column in the collected configuration information file.

Deleted: manufacturered

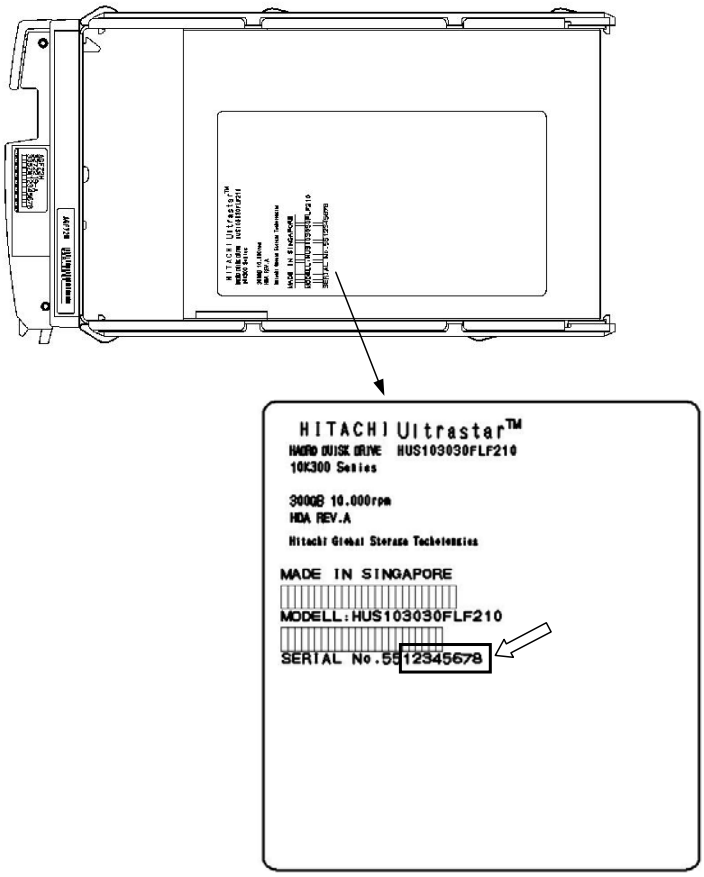


Figure 4.3.1 Serial Number

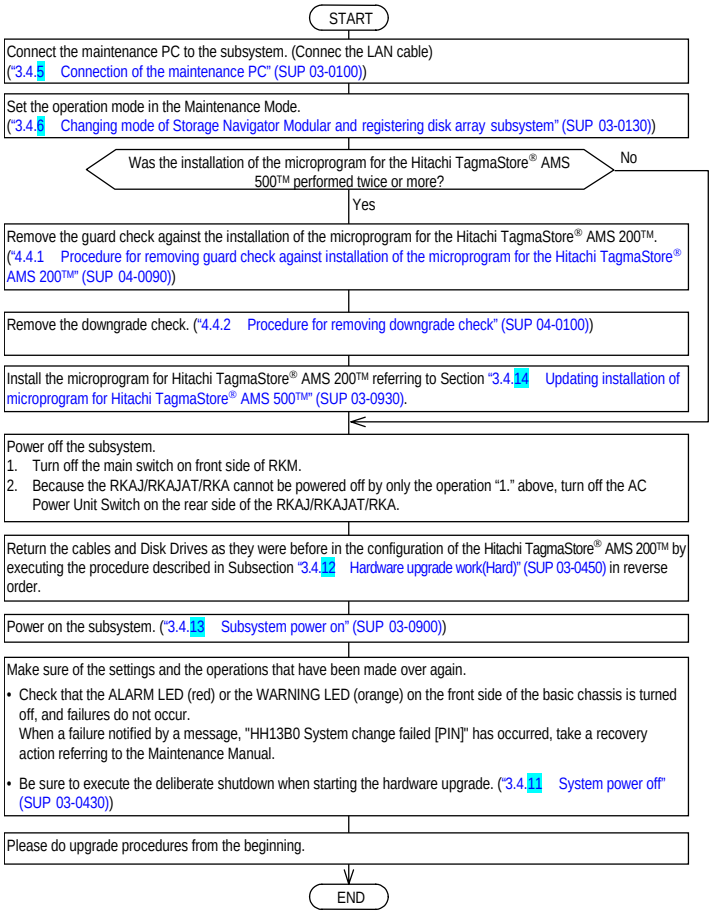
(4) Refer to the configuration information file for the [Unit] and [HDU] of the Disk Drive having the same serial number and reinsert the Disk Drive in the slot having the unit ID number and Disk Drive number shown.
(5) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

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4.4 When Returning Configuration of the Hitachi TagmaStore® AMS 500™ to that of the Hitachi TagmaStore® AMS 200™

The procedure to be used in case the upgrade fails is explained below. In the procedure, the upgrade is made again after the configuration of the disk array subsystem is returned to that of the Hitachi TagmaStore® AMS 200™ once.

NOTE : The configuration of the disk array subsystem cannot be returned to that of the Hitachi TagmaStore® AMS 200™ after the updating installation of the microprogram for the Hitachi TagmaStore® AMS 500™ is executed according to the procedure described in Subsection "3.4.14 Updating installation of microprogram for Hitachi TagmaStore® AMS 500™" (SUP 03-0930) and the subsystem enters the READY status.



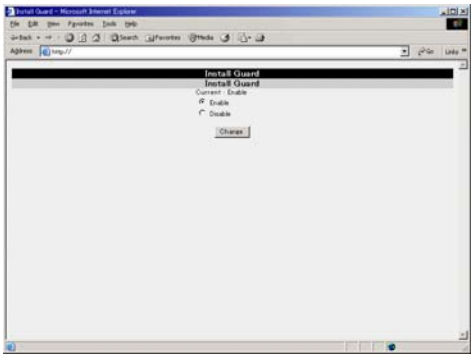
NOTE : Be sure to review all the settings and operations that have been made before making the upgrade again.

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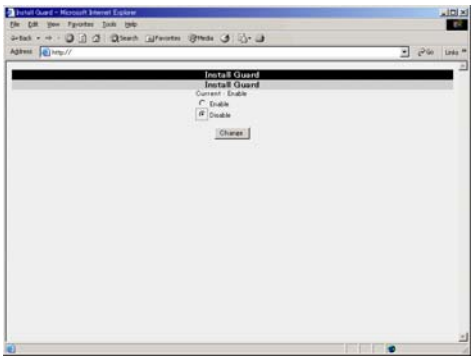
4.4.1 Procedure for removing guard check against installation of the microprogram for the Hitachi TagmaStore® AMS 200™

The procedure for removing the microprogram installation guard check is shown below.

(1) Enter "http://(IP address of the disk array subsystem)/instlgrd" in the [Address].
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].



(2) Select the [Disable] radio button of the [Install Guard] in the "Install Guard" window and click the [Change] button.



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4.4.2 Procedure for removing downgrade check

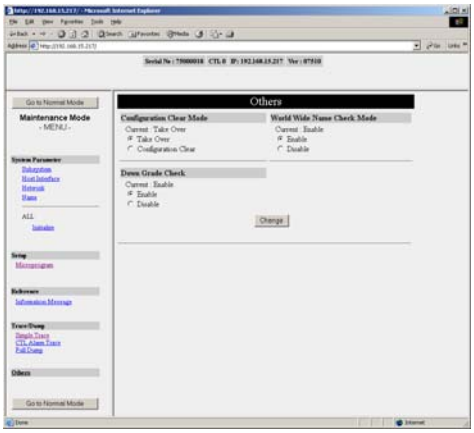
The procedure for removing the downgrade check is shown below.

(1) Set the operation mode in the Maintenance Mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SUP 03-0130))

(2) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. ("3.4.5 Connection of the maintenance PC" (SUP 03-0100))
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

(3) Click [Others] in the menu tree.

(4) Select the [Disable] radio button of the [Down Grade Check].
Click the [Change] button.



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4.4.3 System power off

Because a message, "Download Failed" is displayed and the disk array subsystem is in the Alarm status, the RKAJ/RKAJAT/RKA cannot be powered off although the main switch on the front side of the RKM is turned off. The power of the RKAJ/RKAJAT/RKA must be turned off by the other means.

(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the Front Bezel is off.
(3) Turn off the AC Power Unit Switches of the AC/DC power supplies installed in the RKM and all the RKAJ/RKAJAT/RKAs.
(4) Turn off the battery switch of the Battery Unit on the front side of the disk array subsystem.
(5) All turn off the circuit breaker of the PDB.

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4.5 Procedure for Recovery from Path Detachment and PSUE Status Occur during Upgrade Made when TrueCopy remote replication is Enabled

The procedure for recovery, which is to be used when the pair status is changed to PSUE during the upgrade made when TrueCopy remote replication is enabled, is explained below.
The recovery procedure varies depending on which configuration, the Hitachi TagmaStore® AMS 500™ or the Hitachi TagmaStore® AMS 200™, the disk array subsystem has when the PSUE status occurs.

4.5.1 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 200™

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Hitachi TagmaStore® AMS 200™, make a recovery from the PSUE status first, split the pair again, and then make the ordinary upgrade.
The procedure for resynchronizing a TrueCopy remote replication pair is shown below. The resynchronization must be done using the pairresync command issued by RAID Manager.

(1) Restart RAID Manager. Start the HORCM using the "horcmstart" command.
(2) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
(3) Splitting a pair
Split a pair by executing the pairsplit command and make sure that pair status has been changed to PSUS/SSUS.
(4) Return to the ordinary upgrade operation.
Revalidate the path when necessary, return to the ordinary upgrade, and make the operations over again from the step in which the PSUE status occurred.

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4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 500™

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Hitachi TagmaStore® AMS 500™ , a wrong setting may have been made in the operation that has been made according to Item "3.4.22 (3) Changing settings of the disk array subsystem" (SUP 03-1190).
The recovery procedure is explained below.

(1) Checking/changing settings of the disk array subsystem
Check the remote information of the disk array subsystem that has not been upgraded.
(a) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular.
(b) Set the operation mode of Storage Navigator Modular as Maintenance mode.
(c) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.
(d) Select [Tools] and [Maintenance] in this order in the unit window.
(e) Click the [System Upgrade] tab.
Verification of the displayed serial number.
If an error is found, enter the value of the disk array subsystem that has been upgraded.

If the information setting has been made for a disk array subsystem belonging to another pair by mistake, return the status of the subsystem taken for a target subsystem as it was before by setting the serial number that were noted down in Step "3.4.22 (3) Changing settings of the disk array subsystem" (SUP 03-1190) and by revalidating the path. Then make the settings for the target disk array subsystem.

(2) Revalidate the path using the WEB.
(3) Restart RAID Manager. Start the HORCM using the “horcmstart” command.
(4) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
(5) Make sure that recovery from the path detachment and the PSUE status has been made referring to the "Information MSG" window of the WEB.

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Chapter 5. Appendix

5.1 For Setting Changes in Host Computer and Others

When upgraded from Hitachi TagmaStore® AMS 200™ to Hitachi TagmaStore® AMS 500™, the Disk Array subsystem shows the following changes.

No.	Name of Items	Hitachi TagmaStore® AMS 200™	Hitachi TagmaStore® AMS 500™	Existence of Limits
1	Subsystem Product Serial Number	730xxxxx	750xxxxx	The following contents may be changed depending on the subsystem product serial number changes. As occasion demands, the changing operation for upper host device information or various application setting may be needed. ・World Wide Name ・Product Serial Number of Inquiry
2	World Wide Name	-	-	By registering the subsystem product serial number to Hitachi TagmaStore® AMS 500™ in the Subsystem Maintenance Mode and rebooting the subsystem, WWN on Front End Fibre Channel is changed to the different value from Hitachi TagmaStore® AMS 200™ after Hitachi TagmaStore® AMS 500™ Ready, Front End Fibre Channel can be used, and the LU recognition from the upper Host enables.
3	Target iSCSI Name	-	-	When the Hitachi TagmaStore® AMS 200™ to be upgraded is the system configuration of the iSCSI interface, the Target iSCSI Name of the Hitachi TagmaStore® AMS 500™ succeeds the value before the upgrade. However, when the default iSCSI Name of the Target was used in the array subsystem before the upgrade, it is required to change the Target iSCSI Name of the Hitachi TagmaStore® AMS 500™ to a unique value in the network. If the Hitachi TagmaStore® AMS 500™ is used without changing the Target iSCSI Name and when the array subsystem before the upgrade is configured with the system of the iSCSI interface again after using the Hitachi TagmaStore® AMS 500™ , the iSCSI Name of both array subsystems is duplicated in the network, and trouble is caused to the iSCSI protocol.
4	Inquiry	730xxxxx	750xxxxx	Product Serial Number After upgrading from Hitachi TagmaStore® AMS 200™ to Hitachi TagmaStore® AMS 500™, Hitachi TagmaStore® AMS 500™ responds to 750xxxxx.

(1) When the Disk Array subsystem is the system configuration of the iSCSI interface
You will set new iSCSI name for all targets of the Hitachi TagmaStore® AMS 500™.
And you will follow proper setting procedures to set the information of CHAP authentication, Two-way autentication and digest with new target iSCSI name on the host computer if needed.
Then you will login to the target of Hitachi TagmaStore® AMS 500™ with new target iSCSI name which you set in the upgrade.
The host computer may continue to execute login process to the target of old iSCSI name if the target iSCSI name or the IP address for the iSCSI interface of Hitachi TagmaStore® AMS 500™ are changed.
If it happens, you will logout from the target of old iSCSI name.

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(2) When the Disk Array subsystem is the system configuration of the Fibre Channel interface
The device file name changes due to World Wide Name change. Following the change, OS reconstruction is needed.
The setting review is also needed in the application software using the device file name.

If you use the WWN binding in the Driver setting file, it is necessary to change the setting. And the Host needs rebooting after the setting change.

When Fabric Switch is used and WWN executes zoning, it is necessary to execute the zoning setting review since WWN is changed.

The upgrading operation from Hitachi TagmaStore® AMS 200™ to Hitachi TagmaStore® AMS 500™ is new device addition image for OS. However, as different from the ordinary new device addition, the user's data is maintained when installed. Therefore, great care is needed for setting the Host computer and peripherals.

For each platform, the points of which special care is needed are shown below.

- When HP-UX is used.
  It is necessary to export the Volume Group before upgrading and import the Volume Group after upgrading.
  When MC/service guard is used, it is necessary to suspend the MC/service guard before upgrading and reboot the MC/service guard after upgrading.
- When AIX + HDLM is used.
  It is necessary to export the Volume Group before upgrading and note the disk property such as queue depth for the physical disk and the HDLM device. It is also necessary to import the Volume Group after remaking the HDLM device when the upgrade is completed.

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Examples of the HDLM device file remake

1. deletion of the HDLM device file # rmdev
2. reset of the device configuration information # chdev
3. remake of the HDLM device file # dlmcfgmgr

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- When Solaris + VxVM is used.
  It is necessary to boot the Host with option "r" after upgrading and boot VxVM.

  NOTE : • When HBA: Sun genuine, rebooting is necessary since the driver setting is changed at the time of the device recognition.
  • When SunCluster is used, it is necessary to exclude the wide area device from the definition (excluding "quorum device" in the wide area device from the definition). The correspondence between the disk ID instance number in the wide area device and the disk device (cXtYdZ) is also changed due to the LU serial number change after upgrading. Therefore, check the correspondence between the disk ID instance number and the local and remote path. If the correspondence is illegal, it is necessary to redefine. Then, redefine the wide area device as SunCluster (redefine quorum device from the optional wide area device).

- When IRIX is used.
  It is necessary to execute the device recognition and mapping file making again after upgrading and reboot the Host.

- When Windows®-related system is used.
  Rebooting is necessary after upgrading.

- When Linux + VxVM is used.
  It is necessary to deport the Disk Group before upgrading and import the Disk Group after upgrading.

- When Tru64 is used.
  For UFS: It is necessary to mount with the new device.
  For AdvFS: It is necessary to link again with the new device as the registered device.

  1. device recognition check # scu show edt
  2. device file check # hwmgr –view devices
  3. transfer to domain directory # cd /etc/fdmns/[domain name]
  4. domain directory contents check # ls
  5. allocation to domain directory # ln –fs /dev/disk/dskzzzc dskxxxc
     - dskxxxc: Registered device
     - /dev/disk/dskzzzc: New device file name

  For LSM, the data must be restored at the time of the LSM configuration since the disk group cannot be imported.

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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Apr.28.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	Issued	-
1	Jly.19.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	SUP 0020	4.1.5 was added.	AD
					SUP 01-0000, SUP 03-0390, SUP 03-0440, SUP 03-0800, SUP 03-0910, SUP 04-0080, SUP 04-0110	Description of RKAAT was added.	AD
					SUP 02-0000, SUP 02-0010	Wrist strap was added.	AD
					SUP 03-0020	Table 3.3.1 was deleted.	DL
					SUP 03-0030	Table 3.3.1 was added.	AD
					SUP 03-0090, SUP 03-1010	Subsystem serial number marking was changed.	CH
					SUP 03-0180	Corrected Figure 3.4.4.	CR
					SUP 03-0190, SUP 03-0200, SUP 03-0210, SUP 03-0260, SUP 03-0270, SUP 03-0280, SUP 03-0290, SUP 03-0960	Changed item number.	CH
					SUP 03-0460	"Please be sure to keep a wrist strap near the subsystem." was deleted.	DL
					SUP 03-0811, SUP 03-0812	These pages were newly added.	AD
					SUP 03-0820, SUP 03-0830, SUP 03-0840, SUP 03-0850, SUP 03-0860, SUP 03-0870, SUP 03-0880, SUP 03-0890, SUP 03-0900, SUP 03-0940	Corrected Figure No.	CR
					SUP 03-0851, SUP 03-0852	These pages were newly added.	AD
					SUP 03-0950	Changed screen at (e).	CH
					SUP 03-0970	Changed screen at (i).	
					SUP 03-0980	Changed screen at (l).	CH
					SUP 04-0000	"Collect the error" and "RB0G00" were added.	AD
					SUP 04-0010	"Collect the error" was added.	AD
					SUP 04-0020	"Collect the error", "HZ0300", and "HZ0S00" were added.	AD
					SUP 04-0030	Recovery measures was corrected.	CR
					SUP 04-0040	Corrected "Example".	CR
					SUP 04-0041 to SUP 04-0046	These pages were newly added.	AD
					SUP 04-0050	Changed refer page. (3.1.13→3.1.12)	CH
					SUP 04-0100	Deleted (5) and (6).	DL
2	Sep.14.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	SUP 0010	3.4.16 was added.	AD
					SUP 01-0000	"The procedures about…" was added.	AD
					SUP 03-0060	"Perform the setting of the Port xB side as needed" was added.	AD
					SUP 03-0520, SUP 03-0530	"FC I/F is installed in the RKS" was added.	AD
					SUP 03-0580	*1 was added.	AD
					SUP 03-0680	(e)-(ii) was changed.	CH
					SUP 03-1050	3.4.16 was added.	AD
					SUP 03-1060 to SUP 03-1190	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
3	Nov.4.2005	K.Oonabe	N.Higashijima	A.Ishikawa	SUP 0010	Title was changed at 3.4.6	CH
					SUP 01-0000, SUP 03-0390, SUP 03-0440, SUP 03-0800, SUP 04-0042, SUP 04-0080, SUP 04-0110	RKAAT was deleted.	DL
					SUP 02-0000	*1, *2 was added.	AD
					SUP 03-0000	"The upgrade from…not supported." was added.	AD
					SUP 03-0020	Changed "Notes".	CH
					SUP 03-0030, SUP 03-0050, SUP 03-0120, SUP 03-0170, SUP 03-0180, SUP 03-0470, SUP 03-0520, SUP 03-0530, SUP 03-0570, SUP 03-0750, SUP 03-0790, SUP 03-0870, SUP 03-0880, SUP 03-1050	The content was divided into Fibre and iSCSI.	AD
					SUP 03-0100	Table was changed.	CH
					SUP 03-0110	It changed to an blank page.	CH
					SUP 03-0181, SUP 03-0182, SUP 03-0521, SUP 03-0531, SUP 03-0581, SUP 03-0582, SUP 03-0751, SUP 03-0752, SUP 03-0881, SUP 03-0882	These pages were newly added.	AD
					SUP 03-0270	Changed (d).	CH
					SUP 03-0811, SUP 03-0812, SUP 03-0851, SUP 03-0852	Deleted page.	DL
					SUP 03-0820, SUP 03-0830, SUP 03-0840, SUP 03-0850, SUP 03-0860, SUP 03-0870, SUP 03-0880, SUP 03-0890, SUP 03-0900, SUP 03-0910, SUP 03-0940	Changed Figure No.	CH
					SUP 03-1080, SUP 03-1110, SUP 03-1140, SUP 03-1160	Changed (c).	CH
4	Jan.27.2006				SUP 0010	3.4.16 was added.	AD
					SUP 03-0000	"The upgrade…work." was added.	AD
					SUP 03-0020	"When the Hitachi…to the iSCSI protocol." and "The IP address…occasion demands." were added.	AD
					SUP 03-0060, SUP 03-0540, SUP 03-0550, SUP 03-0560, SUP 03-0570, SUP 03-0580, SUP 03-0581, SUP 03-0590, SUP 03-0600, SUP 03-0610, SUP 03-0620, SUP 03-0630, SUP 03-0640, SUP 03-0650, SUP 03-0670, SUP 03-0680, SUP 03-0690, SUP 03-0700, SUP 03-0710, SUP 03-0720, SUP 03-0730, SUP 03-0740, SUP 03-0750, SUP 03-0751, SUP 03-0760, SUP 03-0770, SUP 03-0780, SUP 03-0790, SUP 03-0800, SUP 03-0810, SUP 03-0820, SUP 03-0830, SUP 03-0840, SUP 03-0850, SUP 03-0860, SUP 03-0870	Changed Subsection No or procedure No or Figure No or Table No.	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SUP 03-0880, SUP 03-0881, SUP 03-0890, SUP 03-0900, SUP 03-0910, SUP 03-0940, SUP 03-1040, SUP 03-1050, SUP 03-1180	Changed Subsection No or procedure No or Figure No or Table No.	CH
					SUP 03-0080, SUP 03-0280, SUP 03-0330, SUP 03-0970, SUP 03-0980	NOTE was added.	AD
					SUP 03-0090	Figure 3.4.1 was added from SUP 03-0080.	AD
					SUP 03-0100	"If not…TRBL 03-0100)." was added at (b).	AD
					SUP 03-0170, SUP 03-0180, SUP 03-0181, SUP 03-0182	Changed figure.	CH
					SUP 03-0270	"Check that the…does not light up." and "Also, check…to update it." were added.	AD
					SUP 03-0290	Figure was changed.	CH
					SUP 03-0390	"125 m/s" was deleted.	DL
					SUP 03-0520, SUP 03-0530, SUP 03-0752	Changed to blank page.	CH
					SUP 03-0521, SUP 03-0531	Page was deleted.	DL
					SUP 03-0990	(n) was added from SUP 03-0980.	AD
					SUP 03-1030	Change was subsection title.	CH
					SUP 03-1031, SUP 03-1032, SUP 03-1041, SUP 03-1042	These pages were newly added.	AD
					SUP 04-0041	NOTE was added.	AD
					SUP 04-0060	"Serial#" → "Serial# (Disk Drive)".	CH
					SUP 04-0090	Corrected procedure.	CR
					SUP 05-0000	No.3 was added at table.	AD
					SUP 05-0010	(2) was added.	AD
					SUP 05-0020	Lay out was changed at "When Tru64 is used.".	CH
5	Feb.10.2006				SUP 03-0130, SUP 03-0190, SUP 03-0210, SUP 03-0230	Added "®".	AD
					SUP 03-0170, SUP 03-0181, SUP 03-0790, SUP 03-0880	"When…Control Unit may be deteriorated." was added.	AD
					SUP 03-0370	Added "(Disk Drive)" at ①.	AD
					SUP 03-0390, SUP 03-0800, SUP 03-0810, SUP 03-0820	Added RKA.	AD
					SUP 03-0740	Deleted Note at (b).	DL
					SUP 03-0831, SUP 03-0832	These pages were newly added.	AD
					SUP 04-0042, SUP 04-0080, SUP 04-0110	Added RKA.	AD
					SUP 05-0020	Added "®".	AD
6	Jul.7.2006				All	"TagmaStore™" → "TagmaStore®"	CH
					SUP 03-0010	(1) to (3) were added at 3.2.	AD
					SUP 03-0020	"The license key of…of the Hitachi TagmaStore® AMS 500™." was added at 3.3.	AD
7	Sep.25.2006				SUP 0010	3.4.18 was added.	AD
					SUP 03-0000	The last five sentences were added.	AD
					SUP 03-0010	(5) and (6) were added.	AD
					SUP 03-0020	"When executing…will be lost." was added.	AD
					SUP 03-0030	"It is required…setting changes." and "When Hitachi TagmaStore…before upgrading." were added.	AD
					SUP 03-0060	3.4.18 was added.	AD
					SUP 03-0330	Changed figure at (d).	CH

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SUP 03-0340	NOTE and Screen were added to (e).	AD
					SUP 03-1180	3.4.18 was added.	AD
8	Dec.22.2006				SUP 0010	3.4.2 and 3.4.22 were added.	AD
					SUP 0020	4.1.4 and 4.5 were added.	AD
					SUP 03-0000	The description that did not support the up-grade to section 3.1 was added.	AD
					SUP 03-0030	Notes of the upgrade work were added.	AD
					SUP 03-0031, SUP 03-0032	These pages were newly added.	AD
					SUP 03-0050, SUP 03-0060	The content of flow was changed.	CH
					SUP 03-0070	3.4.2 was added.	AD
					SUP 03-0071, SUP 03-0072	These pages were newly added.	AD
					SUP 03-0080, SUP 03-0100, SUP 03-0130, SUP 03-0170 SUP 03-0190, SUP 03-0350, SUP 03-0390, SUP 03-0430, SUP 03-0450, SUP 03-0900, SUP 03-0930, SUP 03-1000, SUP 03-1030, SUP 03-1041, SUP 03-1050, SUP 03-1180	The article number was changed.	CH
					SUP 03-0080, SUP 03-0090, SUP 03-0120, SUP 03-0170 SUP 03-0180, SUP 03-0181, SUP 03-0182, SUP 03-0390, SUP 03-0430, SUP 03-0440, SUP 03-0480, SUP 03-0490, SUP 03-0500, SUP 03-0510, SUP 03-0540, SUP 03-0560, SUP 03-0580, SUP 03-0590, SUP 03-0600, SUP 03-0610, SUP 03-0620, SUP 03-0630, SUP 03-0640, SUP 03-0650, SUP 03-0670, SUP 03-0680, SUP 03-0690, SUP 03-0700, SUP 03-0710, SUP 03-0730, SUP 03-0740, SUP 03-0750, SUP 03-0751, SUP 03-0770, SUP 03-0780, SUP 03-0790, SUP 03-0800, SUP 03-0810, SUP 03-0820, SUP 03-0830, SUP 03-0831, SUP 03-0840, SUP 03-0850, SUP 03-0860, SUP 03-0870, SUP 03-0880, SUP 03-0881, SUP 03-0890, SUP 03-0900, SUP 03-0910, SUP 03-0940	The figure number was changed.	CH
					SUP 03-0260, SUP 03-0270, SUP 03-0280, SUP 03-0290, SUP 03-0350, SUP 03-0581, SUP 03-0760, SUP 03-0920, SUP 03-0960, SUP 03-1000, SUP 03-1030, SUP 03-1050, SUP 03-1080, SUP 03-1110, SUP 03-1140, SUP 03-1160	The article number the reference ahead was changed.	CH
					SUP 03-0270, SUP 03-0930	Added was “refer to 1.7.1”.	AD
					SUP 03-0341, SUP 03-0342	These pages were newly added.	AD
					SUP 03-0441, SUP 03-0442	These pages were newly added.	AD

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REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SUP 03-0900	Added was “At this time,…saving spins down.”.	AD
					SUP 03-1190	3.4.22 was added.	AD
					SUP 03-1200, SUP 03-1210, SUP 03-1220, SUP 03-1230	These pages were newly added.	AD
					SUP 04-0030	Added was “refer to 1.7.1, 1.7.2”.	AD
					SUP 04-0031, SUP 04-0032	These pages were newly added.	AD
					SUP 04-0040, SUP 04-0041	The article number was changed.	CH
					SUP 04-0050, SUP 04-0060, SUP 04-0080, SUP 04-0100	The article number the reference ahead was changed.	CH
					SUP 04-0120, SUP 04-0130	These pages were newly added.	AD

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FE-96DF793-03

Hitachi TagmaStore® AMS 200™/AMS 500™ to AMS 1000™ Upgrade Procedures

REV.4

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Chapter 1. Outline

This procedure manual describes the work procedure for upgrading the array subsystem from Hitachi TagmaStore® AMS 200™/AMS 500™ to Hitachi TagmaStore® AMS 1000™ while the customer data of the disk drive used is maintained.
The procedures about the whole system, such as configuration change of the system, and the procedures of addition/subtraction of option parts and the setting of the priced option are not included.
The upgrade procedure of the floor model is not described.
In this procedures, the basic disk array unit of the Hitachi TagmaStore® AMS 200™ (Model name: DF700-RKS) is described as "RKS". In the same way, the basic disk array unit of the Hitachi TagmaStore® AMS 500™/AMS 1000™ (Model name: DF700-RKM/RKH) and the additional disk array unit (Model name: DF700-RKAJ/RKAJAT, DF600-RKA) are described as "RKM/RKH" and "RKAJ/RKAJAT/RKA" respectively.

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Chapter 2. Components and Tools Required for Upgrade(Hard)

Model names of components required for the upgrade are shown below.

Table 2.1 Components to Be Ordered for Upgrade

No.	Detail of upgrade	Model	Unit per ASSY	Components
1	RKH	DF700-RKH	1	Frame (1), Control unit (1), Panel (1), Backup battery unit (4), Fan assembly (2), AC cable J2H (2), Power unit (RKH) (2)
2	RKAJ	DF700-RKAJ	1	Frame (1), AC cable J2H (2), Power unit (RKAJ) (2), ENC unit (2), ENC cable (4), Fan unit (2)
3	Cache memory(*1)(*5)	DF-F700-C1GJ	8	Cache memory of 1,024 M bytes
		DF-F700-C2GJ	8	Cache memory of 2,048 M bytes
4	Interface Board(*3)	DF-F700-DJ4G2H	4	4 G bps Fibre Channel Interface Board (two ports) (1)
		DF-F700-DJSC2H	2	1 G bps iSCSI Interface Board (two ports) (1)
5	ENC cable	DF-F700-K5B	1(*2)	FC cable 5 m (2)
6	Rack rail (for Chassis)	DF-F700-URHTN7	1	Rail Kit for U7 and HA8000/8500
7	Rack frame	DF-F700-U7	1(*2)	Rack frame

*1 : Select the model with the same capacity as that of the cache memory installed in the disk array unit that used to be the Hitachi TagmaStore® AMS 500™ .
When each of the Cache memory of 1G and 2G is installed at the Hitachi TagmaStore® AMS 500™ configuration, make the arrangement so that the Cache memory of the same capacity is installed in the Cache slot #0 and #2, or #1 and #3 according to the customer's use.

*2 : This is required when the disk array unit had the maximum configuration mountable on the U7 rack frame when it was the Hitachi TagmaStore® AMS 500™ .

*3 : Select the Interface Board for the RKH of the same type with the interface which was installed at the Hitachi TagmaStore® AMS 200™/AMS 500™ .

*4 : It is necessary to arrange the Cache memory additionally depending on the use condition of the priced option. (see "Table 3.3.1 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is used (Hitachi TagmaStore® AMS 200™)" (SMUP 03-0030), "Table 3.3.2 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is used (Hitachi TagmaStore® AMS 500™)" (SMUP 03-0030), "3.3.3 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used (Hitachi TagmaStore® AMS 200™)" (SMUP 03-0040), and "3.3.4 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used (Hitachi TagmaStore® AMS 500™)" (SMUP 03-0040).)

*5 : The Hitachi TagmaStore® AMS 1000™ is a dual controller system, and it is necessary to install at least two Cache memories of the same capacity per Control Unit and at least four per whole subsystem. Therefore, it is required to arrange the Cache memory surely by the addition in the following conditions.
- When upgrading it from the Hitachi TagmaStore® AMS 200™
- When upgrading it from the Hitachi TagmaStore® AMS 500™ which is installing only one Cache memory per Control Unit
- When upgrading it from the Hitachi TagmaStore® AMS 500™ of the single controller system

Note: Move the Cache Unit and the Front Bezel used in the RKS/RKM to the RKH and the Disk Drive used in the RKS/RKM to the RKAJ which is added at the time of the upgrade.

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The following tools are required for the upgrade procedures.

Table 2.2 Tools Required

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.1	For Local/Remote Mode Setting Switch (rotary switch)
	Phillips screwdriver	No.2	Installation of skirts and securing the subsystem.
	Slotted screwdriver	No.1	For Device ID Setting Switch
	Allen wrench	No.3	Securing of cable cramps
	Allen wrench	No.4	Securing of rail and connection of power cable.
	Allen wrench	No.6	Opening/closing of doors; removal of stabilizers
	Spanner	No.22	Adjustment of leveling bolts
Tool of other	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 M Hz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended)
	Wrist strap	-	

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Chapter 3. Upgrade Work

3.1 Prerequisites

- The upgrade operation is the offline work.
- The Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded must be in the state in an error free state or condition prior to performing the upgrade.
- Be sure to execute an deliberate shutdown before starting the hardware upgrade.
- Stop host computers from accessing the subsystem before starting the upgrade.
- Use the latest version (Ver.3.10 or later) of Storage Navigator Modular.
- For upgrading, all the Disk Drives mounted on the existing Hitachi TagmaStore® AMS 200™/AMS 500™ are transferred.
- The controllers that are used to upgrade to the Hitachi TagmaStore® AMS 1000™ need to 0731 or later flash program installed prior to performing any upgrade work.
- When TrueCopy remote replication/TrueCopy Extended Distance is enabled and the array subsystem to be upgraded to the Hitachi TagmaStore® AMS 1000™ is the remote Disk Drive subsystem, perform it after changing the pair status (S-VOL) of TrueCopy remote replication/TrueCopy Extended Distance to PSUS.
  However, if the upgrade operation is performed, the path blockade occurs. This path blockade recovers automatically by turning on the power of the array subsystem after performing the upgrade operation.
  Return the pair status (S-VOL) of TrueCopy remote replication/TrueCopy Extended Distance to the original status (PAIR, etc.) after completing the upgrade operation.
  Also, if the upgrade operation is performed, the following phenomenon occurs.
  - Both paths of the TrueCopy remote replication/TrueCopy Extended Distance are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  - When the pair status of the TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- When Hitachi TagmaStore® AMS 200™/AMS 500™ is made as Boot disk, or rootdg of VxVM is installed in Hitachi TagmaStore® AMS 200™/AMS 500™, the upgrade cannot be performed because the device file name which the host recognizes is changed in the case of upgrading to Hitachi TagmaStore® AMS 1000™.
- The downgrade from Hitachi TagmaStore® AMS 1000™ to Hitachi TagmaStore® WMS 100™ or AMS 200™/AMS 500™ is not supported.
- The upgrade from Hitachi TagmaStore® WMS 100™ to Hitachi TagmaStore® AMS 1000™ is not supported.
- The upgrade from Hitachi TagmaStore® AMS 200™/AMS 500™ of the NAS system configuration to Hitachi TagmaStore® AMS 1000™ is not supported.
- It is required to stop and reboot the host because the setting of the host needs to be changed.

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3.2 Before Starting Upgrade Work

(1) Check whether the host interface of the Hitachi TagmaStore® AMS 200™/AMS 500™ is the Fibre Channel or the iSCSI, and prepare the Interface Board of the same kind for the Hitachi TagmaStore® AMS 1000™ by the day of the upgrade work.

(2) Confirm the customer whether to use the priced option, which was used in the Hitachi TagmaStore® AMS 200™/AMS 500™, in the Hitachi TagmaStore® AMS 1000™ also. If it is used, prepare the license key of the Hitachi TagmaStore® AMS 1000™ by the day of the upgrade work. The license key of the priced-option is issued to the subsystem, so that if the priced option used in the Hitachi TagmaStore® AMS 200™/AMS 500™ is also used in the Hitachi TagmaStore® AMS 1000™, it is required to purchase the license key as the Hitachi TagmaStore® AMS 1000™.

(3) When any of Cache Residency Manager, Copy-on-write SnapShot and Cache Partition Manager is used in the Hitachi TagmaStore® AMS 200™/AMS 500™ and it is also continued to be used in the Hitachi TagmaStore® AMS 1000™, the Cache Unit may have to be added depending on the setting or the configuration of the Hitachi TagmaStore® AMS 200™/AMS 500™.
Refer to "3.3 Notes" (SMUP 03-0020) for the details.
When the addition is required, prepare the necessary Cache Unit by the day of the upgrade work.

(4) As for the upgrade work, settings of the subsystem must be changed through operation of a maintenance PC connected via a LAN. Besides, the microprogram must be installed from a CD-ROM. Make the following preparations before starting upgrade work.
- Prepare a PC in which Storage Navigator Modular of the latest revision is installed. The PC must fit the LAN environment and have a CD-ROM drive.
- LAN cross cable
- The CD-ROM for installation of the Hitachi TagmaStore® AMS 1000™ microprogram of the latest revision (0731/A-H or later).
- The Hitachi TagmaStore® AMS 200™ or Hitachi TagmaStore® AMS 500™ microprogram installation CD-ROM of the same revision (0731/A-S or 0731/A-M or later) as the Hitachi TagmaStore® AMS 1000™ microprogram.

(5) Back up the user data by the day of the upgrade work to prepare for emergency. Be sure to perform this work.
If you fail to operate the upgrade work, you may lose the user data on the array subsystem. Back up the user data on the array subsystem by the operation on the host computer side.

(6) Check that Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded is connected as an external storage of SANRISE Universal Storage Platform (USP)/SANRISE Network Storage Controller (NSC). If it is connected as an external storage as a result of the check, perform the upgrade following the procedure for the maintenance manual of SANRISE USP/NSC (refer to EXTERNAL STORAGE MAINTENANCE SECTION "2. Maintenance for External Storage").

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3.3 Notes

- When executing updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.
- When executing updating installation of the microprogram, use the microprogram whose revision is 0731/A-x or later.
- Since configurations of the Hitachi TagmaStore® AMS 200™/AMS 500™ and the Hitachi TagmaStore® AMS 1000™ are different from each other, works such as an installation of the Control Unit for the Hitachi Hitachi TagmaStore® AMS 1000™ in the RKH, shifts of the Disk Drives and Cache Memory installed in the RKS/RKM of the Hitachi TagmaStore® AMS 200™/AMS 500™ .
- When upgrading the Disk Array subsystem, do not upgrade two or more Disk Array subsystem at the same time to avoid the disk drive replacement operation error.
- When Hitachi TagmaStore® AMS 200™/AMS 500™ is used in the Single Mode, change the mode to the Dual Active Mode before starting the upgrade operation.
- When the Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded is the Fibre Channel/iSCSI interface system configuration, do not change the port which connects the Fibre Channel/iSCSI interface cable before and after the upgrade.
- When the Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded, if the serial number of the array subsystem changes in the upgrade work, the WWN (iSCSI Name) also changes. Therefore, it is necessary to change the setting of the host computer, the peripherals, the application software, etc. depending on the case. For the setting change, refer to "5.1 For Setting Changes in Host Computer and Others" (SMUP 05-0000).
- When the Hitachi TagmaStore® AMS 200™ or Hitachi TagmaStore® AMS 500™ to be upgraded is the system configuration of the iSCSI interface, the Target iSCSI Name of the Hitachi TagmaStore® AMS 1000™ succeeds the value before the upgrade. However, when the default iSCSI Name of the Target was used in the array subsystem before the upgrade, it is required to change the Target iSCSI Name of the Hitachi TagmaStore® AMS 1000™ to a unique value in the network. If the Hitachi TagmaStore® AMS 1000™ is used without changing the Target iSCSI Name and when the array subsystem before the upgrade is configured with the system of the iSCSI interface again after using the Hitachi TagmaStore® AMS 1000™ , the iSCSI Name of both array subsystems is duplicated in the network, and trouble is caused to the iSCSI protocol.
- The IP address of the LAN port for the user control or maintenance of the Control Unit succeeds the value before the upgrade. Reset it as occasion demands.
- The license key of the priced-option is issued to the subsystem. When the customer used the priced-option, which was used in the Hitachi TagmaStore® AMS 200™/AMS 500™, even after upgrading to the Hitachi TagmaStore® AMS 1000™, it is required to purchase the license key of the priced-option of the Hitachi TagmaStore® AMS 1000™.
- When using the SNMP Agent Support Function, which is an optional feature, is used, the SNMP environment information file may have to be reviewed.
- When using the Cache Residency Manager, which is an optional feature, there may be a case where the use is not allowed depending on a capacity of the cache memory. Refer to the following Table 3.3.1/3.3.2 and, if the capacity of the cache memory is found to be insufficient, make addition to the cache memory or use the LU as a non-Cache Residency Manager.
  However, when the Cache Residency Manager is enabled after the upgrade in the case where the LU is used as a non-Cache Residency Manager, the subsystem will be placed in a state in which a warning is kept issued.
  It is necessary to add the Cache memory to be installed at the upgrade work when it is used together with Copy-on-write SnapShot or Cache Partition Manager, so that refer to Table 3.3.3/3.3.4.

Deleted: • . When executing a updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.¶

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Table 3.3.1 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is used (Hitachi TagmaStore® AMS 200™)

Capacity of Turbo LU	Capacity of cache memory installed in Hitachi TagmaStore® AMS 200™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 1000™ after upgrade (M bytes/controller)	Remark
1 to 463,680	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	2,048 or more	-
463,681 to 887,040	2,048	2,048 or more	-
887,041 to 1,370,880	2,048	4,096 or more	It is necessary to add the Cache memory.

Table 3.3.2 Cache Memory Capacity before and after the upgrade when Cache Residency Manager is used (Hitachi TagmaStore® AMS 500™)

Capacity of Turbo LU	Capacity of cache memory installed in Hitachi TagmaStore® AMS 500™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 1000™ after upgrade (M bytes/controller)	Remark
1 to 302,400	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	2,048 or more	-
	3,072	4,096 or more	It is necessary to add the Cache memory.
	4,096	4,096 or more	-
302,401 to 887,040	2,048	2,048 or more	-
	3,072	4,096 or more	It is necessary to add the Cache memory.
	4,096	4,096 or more	-
887,041 to 1,048,320	2,048	4,096 or more	It is necessary to add the Cache memory.
	3,072	4,096 or more	It is necessary to add the Cache memory.
	4,096	4,096 or more	-
1,048,321 to 1,995,840	3,072	4,096 or more	It is necessary to add the Cache memory.
	4,096	4,096 or more	-
1,995,841 to 2,741,760	4,096	4,096 or more	-
2,741,761 to 2,903,040	4,096	6,144 or more	It is necessary to add the Cache memory.

- When Copy-on-write SnapShot and Cache Partition Manager of the priced options are used continuously after the upgrade, it is necessary to add the Cache memory to be installed as shown below.

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Table 3.3.3 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used (Hitachi TagmaStore® AMS 200™)

Condition of upgrade	Capacity of cache memory installed in Hitachi TagmaStore® AMS 200™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 1000™ after upgrade (M bytes/controller)	Remark
When Copy-on-write SnapShot is used continuously after the upgrade	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	4,096 or more	
When Cache Partition Manager is used continuously after the upgrade	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	4,096 or more	

Table 3.3.4 Cache Memory Capacity before and after the upgrade when Copy-on-write SnapShot or Cache Partition Manager is used (Hitachi TagmaStore® AMS 500™)

Condition of upgrade	Capacity of cache memory installed in Hitachi TagmaStore® AMS 500™ before upgrade (M bytes/controller)	Capacity of cache memory required for Hitachi TagmaStore® AMS 1000™ after upgrade (M bytes/controller)	Remark
When Copy-on-write SnapShot is used continuously after the upgrade	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	2,048 or more	-
	3,096	4,096 or more	It is necessary to add the Cache memory.
	4,096	4,096 or more	-
When Cache Partition Manager is used continuously after the upgrade	1,024	2,048 or more	It is necessary to add the Cache memory.
	2,048	4,096 or more	
	3,096	4,096 or more	
	4,096	6,144 or more	

- When the upgrade operation is performed leaving Copy-on-write SnapShot valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When the upgrade operation is performed leaving ShadowImage in-system replication valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When the Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded is the iSCSI interface system configuration, do not change the port which connects the iSCSI interface cable before and after the upgrade.
- When the upgrade operation is performed leaving TrueCopy remote replication/TrueCopy Extended Distance valid, restart of RAID Manager (restart of the HORCM) is required after the upgrade is completed.
- When making the upgrade leaving Hitachi TrueCopy remote replication/TrueCopy Extended Distance enabled, do not upgrade both of the local and remote subsystems at the same time for security. However, if the splits of the pairs on both local side and remote side are confirmed, there is no problem to execute the upgrade at the same time.

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- When upgrading one of the two disk array subsystems paired by Hitachi TrueCopy remote replication/TrueCopy Extended Distance which is left enabled, the deliberate shutdown must be executed for one of the two disk array subsystems to be upgraded but it is not necessary for the other disk array subsystem not to be upgraded.
- When performing the upgrade operation with TrueCopy remote replication/TrueCopy Extended Distance enabled, it is required to change the management information on the other array subsystem side which becomes a pair (not the array subsystem performing the upgrade but the one used as other pair) because TrueCopy remote replication/TrueCopy Extended Distance manages the information of the array subsystem which becomes a pair. For example, when the "B" shown in Figure 3.3.1 is upgraded, update of the microprogram and a change of the management information are also required for the "A".

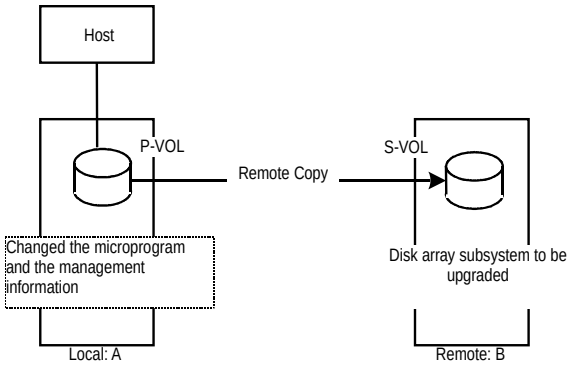


Figure 3.3.1 Paired Disk Array Subsystems

- It is required to change the setting of the host computer, the peripherals, the application software and the like in some cases because if the serial number of the array subsystem is changed in the upgrade work, WWN (iSCSI Name in case of iSCSI connection) is also changed at the same time. Refer to "5.1 For Setting Changes in Host Computer and Others" (SMUP 05-0000) for the setting changes.
- When Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded is an external storage of SANRISE Universal Storage Platform (USP)/SANRISE Network Storage Controller (NSC), the serial number of the subsystem and WWN of the Fibre Channel I/F of upgraded Hitachi TagmaStore® AMS 1000™ are changed, so that SANRISE USP/NSC cannot recognize the LU of Hitachi TagmaStore® AMS 1000™. Therefore, when upgrading Hitachi TagmaStore® AMS 200™/AMS 500™, which is an external storage of SANRISE USP/NSC, perform the upgrade work following the procedure for the SANRISE USP/NSC maintenance manual (refer to EXTERNAL STORAGE MAINTENANCE SECTION "2. Maintenance for External Storage") before upgrading.
- When Power Saving of the priced option is used, if you perform the upgrade after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host after replacing the microprogram and starting the array subsystem. Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then perform the upgrade.
  If the spin-down fails, execute the spin-down again.

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3.4 Upgrade Work

⚠ CAUTION

Touching heat sinks or ICs may cause injury. Be sure to handle with care.

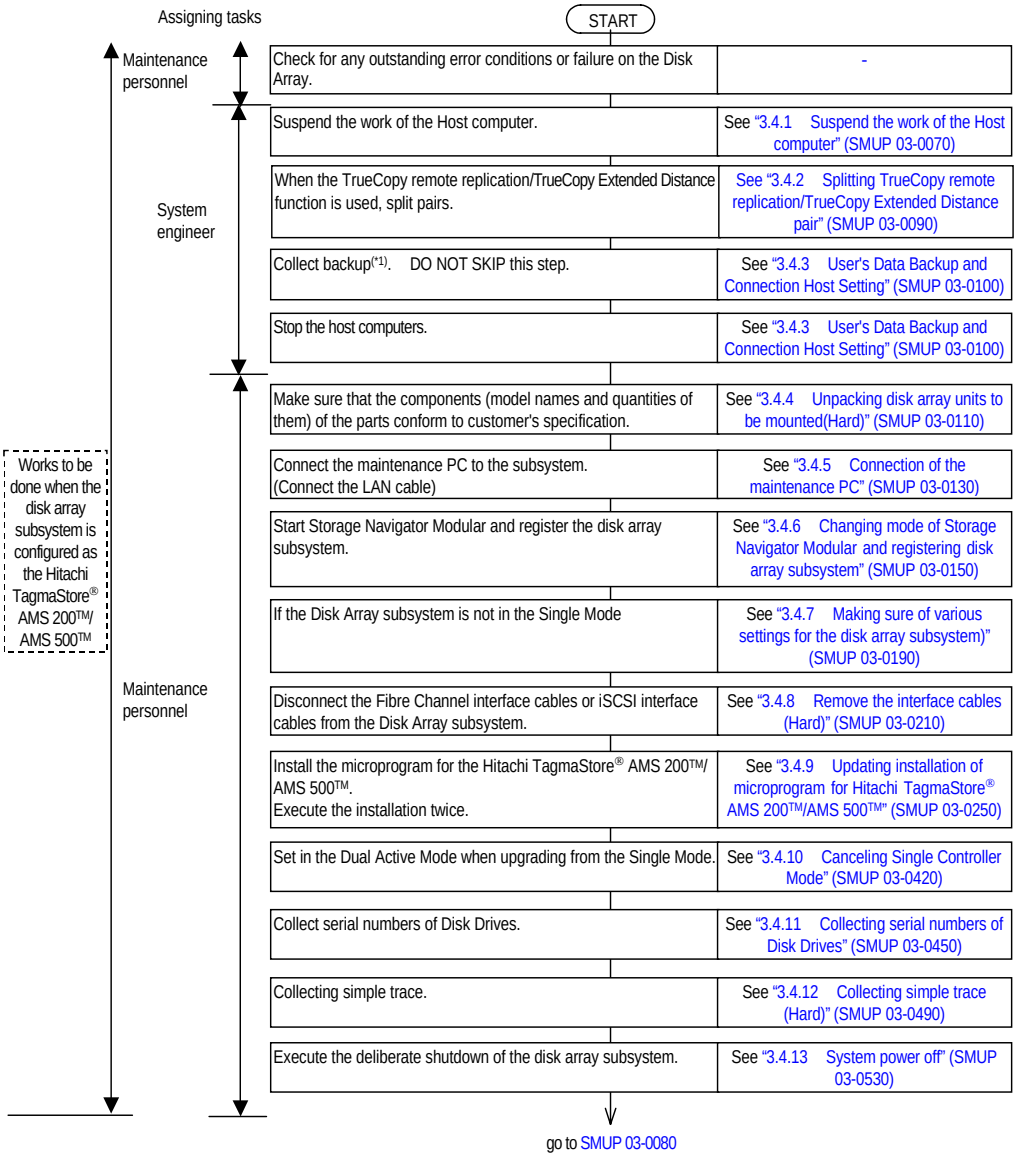
CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts. Otherwise, the static electrical charge on your body may damage the parts.

NOTE : Make the upgrade with the power turned off irrespective of whether the system (host computer) is powered on or off.

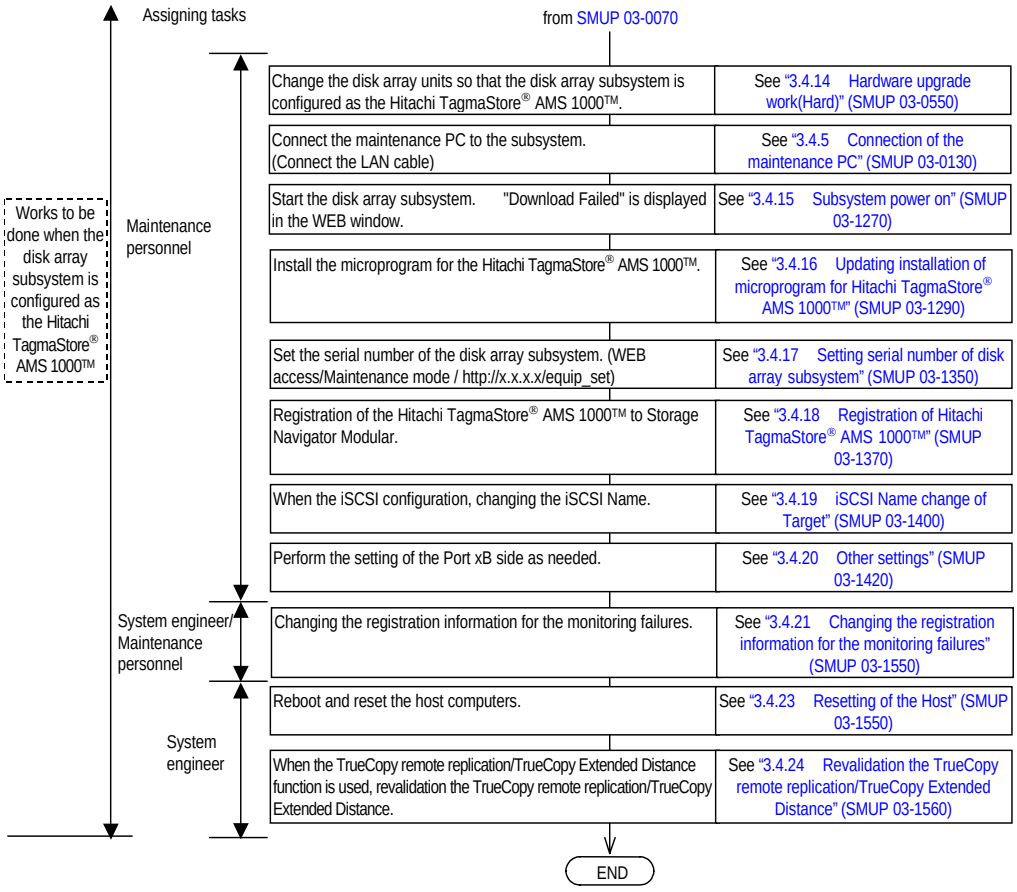
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The procedure for upgrading the Hitachi TagmaStore® AMS 200™/AMS 500™ to the Hitachi TagmaStore® AMS 1000™ is shown below.
Execute the procedure after making sure of the work to be done in each step.



*1 : Maintenance personnel should check if customer has executed user data backups. Without the backups, the upgrade cannot be executed.

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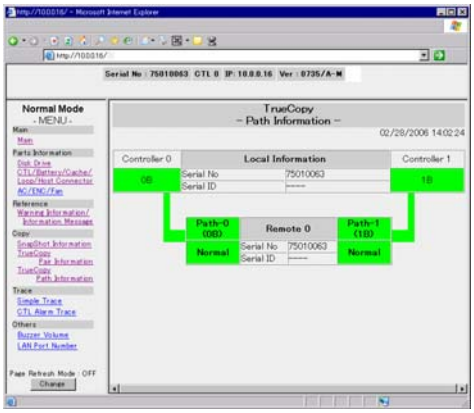
3.4.1 Suspend the work of the Host computer

Suspend the work of the Host computer.

3.4.2 Splitting TrueCopy remote replication/TrueCopy Extended Distance pair

This operation is not required when Hitachi TrueCopy remote replication/TrueCopy Extended Distance is not used.
When making the upgrade leaving TrueCopy remote replication/TrueCopy Extended Distance enabled, a pair splitting must be done before executing the deliberate shutdown of the disk array subsystem.
The procedure is shown below.

(1) Check if the path status is normal using the WEB.
Procedure for Confirming Log Messages:
It switched to the following window by clicking the path of [Summary of Exchangeable Part Statuses] on the main window, and the details of the path status are displayed.
It also switches to the following window by clicking [TrueCopy Path Information] of the menu frame on the main window, and the details of the path status are displayed.
For the maintenance operation for replacement and the recovery method, perform the recovery according to (Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170)).



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(2) Execute the Pairsplit command, perform the pair split, and check that the change to PSUS/SSUS is completed.
It explains the method to split the pair of TrueCopy remote replication/TrueCopy Extended Distance.

(a) Set the group name in the configuration definition file as "vg01." Split the TrueCopy remote replication/TrueCopy Extended Distance pair in the PAIR status with the pairsplit command.

```
c:¥horcm¥etc>pairsplit –g vg01
```

Figure 3.4.1 Example of Pairsplit Command Entry

(b) Make sure of the status and configuration of the pair that has been split by executing the pairsplit command.

```
c:¥horcm¥etc>pairdisplay –g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)      (CL1-A , 1,   1)    174       1..P-VOL PSUS NEVER ,   175       2   -
vg01     oradb1(R)      (CL1-B , 1,   2)    175       2..S-VOL SSUS NEVER ,-----        1   -
```

The pair of TrueCopy remote replication/TrueCopy Extended Distance could be split. Refer to Chapter 4 of "RAID Manager System Administrator's Guide (TagmaStore® WMS/AMS series)" for the details of the pairsplit command and the option.

3.4.3 User's Data Backup and Connection Host Setting

There is the possibility of loss of user data if the upgrade procedures fail. To prepare for an emergency, all the Disk Drive data mounted on Hitachi TagmaStore® AMS 200™/AMS 500™ should be backed up.

NOTE : Maintenance personnel must check if customers have executed users' data backups.

Please stop the host computers.

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3.4.4 Unpacking disk array units to be mounted (Hard)

Unpack the RKH and RKAJ to be mounted to compose the configuration of the Hitachi TagmaStore® AMS 1000™. The procedure is shown below.

⚠ CAUTION

- The unpacking should be done by two or more personnel to prevent turning over of the subsystem or being caught under the subsystem.
- Work carefully because the weight of the single RKH is about 47 kg, RKAJ is about 40 kg.

(1) Unpacking the RKH, RKAJ.

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rain water.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

Figure 3.4.2 shows the subsystem within the outer package.

(a) Remove the outer package and packing materials.
(b) Take the subsystem out of the polyethylene bag.
(c) Remove tapes, etc. applied to the subsystem.
(d) Remove desiccating agent from the lower of the subsystem.
(e) Check the exterior of the subsystem visually for distortion or damage owing to the transport.

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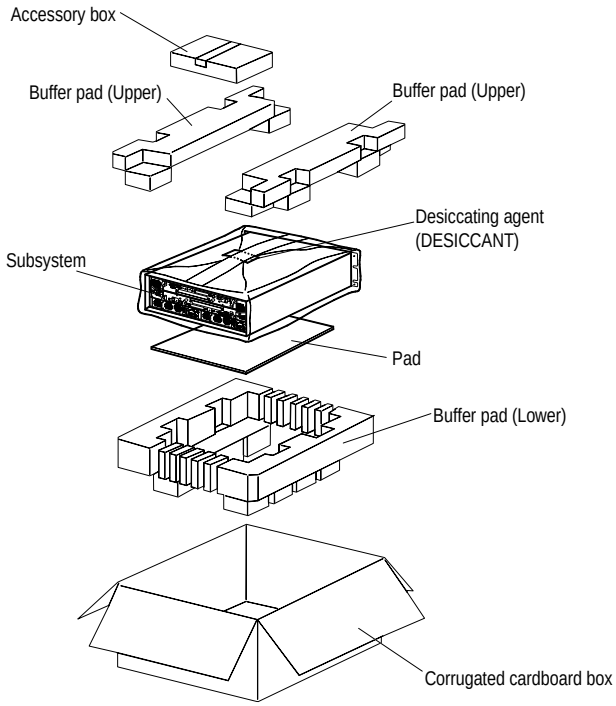


Figure 3.4.2 Packed Subsystem

(2) Check the contents of the package

(a) Check if the contents of the package (their model names, product serial numbers, and quantities) agree with those in the packing list shipped with the subsystem.

(b) The key for the front bezel supplied with the subsystem must be kept by service personnel in order to prevent users from maintaining the subsystem. (The key for Front Bezel is used to mount and dismount Front Bezel.)

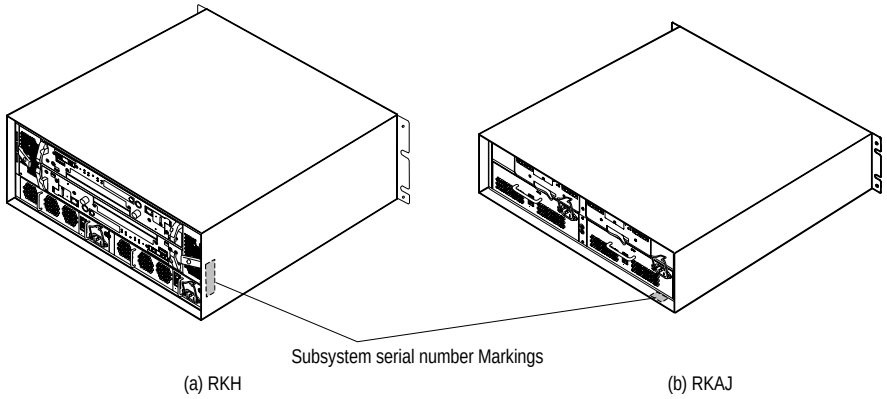


Figure 3.4.3 Locations of Subsystem Serial Number Markings

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3.4.5 Connection of the maintenance PC

Connect the maintenance PC to the disk array subsystem.
The procedure is shown below.

(1) Checking the LAN environment setting

(a) Make sure that the Storage Navigator Modular has been installed. (Make sure that the activation file startsnm.bat exists.)

(b) Check the LAN environment setting for the PC

- Make sure that the following settings have been made, or change the settings to the following.
  For the maintenance PC, set the IP address to 10.0.0.xxx as shown in No. 1.
  If the maintenance PC cannot establish a connection, set the value to shown in No.2 to 5.
  If not connected yet, refer to Maintenance Manual Troubleshooting "3.4 Procedure for specifying maintenance port IP address" (TRBL 03-0100).

No.	Subsystem (LAN maintenance port)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 10.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL0 : 192.168.233.16 CTL1 : 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL0 : 172.23.211.16 CTL1 : 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL0 : 10.197.181.16 CTL1 : 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

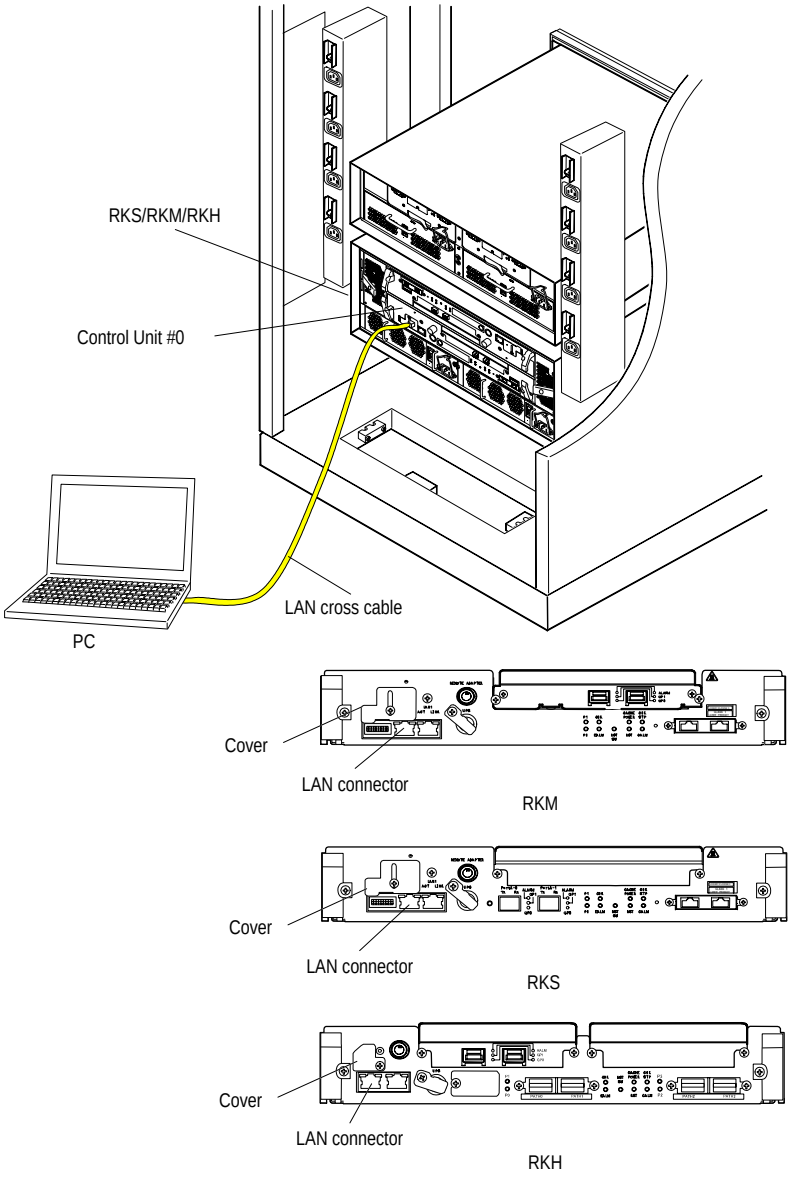
- Manual change of the network parameter of the Maintenance port
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

NOTE: However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
The network address set to the maintenance port cannot be used for the LAN device to be connected to the User management port via the Gateway.
Therefore, use a network address other than that set for the maintenance port.

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(2) Connecting the LAN cross cable0

Remove the LAN Cover of the Control Unit #0 and connect the PC and the subsystem with the LAN cross cable.



*1 : The rackmount model (system configuration of the Fibre Channel interface) is shown as an example.

*2 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.4 Connecting the LAN Cross Cable

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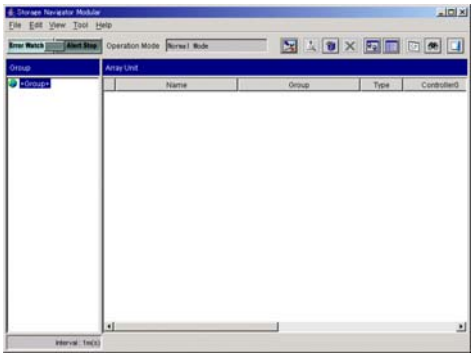
3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem

Register the disk array subsystem using Storage Navigator Modular.
The procedure is shown below.

(1) Activating the Storage Navigator Modular

(a) Execute the batch file or shell script for activating the Storage Navigator Modular.
In the case of Windows®, activate the batch file, startsnm.bat.

(b) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed(‡1).



In the case of Windows®, the prompt window is also displayed.
The prompt window has nothing to do with operation of Storage Navigator Modular. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.

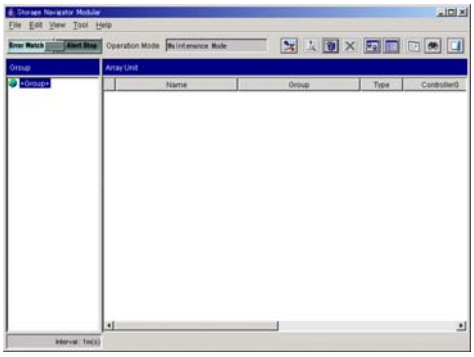
‡1 : The mode change cannot be done at the time of the initial activation of the Storage Navigator Modular. A registration of a password validates the mode change.

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(2) Change the Operation Mode from the Normal Mode to the Maintenance Mode.

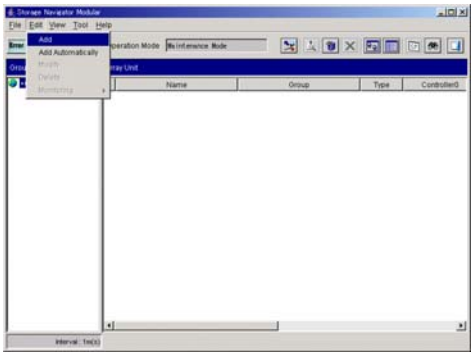
(a) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the [Ctrl], [Shift], and [E] keys at the same time.

Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.



(3) Registering the disk array subsystem

(a) Select [Add] in the main window or click [: Add].

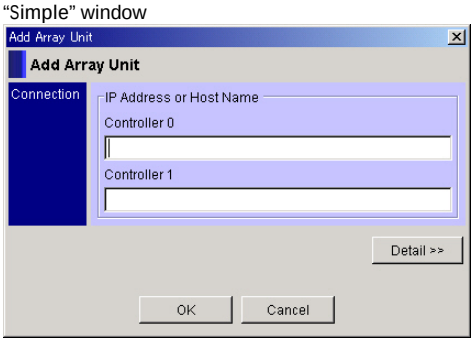


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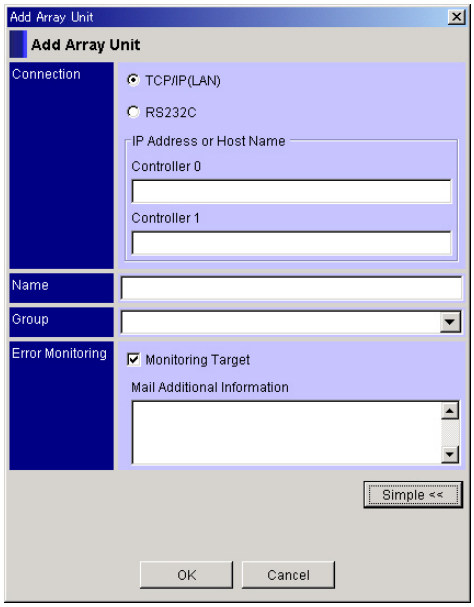
(b) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.
• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select "TCP/IP (LAN)" connection to be used for the disk array subsystem.

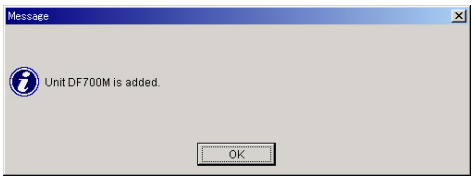
[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _). The maximum number of the groups allowed to be registered is 200. The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

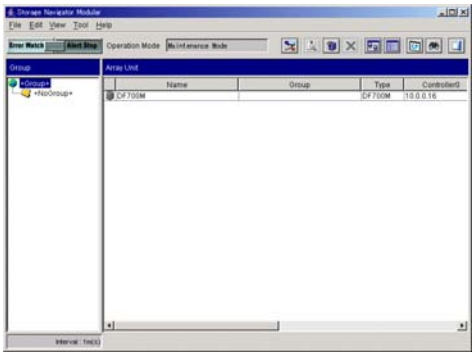
[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

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(c) When a message informing of a completion of the registration is displayed, click the [OK] button.



(d) The updated main window is displayed.



When an entry has been made in [Group Name], the group name is displayed in the tree diagram on the right side of the window. A clicking on the group name displays an icon(s) of the disk array subsystem(s) registered in the group.
There are two types of icon of the disk array subsystem as shown below: an icon for the dual system and that for the single system.

• Icon for the dual system : 

• Icon for the single system : 

The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

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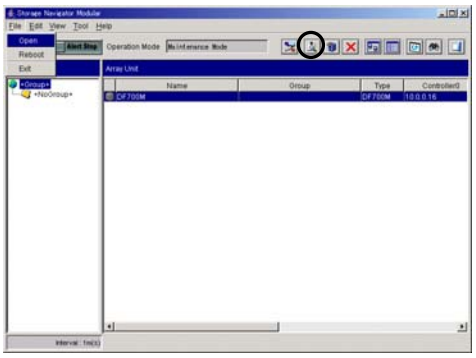
3.4.7 Making sure of various settings for the disk array subsystem

Because the Hitachi TagmaStore® AMS 1000™ does not support the Single mode, make sure that the disk array subsystem is not in the Single mode using Storage Navigator Modular.

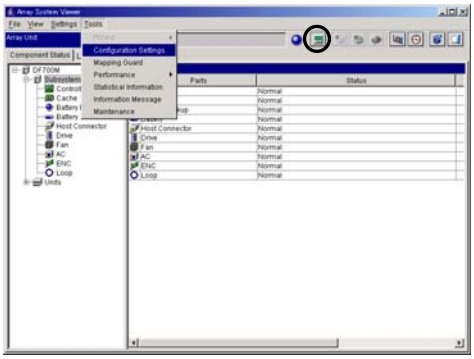
NOTE : The array subsystem to be upgraded to the Hitachi TagmaStore® AMS 1000™ is required to be set to the dual active mode.

(1) Turn on the power supply.
(2) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode".
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again.

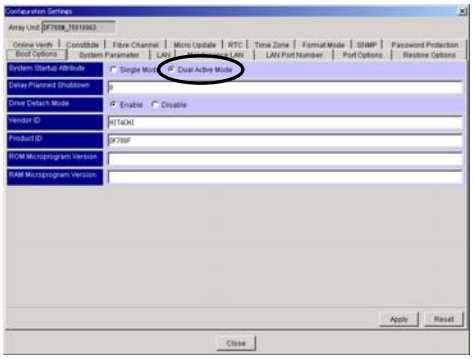


(3) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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(4) Click the [Boot Options] tab.



(5) Click the [Close] button.

When [System Start Attribute] is set to "Single Mode", be sure to remember that it is necessary to change it to "Dual Active Mode" in the following procedure.

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3.4.8 Remove the interface cables (Hard)

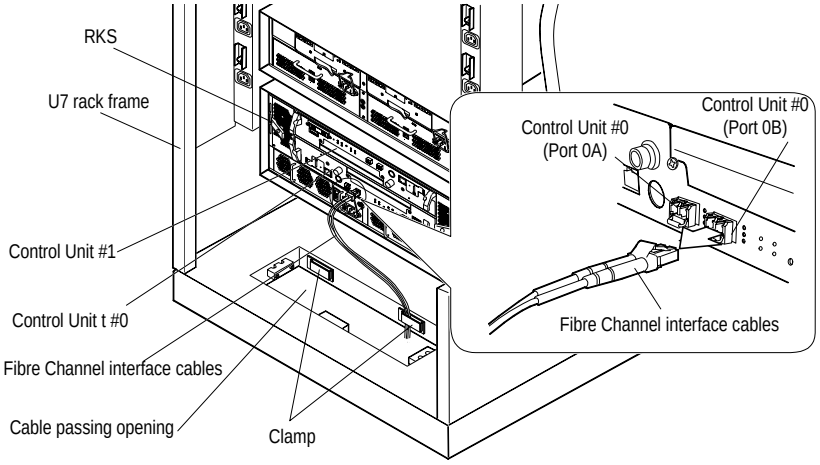
To execute the subsequent operation, Fibre Channel Interface cables and iSCSI cables should be disconnected. If connected, the other connected devices may be affected whenever the Disk Array subsystem reboots.
Disconnect all the Fibre Channel interface cables and iSCSI cables connected to the Disk Array subsystem (on the side of connecting to the Control Unit only).

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

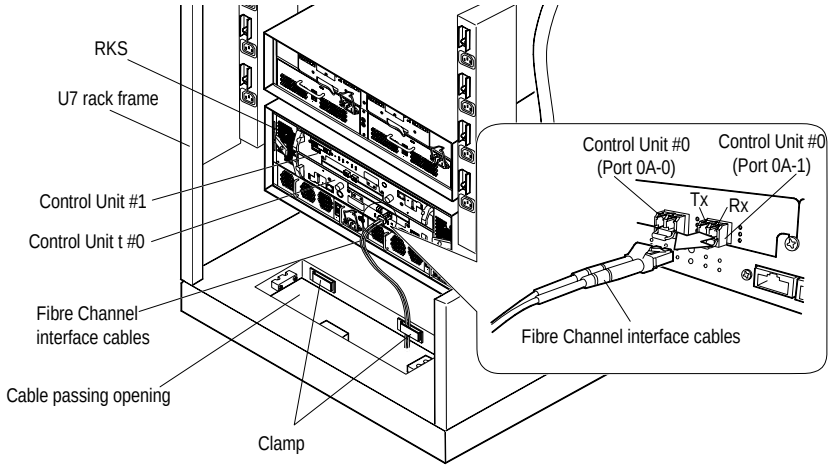
Copyright © 2006, Hitachi, Ltd.

- When the Hitachi TagmaStore® AMS 200™ is the system configuration of the Fibre Channel interface

(a) Disconnect the Fibre Channel interface cable connected to the Control Unit (RKS).
When removing the Fibre Channel interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.



*1 : The figure shows the case where the FC Interface Board is not added in the Control Unit of the RKS.



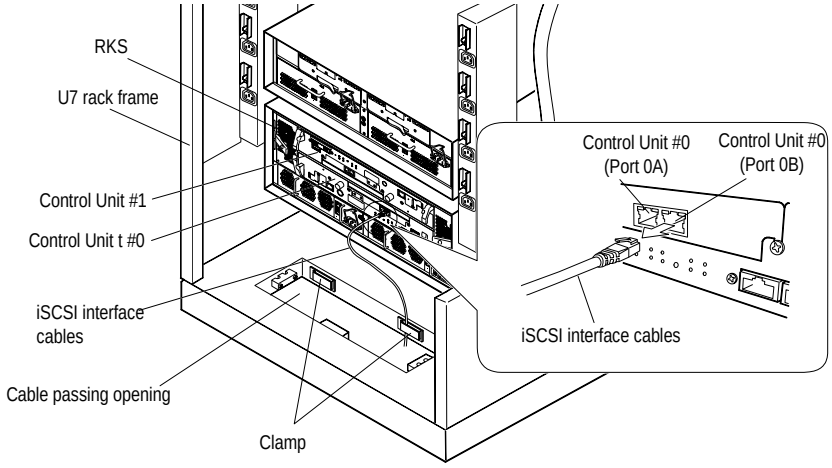
*1 : The figure shows the case where the FC Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (1)

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• When the Hitachi TagmaStore® AMS 200™ is the system configuration of the iSCSI interface

(a) Disconnect the iSCSI interface cable connected to the Control Unit (RKS).



*1 : The figure shows the case where the iSCSI Interface Board is added in the Control Unit of the RKS.

Figure 3.4.5 Disconnecting Interface Cable (2)

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- When the Hitachi TagmaStore® AMS 500™ is the system configuration of the Fibre Channel interface

(a) Disconnect the Fibre Channel interface cable connected to the Control Unit (RKM).
When removing the Fibre Channel interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

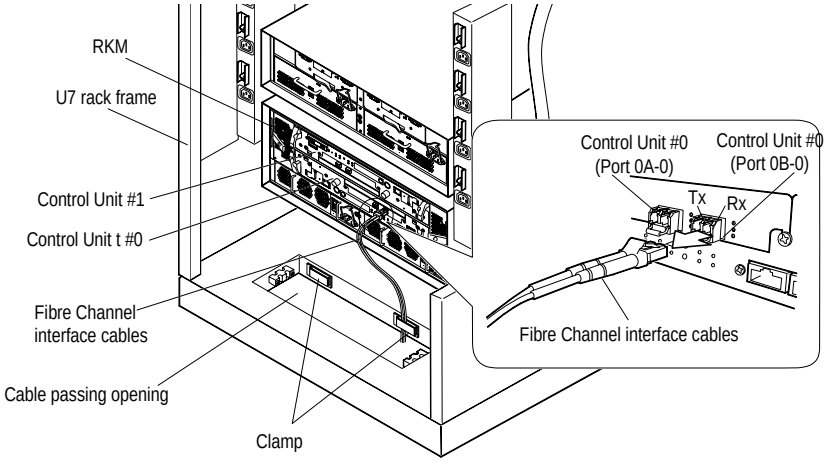


Figure 3.4.5 Disconnecting Interface Cable (3)

- When the Hitachi TagmaStore® AMS 500™ is the system configuration of the iSCSI interface

(a) Disconnect the iSCSI interface cable connected to the Control Unit (RKM).

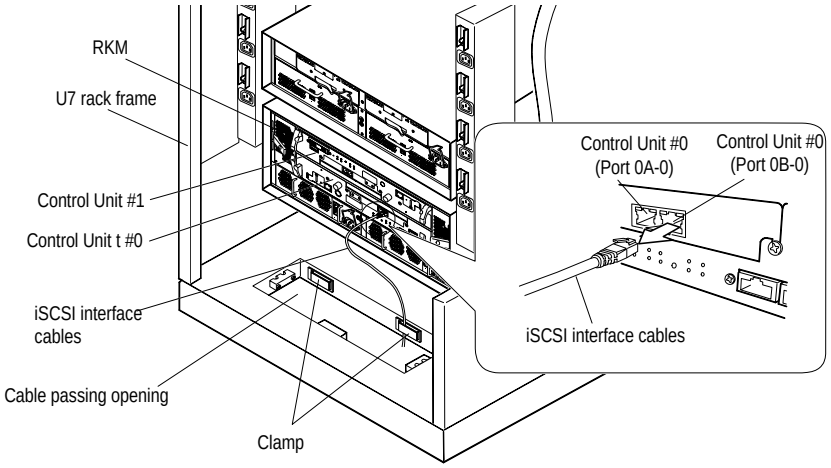


Figure 3.4.5 Disconnecting Interface Cable (4)

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3.4.9 Updating installation of microprogram for Hitachi TagmaStore® AMS 200™/AMS 500™

Install the microprogram for the Hitachi TagmaStore® AMS 200™/AMS 500™ (Microprogram of the same revision with the Hitachi TagmaStore® AMS 1000™of 0731/A-S, or 0731/A-M or later) using the Storage Navigator Modular.

The updating installation must be executed twice in order to completely change information of the microprograms of two generations.

The procedure is shown below.

(1) Preparation for update installation of microprogram

(a) Set up the maintenance PC before starting the update installation.

The setting up is completed when the installer stored in the CD-ROM of the microprogram is executed.

Outline of the setting up is shown below.

- Installation of the JRE 1.3.1_03
- Setting of the security policy file
- Copying of the microprogram from the CD-ROM for the microprogram installation to the maintenance PC

(b) Prerequisites for setting up of a maintenance PC

Prerequisites concerning the user ID of Windows® are as follows.

- The user ID of Windows® at the time when the microprogram is installed in the maintenance PC must be identical with that at the time when a maintenance work is done.

A prerequisite of a drive for booting the OS of the maintenance PC

- The drive for booting the OS must be the C drive.

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(2) Hierarchy of Microprogram Storage Directories

The hierarchical structure of Microprogram storage directories is shown below.
The structure of directories of the CD-ROM for installing the Microprogram is the same as that shown below.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:\diskarray-microprogram\microprogram."
When installing the Microprogram, specify the unified version directory.

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The Microprogram becomes unable to be installed if the directory name is changed.

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(a) Java error codes displayed at the time of update installation and actions for coping with them.

When the PC does not satisfy the prerequisite shown in Item (1)(b), a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

Table 3.4.1 Java error codes

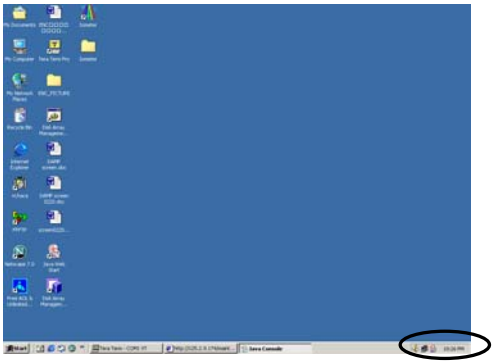
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram is selected. Cause estimated • A drive for booting the OS is not the c drive. • The user name of Windows® at the time when the microprogram was installed in the maintenance PC is not identical with that at the time when the microprogram is updated, or two-byte characters (full size characters or Japanese characters) are used to define the user name	① Check if the drive for booting the OS is the c drive. (Refer to the (i) of (2)(a) in Subsection 3.4.9) In the case of the dual boot, boot Windows® using the c drive and perform the installation again. ② Check if the user name of Windows® at the time when the microprogram is installed in the maintenance PC is identical with that at the time when the microprogram is updated and if two-byte characters (such as full size characters and Japanese characters) are not used. If an illegal specification has been made, perform the logon over again using an appropriate user name and perform the installation again after connecting the browser.
1219	An error occurred during the communication with the subsystem. Confirm the subsystem status and the LAN environment.	Time when the error occurs • The error occurs when the resource for the LAN cannot be ensured. Cause estimated • The error occurs because the resource (memory) of the maintenance PC is insufficient.	① Reboot the subsystem and the maintenance PC and quit unnecessary application programs. Make sure that the subsystem is in the READY status, place the subsystem in the Maintenance mode, and perform the installation again. ② If the error recurs in spite of the operations above, replace the maintenance PC and perform the installation over again from the beginning. Use a PC whose memory capacity is as large as possible.

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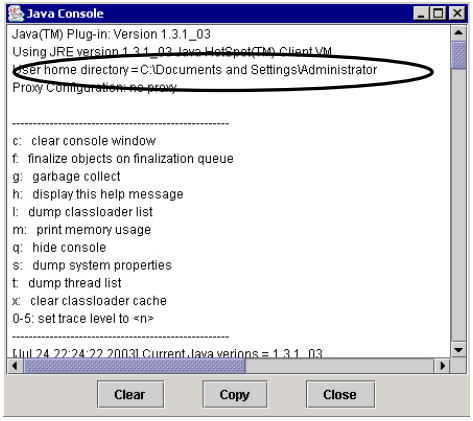
(i) Method for checking the drive for booting the OS

A method for checking the boot drive when the Java message (message code: 1216) is issued is shown below.

① Double click the [: Java icon]on the task tray at the bottom right in the Service PC window.



② Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: *****…).



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(b) Procedure for setting up the maintenance PC

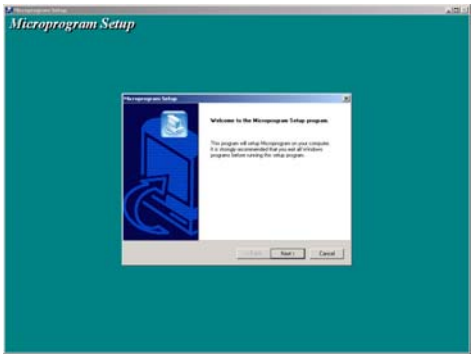
(i) Double click the "Program\micro upload\micro setup\Setup.exe" of the CD-ROM for microprogram installation.

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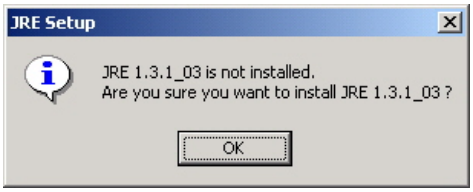
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Deleted: ??

(ii) The initial window of the setting up appears.
When the [Next] button is pressed, the JRE 1.3.1_03 installer is activated in the case where the JRE 1.3.1_03 is not installed yet.
In the case where the JRE 1.3.1_03 has been installed, windows® shown in Steps (iii) to (vii) are not displayed.

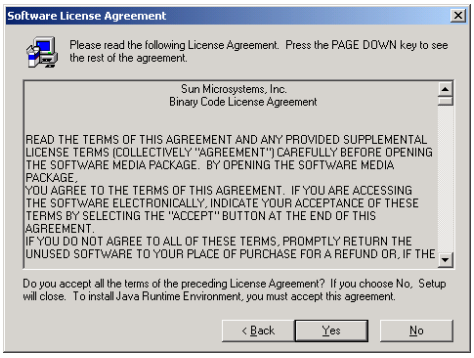


(iii) A dialog box for asking confirmation of starting the JRE 1.3.1_03 installer. Click the [OK] button.

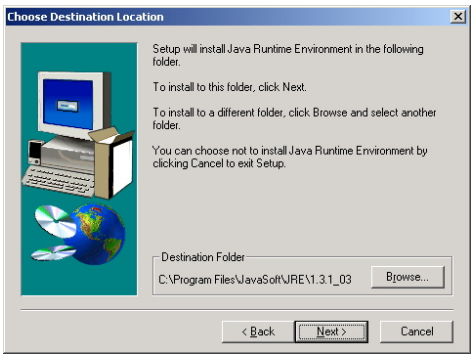


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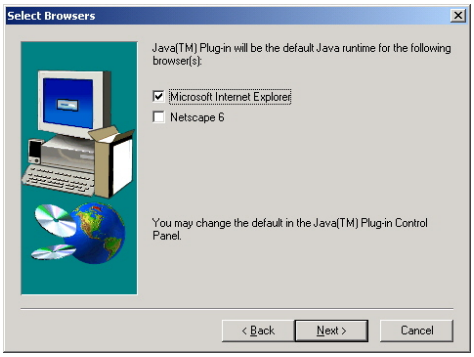
(iv) A window of product licensing contract is displayed. Click the [Yes] button.



(v) A window for selecting a directory in which the JRE 1.3.1_03 is to be installed. Select the directory for the installation and click the [Next] button.

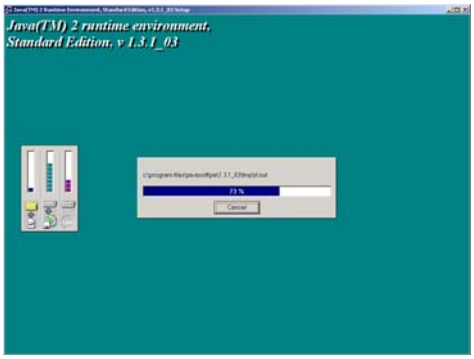


(vi) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



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(vii) Installation of the JRE 1.3.1_03 is started.



(viii)After the installation of the JRE 1.3.1_03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.

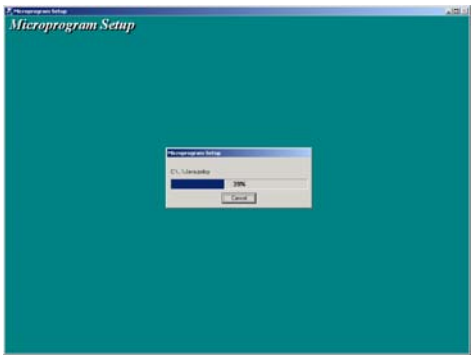




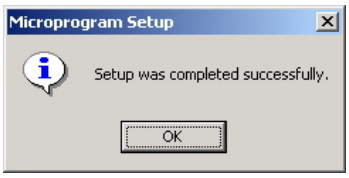
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(ix) The microprogram is copied on the maintenance PC.

Create a directory to which the microprogram is to be copied directly under the "C:\diskarray-microprogram\microprogram" for each microprogram revision and copy the microprogram file with the subdirectories (DF700M, DF700S, ENC, ---) into the directory.



(x) The setting up is completed. Press the [OK] button.



NOTE : • Note that the settings of the security policy file is changed when the maintenance PC is set up.
• If the microprogram is transferred to a directory other than "C:\diskarray-microprogram\microprogram" which is a directory copied by the installer, the installation cannot be done. Therefore, care should be taken.
• Do not change a name of the unified version directory(‡1) or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

‡1 : For the unified version directory, refer to "3.4.9 (2) Hierarchy of Microprogram Storage Directories" (SMUP 03-0260).

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(3) Install the microprogram for the Hitachi TagmaStore® AMS 200™/AMS 500™.

(3-1) Procedure for download

(a) Matters to be made sure of before starting update installation.

Make sure of the following before starting the update installation.

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem. (refer to Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).)
- Check that the READY LED (green) on the Front Bezel of the Basic Chassis lights up. When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 50 minutes until it lights up because the automatic download of the ENC/SENC firmware is being executed. When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 85 minutes until the READY LED (green) on the front of the Basic Chassis lights up because the automatic download of the ENC/SENC firmware or the update of the flash program is being executed.
  Also, check that the WARNING LED (orange) on the Front Bezel does not light up.
- Also, check that the WARNING LED (yellow) on the Front Bezel does not light up or blink at low-speed. When it lights up or blinks at low-speed, connect it to WEB, and perform the maintenance according to the information message on WEB. After the recovery is made, install the microprogram in order to update it.
- Make sure that the system copy is not being executed through the information message (I140xy System copy started (x: Unit number, y: HDU number)) of the WEB.
  If it is in the middle of system copy, please wait until that is completed and update installation of microprogram.

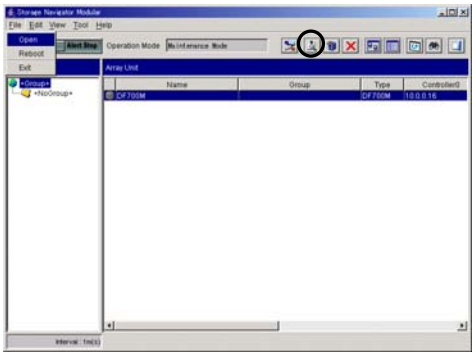
(b) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

(c) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150).)

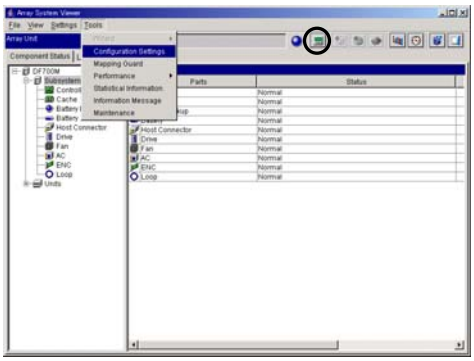
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(d) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

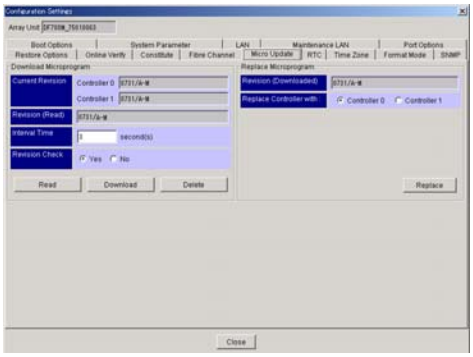
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(e) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



(f) Click the [Micro Update] tab.

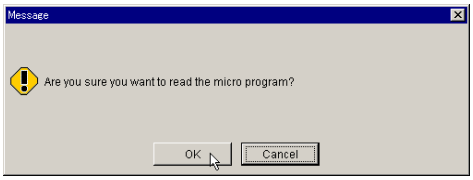


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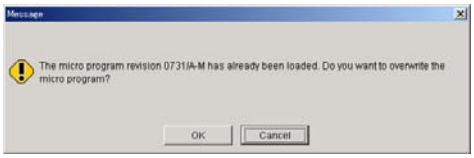
(g) Read in the microprogram to the service PC in which Storage Navigator Modular is installed. Click the [Read] button.
When a microprogram revision is displayed in the [Revision(Read)] box, the microprogram has already been read in. When only the Unified version directory storing the microprogram is specified, the whole microprogram is read in automatically.

(h) Since a message asking for confirmation whether or not to read in the microprogram, click the [OK] button.

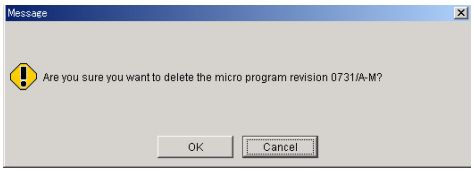
NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the download of the microprogram again from the beginning.



In the case where the microprogram has already been read in, the message asking for the confirmation is displayed. When you click the [OK] button, the microprogram is overwritten. When you abort the reading in, click the [Cancel] button.



When you eliminate the microprogram that has already been read in to the computer, click the [Delete] button. Since the message asking for confirmation is displayed, click the [OK] button.



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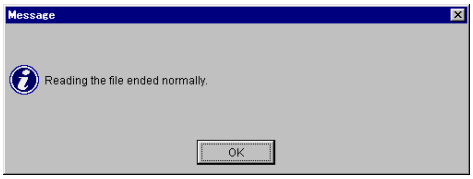
(i) Since a window for specifying the directory in which the microprogram to be read in is stored is displayed, specify the Unified version directory. When you click the [OK] button, reading in of the microprogram is started.
Examples of the path entry are shown below.

When using Windows®:

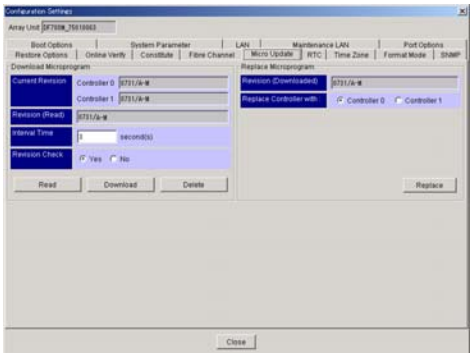
c:/diskarray-microprogram/microprogram/micro/0731A

Unified version directory in the hard disk in which the micro program is copied.

(j) Since a message is displayed when the reading in of the microprogram is completed, click the [OK] button.



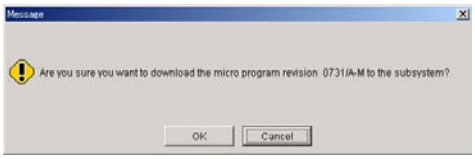
The revision of the microprogram that has been read in is displayed in the [Revision(Read)] box.



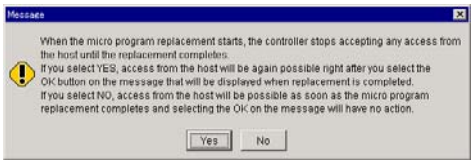
(k) Click the [Download] tab.

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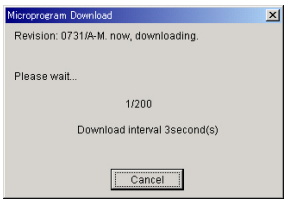
(l) The confirmation window is display. Click the [OK] button.



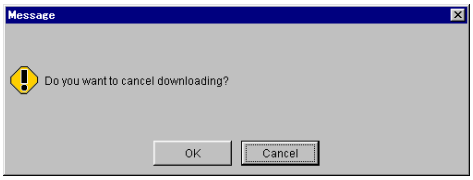
The confirmation window is display. Click the [Yes] button.



The download of the microprogram starts by clicking the [Yes] button, and the dialog is displayed.



When you abort the downloading, click the [Cancel] button.
A message asking for confirmation is displayed. When you click the [OK] button, the downloading is aborted.
When you click the [Cancel] button, the downloading is continued.



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(m) Since a message is displayed when the downloading is completed normally, click the [OK] button.

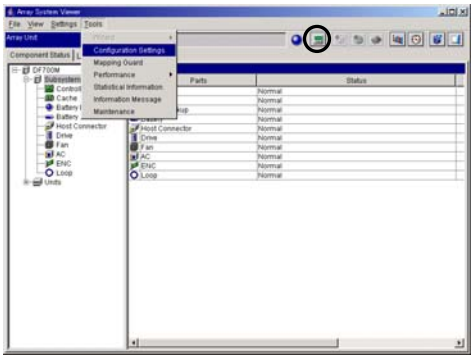


NOTE : After the microprogram is downloaded, be sure to restart the disk array subsystem or replace the microprogram. If the Control Unit board is replaced in the online mode before restarting the disk array subsystem or replacing the microprogram, the replaced Control Unit may be detached. When the subsystem is burdened with a heavy I/O load by a host at the time of the downloading, the downloading may be terminated abnormally. Perform the downloading again.

(3-2) Replacing the microprogram

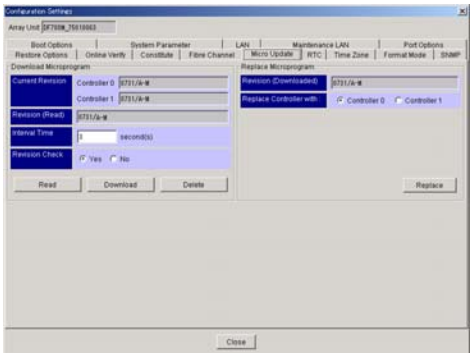
Replace the microprogram that was downloaded to the disk array subsystem with the microprogram installed in the Control Unit. When making replacement, be sure to replace the microprograms of the both Control Units 0 and 1. When the microprogram of one of the Control Units is replaced and the unit window of Storage Navigator Modular is closed, the unit window may be opened no more. When the unit window is not opened, replace the microprogram after changing the subsystem configuration by eliminating the IP address of the Control Unit whose microprogram has been replaced using an IP address of the Control Unit whose microprogram is not replaced yet.

(a) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

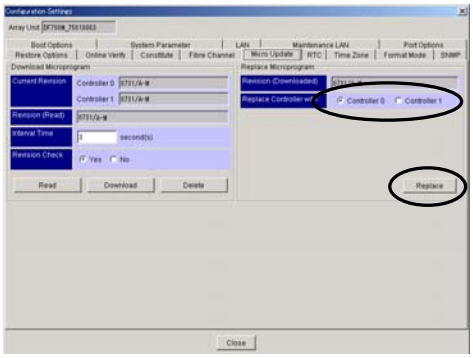


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(b) Click the [Micro Update] tab.

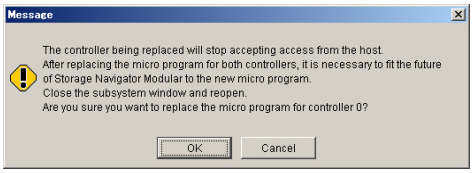


(c) Select the Control Unit whose microprogram is to be replaced and click the [Replace] button.

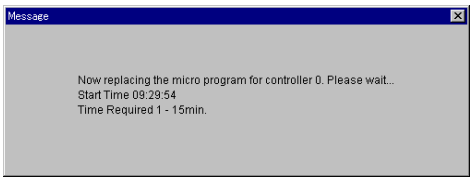


(d) The confirmation window is display. Check if the selected Control Unit is correctly displayed and click the [OK] button.

NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the replace of the microprogram again from the beginning.



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↓

Click the [OK] button according to the dialog message.



(e) When the replacement of the microprogram terminates normally, a completion message is displayed. When the [OK] button is clicked, the revision of the replaced microprogram is updated and the window is displayed.



NOTE : When making the access from the host accepted by the instruction from Storage Navigator Modular, the following message may be displayed if it is not operated for 20 minutes or more in the case where Account Authentication is valid, and it may not be completed normally. Perform the dummy replacement (‡1) of the Control Unit whose microprogram was replaced to make the access from the host accepted.
If the access from the host is made accepted when the replacement of the microprogram is completed, the dummy replacement (‡1) is unnecessary.



(f) Replace the microprogram in the other Control Unit according to the procedure (c) to (e). When replacement of the both Control Units is terminated normally, the microprogram replacement of the disk array subsystem is completed.

NOTE : When the replacement of the microproram is made for only one of the dual Control Unit, the disk array subsystem is put in the status in which a warning is issued. The warning is called off when the other one of the dual Control Unit is replaced. When you replace the microprogram, be sure to make the replacement for the both Control Units continuously.

‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(g) Because the microprogram is managed by two generations, return to the procedure (3) reference place, and perform the update installation of the microprogram again.

NOTE : Because TrueCopy remote replication/TrueCopy Extended Distance manages information stored in paired disk array subsystems, the path of the mate disk subsystem (not the subsystem being upgraded but the other one of the paired subsystems) is detached when TrueCopy remote replication/TrueCopy Extended Distance is used.
When the subsystem "B" shown in Figure 3.4.6 is upgraded, the path of the subsystem "A" is detached.
The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
This is because the "A" becomes unable to access the "B" as a result that the "B" is placed in the Maintenance mode. Therefore, this is not a problem.
However, when the pair status is changed to PSUE, there may have been a mistake in operations that have been made. Recover the pair from the PSUE status referring to Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).

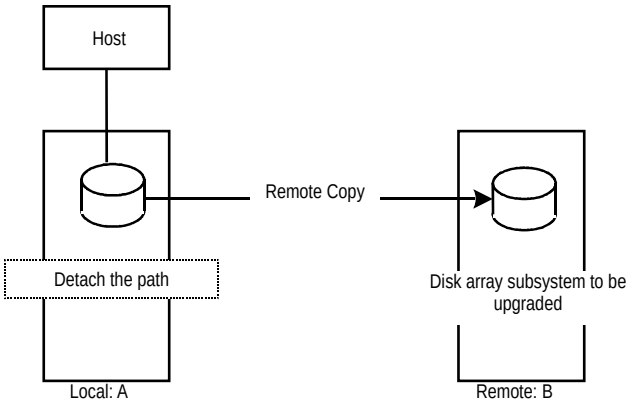


Figure 3.4.6 Paired Disk Array Subsystems (TrueCopy remote replication/TrueCopy Extended Distance)

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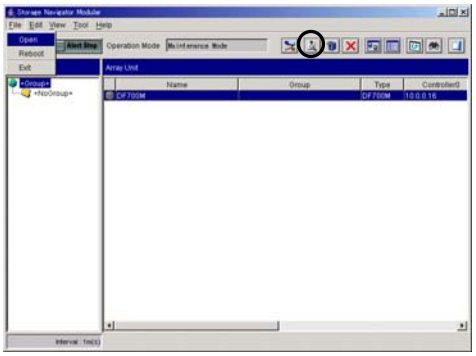
3.4.10 Canceling Single Controller Mode

When it is made clear that the Single Mode is set through the check that has been made according to Subsection "3.4.7 Making sure of various settings for the disk array subsystem" (SMUP 03-0190), change it to the "Dual Active Mode" using Storage Navigator Modular.
The procedure is shown below.

NOTE : The array subsystem to be upgraded to the Hitachi TagmaStore® AMS 1000™ is required to be set to the dual active mode.

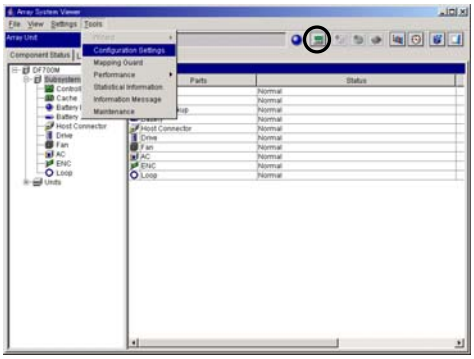
(1) Turn on the power supply.
(2) Start the Storage Navigator Modular and set the Operation Mode to the "Maintenance Mode".
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again.

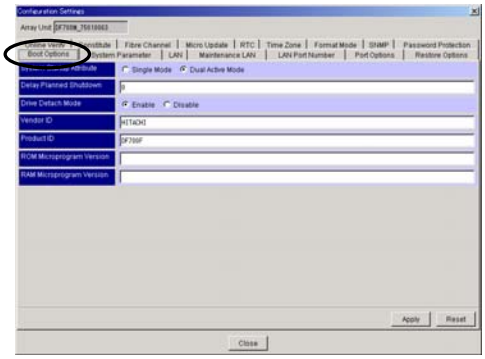


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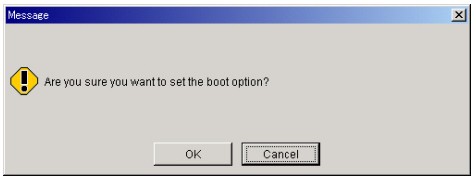
(4) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.

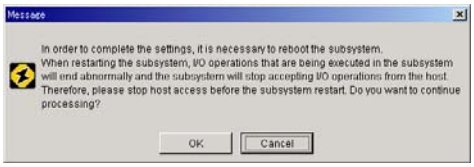


(5) Click the [Boot Options] tab.

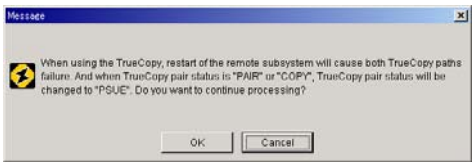


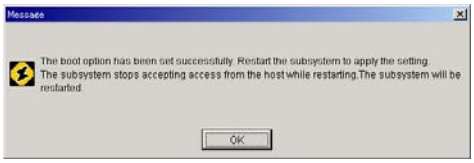
(6) Select the [System Startup Attribute] as [Dual Active Mode], and click the [Apply] button.
(7) The confirmation window is display. Click the [OK] button.





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The following message is displayed further to the message of "Wait a moment", so that click the [OK] button.



The Unit screen is closed. To perform other operations on the Main screen, select an array unit from the Main screen and open the selected Unit screen.

NOTE : There is no problem though WARNING LED lights.
Go to the next work after checking that only the message of "Controller Alarm" is displayed in [Information Message].

(8) Power off the disk array subsystem. ("3.4.13 System power off" (SMUP 03-0530))
(9) Power on the disk array subsystem. ("3.4.15 Subsystem power on" (SMUP 03-1270))

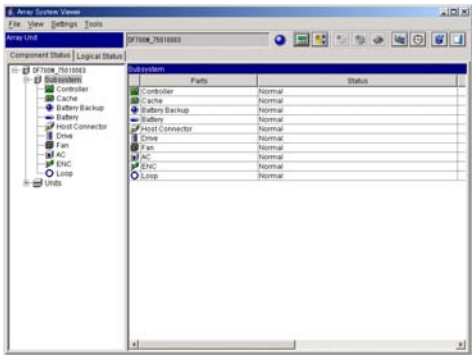
NOTE : There is no problem though WARNING LED lights.
Go to the next work after checking that only the message of "Controller Alarm" is displayed in [Information Message].

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3.4.11 Collecting serial numbers of Disk Drives

There are operations such as removing the Disk Drive from the chassis, moving the chassis in the rack, and inserting the disk Drive in the unchanged installation position of that before removing it in the procedure for the Hitachi TagmaStore® AMS 1000™ upgrade "3.4.14 Hardware upgrade work(Hard)" (SMUP 03-0550).
In that case, it is required to collect the information of the Disk Drive installation position at the Hitachi TagmaStore® AMS 200™/AMS 500™ and save it to cope with such cases that the installation position of the Disk Drive becomes uncertain or the error is found in the installation position.
Collect the serial numbers of the Disk Drives using Storage Navigator Modular.

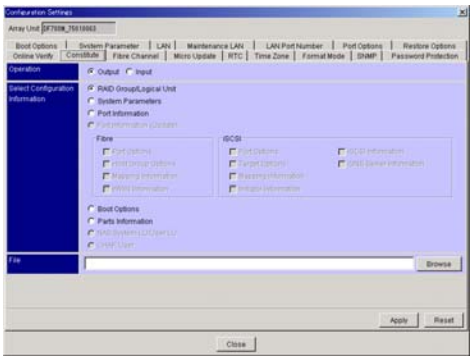
(1) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular. ("3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140))
(2) Set the operation mode of Storage Navigator Modular as Maintenance mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))
(3) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.



(4) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

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(5) Click the [Constitute] tab.



(6) Click the [Operation] radio button and [Output] radio button in the [Select Configuration Information] box.
(7) Check the [RAID Group/Logical Unit] radio button in the [Select Configuration Information] box.
(8) Click the [Browse] button, and specify the directory and file name to output the file of the configuration.
(9) Click the [Apply] button.

