DF600

Disk Array Subsystem

Maintenance Manual

REV.24

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.

HITACHI

Copyright © 2002, 2005, Hitachi, Ltd.

Preface

This manual explains the operation introduction, installation, maintenance, and WEB of the DF600 disk array subsystem for service personnel to make them understand the DF600.

This manual contains information on maintenance works of the DF600 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Cautionary Notes

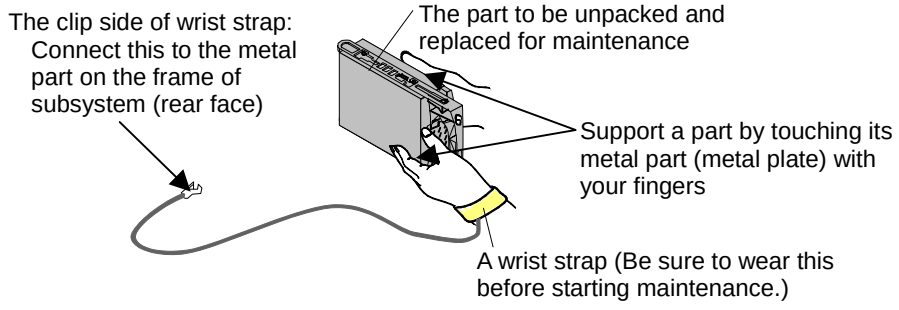
On This Manual

- Hitachi, Ltd. owns the copyrights of the DF600 Maintenance Manual. No part of this manual may be reused or reproduced without permission of Hitachi, Ltd.
- Hitachi, Ltd. is not liable for any troubles or accidents which are caused by operation not written in this manual.
- The DF600 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 two 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 or RS232C 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 keep the wrist band close to the subsystem.
- 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.



Copyright © 2002, 2005, Hitachi, Ltd.

Trademarks

HP is a company name of Hewlett Packard Company, in the U.S.A.
IBM, AIX is a registered trademark of International Business Machines Corp. in the U.S.A.
IRIX is a product name of Sillicon Graphics, Inc. in the U.S.A.
Java and all the brands and logos concerning Java are trade marks or registered trademarks of Sun Microsystems, Inc. in the United States of America and other countries.
Solaris is a product name of Sun Microsystems, Inc. in the U.S.A.
Sun is a registered trademark of Sun Microsystems, Inc. in the U.S.A.
Windows is a registered trademark of Microsoft Corp, Inc. in the U.S.A. and other countries.

Other company names and trade names described in this manual are trademarks or registered trademarks of each respective company.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

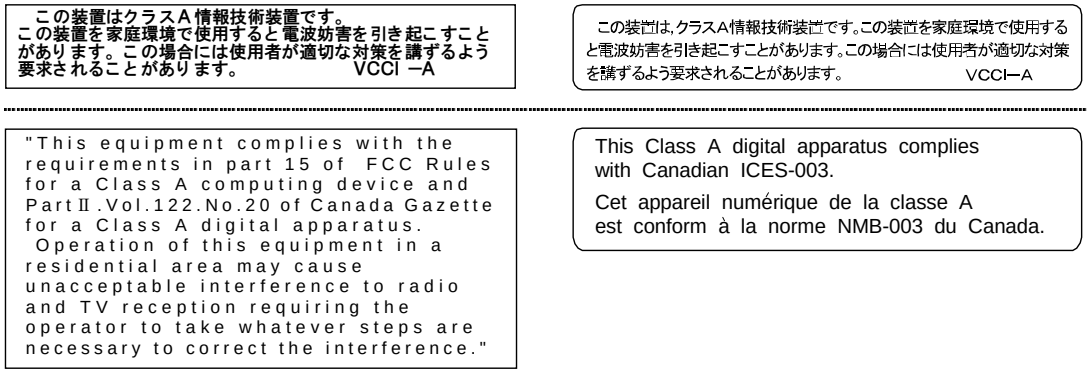
Copyright © 2003, 2005, Hitachi, Ltd.

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.

- DF600-RK/RKD/RKS/RKSD+H1H
- DF600-RK/RKD+RKA/RKAD+H2H
- DF600-RK/RKD+RKA(×14)/RKAD(14)+U6(×2)
- DF600-RK/RKD+RKA(×2)+U6/DF600-RKHE+RKA(×2)+U6
- DF600-RK+RKA+RKAAT+U6
- DF600-RK+RKAJAT(×3)+U6
- DF600-RKH/RKHE+RKA+RKAAT/RKAJAT+U6
- DF600-RKL+RKAATL(×3)

Copyright © 2002, 2005, Hitachi, Ltd.

Model Name Conversion

Throughout this document, product model name is written as “DF600”. When you want to use this document for the HT-4063 series, please conversion the model name “DF600” with “HT-4063”.

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 DF600	Type
DF600-××××	HT-4063-××××	Rackmount model (DF600-RK) Rackmount model (DF600-RKL) Rackmount model (DF600-RKA) Rackmount model (DF600-RKAAT) Rackmount model (DF600-RKAATL) Rackmount model (DF600-RKAJAT) Rackmount model (DF600-RKAJATL) Rackmount model (DF600-RKS) Rackmount model (DF600-RKD) Rackmount model (DF600-RKAD) Rackmount model (DF600-RKSD) Rackmount model (DF600-RKH) Rackmount model (DF600-RKHE) Floor model (RK + H1H) Floor model (RKS+ H1H) Floor model (RK + RKA + H2H) Floor model (RKD + H1HD) Floor model (RKSD+ H1HD) Floor model (RKD + RKAD + H2HD)
DF-F600-××××	HT-F4063-××××	Optional component Accessory component

Copyright © 2002, 2005, Hitachi, Ltd.

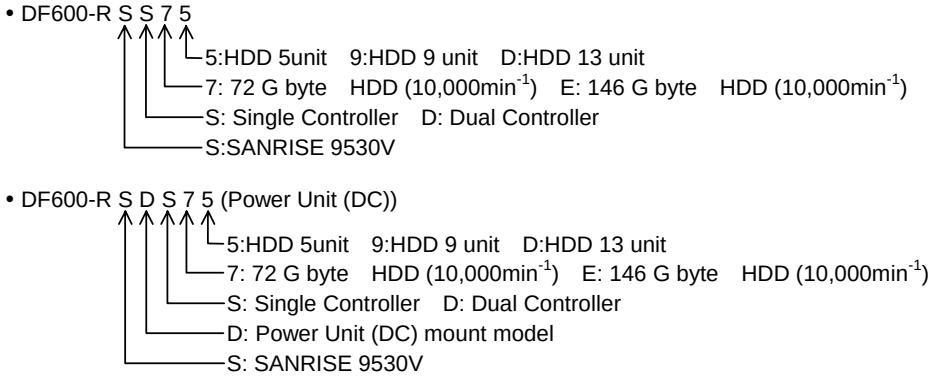
Table 2 Conversion Table for Integration Model Name and Model Name

Integration Model name	Model Component	Remarks
DF600-RKLSA4 (HT-4063-RKLSA4)	DF600-RKL + DF-F600-F1HL×1 + DF-F600-ATE146 L×4 (HT-4063-RKL + HT-F4063-F1HL×1 + HT-F4063-ATE146L×4)	
DF600-RKLV4 (HT-4063-RKLV4)	DF600-RKL + DF-F600-F1HL×2 + DF-F600-ATE146 L×4 (HT-4063-RKL + HT-F4063-F1HL×2 + HT-F4063-ATE146L×4)	
DF600-RKLV7 (HT-4063-RKLV7)	DF600-RKL + DF-F600-F1HL×2 + DF-F600-ATE146 L×7 (HT-4063-RKL + HT-F4063-F1HL×2 + HT-F4063-ATE146L×7)	
DF600-RSS36 (HT-4063-RSS36)	DF600-RKS + DF-F600-F1HS + DF-F600-AEH36×6 (HT-4063-RKS + HT-F4063-F1HS + HT-F4063-AEH36×6)	
DF600-RSD36 (HT-4063-RSD36)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEH36×6 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEH36×6)	
DF600-RSD3D (HT-4063-RSD3D)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEH36×13 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEH36×13)	
DF600-RSS75 (HT-4063-RSS75)	DF600-RKS + DF-F600-F1HS + DF-F600-AEF72×5 (HT-4063-RKS + HT-F4063-F1HS + HT-F4063-AEF72×5)	
DF600-RSD75 (HT-4063-RSD75)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF72×5 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF72×5)	
DF600-RSDE5 (HT-4063-RSDE5)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF146×5 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF146×5)	
DF600-RSD79 (HT-4063-RSD79)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF72×9 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF72×9)	
DF600-RSDE9 (HT-4063-RSDE9)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF146×9 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF146×9)	
DF600-RSD7D (HT-4063-RSD7D)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF72×13 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF72×13)	
DF600-RSDED (HT-4063-RSDED)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEF146×13 (HT-4063-RKS + HT-F4063-F1HS×2 + HT-F4063-AEF146×13)	
DF600-RSDS36 (HT-4063-RSDS36)	DF600-RKS + DF-F600-F1HS + DF-F600-AEH36×6 (HT-4063-RKSD + HT-F4063-F1HS + HT-F4063-AEH36×6)	For Power Unit (DC)
DF600-RSDD36 (HT-4063-RSDD36)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEH36×6 (HT-4063-RKSD + HT-F4063-F1HS×2 + HT-F4063-AEH36×6)	For Power Unit (DC)
DF600-RSDD3D (HT-4063-RSDD3D)	DF600-RKS + DF-F600-F1HS×2 + DF-F600-AEH36×13 (HT-4063-RKSD + HT-F4063-F1HS×2 + HT-F4063-AEH36×13)	For Power Unit (DC)
DF600-RSDS75 (HT-4063-RSDS75)	DF600-RKSD + DF-F600-F1HS + DF-F600-AEF72×5 (HT-4063-RKSD + HT-F4063-F1HS + HT-F4063-AEF72×5)	For Power Unit (DC)
DF600-RSDD75 (HT-4063-RSDD75)	DF600-RKSD + DF-F600-F1HS×2 + DF-F600-AEF72×5 (HT-4063-RKSD + HT-F4063-F1HS×2 + HT-F4063-AEF72×5)	For Power Unit (DC)
DF600-RSDD79 (HT-4063-RSDD79)	DF600-RKSD + DF-F600-F1HS×2 + DF-F600-AEF72×9 (HT-4063-RKSD + HT-F4063-F1HS×2 + HT-F4063-AEF72×9)	For Power Unit (DC)
DF600-RSDD7D (HT-4063-RSDD7D)	DF600-RKSD + DF-F600-F1HS×2 + DF-F600-AEF72×13 (HT-4063-RKSD + HT-F4063-F1HS×2 + HT-F4063-AEF72×13)	For Power Unit (DC)
DF600-RKS(*1) (HT-4063-RKS)	DF600-RKS(Chassis) + DF-F600-F1HS×2 (HT-4063-RKS(Chassis) + HT-F4063-F1HS×2)	Disk drive free

*1 : This does not conform to legend for the collective model name.

Copyright © 2003, 2005, Hitachi, Ltd.

Example for integration model name



Model names exclusive to products for SONY are not described in this manual. However, procedures for operating the products are the same as those of the equivalent products shown below. Therefore, when using the product for SONY, use this manual replacing model names described in it.

Table 3 Replacement of Model Names of Products for SONY with Those of Equivalent Products

Model Names of Products for SONY	Equivalent Model Names
DF600-RK-SY	DF600-RK
DF600-RKA-SY	DF600-RKA
DF-F600-AEH72SY	DF-F600-AEH72

Copyright © 2003, 2005, Hitachi, Ltd.

Contents

Preface ..... GENE 0010

Cautionary Notes ..... GENE 0020

Note ..... GENE 0030

Model Name Conversion ..... GENE 0040

⚠ SAFETY SUMMARY ..... SAFE 0000

[Introduction]

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

1.1 Warranty ..... INTO 01-0000

1.2 Service ..... INTO 01-0010

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

2.1 What is RAID ..... INTO 02-0000

2.1.1 Application of RAID technology ..... INTO 02-0010

2.1.2 RAID levels ..... INTO 02-0020

2.2 Outline of the Subsystem ..... INTO 02-0040

2.2.1 Outline of functions ..... INTO 02-0040

2.2.2 Differences between the DF600 and DF500 ..... INTO 02-0070

2.3 Subsystem Structure ..... INTO 02-0090

2.3.1 External appearances ..... INTO 02-0100

2.3.2 Configuration of floor model ..... INTO 02-0130

2.3.3 System configuration of the rackmount model ..... INTO 02-0140

2.3.4 Configuration of rackmount model with U6/U4 rack frame ..... INTO 02-0160

2.4 Configuration of Internal Power Supply System ..... INTO 02-0180

2.5 Configuration of Internal Data System ..... INTO 02-0210

2.6 Configuration of Built-in Software ..... INTO 02-0230

2.6.1 Block diagram built-in software configuration ..... INTO 02-0230

2.6.2 Storages for parameters ..... INTO 02-0260

Copyright © 2002, 2005, Hitachi, Ltd.

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

3.1 Basic Specifications of the Subsystem .....INTO 03-0010

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

4.1 Power On/Off Sequence .....INTO 04-0000
4.1.1 IMPL sequence.....INTO 04-0000
4.1.2 Disk Drive powering on sequence.....INTO 04-0020
4.1.3 Sequential shutdown.....INTO 04-0050
4.2 Data Format .....INTO 04-0060
4.3 Read/Write Operation.....INTO 04-0070
4.3.1 Command execution.....INTO 04-0070
4.3.2 Dual system configuration.....INTO 04-0080
4.4 Cache Memory Control .....INTO 04-0100
4.4.1 Purpose of Cache memory .....INTO 04-0100
4.4.2 Cache memory configuration .....INTO 04-0101
4.4.3 Cache memory structure.....INTO 04-0102
4.4.4 Basic operation of cache control .....INTO 04-0104
4.4.5 Destaging operation.....INTO 04-0110
4.4.6 Staging operation (Writing to the Cache memory) .....INTO 04-0120
4.5 Optional Functions .....INTO 04-0121
4.6 Operation Against Disk Failure Occurs .....INTO 04-0140
4.7 Setting RAID Group.....INTO 04-0180

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

5.1 P.P.s Required for Maintenance .....INTO 05-0000

Copyright © 2002, 2005, Hitachi, Ltd.

[Installation]

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

1.1 Before Starting Installation Work ..... INST 01-0000
1.2 The Correspondence between the Equipment Serial Number and the Software Revision.. INST 01-0030
1.3 Installation Configuration of the Subsystem ..... INST 01-0040
1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem..... INST 01-0050
1.4.1 How to attach/remove Front Bezel of Floor Model ..... INST 01-0050
1.4.2 How to attach/remove Rear Cover of Floor Model..... INST 01-0070
1.4.3 How to attach/remove Front Bezel of the Rackmount Model ..... INST 01-0080
1.4.4 How to open/close the Rear Door of U6 rack frame ..... INST 01-0100
1.4.5 How to open/close the Rear Door of U4 rack frame ..... INST 01-0110
1.5 Restrictions on Using the Fibre Channel Interface..... INST 01-0120
1.6 Model Name ..... INST 01-0130
1.6.1 Components and indispensable parts ..... INST 01-0130
1.6.2 Optional parts ..... INST 01-0150
1.6.3 Accessory parts..... INST 01-0160
1.7 Device ID Setting and ENC Cable Connection..... INST 01-0180
1.7.1 Example of device ID and ENC cable connection ..... INST 01-0180
1.7.2 Acquisition of device ID and ENC cable connection information ..... INST 01-0220
1.7.3 Checking methods of device ID and ENC cable connection when mounting the newly introduced rack ..... INST 01-0240
1.7.4 Procedure for making the configuration diagram when adding the disk unit(s)..... INST 01-0320

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

2.1 Procedures for Installing Floor Model ..... INST 02-0000
2.2 Unpacking the Subsystem ..... INST 02-0020
2.3 Installing Floor Stand Kit ..... INST 02-0050
2.3.1 Removing Disk Drive..... INST 02-0050
2.3.2 Installing Floor Stand Kit..... INST 02-0070
2.3.3 Procedure for installing Floor Stand Kit ..... INST 02-0080
2.4 Installing the Subsystem..... INST 02-0160
2.4.1 Subsystem floor-space and service clearance ..... INST 02-0160
2.4.2 Installing the subsystem ..... INST 02-0170
2.5 Installing Components..... INST 02-0180

Copyright © 2002, 2005, Hitachi, Ltd.

2.6 Connecting Cables ..... INST 02-0300
2.6.1 Connecting interface cables ..... INST 02-0300
2.6.2 Connecting ENC cables ..... INST 02-0320
2.6.3 Connecting power cables ..... INST 02-0340
2.6.4 Installing cramps ..... INST 02-0350
2.7 Power On/Off Procedure ..... INST 02-0370
2.7.1 Subsystem power on ..... INST 02-0370
2.7.2 Subsystem power off ..... INST 02-0380
2.8 Setting the Power Control Mode (Local/Remote Mode) ..... INST 02-0390
2.9 How to Attach/Remove Front Bezel or Rear Cover ..... INST 02-0420
2.9.1 Attaching Front Bezel ..... INST 02-0420
2.9.2 Attaching Rear Cover ..... INST 02-0430
2.10 Installing Skirt ..... INST 02-0440

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

3.1 Procedures for Installing Rackmount Model ..... INST 03-0000
3.2 Unpacking and Installing Rack Frame ..... INST 03-0020
3.2.1 U6 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas) ..... INST 03-0020
3.2.2 U4 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas) ..... INST 03-0140
3.2.3 HP Rack Frame (Unpacking/Installing and Installation areas/maintenance areas) ..... INST 03-0250
3.2.4 Sun StorEdge Rack Frame (Unpacking/Installing and Installation areas/maintenance areas) ..... INST 03-0310
3.2.5 RS6000 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas) ..... INST 03-0340
3.2.6 SONY Rack Frame (unpacking, area required for installation and maintenance, and installation) ..... INST 03-0361
3.3 Unpacking the Subsystems ..... INST 03-0370
3.4 Removing and Installing Components ..... INST 03-0390
3.4.1 Removing Disk Drive ..... INST 03-0390
3.4.2 Installing components ..... INST 03-0410
3.5 Mounting on Rack Frame ..... INST 03-0500
3.5.1 Mounting lifter on rack frame ..... INST 03-0510
3.5.2 Mounting subsystem on rack frame ..... INST 03-0520
3.5.3 Securing the subsystem ..... INST 03-0540
3.5.4 Installing the Disk Drive ..... INST 03-0620

Copyright © 2002, 2005, Hitachi, Ltd.

3.6 Connecting Cables ..... INST 03-0650
3.6.1 Connecting the Fibre Channel interface cable ..... INST 03-0660
3.6.2 Connecting the ENC cables ..... INST 03-0680
3.6.3 Connecting the power cables ..... INST 03-0700
3.6.4 Connecting the power cables (Rack frame append parts) ..... INST 03-0720
3.7 Attaching Decoration Panels ..... INST 03-0740
3.8 Power On/Off Procedure ..... INST 03-0750
3.8.1 Subsystem power on ..... INST 03-0750
3.8.2 Subsystem power off ..... INST 03-0760
3.9 Setting the Power Control Mode (Local/Remote Mode) ..... INST 03-0770
3.10 Closing Door or Attaching Front Bezel ..... INST 03-0800

Chapter 4. Newly Installing Microprogram ..... INST 04-0000

4.1 Installing Microprogram Newly ..... INST 04-0000
4.1.1 Materials necessary for the new installation ..... INST 04-0000
4.1.2 Outline of procedure for new installation ..... INST 04-0010
4.1.3 Preparation for new installation of microprogram ..... INST 04-0020
4.1.4 Procedure for new installation ..... INST 04-0060
4.2 Procedure for Recovery from a Failure ..... INST 04-0120
4.2.1 Procedure for recovery from a failure occurs during installation ..... INST 04-0120
4.3 Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete" Message Is Output ..... INST 04-0140
4.3.1 Checking whether system copy operation occurred ..... INST 04-0150
4.3.2 Checking the condition of system copy operation complete. INST 04-0160

Chapter 5. Parameter Setting (Disk Array Management Program) ..... INST 05-0000

5.1 Preparation of Setting ..... INST 05-0000
5.1.1 Procedure for connecting Disk Array Management Program with the subsystem ..... INST 05-0010
5.2 Setting System Parameters ..... INST 05-0100
5.2.1 Before starting setting system parameters ..... INST 05-0100
5.2.2 Setting system parameters ..... INST 05-0130
5.2.3 Quitting system parameter setting ..... INST 05-0270
5.3 Setting Host Group ..... INST 05-0290
5.3.1 Before setting host group ..... INST 05-0290
5.3.2 Setting of option ..... INST 05-0310
5.3.3 Setting of LU mapping ..... INST 05-0350

Copyright © 2002, 2005, Hitachi, Ltd.

5.4 Setting the RAID/LU/Spare Disk ..... INST 05-0390
5.4.1 Preparation of RAID/LU setting ..... INST 05-0410
5.4.2 RAID group setting ..... INST 05-0430
5.4.3 Setting of LU ..... INST 05-0530
5.4.4 Setting of Spare Disk ..... INST 05-0730
5.4.5 Checking the status of Disk Drive ..... INST 05-0761
5.5 Setting Configuration Information ..... INST 05-0770
5.5.1 Before setting configuration information ..... INST 05-0770
5.5.2 Setting the subsystem configuration information ..... INST 05-0790
5.6 Device Setting Used in Special Mode ..... INST 05-1010
5.6.1 Before starting special mode ..... INST 05-1010
5.6.2 Setting of special mode ..... INST 05-1020
5.7 Setting an Extra-cost Optional Feature ..... INST 05-1510
5.8 WWN Change Operation at the Time of HBA Replacement ..... INST 05-1520
5.8.1 WWN change operation at the time of HBA replacement ..... INST 05-1520
5.8.2 Procedure for getting WWN of HBA ..... INST 05-1550

Chapter 6. Adding Optional Components .....INST 06-0000
6.1 Before Starting Addition of Optional Components ..... INST 06-0000
6.2 Procedures for Adding Optional Components ..... INST 06-0010
6.2.1 Unpacking ..... INST 06-0080
6.3 Mounting RKA/RKAD/RKAAT/RKAJAT/ RKAATL/RKAJATL on Rack Frame ..... INST 06-0090
6.4 Adding Optional Components ..... INST 06-0100
6.4.1 Subsystems optional components for addition ..... INST 06-0100
6.4.2 Adding a Control Unit ..... INST 06-0110
6.4.3 Adding a Disk Drive ..... INST 06-0140
6.4.4 Adding a Cache Unit ..... INST 06-0330
6.4.5 Adding Interface Boards ..... INST 06-0340
6.5 Adding Other Optional Devices ..... INST 06-0350
6.5.1 Other optional additional devices ..... INST 06-0350
6.5.2 Adding a Remote adapter ..... INST 06-0360
6.5.3 Mounting a PDU ..... INST 06-0480
6.5.4 Mounting a PDB (UPDU6) ..... INST 06-0500
6.6 Adding the RKA/RKAD to the Rack Frame (In the case of the connection to the RK/RKD) ..... INST 06-0530
6.6.1 Procedure for adding the RKA/RKAD to the subsystem of rackmount model with U6/U4 rack frame .. INST 06-0530
6.6.2 Connecting multiple RKAs/RKADs ..... INST 06-0580
6.6.3 Recognition and connection of the added RKA/RKAD ..... INST 06-0650
6.6.4 Verifying the addition ..... INST 06-0750
6.6.5 Install the rest of the Disk Drives ..... INST 06-0830

Copyright © 2002, 2005, Hitachi, Ltd.

6.7 Adding the RKA to the Rack Frame
(In the case of the connection to the RKH/RKHE)..... INST 06-0840
6.7.1 Procedure for adding the RKA to the subsystem of rackmount model with U6/U4 rack frame.. INST 06-0840
6.7.2 Connecting multiple RKAs ..... INST 06-0890
6.7.3 Recognition and connection of the added RKA..... INST 06-0960
6.7.4 Verifying the addition ..... INST 06-1060
6.7.5 Install the rest of the Disk Drives..... INST 06-1060
6.8 Adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the Rack Frame
(In the case of the connection to the RK/RKL) ..... INST 06-1080
6.8.1 Procedure for adding the RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL to the subsystem of rackmount model with U6/U4 rack frame..... INST 06-1080
6.8.2 Connecting multiple RKAs/RKAATs/RKAJATs/ RKAATLs/RKAJATLs ..... INST 06-1130
6.8.3 Recognition and connection of the addedRKA/RKAAT/ RKAJAT/RKAATL/RKAJATL .... INST 06-1220
6.8.4 Verifying the addition ..... INST 06-1330
6.8.5 Install the rest of the Disk Drives..... INST 06-1420
6.9 Adding the RKA/RKAAT/RKAJAT to the Rack Frame
(In the case of the connection to the RKH/RKHE)..... INST 06-1430
6.9.1 Procedure for adding the RKA/RKAAT/RKAJAT to the subsystem of rackmount model with U6/U4 rack frame ..... INST 06-1430
6.9.2 Connecting multiple RKAs/RAATs..... INST 06-1490
6.9.3 Recognition and connection of the added RKAAT/RKAJAT..... INST 06-1580
6.9.4 Verifying the addition ..... INST 06-1690
6.9.5 Install the rest of the Disk Drives..... INST 06-1780
6.10 Connecting ENC Cable (5 m) by means of FC Cable Assembly for 2Gbps(In the case of RK/RKD/RKA/RKAD) ..... INST 06-1790
6.10.1 FC Cable Assembly for 2Gbps components ..... INST 06-1790
6.10.2 Replacing the ENC Unit and connecting ENC cable..... INST 06-1790
6.11 Connecting ENC Cable (5 m) by means of FC Cable Assembly for 2Gbps (In the case of RKH/RKHE/RKA) ..... INST 06-1870
6.11.1 FC Cable Assembly for 2Gbps components ..... INST 06-1870
6.11.2 Replacing the ENC Unit and connecting ENC cable..... INST 06-1870

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 7. Subtracting Optional Components .....INST 07-0000

7.1 Before Starting Subtraction of Optional Components..... INST 07-0000
7.2 Procedures for Subtracting Optional Components ..... INST 07-0010
7.3 Subtracting RKA/RKAD/RKAAT/RKAJAT/ RKAATL/RKAJATL on Rack Frame..... INST 07-0040
7.4 Subtracting Optional Components ..... INST 07-0060
7.4.1 Subsystems optional components for subtraction ..... INST 07-0060
7.4.2 Subtracting a Control Unit ..... INST 07-0070
7.4.3 Subtracting a Disk Drive ..... INST 07-0100
7.4.4 Subtracting a Cache Unit..... INST 07-0150
7.4.5 Subtracting Interface Boards..... INST 07-0156
7.5 Subtracting Other Optional Devices..... INST 07-0160
7.5.1 Other Optional subtraction devices..... INST 07-0160
7.5.2 Subtracting a Remote adapter..... INST 07-0170
7.5.3 Subtracting a PDU..... INST 07-0180
7.5.4 Subtracting a PDB (UPDU6) ..... INST 07-0190

Chapter 8. Relocation/Removal Work.....INST 08-0000

8.1 Before Starting Relocation/Removal Work..... INST 08-0000
8.2 Procedure for Relocating or Removing Floor Model..... INST 08-0030
8.2.1 Disconnecting power cable ..... INST 08-0050
8.2.2 Disconnecting interface cables..... INST 08-0060
8.3 Procedure for Relocating or Removing Rackmount Model ..... INST 08-0080
8.3.1 Disconnecting the power cables..... INST 08-0110
8.3.2 Disconnecting the power Cable (for supplying power to Rack frame) ..... INST 08-0120
8.3.3 Disconnecting interface cables..... INST 08-0130

Chapter 9. ACE (Assist the Connection of Enclosure) Tool .....INST 09-0000

9.1 Starting and Quitting the Tool..... INST 09-0000
9.2 Making of the Configuration Diagram ..... INST 09-0020
9.2.1 Automatic making of configuration diagrams..... INST 09-0020
9.2.2 Manual making of configuration diagrams ..... INST 09-0070
9.2.3 Cooperation with Disk Array Management Program..... INST 09-0170
9.3 Displaying the ENC Cable Connection Diagram ..... INST 09-0210
9.3.1 Displaying the ENC cable connection diagram in the 9520V (RKL) .... INST 09-0210
9.3.2 Displaying the ENC cable connection diagram in the 9570V (RK)..... INST 09-0220

Copyright © 2002, 2005, Hitachi, Ltd.

9.3.3 Displaying the ENC cable connection diagram in the 9580V/9585V (RKH/RKHE) ..... INST 09-0222
9.3.4 Selecting the path ..... INST 09-0230
9.3.5 Selecting the disk unit ..... INST 09-0250
9.3.6 Selecting two or more chassis frames ..... INST 09-0260
9.4 Saving and Reading the Configuration Diagram..... INST 09-0270
9.4.1 Saving the configuration diagram ..... INST 09-0270
9.4.2 Reading the configuration diagram ..... INST 09-0280
9.5 Termination of Making the Configuration Diagram ..... INST 09-0300
9.6 Error Message List ..... INST 09-0310

Copyright © 2002, 2005, Hitachi, Ltd.

[Maintenance]

Chapter 1 Before Maintenance Work ..... MNTE 01-0000

1.1 Before Starting Maintenance Work ..... MNTE 01-0000
1.1.1 Precautions ..... MNTE 01-0000
1.2 Confirming and setting RTC (Real Time Clock) ..... MNTE 01-0020
1.3 Indications and their Functions ..... MNTE 01-0050

Chapter 2. Trouble Analysis ..... MNTE 02-0000

2.1 Before Starting WEB Connection ..... MNTE 02-0020
2.1.1 Procedure to WEB connection ..... MNTE 02-0020
2.1.2 When the WEB has already been connected ..... MNTE 02-0070
2.1.3 Note on WEB connecting ..... MNTE 02-0080
2.2 Trouble Analysis by WEB connection ..... MNTE 02-0110
2.2.1 Confirm state of unit ..... MNTE 02-0120
2.2.2 Confirm state of each part ..... MNTE 02-0150
2.2.3 Confirm log messages ..... MNTE 02-0200
2.2.4 TrueCopy Basic path confirm state ..... MNTE 02-0260
2.3 Trouble Analysis by Messages ..... MNTE 02-0270
2.3.1 CUDG detected messages ..... MNTE 02-0310
2.3.2 Failure messages ..... MNTE 02-0460
2.3.3 Progress message ..... MNTE 02-0810
2.3.4 Flash detected messages ..... MNTE 02-1160
2.3.5 Warning messages ..... MNTE 02-1290
2.3.6 Web error messages ..... MNTE 02-1330
2.3.7 Disk Array Management Program error messages ..... MNTE 02-1340
2.4 Details of Recovery Procedures ..... MNTE 02-1360
2.4.1 Recovery measures ..... MNTE 02-1360
2.4.2 Initialization procedure for configuration information ..... MNTE 02-1980
2.4.3 Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used ..... MNTE 02-2030
2.5 Collecting Error Information ..... MNTE 02-2140
2.5.1 Time to collect failure information ..... MNTE 02-2150
2.5.2 Judge collection of failure information ..... MNTE 02-2160
2.5.3 Collecting simple trace ..... MNTE 02-2180
2.5.4 Collecting CTL alarm trace ..... MNTE 02-2220
2.5.5 Collecting memory dump ..... MNTE 02-2260
2.5.6 Storing simple trace information in the USB memory ..... MNTE 02-2310

Copyright © 2002, 2005, Hitachi, Ltd.

2.6 Trouble Analysis by LED Indication ..... MNTE 02-2320
2.6.1 Trouble Analysis by LED Indication of Front Bezel ..... MNTE 02-2320
2.6.2 Trouble Analysis by LED Indication of Each Part ..... MNTE 02-2400
2.7 Failure Analysis by Sense Data ..... MNTE 02-2540
2.7.1 Details of sense code ..... MNTE 02-2540
2.7.2 List of detail codes of sense code (05/9FFF) ..... MNTE 02-2800
2.8 Procedure for Investigating Disk Array Subsystem Regarding Fibre Channel Failure .... MNTE 02-2820
2.9 Procedure for making sure of model name and drive firmware of disk drive ..... MNTE 02-2930

Chapter 3. Data Collection when a Failure Occurs in Program Product (P.P.) ..... MNTE 03-0000

3.1 Locating Failed Part ..... MNTE 03-0000
3.1.1 When a failure occurs in the DF600 main body ..... MNTE 03-0010
3.1.2 When a failure occurs in a host system server ..... MNTE 03-0010
3.1.3 When a failure occurs in a server for monitoring and setting ..... MNTE 03-0020
3.2 List of Data to Be Collected when a P.P. Failure Occurs ..... MNTE 03-0030

Chapter 4. Trouble Analysis by Error Notification Program ..... MNTE 04-0000

4.1 Trouble Analysis by SNMP Agent Support Function ..... MNTE 04-0000
4.1.1 Maintenance with TRAP Codes ..... MNTE 04-0000
4.1.2 Maintenance with MIB (df Regression) Values ..... MNTE 04-0060
4.2 Trouble Analysis by Disk Array Management Program ..... MNTE 04-0090
4.2.1 Maintenance with the Disk Array Management Program (GUI version) ..... MNTE 04-0090
4.2.2 Disk Array Management Program Maintenance Function .. MNTE 04-0120
4.2.3 Displaying Statistical Information ..... MNTE 04-0140
4.2.4 Displaying Logical Unit Failure Data Information ..... MNTE 04-0290
4.2.5 Setting Pre-fetch Information ..... MNTE 04-0320
4.2.6 Setting a Threshold for Preventive Maintenance ..... MNTE 04-0360
4.2.7 Drive Maintenance ..... MNTE 04-0400
4.2.8 Setting a Mode for Reporting to the Host Using an SSB .... MNTE 04-0440
4.2.9 System Upgrade ..... MNTE 04-0480
4.2.10 Setting SATA Drive Options ..... MNTE 04-0510
4.2.11 Setting SATA Drive Restore Options ..... MNTE 04-0540
4.2.12 Replacing the ENC Micro Program ..... MNTE 04-0570
4.2.13 Drive Performance Delay Diagnostic Function ..... MNTE 04-0670

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 5. Part Replacement.....MNTE 05-0000

5.1 Before Starting Maintenance Work.....MNTE 05-0000
5.1.1 Checking cache memory in the back-up state.....MNTE 05-0030
5.2 Locations of Replacement Components.....MNTE 05-0080
5.2.1 Part Locations of Rackmount Model.....MNTE 05-0080
5.2.2 Part Locations of Floor Model.....MNTE 05-0090
5.3 Replacing of Components.....MNTE 05-0120
5.3.1 Replacing Disk Drive.....MNTE 05-0120
5.3.2 Replacing Backup Battery Unit.....MNTE 05-0260
5.3.3 Replacing Fan Assembly.....MNTE 05-0320
5.3.4 Replacing Power Unit (Power Unit (DC)).....MNTE 05-0340
5.3.5 Replacing Control Unit.....MNTE 05-0380
5.3.6 Replacing Cache Unit.....MNTE 05-0470
5.3.7 Replacing Interface Board.....MNTE 05-0560
5.3.8 Replacing ENC Unit/SENC Unit.....MNTE 05-0640
5.3.9 Replacing ENC cable.....MNTE 05-0692
5.3.10 Replacing Basic Chassis of Rack Mount Style.....MNTE 05-0700
5.3.11 Replacing Additional Chassis of Rack Mount Style.....MNTE 05-0740
5.3.12 Replacing Remote Adapter.....MNTE 05-0770

Chapter 6. Updating Microprogram.....MNTE 06-0000

6.1 Update Installation of Microprogram.....MNTE 06-0000
6.1.1 Materials necessary for the update installation.....MNTE 06-0000
6.1.2 Outline of procedure for update installation.....MNTE 06-0010
6.1.3 Preparation for update installation of microprogram.....MNTE 06-0020
6.1.4 Procedure for update installation.....MNTE 06-0060
6.1.5 Checking the start and the termination of the SENC firmware automatic download.....MNTE 06-0111
6.2 Procedure for Recovery from a Failure.....MNTE 06-0120
6.2.1 Procedure for recovery from a failure during installation.....MNTE 06-0120
6.3 Procedure for Isolating Cause of Disk Drive Failure when “Install partially complete” Message Is Output.....MNTE 06-0140
6.3.1 Procedure for checking whether system copy operation occurred.....MNTE 06-0150
6.3.2 Procedure for checking the status of system copy complete.....MNTE 06-0160

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 7. Periodic Maintenance .....MNTE 07-0000

7.1 Periodic Maintenance Items .....MNTE 07-0000

7.2 Inspecting and Cleaning Floor Model .....MNTE 07-0010

7.2.1 Inspecting fans.....MNTE 07-0020

7.2.2 Cleaning the subsystem .....MNTE 07-0030

7.3 Inspecting and Cleaning Rackmount Model with U6 Rack Frame.....MNTE 07-0040

7.3.1 Inspecting fans.....MNTE 07-0040

7.3.2 Cleaning the subsystem .....MNTE 07-0060

7.4 Cleaning Rackmount Model with U4 Rack Frame .....MNTE 07-0070

7.4.1 Inspecting fans.....MNTE 07-0080

7.4.2 Cleaning the subsystem .....MNTE 07-0090

7.5 Replacing Periodical Replacement Parts.....MNTE 07-0100

7.5.1 Replacing Battery unit.....MNTE 07-0100

Chapter 8. Parts Catalog.....MNTE 08-0000

8.1 How to Use this Parts Catalog.....MNTE 08-0000

8.2 System of Parts Catalog.....MNTE 08-0010

8.3 Parts Catalog.....MNTE 08-0030

Chapter 9. Maintenance Tools.....MNTE 09-0000

9.1 Maintenance Tools for Hardware .....MNTE 09-0000

9.2 Maintenance Tools for Software .....MNTE 09-0010

Copyright © 2002, 2005, Hitachi, Ltd.

[WEB]

Chapter 1 Before Using WEB ..... WEB 01-0000
1.1 The Operating Environment ..... WEB 01-0000
1.2 The Characteristic of the Network Function ..... WEB 01-0020

Chapter 2 The Normal Mode Operation Procedure ..... WEB 02-0000
2.1 Transferring to the Normal Mode ..... WEB 02-0000
2.2 Screen Outline ..... WEB 02-0010
2.3 Main Screen of the Normal Mode ..... WEB 02-0030
2.4 Display of Exchangeable Parts Status (Parts Information) ..... WEB 02-0070
2.5 Information Message ..... WEB 02-0110
2.6 Collecting Simple Trace ..... WEB 02-0120
2.7 Collecting CTL Alarm Trace ..... WEB 02-0140
2.8 Setting of the Buzzer Volume ..... WEB 02-0160
2.9 Host Command Trace Download ..... WEB 02-0170

Chapter 3 The Maintenance Mode Operation Procedure ..... WEB 03-0000
3.1 Transferring to the Maintenance Mode ..... WEB 03-0000
3.2 Reference/Setting of the System Parameter and Initialize ..... WEB 03-0020
3.2.1 Subsystem ..... WEB 03-0030
3.2.2 Host Interface ..... WEB 03-0090
3.2.3 Network ..... WEB 03-0140
3.2.4 Name ..... WEB 03-0190
3.2.5 ALL ..... WEB 03-0230
3.3 Setup ..... WEB 03-0250
3.3.1 Microprogram ..... WEB 03-0250
3.4 Reference ..... WEB 03-0280
3.4.1 Information Message ..... WEB 03-0280
3.5 Trace/Dump ..... WEB 03-0290
3.5.1 Collecting Simple Trace ..... WEB 03-0290
3.5.2 Collecting CTL Alarm Trace ..... WEB 03-0310
3.5.3 Collecting Full Dump ..... WEB 03-0330
3.5.4 Full Dump(QuickShadow) ..... WEB 03-0343
3.6 Other ..... WEB 03-0350
3.7 Return Method to the Normal Mode ..... WEB 03-0360

Copyright © 2004, 2005, Hitachi, Ltd.

Appendix ..... APP 00-0000

Appendix A System Parameter Setting List ..... APP A-0000

Appendix B Recycling ..... APP B-0000

Appendix C Support Browser List ..... APP C-0000

Revision Control .....REV 0000

Copyright © 2004, 2005, Hitachi, Ltd.

⚠ 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.

	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.

1. ⚠ 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.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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 terminals 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.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

2. ⚠ Hazard Warning Statements

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

2.1 ⚠ 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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-0010)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.

(APP B-0010)

- 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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-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.

(APP B-0010)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

2.2 ⚠ 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 03-0520)

- 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.

  (APP B-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.

  (APP B-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.

  (APP B-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.

  (APP B-0020)

2.3 ⚠ CAUTION statements

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

  (INST 01-0050, INST 01-0080)

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

  (INST 01-0070)

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

  (INST 01-0100, INST 01-0110)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

- 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 03-0370)

- Perform the work with enough care because the Floor (RK+H1H/RKD+H1H) Model, Floor (RK+RKA+H2H/RKD+RKAD/H1H) Model, and Floor (RKS+H1H/ RKSD+H1H) Model are heavy; their masses are about 80 kg and 125 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 RK/RKL/RKS/RKD/RKSD are approximately 44 kg.

  (INST 02-0080)

- 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 02-0080, INST 02-0120)

- 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 02-0080, INST 02-0120)

- Masses of RK/RKL/RKS/RKD/RKSD are approximately 44 kg, and RKA/RKAD 42 kg is approximately.

  (INST 02-0120)

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

  (INST 02-0160)

- Take full care to connect cables correctly.

  (INST 02-0300, INST 03-0650)

- 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 02-0341, INST 03-0700, INST 03-0711, INST 03-0714, INST 03-0720, INST 06-0520, INST 08-0050, INST 08-0051, INST 08-0110, INST 08-0111)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

- This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- A readily accessible disconnect device should be incorporated in the building installation wiring.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- The d.c. supply source is to be located within the same premises as this subsystem.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- Use this model in a RESTRICTED ACCESS LOCATION only.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.
  (INST 02-0342, INST 03-0712, MNTE 05-0373, MNTE 05-0376)
- Work carefully because the mass of the single RK/RKL/RKS/RKD/RKSD is about 44 kg, RKA /RKAD/RKAAT/RKAATL is about 42 kg and that of the RKH/RKHE and RKAJAT/RKAJATL is about 40 kg.
  (INST 03-0370, INST 03-0510, INST 03-0520)
- 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 03-0500, INST 03-0510, INST 03-0520)
- Be sure to perform the operation with two or more workers.
  (INST 03-0510, INST 03-0520)
  (MNTE 05-0700, MNTE 05-0740)
- 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 03-0520)
- 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 03-0530)
- 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.
  (MNTE 05-0010)
- 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.
  (MNTE 05-0010)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.

  (MNTE 05-0260)

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

  (MNTE 05-0300)

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

  (MNTE 05-0300)

- Do not allow the battery and Battery Unit to be physically damaged. Otherwise, a short circuit in the battery, which creates an exothermic heat, a bursting and an ignition, may be caused.

  (MNTE 05-0300)

- Replace with the specified battery only. If not, it may cause an explosion.

  (MNTE 05-0300)

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

  (MNTE 05-0320, MNTE 07-0020, MNTE 07-0040, MNTE 07-0080)

- 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.

  (MNTE 07-0030, MNTE 07-0060, MNTE 07-0090)

- Be careful not to move the subsystem during cleaning.

  (MNTE 07-0030, MNTE 07-0060, MNTE 07-0090)

- Install or remove the front bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

  (MNTE 07-0060, MNTE 07-0090)

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

  (MNTE 07-0100)

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

  (MNTE 07-0100)

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

2.4 ⚠CAUTION statements

- Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.
  (INST 06-0110, INST 06-0330, INST 06-0331, INST 06-0333, INST 06-0335, INST 06-0340, INST 06-0341, INST 07-0070, INST 07-0150, INST 07-0151, INST 07-0153, INST 07-0154, INST 07-0156, INST 07-0157) (MNTE 05-0380, MNTE 05-0400, MNTE 05-0430, MNTE 05-0441, MNTE 05-0444, MNTE 05-0461, MNTE 05-0463, MNTE 05-0465, MNTE 05-0450, MNTE 05-0470, MNTE 05-0490, MNTE 05-0520, MNTE 05-0531, MNTE 05-0534, MNTE 05-0540, MNTE 05-0551,MNTE 05-0560, MNTE 05-0580, MNTE 05-0600, MNTE 05-0620)
- Here exists a hazard that can cause an electric shock.
  Start the work after making sure that the breaker in the power distribution box has been turned off.
  Connect the power cable by tightening screws of the terminals firmly.
  (INST 02-0341, INST 03-0711)
- The front and left sides of the Power Unit in the RKH/RKHE may become very hot depending on operation and/or ambient temperature; they can burn your finger when they are touched. When replacing the Power Unit, replace it after waiting for about five minutes later than the AC Power Unit Switch turned off.
  (MNTE 05-0340)

2.5 ⚠CAUTION statements

- Here exists a hazard that can cause an electric shock.
  Start the work after making sure that the breaker in the power distribution box has been turned off.
  (INST 08-0051, INST 08-0111)
- 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.
  (MNTE 05-0010)
- Here exists a hazard that can cause an electric shock.
  Start the work after turning off the breaker in the power distribution box connected to the Power Unit (DC) to be replaced.
  (MNTE 05-0372, MNTE 05-0375)
- If you touch a live part, it is feared that you receive an electric shock.
  (MNTE 07-0030, MNTE 07-0060, MNTE 07-0090)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

2.6 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 (before removing bezel) and do not take it off until you finish.
  Please be sure to keep a wrist strap near the subsystem.
  (INST 01-0000, INST 01-0050, INST 01-0080, INST 02-0050, INST 02-0210, INST 02-0240, INST 02-0260, INST 03-0390, INST 03-0401, INST 03-0440, INST 03-0460, INST 03-0620, INST 03-0641, INST 06-0110, INST 06-0150, INST 06-0330, INST 06-0333, INST 06-0590, INST 06-0900, INST 06-1150, INST 06-1500, INST 06-1800, INST 06-1880, INST 07-0070, INST 07-0110, INST 07-0150, INST 07-0153, INST 07-0156, INST 08-0000)
  (MNTE 01-0000, MNTE 05-0010, MNTE-05-0140, MNTE 05-0380, MNTE 05-0470, MNTE 05-0560, MNTE 05-0640, MNTE 05-0700, MNTE 05-0740)

- 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 02-0050, INST 02-0210, INST 02-0240, INST 02-0260, INST 03-0390, INST 03-0401, INST 03-0440, INST 03-0460, INST 03-0620, INST 03-0641, INST 06-0110, INST 06-0150, INST 06-0330, INST 06-0333, INST 06-0340, INST 06-0590, INST 06-0850, INST 06-0900, INST 06-1150, INST 06-1500, INST 06-1800, INST 06-1880, INST 07-0070, INST 07-0110, INST 07-0153, INST 07-0156, INST 08-0000)
  (MNTE01-0000, MNTE 05-0010, MNTE-05-0140, MNTE 05-0380, MNTE-05-470, MNTE 05-0560, MNTE 05-0640)

- 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 08-0000)
  (MNTE 01-0000)

- Since Front Bezels of the RK/RKL/RKS/RKD/RKSD and the RKA/RKAD are partially different with each other in their external appearances and forms, take care not to take a wrong one.
  (INST 01-0050)

- Since Front Bezels of the RK/RKL/RKS/RKD/RKSD/RKA/ RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL and the RKH/RKHE are partially different with each other in their external appearances and forms, take care not to take a wrong one.
  (The Front Bezels of the RKAAT/RKAJAT/RKAATL/RKAJATL are colored in a single color.)
  (INST 01-0080)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

- Disk Drives are precision components. Be careful not to expose drives to hard shock.
  (INST02-0050, INST 02-0260, INST 03-0400, INST 03-0402, INST 03-0620, INST 03-0641, INST 06-0150, INST 07-0110)
  (MNTE 05-0140)

- 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 02-0050, INST 02-0260, INST 03-0390, INST 03-0401, INST 03-0620, INST 03-0641, INST 06-0150, INST07-0110, INST 08-0000)
  (MNTE 05-0020, MNTE 05-0140)

- 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 02-0210, INST 03-0440, INST 06-0110, INST 06-0330, INST 06-0333, INST 06-0340, INST 07-0070, INST 07-0153, INST 07-0156)
  (MNTE 05-0020, MNTE 05-0380, MNTE 05-0470, MNTE 05-0560)

- 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 02-0240, INST 06-1150, INST 06-1500, INST 06-1800, INST 06-1880)

- 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
  (INST 03-0460, INST 06-0590, INST 06-0850, INST 06-0900)
  (MNTE 05-0020, MNTE 05-0640)

- 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 03-0354)

- When adding Disk Drives #0 to #4 in RK/RKL/RKS/RKD/RKSD for replacement, restore the system information with every replacing one Disk Drive.
  (INST 06-0290)

- Notes on recycling
  For this product, the closed nickel-hydride battery is used. The closed nickel-hydride battery is a valuable resource which can be recycled. When you dispose of a used product, please cooperate in the recycling. (This closed nickel and hydride battery, which is designated as recycling product by a recycling promotion low, needs to be recycled.)
  (MNTE 05-0300)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

- 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 5 minutes, it will stop by detecting the thermal alarm.

  (MNTE 05-0320, MNTE 05-0340)

- 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.

  (MNTE 05-0320)

- When a trouble of the Power Unit (Power Unit (DC)) is detected during replacement of the Fan Assembly, pull out and then insert the Power Unit (Power Unit (DC)).

  (MNTE 05-0320, MNTE 05-0340)

- 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.

  (MNTE 05-0320)

- 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.

  (MNTE 05-0340)

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

  (MNTE 05-0700)

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

  (MNTE 05-0700, MNTE 05-0740)

- When a device is kept with power-off for more than one month, the battery may be excessively discharged, and it may cause an unrecoverable damage. In such a storing condition, either charge the battery at least once 18 days for more than two (2) 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 three months for more than two (2) hours.

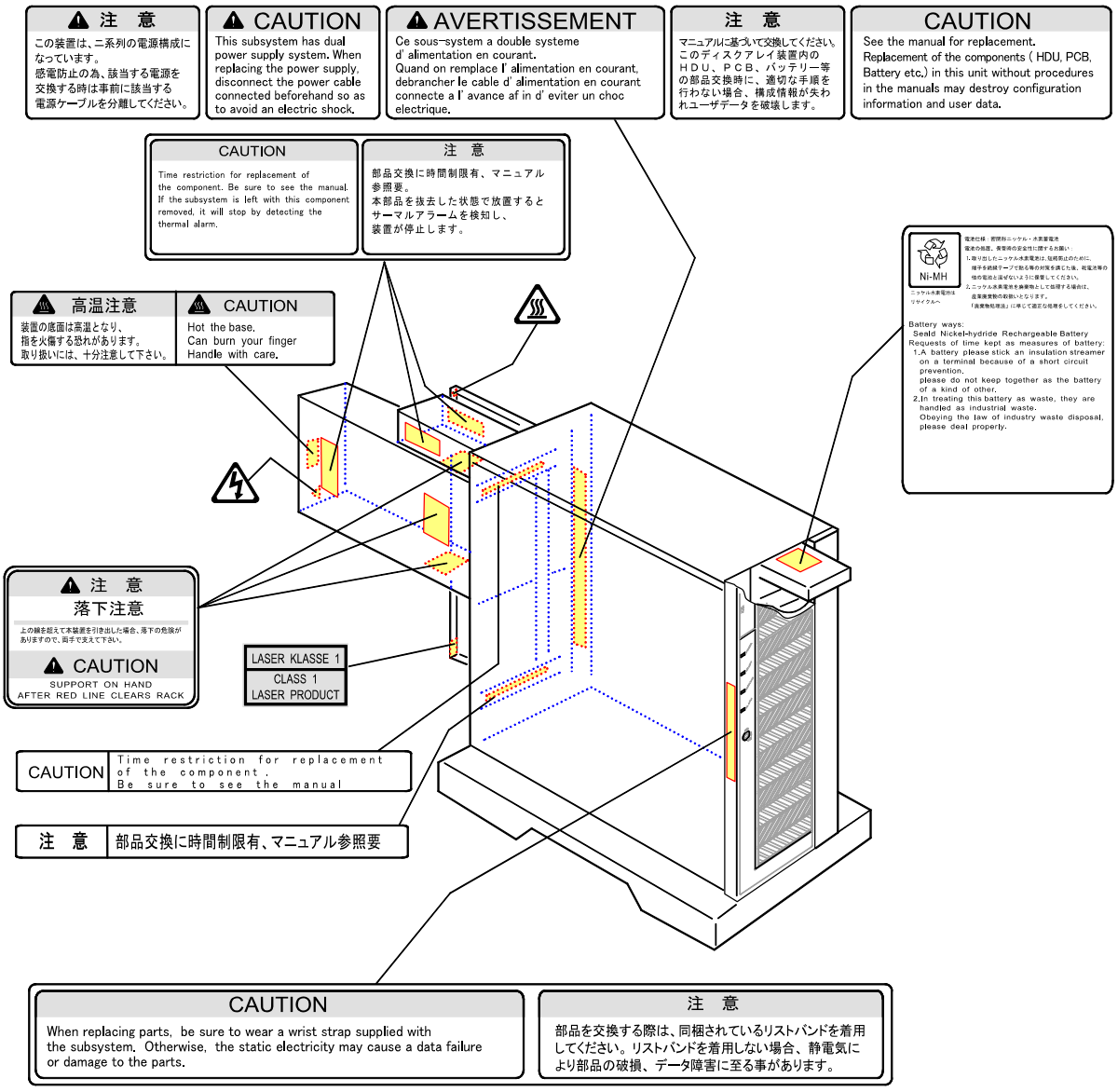
  (MNTE 07-0100)

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

3. ⚠ Warning Labels Affixed on the Subsystem

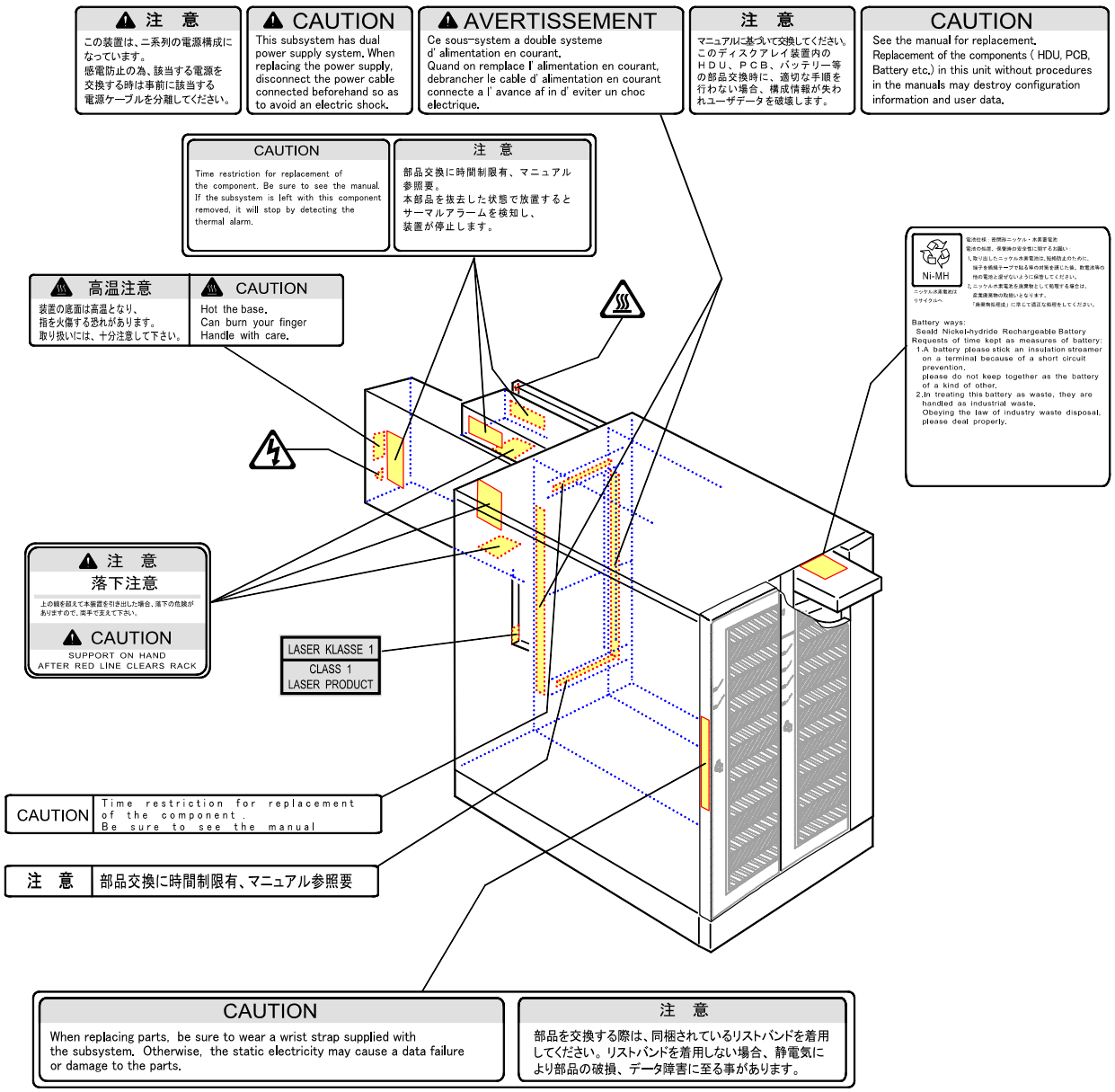
3.1 Floor (RK+H1H) Model/Floor (RKS+H1H) Model



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

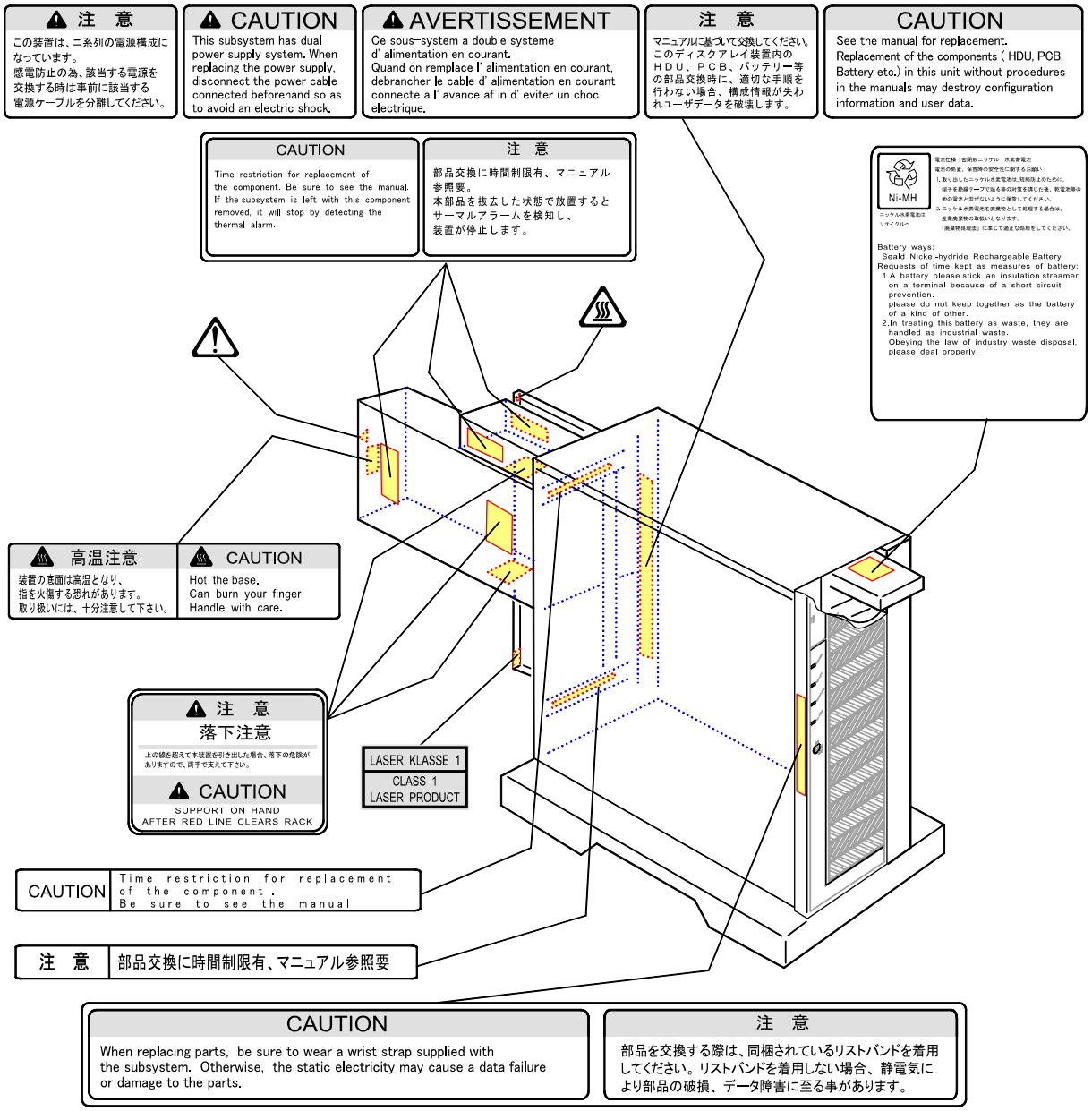
3.2 Floor (RK+RKA+H2H) Model



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

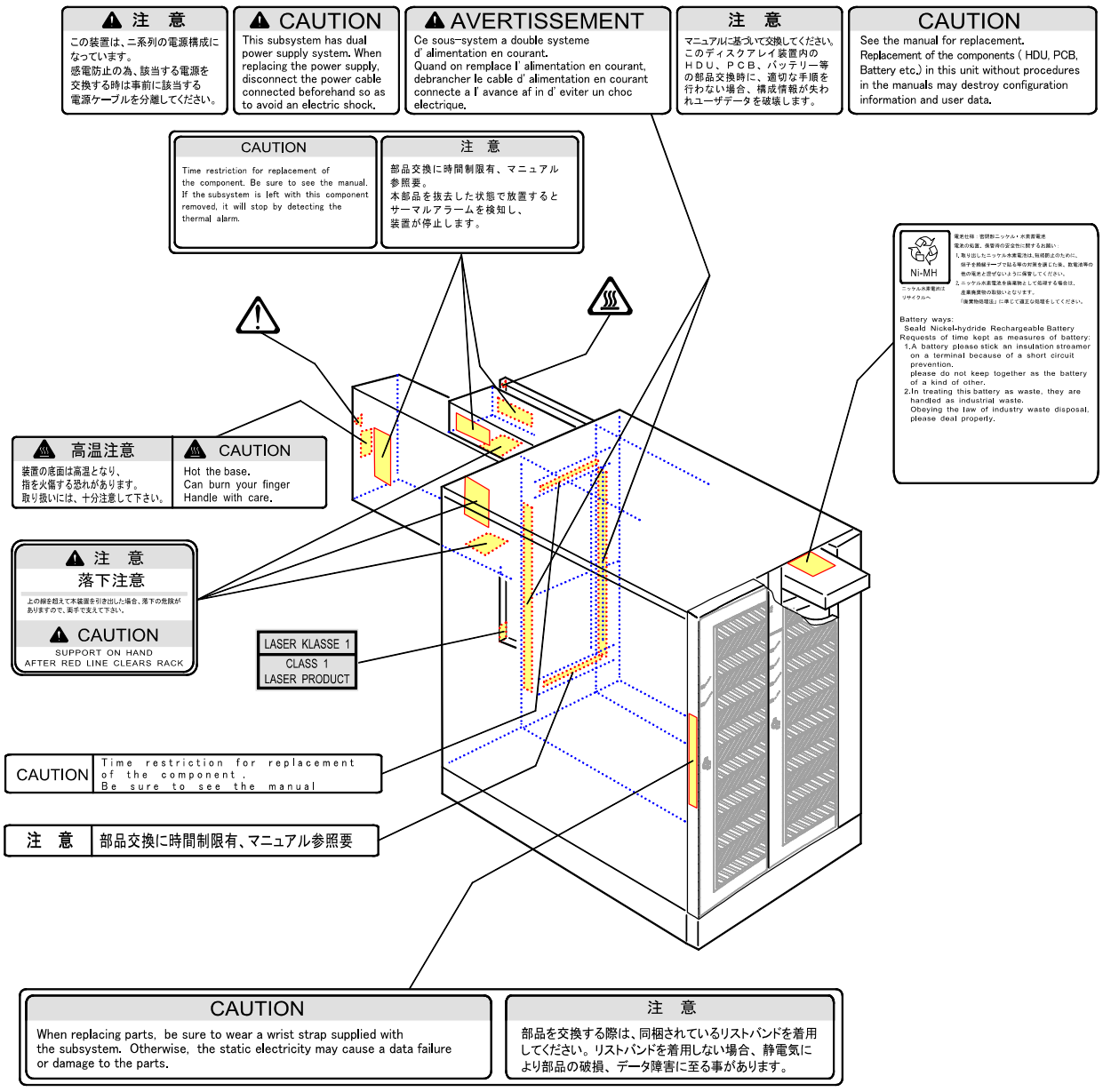
3.3 Floor (RKD+H1HD) Model/Floor (RKSD+H1HD) Model



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

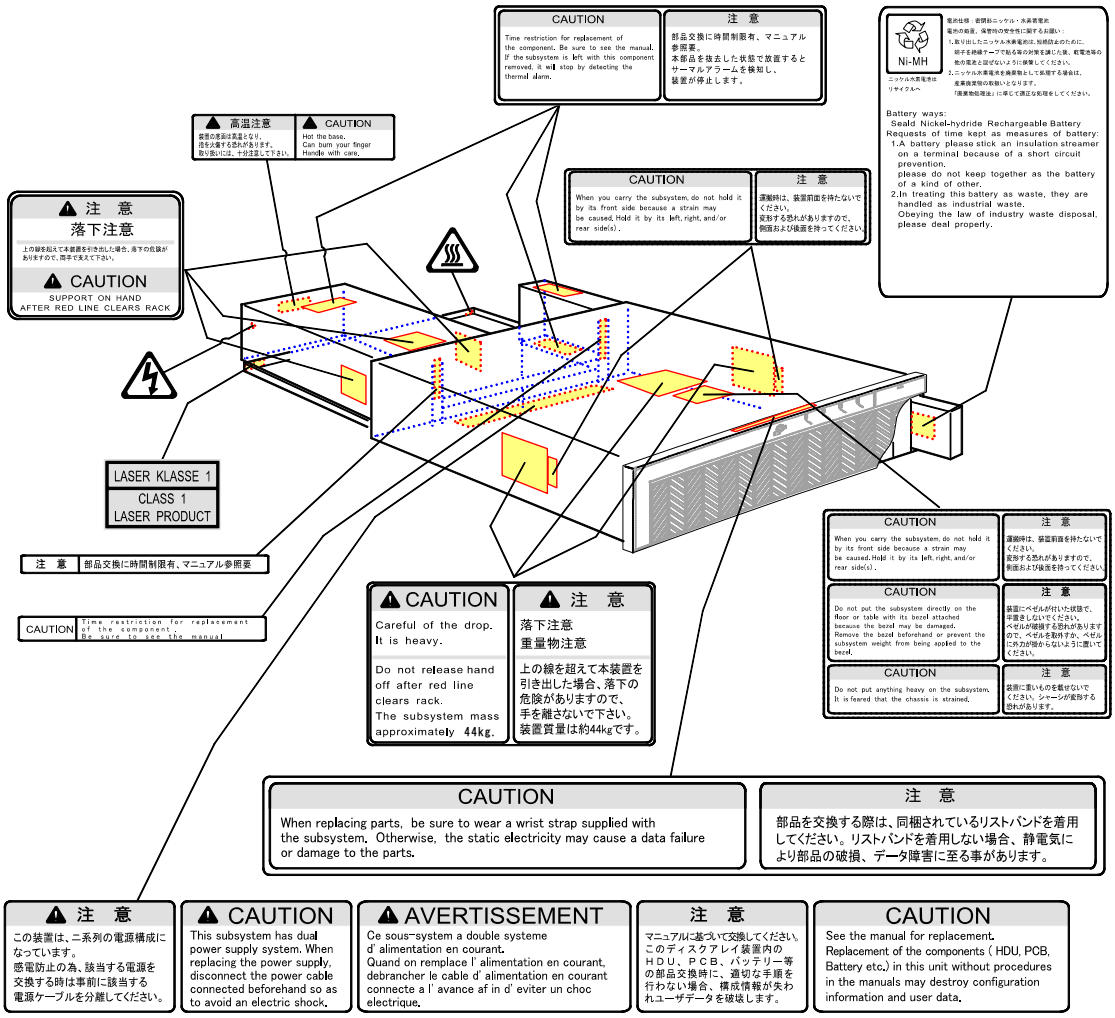
3.4 Floor (RKD+RKAD+H2HD) Model



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

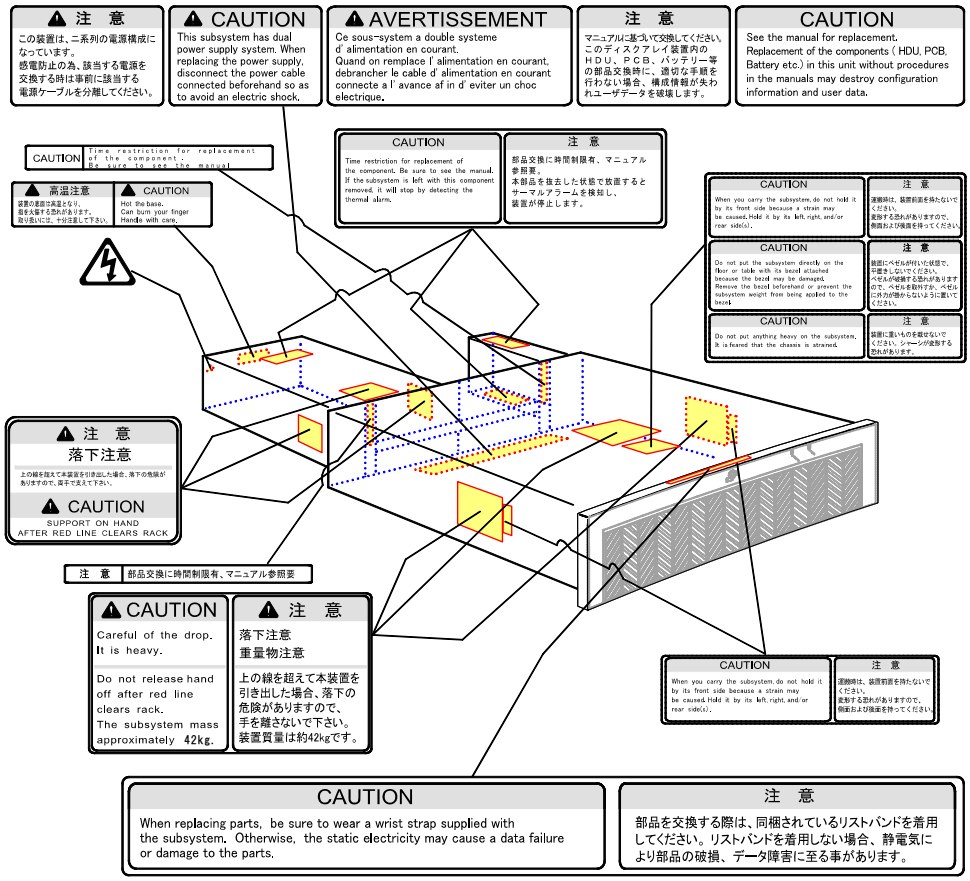
3.5 Rackmount model (RK/RKS/RKL)



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

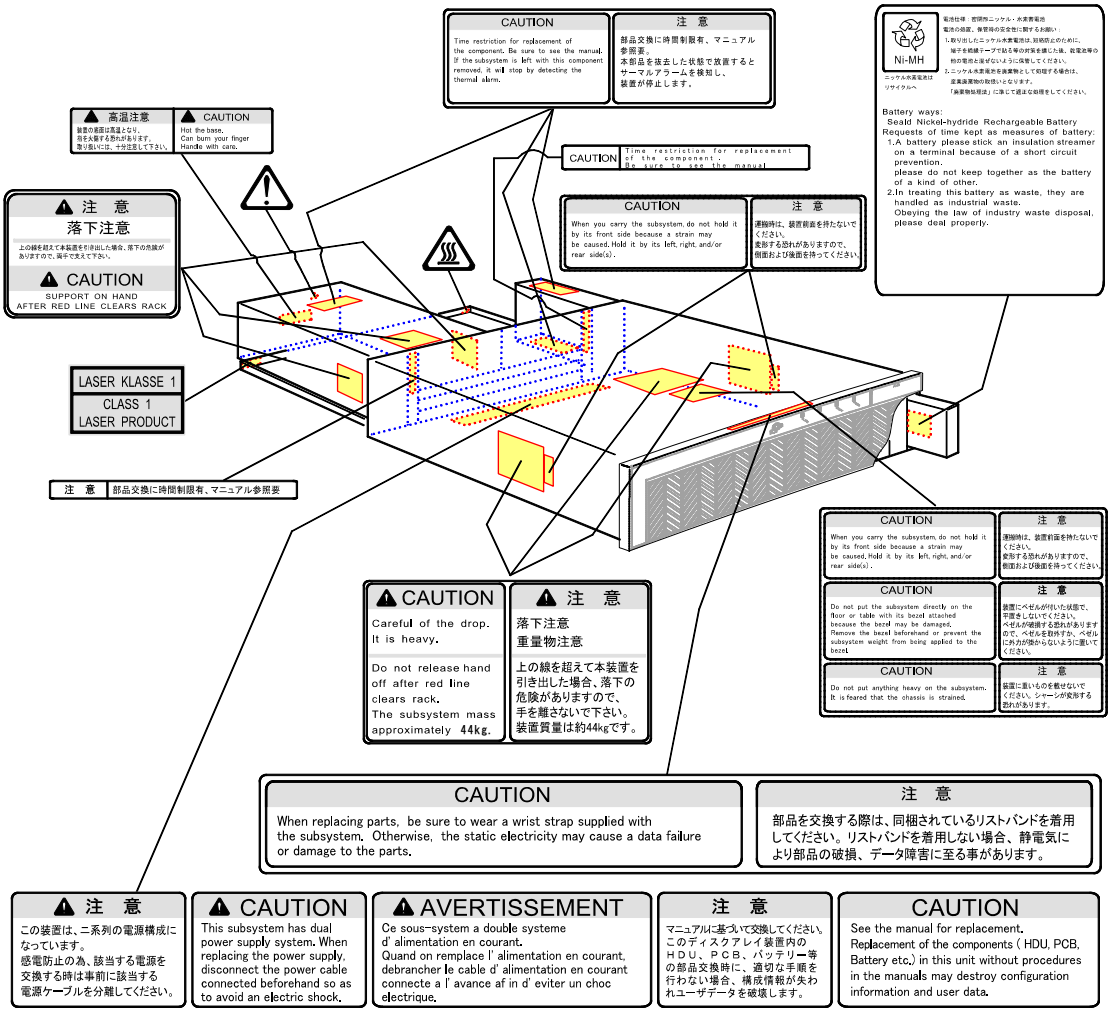
3.6 Rackmount model (RKA)



Copyright © 2002, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

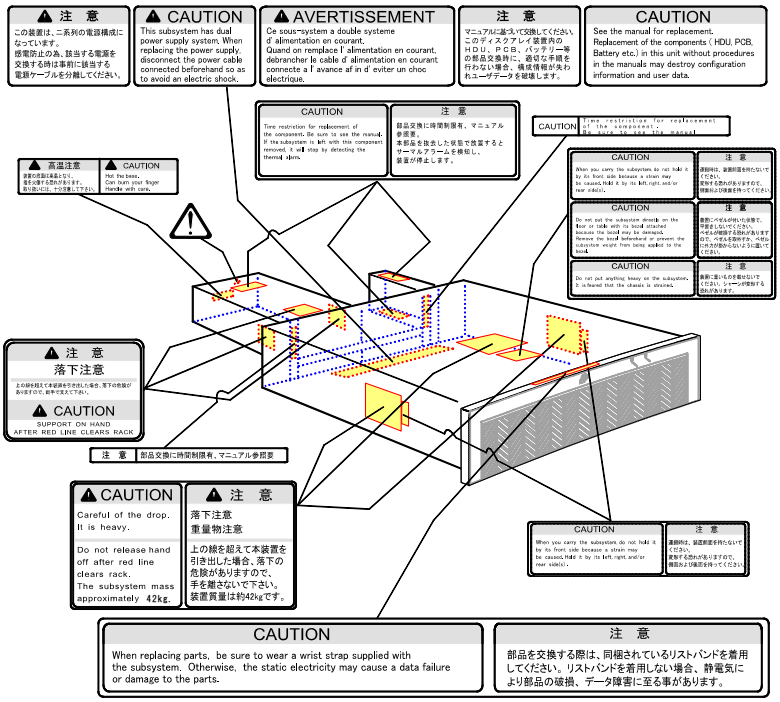
3.7 Rackmount model (RKD/RKSD)



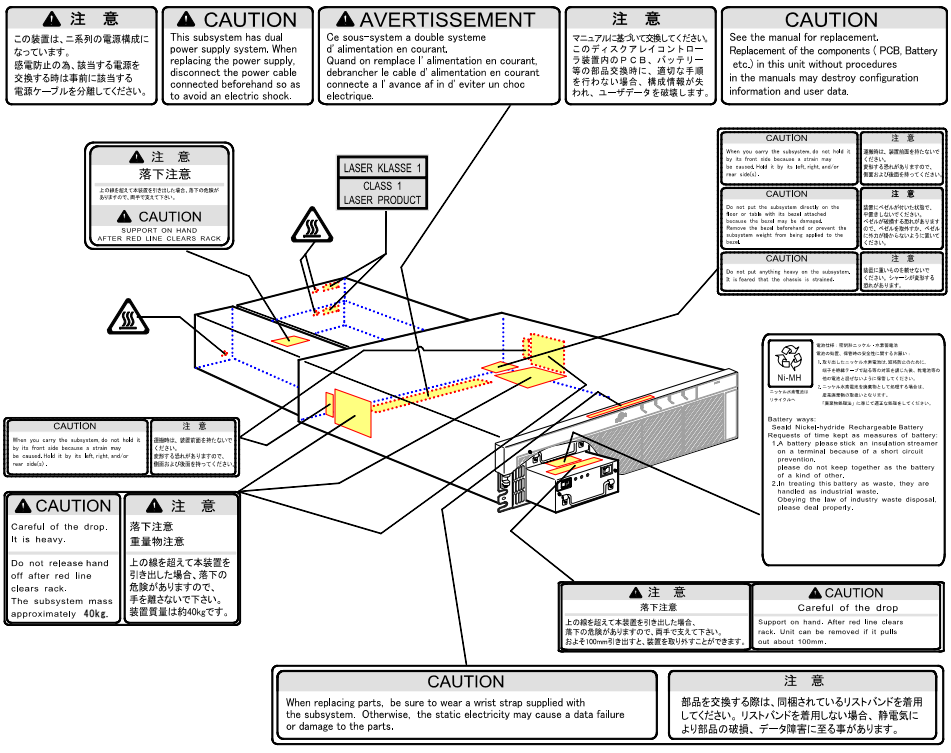
Copyright © 2003, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

3.8 Rackmount model (RKAD)



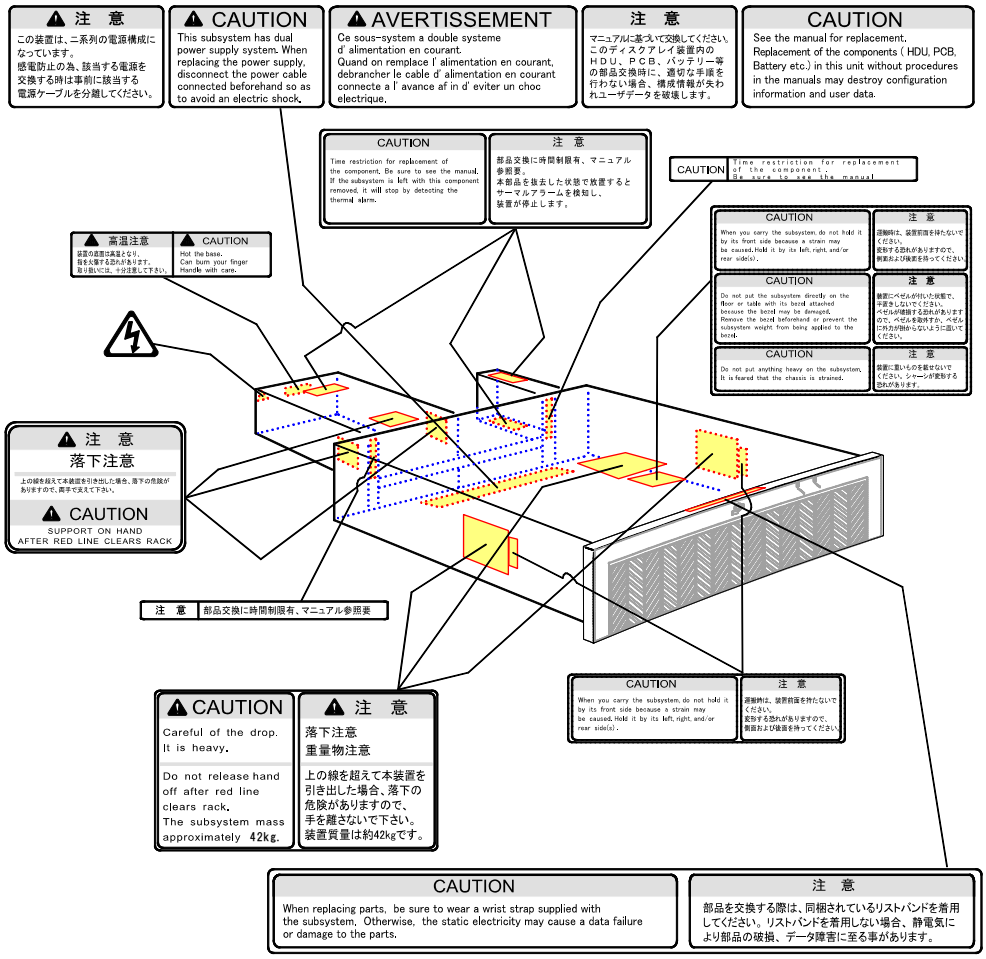
3.9 Rackmount model (RKH/RKHE)



Copyright © 2003, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

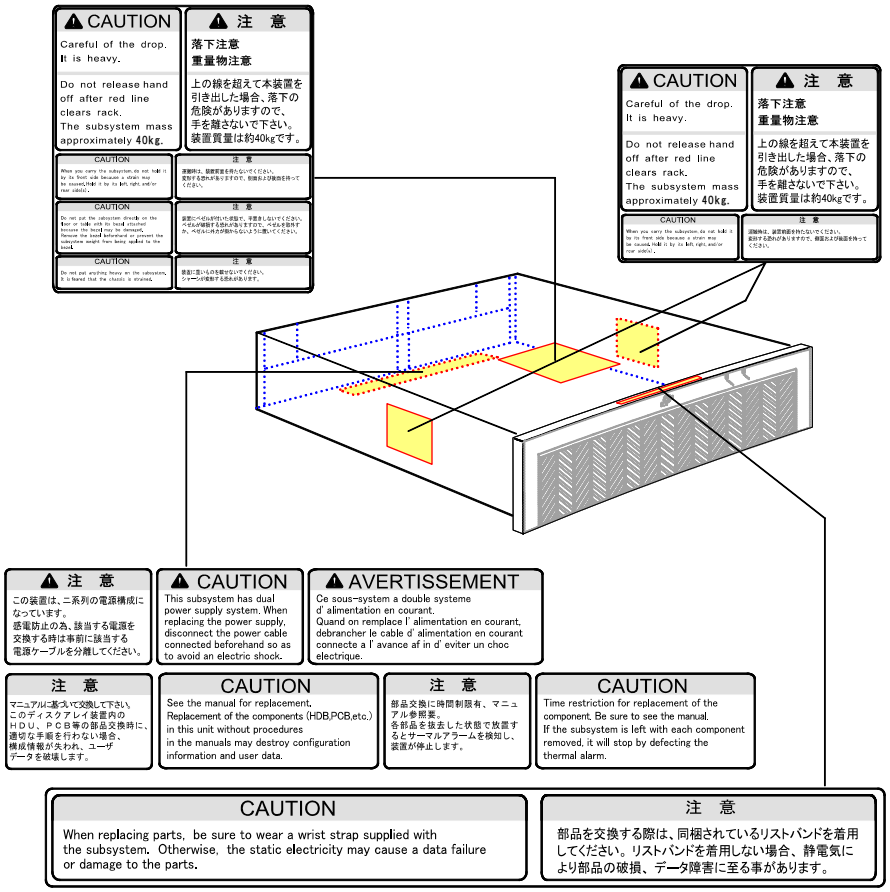
3.10 Rackmount model (RKAAT/RKAATL)



Copyright © 2004, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

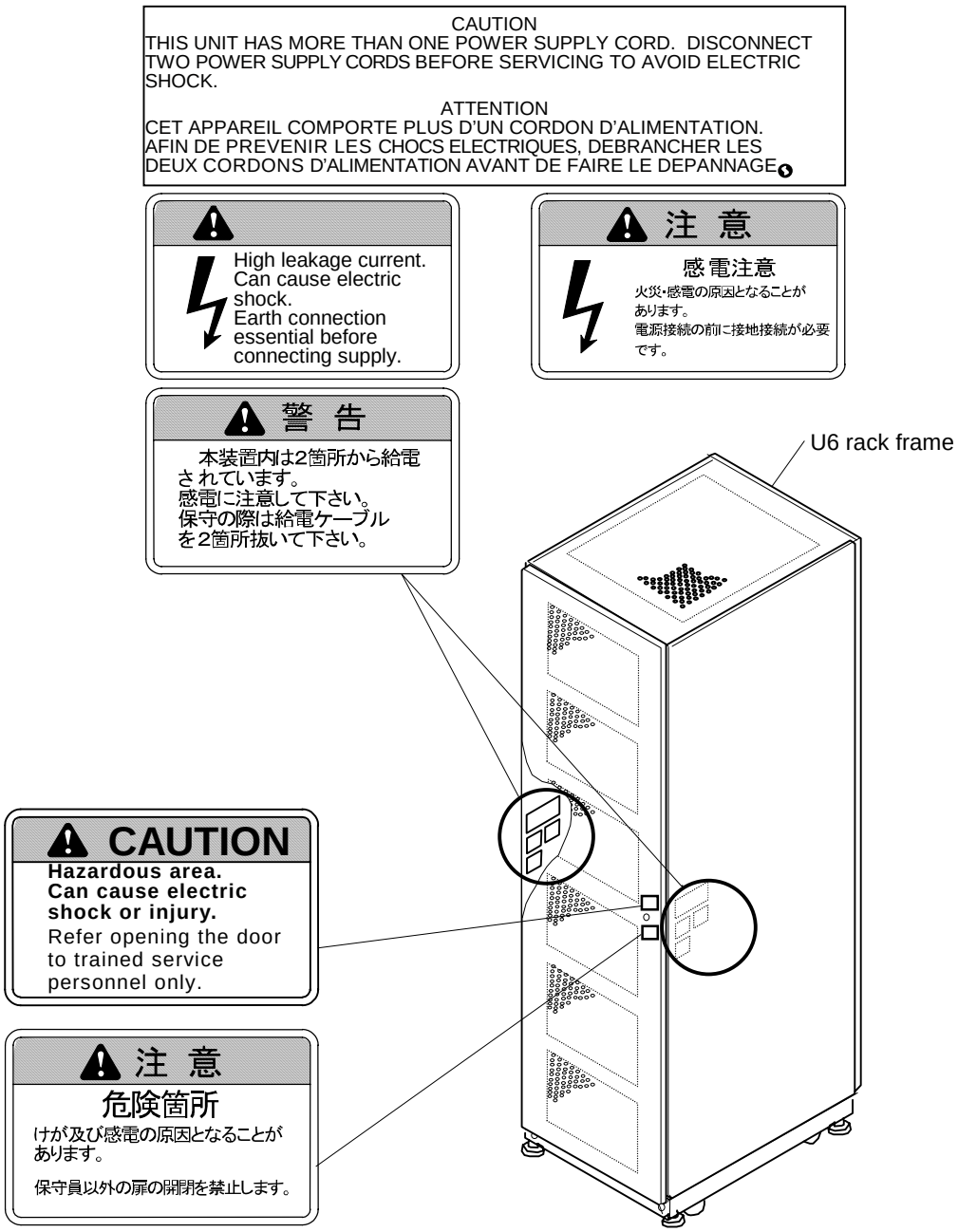
3.11 Rackmount model (RKAJAT/RKAJATL)



Copyright © 2004, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

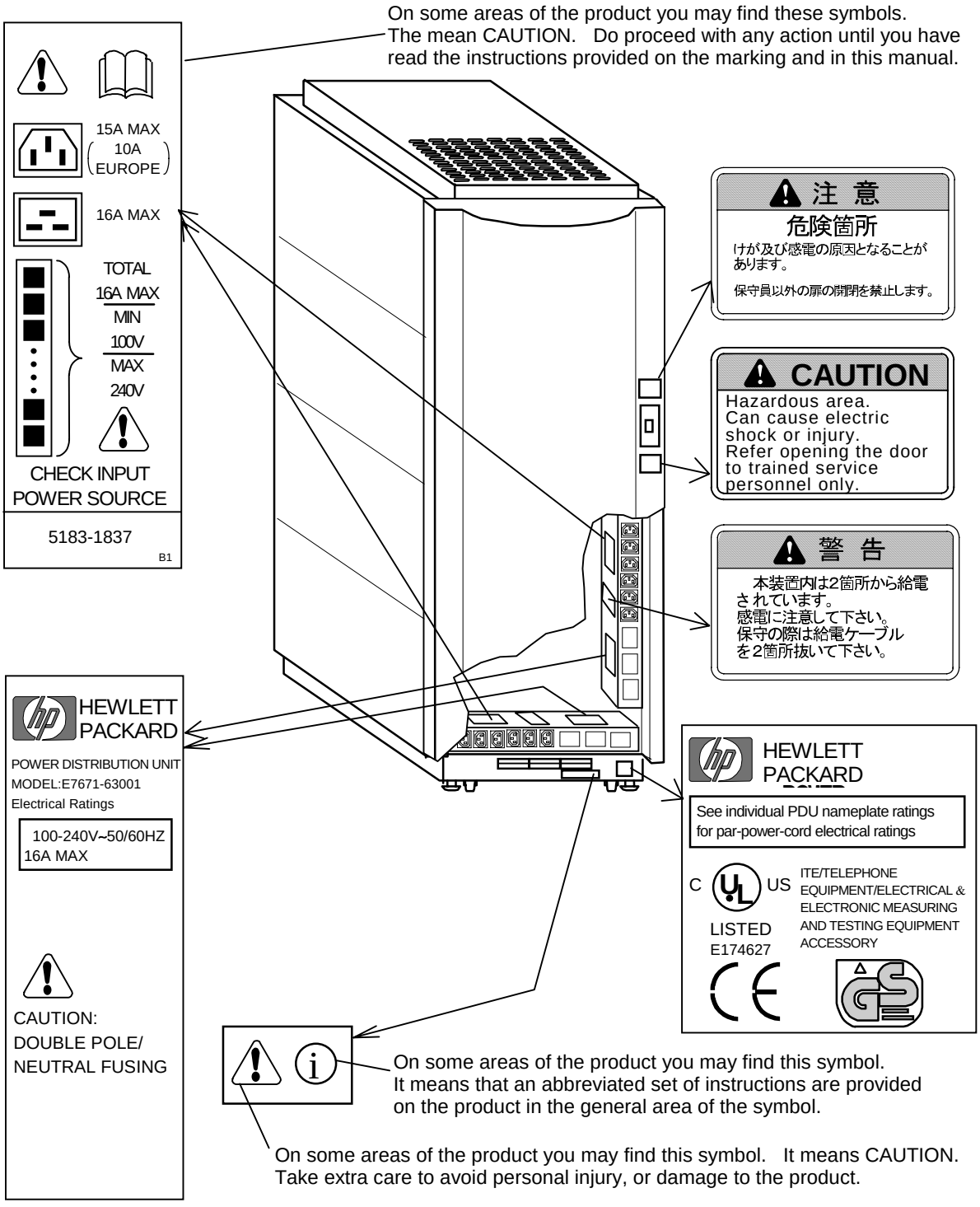
3.12 Rackmount model with U6 rack frame



Copyright © 2003, 2005, Hitachi, Ltd.

⚠ SAFETY SUMMARY (Continued)

3.13 Rackmount model with U4 rack frame



Copyright © 2003, 2005, Hitachi, Ltd.

INTRODUCTION

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

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 1. Warranty and Service

This chapter contains information on items necessary to learn before starting installation or maintenance of the disk array.

1.1 Warranty

- The term of warranty is one year after the procurement. Within the period, periodic inspections and maintenance services against failures are performed free of charge.
- After one year has elapsed, the periodic inspections and maintenance services against failures are to be provided with maintenance contract.
- Above services expires eight years after shipment from the plant.
- SATA Drive needs to be replaced for its limited life after four years elapsed from the procurement to maintain its quality.
- Special maintenance (overhaul) is required to maintain quality when the standard period of six years (for FC drive) elapses after purchase of the product.
- In the subsystem, periodic replacement parts are used.
  Periodic part replacements are required to maintain quality of operation performance.
  The part whose usable life has expired must not be used.

(1) Periodic replacement parts
In the subsystem, periodical replacement parts are used.
Periodical part replacement is required to maintain high-quality operation performance.

Classification	Part name	Life	Treatment
Periodical replacement part	Backup Battery Unit	Two years	• Periodical replacement is required. • When the maintenance service contract is made, the periodical replacement is performed as a part of maintenance service. • If not, the periodical replacement must be performed basically by the user. The genuine parts must be used. • Follow the given procedure to dispose of the used battery.

Copyright © 2002, 2005, Hitachi, Ltd.

1.2 Service

As the maintenance services, provided is services executed after introduction.

Type of service	Contents	Treatment
SATA Drive replacement for its limited life	SATA Drive needs to be replaced after four years elapsed from the procurement.	These services are offered according to contract or ordering.
Special maintenance (overhaul)	For an overhaul to be executed when the standard period of six years (for FC drive) elapses after purchase of the product, the user data backup is required before performing the maintenance.	

Copyright © 2002, 2005, Hitachi, Ltd.

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.

Copyright © 2002, 2005, Hitachi, Ltd.

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.
The stripe size in this subsystem is fixed to only 64 k bytes.
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 (RKS and RKSD is 3 to 14) Disk Drives constitute one parity group (RK and RKA is 2D+1P to 15D+1P, RKL and RKAATL/RKAJATL is 2D+1P to 15D+1P, RKD and RKAD is 2D+1P to 15D+1P, RKS and RKSD is 2D+1P to 13D+1P).
  Since parity data is generated from 2 to 15 (RKS and RKSD is 2 to 13) 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. 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. Extra processing of reading “data before updating” and “parity before update” at this time is called write penalty.

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

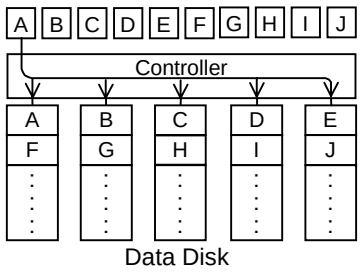
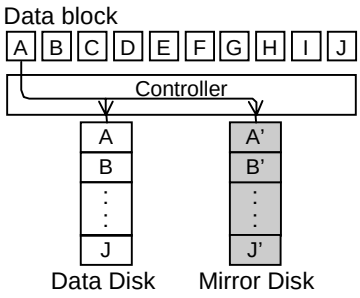
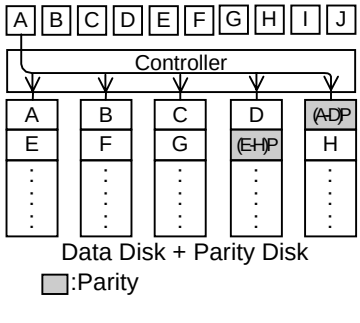
Copyright © 2002, 2005, Hitachi, Ltd.

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 RK (RKD) and RKA (RKAD) or RKH/RKHE and RKA subsystem supports RAID 0 (2D to 16D), RAID 1, RAID 5 (2D+1P to 15D+1P), RAID 1+0 (2D+2P to 8D+8P).
But, the subsystem configured by the RK, RKH/RKHE and RKAAT/RKAJAT and the one configured by the RKL and RKAATL/RKAJATL do not support RAID 0.

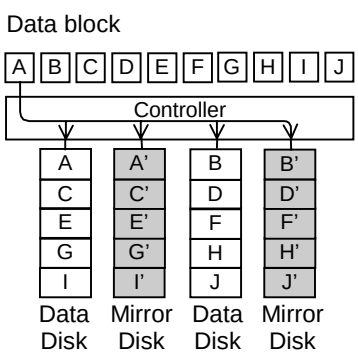
The RKS (RKSD) subsystem supports RAID 0 (2D to 14D), RAID 1, RAID 5 (2D+1P to 13D+1P), RAID 1+0 (2D+2P to 7D+7P). The outline and characteristics of each RAID level are explained in the following.

Table 2.1.1 Outline of RAID Levels(*1)

Level	Configuration		Characteristics
RAID 0		Outline	RAID 0 stripes data across Disk Drives (five Disk Drives in the DF600) 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 DF600 are explained.

Copyright © 2002, 2005, Hitachi, Ltd.

Level	Configuration		Characteristics
RAID 1+0		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 and RKSD 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.

Copyright © 2002, 2005, Hitachi, Ltd.

2.2 Outline of the Subsystem

2.2.1 Outline of functions

DF600 subsystem has two models: floor model and rackmount model.
There are six types of the floor model : one is a combination of the RK and the floor standing kit (hereafter referred to as Floor (RK+H1H) Model) and one is a combination of the RK, the RKA, and the floor standing kit (hereafter, referred to as Floor (RK+RKA+H2H) Model) and one is a combination of the RKS and the floor standing kit (hereafter referred to as Floor (RKS+H1H) Model) and one is a combination of the RKD and the floor standing kit (hereafter referred to as Floor (RKD+H1HD) Model) and one is a combination of the RKD, the RKAD, and the floor standing kit (hereafter, referred to as Floor (RKD+RKAD+H2HD) Model) and the other is a combination of the RKSD and the floor standing kit (hereafter referred to as Floor (RKSD+H1HD) Model).
The rackmount model is a subsystem which is used in the form of a combination of the DF600-RK/ DF600-RKD/ DF600-RKL (hereafter, referred to as RK/RKD/RKL.) and the DF600-RKA/ DF600-RKAAT/ DF600-RKAATL/ DF6000-RKAJAT/ DF600-RKAJATL DF600-RKAD (hereafter, referred to as RKA/RKAAT/RKAATL/RKAJATL/RKAJAT/RKAD).(‡1)
The RKH/RKHE is provided as another rackmount model product. The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system that uses the RKH/RKHE can have a configuration with up to the 30 RKAs (up to 449 Disk Drives (FC)) or up to the 30 RKA/RKAAT/RKAJATs(‡2) (up to 420 Disk Drives (Serial-ATA)).
For an external power supplying, RK, RKL, RKA, RKAAT, RKAATL, RKAJAT, RKAJATL, RKS, RKH, and RKHE are supplied from AC power supply, RKD, RKAD, and RKSD are supplied from DC power supply.
Features of the subsystem are explained below.

- The Floor (RK+H1H/ RKD+H1HD) Model mounts up to fourteen Disk Drives and controls them as RAID by a Controller.
- The Floor (RKS+H1H/ RKSD+H1HD) Model mounts up to fourteen Disk Drives and controls them as RAID by a Controller.
- The Floor (RK+RKA+H2H/ RKD+RKAD+H2HD) Model mounts up to 29 Disk Drives and controls them as RAID by a controller.
- The RK, RKL, RKD, RKS and RKSD mounts up to fourteen Disk Drives and controls them as RAID by a controller.
- The RKA (RKAD)/RKAAT/RKAATL/RKAJAT/RKAJATL mounts up to fifteen Disk Drives and can be used being connected with the RK/RKL (RKD)(‡2) and RKH/RKHE. (The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.)
- The subsystem uses either Fibre Channel (1 G bps/2 G bps, Non-OFC) Wide-differential, or Single-ended) as an interface with a host computer.

‡1 : The two or more RKs/RKDs/RKHs/RKHEs cannot be connected to the one system.
‡2 : The RKAAT/RKAJAT cannot be connected to the RKD. Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

- The RK (RKD), RKA (RKAD) and RKS (RKSD) 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.
- Up to 14 RKA/RKAAT/RKAJAT(s) can be connected with a single RK using special cables so that you can configure a system(‡1) with a set of 224 Disk Drives(FC) or 210 Disk Drives(Serial-ATA) using the Control Unit of the RK.
- Up to 3 RKAATL/RKAJATL(s) can be connected with a single RKL using special cables so that you can configure a system(‡1) with a set of 59 Disk Drives (Serial-ATA) using the Control Unit of the RKL.
- Up to 30 RKA(s) can be connected with a single RKH/RKHE using special cables so that you can configure a system(‡1) with a set of 449 Disk Drives(FC) using the Control Unit of the RKH/RKHE.
- Up to 28 RKAAT/RKAJAT(s)(‡2) can be connected with a single RKH/RKHE using special cables so that you can configure a system(‡1) with a set of 420 Disk Drives(Serial-ATA) using the Control Unit of the RKH/RKHE.
- A special rack frame (DF-F600-U6) is provided, which can mount a various combination of the RK/RKL/RKH/RKHE(s) (3 U units high) and RKA/RKAAT/RKAATL/RKAJAT/RKAJATL(s) (3 U units high) up to a height of 38 U units. (up to 12 U in the configuration of the RKL and RKAATL/RKAJATL.)
- A special rack frame (DF-F600-U4) is provided, which can mount a various combination of the RK/RKL/RKH/RKHE(s) and RKA/RKAAT/RKAATL/RKAJAT/RKAJATL(s) up to a height of 32 U units (EIA Standard). (up to 12 U in the configuration of the RKL and RKAATL/RKAJATL.)
- Fibre Channel interface is used as host interface. The Fibre Channel interface is capable of transferring between hosts at data transfer speeds of up to 200 Mbytes/sec.
- The Fibre Channel interface provides 2 ports per Control Unit (DF-F600-F1H/DF-F600-F1HL).
  (RKS and RKSD can have one port per control Unit, and be connected to up to 1 ports. RKH/RKHE can have 2 ports per control Unit (Can have 4 ports per control Unit as an option))

‡1 : The two or more RKs/RKDs/RKHs/RKHEs cannot be connected to the one system.

‡2 : The RKAAT/RKAATL/RKAJAT/RKAJATL cannot be connected to the RKD, and the RKAATL/RKAJATL cannot be connected to the RK. Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(1) Scalability

- You can construct any system that meets wide variety of demands, from a system with fourteen Disk Drives by using a single RK to a system with the maximum of 224 Disk Drives (FC) or 210 Disk Drives (Serial-ATA) expanded by connecting up to fourteen RKA/RKAAT/RKAJATs (RKADs) to the RK (RKD). The RKL by itself can be connected up to 3 RKAATL/RKAJATLs from the system with the Disk Drives up to 14 and also build up the system which is able to expand the Disk Drives up to 45. When the RKH/RKHE is used, it is possible to construct a system with a configuration in which up to 30 RKAs (up to 449 Disk Drives (FC)) or up to 30 RKA/RKAAT/RKAJATs (up to 420 Disk Drives (Serial-ATA)) are connected.(‡1)(‡2)
- By using the rack frame (U6/U4) exclusive to DF600, you can construct a system conforming to your demand by combining the RK and nine RKAs.
- Spare disk(s), up to fifteen of which can be set up, can be mounted in any location(s).(‡1) However, the HDU 0 to HDU 4 in the RK/RKL/RKS (RKD/RKSD) cannot be set as the spare disk.
  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 (Up to 3 Spare disks can be defined for RKS/RKSD).
- From the host computer, the subsystem can be used not only as a single large scale Disk Drive but also as 512 logical disks (LUs) at the maximum (RKH/RKHE: 2,048 logical disks (LUs) at the maximum).
- The subsystem enables you to construct a system which can connect up to 126 Fibre Channel devices by using the Fibre Channel interface and connecting the HUB and switch (hereafter, referred to as “SW”.).

(2) Multi-RAID configuration

- Four RAID levels, that is, RAID 0, RAID 1, RAID 5, and RAID 1+0 can be set up. (When the RKAAT/RKAATL/RKAJAT/RKAJATL 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.
- With RAID 5 of DF600 (Floor (RK+H1H/ RKD+H1HD) Model, Floor (RK+RKA+H2H /RKD+RKAD+H2HD) Model and RK/RKA/RKS/RKD/RKAD/RKSD), you can construct a flexible system conforming to your demands from a system configured with two data disks (2D+1P) to that with 15 (RKS/RKSD is 14 data disks. The first one of the RKAs connected to the RKH/RKHE) data disks (RK/RKL, RKA, RKAAT/RKAATL/RKAJAT/RKAJATL, RKD and RKAD is 15D+1P, RKS/RKSD is 13D+1P).

‡1 : No Spare Disk can be set for the Disk Drives #0 to #4 of the RK/RKS/RKD/RKSD and the RKA (unit ID #00) which is the first one of the RKA connected to the RKH/RKHE.

‡2 : The two or more RKs/RKLs/RKDs/RKHs/RKHEs cannot be connected to the one system.

‡3 : The RKAAT/RKAATL/RKAJAT/RKAJATL cannot be connected to the RKD, and the RKAATL/RKAJATL cannot be connected to the RK. Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

(3) 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 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 (1,024 M bytes to 2,048 M bytes /CTL, RKH/RKHE is 2,048 M bytes to 4,096 M bytes/CTL), speed-up of command execution at the time of read/write hit was achieved.

(4) Large capacity
- A maximum of 224 subsystems can be connected. The subsystems provide a maximum of 64.4 T bytes disk capacity at RAID 0.
  Further, when the RKAAT/RKAJAT is connected, the maximum disk capacity of 77.0 T bytes is realized (in the case of RAID 5).
- When the RKH/RKHE is used, it is possible to construct a system with a configuration in which up to 30 RKAs (up to 449 Disk Drives) are connected and the disk capacity can reach up to 128.8 TB (in the case of RAID 0).
  Further, when the RKAAT/RKAJAT is connected, the maximum disk capacity of 154.1 T bytes is realized (in the case of RAID 5).

(5) 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.

(6) High data reliability
- The Controller of the DF600 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.

(7) 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 Disk Array Management Program.
- Diagnosis of the subsystem can be done from a distant place by using the remote maintenance function (SNMP).

(8) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

2.2.2 Differences between the DF600 and DF500

Differences between the subsystem and DF500 are explained below.

- High-density package
  Compared to the RK (6 U), RKA (3.5 U) and RKL (4 U) of DF500, RK/RKL, RKA, RKAAT/RKAATL/RKAJAT/RKAJATL, RKS, RKD, RKAD and RKSD of DF600 becomes smaller, 3 U (EIA Standard), since the mounting configuration is designed to minimize the space necessary for the installation of components. That enables to save the space for its installation.
  The RKH/RKHE (3U) is provided as another rackmount model product. The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system can have a configuration in which up to 30 RKAs (up to 449 Disk Drives (FC)) or up to 30 RKA/RKAAT/RKAJATs(‡1) (up to 420 Disk Drives (Serial-ATA)) are connected.
- Adoption of high-speed RISC processor
  The installed microprocessor was changed from POWER PC 750 (300 MHz) of the DF500 to POWER PC 7455 (677 MHz) which has higher speed and higher performance. RKH is POWER PC 7455 (933 MHz). RKHE is POWER PC 7457 (1.3 GHz).
- Removal of the FDD
  The procedure for collecting the trace and dump is changed from by the FDD to by the operation using WEB. The removal of the FDD enables the DF600 to save the space and improve the maintenance operation.
- Fibre Channel interface used as the standard host interface (RK/ Floor (RK+H1H) Model /Floor (RK+RKA+H2H) Model/ RKD/ Floor (RKD+H1H) Model /Floor (RKD+RKAD+H2H) Model) DF500 provides optionally SCSI interface and Fibre Channel interface as the standard host interface to the Control Unit. DF600 also provides Fibre Channel interface as the standard host interface.
- Duplicated power supply
  In the DF600 like the DF500, the power supply which integrates functions of the IN BOX and the Power Unit is duplicated as a standard configuration. This subsystem can equip optionally the power supply for backing up.
  There are also models with a Power Unit (DC) that can connect power supply (DC) as an external input: RKD, RKAD, and RKSD.

‡1 : Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

- Up to 30 Spare Disks installable
  Compared with DF500, DF600 (RKH/RKHE only) can also install up to 30 Spare Disks in one system configuration so that the possibility of data loss due to a failure is reduced. Depending on data disk configuration, Spare Disks can be installed in any slot. (‡1).
- Adoption of Fibre Channel Disk Drive
  In the DF600 like the DF500, a Disk Drive with the Fibre Channel Interface is used as Disk Drives. Although the DF500 can connect up to 100 drives, DF600 can connect up to 449 Disk Drives. This enables user to do the various RAID configuration.(‡2)
- Adoption of Serial-ATA Disk Drive (DF600-RKAAT/RKAATL/RKAJAT/RKAJATL model only)
  A Disk Drive with the Serial-ATA Interface is used as Disk Drives. Although the DF500 can connect up to 100 drives, DF600-RKAAT/RKAJAT can connect up to 210 Disk Drives. This enables user to do the various RAID configuration.(‡3)

‡1 : Spare Disk cannot be set for the Disk Drives #0 to #4 of the RKA (Unit ID #00) which is the first one of the RKAs connected to the RK (RKD), RKS (RKSD) or RKH/RKHE. Also, up to 3 Spare disks can be defined for the RKS and RKSD. Up to 15 Spare disks can be defined for the RK (RKD).

‡2 : Up to 14 Disk Drives can be mounted on RKS (RKSD).

‡3 : Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

2.3 Subsystem Structure

For a single unit of Rackmount model, there are RK/RKL/RKA/RKS/RKH/RKHE/RKAAT/RKAATL/RKAJAT/RKAJATL and RKD/RKAD/RKSD.
Floor model (RKL/RKH/RKHE/RKAAT/RKAATL/RKAJAT/RKAJATL is not supported) or Rackmount model are configured by combining single units.
The RKH/RKHE is a CTU (controller); it has no disk drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it.

RK/RKL/RKA/RKS/RKH/RKHE/RKAAT/RKAATL/RKAJAT/RKAJATL has a Power Unit power-supplied from AC, and RKD/RKAD/RKSD has a Power Unit (DC) that can connect DC power supply.

When using the subsystem (RKD/RKAD/RKSD) with Power Unit (DC) installed in it, meet the following requirements.

- The DC power input ports use terminals for connecting the cables. When connecting the power cables to the terminals, have a professional do the work.
- When replacing a Power Unit (DC) because of its trouble, etc., the power supply to it must be shut off. Due to using terminals to the ports, make sure that a circuit breaker is attached to the power supply system so that power can be turned off via the breaker.
- Neither the UPS interlock function nor the remote adapter can be used.
- The subsystem cannot be used being mounted on the U4/U6 rack frame.
- The power supply unit itself is not commercially available.

(1) RK/RKL, RKA, RKS, RKH, RKHE, RKAAT/RKAATL/RKAJAT/RKAJATL, Floor (RK+H1H/RKS+HIH) Model, Floor (RK+RKA+H2H) Model
The subsystem can be composed of a combination of the RK (s) and RKA (s).
There are three types of the floor model : one is a combination of the RK and the floor standing kit (hereafter referred to as Floor (RK+H1H) Model) and one is a combination of the RK, the RKA, and the floor standing kit (hereafter, referred to as Floor (RK+RKA+H2H) Model) and the other is a combination of the RKS and the floor standing kit (hereafter referred to as Floor (RKS+H1H) Model).
As for the rackmount model (RK, RKS), a system with one RK and up to 11 RKA/RKAATs (with 179 Disk Drives at the maximum) can be configured when using the U6 rack frame (DF-F600-U6).
The system in the DF600 can be configured with up to 14 RKA/RKAAT/RKAJATs for a total of 224 Disk Drives at a maximum of 2 U6 rack frames.
As for the rackmount model (RKL), a system with one RKL and up to 3 RKAATL/RKAJATLs (with 59 Disk Drives at the maximum) can be configured when using the U6 rack frame (DF-F600-U6).
The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system can have a configuration in which up to 30 RKAs (up to 449 Disk Drives (FC)) or up to 30 RKA/RKAAT/RKAJATs (up to 420 Disk Drives (Serial-ATA))(‡1) are connected. The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.
Racks heights are measured in meters, EIA units, and “U.” 1EIA unit equals 1U, which equals 44.45 mm.

‡1 : Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

(a) RK, RKA, RKAAT, RKAJAT, RKS, Floor (RK+H1H/RKS+HIH) Model, Floor (RK+RKA+H2H) Model

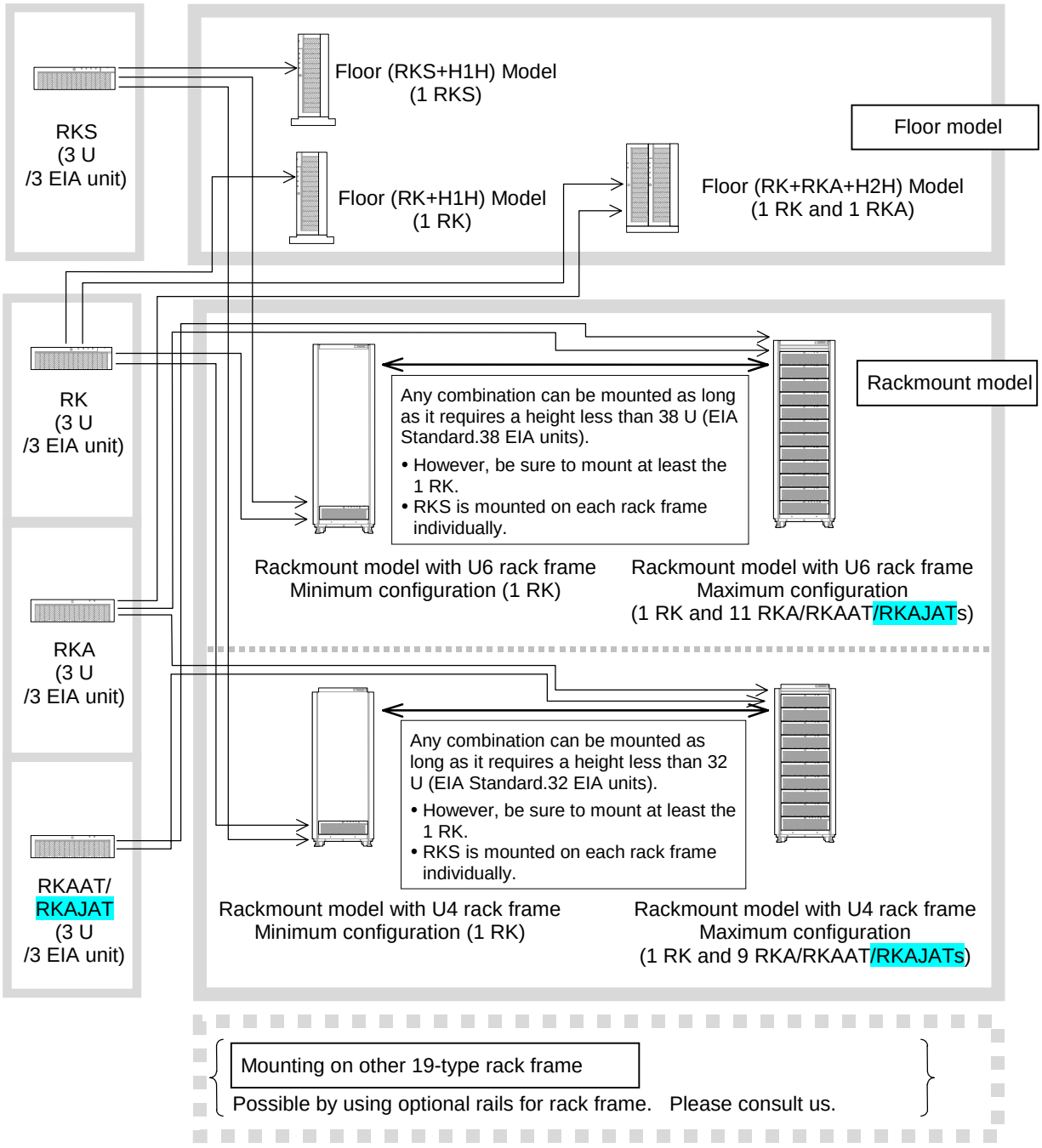


Figure 2.3.1 Subsystem Configuration

Copyright © 2003, 2005, Hitachi, Ltd.

(b) RKH, RKHE, RKA, RKAAT, RKAJAT

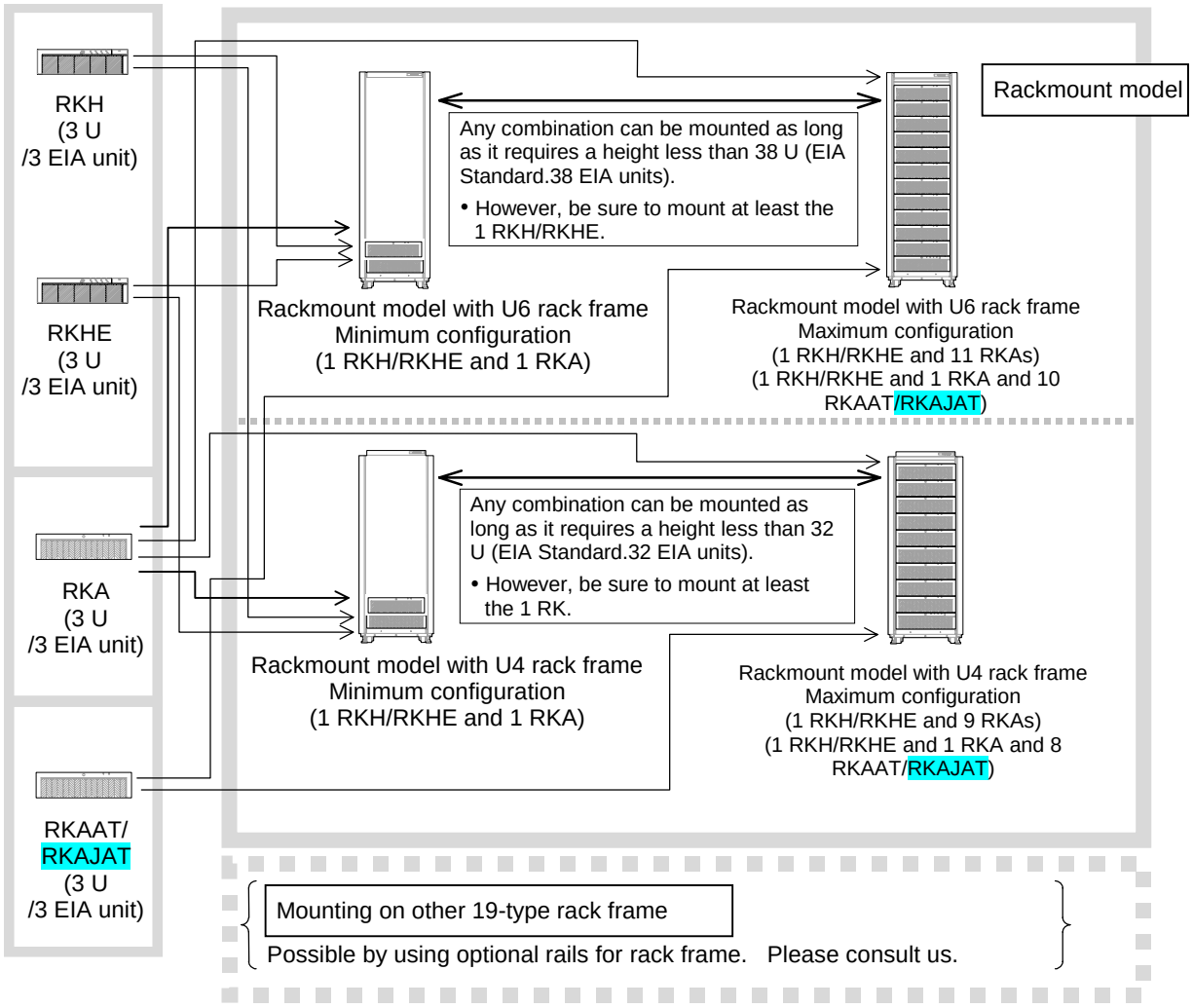


Figure 2.3.1.1 Subsystem Configuration

Copyright © 2003, 2005, Hitachi, Ltd.

(c) RKL, RKAATL, RKAJATL

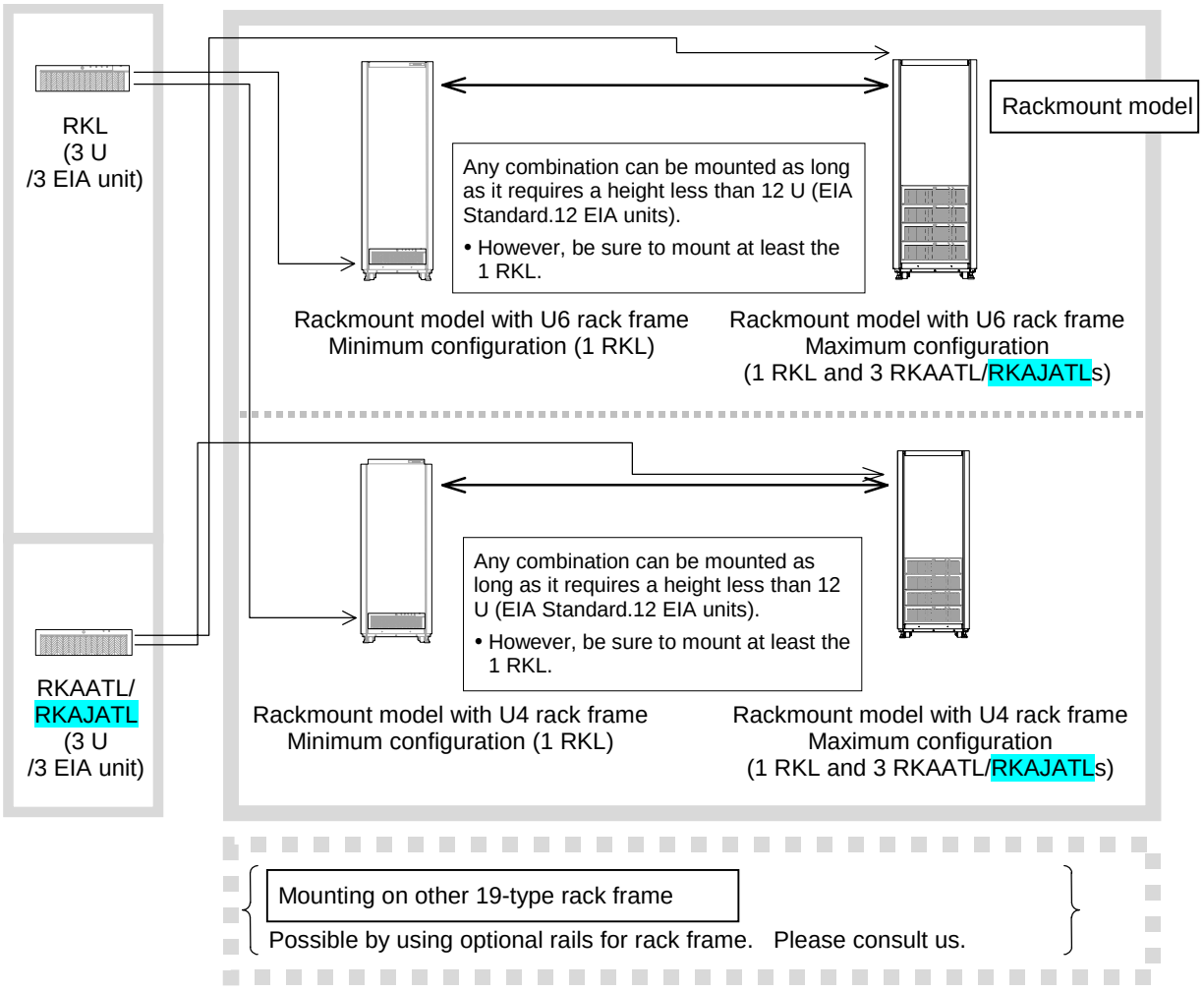


Figure 2.3.1.2 Subsystem Configuration

Copyright © 2004, 2005, Hitachi, Ltd.

(2) RKD, RKAD, RKSD, Floor (RKD+H1HD/RKSD+HIHD) Model, Floor (RKD+RKAD+H2HD) Model

The subsystem can be composed of a combination of the RKD (s) and RKAD (s). There are three types of the floor model : one is a combination of the RKD and the floor standing kit (hereafter referred to as Floor (RKD+H1HD) Model) and one is a combination of the RKD, the RKAD, and the floor standing kit (hereafter, referred to as Floor (RKD+RKAD+H2HD) Model) and the other is a combination of the RKSD and the floor standing kit (hereafter referred to as Floor (RKSD+H1HD) Model).

The RKD, RKAD and RKSD are models to be mounted on a 19-type rack frame.

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

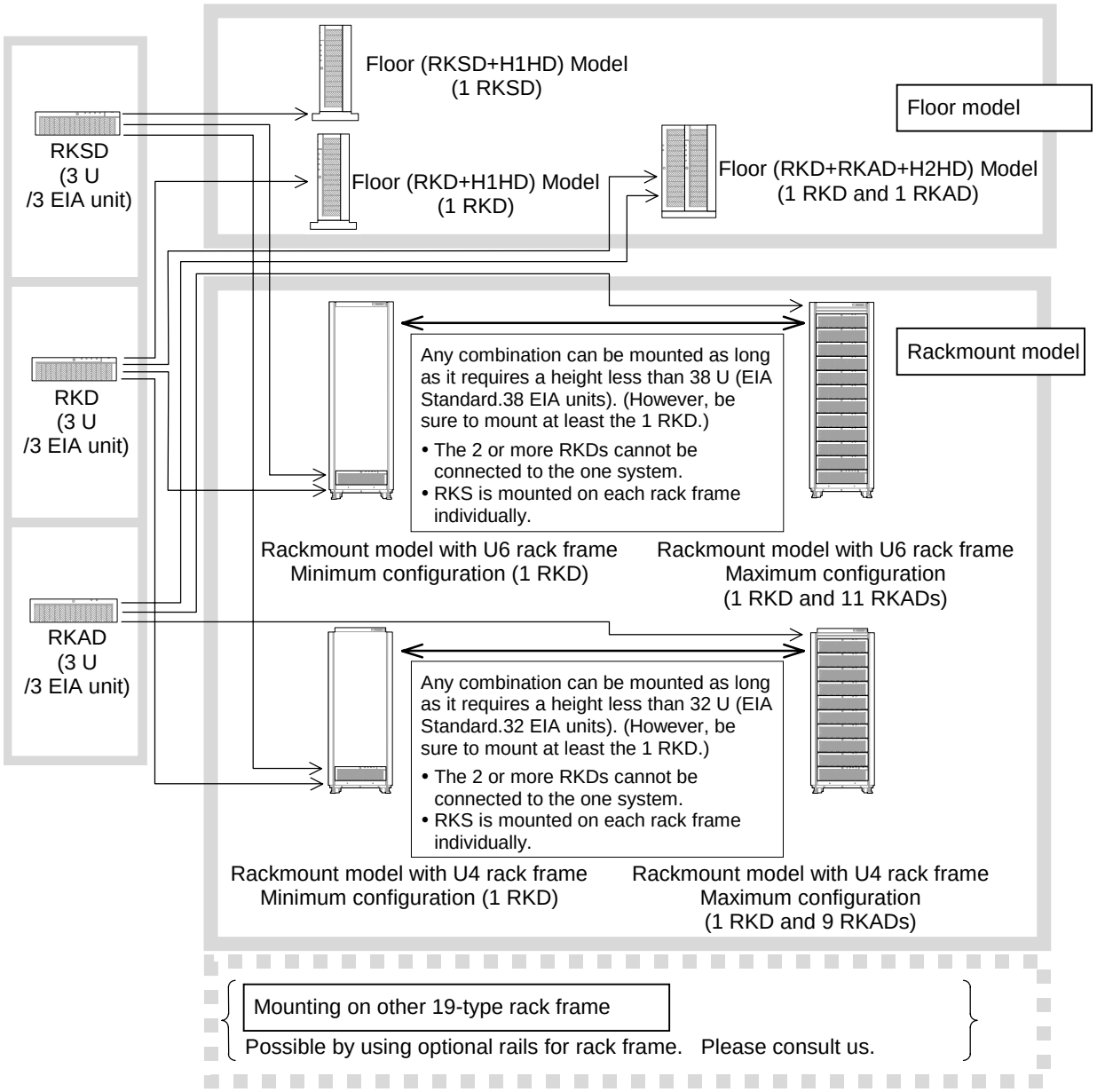


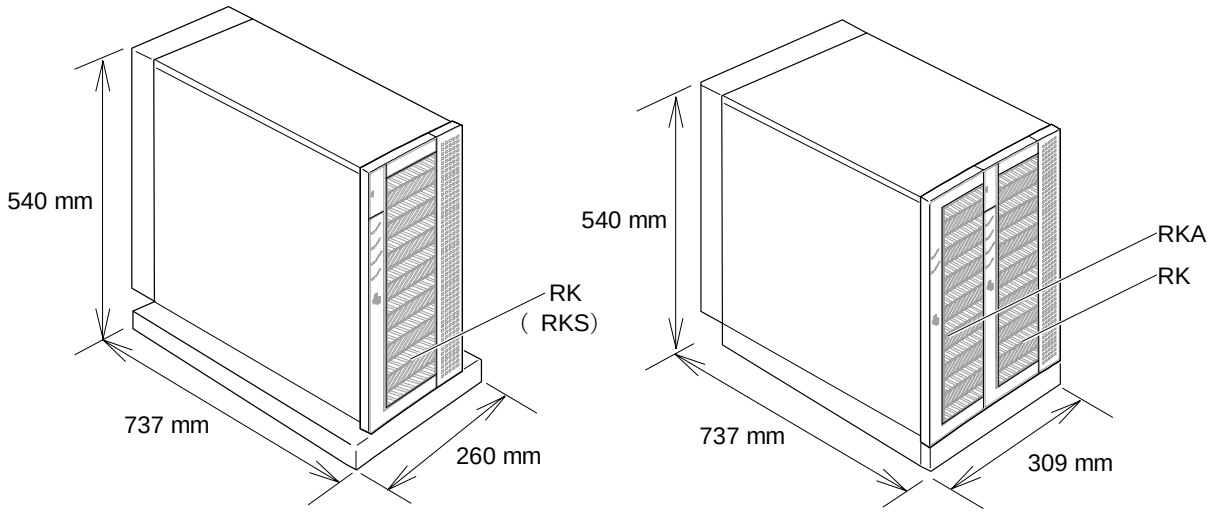
Figure 2.3.1.3 Subsystem Configuration

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.1 External appearances

(1) Appearances of Floor (RK+H1H/ RK+RKA+H2H/ RKS+H1H) Model, RK/RKL, RKA and RKS

(a) Floor (RK+H1H) Model, Floor (RK+RKA+H2H) Model, Floor (RKS+H1H) Model



(a) Floor (RK+H1H/RKS+H1H) Model (b) Floor (RK+RKA+H2H) Model

Figure 2.3.2 Appearances of the Floor Models

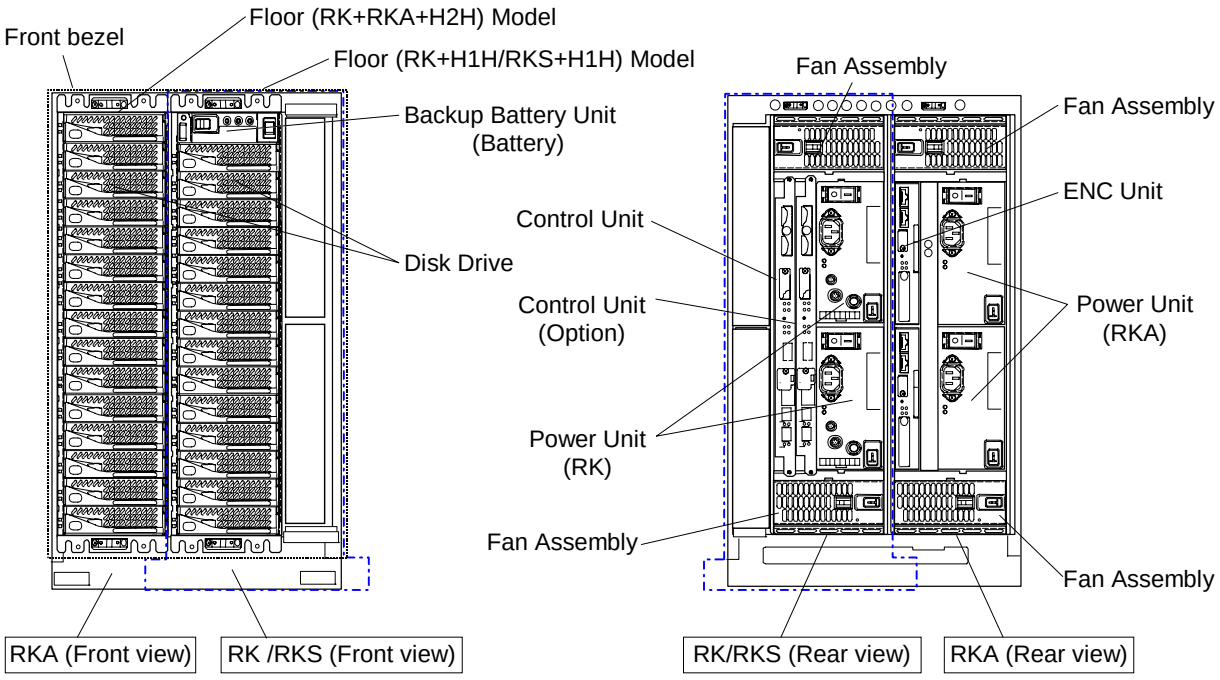


Figure 2.3.3 Major Components of the Floor Model

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Rackmount model (RK/RKL, RKA, RKS)

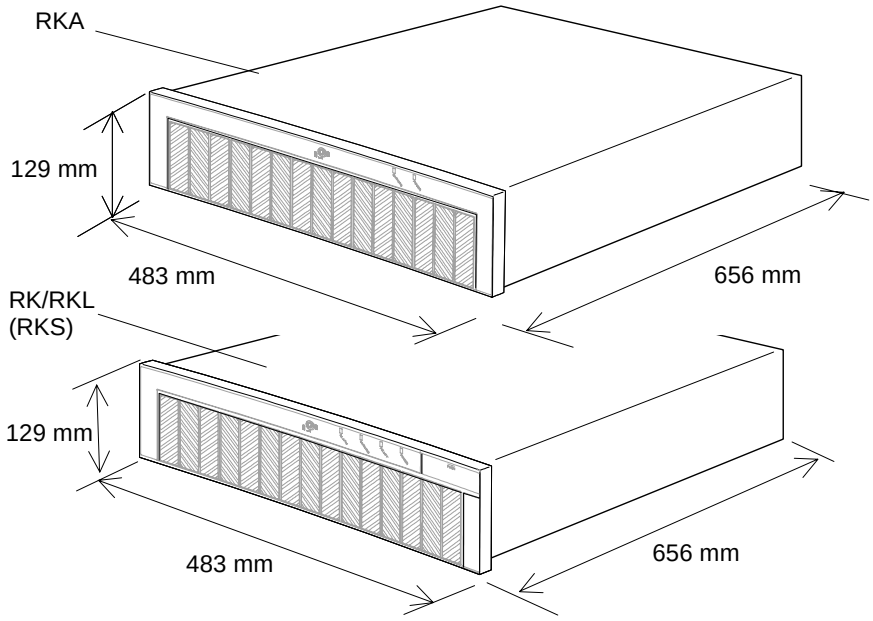


Figure 2.3.4 Appearances of the RK/RKL, RKA and RKS

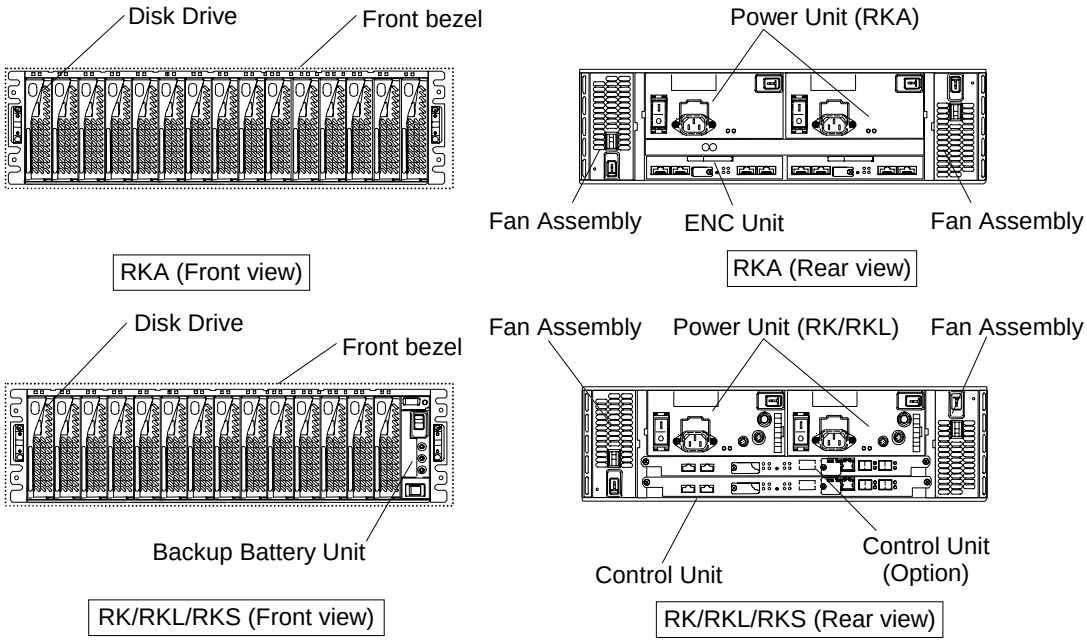
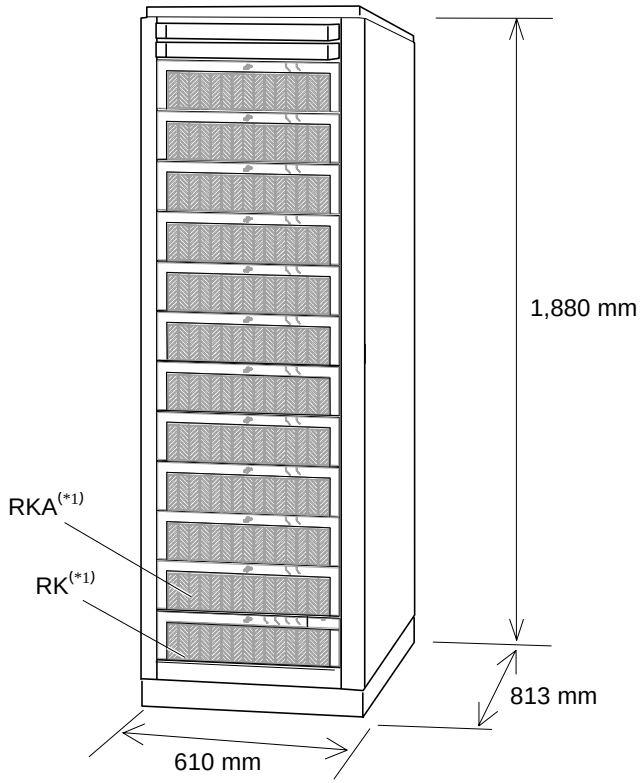


Figure 2.3.5 Major Components of the RK/RKL, RKA and RKS

Copyright © 2002, 2005, Hitachi, Ltd.

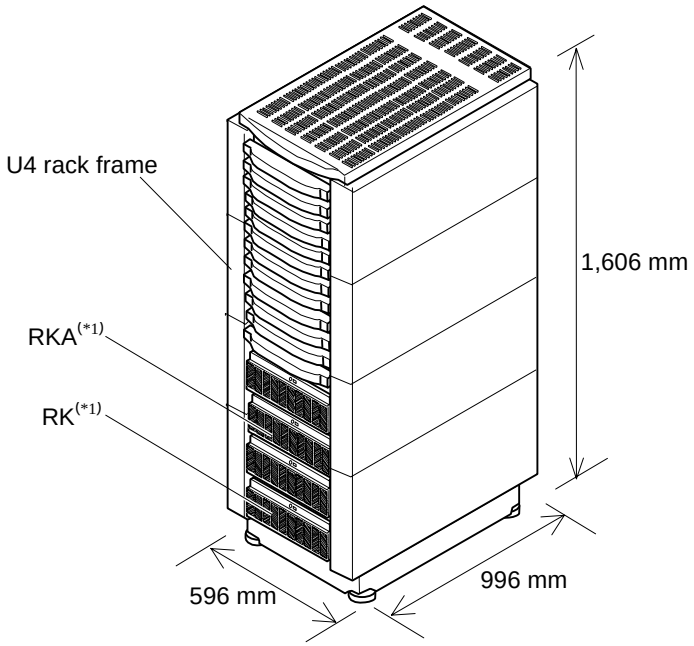
(c) Rackmount model with U6 rack frame



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

Figure 2.3.6 Appearances of the Rackmount Model with U6 Rack Frame

(d) Rackmount model with U4 rack frame



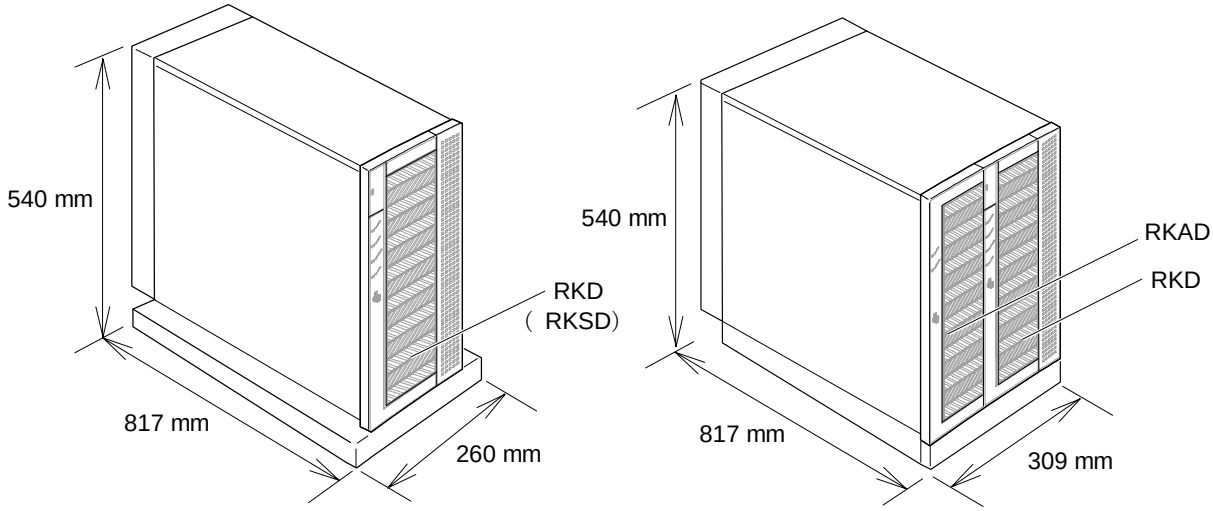
*1 : This figure shows an example of a subsystem with the one RK and three RKAs.

Figure 2.3.7 Appearances of the Rackmount Model with U4 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Appearances of Floor (RKD+H1HD/RKD+RKAD+H2HD/RKSD+H1HD) Model, RKD, RKAD and RKSD

(a) Floor (RKD+H1HD) Model, Floor (RKD+RKAD+H2HD) Model, Floor (RKSD+H1HD) Model



(a) Floor (RKD+H1HD/RKSD+H1HD) Model (b) Floor (RKD+RKAD+H2HD) Model

Figure 2.3.7.1 Appearances of the Floor Models

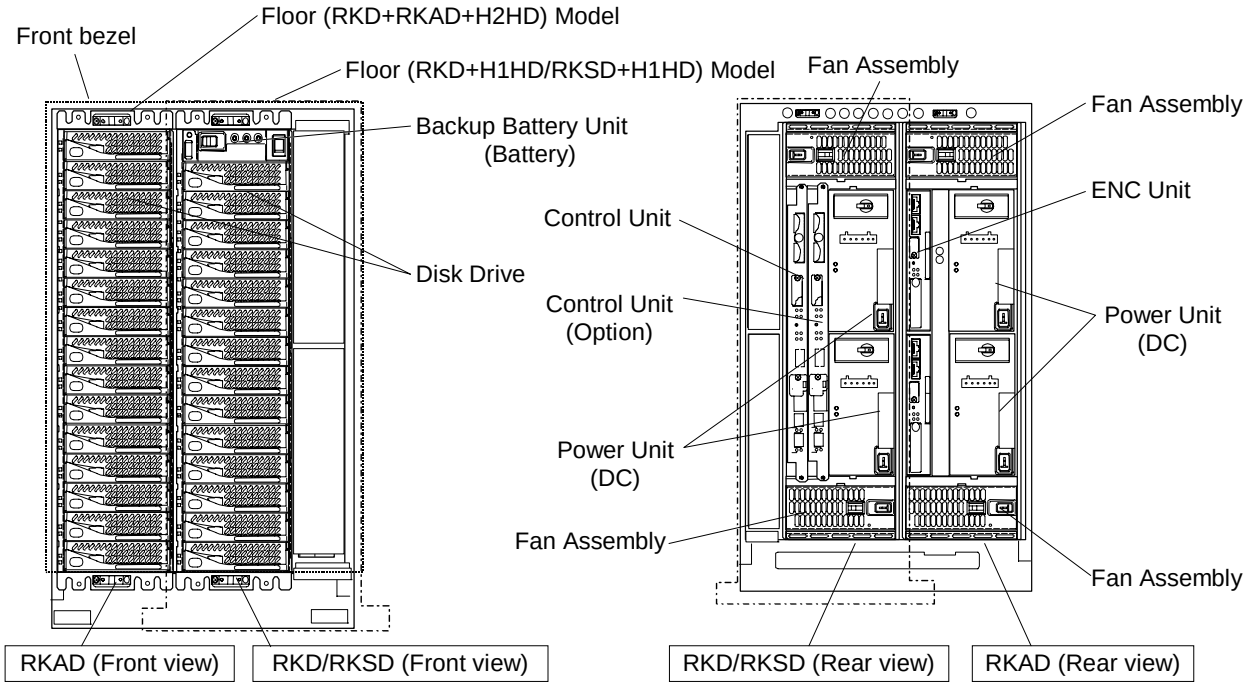


Figure 2.3.7.2 Major Components of the Floor Model

Copyright © 2003, 2005, Hitachi, Ltd.

(b) Rackmount model (RKD, RKAD, RKSD)

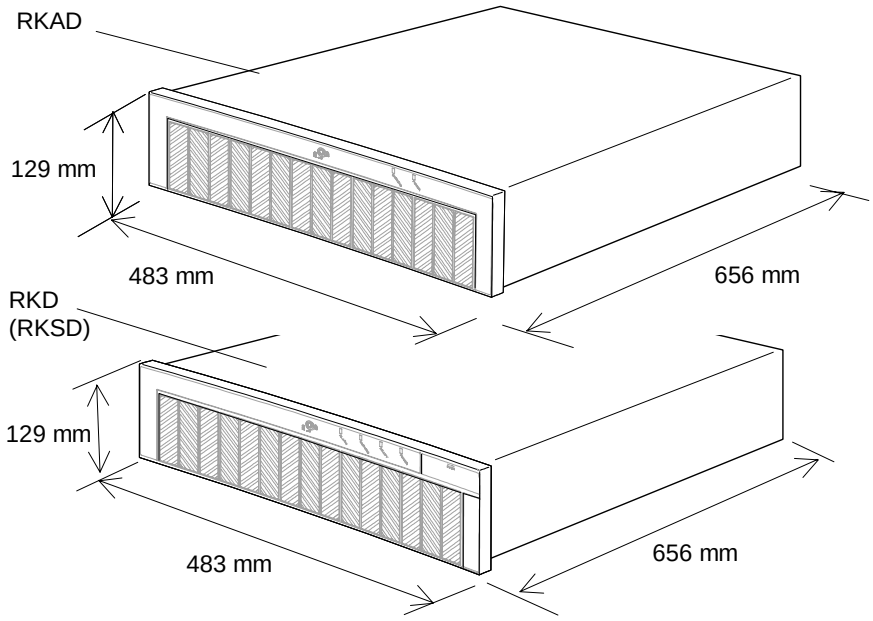


Figure 2.3.7.3 Appearances of the RKD, RKAD and RKSD

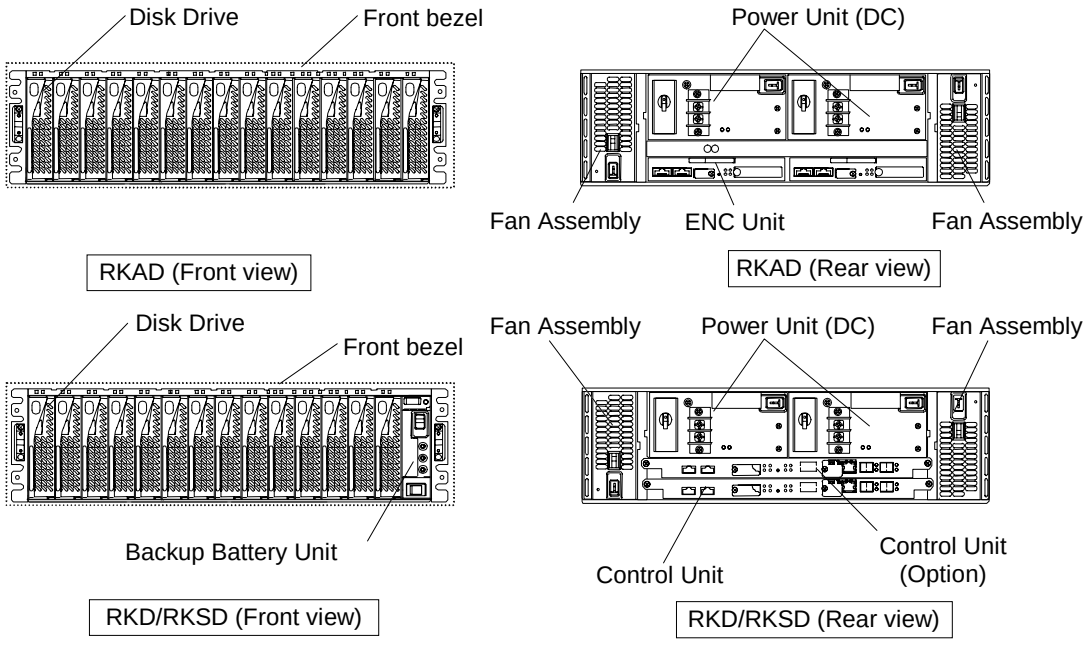


Figure 2.3.7.4 Major Components of the RKD, RKAD and RKSD

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Appearances of the RKH/RKHE

(a) Rackmount model (RKH/RKHE)

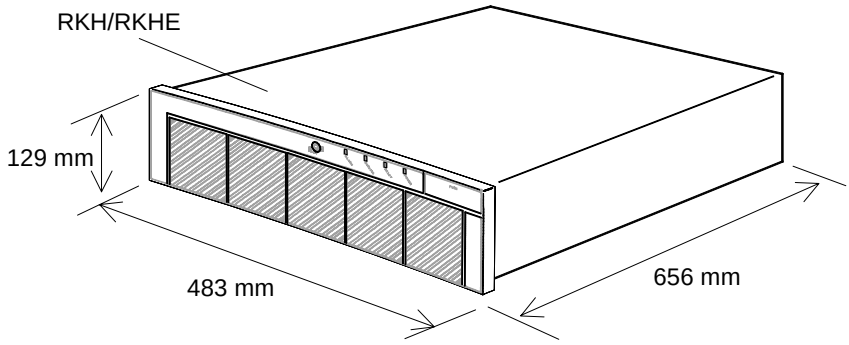


Figure 2.3.7.5 Appearances of the RKH/RKHE

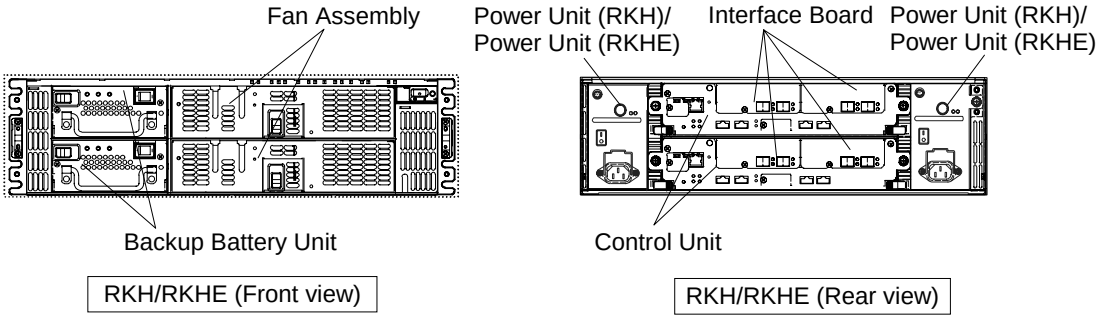


Figure 2.3.7.6 Major Components of the RKH/RKHE

Copyright © 2003, 2005, Hitachi, Ltd.

(4) Appearances of the RKAAT/RKAATL/RKAJAT/RKAJATL

(a) Rackmount model (RKAAT/RKAATL/RKAJAT/RKAJATL)

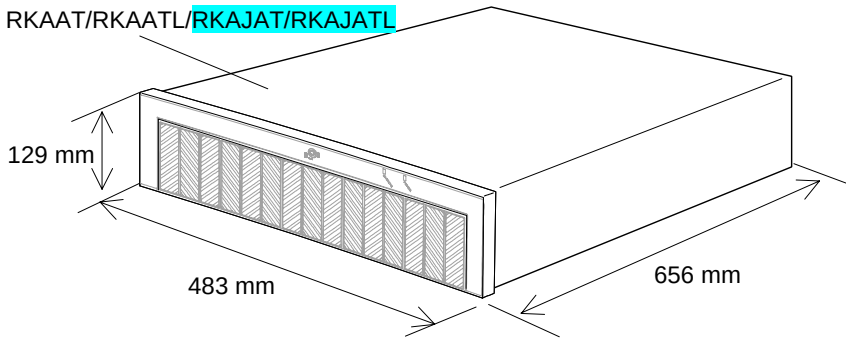


Figure 2.3.7.7 Appearances of the RKAAT/RKAATL/RKAJAT/RKAJATL

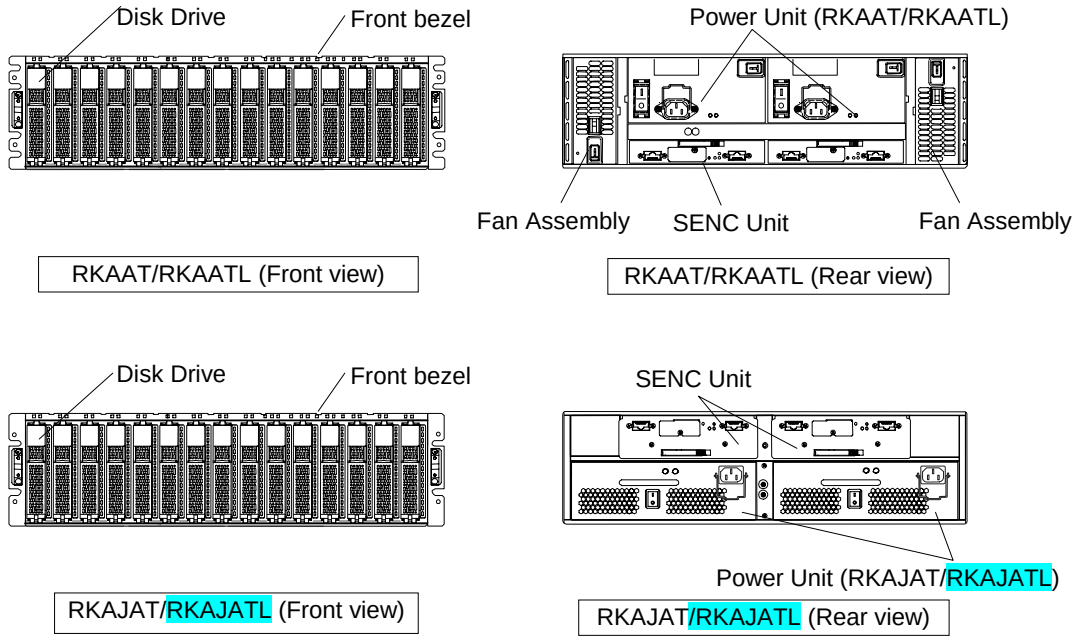
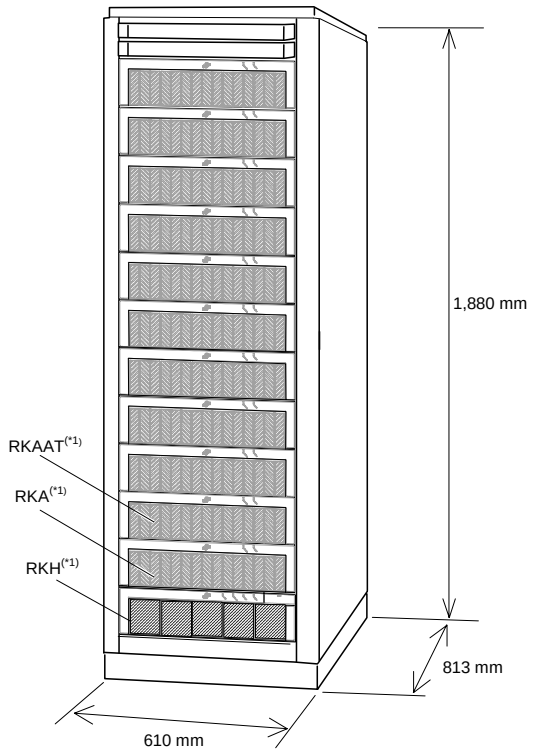


Figure 2.3.7.8 Major Components of the RKAAT/RKAATL/RKAJAT/RKAJATL

Copyright © 2003, 2005, Hitachi, Ltd.

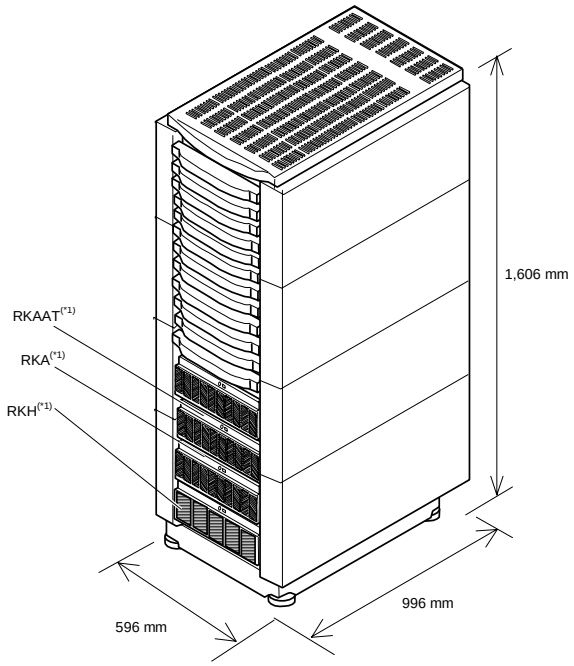
(b) Rackmount model with U6 rack frame



*1 : This figure shows an example of a subsystem with the 1 RKH and 1 RKA and 10 RKAATs.

Figure 2.3.7.9 Appearances of the Rackmount Model with U6 Rack Frame

(c) Rackmount model with U4 rack frame



*1 : This figure shows an example of a subsystem with the 1 RKH and 1 RKA and 2 RKAATs.

Figure 2.3.7.10 Appearances of the Rackmount Model with U4 Rack Frame

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.2 Configuration of floor model

(1) Floor (RK+H1H) Model/Floor (RKS+H1H) Model
This model is produced by the combination of the RK/RKS and Floor Setting Kit (DF-F600-H1H).

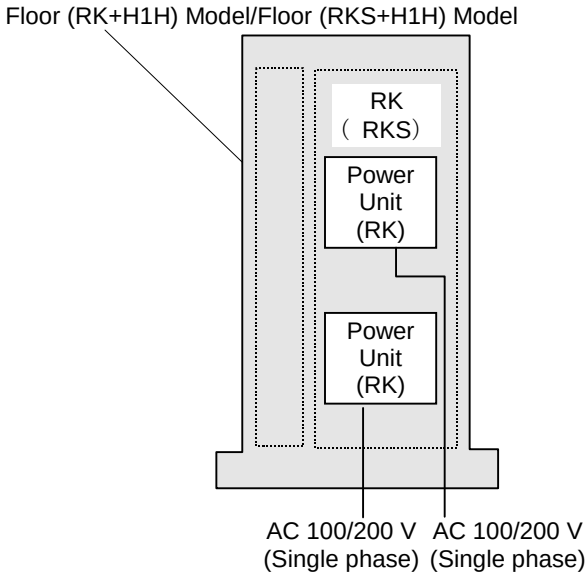


Figure 2.3.8 System Configuration of Floor (RK+H1H/RKS+H1H) Model

(2) Floor (RK+RKA+H2H) Model
This model is produced by the combination of the RK, RKA, and Floor Setting Kit (DF-F600-H2H).

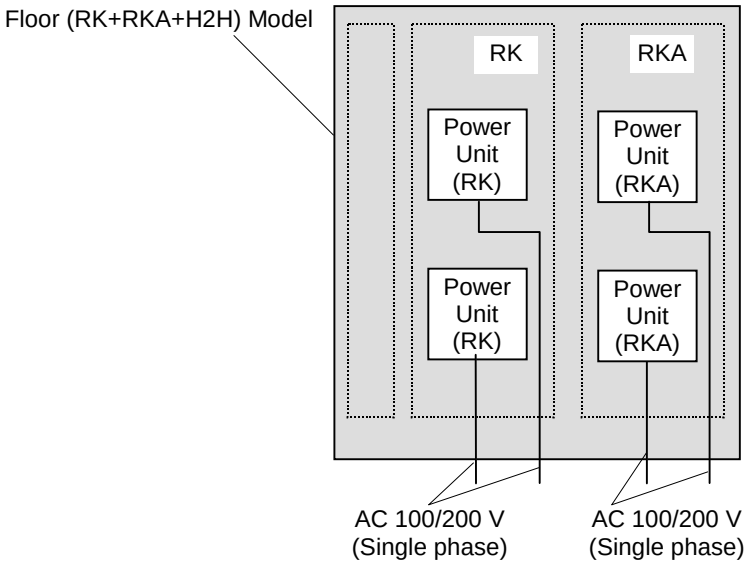


Figure 2.3.9 System Configuration of Floor (RK+RKA+H2H) Model

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Floor (RKD+H1HD) Model/Floor (RKSD+H1HD) Model
This model is produced by the combination of the RKD/RKSD and Floor Setting Kit (DF-F600-H1HD).

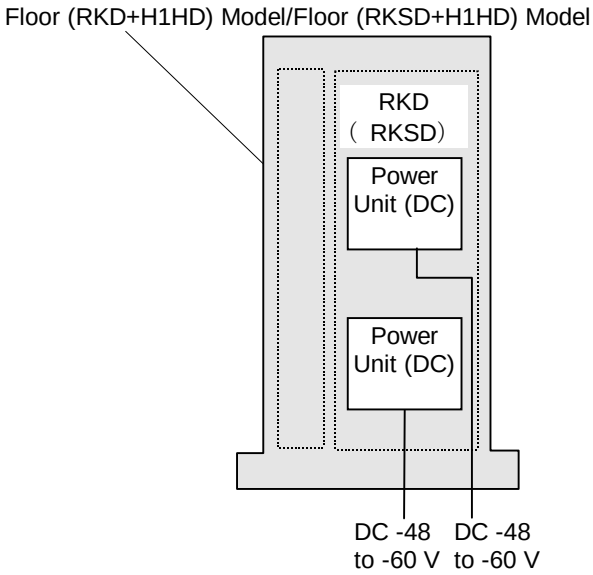


Figure 2.3.9.1 System Configuration of Floor (RKD+H1HD/RKSD+H1HD) Model

(4) Floor (RKD+RKAD+H2HD) Model
This model is produced by the combination of the RKD, RKAD, and Floor Setting Kit (DF-F600-H2HD).

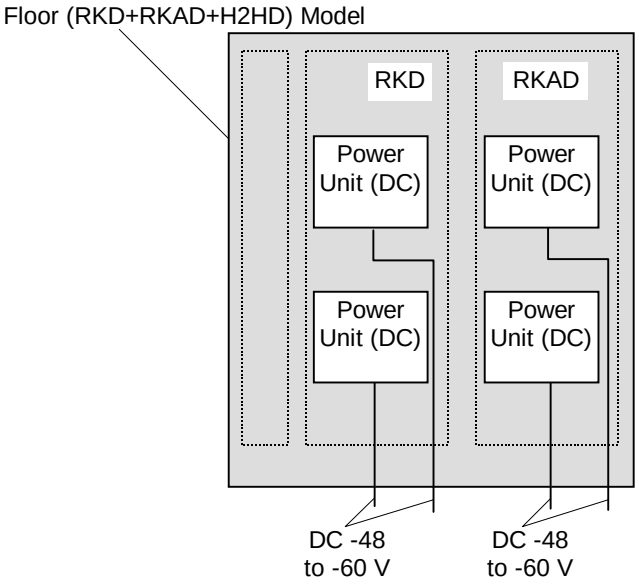


Figure 2.3.9.2 System Configuration of Floor (RKD+RKAD+H2HD) Model

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

2.3.3 System configuration of the rackmount model

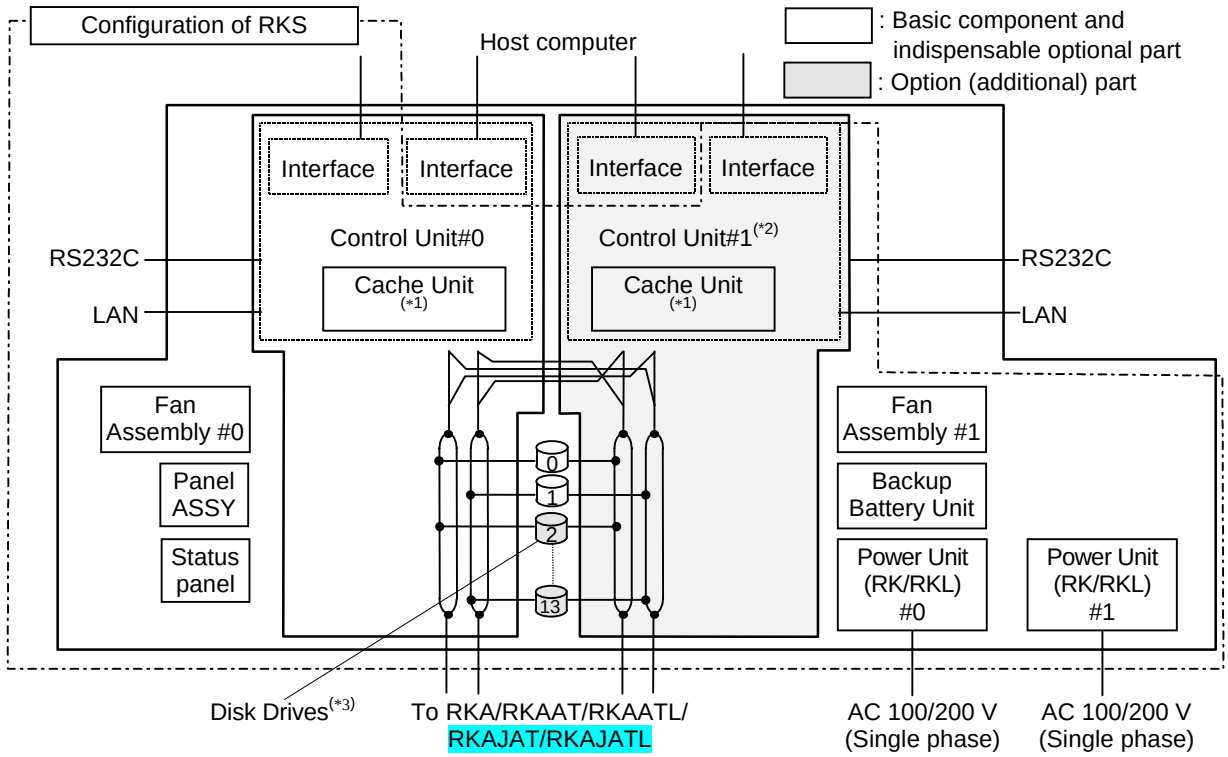
(1) Configuration of RK/RKL, RKA, RKAAT/RKAATL/RKAJAT/RKAJATL and RKS

Configuration block diagram of the RK/RKL, RKA, RKAAT/RKAATL/RKAJAT/RKAJATL and RKS is shown below. Each of the RK/RKL, RKS can mount fourteen Disk Drives. Each of the RKA, RKAAT/RKAATL/RKAJAT/RKAJATL can mount fifteen Disk Drives. (The RK has a Control Unit which can control up to 224 Disk Drives configured as RAID. The RKL has a Control Unit which can control up to 59 Disk Drives configured as RAID.)

The Disk Drives can be assigned to data disk(s), parity disk(s) (mirror disk(s)) depending on the RAID level.

Up to fifteen Spare Disks can be mounted in any locations within the configuration assured (Up to 1 Spare Disks can be defined for RKS). (‡1)

Figure 2.3.10, Figure 2.3.10.1 and Figure 2.3.11 shows configuration block diagrams of the RK/RKL, RKA, RKAAT/RKAATL/RKAJAT/RKAJATL and RKS respectively.



*1 : Cache Unit :
RK, RKS : DF-F600-G512X2 or DF-F600-C1GX2
RKL : DF-F600-C512X2

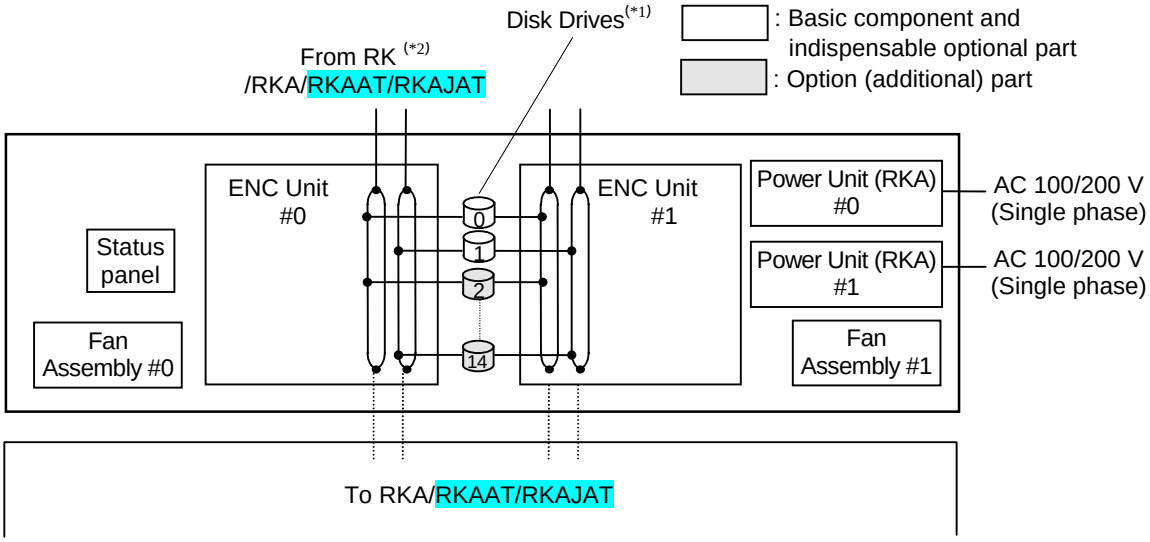
*2 : Control Unit (for extension) :
RK : DF-F600-F1H (Fibre Channel interface, 2port)
RKL : DF-F600-F1HL (Fibre Channel interface, 2port)
RKS : DF-F600-F1HS (Fibre Channel interface, 1port)

*3 : Disk Drive :
RK : DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEH72, DF-F600-AEF146, DF-F600-AEF300
RKL : DF-F600-ATE146L
RKS : DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEF146, DF-F600-AEF300

Figure 2.3.10 System Configuration Block Diagrams of the RK/RKL and RKS

‡1 : No Spare Disk can be set for the Disk Drives #0 to #4 of the RK/RKL and RKS.

Copyright © 2002, 2005, Hitachi, Ltd.

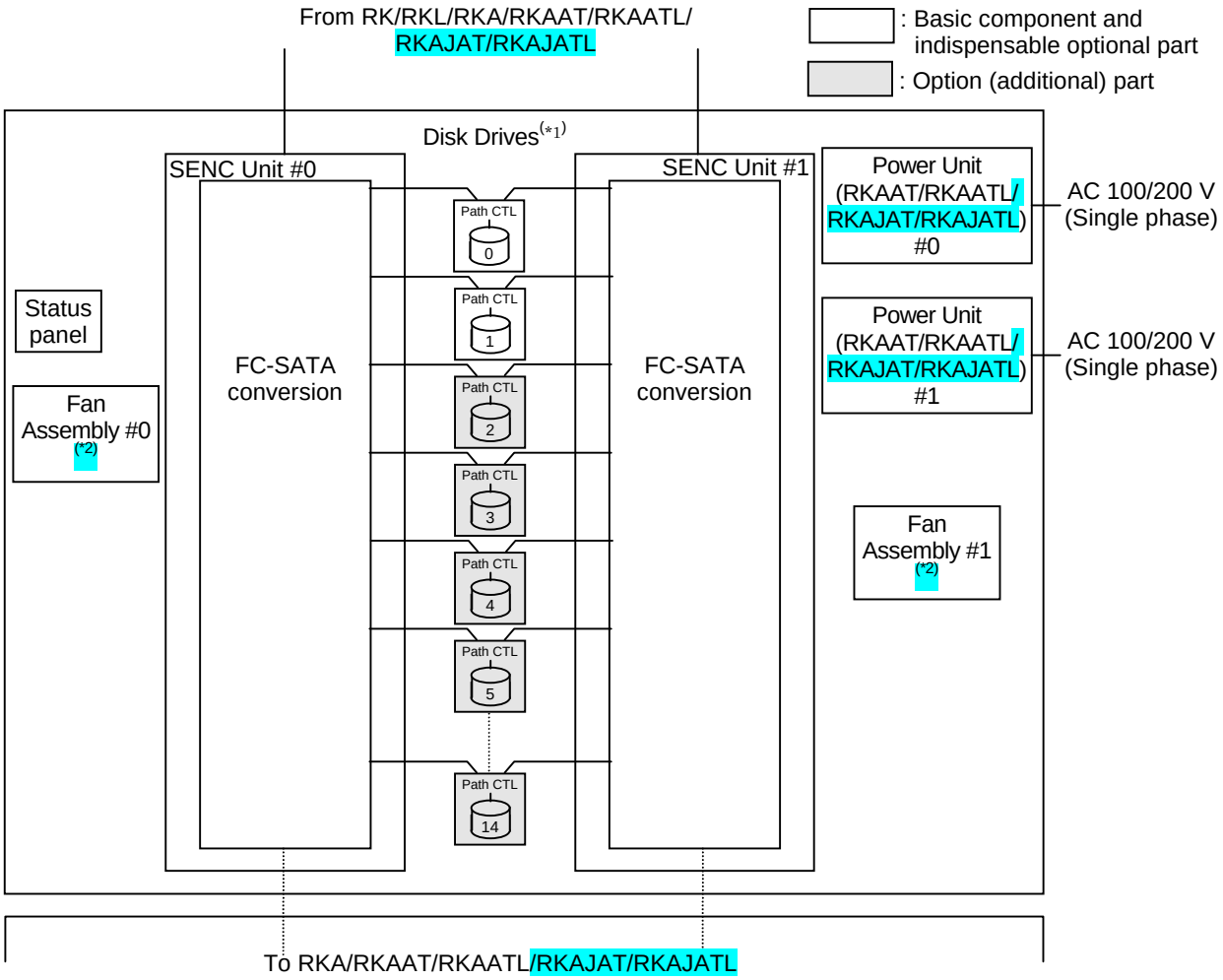


*1 : Disk Drive :
DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEH72, DF-F600-AEF146, DF-F600-AEF300

*2 : When connecting RKA, a dual controller configuration is required for the RK.

Figure 2.3.10.1 System Configuration Block Diagrams of the RKA

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : Disk Drive :
RKAAT : DF-F600-ATE250, DF-F600-ATE400R
RKAATL: DF-F600-ATE250L, DF-F600-ATE250LR, DF-F600-ATE400LR
RKAJATL: DF-F600-ATE250LR, DF-F600-ATE400LR
*2 : RKAJAT/RKAJATL have no Fan Assembly.

Figure 2.3.11 System Configuration Block Diagrams of the RKAAT/RKAATL/RKAJAT/RKAJATL

Copyright © 2004, 2005, Hitachi, Ltd.

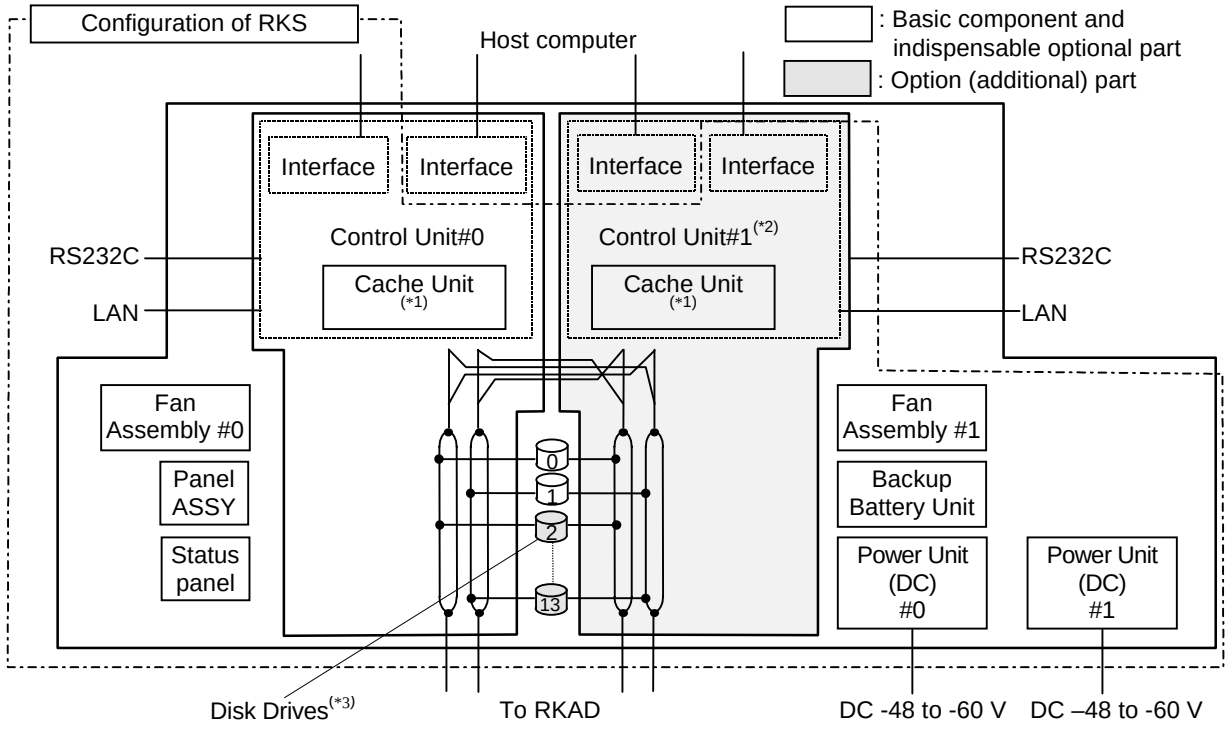
(2) Configuration of RKD, RKAD and RKSD

Configuration block diagram of the RKD, RKAD and RKSD is shown below. Each of the RKD, RKSD can mount fourteen Disk Drives. Each of the RKA can mount fifteen Disk Drives. (The RKD has a Control Unit which can control up to 224 Disk Drives configured as RAID.)

The Disk Drives can be assigned to data disk(s), parity disk(s) (mirror disk(s)) depending on the RAID level.

Up to fifteen Spare Disks can be mounted in any locations within the configuration assured (Up to 1 Spare Disks can be defined for RKSD). (‡1)

Figure 2.3.11.1 and 2.3.11.2 shows configuration block diagrams of the RKD, RKAD and RKSD respectively.



*1 : Cache Unit :
DF-F600-G512X2 or DF-F600-C1GX2

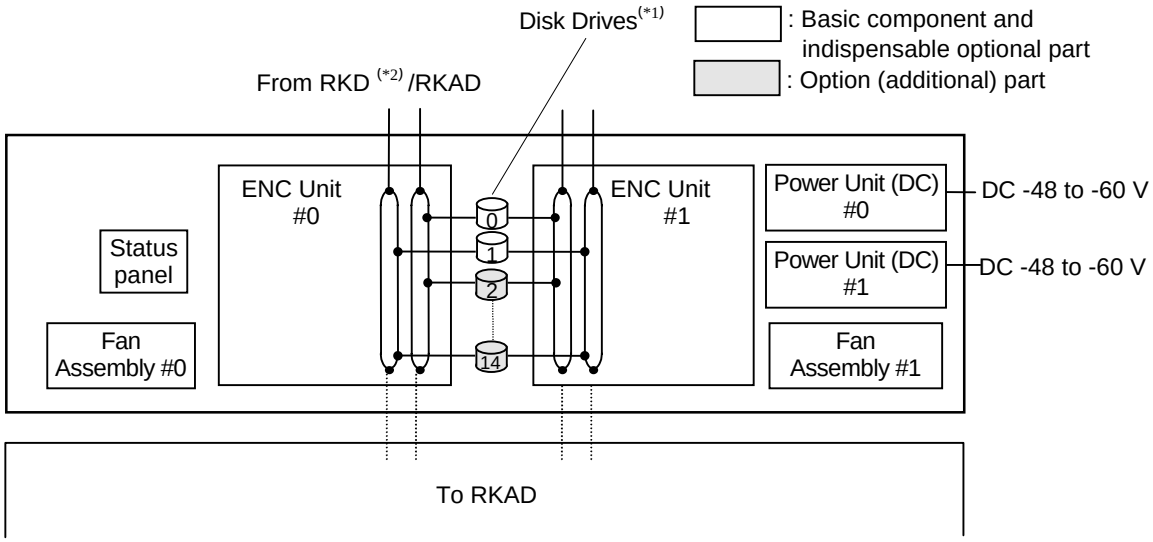
*2 : Control Unit (for extension) :
RKD : DF-F600-F1H (Fibre Channel interface, 2port)
RKSD : DF-F600-F1HS (Fibre Channel interface, 1port)

*3 : Disk Drive :
RKD : DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEH72, DF-F600-AEF146, DF-F600-AEF300
RKSD : DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEF146, DF-F600-AEF300

Figure 2.3.11.1 System Configuration Block Diagrams of the RKD and RKSD

‡1 : No Spare Disk can be set for the Disk Drives #0 to #4 of the RKD and RKSD

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : Disk Drive :
DF-F600-AEH36, DF-F600-AEF72, DF-F600-AEH72, DF-F600-AEF146, DF-F600-AEF300

*2 : When connecting RKAD, a dual controller configuration is required for the RKD.

Figure 2.3.11.2 System Configuration Block Diagrams of the RKAD

Copyright © 2003, 2005, Hitachi, Ltd.

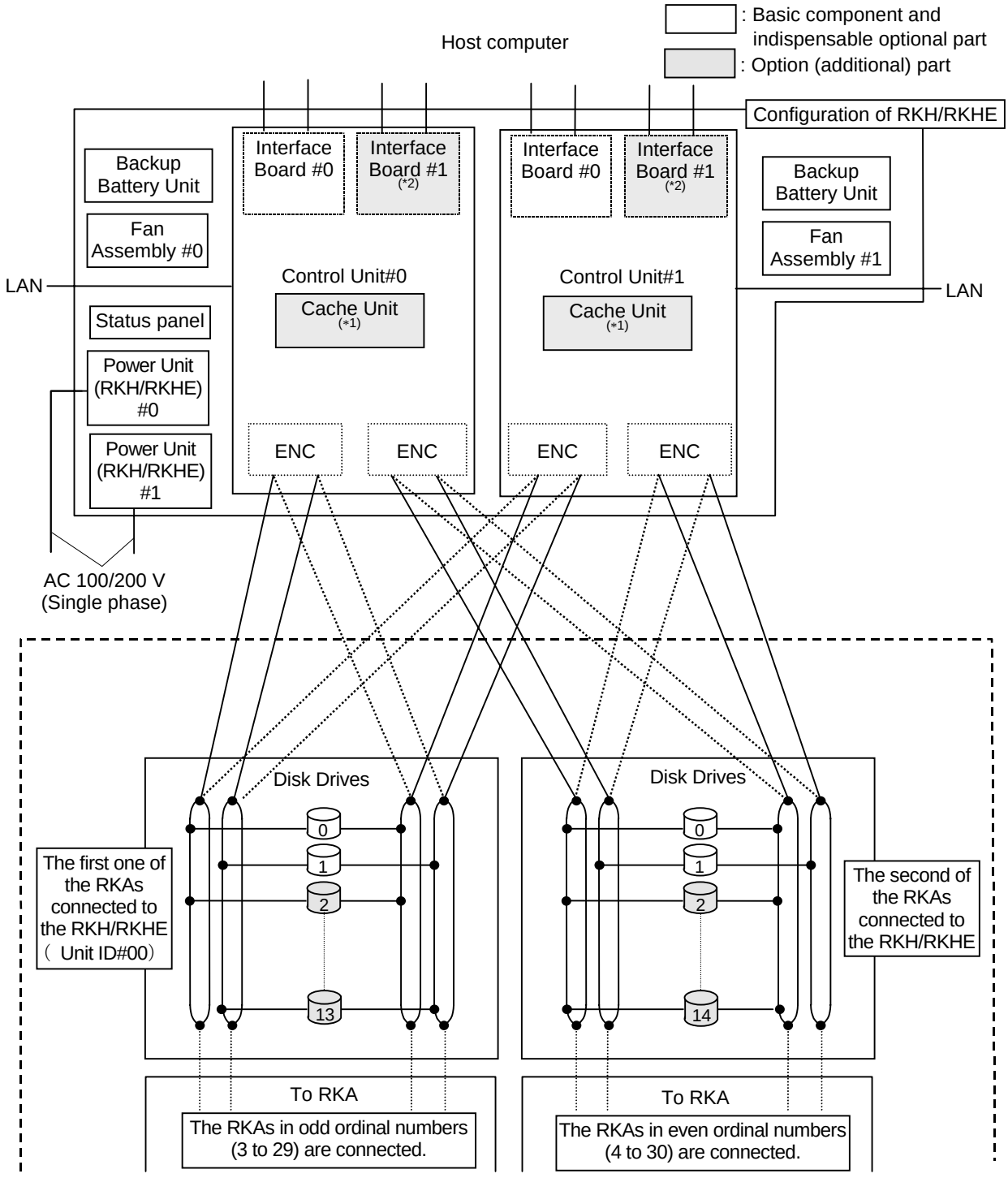
(3) Configuration of RKH/RKHE

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system can have a configuration in which up to 30 RKAs (up to 449 Disk Drives (FC)) or up to 1 RKA+28 RKAAT/RKAJATs(‡1) (up to 420 Disk Drives (Serial-ATA)) are connected.
The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.
Configuration block diagram of the RKH/RKHE is shown below.
(The RKH/RKHE has a Control Unit which can control up to 449 Disk Drives configured as RAID.)
The Disk Drives can be assigned to data disk(s), parity disk(s) (mirror disk(s)) depending on the RAID level.
Up to 30 Spare Disks(‡2) can be mounted in any locations within the configuration assured.
Figure 2.3.11.3 and 2.3.11.4 shows configuration block diagrams of the RKH/RKHE respectively.
For the block configuration diagram of the RKAAT/RKAJAT, see Figure 2.3.11.

‡1 : Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

‡2 : It is recommended that a spare disk is set per 15 disk drives for the subsystem, to which Serial-ATA disk drive is connected, to maintain reliability.

Copyright © 2003, 2005, Hitachi, Ltd.

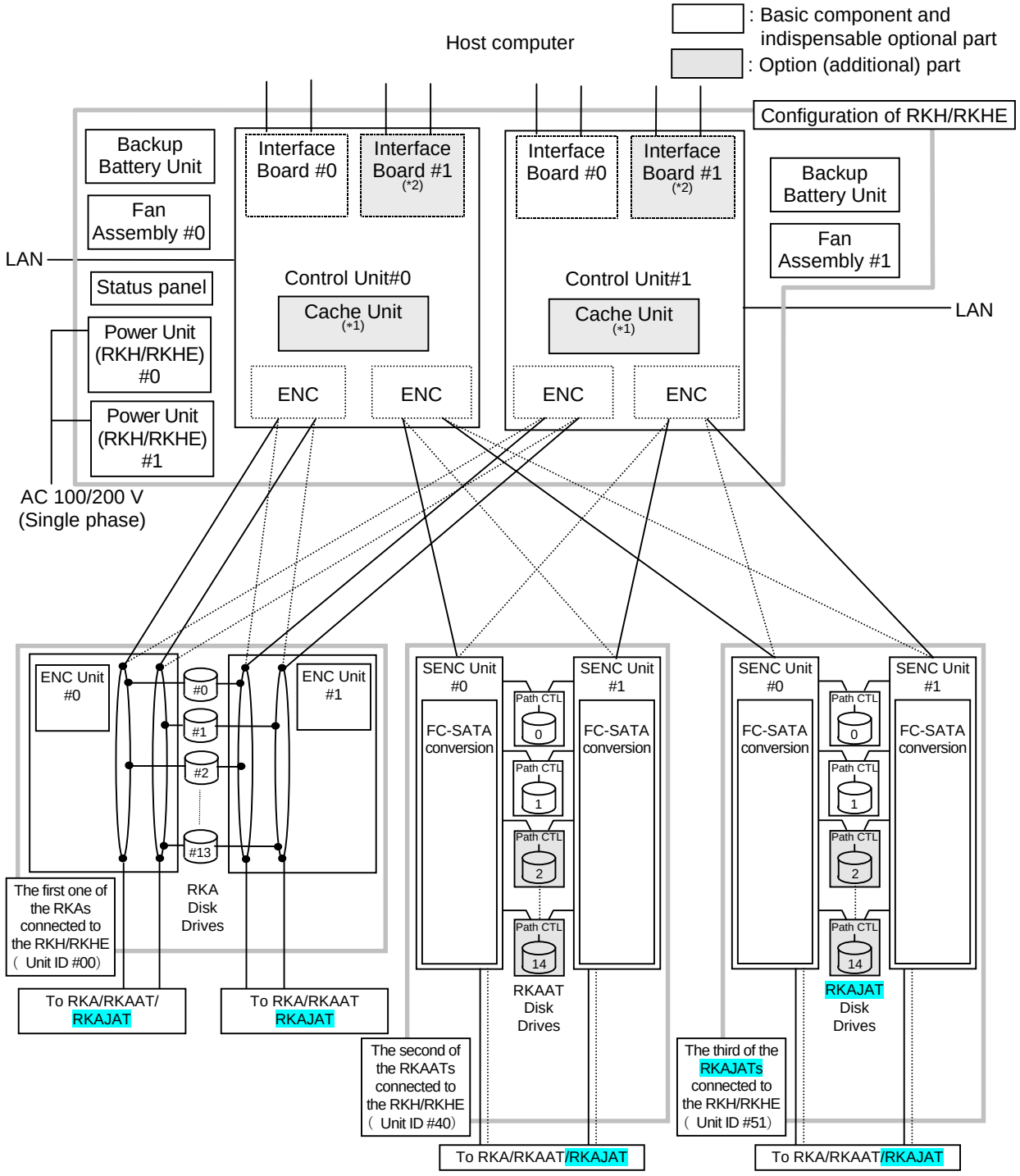


*1 : Cache Unit :
DF-F600-C5122H or DF-F600-C1GX2H

*2 : Interface Board :
DF-F600-DH2G2

Figure 2.3.11.3 System Configuration Block Diagrams of the RKH/RKHE(connected the RKA)

Copyright © 2003, 2005, Hitachi, Ltd.



*1 : Cache Unit : DF-F600-C5122H or DF-F600-C1GX2H

*2 : Interface Board : DF-F600-DH2G2

*3 : A case, where the RKA and the RKAAT/RKAJATs are the first and the second through third disk array units that are connected to the RKH/RKHE respectively, is shown.

Figure 2.3.11.4 System Configuration Block Diagrams of the RKH/RKHE(connected the RKAAT/RKAJAT)

Copyright © 2003, 2005, Hitachi, Ltd.

2.3.4 Configuration of rackmount model with U6/U4 rack frame

(1) Configuration of rackmount model with U6 rack frame

The DF-F600-U6 is an exclusive rack frame for mounting up to a height of 38 U (EIA Standard). (1 RK and 11 RKAs)

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

Up to the eleven RKAs can be mounted through an addition of the UPDU6 (optional).

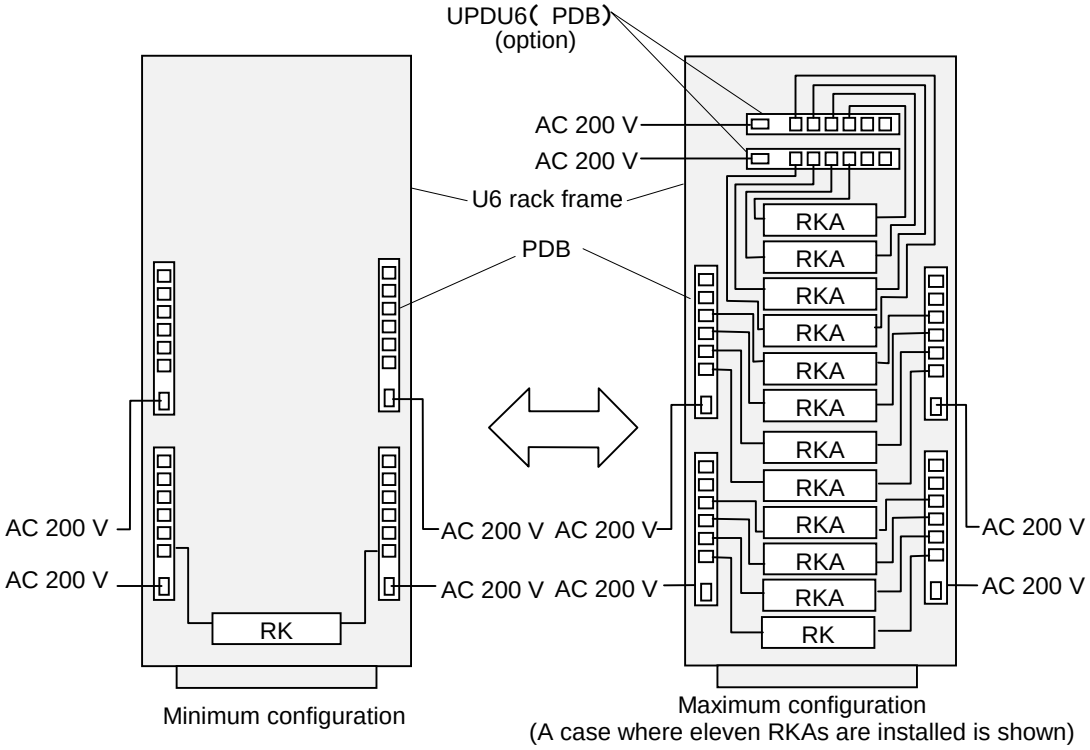


Figure 2.3.12 System Configuration of Rackmount Model with U6 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Configuration of rackmount model with U4 rack frame

The DF-F600-U4 is an exclusive rack frame for mounting up to a height of 32 U (EIA Standard).(1 RK and 9 RKAs)

It consists of a rack frame main body and PDUs to be used to supply AC power to power supply units of the mounted RK(s) and RKA(s). The two PDUs are installed to allow the power system to be duplicated.

Up to the nine RKAs can be mounted through an addition of the UPDU (optional).

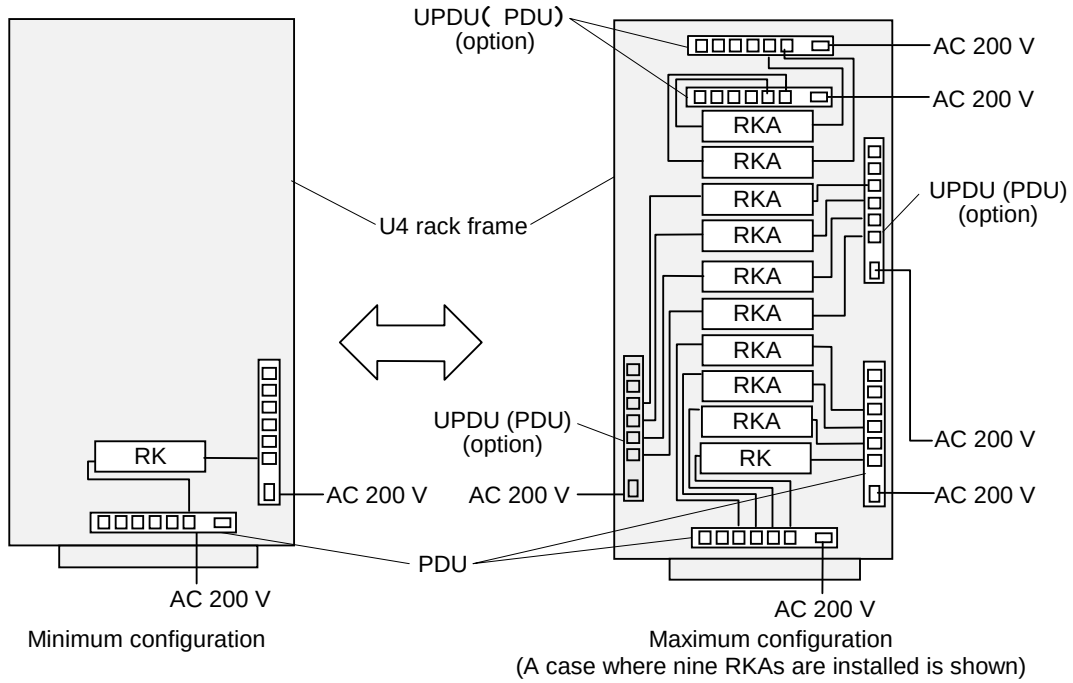


Figure 2.3.13 System Configuration of Rackmount Model with U4 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

2.4 Configuration of Internal Power Supply System

For a single unit of Rackmount model, there are RK/RKL/RKA/RKS/RKAAT/RKAATL/RKAJAT/RKAJATL and RKD/RKAD/RKSD. Floor model(RKAAT/RKAATL/RKAJAT/RKAJATL is not supported) or Rackmount model are configured by combining single units.

The RKH/RKHE is provided as another rackmount model product. The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it.
RK/RKL/RKA/RKS/RKH/RKHE/RKAAT/RKAATL/RKAJAT/RKAJATL has a Power Unit power-supplied from AC, and RKD/RKAD/RKSD has a Power Unit (DC) that can connect DC power supply.

(1) Internal power supply system configuration
(RK/RKL/RKS/RKA/RKAAT/RKAATL/RKAJAT/RKAJATL)
Figure 2.4.1, Figure 2.4.2, and Figure 2.4.2.1 shows the connection diagrams of the internal power supply system of the RK/RKL, RKS, RKA, and RKAAT/RKAATL/RKAJAT/RKAJATL respectively.
Input power to the RK/RKL, RKA and RKS 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.

Copyright © 2002, 2005, Hitachi, Ltd.

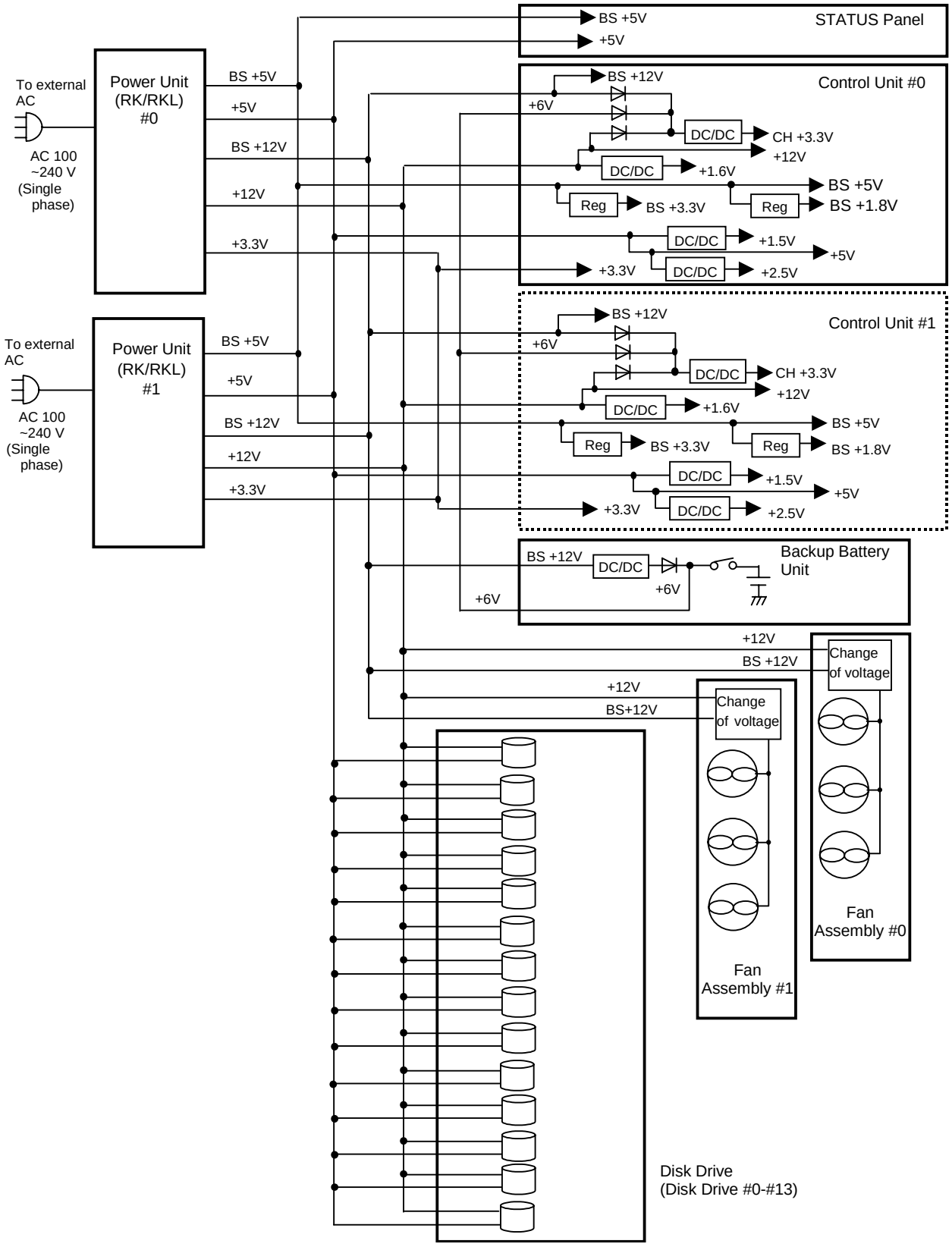


Figure 2.4.1 Connection diagram of Power Supply System (RK/RKL/RKS)

Copyright © 2002, 2005, Hitachi, Ltd.

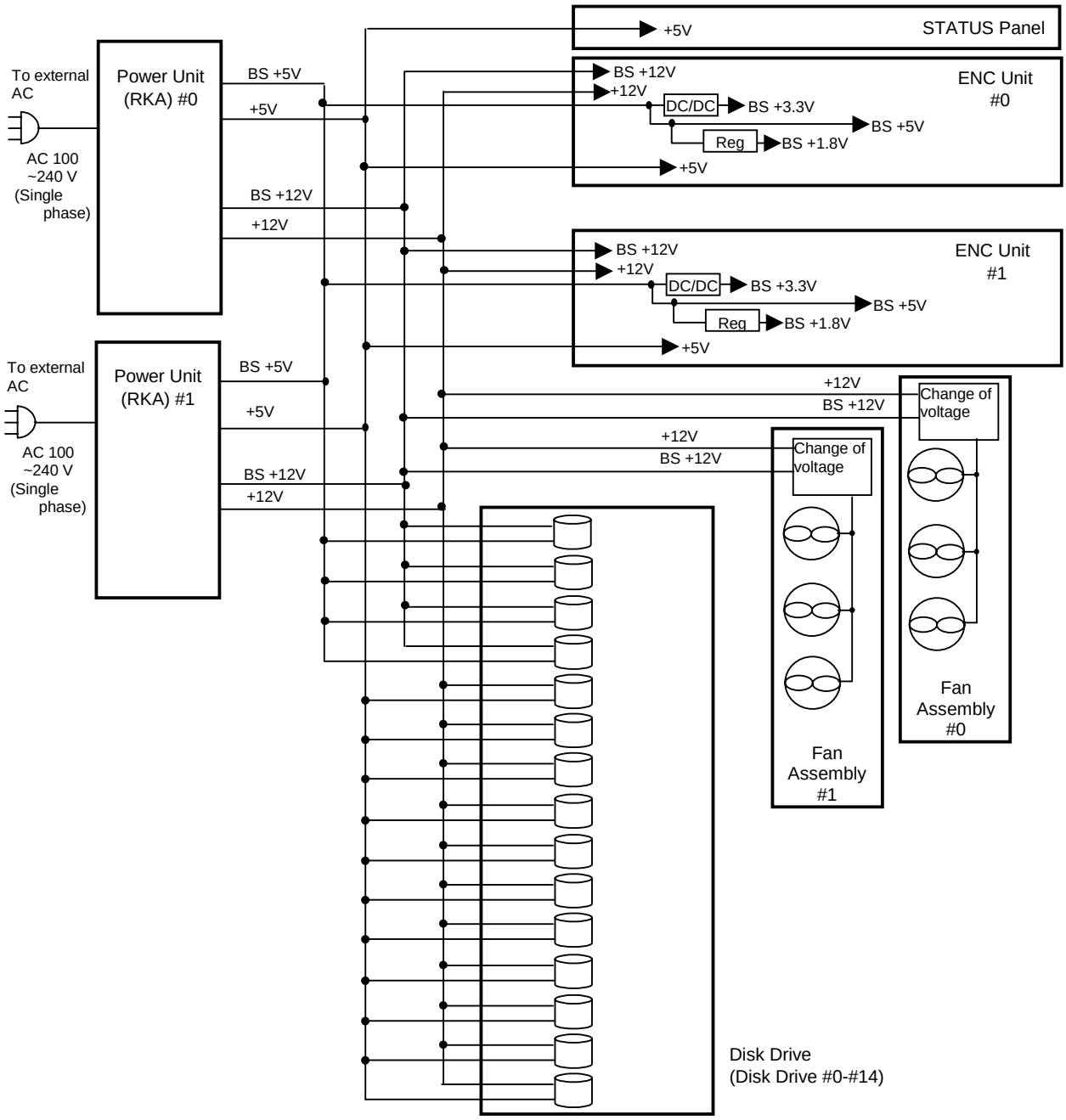


Figure 2.4.2 Connection diagram of Power Supply System (RKA)

Copyright © 2004, 2005, Hitachi, Ltd.

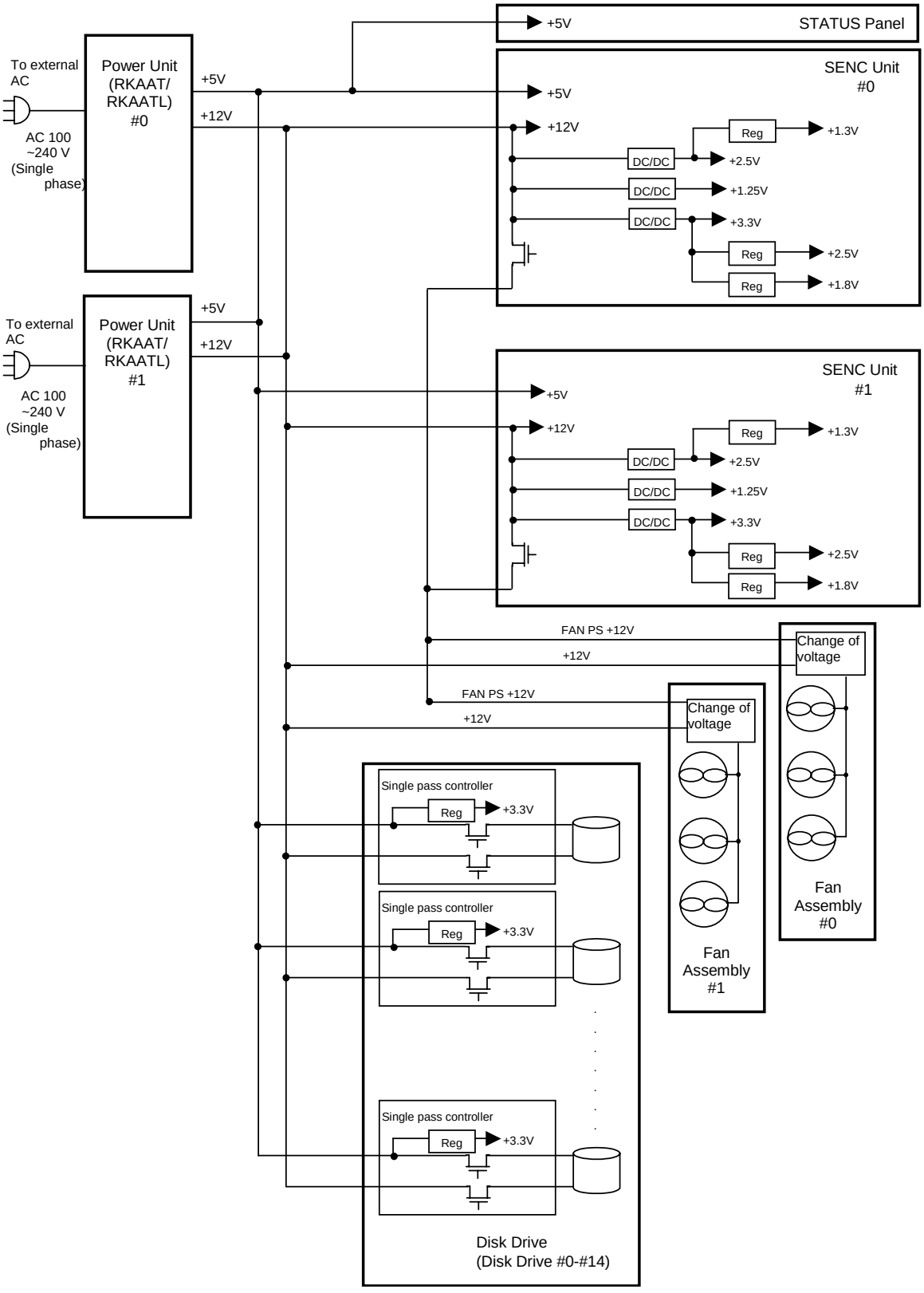


Figure 2.4.2.1 Connection diagram of Power Supply System (RKAAT/RKAATL)

Copyright © 2004, 2005, Hitachi, Ltd.

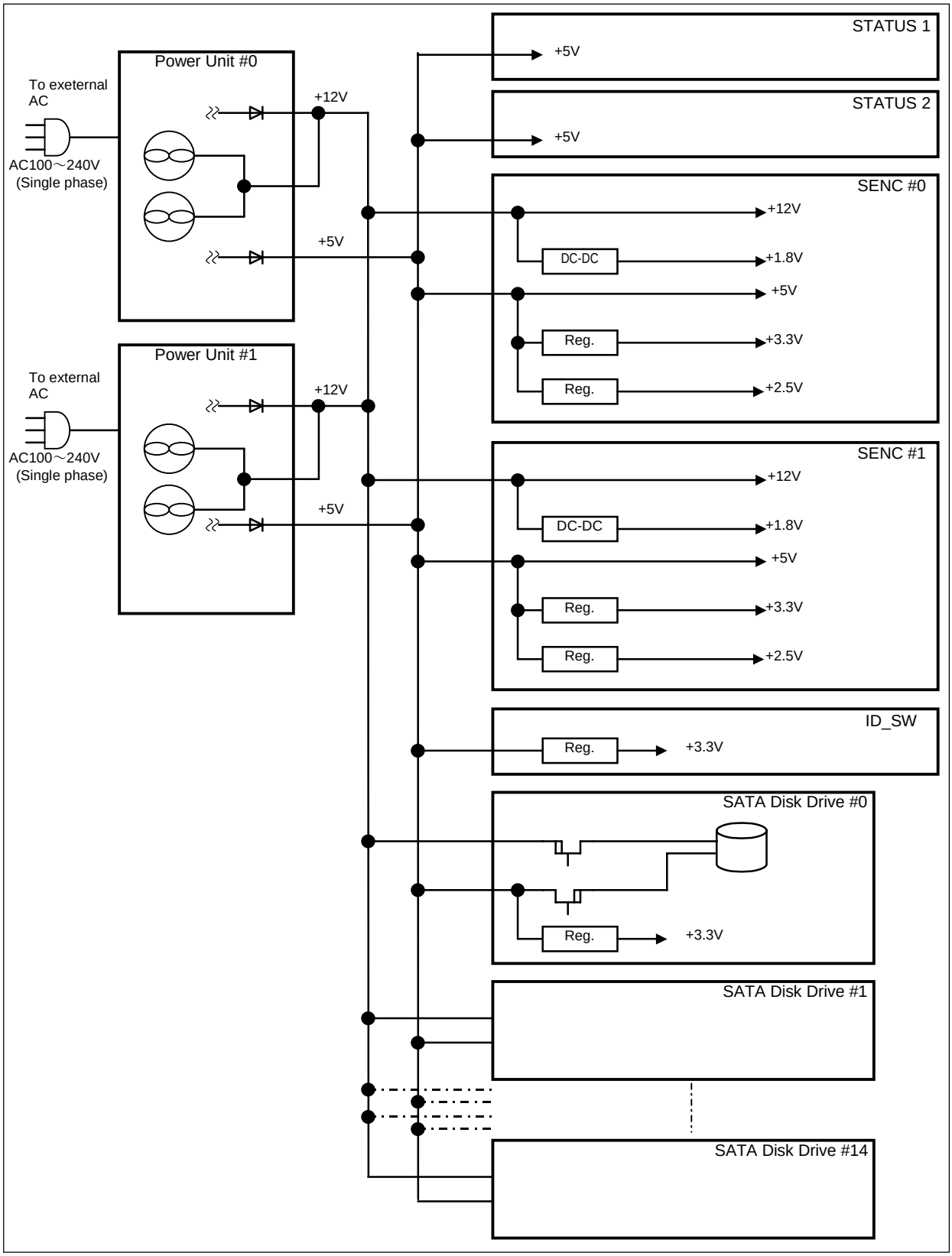


Figure 2.4.2.2 Connection diagram of Power Supply System (RKAJAT/RKAJATL)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Internal power supply system configuration (RKD/ RKSD/ RKAD)
Figure 2.4.3, and Figure 2.4.4 shows the connection diagrams of the internal power supply system of the RKD, RKSD and RKAD respectively.
Input power to the RKD, RKAD and RKSD 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 DC 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 (DC) 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.

Copyright © 2003, 2005, Hitachi, Ltd.

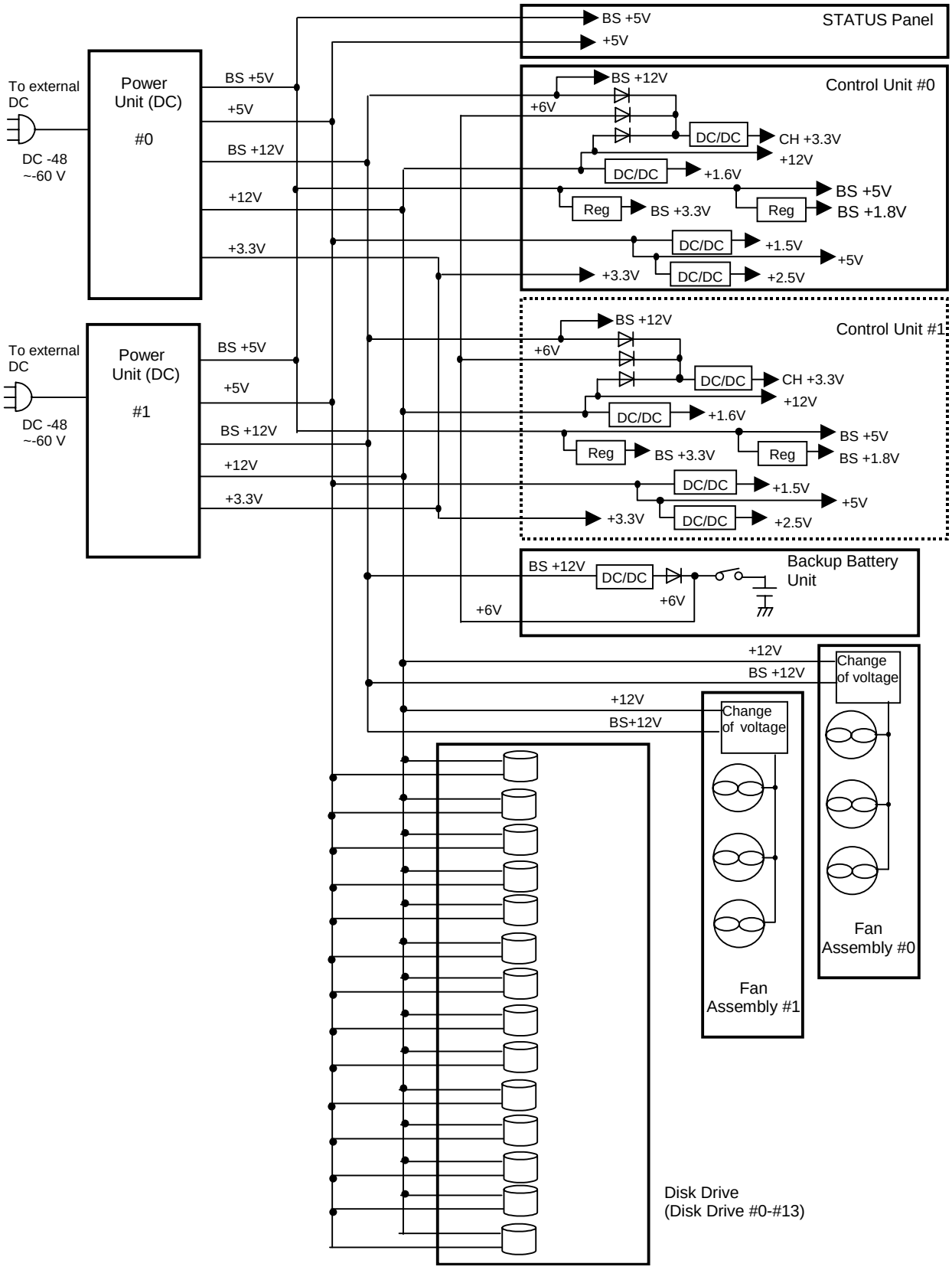


Figure 2.4.3 Connection diagram of Power Supply System (RKD/RKSD)

Copyright © 2003, 2005, Hitachi, Ltd.

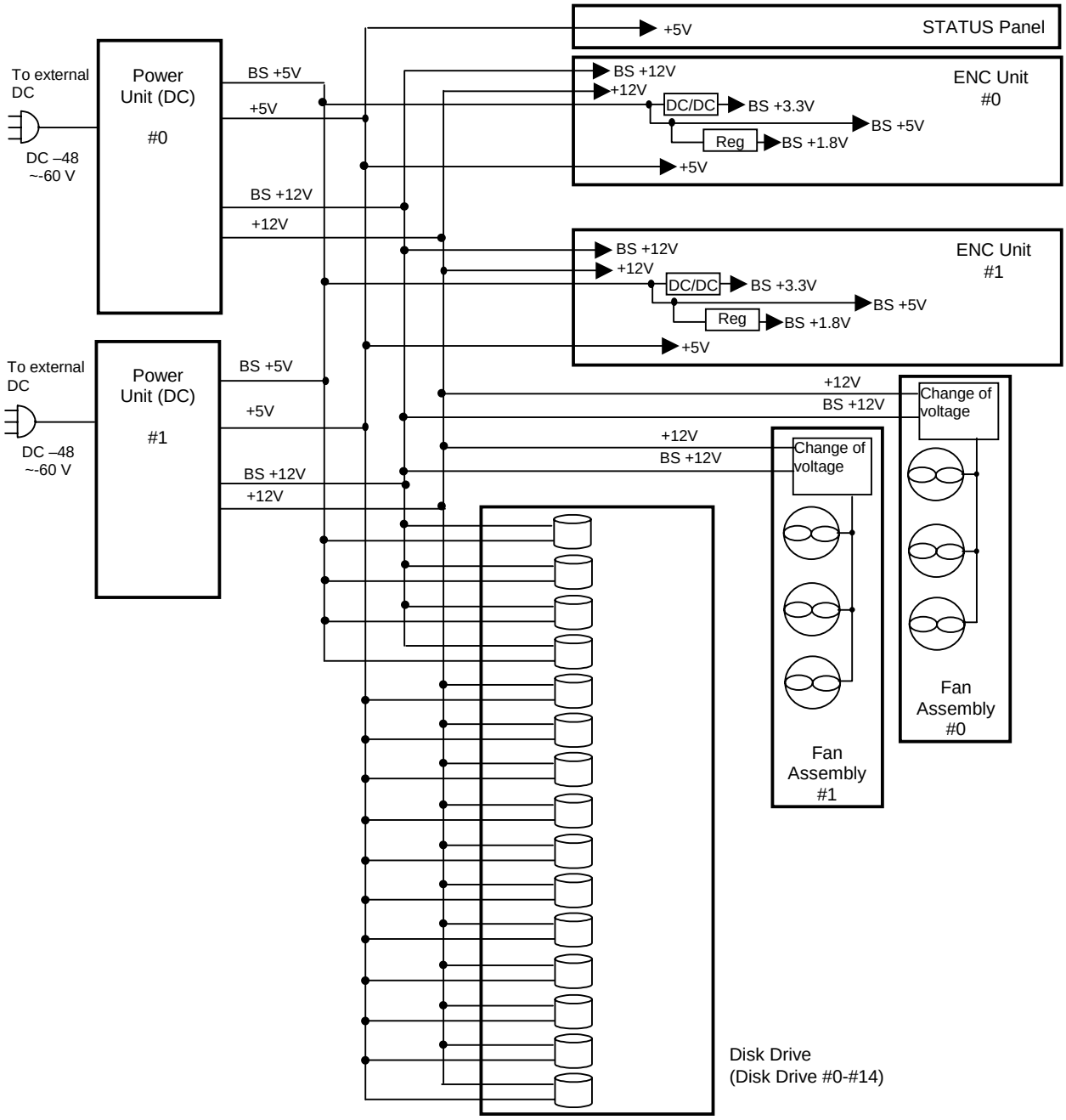


Figure 2.4.4 Connection diagram of Power Supply System (RKAD)

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Internal power supply system configuration (RKH/RKHE)

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

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.

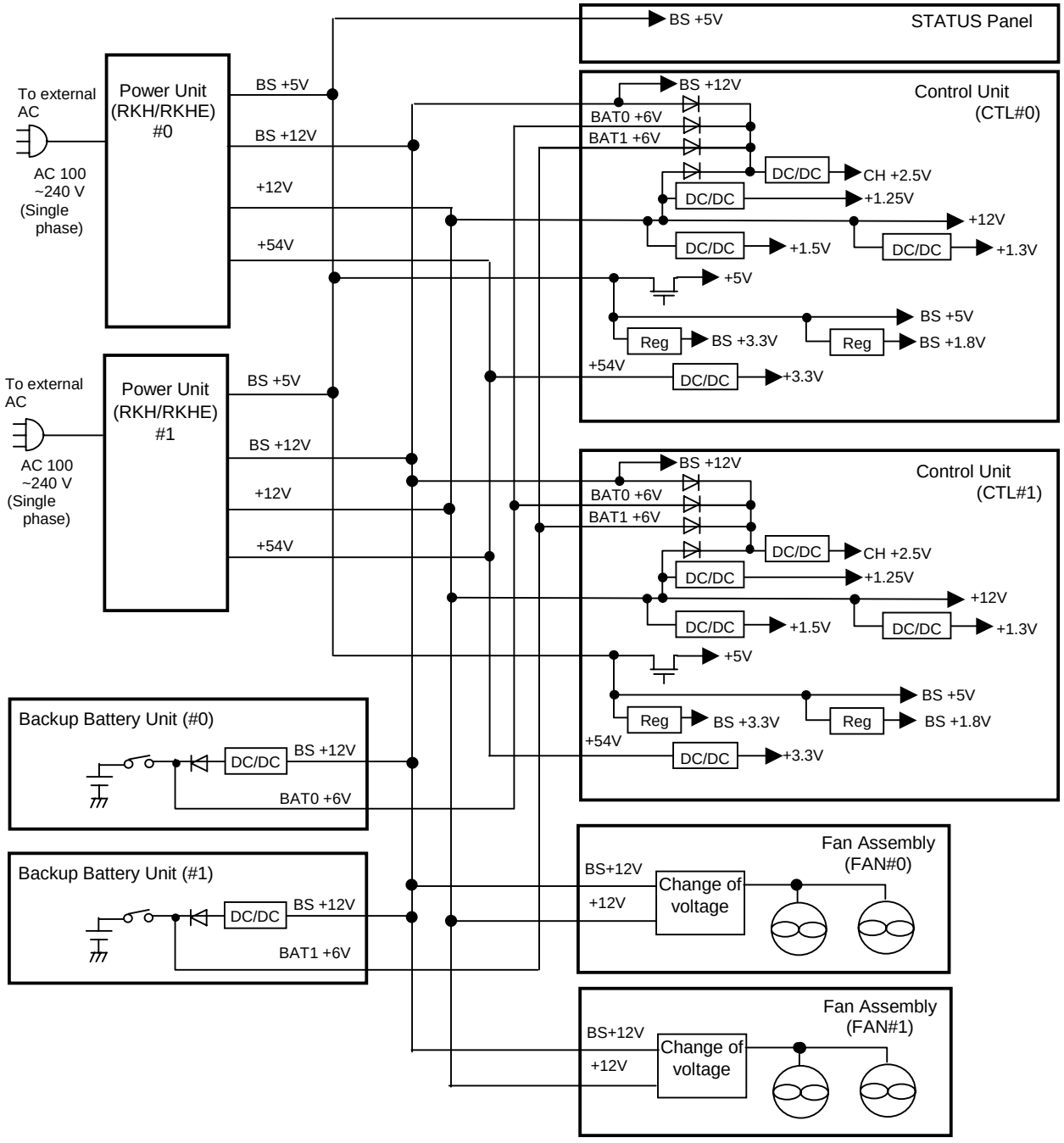


Figure 2.4.5 Connection diagram of Power Supply System (RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

2.5 Configuration of Internal Data System

Figure 2.5.1, and Figure 2.5.2 shows the connection block diagram of the internal data system of the RK/RKL (RKD), RKS (RKSD) and RKA (RKAD) respectively.
Figure 2.5.3 shows the connection block diagram of the internal data system of the RKH/RKHE+RKA respectively.
Figure 2.5.4, Figure 2.5.5, and Figure 2.5.6 shows the connection block diagram of the internal data system of the RK+RKA/RKAAT/RKAJAT, RKL+RKAATL/RKAJATL, and RKH/RKHE+RKA/RKAAT/RKAJAT respectively.

(1) Host interface
The RK (RKD), RKS (RKSD) and RKA (RKAD) subsystem utilize the PCI bus for its host interface, and Control Unit implements a Fibre Channel interface as a 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.
(RKS, RKSD can have one port per controller, and be connected to up to 2 ports).
The RKH/RKHE is provided as another rackmount model product. The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it.
(RKH/RKHE can have 4 ports per controller, and be connected to up to 8 ports).

(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 an optional Spare Disk(s) is set in the Disk Drive group, the subsystem can continue the normal operation even when a Disk Drive fails by restoring data on the Spare Disk(s).
Up to fifteen Spare Disks can be installed. In the case where the two or more Spare Disks are set, the normal operation can be continued even when a Disk Drive fails in addition to another Disk Drive, thus high data reliability is assured (Up to 1 Spare Disks can be defined for RKS, RKSD).

Copyright © 2002, 2005, Hitachi, Ltd.

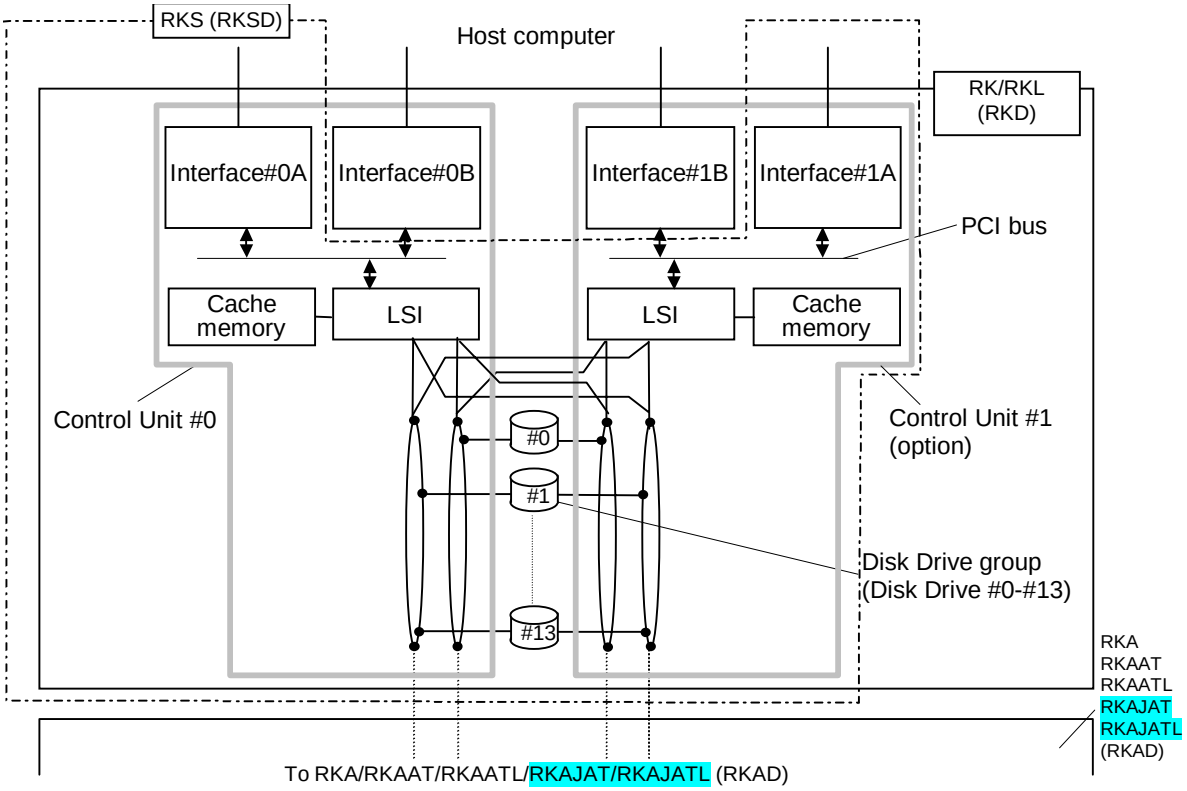


Figure 2.5.1 Internal Data Connection of the RK/RKL (RKD), RKS (RKSD)

Copyright © 2002, 2005, Hitachi, Ltd.

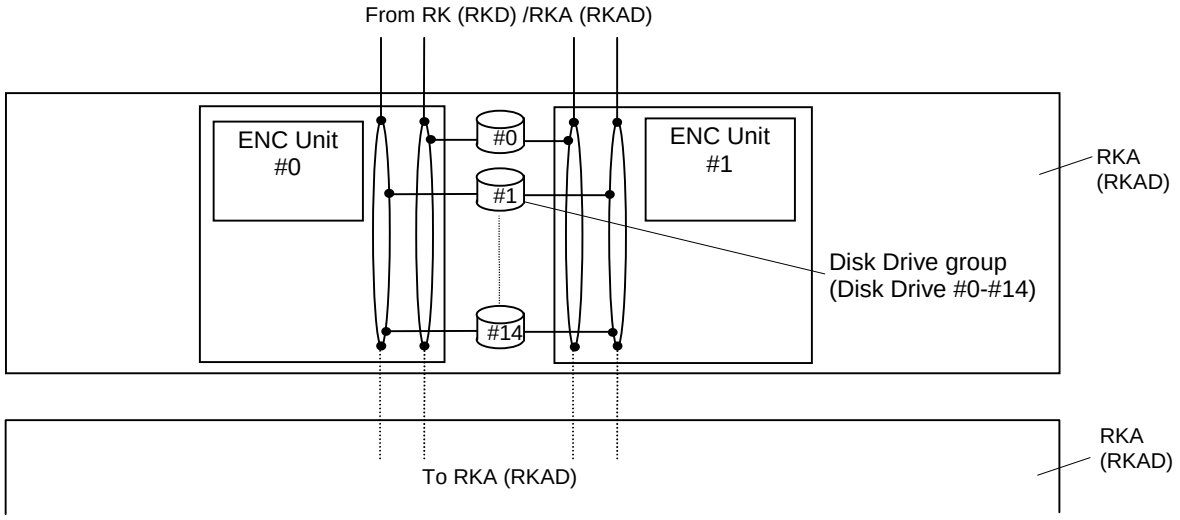


Figure 2.5.2 Internal Data Connection of the RKA (RKAD)

Copyright © 2003, 2005, Hitachi, Ltd.

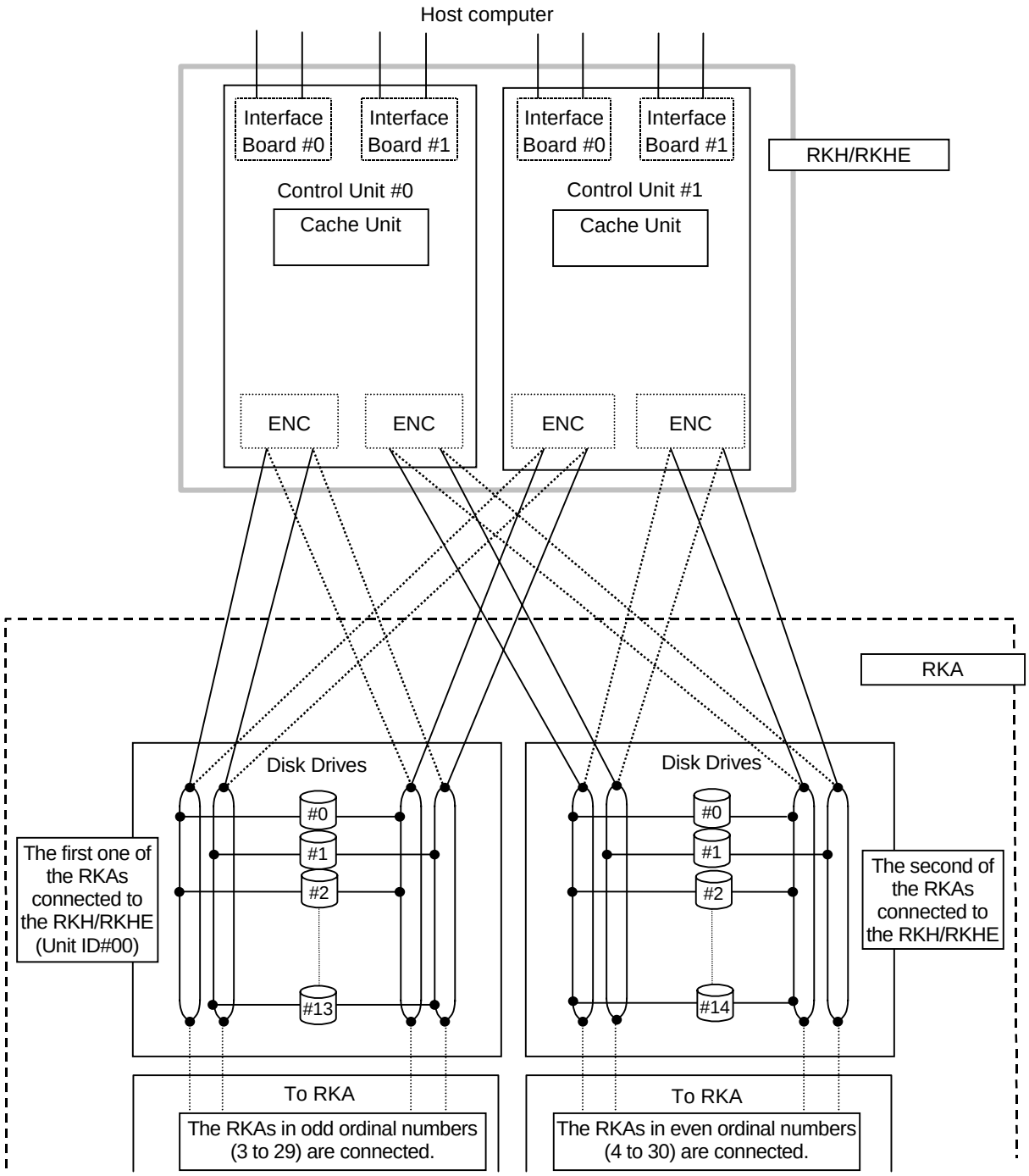
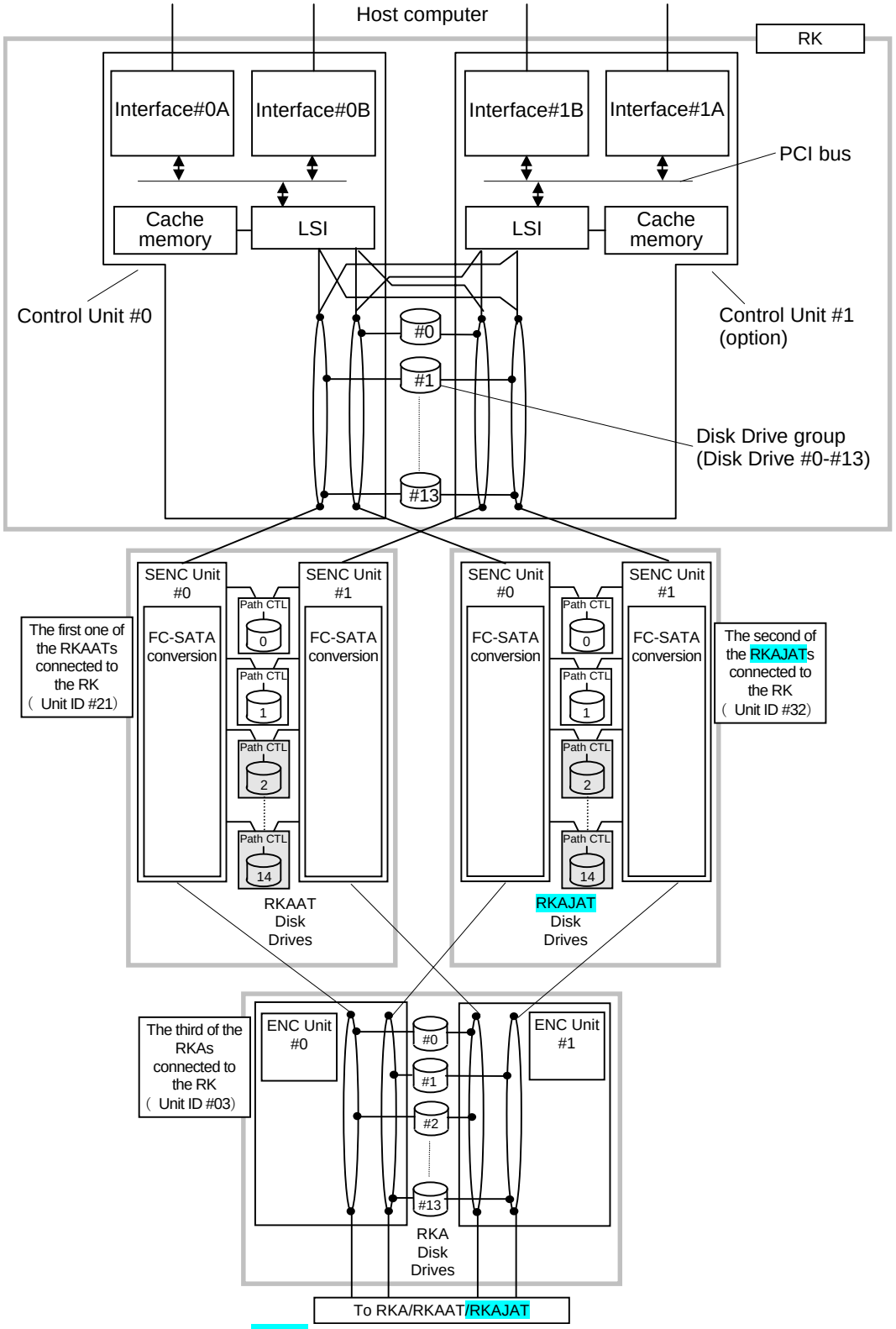


Figure 2.5.3 Internal Data Connection of the RKH/RKHE

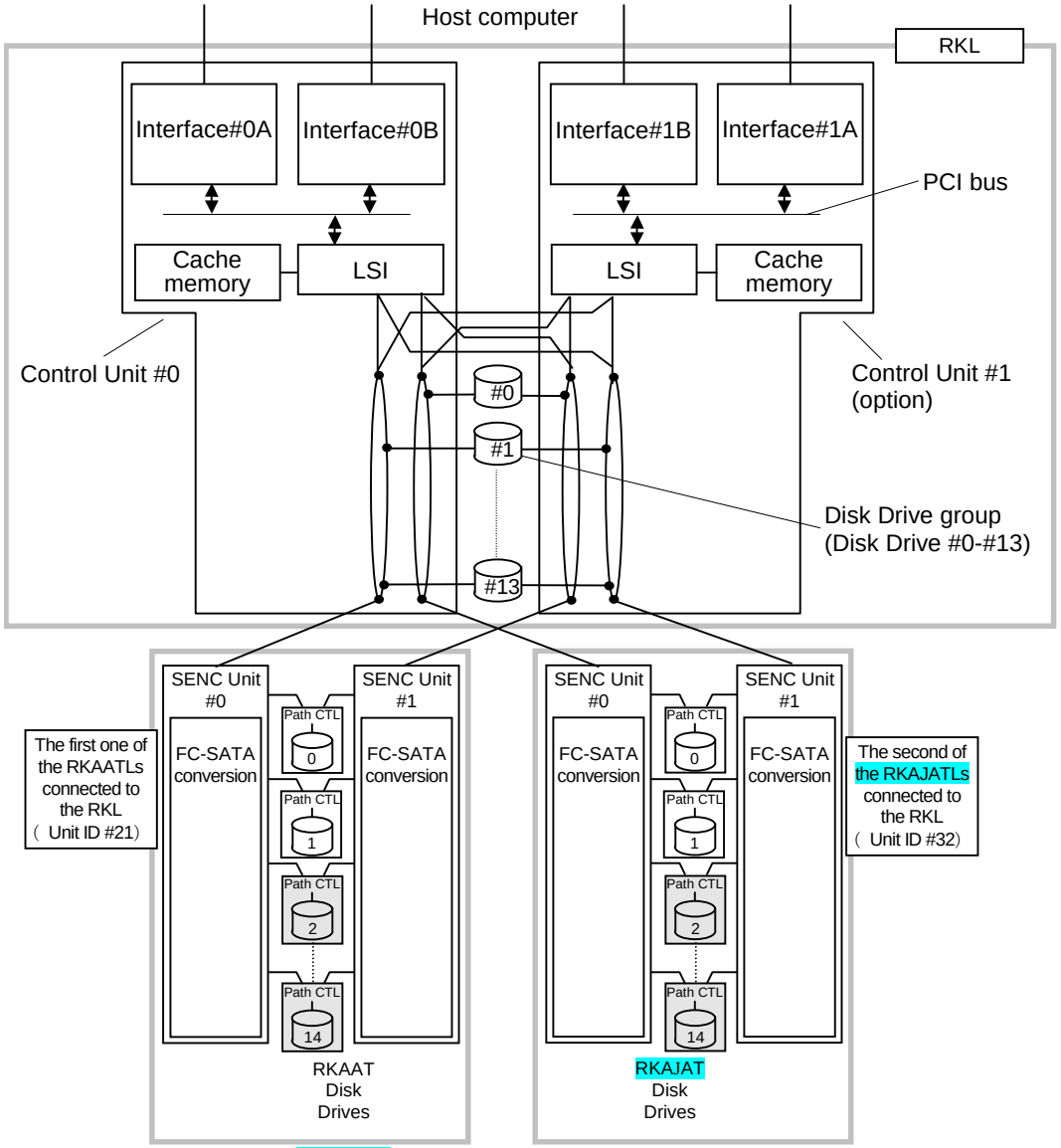
Copyright © 2003, 2005, Hitachi, Ltd.



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

Figure 2.5.4 Internal Data Connection of the RK+RKA/RKAAT/RKAJAT

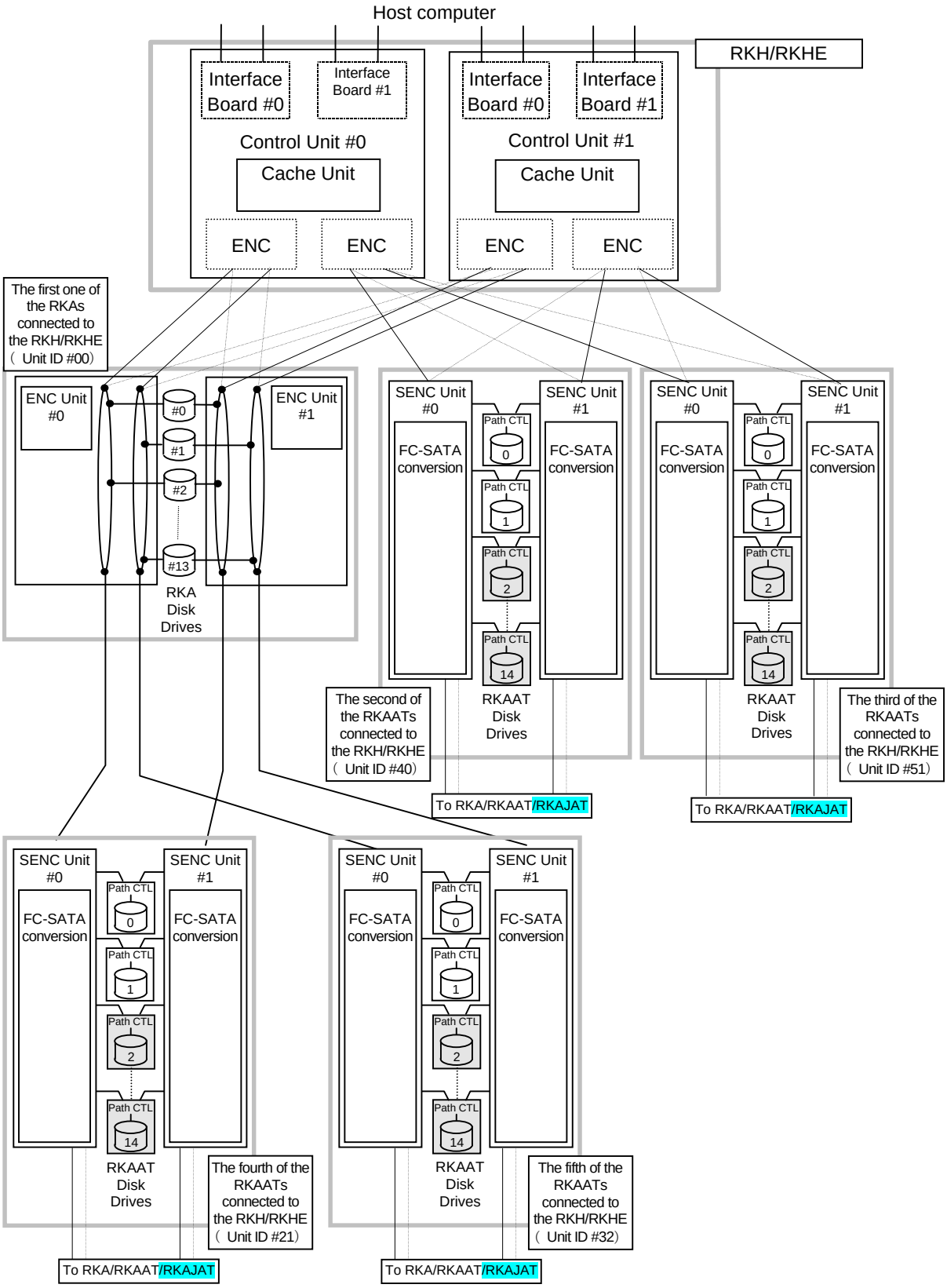
Copyright © 2004, 2005, Hitachi, Ltd.



*1 : A case, where the RKAATL, RKAJATL, and so forth are connected to the RKL in this order, is shown.

Figure 2.5.5 Internal Data Connection of the RKL+RKAATL/RKAJATL

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : A case, where the RKA and the RKAATs are the first and the second through fifth disk array units that are connected to the RKH/RKHE respectively, is shown.

Figure 2.5.6 Internal Data Connection of the RKH/RKHE+RKA/RKAAT/RKAJAT

Copyright © 2004, 2005, Hitachi, Ltd.

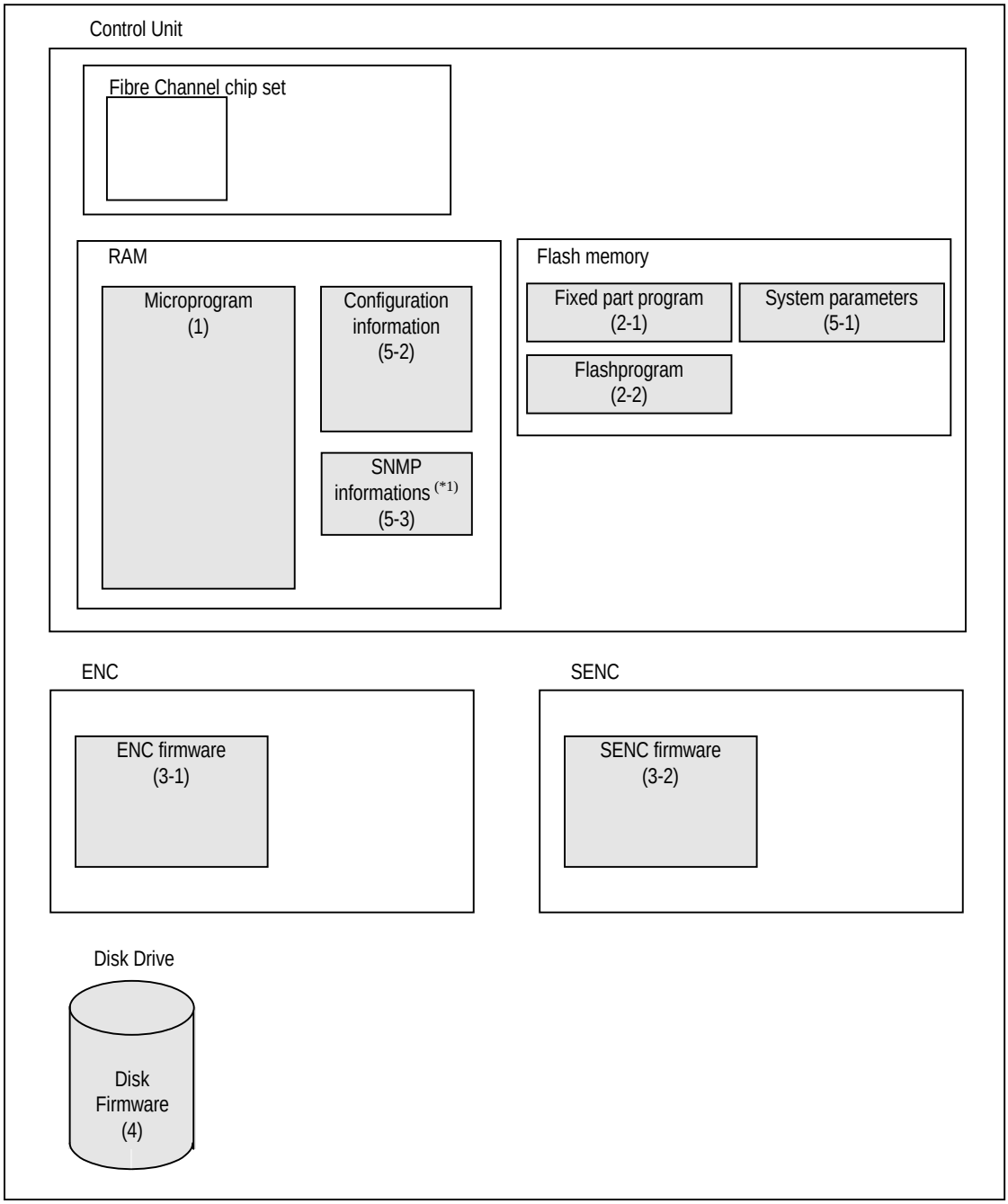
This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

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 DF-F600-WS.

Figure 2.6.1 Software Structure

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Microprograms
- These are programs that control.
- Their version numbers are controlled in the format of ××××/×.
- There are types of microprograms shown below corresponding to as many usages.

No.	Type of usage	Version	Supplying media
1	Fibre Channel	065×/× (×:Optional) 165×/× (×:Optional): for RKH/RKHE	One CD

- "/×" 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 program

No.	Name	Type
1	Fixed part program	F×× (×:Optional)

(2-2) Flashprogram

No.	Name	Type
1	Flashprogram (Fibre Channel) (*1)	065×/× (×:Optional) 165×/× (×:Optional): for RKH/RKHE
*1 : This program and the microprogram are controlled unitarily.		

(3) SENC firmware
- The version of the firmware can be see using Disk Array Management Program 2 or through the Web.
- This firmware makes a change from the S-ATA to the FC.
- This firmware controls the RKAJAT/RKAJATL.

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

(5) Parameter Information

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

(5-1) 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 Installation Chapter 5 Parameter Setting".
- 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(5-2) 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.

(5-3) 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”.

Copyright © 2002, 2005, Hitachi, Ltd.

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 program • Flashprogram • 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 program.....Cannot be backed up. 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.) • The system area is provided on the Disk Drives #0 to #4 in the RK/RKL (RKD)/RKS (RKSD) and the first one of the RKA/RKAAT/RKAATL/RKAJAT/RKAJATLs connected to the RKH/RKHE. Therefore, the system area has redundancy as far as the Disk Drives #0 to #4 in the RK/RKL (RKD)/RKS (RKSD) and the first one of the RKA/RKAAT/RKAATL/RKAJAT/RKAJATLs connected to the RKH/RKHE.

Copyright © 2002, 2005, Hitachi, Ltd.

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) Floor model

(a) Floor (RK+H1H) Model/Floor (RK+RKA+H2H) Model/Floor (RKS+H1H) Model

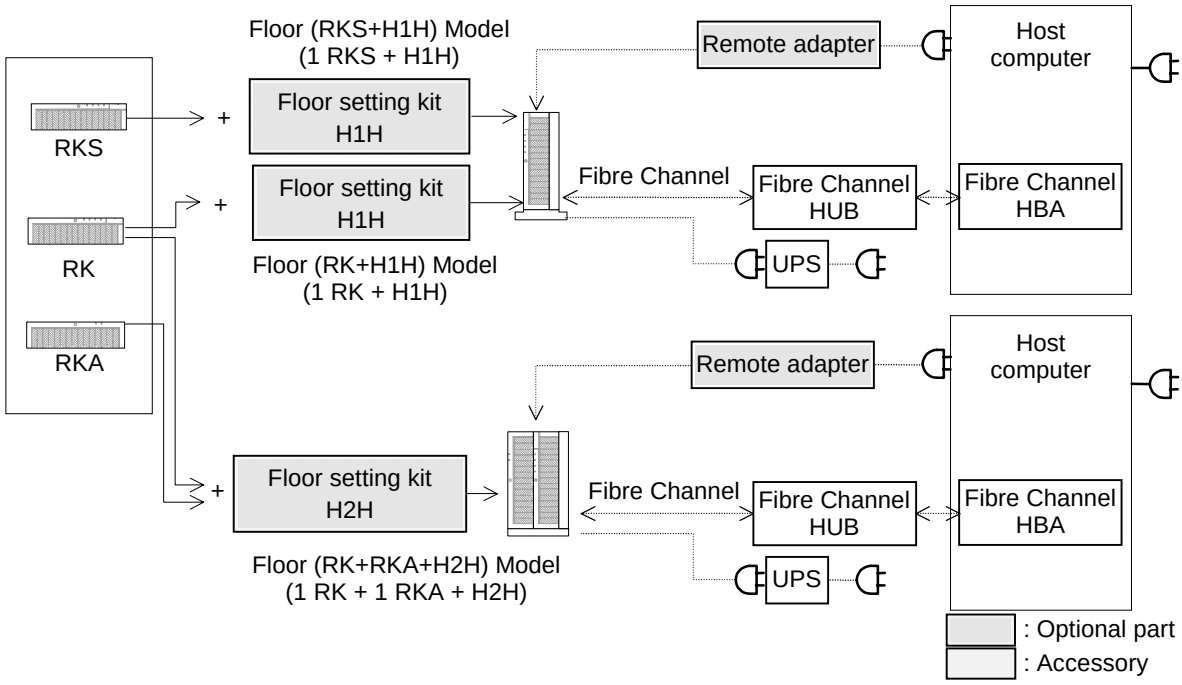


Figure 3.1 System Outline of Floor Model (RK+H1H/RK+RKA+H2H/RKS+H1H)

Copyright ©2002, 2005, Hitachi, Ltd.

(b) Floor (RKD+H1HD) Model/Floor (RKD+RKAD+H2HD) Model/Floor (RKSD+H1HD) Model

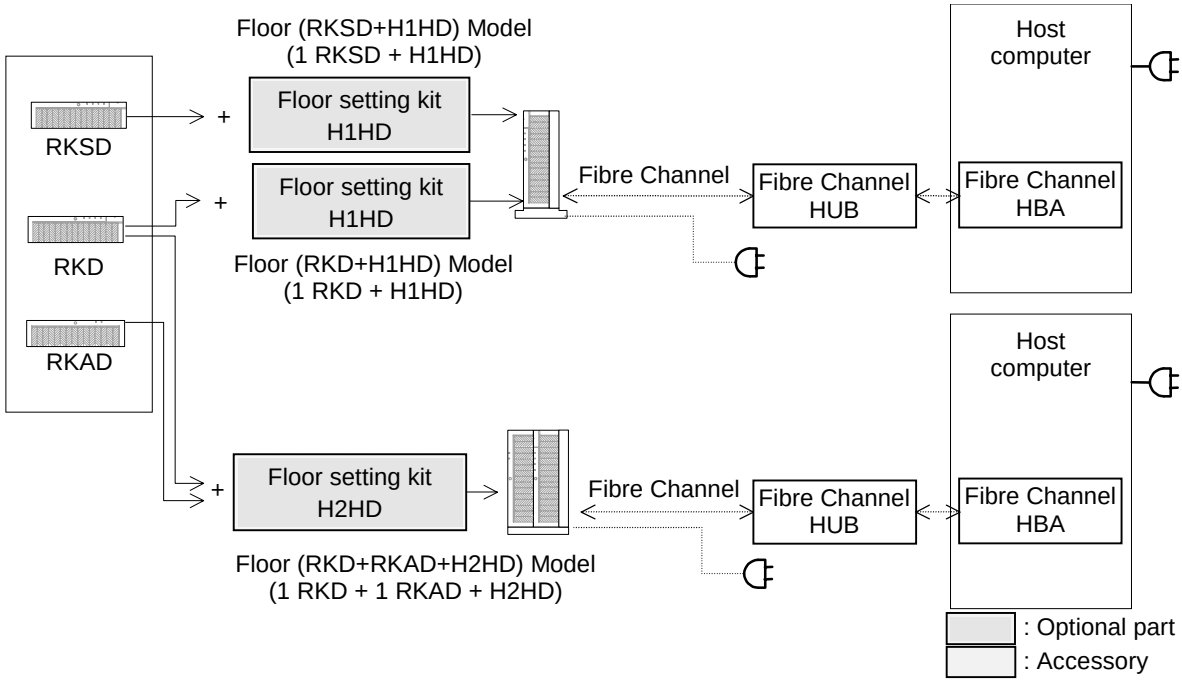
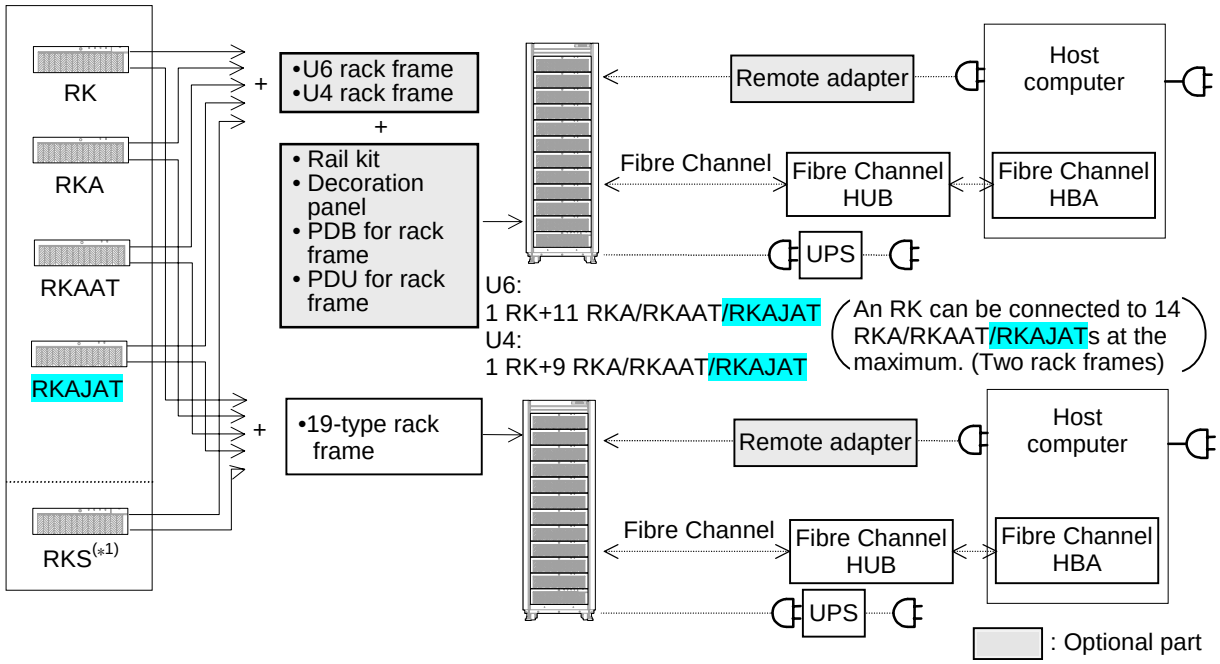


Figure 3.1.1 System Outline of Floor Model (RKD+H1HD/RKD+RKAD+H2HD / RKSD+H1HD)

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Rackmount model

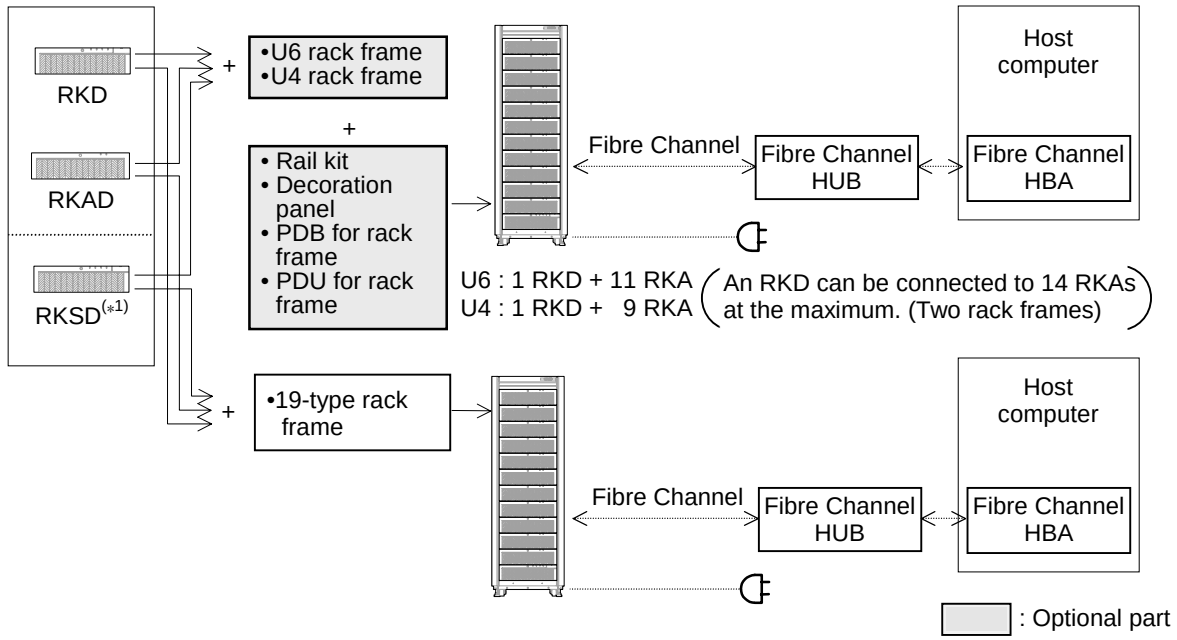
(a) Rackmount model (RK/RKA/RKAAT/RKAJAT/RKS)



*1 : RKS can be mounted by unit within the above scope.

Figure 3.2 System Outline of Rackmount Model (RK/RKA/RKAAT/RKAJAT/RKS)

(b) Rackmount model (RKD/RKAD/RKSD)

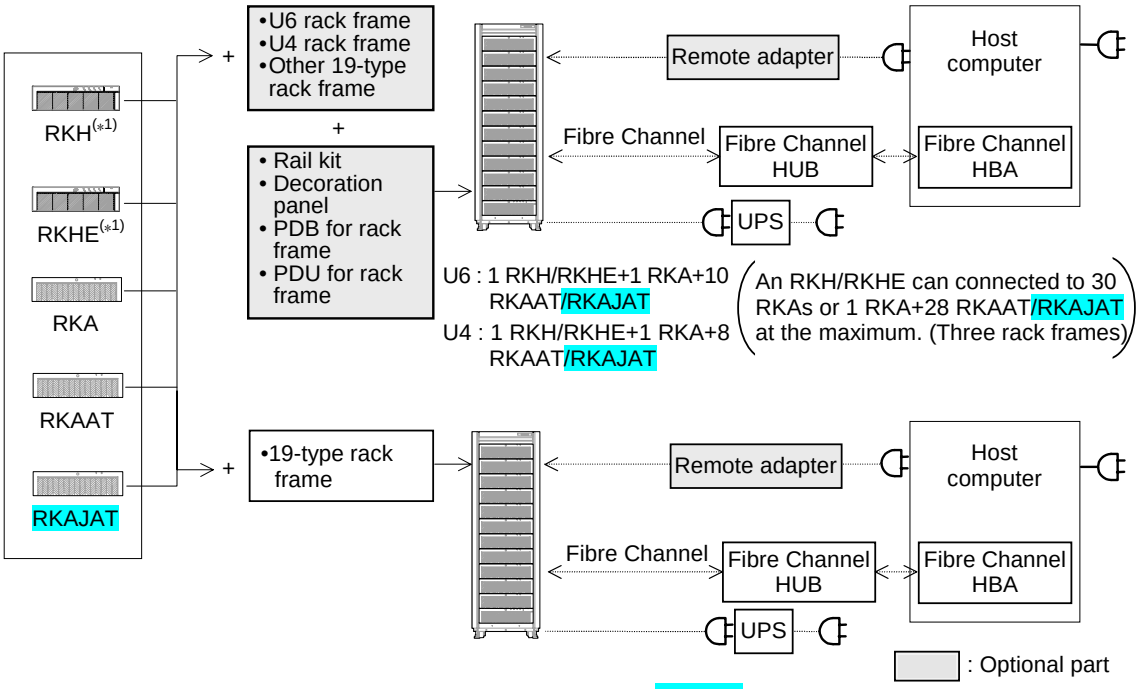


*1 : RKSD can be mounted by unit within the above scope.

Figure 3.2.1 System Outline of Rackmount Model (RKD/RKAD/RKSD)

Copyright © 2003, 2005, Hitachi, Ltd.

(c) Rackmount model (RKH/RKHE/RKA/RKAAT/RKAJAT)



*1 : An RKH/RKHE can connected to 30 RKAs or 1 RKA+28 RKAAT/RKAJAT at the maximum. (Three rack frames)

*2 : Besides, when connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Figure 3.2.2 System Outline of Rackmount Model (RKH/RKHE/RKA/RKAAT/RKAJAT)

(d) Rackmount model (RKL/RKAATL/RKAJATL)

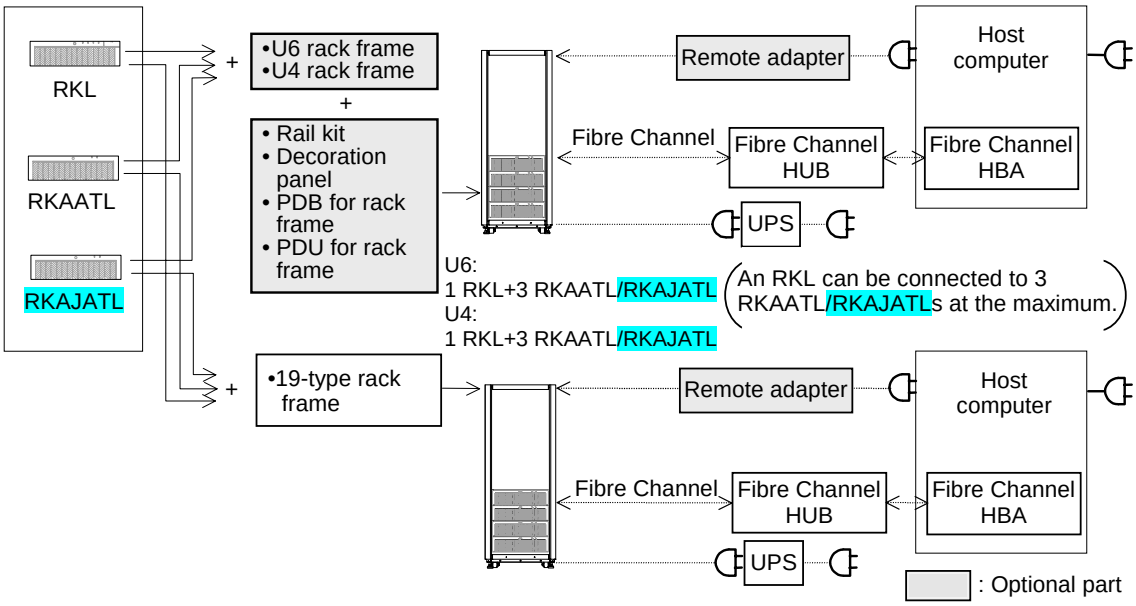


Figure 3.2.3 System Outline of Rackmount Model (RKL/RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

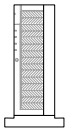
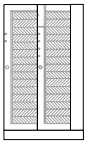
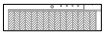
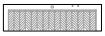
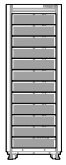
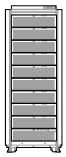
This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

3.1 Basic Specifications of the Subsystem

(1) RK/RKA/Floor (RK+H1H) Model/Floor (RK+RKA+H2H) Model

Table 3.1.1 Basic Specifications

Item \ Model			Floor model		Rackmount model					
			Floor (RK+H1H) Model	Floor (RK+RKA+H2H) Model	RK	RKA	With U6 rack frame		With U4 rack frame	
							One rack	Two rack	One rack	Two rack
Confi-guration	Configuration		1 RK + H1H Floor setting kit (Optional)	1 RK + 1 RKA + H2H Floor setting kit (Optional)	1 RK	1 RKA	1 RK + RKA (11units) (Maximum configuration) + U6 rack frame (Optional)	1 RK + RKA (14units) (Maximum configuration) + U6 rack frame (Optional)	1 RK + RKA (9units) (Maximum configuration) + PDU(*3) (Optional) + U4 rack frame (Optional)	1 RK + RKA (14units) (Maximum configuration) + PDU (Optional) + U4 rack frame (Optional)
	Subsystem appearance									
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4							
	Data capacity(*4) (G byte)		35.4 / 71.3 / 143.3 / 287.6							
	Rotational speed (min^{-1})		3.5-type Disk Drive (35.4 / 71.3 G bytes) : 15,000 3.5-type Disk Drive (71.3 / 143.3 / 287.6 G bytes) : 10,000							
	Maximum mountable quantity (unit)		14	29	14	15	179	224	149	224
Host interface	Host interface		• Fibre Channel Optical (Non-OFC)			—	• Fibre Channel Optical (Non-OFC)			
	Data transfer speed (i.e. maximum speed for transfer to host)		• 200 M bytes/s (Fibre Channel)			—	• 200 M bytes/s (Fibre Channel)			
	Number of ports	Single controller	Fibre Channel : 2			—	Fibre Channel : 2			
		Dual controller	Fibre Channel : 4			—	Fibre Channel : 4			
	Transferred block size (bytes)		512							
RAID specifi-cations(*1)	RAID level(*2)		0/1/5/1+0							
	RAID con-figuration (unit of addition)	RAID 0	2D to 14D	2D to 16D	2D to 14D	—	2D to 16D			
		RAID 1	1D+1P			—	1D+1P			
		RAID 5	2D+1P to 13D+1P	2D+1P to 15D+1P	2D+1P to 13D+1P	—	2D+1P to 15D+1P			
		RAID 1+0	2D+2P to 7D+7P	2D+2P to 8D+8P	2D+2P to 7D+7P	—	2D+2P to 8D+8P			

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

*3 : Up to the nine RKAs can be mounted through an addition of the UPDU (optional).

*4 : 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.

Copyright ©2002, 2005, Hitachi, Ltd.

Item \ Model		Floor model		Rackmount model					
		Floor (RK+H1H) Model	Floor (RK+RKA+ H2H) Model	RK	RKA	With U6 rack frame		With U4 rack frame	
						One rack	Two rack	One rack	Two rack
Internal logic specifi-cations	Control CPU	MPC7455 (667 MHz)			—	MPC7455 (667 MHz)			
	Control memory	•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes			—	•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes			
	Data assurance method	•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code			—	•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code			
Physical Specifi-cations	Start-up time (min)	Standard : 4(*3)			—	Standard : 4(*3)			
	Chassis size (W×D×H) (mm)	(260×737 ×540)	(309×737 ×540)	(483×656 ×129)	(483×656 ×129)	(610×813 ×1,880)	(610×813) ×2×(1,880)	(596×996 ×1,606)	(596×996) ×2×(1,606)
	Mass(*1) (kg)	80 approx.	125 approx.	44 approx.	42 approx.	720 approx	1,030 approx	560 approx.	880 approx.
	Acoustic noise(*2) (dB)	56 approx.	59 approx	57 approx	58 approx	64 approx	65 approx	64 approx	65 approx
	EIA Standard for unit (U) (*5)	—		3	3	Max. 38	Max. 38	Max. 32	Max. 32
Input power specifi-cations	Input voltage (V)	AC 100 to 120/200 to 240 (89 to 127/178 to 254)				AC 200 to 240(178 to 254)			
	Frequency (Hz)	50/60 ± 1							
	Number of phases, cabling	Single-phase with protective grounding							
	Steady-state current (*4)(*6) AC 100 to 120 / 200 to 240 (A)	4.4×2 /2.2×2	4.4×2+3.2×2 /2.2×2 +1.6×2	4.4×2 /2.2×2	3.2×2 /1.6×2	-/16.0 (One PDB)	-/16.0 (One PDB)	-/16.0 (One PDU)	-/16.0 (One PDU)

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

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

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

*4 : 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.

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

*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.

Copyright ©2002, 2005, Hitachi, Ltd.

Item \ Model			Floor model		Rackmount model					
			Floor (RK+H1H) Model	Floor (RK+RKA+ H2H) Model	RK	RKA	With U6 rack frame		With U4 rack frame	
							One rack	Two rack	One rack	Two rack
Input power specifi-cations	Breaking current (A)		16.0							
	Required power	Steady state (VA)	880 or less	1,520 or less	880 or less	640 or less	7,860 or less	9,840 or less	6,640 or less	9,840 or less
		Starting state(*1) (VA)	920 or less	1,640 or less	920 or less	720 or less	8,780 or less	11,000 or less	7,400 or less	11,000 or less
	Heat value (normal) (kJ/h)		3,170 or less	5,470 or less	3,170 or less	2,300 or less	28,300 or less	35,400 or less	23,900 or less	35,400 or less
Cache specifi-cations	Capacity (M bytes/CTL)		1,024 to 2,048			—	1,024 to 2,048			
	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 2,048 M bytes/CTL)			
Mainte-nance specifi-cations/ anti-fault specifi-cations	Parts to which hot replacement is applicable(*3)		•Control Unit •Disk Drive •Power Unit (RK) •Cache Unit •Fan Assembly •Backup Battery Unit(*4)	•Control Unit •Disk Drive •Power Unit (RK) •Power Unit (RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •ENC Unit	•Control Unit •Disk Drive •Power Unit (RK) •Cache Unit •Fan Assembly •Backup Battery Unit(*4)	•Disk Drive •Power Unit (RKA) •ENC Unit •Fan Assembly	•Control Unit •Disk Drive •Power Unit (RK) •Power Unit (RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •ENC Unit •PDB	•Control Unit •Disk Drive •Power Unit (RK) •Power Unit (RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •ENC Unit •PDB	•Control Unit •Disk Drive •Power Unit (RK) •Power Unit (RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •ENC Unit •PDU	•Control Unit •Disk Drive •Power Unit (RK) •Power Unit (RKA) •Cache Unit •Fan Assembly •Backup Battery Unit(*4) •ENC Unit •PDU

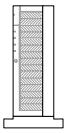
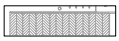
Copyright © 2002, 2005, Hitachi, Ltd.

Item	Model	Floor model		Rackmount model					
		Floor (RK+H1H) Model	Floor (RK+RKA+ H2H) Model	RK	RKA	With U6 rack frame		With U4 rack frame	
						One rack	Two rack	One rack	Two rack
Maintenance specifications/ anti-fault specifications	Microprogram installation method	Flash memory/Disk Drive (resident)			—	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.)			—	•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 fifteen of mounted Disk Drive s can be set to Spare Disks (No Spare Disk can be set for the Disk Drives #0 to #4 of the RK)							
	Collection of trace and dump	• Download the trace and dump through LAN on the maintenance PC.			—	• 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)	AC 1,500 V (10 mA, 1 min)		AC 1,500 V (100 mA, 1 min)	AC 1,500 V (100 mA, 1 min)	AC 1,500 V (10 mA, 1 min)	AC 1,500 V (10 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more							

Copyright ©2002, 2005, Hitachi, Ltd.

(2) RKS/Floor (RKS+H1H) Model

Table 3.1.2 Basic Specifications

Item \ Model			Floor model Floor (RKS+H1H) Model	Rackmount model RKS
Confi-guration	Configuration		1 RKS + H1H Floor setting kit (Optional)	1 RKS
	Subsystem appearance			
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4	
	Data capacity(*3) (G byte)		35.4/71.3/143.3/287.6	
	Rotational speed (min^{-1})		3.5-type Disk Drive (35.4 G bytes) : 15,000 3.5-type Disk Drive (71.3/143.3/287.6 G bytes) : 10,000	
	Maximum mountable quantity (unit)		14	14
Host interface	Host interface		• Fibre Channel Optical (Non-OFC)	• Fibre Channel Optical (Non-OFC)
	Data transfer speed (i.e. maximum speed for transfer to host)		• 200 M bytes/s (Fibre Channel)	• 200 M bytes/s (Fibre Channel)
	Number of ports	Single controller	Fibre Channel : 1	Fibre Channel : 1
		Dual controller	Fibre Channel : 2	Fibre Channel : 2
	Transferred block size (bytes)		512	
RAID specifi-cations(*1)	RAID level(*2)		0/1/5/1+0	
	RAID con-figuration (unit of addition)	RAID 0	2D to 14D	2D to 14D
		RAID 1	1D+1P	1D+1P
		RAID 5	2D+1P to 13D+1P	2D+1P to 13D+1P
		RAID 1+0	2D+2P to 7D+7P	2D+2P to 7D+7P

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

*3 : 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.

Copyright ©2002, 2005, Hitachi, Ltd.

Item \ Model			Floor model	Rackmount model
			Floor (RKS+H1H) Model	RKS
Internal logic specifications	Control CPU		MPC7455 (667 MHz)	
	Control memory		•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes	
	Data assurance method		•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code	
Physical Specifications	Start-up time (min)		Standard : 3(*5)	Standard : 3(*5)
	Chassis size (W×D×H) (mm)		(260×737×540)	(483×656×129)
	Mass(*1) (kg)		80 approx.	44 approx.
	Acoustic noise(*2) (dB)		56 approx.	57 approx
	EIA Standard for unit (U) (*3, *4, *7)		—	3
Input power specifications	Input voltage (V)		AC 100 to 120/200 to 240 (89 to 127/178 to 254)	
	Frequency (Hz)		50/60 ± 1	
	Number of phases, cabling		Single-phase with protective grounding	
	Steady-state current (*6)(*9) AC 100 to 120/200 to 240 (A)		4.4×2/2.2×2	4.4×2/2.2×2
	Breaking current (A)		16.0	
	Required power	Steady state (VA)	880 or less	
		Starting state(*8) (VA)	920 or less	
	Heat value (normal) (kJ/h)		3,170 or less	

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

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

*3 : Can be mounted on the Hitachi special rack frame (U6). 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 : Can be mounted on the Hitachi special rack frame (U4). For the mounting, special rails for the rack frame are required separately depending on the number of the mounted subsystem(s).

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

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

*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.

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

Copyright ©2002, 2005, Hitachi, Ltd.

Item \ Model		Floor model	Rackmount model
		Floor (RKS+H1H) Model	RKS
Cache specifications	Capacity (M bytes/CTL)	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 (RK) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)	•Control Unit •Disk Drive •Power Unit (RK) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)
	Microprogram installation method	Flash memory/Disk Drive (resident)	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.)	•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 one of mounted Disk Drives 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	

*1 :
- 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 three months for longer than 2 hours because spontaneous discharge is done.
- 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.

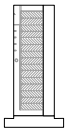
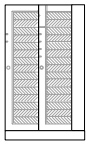
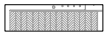
Copyright © 2002, 2005, Hitachi, Ltd.

Item \ Model		Floor model	Rackmount model
		Floor (RKS+H1H) Model	RKS
Insulation performance	Insulation withstand voltage	AC 1,500 V (10 mA, 1 min)	AC 1,500 V (10 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more	

Copyright ©2002, 2005, Hitachi, Ltd.

(3) RKD/RKAD/Floor (RKD+H1HD) Model/Floor (RKD+RKAD+H2HD) Model

Table 3.1.3 Basic Specifications

Item \ Model			Floor model		Rackmount model	
			Floor (RKD+H1HD) Model	Floor (RKD+RKAD+H2HD) Model	RKD	RKAD
Confi-guration	Configuration		1 RKD + H1H Floor setting kit (Optional)	1 RKD + 1 RKAD + H2H Floor setting kit (Optional)	1 RKD	1 RKAD
	Subsystem appearance					
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4			
	Data capacity(*3) (G byte)		35.4 / 71.3 / 143.3 / 287.6			
	Rotational speed (min^{-1})		3.5-type Disk drive (35.4 / 71.3 G bytes) : 15,000 3.5-type Disk drive (71.3 / 143.3 / 287.6 G bytes) : 10,000			
	Maximum mountable quantity (unit)		14	29	14	15
Host interface	Host interface		•Fibre Channel Optical (Non-OFC)			—
	Data transfer speed (i.e. maximum speed for transfer to host)		•200 M bytes/s (Fibre Channel)			—
	Number of ports	Single controller	Fibre Channel : 2			
		Dual controller (optional)	Fibre Channel : 4			
	Transferred block size (bytes)		512			
RAID specifi-cations(*1)	RAID level(*2)		0/1/5/1+0			
	RAID con-figuration (unit of addition)	RAID 0	2D to 14D	2D to 16D	2D to 14D	—
		RAID 1	1D+1P			—
		RAID 5	2D+1P to 13D+1P	2D+1P to 15D+1P	2D+1P to 13D+1P	—
		RAID 1+0	2D+2P to 7D+7P	2D+2P to 8D+8P	2D+2P to 7D+7P	—

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

*3 : 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.

Copyright ©2003, 2005, Hitachi, Ltd.

Item		Model	Floor model		Rackmount model	
			Floor (RKD+H1HD) Model	Floor (RKD+RKAD+H2HD) Model	RKD	RKAD
Internal logic specifi-cations	Control CPU		MPC7455 (667 MHz)			—
	Control memory		•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes			—
	Data assurance method		•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code			—
Physical Specifi-cations	Start-up time (min)		Standard : 4(*3)			—
	Chassis size (W×D×H) (mm)		(260×817×540)	(309×817×540)	(483×656×129)	(483×656×129)
	Mass(*1) (kg)		80 approx.	125 approx.	44 approx.	42 approx.
	Acoustic noise(*2) (dB)		53 approx.	56 approx	53 approx	
	EIA Standard for unit (U) (*5)		—	—	3	3
Input power specifi-cations	Input voltage (V)		DC -48 to -60 (-40.5 to -69)			
	Steady-state current (*4)(*7) DC –48V (A)		17 (8.5×2)	31 (8.5×2+7×2)	17 (8.5×2)	14 (7×2)
	Breaking current (A)		30.0			
	Required power	Steady state (VA)	780 or less	1,420 or less	780 or less	640 or less
		Starting state(*6) (VA)	800 or less	1,480 or less	800 or less	680 or less
	Heat value (normal) (kJ/h)		2,810 or less	5,112 or less	2,810 or less	2,300 or less

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

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

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

*4 : When one of the two power supply units fails, another power supply unit requires electric current for the two power supply units. Therefore, plan the power supply facility in which the current carrying capacity of one of the power supply units is a total capacity of the two power supply units.

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

*6 : Power requirement in the case of the maximum configuration is shown.

*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.

Copyright ©2003, 2005, Hitachi, Ltd.

Item		Model: Floor (RKD+H1HD) Model	Floor (RKD+RKAD+H2HD) Model	Rackmount model: RKD	Rackmount model: RKAD
Cache specifications	Capacity (M bytes/CTL)	1,024 to 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 (DC) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)	• Control Unit •Disk Drive •Power Unit (DC)) •Cache Unit •Fan Assembly •Backup Battery Unit(*3) •ENC Unit	•Control Unit •Disk Drive •Power Unit (DC) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)	•Disk Drive •Power Unit (DC) •ENC Unit • Fan Assembly
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 fifteen of mounted Disk Drives can be set to Spare Disks (No Spare Disk can be set for the Disk Drives #0 to #4 of the RKD)			
	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 1,000 V (10 mA, 1 min)	AC 1,000 V (100 mA, 1 min)	AC 1,000 V (10 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more			

*1 : • 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 2 hours because spontaneous discharge is done.

• To minimize the deterioration of battery, use and keep a battery at the lowest temperature possible.

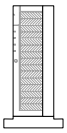
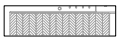
*2 : Only the trained service personnel can perform a hot replacement.

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

Copyright ©2003, 2005, Hitachi, Ltd.

(4) RKSD/ Floor (RKSD+H1HD) Model

Table 3.1.4 Basic Specifications

Item \ Model			Floor model	Rackmount model
			Floor (RKSD+H1HD) Model	RKSD
Confi-guration	Configuration		1 RKSD + H1HD Floor setting kit (Optional)	1 RKSD
	Subsystem appearance			
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4	
	Data capacity(*3) (G byte)		35.4/71.3/143.3/287.6	
	Rotational speed (min^{-1})		3.5-type Disk Drive (35.4 G bytes) : 15,000 3.5-type Disk Drive (71.3/143.3/287.6 G bytes) : 10,000	
	Maximum mountable quantity (unit)		14	14
Host interface	Host interface		•Fibre Channel Optical (Non-OFC)	•Fibre Channel Optical (Non-OFC)
	Data transfer speed (i.e. maximum speed for transfer to host)		•200 M bytes/s (Fibre Channel)	•200 M bytes/s (Fibre Channel)
	Number of ports	Single controller	Fibre Channel : 1	Fibre Channel : 1
		Dual controller	Fibre Channel : 2	Fibre Channel : 2
	Transferred block size (bytes)		512	
RAID specifi-cations(*1)	RAID level(*2)		0/1/5/1+0	
	RAID con-figuration (unit of addition)	RAID 0	2D to 14D	2D to 14D
		RAID 1	1D+1P	1D+1P
		RAID 5	2D+1P to 13D+1P	2D+1P to 13D+1P
		RAID 1+0	2D+2P to 7D+7P	2D+2P to 7D+7P

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

*3 : 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.

Copyright ©2003, 2005, Hitachi, Ltd.

Item		Model	Floor model	Rackmount model
			Floor (RKSD +H1HD) Model	RKSD
Internal logic specifications	Control CPU		MPC7455 (667 MHz)	
	Control memory		•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes	
	Data assurance method		•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code	
Physical Specifications	Start-up time (min)		Standard : 3(*3)	Standard : 3(*3)
	Chassis size (W×D×H) (mm)		(260×817×540)	(483×656×129)
	Mass(*1) (kg)		80 approx.	44 approx.
	Acoustic noise(*2) (dB)		53 approx.	53 approx
	EIA Standard for unit (U) (*5)		—	3
Input power specifications	Input voltage (V)		DC -48 to -60 (-40.5 to -69)	
	Steady-state current (*4)(*7) DC –48V (A)		17 （8.5×2）	17 （8.5×2）
	Breaking current (A)		30.0	
	Required power	Steady state (VA)	780 or less	
		Starting state(*6) (VA)	800 or less	
	Heat value (normal) (kJ/h)		2,810 or less	

*1 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*2 : A noise emitted at the time of start is not included.
*3 : The start-up time may be longer than three minutes depending on the configuration.
*4 : When one of the two power supply units fails, another power supply unit requires electric current for the two power supply units. Therefore, plan the power supply facility in which the current carrying capacity of one of the power supply units is a total capacity of the two power supply units.
*5 : Racks height are measured in meters, EIA units, and “U”. 1EIA unit equals 1U, which equals 44.45 mm.
*6 : Power requirement in the case of the maximum configuration is shown. When planning facilities such as the power supply, specify the power factor as 100% for calculation. The actual required power may exceed the value shown in the table when the tolerance is included.
*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.

Copyright ©2003, 2005, Hitachi, Ltd.

Item \ Model		Floor model	Rackmount model
		Floor (RKSD +H1HD) Model	RKSD
Cache specifications	Capacity (M bytes/CTL)	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 (DC) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)	•Control Unit •Disk Drive •Power Unit (DC) •Cache Unit •Fan Assembly •Backup Battery Unit(*3)
	Microprogram installation method	Flash memory/Disk drive (resident)	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.)	• 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 one of mounted Disk drives 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	

*1 : • 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 2 hours because spontaneous discharge is done.

• 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.

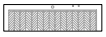
Copyright ©2003, 2005, Hitachi, Ltd.

Item	Model	Floor model	Rackmount model
		Floor (RKSD +H1HD) Model	RKSD
Insulation perform-ance	Insulation withstand voltage	AC 1,000 V (10 mA, 1 min)	AC 1,000 V (10 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more	

Copyright ©2003, 2005, Hitachi, Ltd.

(5) RKH/RKHE Rackmount (RKH/RKHE+RKA) Model

Table 3.1.5 Basic Specifications

Item \ Model		Rackmount model							
		RKH/RKHE	RKA	RKH/RKHE + RKA + 19-type rack frame					
				19-type rack frame	With U6 rack frame		With U4 rack frame		
					One rack	Three rack	One rack	Three rack	Four rack
Confi-guration	Configuration	1 RKH/ 1 RKHE	1 RKA	1 RKH/ 1 RKHE + RKA (30units) (Maximum configuration) + 19- type rack frame	1 RKH/ 1 RKHE + RKA (11units) (Maximum configuration) + U6 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (30units) (Maximum configuration) + U6 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (9units) (Maximum configuration) + U4 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (29units) (Maximum configuration)+ U4 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (30units) (Maximum configuration)+ U4 rack frame (Optional)
	Subsystem appearance								
Disk Drive used	Disk Drive size (W×D×H) (mm)	The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it	101.6×146.1× 25.4	The RKA(s) is connected as an additional device(s). Refer to the basic specifications of the RKA.					
	Data capacity (*2) (G byte)		35.4/71.3/143.3/ 287.6	The RKA(s) is connected as an additional device(s). Refer to the basic specifications of the RKA.					
	Rotational speed (min^{-1})		3.5-type Disk Drive (35.4 / 71.3 G bytes) : 15,000 3.5-type Disk Drive (71.3 / 143.3 / 287.6 G bytes) : 10,000	The RKA(s) is connected as an additional device(s). Refer to the basic specifications of the RKA.					
	Maximum mountable quantity (*1) (unit)		15	449(*3)	164	449	134	434	449
Host interface	Host interface	Fibre Channel Optical (Non-OFC)	—	Fibre Channel Optical (Non-OFC)					
	Data transfer speed (i.e. maximum speed for transfer to host)	200 M bytes/s (Fibre Channel)	—	200 M bytes/s (Fibre Channel)					
	Number of ports / Dual controller /Standard	Fibre Channel : 8	—	Fibre Channel : 8					
	Transferred block size (bytes)	512							

*1 : Can be mounted on the 19 type rack frame.
*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 : The number of disk drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.

Copyright © 2003, 2005, Hitachi, Ltd.

Item \ Model			Rackmount model							
			RKH/RKHE	RKA	RKH/RKHE + RKA + 19-type rack frame					
					19-type rack frame	With U6 rack frame		With U4 rack frame		
						One rack	Three rack	One rack	Three rack	Four rack
RAID specifications(*1)	RAID level (*2)		0/1/5/1+0							
	RAID configuration (unit of addition)	RAID 0	—	2D to 16D	2D to 16D(14D)	2D to 16D				
		RAID 1	—	1D+1P	1D+1P	1D+1P				
		RAID 5	—	2D+1P to 15D+1P	2D+1P to 15D+1P (13D+1P)	2D+1P to 15D+1P				
		RAID 1+0	—	2D+2P to 8D+8P	2D+2P to 8D+8P (7D+7P)	2D+2P to 8D+8P				
Internal logic specifications	Control CPU		It is the same as 'With U6 rack frame'	—	RKH: POWER PC 7455 (933 MHz) RKHE: POWER PC 7457 (1.3 GHz)					
	Control memory			—	• Flash memory : 2 M bytes • L2 Cache memory : 512 k bytes • SRAM : 64 M bytes					
	Data assurance method			—	• Data bus : Through-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(*5)	—	Standard : 4(*5)					
	Chassis size (W×D×H) (mm)		(483×656×129)	(483×656×129)	—					
	Mass(*3) (kg)		40 approx.	42 approx.	—	720 approx.	1,930 approx.	560 approx.	1,675 approx.	1,820 approx.
	Acoustic noise(*4) (dB)		60 approx.	58 approx	—	64 approx.	69 approx.	64 approx.	69 approx.	69 approx.
	EIA Standard for unit (U) (*6)		3	3	—					
Input power specifications	Input voltage (V)		AC 100 to 120/200 to 240 (89 to 127/178 to 254)		The RKA(s) is connected as an additional device(s). RKH/RKHE: Refer to the specifications for the power to be supplied to the RKH/RKHE. RKA: Refer to the specifications for the power to be supplied to the RKA.					
	Frequency (Hz)		50/60 ± 1							
	Number of phases, cabling		Single-phase with protective grounding							
	Steady-state current (*7) AC 100 to 120/200 to 240 (A)		2.8×2/1.4×2	3.2×2/1.6×2						

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

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

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

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

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

*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.

Copyright © 2003, 2005, Hitachi, Ltd.

Item \ Model			Rackmount model						
			RKH/RKHE	RKA	RKH/RKHE + RKA + 19-type rack frame				
					19-type rack frame	With U6 rack frame		With U4 rack frame		
						One rack	Three rack	One rack	Three rack	Four rack
Input power specifications	Breaking current (A)		15.0	16.0	The RKA(s) is connected as an additional device(s). RKH/RKHE: Refer to the specifications for the power to be supplied to the RKH/RKHE. RKA: Refer to the specifications for the power to be supplied to the RKA.					
	Required power	Steady state (VA)	560 or less	640 or less	RKH/RKHE: (RKA) Refer to the specifications for the power to be supplied to the RKH/RKHE: (RKA).	7,600 or less	19,760 or less	6,320 or less	19,120 or less	19,760 or less
		Starting state (*1) (VA)	560 or less	720 or less		8,480 or less	22,160 or less	7,040 or less	21,440 or less	22,160 or less
	Heat value (normal) (kJ/h)		2,016 or less	2,300 or less		27,400 or less	71,200 or less	22,800 or less	68,800 or less	71,200 or less
Cache specifications	Capacity (M bytes/CTL)		It is the same as 'With U6 rack frame'	—	1,024 to 4,096					
	Control method			—	Read LRU/Write after					
	Battery backup			—	Provided					
	Backup duration(*2) (h)			—	48 (When cache of 4,096 M bytes/CTL)					
Maintenance specifications/ anti-fault specifications	Parts to which hot replacement is applicable (*3)		• Control Unit • Power Unit (RKH) • Cache Unit • Fan Assembly • Backup Battery Unit (*4)	•Disk Drive •Power Unit (RKA) •ENC Unit •Fan Assembly	RKH/RKHE: Refer to the list of parts to which hot replacement is applicable to the RKH/RKHE. RKA: Refer to the list of parts to which hot replacement is applicable to the RKA.					

*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 :
- 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 2 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 per one 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 2 hours at least once one month, 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 three months for longer than 2 hours because spontaneous discharge is done.
- 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.

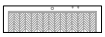
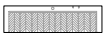
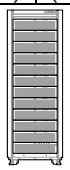
Copyright © 2003, 2005, Hitachi, Ltd.

Item		Model: Rackmount model						
		RKH/RKHE	RKA	RKH/RKHE + RKA + 19-type rack frame				
				19-type rack frame	With U6 rack frame		With U4 rack frame		
					One rack	Three rack	One rack	Three rack	Four rack
Maintenance specifications/ anti-fault specifications	Microprogram installation method	It is the same as 'With U6 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 (No Spare Disk can be set for the Disk Drives #0 to #4 of the Unit ID#0)							
	Collection of trace and dump	• Download the trace and dump through LAN on the maintenance PC.	—	• 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)		—					
	Insulation resistance	DC 500 V, 10 MΩ or more		—					

Copyright © 2003, 2005, Hitachi, Ltd.

(6) Rackmount (RK+RKA/RKAAT/RKAJAT) Model

Table 3.1.6 Basic Specifications

Item		Model	Rackmount model							
			RK	RKA	RKAAT	RKAJAT	RK + RKA/RKAAT/RKAJAT + 19-type rack frame			
							With U6 rack frame		With U4 rack frame	
							One rack	Two rack	One rack	Two rack
Confi-guration	Configuration		1 RK	1 RKA	1 RKAAT	1 RKAJAT	1 RK +RKA/ RKAAT/ RKAJAT (11units) (Maximum configuration) + U6 rack frame (Optional)	1 RK +RKA/ RKAAT/ RKAJAT (14units) (Maximum configuration) + U6 rack frame (Optional)	1 RK +RKA/ RKAAT/ RKAJAT (9units)(*1) (Maximum configuration) + U4 rack frame (Optional)	1 RK +RKA/ RKAAT/ RKAJAT (14units) (Maximum configuration) + U4 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)		RKA: 35.4/71.3/143.3/287.6 RKAAT/RKAJAT: 245.7/393.4							
	Rotational speed (min^{-1})		RKA: 3.5-type Disk Drive (35.4 / 71.3 G bytes) : 15,000 3.5-type Disk Drive (71.3 / 143.3 / 287.6 G bytes) : 10,000 RKAAT/RKAJAT: 3.5-type Disk Drive (245.7 / 393.4 G bytes) : 7,200							
	Maximum mountable quantity (*3) (unit)		14	15	15	15	179	224	149	224
Host interface	Host interface		Fibre Channel Optical (Non-OFC)	—	—	—	Fibre Channel Optical (Non-OFC)			
	Data transfer speed (i.e. maximum speed for transfer to host)		200 M bytes/s (Fibre Channel)	—	—	—	200 M bytes/s (Fibre Channel)			
	Number of ports	Single controller	Fibre Channel : 2	—	—	—	Fibre Channel : 2			
		Dual controller /Optional	Fibre Channel : 4	—	—	—	Fibre Channel : 4			
	Transferred block size (bytes)		512							

*1 : Up to the nine RKA/RKAAT/RKAJATs can be mounted through an addition of the UPDU (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 (U6/U4). 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).

Copyright © 2004, 2005, Hitachi, Ltd.

Item		Model	Rackmount model							
			RK	RKA	RKAAT	RKAJAT	RK + RKA/RKAAT/RKAJAT + 19-type rack frame			
							With U6 rack frame		With U4 rack frame	
							One rack	Two rack	One rack	Two rack
RAID specifications(*1)	RAID level (*2)		1/5/1+0							
	RAID configuration (unit of addition)	RAID 1	1D+1P							
		RAID 5	2D+1P to 15D+1P(*8)							
		RAID 1+0	2D+2P to 8D+8P							
Internal logic specifications	Control CPU		It is the same as 'With U6 rack frame'	—	—	—	MPC7455 (667 MHz)			
	Control memory			—	—	—	• Flash memory : 2 M bytes • L2 Cache memory : 512 k bytes • SRAM : 64 M bytes			
	Data assurance method			—	—	—	• Data bus : Through-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(*5)							
	Chassis size (W×D×H) (mm)		(483×656×129)	(483×656×129)	(483×656×129)	(483×656×129)	(610×813×1,880)	(610×813)×2×(1,880)	(596×996×1,606)	(596×996)×2×(1,606)
	Mass(*3) (*9) (kg)		44 approx.	42 approx.	42 approx.	40 approx.	720 approx./ 720 approx./ 698 approx.	1,030 approx./ 1,030 approx./ 1,002 approx.	560 approx./ 560 approx./ 542 approx.	880 approx./ 880 approx./ 852 approx.
	Acoustic noise(*4) (dB)		57 approx.	58 approx	58 approx	58 approx	64 approx.	65 approx.	64 approx.	65 approx.
	EIA Standard for unit (U) (*6)		3	3	3	3	Max. 38	Max. 38	Max. 32	Max. 32
Input power specifications	Input voltage (V)		AC 100 to 120/200 to 240 (89 to 127/178 to 254)				AC 200 to 240(178 to 254)			
	Frequency (Hz)		50/60 ± 1							
	Number of phases, cabling		Single-phase with protective grounding							
	Steady-state current (*7) AC 100 to 120/200 to 240 (A)		4.4×2/ 2.2×2	3.2×2/ 1.6×2	2.6×2/ 1.3×2	2.4×2/ 1.2×2	-/16.0 (One PDB)	-/16.0 (One PDB)	-/16.0 (One PDU)	-/16.0 (One PDU)

*1 : D : Data disk
P : Parity disk
*2 : Although the subsystem with a configuration of 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.
*3 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*4 : A noise emitted at the time of start is not included.
*5 : The start-up time may be longer than four minutes depending on the configuration.
*6 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*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 : It is recommended to use the RAID configuration within 6D+1P.
*9 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAs to RK, only RKAATs to RK, and only RKAJATs to RK are listed for the purpose of reference.

Copyright © 2004, 2005, Hitachi, Ltd.

Item			Model: Rackmount model							
			RK	RKA	RKAAT	RKAJAT	RK + RKA/RKAAT/RKAJAT + 19-type rack frame			
							With U6 rack frame		With U4 rack frame	
							One rack	Two rack	One rack	Two rack
Input power specifications	Breaking current (A)		16.0	16.0	15.0	15.0	16.0			
	Required power (*5)	Steady state (VA)	880 or less	640 or less	520 or less	480 or less	7,860 or less/ 6,600 or less/ 6,100 or less	9,840 or less/ 8,160 or less/ 7,600 or less	6,640 or less/ 5,560 or less/ 5,200 or less	9,840 or less/ 8,160 or less/ 7,600 or less
		Starting state (*1) (VA)	920 or less	720 or less	520 or less	480 or less	8,780 or less/ 6,640 or less/ 6,140 or less	11,000 or less/ 8,200 or less/ 7,640 or less	7,400 or less/ 5,600 or less/ 5,240 or less	11,000 or less/ 8,200 or less/ 7,640 or less
	Heat value (normal) (kJ/h) (*5)		3,170 or less	2,300 or less	1,800 or less	1,730 or less	28,300 or less/ 23,760 or less/ 22,030 or less	35,400 or less/ 29,380 or less/ 27,420 or less	23,900 or less/ 20,020 or less/ 18,770 or less	35,400 or less/ 29,380 or less/ 27,420 or less
Cache specifications	Capacity (M bytes/CTL)		It is the same as 'With U6 rack frame'	—	—	—	1,024 to 2,048			
	Control method			—	—	—	Read LRU/Write after			
	Battery backup			—	—	—	Provided			
	Backup duration (*2) (h)			—	—	—	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 (RK) •Cache Unit •Fan Assembly •Backup Battery Unit (*4)	•Disk Drive •Power Unit (RKA) •ENC Unit •Fan Assembly	•Disk Drive •Power Unit (RKAAT) •SENC Unit •Fan Assembly	•Disk Drive •Power Unit (RKAJAT) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RK/RKA/RKAAT/RKAJAT) •Cache Unit •Fan Assembly (*6) •Backup Battery Unit (*4) •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 :
- 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 three months for longer than 2 hours because spontaneous discharge is done.
- 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.

*5 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAs to RK, only RKAATs to RK, and only RKAJATs to RK are listed for the purpose of reference.

*6 : The RKAJAT has no Fan Assembly.

Copyright © 2004, 2005, Hitachi, Ltd.

Item \ Model		Rackmount model							
		RK	RKA	RKAAT	RKAJAT	RK + RKA/RKAAT/RKAJAT + 19-type rack frame			
						With U6 rack frame		With U4 rack frame	
						One rack	Two rack	One rack	Two rack
Maintenance specifications/ anti-fault specifications	Microprogram installation method	It is the same as 'With U6 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 (No Spare Disk can be set for the Disk Drives #0 to #4 of the Unit ID#0)							
	Collection of trace and dump	•Download the trace and dump through LAN on the maintenance PC.	—	—	—	• 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)		AC 1,500 V (10 mA, 1 min)	
	Insulation resistance	DC 500 V, 10 MΩ or more							

Copyright © 2004, 2005, Hitachi, Ltd.

(7) Rackmount (RKH/RKHE+RKA/RKAAT/RKAJAT) Model

Table 3.1.7 Basic Specifications

Item		Model: Rackmount model(*4)								
		RKH/ RKHE	RKA	RKAAT	RKAJAT	RKH/RKHE + RKA/RKAAT/RKAJAT + 19-type rack frame				
						19-type rack frame	With U6 rack frame		With U4 rack frame	
							One rack	Three rack	One rack	Four rack
Confi-guration	Configuration	1 RKH/ 1 RKHE	1 RKA	1 RKAAT	1 RKAJAT	1 RKH/ 1 RKHE + RKA (1unit)/ RKAAT/ RKAJAT (28units) (Maximum configuration) + 19- type rack frame	1 RKH/ 1 RKHE + RKA (1unit)/ RKAAT/ RKAJAT (10units) (Maximum configuration) + U6 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (1unit)/ RKAAT/ RKAJAT (28units) (Maximum configuration) + U6 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (1unit)/ RKAAT/ RKAJAT (8units) (Maximum configuration) + U4 rack frame (Optional)	1 RKH/ 1 RKHE + RKA (1unit)/ RKAAT/ RKAJAT (28units) (Maximum configuration) + U4 rack frame (Optional)
	Subsystem appearance									
Disk Drive used	Disk Drive size (W×D×H) (mm)	The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it.	101.6×146.1×25.4			The RKA/RKAAT/RKAJAT(s) is connected as an additional device(s). Refer to the basic specifications of the RKA/RKAAT/RKAJAT.				
	Data capacity (*2) (G byte)		RKA: 35.4/71.3/143.3/287.6 RKAAT/RKAJAT: 245.7/393.4							
	Rotational speed (min^{-1})		RKA: 3.5-type Disk Drive (35.4 / 71.3 G bytes) : 15,000 3.5-type Disk Drive (71.3 / 143.3 / 287.6. G bytes) : 10,000 RKAAT/RKAJAT: 3.5-type Disk Drive (245.7 / 393.4 G bytes) : 7,200							
	Maximum mountable quantity (*1) (unit)		15			420(*3)	164	420	134	420
Host interface	Host interface	It is the same as 'With U6 rack frame'	—	—	—	Fibre Channel Optical (Non-OFC)				
	Data transfer speed (i.e. maximum speed for transfer to host)		—	—	—	200 M bytes/s (Fibre Channel)				
	Number of ports: Dual controller /Standard		—	—	—	Fibre Channel : 8				
	Transferred block size (bytes)	512								

*1 : Can be mounted on the 19 type rack frame.
*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 : The number of disk drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.
*4 : When connecting the RKAAT/RKAJAT to the RKH/RKHE, the disk array unit to be connected first must be the RKA.

Copyright © 2004, 2005, Hitachi, Ltd.

Item \ Model			Rackmount model								
			RKH/ RKHE	RKA	RKAAT	RKAJAT	RKH/RKHE + RKA/RKAAT/RKAJAT + 19-type rack frame				
							19-type rack frame	With U6 rack frame		With U4 rack frame	
								One rack	Three rack	One rack	Four rack
RAID specifications(*1)	RAID level (*2)		1/5/1+0								
	RAID configuration (unit of addition)	RAID 1	—	1D+1P							
		RAID 5	—	2D+1P to 15D+1P(*8)							
		RAID 1+0	—	2D+2P to 8D+8P							
Internal logic specifications	Control CPU		It is the same as 'With U6 rack frame'	—			RKH: POWER PC 7455 (933 MHz) RKHE: POWER PC 7457 (1.3 GHz)				
	Control memory			—			• Flash memory : 2 M bytes • L2 Cache memory : 512 k bytes • SRAM : 64 M bytes				
	Data assurance method			—			• Data bus : Through-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(*5)								
	Chassis size (W×D×H) (mm)		(483×656×129)				—				
	Mass(*3) (*9) (kg)		40 approx.	42 approx.	42 approx.	40 approx.	—	720 approx./ 720 approx./ 700 approx.	1,888 approx./ 1,888 approx./ 1,832 approx.	560 approx./ 560 approx./ 544 approx.	1,778 approx./ 1,778 approx./ 1,722 approx.
	Acoustic noise(*4) (dB)		60 approx.	58 approx	58 approx	58 approx	—	64 approx.	69 approx.	64 approx.	69 approx.
	EIA Standard for unit (U) (*6)		3				—				
Input power specifications	Input voltage (V)		AC 100 to 120/200 to 240 (89 to 127/178 to 254)				The RKA/RKAAT/RKAJAT(s) is connected as an additional device(s). RKH/RKHE: Refer to the specifications for the power to be supplied to the RKH/RKHE. RKA/RKAAT/RKAJAT: Refer to the specifications for the power to be supplied to the RKA/RKAAT/RKAJAT.				
	Frequency (Hz)		50/60 ± 1								
	Number of phases, cabling		Single-phase with protective grounding								
	Steady-state current (*7) AC 100 to 120/200 to 240 (A)		2.8×2/ 1.4×2	3.2×2/ 1.6×2	2.6×2/ 1.3×2	2.4×2/ 1.2×2					

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

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

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

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

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

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

*9 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAs to RKH/RKHE, only RKAATs to RKH/RKHE, and only RKAJATs to RKH/RKHE are listed for the purpose of reference.

Copyright © 2004, 2005, Hitachi, Ltd.

Item			Model: RKH/RKHE	RKA	RKAAT	RKAJAT	RKH/RKHE + RKA/RKAAT/RKAJAT + 19-type rack frame				
							19-type rack frame	With U6 rack frame		With U4 rack frame	
								One rack	Three rack	One rack	Four rack
Input power specifications	Breaking current (A)		15.0	16.0	15.0	15.0	The RKA/RKAAT/RKAJAT(s) is connected as an additional device(s). RKH/RKHE: Refer to the specifications for the power to be supplied to the RKH/RKHE. RKA/RKAAT/RKAJAT: Refer to the specifications for the power to be supplied to the RKA/RKAAT/RKAJAT.				
	Required power (*5)	Steady state (VA)	560 or less	640 or less	520 or less	480 or less	RKH/RKHE: (RKA/RKAAT/RKAJAT) Refer to the specifications for the power to be supplied to the RKH/RKHE:(RKA/RKAAT/RKAJAT).	7,600 or less/ 6,400 or less/ 6,000 or less	19,760 or less/ 15,760 or less/ 15,280 or less	6,320 or less/ 5,880 or less/ 5,040 or less	19,760 or less/ 15,760 or less/ 15,280 or less
		Starting state (*1) (VA)	560 or less	720 or less	520 or less	480 or less		8,480 or less/ 6,480 or less/ 6,080 or less	22,160 or less/ 15,840 or less/ 15,440 or less	7,040 or less/ 5,960 or less/ 5,120 or less	22,160 or less/ 15,840 or less/ 15,440 or less
	Heat value (normal) (kJ/h) (*5)		2,016 or less	2,300 or less	1,880 or less	1,730 or less		27,400 or less/ 23,040 or less/ 21,700 or less	71,200 or less/ 56,740 or less/ 55,240 or less	22,800 or less/ 21,170 or less/ 18,240 or less	71,200 or less/ 56,740 or less/ 55,240 or less
Cache specifications	Capacity (M bytes/CTL)		It is the same as 'With U6 rack frame'	—	—	—	1,024 to 4,096				
	Control method			—	—	—	Read LRU/Write after				
	Battery backup			—	—	—	Provided				
	Backup duration (*2) (h)			—	—	—	48 (When cache of 4,096 M bytes/CTL)				
Maintenance specifications/ anti-fault specifications	Parts to which hot replacement is applicable (*3)		Control Unit/ Power Unit (RKH/RKHE)/ Cache Unit/ Fan Assembly/ Backup Battery Unit (*4)	Disk Drive/ Power Unit (RKA)/ ENC Unit/ Fan Assembly	Disk Drive/ Power Unit (RKAAT)/ SENC Unit/ Fan Assembly	Disk Drive/ Power Unit (RKAJAT)/ SENC Unit	•Control Unit •Disk Drive •Power Unit (RKH/RKHE/RKA/RKAAT/RKAJAT) •Cache Unit •Fan Assembly (*6) •Backup Battery Unit (*4) •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 :
- 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 three months for longer than 2 hours because spontaneous discharge is done.
- 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.

*5 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAs to RKH/RKHE, only RKAATs to RKH/RKHE, and only RKAJATs to RKH/RKHE are listed for the purpose of reference.

*6 : The RKAJAT has no Fan Assembly.

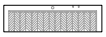
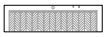
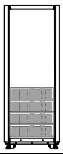
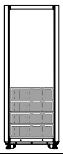
Copyright © 2004, 2005, Hitachi, Ltd.

Item		Model: Rackmount model							
		RKH/ RKHE	RKA	RKAAT	RKAJAT	RKH/RKHE + RKA/RKAAT/RKAJAT + 19-type rack frame			
						19-type rack frame	With U6 rack frame		With U4 rack frame	
							One rack	Three rack	One rack	Four rack
Maintenance specifications/ anti-fault specifications	Microprogram installation method	It is the same as 'With U6 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 fifteen of mounted Disk Drive s can be set to Spare Disks (No Spare Disk can be set for the Disk Drives #0 to #4 of the Unit ID#0)								
	Collection of trace and dump	It is the same as 'With U6 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)				—				
	Insulation resistance	DC 500 V, 10 MΩ or more				—				

Copyright © 2004, 2005, Hitachi, Ltd.

(8) RKL/RKAATL/RKAJATL

Table 3.1.8 Basic Specifications

Item \ Model			Rackmount model				
			RKL	RKAATL	RKAJATL	With U6 rack frame	With U4 rack frame
Configuration	Configuration		1 RKL	1 RKAATL	1 RKAJATL	1 RKL + RKAATL/RKAJATL (3units) (Maximum configuration) + U6 rack frame (Optional)	1 RKL + RKAATL/RKAJATL (3units) (Maximum configuration) + U4 rack frame (Optional)
	Subsystem appearance						
Disk Drive used	Disk Drive size (W×D×H) (mm)		101.6×146.1×25.4				
	Data capacity(*3) (G byte)		RKL: 143.3 RKAATL/RKAJATL: 245.7 / 393.4				
	Rotational speed (min^{-1})		RKL: 3.5-type Disk Drive (143.3 G bytes) : 10,000 RKAATL/RKAJATL:3.5-type Disk Drive (245.7 / 393.4 G bytes) : 7,200				
	Maximum mountable quantity (unit)		14	15	15	59	
Host interface	Host interface		• Fibre Channel Optical (Non-OFC)	—	—	• Fibre Channel Optical (Non-OFC)	
	Data transfer speed (i.e. maximum speed for transfer to host)		• 200 M bytes/s (Fibre Channel)	—	—	• 200 M bytes/s (Fibre Channel)	
	Number of ports	Single controller	Fibre Channel : 2	—	—	Fibre Channel : 2	
		Dual controller	Fibre Channel : 4	—	—	Fibre Channel : 4	
	Transferred block size (bytes)		512				
RAID specifications(*1)	RAID level(*2)		1/5/1+0				
	RAID configuration (unit of addition)	RAID 0	Not supported				
		RAID 1	1D+1P				
		RAID 5	2D+1P to 15D+1P				
		RAID 1+0	2D+2P to 8D+8P				

*1 : D : Data disk
P : Parity disk

*2 : Although the subsystem with a configuration of 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.

*3 : 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.

Copyright © 2004, 2005, Hitachi, Ltd.

Item		Model: Rackmount model				
		RKL	RKAATL	RKAJATL	With U6 rack frame	With U4 rack frame
Internal logic specifications	Control CPU	MPC7455 (667 MHz)	—	—	MPC7455 (667 MHz)	
	Control memory	•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes	—	—	•Flash memory : 2 M bytes •L2 Cache memory : 512 k bytes •SRAM : 64 M bytes	
	Data assurance method	•Data bus : Through-parity •Cache memory : ECC (1 bit for correction, 2 bits for detection) •Disk Drive : Data assurance code			•Data bus : Through-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(*3)				
	Chassis size (W×D×H) (mm)	(483×656×129)			(610×813×1,880)	(596×996×1,606)
	Mass(*1) (*7) (kg)	44 approx.	42 approx.	40 approx.	360 approx./ 354 approx.	290 approx./ 284 approx.
	Acoustic noise(*2) (dB)	57 approx	58 approx	58 approx	64 approx	
	EIA Standard for unit (U) (*5)	3			Max. 12	
Input power specifications	Input voltage (V)	AC 100 to 120/200 to 240 (89 to 127/178 to 254)			AC 200 to 240(178 to 254)	
	Frequency (Hz)	50/60 ± 1				
	Number of phases, cabling	Single-phase with protective grounding				
	Steady-state current (*4)(*6) AC 100 to 120 / 200 to 240 (A)	4.4×2/2.2×2	2.6×2/1.3×2	2.4×2/1.2×2	-/16.0 (One PDB)	-/16.0 (One PDU)

*1 : Value of maximum configuration (in the case where all the mountable Disk Drives and Control Unit are mounted).
*2 : A noise emitted at the time of start is not included.
*3 : The start-up time may be longer than four minutes depending on the configuration.
*4 : 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.
*5 : Racks height are measured in meters, EIA units, and "U". 1EIA unit equals 1U, which equals 44.45 mm.
*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.
*7 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAATLs to RKL, and only RKAJATLs to RKL are listed for the purpose of reference.

Copyright © 2004, 2005, Hitachi, Ltd.

Item \ Model			Rackmount model				
			RKL	RKAATL	RKAJATL	With U6 rack frame	With U4 rack frame
Input power specifications	Breaking current (A)		16.0	15.0	15.0	16.0	
	Required power(*5)	Steady state (VA)	880 or less	520 or less	480 or less	2,440 or less/ 2,320 or less	2,440 or less/ 2,320 or less
		Starting state(*1) (VA)	920 or less	520 or less	480 or less	2,480 or less/ 2,360 or less	2,480 or less/ 2,360 or less
	Heat value (normal) (kJ/h) (*5)		3,170 or less	1,880 or less	1,730 or less	8,790 or less/ 8,670 or less	8,790 or less/ 8,670 or less
Cache specifications	Capacity (M bytes/CTL)		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 (RKL) •Cache Unit •Fan Assembly •Backup Battery Unit(*4)	•Disk Drive •Power Unit (RKAATL) •SENC Unit •Fan Assembly	•Disk Drive •Power Unit (RKAJATL) •SENC Unit	•Control Unit •Disk Drive •Power Unit (RKL) •Power Unit (RKAATL) •Power Unit (RKAJATL) •Cache Unit •Fan Assembly(*6) •Backup Battery Unit(*4) •SENC Unit •PDB	•Control Unit •Disk Drive •Power Unit (RKL) •Power Unit (RKAATL) •Power Unit (RKAJATL) •Cache Unit •Fan Assembly(*6) •Backup Battery Unit(*4) •SENC Unit •PDU

*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 :
- 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 2 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 eighteenth days, 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 2 hours at least once eighteenth days, 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 three months for longer than 2 hours because spontaneous discharge is done.
- 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.
*5 : For the value of when mounting subsystems on a rack, the values in the case of connecting only RKAATLs to RKL, and only RKAJATLs to RKL are listed for the purpose of reference.
*6 : The RKAJATL has no Fan Assembly.

Copyright © 2004, 2005, Hitachi, Ltd.

Item \ Model		Rackmount model				
		RKL	RKAATL	RKAJATL	With U6 rack frame	With U4 rack frame
Maintenance specifications/ anti-fault specifications	Microprogram installation method	Flash memory/Disk Drive (resident)	—	—	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.)	—	—	•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 fifteen of mounted Disk Drive s can be set to Spare Disks (No Spare Disk can be set for the Disk Drives #0 to #4 of the RK)				
	Collection of trace and dump	• Download the trace and dump through LAN on the maintenance PC.	—	—	• 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)	AC 1,500 V (10 mA, 1 min)
	Insulation resistance	DC 500 V, 10 MΩ or more				

Copyright © 2004, 2005, Hitachi, Ltd.

Chapter 4. Theory of Operation

This chapter explains the flow and format of data. It also explains the concrete 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. After spinning up the first group of Disk Drive, the local memory loader loads the OS load module to the local memory. 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. DF initialization task performs the CUDG and the loading of the take-over information using the DF task. And it executes the loop diagnosis at the Disk Drive side and the spin-up of the Disk Drives in the second and the following groups.

Copyright © 2002, 2005, Hitachi, Ltd.

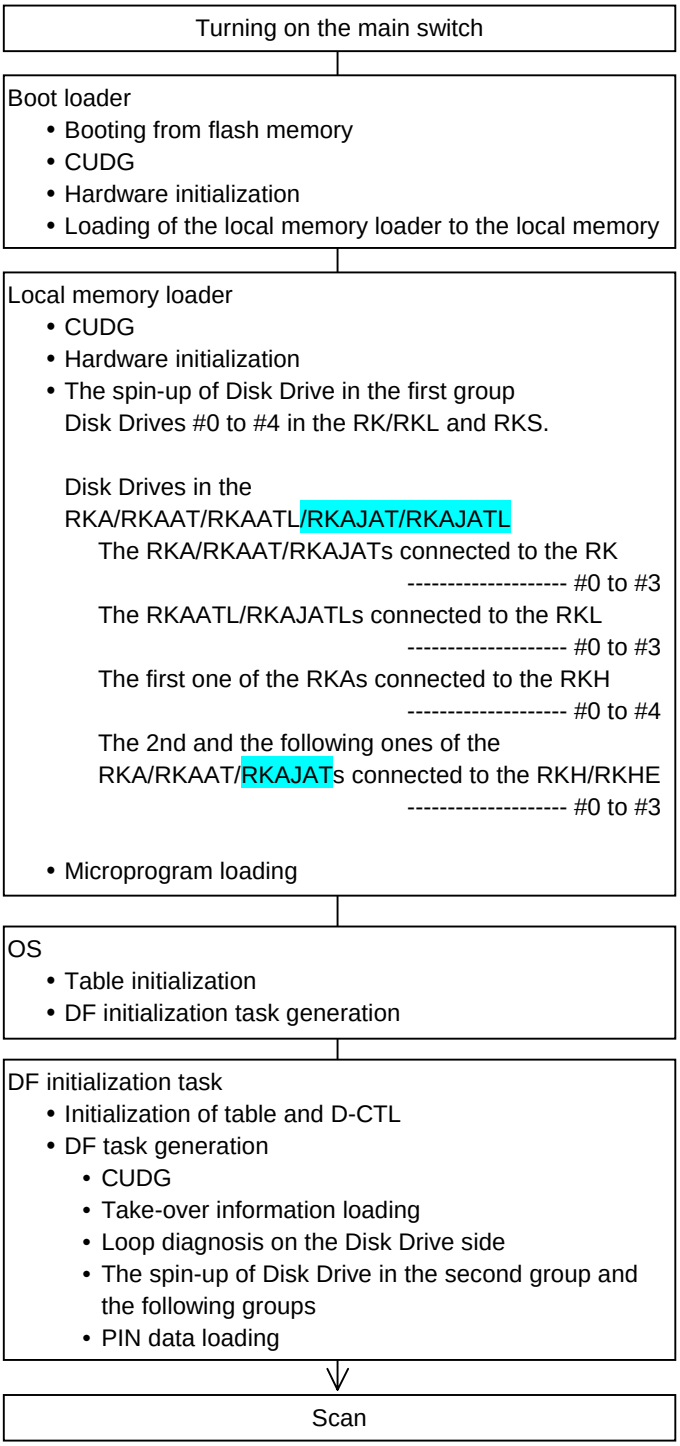


Figure 4.1.1 IMPL Sequence

Copyright © 2002, 2005, Hitachi, Ltd.

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 (RK/RKA/RKAAT/RKAJAT/RKS)

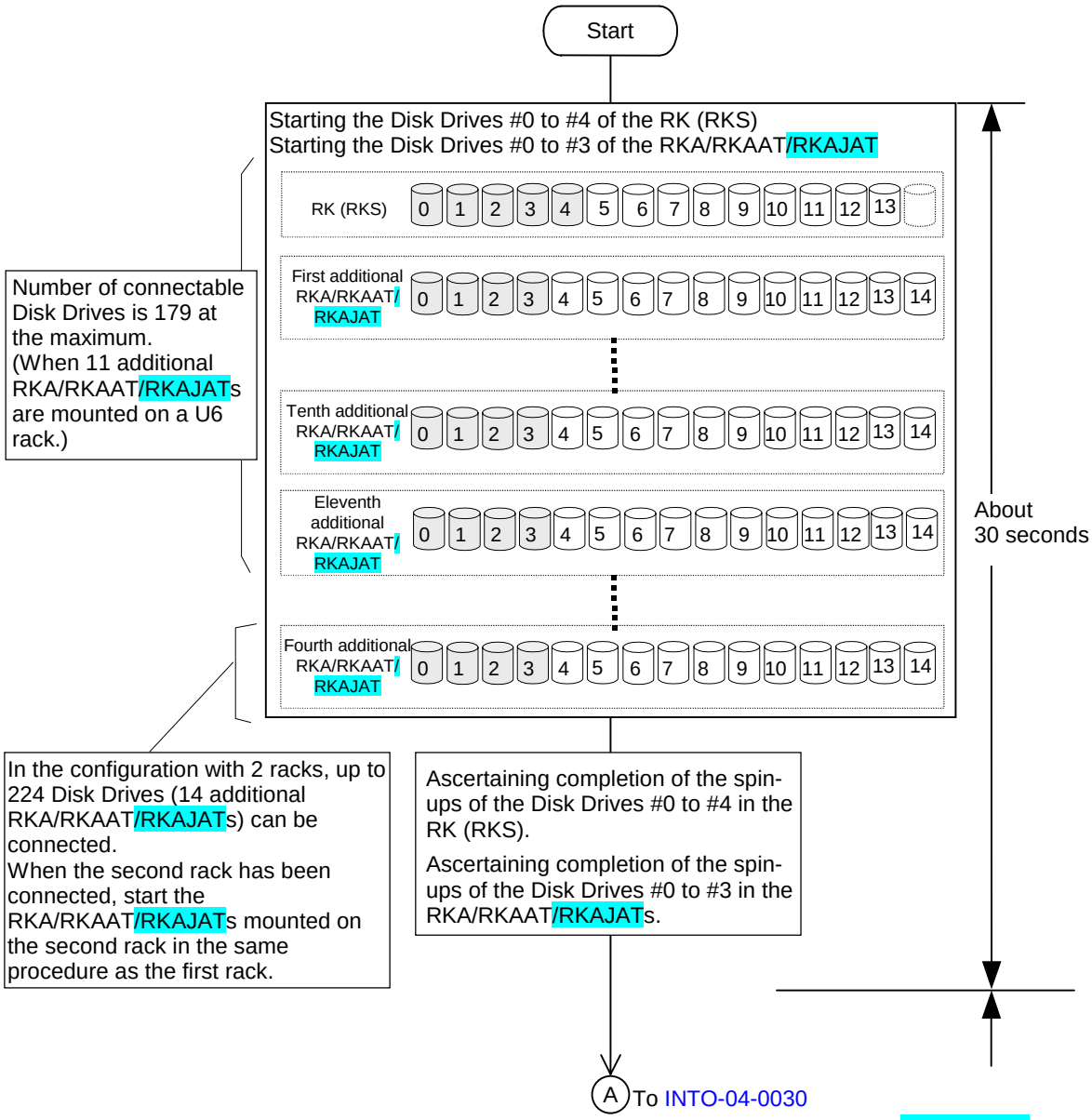


Figure 4.1.2(1/3) Disk Drive Starting Sequence (RK/RKA/RKAAT/RKAJAT/RKS)

Copyright © 2002, 2005, Hitachi, Ltd.

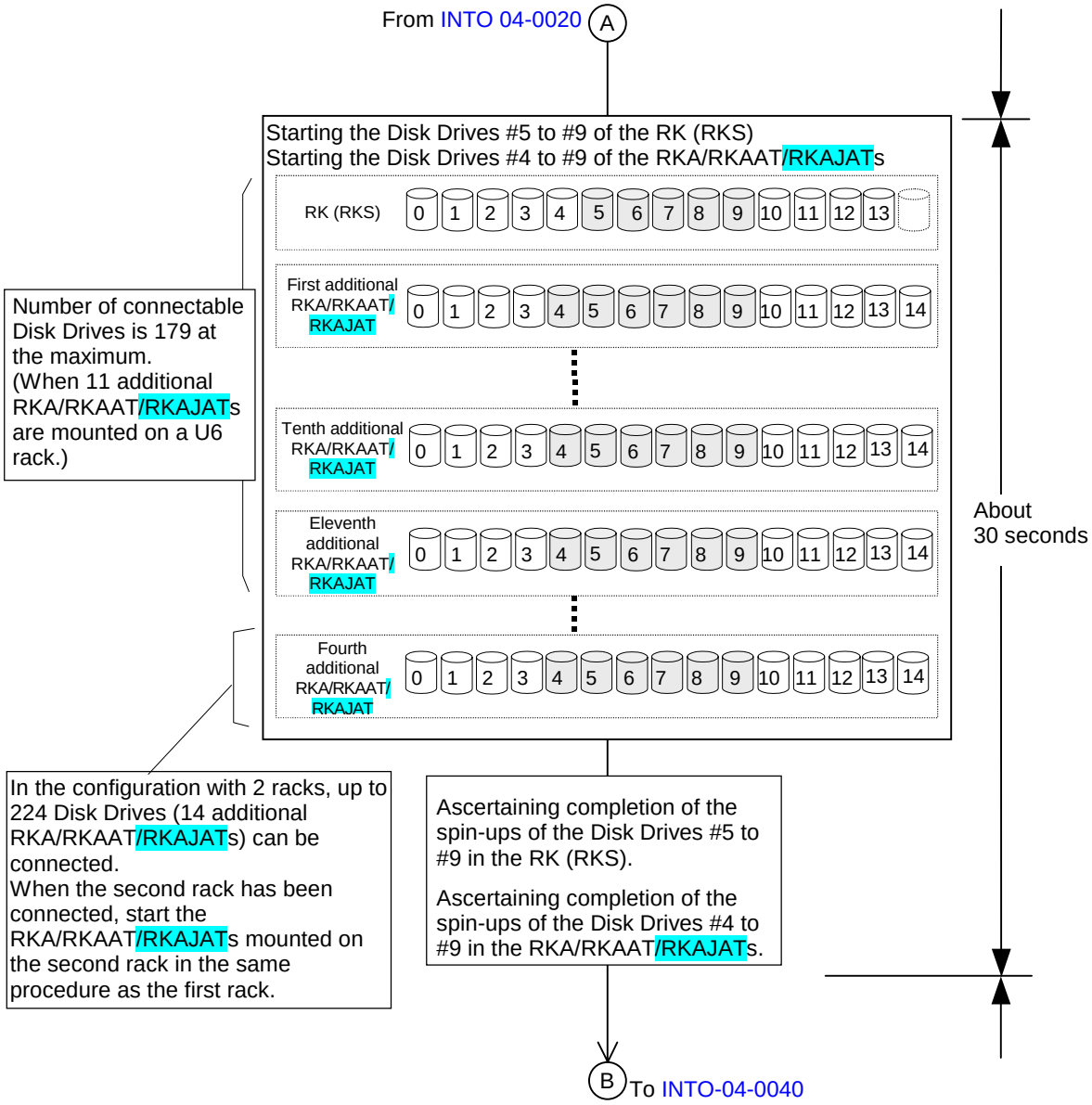


Figure 4.1.2(2/3) Disk Drive Starting Sequence (RK/RKA/RKAAT/RKAJAT/RKS)

Copyright © 2002, 2005, Hitachi, Ltd.

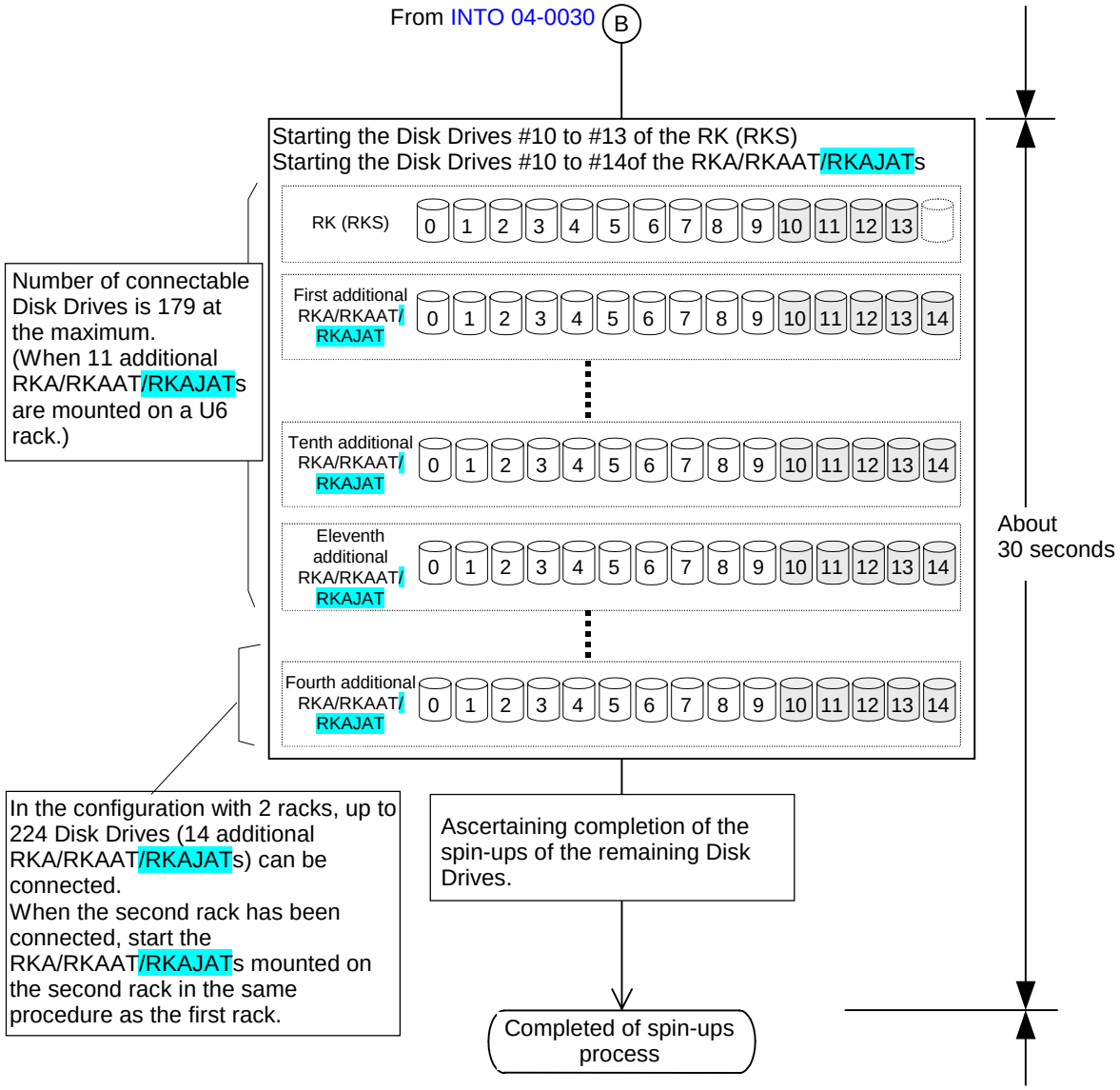


Figure 4.1.2(3/3) Disk Drive Starting Sequence (RK/RKA/RKAAT/RKAJAT/RKS)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Disk Drive Starting Sequence (RKH + RKA/RKHE + RKA)

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it. The system can have a configuration in which up to 30 RKAs (up to 449 Disk Drives) are connected. The number of Disk Drives that can be installed in the first one (Unit ID#00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.

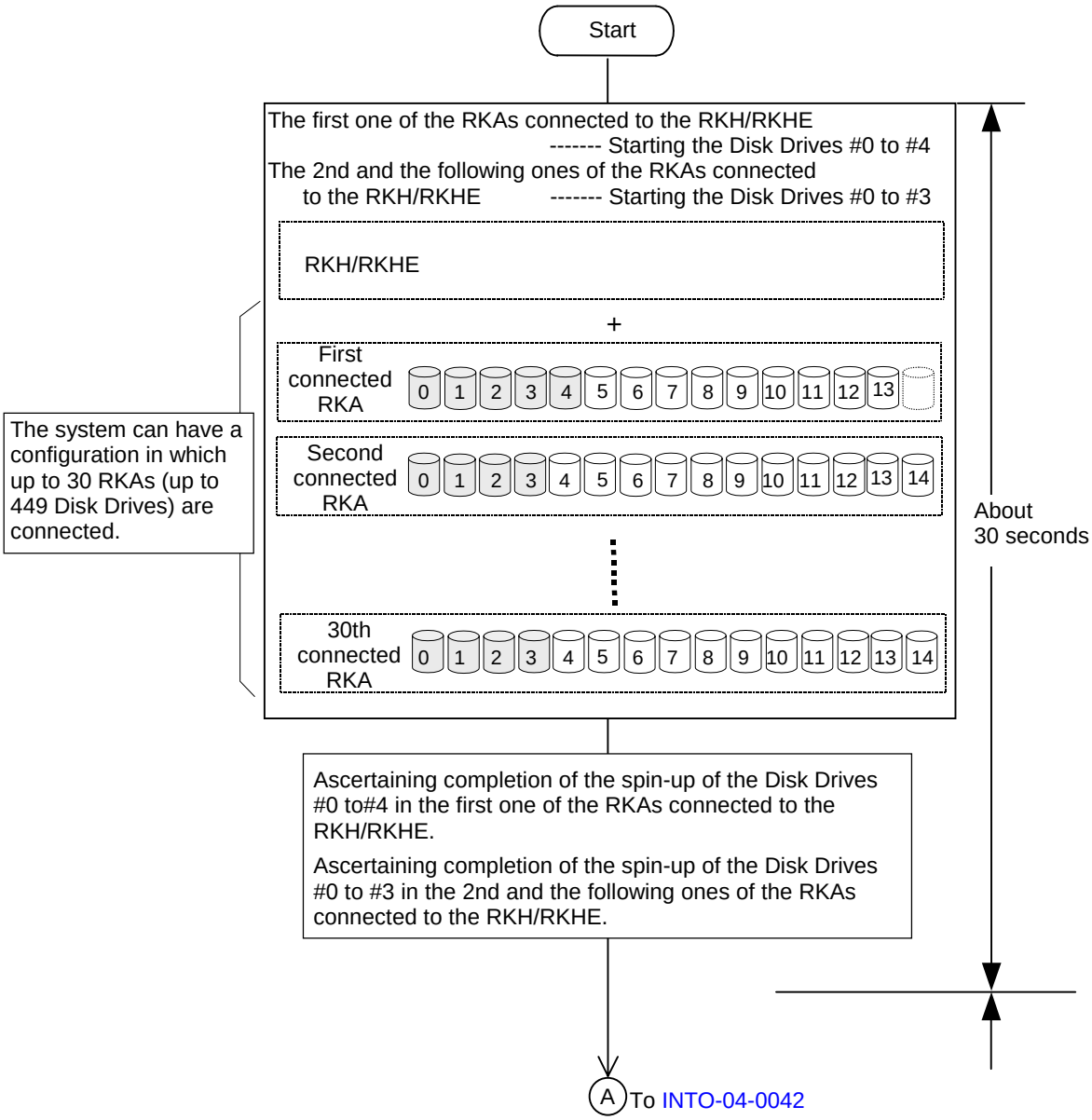


Figure 4.1.2.1(1/3) Disk Drive Starting Sequence (RKH + RKA/RKHE + RKA)

Copyright © 2003, 2005, Hitachi, Ltd.

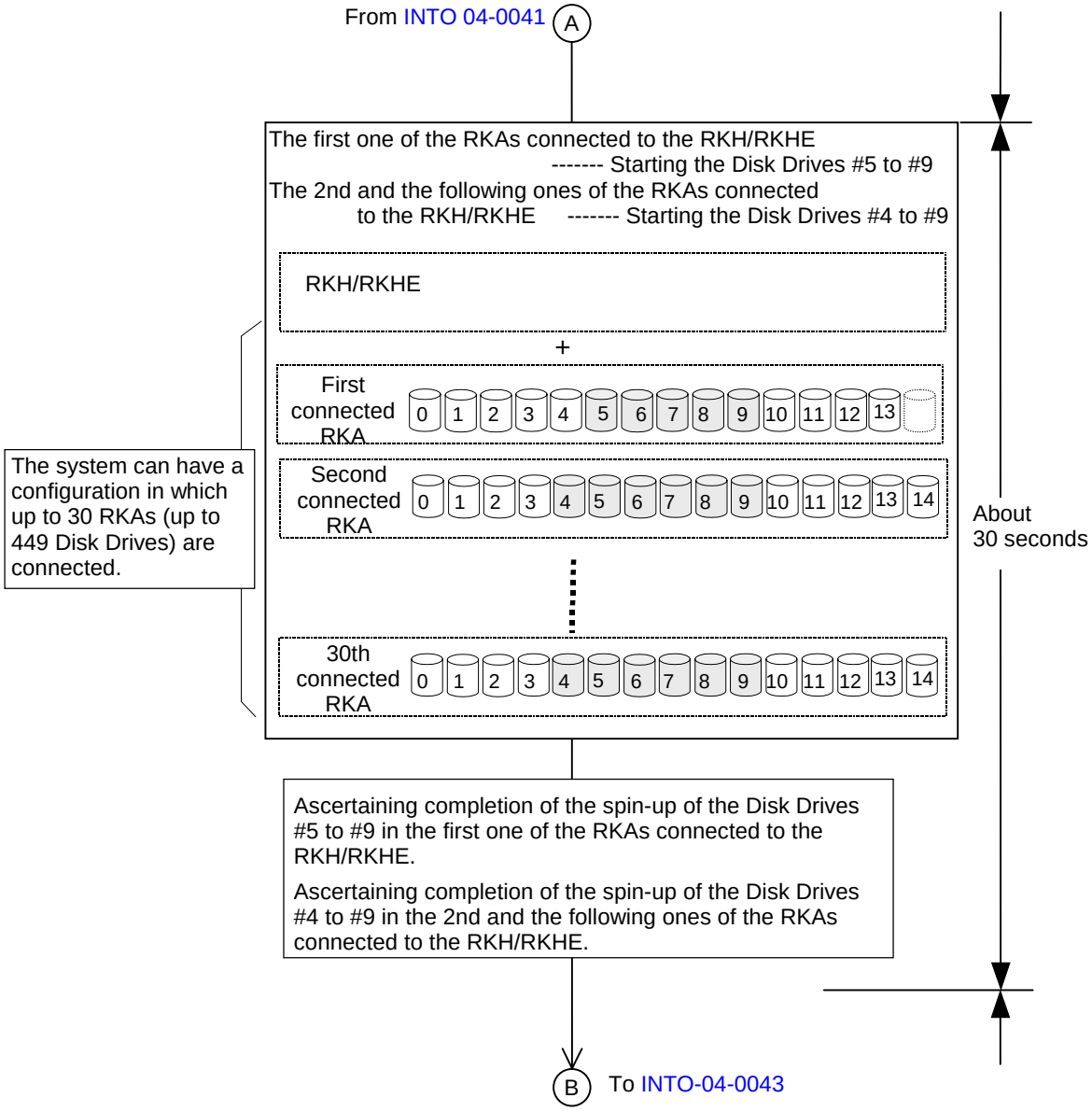


Figure 4.1.2.1(2/3) Disk Drive Starting Sequence (RKH + RKA/RKHE + RKA)

Copyright © 2003, 2005, Hitachi, Ltd.

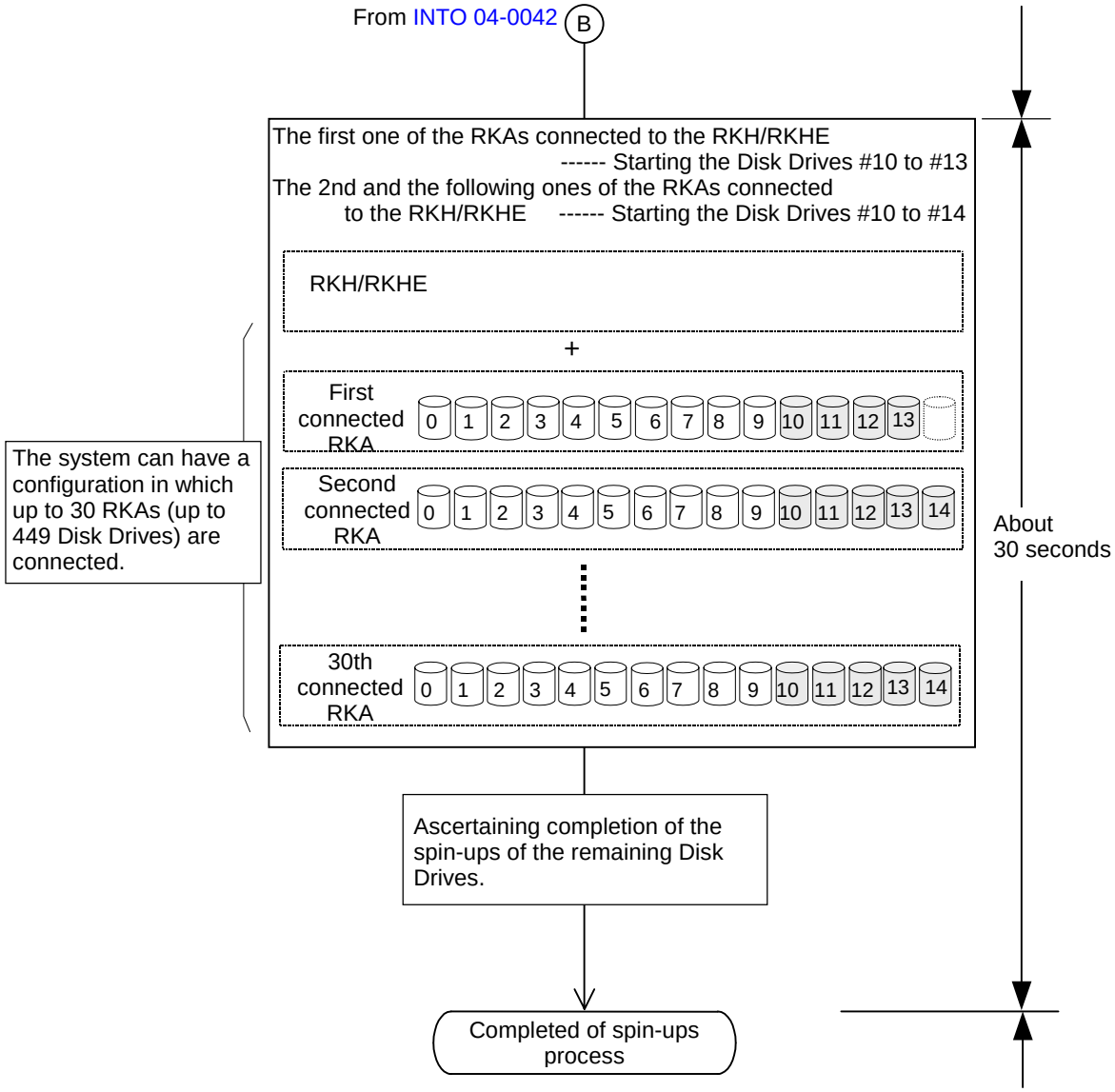


Figure 4.1.2.1(3/3) Disk Drive Starting Sequence (RKH + RKA/RKHE + RKA)

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Disk Drive Starting Sequence (RKH/RKHE/RKA/RKAAT/RKAJAT)

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system can have a configuration in which up to 28 RKA/RKAAT/RKAJATs (up to 420 Disk Drives) are connected. The number of Disk Drives that can be installed in the first one (Unit ID#00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.

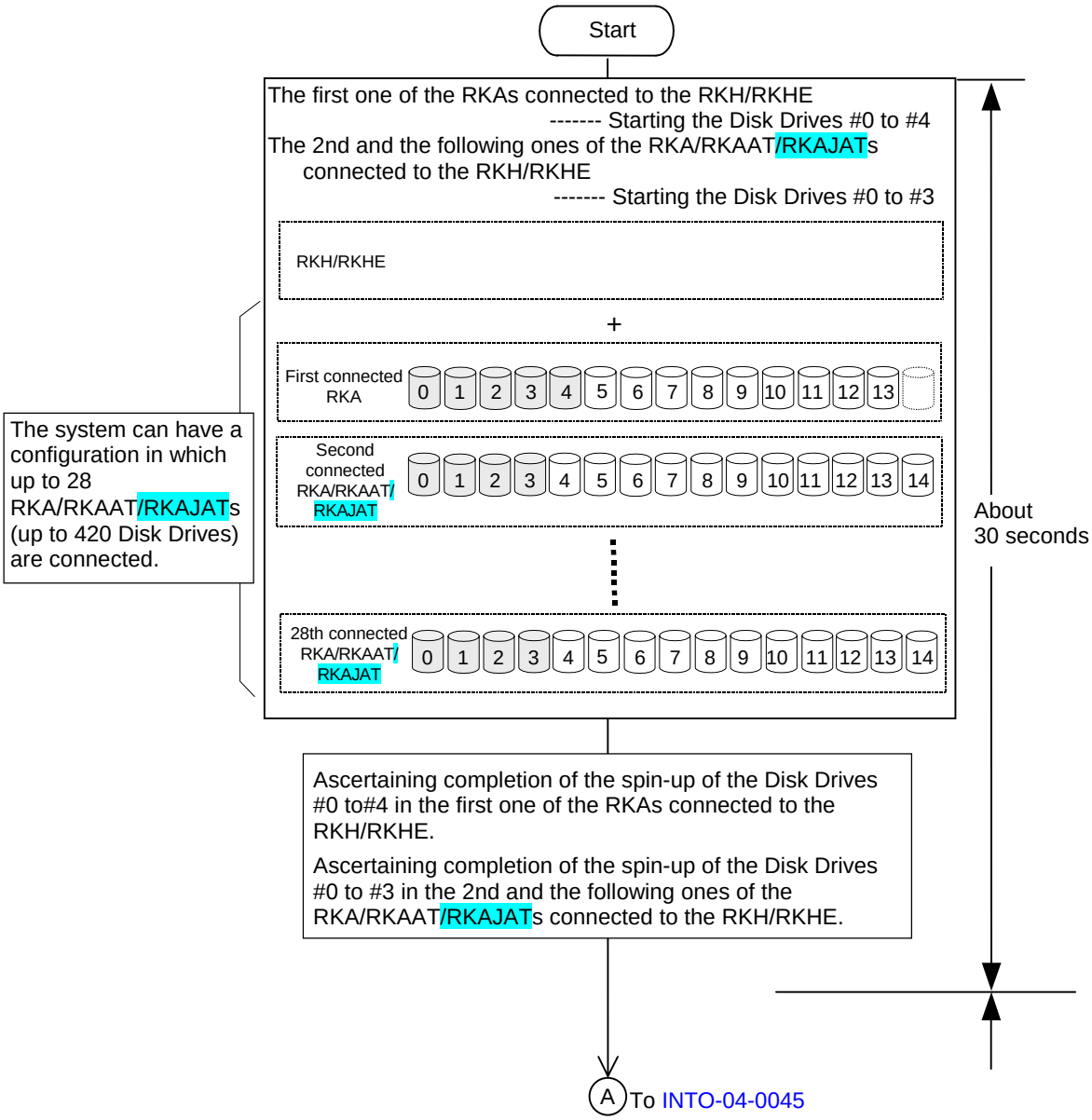


Figure 4.1.2.2(1/3) Disk Drive Starting Sequence (RKH/RKHE/RKA/RKAAT/RKAJAT)

Copyright © 2003, 2005, Hitachi, Ltd.

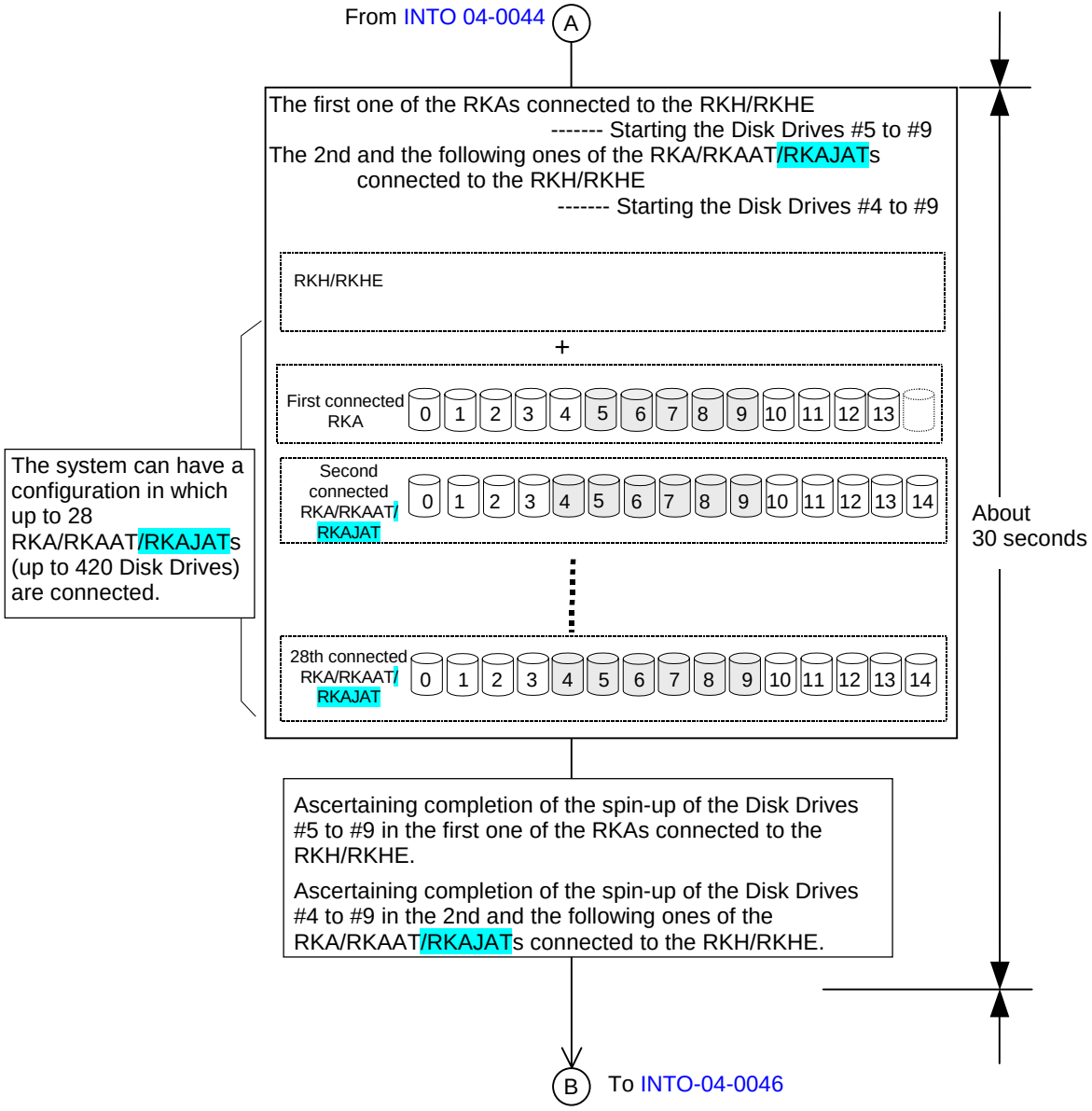


Figure 4.1.2.2(2/3) Disk Drive Starting Sequence (RKH/RKHE/RKA/RKAAT/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

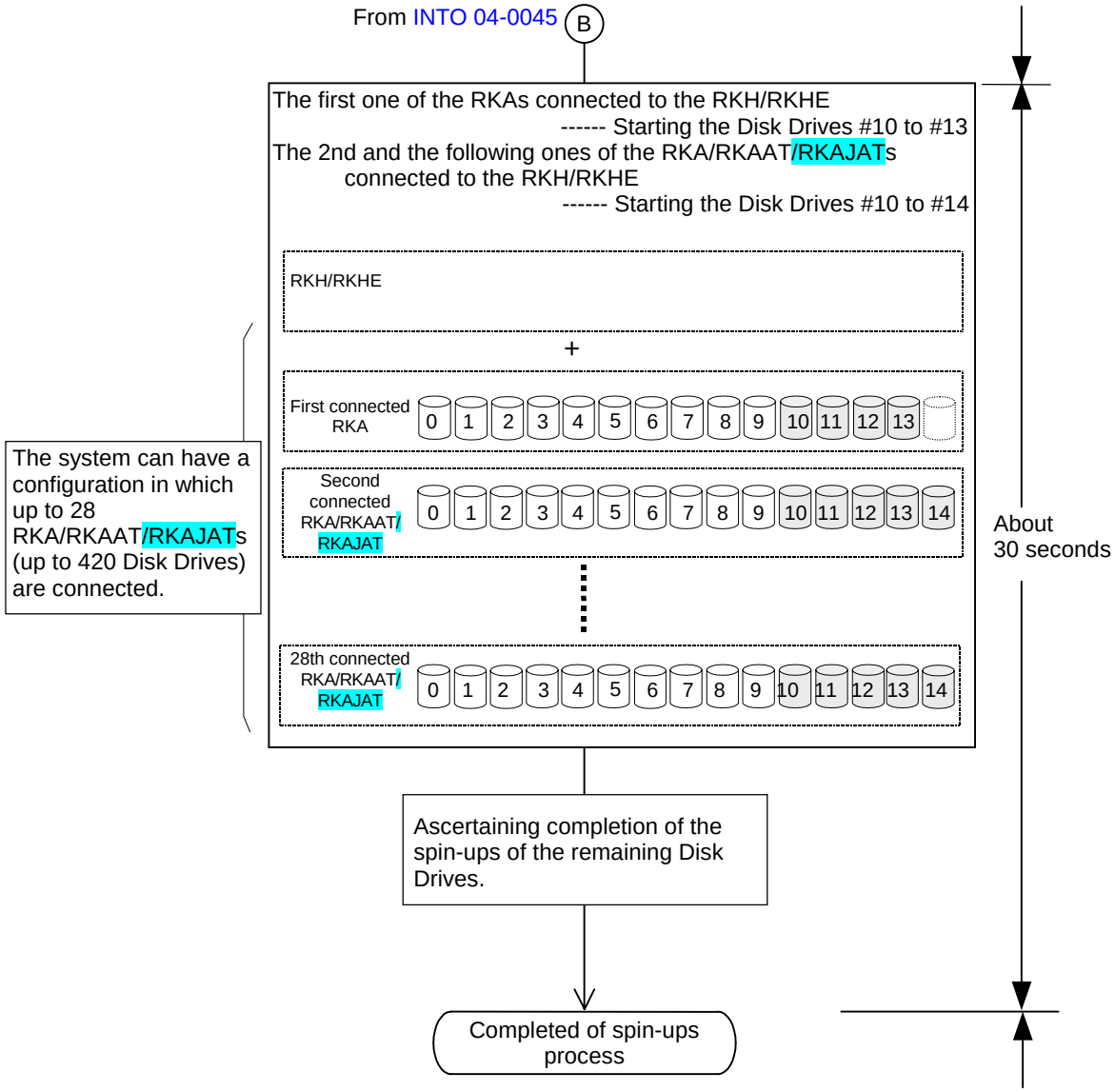


Figure 4.1.2.2(3/3) Disk Drive Starting Sequence (RKH/RKHE/RKA/RKAAT/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

(4) Disk Drive Starting Sequence (RKL/RKAATL/RKAJATL)

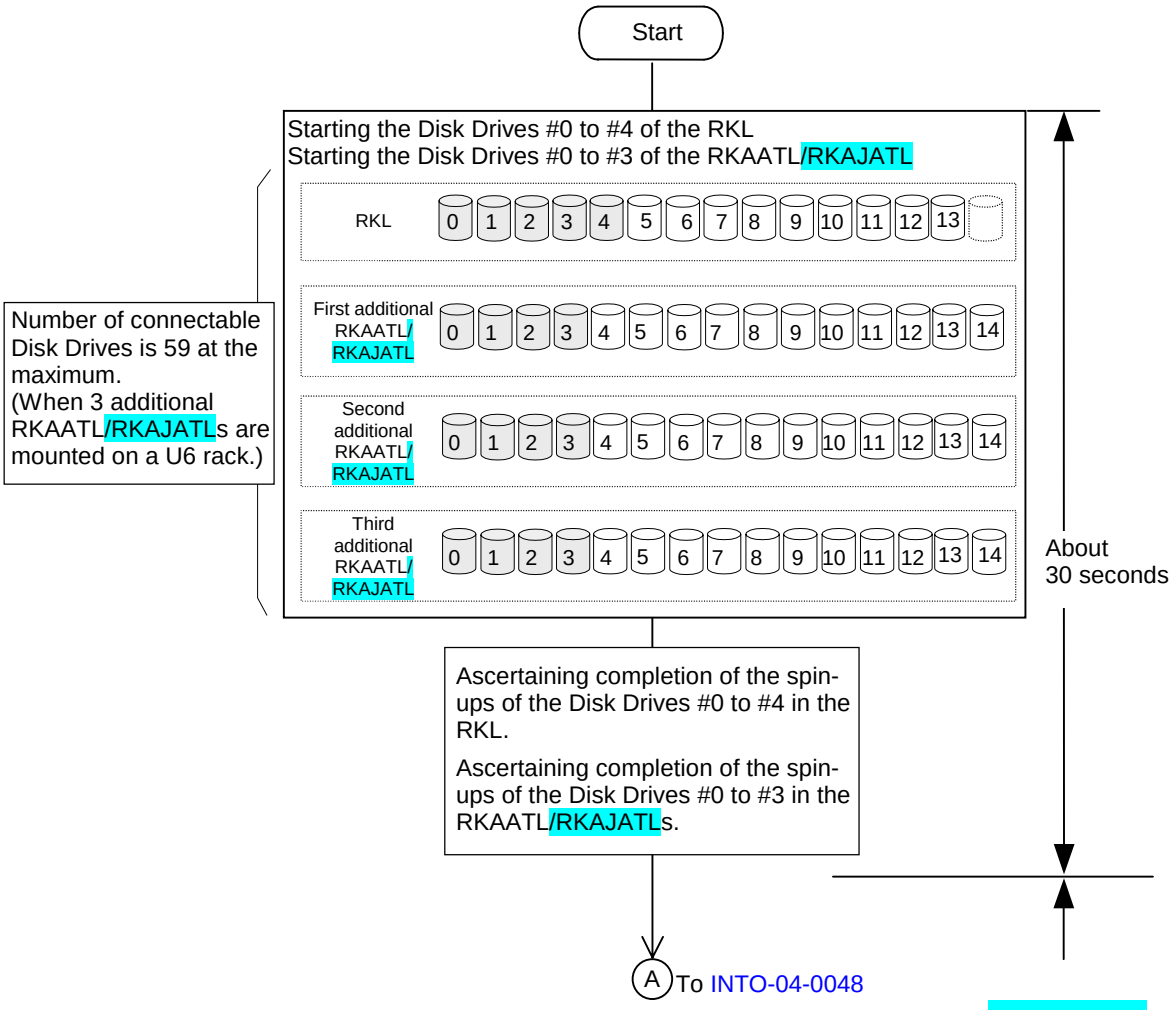


Figure 4.1.2.3(1/3) Disk Drive Starting Sequence (RKL/RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

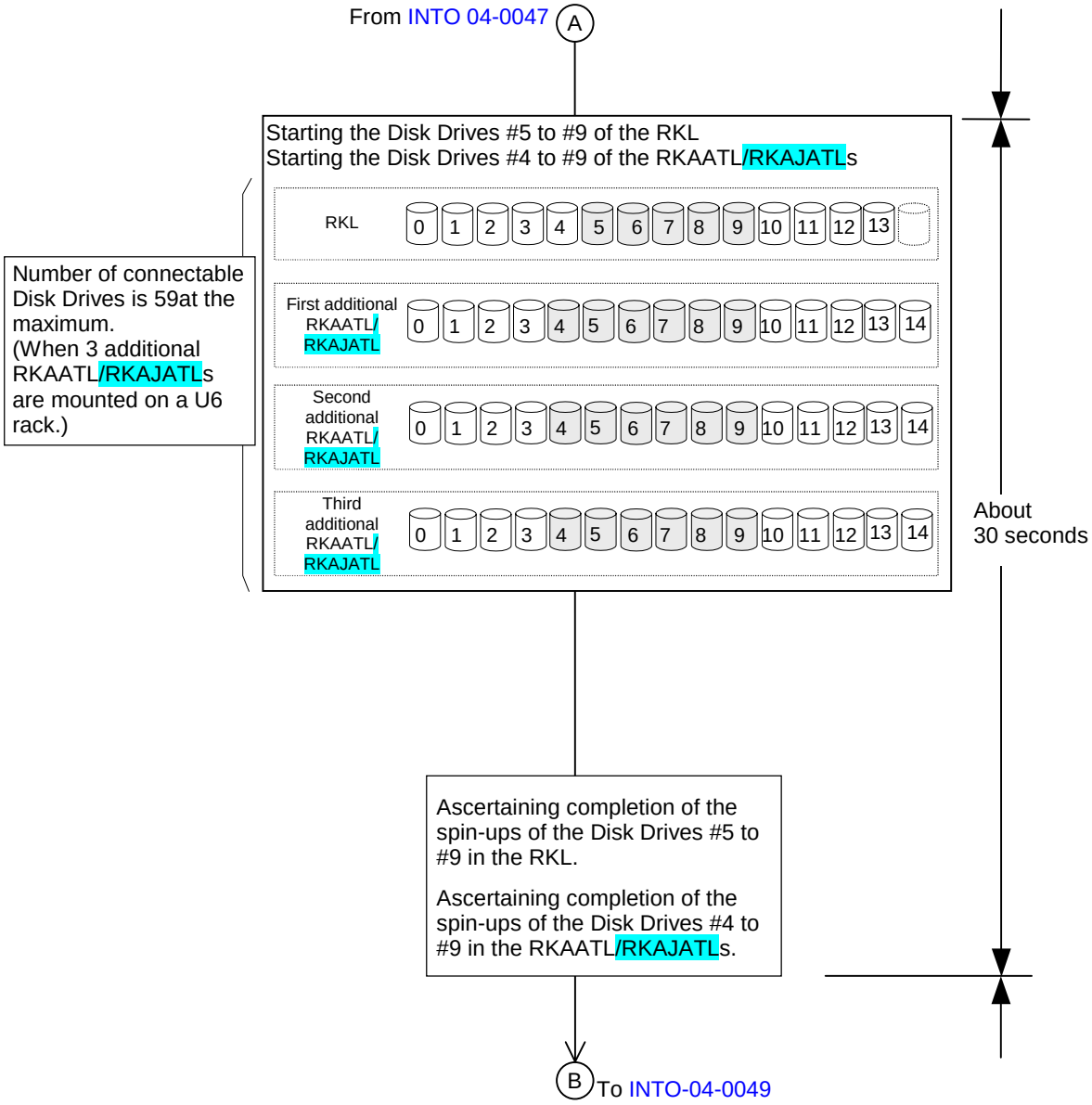


Figure 4.1.2.3(2/3) Disk Drive Starting Sequence (RKL/RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

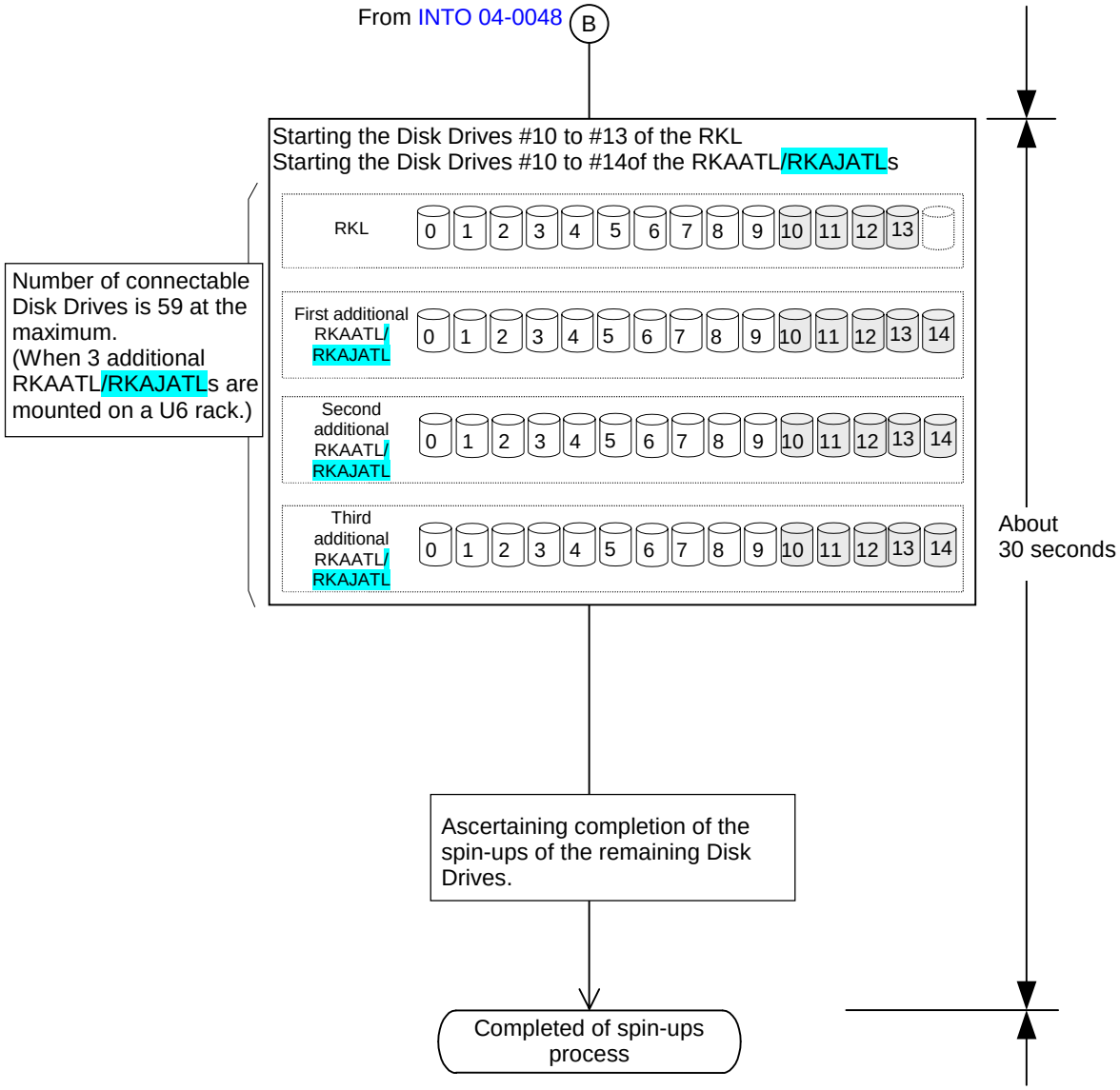


Figure 4.1.2.3(3/3) Disk Drive Starting Sequence (RKL/RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

4.1.3 Sequential shutdown

When the subsystem is instructed to shut it down because of the host computer powering off (remote control) or the main switch turning off (local control), it watches completion of processes being executed and not executed yet 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 (DC Power Unit Switch) of the subsystem becomes able to be turned off after receiving the permission.

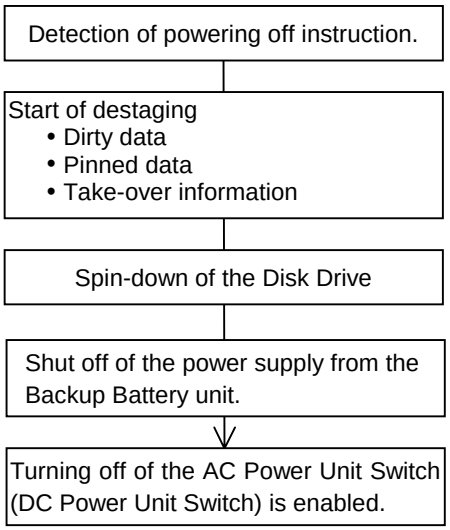


Figure 4.1.3 Flow Chart of Sequential Shutdown

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

4.2 Data Format

Figure 4.2.1 shows the data format.
To the sub-block, the check code the address assurance code (LA) 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.

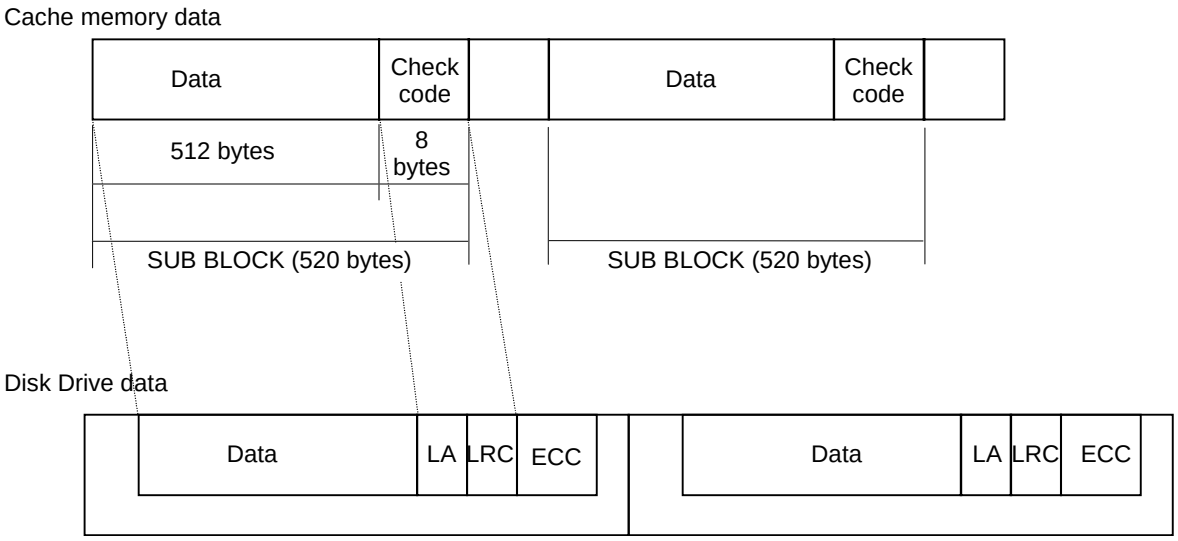


Figure 4.2.1 Data Format

Copyright © 2002, 2005, Hitachi, Ltd.

4.3 Read/Write Operation

4.3.1 Command execution

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

- When read data is in the Cache memory, the data in the Cache memory is transferred to the host computer (Read hit operation).
- Only when read data is not in the cache memory, the data is transferred to the host computer directly from the Disk Drive (Read miss operation). 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 write operation, the write-after operation, in which a operation completion is reported to the host computer when a data writing into the Cache memory is completed, is performed. 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.

Data flows are shown in Figure 4.3.1.

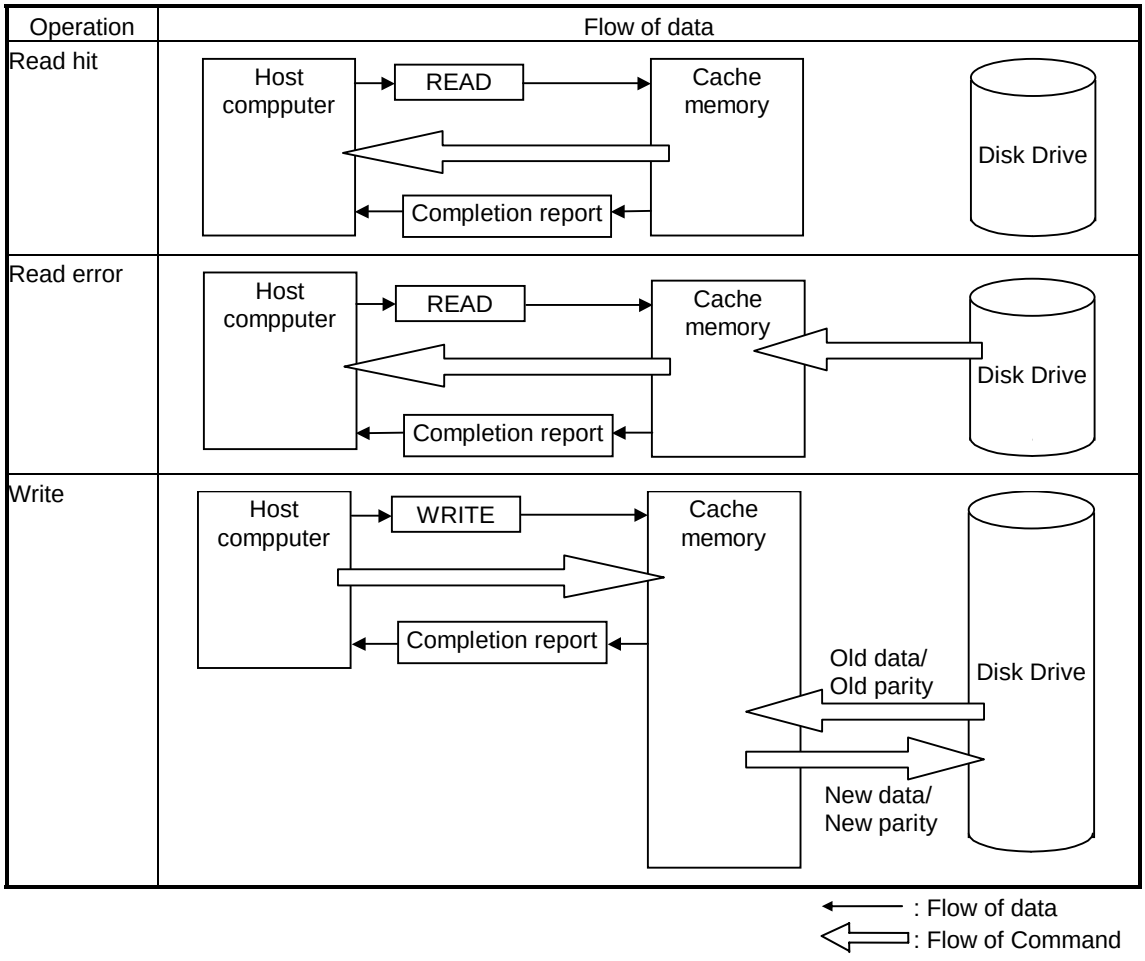


Figure 4.3.1 Flow of Data

Copyright © 2002, 2005, Hitachi, Ltd.

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

(a) Hot Standby mode

This is a system configuration in which the Controller is divided into the two, a main Controller and a standby Controller.

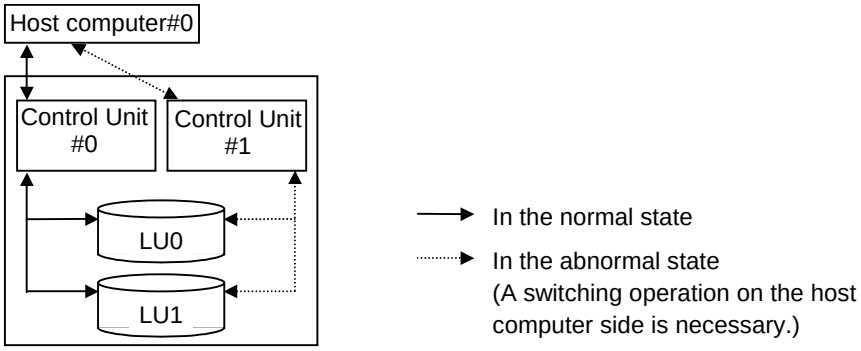


Figure 4.3.2 System Configuration

(b) ID Succession mode(*1)

When the Controller of the main system is blocked owing to a failure, the Controller of the stand-by system takes over the PORT ID of the main system and switches the path automatically.

When the Controller is switched, the standby Controller takes over the PORT ID, so that the host computer need not be conscious of the switching of the Controller.

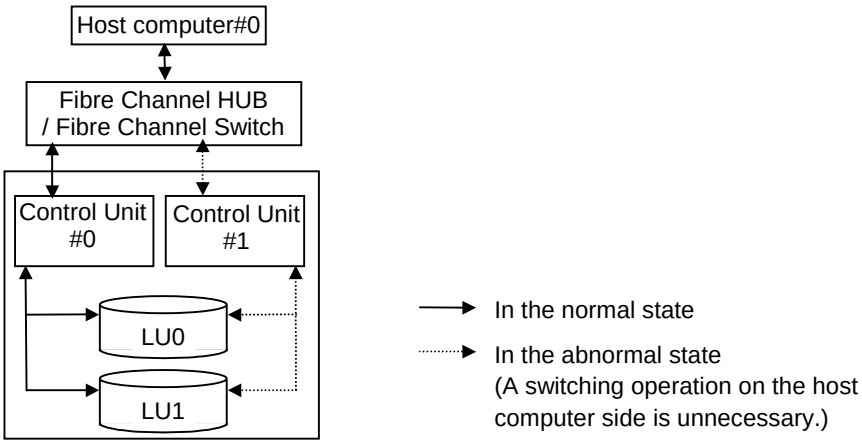


Figure 4.3.3 System Configuration

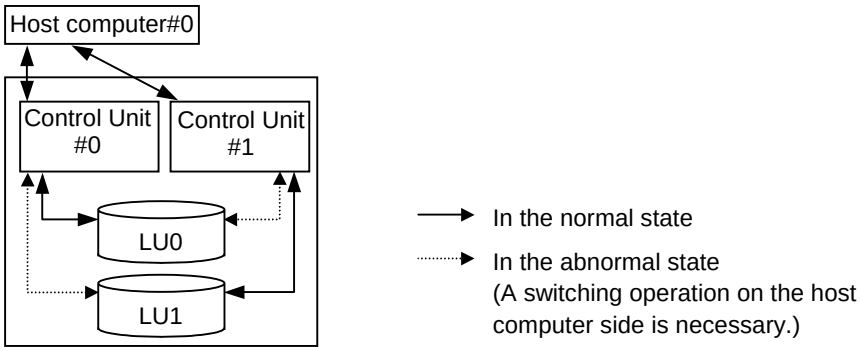
*1: In the ID Succession mode, connect the host computer and the DF600 via the HUB or a switch.

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Dual Active mode

This is a mode in which the two controllers operate in parallel. In this system configuration, LUs to which a controller accesses exclusively are allocated to each controller.

If an LU is accessed by a control which does not control it, the controlled LU is re-allocated, and then the access to it is started. This switching usually takes time, the access to an LU from the controller not controlling the LU causes a lowering of the performance.



*1 : The Control Unit#0 and Control Unit#1 control the LU0 and LU1 respectively.

Figure 4.3.4 System Configuration

(d) Data Sharing mode

This is a mode in which the two Controllers operate in parallel like the Dual Active mode.

In this system configuration, however, the controlled LU is not re-allocated when the LU is accessed by a Controller which does not control it. Therefore, the remarkable lowering of the performance such as that occurs in the case of Dual Active mode is not caused.

In the case of the Data Sharing mode, like the Dual Active mode, each Controller is allocated the LUs to be controlled by exclusively by a Controller are allocated to each Controller.

Aince accesses to the LU by a Controller which does not control it is internally entrusted to the Controller which controls it, the performance is lowerd.

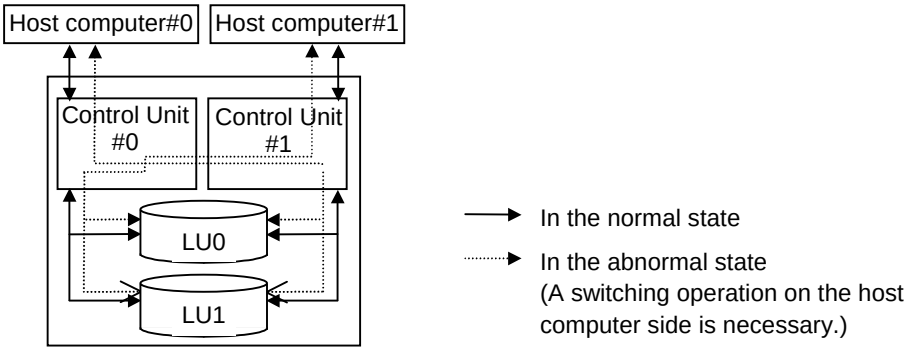


Figure 4.3.5 System Configuration

Copyright © 2002, 2005, Hitachi, Ltd.

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
Received write data is nonvolatile with batteries in order to prevent the data loss due a power failure that might occur before it is written to the HDD. Further, with the duplexed configuration of Controllers, write data are written into both Controller Cache memories, so that the write data is kept even in a case of a controller failure.

(2) Faster of the sequential read operation by the sequential pre-fetch.

(3) Faster of the sequential read operation
Performance of the sequential read operation is inproved 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 Management function (see Section 4.5, “Optional Functions” (INTO 04-0121).).

Copyright © 2002, 2005, Hitachi, Ltd.

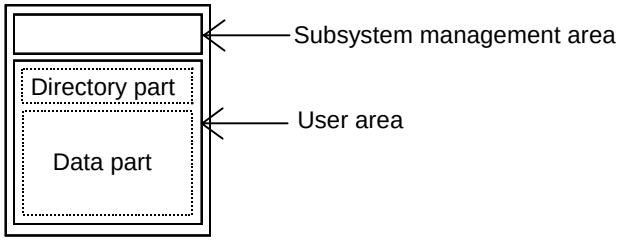
4.4.2 Cache memory configuration

The cache memory consists of the following components.

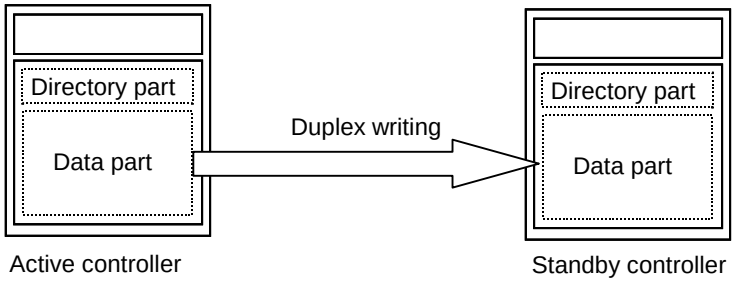
- Subsystem management area
- Directory part
- Data part

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

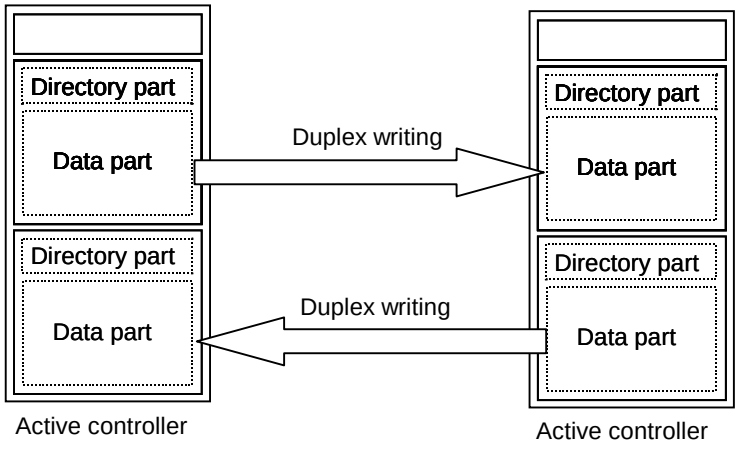
a. For the single controller configuration(RKH/RKHE is not supported)



b. For the dual controller configuration (in the Hot Standby mode)



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



Copyright © 2003, 2005, Hitachi, Ltd.

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

Data stored in the Cache memory is controlled in the state in which it is devided into segments with fixed length 16 k bytes. The minimum unit of data is a sub-block (Logical block 512 bytes) and one segment is equal to 32 sub-blocks. Data are stored 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.

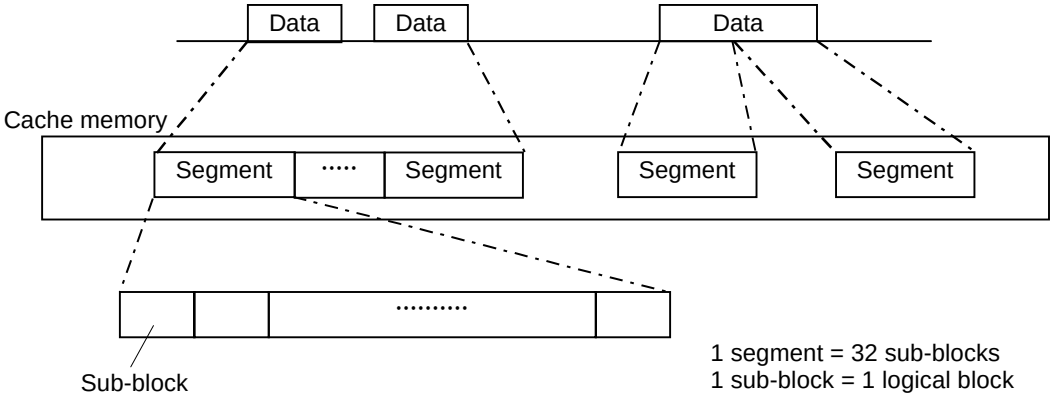


Figure 4.4.1 Data Structure in Cache Memory

Copyright © 2003, 2005, Hitachi, Ltd.

(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.