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(10) Open the configuration information file that has been got in Step (9) and make sure that the following information is output.

```
Array unit configuration information list.

DF Name : 174-175
Date : 2003/12/02 21:12:31
Micro Program Revision : 0710/A-M
Array Unit Type : DF700S
Serial Number : 75010063

---- RAID Configuration ----
RAID    RAID    Start Location          Number of HDU      Number of       Free Capacity
Group   Level   [Unit No.   HDU No.]  in parity group   parity group        [block]
 0       5          0           0              5                1             525680640

-- End

---- LU Configuration ----
     LU    Capacity   Status                    Staging   C-CTL   D-CTL   RG RAID      Capacity
      0     2097152   Normal                        512   0         0     0   5            1.0 GB

-- End

---- Drive Configuration ----
Location        Vendor ID    Product ID             Revision   Capacity    Status      Serial Number
Unit0 ,HDU0     HITACHI    HUS103073FLF210          D6D6       72GB         Normal     305B4910
Unit0 ,HDU1     HITACHI    HUS103073FLF210          D6D6       72GB         Normal     305B9100
Unit0 ,HDU2     HITACHI    HUS103073FLF210          D6D6       72GB         Normal     30532706
Unit0 ,HDU3     HITACHI    HUS103073FLF210          D6D6       72GB         Normal     305C5571
Unit0 ,HDU4     HITACHI    HUS103073FLF210          D6D6       72GB         Normal     30542348
Unit0 ,HDU5     HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     30545271
Unit0 ,HDU6     HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305C5229
Unit0 ,HDU7     HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305B6777
Unit0 ,HDU8     HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305B3188
Unit0 ,HDU9     HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305L1373
Unit0 ,HDU10    HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     30575398
Unit0 ,HDU11    HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305N2858
Unit0 ,HDU12    HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     305K8917
Unit0 ,HDU13    HITACHI    HUS103073FLF210          D6D6       72GB       Undefine     30575348

-- End

～～～～
(abbr.)
```

① [Drive Configuration]

[Location]: Shows a location where a Disk Drive is installed.

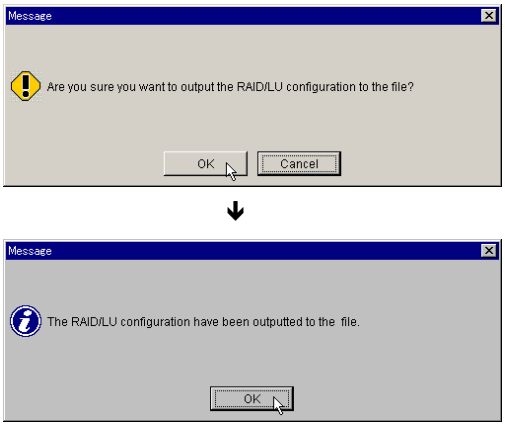
[Unit]: Unit ID#

[HDU]: Disk Drive#

[Serial Number]: Serial # (Disk Drive)

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(11) A message appears, confirming that the system parameter information is output with the specified file name. Click the [OK] button.



System parameter information is saved in the form of a text file with the specified file name.

NOTE : Store the file carefully because it will be required when the upgrade work is done.

(12) Return the window to the unit window by clicking the [Close] button.

(13) Close the unit window. Quit Storage Navigator Modular by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

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3.4.12 Collecting simple trace (Hard)

Collect the simple trace and keep it so that in case of failure. It can be investigated. Collect the simple trace using the WEB.
The procedure is shown below.

(1) Before collecting the simple trace

(a) Items to be prepared

Collection is performed using the normal mode of WEB or Maintenance mode.
For connecting to the WEB, a PC terminal with Browser installed is necessary.
For collecting the simple trace, disk space of 30 M bytes is required. (15 M bytes for temporary data and 15 M bytes for Full Dump data)

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN-cross-cable.

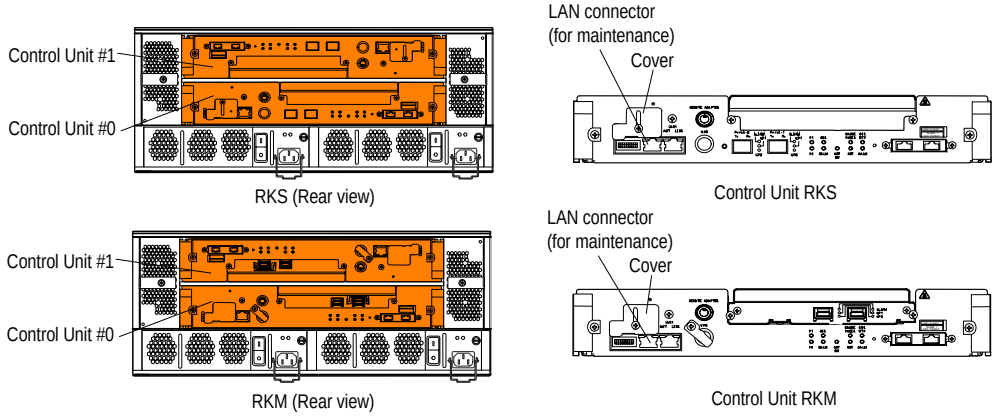


Figure 3.4.7 LAN Connector Position

(c) With Simple Trace Collection, the information of both controllers can be collected from one controller. Therefore, this function does not need to be performed from both Controllers. (As a file name during the collection, “smpl_trc0.dat” is provided for the collection from Control Unit #0, and “simpl_trc1.dat” for the collection from Control Unit #1”.)

(d) Make sure that the WARNING LED (orange) on the Front Bezel is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)

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(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.
- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] - [Cache] - [Clear Cache] in this order.

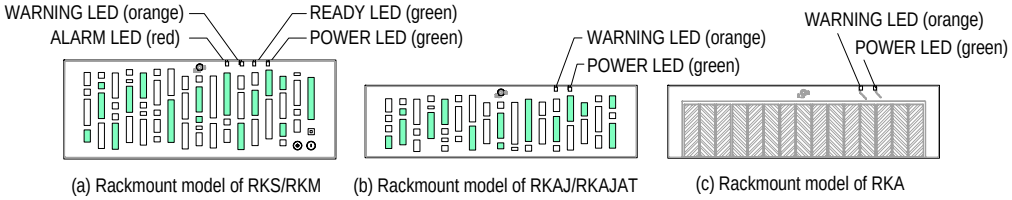


Figure 3.4.8 Indication Locations and Names of LED (Front Bezel)

(2) Procedure for a simple trace collection

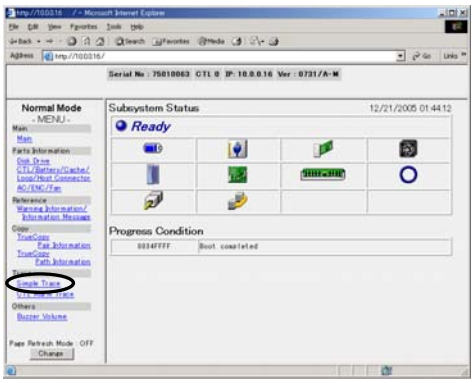
(a) Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser. When the WEB has already been connected, update the page by pressing the Update button. (For the procedure for connecting the WEB, refer to Maintenance Manual WEB "Chapter 1 Before Using Web" (WEB 01-0000).)



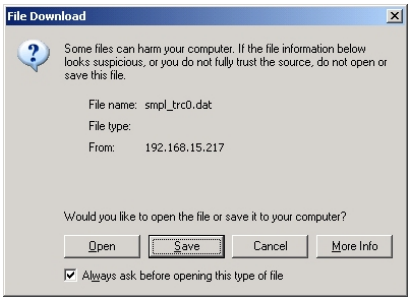
(b) When Windows® XP Service Pack2 or Windows® 2003 Service Pack1 is used in the OS of the maintenance PC, collect the simple trace after changing the setting of the following Internet Explorer.
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
- Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
- Select [OK] button in the [Internet Options] window.

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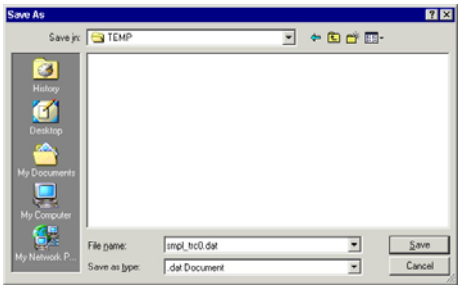
(c) Collect the simple trace according to the WEB and the following procedure.
Click "Trace" in the menu frame of "Simple Trace".



(d) The following dialog is displayed.
Click the [Save] button.



(e) Select the place to save the file and file name (Default file name: CTL#0:smpl_trc0.dat, CTL#1: smpl_trcl.dat) and click [Save][‡1].



The down-loading is started and the progress indicating message window is displayed.

‡1 : There may be a case where the default file name is given as "ctla_trc0.dat..dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

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In this procedure Simple trace is collected by WEB Normal mode. Similarly, Simple trace can be collected by WEB Maintenance mode through Menu Frame.
For entering Maintenance mode, refer to the Maintenance Manual WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

When the USB memory needs to store the simple trace information, refer to Maintenance Manual Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300).

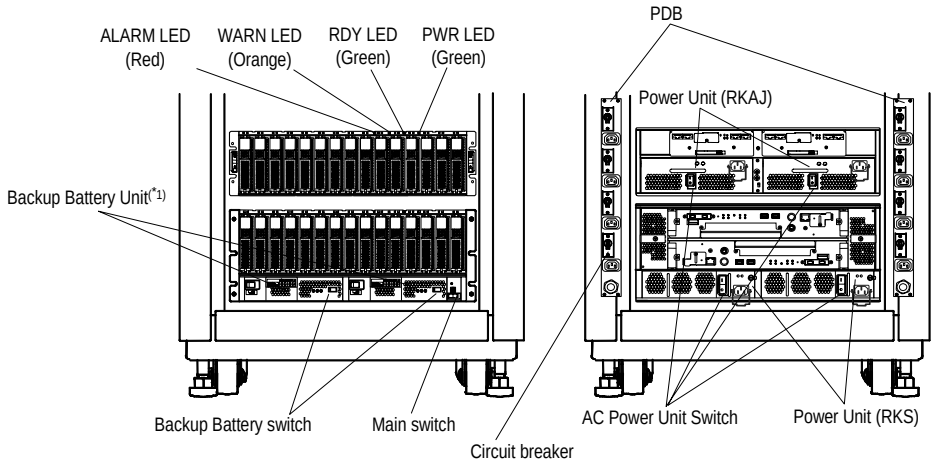
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3.4.13 System power off

Execute the deliberate shutdown of the disk array subsystem.
The procedure is shown below.

NOTE : Do not perform the planned shutdown (power-off) while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes).

(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the front of the subsystem is off.
(3) All turn off the AC Power Unit Switch of the Power Unit.
(4) Turn off the battery switch of the Backup Battery Unit.
(5) All turn off the circuit breaker of the PDB.



*1 : There is only one Backup Battery Unit to be installed in the RKS and install it in the left side of the subsystem.
*2 : The RKS+RKAJ is shown as an example.

Figure 3.4.9 Locations of Switches for Power Off

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NOTE : Because TrueCopy remote replication/TrueCopy Extended Distance manages information stored in paired disk array subsystems, the path of the mate disk subsystem (not the subsystem being upgraded but the other one of the paired subsystems) is detached when TrueCopy remote replication/TrueCopy Extended Distance is used.
When the subsystem "B" shown in Figure 3.4.10 is upgraded, the path of the subsystem "A" is detached.
The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
This is because the "A" becomes unable to access the "B" as a result that the "B" is placed in the Maintenance mode. Therefore, this is not a problem.
However, when the pair status is changed to PSUE, there may have been a mistake in operations that have been made. Recover the pair from the PSUE status referring to Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).

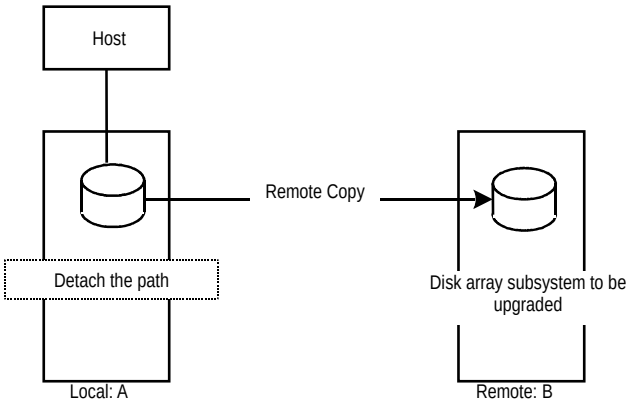


Figure 3.4.10 Paired Disk Array Subsystems (TrueCopy remote replication/TrueCopy Extended Distance)

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3.4.14 Hardware upgrade work(Hard)

Replace some components with those for upgrading the disk array subsystem to the Hitachi TagmaStore® AMS 1000™. Make the replacement above and have the customer keep the components that become unused because they are used in the configuration of the Hitachi TagmaStore® AMS 200™/AMS 500™.
The procedure is shown below.

The hardware upgrade procedure is shown in this section based on the Hitachi TagmaStore® AMS 500™ of the configuration of Figure 3.4.11.
The basic chassis RKM and the additional chassis RKAJ connected to the first unit are shown as "Chassis ① (RKM)" and "Chassis ② (RKAJ)", respectively.
However, if the procedure for upgrading the Hitachi TagmaStore® AMS 200™ differs from the procedure for the Hitachi TagmaStore® AMS 500™, the supplement is added.
When upgrading the Hitachi TagmaStore® AMS 200™, perform the operation by reading the RKM as the RKS and the Hitachi TagmaStore® AMS 500™ as the Hitachi TagmaStore® AMS 200™ for this section.
Also, the procedure for the FibreChannel configuration is shown in this section, but if the procedure differs in the iSCSI configuration, the supplement is added.
Perform the work in the same way when the RKAJAT or the RKA of the additional chassis is installed.
In this section, the procedure only when the additional chassis is the RKAJ is shown, but when the procedure differs for the RKAJAT or the RKA, supplements are added.

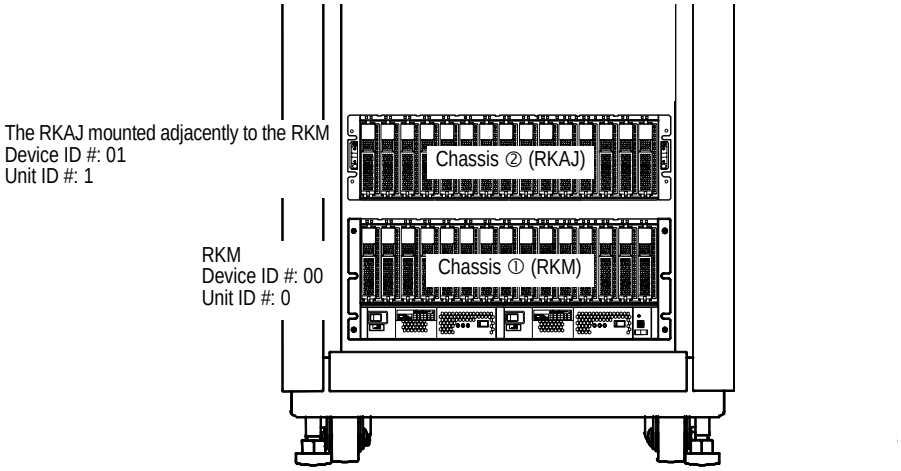
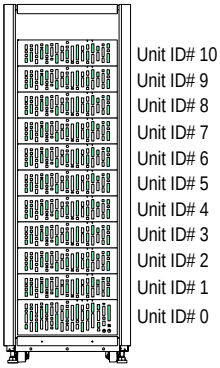


Figure 3.4.11 Procedure for Removing Front Bezel

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NOTE : In this section, the case where a unit ID# is ascending order from the bottom of the U7 rack frame in the configuration before the upgrade is explained to an example.
Start the work after checking this in order of the ENC cable connection. If it is not so, the work occurs in moving the installed chassis to the installation destination, etc. when the chassis is moved in the rack frame.



NOTE : When the number of the U7 rack frame maximum chassis is installed in the configuration before the upgrade, add the U7 rack frame newly. (Refer to Maintenance Manual Installation "3.2.1 U7 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas)" (INST 03-0020))

(1) Note on hardware upgrade works

(a) Perform the powering on/off operation correctly.

It is feared that user data is lost if the powering on/off operation is not done following the procedure correctly.
Since the power supplying system is duplicated, operate AC Power Unit Switch of the both systems when turning on/off the Power Unit.

⚠ CAUTION

Hazard exists that can cause an electric shock.
Start the work after making sure that the breaker in the power distribution box has been turned off.

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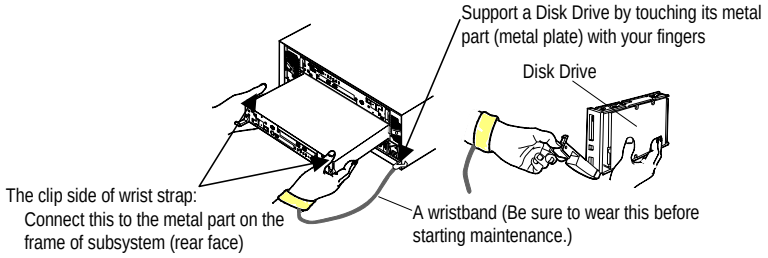
(b) Notes when Unpacking, Installing or Removing the Parts

For installing or removing the parts, do not apply any shock as the precise parts are installed. Be sure to wear a wrist strap connected to the chassis frame before starting the work and do not take it off until it is finished.

For installing the Disk Drive, Cache Memory, support it as touching the metal part at the side with the fingers of the hand that wears a wrist strap.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install are Disk Drive, Control Unit and ENC Unit/SENC Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.
- When you install the Control Unit or a cache memory in the Control Unit, do the installation holding it by its sheet steel part with your hand(s) wearing the ESD grounding wrist band. The electrostatic charge can be discharged through your touch to the sheet steel part.



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(c) Notes on cable routing

(i) Handling of cables placed on the installation floor

- Protect the cables, which cannot be accommodated by the subsystem and thus laid on the floor or cross a passage, with the cable protection duct.
- For cables that relay between the subsystems, lay them on the floor and do not leave them from the floor.

(ii) Handling of under floor cables when the subsystem is installed on the free access floor.

- Give extra lengths to cables routed under the floor and do not make them float in the air.

(iii) Routing method

- Give a room for routing as earthquake and the like are considered.
- Give a room for routing not to disturb the part replacement for maintenance.
- Make the AC cables apart from each other and when they should be adjacent, do not make them in parallel but make them cross at right angle.
- When using a cable protection duct, be careful not to damage or cut cables by catching them.

(iv) Hold the connector to insert or pull out a cable. If the cable part is pulled, it may cause a failure.

(v) For connecting the Fibre Channel interface cable, the FC (ENC) cable, or iSCSI interface cable, bend it with a long radius (not less than 30mm) and do not give the load to the cable and the connector.

(d) Note on completing the work

Close all the external covers when the work is completed.

(The cover is to maintain the performance of the subsystem (radio wave noise suppression and others), so that be sure to keep all the external covers closed to operate the subsystem normally.)

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(2) Open the Rear Door of U7 rack frame.

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

(a) Fit an Allen wrench in the key socket on the rear door, turn the Allen wrench in the direction shown by the arrow (⟶), and open the rear door slowly leaving the wrench as it is.

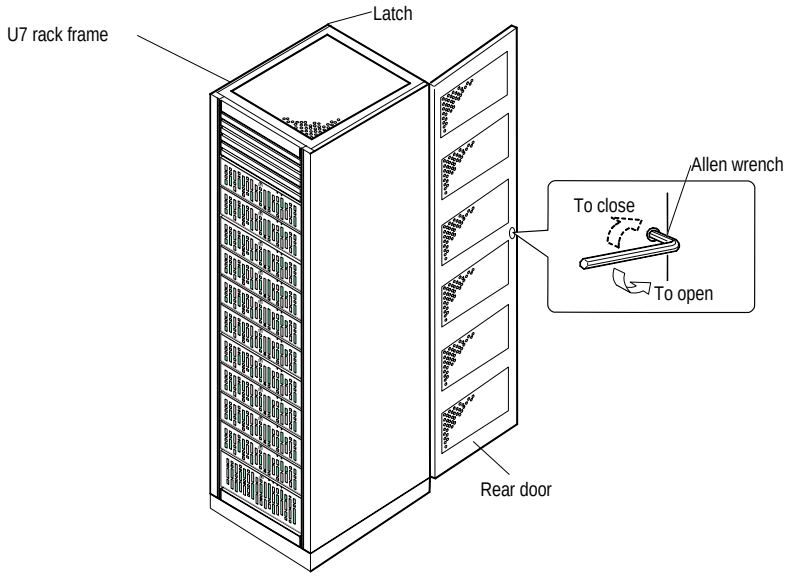


Figure 3.4.12 Procedure for Opening Rear Door

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(3) Installing the rails

Install the rack rail because it is required to add the RKAJ to change the Disk Drive which was installed to the RKM.

EIA units and intervals of mounting holes of 19-inch rack frame conforming to EIA standard

- A unit (U) space conforming to EIA standard is 19 inches wide and 44.5mm high as shown in the figure below.
- The boundary of the unit falls on the middle of the interval of 12.7mm.
- When the unit space is shifted by 0.5 units, the unit boundary is shifted from the normal position by 22.2mm.

For the U7 rack frame

Wide intervals: Repeat of 44.45mm (31.75mm + 12.7mm)

Maximum number of mountable unit spaces: 38

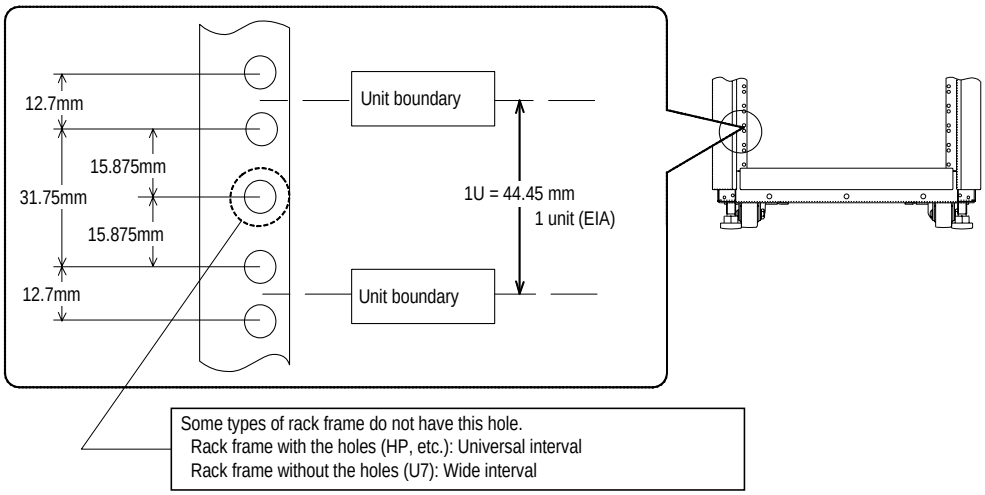


Figure 3.4.13 Attachment Hole Size of Rack

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The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame. In the case of the U7 rack frame, you must count the holes to know the address because no number is marked on the rack frame.

The following figure illustrates the whole layout of addresses of installation positions in the U7 rack frame.

There are 38 addresses, that is, the 1U to 38U counted in the vertical direction starting from the lower boundary of the 1U (the lowest unit).

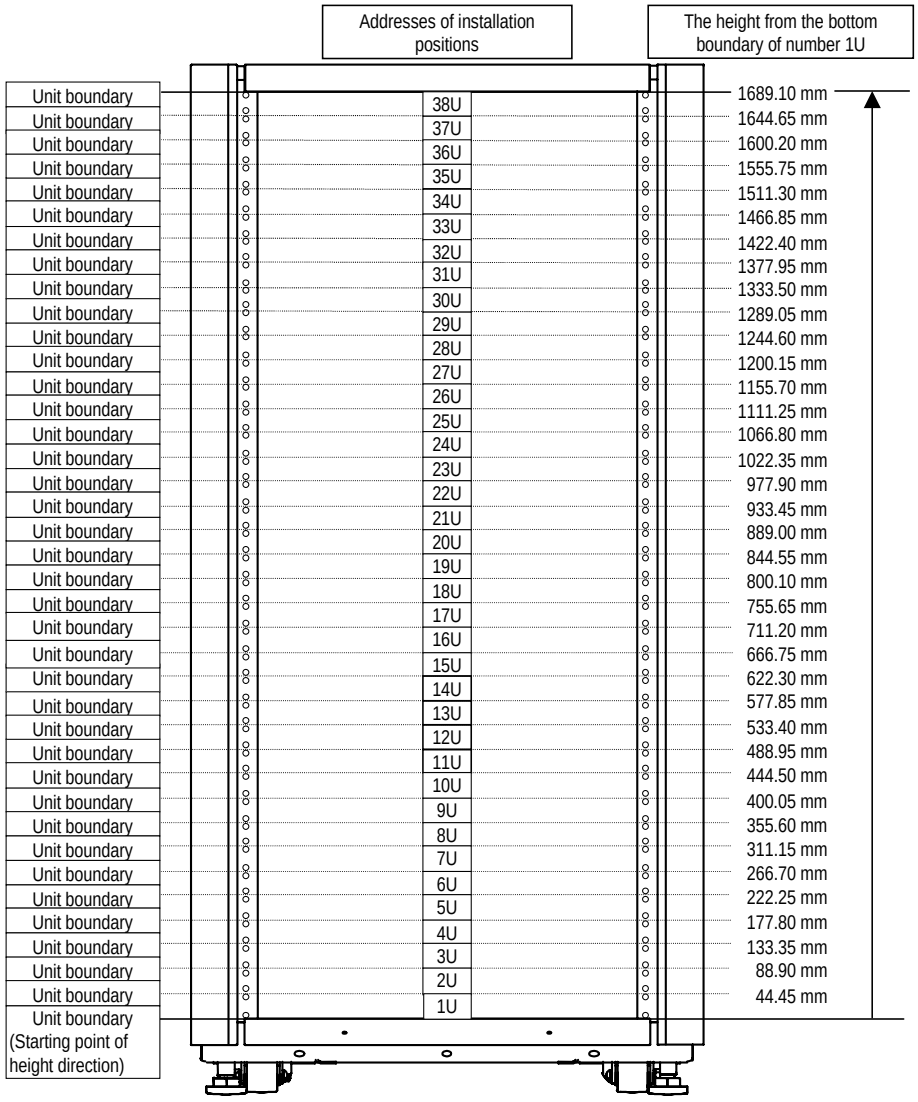


Figure 3.4.14 Whole Layout of Installation Position Addresses

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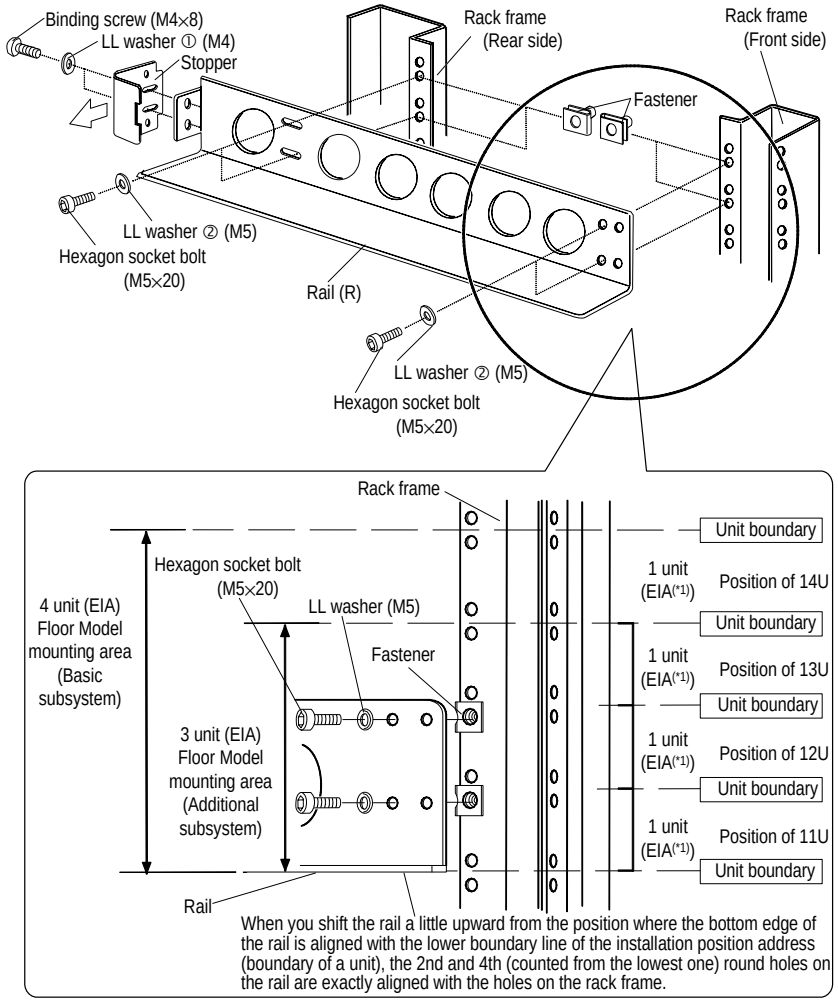
Install the rack rail in the position adjacent to the existing basic chassis or the additional chassis. When the system of the maximum installation is upgraded, install it in the added U7 rack frame.

(a) Slide the stopper in the direction shown by the arrow and temporarily fix it to the Rail (R) using the binding screws and LL washers ① (M4 (at two places.)).
For the installation position address, see "Figure 3.4.14 Whole Layout of Installation Position Addresses" (SMUP 03-0610).

(b) On the right side of the installation location in the rack frame, align the round holes of the Rail (R) with those of the rack frame and insert the fasteners (at four places in total in front and rear.).

(c) Fasten the Rail (R) to the rack frame using the hexagon socket bolts and LL washers ② (M5 (at two places each on the front and rear sides.)).

(d) Install the Rail (L) to the rack frame in the same way.



*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.4.15 Installation of Rails to the Rack frame and Installation Positions

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(4) Installing fasteners on the front side of the rack frame

Install the fasteners on the front side of the rack frame in order to fasten the subsystems to be mounted on the rack frame.

(a) Fit the two fasteners to each of the right and left beams on the front side of the rack frame referring to Figures 3.4.16 and 3.4.17.

Install the mounting fasteners at the 2nd and 5th (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) round holes.

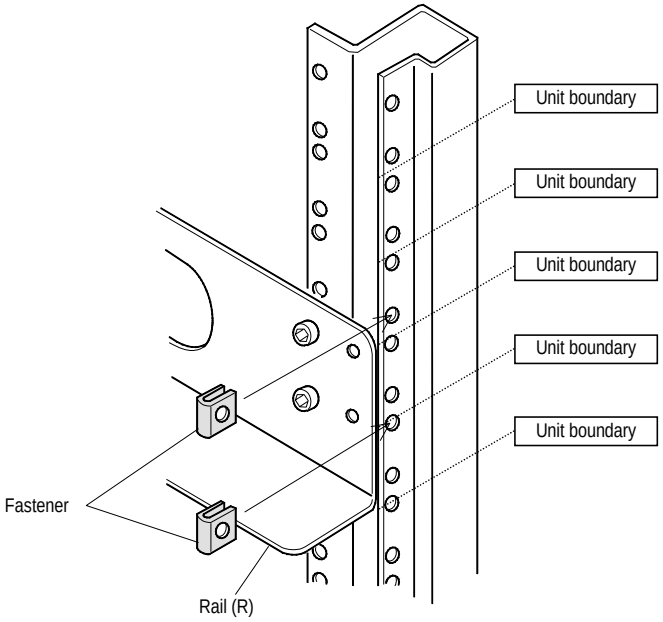


Figure 3.4.16 Installing Fasteners on the Front Side of the Rack Frame

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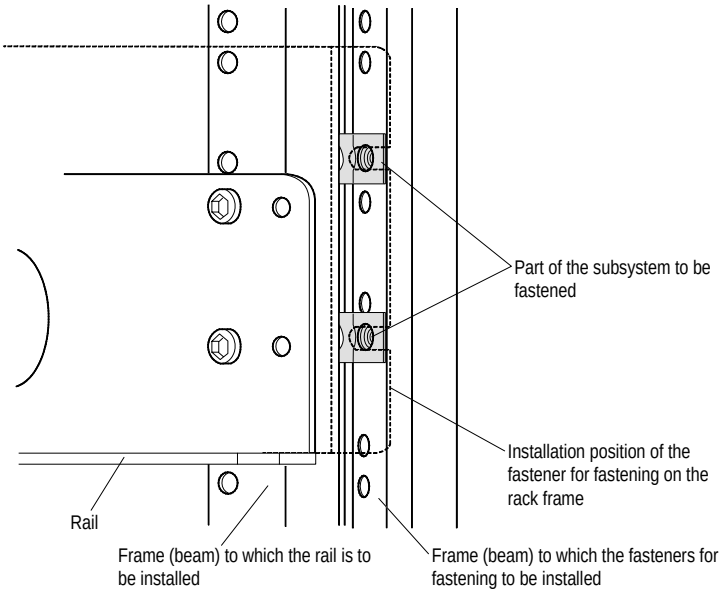


Figure 3.4.17 Installation Positions of Fasteners and Relation with Rails

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(5) Remove the Front Bezel

Remove the Front Bezel attached to "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

NOTE : Please skip to "3.4.14 (13) Remove the Front Bezel" (SMUP 03-0810) when the additional chassis is not connected.

A key is necessary to attach or remove the Front Bezel.

CAUTION

Remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.
(b) Pull the front bezel toward you holding its sides to disengage it from the ball catches.
(c) Disengage the two hooks of the front bezel from the slots on the subsystem main body by shifting the bezel to the right and remove the bezel.

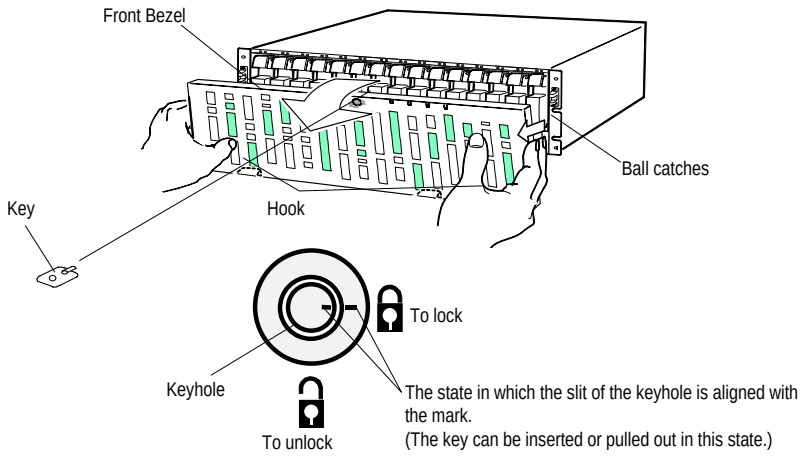
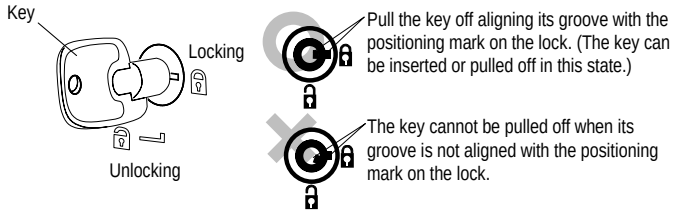


Figure 3.4.18 Procedure for Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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(6) Remove the power cable connected to "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

(a) Disconnect the power cable connected to the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

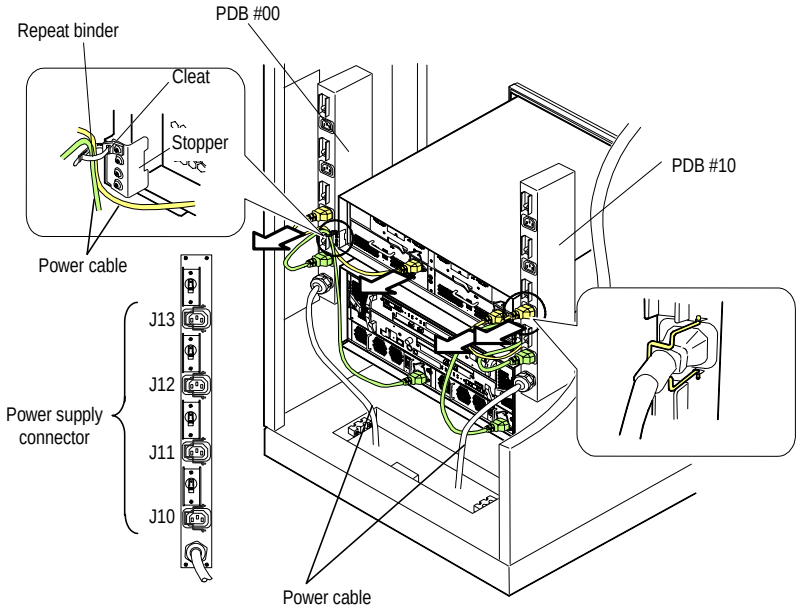


Figure 3.4.19 Disconnecting Power Cables

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(7) Remove the ENC cables connected to the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).
  (a) Remove Repeat Binders securing the ENC cable to the stopper.
  (b) Remove all the ENC cables connecting the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

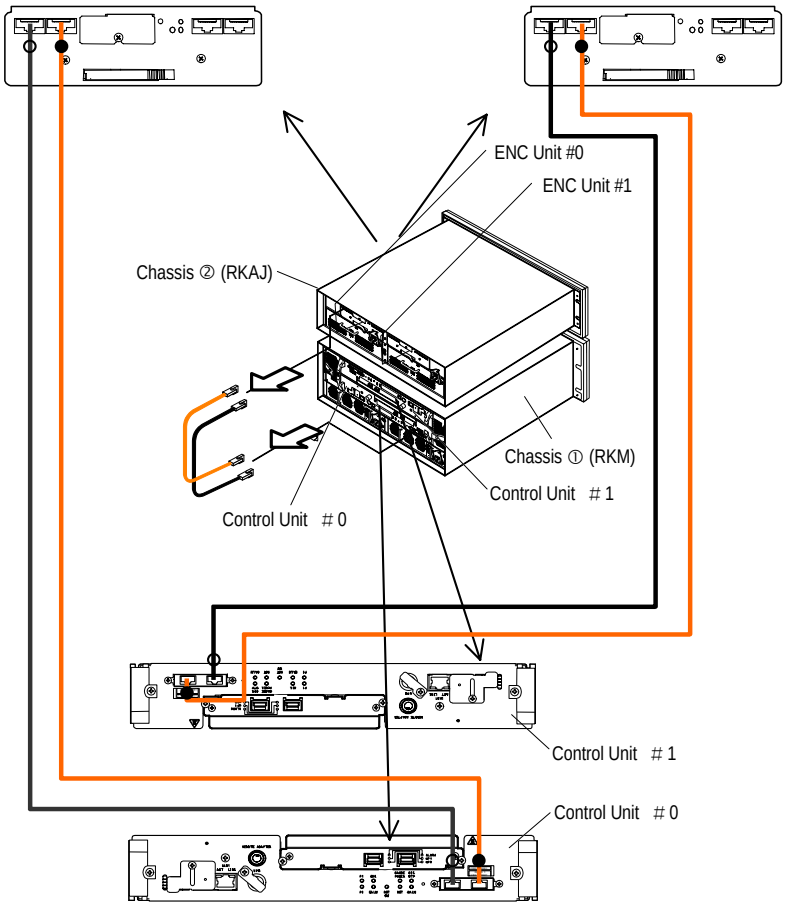


Figure 3.4.20 Disconnecting Power Cables

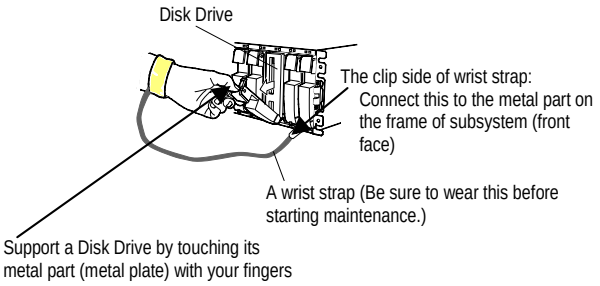
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(8) Remove the disk drives installed in the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.

NOTE : Before replacing, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



(a) Affix labels with the HDD numbers to all the Disk Drives that were installed in the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

Deleted:

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(b) Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.
When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

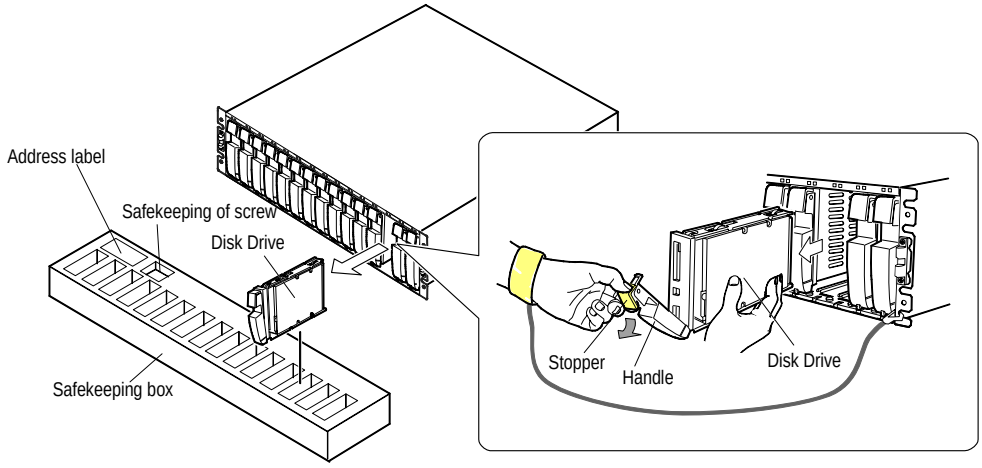
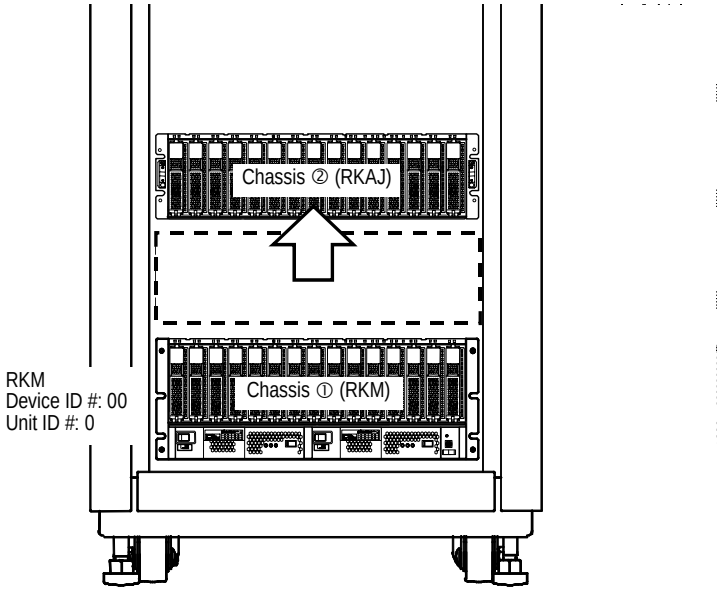


Figure 3.4.21 Remove the Disk Drive

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(9) Move the position of "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) to the position in which the rack rail was installed in the procedure (3) (for three units).



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External appearance of the external lifter.

Figure 3.4.22 shows external appearance of the external lifter.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Be sure to perform the operation with two or more workers.

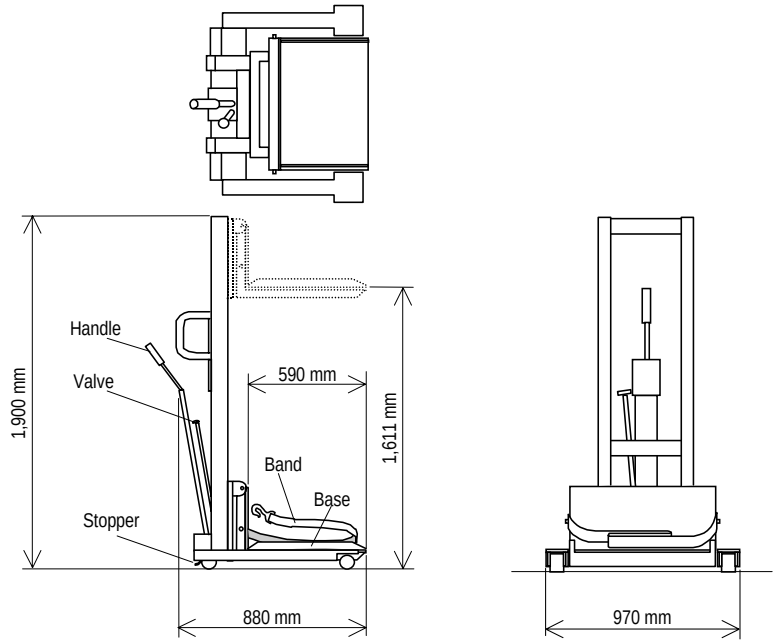


Figure 3.4.22 External Lifter

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(a) Remove the front side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

(i) Remove the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) to the rack frame with the four M5×10 binding screws.

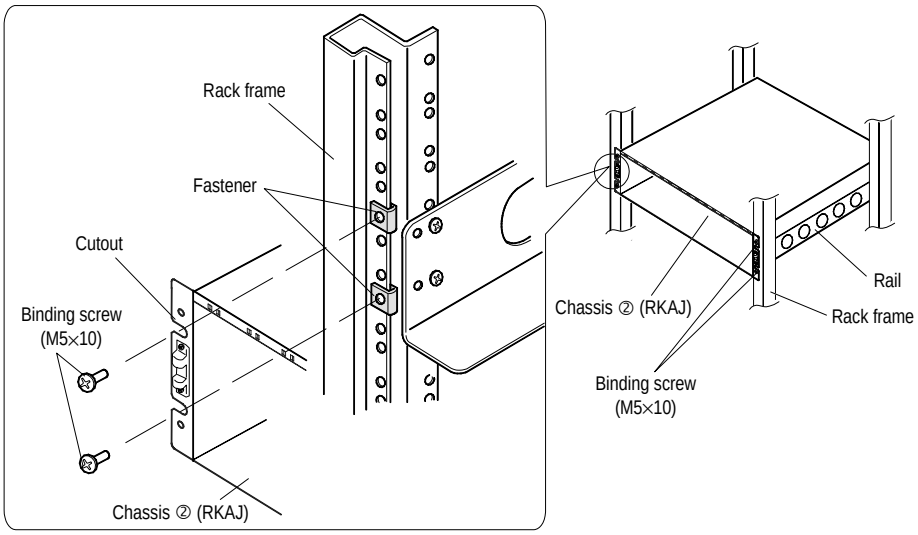


Figure 3.4.23 Fastening Front Side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

(b) Remove rear side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

(i) Remove the binding screws.

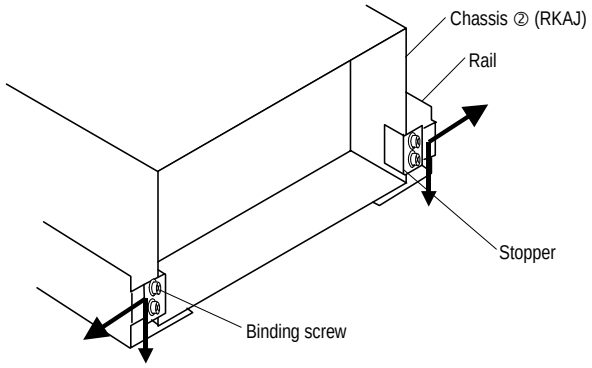


Figure 3.4.24 Securing Rear Side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

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(c) Demount the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) from the U7 rack frame.

(i) Adjust the position of the rack frame, and apply the brake to the lifter.

(ii) Move the pumping handle of the external lifter to the right and left repeatedly to lift the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) up to the height suitable for the unloading.

WARNING

If the RKAJ/RKAJAT falls when the elevator of the lifter is at a high position, a personal injury will be caused.
Perform the positioning, fastening, or other handlings very carefully.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.
- Work carefully because the mass of the single RKAJ/RKAJAT is about 40 kg, RKA is about 42 kg.

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(iii) Shift the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) onto the elevating base of the external lifter. Shift the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) gently until it hits the backboard of the elevating base.

CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKAJ/RKAJAT enters the base across the end of it. Otherwise, falling of the RKAJ/RKAJAT may be caused.

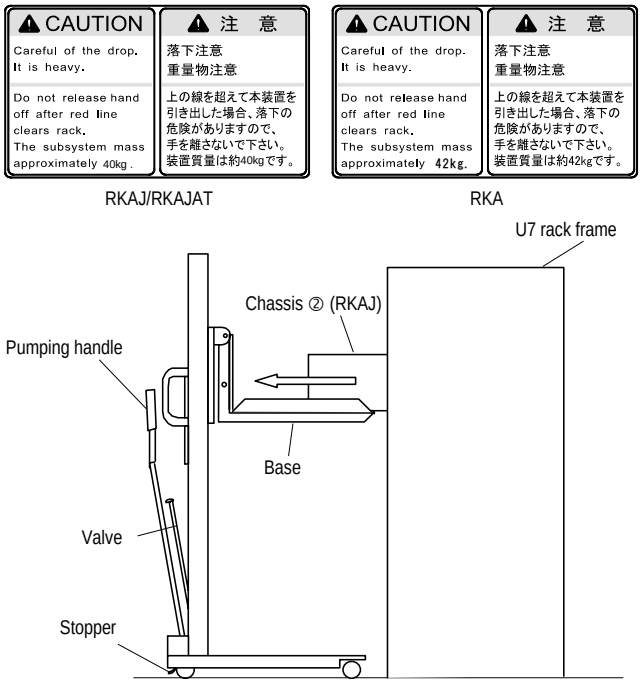


Figure 3.4.25 Mounting "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) on Eternal Lifter

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(iv) Secure the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) to the lifter with a band of the lifter.
Bind the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) with the band tightly by fitting the length of the belt to the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

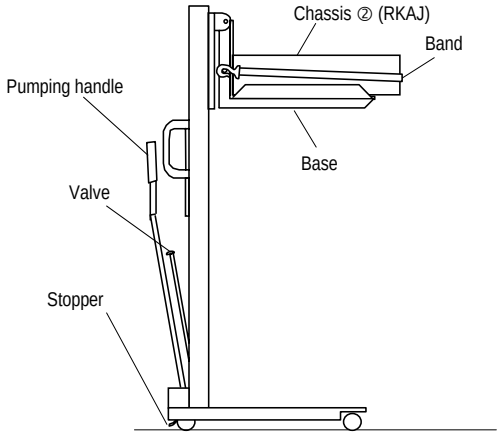


Figure 3.4.26 Secure the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

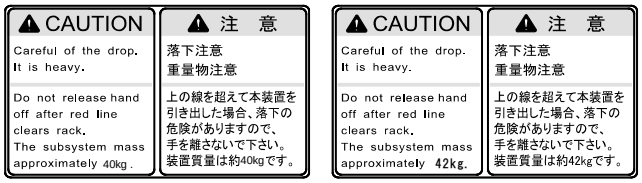
(v) Move the pump handle of the special lifter right and left, and lift it to the height (for three units) of the position where the rack rail was installed in the procedure (3).
(vi) Remove the band and adjust the position of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) so that the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) comes in the center in front of the rack frame. If the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) is positioned off-centered, a screw contacts the front bezel preventing the bezel from being opened or closed.

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(vii) Shift the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) onto the rails in the rack frame. When shifting the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last), push it in to the end gently.

CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKAJ/RKAJAT/RKA enters the rack frame across the end of it. Otherwise, falling of the RKAJ/RKAJAT/RKA may be caused.



RKAJ/RKAJAT RKA

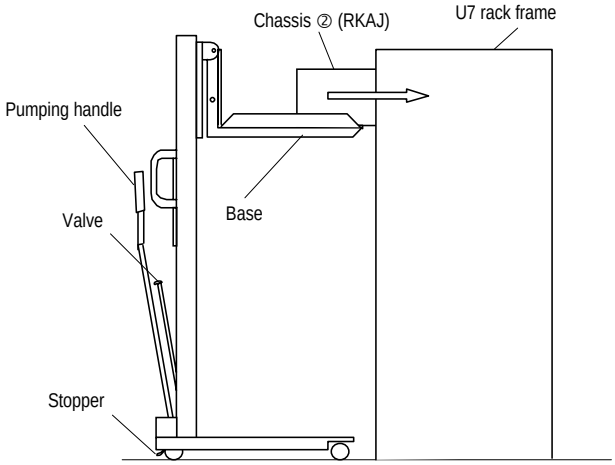


Figure 3.4.27 Mounting "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) on Rack Frame

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(viii) Fasten the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) to the rack frame with the four M5×10 binding screws.

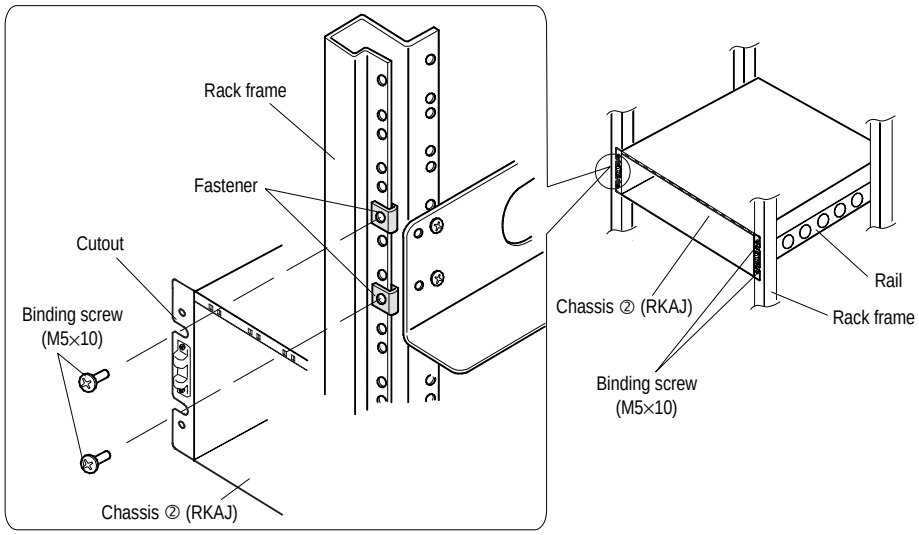


Figure 3.4.28 Fastening Front Side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

(ix) Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.

(x) Tighten the binding screws.

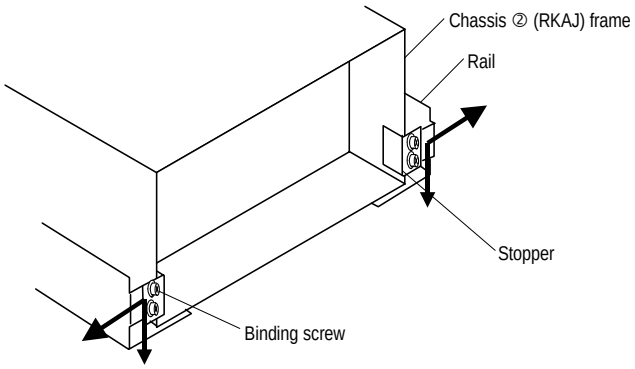


Figure 3.4.29 Securing Rear Side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last)

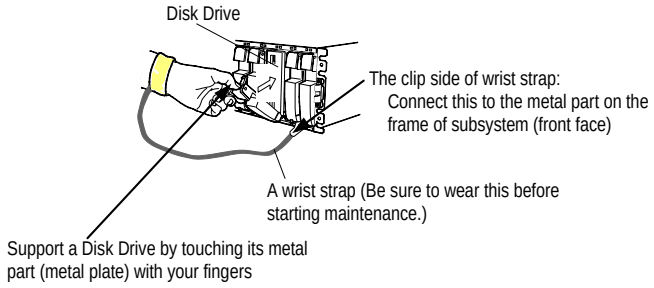
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(10) Install the Disk Drive which was removed in the procedure (8) in "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(a) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.
(b) Insert the Disk Drive into the position (address) where it was by holding it with the handle.
(i) Fit the Disk Drive in the guide rail of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last) and slide it in the direction shown by the arrow.
(ii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).
(iii) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(c) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.
(d) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.

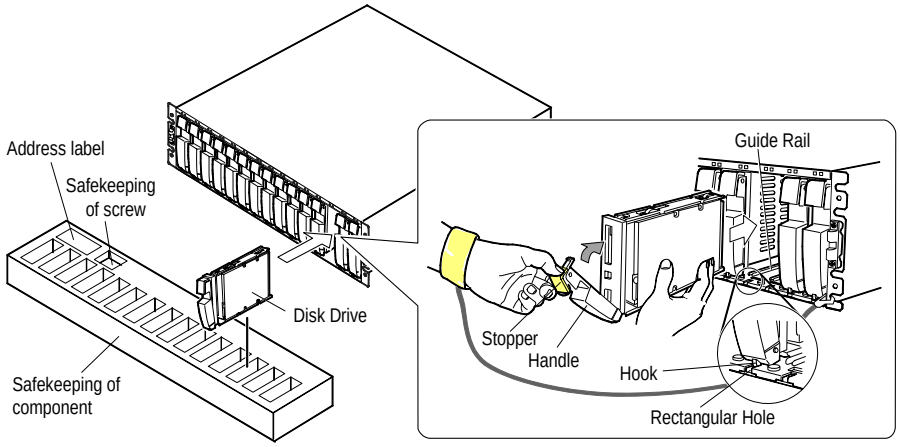


Figure 3.4.30 Installing of Disk Drive

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(11) Attach the Front Bezel attached to "Chassis ② (RKAJ)" (the additional chassis whose Unit ID# is the last).

(a) Hold the side of Front Bezel with your both hands.

(b) Engage two hooks of the front bezel with the slots on the right side of the subsystem main body.

(c) After making the hooks of the front bezel engaged, press the bezel against the main body until it is stopped.

(d) Fix the front bezel by turning the key.

(12) When two or more additional chassis (RKAJ/RKAJAT/RKA) are installed, repeat the procedure (5) to (11) in order whose Unit ID# is large, and move all the rack installation positions by three units.

NOTE : Be sure to execute the movement of the additional chassis one by one.

If the movement of all the additional chassis (RKAJ/RKAJAT/RKA) is completed, go to the procedure (13).

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(13) Remove the Front Bezel

Remove the Front Bezel attached to "Chassis ① (RKM)" (the basic chassis).

A key is necessary to attach or remove the Front Bezel.

CAUTION

Remove the Front Bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(a) Insert the key into the keyhole on the Front Bezel and release the Lock of the Front Bezel.

(b) Pull the front bezel toward you holding its sides to disengage it from the ball catches.

(c) Disengage the two hooks of the front bezel from the slots on the subsystem main body by shifting the bezel to the right and remove the bezel.

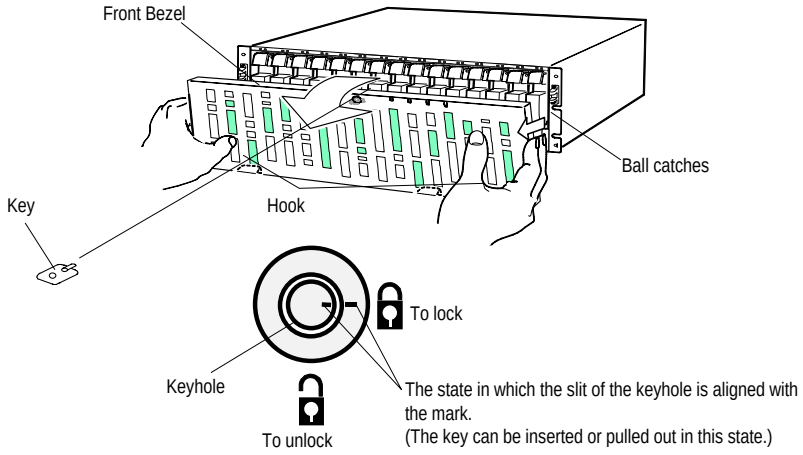
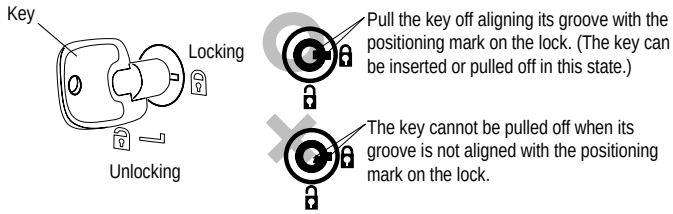


Figure 3.4.31 Procedure for Removing Front Bezel

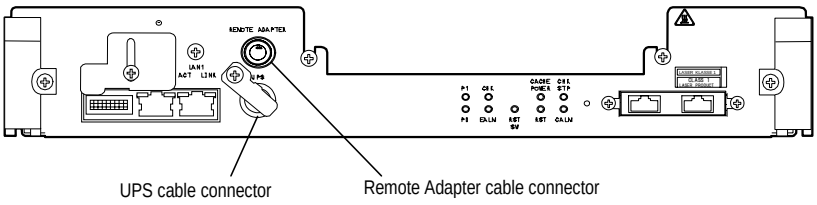
NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage of it may be caused.



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.
When the key is pulled off in the state where its groove is not aligned with the positioning mark on the lock, a damage of the lock may be caused.

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(14) When the Remote Adapter is connected, remove all of them.
When the UPS is connected, remote all of them.



(15) Disconnect only the connector, which is connected to the AC/DC Power Unit (RKM), of the power cable connected to the "Chassis ① (RKM)" (the basic chassis).

⚠ CAUTION

Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the parts a little, and then perform the cable removal again.

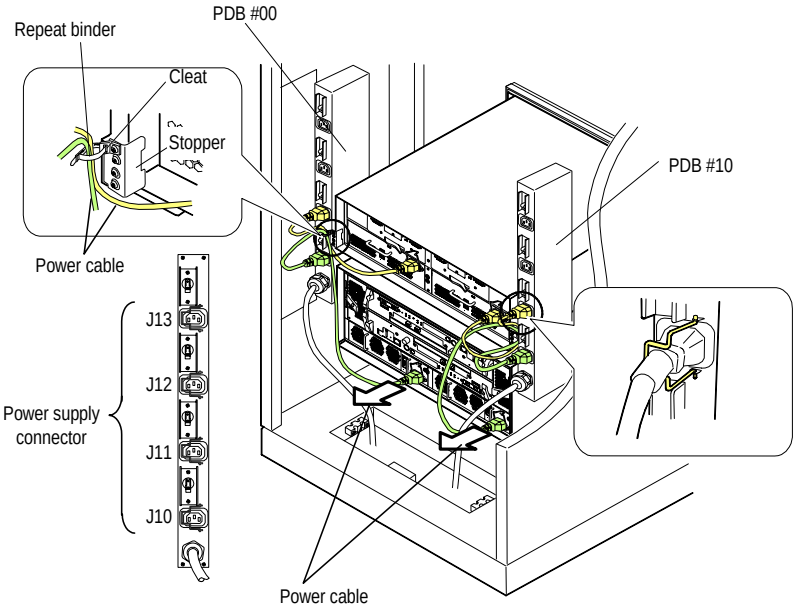


Figure 3.4.32 Disconnecting Power Cables

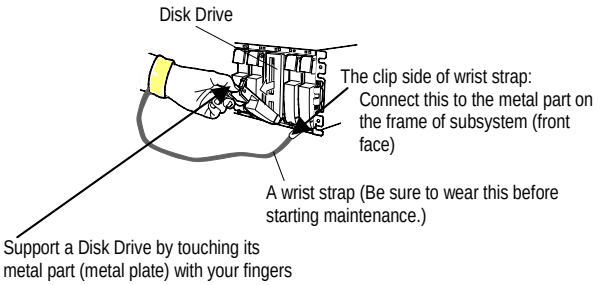
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(16) Remove the disk drives installed in the "Chassis ① (RKM)" (the basic chassis) .

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.

NOTE : Before replacing, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



(a) Affix labels with the HDD numbers to all the Disk Drives that were installed in the "Chassis ① (RKM)" (the basic chassis) .

Deleted:

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(b) Pull the stopper at the upper part of the disk drive handle toward you to have the lock off, tilt the handle toward you, and then remove the Disk Drive by pulling it out taking care not to apply a shock to it.
When using the removed Disk Drive for the purpose of addition to another disk array unit, keep it in custody with its handle returned to its original state (locked by the stopper) taking care not to apply a shock to it.

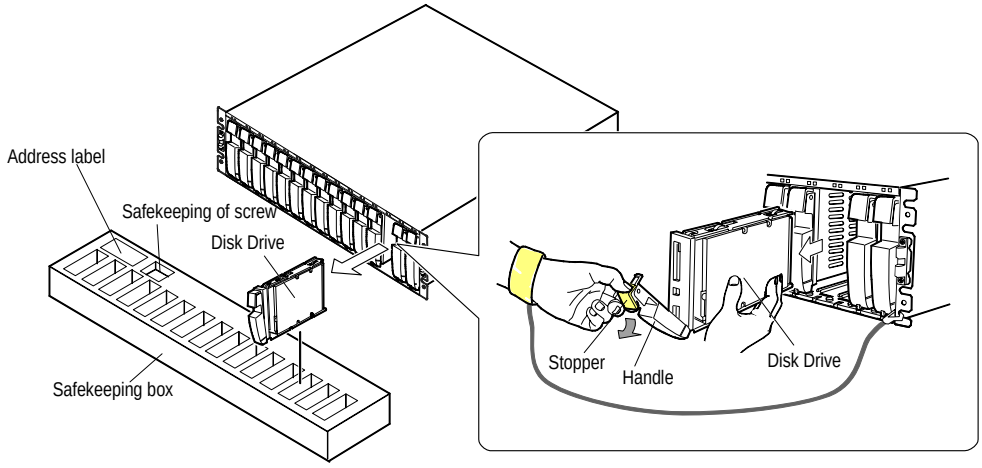


Figure 3.4.33 Remove the Disk Drive

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(17) Remove the Cache Unit from the Control Unit installed in the "Chassis ① (RKM)" (the basic chassis) .
In case of the dual controller configuration, remove all the Cache Units from both Control Units.
Request the customer to keep the removed Cache Unit which is not used for the Hitachi TagmaStore® AMS 1000™ with caution.

⚠ CAUTION

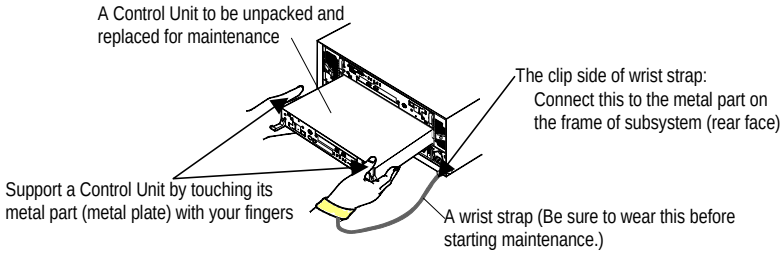
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install is Control Unit, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

When replacing the additional chassis, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



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- When the Hitachi TagmaStore® AMS 500™ is the system configuration of the Fibre Channel interface

(a) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(b) Remove the Control Unit by pulling it out toward you.
(c) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.
(d) Replace the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(e) In the case of the dual controller configuration, remove the cache memories from the other Control Unit by repeating Steps (a) to (d).

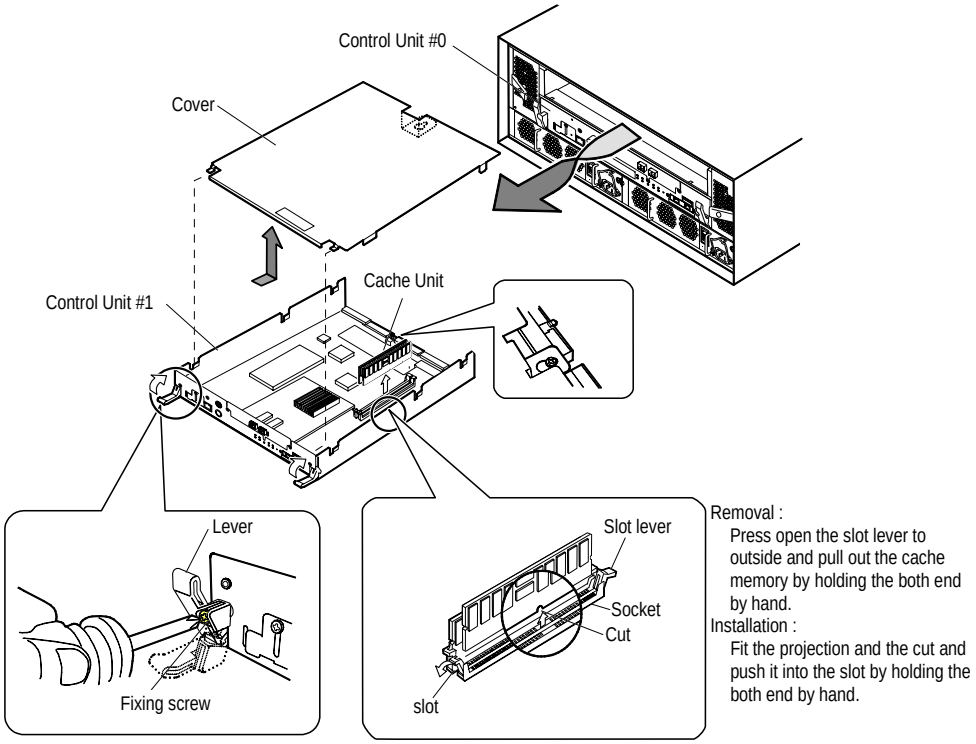


Figure 3.4.34 Remote the Cache Unit (1)

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• When the SANRISE AMS500 is the system configuration of the iSCSI interface

(a) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(b) Remove the Control Unit by pulling it out toward you.

(c) Loosen the fixing screw for the cover at the back of the cover, slide the cover in the direction shown by the arrow (⟶), and remove it.

(d) Replace the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(e) In the case of the dual controller configuration, remove the cache memories from the other Control Unit by repeating Steps (a) to (d).

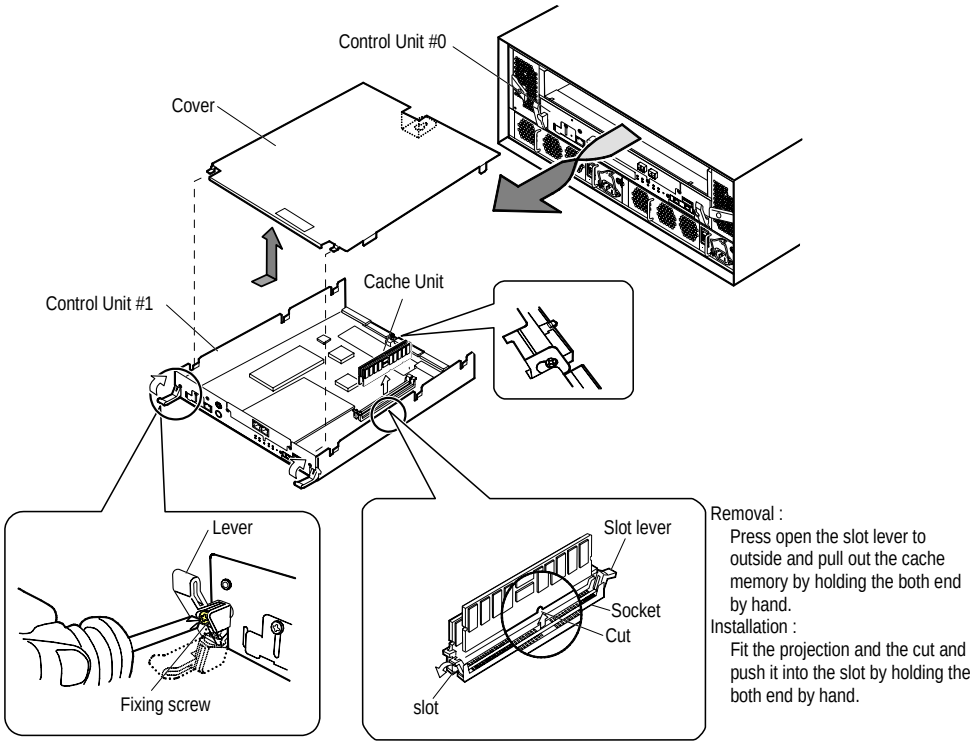


Figure 3.4.34 Remote the Cache Unit (2)

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(18) Replace the "Chassis ① (RKM)" (the basic chassis) with the RKH.

External appearance of the external lifter.

Figure 3.4.35 shows external appearance of the external lifter.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Be sure to perform the operation with two or more workers.

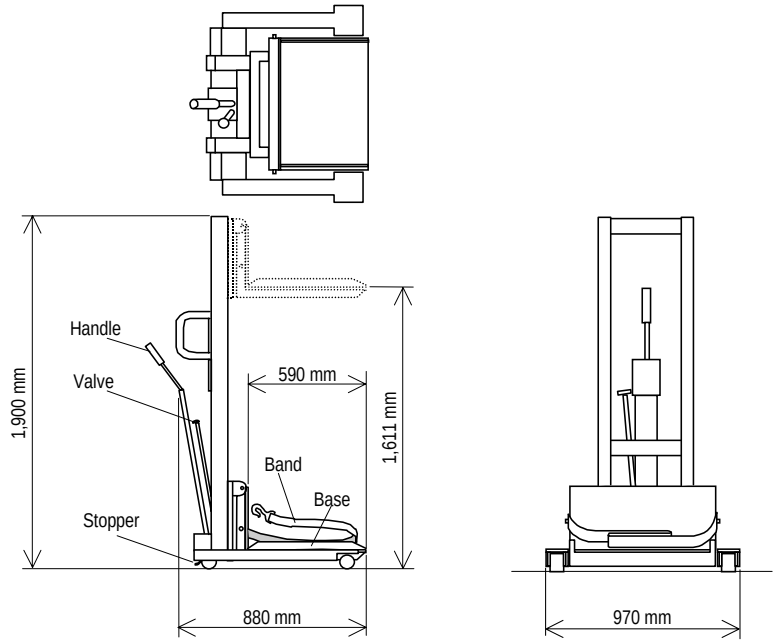


Figure 3.4.35 External Lifter

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(a) Remove the front side of the "Chassis ① (RKM)" (the basic chassis)

(i) Remove the "Chassis ① (RKM)" (the basic chassis) to the rack frame with the four M5×10 binding screws.

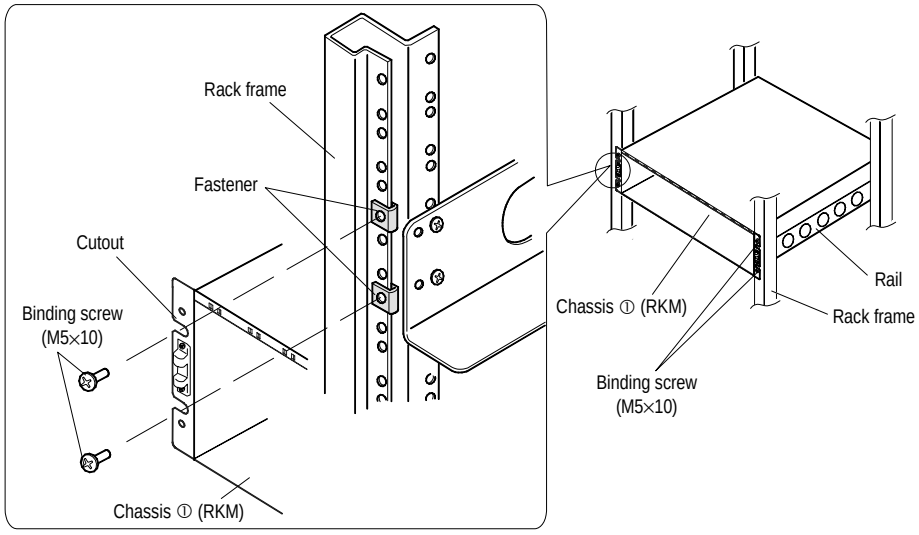


Figure 3.4.36 Fastening Front Side of the "Chassis ① (RKM)" (the basic chassis)

(b) Remove rear side of the "Chassis ① (RKM)" (the basic chassis)

(i) Remove the binding screws.

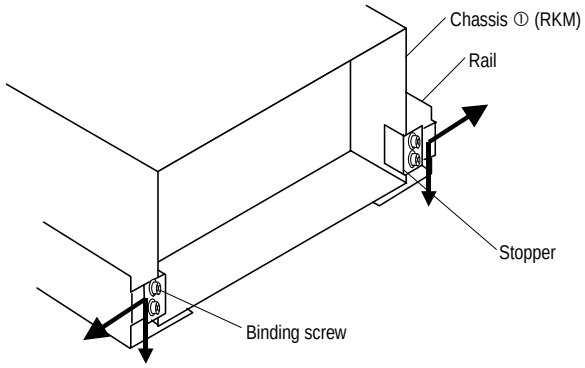


Figure 3.4.37 Securing Rear Side of the "Chassis ① (RKM)" (the basic chassis)

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(c) Demount the "Chassis ① (RKM)" (the basic chassis) from the U7 rack frame.

(i) Adjust the position of the rack frame, and apply the brake to the lifter.

(ii) Move the pumping handle of the external lifter to the right and left repeatedly to lift the "Chassis ① (RKM)" (the basic chassis) up to the height suitable for the unloading.

WARNING

If the RKS/RKM/RKH falls when the elevator of the lifter is at a high position, a personal injury will be caused.
Perform the positioning, fastening, or other handlings very carefully.

CAUTION

- Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.
- Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.
- Work carefully because the mass of the single RKS is about 56 kg, RKM is about 58 kg, RKH is about 47 kg.

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(iii) Shift the "Chassis ① (RKM)" (the basic chassis) onto the elevating base of the external lifter. Shift the "Chassis ① (RKM)" (the basic chassis) gently until it hits the backboard of the elevating base.

⚠ CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKS/RKM/RKH enters the base across the end of it. Otherwise, falling of the RKS/RKM/RKH may be caused.



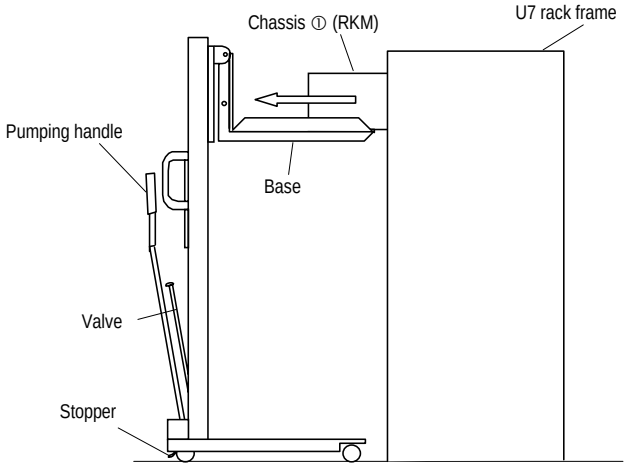


Figure 3.4.38 Mounting "Chassis ① (RKM)" (the basic chassis) on Eternal Lifter

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(iv) Secure the "Chassis ① (RKM)" (the basic chassis) to the lifter with a band of the lifter. Bind the "Chassis ① (RKM)" (the basic chassis) with the band tightly by fitting the length of the belt to the "Chassis ① (RKM)" (the basic chassis) .

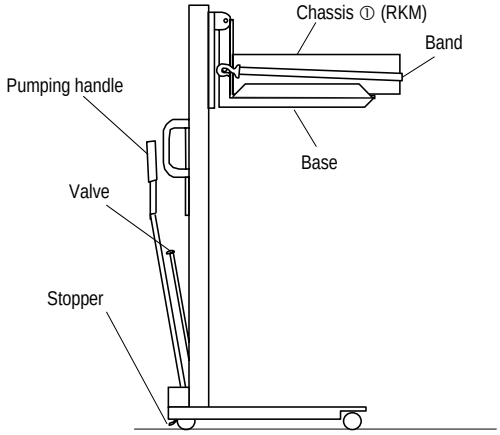


Figure 3.4.39 Secure the "Chassis ① (RKM)" (the basic chassis)

(v) After securing the "Chassis ① (RKM)" (the basic chassis) to the elevating base, open the up/down valve of the external lifter gently and lower the elevating base to the lowermost position.

(vi) Take off the brake of the external lifter, move the lifter away from the U7 rack frame, and take down the "Chassis ① (RKM)" (the basic chassis) after loosening the belt.

(vii) Move the external lifter to the place where the lifter does not disturb the following works.

(viii) Packing the "Chassis ① (RKM)" (the basic chassis). (See "Export Packing Specifications")

(d) Sticking EMI gasket

Stick the EMI gasket supplied with the rack rail on the top of the RKH/RKAJ frame.

(i) Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.

(ii) Stick the EMI gasket by aligning it with the front end of the top of the frame.

(iii) Stick the EMI gasket by aligning it with the back end of the top of the frame.

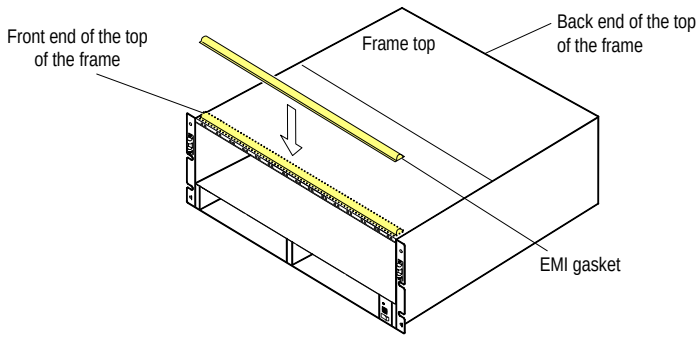
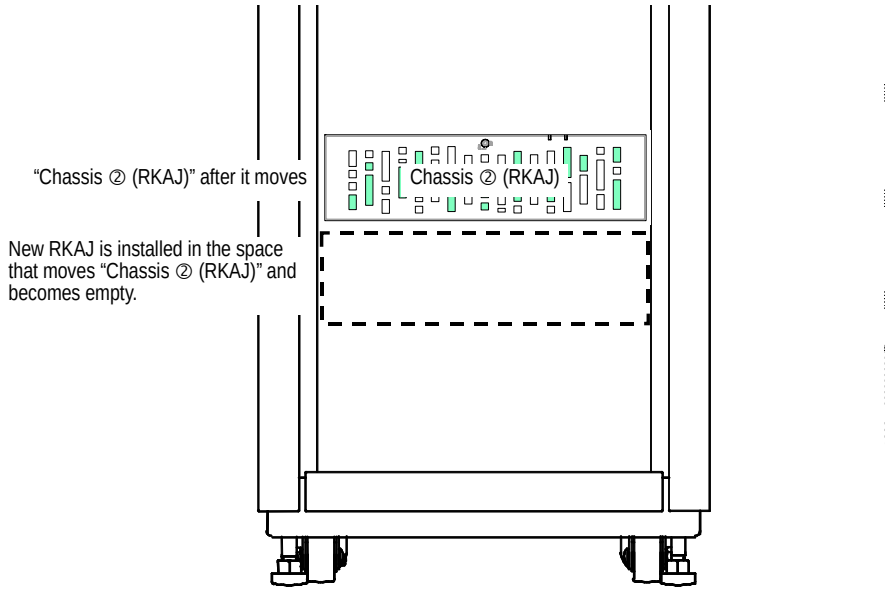


Figure 3.4.40 Position for Sticking EMI Gasket

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(e) Mounting the RKAJ on the U7 rack frame.



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(i) Bring the lifter close to the RKAJ to be mounted and apply the brake to the lifter.

NOTE : When putting the RKAJ on the lifter, be sure to remove the front bezel beforehand.

(ii) Put the RKAJ on the lifter.

(iii) Secure the RKAJ to the lifter with a band of the lifter.
Bind the RKAJ with the band tightly by fitting the length of the belt to the RKAJ.

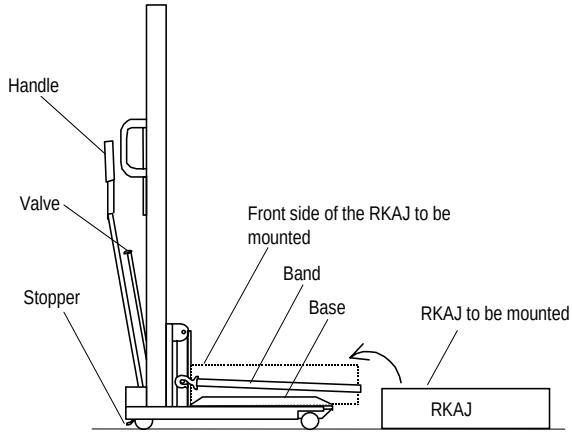


Figure 3.4.41 Putting the RKAJ on Lifter

WARNING

If the RKH/RKAJ falls when the elevator of the lifter is at a high position, a personal injury will be caused.
Perform the positioning, fastening, or other handlings very carefully.

(iv) Take off the brake of the lifter on which the RKAJ has been put, and move the lifter close to the U7 rack frame.

(v) Adjust the position of the RKAJ so that it is seated in the center of the U7 rack frame.

(vi) Move the pumping handle of the lifter to the right and left repeatedly to lift the RKAJ up to the height suitable for the mounting.
Be careful not to lift the elevating base too high. If you lift it too high, lower it by opening the up/down valve gently.

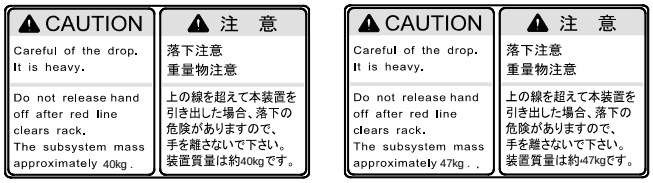
(vii) Remove the band and adjust the position of the RKAJ so that the RKAJ comes in the center in front of the rack frame. If the RKAJ is positioned off-centered, a screw contacts the front bezel preventing the bezel from being opened or closed.

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(viii) Shift the RKAJ onto the rails in the rack frame. When shifting the RKAJ, push it in to the end gently.

CAUTION

Do not move the lifter away from the rack frame nor lower the elevator until the red line on the label affixed on the RKH/RKAJ enters the rack frame across the end of it. Otherwise, falling of the RKH/RKAJ may be caused.



RKAJ RKH

(ix) Fasten the RKAJ to the rack frame with the four M5×10 binding screws.

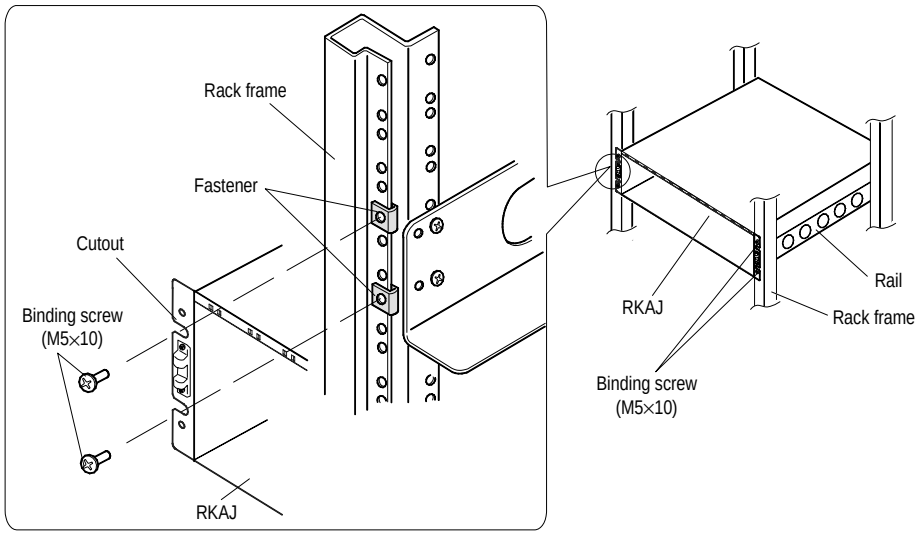


Figure 3.4.42 Fastening Front Side of the RKAJ

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(x) Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.

(xi) Tighten the binding screws.

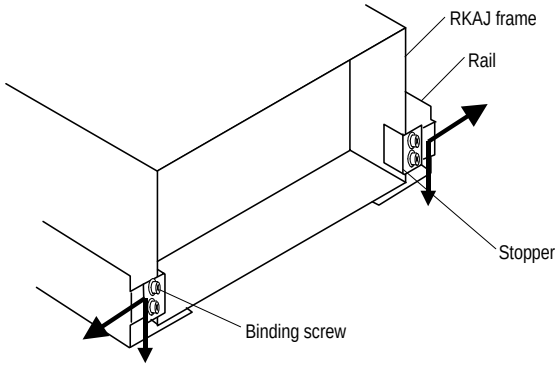


Figure 3.4.43 Securing Rear Side of the RKAJ

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(f) Install the disk drives, which were removed from the "Chassis ① (RKM)" (the basic chassis), in the RKAJ.

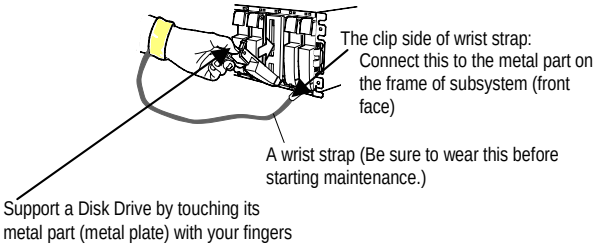
NOTE : There is no setting of the Device ID for the RKH (because the Disk Drive is not installed).

Notes on the move of the Disk Drives:
Because the Disk Drive cannot be installed in the RKH, it is required to replace the Disk Drive installed in "Chassis ① (RKM)" (the basic chassis) at the Hitachi TagmaStore® AMS 200™/AMS 500™ to the RKAJ which is newly installed.
Make the Disk Drive number unchanged with the position where it was installed in the chassis before replacing it.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.
  Please be sure to keep a wrist strap near the subsystem.
- Disk Drives are precision components.
  Be careful not to expose drives to hard shock.
- When you install a Disk Drive, support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.

NOTE : Before unpacking and replacing maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Disk Drive into the subsystem, support the Disk Drive as touching its metal part with fingers of your hand that wears a wrist strap.



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(i) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.

NOTE : Install the Disk Drives making sure that the locations are the same as those where the Disk Drives were installed when the disk array subsystem was the Hitachi TagmaStore® AMS 500™ by referring to the record made according to Subsection "3.4.11 Getting serial numbers of Disk Drives" (SMUP 03-0450).

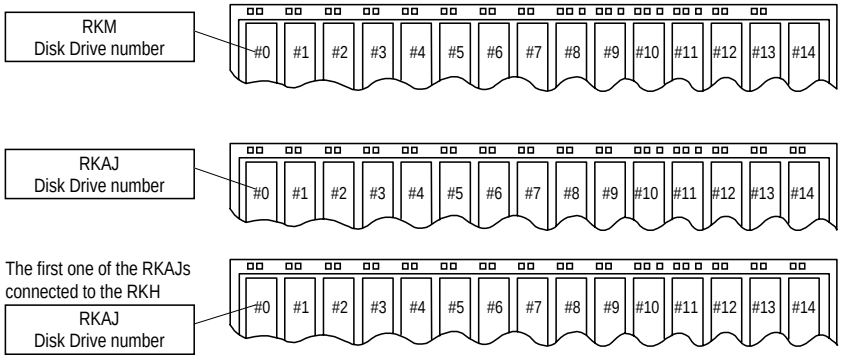


Figure 3.4.44 Disk Drive Mounting Location

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(ii) Fit the Disk Drive in the guide rail of the RKAJ and slide it in the direction shown by the arrow.

(iii) Push it in until it reaches the position where a hook of the handle can be entered into the rectangular hole at the lower part of a frame on the front side of the RKAJ.

(iv) Raise the stopper, which has been titled toward you, and then have the lock on by pressing the stopper.

NOTE : If the handle is raised in the state in which its hook cannot be entered into the rectangular hole, the Disk Drive cannot be installed correctly because it runs into the frame of the disk array unit.

(v) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

(vi) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.

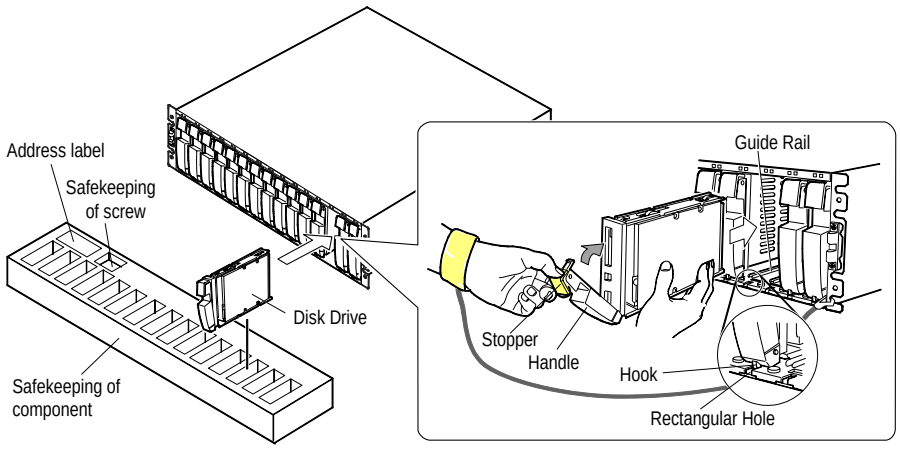
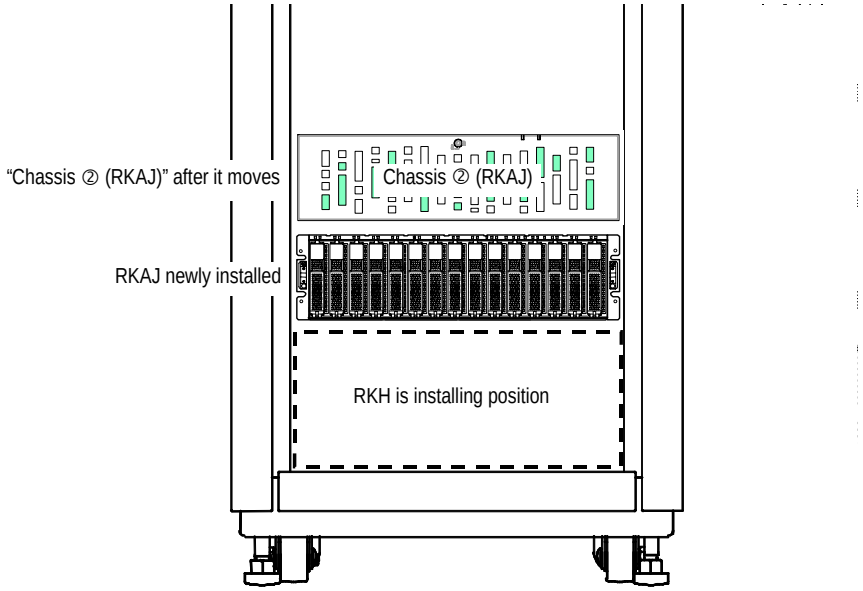


Figure 3.4.45 Installing of Disk Drive

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(g) Mounting the RKH on the U7 rack frame.

(i) Install the RKH and fix it in the position where "Chassis ① (RKM)" (the basic chassis) of the U7 rack frame was installed referring to the procedure (18) (e) (i) to (xi).



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(19) Change the device ID# of all the RKAJs/RKAJAT/RKAs to that for the Hitachi TagmaStore® AMS 1000™ configuration.

NOTE : There is no setting of the Device ID for the RKH (because the Disk Drive is not installed).

It is required to make the unit ID# of each RKAJ/RKAJAT/RKA at the Hitachi TagmaStore® AMS 1000™ same as that of the Hitachi TagmaStore® AMS 200™/AMS 500™ even if each RKAJ/RKAJAT/RKA is moved by three units in the rack.
The installation position, the device ID#, and the unit ID# of each RKAJ/RKAJAT/RKA in the rack is already checked in the "3.4.14 Hardware upgrade work(Hard)" (SMUP 03-0550). Set the device ID# of each RKAJ/RKAJAT/RKA at the Hitachi TagmaStore® AMS 1000™ configuration so that the unit ID# of each RKAJ/RKAJAT/RKA becomes the same as that at the Hitachi TagmaStore® AMS 200™/AMS 500™ configuration(if x16 switch of the device ID setting switch is set to 0 and x1 switch is set to 0 to F, the unit ID is allocated to 0 to 15).

NOTE : If the Device ID# is set wrongly, the upgrade will fail because the disk array subsystem is not recognized correctly.

NOTE : Set the Device ID# 00 to the RKAJ which was newly added in the procedure (18) (e).

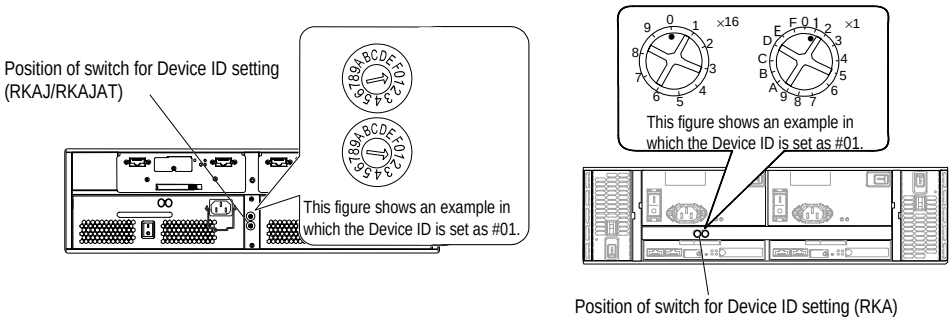
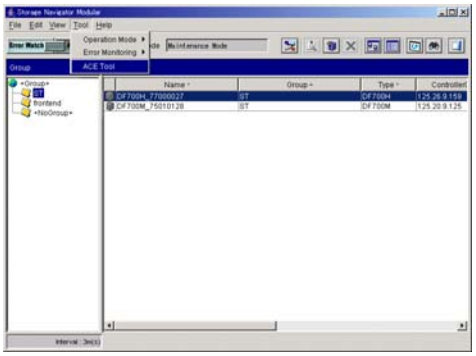


Figure 3.4.46 Setting of Device ID

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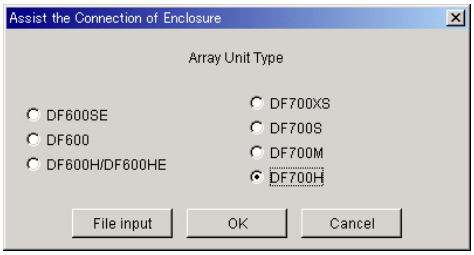
(a) Start Storage Navigator Modular and select [Tool] and [ACE Tool] in this order in the main window. The ACE Tool is started and a window for selecting a subsystem is displayed.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again.



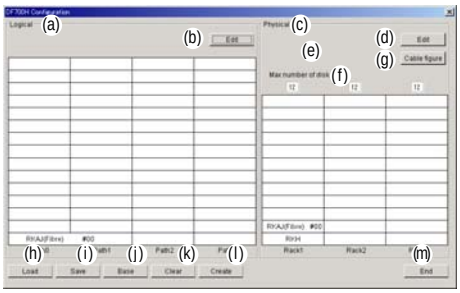
(b) Select the [DF700H], and click the [OK] button.

NOTE : When selecting a subsystem in (a), this dialog is not displayed.



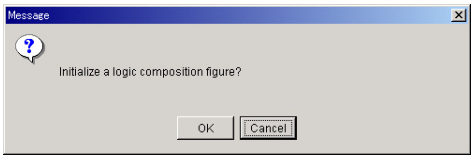
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(c) Set the subsystem to be configured in the frame part of the Physical.
Click the [Edit] button in the Physical part.



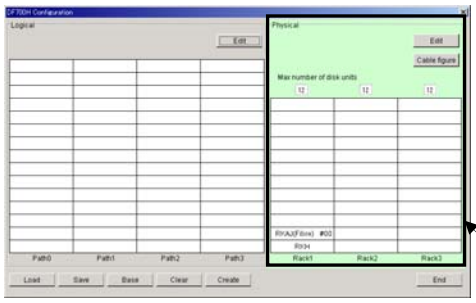
(a) [Logical] : The device ID can be checked per Path.
(b) [Edit in Logical] button : The chassis frame in Logical can be edited manually. If [Create] button is selected after the setting, the subsystem and the device ID are displayed in the Logical part and the Physical part.
(c) [Physical] : The device ID can be checked per Rack.
(d) [Edit in Physical] button : The chassis frame in Physical can be edited manually. If [Create] button is selected after the setting, the subsystem and the device ID are displayed in the Logical part and the Physical part.
(e) [Single, Dual in Physical] button : It selects the installation configuration of the Control Unit.
(f) [Max number of disk units] button : The maximum number of chassis frames per Rack can be specified.
(g) [Cable figure] button : The ENC cable connection figure is displayed.
(h) [Load] button : The configuration figure can be read.
(i) [Save] button : The configuration figure can be stored in files.
(j) [Base] button : The chassis frame type and the device ID are displayed automatically in the Logical part and the Physical part.
(k) [Clear] button : The subsystem and the device ID, which have been set, are cleared.
(l) [Create] button : The name and ID number of the subsystem are displayed in the Logical part and Physical part.
(m) [End] button : It returns to the device model selection window.

(d) Click the [OK] button.

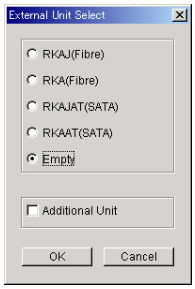


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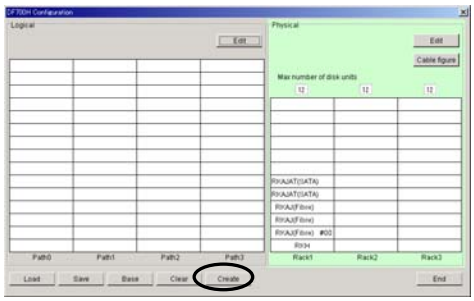
(e) If the chassis frame section the Physical part is clicked, the “Unit Select” window is displayed. Select RKAJ (Fibre), RKA(Fibre), RKAJAT (SATA) or Empty and input the configuration.
Check that the actual rack mounting position and the Physical part are the same.



Frame type selection window

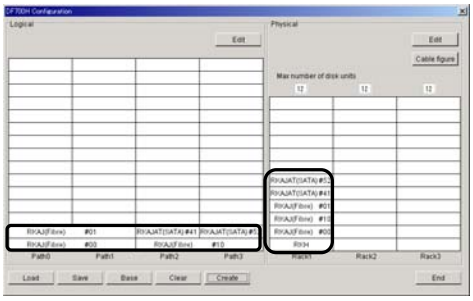


(f) Click the [Create] button.



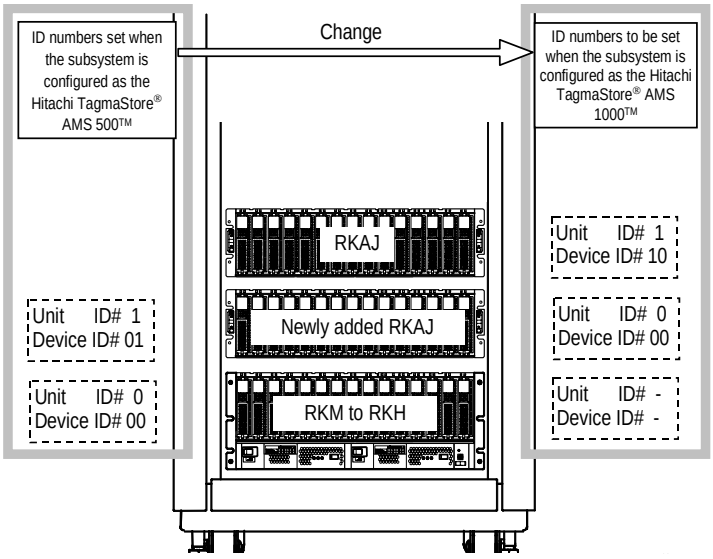
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(g) The Device ID# is output in the Logical part and the Physical part window.



(h) Set the Device ID# shown in the Physical part window to all the RKAJs/RKAJAT/RKAs which are installed in the same position.

Setting changes in the case where the two RKAJs were connected when the disk array subsystem was configured as the Hitachi TagmaStore® AMS 500™
(Set the Device ID# 10(Unit ID# 1) for the RKAJ for which the Device ID# 01(Unit ID# 1) were set.
Set the Device ID# 00(Unit ID# 0) for the RKAJ newly added.)



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Example 1: The Unit ID# and the Device ID# for the Hitachi TagmaStore® AMS 1000™ are set based on those at the configuration before the upgrade.
The relation between the Unit ID# and the Device ID# when it is upgraded at the Hitachi TagmaStore® AMS 500™ configuration is shown as an example.

ID numbers set when the subsystem is configured as the Hitachi TagmaStore® AMS 500™				ID numbers to be set when the subsystem is configured as the Hitachi TagmaStore® AMS 1000™		
Unit ID	Device ID	Device		Unit ID	Device ID	Device
-	-	-	→	-	-	RKH
#0	#00	RKM	→	#0	#00	RKAJ
#1	#01	RKAJ	→	#1	#10	RKAJ
#2	#02	RKAJ	→	#2	#01	RKAJ
#3	#03	RKAJ	→	#3	#11	RKAJ
#4	#04	RKAJ	→	#4	#02	RKAJ
#5	#05	RKAJ	→	#5	#12	RKAJ
#6	#06	RKAJ	→	#6	#03	RKAJ
#7	#07	RKAJ	→	#7	#13	RKAJ
#8	#08	RKAJ	→	#8	#04	RKAJ
#9	#09	RKAJAT	→	#9	#44	RKAJAT
#10	#0A	RKAJAT	→	#10	#55	RKAJAT
#11	#0B	RKAJAT	→	#11	#25	RKAJAT
#12	#0C	RKAJAT	→	#12	#36	RKAJAT
#13	#0D	RKAJAT	→	#13	#46	RKAJAT
#14	#0E	RKAJAT	→	#14	#57	RKAJAT

(i) When the RKAJ is connected to the RKS, make the setting of the device identification switches of all the RKAJs. When the basic subsystem to be connected is the RKH, set it in the M side.

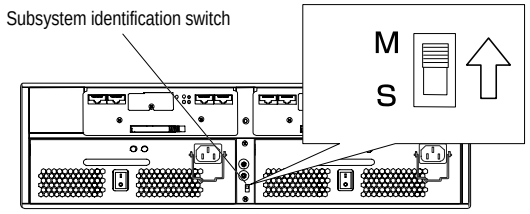


Figure 3.4.47 Position of Switch for Device ID Setting

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(20) Install the Cache Unit, which were removed from the RKM, in the RKH.
In the case of the dual controller configuration, install the Cache Units in the both Control Units.
When using Copy-on-write SnapShot, Cache Partition Manager and Cache Residency Manager with the Hitachi TagmaStore® AMS 500™ and using them continuously even after upgrading it to the Hitachi TagmaStore® AMS 1000™, install the Cache Unit for the necessary capacity referring to "3.3 Notes" (SMUP 03-0020).
When the iSCSI interface system configuration, install the iSCSI interface board for iSCSI.

(a) Loosen two fixing screws for the cover at the back of the cover, remove the cover in the direction shown by the arrow (⟶).

(b) When the FC Interface Board was installed, Push the host connector once to check that it is not to be removed.

(c) Install the Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
Insert the connectors surely.
Install the Interface Board making its sheet metal part face inside of the Control Unit.

NOTE : • Be careful that the position to install the Interface Board is determined. (Refer to Table 3.4.2).
• Install the Interface Boards of the same type in the same position of the Control Unit #0 and #1.
• Please install Interface Board on #0 sides when installing it only by one Interface Board.

(d) Make sure that the Interface Board is firmly installed.
When the NAS Interface Board was installed, loosen the screws of the connector cover for the maintenance of the Control Unit, open it.

(e) Install the Cache memory after removing the dust cover from the Cache slot of the Control Unit.

NOTE : • Install the Cache Units in order of the slot #0, #1, #2 and #3.
• Install the Cache Unit of the same capacity in the Control Unit #0 and #1.
• Install the Cache Units by the set of two in the slot #0 and #1 and the slot #2 and #3.
• Install the Cache Unit of the same capacity in the slot #0, slot #1 and slot #2, slot #3, respectively.
• Insert the dust cover in the Cache slot in which the Cache memory is not installed.

(f) Make sure that the Cache Unit is firmly installed.

(g) Attach the cover in the opposite direction of which it was removed, and tighten the fixing screw for the cover at the back of the cover.

(h) Insert it into the position in the Control Unit #0 with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
Insert it into the position in the Control Unit #1 too.

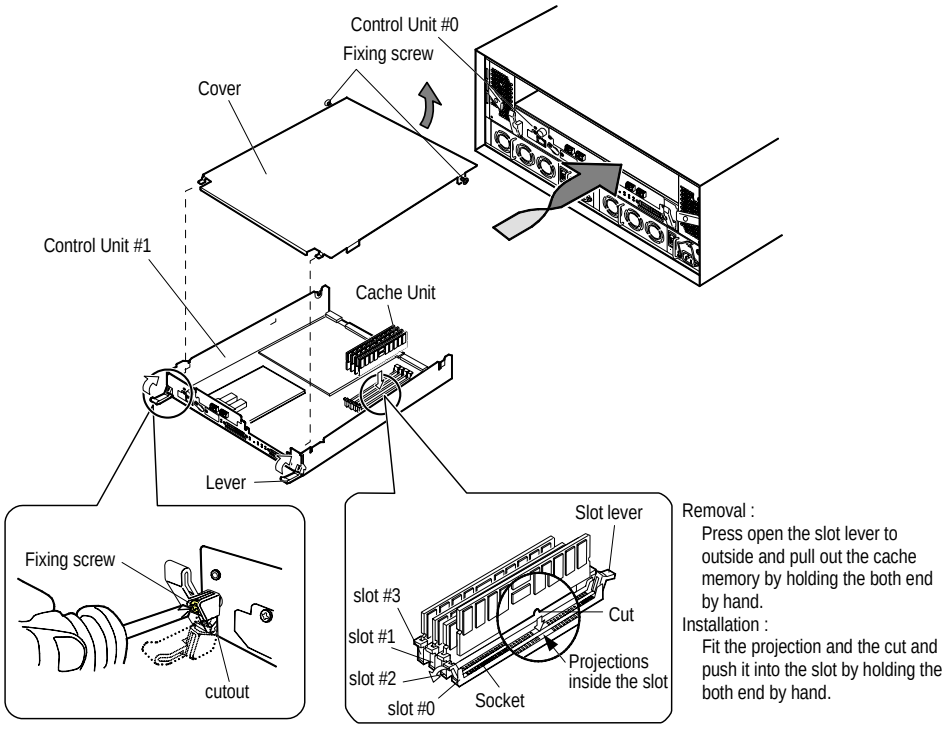
NOTE : The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

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Table 3.4.2 Installation position of the Interface Board

Installation case	Installation position	
	Interface Board #0	Interface Board #1
1	FC Interface Board	–
2	iSCSI Interface Board	–

NOTE : When adding the Interface Board, add it referring to the Maintenance Manual after completing the upgrade.