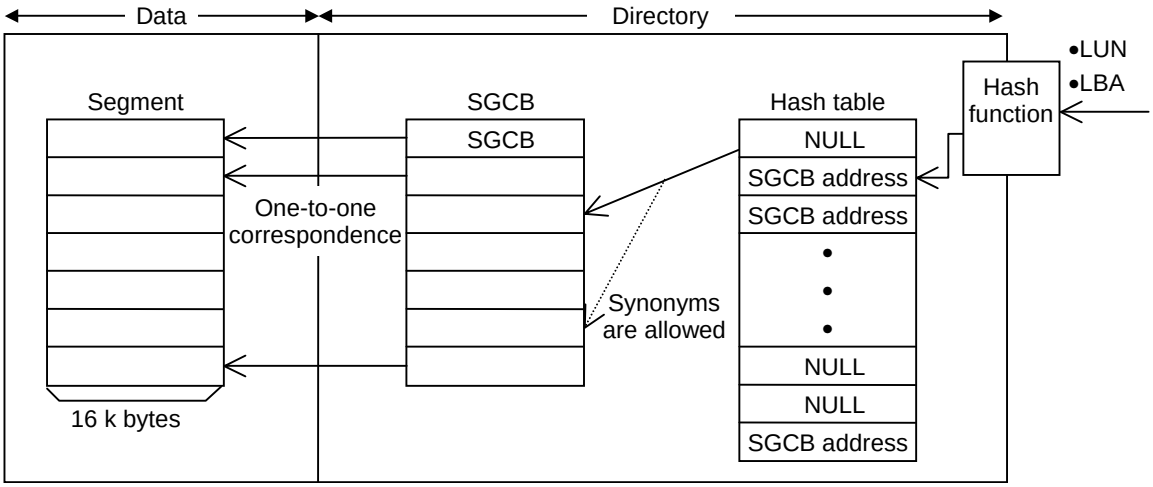


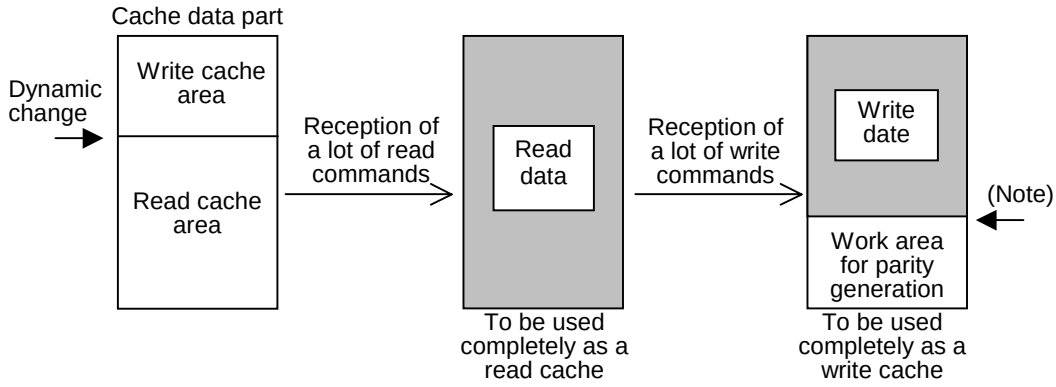
Figure 4.4.2 Control Structure in Cache Memory

Copyright © 2003, 2005, Hitachi, Ltd.

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.
(Refer to Subsection 4.4.5, “Destaging operation” (INTO 04-0110).)

(3) Dynamic optimization of staging algorithm
The optimum staging algorithm is selected automatically through a study of a read command issued by a host.
(Refer to Subsection 4.4.6, “Staging operation” (INTO 04-0120).)

Copyright © 2003, 2005, Hitachi, Ltd.

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.

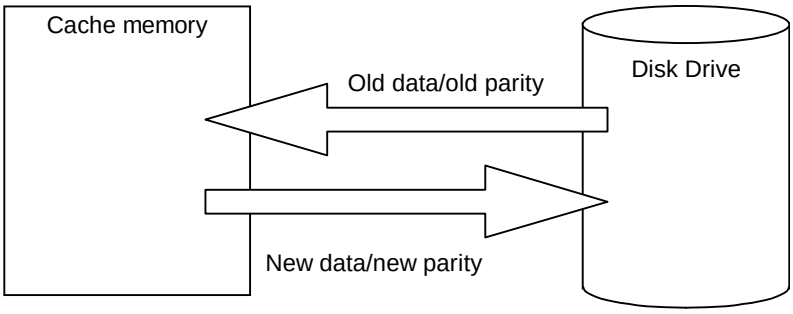


Figure 4.4.3 Destaging of Random Data

(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.

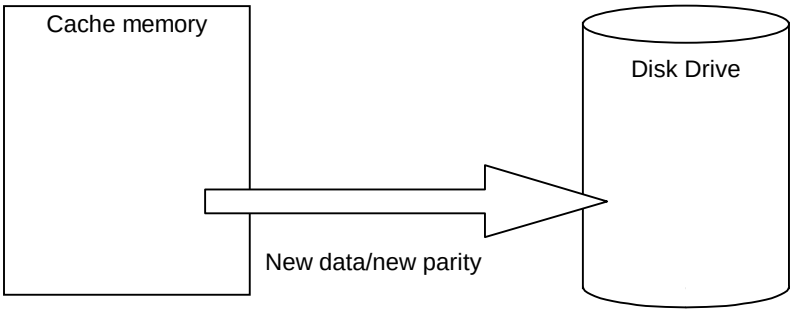


Figure 4.4.4 Destaging of Sequential Data

Copyright © 2002, 2005, Hitachi, Ltd.

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.

Copyright © 2002, 2005, Hitachi, Ltd.

4.5 Optional Functions

(1) Cache Management function

The subsystem provides the Cache Management function as an optional function. To use the Cache Management function, the P-002D-J215 is required separately. The Cache Management function makes data of specific LUs resident in a cache and makes all accesses to the LUs from the host cache hit without making any disk accesses occur. When the function is applied to an LU frequently accessed, it is expected that the throughput is increased because all data R/W can be performed as cache hits. (For the details, refer to the manual supplied with the P-002D-J215.)

(2) LUN Security function

The subsystem provides the LUN Security function as an optional function. To use the LUN Security function, the P-002D-J203 or P-002D-J203S is required separately. The LUN Security function prevents data from being destroyed by illegal accesses by specifying hosts to be permitted to access an LUN optionally specified. (For the details, refer to the manual supplied with the P-002D-J203 or P-002D-J203S.)

(3) Dual ID Succession function

The subsystem provides the dual active Dual ID Succession function as an optional function. To use the dual active Dual ID Succession function, the P-002D-J216 is required separately. The dual active Dual ID Succession function takes over the Port ID in the dual controller configuration.
Even when one of the two Controllers becomes inoperable owing to a failure, the path is automatically switched to the other Controller and the operation can be continued. (For the details, refer to the manual supplied with the P-002D-J216.)

(4) 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-J213 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-J213.)

Copyright © 2003, 2005, Hitachi, Ltd.

(5) Password Protection function
The subsystem provides the Password Protection function as an optional function.
To use the Password Protection function, the P-002D-J212 is required separately.
The Password Protection function prevents any DF600 from being concurrently accessed by users by limiting users of Disk Array Management Program to be permitted to access the DF600. It can suspend the information provided from the DF600 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-J212.)

(6) Hitachi Shadow Image function
This subsystem provides the Hitachi Shadow Image function as an optional function.
To use the Hitachi Shadow Image function, the P-002D-J201 or P-002D-J201S is required separately.
The Hitachi Shadow Image function 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-J201 or P-002D-J201S.)

(7) LUN Expansion function
This subsystem provides the LUN Expansion function as an optional feature.
To use the LUN Expansion function, the P-002D-J214 is required separately.
The LUN Expansion function 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-J214).

(8) Hitachi TrueCopy Basic function (SANRISE 9520V is not supported)
The subsystem provides the Hitachi TrueCopy Basic function as an optional function.
To use the Hitachi TrueCopy Basic function copy, the P-002D-J202 or P-002D-J202S is required separately.
The Hitachi TrueCopy Basic function 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-J202 or P-002D-J202S.)

(9) Hitachi TrueCopy Basic upgrade (SANRISE 9520V is not supported)
The subsystem provides the Hitachi TrueCopy Basic upgrade as an optional function.
To use the Hitachi TrueCopy Basic upgrade, the P-002D-J202U or P-002D-J202SU is required separately.
The function is an optional one to upgrade the Hitachi Shadow Image function to the Hitachi TrueCopy Basic function.
(For the details, refer to the manual supplied with the P-002D-J202U or P-002D-J202SU.)

Copyright © 2003, 2005, Hitachi, Ltd.

(10) LUN Management function

The subsystem provides the LUN Management function as an optional function.
To use the LUN Management function, the P-002D-J204 or P-002D-J204S is required separately.
The LUN Management function 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-J204 or P-002D-J204S.)

(11) Hitachi QuickShadow function

This subsystem provides the Hitachi QuickShadow function as an optional function.
To use the Hitachi QuickShadow function, the P-002D-J205 or P-002D-J205S is required separately. QuickShadow is a function to internally retain a logical duplication of the primary volume data at the time of the command instruction.
QuickShadow function 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-J205 or P-002D-J205S.)

(12) Open LDEV Guard function

This subsystem provides the Open LDEV Guard function as an optional function.
To use the Open LDEV Guard function, the P-002D-J206 or P-002D-J206S is required separately. Open LDEV Guard is an option for protecting a logical unit (LU) against an illegal access from a host by setting an access attribute to LU.
(For the details, refer to the manual supplied with the P-002D-J206 or P-002D-J206S.)

(13) Performance Management -Base Monitor function

This subsystem provides the Performance Management -Base Monitor function as an optional function.
To use the Performance Management -Base Monitor function, the P-002D-J217 is required separately. Performance Management -Base 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-J217.)

Copyright © 2002, 2005, Hitachi, Ltd.

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.

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

Data B reading request

(a) Data B read request

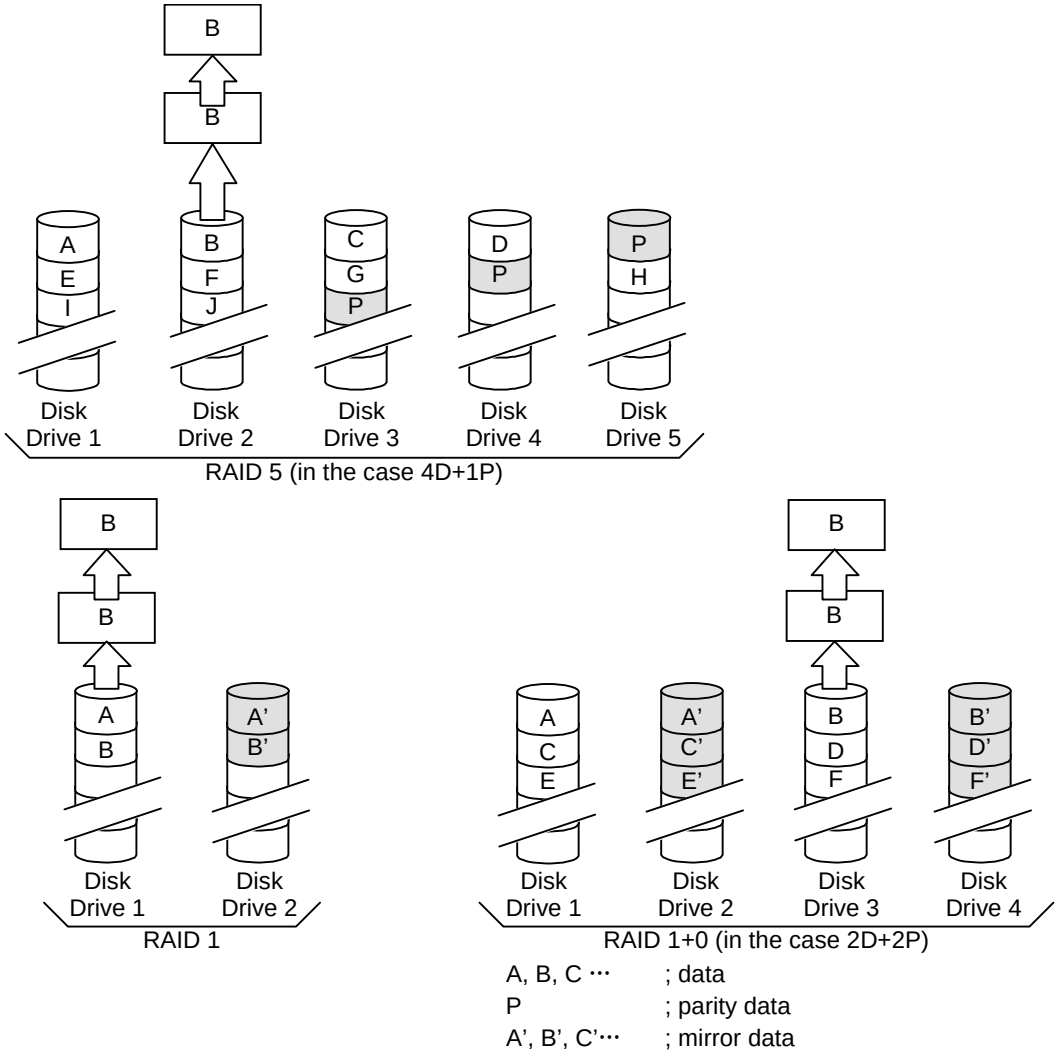
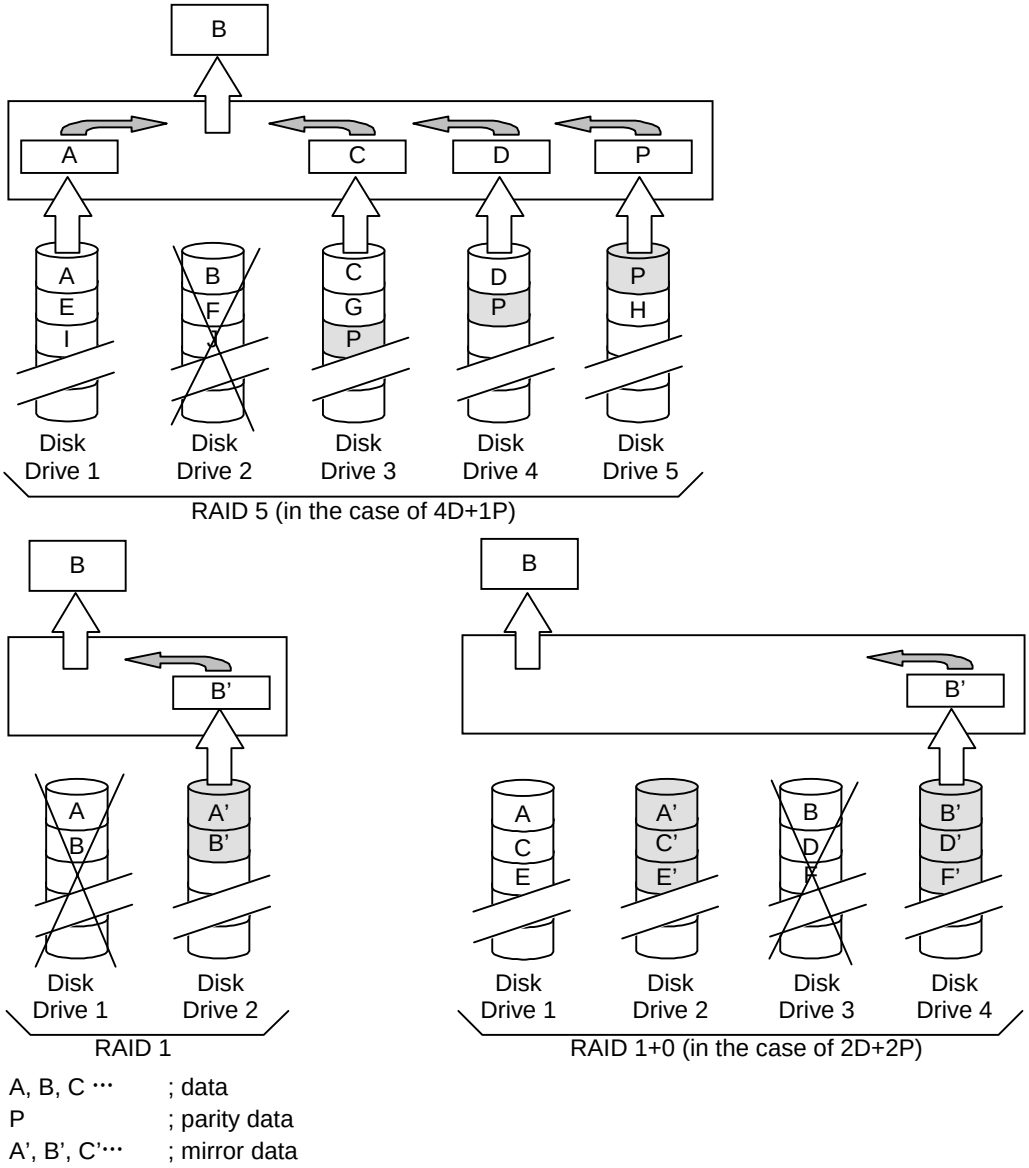


Figure 4.6.1 Data Reading Operation When Disk Drive is Normal

Copyright © 2002, 2005, Hitachi, Ltd.

(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

Copyright © 2002, 2005, Hitachi, Ltd.

(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. 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.

(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.

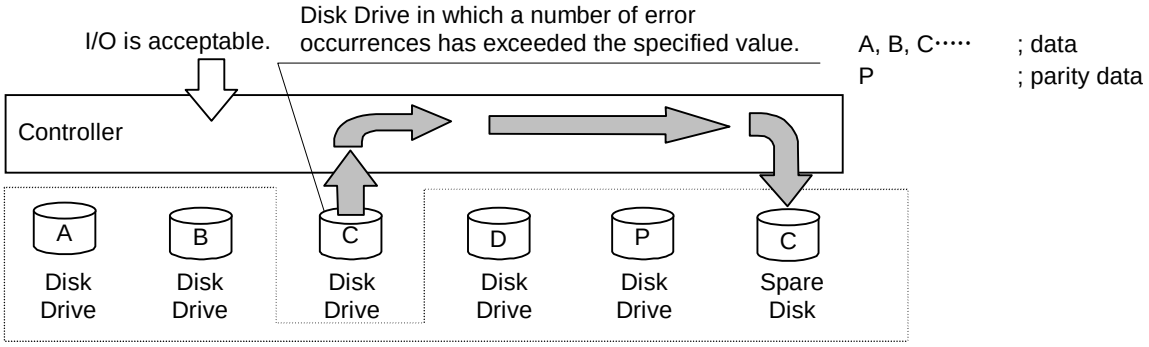


Figure 4.6.3 Dynamic Sparing

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Correction copy

In the subsystem with the RAID 5 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.

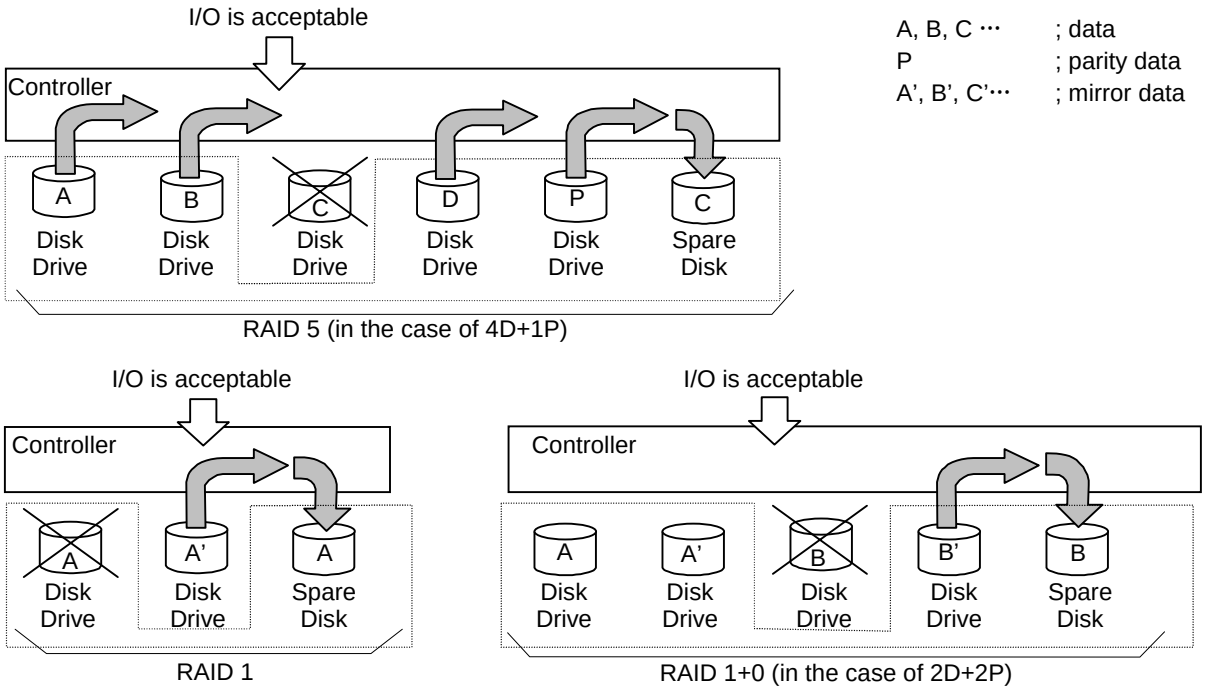


Figure 4.6.4 Correction Copy

6Copyright © 2002, 2005, Hitachi, Ltd.

4.7 Setting RAID Group

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

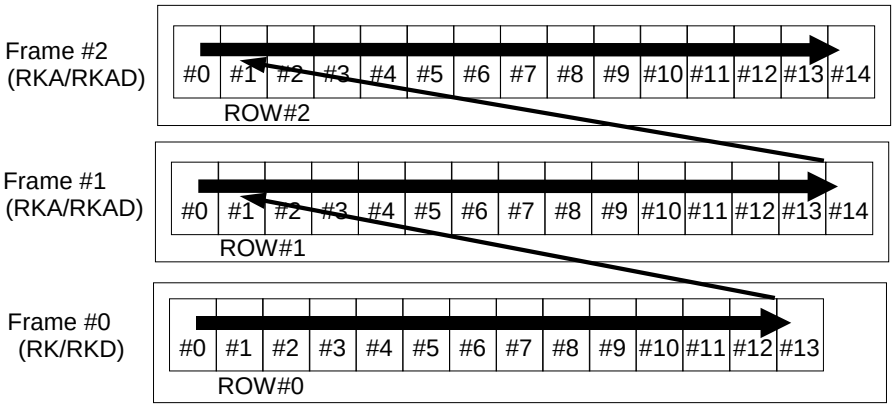
(1) RAID level
The range of the RAID levels supported by the DF600 is shown in the table below.

Table 4.7.1 Range of Supported RAID Levels

No.	RAID level	Supported range				Remarks
		RK (RKD) + RKA (RKAD)	RKS (RKSD)	RKH + RKA, RKHE + RKA	RK + RKA/RKAAT/ RKAJAT, RKH/RKHE + RKA/ RKAAT/RKAJAT RKL + RKAATL/ RKAJATL	
1	RAID 0	2D to 16D	2D to 14D	2D to 16D	Not supported	The stripe size is fixed to only 64 k bytes.
2	RAID 1	1D+1P	1D+1P	1D+1P	1D+1P	
3	RAID 5	2D+1P to 15D+1P	2D+1P to 13D+1P	2D+1P to 15D+1P	2D+1P to 15D+1P	
4	RAID 1+0	2D+2P to 8D+8P	2D+2P to 7D+7P	2D+2P to 8D+8P	2D+2P to 8D+8P	

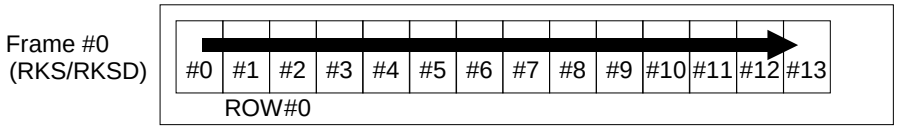
(2) Disk Drives of a RAID group are allocated as follows because of the full mapping. They are allocated in numerical order (in ascending order) starting from the top Disk Drive (the Disk Drive #0 in the frame #0) and in order of the frame No., up to the number calculated as multiplying the RAID width (number of Disk Drives in the parity group) by the depth (number of parity groups).

(2-1) RK (RKD) + RKA (RKAD)



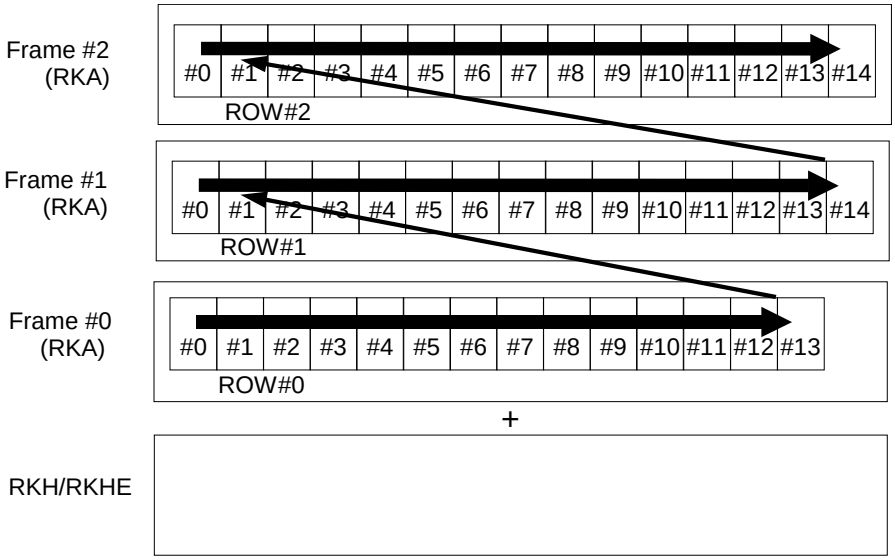
Copyright © 2002, 2005, Hitachi, Ltd.

(2-2) RKS (RKSD)

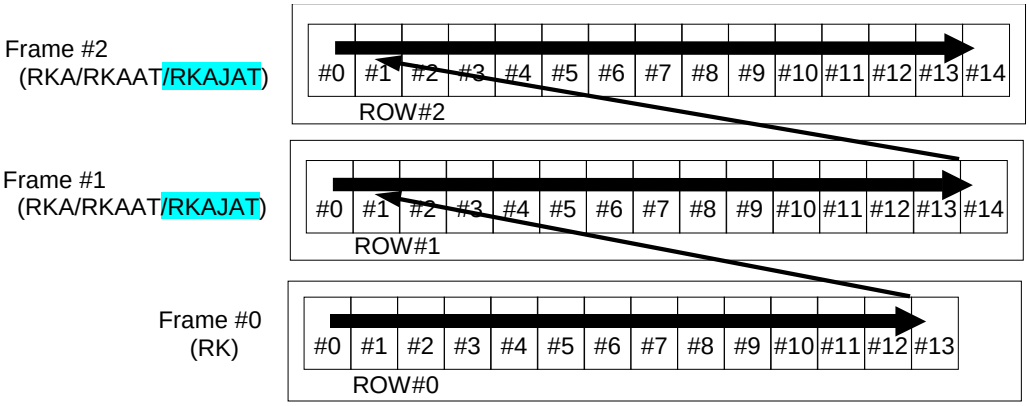


(2-3) RKH/RKHE + RKA

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it. The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.



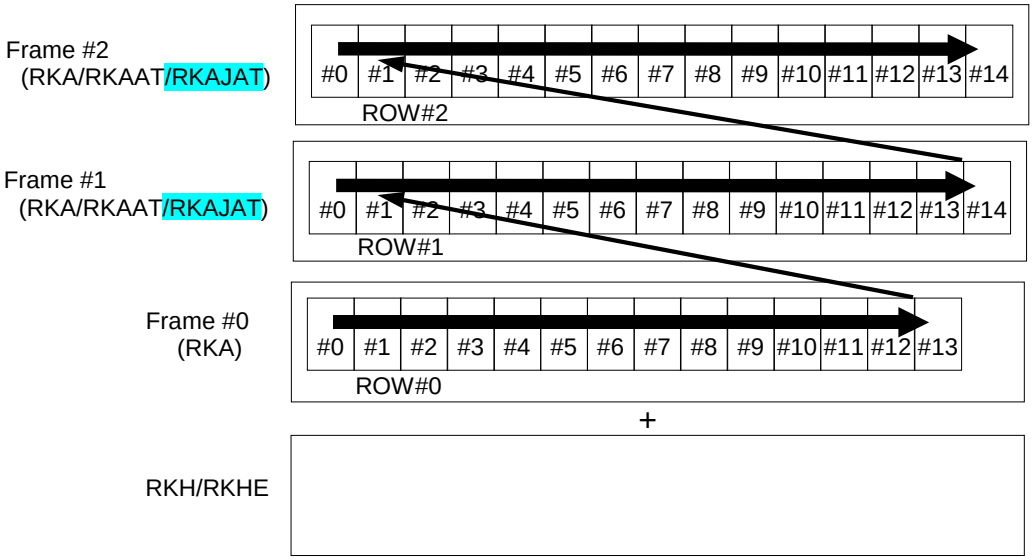
(2-4) RK + RKA/RKAAT/RKAJAT



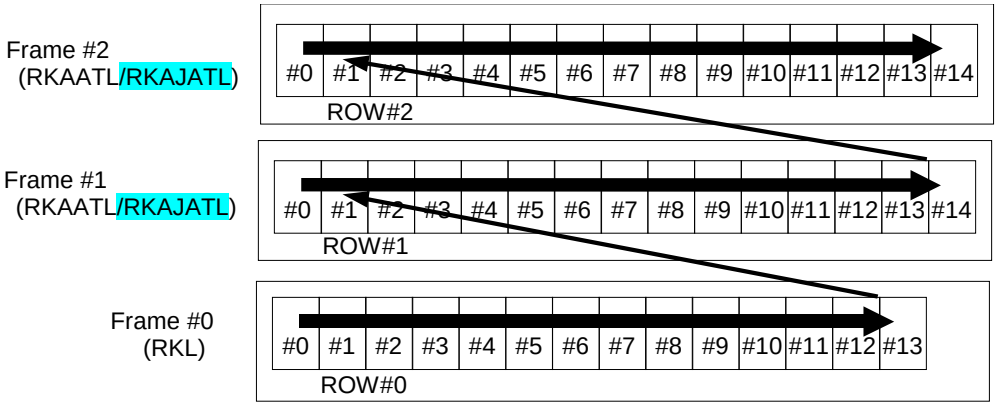
Copyright © 2003, 2005, Hitachi, Ltd.

(2-5) RKH/RKHE + RKA/RKAAT/RKAJAT

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA/RKAAT/RKAJAT(s) to it. The system can have a configuration in which up to 28 RKA/RKAAT/RKAJATs (up to 420 Disk Drives) are connected. The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.



(2-6) RKL + RKAATL/RKAJATL



Copyright © 2003, 2005, Hitachi, Ltd.

(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 0x0400.

Expression:

User data size = ((LAST LBA + 1) - Data portion beginning LBA) & 0xFFFFFC00

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.

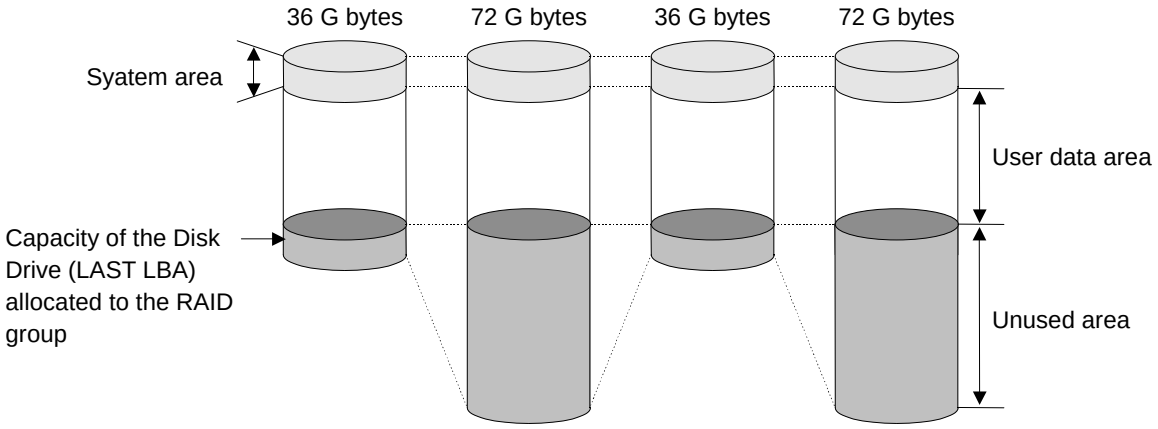


Figure 4.7.1 User Data Area

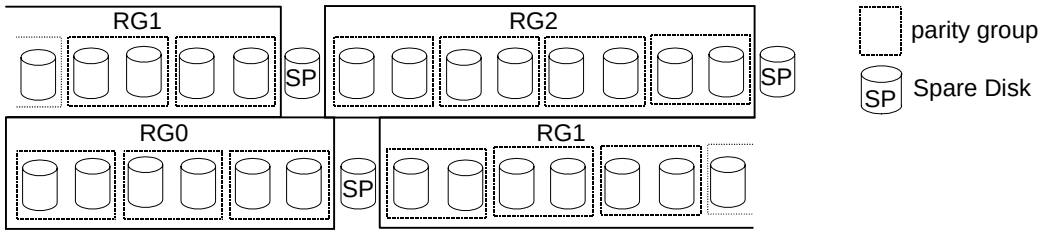
Copyright © 2002, 2005, Hitachi, Ltd.

(4) Image of RAID group definition for each RAID level (RK + RKA/RKAAT/RKAJAT, RKL + RKAATL/RKAJATL, RKD + RKAD, RKH + RKA/RKAAT/RKAJAT, or RKHE + RKA/RKAAT/RKAJAT)

The RKH/RKHE is a CTU (controller); it has no Disk Drive installed in it. A system is composed through a connection of the RKA(s) to it. The number of Disk Drives that can be installed in the first one (Unit ID #00) of the RKAs connected to the RKH/RKHE is 14 (#0 to #13). The Disk Drive #14 does not exist.

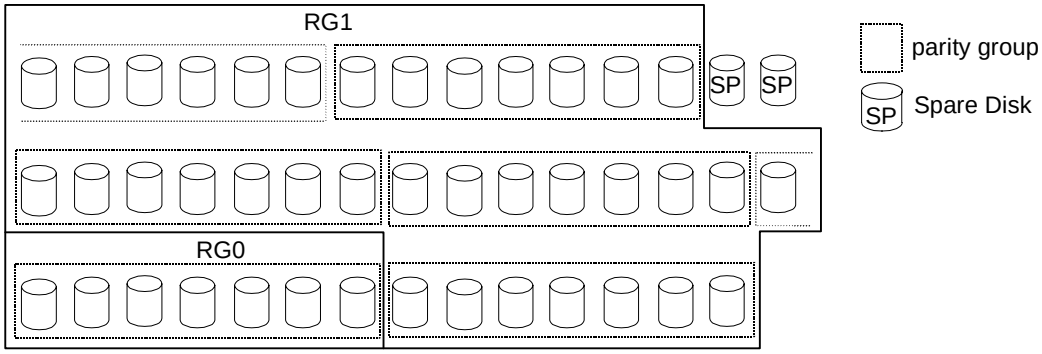
(a) RAID 0 (when connected RKAAT/RKAATL/RKAJAT/RKAJATL, RAID 0 is not supported)

• 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 = 4

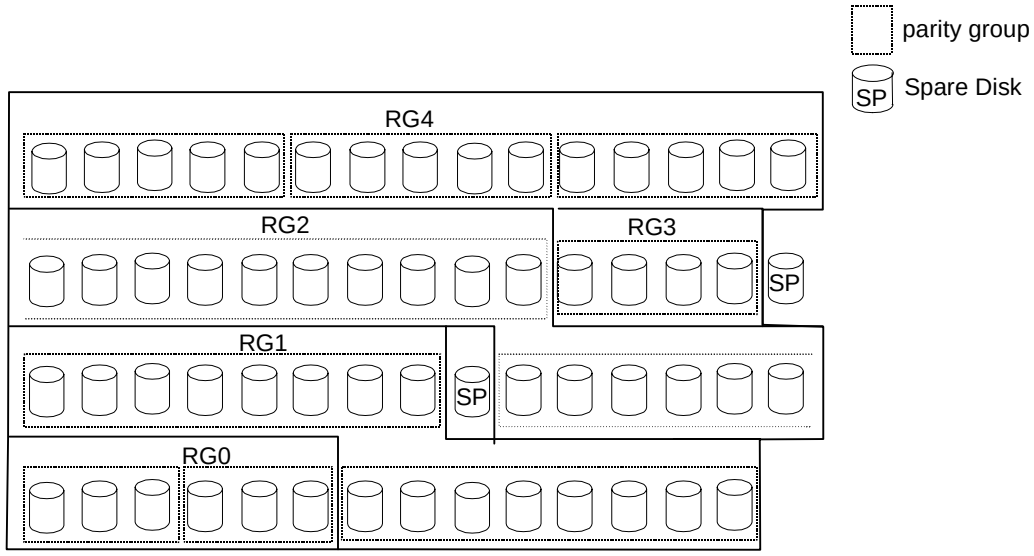
• In the case of 7D



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

Copyright © 2002, 2005, Hitachi, Ltd.

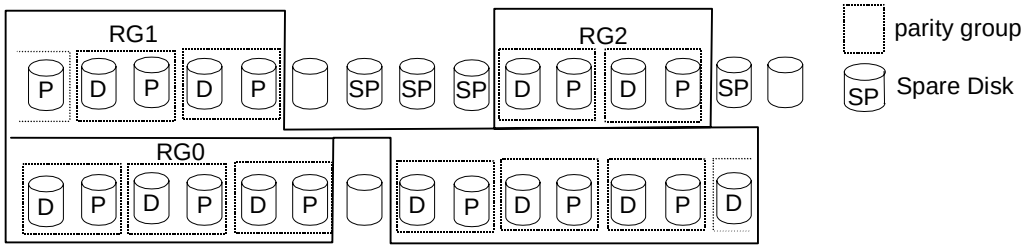
• In the case of 2D to16D



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

Copyright © 2002, 2005, Hitachi, Ltd.

(b) RAID 1

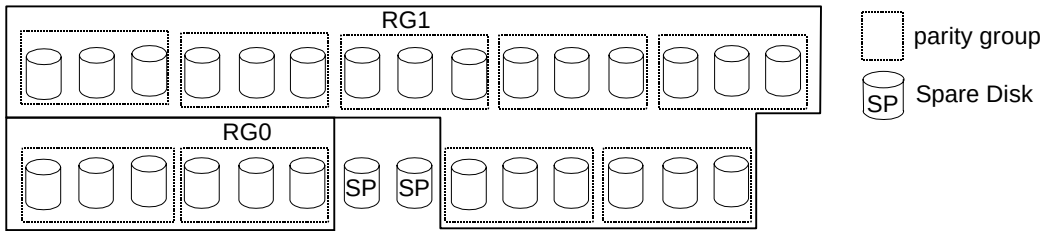


RG0 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 3
RG1 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 6
RG2 : Number of the Disk Drive in the parity group = 2
Number of parity groups = 2

Copyright © 2002, 2005, Hitachi, Ltd.

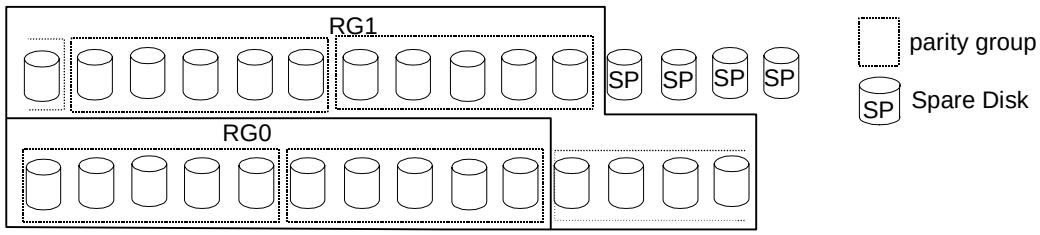
(c) RAID 5

- 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

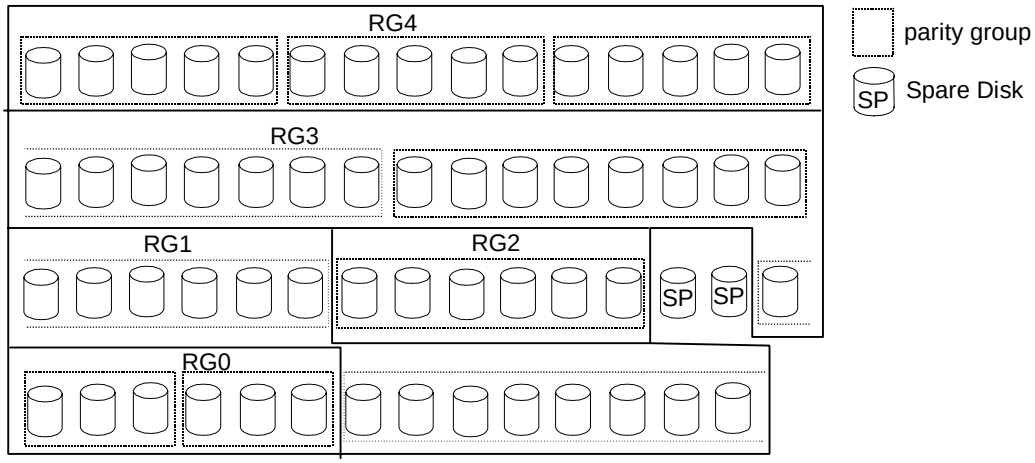
- In the case of 4D + 1P



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

Copyright © 2002, 2005, Hitachi, Ltd.

- In the case of 2D + 1P to 15D + 1P

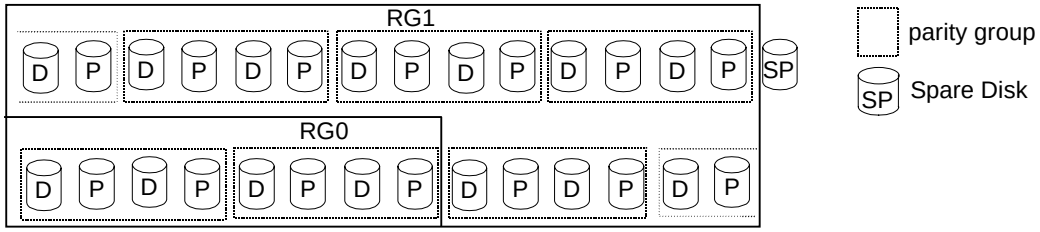


RG0 : 2D + 1P Number of the Disk Drive in the parity group = 3
Number of parity groups = 2
RG1:13D + 1P Number of the Disk Drive in the parity group = 14
Number of parity groups =1
RG2: 5D + 1P Number of the Disk Drive in the parity group = 6
Number of parity groups = 1
RG3: 6D + 1P Number of the Disk Drive in the parity group = 8
Number of parity groups = 2
RG4: 3D + 1P Number of the Disk Drive in the parity group = 5
Number of parity groups = 3

Copyright © 2002, 2005, Hitachi, Ltd.

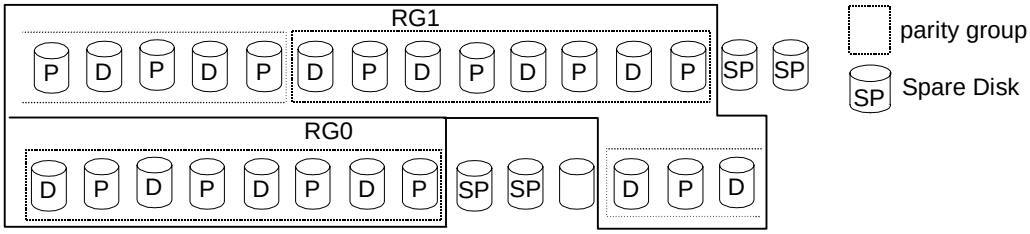
(d) RAID 1+0 (RAID A)

- 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

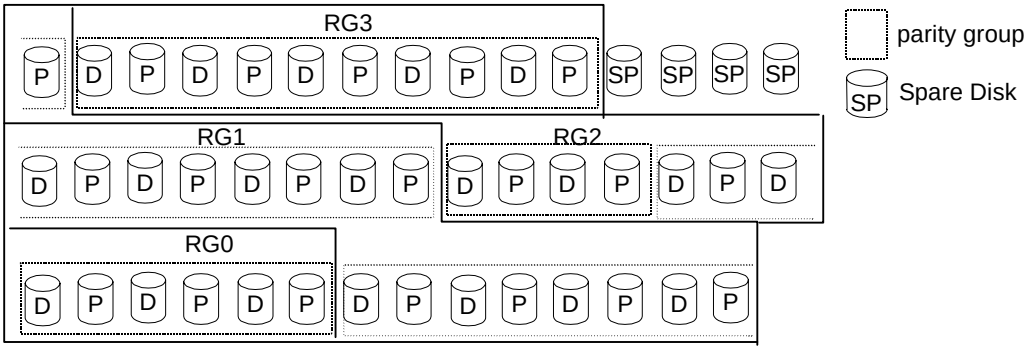
- In the case of 4D + 4P



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

Copyright © 2002, 2005, Hitachi, Ltd.

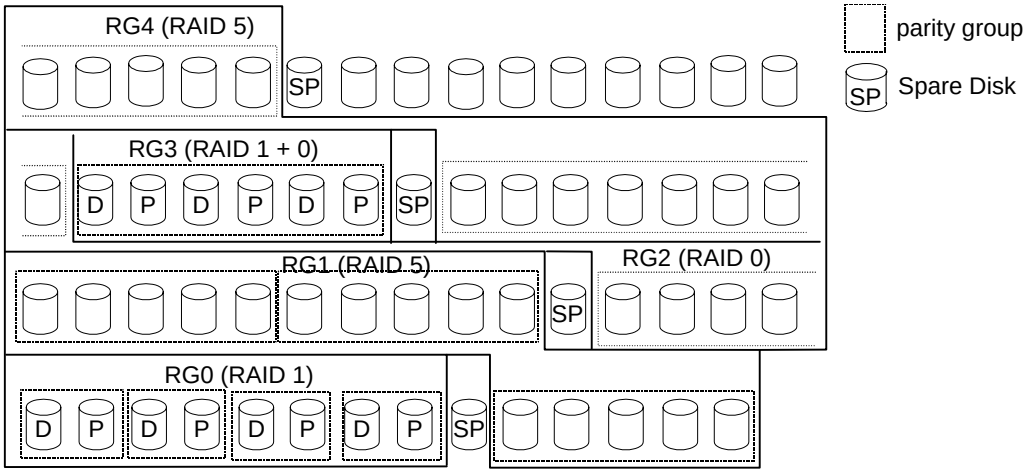
- In the case of 2D + 2P to 8D + 8P



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

Copyright © 2002, 2005, Hitachi, Ltd.

(e) In the case where RAID levels coexist



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

RG1 (RAID 5) : 4D + 1P
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 + 3P
Number of the Disk Drive in the parity group = 6
Number of parity groups = 1

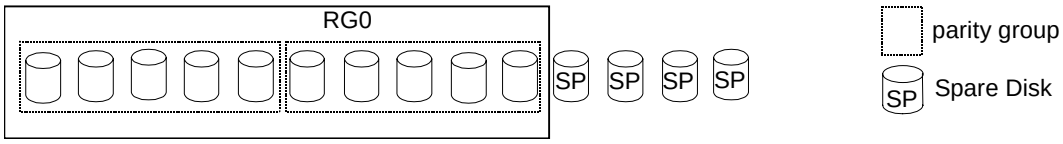
RG4 (RAID 5) : 11D + 1P
Number of the Disk Drive in the parity group = 12
Number of parity groups = 1

Copyright © 2002, 2005, Hitachi, Ltd.

(5) Image of RAID group definition for each RAID level (RKS or RKSD)

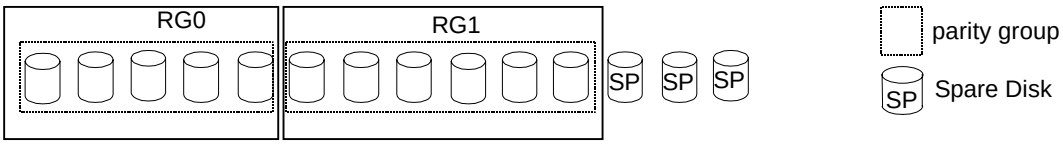
(a) RAID 0

• In the case of 5D



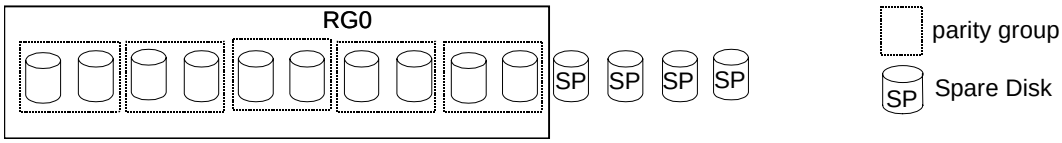
RG0 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 2

• In the case where 5D and 6D coexist



RG0 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 1
RG1 : Number of the Disk Drive in the parity group = 6
Number of parity groups = 1

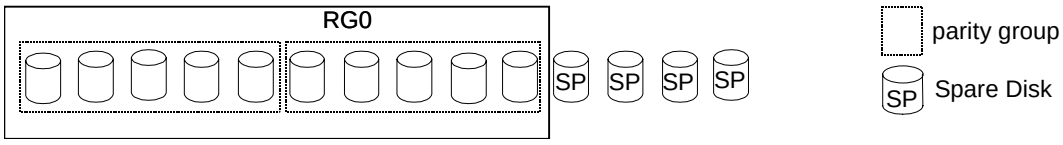
(b) RAID 1



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

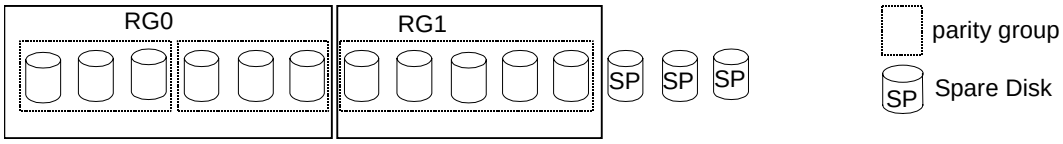
(c) RAID 5

• In the case of 4D + 1P



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

• In the case where 2D + 1P and 4D + 1P coexist

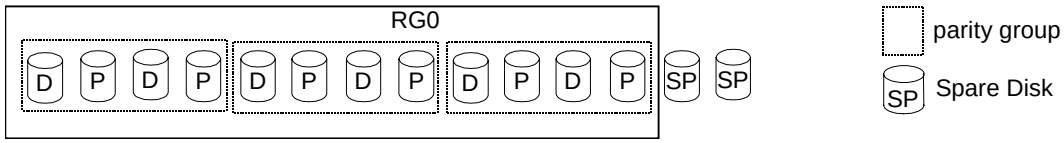


RG0 : Number of the Disk Drive in the parity group = 3
Number of parity groups = 2
RG1 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 1

Copyright © 2002, 2005, Hitachi, Ltd.

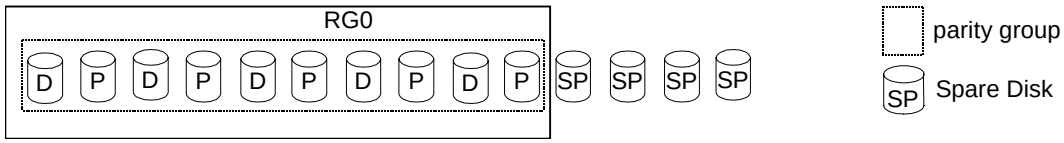
(d) RAID 1+0 (RAID A)

- In the case of 2D + 2P



RG0 : Number of the Disk Drive in the parity group = 4
Number of parity groups = 3

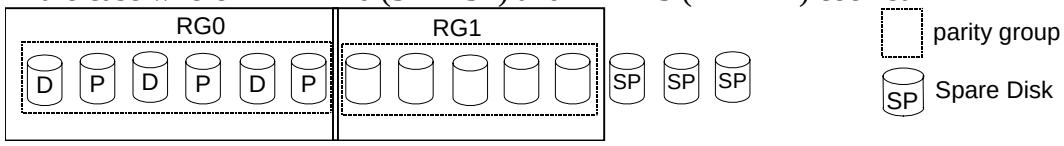
- In the case of 5D + 5P



RG0 : Number of the Disk Drive in the parity group = 10
Number of parity groups = 1

(e) In the case where RAID coexist

- In the case where RAID 1+0 (3D + 3P) and RAID 5 (4D + 1P) coexist



RG0 : Number of the Disk Drive in the parity group = 6
Number of parity groups = 1
RG1 : Number of the Disk Drive in the parity group = 5
Number of parity groups = 1

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 5. Outline of P.P.

5.1 P.P.s Required for Maintenance

P.P.s included in DF600 required for maintenance are divided mainly into three categories depending on the related part.

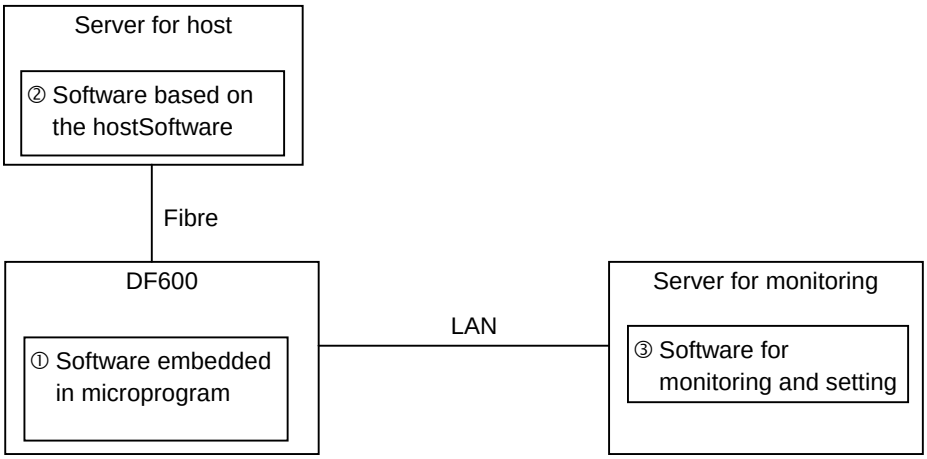


Figure 5.1.1 P.Ps required for maintenance and its related parts

① Software embedded in microprogram:
Is software embedded in microprogram in DF600. 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 DF600 with Fibre Channel interface.

③ Monitoring, setting software:
Is software performed and installed on the monitoring server / PC connected to the DF600 with a LAN.

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

Copyright © 2002, 2005, Hitachi, Ltd.

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	Disk Array Management Program	P-002D-J211	③	○	-	○	• Disk Array Management Program 2 (for GUI) User's Guide • Disk Array Management Program 3 (for GUI) User's Guide
2.	Failure monitoring program	P-222Z-J001	③	○	-	○	• Failure monitoring program User's Guide
3	Hitachi ShadowImage Function (include RAID Manager)	P-002D-J201 P-002D-J201S	①,②	○	○	-	• Hitachi ShadowImage User's Guide • Hitachi RAID Manager System Manager Guide
4	Hitachi QuickShadow Function (include RAID Manager)	P-002D-J205 P-002D-J205S	①,②	○	○	-	• Hitachi QuickShadow User's Guide • Hitachi RAID Manager System Manager Guide
5	Hitachi TrueCopy Basic Function (include RAID Manager)	P-002D-J202 P-002D-J202U	①,②	○	○	-	• Hitachi TrueCopy Basic User's Guide • Hitachi RAID Manager System Manager Guide
6	Open LDEV Guard Function (include RAID Manager)	P-002D-J206 P-002D-J206S	①,②	○	○	-	• Open LDEV Guard User's Guide • Hitachi RAID Manager System Manager Guide
7	LUN Security Function	P-002D-J203 P-002D-J203S	①	○	-	-	• LUN Security User's Guide
8	Cache Management Function	P-002D-J215	①	○	-	-	• FlashAccess User's Guide
9	Dual ID Succession Function	P-002D-J216	①	○	-	-	• Dual ID Succession User's Guide
10	SNMP Agent Support Function	P-002D-J213	①	○	-	-	• SNMP Agent Support Function User's Guide
11	LUN Expansion Function	P-002D-J214	①	○	-	-	• LUN Expansion Function User's Guide
12	Password Protection Function	P-002D-J212	①	○	-	-	• Password Protection User's Guide
13	LAN Management Function	P-002D-J204, P-002D-D204S	①	○	-	-	• LAN Management User's Guide
14	Performance Management -Base Monitor Function	P-002D-J217	①	○	-	-	• Performance Management -Base Monitor User's Guide

Copyright © 2002, 2005, Hitachi, Ltd.

INSTALLATION

Chapter 1. Before Starting Installation Work 01-0000
Chapter 2. Installing Floor Model 02-0000
Chapter 3. Installing Rackmount Model 03-0000
Chapter 4. Newly Installing Microprogram 04-0000
Chapter 5. Parameter Setting (Disk Array Management Program) 05-0000
Chapter 6. Adding Optional Components 06-0000
Chapter 7. Subtracting Optional Components 07-0000
Chapter 8. Relocation/Removal Work 08-0000
Chapter 9. ACE (Assist the Connection of Enclosure) Tool 09-0000

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 1. Before Starting Installation Work

1.1 Before Starting Installation Work

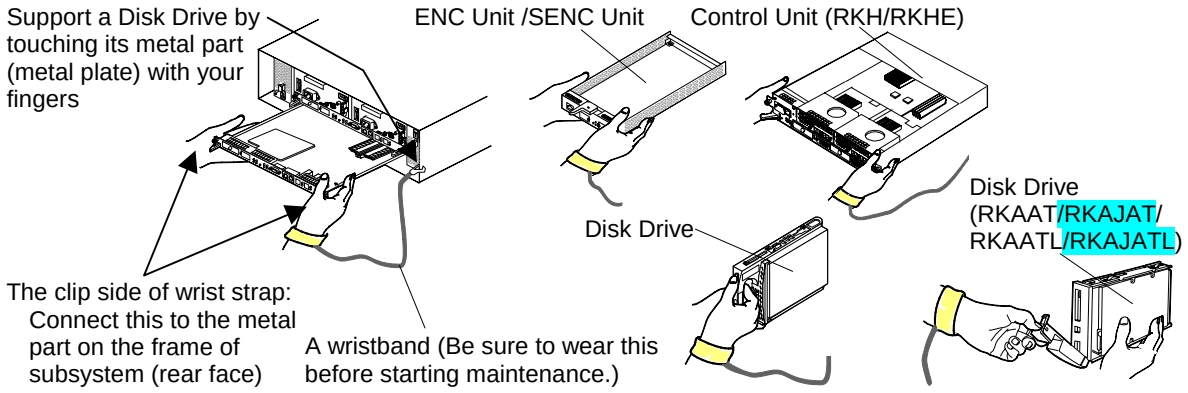
Take notice of the following when performing a installation work for the subsystem. Read and understand them well before performing the installation.

(1) Note 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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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 (DC) 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

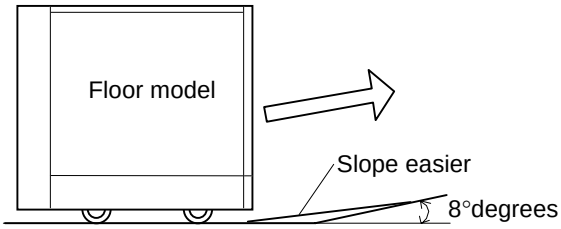
Close all the external covers when a maintenance work is completed.
It is required to make all the external covers closed to operate the subsystem properly. (Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

1.2 The Correspondence between the Equipment Serial Number and the Software Revision

It has not been released yet for the current Rev.0.

Copyright © 2002, 2005, Hitachi, Ltd.

1.3 Installation Configuration of the Subsystem

There are two models of the DF600, floor model and rack-mount model, which are classified according to their installation forms. The former includes combinations of the RK (RKD), RKA (RKAD), and the Floor Standing Kit and a combination of the RKSs (RKSDs) and the Floor Standing Kit and the latter includes combinations of the RK (RKD) and RKA (RKAD) mounted on the 19-inch rack frame. As another rackmount model product, the RKH/RKHE is provided. The RKH/RKHE is a CTU (Controller) with no Disk Drive installed in it.

There are three types of the floor model: an RK (RKD) alone, an RK (RKD) added with an RKA (RKAD), and an RKSs (RKSDs) alone.

The rackmount model uses the special U6 rack frame and it can connect up to 11 RKA (RKAD) (up to 179 Disk Drives) to an RK (RKS). A subsystem with the two U6 rack frames containing up to 14 RKAs (RKADs) (up to 224 Disk Drives) can be configured. A mixed configuration, in which up to the 14 RKAs/RKAATs/RKAJATs in total (up to the 224 Disk Drives) are connected to the one RK, can be formed.

The RKH/RKHE can have a configuration in which up to 30 RKAs (up to 449 Disk Drives) are connected to the one RKH/RKHE.

In the case of the RKH/RKHE, a mixed configuration, in which up to the 30 RKAs and RKAATs/RKAJATs in total, that is, the two RKAs and 28 RKAATs/RKAJATs (449 Disk Drives (420 Disk Drives, in the case of the Serial-ATA)) are connected to the one RKH/RKHE, can be formed.

A configuration, in which up to the 3 RKAATLs/RKAJATLs in total (up to the 59 Disk Drives) are connected to the one RKL, can be formed.

Copyright © 2002, 2005, Hitachi, Ltd.

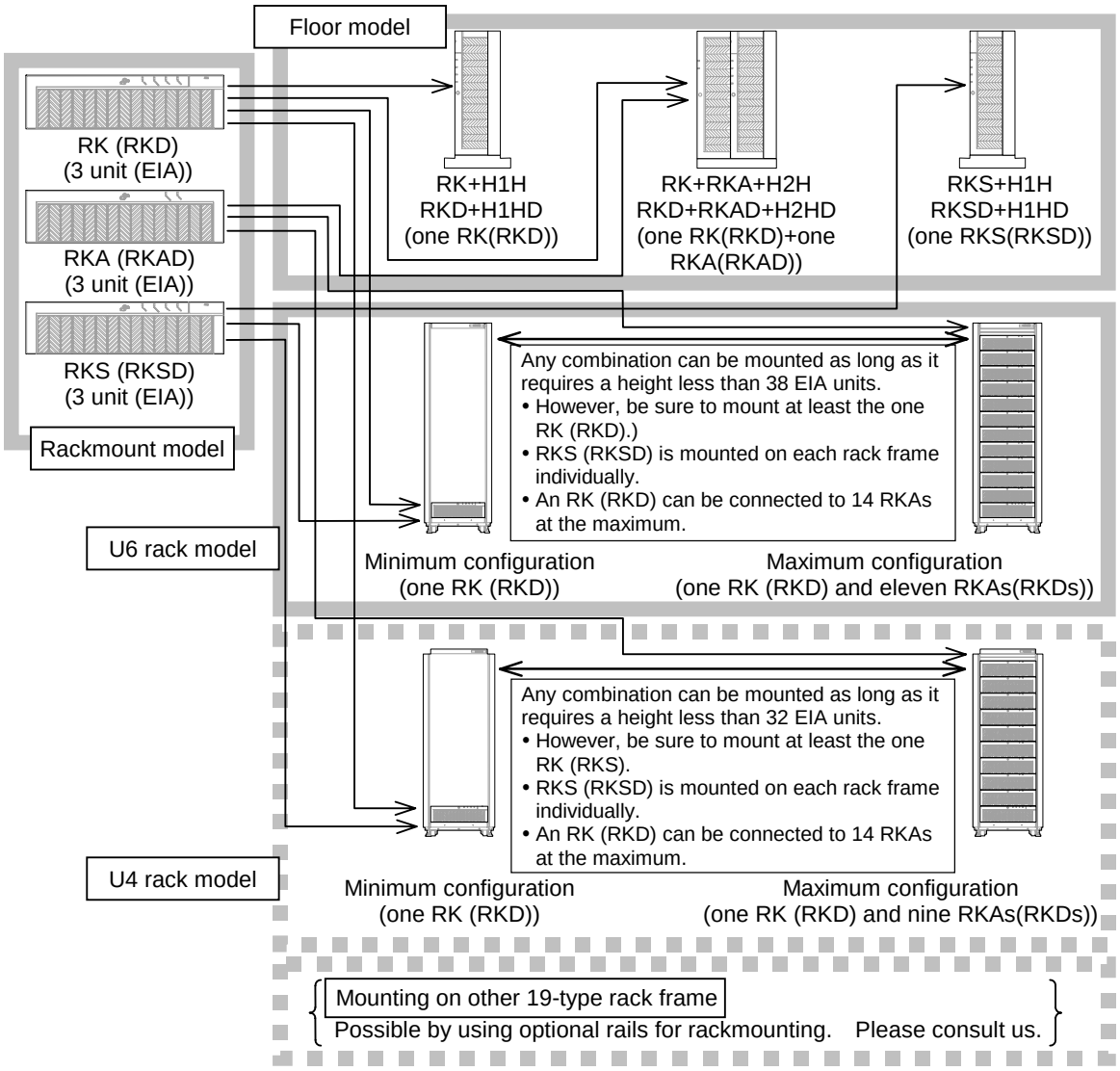


Figure 1.3.1 Subsystem Configuration (RK/RKD/\RKA/RKAD)

Copyright © 2003, 2005, Hitachi, Ltd.

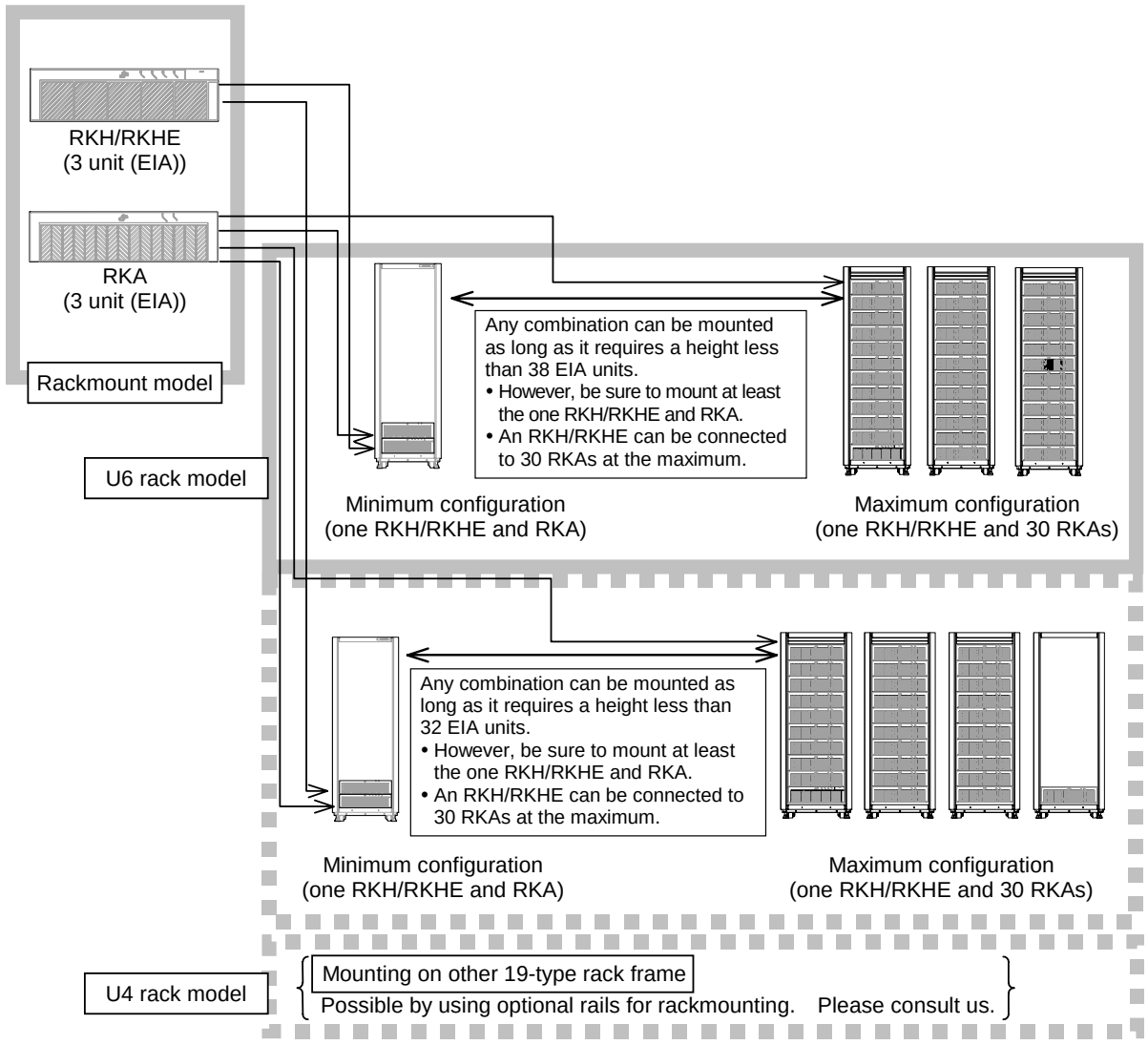


Figure 1.3.2 Subsystem Configuration (RKH/RKHE/RKA)

Copyright © 2003, 2005, Hitachi, Ltd.

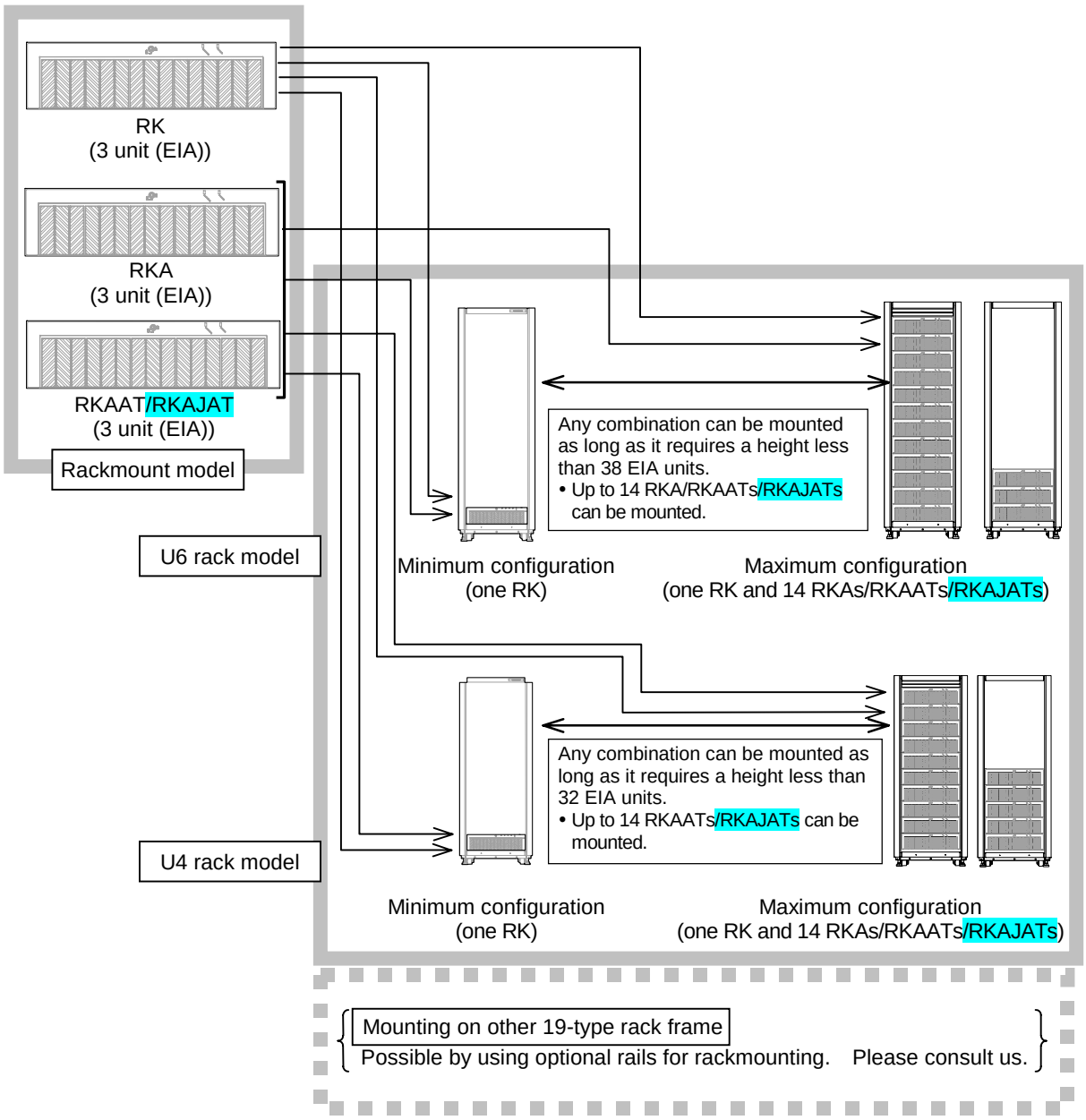


Figure 1.3.2.1 Subsystem Configuration (RK+RKA/RKAAT/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

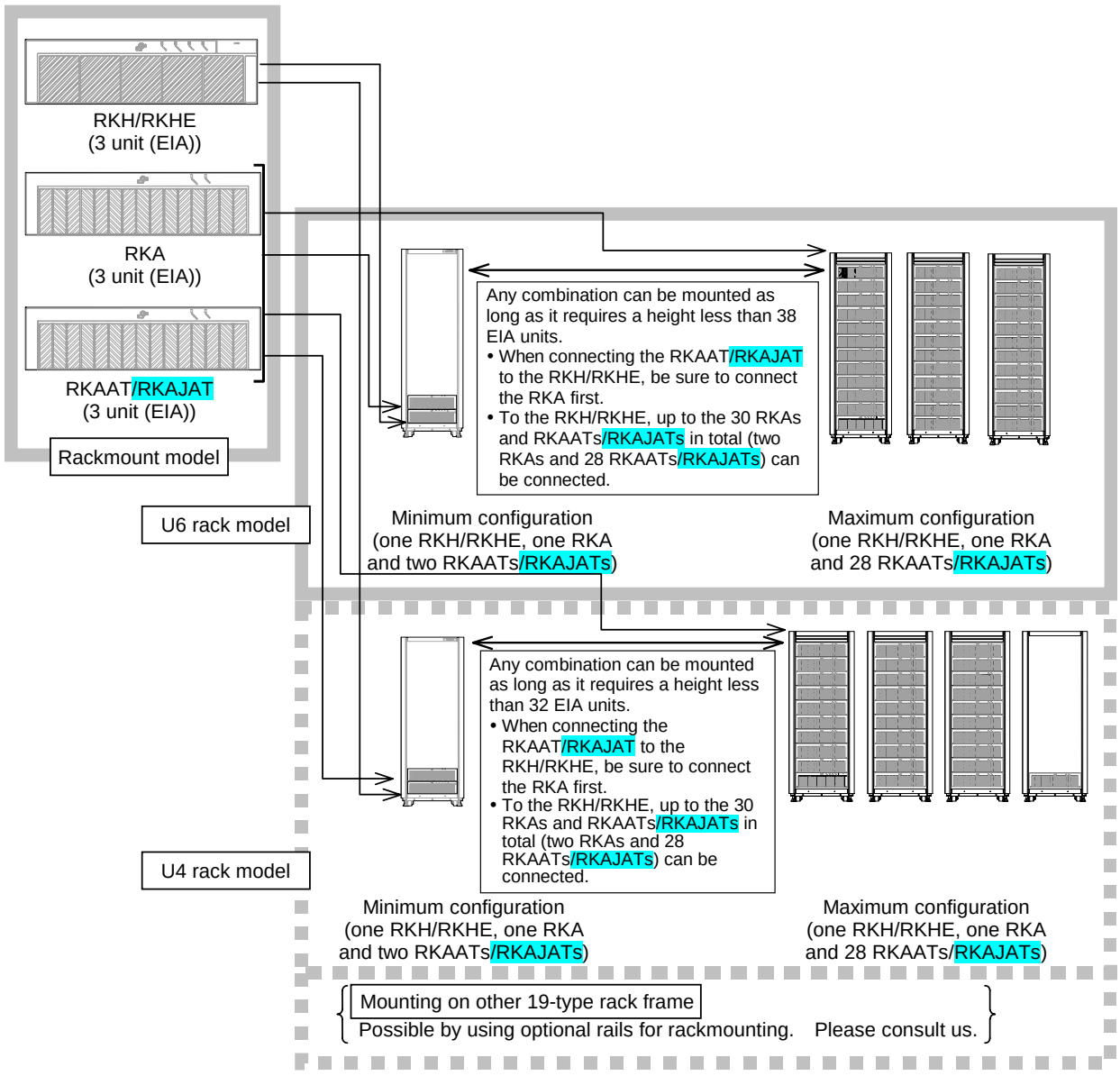


Figure 1.3.2.2 Subsystem Configuration (RKH/RKHE+RKA/RKAAT/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

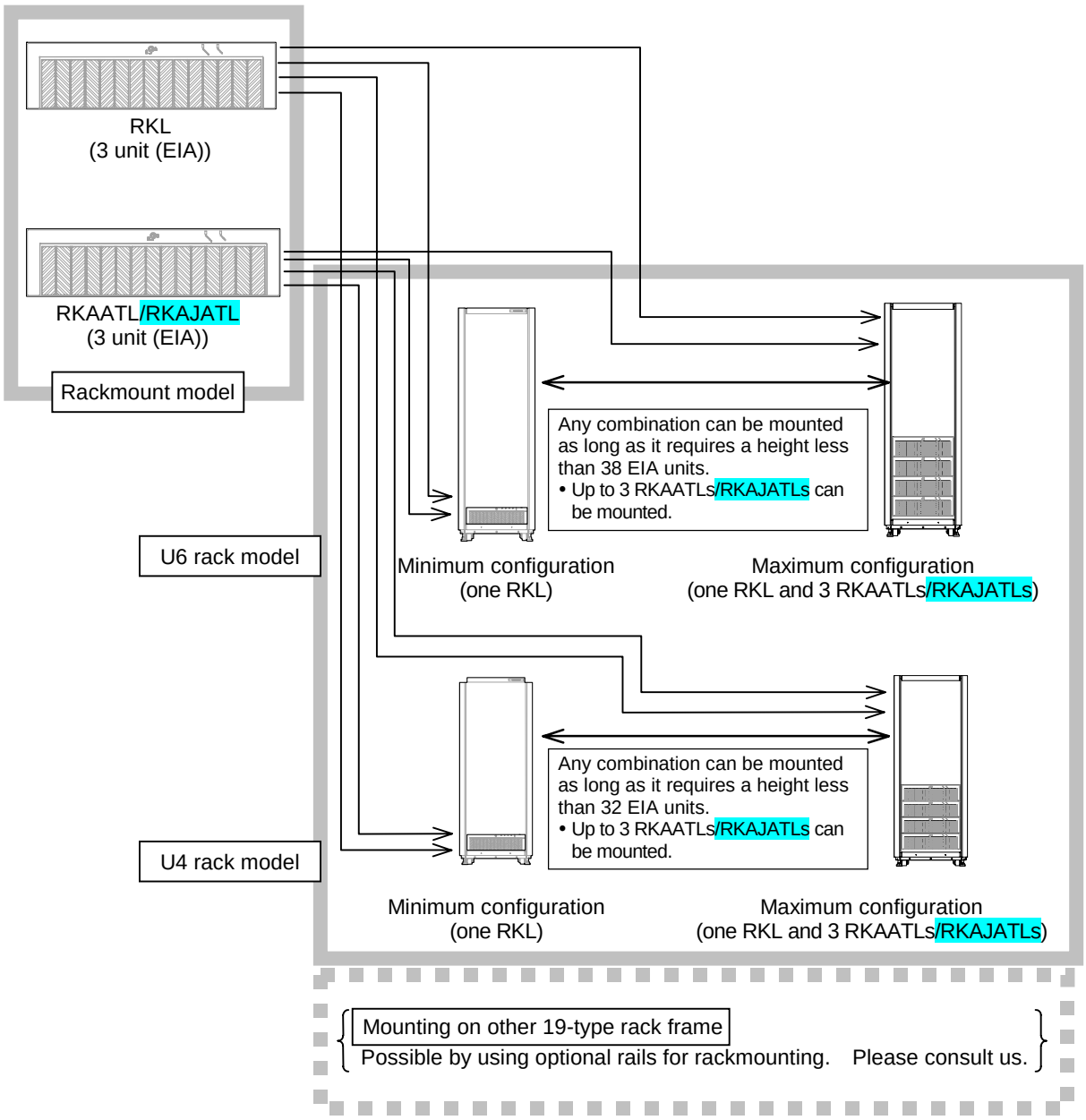


Figure 1.3.2.3 Subsystem Configuration (RKL+RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem

1.4.1 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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **Since front bezels of the RK/RKL/RKS/RKD/RKSD and the RKA/RKAD are partially different with each other in their external appearances, take care not to take a wrong one.**

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 turn it in the direction shown by the arrow ① (⟶).
  (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.
  (d) Disengage the ball catch of the option bezel by pulling the bottom of the option bezel toward you and detach the option bezel from the upper hook.

(2) Procedure for attachment
  (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 in the direction shown by the arrow ② (<·····).
  (e) Hitch the top of option bezel to the upper hook and fasten it by pressing its bottom against the main body to engage the ball catch.

Copyright © 2002, 2005, Hitachi, Ltd.

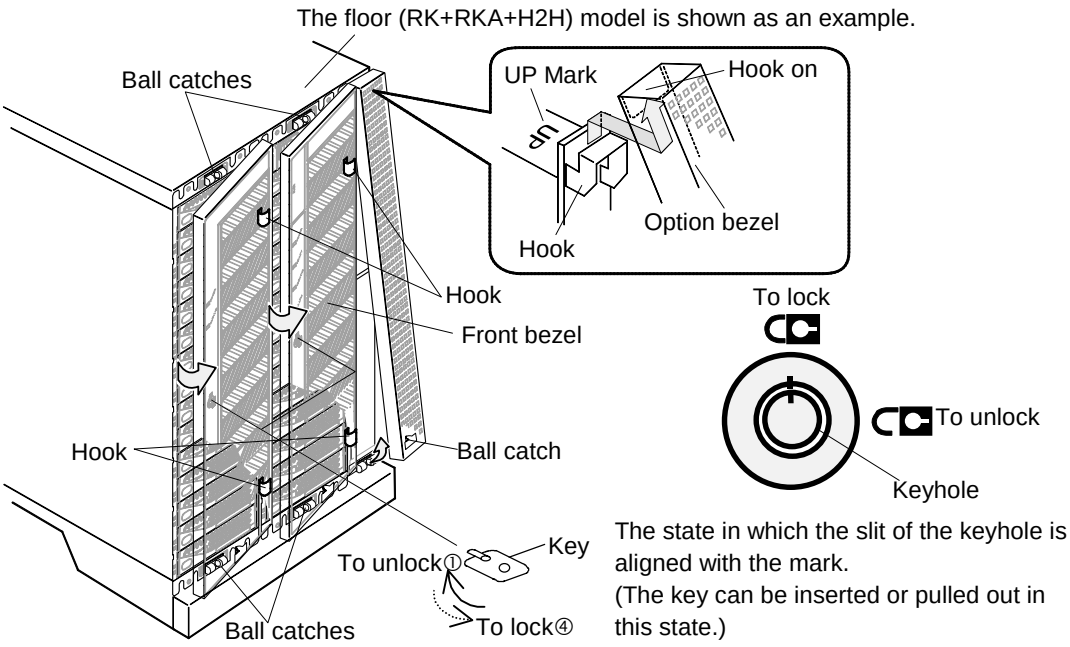
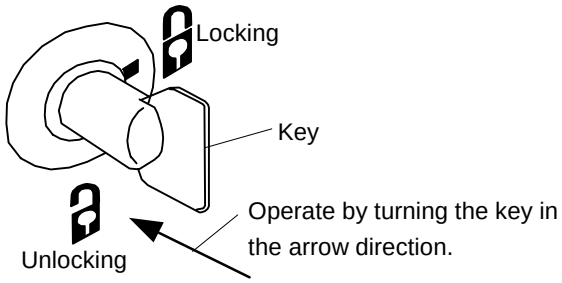
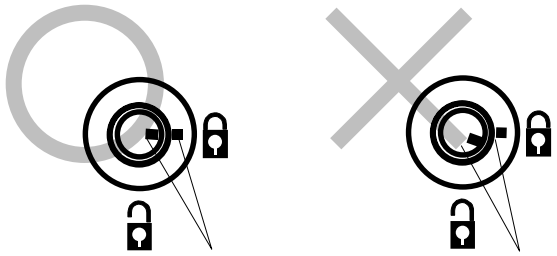


Figure 1.4.1 Procedure for Attaching/Removing Front Bezel

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.



Pull the key off aligning its groove with the positioning mark on the lock. (The key can be inserted or pulled off in this state.)

The key cannot be pulled off when its groove is not aligned 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.

Copyright © 2002, 2005, Hitachi, Ltd.

1.4.2 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.

(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.

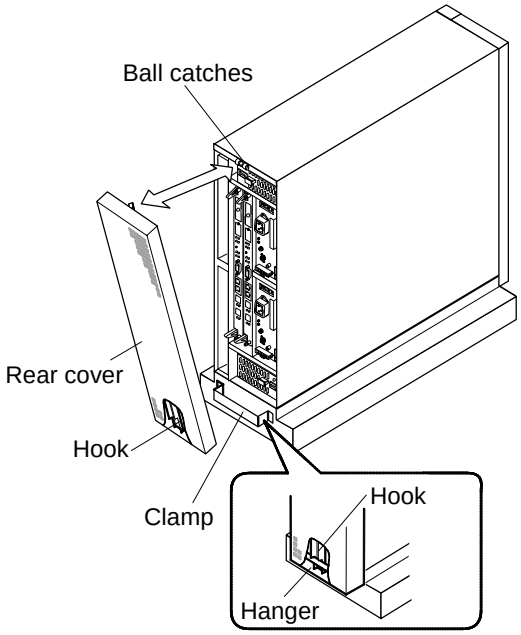
(2) Procedure for attachment

NOTE : When installing Rear Cover, be careful not to catch cables.

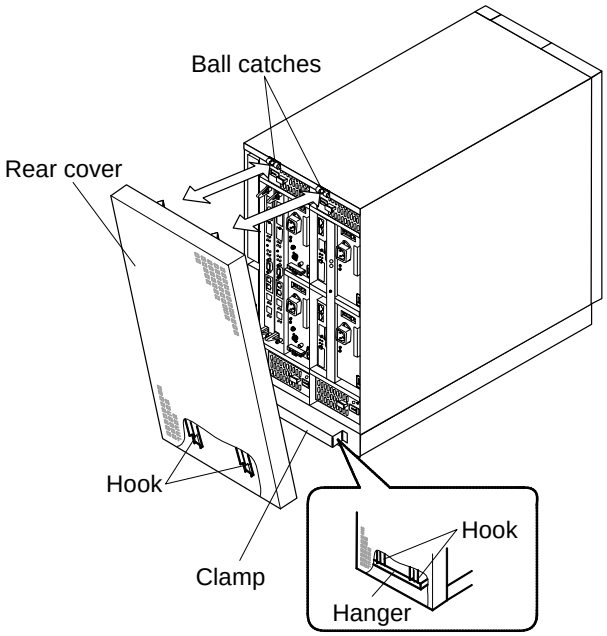
(a) Hold the rear cover with your both hands.

(b) Hitch the hook at the bottom of the rear cover to the cramp. (For the installation of the cramp, refer to Subsection 2.6.4, “Installing cable cramp” on page INST 02-0350.)

(c) Fasten the rear cover by pressing it against the ball catch at the upper part of the subsystem main body.



(a) Floor (RK+H1H) Model / Floor (RKS+H1H) Model
Floor (RKD+H1HD) Model / Floor (RKSD+H1HD) Model



(b) Floor (RK+RKA+H2H) Model
Floor (RKD+RKAD+H2HD) Model

Figure 1.4.2 Procedure for Attaching/Removing Rear Cover

Copyright © 2002, 2005, Hitachi, Ltd.

1.4.3 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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **Since Front Bezels of the RK/RKL/RKS/RKD/RKSD/RKA/ RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL and the RKH/RKHE are partially different with each other in their external appearances and forms, take care not to take a wrong one.**
  (The Front Bezels of the RKAAT/RKAJAT/RKAATL/ RKAJATL are colored in a single color.)

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 turn it in the direction shown by the arrow ① (⟶).
  (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) 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 in the direction shown by the arrow ② (<·····).

Copyright © 2002, 2005, Hitachi, Ltd.

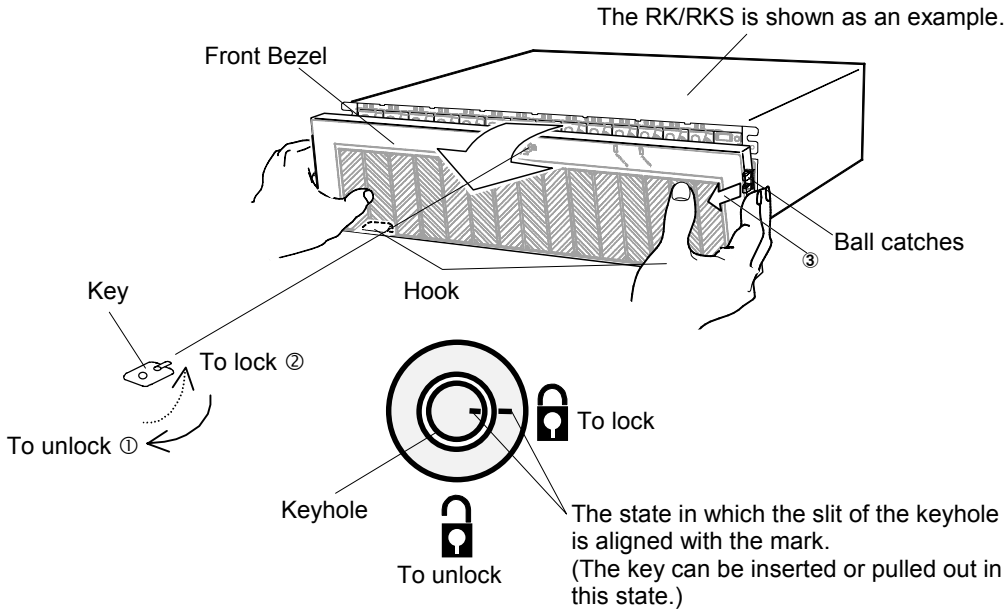
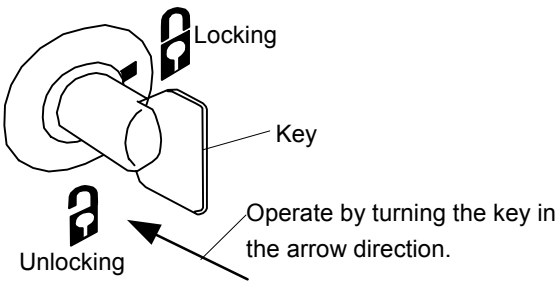
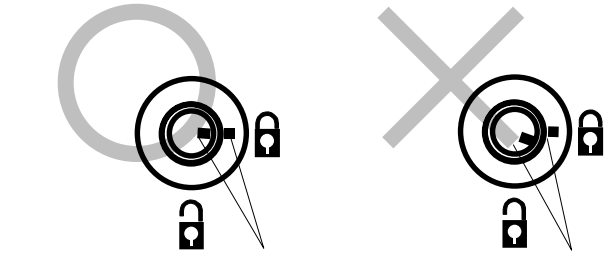


Figure 1.4.3 Procedure for Attaching/Removing Front Bezel

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.

Copyright © 2002, 2005, Hitachi, Ltd.

1.4.4 How to open/close the Rear Door of U6 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 Section 1.4 on page INST 01-0050.

(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.

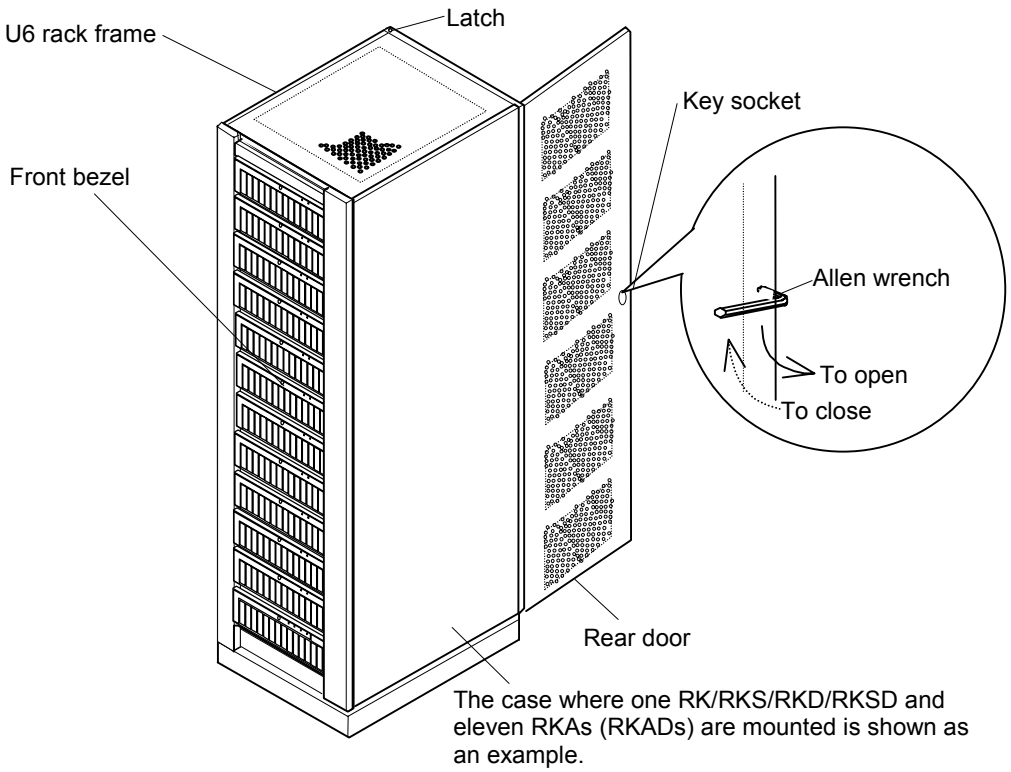


Figure 1.4.4 Procedure for Opening/Closing Rear Door

Copyright © 2002, 2005, Hitachi, Ltd.

1.4.5 How to open/close the Rear Door of U4 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 Section 1.4 on page INST 01-0050.

(1) Fit the key in the keyhole on the rear door and turn the key to the left to unlock the door.
(2) Pull the bottom of the lever toward you (②). Turn the lever to the right (③) and then open the door.
(3) To close the door, close the door slowly in the direction of the arrow (➥) and turn the lever to the left (in the backward direction of (③)).
(4) Fit the key in the keyhole and turn the key to the right to lock the door.

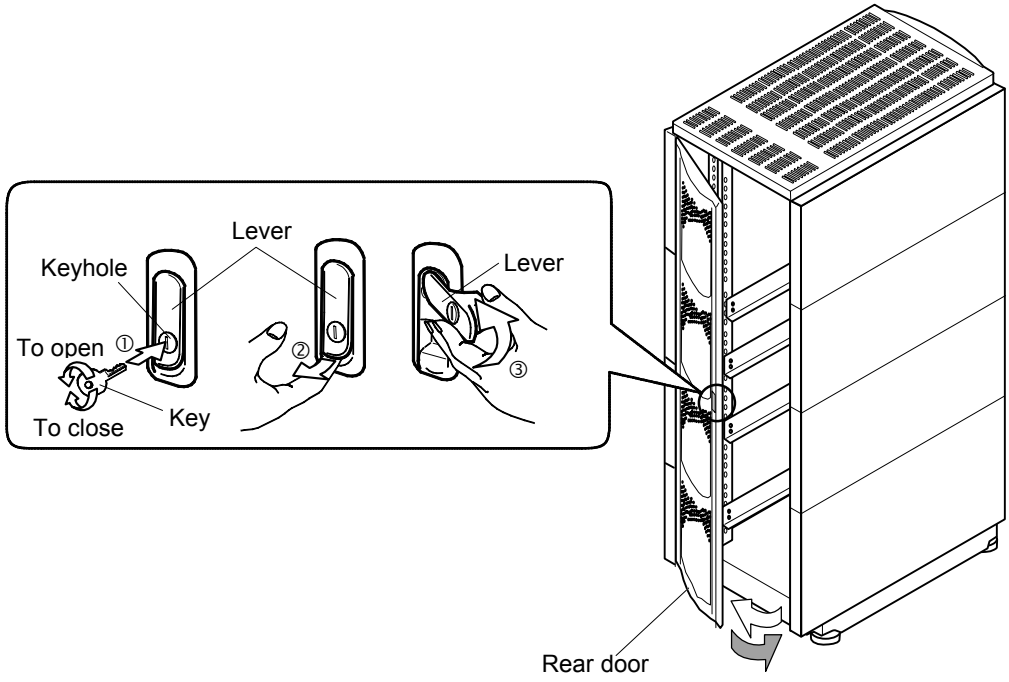


Figure 1.4.5 Procedure for Opening/Closing Rear Door

Copyright © 2002, 2005, Hitachi, Ltd.

1.5 Restrictions on Using the Fibre Channel Interface

When using a 2G bps Fibre Channel Interface board as 1G bps mode, the GBIC used in the target connection (HUB/Sw) 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 later

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

1.6 Model Name

1.6.1 Components and indispensable parts

Table 1.6.1 Components and indispensable parts (SANRISE 9580V/9585V)

No.	Name	Model	Components
1	RKH	DF600-RKH	Frame (1), Control Unit (2) (Interface Board (2)), Panel (1), Backup Battery Unit (2), Fan Assembly (2), AC cable J2H (2), Power Unit (RKH/RKHE) (2)
	RKHE	DF600-RKHE	Frame (1), Control Unit (2) (Interface Board (2)), Panel (1), Backup Battery Unit (2), Fan Assembly (2), AC cable J2H (2), Power Unit (RKH/RKHE) (2)
2	RKA	DF600-RKA	Frame (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKA) (2), ENC Unit (2), ENC cable (4)
3	RKAAT	DF600-RKAAT	Frame (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKAAT) (2), SENC Unit (2), ENC cable (2)
4	RKAJAT	DF600-RKAJAT	Frame (1), AC cable J2H (2), Power Unit (RKAJAT) (2), SENC Unit (2), ENC cable (2)
5	Cache Unit	DF-F600-C512X2H	Cache Unit of 1,024 M bytes (512 M bytes×2)
		DF-F600-C1GX2H	Cache Unit of 2,048 M bytes (1,024 M bytes×2)
6	Interface Board	DF-F600-DH2G2	2Gbps Fibre Channel Interface
7	Disk Drive(*1)	DF-F600-AEH36	3.5-type Disk Drive (35.4 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-ATE250	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE400R	3.5-type Disk Drive (393.4 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.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

Copyright © 2003, 2005, Hitachi, Ltd.

Table 1.6.2 Components and indispensable parts (SANRISE 9570V)

No.	Name	Model	Components
1	RK	DF600-RK	Frame (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RK) (2)
2	RKD(*1)	DF600-RKD	Frame (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), Power Unit (DC) (2)
3	RKA	DF600-RKA	Frame (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKA) (2), ENC Unit (2), ENC cable (4)
4	RKAD(*1)	DF600-RKAD	Frame (1), Fan Assembly (2), Power Unit (DC) (2), ENC unit (2), ENC cable (4)
5	RKAAT	DF600-RKAAT	Frame (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKAAT) (2), SENC Unit (2), ENC cable (2)
6	RKAJAT	DF600-RKAJAT	Frame (1), AC cable J2H (2), Power Unit (RKAJAT) (2), SENC Unit (2), ENC cable (2)
7	Floor (RK+H1H) Model	DF600-RK+ DF-F600-H1H	RK (1), Floor setting kit H1H (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), AC cable J1H (2), Power Unit (RK) (2)
8	Floor (RKD+H1HD) Model	DF600-RKD+ DF-F600-H1HD	RKD (1), Floor setting kit H1HD (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), Power Unit (DC) (2)
9	Floor (RK+RKA+H2H) Model	DF600-RK+ DF600-RKA+ DF-F600-H2H	RK (1), RKA (1), Floor setting kit H2H (1), Frame (1), Control unit (including Fibre Channel interface) (1), Panel (1), Power Unit (RK) (2), Power Unit (RKA) (2), Backup Battery Unit (1), Fan Assembly (4), ENC Unit (2), ENC cable (4), AC cable J1H (4)
10	Floor (RKD+RKAD+H2HD) Model	DF600-RKD+ DF600-RKAD+ DF-F600-H2HD	RKD (1), RKAD (1), Floor setting kit H2HD (1), Frame (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Power Unit (DC) (4), Backup Battery Unit (1), Fan Assembly (4), ENC Unit (2), ENC cable (4)
11	Cache Unit	DF-F600-C512X2	Cache Unit of 1,024 M bytes (512 M bytes×2)
		DF-F600-C1GX2	Cache Unit of 2,048 M bytes (1,024 M bytes×2)
12	Disk Drive(*2)	DF-F600-AEH36	3.5-type Disk Drive (35.4 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-ATE250	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE250R	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE400R	3.5-type Disk Drive (393.4 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)

*1 : This model name is not supported in countries other than Japan.

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

Copyright © 2003, 2005, Hitachi, Ltd.

Table 1.6.3 Components and indispensable parts (SANRISE 9530V)

No.	Name	Model	Components
1	RKS	DF600-RKS(*1)	Frame (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKS) (2)
2	RKSD(*2)	DF600-RKSD(*3)	Frame (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), Power Unit (DC) (2)
3	Floor (RKS+H1H) Model	DF600-RKS+ DF-F600-H1H	RKS (1), Floor setting kit H1H (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), AC cable J1H (2), Power Unit (RKS) (2)
4	Floor (RKSD+H1HD) Model	DF600-RKSD+ DF-F600-H1HD	RKSD (1), Floor setting kit H1HD (1), Control Unit (including Fibre Channel interface) (1), Panel (1), Backup Battery Unit (1), Fan Assembly (2), Power Unit (DC) (2)
5	Cache Unit	DF-F600-C512X2	Cache Unit of 1,024 M bytes (512 M bytes×2)
		DF-F600-C1GX2	Cache Unit of 2,048 M bytes (1,024 M bytes×2)
6	Disk Drive(*4)	DF-F600-AEH36	3.5-type Disk Drive (35.4 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEH72	3.5-type Disk Drive (71.3 G bytes) installed in a canister. (Disk rotational speed: 15,000 min-1)
		DF-F600-AEF146	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-AEF300	3.5-type Disk Drive (287.6 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)

*1 : DF600-RKS is not the model name for the arrangement. Make the arrangements with the collective model names including this model name; DF600-RSS75, DF600-RSD75, DF600-RSD79 and DF600-RSD7D.
*2 : This model name is not supported in countries other than Japan.
*3 : DF600-RKSD is not the model name for the arrangement. Make the arrangements with the collective model names including this model name; DF600-RSDS75, DF600-RSDD75, DF600-RSDD79 and DF600-RSDD7D.
*4 : This values of storage capacity are calculated as 1 G bytes = 1,000,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

Copyright © 2003, 2005, Hitachi, Ltd.

Table 1.6.3.1 Components and indispensable parts (SANRISE 9520V)

No.	Name	Model	Components
1	RKL	DF600-RKL	Frame (1), Control Unit (including Fibre Channel interface) (1), Cache Unit of 1,024 M bytes (512 M bytes×2) (1), Panel (1), Backup battery Unit (1), Fan assembly (2), AC cable J2H (2), Power Unit (RKL) (2)
2	RKAATL	DF600-RKAATL	Frame (1), Fan Assembly (2), AC cable J2H (2), Power Unit (RKAATL) (2), SENC Unit (2), ENC cable (2)
3	RKAJATL	DF600-RKAJATL	Frame (1), AC cable J2H (2), Power Unit (RKAJATL) (2), SENC Unit (2), ENC cable (2)
4	Disk Drive(*1)	DF-F600-ATE146L (RKL)	3.5-type Disk Drive (143.3 G bytes) installed in a canister. (Disk rotational speed: 10,000 min-1)
		DF-F600-ATE250L (RKAATL)	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE250LR (RKAATL/RKAJATL)	3.5-type Disk Drive (245.7 G bytes) installed in a canister. (Disk rotational speed: 7,200 min-1)
		DF-F600-ATE400LR (RKAATL/RKAJATL)	3.5-type Disk Drive (393.4 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.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

1.6.2 Optional parts

Table 1.6.4 Optional Parts

No.	Classification	Model	Name	Specification
1	Spare Disk Drive	-	Disk Drive	Name : Refer to the column of the Disk Drive.
2	Control Unit	DF-F600-F1H	Control Unit	Array Control Unit for duplication, Software P.P. (Fibre I/F (2) is standard installation.)
		DF-F600-F1HL		Array Control Unit for duplication, Software P.P. (Fibre I/F (2) is standard installation.) Cache Unit of 1,024 M bytes (512 M bytes×2) (1),
		-	Cache Unit	Name : Refer to the column of the Cache Unit.
3	Floor setting kit	DF-F600-H1H	Floor setting kit for RK	Floor setting kit
		DF-F600-H1HD	Floor setting kit for RKD	Floor setting kit
		DF-F600-H2H	Floor setting kit for RK+RKA	Floor setting kit (for RK+RKA)
		DF-F600-H2HD	Floor setting kit for RKD+RKAD	Floor setting kit (for RKD+RKAD)
4	Disk Drive for addition (RK/RKL/RKD/RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL)	-	Disk Drive	Name : Refer to the column of the Disk Drive.
5	Interface Board for addition (RKH/RKHE)	DF-F600-DH2G2	Interface Board	Name : Refer to the column of the Interface Board.
6	SANRISE 9530V upgrade kit	DF-F600-RUP12	Up grade kit (RSS75→RSD79)	Kit for upgrading from SANRISE 9531V to SANRISE 9532V.
		DF-F600-RUP13	Up grade kit (RSS75→RSD7D)	Kit for upgrading from SANRISE 9531V to SANRISE 9533V.
		DF-F600-RUP23	Up grade kit (RSS79→RSD7D)	Kit for upgrading from SANRISE 9532V to SANRISE 9533V. Kit for upgrading from SANRISE 9531DV to SANRISE 9532V.
		DF-F600-RUP1D3	Up grade kit	Kit for upgrading from SANRISE 9531DV to SANRISE 9533V
7	SANRISE 9500V upgrade kit	DF-F600-RSUP	Up grade kit (DF600S→DF600)	Kit for upgrading from SANRISE 9530V series to SANRISE 9570V series.
8	SANRISE 9580V upgrade kit	DF-F600-F2HUP	Up grade kit (DF600H→DF600HE)	Kit for upgrading from SANRISE 9580V to SANRISE 9585V.
9	Rack frame	DF-F600-U6	Rack frame	Rack frame
10	PDB	DF-F600-UPDU6	PDB	Power distribution box for U6 rack. PDB (2), Bracket (4), Cable (2), Cable clamp (2)
11	PDU	DF-F600-UPDU	PDU	PDU for mounting on the side of the 19-inch rack which has only 100V power supply
12	Remote Adapter(*1)	DF-F600-VR3A	Remote Adapter (Main unit)	Adapter for PS interlock control (Power cables for 100V and 200V each are standard equipment)
		DF-F600-VR3H	Remote Adapter (Hub)	Hub for Remote Adapter (Power cables for 100V and 200V each are standard equipment)

*1 : RKD, RKAD, RKSD model are not used.

Copyright © 2003, 2005, Hitachi, Ltd.

1.6.3 Accessory parts

Table 1.6.5 Accessory Parts

No.	Classification	Model	Name	Specification
1	Power cable(*1)	DF-F600-J1H	Power cable	2.5 m, 2-pole power cable with grounding terminal (AC 125 V, 13 A or 15 A)
		DF-F600-J2H	Power cable	2.5 m, 2-pole power cable with grounding terminal (AC 250 V, 13 A or 15 A)
		DF-F600-J2H5	Power cable	5.0 m, 2-pole power cable with grounding terminal (AC 200 V, 13 A or 15 A)
		DF-F600-H2H10	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-F600-K5M	1 G-1 G Fibre I/F Cable	SC-SC Fibre I/F cable for Optical (5 m)
		DF-F600-K10M	1 G-1 G Fibre I/F Cable	SC-SC Fibre I/F cable for Optical (10 m)
		DF-F600-K20M	1 G-1 G Fibre I/F Cable	SC-SC Fibre I/F cable for Optical (20 m)
		DF-F600-K50M	1 G-1 G Fibre I/F Cable	SC-SC Fibre I/F cable for Optical (50 m)
		DF-F600-K1HM	1 G-1 G Fibre I/F Cable	SC-SC Fibre I/F cable for Optical (100 m)
		DF-F600-KB5M	1 G-2 G Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (5 m)
		DF-F600-KB10M	1 G-2 G Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (10 m)
		DF-F600-KB20M	1 G-2 G Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (20 m)
		DF-F600-KB50M	1 G-2 G Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (50 m)
		DF-F600-KB1HM	1 G-2 G Fibre I/F Cable	SC-LC Fibre I/F cable for Optical (100 m)
		DF-F600-KC5M	2 G-2 G Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (5 m)
		DF-F600-KC10M	2 G-2 G Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (10 m)
		DF-F600-KC20M	2 G-2 G Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (20 m)
		DF-F600-KC50M	2 G-2 G Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (50 m)
		DF-F600-KC1HM	2 G-2 G Fibre I/F Cable	LC-LC Fibre I/F cable for Optical (100 m)
3	RS232C cable(*2)	DF-F600-S5	RS232C cable	9 pins - 9 pins, 5 m
		DF-F600-S10	RS232C cable (SUN Ultra 5, 10)	9 pins - 9 pins, 10 m
		DF-F600-SH5	RS232C cable (HP)	9 pins - 25 pins, 5 m
		DF-F600-SH10	RS232C cable (HP)	9 pins - 25 pins, 10 m
		DF-F600-SS5	RS232C cable (SUN SPARC station)	9 pins - 25 pins, 5 m
		DF-F600-SS10	RS232C cable (SUN SPARC station)	9 pins - 25 pins, 10 m
		DF-F600-SR5	RS232C cable (IBM RS/6000)	9 pins - 25 pins, 5 m
		DF-F600-SR10	RS232C cable (IBM RS/6000)	9 pins - 25 pins, 10 m
4	Remote adapter cable(*1)	DF-F600-VRC2	Remote adapter cable	For control of Remote adapter, 2 m
		DF-F600-VRC5	Remote adapter cable	For control of Remote adapter, 5 m
		DF-F600-VRC10	Remote adapter cable	For control of Remote adapter, 10 m
		DF-F600-VRC20	Remote adapter cable	For control of Remote adapter, 20 m
		DF-F600-VRC50	Remote adapter cable	For control of Remote adapter, 50 m
5	Tray for remote adapter(*1)	DF-F600-HVR3	Tray for remote adapter	Rail kit for mounting the Remote adapter on the U6 rack frame.
6	FC cable assembly for 2 G bps	DF-F600-K5B	FC cable assembly	FC cable 5 m (2)
		DF-F600-K075B	FC cable assembly	FC cable 75 cm (2)
		DF-F600-K5BUP	FC cable assembly Kit	FC cable 5 m (2), ENC P/K (2)
7	Decoration panel	DF-F600-U10D	Decoration panel	Panel to cover vacant space (1 EIA) of the U6 rack frame.

*1 : RKD, RKAD, RKSD, Floor (RKD+H1HD) Model, Floor (RKD+RKAD+H2HD) Model, and Floor (RKSD+H1HD) Model are not used.

*2 : This cable cannot be used for models in which the RKH/RKHE is mounted.

Copyright © 2003, 2005, Hitachi, Ltd.

1.7 Device ID Setting and ENC Cable Connection

1.7.1 Example of device ID and ENC cable connection

(1) For RK+RKA

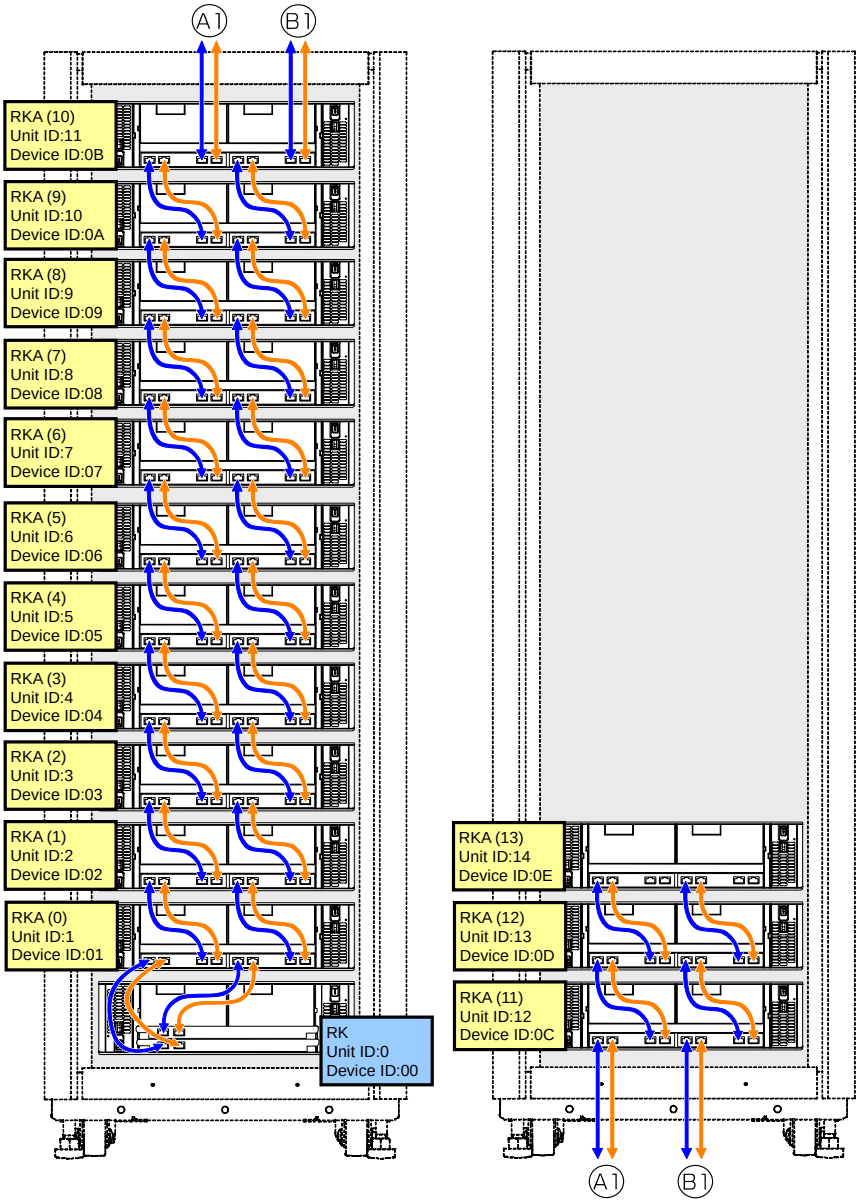


Figure 1.7.1 Example of RK+RKA ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	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
4th	#3	#03	8th	#7	#07	12th	#11	#0B			

Copyright © 2004, 2005, Hitachi, Ltd.

(2) For RKH/RKHE+RKA

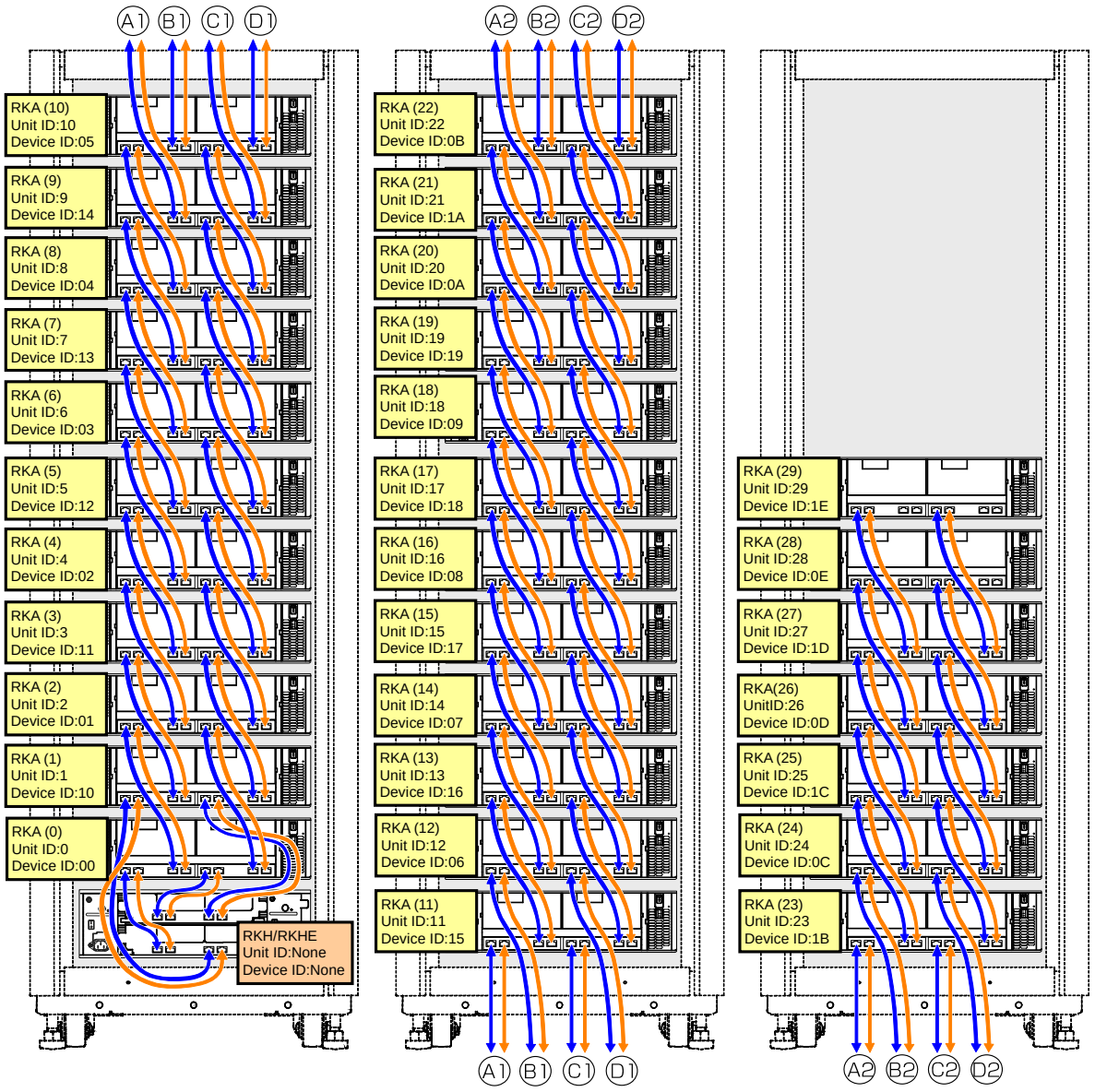


Figure 1.7.2 Example of RKH/RKHE+RKA ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID		Unit ID	Device ID
1st	-	-	9th	#7	#13	17th	#15	#17	25th	#23	#1B
2nd	#0	#00	10th	#8	#04	18th	#16	#08	26th	#24	#0C
3rd	#1	#10	11th	#9	#14	19th	#17	#18	27th	#25	#1C
4th	#2	#01	12th	#10	#05	20th	#18	#09	28th	#26	#0D
5th	#3	#11	13th	#11	#15	21st	#19	#19	29th	#27	#1D
6th	#4	#02	14th	#12	#06	22nd	#20	#0A	30th	#28	#0E
7th	#5	#12	15th	#13	#16	23rd	#21	#1A	31th	#29	#1E
8th	#6	#03	16th	#14	#07	24th	#22	#0B			

Copyright © 2004, 2005, Hitachi, Ltd.

(3) For RK+RKA+RKAAT

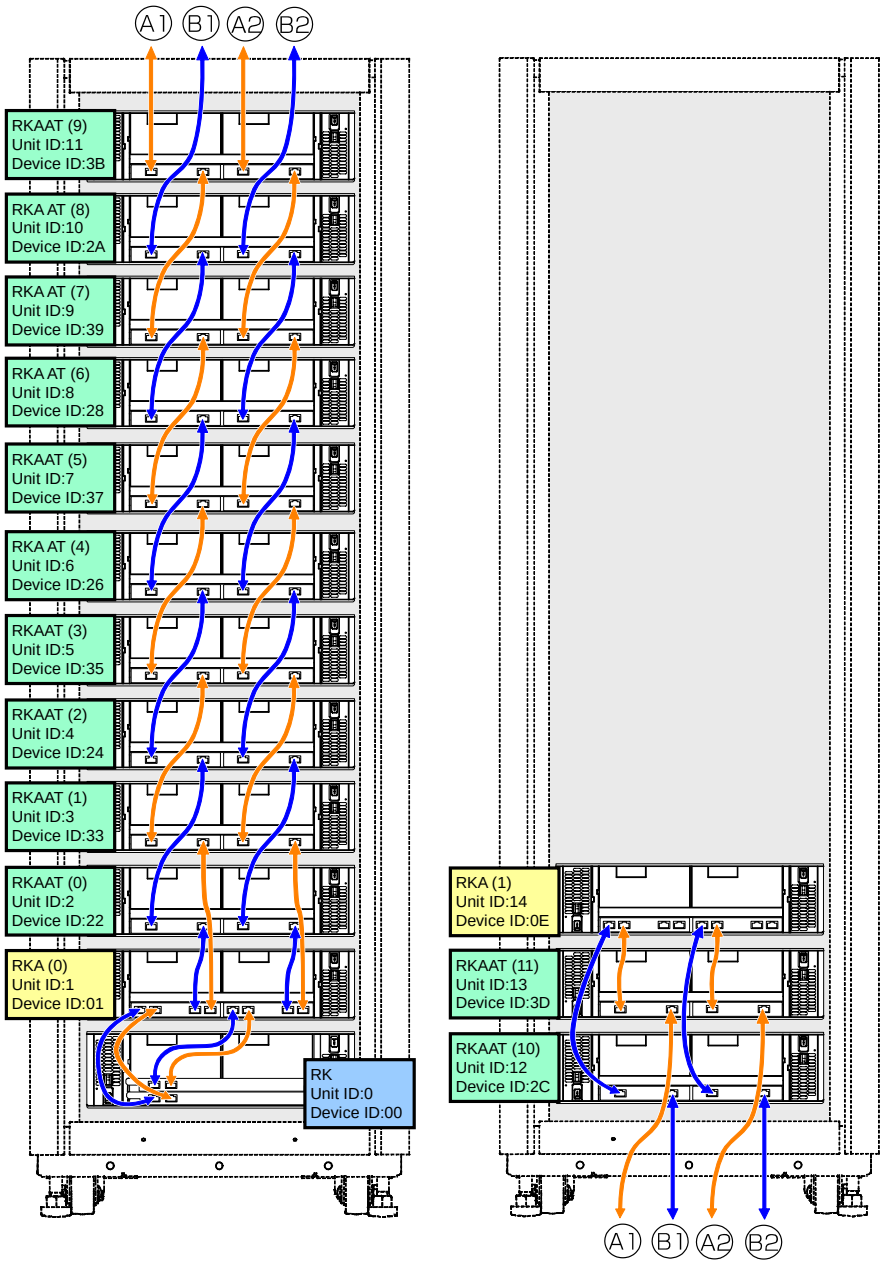


Figure 1.7.3 Example of RK+RKA+RKAAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	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			

Copyright © 2004, 2005, Hitachi, Ltd.

(4) For RK+RKA+RKAJAT

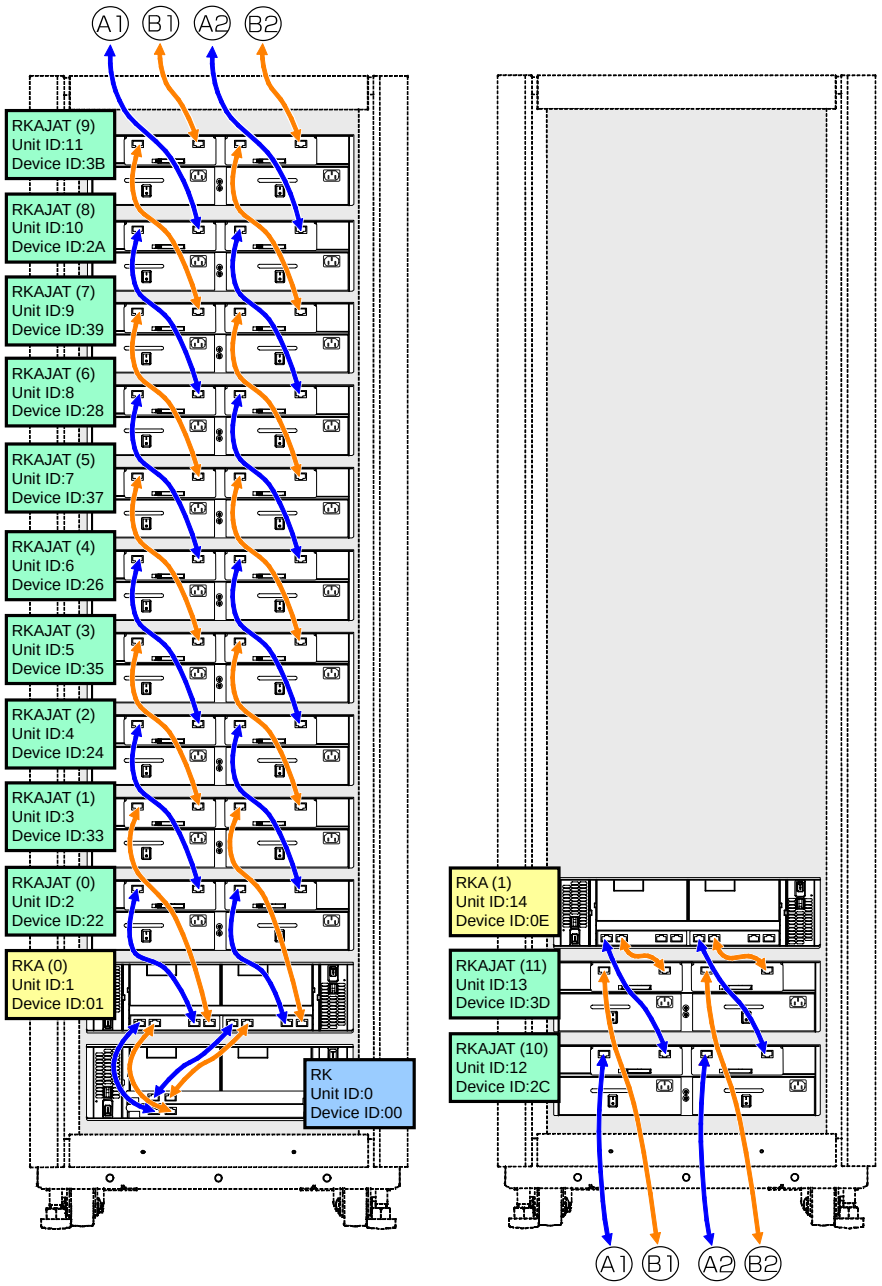


Figure 1.7.4 Example of RK+RKA+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	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			

Copyright © 2005, Hitachi, Ltd.

(5) For RKH/RKHE+RKA+RKAAT

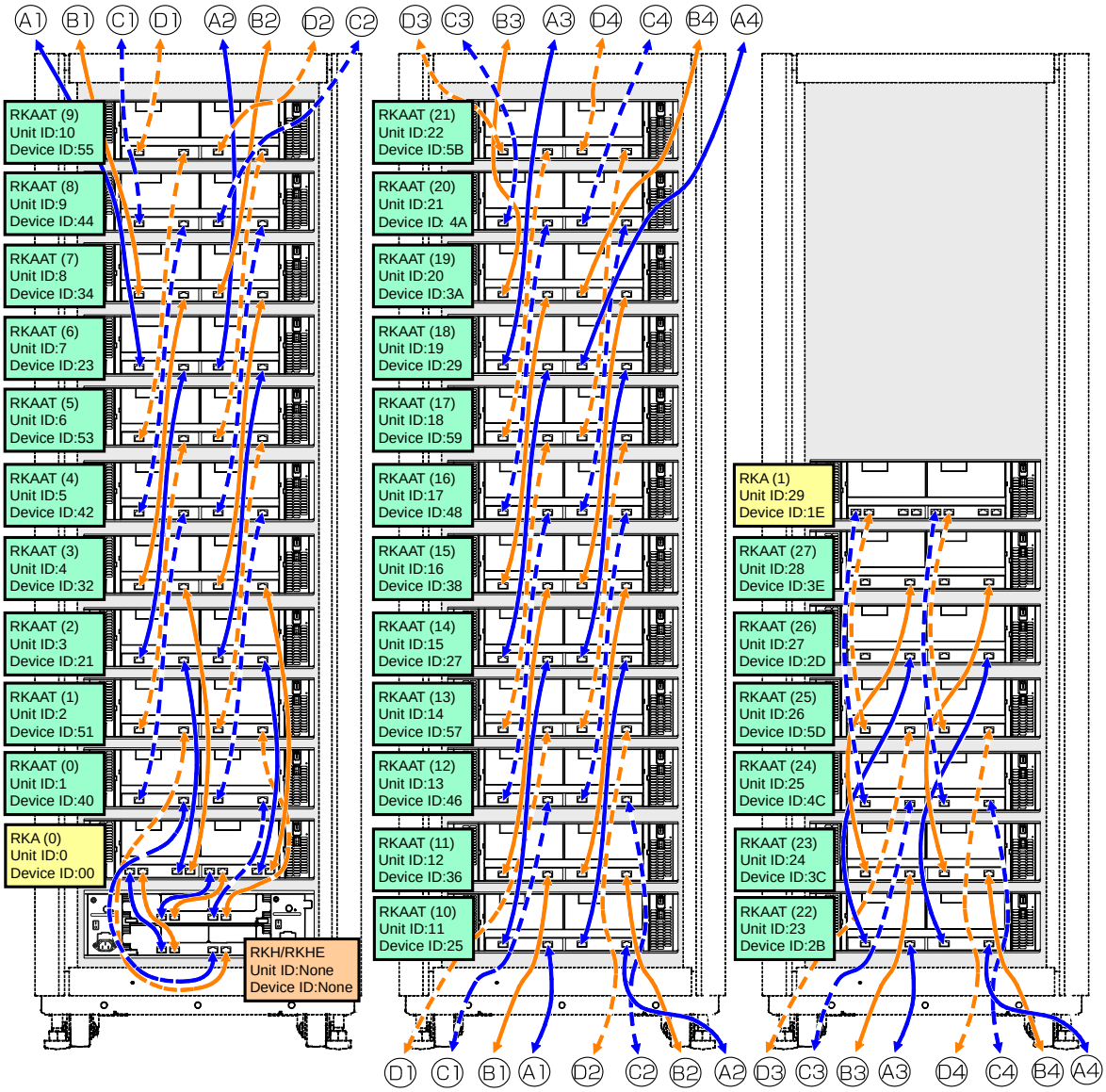


Figure 1.7.5 Example of RKH/RKHE+RKA+RKAAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	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			

Copyright © 2005, Hitachi, Ltd.

(6) For RKH/RKHE+RKA+RKAJAT

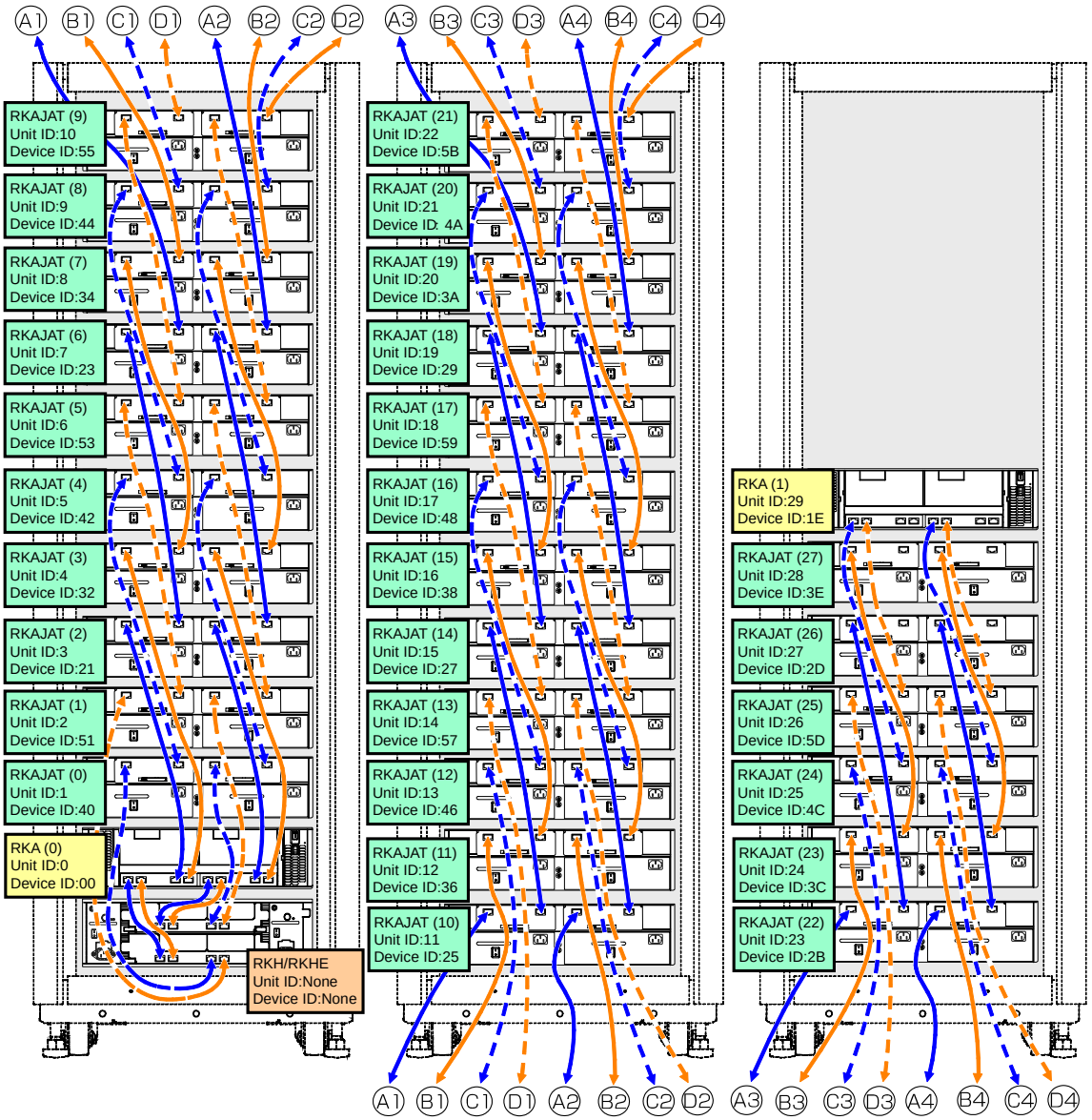


Figure 1.7.6 Example of RKH/RKHE+RKA+RKAJAT ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	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			

Copyright © 2004, 2005, Hitachi, Ltd.

(7) For RKL+RKAATL

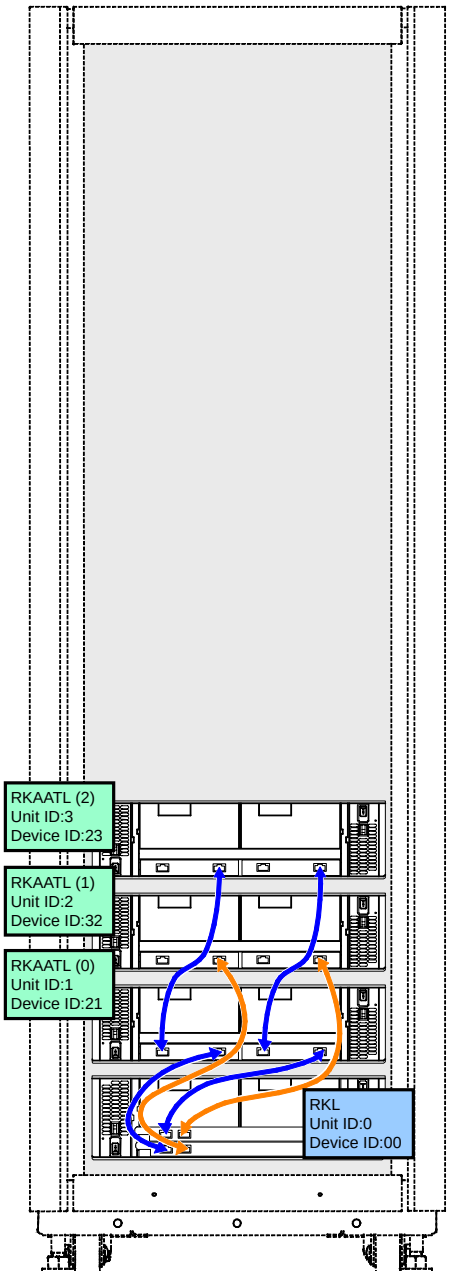


Figure 1.7.7 Example of RKL+RKAATL ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	Unit ID	Device ID
1st	#0	#00
2nd	#1	#21
3rd	#2	#32
4th	#3	#23

Copyright © 2004, 2005, Hitachi, Ltd.

(8) For RKL+RKAJATL

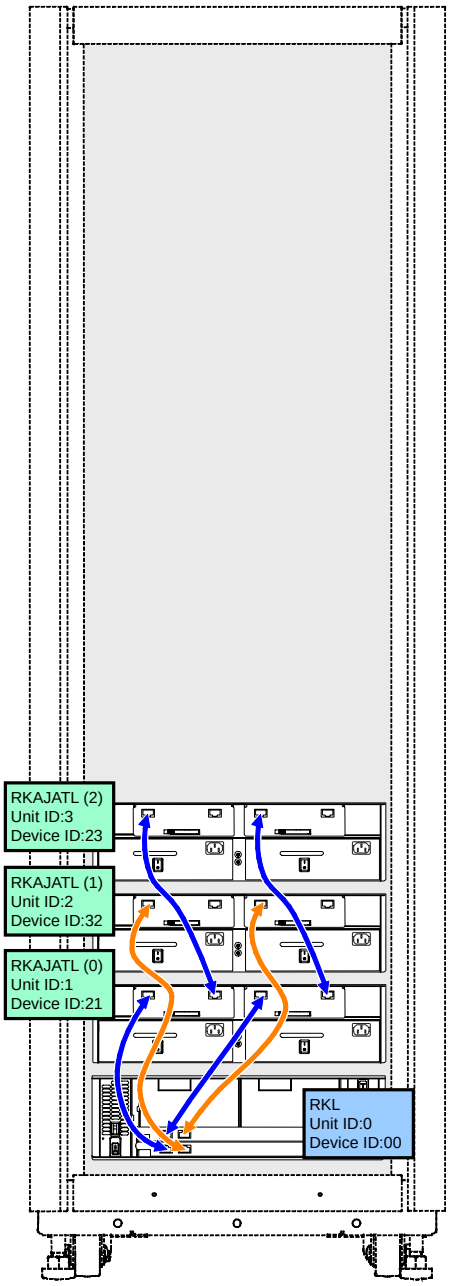


Figure 1.7.8 Example of RKL+RKAJATL ENC cable connection (The figure shows an example in which the maximum configuration is installed in the U6 rack frame.)

	Unit ID	Device ID
1st	#0	#00
2nd	#1	#21
3rd	#2	#32
4th	#3	#23

Copyright © 2004, 2005, Hitachi, Ltd.

1.7.2 Acquisition of device ID and ENC cable connection information

Set up the specified device ID and connect the ENC cable by executing the ACE tool. If error messages are displayed during the operation, refer to "9.6 Error Message List" (INS 09-0310) and perform the recovery method.

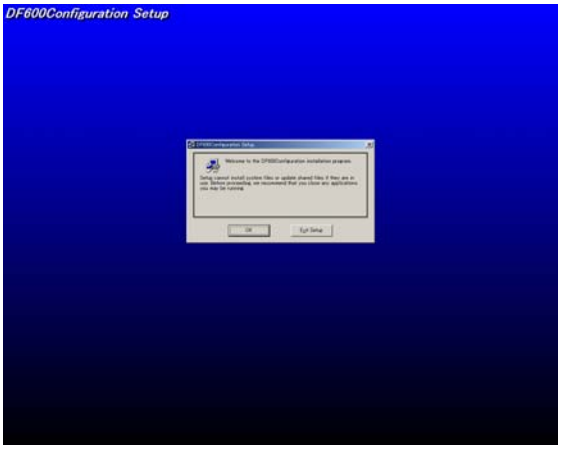
The unit models that are represented by "Fibre" and "SATA" displayed in windows differ by 9520V, 9570V, and 9580V/9585V. For the represented unit models, refer to the following table.

	9520V (RKL)	9570V (RK)	9580V/9585V (RKH/RKHE)
Fibre	—	RK/RKA	RKA
SATA	RKAATL/RKAJATL	RKAAT/RKAJAT	RKAAT/RKAJAT

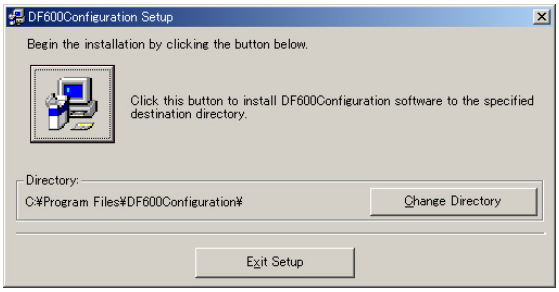
(1) Procedure for Installation

NOTE : When ACE tool of early version is installed, uninstall it and then install the later and appropriate one.

(a) Double click the "ACE_tool\setup.exe" of the CD-ROM for microprogram installation.
(b) The initial setting up window is activated.
(c) Click the [OK] button.

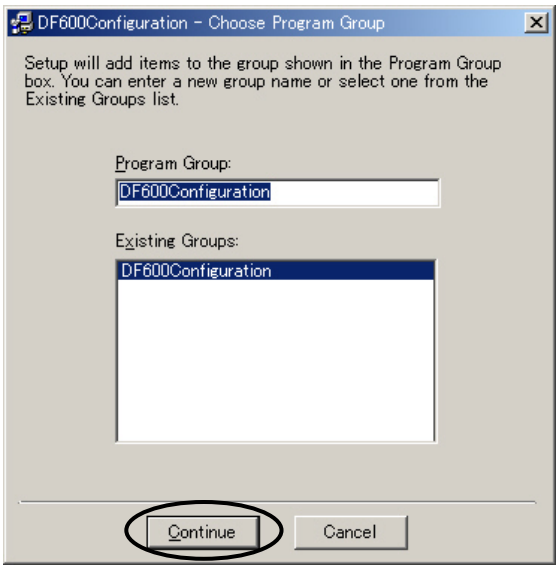


(d) Click the [] button.



Copyright © 2004, 2005, Hitachi, Ltd.

(e) Click the [Continue] button.



(f) Click the [OK] button.

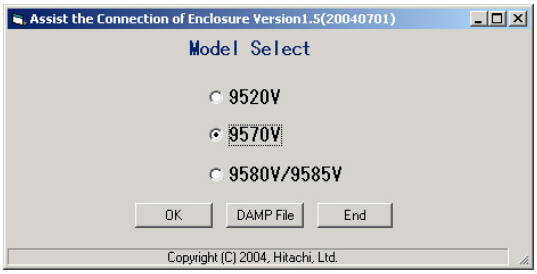


Copyright © 2004, 2005, Hitachi, Ltd.

1.7.3 Checking methods of device ID and ENC cable connection when mounting the newly introduced rack

(1) Select [Start] – [Program] – [DF600Configuration] – [DF600Configuration].
The ACE tool starts up and the "Model Select" window is displayed.

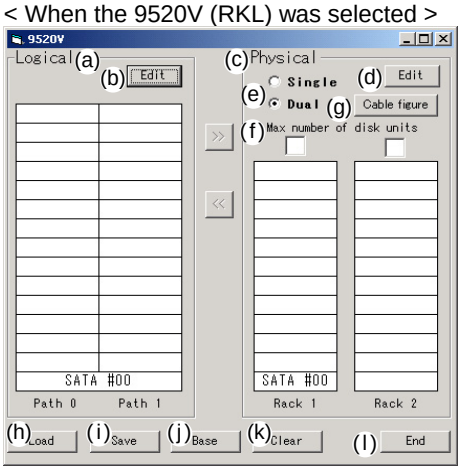
(2) Select the subsystem, and click the [OK] button.



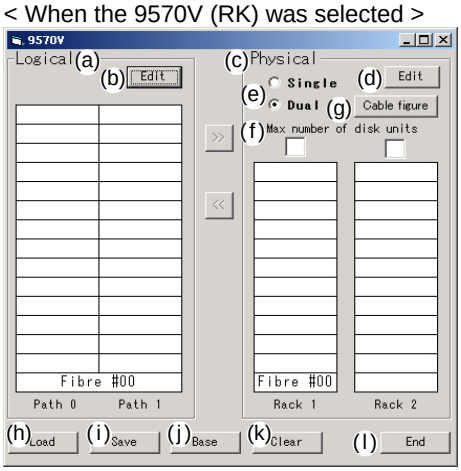
(3) Set the subsystem to be configured in the frame part of the physical configuration window.
Click the [Edit] button in the physical configuration window.

Version 1.5

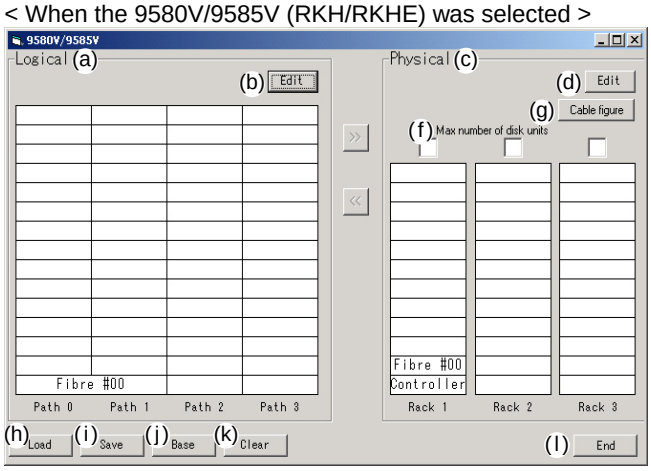
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >



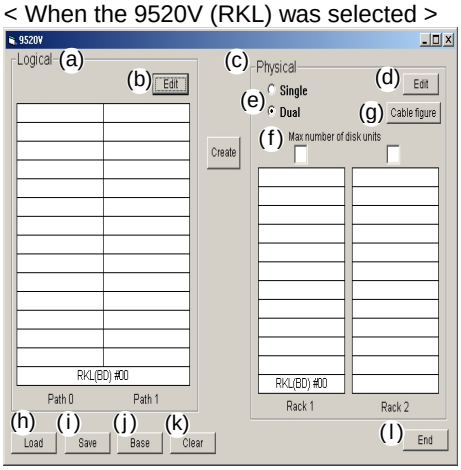
Copyright © 2004, 2005, Hitachi, Ltd.

(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 [] button is selected after the setting, the subsystem and the device ID are displayed in the Logical and the Physical windows.
(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 [] button is selected after the setting, the subsystem and the device ID are displayed in the Logical and the Physical windows.
(e) [Single, Dual in Physical] button : It selects the installation configuration of the Control Unit (not displayed in the 9580V/9585V (RKH/RKHE)).
(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 and the Physical windows.
(k) [Clear] button : The subsystem and the device ID, which have been set, are cleared.
(l) [End] button : It returns to the device model selection window.

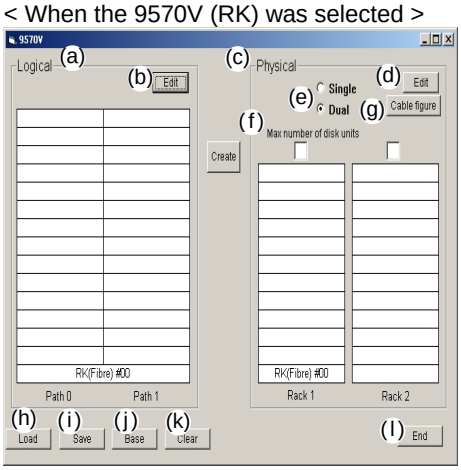
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

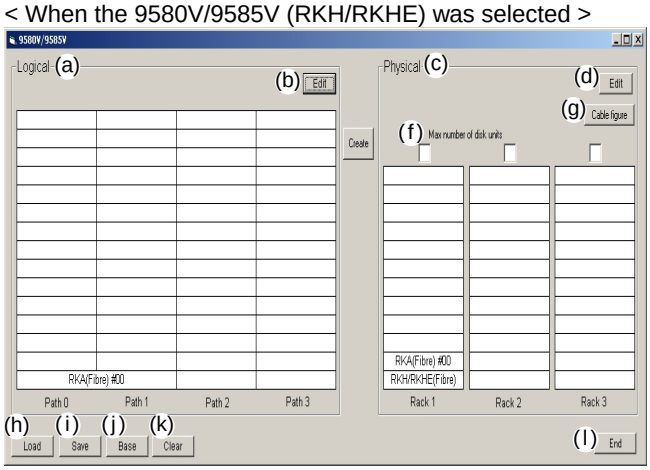
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >

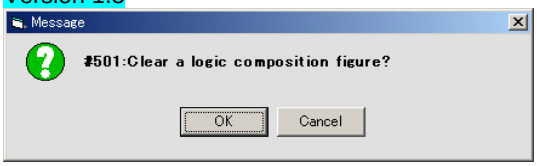


Copyright © 2004, 2005, Hitachi, Ltd.

(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 and the Physical windows.
(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 and the Physical windows.
(e) [Single, Dual in Physical] button : It selects the installation configuration of the Control Unit (not displayed in the 9580V/9585V (RKH/RKHE)).
(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 and the Physical windows.
(k) [Clear] button : The subsystem and the device ID, which have been set, are cleared.
(l) [End] button : It returns to the device model selection window.

(4) Click the [OK] button.

Version 1.5



Version 2.0

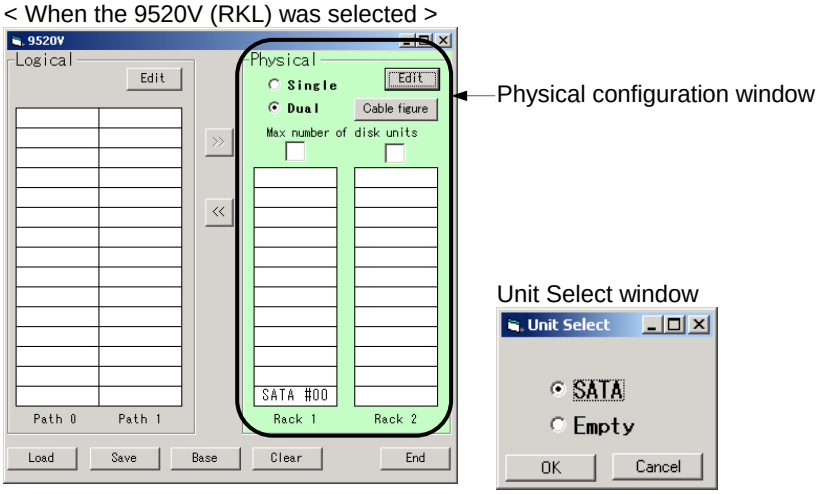


Copyright © 2004, 2005, Hitachi, Ltd.

(5) If the chassis frame section the physical configuration window is clicked, the “Unit Select” window is displayed. Select Fibre, SATA or Empty and input the configuration. Check that the actual rack mounting position and the physical configuration window are the same.
In the case of Version 2.0, select RKA(Fibre), RKAAT(SATA), RKAJAT(SATA), or Empty.

Version 1.5

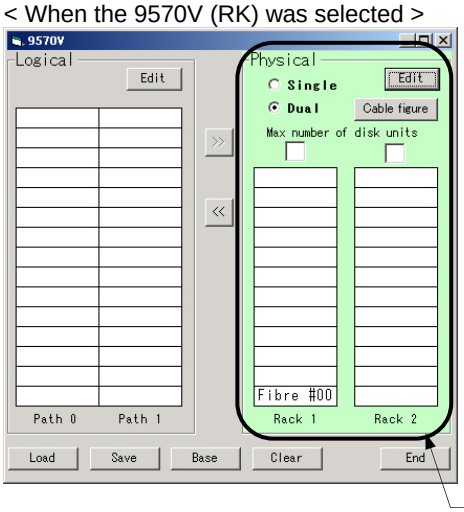
< When the 9520V (RKL) was selected >



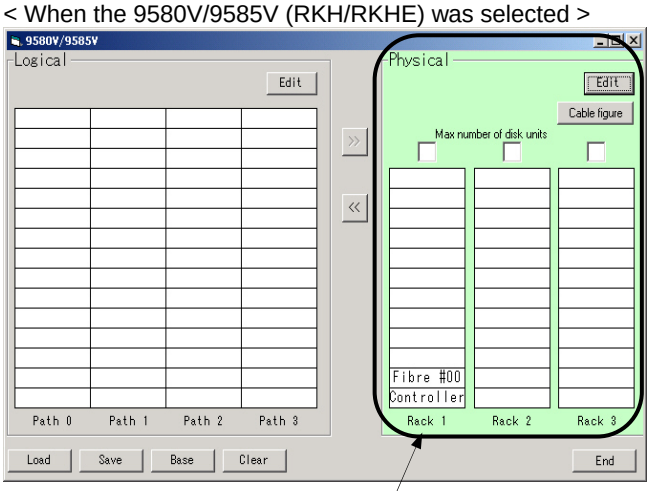
Physical configuration window

Unit Select window

< When the 9570V (RK) was selected >

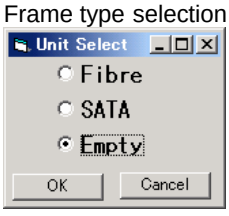


< When the 9580V/9585V (RKH/RKHE) was selected >



Physical configuration window

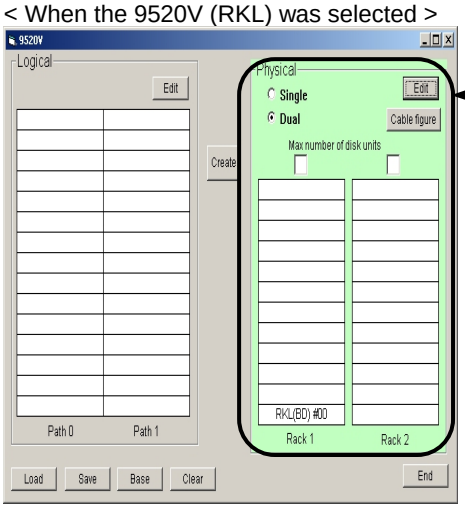
Frame type selection window



Copyright © 2005, Hitachi, Ltd.

Version 2.0

< When the 9520V (RKL) was selected >

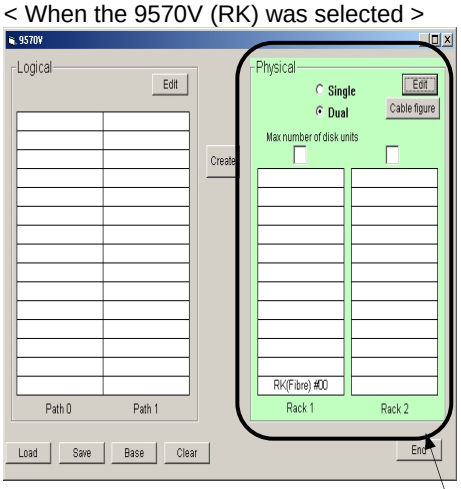


Physical configuration window

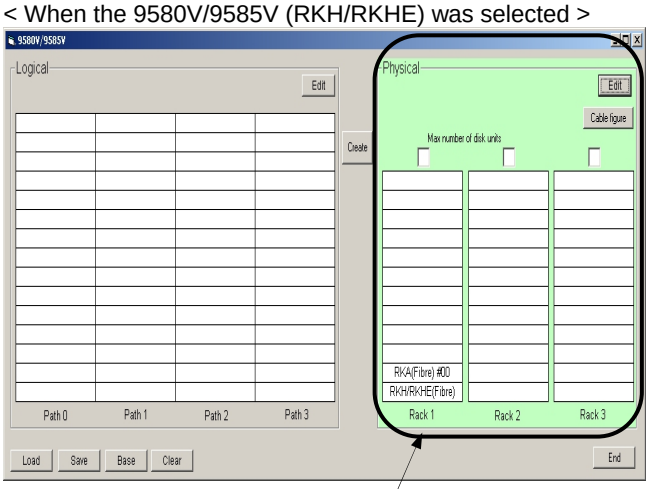
Unit Select window



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >



Physical configuration window

Frame type selection window

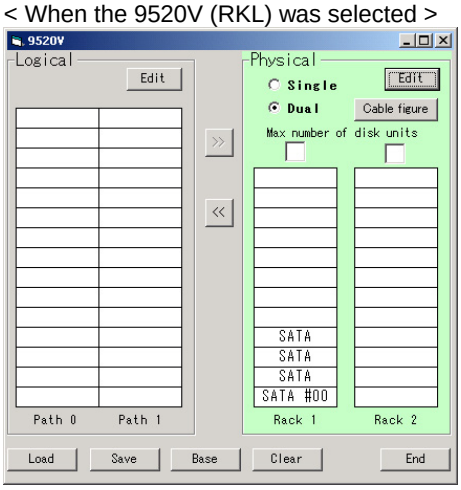


Copyright © 2005, Hitachi, Ltd.

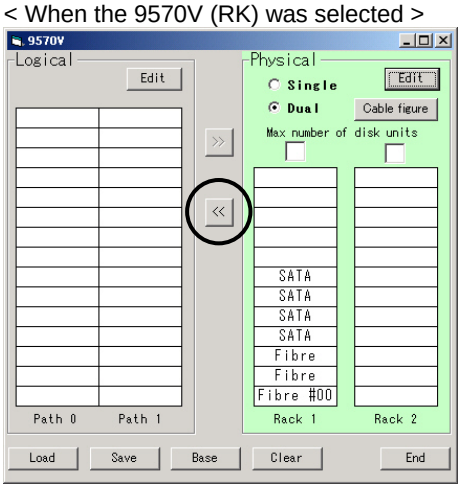
(6) Click the [<<] button.
In the case of Version 2.0, click the [Create] button.

Version 1.5

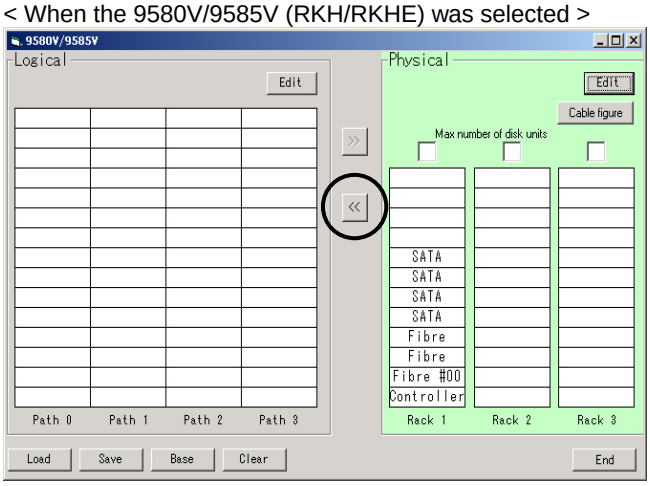
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



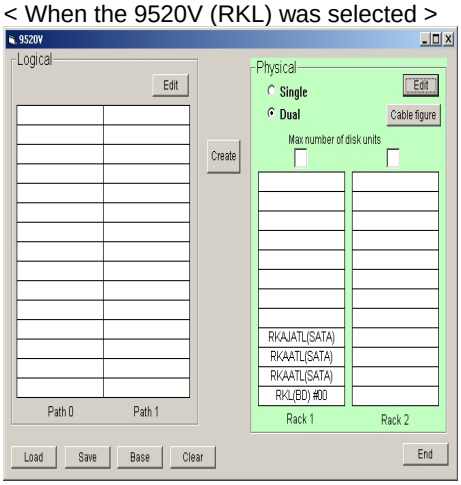
< When the 9580V/9585V (RKH/RKHE) was selected >



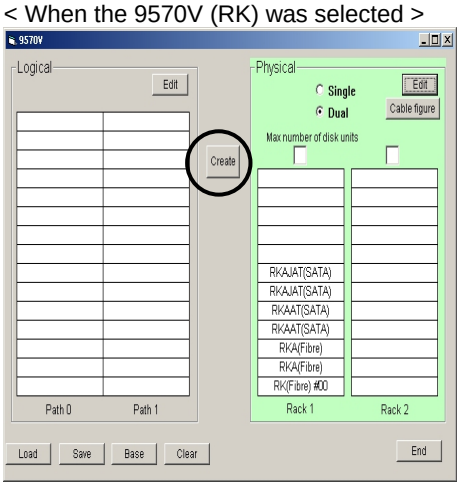
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

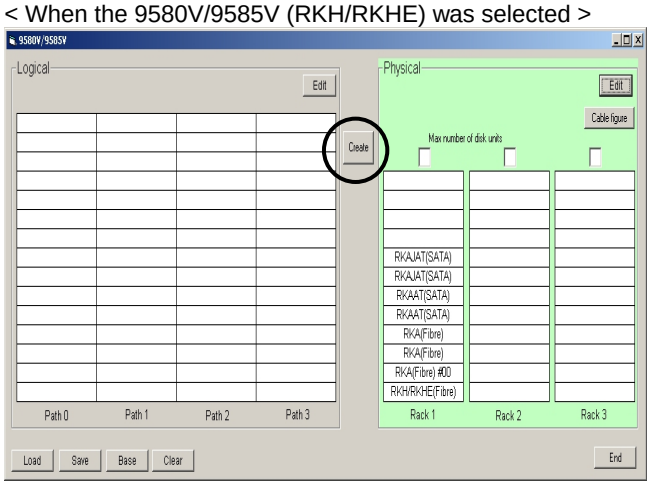
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >

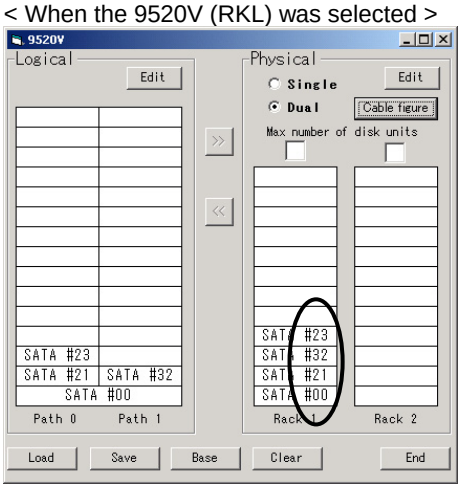


Copyright © 2005, Hitachi, Ltd.

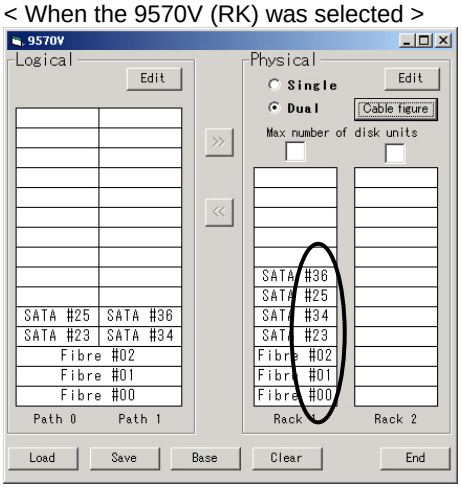
(7) The device ID# is output in the logical window and the physical configuration window.

Version 1.5

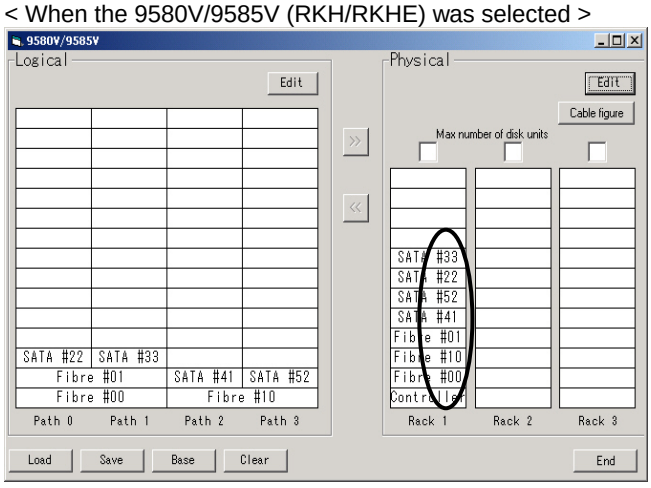
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



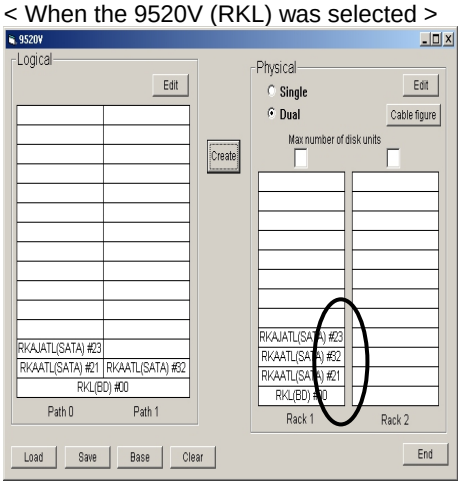
< When the 9580V/9585V (RKH/RKHE) was selected >



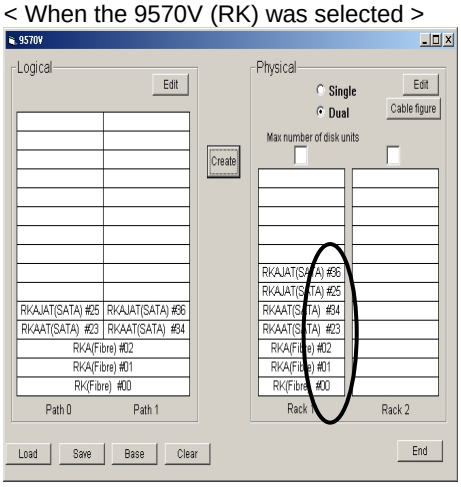
Copyright © 2005, Hitachi, Ltd.

Version 2.0

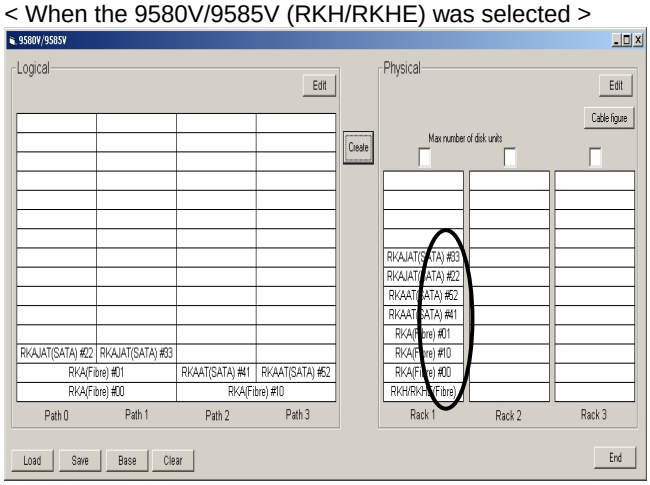
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >

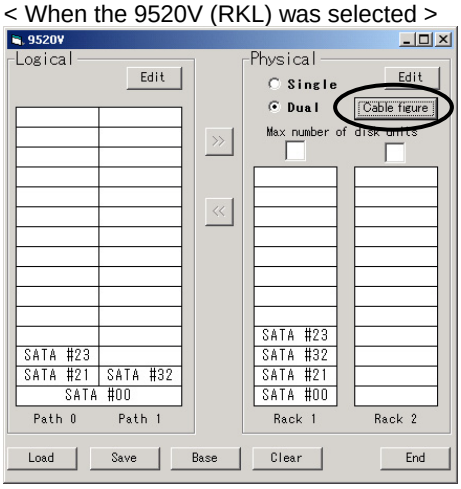


Copyright © 2004, 2005, Hitachi, Ltd.

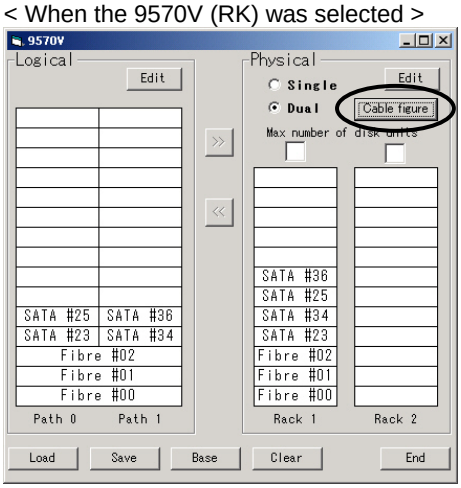
(8) Click the [Cable figure] button.

Version 1.5

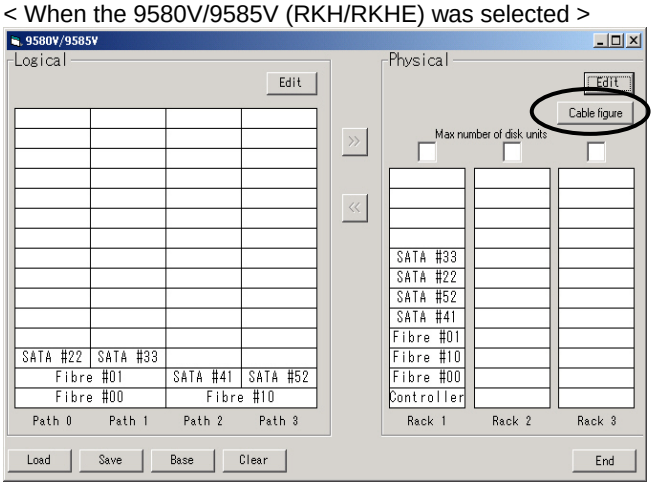
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



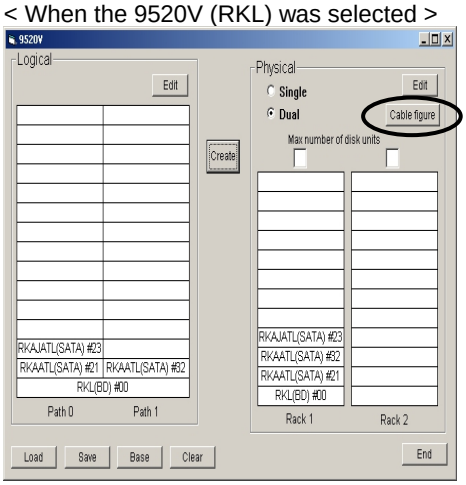
< When the 9580V/9585V (RKH/RKHE) was selected >



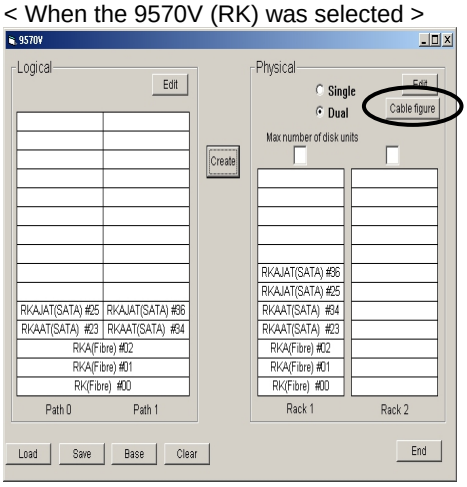
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

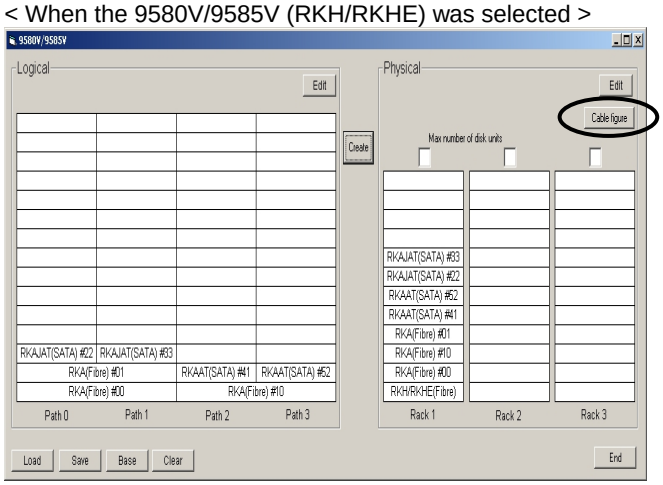
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >



Copyright © 2004, 2005, Hitachi, Ltd.

(9) The ENC cable connection diagram is displayed.
Refer to the ENC cable connection figure, and perform the ENC cable connection.

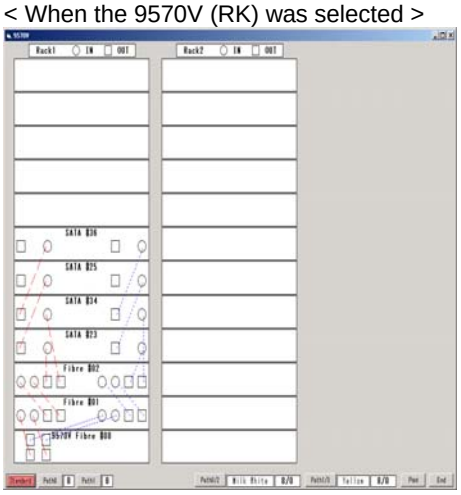
NOTE : • Positions of the connectors on the RKA/RKAAT and RKAJAT are the upper and lower ones respectively.
• Locations of the IN/OUT on the RKAAT and RKAJAT are different from each other.

Version 1.5

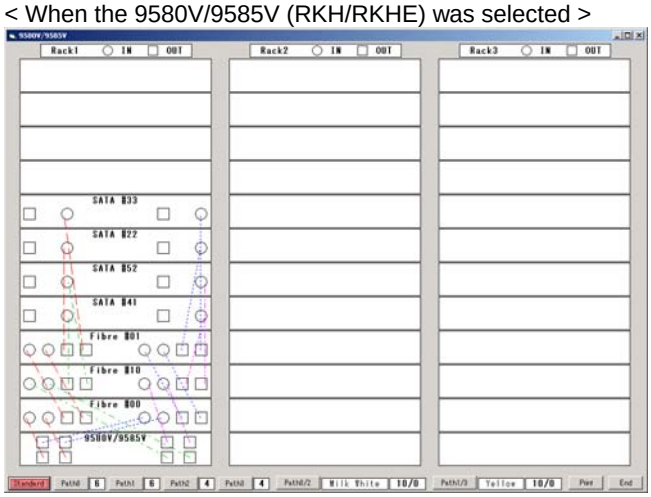
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



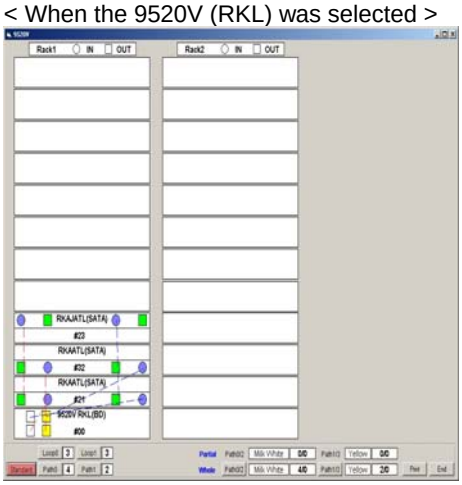
< When the 9580V/9585V (RKH/RKHE) was selected >



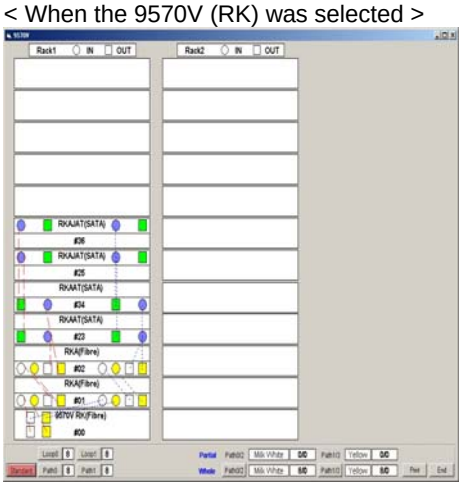
Copyright © 2005, Hitachi, Ltd.

Version 2.0

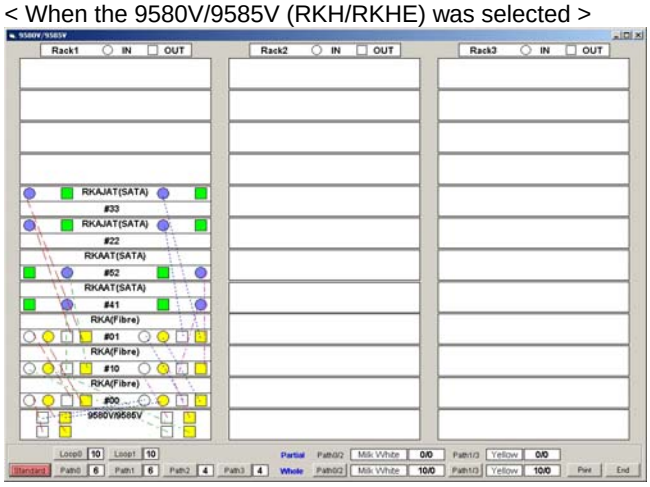
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



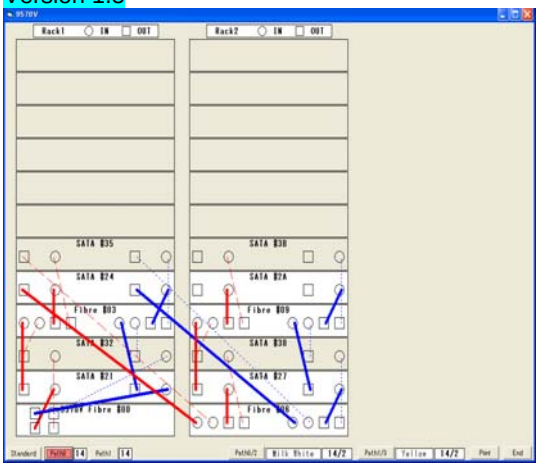
< When the 9580V/9585V (RKH/RKHE) was selected >



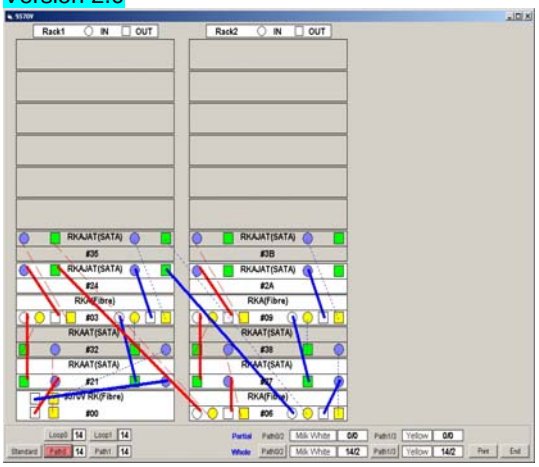
Copyright © 2005, Hitachi, Ltd.

(a) When Path 0 is selected, the Path 0 is highlighted and the disk units connected to its lines are displayed in white.

Version 1.5

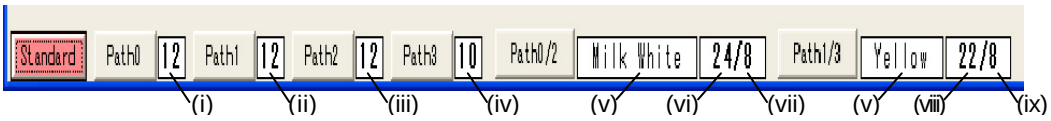


Version 2.0

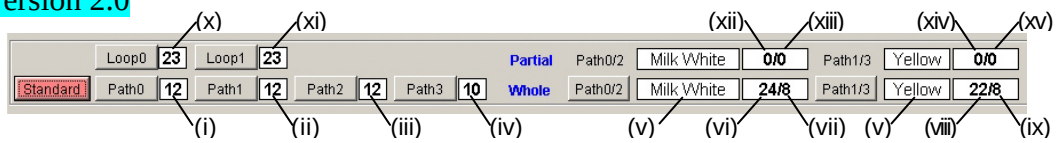


When the each [Path] button is clicked, the displayed lines connected to the path are highlighted, disk units connected to the lines are displayed in white, and disk units not connected to the lines are displayed in gray.
To cancel the highlighting, click the [Standard] button.
The explanations of the buttons are shown below.

Version 1.5



Version 2.0



[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 9520V (RKL)/9570V (RK)).
[Path3] button	: The line connected to Path3 is highlighted (it is not displayed in the 9520V (RKL)/9570V (RK)).
[Path0/2] button	: The lines connected to Path0 and Path2 are highlighted (Path2 does not exist in the 9520V (RKL)/9570V (RK)).
[Path1/3] button	: The lines connected to Path1 and Path3 are highlighted (Path3 does not exist in the 9520V (RKL)/9570V (RK)).
[Loop0] button	: The line connected to Loop0 is highlighted.
[Loop1] button	: The line connected to Loop1 is highlighted.

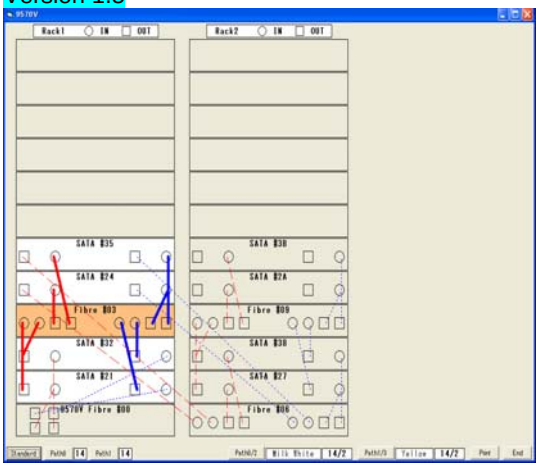
Copyright © 2004, 2005, Hitachi, Ltd.

[Explanation of the window display]

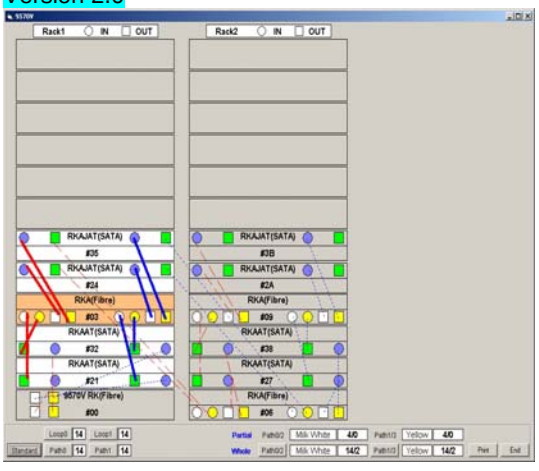
(i) The number of ENC cables of Path0 is displayed.
(ii) The number of ENC cables of Path1 is displayed.
(iii) The number of ENC cables of Path2 is displayed (it is not displayed in the 9520V (RKL)/9570V (RK)).
(iv) The number of ENC cables of Path3 is displayed (it is not displayed in the 9520V (RKL)/9570V (RK)).
(v) The color of the binders attached to both ends of the ENC cable is displayed.
(vi) The number of ENC cables of Path0 and Path2 is displayed (only the number of Path0 is displayed in the 9520V (RKL)/9570V (RK) because Path2 does not exist).
(vii) The number of ENC cables (long ENC cables) between the racks of Path0 and Path2 is displayed.
(viii) The number of ENC cables of Path1 and Path3 is displayed (only the number of Path1 is displayed in the 9520V (RKL)/9570V (RK) because Path3 does not exist).
(ix) The number of ENC cables (long ENC cables) between the racks of Path1 and Path3 is displayed.
(x) The number of ENC cables of Loop0 is displayed.
(xi) The number of ENC cables of Loop1 is displayed.
(xii) 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.
(xiii) 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.
(xiv) 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.
(xv) 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 “Fibre #03” is selected, the Fibre #03 disk unit is displayed in orange and disk units connected to the Fibre #03 disk unit are displayed in white.
Besides, the displayed ENC cables connected to the Fibre #03 disk unit are highlighted.

Version 1.5



Version 2.0



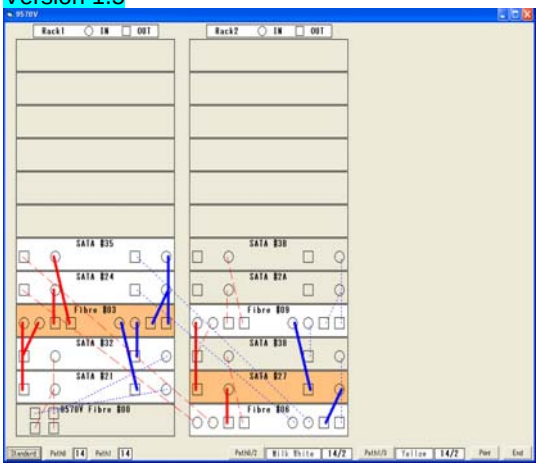
Copyright © 2004, 2005, Hitachi, Ltd.

To cancel the selection of the disk unit, click the [Standard] button.

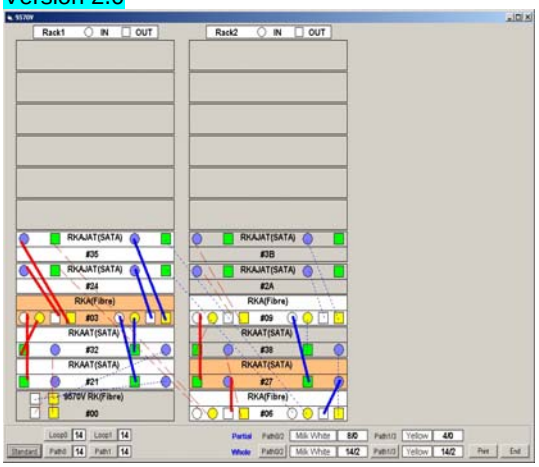
Copyright © 2004, 2005, Hitachi, Ltd.

(c) When [Fibre#03] is selected and [SATA#27] is clicked while the control [Ctrl] key is pressed, the chassis frame connected to the [Fibre#03 and SATA#27] chassis frame is displayed in white. Also, the connecting ENC cable from the [Fibre#03 and SATA#27] chassis frame is highlighted.

Version 1.5



Version 2.0



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.

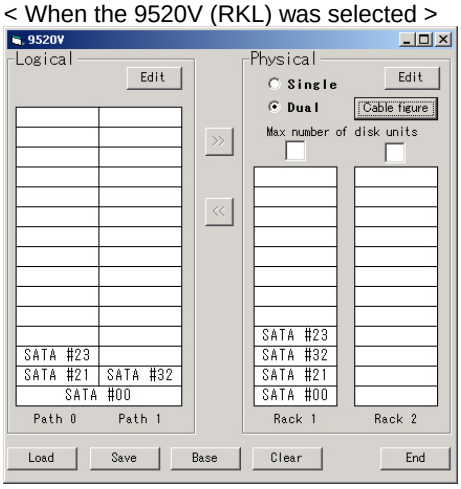
(10) Click the [End] button in the ENC cable connection figure.
It returns to the physical configuration window.

Copyright © 2004, 2005, Hitachi, Ltd.

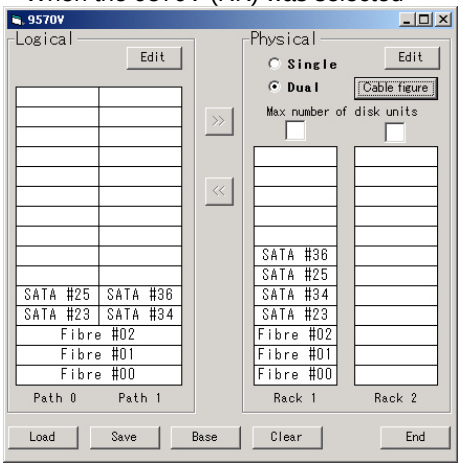
(11) Click the [End] button.

Version 1.5

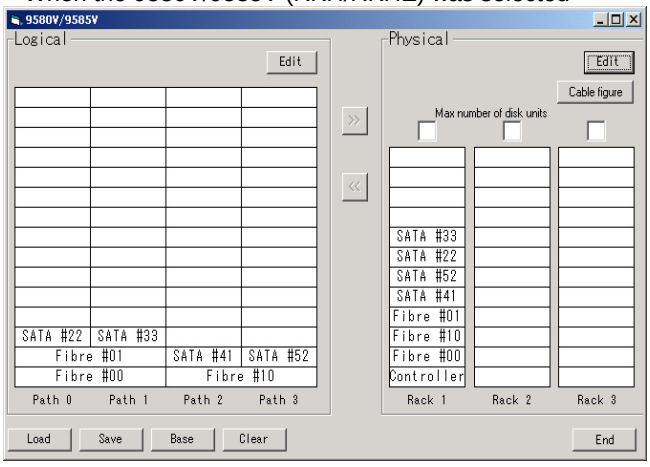
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



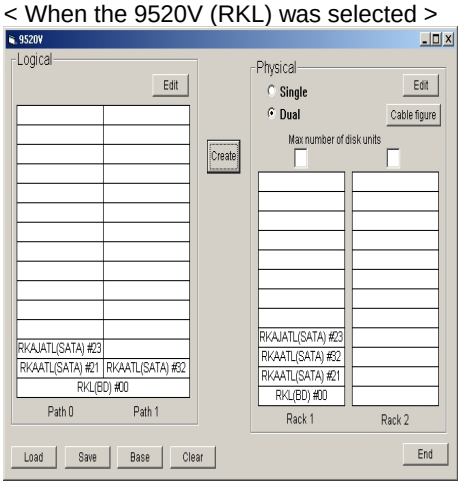
< When the 9580V/9585V (RKH/RKHE) was selected >



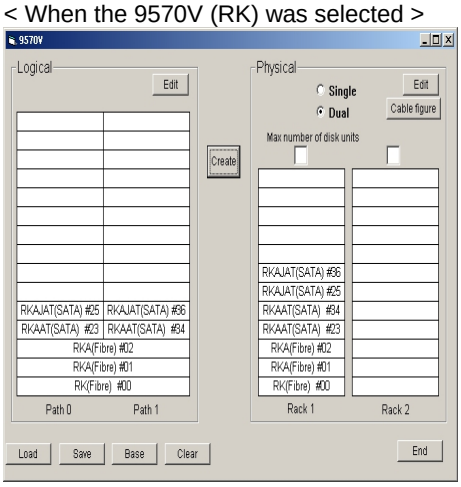
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

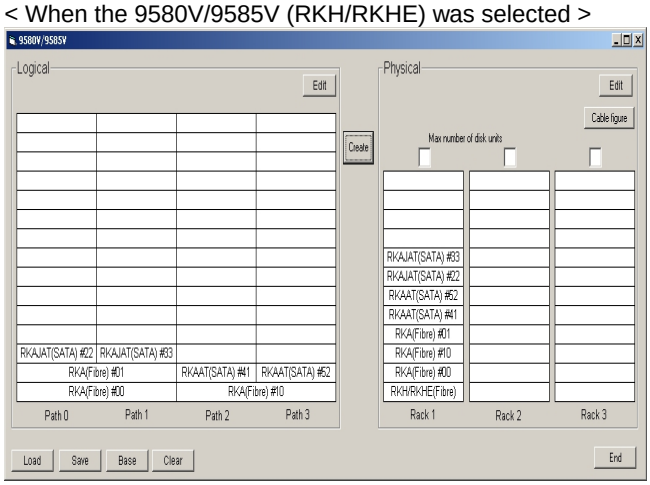
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >

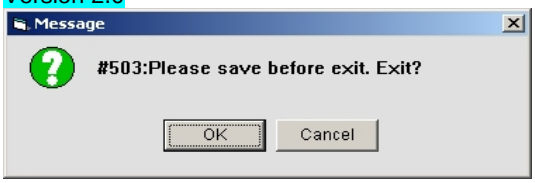


(12) Click the [OK] button.

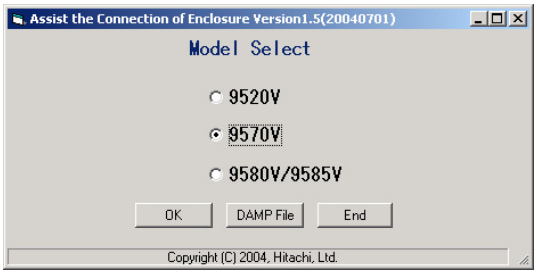
Version 1.5



Version 2.0



(13) Click the [End] button. The tool is terminated.



Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

1.7.4 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 Disk Array Management Program and to have the file read.

NOTE : • When the configuration information is got from the system, to which the RKAJAT is connected, using the configuration copy function of Disk Array Management Program 2 and the ACE Tool is made to read in the file, the ACE Tool displays RKAAT instead of RKAJAT. Change the RKAAT to RKAJAT manually because their cable connections are different from each other though their device IDs are the same.
• When the RKAJAT is connected, use the ACE Tool of Version 2.0 because that of Version 1.0 does not support it.

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 "9.6 Error Message List" (INS 09-0310) and perform the recovery method.
③ The unit models that are represented by "Fibre" and "SATA" displayed in windows differs by 9520V, 9570V, and 9580V/9585V. For the represented unit models, refer to the following table.

	9520V (RKL)	9570V (RK)	9580V/9585V (RKH/RKHE)
Fibre	—	RK/RKA	RKA
SATA	RKAATL/RKAJATL	RKAAT/RKAJAT	RKAAT/RKAJAT

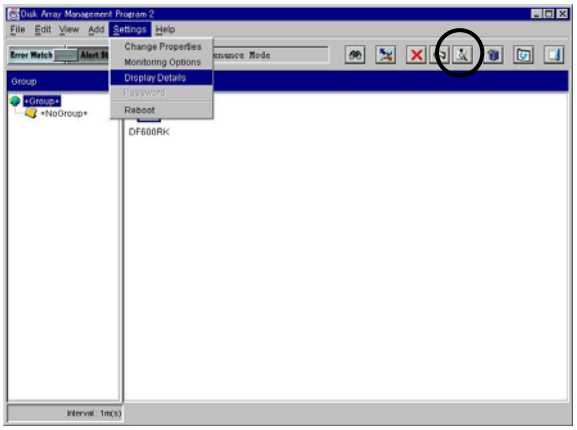
④ The configuration figure creation method for adding chassis frames is corresponding to the Disk Array Management Program version 9.50 or later.

Copyright © 2004, 2005, Hitachi, Ltd.

(1) For the installation method of the ACE tool, refer to “1.7.2 (1) Procedure for Installation” (INS 01-0220).

(2) Start the Disk Array Management Program and set the Active Mode in the “Maintenance Mode”.
For the procedure for changing to the Maintenance mode, refer to Step (b), “Changing the Maintenance Mode” on page INST 05-0050 in Item (3), “Registering the newly introduced DF in the Disk Array Management Program” in Subsection 5.1.1.

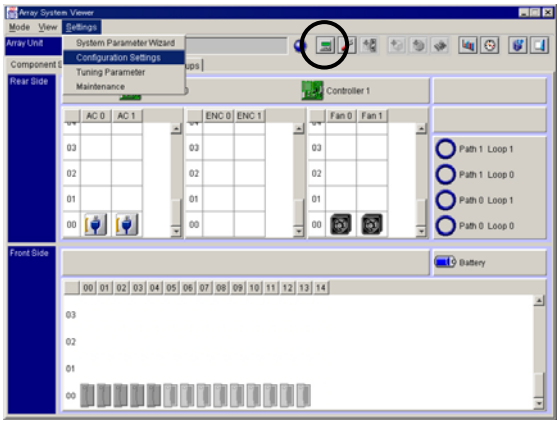
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Display Details]



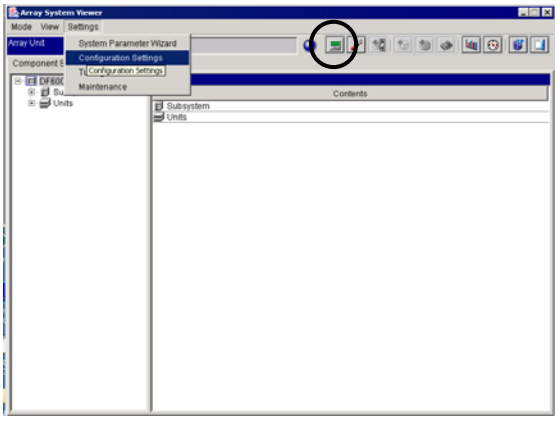
Copyright © 2004, 2005, Hitachi, Ltd.

(4) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] in the tool bar.

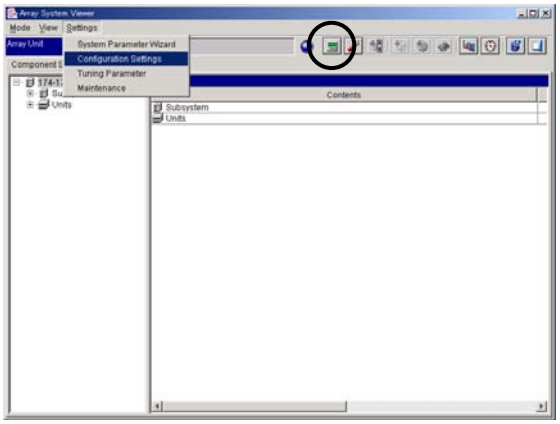
DAMP Version is Ver.7.xx or earlier.



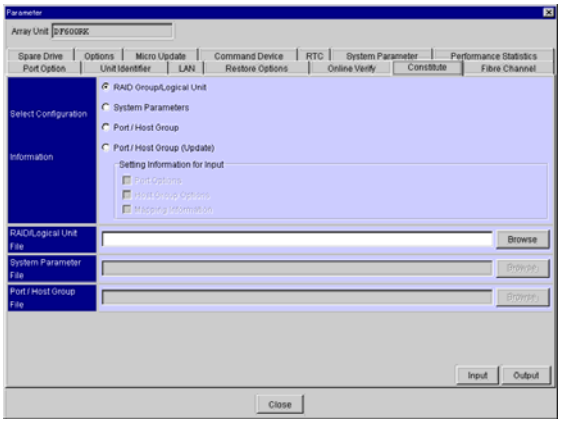
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.



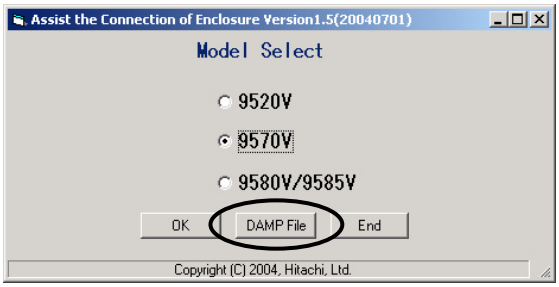
(5) Click the [Constitute] tab.
Get the configuration information by selecting [RAID Group/Logical Unit].



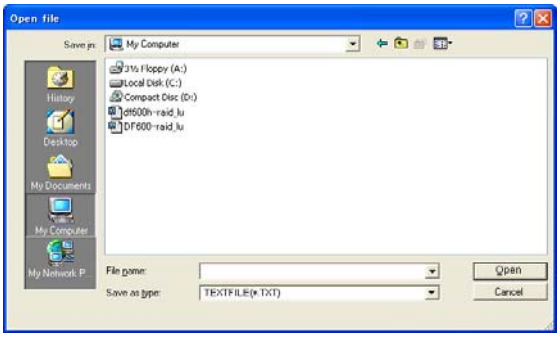
Copyright © 2004, 2005, Hitachi, Ltd.

(6) Select [Start] – [Program] – [DF600Configuration] – [DF600Configuration]. The ACE tool starts up and the "Model Select" window is displayed.

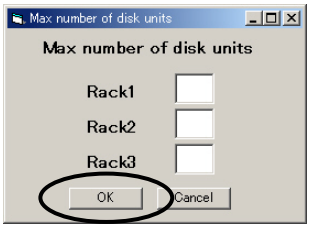
(7) Select the subsystem, and click the [DAMP File] button.



(8) Have the file that has been got in Step (2) read.



(9) 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.

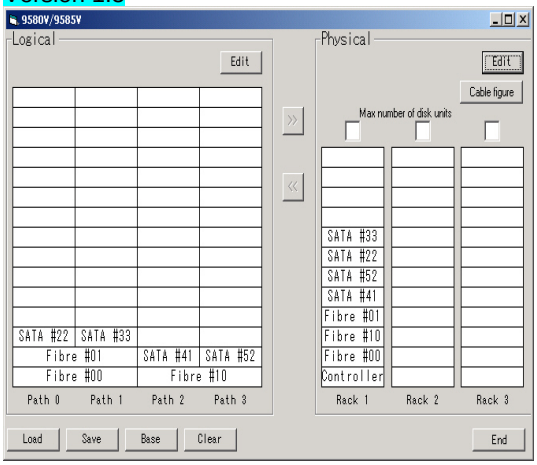


(10) Click the [OK] button.

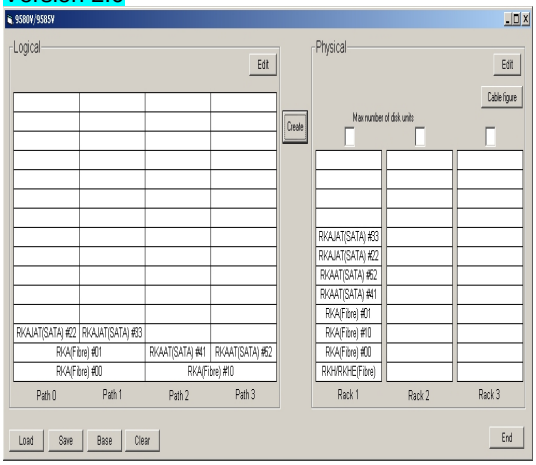
Copyright © 2004, 2005, Hitachi, Ltd.

(11) The device ID numbers are displayed in the logical and physical configuration diagrams.

Version 1.5



Version 2.0



The post-addition configuration can be derived from the diagrams above.

NOTE : In the case of the system to which the RKAJAT is connected, change the RKAAT to RKAJAT manually.

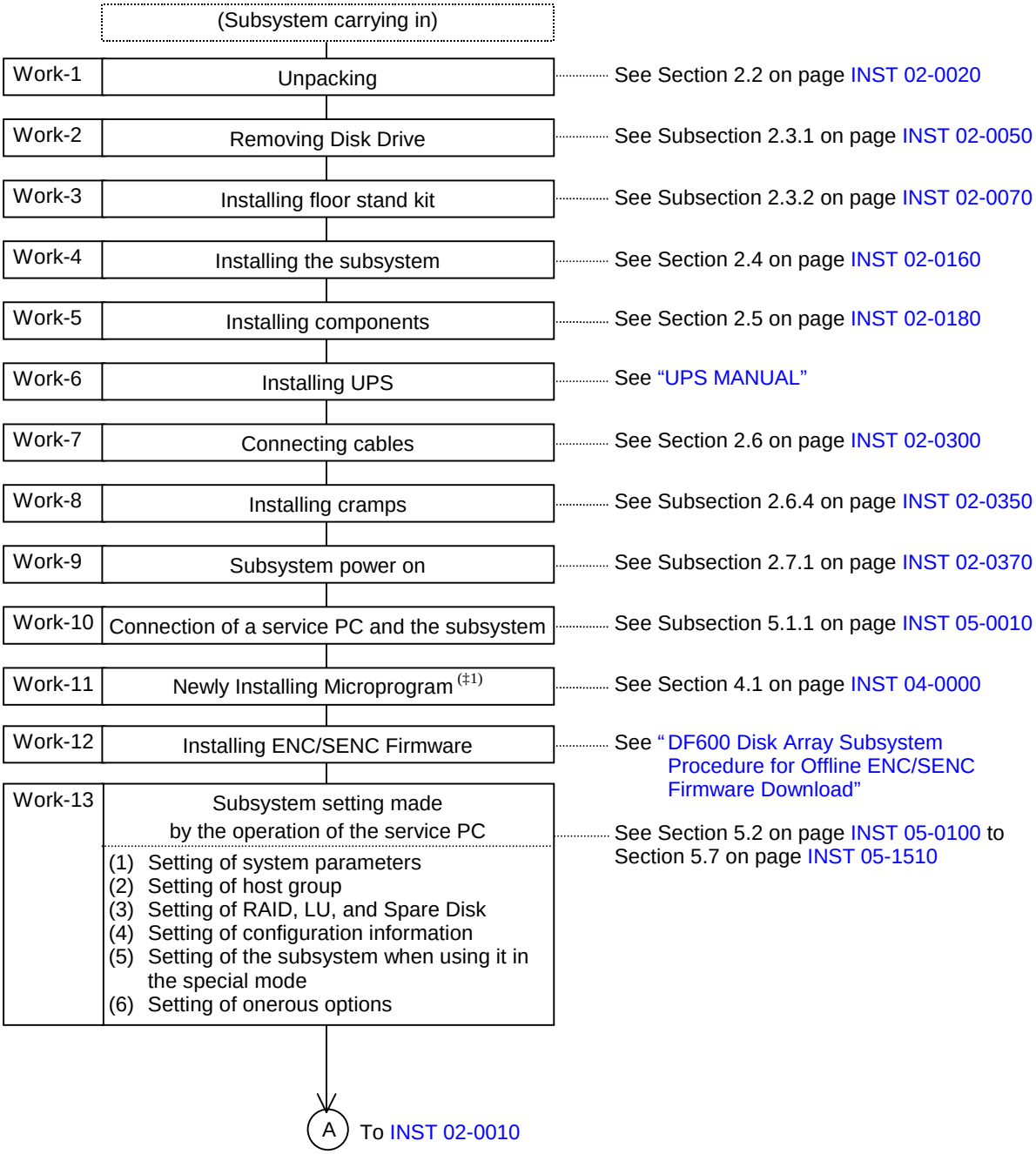
For the creation procedure, refer to Item (3) in Subsection 1.7.3, “Checking methods of device ID and ENC cable connection when mounting the newly introduced rack” (INST 01-0240) and add the chassis frame to be added by the connection tool and perform the specified device ID and ENC cable connection.

Copyright © 2005, Hitachi, Ltd.

Chapter 2. Installing Floor Model

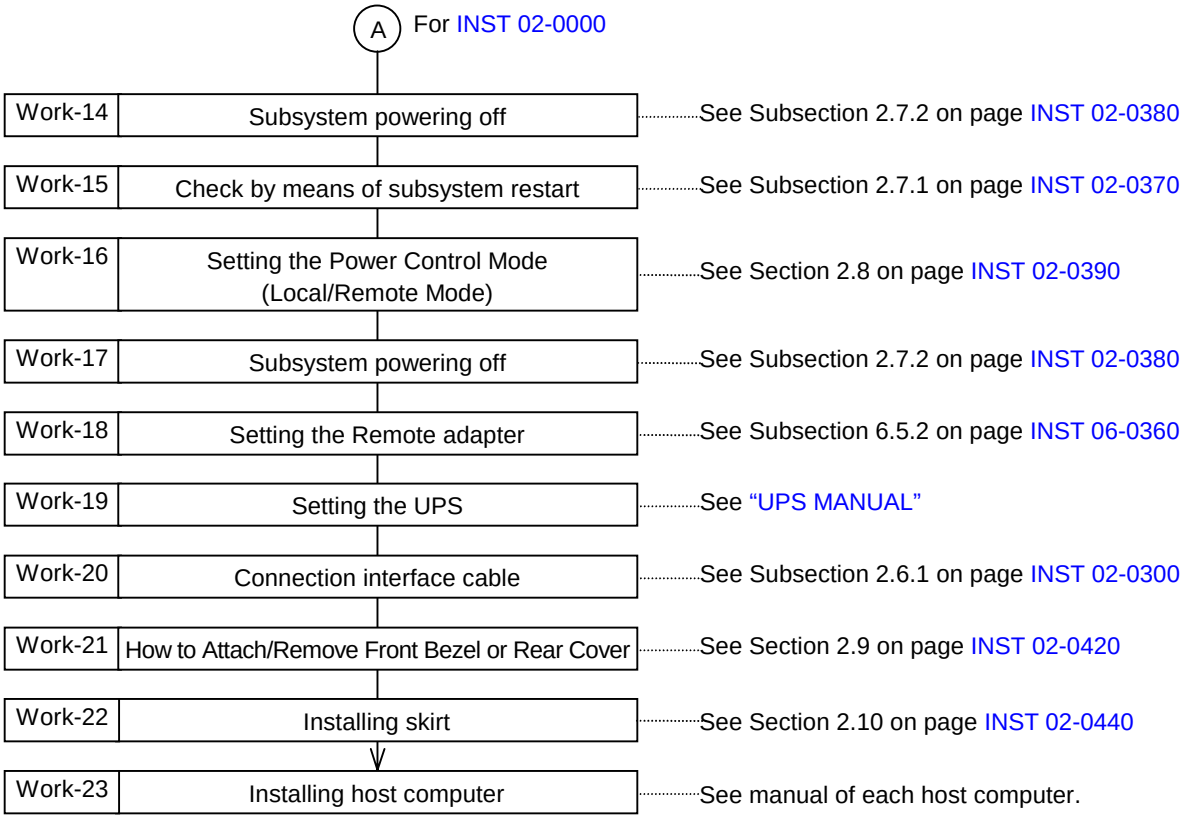
2.1 Procedures for Installing Floor Model

(1) Procedures for installing floor model
Before installing and moving subsystem, confirm the following work.



‡1 : Normally, microprograms are installed when the subsystem is shipped from the factory.

Copyright © 2002, 2005, Hitachi, Ltd.



(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.2	For general works
	Phillips screwdriver	No.1	For setting rotary switch.
	Allen wrench	No.3	For installing the floor standing kits (H1H and H2H)
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)

Copyright © 2002, 2005, Hitachi, Ltd.

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 (RK+H1H/RKD+H1H) Model, Floor (RK+RKA+H2H/ RKD+RKAD+H2H) Model, and Floor (RKS+H1H/ RKSD+H1H) Model are heavy; their masses are about 80 kg and 123 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

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.

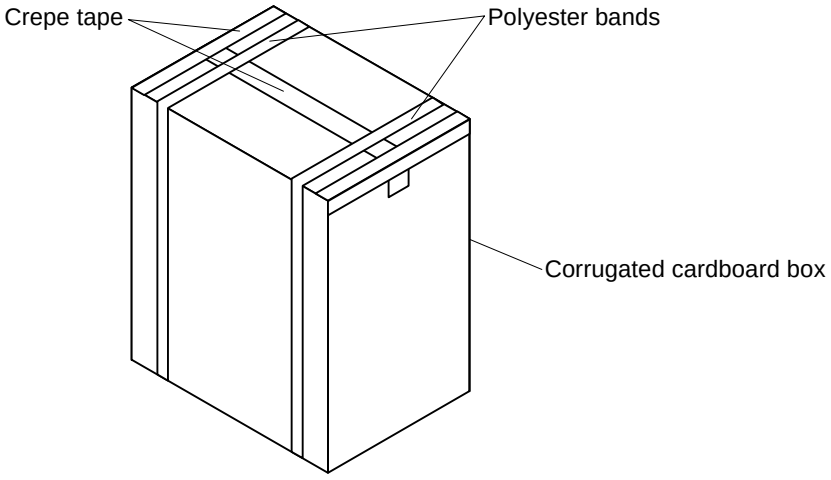


Figure 2.2.1 Packed Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

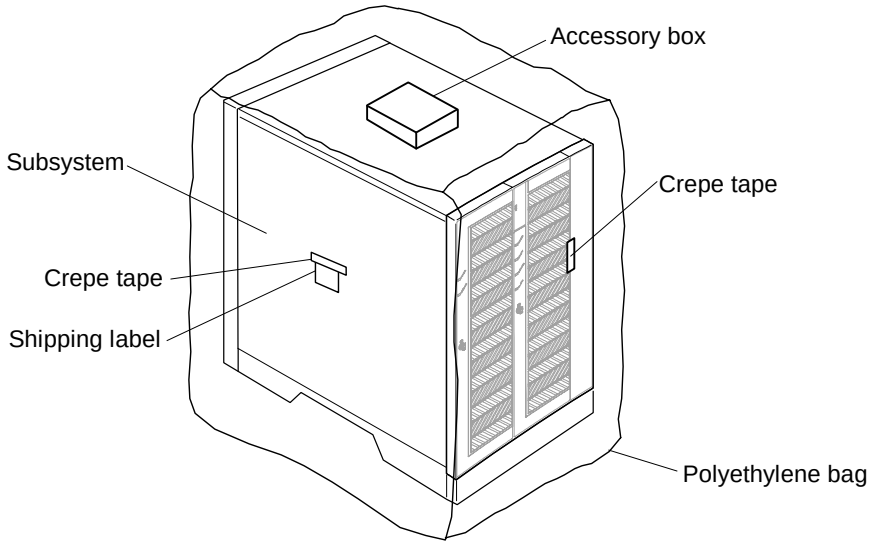
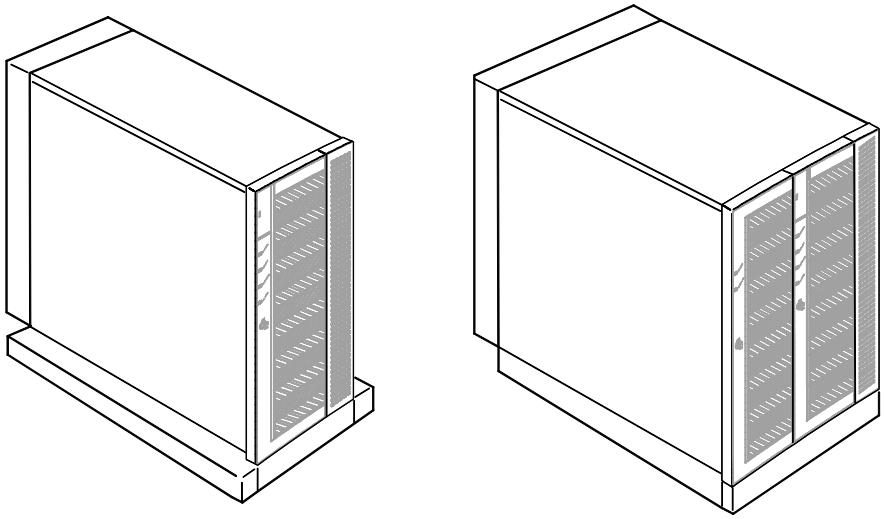


Figure 2.2.2 Packed Subsystem after Removing Other Package

(2) Inspecting the subsystem visually
Check the exterior of the subsystem visually for distortion or damage owing to the transport.



(a) Floor (RK+H1H) Model
Floor (RKS+H1H) Model
Floor (RKD+H1HD) Model
Floor (RKSD+H1HD) Model

(b) Floor (RK+RKA+H2H) Mode
Floor (RKD+RKAD+H2HD) Model

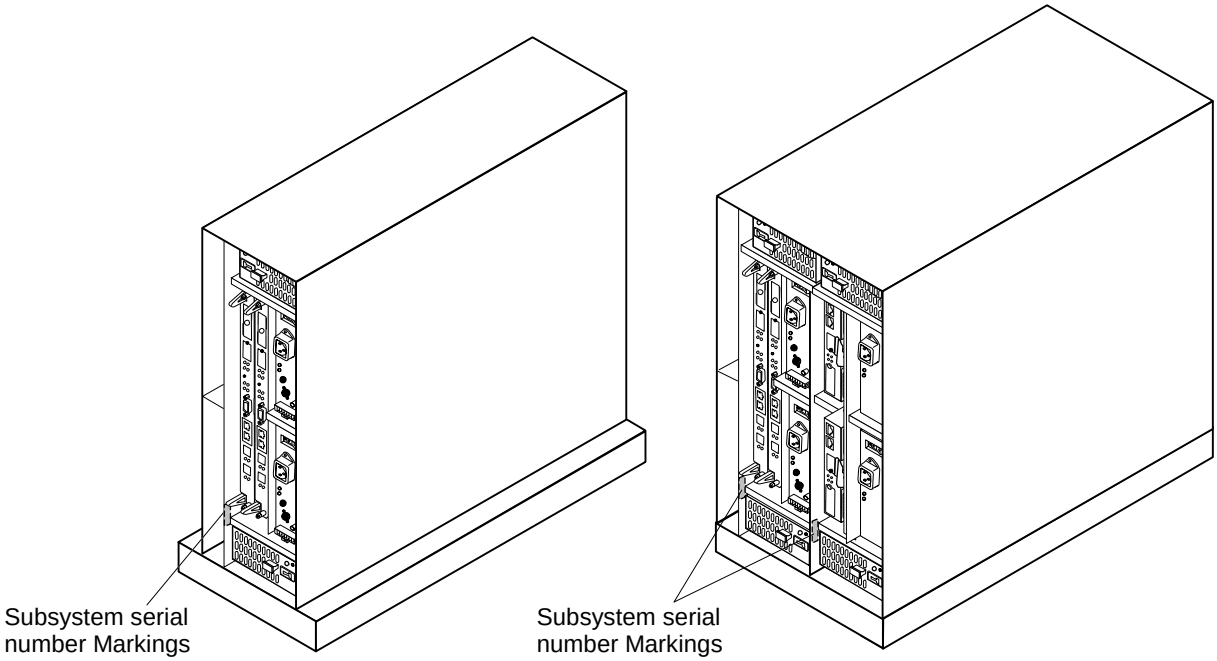
Figure 2.2.3 External Appearances of Floor Model Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(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 and the keys for the latches (one each for latches of the Power Unit (Power Unit (DC)), and Fan Assembly) 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.
The key for Latches is used to mount and dismount Power Units (Power Units (DC)), or Fans Assembly.



(a) Floor (RK+H1H) Model
Floor (RKS+H1H) Model
Floor (RKD+H1HD) Model
Floor (RKSD+H1HD) Model

(b) Floor (RK+RKA+H2H) Model
Floor (RKD+RKAD+H2HD) Model

Figure 2.2.4 Locations of Subsystem Serial Number Markings

‡1 : Two keys for Front Bezel are attached to Floor Model (RK+H1H/RKS+H1H/RKD+H1HD/RKSD+H1HD)
Four keys for Front Bezel are attached to Floor Model (RK+RKA+H2H/RKD+RKAD+H2HD).

Copyright © 2002, 2005, Hitachi, Ltd.

2.3 Installing Floor Stand Kit

When parts are already installed before installing the Floor Stand Kit, remove Disk Drives to prevent from shock.

2.3.1 Removing Disk Drive

CAUTION

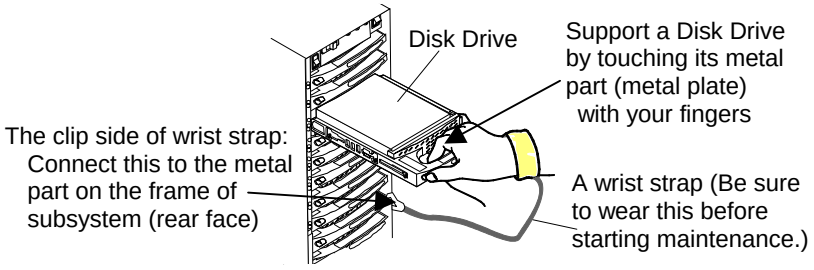
- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **Be sure to 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 is Disk Drive support its metal part with your hand that has the wrist strap. You can discharge static electricity by touching the metal plate.**

Adhere a label bearing an HDD number to the Disk Drive before removing it.

NOTE : Be sure to remove Disk Drives before installing the Floor Stand Kit. Never install the Floor Stand Kit while Disk Drives are left in the Rack.

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.



Copyright © 2002, 2005, Hitachi, Ltd.

<Working Procedure>

(1) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050))

(2) Remove the Disk Drive or a dummy (Disk Drive).
Operate the lock release button of the Disk Drive and remove the Disk Drive taking care not to apply any shock to it.

(3) Store a removed Disk Drive or a dummy (Disk Drive) safekeeping box at the same position of address label.
They are to be installed in the subsystem after the subsystem is installing on the floor stand kit.

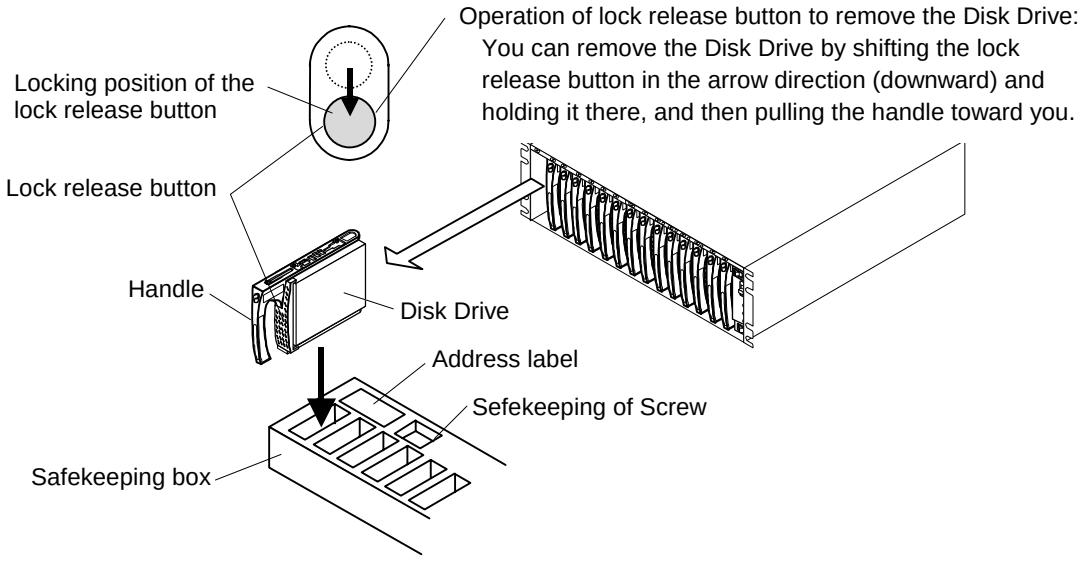


Figure 2.3.1 Removing Disk Drive

Copyright © 2002, 2005, Hitachi, Ltd.

2.3.2 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 Section 2.4, "Installing the Subsystem" (INST 02-0160).

When remaking the subsystem into the floor model, perform the work explained in Subsection 2.3.3, "Procedure for installing floor stand kit" (INST 02-0080).
It is required to install the floor standing kit, which is an optional component (see Table 2.3.1), to the RK/RKS/RKD/RKSD or a combination of the RK/RKD and RKA/RKAD 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 H1H /H1HD	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 (H1H)	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	H1H only
	14	3266241-B	Rear cover	1	H1HD only
	15	3266191-A	Crump (H1H)	1	H1H only
	16	3267440-A	Crump (H1HD)	1	H1HD only
	17	3259043-445	EMI gasket	1	Against radio-frequency radiation
	18	SB306	Bind screw (M3×6.3)	4	
Floor stand kit H2H /H2HD	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 (H2H)	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	H2H only
	14	3266234-B	Rear cover	1	H2HD only
	15	3266192-A	Crump (H2H)	1	H2H only
	16	3267441-A	Crump (H2HD)	1	H2HD only
	17	3259043-445	EMI gasket	2	Against radio-frequency radiation
	18	SB306	Bind screw (M3×6.3)	4	

Copyright © 2002, 2005, Hitachi, Ltd.

2.3.3 Procedure for installing Floor Stand Kit

(1) Floor (RK+H1H/RKD+H1HD) Model/Floor (RKS+H1H/RKSD+H1HD) Model

(a) Installing the CART

⚠ CAUTION

- **Masses of RK/RKS/RKD/RKSD are approximately 44 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) Stick the EMI gasket on the right side surface of the RK/RKD.

(iii) Raise the RK/RKS/RKD/RKSD 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 RK/RKS/RKD/RKSD to the cart each with four washer and socket bolts.

Copyright © 2002, 2005, Hitachi, Ltd.

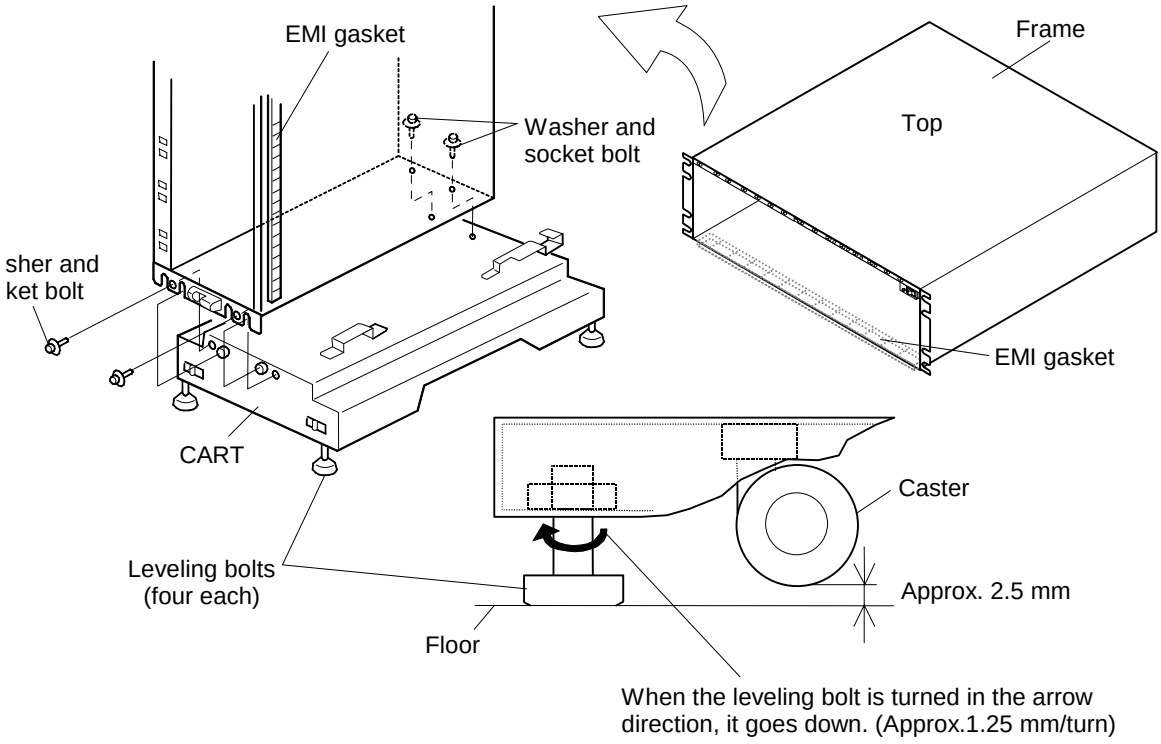


Figure 2.3.2 Installing CART

(b) Installing the Option tray

(i) Slide the Option tray in the direction shown by the arrow and fit its hook to the side panel of the CART.

(ii) Fasten top of the tray to the CART with two washer and socket bolts.

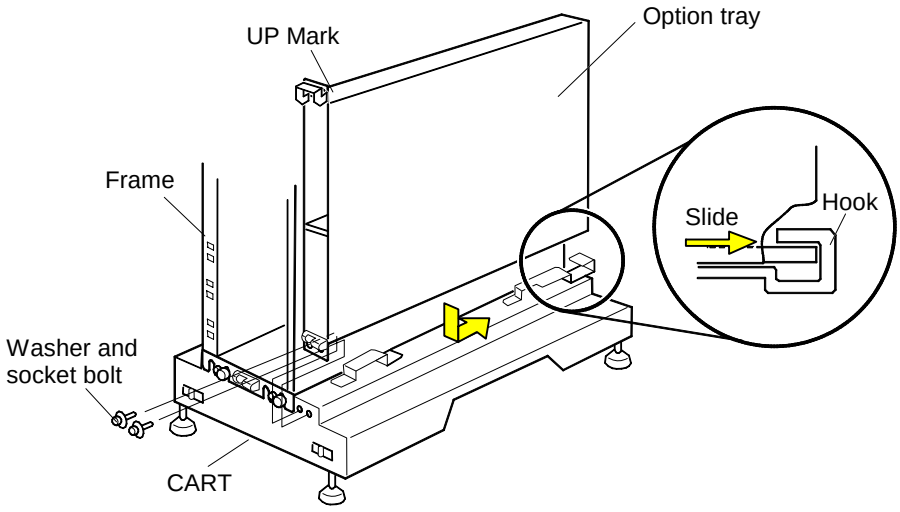


Figure 2.3.3 Installing Option Tray

Copyright © 2002, 2005,Hitachi, Ltd.

(c) 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.

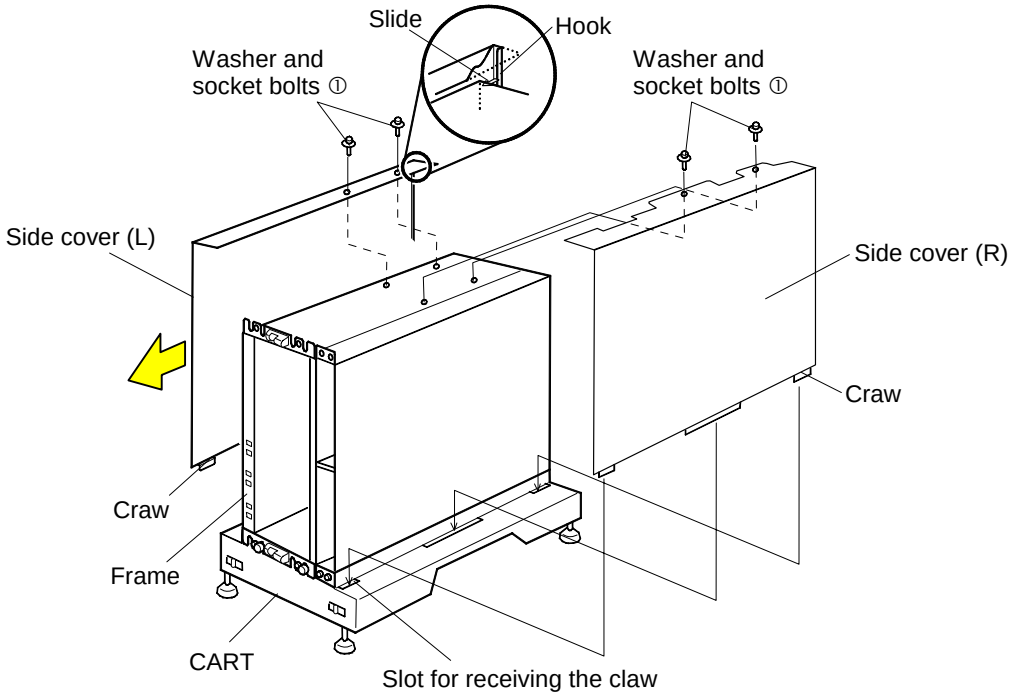


Figure 2.3.4 Installing Side Covers

Copyright © 2002, 2005, Hitachi, Ltd.

(d) Installing the top cover

(i) Place the top cover on the RK/RKS/RKD/RKSD 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).

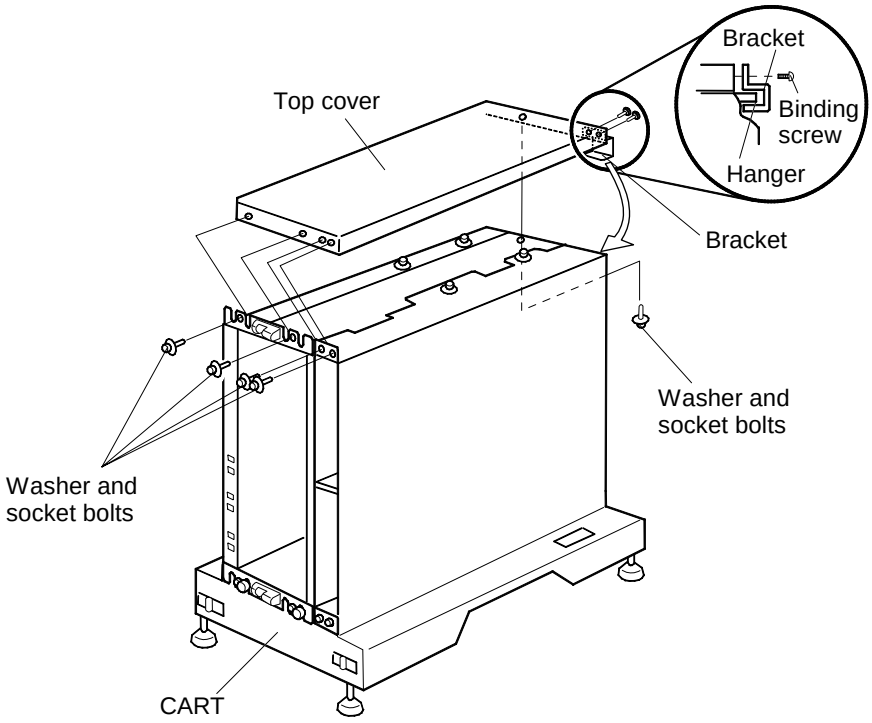


Figure 2.3.5 Installing Top Covers

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Floor (RK+RKA+H2H/RKD+RKAD+H2H) Model

(a) Installing the CART

⚠ CAUTION

- **Masses of RK/RKS/RKD/RKSD are approximately 44 kg, and RKA/RKAD 42 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 right side surface of the RK/RKD.

⚠ 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.

(iii) Raise the RK/RKA/RKD/RKAD making its top facing left, and place it on the cart.

(iv) Fasten front and rear sides of the subsystem to the CART each with four washer and socket bolts.
When installing the RK/RKA/RKD/RKAD on the cart, install the RK/RKD first, and then install the RKA/RKAD.

Copyright © 2002, 2005, Hitachi, Ltd.

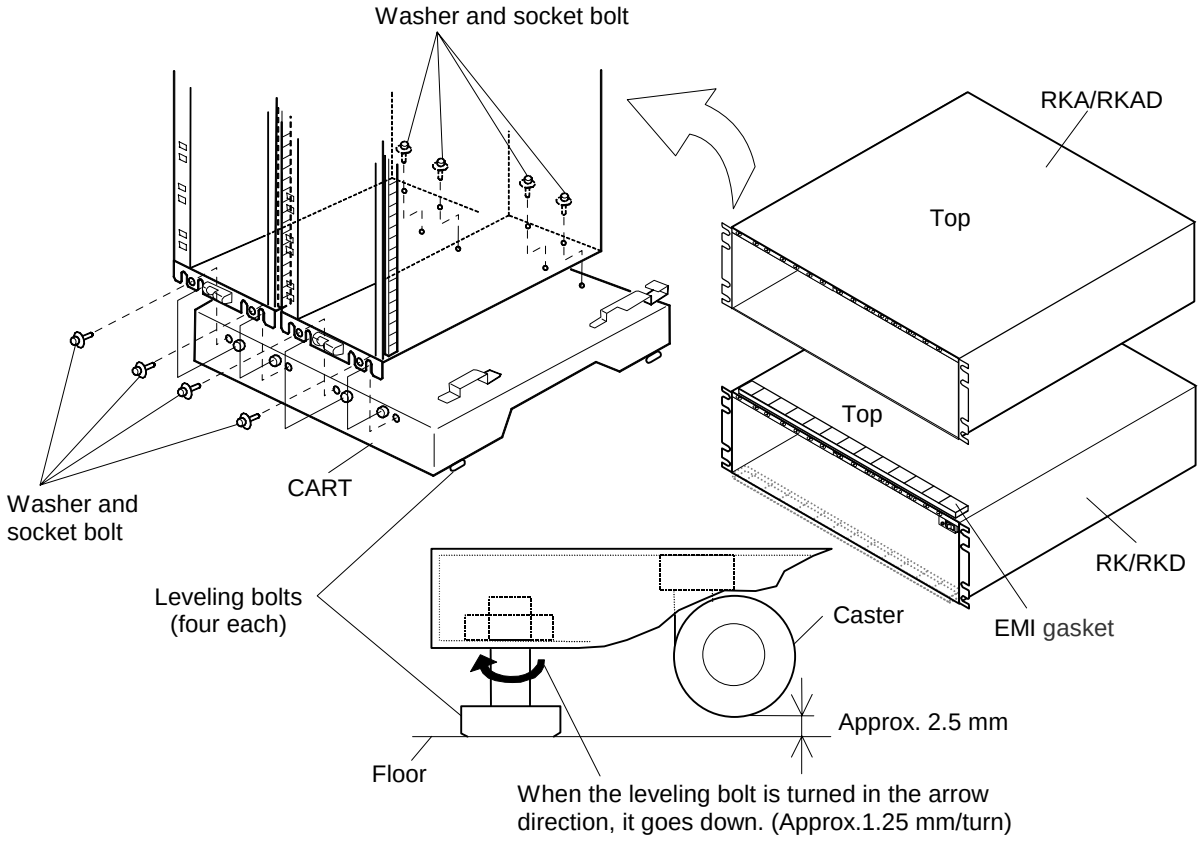


Figure 2.3.6 Installing CART

(b) Installing the Option tray

(i) Slide the Option tray in the direction shown by the arrow and fit its hook to the side panel of the CART.

(ii) Fasten top of the tray to the CART with two washer and socket bolts.

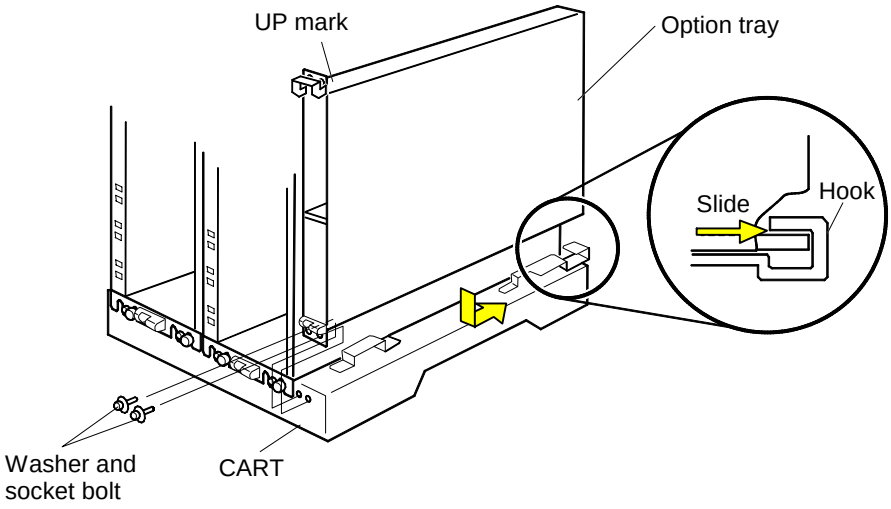


Figure 2.3.7 Installing Option Tray

Copyright © 2002, 2005, Hitachi, Ltd.

(c) 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 RKA/RKAD.

(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 RKA/RKAD (RK/RKD, in the case of the H1H) 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 RKA/RKAD with two washer and socket bolts①.

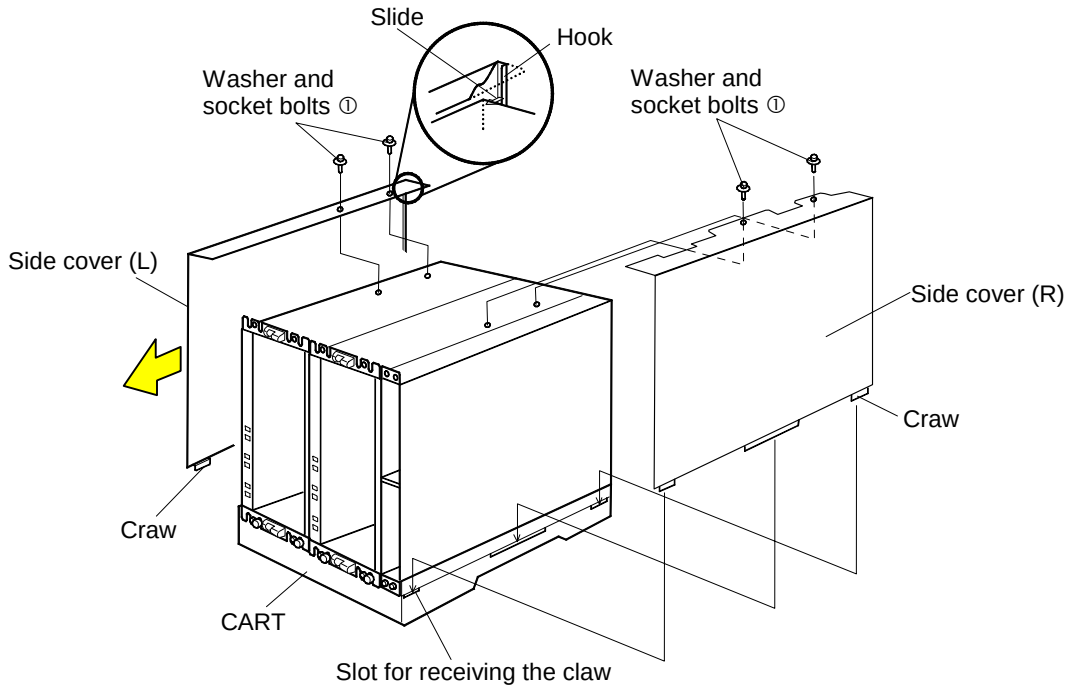


Figure 2.3.8 Installing Side Covers

Copyright © 2002, 2005, Hitachi, Ltd.

(d) Installing the top cover

(i) Place the top cover on the RK/RKA/RKD/RKAD main body.

(ii) Fasten its front and rear sides with six and two washer and socket bolts respectively.

(iii) Fasten the bracket to the upper rear side of the Option tray with two binding screws (M3×6).

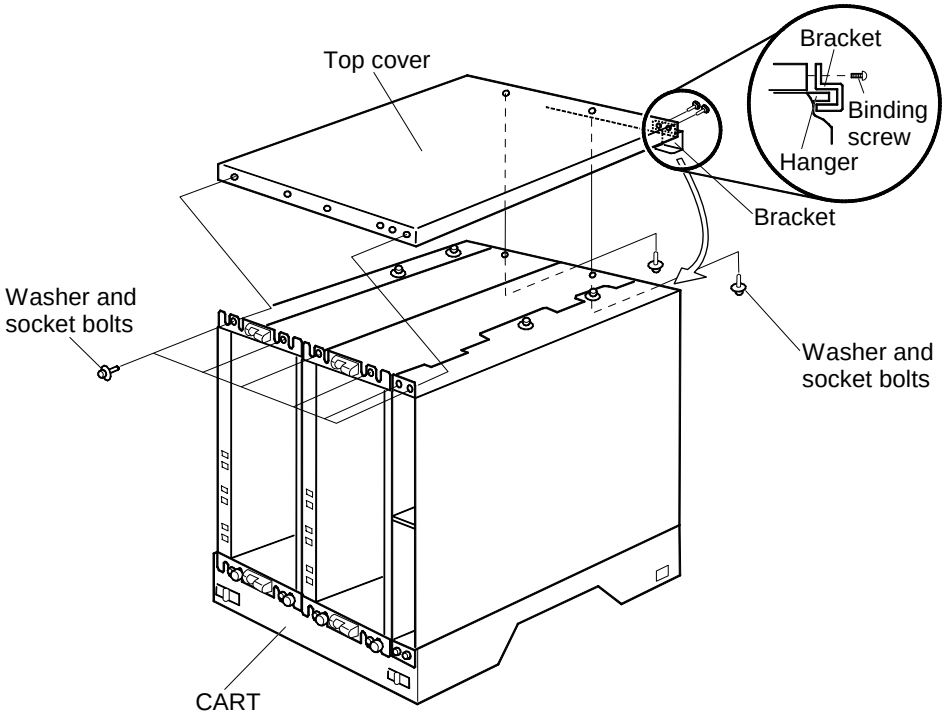


Figure 2.3.9 Installing Top Covers

Copyright © 2002, 2005, Hitachi, Ltd.

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

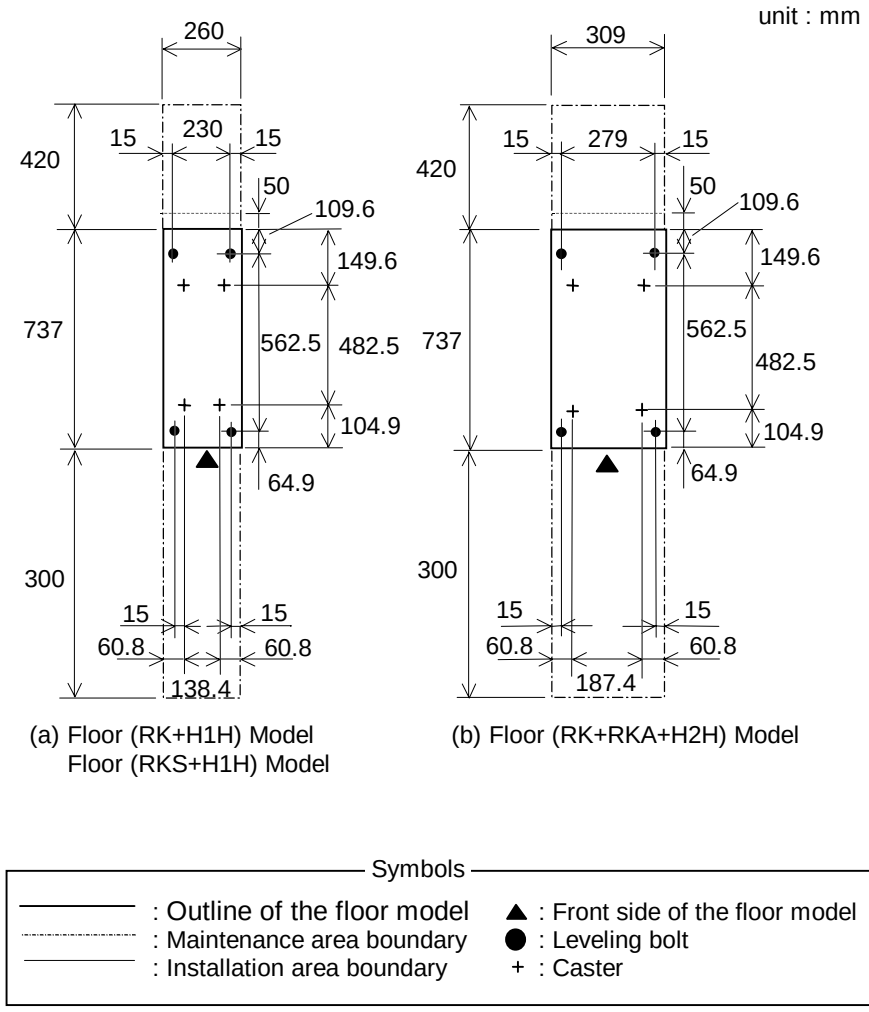


Figure 2.4.1 Floor space and service clearance of Floor Models

Copyright © 2002, 2005, Hitachi, Ltd.

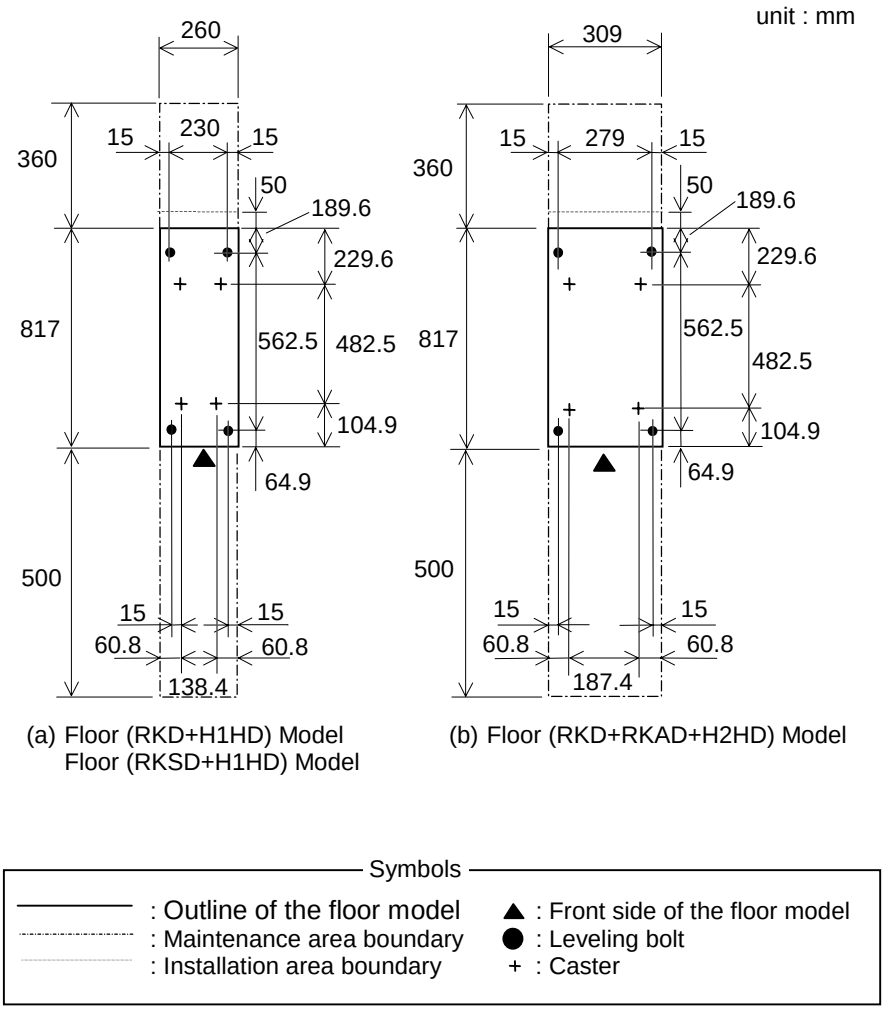


Figure 2.4.1-2 Floor space and service clearance of Floor Models

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

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.

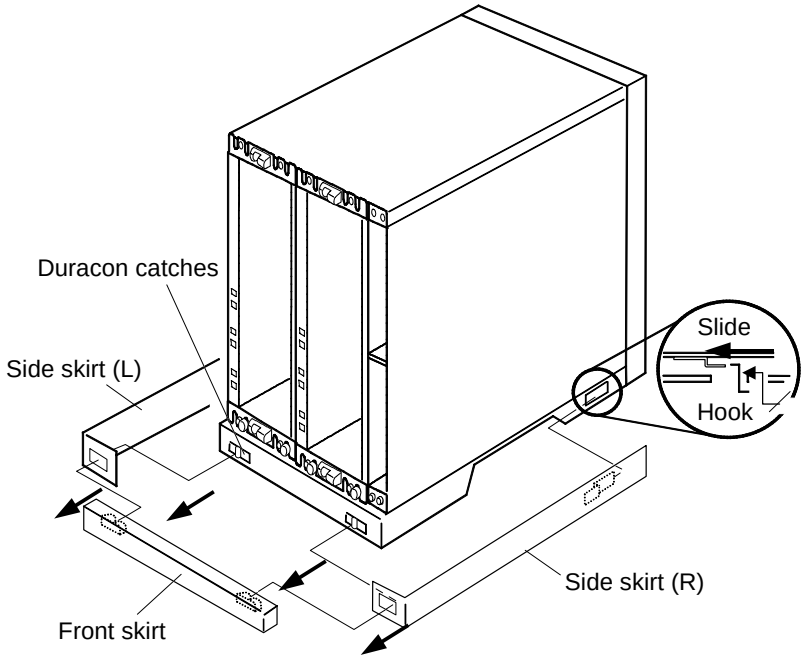


Figure 2.4.2 Removing Skirt

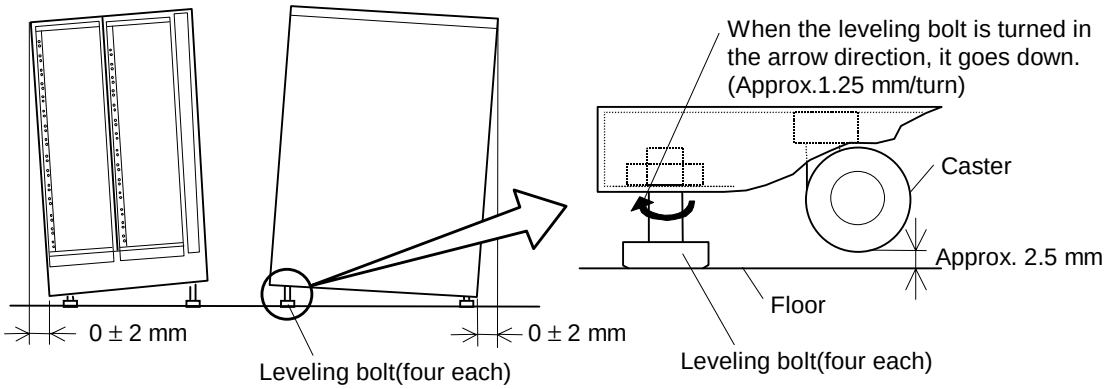


Figure 2.4.3 Adjusting Leveling Bolts

Copyright © 2002, 2005, Hitachi, Ltd.

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 (RK+RKA+H2H). 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 Section 1.4, "How to Open/Close Door and Front Bezel of the Subsystem" on page INST 01-0050.)

Table 2.5.1 Components Required for the Floor (RK+H1H/RKS+H1H)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Units with a model name selected from those shown on the left are installed.
		DF-F600-C1GX2		
5	Power Unit	—	2	—
6	Disk Drive	DF-F600-AEH36	2 to 14(*1)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		

*1 : When no component is installed, a dummy part is installed instead.

Table 2.5.2 Components Required for the (RK+RKA+H2H)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	4	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F600-C1GX2		
5	Power Unit	—	2	for RK
6	Power Unit	—	2	for RKA
7	ENC Unit	—	2	—
8	Disk Drive	DF-F600-AEH36	2 to 29(*1)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		

*1 : When no component is installed, a dummy part is installed instead.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 2.5.3 Components Required for the Floor (RKD+H1HD/RKSD+H1HD)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Units with a model name selected from those shown on the left are installed.
		DF-F600-C1GX2		
5	Power Unit (DC)	—	2	—
6	Disk Drive	DF-F600-AEH36	2 to 14(*1)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		

*1 : When no component is installed, a dummy part is installed instead.

Table 2.5.4 Components Required for the (RKD+RKAD+H2HD)

No.	Component name	Model	Quantity	Remarks
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	4	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Unit with a model name selected from those shown on the left are installed.
		DF-F600-C1GX2		
5	Power Unit (DC)	—	4	—
6	ENC Unit	—	2	—
7	Disk Drive	DF-F600-AEH36	2 to 29(*1)	The Disk Drives with a model name selected from those shown on the left are installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		

*1 : When no component is installed, a dummy part is installed instead.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Installing the Backup Battery Unit

(a) Make sure that the battery switch on the Battery Unit is turned off.

(b) Insert the Backup Battery Unit into the specified position in the subsystem.

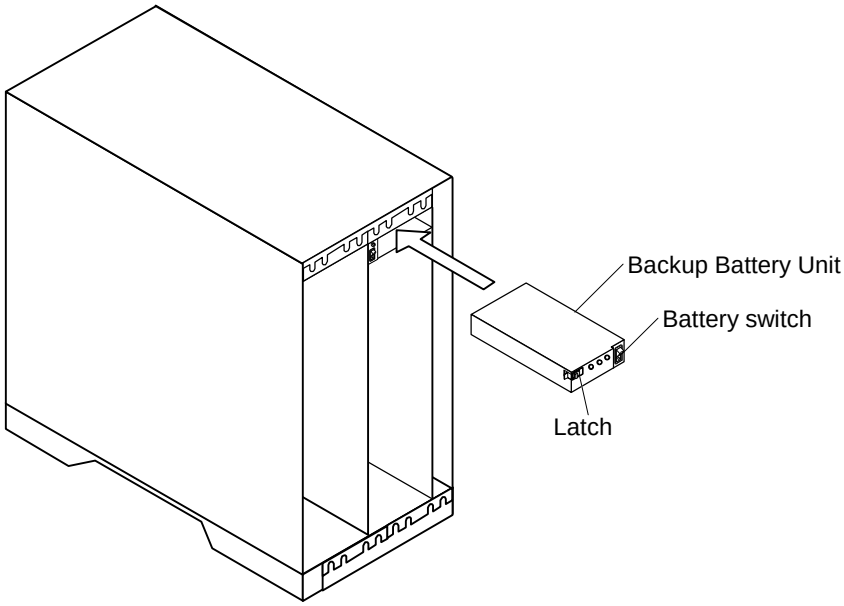


Figure 2.5.1 Installing Backup Battery Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Installing the Fan Assembly

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 into the specified position in the subsystem.

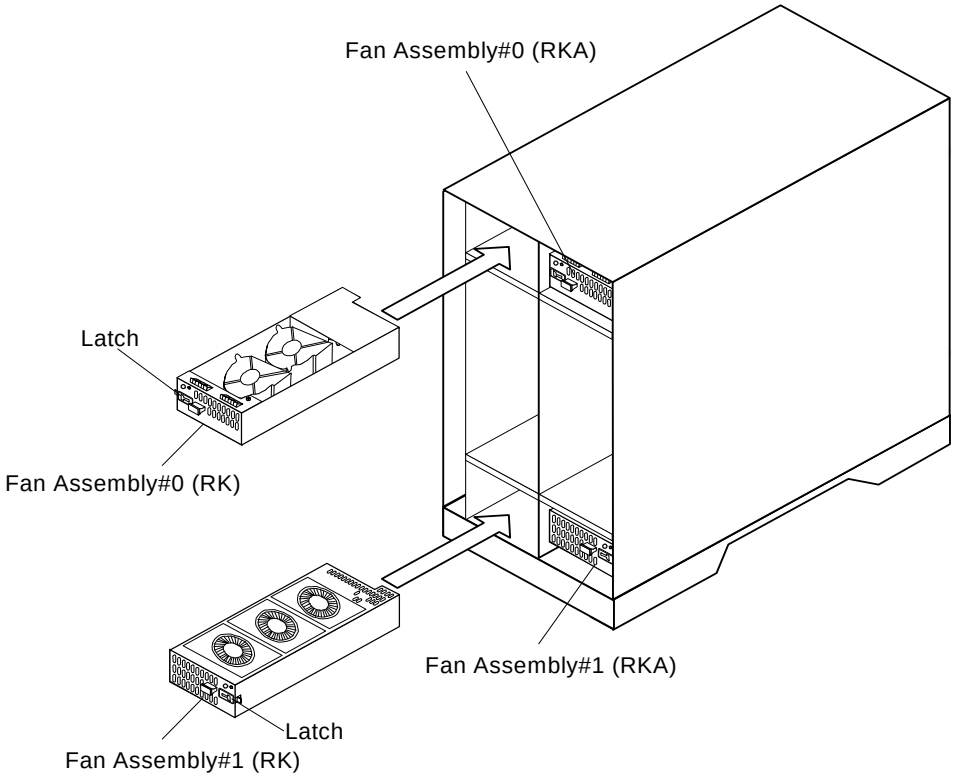


Figure 2.5.2 Installing Fan Assembly

Copyright © 2002, 2005, Hitachi, Ltd.

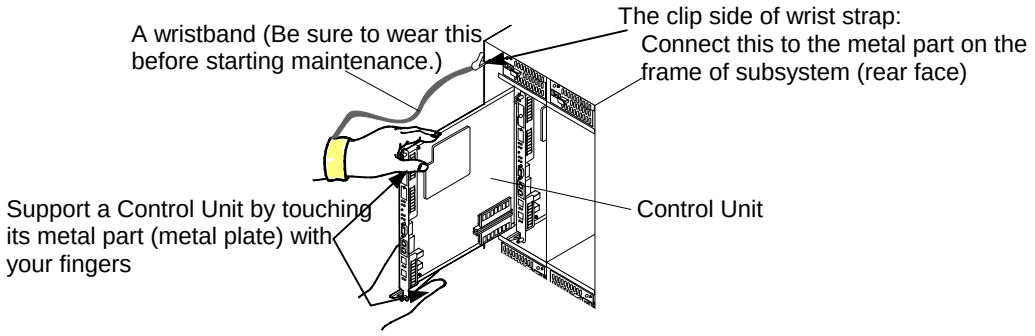
(3) Installing the Control Unit, and Cache Unit

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

<Working Procedure>

(a) Mount the Cache Unit on the Control Unit in the form of sets each consisting of the two Cache Units.
- Install the Cache Unit with the same capacity and in the same slot as those of the Control Unit of another system.
- Be careful not to insert Cache Units at the reversed direction.

(b) Make sure that the Cache Unit is firmly installed.

(c) Insert the Control Unit in the specified position with the upper and lower levers being raised, then return in the two levers at the same time in the direction shown by the arrows (⟶).

(d) In the dual controller configuration, mount the Cache Unit on the Control Unit#1. In the single controller configuration, mount the dummy Control Unit on the Control Unit#1.

(e) Fasten the upper and lower fixing screws of the Control Unit.

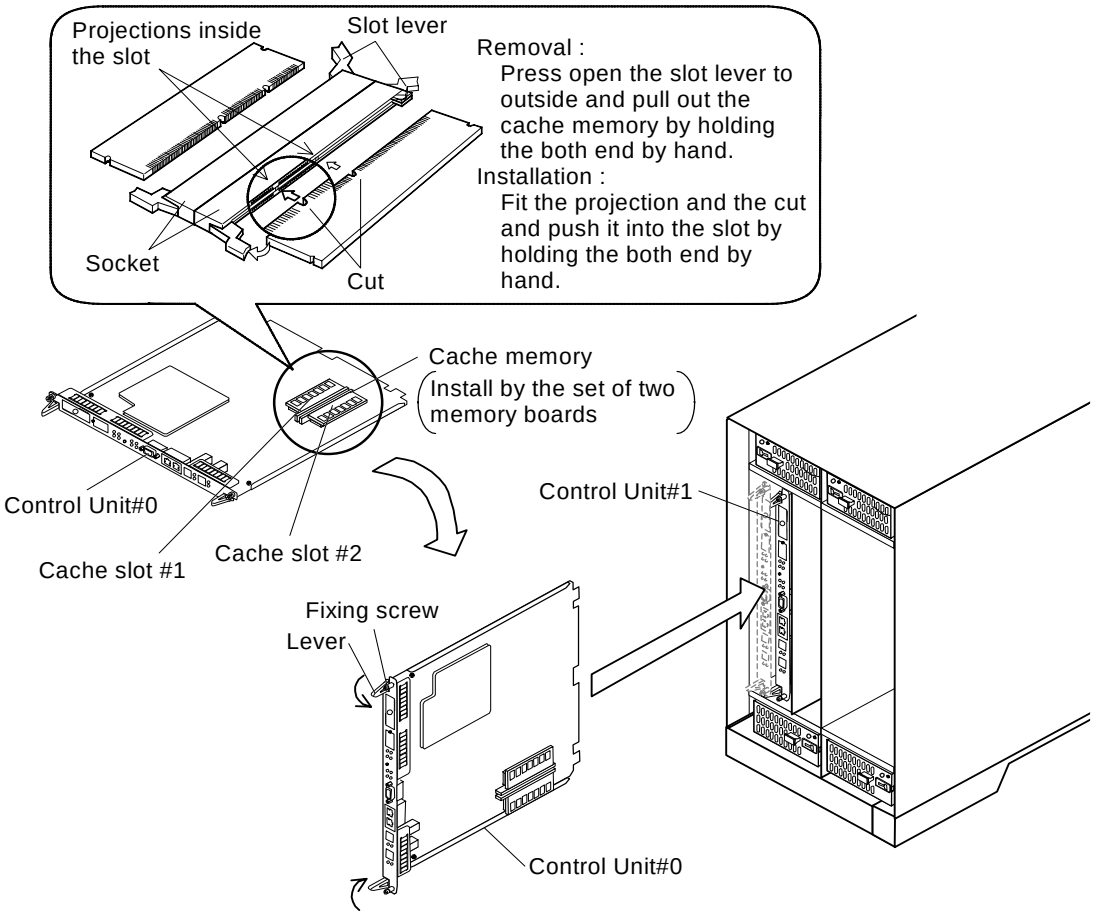


Figure 2.5.3 Installing Control Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Installing Power Unit

(a) Power Unit of RK/RKA/RKS

Since the Power Units of the RK and RKA 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) Insert the two Power Units (RK/RKS) into the specified position in the subsystem until it is latched with a click.

(iii) Insert the two Power Units (RKA) into the specified position in the subsystem until it is latched with a click.

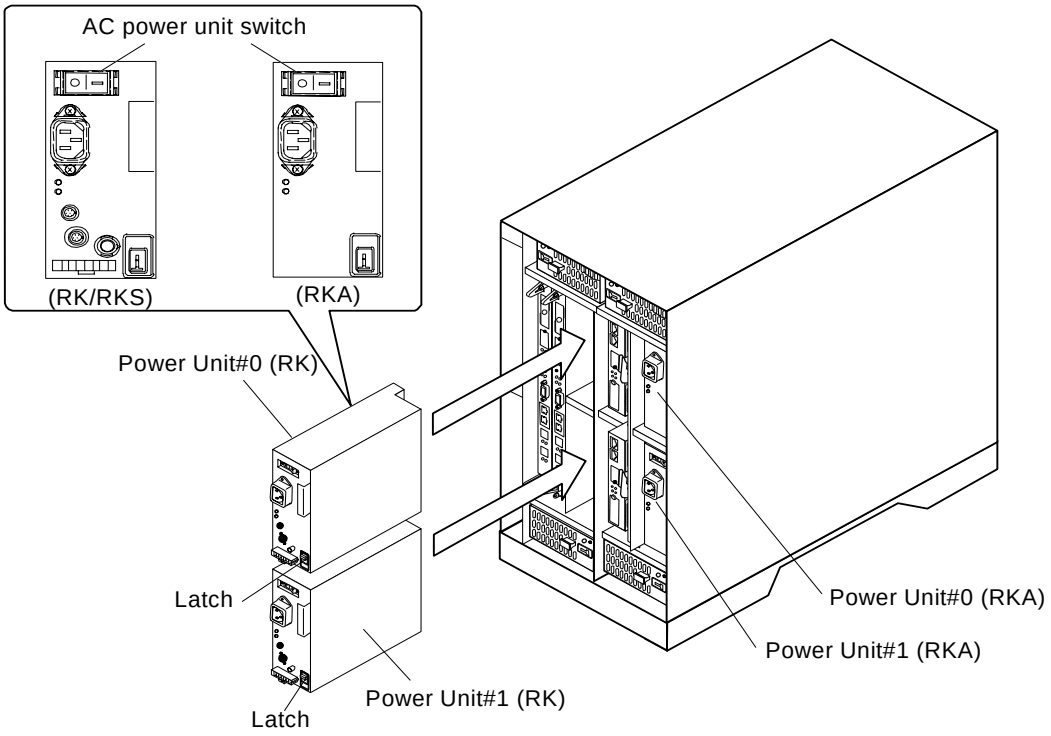


Figure 2.5.4 Installing Power Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Power Unit of RKD/RKD/RKSD

(i) Make sure that the DC Power Unit Switch is turned off.

(ii) Insert the two Power Units (DC) into the specified position in the subsystem until it is latched with a click.

(iii) Insert the two Power Units (DC) into the specified position in the subsystem until it is latched with a click.

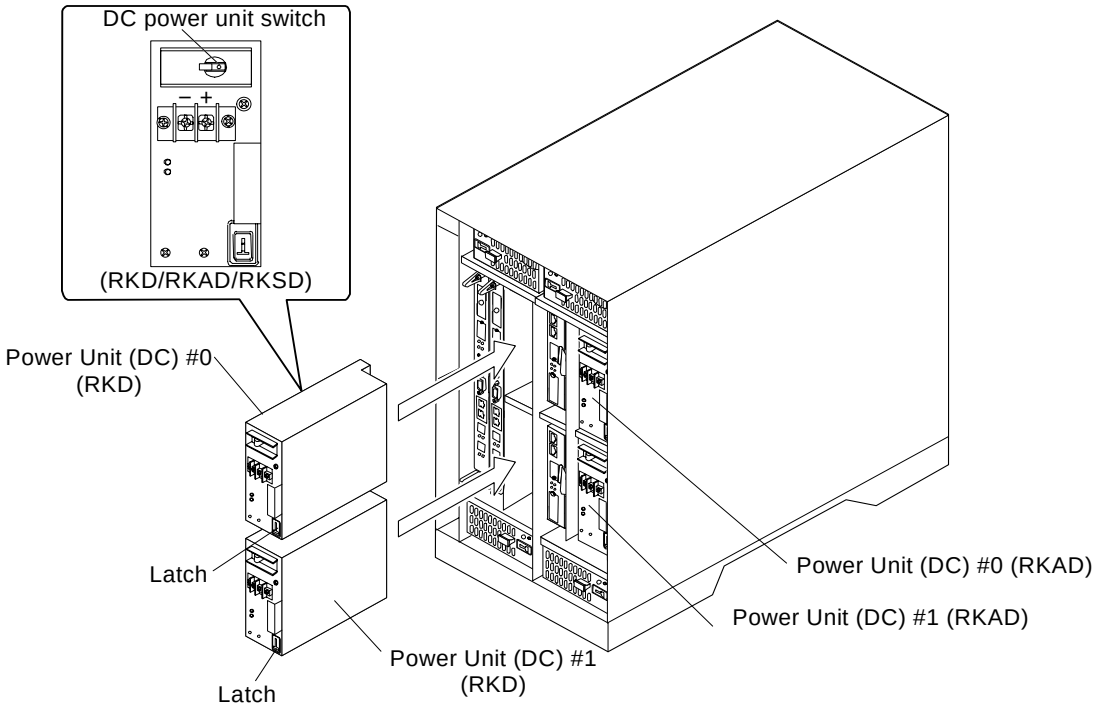


Figure 2.5.4.1 Installing Power Unit

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

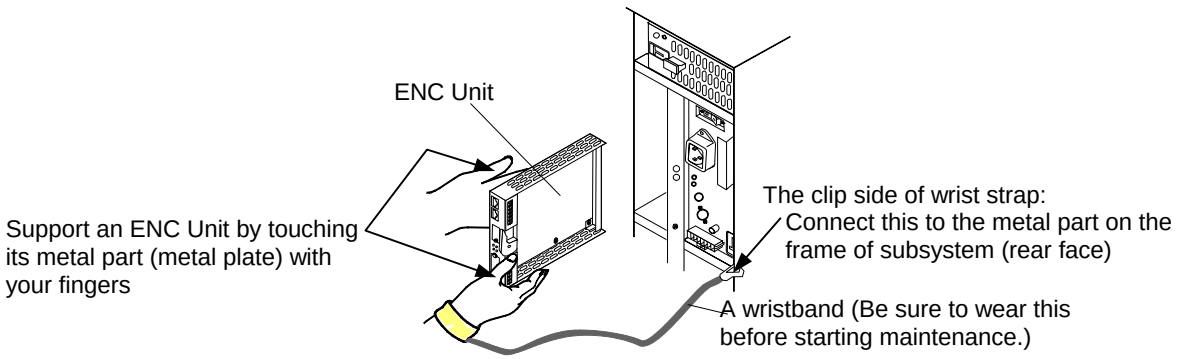
(5) Installing the ENC Unit
This installation work is only applied to Floor model (RK+RKA+H2H/ RKD+RKAD+H2H).

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.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(a) Insert the ENC Unit into the specified location in the subsystem with its lever being raised, then return the lever in the direction shown by the arrow (⟶).

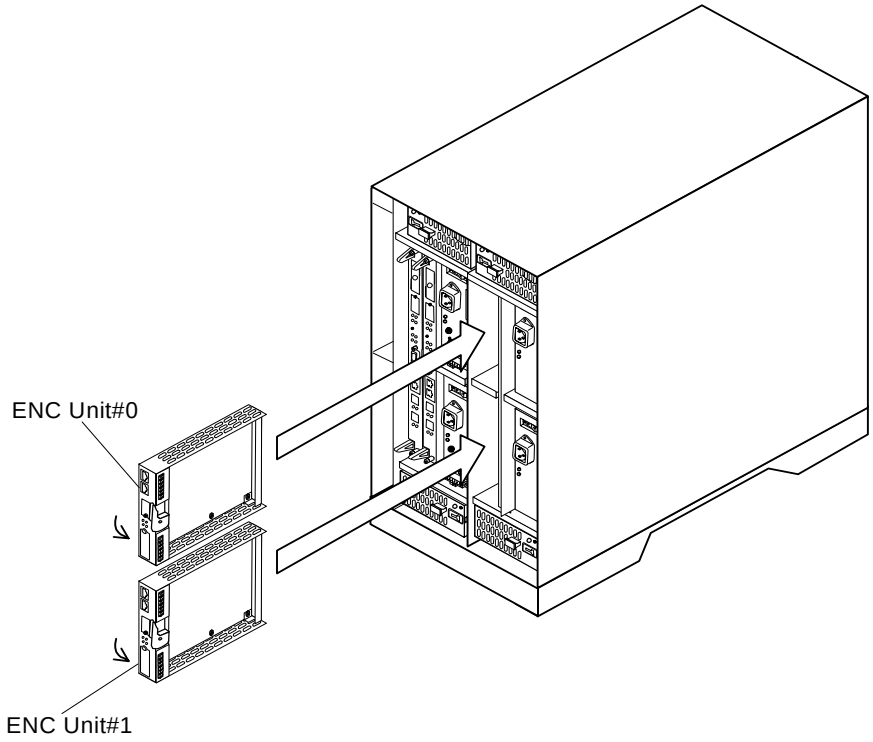


Figure 2.5.5 Installing ENC Unit

Copyright © 2002, 2005, Hitachi, Ltd.

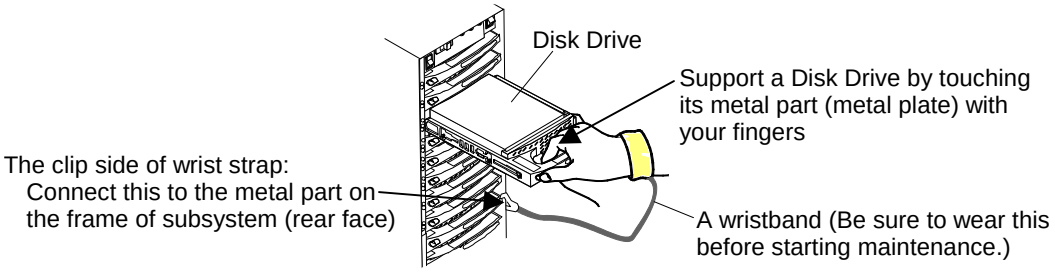
(6) Installing the Disk Drive

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(a) Mount the Disk Drive.
Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.
When performing the work of "2.3.1 Removing Disk Drives" (INST 02-0050), be careful not to install a drive into a wrong bay.
(b) Make sure that the mounted Disk Drives are secured.
(c) Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed.

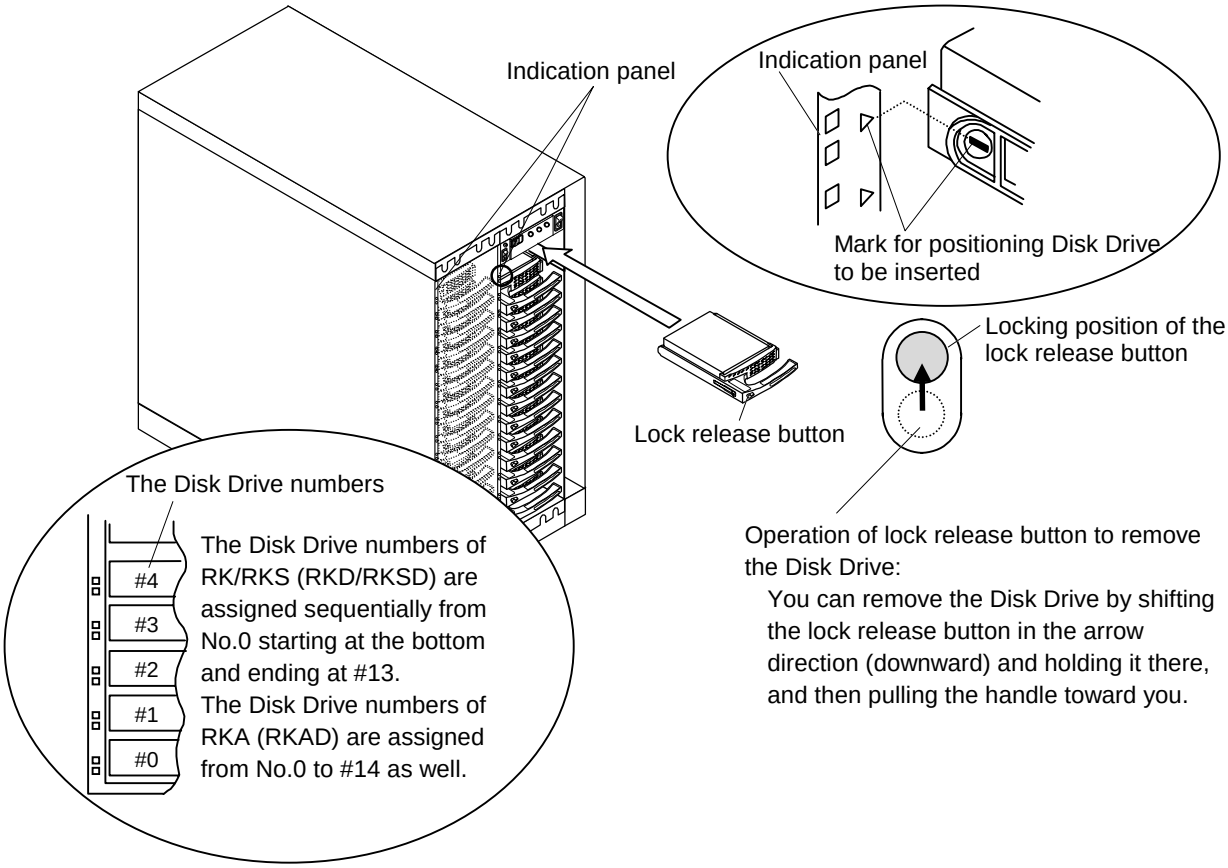


Figure 2.5.6 Installing Disk Drive

Copyright © 2002, 2005, Hitachi, Ltd.

(7) Setting Unit number
The device ID number of the RK/RKS/RKA/RKD has been set to #0. Set the Device ID number of the RKA/RKAD to be connected to #1.

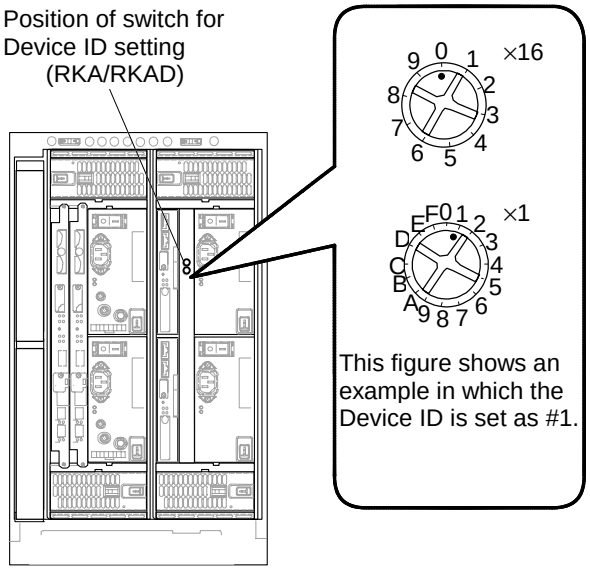


Figure 2.5.7 Position of Switch for Device ID Setting

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

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 "Note on cable routing" in Item (2) in Section 1.1 on page INST 01-0010.
When the cable has already been connected, it is not necessary to connect it newly.

Be sure to install cable cramps after connecting cables. (See Subsection 2.6.4, "Installing cable cramps" on page INST 02-0350.)

The figures in this section are drawn for the procedure of Floor model (RK+RKA+H2H/RKD+RKAD+H2H). 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 interface cables

(1) Connecting the Fibre cable(‡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 .

Three types of cable are provided as the Fibre cables to be used so that they fit to connector shapes of the RK/RKS/RKD/RKSD and host computer (or HUB/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 RK/RKS/RKD/RKSD side)			Host computer side (HUB/SW)	Types Cables to be Connected	
Parts name of connected cable plug	Model	Connector form	Connector form	Cable connector shape	Model
Control Unit	DF-F600-F1H (RKS: DF-F600-F1HS)	LC	SC	SC-LC cable	DF-F600-KBx(*1)
			LC	LC-LC cable	DF-F600-KCx(*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.

Copyright © 2002, 2005, Hitachi, Ltd.

Connect the Fibre Channel interface cables after making sure of the ports to be connected the label.

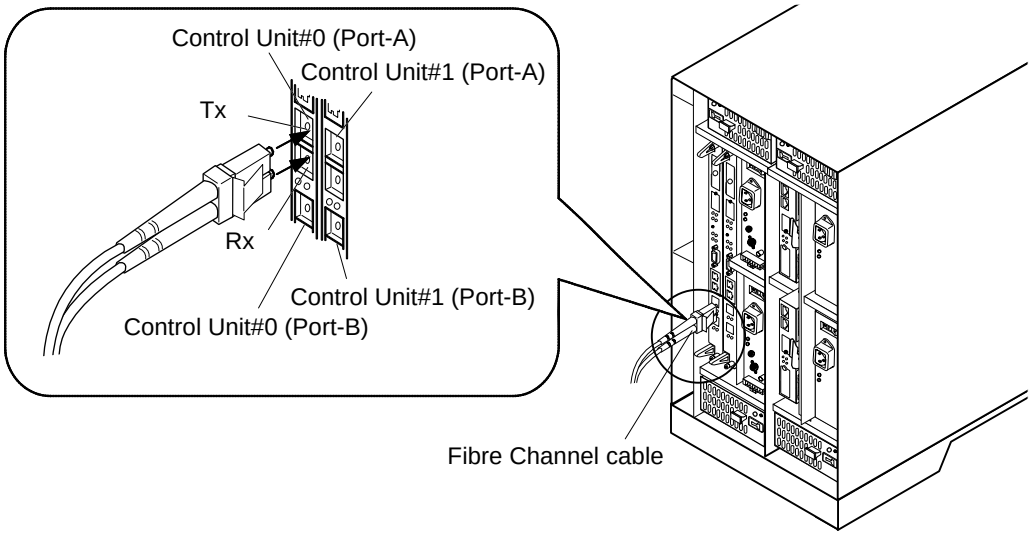


Figure 2.6.1 Port Layout of Fibre Channel

Copyright © 2002, 2005, Hitachi, Ltd.

2.6.2 Connecting ENC cables

In the case of the Floor (RK+RKA+H2H/RKD+RKAD+H2HD) model with both of the RK/RKA/RKD/RKAD, it is required to connect the Control Unit (RK/RKD) and the ENC Unit (RKA/RKAD) with the ENC cables (‡1). (The ENC cables are supplied with the RKA/RKAD.)

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) Remove the blinds (‡2) on the Control Unit.
(2) Connect the ENC cable to the Control Unit.
  (a) To the PATH#0 (marked in milky white on the RK/RKD side), connect the ENC cable marked in milky white.
  (b) To the PATH#1 (marked in yellow on the RK/RKD side), connect the ENC cable marked in yellow.
(3) Connect the ENC cable to the ENC Unit.
  (a) 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).
  (b) 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).

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

Copyright © 2002, 2005, Hitachi, Ltd.

‡2 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2002, 2005, Hitachi, Ltd.

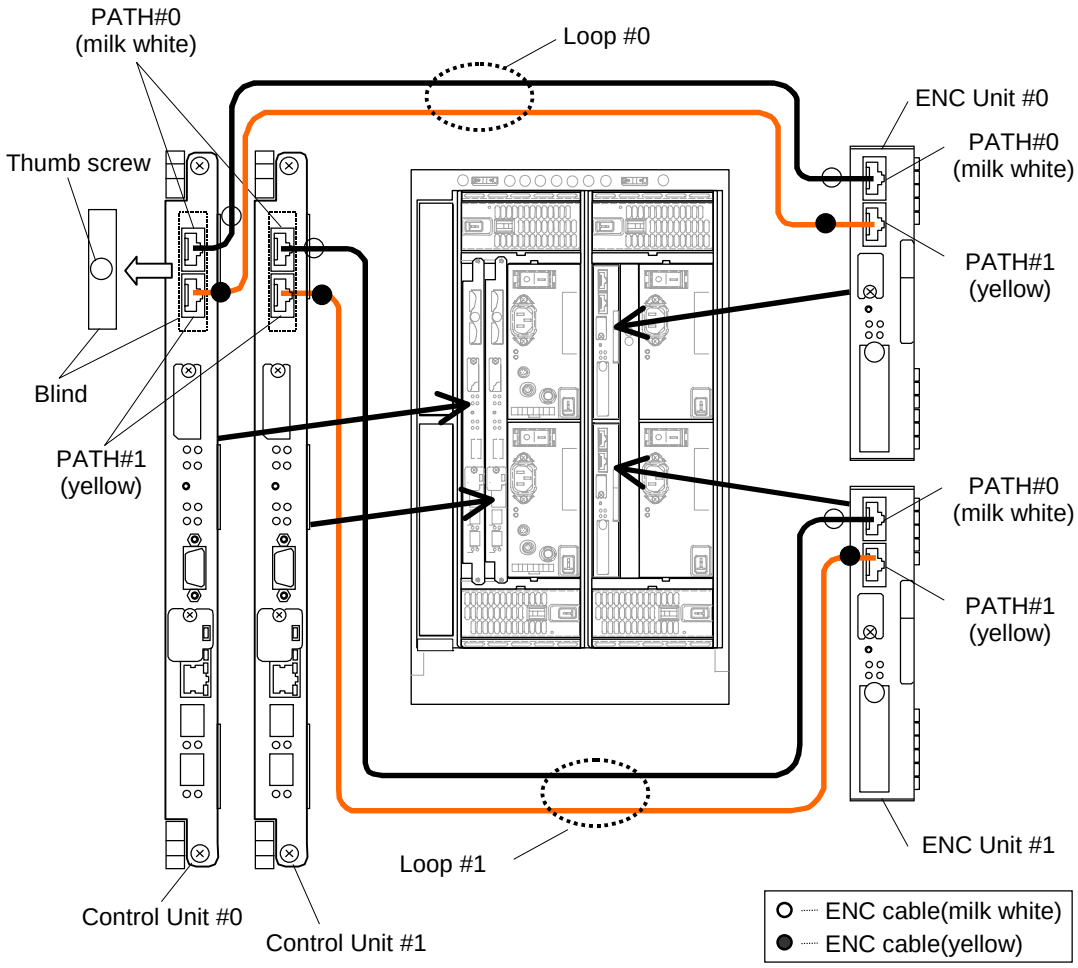


Figure 2.6.2 ENC Cable Connection

Copyright © 2002, 2005, Hitachi, Ltd.

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.

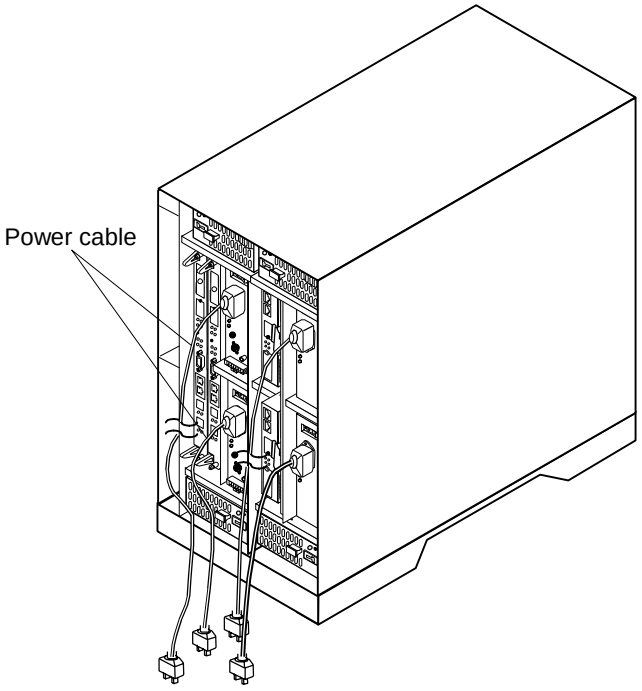


Figure 2.6.3 Power Cable Connection

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Connecting the power cables (DC) of Power Unit (DC)

⚠ CAUTION

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

⚠ CAUTION

Here exists a hazard that can cause an electric shock.
Start the work after making sure that the breaker in the power distribution box has been turned off.
Connect the power cable by tightening screws of the terminals firmly.

NOTE : • Connect the power cable (DC) to the two systems, Power Unit (DC)#0 and Power Unit (DC)#1.
• Although the subsystem has a dual power-system, each Power Unit (DC) 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 (DC) is also required to have capacity for the whole subsystem.

(a) Make sure that DC power input switches (breakers) on the Power Unit (DC) have been all turned off.
(b) Fasten the power cable (DC) to the Cable Stay with a strain relief and two mounting screws.
When doing this, prevent the FG cable from intertwining with the (+) and (–) cables when they are connected to the Power Unit (DC).

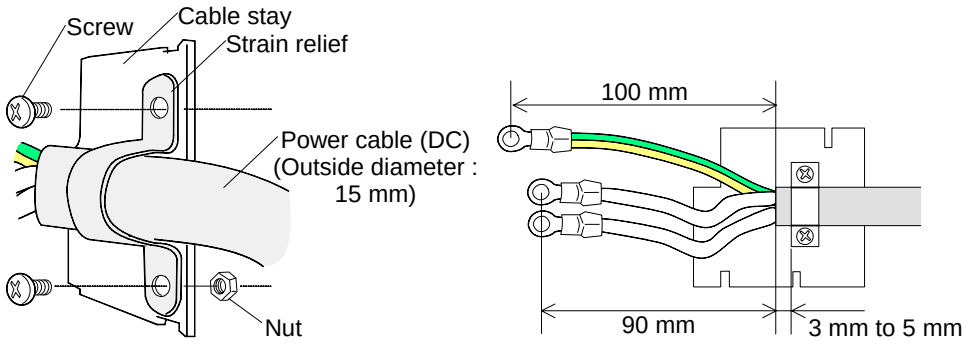


Figure 2.6.3.1 Fixing the Power Cable (DC)

Copyright © 2003, 2005, Hitachi, Ltd.

(c) Remove the terminal block cover.
(d) Remove the two Cable Stay mounting screws.

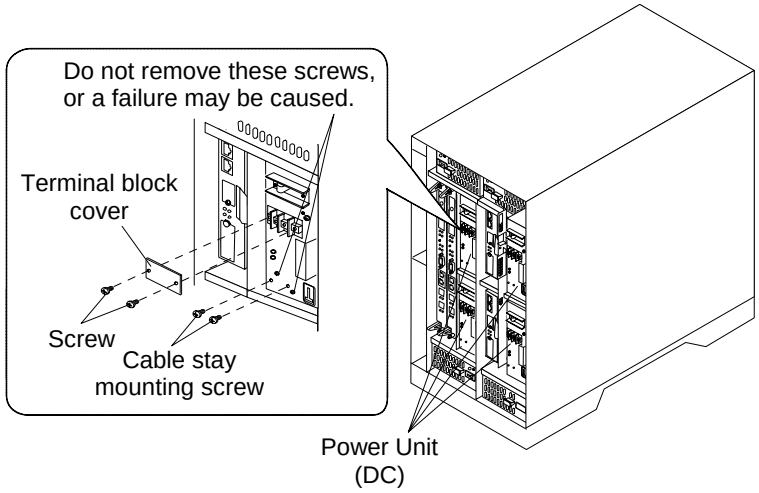


Figure 2.6.3.2 Removing Terminal Block Cover and Mounting Screws

⚠ CAUTION

- **This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.**
- **This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.**
- **A readily accessible disconnect device should be incorporated in the building installation wiring.**
- **The d.c. supply source is to be located within the same premises as this subsystem.**
- **Use this model in a RESTRICTED ACCESS LOCATION only.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.**

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Connect the FG cable to the frame ground (FG).
When doing this, route the FG cable making it run under the handle.
(f) Connect the cable to the (+) and (–) power input terminals on the terminal block.
When doing this, take care not to confuse the plus and minus terminals.

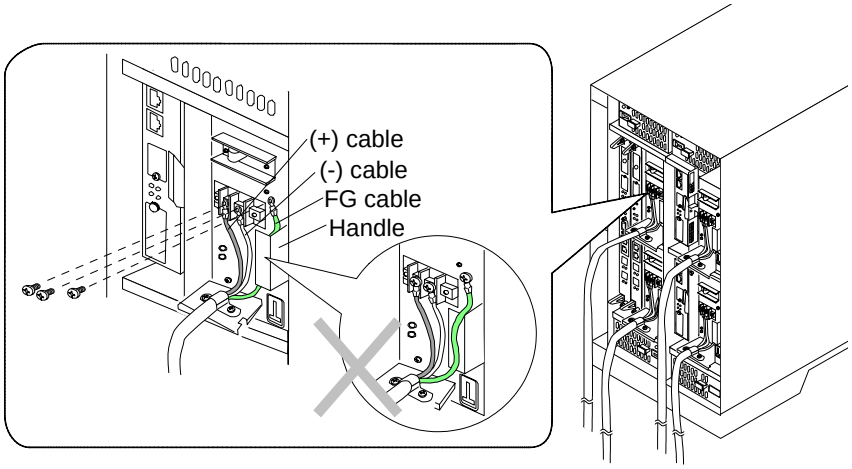


Figure 2.6.3.3 Power Cable Connection

(g) Install the terminal block cover.
(h) Install the Cable Stay.

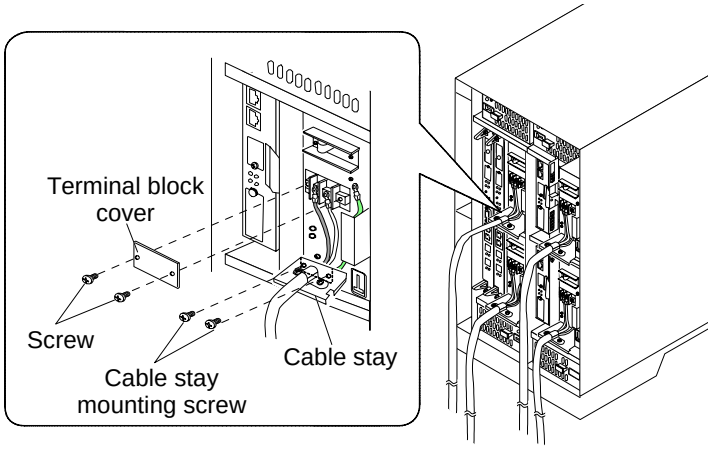


Figure 2.6.3.4 Installing Terminal Block Cover

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

2.6.4 Installing cramps

(1) Remove two Allen bolts on the rear side of the cart.
(2) Fasten the cramp by tightening the bolts. When doing this, take care not to catch the cables by the cramp.
(3) Since a malfunction of the subsystem is caused if cables are routed wrongly, follow the instructions given in Item (2) in Section 1.1, “Notes on cable routing” on page INST 01-0010.

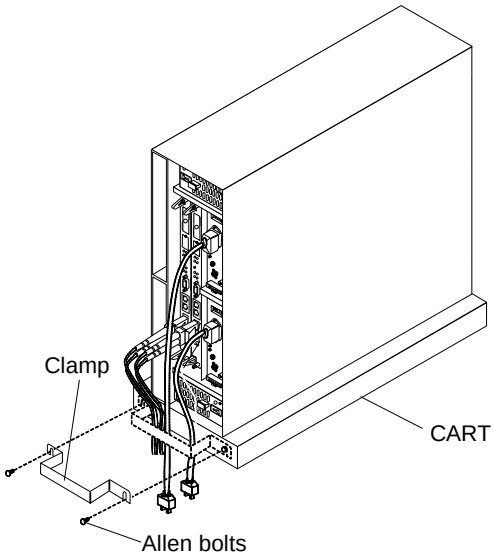


Figure 2.6.4 How to attach/Clamp

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

2.7 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 it does not mean a problem as long as the WARNING or ALARM LED of the basic subsystem is off, please use the subsystem as it is.

2.7.1 Subsystem power on

(1) Floor model (RK+H1H/RK+RKA+H2H/RKS+H1H)

(a) Make sure that the AC Power Unit Switch of the Power Unit is turned off.
(b) Make sure that the main switch is turned off.
(c) All turn on the battery switch of the Backup Battery Unit on the front of the subsystem.
(d) Turn on the AC Power Unit Switch of the Power Unit.(‡1)
(e) Turn on the main switch.
(f) Make sure that the RDY LED (green) comes on about four minutes later normally. If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, "Trouble analysis based on LED indications of Front Bezel" on page MNTE 02-2320 in the "Maintenance Manual - for Maintenance".

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.

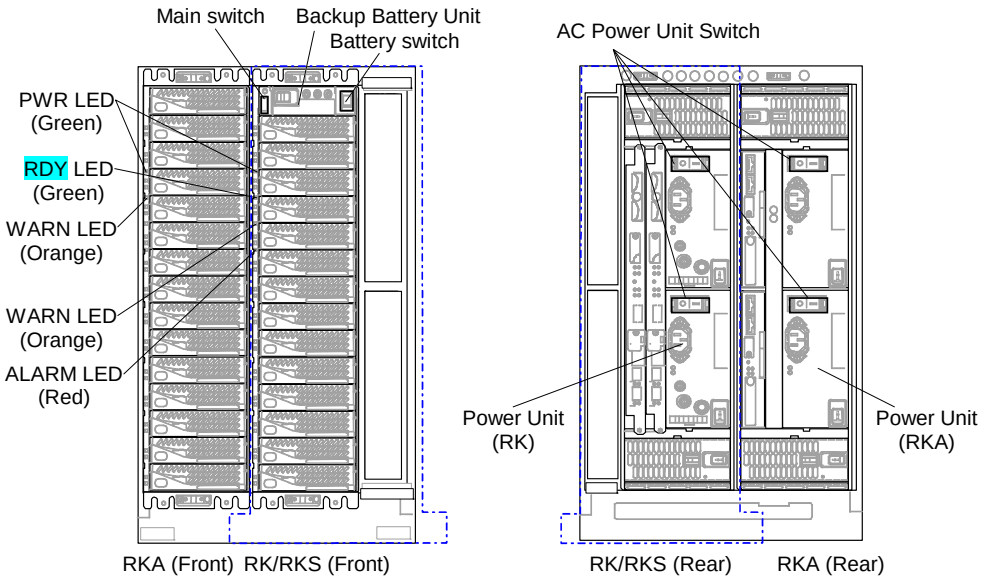


Figure 2.7.1 Location of Switches for Power On

‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKA).

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Floor model (RKD+H1HD/RKD+RKAD+H2HD/RKSD+H1HD)

(a) Make sure that the DC Power Unit Switch of the Power Unit (DC) is turned off.

(b) Make sure that the main switch is turned off.

(c) All turn on the battery switch of the Backup Battery Unit on the front of the subsystem.

(d) Turn on the DC Power Unit Switch of the Power Unit (DC).(‡1)

(e) Turn on the main switch.

(f) Make sure that the RDY LED (green) comes on about four minutes later normally. If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, “Trouble analysis based on LED indications of Front Bezel” on page MNTE 02-2320.

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.

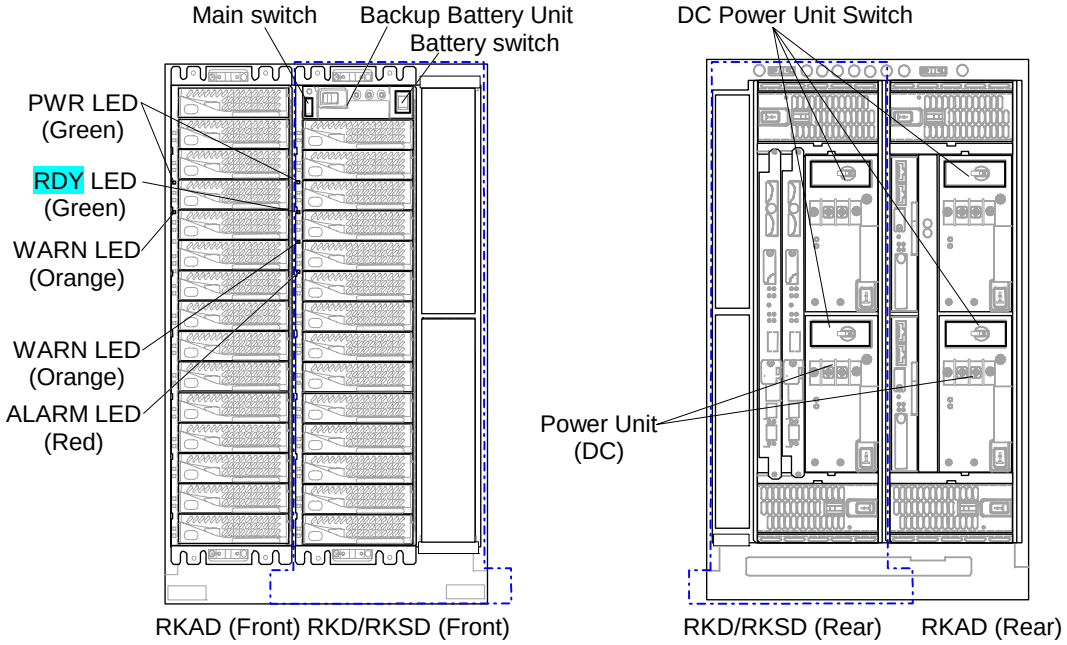


Figure 2.7.1.1 Location of Switches for Power On

Copyright © 2003, 2005, Hitachi, Ltd.

‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKAD).

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

2.7.2 Subsystem power off

(1) Floor model (RK+H1H/RK+RKA+H2H/RKS+H1H).
  (a) Turn off the main switch.
  (b) Make sure that the PWR LED (green) on the front of the subsystem is off.
  (c) All turn off the AC Power Unit Switch of the Power Unit.
  (d) Turn off the battery switch of the Backup Battery Unit.

(2) Floor model (RKD+H1HD/RKD+RKAD+H2HD/RKSD+H1HD).
  (a) Turn off the main switch.
  (b) Make sure that the PWR LED (green) on the front of the subsystem is off.
  (c) All turn off the DC Power Unit Switch of the Power Unit.
  (d) Turn off the battery switch of the Backup Battery Unit.

Copyright © 2002, 2005, Hitachi, Ltd.

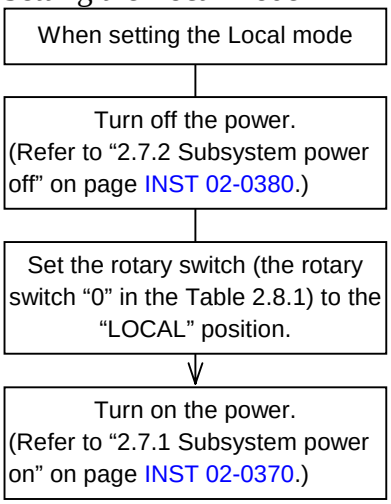
2.8 Setting the Power Control Mode (Local/Remote Mode)

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.

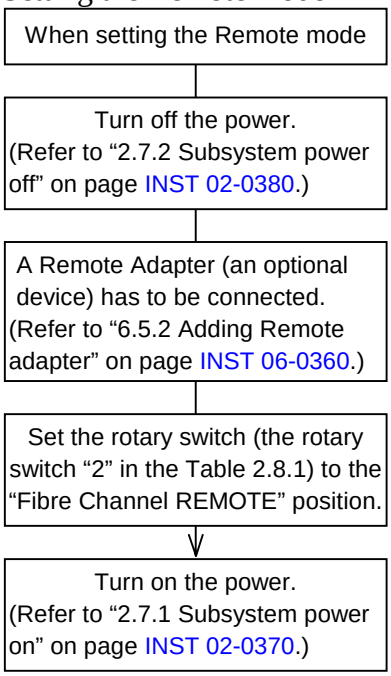
Place the RKD (RKSD) in the Local mode (by operating the rotary switch “0”).
It cannot be placed in the other power control mode.

(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



Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Setting the Rotary switch (The rotary switch is on the side of the main 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 2.8.1.

Table 2.8.1 Power Control Mode Settings and Corresponding Operation Modes

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment)
1	—	—
2	Fibre Channel 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 U6 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.
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.

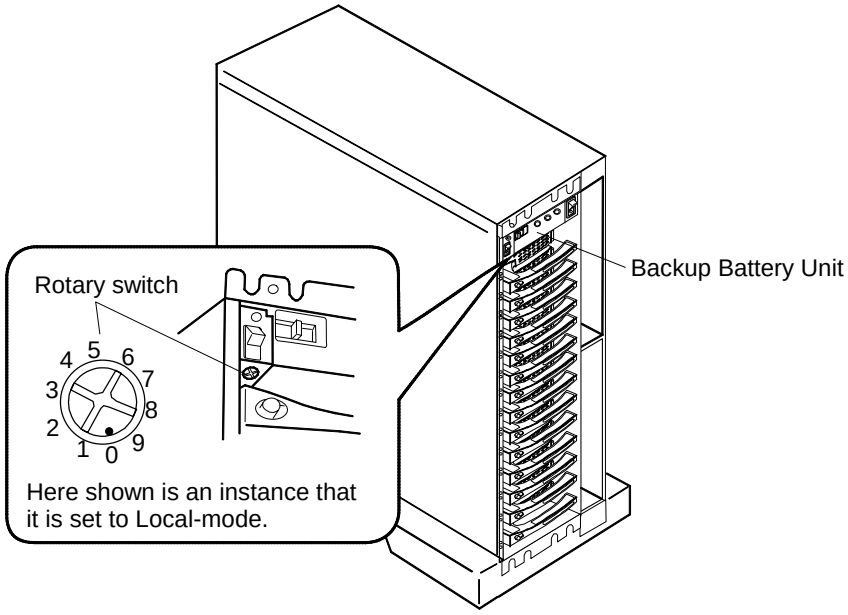


Figure 2.8.1 Location of Rotary Switch for Setting Power Control Mode

Copyright © 2002, 2005, Hitachi, Ltd.

2.9 How to Attach/Remove Front Bezel or Rear Cover

2.9.1 Attaching Front Bezel

(1) Hold the side of front bezel with your both hands.
(2) Engage two hooks of the Front Bezel with the slots on the right side of the subsystem main body.
(3) After making the hooks of the Front Bezel engaged, press the bezel against the main body until it is stopped.
(4) Fix the front bezel by turning the key in the direction shown by the arrow ② (<·····).
(5) Hitch the top of the option bezel to the upper hook and fasten it by pressing its bottom against the main body to engage the ball catch.

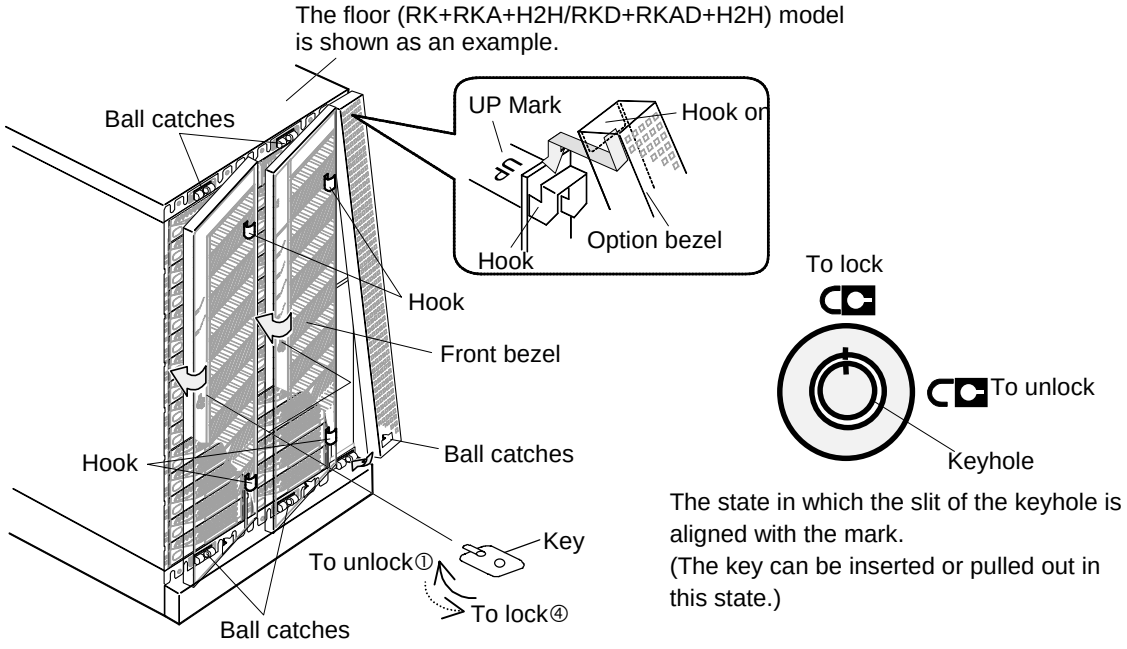


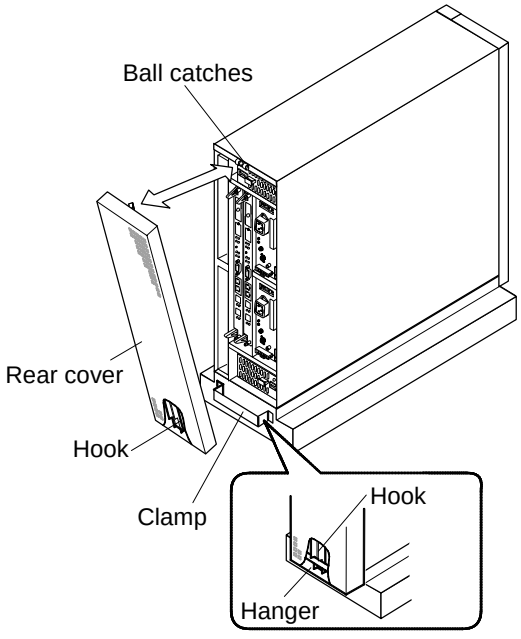
Figure 2.9.1 Attaching Front Bezel

Copyright © 2002, 2005, Hitachi, Ltd.

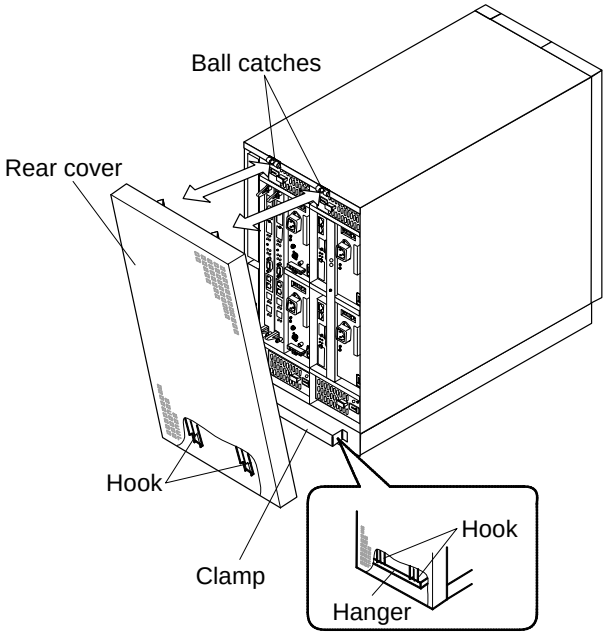
2.9.2 Attaching Rear Cover

NOTE : When installing Rear Cover, be careful not to catch cables.

(1) Hold the rear cover with your both hands.
(2) Hitch the hook at the bottom of the rear cover to the cramp. (For the installation of the cramp, refer to Subsection 2.6.4, “Installing cramp” on page INST 02-0350.)
(3) Fasten the rear cover by pressing it against the ball catch at the upper part of the subsystem main body.



(a) Floor (RK+H1H) Model / Floor (RKS+H1H) Model
Floor (RKD+H1HD) Model / Floor (RKSD+H1HD) Model



(b) Floor (RK+RKA+H2H) Model
Floor (RKD+RKAD+H2HD) Model

Figure 2.9.2 Attaching Rear Cover

Copyright © 2002, 2005, Hitachi, Ltd.

2.10 Installing Skirt

(1) Floor (RK+H1H/RKD+H1HD) Model/Floor (RKS+H1H/RKS+H1HD) 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.

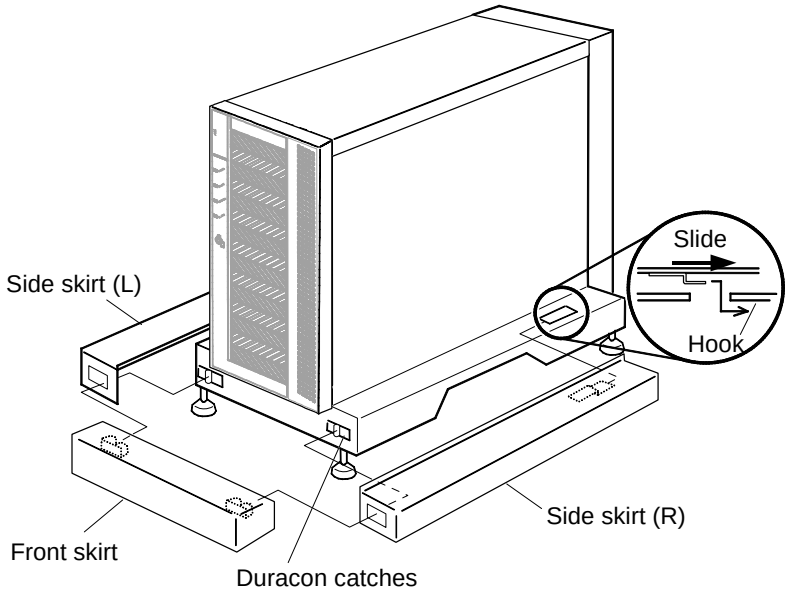


Figure 2.10.1 Installing Skirt

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Floor (RK+RKA+H2H/RKD+RKAD+H2HD) 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.

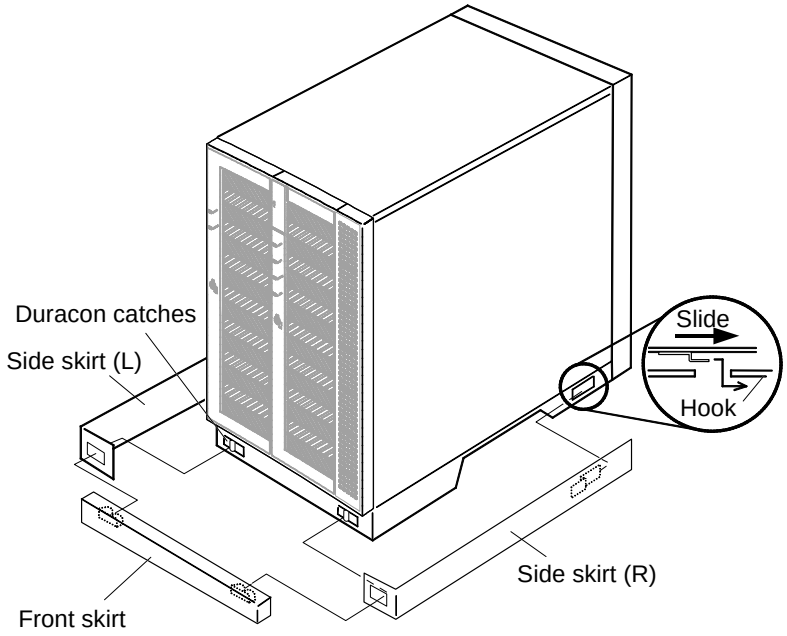


Figure 2.10.2 Installing Skirt

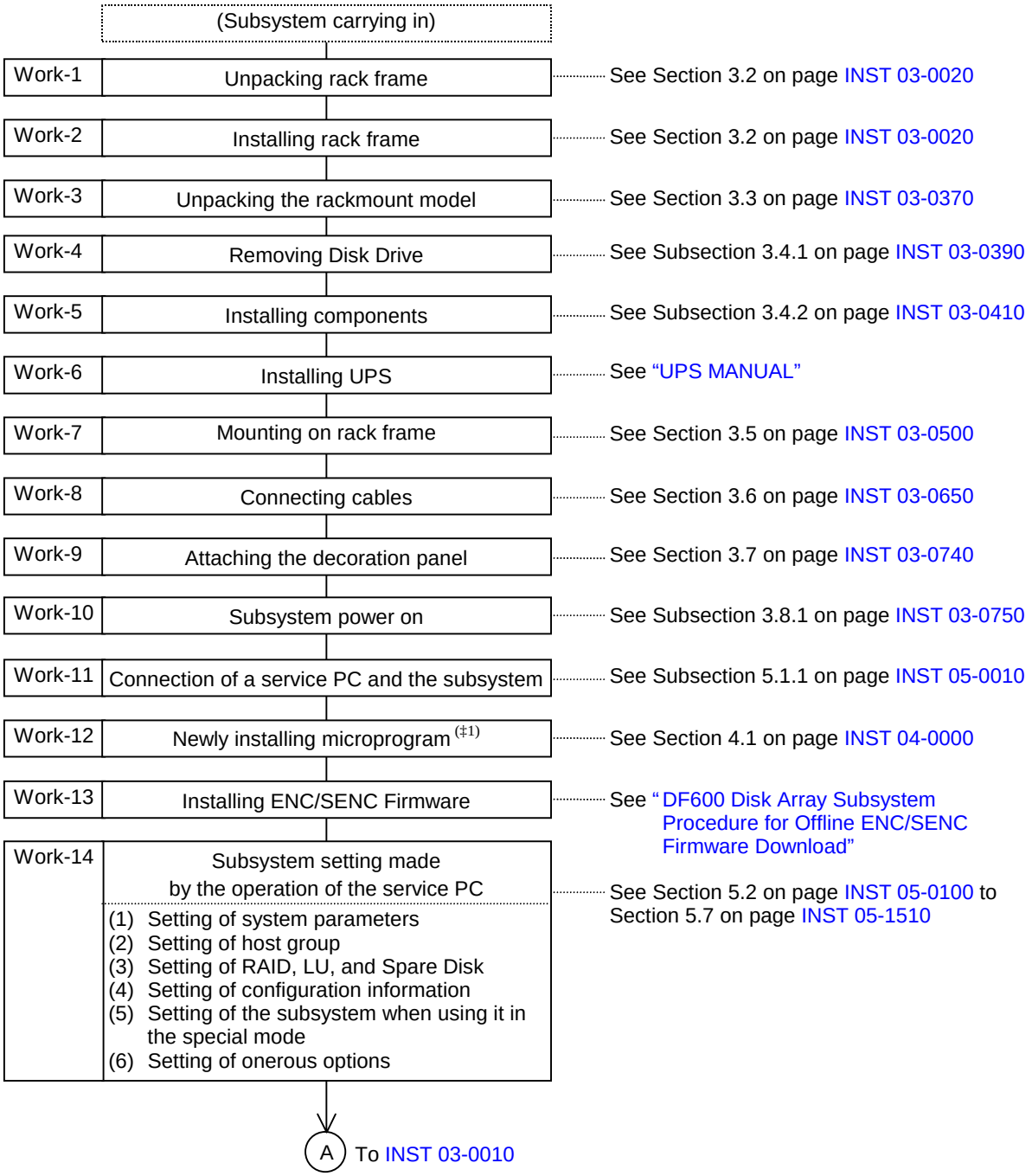
Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 3. Installing Rackmount Model

3.1 Procedures for Installing Rackmount Model

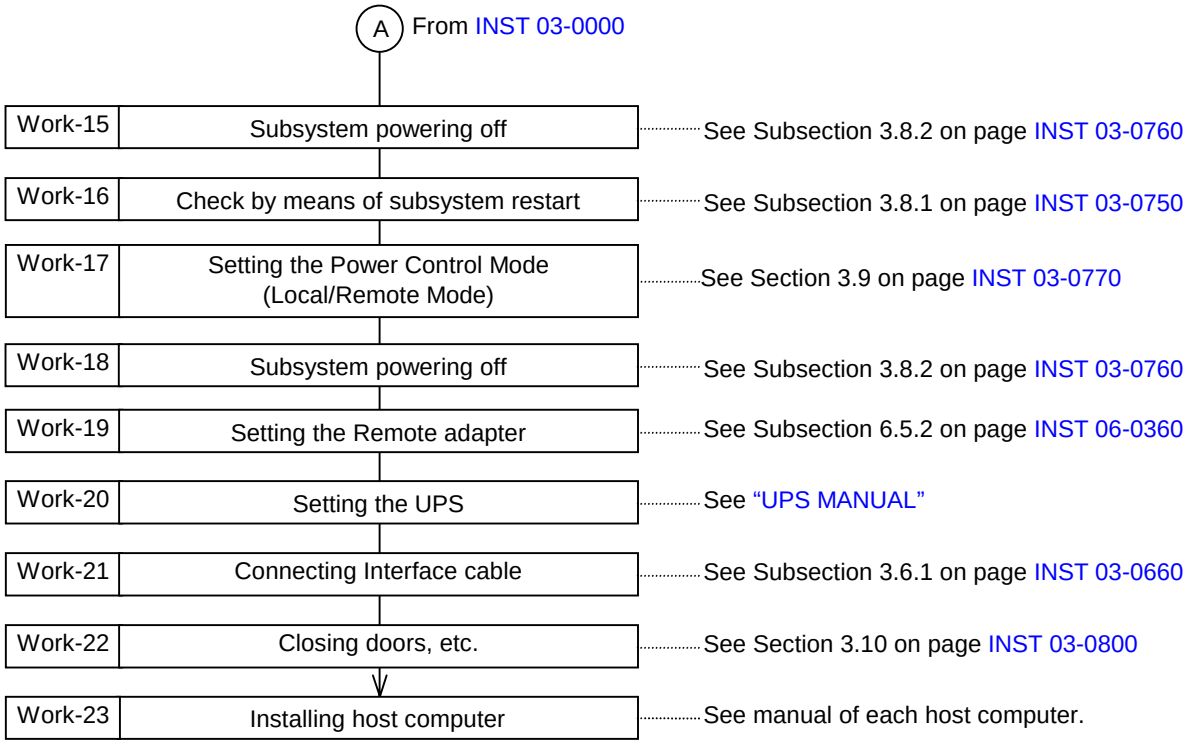
(1) Procedures for installation

In the case of a new introduction or moving, perform the installation after making sure of the following necessary works.



‡1 : Normally, microprograms are installed when the subsystem is shipped from the factory.

Copyright © 2002, 2005, Hitachi, Ltd.



(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.2	Installation of skirts and securing the subsystem.
	Phillips screwdriver	No.1	For setting rotary switch, switch for Unit ID setting.
	Slotted screwdriver	No.1	For Device ID Setting Switch (RKAJAT)
	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)

Copyright © 2002, 2005, Hitachi, Ltd.

3.2 Unpacking and Installing Rack Frame

3.2.1 U6 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 (10), “Installing rails” on page INST 03-0090 and the following steps.

The exterior of the packed rack frame is shown in the Figure 3.2.1.
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-F600-URHT5

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3259079-1	1	For right hand side	
2	Rail	3259079-2	1	For left hand side	
3	Stopper	5510051-1	2	For the rail	
4	Stopper (UPS)	5510102-1	1	For the UPS	Not used
5	Stopper (UPS)	5510102-2	1	For the UPS	Not used
6	LL washer (M4)	2051001-432	6(*1)	For securing the stopper	
7	LL washer (M5)	2051001-513	10(*1)	For securing the rail	
8	Bind screw (M5×10)	SB510	6(*1)	For securing the subsystems	
9	Hexagon socket bolt (M5×20)	BS520	10(*1)	For securing the rail	
10	Bind screw (M4×8)	SB408	8(*1)	For securing the stopper	
11	Repeat binder	5409042-3	3(*2)	Used to fix a slackened part of overlong cable	
12	Fastener	5510146-1	14(*1)	For securing the rail, subsystems	
13	Cleat	5409055-1	4(*1)	For securing the cable	
14	EMI gasket	3259043-445	1	Used to fit the gap between cabinets	
15	Power cable	3259061-C	2	Power cable (600 mm)	
16	Clamp	5511447-1	2	For securing the cable	
17	Binder	5409039-1	6	For securing the cable	

*1 : 2 spares are included.
*2 : 1 spare is included.

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Unpacking

(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 U6 rack frame against the table below.

Table 3.2.2 Parts Required for Installation of DF-F600-U6(*1)

No.	Product name	Parts No.	Quantity	Comment
1	U6 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).

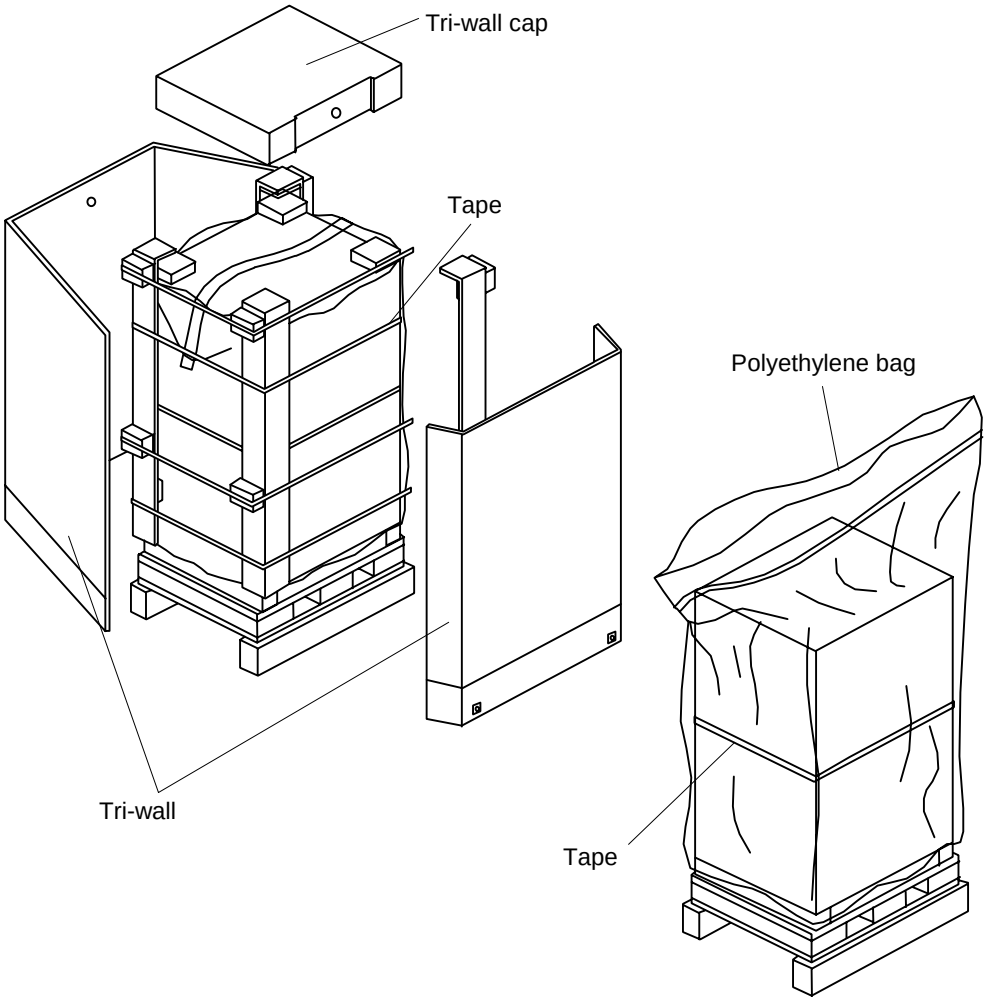


Figure 3.2.1 Packed Status of the U6 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Inspecting the subsystem visually
Check the exterior of the subsystem visually for distortion or damage owing to the transport.

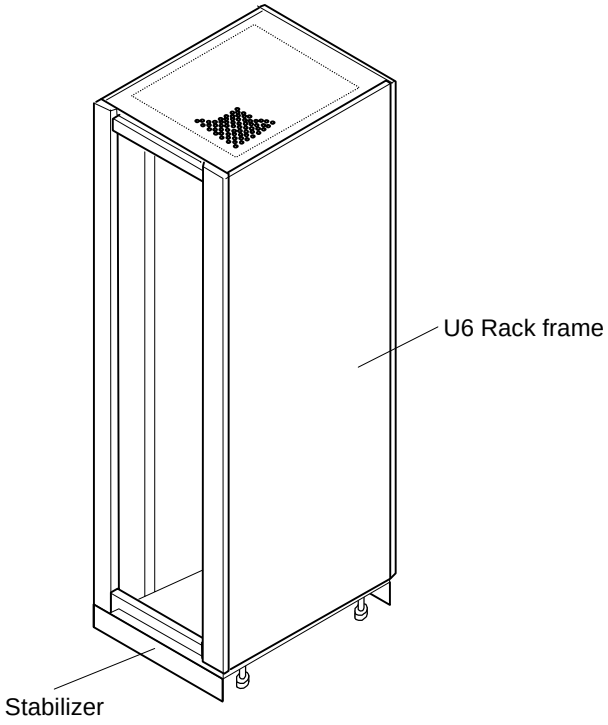


Figure 3.2.2 Exterior Rack Frame

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Installation and maintenance areas
Figure 3.2.3 shows installation and maintenance areas for the DF-F600-U6 rack frame.

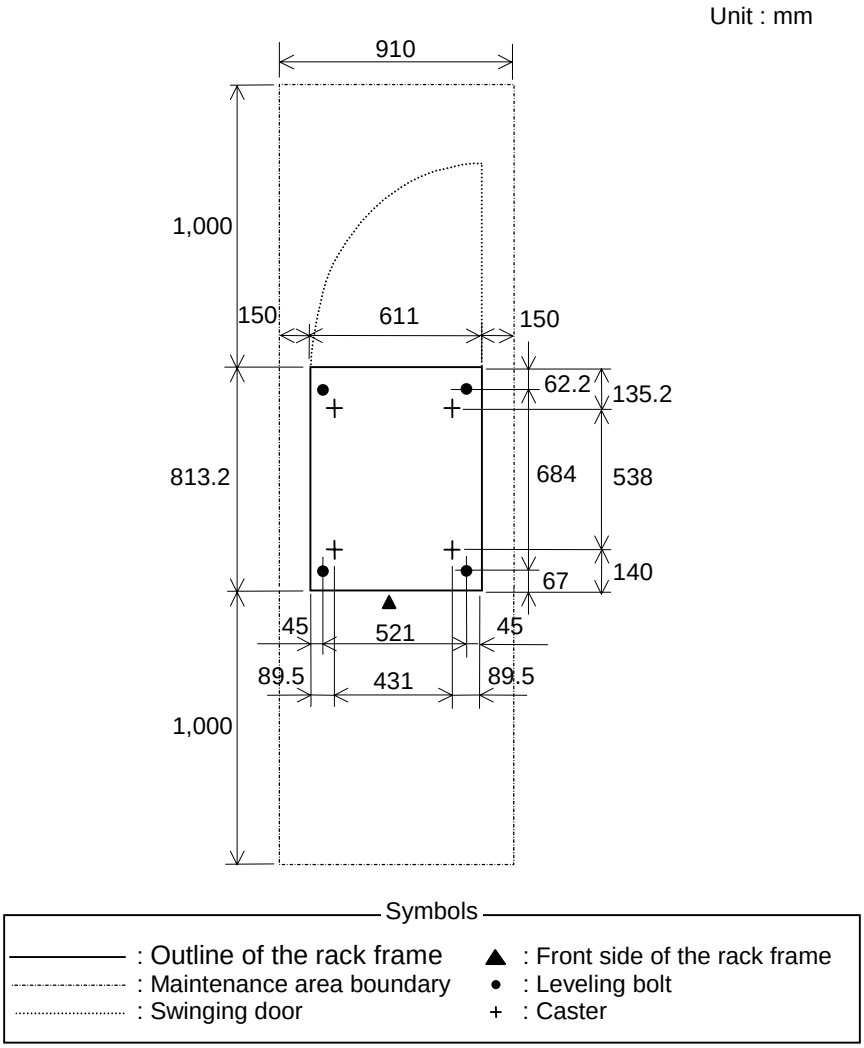


Figure 3.2.3 Installation and Maintenance Areas of Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(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 bolts with an Allen wrench.
(b) Remove the stabilizers from subsystem.
Keep the removed bolts and stabilizers. (They will be necessary when the rack frame is moved again later.)

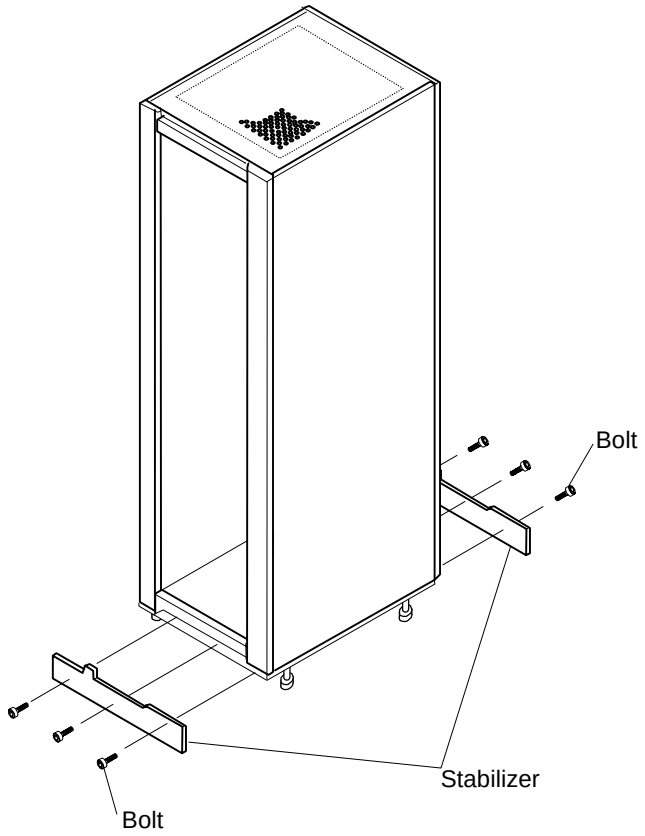


Figure 3.2.4 Removing the Stabilizers

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

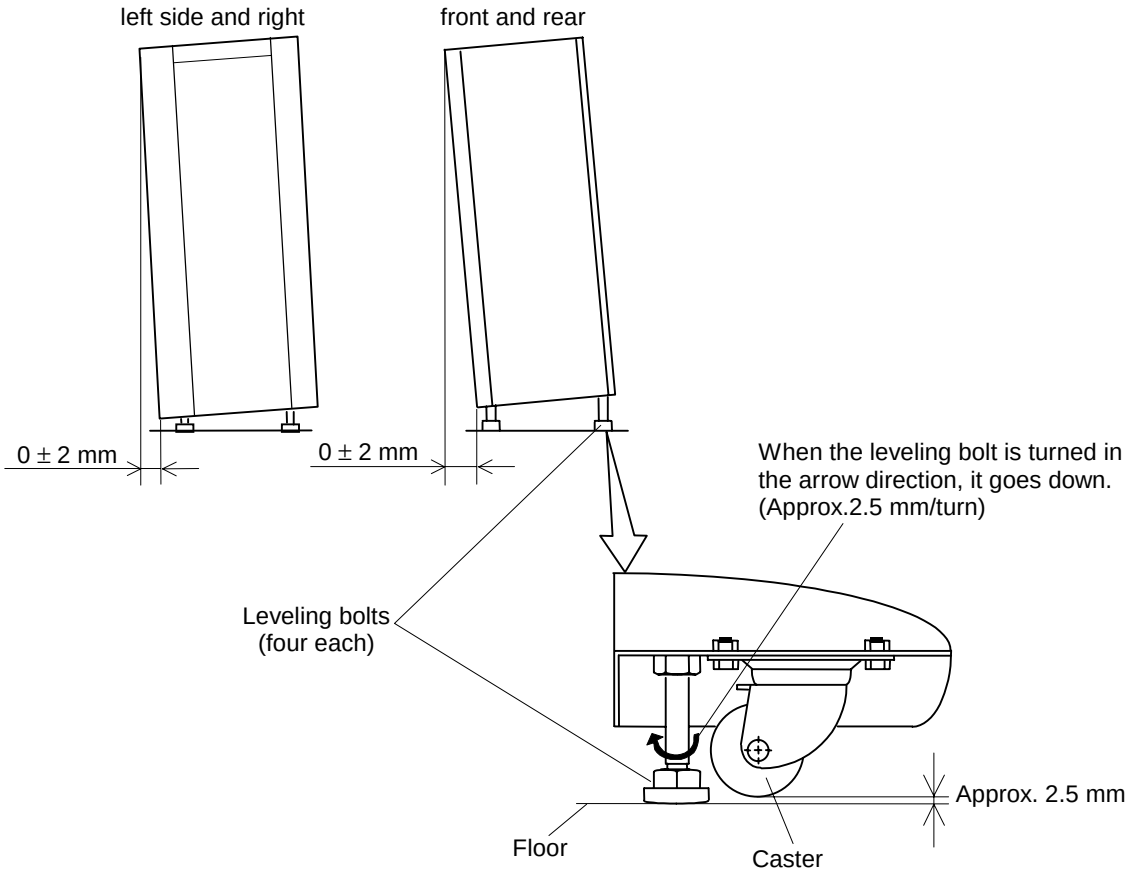


Figure 3.2.5 Adjusting Leveling Bolts

Copyright © 2002, 2005, Hitachi, Ltd.

(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 (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) Install the skirt (R) by fitting its claws into the rectangular holes on the skirt (S).

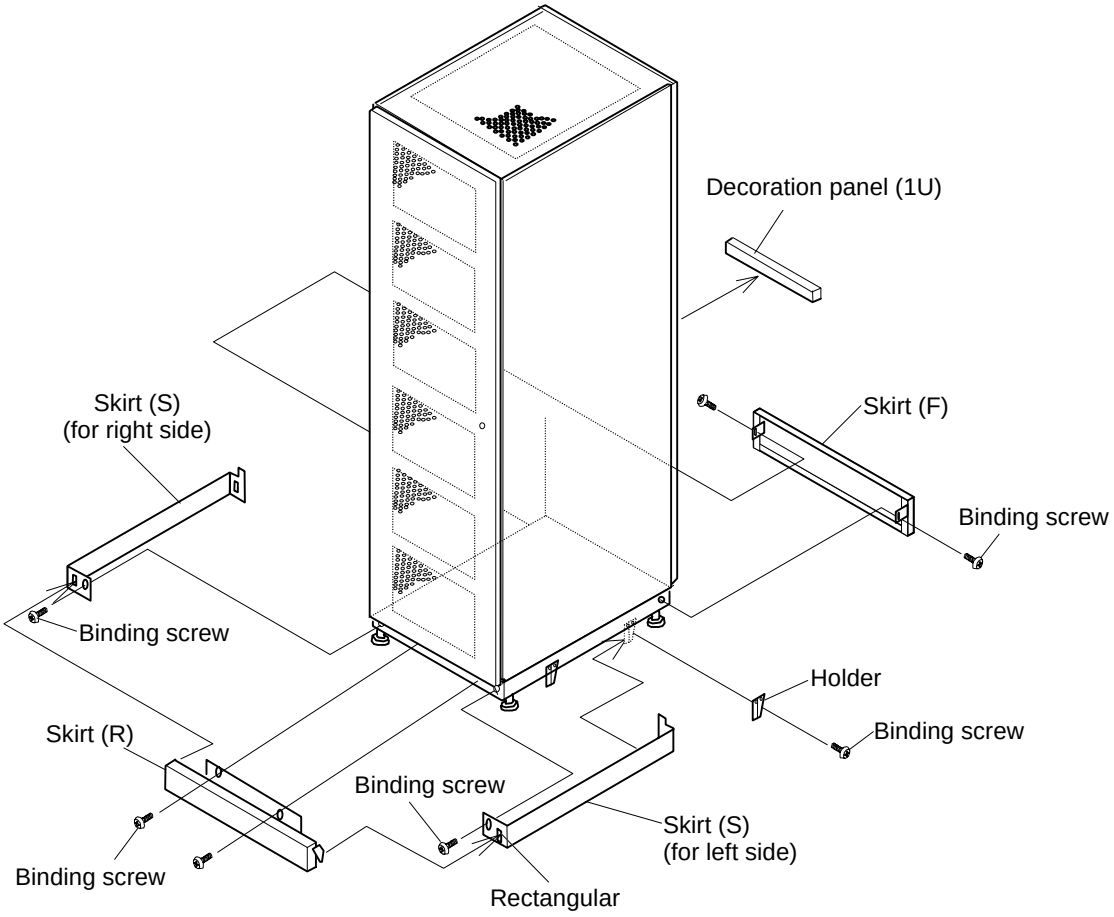


Figure 3.2.6 Installing Skirts and Removing Decoration Panel(s)

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

(10) Installing the rails (URHT5) (If the rails have already been installed, this installation is not required.)

For the components list, see Table 3.2.1 (INST 03-0020).

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 U6 rack frame

Wide intervals: Repeat of 44.45mm (31.75mm + 12.7mm)

Maximum number of mountable unit spaces: 38

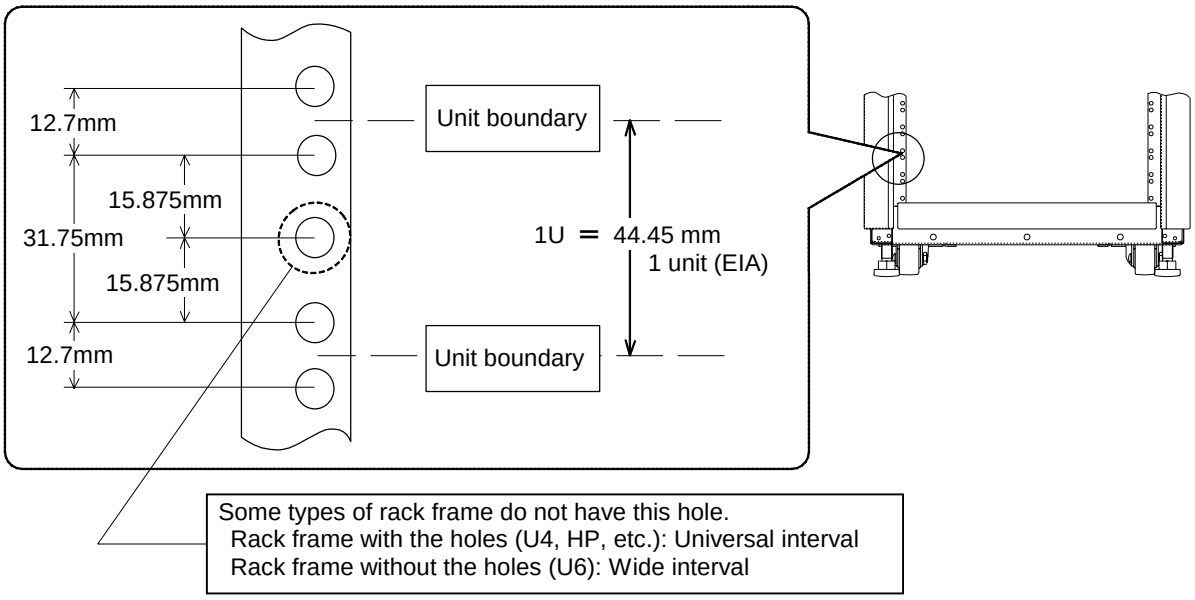
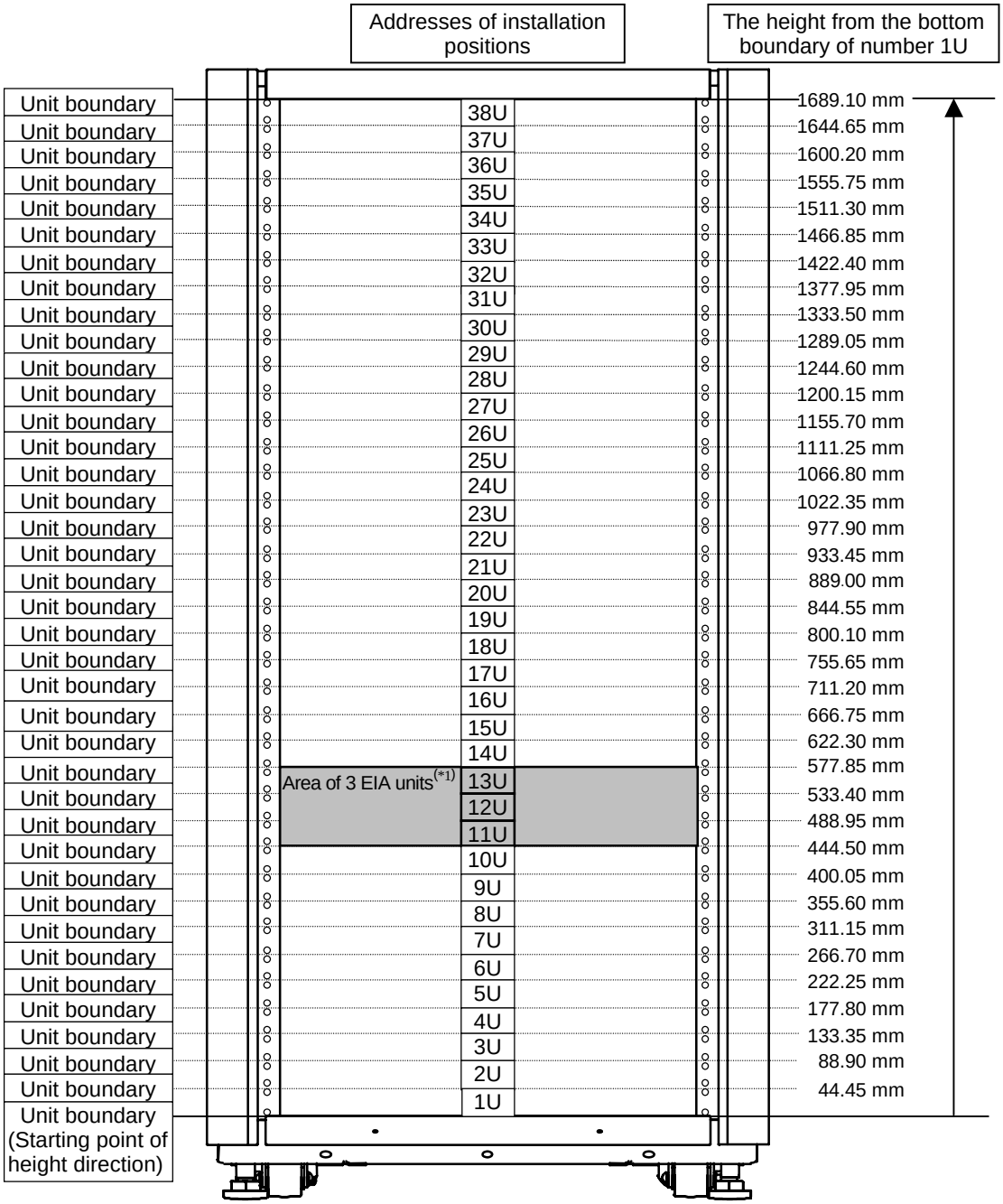


Figure 3.2.7 Attachment Hole Size of Rack

Copyright © 2002, 2005, Hitachi, Ltd.

The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame. In the case of the U6 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 U6 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).

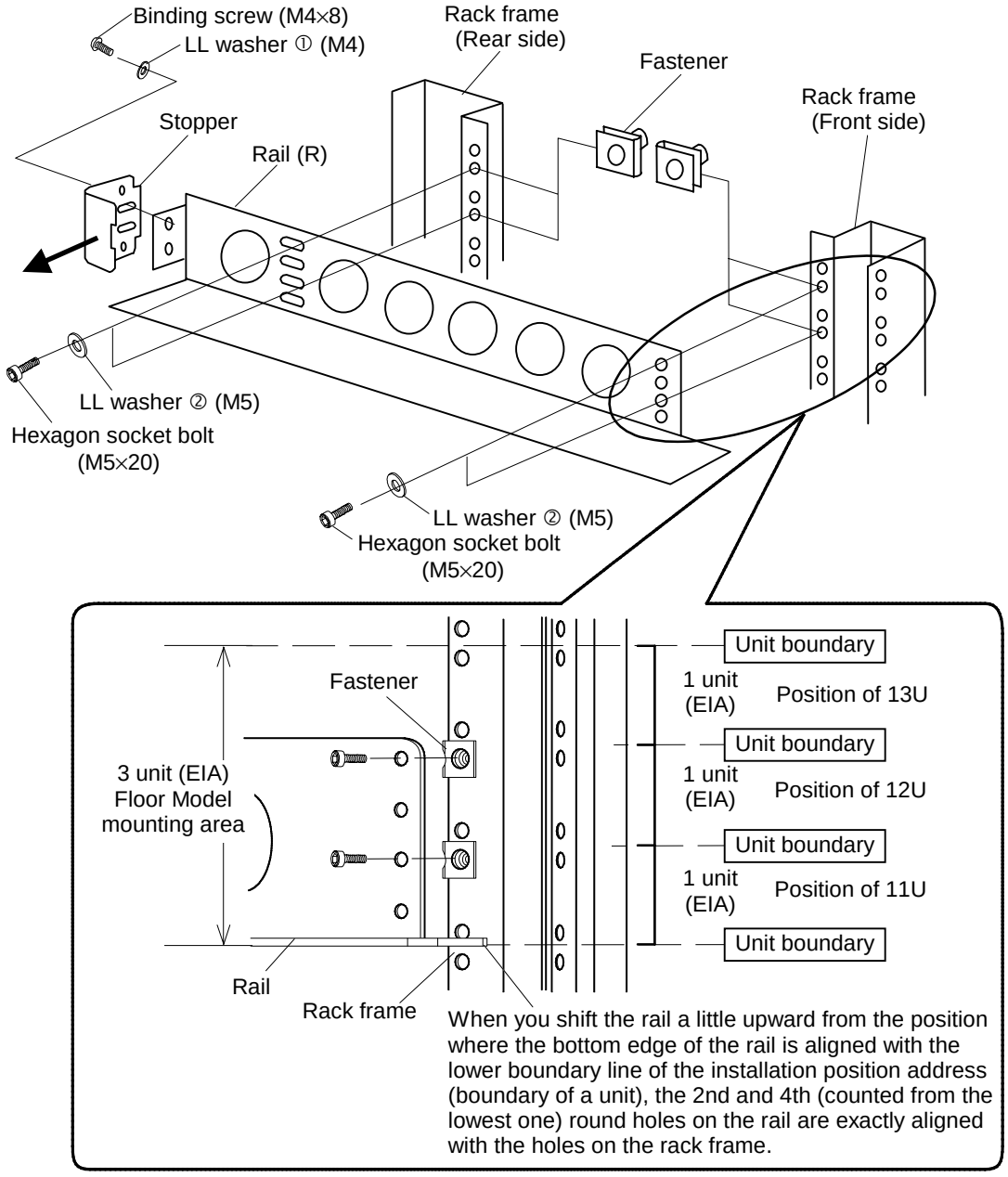


*1 : The grayed are ▭ shows a layout of an area for installing the subsystem at the 11U

Figure 3.2.8 Whole Layout of Installation Position Addresses

Copyright © 2002, 2005, Hitachi, Ltd.

(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 Frame and Installation Positions

Copyright © 2002, 2005, Hitachi, Ltd.

(11) 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.

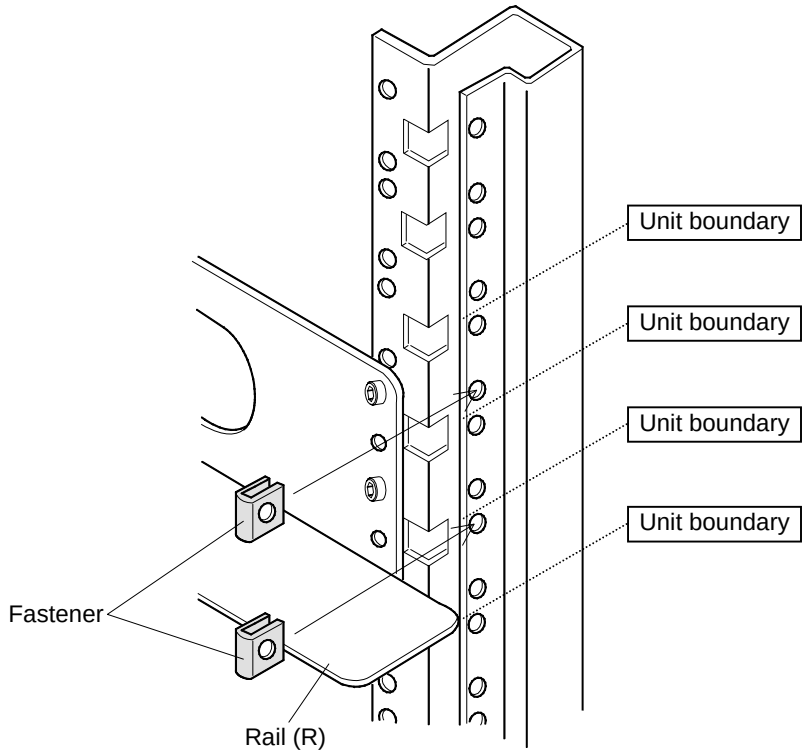


Figure 3.2.10 Installing Fasteners on the Front Side of the Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

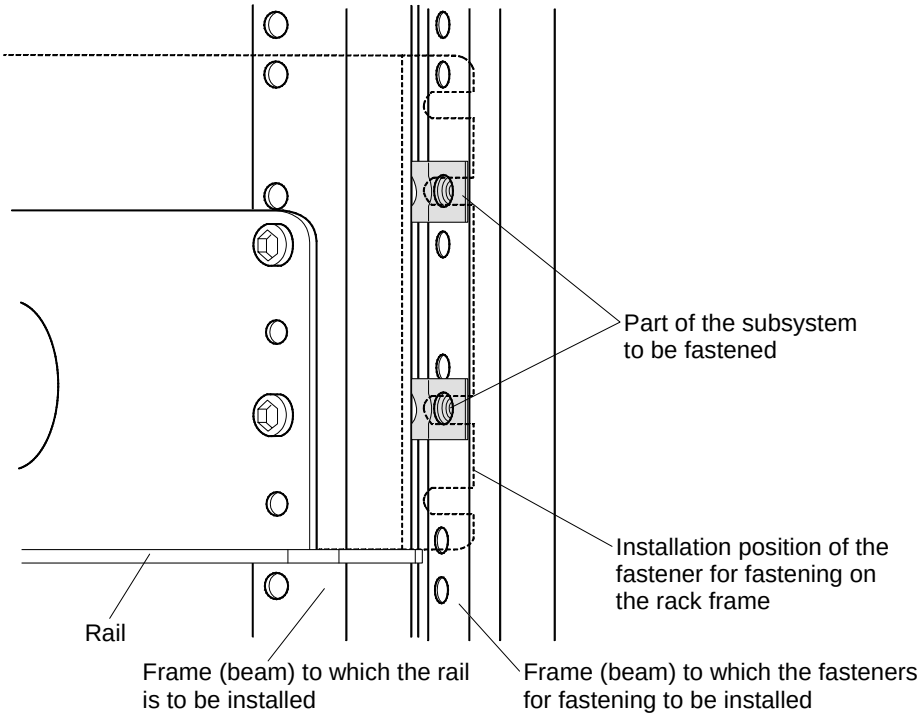


Figure 3.2.11 Installation Positions of Fasteners and Relation with Rails

Copyright © 2002, 2005, Hitachi, Ltd.

3.2.2 U4 Rack Frame (Unpacking/Installing and Installation areas/maintenance areas)

NOTE : When installing rack rails in the rack frame that has already been in use, perform the installation works in Step (8), “Installing rails” on page INST 03-0200 and the following steps.

The external appearance of the packed rack frame is shown in the Figure 3.2.12. Table 3.2.3 shows optional parts required to install a subsystem.

Table 3.2.3 Parts List for the Rack frame DF-F600-URHP5 (Rev.B or C)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3258442-1	1	For right hand side	
2	Rail	3258442-2	1	For left hand side	
3	Spacer	5507394-1	2	—	Rev.B only
4	Spacer	5507394-2	2	—	Rev.C only(*2)
5	Stopper	5510051-1	2	For the subsystems	
6	Stopper (UPS)	5510102-1	1	For the UPS (R)	Not used
7	Stopper (UPS)	5510102-2	1	For the UPS (L)	Not used
8	Fastener	5486485-1	16(*1)	For securing the rail, subsystems	
9	Bind screw (M4×8)	SB408	6(*1)	For securing the stopper	
10	Bind screw (M5×16)	SB516	10(*1)	For securing the rail	
11	Bind screw (M5×10)	SB510	8(*1)	For securing the subsystems	
12	LL washer (M4)	2051001-432	6(*1)	For securing the stopper	
13	Repeat binder	50409042-3	3	For securing cables on the subsystem	

*1 : 2 spares are included.

*2 : Rev.C is necessary to install RKH/RKHE.

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Unpacking
  (a) Remove the external packaging and packing materials.
  (b) Take the rack frame out of the polyethylene bag. Remove two tapes used to secure the rear door.
  (c) Remove the tapes from the leveling bolts.

Table 3.2.4 Parts List for the Rack Frame DF-F600-U4(*1)

No.	Product name	Parts No.	Quantity	Comment
1	U4 rack frame	—	1	—
2	AC power cable	—	2	—
	*1 : Exclusive rack frame for mounting an subsystem(s).			

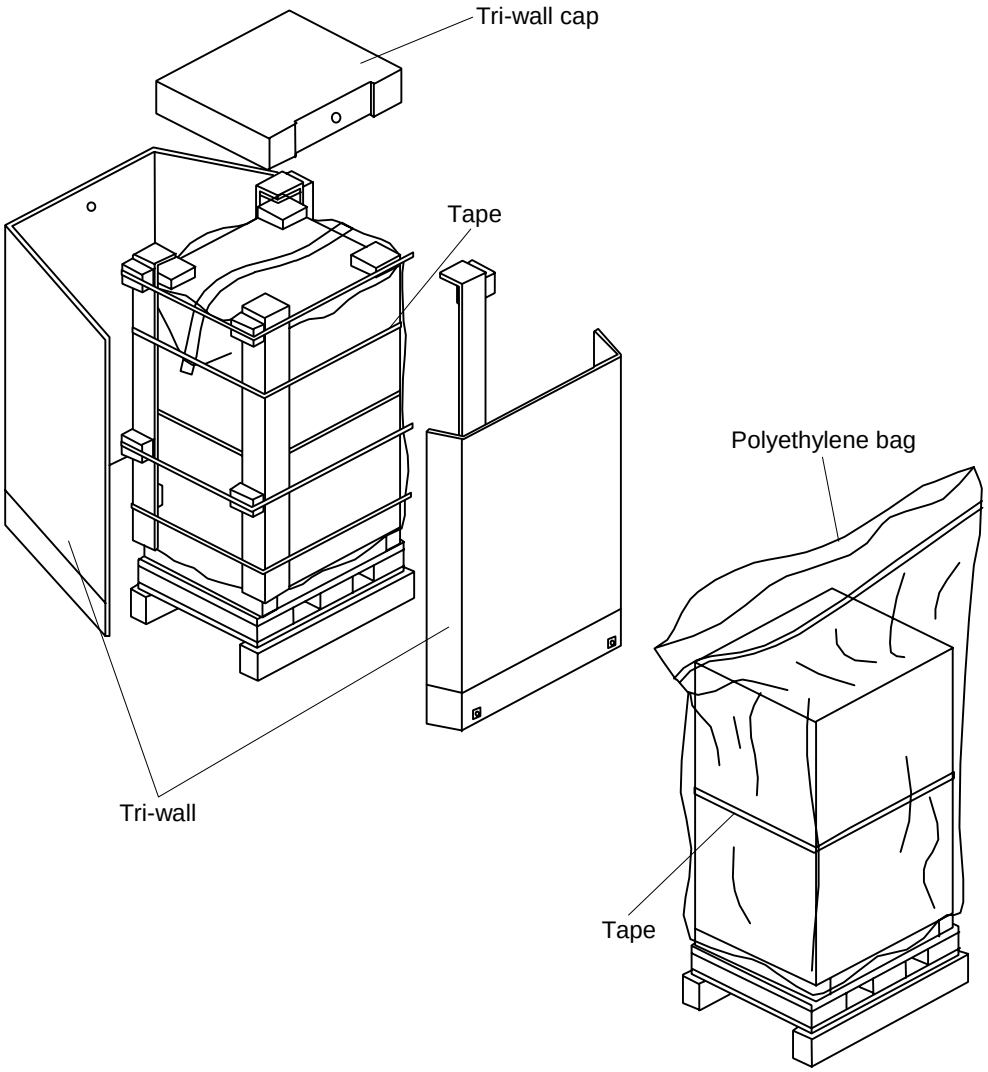


Figure 3.2.12 The Packed U4 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Inspecting the external appearance of the rack frame visually
Check the appearance for any distortion or damage generated under transportation.

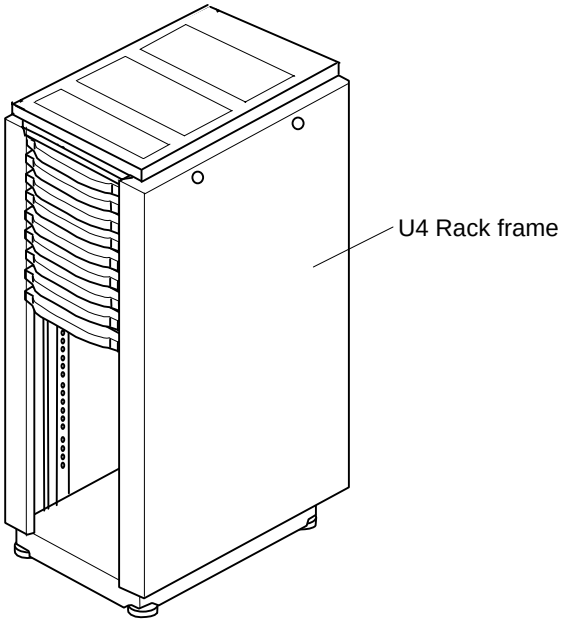


Figure 3.2.13 Exterior Rack Frame

(3) Checking the package contents
Check that the package contents (their model names, product serial numbers, and quantities) accord with those listed in the packing list attached to the rack frame.

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Installation and maintenance areas

Figure 3.2.14 shows the installation and maintenance areas for the DF-F600-U4 rack frame.

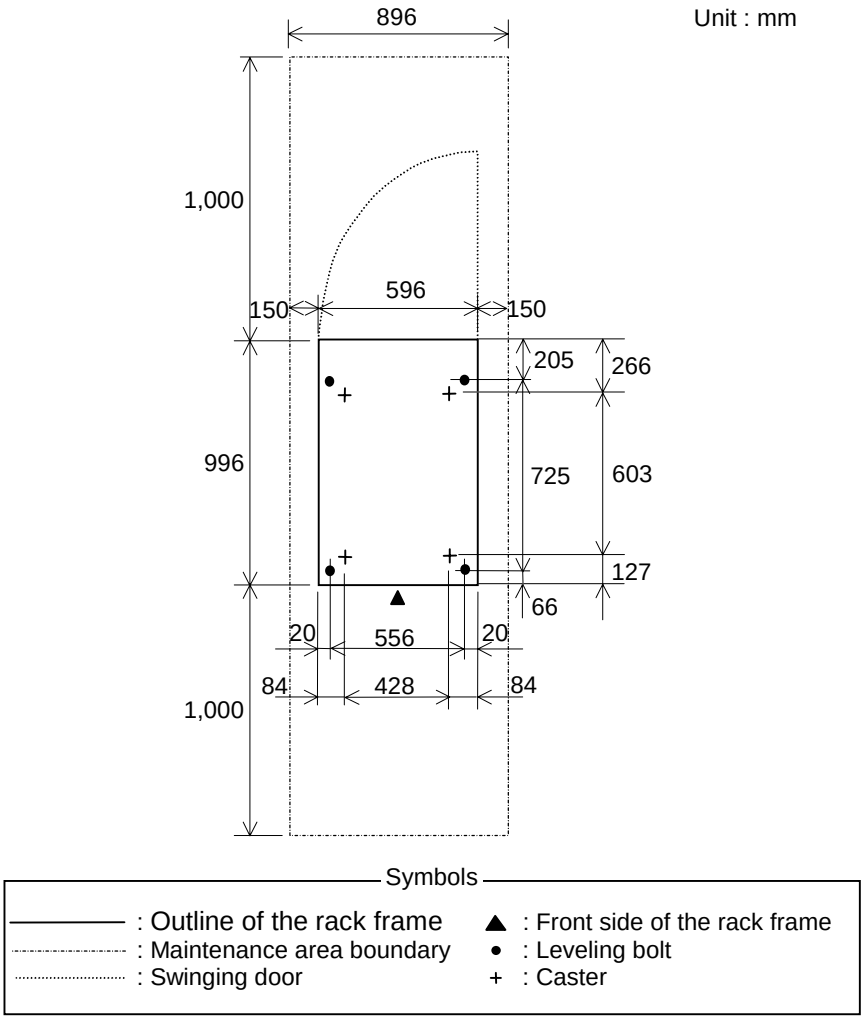


Figure 3.2.14 Installation and Maintenance Areas for the Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(5) Moving the unpacked rack frame to the installation area.

(6) Securing the rack frame
Secure the rack frame in the installation area by adjusting the leveling bolts.
(a) Turn each of the leveling bolts to the arrow direction so that the clearance between each caster and the floor becomes about 2.5 mm.
(b) Adjust the leveling volts until the tilt of the rack frame to each quarter becomes 0 ± 2 mm.

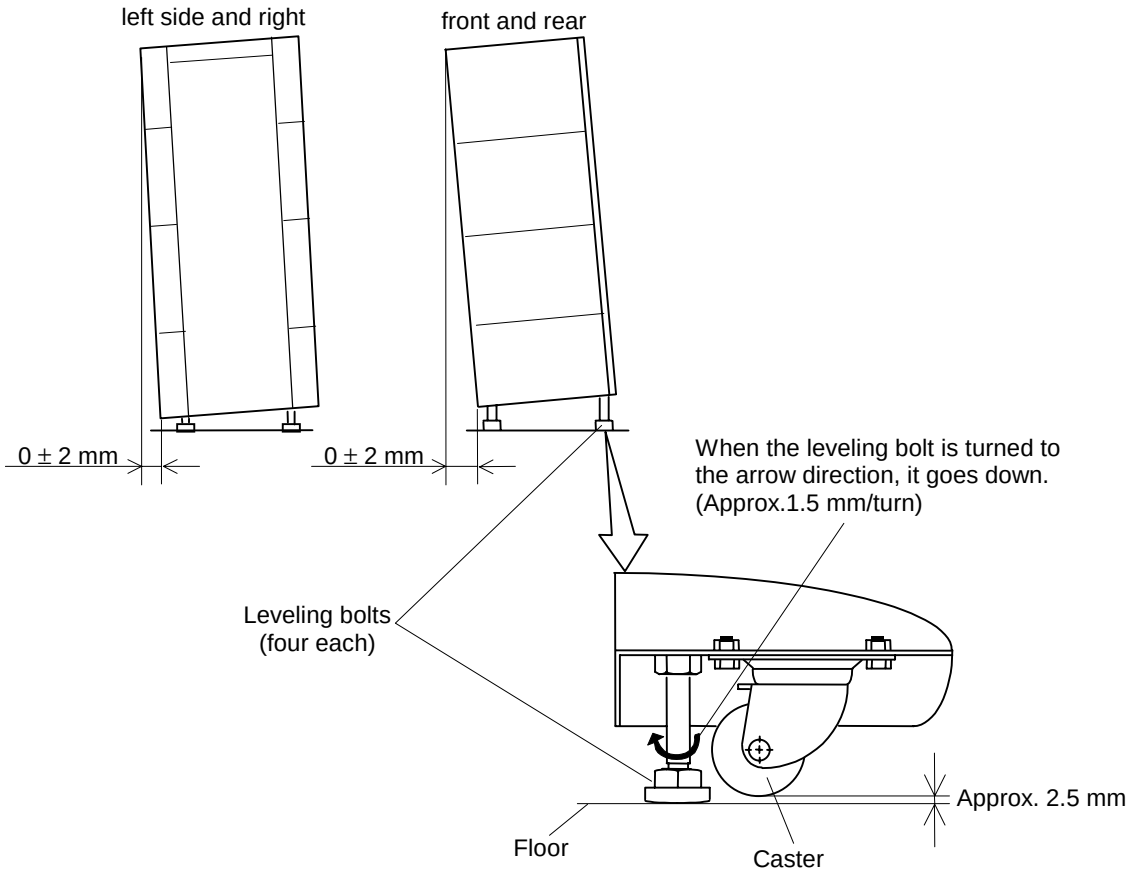


Figure 3.2.15 Adjusting the Leveling Bolts

Copyright © 2002, 2005, Hitachi, Ltd.

(7) Removing the filler panels
When the filler panels are attached to the location where the subsystem is to be installed, remove them from the rack frame.
(a) Pull each of the filler panels towards you.
(b) The filler panel is removed.

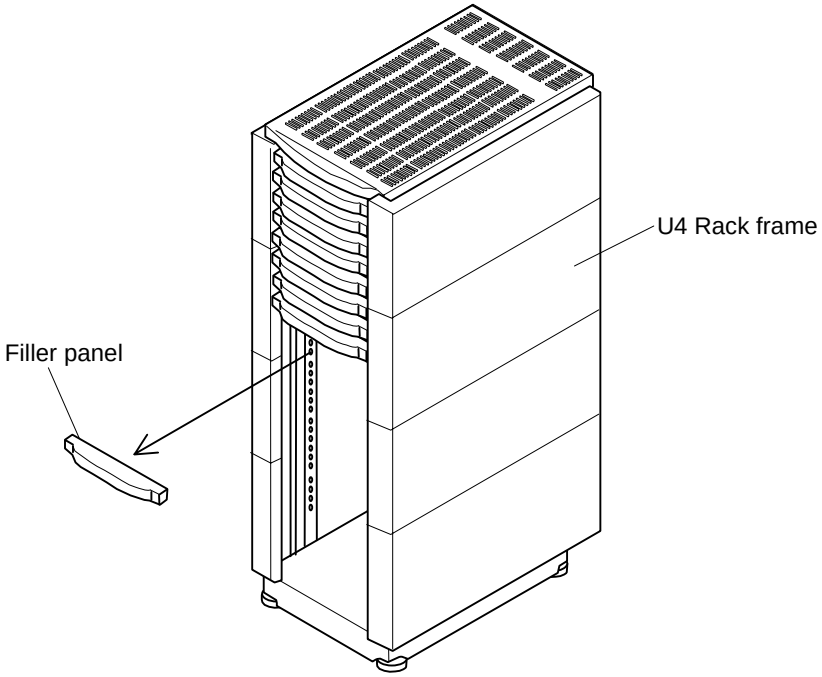


Figure 3.2.16 Removing the Filler Panels

Copyright © 2002, 2005, Hitachi, Ltd.

(8) Installing the rails (URHT5) (If the rails are already installed, this installation procedure is not required.)

Refer to Table 3.2.3 (INST 03-0140) for the parts lists.

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 U4 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

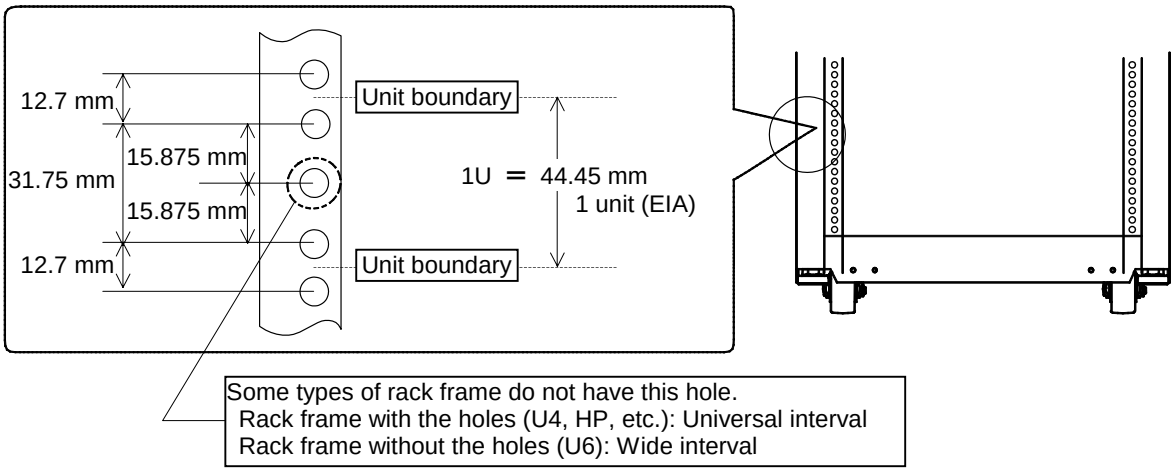
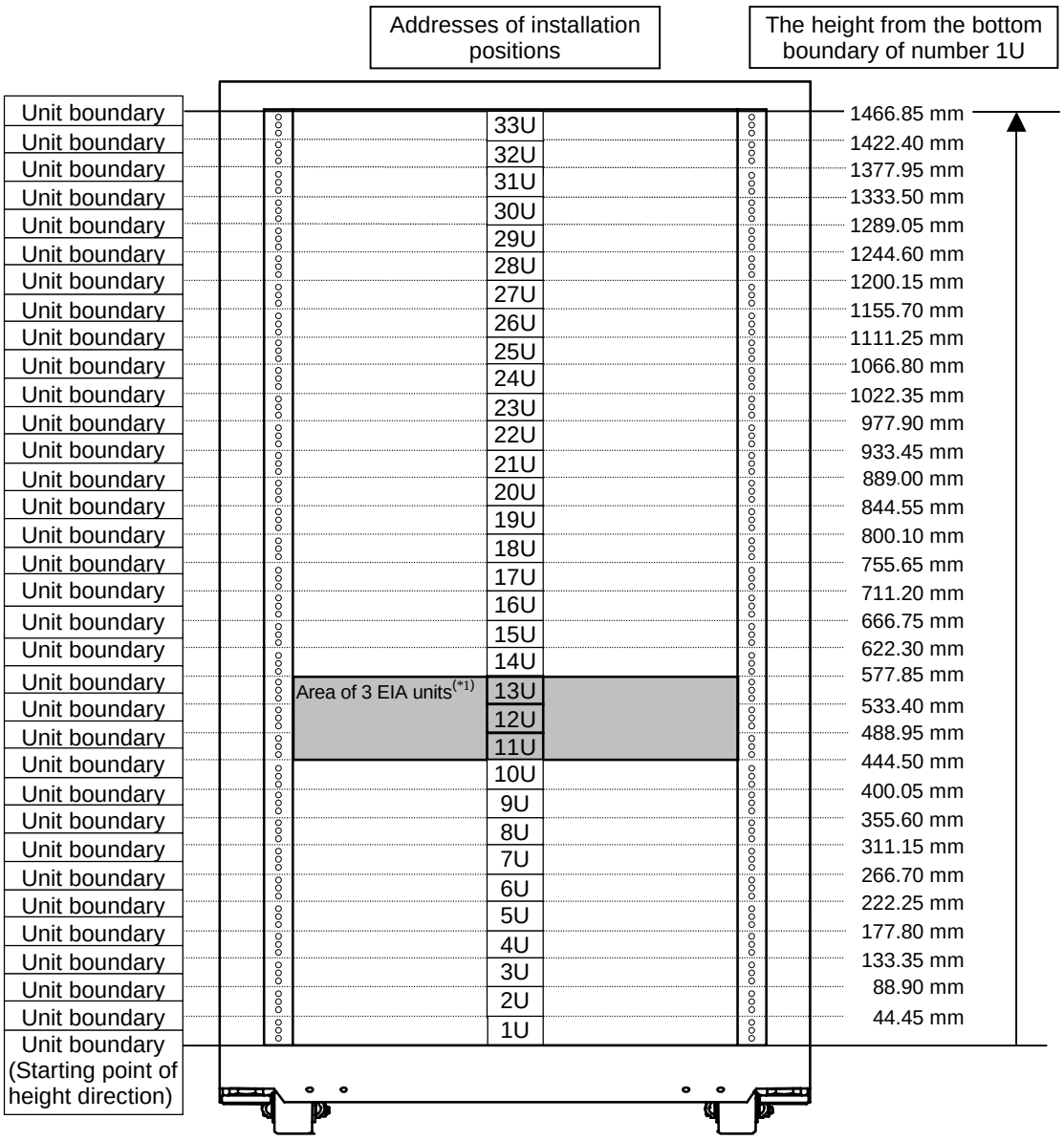


Figure 3.2.17 Attachment Hole Size of Rack

Copyright © 2002, 2005, Hitachi, Ltd.

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 : Do not use a space of one EIA unit on the bottom of the rack frame because it may be used for installing the PDU.

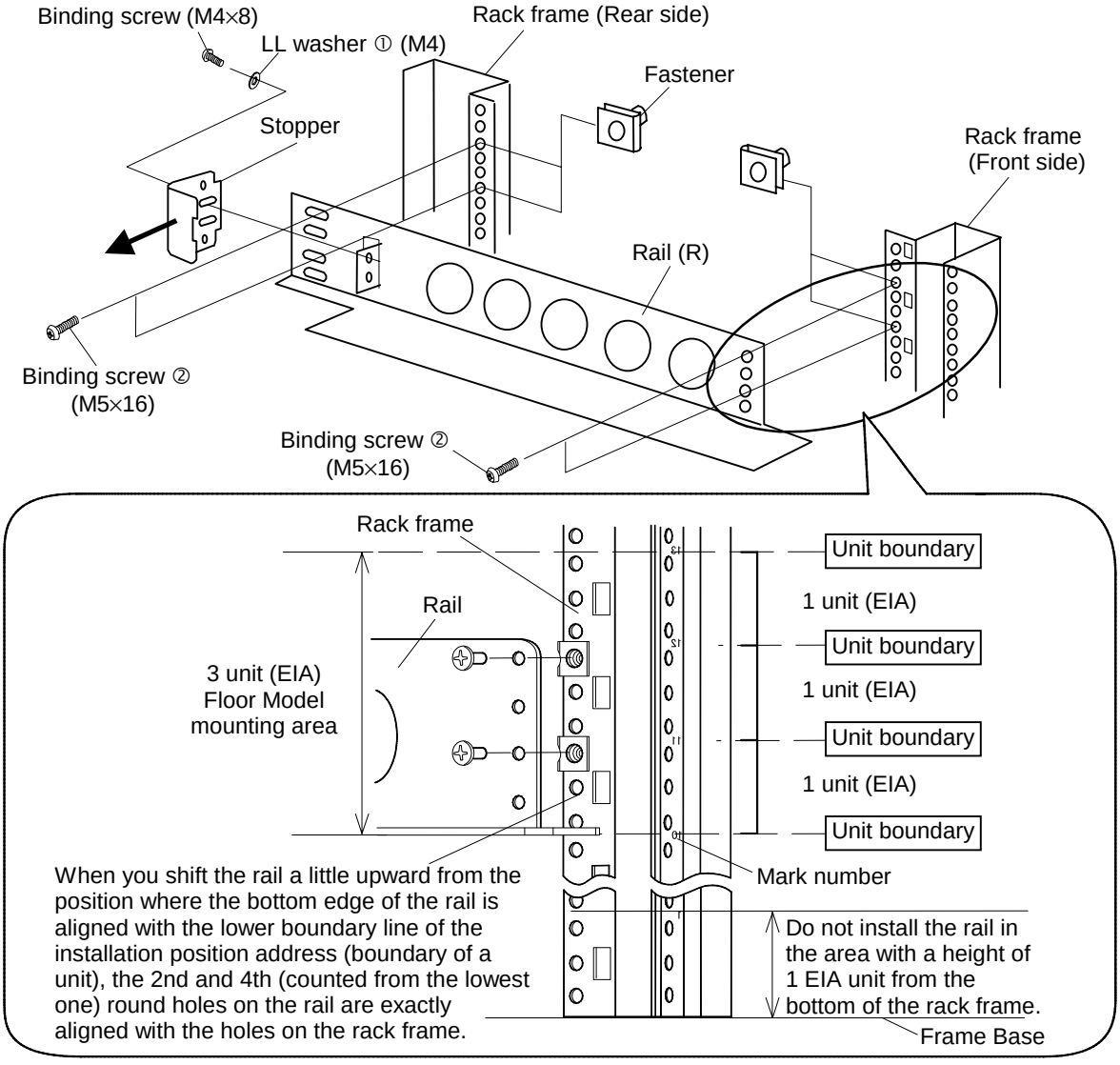


*1 : The grayed are ▭ shows a layout of an area for installing the subsystem at the 11U

Figure 3.2.18 Whole Layout of Installation Position Addresses (U4)

Copyright © 2002, 2005, Hitachi, Ltd.

(a) Slide the stopper in the direction shown by the arrow and temporarily fixes it to the Rail (R) using the binding screws and LL washers ① (M4 (at two places.)).
For the installation position address, see Figure 3.2.18.
(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 binding screws ② (at four places each on the front and rear sides.).
(d) Temporarily attach the stopper (L) to the rail (L), and secure the rail (L) to the rack frame in the same way.



*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.2.19 Installation of Rails to Frame and Installation Positions

Copyright © 2002, 2005, Hitachi, Ltd.

(9) Installing the spacer

Attach two Spacers to the front (right and left each) of the Rack frame for fixing the Device which is installed in the Rack frame.

Attach the Spacers for installing the device following Fig3.2.20 and Fig3.2.21.

(a) Install the spacer by screwing a binding screw (M5×10) from the rear side of the rack frame through the 9th (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) mounting hole and the top threaded hole on the spacer.

(b) Install the spacer by screwing a binding screw (M5×10) from the rear side of the rack frame through the 3rd (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) mounting hole and the 2nd (counted from the bottom) threaded hole on the spacer.

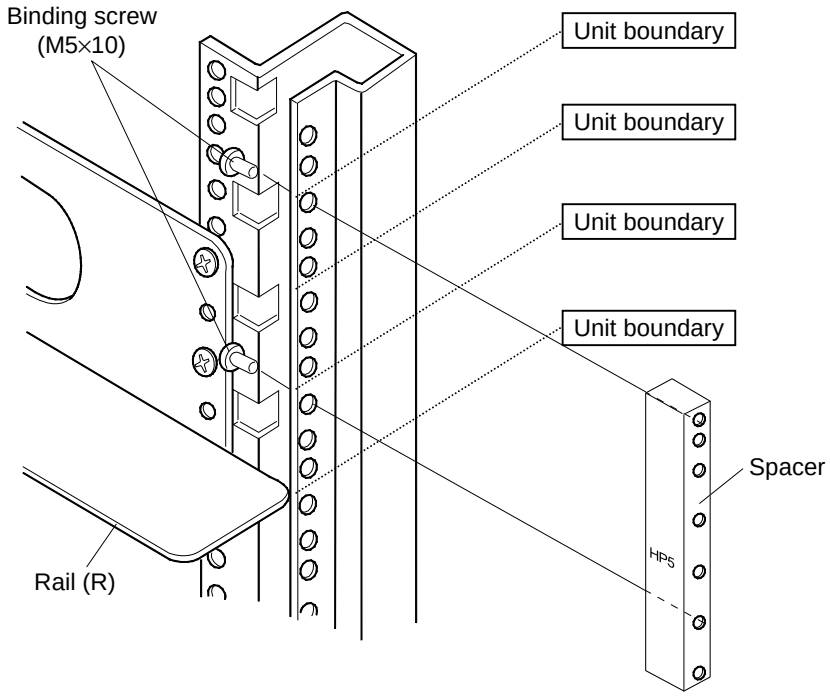


Figure 3.2.20 Location of Installing the Spacer

Copyright © 2002, 2005, Hitachi, Ltd.

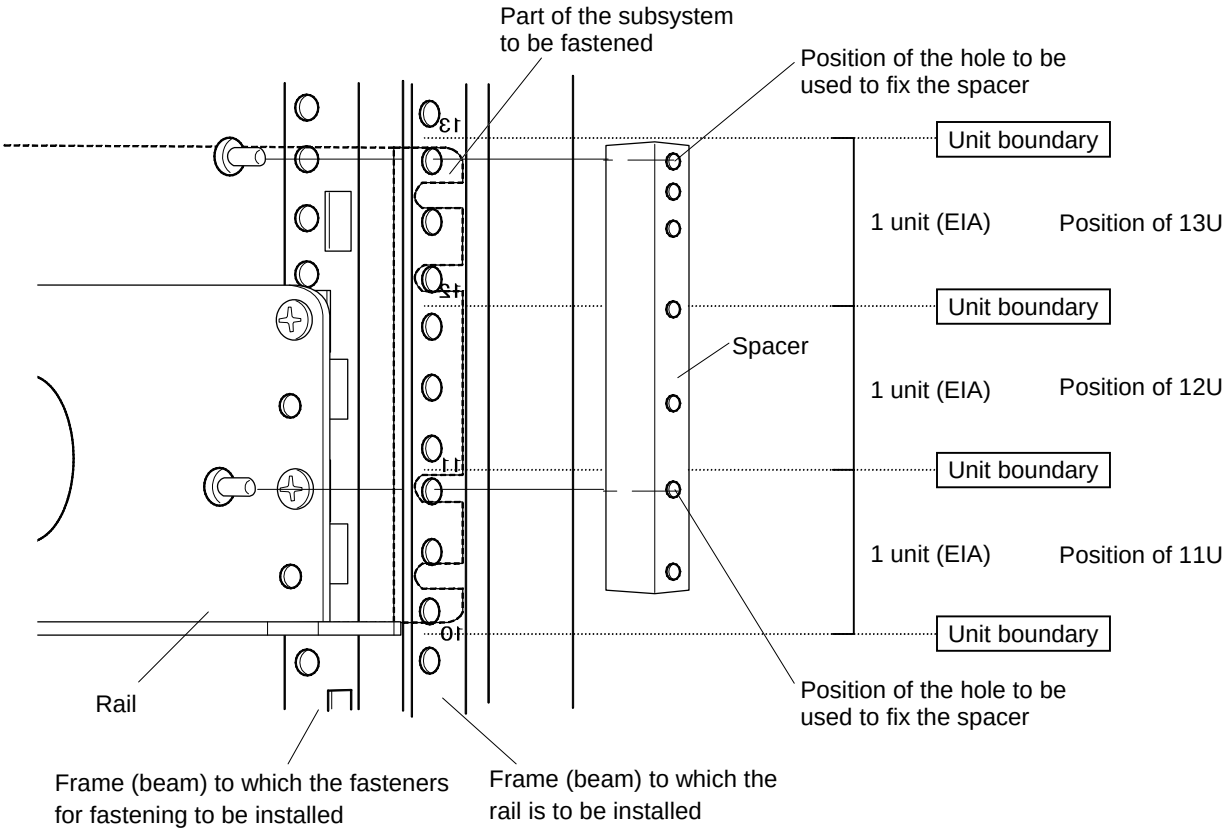


Figure 3.2.21 Installation Positions of Fasteners and Relation with Rails

Copyright © 2002, 2005, Hitachi, Ltd.

3.2.3 HP Rack Frame (Unpacking/Installing and Installation areas/maintenance areas)

The DF600 can be mounted on the HP rack frame by installing the rack rails for Hitachi common rack frame (DF-F600-URHP5) 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 3.2.5 show optional parts required to install one subsystem.
As many kits as the subsystems to be mounted are required.

Table 3.2.5 Parts Required for Installation of DF-F600-URHP5 (Rev.B or C)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail	3258442-1	1	For right hand side	
2	Rail	3258442-2	1	For left hand side	
3	Spacer	5507394-1	2	—	Rev.B only
4	Spacer	5507394-2	2	—	Rev.C only (*1)
5	Stopper	5510051-1	2	For the subsystems	
6	Stopper (UPS)	5510102-1	1	For the UPS (R)	Not used
7	Stopper (UPS)	5510102-2	1	For the UPS (L)	Not used
8	Fastener	5486485-1	10	For securing the rail	
9	Bind screw (M4×8)	SB408	6	For securing the stopper	
10	Bind screw (M5×16)	SB516	10	For securing the rail	
11	Bind screw (M5×10)	SB510	10	For securing the subsystems	
12	LL washer (M4)	2051001-432	6	For securing the stopper	
13	Repeat binder	5409042-3	3	For securing cables on the subsystem	
*1 : Rev.C is necessary to install RKH/RKHE.					

(1) Appearance of HP rack frame
Figure 3.2.22 shows appearance of the HP rack frame.

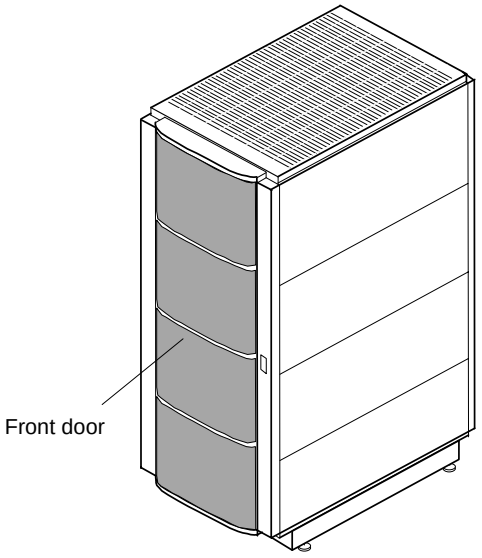


Figure 3.2.22 Appearance of Rack Frame (HP Model Name: J1501A)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Installing the rails (URHP5) (If the rails have already been installed, this installation is not required.)

For the components list, see Table 3.2.5 (INST 03-0250).

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

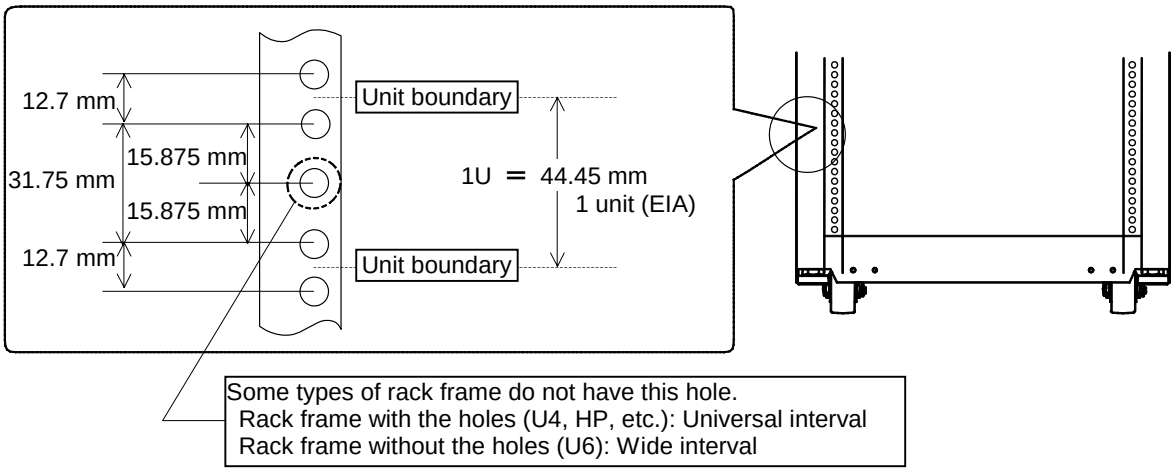
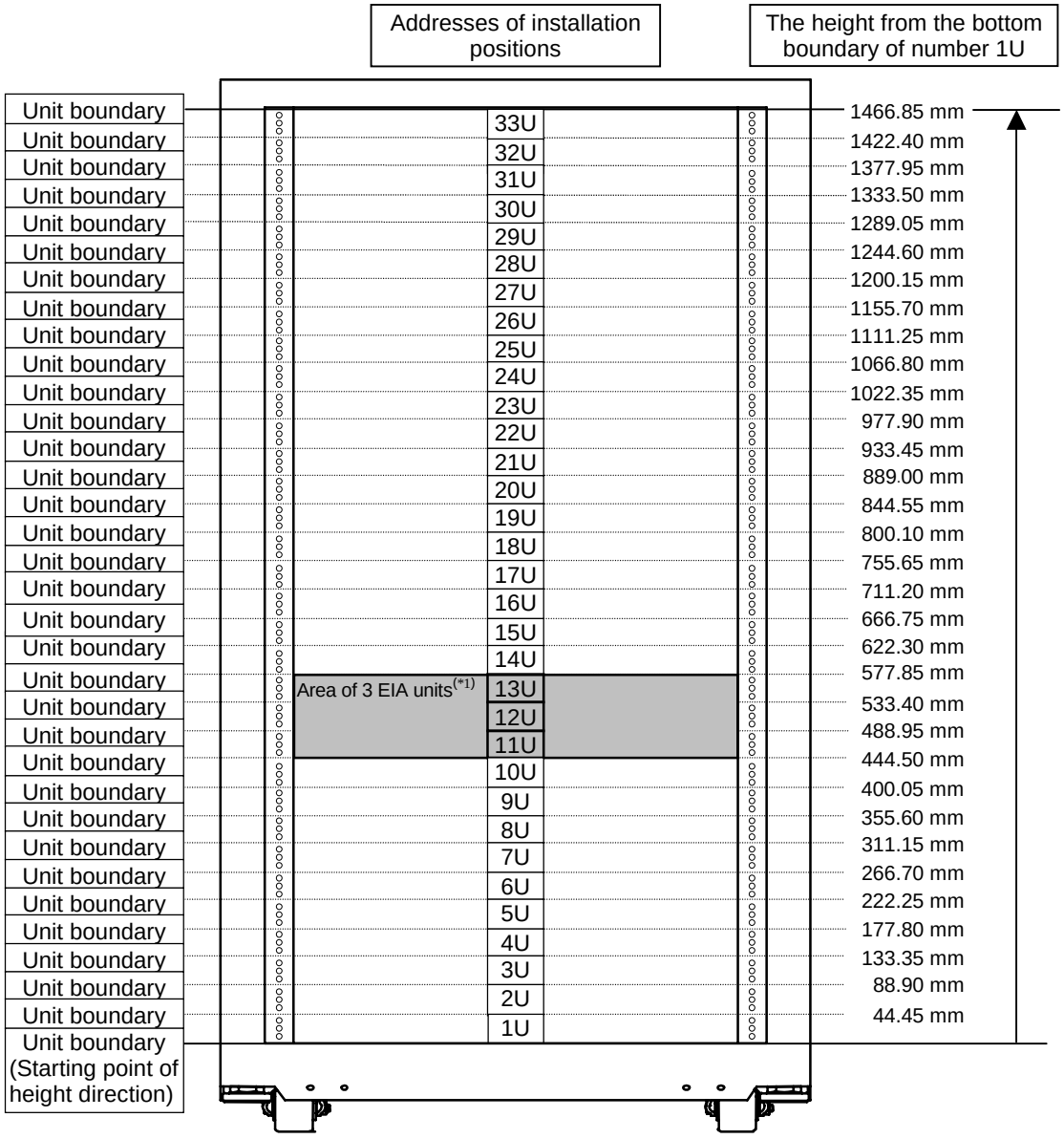


Figure 3.2.23 Attachment Hole Size of Rack

Copyright © 2002, 2005, Hitachi, Ltd.