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.48 Installing Control Unit, Cache Unit and Interface Board

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(21) Connecting Cables

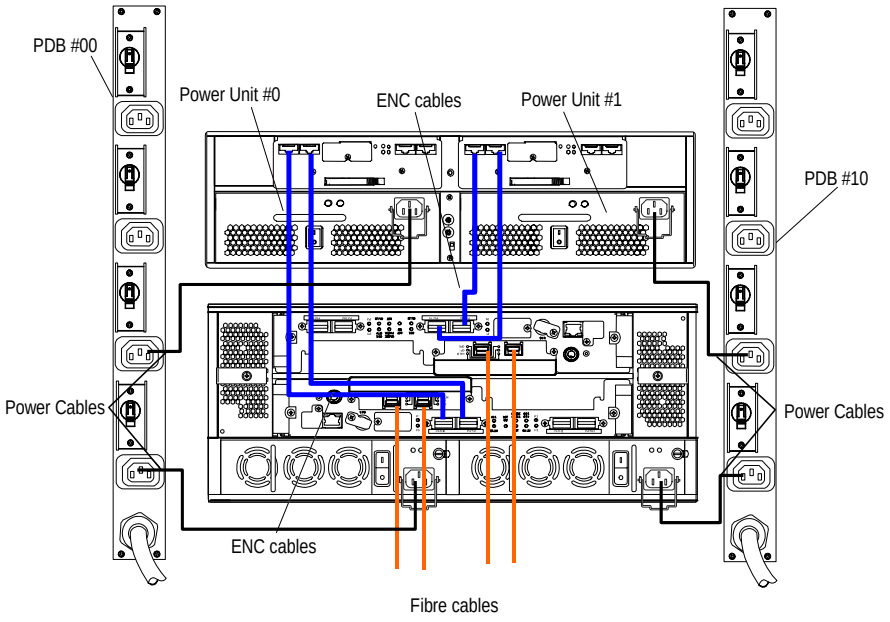
CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "3.4.14 (1) (c) Notes on cable routing" (SMUP 03-0580).

NOTE : Power supply system of the RKH/RKAJ/RKAJAT/RKA is duplicated.
It is recommended to connect each system to outlet of one of the two power sources independent of each other.

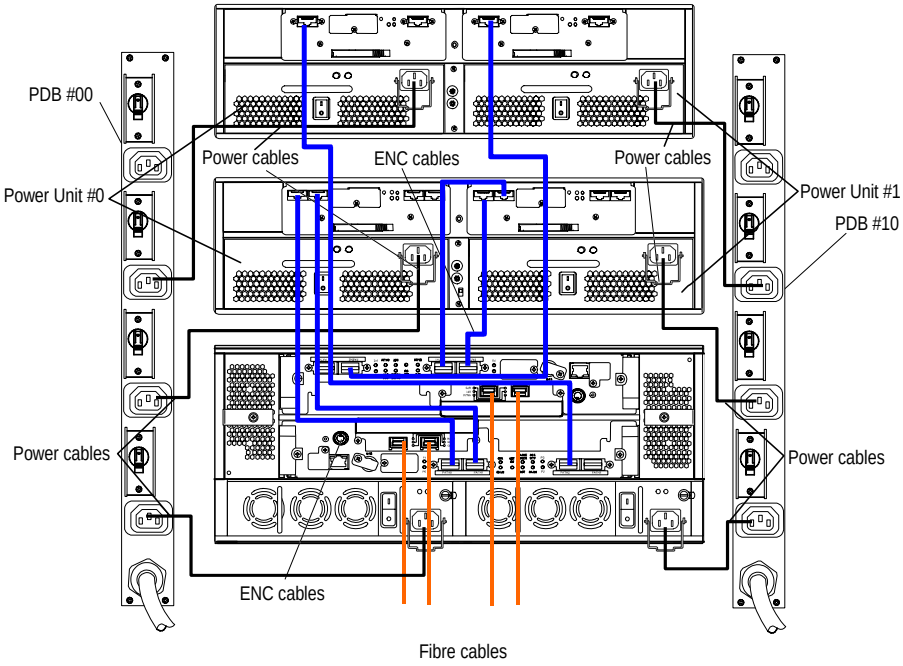
The cable routing for the subsystem which is mounted on the rack frame is shown in Figure 3.4.49, Figure 3.4.50, Figure 3.4.50.1, and Figure 3.4.51.



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.49 FC Interface cable Routing for the Subsystem (RKH+RKAJ)

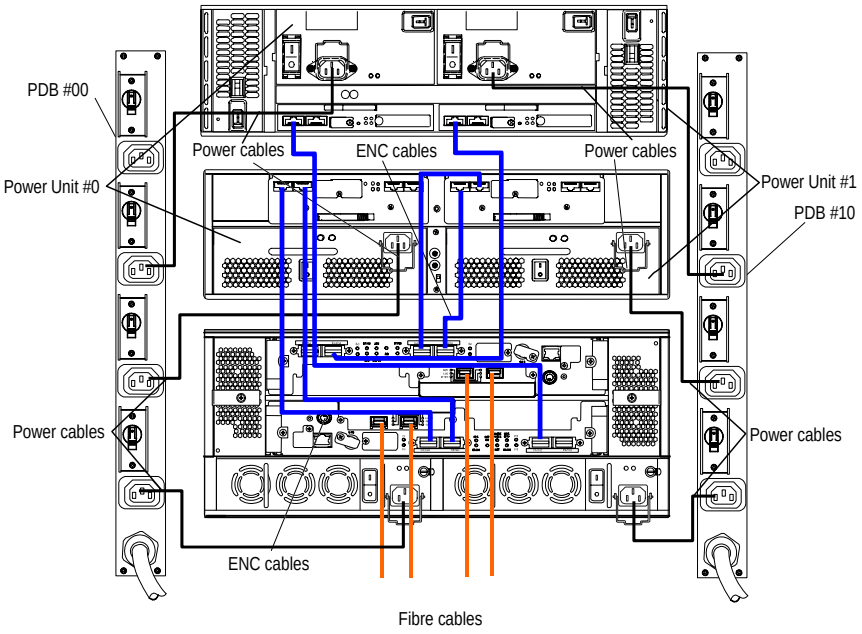
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*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

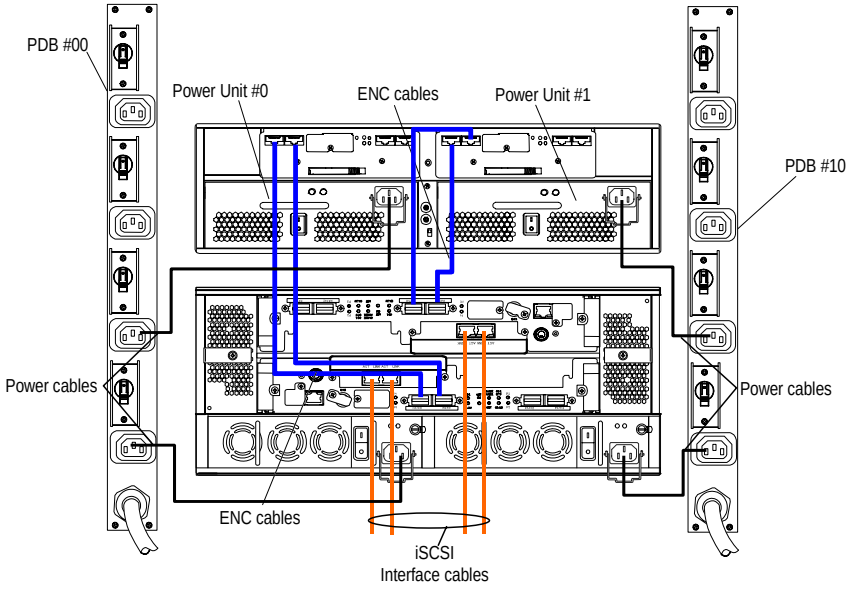
Figure 3.4.50 FC Interface cable Routing for the Subsystem (RKH+RKAJ+RKAJAT)

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*1 : The Interface Board is installed on interface #0 sides for RKH. Please install the dummy on interface #1 side.
*2 : It is a similar connection for the iSCSI interface.

Figure 3.4.51 FC Interface cable Routing for the Subsystem (RKH+RKAJ+RKA)



*1 : The Interface Board is installed on interface #0 sides for RKH. Please install the dummy on interface #1 side.

Figure 3.4.51 iSCSI Interface cable Routing for the Subsystem (RKH+RKAJ)

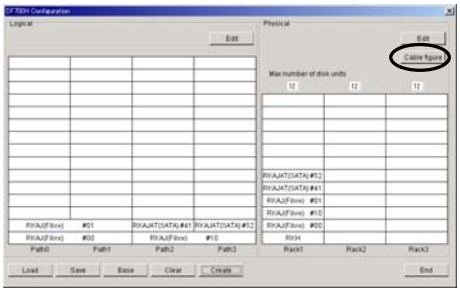
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(a) Connecting ENC cables

Connect the ENC cables according to the connection figure of the ACE tool.

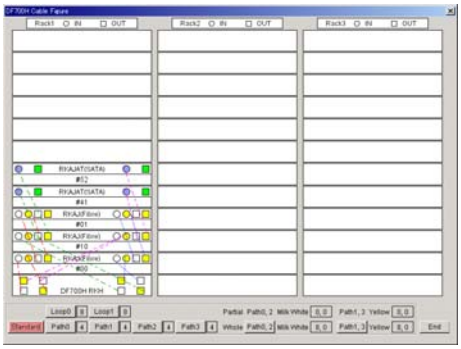
(i) Perform (a) to (g) in the procedure (19).

(ii) Click the [Cable figure] button.



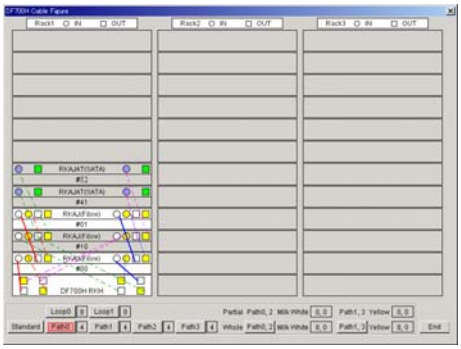
(iii) The ENC cable connection diagram is displayed.

Refer to the ENC cable connection figure, and perform the ENC cable connection.



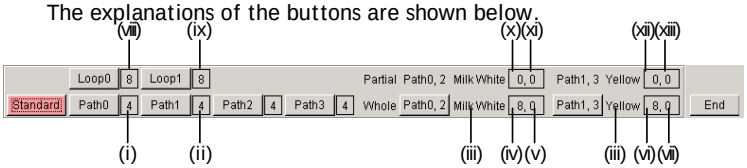
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① When Path 0 is selected, the Path 0 is highlighted and the disk units connected to its lines are displayed in white.



When the each [Path] button is clicked, the displayed lines connected to the path are highlighted, disk units connected to the lines are displayed in white, and disk units not connected to the lines are displayed in gray.
To cancel the highlighting, click the [Standard] button.

The explanations of the buttons are shown below.



[Explanation of each button]

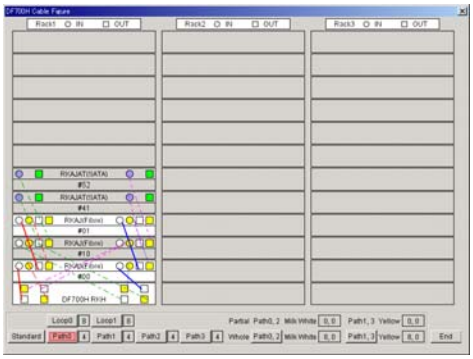
[Standard] button	:	It returns the window line to the initial status (the highlighting is cancelled).
[Path0] button	:	The line connected to Path0 is highlighted.
[Path1] button	:	The line connected to Path1 is highlighted.
[Path2] button	:	The line connected to Path2 is highlighted (it is not displayed in the 700M (RKM)).
[Path3] button	:	The line connected to Path3 is highlighted (it is not displayed in the 700M (RKM)).
[Path0/2] button	:	The lines connected to Path0 and Path2 are highlighted (Path2 does not exist in the 700M (RKM)).
[Path1/3] button	:	The lines connected to Path1 and Path3 are highlighted (Path3 does not exist in the 700M (RKM)).
[Loop0] button	:	The line connected to Loop0 is highlighted.
[Loop1] button	:	The line connected to Loop1 is highlighted.

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[Explanation of the window display]

(i) The number of ENC cables of Path0 is displayed.
(ii) The number of ENC cables of Path1 is displayed.
(iii) The color of the binders attached to both ends of the ENC cable is displayed.
(iv) The number of ENC cables of Path0 is displayed.
(v) The number of ENC cables (long ENC cables) between the racks of Path0 is displayed.
(vi) The number of ENC cables of Path1 is displayed.
(vii) The number of ENC cables (long ENC cables) between the racks of Path1 is displayed.
(viii) The number of ENC cables of Loop0 is displayed.
(ix) The number of ENC cables of Loop1 is displayed.
(x) The number of the cables of the Path 0 connected to the selected disk unit or that of the Path 0 connected to the additional disk unit is displayed.
(xi) The number of the inter-rack cables (long ENC cables) of the Path 0 connected to the selected disk unit or that of the Path 0 connected to the additional disk unit is displayed.
(xii) The number of the cables of the Path 1 connected to the selected disk unit or that of the Path 1 connected to the additional disk unit is displayed.
(xiii) The number of the inter-rack cables (long ENC cables) of the Path 1 connected to the selected disk unit or that of the Path 1 connected to the additional disk unit is displayed.

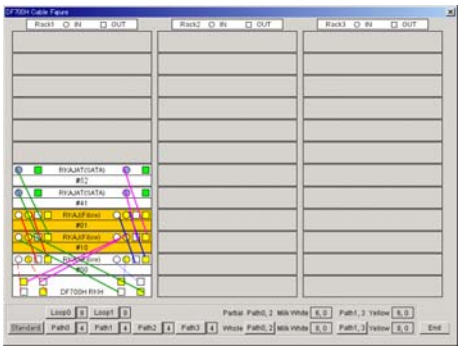
② When [RKAJ(Fibre) #01] is selected, the [RKAJ(Fibre) #01] disk unit is displayed in orange and disk units connected to the [RKAJ(Fibre) #01] disk unit are displayed in white. Besides, the displayed ENC cables connected to the [RKAJ(Fibre) #01] disk unit are highlighted.



To cancel the selection of the disk unit, click the [Standard] button.

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③ When [RKAJ(Fibre) #01] is selected and [RKAJAT(SATA) #10] is clicked while the control [Ctrl] key is pressed, the chassis frame connected to the [RKAJ(Fibre) #01 and RKAJAT(SATA) #10] chassis frame is displayed in white. Also, the connecting ENC cable from the [RKAJ(Fibre) #01 and RKAJAT(SATA) #10] chassis frame is highlighted.

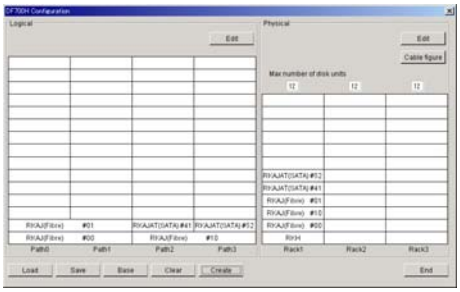


Any of the following methods is able to cancel the selection of two or more chassis frames.

① Click the selected chassis frame again while the control [Ctrl] key is pressed.
② Click the [Standard] button.
③ Click another chassis frame while the control [Ctrl] key is not pressed.

(iv) Click the [End] button in the ENC cable connection figure.
It returns to the Configuration window.

(v) Click the [End] button.



(vi) Click the [OK] button.

(vii) Connect the ENC cables according to the connection figure of the ACE tool.

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• When connecting the RKH and RKAJ/RKA
In the case of the RKAJ/RKA with both of the Control Unit of RKAJ/RKA, it is required to connect the Control Unit (RKH) and the ENC Unit with the ENC cables.

NOTE : When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(i) Remove the rubber cap on the Control Unit.
(ii) Connect the ENC cable to the RKH.
(iii) Connect the ENC cable to the ENC Unit of the RKAJ/RKA.

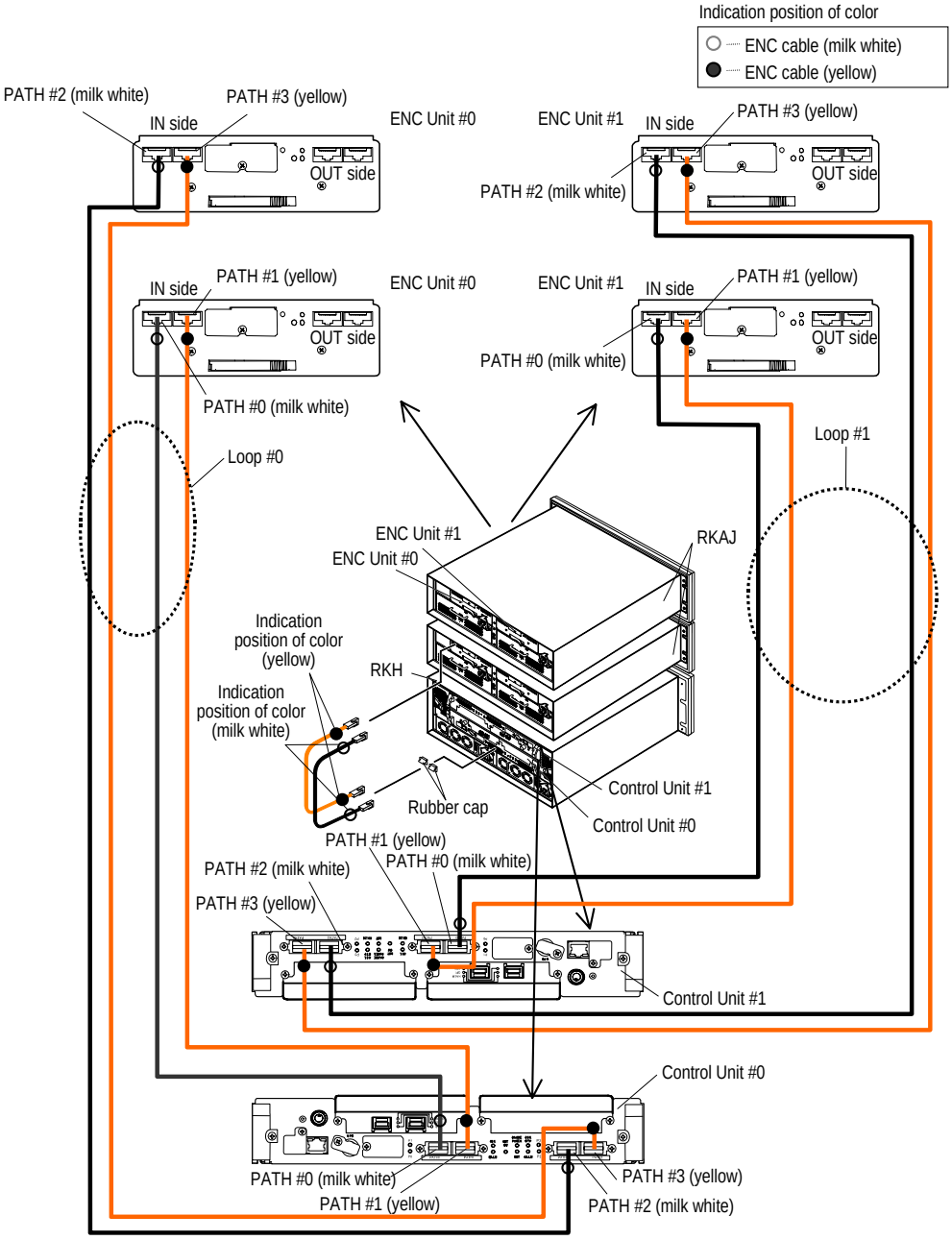
NOTE : Connect the Control Unit#0 of the RKH with the ENC Unit#0 of the RKAJ and the Control Unit#1 of the RKH with the ENC Unit#1 of the RKAJ. Connect two Path#0, #2 connectors (with milk white indication) using the ENC cable and also connect two Path#1, #3 connectors (with yellow indication) using another ENC cable (see Figure 3.4.52, Figure 3.4.52.1).

① To the PATH#0, #2 (marked in milky white on the RKH side), connect the ENC cable marked in milky white.
② To the PATH#1, #3 (marked in yellow on the RKH side), connect the ENC cable marked in yellow.

(iv) When the two or more RKAJ/RKAs are mounted, connect each of the sets of the adjacent connectors of the same kind, that is, the PATH#0, PATH#1, PATH#2 and PATH#3 of the RKAJ/RKAs using the ENC cables. (see Figure 3.4.52, Figure 3.4.52.1).
① Remove the rubber cap of the ENC Units in the locations where the ENC cables are to be connected by loosening the thumb screws.
② Connect each of the connectors PATH#0, #2 (marked in milk white) and PATH#1, #3 (marked in yellow) of the ENC Unit, from which the rubber cap was removed, with the ENC cables marked in the same color respectively.
③ Connect each of the connectors PATH#0, #2 (marked in milk white) and PATH#1, #3 (marked in yellow) of the adjacent RKAJ/RKA with the ENC cables marked in the same color.

(iv) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

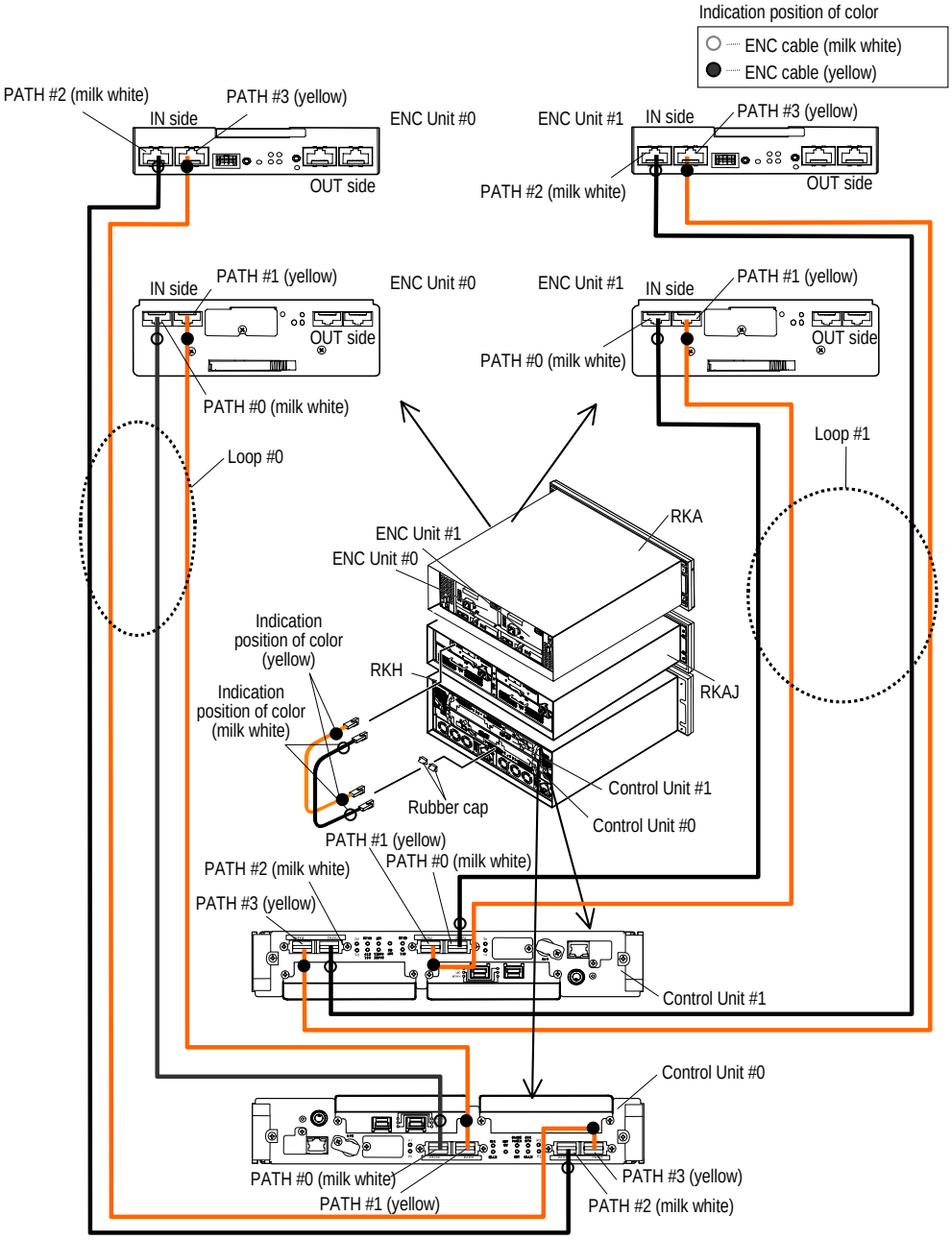
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*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.52 Connecting ENC Cables(RKH+RKAJ)

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*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.52.1 Connecting ENC Cables(RKH+RKAJ+RKA)

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- When connecting the RKH and RKAJ/RKAJAT
  In the case of the RKAJAT with both of the Control Unit of RKH, it is required to connect the Control Unit (RKH) and the ENC Unit/ SENC Unit with the ENC cables.

  NOTE : • When bending the ENC cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses ..
  • The IN and OUT connectors of the SENC Unit of the RKAJAT have indications by means of blue and green labels respectively.

Execute the following.
When connecting the RKH+ RKA and RKAJAT, refer to Figure 3.4.53.

(i) Attach milk white or yellow Mini-Binders to the ENC cable.
(ii) Remove the rubber cap on the Control Unit.
(iii) Connect the ENC cable to the RKH.
(iv) Connect the ENC cable to the ENC Unit of the RKAJ.

NOTE : Connect the Control Unit#0 of the RKH with the ENC Unit#0 of the RKAJ and the Control Unit#1 of the RKH with the ENC Unit#1 of the RKAJ.
Connect two PATH#0 connectors (with milk white indication) using the ENC cable and also connect two PATH#1 connectors (with yellow indication) using another ENC cable.

① To the PATH#0 (marked in milky white on the RKAJ side), connect the ENC cable marked in milky white.
② To the PATH#1 (marked in yellow on the RKAJ side), connect the ENC cable marked in yellow.

(v) When the two or more RKAJATs are mounted, connect the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit of the RKAATs/RKAJATs using the ENC cables.
① Remove the rubber cap of the ENC Units/SENC Units in the locations where the ENC cables are to be connected by loosening the thumb screws.
② Connect each of the connectors the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit, from which the rubber cap was removed, with the ENC cables.
(vi) After connecting the ENC cable, roll up the excess part of the cable in a circle, tighten it lightly with the repeat binder.

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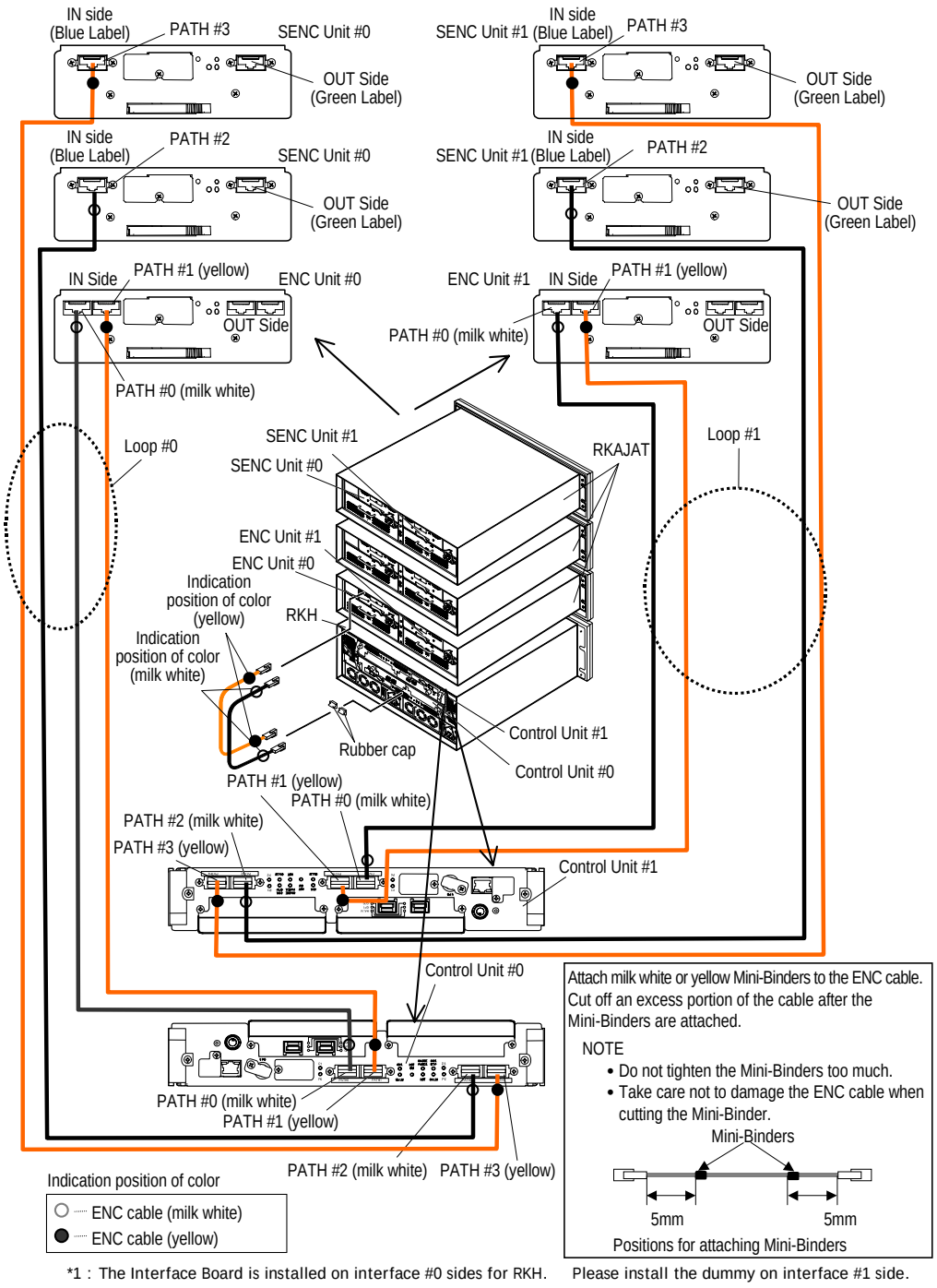


Figure 3.4.53 Connecting ENC Cables (RKH+RKAJAT)

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(b) Connecting the power cables of Power Unit

⚠ CAUTION

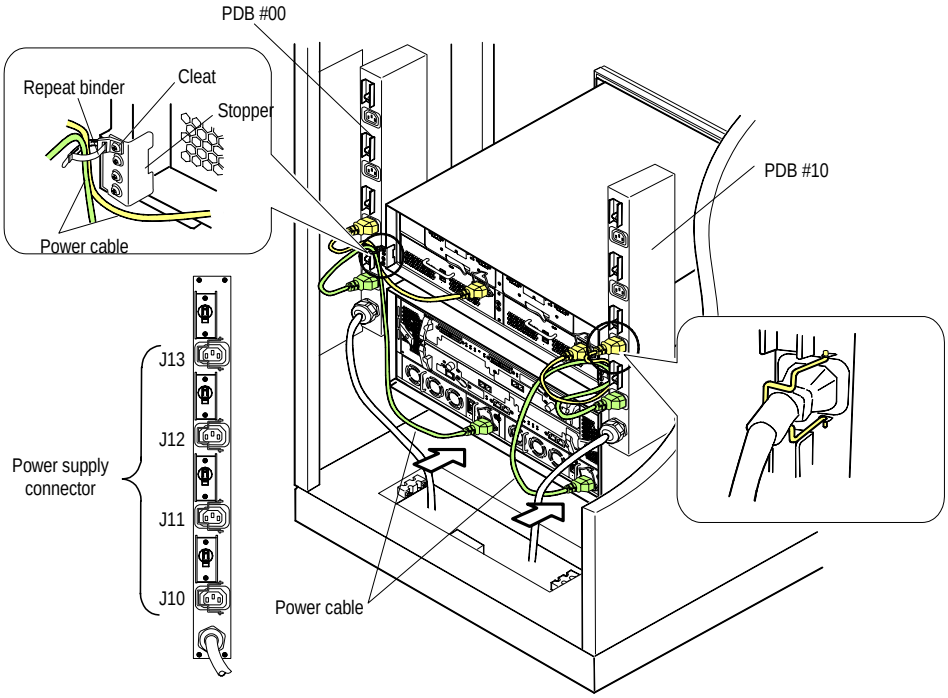
Make sure that there is no scratch or flaw on a power cable. It can cause an electric shock or even a fire.

(i) Make sure that the breaker of the each PDB has been turned off.
(ii) Make sure that the AC Power Unit Switch of the each Power Unit has been turned off.
(iii) Insert the power cable plug into the receptacle on the each Power Unit.
(iv) Pass Repeat Binders through the cleats attached to the right and left stoppers and fasten the power cable with the Binders.
(v) Insert the each power cable plug into the corresponding receptacle of the PDB. (Use the PDB receptacles in the order from the J10 to J13.)

NOTE : • Be sure to plug the power cable for the Power Unit#0 in the receptacle of the PDB#00 or PDB#01.
Be sure to plug the power cable for the Power Unit#1 in the receptacle of the PDB#10 or PDB#11.
If they are plugged in the receptacles of the PDBs on the same side, the function of the duplicated power supply does not work.
• Do not plug any cable other than the power cable of the mounted subsystem in the outlet of the PDB.
• Limit the total current output from the outlets J10 to J13 so that it does not exceed 20 amperes.

(vi) Hang the cable clamp of PDB on the plug of the power cable.
(vii) Route the power cables.
(viii) Push in the plug of the power cable which has been inserted into the PDB again.
It may be loosened owing to a routing.

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*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.54 Routing Power Cables to the Mounted Subsystem

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(c) Connecting interface cables

- When upgrading the Hitachi TagmaStore® AMS 500™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 1000™

(i) Connect the Fibre Channel Interface cables after making sure of the ports to be connected the LOCATION (REAR) label.
When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

NOTE : When bending the Fibre Channel Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(ii) Pull all the Fibre Channel Interface cables into the rack frame passing them through an opening for cables on the bottom plate of the U7 rack frame.

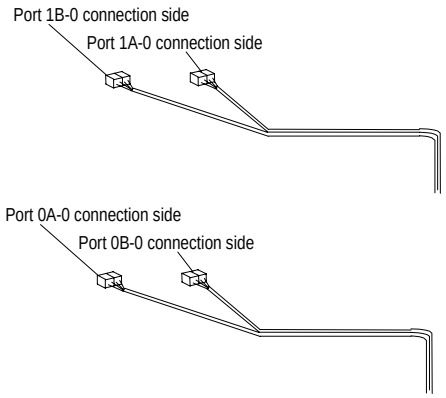


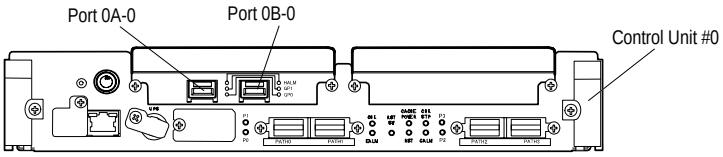
Figure 3.4.55 Binding Interface Cables

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(iii) Connect the Fibre Channel interface cable to the connector of each port in the same position before upgrading it.
When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

(iv) In the case of the U7 rack frame, affix the clamps attached to the DF-F700-URHT7 (rail kit for the U7) on it, and perform the routing of the Fibre Channel interface cables.

(v) Fasten the Fibre Channel Interface cables to the rack frame at the cable passing opening on the he bottom plate giving them excessive lengths so that they will not be pulled.



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.56 Routing Interface Cables

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- When upgrading the Hitachi TagmaStore® AMS 500™, which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 1000™

(i) Connect the iSCSI Interface cables after making sure of the ports to be connected the LOCATION (REAR) label.

NOTE : When bending the iSCSI Interface cable to connect it, give it a bend with a long radius (not less than 30 mm) so as not to apply the cable and the connector excessive stresses.

(ii) Pull all the Interface cables into the rack frame passing them through an opening for cables on the bottom plate of the U7 rack frame.

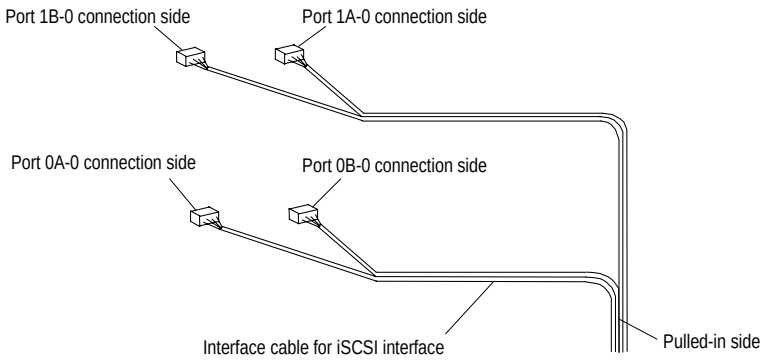


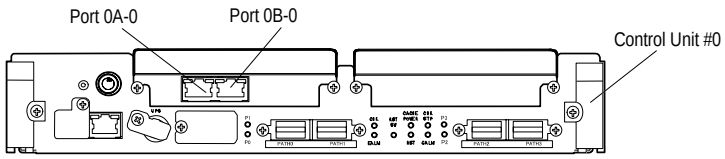
Figure 3.4.57 Binding Interface Cables

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(iii) Connect the iSCSI interface cable to the connector of each port in the same position before upgrading it.

(iv) In case of the U7 rack frame, perform the routing of the iSCSI interface cables, attach the cleat to the stopper, and fix the iSCSI interface cables through the repeat binder.

(v) Fasten the iSCSI interface cables giving them excessive lengths so that they will not be pulled.



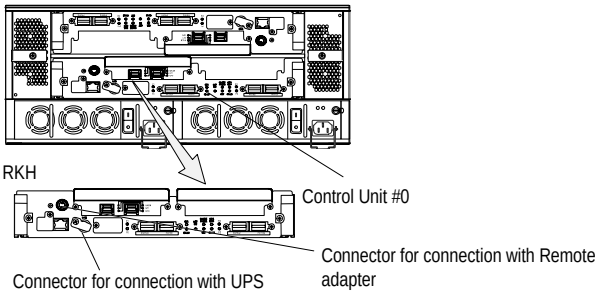
*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.58 Routing Interface Cables

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(22) Connecting the Remote adapter/UPS

(a) When connecting the Remote adapter/UPS to the RKH, connect the Connector in the Control Unit.



*1 : The Interface Board is installed on interface #0 sides for RKH. Please install the dummy on interface #1 side.

Figure 3.4.59 Physical Location of Connector on Subsystems for Remote Adapter/UPS Connection

(b) Setting the Rotary switch.

Set the mode of power control. Either Local mode or Remote mode is set by the Rotary switch. Local/Remote mode settings and corresponding operation modes are shown below.

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment. When the remote adaptor is not used.)
1	—	—
2	REMOTE	Remote mode by means of the HOST AC (using a remote adapter)
3	—	—
4	UPS Interlock mode 1	Interlock mode 1 with an UPS exclusive for the subsystem To set the mode, connect AC#0 and AC#1 to the UPS and an external and an external AC power supply or the PDB of the U7 rack frame respectively.
5	UPS Interlock mode 2	Interlocking mode 2 with an UPS exclusive for the subsystem To set the mode connect AC#0 and AC#1 to the one UPS.(*1)
6	UPS Interlock mode 3	Interlocking mode 3 with an UPS exclusive for the subsystem To set the mode, connect each of AC#0 and AC#1 to the different UPSs. (*2)
7	—	—
8	—	—
9	—	—

: Do not make this setting when the UPS is not connected.

*1 : The duplication of the power supply system becomes unable to be done.

*2 : This cannot be used in the case of the single controller configuration.

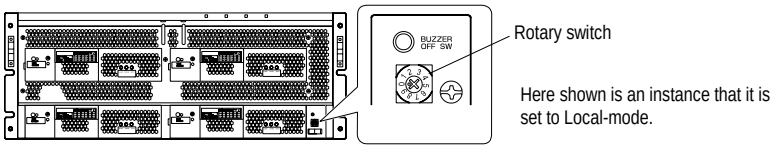


Figure 3.4.60 Location of Rotary Switch for Setting Power Control Mode

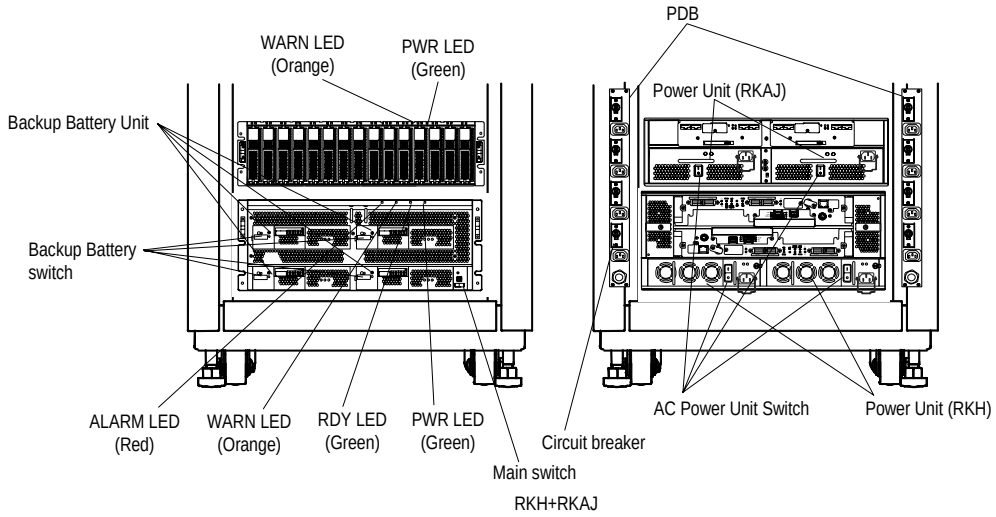
(23) Connect the maintenance PC to the disk array subsystem.

Connect the maintenance PC to the RKH referring to Step "3.4.5 Connection of the maintenance PC" (SMUP 03-0130).

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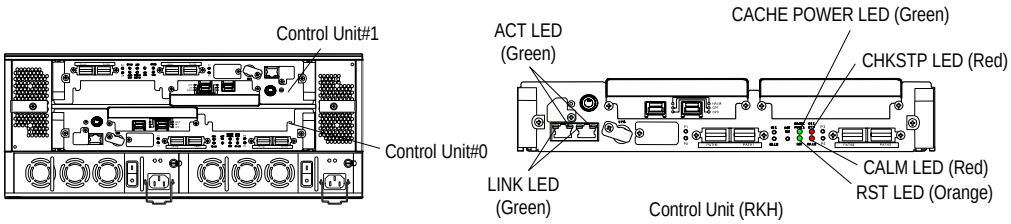
3.4.15 Subsystem power on

(1) Make sure that the circuit breaker is turned off.
(2) Make sure that the main switch is turned off.
(3) All turn on the battery switch of the Backup Battery Unit on the front of the subsystem.
(4) Turn on the circuit breaker of the PDB.
(5) Turn on the AC Power Unit Switch of the Power Unit on the Basic and Additional subsystem. (‡1)
(6) Turn on the main switch.
(7) Make sure that the ALARM LED (red) on the Front Bezel of the RKH comes on.
At this time, the Disk Drive, which was spun down due to the power saving of the priced option, also spins up in SANRISE AMS200/500. When the array subsystem finally becomes a ready status as SANRISE AMS1000, the Disk Drive set tot the power saving spins down.
(8) Check if the CALM LEDs (red) on the both Control Units light on.



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.61 Locations of Switches for Power On



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Table 3.4.62 LED Indication on Control Unit

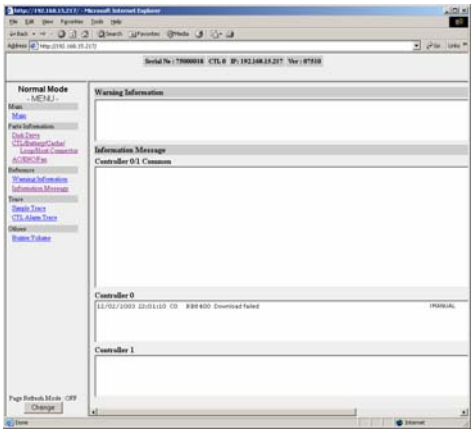
‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKAJ).

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(9) Connect the WEB by connecting the LAN cross cable to the LAN connector for maintenance on the disk array subsystem. ("3.4.5 Connection of the maintenance PC" (SMUP 03-0130))

(10) Select the [Information Message].

(11) Check that [RB8400 Download failed] message is displayed in [Information Message], and move on to the next operation.



NOTE : When the checked contents in the operation (7), (8) , (11) are not shown as above, the operation so far may have errors. Refer to "Chapter 4. Trouble Shooting" (SMUP 04-0000) to solve the problem.

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3.4.16 Updating installation of microprogram for Hitachi TagmaStore® AMS 1000™

Install the microprogram for the Hitachi TagmaStore® AMS 1000™ (latest revision) using the WEB.

Check if the microprogram revision is 0731/A-H or later.

(1) The point to be checked before installation

Make sure of the following before starting installation

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem. (refer to Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).)

(2) Procedure for installation

(a) Press the RST SW of the Control Unit #0. (While pressing RST SW, the RST LED is on.)

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

(b) Press the RST SW of the Control Unit #1 immediately (within ten seconds) checking the CALM LED (red) of the Control Unit#0 comes on.

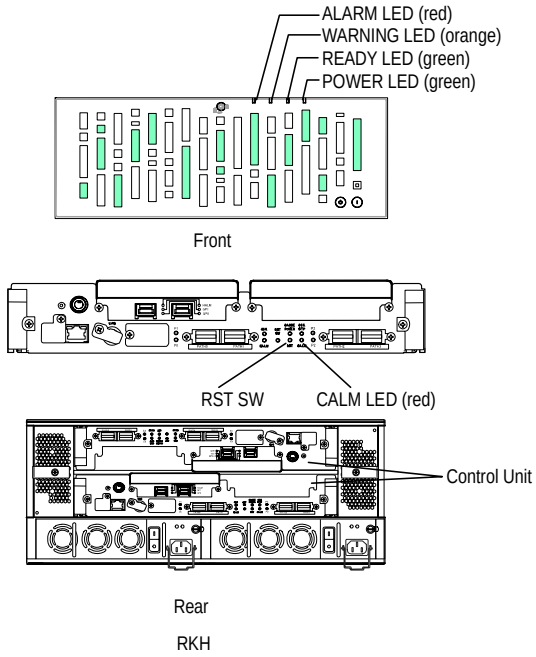
(Sometimes the buzzer may beeps when the RST SW is pressed, however, you do not have to stop it until these operations are completed.)

When the CALM LED on the Control Unit #0 does not go out after that, turn off the subsystem power and then turn it on without pulling out and inserting the Control Unit. Then, return to Step (1) and do all the works over again.

NOTE : Because the Control Unit is shutdown status for the Maintenance Mode, the command from the host is impossible execution.

When CALM LED on Control Unit #0 turns off and READY LED on Front Bezel turns off, it transfers to Maintenance mode.

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*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

Figure 3.4.63 Indication Position

NOTE : • Set the TCP/IP to "Disable DNS" because the connection takes a long time when the TCP/IP of the network is set to the condition in which the DNS is used. For the setting procedure, refer to the instruction manual of the PC to be used.
• Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used.

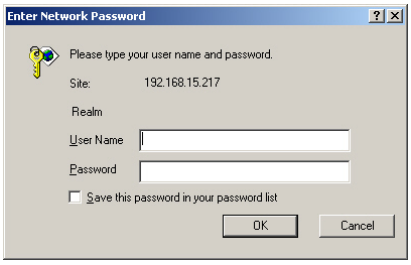
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(c) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web.

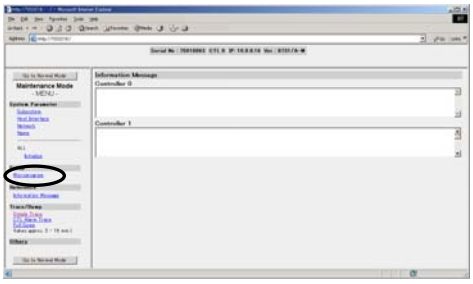
(d) Please input the IP Address of the Control Unit where it was connected with the network to the browser. Please input the page by the update button of the browser if it has already been connected with WEB.

NOTE : The contents that were set up with "System Parameter" and the Microprogram that was installed with "Setup" come into effect after the rebooting of the Control Unit.

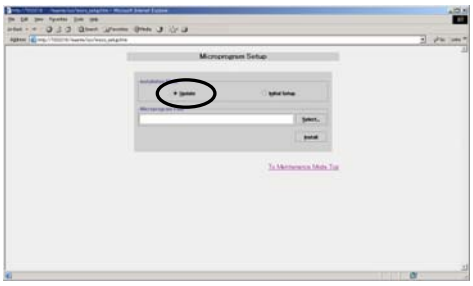
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].



(e) Click "Maintenance", "Setup", and "Microprogram" in this order in the Web window.



(f) When the Microprogram Setup window is displayed, check the "Update" radio button of the "Installation Mode."



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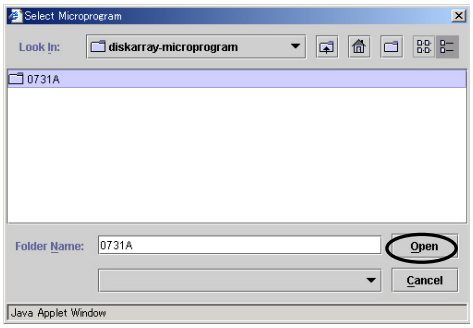
(g) Set the microprogram path.

Specify the Unified version directory(‡1) in which the microprogram that has been copied to the service PC is stored.

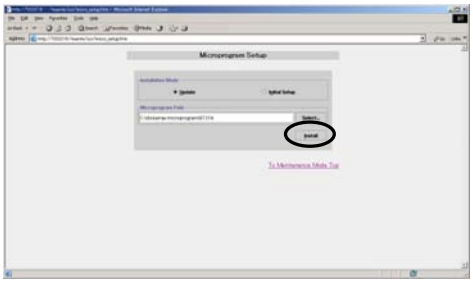
When the "Select" button is clicked, the "Select Microprogram" window is displayed.

Select the Unified version directory in which the microprogram is stored and click the "Open" button.

NOTE : If the window is not displayed, the JRE 1.3.1 03 may have not been installed or the installation of it may have failed.
Perform the installation of the JRE 1.3.1 03 (See Refer to "3.4.9 (2)(a)(i) Method for checking the drive for booting the OS" (SMUP 03-0280)) again.



(h) Click the [Install] button to install the microprogram.

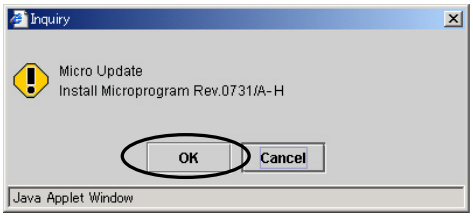


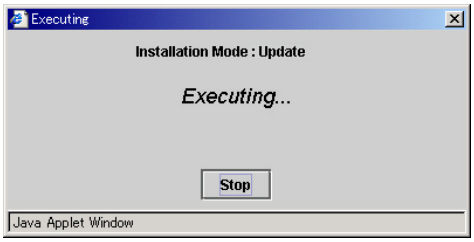
‡1 : For the unified version directory, refer to "3.4.9 Updating installation of microprogram for Hitachi TagmaStore® AMS 200™/AMS 500™" (SMUP 03-0250).

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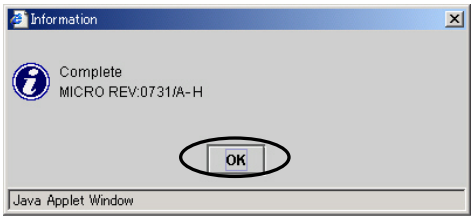
(i) The following window that asks for confirmation is displayed. When the [OK] button in the window is clicked, the installation is started.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the window in the procedure (j) was displayed, execute the update installation procedure again from the beginning.

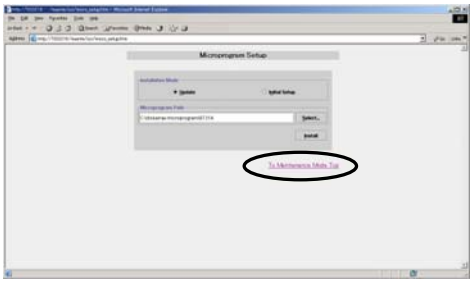




(j) When the installation is completed, the completion window is displayed. Click the [OK] button.

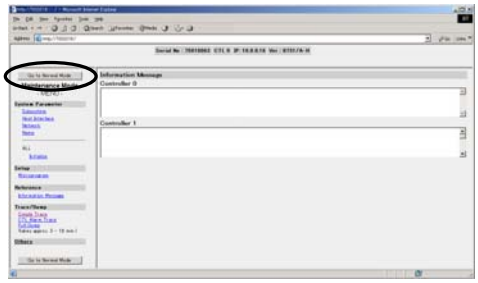


(k) Go to the “Maintenance Mode” window by clicking “To Maintenance Mode Top” in the Microprogram Setup” window.



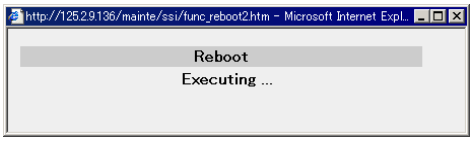
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(l) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.

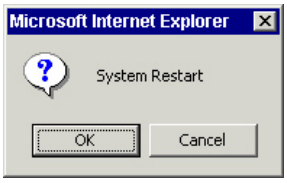


(m) When the [Go to Normal Mode] button is clicked, the following window is displayed.

NOTE : When a LAN failure, etc. occurred and the processing of WEB terminated abnormally before the display of the following window disappears, click [View] – [Refresh] of the menu bar or the [Refresh] button of the tool bar, and then update the page of WEB.
After that, click the [Go to Normal Mode] button when the main window is displayed.



(n) Click the [OK] button.



(o) The subsystem becomes ready in about five minutes.
Make sure that the READY LED of the front bezel is on.
If the READY LED does not come on, the installation may have failed. Perform the installation over again.

NOTE : • When [Abnormal End Empty System Retry Full Install] is displayed, refer to the recovery procedure, "4.2 When Abnormal End Empty System Retry Full Install occurs" (SMUP 04-0120).
• After the updating installation is executed, the configuration of the disk array subsystem becomes unable to be returned to that of the Hitachi TagmaStore® AMS 200™/AMS 500™ at the time when the subsystem enters the READY status.

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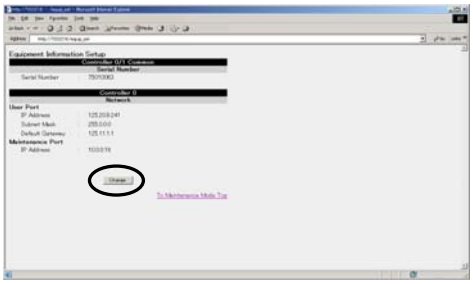
3.4.17 Setting serial number of disk array subsystem

Change the serial number of the disk array subsystem through the hidden WEB window using the serial number setting up function.
The procedure is shown below.

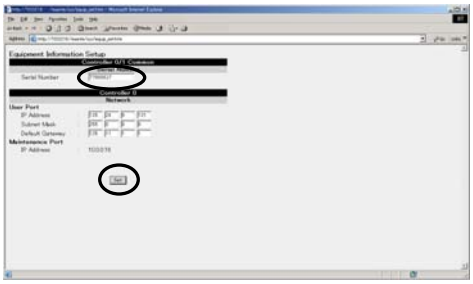
(1) Set the operation mode in the Maintenance Mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))

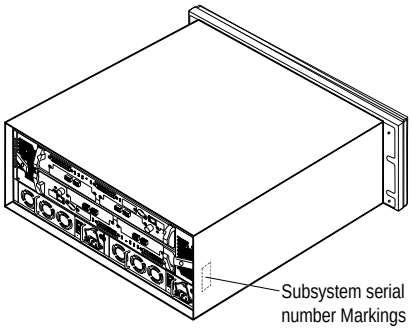
(2) Enter "http://(IP address of the disk array subsystem)/equip_set" in the [Address].
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

(3) Displayed the [Equipment Information Setup].
Click the [Change] button.



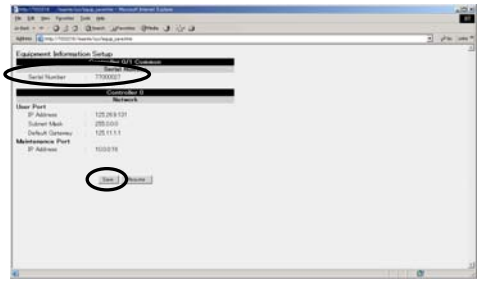
(4) Enter a serial number in the [Serial Number] box and click the [Set] button.
The serial number is an eight figure number indicated in the section for the serial number in Figure.





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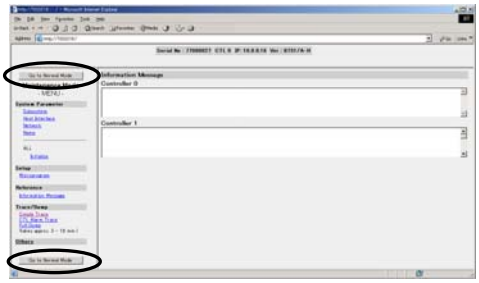
(5) After making sure that the change to be made is correct, click the [Save] button.



The subsystem serial number is changed.

(6) Enter "http://(IP address of the disk array subsystem)/" in the [Address].

(7) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.



When the [Go to Normal Mode] button is clicked, the following window is displayed.



(8) Click the [OK] button.



(9) The subsystem becomes ready in about 5 to 15 minutes.
Make sure that the RDY LED of the RKH is on.

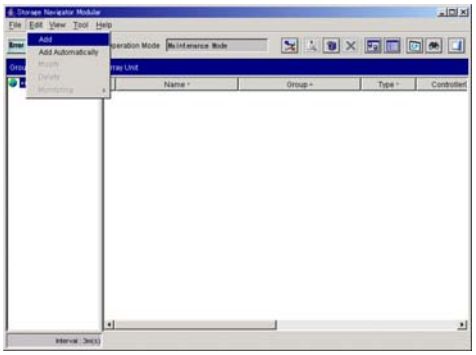
(10) Quit the WEB.

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3.4.18 Registration of Hitachi TagmaStore® AMS 1000™

Register the Hitachi TagmaStore® AMS 1000™ that does the up-grade to Storage Navigator Modular.
The procedure is shown below.

(1) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular. ("3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140))
(2) Set the operation mode of Storage Navigator Modular as Maintenance mode. ("3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))
(3) Click the icon of an array unit on the Main screen. On the [Edit] menu, click [Add].

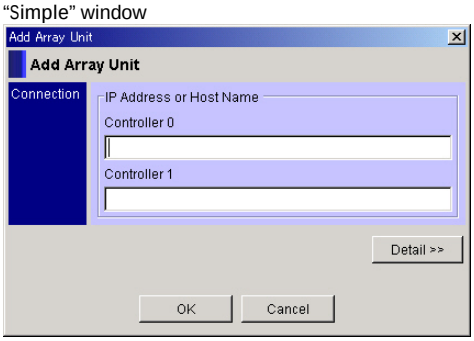


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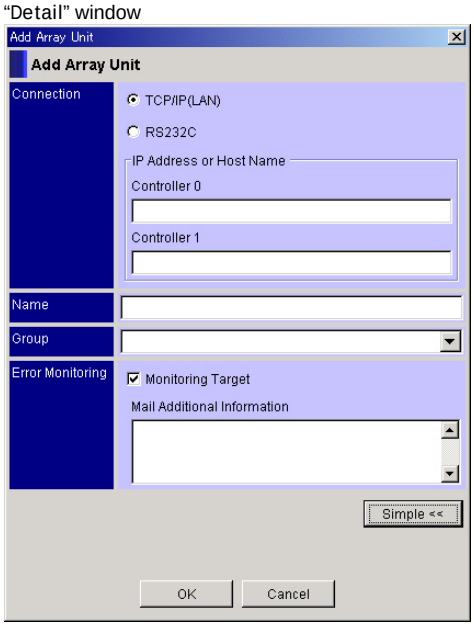
(4) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. [Array Unit Type] is used to select a type of the subsystem to be connected. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.
• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select TCP/IP (LAN) connection to be used for the disk array subsystem.
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

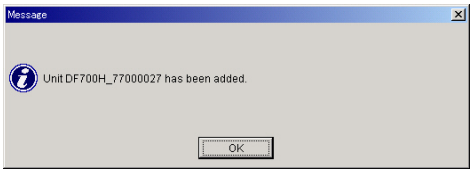
[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).
The maximum number of the groups allowed to be registered is 200. The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

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[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

(5) When a message informing of a completion of the registration is displayed, click the [OK] button.



The Main screen is updated and then displayed.

(6) When the property window is open, click the [Close] button.
(7) Close the unit window. Quit Storage Navigator Modular by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

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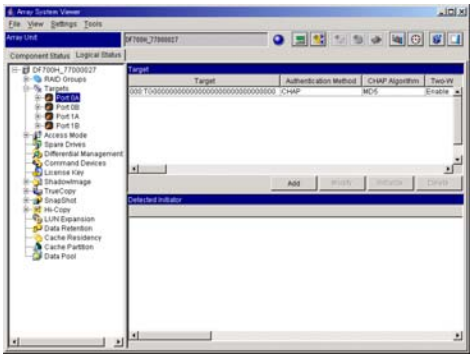
3.4.19 iSCSI Name change of Target

The procedure to upgrade the Hitachi TagmaStore® AMS 200™/AMS 500™ , which is the system configuration of the iSCSI interface, to the Hitachi TagmaStore® AMS 1000™ is shown.
For Targets, only the "000:T000" is supported.

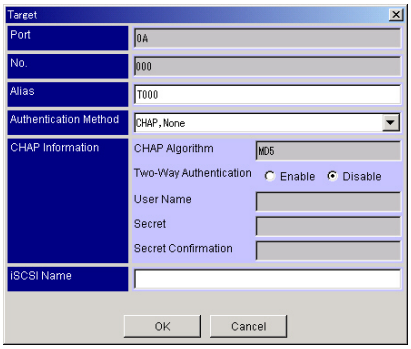
NOTE : Up to 128 targets can be set when the LUN Manager, which is an extra cost optional feature, is used.
In that case, change all the Target iSCSI Names.

(1) Click the [Logical Status] tab in the unit screen.

(2) Double-click the port which changes the information on the two-way authentication, select [000:T000], and click the [Modify] button.



(3) The "Target" dialog is displayed.
Change the "iSCSI Name".

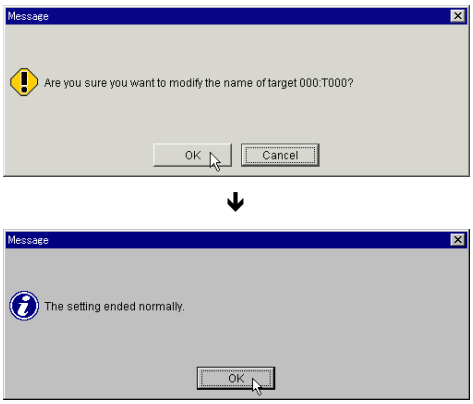


① [iSCSI Name] : Enter the name of the iSCSI Name with 233 or less alphanumeric character. A period (.), hyphen (-), and colon (:) can be used.

(4) Click the [OK] button.

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(5) The confirmation message is displayed. Select the [OK] button.



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3.4.20 Other settings

The procedure to upgrade the Hitachi TagmaStore® AMS 200™, which is the system configuration of the Fibre Channel interface, to the Hitachi TagmaStore® AMS 1000™ is shown. When the RKS, which was using the Mini-HUB, was upgraded to the RKH, perform the following settings of (1) to (5) as needed.

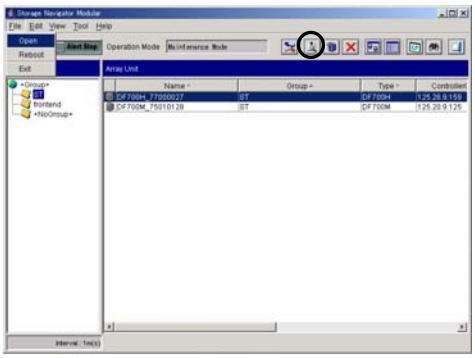
(1) Setting the Port Options

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

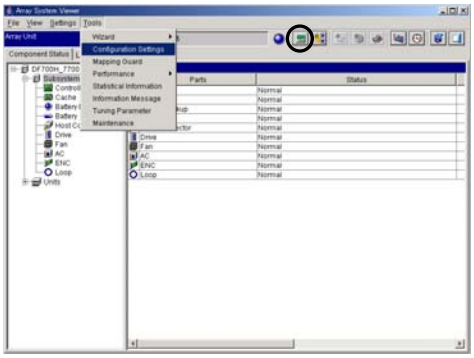
(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150).)

(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Open]



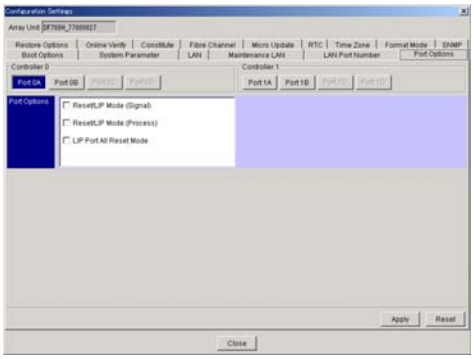
(d) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.



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(e) Click the [Port Options] tab. The window for setting the "Port Options" is displayed.

(f) Click the [Port 0A] button.

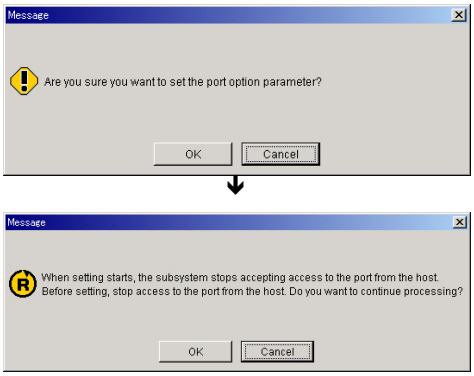


(g) Check the set contents.

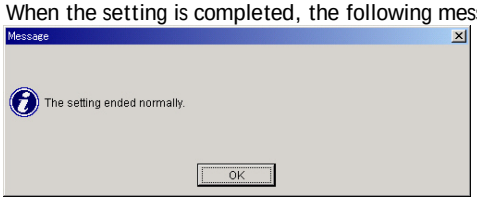
(h) Specify a port options. Select an option you want to set by clicking its check box.

(i) When the setting is completed, click the [Apply] button at lower right corner of the window.

(j) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.



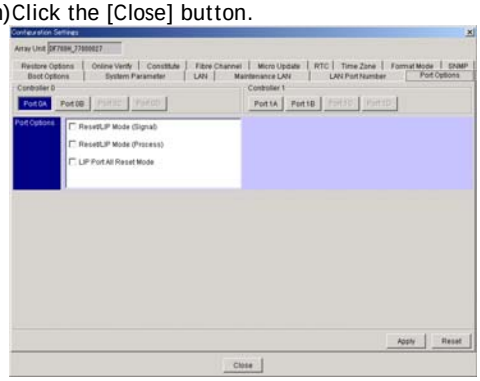
(k) When the setting is completed, the following message is displayed. Click the [OK] button.



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(l) The setting/verification of the port 0A is completed. Do the same for the other ports.

(m) Click the [Close] button.



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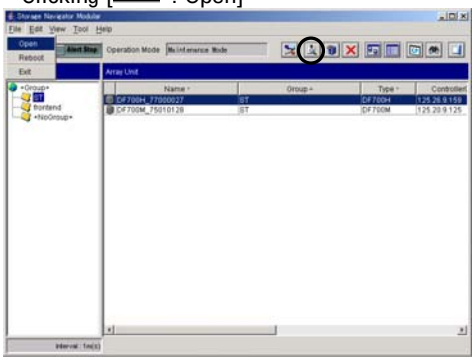
(2) Setting the Fibre Channel

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

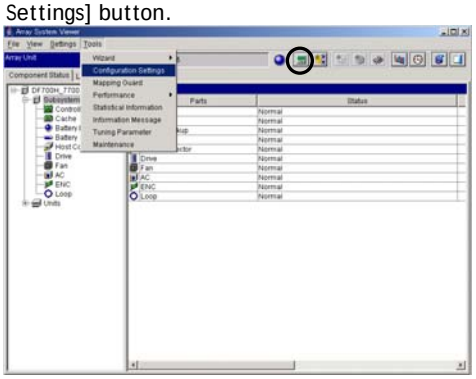
(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))

(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



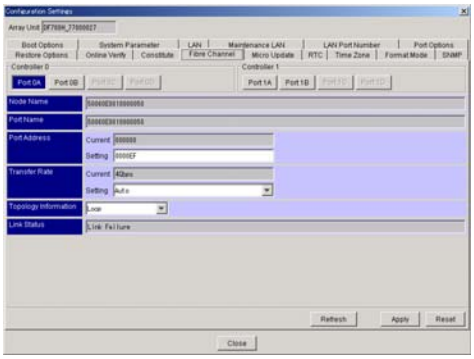
(d) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



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(e) Click the [Fibre Channel] tab. The window for setting the "Fibre Channel" is displayed.

(f) Click the [Port 0A] button.

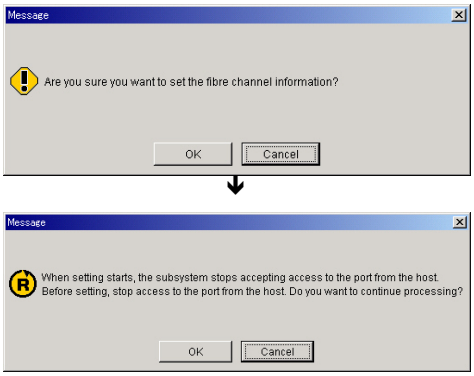


(g) Check the set contents.

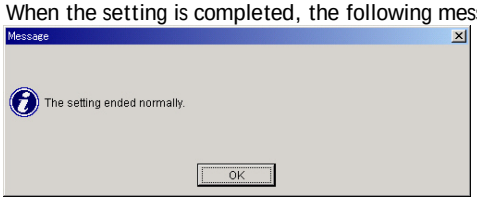
(h) Setting value of [Port Address], [Transfer Rate] and [Topology Information].

(i) When the setting is completed, click the [Apply] button at lower right corner of the window.

(j) A message asking you to verify the setting is displayed.
After making sure that the I/O request from a host is suppressed, click the [OK] button.

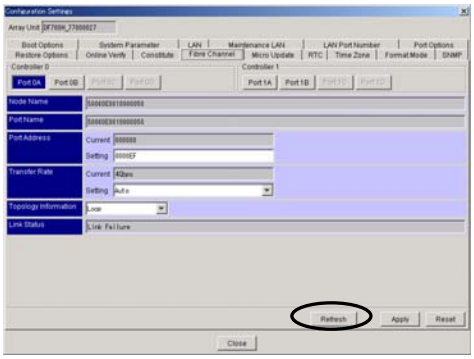


(k) When the setting is completed, the following message is displayed. Click the [OK] button.



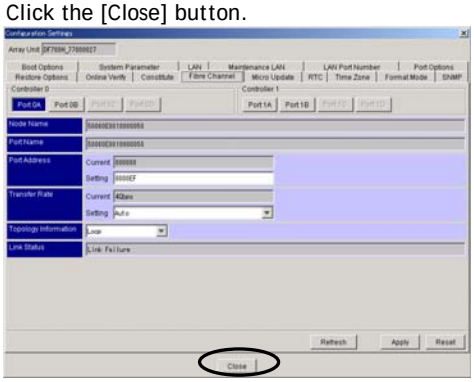
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(l) Click the [Refresh] button at the lower right part of the window to check if the setting is reflected on the display.



(m) The setting /verification for the Port 0A is completed. Do the same for the other ports.

(n) Click the [Close] button.



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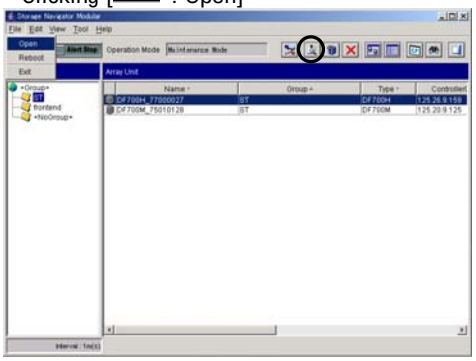
(3) Setting the Host Group Options

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))

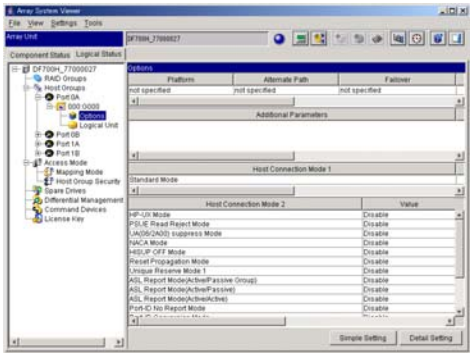
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

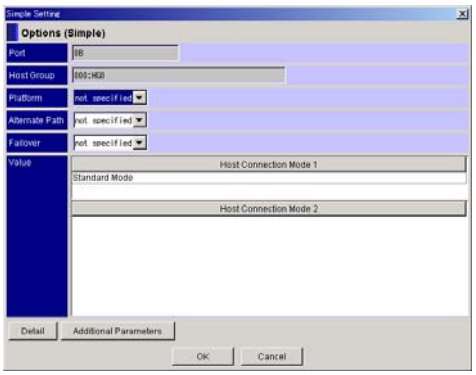
(e) Display the [000: G000] by double clicking the [Port XX] for which you want to set the mode for connecting a host after double clicking the [Host Groups].
Display the option and logical unit by double clicking the [000: G000], and then click the [Options].



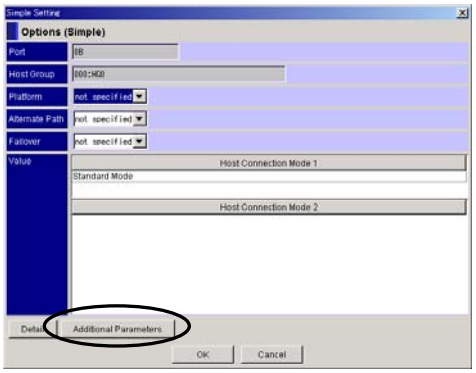
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(f) Click the [Simple Setting] button that is displayed at the lower right part of the window.

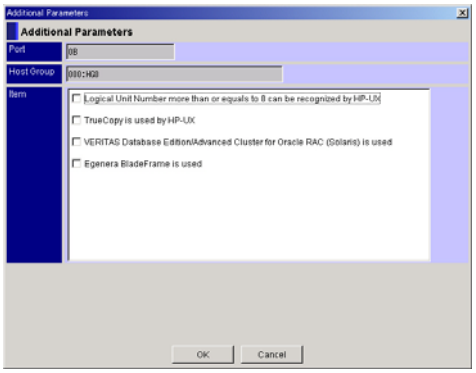
(g) "Option (Simple)"Property window is opened.
Select [Platform], [Alternative Path], and [Failover] that conform to the environment of a host to be connected.



(h) Click the [Additional Parameters] button.



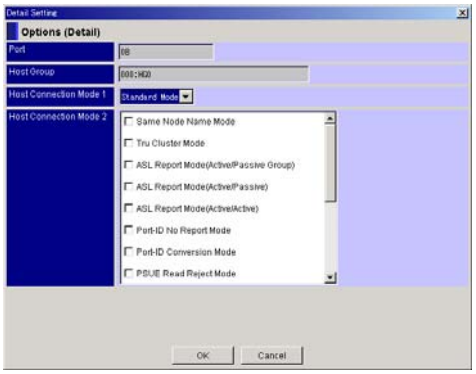
(i) The "Additional Parameters" window is opened. Select the [Item] as occasion demands and click the [OK] button.



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(j) Click the [Detail] button as occasion demands.

(k) Select [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.



(l) Click the [OK] button in the "Option (Simple)" window.



(m) The setting that has been made is displayed.

Make sure that the selected host environment (platform, alternate path, and failover) and the Additional Parameter are reflected in the display. Besides, when you have set the host connection mode 1 and 2 directly, make sure that the mode that has been set is reflected in the display.

(n) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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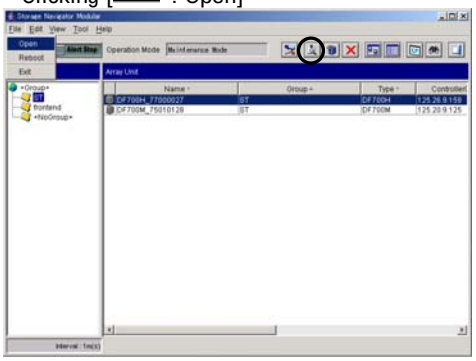
(4) Setting the LU mapping

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))

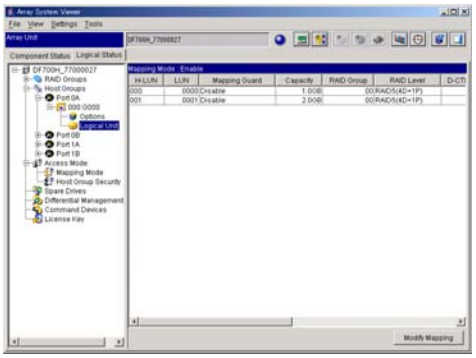
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

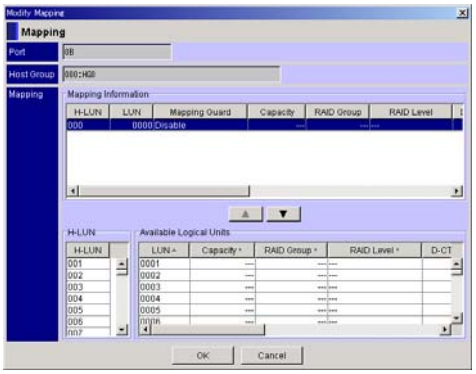
(e) In the unit window, display [000: G000] by double clicking the [Port XX] to be specified after double clicking the [Host Groups].
Display the [Option] and [Logical Unit] by clicking the [000:G000], and then click the [Logical Unit].



(f) Click the [Modify Mapping] button that is displayed at the lower right part of the window.

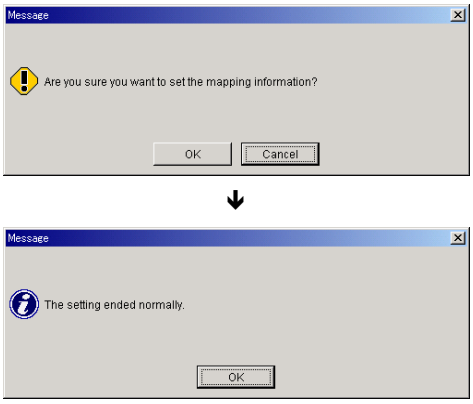
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(g) Select one H-LUN from the [H-LUN] list of the mapping. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [▲] button.



The H-LUN and LUN that were selected are moved to the [Mapping Information] list.
Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



(i) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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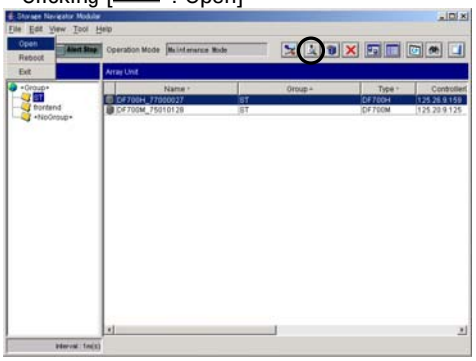
(5) Setting the Host Group Security

(a) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.5 (2) Connecting the LAN cross cable0" (SMUP 03-0140).

(b) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem" (SMUP 03-0150))

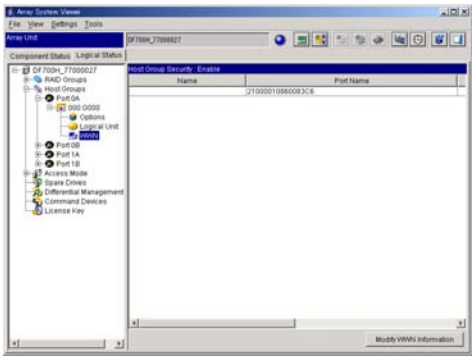
(c) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(d) Click the [Logical Status] tab in the unit window.

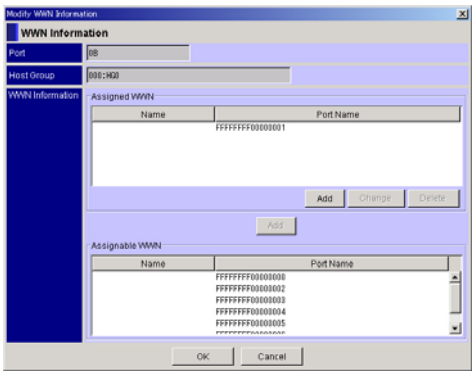
(e) Double click the [Host Groups] in the tree, and then double click the port for which you have validated the host group security. Select [WWN] by clicking the [000:G000].



(f) Click the [Modify WWN Information] button that is displayed at the lower right part of the window.

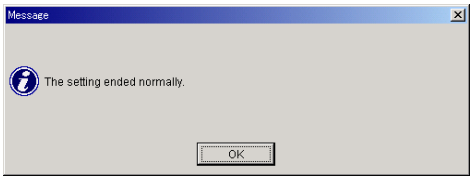
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(g) Select WWN Information in the [Assignable WWN] list and select the [Add] button.
The WWN moves from the [Assignable WWN] list to the [Assigned WWN] list.
When the WWN to be assigned to a Host Group is not listed in the [Assignable WWN] list, input and add the WWN.



Click the [OK] button.

(h) The confirmation window is display. Click the [OK] button.



(i) Set the remaining ports in the same way.

NOTE : When two or more host groups are set using the LUN Manager of the priced option, set all the host groups in the same way.

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3.4.21 Changing the registration information for the monitoring failures

Change the device model name of the SNMP Agent Support Function from the RKH to the RKHE.

3.4.22 Works to be done after the upgrade is completed

When all the upgrade works are completed, do the works such as removal of the maintenance PC.
The procedure is shown below.

(1) Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Step "3.4.5 Connection of the maintenance PC" (SMUP 03-0130).
(2) Attach the Front Bezels to the RKH by executing the procedure "3.4.14 (5) Removing the Front Bezels" (SMUP 03-0650) in reverse order.

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

(3) Close the rear door referring to the instruction given in Step "3.4.14 (2) Open the Rear Door of U7 rack frame" (SMUP 03-0590).
Make sure that the rear door is latched and cannot be opened.

3.4.23 Resetting of the Host

Reboot the connecting Host and execute the setting.
For notes, refer to "5.1 For Setting Changes in Host Computer and Others" (SMUP 05-0000).

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3.4.24 Revalidation the TrueCopy remote replication/TrueCopy Extended Distance

This operation is not required when TrueCopy remote replication/TrueCopy Extended Distance is not used.

Perform the revalidation

For example, even when the remote disk array subsystem is upgraded as shown in Figure 3.4.64, the microprogram of the local disk array subsystem must be updated.

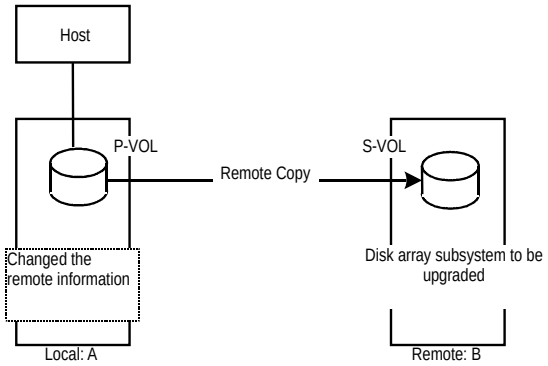


Figure 3.4.64 Change the Remote Information

The procedure is shown below.

(1) Connect the service PC to the other one of the two subsystems paired by TrueCopy remote replication/TrueCopy Extended Distance.

(2) Start Storage Navigator Modular and register the other one of the two subsystems paired by TrueCopy remote replication/TrueCopy Extended Distance.

(3) Changing settings of the disk array subsystem

It is required to change remote information of the disk array subsystem that has not been upgraded. Make the change as shown below.

(a) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular.

(b) Set the operation mode of Storage Navigator Modular as Maintenance mode.

(c) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.

(d) Select [Tools] and [Maintenance] in this order in the unit window.

(e) Click the [System Upgrade] tab.

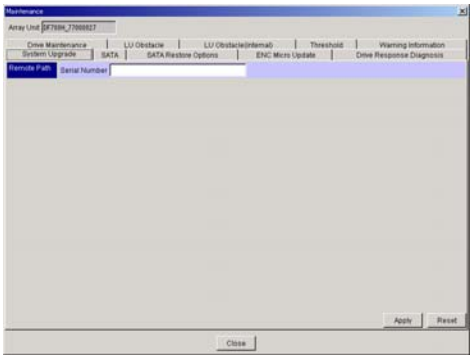
Take down notes of the displayed serial number in the following blank lines.

Serial Number: _____

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(e) Change the serial number.

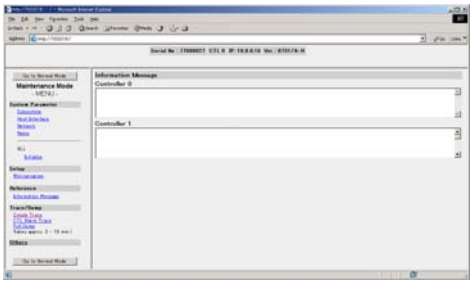
Enter the serial number of the disk array subsystem that has been upgraded.



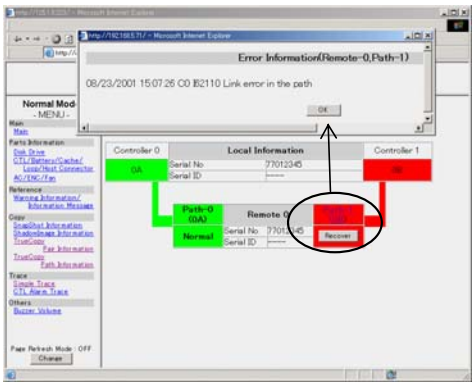
(4) Revalidate the path using the Web.

Perform the revalidation through the "TrueCopy Path Information" window.

Screen 1: Image of the "Information Message" window

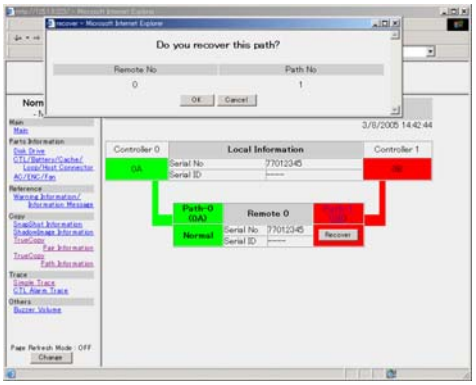


Screen 2: Image of the "Path Detachment Factors" window

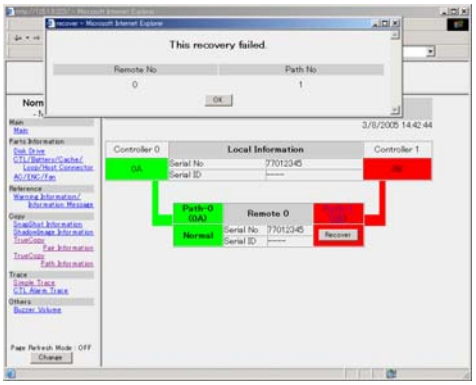


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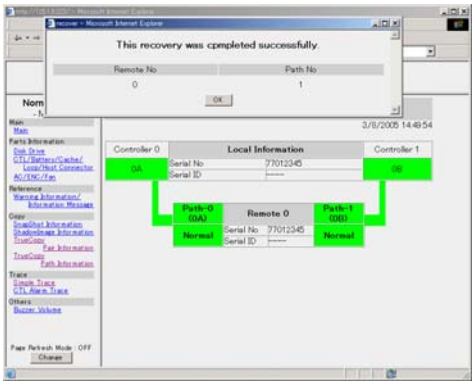
Screen 3: Image of the "Revalidation Instruction" window



Screen 4: Image of the "Revalidation Result" window (for the case where the operation terminated abnormally)



Screen 5: Image of the "Revalidation Result" window (for the case where the operation terminated normally)



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(5) Restart RAID Manager. Start the HORCM using the "horcmstart" command.
It is necessary to set an environmental variable (for TrueCopy) of the environment in which the command is executed. This example of the setting is premised on a configuration in which two instances in the same server (Windows NT®/Windows® 2000) use the same command device.

(a) Set an environmental variable that shows the each instance number. Enter the following via the command prompt window.

```
c:¥horcm¥etc>set HORCMINST=0
```

(b) Execute the horcm starting script, and then make sure of the configuration by executing the pairdisplay command.

```
c:¥horcm¥etc>horcmstart 0 1
starting HORCM inst 0
HORCM inst 0 starts successfully.
starting HORCM inst 1
HORCM inst 1 starts successfully.

Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)    (CL1-A , 1,  1)   174    1..P-VOL PSUS NEVER ,   175    2  -
vg01     oradb1(R)    (CL1-B , 1,  2)   175    2..S-VOL SSUS NEVER ,-----     1  -
```

A preparation for starting TrueCopy has been completed.

(6) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
The method for resynchronizing a TrueCopy remote replication/TrueCopy Extended Distance pair is explained below.

(a) Set the group name in the configuration definition file as "vg01".
Resynchronize a TrueCopy remote replication/TrueCopy Extended Distance pair, which has been split, using the pairresync command. When doing this, be sure to set the value of the -c option, which specifies the copy speed, as 15. Furthermore, make sure that the status of each volume becomes PAIR by executing the pairevtwait command.

```
c:¥horcm¥etc>pairresync –g vg01 –c 15
c:¥horcm¥etc>pairevtwait –g vg01 –s pair –t 300 10
pairevtwait : Wait status done.
```

Figure 3.4.65 Examples of Input and Output Results of Pairresync Command

(b) Make sure of the status and configuration of the resynchronized pair by executing the pairdisplay command.

```
c:¥horcm¥etc>pairdisplay -g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)    (CL1-A , 1,  1)   174    1..P-VOL PAIR NEVER , 174      2  -
vg01     oradb1(R)    (CL1-B , 2,  2)   175    2..S-VOL PAIR NEVER ,-----     1  -
```

The TrueCopy remote replication/TrueCopy Extended Distance pair has been resynchronize.
For details of the pairsplit command and its options, refer to Chapter 4 in the "RAID Manager System Administrator's Guide (Hitachi TagmaStore® AMS Series)".

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Chapter 4. Trouble Shooting

4.1 Error Messages

4.1.1 Flash detected messages

Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
RB0G00	Initial setup of microprogram failed	It tried to install the microprogram newly although the installation guard of the microprogram was set to “Disable”.	Gather			① Perform the update installation of the microprogram of the lower grade model.
RBE900	Upgrade failed [the installed microprogram is incorrect]	The upgrade failed because the microprogram, installation of which was attempted, was incorrect.	Gather			① Select the unified version directory, whose version is a unified version same as that of the microprogram of the lower grade model, and install the microprogram in the subsystem of the higher grade model for the purpose of update.
RBEA00	Downgrade failed [the installed microprogram is incorrect]	The downgrade failed because the microprogram, installation of which was attempted, was incorrect.	Gather			① Select the unified version directory, whose version is a unified version same as that of the microprogram of the higher grade model already installed, and install the microprogram in the subsystem of the higher grade model for the purpose of update.

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4.1.2 Failure messages

Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
HH13B0	System change failed [PIN]	The upgrade cannot be made because the system change has not been made normally and a pinned segment exists.		Gather		① Return the Disk Drives to the lower grade model, restart the subsystem, clear the pinned segment, and then make the upgrade again.
HH13B1	System change failed [PSOFF]	The upgrade cannot be made because the system change has not been made normally.		Gather		① Return the Disk Drives to the lower grade model, restart the subsystem, execute the deliberate shutdown, and then make the upgrade again.
HH2B00	Upgrade failed [PSOFF]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the deliberate shutdown had not been executed.	Gather			① Set the downgrade check as Disable, and then install the lower grade model microprogram to update it. ② After the updating installation is completed, turn off the AC Power Unit Switches of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the lower grade model. ③ Turn on the AC Power Unit Switches of all the disk array units and execute the deliberate shutdown after the disk array units become ready. ④ Make the upgrade from the lower grade model to the higher grade model again.
HH2C00	Upgrade failed [Single]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the System Startup Attribute was set as the Single mode.	Gather			① Do the upgrading installation of the microprogram for the lower grade model after disabling the installation guard. ② Power off the subsystem after the updating installation is completed. ③ Return the hardware configuration to that of the lower grade model. ④ Change the mode to the Maintenance mode after booting the subsystem while it is the lower grade model. ⑤ Execute the “Go to Normal Mode” after setting the “System Setup Attribute” as the “Dual Active Mode”. ⑥ Boot the subsystem. ⑦ Execute the procedure for the upgrade from the lower grade model to the higher grade model.
HH2D00	Upgrade failed [microprogram revision]	When upgrade from the lower grade model to the higher grade model was attempted, it failed because the microprogram revisions of the lower grade model and higher grade model were not the same.	Gather			① Install the higher grade model microproram revision, which is the same as the lower grade model microprogram revision in the drive.

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Message code	Message text	Description	Collect the error			Recovery measures
			Simple Trace	CTL Trace	Full Dump	
HH2F00	Downgrade failed [Subsystem can not take over the user data]	The subsystem start-up of the lower model failed because it tried to downgrade from the upper model to the lower model.	Gather			① Execute the initial setup to the subsystem that is the hardware configuration of the lower model, and start up the subsystem when operating the subsystem as a lower model. ② Turn on all the AC input power supply switches of the subsystem after returning the hardware configuration of the subsystem to the status that is upgraded to the upper model, and start up the subsystem of the upper model when operating the subsystem as an upper model.
HZ0300	Not enough Cache memory to use QuickShadow function	The capacity of the cache memory is not sufficient to use the Copy-on write SnapShot function.		Gather		① Increase the cache memory capacity to 2 Gbytes per controller.
HZ0S00	Not enough Cache memory to use Cache Partition Manager	The Cache capacity to use Cache Partition Manager was insufficient due to the upgrade of the model.	Gather			① Add the Cache memory in the capacity to be able to upgrade the model.

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4.1.3 WEB error messages

Message code	Message text	Description	Recovery measures
—	Abnormal End Empty System Retry Full Install	The updating installation of the microprogram cannot be done because the old microprogram does not exist in the system disk drive.	① In the case where this message is displayed when the microprogram is installed in the subsystem of the higher grade model for the purpose of update during the upgrade from the lower grade model to the higher grade model, take recovery actions according to Section "4.2 When Abnormal End Empty System Retry Full Install occurs" (SUP 04-0050). ② When it is evident that the old microprogram does not exist in the system disk drive, install the microprogram newly. ③ When this message is displayed in a case other than the case ① or ②, execute the updating installation again after making sure that the system copy has been completed through the Information Message of the Web. In either of the following cases, the system copy has been completed. • "I140xy (or I140HH) System copy started" is not displayed. • "I140xy (or I140HH) System copy started" and "I141xy (or I141HH) System copy completed" are displayed consecutively. When the system copy is being made, turn off the main switch and then turn it on again later than 20 seconds. In the following case, the system copy is being made. (refer to Maintenance Manual Installation "1.7.2 Subsystem power off (Sequential shutdown)" (INST 01-0310), Maintenance Manual Installation "1.7.1 Subsystem power on" (INST 01-0290).) • While "I140xy (or I140HH) System copy started" is displayed, "I141xy (or I141HH) System copy completed" is not displayed successively. Execute the updating installation again after making sure that the RDY LED (green) comes on and then the system copy is completed.
1204	A specified file doesn't exist. Confirm elements of designation.	The specified file does not exist.	① Make sure that the path to the directory of the microprogram to be installed is specified correctly.
—	Abnormal End Down Grade Check NG	Though a version down of the microprogram was attempted, the updating installation terminated abnormally because the Down Grade Check was not disabled.	① Change the mode of the Down Grade Check to Disable. (Refer to "4.4.2 Procedure for removing downgrade check" (SMUP 04-0180)) Then execute the updating installation again.

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4.1.4 Error messages issued during upgrade made when TrueCopy remote replication/TrueCopy Extended Distance is enabled

This operation is not required when TrueCopy remote replication/TrueCopy Extended Distance is not used.

Message code	Message text	Description	Recovery measures
I62300	Path not connected	<In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW.	① Refer to Maintenance Manual Troubleshooting Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).
		A serial number that does not exist was entered.	① Enter a correct serial number referring to "4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 1000™" (SMUP 04-0210).
I62D00	Remote option disable [TrueCopy Basic]	A path detachment occurred because the TrueCopy remote replication/TrueCopy Extended Distance of the remote DF was locked.	① Refer to Maintenance Manual Troubleshooting Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1170).
		A serial number of another subsystem was entered by mistake. The onerous option of the TrueCopy remote replication/TrueCopy Extended Distance in the subsystem was invalid.	① Enter a correct serial number referring to "4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 1000™" (SMUP 04-0210).

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NOTE : During the upgrade made when Hitachi TrueCopy remote replication/TrueCopy Extended Distance is left enabled, one of the following messages is sure to be displayed even in the normal state.

Message code	Message text	Recovery measures
I6220x	Link down time-out (Port-x)	① A state in which no link up is done has kept on longer than the regulated time at the port for which a path has been set. x: Port #
I62300	Path not connected	① <In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW.
I6250x	Path login failed	① The sending and response of FLOGI, PLOGI, RSCN, etc. to the SW terminated abnormally when a log-in to the set path was done in the case of the connection via the SW. x : Port #
I62600	Fabric connection failed (Port-x)	① Sending and response of PLOGI and PRLI done at the time of a log-in to the set path terminated abnormally.

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4.1.5 Other messages

When a message other than the above is displayed, be sure to check the configuration first. Check whether the Disk Drive locations are correct, whether the settings of the Device ID is correct, whether the cable connections are correct, and so on following the procedure.
To check the Disk Drive locations, refer to Section "4.3 When a Disk Drive was inserted in a wrong location" (SMUP 04-0130).

Example)

- RA7900 System HDU spin up failed:
  Spin-up of the system drive failed.
- HE05HH Backend down [Unit# ERR] (Unit-01):
  The back end was blocked : Abnormality was detected in the connection order of the array subsystem, the setting of the device ID, or the setting of the subsystem identification switch.
- HH1Q00 SES error inf. [SES-HDU error]:
  The Control Unit was detached because both of the two SES drives could not access the ENC.
- W080xy Loop alarm (Path-x, Loop-y):
  Since the Fibre Channel loop failed, the operation is continued with the alternative loop.

When one of the following messages is displayed, there may be a mistake in the Disk Drive location, the Device ID, or some other matter. Check if the configuration is correct.

When a problem is found in the configuration related to the upgrade, correct the configuration. When no problem is found in the configuration and the operation, take some recovery action referring to the Maintenance Manual.

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4.1.6 Collecting CTL Alarm Trace

Through the CTL Alarm Trace collection, detailed information (the CTL Alarm Trace) on the immediately previous Controller blockage stored in the Controller is collected.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

Since the above-mentioned CTL Alarm Trace information is taken over from the blocked Control Unit to the replaced Control Unit, it can be collected after the Control Unit is recovered from the failure. If the Control Unit is blocked while collecting the CTL Alarm Trace may not be collected normally. Therefore, in this case, collect the CTL Alarm Trace again.

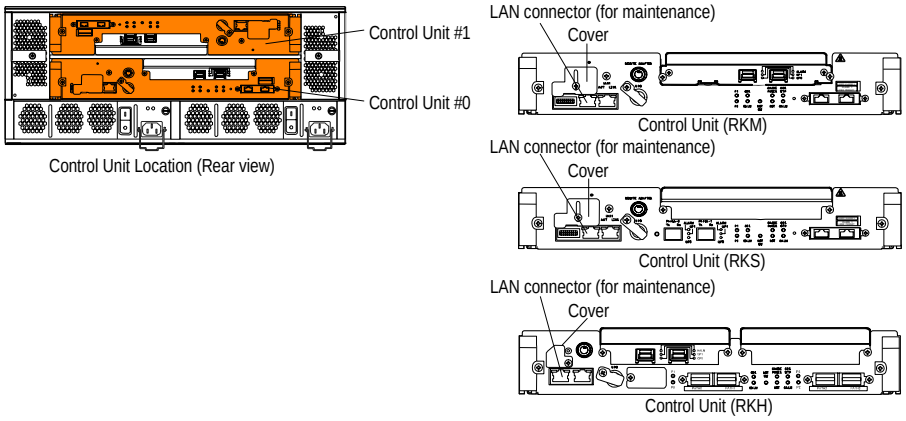
The method of collecting the CTL Alarm Trace is shown below.

(1) Before collecting the CTL Alarm Trace

(a) Items to be prepared

The CTL Alarm Trace is collected in the normal mode or the maintenance mode of the WEB. For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary. For collecting the CTL ALARM TRACE, disk space of 40 M bytes per one Control Unit is required. (20 M bytes for temporary data and 20 M bytes for Full Dump data)

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable.



*1 : The Interface Board is installed on interface #0 sides for RKH.
Please install the dummy on interface #1 side.

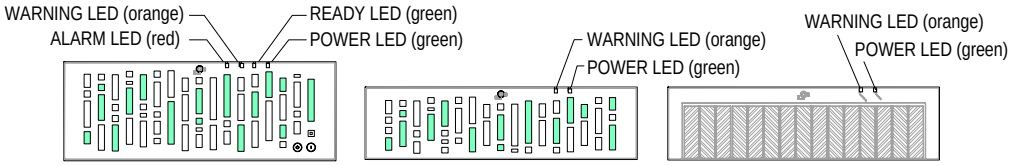
Figure 4.1.1 LAN Connector Position

(c) Collect the CTL Alarm Trace information from each Control Unit.

Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

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(d) Make sure that the WARNING LED (orange) on the Front Bezel of RKM/RKS is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)



(a) Rackmount model of RKS/RKM/RKH (b) Rackmount model of RKAJ/RKAJAT (c) Rackmount model of RKA

Figure 4.1.2 Indication Locations and Names of LED (Front Bezel)

(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

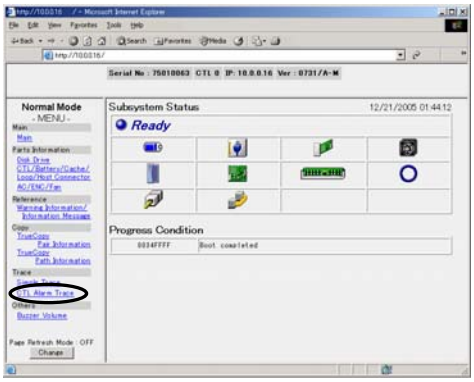
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(2) Procedure for collecting a CTL Alarm Trace

(a) Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button.

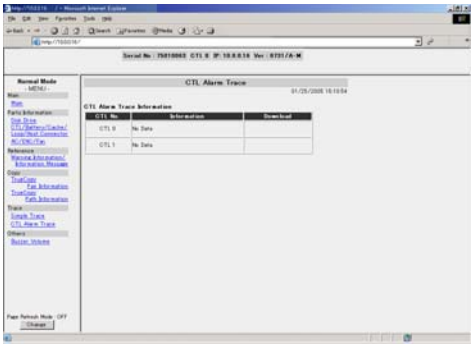


(b) Collect the memory dump according to the WEB and the following procedure.
Click “CTL Alarm Trace” in the menu frame of “Trace”.



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If CTL Alarm Trace exists, the CTL Alarm Trace information window is displayed.



Description of information

"Not Ready" ····· Indicates the situation where the trace area is not established in the device.

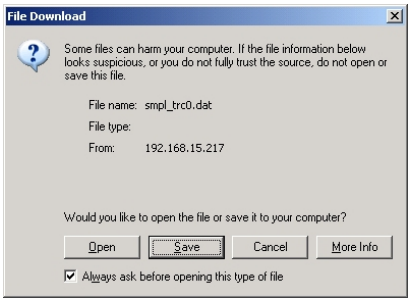
"No Data" ····· CTL Alarm Trace information does not exist or while information is being created.

"MM/DD/20YY hh:mm:ss" ····· CTL Alarm Trace information exists.

NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL Alarm Trace may not be collected normally. Therefore, collect the Simple Trace.
If Simple Trace cannot be obtained through detached Control Unit, connect the Maintenance PC to the Control Unit at the opposite side, and collect the Simple Trace.

(c) Press the "Download" button on the Control Unit side to be collected in "CTL Alarm Trace information".(‡1)

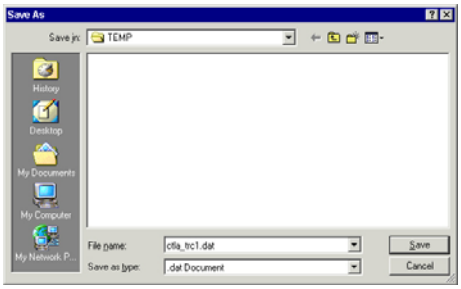
(d) The following dialog is displayed. Click the [Save] button.



‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

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(e) Select the place to save the file and file name (Default file name: ctla_trc0.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed.

In this procedure is collected by WEB Normal mode. Similarly, CTL Alarm Trace can be collected by WEB Maintenance mode through Menu Frame.

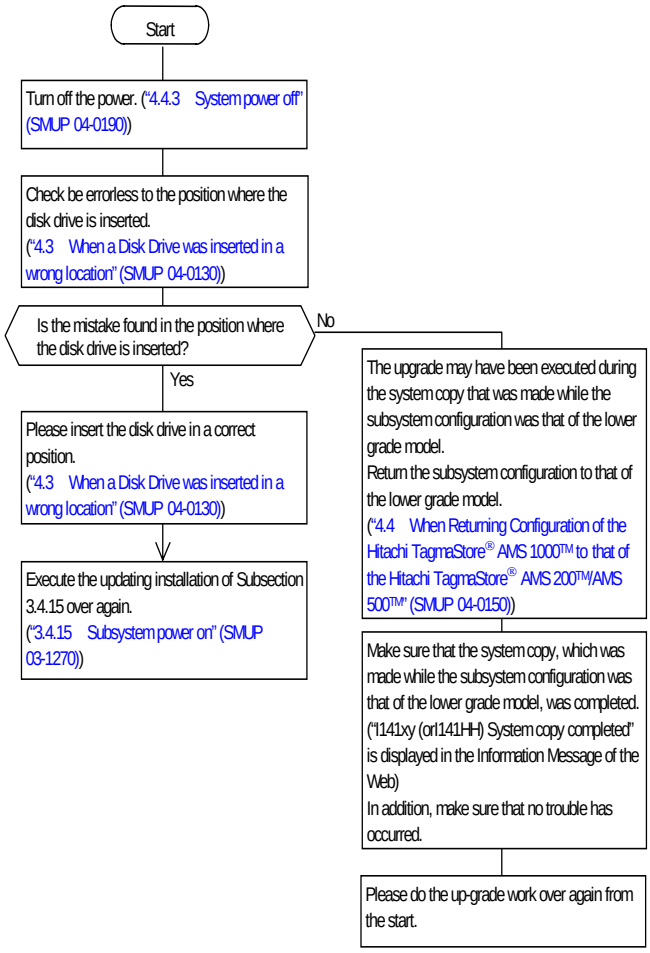
‡1 : There may be a case where the default file name is given as “ctla_trc0.dat.dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

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4.2 When Abnormal End Empty System Retry Full Install occurs

The procedure for troubleshooting and actions to be taken when the Abnormal End Empty System Retry Full Install occurs are shown below.

Make a recovery from the failure following the procedure for troubleshooting.



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4.3 When a Disk Drive was inserted in a wrong location

The recovery procedure to be used when a Disk Drive was inserted in a wrong location is shown below.

(1) Check the following information referring to the configuration information collected according to Subsection "3.4.11 Collecting serial numbers of Disk Drives" (SMUP 03-0450).

```
Array unit configuration information list.

DF Name : 174-175
Date : 2003/12/02 21:12:31
Micro Program Revision : 0710/A-S
Array Unit Type : DF700S
Serial Number : 73010055

---- RAID Configuration ----
RAID    RAID    Start Location          Number of HDU     Number of       Free Capacity
Group   Level   [Unit No.   HDU No.]  in parity group  parity group        [block]
 0       5          0          0              5                1             525680640

-- End

---- LU Configuration ----
     LU    Capacity   Status                    Staging   C-CTL   D-CTL   RG RAID      Capacity
      0    2097152    Normal                        512   0         0          0   5          1.0 GB

-- End

---- Drive Configuration ----
Location        Vendor ID    Product ID              Revision   Capacity    Status      Serial Number
Unit0 ,HDU0     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305B4910
Unit0 ,HDU1     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305B9100
Unit0 ,HDU2     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    30532706
Unit0 ,HDU3     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    305C5571
Unit0 ,HDU4     HITACHI      HUS103073FLF210         D6D6          72GB       Normal    30542348
Unit0 ,HDU5     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   30545271
Unit0 ,HDU6     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305C5229
Unit0 ,HDU7     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305B6777
Unit0 ,HDU8     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305B3188
Unit0 ,HDU9     HITACHI      HUS103073FLF210         D6D6          72GB      Undefine   305L1373
Unit0 ,HDU10 HITACHI         HUS103073FLF210         D6D6          72GB      Undefine   30575398
Unit0 ,HDU11 HITACHI         HUS103073FLF210         D6D6          72GB      Undefine   305N2858
Unit0 ,HDU12 HITACHI         HUS103073FLF210         D6D6          72GB      Undefine   305K8917
Unit0 ,HDU13 HITACHI         HUS103073FLF210         D6D6          72GB      Undefine   30575348

-- End

～～～～
(abbr.)
```

① [Drive Configuration]

[Location]: Shows a location where a Disk Drive is installed.

[Unit]: Unit ID#

[HDU]: Disk drive#

[Serial Number]: Serial# (Disk Drive)

(2) Remove Disk Drives from the RKH replaced and keep them in the safekeeping container.

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(3) Take out a Disk Drive from the safekeeping container and read the serial number indicated on the side of the Disk Drive.
For serial#, refer to Figure 4.3.1.

NOTE : For the serial# of the Disk Drive manufactured by HITACHI, the last 8 digit values recorded on the side of the Disk Drive are displayed in the "Serial Number" column in the collected configuration information file.