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 subsystem at the 11U

Figure 3.2.24 Whole Layout of Installation Position Addresses (HP)

Copyright © 2002, 2005, Hitachi, Ltd.

(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 3.2.24.
(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 binding screws ② (at four places each on the front and rear sides.).
(d) Temporarily attach the stopper (L) to the rail (L), and secure the rail (L) to the rack frame in the same way.

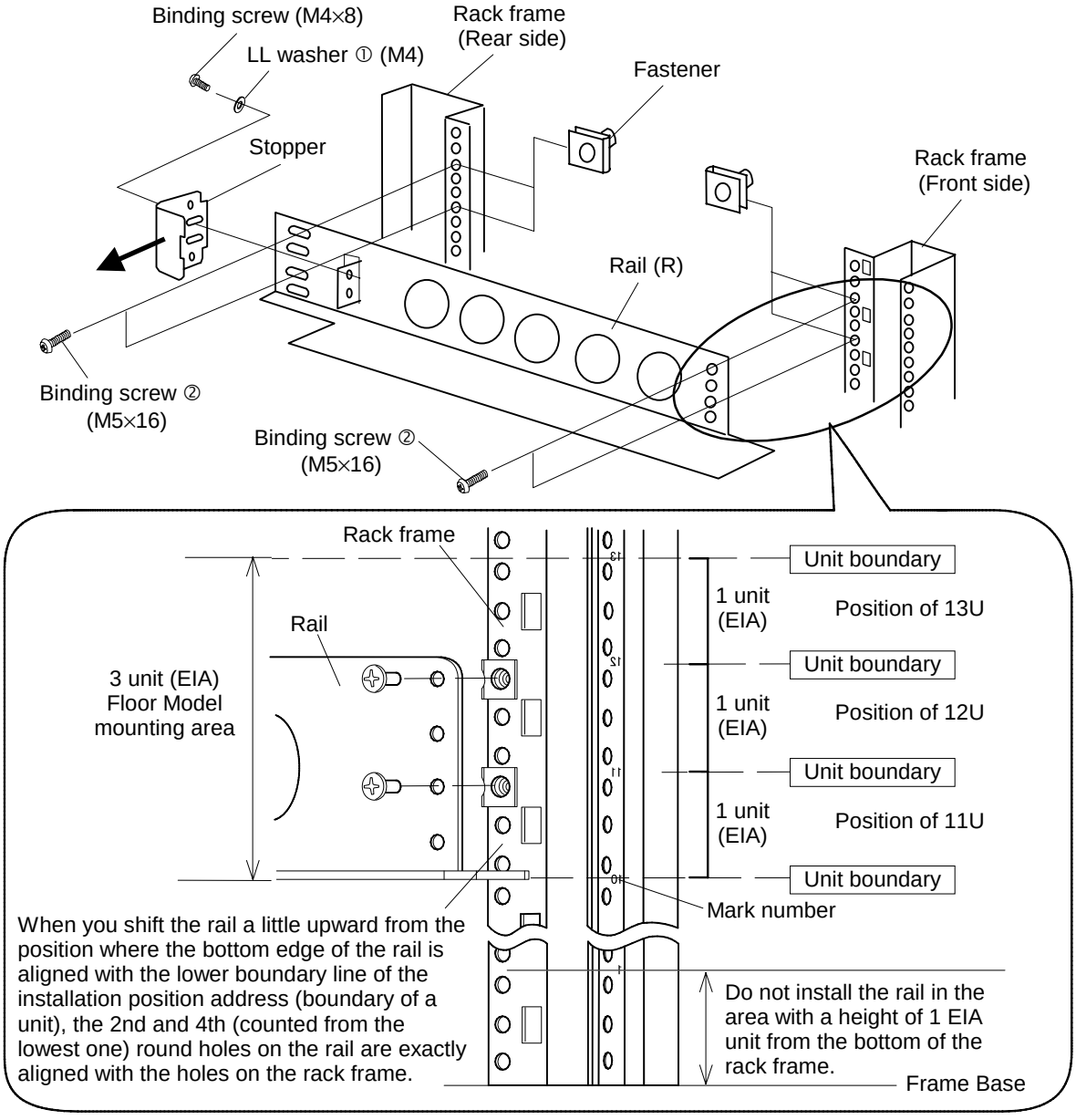


Figure 3.2.25 Installing Rails

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Installing the spacer

Install the fasteners and spacers on the front side of the rack frame in order to fasten the subsystem to be mounted on the rack frame. (Refer to Figure 3.2.26 and Figure 3.2.27)

(a) Install the spacer by screwing a binding screw (M5×10) from the rear side of the rack frame through the 9th (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) mounting hole and the top threaded hole on the spacer.

(b) Install the spacer by screwing a binding screw (M5×10) from the rear side of the rack frame through the 3rd (counted upward from the unit boundary on the rack frame at the same height as the bottom of the rail) mounting hole and the 2nd (counted from the bottom) threaded hole on the spacer.

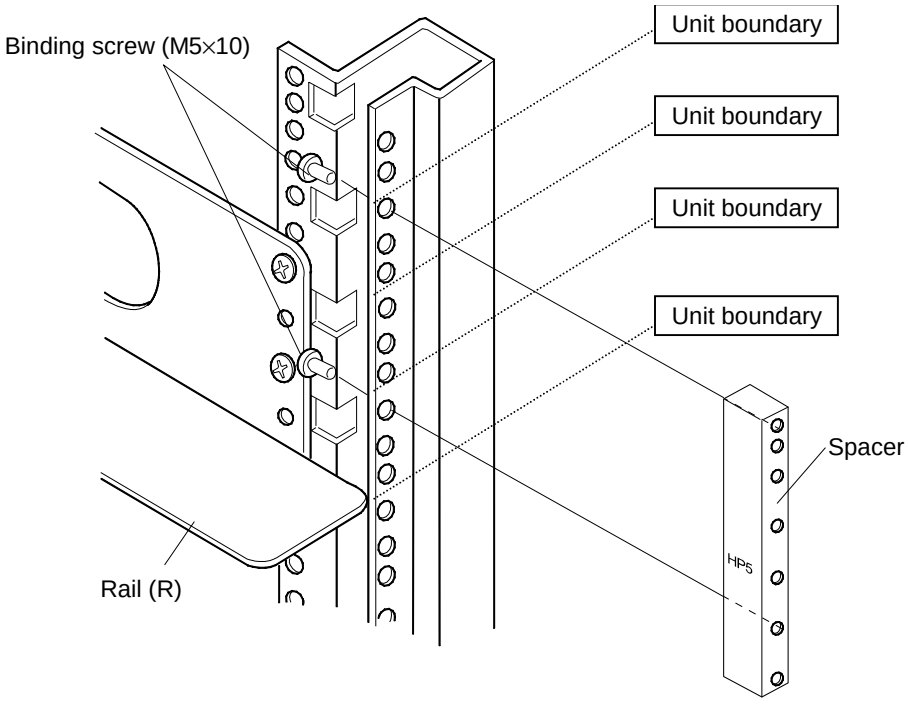


Figure 3.2.26 Location of Installing the Spacer

Copyright © 2002, 2005, Hitachi, Ltd.

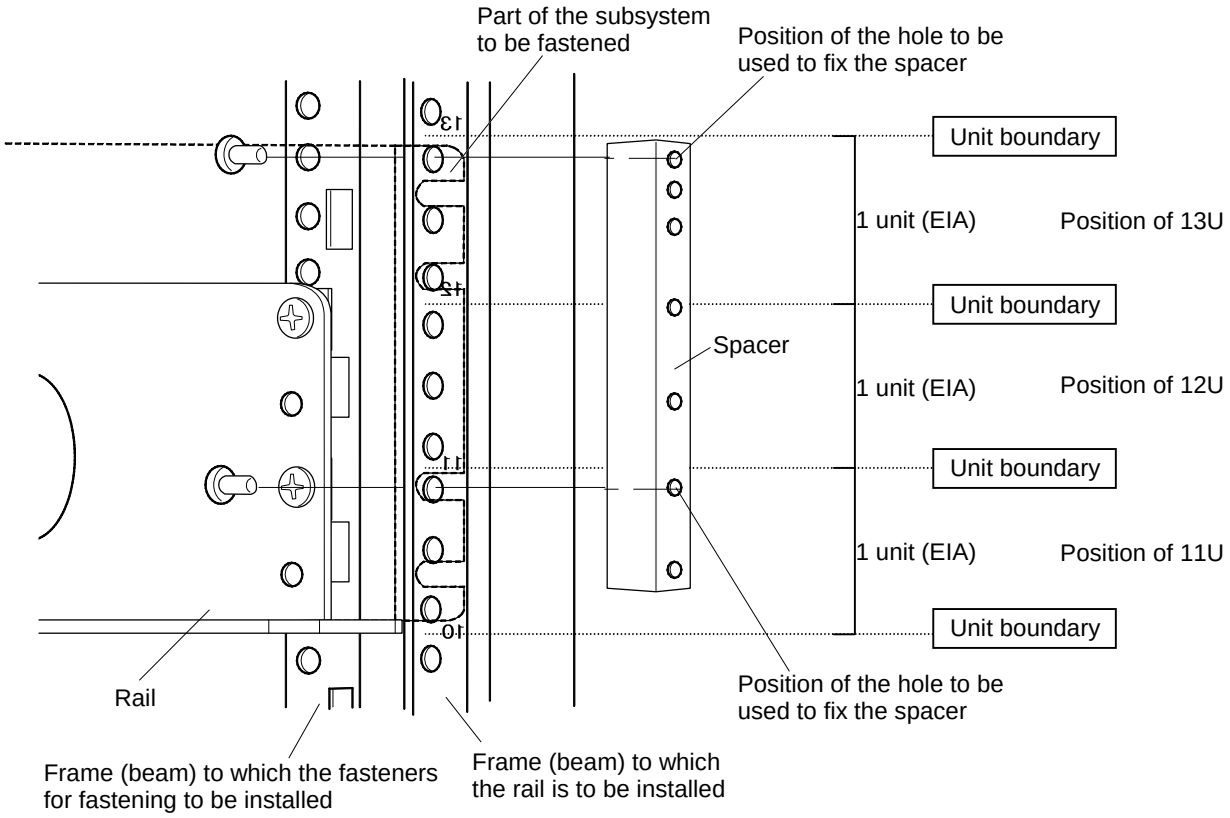


Figure 3.2.27 Installation Positions of Fasteners and Relation with Rails

Copyright © 2002, 2005, Hitachi, Ltd.

3.2.4 Sun StorEdge Rack Frame (Unpacking/Installing and Installation areas/maintenance areas)

The RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL/RKS/RKD/RKAD/RKSD can be mounted on the Sun 19-inch rack frame by installing the rack rails (DF-F600-URSU5) which are accessory parts.
Installation procedure for the case where the Sun 19-inch rack frame with the rack rails (DF-F600-URSU5) are used is shown below.

The Components-list of SUN StorEdge Rack-frame is shown in Table 3.2.6.
The packaging of the Rack-frame is shown in Figure 3.2.28.

Table 3.2.6 Components of Rack-rail (HT-F-URSU5) (per one unit)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail (L)	3261249-1	1	For left hand side	
2	Rail (R)	3261249-2	1	For right hand side	
3	Stopper 400 RKL	5513027-1	1	For securing the DF400	
4	Stopper 400 RKL	5513027-2	1	For securing the DF400	
5	Stopper 500 RK	5513028-1	2	For securing the DF500	
6	Stopper 500UPS (L)	5513029-1	1	For securing the DF500 UPS For right hand side	Not used
7	Stopper 500UPS (R)	5513029-2	1	For securing the DF500 UPS For left hand side	Not used
8	BK-ASM	5513030-A	2		
9	Stopper 400UPS (L)	55172214-1	1	For securing the DF400 UPS For right hand side	Not used
10	Stopper 400UPS (R)	55172214-2	1	For securing the DF400 UPS For left hand side	Not used
11	Hexagon Socket Head Bolts (M4×8)	BS408	6	For securing the Stopper	Two spares
12	Bind screw (M4×6)	SB406	4	For securing the cleat	Two spares
13	Hexagon Socket Head Bolts	5503443-1	15	For securing the DF600 For securing the Rail	Three spares
14	LL washer (M4)	2051001-413	8	For securing the Stopper	Four spares
15	LL washer (M4) (433)	2051001-433	4	For securing the DF600 UPS	Not used
16	Washer (M5)	WP005	15	For securing the DF600 For securing the Rail	Three spares
17	Cable mount	5480387-1	4	For securing the cable	For use at need
18	Cleat	5409055-1	3	For securing the cable	One spare
19	Mini binder	5409041-1	10	For securing the cable	For use at need
20	Repeat binder	5409042-3	3	Used to fix a slackened part of overlong cable	One spare

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Appearance of Sun 19-inch rack frame
Figure 3.2.28 shows appearance of the Sun 19-inch rack frame.
(There are two types of Sun 19-inch rack frames: Sun StorEdge and Sun Fire.)

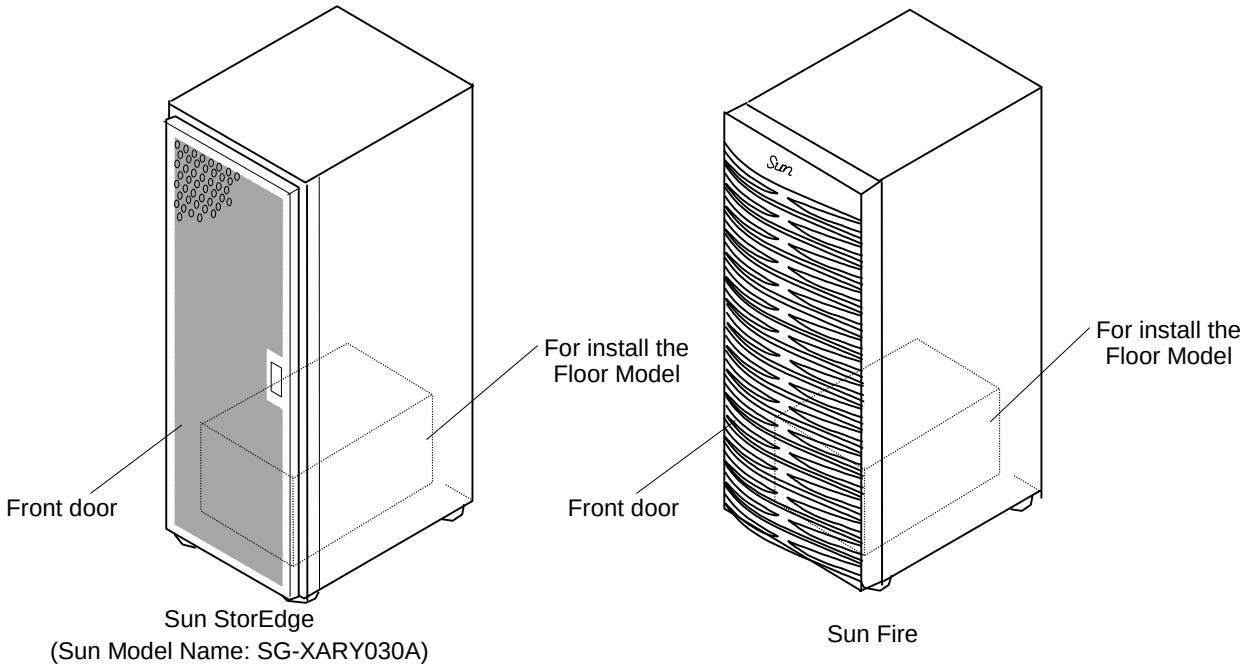


Figure 3.2.28 Appearance of Sun 19-inch Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Installing rails (URSU5)

Install the rails in order to mount the subsystem on the rack frame. (Refer to Figure 3.2.29.)

NOTE : Mount the subsystem leaving a space of four EIA units from the bottom including two EIA units for the power supply of the rack frame.

(a) Slide the stopper 500 RK in the direction shown by the arrow and temporarily fixes it to the rail (R) using the binding hexagon socket head bolts (M4×8) and LL washers M4 (at two places.).

(b) Fasten the rail (R) by screwing hexagon socket head bolts (M5) with washers M5 in the four screws holes front and rear at the locations for fastening the rail (R).

(c) In the same way, temporarily fix the stopper 500 RK to the rail (L) and fasten the rail on the left side of the rack frame.

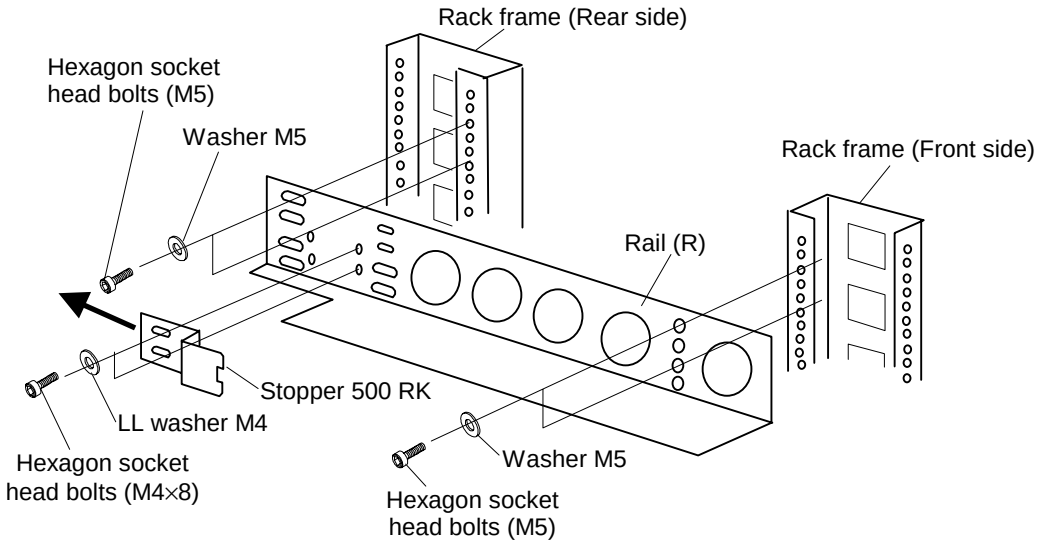


Figure 3.2.29 Installing Rails

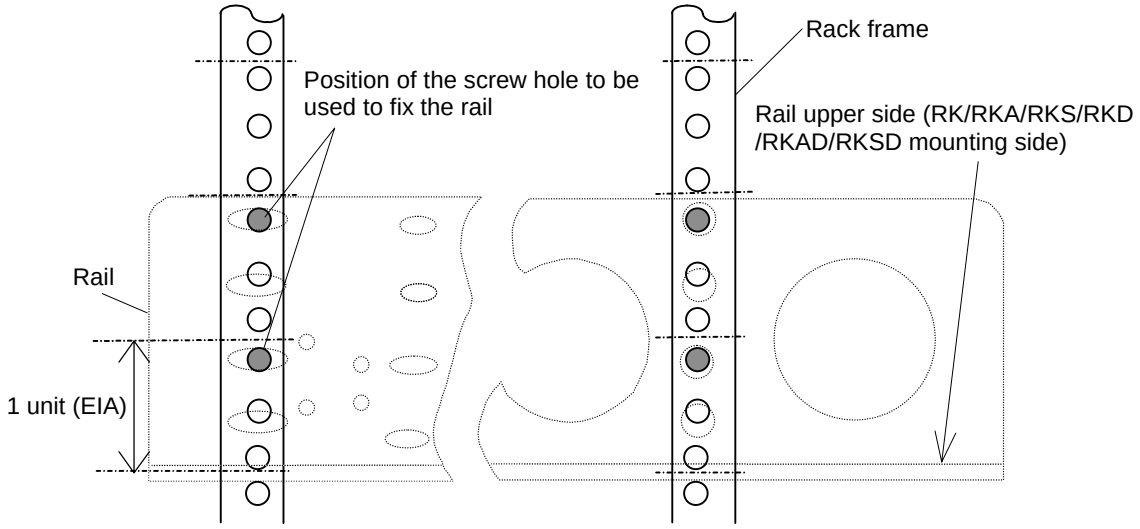


Figure 3.2.30 Installing Rails Position

Copyright © 2002, 2005, Hitachi, Ltd.

3.2.5 RS6000 Rack Frame (Unpacking/Installing and Installation areas/ maintenance areas)

The subsystems can be mounted on the IBM RS6000 rack frame by installing the rack rails (DF-F600-UR6/DF-F600-URRS5), which are accessory parts.
For DF600-RKH/DF600-RKHE mounting, use DF-F600-UR6.

- When installing DF-F600-UR6 rack rail ····· (1) Refer to (INST 03-0340)
- When installing DF-F600-URRS5 rack rail ····· (2) Refer to (INST 03-0355)

(1) When installingDF-F600-UR6
The Components-list of RS6000 Rack Frame is shown in Table 3.2.7.

Table 3.2.7 Parts Required for Installation of DF-F600-UR6

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Front rail (L)	3256724-A	1		
2	Front rail (R)	3256724-B	1		
3	Rear rail	3256725-1	2	—	
4	Stopper	5507432-1	2	For securing the subsystems	
5	Binding screw (M5×25)	SB525N	4(*1)	For securing the subsystems, rail	
6	Binding screw (M5×10)	SB510N	14(*1)	For securing the subsystems, rail	RKH/RKHE use only
7	Binding screw (M4×8)	SB408N	14(*1)	For securing the rail	
8	Binding screw (M3×6)	SB306N	6(*1)	For securing the stopper	
9	Rack nut	5507437-1	9(*2)	For securing the rail	
10	Cage nut	5490841-23	9(*2)	For securing the rail	Not used
11	Repeat binder	50409042-1	3(*2)	For securing cable routing	

*1 : 2 spares are included.
*2 : 1 spares are included.

Copyright © 2002, 2005, Hitachi, Ltd.

(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

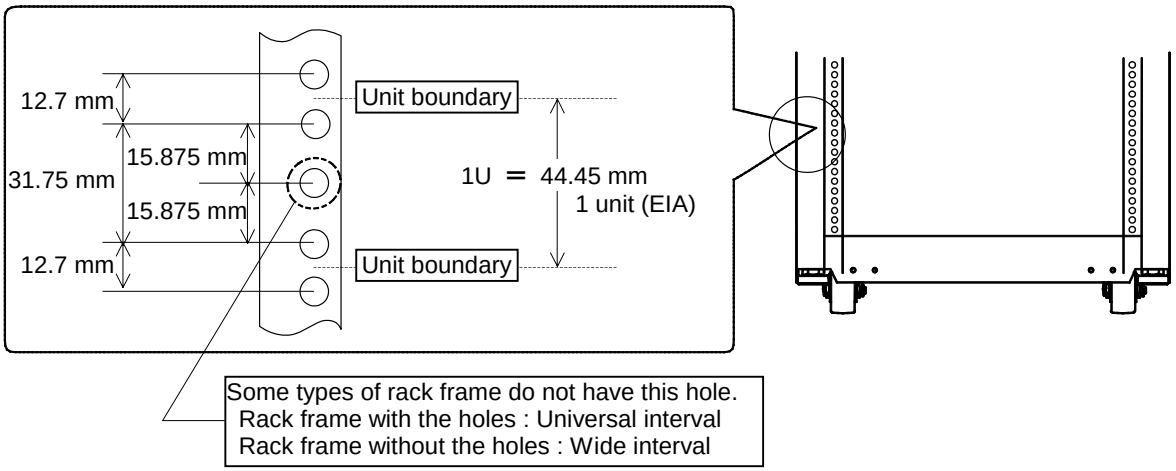


Figure 3.2.31 Attachment Hole Size of Rack

Copyright © 2002, 2005, Hitachi, Ltd.

(i) Assemble the front and rear rails temporarily before fitting the rails in the rack frame.
Fit the front (L) and rear rails in between the front and rear beams of the rack frame, adjusting each other in position.

NOTE : These rails are suitable to the rack frame that has a depth of 550 to 800mm.

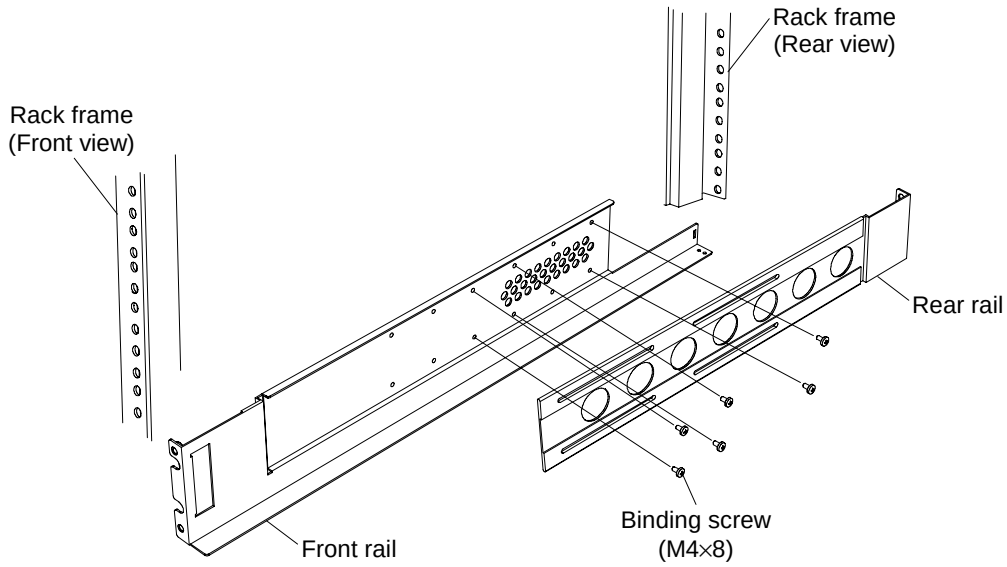


Figure 3.2.32 Temporal Assembly of the Rails

(ii) Fasten the joints between the holes on the front rail (L) and the long holes on the rear rail temporality using binding screws (M4x8 (six holes)).
(iii) Repeat the same procedure for fixing the front (R) and rear rails temporarily.
(iv) Set the rack nuts (two holes each on the front and rear sides) to the rack frame (left side) from the both sides before fastening the rail (L), which was fastened temporarily.

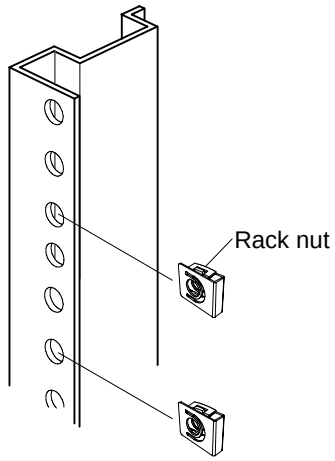


Figure 3.2.32.1 Installing Rack Nuts

Copyright © 2003, 2005, Hitachi, Ltd.

(v) Fix the semi-assembled rail (L) to the front rack frame (left-hand side), by joining these two coved openings of the rail and these two top holes of 1U and 2U of the rack frame pillar located from the standard set position, using the binding screws (M5×10 (at two holes)) as indicated below.
Make sure that the installation area of the rail be placed as illustrated below.

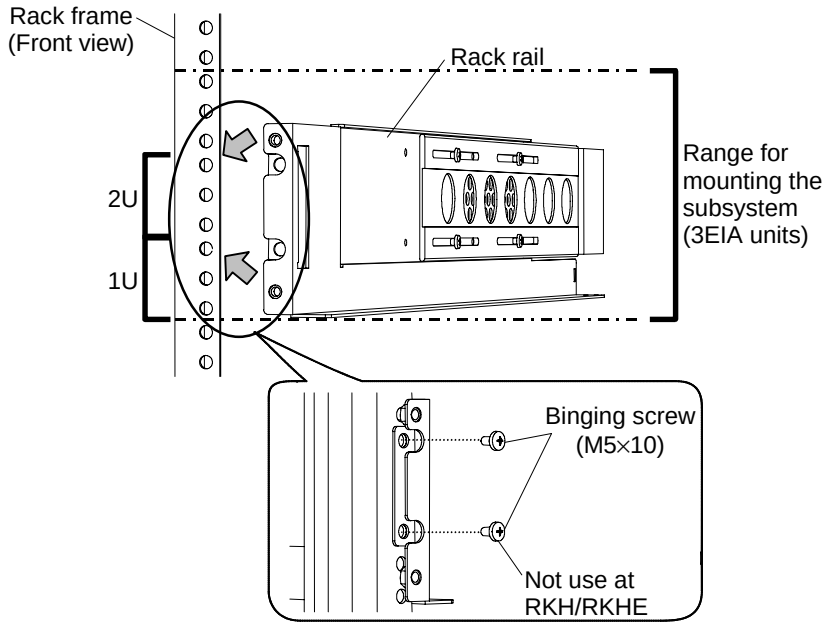


Figure 3.2.33 Installation Position of the Rail Front

Copyright © 2003, 2005, Hitachi, Ltd.

(vi) Join the bottom hole and the third hole from the bottom of the rail (L) with these two top holes of 1U and 2U of the rear rack frame (left-hand side) on the located from the standard set position, using the screws (M5×10 (at two points)) as indicated below to fix the rail to the frame rack pillar.
Make sure that the installation area of the rail be placed as illustrated.

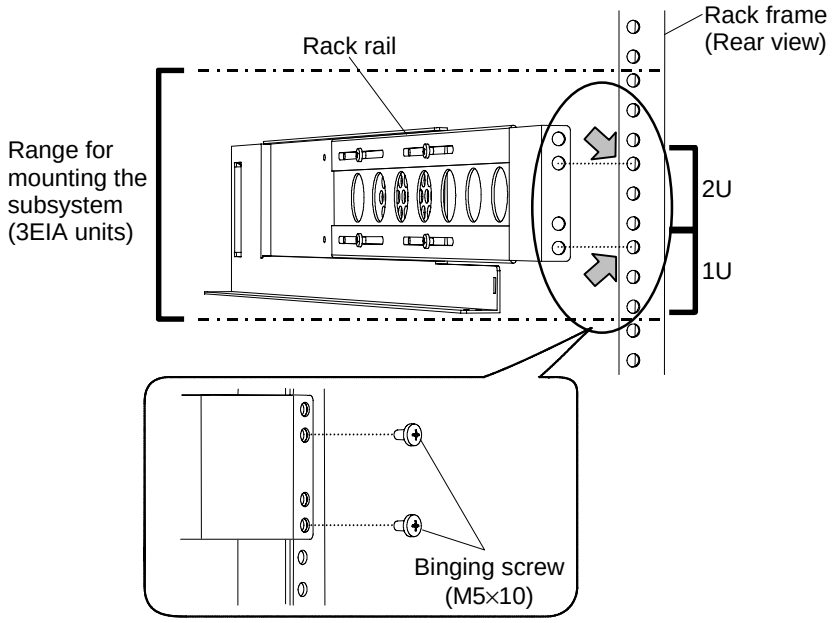


Figure 3.2.33.1 Installation Position of the Rear Rail

(vii) Fasten the front rail (R) to the rack frame (right front side) and the rear rail to the rack frame (rear side) using binding screws (M5×10 (two holes each on the front and rear sides)).

Copyright © 2003, 2005, Hitachi, Ltd.

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.



(viii) Fastening the binding screws (M4×8) firmly to secure the semi-assembled front rail (L) and the rear rail.

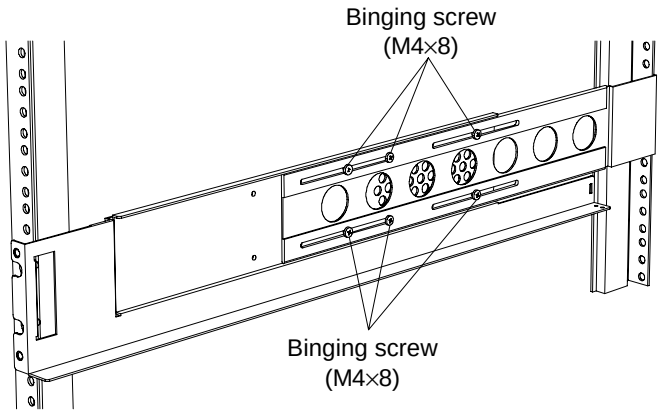


Figure 3.2.33.2 Fastening of the Rail

(ix) Fasten the binding screws (M4×8), which were temporarily fastened.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) When installingDF-F600-URRS5
It cannot install to DF600-RKH/DF600-RKHE.
The Components-list of RS6000 Rack Frame is shown in Table 3.2.7.1.

Table 3.2.7.1 Parts Required for Installation of DF-F600-URRS5

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail (RS6000)	3256634-1	1	For right hand side	
2	Rail (RS6000)	3256634-2	1	For left hand side	
3	Bracket (RS6000)	5507295-1	2	For securing the rail (Left and right)	
4	Stopper	5510051-1	2	For securing the subsystems	
5	Stopper (UPS)	5510102-1	1	For the UPS	Not used
6	Stopper (UPS)	5510102-2	1	For the UPS	Not used
7	Spacer (6 EIA)	3256617-1	2	For the subsystems	
8	Spacer (3.5/4 EIA)	5507248-1	2	For the subsystems or UPS	
9	Spacer (3 EIA)	5507249-1	2	For the UPS	Not used
10	Hexagon socket head bolt (M5×10)	BS510	24(*2)	For securing the subsystems For securing the rail	
11	Hexagon socket head bolt (M4×8)	BS408	6(*2)	For securing the stopper	
12	Hexagon socket head bolt (M3×3)	BS306	3(*1)	For positioning the rail	
13	Bind screw (M4×8)	SB408	3(*1)	For securing the cable	
14	Repeat binder	5409042-1	3(*1)	For securing cables on the subsystem	
15	Cleat	5409055-1	3(*1)	For securing cables on the subsystem	
16	LL washer M5	2051001-513	26(*2)	For securing the subsystems For securing the rail	
17	LL washer M4	2051001-413	6(*2)	For securing the stopper	

*1 : 1 spare is included.
*2 : 2 spares are included.

Copyright © 2003, 2005, Hitachi, Ltd.

(a) Installing the rails and spacers (See Figure 3.2.33.3 and Figure 3.2.33.4.)
Install the rails and spacers in order to mount the subsystem(s) on the rack frame. Installation positions of the rails and spacers vary depending on the following.

(i) Fix the appropriate spacer to the position for installing it on the front side of the rack frame using a hexagon socket head bolt (M5×10) and an LL washer M5. (Take care not to fasten the spacer upside down.)
(ii) Slide the stopper on the rail in the direction shown by the arrow and temporarily fix it to the rail using two sets of the hexagon socket head bolt (M4×8) and LL washer M4.
(iii) Screw the one hexagon socket head bolt (M3×6) on the front side of the rail (RS6000).
(iv) Fit the head of the hexagon socket head bolt (M3×6), that has been screwed on the front side of the rail (RS6000), to the appropriate position on the spacer, and then fasten the rail to the rack frame with the two sets of the hexagon socket head bolt (M5×10) and LL washer M5.

(b) Installing the bracket (RS6000) (See Figure 3.2.33.3 and Figure 3.2.33.4.)

(i) Temporarily fix the bracket (RS6000) on the rear side of the rack frame with the two sets of the hexagon socket head bolt (M5×10) and LL washer M5.
(ii) Temporarily fix the rail (RS6000) to the bracket (RS6000) with the four sets of the hexagon socket head bolt (M5×10) and LL washer M5.
(iii) Tighten the two hexagon socket head bolts (M5×10) that are fixing the bracket (RS6000) to the rack frame temporarily.
(iv) Fasten the rail (RS6000) to the bracket (RS6000) with the four sets of the hexagon socket head bolt (M5×10) and LL washer M5 that are fixing the rail to the bracket temporarily.

Symbols

One dot chain line A: Position where the Hexagon socket head bolt (BS306) is installed
One dot chain line B: Position where the bolt for fastening the rail (BS510) is installed
One dot chain line C: Position where the screw for fastening the spacer (BS510) is installed
One dot chain line D: Position where the bolt for fastening the subsystem (BS510) is installed

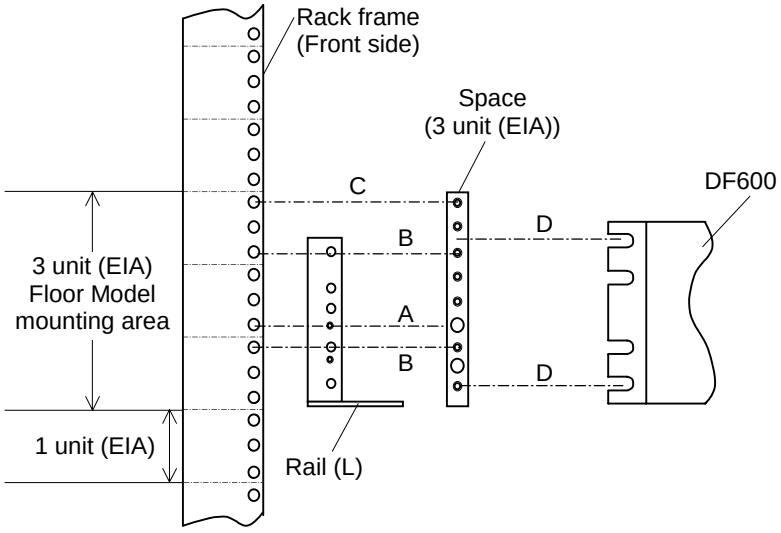


Figure 3.2.33.3 Location of Installing the Rail

Copyright © 2003, 2005, Hitachi, Ltd.

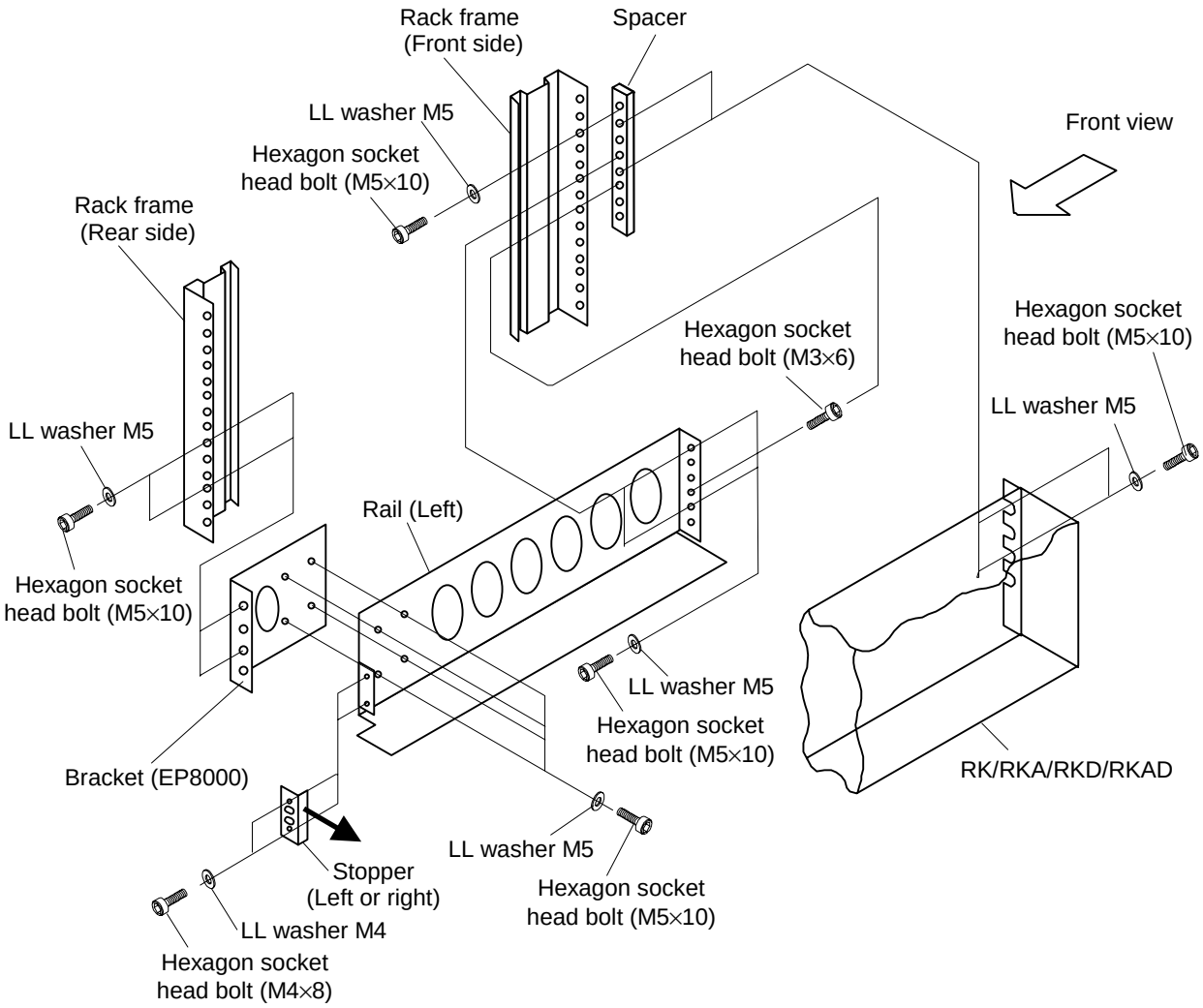


Figure 3.2.33.4 Installing Rails

Copyright © 2002, 2005, Hitachi, Ltd.

3.2.6 SONY Rack Frame (unpacking, area required for installation and maintenance, and installation)

The subsystems can be mounted on the SONY rack frame through attachment of Rack Rail (DF-F600-URSY), which is a set of accessory parts, for the SONY rack frame. This subsection explains a procedure for mounting on the SONY rack frame with the Rack Rail for the SONY rack frame.
Composition of the Rack Rail for the SONY rack frame is shown in Table 3.2.8.

NOTE : When installing the Rack Rail, SONY is requested to provide four grip nuts for rack frame.

Table 3.2.8 Components of Rack Rail (DF-F600-URSY)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	Rail (L)	3256748-A	1		
2	Rail (R)	3256748-B	1		
3	Stopper	5507484-1	2		
4	M5×10 binding screw (nickel plated)	SB510N	6	Fastening of the subsystems	Quantity includes two spares
5	M4×10 binding screw (nickel plated)	SB410N	10	Fastening of the subsystems and rails	Quantity includes two spares
6	M3×10 binding screw (nickel plated)	SB306N	6	Fastening of rails	Quantity includes two spares
7	Repeat Binder	5409042-1	3	Fastening of stoppers	Quantity includes one spare

Copyright © 2003, 2005, Hitachi, Ltd.

(1) EIA standard

Intervals of mounting holes on the front and rear sides of the rack frame conform to the EIA standard.

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 SONY 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

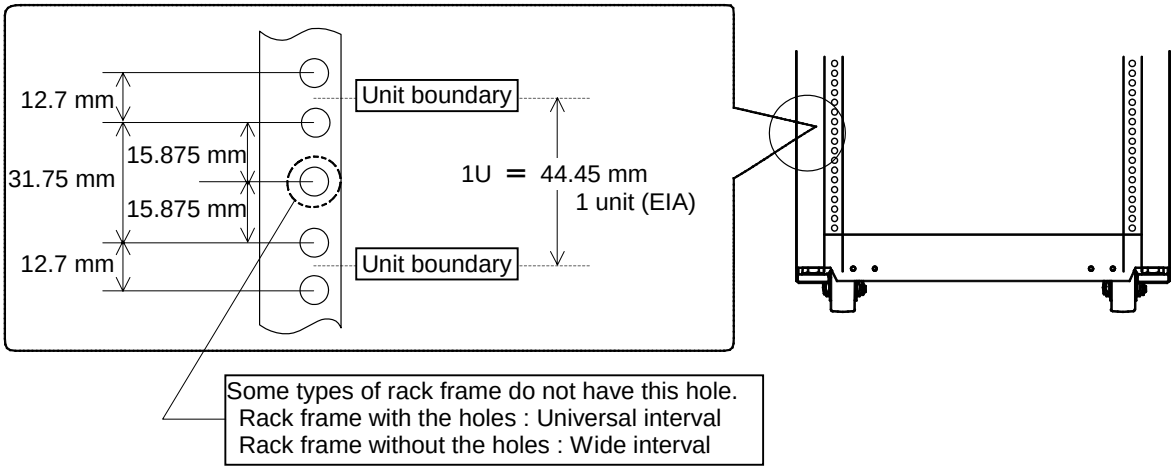


Figure 3.2.33 Attachment Hole Size of Rack

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Installing the grip nuts

NOTE : Before installing the rails, it is required to install grip nuts, which are supplied by a customer, on the rack frame.

(a) Install the one grip nut to each of the front and center columns of the rack frame (four grip nuts in total on both left and right sides).
The rear columns are not used for the mounting.
(b) Install the grip nut at the lowest section (with a height of one EIA unit) within the range for mounting the subsystem on each column. (See Figure 3.2.37.)

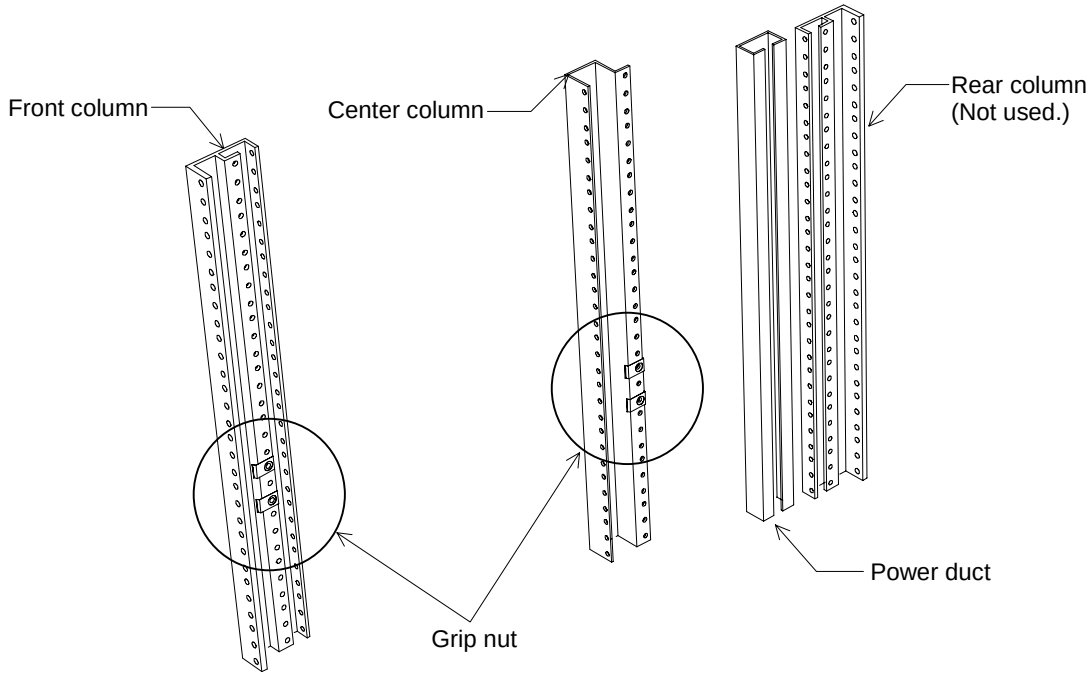


Figure 3.2.34 Installing Grip Nuts

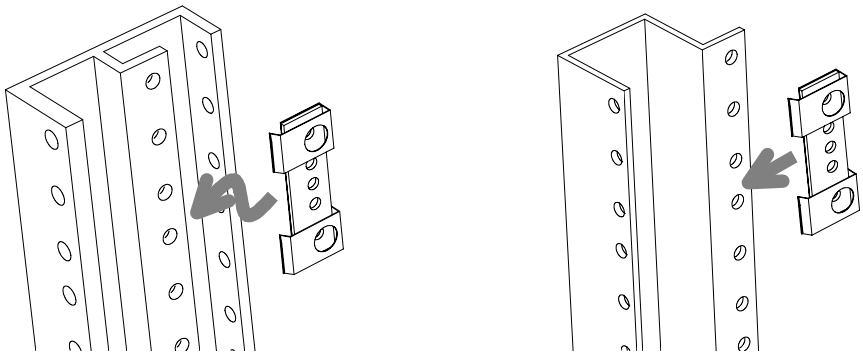


Figure 3.2.35 Detail of Grip Nut Installation

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Installing the rails

Fasten the rails to the grip nuts that have been installed on the rack frame.

(a) Fasten the rail (L) at two positions, where mounting holes on the column of the rack frame align with threaded holes on the grip nut, on each column on the left side of the rack frame using four M4×8 binding screws in total. (For the fastening positions, see Figure 3.2.48.)

(b) Also fasten the rail (R) to the right side of the rack frame in the same way.

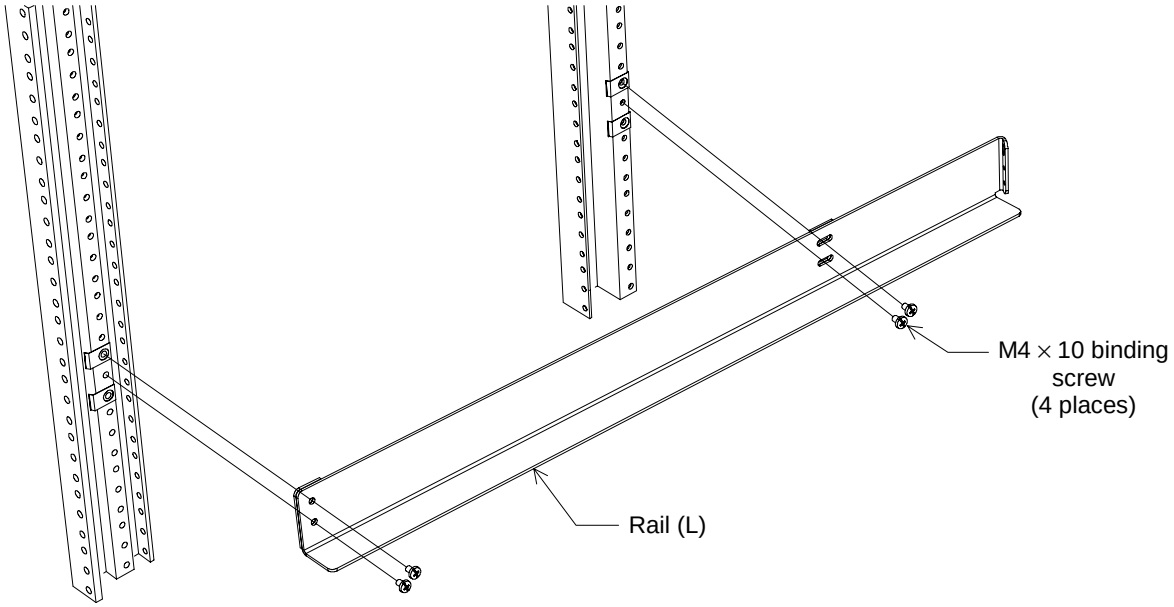


Figure 3.2.36 Installing the Rail

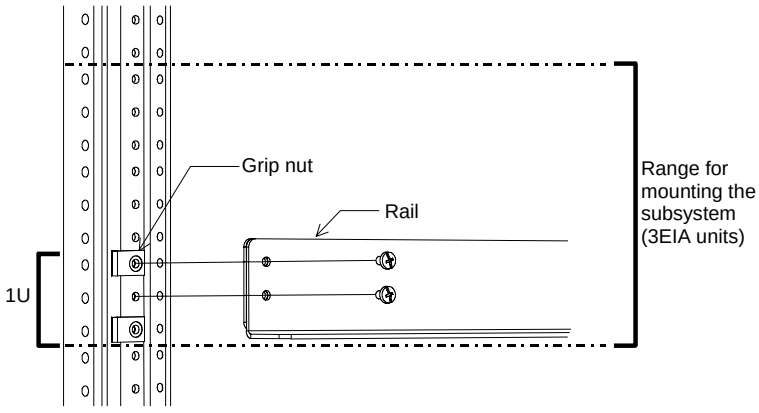


Figure 3.2.37 Position (s) for Installing the Grip Nuts and Rail

Copyright © 2003, 2005, Hitachi, Ltd.

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 RK/RKL/RKS/RKD/RKSD is about 44 kg, RKA /RKAD/RKAAT/RKAATL is about 42 kg and that of the RKH/RKHE and RKAJAT/RKAJATL is about 40 kg.**

(1) Unpacking

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.

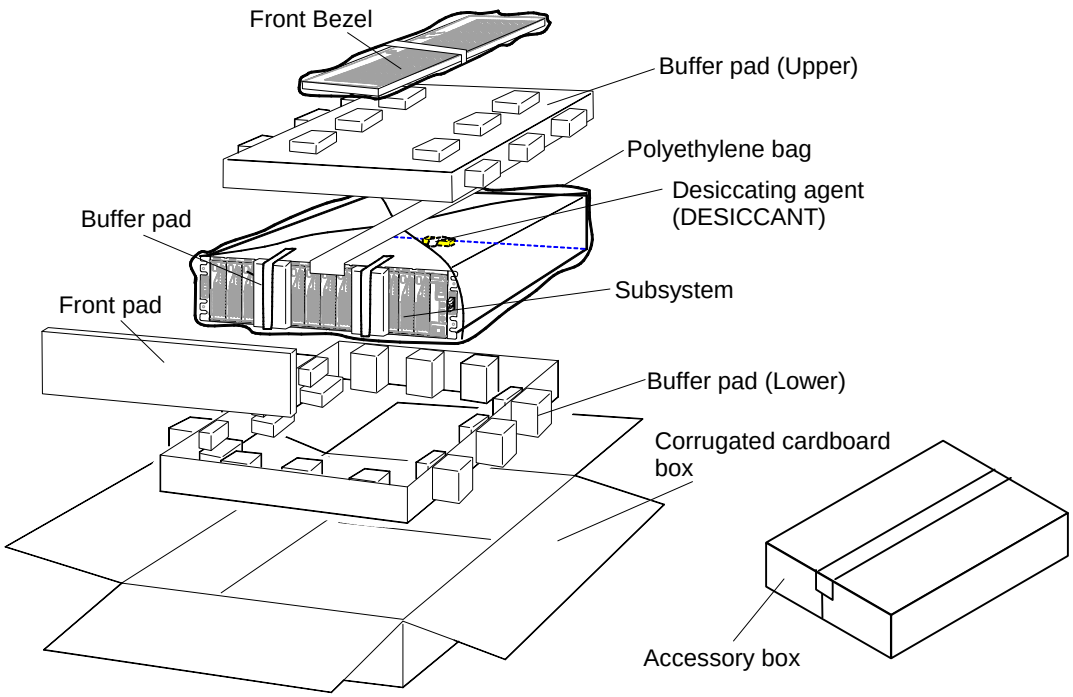


Figure 3.3.1 Packed Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(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 and the keys for the latches (one each for latches of the Power Unit (Power Unit (DC)), and Fan Assembly) 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. The key for Latches is used to mount and dismount Power Units (Power Units (DC)), or Fans Assembly.

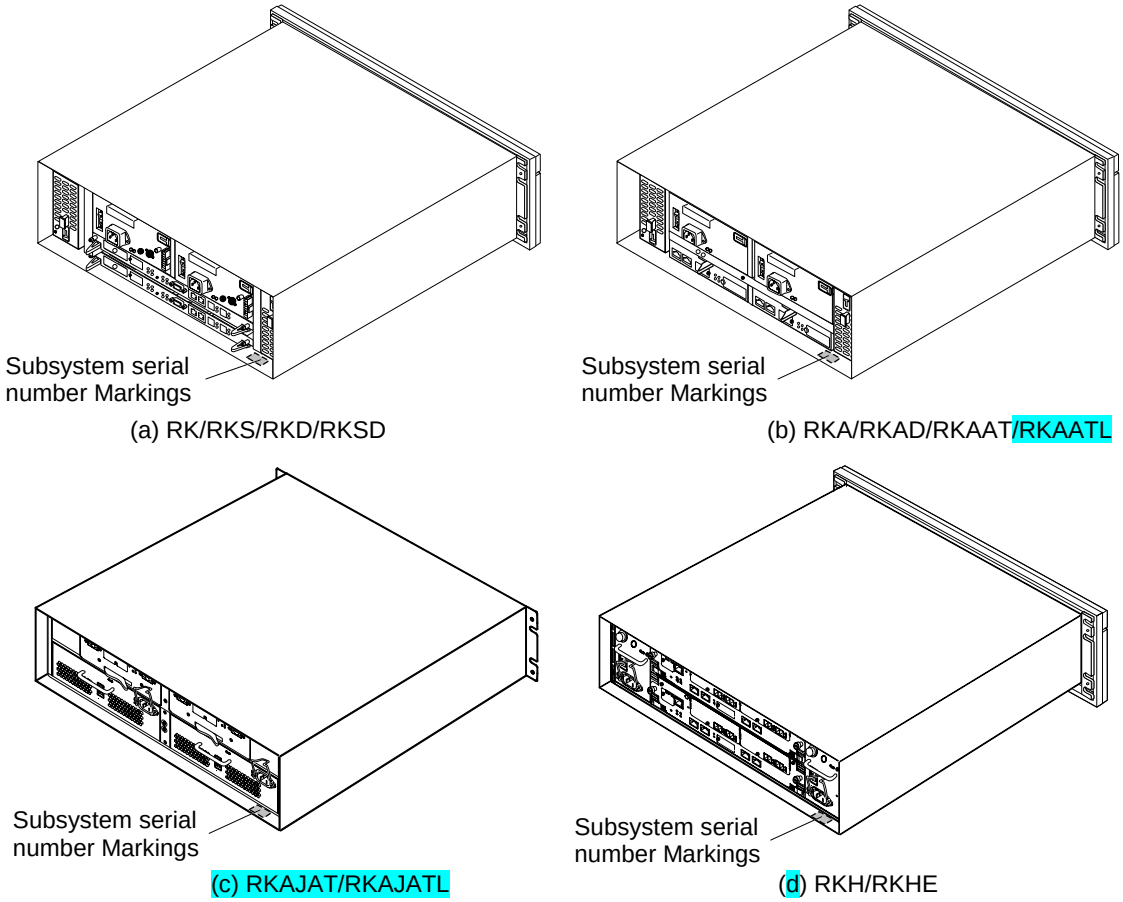


Figure 3.3.2 Locations of Subsystem Serial Number Markings

Copyright © 2002, 2005, Hitachi, Ltd.

3.4 Removing and Installing Components

When parts are already installed before installing the Rack mounting, remove Disk Drives to prevent from shock.

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 Item (2) in Subsection 3.5.4 on page INST03-0643.)

3.4.1 Removing Disk Drive

Adhere a label bearing an HDD number to the Disk Drive before removing it.

(1) In the case of RK/RKL/RKD/RKA/RKAD/RKS/RKSD

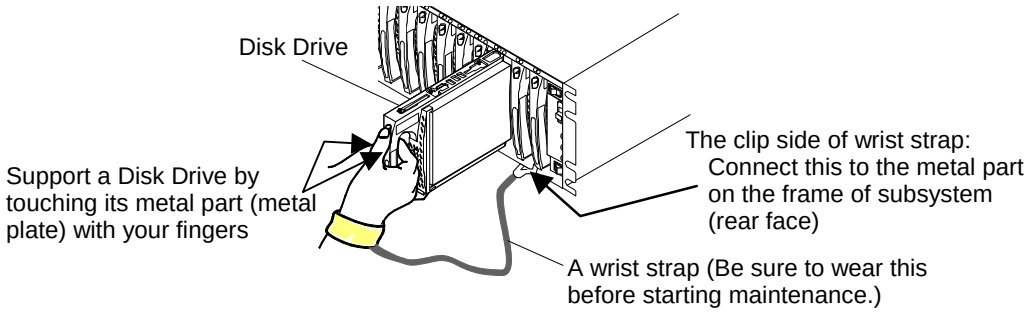
NOTE : Be sure to remove Disk Drives before installing the Rack mounting. Never install the Rack mounting while Disk Drives are left in the Rack.

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.
- **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 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.



Copyright © 2002, 2005, Hitachi, Ltd.

CAUTION

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

(a) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050).)
(b) Remove the Disk Drive or a dummy (Disk Drive).
Operate the lock release button of the Disk Drive and remove the Disk Drive taking care not to apply any shock to it.
(c) Store a removed Disk Drive or a dummy (Disk Drive) safekeeping box at the same position of address label.
They are to be installed in the subsystem after the subsystem is installing on the floor stand kit.

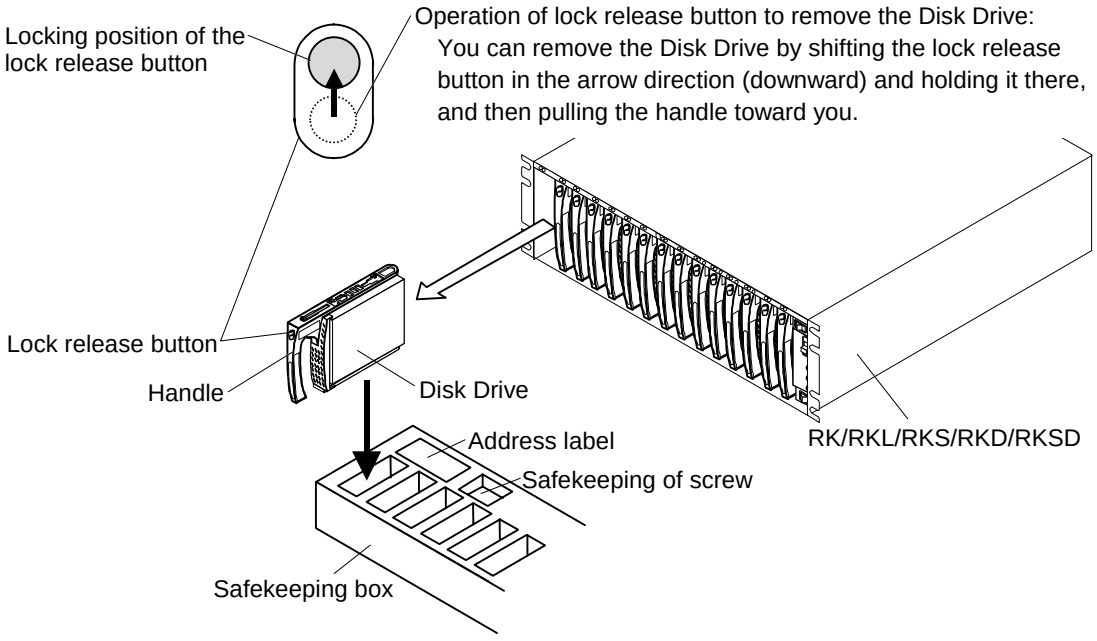


Figure 3.4.1 Removing Disk Drive (RK/RKL/RKS/RKD/RKSD)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) In the case of RKAAT/RKAJAT/RKAATL/RKAJATL

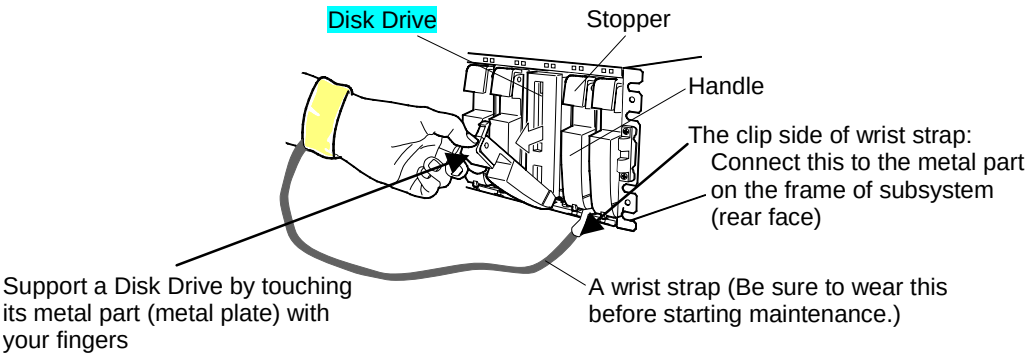
NOTE : Be sure to remove Disk Drives before installing the Rack mounting.
Never install the Rack mounting while Disk Drives are left in the Rack.

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.
- **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 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.



Copyright © 2004, 2005, Hitachi, Ltd.

CAUTION

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

<Working Procedure>

(a) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050).)

(b) 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.

(c) 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.

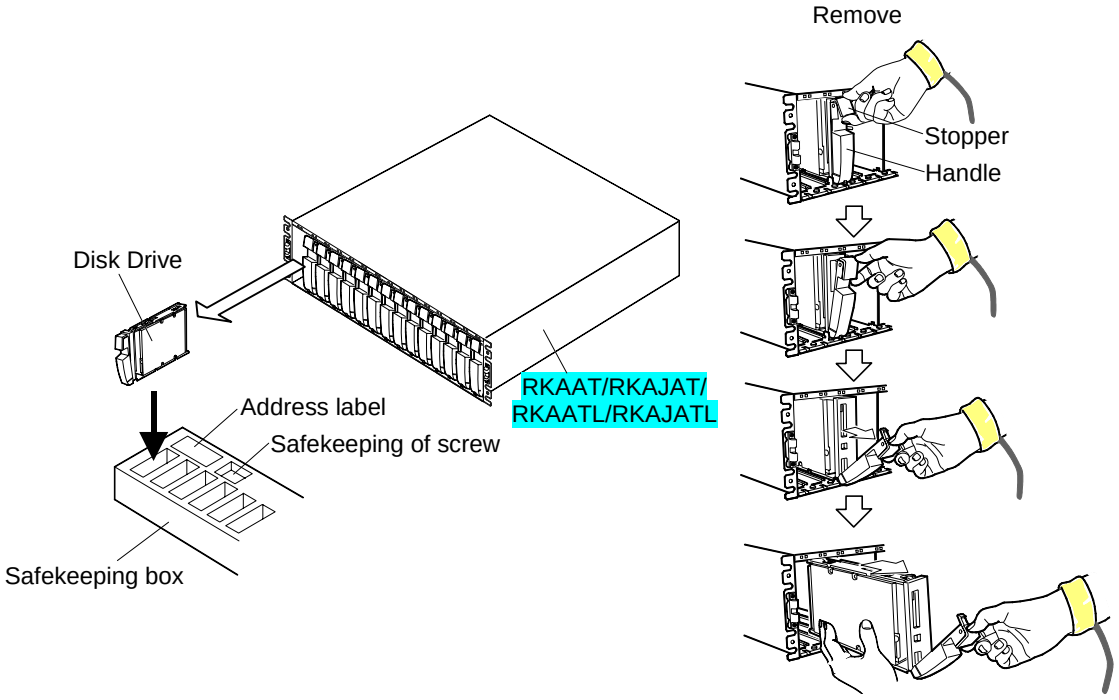


Figure 3.4.2 Removing Disk Drive (RKAAT/RKAJAT/RKAATL/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

3.4.2 Installing components

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 RK/RKL/RKS

No.	Component name	Model	Quantity	Remark
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
		DF-F600-F1HL (RKL)	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Unit with a model name selected from those shown on the left is installed.
		DF-F600-C1GX2		
5	Power Unit	—	2	—
*1 : When no component is installed, a dummy of it is installed instead.				

Table 3.4.2 Components Required for the RKA

No.	Component name	Model	Quantity	Remark
1	ENC Unit (RKA)	—	2	—
2	Fan Assembly	—	2	—
3	Power Unit (RKA)	—	2	—
4	ENC cable	—	4	See Section 3.6

Table 3.4.3 Parts Required for Installation of RKD/RKSD

No.	Component name	Model	Quantity	Remark
1	Backup Battery Unit	—	1	—
2	Fan Assembly	—	2	—
3	Control Unit	DF-F600-F1H	1 or 2(*1)	—
4	Cache Unit	DF-F600-C512X2	2	The Cache Unit with a model name selected from those shown on the left is installed.
		DF-F600-C1GX2		
5	Power Unit (DC)	—	2	—
*1 : When no component is installed, a dummy of it is installed instead.				

Table 3.4.4 Components Required for the RKAD

No.	Component name	Model	Quantity	Remark
1	ENC Unit	—	2	—
2	Fan Assembly	—	2	—
3	Power Unit (DC)	—	2	—
4	ENC cable	—	4	See Section 3.6.2 (INST 03-0680)
*1 : When no component is installed, a dummy of it is installed instead.				

Copyright © 2002, 2005, Hitachi, Ltd.

Table 3.4.5 Parts Required for Installation of RKH/RKHE

No.	Component name	Model	Quantity	Remark
1	Backup Battery Unit	—	2	—
2	Fan Assembly	—	2	—
3	Control Unit	—	2	—
4	Cache Unit	DF-F600-C5122H DF-F600-C1GX2H	4	The Cache Unit with a model name selected from those shown on the left is installed.
5	Interface Board	DF-F600-DH2GH	2	—
6	Power Unit (DC)	—	2	—

Table 3.4.6 Components Required for the RKAAT/RKAATL

No.	Component name	Model	Quantity	Remark
1	SENC Unit (RKAAT/RKAATL)	—	2	—
2	Fan Assembly	—	2	—
3	Power Unit (RKAAT/RKAATL)	—	2	—
4	ENC cable	—	2	See Section 3.6

Table 3.4.7 Components Required for the RKAJAT/RKAJATL

No.	Component name	Model	Quantity	Remark
1	SENC Unit (RKAJAT/RKAJATL)	—	2	—
2	Power Unit (RKAJAT/RKAJATL)	—	2	—
3	ENC cable	—	2	See Section 3.6

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Installing Backup Battery Unit

This installation work is only applied to RK/RKL/RKS/RKD/RKSD/RKH/RKHE.

(a) In the case of the RK/RKL/RKS/RKD/RKSD

(i) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050))

(ii) Make sure that the battery switch on the Backup Battery Unit is turned off.

(iii) Insert the Backup Battery Unit into the specified position in the subsystem.

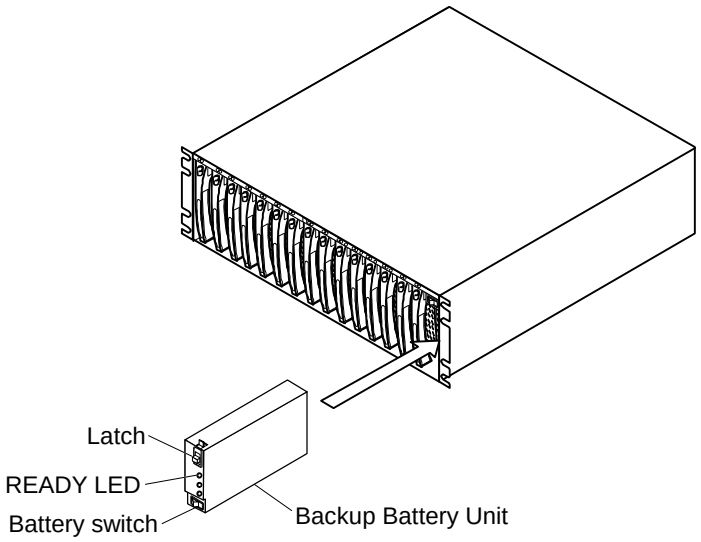


Figure 3.4.3 Installing Backup Battery Unit

(b) In the case of the RKH/RKHE

(i) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050))

(ii) Make sure that the battery switch on the Backup Battery Unit is turned off.

(iii) Insert the Backup Battery Unit into the specified position in the subsystem.

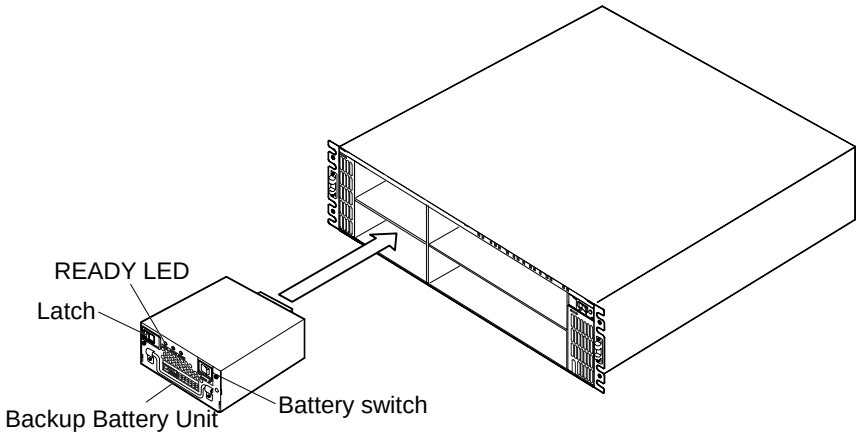


Figure 3.4.3.1 Installing Backup Battery Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Installing Fan Assembly

(a) In the case of the RK/RKL/RKS/RKD/RKSD/RKAAT/RKAATL

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.

(i) Insert the Fan Assembly into the specified position in the subsystem.

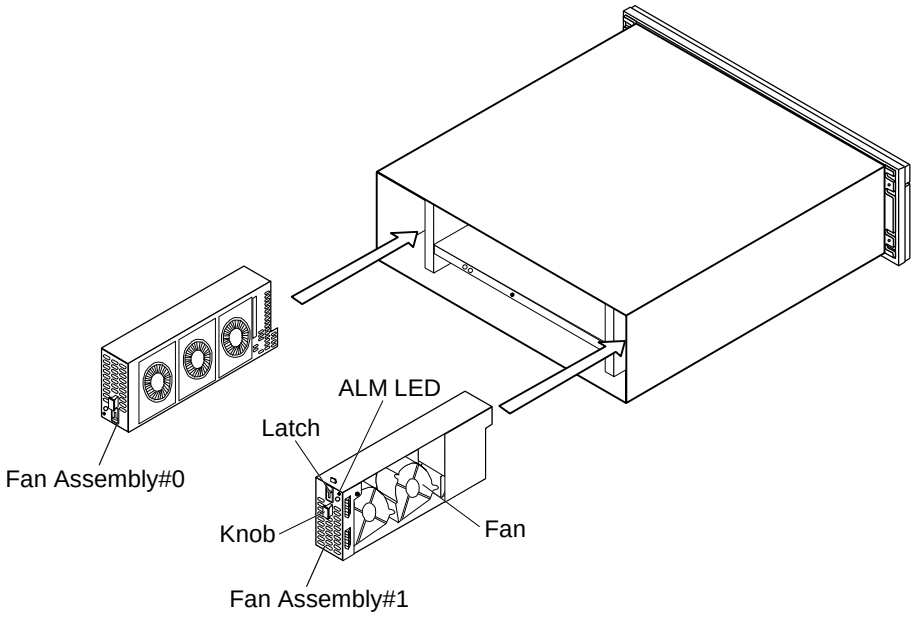


Figure 3.4.4 Installing Fan Assembly

(b) In the case of the RKH/RKHE

(i) Insert the Fan Assembly into the specified position in the subsystem.

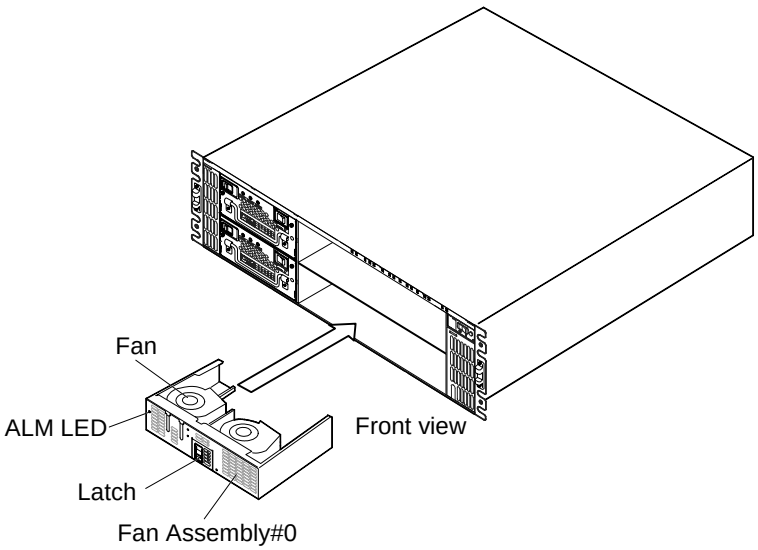


Figure 3.4.4.1 Installing Fan Assembly

Copyright © 2002, 2005, Hitachi, Ltd.

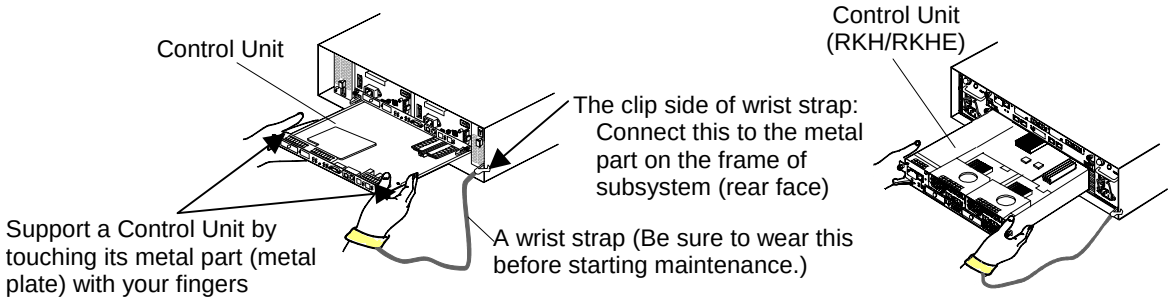
(3) Installing the Control Unit, Cache Unit and Interface Board

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

<Working Procedure>

(a) In the case of the RK/RKL/RKS/RKD/RKSD

(i) Mount the Cache memories on the Control Unit in the form of sets each consisting of the two Cache memories.

- Install the Cache Unit with the same capacity and in the same slot as those of the Control Unit of another system.
- Be careful not to insert Cache Units at the reversed direction.

(ii) Make sure that the Cache memory is firmly installed.

(iii) Insert the Control Unit in the specified position with the right and left levers being raised, then return in the two levers at the same time in the direction shown by the arrows (⟶).

In the case of the dual Control Unit system, also install another Control Unit in the location for the Control Unit#1.

(iv) Fasten the right and left fixing screws of the Control Unit.

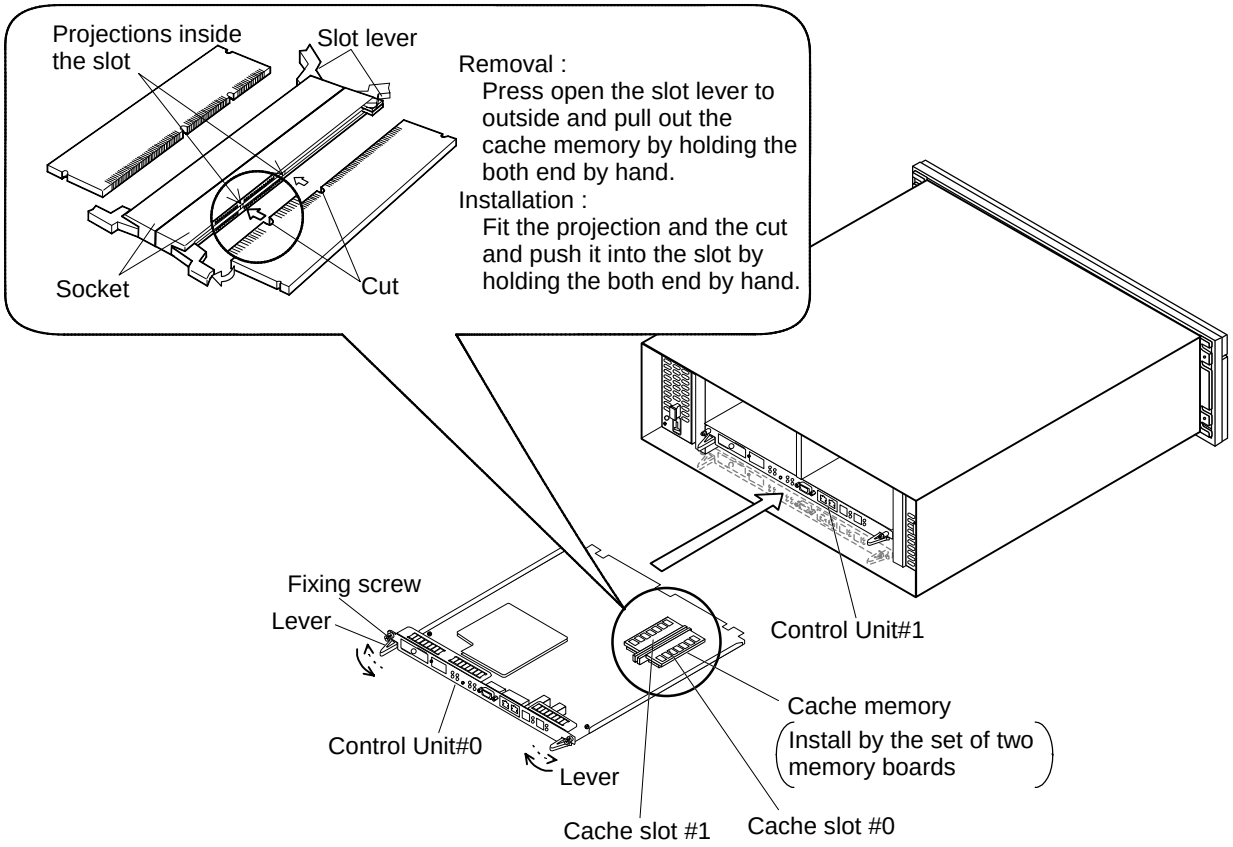


Figure 3.4.5 Installing Control Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(b) In the case of the RKH/RKHE

This installation work is only applied to RKH/RKHE.

(i) Place the Interface Board on the Control Unit fitting it to the positioning pin and fasten it by tightening the three mounting screws.

(ii) Make sure that the Interface Board is firmly installed.

(iii) Mount a Cache Units on the Control Unit.

- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the same way, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(iv) Make sure that the Cache Unit is firmly installed.

(v) Insert the Control Unit in the specified position with the right and left levers being raised, then return in the two levers at the same time in the direction shown by the arrows (⟶).

(vi) Fasten the right and left fixing screws of the Control Unit.

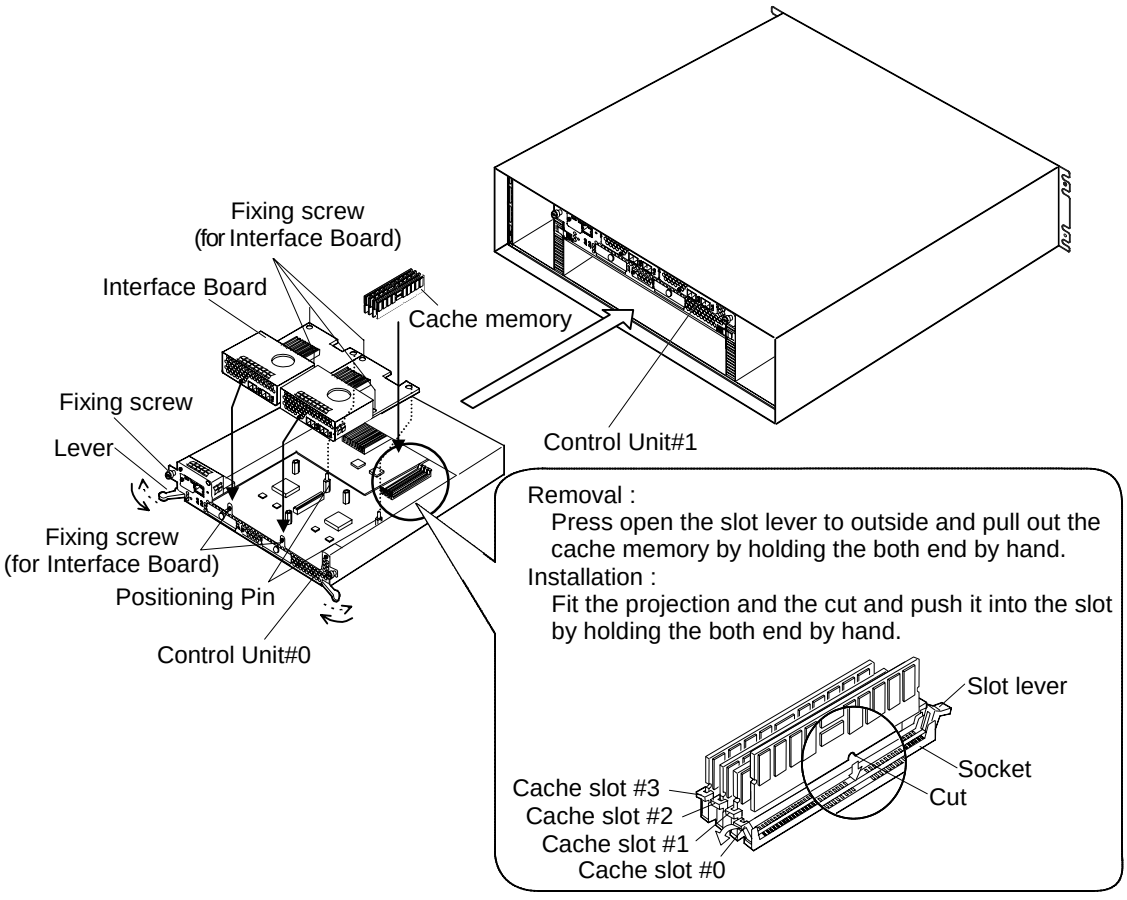


Figure 3.4.5.1 Installing Control Unit

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

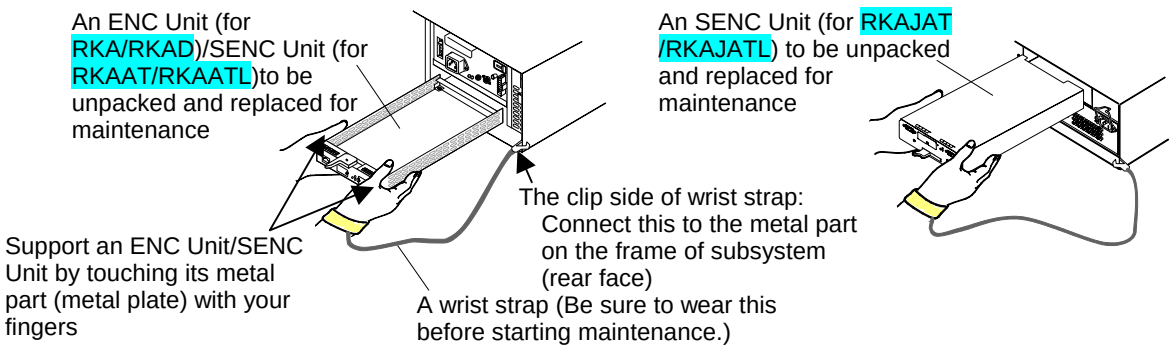
(4) Installing ENC Unit (for RKA/RKAD) and SENC Unit (for RKAAT/RKAJAT/ RKAATL/RKAJATL)
Install the ENC unit in the RKA/RKAD and the SENC unit in the RKAAT/RKAJAT/RKAATL/RKAJATL.

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.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.
Be careful that the installing position is different only for the SENC Unit of RKAJAT/RKAJATL (Refer to Figure 3.4.6.1).

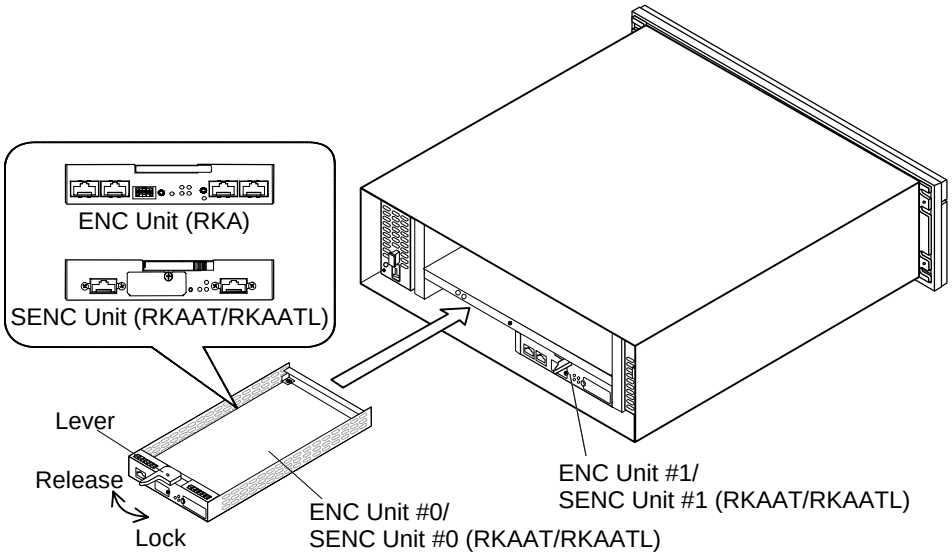


Figure 3.4.6 Installing ENC Unit (RKA/RKAD)/SENC Unit(RKAAT/RKAATL)

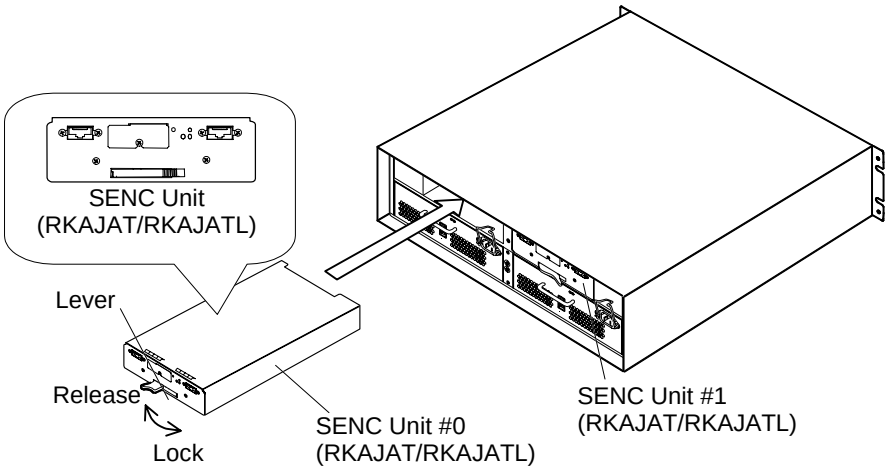


Figure 3.4.6.1 Installing SENC Unit(RKAJAT/RKAJATL)

Copyright © 2002, 2005, Hitachi, Ltd.

(5) Installing Power Unit

(5-1) In the case of the RK/RKL/RKS/RKD/RKSD/RKAAT/RKAJAT/RKAATL/RKAJATL

(a) Power Unit of RK/RKL/RKA/RKS/RKAAT/RKAATL

The Power Units differ among the RK/RKL/RKS, RKA and RKAAT/RKAATL. Install them correctly in the prescribed positions by paying attention to their part model names.

(i) Make sure that the AC Power Unit Switch is turned off.

(ii) Insert the two Power Unit into the specified position in the subsystem until it is latched with a click.

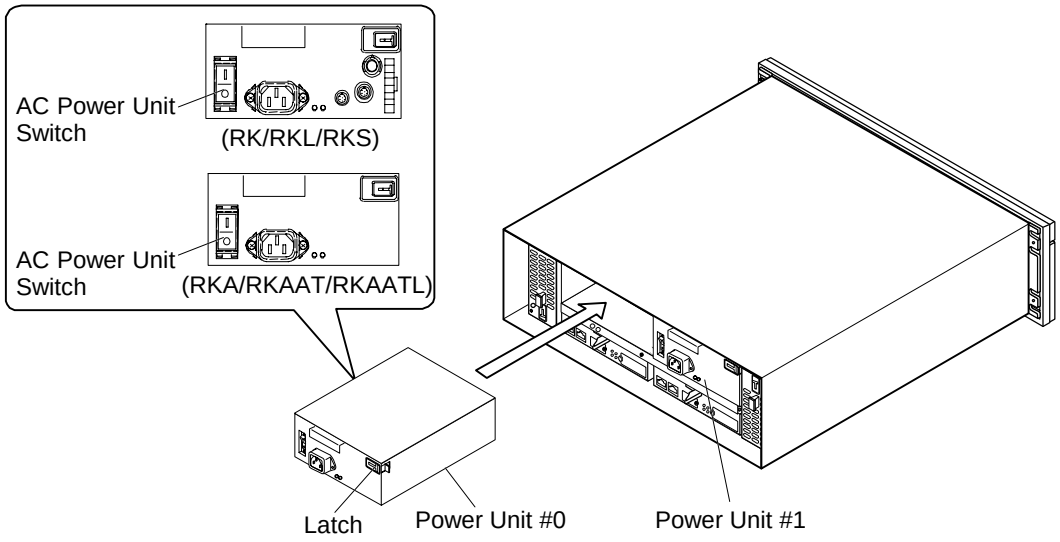


Figure 3.4.7 Installing Power Unit

(b) Power Unit of RKAJAT/RKAJATL

(i) Make sure that the AC Power Unit Switch is turned off.

(ii) Insert the two Power Unit into the specified position in the subsystem after making a Latch (fixing screw) to the Release side, and tighten the fixing screw.

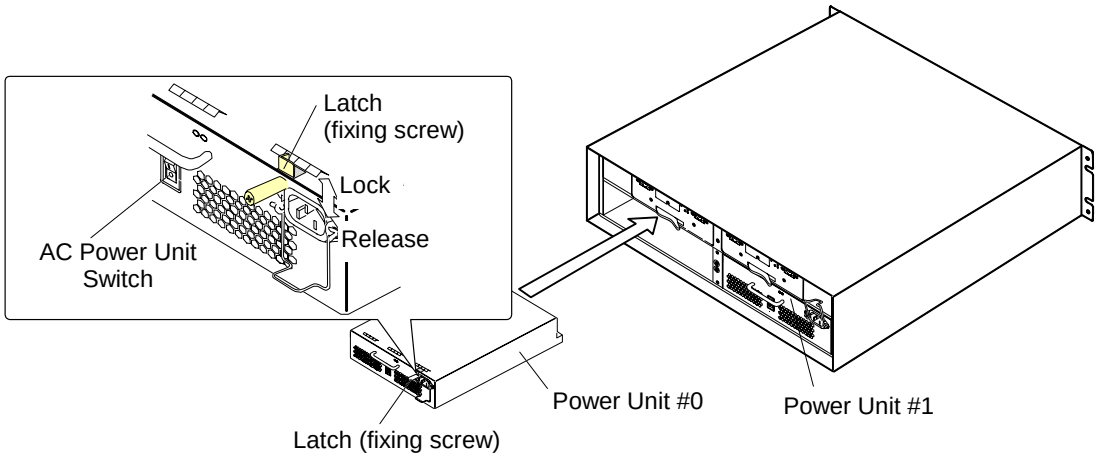


Figure 3.4.7.1 Installing Power Unit (RKAJAT/RKAJATL)

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Power Unit of RKD/RKD/RKSD

(i) Make sure that the DC Power Unit Switch is turned off.

(ii) Insert the two Power Unit into the specified position in the subsystem until it is latched with a click.

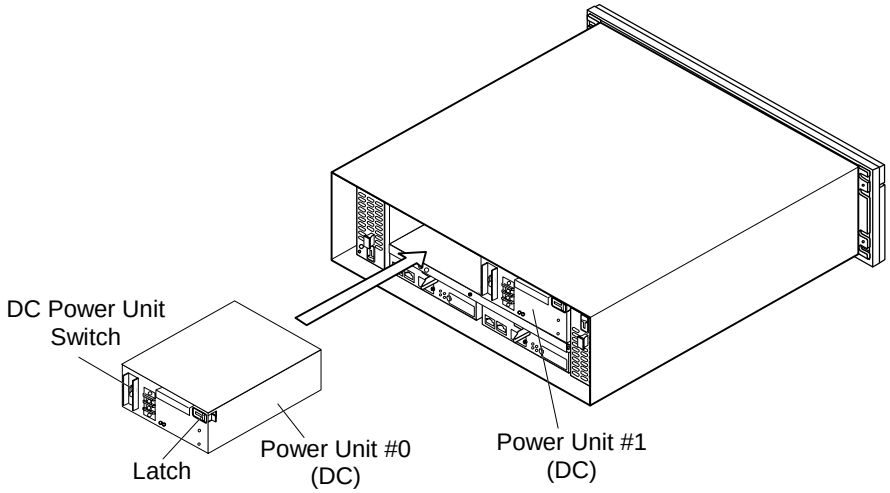


Figure 3.4.7.2 Installing Power Unit (DC)

(5-2) In the case of the RKH/RKHE

(a) Make sure that the AC Power Unit Switch is turned off.

(b) Insert the AC/DC Power Unit into the specified location in the subsystem.

(c) Secure the AC/DC Power Unit by tightening the screw for fixing it.

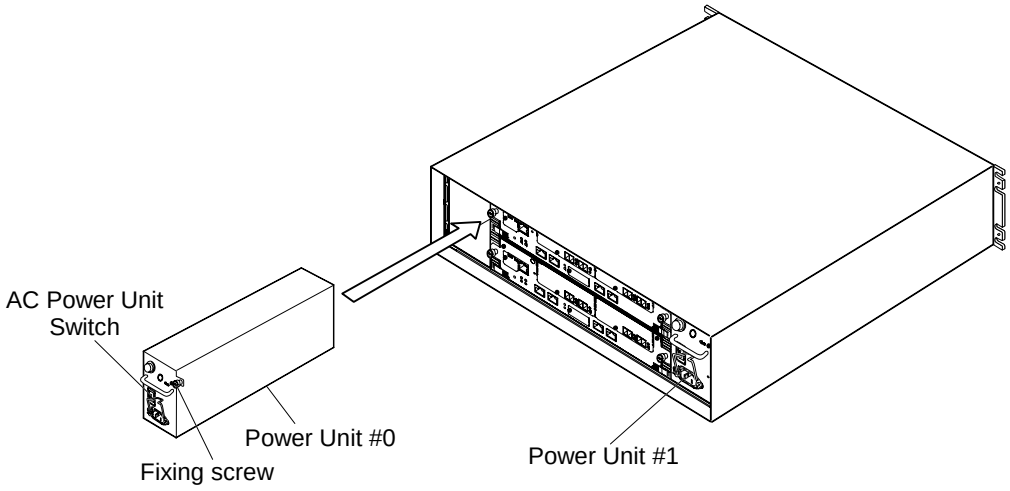


Figure 3.4.7.2 Installing Power Unit

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(6) Sticking EMI gasket

(6-1) Outside of RKAJAT/RKAJATL

Stick the EMI gasket supplied with the URHT5 on the top of the RK/RKL/RKA /RKAAT/RKAATL/RKD/RKAD frame.

(a) Make sure of the orientation of the open end of the EMI gasket. (Refer to Figure 3.4.9.) The orientation of the open end of the EMI gasket varies depending on the mounting condition of the subsystem on which the gasket is to be stuck.

(b) Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.

(c) Stick the EMI gasket taking care not to let it protrude by aligning its end (or the edge of the bend) with the front end of the top of the frame (the RK/RKL/RKA/RKAAT/RKAATL/RKS/RKD/RKAD/ RKSD).

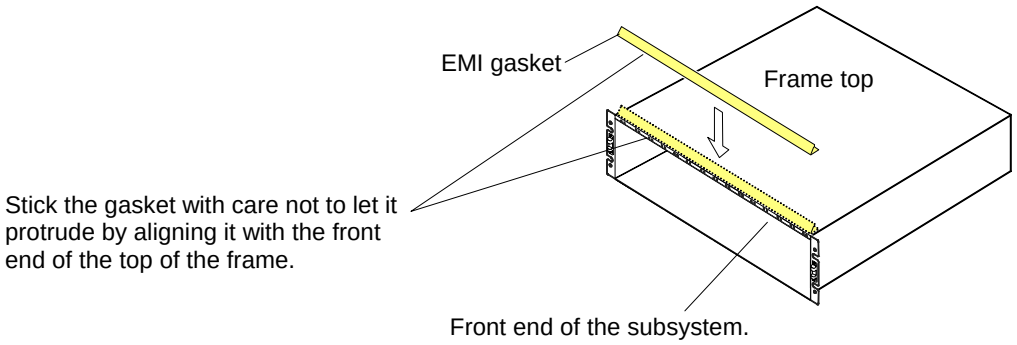
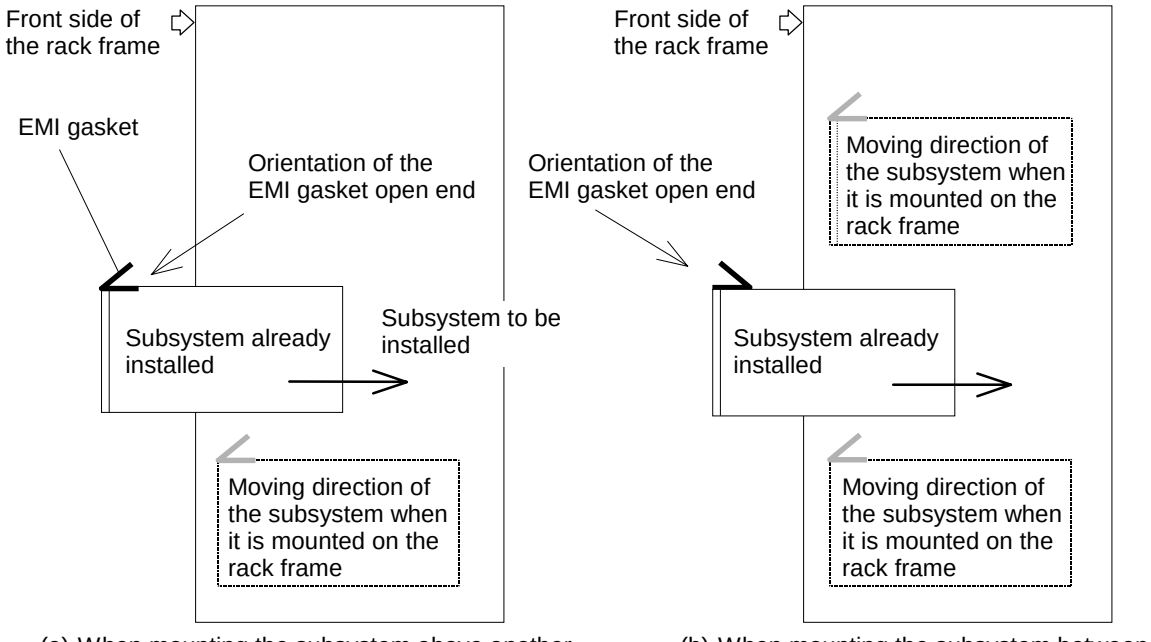


Figure 3.4.8 Position for Sticking EMI Gasket (outside of RKAJAT/RKAJATL)



(a) When mounting the subsystem above another one in order or mounting the subsystem adjacently on another one in order

(b) When mounting the subsystem between other ones already mounted

Figure 3.4.9 Orientation of EMI Gasket Open End when It Is Stuck

Copyright © 2002, 2005, Hitachi, Ltd.

(6-2) For the RKAJAT/RKAJATL

Stick the EMI gasket supplied with the URHT5 on the top of the RKAJAT/RKAJATL frame.

(a) Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.

(b) Stick the EMI gasket so that the screws at the front of the top of the frame can be seen.

(c) Stick the EMI gasket by aligning it with the back end of the top of the frame.

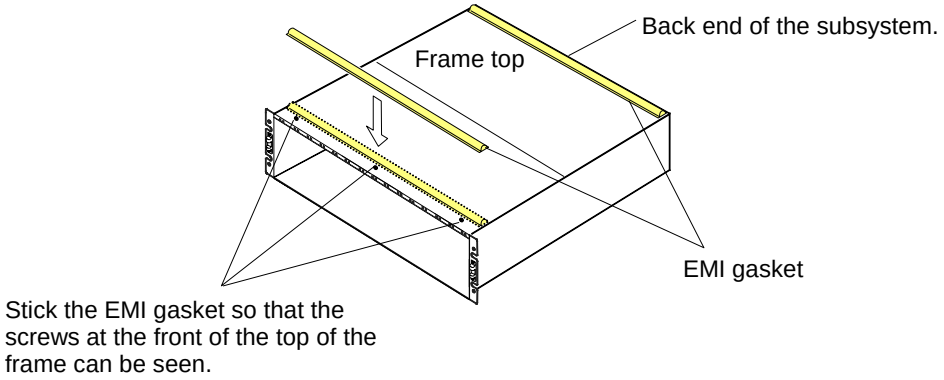


Figure 3.4.9 Position for Sticking EMI Gasket (RKAJAT/RKAJATL)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

3.5 Mounting on Rack Frame

You can use a special lifter to mount the subsystem on the rack frame.
This section explains a procedure for the mounting using the special lifter.
If you do not use the lifter, you must follow another procedure.

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.

(1) External appearance of the special lifter
Figure 3.5.1 shows external appearance of the special lifter.

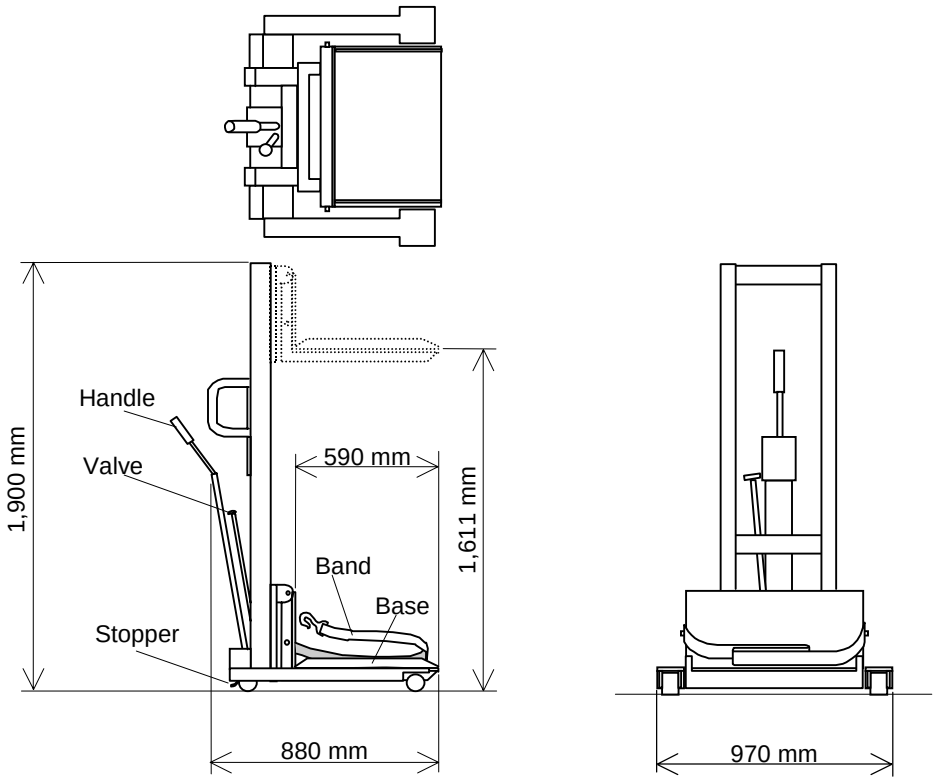


Figure 3.5.1 External lifter

Copyright © 2002, 2005, Hitachi, Ltd.

3.5.1 Mounting lifter on rack frame

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 RK/RKL/RKS/RKD/RKSD is about 44 kg, RKA/RKAD /RKAAT/RKAATL is about 42 kg and that of the RKH/RKHE and RKAJAT/RKAJATL 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.

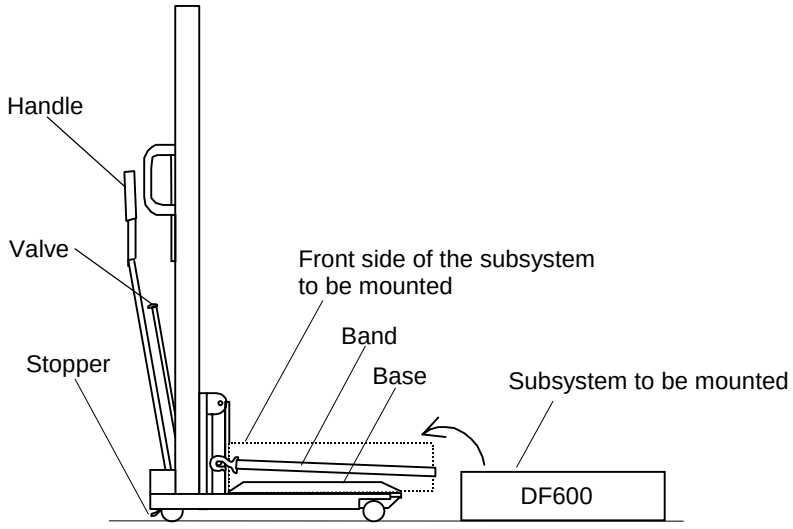


Figure 3.5.2 Putting the Subsystems on Special Lifter

Copyright © 2002, 2005, Hitachi, Ltd.

3.5.2 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

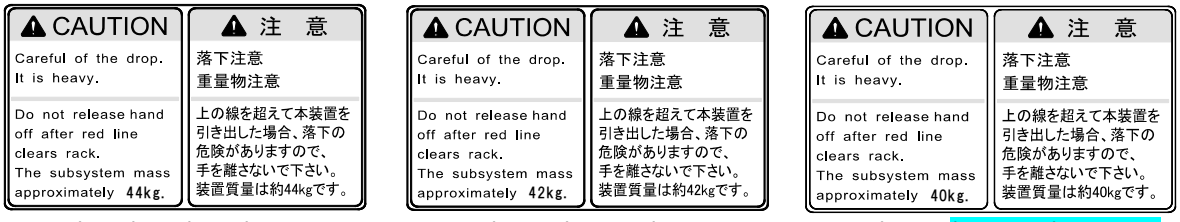
- **Rack mounting and lifter operation should only be conducted by a person who has been trained and qualified since the subsystem could turn over or a worker could be caught under the subsystem.**
- **Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends 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 RK/RKL/RKS/RKD/RKSD is about 44 kg, RKA/RKAD /RKAAT/RKAATL is about 42 kg and that of the RKH/RKHE and RKAJAT/RKAJATL is about 40 kg.**

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

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.



RK/RKL/RKS/RKD/RKSD RKA/RKAD/RKAAT/RKAATL RKH/RKHE/RKAJAT/RKAJATL

(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.

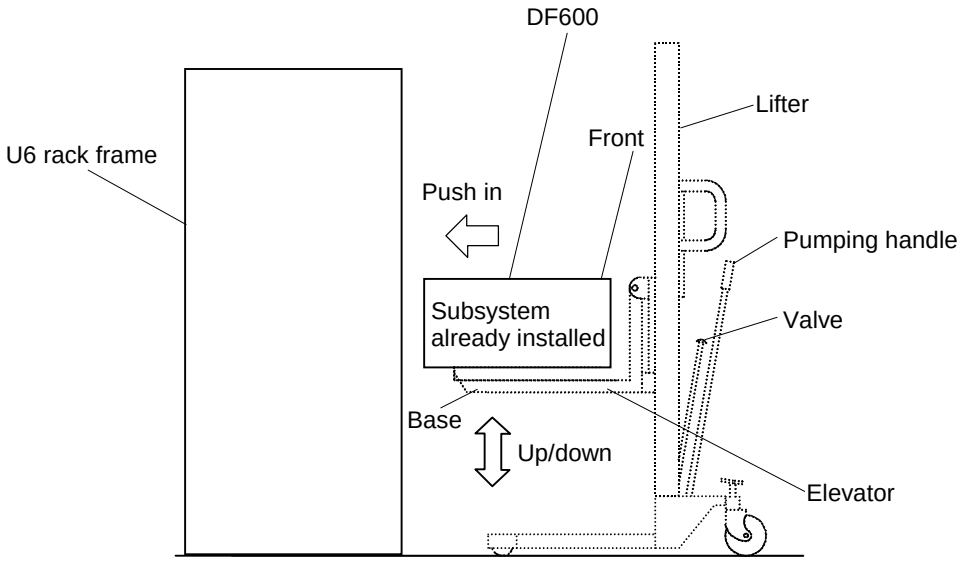


Figure 3.5.3 Mounting Subsystem on Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

3.5.3 Securing the subsystem

(1) U6 Rack frame

(a) Fastening the front side of the subsystem

(i) Fasten the subsystem to the rack frame with the four M5×10 binding screws.

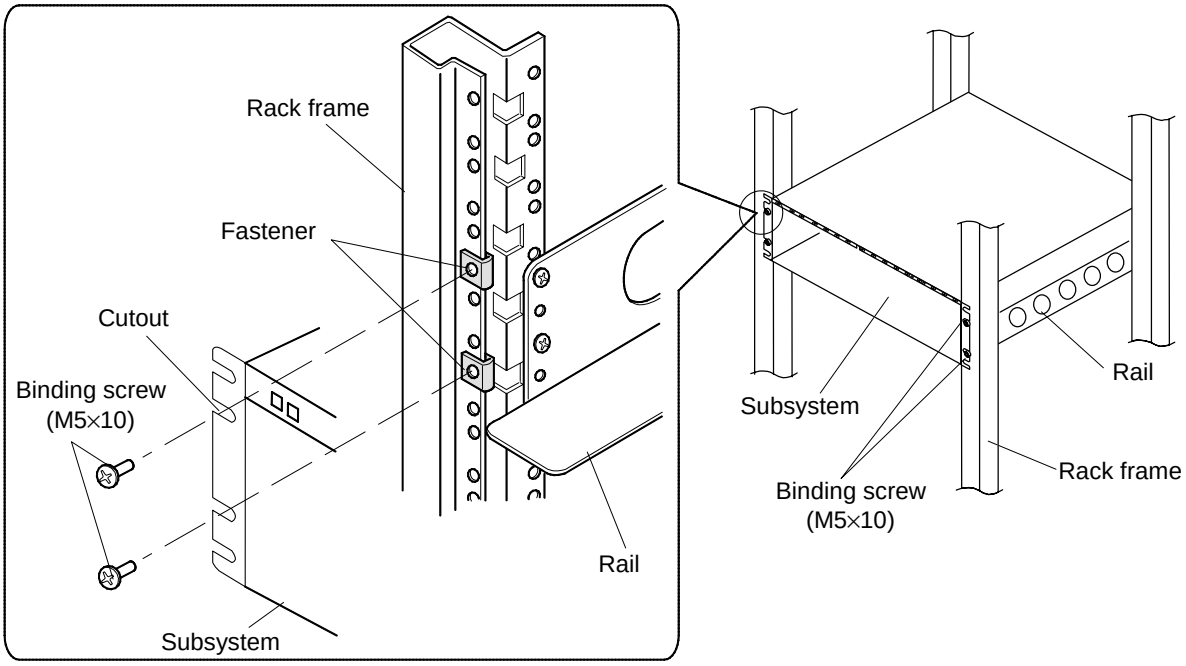


Figure 3.5.4 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

(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.

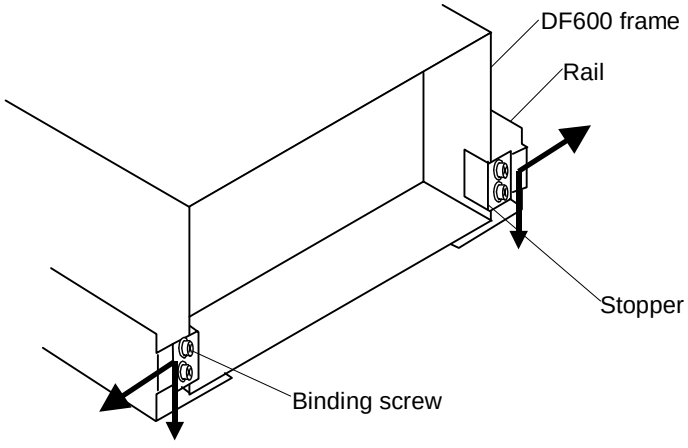


Figure 3.5.5 Securing Rear Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(2) U4 Rack frame

(a) Fastening the front side of the subsystem

(i) Fasten the subsystem to the rack frame with the four M5×10 binding screws.

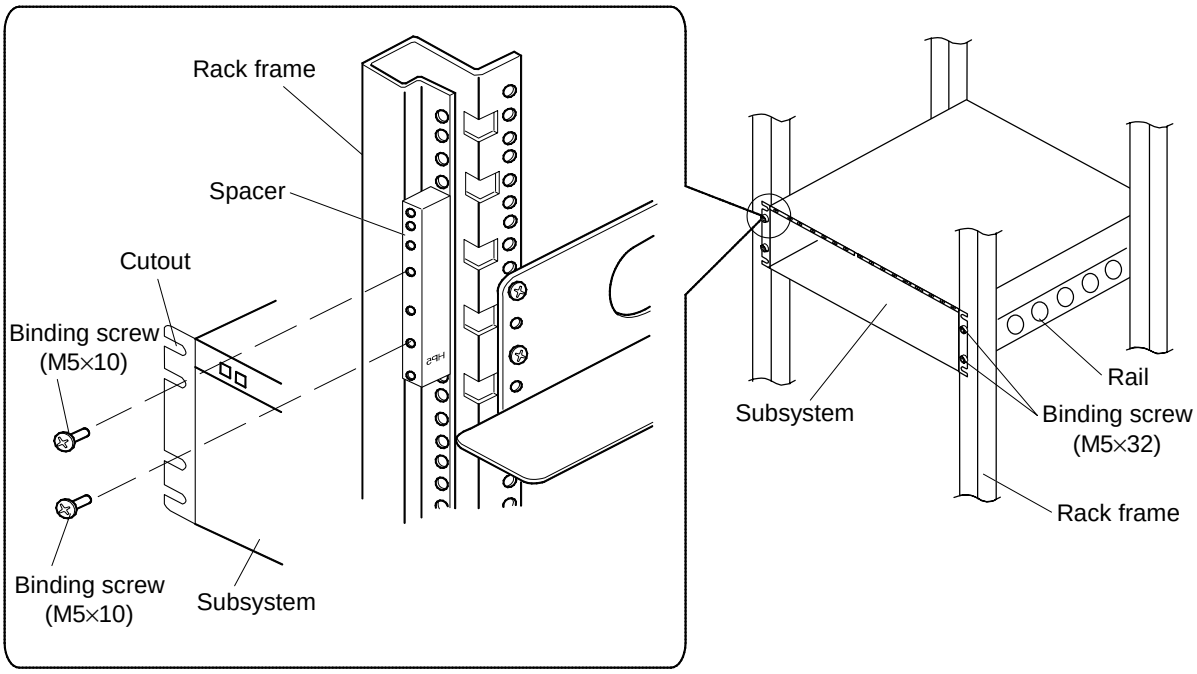


Figure 3.5.6 Fastening Front Side of the Subsystem

(b) Fastening rear side of the subsystem

(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.

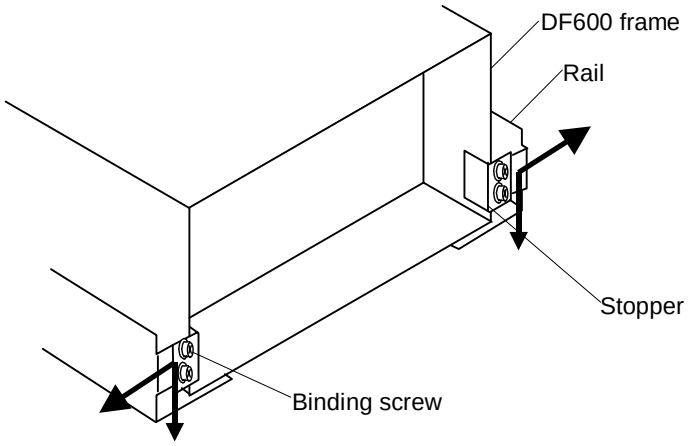


Figure 3.5.7 Securing Rear Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(3) HP Rack frame

(a) Fastening the front side of the subsystem

(i) Fasten the subsystem to the rack frame with the four M5×10 binding screws.

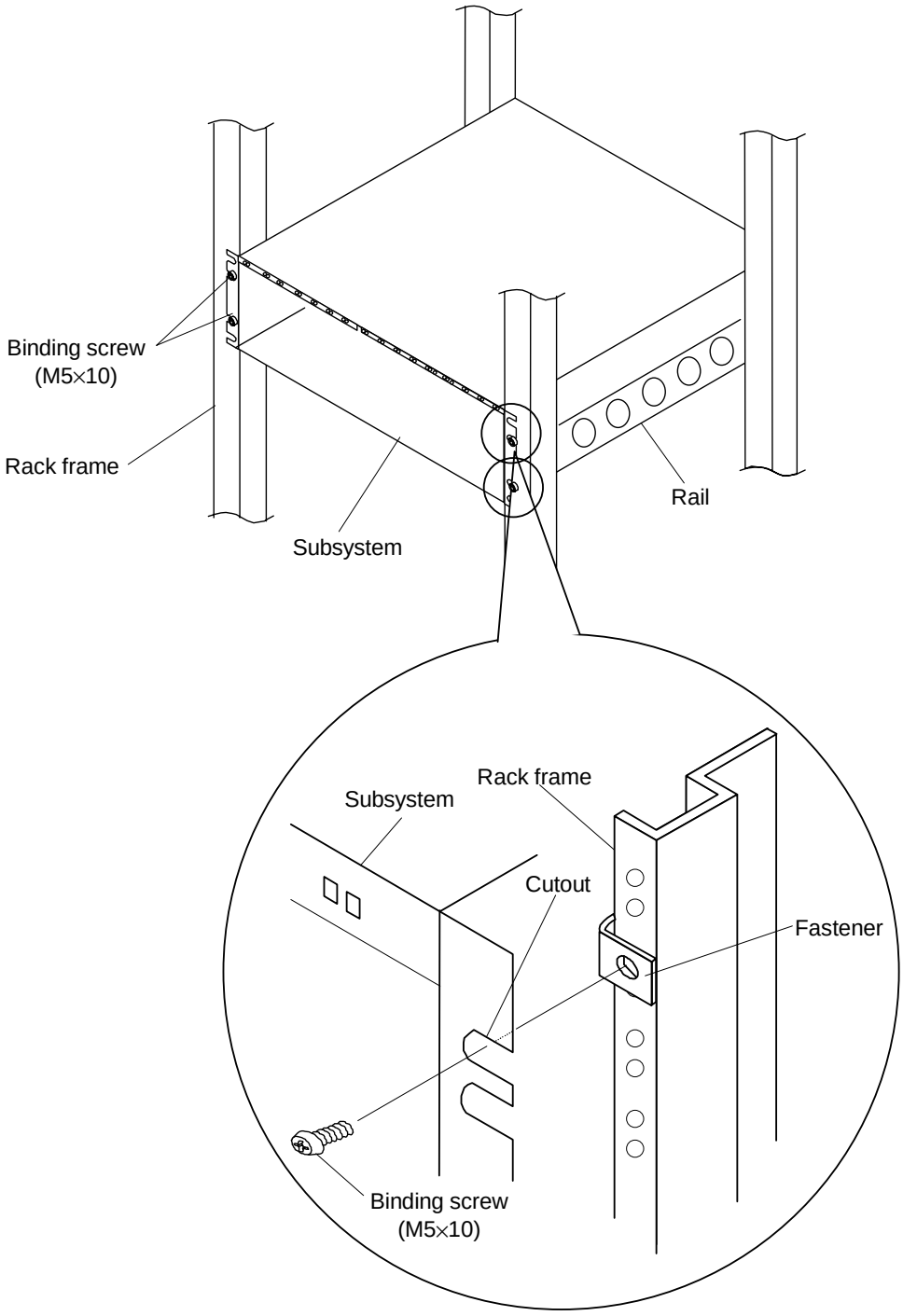


Figure 3.5.8 Fastening Front Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Fastening rear side of the subsystem

(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.

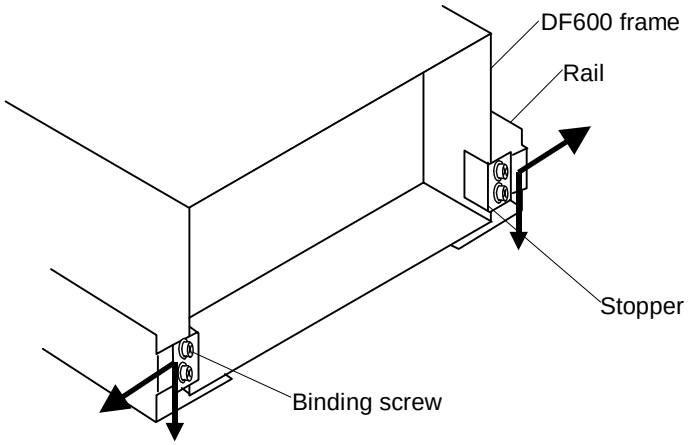


Figure 3.5.9 Securing Rear Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Sun StorEdge Rack frame

(a) Fastening the front side of the subsystem

(i) Fasten the notched portions of the subsystem to the rack frame with four sets of a hexagon socket head bolt (M5) and washer M5. (Perform the fastening at four places each of where the two notches of the subsystem are aligned with screw holes of the rack frame.)

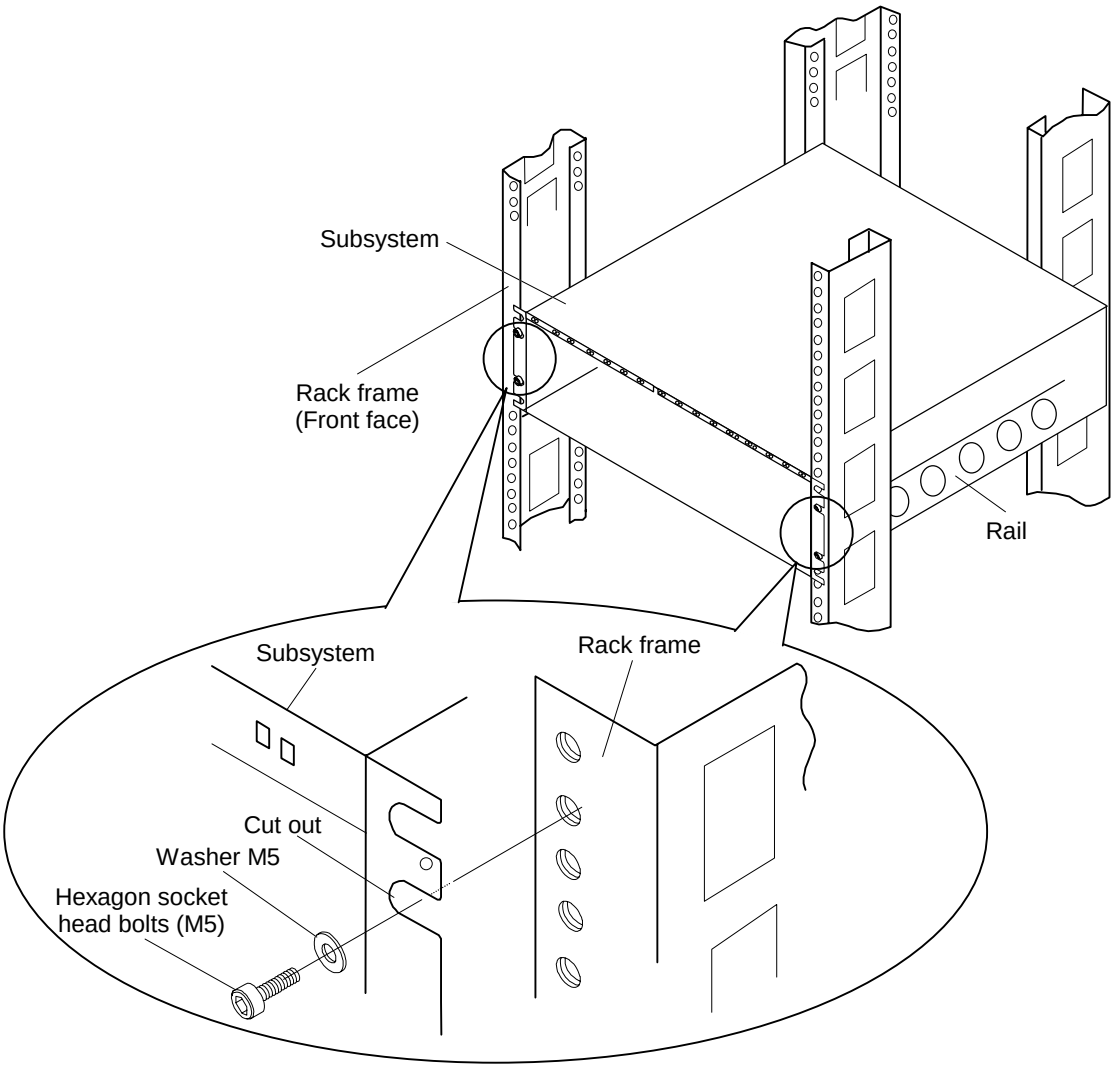


Figure 3.5.10 Fastening Front Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Fastening rear side of the subsystem

(i) Slide the stopper 500 RKs in the arrow direction to have them contacts the frame.

(ii) Fasten the stoppers by tightening the hexagon socket head bolts (M4×8).

(iii) Fix the two cleats for fastening the power cable with the two binding screws (M4×6).

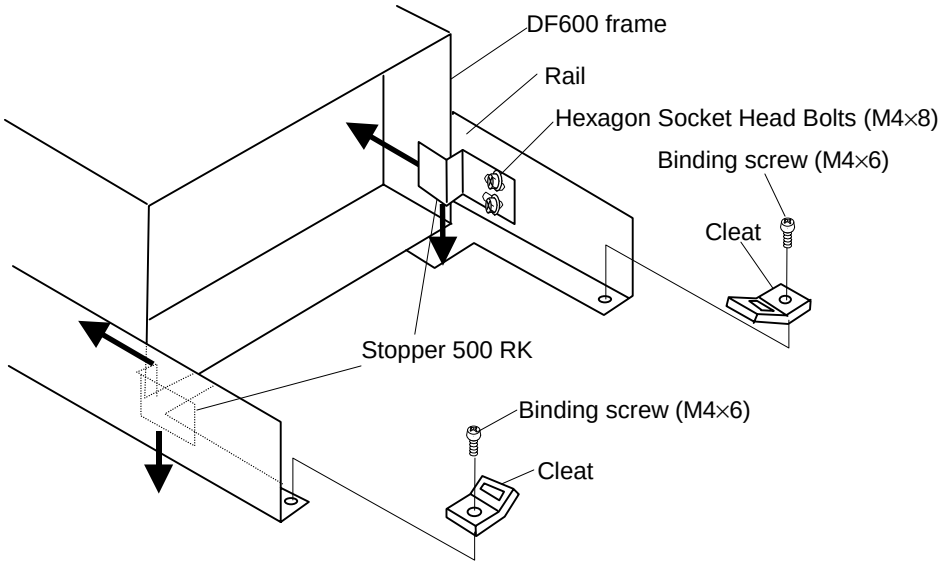


Figure 3.5.11 Securing Rear Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(5) IBM RS6000 Rack frame

(a) Fastening the front side of the subsystem

(a-1) Fastening the front side of the RK/RKL/RKD/RKSD/RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL

(i) Fasten the cut sections at both ends on the front side of the subsystem using binding screws M5×10 (four sections).
In this case, the subsystem should be located in the center of the rack frame.

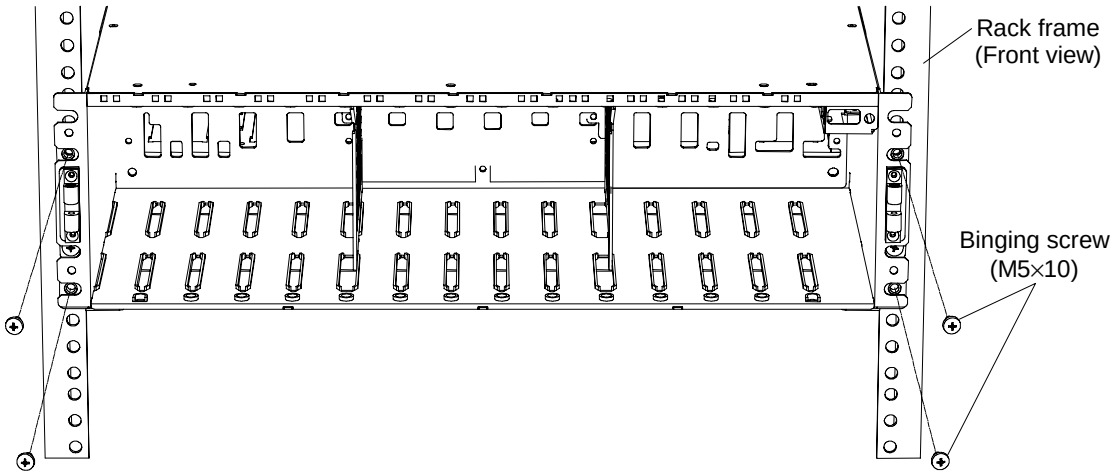


Figure 3.5.12 Fastening Front Side of the Subsystem

(a-2) Fastening the front side of the RKH/RKHE

(i) Fasten the cut sections at both ends on the front side of the subsystem using binding screws M5×10 (two sections) and binding screws M5×25 (two sections).
In this case, the subsystem should be located in the center of the rack frame.

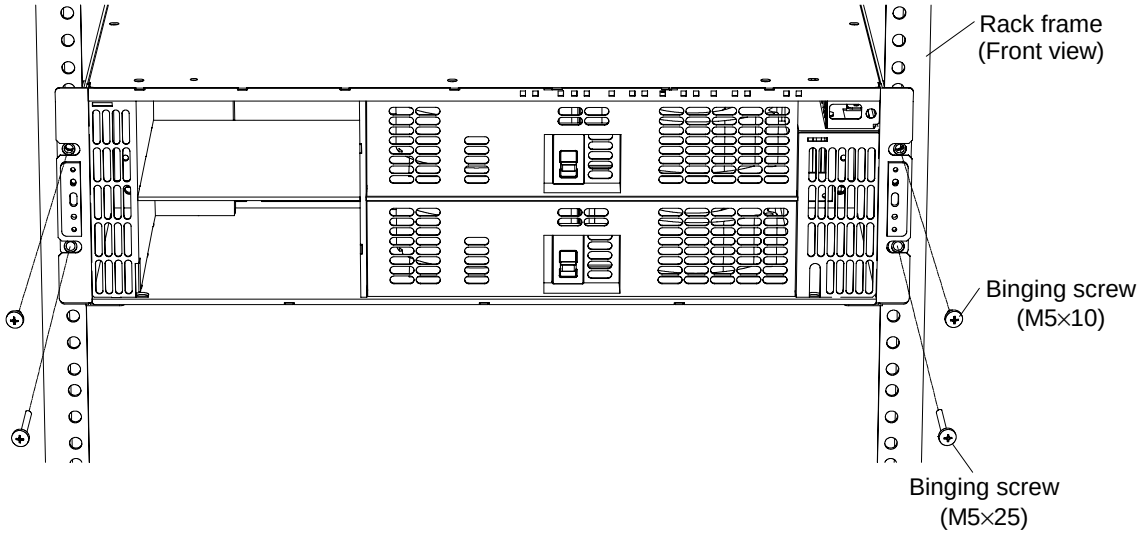


Figure 3.5.12.1 Fastening Front Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Fastening rear side of the subsystem

(i) Fasten the stoppers temporarily using binding screws (M3x6).

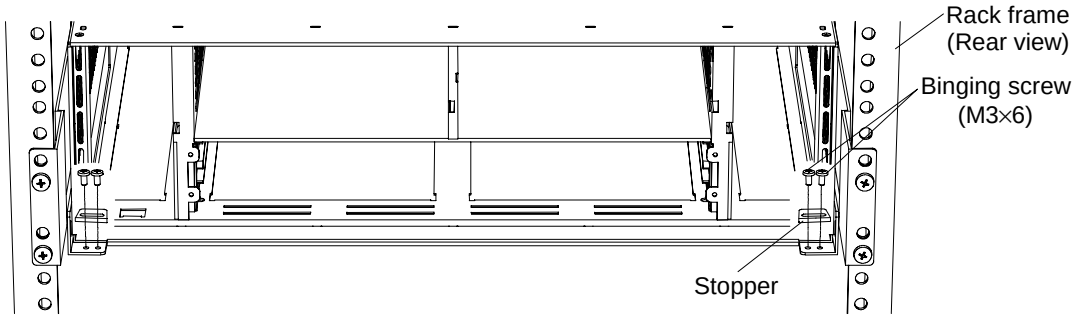


Figure 3.5.13 Temporal Assembly of the Stopper

(ii) Slide both of the stoppers (L/R) either outward or inward as far as possible and tighten the binding screws (M3×6) firmly to secure the equipment.

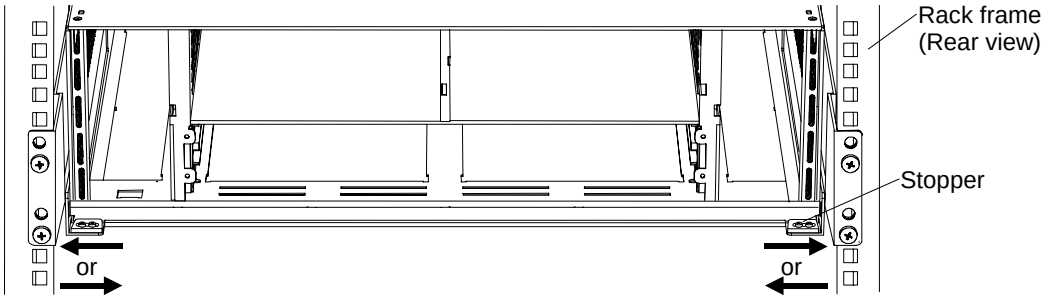


Figure 3.5.14 Securing Rear Side of the Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(6) SONY Rack frame

(a) Fastening front side of the Subsystem

(i) Fasten the notched parts on the front left and right sides of the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the rack frame with the four M5×10 binding screws. When doing this, position the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL just in the center of the rack frame.

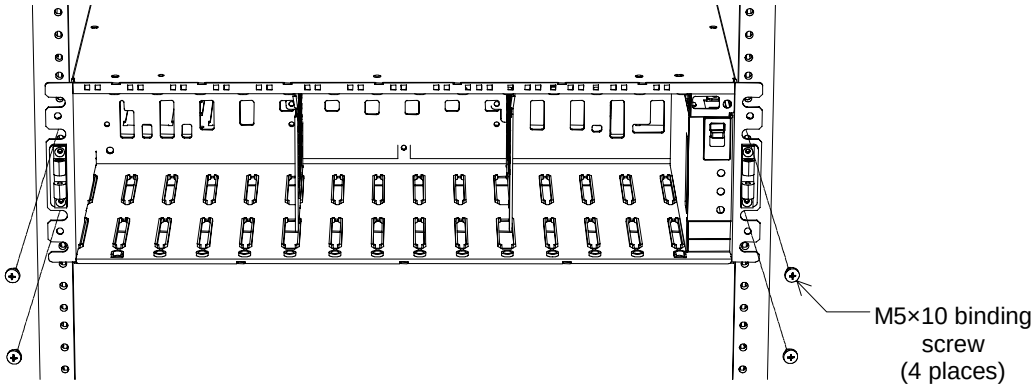


Figure 3.5.15 Fastening Front Side of the Subsystem

(b) Fastening rear side of the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL

(i) Fasten the each stopper temporarily in the posture shown in the figure below with the M3×6 binding screws.

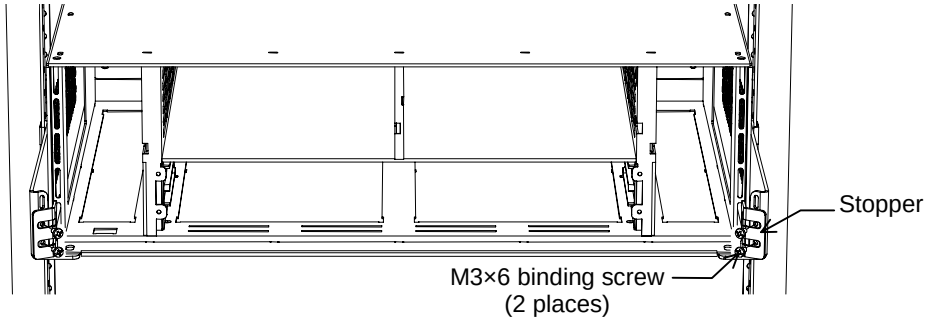


Figure 3.5.16 Fastening the Stoppers Temporarily

(ii) Make the left and right stoppers contact the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL by pressing them in the directions shown by arrows in the figure and tighten the M3×6 binding screws.

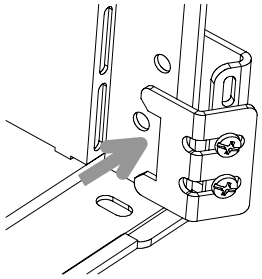


Figure 3.5.17 Fastening Rear Side of the Subsystem

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

3.5.4 Installing the Disk Drive

(1) Procedure for installation

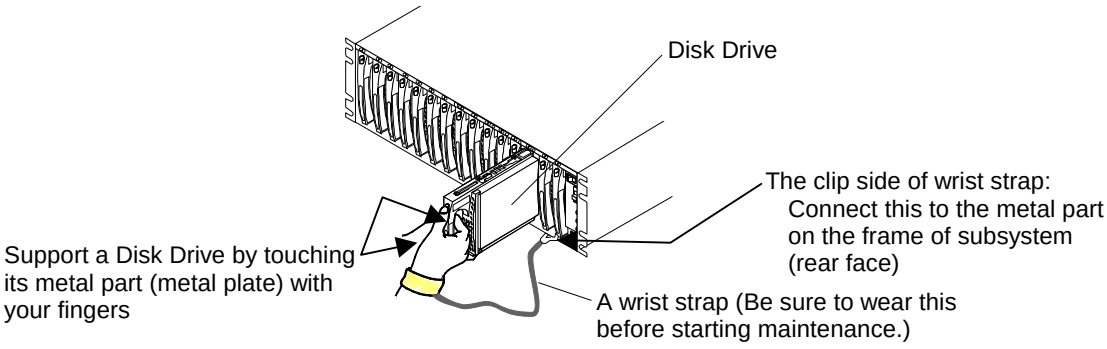
- RK/RKL/RKD/RKA/RKAD/RKS/RKSD

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.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

Table 3.5.1 Parts Required for Installation of RK/RKL/RKS/RKD/RKSD

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F600-AEH36	2 to 14(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		
		DF-F600-ATE146L (RKL)		
*1 : When no component is installed, a dummy of it is installed instead.				

Table 3.5.2 Components Required for the RKA/RKAD

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F600-AEH36	2 to 15(*1)	The Disk Drive with a model name selected from those shown on the left is installed.
		DF-F600-AEF72		
		DF-F600-AEH72		
		DF-F600-AEF146		
		DF-F600-AEH146		
		DF-F600-AEF300		
*1 : When no component is installed, a dummy of it is installed instead.				

<Working Procedure>

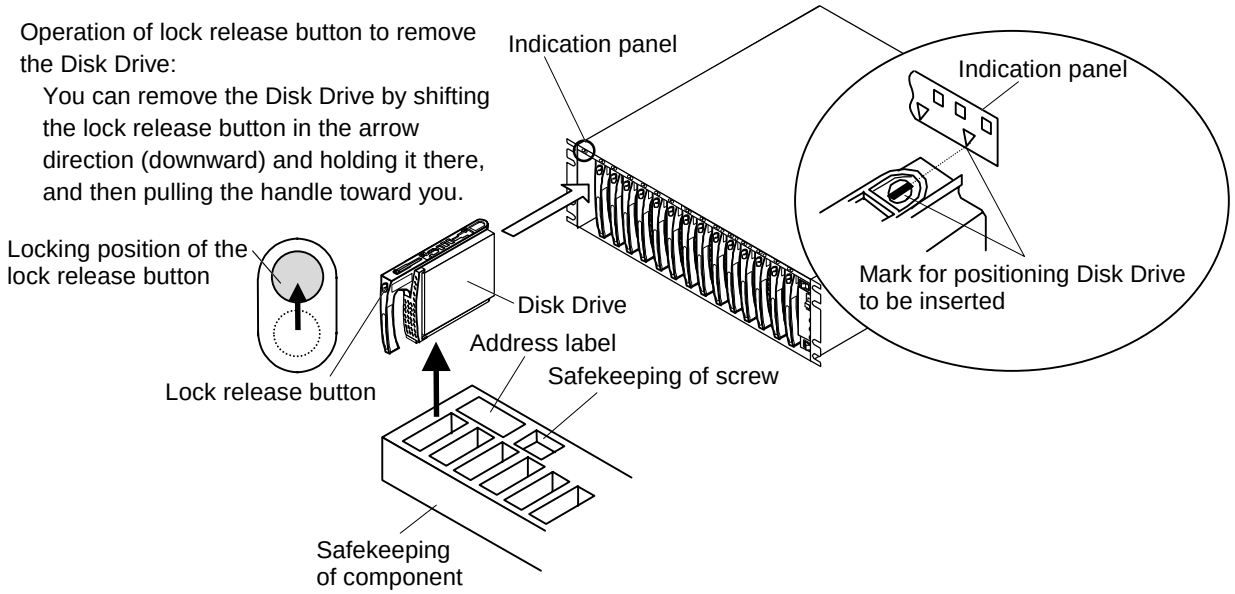
(a) Pull the parts out of the Disk Drives safekeeping of component.
Be sure to install the removed Disk Drive to the original bay.

(b) Insert the Disk Drive into the position (address) where it was by holding it with the handle. Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.

(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.

Operation of lock release button to remove the Disk Drive:
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.



Copyright © 2002, 2005, Hitachi, Ltd.

Figure 3.5.15 Installing of Disk Drive

Copyright © 2002, 2005, Hitachi, Ltd.

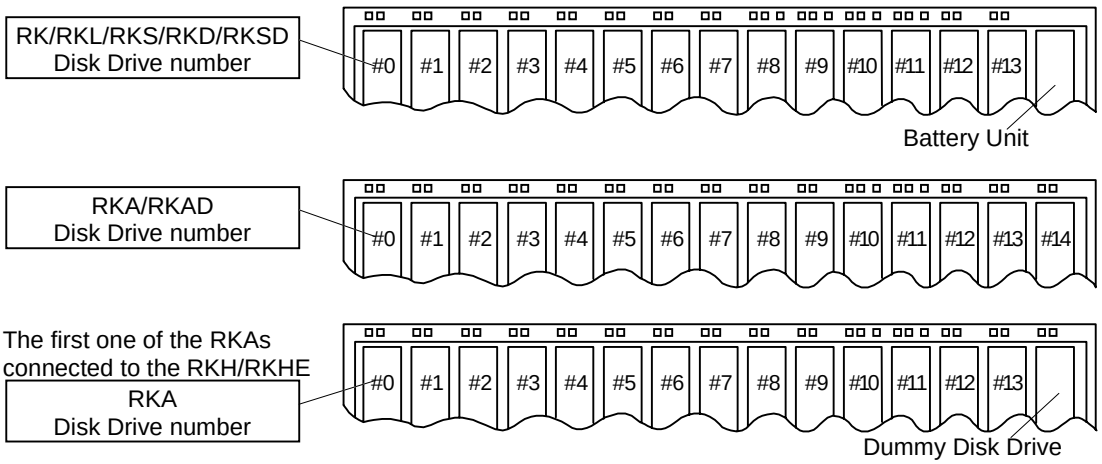


Figure 3.5.15.1 Disk Drive Mounting Location

Copyright © 2002, 2005, Hitachi, Ltd.

- RKAAT/RKAJAT/RKAATL/RKAJATL

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.
- **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.

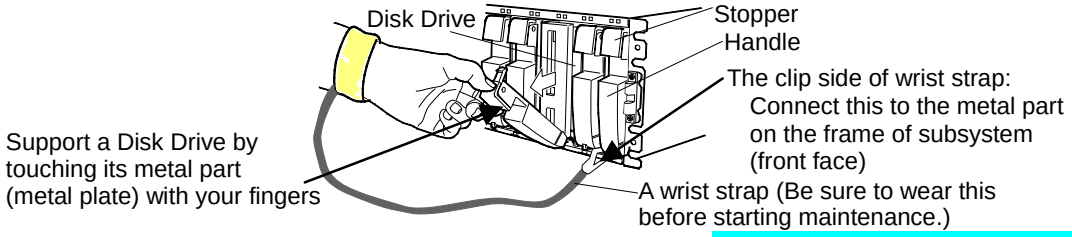


Table 3.5.2.1 Components Required for the RKAAT/RKAJAT/RKAATL/RKAJATL

No.	Component name	Model	Quantity	Remark
1	DISK Drive	DF-F600-ATE250 (RKAAT)	2 to 15(*1)	
		DF-F600-ATE250R (RKAAT/RKAJAT)		
		DF-F600-ATE250L (RKAATL)		
		DF-F600-ATE250LR (RKAATL/RKAJATL)		
		DF-F600-ATE400R (RKAAT/RKAJAT)		
		DF-F600-ATE400LR (RKAATL/RKAJATL)		

Copyright © 2003, 2005, Hitachi, Ltd.

*1 : When no component is installed, a dummy of it is installed instead.

Copyright © 2003, 2005, Hitachi, Ltd.

<Working Procedure>

(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 RKAAT/RKAJAT/RKAATL/RKAJATL 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.

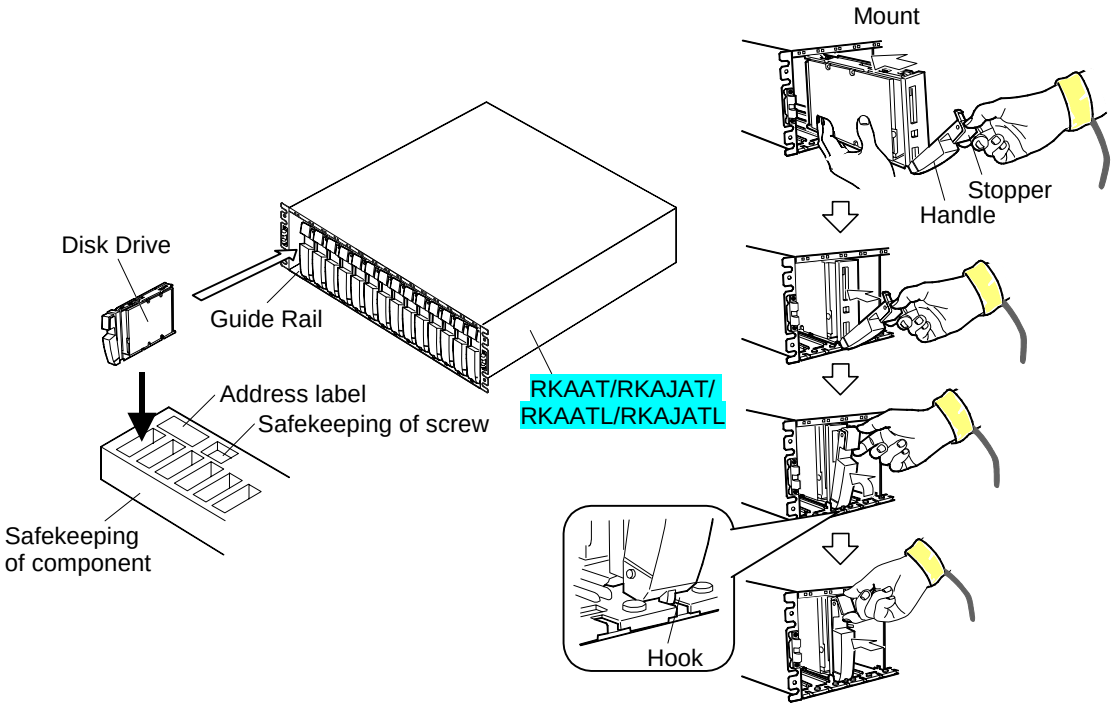


Figure 3.5.2.2 Installing of Disk Drive

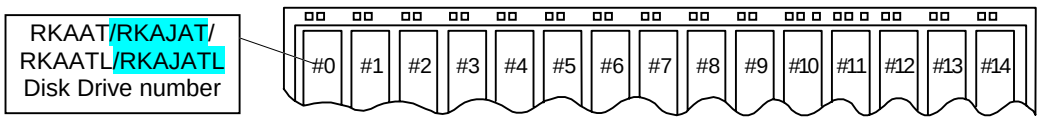


Figure 3.5.2.3 Disk Drive Mounting Location

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Setting Device ID number

The Device ID of the RK (RKD) has been set as #0.

In the case of the RKH/RKHE, however, it has not been set.

Set the Device ID numbers of the RKA (RKAD) in serial order starting from the RKA (RKA/RKAD) connected next to the RK (RKD). However, in the case of the RKA to be connected to the RKH/RKHE, the RKA/RKAAT/RKAJAT to be connected to the RK, or the RKA/RKAAT/RKAJAT to be connected to the RKH/RKHE. (When the "×16" switch of the Device ID number setting switch is set to 0 and the "×1" switch to 0 to F, the Device ID number is set as 0 to 15.)

In the case of a configuration of one RK+ RKAs + RKAATs/RKAJATs, set the device IDs of the RKA, the RKAATs/RKAJATs connected to the Path 0, and the RKAATs/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 RKA and RKAAT/RKAJAT.

In the case of a configuration of one RKH/RKHE + RKAs + RKAATs/RKAJATs, set the device IDs of the RKA, the RKAATs/RKAJATs connected to the Path 0, and the RKAATs/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 RKA and RKAAT/RKAJAT.

In the case of a configuration of one RKL + RKAATLs/RKAJATLs, set the device IDs of the RKAATLs/RKAJATLs connected to the Path 0, and the RKAATLs/RKAJATLs connected to the Path 1 as #2x, and #3x respectively.

Set the "x" as an ascending serial number in each of the Path 0 and Path 1.

For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

Be careful that the position of switch for Device ID is different for RKAJAT/RKAJATL.

In the case of RKA/RKAAT/RKAATL/RKAD, see Figure 3.5.3.

In the case of RKAJAT/RKAJATL, see Figure 3.5.3.1

Copyright © 2004, 2005, Hitachi, Ltd.

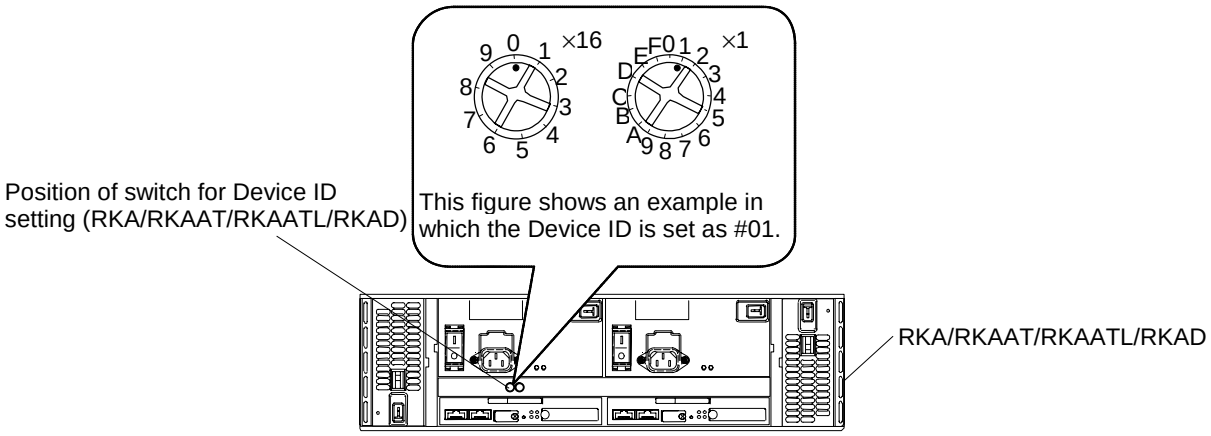


Figure 3.5.3 Position of Switch for Device ID Setting (RKA/RKAAT/RKAATL/RKAD)

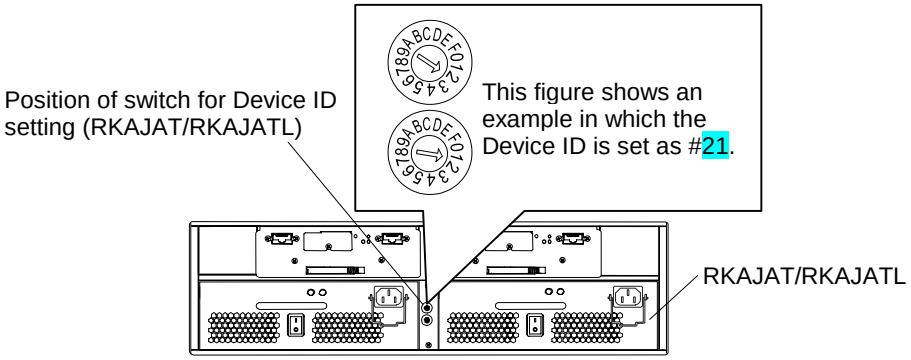


Figure 3.5.3.1 Position of Switch for Device ID Setting (RKAJAT/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

3.6 Connecting Cables

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the "Note on cable routing" in Item (2) in Subsection 1.1 on page INST 01-0010.

NOTE : Power supply system of the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL/RKS/ RKH/RKHE (RKD/RKAD/RKSD) 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 3.6.1, Figure 3.6.1.1, Figure 3.6.1.2, Figure 3.6.1.3, Figure 3.6.1.4, Figure 3.6.1.5, and Figure 3.6.1.6. Types of the cables to be used are shown in Table 3.6.1.

Table 3.6.1 Types Cables to be Connected

No.	Cable name	Remarks
1	Interface cable (Fibre Channel)	See 3.6.1 on page INST 03-0660
2	ENC cable	See 3.6.2 on page INST 03-0680
3	Power cable(*1) (100 V)	See 3.6.3 on page INST 03-0700
4	Power cable (200 V) (Supplied with the rack frame)	See 3.6.4 on page INST 03-0720
	Power cable (Added PDB append parts)	See 6.5.4 (5) on page INST 06-0520

*1 : When replacing power cable of the RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL/RKS/RKH/RKHE/RKD/RKAD /RKSD, which has already been connected, with the optional power cable, refer to "Removing power cable" on page or page INST 08-0110.

Copyright © 2002, 2005, Hitachi, Ltd.

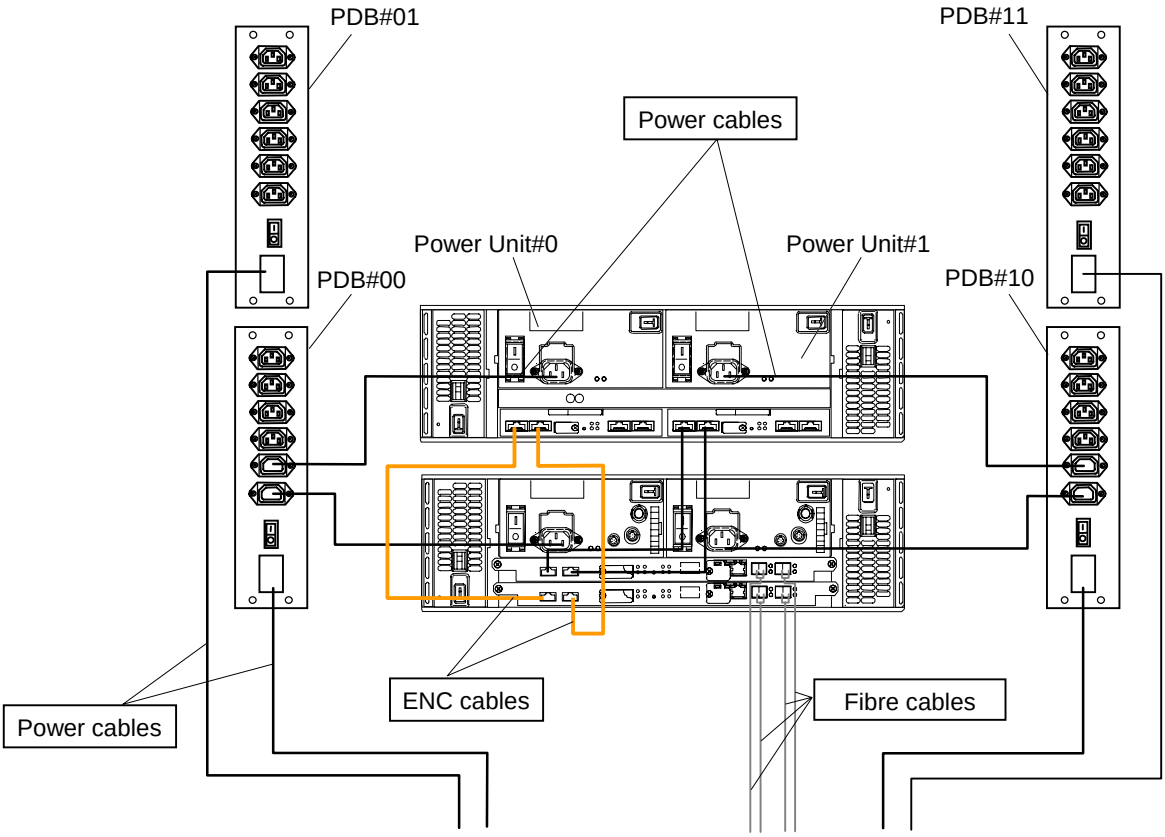
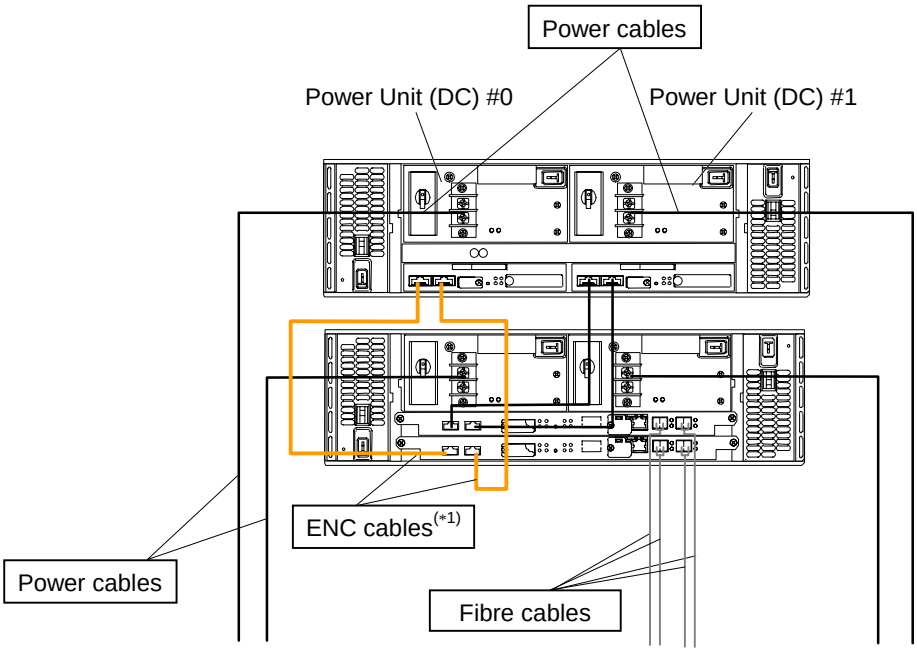


Figure 3.6.1 Cable Routing for the Subsystem (RK/RKA/RKS)



*1 : To the RKSD, no ENC cable is connected.

Figure 3.6.1.1 Cable Routing for the Subsystem (RKD/RKAD/RKSD)

Copyright © 2003, 2005, Hitachi, Ltd.

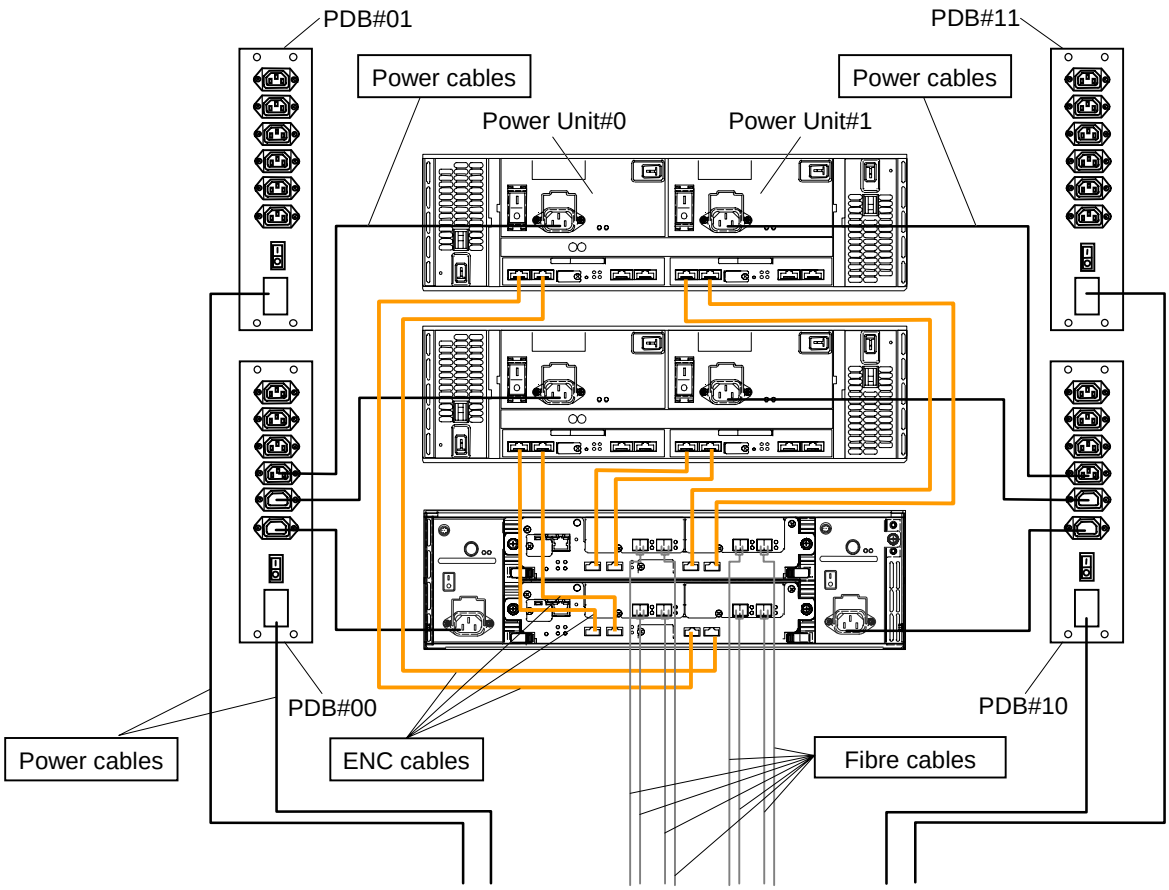


Figure 3.6.1.2 Cable Routing for the Subsystem (RKH/RKHE/RKA)

Copyright © 2003, 2005, Hitachi, Ltd.

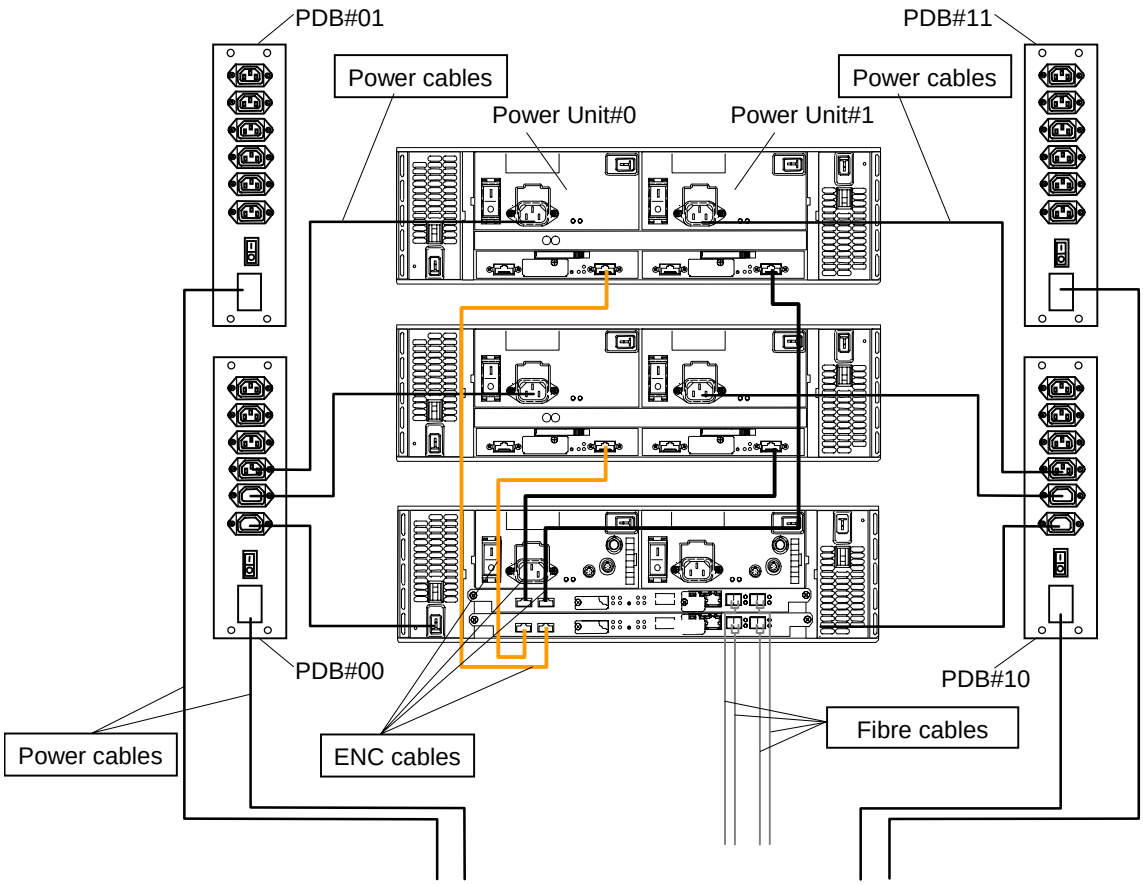


Figure 3.6.1.3 Cable Routing for the Subsystem (RK/RKL+RKAAT/RKAATL)

Copyright © 2004, 2005, Hitachi, Ltd.

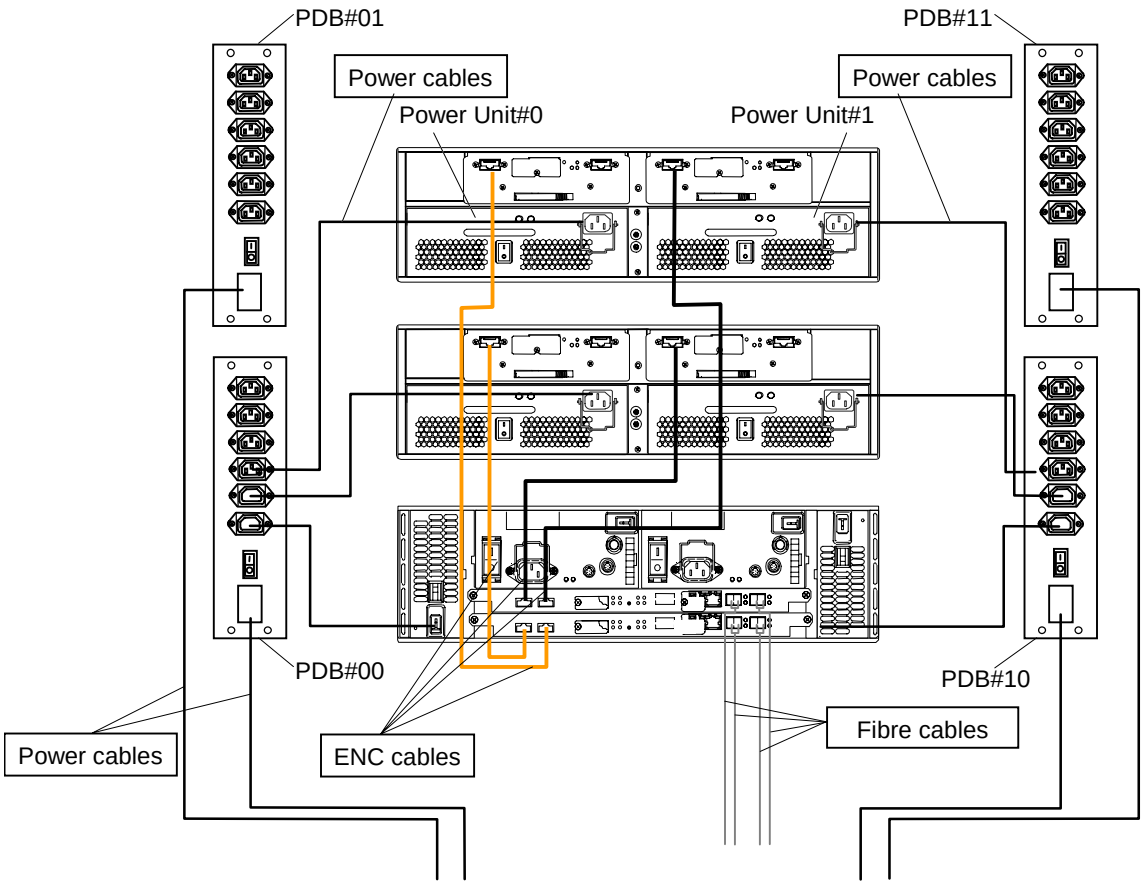


Figure 3.6.1.4 Cable Routing for the Subsystem (RK/RKL+RKAJAT/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

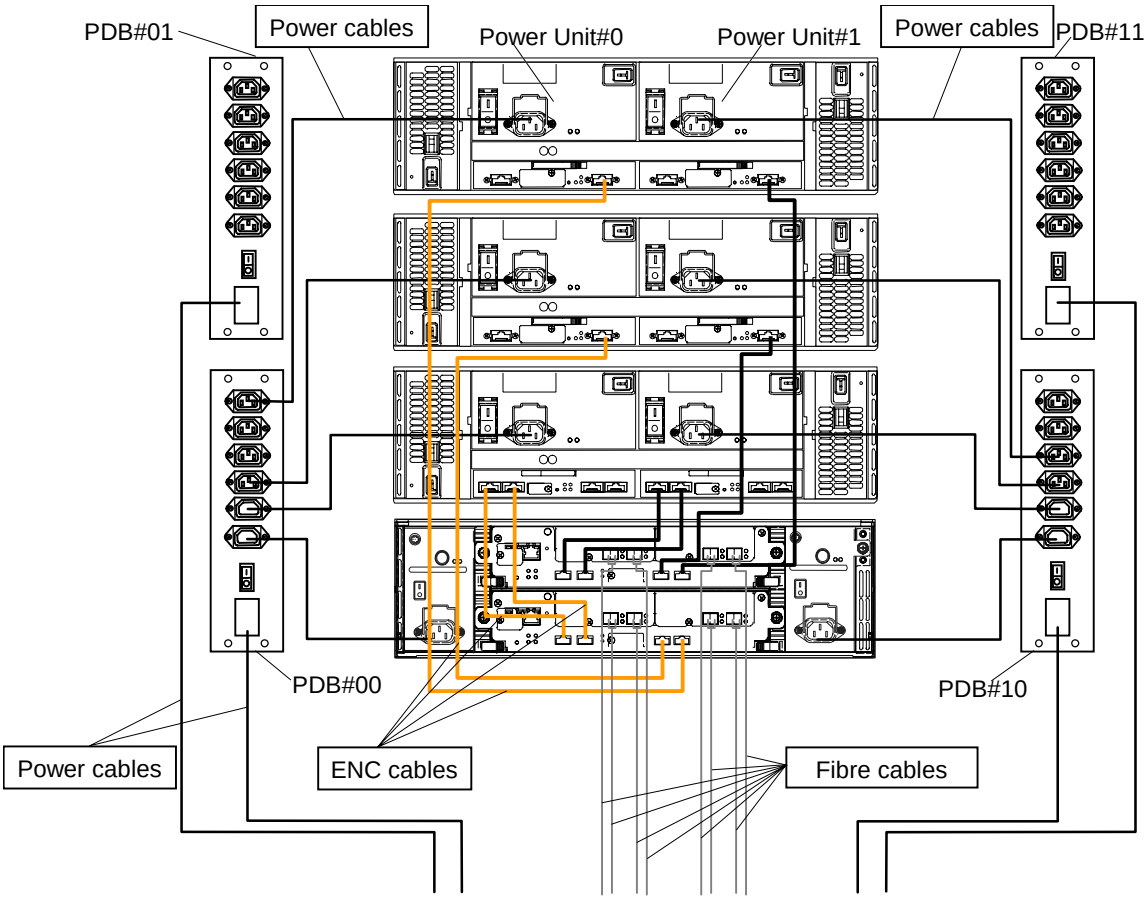


Figure 3.6.1.5 Cable Routing for the Subsystem (RKH/RKHE+RKA/RKAAT)

Copyright © 2005, Hitachi, Ltd.

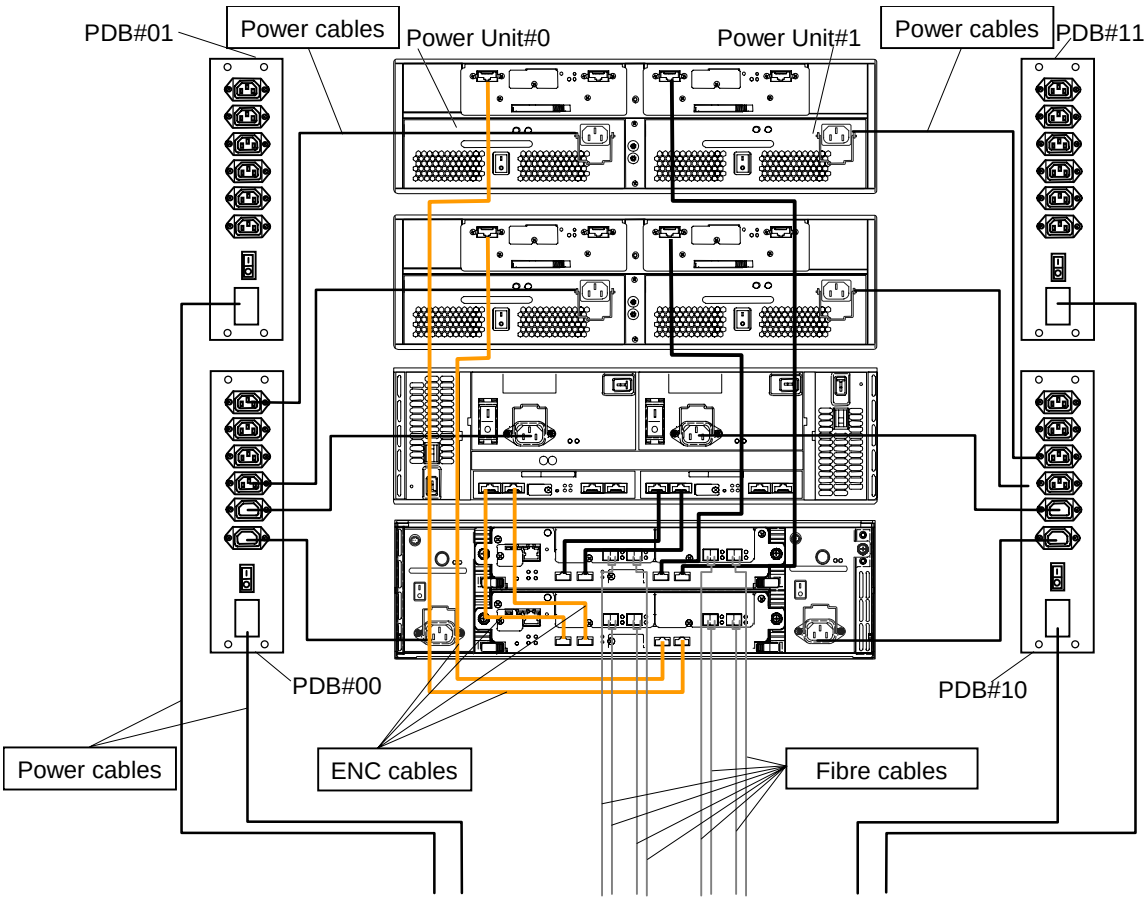


Figure 3.6.1.6 Cable Routing for the Subsystem (RKH/RKHE+RKA/RKAJAT)

Copyright © 2005, Hitachi, Ltd.

3.6.1 Connecting the Fibre Channel interface cable(‡1)

Two types of cable are provided as the interface cables to be used so that they fit to connector shapes of the RK/RKL/RKS/RKH/RKHE/RKD/RKSD and host computer (or HUB/SW) to be connected.
Table 3.6.2 shows correspondences between the connector shapes and cable types.
Choose the applicable cables from the table correctly.

Table 3.6.2 Types Cables to be Connected

Control Unit side (for RK/RKS/RKH/RKHE/RKD/RKSD side)			Host computer side (HUB/SW)	Types Cables to be Connected	
Parts name of connected cable plug	Model	Connector form	Connector form	Cable connector shape	Model
Control Unit	DF-F600-F1H DF-F600-F1HS(RKS) DF-F600-F1HL(RKL)	SC	SC	SC-SC cable	DF-F600-KBx(*1)
			LC	SC-LC cable	DF-F600-KCx(*1)
Interface Board	DF-F600-DH2G2	SC	SC	SC-SC cable	DF-F600-KBx(*1)
			LC	SC-LC cable	DF-F600-KCx(*1)
*1 : "x" denotes a valuable (1 to 5) that shows a cable length.					

(1) Connect the Fibre Channel interface cables after making sure of the ports to be connected the label. (Refer to Figure 3.6.3.)

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 an excessive stress .

(2) Pull all the interface cables into the rack frame passing them through an opening for cables on the bottom plate of the rack frame.
(3) Group the cables according to the destination to be connected, and bind each with Mini-Binders.

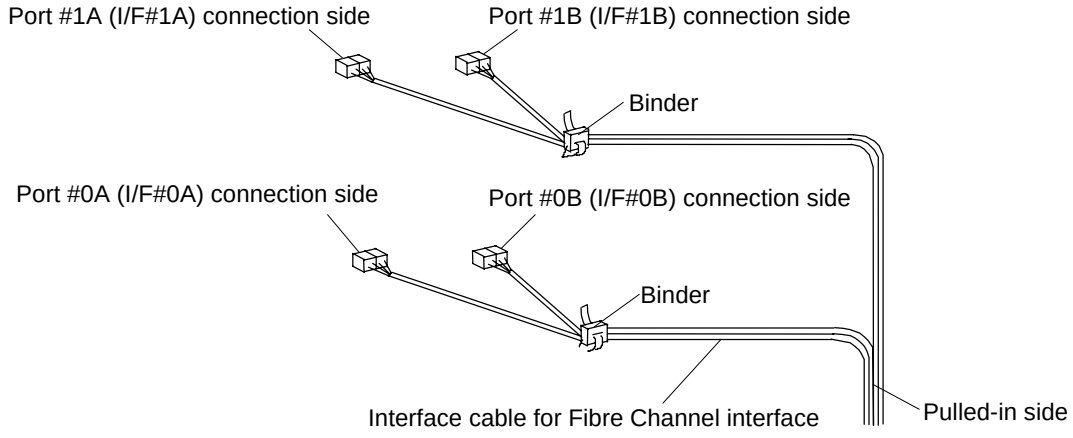


Figure 3.6.2 Binding Interface Cables

‡1 : When the multiple ports are used, make sure of the port corresponding to the host computer to be connected.

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Connect the interface cable to the connector of the each port.
(5) Affix the Clamps (Fibre), which are supplied with the DF-F600-URHT5 (rail kit for the U6), on the U6 rack frame and route the Fibre Channel interface cable using the Clamps.
(6) Fasten the 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.

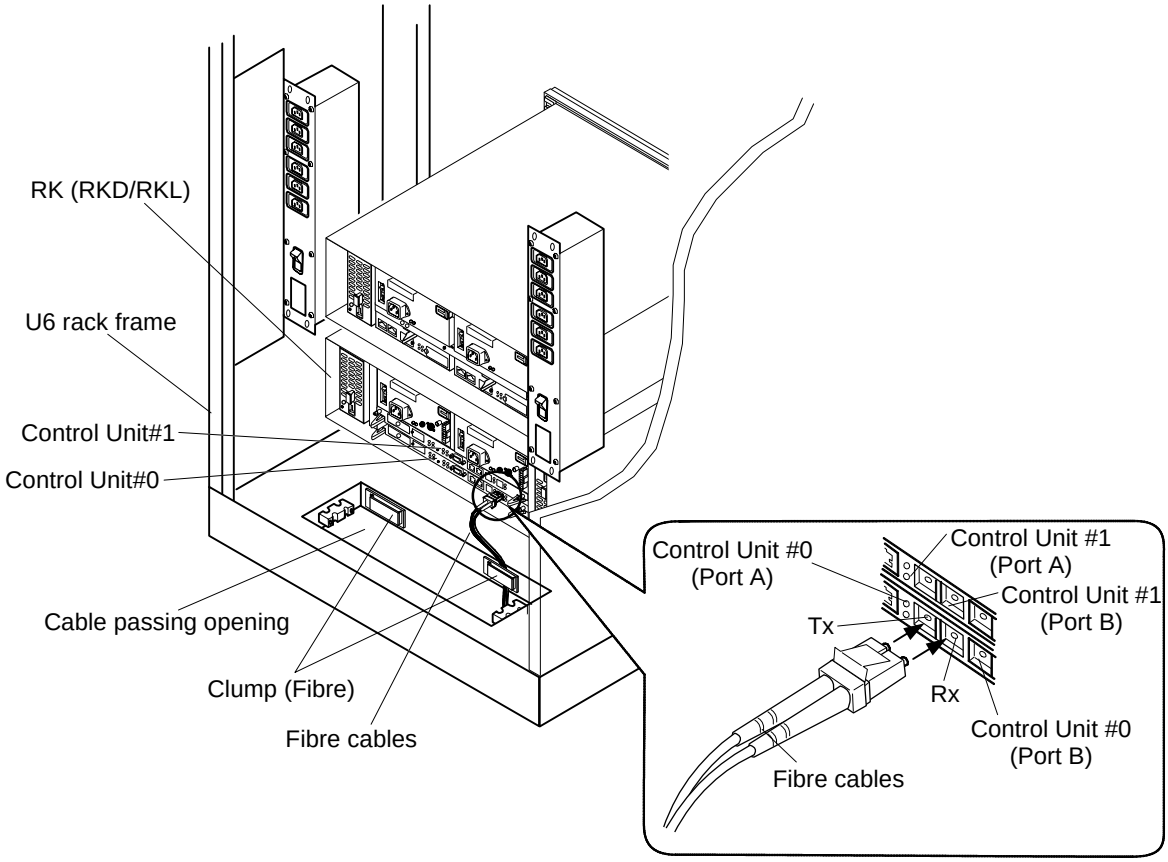


Figure 3.6.3 Routing Interface Cables (RK/RKL)

Copyright © 2002, 2005, Hitachi, Ltd.

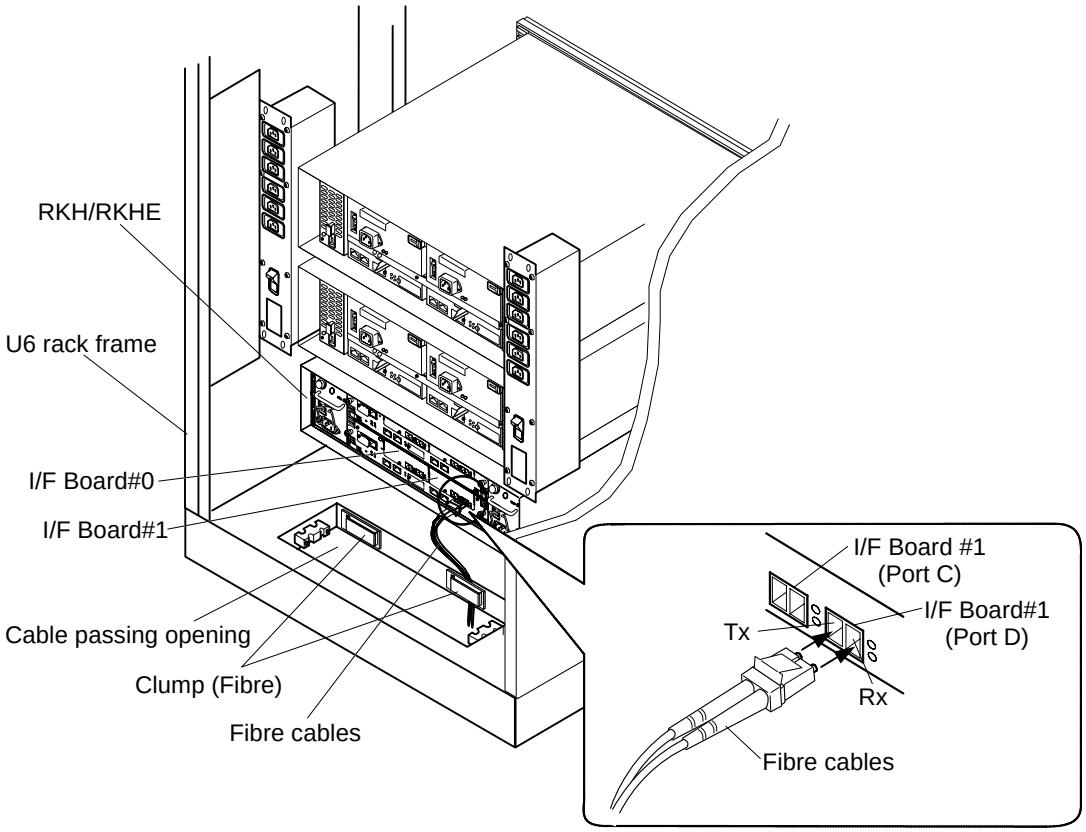


Figure 3.6.3.1 Routing Interface Cables (RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

3.6.2 Connecting the ENC cables

When connecting the RK (RKD) and RKA (RKAD), execute the procedure (1).
(Refer to page INST 03-0680.)
When connecting the RKH/RKHE and RKA, execute the procedure (2).
(Refer to page INST 03-0683.)
When connecting the RK/RKL and RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, execute the procedure (3).
(Refer to page INST 03-0690.)
When connecting the RKH/RKHE and RKA/RKAAT/RKAJAT, execute the procedure (4).
(Refer to page INST 03-0693.)

(1) When connecting the RK (RKD) and RKA (RKAD)
In the case of the RKA/RKAD with both of the Control Unit of RK/RKA/RKD/RKAD, it is required to connect the Control Unit (RK/RKD) and the ENC Unit with the ENC cables (‡1). (The ENC cables are supplied with the RKA/RKAD.)

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 RKA are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should be connected for the RKA.
• 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 3.6.4 (INST 03-0682).
(a) Remove the blinds (‡2) on the Control Unit.
(b) Connect the ENC cable to the Control Unit.
(c) Connect the ENC cable to the ENC Unit of the RKA/RKAD.

NOTE : Connect the Control Unit#0 of the RK/RKD with the ENC Unit#0 of the RKA/RKAD and the Control Unit#1 of the RK/RKD with the ENC Unit 1 of the RKA/RKAD. 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 RK/RKD side), connect the ENC cable marked in milky white.
(ii) To the PATH#1 (marked in yellow on the RK/RKD side), connect the ENC cable marked in yellow.

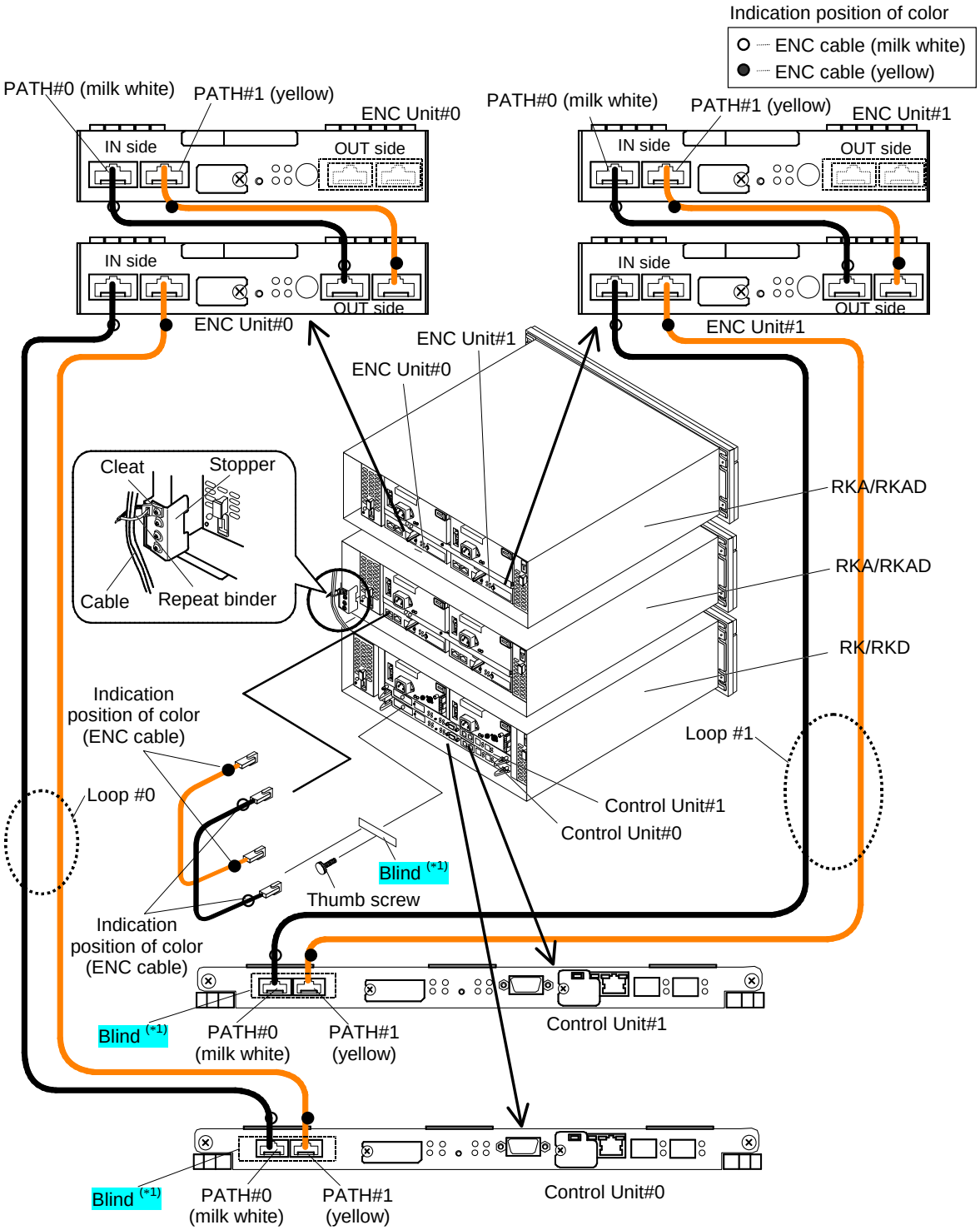
‡1 : Keep the ENC cables carefully to provide for the case where they are needed.
‡2 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2002, 2005, Hitachi, Ltd.

(d) When the two or more RKAs/RKADs 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 RKAs/ RKADs using the ENC cables. (see Figure 3.6.4)
For the ENC cable connection in which the maximum configuration of RK and RKAs is installed, refer to Figure 1.7.1 (INST 01-0180).
  (i) Remove the blinds 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 (marked in milk white) and PATH#1 (marked in yellow) of the ENC Unit, from which the blind 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 RKA/RKAD with the ENC cables marked in the same color.

(e) Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4 Connecting ENC Cables

Copyright © 2004, 2005, Hitachi, Ltd.

(2) When connecting the RKH/RKHE and RKA
In the case of the RKA with both of the Control Unit of RKA, it is required to connect the Control Unit (RKH/RKHE) 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 3.6.4.1 (INST 03-0684).

(a) Remove the blinds (‡2) on the Control Unit.
(b) Connect the ENC cable to the Control Unit.
(c) Connect the ENC cable to the ENC Unit of the RKA.

NOTE : Connect the Control Unit#0 of the RKH/RKHE with the ENC Unit#0 of the RKA and the Control Unit#1 of the RKH/RKHE with the ENC Unit#1 of the RKA. 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 3.6.4.1).

(i) To the PATH#0, #2 (marked in milky white on the RKH/RKHE side), connect the ENC cable marked in milky white.
(ii) To the PATH#1, #3 (marked in yellow on the RKH/RKHE side), connect the ENC cable marked in yellow.

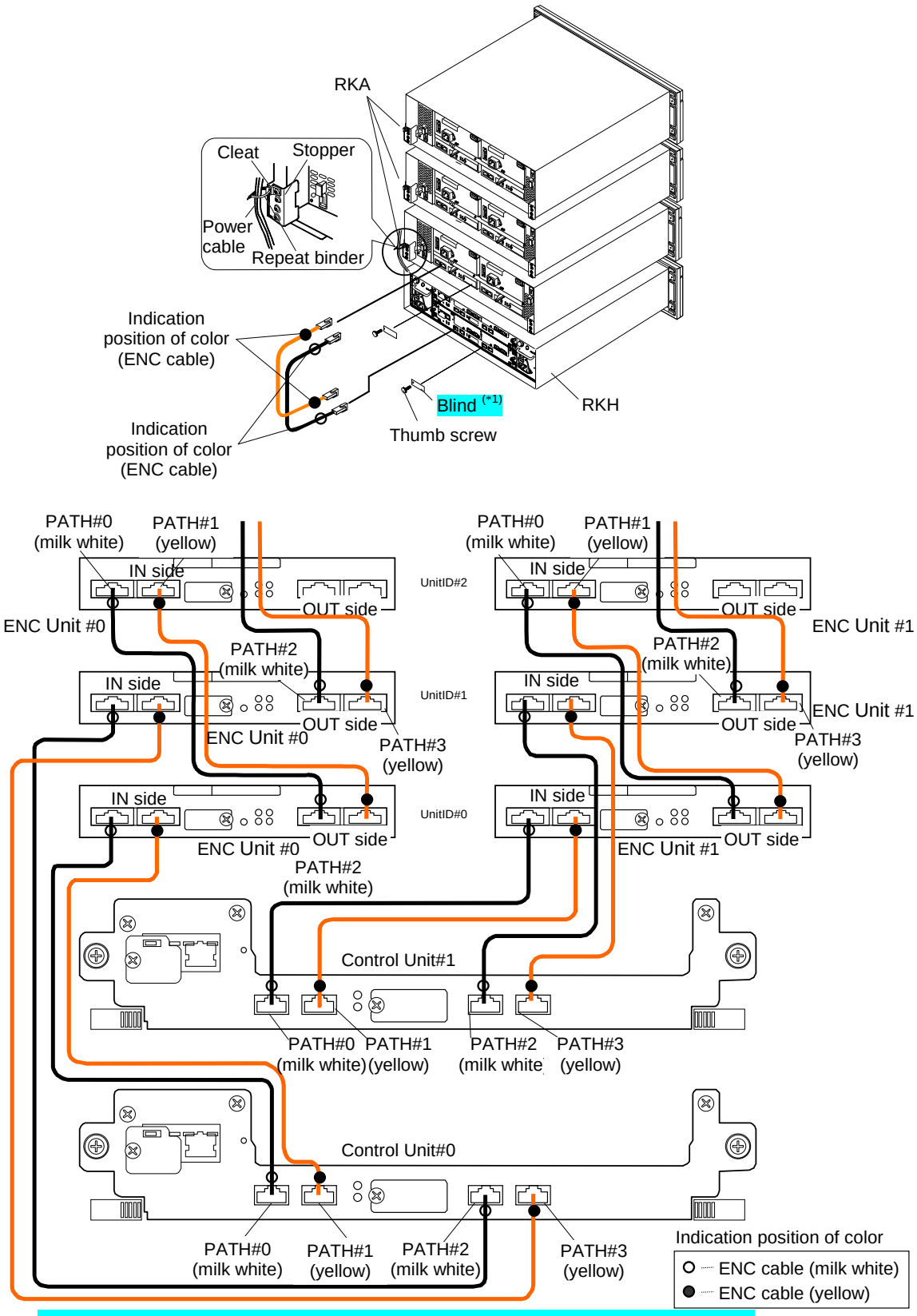
(d) When the two or more RKAs are mounted, connect each of the sets of the adjacent connectors of the same kind, that is, the PATH#0, PATH#1, PATH#2 and PATH#3 of the RKAs using the ENC cables. (see Figure 3.6.4.1)
For the ENC cable connection in which the maximum configuration of RKH/RKHE and RKAs is installed, refer to Figure 1.7.2 (INST 01-0190).

(i) Remove the blinds (‡2) 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 blind (‡2) 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 RKA with the ENC cables marked in the same color.

(e) Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.
‡2 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4.1 Connecting ENC Cables

Copyright © 2004, 2005, Hitachi, Ltd.

(3) When connecting the RK/RKL and RKA/RKAAT/RKAJAT/RKAATL/RKAJATL
In the case of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL with both of the Control Unit of RK/RKL, it is required to connect the Control Unit (RK/RKL) and the ENC Unit/SENC Unit with the ENC cables (‡1). (The ENC cables are supplied with the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.)

NOTE :
- In single controller configuration, connect the ENC cable only to the Loop #0 (ENC Unit #0/SENC Unit #0) side. Do not connect it to the Loop #1 (ENC unit #1/SENC unit #1) side.
  When two or more RKA/RKAAT/RKAJAT/RKAATL/RKAJATL are connected, however, both cables in ENC Unit #0/SENC Unit #0/ and ENC Unit #1/ SENC Unit #1 should be connected for the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.
- 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 RKAAT/RKAJAT/RKAATL/RKAJATL have indications by means of blue and green labels respectively.

Execute the following.
When connecting the RK and RKAAT/RKAATL, refer to Figure 3.6.4.2.
When connecting the RKL and RKAJAT/RKAJATL, refer to Figure 3.6.4.3.

(a) Attach milk white or yellow Mini-Binders to the ENC cable.
(b) Remove the blinds (‡2) 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 RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.

NOTE : Connect the Control Unit#0 of the RK/RKL with the ENC Unit#0/SENC Unit#0 of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL and the Control Unit#1 of the RK /RKL with the ENC Unit #1/SENC Unit #1 of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL (see Figure 3.6.4.2, Figure 3.6.4.3).

(i) Connect the cable marked in milky white from PATH#0 (marked in milky white) of RK/RKL to the IN side (Blue Label) of the SENC Unit of RKAAT/RKAJAT/RKAATL/RKAJATL (Unit ID#1).
(ii) Connect the cable marked in yellow from PATH#1 (marked in yellow) of RK/RKL to the IN side (Blue Label) of the SENC Unit of RKAAT/RKAJAT/RKAATL/RKAJATL (Unit ID#2).

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.
‡2 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) When the two or more RKAATs/RKAJATs/RKAATLs/RKAJATLs are mounted, connect the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit of the RKAATs/RKAJATs/RKAATLs/RKAJATLs using the ENC cables. (see Figure 3.6.4.2, Figure 3.6.4.3)
For the ENC cable connection in which the maximum configuration of RK/RKL and RKAs/ RKAATs/RKAJATs/RKAATLs/RKAJATLs is installed, refer to "1.7.1 Example of device ID and ENC cable connection " (INST 01-0180).

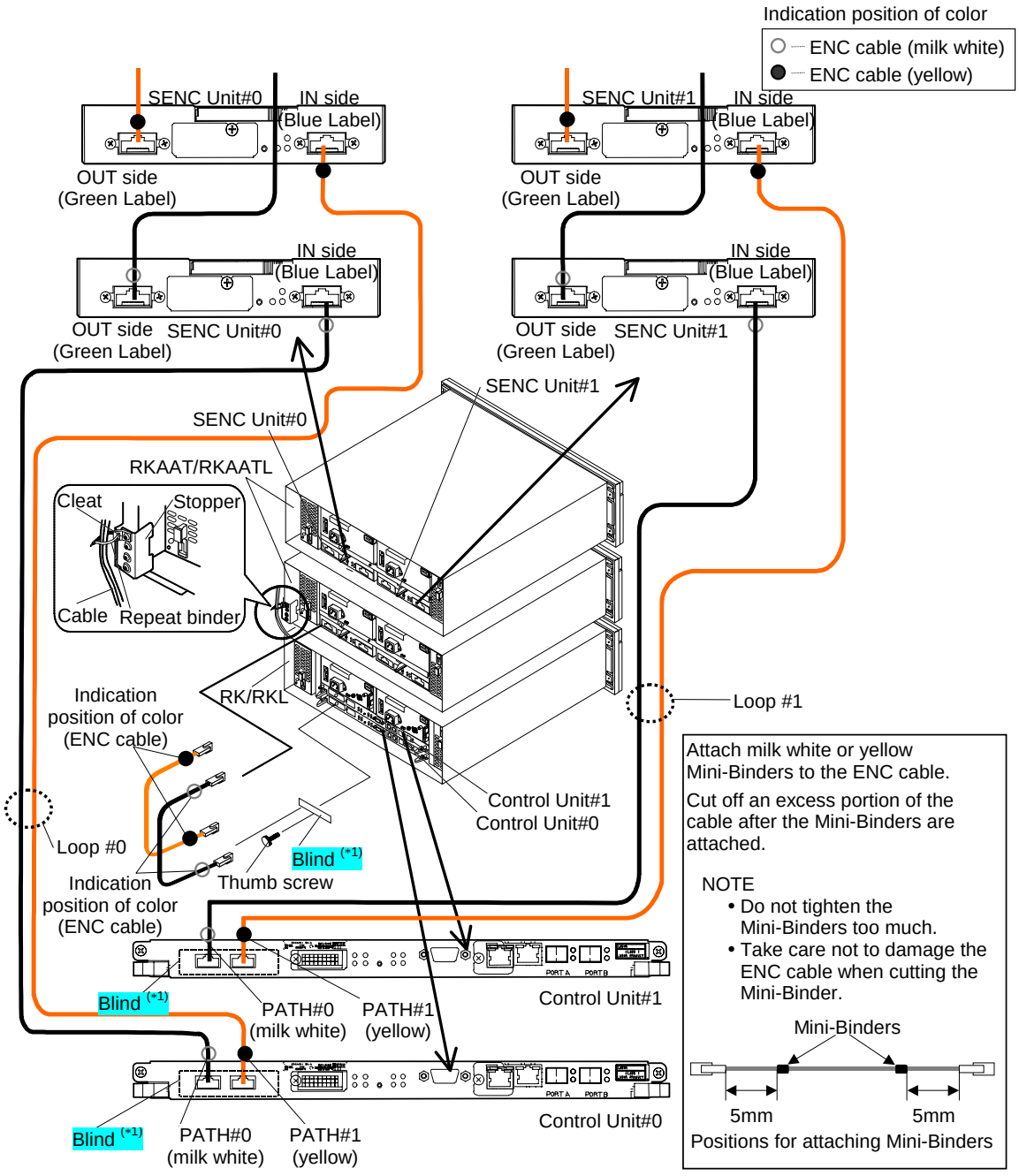
(i) Remove the blinds (‡1) of the ENC Units/SENC Units in the locations where the ENC cables are to be connected by loosening the thumb screws.

(ii) Connect each of the connectors the OUT side (Green Label) and the IN side (Blue Label) of the SENC Unit, from which the blind (‡1) was removed, with the ENC cables.

(f) Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

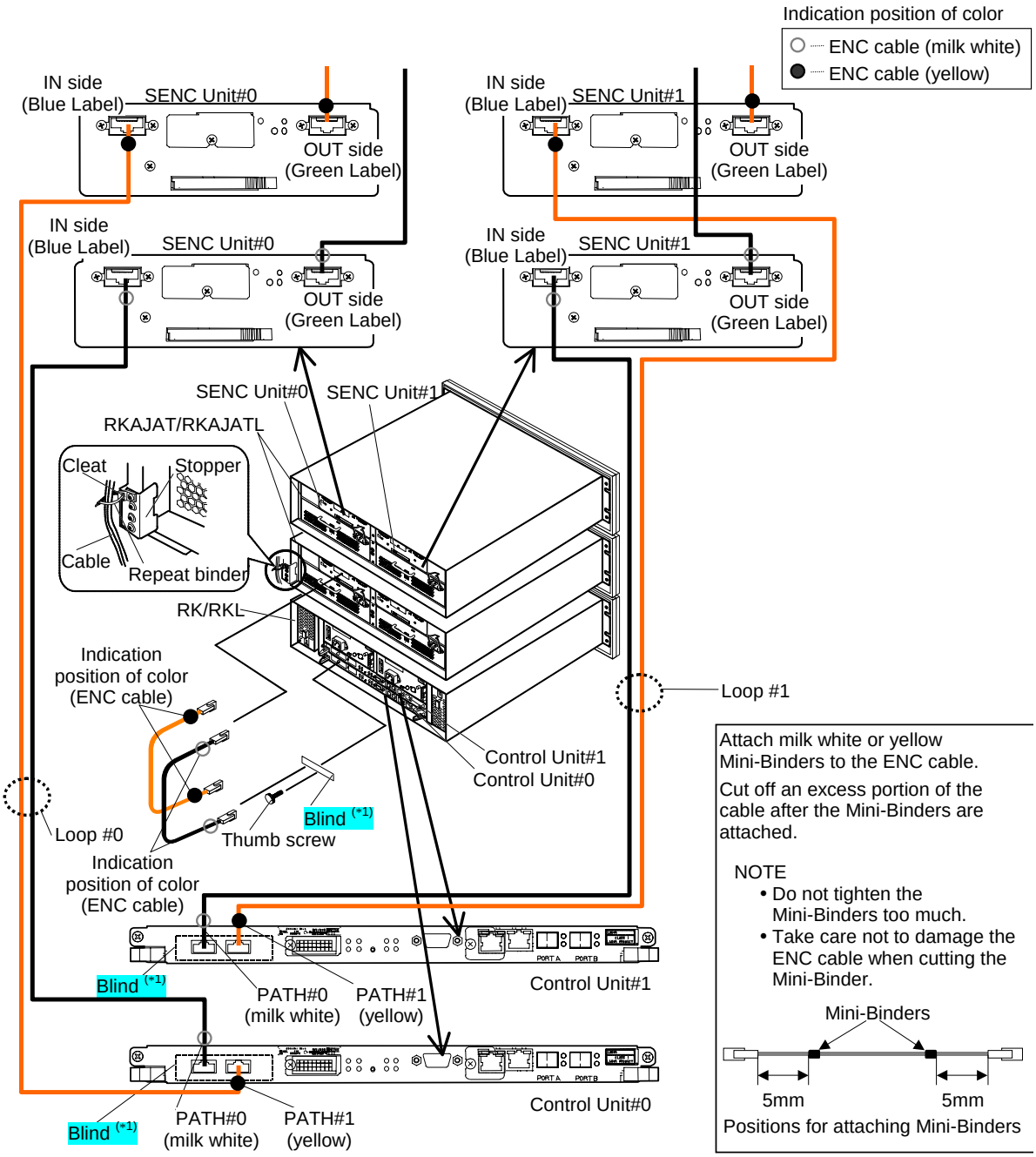
Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4.2 Connecting ENC Cables (RK/RKL+RKAAT/RKAATL)

Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4.3 Connecting ENC Cables (RK/RKL+RKAJAT/RKAJATL)

Copyright © 2003, 2005, Hitachi, Ltd.

(4) When connecting the RKH/RKHE and RKA/RKAAT/RKAJAT
In the case of the RKA/RKAAT/RKAJAT with both of the Control Unit of RKH/RKHE, it is required to connect the Control Unit (RKH/RKHE) 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 RKAAT/ RKAJAT have indications by means of blue and green labels respectively.

Execute the following.
When connecting the RKH/RKHE and RKA/RKAAT, refer to Figure 3.6.4.4.
When connecting the RKH/RKHE and RKA/RKAJAT, refer to Figure 3.6.4.5.

(a) Attach milk white or yellow Mini-Binders to the ENC cable.
(b) Remove the blinds (‡2) on the Control Unit.
(c) Connect the ENC cable to the Control Unit.
(d) Connect the ENC cable to the ENC Unit of the RKA.

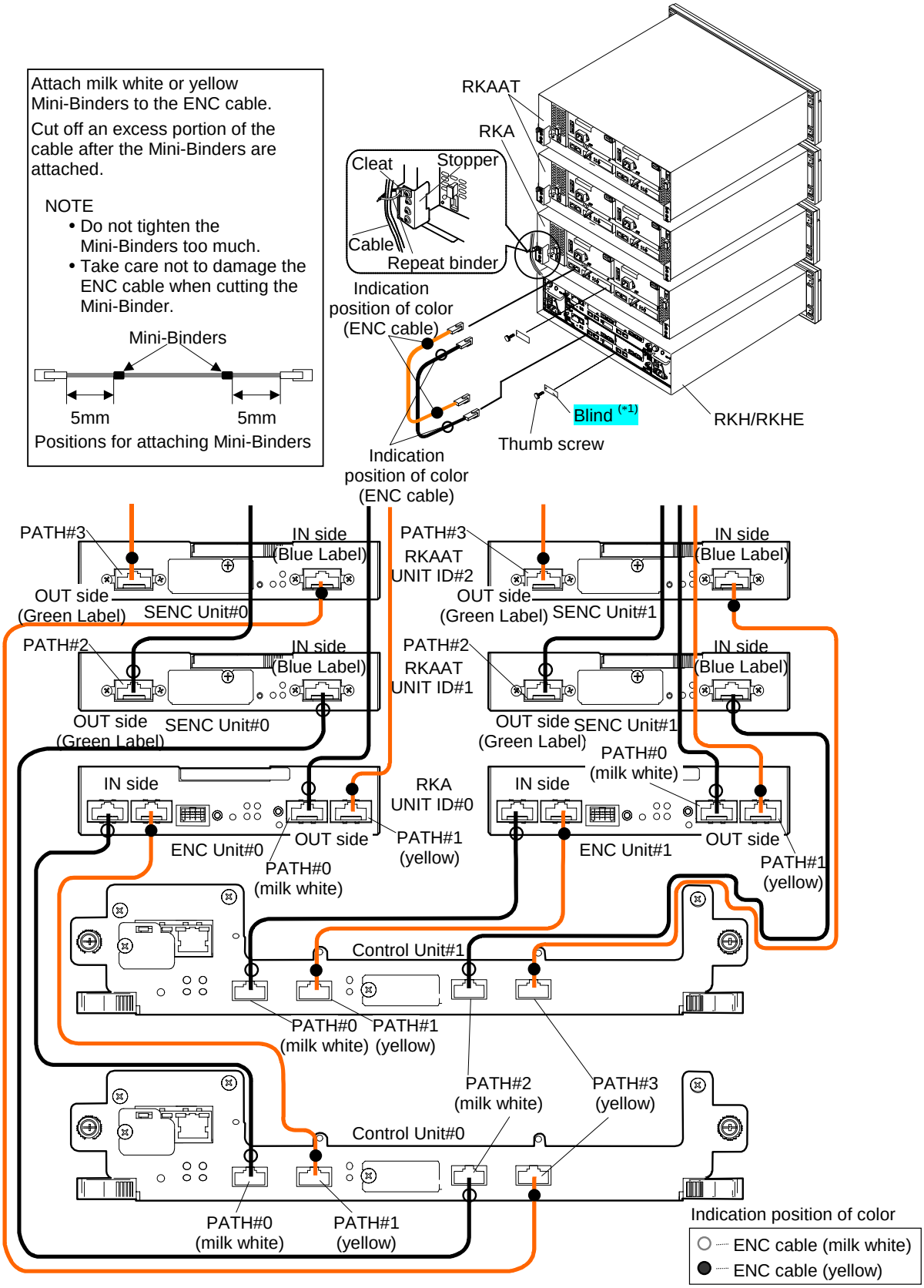
NOTE : Connect the Control Unit#0 of the RKH/RKHE with the ENC Unit#0 of the RKA and the Control Unit#1 of the RKH/RKHE with the ENC Unit#1 of the RKA.
Connect two PATH#0, #2 connectors (with milk white indication) using the ENC cable and also connect two PATH#1, #3 connectors (with yellow indication) using another ENC cable (see Figure 3.6.4.4, Figure 3.6.4.5).

(i) To the PATH#0, #2 (marked in milky white on the RKH/RKHE side), connect the ENC cable marked in milky white.
(ii) To the PATH#1, #3 (marked in yellow on the RKH/RKHE side), connect the ENC cable marked in yellow.

(e) When the two or more RKAATs/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. (see Figure 3.6.4.4, Figure 3.6.4.5)
For the ENC cable connection in which the maximum configuration of RKH/RKHE and RKAs/RKAATs/RKAJATs is installed, refer to “1.7.1 Example of device ID and ENC cable connection “ (INST 01-0180).
(i) Remove the blinds (‡2) 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 blind (‡2) was removed, with the ENC cables.
(f) Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.
‡2 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

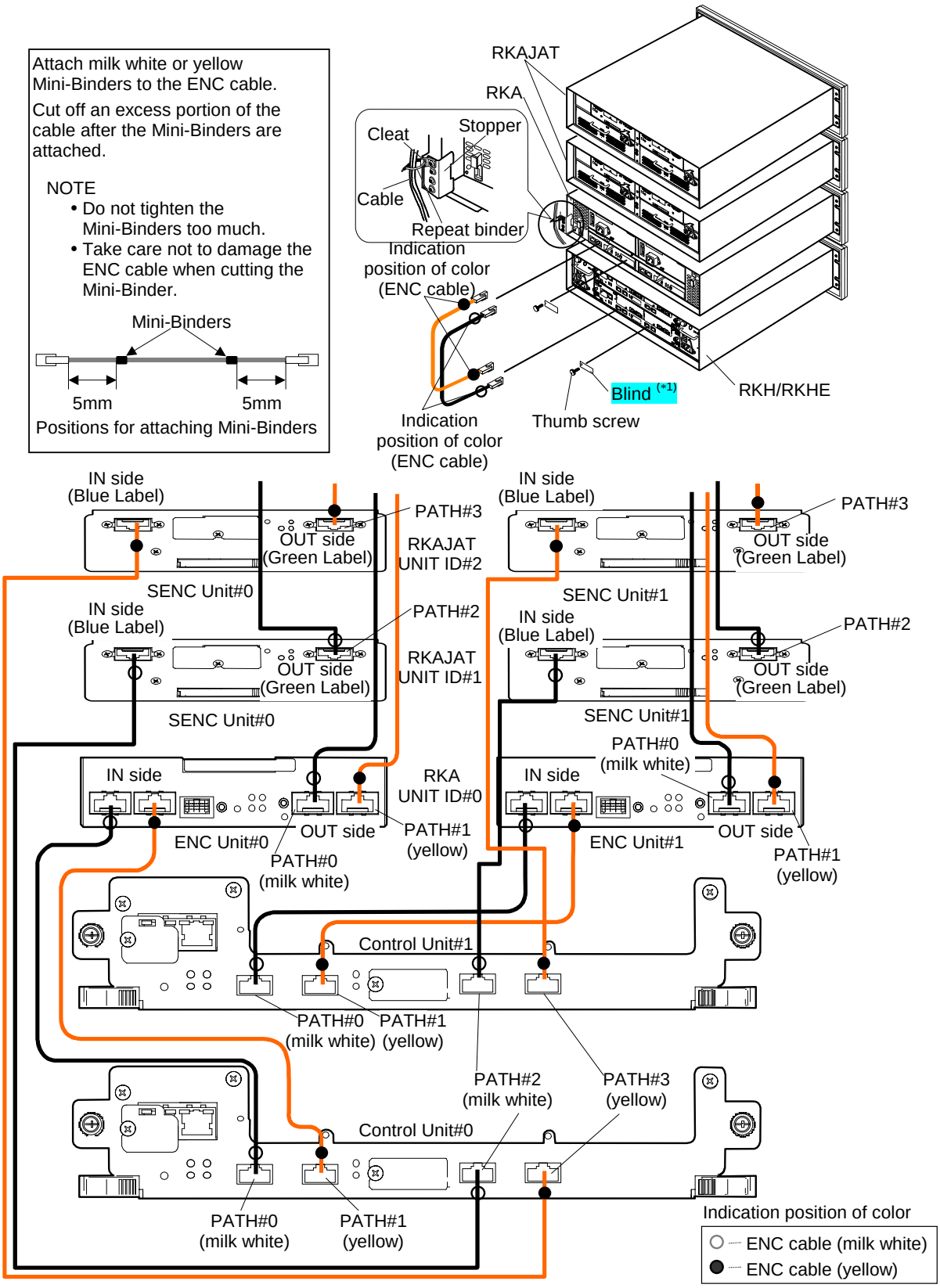
Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4.4 Connecting ENC Cables (RKH/RKHE+RKA/RKAAT)

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 3.6.4.5 Connecting ENC Cables (RKH/RKHE+RKA/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

3.6.3 Connecting the power cables

(1) In the case of the RK(RKD)/RKL

(a) 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 : For connecting the power cable in the case where the Remote Adapter is used and installing the remote adapter in the rack frame, refer to Subsection 6.5.2, “Adding remote adapter” on page INST 06-0360.

(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) In the case of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, 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 J15.)

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.
- The J15 is a service power outlet. When using the J15, limit the total current output from the outlets J10 to J15 so that it does not exceed 16 A(‡1).

(vi) Route the power cables.

(vii) 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 RKs/RKLs, connect them so that the load on a PDB does not exceed 16 A after checking the load through a calculation.
RK/RKL one unit : 4.4 A, RKA one unit : 3.2A, RKAAT/RKAATL one unit : 2.6A, RKAJAT/RKAJATL : one unit : 2.4A.

Copyright © 2002, 2005, Hitachi, Ltd.

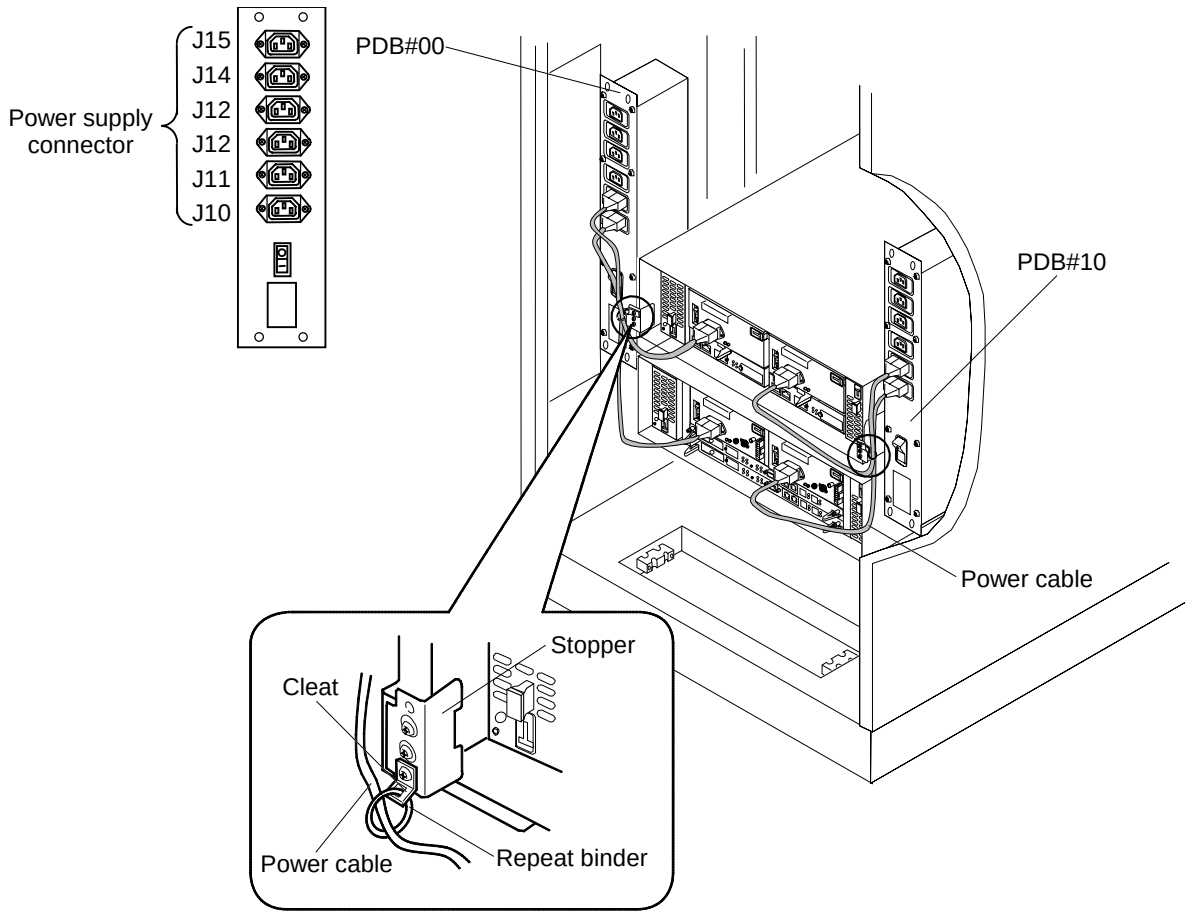


Figure 3.6.5 Routing Power Cables to the Mounted Subsystem

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Connecting the power cables (DC) of Power Unit (DC)

⚠ CAUTION

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

⚠ CAUTION

Here exists a hazard that can cause an electric shock.
Start the work after making sure that the breaker in the power distribution box has been turned off.
Connect the power cable by tightening screws of the terminals firmly.

(i) Make sure that DC power input switches (breakers) on the Power Unit (DC) have been all turned off.

(ii) Fasten the power cable (DC) to the Cable Stay with a strain relief and two mounting screws.
When doing this, prevent the FG cable from intertwining with the (+) and (–) cables when they are connected to the Power Unit (DC).

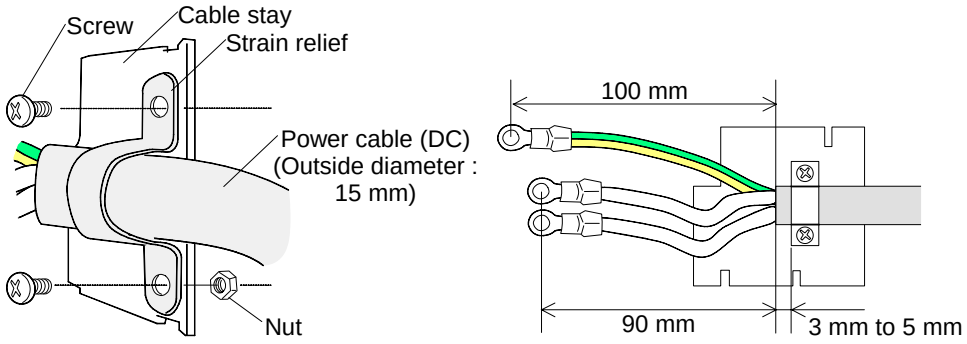


Figure 3.6.5.1 Fixing the Power Cable (DC) and strain relief

Copyright © 2003, 2005, Hitachi, Ltd.

(iii) Remove the terminal block cover.
(iv) Remove the two Cable Stay mounting screws.

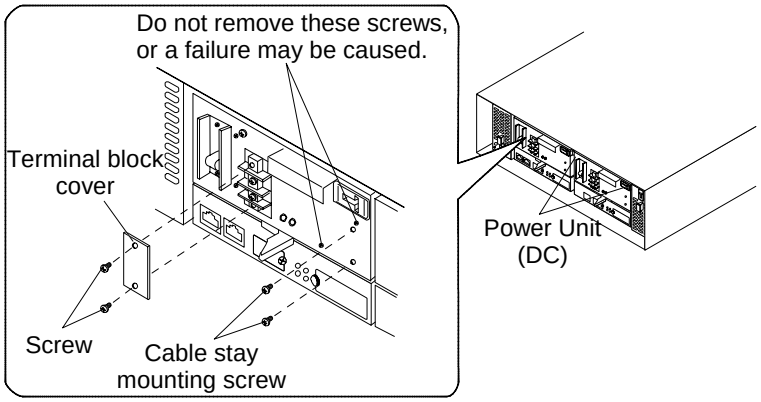


Figure 3.6.5.2 Removing Terminal Block Cover and Mounting Screws

⚠ CAUTION

- **This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.**
- **This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.**
- **A readily accessible disconnect device should be incorporated in the building installation wiring.**
- **The d.c. supply source is to be located within the same premises as this subsystem.**
- **Use this model in a RESTRICTED ACCESS LOCATION only.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.**

Copyright © 2003, 2005, Hitachi, Ltd.

(v) Connect the FG cable to the frame ground (FG).
When doing this, route the FG cable making it run under the handle.

(vi) Connect the cable to the (+) and (–) power input terminals on the terminal block.
When doing this, take care not to confuse the plus and minus terminals.

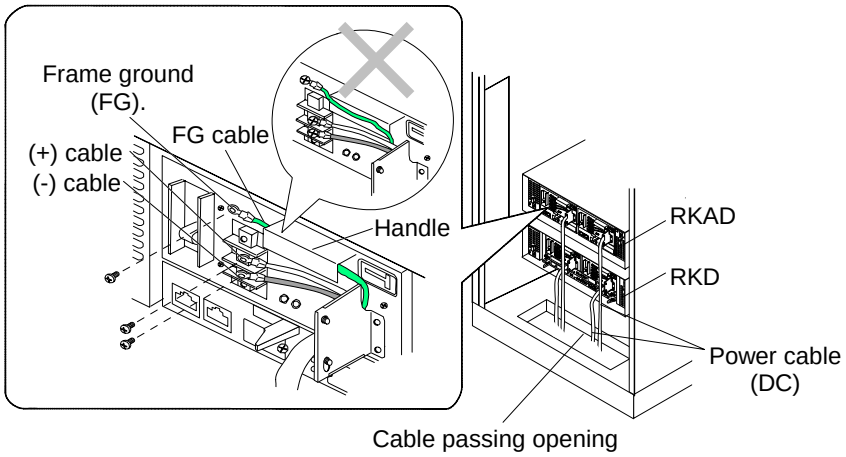


Figure 3.6.5.3 Power Cable Connection

(vii) Install the terminal block cover.

(viii) Install the Cable Stay.

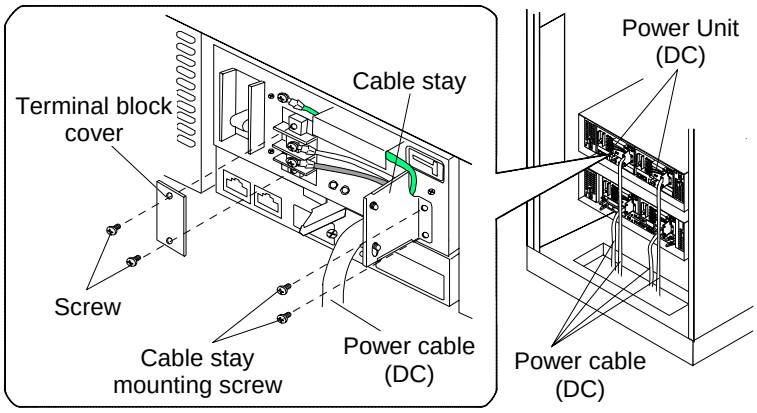


Figure 3.6.5.4 Installing Terminal Block Cover

Copyright © 2003, 2005, Hitachi, Ltd.

(2) In the case of the RKH/RKHE

(a) 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 : For connecting the power cable in the case where the Remote Adapter is used and installing the remote adapter in the rack frame, refer to Subsection 6.5.2, “Adding remote adapter” on page INST 06-0360.

(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) In the case of the RKA, 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 J15.)

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.
- The J15 is a service power outlet. When using the J15, limit the total current output from the outlets J10 to J15 so that it does not exceed 16 A(‡1).

(vi) Route the power cables.

(vii) 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 : Connect them so that the load on a PDB does not exceed 16 A after checking the load through a calculation.
RKH/RKHE one unit : 2.8 A, RKA one unit : 3.2A, RKAAT one unit : 2.6A, RKAJAT one unit : 2.4A.

Copyright © 2003, 2005, Hitachi, Ltd.

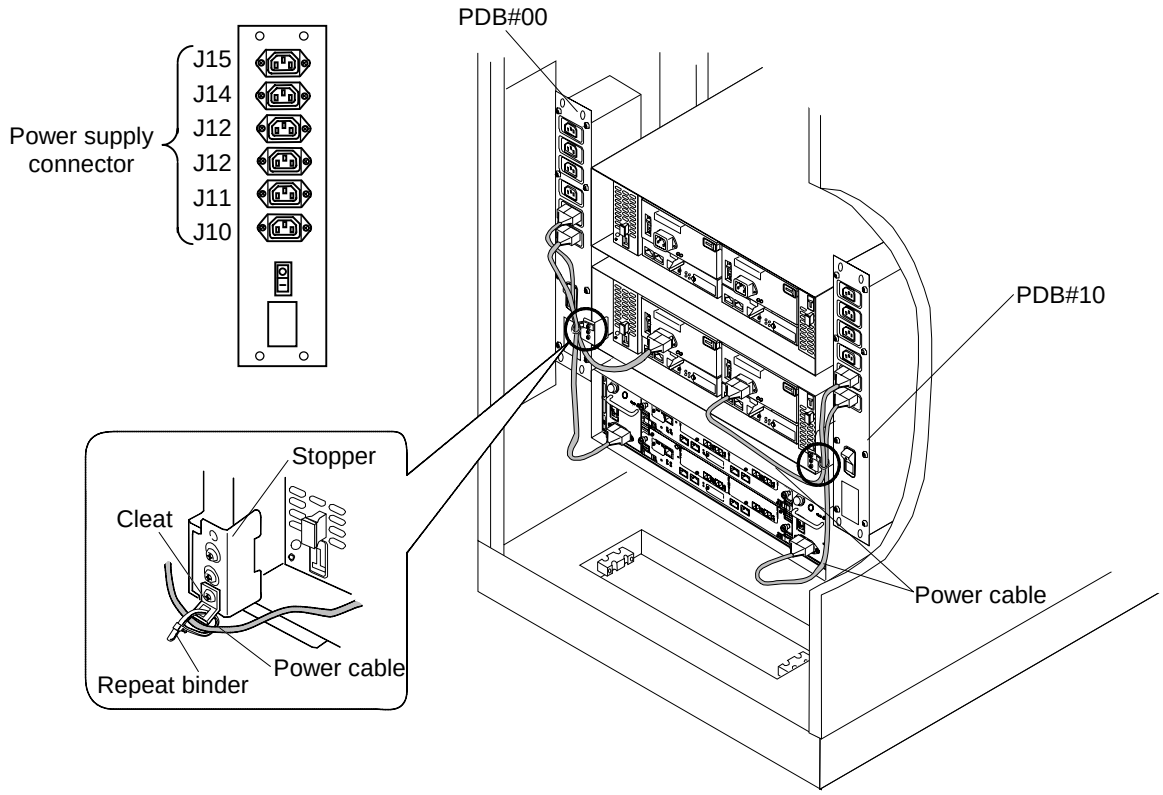


Figure 3.6.5.5 Routing Power Cables to the Mounted Subsystem

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

3.6.4 Connecting the power cables (Rack frame append parts)

⚠ 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 : 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.

Power cables each having a plug (30 A) with two pins and a grounding prong are supplied with the U6 rack frame as the four cable standard(‡1).

(1) Open the rear door. (See Subsection 1.4.4, "How to open/close the rear door of U6 rack frame" on page INST 01-0100.)
(2) Make sure that the power supply switches of the PDBs are turned off.
(3) Insert the power cable (attached to Rack frame) into the Rack through the opening for cables at the bottom of the Rack.
(4) Shape the cable (attached to Rack frame) to the Rack frame and connect it to the inlet connecter on the PDB.
(5) Remove the cable holders from the rack frame by removing the hexagon socket head bolts.
(6) Fasten the power cables to the rack frame by attaching the cable holders with the Allen bolts.
(7) Make sure that the connecter is securely fixed after the assembly work.

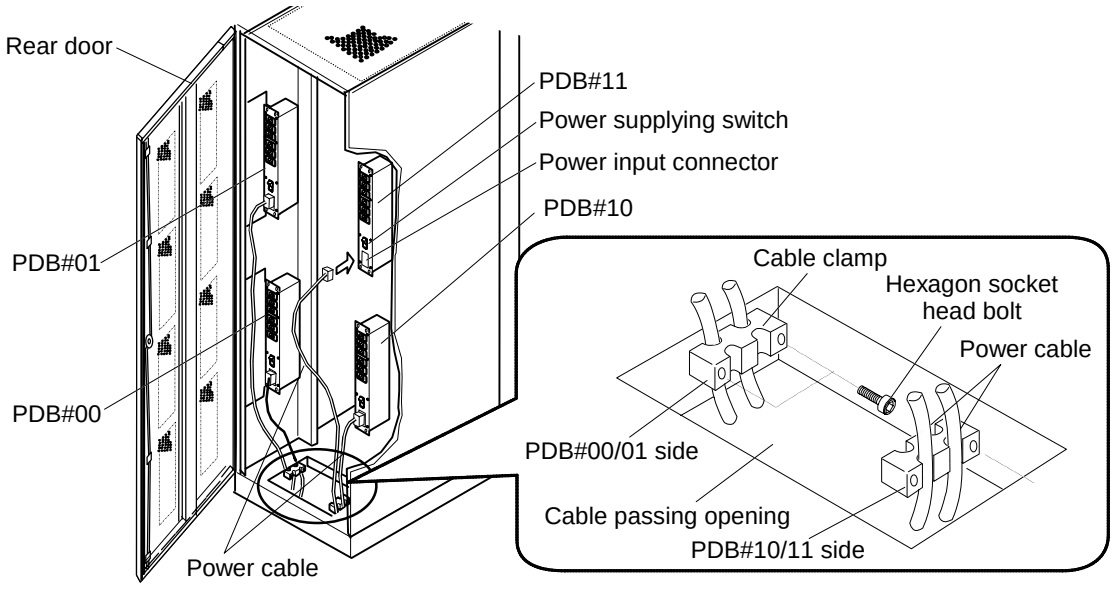


Figure 3.6.6 Connecting Power Cables (Rack frame append parts)

Copyright © 2002, 2005, Hitachi, Ltd.

‡1 : When the upper PDB is not used, connection to it is not necessary. Keep the unused cables carefully in case where they are used in the future.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

3.7 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.

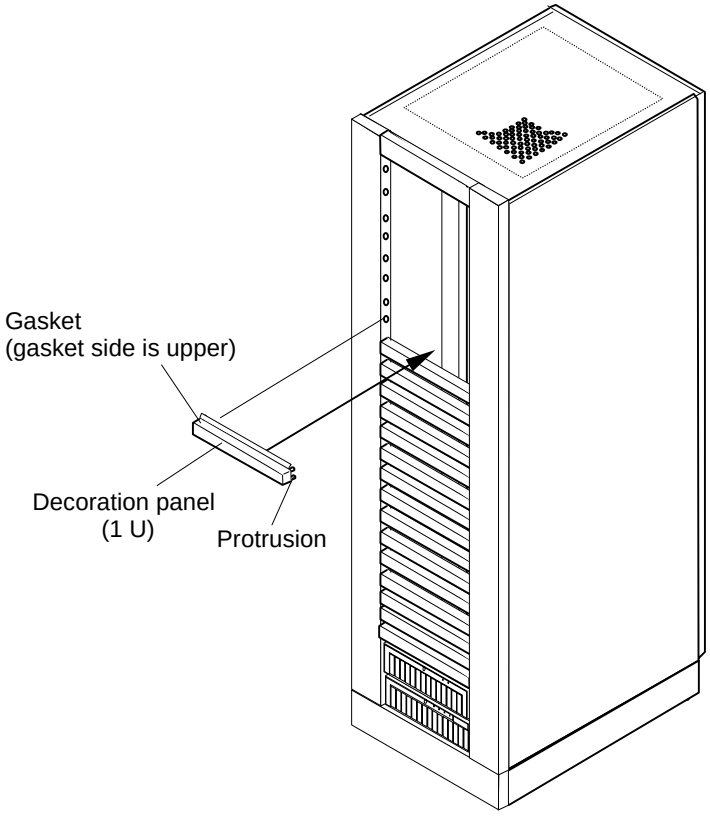


Figure 3.7.1 Attaching Decoration Panel

Copyright © 2002, 2005, Hitachi, Ltd.

3.8 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 it does not mean a problem as long as the WARNING or ALARM LED of the basic subsystem is off, please use the subsystem as it is.

3.8.1 Subsystem power on

(1) Rackmount model (RK/RKA/RKS)

(a) Make sure that the circuit breaker (CB1) is turned off.
(b) Make sure that the AC Power Unit Switch of the each Power Unit is turned off.
(c) Make sure that the main switch is turned off.
(d) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.
(e) Turn on the circuit breaker (CB1) of the PDB.
(f) Turn on the AC Power Unit Switch of the Power Unit. (‡1)
(g) Turn on the main switch.
(h) Make sure that the RDY LED (green) comes on about four minutes later normally. However, when it is blinking at high speed, it blinks up to 15 minutes because the SENC firmware is being downloaded.
If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, “Trouble Analysis Based on LED Indication of Front Bezel” on page MNTE 02-2320 in the “Maintenance Manual - for Maintenance”.

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.

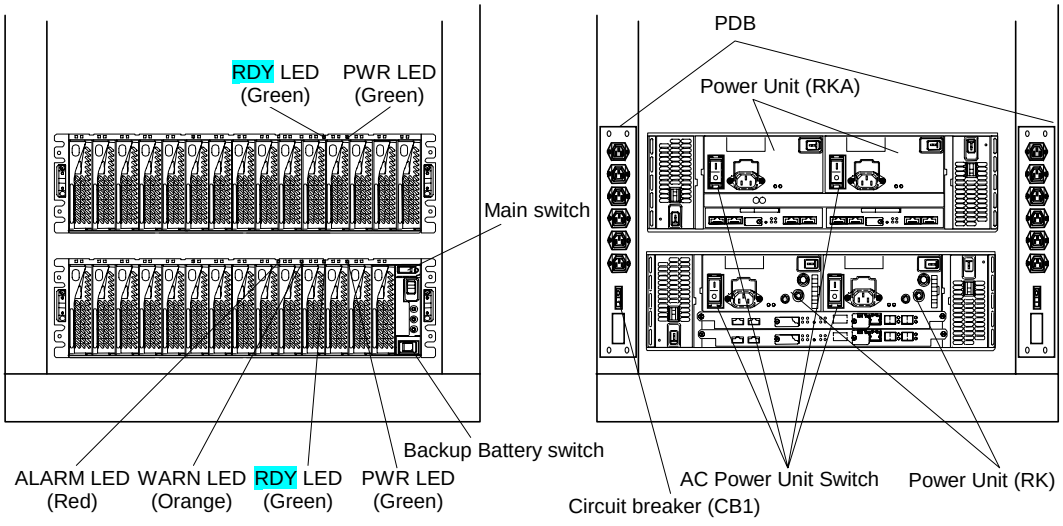


Figure 3.8.1 Locations of Switches for Power On

‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKA).

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Rackmount model (RKD/RKAD/RKSD).

(a) Make sure that the DC Power Unit Switch of the each Power Unit (DC) is turned off.

(b) Make sure that the main switch is turned off.

(c) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.

(d) Turn on the DC Power Unit Switch of the Power Unit (DC).(‡1)

(e) Turn on the main switch.

(f) Make sure that the RDY LED (green) comes on about four minutes later normally. However, when it is blinking at high speed, it blinks up to 15 minutes because the SENC firmware is being downloaded.
If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, “Trouble Analysis Based on LED Indication of Front Bezel” on page MNTE 02-2320.

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.

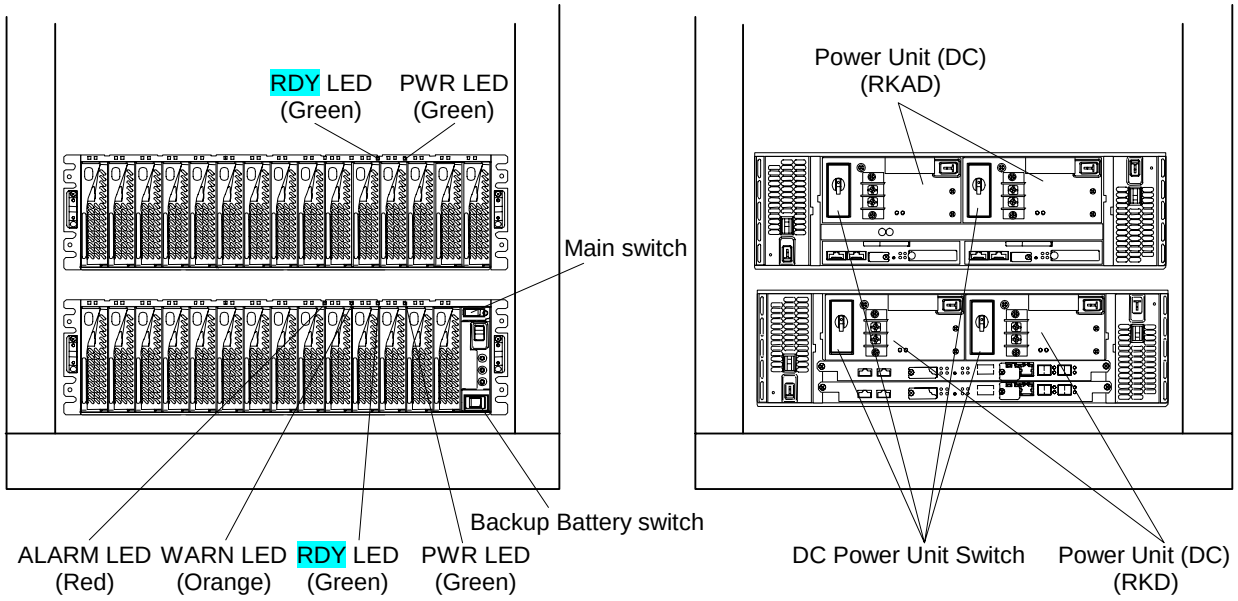


Figure 3.8.1.1 Locations of Switches for Power On

Copyright © 2003, 2005, Hitachi, Ltd.

‡1 : When Disk Drives are not installed on the additional Disk Drive, shut off the power to the Power Unit (RKAD).

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Rackmount model (RKH/RKHE/RKA/RKAAT/RKAJAT)

(a) Make sure that the circuit breaker (CB1) is turned off.

(b) Make sure that the AC Power Unit Switch of the each Power Unit is turned off.

(c) Make sure that the main switch is turned off.

(d) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.

(e) Turn on the circuit breaker (CB1) of the PDB.

(f) Turn on the AC Power Unit Switch of the Power Unit.

(g) Turn on the main switch.

(h) Make sure that the RDY LED (green) comes on about four minutes later normally. However, when it is blinking at high speed, it blinks up to 15 minutes because the SENC firmware is being downloaded.
If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, "Trouble Analysis by LED Indication of Front Bezel" on page MNTE 02-2320 in the "Maintenance Manual - for Maintenance".

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.

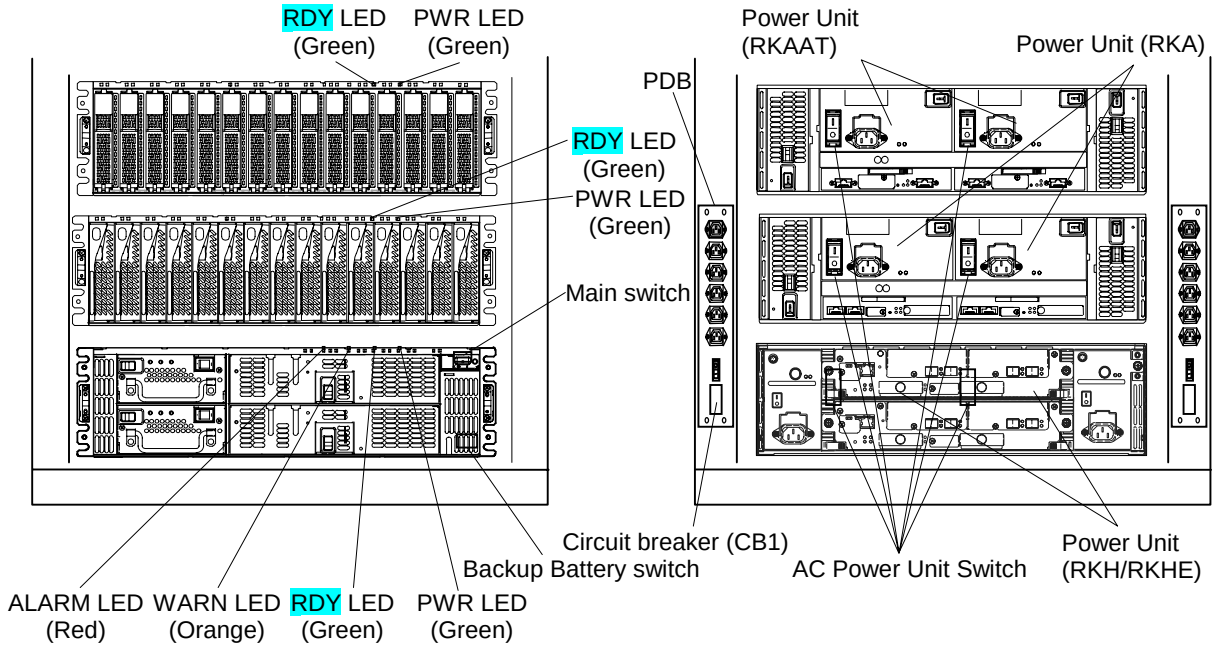


Figure 3.8.1.2 Locations of Switches for Power On (RKH/RKHE/RKA/RKAAT)

Copyright © 2003, 2005, Hitachi, Ltd.

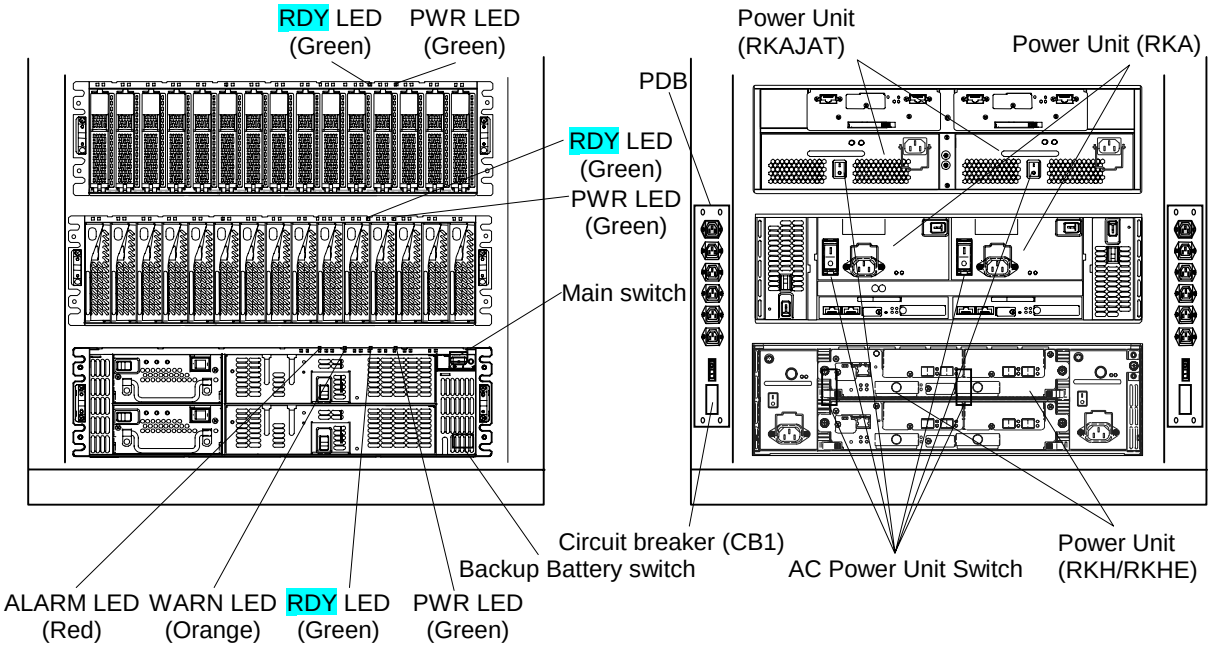


Figure 3.8.1.3 Locations of Switches for Power On (RKH/RKHE/RKA/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

(4) Rackmount model (RK/RKL/RKAAT/RKAJAT/RKAATL/RKAJATL)

(a) Make sure that the circuit breaker (CB1) is turned off.

(b) Make sure that the AC Power Unit Switch of the each Power Unit is turned off.

(c) Make sure that the main switch is turned off.

(d) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.

(e) Turn on the circuit breaker (CB1) of the PDB.

(f) Turn on the AC Power Unit Switch of the Power Unit.

(g) Turn on the main switch.

(h) Make sure that the RDY LED (green) comes on about four minutes later normally. However, when it is blinking at high speed, it blinks up to 15 minutes because the SENC firmware is being downloaded.
If the ALARM LED (red) or WARN LED (orange) comes on, refer to Subsection 2.6.1, "Trouble Analysis by LED Indication of Front Bezel" on page MNTE 02-2320 in the "Maintenance Manual - for Maintenance".

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.

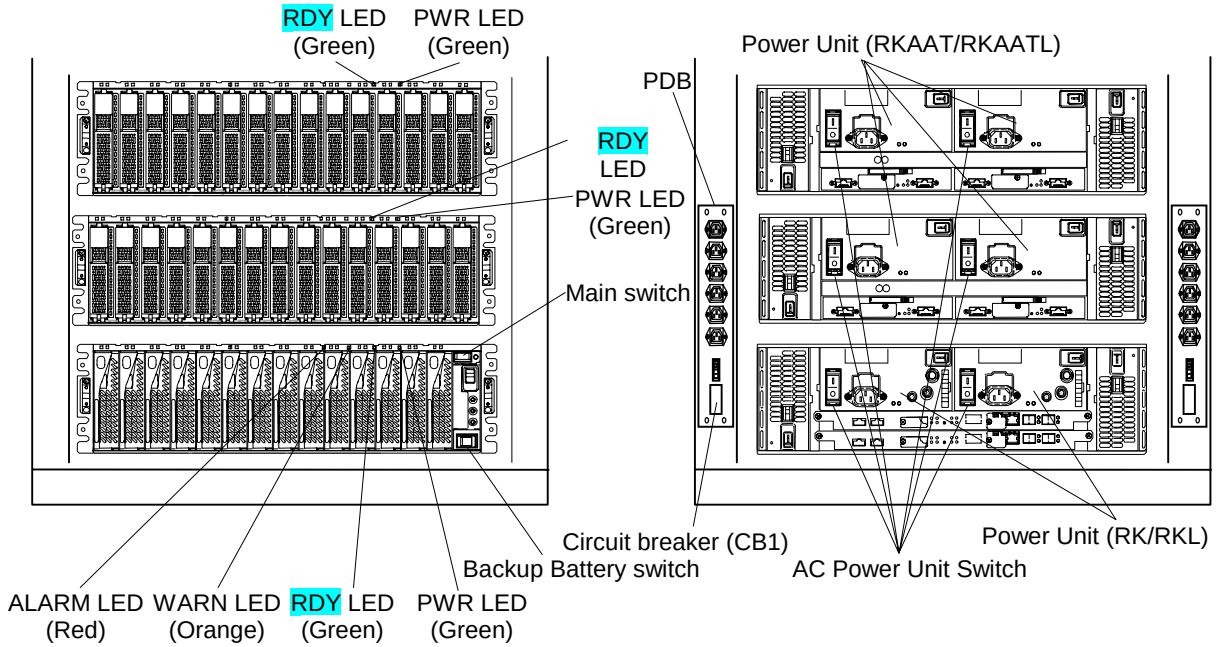


Figure 3.8.1.4 Locations of Switches for Power On

Copyright © 2004, 2005, Hitachi, Ltd.

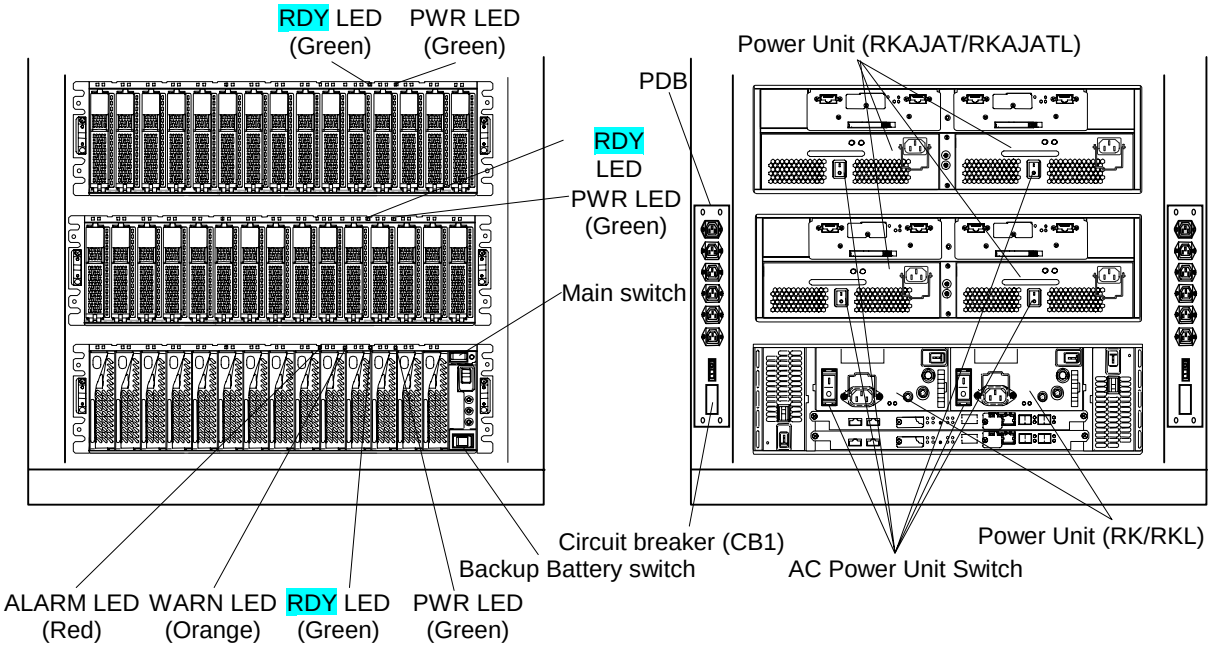


Figure 3.8.1.5 Locations of Switches for Power On

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

3.8.2 Subsystem power off

(1) Rackmount model (RK/RKA/RKS)
(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the Front Bezel is off. (‡1)
(c) All turn off the AC Power Unit Switch of the Power Unit.
(d) Turn off the battery switch of the Backup Battery Unit.
(e) All turn off the circuit breaker (CB1) of the PDB.

NOTE : 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) Rackmount model (RKD/RKAD/RKSD).
(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the Front Bezel is off. (‡1)
(c) All turn off the DC Power Unit Switch of the Power Unit (DC).
(d) Turn off the battery switch of the Backup Battery Unit.

NOTE : 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.

(3) Rackmount model (RKH/RKHE/RKA/RKAAT/RKAJAT)
(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the Front Bezel is off. (‡1)
(c) All turn off the AC Power Unit Switch of the Power Unit.
(d) Turn off the battery switch of the Backup Battery Unit.
(e) All turn off the circuit breaker (CB1) of the PDB.

NOTE : 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.

(4) Rackmount model (RK/RKAAT/RKAJAT/RKAATL/RKAJATL)
(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the Front Bezel is off. (‡1)
(c) All turn off the AC Power Unit Switch of the Power Unit.
(d) Turn off the battery switch of the Backup Battery Unit.
(e) All turn off the circuit breaker (CB1) of the PDB.

NOTE : 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.

‡1 : The PWR LED (green) of the RKA does not go out when the main switch is turned off in the Maintenance mode, however, this is not a problem.

Copyright © 2002, 2005, Hitachi, Ltd.

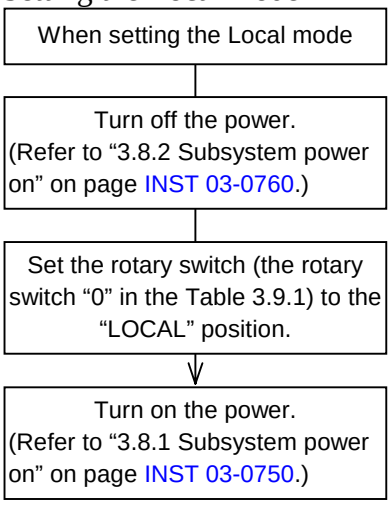
3.9 Setting the Power Control Mode (Local/Remote Mode)

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.

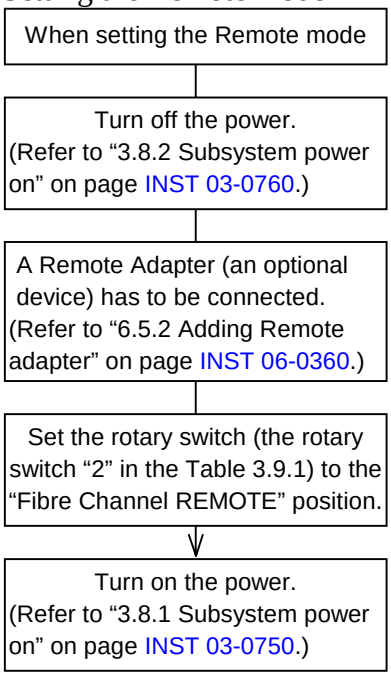
Place the RKD (RKSD) in the Local mode (by operating the rotary switch "0").
It cannot be placed in the other power control mode.

(1) Procedure for setting the Remote/Local mode
When a UPS with the interlock function is used, there may be a case where a remote adapter is not necessary.

(a) Setting the Local mode



(b) Setting the Remote mode



Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Setting the Rotary switch (The rotary switch is on the side of the main 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 3.9.1.

Table 3.9.1 Power Control Mode Settings and Corresponding Operation Modes

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment)
1	—	—
2	Fibre Channel 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 U6 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.
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.

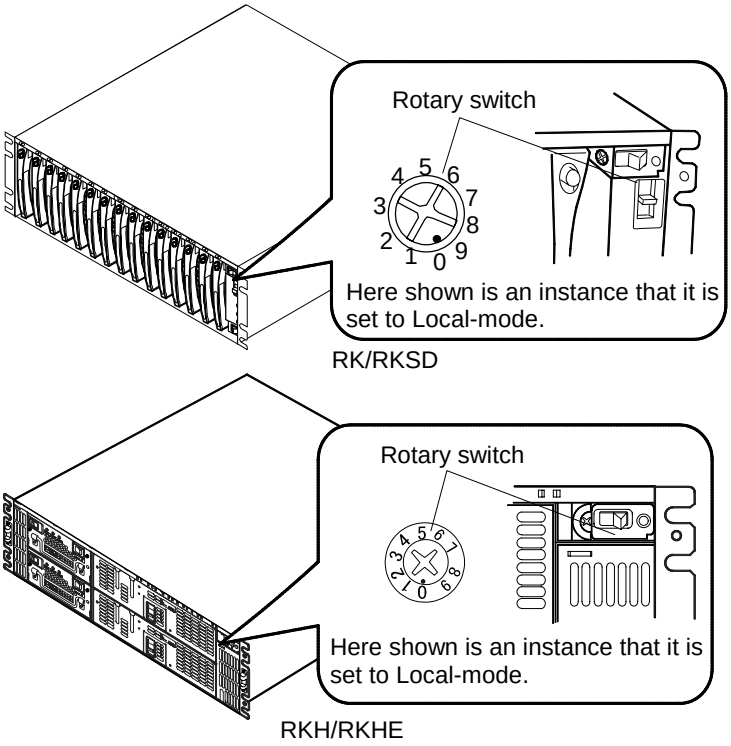


Figure 3.9.1 Location of Rotary Switch for Setting Power Control Mode

Copyright © 2002, 2005, Hitachi, Ltd.

3.10 Closing Door or Attaching Front Bezel

(1) Close the rear door. (Refer to Subsection 1.4.4, “How to open/close the rear door U6 rack frame” on page INST 01-0100.)
(2) Attach the Front Bezel. (Refer to Subsection 1.4.3, “How to attach/remove front bezel of the Rackmount Model” on page INST 01-0080.)

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 4. Newly Installing Microprogram

4.1 Installing Microprogram Newly

This is a work to install the microprogram in the subsystem.
If the microprogram has already been installed, refer to Chapter 6, “Updating Microprogram” on page MNTE 06-0000 in the Maintenance Manual for Maintenance.

4.1.1 Materials necessary for the new installation

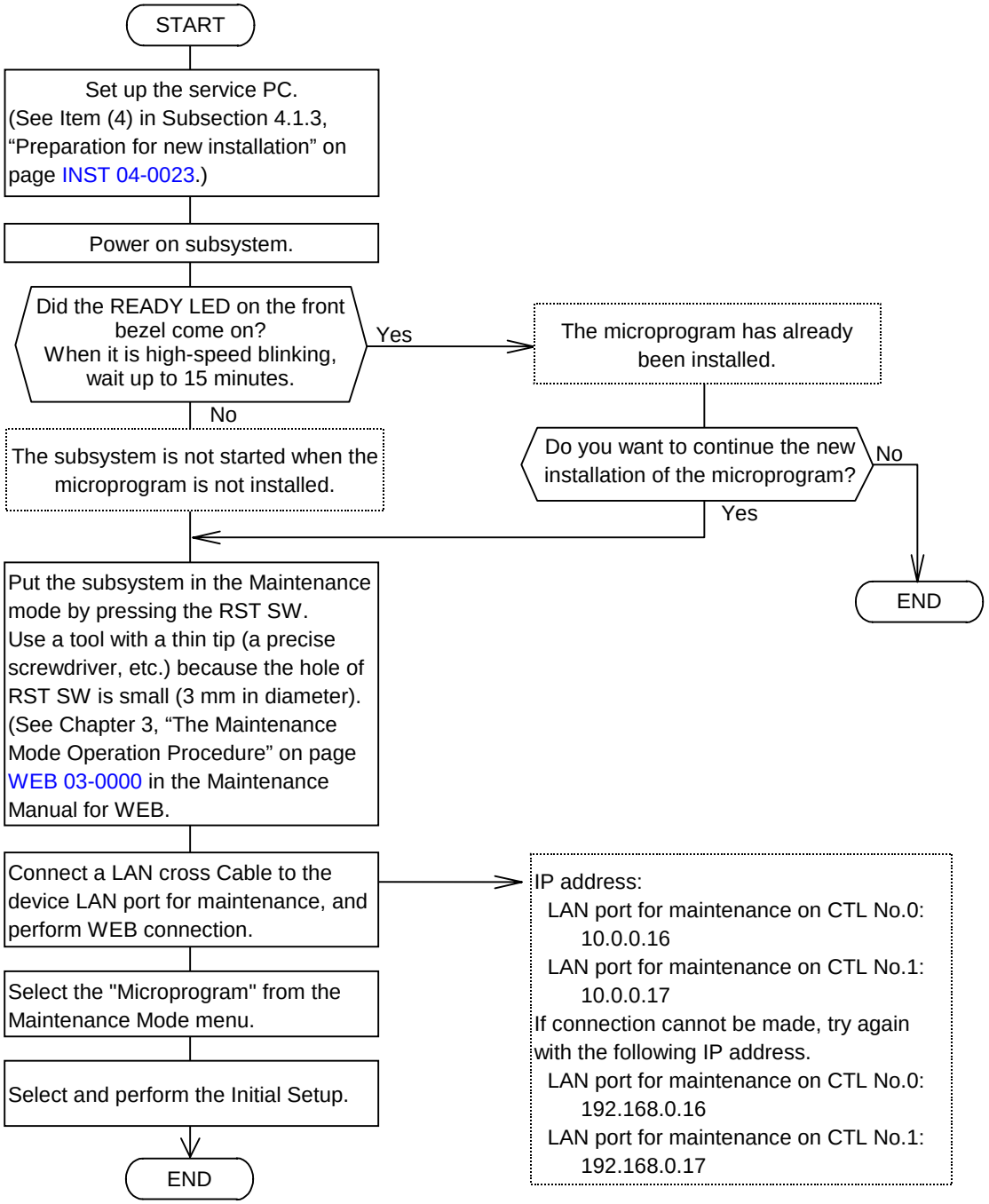
- Service PC(‡1)
- LAN cross cable
- CD-ROM for microprogram installation

‡1 : The service PC must have a CD-ROM drive for the microprogram installation. If the service PC has no CD-ROM drive, it must be set up beforehand via a network.
(See Item (4) in Subsection 4.1.3, “Preparation for new installation of microprogram” on page INST 04-0023.)
Further, the service PC must be started by the OS from the drive C in order to prevent a security problem from occurring.

Copyright © 2002, 2005, Hitachi, Ltd.

4.1.2 Outline of procedure for new installation

(1) Install the microprogram newly using a service PC via the Web connection.
(2) In the service PC, JRE(‡1) 1.3.1 03 must be installed. (See Item (4) in Subsection 4.1.3, "Preparation for new installation of microprogram" on page INST 04-0023.)
(3) 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 : Java runtime environment

Copyright © 2002, 2005, Hitachi, Ltd.

4.1.3 Preparation for new installation of microprogram

(1) Outline

Set up the service PC before starting the new 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 service 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 service 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 service 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) in Subsection 4.1.3, “Preparation for new installation of microprogram” a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 4.1.1 Java error codes

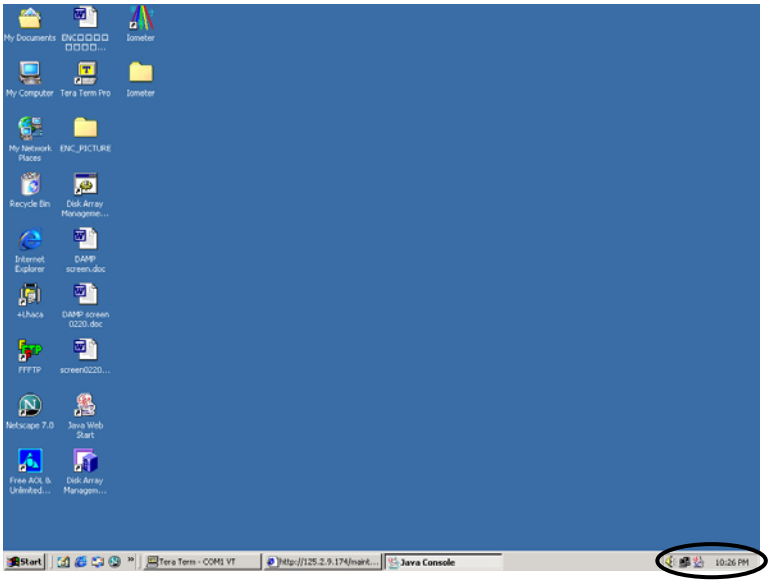
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram 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 service 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 4.1.3.) 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 service 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 service PC is insufficient.	① Reboot the subsystem and the service 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 service PC and perform the installation over again from the beginning. Use a PC whose memory capacity is as large as possible.

Copyright © 2003, 2005, Hitachi, Ltd.

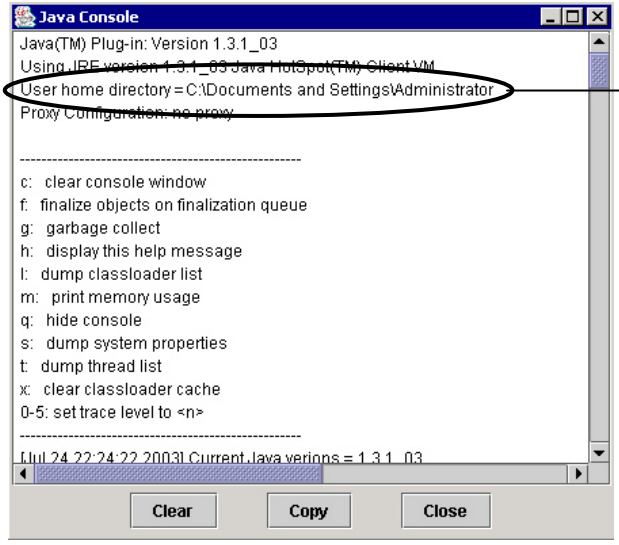
(a) Method for checking the drive for booting the OS

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 Service PC window.



(ii) Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: *****…).



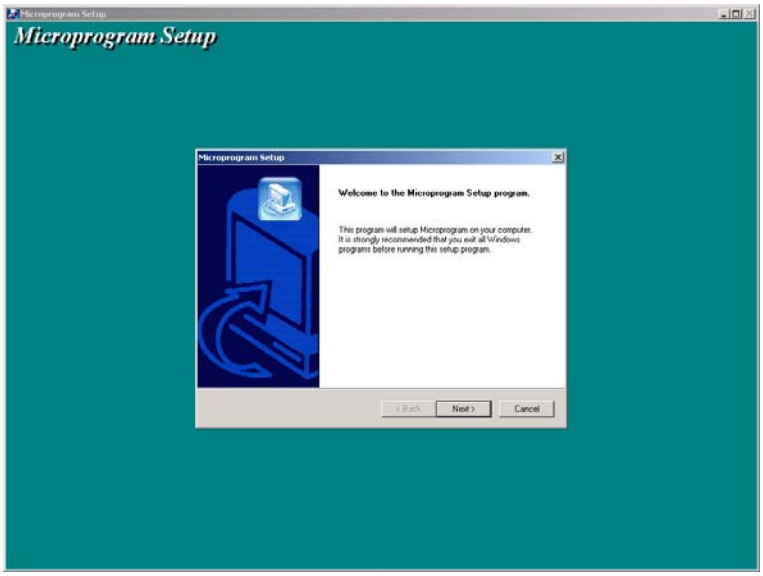
If "=C:***** …" is displayed here, the boot drive is the c drive.

Copyright © 2003, 2005, Hitachi, Ltd.

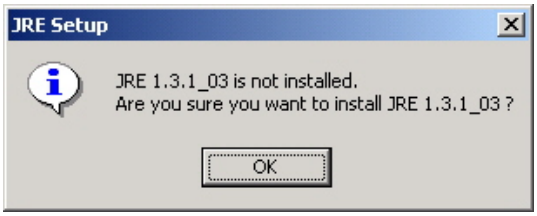
(4) Procedure for setting up the service PC

(a) Double click the “micro upload\micro setup\Setup. exe” of the CD-ROM for microprogram installation.

(b) 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 (c) to (g) are not displayed.



(c) A dialog box for asking confirmation of starting the JRE 1.3.1 03 installer. Click the [OK] button.

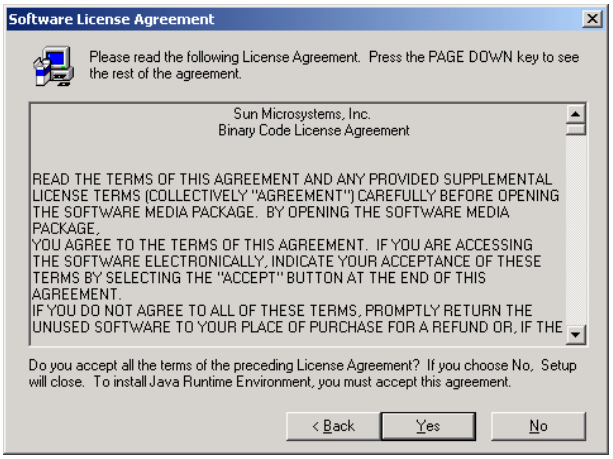


Copyright © 2003, 2005, Hitachi, Ltd.

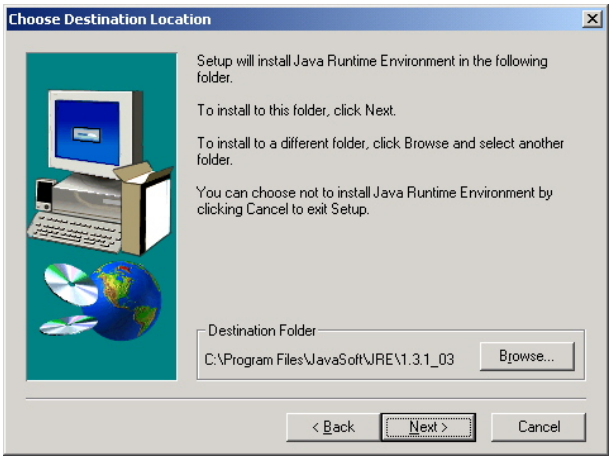
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

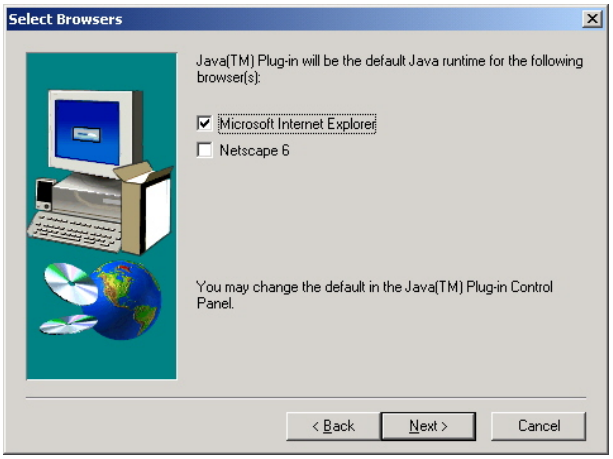
(d) A window of product licensing contract is displayed. Click the [Yes] button.



(e) 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.

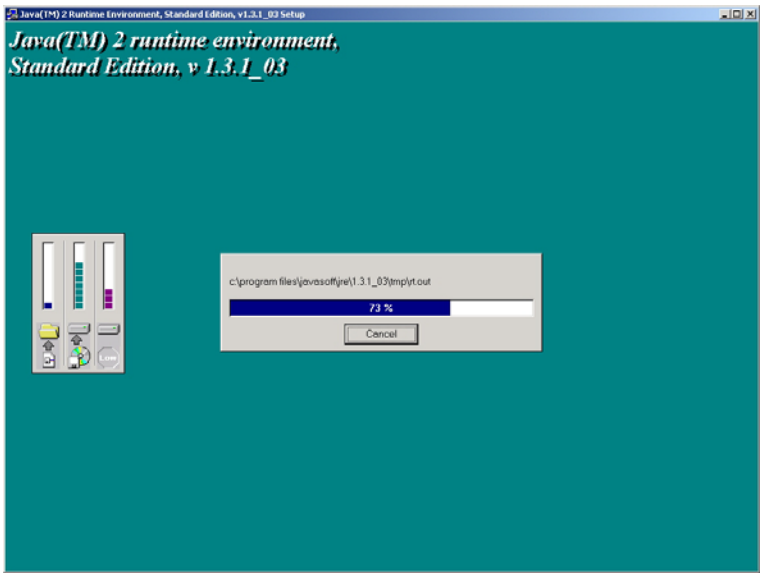


(f) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



Copyright © 2002, 2005, Hitachi, Ltd.

(g) Installation of the JRE 1.3.1 03 is started.



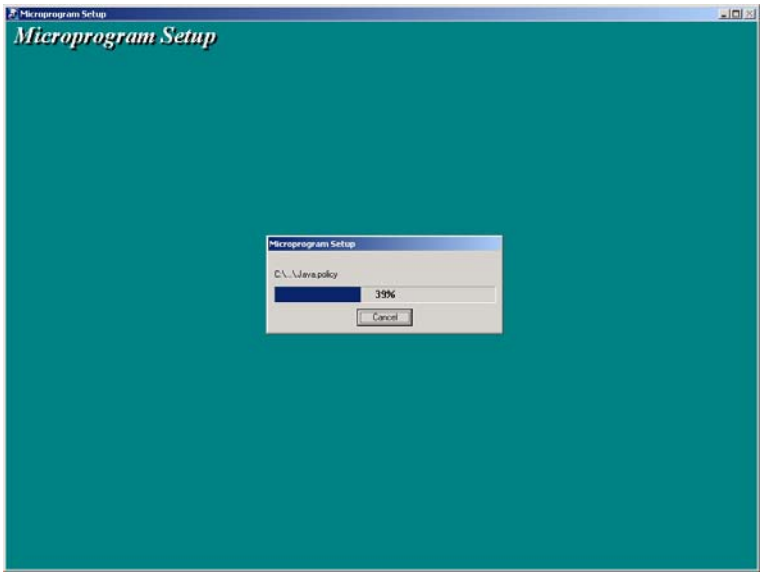
(h) After the installation of the JRE 1.3.1 03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.



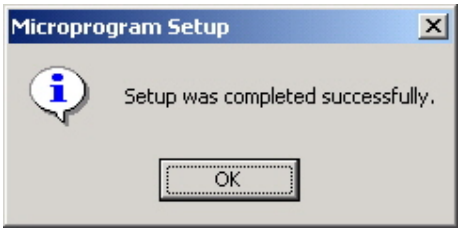


Copyright © 2002, 2005, Hitachi, Ltd.

(i) The microprogram is copied on the service 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 (disk01, disk02, ---) into the directory.



(j) 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 service 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.

Copyright © 2002, 2005, Hitachi, Ltd.

4.1.4 Procedure for new installation

(1) Matters to be made sure of before starting new installation

Make sure of the following before starting the new installation

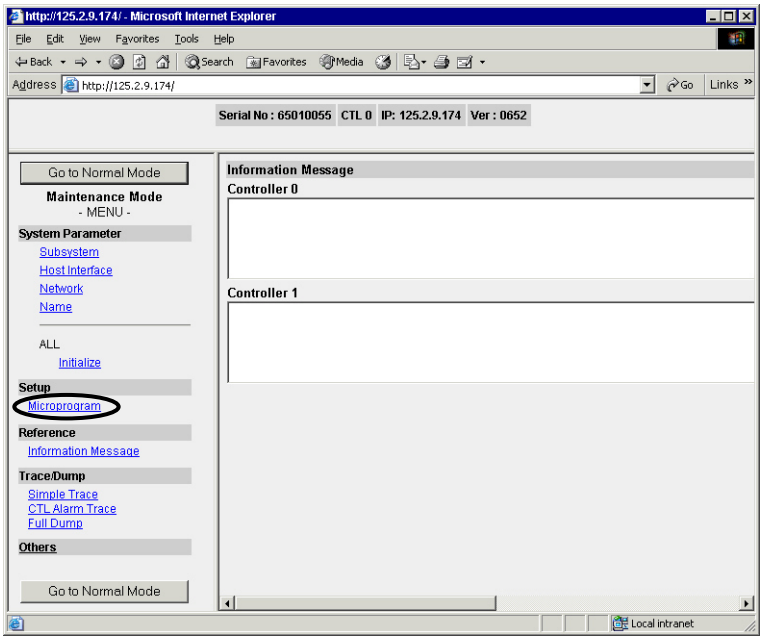
- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem.
- When performing the new installation, the subsystem does not become ready because the microprogram is not installed.
  ("RB8400 Download failed" is displayed on the "Information Message".)
  When the microprogram has already been installed, perform the updating installation (see Chapter 6, "Updating Microprogram" on page MNTE 06-0000 in the Maintenance Manual for Maintenance).

(2) Procedure for new installation

(a) Set the operation mode in the Maintenance Mode. (See Chapter 3, "Maintenance Mode Operation Procedure" in the Maintenance Manual for Web. (WEB 03-0000))

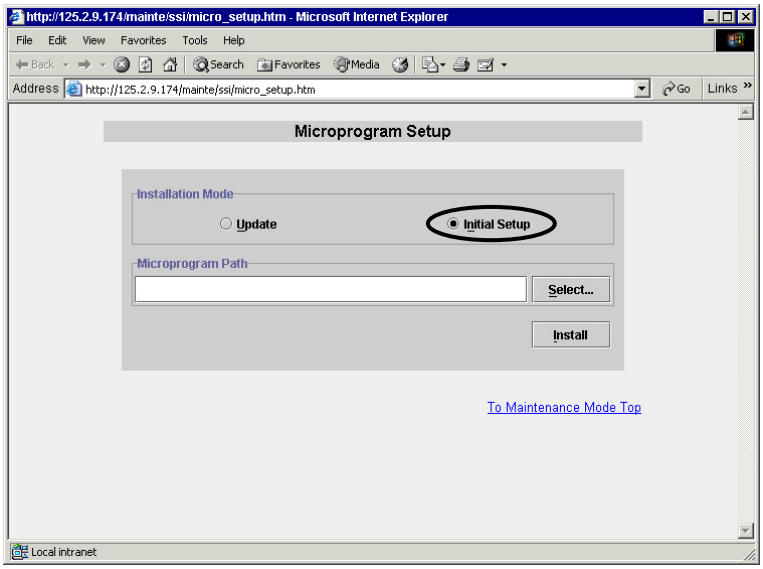
(b) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web. (See Subsection 2.1.1, "Procedure for connecting Web" on page MNTE 02-0020 in the Maintenance Manual for Maintenance.)

(c) 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].



Copyright © 2002, 2005, Hitachi, Ltd.

(d) When the Microprogram Setup window is displayed, check the “Initial Setup” radio button of the “Installation Mode.”



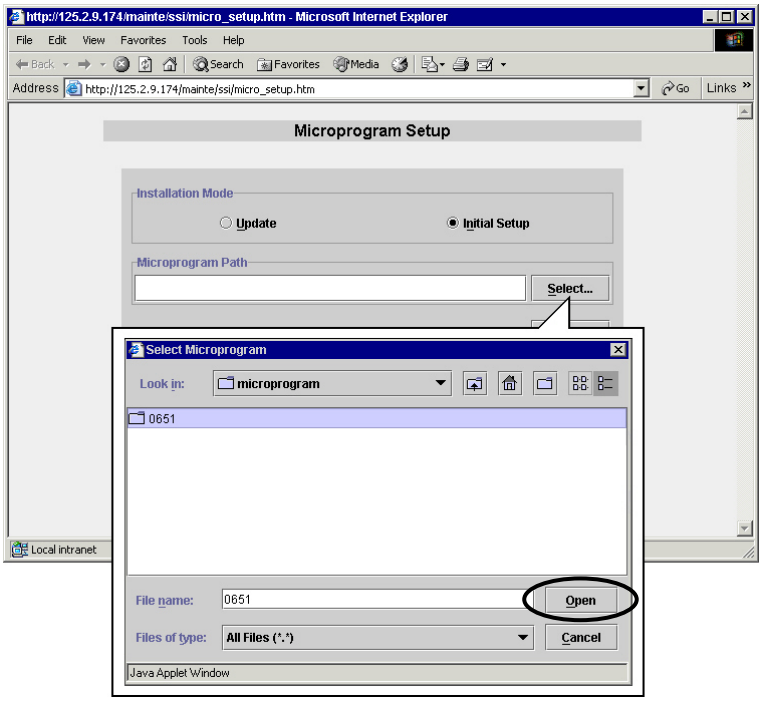
Copyright © 2002, 2005, Hitachi, Ltd.

(e) Set the microprogram path.

Specify the directory in which the microprogram that has been copied to the service PC is stored.

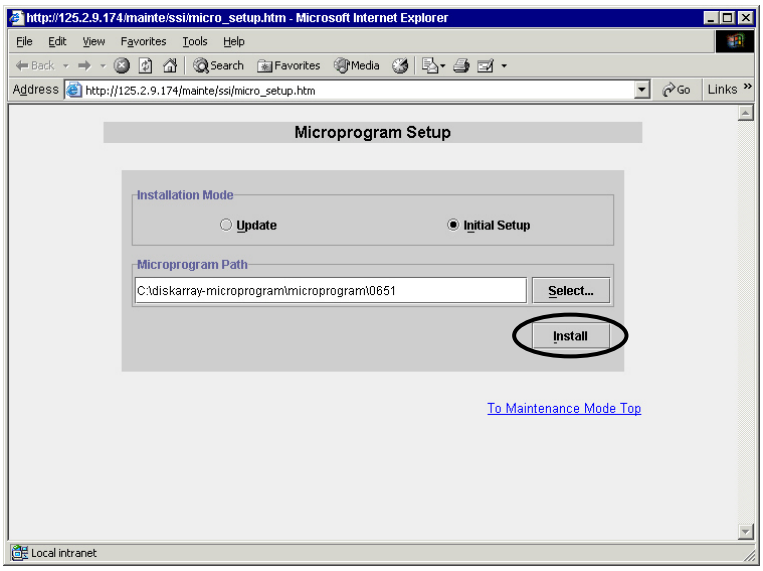
When the “Select” button is clicked, the “Select Microprogram” window is displayed. Select the directory in which the microprogram is stored and click the “Open” button.

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 Item (2) in Subsection 4.1.3, “Preparation for new installation of microprogram” on page INST 04-0020) again.

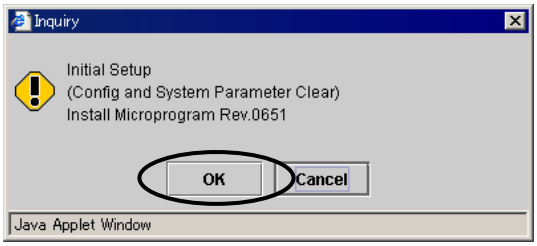


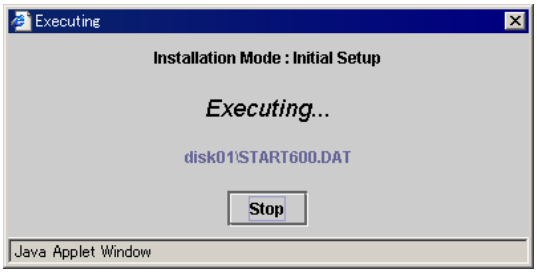
Copyright © 2002, 2005, Hitachi, Ltd.

(f) Click the [Install] button to install the microprogram.



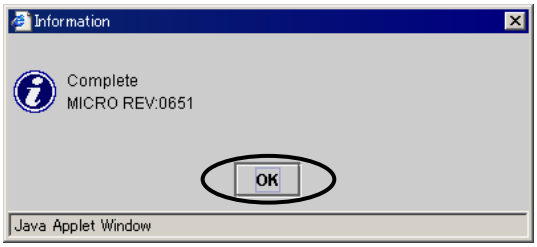
(g) The following window that asks for confirmation is displayed. When the [OK] button in the window is clicked, the installation is started.



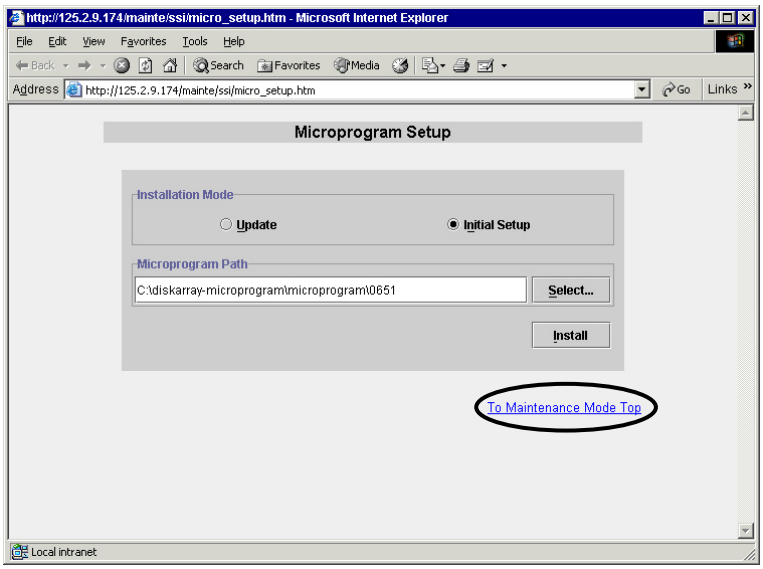


Copyright © 2002, 2005, Hitachi, Ltd.

(h) When the installation is completed, the completion window is displayed. Click the [OK] button.



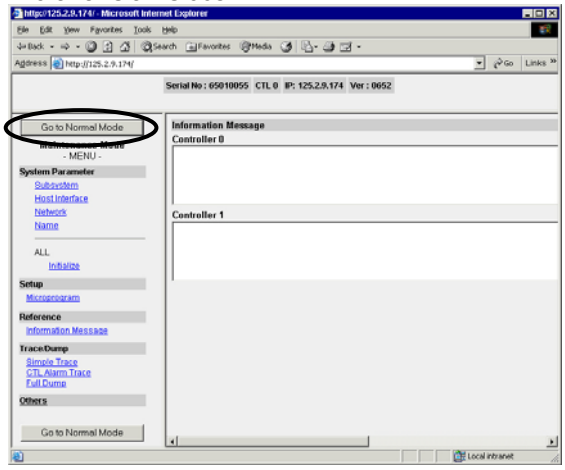
(i) Go to the “Maintenance Mode” window by clicking “To Maintenance Mode Top” in the Microprogram Setup” window.



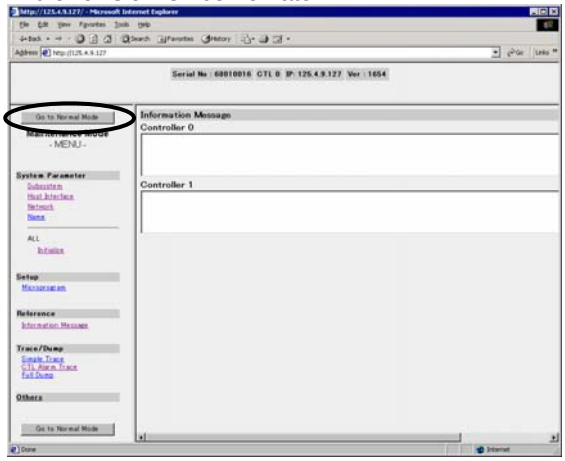
Copyright © 2002, 2005, Hitachi, Ltd.

(j) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.

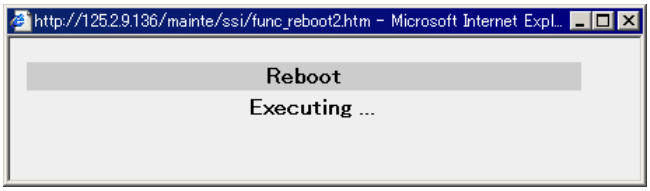
Micro revision is 065x



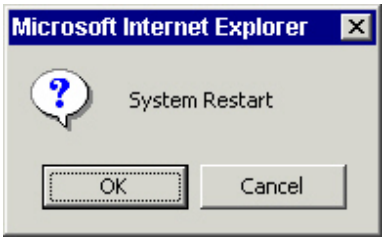
Micro revision is 1654 or later.



(k) When the [Go to Normal Mode] button is clicked, the following window is displayed.



(l) Click the [OK] button.



(m) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

4.2 Procedure for Recovery from a Failure

4.2.1 Procedure for recovery from a failure occurs 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	Turn on the power again, and perform the operation over again from the beginning. If a recovery from the failure is not successful nevertheless, connect the WEB and recover from the failure following the recovery procedure against each WEB message. For the details, refer to Section 2.2, "Trouble Analysis by WEB Connection" on page MNTE 02-0110 in the Maintenance Manual for Maintenance.

- Details of WEB error logs

Message code	Message text	Recovery procedure	Remark
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.	
RB3600	Bad LBA in START600. DAT	The content of the "START600. DAT" is incorrect.	
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	A downgrade of the program was detected.	
RBC000	No drive available	The access to all the system drives is disabled.	
RBC10x	Drive block size error (Unit-0, HDU-x)	The drive block size is the other than 512 bytes.	
RBC20x	Unknown drive (Unit-0, HDU-x)	The system area size is larger than the drive capacity.	

Copyright © 2002, 2005, Hitachi, Ltd.

<Install partially complete (The installation of some of the Disk Drives failed.)>

- LED status

WARNING LED	ALARM LED	Recovery procedure
Off(*1)	Off	It may be a Disk Drive failure. For the details, refer to Section 4.3, "Procedure for Isolating Cause of Disk Drive Failure when" Install partially complete "Message Is Output" on page INST 04-0140.

*1 : When a beep of the buzzer is stopped by a pressing of the 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

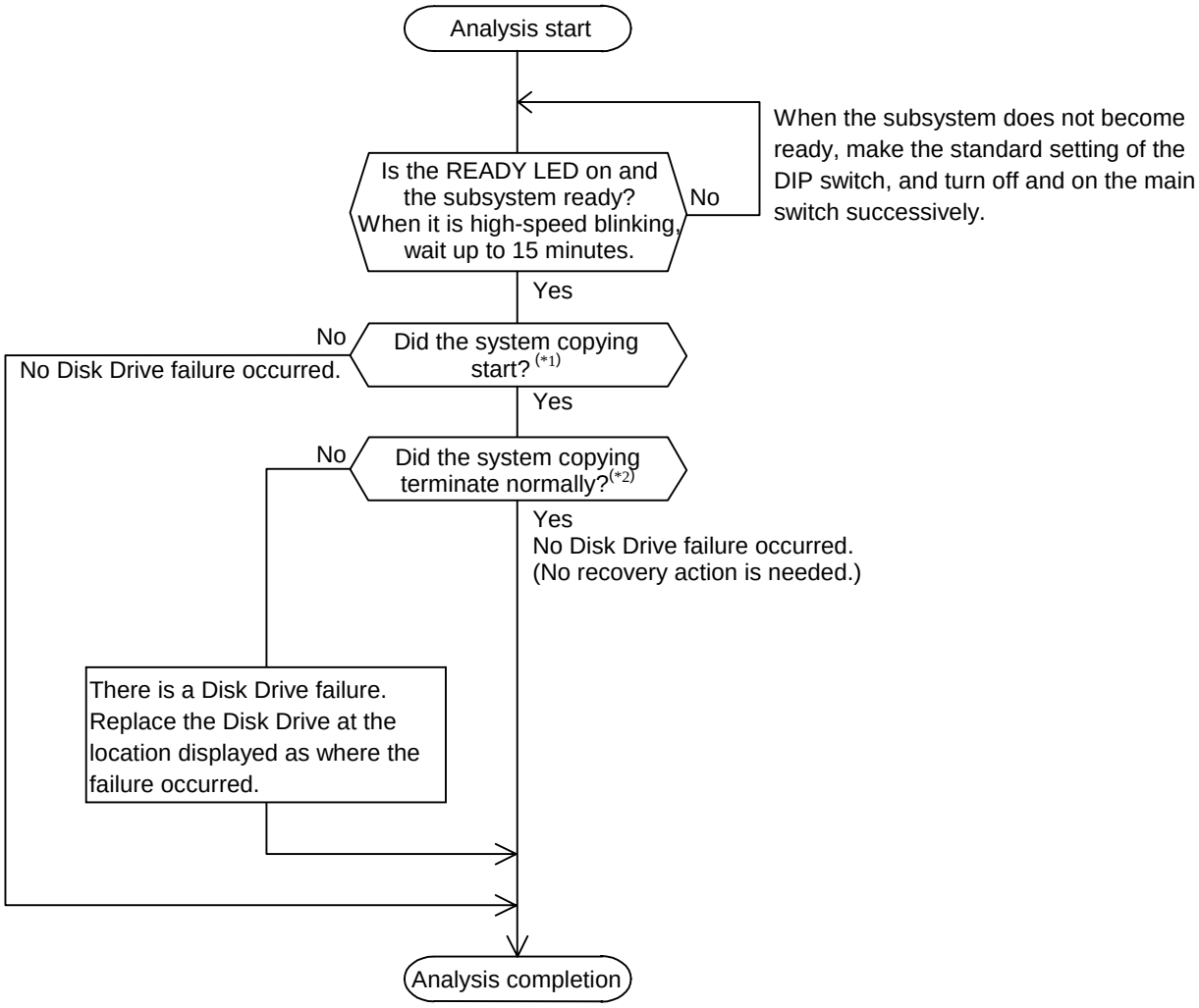
Message code	Message text	Recovery procedure	Remark
RB8200	Install partially complete	The installation of some of the Disk Drives failed.	

Copyright © 2002, 2005, Hitachi, Ltd.

4.3 Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete" Message Is Output

The message "install partially complete" is displayed on the WEB window when the subsystem detects either of the following statuses. The "Install partially complete" status can be known through the status of the LED.

- When at least one Disk Drive among the Disk Drives#0 to #4 in the RK/RKL/RKS/RKD/RKSD or RKA of the unit ID#0 connected to RKH/RKHE frame is not installed.
  Because this is not a failure, no recovery action is required.
- One or more Disk Drive (s) failed to install a program.
  This may be a Disk Drive failure. Analyze the phenomena following the procedure below and take necessary action.



*1 : Refer to "4.3.1 Checking whether system copy operation occurred" (INST 04-0150).

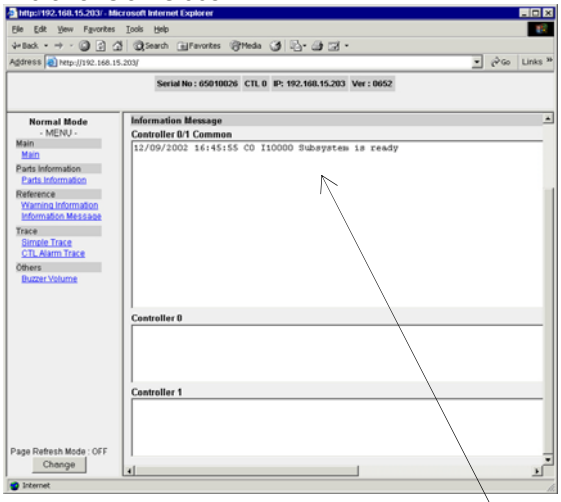
*2 : Refer to "4.3.2 Checking the condition of system copy operation complete" (INST 04-0160).

Copyright © 2002, 2005, Hitachi, Ltd.

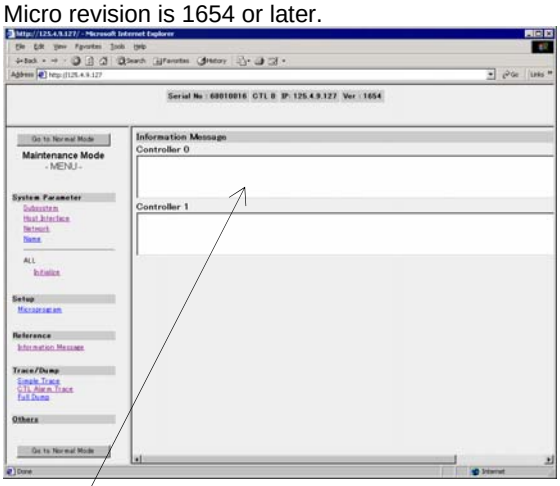
4.3.1 Checking whether system copy operation occurred

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.

Micro revision is 065x



Micro revision is 1654 or later.



Refer to this place.

- When a system copy occurs

MM/DD/YYYY HH:MM:SS Cx I140xy System copy started (Unit-x, HDU-y)

Date Time Detect Controller# x : Unit ID#, y : Disk drive#

The above is displayed.

- When the not occurred of system copy

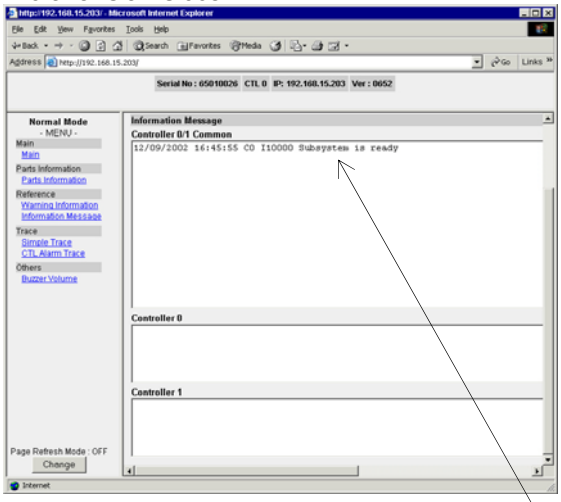
The message above is not displayed but a message "I10000 Subsystem is Ready" is displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

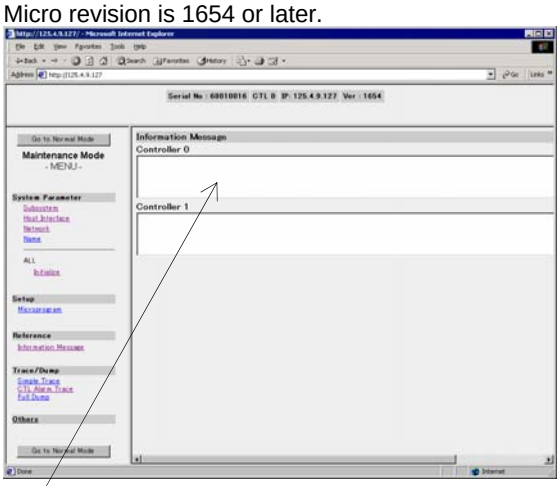
4.3.2 Checking the condition of system copy operation complete

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.

Micro revision is 065x



Micro revision is 1654 or later.



Refer to this place.

- When a system copy completes normally

MM/DD/YYYY HH:MM:SS Cx I10000 Subsystem is Ready
MM/DD/YYYY HH:MM:SS Cx I141xy System copy completed (Unit-x, HDU-y)
MM/DD/YYYY HH:MM:SS Cx I140xy System copy started (Unit-x, HDU-y)

Date Time Detect Controller# x : Unit ID#, y : Disk drive#

System copy start message
System copy normal completion message
Subsystem Ready status reporting message

The above is displayed.

- When the not occurred of system copy

MM/DD/YYYY HH:MM:SS Cx I10000 Subsystem is Ready
MM/DD/YYYY HH:MM:SS Cx I142xy System copy failed (Unit-x, HDU-y)
MM/DD/YYYY HH:MM:SS Cx I140xy System copy started (Unit-x, HDU-y)

Date Time Detect Controller# x : Unit ID#, y : Disk drive#

System copy start message
System copy failed completion message
Ready report message of unit

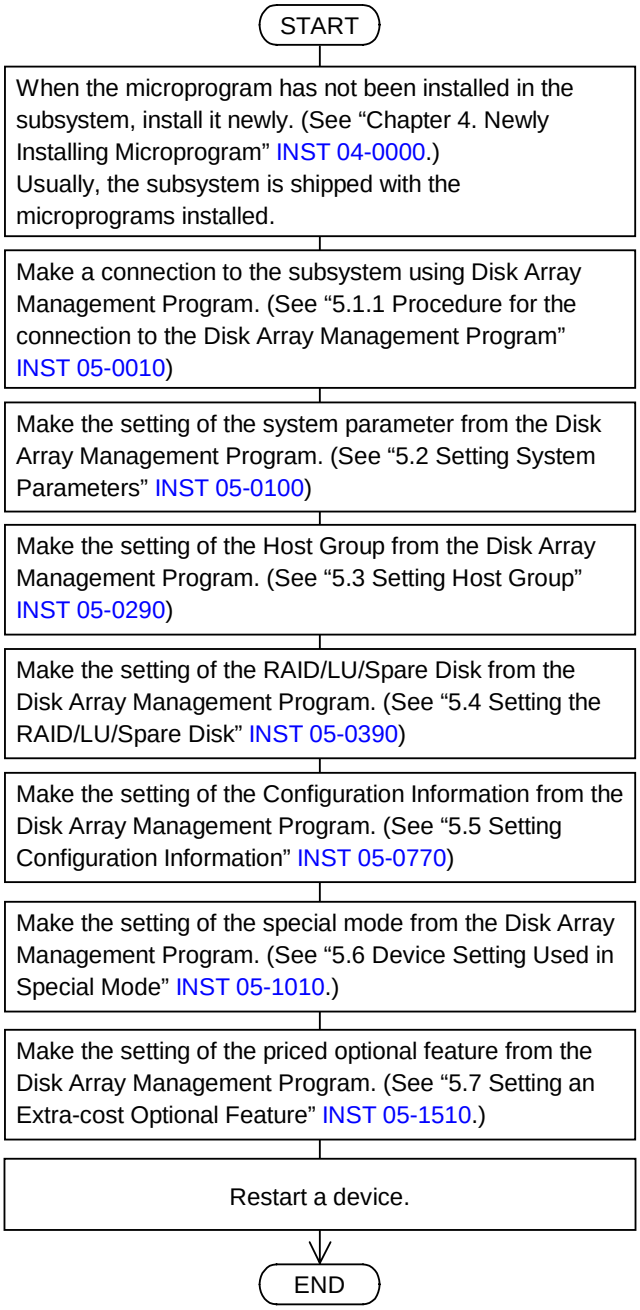
Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 5. Parameter Setting (Disk Array Management Program)

This chapter explains method of setting the subsystem parameters using Disk Array Management Program.

5.1 Preparation of Setting

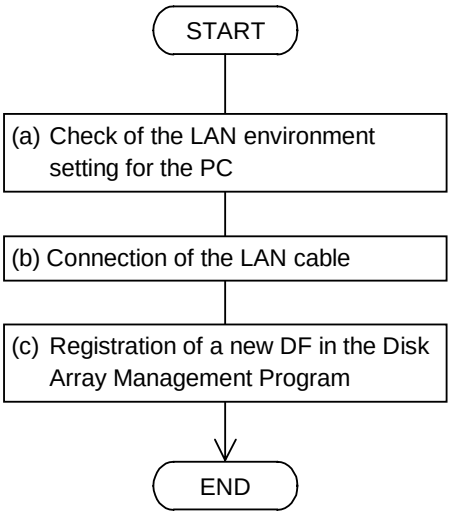
The procedures for setting device parameters are described below.



Copyright © 2002, 2005, Hitachi, Ltd.

5.1.1 Procedure for connecting Disk Array Management Program with the subsystem

The procedure for connecting Disk Array Management Program with the subsystem is shown below.



(1) Checking the LAN environment setting

(a) Make sure that the Disk Array Management Program has been installed. (Make sure that the activation file startmgr2.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.
  If the maintenance PC cannot be connected, set the value in No. 2.

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)	2550.0.0/ 255.255.255.224(*1) (At the time of shipment)	**10.0.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0/ 255.255.255.224(*1)	**192.168.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**

*1 : Micro revision is 0653/C or later.

Copyright © 2002, 2005, Hitachi, Ltd.

- Automatic change of network parameters of the Port 0 (for maintenance)
  Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
  When the network address of the Port 1o9 (for users) is set as "10.*.*.*", that of the Port 0 (for maintenance) is changed as shown below.

  NOTE : However, if the network address of the LAN device connected to Port 1 (Users) via the Gate Way accords with that of Port 0 (Maintenance), they will collide each other, disabling to communicate normally.
  Microprogram revision 0653/B or earlier
  (1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.*.*.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "10.*.*.*".
  (2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "192.168.0.*".
  Microprogram revision 0653/C or later
  (1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.0.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "10.0.0.(0 to 31)".
  (2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "192.168.0.(0 to 31)".

Network parameter	Description	Control Unit#0	Control Unit#1
		Port 0 (Maintenance) < Fixed IP >	Port 0 (Maintenance) < Fixed IP >
IP Address	The IP Address is changed/set up.	192.168.0.16	192.268.0.17
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.0/ 255.255.255.224(*1)	255.255.255.0/ 255.255.255.224(*1)
Default Gateway	The Default Gateway is changed/set up.	0.0.0.0	0.0.0.0
DHCP	Enable/Disable of the DHCP function is set up.	OFF	OFF
*1 : Micro revision is 0653/C or later.			

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Connecting the LAN cross cable
Connect the Control Unit#0 of the subsystem and the LAN card of a PC.
(a) for the RK/RKL/RKS/RKD/RKSD

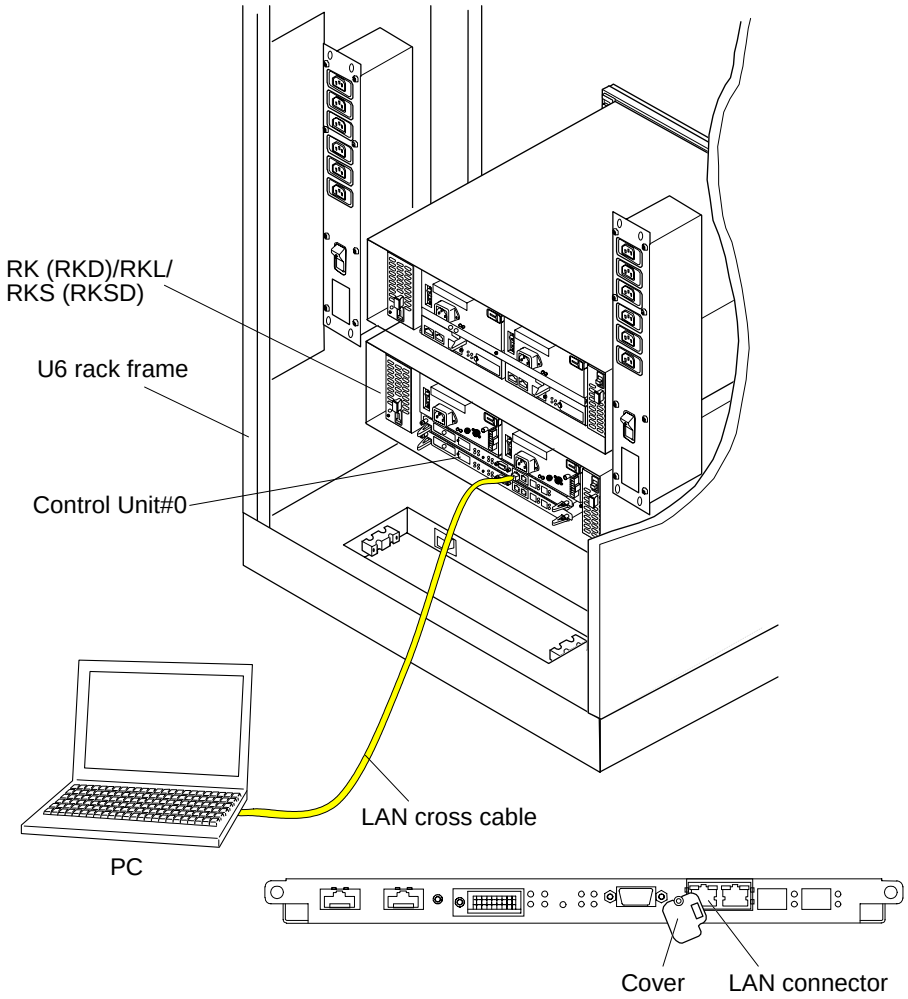


Figure 5.1.1 Connecting the LAN cable (for the RK/RKL/RKS/RKD/RKSD)

Copyright © 2002, 2005, Hitachi, Ltd.

(b) for the RKH/RKHE

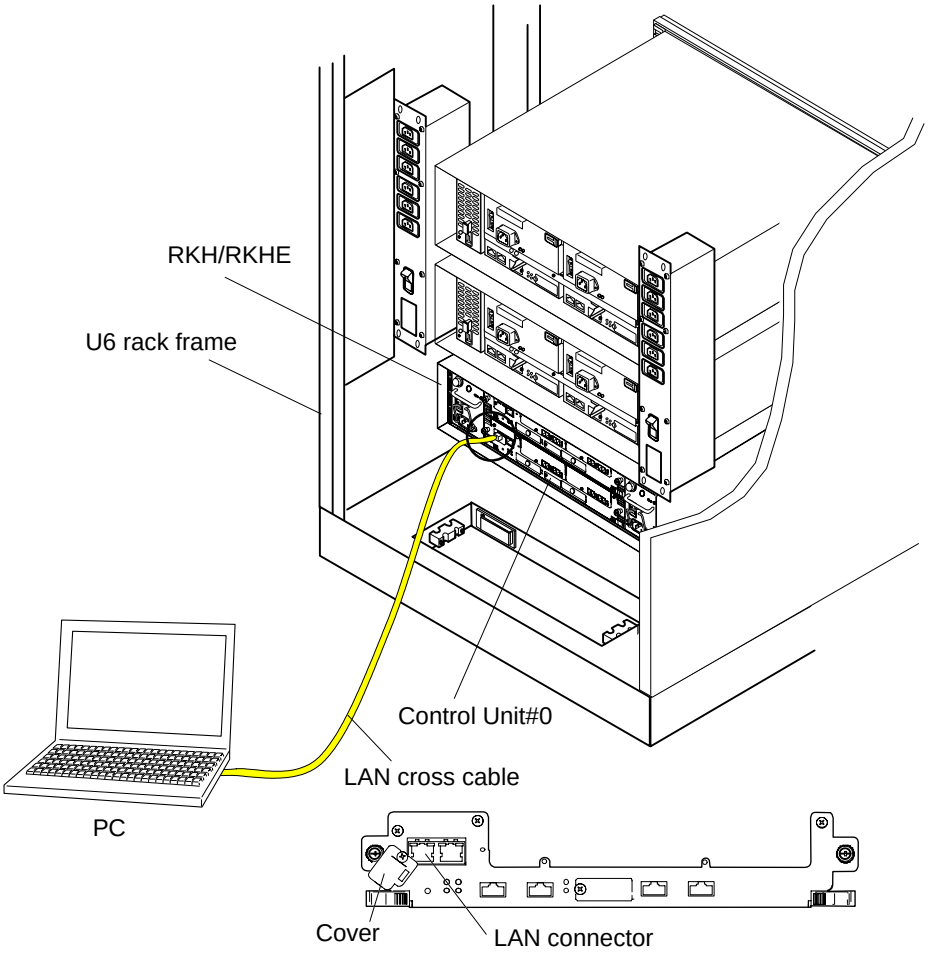


Figure 5.1.2 Connecting the LAN cable (for the RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

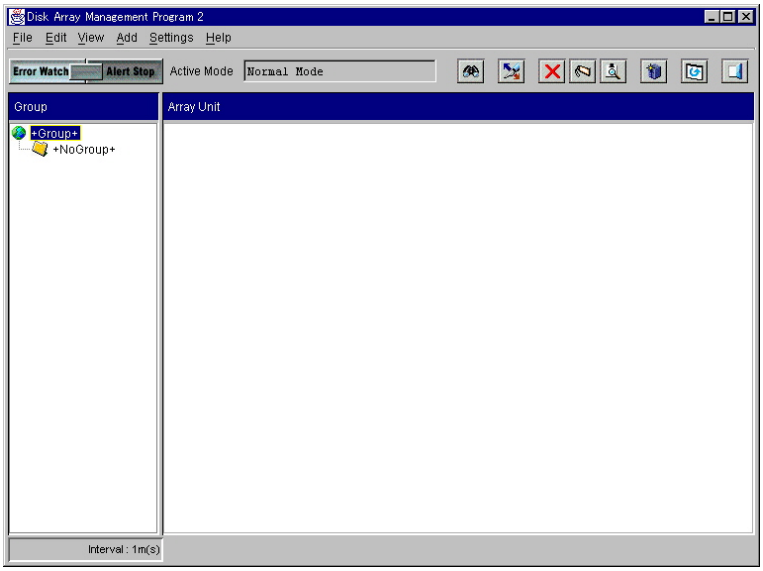
Copyright © 2003, 2005, Hitachi, Ltd.

(3) Registering the newly introduced DF in the Disk Array Management Program

(a) Activating the Disk Array Management Program

(i) Execute the batch file or shell script for activating the Disk Array Management Program.
In the case of Windows, activate the batch file, startmgr2.bat.

(ii) The Disk Array Management Program 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 Disk Array Management Program. 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 Disk Array Management Program Active 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 Active Mode
- Display of the version

‡1 : The mode change cannot be done at the time of the initial activation of the Disk Array Management Program. A registration of a password validates the mode change.

Copyright © 2002, 2005, Hitachi, Ltd.

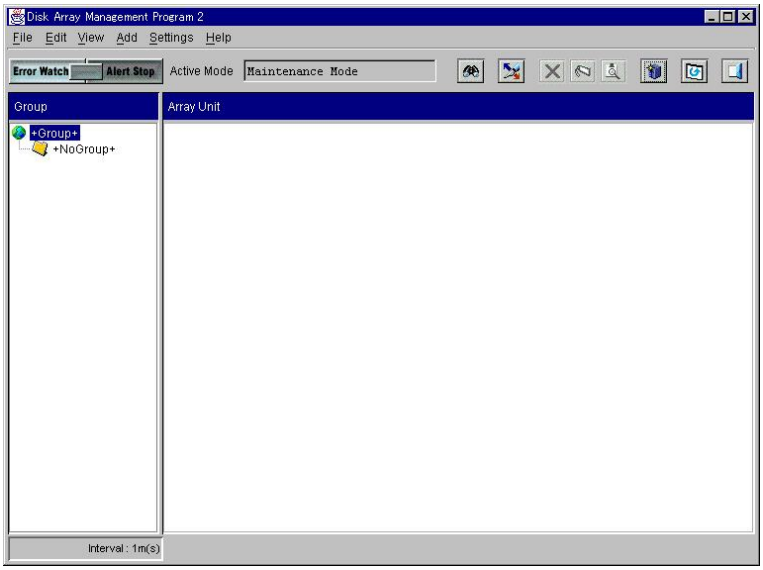
(b) Changing the Maintenance Mode

Disk Array Management Program 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 Active 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 [Active 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 Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

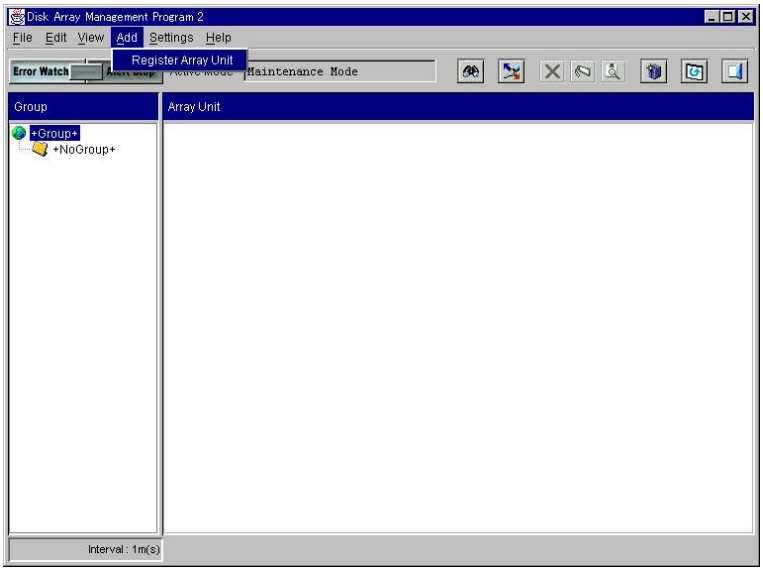


Copyright © 2002, 2005, Hitachi, Ltd.

(c) Registering the disk array subsystem

Register the disk array subsystem to be operated in order to operate it from the Disk Array Management Program. A temporary registration of the disk array subsystem which does not exist cannot be done.

(i) Select [Registering Array Unit] in the main window or click [: Array Unit Registering].

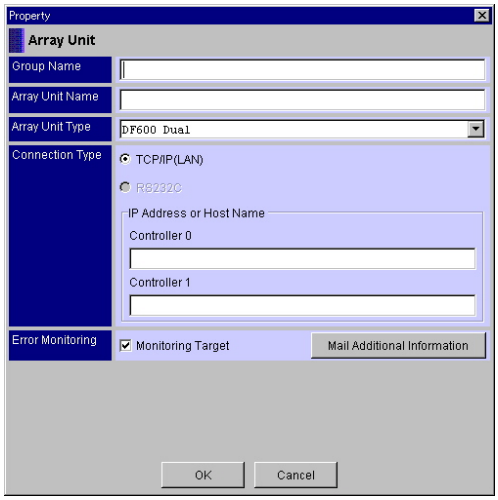


Copyright © 2002, 2005, Hitachi, Ltd.

(ii) Enter the information for the registration and click the [OK] 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 maintenance PC connected Controller only.

• 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.



[Group Name] : 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.

[Array Unit 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 _).

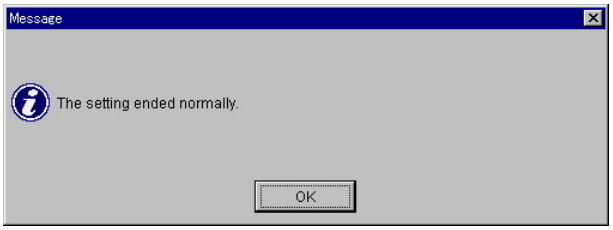
[Array Unit Type] : Select a type of the disk array subsystem.

[Connection Type] : Select a type of the connection to be used for the disk array subsystem. Select [TCP/IP (LAN)] when connecting the subsystem via a LAN or [RS232C] when connecting it via RS232C.
[IP Address, Host Name, or Device Name]
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.

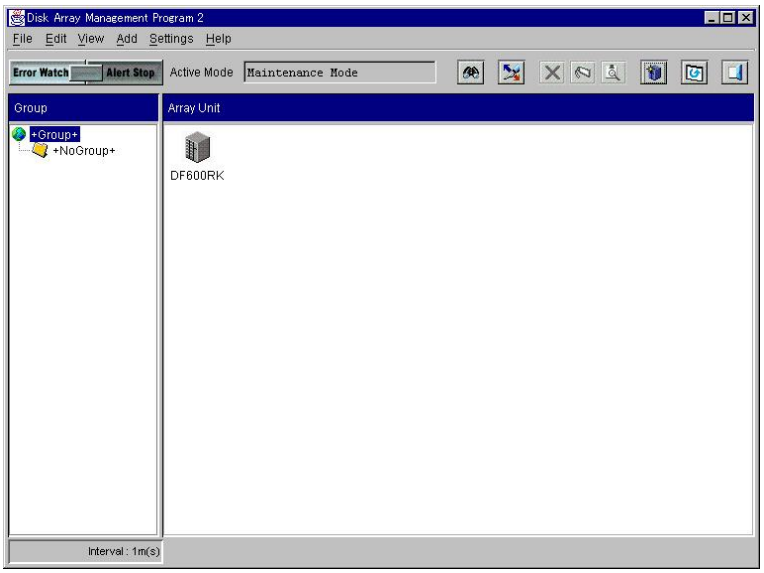
[Error Monitoring] : Set whether to apply the failure monitoring or not.
Checking off the box : The failure monitoring is applied.
Not checking off the box: The failure monitoring is not applied.

Copyright © 2002, 2005, Hitachi, Ltd.

(iii) Since 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 : 

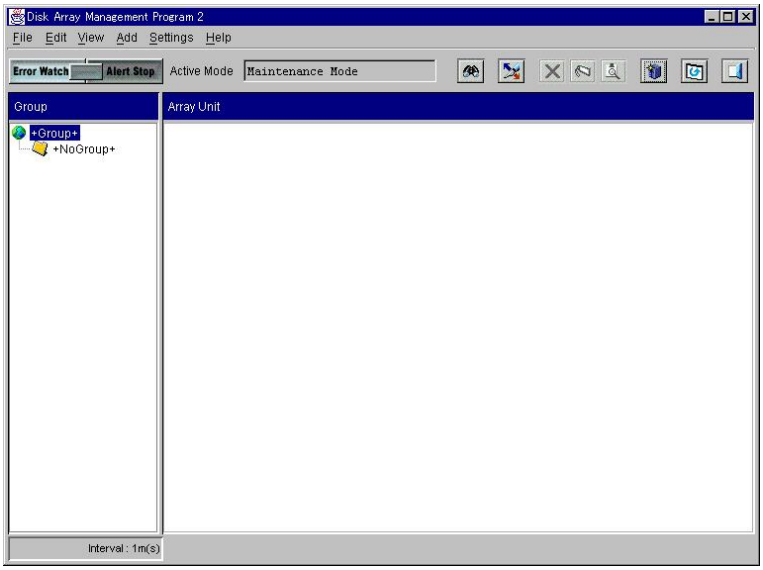
The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

Copyright © 2002, 2005, Hitachi, Ltd.

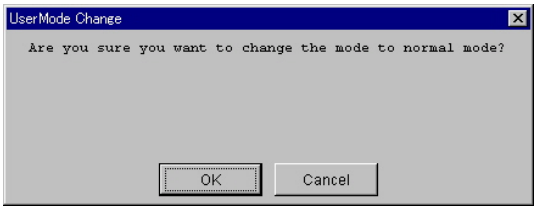
(d) Changing the Maintenance Mode to the Normal Mode

Change the Active 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 [Active Mode] in the upper part of the main window.

(i) Select [File] – [Change Mode] in the main window or click [ : Change Mode].



(ii) The message asking for the confirmation is displayed. Click [OK] button.



(iii) [Normal Mode] is displayed for the [Active Mode] in the upper part of the main window. When the unit window is displayed, the Disk Array Management Program operates in the [Normal Mode].

Copyright © 2002, 2005, Hitachi, Ltd.

5.2 Setting System Parameters

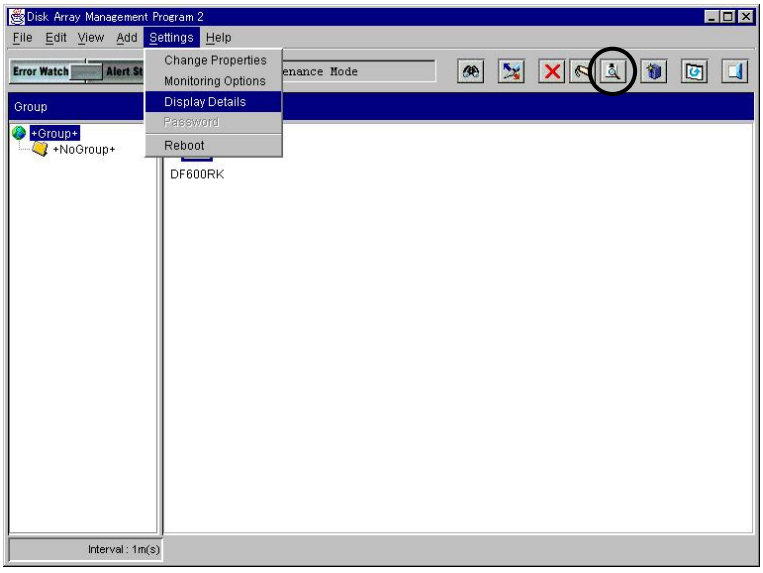
For setting the system parameters, use the Disk Array Management Program to perform the operation of setting.
When the “System Parameter Wizard” is used, the subsystem must be restarted after the system parameters have been set. When the restart is executed, an access from a host computer is not accepted until the restart is completed. Reset the system parameters after making sure that the access from the host computer ceases.

5.2.1 Before starting setting system parameters

The procedures for setting a system parameter from the Disk Array Management Program are described.

For the setting from the Disk Array Management Program, a PC/WS in which the Disk Array Management Program connected to a device is installed is necessary.

(1) Turn on the power supply.
(2) Start the Disk Array Management Program and set the Active Mode in 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 setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

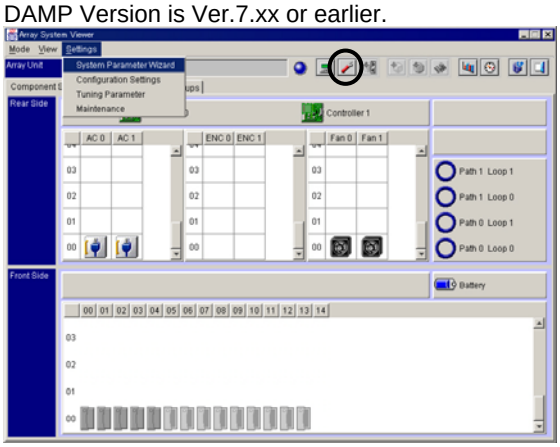


‡1 : For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), “Changing the Maintenance Mode” on page INST 05-0050.

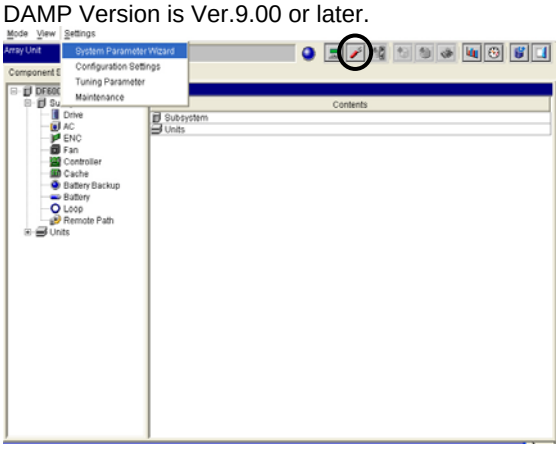
Copyright © 2002, 2005, Hitachi, Ltd.

(4) Select [Settings] – [System Parameter Wizard] in the unit window or click [ : System Parameter Wizard] button.

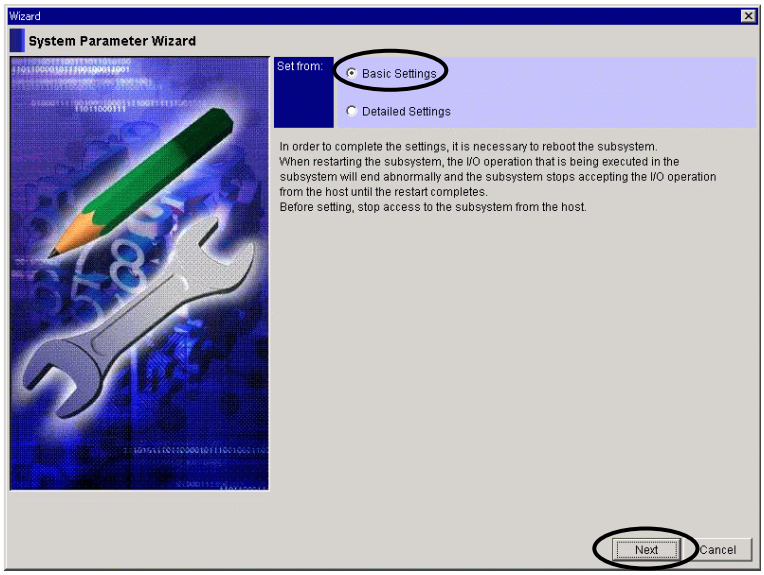
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

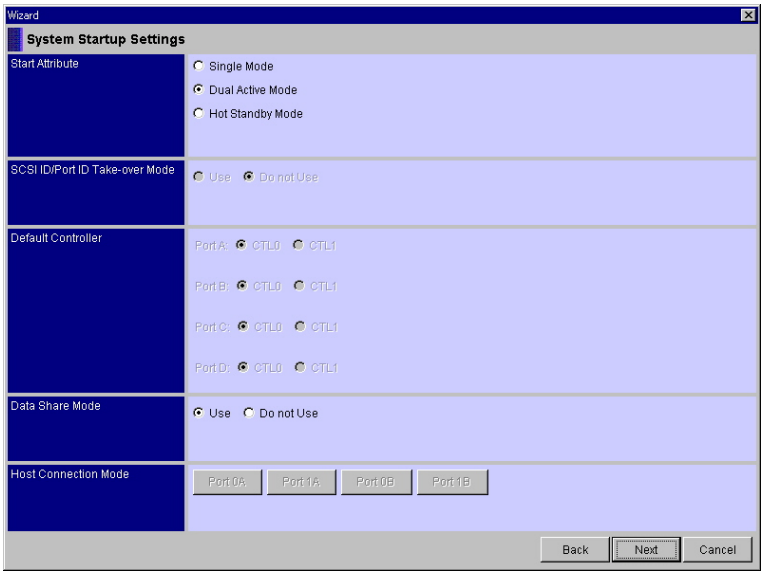


(5) Select “Basic Settings” and click the [Next] button.
When “From Detail Setting” is selected and the [Next] button is clicked, the “Data Striping” is displayed.



Copyright © 2002, 2005, Hitachi, Ltd.

(6) Check that “System Startup Settings” is displayed.



Go to the next step.

Copyright © 2002, 2005, Hitachi, Ltd.

5.2.2 Setting system parameters

Each system parameter has setting items as shown in Table 5.2.1.

- The menu name shows the one displayed at upper left part of the “Wizard” window.
- To change the menu, press the [Next] or [Return] button at lower right part of the “Wizard” window.
- When you have set all menus/parameters that you want to set, click the [Next] button repeatedly until the “System Parameter Setting Completed” menu is displayed.

Table 5.2.1 Setting System Parameter Menu Items

No.	Menu item	Use	Contents		Factory setting	Change of Setting (*1)	Reference page
			Parameter	How to set			
1	System Startup Settings	Specifies the system startup attribute.	Start Attribute			Yes	INST 05-0160
			Single Mode(*3) : Single configuration	Select	Depending on the configuration at shipment		
			Dual Active Mode : Dual stand-by configuration setting				
			Hot Stand-By Mode : Hot stand-by configuration setting				
			SCSI ID/Port ID Take-over Mode				
			Used : Executed in the ID succession	Select	Not used.		
			Do not use : Not executed in the ID succession				
			Default Controller : In the ID takeover mode, select the controller responding by the default. (Selectable only in the dual active mode)	Select	CTL0		
			Data Share Mode	Select	Depending on the configuration at shipment	No	
			Used : Used in the Data share mode				
			Do not use : Not used in the Data share mode				
			Host connection mode : Host connection mode setting	—	—	Yes	
2	Common 1	Sets the common items 1.	Serial Number : Enter a serial number.	—	—	No	INST 05-0180
			Delay Planned Shutdown(*2) : A time to put off a planned shutdown (0 to 60 minutes).	Enter	0	Yes	
3	OPTION 1	Sets a option 1.	SCSI/Fiber-Channel Common Options				INST 05-0190
			Drive blocking mode : Validates the Drive blocking mode.	Select	Not select	No	
			SCSI Option : SCSI Option	—	—	Yes	
			Fibre-Channel Options : Fibre-Channel Options	—	—		

*1 : Whether a change of the setting for the DF600 is possible or not is shown.

*2 : Do not perform hot replacement of the microprogram or a Controller during a period from the subsystem powering off to the completion of a planned shutdown in a state in which the Delay Planned Shutdown function is used.
When interlocking the subsystem power supply with a UPS, do not use the Delay Planned Shutdown function.

*3 : RKH/RKHE+RKA is not supported.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Menu item	Use	Contents		Factory setting	Change of Setting (*1)	Reference page
			Parameter	How to set			
4	OPTION 2	Sets a option 2.	SCSI/Fiber-Channel Common Options				INST 05-0200
			Multipath (Controller) : Makes the sequential judgment made for each controller.	—	—	Yes	
			PROCOM Mode : PROCOM mode	Select	Not select	No	
			Report State (Normal/Warning)(*4) : Warning State Report Mode	Select	Not select		
			Multipath (Array Unit) : Makes the sequential judgment made for the disk array subsystem.	—	—		
			LU Caching Warning : If the LU cache residence feature is disabled, specify the setting whether the operation of Read/Write commands are suspended or not.	Select	Not select		
			NX Mode : NX Host Connection mode(*2)	Select	Not select		
			Auto Reconstruction Mode : Restores data onto a Spare drive when a drive is pulled out.	Select	Not select		
			Forced Write Through Mode : Performs a write through operation when the Controller is blocked or a failure occurs in the power supply.	Select	Not select		
			Changing Logical Unit Mode 1 : Validates the Logical Unit Change Mode 1.	Select	Not select		
			Multi Stream Mode(*3) : Validates the Multi stream mode.	Select	Not select		
			Multi Stream Mode (Write) : Validates the Multi stream mode (Write).	Select	Not select		
			Multi Stream Mode (Read) : Validates the Multi stream mode (Read).	Select	Not select		
			High-Speed Sequential write Mode(*5), (*6), (*7) : Speeds up the sequential writing.	Select	Not select		
			ShadowImage I/O Switch Mode : Validates the ShadowImage I/O switch mode	Select	Not select		
			Synchronize Cache All Execution Mode : Validates the Synchronize Cache all execution mode.	Select	Not select		
			Synchronize Cache Invalid Mode : Validates the Synchronize Cache invalid mode.	Select	Not select		
			Fibre-Channel Options				
			RAID3 Mode : RAID3 Mode	—	—	No	

*1 : Whether a change of the setting for the DF600 is possible or not is shown.

*2 : When setting this option, set the RAID level to RAID 0 or RAID 1+0. (If not, the subsystem does not operate correctly.)

*3 : A high-speed mode to be used when the two or more stream (sequential read/write) accesses are performed in and LU. However, performance of the individual stream (sequential write) access is lowered by about ten percent.

*4 : RKH/RKHE+RKA is not supported.

*5 : It has no effect to set this mode for the RKS. The setting of this mode for the RK/RKL, RKH, or RKHE may also have no effect depending on a configuration.

*6 : The microprogram revision cannot be downgraded to that earlier than x656 in the state in which this mode is left set.

*7 : The setting of this mode has no effect when the Multi-Stream Mode or Multi-Stream Mode (Write) is set.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Menu item	Use	Contents		Factory setting	Change of Setting (*1)	Reference page
			Parameter	How to set			
5	Data Striping	Data striping size	Data Striping Size : Specify the data striping size.	—	—	No	INST 05-0220
		Logical Unit size to be reported to host	Logical Unit size to be reported to the host : Set a size of an LU reported to a host.	—	—		
		Sets operation at processor fault occurrence.	Operation if the processor failure occurs : Reset of occurred. Restart of Controller. System down : Shutdown the Array.	Select	Reset of occurred.	Yes	
6	INQUIRY Setting	Specifies the vendor name, model name, and command queuing.	Command Queuing Mode ON : Executes the command queuing. OFF : Inhibits the command queuing.	Select	ON	Yes	INST 05-0230
			ANSI Version : Set the SCSI 2/3 reporting mode.	—	—	No	
			Vender ID : Vendor name	Enter	HITACHI	Yes	
			Product ID : Model name	Enter	DF600F		
			ROM Microprogram Version : Specifies the ROM microprogram revision.	Enter	Not enter		
			RAM Microprogram Version : Specifies the RAM microprogram revision.	Enter	Not enter		
			WEB Title :Sets the WEB Title.	Enter	—		
			Cache Mode : Set a method for allocating cache mode.	—	—	No	
			Host Connection Mode : Set the LINK Separation mode.	—	—		
7	Controller Option	Controller Identifier	Controller Identifier : Controller identifier: Set the controller identifier.	—	—	No	INST 05-0250
		Set up the RS232C error information outflow mode(*2)	RS232C Error Information Outflow Mode			Yes	
			ON (NORMAL) : Does not inhibit an output of error information.	Select	OFF		
			ON (HITRACK) : Does not inhibit an output of error information by the HITRACK.				
			OFF : Inhibits an output of error information.				
		Specifies the write and verify execution mode.	Write and verify mode				
			ON : Does not inhibit the write and verify execution mode.	Select	ON		
			OFF : Inhibits the write and verify execution mode.				

*1 : Whether a change of the setting for the DF600 is possible or not is shown.

*2 : RKH/RKHE+RKA is not supported.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Menu item	Use	Contents		Factory setting	Change of Setting (*1)	Reference page
			Parameter	How to set			
8	LAN Setting	Specifies the LAN configuration information.	DHCP(*2). ON: Enables the DHCP mode.	Select	Not select	Yes	INST 05-0260
			LAN information				
			IP Address : Sets the IP ADDRESS.	Enter	192.168.0.16		
			SUB Net Mask : Sets the SUB NET MASK.	Enter	255.255.255.0/ 255.255.255.224 (*3)		
			Default Gateway : Sets the Default GATEWAY.	Enter	0.0.0.0		
			Ether Address : An Ether Address is displayed. It cannot be changed.	—	Preset Ether address		

*1 : Whether a change of the setting for the DF600 is possible or not is shown.

*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”. (Disk Array Management Program 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 this device is used as an external Disk Drive of the DHCP server and the device IP address is obtained by DHCP function, and if the IP address of “10.x.x.x” is assigned to the device, IP addresses of Ports for Users and Maintenance may conflict with each other and the device may not function normally.
Request the system administrator that the DHCP server does not assign IP address of “11.x.x.x” to the device.

*3 : Micro revision is 0653/C or later.

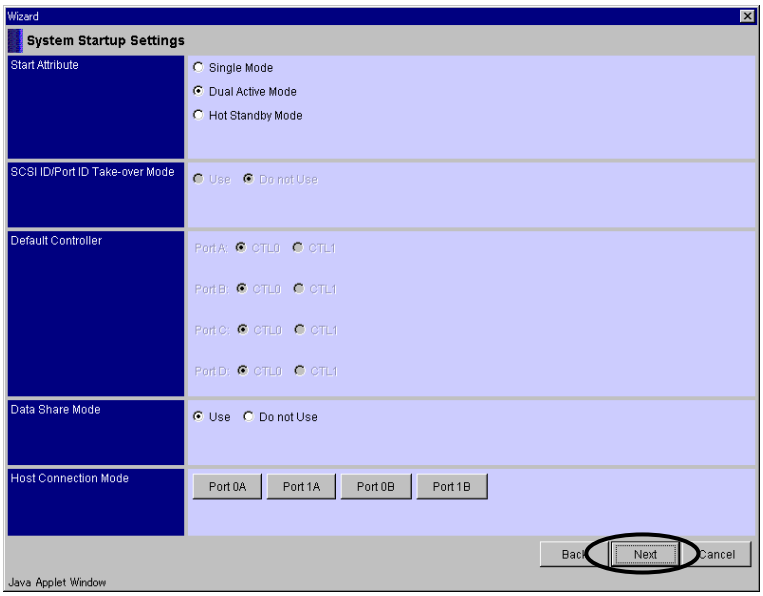
Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(1) Setting of System Startup Settings

(a) The system parameter window is displayed starting with [System Startup Settings]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [Start Attribute] : Select the configuration of the array unit.
For the details of the mode, refer to Subsection 4.3.2, “Dual system configuration” on page INTO 04-0080.
[Single Mode] : Single configuration (RKH/RKHE+RKA is not supported)
[Dual Active Mode] : Dual active configuration
[Hot Standby Mode] : Hot standby configuration

② [SCSI ID/Port ID Take-over Mode] : Specifies the take-over of SCSI ID/port ID.
[Use] : Used the SCSI ID/Port ID Take-over Mode.
[Do Not Use] : Not used the SCSI ID/Port ID Take-over Mode

③ [Default Controller] : Specify a controller that controls the port.
The specification can be made only when the SCSI ID/Port ID Takeover mode is specified.

④ [Data Share Mode] : Specifies the attribute of the data share mode.
For the details of the Data Sharing mode, refer to Subsection 4.3.2, “Dual system configuration” on page INTO 04-0080.
[Use] : Used in the data share mode.
[Do Not Use] : Not used in the data share mode.

⑤ [Host Connection Mode] : This item cannot be set for the DF600.

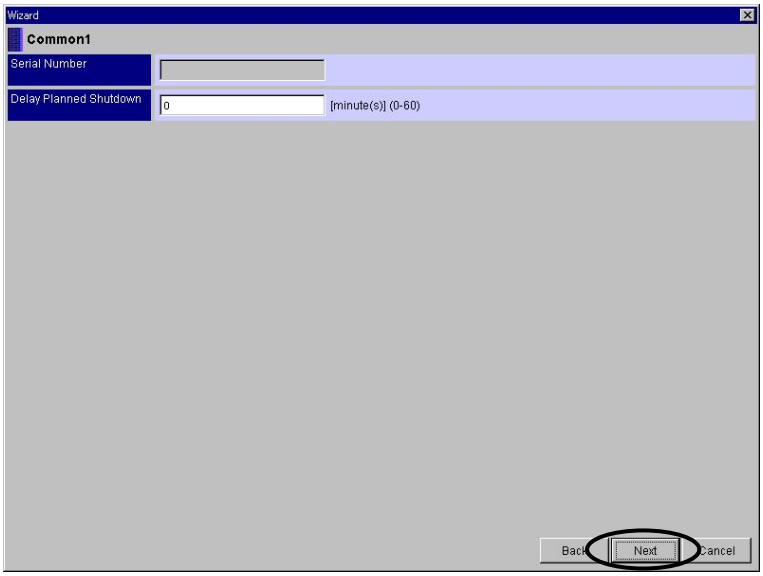
Copyright © 2002, 2005, Hitachi, Ltd.

(b) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Setting of Common1

(a) The system parameter window is displayed starting with [Common1]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [Serial Number] : Setting of this item is not necessary for the DF600.

② [Delay Planned Shutdown] : Specify the time in minutes to delay the execution of the planned shutdown when the main switch has turned off.
The applicable range is from 0 to 60 minutes.

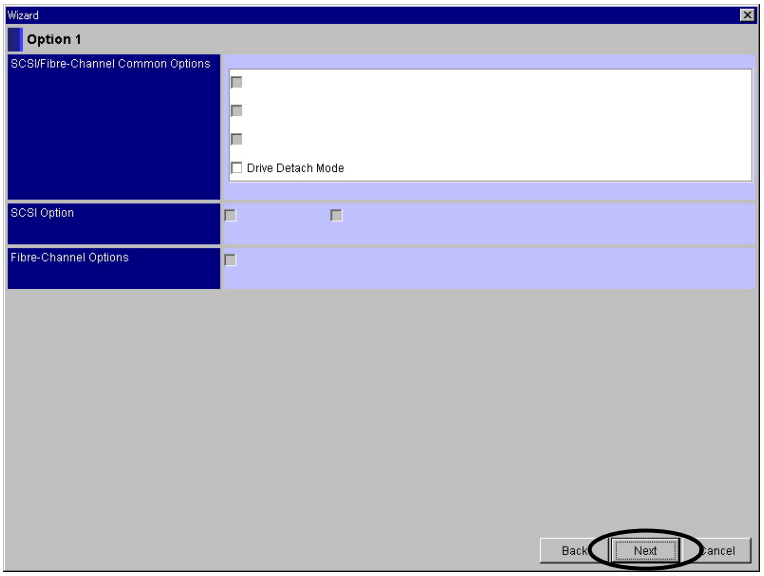
(b) Verify that the settings that have been made are correct and click the [Next] button. When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Setting of Option 1

Set the Option 1 function of the array unit. Two or more optional functions can be selected.

(a) The system parameter window is displayed starting with [Option1]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [SCSI/Fibre-Channel Common Options] : Set the optional function(s) according to the configuration of the array unit.
[Drive Detach Mode] : Validates the drive blockade mode.

② [SCSI Option] : Setting of this item is not necessary for the DF600.

③ [Fibre-Channel Options] : Setting of this item is not necessary for the DF600.

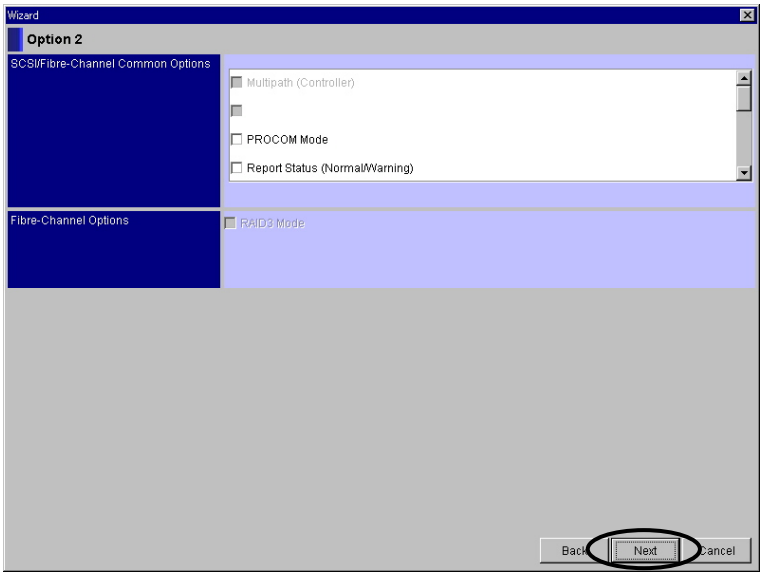
(b) Verify that the settings that have been made are correct and click the [Next] button. When the [Return] button is clicked, the preceding window is displayed. To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Setting of Option 2

Set the Option 2 function (expanded option) of the array unit. Two or more optional functions can be selected.

(a) The system parameter window is displayed starting with [Option 2]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [SCSI/Fibre-Channel Common Options] : Options that can be used by the SCSI and Fibre Channel interface array units. Set the optional function(s) according to the configuration of the array unit.

[Multipath (Controller)] : Setting of this item is not necessary for the DF600.
[PROCOM Mode] : Validates the warning status report mode.
[Report Status (Normal/Warning)] : Validates the warning status report mode. (RKH/RKHE+RKA is not supported)
[Multipath (Array Unit)] : Sets a unit of the sequential judgment to each array unit.
[Turbo LU Warning] : Reports the warning status when Cache Management is invalidated.
[NX Mode] : Validates the NX Mode.
[Auto Reconstruction Mode] : Validates the Auto Reconstruction Mode.
[Forced Write Through Mode] : Validates the Forced Write Through Mode.
[Changing Logical Unit Mode 1] : Validates the Changing Logical Unit Mode 1.
[Multiple Stream Mode] : Validates the Multiple Stream Mode.
[Multiple Stream Mode (Write)] : Validates the Multiple Stream Mode (Write).
[Multiple Stream Mode (Read)] : Validates the Multiple Stream Mode (Read).
[High-Speed Sequential write Mode] : Speeds up the sequential writing.

Copyright © 2002, 2005, Hitachi, Ltd.

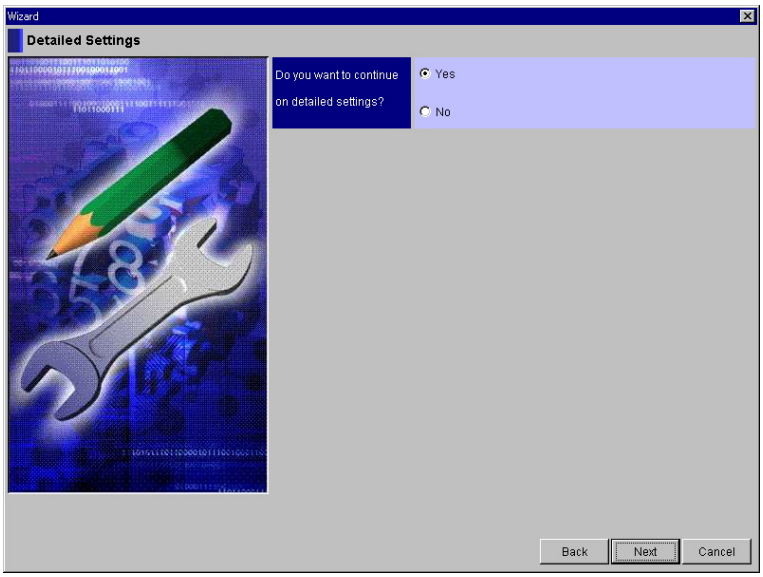
[ShadowImage I/O Switch Mode] : Validates the ShadowImage I/O Switch Mode.
[Synchronize Cache All Execution Mode] : Validates the Synchronize Cache All Execution Mode.
[Synchronize Cache Invalid Mode] : Validates the Synchronize Cache Invalid Mode.

NOTE : When both of the Synchronize Cache Complete Execution mode and Synchronize Cache Suppression mode are checked off, the Synchronize Cache Complete Execution mode is validated.

② [Fibre-Channel Options] : Setting of this item is not necessary for the DF600.

(b) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

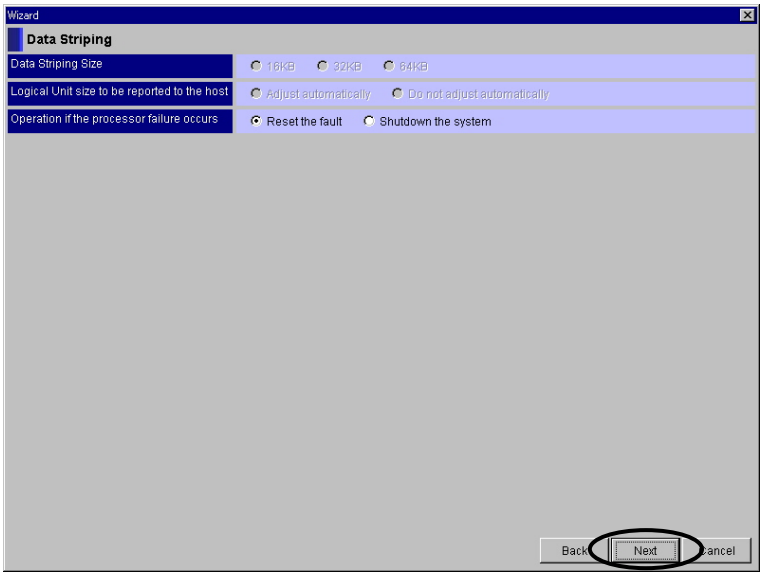
(c) Select [Yes] when you set the “From Detail Setting” as before, or select [No] when you do not set it, and then click the [Next] button.
When you select [No], the “System Parameter Setting Completed” window is displayed. Proceed to Subsection 5.2.3, “Quitting system parameter setting” on page INST 05-0270.



Copyright © 2002, 2005, Hitachi, Ltd.

(5) Setting of Data Striping

(a) The system parameter window is displayed starting with [Data Striping]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [Data Striping Size] : Setting of this item is not necessary for the DF600.

② [Logical Unit size to be reported to the host] : Setting of this item is not necessary for the DF600.

③ [Operation if the processor failure occurs] : Sets the operation to be performed when a processor failure occurs.

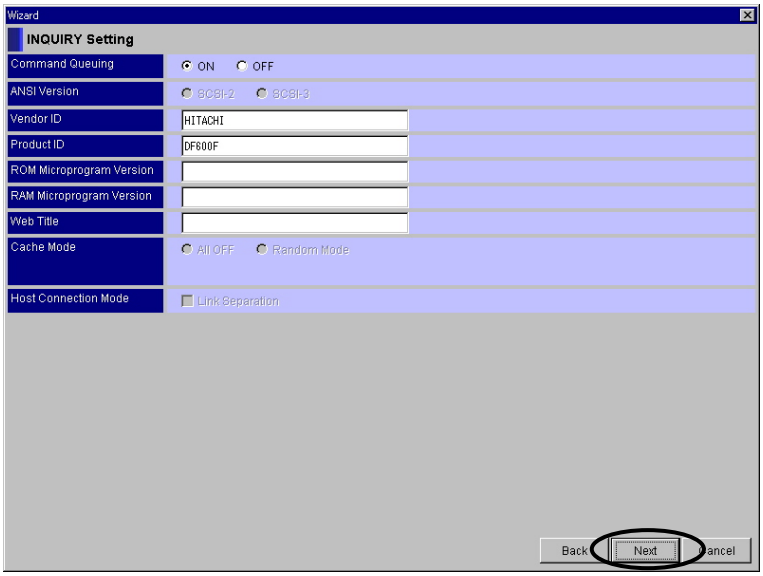
[Reset the fault] : Resets a failure, and restart the controller.
[Shutdown the system] : Shuts the array unit down.

(b) Verify that the settings that have been made are correct and click the [Next] button. When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(6) Setting of INQUIRY Setting

(a) The system parameter window is displayed starting with [INQUIRY Setting]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [Data Striping Size] : Specifies an execution of a command queuing.
[ON] : Executes a command queuing.
[Off] : Inhibits a command queuing.

② [ANSI Version] : Setting of this item is not necessary for the DF600.

③ [Vendor ID] : Enter a vendor name with eight characters. When the name consists of less than seven characters, make an eight-character entry by filling the reset with space(s).

④ [Product ID] : Enter a model name with 16 characters. When the name consists of less than 16 characters, make a 16-character entry by filling the reset with space(s).

⑤ [ROM Microprogram Version] : Specifies a microprogram version of a ROM reported by inquiry command.

⑥ [RAM Microprogram Version] : Specifies a microprogram version of a RAM reported by inquiry command.

⑦ [Web Title] : [Web Title]: Specify characters to be displayed in the title bar of the browser when displaying the Web function built in the disk array subsystem by the browser. Enter 32 or less one-byte numerals and/or alphabetic characters or characters excluding numerals and symbols (‘, “, and \).

⑧ [Cache Mode] : Setting of this item is not necessary for the DF600.

⑨ [Host Connection Mode] : Setting of this item is not necessary for the DF600.

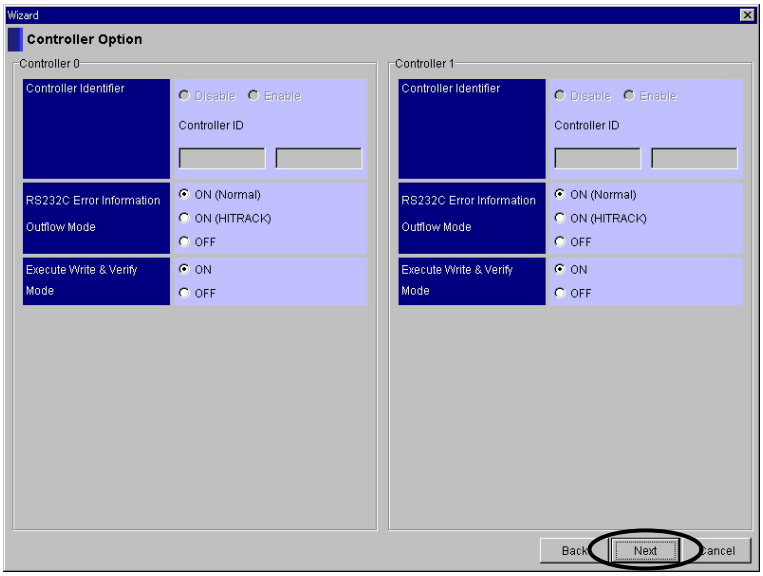
Copyright © 2002, 2005, Hitachi, Ltd.

(b) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(7) Setting of Controller Option

(a) The system parameter window is displayed starting with [Controller Option]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [Controller Identifier]: Setting of this item is not necessary for the DF600.

② [RS232C Error Information Outflow Mode] : Sets the mode of the error information sending to the RS232C of the controller 0/1. (RKH/RKHE+RKA is not supported)

[ON (Normal)] : Outputs information.
[ON (HITRACK)] : Outputs HITRACK mode information.
[OFF] : Inhibits an output of information.

③ [Execute Write & Verify Mode] : Sets the write & verify execution mode of the controller 0/1.

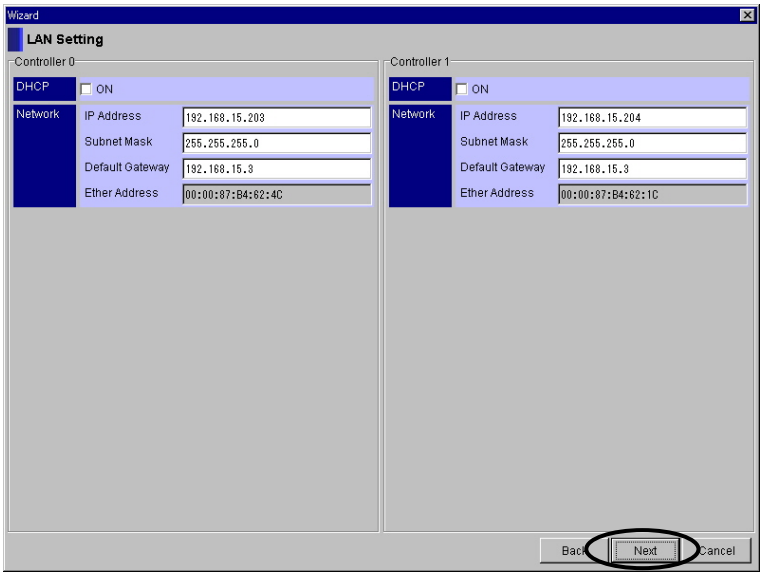
[ON] : Executes write and verify.
[Off] : Does not execute write and verify.

(b) Verify that the settings that have been made are correct and click the [Next] button. When the [Return] button is clicked, the preceding window is displayed. To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(8) Setting of LAN Setting

(a) The system parameter window is displayed starting with [LAN Setting]. The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



① [DHCP] : Sets the DHCP function
When the check box of the [DHCP] is checked, the DHCP mode is validated.

② [Network] : Sets the LAN parameter.
When the check box of the [DHCP] is checked, this item is grayed and cannot be set.

[IP Address] : Sets the IP address.
(At the head of IP Address, '0', '127', and '255' cannot be set. When clicking the [Next] button after setting any one of these values, an error will be caused.)

[Subnet Mask] : Sets the subnet mask.

[Default Gateway] : Sets the default gateway.

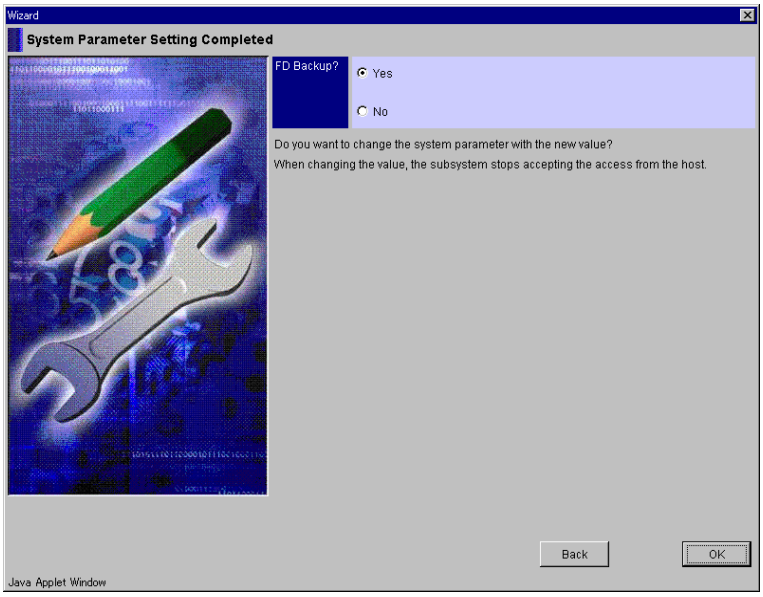
[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

(b) Verify that the settings that have been made are correct and click the [Next] button. When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

Copyright © 2002, 2005, Hitachi, Ltd.

5.2.3 Quitting system parameter setting

(1) "System Parameter Setting Completed" is displayed. Click the [OK] button. Incidentally, the "FD backup" cannot be set for the DF600.



(2) If system parameter setting is completed, the following window is displayed. Click the [OK] button.

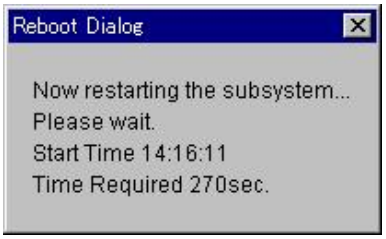


To validate the target ID which has been set, it is required to restart the subsystem. The former setting is valid until the subsystem is restarted. When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, restart the subsystem after making sure that accesses from a host computer has ceased.

NOTE : If LAN configuration information is modified, an error message (Interface Error) may be displayed without displaying a restart completion message when restarting is initiated.
When an error message is displayed after the LAN configuration information is modified and a restarting is directed to be done, close the unit screen, make a change in the information that has been registered through the main screen, and then open the unit screen again.

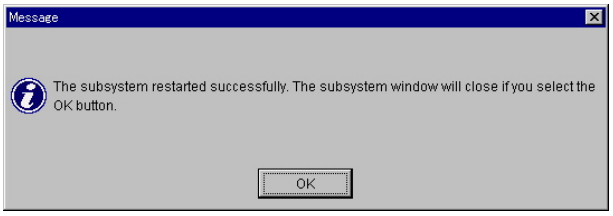
Copyright © 2002, 2005, Hitachi, Ltd.

(3) When the disk array subsystem is restarted, a time when the restarting is commenced is displayed. The restarting requires about two to six minutes.



NOTE : It may take a long time until a reply is made depending on the status of the disk array subsystem. If no reply is made after waiting for longer than ten minutes, check the status of the disk array subsystem.

(4) As a message is displayed when the restart has been completed, click the [OK] button.



When the [OK] button is clicked, the unit window is closed.
When you want to do another operation, open the unit window by selecting a disk array subsystem to be operated again in the main window.

Copyright © 2002, 2005, Hitachi, Ltd.

5.3 Setting Host Group

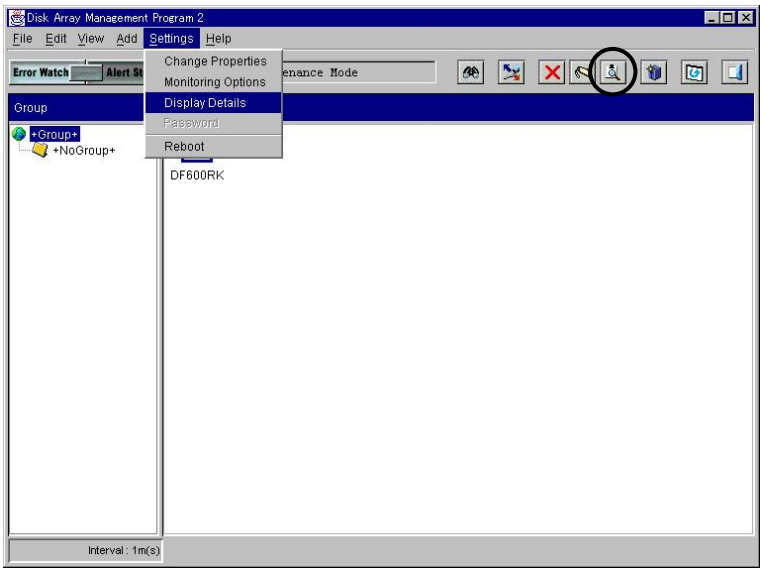
- Make a setting for making the subsystem recognized by a server.
- The setting of the host group must be made for each port.

5.3.1 Before setting host group

(1) Turn on the power supply.

(2) Start the Disk Array Management Program and set the Active Mode in the "Maintenance Mode".
For the procedure for changing to the Maintenance mode, refer to Step (b), "Changing the Maintenance Mode" on page INST 05-0050 in Item (3), "Registering the newly introduced DF in the Disk Array Management Program" in Subsection 5.1.1.

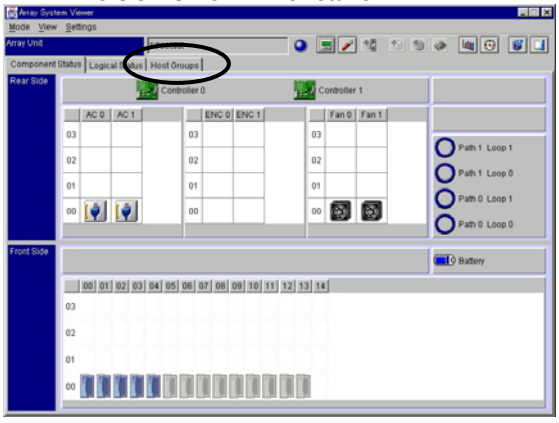
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Display Details]



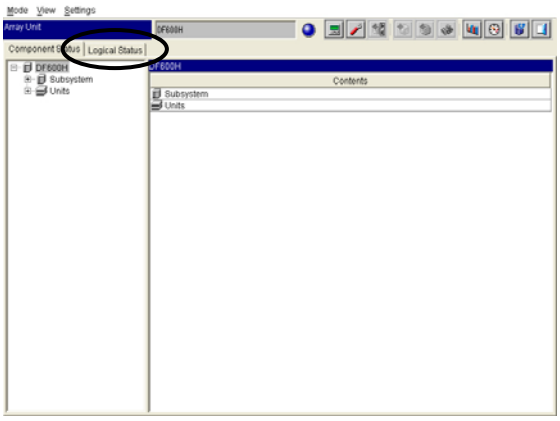
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the unit window, click the [Host Groups] tab. (DAMP Version is Ver.7.xx or earlier)
On the unit window, click the [Logical Status] tab. (DAMP Version is Ver.9.00 or later)

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

5.3.2 Setting of option

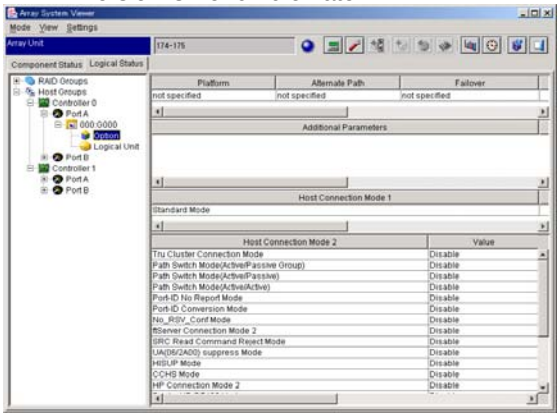
There are two methods for setting the options, that is, the simple setting and detail setting. When making the simple setting, select elements of an environment of the host computer to be connected. When the selection is made, the host group options (host connection mode 1 and 2) necessary for the host 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.

(1) 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.

(a) Click the [Logical Status] tab in the unit window.

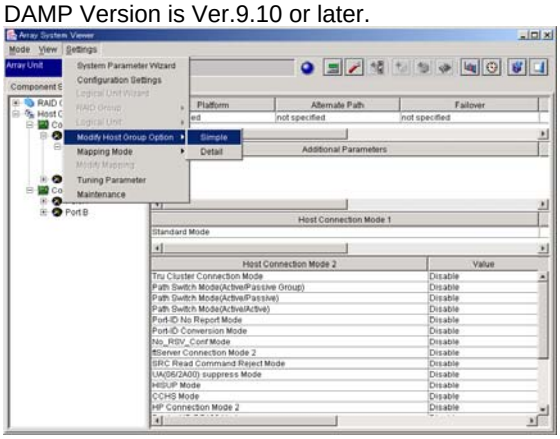
(b) Display the [000:G000] by clicking the port through a controller for which you want to set the host connection mode. Then display the options and logical unit by double clicking on the [000:G000] and select the options.

DAMP Version is Ver.9.10 or later.



(c) Select [Settings], [Modify Host Group Option], and [Simple] in this order.

DAMP Version is Ver.9.10 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

(d) “Option (Simple)”Property window is opened.
Select [Platform], [Alternative Path], and [Fail-Over] according to an environment of the host to be connected.

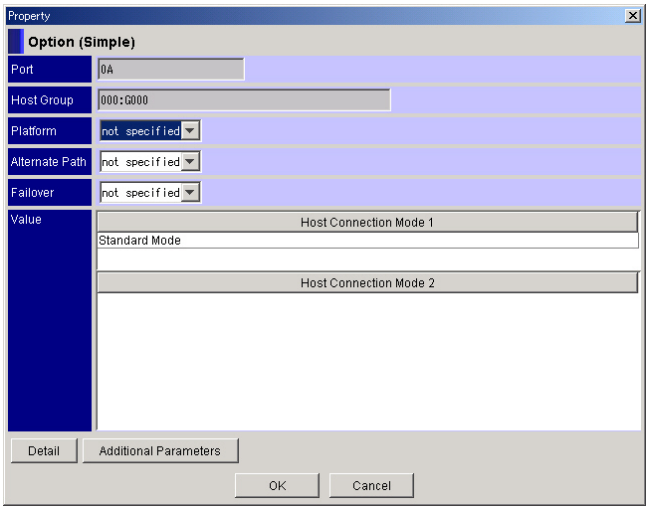
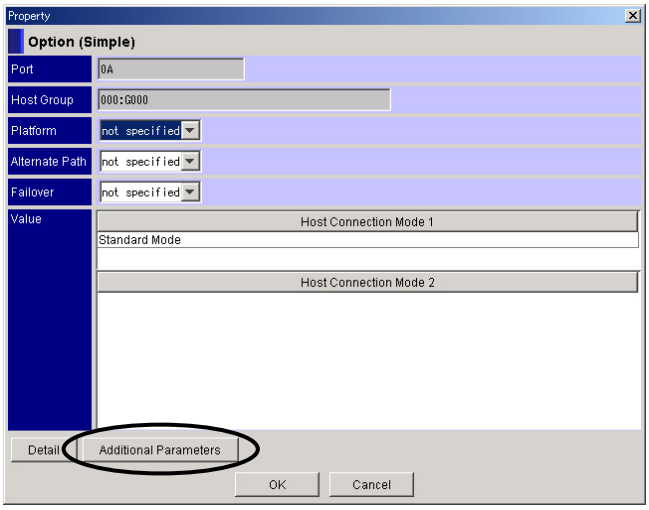


Table 5.3.1 Simple Setting Item List

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		

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Click the [Additional Parameters] button.



(f) The “Additional Parameters” window is opened. Select the [Item] as occasion demands and click the [OK] button.

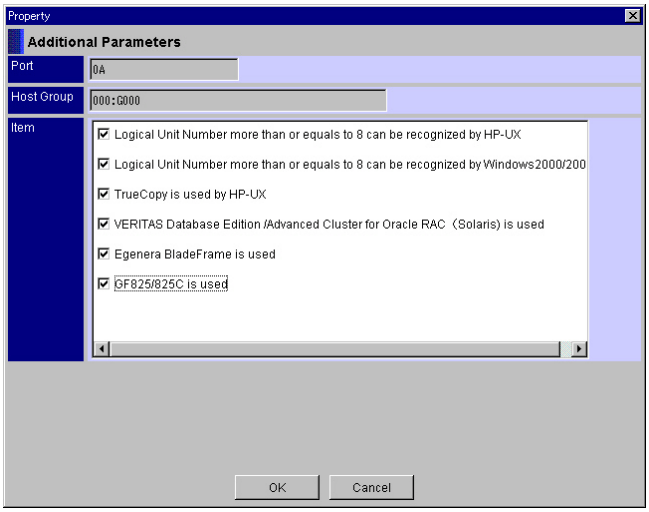


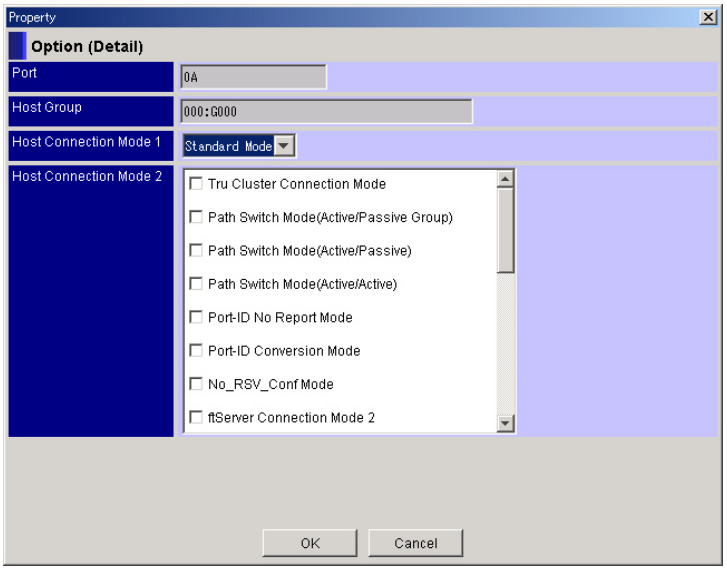
Table 5.3.1.1 Simple Setting Item List

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
		Logical Unit Number more than or equals to 8 can be recognized by Windows 2000/2003		
		TrueCopy is used by HP-UX		
		VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris) is used		
		Egenera BladeFrame is used		
		GF825/825C is used		

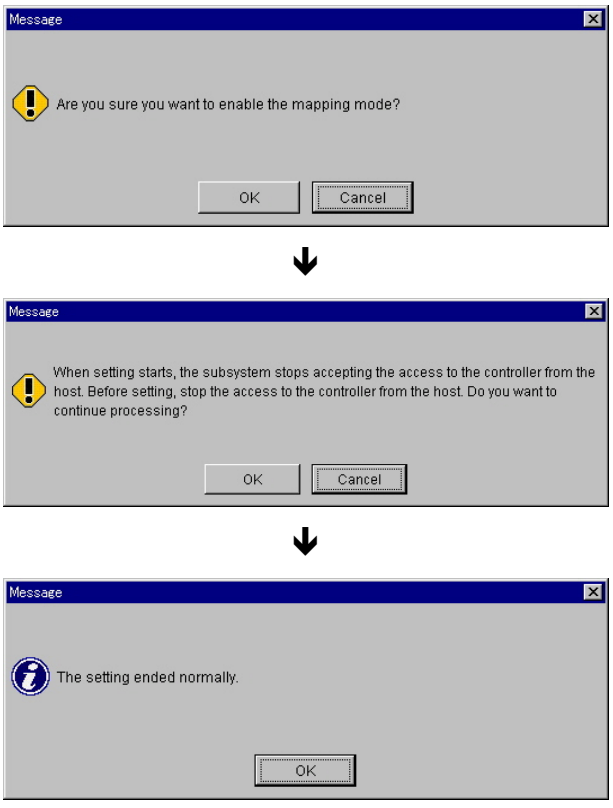
(g) Click the [Detail] button as occasion demands.

Copyright © 2003, 2005, Hitachi, Ltd.

(h) Select [Host Connection Mode 1] and [Host Connection Mode 2] and click the [OK] button.



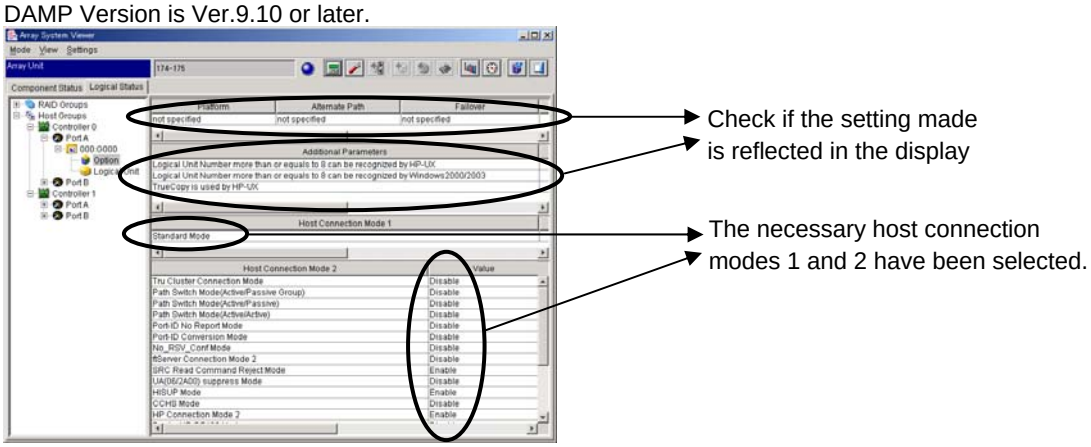
(i) Click the [OK] button in the “Option (Simple)” window.



Copyright © 2003, 2005, Hitachi, Ltd.

(j) 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.

DAMP Version is Ver.9.10 or later.



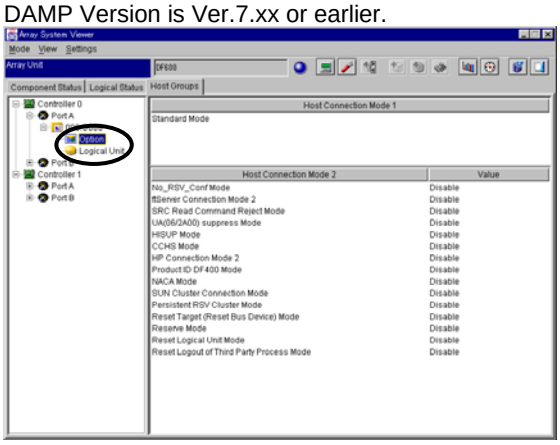
(k) Make the settings for the rest of the ports in the same way.

Copyright © 2003, 2005, Hitachi, Ltd.

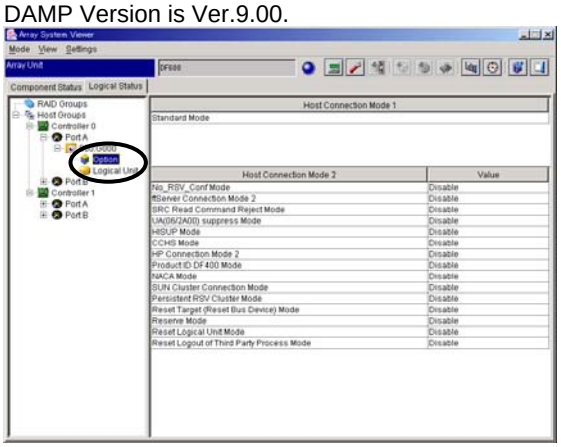
(2) Detail setting

(a) 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 “Option” and “Logical Unit” by clicking the “000:G000,” and then click the “Option.”

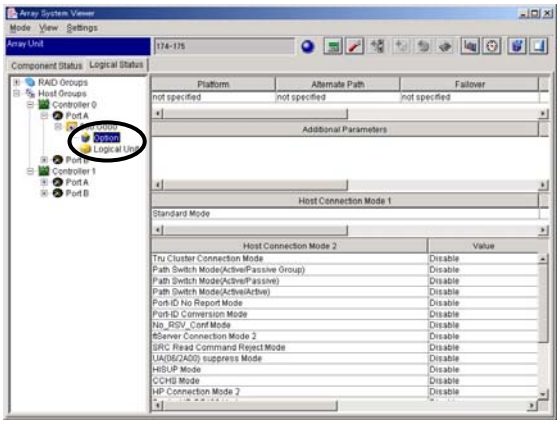
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



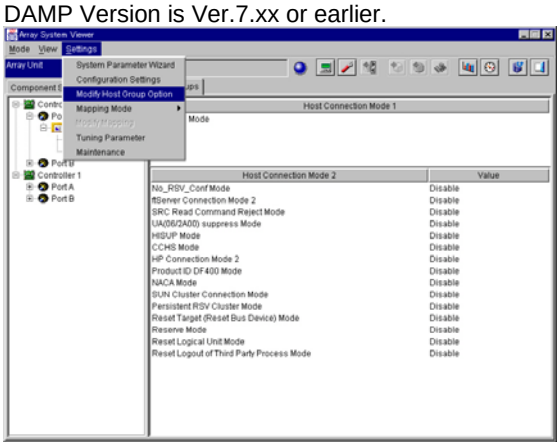
DAMP Version is Ver.9.00 or later.



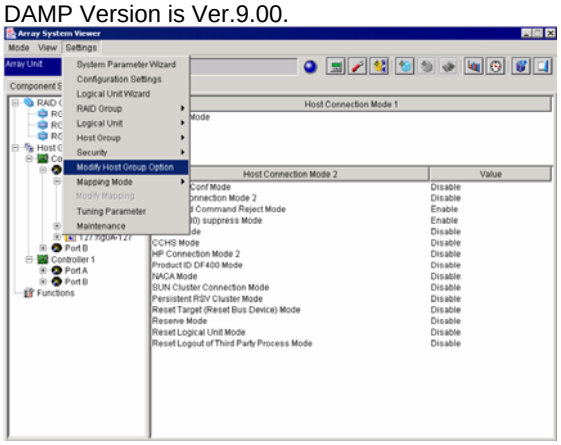
Copyright © 2003, 2005, Hitachi, Ltd.

(b) Select “Settings”, and then select “Modify Host Group Option”.

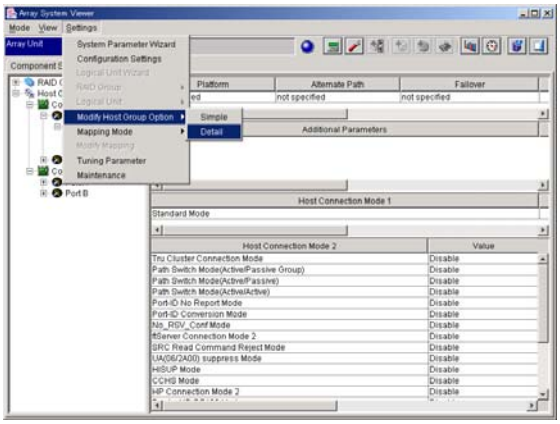
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



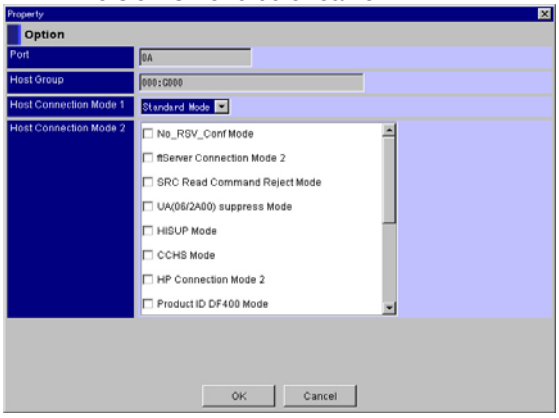
DAMP Version is Ver.9.10 or later.



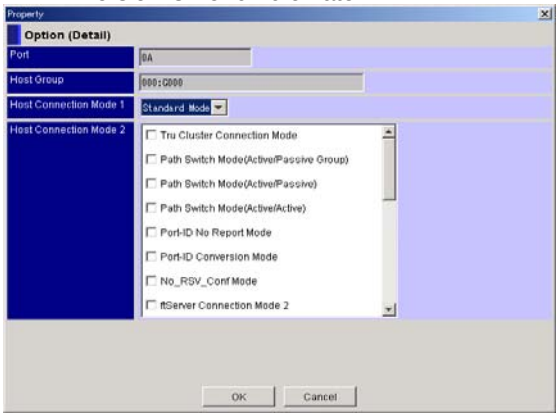
Copyright © 2003, 2005, Hitachi, Ltd.

(c) The “Property” 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)].

DAMP Version is Ver.9.00 or earlier.



DAMP Version is Ver.9.10 or later.



Host Connection Mode 1 : See No. 1 in Table 5.3.1, “List of Host Group Setting Items”.
Host Connection Mode 2 : See No. 2 in Table 5.3.1, “List of Host Group Setting Items”.

Table 5.3.1.2 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.)	Same Node Name Mode : When using SANsurfer, you need to set this mode.	Select	Not selected
		Tru Cluster Connection Mode(*2) : When using Tru Cluster, you need to set this mode.	Select	Not selected
		Path switch Mode (Active/Passive Group) : Not use	Select	Not selected
		Path switch Mode (Active/Passive) : Not use	Select	Not selected
		Path switch Mode (Active/Active) : Not use	Select	Not selected
		Port-ID No Report Mode: Not use	Select	Not selected
		Port-ID Conversion Mode(*2): When using the DBE_AC with direct connection, set the PortID Conversion Mode.	Select	Not selected
		No_RSV_Conf Mode(*1) : The Resavation Conflict answer is suppressing.	Select	Not selected
		ftServer Connection Mode2 : Supports ftServer Connection function.	Select	Not selected
		SRC Read Command Reject Mode : If you want to use the subsystem suppressing the read access to the P-VOL when the mode is changed to PSUE, select [SRC Read Command Reject Mode]for the [Host Connection Mode 2]		
		UA (06/2A00) suppress Mode : Unit attention (06/2A00) is suppressed.	Select	Not selected
		HISUP Mode : In this mode, a response to the Standard Inquiry is made with the HISUP bit set to 1.	Select	Not selected
		CCHS Mode : CCHS convert Mode	Select	Not selected
		HP Connection Mode 2: 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

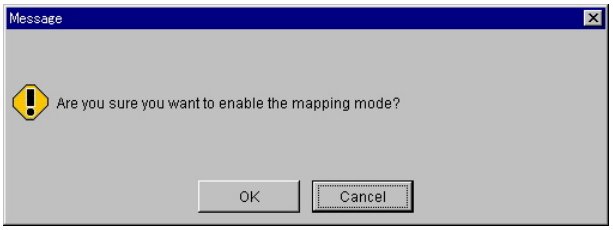
*1 : This can be set up if the microprogram revision is 0653/C or the subsequent ones.
*2 : This can be set up if the microprogram revision is x655/D or the subsequent ones.

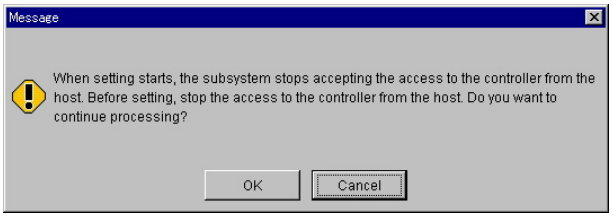
Copyright © 2002, 2005, Hitachi, Ltd.

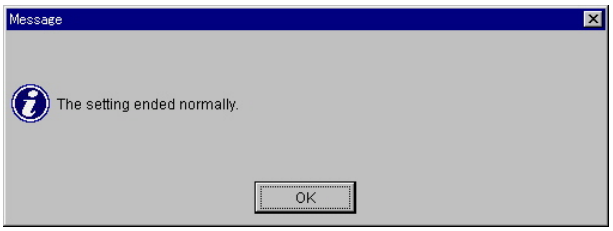
No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Host Connection Mode 2 (Two or more modes may be selected.)	Product ID DF400 Mode : Product ID DF400 Mode.	Select	Not selected
		NACA Mode(*2) : Supports NACA (Normal Auto Contingent Allegiance) that is a standard on SCSI-3.	Select	Not select
		SUN Cluster Connection Mode : This mode enables each LU to be assigned a unique DID in the SUN Cluster 3.0 system.	Select	Not select
		Persistent RSV Cluster Mode : Supports Persistent Reserve command.	Select	Not select
		Target Reset (Bus Device Reset) Mode : Sets the target reset mode at reception of target reset from another port.	Select	Not select
		Reserve Mode : Sets the effect range of LU reserve.	Select	Not select
		Logical Unit Reset Propagation Mode : Sets the Logical Unit Reset Propagation mode at the time when the Logical Unit Reset is received from another port.	Selectd	Not select
		Third Party Process Logout Mode : Sets the Third Party Process Logout mode at the time when the Third Party Process Logout is received from another port.	Select	Not select

*2 : Set the NACA mode in the case where the subsystem is connected to the AIX server in which the IBM genuine HBA (FC6227 or later) is installed.
Do not connect a server other than the AIX server, in which the IBM genuine HBA (FC6227 or later) is installed, to a port of the DF600 for which the NACA mode has been set. (In the Fibre Channel Loop connection or Fabric connection, do not connect the AIX server, in which the IBM genuine HBA (FC6227 or later) is installed, together with another type server to a port of the DF600 for which the NACA mode has been set.)

(d) The confirmation window is display. Click the [OK] button.



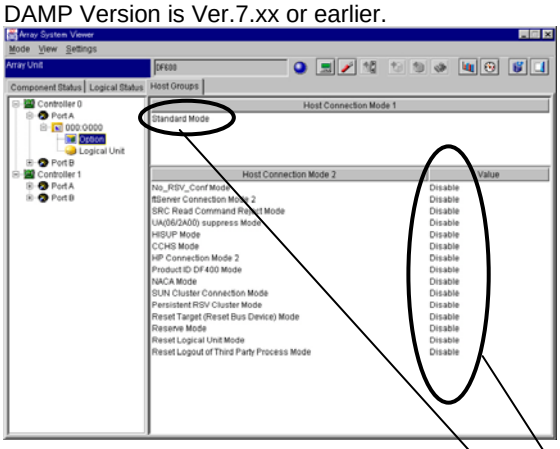




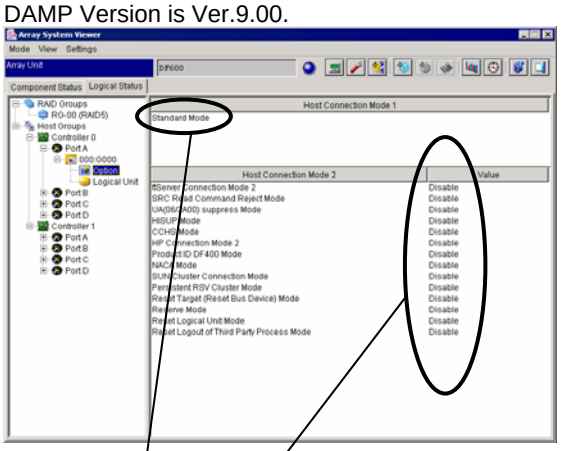
Copyright © 2002, 2005, Hitachi, Ltd.