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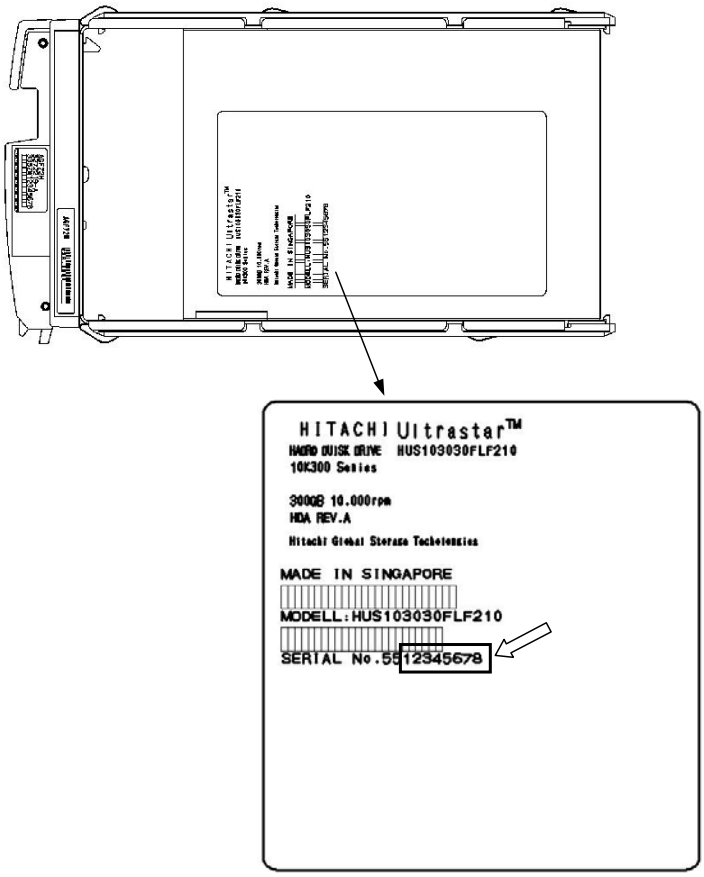


Figure 4.3.1 Serial Number

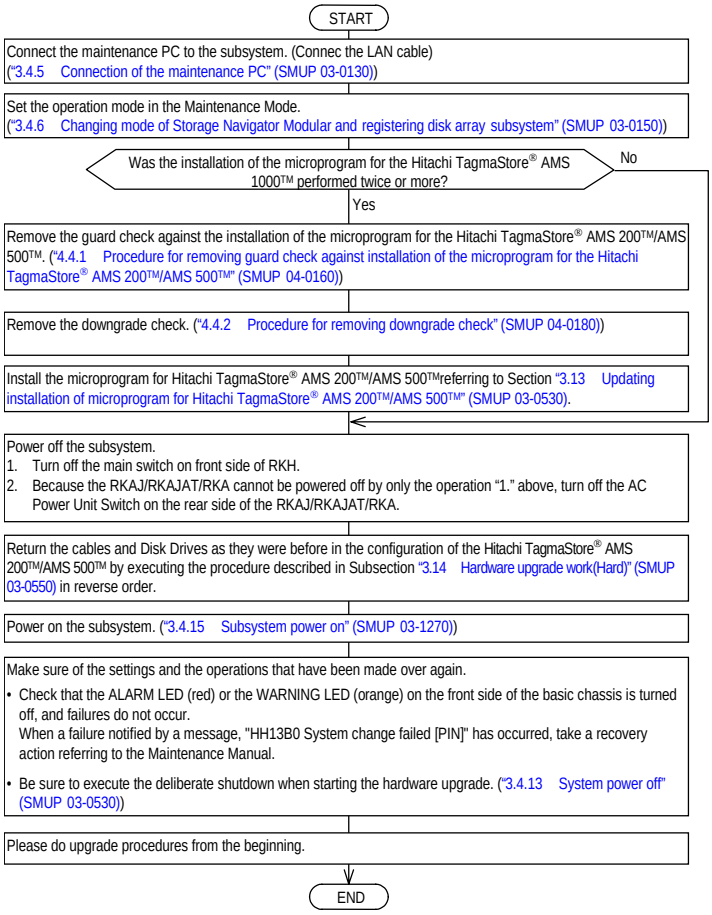
(4) Refer to the configuration information file for the [Unit] and [HDU] of the Disk Drive having the same serial number and reinsert the Disk Drive in the slot having the unit ID number and Disk Drive number shown.
(5) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

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4.4 When Returning Configuration of the Hitachi TagmaStore® AMS 1000™ to that of the Hitachi TagmaStore® AMS 200™/AMS 500™

The procedure to be used in case the upgrade fails is explained below. In the procedure, the upgrade is made again after the configuration of the disk array subsystem is returned to that of the Hitachi TagmaStore® AMS 200™/AMS 500™ once.

NOTE : The configuration of the disk array subsystem cannot be returned to that of the Hitachi TagmaStore® AMS 200™/AMS 500™ after the updating installation of the microprogram for the Hitachi TagmaStore® AMS 1000™ is executed according to the procedure described in Subsection "3.4.16 Updating installation of microprogram for Hitachi TagmaStore® AMS 1000™" (SMUP 03-1290) and the subsystem enters the READY status.



NOTE : Be sure to review all the settings and operations that have been made before making the upgrade again.

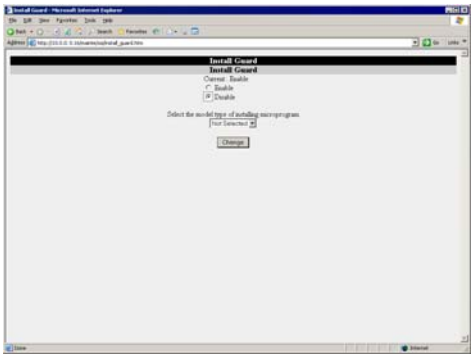
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4.4.1 Procedure for removing guard check against installation of the microprogram for the Hitachi TagmaStore® AMS 200™/AMS 500™

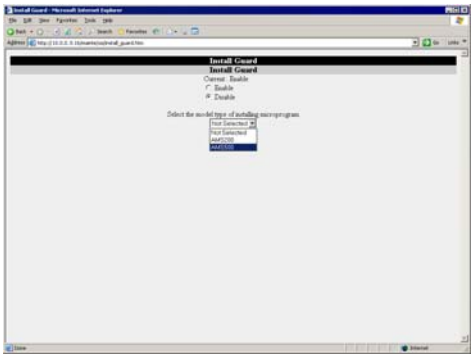
The procedure for removing the microprogram installation guard check is shown below.

(1) Enter "http://(IP address of the disk array subsystem)/instlgrd" in the [Address].
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

(2) Select the "Disable".

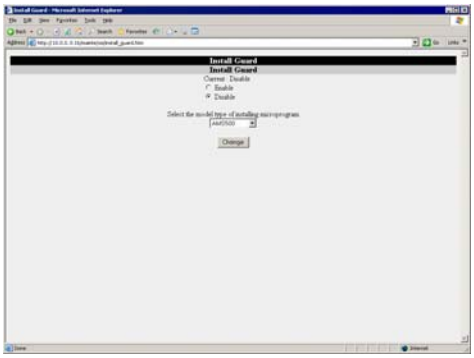


(3) Select the subsystem that tries to be returned from the Hitachi TagmaStore® AMS 1000™ , and click the [Change] button.



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The microprogram installation guard check was removed.



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4.4.2 Procedure for removing downgrade check

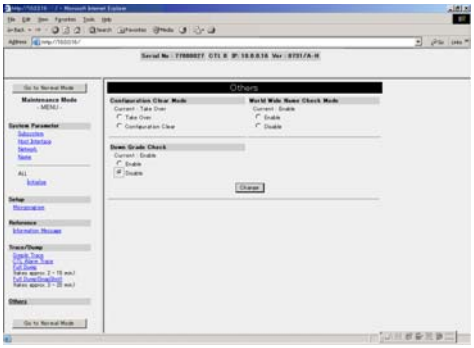
The procedure for removing the downgrade check is shown below.

(1) Set the operation mode in the Maintenance Mode. (“3.4.6 Changing mode of Storage Navigator Modular and registering disk array subsystem” (SMUP 03-0150))

(2) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (“3.4.5 Connection of the maintenance PC” (SMUP 03-0130))
A [User Name] and a [Password] may be requested at the time of WEB connection or WEB operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

(3) Click [Others] in the menu tree.

(4) Select the [Disable] radio button of the [Down Grade Check].
Click the [Change] button.



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4.4.3 System power off

Because a message, "Download Failed" is displayed and the disk array subsystem is in the Alarm status, the RKAJ/RKAJAT/RKA cannot be powered off although the main switch on the front side of the RKH is turned off. The power of the RKAJ/RKAJAT/RKA must be turned off by the other means.

(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the Front Bezel is off.
(3) Turn off the AC Power Unit Switches of the AC/DC power supplies installed in the RKH and all the RKAJ/RKAJAT/RKAs.
(4) Turn off the battery switch of the Battery Unit on the front side of the disk array subsystem.
(5) All turn off the circuit breaker of the PDB.

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4.5 Procedure for Recovery from Path Detachment and PSUE Status Occur during Upgrade Made when TrueCopy remote replication/TrueCopy Extended Distance is Enabled

The procedure for recovery, which is to be used when the pair status is changed to PSUE during the upgrade made when TrueCopy remote replication/TrueCopy Extended Distance is enabled, is explained below.
The recovery procedure varies depending on which configuration, the Hitachi TagmaStore® AMS 1000™ or the Hitachi TagmaStore® AMS 200™/AMS 500™ , the disk array subsystem has when the PSUE status occurs.

4.5.1 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 200™/AMS 500™

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Hitachi TagmaStore® AMS 200™/AMS 500™ , make a recovery from the PSUE status first, split the pair again, and then make the ordinary upgrade.
The procedure for resynchronizing a TrueCopy remote replication/TrueCopy Extended Distance pair is shown below. The resynchronization must be done using the pairresync command issued by RAID Manager.

(1) Restart RAID Manager. Start the HORCM using the "horcmstart" command.
(2) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
(3) Splitting a pair
Split a pair by executing the pairsplit command and make sure that pair status has been changed to PSUS/SSUS.
(4) Return to the ordinary upgrade operation.
Revalidate the path when necessary, return to the ordinary upgrade, and make the operations over again from the step in which the PSUE status occurred.

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4.5.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Hitachi TagmaStore® AMS 1000™

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Hitachi TagmaStore® AMS 1000™ , a wrong setting may have been made in the operation that has been made according to Item "3.4.24 (3) Changing settings of the disk array subsystem" (SMUP 03-1560).
The recovery procedure is explained below.

(1) Checking/changing settings of the disk array subsystem
Check the remote information of the disk array subsystem that has not been upgraded.
(a) Connect the maintenance PC to the disk array subsystem and start Storage Navigator Modular.
(b) Set the operation mode of Storage Navigator Modular as Maintenance mode.
(c) Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.
(d) Select [Tools] and [Maintenance] in this order in the unit window.
(e) Click the [System Upgrade] tab.
Verification of the displayed serial number.
If an error is found, enter the value of the disk array subsystem that has been upgraded.

If the information setting has been made for a disk array subsystem belonging to another pair by mistake, return the status of the subsystem taken for a target subsystem as it was before by setting the serial number that were noted down in Step "3.4.24 (3) Changing settings of the disk array subsystem" (SMUP 03-1560) and by revalidating the path. Then make the settings for the target disk array subsystem.

(2) Revalidate the path using the WEB.
(3) Restart RAID Manager. Start the HORCM using the “horcmstart” command.
(4) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
(5) Make sure that recovery from the path detachment and the PSUE status has been made referring to the "Information MSG" window of the WEB.

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Chapter 5. Appendix

5.1 For Setting Changes in Host Computer and Others

When upgraded from Hitachi TagmaStore® AMS 200™/AMS 500™ to Hitachi TagmaStore® AMS 1000™, the Disk Array subsystem shows the following changes.

No.	Name of Items	Hitachi TagmaStore® AMS 200™	Hitachi TagmaStore® AMS 500™	Hitachi TagmaStore® AMS 1000™	Existence of Limits
1	Subsystem Product Serial Number	730xxxxx	750xxxxx	770xxxxx	The following contents may be changed depending on the subsystem product serial number changes. As occasion demands, the changing operation for upper host device information or various application setting may be needed. ・World Wide Name ・Product Serial Number of Inquiry
2	World Wide Name	-	-	-	By registering the subsystem product serial number to Hitachi TagmaStore® AMS 1000™ in the Subsystem Maintenance Mode and rebooting the subsystem, WWN on Front End Fibre Channel is changed to the different value from Hitachi TagmaStore® AMS 200™/AMS 500™ after Hitachi TagmaStore® AMS 1000™ Ready, Front End Fibre Channel can be used, and the LU recognition from the upper Host enables.
3	Target iSCSI Name	-	-	Same value with the lower model	When the Hitachi TagmaStore® AMS 200™/AMS 500™ to be upgraded is the system configuration of the iSCSI interface, the Target iSCSI Name of the Hitachi TagmaStore® AMS 1000™ succeeds the value before the upgrade. However, when the default iSCSI Name of the Target was used in the array subsystem before the upgrade, it is required to change the Target iSCSI Name of the Hitachi TagmaStore® AMS 1000™ to a unique value in the network. If the Hitachi TagmaStore® AMS 1000™ is used without changing the Target iSCSI Name and when the array subsystem before the upgrade is configured with the system of the iSCSI interface again after using the Hitachi TagmaStore® AMS 1000™ , the iSCSI Name of both array subsystems is duplicated in the network, and trouble is caused to the iSCSI protocol.
4	Inquiry	730xxxxx	750xxxxx	770xxxxx	Product Serial Number After upgrading from Hitachi TagmaStore® AMS 200™/AMS 500™ to Hitachi TagmaStore® AMS 1000™, Hitachi TagmaStore® AMS 1000™ responds to 770xxxxx.

(1) When the Disk Array subsystem is the system configuration of the iSCSI interface
You will set new iSCSI name for all targets of the Hitachi TagmaStore® AMS 1000™.
And you will follow proper setting procedures to set the information of CHAP authentication, Two-way autentication and digest with new target iSCSI name on the host computer if needed.
Then you will login to the target of Hitachi TagmaStore® AMS 1000™ with new target iSCSI name which you set in the upgrade.
The host computer may continue to execute login process to the target of old iSCSI name if the target iSCSI name or the IP address for the iSCSI interface of Hitachi TagmaStore® AMS 1000™ are changed.
If it happens, you will logout from the target of old iSCSI name.

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(2) When the Disk Array subsystem is the system configuration of the Fibre Channel interface

The device file name changes due to World Wide Name or iSCSI Name change. Following the change, OS reconstruction is needed.
The setting review is also needed in the application software using the device file name.

If you use the WWN/iSCSI Name binding in the Driver setting file, it is necessary to change the setting. And the Host needs rebooting after the setting change.

When Fabric Switch is used and WWN executes zoning, it is necessary to execute the zoning setting review since WWN is changed.

The upgrading operation from Hitachi TagmaStore® AMS 200™/AMS 500™ to Hitachi TagmaStore® AMS 1000™ is new device addition image for OS. However, as different from the ordinary new device addition, the user's data is maintained when installed. Therefore, great care is needed for setting the Host computer and peripherals.

For each platform, the points of which special care is needed are shown below.

- When HP-UX is used.
  It is necessary to export the Volume Group before upgrading and import the Volume Group after upgrading.
  When MC/service guard is used, it is necessary to suspend the MC/service guard before upgrading and reboot the MC/service guard after upgrading.
- When AIX + HDLM is used.
  It is necessary to export the Volume Group before upgrading and note the disk property such as queue depth for the physical disk and the HDLM device. It is also necessary to import the Volume Group after remaking the HDLM device when the upgrade is completed.

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Examples of the HDLM device file remake

① deletion of the HDLM device file	# rmdev
② reset of the device configuration information	# chdev
③ remake of the HDLM device file	# dlmcfgmgr

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- When Solaris + VxVM is used.
  It is necessary to boot the Host with option "r" after upgrading and boot VxVM.

  NOTE : • When HBA: Sun genuine, rebooting is necessary since the driver setting is changed at the time of the device recognition.
  • When SunCluster is used, it is necessary to exclude the wide area device from the definition (excluding "quorum device" in the wide area device from the definition). The correspondence between the disk ID instance number in the wide area device and the disk device (cXtYdZ) is also changed due to the LU serial number change after upgrading. Therefore, check the correspondence between the disk ID instance number and the local and remote path. If the correspondence is illegal, it is necessary to redefine. Then, redefine the wide area device as SunCluster (redefine quorum device from the optional wide area device).

- When IRIX is used.
  It is necessary to execute the device recognition and mapping file making again after upgrading and reboot the Host.

- When Windows®-related system is used.
  Rebooting is necessary after upgrading.

- When Linux + VxVM is used.
  It is necessary to deport the Disk Group before upgrading and import the Disk Group after upgrading.

- When Tru64 is used.
  For UFS: It is necessary to mount with the new device.
  For AdvFS: It is necessary to link again with the new device as the registered device.

① device recognition check	# scu show edt
② device file check	# hwmgr –view devices
③ transfer to domain directory	# cd /etc/fdmns/[domain name]
④ domain directory contents check	# ls
⑤ allocation to domain directory	# ln –fs /dev/disk/dskzzzc dskxxxc

  Registered device
  New device file name

  For LSM, the data must be restored at the time of the LSM configuration since the disk group cannot be imported.

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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Jan.27.2006				All	Issued	-
1	Feb.10.2006				SMUP 0010, SMUP 0020	"TrueCopy Extended Distance" was added.	AD
					SMUP 02-0000	Note was changed.	CH
					SMUP 03-0000, SMUP 03-0040, SMUP 03-0050, SMUP 03-0070, SMUP 03-0080, SMUP 03-0090, SMUP 03-0100, SMUP 03-0410, SMUP 03-0540, SMUP 03-1560, SMUP 03-1590	"TrueCopy Extended Distance" was added.	AD
					SMUP 03-0140, SMUP 03-1080, SMUP 03-1100, SMUP 03-1110, SMUP 03-1170, SMUP 03-1190, SMUP 03-1210, SMUP 03-1230, SMUP 03-1250, SMUP 03-1260, SMUP 03-1270, SMUP 03-1300	Figure was changed at RKH.	CH
					SMUP 03-0150, SMUP 03-0250, SMUP 03-0270, SMUP 03-0290, SMUP 03-0500, SMUP 03-1590	Added "®".	AD
					SMUP 03-0220, SMUP 03-0240, SMUP 03-1220, SMUP 03-1230	"When…Control Unit may be deteriorated." was added.	AD
					SMUP 03-0430	Figure was corrected at (5).	CR
					SMUP 03-0440	Procedure (8), (9) were corrected.	CR
					SMUP 03-0500, SMUP 03-0730, SMUP 03-0740, SMUP 03-0760, SMUP 03-0800, SMUP 03-1010, SMUP 03-1050, SMUP 03-1090, SMUP 03-1160	Added RKA.	AD
					SMUP 03-1070	Note was corrected at (e).	CR
					SMUP 03-1171, SMUP 03-1172	These pages were newly added.	AD
					SMUP 03-1570, SMUP 03-1580	Figure was corrected.	CR
					SMUP 04-0040, SMUP 04-0050, SMUP 04-0200	"TrueCopy Extended Distance" was added.	AD
					SMUP 04-0070	Figure was changed at RKH.	CH
					SMUP 04-0080, SMUP 04-0150, SMUP 04-0190	Added RKA.	AD
					SMUP 05-0020	Added "®".	AD
2	Jul.7.2006				All	"TagmaStore™" → "TagmaStore®"	CH
					SMUP 03-0010	(1) to (3) were added at 3.2.	AD
					SMUP 03-0020	"The license key of…of the Hitachi TagmaStore® AMS 1000™." was added at 3.3.	AD
3	Sep.25.2006				SMUP 0010	3.4.21 was added.	AD
					SMUP 03-0000	The last five sentences were added.	AD
					SMUP 03-0010	(5) and (6) were added.	AD
					SMUP 03-0020	"When executing…will be lost." was added.	AD
					SMUP 03-0050	"It is required…setting changes." and "When Hitachi TagmaStore…before upgrading." were added.	AD
					SMUP 03-0080, SMUP 03-1550	3.4.21 was added.	AD
					SMUP 03-0390	Changed figure at (d).	CH
					SMUP 03-0400	NOTE and Screen were added to (e).	AD
						(g) was moved to SMUP 03-0410.	DL

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					SMUP 03-0410	(g) was moved from SMUP 03-0400.	AD
					SMUP 03-1560	"3.4.23" → "3.4.24"	CH
					SMUP 04-0210	"3.4.23" → "3.4.24"	CH
4	Dec.22.2006				SMUP 03-0050	"• When Power Saving of the priced option is used,..." was added.	AD
					SMUP 03-0330, SMUP 03-1290	Added was "refer to 1.7.1".	AD
					SMUP 03-1270	Added was "At this time,…saving spins down.".	AD
					SMUP 04-0030	Added was "refer to 1.7.1, 1.7.2".	AD

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DF700 iSCSI Configuration Guide

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Document Revision Level

Revision	Date	Description
K6603243-4	September 2006	5th Release.

Preface

This document is the iSCSI System Configuration Guide for the DF700 series disk array subsystem. The document explains works up to operation required when connecting the disk array subsystem to hosts via the LAN using LUN Manager and notes on the iSCSI system construction.

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1 Overview of iSCSI

This chapter includes the following information:

1.1	What is iSCSI?
1.2	DF700 iSCSI
1.3	System Configuration Example

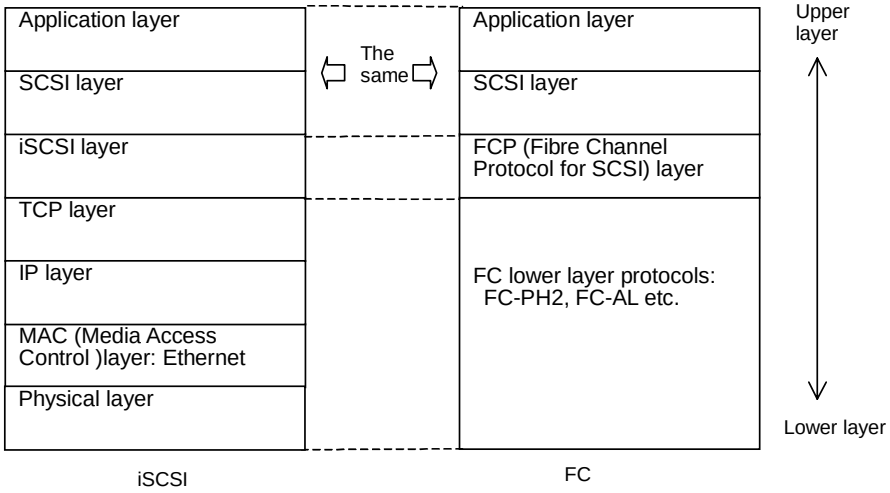
1.1 What is iSCSI?

1.1.1 What is iSCSI?

iSCSI1 (Internet SCSI) is a protocol for sending and receiving a SCSI2 command via an IP network, and it can transfer data in units of block.

The inexpensive IP-SAN (IP-Storage Area Network) that uses the existing or ready-made network equipments can be constructed and operated by using the iSCSI. For application software of a host, a disk array communicated with iSCSI is the same as an internal disk drive and is the same as a disk array communicated with FC (Fibre Channel) in terms of using SCSI command for accessing storage (Figure 1.1). Therefore iSCSI is applicable with existing software property used. Further, illegal access from a host to the storage can be prevented by using the CHAP3 authentication.

Figure 1.1 Protocol Stack of iSCSI and FC



1 iSCSI was standardized by IETF (Internet Engineering Task force) as RFC3720, in 2003 (http://www.ietf.org/rfc/rfc3720.txt).
2 Small Computer Systems Interface
3 Challenge Handshake Authentication Protocol

1.1.2 Characteristics of iSCSI

iSCSI can be introduced to a host at a low cost by using software initiator (Microsoft® iSCSI Software Initiator4, etc.) and NIC5. Furthermore the disk array can be connected lots of hosts at a low cost, by using existing IP network equipments.

Table 1.1 lists Comparison of iSCSI with FC

Table 1.1 Comparison of iSCSI with FC

No.	Item	iSCSI	Fibre Channel
1	Utilizing IP network	With iSCSI, it is able to utilize IP network constructed by Gigabit Ethernet.	To utilize IP network, protocol converters that converts FC and IP are needed. (iFCP or FCIP6)
2	Packet/frame loss on a communication link	The loss may occur by TCP control, but the TCP retransmission recovers the lost packet.	The frame loss does not occur except for the failure.
3	Data protection	CRC7 (Ethernet), check sum (TCP and IP), iSCSI Header/Data digest (optional)	CRC (FC-PH2)
4	Name Service (associating address and identifier)	As “Discovery” process in iSCSI layer. By using iSNS8, it is able to process discovery without knowing IP addresses of targets.	Switch (Fabric) processes automatically.

As a comparison of physical link of iSCSI and FC, Table 1.2 lists comparison of Gigabit Ethernet (1000BASE-T) with FC lower Protocol. In FC, fiber cable is major for host connection, whereas copper cable is used for connecting disk drives in a disk array.

Table 1.2 Comparison of Gigabit Ethernet (1000BASE-T) with FC lower Protocol

No.	Item	1000BASE-T (full duplex)	FC lower layer protocol
1	Cable	Category 5e9 or 6 (Copper)	Single/Multi Mode Fiber Optic cable
2	Connector type	RJ45	LC/SC
3	Transfer speed	Can communicate at a maximum of 1 Gbps per port.	Can communicate at a maximum of 4 Gbps per port by using the 4 Gbps Fibre Channel Interface Card.
4	Distance between direct attached nodes	Max 100 m	Max 10 km

4 Refer to Appendix B for installing Microsoft® iSCSI Software Initiator.

5 Network Interface Card. In this document, NIC includes not only the interface cards connected with PCI, PCI-X, or PCI-Express, but also network ports implemented on the mother board of the host.

6 Internet Fibre Channel Protocol, Fibre Channel over IP. They are technologies that communicates FC by way of IP.

7 Cyclic Redundancy Check.

8 Internet Storage Name Service. iSNS was standardized by IETF as RFC4171, in 2005 (http://www.ietf.org/rfc/rfc3720.txt).

9 Also called as Category 5 Enhanced or as Enhanced Category 5.

1.1.3 Points to Consider for designing IP-SAN

iSCSI makes it possible to construct IP-SAN by connecting many hosts and disk arrays at a low cost. On the other hand, loads of network and disk array will increase. When using iSCSI, it is required to design a system configuration that distributes the loads concentrated on the network, port, controller, and disk drive.

Followings are points to consider for designing IP-SAN. Though switches and NICs are the same to LAN (Local Area Network), points to consider are different, especially from the office LAN.

- iSCSI consumes almost all the bandwidth of Ethernet, whereas LAN is usually designed and constructed to consume a fraction of the band of Ethernet for communication. If IP-SAN is made to exist together to the office LAN, the cost to construct is low, but IP-SAN and office LAN mutually affects negatively.
  - iSCSI traffic disturbs LAN traffic.
  - Collisions among iSCSI traffic and LAN traffic occurs and packets will be lost. So iSCSI transfer performance will be decrease considerably.

  Thus, IP-SAN and office LAN strongly recommended to be separated.
- Packet loss will cause TCP congestion control and that will let iSCSI transfer performance slow down. Packet loss and congestion control is unavoidable at network, but to minimize the probability of them is effective to keep iSCSI performance. It is very important to minimize the probability of packet loss.
- Conditions of host accesses influence the performance of iSCSI traffic (actual amount of data transfer per second, response time, etc.). Moreover, the larger the number of initiator to an iSCSI resource (port, controller etc.) of a diskarray becomes, the lower the iSCSI performance viewed from each initiator will become.
- The market of network equipments is huge and various venders have entered there. As a result of the market competition, prices of network equipments are lower than those of FC equipments. The customer can apply such equipments to construct IP-SAN at a low cost. However the whole system's reliability depends on each equipment. So please decide the equipment to adopt carefully. IP-SAN should not use to the communication of mission-critical data.
- When high performance and high reliability are required for the system, to apply FC is recommended than to apply iSCSI.
- The failover path between host and DF700 iSCSI makes it possible to update the micro-program of DF700 iSCSI without stopping the system. Without such failover path, updating micro-program needs to stop the service of object controller.
- Using NIC for iSCSI communication, the NIC will handle not only iSCSI traffic but also non-iSCSI traffic as required OS or other services.

1.2 DF700 iSCSI

1.2.1 Characteristics of DF700 iSCSI

Installing iSCSI interface board (option), DF700 can communicate to host with iSCSI. That configuration is expressed as “DF700 iSCSI” in this document. Characteristics of DF700 iSCSI are as follows:

- DF700 iSCSI communicates through IP network constructed on Gigabit Ethernet.
- Applying LUN Manager (optional program), max 128 (255: the micro program version 0750/A or later) iSCSI targets (thereafter, simply written as “target”) can be defined under an iSCSI port. As LU mapping and host connection mode are configured per target, each host can access separate logical iSCSI storage (i.e. target). Thus it comes to be able to set LU configuration and access authentication flexibly.
- DF700 iSCSI authenticates a host (or a user of hosts) by setting the authorized user of the access and the Secret, and determines which user can access which target. Moreover, DF700 iSCSI can authenticate hosts for individual target of plural targets by using the LUN Manager together.
- Using both ports on a controller, the total performance does not reach twice the maximum performance of one port.
- Operation and management of the features not related iSCSI communication (e.g. RAID group, LU configuration etc.) are the same as FC communication to hosts.
- User management ports and maintenance ports, which communicate to Storage Navigator Modular, are the same as usual and do not support iSCSI. Those ports communicate with 10/100BASE-T.

1.2.2 Specifications of iSCSI

The specifications of DF700 iSCSI are shown in Table 1.3.

Table 1.3 DF700 iSCSI specifications

No.	Protocol layer	Item	DF700 iSCSI	Remark
1	General	iSCSI target function	Support	
2		iSCSI initiator function	Not Available	
3		iSCSI ports	2 iSCSI ports/controller (Max 4 iSCSI ports/disk array)	
4		Connecting hosts at a time	Max 128 (255: the micro program version 0750/A or later) hosts/iSCSI port	With Linux software initiator, the max number will be decrease. (See the notification of section 2.7)
5		Path failover	-	Not supporting Microsoft® MPIO (Multi Path IO)
6	Physical layer,	Link	1000BASE-T (full duplex)	Only 1000BASE-T (full duplex) is available to the directly connected port.
7	MAC layer	Transfer speed	1000 Mbps (full duplex)	
8		Connector type	RJ45	General type of LAN connector
9		Cable	Category 5e or 6 (Copper)	Please refer to the manual of the connected equipment to check which cable type should be used straight or cross10.
10		Network switch	L2 switch, L3 switch	Should be compliant to IEEE802.3ab (1000BASE-T (full duplex))
11		Switch cascading	Max 5	Minimum number of cascading is recommended.
12		MAC address	Per port (fixed value)	Factory setting: World Wide Unique value. Unchangeable.
13		Max Transfer Unit (MTU)	1500 bytes (Ethernet frame)	Unchangeable
14		Jumbo frame	Not Available	
15		Link aggregation	Not Available	
16		Tagged-VLAN	Not Available	Meanwhile port VLAN on a switch is available as long as it is transparent to DF700 iSCSI.
17	IP	IPv4	Support	
18		IPv6	Not Available	
19		Subnet mask	Support	
20		Gateway address	Support	
21		DHCP	Not Available	
22		DNS	Not Available	

10 To generic NIC, HBA and switch port, it is possible to connect with both straight cable and cross cable.

No.	Protocol layer	Item	DF700 iSCSI	Remark
23		Ping (ICMP ECHO) transmit/ receive	Support	See the notification of section 2.7.
24		IPsec11	Not Available	
25	iSCSI	TCP port number	3260	Changeable among 1-65,535, but be careful for changing: (1) the setting of the corresponding host should be also changed to login the new port number, (2) the new port number might conflict other network communication or be filtered on some network equipment. As results, there is a possibility that unable to communicate through the new port number.
26		iSCSI Name	Both iqn12 and eui13 type are supported	iqn value, which is World Wide Unique, is automatically set when a target is made. iSCSI Name is Configurable.
27		Error Recovery Level	0 (zero)	Error recovery by retrying from the host. Not supporting Level 1, 2
28		Header digest	Support	Detects header error or data error of iSCSI communication. DF700 iSCSI follows the setting of the host about the digest. When digest is enabled, the performance will degrade. (How much the performance will degrade depends of the performance of host, the transaction pattern, etc.)
29		Data digest	Support	
30		Max numbers of connections at a time	Max 128 (255: the micro program version 0750/A or later) connections/iSCSI port	
31		CHAP	Support	Authentication: the login request is sent from proper host, for the storage. CHAP does not supported in discovery session.
32		Mutual CHAP	Support (If connected to Linux software initiator, Not Available)	Authentication: the login request is sent to proper storage, for the host. Also referred to as two-way authentication.
33		CHAP User registration	Max 256 (512: the micro program version 0750/A or later) users/iSCSI port	
34		iSNS	Support	With iSNS (Name service), a host can discover a target even not knowing IP address of the target.

11 IP Security. Authentication and encryption of IP packets. DF700 iSCSI does not support IPsec.

12 iqn: iSCSI Qualified Name

The iqn consists of a type identifier, “iqn”, a date of domain acquisition, a domain name, and a character string given by a person who acquired the domain.
Example: iqn.1994-04.jp.co.hitachi:rsd.d7m.t.10020.1b000.Tar

13 eui: 64bit Extended Unique Identifier
The eui consists of a type identifier, “eui” and an ASCII coded hexadecimal EUI-64 identifier.
Example: eui.0123456789abcdef

1.2.3 Settings of DF700 iSCSI

The settings of DF700 iSCSI are shown in Table 1.4. The setting can be added, modified, or deleted by Storage Navigator Modular. When adding, modifying, or deleting the setting, it is not necessary to reboot the Disk Array subsystem. However configuring the setting when communicating to hosts will close related connections with hosts on the same controller.

Table 1.4 Settings of DF700 iSCSI

No.	Item	Details
1	Target	• iSCSI initiator in a host logs-in iSCSI target of DF700 iSCSI. • Target 0 (zero) is set as default. • Up to 128 (255: the micro program version 0750/A or later) targets can be set for each Port by purchasing the LUN Manager.
2	Setting/Deleting a target	• Purchasing the LUN Manager, targets 1 through 127 (1 through 254: the micro program version 0750/A or later) can be set or deleted. • Target 0 (zero) cannot be deleted. In order to delete iSCSI Name, options, and LU Mapping of target 0 (zero), initialize target 0 (zero).
3	Target alias	• It is required to set a target alias when the target is created. • The target alias can also be changed.
4	iSCSI Name	• Used for identifying initiators and targets. iSCSI Name need to have World Wide Unique value. • iqn and eui are supported. • iSCSI Name of a target is automatically set as a World Wide Unique when initializing the target. The value can be changed by purchasing the LUN Manager, however the customer need to assure the World Wide Uniqueness of the new iSCSI Name14.
5	iSCSI User Name	• Used for identifying an initiator itself or a user who use the initiator at the process of CHAP authentication. • Up to 256 (512: the micro program version 0750/A or later) iSCSI User Name accessing iSCSI targets, can be set for an iSCSI port. • The same iSCSI User Name cannot be set to the other target of the same port with another Secret.
6	iSNS	• If IP address of iSNS server is set, iSNS can be used for discovery.
7	Login Authentication	• None, CHAP is supported. None: always no authentication, CHAP: always CHAP authentication is executed, None, CHAP: Follows to the host setting. When the host also presents “None, CHAP” in login, CHAP authentication is executed. • Mutual authentication is supported
8	LU Mapping	• LU Mapping can be set per a target. • Up to 256 LU Mappings can be set for a target. Up to 256X128 (256X255: the micro program version 0750/A or later) LU Mappings can be set for a Port. (However the max number should not exceed the max number of LU per port.)

14 If new iSCSI Name is not World Wide Unique and overlapped to other one as a result, the communication will not be guaranteed.

No.	Item	Details
9	Concurrent use of LUN Manager	• Up to 128 (255: the micro program version 0750/A or later) targets can be set by using the LAN Manager together.

1.2.4 Requirements for using iSCSI

The requirements for using iSCSI are shown in Table1.5. See section 2.7 for construction and operation of IP-SAN.

Table 1.5 The requirements for using DF700 iSCSI

No.	Item	Conditions
1	Hardware	iSCSI interface board needs to be installed. When updating a host interface of DF700S, please confirm the manufacturing number of a basic chassis and contact your local Hitachi sales office. It is necessary to update the controller of DF700S according to its shipment time.
2	Means of making setting	Storage Navigator Modular of the version 3.00 or later, which corresponds to the micro program, is required. (For example, use Storage Navigator Modular of the version 5.00 when the micro program of the version 0750/A is installed.)
3	Micro program revision	For DF700XS, DF700S, and DF700M: micro code version 0730/B or higher is required. For DF700H: micro code version 0732/A or higher is required.
4	Concurrent use of other optional functions	TrueCopy remote replication cannot be used.
5	Network equipments	Switch, NIC and HBA that is directly connected with iSCSI port of DF700 should support IEEE 802.3ab (1000Base-T (full duplex)).
6	Network cable	Category 5e or Category 6 is required.
7	Host OS	Refer to the most recent product announcement or contact your local Hitachi sales office for supporting OS. Meanwhile operation under virtual OS environment is not supported.
8	Host NIC	iSCSI interface of Host should be either a network port on the motherboard or a NIC that is recommended by the vendor of the host.
9	ISNS	When using iSNS client function of DF700, Microsoft® iSNS Server 3.0 needs to be available on the same IP-SAN so as to be registered target information.

1.3 System Configuration Example

The Direct Attached and the Network Switch connection (Network Attached) are supported as the connection methods, and the IP-SAN using the Layer 2 network switch/Layer 3 network switch can be constructed.

Configured only 1 path in 1 port, it might take long time to recover for the cable tie changing the reconnecting at the failure. On the other hand, the configuration having redundant paths will make maintenance easy as the exchanging micro-program is possible while even the disk array is operating.

Section 1.3.1 shows examples of direct attached configuration and section 1.3.2 shows examples of network attached configuration. In each figure,

0A, 0B, 1A, 1B: iSCSI port of DF700 to communicate with hosts,

GbE: Gigabit Ethernet link,

L2 switch: Layer 2 network switch,

L3 switch: Layer 3 network switch,

Broken line: standby path.

Note: At a Configuration without redundant paths (like Figure 1.6), the recovery means at the failure is limited, and there is a risk that requires a lot of time to recover in no composition of tedium in communication path.

1.3.1 Direct Attached

Figure 1.2 Direct Attached-1

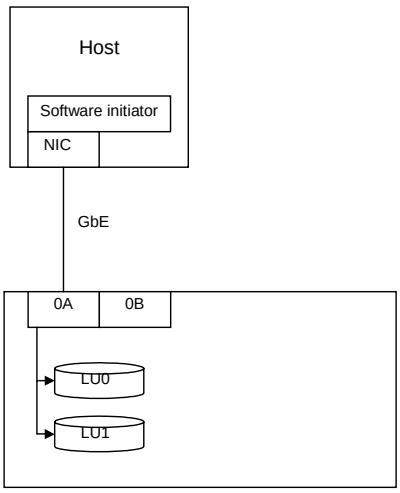


Figure 1.3 Direct Attached-2

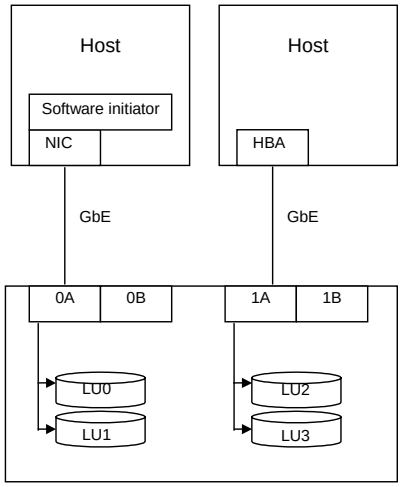


Figure 1.4 Direct Attached-3

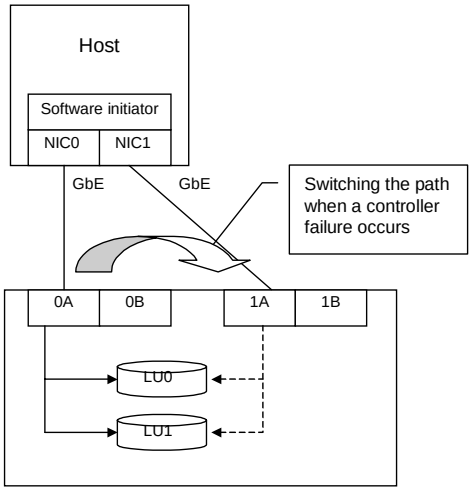


Figure 1.5 Direct Attached-4

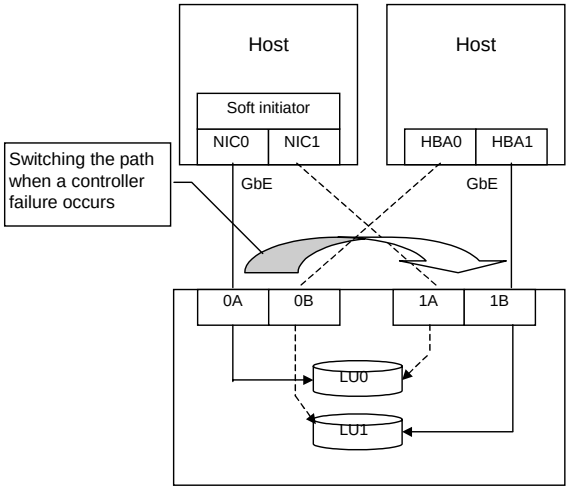
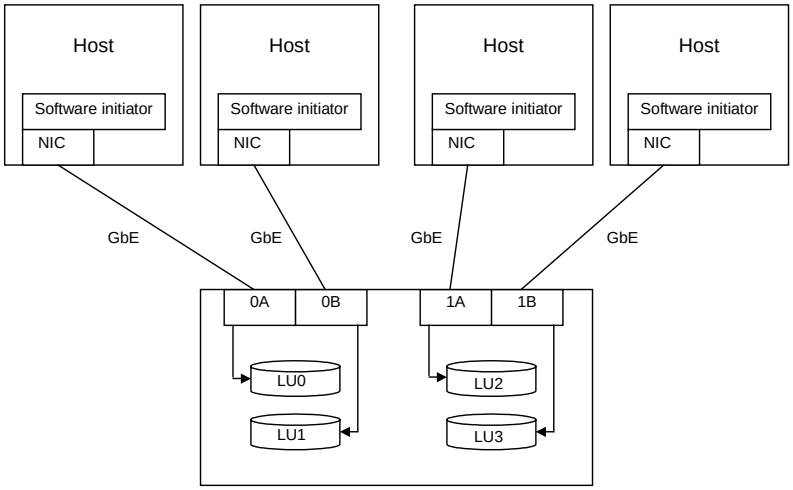


Figure 1.6 Direct Attached-5



1.3.2 Network Switch Attached

Figure 1.7 Network Switch Attached-1

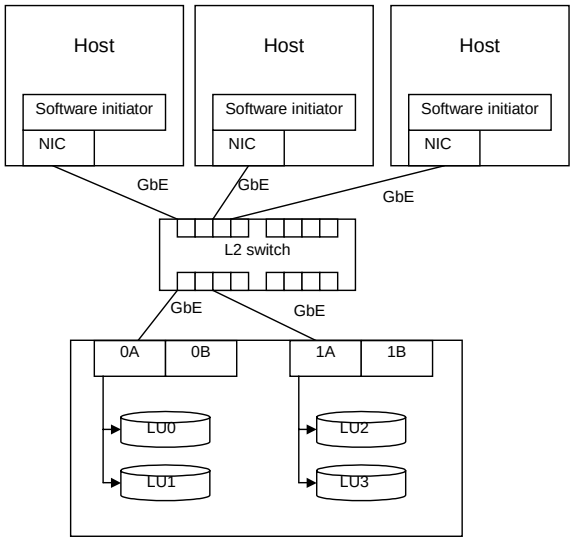


Figure 1.8 Network Switch Attached-2

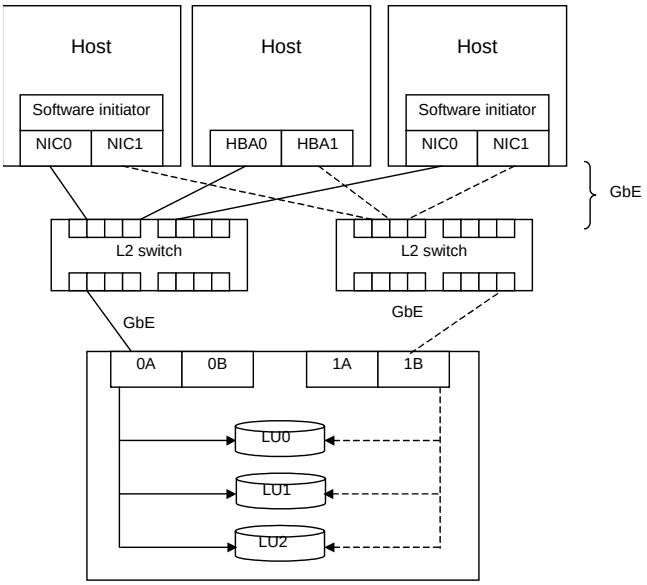
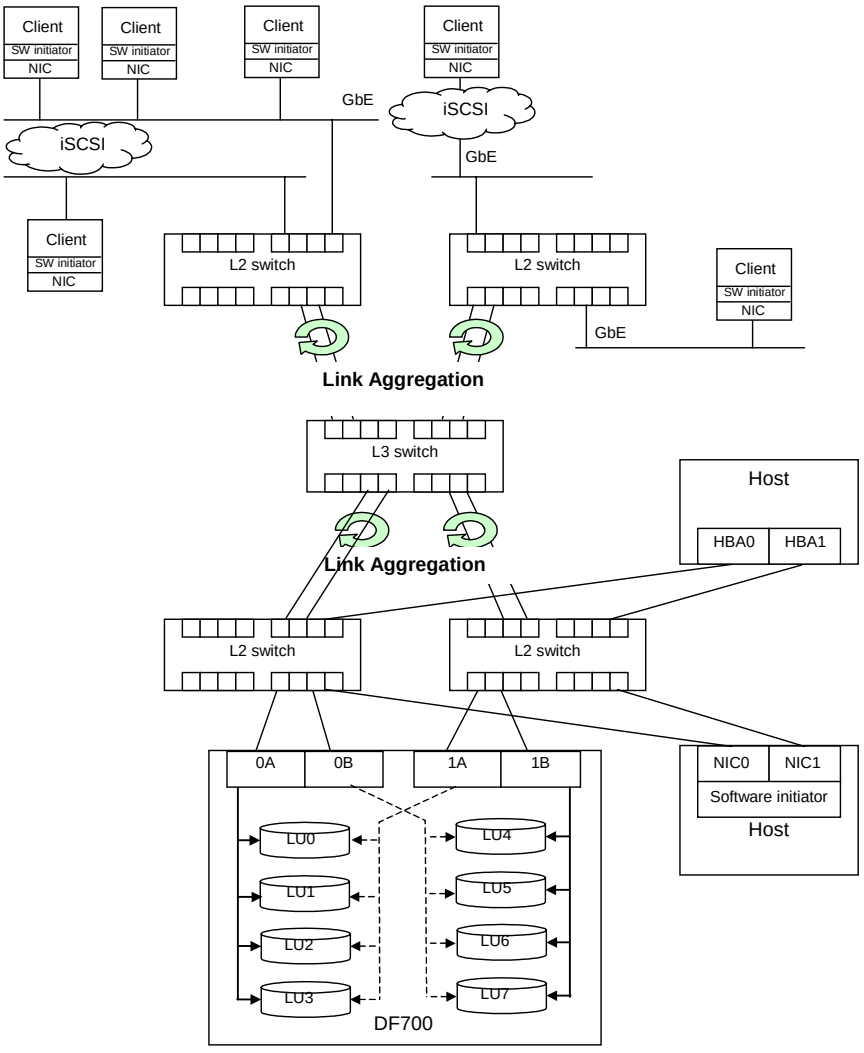


Figure 1.9 Network Switch Attached-3



2 Configuring of iSCSI

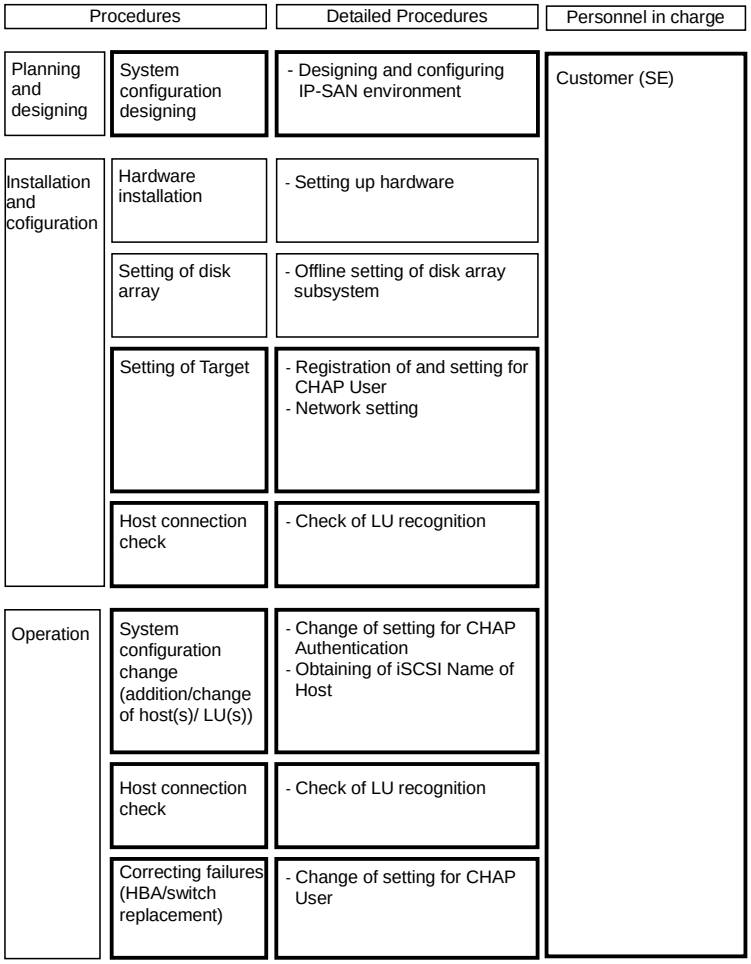
This chapter explains procedures for configuring and using iSCSI. Actions to be taken when failures occur are also explained.

2.1	Overview
2.2	System Design
2.3	System Configuration
2.4	Test of Host Connection
2.5	Adding and Replacing Equipment
2.6	Multi-Interface Configuration
2.7	Notes in Construction and Operation of IP-SAN

2.1 Overview

The procedures required to install and use iSCSI are shown in Figure 2.1.

Figure 2.1 Flow of Operations Required for Using iSCSI



2.2 System Design

System design should consider each of the following.

2.2.1 Deciding the Number of Hosts, Storage Capacity and Bandwidth

- Deciding the number of hosts which communicate with the diskarray(s)

  The scale of IP-SAN will be influenced.

- Deciding the storage capacities that each host will access.

  If the total capacity is too much than DF700 can be accessed, more disk array will be needed. Thus the scale of IP-SAN will be influenced.

Note: DF700 iSCSI does not support the operation as network boot disk. Don't use DF700 iSCSI as a netboot device. Storage of User data will be appropriate.

- Estimating the bandwidth to be used by the hosts.

  Required bandwidth depends of the application software. In general, only for office application, such as document making and spreadsheet handling, a host need as more as average 5 MB/s bandwidth or so. However, if many access from hosts concentrate to a port, heavy load to the network and disk array will be caused. Thus, periodical accessing program (e.g. scanning of anti-virus software etc.) should be executed one by one at a time, in order to avoid the concentration of loads.

2.2.2 Confirm the Settings of Each Hosts

- Confirm the kind of OS

  Each host should have OS supported by DF700 iSCSI.

- Deciding the interface of the host

  Deciding which method is used in a host, ISCS HBA or NIC+ iSCSI software initiator. The performance of NIC+ iSCSI software initiator will be affected by the specifications of the host (CPU, memory size).

Table 2.1 The characteristics of the ways to iSCSI support

Interface	Cost	Load of host CPU
ISCSI HBA	iSCSI HBA is required. That costs much than NIC + software initiator collection.	Relatively low, as HBA offloads most protocol processing.
Controlling a NIC by iSCSI Software initiator driver	Network port already the server has on its mother board or NIC is required. Such cost is less than that of HBA.	Relatively high

2.2.3 Preventing Illegal Access

Decide to apply CHAP authentication, LUN Manager (option), or both in order to prevent illegal access. Moreover, to constitute IP-SAN completely isolated from external networks is effective.

- Closed IP-SAN

  In the point of view of security, it is effective to design IP-SAN completely isolated from the other external networks.

- CHAP authentication

  The user is authenticated using the CHAP. It is required to register the CHAP user who is authorized of the connection and the Secret in the disk array subsystem.

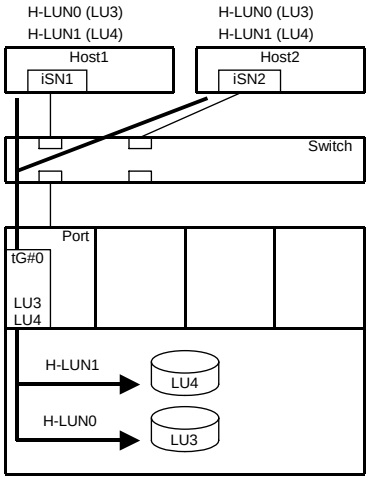
- LUN Manager

  Determine input/output paths between hosts and LUs according to the assignment mode using LUN Manager. The input/output path is a route through which access from the host is permitted.

The user can be authenticated for each target by using the LUN Manager together. When connecting hosts and one port of the disk array subsystem using the network switch, a control to distinguish accessible host is required for each LU.

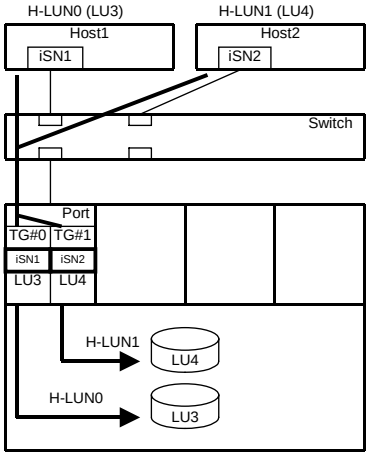
When assigning LU3 to Host 1 and LU4 to Host 2, both hosts can access the same LU if the LU mapping is set alone as shown in Figure 2.2. When LUN Manager and CHAP are used in this case, the host (iSCSI Name) access to each LU can be distinguished even in the same port as shown in Figure 2.3.

Figure 2.2 A Case Where Only LU Mapping is Set



(TG: Target, iSN: iSCSI Name)

Figure 2.3 A Case Where LUN Manager and CHAP Authentication is Used



(TG: Target, iSN: iSCSI Name)

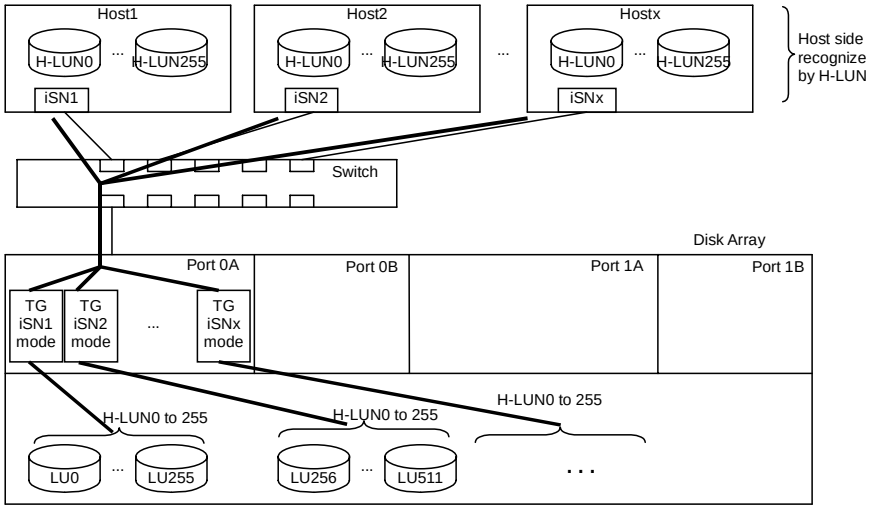
2.2.4 Assigning Targets and LUs to Hosts

Groups of LU, for which certain hosts are allowed to access, are associated to a target by LU mapping. To apply CHAP authentication, the required configurations (username, Secret) can be set per target. Max 128 (255: the micro program version 0750/A or later) targets can be defined for an iSCSI port.

Up to 256 LU Mappings can be set for a target. The host recognizes LUN(s) in the range between H-LUN0 and H-LUN255. A Host computer will specify a target by iSCSI Name and will access LU that is mapped to the target. Figure 2.4 shows address setting, target setting and LUN mapping for an iSCSI port.

Up to 256 LU mapping ×128 (255: the micro program version 0750/A or later) target can be set for a Port.

Figure 2.4 Number of LU mappings that can be set for targets



(iSN: iSCSI Name, TG: Target)

2.2.5 Make a Decision about Redundancy

Each component, path of IP-SAN might be doubled if necessary.

- At a Configuration with redundant paths, the tolerance for failure is higher. But the cost to construct and operate the IP-SAN soars.
- At a Configuration without redundant paths, many hosts could be attached at a low cost. Total performance does not exceed certain level, even lots of host is logged-in a disk array. But in that configuration, the recovery means at the failure is limited, and there is a risk that requires a lot of time to recover in no composition of tedium in communication path.

When it is necessary to exchange a controller, it is necessary to ensure the time of the maintenance for the exchange of the controller. During exchanging a controller, all hosts who use that controller without redundant way to access will be unable to use the disk array.

When building the system that can be shutdown every day, failures will not seriously impact the operation of the system even the system does not have redundant communication paths.

There are various ways and degrees to construct redundant SAN, for example, redundant switch is used but the connections to the controllers are not redundant. There are also switches that can reroute the communication path to working path automatically at the time of the failure.

When increasing the degrees of the duplication of the IP-SAN component, the low cost advantage of IP-SAN will be lost. For constructing high reliability system, FC is recommended instead of iSCSI.

2.2.6 Deciding connection number to iSCSI ports

By consolidating plural host connection to an iSCSI port, it is possible to connect an iSCSI port up to max 128 (255: the micro program version 0750/A or later) hosts. On the other hand, there are limits for processing commands and transfer capacity of a port. If too much load exceeds such limits, the performance of the port will degrade.

Maximum bandwidth of one iSCSI port is at most 100 MB or so, according to a physical limit of Gigabit Ethernet. When the communication frequency of an iSCSI port becomes more than is this limit, the delay and the timeout of commands will occur frequently. In that case, it is recommended to decrease the number of hosts and I/Os, or to increase the number of disk arrays.

When the heavy load I/O is processed in the state in which many hosts are connected to a port in the DF700 iSCSI, there may be a case where the operation performance is deteriorated. Generally speaking, the heavier the load becomes, the longer the response time becomes. Degrees of the performance deterioration and the response delay depend on the number of the connected hosts, performance of the hosts, applications, network configuration, etc.

Example 1: The operation with 255 hosts/port is possible in the network in which the time required for communication from and to the host is 1 ms or less if the use of the network is limited to the office applications in which disks are accessed not frequently. However even in this case, it is recommended to limit the number of the hosts, which execute the heavy load virus scanning at the same time, to up to 50 or so (stagger the time for the scheduled virus scanning).

Example 2: In the case where the database or the like is accessed very frequently, reduce the number of the connected hosts per port. As to the database servers that require the line speed to be 20 MB/s, for instance, log in only five of them per port.

2.2.7 Deciding on whether to use iSNS

DF700 iSCSI supports iSNS. When operating many iSCSI storage systems, iSNS is effective. To introduce iSNS, it is necessary that iSNS is connected to IP-SAN and it is accessible from DF700 iSCSI and the host. Refer to Appendix C for installation of iSNS.

Introducing iSNS into the IP-SAN has advantage and disadvantage:

- Advantage: When there is a change in iSCSI Name or the IP address of the target, there is no need to retype in from all of the connecting initiators. Because information on the target that can be taken from iSNS is updated, please login again according to the information after update.
- Disadvantage: A server attached to the IP-SAN is required to install and provide iSNS service. Make sure to prevent the load concentrate.

2.2.8 Designing Network

Network connections among hosts and disk arrays should be designed.

- Select whether to use or not to use network switches.
  - If the number of hosts to connect is greater than the number of iSCSI ports, network switches are needed to connect them.
  - DF700 iSCSI cannot connect directly to the switch as long as that does not support 1000BASE-T (full duplex), however a switch which supports both 1000BASE-T (full duplex) and 1000BASE-SX or 100BASE-TX will make DF700 iSCSI possible to communicate with 1000BASE-SX or 100BASE-TX.

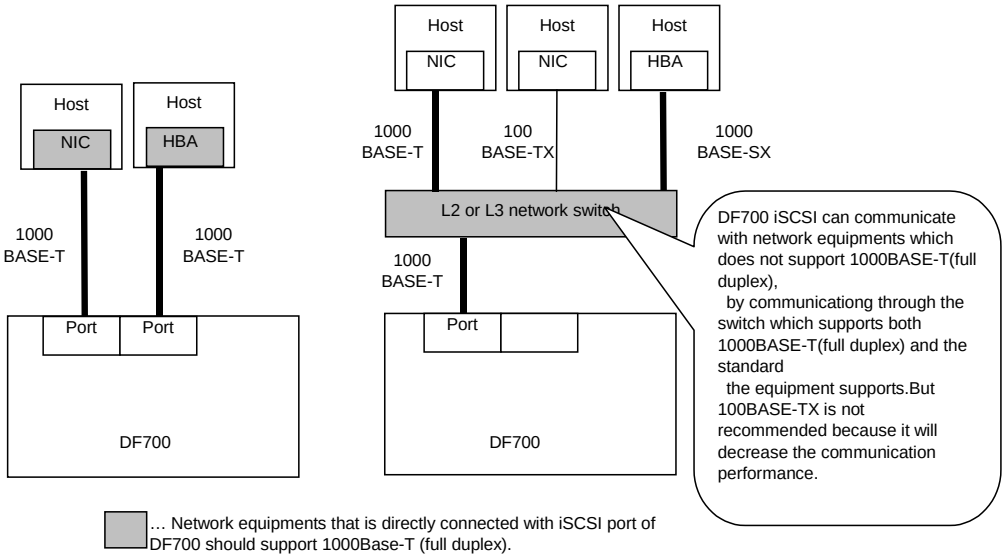
Note 1: All connections direct to iSCSI in the IP-SAN should be 1000BASE-T (full duplex)15.

Note 2: 100BASE-T will decrease the performance of IP-SAN. It is recommended to apply 1000BASE-T(full duplex) for all connections.

Note 3: DF700 iSCSI doesn't support directly or indirectly to attach to the network peripheral which only supports 10BASE.

15 On the other hand, management ports and maintenance ports of DF700 only supports 10/100BASE.

Figure 2.5 Notice about network connection



– Feature of the network switch will be available, as long as that is transparent to disk arrays. (port base VLAN etc.)

Note 4: DF700 iSCSI doesn't support either tagged VLAN or link aggregation. The packets to transfer such protocols should filtered out in switches.

– When IP-SAN is designed, cautions same to build IP network with gigabit Ethernet, is also necessary. Especially, overlapping of addresses or connecting loop-shape made in a subnet will cause serious degrade of communication performance and even cause disconnections.

– If a network switch with the network management function such as SNMP, it can know the trouble of the communication route and the ratio of the packet loss. Please refer to the manual of the switch for use. A low-cost network switch has something without such a function. In that case, it might be delayed to aware the failure or the analysis of the trouble become difficult.

– It is required to separate an IP-SAN (i.e. the network on that iSCSI communication is done) from the other network (management LAN, office LAN, other IP-SAN etc.) when you need the performance of iSCSI communication or security of iSCSI communication. Port VLAN function of a switch will be able to separate the networks logically.

– When multiple NICs are installed in a host, they should have addresses as belonging to different network segments16.

16 For example, IP address of NIC1 is 172.16.0.221 and that of NIC2 is 17.16.1.222. The address of different NICs should be segmented.

- Network settings of iSCSI ports should be decided.
  - Make sure to set the IP address (IPv4) to each iSCSI port, so as not to overlap the other ports (including other network equipments'). Then make sure to set appropriate subnetmask and default gateway address to the port.
  - Targets are set to the subordinate of iSCSI ports. Target 0 is made in default for each iSCSI ports.
  - Each iSCSI target is assigned its iSCSI name automatically.

2.2.9 Avoiding RAID Group Conflicts

When two or more hosts are connected to a disk array subsystem and LUs assigned to each host belong to the same RAID group, concurrent access to the same disk drive will occur. Because of this conflict for access to the disk drive, performance may decrease. Basically, LUNs in one RAID group should only be accessed by one host. To avoid a conflict, you should never have more than one host access multiple LUNs in one RAID group.

The number of RAID groups that can be created is determined by the number of mounted disk drives and the RAID level of the RAID groups to be created. If unable to create as many RAID groups as hosts to be connected, organize the RAID groups according to operational states of the hosts (see Figure 2.6 and Figure 2.7).

Figure 2.6 In the Case of the Same RAID Group

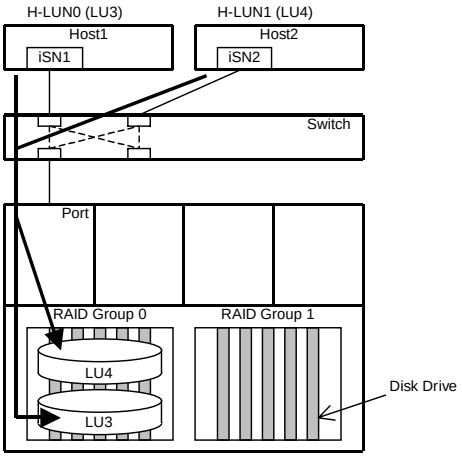
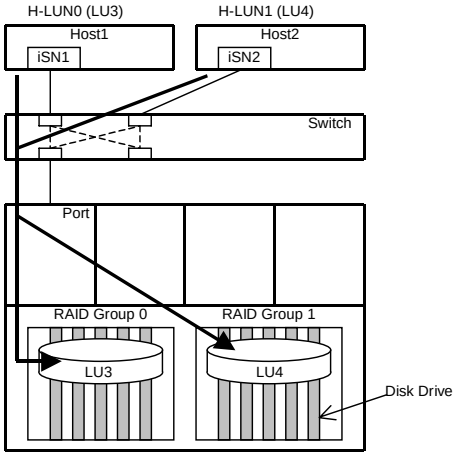


Figure 2.7 In the Case of Respective RAID Groups



2.2.10 Other point

DF700 iSCSI supports both iSCSI Header digest and iSCSI Data digest. Make a decision whether to use iSCSI digest or not to use iSCSI digest:

- Advantage: data is assured on network as these check code are used to check data integrity.
- Disadvantage: processing power is consumed at hosts and disk arrays, in order to generate and check the data digest code.

In many cases if iSCSI digest enabling, the performance of transfer decreases to about 90% owing to the disadvantage. (This rate will be affected by network configuration, hosts' performance, hosts' application etc.) iSCSI Header digest and iSCSI Data digest should be used with L3 switch (including router) in the link of hosts and DF700 iSCSI port.

2.3 System Configuration

System configuration entails doing the following:

- Setting a network consisting of hosts and disk array subsystems
- Making setting for LUN Manager

  Set the following for the disk array subsystem in order to specify input/output paths between hosts and LUs using LUN Manager (option). It is recommended to connect DF700 iSCSI to IP-SAN after setting LU mapping and CHAP User and Secret, in order to prevent illegal access. (Please refer LUN Manager User's Guide for setting parameters)

  - Target
  - iSCSI Name of HBA
  - LU mapping
  - Host connection mode

  It is necessary to manage the settings that have been made for the disk array subsystem keeping a documented record. When an HBA is replaced, change the iSCSI Name accordingly. In this way, you can identify the iSCSI Name that was set before the replacement by referring to the record.

- Registering CHAP User

  The user is authenticated using the CHAP. Set the target, the CHAP user and the Secret, which authorize the connection to the disk array subsystem. (Please refer DF700 Disk Array Subsystem User's Guide for setting parameters)

  - Target
  - CHAP User and Secret

  It is necessary to manage the settings that have been made for the disk array subsystem keeping a documented record. When an HBA is replaced, change the iSCSI Name accordingly. In this way, you can identify the iSCSI Name that was set before the replacement by referring to the record.

  CHAP authentication information can be imported by a CSV format file. (Please refer to Storage Navigator Modular (for GUI) User's Guide.) On the other hand, the function to output CHAP authentication information is not provided, from the consideration on security.

  Note: Please manage the documented record and the CSV format file of CHAP authentication information strictly to prevent illegal access.

- Setting Option function

  It is required to examine the iSCSI name to be registered for the CHAP authentication. Refer to the user's guide for the method of acquiring the iSCSI Name for each platform and each HBA. Set the port-based VLAN of the Network Switch if necessary.

2.3.1 Setting of iSCSI Network

Refer to the DF700 Disk Array Subsystem User's Guide for setting of iSCSI network.

2.3.2 Setting of LUN Manager

Refer to the LUN Manager user's guide for setting of LUN Manager.

2.3.3 Setting of CHAP User

Refer to the DF700 Disk Array Subsystem User's Guide for setting of CHAP User.

2.4 Test of Host Connection

Whether the host can be recognized from the DF700 iSCSI as the system construction design is confirmed, please refer to the user's manual for the method of recognizing the host LU. If the host LU cannot be recognized from DF700 iSCSI, please solve the problem by referring to the network system trouble shooting in the user's guide.

2.5 Adding and Replacing Equipment

After installing iSCSI, you must perform the following tasks:

- Add a host and HBA

  When assigning LUs within the disk array subsystem to a host and an HBA, add a target to the disk array subsystem. When adding a setting of CHAP, it is not necessary to restart the disk array subsystem. Execute a host boot or the disk recognition command after making a setting of CHAP.

- Add an LU

  When adding an LU to the disk array subsystem and assigning it to a host that has been connected, add a mapping of the LU to the target to which the host belongs. When adding the setting for CHAP, it is not necessary to restart the disk array subsystem. Execute a host boot or the disk recognition command after making a setting of CHAP.

- Replace HBA

  When replacing an HBA of a host, the setting for CHAP must be modified. Change the iSCSI User Name of the HBA. If you do not make this change, the host will not be able to access the LU after the replacement of the HBA.

  Each setting for CHAP must be documented when the configuration is created so that the previous setting can be reviewed before making a change to the setting.

- Replace the switch

  When the Network Switch is replaced, it is required to set the same connection as before the replacement to the Switch after the replacement.

When the exchange and the composition change of equipments are done, it is required to test to connect host and to let host recognize the LU.

2.6 Multi-Interface Configuration

DF700H can be equipped with maximum 2 of the following interfaces on the array controller. One array can be connected to multiple types of interfaces.

- Fibre Channel : FC interface board
- NAS : NAS interface board
- iSCSI : iSCSI interface board

2.6.1 Interface Board Configuration Rule when Mixing Interfaces

Install the interfaces on DF700H by following configurations only.

Table 2.2 Location of Interface Board

Case#	Location	
	Interface Board #0	Interface Board #1
1	FC interface board	–
2	–	NAS interface board
3	iSCSI interface board	–
4	FC interface board	FC interface board
5	FC interface board	NAS interface board
6	iSCSI interface board	FC interface board
7	iSCSI interface board	NAS interface board

- Conditions/cautions for interface intermix
  - Be sure to use same type of interface on same locations on controllers #0 and #1.
  - Install iSCSI boards only on interface board #0.
  - Install NAS boards on interface board #1 only.
  - If the type of the installed interface board is changed, all of the configuration setting described below will be cleared for that changed port. Please redo the setting after exchanging the interface board.

  a) Host group information/target information

  b) Host group options/target options

  c) Mapping information

  d) Fibre Channel port setting information/NAS connection information/iSCSI port setting information

  e) CHAP security information (iSCSI)

2.6.2 Cautions for Interface Intermix

- Cautions when intermixing Fibre Channel and iSCSI interfaces

  When intermixing Fibre Channel and iSCSI interfaces, the following conditions/cautions must be met.

  - Install iSCSI board onto interface board #0 only.
  - It is possible to access the same LU from Fibre Channel interface and iSCSI interface, as was with multiple Fibre Channel ports. However, if exclusive access is necessary at the application level, then it is recommended to install exclusive access by LU mapping, as was with multiple Fibre Channel ports.
  - CCI can be used shared between Fibre Channel and iSCSI interfaces. Therefore, it is possible to manage the LU used from Fibre Channel interface via the iSCSI interface.
  - Path failover software (such as HDLM) and cluster configuration between Fibre Channel and iSCSI interfaces are not supported.

- Cautions when mixing iSCSI and NAS interfaces

  When intermixing iSCSI and NAS interfaces, the following conditions/cautions must be met.

  - Install iSCSI board onto interface board #0 only, and NAS board onto interface board #1 only.
  - When both iSCSI and NAS interfaced are used, be sure to perform LU mapping on all created LUs, and make sure that LUs used by iSCSI and LUs used by NAS are mapped exclusive of each other.
  - When intermixing iSCSI and NAS interfaces, it is recommended to use different partitions for NAS logical units and iSCSI logical units by using Cache Partition Manager function.
  - When both iSCSI and NAS interface are used, and when NAS OS is shutdown, booted, or rebooted while there is I/O load from the iSCSI Interface, there may be cases where the process abnormally ends (e.g. timeout).
  - When intermixing iSCSI and NAS interfaces, it is recommended to set user LUs and system LUs for NAS on RAID groups that are NOT used for LUs used for iSCSI access.
  - When both iSCSI and NAS interfaces are used, the load on NAS can have impact on the iSCSI, or vice versa. It is recommended to design the system with good performance margin.
  - When both iSCSI and NAS interfaces are used, iSCSI performance may be affected during such periods as failover processing due to NAS failure, or NAS maintenance operation (boot/reboot/shutdown of NAS OS, installation of NAS OS related Program Product). It is recommended to design the system with good performance margin.

2.6.3 Addition/Subtraction on iSCSI Interface Boards

Followings are cautions/procedures for adding or subtracting on iSCSI interface boards.

- Cautions
  - iSCSI boards can be installed only as interface board #0.
  - If the type of the installed interface board is changed, all of the configuration setting described below will be cleared for that changed port. Therefore, be sure to output the configuration information to keep a copy of the configuration setting before exchanging the interface board. CHAP information (except for the information of two-way authentication) can be input by a file but cannot be output to a file, for security reasons.

    a) Host group information/target information

    b) Host group options/target options

    c) Mapping information

    d) Fibre Channel port setting information/NAS connection information/iSCSI port setting information

    e) CHAP security information (iSCSI)
  - For the same location on controllers #0 and #1, the same type of interface boards must be installed.
- Procedures

1. Acquiring the configuration information

   Acquire the configuration information by the “Constitute” function of Storage Navigator Modular.

2. Stopping the disk array subsystem

   Turn off the main switch of the disk array subsystem. After stopping the disk array subsystem, turn off the AC input power switch.

3. De-installation of the controllers

   Remove off the attached cables, and then de-install the controllers.

4. Add/subtract on iSCSI interface boards

   Install or uninstall iSCSI interface boards on interface board #0, for each controller. If other interface board is already installed on interface board #0 in case of adding on iSCSI interface board, move that board from #0 to #1 before installing the iSCSI board.

5. Installation the controllers

   Install the controllers to the chassis of the disk array subsystem. Then connecting the cables.

6. Starting up the disk array subsystem

   Turn on the AC input power switch/main switch of the disk array subsystem to start up.

7. Setting the interface information

   Set the following configuration information about the iSCSI ports of the iSCSI boards. If interface boards (that was installed #0 and has moved from #0 to #1), set the following configuration information about the ports of these (moved) boards, too.

   a) Host group information/target information
   b) Host group options/target options
   c) Mapping information
   d) Fibre Channel port setting information/iSCSI port setting information
   e) CHAP security information (iSCSI)

2.7 Notes in Construction and Operation of IP-SAN

Keep the following in mind while using iSCSI:

- Target information must be accurate. If CHAP authentication information is set wrong, the system will not operate normally for the following reasons:
  - Initiator (user), which is intended to be allowed to login the target, cannot login actually.
  - Initiator (user), which is not intended to be allowed to login the target, can login actually.
- This function is not available when a host (OS or driver) cannot identify an LU without LUN0. It is necessary to set H-LUN = 0 to the target in this case.

Table 2.3 Combinations of OS and HBA for iSCSI

OS	Software initiator/HBA
Windows® XP	Microsoft® iSCSI Software initiator
Windows Server™ 2003	Microsoft® iSCSI Software initiator Qlogic® HBA
Linux®	SourceForge iSCSI Software initiator Qlogic® HBA

- When you replace an HBA in a host attached to a Disk Array subsystem using target, be sure to change the iSCSI Name setting in CHAP.
- Transmit/receive Ping
  - DF700 iSCSI port responds ping up to 404 bytes payload.
  - DF700 iSCSI port does not respond ping more than 404 bytes payload.
- Sending PING to unreachable address might cause the delay of the host I/O processing on the controller. Especially pinging from both ports on a controller at a time cause I/O timeout. It is strongly recommended that ping test should be executed when no I/O exists on the controller.
- Please disable the Spanning Tree function for a physical port of the network switch connected directly with the host or DF700 iSCSI (see the manual of the switch to be used for the checking and setting methods). There is a possibility that the communication is obstructed by the Spanning Tree.

Windows® Host:

- When some trouble has been caused on the communication between DF700 iSCSI and a host, the cause will be either the host, the network or the DF700. Therefore, to solve the issue, the customer would be needed to research or analyze from the point of view of the host or the network in some case.
- Make sure to use powerful computer enough to operate Windows Server™ 2003/ Windows® XP without stress. Recommendation: CPU Pentium 4, Clock 2 GHz+, Memory 512MB+

- For a host, the Configuration of NIC with iSCSI software initiator needs more computing power than the configuration of HBA. Thus other applications, concurrently executing on the host, might be degraded their performances.
- The NIC or HBA that have the designed for Windows® logo is recommended to use.
- Please apply the service pack and the patch of the latest version to the OS, NIC and HBA drivers.
- On using Microsoft® iSCSI software initiator, be sure to use version 2.0. The lower version is not supported by DF700 iSCSI. For the higher version, please refer to the most recent product announcement or contact your local Hitachi sales office for information on feature and product availability.
- The service of application and OS not used is recommended to stop. As a result, an unnecessary communication and the load are reduced.
- Connection host and disk array through one or more switches, the NIC of the host is not necessarily support 1000BASE-T. However the performance might decrease. (It depends on the configuration of the IP-SAN.)
- When using iSCSI Data Digest and Header Digest (CRC/Checksum), though the reliability of data on the communication link is improve, the performance will decrease. The ratio of the decrease depends on the environment on the host and the network, etc. In most environments, the performance will decrease by about 10%. However with some old-fashioned HBA, the performance will decrease by 50% or more.

Linux® Host:

- When some trouble has been caused on the communication between DF700 iSCSI and a host, the cause will be either the host, the network or the DF700. Therefore, to solve the issue, the customer would be needed to research or analyze from the point of view of the host or the network in some case.
- For a host, the Configuration of NIC with iSCSI software initiator needs more computing power than the configuration of HBA. Thus other applications, concurrently executing on the host, might be degraded their performances.
- Mutual CHAP is not supported to communicate with Linux® software initiator.
- When using iSCSI Data Digest and Header Digest, though the reliability of data on the communication link is improve, the performance will decrease. The ratio of the decrease depends on the environment on the host and the network, etc. In most environments, the performance will decrease by about 10%. However with some old-fashioned HBA, the performance will decrease by 50% or more.
- Linux software initiator establishes two connections in order to communicate with a target. DF700 iSCSI can establish max 128 (255: the micro program version 0750/A or later) connections at the same time in an iSCSI port and it can communicate with max 128 (255: the micro program version 0750/A or later) hosts, however, the max number of the of hosts that can be communicated with will decrease when Linux software initiator are included in the hosts, according to the characteristic of above mentioned. For instance, when all hosts use Linux software initiator, DF700 iSCSI can communicate with 64 (127: the micro program version 0750/A or later) hosts or less in an iSCSI port.

Notes on iSCSI connection

- Do not change the host computer's registry (TCP/IP Stack). Use the default value.

Appendix A Acronyms and Abbreviations

CRC	Cyclic Redundancy Check
FC	Fibre Channel
HBA	Host Bus Adapter
H-LUN	Host Logical Unit Number
I/O	input/output
IETF	Internet Engineering Task Force
iSCSI	internet SCSI
iSNS	internet Storage Name Service
LU	Logical Unit
LUN	Logical Unit Number
NIC	Network Interface Card
RFC	Request for Comments
SAN	Storage Area Network
SCSI	Small Computer Systems Interface

Appendix B Installing of Microsoft® iSCSI Software Initiator

B.1 What is Microsoft® iSCSI Software Initiator?

It is iSCSI software initiator for Windows® 2000/Windows Server™ 2003/Windows® XP which Microsoft® offers. You use general NIC and can be connected to a host in iSCSI without installing iSCSI HBA by introducing this software.

B.2 Download

1. On the Web, connect to http://www.microsoft.com/.
2. Select **Downloads**.
3. Search **iSCSI initiator**.
4. Select Microsoft® iSCSI software initiator, download it to your PC.

B.3 Installation of Microsoft® iSCSI Software Initiator

1. Double click the downloaded file and execute the installing.
2. Select **Next**.
3. Select **Next**.
4. Read the License Agreement and select **I Agree**. And select **Next**.
5. Select **Complete**.

B.4 Setting Microsoft® iSCSI Software Initiator

1. On the **Control Panel** of Windows, select **iSCSI Initiator**.
2. When applying two-way authentication (i.e. Mutual CHAP), push **Secret** button of the **General** tab beforehand here, and input Secret of the host and click **OK**. The length of Secret must be from 12-character (96 bits) to 16-character. In Microsoft iSCSI software initiator, Username of the host is not set for mutual authentication. Secret of the host doesn't depend on the logging target and only one secret can be set.
3. Select the **Discovery** tab. (Step 4 to 8 is about discovery. When applying iSNS, click **Add** button of **iSNS Server** area (on the iSCSI initiator) to input IP address of iSNS server and go to step 9.)
4. Select **Add** on the **Target Portals**. Then add the connecting Target.
5. Set the IP address of Target. If TCP port number of DF700 iSCSI is changed from 3260, input the TCP port number, too. After that, click **Advanced** button.

6. When applying **CRC/Checksum** (**iSCSI Data Digest, Header Digest**), check the corresponding check box. They are recommended to apply when L3 switch is used in the IP-SAN. When using iSCSI Data Digest and Header Digest, though the reliability of data on the communication link is improve, the performance will decrease. The ratio of the decrease depends on the environment on the host and the network, etc. In most environments, the performance will decrease by about 10%. However with some old-fashioned HBA, the performance will decrease by 50% or more.
7. Click on **OK** button. DF700 iSCSI doesn't support CHAP authentication in the Discovery session.
8. Click on **OK** button.
9. Select **Targets** tab. (Step 10-16 is about log on (log in) to the target.)
10. Select a logging target from the displayed targets and check **Logon** button.
11. When reconnecting automatically every time it does a host in the reboot in the future, check **Automatically restore this connection when the system boots** check box.
12. Click on **Advanced** button.
13. When applying **CRC/Checksum** (**iSCSI Data Digest, Header Digest**), check the corresponding check box. They are recommended to apply when L3 switch is used in the IP-SAN. When using iSCSI Data Digest and Header Digest, though the reliability of data on the communication link is improve, the performance will decrease. The ratio of the decrease depends on the environment on the host and the network, etc. In most environments, the performance will decrease by about 10%. However with some old-fashioned HBA, the performance will decrease by 50% or more.
14. When applying CHAP authentication at the time of the log on from this initiator, check **CHAP Logon Information** check box and input Username and Target Secret. The length of Secret must be from 12-character (96 bits) to 16-character. Moreover, when applying mutual authentication, check **Perform mutual authentication** check box (In this case, be sure to input the secret of the host in step 2 beforehand).
15. Click on **OK** button.
16. Click on **OK** button.
17. Confirms that status of the target which was chosen in the **Targets** tab became "Connected", then click on **OK** button. Thus the initiator has Logged on the target. The recognition and the format of the disk are same as the disk that connected with the FC. Do appropriate processing about the disk which was added from Windows' **Control Panel** → management tool → management of the computer → management of the disk.

Note: Data will be destroyed when partitioning or formatting the area where data is already stored. Implement after confirming that the data not to want to destroy isn't exist to the area.

B.5 Logging Off

Replacement of network cables or the power off of the target equipment, and so on, needs iSCSI log off (log out) to the initiators which have logged on the target. On the other hand, when a host is shutdown, there are no needs to reboot nor log off the target. Moreover, logging off a target doesn't have an influence on I/O with other targets nor with other hosts.

Note: Before logging off, make sure to stop the application that is accessing the target. Logging off while accessing from the host has a possibility to lose data.

1. Property of iSCSI software Initiator → **Targets** tab → Choose and click the target to want to log out → Click Details.
2. After step 1, property of the target window → **Sessions** tab → choose and click the session to want to log off → click on **Log off** button
3. Confirm that the display of the chosen session disappeared and click **OK** button.
4. Confirm that status of the chosen target is Inactive (not activated) and click **OK** button.

Appendix C Installation of Microsoft® iSNS Server

C.1 What is Microsoft® iSNS Server ?

This is iSNS Server provided by Microsoft Inc. for Windows® 2000 SP4/Windows Server™ 2003.

By using the server with iSNS on the IP-SAN network, the host can connect to the target by inquiring to iSNS, without having to specify the IP address of the iSCSI target directly and make a Discovery.

If Discovery domain is set, then the host will only know the existence of the target it needs to know when the host makes inquiry to iSNS. In other words, that host will not know of a target it does not need to know, or is not supposed to access.

For Windows® 2000 SP4 or Windows Server™ 2003, Microsoft® iSNS Server can be installed onto the same server where iSCSI initiator works, but it is recommended to install iSNS to server separate from the initiator to avoid overloading.

C.2 Download

1. Open and connect Web browser to www.microsoft.com.
2. Click **Downloads** to go to Microsoft Download Center.
3. Search for iSNS Server.
4. Select the latest edition of Microsoft® iSNS Server for the Operating System used and download to the local computer (version 3.0).

C.3 Installation of Microsoft® iSNS Server

1. Double click on the file that was downloaded as above procedure to start installation.
2. Click on **Next** button.
3. Read the License Agreement, choose **I agree** only when agreeing and click the **Next** button.
4. Choose the directory to install and click on **Next** button.
5. Click on **Next** button.
6. Confirm that **Install iSNS option** is chosen and click **OK**.
7. Read the License Agreement and click **Agree** only when agreeing.
8. Click on **Next** button.
9. The installation is completed. Click **complete** and end setup.

C.4 Setting to iSCSI Targets

1. Subscribe the IP address of iSNS from Storage Navigator Modular.

   Click Array System Viewer's **tool** button → Select the port → Click use iSNS → Enter IP address and the port number of iSNS server (That is the TCP port number for iSNS of DF700. 1 to 65535 is possible and 3205 should be set when not changing setting on the side of the iSNS server) → Click **Apply** button.

   Be sure not to set the correct IP address and correct TCP port number. iSNS can not be used when the IP address or the port number of the iSNS server is different to the value which is set to the target.

2. After the step 1, if changing in the IP address or iSCSI Name about the iSCSI target DF700 iSCSI will subscribe the new IP address or new iSCSI Name to iSNS automatically.

3. Just one iSNS Server is available for one port of DF700 iSCSI.

C.5 Setting to Microsoft® iSCSI Software Initiator

1. On the server which installed iSCSI software initiator, open the property of iSCSI software initiator → Select **Discovery** tab → Click on **Add** button in the area of **iSNS Servers** → Input IP address of iSNS.

2. After that, without inputting the IP address of the target to the **Target Portal** tab of the iSCSI initiator, iSCSI target which has been subscribed to iSNS is displayed.

   The registered information will be used for log on to the target.

   Click **Refresh** button then the latest registered information is displayed.

3. To subscribe IP address of more than one iSNS Server, the information on iSCSI target can be acquired using all of them.

C.6 Setting of Microsoft® iSNS Server

After installation (C.3), iSNS is working automatically.

If iSNS, hosts (initiators) and a disk array (target) are appropriately connected, then the iSNS will be able to register the initiators and the targets. iSNS can be used by C.4 and C.5.

The procedure to subscribe initiators and targets to iSNS and to set Discovery domain is as follows.

1. Open the property of iSNS from the Server to which iSNS was installed.

2. In the **General** tab, the list of the initiators and the targets registered to the iSNS is displayed.

3. To set and to confirm a Discovery domain, select **Discovery Domains** or **Discovery Domain sets** tabs of the property of iSNS. For more information, refer to Microsoft iSNS Server Users Guide that was installed simultaneously with installation of iSNS. That is stored in the directory to which iSNS was installed. To open the iSNS Server Users Guide, click **Start menu** button of Windows → **program** → **Microsoft iSNS Sever** → Users Guide.

Appendix D The IP-SAN Configuration Example

In this part, an example of the IP-SAN configuration is described.

The subject of this example is to construct a large scale IP-SAN at a low-cost.

D.1 Assumptions

Assumptions of this example are as follows:

- Hosts
  - Number of host is 224 (Host 0 to Host 223)
  - Each capacity and communications-zone ... host is the used only of the office application program and the storage capacity to use is 40 GB respectively. There are very few average communications-traffics and the some delay of access is allowable. Each host will access the storage area (LU) which was allocated to itself specifically.
  - The OS uses a NIC and Microsoft® iSCSI Software initiator in Microsoft® Windows® XP or Microsoft® Windows Server™ 2003.
- Redundancy
  - Host itself doesn't have a redundant access means.
  - A part of the network-path and the stand-by-system that doesn't use the half of the iSCSI ports in the ordinary access. The part will be used for detecting which component is fault and for the alternation at the time of the failure.
- The illegal access prevention policy
  - Constructed as closed IP-SAN, which is isolated to external environment.
  - LUN Manager is used. Each host is required CHAP authentication when log on to a target. It is possible for each host to refer only to allocated LU and to log on only to the allowed target.
- The iSNS use
  - Because there are many numbers of the hosts, the management of iSCSI Name and the IP address will be complex. To reduce the complexity, iSNS will be introduced.

D.2 The Network-Design

- Because there are more numbers of the hosts than the DF700 iSCSI numbers of the ports, the switch is needed to connect them. Using 16 port L2 network switch which supported 1000BASE-T(full duplex).
- Port 0A, host 112 to 223 logs on to the target of Port 0A which was allocated from the port 1B and host 0 to 111 accesses allocated LU (It expects that the division load resembles about the half about the half and that it becomes in the host among the controllers).
- It decides to compose a network (subnet 1) for the access by host 0 to 111, a network (subnet 2) for the access by host 112 to 223, doing Networks itch respectively in the second cascade. Introducing iSNS for each sub-net respectively.
- Assigning IP address to each port appropriately.

D.3 The Composition Inside DF700

Configure host 0 to 111 (Figure D.1).

- On CTL0, configuring target #1 to #111 of port 0A and setting host 0 to 111 to be able to log on to target #0 to #111 of port 0A respectively.
  - Assigning the LU that host 0 accesses through target 0 by the LU mapping.
  - (By setting iSCSI Name of host 0 and LUN of accessing LU. More than one LU is able to be assigned to a target).
  - Set CHAP authentication information so that host 0 may log on to target 0.
  - Hereinafter, host 1 to 111 is able to log on to target #1 to #111, too, in the same way.
- On CTL1, configuring target #1 to #111 of port 1A and setting host 0 to 111 to be able to log on to target #0 to #111 of port 1A respectively, in the same way as port 0A and target #0 to #111. Set the LU mapping of the target #0 of port 0A same to the LU mapping of the target #0 of port 0B (both target are associated to the same LU).

  Port 1A is used as the alternation path.

Also configure host 112 to 223 in the same way (Figure D.2).

- On CTL1, configuring target #1 to #111 of port 1B and setting host 112 to 223 to be able to log on to target #0 to #111 of port 1B respectively.
- On CTL0, configuring target #1 to #111 of port 0B and setting host 112 to 223 to be able to log on to target #0 to #111 of port 0B respectively.

D.4 The Initiator Setting and Connection

- Set the same target information to each host.
- The alternation between the normal path and the stand-by-path is handled by the switch or by the hand. Connects normal path and logs on to the target from the hosts.

  When switching a path through the reconnection, it is required to make the target recognized again by the hosts. When the path switching software is used, the path can be switched automatically when a failure occurs. However, there may be a case where the path switching software is not supported depending on the OS used by a host.

Figure D.1 The target configuration example (Host 0 to 111)

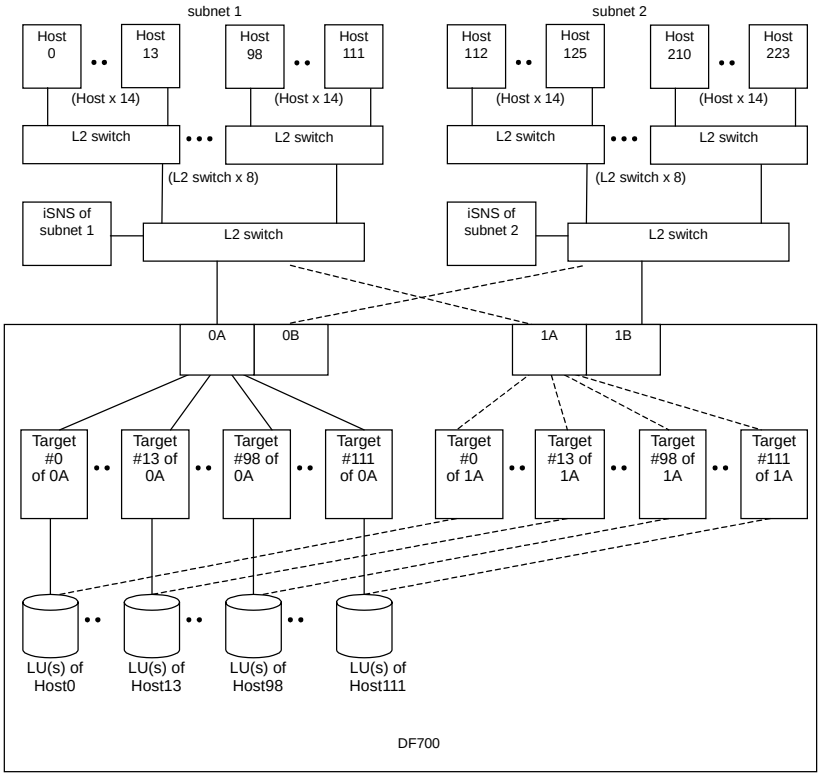
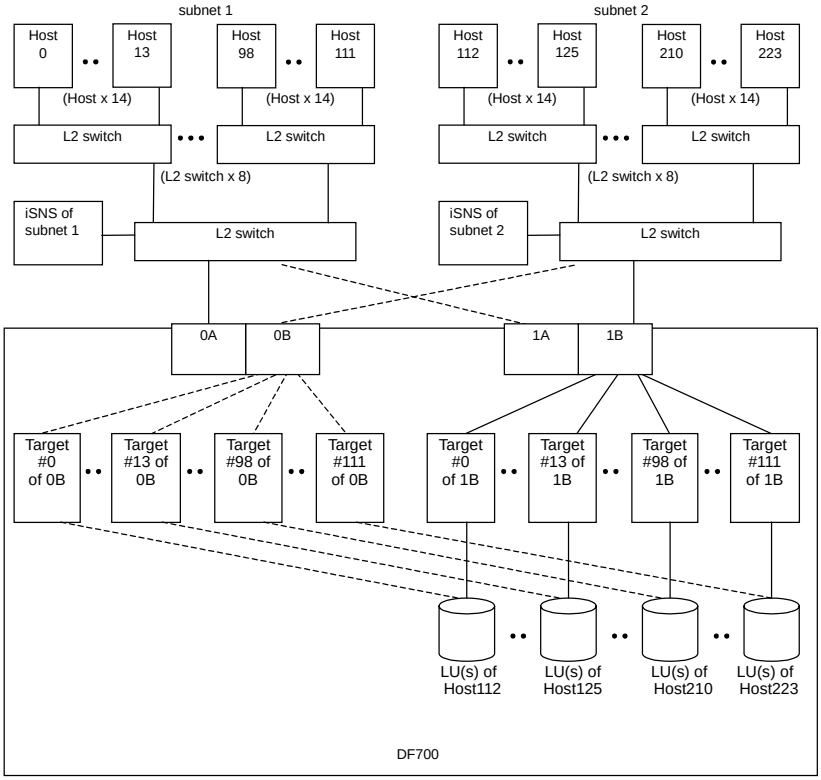


Figure D.2 The target configuration example (Host 112 to 223)



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FE-96DF798-01

Hitachi TagmaStore® AMS 1000™ (RKH) to (RKHE) Upgrade Procedures

REV.1

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Chapter 1. Outline

This procedure manual describes the work procedures for upgrading the basic chassis of the Hitachi TagmaStore® AMS 1000™ from the RKH to the RKHE and for upgrading the array subsystem while maintaining the customer data in the Disk Drive used.
The procedures about the whole system, such as configuration change of the system, and the procedures of addition/subtraction of option parts and the setting of the priced option are not included.
In this procedure manual, the basic chassis (model name: DF700-RKH) is described as "RKH", the basic chassis (model name: DF700-RKHE) as "RKHE", the additional chassis (model name: DF700-RKAJ/RKAJAT) as "RKAJ/RKAJAT" and the additional chassis (model name: DF700-RKA) as "RKA" for the Hitachi TagmaStore® AMS 1000™.

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Chapter 2. Components and Tools Required for Upgrade

Model names of components required for the upgrade are shown below.

Table 2.1 Components to Be Ordered for Upgrade

Upgrade	Upgrade Kit Model name	Components of Upgrade Kit		
		Parts	Model	Quantity
RKH → RKHE	DF-F700-F2JH	Control Unit	DF-F700-F2JH (Excluding DF-F700-DJ4G2H (FC Interface Board), DF-F700-DJNASH (NAS Interface Board), DF-F700-DJSC2H (iSCSI Interface Board), DF-F700-C1GJ (1 GB CacheUnit), (DF-F700-C2GJ (2 GB Cache Unit))	2

The following tools are required for the upgrade procedures.

Table 2.2 Tools Required

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.2	For replacing Control Unit.
	Allen wrench	No.6	Opening/closing of doors.
Tool of other	LAN cross cable	Category 5	For connecting a service PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 M Hz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended) • Storage Navigator Modular (GUI) (Ver.6.00 or later) • TDCONV analysis tool (Ver.0615 or later) • IE 5.5 or later
	Wrist strap	-	

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Chapter 3. Upgrade Work

3.1 Prerequisites

- The Hitachi TagmaStore® AMS 1000™(RKH) to be upgraded must be in the state in an error free state or condition prior to performing the upgrade.
- The processing for re-recognizing the host is required because the setting of the host needs to be changed.
- Use the latest version (Ver.6.00 or later) of Storage Navigator Modular.
- Hitachi TagmaStore® AMS 1000™(RKHE) to the Hitachi TagmaStore® WMS 100™/AMS 200™/AMS 500™/AMS 1000™(RKH) downgrade is not supported.
- The Control Units that are used to upgrade to the Hitachi TagmaStore® AMS 1000™(RKH) need to 0760/A or later flash program installed prior to performing any upgrade work.
- When TrueCopy remote replication/TrueCopy Extended Distance is enabled and the array subsystem to be upgraded to the Hitachi TagmaStore® 1000™(RKHE) is the remote Disk Drive subsystem, perform it after changing the pair status (S-VOL) of TrueCopy remote replication/TrueCopy Extended Distance to PSUS.
  However, if the upgrade operation is performed, the path blockade occurs. If the upgrade work replacement is performed, a path blockade occurs. This path blockade automatically recovers after performing the upgrade work.
  Return the pair status (S-VOL) of TrueCopy remote replication/TrueCopy Extended Distance to the original status (PAIR, etc.) after completing the upgrade operation.
  Also, if the upgrade operation is performed, the following phenomenon occurs.
  - Both paths of the TrueCopy remote replication/TrueCopy Extended Distance are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
  - When the pair status of the TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.

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3.2 Before Starting Upgrade Work

(1) Back up the user data by the day of the upgrade work in preparation for an emergency accident.
If a wrong operation is done in a upgrade work, it is feared that user data stored in the subsystem is lost.
Backup user data stored in the subsystem by operating a host computer.

(2) As for the upgrade work, settings of the subsystem must be changed through operation of a maintenance PC connected via a LAN. Besides, the microprogram must be installed from a CD-ROM. Make the following preparations before starting upgrade work.
- Prepare a PC in which Storage Navigator Modular of the latest revision is installed.
  The PC must fit the LAN environment and have a CD-ROM drive.
- LAN cross cable
- The CD-ROM for installation of the Hitachi TagmaStore® AMS 1000™ microprogram of the latest revision (0760/A-H or later).

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3.3 Notes

- When executing updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.
- When executing updating installation of the microprogram, use the microprogram whose revision is 0760/A-H or later.
- When upgrading the Disk Array subsystem, do not upgrade two or more Disk Array subsystem at the same time to avoid the disk drive replacement operation error.
- When the Hitachi TagmaStore® AMS 1000™(RKH) to be upgraded is the Fibre Channel/iSCSI interface system configuration, do not change the port which connects the Fibre Channel/iSCSI interface cable before and after the upgrade.
- The IP address of the LAN port for the user control or maintenance of the Control Unit succeeds the value before the upgrade. Reset it as occasion demands.
- When using the SNMP Agent Support Function, which is an optional feature, is used, the SNMP environment information file may have to be reviewed.
- When making the upgrade leaving Hitachi TrueCopy remote replication/TrueCopy Extended Distance enabled, do not upgrade both of the local and remote subsystems at the same time for security. However, if the splits of the pairs on both local side and remote side are confirmed, there is no problem to execute the upgrade at the same time. (refer to the Figure 3.3.1)
- The path is blocked if the upgrade work is performed with TrueCopy remote replication/TrueCopy Extended Distance made enabled. This path blockade automatically recovers after performing the upgrade work. (refer to the Figure 3.3.1)

Deleted: • When executing a updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.¶

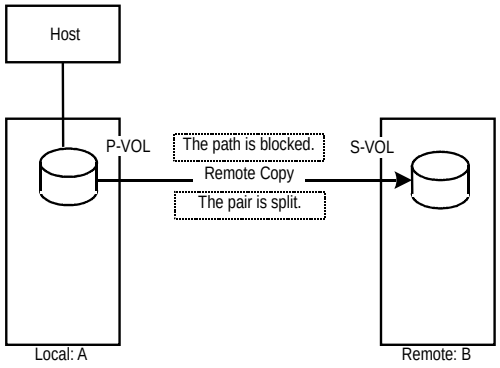


Figure 3.3.1 The array subsystem that a pair of TrueCopy remote replication/TrueCopy Extended Distance is set

- When Power Saving of the priced option is used, if you perform the upgrade after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host after replacing the microprogram and starting the array subsystem. Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then perform the upgrade. If the spin-down fails, execute the spin-down again.

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3.4 Upgrade Work

⚠ CAUTION

Touching heat sinks or ICs may cause injury. Be sure to handle with care.

CAUTION

- To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.
- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts. Otherwise, the static electrical charge on your body may damage the parts.

The procedure for upgrading the Hitachi TagmaStore® AMS 1000™(RKH) to the Hitachi TagmaStore® 1000™(RKHE) is shown below.
The procedure is different depending on the cases where it is upgraded with the host online and it is upgraded offline.
Execute the procedure after making sure of the work to be done in each step.

NOTE : • When you replace a microprogram, you cannot access the Control Unit that the microprogram is to be replaced. (The microprogram replacement takes place by rebooting the both Control Units one by one.) To perform the replacement, always follow the check list shown below and read the cautions.
• When you replace a Control Unit, you cannot access the Control Unit that the Control Unit is to be replaced. (The Control Unit replacement takes place by rebooting the both Control Units one by one.) To perform the replacement, always follow the check list shown below and read the cautions.

The replacement needs to check the host side, so perform the operations according to your customer's schedule. Since the host I/O (input and output) may be concentrated on one Control Unit during the microprogram replacement or the Control Unit replacement, it is recommended that the operations perform during a time period when the I/O load to the host is light.

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(1) Check List

The upgrade work online (a status that the I/O with the host is not stopped) is possible when te following conditions are met. (refer to "3.4 (1)(a) Upgrade work online (a status that the I/O with the host is not stopped)" (HUP 03-0050))

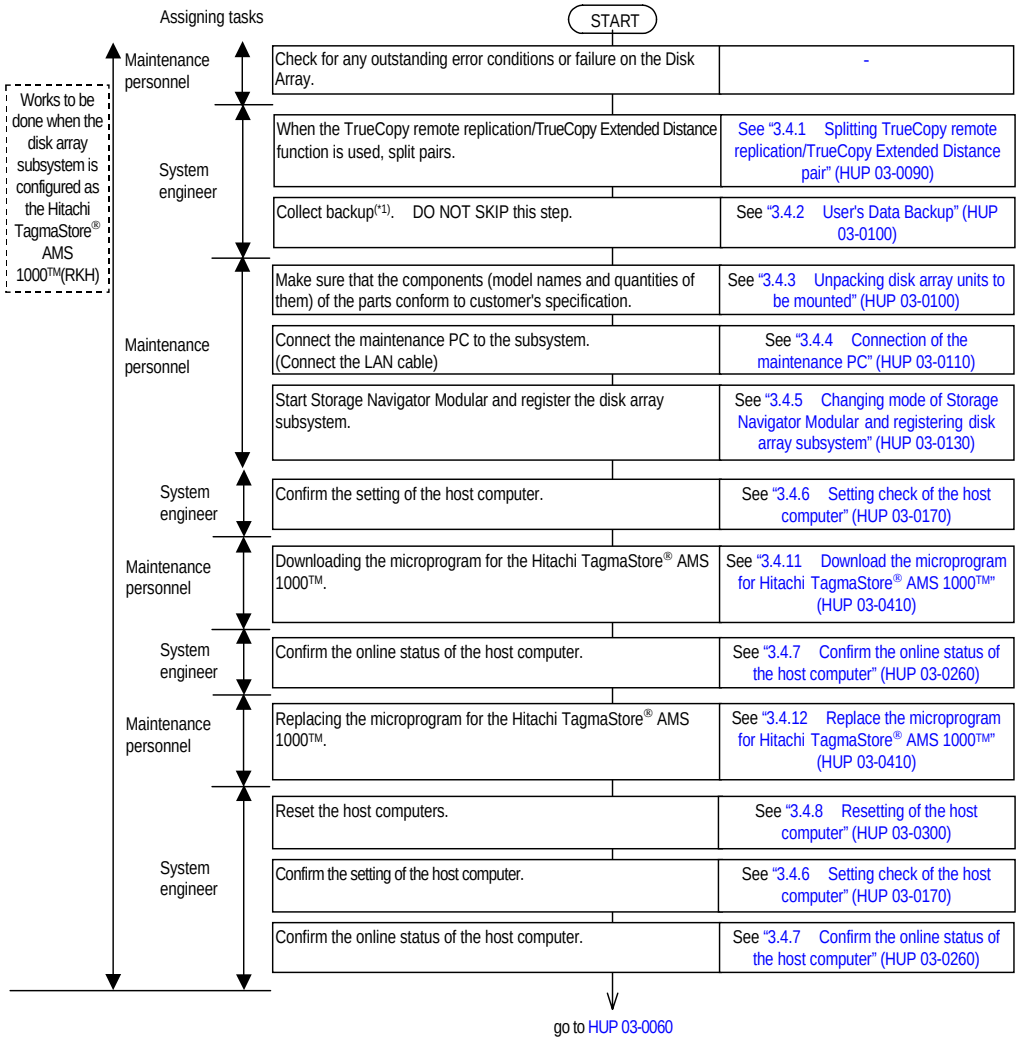
Perform the upgrade work offline (a status that the I/O with the host is stopped) when there is any item that does not meet the following conditions. (refer to "3.4 (1)(b) Upgrade work offline (a status that the I/O with the host is stopped)" (HUP 03-0070))

- Are you using the path switching software (PVLink or HDLM or VxVM-DMP)?
- Is the Control Unit of a main path to LUs (Logical Units) separated from the Control Unit of an alternative path?
- Is the alternate path set in all the volumes accessed by the operating job during the microprogram replacement or the Control Unit replacement?
- Are the host side parameters set up correctly?
- Is it possible to stop the changing of pair status of ShadowImage in-system replication, TrueCopy remote replication, or Copy-on-write SnapShot during the microprogram replacement or the Control Unit replacement?
  (Customer cannot execute "paircreate" and "pairresync" commands.)
- Is it possible to change the pair status of TrueCopy Extended Distance from "PAIR" and "COPY" to "PSUS" during the microprogram replacement or the Control Unit replacement?
- If the customer uses the cluster software "MC/SG", is the lock disk stored in the disk other than the Hitachi TagmaStore® AMS 1000™?
- Is the boot disk stored in the disk other than the Hitachi TagmaStore® AMS 1000™?
  Is the redundancy condition of the boot path described on the System Construction Guide of BladeSymphony satisfied when it is connected to BladeSymphony?
- The I/O errors may be logged in a log file during the microprogram replacement or the Control Unit replacement, though the data accesses continue on an alternative path. Can the system ignore such the errors?
- The completion of I/O processing may take approximately 60 seconds during the microprogram replacement or the Control Unit replacement. Can the customer's system wait for this time?
- Is it possible to stop LU format?
  (The microprogram replacement during the LU format and the LU format during the microprogram replacement cannot be executed.)
- ShadowImage in-system replication is enabled, and pair status is not PSUE.
- Can other applications (JP1/HiCommnd Device Manager, other Storage Navigator Modular) which perform the LAN access to the Hitachi TagmaStore® AMS 1000™ be stopped during the microprogram replacement or the Control Unit replacement?

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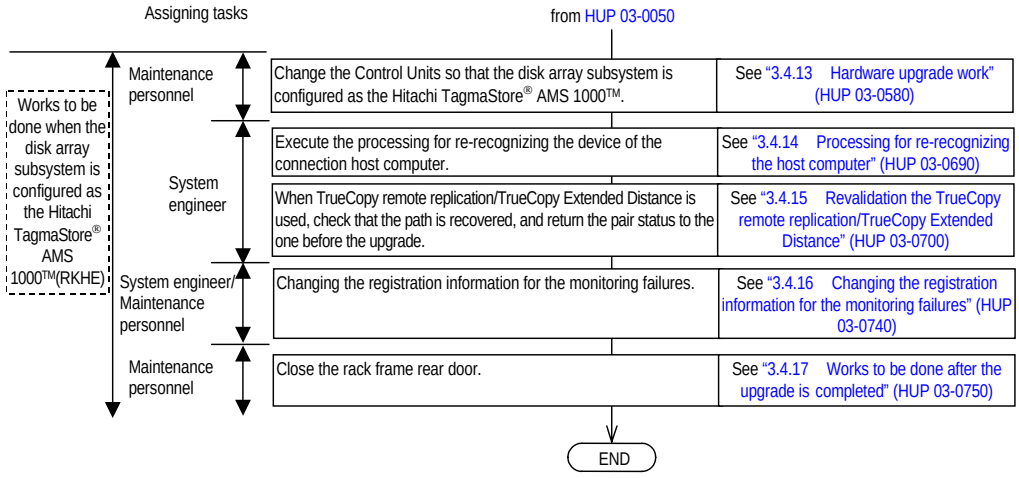
(a) Upgrade work online (a status that the I/O with the host is not stopped)

Perform the upgrade work according to the following procedure.