(e) 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.

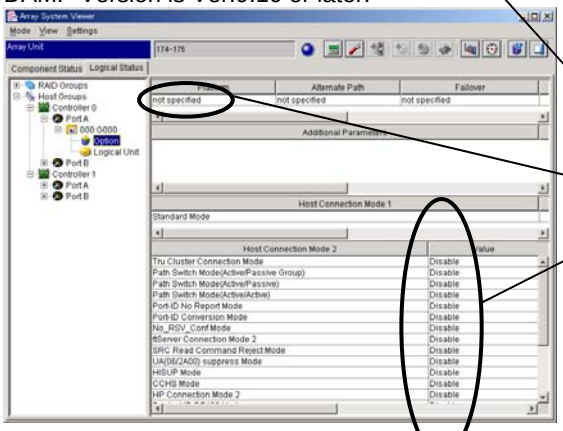
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.



Make sure whether the setting that has been made is displayed here.

(f) Make the setting for the other ports in the same way.

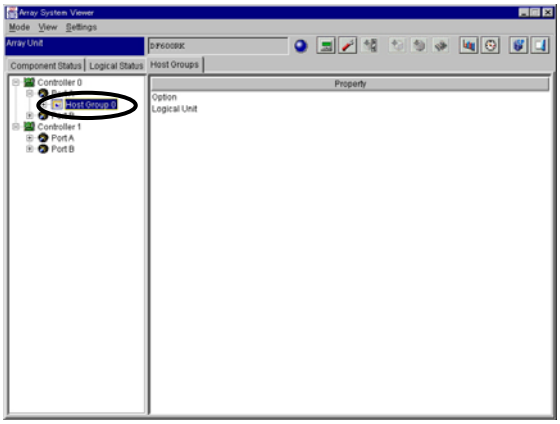
Copyright © 2002, 2005, Hitachi, Ltd.

5.3.3 Setting LU mapping

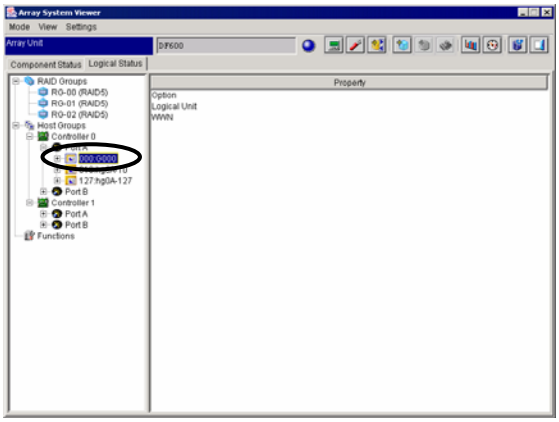
Set mappings of the Port ID, and Host LUN for a LUN so that they are used in the configuration set by a host computer. The setting of the mapping can be newly added while an I/O is being executed using the existing mapping setting。

(1) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.

DAMP Version is Ver.7.xx or earlier.



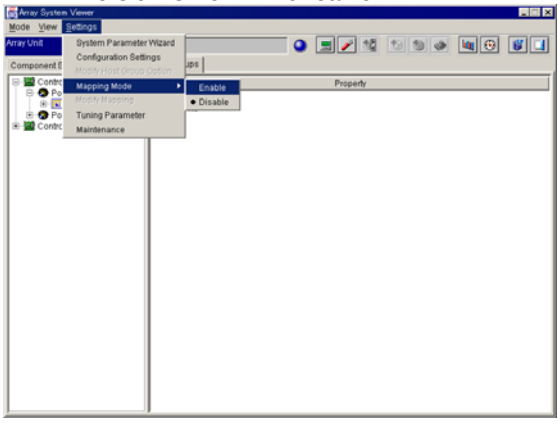
DAMP Version is Ver.9.00 or later.



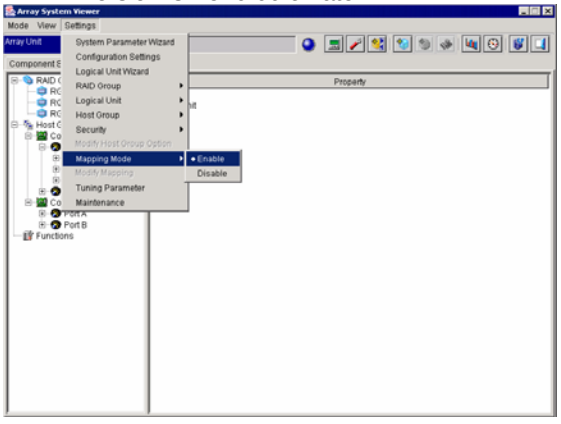
(2) On the unit window, double-click the Controller which you want to set for the connection mode with the host, and then display the Host group 0 by double-clicking the Port.

(3) On the [Settings] menu, select [Mapping Mode] and click the [Enable].

DAMP Version is Ver.7.xx or earlier.

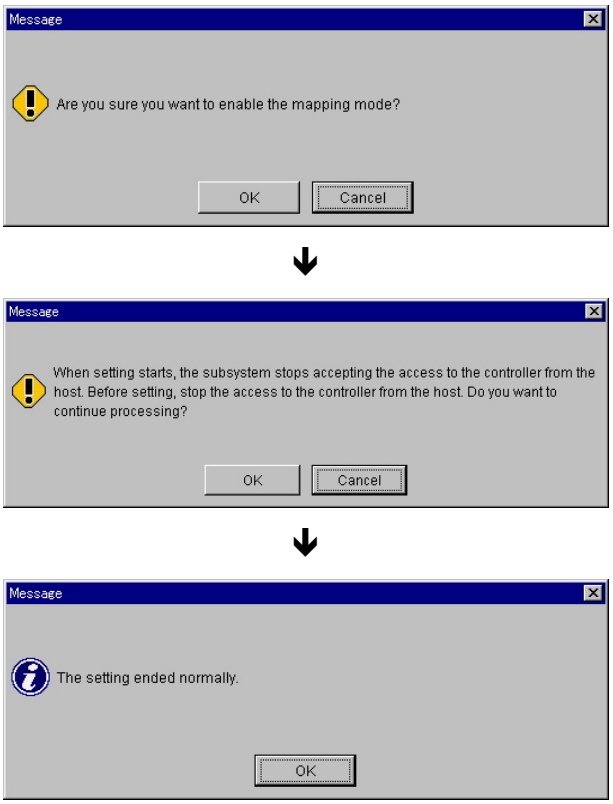


DAMP Version is Ver.9.00 or later.



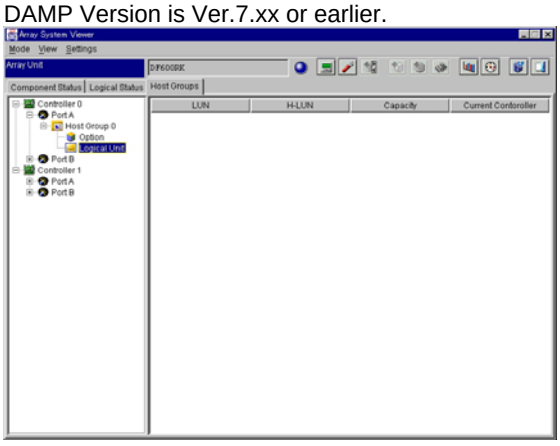
Copyright © 2002, 2005, Hitachi, Ltd.

(4) The confirmation window is display. Click the [OK] button.

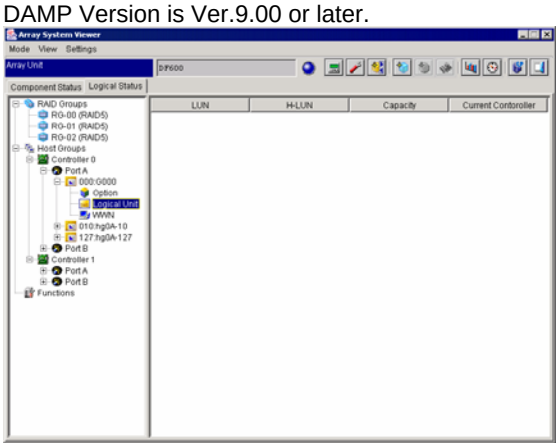


(5) Click the [Logical unit].

DAMP Version is Ver.7.xx or earlier.



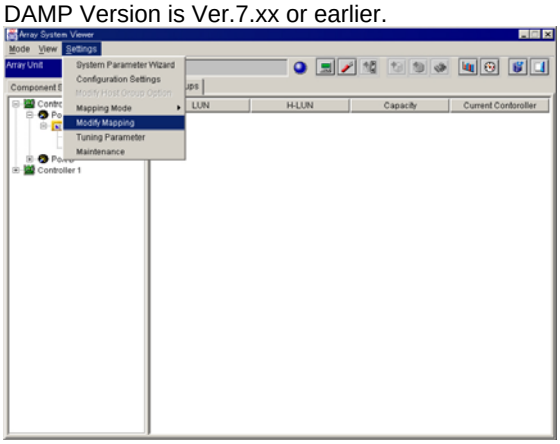
DAMP Version is Ver.9.00 or later.



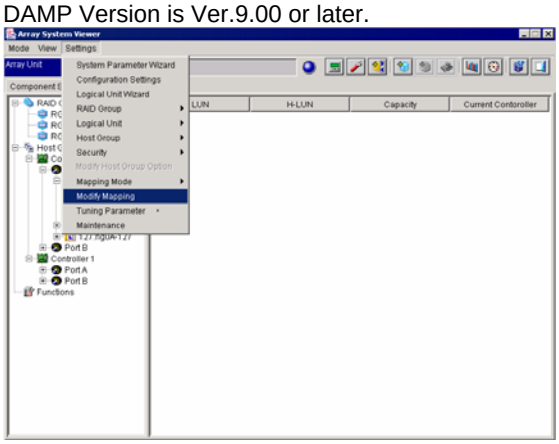
Copyright © 2002, 2005, Hitachi, Ltd.

(6) On the [Settings] menu, click the [Modify Mapping].

DAMP Version is Ver.7.xx or earlier.

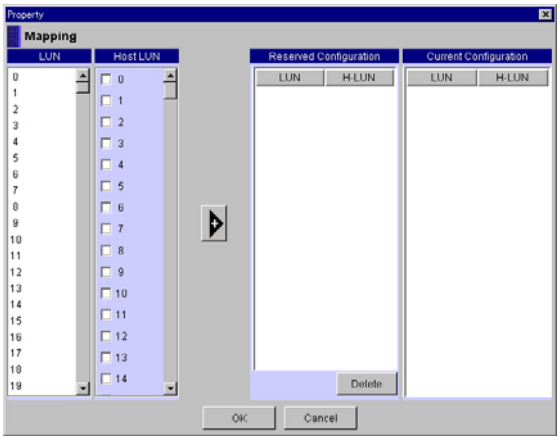


DAMP Version is Ver.9.00 or later.

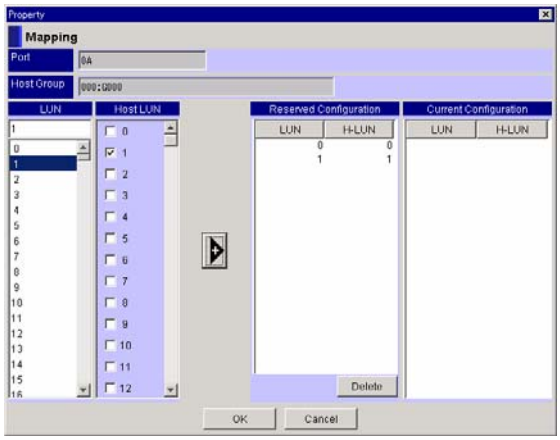


(7) Select one “LUN” and one or more “Host LUN”, and then click button. The added specification is displayed in the “Reserved Configuration”. For the “Host LUN”, multiple selections can be made(‡1).
For deleting LUN mapping information, select the line that you want to delete from the “Reserved Configuration”, and then click the [Delete] button.
The deleted specification disappears from the “Reserved Configuration” display.
Click the [OK] button.

In the case of the connection to the RK/RKL/RKS/RKD/RKSD



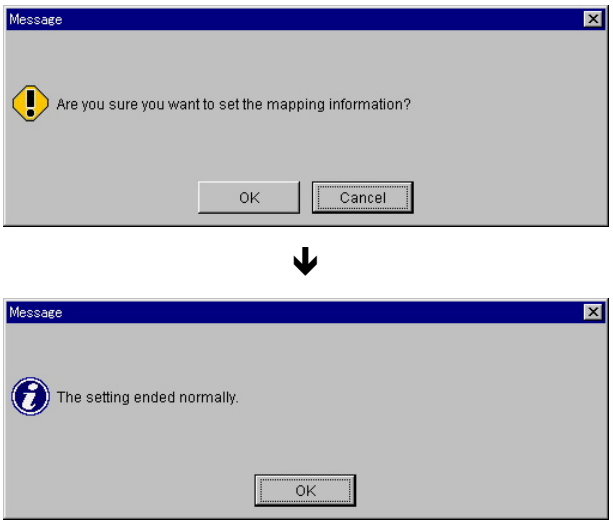
In the case of the connection to the RKH/RKHE



‡1 : When multiple [Host LUN]s are selected, the further values than the selected LUN is automatically allocated, and then it is displayed on the “Reserved Configuration.”

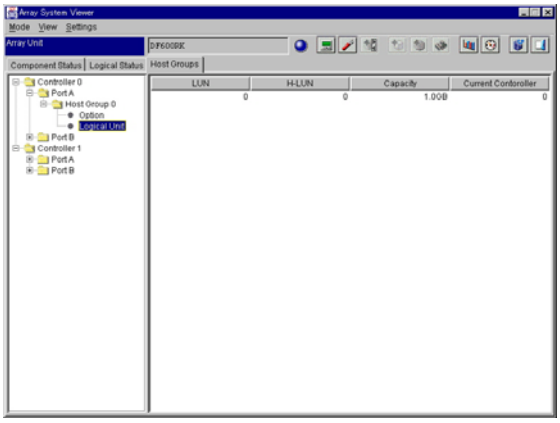
Copyright © 2002, 2005, Hitachi, Ltd.

(8) The confirmation window is display. Click the [OK] button.

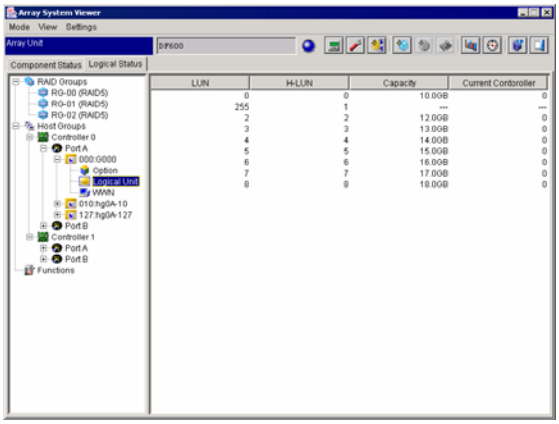


(9) The mapping information is updated and the following window is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(10) Make the setting for the other ports in the same way.

Copyright © 2002, 2005, Hitachi, Ltd.

5.4 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.

NOTE : A read/write from a host computer cannot be executed during an LU formatting. When the subsystem receives a host command, it reports the Not Ready status to the host computer.

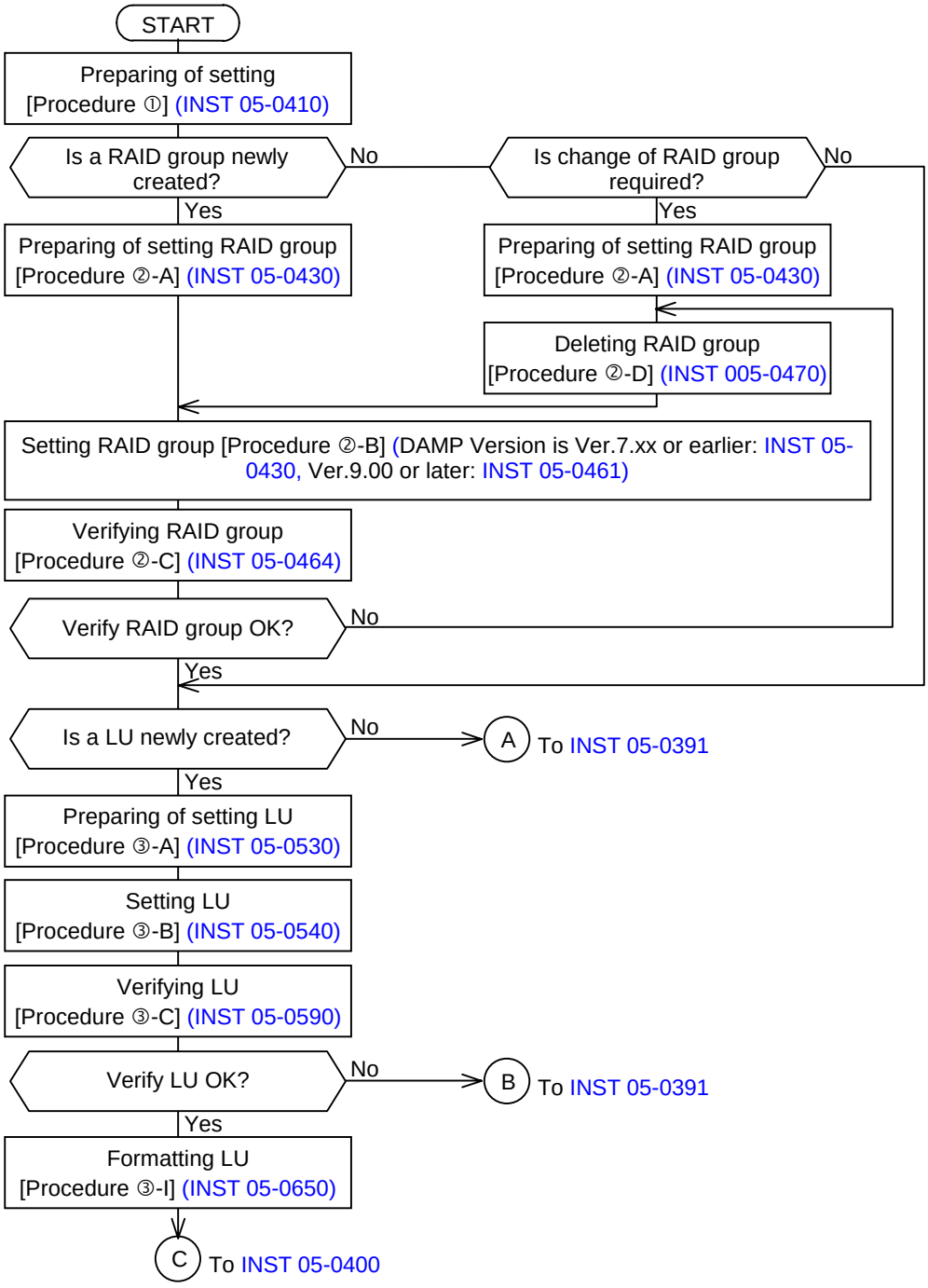


Figure 5.4.1 (1/3) Setting Flow the RAID/LU/Spare Disk

Copyright © 2002, 2005, Hitachi, Ltd.

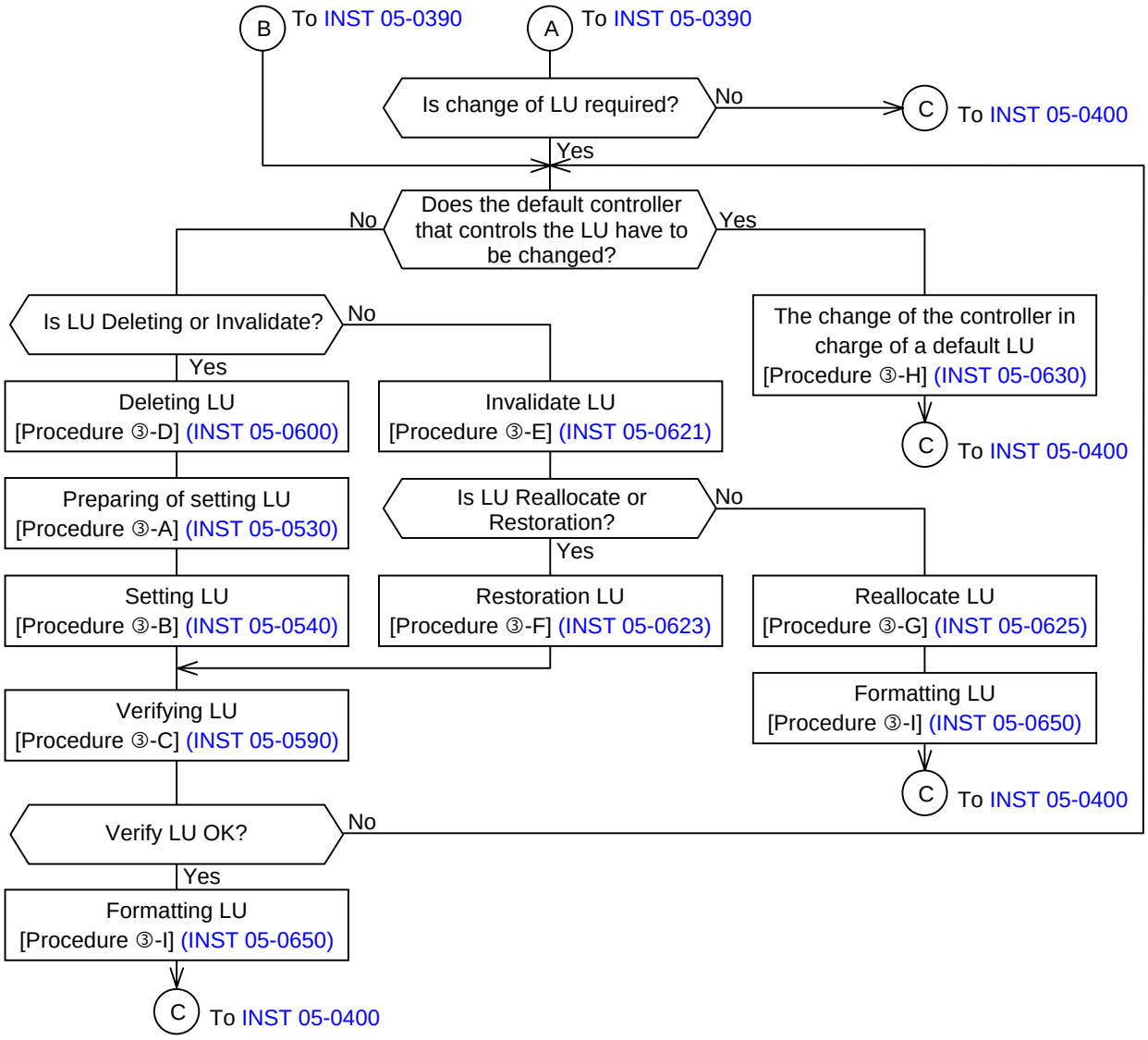


Figure 5.4.1 (2/3) Setting Flow the RAID/LU/Spare Disk

Copyright © 2003, 2005, Hitachi, Ltd.

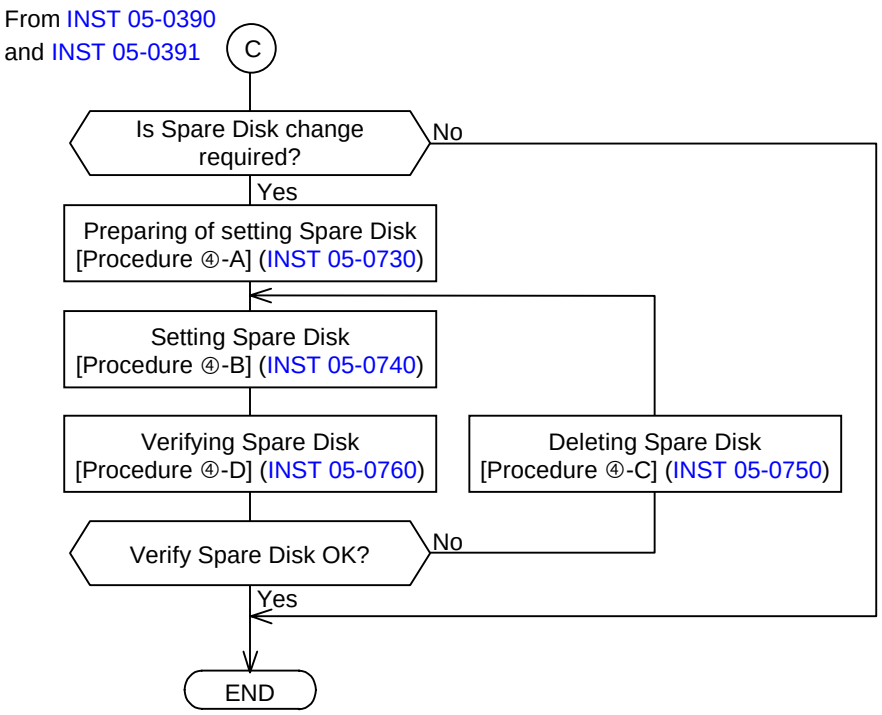


Figure 5.4.1 (3/3) Setting Flow the RAID/LU/Spare Disk

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

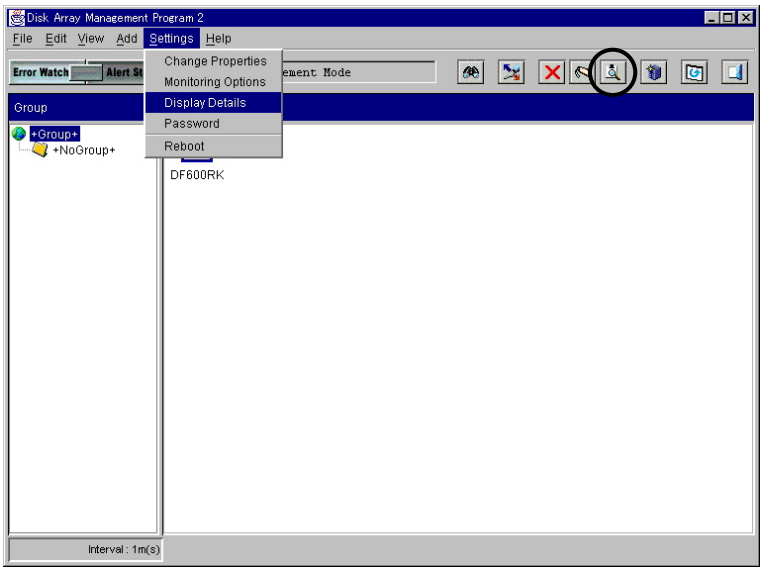
Copyright © 2002, 2005, Hitachi, Ltd.

5.4.1 Preparation of RAID/LU setting

[Procedure ①] Preparing of setting

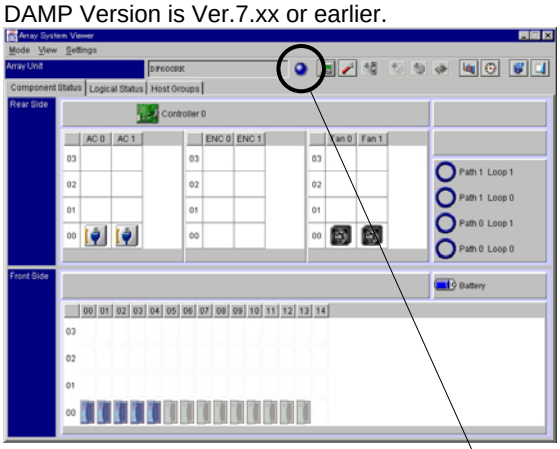
(1) Start the Disk Array Management Program and set the operation mode in the "Management Mode"(‡1).

(2) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

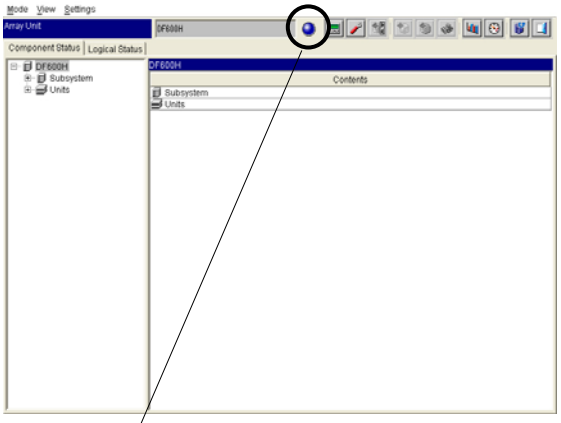


(3) Check that the unit is ready.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



Displayed in green in the ready state.

‡1 : For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), "Changing the Maintenance Mode" on page INST 05-0050

Copyright © 2002, 2005, Hitachi, Ltd.

(4) • When newly creating or changing a RAID group, go to “5.4.2 RAID group setting” (INST 05-0430).
• Go to “5.4.3 Setting of LU” (INST 05-0530) 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].

Copyright © 2002, 2005, Hitachi, Ltd.

5.4.2 RAID group setting

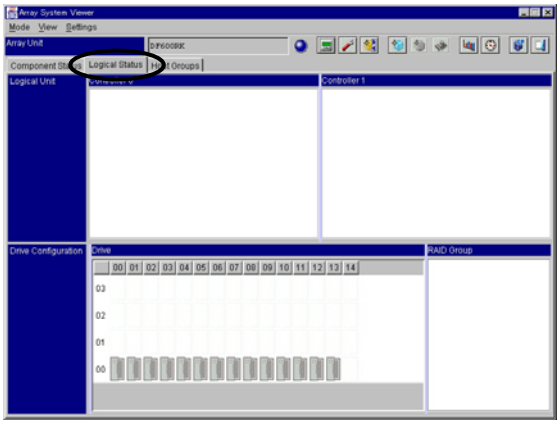
This setting is used to set, delete and reference a RAID group. This function can be used in the device ready state. (The power needs not to turn on again.)

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 "4. 7 Setting RAID Group" (INTO 04-0180) in the Introduction Part.

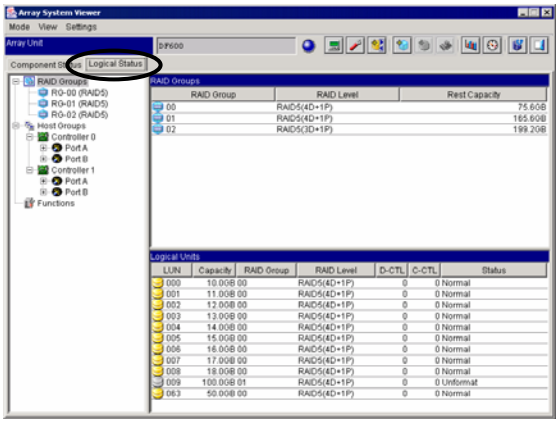
[Procedure ②-A] RAID group setting preparation or confirmation

(1) Click the [Logical Status] tab in the unit window.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



RAID groups and logical units defined for the disk array subsystem are displayed.

[Logical Unit] : Information on all logical units defined for the disk array subsystem is displayed for each controller controlling the logical units.

[Controller 0] : A number (×××) of each logical unit controlled by the Controller-0 and a RAID level and status of a RAID group for which the logical unit is defined are displayed.

[Controller 1] : A number (×××) of each logical unit controlled by the Controller-1 and a RAID level and status of a RAID group for which the logical unit is defined are displayed.

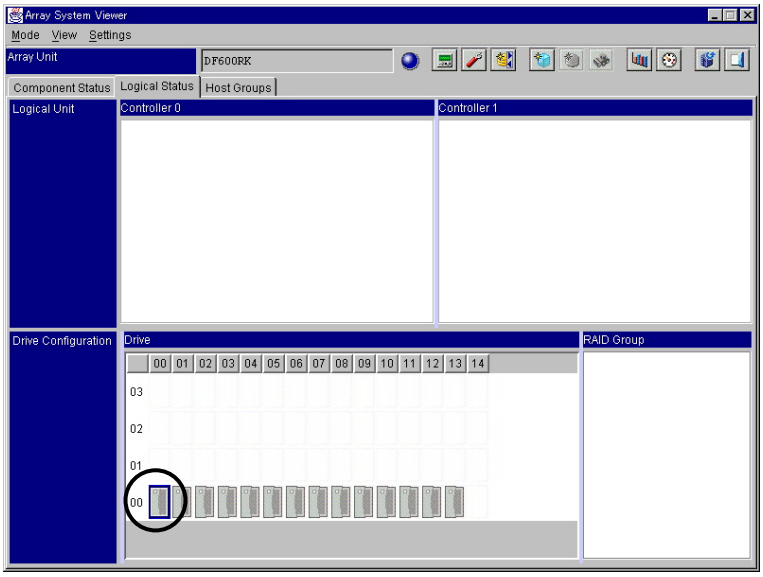
[Drive Configuration] : Statuses of Disk Drives installed in the disk array subsystem are displayed.

[RAID Group] : Information on all RAID groups defined for the disk array subsystem are displayed.

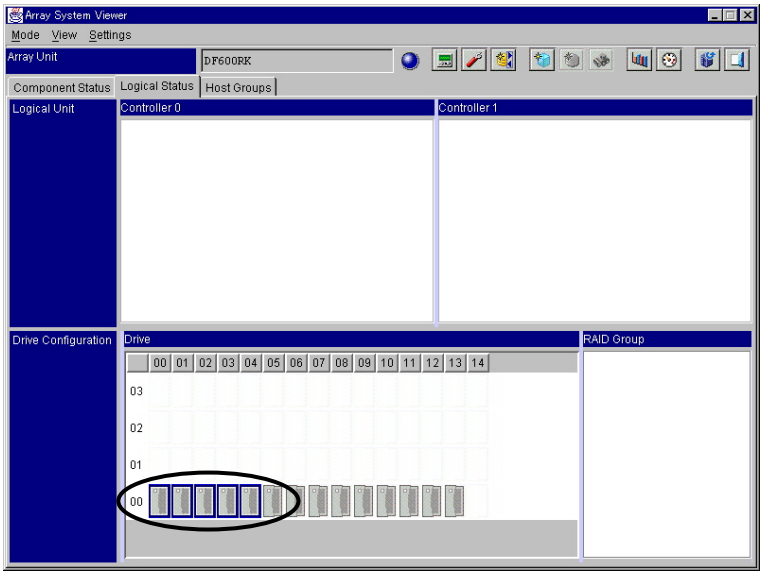
Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure ②-B] Setting RAID group
(Disk Array Management Program is Ver.7.xx or earlier)

(1) Drag the first Disk Drive which creates a RAID group. The clicked Disk Drive is enclosed in blue.

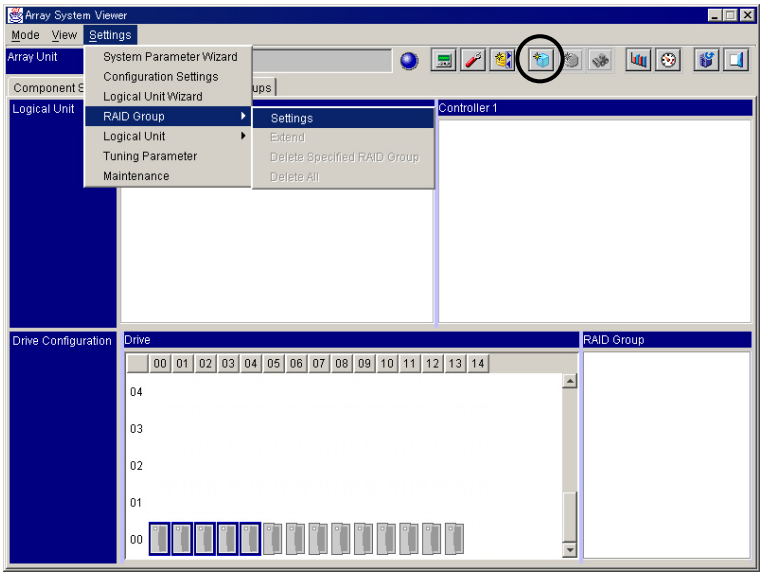


(2) Click the final Disk Drive for composing a RAID group while the [Shift] key is held down. Selected Disk Drives are displayed being highlighted with bold contours.

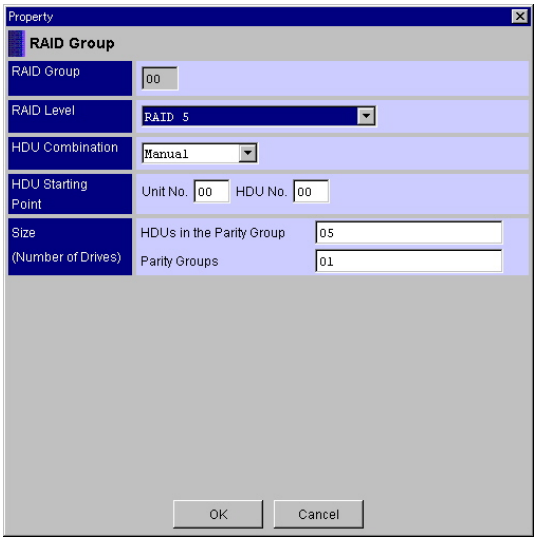


Copyright © 2002, 2005, Hitachi, Ltd.

(3) Select [Settings] – [RAID Group] – [Settings], or click the [ : RAID Group Settings] button.



(4) Set a RAID group within the selected range.
Select a RAID level, and set the number of Disk Drives within a parity group and the number of parity groups. Subsequently, click the [OK] button.

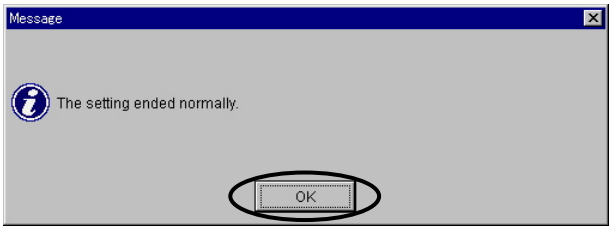


(The case where five Disk Drives are set to RAID5 (4D + 1P) with drive #0 and Disk Drive #0 at the head is shown).

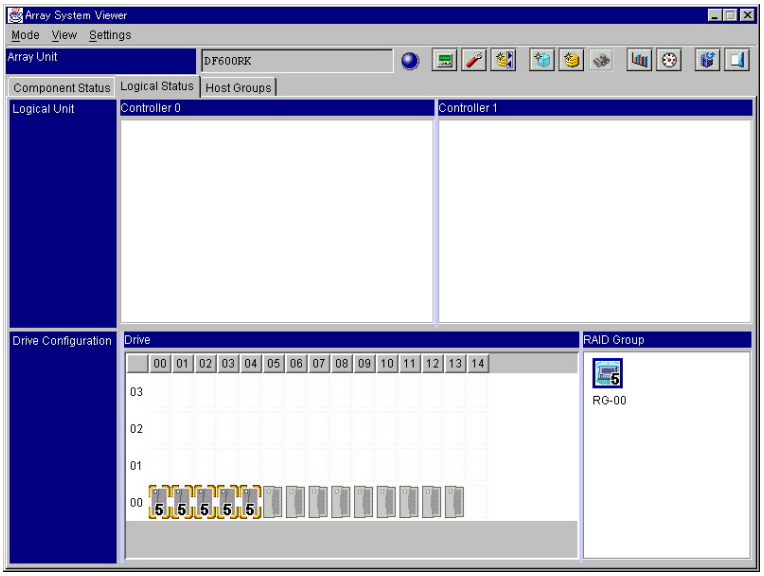
NOTE : The first Disk Drive position and size (number of drives) are automatically displayed. Besides, when changing the number of parity groups, refer to “4. 7 Setting RAID Group” (INTO 04-0180) in the Introduction Part.

Copyright © 2002, 2005, Hitachi, Ltd.

(5) A window showing a normal completion of the RAID setting is displayed. Click the [OK] button.(‡1)



(6) The screen from which a RAID group was updated is displayed.



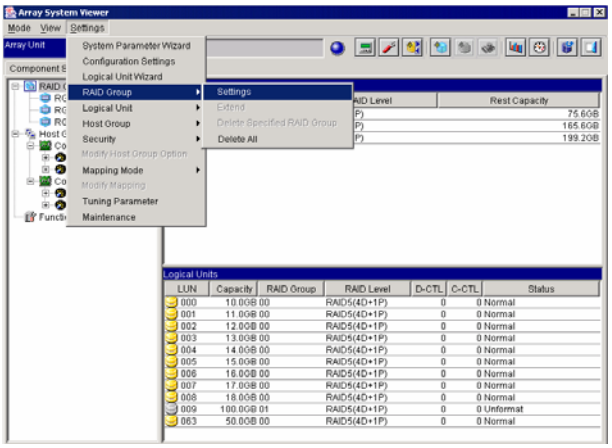
- When setting the multiples RAID Group, return to the [Procedure ②-B] “Setting RAID Group” (INST 05-0440), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to [Procedure ③-A] “Preparing of setting LU” (INST 05-0530).
- When verifying RAID group [NG], go to [Procedure ②-D] “Deleting RAID group” (INST 05-0470).

‡1 : When the message, “DMES059541:Drive capacity of RAID group is invalid, or RAID group capacity is too large.” is displayed, capacity of the Disk Drive (single Disk Drive) in the RAID group to be created is larger than that of the Spare Disk in the subsystem.
Check the Disk Drive capacity (referring to Subsection 5.4.5 “Checking the status of Disk Drive” (INST 05-0761).), replace the Disk Drive with that having the appropriate capacity, and set the RAID group again.

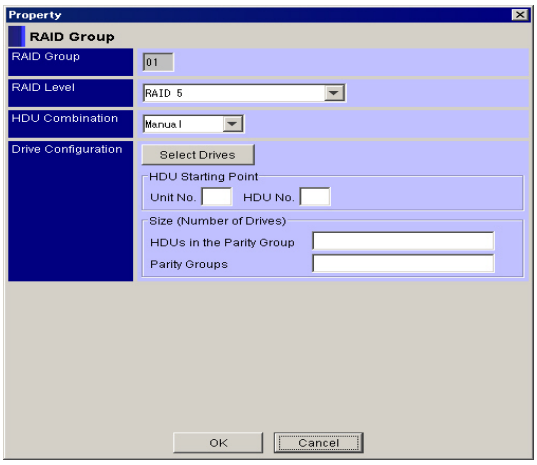
Copyright © 2002, 2005, Hitachi, Ltd.

(Disk Array Management Program is Ver.9.00 or later)

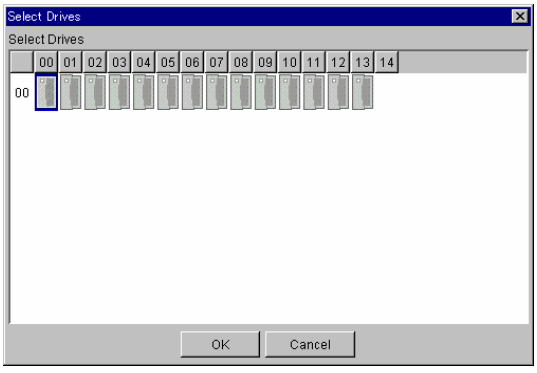
(1) Select [Settings] – [RAID Group] – [Settings], or click the [ : RAID Group Settings] button.



(2) Click the [Select Drives] button on the [RAID Group] dialog box.

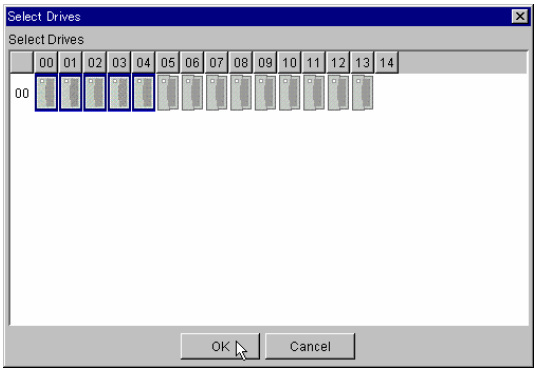


(3) The [Select Drives] dialog box is opened.
Drag the first Disk Drive which creates a RAID group. The clicked Disk Drive is enclosed in blue.



Copyright © 2003, 2005, Hitachi, Ltd.

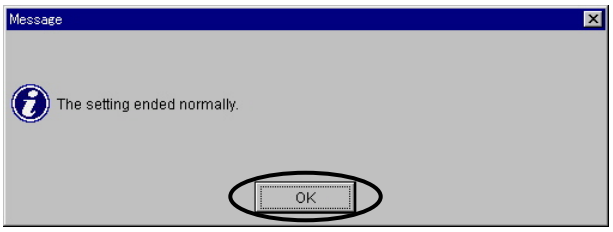
(4) Click the final Disk Drive for composing a RAID group while the [Shift] key is held down. Selected Disk Drives are displayed being highlighted with bold contours.



(5) Set a RAID group within the selected range.
Select a RAID level, and set the number of Disk Drives within a parity group and the number of parity groups. Subsequently, click the [OK] button on the [Select Drives] dialog box.

NOTE : The first Disk Drive position and size (number of drives) are automatically displayed. Besides, when changing the number of parity groups, refer to "4. 7 Setting RAID Group" (INTO 04-0180) in the Introduction Part.

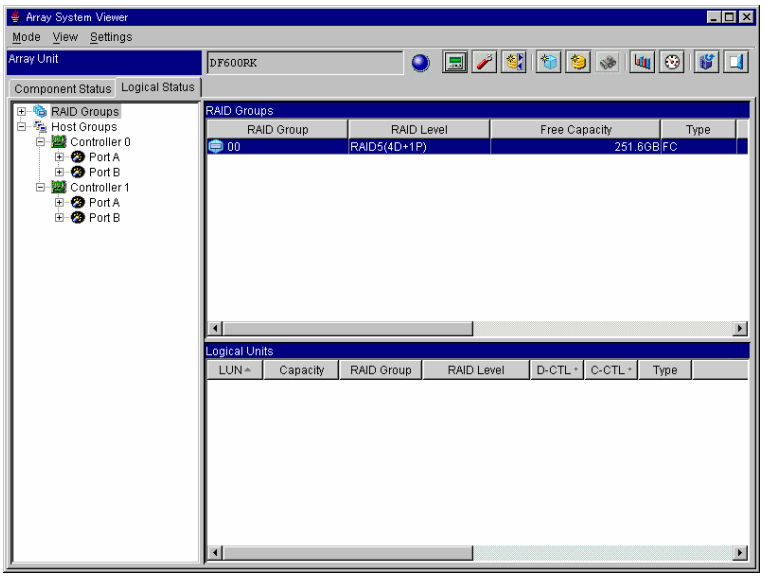
(6) A window showing a normal completion of the RAID setting is displayed.
Click the [OK] button.(‡1)



‡1 : When the message, "DMES059541:Drive capacity of RAID group is invalid, or RAID group capacity is too large." is displayed, capacity of the Disk Drive (single Disk Drive) in the RAID group to be created is larger than that of the Spare Disk in the subsystem.
Check the Disk Drive capacity (referring to Subsection 5.4.5 "Checking the status of Disk Drive" (INST 05-0761).), replace the Disk Drive with that having the appropriate capacity, and set the RAID group again.

Copyright © 2003, 2005, Hitachi, Ltd.

(7) The screen from which a RAID group was updated is displayed.



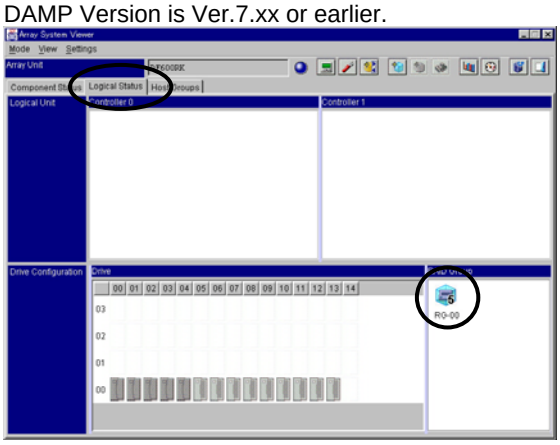
- When setting the multiples RAID Group, return to the [Procedure ②-B] “Setting RAID Group (Disk Array Management Program is Ver.9.00 or later)” (INST 05-0461), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to [Procedure ③-A] “Preparing of setting LU” (INST 05-0530).
- When verifying RAID group [NG], go to [Procedure ②-D] “Deleting RAID group” (INST 05-0470).

Copyright © 2003, 2005, Hitachi, Ltd.

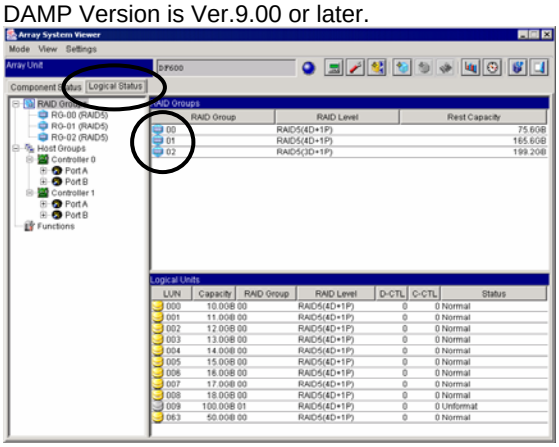
[Procedure ②-C] Verifying RAID group

(1) Click the [Logical Status] tab in the unit window.

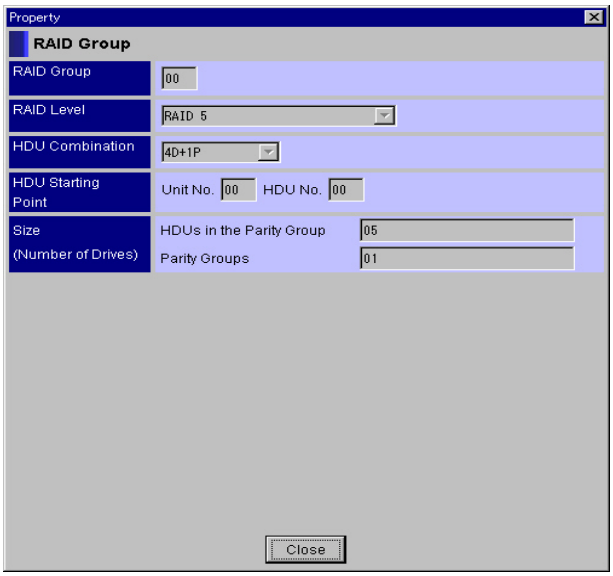
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(2) The setting made in [Procedure ②-B] can be referred to by a 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” (DAMP Version is Ver.7.xx or earlier: INST 05-0440, Ver.9.00 or later: INST 05-0461), and specify the rest of RAID Group to be set.
- When verifying RAID group [OK], go to [Procedure ③-A] “Preparing of setting LU” (INST 05-0530).
- When verifying RAID group [NG], go to [Procedure ②-D] “Deleting RAID group” (INST 05-0470).

Copyright © 2003, 2005, Hitachi, Ltd.

[Procedure ②-D] Deleting RAID group

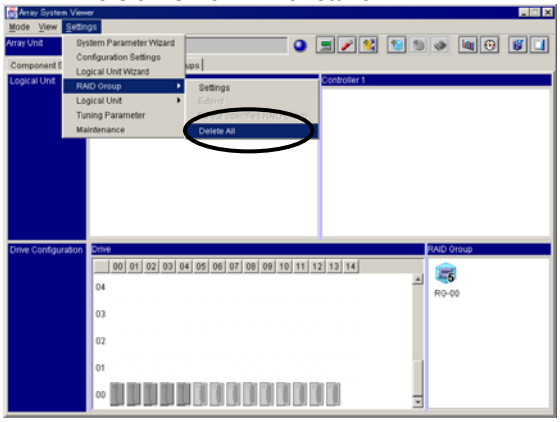
NOTE : • All user data is lost by deleting the LU. Backup user data before deleting the RAID group.
• RAID group cannot be deleted during a restoration of the drive.

- When deleting all RAID groups, go to the (1) “Deleting all RAID groups” (INST 05-0470).
- When Deleting a specified RAID group, go to the (2) “Deleting a specified RAID group” (INST 05-0500).

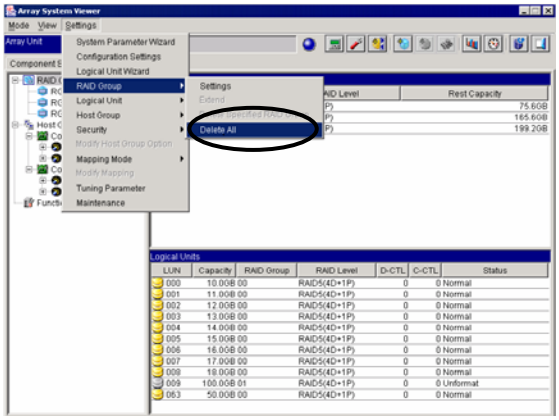
(1) Deleting all RAID groups

(a) Select [Settings] – [RAID Group] – [Delete All].

DAMP Version is Ver.7.xx or earlier.



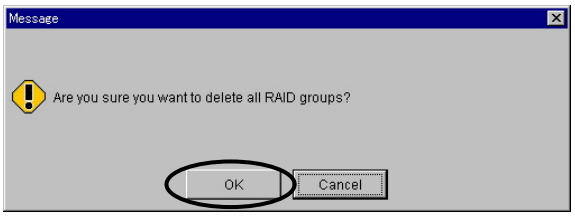
DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

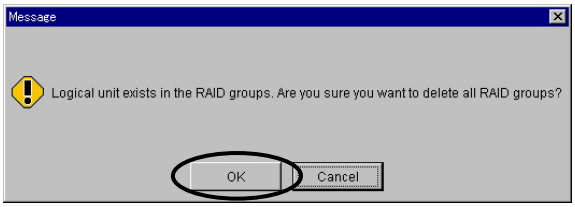
(b) If the confirmation message is displayed. Click the [OK] button.

- When there is no formatted LU in a RAID group

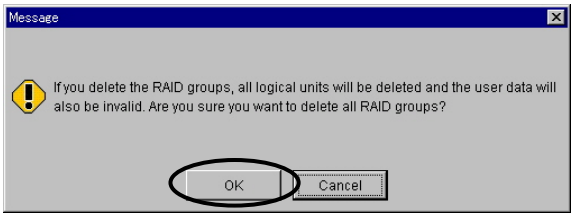


- When there is a formatted LU in a RAID group

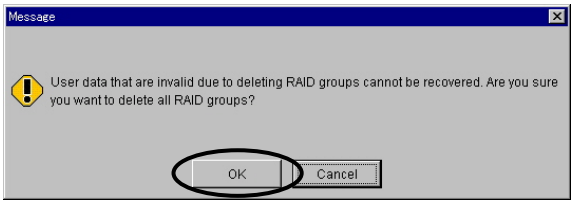
(i) Click the [OK] button.



(ii) Click the [OK] button.



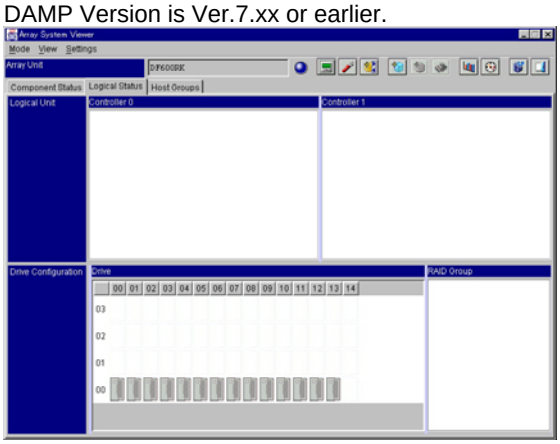
(iii) Click the [OK] button.



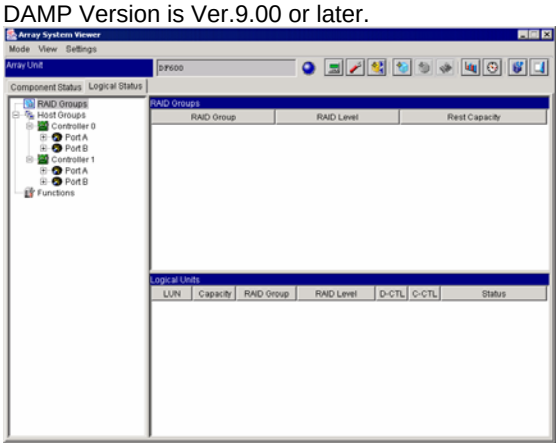
Copyright © 2002, 2005, Hitachi, Ltd.

(c) The screen from which all RAID groups were deleted is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



- When setting the RAID group, go to [procedure (2)-B] “Setting RAID group” (DAMP Version is Ver.7.xx or earlier: INST 05-0440, Ver.9.00 or later: INST 05-0461).

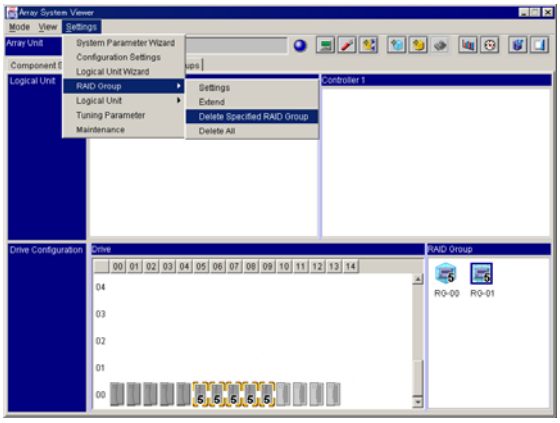
Copyright © 2002, 2005, Hitachi, Ltd.

(2) Deleting a specified RAID group

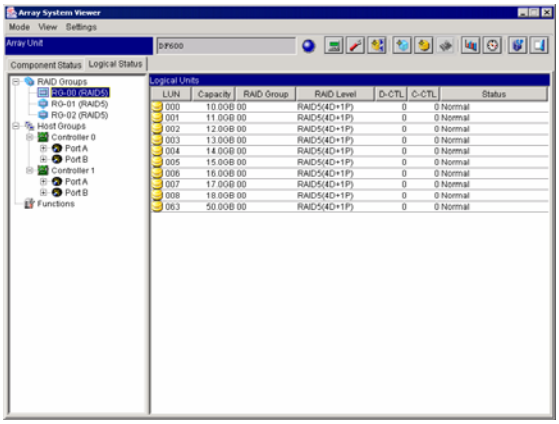
NOTE : A specified RAID group can be deleted even if an LU is defined in the RAID group.
However, the specified RAID group cannot be deleted when a unified LU(‡1) is left in the RAID group. When deleting the specified RAID group that includes a unified LU, do it after dissolving the unification of the unified LU in the specified RAID group.

(a) Click the RAID group to be deleted, and select.

DAMP Version is Ver.7.xx or earlier.

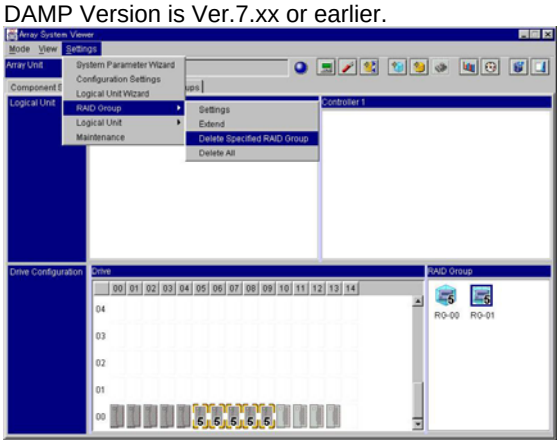


DAMP Version is Ver.9.00 or later.

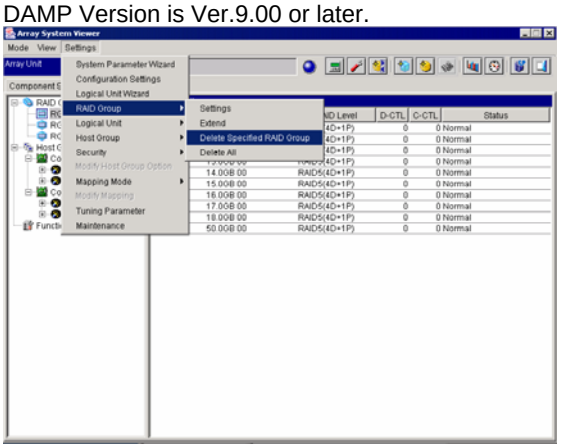


(b) Select [Settings] – [RAID Group] – [Delete Specified RAID Group].

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

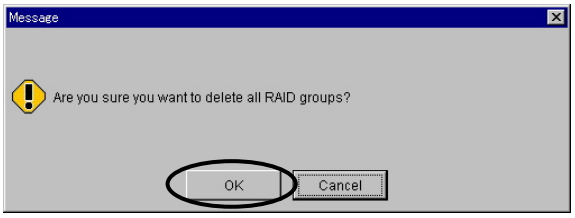


‡1 : Support a function (LUN Expansion function) that creates a unified LU by combining LUs. The LUN Expansion function is an optional function.
To use the LUN Expansion function, the P-002D-J214 is required separately. For the procedure to dissolve the unification of the unified LU, refer to the manual supplied with the P-002D-J214.

Copyright © 2002, 2005, Hitachi, Ltd.

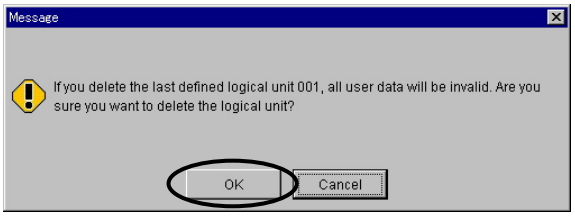
(c) If the confirmation message is displayed. Click the [OK] button.

- When there is no formatted LU in a RAID group

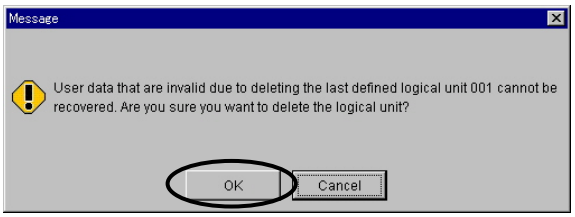


- When there is a formatted LU in a RAID group

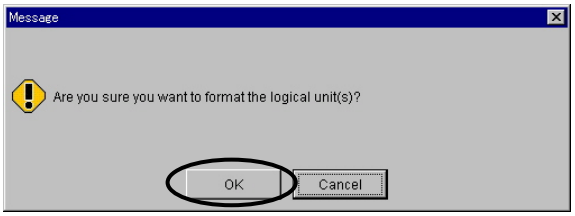
(i) Click the [OK] button.



(ii) Click the [OK] button.



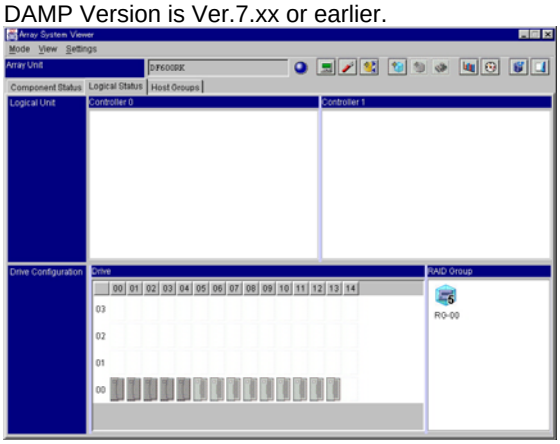
(iii) Click the [OK] button.



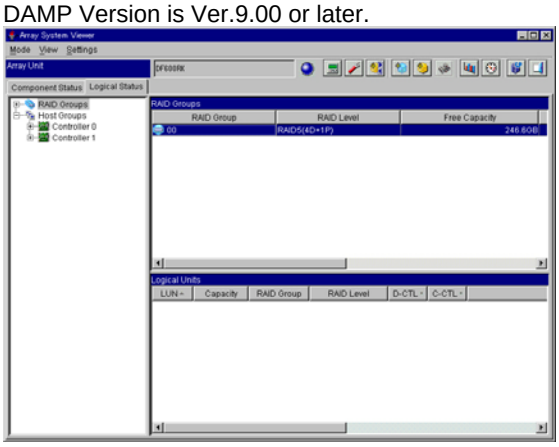
Copyright © 2002, 2005, Hitachi, Ltd.

(d) The screen from which RAID groups the selected were deleted is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



Any LU (RAID group) can be selected and deleted in the case where the LUs have been set in the RAID group one by one.

- When setting the RAID group, go to [procedure (2)-B] “Setting RAID group” (DAMP Version is Ver.7.xx or earlier: INST 05-0440, Ver.9.00 or later: INST 05-0461).

Copyright © 2002, 2005, Hitachi, Ltd.

5.4.3 Setting of LU

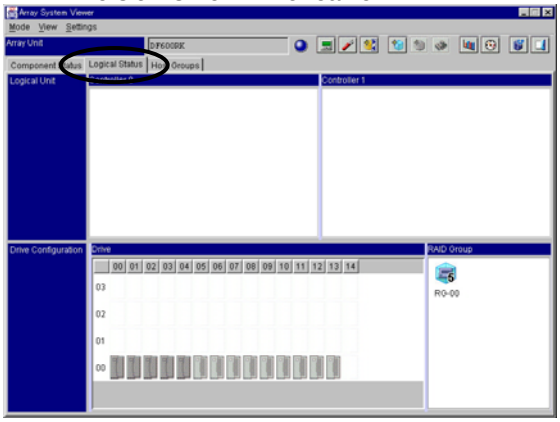
This setting is used to set, delete, reference and formatting an LU.
This function can be used in the device ready state.

NOTE : 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.

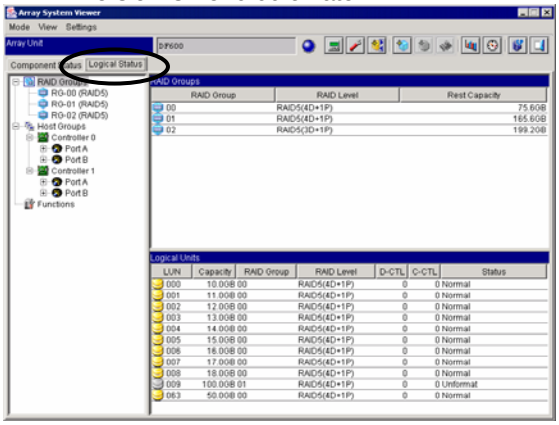
[Procedure ③-A] Preparing of setting LU

(1) Click the [Logical Status] tab in the unit window.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



RAID groups and logical units defined for the disk array subsystem are displayed.

DAMP Version is Ver.7.xx or earlier.

[Logical Unit] : Information on all logical units defined for the disk array subsystem is displayed for each controller controlling the logical units.
[Controller 0] : A number (×××) of each logical unit controlled by the Controller-0 and a RAID level and status of a RAID group for which the logical unit is defined are displayed.
[Controller 1] : A number (×××) of each logical unit controlled by the Controller-1 and a RAID level and status of a RAID group for which the logical unit is defined are displayed.

[Drive Configuration] : Statuses of Disk Drives installed in the disk array subsystem are displayed.

[RAID Group] : Information on all RAID groups defined for the disk array subsystem are displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

DAMP Version is Ver.9.00 or later.

[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.
- [Rest Capacity] : A residual capacity of the 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.
- [Status] : A status of the logical unit is displayed.

Copyright © 2004, 2005, Hitachi, Ltd.

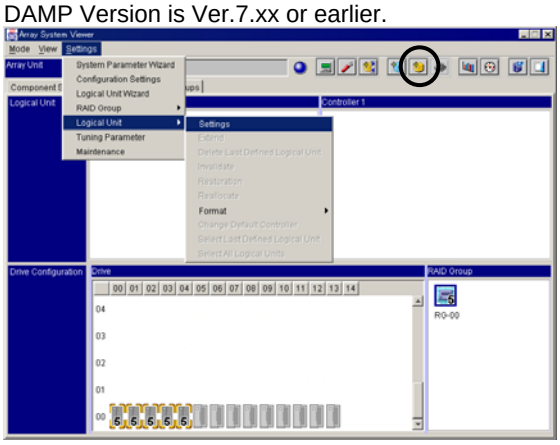
This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

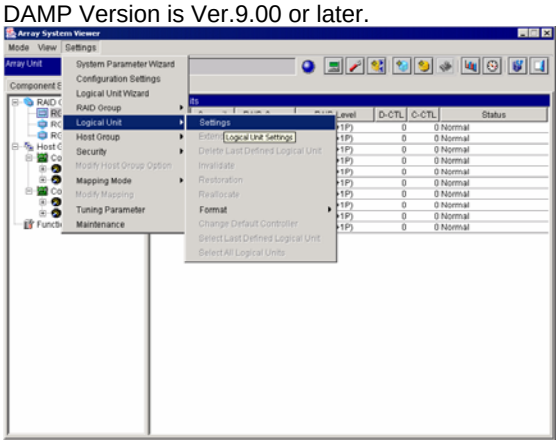
[Procedure ③-B] Setting LU

(1) Click the RAID group for which an LU is to be created, and then select [Settings] – [Logical Unit] – [Settings] or click [ : Logical Unit Setting].

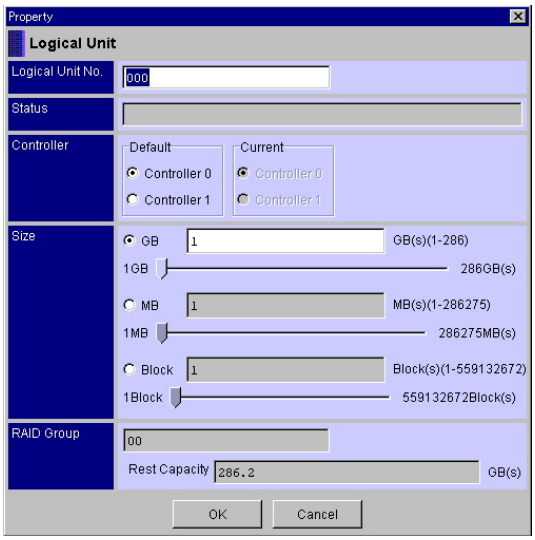
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(2) Enter the capacity value and select the controller that controls the LU using the "Controller" boxes.



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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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" (INST 05-0560).

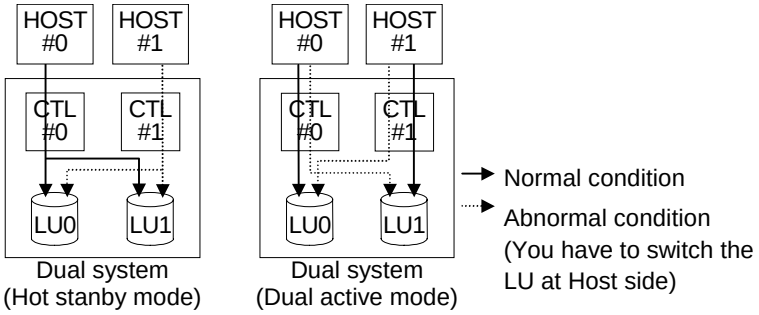
Besides, you can also enter the capacity value by the M byte in the case of Disk Array Management Program.

(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-H] The change of the controller in charge of a default LU" (INST 05-0630) to change the controller in charge.



- The function of "Hot standby mode"
  It is possible that the system is continued to execute commands by switching the direction of the commands from Host computer to the other Controller, if the Host computer or the Controller failure occurs.
- 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Setting value of the number of logical blocks

(i) A logical unit can divide all RAID groups into up to 512 (RKH/RKHE: up to 2,048).

(ii) Set the number of logical blocks set for each logical unit using the following multiples in accordance with RAID levels.

Table 5.4.1 Number of Logical Blocks and RAID Levels

RAID level	Logical block number	Remake
RAID 0(2D)	2048	
RAID 0(3D)	3072	
RAID 0(4D)	4096	
RAID 0(5D)	5120	
RAID 0(6D)	6144	
RAID 0(7D)	7168	
RAID 0(8D)	8192	
RAID 0(9D)	9216	
RAID 0(10D)	10240	
RAID 0(11D)	11264	
RAID 0(12D)	12288	
RAID 0(13D)	13312	
RAID 0(14D)	14336	
RAID 0(15D)	15360	
RAID 0(16D)	16384	
RAID 1	1024	
RAID 5(2D+1P)	2048	
RAID 5(3D+1P)	3072	
RAID 5(4D+1P)	4096	
RAID 5(5D+1P)	5120	
RAID 5(6D+1P)	6144	
RAID 5(7D+1P)	7168	
RAID 5(8D+1P)	8192	
RAID 5(9D+1P)	9216	
RAID 5(10D+1P)	10240	
RAID 5(11D+1P)	11264	
RAID 5(12D+1P)	12288	
RAID 5(13D+1P)	13312	
RAID 5(14D+1P)	14336	
RAID 5(15D+1P)	15360	
RAID 1+0(2D+2M)	2048	
RAID 1+0(3D+3M)	3072	
RAID 1+0(4D+4M)	4096	
RAID 1+0(5D+5M)	5120	
RAID 1+0(6D+6M)	6144	
RAID 1+0(7D+7M)	7168	
RAID 1+0(8D+8M)	8192	

Copyright © 2002, 2005, Hitachi, Ltd.

(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 5.4.2 Number of Logical Blocks of One Parity Group

RAID configuration \ Disk Drive capacity(*1) (*2)		35.4 G bytes		71.3 G bytes		143.3 G bytes	
		Number of Logical Blocks 1	Number of Logical Blocks 2	Number of Logical Blocks 1	Number of Logical Blocks 2	Number of Logical Blocks 1	Number of Logical Blocks 2
RAID 0	2D	138,113,024	123,443,200	278,558,720	263,888,896	559,790,080	545,120,256
	3D	207,169,536	185,164,800	417,838,080	395,833,344	839,685,120	817,680,384
	4D	276,226,048	246,886,400	557,117,440	527,777,792	1,119,580,160	1,090,240,512
	5D	345,282,560	308,608,000	696,396,800	659,722,240	1,399,475,200	1,362,800,640
	6D	414,339,072	370,329,600	835,676,160	791,666,688	1,679,370,240	1,635,360,768
	7D	483,395,584	432,051,200	974,955,520	923,611,136	1,959,265,280	1,907,920,896
	8D	552,452,096	493,772,800	1,114,234,880	1,055,555,584	2,239,160,320	2,180,481,024
	9D	621,508,608	555,494,400	1,253,514,240	1,187,500,032	2,519,055,360	2,453,041,152
	10D	690,565,120	617,216,000	1,392,793,600	1,319,444,480	2,798,950,400	2,725,601,280
	11D	759,621,632	678,937,600	1,532,072,960	1,451,388,928	3,078,845,440	2,998,161,408
	12D	828,678,144	740,659,200	1,671,352,320	1,583,333,376	3,358,740,480	3,270,721,536
	13D	897,734,656	802,380,800	1,810,631,680	1,715,277,824	3,638,635,520	3,543,281,664
	14D	966,791,168	864,102,400	1,949,911,040	1,847,222,272	3,918,530,560	3,815,841,792
	15D	1,035,847,680	925,824,000	2,089,190,400	1,979,166,720	4,198,425,600	4,088,401,920
	16D	1,104,904,192	987,545,600	2,228,469,760	2,111,111,168	4,478,320,640	4,360,962,048
RAID 1	1D+1M	69,056,512	61,721,600	139,279,360	131,944,448	279,895,040	272,560,128
RAID 5	2D+1P	138,113,024	123,443,200	278,558,720	263,888,896	559,790,080	545,120,256
	3D+1P	207,169,536	185,164,800	417,838,080	395,833,344	839,685,120	817,680,384
	4D+1P	276,226,048	246,886,400	557,117,440	527,777,792	1,119,580,160	1,090,240,512
	5D+1P	345,282,560	308,608,000	696,396,800	659,722,240	1,399,475,200	1,362,800,640
	6D+1P	414,339,072	370,329,600	835,676,160	791,666,688	1,679,370,240	1,635,360,768
	7D+1P	483,395,584	432,051,200	974,955,520	923,611,136	1,959,265,280	1,907,920,896
	8D+1P	552,452,096	493,772,800	1,114,234,880	1,055,555,584	2,239,160,320	2,180,481,024
	9D+1P	621,508,608	555,494,400	1,253,514,240	1,187,500,032	2,519,055,360	2,453,041,152
	10D+1P	690,565,120	617,216,000	1,392,793,600	1,319,444,480	2,798,950,400	2,725,601,280
	11D+1P	759,621,632	678,937,600	1,532,072,960	1,451,388,928	3,078,845,440	2,998,161,408
	12D+1P	828,678,144	740,659,200	1,671,352,320	1,583,333,376	3,358,740,480	3,270,721,536
	13D+1P	897,734,656	802,380,800	1,810,631,680	1,715,277,824	3,638,635,520	3,543,281,664
	14D+1P	966,791,168	864,102,400	1,949,911,040	1,847,222,272	3,918,530,560	3,815,841,792
	15D+1P	1,035,847,680	925,824,000	2,089,190,400	1,979,166,720	4,198,425,600	4,088,401,920
RAID 1+0	2D+2M	138,113,024	123,443,200	278,558,720	263,888,896	559,790,080	545,120,256
	3D+3M	207,169,536	185,164,800	417,838,080	395,833,344	839,685,120	817,680,384
	4D+4M	276,226,048	246,886,400	557,117,440	527,777,792	1,119,580,160	1,090,240,512
	5D+5M	345,282,560	308,608,000	696,396,800	659,722,240	1,399,475,200	1,362,800,640
	6D+6M	414,339,072	370,329,600	835,676,160	791,666,688	1,679,370,240	1,635,360,768
	7D+7M	483,395,584	432,051,200	974,955,520	923,611,136	1,959,265,280	1,907,920,896
	8D+8M	552,452,096	493,772,800	1,114,234,880	1,055,555,584	2,239,160,320	2,180,481,024

*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.

Copyright © 2002, 2005, Hitachi, Ltd.

RAID configuration \ Disk Drive capacity (*1) (*2)		245.7 G bytes	287.6 G bytes		393.4 G bytes
		Number of Logical Blocks 1	Number of Logical Blocks 1	Number of Logical Blocks 2	Number of Logical Blocks 1
RAID 0	2D	-	1,123,549,184	1,108,879,360	-
	3D	-	1,685,323,776	1,663,319,040	-
	4D	-	2,247,098,368	2,217,758,720	-
	5D	-	2,808,872,960	2,772,198,400	-
	6D	-	3,370,647,552	3,326,638,080	-
	7D	-	3,932,422,144	3,881,077,760	-
	8D	-	4,494,196,736	4,435,517,440	-
	9D	-	5,055,971,328	4,989,957,120	-
	10D	-	5,617,745,920	5,544,396,800	-
	11D	-	6,179,520,512	6,098,836,480	-
	12D	-	6,741,295,104	6,653,276,160	-
	13D	-	7,303,069,696	7,207,715,840	-
	14D	-	7,864,844,288	7,762,155,520	-
	15D	-	8,426,618,880	8,316,595,200	-
	16D	-	8,988,393,472	8,871,034,880	-
RAID 1	1D+1M	479,972,352	561,774,592	554,439,680	768,475,136
RAID 5	2D+1P	959,944,704	1,123,549,184	1,108,879,360	1,536,950,272
	3D+1P	1,439,917,056	1,685,323,776	1,663,319,040	2,305,425,408
	4D+1P	1,919,889,408	2,247,098,368	2,217,758,720	3,073,900,544
	5D+1P	2,399,861,760	2,808,872,960	2,772,198,400	3,842,375,680
	6D+1P	2,879,834,112	3,370,647,552	3,326,638,080	4,610,850,816
	7D+1P	3,359,806,464	3,932,422,144	3,881,077,760	5,379,325,952
	8D+1P	3,839,778,816	4,494,196,736	4,435,517,440	6,147,801,088
	9D+1P	4,319,751,168	5,055,971,328	4,989,957,120	6,916,276,224
	10D+1P	4,799,723,520	5,617,745,920	5,544,396,800	7,684,751,360
	11D+1P	5,279,695,872	6,179,520,512	6,098,836,480	8,453,226,496
	12D+1P	5,759,668,224	6,741,295,104	6,653,276,160	9,221,701,632
	13D+1P	6,239,640,576	7,303,069,696	7,207,715,840	9,990,176,768
	14D+1P	6,719,612,928	7,864,844,288	7,762,155,520	10,758,651,904
	15D+1P	7,199,585,280	8,426,618,880	8,316,595,200	11,527,127,040
RAID 1+0	2D+2M	959,944,704	1,123,549,184	1,108,879,360	1,536,950,272
	3D+3M	1,439,917,056	1,685,323,776	1,663,319,040	2,305,425,408
	4D+4M	1,919,889,408	2,247,098,368	2,217,758,720	3,073,900,544
	5D+5M	2,399,861,760	2,808,872,960	2,772,198,400	3,842,375,680
	6D+6M	2,879,834,112	3,370,647,552	3,326,638,080	4,610,850,816
	7D+7M	3,359,806,464	3,932,422,144	3,881,077,760	5,379,325,952
	8D+8M	3,839,778,816	4,494,196,736	4,435,517,440	6,147,801,088

*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.

Copyright © 2004, 2005, Hitachi, Ltd.

(v) Number of logical blocks per Disk Drive.

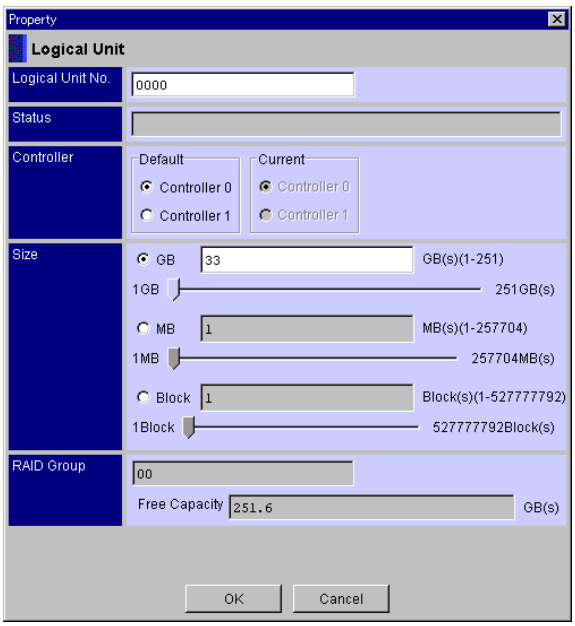
Table 5.4.3 Number of Blocks (m) and Capacity per Disk Drive

Disk Drive model name / Capacity(*1)		35.6 G bytes	71.6 G bytes	143.3 G bytes	247.5 G bytes	287.6 G bytes	393.4 G bytes
Capacity (user area size) per Disk Drive	Number of blocks (m)	69,056,512	139,279,360	279,895,040	479,972,352	561,774,592	768,475,136
	Capacity (G bytes)	35.357	71.311	143.307	245.745	287.629	393.459

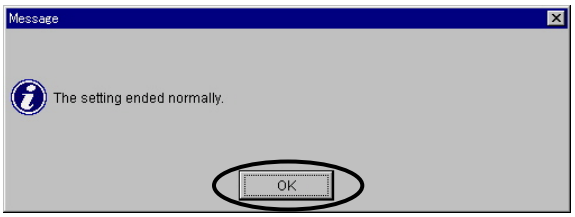
*1 : These values of storage capacity are calculated as 1 G bytes = 1,00,000,000 bytes.
This definition is different from that (1 k bytes = 1,024 bytes) shown on PCs you are using.

Copyright © 2004, 2005, Hitachi, Ltd.

(3) After completion of the setting, click [OK] button.

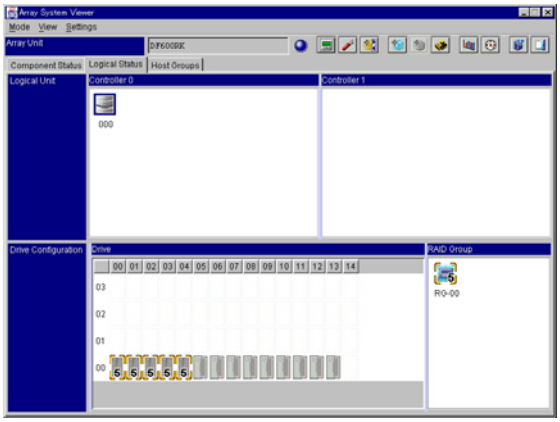


(4) If the ended normally message is displayed. Click the [OK] button.

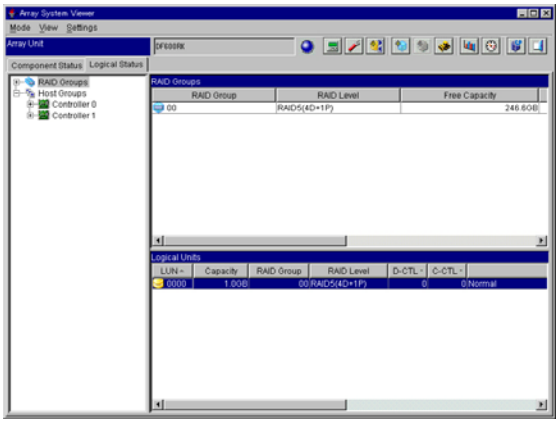


(5) Preset LU information is updated and the screen is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



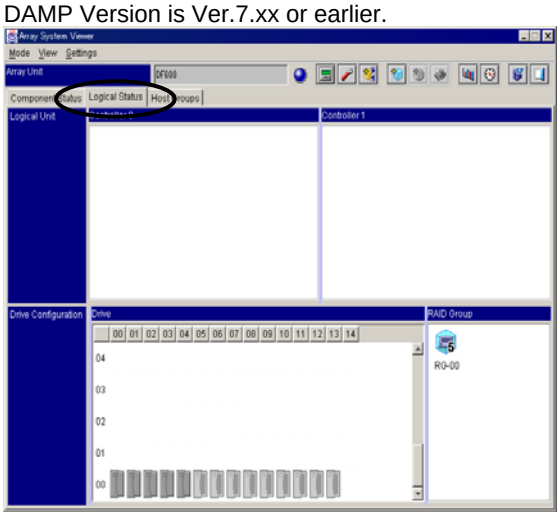
For a “Controller No.” at LU creation, specify a controller in charge of a default LU. “Current controller” when an LU was created becomes equal to the current of the controller in charge of the default LU. However, if LU switching might have occurred, it does not become equal.

Copyright © 2002, 2005, Hitachi, Ltd.

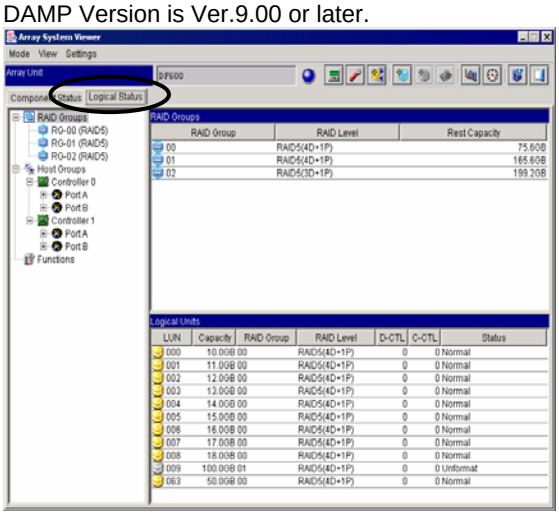
[Procedure ③-C] Verifying LU

(1) Click the [Logical Status] tab. Usually, when the setting of an LU is completed, the [Logical Status] tab is in the clicked state.

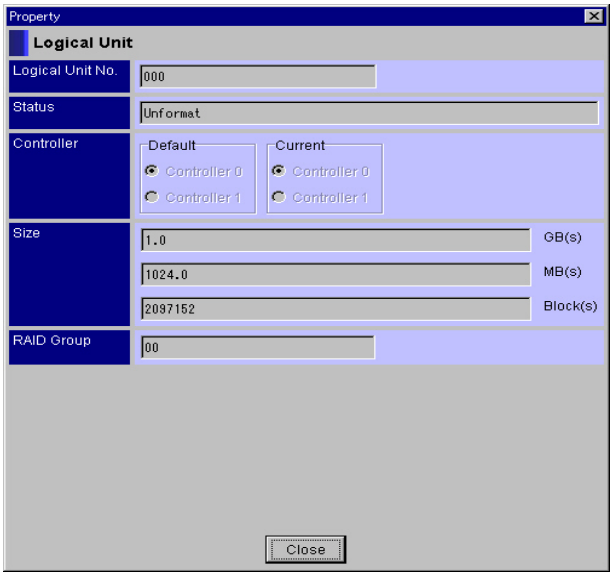
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(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-I] “Formatting LU” (INST 05-0650).
- If the confirmation of LU is NG, and if the change of LU in charge is required, go to the [Procedure ③-H] “The change of the controller in charge of a default LU” (INST 05-0630).
- If the setting of Default LU controller, go to the [Procedure ③-D] “Deleting LU”. (INST 05-0600)

Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure ③-D] Deleting LU

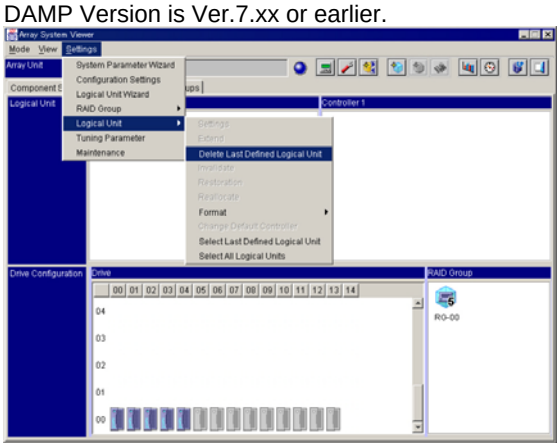
NOTE : • All user data is lost by deleting the LU. Backup user data before deleting the RAID group.
• LU cannot be deleted during a restoration of the drive.

(1) Deleting the last LU

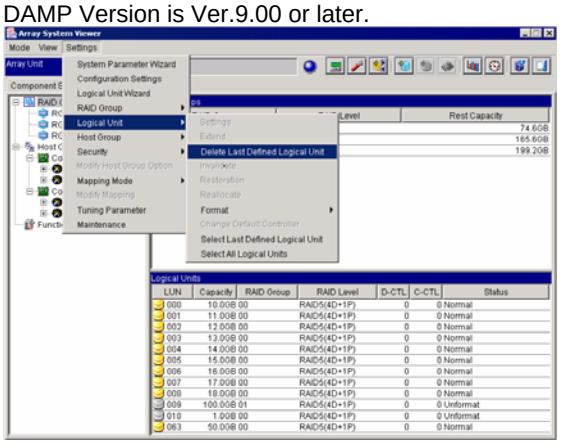
NOTE : The last one of the LUs which have been set is the final LU. When the final LU is deleted, a number of the LU to be actually deleted is displayed.

(a) Select [Settings] – [Logical Unit] – [Delete Last Defined Logical Unit].

DAMP Version is Ver.7.xx or earlier.



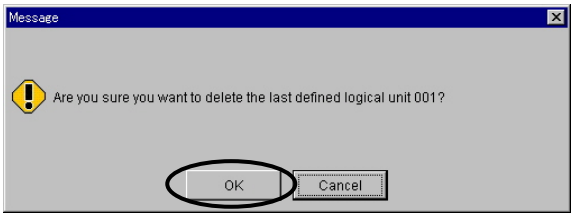
DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

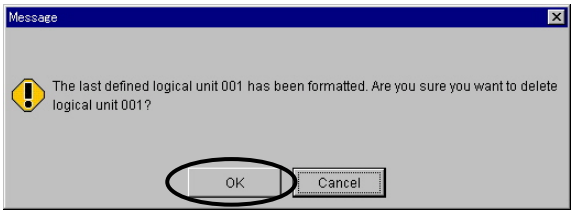
(b) A confirmation message is displayed indicating whether last LUs should be deleted or not.

- When there is no formatted LU in a RAID group

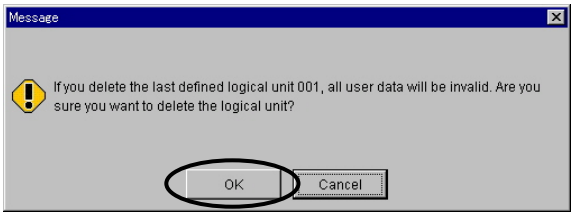


- When there is a formatted LU in a RAID group

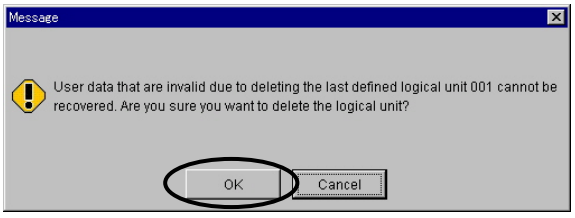
(i) Click the [OK] button.



(ii) Click the [OK] button.



(iii) Click the [OK] button.



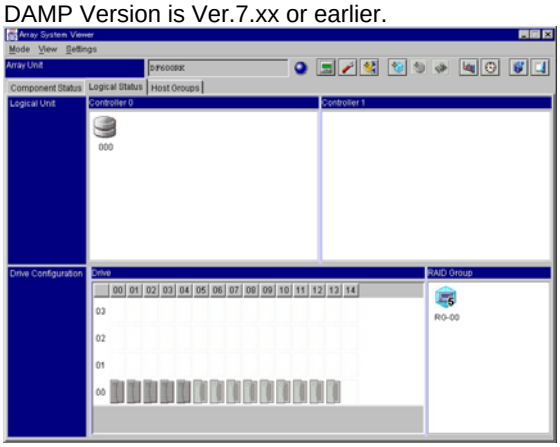
(c) Click [OK], and last LUs will be deleted.(‡1)

‡1 : When all the LUs have been deleted, the user data in the LUs will be lost.

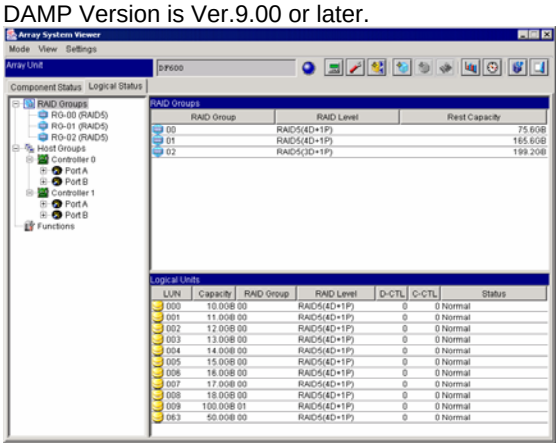
Copyright © 2002, 2005, Hitachi, Ltd.

(d) The LU information in which last LUs have been deleted is updated and the window is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



- When setting the LU, go to Procedure ③-B, “Setting LU” on page (INST 05-0590).

Copyright © 2002, 2005, Hitachi, Ltd.

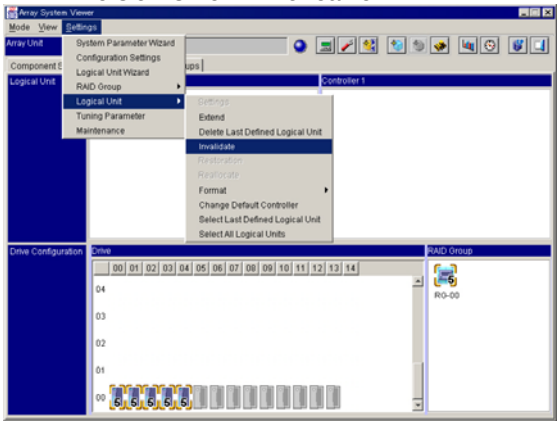
[Procedure ③-E] Invalidate LU

NOTE : “Invalidate LU” cannot be set during a restoration of the drive.

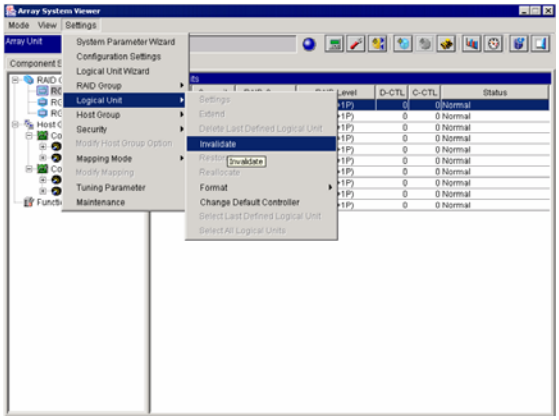
(1) Invalidate LU

(a) Select an LU to be invalidated and select [Settings], [Logical Unit], and [Invalidate] in this order.

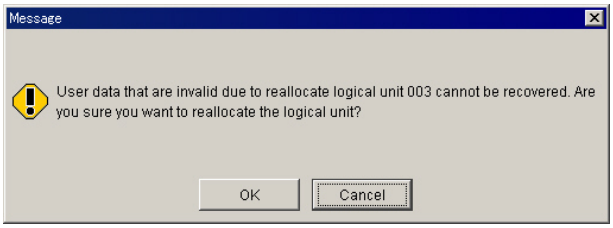
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



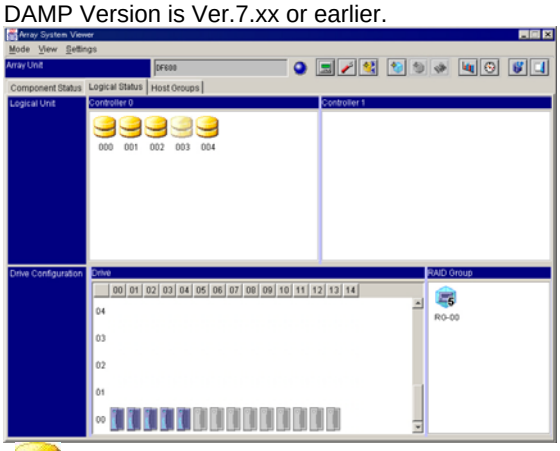
(b) A message asking for confirmation of the LU invalidation is displayed. When the [OK] button is clicked, the LU is invalidated.



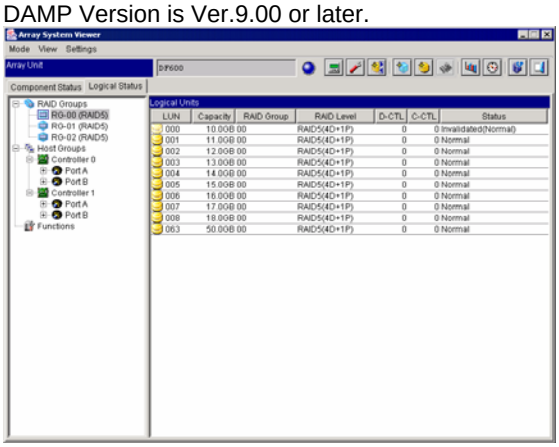
Copyright © 2003, 2005, Hitachi, Ltd.

(c) The window in which the LU information on the invalidated LU has been updated is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



: Normal Logical Format (Formatted)

: Invalidate Logical Format (Formatted)

- When restoring the LU, go to Procedure ③-F, “Restoration LU” on page INST 05-0623.
- When reassigning the LU, go to Procedure ③-G, “Reallocate LU” on page INST 05-0625.

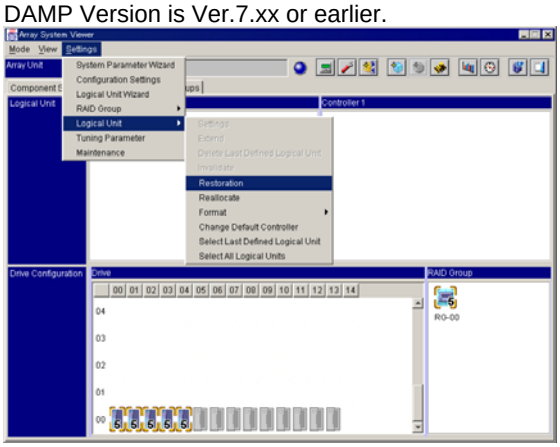
Copyright © 2003, 2005, Hitachi, Ltd.

[Procedure ③-F] Restoration LU

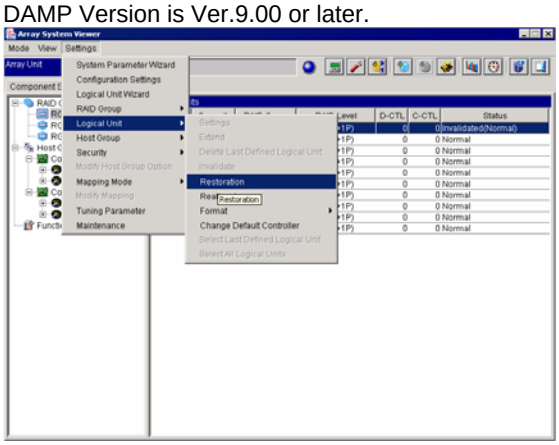
(1) Restoration LU

(a) Select an LU to be restored and select [Settings], [Logical Unit], and [Restoration] in this order.

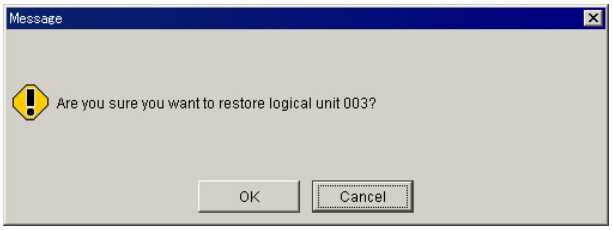
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

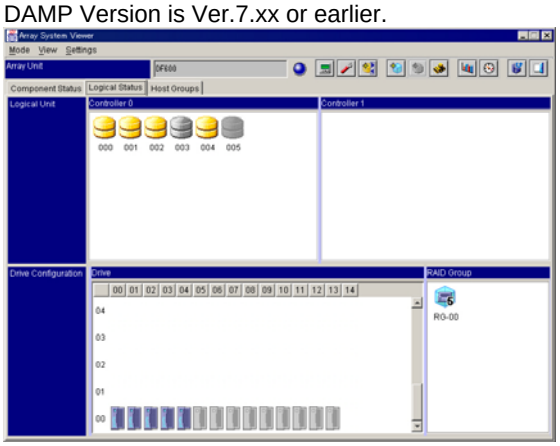


(b) A message asking for confirmation of the LU restoration is displayed. When the [OK] button is clicked, the LU is restored.

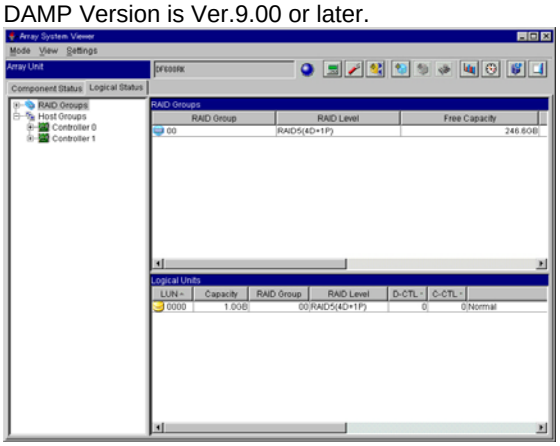


(c) The window in which the LU information on the restored LU has been updated is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



- When reassigning the LU, go to Procedure ③-G, “Reallocate LU” on page INST 05-0625.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

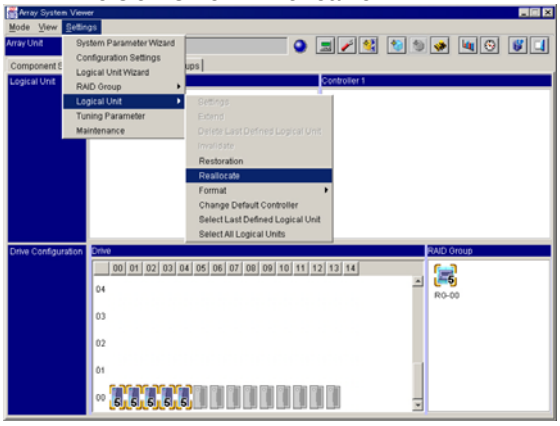
Copyright © 2003, 2005, Hitachi, Ltd.

[Procedure ③-G] Reallocate LU

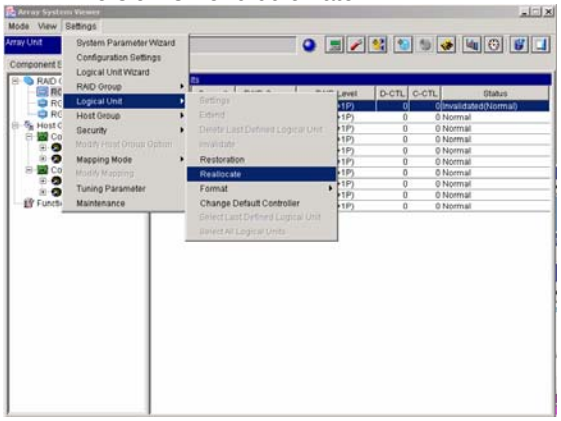
NOTE : “Reallocate LU” cannot be set during a restoration of the drive.

(1) Select an invalidated LU to be reassigned and select [Settings], [Logical Unit], and [Reallocate] in this order.

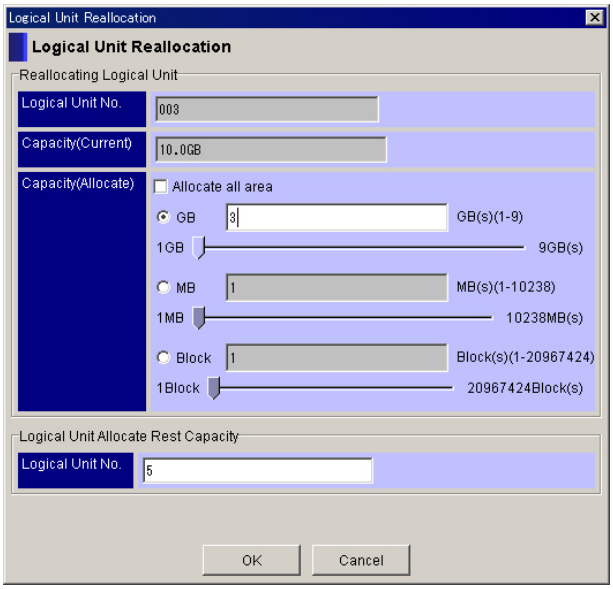
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(2) Determine a capacity to be reassigned.

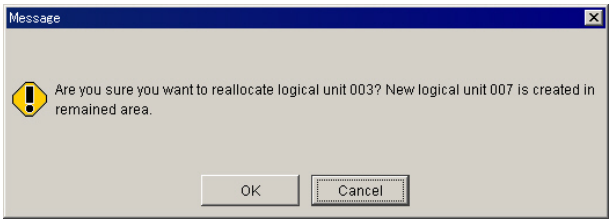


NOTE : The capacity to be reassigned can be specified within a range not larger than that of the logical unit invalidated.

Copyright © 2003, 2005, Hitachi, Ltd.

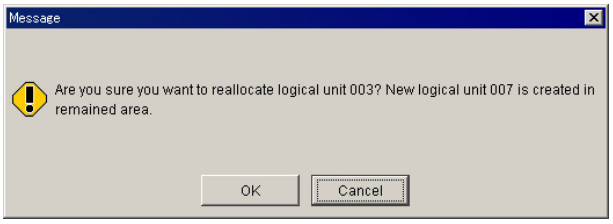
(3) A message asking for confirmation of the reassignment of the selected LU is displayed.

• When the invalidated LU is not formatted

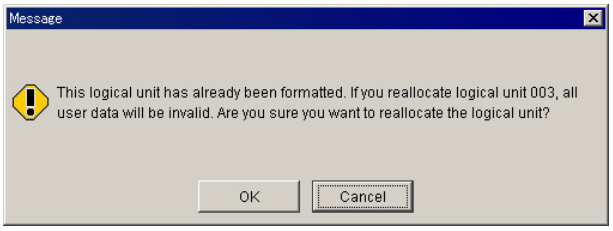


• When the invalidated LU has been formatted

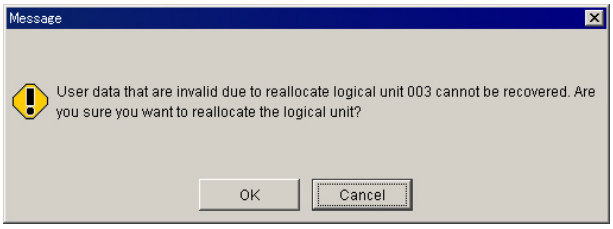
(a) Click the [OK] button.



(b) Click the [OK] button.



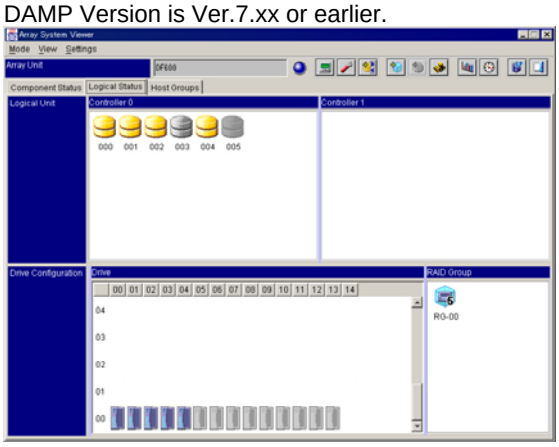
(c) Click the [OK] button.



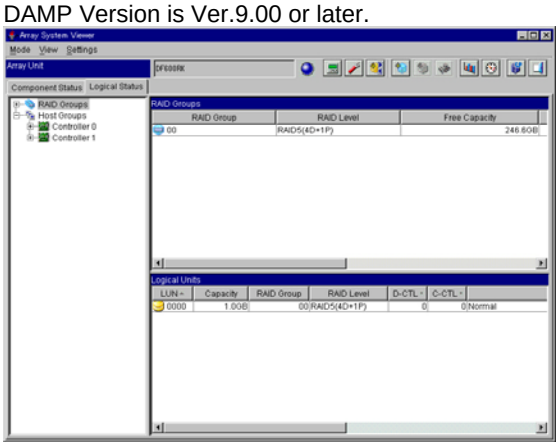
Copyright © 2003, 2005, Hitachi, Ltd.

(4) The window in which the LU information on the reassigned LU has been updated is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

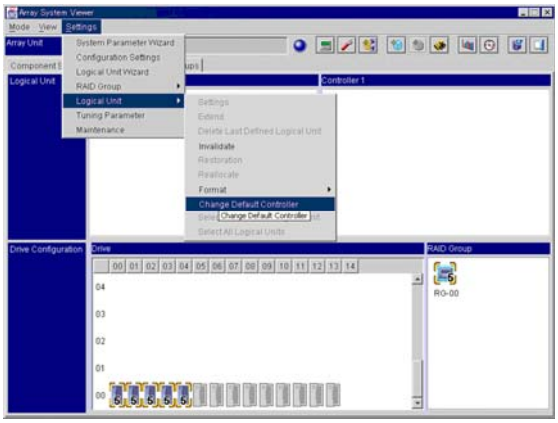
Copyright © 2003, 2005, Hitachi, Ltd.

[Procedure ③-H] The change of the controller in charge of a default LU

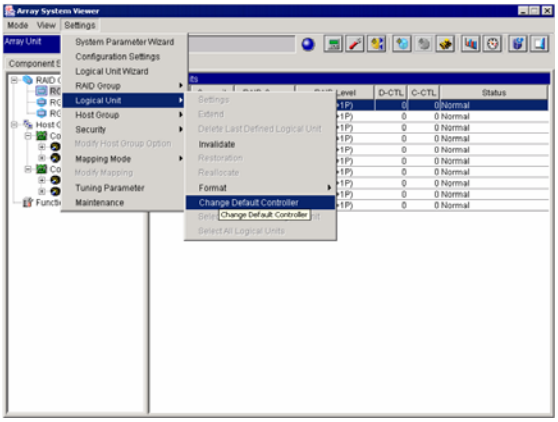
NOTE : The change of the controller in charge of a default LU can be used only for the dual active mode configuration of a dual system.

(1) Click an icon of an LU the default Controller controlling which is to be changed, and then select [Settings] – [Logical Unit] – [Change Default Controller].

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

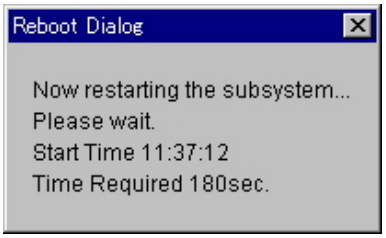


(2) The message indicating that the change of a controller in charge of a default LU was completed is displayed and restart is requested. For restart, click the [OK] button.



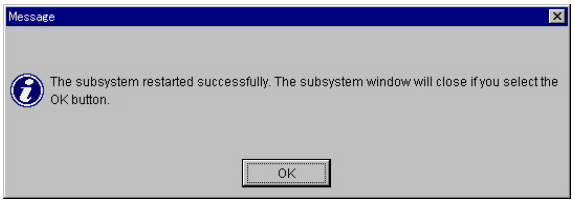
To enable a Controller in charge of a preset default LU, restart a device.
The former setting is valid until the subsystem is restarted. When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, restart the subsystem after making sure that accesses from a host computer has ceased.

When specifying the restart of a device, the time when the restart began is displayed. The restart takes about two to six minutes.



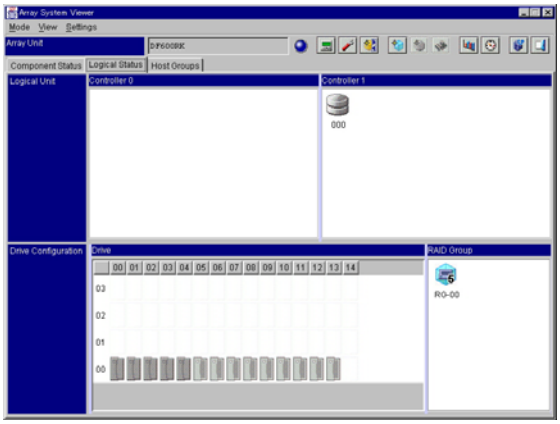
Copyright © 2002, 2005, Hitachi, Ltd.

(3) A message indicating that the restarting has terminated is displayed. Click the [OK] button(‡1).

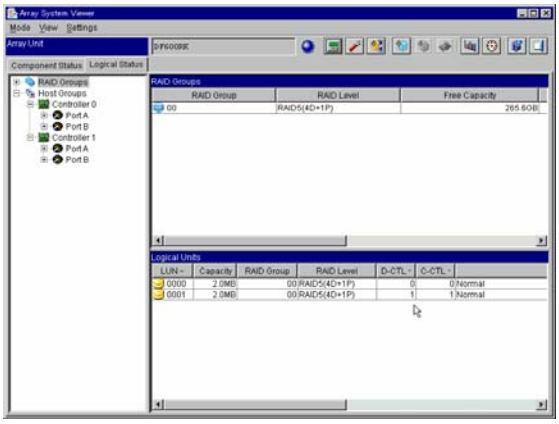


When the subsystem is not restarted, the following window will be displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



- The restarting has terminated, go to [Procedure ③-C] “Verifying LU” (INST 05-0590).

‡1 : A clicking on the [OK] button closes the unit window. When you want to perform another operation, select the subsystem to be operated again in the main window and open the unit window.

Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure ③-I] Formatting LU

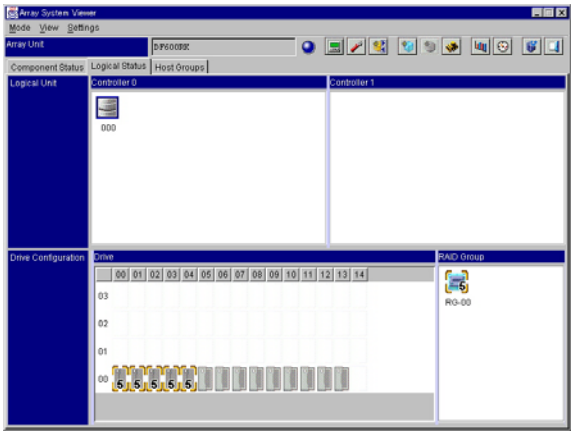
An LU is formatted.

No.	When performing	Reference section to the procedure for formatting LU
1	When performing while online(*1)	Refer to (1). (INST 05-0650)
2	When performing while offline(*2)	Refer to (2). (INST 05-0670)

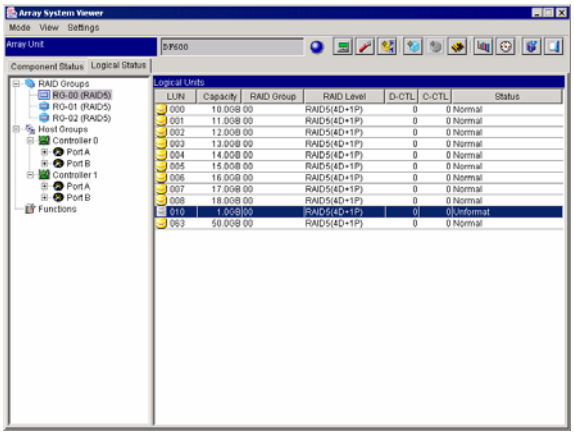
*1 : Online means the status that the array unit is recognized by the system (host computer) when the system (host computer) is connected to array unit.

*2 : Offline means the status that the system (host computer) is not connected.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



(1) Formatting while online

- Online

  A specified LU is formatted every LU and the execution progress of formatting is displayed in percentage [%].

- Quick

  This mode enables the subsystem to start its operation earlier by formatting the specified LU in the background to make it usable by a host. The number of LUs for which an application of the quick formatting can be specified is up to 512 (2,048 in the case of the RKH/RKHE). The number can be increased also. However, the number of LUs that can be formatted in the background at the same time is six per CTL.
  When executing the “Quick” formatting, Disk Array Management Program can perform its operation (such as a RAID group creation) even when the formatting is being executed.
  Even when Disk Array Management Program is quit while the “Quick” formatting is being executed, the formatting is continued.
  Besides, when Disk Array Management Program is quit while the “Quick” formatting is being executed, the progress of the formatting is displayed in percentage in the logical unit status column when Disk Array Management Program is activated again.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 5.4.4 LU Formatting Mode and while Online Description of Operation

No.	LU format mode	Connection mode of array disk management mode and device configuration		Restriction
		Single system Dual system + LAN dual-system connection.	Dual system + LAN single-system connection.	
1	Online	Can be executed during online processing.	Can be executed during online processing. Only the LU in charge of the current of the controller to which utilities were connected is selected. (When formatting an LU which is not in charge of the current, the connection cable needs to be replaced by a new one.)	• In the configuration to issue Reserve in AIX/Windows, on-line single format cannot be executed when Wolfpack mode is not used. • In the configuration of cluster software or path switching software in AIX/Windows, on-line single format cannot be executed when the software (such as HDLM) to issue Persistent Reserve is used.
2	Quick	Can be executed during online processing.	Can be executed during online processing. Only the LU in charge of the current of the controller to which utilities were connected is selected. (When formatting an LU which is not in charge of the current, the connection cable needs to be replaced by a new one.)	• For ShadowImage, TrueCopy Basic and QuickShadow, pair definition cannot be executed when LU is in quick format. If pair definition is in process, quick format cannot be applied. • An LU being quick formatted cannot be unified or extended. Besides, an extended LU cannot be quick formatted. Further, when the microprogram revision is earlier than x657, a unified LU cannot be quick formatted. • It is supported in the Disk Array Management Program Ver.9.10 or later and the Micro Revision Ver.X655 or later. • If LU to be formatted has been set at RAID 0, Quick format cannot be performed.

NOTE : • Host access performance deteriorates during single/quick format.
• The LU status in which the LU is being quick formatted is maintained beyond the deliberate shutdown.

Copyright © 2003, 2005, Hitachi, Ltd.

NOTE : • When two or more of ShadowImage, TrueCopy Basic, and Quick Shadow are used together, a capacity of the LUs that can be quick formatted at a time is limited.
The standard capacity of the LU that Quick Format can be done at a time is calculated by the following formula.
For RK/RKL/RKS ([T byte] in every unit)
(LU capacity that Quick Format can be done at a time) =
120-{(primary and secondary capacity of TrueCopy Basic) (‡1) + (primary and secondary capacity of ShadowImage) + (primary capacity of QuickShadow) × 16}
For RKH/RKHE ([T byte] in every unit)
(LU capacity that Quick Format can be done at a time) =
560-{(primary and secondary capacity of TrueCopy Basic) + (primary and secondary capacity of ShadowImage) + (primary capacity of QuickShadow) × 16}
However, up to 8 T bytes (16 T bytes, in the case of the RKH/RKHE) of LU(s) can be quick formatted at a time irrespective of a total capacity of LUs being used by Shadow Image, True Copy Basic, and/or Quick Shadow. When forming a Shadow Image, True Copy Basic, or Quick Shadow pair with LUs that are being quick formatted, the total capacity of the LUs can be paired is limited.

- When PIN OVER occurs during quick format, a formatting in the background is interrupted. The formatting in the background is resumed automatically after PIN OVER is recovered. Refer to “2.4 1 (11) Recovery procedure for PIN OVER” (MNTE 02-1530)
- When a data loss occurs owing to a power failure and battery exhaustion, an LU being quick formatted enters the Unrestored status. Basically, use the LU after the quick formatting is completed.
- When the host I/O is executed for the LU in formatting, the Quick Format completion may be delayed.
  In this case, it may take 400 seconds at maximum from the 99 % progress status.
- 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 Microrevision is under x657, take notice that the following matter may occur.
  ① If Quick Format is executed in the LU of 2 T bytes (maximum capacity), a Control Unit failure may occur.
  In this case, use Single or Multiple Format.
  ② If the total capacity of the LU specified in Quick Format is over 8 T bytes, a Control Unit failure may occur.
  In this case, keep the total capacity of the LU that executes Quick Format at a time in 8 T bytes or below.
  ③ If Quick Format is executed during the drive restoration (Collection Copy, Dynamic Sparing or Copy Back) or the drive restoration is performed during Quick Format, Quick Format may not be progressed. However, Quick Format restarts when the drive restoration is completed.

Copyright © 2003, 2005, Hitachi, Ltd.

‡1 : RKL/RKS dose not support TrueCopy Basic.

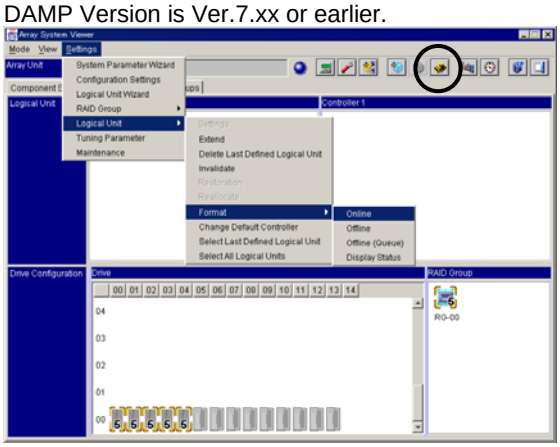
Copyright © 2003, 2005, Hitachi, Ltd.

(a) Select an LU or LU's to be formatted, and then select either of the [Settings] – [Logical Unit] – [Format] – [Online] or [Quick].

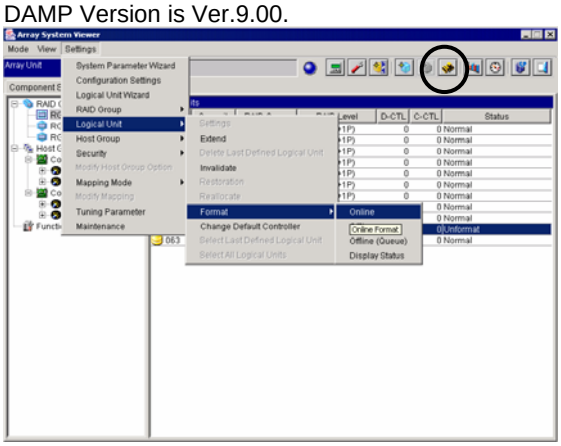
In the case of the Online, clicking of the [: Online] button opens the same window.

NOTE : Quick Format is supported in the Disk Array Management Program Ver.9.10 or later and the Micro Revision Ver.X655 or later.

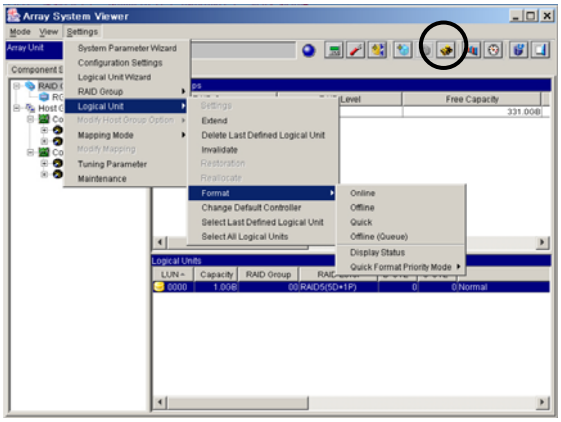
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.

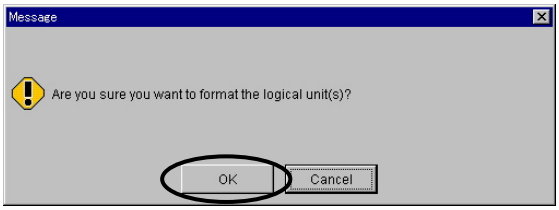


Copyright © 2003, 2005, Hitachi, Ltd.

(b) If the confirmation message is displayed.

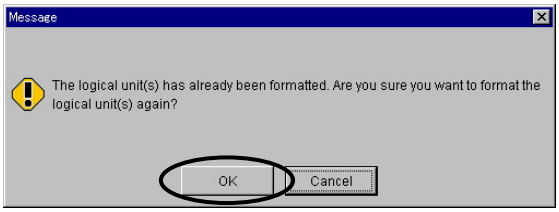
• When an LU that has been “Online” formatted does not exist

(i) Click the [OK] button.

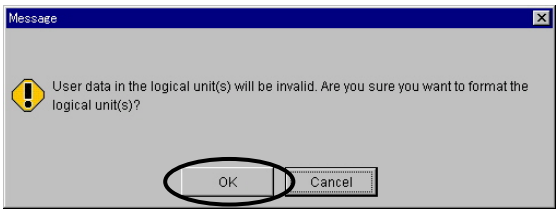


• When an LU that has been “Online” formatted exists

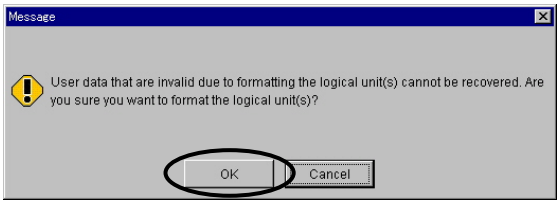
(i) Click the [OK] button.



(ii) Click the [OK] button.



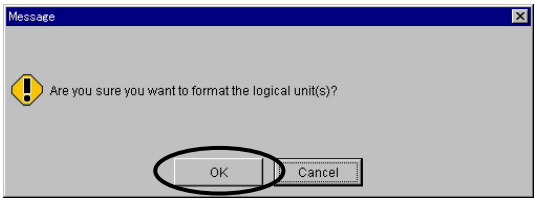
(iii) Click the [OK] button.



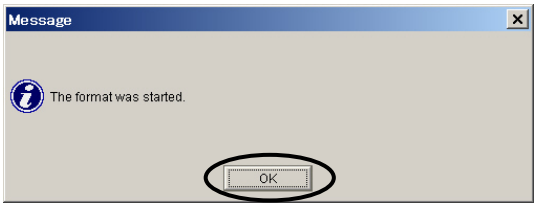
Copyright © 2003, 2005, Hitachi, Ltd.

• When an LU that has been “Quick” formatted does not exist

(i) Click the [OK] button.

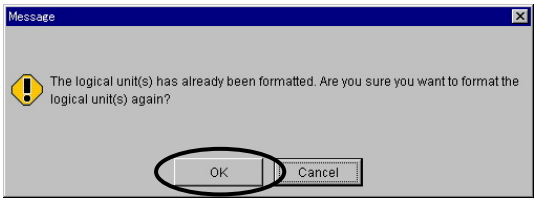


(ii) Click the [OK] button.

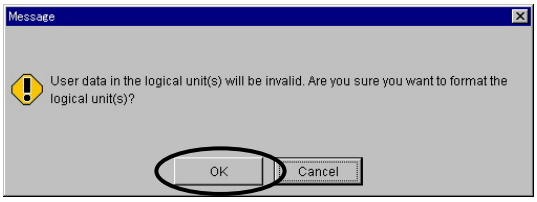


• When an LU that has been “Quick” formatted exists

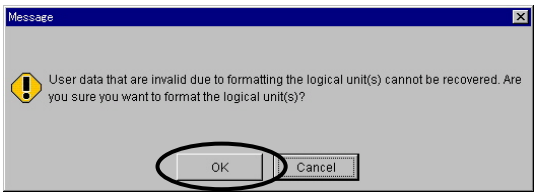
(i) Click the [OK] button.



(ii) Click the [OK] button.



(iii) Click the [OK] button.



(iv) Click the [OK] button.

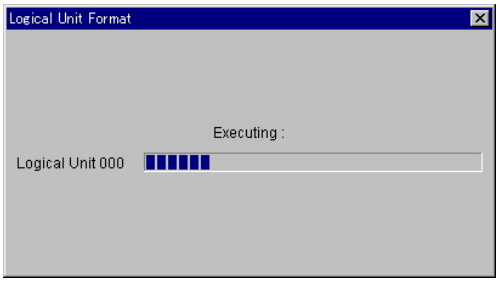


Copyright © 2003, 2005, Hitachi, Ltd.

(c) If [OK] is clicked, the specified LU is formatted(‡1).

(d) Message is displayed.

- When specifying “Online”
  The number of an LU which is currently being formatted and the progress.
  The progress status is updated every other ten seconds.

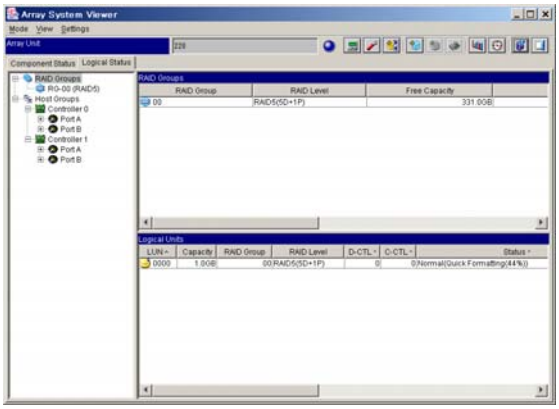


When multiple LUs are specified, the progress in which formatting of an LU was executed in descending order of an LU number is displayed.

- When the “Quick” is specified
  When the “Quick” is specified, it is displayed in the logical unit status column.

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.

DAMP Version is Ver.9.10 or later.



‡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.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) The result of the formatting is displayed. After checking the formatting result, click the [OK] button. If formatting terminates abnormally, refer to Table 5.4.5.

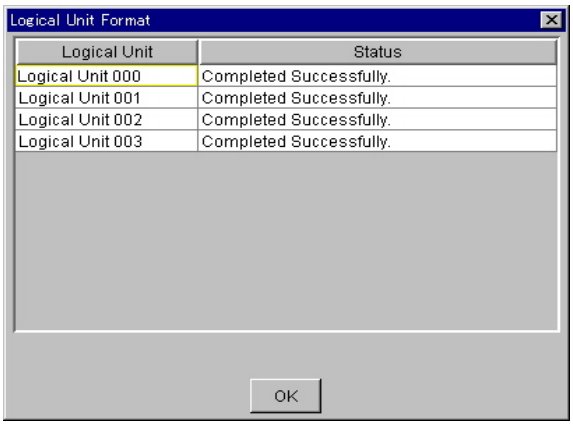


Table 5.4.5 Contents of Display of Execution Result Screen

No.	Status		Result
1	"Completed Successfully."		Successful
2	"Abnormal end"	"CHECK CONDITION (xx-xxxx)" is displayed(*1) Sense key Sense code	Unsuccessful Format Unit Unsuccessful command
3		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 2.7 Failure Analysis by Sense Data, "Sense Data" on page MAINTE 02-2540 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 05-25 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.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

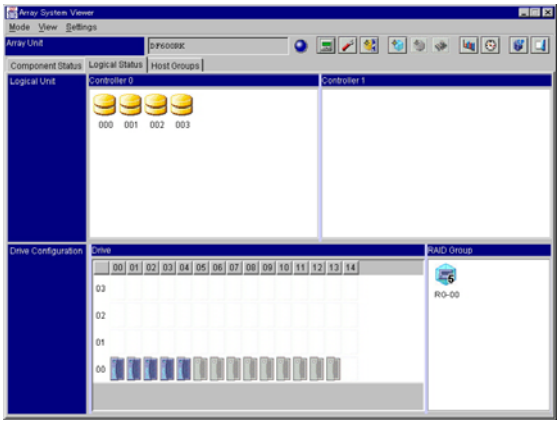
Copyright © 2004, 2005, Hitachi, Ltd.

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.

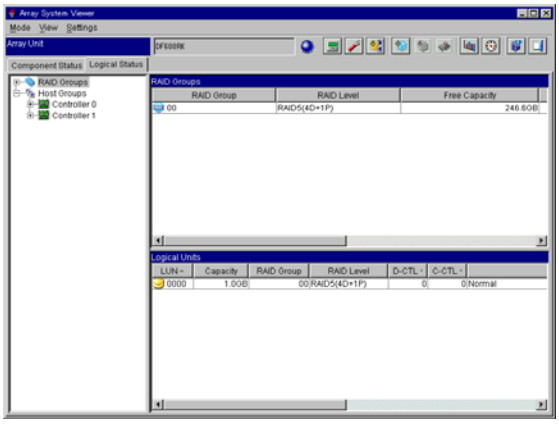
When message-text is indicated, take measure according to the message.
Take action in accordance with message text = message.
The message indicating that “An error occurred in the communication with an array device.” at the time when selecting “Online Format” is output since the progress screen cannot be displayed due to the interface failure between the Disk Array Management Program and a device.
For LU formatting, only the LU being executed is continuously formatted.

(f) Preset LU information is updated and the screen is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



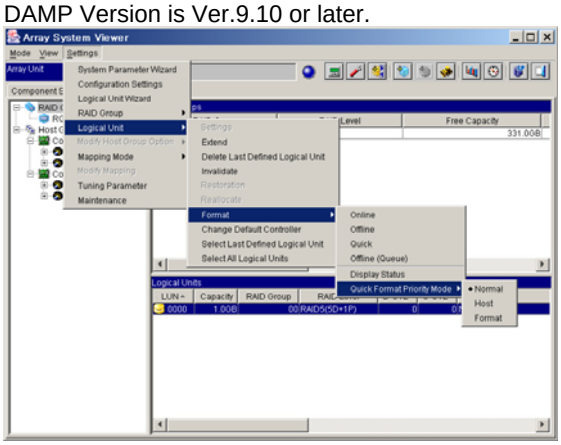
- The formatting LU has terminated, go to “5.4.4 Setting of Spare Disk” (INST 05-0730).

Copyright © 2002, 2005, Hitachi, Ltd.

- Quick Format Priority Mode
  When you want to specify the mode that gives priority to the quick formatting, select [Settings] – [Logical Unit] – [Format] – [Quick Format Priority Mode], and one of [Normal], [Host], and [Format] in this order.

(g) The window, in which information on the formatted LU is updated, is displayed.

DAMP Version is Ver.9.10 or later.



When you specify the quick formatting, you can specify which of the quick formatting or host access you give priority throughout the system. The specification can be changed in the online status. Specifications of the mode and corresponding quick formatting operations are shown in the table below.

Table 5.4.5.1 Operations in Preferential Quick Formatting Mode

No.	Mode	Corresponding operation	Comparison to Ordinary Performance(*1) (*2)		Remarks
			Host Performance	Format Performance	
1	Normal	The middle mode between host priority and format priority.	70 %	30 %	Default
2	Host	The mode to prioritize host access to background format.	90 %	20 %	
3	Format	The mode to prioritize background format to host access.	50 %	50 %	

*1 : Ordinary time means host performance without quick format and format performance without host access.
*2 : Compared performance goes up/down depending on the configuration or the volume of host access. It also goes up/down in case of host access to LU in quick format.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Formatting while offline

The execution method of formatting is divided into two modes.

- Offline Format

  Up to six specified LUs are simultaneously formatted and the execution progress of formatting is displayed in percentage [%].

  If two LUs or more are specified and formatted during online processing, formatting and a command being executed terminates abnormally. Following the Formatting procedure (single), format each LU one by another.

  Once “Offline Format” is executed, any other functions of Disk Array Management Program cannot be used until “Offline Format” is finished.

  The Disk Array Management Program cannot be terminated before “Offline Format” is finished.

  ”Offline Format” should be used when Password Protection is unlocked and enabled.

- Offline (Queue)

  Up to six specified LUs are formatted at the same time and the progress of the formatting execution is displayed.

  When two or more specified LUs are formatted during an online processing, the formatting and a command being executed terminate abnormally. Format each LU one by one following the procedure for formatting (single LU).

  When “Offline (Queue) Format” is executed, the operations of the Disk Array Management Program to refer the information about the Disk Array Unit can be used during formatting LUs. And the Disk Array Management Program can be terminated before “Offline (Queue) Format” is finished.

  After the termination of the Disk Array Management Program, formatting LUs is executed by back-graund process, and the progress of the “Offline (Queue) Format” can be displayed by reconnecting the Disk Array Management Program and checking the [Settings] ->[Logical Unit]->[Display Status].

  “Offline (Queue) Format” should be used if the another function of the Disk Array Management Program is used, the Disk Array Management Program is terminated, or the PC for Maintenance Work for the Disk Array Unit is taken off from the Disk Array unit while formatting LUs.

  ”Offline (Queue) Format” cannot be used when Password Protection is unlocked and enabled.

  NOTE : When formatting an LU whose LU capacity is less than 100,000 (blocks), formatting may terminate abnormally. When formatting an LU whose LU capacity is 100,000 (blocks), select “Online Format”.

The operation in each section of LU formatting menu varies depending on the network of Resource Manager 2 and the configuration of devices as shown in Table 5.4.5.2

Copyright © 2002, 2005, Hitachi, Ltd.

Table 5.4.5.2 LU Formatting Mode and while Offline Description of Operation

No.	LU format mode	Connection mode of the Disk Array Management Program and device configuration		Restriction
		Single system Dual system + LAN dual-system connection.	Dual system + LAN single-system connection.	
1	Offline	Cannot be executed during online processing. Two LUs or more are selected in the “Offline” mode.	Cannot be executed during online processing. “Offline” is selected, and only one LU in charge of the current to which utilities were connected is selected. Two LUs or more are selected in the “Offline Format” mode.	Any other functions of the Disk Array Management Program cannot be executed before “Offline Format” is finished. The Disk Array Management Program should not be terminated before “Offline Format” is finished.
2	Offline (Queue)	Cannot be executed during online processing. Two LUs or more are selected in the “Offline (Queue)” mode.	Cannot be executed during online processing. “Offline (Queue)” is selected, and only one LU in charge of the current to which utilities were connected is selected. Two LUs or more are selected in the “Offline Format (Queue)” mode.	Cannot be performed when Password Protection is unlocked and enabled.

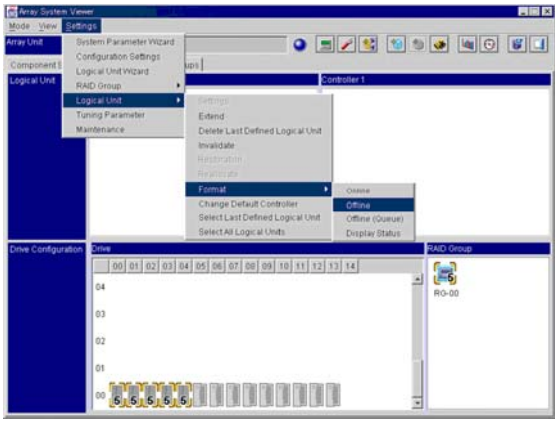
NOTE : • While formatting is being executed in the executable mode during online processing, if rebooting of a host computer, I/O bus switching and LU accessing by a controller not in charge occur, formatting is interrupted in some case.

- When a formatting is being executed in a mode that allows the execution of the formatting online, performance of an access to another LU (a host computer I/O) is lowered to about 80 percent.
- If Multiple is used during the forced parity correction, drive restoration or TrueCopy/ShadowImage/QuickShadow use, the format may terminate abnormally. Use Single or Quick to execute the format during the forced parity correction, drive restoration or TrueCopy/ShadowImage/QuickShadow use.

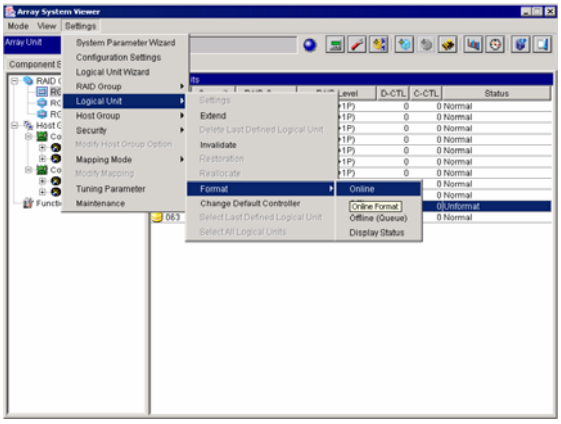
Copyright © 2002, 2005, Hitachi, Ltd.

(a) Select an LU or LU's to be formatted, and then select either of the [Settings] – [Logical Unit] – [Format] – [Offline] or [Offline (Queue)].

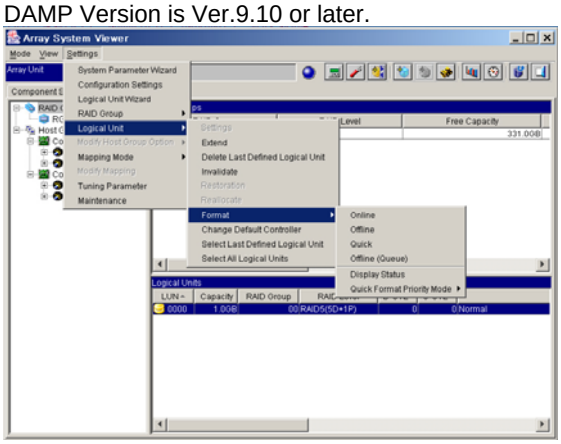
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.

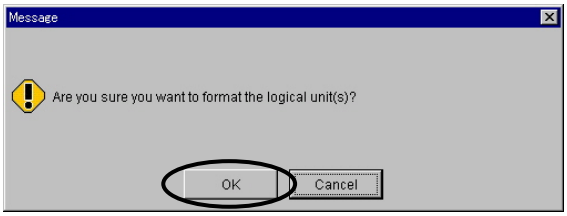


Copyright © 2002, 2005, Hitachi, Ltd.

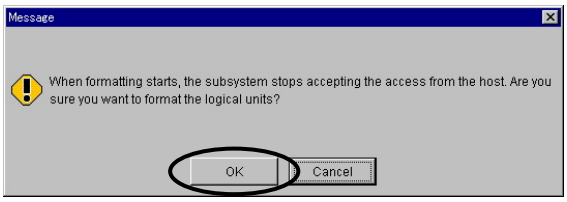
(b) If the confirmation message is displayed.

• When two LUs or more are specified in the “Offline”, but there is no formatted LU

(i) Click the [OK] button.

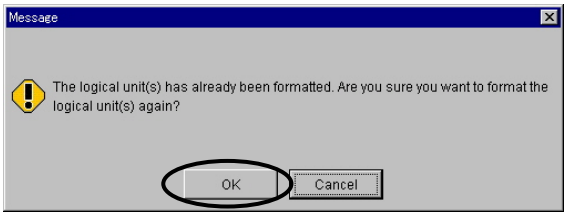


(ii) Click the [OK] button.

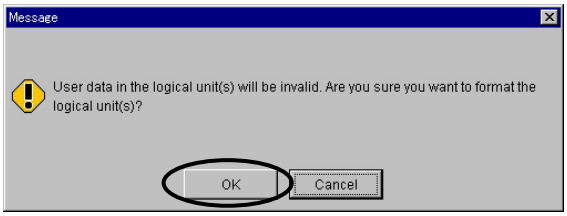


• When two LUs or more are specified in the “Offline”, and there is a formatted LU

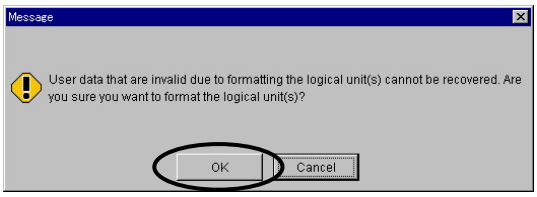
(i) Click the [OK] button.



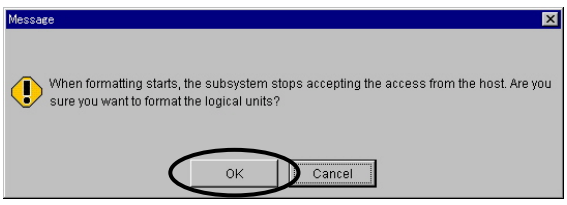
(ii) Click the [OK] button.



(iii) Click the [OK] button.



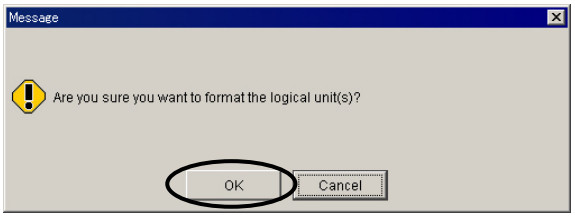
(iv) Click the [OK] button.



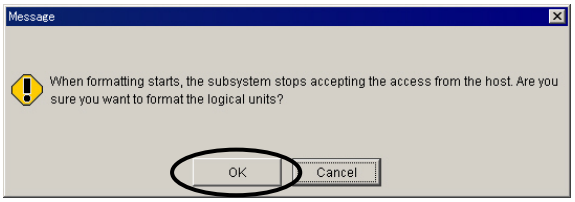
Copyright © 2003, 2005, Hitachi, Ltd.

- When two LUs or more are specified in the “Offline (Queue)”, but there is no formatted LU

(i) Click the [OK] button.

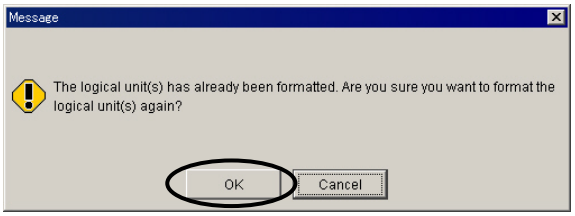


(ii) Click the [OK] button.

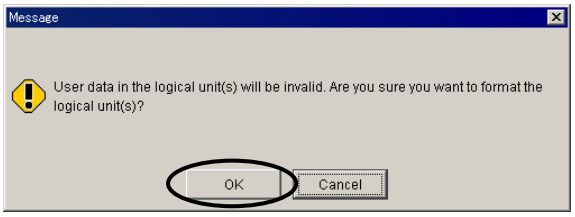


- When two LUs or more are specified in the “Offline (Queue)”, and there is a formatted LU

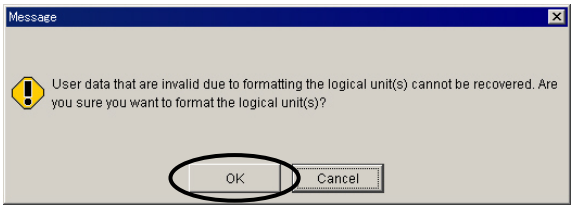
(i) Click the [OK] button.



(ii) Click the [OK] button.

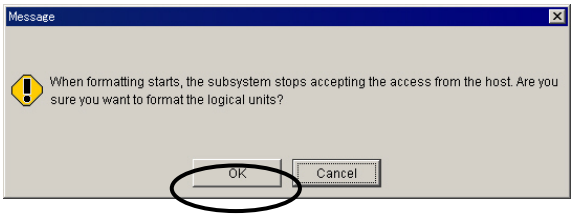


(iii) Click the [OK] button.



(iv) Click the [OK] button.

Copyright © 2003, 2005, Hitachi, Ltd.

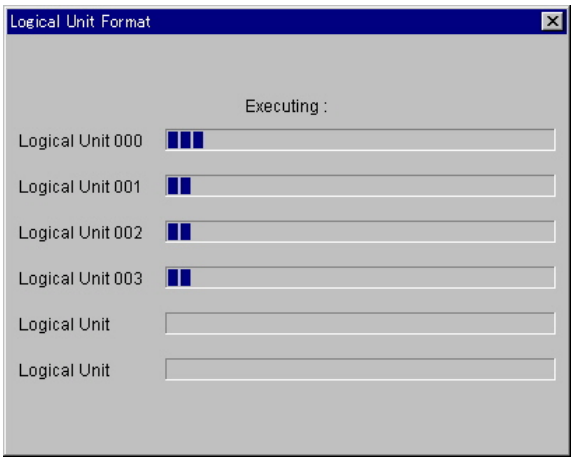


Copyright © 2003, 2005, Hitachi, Ltd.

(c) If [OK] is clicked, the specified LU is formatted(‡1).

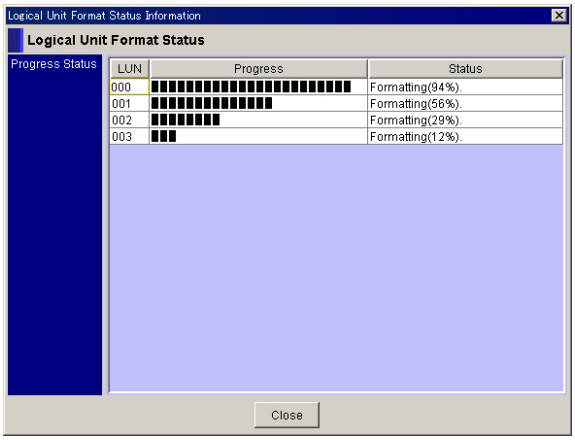
(d) Message is displayed.

- When specifying “Offline”
  The number of an LU which is currently being formatted and the progress.
  The progress status is updated every other ten seconds.



When multiple LUs are specified, the progress in which up to six LUs were executed in descending order of an LU number is displayed. After formatting of a LU has terminated, the progress in which formatting of the next LU was executed is displayed.

- When specifying “Offline (Queue)”
  The number of an LU which is currently being formatted and the progress.
  The progress status is updated every other ten seconds.



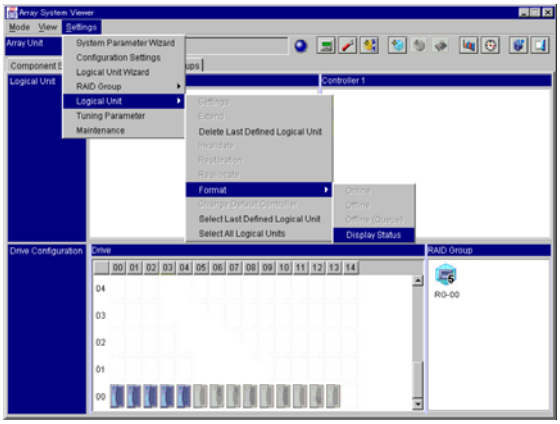
When the two or more LUs are selected, progress of the formatting being executed is displayed in ascending order of LU numbers up to 512. The window that displays the progress can be closed.

‡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.

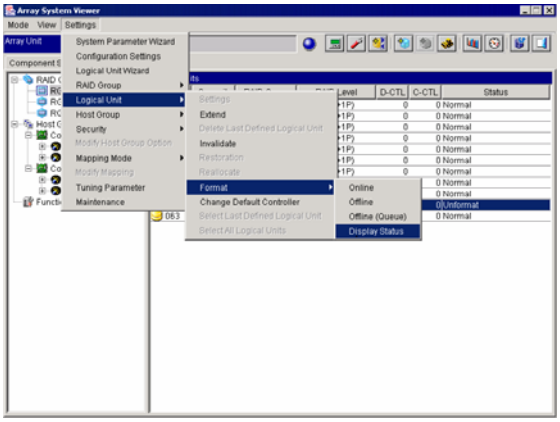
Copyright © 2002, 2005, Hitachi, Ltd.

- Display Status
  When you want to display progress of the batch formatting, select [Settings] – [Logical Unit] – [Display Status], and [Quick Format Priority Mode] in this order.

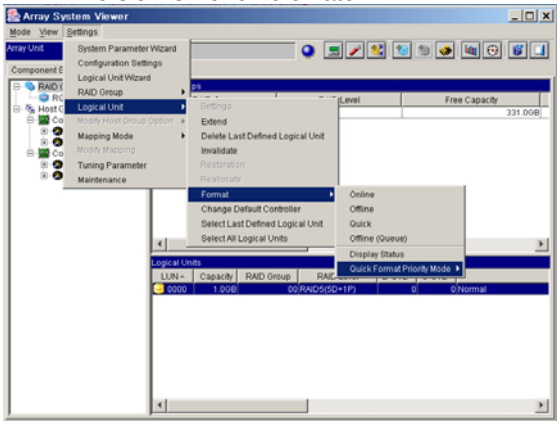
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.



Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) The result of the formatting is displayed. After checking the formatting result, click the [OK] button. If formatting terminates abnormally, refer to Table 5.4.5.

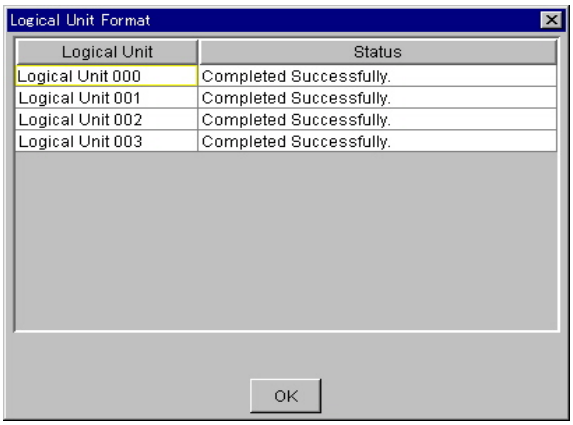


Table 5.4.5 Contents of Display of Execution Result Screen

No.	Status		Result
1	Completed Successfully."		Successful
2	"Abnormal end"	"CHECK CONDITION (xx-xxxx)" is displayed(*1) Sense key Sense code	Unsuccessful Format Unit Unsuccessful command
3		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 2.7 Failure Analysis by Sense Data, "Sense Data" on page MAINTE 02-2540 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 05-25 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.

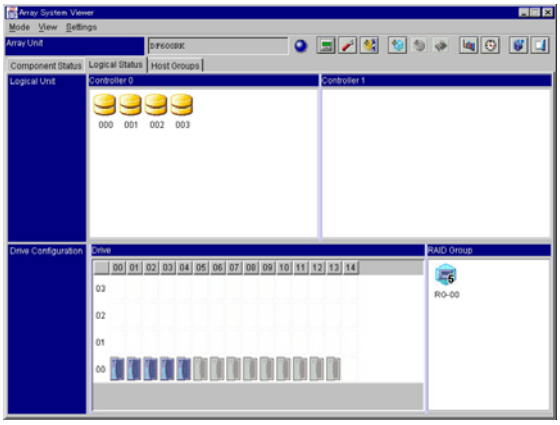
Copyright © 2002, 2005, Hitachi, Ltd.

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.

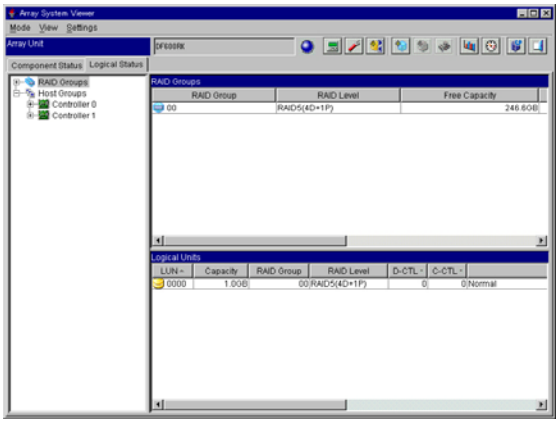
When message-text is indicated, take measure according to the message.
Take action in accordance with message text = message.
If Multiple is used during the forced parity correction, drive restoration or TrueCopy/ShadowImage/QuickShadow use, the message, “DMEA000006” or “DMEA000007”, is displayed, and the format may terminate abnormally. For the LU that the format terminated abnormally, execute the format again with “Single” or “Quick”.

(f) Preset LU information is updated and the screen is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



- The formatting LU has terminated, go to “5.4.4 Setting of Spare Disk” (INST 05-0730).

Copyright © 2002, 2005, Hitachi, Ltd.

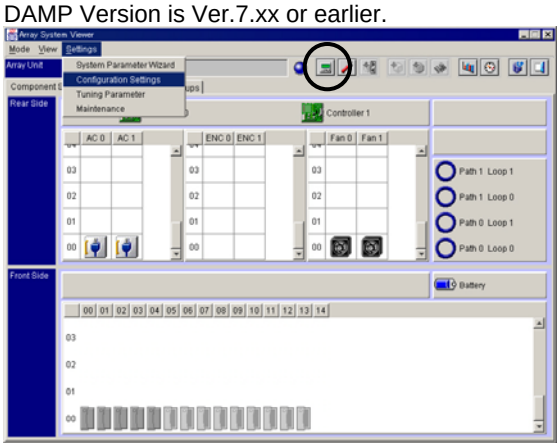
5.4.4 Setting of Spare Disk

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 other than the HDU 0 to HDU 4 in the Unit 0 for which no RAID group is defined.

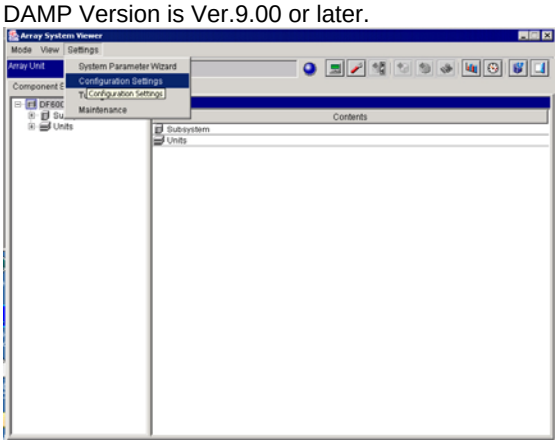
[Procedure ④-A] Preparing of setting Spare Disk

(1) Select [Settings] – [Configuration Settings] in the unit window or click [ : Configuration Settings] button.

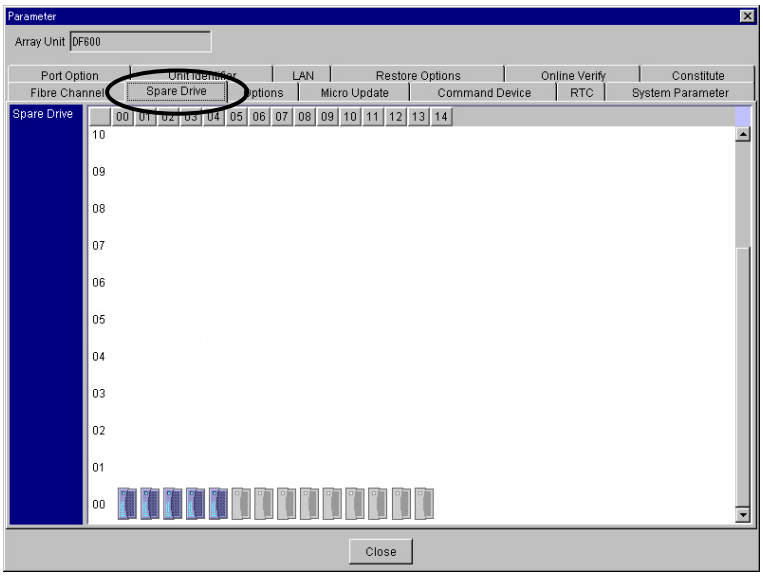
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



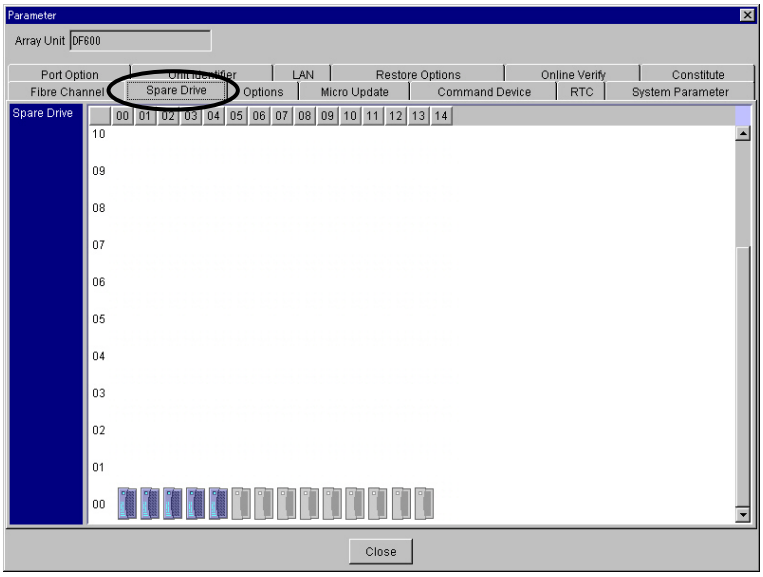
(2) Click the [Spare Drive] button.



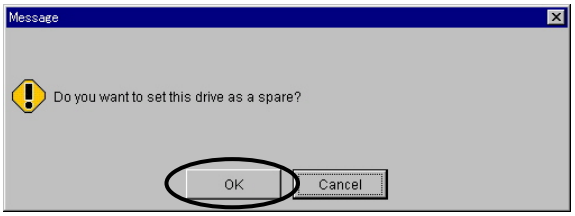
Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure ④-B] Setting Spare Disk

(1) Double-click the icon of the Disk Drive to be assigned to a Spare Disk.



(2) When a confirmation window of Spare Disk setting appears. Click the [OK] button(‡1).



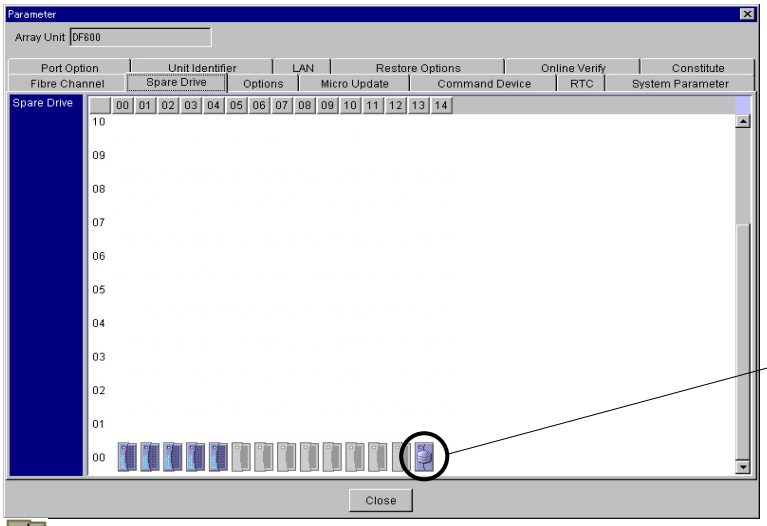
- When verifying the Spare Disk, go to [Procedure ④-D] “Verifying Spare Disk” (INST 05-0760).

‡1 : When incorrectly specifying an Disk Drive, press the [Cancel] button and redo processing by [Procedure ④-B].

Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure ④-C] Deleting Spare Disk

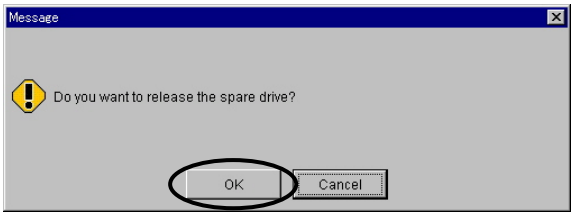
(1) Double-click the icon of the Disk Drive that has been assigned to a Spare Disk.



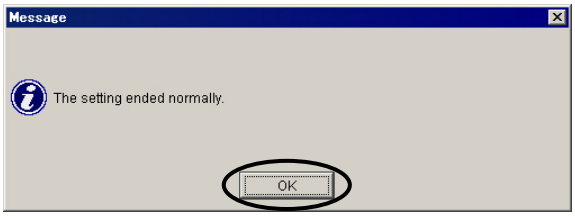
 : Data Disk

 : Spare Disk

(2) The Spare Disk reset confirmation is displayed. Click the [OK] button(‡1).



(3) If the confirmation message is displayed. Click the [OK] button.



- When setting the Spare Disk, go to [Procedure ④-B] “Setting Spare Disk” (INST 05-0740).

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.

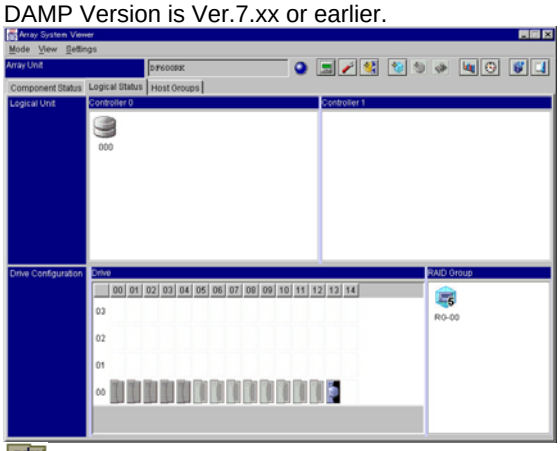
‡1 : When incorrectly specifying an Disk Drive, press the [Cancel] button and redo processing by [Procedure ④-C].

Copyright © 2002, 2005, Hitachi, Ltd.

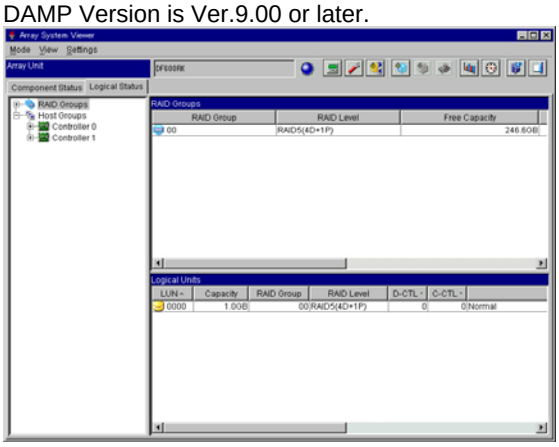
[Procedure ④-D] Verifying Spare Disk

(1) The setting of the Spare Disk can be verified in the unit window

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.




: Data Disk


: Spare Disk

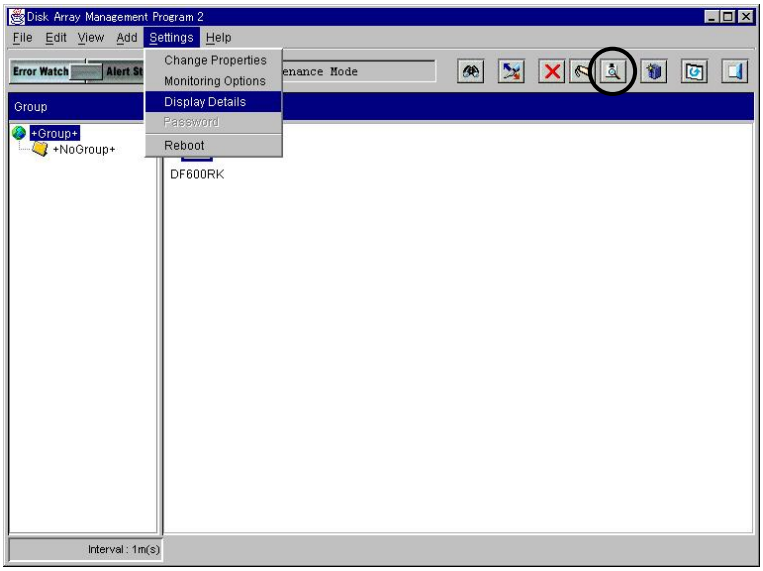
- If confirmation is OK, go to “5.3 Setting Host Group” (INST 05-0290)
- If confirmation is NG, go to [Procedure ④-C] “Deleting Spare Disk” (INST 05-0750)

Copyright © 2002, 2005, Hitachi, Ltd.

5.4.5 Checking the status of Disk Drive

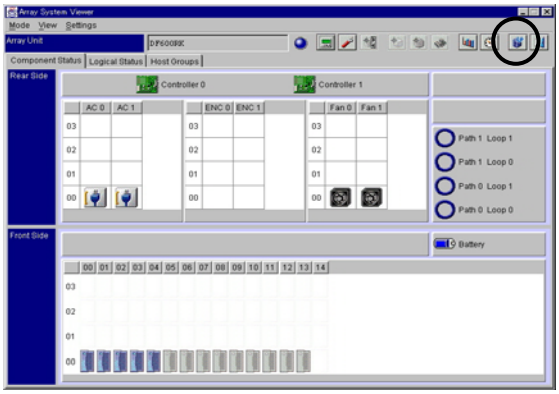
Display the array unit component status and information by using icons. When you double-click each icon, the information of the component part indicated by the icon is displayed.

(1) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Display Details]

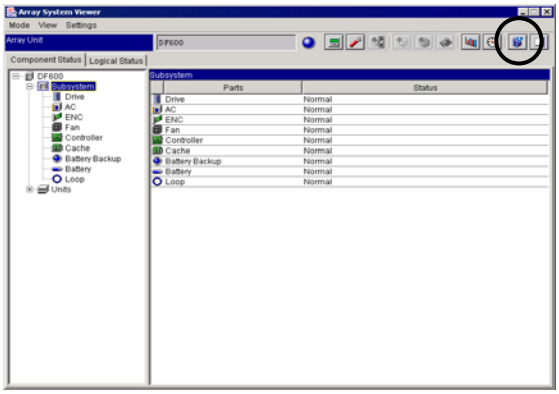


(2) To update the component display, on the View menu, select Refresh or click [ : Refresh] button in the tool bar.

DAMP Version is Ver.7.xx or earlier.



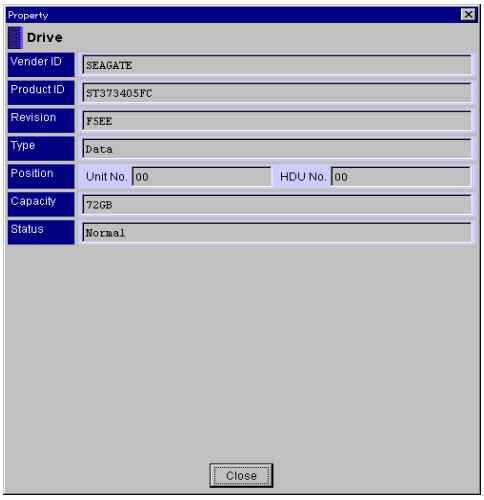
DAMP Version is Ver.9.00 or later.



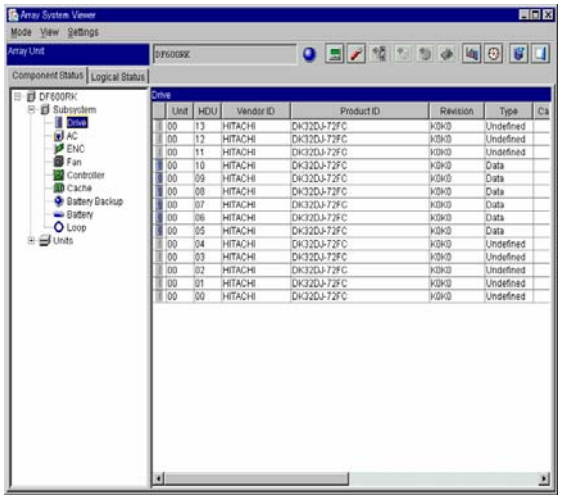
Copyright © 2004, 2005, Hitachi, Ltd.

(3) When you double-click Drive icon, the property screen of the component part is displayed.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



NOTE : Vendor ID, Product ID, Revision, and Serial No. may not be displayed depending on the drive mounting and drive status.

[Unit] : Unit No. (Ver.9.00 or later)
[HDU] : HDU No. (Ver.9.00 or later)
[Vendor ID] : Vendor ID of drive
[Product ID] : Product ID of drive
[Revision] : Firmware revision of drive
[Type] : Drive using form
- Data : Data drive
- Spare : Spare drive
- Undefine : Normal (LU not defined) (Ver.9.00 or later)

[Position] : Drive mounting position (Ver.7.xx or earlier)
- Unit No. : Unit No. (Ver.7.xx or earlier)
- HDU No. : HDU No. (Ver.7.xx or earlier)

[Capacity] : Storage capacity of a drive
[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) (Ver.7.xx or earlier)
- 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. (Ver.7.xx or earlier)
- Waiting : Spare drive not used

[Serial No.] : Serial No. of a drive (Ver.9.00 or later)

Copyright © 2004, 2005, Hitachi, Ltd.

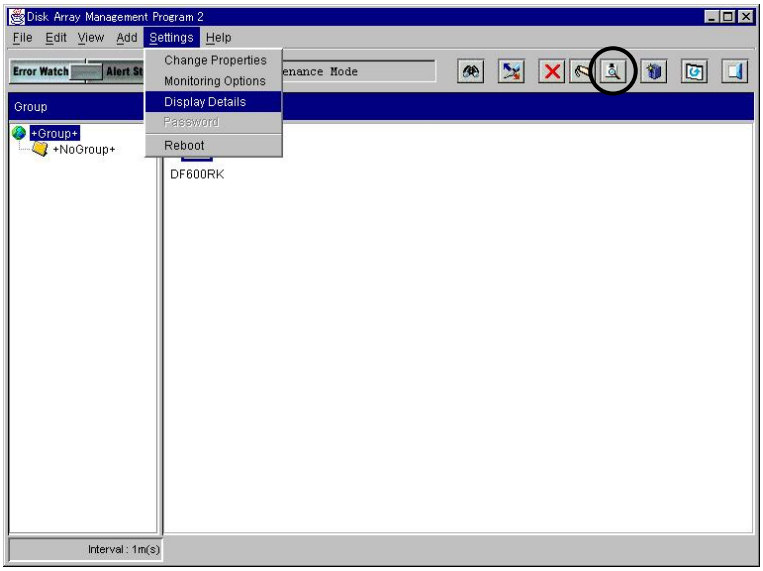
5.5 Setting Configuration Information

5.5.1 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 Disk Array Management Program and set the Active Mode in 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 setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

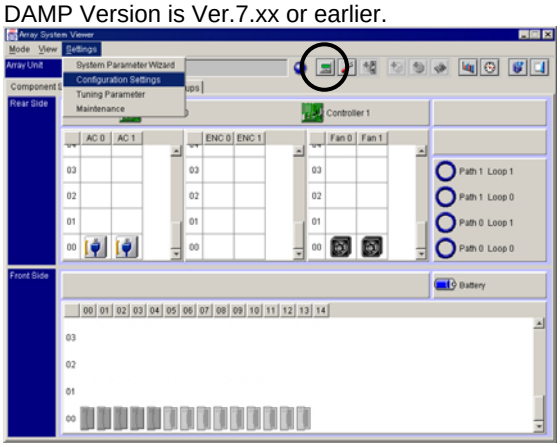


‡1 : For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), "Changing the Maintenance Mode" on page INST 05-0050.

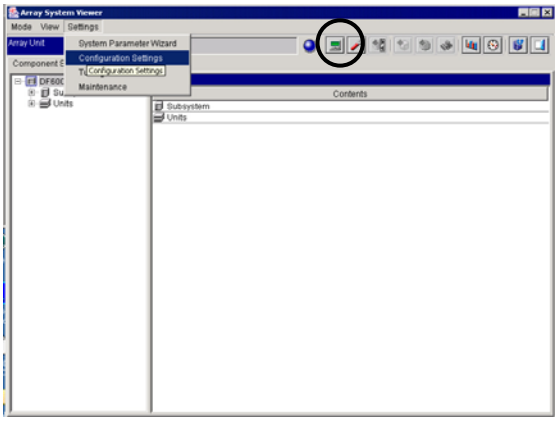
Copyright © 2002, 2005, Hitachi, Ltd.

(4) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

5.5.2 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” and “Fibre Option” must be made for each port (each of Port 0A, 0B, 1A, and 1B(RKH/RKHE+RKA: each of Port 0A, 0B, 0C, 0D, 1A, 1B, 1C, and 1D)).

Table 5.5.1 The menu items of setting parameter

No.	Menu item	Use	Contents	Factory setting	Reference page
1	Port Option	Set the port options of a controller	① Reference/setting of the Host Connection Mode 1 for each port	Cannot be set for the DF600.	INST 05-0810
			② Reference/setting of the Host Connection Mode 2 for each port	Cannot be set for the DF600.	
			③ Reference/setting of the port option for each port	—	
2	Unit Identifier	Reference to and setting of the Equipment ID, Controller Identifier.	① Reference to and setting of the Equipment ID.	—	INST 05-0830
			② Reference to and setting of the Controller Identifier (valid/invalid).	Invalid	
			③ Reference to and setting of the controller ID.		
3	LAN	Reference to and setting of the LAN configuration information.	① Reference to and/or setting of enable or disable of the DHCP mode.(*1)	OFF	INST 05-0840
			② Reference to and setting of IP Address.	192.168.0.16	
			③ Reference to and setting of SUB NET MASK.	255.255.255.0/ 255.255.255.224(*2)	
			④ Reference to and setting of Default Gateway.	0.0.0.0	
			⑤ Reference to the Ether Address.	—	

*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”. (Disk Array Management Program 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 this device is used as an external Disk Drive of the DHCP server and the device IP address is obtained by DHCP function, and if the IP address of “10.x.x.x” is assigned to the device, IP addresses of Ports for Users and Maintenance may conflict with each other and the device may not function normally.
Request the system administrator that the DHCP server does not assign IP address of “11.x.x.x” to the device.

*2 : Micro revision is 0653/C or later.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Menu item	Use	Contents	Factory setting	Reference page
4	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) (*3)	INST 05-0850
			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	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)	INST 05-0870
			② Reference to and setting of idling time.	10 sec	
			③Refers to and/or sets validity or invalidity of verify processing.	OFF	
6	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).	—	INST 05-0880
			② Input of system parameters and configuration information to (a) file(s).		
7	Fibre Channel	Reference to and setting of information regarding the Fibre Channel.	① Reference/setting of Topology Information for each port	Loop	INST 05-0900
			② Setting of Port Address for each port.	0000EF	
			③ Setting of Transfer Rate for each port.	Auto	
			④ Reference to and setting of Security Information.	LUN security = OFF	
8	Spare Drive	Reference to and setting of the Spare Disk.	① Reference to and setting of the Spare Disk.	Depending on the configuration from the factory.	INST 05-0930
9 (*2)	Options	To be used for references and settings when introducing the onerous optional functions.	① Unlocks the optional function.	—	INST 05-0960
			② Locks the optional function.		
			③ Change of status of the optional function		
10	Micro Update	Down load and replace the microprogram.	① Setting of down load of the microprogram.	—	INST 05-0970
			② Setting of replacement of the microprogram.		
11	Command Device	Reference/setting of command device information	① Reference/setting of the Logical Unit Number to be set as the Command Device 1.	—	INST 05-0990
			② Reference/setting of the logical unit number to be set as the command device 2.		
			③ Reference/setting of the Serial ID		
12	RTC	Reference to and setting of date, time.	① Setting procedure.	—	INST 05-1000
			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 : 4 (× 32 block)

*2 : Refer to “4.5 Optional Functions” (INTO 04-0121) for Optional Functions.

*3 : When the microprogram revision is 0654 or earlier, the mode is set as Background. When it is 0655, 1654, or later, the mode is set as Interleave (Normal).

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Menu item	Use	Contents	Factory setting	Reference page
13	System Parameter	To be used to set the system parameters.	① Selection of system parameters	—	INST 05-1001
			② Setting of an action against a processor failure	Reset of occurred.	
			③ Setting of command queuing execution	ON	
			④ Web title	—	
			⑤ Setting of the transmission mode of RS232C error information(*1)	OFF	
			⑥ Setting of the mode for executing the Write and Verify	ON	
14	Performance Statistics	To be used to set the Performance Statistics	① Selection of performance statistics.	—	INST 05-1002
15	LU Prefetch Information	To be used to set the Prefetch Staging Size	① Setting of the pre-fetch staging size (sub blocks) value to every LUs.	—	INST 05-1004

*1 : RKH/RKHE+RKA is not supported.

Copyright © 2003, 2005, Hitachi, Ltd.

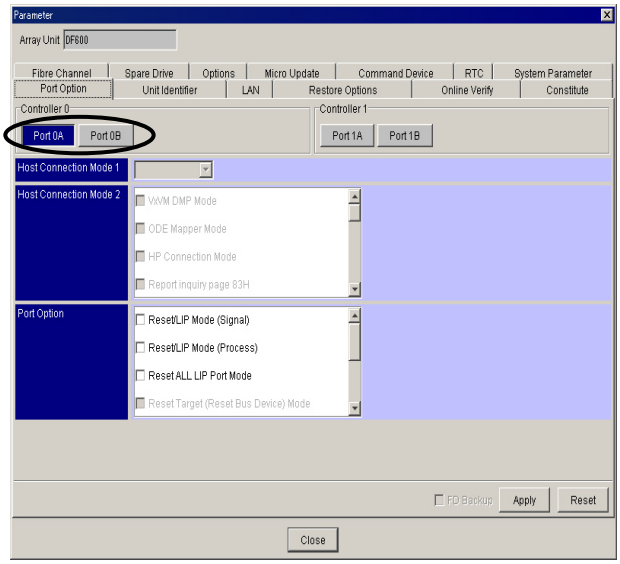
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Setting of Port Option

(a) Click the [Port Option] tab. The window for setting the "Port Option" is displayed in the Parameter window.

(b) Click the [Port 0A] button.



① [Host Connection Mode 1] : This item cannot be set for the DF600.

② [Host Connection Mode 2] : This item cannot be set for the DF600.

③ [Port Option] : Specify a port option. 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.

[Target Reset (Bus Device Reset) Mode] : This item cannot be set for the DF600.

[Reserve Mode] : This item cannot be set for the DF600.

[Logical Unit Reset Propagation Mode] : This item cannot be set for the DF600.

[Third Party Process Logout Mode] : This item cannot be set for the DF600.

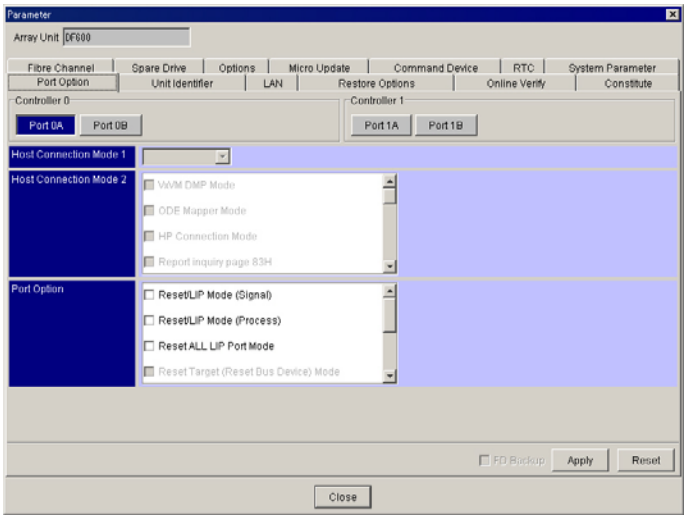
[Read Frame Min 128 Byte Mode] : This is a mode for setting the minimal size of the flame size transferred by a read to the 128 bytes.

NOTE : The Reset/LIP mode (signal transmission) is effective when the Reset/LIP mode (processing transmission) is set.

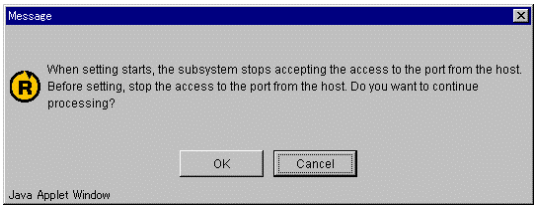
④ [FD Backup] : This item cannot be set for the DF600.

Copyright © 2002, 2005, Hitachi, Ltd.

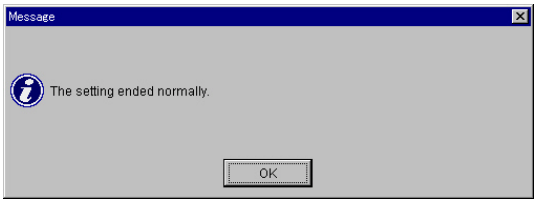
(c) When the setting is completed, click the [Apply] button at lower right corner of the "Parameter" window. When the [Reset] button is clicked, the change is cancelled.



(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.



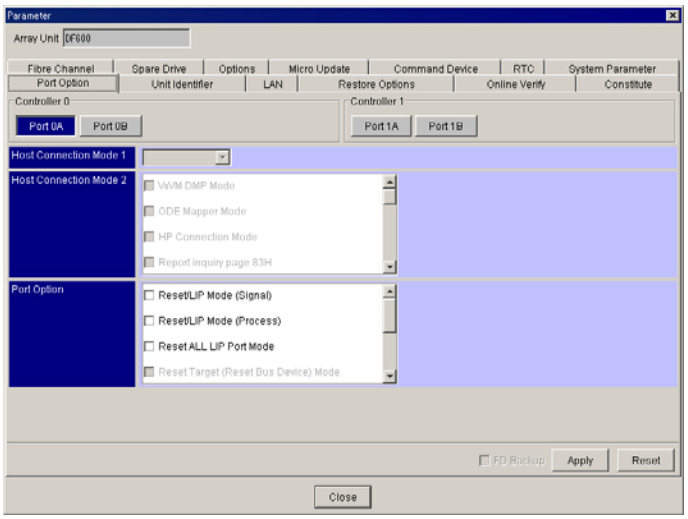
(e) When the setting is completed, the following message is displayed. Click the [OK] button.



(f) The setting/verification of the port 0A is completed.

(g) The setting/verification of the port 0A is completed. Do the same for the other ports.

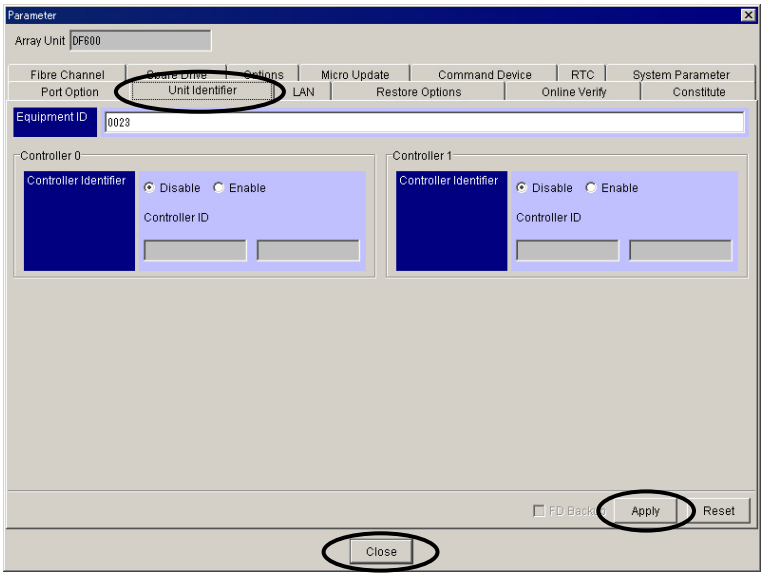
Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

(2) Setting of Unit Identifier

(a) Click the [Unit Identifier] tab. The window for setting the "Unit Identifier" is displayed in the Parameter window.



① [Equipment ID] : The last four figures of the subsystem serial number have been set in default. Change the device ID as occasion demands so that two identical device IDs do not exist in a system.

② [Controller Identifier] : The controller identifier becomes able to be entered when "Valid" is selected. The controller identifier is described by ten characters. The top eight characters can be changed but the last two characters cannot. The controller identifier is validated when the controller identifier is set.

③ [FD Backup] : This item cannot be set for the DF600.

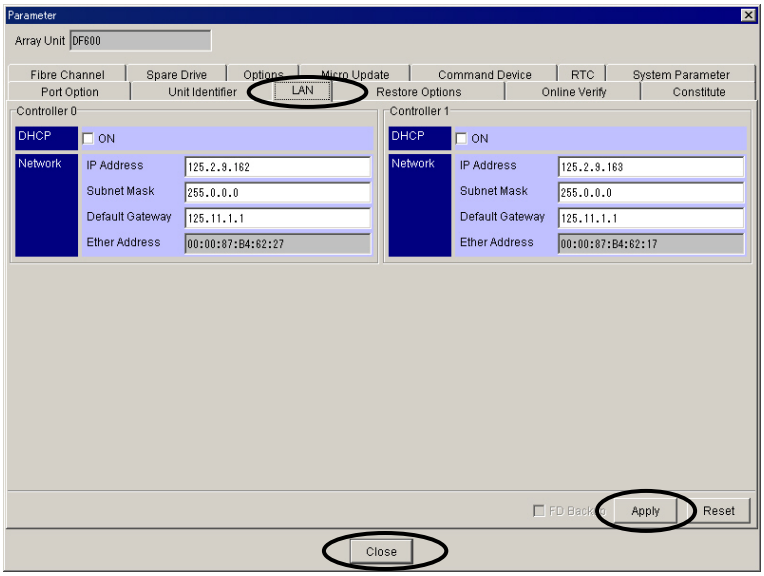
Set this item for the both controllers when necessary.

(b) Verify that the settings 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Setting of LAN

(a) Click the [LAN] tab. The window for setting the "LAN" is displayed in the Parameter window.



① [DHCP] : Sets the DHCP function
When the check box of the [DHCP] is checked, the DHCP mode is validated.

② [Network] : Sets the LAN parameter.
When the check box of the [DHCP] is checked, this item is grayed and cannot be set.

[IP Address] : Sets the IP address.
[Subnet Mask] : Sets the subnet mask.
[Default Gateway] : Sets the default gateway.
[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

Set this item for the both controllers when necessary.

NOTE : After applying the change of setting, the reboot of subsystem is not requested. But to reflect the setting value, the subsystem needs to be rebooted.

(b) Verify that the settings 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.

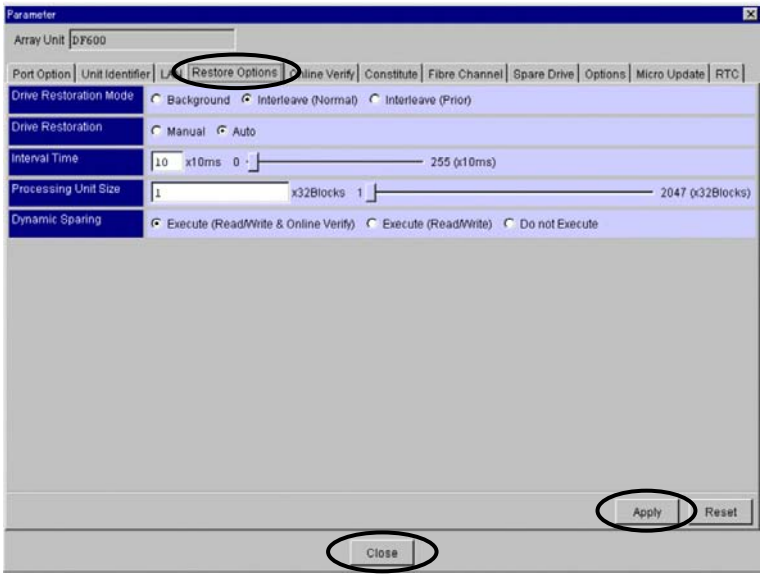
Copyright © 2002, 2005, Hitachi, Ltd.

(4) Setting of Restore Options

In case of the microprogram revision 0653/C or later: It becomes availableness as soon as possible when an option is set up by using this function during the drive is being restored.

In case of the microprogram revision 0653/B or earlier: If the option setting is changed using this function while the drive is being restored, the change is not validated. (The restoration is performed by a drive restoration option usable when the restoration is started.) Therefore, change the option setting after making sure that the drive restoration is not in progress.

(a) Click the [Restore Options] tab. The window for setting the "Restore Option" is displayed in the Parameter window.



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.

[Auto] : A data restoration and data copying from a Spare Drive to an original drive are started automatically.

Copyright © 2002, 2005, Hitachi, Ltd.

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.

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 2,047.

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.

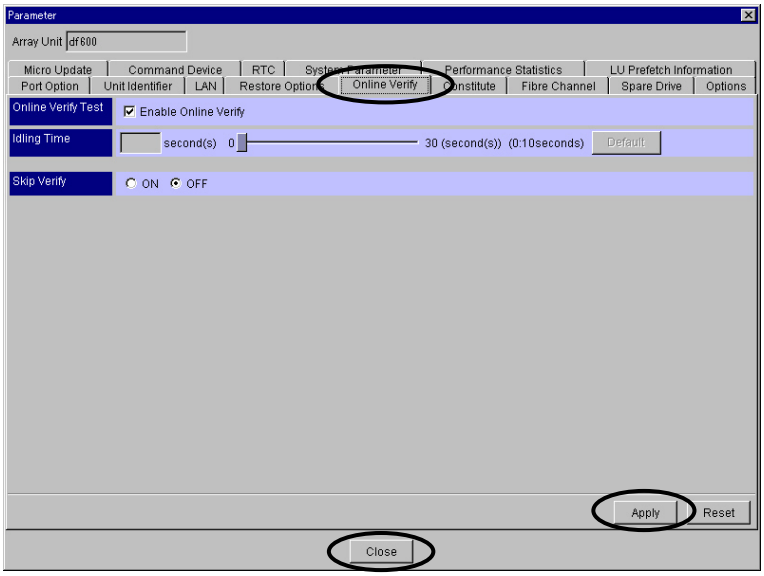
[Do not Execute] : When the count of read/write errors or online verification errors exceeds a threshold value, the dynamic sparing is not performed.

(b) Verify that the settings 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(5) 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.

② [Idling Time] : This item cannot be set for the DF600.
[Default] : This item cannot be set for the DF600.

③ [Skip Verify] : Set whether or not the verify operation should be skipped. When an NTFS full format is done in Windows OS, Verify commands are issued abundantly, and performance deterioration of the subsystem occurs for this processing. When this made is set to ON, Verify operation is skipped. And, performance deterioration of a subsystem can be prevented.
In addition, please set it in OFF when down grade is done to microcode older than x65A/N after having made this setting ON.

(b) Verify that the settings 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.

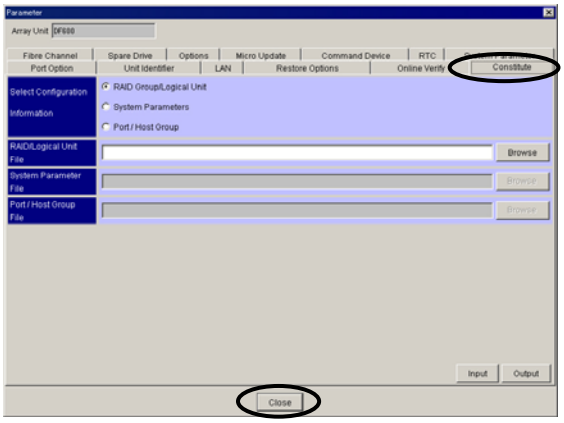
Copyright © 2002, 2005, Hitachi, Ltd.

(6) Setting of Constitute

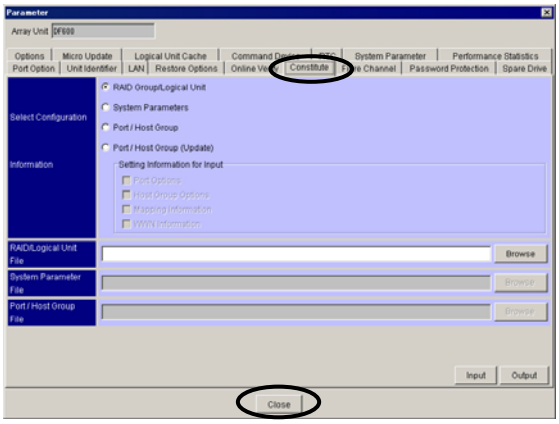
Output configuration information of the disk array subsystem to a text file or set the configuration by using the text file.
The configuration information to be output to a text file includes RAID group/logical unit, system parameters, and port/host group information.
The configuration to be set includes 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.

(a) Click the [Constitute] tab. The window for setting the "Constitute" is displayed in the Parameter window.

DAMP Version is less than Ver.7.50.



DAMP Version is Ver.7.50 or later.



① [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.

[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.

Copyright © 2002, 2005, Hitachi, Ltd.

[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.
[WWN Information] : Specify this when setting a WWN information.