*1 : Maintenance personnel should check if customer has executed user data backups. Without the backups, the upgrade cannot be executed.

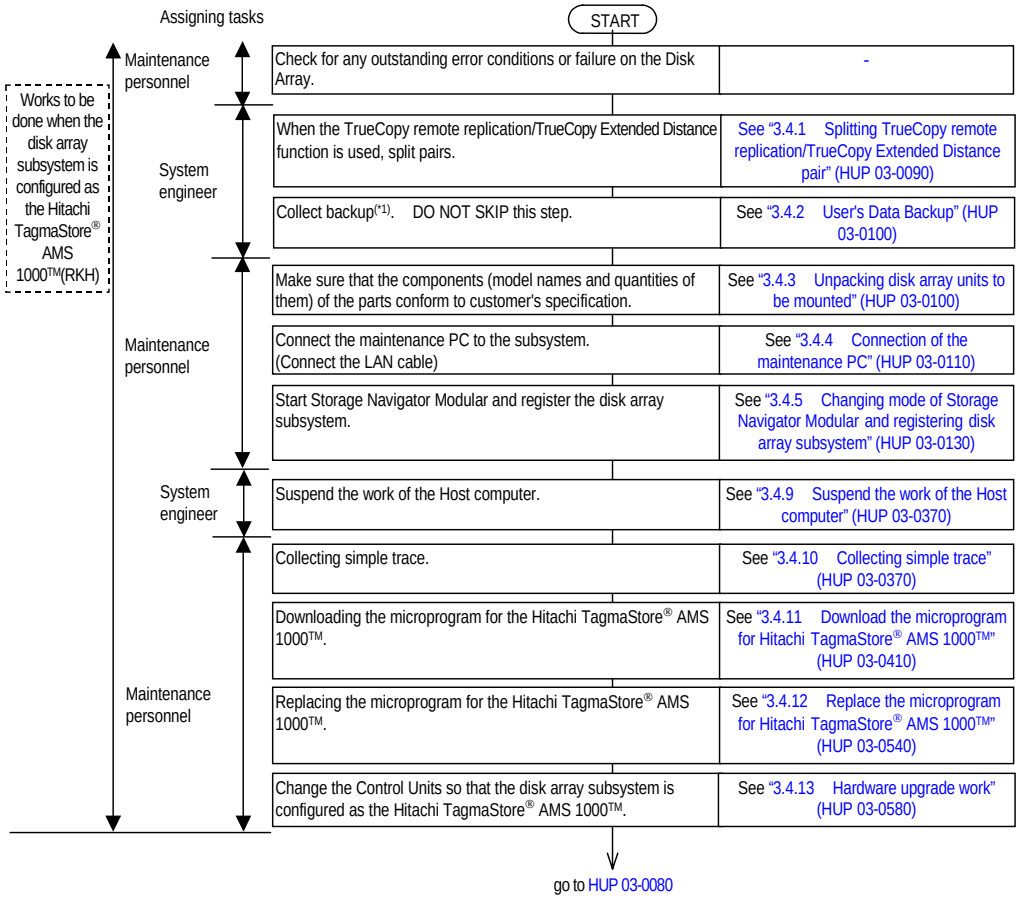
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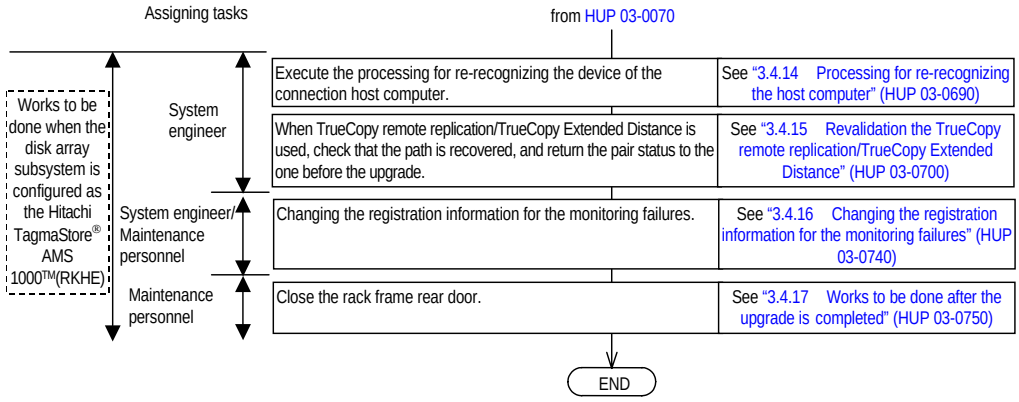
(b) Upgrade work offline (a status that the I/O with the host is stopped)

Perform the upgrade work according to the following procedure.



*1 : Maintenance personnel should check if customer has executed user data backups. Without the backups, the upgrade cannot be executed.

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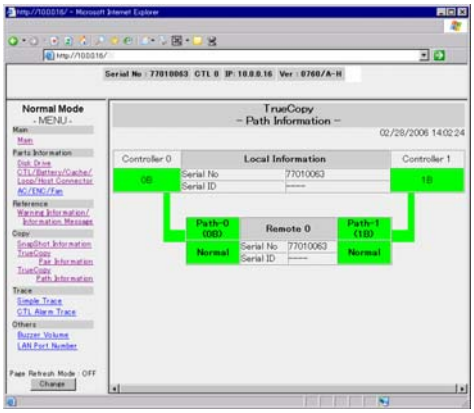


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3.4.1 Splitting TrueCopy remote replication/TrueCopy Extended Distance pair

This operation is not required when Hitachi TrueCopy remote replication/TrueCopy Extended Distance is not used.
When making the upgrade leaving TrueCopy remote replication/TrueCopy Extended Distance enabled, a pair splitting must be done.
The procedure is shown below.

(1) Check if the path status is normal using the WEB.
Procedure for Confirming Log Messages:
It switched to the following window by clicking the remote path icon of [] on the main window, and the details of the path status are displayed.
It also switches to the following window by clicking [TrueCopy Path Information] of the menu frame on the main window, and the details of the path status are displayed.
For the maintenance operation for replacement and the recovery method, perform the recovery according to (Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360)).



(2) Execute the pairsplit command, perform the pair split, and check that the change to PSUS/SSUS is completed.
It explains the method to split the pair of TrueCopy remote replication/TrueCopy Extended Distance.
(a) Set the group name in the configuration definition file as "vg01." Split the TrueCopy remote replication/TrueCopy Extended Distance pair in the PAIR status with the pairsplit command.

```
c:¥horcm¥etc>pairsplit –g vg01
```

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(b) Make sure of the status and configuration of the pair that has been split by executing the pairsplit command.

```
c:¥horcm¥etc>pairdisplay –g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)    (CL1-A , 1,  1)   174     1..P-VOL PSUS NEVER ,  175     2  -
vg01     oradb1(R)    (CL1-B , 1,  2)   175     2..S-VOL SSUS NEVER ,-----     1  -
```

The pair of TrueCopy remote replication/TrueCopy Extended Distance could be split. Refer to Chapter 4 of "RAID Manager System Administrator's Guide (TagmaStore® AMS/WMS series)" for the details of the pairsplit command and the option.

3.4.2 User's Data Backup

There is the possibility of loss of user data if the upgrade procedures fail. To prepare for an emergency, all the Disk Drive data mounted on Hitachi TagmaStore® AMS 1000™ should be backed up.

NOTE : Maintenance personnel must check if customers have executed users' data backups.

3.4.3 Unpacking disk array units to be mounted

Unpack the Control Unit to be mounted to compose the configuration of the Hitachi TagmaStore® AMS 1000™(RKHE). The procedure is shown below.

(1) Unpacking the Control Unit.

NOTE : • Unpack it indoor.
Especially, do not unpack it in such places with the outdoor dust, the direct sunlight, and the infiltration of rain water.
• Work on the unpacking in the place where a rapid difference of temperature does not occur.
It may have dew condensation when it is unpacked in the place where a difference of temperature is extreme.

(2) Check the contents of the package

(a) Check if the contents of the Upgrade kit (their model names, product serial numbers, and quantities) agree with those in the packing list.

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3.4.4 Connection of the maintenance PC

Connect the maintenance PC to the disk array subsystem.
The procedure is shown below.

(1) Checking the LAN environment setting

(a) Make sure that the Storage Navigator Modular has been installed. (Make sure that the activation file startsnm.bat exists.)

(b) Check the LAN environment setting for the PC

- Make sure that the following settings have been made, or change the settings to the following.
  For the maintenance PC, set the IP address to 10.0.0.xxx as shown in No. 1.
  If the maintenance PC cannot establish a connection, set the value to shown in No.2 to 5.
  If not connected yet, refer to Maintenance Manual Troubleshooting "3.4 Procedure for specifying maintenance port IP address" (TRBL 03-0100).

No.	Subsystem (LAN maintenance port)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 10.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL0 : 192.168.233.16 CTL1 : 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL0 : 172.23.211.16 CTL1 : 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL0 : 10.197.181.16 CTL1 : 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

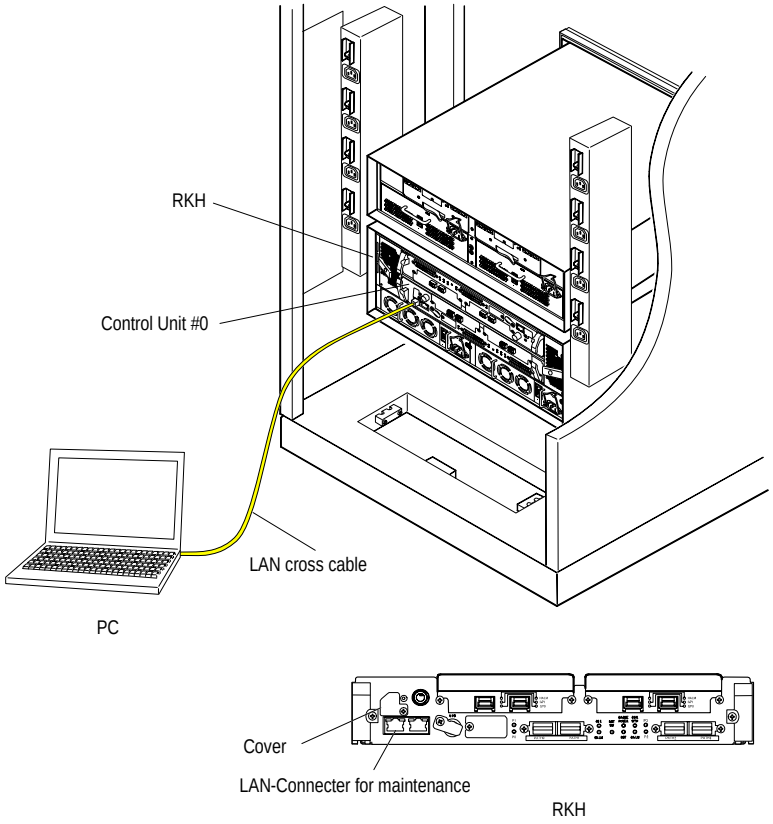
- Manual change of the network parameter of the Maintenance port
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

NOTE: However, when the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
The network address set to the maintenance port cannot be used for the LAN device to be connected to the User management port via the Gateway.
Therefore, use a network address other than that set for the maintenance port.

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(2) Connecting the LAN cross cable0

Remove the cover on the Control Unit. Connect the LAN-Connecter for maintenance and the LAN-Connecter of Maintenance PC with a LAN-cross-cable.



*1 : The system configuration of the Fibre Channel interface is shown as an example.

Figure 3.4.1 Connecting the LAN Cross Cable

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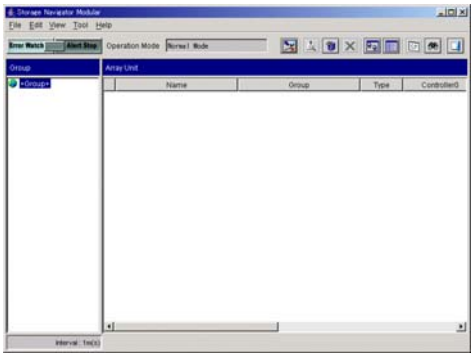
3.4.5 Changing mode of Storage Navigator Modular and registering disk array subsystem

Register the disk array subsystem using Storage Navigator Modular.
The procedure is shown below.

(1) Activating the Storage Navigator Modular

(a) Execute the batch file or shell script for activating the Storage Navigator Modular.
In the case of Windows®, activate the batch file, startsnm.bat.

(b) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed(‡1).



In the case of Windows®, the prompt window is also displayed.
The prompt window has nothing to do with operation of Storage Navigator Modular. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.

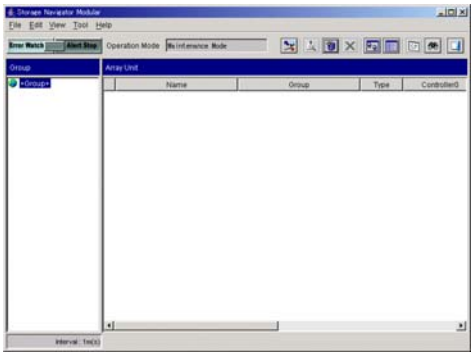
‡1 : The mode change cannot be done at the time of the initial activation of the Storage Navigator Modular. A registration of a password validates the mode change.

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(2) Change the Operation Mode from the Normal Mode to the Maintenance Mode.

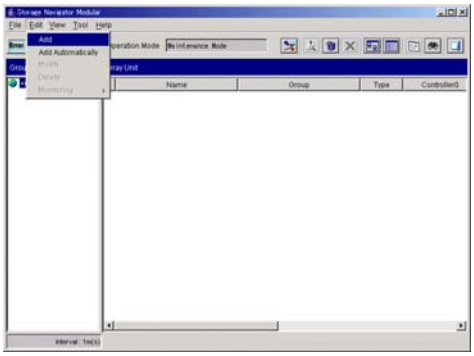
(a) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the [Ctrl], [Shift], and [E] keys at the same time.

Maintenance Mode is displayed in the Operation Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.



(3) Registering the disk array subsystem

(a) Select [Add] in the main window or click [: Add].

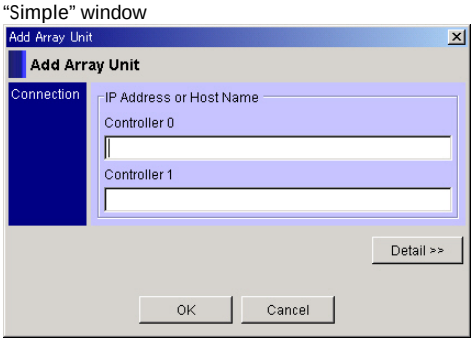


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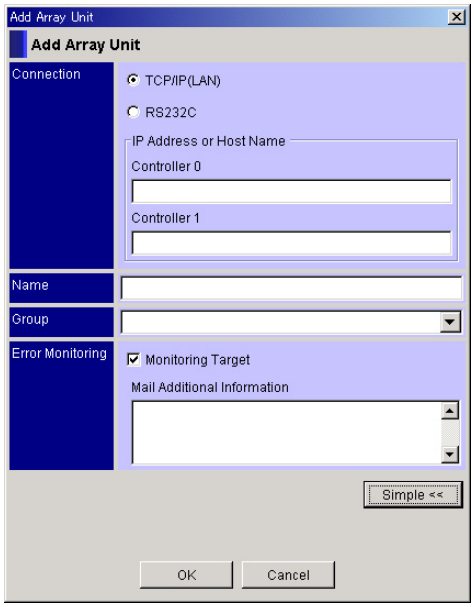
(b) Enter the information for the registration and click the [OK] button. Alternative, click the [Detail] button.

NOTE : • The disk array subsystem with the dual system can also be used with a single Controller only. For [IP Address, Host Name, or Device Name], enter information of the Controller connected to the maintenance PC.
• Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

"Simple" window



"Detail" window



[Connection] : Select "TCP/IP (LAN)" connection to be used for the disk array subsystem.

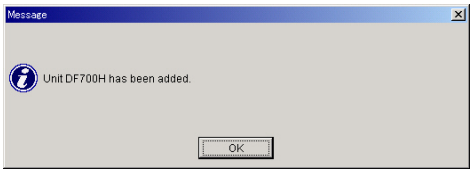
[Name] : Specify a disk array subsystem name to be registered. Specify it with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _).

[Group] : Specify group names when applying group control to the disk array subsystems. Specify each of them with16 or less half size alphabetic characters, numerals, and/or symbols (- and/or _). The maximum number of the groups allowed to be registered is 200. The entrance of the group names is not necessary when the group control is not applied to the disk array subsystems.

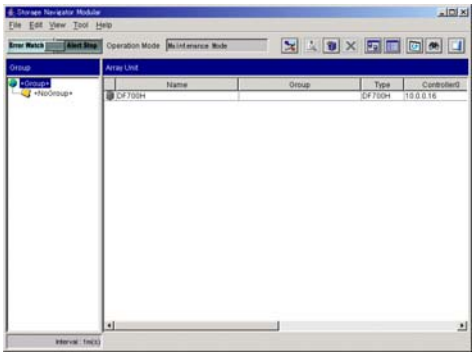
[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box : The failure monitoring is not applied.

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(c) When a message informing of a completion of the registration is displayed, click the [OK] button.



(d) The updated main window is displayed.



When an entry has been made in [Group Name], the group name is displayed in the tree diagram on the right side of the window. A clicking on the group name displays an icon(s) of the disk array subsystem(s) registered in the group.
The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

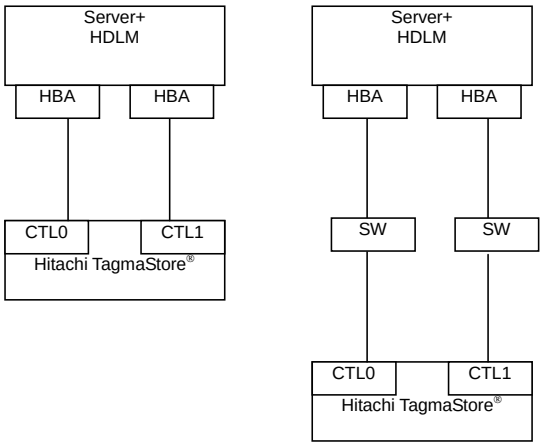
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3.4.6 Setting check of the host computer

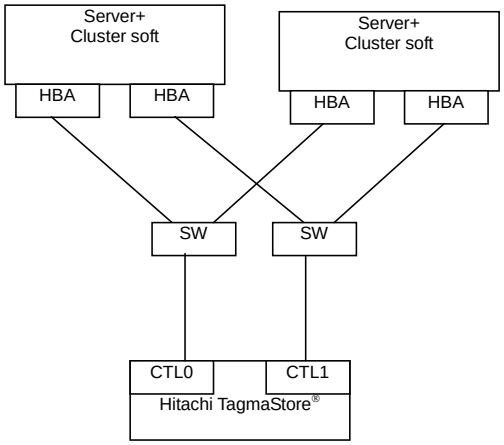
(1) When HP-UX+HDLM, Solaris+HDLM, AIX+HDLM, or Windows+HDLM is used

(a) System Configuration

If the system is configured as shown below, the replacement of an online microprogram/Control Unit are possible.



- Two or more HBAs (Host Bus Adapters) must be installed.
- Paths connect to an individual Control Unit.
- The HDLMs must be set correctly and all the paths must be monitored normally.
- If the TagmaStore® has a boot disk, the built-in disk needs to be mirrored by software because the subsystem cannot set an alternative path to rootdg.



- The cluster lock disk should not be stored in the Hitachi TagmaStore®.

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(b) Cautions

Always follow the cautions and restrictions shown below.

- The HDLM must run normally on all the servers connected to the Hitachi TagmaStore® and all the paths to the LUs (Logical Units) must be duplicated by the HDLM. If there are any LUs whose path is not duplicated, replace the microprogram/Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram/Control Unit after recovering the failure.
- Replace the microprogram on the Control Unit #0, and then replace the microprogram on the Control Unit #1. The reverse order of the replacement is possible.

(c) Host side parameters

- For OS:
  Refer to the software data attached to HDLM, "Application OS (Operating System)/Application Models".
- For HBA and drivers:
  Refer to the software data attached to HDLM, "Application OS (Operating System)/Application Models".
- For HDLM:
  Refer to the user's guide, the software data attached or the hardware notes.

(d) Procedure for replacement

Perform the microprogram replacement or the Control Unit replacement following the procedure explained below.

Take notice that the version of Storage Navigator Modular must be 6.00 or later.

(i) Do the following works before starting the microprogram replacement or the Control Unit replacement.

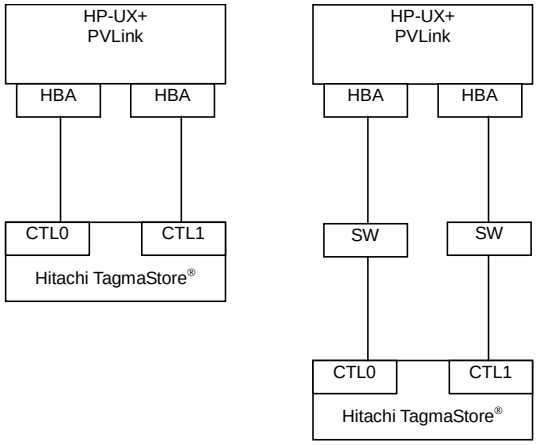
- The system parameters for the Hitachi TagmaStore® are set correctly.
- The parameters for the OS, HBA, or path switching software are set correctly.
- The alarm/warning light on the Hitachi TagmaStore®, the host or the switch does not light up.
- In case of a direct connection, a port on the Hitachi TagmaStore® is linked up with the system. In case of a switch connection, a port on the switch is linked up.
- An initial copy or resynchronization is not running in the ShadowImage in-system replication, Copy-on-write SnapShot, TrueCopy remote replication, or TrueCopy Extended Distance.
- Connect the Storage Navigator Modular and download the microprogram to be replaced.

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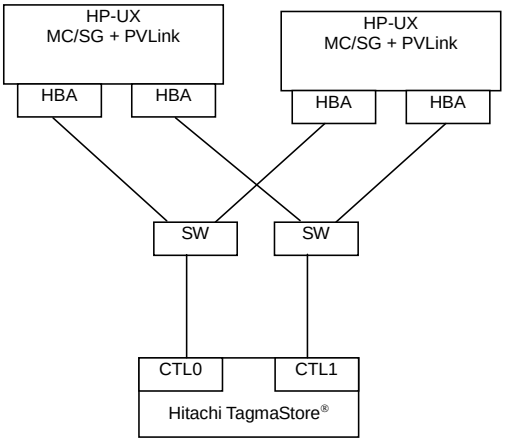
(2) When HP-UX+PVLink is used

(a) System Configuration

If the system is configured as shown below, the replacement of an online microprogram/Control Unit are possible.



- Two or more HBAs (Host Bus Adapters) must be installed.
- Paths connect to an individual Control Unit.
- The PVLinks must be set correctly and all the paths must be monitored normally.



- The cluster lock disk should not be stored in the Hitachi TagmaStore®.

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(b) Cautions

Always follow the cautions and restrictions shown below.

- The PVLink must run normally on all the HP-UX servers connected to the disk array subsystem and all paths to the LUs (Logical Units) are to be duplicated by the PVLink. If there are any LUs whose path is not duplicated, replace the microprogram/Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram/Control Unit after recovering the failure.
- Replace the microprogram on the Control Unit #0, and then replace the microprogram on the Control Unit #1. The reverse order of the replacement is possible.

(c) Host side parameters

- HP-UX 11i, 11.0, and 10.20:

  No specific settings are provided.
- HBA and drivers:

  No specific settings are provided.

No.	HBA	Driver
1	A3404A (HT-F3360-FC2)	Bundle
2	A3591B (HT-F3360-FC3)	Bundle
3	A3636A (HT-F3360-FC1)	Bundle
4	A3740A (HT-F3360-PC5)	Bundle
5	A5158A (HT-F3360-PC5A)	Bundle
6	A6795A (HT-F3360-PCFC)	Bundle

- PVLink:

  Set the values of two parameters as shown in the following table during the online microprogram/Control Unit replacement, and return the values to the original values when the microprogram/Control Unit replacement is completed.

No.	Parameters	Default Value	Setting Information
1	IO Timeout value displayed by executing the "pvdisplay /dev/dsk/cxtxdx" command(*1).	default (30 seconds)	Check by syslog that the application retries in the Timeout value shown left.(*2)
2	Autoswitch value displayed by executing the "pvdisplay /dev/dsk/cxtxdx" command(*3)	On	Check that the path switching is valid.(*2)

*1: To change the IO Timeout value to 60 seconds, execute the [pvchange –t 60 /dev/dsk/cxtxdx] command.

*2: If the [tail –f /var/adm/syslog/syslog.log] command is executed, the retry information is displayed. Keep it displayed all the time during the operation.

*3: To change the Autoswitch value to On, execute the [pvchange –S y /dev/dsk/cxtxdx] command (the setting can be changed online).

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(d) Procedure for replacement

Perform the microprogram replacement or the Control Unit replacement following the procedure explained below.

Take notice that the version of Storage Navigator Modular must be 6.00 or later.

(i) Do the following works before starting the microprogram replacement or the Control Unit replacement.

- The system parameters for the Hitachi TagmaStore® series are set correctly.
- The parameters for the OS, HBA, or path switching software are set correctly.
- The alarm/warning light on the Hitachi TagmaStore®, the host or the switch does not light up.
- In case of a direct connection, a port on the Hitachi TagmaStore® is linked up with the system. In case of a switch connection, a port on the switch is linked up.
- An initial copy or resynchronization is not running in the ShadowImage in-system replication, Copy-on-write SnapShot, TrueCopy remote replication, or TrueCopy Extended Distance.

(ii) Log in as a user having the root authorization in HP-UX, and execute the [vgdisplay /dev/dsk/c?t?d] command.

Execution example of IO Timeout value change:

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        default
Autoswitch                  On
```

The default is 30 seconds and the host I/O may stop during the microprogram replacement/Control Unit replacement, so that be sure to change it to 60 seconds or more.

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Execution example of IO Timeout value change:

```
# pvchange -t 60 /dev/dsk/c11t0d1
Physical volume "/dev/dsk/c11t0d1" has been successfully changed.
Volume Group configuration for /dev/vg02 has been saved in /etc/lvmconf/vg02.conf

# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  On
```

Change the IO Timeout value to 60 seconds.

Check that the IO Timeout value was changed to 60 seconds.

Execute the [vgdisplay /dev/dsk/c?t?d?] command.

Execution example of Autoswitch value change:

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  Off
```

If the Autoswitch value is Off, it needs to be changed to On.

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When "Off" is specified for Autoswitch, execute the [pvchange –S y /dev/dsk/c?t?d?] command.

Execution example of Autoswitch value change:

```
# pvchange -S y /dev/dsk/c11t0d1
Physical volume "/dev/dsk/c11t0d1" has been successfully changed.
Volume Group configuration for /dev/vg02 has been saved in /etc/lvmconf/vg02.conf

# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  On
```

Change the Autoswitch to On.

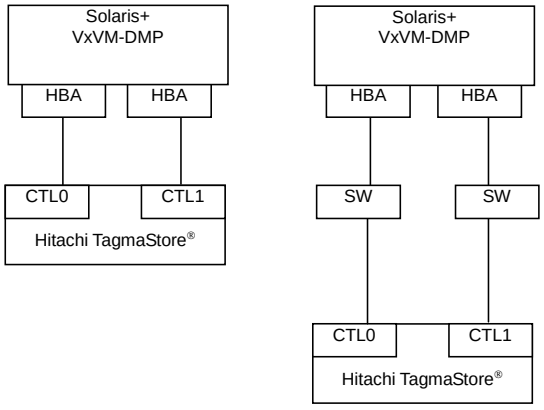
Check that the Autoswitch was changed to On.

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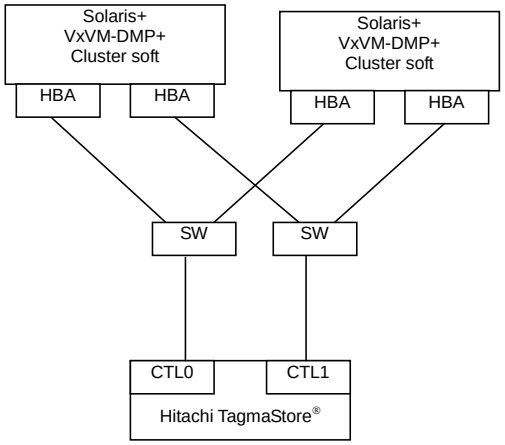
(3) When Solaris+VxVM-DMP is used

(a) System Configuration

If the system is configured as shown below, the replacement of an online microprogram/Control Unit is possible.



- Two or more HBAs (Host Bus Adapters) must be installed.
- Paths connect to an individual Control Unit.
- The VxVM-DMPs must be set correctly and all the paths must be monitored normally.



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(b) Cautions

Always follow the cautions and restrictions shown below.

- The VxVM-DMP must run normally on all the Solaris servers connected to the disk array subsystem and all paths to the LUs (Logical Units) are to be duplicated by the VxVM-DMP. If there are any LUs whose path is not duplicated, replace the microprogram/Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram/Control Unit after recovering the failure.
- Replace the microprogram on the Control Unit #0, and then replace the microprogram on the Control Unit #1. The reverse order of the replacement is possible.

(c) Host side parameters

- Solaris 2.6, 7, 8 and 9:

  No specific settings are provided.
- HBA and drivers:

  The following setup is necessary for JNI-made FCE-1063/FCE-6410 (driver 4.1.3).

No.	Parameters	Default Value	Setting Information
1	FcPortCfgEnable	0	1
2	FailoverDelay	0	30

  No specific settings are provided for other HBAs.
- VxVM-DMP:

  No specific settings are provided.

(d) Procedure for replacement

Perform the microprogram replacement or the Control Unit replacement following the procedure explained below.

Take notice that the version of Storage Navigator Modular must be 6.00 or later.

(i) Do the following works before starting the microprogram replacement or the Control Unit replacement.

- The system parameters for the Hitachi TagmaStore® series are set correctly.
- The parameters for the OS, HBA, or path switching software are set correctly.
- The alarm/warning light on the Hitachi TagmaStore®, the host or the switch does not light up.
- In case of a direct connection, a port on the Hitachi TagmaStore® is linked up with the system. In case of a switch connection, a port on the switch is linked up.
- An initial copy or resynchronization is not running in the ShadowImage in-system replication, Copy-on-write SnapShot, TrueCopy remote replication, or TrueCopy Extended Distance.
- Connect the Storage Navigator Modular and download the microprogram to be replaced.

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3.4.7 Confirm the online status of the host computer

(1) When HP-UX+HDLM, Solaris+HDLM, AIX+HDLM, or Windows+HDLM is used

Log in the server as a user with the root authority and execute the [dlnkmgr view –path] command.

In the case of Windows, open the command prompt window and execute the [dlnkmgr view –path] command.

• In the case of HP-UX

Execution example:

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus    IO-Counts    IO-Errors
Online        310          0

PathID    PathNameDskName ···        ChaPort   Status    Type ···
000000    ···        HITACHI DF700F  0A        Online    Own
000001    ···        HITACHI DF700F  1A        Online    Non
:         :          :               :         :         :
```

• In the case of Solaris

Execution example:

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000016
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID    PathNameDskName ···        ChaPort   Status    Type ···
000000    ···        HITACHI DF700F  0A        Online    Own
000001    ···        HITACHI DF700F  1A        Online    Non
:         :          :               :         :         :
```

• In the case of AIX

Execution example:

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID    PathNameDskName ···        ChaPort   Status    Type ···
000000    ···        HITACHI DF700F  0A        Online    Own
000001    ···        HITACHI DF700F  1A        Online    Non
:         :          :               :         :         :
```

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• In the case of Windows

Execution example:

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000006
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID   PathNameDskName ···          ChaPort  Status   Type ···
000000   ···         HITACHI DF700F   0A       Online   Own
000001   ···         HITACHI DF700F   1A       Online   Non
:        :           :                :        :        :
```

Make sure that values of the [Paths:] and [Online Paths:] are the same.
Next, make sure that descriptions in the [Status] column for all the paths are “Online”.
When at least one path has a failure, interrupt the microprogram/Control Unit replacement and take a recovery action.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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(2) When HP-UX+PVLink is used

Log in as a user having the root authorization in HP-UX, and execute the [vgdisplay –v vg??] command. "??" indicates VolumeGroup numbers.

Execution example:

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0

   --- Logical volumes ---
   LV Name                  /dev/vg02/lvol1
   LV Status                available/syncd
   LV Size (Mbytes)         1000
   Current LE               250
   Allocated PE             250
   Used PV                  1

   --- Physical volumes ---
   PV Name                  /dev/dsk/c83t0d0
   PV Name                  /dev/dsk/c24t0d0 Alternate Link
   PV Status                available
   Total PE                 511
   Free PE                  11
   Autoswitch               On
```

Record the initial status.

Check that two or more [PV Names] of [Physical volumes] are displayed and at least one path is displayed as [Alternate Link].

If any path has a failure, suspend the microprogram/Control Unit replacement and recover the failure. Also, record the PV Name of the active path. [/dev/dsk/c83t0d0] is the active path in the above figure.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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(3) When Solaris+VxVM-DMP is used

Log in as a user having the root authorization in Solaris, check the device through the "vxdisk list" command and execute the "vxdisk list cXtYdZs2" command (cXtYdZs2 is a device file).

Execution example:

```
V880-1# vxdisk list
DEVICE          TYPE      DISK          GROUP          STATUS
c1t0d0s2        sliced                                 error
c1t0d0s3        simple    c1t0d0s3      rootdg         online
c4t0d0s2  sliced  disk01          DG0            online
c4t0d1s2        sliced    disk01        DG1            online
c4t0d2s2        sliced    disk01        DG2            online

# vxdisk list c4t0d0s2
Device:         c4t0d0s2
devicetag:      c4t0d0
type:           sliced
hostid:
disk:           name= id=1067933033.3997.V880-1
group:          name= id=1067933103.4030.V880-1
flags:          online ready private autoconfig
pubpaths: block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths:      block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:        2.2
iosize:         min=512 (bytes) max=256 (blocks)
public:         slice=4 offset=0 len=8217600
private:        slice=3 offset=1 len=38143
update:         time=1067993564 seqno=0.147
headers:        0 248
configs:        count=1 len=28130
logs:           count=1 len=4262
Defined regions:
 config   priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config   priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log      priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:   2
c4t0d0s2        state=enabled     type=primary
c5t1d0s2        state=enabled     type=secondary
```

Check that all the paths are displayed as "Enabled".

If any path has a failure, suspend the microprogram/Control Unit replacement and recover the failure.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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3.4.8 Resetting of the host computer

(1) When HP-UX+HDLM, Solaris+HDLM, AIX+HDLM, or Windows+HDLM is used

(a) Execute the [dlnkmgr online] command and change the offline path to the online status.

• In the case of HP-UX

```
Execution example:
# /opt/DynamicLinkManager/bin/dlnkmgr online

Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name = online
```

• In the case of Solaris

```
Execution example:
# /opt/DynamicLinkManager/bin/dlnkmgr online

Execute command?
[y/n] : y
KAPL01022-I The eight paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name = online
```

• In the case of AIX

```
Execution example:
# /usr/DynamicLinkManager/bin/dlnkmgr online

Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name = online
```

• In the case of Windows

```
Execution example:
# dlnkmgr online

Execute command?
[y/n] : y
KAPL01022-I The three paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name = online
```

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(b) Execute the [dlnkmgr view -path] command.

• In the case of HP-UX

Execution example:

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus    IO-Counts    IO-Errors
Online        310          0

PathID   PathNameDskName ···        ChaPort  Status    Type ···
000000   ···      HITACHI DF700F    0A       Online    Own
000001   ···      HITACHI DF700F    1A       Online    Non
:        :        :                 :        :         :
```

• In the case of Solaris

Execution example:

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000016
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID   PathNameDskName ···        ChaPort  Status    Type ···
000000   ···      HITACHI DF700F    0A       Online    Own
000001   ···      HITACHI DF700F    1A       Online    Non
:        :        :                 :        :         :
```

• In the case of AIX

Execution example:

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID   PathNameDskName ···        ChaPort  Status    Type ···
000000   ···      HITACHI DF700F    0A       Online    Own
000001   ···      HITACHI DF700F    1A       Online    Non
:        :        :                 :        :         :
```

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• In the case of Windows

Execution example:

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000006
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID   PathName DskName ···          ChaPort  Status    Type ···
000000   ···      HITACHI DF700F       0A       Online    Own
000001   ···      HITACHI DF700F       1A       Online    Non
:        :        :                    :        :         :
```

Make sure that values of the [Paths:] and [Online Paths:] are the same.
Next, make sure that descriptions in the [Status] column for all the paths are “Online”.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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(2) When HP-UX+PVLink is used

(a) Execute the [vgdisplay –v vg??] command, and check that all the active paths returned to the initial status. "??" indicates VolumeGroup numbers.

Execution example:

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0

   --- Logical volumes ---
   LV Name                  /dev/vg02/lvol1
   LV Status                available/syncd
   LV Size (Mbytes) 1000
   Current LE               250
   Allocated PE             250
   Used PV                  1

   --- Physical volumes ---
   PV Name                  /dev/dsk/c83t0d0
   PV Name                  /dev/dsk/c24t0d0 Alternate Link
   PV Status                available
   Total PE                 511
   Free PE                  11
   Autoswitch               On
```

Record the initial status.

If the path is not returned, execute the [vgdisplay –v vg??] command every 30 seconds and check.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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(b) When the setting has been changed, return it to the default one.

Execution example of IO Timeout value change:

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  On
```

Execution example of IO Timeout value change:

```
# pvchange -t 0 /dev/dsk/c11t0d1
Physical volume "/dev/dsk/c11t0d1" has been successfully changed.
Volume Group configuration for /dev/vg02 has been saved in /etc/lvmconf/vg02.conf

# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        default
Autoswitch                  On
```

Return this value to the original value. It returns to the default value if “0” is specified.

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Execution example of Autoswitch value changes:

```
# pvchange -S n /dev/dsk/c11t0d1
Physical volume "/dev/dsk/c11t0d1" has been successfully changed.
Volume Group configuration for /dev/vg02 has been saved in /etc/lvmconf/vg02.conf

# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  Off
```

Return this value to the original value. Default is “On”.

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(3) When Solaris+VxVM-DMP is used

(a) Execute the [xdisk list cXtYdZs2]command, and check that all the paths returned to the owner Control Unit.

```
Execution example:
# vxdisk list c4t0d0s2
Device:       c4t0d0s2
devicetag: c4t0d0
type:         sliced
hostid:
disk:         name= id=1067933033.3997.V880-1
group:        name= id=1067933103.4030.V880-1
flags:        online ready private autoconfig
pubpaths:    block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths: block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:     2.2
iosize:       min=512 (bytes) max=256 (blocks)
public:       slice=4 offset=0 len=8217600
private:     slice=3 offset=1 len=38143
update:       time=1067993564 seqno=0.147
headers:     0 248
configs:     count=1 len=28130
logs:         count=1 len=4262
Defined regions:
 config     priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config     priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log          priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:     2
c4t0d0s2            state=enabled     type=primary
c5t1d0s2            state=enabled     type=secondary
```

The following message is displayed in the console window when the path returns.

```
Display example:
vxdmp: [ID 916426 kern.notice] NOTICE:
vxvm:vxdmp: enabled controller
/sbus@a,0/fcr@2,400000 connected to disk array ???
```

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram/Control Unit is to be replaced.

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3.4.9 Suspend the work of the Host computer

Suspend the work of the Host computer.

3.4.10 Collecting simple trace

Collect the simple trace and keep it so that in case of failure. It can be investigated. Collect the simple trace using the WEB.
The procedure is shown below.

(1) Before collecting the simple trace

(a) Items to be prepared

Collection is performed using the normal mode of WEB or Maintenance mode.
For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary.
For collecting the simple trace, disk space of 520 M bytes is required. (260 M bytes for temporary data and 260 M bytes for Full Dump data)
Under ordinary maintenance works, disk space of no less than 5 M bytes is required.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN-cross-cable.

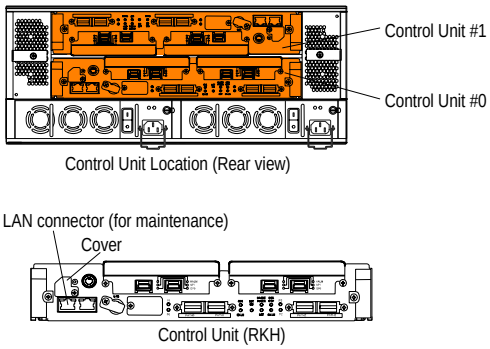


Figure 3.4.2 LAN Connector Position

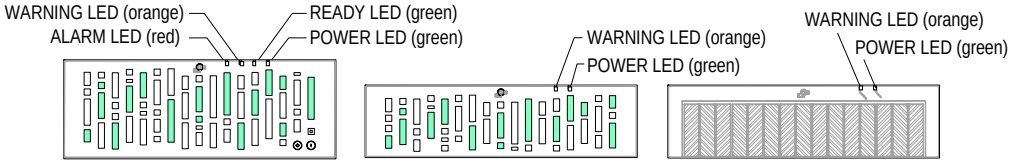
(c) With Simple Trace Collection, the information of both controllers can be collected from one controller. Therefore, this function does not need to be performed from both Controllers. (As a file name during the collection, “smpl_trc0.dat” is provided for the collection from Control Unit #0, and “simpl_trc1.dat” for the collection from Control Unit #1”.)

(d) Make sure that the WARNING LED (orange) on the Front Bezel is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)

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(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] - [Cache] - [Clear Cache] in this order.



(a) Rackmount model of RKH (b) Rackmount model of RKAJ/RKAJAT (c) Rackmount model of RKA

Figure 3.4.3 Indication Locations and Names of LED

(2) Procedure for a simple trace collection

(a) Enter the IP address of the LAN connector for maintenance, to which the service PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button. (For the procedure for connecting the Web, refer to Maintenance Manual Troubleshooting "Chapter 3. Before Starting WEB Connection" (TRBL 03-0000).)

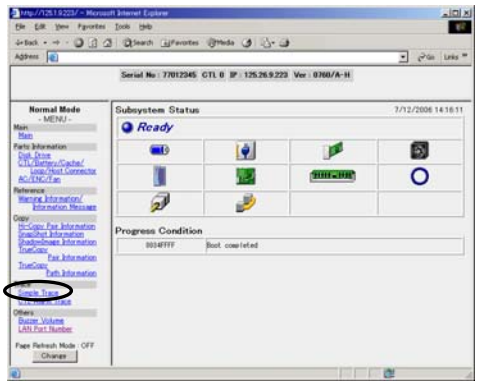


(b) When Windows XP Service Pack2 or Windows 2003 Service Pack1 is used in the OS of the maintenance PC, collect the simple trace after changing the setting of the following Internet Explorer.

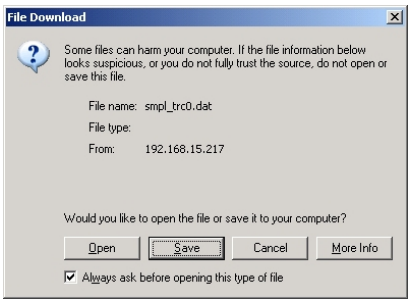
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Privacy] tab, check [Blocked pop-up] of [Pop-up block], and click the [Set] button.
- Set [Filter level] to [Medium] in the [Setting pop-up block] window and click the [Close] button.
- Select [OK] button in the [Internet Options] window.

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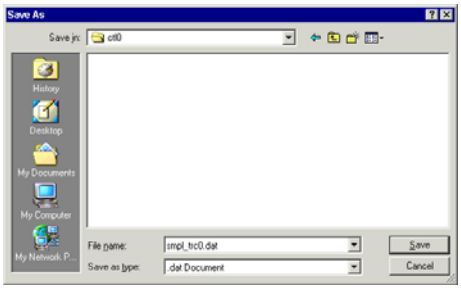
(c) Collect the simple trace according to the WEB and the following procedure.
Click “Trace” in the menu frame of “Simple Trace”.



(d) The following dialog is displayed.
Click the [Save] button.



(e) Select the place to save the file and file name (Default file name: CTL#0:smpl_trc0.dat, CTL#1: smpl_trcl.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed.

‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

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In this procedure Simple trace is collected by WEB Normal mode. Similarly, Simple trace can be collected by WEB Maintenance mode through Menu Frame.
For entering Maintenance mode, refer to the Maintenance Manual WEB "3.1 Transferring to the Maintenance Mode" (WEB 03-0000).

When the USB memory needs to store the simple trace information, refer to Maintenance Manual Troubleshooting "7.8 Storing simple trace information in the USB memory" (TRBL 07-0300).

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3.4.11 Download the microprogram for Hitachi TagmaStore® AMS 1000™

Download the microprogram for the Hitachi TagmaStore® AMS 1000™ (0760/A-H or later) using the Storage Navigator Modular.

The procedure is shown below.

(1) Preparation for update installation of microprogram

(a) Set up the maintenance PC before starting the update installation.

The setting up is completed when the installer stored in the CD-ROM of the microprogram is executed.

Outline of the setting up is shown below.

- Installation of the JRE 1.3.1_03
- Setting of the security policy file
- Copying of the microprogram from the CD-ROM for the microprogram installation to the maintenance PC

(b) Prerequisites for setting up of a maintenance PC

Prerequisites concerning the user ID of Windows® are as follows.

- The user ID of Windows® at the time when the microprogram is installed in the maintenance PC must be identical with that at the time when a maintenance work is done.

A prerequisite of a drive for booting the OS of the maintenance PC

- The drive for booting the OS must be the C drive.

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(2) Hierarchy of Microprogram Storage Directories

The hierarchical structure of Microprogram storage directories is shown below.
The structure of directories of the CD-ROM for installing the Microprogram is the same as that shown below.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:\diskarray-microprogram\microprogram."
When installing the Microprogram, specify the unified version directory.

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The Microprogram becomes unable to be installed if the directory name is changed.

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(a) Java error codes displayed at the time of update installation and actions for coping with them.

When the PC does not satisfy the prerequisite shown in Item (1)(b), a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

Table 3.4.1 Java error codes

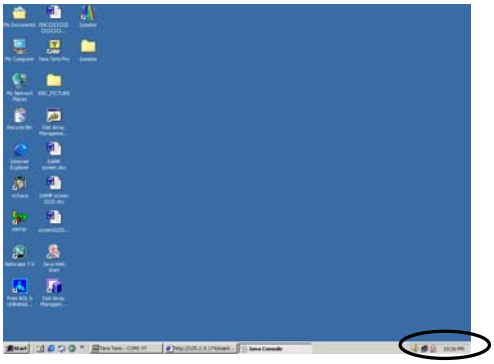
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram is selected. Cause estimated • A drive for booting the OS is not the c drive. • The user name of Windows® at the time when the microprogram was installed in the maintenance PC is not identical with that at the time when the microprogram is updated, or two-byte characters (full size characters or Japanese characters) are used to define the user name	① Check if the drive for booting the OS is the c drive. (Refer to the (i) of (2)(a) in Subsection 3.4.11) In the case of the dual boot, boot Windows® using the c drive and perform the installation again. ② Check if the user name of Windows® at the time when the microprogram is installed in the maintenance PC is identical with that at the time when the microprogram is updated and if two-byte characters (such as full size characters and Japanese characters) are not used. If an illegal specification has been made, perform the logon over again using an appropriate user name and perform the installation again after connecting the browser.
1219	An error occurred during the communication with the subsystem. Confirm the subsystem status and the LAN environment.	Time when the error occurs • The error occurs when the resource for the LAN cannot be ensured. Cause estimated • The error occurs because the resource (memory) of the maintenance PC is insufficient.	① Reboot the subsystem and the maintenance PC and quit unnecessary application programs. Make sure that the subsystem is in the READY status, place the subsystem in the Maintenance mode, and perform the installation again. ② If the error recurs in spite of the operations above, replace the maintenance PC and perform the installation over again from the beginning. Use a PC whose memory capacity is as large as possible.

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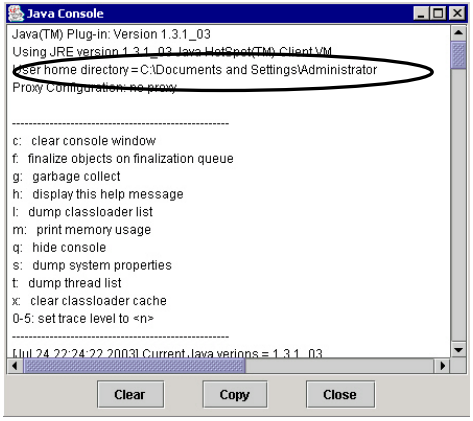
(i) Method for checking the drive for booting the OS

A method for checking the boot drive when the Java message (message code: 1216) is issued is shown below.

① Double click the [: Java icon]on the task tray at the bottom right in the Service PC window.



② Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: *****…).



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(b) Procedure for setting up the maintenance PC

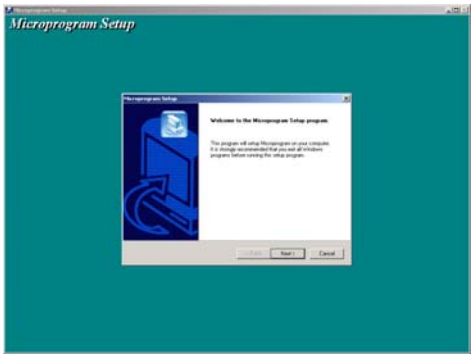
(i) Double click the "Program\micro upload\micro setup\Setup.exe" of the CD-ROM for microprogram installation.

Deleted: ??

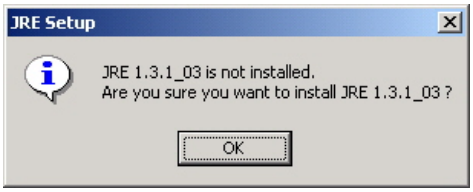
Deleted: ??

Deleted: ??

(ii) The initial window of the setting up appears.
When the [Next] button is pressed, the JRE 1.3.1_03 installer is activated in the case where the JRE 1.3.1_03 is not installed yet.
In the case where the JRE 1.3.1_03 has been installed, windows® shown in Steps (iii) to (vii) are not displayed.

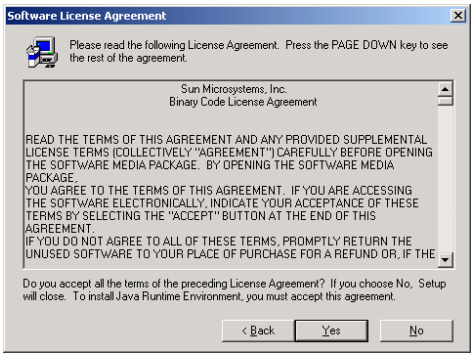


(iii) A dialog box for asking confirmation of starting the JRE 1.3.1_03 installer. Click the [OK] button.

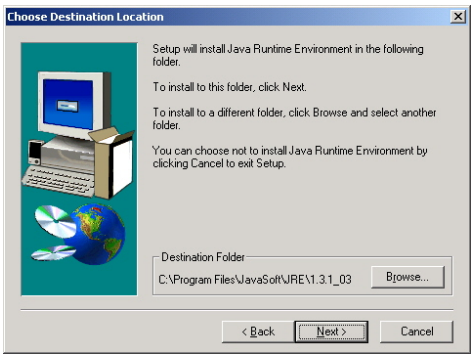


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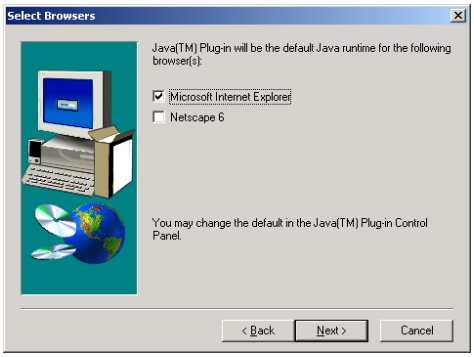
(iv) A window of product licensing contract is displayed. Click the [Yes] button.



(v) A window for selecting a directory in which the JRE 1.3.1_03 is to be installed. Select the directory for the installation and click the [Next] button.

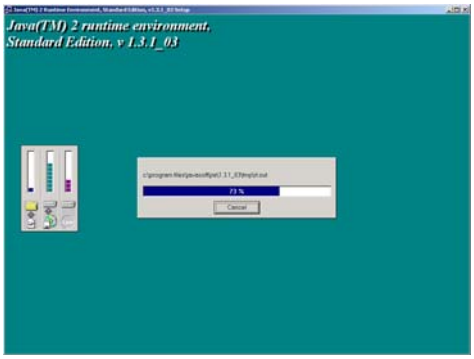


(vi) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



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(vii) Installation of the JRE 1.3.1_03 is started.



(viii)After the installation of the JRE 1.3.1_03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.

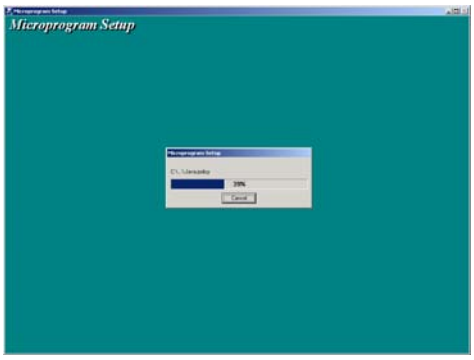




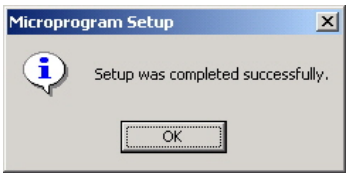
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(ix) The microprogram is copied on the maintenance PC.

Create a directory to which the microprogram is to be copied directly under the "C:\diskarray-microprogram\microprogram" for each microprogram revision and copy the microprogram file with the subdirectories (DF700H, ENC, ---) into the directory.



(x) The setting up is completed. Press the [OK] button.



NOTE : • Note that the settings of the security policy file is changed when the maintenance PC is set up.
• If the microprogram is transferred to a directory other than "C:\diskarray-microprogram\microprogram" which is a directory copied by the installer, the installation cannot be done. Therefore, care should be taken.
• Do not change a name of the unified version directory(‡1) or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

‡1 : For the unified version directory, refer to "3.4.11 (2) Hierarchy of Microprogram Storage Directories" (HUP 03-0420).

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(3) Download the microprogram for the Hitachi TagmaStore® AMS 1000™ (0760/A-H or later).

(3-1) Procedure for download

(a) Matters to be made sure of before starting update installation.

Make sure of the following before starting the update installation.

- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem.
- Check that the READY LED (green) on the Front Bezel of the Basic Chassis lights up. When the READY LED (green) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 60 minutes until it lights up because the automatic download of the ENC/SENC firmware is being executed. When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the update operation for the maximum of 30 to 85 minutes until the READY LED (green) on the front of the Basic Chassis lights up because the automatic download of the ENC/SENC firmware or the update of the flash program is being executed.
  Also, check that the WARNING LED (orange) on the Front Bezel does not light up.
- Also, check that the WARNING LED (yellow) on the Front Bezel does not light up or blink at low-speed. When it lights up or blinks at low-speed, connect it to WEB, and perform the maintenance according to the information message on WEB. After the recovery is made, install the microprogram in order to update it.
- Make sure that the system copy is not being executed through the information message (I140xy System copy started (x: Unit number, y: HDU number)) of the WEB.
  If it is in the middle of system copy, please wait until that is completed and update installation of microprogram.

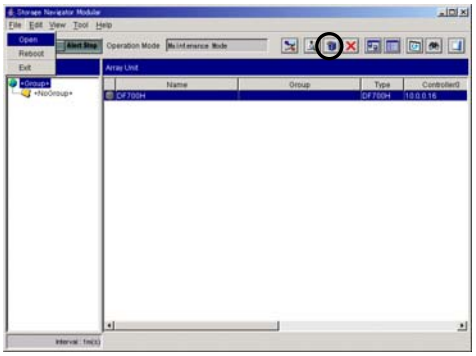
(b) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the WEB. (See Subsection "3.4.4 (2) Connecting the LAN cross cable0" (HUP 03-0120).

(c) Start the Storage Navigator Modular and set the operation mode in the "Management Mode". (See Subsection "3.4.5 Changing mode of Storage Navigator Modular and registering disk array subsystem" (HUP 03-0130).)

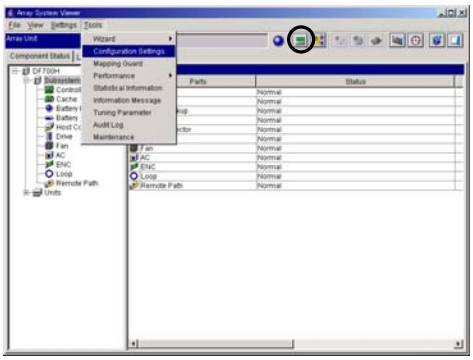
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(d) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the selection methods as shown below.

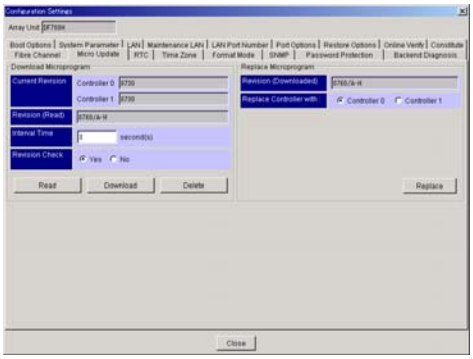
- Selecting [File] – [Open]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Open]



(e) Select [Tools] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



(f) Click the [Micro Update] tab.

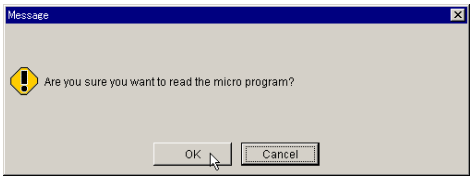


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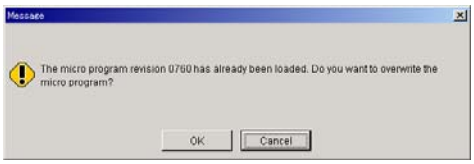
(g) Read in the microprogram to the service PC in which Storage Navigator Modular is installed. Click the [Read] button.
When a microprogram revision is displayed in the [Revision(Read)] box, the microprogram has already been read in. When only the Unified version directory storing the microprogram is specified, the whole microprogram is read in automatically.

(h) Since a message asking for confirmation whether or not to read in the microprogram, click the [OK] button.

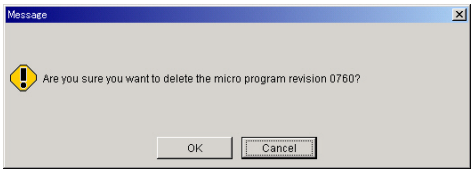
NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the download of the microprogram again from the beginning.



In the case where the microprogram has already been read in, the message asking for the confirmation is displayed. When you click the [OK] button, the microprogram is overwritten. When you abort the reading in, click the [Cancel] button.



When you eliminate the microprogram that has already been read in to the computer, click the [Delete] button. Since the message asking for confirmation is displayed, click the [OK] button.



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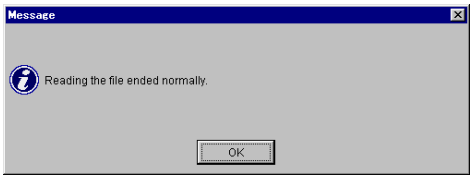
(i) Since a window for specifying the directory in which the microprogram to be read in is stored is displayed, specify the Unified version directory. When you click the [OK] button, reading in of the microprogram is started.
Examples of the path entry are shown below.

When using Windows®:

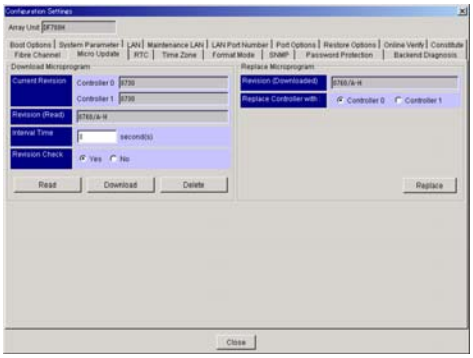
c:/diskarray-microprogram/microprogram/micro/0760A

Unified version directory in the hard disk in which the micro program is copied.

(j) Since a message is displayed when the reading in of the microprogram is completed, click the [OK] button.



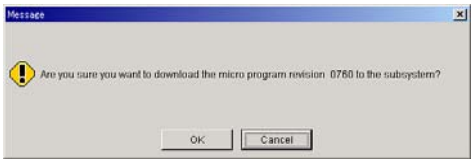
The revision of the microprogram that has been read in is displayed in the [Revision(Read)] box.



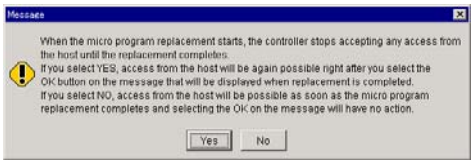
(k) Click the [Download] tab.

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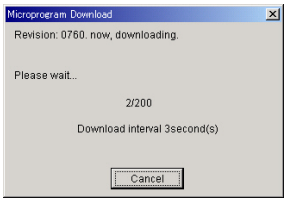
(l) The confirmation window is display. Click the [OK] button.



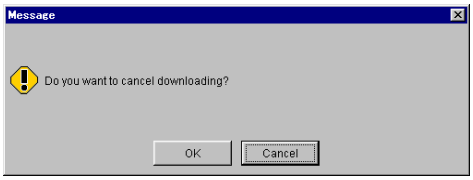
The confirmation window is display. Click the [Yes] button.



The download of the microprogram starts by clicking the [Yes] button, and the dialog is displayed.



When you abort the downloading, click the [Cancel] button.
A message asking for confirmation is displayed. When you click the [OK] button, the downloading is aborted.
When you click the [Cancel] button, the downloading is continued.



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(m) Since a message is displayed when the downloading is completed normally, click the [OK] button.

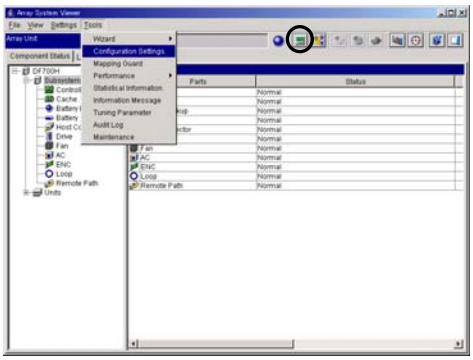


NOTE : After the microprogram is downloaded, be sure to restart the disk array subsystem or replace the microprogram. If the Control Unit board is replaced in the online mode before restarting the disk array subsystem or replacing the microprogram, the replaced Control Unit may be detached. When the subsystem is burdened with a heavy I/O load by a host at the time of the downloading, the downloading may be terminated abnormally. Perform the downloading again.

3.4.12 Replace the microprogram for Hitachi TagmaStore® AMS 1000™

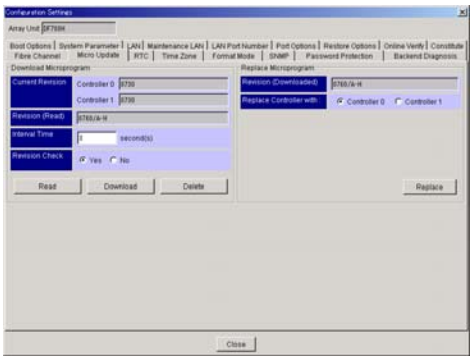
Replace the microprogram that was downloaded to the disk array subsystem with the microprogram installed in the Control Unit. When making replacement, be sure to replace the microprograms of the both Control Units 0 and 1. When the microprogram of one of the Control Units is replaced and the unit window of Storage Navigator Modular is closed, the unit window may be opened no more. When the unit window is not opened, replace the microprogram after changing the subsystem configuration by eliminating the IP address of the Control Unit whose microprogram has been replaced using an IP address of the Control Unit whose microprogram is not replaced yet.

(1) Select [Tools] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

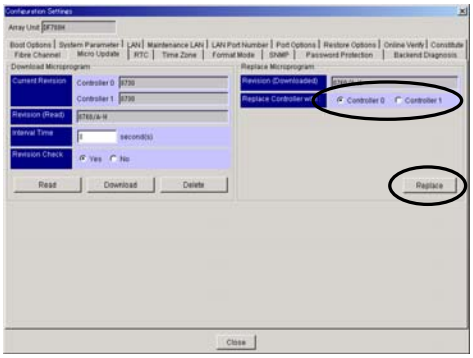


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(2) Click the [Micro Update] tab.

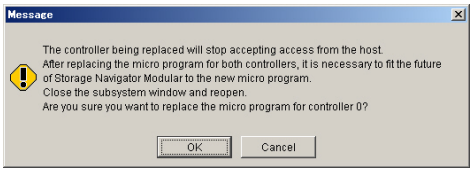


(3) Select the Control Unit whose microprogram is to be replaced and click the [Replace] button.

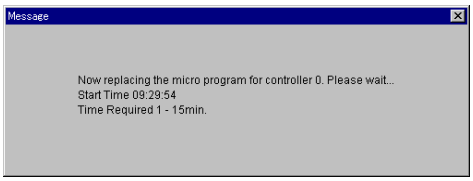


(4) The confirmation window is display. Check if the selected Control Unit is correctly displayed and click the [OK] button.

NOTE : When a LAN failure, etc. occurred and the processing of the Storage Navigator Modular terminated abnormally, execute the replace of the microprogram again from the beginning.



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↓

Click the [OK] button according to the dialog message.



(5) When the replacement of the microprogram terminates normally, a completion message is displayed. When the [OK] button is clicked, the revision of the replaced microprogram is updated and the window is displayed.



NOTE : When making the access from the host accepted by the instruction from Storage Navigator Modular, the following message may be displayed if it is not operated for 20 minutes or more in the case where Account Authentication is valid, and it may not be completed normally. Perform the dummy replacement (‡1) of the Control Unit whose microprogram was replaced to make the access from the host accepted.
If the access from the host is made accepted when the replacement of the microprogram is completed, the dummy replacement (‡1) is unnecessary.



‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(6) After executing "3.4.8 Resetting of the host computer" (HUP 03-0300), update the microprogram of the other Control Unit as well in the procedure from "3.4.6 Setting check of the host computer" (HUP 03-0170).
When it is upgraded offline, perform the update of the microprogram in the other Control Unit also from "3.4.11 Downloading the microprogram for Hitachi TagmaStore® AMS 1000™" (HUP 03-0410).

NOTE : When the replacement of the microproram is made for only one of the dual Control Unit, the disk array subsystem is put in the status in which a warning is issued. The warning is called off when the other one of the dual Control Unit is replaced. When you replace the microprogram, be sure to make the replacement for the both Control Units continuously.

NOTE : Because TrueCopy remote replication/TrueCopy Extended Distance manages information stored in paired disk array subsystems, the path of the mate disk subsystem (not the subsystem being upgraded but the other one of the paired subsystems) is detached when TrueCopy remote replication/TrueCopy Extended Distance is used.
When the subsystem "B" shown in Figure 3.4.4 is upgraded, the path of the subsystem "A" is detached.
The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance.
This is because the "A" becomes unable to access the "B" as a result that the "B" is placed in the Maintenance mode. Therefore, this is not a problem.
However, when the pair status is changed to PSUE, there may have been a mistake in operations that have been made. Recover the pair from the PSUE status referring to Maintenance Manual Troubleshooting "6.3 Procedure for Recovery from Path Blockade when the TrueCopy remote replication/TrueCopy Extended Distance Function Is Used" (TRBL 06-1360).

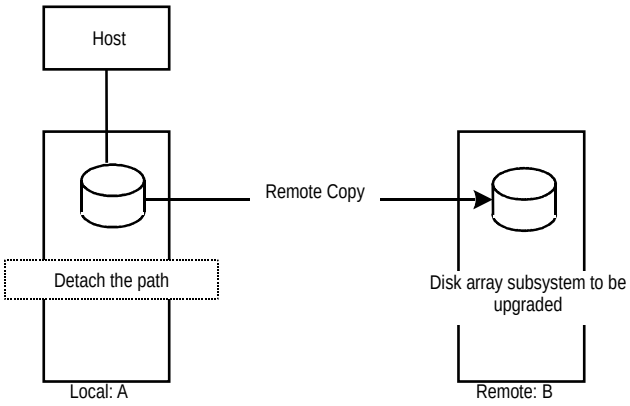


Figure 3.4.4 Paired Disk Array Subsystems (TrueCopy remote replication/TrueCopy Extended Distance)

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3.4.13 Hardware upgrade work

Replace some components with those for upgrading the disk array subsystem to the Hitachi TagmaStore® AMS 1000™(RKHE). Make the replacement above and have the customer keep the components that become unused because they are used in the configuration of the Hitachi TagmaStore® AMS 1000™(RKH).
The procedure is shown below.

(1) Note on hardware upgrade works

(a) Notes when Unpacking, Installing or Removing the Parts

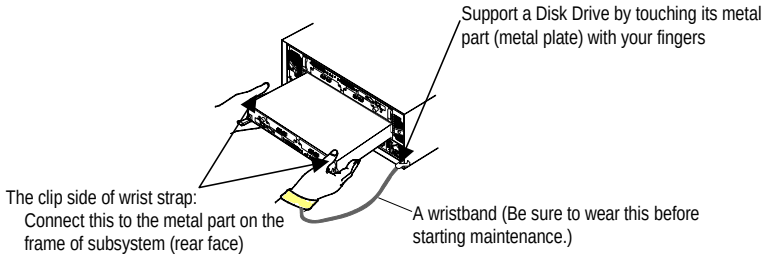
For installing or removing the parts, do not apply any shock as the precise parts are installed. Be sure to wear a wrist strap connected to the chassis frame before starting the work and do not take it off until it is finished.
For installing the Interface Board, Cache Unit, support it as touching the metal part at the side with the fingers of the hand that wears a wrist strap.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

CAUTION

- Be sure to wear a wrist strap connected to the chassis whenever you unpack parts from a case. Otherwise, the static electrical charge on your body may damage the parts.
- When you install the Control Unit, the Interface Board, or the Cache Unit, do the installation holding it by its sheet steel part with your hand(s) wearing the ESD grounding wrist band. The electrostatic charge can be discharged through your touch to the sheet steel part.
- In this operation, return the Interface Board, the Cache Unit and each cable to be removed once to the original installation places.



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(c) Notes on cable routing

(i) Handling of cables placed on the installation floor

- Protect the cables, which cannot be accommodated by the subsystem and thus laid on the floor or cross a passage, with the cable protection duct.
- For cables that relay between the subsystems, lay them on the floor and do not leave them from the floor.

(ii) Handling of under floor cables when the subsystem is installed on the free access floor.

- Give extra lengths to cables routed under the floor and do not make them float in the air.

(iii) Routing method

- Give a room for routing as earthquake and the like are considered.
- Give a room for routing not to disturb the part replacement for maintenance.
- Make the AC cables apart from each other and when they should be adjacent, do not make them in parallel but make them cross at right angle.
- When using a cable protection duct, be careful not to damage or cut cables by catching them.

(iv) Hold the connector to insert or pull out a cable. If the cable part is pulled, it may cause a failure.

(v) For connecting the Fibre Channel interface cable, the FC (ENC) cable, or iSCSI interface cable, bend it with a long radius (not less than 30mm) and do not give the load to the cable and the connector.

(d) Note on completing the work

Close all the external covers when the work is completed.

(The cover is to maintain the performance of the subsystem (radio wave noise suppression and others), so that be sure to keep all the external covers closed to operate the subsystem normally.)

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(2) Open the Rear Door of U7 rack frame.

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

(a) Fit an Allen wrench in the key socket on the rear door, turn the Allen wrench in the direction shown by the arrow (⟶), and open the rear door slowly leaving the wrench as it is.

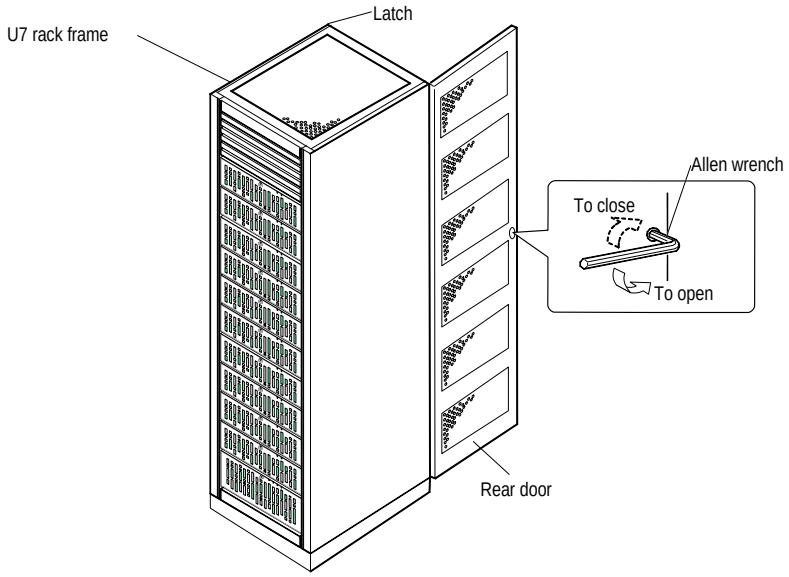


Figure 3.4.5 Procedure for Opening Rear Door

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(3) Select a procedure from the following and execute it.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	1. Complete the replacement within five minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 2. Replace the Control Unit after blocking the Control Unit to be replaced. 3. When replacing Control Unit of both systems (CTL 0 and CTL 1), power off the subsystem before the replacement.	• See "(3-1) Procedure for replacement with the power turned on (hot replacement)" (HUP 03-0620).
2	Replacement with the power turned off	—	• See "(3-2) Procedure for replacement with the power turned off" (HUP 03-0670).

NOTE : • When replacing the Control Unit while the subsystem power is turned on, be sure to replace them one by one. When replacing the Control Unit of the both systems (Control Unit #0 and Control Unit #1) at the same time, follow the procedure explained in "(3-2) Procedure for replacement with the power turned off" (HUP 03-0670).

• System parameters are automatically loaded to the new Control Unit from the built in Disk Drive. Accordingly no setting, such as operating manually, is required.

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(3-1) Procedure for replacement with the power turned on (hot replacement)

(a) For preventive detaching of the Control Unit, press RST SW.

Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

Make sure that the CALM LED (red), EALM LED (red) or RST LED (orange) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.

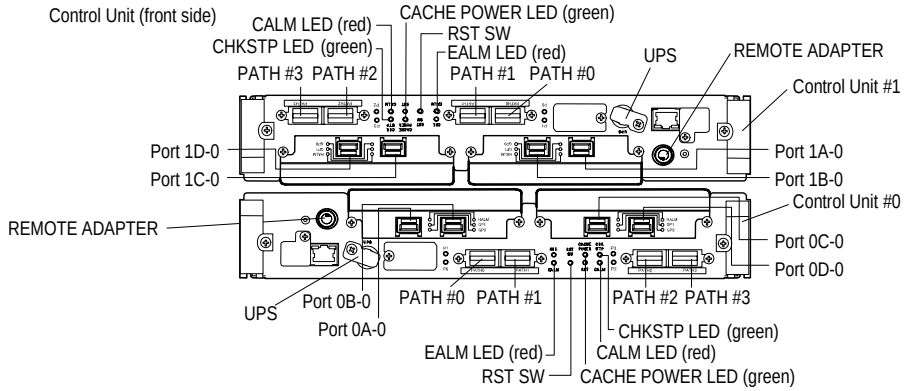


Figure 3.4.6 Control Unit replacement and LED locations

(b) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit to be replaced is installed.

(c) Loosen the screws (right and left) which are fixing the levers of the Control Unit(for RKH), push down the levers forward, and pull out the Control Unit(for RKH).

(d) Remove the all cables connected to the Control Unit(for RKH) that was blocked for prevention against a failure.

NOTE : When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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(e) Remove the Control Unit(for RKH) by pulling it out toward you.
(f) Loosen the two fixing screws for the cover at the back of the cover, and remove it.
(g) Remove the Cache Unit mounted on the Control Unit(for RKH).
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Interface Board and Cache Unit temporarily in the place where the anti-static measures are taken.

(h) Remove that Interface Board.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit(for RKH) and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit(for RKH).

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(i) Loosen the two fixing screws for the cover at the back of the cover of the new Control Unit(for RKHE), and remove it.
(j) Install the Cache Unit removed from the Control Unit for the RKH in the position of the same slot number of the Control Unit for the RKHE.
(k) Install the Interface Board removed from the Control Unit for the RKH fitting it to the positioning pin of the same position of the Control Unit for the RKHE, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit(for RKHE).
(l) Attach the cover, and tighten the fixing two screws for the cover at the back of the cover.
(m) Connect the removed interlocking cable to the new Control Unit(for RKHE) when the special UPS is connected.
(n) Connect the ENC/SENC cables.

NOTE : • The loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC/SENC cables are connected.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

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(o) Wait for more than 20 seconds, and then insert it into the specified position with the both right and left levers of the Control Unit(for RKHE) pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit(for RKHE) turn on, then EALM LED turns off and CALM LED turns off next.
If the Control Unit(for RKHE) is inserted without waiting for 20 seconds, it is possible that the Control Unit(for RKHE) is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement(‡1) of the Control Unit(for RKHE) which was inserted.
When the Control Unit(for RKHE) is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit(for RKHE) which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the Cache Units installed.)
But, when any messages are displayed on WEB about the Control Unit(for RKHE) or the Cache Units installed, then service personnel connects the other Control Unit(for RKHE) to the WEB and takes recovery actions according to "Information Message" in the other Control Unit(for RKHE).

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit #0 and #1. Install the Control Unit #0 with the cover up and #1 with the cover down.
• When pushing the levers at the same time in the direction shown by the arrows (⟵), perform this operation within one minute. If it has taken more than one minute to perform the operation, it may not be recovered. In this case, execute the replacement procedure again. Nevertheless, if it is not recovered, perform the Control Unit replacement since the failure may be caused in the Control Unit.

(p) Make sure that the WARNING LED (orange) on the Front Bezel is off.
(The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)
If WARNING LED (orange) is on, replace the Control Unit(for RKHE) again.
If WARNING LED (orange) is blinking, make sure WARNING LED (orange) goes off by referring to WEB.

‡1 : To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more.

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(q) Connect all of the removed cables to the Control Unit for the RKHE same as the time of the RKH configuration.

NOTE : • When connecting the interface cables, insert the interface cables until they are fixed to the host connectors.
If the Interface cables are inserted half in the host connectors, the Control Unit continues to detect the failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(r) Make sure that the READY LED (green) on the front of the Basic Chassis lights up.
The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 60 minutes) before it lights up.

(s) Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated.
Check that "I5390x The CTL type different from the other CTL was detected (CTL-0 yyyy, CTL-1 zzzz)" is displayed before "I0010x CTL recovered (CTL-x)" at the time that the first Control Unit was replaced.
Check that "I5390x The CTL type different from the other CTL was detected (CTL-0 yyyy, CTL-1 zzzz)" is not displayed before "I0010x CTL recovered (CTL-x)" at the time that the second Control Unit was replaced.(‡1)
The replacement work of the Control Unit is completed if these are checked.

(t) Check that the LED of the remote adaptor connected to the Control Unit(for RKHE) is installed lights on when the remote adaptor is connected.

(u) Replace the Control Unit(for RKHE) of the other controller also following the procedure starting from Step (a).
When the replacement for the both controllers is completed normally, the Control Unit(for RKHE) replacement for the disk array subsystem is completed.

‡1 : Perform the maintenance referring to the recovery method of this message if "I5390x The CTL type different from the other CTL was detected (CTL-0 yyyy, CTL-1 zzzz)" is displayed after replacing both Control Units.

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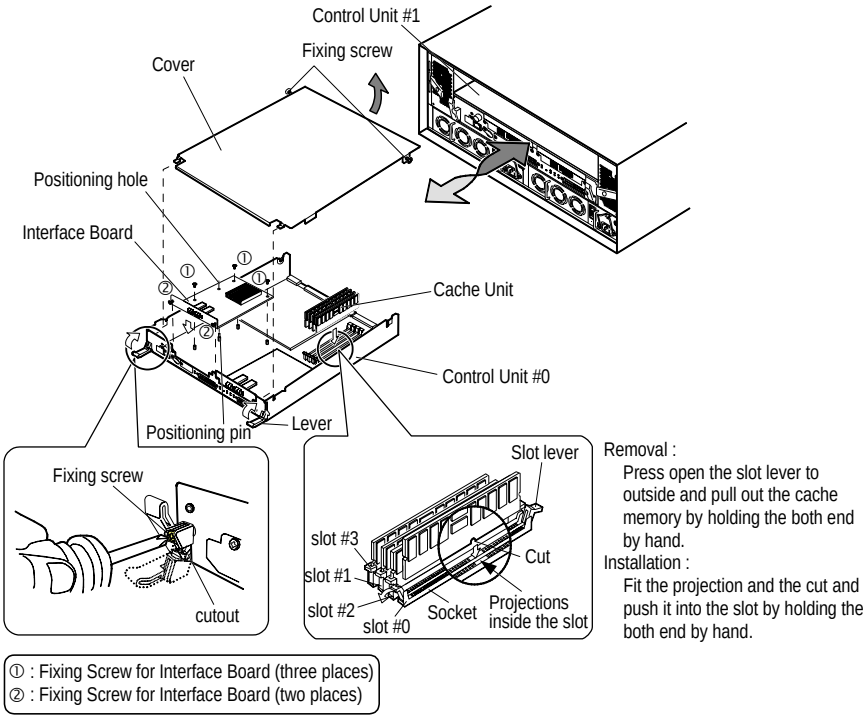


Figure 3.4.7 Control Unit replacement

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(3-2) Procedure for replacement with the power turned off

NOTE : Do not perform the planned shutdown (power-off) while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 40 to 60 minutes).

(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the front of the subsystem is off.
(c) Turn off the AC Power Unit Switch of the Power Unit on the Basic and Additional subsystem.
(d) All turn off the circuit breaker of the PDB.

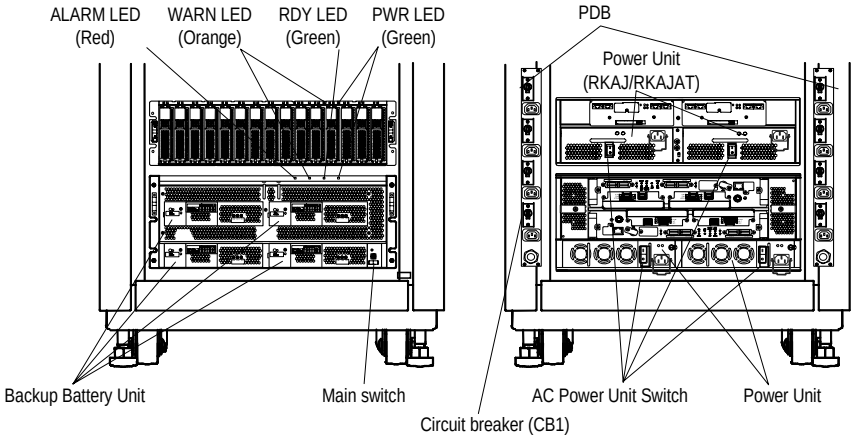


Figure 3.4.8 Locations of Switches for Power Off

(e) Loosen the screws (right and left) which are fixing the levers of the Control Unit(for RKH), push down the levers forward, and pull out the Control Unit(for RKH).
(f) Remove the all cables connected to the Control Unit(for RKH).

NOTE : • When the cable cannot be removed easily, do not pull it by force. Besides, the cable can be damaged if it is bent upward or downward forcibly.
• When removing the Interface cables, pull out the interface cables completely from the host connectors.
If the Interface cables are inserted half in the host connectors, the Control Unit continues to detect the failures, and the I/O processing of the Control Unit may be deteriorated.

⚠ CAUTION

Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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(g) Remove the Control Unit(for RKH) by pulling it out toward you.
(h) Loosen the two fixing screws for the cover at the back of the cover, and remove it.
(i) Remove the Cache Unit mounted on the Control Unit(for RKH).
Push the slot levers which fix the Cache Unit, and pull up the Cache Unit by holding both the end of the Cache Unit, and then the cache memory can be removed.

NOTE : Place the removed Interface Board and Cache Unit temporarily in the place where the anti-static measures are taken.

(j) Remove that Interface Board.
Loosen the fixing screws ② (two places) of the Interface Board installed in the Control Unit(for RKH) and remove the fixing screws ① (three places), and then pull up the Interface Board upwards and remove it from the Control Unit(for RKH).

NOTE : Place the removed Interface Board in the place where anti-static measures are taken.

(k) Loosen the two fixing screws for the cover at the back of the cover of the new Control Unit(for RKHE), and remove it.
(l) Loosen the two fixing screws for the cover at the back of the cover of the new Control Unit(for RKHE), and remove it.
(m) Install the Cache Unit removed from the Control Unit for the RKH in the position of the same slot number of the Control Unit for the RKHE.
At this time, check that the connectors are surely inserted.
Install the Interface Board making its sheet metal part face inside of the Control Unit(for RKHE).
(n) Attach the cover, and tighten the fixing two screws for the cover at the back of the cover.
(o) Insert it into the specified position with the both right and left levers of the Control Unit(for RKHE) pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
If the Control Unit(for RKHE) is caught by something when it is inserted, do not push it in forcibly. Retry the insertion from the beginning. If forced, pins might be broken.

NOTE : • Do not catch a ENC cable, when the Control Unit for the inserted.
• The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

(p) Connect all of the removed cables to the Control Unit for the RKHE same as the time of the RKH configuration.

NOTE : • When connecting the interface cables, insert the interface cables until they are fixed to the host connectors.
If the Interface cables are inserted half in the host connectors, the Control Unit continues to detect the failures, and the I/O processing of the Control Unit may be deteriorated.
• The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

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(q) Make sure that the circuit breaker is turned off.
(r) Make sure that the main switch is turned off.
(s) Turn on the circuit breaker of the PDB.
(t) Turn on the AC Power Unit Switch of the Power Unit on the Basic and Additional Chassis.
(u) Turn on the main switch.
(v) Check that the RDY LED (green) on the front of the RKHE usually lights up after five minutes, and the ALARM LED (red) and the WARNING LED (orange) to out.(‡1)
At this time, when the RDY LED (green) is blinking at high speed, the RDY LED (green) on the front of the basic chassis lights up after blinking high-speed because the automatic download of the ENC/SENC firmware is being operated (at the maximum of 40 to 60 minutes).

NOTE : The EALM LED (red) on the Control Unit (on the rear side of the subsystem) may come on after powering on the subsystem. However, it is not a problem if the EALM LED (red) goes out until the RDY LED (green) comes on the front of the Basic Chassis.

(w) Check that "I10000 Subsystem is ready" is displayed referring to the Information Message on WEB.
Check that "I5390x The CTL type different from the other CTL was detected (CTL-0 yyyy, CTL-1 zzzz)" is not displayed before "I10000 Subsystem is ready (CTL-x)".(‡2)

3.4.14 Processing for re-recognizing the host computer

Execute the processing for re-recognizing the device of the connection host computer.

‡1 : When the WARNING LED (orange) is blinking at low speed, perform the maintenance according to the recovery method on the displayed message referring to the Information Message on WEB. When referring to the Information Message on WEB, if the array subsystem is in the WARNING status, the WARNING LED (orange) lights up, and if the array subsystem is not in the WARNING status, the WARNING LED (orange) goes out.
‡2 : Perform the maintenance referring to the recovery method of this message if "I5390x The CTL type different from the other CTL was detected (CTL-0 yyyy, CTL-1 zzzz)" is displayed after replacing both Control Units.

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3.4.15 Revalidation the TrueCopy remote replication/TrueCopy Extended Distance

This operation is not required when TrueCopy remote replication/TrueCopy Extended Distance is not used.

Perform the revalidation.

For example, even when the remote disk array subsystem is upgraded as shown in Figure 3.4.9, the microprogram of the local disk array subsystem must be updated.

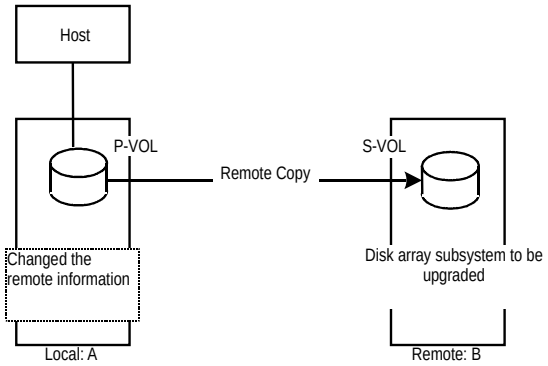


Figure 3.4.9 Change the Remote Information

The procedure is shown below.

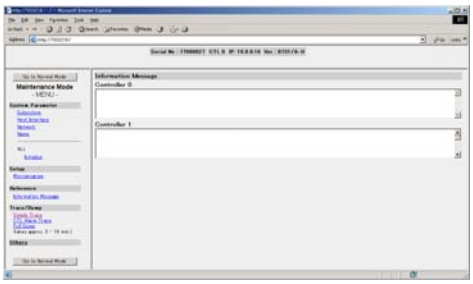
(1) Connect the maintenance PC to the other one of the two subsystems paired by TrueCopy remote replication/TrueCopy Extended Distance.

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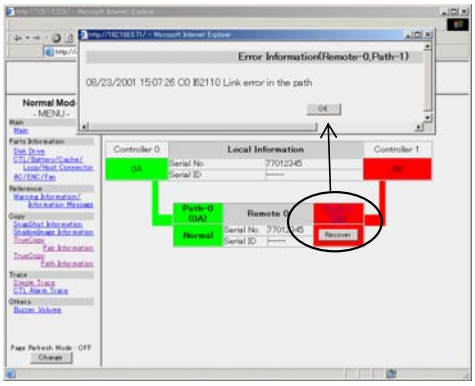
(4) Revalidate the path using the WEB.

Perform the revalidation through the "TrueCopy Path Information" window.

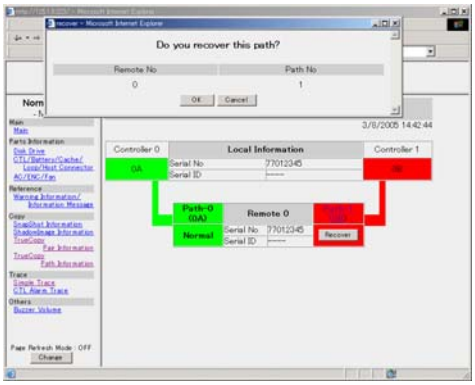
Screen 1: Image of the "Information Message" window



Screen 2: Image of the "Path Detachment Factors" window

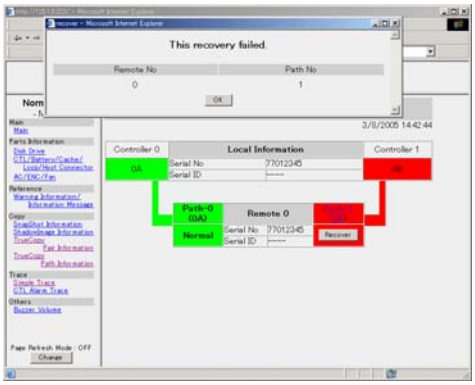


Screen 3: Image of the "Revalidation Instruction" window

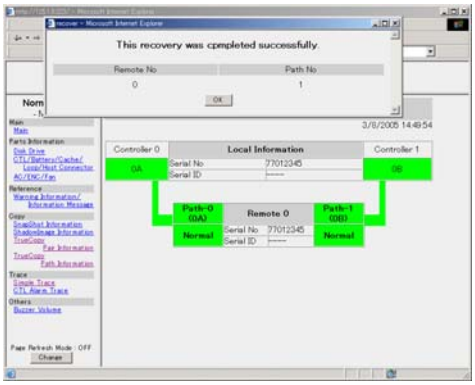


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Screen 4: Image of the "Revalidation Result" window (for the case where the operation terminated abnormally)



Screen 5: Image of the "Revalidation Result" window (for the case where the operation terminated normally)



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(5) Restart RAID Manager. Start the HORCM using the "horcmstart" command.
It is necessary to set an environmental variable (for TrueCopy) of the environment in which the command is executed. This example of the setting is premised on a configuration in which two instances in the same server (Windows NT®/Windows® 2000) use the same command device.

(a) Set an environmental variable that shows the each instance number. Enter the following via the command prompt window.

```
c:¥horcm¥etc>set HORCMINST=0
```

(b) Execute the horcm starting script, and then make sure of the configuration by executing the pairdisplay command.

```
c:¥horcm¥etc>horcmstart 0 1
starting HORCM inst 0
HORCM inst 0 starts successfully.
starting HORCM inst 1
HORCM inst 1 starts successfully.

Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)      (CL1-A , 1,   1)    174       1..P-VOL PSUS NEVER ,   175       2   -
vg01     oradb1(R)      (CL1-B , 1,   2)    175       2..S-VOL SSUS NEVER ,-----        1   -
```

A preparation for starting TrueCopy has been completed.

(6) Resynchronizing a pair
Resynchronize a pair by RAID Manager using the pairresync command.
The method for resynchronizing a TrueCopy remote replication/TrueCopy Extended Distance pair is explained below.

(a) Set the group name in the configuration definition file as "vg01".
Resynchronize a TrueCopy remote replication/TrueCopy Extended Distance pair, which has been split, using the pairresync command. When doing this, be sure to set the value of the -c option, which specifies the copy speed, as 15. Furthermore, make sure that the status of each volume becomes PAIR by executing the pairevtwait command.

```
c:¥horcm¥etc>pairresync –g vg01 –c 15
c:¥horcm¥etc>pairevtwait –g vg01 –s pair –t 300 10
pairevtwait : Wait status done.
```

(b) Make sure of the status and configuration of the resynchronized pair by executing the pairdisplay command.

```
c:¥horcm¥etc>pairdisplay -g vg01
Group    PairVol(L/R) (Port#,TID,LU),Seq#,LDEV#.P/S,Status,Fence, Seq#,P-LDEV# M
vg01     oradb1(L)      (CL1-A , 1,   1)    174       1..P-VOL PAIR NEVER , 174         2   -
vg01     oradb1(R)      (CL1-B , 2,   2)    175       2..S-VOL PAIR NEVER ,-----        1   -
```

The TrueCopy remote replication/TrueCopy Extended Distance pair has been resynchronize.
For details of the pairsplit command and its options, refer to Chapter 4 in the "RAID Manager System Administrator's Guide (Hitachi TagmaStore® AMS/WMS Series)".

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3.4.16 Changing the registration information for the monitoring failures

Change the device model name of the SNMP Agent Support Function from the RKH to the RKHE.

3.4.17 Works to be done after the upgrade is completed

When all the upgrade works are completed, do the works such as removal of the maintenance PC.
The procedure is shown below.

(1) Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Step "3.4.4 Connection of the maintenance PC" (HUP 03-0110).

(2) Close the rear door referring to the instruction given in Step "3.4.13 (2) Open the Rear Door of U7 rack frame" (HUP 03-0600).
Make sure that the rear door is latched and cannot be opened.

CAUTION

Open or close the door carefully following the procedure.
Otherwise, you may hurt you fingers by pinching them.

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Chapter 4. Trouble Shooting

4.1 Error Messages

4.1.1 Progress messages

Message code	Message text	Description	Collect the error	Recovery measures
I5390x	The CTL type different from tne other CTL was detected (CTL-0 xxxx, CTL-1 yyyy)	It was detected that the Control Units of the RKH and the RKHE were mixed. The Control Units to be installed in the AMS1000 must be unified to the Control Units of the RKH or the RKHE. xxxx, yyyy : Indicates either of the RKH or the RKHE.	Simple Trace	① There is no problem if this message is displayed before "I0010x CTL recovered" after replacing one Control Unit by the upgrade from the RKH to the RKHE. Perform the upgrade work continuously. ② The Control Unit displayed as "RKH" in the message is a Control Unit of the RKH if this message is displayed before "I0010x CTL recovered" or "I10000 Subsystem is ready" after replacing the second Control Unit by the upgrade from the RKH to the RKHE. Replace the Control Unit to a Control Unit of "RKHE". ③ The Control Unit displayed as "RKHE" in the message is a Control Unit of the RKHE if this message is displayed before "I0010x CTL recovered" or "I10000 Subsystem is ready" after replacing the second Control Unit to return the configuration of the Control Unit to the RKH by the upgrade from the RKH to the RKHE. Replace the Control Unit to a Control Unit of "RKH". ④ The model name of the replaced Control Unit is different from the other Control Unit if this message is displayed before "I0010x CTL recovered" or "I1000 Subsystem is ready" after replacing the Control Unit in the status that the upgrade from the RKH to the RKHE is not performed. Replace the other Control Unit to the Control Unit of a correct model name so that both Control Units to be installed are Control Units of the RKHE or the RKH.

4.1.2 Flash detected messages

Message code	Message text	Description	Collect the error	Recovery measures
R5230x	Unsupported control unit type (CTL-x)	The Control Unit, which the microprogram stored in the system disk is not supporting, was detected. x : Control Unit # (0-1)	Simple Trace	① Refer to Maintenance Manual Troubleshooting "6.1.25 Recovery method when the Control Unit whose microprogram is not supporting was detected" (TRBL 06-1313).

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4.1.3 WEB error messages

Message code	Message text	Description	Recovery measures
—	Abnormal End Empty System Retry Full Install	The updating installation of the microprogram cannot be done because the old microprogram does not exist in the system disk drive.	① In the case where this message is displayed when the microprogram is installed in the subsystem of the RKHE for the purpose of update during the upgrade from the RKH to the RKHE, take recovery actions according to Section "4.2 When Abnormal End Empty System Retry Full Install occurs" (HUP 04-0080). ② When it is evident that the old microprogram does not exist in the system disk drive, install the microprogram newly. ③ When this message is displayed in a case other than the case ① or ②, execute the updating installation again after making sure that the system copy has been completed through the Information Message of the Web. In either of the following cases, the system copy has been completed. • "I140xy (or I140HH) System copy started" is not displayed. • "I140xy (or I140HH) System copy started" and "I141xy (or I141HH) System copy completed" are displayed consecutively. When the system copy is being made, turn off the main switch and then turn it on again later than 20 seconds. In the following case, the system copy is being made. • While "I140xy (or I140HH) System copy started" is displayed, "I141xy (or I141HH) System copy completed" is not displayed successively. Execute the updating installation again after making sure that the RDY LED (green) comes on and then the system copy is completed.
1204	A specified file doesn't exist. Confirm elements of designation.	The specified file does not exist.	① Make sure that the path to the directory of the microprogram to be installed is specified correctly.

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4.1.4 Error messages issued during upgrade made when TrueCopy remote replication/TrueCopy Extended Distance is enabled

This operation is not required when TrueCopy remote replication/TrueCopy Extended Distance is not used.

Message code	Message text	Recovery measures
I6220x	Link down time-out (Port-x)	① A state in which no link up is done has kept on longer than the regulated time at the port for which a path has been set. x: Port #
I62300	Path not connected	① <In the case of the direct connection> The remote DF that attempted to log in to the set path is not connected, or the LoopMap of the LILP is not connected one-to-one. <In the case of the connection via SW> A serial number (WWN) of the remote DF that attempted to log in to the set path is not registered in the name server of the SW.
I6250x	Path login failed	① The sending and response of FLOGI, PLOGI, RSCN, etc. to the SW terminated abnormally when a log-in to the set path was done in the case of the connection via the SW. x : Port #
I62600	Fabric connection failed (Port-x)	① Sending and response of PLOGI and PRLI done at the time of a log-in to the set path terminated abnormally.

4.1.5 Other messages

When a message other than the above is displayed, be sure to check the configuration first. Check whether the cable connections are correct, and so on following the procedure.

Example)

- RA7900 System HDU spin up failed:
  Spin-up of the system drive failed.
- HE05HH Backend down [Unit# ERR] (Unit-01):
  The back end was blocked : Abnormality was detected in the connection order of the array subsystem, the setting of the device ID, or the setting of the subsystem identification switch.
- HH1Q00 SES error inf. [SES-HDU error]:
  The Control Unit was detached because both of the two SES drives could not access the ENC.
- W080xy Loop alarm (Path-x, Loop-y):
  Since the Fibre Channel loop failed, the operation is continued with the alternative loop.

When one of the following messages is displayed, there may be a mistake in the Device ID, or some other matter. Check if the configuration is correct.

When a problem is found in the configuration related to the upgrade, correct the configuration. When no problem is found in the configuration and the operation, take some recovery action referring to the Maintenance Manual.

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4.1.6 Collecting CTL Alarm Trace

Through the CTL Alarm Trace collection, detailed information (the CTL Alarm Trace) on the immediately previous Controller blockage stored in the Controller is collected.

NOTE : When the Control Unit to be connected to WEB is blocked, the WEB connection may not be performed for two to three minutes usually (for the maximum of 50 minutes) from the time when the Control Unit was blocked because the CTL alarm trace is being created.

Since the above-mentioned CTL Alarm Trace information is taken over from the blocked Control Unit to the replaced Control Unit, it can be collected after the Control Unit is recovered from the failure. If the Control Unit is blocked while collecting the CTL Alarm Trace may not be collected normally. Therefore, in this case, collect the CTL Alarm Trace again.

The method of collecting the CTL Alarm Trace is shown below.

(1) Before collecting the CTL Alarm Trace

(a) Items to be prepared

The CTL Alarm Trace is collected in the normal mode or the maintenance mode of the WEB. For connecting to the WEB, a maintenance PC terminal with Browser installed is necessary. For collecting the CTL ALARM TRACE, disk space of 520 M bytes per one Control Unit is required. (260 M bytes for temporary data and 260 M bytes for Full Dump data)

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable.

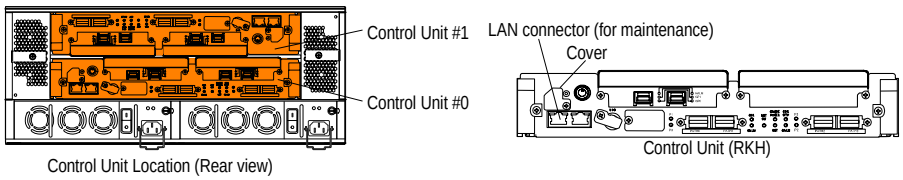


Figure 4.1.1 LAN Connector Position

(c) Collect the CTL Alarm Trace information from each Control Unit.

Save the files collected from different controllers into different directories or put different names to them so that you will see from which controller they were collected.

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(d) Make sure that the WARNING LED (orange) on the Front Bezel is not blinking fast. If it is, wait for a while (up to 80 seconds), and it stops blinking fast. (If this LED is blinking slow (at the interval of 1 second), there are no problems.)

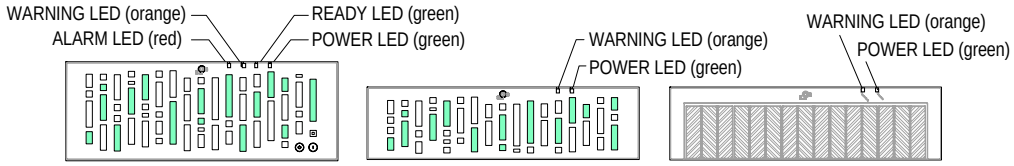


Figure 4.1.2 Indication Locations and Names of LED (Front Bezel)

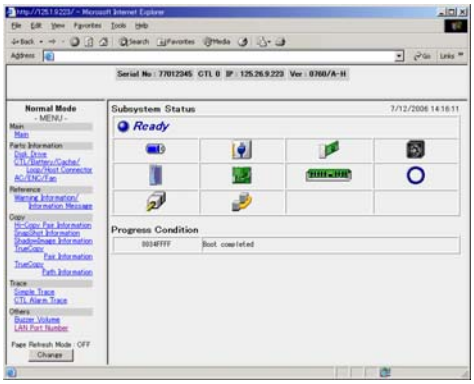
(e) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.

- In the case of Internet Explorer, select the [Tools] - [Internet Options] - [General] - [Temporary Internet files] - [Delete Files] in this order.
- In the case of Netscape, select the [Edit] - [Preferences] – [Cache] - [Clear Cache] in this order.

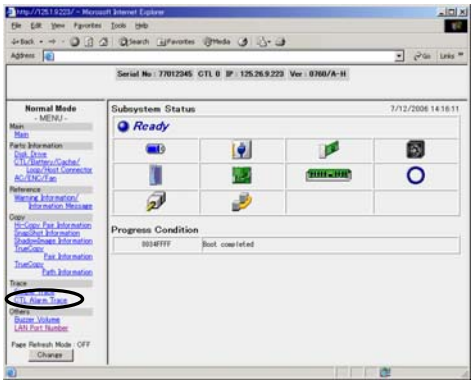
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(2) Procedure for collecting a CTL Alarm Trace

(a) Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser. When the Web has already been connected, update the page by pressing the Update button.

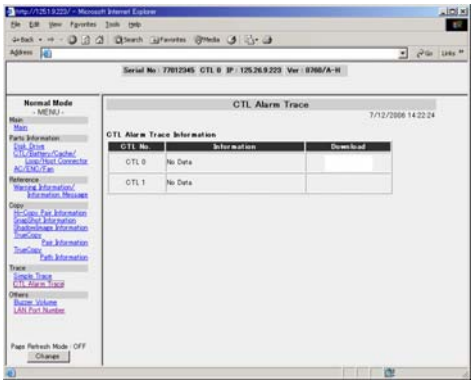


(b) Collect the memory dump according to the WEB and the following procedure.
Click “CTL Alarm Trace” in the menu frame of “Trace”.



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If CTL Alarm Trace exists, the CTL Alarm Trace information window is displayed.



Description of information

"Not Ready" ····· Indicates the situation where the trace area is not established in the device.

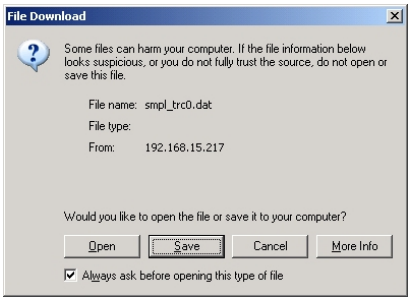
"No Data" ····· CTL Alarm Trace information does not exist or while information is being created.

"MM/DD/20YY hh:mm:ss" ····· CTL Alarm Trace information exists.

NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL Alarm Trace may not be collected normally. Therefore, collect the Simple Trace.
If Simple Trace cannot be obtained through detached Control Unit, connect the Maintenance PC to the Control Unit at the opposite side, and collect the Simple Trace.

(c) Press the "Download" button on the Control Unit side to be collected in "CTL Alarm Trace information".(‡1)

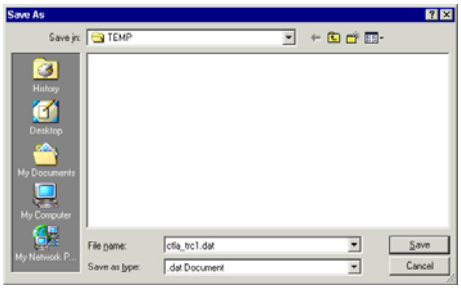
(d) The following dialog is displayed. Click the [Save] button.



‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

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(e) Select the place to save the file and file name (Default file name: ctla_trc0.dat) and click [Save](‡1).



The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed.

In this procedure is collected by WEB Normal mode. Similarly, CTL Alarm Trace can be collected by WEB Maintenance mode through Menu Frame.

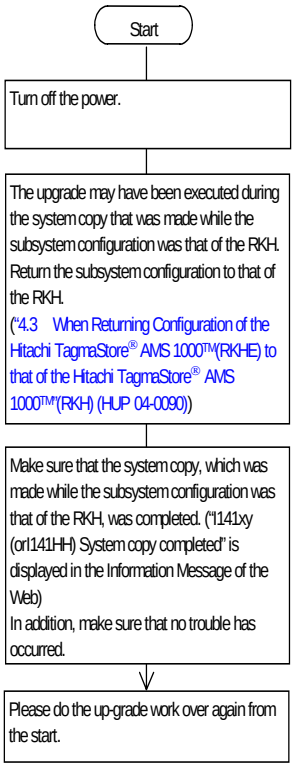
‡1 : There may be a case where the default file name is given as "ctla_trc0.dat.dat" depending on the setting of the PC. In this case, reset the file name to "ctla_trc0.dat" or any other name.

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4.2 When Abnormal End Empty System Retry Full Install occurs

The procedure for troubleshooting and actions to be taken when the Abnormal End Empty System Retry Full Install occurs are shown below.

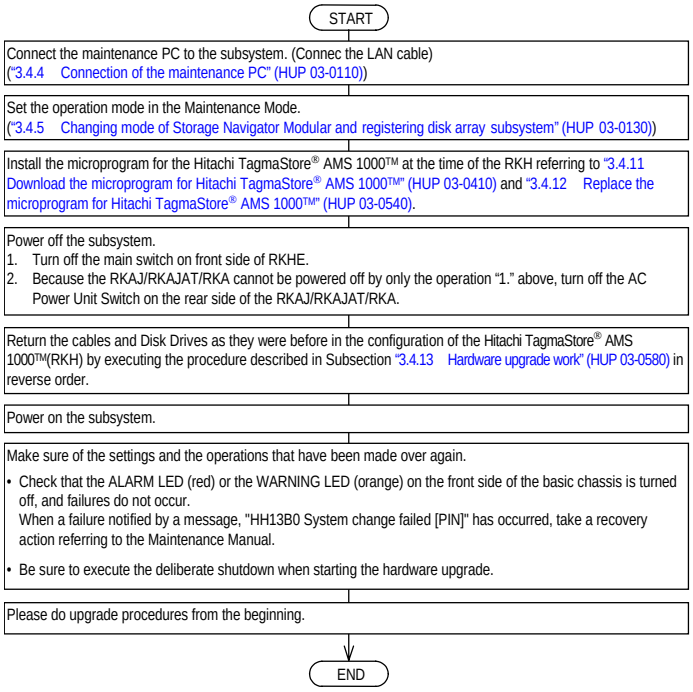
Make a recovery from the failure following the procedure for troubleshooting.



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4.3 When Returning Configuration of the Hitachi TagmaStore® AMS 1000™(RKHE) to that of the Hitachi TagmaStore® AMS 1000™(RKH)

The procedure to be used in case the upgrade fails is explained below. In the procedure, the upgrade is made again after the configuration of the disk array subsystem is returned to that of the Hitachi TagmaStore® AMS 1000™(RKH) once.



NOTE : Be sure to review all the settings and operations that have been made before making the upgrade again.

4.3.1 System power off

Because a message, "Download Failed" is displayed and the disk array subsystem is in the Alarm status, the RKAJ/RKAJAT/RKA cannot be powered off although the main switch on the front side of the RKHE is turned off. The power of the RKAJ/RKAJAT/RKA must be turned off by the other means.

(1) Turn off the main switch.
(2) Make sure that the PWR LED (green) on the Front Bezel is off.
(3) Turn off the AC Power Unit Switches of the AC power supplies installed in the RKHE and all the RKAJ/RKAJAT/RKAs.
(4) All turn off the circuit breaker of the PDB.

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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Sep.25.2006				All	Issued	-
1	Dec.22.2006				Cover	Rev.0 → Rev.1	CH
					HUP 03-0020	"• When Power Saving of the priced option is used,..." was added.	AD

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FE-96DF802-01

DF700 Online Fibre Channel Interface Board Addition Procedure

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Document Revision Level

Revision	Date	Description
Revision 0	Sep. 2006	First Release
Revision 1	Dec. 2006	Second Release

Preface

"**Online** FC Interface Board Addition" requires the path failover on the all servers that are connected with DF700. However, there are too many systems that are not configured with having this behavior. Therefore, RSD always recommends the using the "**Offline** FC Interface Board Addition".

In the other hand, the systems that are very difficult to stop are increasing. In such case, system should have the conditions described in this procedure.

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1 Overview

This data describes the procedure for addition the Fibre Channel (FC) Interface Board at the time of the FC configuration.

When you addition the FC Interface Board, all applications cannot access to the controller that the FC Interface Board is to be added. (The FC Interface Board addition takes place by blockade the both controllers one by one.) To perform the FC Interface Board addition, always follow the checklist shown below and read the cautions.

The FC Interface Board addition needs to check the status of paths and applications, so perform the operations according to your customer's schedule. And since the all accesses from servers may be concentrated on one controller during the adding, it is recommended that the operations should be performed during a time period when the I/O loads are light.

If the DF700 (AMS1000) meet the specific conditions (refer to "2 Checklist"), you will be able to perform the "Online FC Interface Board addition".

2 Checklist

If "No" is checked in the checklist, replacement with the servers suspended is required.

Table 1 Checklist for Online FC Interface Board addition

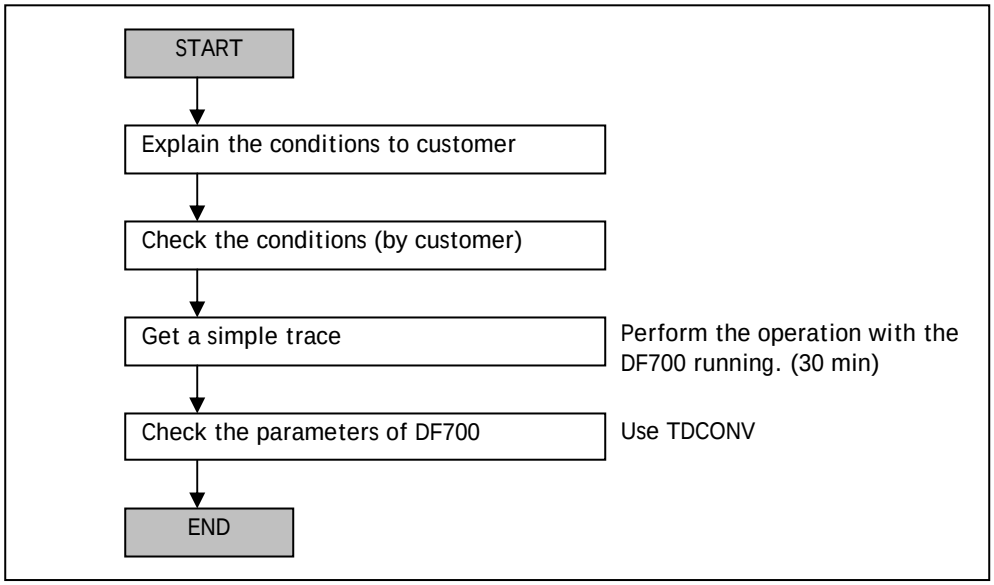
No	Contents	Yes / No
1	Does the DF700 have the dual controller configuration?	
2	Is the customer using the path switching software? (Please refer to "Table 2, Tested Path Switching Software" in the detail.)	
3	Is the controller of a main path to LUs separated from the controller of an alternative path?	
4	Is an alternative path set to all LUs?	
5	Are the host side parameters that are described in this document set correctly?	
6	Are the DF700 parameters that are described in the User's Guide of DF700 set correctly? (Before the adding, please get a simple trace to check.)	
7	Is it possible to stop the changing of pair status of ShadowImage in-system replication, TrueCopy remote replication or Copy-on-write SnapShot during the FC Interface Board addition ? (Customer cannot execute "paircreate" and "pairresync" commands.)	
8	Is it possible to change the pair status of TrueCopy Extended Distance from "PAIR" and "COPY" to "PSUS" during the FC Interface Board addition ?	
9	Is it possible to try not to execute the migration with Modular Volume Migration during the FC Interface Board addition ?	
10	If the customer uses the cluster software "MC/SG", is the lock disk stored in the disk other than the DF700?	
11	Is the boot disk stored in the disk other than the DF700? Is the redundancy condition of the boot path described on the System Construction Guide of BladeSymphony satisfied when it is connected to BladeSymphony?	
12	The I/O errors may be logged in a log file during the FC Interface Board addition, though the data accesses continue on an alternative path. Can the system ignore such the errors?	
13	Can other applications (HITRACK, HiCommand, other SNM) which perform the LAN access to the DF700 be stopped during the FC Interface Board addition?	

3 Flowchart

First step;

Please discuss with customers whether the conditions of this guideline meet with the customer's system or not. And get a simple trace to check the parameters of DF700.

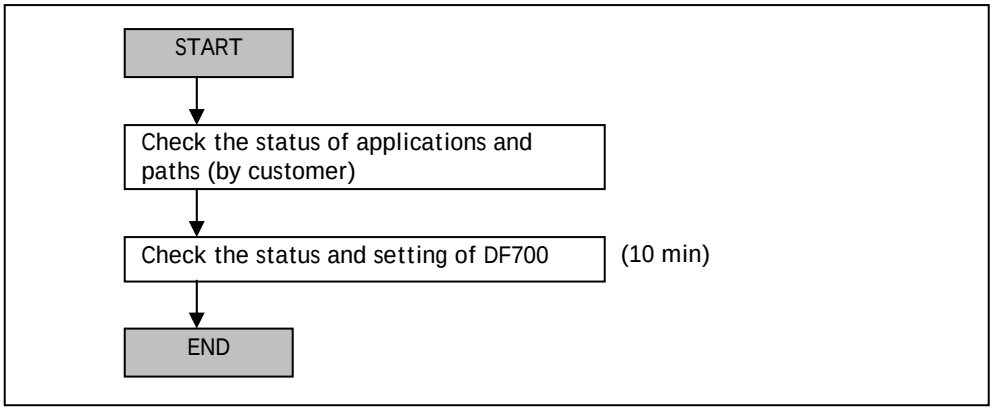
Figure 1 Flowchart of checking the conditions



Second step;

Please check the status of applications, paths, switches and DF700 before addition the FC Interface Board.

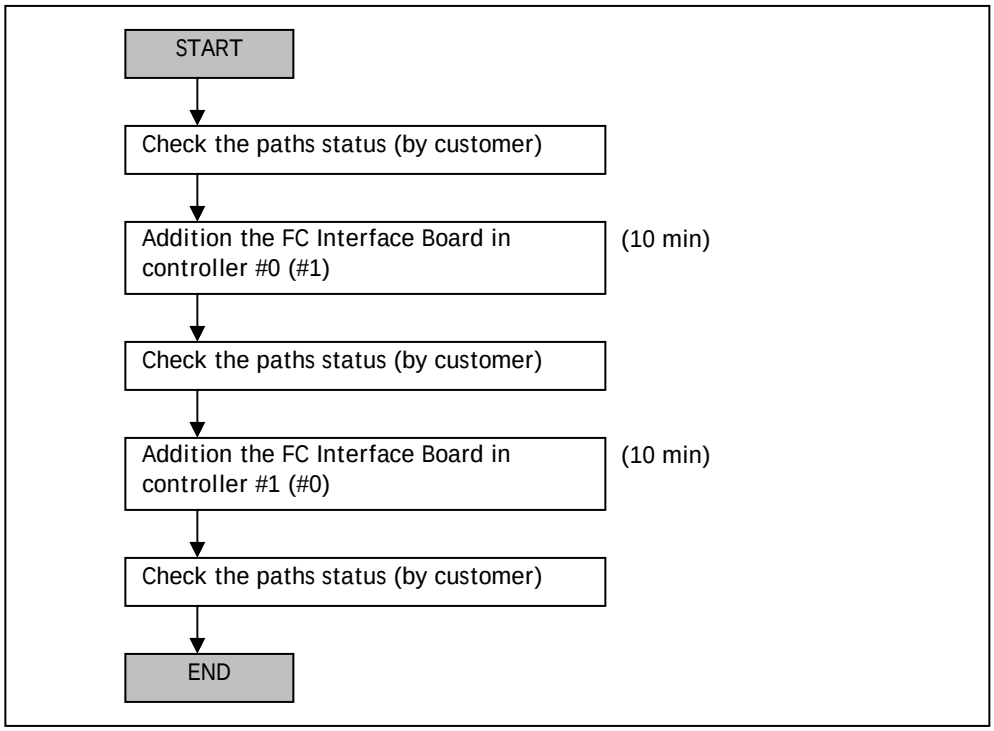
Figure 2 Flowchart of preparation of adding



Third step;

Perform the FC Interface Board addition.

Figure 3 Flowchart of adding the FC Interface Board



4 System Configuration

If the system is configured as shown below, online FC Interface Board addition is possible.

Figure 4 Figure of Configuration

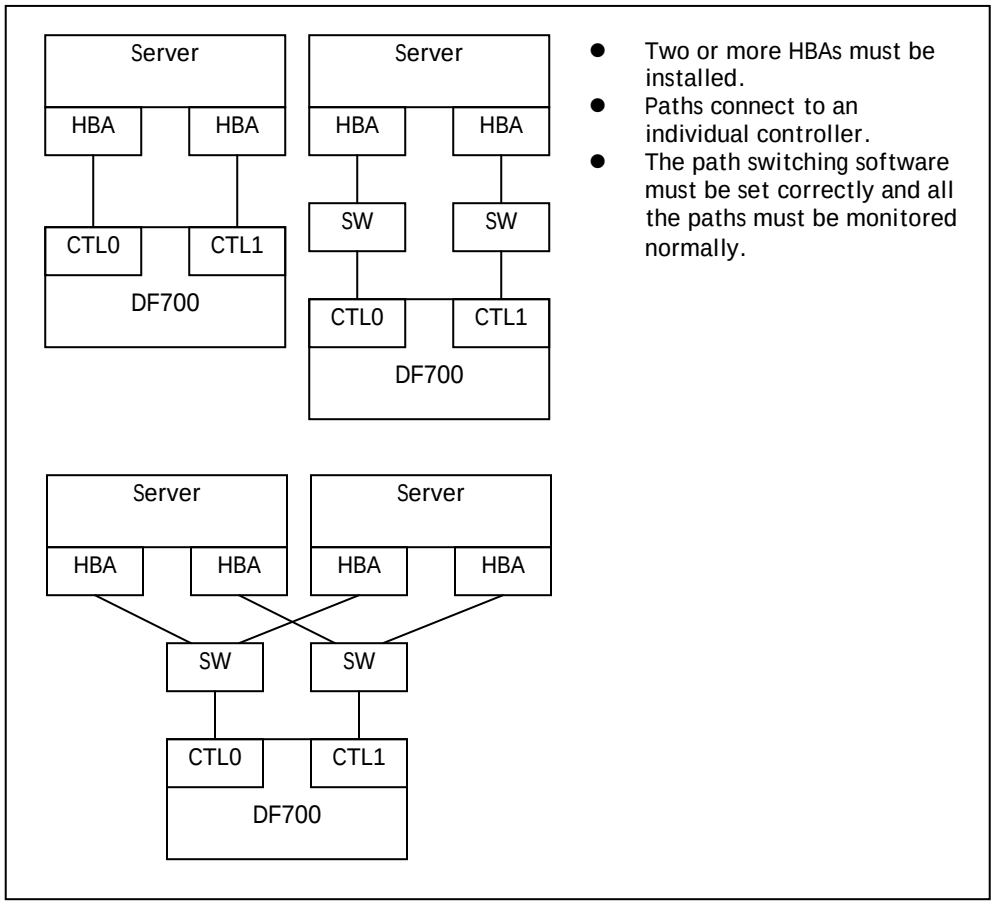


Table 2 Tested path switching software

No	OS, Version	DF700
1	HP-UX 11i, 11.0	HDLM, PVLink
2	Solaris 9, 8, 7, 2.6	HDLM, VxVM-DMP
3	AIX 5.2, 5.1, 4.3.3	HDLM
4	Windows 2K3, 2K, NT4.0	HDLM
5	Red Hat Advanced Server 2.1, Red Hat Enterprise Linux 3.0, AS 2.1, AS3(IA32), ES3(IA32), AS3(IPF)	HDLM, HFC-PCM, VxVM-DMP
6	USP/NSC/9900V	Alternative path

Note: This document uses the abbreviation "HDLM" to represent the "HiCommand Dynamic Link Manager".

Table 3 Software Parameters

No	Software	Parameter	Default	Setting
1	PVLink	IO Timeout	default (=30sec)	60sec
2		Auto Switch	On	On
3	VxVM-DMP	Please check the VxVM's manual.		
4	HDLM	Please check the HDLM's manual.		

Table 4 HBA Parameters

No	HBA	Parameter	Default	Setting
1	JNI FCE-1063	FcPortCfgEnable	0	1
	JNI FCE-6410	FailoverDelay	0	30
2	JNI FC64-1063 JNI FCI-1063 JNI FCE-1473 JNI FCE-6460 JNI FCC-6460 JNI FCX-6562	FailoverDelay	0	30

Note: In regard to the other HBAs, no parameter is required to be changed.

In regard to the system parameters of DF700, please refer to the User's Guide of DF700.

5 Cautions and Restrictions

Always follow the cautions and restrictions shown in this document and the path switching software manual.

Table 5 Cautions and Restrictions

No	Contents
1	The path switching software must run normally on all the servers connected to the DF700, and all paths to the LUs are to be duplicated by the path switching software. If there are any LUs whose path is not duplicated, addition the FC Interface Board after dismounting it beforehand.
2	All the paths must be normal. If a failure is found on the path, addition the FC Interface Board after recovering the failure.
3	Addition the FC Interface Board on the controller #0, and then addition the FC Interface Board on the controller #1. The reverse order of the addition is possible.
4	When Path Blockade is occurred in TrueCopy remote replication/TrueCopy Extended Distance while addition FC Interface Board on adding AMS1000, please recover the Path Blockade first, after stopping the addition.
5	The CCI command “paircreate” and “pairresync” cannot be executed during the adding of FC Interface Board.
6	When the pair status of TrueCopy Extended Distance is “PAIR” or “COPY”, do not perform the FC Interface Board addition.
7	Do not perform the FC Interface Board addition when the migration is being executed with Modular Volume Migration.
8	The migration of Modular Volume Migration cannot be executed during the FC Interface Board addition.
9	When Power Saving of the priced option is used, if you add the FC Interface Board after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the Control Unit recovers. Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then add the FC Interface Board. If the spin-down fails, execute the spin-down again.

6 Operations for FC Interface Board addition

To addition the FC Interface Board , follow the operations below.

This document uses the abbreviation “SNM” to represent the “Storage Navigator Modular” for DF700.

6.1 Preparation

Following procedures should be done before FC Interface Board addition.

Table 6 Checklist for Preparation of FC Interface Board Addition

No	Contents	Check
1	The parameters for DF700 are set correctly.	
2	The parameters for OS, HBA and path switching software are set correctly.	
3	The alarm light on the DF700 does not light up. And the servers and switches do not have any errors.	
4	In the case of the direct connection, the ports on the DF700 are linked up with the system.	
5	In the case of switch connection, the ports on the switches are linked up.	
6	Check that the READY LED on the DF700 lights up. When it is blinking at high speed, wait for the maximum of 30 to 85 minutes.	
7	The CCI command “paircreate” or “pairresync” is not running.	
8	Check that the pair status of TrueCopy Extended Distance was changed to “PSUS”.	
9	Check that the migration of Modular Volume Migration is not being executed.	
10	During the online FC Interface Board addition, please stop the other programs (HITRACK, HiCommand, other SNM) that may issue a command to the subsystem through the LAN, or remove the LAN cable to disconnect from such programs.	
11	To change the PVLink parameters “IO Timeout” and “AutoSwitch”, perform the following operations. Refer to the following procedures for the detail.	
12	When Power Saving of the priced option is used, check that there is no RAID Group whose power saving status is “Normal (command monitoring)” (spin-down is not being executed). If there is the RAID Group whose power saving status is “Normal (command monitoring)”, wait for a few minutes until the power saving status changes to “Normal (spin-down)”.	

[Operations of changing the PVLink parameters]

(1) Login as a user having the root authorization in HP-UX, and execute "vgdisplay /dev/dsk/c?t?d?" command.

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1        Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        default
Autoswitch                  On
#
```

Default is 30 seconds. Always change it to 60 seconds or longer since server I/O may take longer time during the FC Interface Board addition.

Default is On.

(2) Execute "pvchange –t 60 /dev/dsk/c?t?d?" command to change the "IO Timeout" parameter, and execute "vgdisplay ./dev/dsk/c?t?d?" command to check the result.

(3) When "Off" is specified for "AutoSwitch" parameter, execute "pvchange –S y "dev/dsk/c?t?d?" command, and check the result.

6.2 Operations for the FC Interface Board addition

The procedure of FC Interface Board addition is performed as following.

Step1: (server side)

Check the status of paths to the LUs. If multiple OS are connected, perform the operations on all the servers connected to DF700 that the FC Interface Board is to be added.

(1) In the case of PVLink on HP-UX

Login as a user having the root authorization, and execute "vgdisplay –v vg??" command.

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0
  --- Logical volumes ---
  LV Name                   /dev/vg02/lvol1
  LV Status                 available/syncd
  LV Size (Mbytes)          1000
  Current LE                250
  Allocated PE              250
  Used PV                   1
  --- Physical volumes ---
  PV Name                   /dev/dsk/c83t0d0
  PV Name                   /dev/dsk/c24t0d0 Alternate Link
  PV Status                 available
  Total PE                  511
  Free PE                   11
  Autoswitch                On
```

Check that two or more "PV Name" of "Physical volumes" are displayed and at least one path is displayed as "Alternate Link". If any path has a failure, suspend the FC Interface Board addition and recover the failure. Also, recode the PVName of the active path.

(2) In the case of HDLM on HP-UX

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off
Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Login as a user having the root authorization, and execute “dlnkmgr view -path” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName      DskName .....   ChaPort Status  Type .....
000000  .....         HITACHI DF700F  0A      Online  Own
000001  .....         HITACHI DF700F  1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where FC Interface Board addition is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where FC Interface Board addition is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where FC Interface Board addition is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where FC Interface Board addition is only 0A.

ExampleA-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName              DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000001     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000002     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000003     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000004     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000005     ···          HITACHI .DF700F….0051       1A       Online          Non      1
 :          :            :                          :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName              DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000001     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000002     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000003     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000004     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000005     ···          HITACHI .DF700F….0051       1A       Online          Non      1
 :          :            :                          :        :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where FC Interface Board addition is only 1A.

ExampleB-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000001   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000002   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000003   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000004   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000005   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
 :        :        :                        :        :             :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000001   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000002   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000003   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000004   ···     HITACHI .DF700F....0051   0A       Online        Own    10
000005   ···     HITACHI .DF700F....0051   1A       Offline(C)    Non    1
 :        :        :                        :        :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the DF700 side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the DF700 side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of (2) in Step1: (server side) again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

```
# diff path01.txt path02.txt
2c2
< Reduced      33        0
---
> Reduced     265        0
```

(3) In the case of VxVM-DMP on Solaris

Log into Solaris with the user who has the root authority, and check that all the paths are in the enable status using the command of VxVM.
The commands to operate differ in the cases where the version of VxVM is 3.2 or later and where it is before 3.2.

(a) When the version of VxVM is 3.2 or later, check the CTLR-NAME connecting the DF700 by the command [vxdmpadm listctlr all]. Furthermore, execute the command [vxdmpadm getsubpaths ctlr=cx] for each CTLR-NAME (cx is CTLR-NAME).

```
# vxdmpadm listctlr all
CTLR-NAME       ENCLR-TYPE      STATE           ENCLR-NAME
=================================================
c1              Disk            ENABLED         Disk
c2              AMS_WMS         ENABLED         AMS_WMS0
c3              AMS_WMS         ENABLED         AMS_WMS0

# vxdmpadm getsubpaths ctlr=c2
NAME      STATE[A]     PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME    ATTRS
=============================================================================
c2t0d0s2  ENABLED      SECONDARY     c2t0d0s2    AMS_WMS     AMS_WMS0      -
c2t0d1s2  ENABLED(A)   PRIMARY       c2t0d1s2    AMS_WMS     AMS_WMS0      -
c2t0d2s2  ENABLED      SECONDARY     c2t0d2s2    AMS_WMS     AMS_WMS0      -
c2t0d3s2  ENABLED(A)   PRIMARY       c2t0d3s2    AMS_WMS     AMS_WMS0      -
c2t0d4s2  ENABLED      SECONDARY     c2t0d4s2    AMS_WMS     AMS_WMS0      -
c2t0d5s2  ENABLED(A)   PRIMARY       c2t0d5s2    AMS_WMS     AMS_WMS0      -
c2t0d6s2  ENABLED      SECONDARY     c2t0d6s2    AMS_WMS     AMS_WMS0      -
c2t0d7s2  ENABLED(A)   PRIMARY       c2t0d7s2    AMS_WMS     AMS_WMS0      -

# vxdmpadm getsubpaths ctlr=c3
NAME      STATE[A]     PATH-TYPE[M] DMPNODENAME ENCLR-TYPE ENCLR-NAME ATTRS
=============================================================================
c3t0d0s2  ENABLED(A)   PRIMARY       c2t0d0s2    AMS_WMS     AMS_WMS0      -
c3t0d1s2  ENABLED      SECONDARY     c2t0d1s2    AMS_WMS     AMS_WMS0      -
c3t0d2s2  ENABLED(A)   PRIMARY       c2t0d2s2    AMS_WMS     AMS_WMS0      -
c3t0d3s2  ENABLED      SECONDARY     c2t0d3s2    AMS_WMS     AMS_WMS0      -
c3t0d4s2  ENABLED(A)   PRIMARY       c2t0d4s2    AMS_WMS     AMS_WMS0      -
c3t0d5s2  ENABLED      SECONDARY     c2t0d5s2    AMS_WMS     AMS_WMS0      -
c3t0d6s2  ENABLED(A)   PRIMARY       c2t0d6s2    AMS_WMS     AMS_WMS0      -
c3t0d7s2  ENABLED      SECONDARY     c2t0d7s2    AMS_WMS     AMS_WMS0      -
```

Check that all the paths are displayed as “ENABLED”. If any path has a failure (DISABLED), suspend the FC Interface Board addition and recover the failure.

(b) When the version of VxVM is before 3.2, execute the command [vxdisk list cXtYdZs2] after checking the device by the command [vxdisk list] (cXtYdZs2 is the device file).

```
# vxdisk list
DEVICE          TYPE     DISK          GROUP         STATUS
c1t0d0s2        sliced                                error
c1t0d0s3        simple   c1t0d0s3      rootdg        online
c4t0d0s2        sliced   disk01        DG0           online
c4t0d1s2        sliced   disk01        DG1           online
c4t0d2s2        sliced   disk01        DG2           online

# vxdisk list c4t0d0s2
Device:         c4t0d0s2
devicetag:      c4t0d0
type:           sliced
hostid:
disk:           name= id=1067933033.3997.V880-1
group:          name= id=1067933103.4030.V880-1
flags:          online ready private autoconfig
pubpaths:       block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths:      block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:        2.2
iosize:         min=512 (bytes) max=256 (blocks)
public:         slice=4 offset=0 len=8217600
private:        slice=3 offset=1 len=38143
update:         time=1067993564 seqno=0.147
headers:        0 248
configs:        count=1 len=28130
logs:           count=1 len=4262
Defined regions:
 config   priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config   priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log      priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:   2
c4t0d0s2        state=enabled    type=primary
c5t1d0s2        state=enabled    type=secondary
```

Check that all the paths are displayed as “enabled”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

(4) In the case of HDLM on Solaris

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName      DskName .....     ChaPort Status  Type .....
000000  .....         HITACHI DF700F    0A      Online  Own
000001  .....         HITACHI DF700F    1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where FC Interface Board addition is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where FC Interface Board addition is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where FC Interface Board addition is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where FC Interface Board addition is only 0A.

ExampleA-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···    ChaPort   Status          Type   IO-Count ···
000000   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000001   ···     HITACHI .DF700F….0051     1A        Online          Non    1
000002   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000003   ···     HITACHI .DF700F….0051     1A        Online          Non    1
000004   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000005   ···     HITACHI .DF700F….0051     1A        Online          Non    1
 :        :        :                        :         :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···    ChaPort   Status          Type   IO-Count ···
000000   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000001   ···     HITACHI .DF700F….0051     1A        Online          Non    1
000002   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000003   ···     HITACHI .DF700F….0051     1A        Online          Non    1
000004   ···     HITACHI .DF700F….0051     0A        Offline(C)      Own    10
000005   ···     HITACHI .DF700F….0051     1A        Online          Non    1
 :        :        :                        :         :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where FC Interface Board addition is only 1A.

ExampleB-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···        ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000001    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
000002    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000003    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
000004    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000005    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
 :          :          :                        :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···        ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000001    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
000002    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000003    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
000004    ···       HITACHI .DF700F....0051    0A       Online          Own    10
000005    ···       HITACHI .DF700F....0051    1A       Offline(C)      Non    1
 :          :          :                        :        :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the DF700 side (Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the DF700 side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of (4) in Step1: (server side) again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced       33        0
---
> Reduced      265        0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken      33        0
---
> Shrunken     265        0
```

(5) In the case of HDLM on AIX

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /usr/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID  PathName      DskName .....     ChaPort Status  Type .....
000000  .....         HITACHI DF700F    0A      Online  Own
000001  .....         HITACHI DF700F    1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where FC Interface Board addition is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where FC Interface Board addition is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where FC Interface Board addition is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where FC Interface Board addition is only 0A.

ExampleA-1) Version 05-00 or later

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName              DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000001     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000002     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000003     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000004     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000005     ···          HITACHI .DF700F….0051       1A       Online          Non      1
 :          :            :                          :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName              DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000001     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000002     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000003     ···          HITACHI .DF700F….0051       1A       Online          Non      1
000004     ···          HITACHI .DF700F….0051       0A       Offline(C)      Own      10
000005     ···          HITACHI .DF700F….0051       1A       Online          Non      1
 :          :            :                          :        :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where FC Interface Board addition is only 1A.

ExampleB-1) Version 05-00 or later

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000001   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000002   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000003   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000004   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000005   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
 :        :          :                    :        :             :
```

ExampleA-2) Version 04-xx or prior

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000001   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000002   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000003   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
000004   ···   HITACHI .DF700F....0051   0A       Online        Own    10
000005   ···   HITACHI .DF700F....0051   1A       Offline(C)    Non    1
 :        :          :                    :        :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /usr/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /usr/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the DF700 side (Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the DF700 side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of (5) in Step1: (server side) again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced      33        0
---
> Reduced     265        0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken     33        0
---
> Shrunken    265        0
```

(6) In the case of HDLM on Windows

Log into Windows with the user who has the Administrator authority, and execute the command [dlnkmgr view -sys -sfunc] from the command prompt.

```
# dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# dlnkmgr set -afb off
Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Open the command prompt, and execute “dlnkmgr view -path” command.

```
# dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName        DskName .....     ChaPort Status  Type .....
000000  .....           HITACHI DF700F    0A      Online  Own
000001  .....           HITACHI DF700F    1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where FC Interface Board addition is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where FC Interface Board addition is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where FC Interface Board addition is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where FC Interface Board addition is only 0A.

ExampleA-1) Version 05-00 or later

```
# dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000001    ···       HITACHI .DF700F….0051     1A      Online          Non     1
000002    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000003    ···       HITACHI .DF700F….0051     1A      Online          Non     1
000004    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000005    ···       HITACHI .DF700F….0051     1A      Online          Non     1
 :          :          :                      :        :              :
```

ExampleA-2) Version 04-xx or prior

```
dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000001    ···       HITACHI .DF700F….0051     1A      Online          Non     1
000002    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000003    ···       HITACHI .DF700F….0051     1A      Online          Non     1
000004    ···       HITACHI .DF700F….0051     0A      Offline(C)      Own     10
000005    ···       HITACHI .DF700F….0051     1A      Online          Non     1
 :          :          :                      :        :              :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where FC Interface Board addition is only 1A.

ExampleB-1) Version 05-00 or later

```
dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···        ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000001    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
000002    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000003    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
000004    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000005    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
 :          :          :                         :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···        ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000001    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
000002    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000003    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
000004    ···       HITACHI .DF700F....0051     0A       Online          Own    10
000005    ···       HITACHI .DF700F....0051     1A       Offline(C)      Non    1
 :          :          :                         :        :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd C:\tmp
# mkdir HDLMLOG
# cd HDLMLOG
# dlnkmgr view –path > path01.txt

   waiting for five minutes or more

# dlnkmgr view –path > path02.txt
```

When the contents are matched, perform the next operation in the DF700 side (Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the DF700 side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of (6) in Step1: (server side) again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced       33        0
---
> Reduced      265        0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken      33        0
---
> Shrunken     265        0
```

(7) In the case of HDLM on Linux

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Login as a user having the root authorization, and execute “dlnkmgr view -path” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID  PathName       DskName .....    ChaPort Status  Type .....
000000  .....          HITACHI DF700F   0A      Online  Own
000001  .....          HITACHI DF700F   1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where FC Interface Board addition is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-02 or later, execute this operation to a port of the controller where FC Interface Board addition is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where FC Interface Board addition is executed.

  dlnkmgr offline –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where FC Interface Board addition is only 0A.

ExampleA-1) Version 05-02 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 8 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000001    ···       HITACHI .DF700F….0051      1A       Online          Non     1
000002    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000003    ···       HITACHI .DF700F….0051      1A       Online          Non     1
000004    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000005    ···       HITACHI .DF700F….0051      1A       Online          Non     1
 :          :          :                        :          :             :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000002
    :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000004
    :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000001    ···       HITACHI .DF700F….0051      1A       Online          Non     1
000002    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000003    ···       HITACHI .DF700F….0051      1A       Online          Non     1
000004    ···       HITACHI .DF700F….0051      0A       Offline(C)      Own     10
000005    ···       HITACHI .DF700F….0051      1A       Online          Non     1
 :          :          :                        :          :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where FC Interface Board addition is only 1A.

ExampleB-1) Version 05-02 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 8 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000008
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000001   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
000002   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000003   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
000004   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000005   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
 :        :          :                         :        :             :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000008
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000001   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
000002   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000003   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
000004   ···      HITACHI .DF700F....0051      0A       Online        Own    10
000005   ···      HITACHI .DF700F....0051      1A       Offline(C)    Non    1
 :        :          :                         :        :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the DF700 side (Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the DF700 side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of (7) in Step1: (server side) again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

```
# diff path01.txt path02.txt
2c2
< Reduced      33        0
---
> Reduced     265        0
```

(8) In the case of VxVM-DMP on Linux

Log into Linux with the user who has the root authority, and check CTLR-NAME connecting the DF700 by the command [vxdmpadm listctlr all]. Furthermore, execute the command [xvdmpadm getsubpaths ctlr=cx] for each CTLR-NAME (cx is CTLR-NAME).

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
# vxdmpadm listctlr all
CTLR-NAME          ENCLR-TYPE          STATE     ENCLR-NAME
=============================================
c0                 Disk                ENABLED  Disk
c3                 HDS9500V            ENABLED  HDS9500V0
c2                 HDS9500V            ENABLED  HDS9500V0

# vxdmpadm getsubpaths ctlr=c2
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
=============================================================================
sdb    ENABLED(A)    PRIMARY       sdb           HDS9500V    HDS9500V0   -
sdc    ENABLED       SECONDARY     sdc           HDS9500V    HDS9500V0   -
sdd    ENABLED(A)    PRIMARY       sdd           HDS9500V    HDS9500V0   -
sde    ENABLED       SECONDARY     sde           HDS9500V    HDS9500V0   -
sdf    ENABLED(A)    PRIMARY       sdf           HDS9500V    HDS9500V0   -
sdg    ENABLED       SECONDARY     sdg           HDS9500V    HDS9500V0   -
sdh    ENABLED(A)    PRIMARY       sdh           HDS9500V    HDS9500V0   -
sdi    ENABLED       SECONDARY     sdi           HDS9500V    HDS9500V0   -
sdj    ENABLED(A)    PRIMARY       sdj           HDS9500V    HDS9500V0   -
sdk    ENABLED       SECONDARY     sdk           HDS9500V    HDS9500V0   -
sdl    ENABLED(A)    PRIMARY       sdl           HDS9500V    HDS9500V0   -

# vxdmpadm getsubpaths ctlr=c3
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
=============================================================================
sdm    ENABLED       SECONDARY     sdb           HDS9500V    HDS9500V0   -
sdn    ENABLED(A)    PRIMARY       sdc           HDS9500V    HDS9500V0   -
sdo    ENABLED       SECONDARY     sdd           HDS9500V    HDS9500V0   -
sdp    ENABLED(A)    PRIMARY       sde           HDS9500V    HDS9500V0   -
sdq    ENABLED       SECONDARY     sdf           HDS9500V    HDS9500V0   -
sdr    ENABLED(A)    PRIMARY       sdg           HDS9500V    HDS9500V0   -
sds    ENABLED       SECONDARY     sdh           HDS9500V    HDS9500V0   -
sdt    ENABLED(A)    PRIMARY       sdi           HDS9500V    HDS9500V0   -
sdu    ENABLED       SECONDARY     sdj           HDS9500V    HDS9500V0   -
sdv    ENABLED(A)    PRIMARY       sdk           HDS9500V    HDS9500V0   -
sdw    ENABLED       SECONDARY     sdl           HDS9500V    HDS9500V0   -
```

Check that all the paths are displayed as “ENABLED”. If any path has a failure (DISABLED), suspend the FC Interface Board addition and recover the failure.

Note: The FC Interface Board addition by pulling out the FC cables cannot be performed.

(9) In the case of USP/NSC/9900V

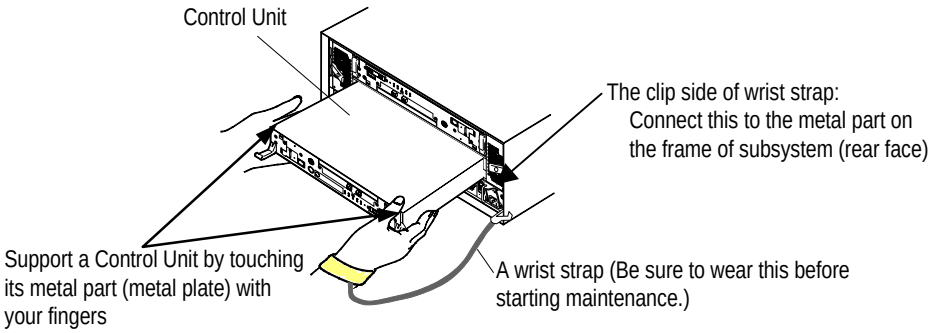
Maintain paths from USP/NSC/9900V to DF700, if it is necessary.

Please maintain paths with USP/NSC/9900V maintenance member.

Step2:

When adding the FC Interface Board, a failure may be caused by the electric shock since the Control Unit is precision instrument. Before starting the operation, make sure to wear a wrist strap to protect Control Unit against the electric shock.

Note: Before unpacking and adding maintenance components, be sure to wear a wrist strap and connect to ground the grounding clip in the opposite end of the wrist strap to the chassis frame (metal part).
When you insert a Control Unit into the subsystem, support the Control Unit as touching its metal part with fingers of your hand that wears a wrist strap.



(1) Press the RST SW on the Control Unit, in which the Interface Board to be added is installed, and make sure that the CALM LED (red) comes on. Use a tool with a thin tip (a precise screwdriver, etc.) because the hole of RST SW is small (3 mm in diameter).

(2) Connect OUT (J100-J10x) of the remote adaptor in the final steps and the connector (REMOTE ADAPTER) of the Control Unit installing the FC Interface Board that is not added in DF700 are connected with the remote cable (VRCx) when the remote adaptor is connected. Check that the LED of the connected remote adaptor lights on when the remote cable has already been connected. Next, remove the remote cable connected to the Control Unit in which the FC Interface Board to be added is installed.

(3) Loosen the screws (right and left) which are fixing the levers of the Control Unit, push down the levers forward, and pull out the Control Unit.

(4) Remove the all cables connected to the Control Unit.

Note: When the cable cannot be removed easily, do not pull it by force.
Besides, the cable can be damaged if it is bent upward or downward forcibly.

Note: When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

Note: Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

(5) Remove the Control Unit by pulling it out toward you.

(6) Loosen the two fixing screws for the cover at the back of the cover, remove the cover.

(7) Loosen the fixing screws ② (two places) of the dummy Interface Board installed in the Control Unit and remove the fixing screws ① (three places), and then pull up the dummy Interface Board upwards and remove it from the Control Unit.

(8) Install the adding FC Interface Board fitting it to the positioning pin of the Control Unit, tighten the fixing screws ① (three places), and then fix it by tightening the fixing screws ② (two places).
At this time, check that the connectors are surely inserted.
Also, install it so that the sheet metal part of the FC Interface Board may become the inside of the Control Unit.

(9) Install the removed Host Connector in the new Control Unit.

(10) Attach the cover in the opposite direction of which it was removed, tighten the fixing screw for the cover at the back of the cover.

(11) Connect the removed interlocking cable to the Control Unit when the special UPS is connected.

(12) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out. If the controller is inserted before 20 seconds has elapsed, the Control Unit may not be recovered normally.

(13) Connect the ENC cable.

Note: The loop is not recovered and the Control Unit fails again unless the Control Unit is inserted in the state in which the ENC cable is connected.

Note: The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(14) Insert it into the specified position with the both right and left levers of the Control Unit pushed down, raise the levers with the hooks fitting to the cutouts of the subsystem, and tighten the fixing screw for the lever.
CALM LED and EALM LED of newly installed Control Unit turn on, then EALM LED turns off and CALM LED turns off next.
If the Control Unit is inserted without waiting for 20 seconds, it is possible that the Control Unit is not recovered from the failure normally.
When it is not recovered even if ten minutes or more elapsed, perform the dummy replacement of the Control Unit which was inserted.
When the Control Unit is not recovered (ten minutes or more elapsed) even if "I1G300 CTL recovery start" is displayed in the Information Message of WEB after the dummy replacement, perform the dummy replacement of the Control Unit which was inserted, again.
When it is not recovered after another ten minutes, service personnel connects it to the WEB and takes recovery actions according to "Information Message" on WEB. (There may be a problem on the Control Unit or the cache memories installed.)
But, when any messages are displayed on WEB about the Control Unit or the cache memories installed, then service personnel connects the other Control Unit to the WEB and takes recovery actions according to "Information Message" in the other Control Unit.

Note: Do not catch a ENC cable, when the Control Unit for the inserted.

Note: The installation direction is different in the Control Unit # 0 and # 1. Install the Control Unit #0 with the cover up and #1 with the cover down.

Note: When returning the levers in the arrow directions (⟶) at the same time, operate them within one second. If the operation takes longer than one second, the Control Unit may not be recovered. If it occurs, execute the recovery procedure once again. If the Control Unit is not recovered in spite of the re-execution, replace the Control Unit because it may be faulty.

(15) Check that the CALM LED (red) on the Control Unit is off.

(16) Check that the WARNING LED (orange) on the front of the Basic Chassis goes out. (The Control Unit usually recovers in about three (3) minutes, but if the I/O load from the host computer is high, it may take three (3) minutes or more to recover.)

(17) Reconnect all cables that were disconnected.

Note: When connecting the Fibre Channel interface cables removed in Procedure (4), insert them in the host connectors which are the same as those before removing.

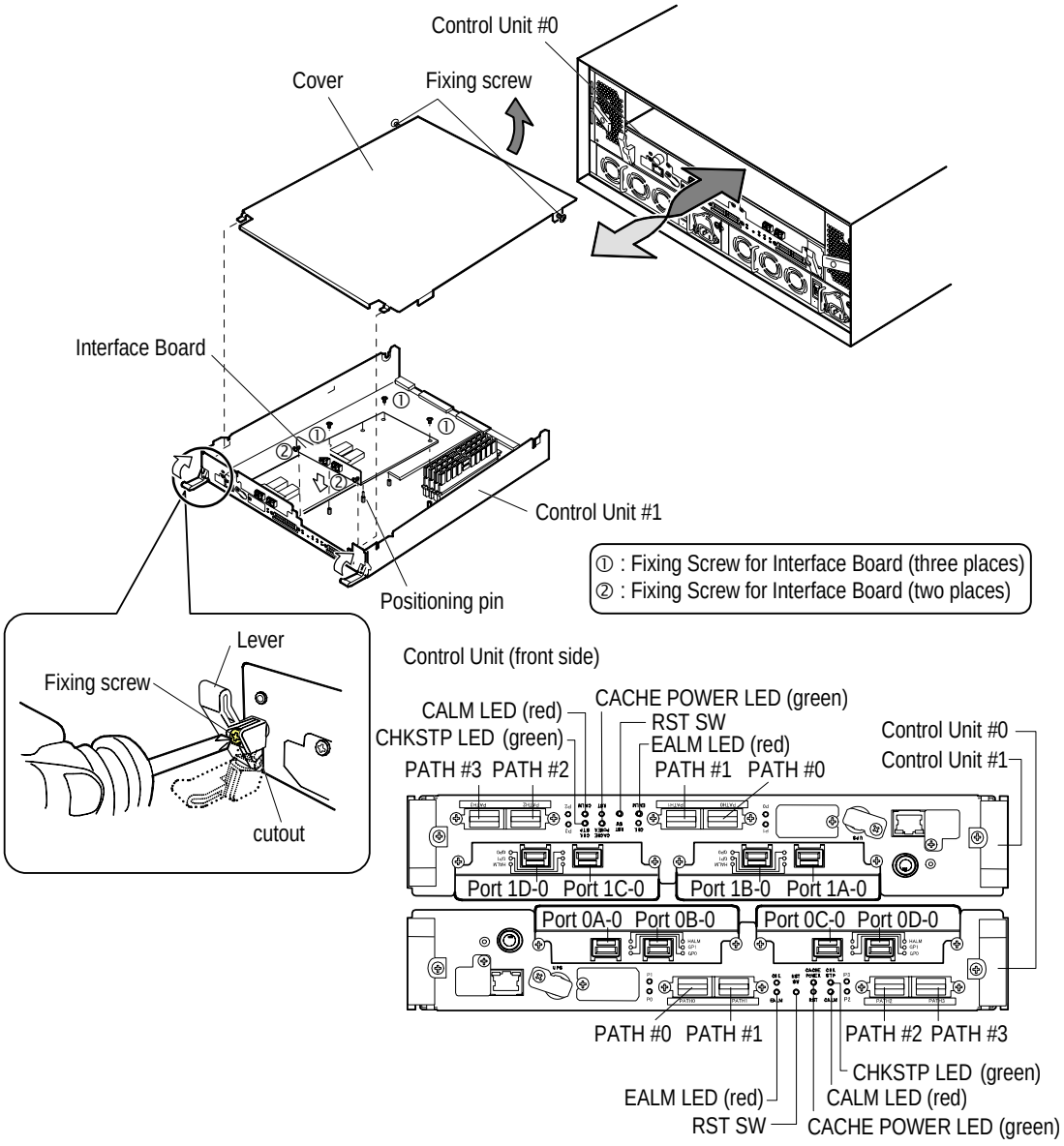
Note: When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

Note: The installed direction is different in the Control Unit #0 and #1, so that be careful of the connecting position of the cables.

(18)Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the front of the Basic Chassis may blink at high speed (for the maximum of 30 to 60 minutes) before it lights up.

(19)Refer to "Information Message" on WEB, and check to see that [I0010x CTL recovered (CTL-x)] is indicated.
When this is indicated, the addition of Interface Board has completed.

(20)Check that the LED of the remote adaptor connected to the Control Unit in which the added FC Interface Board is installed lights on when the remote adaptor is connected.



Step3: (server side)

Check the status of paths to the LUs. If multiple OS are connected, perform the operations on all the servers connected to DF700 that the FC Interface Board is to be added.

(1) In the case of PVLink on HP-UX

Execute "vgdisplay –v vg??" command, and check that all the active paths returned to the initial status.

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0
  --- Logical volumes ---
  LV Name                   /dev/vg02/lvol1
  LV Status                 available/syncd
  LV Size (Mbytes)          1000
  Current LE                250
  Allocated PE              250
  Used PV                   1
  --- Physical volumes ---
  PV Name                   /dev/dsk/c83t0d0
  PV Name                   /dev/dsk/c24t0d0 Alternate Link
  PV Status                 available
  Total PE                  511
  Free PE                   11
  Autoswitch                On
```

If the path is not returned to the initial status, execute the "vgdisplay –v vg??" command every 30 seconds and check.

(2) In the case of HDLM on HP-UX

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName      DskName .....   ChaPort Status  Type .....
000000  .....         HITACHI DF700F  0A      Online  Own
000001  .....         HITACHI DF700F  1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(3) In the case of VxVM-DMP on Solaris

The commands to operate differ in the cases where the version of VxVM is 3.2 or later and where it is before 3.2.

(a) When the version of VxVM is 3.2 or later, execute the command [vxdmpadm listctlr all] and the command [vxdmpadm getsubpaths ctlr=cx], and check the path status (cx is CTLR-NAME).

```
# vxdmpadm listctlr all
CTLR-NAME       ENCLR-TYPE      STATE           ENCLR-NAME
=========================================================
c1              Disk            ENABLED         Disk
c2              AMS_WMS         ENABLED         AMS_WMS0
c3              AMS_WMS         ENABLED         AMS_WMS0

# vxdmpadm getsubpaths ctlr=c2
NAME      STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE    ENCLR-NAME  ATTRS
=============================================================================
c2t0d0s2  ENABLED(A)    SECONDARY     c2t0d0s2      AMS_WMS       AMS_WMS0    -
c2t0d1s2  ENABLED(A)    PRIMARY       c2t0d1s2      AMS_WMS       AMS_WMS0    -
c2t0d2s2  ENABLED(A)    SECONDARY     c2t0d2s2      AMS_WMS       AMS_WMS0    -
c2t0d3s2  ENABLED(A)    PRIMARY       c2t0d3s2      AMS_WMS       AMS_WMS0    -
c2t0d4s2  ENABLED       SECONDARY     c2t0d4s2      AMS_WMS       AMS_WMS0    -
c2t0d5s2  ENABLED(A)    PRIMARY       c2t0d5s2      AMS_WMS       AMS_WMS0    -
c2t0d6s2  ENABLED       SECONDARY     c2t0d6s2      AMS_WMS       AMS_WMS0    -
c2t0d7s2  ENABLED(A)    PRIMARY       c2t0d7s2      AMS_WMS       AMS_WMS0    -

# vxdmpadm getsubpaths ctlr=c3
NAME      STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE    ENCLR-NAME  ATTRS
=============================================================================
c3t0d0s2  DISABLED      PRIMARY       c2t0d0s2      AMS_WMS       AMS_WMS0    -
c3t0d1s2  ENABLED       SECONDARY     c2t0d1s2      AMS_WMS       AMS_WMS0    -
c3t0d2s2  DISABLED      PRIMARY       c2t0d2s2      AMS_WMS       AMS_WMS0    -
c3t0d3s2  ENABLED       SECONDARY     c2t0d3s2      AMS_WMS       AMS_WMS0    -
c3t0d4s2  ENABLED(A)    PRIMARY       c2t0d4s2      AMS_WMS       AMS_WMS0    -
c3t0d5s2  ENABLED       SECONDARY     c2t0d5s2      AMS_WMS       AMS_WMS0    -
c3t0d6s2  ENABLED(A)    PRIMARY       c2t0d6s2      AMS_WMS       AMS_WMS0    -
c3t0d7s2  ENABLED       SECONDARY     c2t0d7s2      AMS_WMS       AMS_WMS0    -
```

When DISABLED is included in the path status displayed by the command [vxdmpadmgetsubpaths ctlr=cx], execute the command [vxdmpadm enable ctlr=cx] for the CTLR-NAME (c3 in the above case), and change the path into the enable status. After that, execute the command [vxdmpadm getsubpaths ctlr=cx], and check that all the path statuses are returned to ENABLED (cx is CTLR-NAME).

```
# vxdmpadm enable ctlr=c3

# vxdmpadm getsubpaths ctlr=c2
NAME      STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE    ENCLR-NAME  ATTRS
================================================================================
c2t0d0s2  ENABLED       SECONDARY     c2t0d0s2      AMS_WMS       AMS_WMS0    -
c2t0d1s2  ENABLED(A)    PRIMARY       c2t0d1s2      AMS_WMS       AMS_WMS0    -
c2t0d2s2  ENABLED       SECONDARY     c2t0d2s2      AMS_WMS       AMS_WMS0    -
c2t0d3s2  ENABLED(A)    PRIMARY       c2t0d3s2      AMS_WMS       AMS_WMS0    -
c2t0d4s2  ENABLED       SECONDARY     c2t0d4s2      AMS_WMS       AMS_WMS0    -
c2t0d5s2  ENABLED(A)    PRIMARY       c2t0d5s2      AMS_WMS       AMS_WMS0    -
c2t0d6s2  ENABLED       SECONDARY     c2t0d6s2      AMS_WMS       AMS_WMS0    -
c2t0d7s2  ENABLED(A)    PRIMARY       c2t0d7s2      AMS_WMS       AMS_WMS0    -

# vxdmpadm getsubpaths ctlr=c3
NAME      STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE    ENCLR-NAME  ATTRS
================================================================================
c3t0d0s2  ENABLED(A)    PRIMARY       c2t0d0s2      AMS_WMS       AMS_WMS0    -
c3t0d1s2  ENABLED       SECONDARY     c2t0d1s2      AMS_WMS       AMS_WMS0    -
c3t0d2s2  ENABLED(A)    PRIMARY       c2t0d2s2      AMS_WMS       AMS_WMS0    -
c3t0d3s2  ENABLED       SECONDARY     c2t0d3s2      AMS_WMS       AMS_WMS0    -
c3t0d4s2  ENABLED(A)    PRIMARY       c2t0d4s2      AMS_WMS       AMS_WMS0    -
c3t0d5s2  ENABLED       SECONDARY     c2t0d5s2      AMS_WMS       AMS_WMS0    -
c3t0d6s2  ENABLED(A)    PRIMARY       c2t0d6s2      AMS_WMS       AMS_WMS0    -
c3t0d7s2  ENABLED       SECONDARY     c2t0d7s2      AMS_WMS       AMS_WMS0    -
```

(b) When the version of VxVM is before 3.2, execute the command [vxdisk list cXtYdZs2], and check that all the paths are returned to the owner Control Unit.

```
# vxdisk list c4t0d0s2
Device:         c4t0d0s2
devicetag:      c4t0d0
type:           sliced
hostid:
disk:           name= id=1067933033.3997.V880-1
group:          name= id=1067933103.4030.V880-1
flags:          online ready private autoconfig
pubpaths:       block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths:      block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:        2.2
iosize:         min=512 (bytes) max=256 (blocks)
public:         slice=4 offset=0 len=8217600
private:        slice=3 offset=1 len=38143
update:         time=1067993564 seqno=0.147
headers:        0 248
configs:        count=1 len=28130
logs:           count=1 len=4262
Defined regions:
 config   priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config   priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log      priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:   2
c4t0d0s2        state=enabled    type=primary
c5t1d0s2        state=enabled    type=secondary
```

The following message is displayed in the console window when the path returns.

```
vxdmp: [ID 916426 kern.notice] NOTICE:
vxvm:vxdmp: enabled controller
/sbus@a,0/fcr@2,400000 connected to disk array ???
```

(4) In the case of HDLM on Solaris

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName        DskName .....   ChaPort Status  Type .....
000000  .....           HITACHI DF700F  0A      Online  Own
000001  .....           HITACHI DF700F  1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(5) In the case of HDLM on AIX

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName        DskName .....   ChaPort Status  Type .....
000000  .....           HITACHI DF700F  0A      Online  Own
000001  .....           HITACHI DF700F  1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(6) In the case of HDLM on Windows

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort Status   Type .....
000000   .....           HITACHI DF700F    0A      Online   Own
000001   .....           HITACHI DF700F    1A      Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(7) In the case of HDLM on Linux

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort Status   Type .....
000000   .....           HITACHI DF700F    0A      Online   Own
000001   .....           HITACHI DF700F    1A      Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(8) In the case of VxVM-DMP on Linux

When DISABLED is included in the path status displayed by the command [vxdmpadm getsubpaths ctlr=cx], execute the command [vxdmpadm enable ctlr=cx] for the CTLR-NAME (c2 in the above case), and change the path into the enable status. After that, execute the command [vxdmpadm getsubpaths ctlr=cx], and check that all the path statuses are returned to ENABLED (cx is CTLR-NAME).

```
# vxdmpadm enable ctlr=c2

# vxdmpadm getsubpaths ctlr=c2
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
==========================================================================
sdb    ENABLED(A)   PRIMARY       sdb         HDS9500V    HDS9500V0   -
sdc    ENABLED      SECONDARY     sdc         HDS9500V    HDS9500V0   -
sdd    ENABLED(A)   PRIMARY       sdd         HDS9500V    HDS9500V0   -
sde    ENABLED      SECONDARY     sde         HDS9500V    HDS9500V0   -
sdf    ENABLED(A)   PRIMARY       sdf         HDS9500V    HDS9500V0   -
sdg    ENABLED      SECONDARY     sdg         HDS9500V    HDS9500V0   -
sdh    ENABLED(A)   PRIMARY       sdh         HDS9500V    HDS9500V0   -
sdi    ENABLED      SECONDARY     sdi         HDS9500V    HDS9500V0   -
sdj    ENABLED(A)   PRIMARY       sdj         HDS9500V    HDS9500V0   -
sdk    ENABLED      SECONDARY     sdk         HDS9500V    HDS9500V0   -
sdl    ENABLED(A)   PRIMARY       sdl         HDS9500V    HDS9500V0   -

# vxdmpadm getsubpaths ctlr=c3
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
==========================================================================
sdm    ENABLED      SECONDARY     sdb         HDS9500V    HDS9500V0   -
sdn    ENABLED(A)   PRIMARY       sdc         HDS9500V    HDS9500V0   -
sdo    ENABLED      SECONDARY     sdd         HDS9500V    HDS9500V0   -
sdp    ENABLED(A)   PRIMARY       sde         HDS9500V    HDS9500V0   -
sdq    ENABLED      SECONDARY     sdf         HDS9500V    HDS9500V0   -
sdr    ENABLED(A)   PRIMARY       sdg         HDS9500V    HDS9500V0   -
sds    ENABLED      SECONDARY     sdh         HDS9500V    HDS9500V0   -
sdt    ENABLED(A)   PRIMARY       sdi         HDS9500V    HDS9500V0   -
sdu    ENABLED      SECONDARY     sdj         HDS9500V    HDS9500V0   -
sdv    ENABLED(A)   PRIMARY       sdk         HDS9500V    HDS9500V0   -
sdw    ENABLED      SECONDARY     sdl         HDS9500V    HDS9500V0   -
```

The following message is displayed in the console window when the path returns.

```
Nov 11 17:03:28 RH3U3-2 kernel: vxvm:vxdmp: enabled path 8/0xe0 belonging
to the dmpnode 201/0x1f
```

(9) In the case of USP/NSC/9900V

Maintain paths from USP/NSC/9900V to DF700.
Please maintain paths with USP/NSC/9900V maintenance member.

Step4:

Addition the FC Interface Board on the other controller by following the procedures in Step1 to Step3.

6.3 Operations after the FC Interface Board Addition

If “IO Timeout” or “AutoSwitch” parameter of PVLink was changed, perform the following operation to recover the original value.

[Operations of returning the PVLink parameters]

(1) Login as a user having the root authorization in HP-UX, and execute “vgdisplay /dev/dsk/c?t?d?” command.

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                 /dev/dsk/c11t0d1
PV Name                 /dev/dsk/c13t1d1        Alternate Link
VG Name                 /dev/vg02
PV Status               available
Allocatable             yes
VGDA                    2
Cur LV                  4
PE Size (Mbytes)        4
Total PE                1023
Free PE                 148
Allocated PE            875
Stale PE                0
IO Timeout (Seconds)    60
Autoswitch              On
#
```

(2) If original value of “IO Timeout” parameter was default, execute “pvchange –t 0 /dev/dsk/c?t?d?” command to return. If original value was 50, execute “pvchange –t 50 /dev/dsk/c?t?d?” command. And, execute “vgdisplay ./dev/dsk/c?t?d?” command to check the result.

(3) If original value of “AutoSwitch” parameter was Off, execute “pvchange –S n “dev/dsk/c?t?d?” command to return, and check the result.

When "Auto Failback :" is disabled, execute the following.

[Operations of returning the HDLM parameters]

(1) Excute the command [dlmkmgr view -sys -sfunc].

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

(2) When "Auto Failback :" is disabled (off), execute the command [dlnkmgr set -afb on].

```
# /usr/DynamicLinkManager/bin/dlnkmgr set -afb on



Execute command? [y/n] : y

KAPL01001-I The HDLM command completed normally. Operation name = set
```

(3) Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

FE-95DF764-01

DF700

Disk Array Subsystem

Procedure for Online ENC/SENC Firmware Download

REV.6

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[Definition of terms]

Term	Meaning
RKA	In this procedure manual, it is used as the abbreviation of the DF600-RKA.
RKAJAT	In this procedure manual, it is used as the generic name of the DF700-RKAJAT.
Offline	Issue of the host I/O instruction is not required.
Online	Issue of the host I/O instruction is required.
Offline ENC/SENC Firmware Download	Function for downloading the ENC/SENC firmware supported in the offline state (offline replacement)
Online ENC/SENC Firmware Download	Function for downloading the ENC/SENC firmware supported in the online state (online replacement) This function can be used offline also.
SH Firmware	This is the general term for the following firmware shown in Web and Storage Navigator Modular, and required for the ENC operation of RKH, RKM, RKS, RKAJ and RKA. RKH, RKM, RKS, RKAJ : ENC(MAIN) RKA : ENC(MAIN), ENC(BOOT)
H8S Firmware	This is the following firmware shown in Web and Storage Navigator Modular, and required for the SENC operation of RKXS and RKAJAT. RKXS, RKAJAT: SENC(SES)
SR Firmware	This is the following firmware shown in Web and Storage Navigator Modular, and required for the SENC operation of RKXS and RKAJAT. RKXS, RKAJAT: SENC(RTR)

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Chapter 1. Outline of Online ENC/SENC Firmware Download

This describes the method of downloading the ENC/SENC firmware (SH firmware, H8S firmware and SR firmware) from the PC used for maintenance through the microprogram without replacing the hard parts when the ENC/SENC firmware version-up is required.

In the Online ENC/SENC Firmware Download, firmware shown in the following table are downloaded.

Disk array unit type		DF700
Basic disk array unit	FC	(RKH, RKM, RKS) SH Firmware
	SATA	(RKXS) H8S Firmware SR Firmware
Expanded disk array unit	FC	(RKAJ, RKA) SH Firmware
	SATA	(RKAJAT) H8S Firmware SR Firmware

[Possibility of the ENC/SENC firmware download depending on whether the host I/O instruction is required or not]

The following table shows possibility of the ENC/SENC firmware download depending on whether the host I/O instruction is required or not.

Item	Issue of the host I/O instruction		Note
	Required (online state)	Not required (offline state)	
Offline ENC/SENC Firmware Download	Not executable	Executable	
Online ENC/SENC Firmware Download	Executable	Executable	

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Chapter 2. Preconditions for Online ENC/SENC Firmware Download

(1) To perform the Online ENC/SENC Firmware Download using Storage Navigator Modular, a service terminal is required. Besides, have the maintenance manual with you in order to cope with a failure that occurs during the Online ENC/SENC Firmware Download.

(2) State of the subsystem must be normal as shown below. Otherwise, an error message will be output when Storage Navigator Modular issues an instruction for the replacement.

- All the loops on the back end side are normal.
- Both of the controllers are normal.
- All the ENC/SENCs are normal.

(3) During the Online ENC/SENC Firmware Download, the SES drives concerning the both ENC/SENCs must be installed being combined as shown below at a minimum in order to keep watch on replacement parts of the ENC/SENCs to which no download is performed.

- HDU #0 – HDU #1
- HDU #2 – HDU #3
- HDU #0 – HDU #3
- HDU #1 – HDU #2

(4) The Online ENC/SENC Firmware Download supports the dual controller configuration only. Do not apply the procedure for the case of the single controller configuration to the Online ENC/SENC Firmware Download.

(5) Do not install the SENC firmware whose revision is less than 5.80/A in the array subsystem which uses the priced option Power Saving.
If the SENC firmware whose revision is less than 5.80/A is installed in the array subsystem which uses the priced option Power Saving, "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is displayed in Warning Information on WEB after the array subsystem is restarted, and the WARN LED (orange) on the front of the basic chassis lights up and it becomes in the warning status.
Also, if the SENC firmware whose revision is less than 5.80/A is installed in the array subsystem that "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is already displayed in Warning Information on WEB, the message code "W0GM00" does not disappear, and the warning status of the array subsystem does not recover.

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Chapter 3. Restriction and notes of Online ENC/SENC Firmware Download

3.1 Restriction

(1) Do not remove or insert any parts, for maintenance or any other reason, during Online ENC/SENC Firmware Download.
Inserting or removing parts during Online ENC/SENC Firmware Download may cause a fault. If parts are inserted or removed during Online ENC/SENC Firmware Download and a fault results, action the Online ENC/SENC Firmware Download.

(2) Do not alter the disk array architecture during Online ENC/SENC Firmware Download.
Altering the disk array architecture during Online ENC/SENC Firmware Download may cause download to fail.

(3) If maintenance personnel download an Online ENC/SENC Firmware Download when one of the ENC/SENC firmware already installed is defective or there is an ENC/SENC hardware error, the ENC/SENC firmware (SH firmware, H8S firmware and SR firmware) exchange may fail. At this time, refer to the Web message and follow the maintenance manual to perform the maintenance work, and then follow this procedure manual to perform the Online ENC/SENC Firmware Download again.

(4) When each automatic diagnosis function operates due to the backend failures, the Online ENC/SENC Firmware Download fails.
In such a case, perform the Online ENC/SENC Firmware Download again after removing the failed part.

(5) Do not execute the deliberate shutdown or power turning off when the online ENC/SENC download is terminated abnormally because the ENC/SENC firmware (part for the boot) may be damaged. When the download is terminated abnormally, issue the download instruction again through Storage Navigator Modular after removing a failed part. If the online ENC/SENC download is terminated abnormally in spite of the operation above, replace the ENC/SENC.
If the deliberate shutdown or power turning off is executed after the abnormal termination of the download, the ENC/SENC may be detached at the time of the next boot of the subsystem. If it occurs, replace the ENC/SENC following the maintenance manual.

(6) Be sure to set the automatic download function to “Disable” before performing the online ENC/SENC firmware download.
Bu sure to set it to “Enable” again after executing the online ENC/SENC firmware download.

(7) When the subsystem is shut down deliberately during execution of the online ENC/SENC firmware downloading, turn off the AC Power Unit Switches of all the frames that are connected, turn them on again, and then turn on the main switch on the front side. If the subsystem is started up without performing the operation above, the ENC/SENC is detached. If it is detached, replace the ENC/SENC following the maintenance manual.

(8) The SANRISE AMS1000 can connect the DF600-RKA from the microprogram revision of 0731/A-H.

(9) The SANRISE AMS500 can connect the DF600-RKA from the microprogram revision of 0720/A-M.

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(10) The SANRISE AMS/WMS Series can connect the DF600-RKAJAT.
(11) The SANRISE AMS/WMS Series cannot connect the DF600-RKAAT.
(12) If the revision of the ENC firmware of ENC installed in the DF600-RKA is Rev. 18 or less, the revision of the ENC firmware should be updated when reducing it from the SANRISE 9570V/9580V/9585V.

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3.2 Precautions

(1) Although the WARN LED (orange) on the front of the basic chassis of the array subsystem which uses the priced option lights up, if only "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is displayed in Warning Information on WEB, the installation of the ENC/SENC firmware is executable.

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Chapter 4. Time Required for Online ENC/SENC Firmware Download

For the Disk Array Subsystem, the standard time of working hours required for executing the online ENC/SENC firmware download function is shown below. The working hours of Table 4.1 show the time from starting the replacement of the ENC/SENC firmware for ENC#0 or ENC#1 by the Storage Navigator Modular to the end of the replacement.

Table 4.1 Standard of the time required for the download of the ENC/SENC for ENC#0 or ENC#1

N: Number of RKA

Model	Target chassis for ENC/SENC firmware download	Working hours	
		Standard	Maximum
WMS100	N/A	16 minutes	40 minutes
	Only RKXS or RKXS and RKAJAT		
	Only RKAJAT	15 minutes	30 minutes
AMS200	Only RKS	7 minutes	20 minutes
	Only RKAJ		
	RKS and RKAJ		
	Only RKAJAT	15 minutes	30 minutes
	(RKS or RKAJ) and RKAJAT	21 minutes	50 minutes
AMS500	Only RKM	7 minutes	20 minutes
	Only RKAJ		
	RKM and RKAJ		
	Only RKA	4 minutes + 3 minutes 20 seconds×N	10 minutes + 7 minutes×N
	RKA and (RKM or RKAJ)		
	RKAJAT	15 minutes	30 minutes
	(RKM or RKAJ) and RKAJAT	21 minutes	50 minutes
		18 minutes + 3 minutes 20 seconds×N	40 minutes + 7 minutes×N
AMS1000	Only RKH	6 minutes	20 minutes
	Only RKAJ	7 minutes	20 minutes
	Only RKM or RKAJ and RKA	4miuntes + 3 minutes 20 seconds×N	10 minutes + 7 minutes×N
	Only RKAJAT	15 minutes	30 minutes
	RKH and RKAJ	12 minutes	30 minutes
	RKH and RKA or RKH, RKAJ and RKA	10 minutes + 3 minutes 20 seconds×N	20 minutes+ 7 minutes×N
	RKH and RKAJAT	20 minutes	40 minutes
	RKAJ and RKAJAT	21 minutes	50 minutes
	RKAJAT and RKA or RKAJ, RKAJAT, and RKA	19 minutes + 3 minutes 20 seconds×N	40 minutes + 7 minutes ×N
	RKH, RKAJ and RKAJAT	27 minutes	60 minutes
	RKH, RKAJAT and RKA or RKH, RKAJ, RKAJAT and RKA	24 minutes + 3 minutes 20 seconds×N	50 minutes + 7 minutes ×N

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Chapter 5. Before Starting Online ENC/SENC Firmware Download

The PC that is used for maintenance and connected to the LAN must be used to download Online ENC/SENC Firmware Download. Before beginning Online ENC/SENC Firmware Download, confirm/prepare the following:

(1) After referring to the web connection procedures in the DF700 Disk Array Subsystem Maintenance Manual WEB "Chapter 1. Before Using Web" (WEB 01-0000), prepare 1 PC on which a web browser has been installed and that can be used in a LAN.
(2) Set the service PC up. (See DF700 Disk Array Subsystem Maintenance Manual Microprogram "1.3 Preparation for installation of microprogram" (MICRO 01-0020)).
(3) Prepare a CD-ROM of the specified revision for microprogram installation.
(4) Execute the installer of the CD-ROM and store the unified version directory(‡1) under the directory, "C:\diskarray-microprogram\microprogram."
(5) If a failure occurs during the ENC/SENC firmware download, it is required to see the recovery measures. Prepare the DF700 Disk Array Subsystem Maintenance Manual, and perform the recovery work following the manual.

‡1 : For the unified version directory, refer to "5.1 Hierarchy of ENC/SENC Firmware Storage Directories" (OEMD 05-0010).

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5.1 Hierarchy of ENC/SENC Firmware Storage Directories

The hierarchical structure of ENC/SENC firmware storage directories is shown in Table 5.1.1. The structure of directories of the CD-ROM for installing the ENC/SENC firmware is the same as that shown in Table 5.1.1.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:\diskarray-microprogram\microprogram."
When installing the ENC/SENC firmware, specify the unified version directory.

Table 5.1.1 Directory Hierarchy

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	Microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

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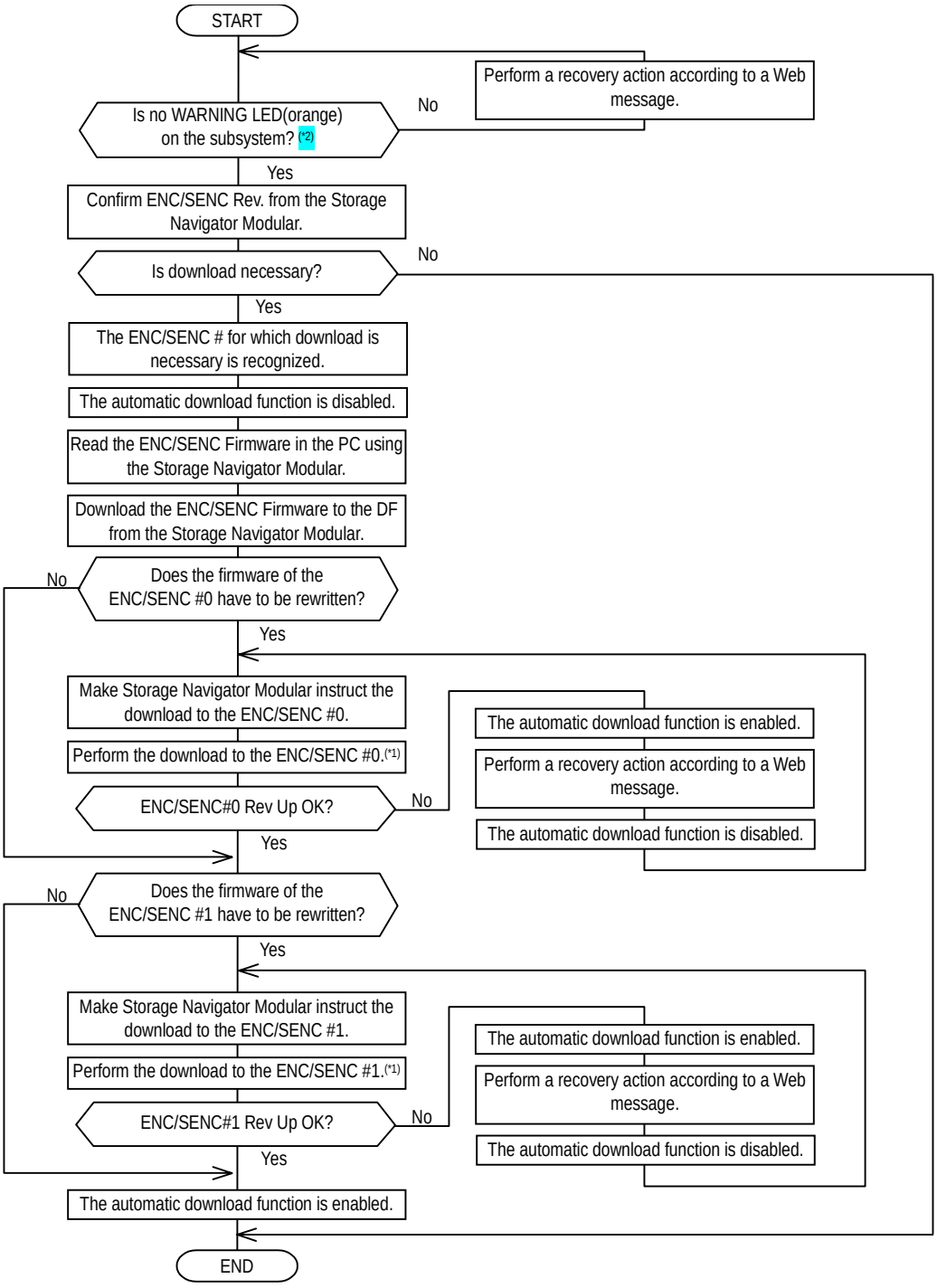
Chapter 6. Procedure for Online ENC/SENC Firmware Download

The procedure that must be followed in order to download Online ENC/SENC Firmware Download does not support single controllers.

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6.1 Flowchart

The procedure for the maintenance operation is shown below.



*1 : The ALM LED(red) on the ENC/SENC lights on during the ENC/SENC firmware download.

*2 : Although the WARN LED (orange) on the front of the basic chassis of the array subsystem which uses the priced option lights up, if only "W0GM00 SENC which may attach restrictions on Power Saving function was detected" is displayed in Warning Information on WEB, the installation of the ENC/SENC firmware is executable.

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6.2 Online ENC/SENC Firmware Download Procedure Window

6.2.1 Connecting the PC Used for Maintenance

The maintenance LAN connector and the LAN connector of the PC used for maintenance must be connected using a LAN cross cable. Follow the procedure shown below to make the necessary connection.

(1) Confirm the following before connecting the PC used for maintenance:
Check the following LEDs before connecting the PC used for maintenance:

- POWER LED(green) confirmation:
  Confirm that the POWER LED(green) located on the top of the front bezel is lit.
  If the POWER LED(green) is not lit, refer to the DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000) for details on how to correct the error.
- WARNING LED(orange) confirmation:
  Confirm that the WARNING LED(orange) located on the top of the front bezel is not lit.
  If the WARNING LED(orange) is lit or blinking, refer to the DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000) for details on how to correct the error.

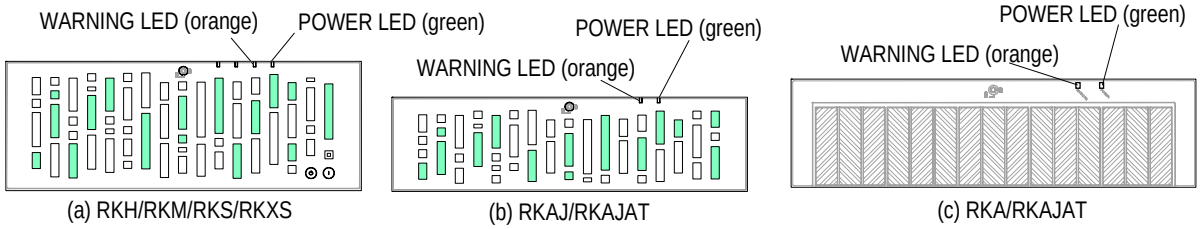


Figure 6.2.1 Locations and Name of LED

- Controller CHKSTP LED(red) confirmation:
  Confirm whether or not the CHKSTP LED(red) located on the top of the controller is lit.
  Replace any controllers on which the CHKSTP LED(red) is lit. For details on how to replace controllers, refer to the DF700 Disk Array Subsystem Maintenance Manual Replace "2.2.5 Replacing Control Unit" (REP 02-0400) for details on how to correct the error.

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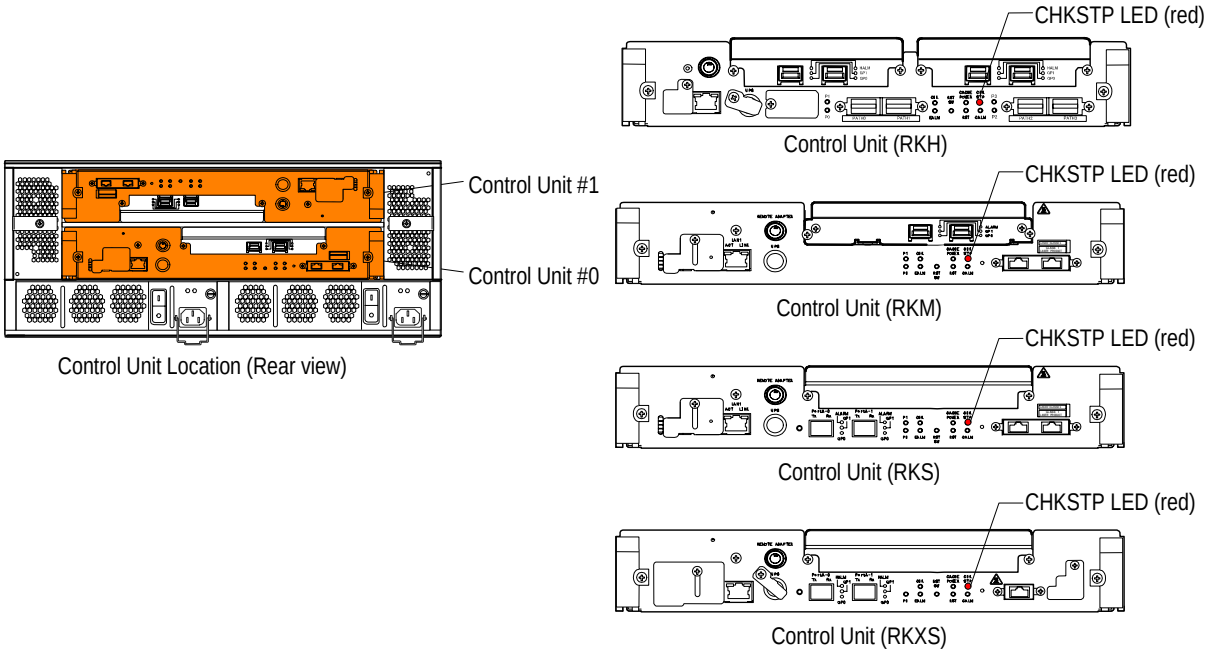


Figure 6.2.2 Locations and Name of LED

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(2) Preparing the maintenance terminal for use

Table 6.2.1 Preparing the maintenance terminal

Item Number	Customer Environment	Terminal used for maintenance	Preparation
1	Uses controller's maintenance-use LAN connector	Use the LAN to connect the PC that is being carried and will be used for maintenance.	• PC used for maintenance • LAN cross cable

(3) Controller to be connected

With dual system architecture, the browser connection is identical no matter which controller is connected. First, connect to controller #0.

If controller #0 is closed, subsequent information can only be referenced on the controller #1 side. If controller #0 is closed, connect to controller #1.

(4) Connecting the procedures of the PC Used for Maintenance

- Remove the cover located above the controller on the unit. Using the LAN cable, connect the maintenance LAN connector and the connector of the PC used for maintenance.

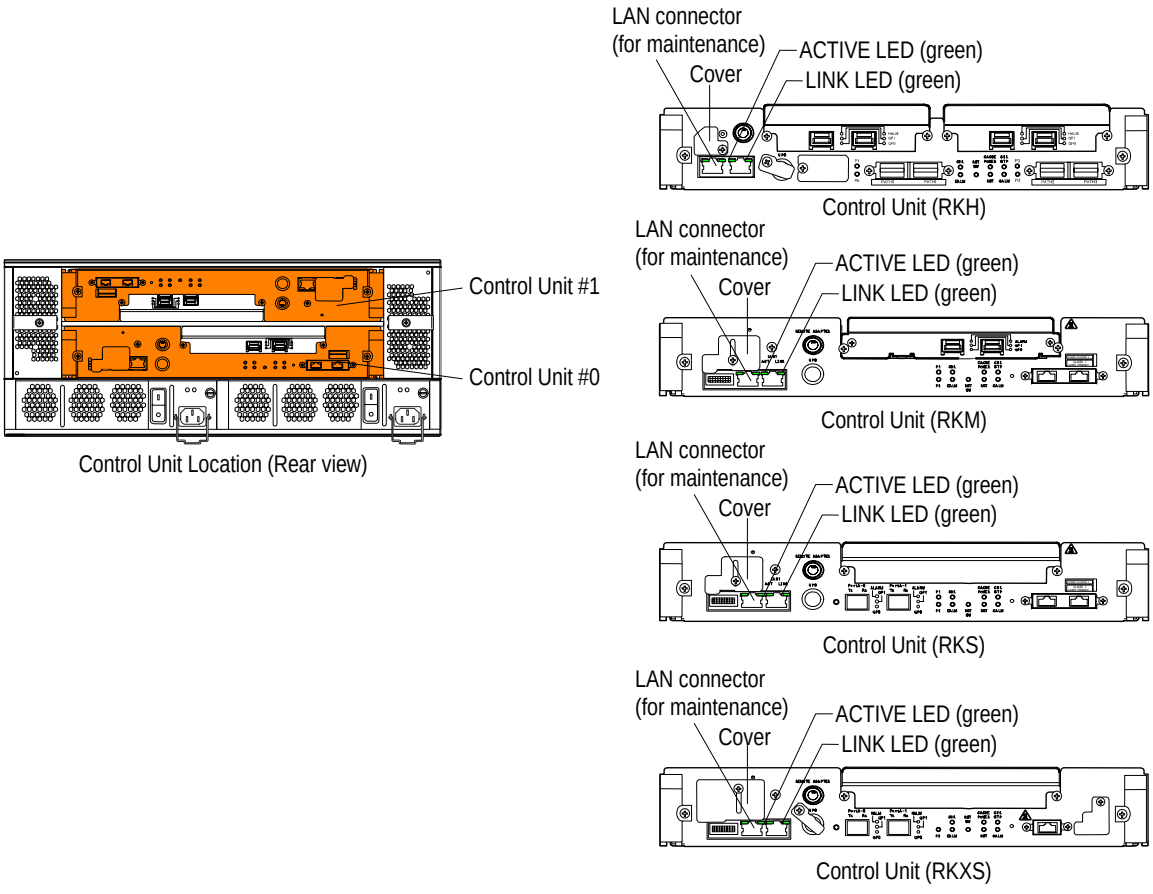


Figure 6.2.3 LAN Connector Position

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- Start up the maintenance PC.
- Change the IP address of the network parameter for the maintenance PC.
  For the maintenance PC, set the IP address shown in No. 1 in Table 6.2.2 below.
  If the maintenance PC cannot be connected, set the value in No.2 to No.5.

Table 6.2.2 Operating Environment

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1:172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1:10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

- Manual change of the network parameter of the Maintenance port
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

NOTE : When the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
The network address set to the maintenance port cannot be used for the LAN device to be connected to the User management port via the Gateway.
Therefore, use a network address other than that set for the maintenance port.

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6.2.2 Online ENC/SENC Firmware Download

The procedure for downloading the ENC/SENC firmware using Storage Navigator Modular is shown below. According to the procedure, the following operations are performed in due order.

① Checking the revision.
② The automatic download function is disabled.
③ Reading the ENC/SENC firmware.
④ Instructing for the download to the disk array unit (from the Storage Navigator Modular to the disk array unit main memory).
⑤ Instructing for the replacement of the ENC/SENC firmware (from the disk array unit main memory to the ENC/SENC).
⑥ The automatic download function is enabled.

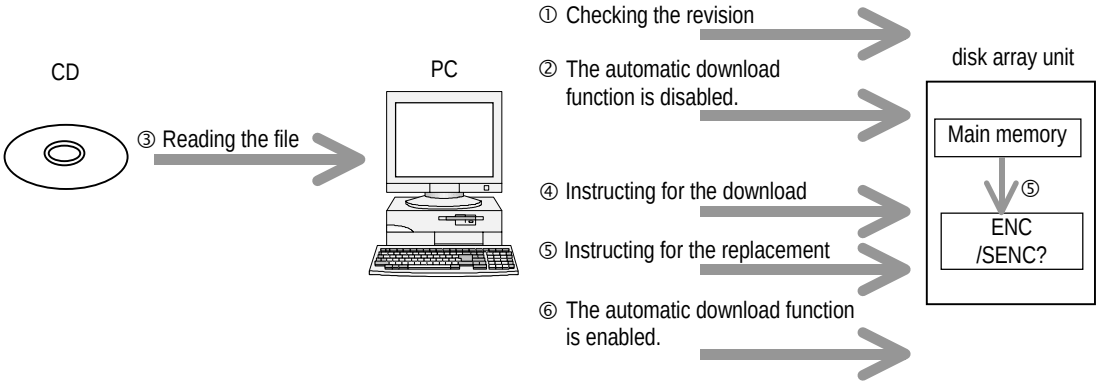
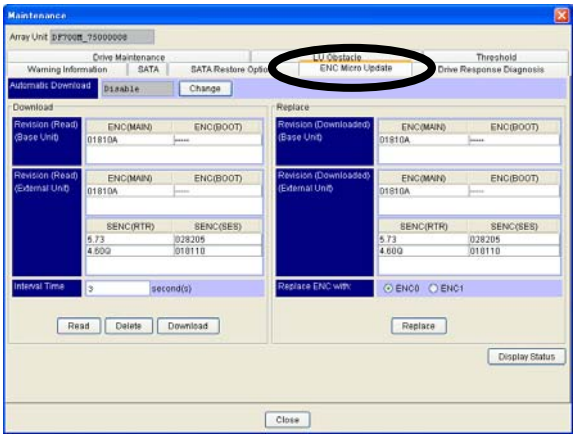


Figure 6.2.4 Procedure for ENC/SENC firmware download

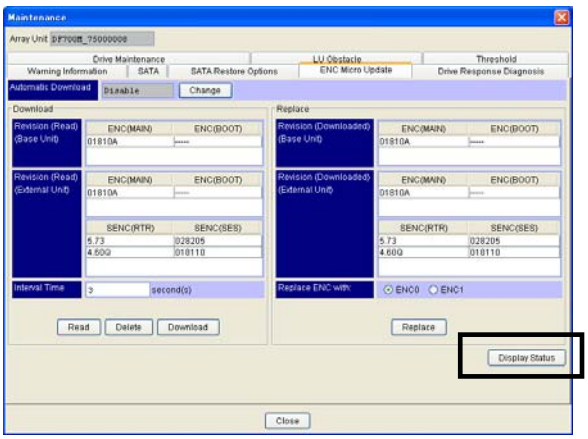
(1) Checking the revision

(a) Select the "ENC Micro Update" tab in the Storage Navigator Modular maintenance window.

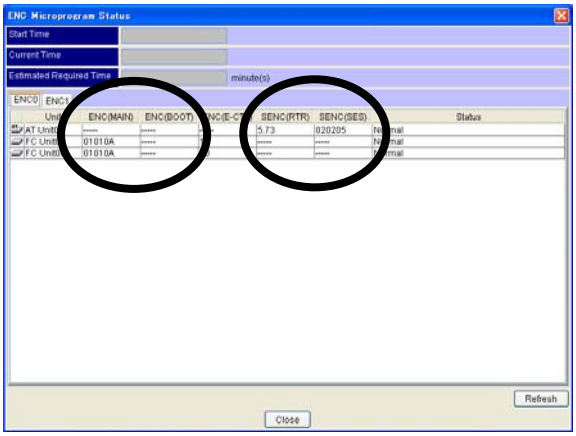


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(b) Display the revision of the current ENC/SENC firmware by selecting the "Display Status" button.

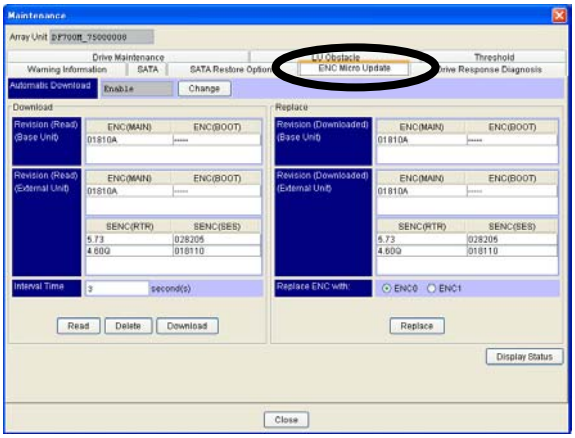


(c) Check the revision of the current ENC/SENC firmware.
When the Rev. of the ENC/SENC #0 and #1 are both the same with or newer than the Rev. to be downloaded, it is not necessary to download the ENC/SENC firmware, so that terminate the work.
When either or both of the Rev. of the ENC/SENC #0 and #1 are older than the Rev. to be downloaded, go to the Step (2).
For RKA, both ENC (MAIN) and ENC (BOOT) become the checking target.



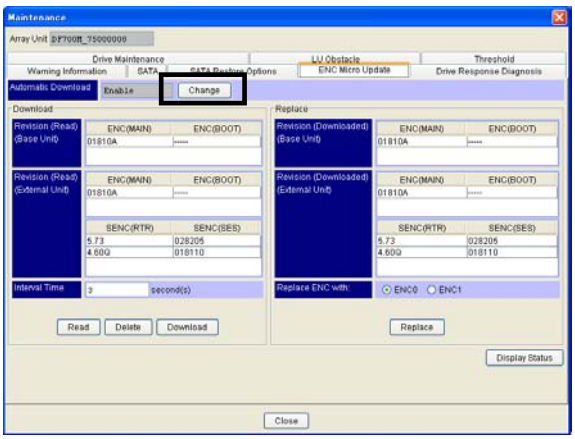
(2) The automatic download function is disabled.

(a) Select the "ENC Micro Update" tab in the Storage Navigator Modular maintenance window.

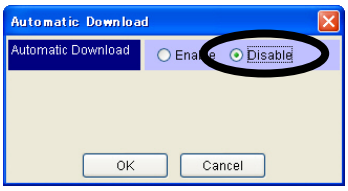


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(b) Press the “Change” button on the “Automatic Download”.

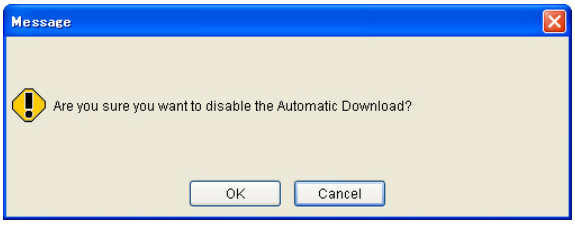


(c) Selected “Disable” in the Automatic Download window.

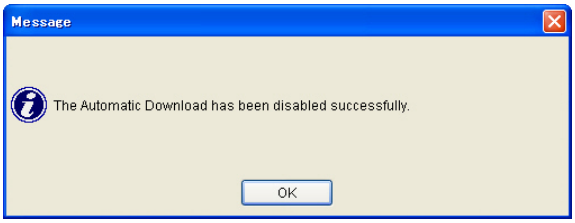


Press the “OK” button.

(d) The configuration message dialog box appears. Press the “OK” button.



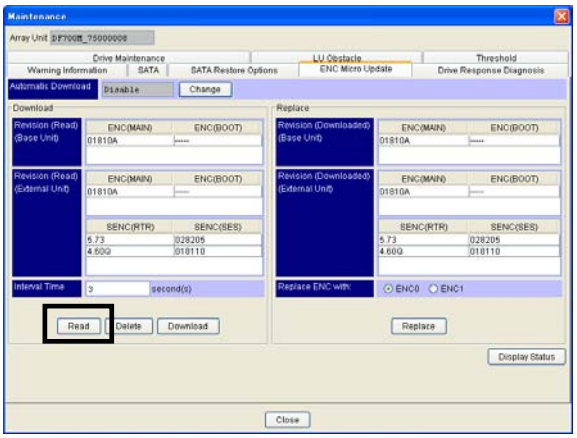
(e) When the set is completed normally. Press the “OK” button.



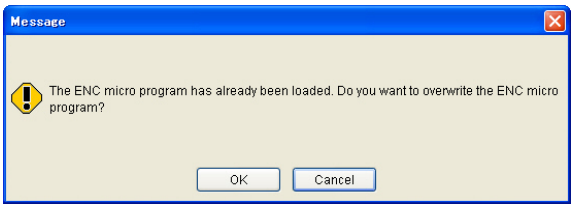
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(3) Reading the ENC/SENC firmware (It is described as a procedure to the ENC/SENC #0.)

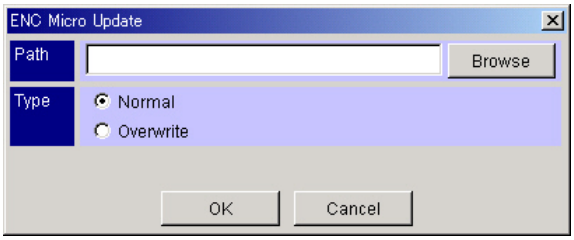
(a) Select the "Read" button on the "ENC Micro Update" tab.



(b) The "Configuration Message" dialog box appears. Press the “OK” button.



(c) Specify the unified version directory(‡1) to the “Path”, check that the “Type” is the Normal version, and press the “OK” button.
When “Overwrite” is selected, specify “Normal”.
Select “Overwrite” only when there is the instruction to select it.



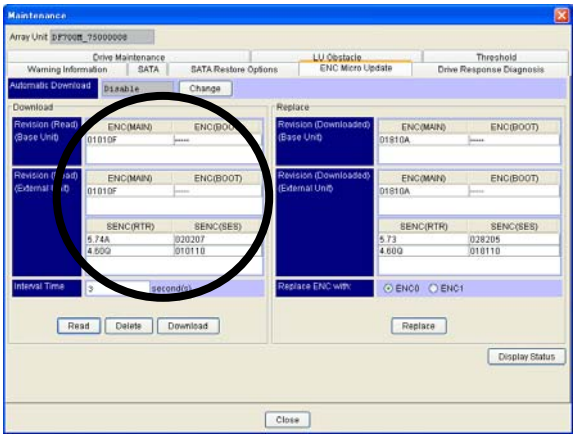
(d) When the download of the file is completed, press the “OK” button.



‡1 : For the unified version directory, refer to “5.1 Hierarchy of ENC/SENC Firmware Storage Directories” (OEMD 05-0010).

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(e) The revision of the ENC/SENC firmware that has been read in is displayed in the "ENC Micro Update" tab. Make sure that the revision of the displayed ENC/SENC firmware is the same as that to be downloaded. If they are not the same, read in the ENC/SENC firmware again.

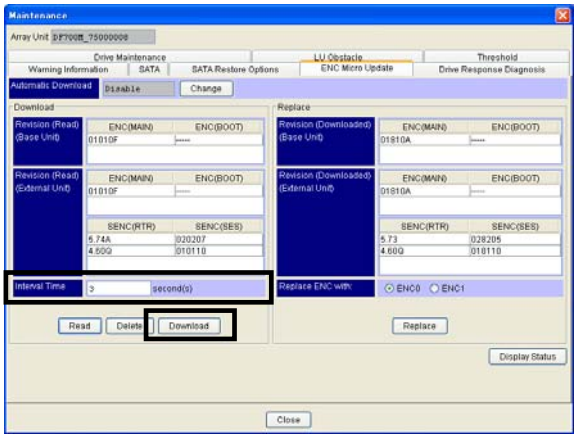


(4) Instructing for the download to the disk array unit

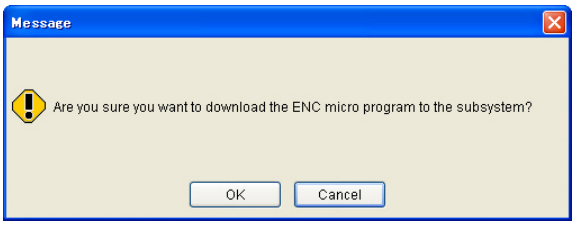
(a) Download the ENC/SENC firmware that has been read in the Storage Navigator Modular to the disk array unit.

To perform the download, enter the "Interval Time" and press the "Download" button.

Three seconds or more of the default value are recommended to avoid the influence on the host I/O for the "Interval Time".

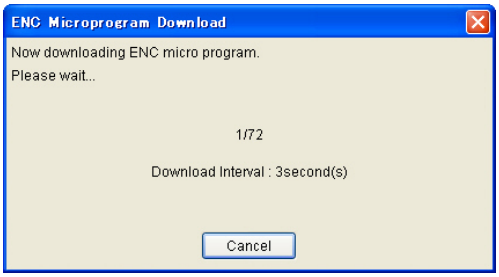


(b) The "Configuration Message" dialog box appears. Press the "OK" button.



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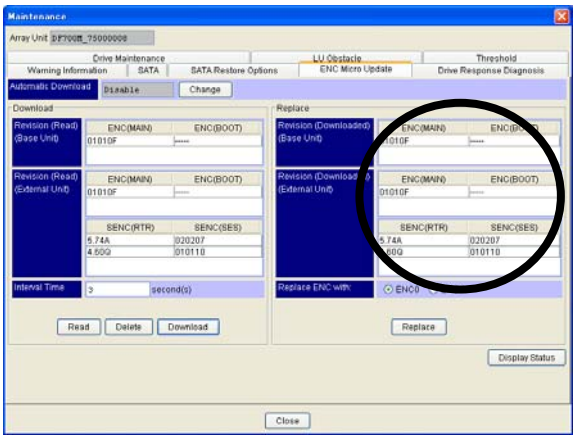
(c) During the download, a dialog box showing that the download is in progress is displayed. When the “Cancel” button is pressed, the download is aborted and the window is returned to the "ENC Micro Update" tab.



(d) When the download is completed normally, press the “OK” button.



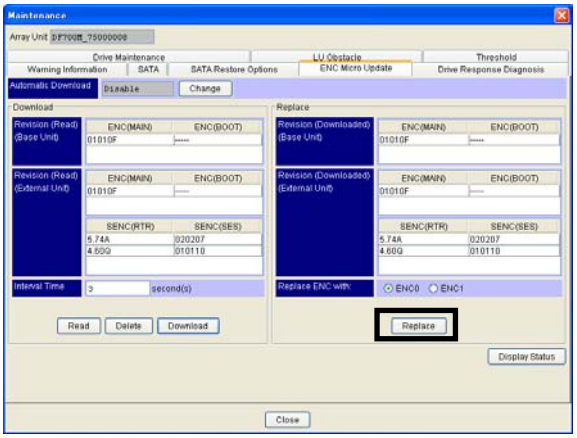
(e) When the window is returned to the "ENC Micro Update" tab, the revision of the firmware that has been downloaded is displayed.



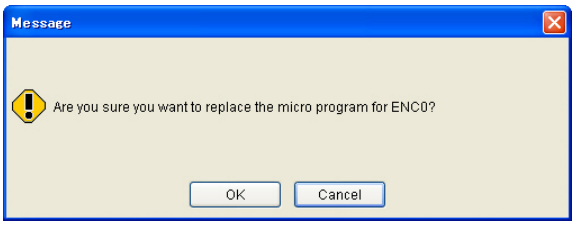
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(5) Instructing for the replacement of the ENC/SENC firmware

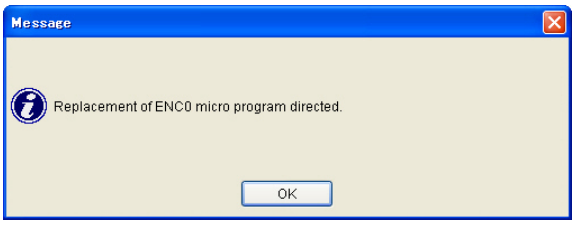
(a) When starting the download of the ENC/SENC firmware, specify the number of the ENC/SENC whose firmware is to be replaced and press the "Replace" button.



(b) The "Configuration Message" dialog box appears. Press the “OK” button.

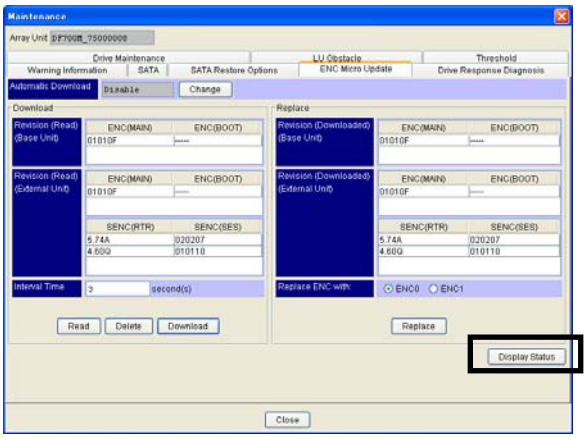


(c) When the “OK” button is pressed, the window is returned to the original window of Step (a).

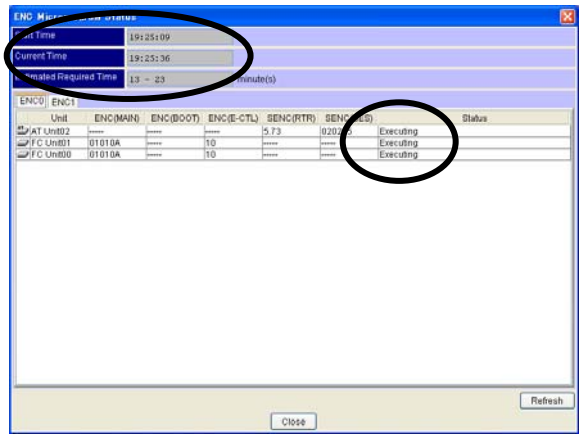


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(d) Display the current progress state of the ENC/SENC firmware downloading by selecting the "Display Status" button.



(e) Make sure of the current progress state of the ENC/SENC firmware downloading.

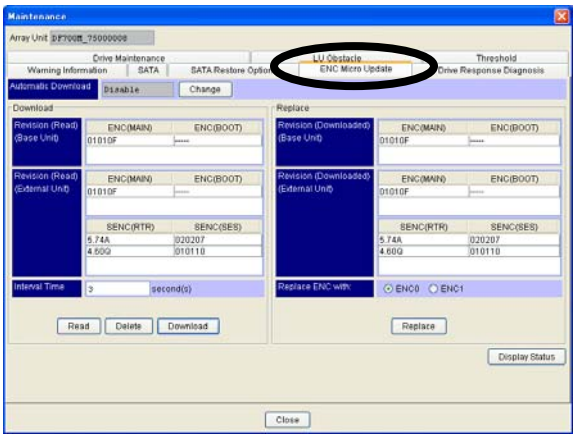


When the download of the other ENC/SENC is necessary, return to the Step (3) and work.
If the download is unnecessary, go to the Step (6).

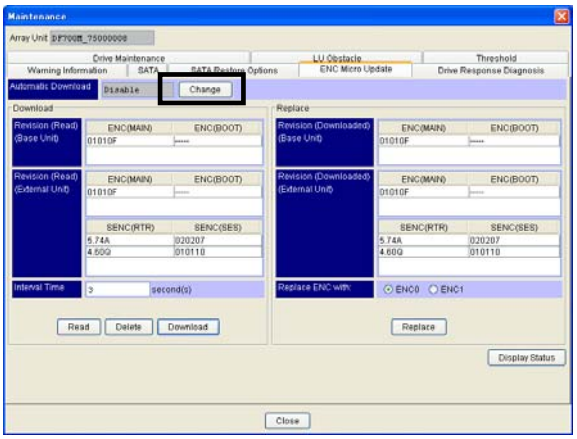
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(6) The automatic download function is enabled.
When the function is changed from “Disable” to “Enable”, check if the automatic download is required again. Therefore, the start and termination messages of the automatic download are displayed.

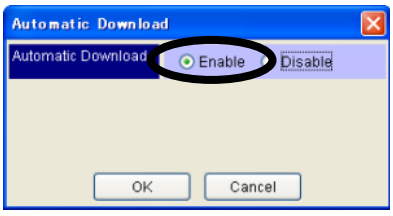
(a) Select the "ENC Micro Update" tab in the Storage Navigator Modular maintenance window.



(b) Press the “Change” button on the “Automatic Download”.



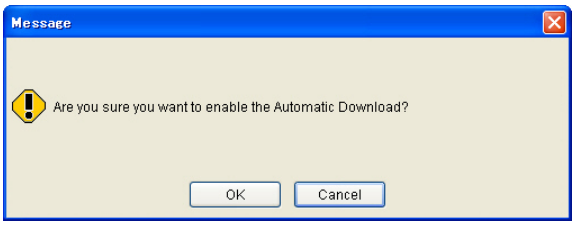
(c) Selected “Enable” in the Automatic Download window.



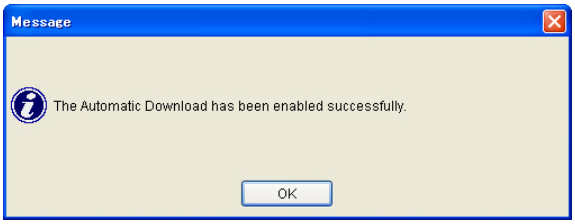
Press the “OK” button.

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(d) The configuration message dialog box appears. Press the "OK" button.



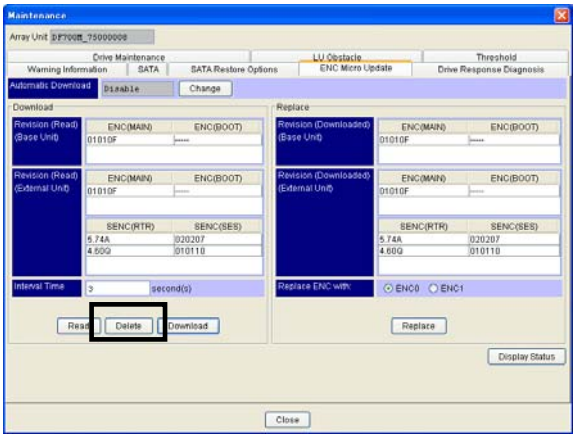
(e) When the set is completed normally. Press the "OK" button.



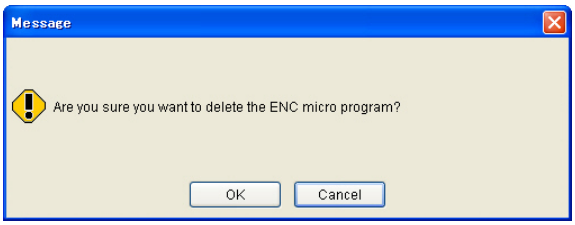
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(7) Deleting the file

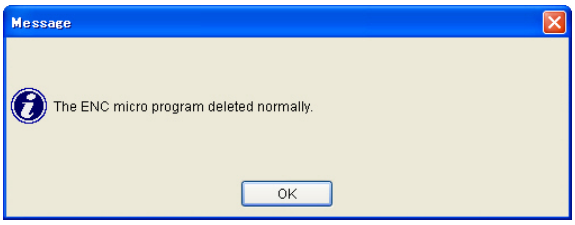
(a) When deleting the ENC/SENC firmware that has been read in the Storage Navigator Modular, press the "Delete" button.



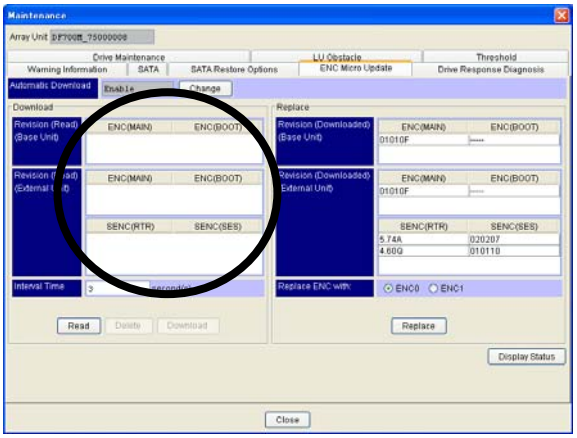
(b) The "Configuration Message" dialog box appears. Press the “OK” button.



(c) When the deletion of the firmware is completed normally, press the “OK” button.



(d) If it returns to the “Enc Micro Update” tab, the revision, which has already been read, displays a blank column.



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Chapter 7. Procedure for Displaying ENC/SENC Firmware Revision Using Web

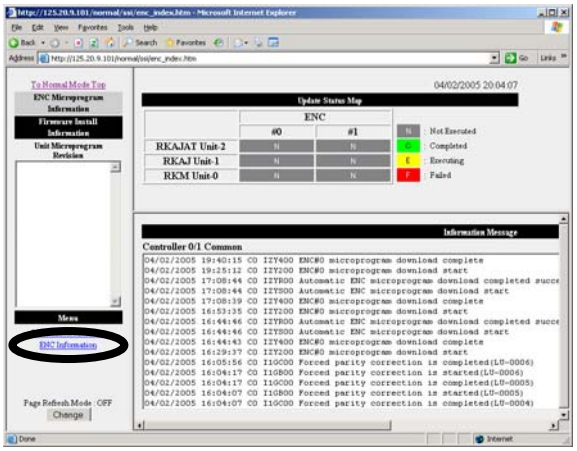
The revision of the ENC/SENC firmware can be looked up using not only Storage Navigator Modular but also the Web.

The window for displaying the ENC/SENC firmware revision is displayed through an entry of the following URL into the Web browser using the PC connected to the disk array subsystem.

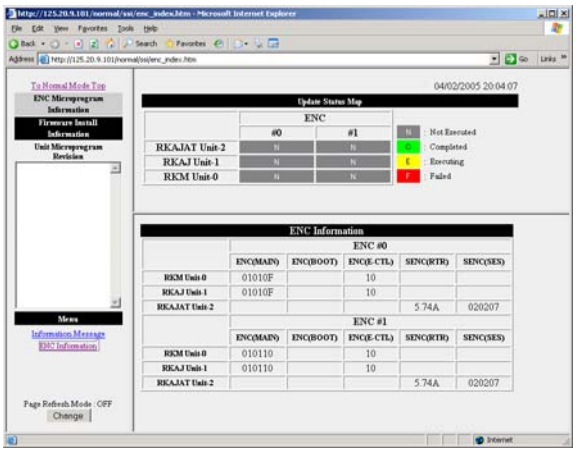
http://"IP address of a controller"/encmicro

Entries of a "User's Name" and "Password" may be required when connecting or operating the Web. In such a case, enter "maintenance" as a user's name and "hosyu9500" as a password.

- Select "ENC Information" from the "Menu" in the window displaying the ENC/SENC firmware revision.



- The ENC/SENC firmware revision is displayed.



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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Apr.28.2005	K.Onabe	N.Higashijima	A.Ishikawa	All	Issued	-
1	Jun.28.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.0→Rev.1	CH
					OEMD 0020	"RKA", "RKAAT", and "RKAJAT" were added.	AD
						The type name was added	AD
					OEMD 01-0000	"SATA" was added to Basic disk array unit.	AD
					OEMD 03-0000	(8) was added.	AD
					OEMD 03-0010	(9) to (11) were added.	AD
					OEMD 04-0000	The content of Table 4.1 was added.	AD
					OEMD 05-0010	"NAS" was added to Table 5.1.1.	AD
					OEMD 06-0010	Figure 6.2.1 and Figure 6.2.2 were changed.	CH
					OEMD 06-0020	Figure 6.2.3 was changed.	CH
					OEMD 06-0040	"RKA" was added to (c).	AD
2	Dec.7.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.1→Rev.2	CH
					OEMD 0020	"RKAAT" was deleted.	DL
					OEMD 01-0000	"RKAAT" was deleted.	DL
					OEMD 03-0000	"RKAAT" was deleted from (8).	DL
					OEMD 03-0010	(9) and (10) were changed.	CH
					OEMD 04-0000	"RKAAT" was deleted from Table 4.1.	DL
					OEMD 05-0010	"NAS_BIOS" was added to Table 5.1.1.	AD
					OEMD 06-0010	"RKAAT" was deleted from Figure 6.2.1.	DL
					OEMD 06-0030	(4) was changed.	CH
3	Dec.22.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.2→Rev.3	CH
					OEMD 0020	"RKH" was added.	AD
					OEMD01-0000	"RKH" was added.	AD
					OEMD03-0000	(8) was added.	AD
					OEMD03-0010	Item numbers were reassigned.	CH
					OEMD04-0000	AMS1000 was added to Table 4.1	AD
						Working hours was changed to Table 4.1	CH
					OEMD06-0010	"RKH" was added to Figure 6.2.1 (a)	AD
					OEMD06-0011, OEMD06-0012	These page were added.	AD
						Figure 6.2.2 was moved from OEMD 06-0010.	CH
						Control Unit(RKH) was added to Figure 6.2.2.	AD
					OEMD06-0020	Control Unit(RKH) was added to Figure 6.2.3.	AD
4	Feb.8.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.3→Rev.4	CH
					OEMD 06-0070	(c) was changed.	CH
5	Jun.16.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.4→Rev.5	CH
					OEMD 06-0060	(c) was changed.	CH
					OEMD 06-0120	(c) was changed.	CH
6	Dec.8.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.5→Rev.6	CH
					OMED 0010	3.2 was added.	AD
						The page number of 6.1 was changed.	CH
					OEMD 02-0000	(5) was added.	AD
					OEMD 03-0020, OEMD 03-0030	These page were added.	AD
					OEMD 06-0000	6.1 was moved to OEMD 06-0001.	DL
					OEMD 06-0001, OEMD 06-0002	These page were added.	AD

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FE-95DF765-01

DF700

Disk Array Subsystem

Procedure for Offline ENC/SENC Firmware Download

REV.7

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      7.1.2 Flowchart (Detailed) ····· EMD 07-0020
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8. Offline ENC/SENC Firmware Download Web Display Screen ····· EMD 08-0000
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   8.2 Web Screen Image ····· EMD 08-0010
      8.2.1 Side Frame and Top Frame Image Screen Details ····· EMD 08-0020
      8.2.2 Select Frame Image Screen Details ····· EMD 08-0030
9. Procedure for Invalidating the Automatic ENC/SENC Firmware Downloading Function ····· EMD 09-0000

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[Definition of terms]

Term	Meaning
RKA	In this procedure manual, it is used as the abbreviation of the DF600-RKA.
RKAJAT	In this procedure manual, it is used as the generic name of the DF700-RKAJAT and the DF600-RKAJAT.
Offline	Issue of the host I/O instruction is not required.
Online	Issue of the host I/O instruction is required.
Offline ENC/SENC Firmware Download	Function for downloading the ENC/SENC firmware supported in the offline state (offline replacement)
Online ENC/SENC Firmware Download	Function for downloading the ENC/SENC firmware supported in the online state (online replacement) This function can be used offline also.
SH Firmware	This is the general term for the following firmware shown in Web and Storage Navigator Modular, and required for the ENC operation of RKH, RKM, RKS, RKAJ and RKA. RKH, RKM, RKS, RKAJ : ENC(MAIN) RKA : ENC(MAIN), ENC(BOOT)
H8S Firmware	This is the following firmware shown in Web and Storage Navigator Modular, and required for the SENC operation of RKXS and RKAJAT. RKXS, RKAJAT:SENC(SES)
SR Firmware	This is the following firmware shown in Web and Storage Navigator Modular, and required for the SENC operation of RKXS and RKAJAT. RKXS, RKAJAT:SENC(RTR)

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Chapter 1. Offline ENC/SENC Firmware Download Overview

This document explains how to use the microprogram to download ENC/SENC Firmwares from the PC used for maintenance without replacing any hardware parts in the event of an ENC/SENC Firmware malfunction.

The following three types of download are implemented during ENC/SENC firmware download:

- SH Firmware download
- H8S Firmware download
- SR Firmware download

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Chapter 2. Offline ENC/SENC Firmware Download Prerequisites

(1) A maintenance terminal is required to connect to the web and download ENC/SENC firmware. Keep the maintenance manual at hand in order to be prepared for errors that may occur during ENC/SENC Firmware download.

(2) To download the ENC/SENC firmware making a connection to the Web, it is required to connect the LAN connector of the Controller 0. If the Controller 1 is connected, the ENC/SENC firmware cannot be downloaded.

(3) Either HDD #0 or HDD #2 must be installed at each unit in the disk array when downloading ENC/SENC firmware for ENC #0. Either HDD #1 or HDD #3 must be installed at each unit in the disk array when downloading ENC/SENC firmware for ENC #1. In addition, ENC #0 and ENC #1 must be installed at each expansion unit. Attempting ENC/SENC firmware download when the aforementioned are not installed may cause a subsystem to go down. In the event of a subsystem error, restart the ENC/SENC firmware download after confirming that the required HDDs and ENC/SENC units have been installed.

(4) Maintenance personnel must only use the ENC/SENC firmware download function when the subsystem is offline. The following tasks and situations will occur during Offline ENC/SENC Firmware download procedures:

- Maintenance personnel must perform the planned stop of the disk array subsystem on the measurement screen.
- Maintenance personnel must start the disk array in start mode (ENC Micro-Download Mode).
- The disk array subsystem may reboot automatically.

If the ENC/SENC firmware download is performed when the system is online, abnormal termination will result. The host computer may also detect I/O errors and refuse to recognize LUs, which will cause business applications to stop responding. If any of the aforementioned errors occurs, take the system offline and restart the ENC/SENC firmware.

Also, stop the failure monitoring such as the E-Mail ASSIST function, the PC ASSIST, the SNMP monitoring, the failure monitoring of the Storage Navigator Modular, the Hi-Track monitoring, etc.

And, restart the failure monitoring after completing the download of the ENC/SENC firmware.

Offline is used to explain the situation detailed below.

The host computer neither accesses the disk array unit nor recognizes the LU, does not execute a drive restoration (dynamic sparing, copy back, and/ or correction copy), LU formatting, pair creation/resynchronization of ShadowImage in-system replication, and restoration of Copy-on-write Snapshot within the disk array unit and does not execute the resynchronization of TrueCopy remote replication between the disk array units. If the host computer will not access the disk array subsystem, either all power to the host computer is turned off or the host computer is ready but the disk array subsystem, including direct fiber optic cable connections and switches, is physically disconnected.

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(5) Do not download ENC/SENC firmware if the ENC/SENC unit is not installed at the expansion unit. If the ENC/SENC unit opposite the number of the ENC/SENC firmware to be downloaded is removed or if an ENC/SENC firmware download is attempted when the ENC/SENC unit is uninstalled, a loop switch fault on the drive side will result, causing the subsystem to go down.

(6) Confirm that the subsystem is ready and there is not an error other than an ENC/SENC error in the subsystem. If an ENC/SENC firmware is downloaded when there is an error other than an ENC error in the subsystem, the download may result in an abnormal shutdown. When an abnormal shutdown occurs, confirm the subsystem's status on the web, and, after addressing the error, restart the ENC/SENC firmware download.

(7) In order to prevent user data loss and other problems that may occur when the Offline ENC/SENC Firmware download function is used, perform the planned stop of the subsystem before attempting to download the ENC/SENC firmware. After the subsystem boots up again, download the ENC/SENC firmware once the subsystem is in the system ready status.
Be aware that the ENC/SENC firmware download function can be used without performing the planned stop. The ENC/SENC firmware download function cannot be used when the subsystem is in one of the statuses listed below. When the subsystem is in one of the following statuses, refer to the maintenance manual for instructions on how to properly correct the error. After the error has been corrected, restart the ENC/SENC firmware download.
  - Forced parity recovery is required.
  - User data is stored in the cache.

(8) When the READY LED (green) on the Front Bezel of a Basic disk array unit is blinking quickly, the ENC/SENC firmware is being downloaded. Therefore, start the downloading after the READY LED (green) becomes kept on.

(9) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the work. The automatic download of the ENC/SENC firmware or the update of the flash program is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up.

(10) When the TrueCopy remote replication is enabled, and the array subsystem, which the ENC/SENC firmware download is to be performed, is a remote disk subsystem, perform the ENC/SENC firmware download after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.
However, although a path blockade occurs if the ENC/SENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array subsystem after performing the ENC/SENC firmware download.
After the offline ENC/SENC firmware dounload is completed, set the pair status (S-VOL) of the TrueCopy remote replication to previous state.
Also, if the ENC/SENC firmware download is performed, the following phenomena occur.
  - Both paths of the TrueCopy remote replication are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
  - When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.

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(11) When the TrueCopy Extended Distance is enabled, and the array subsystem, which the ENC/SENC firmware download is to be performed, is a remote disk subsystem, perform the ENC/SENC firmware download after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS.
However, although a path blockade occurs if the ENC/SENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array subsystem after performing the ENC/SENC firmware download.
After the offline ENC/SENC firmware dounload is completed, set the pair status (S-VOL) of the TrueCopy Extended Distance to previous state.
Also, if the ENC/SENC firmware download is performed, the following phenomena occur.

- Both paths of the TrueCopy Extended Distance are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.

(12) When it sets to the mode that executes the offline ENC/SENC firmware replacement and the array subsystem starts, the Disk Drives, which were spun down due to the Power Saving of the priced option, spin up.
When the array subsystem normally starts and it becomes the Ready status after completing the offline ENC/SENC firmware replacement, the Disk Drives set to the Power Saving spin down.

(13) Do not install the SENC firmware whose revision is less than 5.80/A in the array subsystem which uses the priced option Power Saving.
If the SENC firmware whose revision is less than 5.80/A is installed in the array subsystem which uses the priced option Power Saving, “W0GM00 SENC which may attach restrictions on Power Saving function was detected” is displayed in Warning Information on WEB after the array subsystem is restarted, and the WARN LED (orange) on the front of the basic chassis lights up and it becomes in the warning status.

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Chapter 3. Restriction and Notes of Offline ENC/SENC Firmware Download

(1) Do not remove or insert any parts, for maintenance or any other reason, during ENC/SENC firmware download.
Inserting or removing parts during ENC/SENC firmware download may cause a fault. If parts are inserted or removed during ENC/SENC firmware download and a fault results, retry the ENC/SENC firmware download.
Do not download ENC/SENC firmware if the ENC/SENC unit is not installed at the expansion unit. If an ENC/SENC firmware download is attempted when ENC/SENC is not installed at the expansion unit, a loop switch error will result at the drive side, causing the system to go down.

(2) Do not alter the disk array architecture during ENC/SENC firmware download. Altering the disk array architecture during ENC/SENC firmware download may cause download to fail.

(3) If maintenance personnel download an ENC/SENC firmware when one of the ENC/SENC firmware already installed is defective or there is an ENC/SENC hardware error, the ENC/SENC firmware (SH firmware, H8S firmware and/or SR firmware) exchange may fail. If a failure occurs, correct the error by retrying the ENC/SENC firmware download in accordance with the procedure manual and/or referring to web messages and the maintenance manual.

(4) After downloading an ENC/SENC firmware, the ALARM LED (red) on the ENC/SENC unit that performed the download will light up. This means that the ENC/SENC is automatically rebooting after the ENC/SENC firmware was downloaded and does not indicate an error. In accordance with offline ENC/SENC firmware download procedure, turn the AC power supply switch power off after the download has been completed. After turning the power to the subsystem back on, confirm that the subsystem boots up properly and that the ENC/SENC firmware has been updated.

(5) When returning the revision of the ENC/SENC firmware to the previous one after downloading the firmware because of its trouble, etc., it is required to invalidate the automatic downloading function before downloading the firmware.
For the procedure for invalidating the automatic downloading function, "Chapter 9. Procedure for Invalidating the Automatic ENC/SENC Firmware Downloading Function" (EMD 09-0000).

(6) The SANRISE AMS1000 can connect the DF600-RKA from the microprogram revision of 0731/A-H.

(7) The SANRISE AMS500 can connect the DF600-RKA and the DF600-RKAAT from the microprogram revision of 0720/A-M.

(8) The SANRISE AMS/WMS Series can connect the DF600-RKAJAT.

(9) The SANRISE AMS/WMS Series cannot connect the DF600-RKAAT.

(10) If the revision of the ENC firmware of ENC installed in the DF600-RKA is Rev. 18 or less, the revision of the ENC firmware should be updated when reducing it from the SANRISE 9570V/9580V/9585V.

(11) When it sets to the mode that executes the offline ENC/SENC firmware replacement and the array subsystem starts, the Disk Drives, which were spun down due to the Power Saving of the priced option, spin up.
When the array subsystem normally starts and it becomes the Ready status after completing the offline ENC/SENC firmware replacement, the Disk Drives set to the Power Saving spin down.

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Chapter 4. Offline ENC/SENC Firmware Download Time

The table below shows the amount of time required to download an ENC/SENC firmware in the disk array subsystem. These figures do not include the amount of time required for the system (including the host computer) to go online. The working hours of Table 4.1 show the time from instructing the download of the ENC/SENC firmware for ENC#0 or ENC#1 by WEB to the end of the download.

Table 4.1 Standard of the time required for the off-line ENC/SENC firmware download of the SANRISE AMS500/AMS200

#	Item	Time Required					
	Target chassis for ENC/SENC firmware download	Only RKS Only RKM Only RKAJ Only RKA Optional combination of (RKS, RKAJ or RKA) Optional combination of (RKM, RKAJ or RKA)		Only RKAJAT		(RKS, RKAJ or RKA) and RKAJAT are mixed. (RKM, RKAJ or RKA) and RKAJAT are mixed.	
		Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC/SENC firmware download task						
1	Host I/O stop	Varies with system architecture.					
2	Planned stop	1 minute	3 minutes	1 minute	3 minutes	1 minute	3 minutes
3	Subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	ENC #0 side firmware download						
4	Disk array subsystem reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
5	ENC #0 side download	4 minutes	8 minutes	6 minutes	12 minutes	10 minutes	20 minutes
6	subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
	ENC #1 side firmware download						
7	Disk array subsystem reboot	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
8	ENC #1 side download	4 minutes	8 minutes	6 minutes	12 minutes	10 minutes	20 minutes
9	subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes	4 minutes	6 minutes
10	Total	29 minutes	49 minutes	33 minutes	57 minutes	41 minutes	73 minutes

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Table 4.2 Standard of the time required for the off-line ENC/SENC firmware download of the SANRISE WMS100

#	Item	Time Required			
	Target chassis for ENC/SENC firmware download	RKXS is included.		RKXS is not included.	
		Standard	Maximum	Standard	Maximum
	ENC/SENC firmware download task				
1	Host I/O stop	Varies with system architecture.			
2	Planned stop	1 minute	3 minutes	1 minute	3 minutes
3	Subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes
	ENC #0 side firmware download				
4	Disk array subsystem reboot	4 minutes	6 minutes	4 minutes	6 minutes
5	ENC #0 side download	8 minutes	16 minutes	6 minutes	12 minutes
6	subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes
	ENC #1 side firmware download				
7	Disk array subsystem reboot	4 minutes	6 minutes	4 minutes	6 minutes
8	ENC #1 side download	8 minutes	16 minutes	6 minutes	12 minutes
9	subsystem startup	4 minutes	6 minutes	4 minutes	6 minutes
10	Total	37 minutes	65 minutes	33 minutes	57 minutes

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Table 4.3 Standard of the time required for the off-line ENC/SENC firmware download of the SANRISE AMS1000

#	Item	Time Required											
	Target chassis for ENC/SENC firmware download	Only RKAJ		RKH and RKAJ		Only RKAJAT		RKH and RKAJAT		RKAJ and RKAJAT		RKH, RKAJ and RKAJAT	
		Only RKA		RKH and RKA						RKAJAT and RKA		RKH, RKAJAT and RKA	
		RKAJ and RKA		RKH, RKAJ and RKA						RKAJ, RKAJAT and RKA		RKH, RKAJ, RKAJAT and RKA	
		Standard	Maximum	Standard	Maximum	Standard	Maximum	Standard	Maximum	Standard	Maximum	Standard	Maximum
	ENC/SENC firmware download task												
1	Host I/O stop	Varies with system architecture.											
2	Planned stop	2 minutes	6 minutes	2 minutes	6 minutes	2 minutes	6 minutes	2 minutes	6 minutes	2 minutes	6 minutes	2 minutes	6 minutes
3	Subsystem startup	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes
	ENC #0 side firmware download												
4	Disk array subsystem reboot	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes
5	ENC #0 side download	4 minutes	8 minutes	5 minutes	10 minutes	6 minutes	12 minutes	7 minutes	15 minutes	10 minutes	20 minutes	11 minutes	25 minutes
6	subsystem startup	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes
	ENC #1 side firmware download												
7	Disk array subsystem reboot	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes
8	ENC #1 side download	4 minutes	8 minutes	5 minutes	10 minutes	6 minutes	12 minutes	7 minutes	15 minutes	10 minutes	20 minutes	11 minutes	25 minutes
9	subsystem startup	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes	5 minutes	8 minutes
10	Total	29 minutes	49 minutes	37 minutes	66 minutes	33 minutes	57 minutes	41 minutes	76 minutes	41 minutes	73 minutes	49 minutes	96 minutes

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Chapter 5. Before Beginning an Offline ENC/SENC Firmware Download

Before beginning ENC/SENC firmware download, confirm/prepare the following:

(1) After referring to the web connection procedures in the DF700 Disk Array Subsystem Maintenance Manual WEB "Chapter 1. Before Using Web" (WEB 01-0000), prepare 1 PC on which a web browser has been installed and that can be used in a LAN.
The PC that is used for maintenance and connected to the LAN must be used to download ENC/SENC firmware.

(2) Set the service PC up. (See DF700 Disk Array Subsystem Maintenance Manual Microprogram "1.3 Preparation for installation of microprogram" (MICRO 01-0020)).

(3) Prepare a CD-ROM of the specified revision for microprogram installation.

(4) Execute the installer of the CD-ROM, and save the unified version directory(‡1), where the ENC/SENC firmware is stored, under the directory "C:¥diskarray-microprogram¥microprogram".

(5) If a failure occurs during the ENC/SENC firmware download, it is required to see the recovery measures. Prepare the DF700 Disk Array Subsystem Maintenance Manual, and perform the recovery work following the manual.

(6) ENC/SENC firmware can only be downloaded when the system is off (when the host I/O is stopped). (When the LU formatting, drive restoration (dynamic sparing, copy back, and/or correction copy), pair creation/resynchronization of ShadowImage in-system replication, or restore of Copy-on-write Snapshot, or copying of TrueCopy remote replication is in progress, perform the downloading after the operation above is completed.

(7) Stop the failure monitoring such as the E-Mail ASSIST function, the PC ASSIST, the SNMP monitoring, the failure monitoring of the Storage Navigator Modular, the Hi-Track monitoring, etc.
And, restart the failure monitoring after completing the download of the ENC/SENC firmware.

(8) Confirm that the subsystem is ready and there is not an error other than an ENC/SENC error in the subsystem. If an ENC/SENC firmware is downloaded when there is an error other than an ENC error in the subsystem, the download may result in an abnormal shutdown. When an abnormal shutdown occurs, confirm the subsystem's status on the web, and, after addressing the error, restart the ENC/SENC firmware download.

(9) In order to prevent user data loss and other problems that may occur when the Offline ENC/SENC Firmware download function is used, perform the planned stop of the subsystem before attempting to download the ENC/SENC firmware. After the subsystem boots up again, download the ENC/SENC firmware once the subsystem is in the system ready status.
Be aware that the ENC/SENC firmware download function can be used without performing the planned stop. The ENC/SENC firmware download function cannot be used when the subsystem is in one of the statuses listed below. When the subsystem is in one of the following statuses, refer to the maintenance manual for instructions on how to properly correct the error. After the error has been corrected, restart the ENC/SENC firmware download.

- Forced parity recovery is required.
- User data is stored in the cache.

‡1 : For the unified version directory, refer to "5.1 Hierarchy of ENC/SENC Firmware Storage Directories" (EMD 05-0010).

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(10) When the READY LED (green) on the Front Bezel of a Basic disk array unit is blinking quickly, the ENC/SENC firmware is being downloaded. Therefore, start the downloading after the READY LED (green) becomes kept on.

(11) When the WARNING LED (orange) on the front of the Basic Chassis is blinking at high speed, do not perform the work. The automatic download of the ENC/SENC firmware or the update of the flash program is being executed. Perform the work after checking that the WARNING LED (orange) on the front of the Basic Chassis goes out and the READY LED (green) lights up.

(12) When the TrueCopy remote replication is enabled, and the array subsystem, which the ENC/SENC firmware download is to be performed, is a remote disk subsystem, perform the ENC/SENC firmware download after changing the pair status (S-VOL) of TrueCopy remote replication to PSUS.

However, although a path blockade occurs if the ENC/SENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array subsystem after performing the ENC/SENC firmware download.

Also, if the ENC/SENC firmware download is performed, the following phenomena occur.

- Both paths of the TrueCopy remote replication are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the pair status of the TrueCopy remote replication is PAIR or COPY, the pair status changes to PSUE.

(13) When the TrueCopy Extended Distance is enabled, and the array subsystem, which the ENC/SENC firmware download is to be performed, is a remote disk subsystem, perform the ENC/SENC firmware download after changing the pair status (S-VOL) of TrueCopy Extended Distance to PSUS.

However, although a path blockade occurs if the ENC/SENC firmware download is performed, the pair blockade is automatically recovered by turning on the power supply of the array subsystem after performing the ENC/SENC firmware download.

Also, if the ENC/SENC firmware download is performed, the following phenomena occur.

- Both paths of the TrueCopy Extended Distance are blocked. The notice of SNMP Agent Support Function and TRAP occur at the time of the path blockade. Perform the notice and the check to the Failure Monitoring Department in advance. The path blockade automatically recovers after restarting.
- When the pair status of the TrueCopy Extended Distance is PAIR or COPY, the pair status changes to PSUE.
- When Power Saving of the priced option is used, if you perform the download of the ENC/SENC firmware after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host when the array subsystem starts. Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then perform the download of the ENC/SENC firmware.

  If the spin-down fails, execute the spin-down again.

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5.1 Hierarchy of ENC/SENC Firmware Storage Directories

The hierarchical structure of ENC/SENC firmware storage directories is shown in Table 5.1.1. The structure of directories of the CD-ROM for installing the ENC/SENC firmware is the same as that shown in Table 5.1.1.
When the CD-ROM installer is executed, the unified version directory is stored under the directory, "C:¥diskarray-microprogram¥microprogram."
When installing the ENC/SENC firmware, specify the unified version directory.

Table 5.1.1 Directory Hierarchy

First stratum	Second stratum	Third stratum	Fourth stratum	Fifth stratum
Unified version directory	DF700M	disk 01 - disk X	Microprogram file	-
		fmins		-
	DF700S	disk 01 - disk X		-
		fmins		-
	DF700H	disk 01 - disk X		-
		fmins		-
	DF700XS	disk 01 - disk X		-
		fmins		-
	ENC	online	update	ENC/SENC firmware file
			overwrite	
		offline	update	
			overwrite	
	NAS_BIOS	Microprogram file	-	-

NOTE : Do not change a name of the unified version directory or directory in a stratum under the unified version directory. The ENC/SENC firmware becomes unable to be installed if the directory name is changed.

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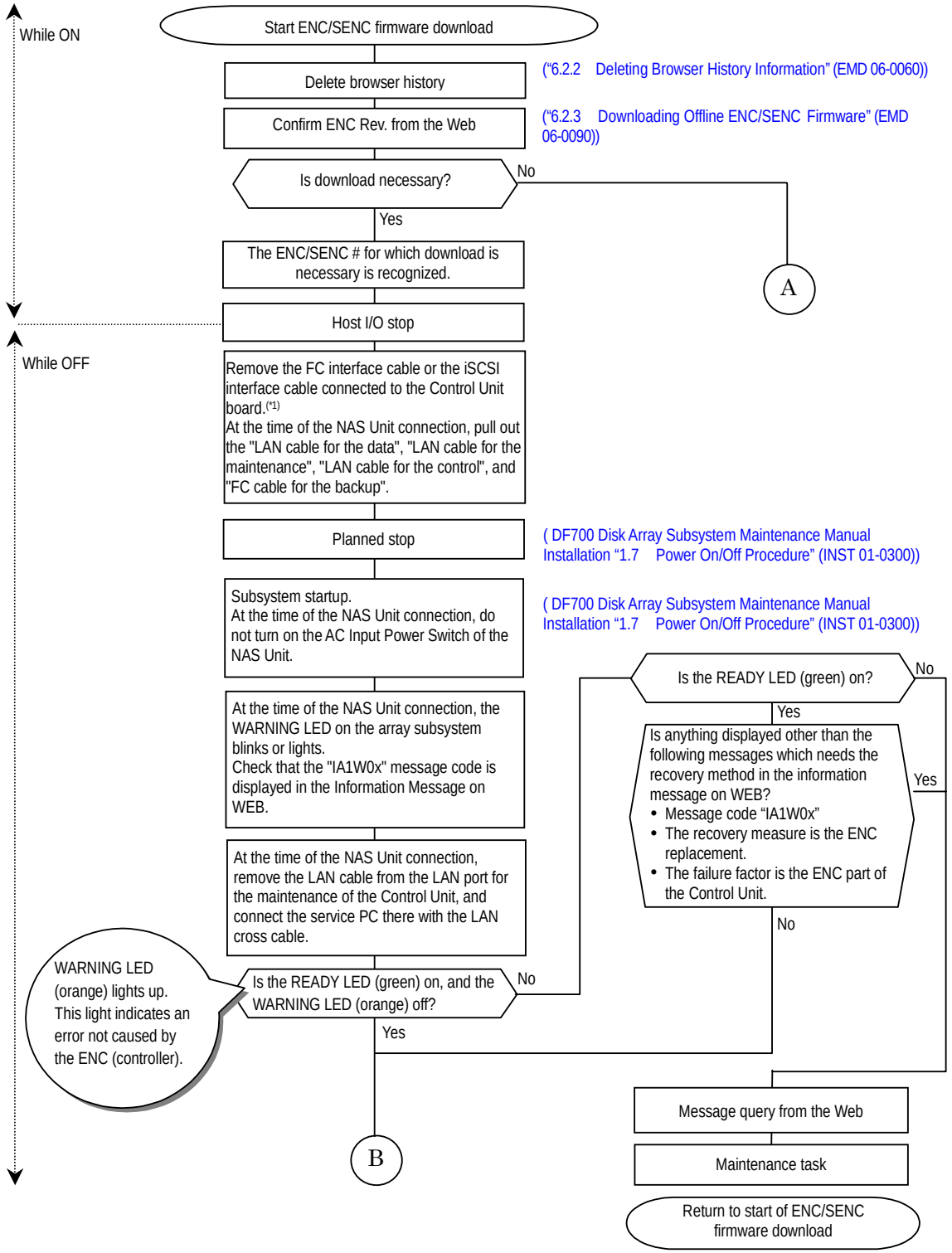
Chapter 6. Offline ENC/SENC Firmware Download Procedure (Dual Controller)

The procedure that must be followed in order to download ENC/SENC firmware differs depending on whether RKM/RKS/RKXS use single or dual controller configuration. For details on using dual controller configuration when downloading ENC/SENC firmware, refer to "6.1 Flowchart" (EMD 06-0010). For details on using single controller configuration when downloading ENC/SENC firmware, refer to "Chapter 7. Offline ENC/SENC Firmware Download Procedure (Single Controller)" (EMD 07-0000). For details on the ENC/SENC firmware download operation for the AMS1000, refer to "Chapter 6. Offline ENC/SENC Firmware Download Procedure (Dual Controller)" (EMD 06-0000).

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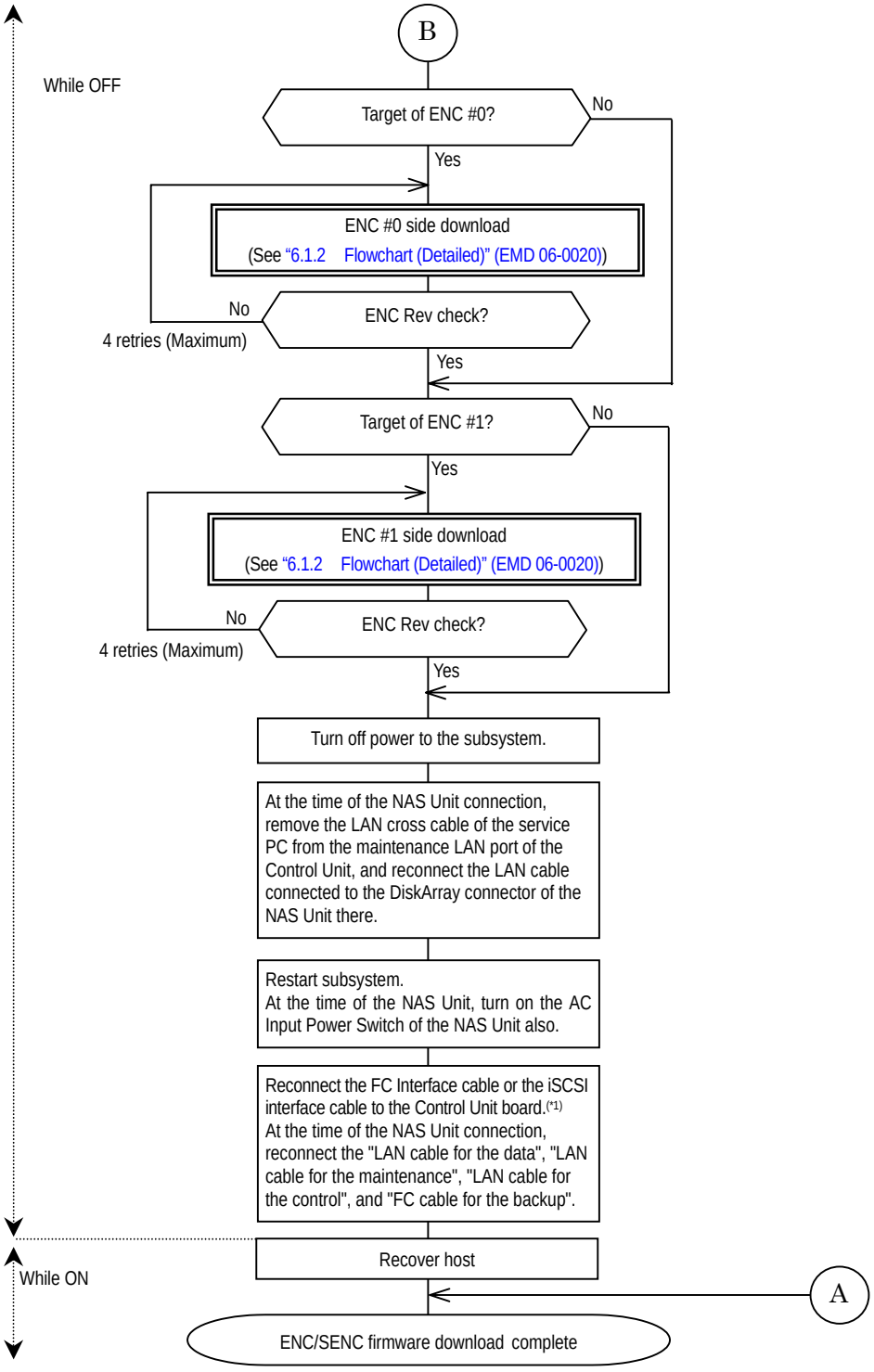
6.1 Flowchart

6.1.1 Flowchart (General)



*1 : When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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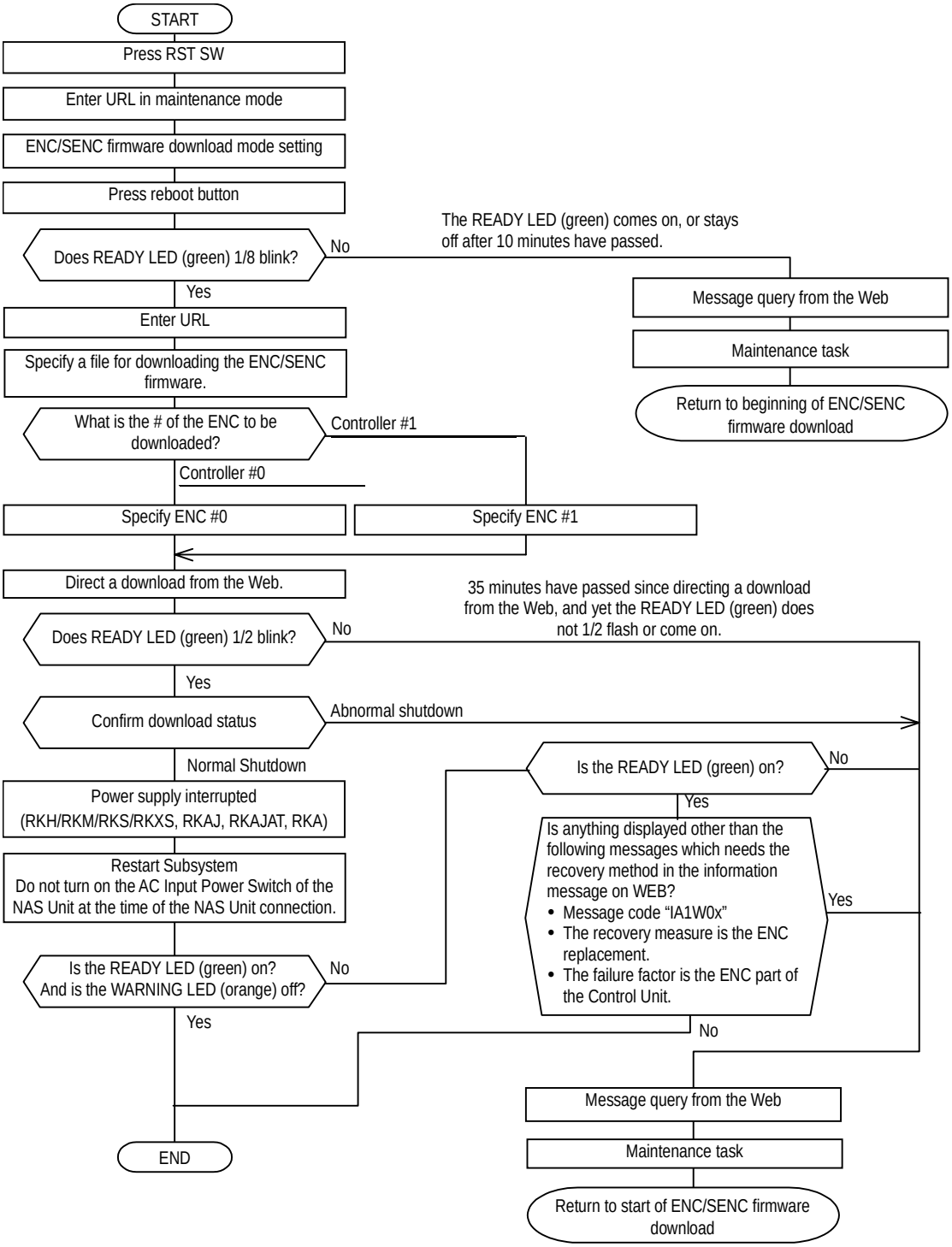
*1 : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors.
If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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6.1.2 Flowchart (Detailed)



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6.2 Offline ENC/SENC Firmware Download Procedure Screen (Dual Controller)

6.2.1 Connecting the PC Used for Maintenance

The maintenance LAN connector and the LAN connector of the PC used for maintenance must be connected using a LAN cross cable. Follow the procedure shown below to make the necessary connection.

(1) Confirm the following before connecting the PC used for maintenance:
Check the following LEDs before connecting the PC used for maintenance:

- POWER LED(green) confirmation:
  Confirm that the POWER LED(green) located on the top of the front bezel is lit.
  If the POWER LED(green) is not lit, refer to the DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000) for details on how to correct the error.
- WARNING LED(orange) confirmation:
  Confirm that the WARNING LED(orange) located on the top of the front bezel is not lit.
  If the WARNING LED(orange) is lit or blinking, refer to the DF700 Disk Array Subsystem Maintenance Manual Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000) for details on how to correct the error.

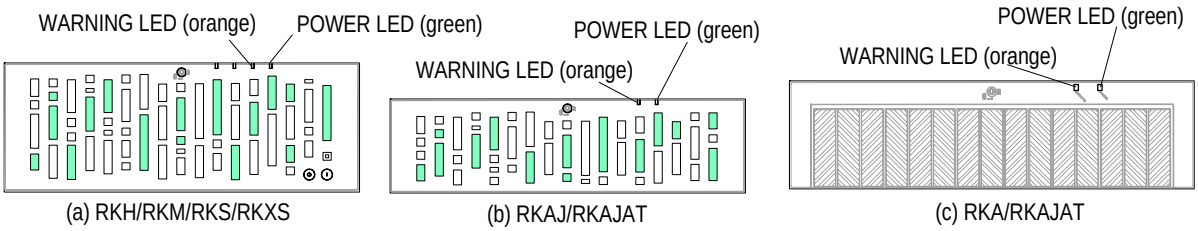


Figure 6.2.1 Locations and Name of LED

- Controller CHKSTP LED(red) confirmation:
  Confirm whether or not the CHKSTP LED(red) located on the top of the controller is lit.
  Replace any controllers on which the CHKSTP LED(red) is lit. For details on how to replace controllers, refer to the DF700 Disk Array Subsystem Maintenance Manual Replace "2.2.5 Replacing Control Unit" (REP 02-0400) for details on how to correct the error.

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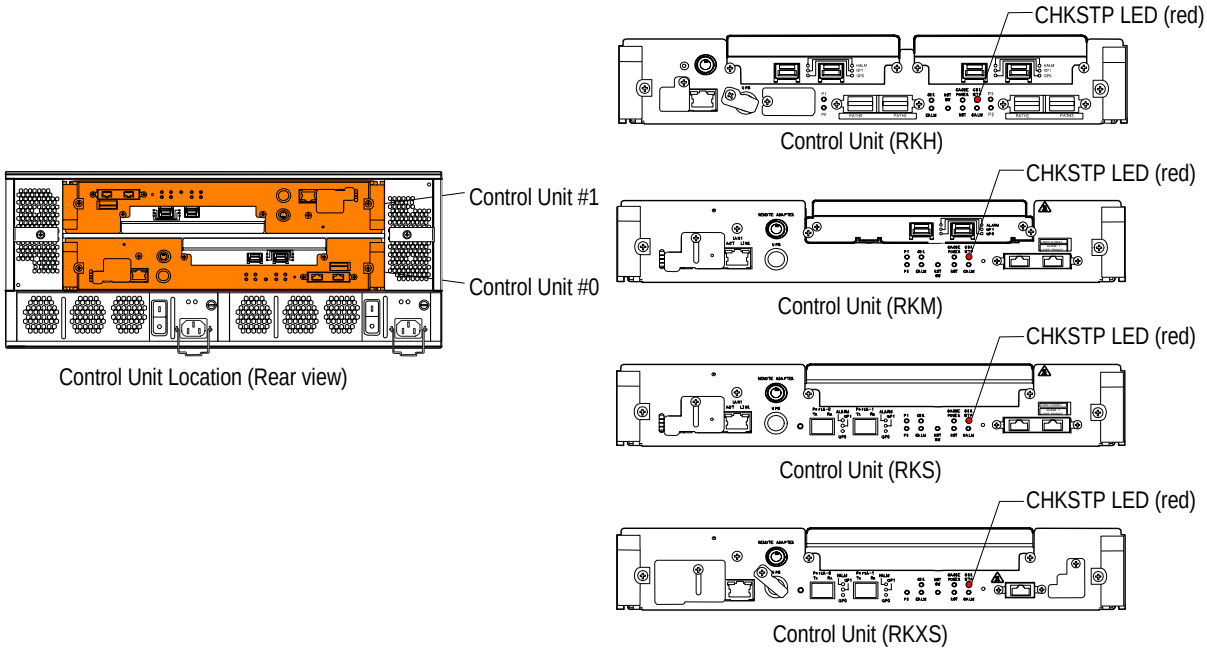


Figure 6.2.2 Locations and Name of LED

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(2) Preparing the maintenance terminal for use

Table 6.2.1 Preparing the maintenance terminal

Item Number	Customer Environment	Terminal used for maintenance	Preparation
1	Uses controller's maintenance-use LAN connector	Use the LAN to connect the PC that is being carried and will be used for maintenance.	• PC used for maintenance • LAN cross cable

(3) Controller to be connected

With dual system architecture, the browser connection is identical no matter which controller is connected. First, connect to controller #0.

If controller #0 is closed, subsequent information can only be referenced on the controller #1 side. If controller #0 is closed, connect to controller #1.

When performing the offline ENC/SENC firmware downloading, however, perform it through the Controller #0. The firmware is not downloaded through the Controller #1.

(4) Procedure to connect portable maintenance PC to WEB

(a) Remove the cover on the Control Unit. Connect the LAN-Connecter for maintenance and the LAN-Connecter of Maintenance PC with a LAN-cross-cable.

At the time of the RKNAS connection, remove the cover of the LAN connector for the maintenance in the RKNAS (rear side), and connect the LAN connector for the maintenance and the LAN connector of the Maintenance PC.

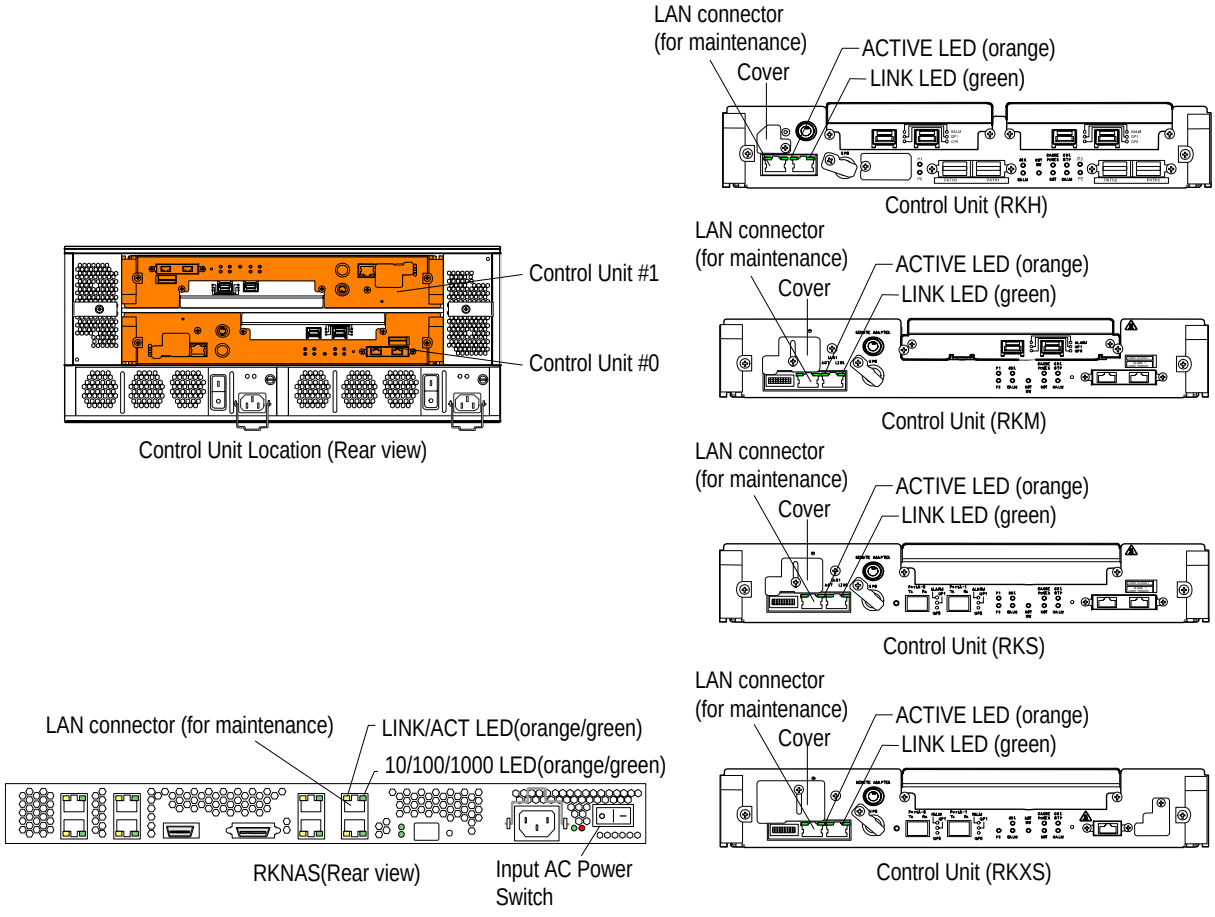


Figure 6.2.3 LAN Connector Position

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(b) Start up the maintenance PC.

(c) Change the IP address of the network parameter for the maintenance PC.

For the maintenance PC, set the IP address shown in No. 1 in Table 6.2.2 below.

If the maintenance PC cannot be connected, set the value in No.2 to No.5.

Table 6.2.2 Operating Environment

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1:172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1:10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

- Manual change of the network parameter of the Maintenance port

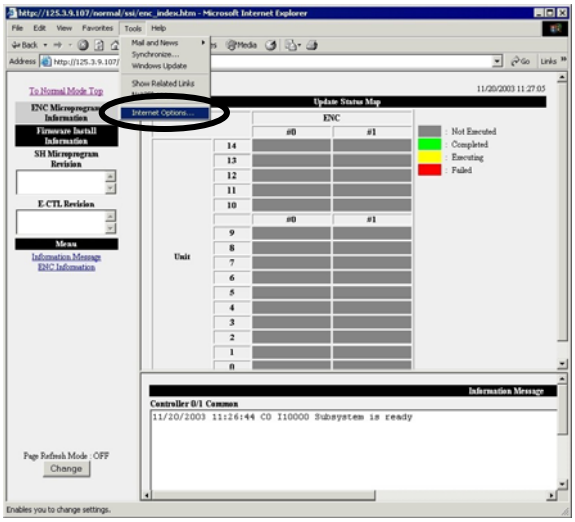
  When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

  NOTE : When the network address of the LAN device, which is connected via the Gateway in the extension of the User management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.
  The network address set to the maintenance port cannot be used for the LAN device to be connected to the User management port via the Gateway.
  Therefore, use a network address other than that set for the maintenance port.

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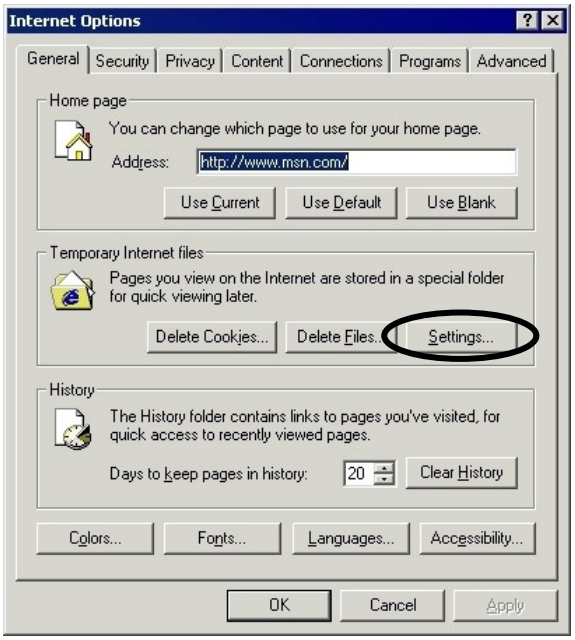
6.2.2 Deleting Browser History Information

Boot up the browser on the PC used for maintenance and delete history information.



(1) Internet Explorer

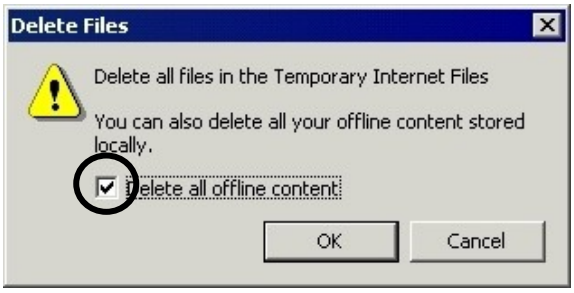
(a) From the menu, select "Tool" - " Internet Options".



(b) Click the "Delete Files" button, which is located on the Temporary Internet File section of the general tag.

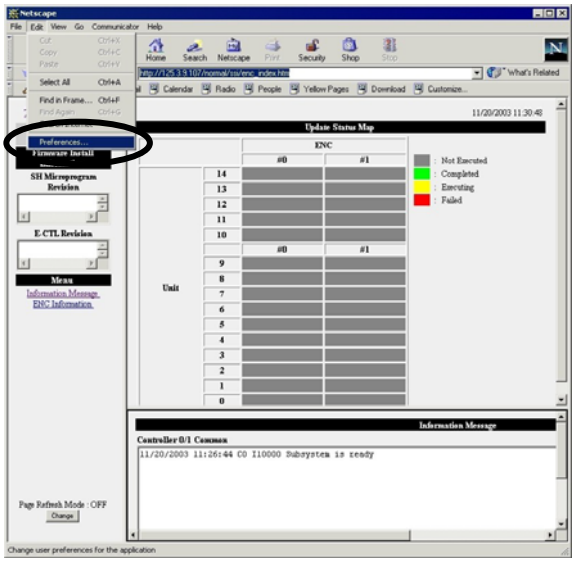
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(c) A dialog box will be displayed. Check "Delete all offline content" and click the "OK" button.

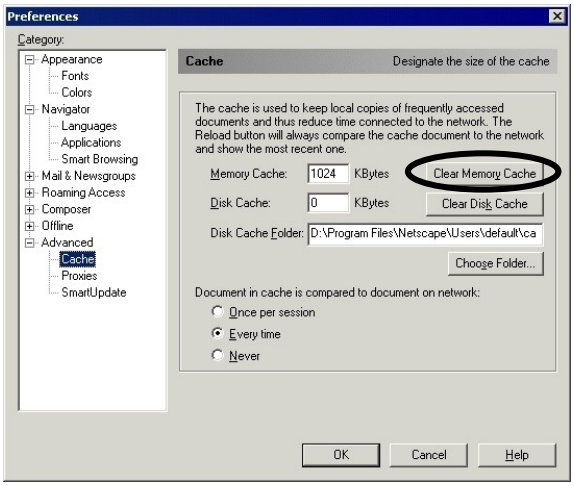


(2) Netscape

(a) From the menu, select "Edit" – "Preferences".

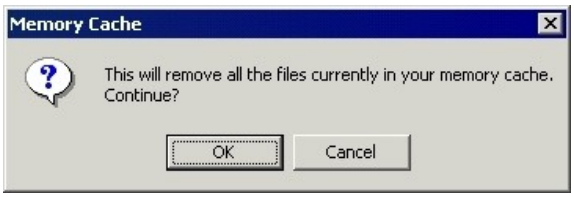


(b) From categories, select "Details" – "Cache". Click the "Clear memory cache" button.

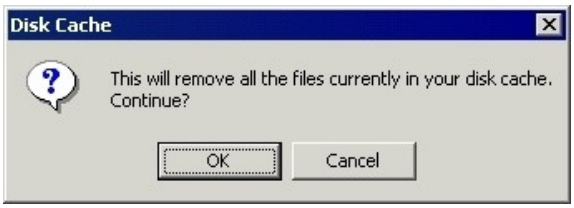


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(c) A dialog box will be displayed. Click the "OK" button.



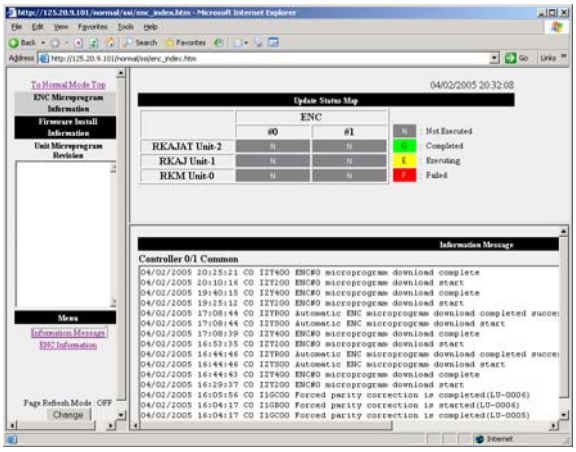
(d) Click the "Clear disk cache" button to display dialog box ③. Click the "OK" button.



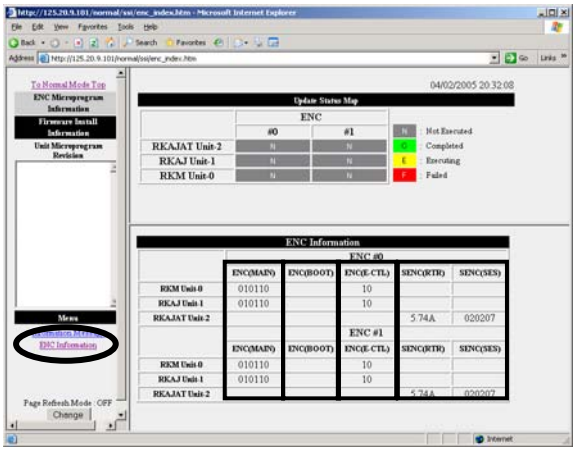
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6.2.3 Downloading Offline ENC/SENC Firmware

(1) While the disk array subsystem is on, enter the following URL in the browser of the PC used for maintenance: "http:// subsystem maintenance LAN port IP address/encmicro". A screen showing the ENC/SENC Firmware Rev. will be displayed.
At the time when the Web is connected or operated, entries of a user name and a password may be required. In such a case, enter "maintenance" as a user name and "hosyu9500" as a password.



(2) Press "ENC Information" in the menu section, and check Rev. of the current ENC/SENC firmware (SH firmware, H8S firmware and SR firmware) displayed in "ENC Information". When the Rev. of the ENC/SENC #0 and #1 are both the same with of newer than the Rev. to be downloaded, it is not necessary to download the ENC/SENC firmware, so that terminate the work. When either or both of the Rev. of the NEC/SENC #0 and #1 are older than the Rev. to be downloaded, go to the Step (2).



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(3) When the downloading of the ENC/SENC firmware is required, make sure that none of the host I/O, LU formatting, drive restoration (dynamic sparing, copy back, or correction copy), pair creation/resynchronization of ShadowImage in-system replication, resynchronization of Copy-on-write Snapshot, and copying of TrueCopy remote replication is not in progress, and then perform the deliberate shutdown of the disk array subsystem.
When Power Saving of the priced option is used, if you perform the planned shutdown of the array subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host when the array subsystem starts.
Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then perform the planned shutdown of the array subsystem.
If the spin-down fails, execute the spin-down again.
After normal completion of the planned stop, reboot the disk array subsystem and confirm that the READY LED (green) is lit and that the WARNING LED (orange) is blinking.

(4) Press the RST SW on each controller and proceed to the maintenance mode.
(a) Proceeding to the Maintenance Mode
The method used to proceed to the maintenance mode differs depending on whether the READY LED (green) or the ALARM LED (red), both of which are located on the top of the front bezel (RKH/RKM/RKS/RKXS) is lit.
- If the READY LED (green) is lit, proceed to Step (ii) of the procedures.
- If the ALARM LED (red) is lit, wait 3 minutes before proceeding to Step (ii).
- If neither the READY LED (green) nor the ALARM LED (red) lights up after the power to the subsystem has been turned on for 10 minutes, follow the procedure listed below.

(i) Confirm that the WARNING LED (orange) on the front bezel is not blinking at a high rate of speed (in 125 ms intervals).
If the WARNING LED (orange) is blinking at a high rate of speed, wait for up to 80 seconds. The LED will stop blinking.
There is no error if the LED is blinking at a low rate of speed (once per second).
(ii) Perform the change to the maintenance mode.
- Single controller
  Press the RST SW on the single controller (the RST LED (orange) will light up while the RST SW is pressed).
- Dual controller

① Press the RST SW on controller #0 (the RST LED (orange) will light up while the RST SW is pressed).
② Press the RST SW on controller #1 (within 10 seconds of the first time the CALM LED (red) on controller #0 lights up). (A buzzer may sound when the RST SW is pressed. You need not turn this buzzer off until the procedures listed above are complete.)
If the CALM LED (red) on controller #0 has not lit up by this point, turn the power to the subsystem off and back on without removing the controller, return to Step (a), and repeat the procedure.

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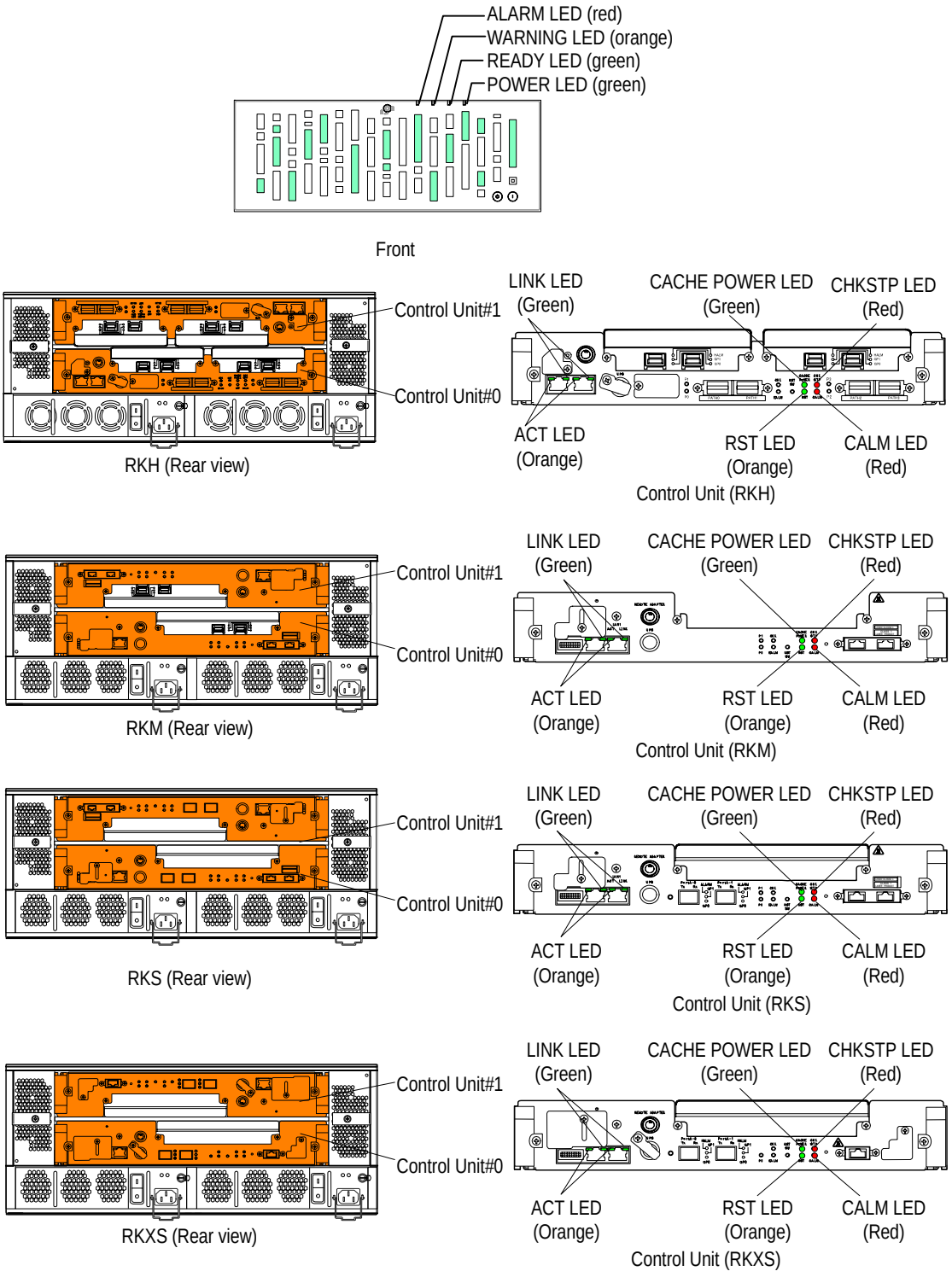


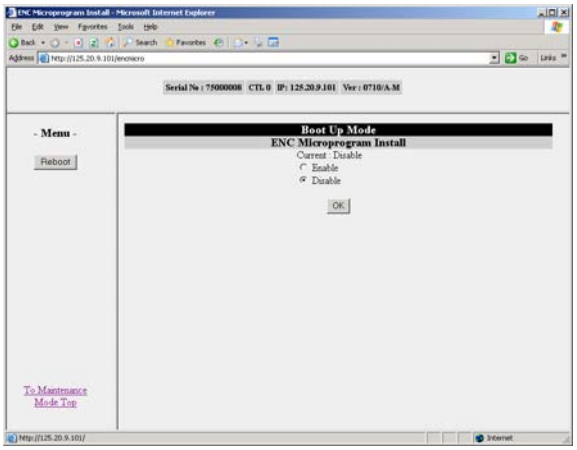
Figure 6.2.4 Indication Position

The figure above shows a rack-mounted model. Floor models are equipped with identical functions.

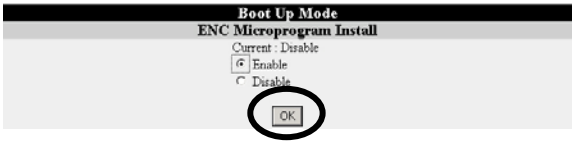
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NOTE : • The controller will remain closed while the subsystem is in the maintenance mode. No commands from the host computer can be performd during this time.
To recover, you must reboot the controller.
The subsystem will proceed to the maintenance mode once the CALM LED (red) on controller #0 and the READY LED (orange) on the front bezel are both lit.
• Using DNS at the network TCP/IP settings increases the time it takes to connect to the network. To expedite connections, set "Do not use DNS". Refer to the instruction manual of the PC in use for details on how to make settings.
• The subsystem cannot connect to the network if the browser is set to use the proxy server. Confirm that the browser is set not to use it.
Refer to the instruction manual of the browser in use for details on how to confirm settings.

(5) Enter the following URL in the browser of the PC used for maintenance: "http://subsistem maintenance LAN port IP address/encmicro". The bootup settings screen for firmware download will be displayed.

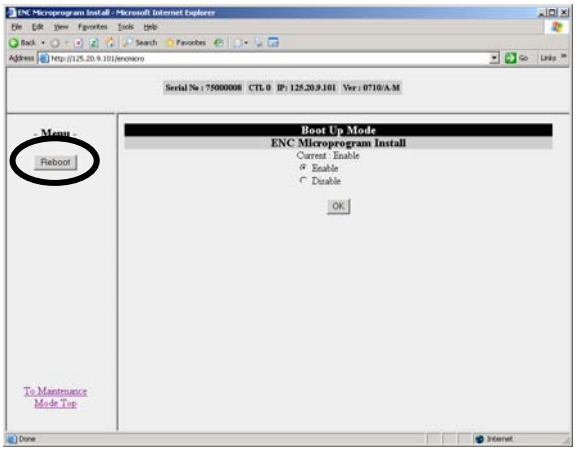


(6) Change the Boot Up Mode to Enable and click the "OK" button. Confirm that Enable has been selected.



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(7) Click the "Reboot" button on the menu. Reboot the subsystem according to the instructions provided by the dialog box.

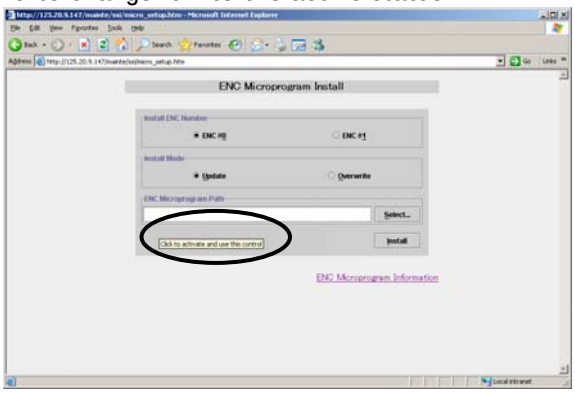


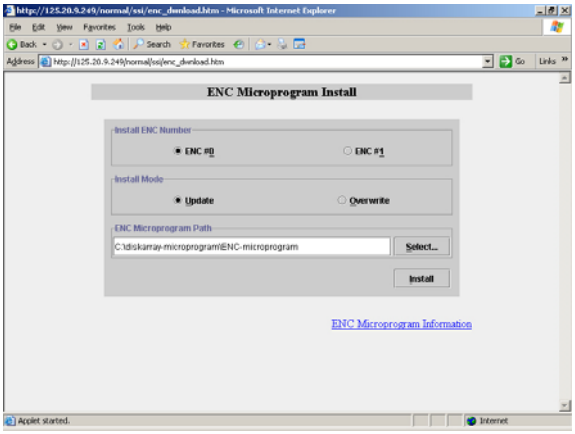




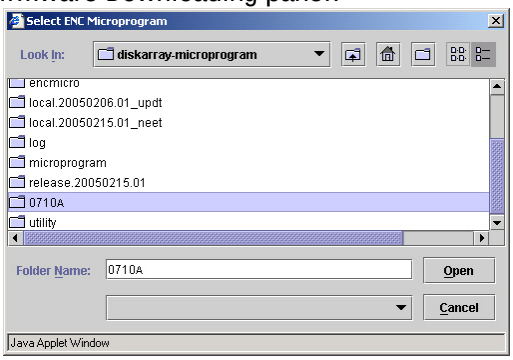
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(8) When the READY LED (green) on the subsystem starts to blink for 1/8 seconds, enter the following URL in order to display the ENC/SENC firmware download screen (Java applet): "http://subsystem maintenance LAN port IP address/encmicro".(‡1) If the READY LED (green) blinks for less than 1/8 seconds, enter the following URL in the browser in order to confirm the subsystem's status: "http://subsystem maintenance LAN port IP Address" and correct the error in accordance with the maintenance manual.
If the READY LED (green) on the subsystem lights up instead of blinking for 1/8 seconds, enter the following URL in the browser of the PC used for maintenance in order to display the information screen for the ENC/SENC firmware: "http:// subsystem maintenance LAN port IP address/encmicro". Refer to the "Information Message" displayed. Refer to the maintenance manual for details on how to correct it.
When the following message is displayed, it is necessary to click ActiveX Control with a mouse and to change it into the active status.





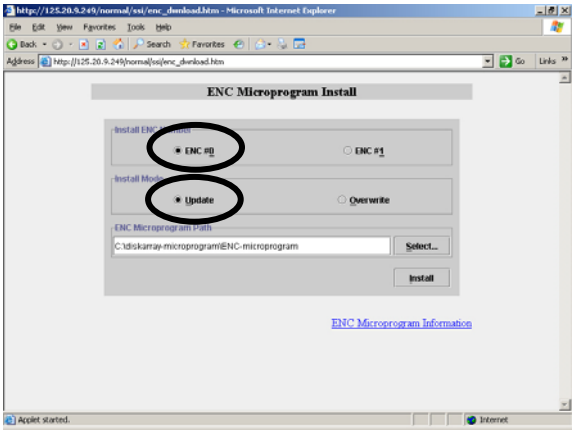
Specify the unified version directory(‡2) by pressing the "Select…" button on the ENC/SENC Firmware Downloading panel.



‡1 : The Disk Drives, which were spun down due to the Power Saving of the priced option, are also spinning up.
‡2 : For the unified version directory, refer to "5.1 Hierarchy of ENC/SENC Firmware Storage Directories" (EMD 05-0010).

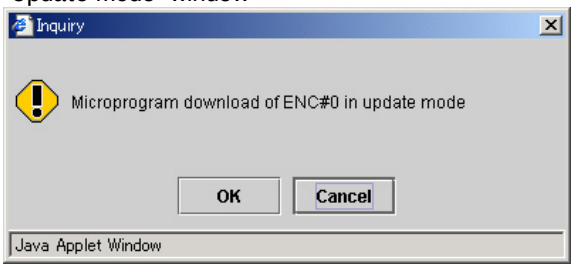
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(9) The ENC number in which the ENC/SENC firmware is downloaded from "Install ENC Number" is checked.
Also, check that "Update" of "Install Mode" is selected. Specify it for "Update" when "Overwrite" is selected. Select "Overwrite" only when there is an instruction.
The download procedure from ENC #0 is shown in this procedure.

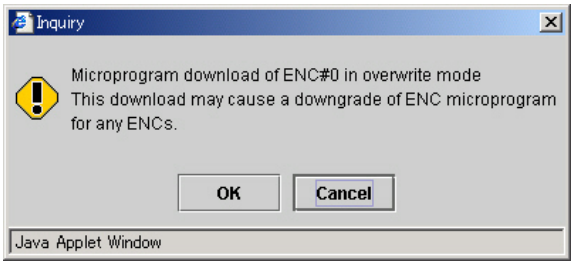


Click the "Install" button to display the dialog box in which the number of the ENC to be downloaded can be confirmed. Check the ENC number to be downloaded and press the "OK" button.

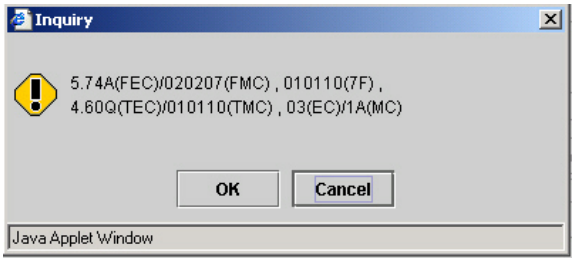
"Update mode" window



"Overwrite mode" window



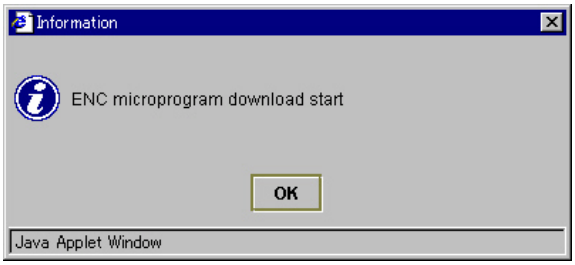
(10) The "dialog box for the confirmation of the ENC/SENC firmware Rev." will be displayed. If there is no error in Rev. to be downloaded, press the "OK" button. The transfer of the ENC/SENC firmware file will begin.



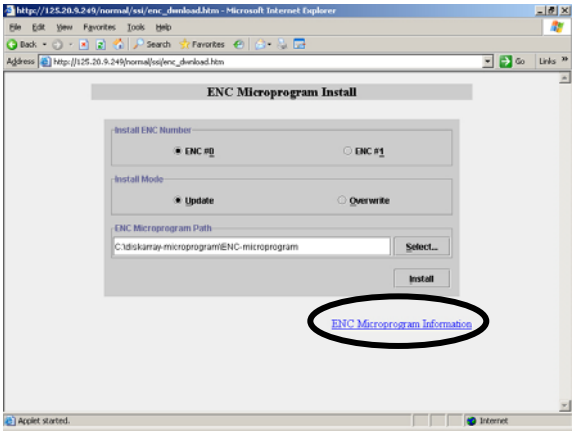


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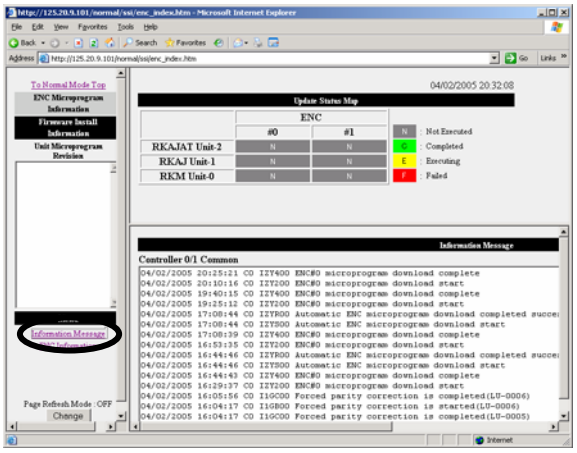
(11) If all the ENC/SENC Firmware file transfers are accepted normally, the "ENC microprogram download start" dialog box will be displayed. Click the "OK" button.
The download of the SH firmware, H8S firmware and SR firmware will begin.



(12) Click "ENC Microprogram Information" to display the ENC/SENC firmware download status view screen. The progress of the ENC/SENC firmware download can be confirmed at this screen.

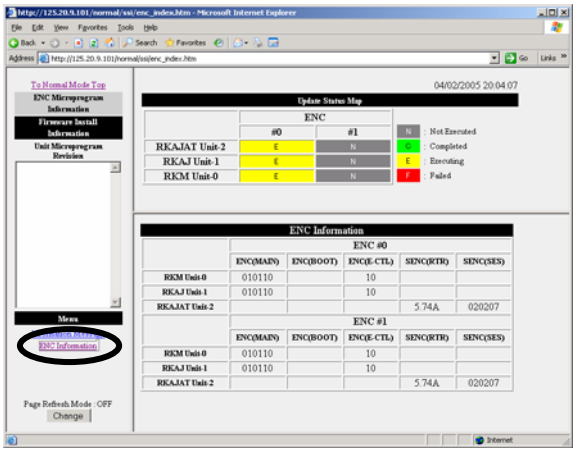


A message indicating the download status can be confirmed by clicking "Information Message" on the menu.



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When the download starts, "ENC #x microprogram download start" is displayed in the "Information Message" column.



Download status is indicated by different colors on the "Update Status Map" and "ENC Information". The status indicated by each color is as shown on the table below.

Screen (color)		Status
	Gray	Not targeted for download
	Green	Download complete
	Yellow	Downloading
	Red	The downloading failed (a failure occurred) or it was attempted for firmware outside the range to be downloaded (*1).

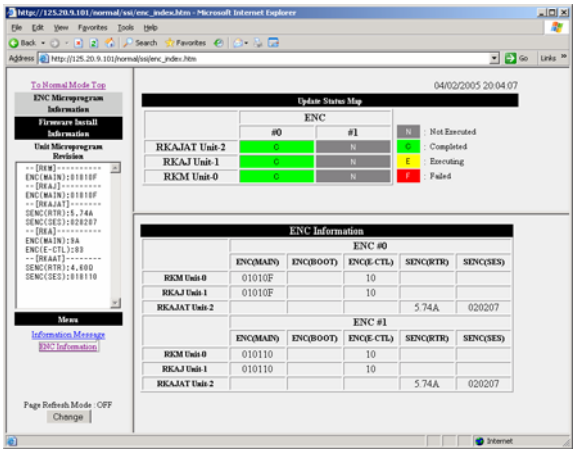
*1 : When it is intended to download only a part of the ENC/SENC firmware, a window, which shows the status of the ENC/SENC of a disk array unit having firmware outside the range to be downloaded, may be displayed in red. In this case, you can see which of the above is the case in point by checking whether or not a failure has occurred referring to the "Information Message" for a message as shown below.

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(13) After all ENC/SENC firmware installation is complete, "ENC#X microprogram download complete" will be displayed in "Information Message" and the READY LED (green) on the subsystem will blink for 1/2 seconds.

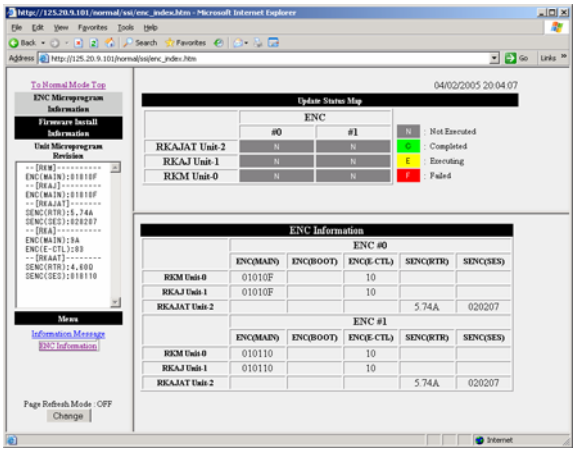
Note: After an ENC/SENC firmware download has been completed normally, the ENC ALARM of the ENC/SENC that downloaded the firmware will light up. This light means that the ENC/SENC has rebooted automatically and does not indicate an error.

If the message "ENC #x microprogram download complete" is not displayed or if the READY LED (green) on the subsystem don't blink for 1/2 seconds 35 minutes after the message "ENC #x microprogram download start" is displayed, refer to (See Step (12)) and refer to the maintenance manual for details on how to correct the error. If an error message is displayed between "ENC #x microprogram download start" and "ENC #x microprogram download complete", correct the error in accordance with the instructions in the error message.

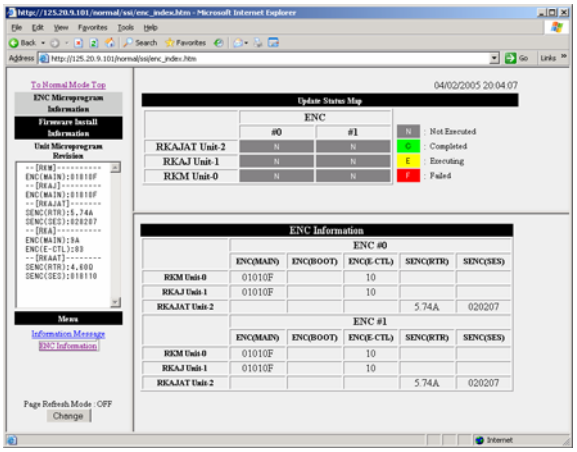


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(14) Turn off all unit AC power to the disk array subsystem. After turning the power back on, use the main switch to boot up the subsystem again. Confirm that the subsystem is Ready and that the WARNING LED (orange) is off. If the subsystem does not become Ready or the WARNING LED (orange) does not light up/blink, refer to the maintenance manual for details on how to correct the error.
Next, enter the following URL in the browser: "http://IP address/encmicro", click "ENC Information" on the menu, and confirm that the Revs of the SH firmware, H8S firmware and SR firmware that were downloaded are equivalent to or greater than the Revs that were overwritten.



(15) When the download is necessary for the other ENC/SENC, repeat (4) to (14) of "6.2.3 Downloading Offline ENC/SENC Firmware" (EMD 06-0090), and download the ENC/SENC firmware.

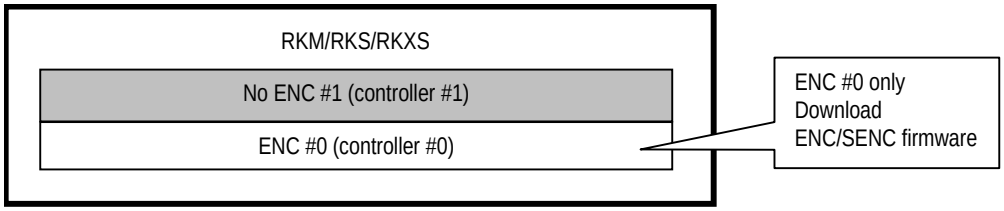


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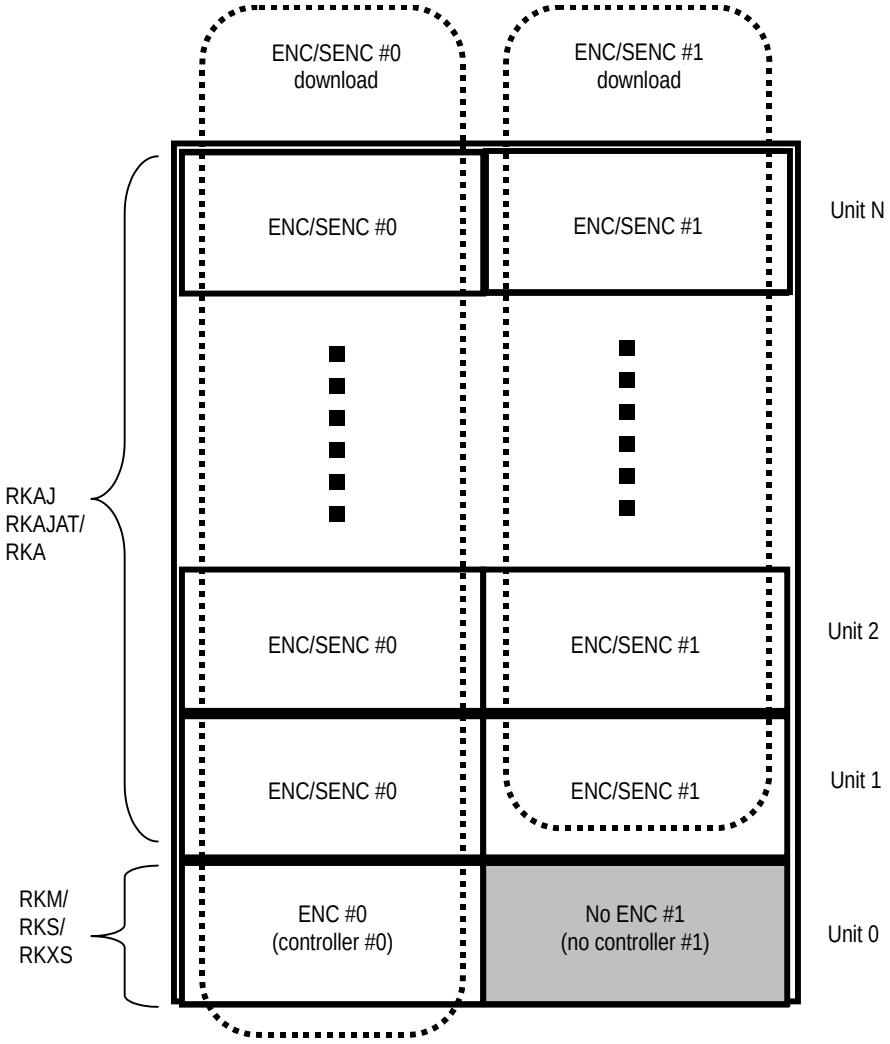
Chapter 7. Offline ENC/SENC Firmware Download Procedure (Single Controller)

This procedure is explained below, with the mounted controller as controller #0.

- For RKM/RKS/RKXS only
  Since the RKM/RKS ENC forms a single unit with the controller, download ENC #0 only.



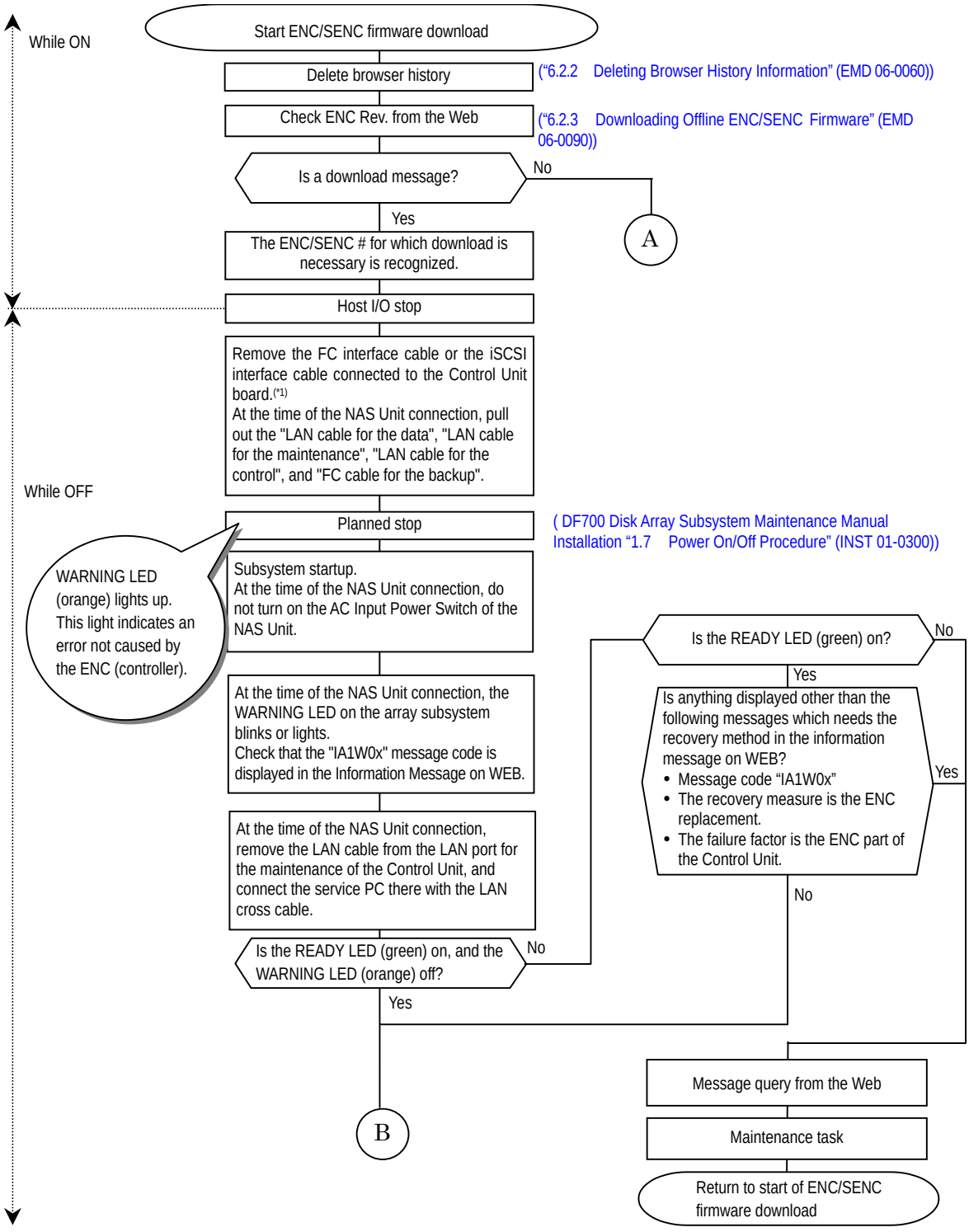
- For RKM+RKAJ/RKAJAT/RKA
  RKS+RLAJ/RKAJAT
  For RKXS+RKAJAT
  Although RKM/RKS/RKXS has only ENC #0, RKAJ/RKAJAT/RKA includes both ENC/SENC #0 and ENC/SENC #1. Therefore, it is necessary to download to both ENC/SENC #0 and ENC/SENC #1.



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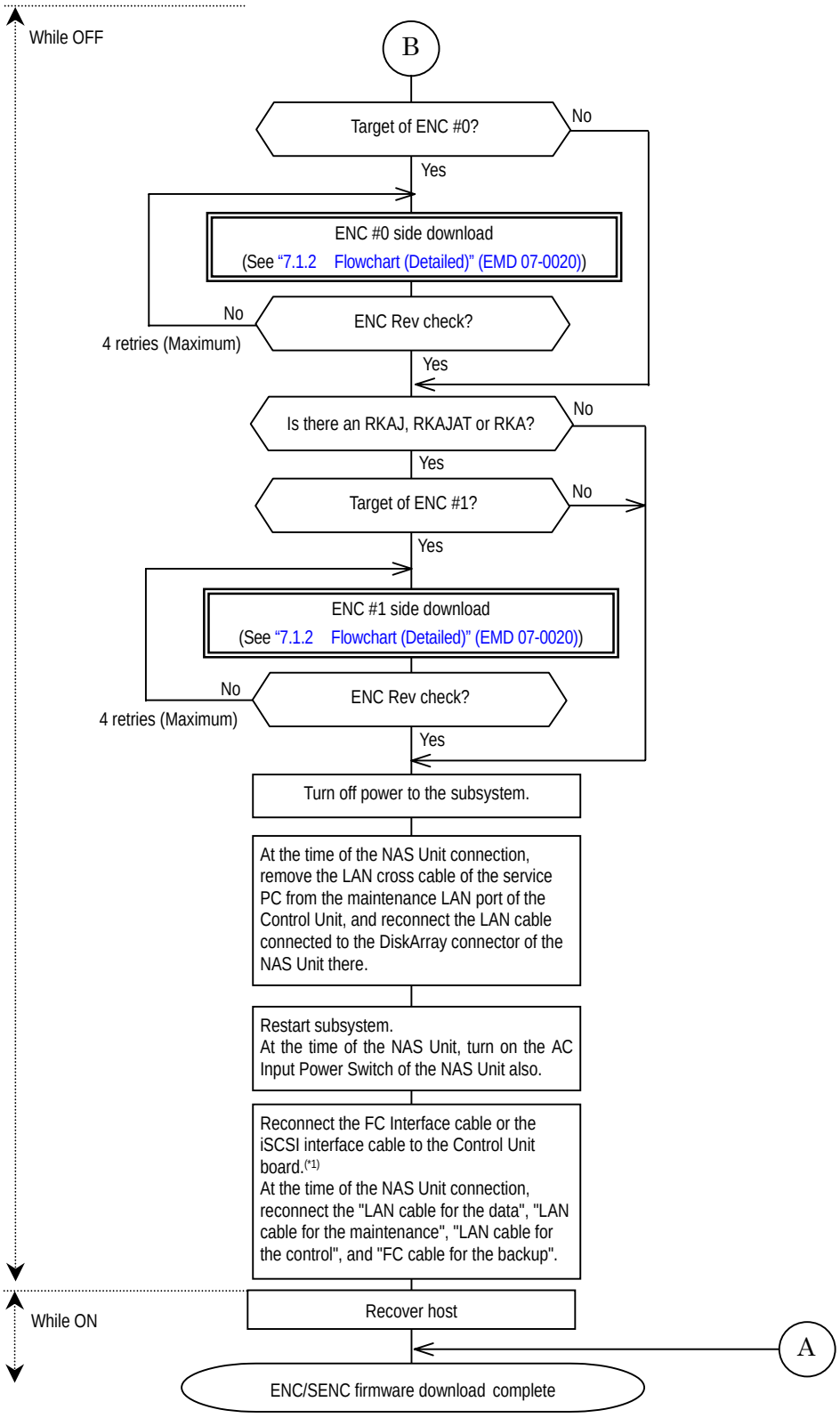
7.1 Flowchart

7.1.1 Flowchart (General)



*1 : When removing the Fibre Channel Interface cables, pull out the Fibre Channel interface cables completely from the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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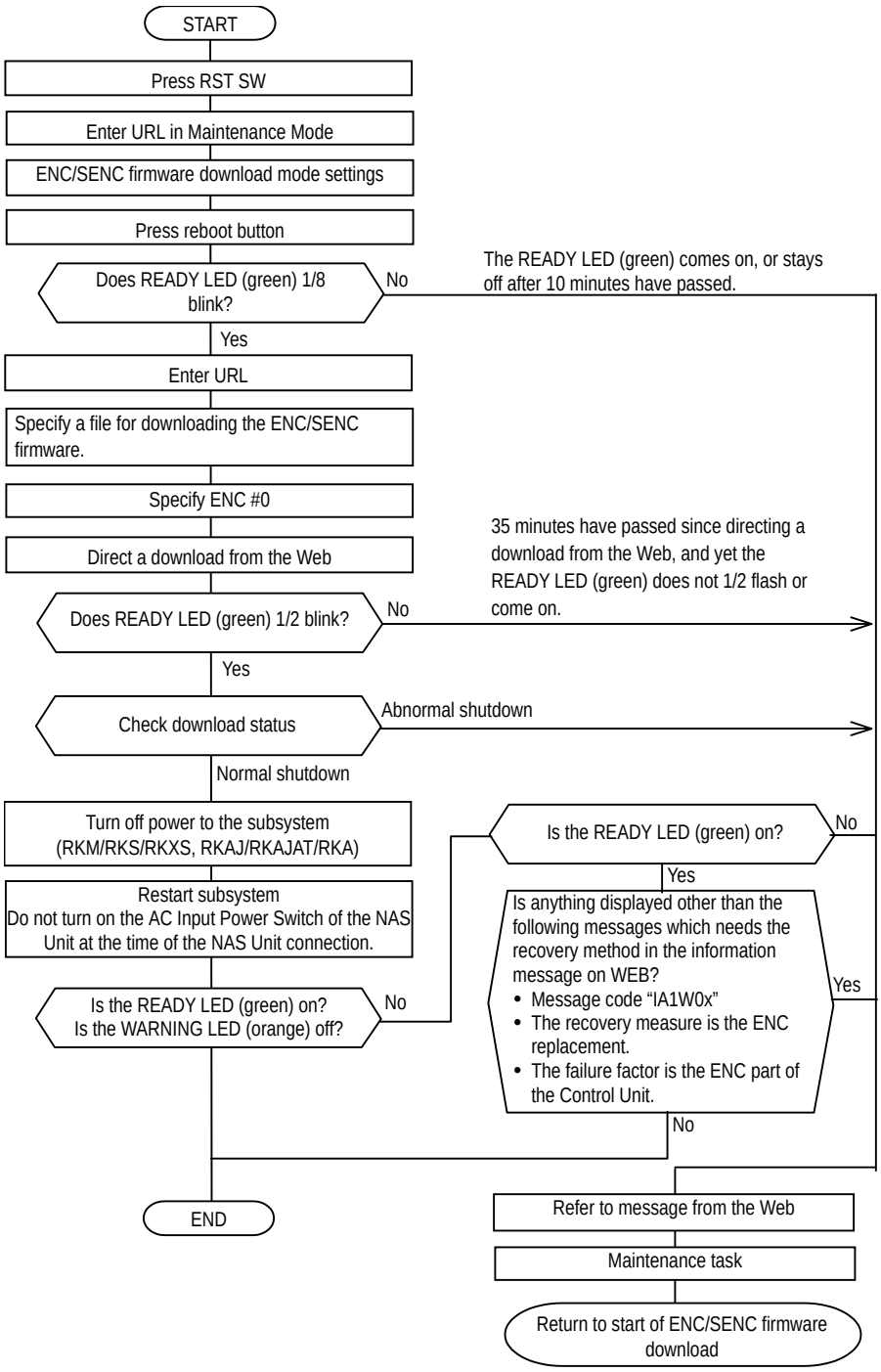
*1 : When connecting the Fibre Channel interface cables, insert the Fibre Channel interface cables until they are fixed to the host connectors. If the Fibre Channel Interface cables are inserted half in the host connectors, the Control Unit continues to detect the Fibre Channel failures, and the I/O processing of the Control Unit may be deteriorated.

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7.1.2 Flowchart (Detailed)



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7.2 Offline ENC/SENC Firmware Download Procedure Screen (Single Controller)

The download procedure of the ENC/SENC firmware is the same procedure as the dual Control Unit.

(1) Use a LAN cross cable to connect the LAN connector used for maintenance to the LAN connector of the PC used for maintenance. (See "6.2.1 Connecting the PC Used for Maintenance" (EMD 06-0030).)
(2) Start the browser on the PC used for maintenance, and delete the history. (See "6.2.2 Deleting Browser History Information" (EMD 06-0060).)
(3) Download the ENC/SENC firmware. (See "6.2.3 Downloading Offline ENC/SENC Firmware" (EMD 06-0090).)

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Chapter 8. Offline ENC/SENC Firmware Download Web Display Screen

8.1 URLs

The ENC/SENC firmware Rev. display screen is displayed by entering the following URL in the Web browser of the PC connected to DF. (ENC/SENC firmware download status reference screen during ENC/SENC firmware download.)

http://controller IP address/encmicro

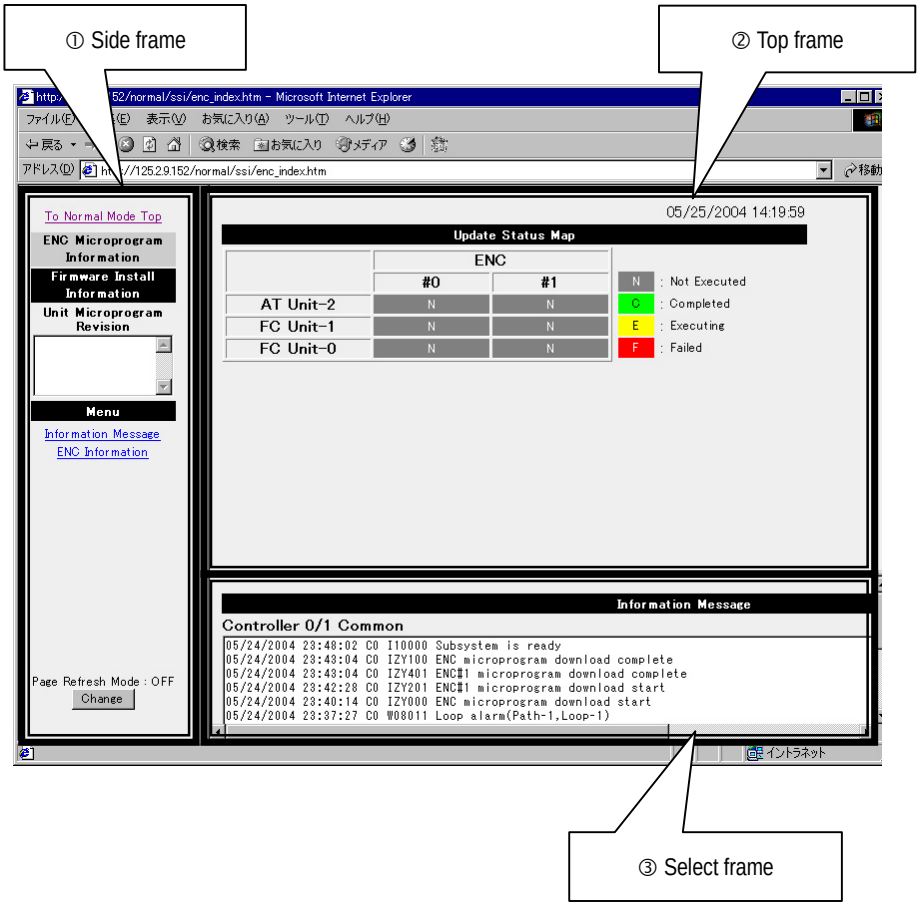
At the time when the Web is connected or operated, entries of a user name and a password may be required. In such a case, enter "maintenance" as a user name and "hosyu9500" as a password.

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8.2 Web Screen Image

A Web screen image of the ENC/SENC firmware Rev. display as it appears in Internet Explorer is shown below.

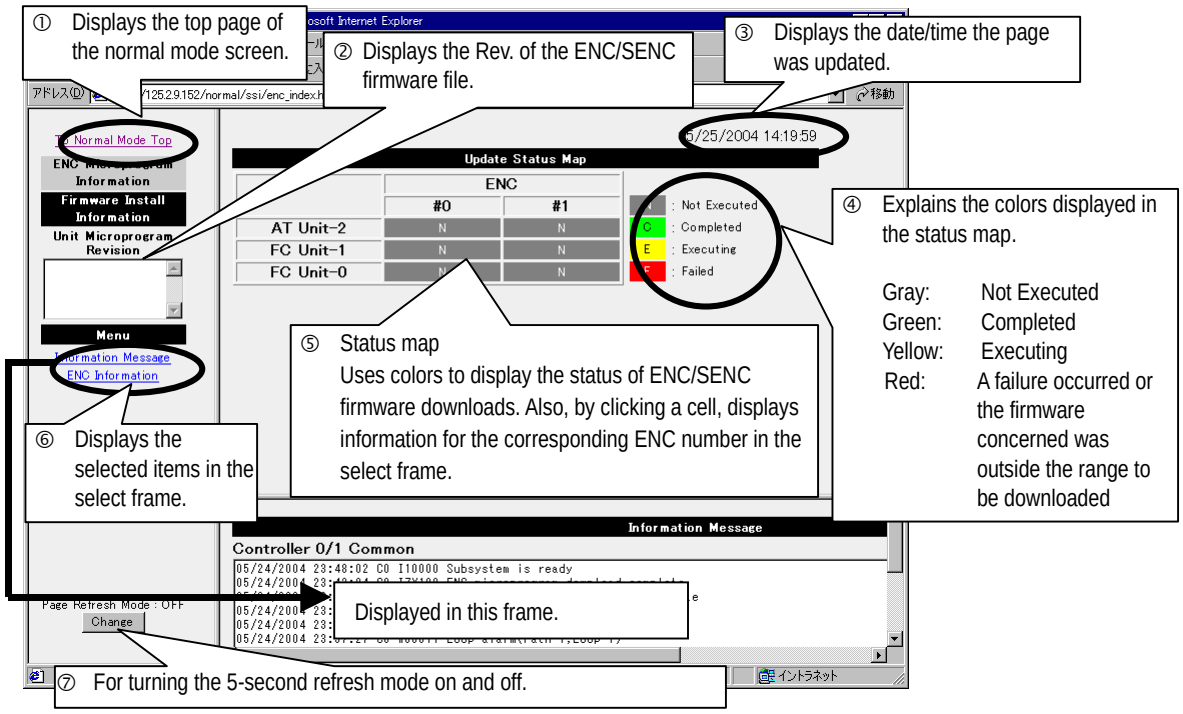
After the INQUIRY information is fixed, enter the URL to display the following screen.
In the figure below, the left side is called the Side frame, the top right half is called the Top frame, and the bottom half is called the Select frame.



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8.2.1 Side Frame and Top Frame Image Screen Details

The details of the side frame and top frame are shown below.

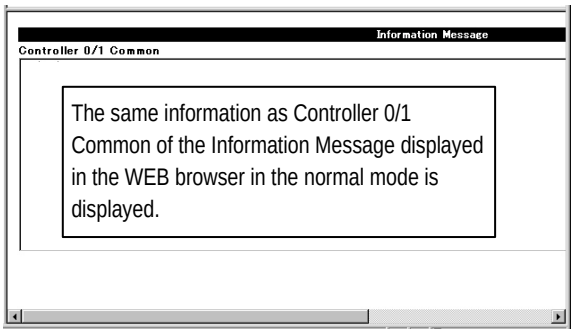


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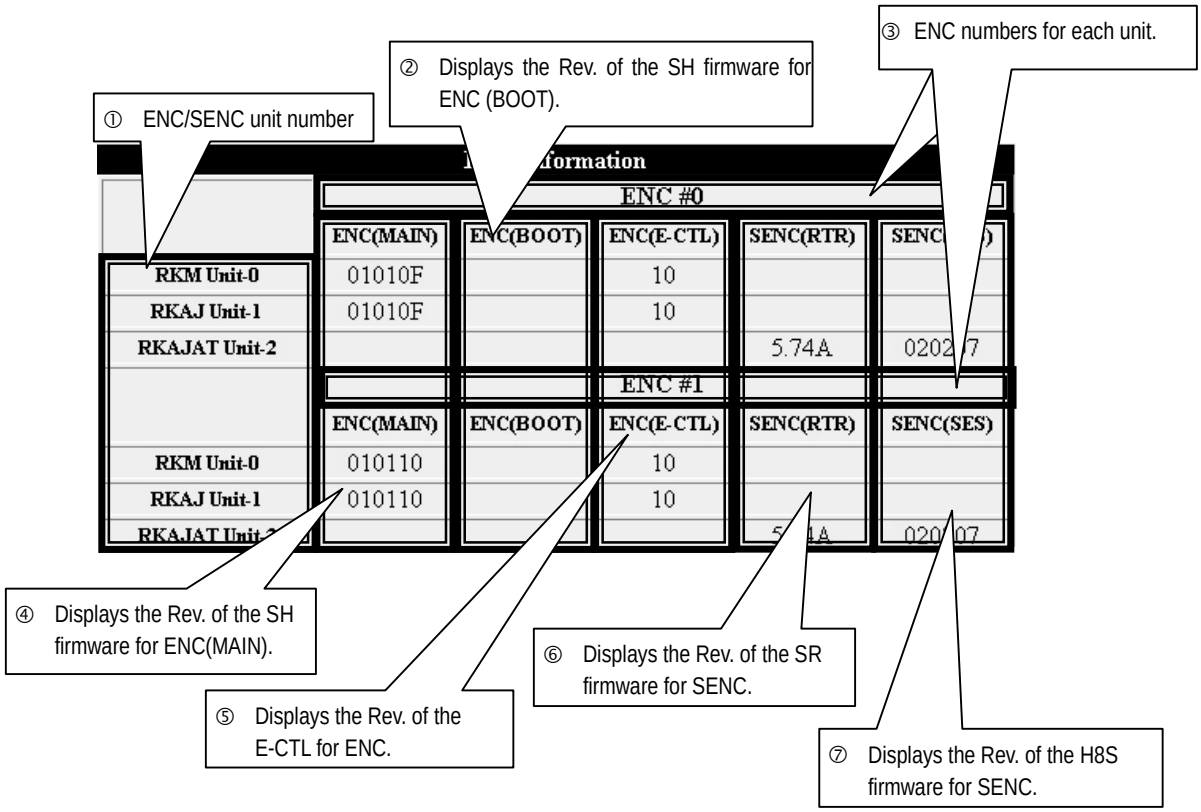
8.2.2 Select Frame Image Screen Details

The details of the select frame are shown below.
One of the following two patterns is displayed, depending on settings.

(1) The select frame screen when an Information Message is selected is shown below.



(2) The select frame screen when ENC Information is selected is shown below.



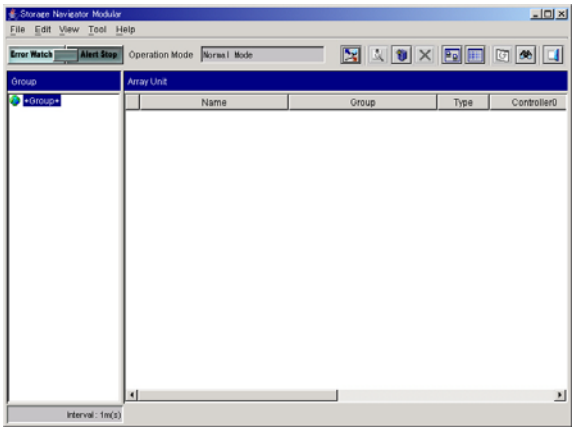
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Chapter 9. Procedure for Invalidating the Automatic ENC/SENC Firmware Downloading Function

When returning the revision of the ENC/SENC firmware to the previous one after downloading the firmware because of its trouble, etc., it is required to invalidate the automatic downloading function before downloading the firmware.
Execute the following procedure using Storage Navigator Modular.

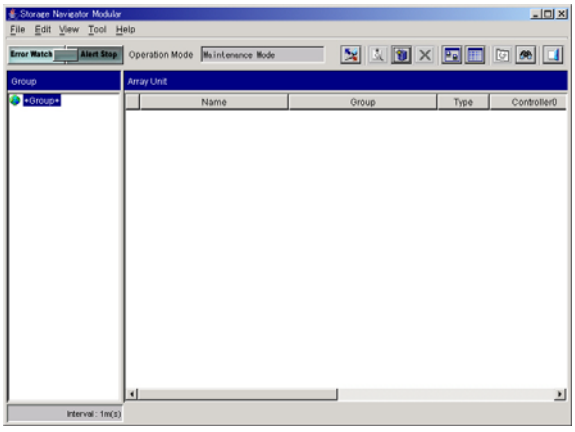
(1) Double click the icon of Storage Navigator Modular "  " on the desktop. Storage Navigator Modular is started.
You can also start Storage Navigator Modular by positioning the pointer on Program in the Start menu and select Storage Navigator Modular.

(2) The Storage Navigator Modular is activated in the Normal Mode and the main window is displayed.



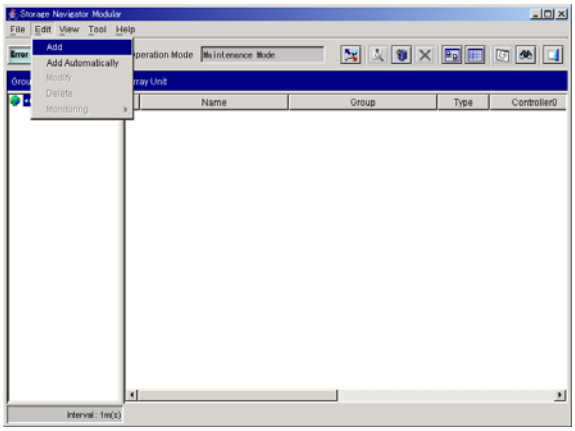
(3) In the main window, position the focus "  " on the icon "  " of the array subsystem register by pressing the "Tab" key, and then press the Ctrl, Shift, and E keys at the same time.

(4) Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Storage Navigator Modular operates in the maintenance mode.

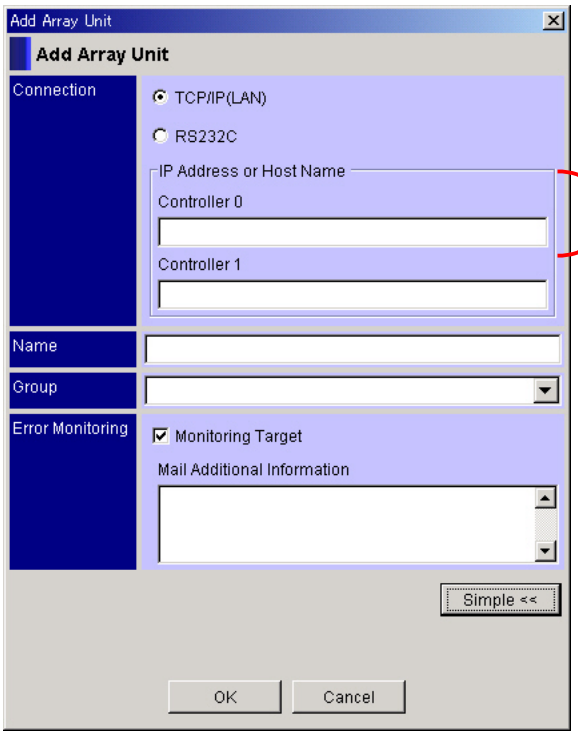


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(5) Select "Add" in the main window or click "  : Add".



(6) Click the "Detail" button.
Select "TCP/IP (LAN)" for the connection form. Enter the information for the registration and click the "OK" button.

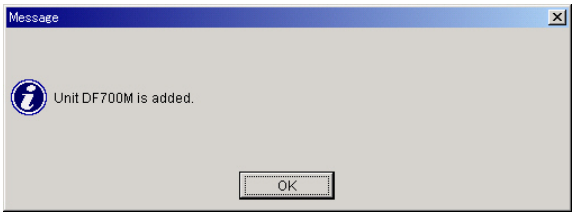


- In the case of the single CTL configuration, enter the IP address of the CTL 0 side only.
- In the case of the dual CTL configuration, enter the IP address of the CTL connected to the network (*).

*: When the personal computer is directly connected, enter only the IP address of the CTL that is connected to a LAN. When the both CTLs are connected via a LAN, enter the IP addresses of the both CTLs.

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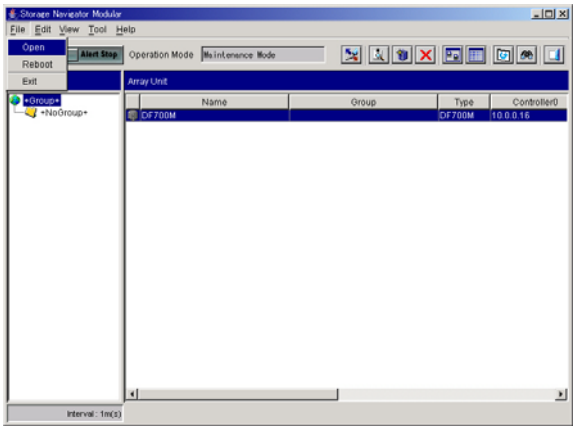
(7) Since a message informing of a completion of the registration is displayed, click the "OK" button.



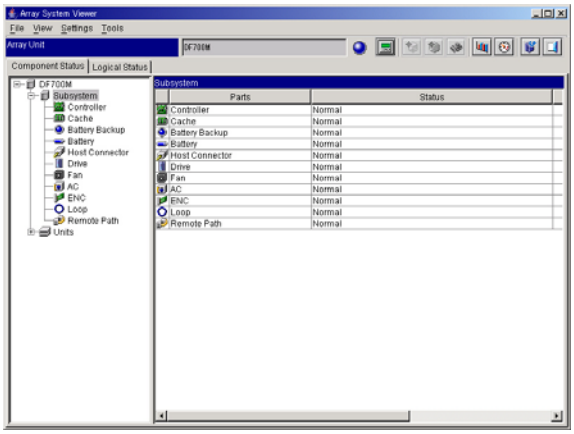
(8) An icon of the disk array subsystem that has been registered with the main window is added.

(9) Select the icon of the disk array subsystem by clicking it in the main window.

(10) Selecting "File" – "Open".



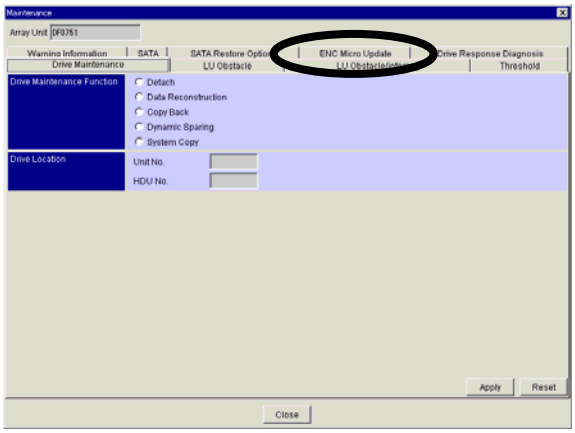
(11) The unit window is opened.



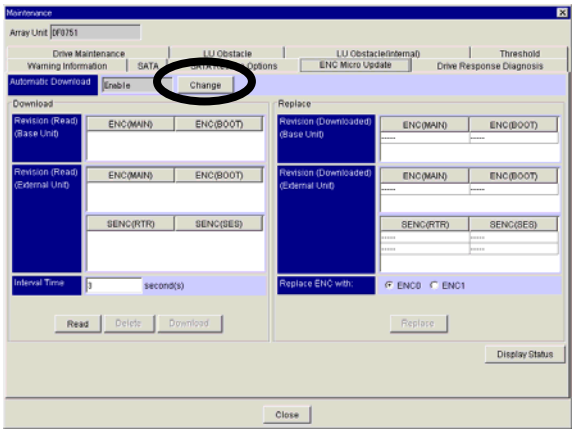
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(12) Select “Maintenance” from the Settings menu.

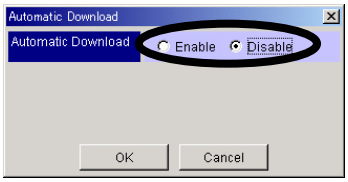
(13) Select the "ENC Micro Update" tab.



(14) Press the “Change” button on the “Automatic Download”.



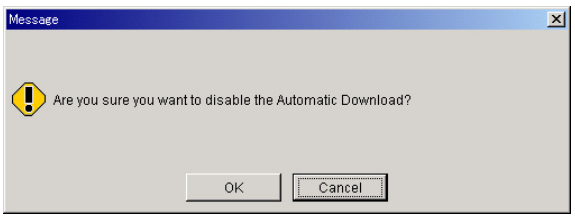
(15) Remove the check on “Enable” in the Automatic Download window.



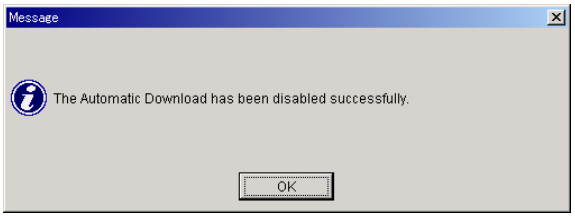
(16) Press the “OK” button.

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(17) The configuration message dialog box appears. Press the "OK" button.



(18) When the set is completed normally. Press the "OK" button.



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Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Apr.28.2005	K.Onabe	N.Higashijima	A.Ishikawa	All	Issued	-
1	Jun.28.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.0→Rev.1	CH
					EMD 0020	RKA, RKAAT, and RKAJAT were added.	AD
						The type name was added	AD
					EMD 03-0000	(6) to (9) were added.	AD
					EMD 04-0000	The content of Table 4.1 was changed.	CH
					EMD 04-0010	Table 4.2 was added.	AD
					EMD 05-0010	"NAS" was added to Table 5.1.1.	AD
					EMD 06-0000	"RKXS" was added.	AD
					EMD 06-0020	RKXS, RKA, and RKAAT were added to flow.	AD
					EMD 06-0030, EMD 06-0040,	Figure of RKXS was added.	AD
					EMD 06-0100	"RKXS" was added to (a).	AD
					EMD 06-0110	Figure of RKXS was added.	AD
						NOTE was moved to EMD 06-0120.	DL
					EMD 06-0120	NOTE was moved from EMD 06-0110.	AD
					EMD 07-0000, EMD 07-0020	RKXS, RKA, and RKAAT were added.	AD
					EMD 07-0010	RKA, and RKAAT were added.	AD
2	Oct.5.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.1→Rev.2	CH
					EMD 06-0010	Flowchart was changed.	CH
					EMD 06-0011, EMD 06-0012	These pages were newly added.	AD
3	Dec.7.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.2→Rev.3	CH
					EMD 0020	RKAAT was deleted.	DL
					EMD 02-0000	(4) was changed.	CH
					EMD 02-0010	(9) was added.	AD
					EMD 03-0000	(7) and (8) were changed.	CH
					EMD 04-0000	RKAAT in Table 4.1 was deleted.	DL
					EMD-05-0001, EMD 05-0002	These pages were newly added.	AD
					EMD 05-0010	"NAS_BIOS" was added to Table 5.1.1.	AD
					EMD 06-0010, EMD 06-0011	6.1.1 Flowchart was changed.	CH
					EMD 06-0020	6.1.2 Flowchart was changed.	CH
					EMD 06-0030	RKAAT was deleted.	DL
					EMD 06-0040, EMD 06-0050	(4) was changed.	CH
					EMD 07-0000	RKAAT was deleted.	DL
					EMD 07-0010	7.1.1 Flowchart was changed.	CH
					EMD 07-0011, EMD 07-0012	These pages were newly added.	AD
					EMD 07-0020	7.1.2 Flowchart was changed.	CH
4	Dec.22.2005	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.3→Rev.4	CH
					EMD 0020	"RKH" was added.	CH
					EMD 03-0000	(10) was added.	AD
					EMD 04-0000, EMD 04-0010	Time required was changed.	CH
					EMD 04-0020, EMD 04-0030	These pages were newly added. Table 4.3 was added.	AD
					EMD 06-0000	Description was added.	AD
					EMD 06-0020	"RKH" was added.	AD
					EMD 06-0030	"RKH" was added.	AD
					EMD 06-0031, EMD 06-0032	These pages were newly added. Figure of Control Unit (RKH) was added.	AD
					EMD 06-0040	Figure of Control Unit (RKH) was added.	AD
						Color name of ACTIVE LED was corrected.	CR
					EMD 06-0090	Frame was added in Figure of (2).	AD
					EMD 06-0100	"RKH" was added.	AD
					EMD 06-0110	Figure of RKH was added.	AD
						LINK LED is exchanged for ACT LED.	CR
						ACT LED is exchanged for LINK LED.	CR

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
5	Feb.8.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.4→Rev.5	CH
					EMD 01-0000	The number of download was corrected from four to three.	CR
					EMD 02-0000	(4) was changed.	CH
					EMD 02-0010	(8) was changed.	CH
						(9) was added.	AD
					EMD 02-0020, EMD 02-0030	These pages were newly added. ((11) was added.)	AD
					EMD 05-0000	(7) was changed.	CH
					EMD 05-0001	(10), (11) and (13) were added.	AD
					EMD 06-0010, EMD 06-0011	*1 was added.	AD
					EMD 07-0010, EMD 07-0011	*1 was added.	AD
6	Apr.21.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.5→Rev.6	CH
					EMD 06-0140	The description and the image of ActiveX were added to (8).	AD
7	Dec.22.2006	K.Onabe	N.Higashijima	A.Ishikawa	Cover	Rev.6→Rev.7	CH
					EMD 02-0020	(12) and (13) were added.	AD
					EMD 03-0000	(11) was added.	AD
					EMD 05-0001	"• When Power Saving of the priced option is used,..." was added.	AD
					EMD 06-0090	(3) was moved to EMD 06-0100.	DL
					EMD 06-0100	(3) was moved from EMD 06-0100.	AD
						"• When Power Saving of the priced option is used,..." was added.	
					EMD 06-0140	"‡1 :The Disk Drives, … are also spinning up." was added.	AD

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HITACHI
Inspire the Next

FE-95DF766-00

DF700 Disk Array
Drive Recovery Guideline

Hitachi Proprietary

Preface

This guideline describes how to recover the HT-4064 drive.

The drive recovery time for the theoretical values described in this guideline indicates the time in case no access is provided from the host.
If continuous access is provided from the host, the recovery gets later than the indicated time.

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July xx, 2005 (Second edition)

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- The information in this guideline is subject to change without notice.
- Every precaution has been taken in the preparation of this guideline. If you notice any ambiguities, errors, or omissions, please contact:

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8. Operation Mode in the Spare Drive Mode 6

9. Execution Time of Collection Copy 8

9.1 Execution time of collection copy with I/O not provided form the host 8
9.2 Execution time of collection copy with I/O provided form the host 9

1. Drive Recovery Mode

The following table shows how to recover a drive.

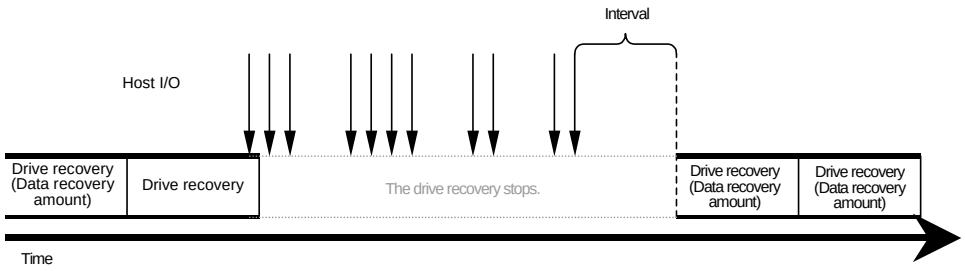
Setting value	Initial value	Description	
Background		Select this mode when the input/output (I/O) is not provided from the host to the disk array subsystem at night. For the time required for the drive recovery, see Maintenance Manual, Table 9.1.1 Standard execution time for collection copy. Example: In the configuration of RAID 15D+1P with 71.3-gigabyte HDD, copying to a spare drive takes three hours. Select this mode if the I/O from the host stops more than three hours so that copying to the HDD's spare disk is complete within a day. Note: If the I/O is provided from the host, the drive recovery will stop. If the I/O is not provided, the drive recover will resume.	Drive recovery without host I/O: Invalid Drive recovery with host I/O: Improper Affection to host I/O: None
Interleave (standard)		Select this mode if you cannot the I/O from the host and you perform preferentially the processing from the host. Since the processing from the host is executed preferentially, the processing time for the drive recovery will not be guarantied.	Drive recovery without host I/O: Valid Drive recovery with host I/O: Valid Affection to host I/O: Small

Setting value	Initial value	Description	
Interleave (preference)	✓	Select this mode if the I/O from the host is not provided and the drive recovery is preferentially executed. Since the drive is preferentially recovered before the processing from the host, the drive recovery time is guarantied as in Table 9.2.2 Correction copy execution time in the interleave (preference) mode.	Drive recovery without host I/O: Valid Drive recovery with host I/O: Valid Affection to host I/O: Large

2. Operation of Each Mode during Drive Recovery

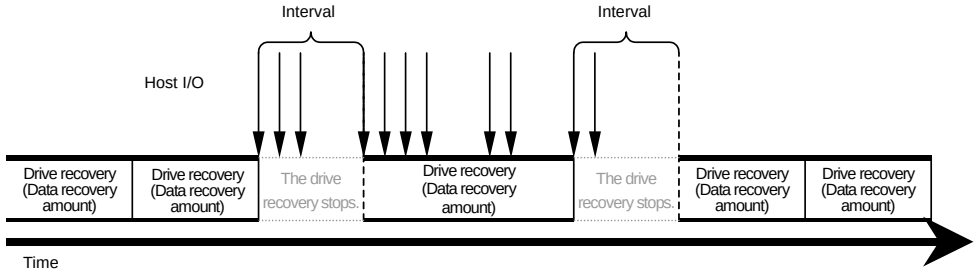
- Background
  If the host I/O is not provided, the drive recovery is sequentially performed in data recovery amounts.
  When the host I/O provided during the drive recovery, the recovery stops and the host I/O processing is executed. If the host I/O stops and the interval time elapses, the drive recovery will resume.

Figure 2.1 Drive recovery (background mode)



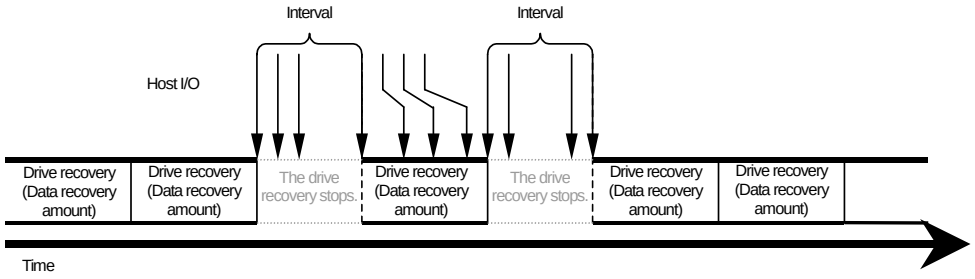
- Interleave (Standard)
  If the host I/O is not provided, the drive recovery is sequentially performed in data recovery amounts.
  If the host I/O is provided during the drive recovery, it stops at the interval and then the host I/O processing is performed. When the interval time elapses, the drive recovery resumes, but the host I/O and other processing are preferably performed. Therefore, the time required until the completion of the drive recovery cannot be guarantied.

Figure 2.2 Drive recovery (Interleave (standard) mode))



- Interleave (preference)
  If the host I/O is not provided, the drive recovery is sequentially performed in data recovery amounts.
  If the host I/O is provided during the drive recovery, it stops at the interval and then the host I/O processing is performed. When the interval time elapses, the drive recovery resumes and then it is preferably executed to the host I/O. The performance of the host I/O processing lowers, but the processing time of the drive recovery is guarantied as shown in Table 9.2.2 Correction copy execution time in the interleave (preference) mode.

Figure 2.3 Drive recovery (Interleave (preference) mode))



3. Trigger for Drive Recovery

This chapter specifies the data reconfiguration to the failed drive, data reconfiguration to the spare drive, data copy on the spare drive to the original drive, and automatic or manual startup of the dynamic sparing processing.

Setting value	Initial value	Description
Manual		This sets when you start manually the data reconfiguration and the processing that copies the data on the spare drive to the original drive (copy back).
Automatic	✓	This sets when you start automatically the data reconfiguration and the processing that copies the data on the spare drive to the original drive (copy back).

4. Interval Time

The interval time specifies an interval of the recovery processing. The default is a zero. Specify an integer between 0 and 255 in 10 ms. For example, when you specify value 10, the interval time of 10×10 ms = 100 ms will be specified.

This interval time indicates the time until the I/O from the host stops in the background mode. In the interleave mode (standard or preference), it indicates the time when the drive stops if the host I/O is provided.

You must set to the proper time considering the data recovery amount and the interval time.

Setting value	Initial value	Description
0 to 255	0	Specify an interval of recovery processing in 10 ms.

5. Amount of Data Recovery

Specify the unit amount of data. The default is one. Specify an integer between 1 and 511 as a unit of 128 blocks. For example, when you specify value 10, the data recovery amount of 10×128 (block) ×512 (bytes/block) = 640 KB will be specified.

If the host I/O is provided in the interleave mode (standard or preference), it recovers the data amount specified here and then waits for the time specified by the interval time, recovering the next data.

You must set to the proper time by considering the data recovery amount and the interval time.

Setting value	Initial value	Description
1 to 511	1	Specify the unit amount of data recovery in 128 blocks.

6. Dynamic Sparing

If the number of failure occurrences managed by the preventive maintenance exceeds a threshold, specify a mode that recovers data to the spare drive.

Setting value	Initial value	Description
Execution (Read/write & online verify)	✓	If the number of failure occurrences of a read/write error or online verify error exceeds a threshold, recover the data in the unused spare drive and then block the failed drive.
Execution (Read/write)		If the number of failure occurrences of a read/write error exceeds a threshold, recover the data in the unused spare drive and then block the failed drive. If the number of failure occurrences of an online verify error exceeds a threshold, dynamic sparing will not be performed.
Non-execution		If the number of failure occurrences of a read/write error or online verify error exceeds a threshold, dynamic sparing will not be performed.

7. Operation Mode of Spare Drives

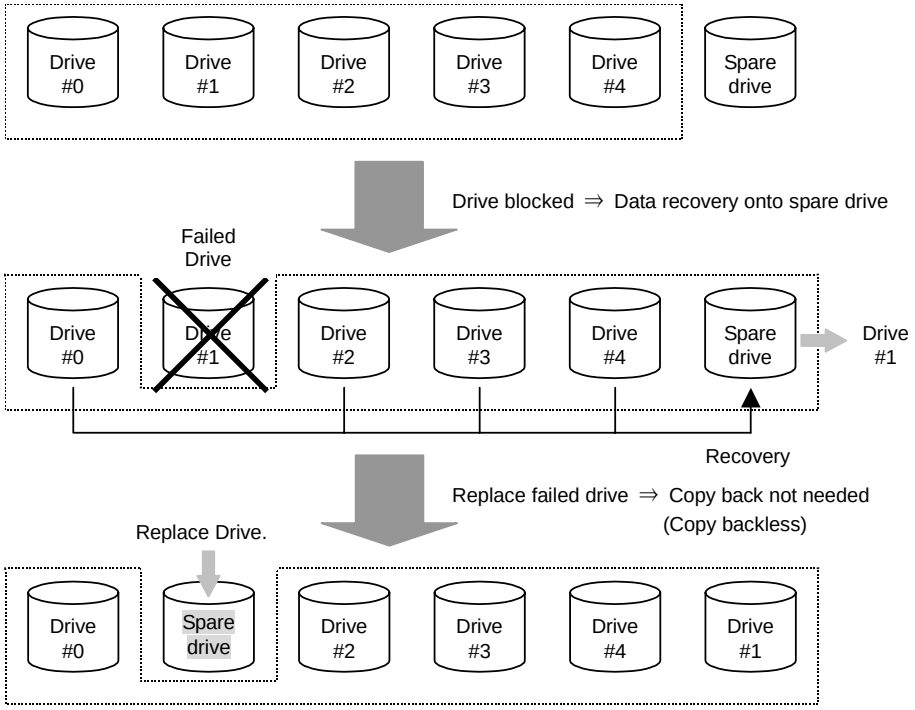
The table below shows how to operate a spare drive.

Setting value	Initial value	Description
Variable	✓	When you replace a failed drive, the drive becomes a spare drive (copy backless).
Fixed		The set drive becomes a fixed spare drive.

8. Operation Mode in the Spare Drive Mode

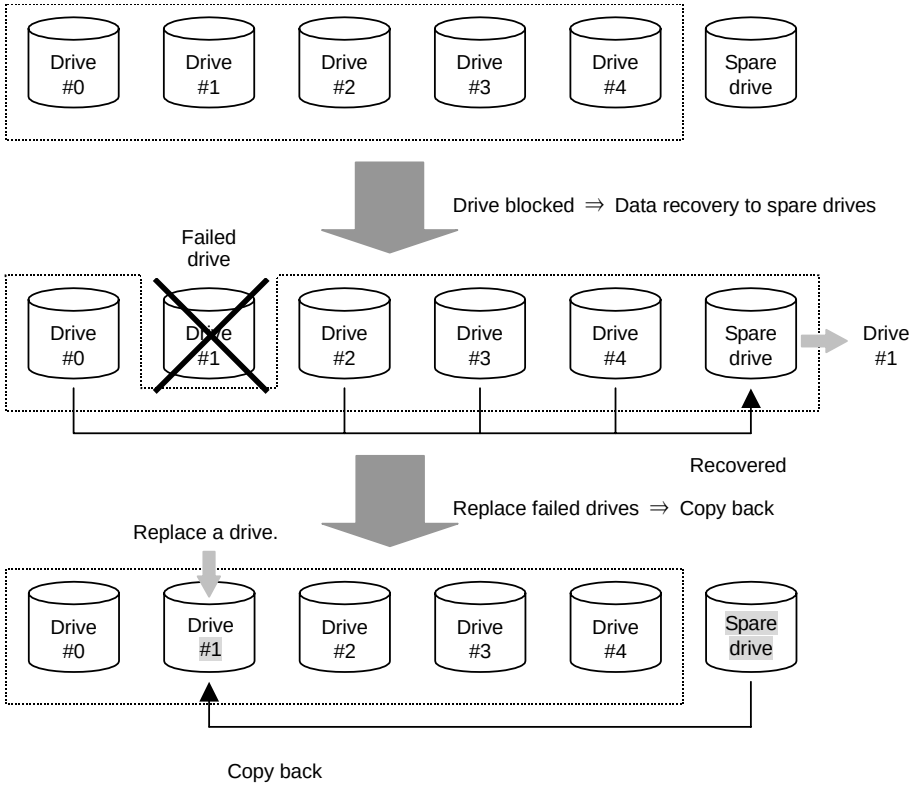
- Variable (copy backless)
  Even if you insert a replacement drive into the mounting location where a failure occurred, data is not recovered on the drive, leaving operated as a spare drive.

Figure 8.1 Operation modes of spare drives (variable)



- Fixed
  If you insert a replacement drive into the mounting location where a failure occurred, data onto the drive is recovered (copy back).
  If the drive recovery trigger is set to "Auto", copy-back is started automatically. If set to "Manual", copy-back must be performed by the instructions on the Storage Navigator Modular (SNM).

Figure 8.2 Operation mode of spare drives (fixed)



9. Execution Time of Collection Copy

9.1 Execution time of collection copy with I/O not provided form the host

- DF700 conditions
  - Subsystem: RKM, RKAJAT
  - RAID configuration: RAID 5（4D+1P, 15D+1P）
  - LU: 1 LU (Capacity: 20 GB)
  - Microprogram revision: 0710/A

- Measuring
  - Set to the drive block mode.
  - Unplug a drive.
  - Insert the drive after a while.
  - Start the drive recovery.
  - Measure the time from the startup of drive recovery to the end of the recovery.
  - The time of the collection copy of full capacity is calculated from the time of the collection copy of LU of 20 GB.

Table 9.1.1 Execution time of collection copy without I/O (in minutes)

		Execution time
71.3 GB HDD FC	RAID5 4D+1P	30
	RAID5 15D+1P	90
143.3 GB HDD FC	RAID5 4D+1P	60
	RAID5 15D+1P	200
287.6 GB HDD FC	RAID5 4D+1P	190
	RAID5 15D+1P	440
245.7 GB HDD SATA	RAID5 4D+1P	90
	RAID5 15D+1P	380
393.5 GB HDD SATA	RAID5 4D+1P	285
	RAID5 15D+1P	510

Note:
Without the host I/O, both the background and interleave (standard or preference) modes take the same processing time.

9.2 Execution time of collection copy with I/O provided form the host

- Host conditions

  - Tool: I/O meter
  - Data pattern: Random read/write (70:30)
  - Data length: 4 KB
  - Multiplicity of I/O: FC drive… 8
    SATA drive… 4
  - Host I/O: FC drive… 620 IOPS approx
    SATA drive… 180 IOPS approx

- DF700 conditions

  - Subsystem: RKM, RKAJAT
  - RAID configuration: RAID 5（4D+1P）
  - LU: 1LU (Capacity: 20 GB)
  - Microprogram revision: 0710/A 0720

- Measuring

  - Set to the drive block mode.
  - Run the host I/O.
  - Unplug a drive.
  - Insert the drive after a while.
  - Start the drive recovery.
  - Measure the time from the startup of drive recovery to the end of the recovery.
  - The time of the collection copy of full capacity is calculated from the time of the collection copy of LU of 20 GB.

Table 9.2.1 Execution time of collection copy in the interleave mode (standard) with I/O provided (for 0710/A)

(day/hour: Minute)

Drive recovery mode: Interleave (standard)		Interval setting value (in ms in parenthesis)					
Drive configuration							
71.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	1:00	02:00	04:15	07:30	2/16:30	6/01:00
	10(1,280)	1:00	01:15	01:30	01:45	08:00	18:30
	100(12,800)	1:00	01:00	01:15	01:15	02:00	02:45
	300(38,400)	1:00	01:00	01:00	01:15	01:30	01:45
	511(65,408)	1:00	01:00	01:00	01:15	01:15	01:30
143.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	2:00	03:45	08:00	14:15	5/08:30	12/03:00
	10(1,280)	2:00	02:30	02:45	03:15	15:30	1/13:00
	100(12,800)	2:00	02:15	02:15	02:30	04:00	05:45
	300(38,400)	2:00	02:15	02:15	02:15	02:45	03:15
	511(65,408)	2:00	02:00	02:15	02:15	02:30	02:45
287.6 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	04:00	06:45	19:30	1/05:00	11/12:00	27/10:00
	10(1,280)	04:00	04:45	05:30	06:30	1/08:30	2/23:00
	100(12,800)	04:00	04:15	04:30	04:30	07:00	11:00
	300(38,400)	04:00	04:15	04:15	04:30	05:15	06:30
	511(65,408)	04:00	04:15	04:15	04:15	04:45	05:30
245.7 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	3/01:00	5/08:00	6/09:30	8/00:00	18/14:00	33/05:30
	10(1,280)	3/01:00	4/06:30	4/19:00	5/08:00	8/12:00	10/00:00
	100(12,800)	3/01:00	3/17:30	4/00:00	4/19:00	6/09:00	8/12:00
	300(38,400)	3/01:00	3/17:00	3/15:00	4/00:00	5/07:30	8/04:30
	511(65,408)	3/01:00	3/14:00	3/15:00	3/17:30	4/03:30	4/16:30
393.5 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	4/20:30	8/12:30	10/05:00	12/18:30	29/17:30	53/04:00
	10(1,280)	4/20:30	6/19:30	7/16:00	8/12:30	13/14:30	16/00:00
	100(12,800)	4/20:30	5/23:00	6/09:30	7/16:00	10/05:00	13/14:00
	300(38,400)	4/20:30	5/19:00	5/19:00	6/09:30	8/12:00	13/02:00
	511(65,408)	4/20:30	5/17:30	5/19:00	5/23:00	6/15:00	7/10:30

Note 1:
Since the execution time of collection copy depends on the measurement conditions, the above values may increase or decrease.

Note 2:
The host I/O performance deteriorates while the disk drive is restoring.
FC drive: 160 to 260 IOPS, SATA drive: 110 to 125 IOPS

Note 3:
The interleave time and the operation when the amount of the data restoration is the default value are shown in the shaded area.

Table 9.2.2 Execution time of collection copy in the interleave mode (preference) with I/O provided (for 0710/A)

(day/hour: Minute)

Drive recovery mode: Interleave (preference)		Interval setting value (in ms in parenthesis)					
Drive configuration							
71.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	1:00	02:00	05:00	08:45	3/03:00	7/16:30
	10(1,280)	1:00	01:00	01:30	01:45	08:30	19:30
	100(12,800)	1:00	01:00	01:15	01:15	01:45	02:45
	300(38,400)	1:00	01:00	01:00	01:00	01:15	01:30
	511(65,408)	1:00	01:00	01:00	01:00	01:15	01:15
143.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	1:45	03:30	09:30	17:00	6/06:15	15/10:30
	10(1,280)	1:45	02:00	02:30	03:15	16:30	1/16:30
	100(12,800)	1:45	02:00	02:00	02:00	03:15	05:30
	300(38,400)	1:45	01:45	01:45	02:00	02:30	03:00
	511(65,408)	1:45	01:45	01:45	02:00	02:15	02:30
287.6 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	3:15	07:00	19:00	1/10:00	12/03:15	33/10:30
	10(1,280)	3:15	04:00	05:00	07:15	1/09:15	3/03:30
	100(12,800)	3:15	03:45	03:30	04:00	05:45	11:00
	300(38,400)	3:15	03:30	03:45	03:45	04:30	05:45
	511(65,408)	3:15	03:15	03:30	03:30	03:45	04:00
245.7 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	2/19:00	6/04:00	7/10:30	13/06:30	21/05:15	43/00:00
	10(1,280)	2/19:00	4/19:00	5/07:30	7/10:30	9/13:30	11/22:15
	100(12,800)	2/19:00	3/17:30	4/06:15	6/05:00	7/04:15	9/00:30
	300(38,400)	2/19:00	3/11:00	3/11:00	3/17:30	4/13:30	5/11:15
	511(65,408)	2/19:00	3/07:00	3/08:30	3/11:00	3/13:30	3/17:15
393.5 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	4/10:30	9/20:30	11/21:30	21/05:30	33/23:00	68/19:00
	10(1,280)	4/10:30	7/15:45	8/12:00	11/21:30	15/07:00	19/02:00
	100(12,800)	4/10:30	5/22:45	6/19:15	9/22:00	11/11:15	14/10:30
	300(38,400)	4/10:30	5/12:45	5/12:45	5/22:45	7/05:15	8/18:00
	511(65,408)	4/10:30	5/05:15	5/08:30	5/12:30	5/16:45	5/22:45

Note 1:
Since the execution time of collection copy depends on the measurement conditions, the above values may increase or decrease.

Note 2:
The host I/O performance deteriorates while the disk drive is restoring.
FC drive: 160 to 260 IOPS, SATA drive: 110 to 125 IOPS

Note 3:
The interleave time and the operation when the amount of the data restoration is the default value are shown in the shaded area.

Table 9.2.3 Execution time of collection copy in the interleave mode (standard) with I/O provided (for 0720)

(day/hour: Minute)

Drive recovery mode: Interleave (standard)		Interval setting value (in ms in parenthesis)					
Drive configuration							
71.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	1:00	2:00	4:30	9:45	3/02:00	10/04:15
	10(1,280)	1:00	1:30	1:45	2:00	9:00	21:00
	100(12,800)	1:00	1:15	1:15	1:15	2:00	2:45
	300(38,400)	1:00	1:15	1:15	1:15	1:30	1:45
	511(65,408)	1:00	1:15	1:15	1:15	1:15	1:15
143.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	2:00	4:00	10:00	19:45	6/10:30	16/13:15
	10(1,280)	2:00	2:30	2:45	6:15	13:30	1/17:00
	100(12,800)	2:00	2:00	2:00	2:15	3:45	6:00
	300(38,400)	2:00	2:00	2:00	2:00	2:30	3:00
	511(65,408)	2:00	2:00	2:00	2:00	2:00	2:15
287.6 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	4:00	8:00	18:00	1/14:30	12/18:00	21/18:30
	10(1,280)	4:00	4:30	5:00	6:15	1/02:00	3/07:15
	100(12,800)	4:00	4:00	4:00	4:15	7:00	11:15
	300(38,400)	4:00	4:00	4:00	4:00	5:00	6:30
	511(65,408)	4:00	4:00	4:00	4:00	4:00	4:15
245.7 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	3/10:30	3/14:00	3/15:30	3/19:00	6/10:30	12/01:00
	10(1,280)	3/10:30	3/12:30	3/13:00	3/14:00	4/00:00	4/19:00
	100(12,800)	3/10:30	3/11:00	3/11:30	3/12:00	3/13:30	3/15:00
	300(38,400)	3/10:30	3/11:00	3/11:00	3/11:30	3/13:00	3/14:45
	511(65,408)	3/10:30	3/10:30	3/10:30	3/11:00	3/12:30	3/14:30
393.5 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	5/10:15	5/13:00	5/15:00	5/20:30	8/19:00	15/11:15
	10(1,280)	5/10:15	5/12:15	5/13:00	5/14:30	6/03:30	7/02:15
	100(12,800)	5/10:15	5/12:00	5/12:00	5/12:30	5/14:00	5/15:30
	300(38,400)	5/10:15	5/11:45	5/11:45	5/12:00	5/13:30	5/15:30
	511(65,408)	5/10:15	5/11:45	5/11:45	5/12:00	5/12:30	5/15:00

Note 1:
Since the execution time of collection copy depends on the measurement conditions, the above values may increase or decrease.

Note 2:
The host I/O performance deteriorates while the disk drive is restoring.
FC drive: 160 to 260 IOPS, SATA drive: 110 to 125 IOPS

Note 3:
The interleave time and the operation when the amount of the data restoration is the default value are shown in the shaded area.

Table 9.2.4 Execution time of collection copy in the interleave mode (preference) with I/O provided (for 0720)

(day/hour: Minute)

Drive recovery mode: Interleave (preference) / Drive configuration		Interval setting value (in ms in parenthesis)					
71.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	1:00	2:00	5:30	9:30	2/22:00	9/20:00
	10(1,280)	1:00	1:15	1:45	2:00	9:00	21:00
	100(12,800)	1:00	1:15	1:15	1:15	1:45	2:45
	300(38,400)	1:00	1:15	1:15	1:15	1:15	1:30
	511(65,408)	1:00	1:15	1:15	1:15	1:15	1:15
143.3 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	2:00	4:00	11:45	20:15	6/12:00	19/09:00
	10(1,280)	2:00	2:15	3:00	8:15	16:30	1/19:00
	100(12,800)	2:00	2:00	2:15	2:15	3:00	5:30
	300(38,400)	2:00	2:00	2:00	2:00	2:15	2:45
	511(65,408)	2:00	2:00	2:00	2:00	2:00	2:00
287.6 GB HDD, FC, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	4:00	8:00	21:30	1/15:15	12/16:15	27/17:45
	10(1,280)	4:00	4:30	6:00	8:15	1/11:30	3/10:00
	100(12,800)	4:00	4:00	4:15	4:15	5:45	10:15
	300(38,400)	4:00	4:00	4:00	4:00	4:30	5:30
	511(65,408)	4:00	4:00	4:00	4:00	4:00	4:00
245.7 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	3/08:30	3/11:45	3/15:00	3/17:00	6/19:00	11/14:00
	10(1,280)	3/08:30	3/11:30	3/14:00	3/15:00	4/02:00	4/15:00
	100(12,800)	3/08:30	3/10:30	3/12:00	3/13:45	3/14:30	3/15:00
	300(38,400)	3/08:30	3/09:30	3/09:30	3/11:00	3/13:30	3/14:15
	511(65,408)	3/08:30	3/09:30	3/09:30	3/10:45	3/12:00	3/14:00
393.5 GB HDD, SATA, RAID 5, 4D+1P		0(0)	1(10)	5(50)	10(100)	100(1,000)	255(2,550)
Setting value of data recovery amount (Block counts in parenthesis)	1(128)	5/09:00	5/10:00	5/16:00	5/21:30	10/12:00	18/07:45
	10(1,280)	5/09:00	5/09:45	5/13:45	5/12:00	6/12:30	7/03:00
	100(12,800)	5/09:00	5/09:30	5/10:15	5/11:45	5/16:30	5/18:00
	300(38,400)	5/09:00	5/09:30	5/09:30	5/10:30	5/15:45	5/17:00
	511(65,408)	5/09:00	5/09:15	5/09:30	5/10:00	5/13:00	5/16:00

Note 1:
Since the execution time of collection copy depends on the measurement conditions, the above values may increase or decrease.

Note 2:
The host I/O performance deteriorates while the disk drive is restoring.
FC drive: 160 to 260 IOPS, SATA drive: 110 to 125 IOPS

Note 3:
The interleave time and the operation when the amount of the data restoration is the default value are shown in the shaded area.

DF700
Disk Array Subsystem
Drive Recovery Guideline

1st edition April xx, 2005
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Hitachi, Ltd.

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Guideline for the DF700/DF600/DF500
(Fibre Channel configuration)
Online Micro Program Replacement

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Revision 1	Feb. 2004	First Release
Revision 2	Mar. 2004	Addition of checklist Addition of cautions and restrictions
Revision 3	May. 2004	Addition of checklist Addition of cautions and restrictions

Revision 4	Sep. 2004	Addition of checklist Addition of preparation Addition of cautions and restrictions
Revision 5	Jan. 2005	Addition of checklist Addition of system configuration Addition of step1 and step3 of operations for the micro program replacement
Revision 6	Apr. 2005	Addition of DF700.
Revision 7	Jan. 2006	Addition of DF700H.
Revision 8	Feb. 2006	Addition of TrueCopy Extended Distance
Revision 9	Mar. 2006	Change of the procedure in case of HDLM. Addition of cautions and restrictions
Revision 10	June. 2006	Change of the procedure in case of FC.
Revision 11	Sep. 2006	Supersedes and replaces Revision 10.
Revision 12	Dec. 2006	Supersedes and replaces Revision 11.

Preface

"**Online** Micro Program Replacement" requires the path failover on the all servers that are connected with DF700/DF600/DF500. However, there are too many systems that are not configured with having this behavior. Therefore, RSD always recommends the using the "**Offline** Micro Program Replacement".

In the other hand, the systems that are very difficult to stop are increasing. In such case, system should have the conditions described in this guideline.

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1 Overview

This data describes the procedure for replacing the microprogram at the time of the Fibre Channel (FC) configuration.

When you replace the micro program, all applications cannot access to the controller that the micro program is to be replaced. (The micro program replacement takes place by rebooting the both controllers one by one.) To perform the micro program replacement, always follow the checklist shown below and read the cautions.

The micro program replacement needs to check the status of paths and applications, so perform the operations according to your customer's schedule. And since the all accesses from servers may be concentrated on one controller during the replacement, it is recommended that the operations should be performed during a time period when the I/O loads are light.

If the DF700, DF600 and DF500 meet the specific conditions (refer to "2 Checklist"), you will be able to perform the "Online Micro Program Replacement".

The Interface Board can be installed in the following configuration in the DF700.

Installation case	Installation position		
	Interface Board #0	Interface Board #1	
1	FC Interface Board	Not installed	← **Target configuration of this data**
2	Not installed	NAS Interface Board	
3	iSCSI Interface Board	Not installed	
4	FC Interface Board	FC Interface Board	← **Target configuration of this data**
5	FC Interface Board	NAS Interface Board	
6	iSCSI Interface Board	FC Interface Board	
7	iSCSI Interface Board	NAS Interface Board	

2 Checklist

If "No" is checked in the checklist, replacement with the servers suspended is required.

Table 1 Checklist for Online Micro Program Replacement

No	Contents	Yes / No
1	Does the DF700/DF600/DF500 have the dual controller configuration?	
2	Is the customer using the path switching software? (Please refer to "Table 2, Tested Path Switching Software" in the detail.)	

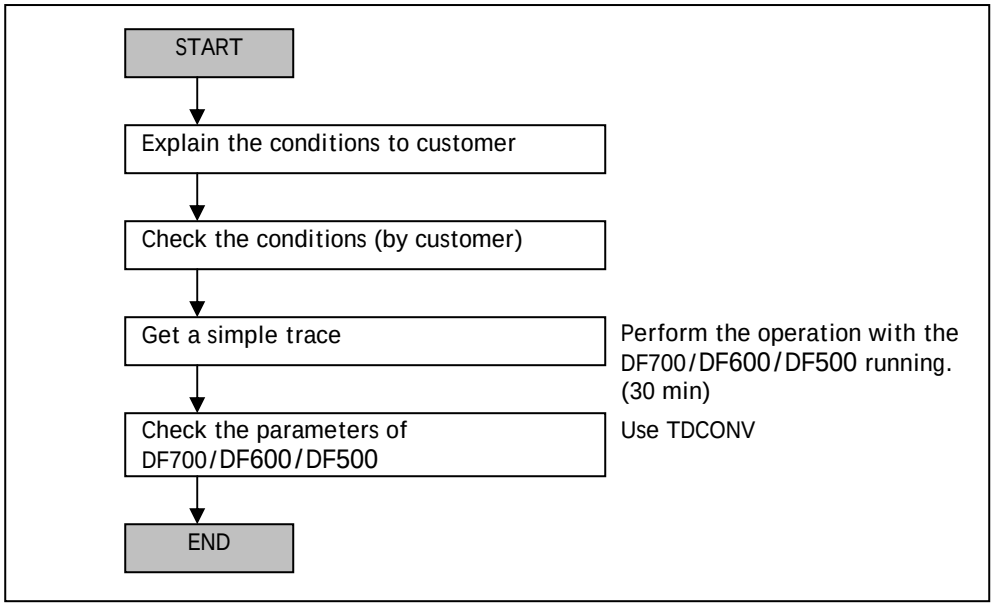
No	Contents	Yes / No
3	Is the controller of a main path to LUs separated from the controller of an alternative path?	
4	Is an alternative path set to all LUs?	
5	Are the host side parameters that are described in this document set correctly?	
6	Are the DF700/DF600/DF500 parameters that are described in the User's Guide of DF700/DF600/DF500 set correctly? (Before the replacement, please get a simple trace to check.)	
7	Is it possible to stop the changing of pair status of ShadowImage, SnapShot, QuickShadow or TrueCopy or Hi-Copy during the micro program replacement? (Customer cannot execute "paircreate" and "pairresync" commands.)	
8	Is it possible to change the pair status of TrueCopy Extended Distance from "PAIR" and "COPY" to "PSUS" during the microprogram replacement?	
9	Is it possible to try not to execute the migration with Modular Volume Migration during the microprogram replacement?	
10	If the customer uses the cluster software "MC/SG", is the lock disk stored in the disk other than the DF700/DF600/DF500?	
11	Is the boot disk stored in the disk other than the DF700/DF600/DF500? Is the redundancy condition of the boot path described on the System Construction Guide of BladeSymphony satisfied when it is connected to BladeSymphony?	
12	The I/O errors may be logged in a log file during the micro program replacement, though the data accesses continue on an alternative path. Can the system ignore such the errors?	
13	The completion of I/O processing may take approximately 60 seconds during the micro program replacement. Can the customer's system wait for this time?	
14	Is it possible to stop Format? (The microprogram replacement during the LU format and the LU format during the microprogram replacement cannot be executed.)	
15	Is ShadowImage in-system replication/ShadowImage I/O Switch Mode disabled?	
16	Can other applications (HITRACK, HiCommand, other DAMP/SNM) which perform the LAN access to the SANRISE be stopped during the microprogram replacement?	

3 Flowchart

First step;

Please discuss with customers whether the conditions of this guideline meet with the customer's system or not. And get a simple trace to check the parameters of DF700/DF600/DF500.

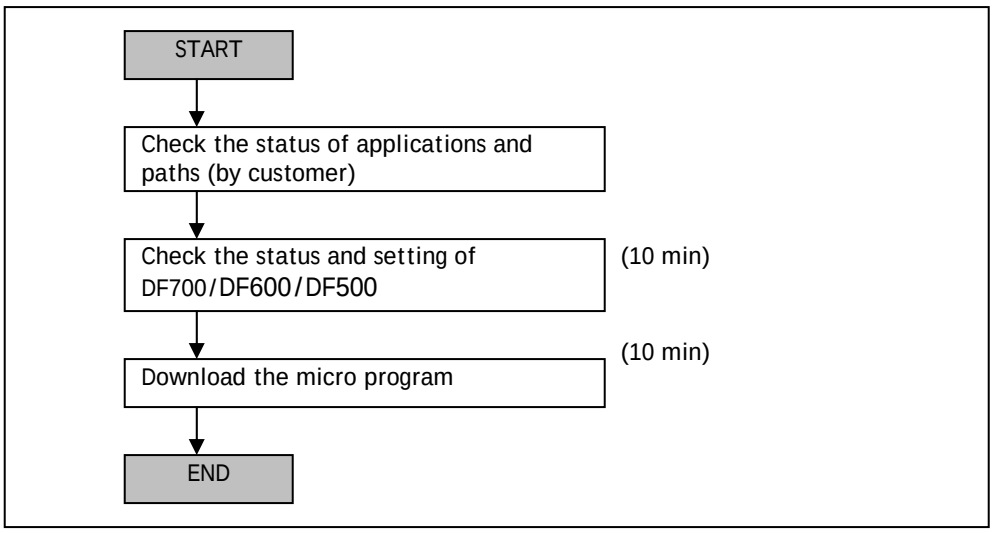
Figure 1 Flowchart of checking the conditions



Second step;

Please check the status of applications, paths, switches and DF700/DF600/DF500 before replace the micro program.

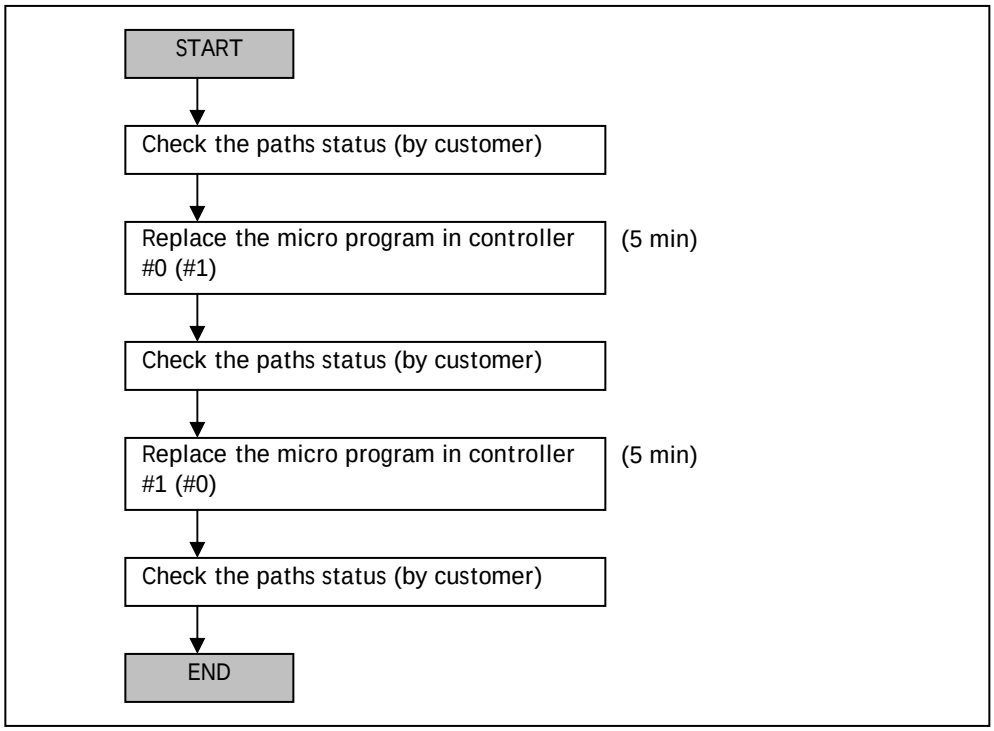
Figure 2 Flowchart of preparation of replacement



Third step;

Perform the replace the micro program.

Figure 3 Flowchart of replace the micro program



4 System Configuration

If the system is configured as shown below, online micro program replacement is possible.

Figure 4 Figure of Configuration

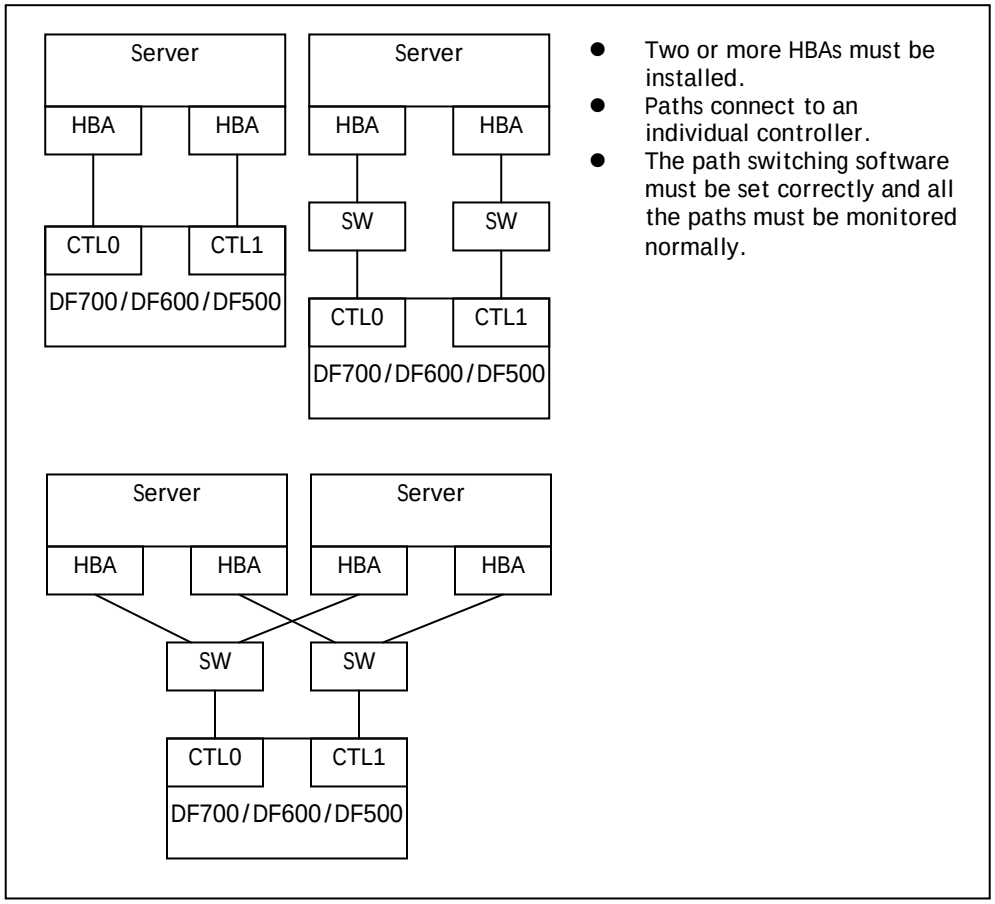


Table 2 Tested path switching software

No	OS, Version	DF700	DF600	DF500 (Fibre)
1	HP-UX 11i, 11.0, 10.20	PVLink	PVLink, HDLM *1	PVLink, HDLM *1
2	Solaris 9, 8, 7, 2.6	VxVM-DMP, HDLM	VxVM-DMP, HDLM	VxVM-DMP, HDLM, HPM
3	AIX 5.2, 5.1, 4.3.3	HDLM	HDLM	HDLM, HPM *2
4	Windows 2K3, 2K, NT4.0	HDLM	HDLM	HDLM, HPM *3
5	Red Hat Advanced Server 2.1, Red Hat Enterprise Linux 3.0, AS 2.1, AS3(IA32), ES3(IA32), AS3(IPF)	VxVM-DMP, HDLM	VxVM-DMP, HDLM	VxVM-DMP, HDLM
6	9900V	Alternative path	Alternative path	

Note: This document uses the abbreviation "HDLM" to represent the "HiCommand Dynamic Link Manager", and "HPM" to represent the "Hitachi Path Manager".

*1: HDLM can be used on HP-UX 11i and 11.0 only.

*2: HPM can be used on AIX 5.1 and 4.3.3 only.

*3: HPM can be used on Windows 2K (or with SP1/2) and NT4.0 (with SP3/4/5/6a) only.

Table 3 Software Parameters

No	Software	Parameter	Default	Setting
1	PVLink	IO Timeout *1	default (=30sec)	60sec
2		Auto Switch	On	On
3	VxVM-DMP	Please check the VxVM's manual.		
4	HDLM	Please check the HDLM's manual.		
5	HPM	Please check the HPM's manual.		

Table 4 HBA Parameters

No	HBA	Parameter	Default	Setting
1	JNI FCE-1063	FcPortCfgEnable	0	1
	JNI FCE-6410	FailoverDelay	0	30
2	JNI FC64-1063 JNI FCI-1063 JNI FCE-1473 JNI FCE-6460 JNI FCC-6460 JNI FCX-6562	FailoverDelay	0	30

Note: In regard to the other HBAs, no parameter is required to be changed.

In regard to the system parameters of DF700/DF600/DF500, please refer to the User's Guide of DF700, DF600 and DF500.

5 Cautions and Restrictions

Always follow the cautions and restrictions shown in this document and the path switching software manual.

Table 5 Cautions and Restrictions

No	Contents
1	The path switching software must run normally on all the servers connected to the DF700/DF600/DF500, and all paths to the LUs are to be duplicated by the path switching software. If there are any LUs whose path is not duplicated, replace the micro program after dismounting it beforehand.
2	All the paths must be normal. If a failure is found on the path, replace the micro program after recovering the failure.
3	Replace the micro program on the controller #0, and then replace the micro program on the controller #1. The reverse order of the replacement is possible.
4	If customer is using WinNT and HPM, the number of partitions per LU is within 30.
5	When HDD blockade is occurred, the HDD data recovery may fail by the replacement. In such case, please stop the replacement and recover the HDD failure first. Please refer to the DF600-EN-040116-2.
6	When Path Blockade is occurred in TrueCopy Basic/TrueCopy remote replication/TrueCopy Extended Distance while replacing micro program on replacing AMS1000, please recover the Path Blockade first, after stopping the replacement.
7	Down grade to the micro program version “055G/L” or prior of DF500 and “0653/A” or prior of DF600 is not supported.
8	When the customer is using the function that is not supported by the old micro program, the function must be disabled before down grade to the old micro program.
9	The up/down grade of micro program should not be executed while CCI command “paircreate” and “pairresync” is running.
10	The CCI command “paircreate” and “pairresync” cannot be executed during the up/down grade of micro program.
11	When the pair status of TrueCopy Extended Distance is “PAIR” or “COPY”, do not perform the microprogram replacement.
12	Do not perform the microprogram replacement when the migration is being executed with Modular Volume Migration.
13	In case of online micro program replacement to "055H/C" or prior for DF500, controller failure with a check code error may occurs. Please refer to DF500-EN-0225-3.
14	The migration of Modular Volume Migration cannot be executed during the microprogram replacement.
15	Format cannot be executed during the up/down grade of micro program.
16	The up/down grade of micro program should not be executed when ShadowImage I/O Switch Mode is enabled and the pair status is PSUE(S-VOL Switch).
17	In case of DF600H/DF600HE, when downgrade to 1657/X or prior and more than 16 drives are set, please release spare drives to less than 15 drives in reverse sequence of the order the spare drives were set. If the order in which they were set is unknown, release all spare drives before performing the download.

No	Contents
18	When copy function (ShadowImage, QuickShadow or TrueCopy Basic or Hi-Copy) is installed, upgrade to the version x658 or later and x659 may fail. Please upgrade to the version x659/A or later.
19	When Power Saving of the priced option is used, if you perform the replace the micro program on the controller after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the microprogram replacement is completed. Check that there is no RAID Group whose power saving status is "Normal (command monitoring)" after executing the spin-down, and then replace the micro program on the controller. If the spin-down fails, execute the spin-down again.

Table 6 Downgrade Restrictions for each Function

No	Function	Restrictions Condition	Restrictions Version
1	OPEN LDEV Guard	When OPEN LDEV Guard P.P. is enabled and access attribute is set.	"X655/X" or prior of DF600
2	Hi-Speed Sequential Write Mode	When Hi-Speed Sequential Write Mode is enabled.	"X656/X" or prior of DF600
3	Specifying Random Simple Buffer Size 0%	When Specifying Random Simple Buffer Size 0% is enabled.	"X656/X" or prior of DF600
4	RKAAT	When RKAAT is connected.	"X657/X" or prior of DF600
5	ShadowImage I/O Switch Mode	When ShadowImage I/O Switch Mode is enabled.	"X657/X" or prior of DF600
6	Concurrent use of QuickShadow and FlashAccess	When QuickShadow and FlashAccess are used concurrently.	"X657/X" or prior of DF600
7	Spare drive	When Spare drives are set more than 16 drives.	"1657/X" or prior of DF600

6 Operations for Micro Program Replacement

To replace the micro program, follow the operations below.

This document uses the abbreviation "DAMP" to represent the "Disk Array Management Program" for DF600/DF500. Note that the version of DAMP to be used is 7.50 or later.

This document uses the abbreviation "SNM" to represent the "Storage Navigator Modular" for DF700.

6.1 Preparation

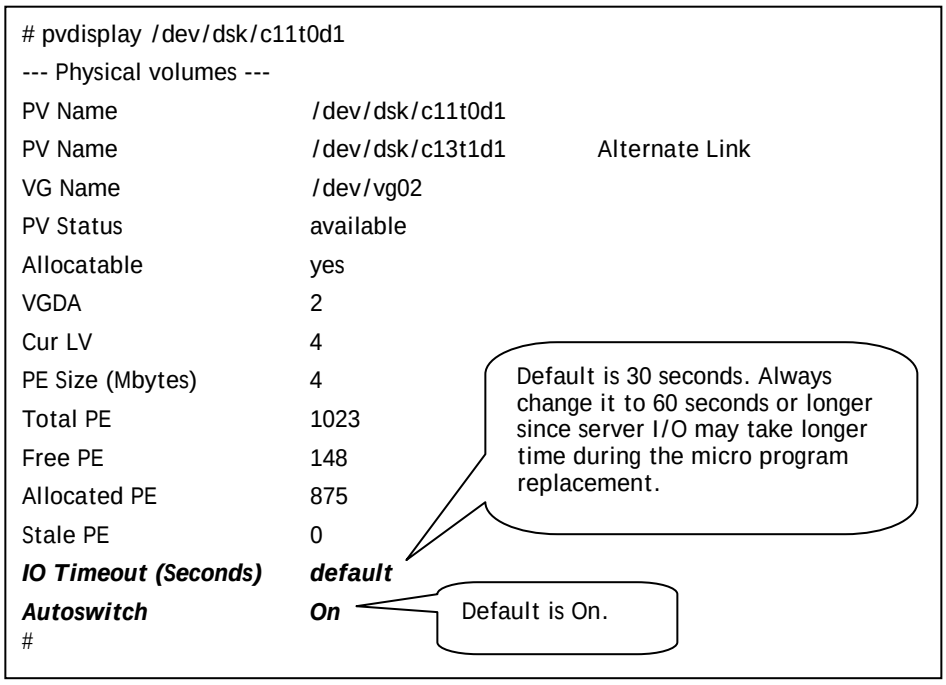
Following procedures should be done before micro program replacement.

Table 7 Checklist for Preparation of Micro Program Replacement

No	Contents	Check
1	The parameters for DF700/DF600/DF500 are set correctly.	
2	The parameters for OS, HBA and path switching software are set correctly.	
3	The alarm light on the DF700/DF600/DF500 does not light up. And the servers and switches do not have any errors.	
4	In the case of the direct connection, the ports on the DF700/DF600/DF500 are linked up with the system.	
5	Check that the READY LED on the SANRISE lights up. When it is blinking at high speed, wait for the maximum of 15 to 30 minutes for the SANRISE 9500V and the maximum of 30 to 85 minutes for the SANRISE AMS/WMS.	
6	In the case of switch connection, the ports on the switches are linked up.	
7	The CCI command “paircreate” or “pairresync” is not running.	
8	Check that the pair status of TrueCopy Extended Distance was changed to “PSUS”.	
9	Check that the migration of Modular Volume Migration is not being executed.	
10	When Power Saving of the priced option is used, check that there is no RAID Group whose power saving status is “Normal (command monitoring)” (spin-down is not being executed).	
11	During the online micro program replacement, please stop the other programs (HITRACK, HiCommand, other DAMP/SNM) that may issue a command to the subsystem through the LAN, or remove the LAN cable to disconnect from such programs.	
12	To change the PVLink parameters “IO Timeout” and “AutoSwitch”, perform the following operations. Refer to the following procedures for the detail.	
13	Connect the DAMP/SNM and download the micro program to be replaced. Refer to the following procedures for the detail.	

[Operations of changing the PVLink parameters]

(1) Login as a user having the root authorization in HP-UX, and execute "vgdisplay /dev/dsk/c?t?d?" command.

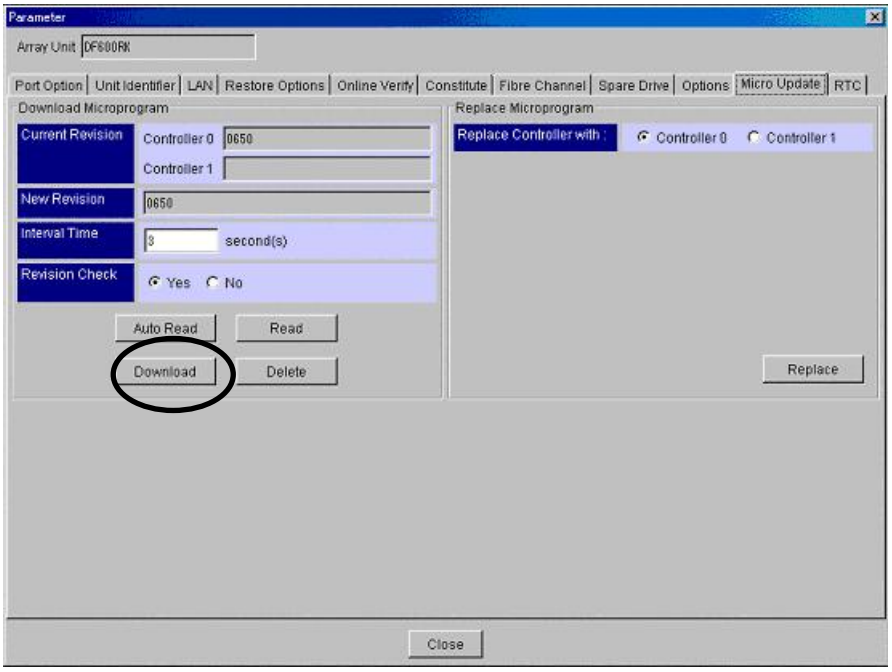


(2) Execute "pvchange –t 60 /dev/dsk/c?t?d?" command to change the "IO Timeout" parameter, and execute "vgdisplay ./dev/dsk/c?t?d?" command to check the result.

(3) When "Off" is specified for "AutoSwitch" parameter, execute "pvchange –S y "dev/dsk/c?t?d?" command, and check the result.

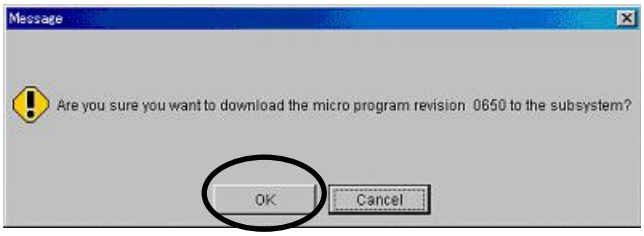
[Operations of download the micro program]

(1) Click the “Download” button on the “Micro Update” window of DAMP/SNM.

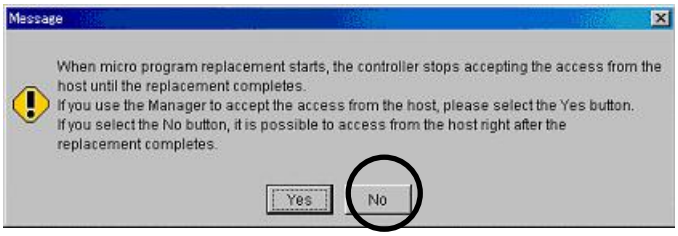


Note: This operation only downloads the microprogram in the SANRISE subsystem, and the replacement (upgrade/downgrade) is executed in "Step 2:" in Chapter 6.2.

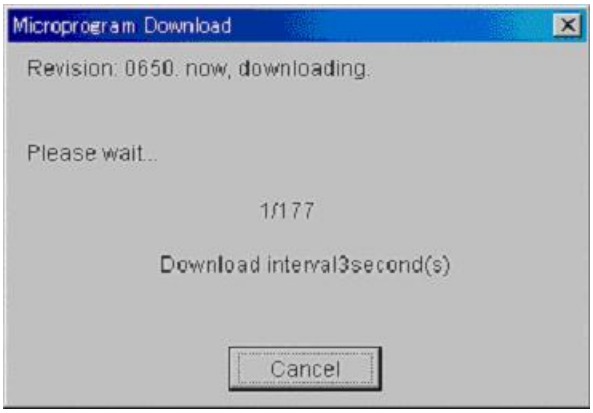
(2) Click the “OK” button.



(3) If the version of micro program for the DF600 is x6x3/F or later and that for the DF500 is x5xH or later, the following window is displayed. Click the “**No**” button.



(4) A downloading message is displayed. Wait for a while.



(5) When the download is completed, the following window is displayed. Click the "OK" button.



6.2 Operations for the Micro Program Replacement

The procedure of micro program replacement is performed as following.

Step1: (server side)

Check the status of paths to the LUs. If multiple OS are connected, perform the operations on all the servers connected to DF700/DF600/DF500 that the micro program is to be replaced.

(1) In the case of PVLink on HP-UX

Login as a user having the root authorization, and execute "vgdisplay –v vg??" command.

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0
  --- Logical volumes ---
  LV Name                   /dev/vg02/lvol1
  LV Status                 available/syncd
  LV Size (Mbytes)          1000
  Current LE                250
  Allocated PE              250
  Used PV                   1
  --- Physical volumes ---
  PV Name                   /dev/dsk/c83t0d0
  PV Name                   /dev/dsk/c24t0d0 Alternate Link
  PV Status                 available
  Total PE                  511
  Free PE                   11
  Autoswitch                On
```

Check that two or more "PV Name" of "Physical volumes" are displayed and at least one path is displayed as "Alternate Link". If any path has a failure, suspend the micro program replacement and recover the failure. Also, recode the PVName of the active path.

(2) In the case of HDLM on HP-UX

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off
Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Login as a user having the root authorization, and execute “dlnkmgr view -path” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort Status   Type .....
000000   .....           HITACHI DF600F    0A      Online   Own
000001   .....           HITACHI DF600F    1A      Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where micro program replacement is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where micro program replacement is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where micro program replacement is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where micro program replacement is only 0A.

ExampleA-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000001    ···       HITACHI .DF600F….0051     1A      Online          Non     1
000002    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000003    ···       HITACHI .DF600F….0051     1A      Online          Non     1
000004    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000005    ···       HITACHI .DF600F….0051     1A      Online          Non     1
 :          :          :                      :        :              :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···    ChaPort    Status          Type    IO-Count ···
000000    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000001    ···       HITACHI .DF600F….0051     1A      Online          Non     1
000002    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000003    ···       HITACHI .DF600F….0051     1A      Online          Non     1
000004    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own     10
000005    ···       HITACHI .DF600F….0051     1A      Online          Non     1
 :          :          :                      :        :              :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where micro program replacement is only 1A.

ExampleB-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···      ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000001    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000002    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000003    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000004    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000005    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
 :          :          :                       :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···      ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000001    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000002    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000003    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000004    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000005    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
 :          :          :                       :        :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the SANRISE side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the SANRISE side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of "[Operations of download the micro program]" in 6.1 again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

```
# diff path01.txt path02.txt
2c2
< Reduced      33        0
---
> Reduced     265        0
```

(3) In the case of VxVM-DMP on Solaris

Log into Solaris with the user who has the root authority, and check that all the paths are in the enable status using the command of VxVM.
The commands to operate differ in the cases where the version of VxVM is 3.2 or later and where it is before 3.2.

(a) When the version of VxVM is 3.2 or later, check the CTLR-NAME connecting the SANRISE by the command [vxdmpadm listctlr all]. Furthermore, execute the command [vxdmpadm getsubpaths ctlr=cx] for each CTLR-NAME (cx is CTLR-NAME).

```
# vxdmpadm listctlr all
CTLR-NAME       ENCLR-TYPE      STATE           ENCLR-NAME
=================================================
c1              Disk            ENABLED         Disk
c2              AMS_WMS         ENABLED         AMS_WMS0
c3              AMS_WMS         ENABLED         AMS_WMS0

# vxdmpadm getsubpaths ctlr=c2
NAME      STATE[A]     PATH-TYPE[M] DMPNODENAME ENCLR-TYPE ENCLR-NAME ATTRS
=============================================================================
c2t0d0s2  ENABLED      SECONDARY    c2t0d0s2    AMS_WMS    AMS_WMS0    -
c2t0d1s2  ENABLED(A)   PRIMARY      c2t0d1s2    AMS_WMS    AMS_WMS0    -
c2t0d2s2  ENABLED      SECONDARY    c2t0d2s2    AMS_WMS    AMS_WMS0    -
c2t0d3s2  ENABLED(A)   PRIMARY      c2t0d3s2    AMS_WMS    AMS_WMS0    -
c2t0d4s2  ENABLED      SECONDARY    c2t0d4s2    AMS_WMS    AMS_WMS0    -
c2t0d5s2  ENABLED(A)   PRIMARY      c2t0d5s2    AMS_WMS    AMS_WMS0    -
c2t0d6s2  ENABLED      SECONDARY    c2t0d6s2    AMS_WMS    AMS_WMS0    -
c2t0d7s2  ENABLED(A)   PRIMARY      c2t0d7s2    AMS_WMS    AMS_WMS0    -

# vxdmpadm getsubpaths ctlr=c3
NAME      STATE[A]     PATH-TYPE[M] DMPNODENAME ENCLR-TYPE ENCLR-NAME ATTRS
=============================================================================
c3t0d0s2  ENABLED(A)   PRIMARY      c2t0d0s2    AMS_WMS    AMS_WMS0    -
c3t0d1s2  ENABLED      SECONDARY    c2t0d1s2    AMS_WMS    AMS_WMS0    -
c3t0d2s2  ENABLED(A)   PRIMARY      c2t0d2s2    AMS_WMS    AMS_WMS0    -
c3t0d3s2  ENABLED      SECONDARY    c2t0d3s2    AMS_WMS    AMS_WMS0    -
c3t0d4s2  ENABLED(A)   PRIMARY      c2t0d4s2    AMS_WMS    AMS_WMS0    -
c3t0d5s2  ENABLED      SECONDARY    c2t0d5s2    AMS_WMS    AMS_WMS0    -
c3t0d6s2  ENABLED(A)   PRIMARY      c2t0d6s2    AMS_WMS    AMS_WMS0    -
c3t0d7s2  ENABLED      SECONDARY    c2t0d7s2    AMS_WMS    AMS_WMS0    -
```

Check that all the paths are displayed as “ENABLED”. If any path has a failure (DISABLED), suspend the micro program replacement and recover the failure.

(b) When the version of VxVM is before 3.2, execute the command [vxdisk list cXtYdZs2] after checking the device by the command [vxdisk list] (cXtYdZs2 is the device file).

```
# vxdisk list
DEVICE          TYPE     DISK          GROUP         STATUS
c1t0d0s2        sliced                                error
c1t0d0s3        simple   c1t0d0s3      rootdg        online
c4t0d0s2        sliced   disk01        DG0           online
c4t0d1s2        sliced   disk01        DG1           online
c4t0d2s2        sliced   disk01        DG2           online

# vxdisk list c4t0d0s2
Device:         c4t0d0s2
devicetag:      c4t0d0
type:           sliced
hostid:
disk:           name= id=1067933033.3997.V880-1
group:          name= id=1067933103.4030.V880-1
flags:          online ready private autoconfig
pubpaths:       block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths:      block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:        2.2
iosize:         min=512 (bytes) max=256 (blocks)
public:         slice=4 offset=0 len=8217600
private:        slice=3 offset=1 len=38143
update:         time=1067993564 seqno=0.147
headers:        0 248
configs:        count=1 len=28130
logs:           count=1 len=4262
Defined regions:
 config   priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config   priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log      priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:   2
c4t0d0s2        state=enabled    type=primary
c5t1d0s2        state=enabled    type=secondary
```

Check that all the paths are displayed as “enabled”. If any path has a failure, suspend the micro program replacement and recover the failure.

(4) In the case of HDLM on Solaris

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName      DskName .....     ChaPort Status  Type .....
000000  .....         HITACHI DF600F    0A      Online  Own
000001  .....         HITACHI DF600F    1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where micro program replacement is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where micro program replacement is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where micro program replacement is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where micro program replacement is only 0A.

ExampleA-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName            DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000001     ···          HITACHI .DF600F….0051      1A      Online          Non      1
000002     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000003     ···          HITACHI .DF600F….0051      1A      Online          Non      1
000004     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000005     ···          HITACHI .DF600F….0051      1A      Online          Non      1
 :          :            :                         :       :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName            DskName ···     ChaPort     Status          Type     IO-Count ···
000000     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000001     ···          HITACHI .DF600F….0051      1A      Online          Non      1
000002     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000003     ···          HITACHI .DF600F….0051      1A      Online          Non      1
000004     ···          HITACHI .DF600F….0051      0A      Offline(C)      Own      10
000005     ···          HITACHI .DF600F….0051      1A      Online          Non      1
 :          :            :                         :       :               :
```

Confirm the value of ‘OnlinePaths’. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where micro program replacement is only 1A.

ExampleB-1) Version 05-00 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···      ChaPort   Status          Type    IO-Count ···
000000    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000001    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
000002    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000003    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
000004    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000005    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
 :          :           :                        :         :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···      ChaPort   Status          Type    IO-Count ···
000000    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000001    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
000002    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000003    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
000004    ···        HITACHI .DF600F….0051      0A        Online          Own     10
000005    ···        HITACHI .DF600F….0051      1A        Offline(C)      Non     1
 :          :           :                        :         :               :
```

Confirm the value of ‘OnlinePaths’. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the SANRISE side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the SANRISE side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of "[Operations of download the micro program]" in 6.1 again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced       33         0
---
> Reduced      265         0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken      33         0
---
> Shrunken     265         0
```

(5) In the case of HPM on Solaris

Login as a user having the root authorization, and execute “datapath query adapter” command.

```
# /opt/HITdpo/bin/datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State      Mode      Select  Errors  Paths  Active
  0 QLGC,isp@0,1000     NORMALACTIVE 36098   0       8       8
  1 QLGC,isp@1,1000     NORMALACTIVE 38      0       8       8
```

ck that all the paths are connected to the DF500 and the “State” is displayed as “NORMAL” and “Mode” is displayed as “ACTIVE”. If neither “NORMAL” nor “ACTIVE” is displayed, suspend the micro program replacement and recover the failure.

(6) In the case of HDLM on AIX

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /usr/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort  Status   Type .....
000000   .....           HITACHI DF600F    0A       Online   Own
000001   .....           HITACHI DF600F    1A       Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where micro program replacement is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where micro program replacement is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where micro program replacement is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where micro program replacement is only 0A.

ExampleA-1) Version 05-00 or later

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···   ChaPort    Status          Type    IO-Count ···
000000    ···     HITACHI .DF600F….0051     0A      Offline(C)       Own     10
000001    ···     HITACHI .DF600F….0051     1A      Online           Non     1
000002    ···     HITACHI .DF600F….0051     0A      Offline(C)       Own     10
000003    ···     HITACHI .DF600F….0051     1A      Online           Non     1
000004    ···     HITACHI .DF600F….0051     0A      Offline(C)       Own     10
000005    ···     HITACHI .DF600F….0051     1A      Online           Non     1
 :          :          :                     :          :              :
```

ExampleA-2) Version 04-xx or prior

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName            DskName ···     ChaPort     Status          Type      IO-Count ···
000000     ···          HITACHI .DF600F....0051     0A      Offline(C)      Own       10
000001     ···          HITACHI .DF600F....0051     1A      Online          Non       1
000002     ···          HITACHI .DF600F....0051     0A      Offline(C)      Own       10
000003     ···          HITACHI .DF600F....0051     1A      Online          Non       1
000004     ···          HITACHI .DF600F....0051     0A      Offline(C)      Own       10
000005     ···          HITACHI .DF600F....0051     1A      Online          Non       1
 :          :            :                          :       :               :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where micro program replacement is only 1A.

ExampleB-1) Version 05-00 or later

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID     PathName            DskName ···     ChaPort     Status          Type      IO-Count ···
000000     ···          HITACHI .DF600F....0051     0A      Online          Own       10
000001     ···          HITACHI .DF600F....0051     1A      Offline(C)      Non       1
000002     ···          HITACHI .DF600F....0051     0A      Online          Own       10
000003     ···          HITACHI .DF600F....0051     1A      Offline(C)      Non       1
000004     ···          HITACHI .DF600F....0051     0A      Online          Own       10
000005     ···          HITACHI .DF600F....0051     1A      Offline(C)      Non       1
 :          :            :                          :       :               :
```

ExampleA-2) Version 04-xx or prior

```
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID    PathName          DskName ···      ChaPort   Status          Type    IO-Count ···
000000    ···       HITACHI .DF600F....0051   0A        Online          Own     10
000001    ···       HITACHI .DF600F....0051   1A        Offline(C)      Non     1
000002    ···       HITACHI .DF600F....0051   0A        Online          Own     10
000003    ···       HITACHI .DF600F....0051   1A        Offline(C)      Non     1
000004    ···       HITACHI .DF600F....0051   0A        Online          Own     10
000005    ···       HITACHI .DF600F....0051   1A        Offline(C)      Non     1
 :          :          :                :         :          :              :
```

Confirm the value of ‘OnlinePaths’. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /usr/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /usr/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the SANRISE side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the SANRISE side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of "[Operations of download the micro program]" in 6.1 again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced       33         0
---
> Reduced      265         0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken      33         0
---
> Shrunken     265         0
```

(7) In the case of HPM on AIX

Login as a user having the root authorization, and execute “datapath query adapter” command.

```
# /opt/HITdpo/bin/datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State      Mode      Select   Errors   Paths   Active
  0       fscsi0        NORMAL ACTIVE    36098    0        8       8
  1       fscsi1        NORMAL ACTIVE    38       0        8       8
```

Check that all the paths are connected to the DF500 and the “State” is displayed as “NORMAL” and “Mode” is displayed as “ACTIVE”. If neither “NORMAL” nor “ACTIVE” is displayed, suspend the micro program replacement and recover the failure.

(8) In the case of HDLM on Windows

Log into Windows with the user who has the Administrator authority, and execute the command [dlnkmgr view -sys -sfunc] from the command prompt.

```
# dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# dlnkmgr set -afb off
Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Open the command prompt, and execute “dlnkmgr view -path” command.

```
# dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName       DskName .....     ChaPort Status  Type .....
000000  .....          HITACHI DF600F    0A      Online  Own
000001  .....          HITACHI DF600F    1A      Online  Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where micro program replacement is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-00 or later, execute this operation to a port of the controller where micro program replacement is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where micro program replacement is executed.

  /usr/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where micro program replacement is only 0A.

ExampleA-1) Version 05-00 or later

```
# dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···   ChaPort   Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000001    ···       HITACHI .DF600F….0051     1A      Online          Non    1
000002    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000003    ···       HITACHI .DF600F….0051     1A      Online          Non    1
000004    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000005    ···       HITACHI .DF600F….0051     1A      Online          Non    1
 :          :          :                      :       :              :
```

ExampleA-2) Version 04-xx or prior

```
dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···   ChaPort   Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000001    ···       HITACHI .DF600F….0051     1A      Online          Non    1
000002    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000003    ···       HITACHI .DF600F….0051     1A      Online          Non    1
000004    ···       HITACHI .DF600F….0051     0A      Offline(C)      Own    10
000005    ···       HITACHI .DF600F….0051     1A      Online          Non    1
 :          :          :                      :       :              :
```

Confirm the value of ‘OnlinePaths’. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where micro program replacement is only 1A.

ExampleB-1) Version 05-00 or later

```
dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 3 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000001    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
000002    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000003    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
000004    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000005    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
 :          :            :                      :        :             :
```

ExampleA-2) Version 04-xx or prior

```
# dlnkmgr offline –pathid   000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000005
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName            DskName ···      ChaPort  Status        Type   IO-Count ···
000000    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000001    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
000002    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000003    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
000004    ···       HITACHI .DF600F….0051      0A       Online        Own    10
000005    ···       HITACHI .DF600F….0051      1A       Offline(C)    Non    1
 :          :            :                      :        :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd C:\tmp
# mkdir HDLMLOG
# cd HDLMLOG
# dlnkmgr view –path > path01.txt

   waiting for five minutes or more

# dlnkmgr view –path > path02.txt
```

When the contents are matched, perform the next operation in the SANRISE side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the SANRISE side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of "[Operations of download the micro program]" in 6.1 again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

HDLM version is 03-02 or later

```
# diff path01.txt path02.txt
2c2
< Reduced       33        0
---
> Reduced      265        0
```

HDLM version is 03-01 or earlier

```
# diff path01.txt path02.txt
2c2
< Shrunken       33        0
---
> Shrunken      265        0
```

(9) In the case of HPM on Windows

Press the “Start” menu and open “Program” -> “Path Manager” -> “Path Management”, then execute “datapath query adapter” command.

```
C:\Program Files\Hitachi\Path manager> datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State     Mode      Select  Errors  Paths  Active
  0     Scsi Port0 Bus0 NORMAL    ACTIVE    36098   0       8      8
  1     Scsi Port1 Bus0 NORMAL    ACTIVE    38      0       8      8
```

Check that all the paths are connected to the DF500 and the “State” is displayed as “NORMAL” and “Mode” is displayed as “ACTIVE”. If neither “NORMAL” nor “ACTIVE” is displayed, suspend the micro program replacement and recover the failure.

(10)In the case of HDLM on Linux

Login as a user having the root authorization, and execute “dlnkmgr view -sys -sfunc” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

When "Auto Failback :" is enabled (on), execute the command [dlnkmgr set -afb off].

```
# /opt/DynamicLinkManager/bin/dlnkmgr set -afb off

Execute command? [y/n] : y
KAPL01001-I The HDLM command completed normally. Operation name = set
```

Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
KAPL01001-I The HDLM command completed normally. Operation name = view
```

Execute the command [dlnkmgr view -path].

Login as a user having the root authorization, and execute “dlnkmgr view -path” command.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort Status   Type .....
000000   .....           HITACHI DF600F    0A      Online   Own
000001   .....           HITACHI DF600F    1A      Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”. If any path has a failure, suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

Execute “dlnkmgr offline” command, and change all the paths of the controller where micro program replacement is executed to the offline(C) status. This Operation is different according to the version of HDLM.

- In case of version 05-02 or later, execute this operation to a port of the controller where micro program replacement is executed. Once this operation is executed, all the paths of the targeted port number are changed to the offline(C) status.

  dlnkmgr offline –cha –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command.

- In case of version 04-xx or prior, execute this operation to all the paths of the port of the controller where micro program replacement is executed.

  dlnkmgr offline –pathid <PathID>

  <PathID> Specify the PathID corresponding to the storage subsystem name(DskName) and port number(ChaPort) which is shown by ‘dlnkmgr view –path’ command. Execute the above ‘dlnkmgr offline’ command to all the paths of the targeted port (ChaPort).

Example A) Port of the controller 0 where micro program replacement is only 0A.

ExampleA-1) Version 05-02 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000000
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 8 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···    ChaPort   Status        Type   IO-Count ···
000000   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000001   ···     HITACHI .DF600F….0051     1A        Online        Non    1
000002   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000003   ···     HITACHI .DF600F….0051     1A        Online        Non    1
000004   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000005   ···     HITACHI .DF600F….0051     1A        Online        Non    1
 :        :        :                        :         :             :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid   000000
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000002
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid   000004
   :
```

Execute the 'dlnkmgr view –path' command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000006 OnlinePaths:000003
PathStatus   IO-Counts   IO-Errors
Reduced      334         0

PathID   PathName          DskName ···    ChaPort   Status        Type   IO-Count ···
000000   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000001   ···     HITACHI .DF600F….0051     1A        Online        Non    1
000002   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000003   ···     HITACHI .DF600F….0051     1A        Online        Non    1
000004   ···     HITACHI .DF600F….0051     0A        Offline(C)    Own    10
000005   ···     HITACHI .DF600F….0051     1A        Online        Non    1
 :        :        :                        :         :             :
```

Confirm the value of 'OnlinePaths'. This value should be decreased by the number of 0A ports. And confirm the status of the 0A Port. This value should be the Offline (C) status.

Example B) Port of the controller 1 where micro program replacement is only 1A.

ExampleB-1) Version 05-02 or later

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –cha –pathid 00000001
KAPL01055-I All the paths which pass the specified CHA port will be changed to the Offline(C) status.
Is this OK? [y/n]:y
KAPL01056-I If you are sure that there would be no problem when all the paths which pass the specified
CHA port are placed in the Offline(C) status, enter y. Otherwise, enter n. [y/n]:y
KAPL01061-I 8 path(s) were successfully placed Offline(C); 0 path(s) were not. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000008
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···      ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000001    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000002    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000003    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000004    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000005    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
 :          :          :                       :        :               :
```

ExampleA-2) Version 04-xx or prior

```
# /opt/DynamicLinkManager/bin/dlnkmgr offline –pathid    000001
Execute command? [y/n] : y
KAPL01022-I 1 path(s) were processed. Operation name = offline
KAPL01001-I The HDLM command completed normally. Operation name = offline
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000003
   :
# /usr/DynamicLinkManager/bin/dlnkmgr offline –pathid    000005
   :
```

Execute the ‘dlnkmgr view –path’ command to confirm the offline(C) status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000016 OnlinePaths:000008
PathStatus   IO-Counts   IO-Errors
Reduced     334         0

PathID    PathName          DskName ···      ChaPort  Status          Type   IO-Count ···
000000    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000001    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000002    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000003    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
000004    ···       HITACHI .DF600F....0051   0A       Online          Own    10
000005    ···       HITACHI .DF600F....0051   1A       Offline(C)      Non    1
 :          :          :                       :        :               :
```

Confirm the value of ‘OnlinePaths’. This value should be decreased by the number of 1A ports. And confirm the status of the 1A Port. This value should be the Offline (C) status.

Output dlnkmgr view -path to the file after the Office(C) operation.
Compare the contents by outputting dlnkmgr view -path to the file again after waiting for five minutes or more to check the path determination.

```
# cd /tmp
# mkdir HDLMLOG
# cd HDLMLOG
# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path01.txt

   waiting for five minutes or more

# /opt/DynamicLinkManager/bin/dlnkmgr view –path | grep -v “Online” > path02.txt
# diff path01.txt path02.txt
```

When the contents are matched, perform the next operation in the SANRISE side(Note 1).
When the contents are mismatched, perform the following according to the mismatched contents.

(a) When IO-Counts displayed in dlnkmgr view -path are mismatched
Output dlnkmgr view -path to the file after waiting for further five minutes or more, and compare it with the previous output content.
If they are matched, perform the operation in the SANRISE side.
If they are mismatched, perform the operation of (a) again.

(b) When Offline(E) is displayed in dlnkmgr view -path.
Operate the procedure of "[Operations of download the micro program]" in 6.1 again with the path which is Offline(E).

Note 1: The following difference may occur in the comparison (diff) of the dlnkmgr view -path results. There is no problem because this is the one that the I/O count value increased as the I/O flowed to the Online path after offline(C).

```
# diff path01.txt path02.txt
2c2
< Reduced      33        0
---
> Reduced     265        0
```

(11)In the case of VxVM-DMP on Linux

Log into Linux with the user who has the root authority, and check CTLR-NAME connectin ghe SANRISE by the command [vxdmpadm listctlr all]. Furthermore, execute the command [xvdmpadm getsubpaths ctlr=cx] for each CTLR-NAME (cx is CTLR-NAME).

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
# vxdmpadm listctlr all
CTLR-NAME          ENCLR-TYPE          STATE     ENCLR-NAME
=================================================
c0                 Disk                ENABLED  Disk
c3                 HDS9500V            ENABLED  HDS9500V0
c2                 HDS9500V            ENABLED  HDS9500V0

# vxdmpadm getsubpaths ctlr=c2
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
=============================================================================
sdb    ENABLED(A)   PRIMARY       sdb         HDS9500V    HDS9500V0   -
sdc    ENABLED      SECONDARY     sdc         HDS9500V    HDS9500V0   -
sdd    ENABLED(A)   PRIMARY       sdd         HDS9500V    HDS9500V0   -
sde    ENABLED      SECONDARY     sde         HDS9500V    HDS9500V0   -
sdf    ENABLED(A)   PRIMARY       sdf         HDS9500V    HDS9500V0   -
sdg    ENABLED      SECONDARY     sdg         HDS9500V    HDS9500V0   -
sdh    ENABLED(A)   PRIMARY       sdh         HDS9500V    HDS9500V0   -
sdi    ENABLED      SECONDARY     sdi         HDS9500V    HDS9500V0   -
sdj    ENABLED(A)   PRIMARY       sdj         HDS9500V    HDS9500V0   -
sdk    ENABLED      SECONDARY     sdk         HDS9500V    HDS9500V0   -
sdl    ENABLED(A)   PRIMARY       sdl         HDS9500V    HDS9500V0   -

# vxdmpadm getsubpaths ctlr=c3
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
=============================================================================
sdm    ENABLED      SECONDARY     sdb         HDS9500V    HDS9500V0   -
sdn    ENABLED(A)   PRIMARY       sdc         HDS9500V    HDS9500V0   -
sdo    ENABLED      SECONDARY     sdd         HDS9500V    HDS9500V0   -
sdp    ENABLED(A)   PRIMARY       sde         HDS9500V    HDS9500V0   -
sdq    ENABLED      SECONDARY     sdf         HDS9500V    HDS9500V0   -
sdr    ENABLED(A)   PRIMARY       sdg         HDS9500V    HDS9500V0   -
sds    ENABLED      SECONDARY     sdh         HDS9500V    HDS9500V0   -
sdt    ENABLED(A)   PRIMARY       sdi         HDS9500V    HDS9500V0   -
sdu    ENABLED      SECONDARY     sdj         HDS9500V    HDS9500V0   -
sdv    ENABLED(A)   PRIMARY       sdk         HDS9500V    HDS9500V0   -
sdw    ENABLED      SECONDARY     sdl         HDS9500V    HDS9500V0   -
```

Check that all the paths are displayed as “ENABLED”. If any path has a failure (DISABLED), suspend the micro program replacement and recover the failure.

Note: The microprogram replacement by pulling out the FC cables cannot be performed.

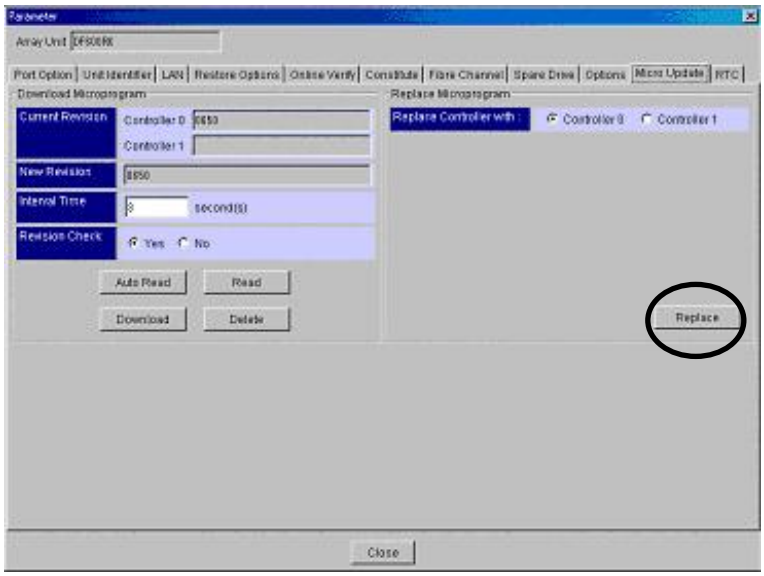
(12)In the case of 9900V

Maintain paths from 9900V to DF700/DF600, if it is necessary.

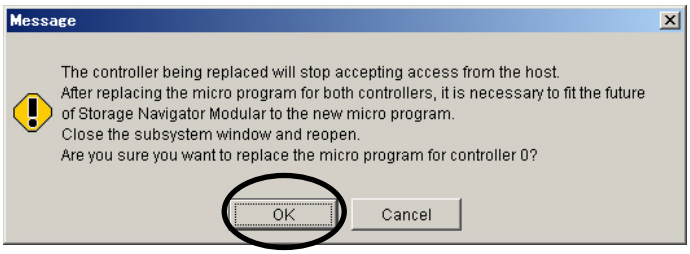
Please maintain paths with 9900V maintenance member.

Step2:

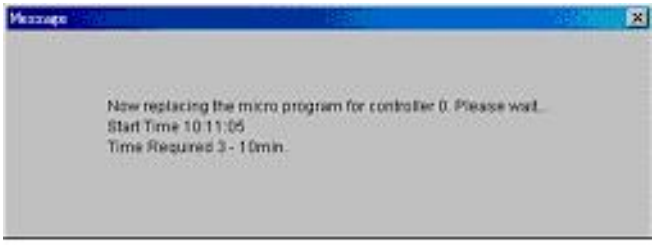
Select a controller unit to replace the micro program on the "Micro Update" window of DAMP/SNM and then click the "Replace" button.



Click the "OK" button.



The following window is displayed and the micro program is updated.



[For DF500]

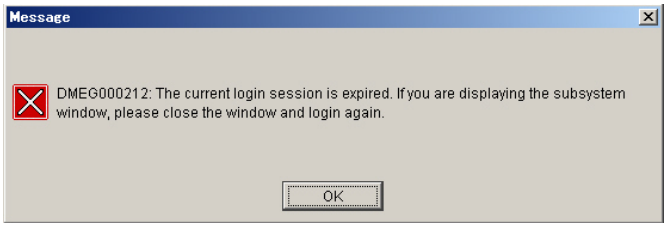


When the micro program update is completed, following message is displayed on the DAMP. Click the "OK" button.



Note: If the operations for changing the system configuration (for example, LU creation, format, LU owner right change) were done before Online Micro Program Replacement, "I140xy (or I140HH) system copy started (Unit-x, HDU-y)" message on the information message of WEB may be displayed multiple times. However, there is no problem.

Note: When making the access from the host accepted by the instruction from Storage Navigator Modular, the following message may be displayed if it is not operated for 20 minutes or more in the case where Account Authentication is valid, and it may not be completed normally. Perform the dummy replacement (To remove the part concerned once, and then to reinstall it after waiting for 20 seconds or more) of the Control Unit whose microprogram was replaced to make the access from the host accepted.
If the access from the host is made accepted when the replacement of the microprogram is completed, the dummy replacement is unnecessary.



Step3: (server side)

Check the status of paths to the LUs. If multiple OS are connected, perform the operations on all the servers connected to DF700/DF600/DF500 that the micro program is to be replaced.

(1) In the case of PVLink on HP-UX

Execute "vgdisplay –v vg??" command, and check that all the active paths returned to the initial status.

```
# vgdisplay –v vg02
--- Volume groups ---
VG Name                     /dev/vg02
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      4
Open LV                     4
Max PV                      16
Cur PV                      1
Act PV                      1
Max PE per PV               1016
VGDA                        2
PE Size (Mbytes)            4
Total PE                    511
Alloc PE                    500
Free PE                     11
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0
   --- Logical volumes ---
   LV Name                  /dev/vg02/lvol1
   LV Status                available/syncd
   LV Size (Mbytes)         1000
   Current LE               250
   Allocated PE             250
   Used PV                  1
   --- Physical volumes ---
   PV Name                  /dev/dsk/c83t0d0
   PV Name                  /dev/dsk/c24t0d0 Alternate Link
   PV Status                available
   Total PE                 511
   Free PE                  11
   Autoswitch               On
```

If the path is not returned to the initial status, execute the "vgdisplay –v vg??" command every 30 seconds and check.

(2) In the case of HDLM on HP-UX

Execute the “dlnkmgr online” command and change the offline path to the online status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the “dlnkmgr view -path” command

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID   PathName        DskName .....     ChaPort Status   Type .....
000000   .....           HITACHI DF600F    0A      Online   Own
000001   .....           HITACHI DF600F    1A      Online   Non
```

Check that the values of “Paths:” and “OnlinePaths:” are the same. Then, check that all paths are “Online”.

(3) In the case of VxVM-DMP on Solaris

The commands to operate differ in the cases where the version of VxVM is 3.2 or later and where it is before 3.2.

(a) When the version of VxVM is 3.2 or later, execute the command [vxdmpadm listctlr all] and the command [vxdmpadm getsubpaths ctlr=cx], and check the path status (cx is CTLR-NAME).

```
# vxdmpadm listctlr all
CTLR-NAME       ENCLR-TYPE      STATE           ENCLR-NAME
=============================================================
c1              Disk            ENABLED         Disk
c2              AMS_WMS         ENABLED         AMS_WMS0
c3              AMS_WMS         ENABLED         AMS_WMS0

# vxdmpadm getsubpaths ctlr=c2
NAME    STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE   ENCLR-NAME  ATTRS
=============================================================================
c2t0d0s2 ENABLED(A)   SECONDARY     c2t0d0s2      AMS_WMS      AMS_WMS0    -
c2t0d1s2 ENABLED(A)   PRIMARY       c2t0d1s2      AMS_WMS      AMS_WMS0    -
c2t0d2s2 ENABLED(A)   SECONDARY     c2t0d2s2      AMS_WMS      AMS_WMS0    -
c2t0d3s2 ENABLED(A)   PRIMARY       c2t0d3s2      AMS_WMS      AMS_WMS0    -
c2t0d4s2 ENABLED      SECONDARY     c2t0d4s2      AMS_WMS      AMS_WMS0    -
c2t0d5s2 ENABLED(A)   PRIMARY       c2t0d5s2      AMS_WMS      AMS_WMS0    -
c2t0d6s2 ENABLED      SECONDARY     c2t0d6s2      AMS_WMS      AMS_WMS0    -
c2t0d7s2 ENABLED(A)   PRIMARY       c2t0d7s2      AMS_WMS      AMS_WMS0    -

# vxdmpadm getsubpaths ctlr=c3
NAME    STATE[A]      PATH-TYPE[M]  DMPNODENAME   ENCLR-TYPE   ENCLR-NAME  ATTRS
=============================================================================
c3t0d0s2 DISABLED     PRIMARY       c2t0d0s2      AMS_WMS      AMS_WMS0    -
c3t0d1s2 ENABLED      SECONDARY     c2t0d1s2      AMS_WMS      AMS_WMS0    -
c3t0d2s2 DISABLED     PRIMARY       c2t0d2s2      AMS_WMS      AMS_WMS0    -
c3t0d3s2 ENABLED      SECONDARY     c2t0d3s2      AMS_WMS      AMS_WMS0    -
c3t0d4s2 ENABLED(A)   PRIMARY       c2t0d4s2      AMS_WMS      AMS_WMS0    -
c3t0d5s2 ENABLED      SECONDARY     c2t0d5s2      AMS_WMS      AMS_WMS0    -
c3t0d6s2 ENABLED(A)   PRIMARY       c2t0d6s2      AMS_WMS      AMS_WMS0    -
c3t0d7s2 ENABLED      SECONDARY     c2t0d7s2      AMS_WMS      AMS_WMS0    -
```

When DISABLED is included in the path status displayed by the command [vxdmpadmgetsubpaths ctlr=cx], execute the command [vxdmpadm enable ctlr=cx] for the CTLR-NAME (c3 in the above case), and change the path into the enable status. After that, execute the command [vxdmpadm getsubpaths ctlr=cx], and check that all the path statuses are returned to ENABLED (cx is CTLR-NAME).

```
# vxdmpadm enable ctlr=c3

# vxdmpadm getsubpaths ctlr=c2
NAME      STATE[A]      PATH-TYPE[M] DMPNODENAME   ENCLR-TYPE   ENCLR-NAME  ATTRS
================================================================================
c2t0d0s2  ENABLED       SECONDARY    c2t0d0s2      AMS_WMS      AMS_WMS0    -
c2t0d1s2  ENABLED(A)    PRIMARY      c2t0d1s2      AMS_WMS      AMS_WMS0    -
c2t0d2s2  ENABLED       SECONDARY    c2t0d2s2      AMS_WMS      AMS_WMS0    -
c2t0d3s2  ENABLED(A)    PRIMARY      c2t0d3s2      AMS_WMS      AMS_WMS0    -
c2t0d4s2  ENABLED       SECONDARY    c2t0d4s2      AMS_WMS      AMS_WMS0    -
c2t0d5s2  ENABLED(A)    PRIMARY      c2t0d5s2      AMS_WMS      AMS_WMS0    -
c2t0d6s2  ENABLED       SECONDARY    c2t0d6s2      AMS_WMS      AMS_WMS0    -
c2t0d7s2  ENABLED(A)    PRIMARY      c2t0d7s2      AMS_WMS      AMS_WMS0    -

# vxdmpadm getsubpaths ctlr=c3
NAME      STATE[A]      PATH-TYPE[M] DMPNODENAME   ENCLR-TYPE   ENCLR-NAME  ATTRS
================================================================================
c3t0d0s2  ENABLED(A)    PRIMARY      c2t0d0s2      AMS_WMS      AMS_WMS0    -
c3t0d1s2  ENABLED       SECONDARY    c2t0d1s2      AMS_WMS      AMS_WMS0    -
c3t0d2s2  ENABLED(A)    PRIMARY      c2t0d2s2      AMS_WMS      AMS_WMS0    -
c3t0d3s2  ENABLED       SECONDARY    c2t0d3s2      AMS_WMS      AMS_WMS0    -
c3t0d4s2  ENABLED(A)    PRIMARY      c2t0d4s2      AMS_WMS      AMS_WMS0    -
c3t0d5s2  ENABLED       SECONDARY    c2t0d5s2      AMS_WMS      AMS_WMS0    -
c3t0d6s2  ENABLED(A)    PRIMARY      c2t0d6s2      AMS_WMS      AMS_WMS0    -
c3t0d7s2  ENABLED       SECONDARY    c2t0d7s2      AMS_WMS      AMS_WMS0    -
```

(b) When the version of VxVM is before 3.2, execute the command [vxdisk list cXtYdZs2], and check that all the paths are returned to the owner Control Unit.

```
# vxdisk list c4t0d0s2
Device:         c4t0d0s2
devicetag:      c4t0d0
type:           sliced
hostid:
disk:           name= id=1067933033.3997.V880-1
group:          name= id=1067933103.4030.V880-1
flags:          online ready private autoconfig
pubpaths:       block=/dev/vx/dmp/c4t0d0s4 char=/dev/vx/rdmp/c4t0d0s4
privpaths:      block=/dev/vx/dmp/c4t0d0s3 char=/dev/vx/rdmp/c4t0d0s3
version:        2.2
iosize:         min=512 (bytes) max=256 (blocks)
public:         slice=4 offset=0 len=8217600
private:        slice=3 offset=1 len=38143
update:         time=1067993564 seqno=0.147
headers:        0 248
configs:        count=1 len=28130
logs:           count=1 len=4262
Defined regions:
 config   priv 000017-000247[000231]: copy=01 offset=000000 enabled
 config   priv 000249-028147[027899]: copy=01 offset=000231 enabled
 log      priv 028148-032409[004262]: copy=01 offset=000000 enabled
Multipathing information:
numpaths:   2
c4t0d0s2        state=enabled     type=primary
c5t1d0s2        state=enabled     type=secondary
```

The following message is displayed in the console window when the path returns.

```
vxdmp: [ID 916426 kern.notice] NOTICE:
vxvm:vxdmp: enabled controller
/sbus@a,0/fcr@2,400000 connected to disk array ???
```

(4) In the case of HDLM on Solaris

Execute the "dlnkmgr online" command and change the offline path to the online status.

```
# /opt/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the "dlnkmgr view -path" command

```
# /opt/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName        DskName .....   ChaPort Status  Type .....
000000  .....           HITACHI DF600F  0A      Online  Own
000001  .....           HITACHI DF600F  1A      Online  Non
```

Check that the values of "Paths:" and "OnlinePaths:" are the same. Then, check that all paths are "Online".

(5) In the case of HPM on Solaris

Execute "datapath query adapter" command.

```
# /opt/HITdpo/bin/datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State     Mode    Select  Errors  Paths   Active
  0 QLGC,isp@0,1000     DEGRAD    ACTIVE  36098   0       8       8
  1 QLGC,isp@1,1000     NORMAL    ACTIVE  38      0       8       8
```

Since the server cannot complete the I/O issued to the controller replacing the micro program, the status of the path may change to "DEGRAD" or "FAILED" from "NORMAL". If you want to switch this status to "NORMAL", use the "datapath set adapter ? online" command. (? = adapter number)

```
# /opt/HITdpo/bin/datapath set adapter 0 online
```

After execution of this command, execute "datapath query adapter" command to check that the "State" of the path is "NORMAL".

(6) In the case of HDLM on AIX

Execute the "dlnkmgr online" command and change the offline path to the online status.

```
# /usr/DynamicLinkManager/bin/dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the "dlnkmgr view -path" command

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus        IO-Counts        IO-Errors
Online            310              0

PathID  PathName        DskName .....     ChaPort Status  Type .....
000000  .....           HITACHI DF600F    0A      Online  Own
000001  .....           HITACHI DF600F    1A      Online  Non
```

Check that the values of "Paths:" and "OnlinePaths:" are the same. Then, check that all paths are "Online".

(7) In the case of HPM on AIX

Execute "datapath query adapter" command.

```
# /opt/HITdpo/bin/datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State    Mode    Select  Errors  Paths  Active
  0     fscsi0          DEGRAD   ACTIVE  36098   0       8      8
  1     fscsi1          NORMAL   ACTIVE  38      0       8      8
```

Since the server cannot complete the I/O issued to the controller replacing the micro program, the status of the path may change to "DEGRAD" or "FAILED" from "NORMAL". If you want to switch this status to "NORMAL", use the "datapath set adapter ? online" command. (? = adapter number)

```
# /opt/HITdpo/bin/datapath set adapter 0 online
```

After execution of this command, execute "datapath query adapter" command to check that the "State" of the path is "NORMAL".

(8) In the case of HDLM on Windows

Execute the "dlnkmgr online" command and change the offline path to the online status.

```
# dlnkmgr online
Execute command?
[y/n] : y
KAPL01022-I The six paths are processed. Operation name = online
KAPL01001-I The HDLM command was completed normally. Operation name =
online
```

Execute the "dlnkmgr view -path" command

```
# dlnkmgr view –path
Paths:000012 OnlinePaths:000012
PathStatus      IO-Counts       IO-Errors
Online          310             0

PathID  PathName        DskName .....   ChaPort Status  Type .....
000000  .....           HITACHI DF600F  0A      Online  Own
000001  .....           HITACHI DF600F  1A      Online  Non
```

Check that the values of "Paths:" and "OnlinePaths:" are the same. Then, check that all paths are "Online".

(9) In the case of HPM on Windows

Execute "datapath query adapter" command.

```
C:\Program Files\Hitachi\Path manager> datapath query adapter

Active Adapters :2
  Adpt# Adapters Name   State     Mode    Select  Errors  Paths   Active
  0     fscsi0          DEGRAD    ACTIVE  36098   0       8       8
  1     fscsi1          NORMAL    ACTIVE  38      0       8       8
```

Since the server cannot complete the I/O issued to the controller replacing the micro program, the status of the path may change to "DEGRAD" or "FAILED" from "NORMAL". If you want to switch this status to "NORMAL", use the "datapath set adapter ? online" command. (? = adapter number)

```
C:\Program Files\Hitachi\Path manager> datapath set adapter 0 online
```

After execution of this command, execute "datapath query adapter" command to check that the "State" of the path is "NORMAL".

(10)In the case of VxVM-DMP on Linux

When DISABLED is included in the path status displayed by the command [vxdmpadm getsubpaths ctlr=cx], execute the command [vxdmpadm enable ctlr=cx] for the CTLR-NAME (c2 in the above case), and change the path into the enable status. After that, execute the command [vxdmpadm getsubpaths ctlr=cx], and check that all the path statuses are returned to ENABLED (cx is CTLR-NAME).

```
# vxdmpadm enable ctlr=c2

# vxdmpadm getsubpaths ctlr=c2
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
==========================================================================
sdb    ENABLED(A)   PRIMARY       sdb         HDS9500V    HDS9500V0   -
sdc    ENABLED      SECONDARY     sdc         HDS9500V    HDS9500V0   -
sdd    ENABLED(A)   PRIMARY       sdd         HDS9500V    HDS9500V0   -
sde    ENABLED      SECONDARY     sde         HDS9500V    HDS9500V0   -
sdf    ENABLED(A)   PRIMARY       sdf         HDS9500V    HDS9500V0   -
sdg    ENABLED      SECONDARY     sdg         HDS9500V    HDS9500V0   -
sdh    ENABLED(A)   PRIMARY       sdh         HDS9500V    HDS9500V0   -
sdi    ENABLED      SECONDARY     sdi         HDS9500V    HDS9500V0   -
sdj    ENABLED(A)   PRIMARY       sdj         HDS9500V    HDS9500V0   -
sdk    ENABLED      SECONDARY     sdk         HDS9500V    HDS9500V0   -
sdl    ENABLED(A)   PRIMARY       sdl         HDS9500V    HDS9500V0   -

# vxdmpadm getsubpaths ctlr=c3
NAME   STATE[A]      PATH-TYPE[M]  DMPNODENAME ENCLR-TYPE  ENCLR-NAME  ATTRS
==========================================================================
sdm    ENABLED      SECONDARY     sdb         HDS9500V    HDS9500V0   -
sdn    ENABLED(A)   PRIMARY       sdc         HDS9500V    HDS9500V0   -
sdo    ENABLED      SECONDARY     sdd         HDS9500V    HDS9500V0   -
sdp    ENABLED(A)   PRIMARY       sde         HDS9500V    HDS9500V0   -
sdq    ENABLED      SECONDARY     sdf         HDS9500V    HDS9500V0   -
sdr    ENABLED(A)   PRIMARY       sdg         HDS9500V    HDS9500V0   -
sds    ENABLED      SECONDARY     sdh         HDS9500V    HDS9500V0   -
sdt    ENABLED(A)   PRIMARY       sdi         HDS9500V    HDS9500V0   -
sdu    ENABLED      SECONDARY     sdj         HDS9500V    HDS9500V0   -
sdv    ENABLED(A)   PRIMARY       sdk         HDS9500V    HDS9500V0   -
sdw    ENABLED      SECONDARY     sdl         HDS9500V    HDS9500V0   -
```

The following message is displayed in the console window when the path returns.

```
Nov 11 17:03:28 RH3U3-2 kernel: vxvm:vxdmp: enabled path 8/0xe0 belonging
to the dmpnode 201/0x1f
```

(11)In the case of 9900V

Maintain paths from 9900V to DF700/DF600.
Please maintain paths with 9900V maintenance member.

Step4:

Replace the micro program on the other controller by following the procedures in Step1 to Step3.

6.3 Operations after the Micro Program Replacement

If "IO Timeout" or "AutoSwitch" parameter of PVLink was changed, perform the following operation to recover the original value.

[Operations of returning the PVLink parameters]

(1) Login as a user having the root authorization in HP-UX, and execute "vgdisplay /dev/dsk/c?t?d?" command.

```
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                 /dev/dsk/c11t0d1
PV Name                 /dev/dsk/c13t1d1        Alternate Link
VG Name                 /dev/vg02
PV Status               available
Allocatable             yes
VGDA                    2
Cur LV                  4
PE Size (Mbytes)        4
Total PE                1023
Free PE                 148
Allocated PE            875
Stale PE                0
IO Timeout (Seconds)    60
Autoswitch              On
#
```

(2) If original value of "IO Timeout" parameter was default, execute "pvchange –t 0 /dev/dsk/c?t?d?" command to return. If original value was 50, execute "pvchange –t 50 /dev/dsk/c?t?d?" command. And, execute "vgdisplay ./dev/dsk/c?t?d?" command to check the result.

(3) If original value of "AutoSwitch" parameter was Off, execute "pvchange –S n "dev/dsk/c?t?d?" command to return, and check the result.

When "Auto Failback :" is disabled, execute the following.

[Operations of returning the HDLM parameters]

(1) Excute the command [dlmkmgr view -sys -sfunc].

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : off
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```

(2) When "Auto Failback :" is disabled (off), execute the command [dlnkmgr set -afb on].

```
# /usr/DynamicLinkManager/bin/dlnkmgr set -afb on



Execute command? [y/n] : y

KAPL01001-I The HDLM command completed normally. Operation name = set
```

(3) Execute the command [dlnkmgr view -sys -sfunc], and check the change.

```
# /usr/DynamicLinkManager/bin/dlnkmgr view –sys –sfunc
HDLM Version : 04-00
Load Balance : on
Support Cluster :
Elog Level : 3
Elog File Size(KB) : 1000
Trace Level : 1
Path Health Checking : on(30)
Auto Failback : on(1)
Reservation Status : on(0)
KAPL01001-I The HDLM command completed normally. Operation name = view
```