② [RAID/Logical Unit File] : This item can be set when the "RAID Group/Logical Unit" radio button is selected from the [Selection of Configuration Information Copy].
Select a directory and file name for an input/output by clicking the [Reference] button.

③ [System Parameter File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].

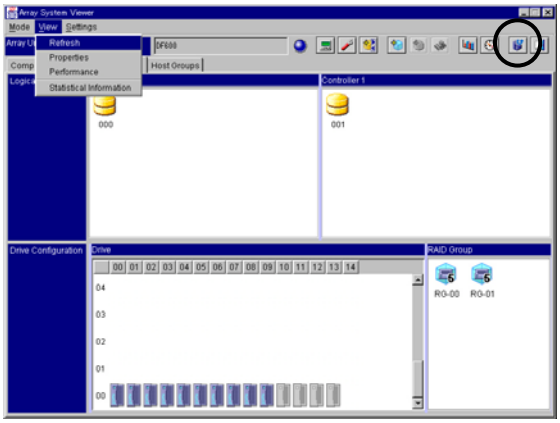
④ [Port/Host Group File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].
Select a directory and file name for an input/output by clicking the [Reference] button.

⑤ [Input] : Selected information is loaded and set with a specified file name.

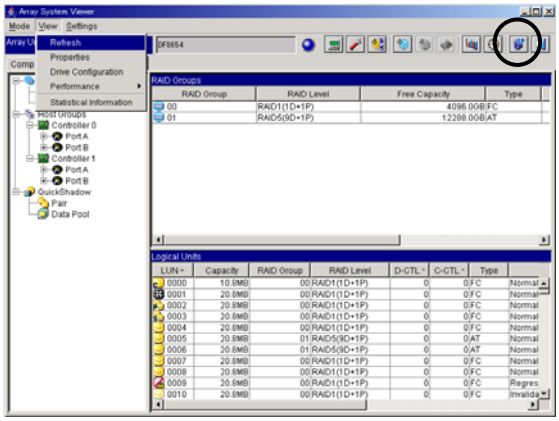
⑥ [Output] :Selected information is output to a text file with a specified file name.

(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].

DAMP Version is Ver.7.xx or earlier.



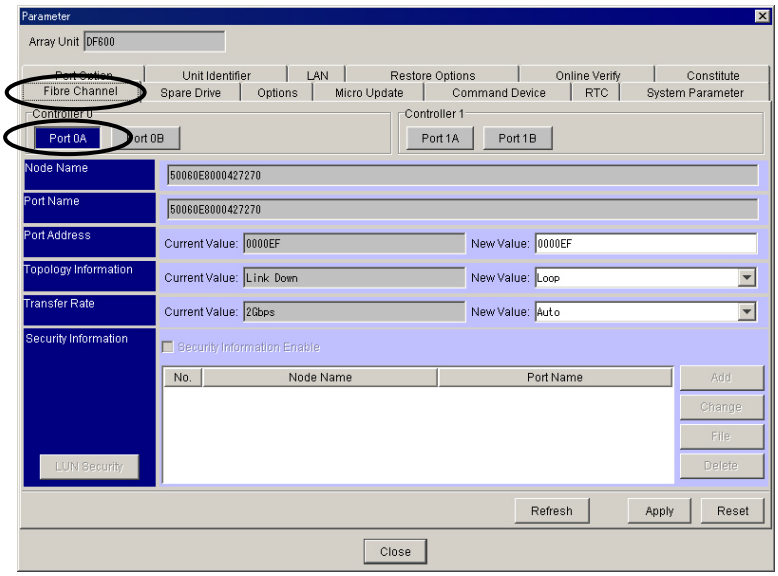
DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

(7) 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.
<New Value>
A port address you want to set with a six-figure hexadecimal number.

④ [Topology Information] : A topology that is set can be displayed or a topology can be set newly.

<Current Value>
[Link Up (Private Loop)] : An arbitrated loop to which no Fibre Channel switch is connected
[Link Up (Public Loop)] : An arbitrated loop to which a Fibre Channel switch is connected.
[Link Up (N_Port connection)] : Connection to a host via the Point to Point Protocol.
[Link Up (F_Port connection)] : Connection to a Fibre Channel switch via the Point to Point Protocol.
[Loop Port Bypass] : The loop is bypassed.
[Standby] : Stand by status.
[Link Down] : Status in which the Link is initialized
[Link Failure] : Link failure

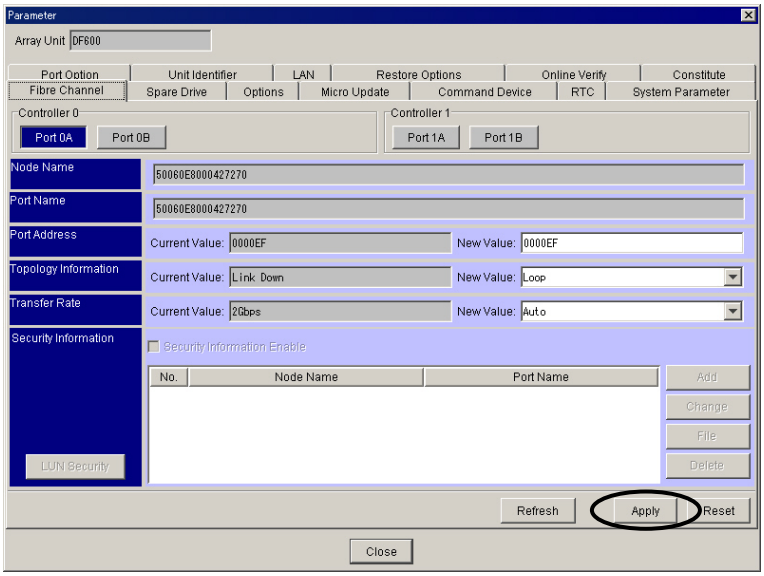
Copyright © 2002, 2005, Hitachi, Ltd.

<New Value>
[Loop] : Set this item when making a connection using a hub or directly to a host.
[Point-to-Point] : Set this item when making a fabric connection using an FC switch.

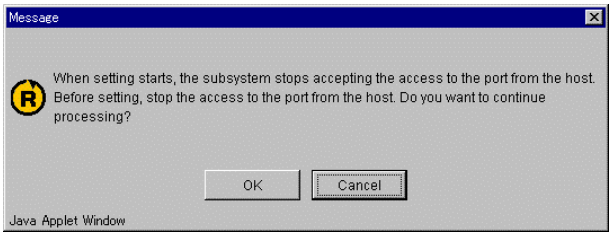
⑤ [Transfer Rate] : A transfer rate of the Fibre Channel can be displayed or set.
<Current Value>
A current transfer rate of the Fibre Channel is displayed.
<New Value>
[1Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 1Gbps.
[2Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 2Gbps.
[Auto] : Set this when using the Fibre Channel at a transfer rate that is changed automatically.

⑥ [Security Information] : This item cannot be set for the DF600.

(c) When the setting is completed, click the [Apply] button at lower right corner of the "Parameter" 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.

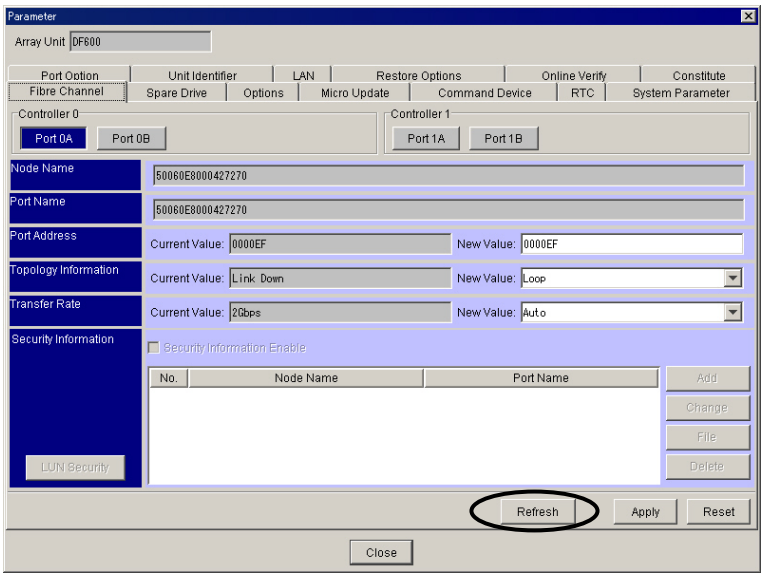


Copyright © 2002, 2005, Hitachi, Ltd.

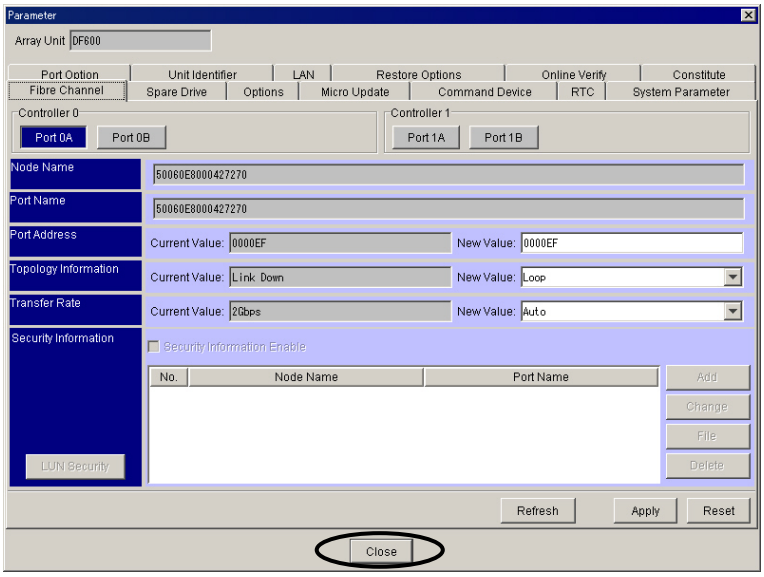
(e) When the setting is completed, the following message is displayed. Click the [OK] button.



(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.

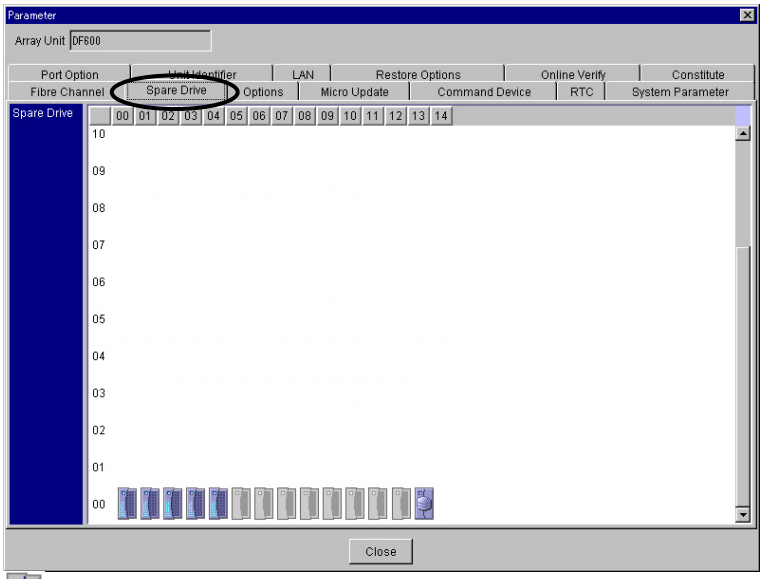


Copyright © 2002, 2005, Hitachi, Ltd.

(8) Setting of Spare Drive

Set or cancel a Spare Drive. It is required to allocate the largest drive capacity to the Spare Drive.

(a) Click the [Spare Drive] tab. The window for setting the "Spare Drive" is displayed in the Parameter window.



 : Data Disk

 : Spare Disk

(b) To set a drive as the Spare Drive, double click the icon of an HDU to be set as the spare drive. The drive that can be set as the Spare Drive is a data drive other than the HDU 0 to HDU 4 in the Unit 0 for which no RAID group is defined.
To cancel the Spare Drive, double click the icon of the drive concerned.

Copyright © 2002, 2005, Hitachi, Ltd.

(c) When a message asking you to confirm whether to set/cancel the Spare Drive is displayed, click the [OK] button.

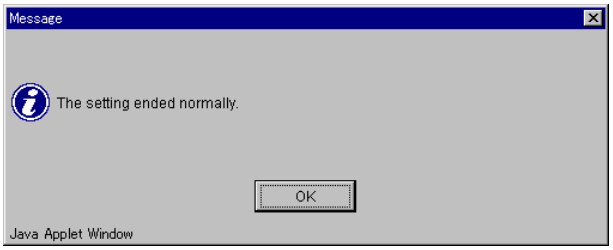
- When setting a drive as the Spare Drive



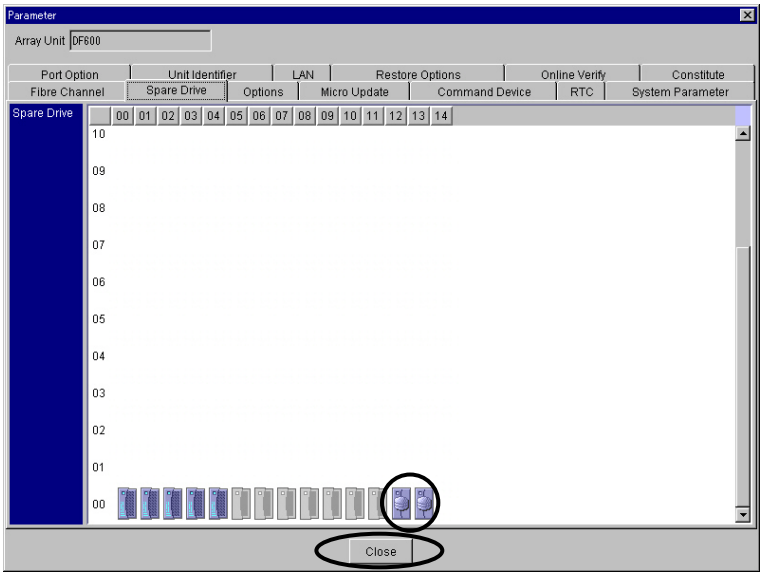
- When canceling the Spare Drive



(d) When the setting is completed, the following message is displayed. Click the [OK] button.



(e) The icon of the drive that has been set or cancelled is updated and displayed.



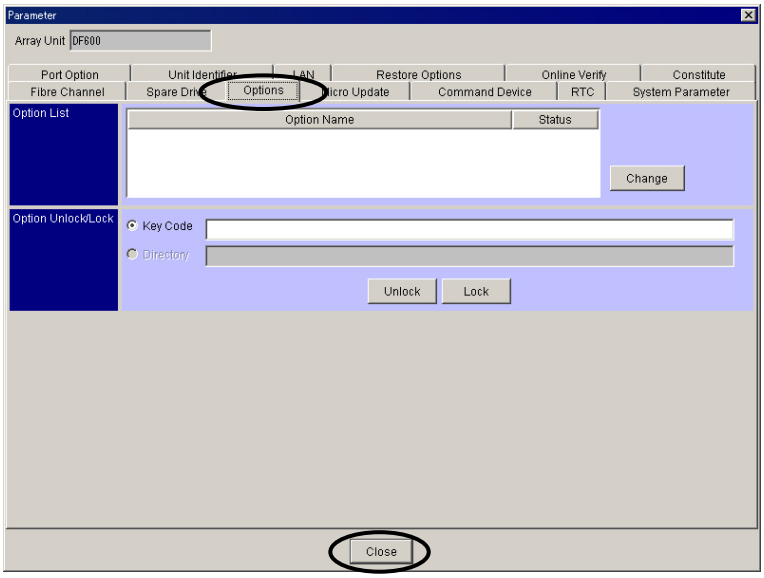
Copyright © 2002, 2005, Hitachi, Ltd.

(f) Verify that the setting that has been made is correct, and then click the [Close] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(9) Setting of Options

(a) Click the [Options] tab. The window for setting the "Options" is displayed in the Parameter window.



① [Option List] : Statuses of onerous options set for the disk array subsystem are displayed.
[Option Name] : Unlocked onerous options are displayed.
[Status] : Statuses (valid or invalid) of onerous options are displayed.

② [Option Unlock/Lock] : Set whether to Lock or Unlock the onerous option.
[Key Code] : When the radio button is selected, the key code can be entered.
[Directory] : This item cannot be set for the DF600.

(b) To install (Unlock) an onerous option newly, select the [Key Code] radio button from the "Option Unlock/Lock", enter a key code in a position on the right side of the [Key Code] radio button, and click the [Unlock] button.

(c) To de-install (Lock) an option installed, select the [Key Code] radio button from the "Option Unlock/Lock", enter a key code in a position on the right side of the [Key Code] radio button, and click the [Lock] button.

(d) To invalidate an onerous option installed, select the onerous option from "Option Name" in the "Option List" and click the [Change] button.

(e) To terminate the setting, click the [Close] button.

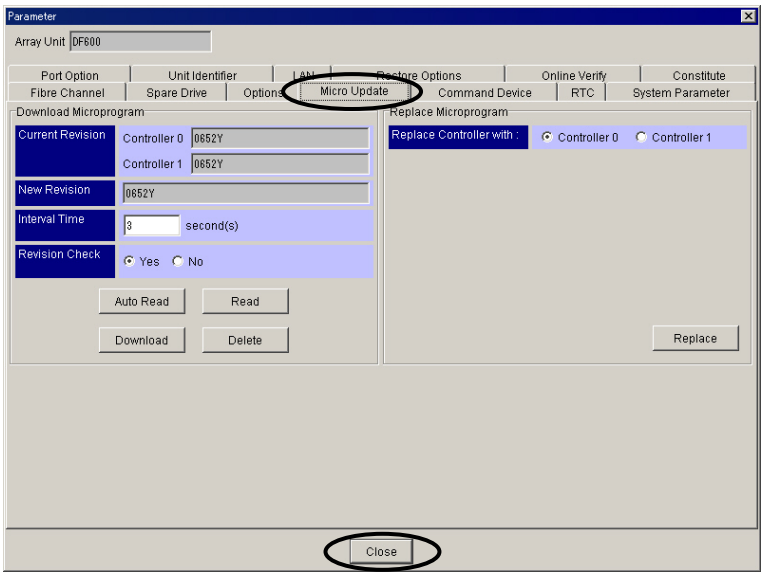
Copyright © 2002, 2005, Hitachi, Ltd.

(10) 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 [New Revision] : The revision of the microprogram loaded on to the computer, in which Resource Manager 2 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. You can check whether the microprogram can be replaced while the subsystem power is turned on or not by instructing to carry out the revision check. Select [Yes].

Copyright © 2002, 2005, Hitachi, Ltd.

⑤ [Auto Read] : Load the microprogram onto the computer in which Resource Manager 2 is installed. When only the top directory, in which the microprogram is installed, is specified, all the microprograms are loaded automatically.

⑥ [Read] : Load the microprogram onto the computer in which Resource Manager 2 is installed. Specify the directory in which the microprogram is installed following the instructions given in the window.

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 Resource Manager 2 is installed.

NOTE : When the microprogram is not loaded, this item is grayed and cannot be selected.

<Replace Microprogram>

① [Replace Controller with] : Replace the microprogram of the controller specified.

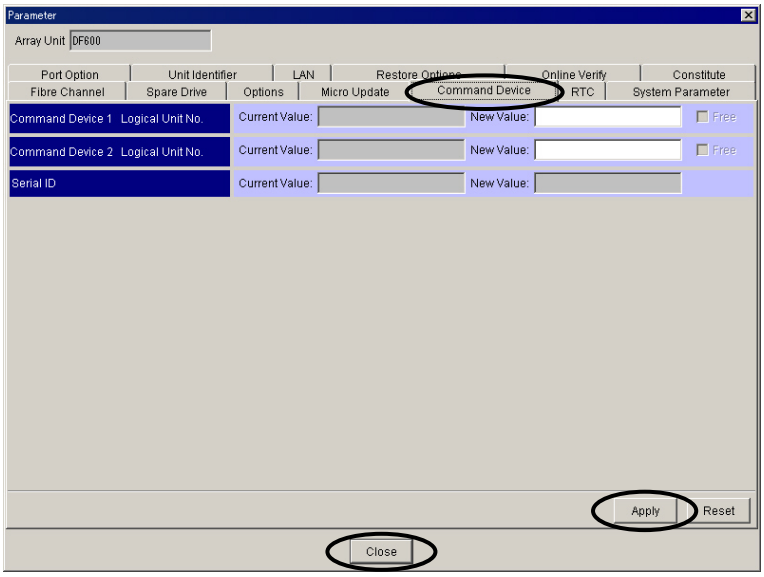
NOTE : When the replacement is performed for only one of the controllers, the disk array subsystem is given a warning. The warning is cancelled when the microprogram of another controller is replaced. When replacing the microprogram, be sure to perform the replacement for the both controllers continuously.

(b) To terminate the setting, click the [Close] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(11) Setting of Command Device

(a) Click the [Command Device] tab. The window for setting the "Command Device" is displayed in the Parameter window.



① [Command Device 1 Logical Unit No.] :
<Current Value> : Displays the number of the logical units currently set as a command device 1.
<New Value> : Set a logical unit number as command device 1.
<Free> : Set this when releasing a command device that is currently set.

② [Command Device 2 Logical Unit No.] :
<Current Value> : Displays the number of the logical units currently set as a command device 2.
<New Value> : Set a logical unit number as command device 2.
<Free> : Set this when releasing a command device that is currently set.

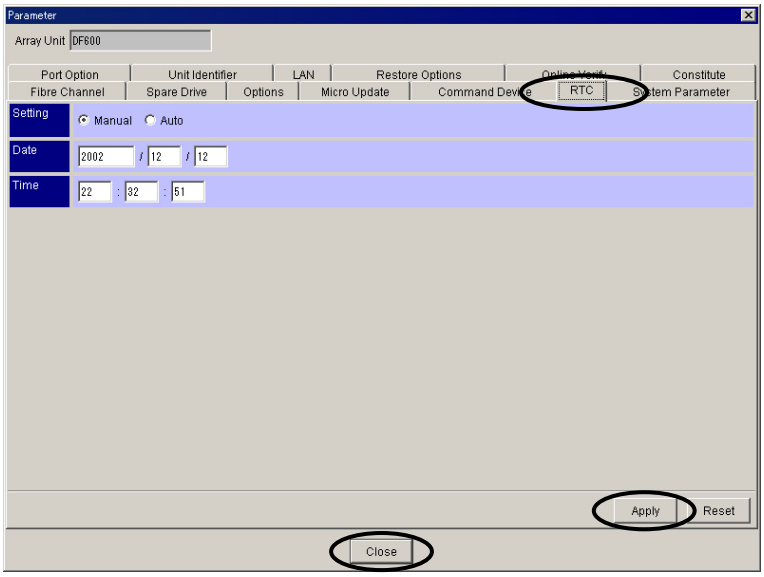
③ [Serial ID] : This item cannot be set for the DF600.

(b) Verify that the setting 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 Resource Manager.

② [Date] : The date currently set can be displayed or set.

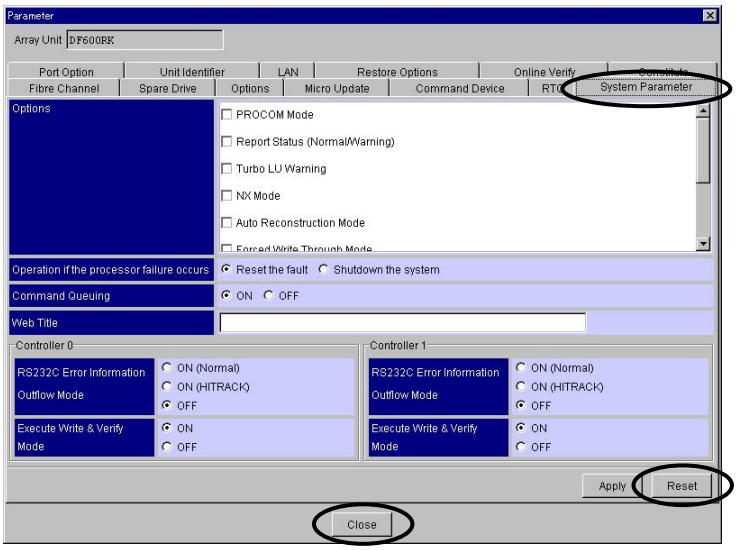
③ [Time] : The time currently set can be displayed or set.

(b) Verify that the setting 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(13) Setting of System Parameter

(a) Click the [System Parameter] tab. The window for setting the "System Parameter" is displayed in the Parameter window.



① [Option] : Select (a) system parameter(s) to be set.

② [Action Against Processor Failure] : This is not required to be set for the DF600.

[Reset Failure] : The failure is reset and the controller is restarted.

[System Down] : The disk array subsystem is made to go down.

③ [Command Queuing Mode] : Specify whether or not to execute a command queuing.

[ON] : The command queuing is executed.

[OFF] : The command queuing is not executed.

④ [Web Title] : Specify a character string to be displayed in the title bar of the browser when displaying the Web function, which is built in the disk array subsystem, in the browser. Enter 32 or less one-byte numerals or alphabetic characters, or characters other than numerals (excluding ', ", and \).

⑤ [RS232C Error Information Transmission Mode] :

Set the mode for transmitting error information to the RS232C for the Controller 0 or 1.
(RKH/RKHE is not supported)

[ON (Normal)] : The information is output.

[ON (HITRACK)] : The information in the HITRACK mode is output.

[OFF] : The output of the information is suppressed.

⑥ [Write and Verify Execution] : Set the mode for executing the Write and Verify for the Controller 0 or 1.

[ON] : The Write and Verify is executed.

[OFF] : The Write and Verify is not executed.

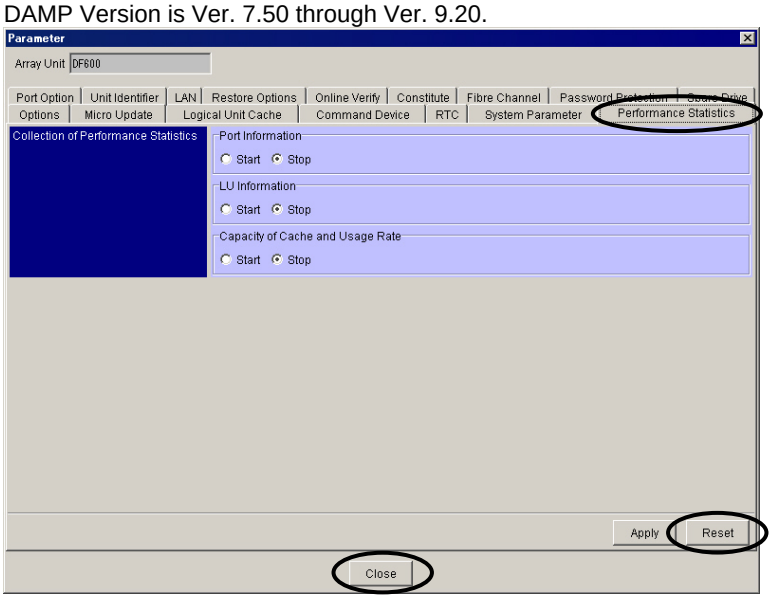
(b) Check if the settings that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the settings that have been made are cancelled. To terminate the setting, click the [Close] button.

Copyright © 2003, 2005, Hitachi, Ltd.

(14) Setting of Performance Statistics

(a) Click the [Performance Statistics] tab. The window for setting the "Performance Statistics" is displayed in the Parameter window.

DAMP Version is Ver. 7.50 through Ver. 9.20.

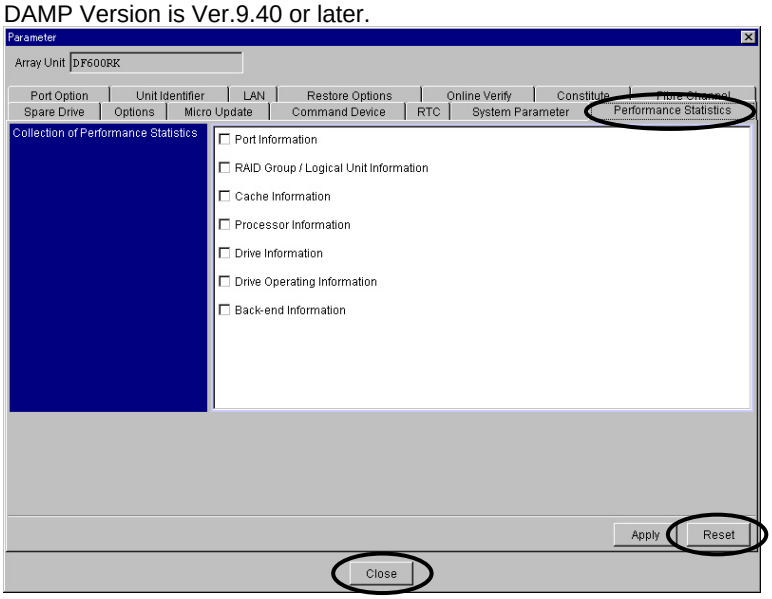


① [Collection of Performance Statistics] :
Select an item of statistical information to be collected.
[Port Information] : Select "Start" when getting information on each port.
[LU Information] : Select "Start" when getting information on each LU.
[Capacity of Cache and Usage Rate] : Select "Start" when getting cache capacity and its rate of use.

NOTE : When the collection of the statistical information is started, it exerts an effect on the execution of an I/O instructed by a host.

Copyright © 2003, 2005, Hitachi, Ltd.

DAMP Version is Ver.9.40 or later.



① [Collection of Performance Statistics] :
Select an item of statistical information to be collected.
[Port Information] : Select "Start" when getting information on each port.
[RAID Group / Logical Unit Information] : Information on each RAID group or logical unit is collected is selected.
[Processor Information] : Information on the each processor is collected.
[Drive Information] : Information on the drive is collected
[Drive Operating Information] : Information on the drive operation is collected.
[Back-end Information] : The back end information is collected.

NOTE : When the collection of the statistical information is started, it exerts an effect on the execution of an I/O instructed by a host.

(b) Check if the settings 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.

Copyright © 2004, 2005, Hitachi, Ltd.

(15) Setting LU Pre-fetch Information

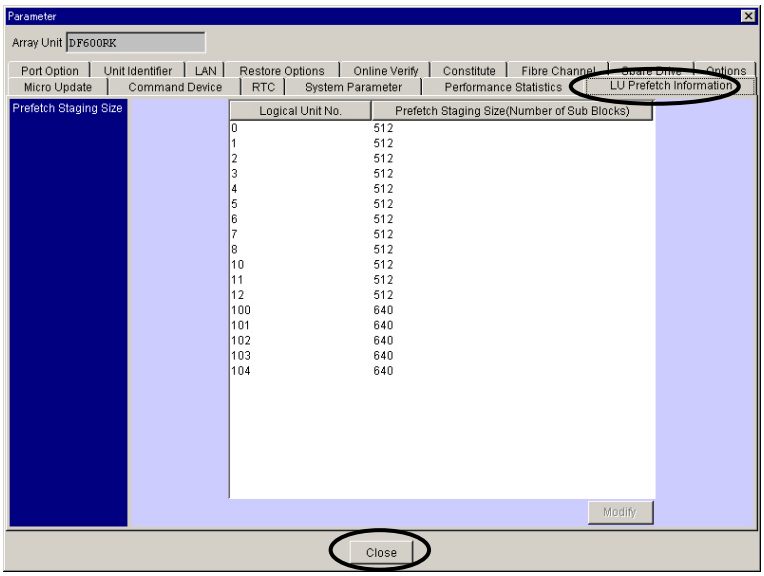
The prefetch staging size is set when a logical unit is created. The default value is 128 × n (n is a number of data disks). Use the prefetch staging data size leaving its value as the default one except the following case.

A case where a logical unit, which consists of the SATA drives and whose RAID level is RAID 5, is used for operation such as a backup (operation that requires frequent sequential access)

Specify it as 512 × n (n is a number of data disks).

NOTE : When the prefetch staging data size is specified as a value smaller than the default value, performance of random read access such as transaction is lowered. Besides, when making the prefetch staging data size larger, take notice that the performance of the sequential read may be lowered because data that has undergone the prefetch staging can be erased from the cache memory before it is read.

(a) Click the LU Prefetch Information tab.
A list of the defined logical units is displayed.



① [Prefetch Staging Size] : The pre-fetch staging size (sub blocks) value is displayed.

(b) When you want to change the pre-fetch staging size (number of sub blocks), select a Logical Unit No. and click the [Modify] button.

(c) Enter the pre-fetch staging size (number of sub blocks) and click the [OK] button.
To specify the value of the prefetch staging data size as the default one, put a check mark in the Use default value check box and click the [OK] button.

(d) To terminate the setting, click the [Close] button.

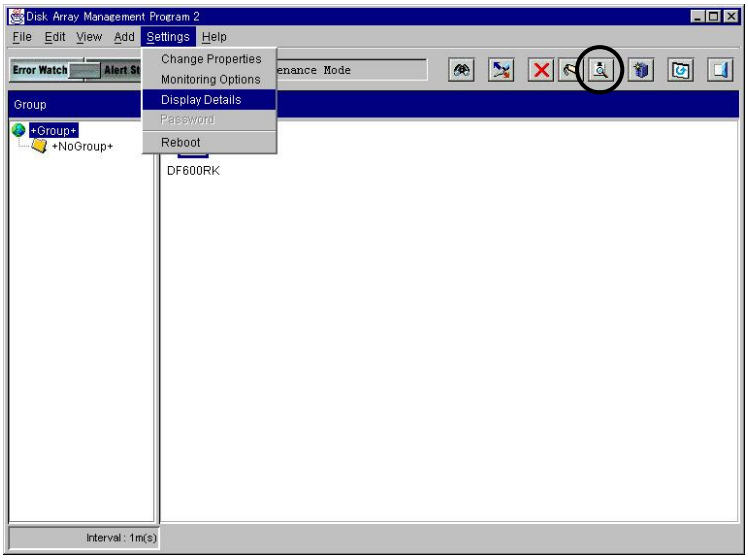
Copyright © 2004, 2005, Hitachi, Ltd.

5.6 Device Setting Used in Special Mode

Set a subsystem from the Disk Array Management Program. Perform the operation of setting accordance with the following below. Follow the procedure and set it.

5.6.1 Before starting special mode

(1) Turn on the power supply.
(2) Start the Disk Array Management Program and set the Active Mode in the “Maintenance Mode”.
For the procedure for changing to the Maintenance Mode, refer to Section “5.1.1 (3) (b) Changing the Maintenance Mode” on page INST 05-0050.
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]



Copyright © 2002, 2005, Hitachi, Ltd.

5.6.2 Setting of special mode

After the setting, the back up of the setting is recommended.

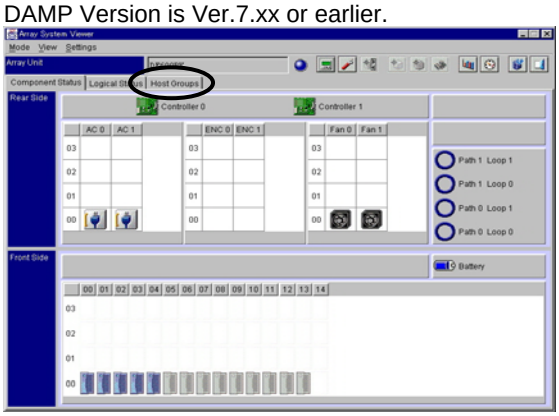
No.	Mode name	Online setting right or wrong	Reference page
1	I/O Path switching function in sequent NUMA-Q connection	Disable	(1) INST 05-1030
2	LU blockade Mode	Disable	(2) INST 05-1070
3	WolfPack Mode	Enable	(3) INST 05-1100
4	VxVM (Ver.3.2p + pp)	Enable	(4) INST 05-1140
5	When making 8 or more LUN recognized by using on Windows 2000	Enable	(5) INST 05-1160
6	When making LUs, whose LU numbers are 8 or more, recognized in the case where the subsystem is connected to the HP server	Enable	(6) INST 05-1190
7	SUN Cluster 3	Enable	(7) INST 05-1220
8	ftServer	Enable	(8) INST 05-1250
9	Hitachi TrueCopy Basic function	Enable	(9) INST 05-1280
10	Microsoft Cluster Server	Enable	(10) INST 05-1310
11	Connecting a device as a boot disk or dump device of HP server.	Enable	(11) INST 05-1320
12	When using the Egenera Blade Flame	Disable	(12) INST 05-1340
13	When using Tru Cluster	Enable	(13) INST 05-1390
14	When using VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris)	Enable	(14) INST 05-1420
15	When using GF825/825C	Enable	(15) INST 05-1450
16	When using SANsurfer	Enable	(16) INST 05-1501

Copyright © 2002, 2005, Hitachi, Ltd.

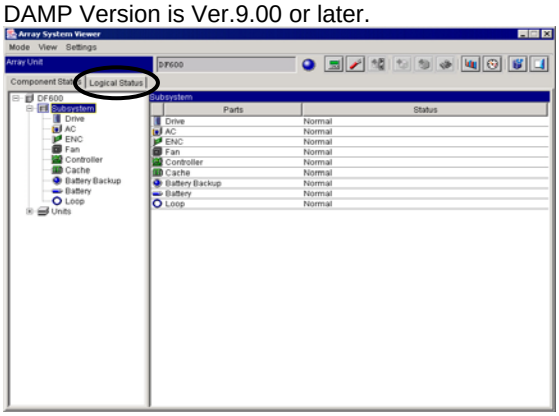
(1) When using the I/O Path switching function in sequent NUMA-Q connection

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

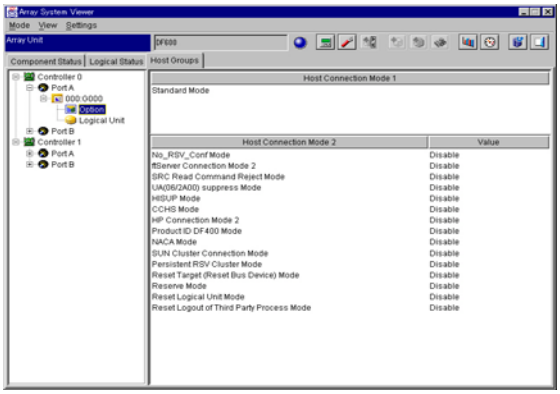


DAMP Version is Ver.9.00 or later.

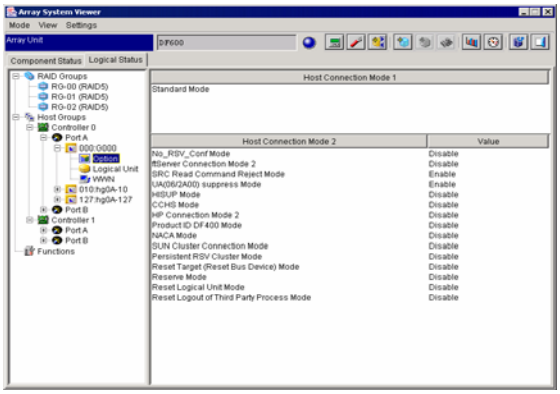


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

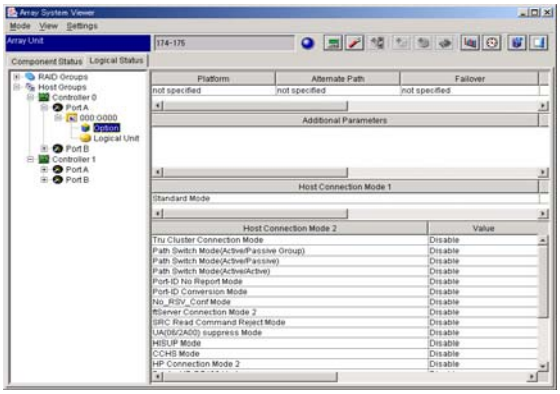
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



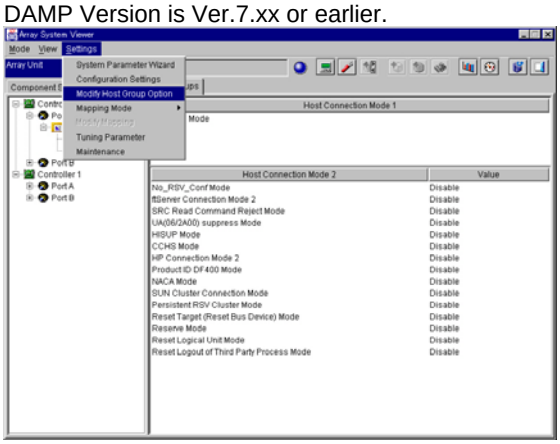
DAMP Version is Ver.9.10 or later.



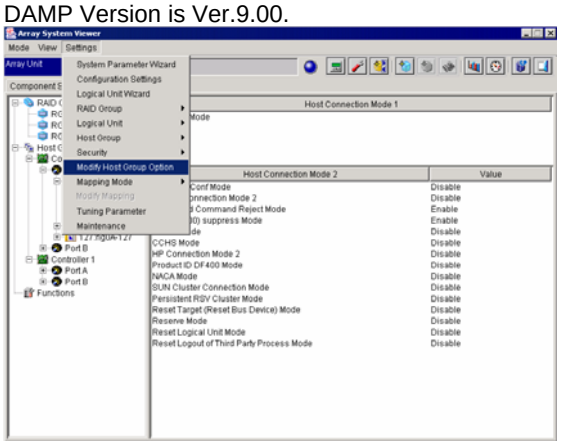
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].

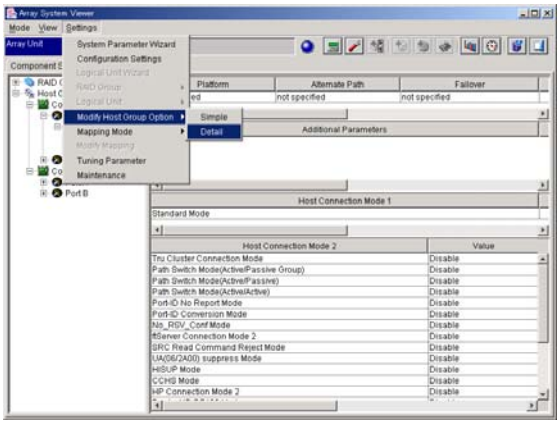
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

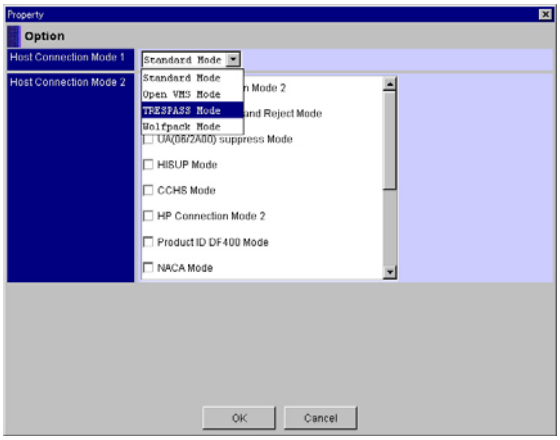


DAMP Version is Ver.9.10 or later.

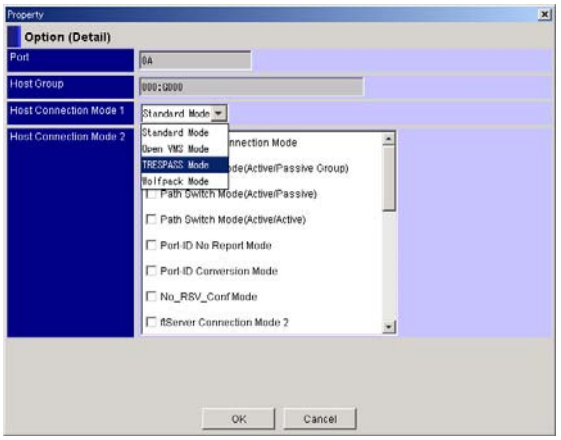


(d) Select the [TRESPASS Mode] in the “Host Connection Mode 1”. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

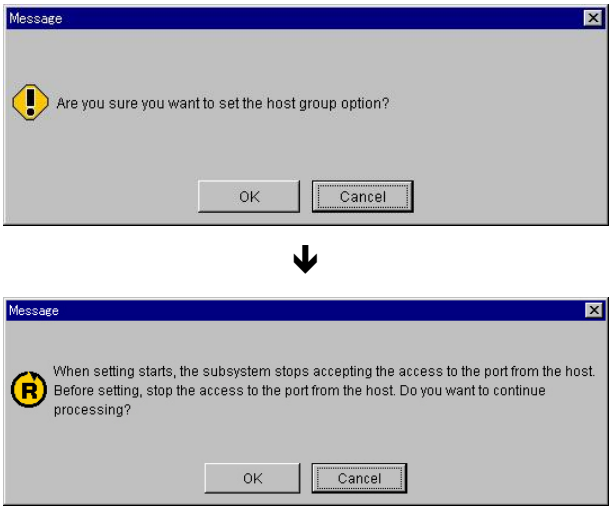


DAMP Version is Ver.9.10 or later.

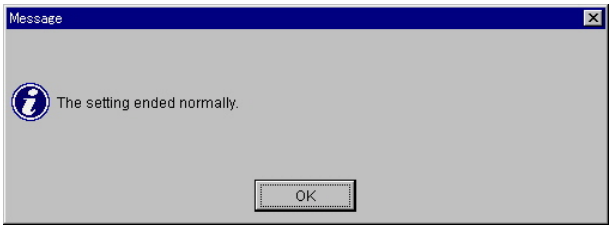


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



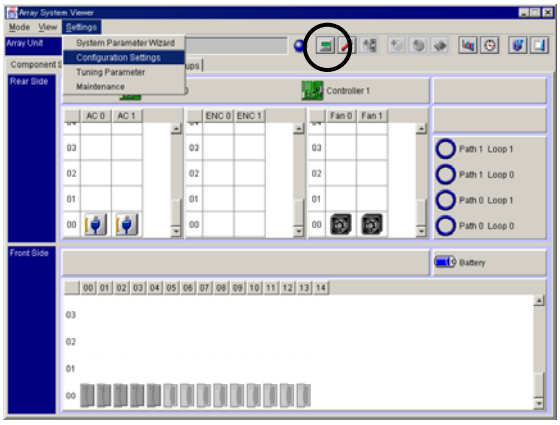
(f) A message indicating completion of setting is displayed. Click the [OK] button.



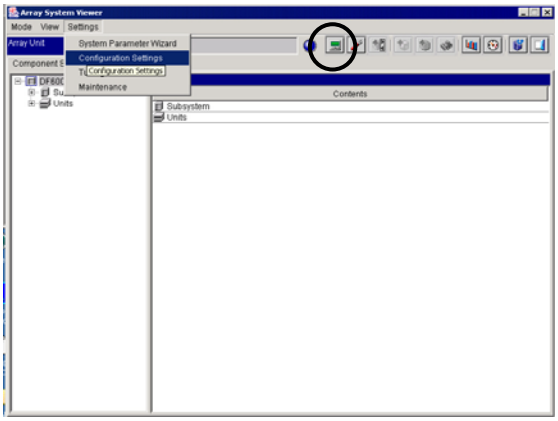
Copyright © 2002, 2005, Hitachi, Ltd.

(g) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] in the tool bar.

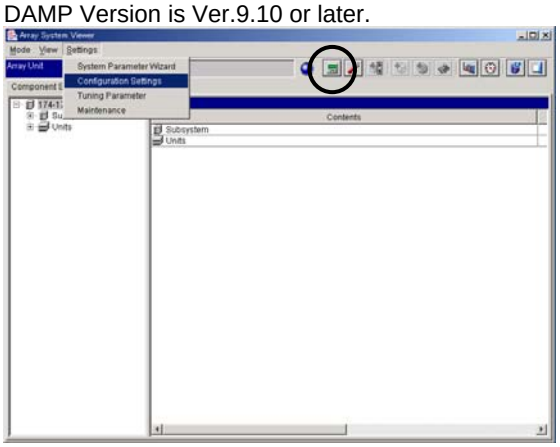
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



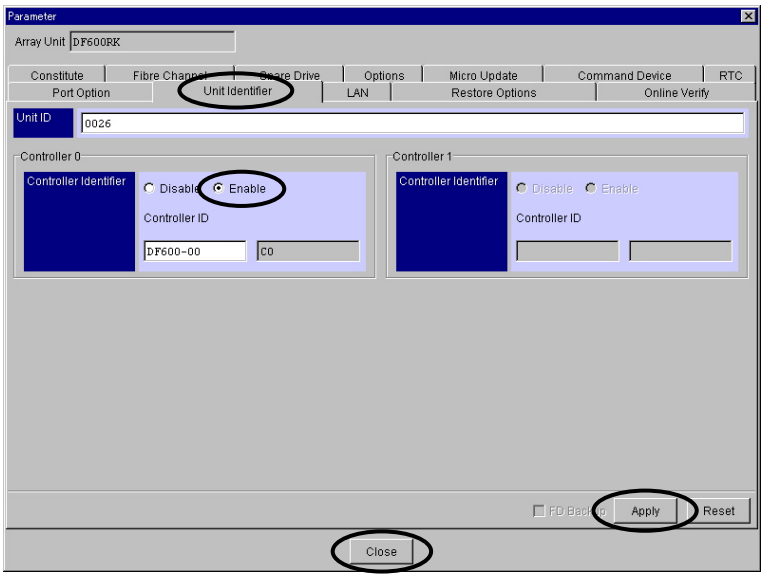
DAMP Version is Ver.9.10 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

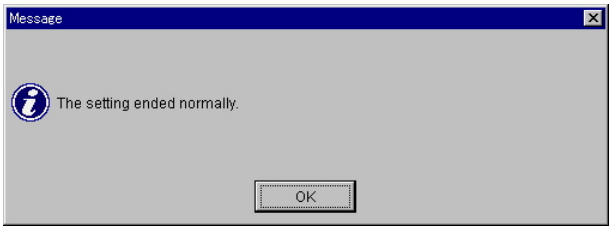
(h) Click the [Unit Identifier] tab.

(i) After “Controller Option” is displayed and click [Enable] in the [Controller Identifier]. If nothing is input to a “Controller ID, DF600-00” (default value) is reported. A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.



(j) Click the [Apply] button.

(k) A message indicating completion of setting is displayed. Click the [OK] button.



(l) Click the [Close] button.

Copyright © 2003, 2005, Hitachi, Ltd.

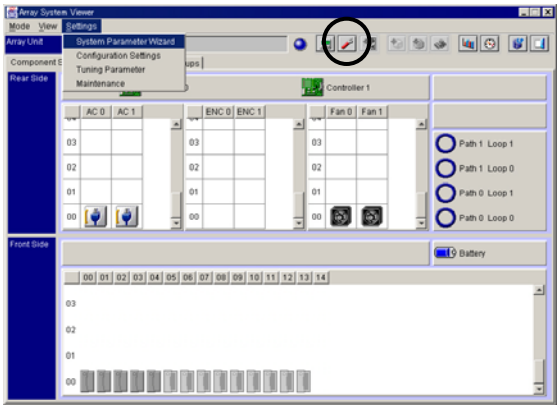
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

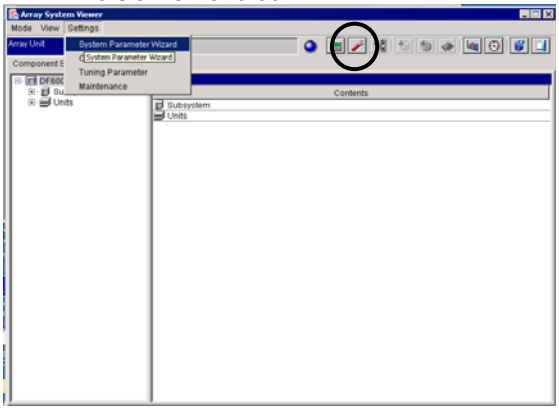
(2) When using the subsystem in LU blockade Mode

(a) Select [Settings] – [System Parameter Wizard] in the unit window or click [ : System Parameter Wizard].

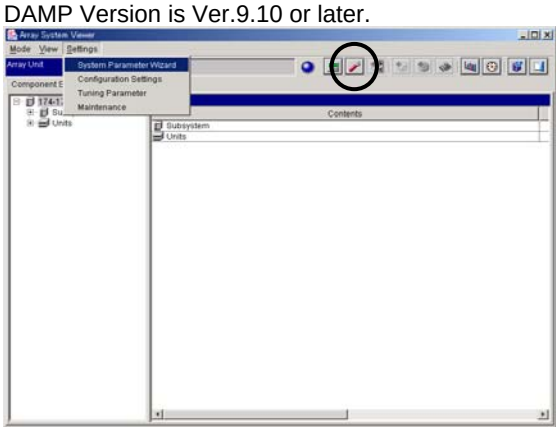
DAMP Version is Ver.7.xx or earlier.



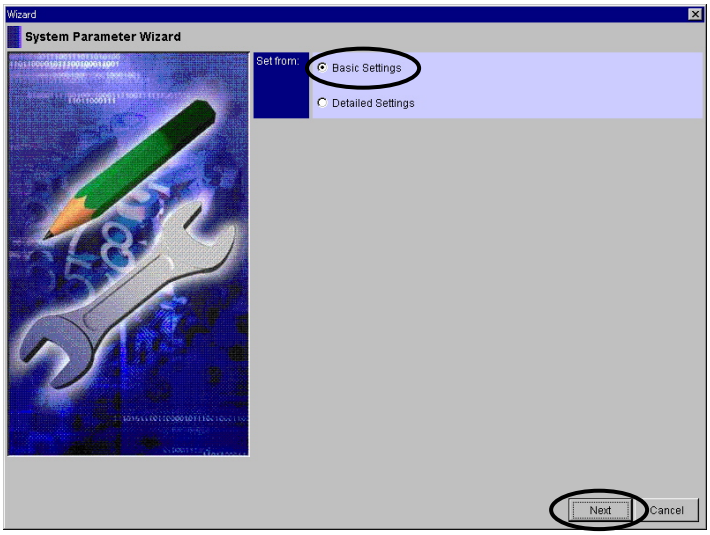
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.

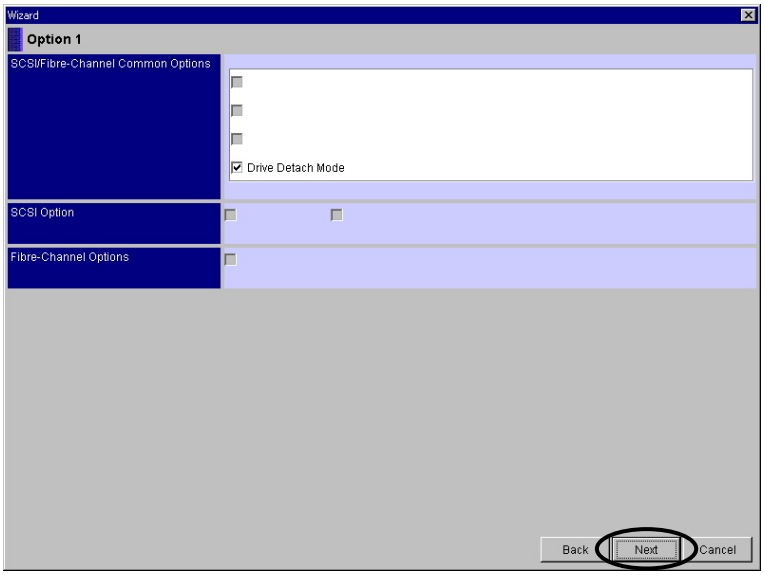


(b) Click the [Basic Settings] button. Click the [Next] button.

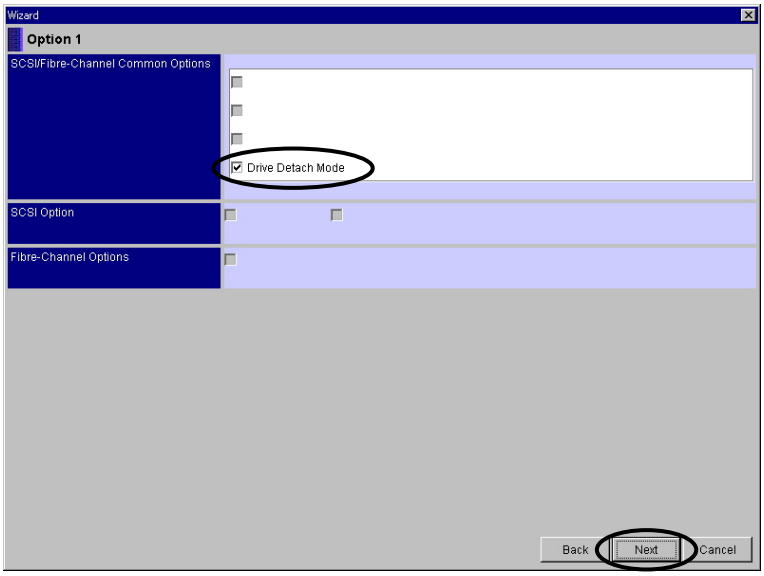


Copyright © 2002, 2005, Hitachi, Ltd.

(c) Click the [Next] button until [Option 1] is displayed.



(d) After [Option 1] has been displayed, click the “Drive Detach Mode” in the “SCSI/Fibre-Channel Common Options”.



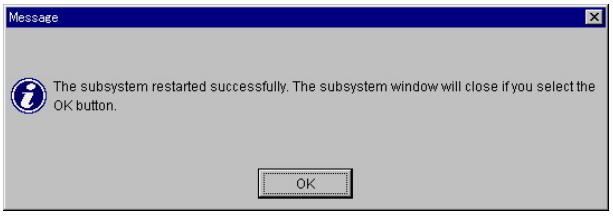
(e) Click the [Next] button until “System Parameter Setting Completed” is displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) Click the [OK] button.
When terminated set the system parameters, then following window is displayed.



(g) Click the [OK] button.
(h) A message appears, stating that the restart is successful. Click the [OK] button.



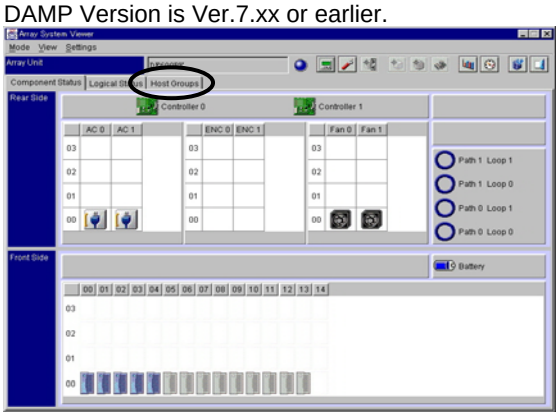
The Unit screen is closed. To perform other operations on the Main screen, select an array unit from the Main screen and open the selected Unit screen.

Copyright © 2002, 2005, Hitachi, Ltd.

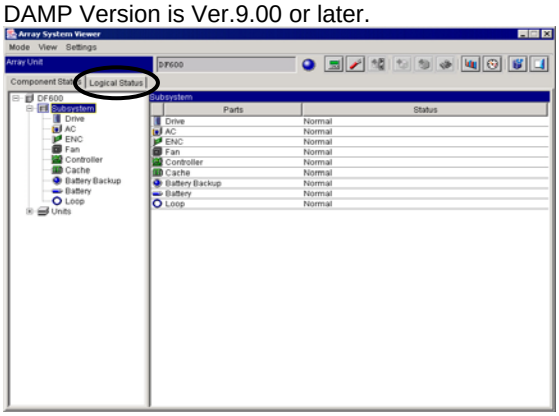
(3) Using in the WolfPack Mode

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

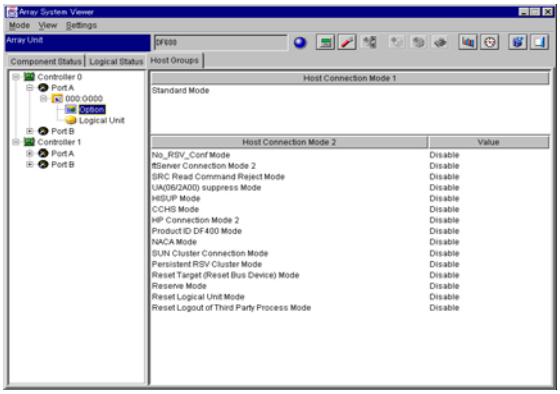


DAMP Version is Ver.9.00 or later.

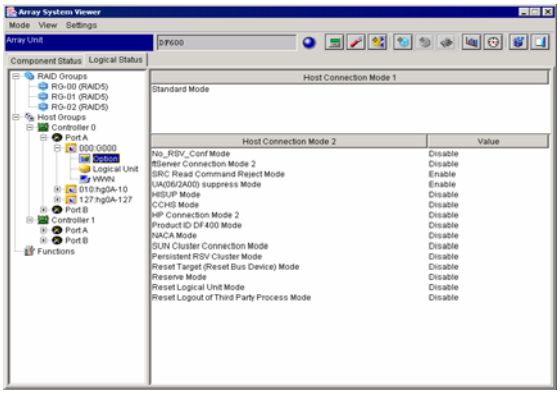


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

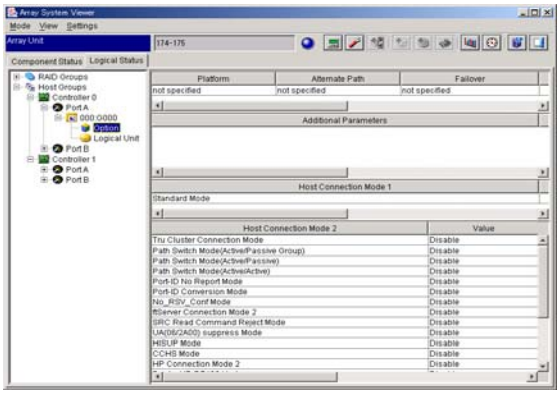
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



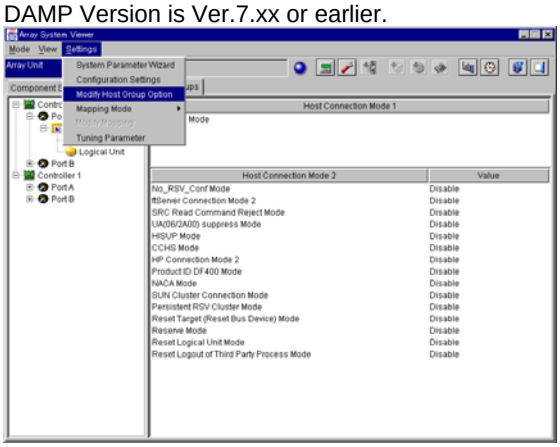
DAMP Version is Ver.9.10 or later.



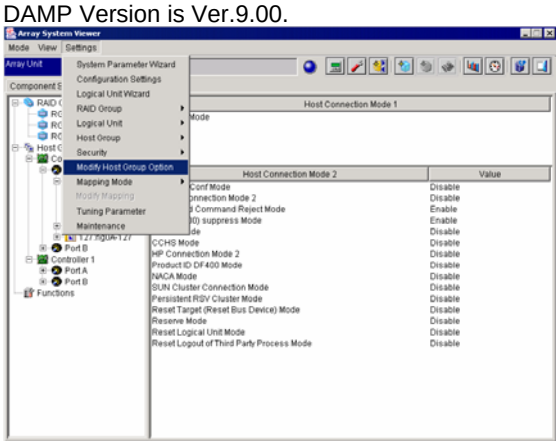
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the [Settings] menu, select [Modify Host Group Option].

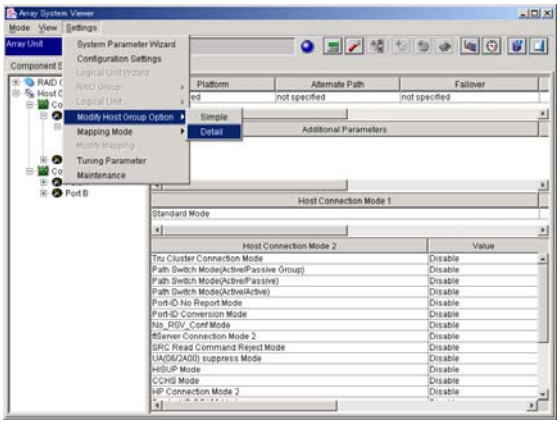
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

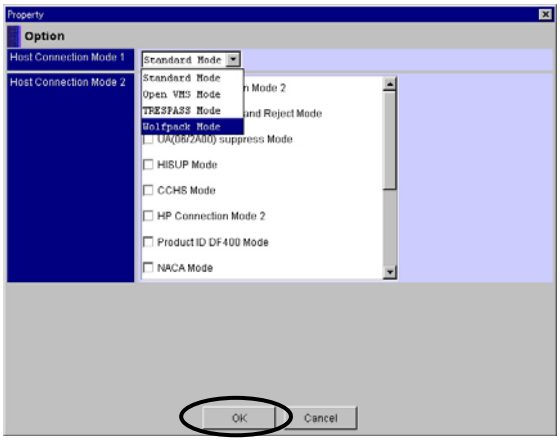


DAMP Version is Ver.9.10 or later.

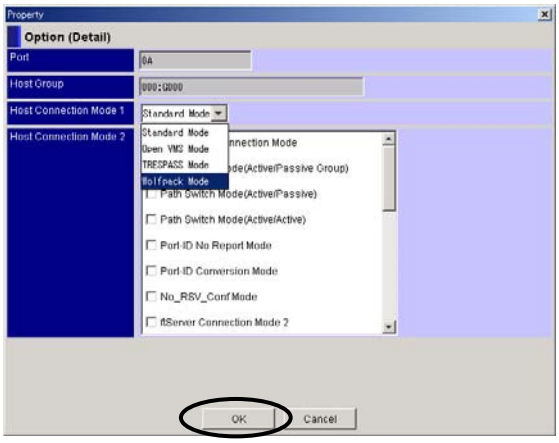


(d) Select the [Wolfpack Mode] in the “Host Connection Mode 1”.

DAMP Version is Ver.9.00 or later.



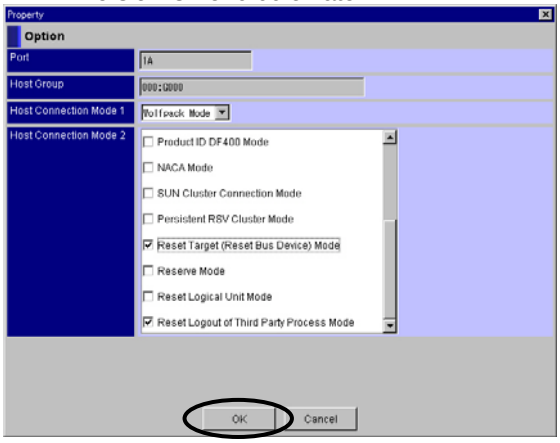
DAMP Version is Ver.9.10 or later.



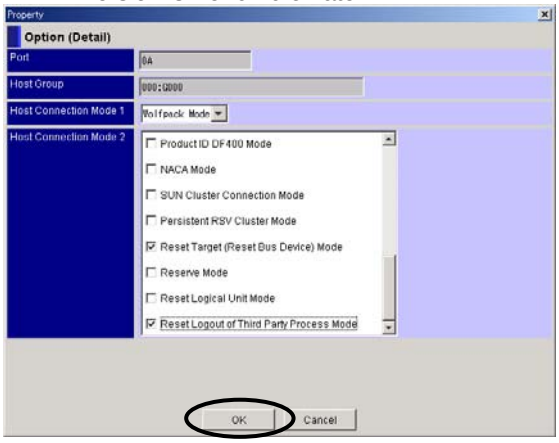
Copyright © 2002, 2005, Hitachi, Ltd.

(e) Select the [Reset Target (Reset Bus Device) Mode] and [Reset Logout of Third Party Process Mode] in the "Host Connection Mode 2". Click the [OK] button.

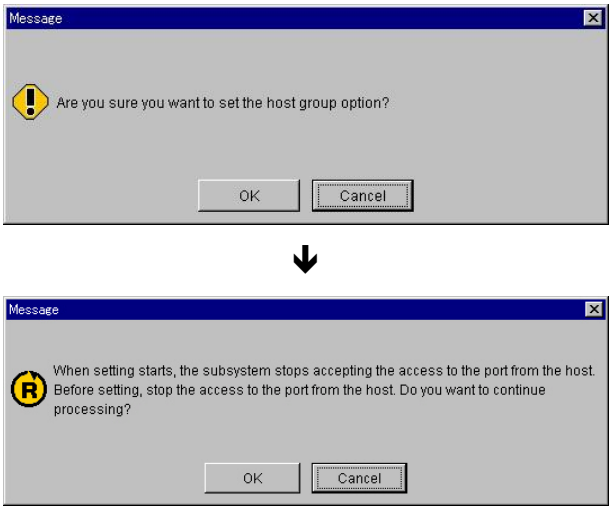
DAMP Version is Ver.9.00 or later.



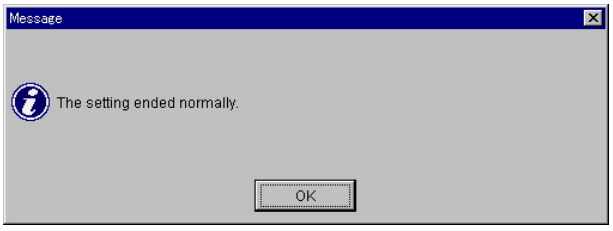
DAMP Version is Ver.9.10 or later.



(f) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(g) A message indicating completion of setting is displayed. Click the [OK] button.

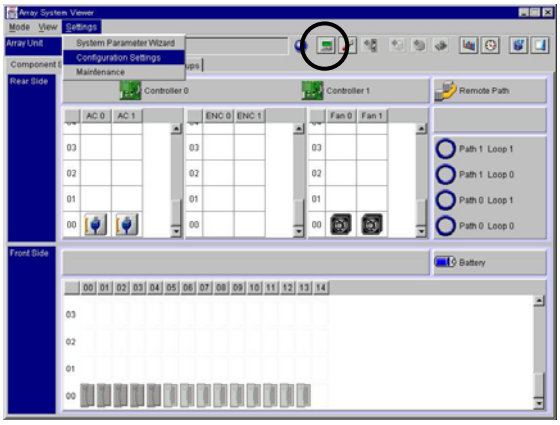


(h) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

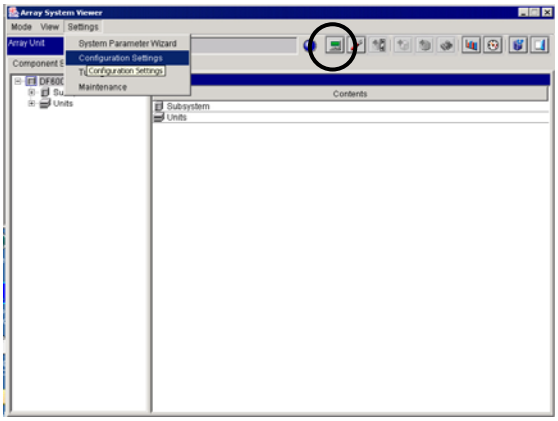
Copyright © 2002, 2005, Hitachi, Ltd.

(i) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] in the tool bar.

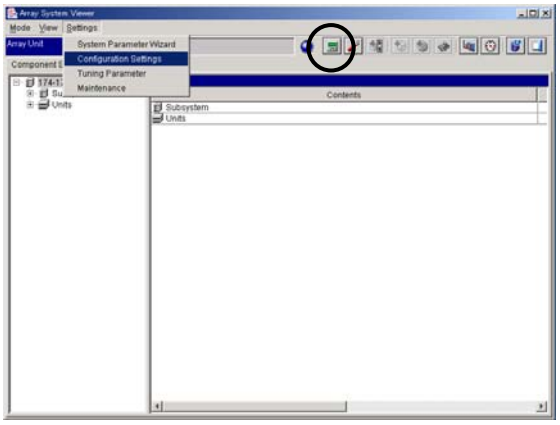
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

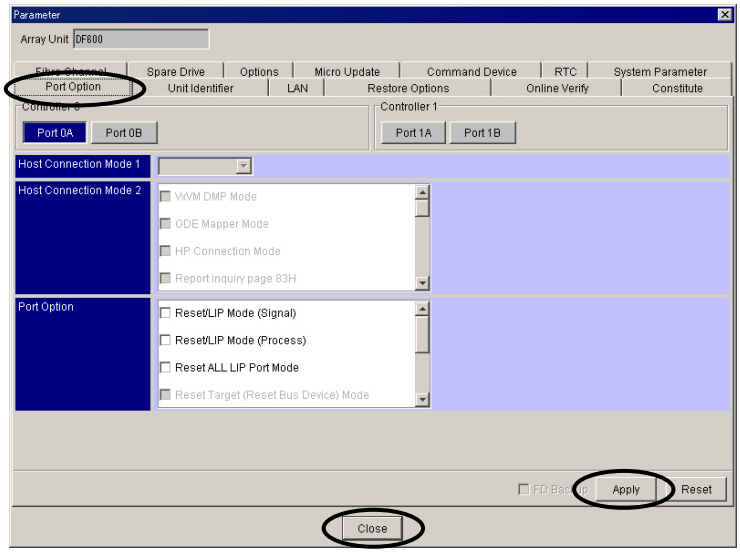


DAMP Version is Ver.9.10 or later.

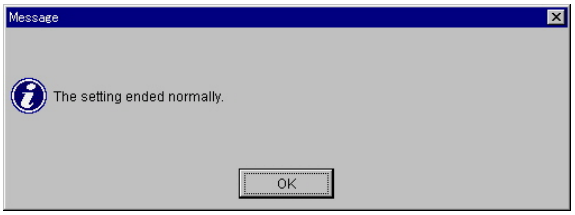


Copyright © 2002, 2005, Hitachi, Ltd.

(j) Click the [Port Option] tab.
(k) Select [Reset ALL LIP Port Mode] of the “Port Option”.



(l) Click the [Apply] button.
(m) A message indicating completion of setting is displayed. Click the [OK] button.



(n) Click the [Close] button.

Copyright © 2003, 2005, Hitachi, Ltd.

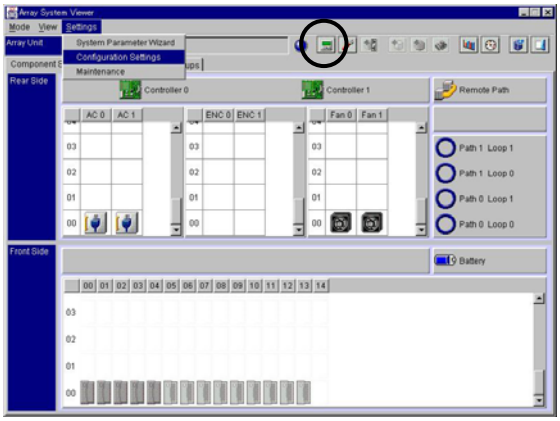
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

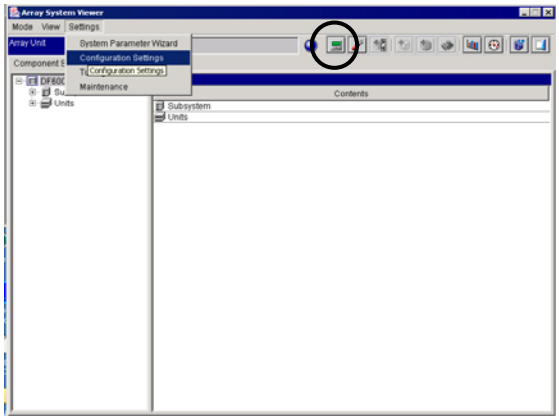
(4) When the VxVM (3.2p2 + pp) is used on the host side

(a) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.

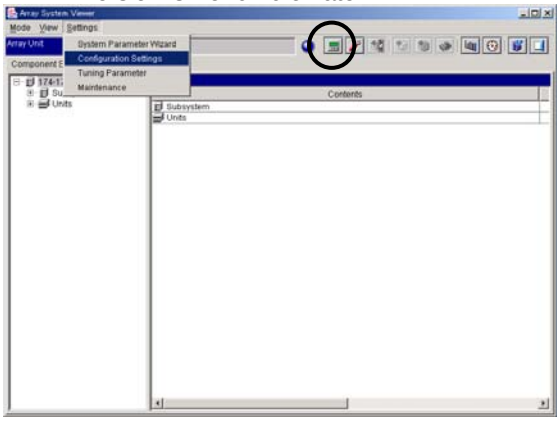
DAMP Version is Ver.7.xx or earlier.



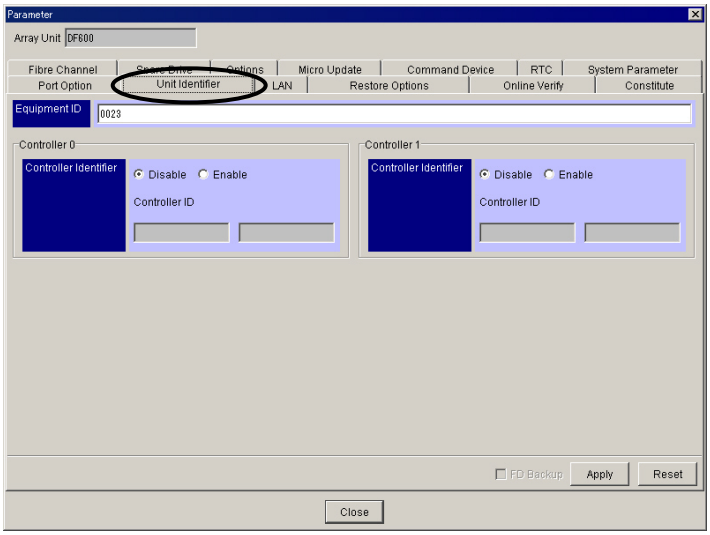
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.

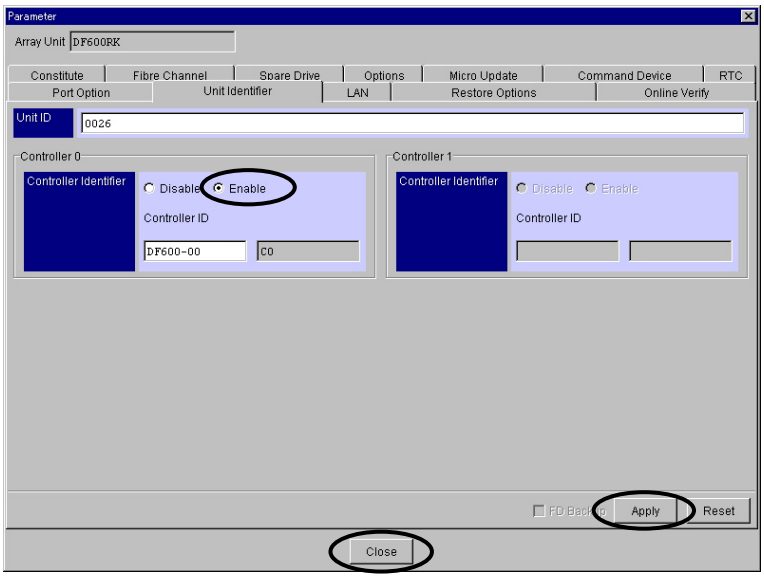


(b) Click the [Unit Identifier] tab.

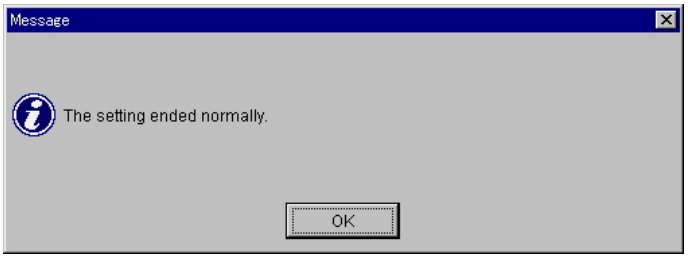


Copyright © 2002, 2005, Hitachi, Ltd.

(c) After “Controller Option” is displayed and click “Enable” in the “Controller Identifier”.
Enter the “Controller ID” with eight characters.
If nothing is input to a “Controller ID”, “DF600-00” (default value) is reported.
A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.



(d) Click the [Apply] button.
(e) A message indicating completion of setting is displayed. Click the [OK] button.



(f) Click the [Close] button.

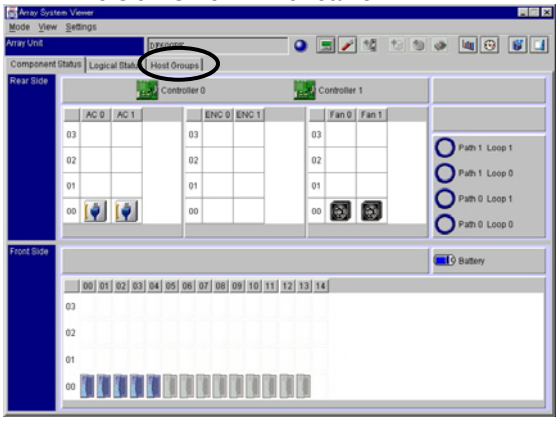
Copyright © 2002, 2005, Hitachi, Ltd.

(5) When making logical unit number 8 recognized by using Qlogic HBA or Emulex HBA on Windows 2000

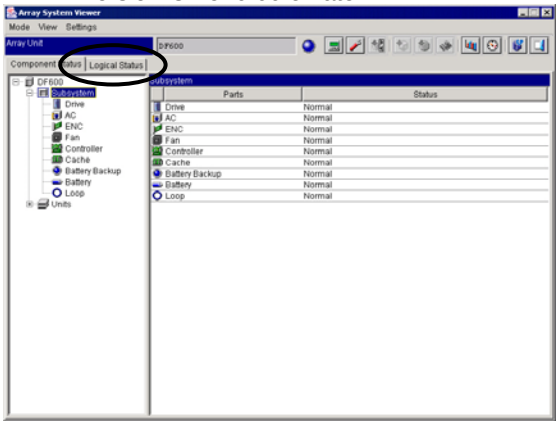
NOTE : To have the logical unit number 8 recognized, it is required that a host computer recognizes the logical unit number 0.

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.



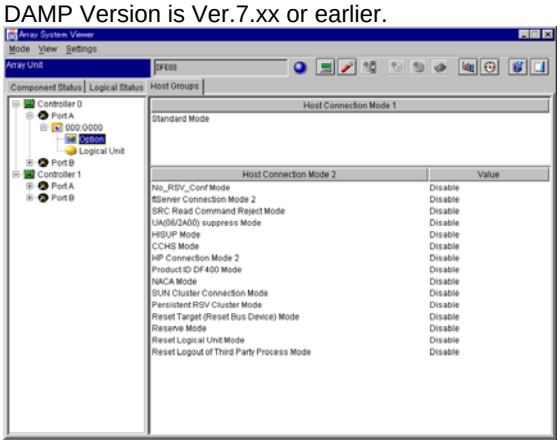
DAMP Version is Ver.9.00 or later.



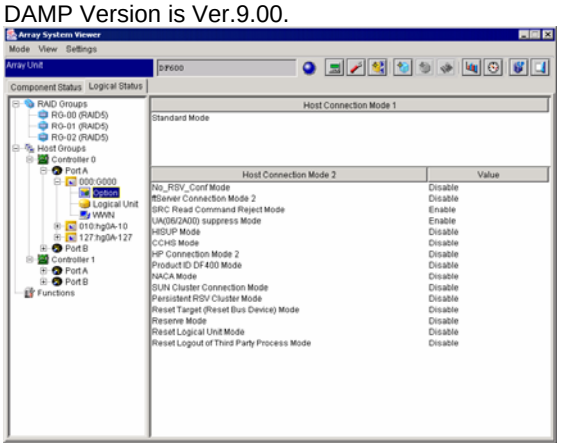
Copyright © 2002, 2005, Hitachi, Ltd.

(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

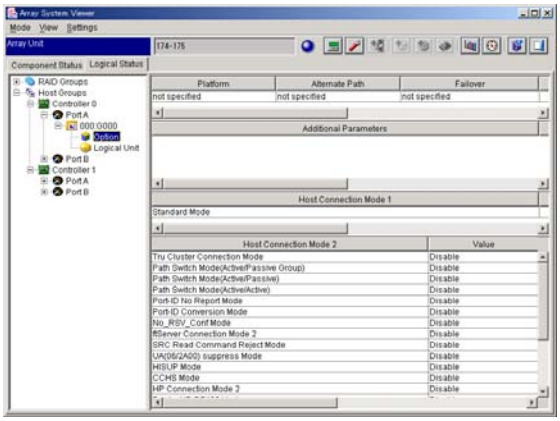
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



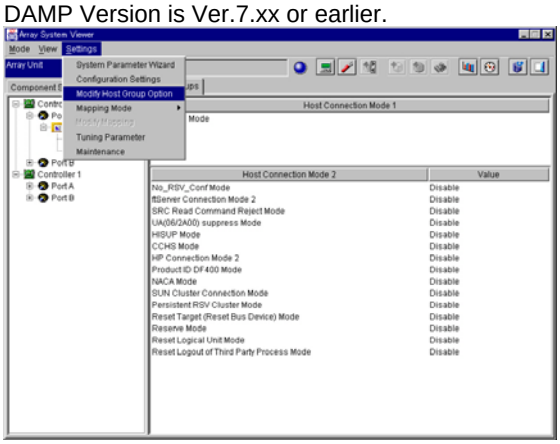
DAMP Version is Ver.9.1 or later.



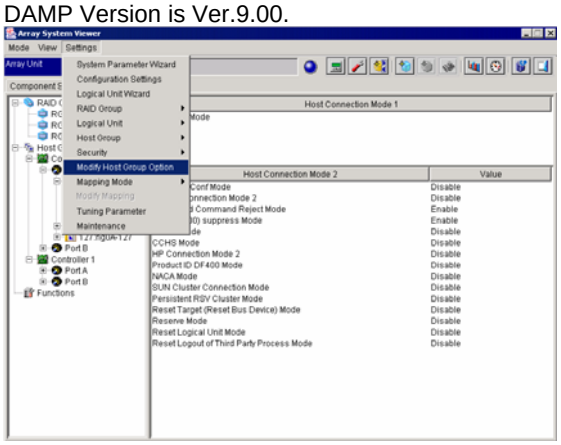
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the [Settings] menu, select [Modify Host Group Option].

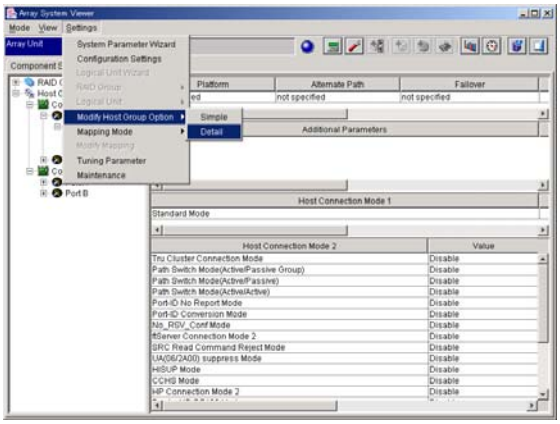
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

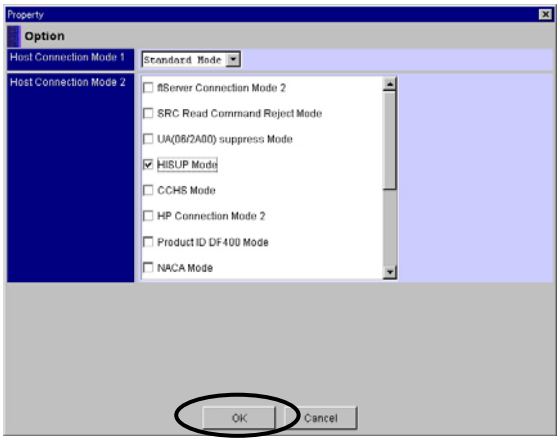


DAMP Version is Ver.9.10 or later.

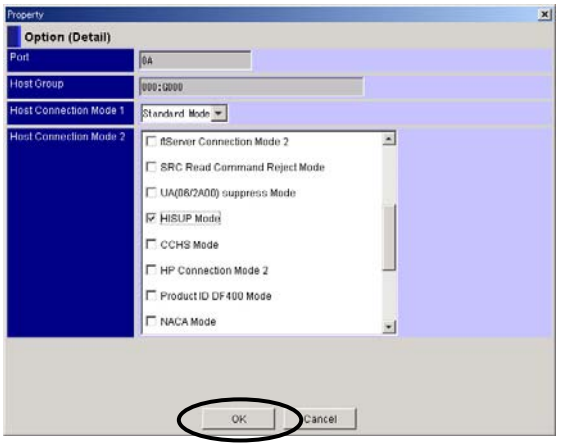


(d) Select the [HISUP Mode] in the “Host Connection Mode 2”. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

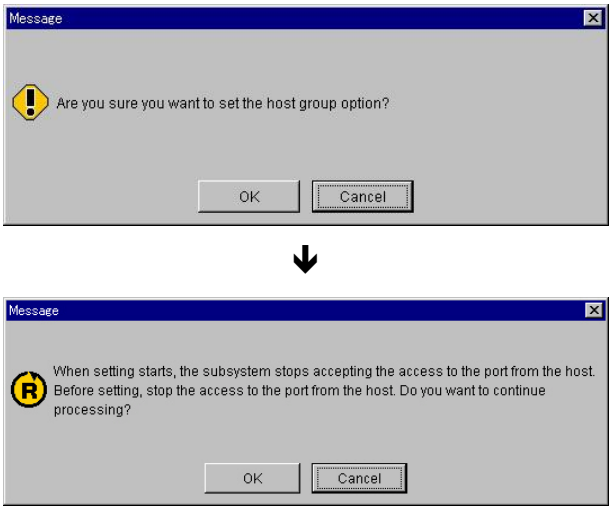


DAMP Version is Ver.9.10 or later.

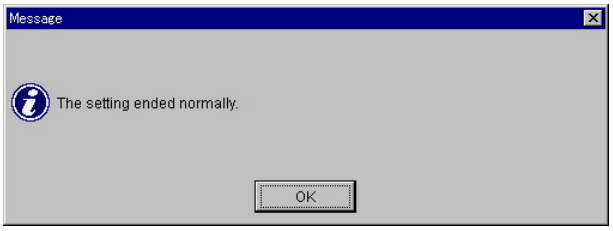


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.



(g) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

Copyright © 2003, 2005, Hitachi, Ltd.

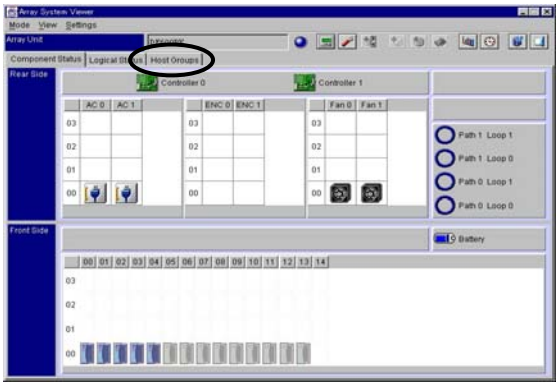
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

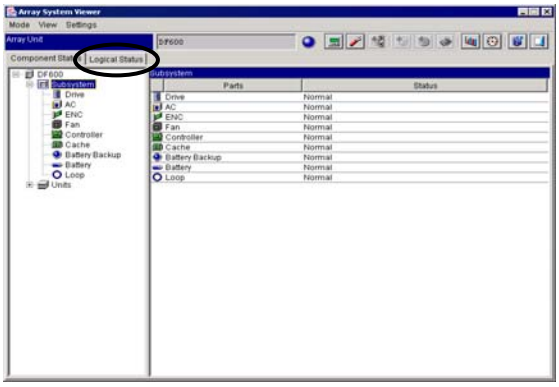
(6) When making LUs, whose logical unit numbers are 8 or more, recognized in the case where the subsystem is connected to the HP server

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

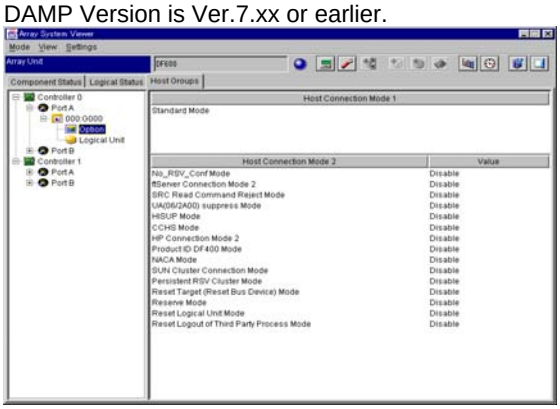


DAMP Version is Ver.9.00 or later.

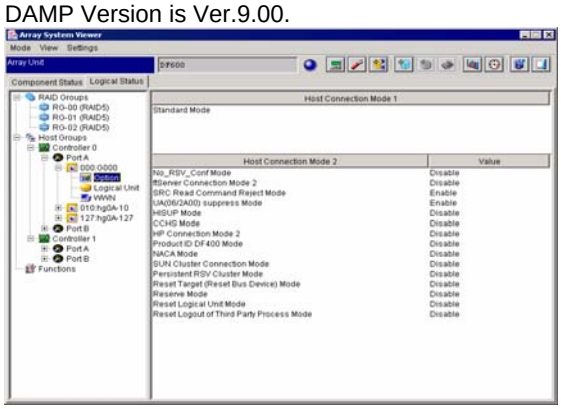


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

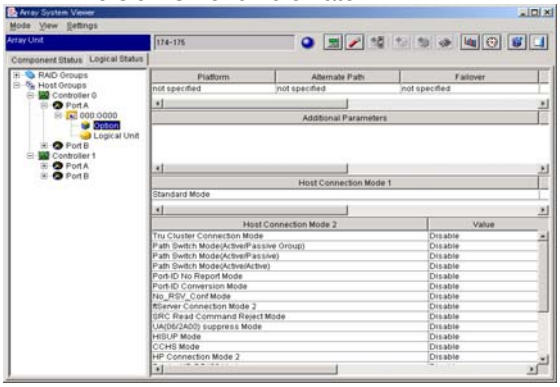
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



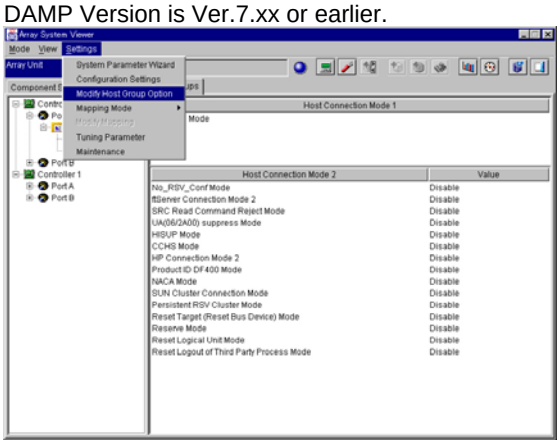
DAMP Version is Ver.9.10 or later.



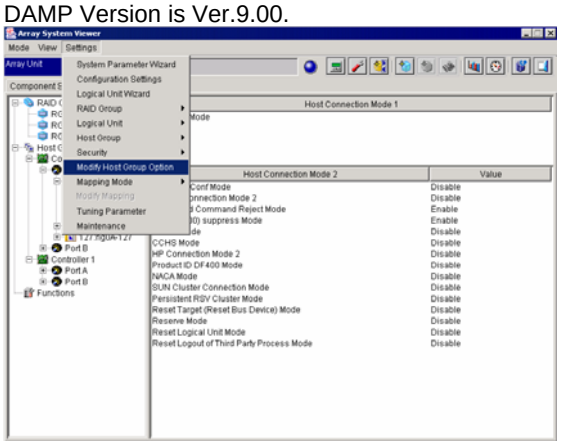
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].

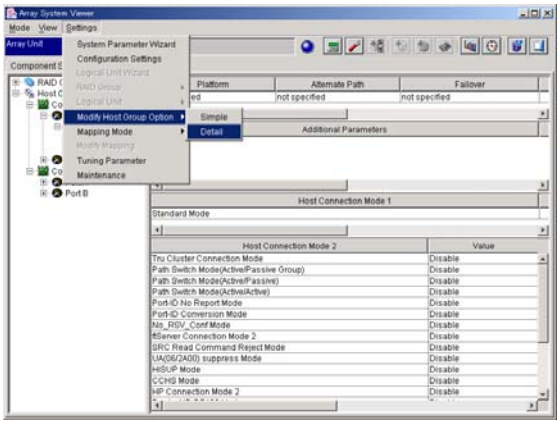
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

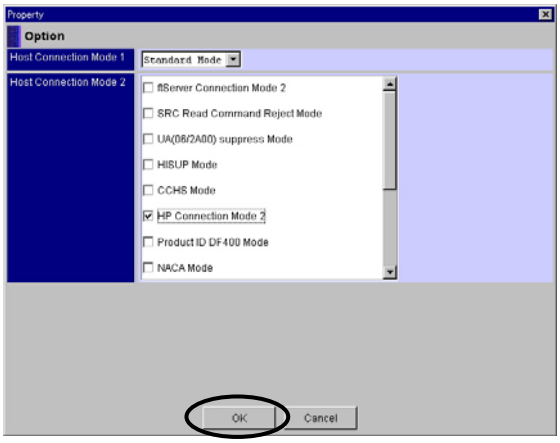


DAMP Version is Ver.9.10 or later.

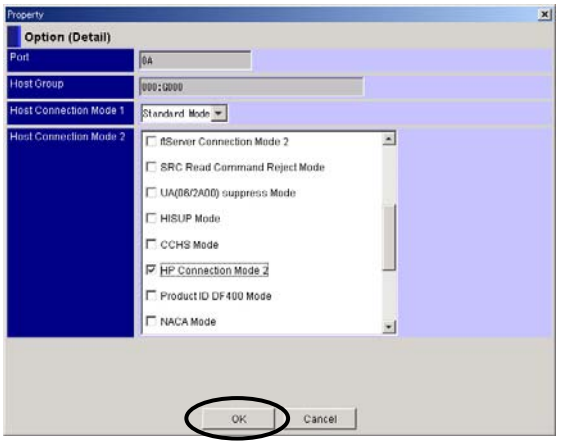


(d) Select the [HP Connection Mode 2] in the [Host Connection Mode 2]. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

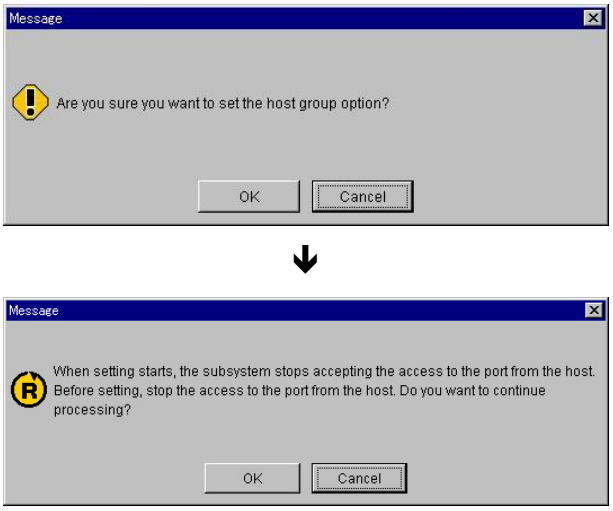


DAMP Version is Ver.9.10 or later.

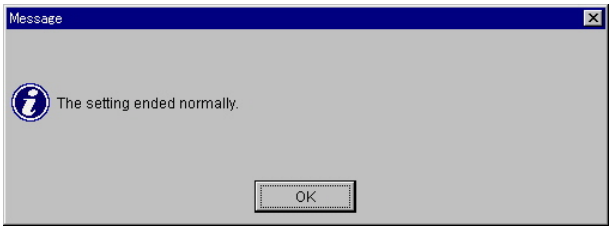


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.



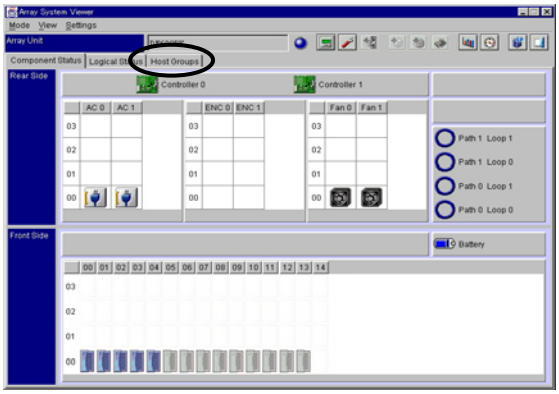
(g) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

Copyright © 2002, 2005, Hitachi, Ltd.

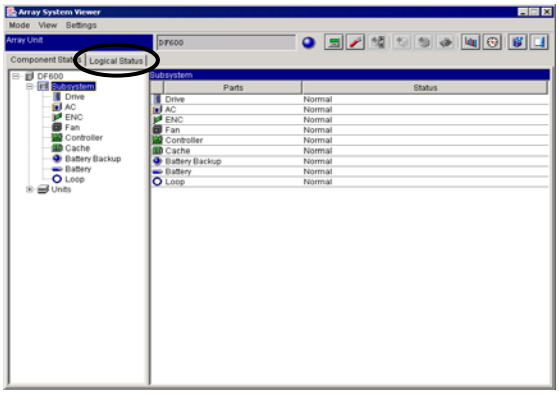
(7) When the SUN Cluster 3.0 is used

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

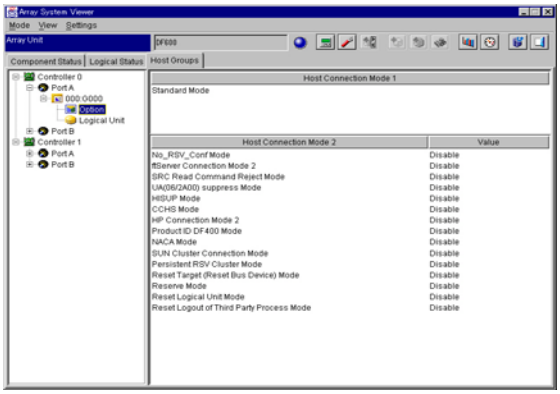


DAMP Version is Ver.9.00 or later.

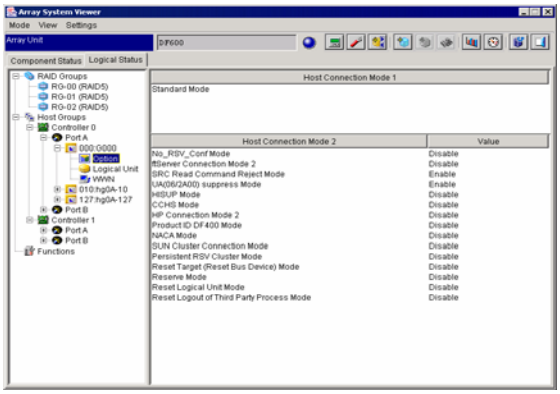


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

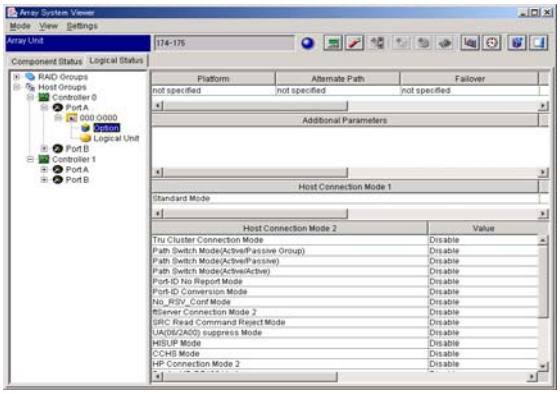
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



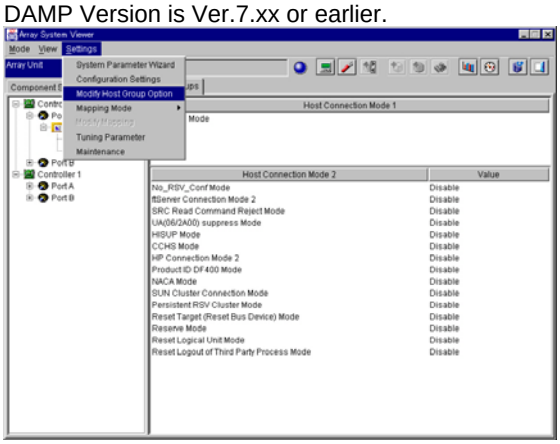
DAMP Version is Ver.9.10 or later.



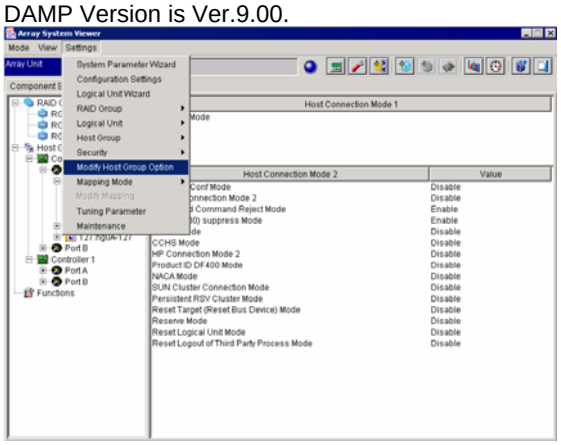
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].

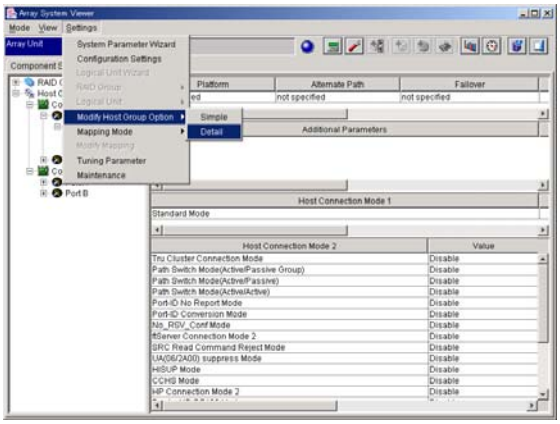
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

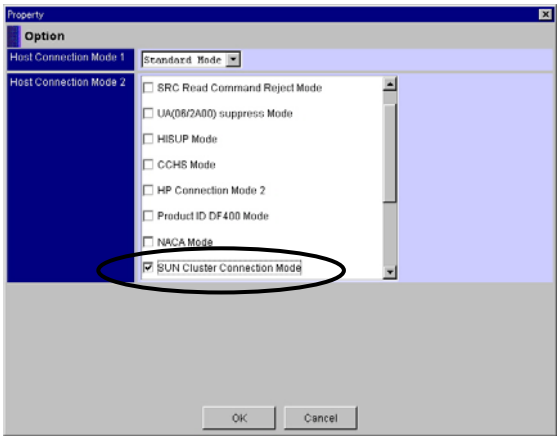


DAMP Version is Ver.9.10 or later.

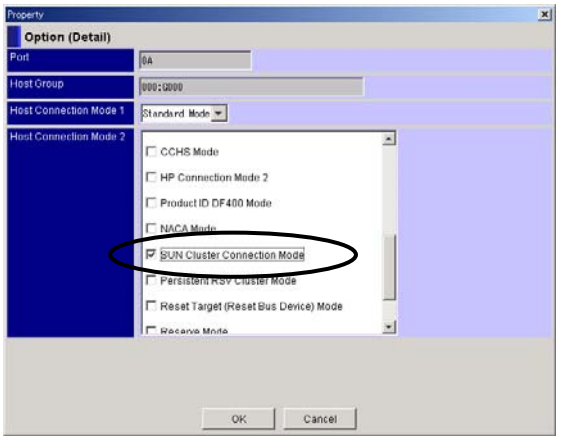


(d) Select the [SUN Cluster Connection Mode] in the [Host Connection Mode 2]. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

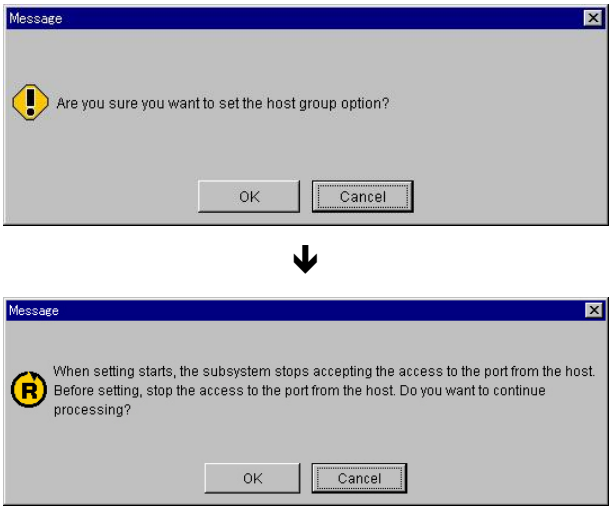


DAMP Version is Ver.9.10 or later.

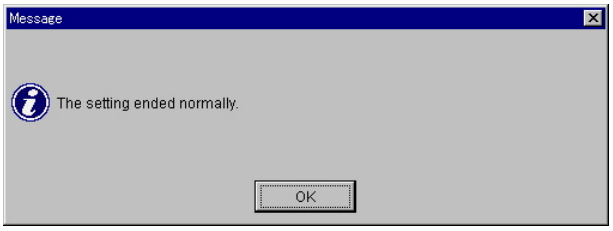


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.



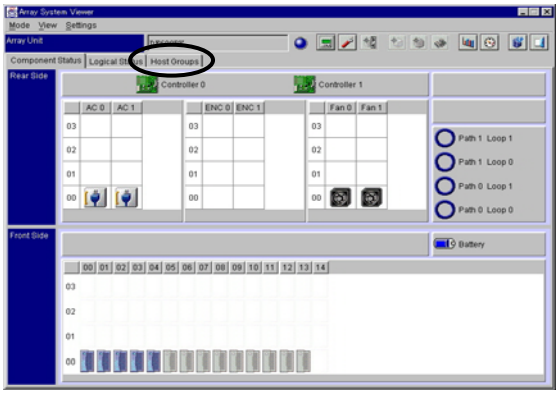
(g) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

Copyright © 2002, 2005, Hitachi, Ltd.

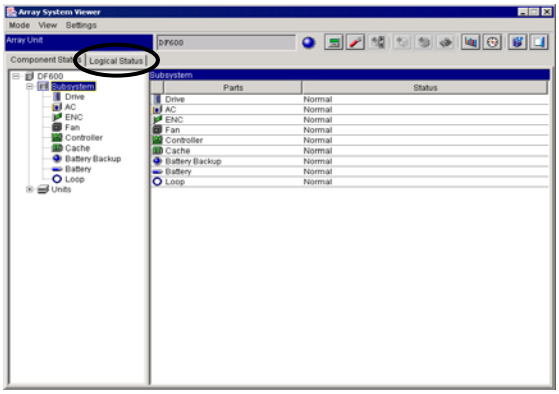
(8) When the ftServer is used

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

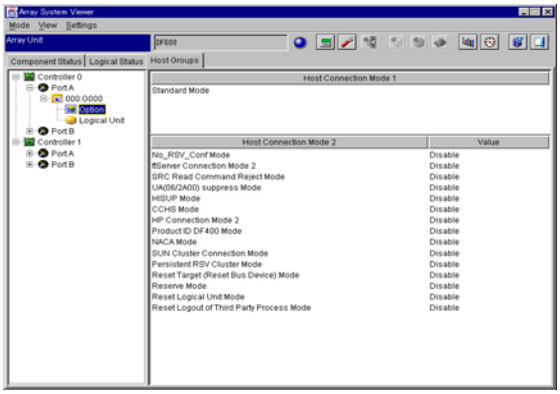


DAMP Version is Ver.9.00 or later.

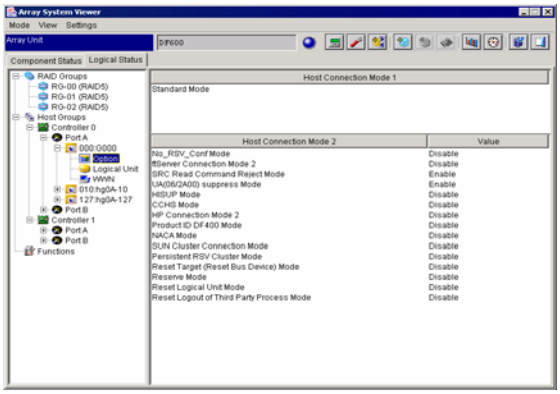


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

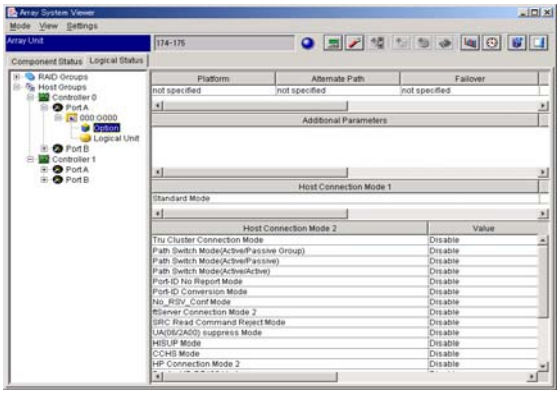
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



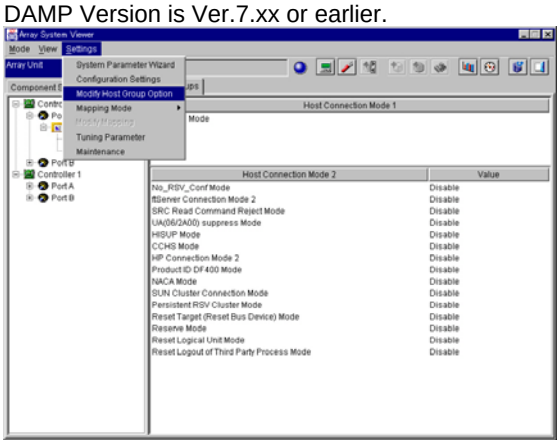
DAMP Version is Ver.9.10 or later.



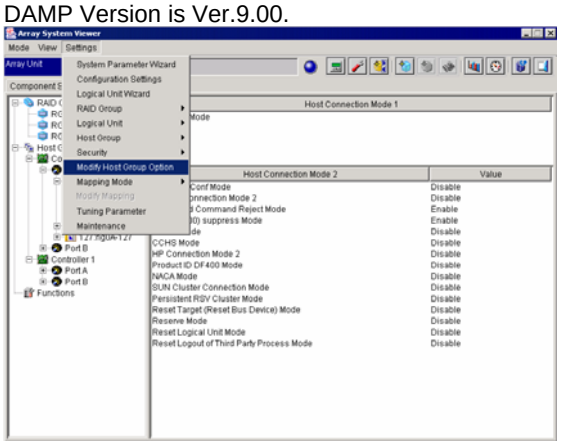
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].

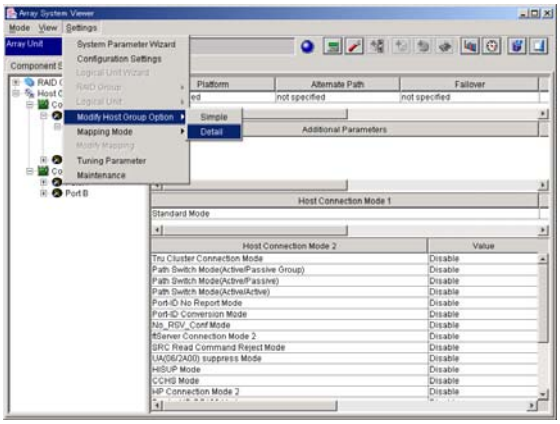
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

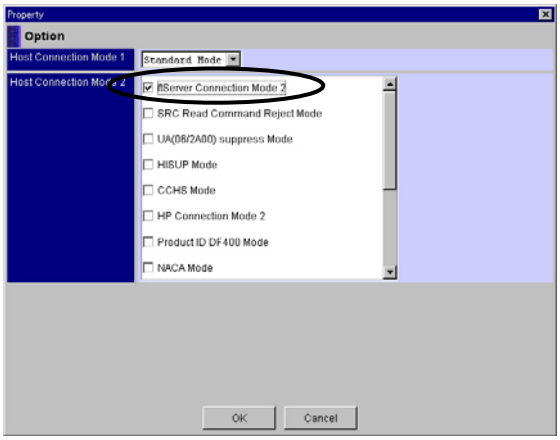


DAMP Version is Ver.9.10 or later.

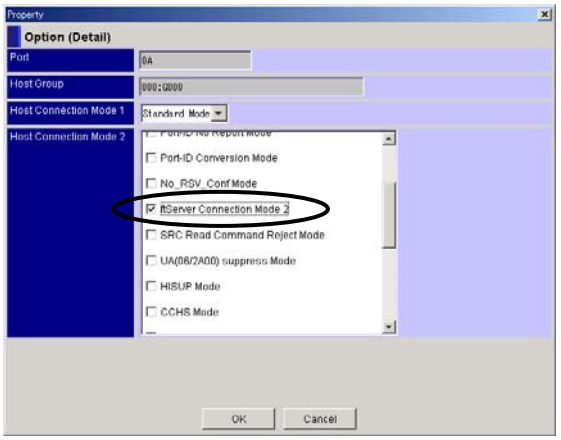


(d) Select the [ftServer Connection Mode 2] in the [Host Connection Mode 2]. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

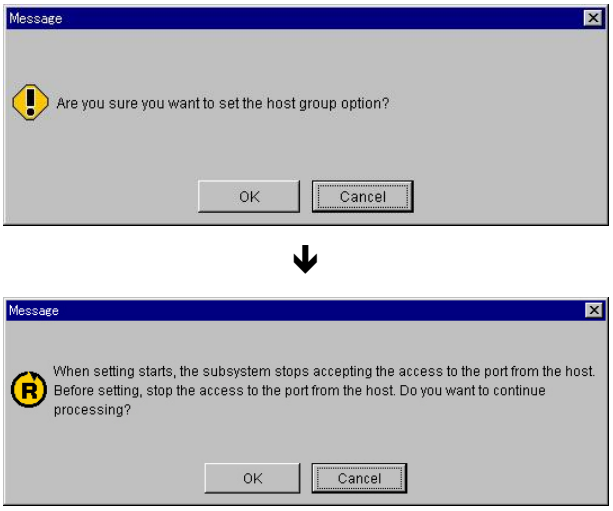


DAMP Version is Ver.9.10 or later.

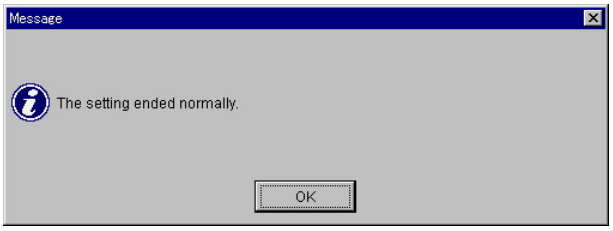


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.



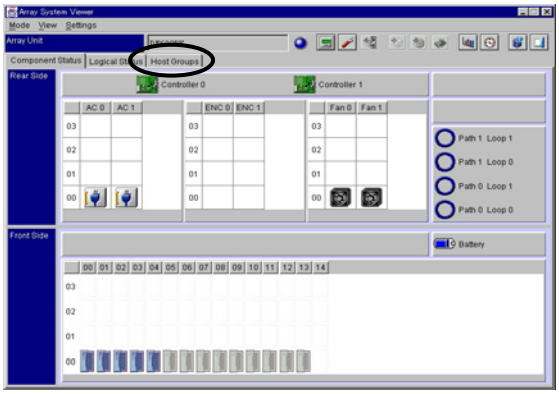
(g) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

Copyright © 2002, 2005, Hitachi, Ltd.

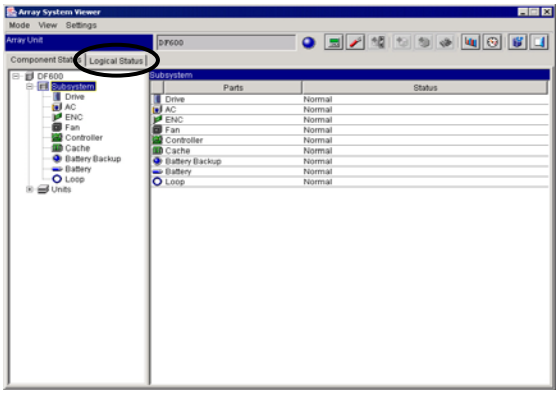
(9) When the Hitachi TrueCopy Basic function is used

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

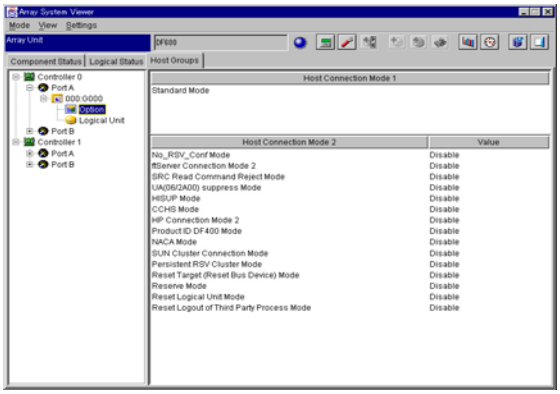


DAMP Version is Ver.9.00 or later.

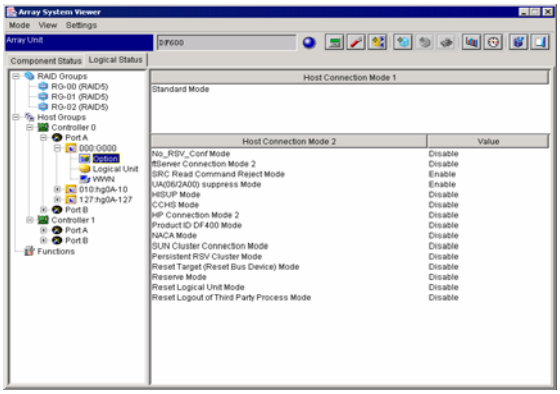


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

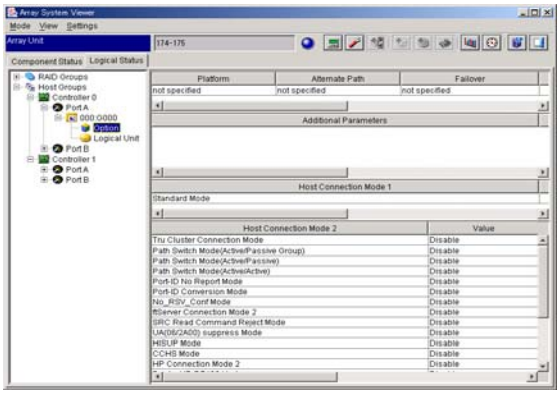
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



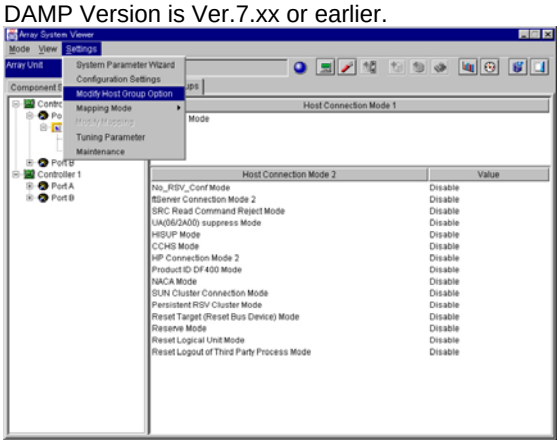
DAMP Version is Ver.9.10 or later.



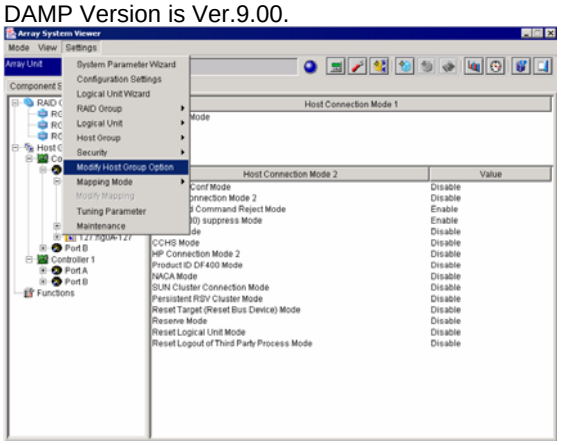
Copyright © 2002, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].

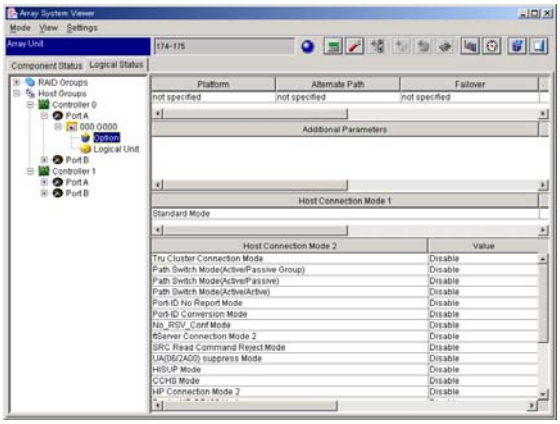
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

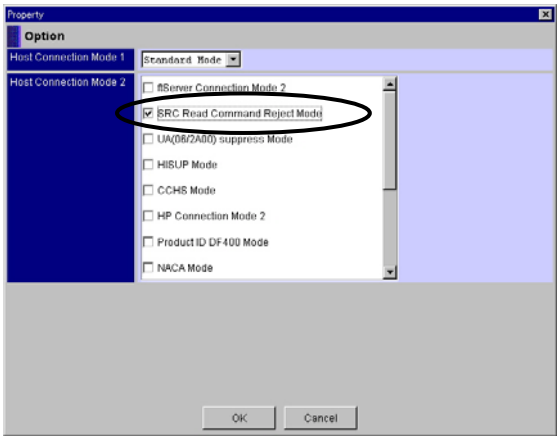


DAMP Version is Ver.9.10 or later.

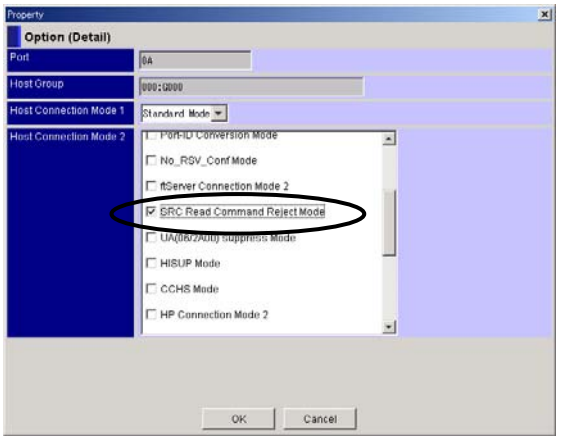


(d) If you want to use the subsystem suppressing the read access to the P-VOL when the mode is changed to PSUE, select [SRC Read Command Reject Mode] for the [Host Connection Mode 2]. Click the [OK] button.

DAMP Version is Ver.9.00 or earlier.

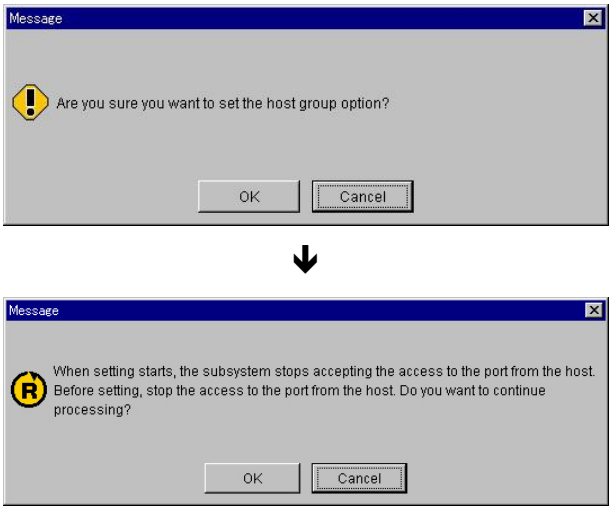


DAMP Version is Ver.9.10 or later.

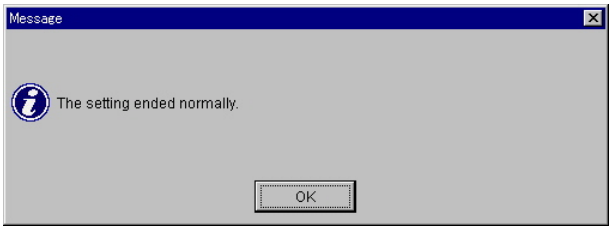


Copyright © 2002, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.

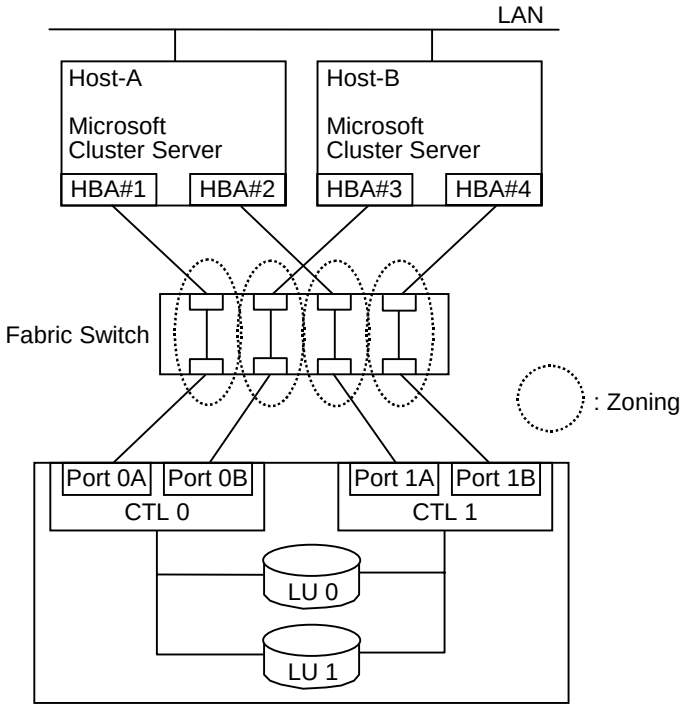


(g) Repeat the operation in steps (b) to (f) to make the settings for all the object ports.

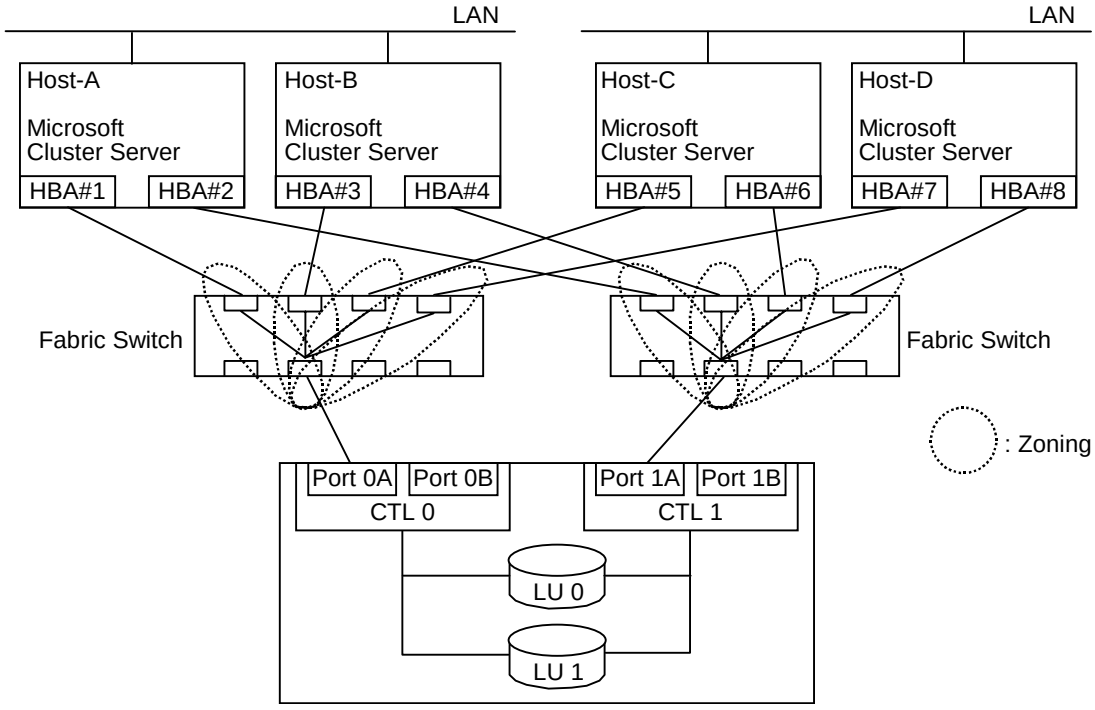
Copyright © 2002, 2005, Hitachi, Ltd.

(10) When the Microsoft Cluster Sever function is used
When connecting to Microsoft Cluster Server via Fabric Switch, Zoning on Fabric Switch must be set for each HBA as shown below.

• Configuration example –without port sharing



• Configuration example –with port sharing

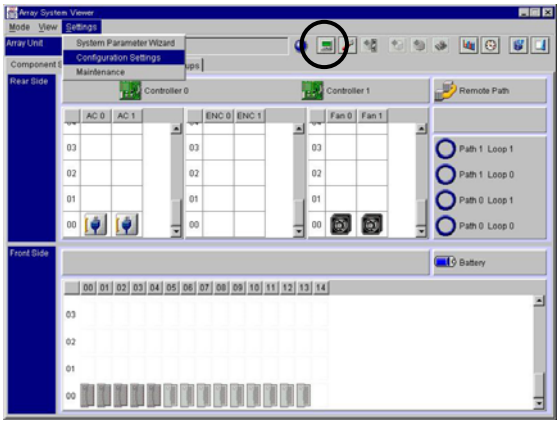


Copyright © 2002, 2005, Hitachi, Ltd.

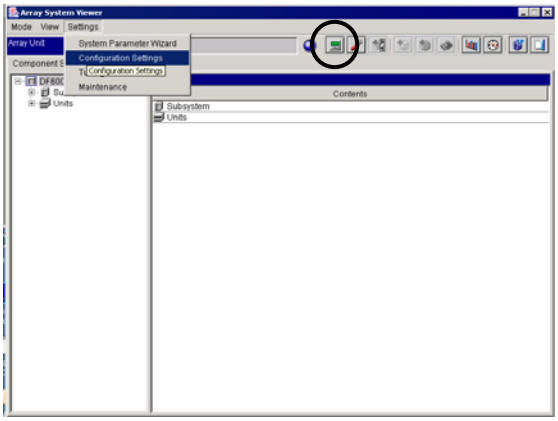
(11) When connecting a device as a boot disk or dump device of HP server.

(a) Select [Settings] – [Configuration Settings] in the unit window or click [ : Configuration Settings] in the tool bar.

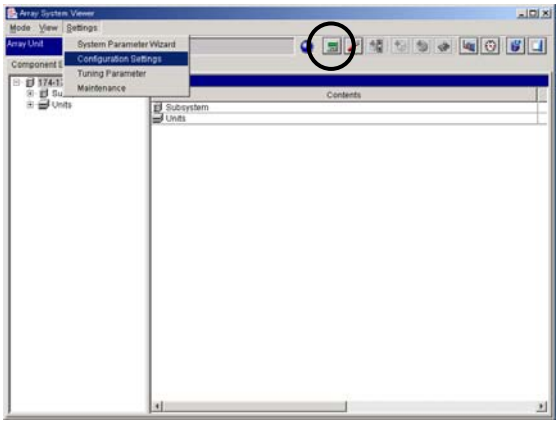
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.

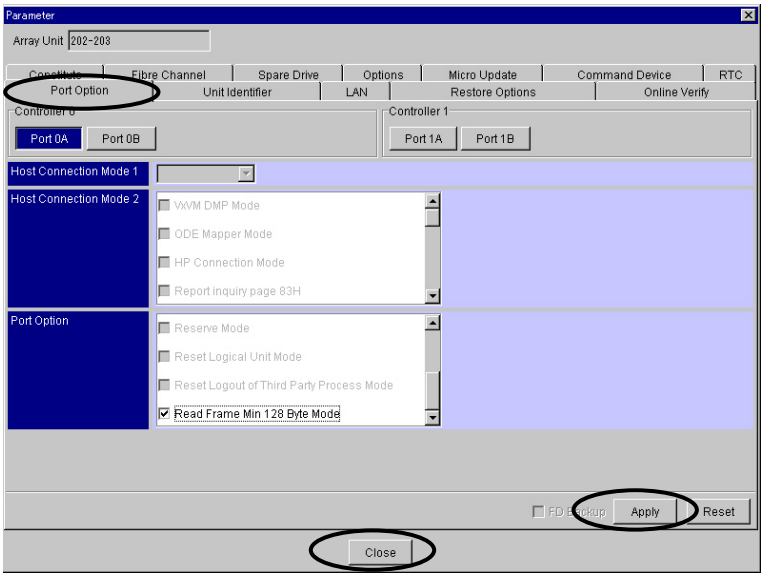


DAMP Version is Ver.9.10 or later.

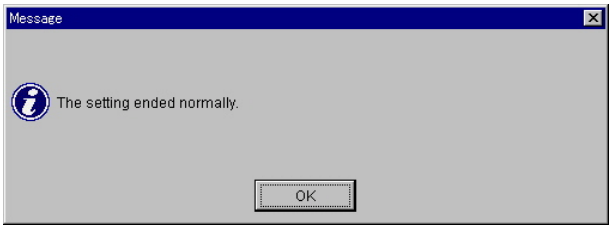


Copyright © 2002, 2005, Hitachi, Ltd.

(b) Click the [Port Option] tab.
(c) Select [Read Frame Min 128 Byte Mode] of the “Port Option”.



(d) Click the [Apply] button.
(e) A message indicating completion of setting is displayed. Click the [OK] button.



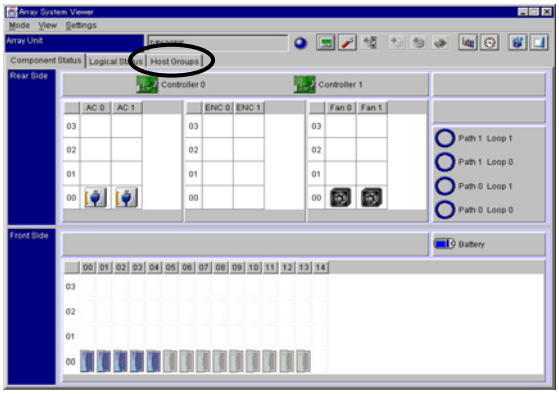
(f) Click the [Close] button.

Copyright © 2003, 2005, Hitachi, Ltd.

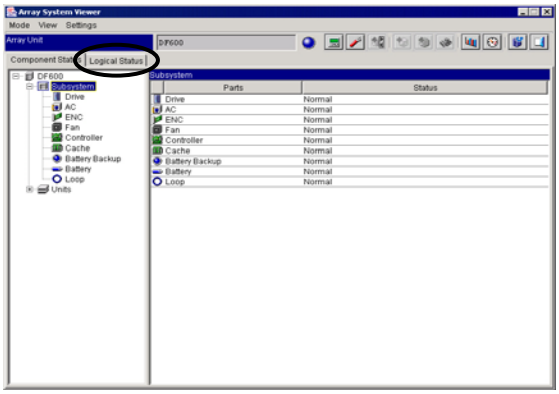
(12) When using the Egenera Blade Flame

(a) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.

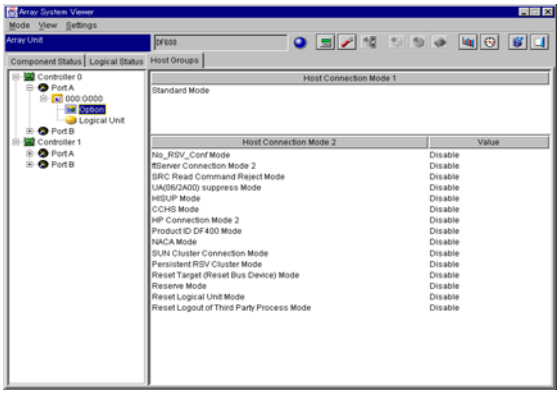


DAMP Version is Ver.9.00 or later.

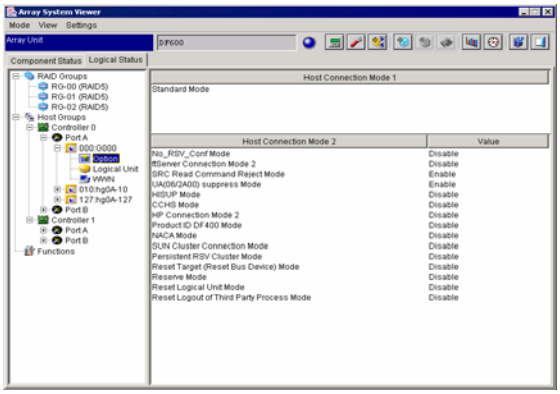


(b) When Disk Array Management Program Ver.7.xx or earlier is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

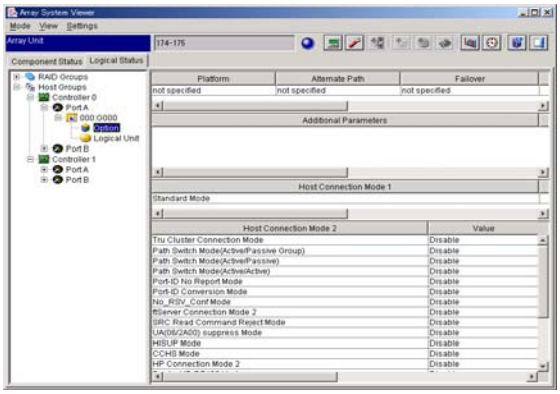
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00.



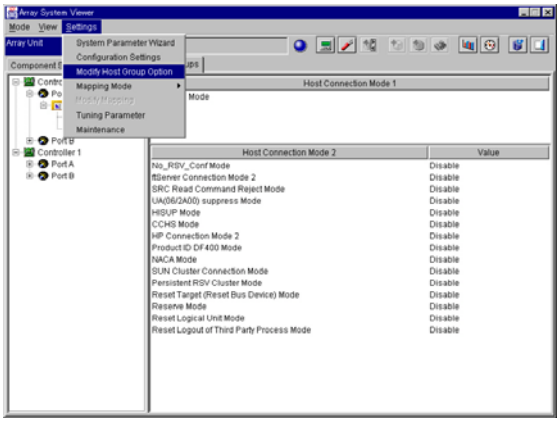
DAMP Version is Ver.9.10 or later.



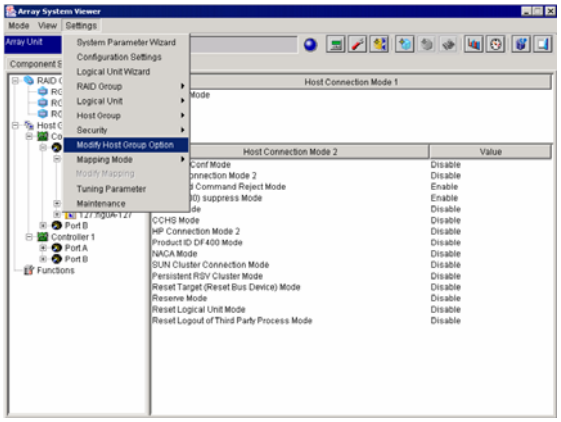
Copyright © 2003, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].
When using Disk Array Management Program Ver. 9.10, select [Settings], [Modify Host Group Option], and [Detail] in this order.
When using Disk Array Management Program Ver. 9.20 or later, select [Settings], [Modify Host Group Option], and [Simple] in this order.

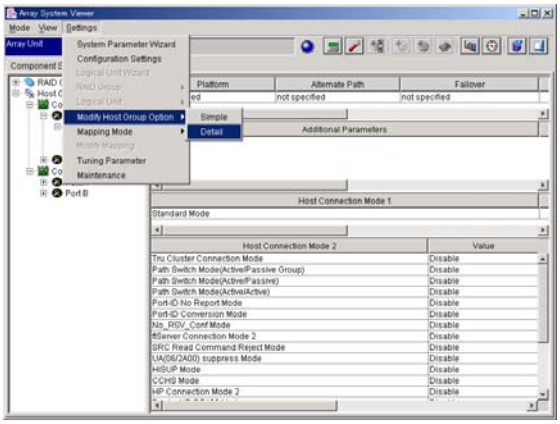
DAMP Version is Ver.7.xx or earlier.



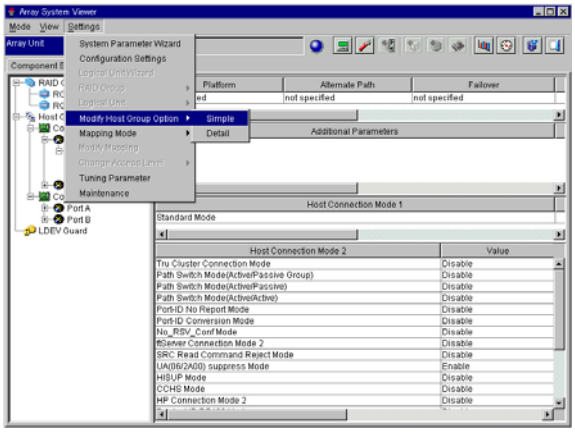
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10.



DAMP Version is Ver.9.20 or later.

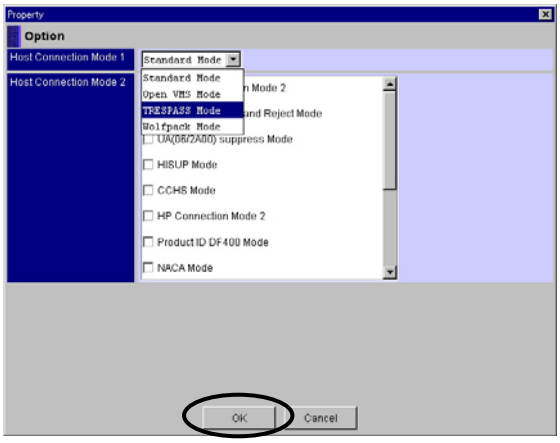


Copyright © 2003, 2005, Hitachi, Ltd.

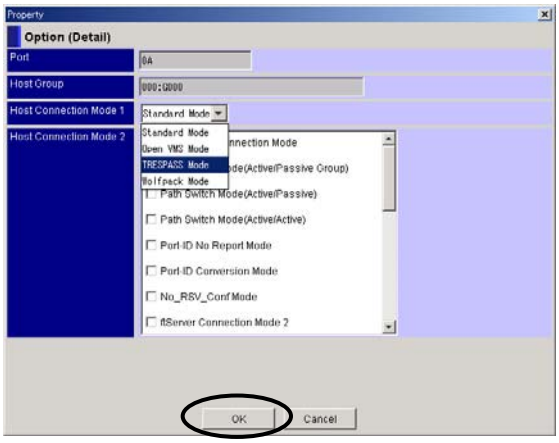
(d) Following operations vary depending on the version of Disk Array Management Program.

(d-1) In the case of Disk Array Management Program Ver. 9.10 or earlier.
Select [TRESPASS Mode] from the “Host Connection Mode 1” and click the [OK] button.

DAMP Version is Ver.9.10 or earlier.



DAMP Version is Ver.9.10 or later.

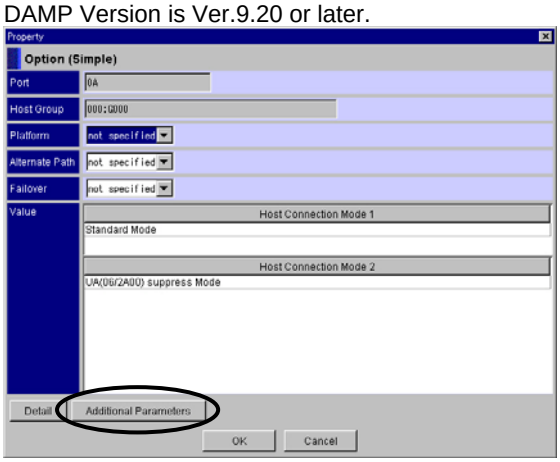


Copyright © 2003, 2005, Hitachi, Ltd.

(d-2) When [Simple] is selected in the case of Disk Array Management Program Ver. 9.20 or later.

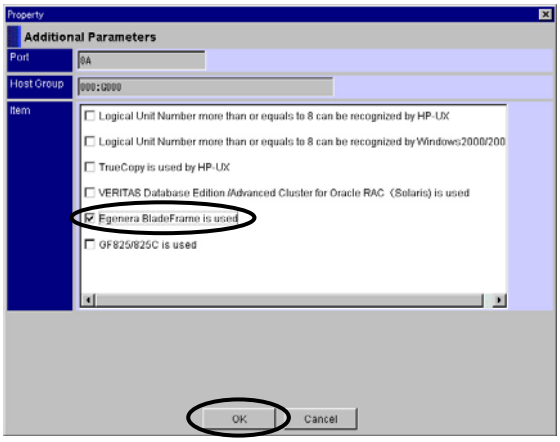
(i) Select [Additional Parameters].

DAMP Version is Ver.9.20 or later.



(ii) Select [Egenera BladeFrame is use] and click the [OK] button.

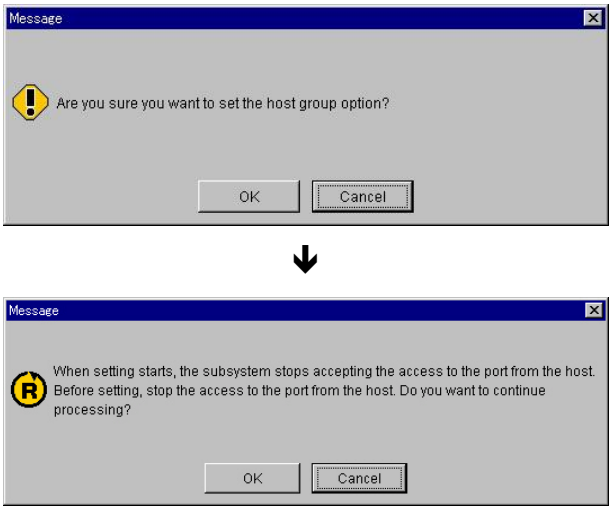
DAMP Version is Ver.9.20 or later.



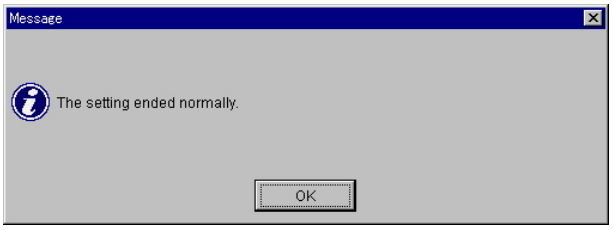
(iii) Return to the “Option (Simple)” window and click the [OK] button.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.



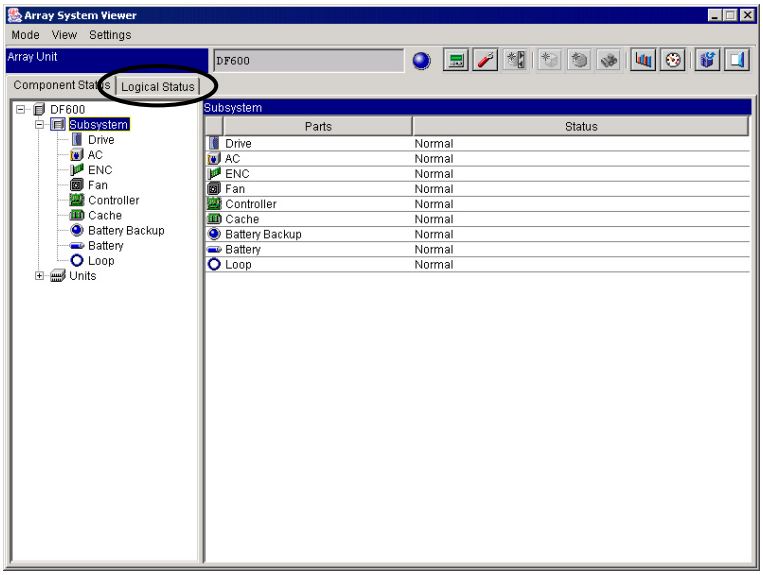
(g) Click the [Close] button.

Copyright © 2003, 2005, Hitachi, Ltd.

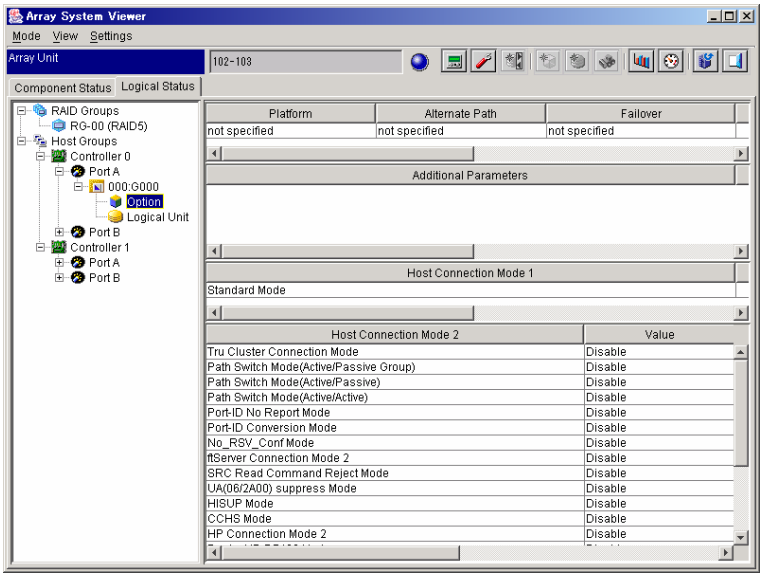
(13) When using Tru Cluster

This can be set up if the microprogram revision is x655/D or later and DAMP version is Ver.9.10 or later.

(a) On the unit window, click the [Logical Status] tab.

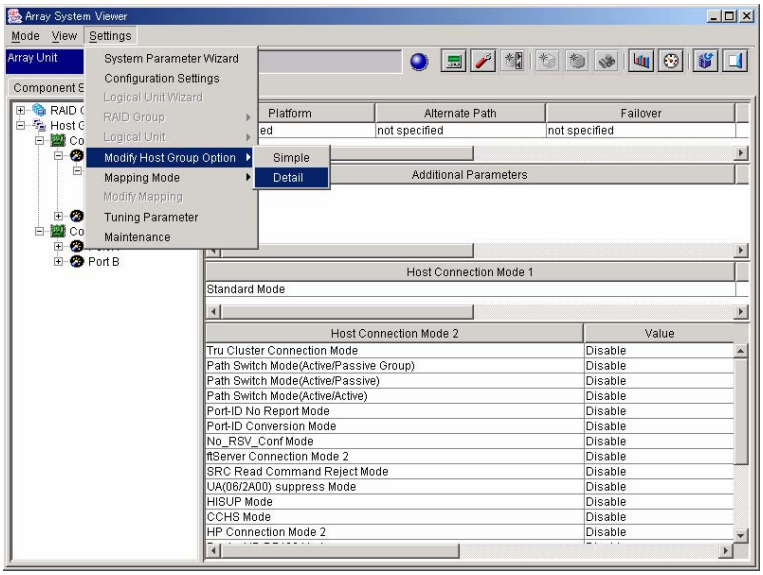


(b) Display the 000:G000 by double clicking the "Host Groups" and "Controller" which is an object of the setting and then double clicking the "Port" in the unit window. Display the "Option" and "Logical Unit" by clicking the "000:G000," and then click the "Option".



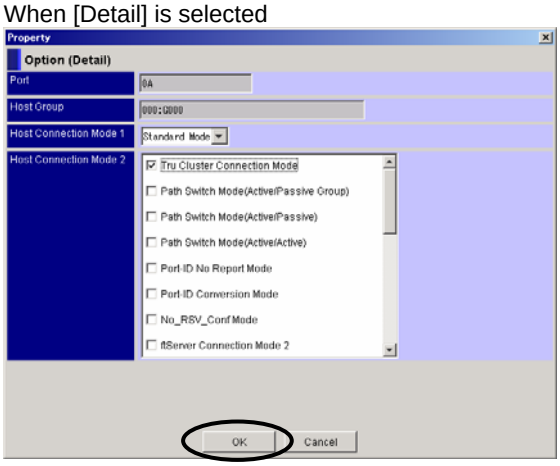
Copyright © 2003, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option] and click the [Detail]. When using the [Simple] setting, Disk Array Management Program Ver. 9.20 or later is required.

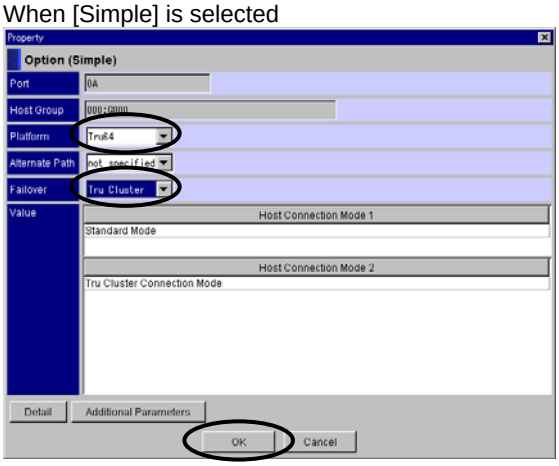


(d) When [Detail] is selected, select the [Tru Cluster Connection Mode] from the “Host Connection Mode 2” and click the [OK] button.
When [Simple] is selected, select [Tru 64] from the “Platform” and [Tru Cluster] from the “Failover” and click the [OK] button.

When [Detail] is selected

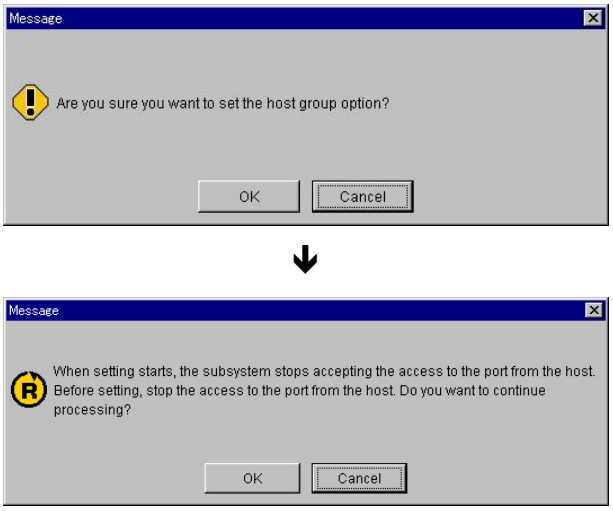


When [Simple] is selected

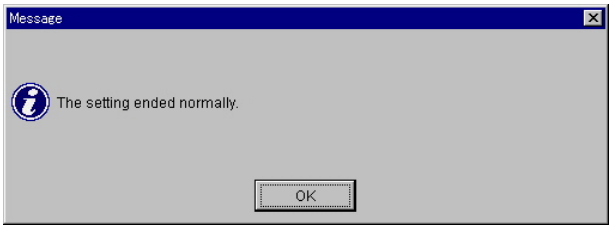


Copyright © 2003, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



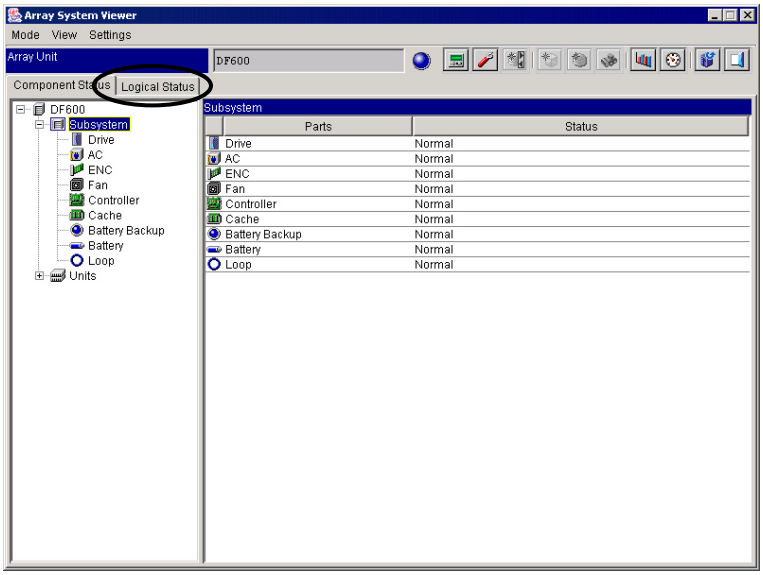
(f) A message indicating completion of setting is displayed. Click the [OK] button.



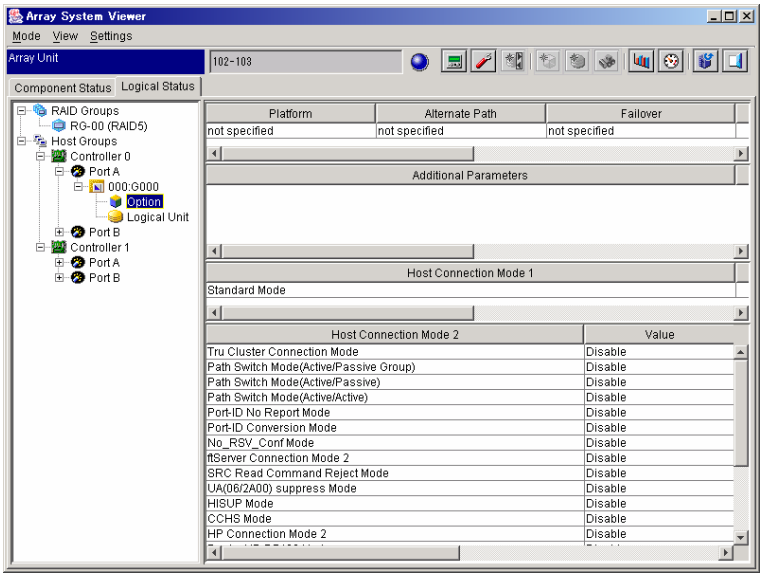
Copyright © 2003, 2005, Hitachi, Ltd.

(14) When using VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris)
This can be set up if the microprogram revision is x655/D or later and DAMP version is Ver.9.20 or later.

(a) On the unit window, click the [Logical Status] tab.

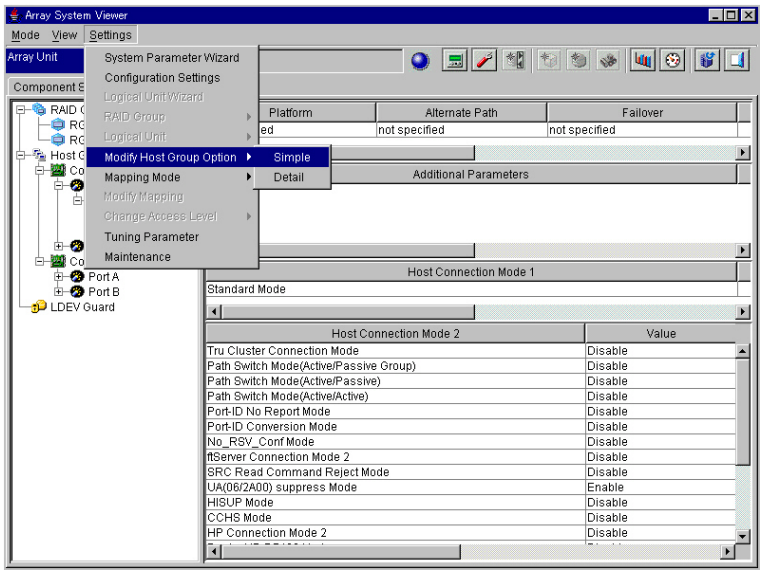


(b) Display the 000:G000 by double clicking the "Host Groups" and "Controller" which is an object of the setting and then double clicking the "Port" in the unit window. Display the "Option" and "Logical Unit" by clicking the "000:G000," and then click the "Option".

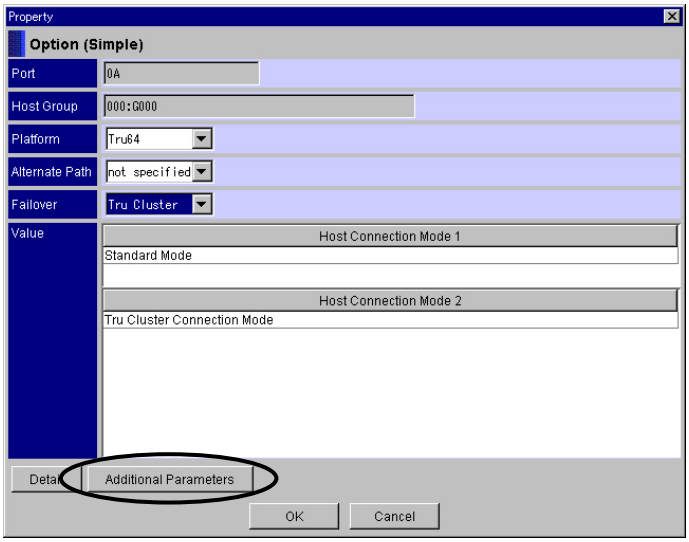


Copyright © 2003, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option] and click the [Simple].

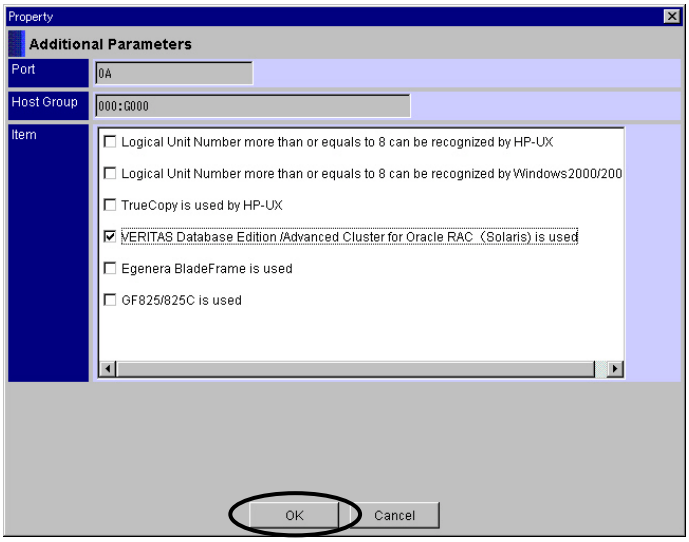


(d) Select [Additional Parameters].



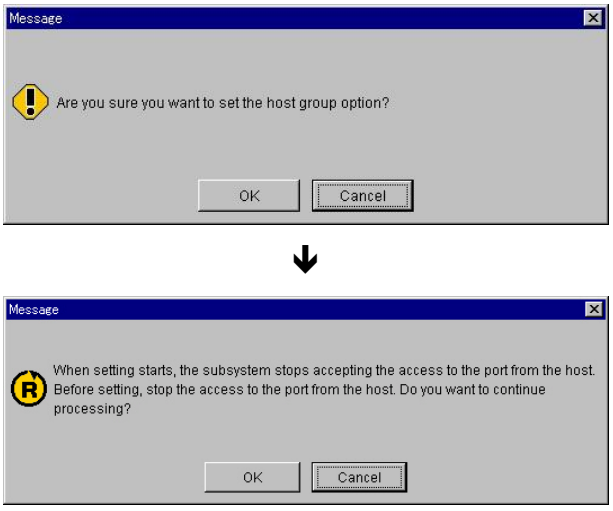
Copyright © 2003, 2005, Hitachi, Ltd.

(e) Select [VERITAS Database Edition /Advanced Cluster for Oracle RAC (Solaris) is used] and click the [OK] button.

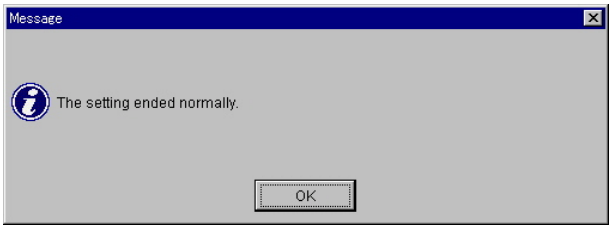


(f) Return to the “Option (Simple)” window and click the [OK] button.

(g) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(h) A message indicating completion of setting is displayed. Click the [OK] button.



Copyright © 2003, 2005, Hitachi, Ltd.

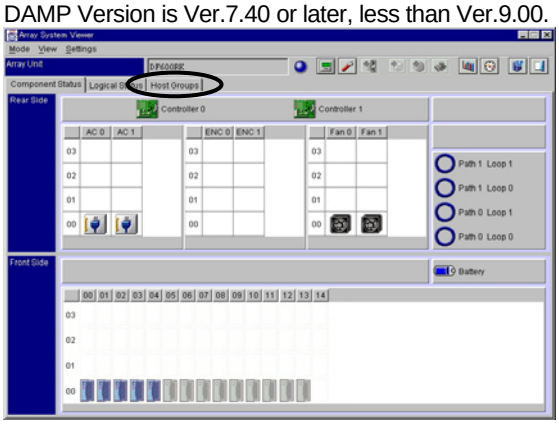
(15) When using GF825/825C

This can be set up if the microprogram revision is x655/D or later and DAMP version is Ver.7.40 or later.

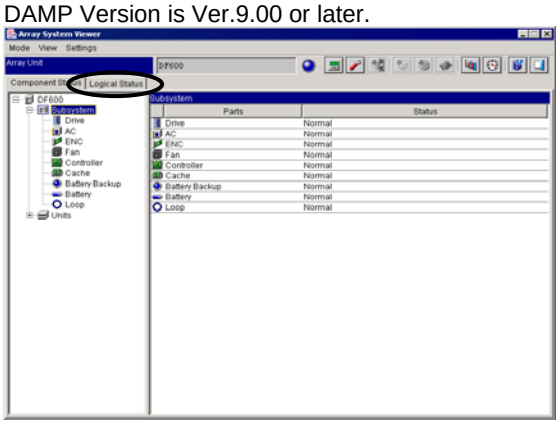
(a) DAMP Ver.7.xx or later, less than Ver.9.00: On the unit window, click the [Host Groups] tab.

DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.40 or later, less than Ver.9.00.



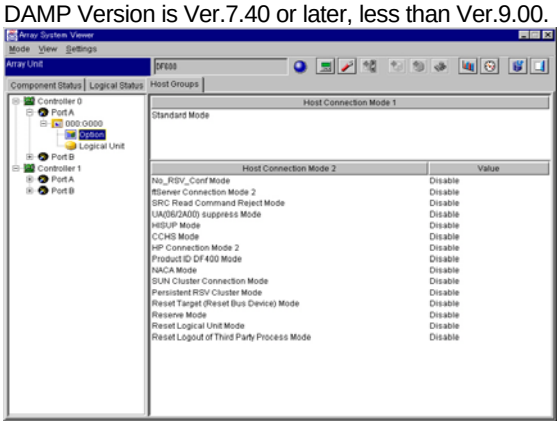
DAMP Version is Ver.9.00 or later.



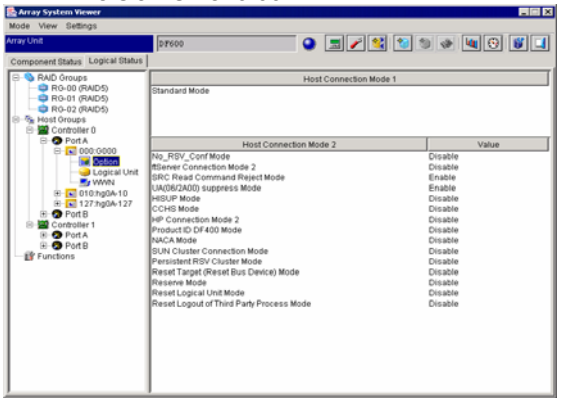
Copyright © 2003, 2005, Hitachi, Ltd.

(b) When Disk Array Management Program Ver.7.xx or later less than Ver.9.00 is used, display [000:G000] by double clicking the [Controller], for which you want to set the mode for connecting with a host, in the unit window and then double clicking the [Port].
When Disk Array Management Program Ver. 9.00 or later is used, display the [Port] and [000:G000] by double clicking [Host Group], and then double clicking the [Controller] for which the setting is to be made.
When Disk Array Management Program Ver. 9.10 or later is used, display “Option” and “Logical Unit” by double clicking the “000:G000” and click the [Option].

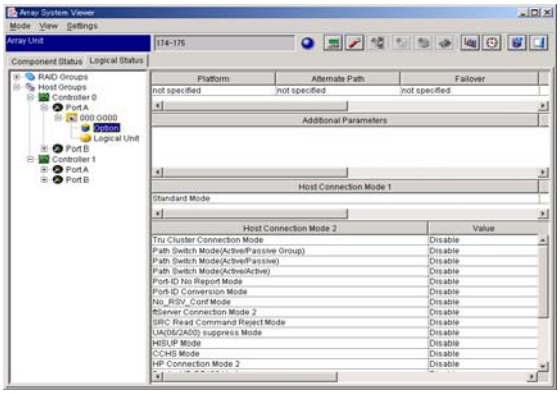
DAMP Version is Ver.7.40 or later, less than Ver.9.00.



DAMP Version is Ver.9.00.



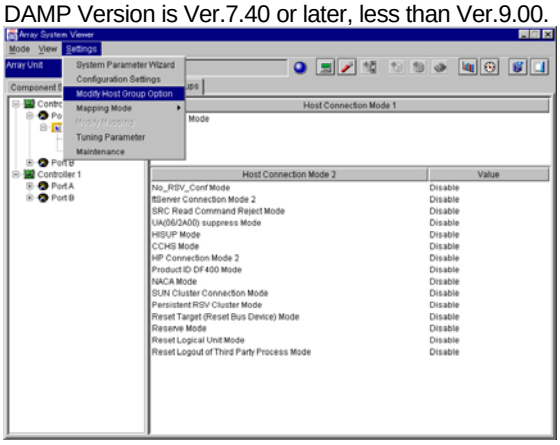
DAMP Version is Ver.9.10 or later.



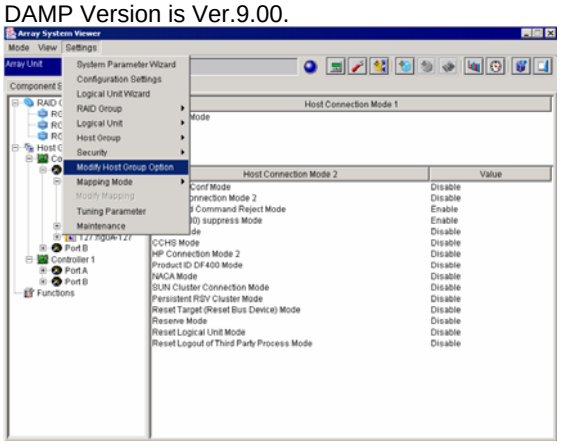
Copyright © 2003, 2005, Hitachi, Ltd.

(c) On the “Settings” menu, select [Modify Host Group Option].
When using Disk Array Management Program Ver. 9.10, select [Settings], [Modify Host Group Option], and [Detail] in this order.
When using Disk Array Management Program Ver. 9.20 or later, select [Settings], [Modify Host Group Option], and [Simple] in this order.

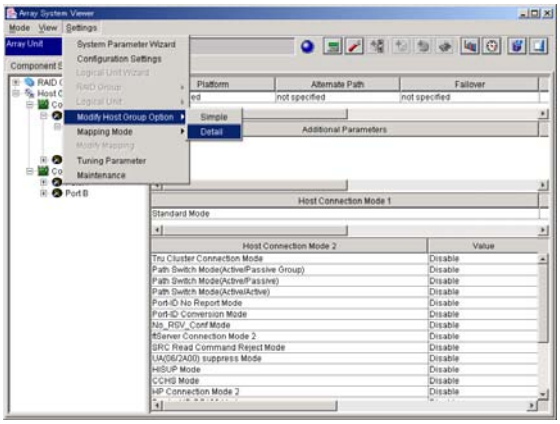
DAMP Version is Ver.7.40 or later, less than Ver.9.00.



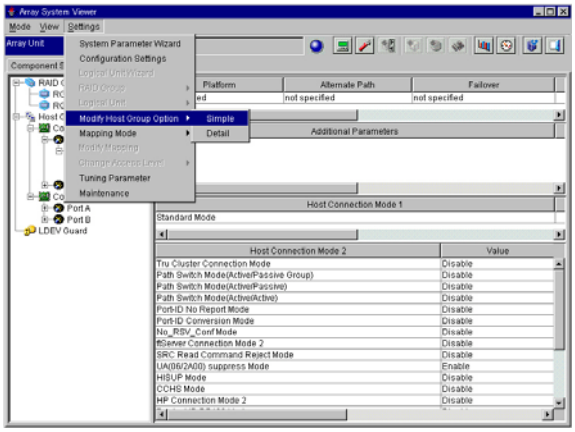
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10.



DAMP Version is Ver.9.20 or later.

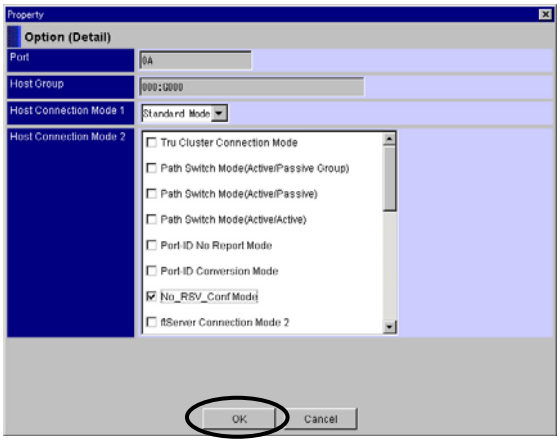


Copyright © 2003, 2005, Hitachi, Ltd.

(d) Following operations vary depending on the version of Disk Array Management Program.

(d-1) In the case of Disk Array Management Program Ver. 9.10 or earlier.
Select [No_RSV_Conf Mode] from the “Host Connection Mode 2” and click the [OK] button.

DAMP Version is Ver.9.10 or earlier.

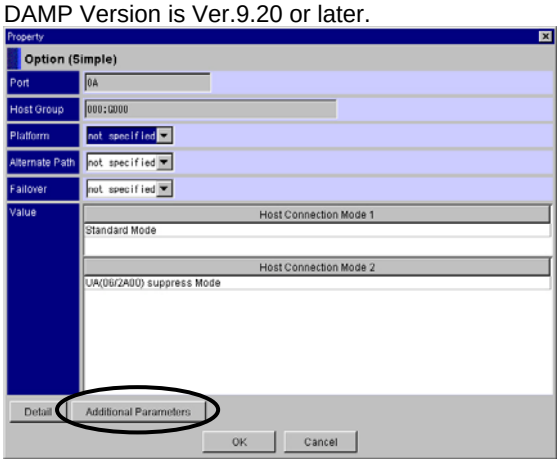


Copyright © 2003, 2005, Hitachi, Ltd.

(d-2) When [Simple] is selected in the case of Disk Array Management Program Ver. 9.20 or later.

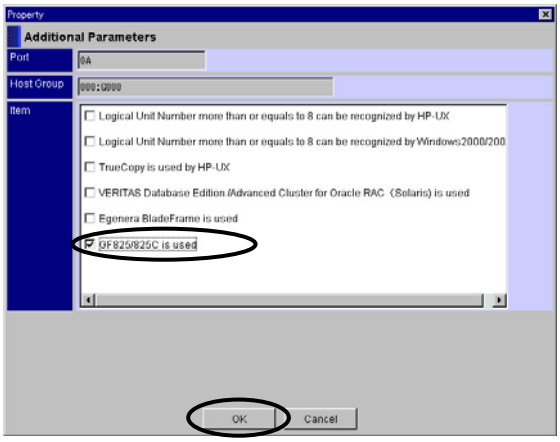
(i) Select [Additional Parameters].

DAMP Version is Ver.9.20 or later.



(ii) Select [GF825/825C is used] and click the [OK] button.

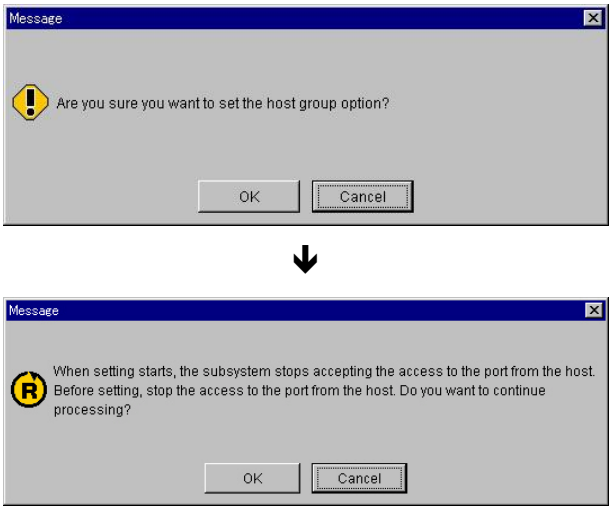
DAMP Version is Ver.9.20 or later.



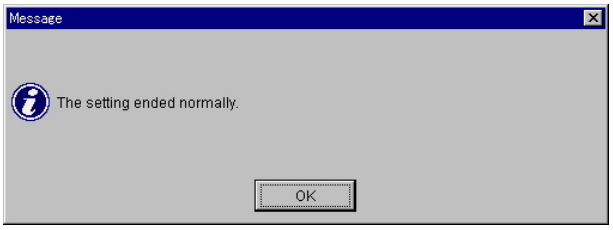
(iii) Return to the “Option (Simple)” window and click the [OK] button.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(f) A message indicating completion of setting is displayed. Click the [OK] button.

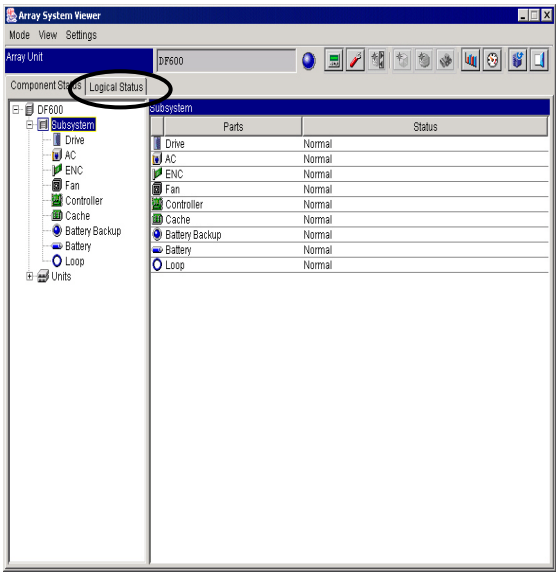


(g) Click the [Close] button.

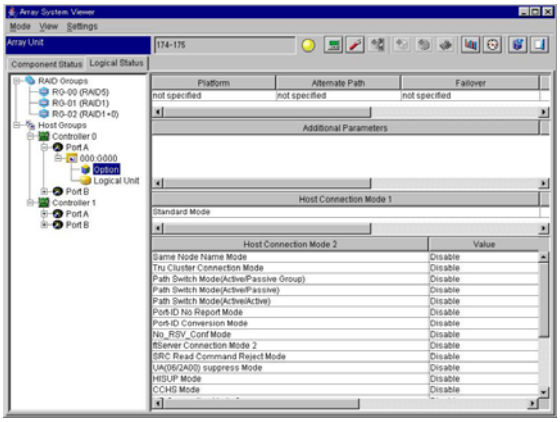
Copyright © 2003, 2005, Hitachi, Ltd.

(16) When using SANsurfer

(a) On the unit window, click the [Logical Status] tab.
In the case of Disk Array Management Program Version 9.00 or later, click the [Logical Status] tab.

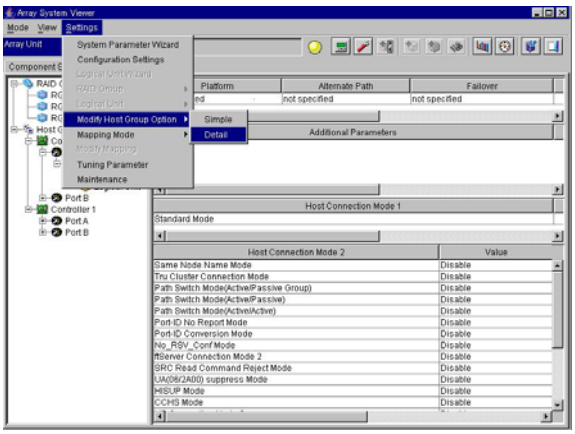


(b) Display the 000:G000 by double clicking the “Host Groups” and “Controller” which is an object of the setting and then double clicking the “Port” in the unit window.
Display the “Option” and “Logical Unit” by clicking the “000:G000,” and then click the “Option”.

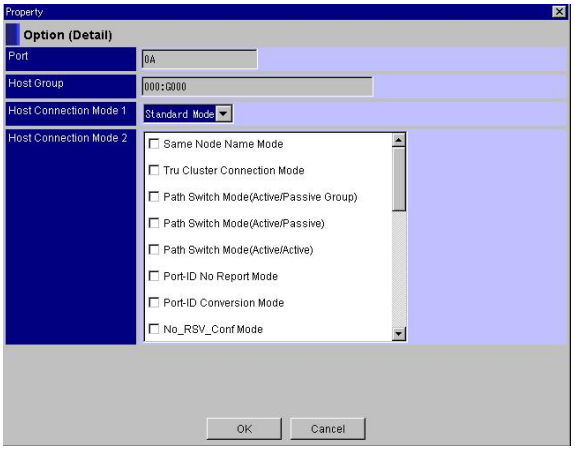


Copyright © 2004, 2005, Hitachi, Ltd.

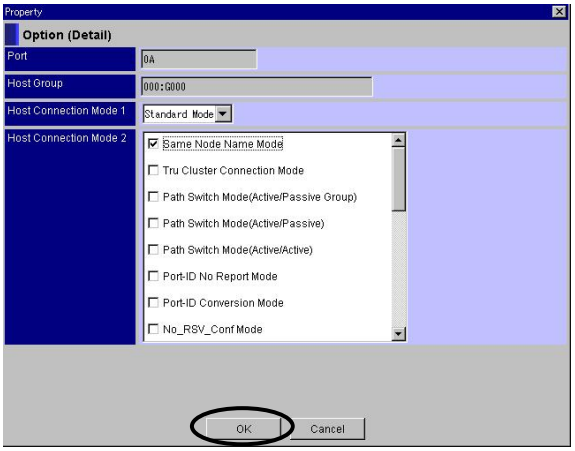
(c) On the “Settings” menu, select [Modify Host Group Option] and click the [Detail].



(d) The “Option (Detail)” property dialog box is opened.

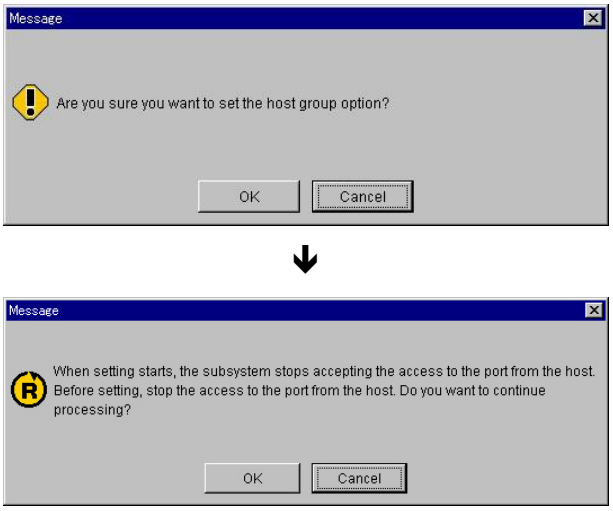


(e) Select “Same Node Name Mode” and click the [OK] button.

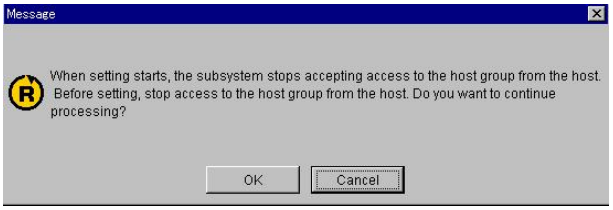


Copyright © 2004, 2005, Hitachi, Ltd.

(f) Since a message asking for a confirmation that you want to set the mode, confirm it by clicking the [OK] button.



(g) Since a message asking whether or not execution of the host I/O has been stopped is displayed, stop the execution of the I/O and then click the [OK] button.



(h) A message indicating completion of setting is displayed. Click the [OK] button.



(i) Click the [Close] button.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

5.7 Setting an Extra-cost Optional Feature

For setting optional feature, refer to the installation or setting section in the manual attached to an extra-cost each extra-cost optional feature.

Copyright © 2003, 2005, Hitachi, Ltd.

5.8 WWN Change Operation at the Time of HBA Replacement

When the HBA (Host Bus Adapter) of a host computer is replaced while LUN Management is used, the setting of the WWN (World Wide Name) of LUN Management must be changed. Change the WWN setting of LUN Management following the procedure explained below.

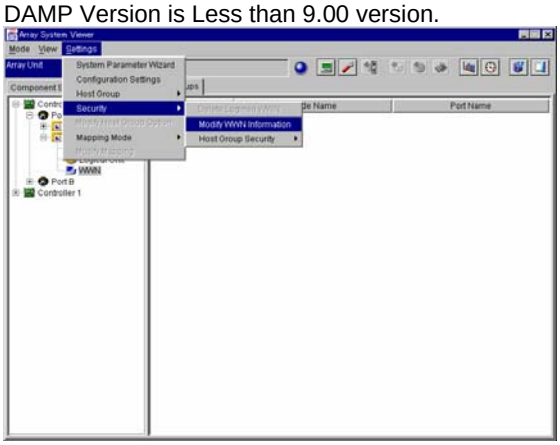
5.8.1 WWN change operation at the time of HBA replacement

(1) Make sure of the WWNs before and after the HBA replacement. For the WWN after the HBA replacement, refer to Subsection 5.8.2, “Procedure for getting WWN of HBA”.

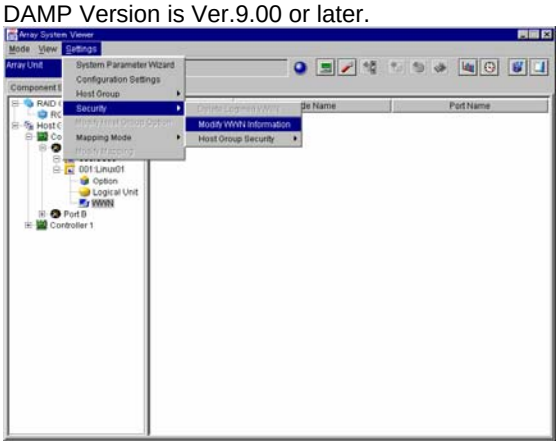
(2) Change the WWN before the HBA replacement to that after the replacement using the means of setting the LUN Management explained below.

(3) Select the icon of the WWN to be set by choosing [Controller], [Port], [Host Group], and [WWN] in this order, and then select the WWN information change from the setting menu by positioning the pointer on Security.
You can start the operation using the context menu of the WWN icon.

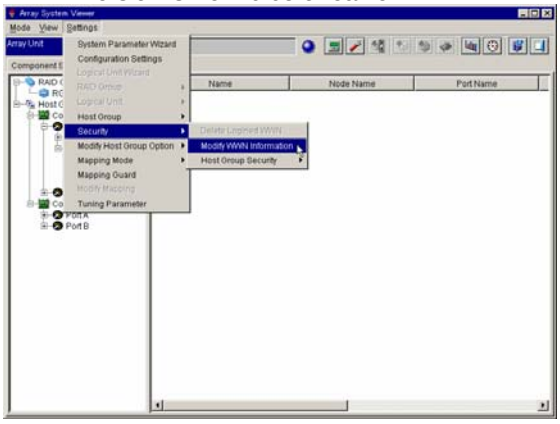
DAMP Version is Less than 9.00 version.



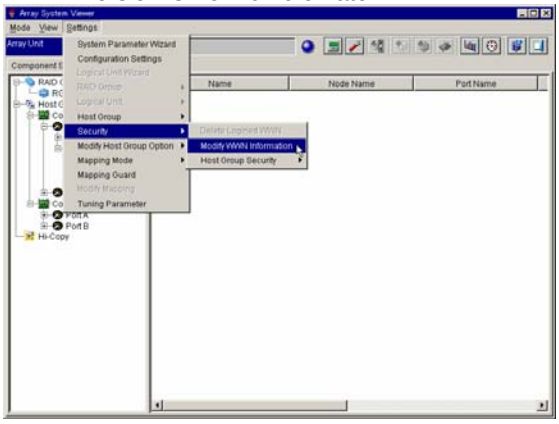
DAMP Version is Ver.9.00 or later.



DAMP Version is Ver.10.05 or earlier.



DAMP Version is Ver.10.10 or later.

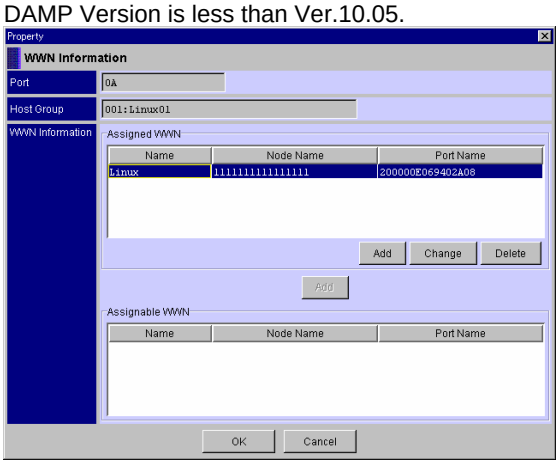


Copyright © 2005, Hitachi, Ltd.

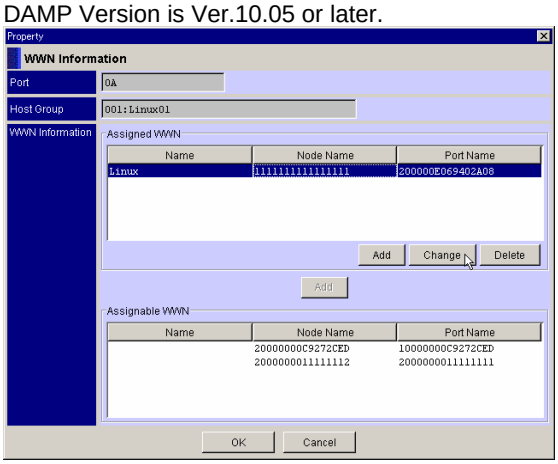
(4) You can start the operation using the context menu of the WWN icon.
The WWN Information Property window is displayed.

(5) Select the name you want to change and click the [Change] button.

DAMP Version is less than Ver.10.05.

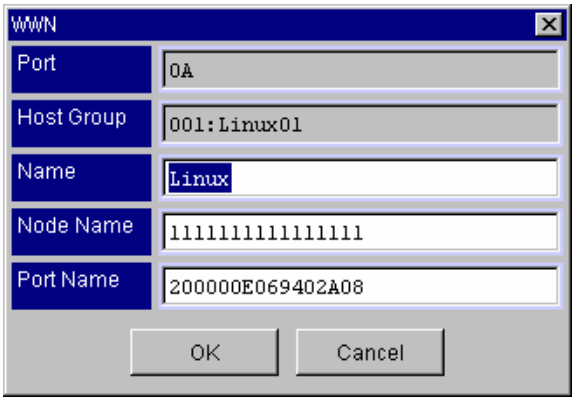


DAMP Version is Ver.10.05 or later.



The WWN dialog box is displayed.

(6) Enter the [Name], [Node Name], or [Port Name] and click the [OK] button.



NOTE : When the Node Name is not clear, enter “1111111111111111”. The node name is not related to judgment of the host recognition.

① [Name] : Enter a name with 16 or less (in the case of the microprogram revision of x659/M or later) or eight or less (in the case of the microprogram revision of earlier than x659/M) half size alphabetic characters and/or numerals (excluding \, /, :, ,, ;, *, ?, “, <, >, |, and ’).
The space(s) at the top and/or end is/are ignored. The same name cannot be used within the same port.

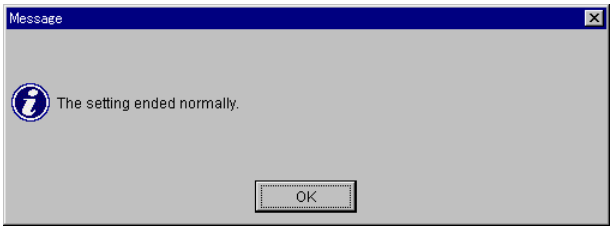
② [Node Name] : Enter a node name with a hexadecimal number of 16 figures.

③ [Port Name] : Enter a port name with a hexadecimal number of 16 figures.

Information that has been entered is displayed in the WWN Information Property window.

Copyright © 2005, Hitachi, Ltd.

(7) Click the [OK] button in the WWN Information Property window.
(8) Since a message asking for confirmation is displayed, click the [OK] button.



(9) Start up the host, whose HBA has been replaced, again and check if the LU that was recognized before the HBA replacement is recognized in the same way after the HBA replacement. If the LU is not recognized correctly, make the setting again from Step (2) because LUN Management is not set correctly.

Copyright © 2005, Hitachi, Ltd.

5.8.2 Procedure for getting WWN of HBA

Procedures for getting the node name, port name, and N Port ID on the host side, which are necessary information for recognizing a host, through operations performed on the host side are explained below.

- In the case of the BladeSymphony server
  The WWN is expressly written on the HBA main body.



WWN (World Wide Name): A hexadecimal number of 16 figures

Copyright © 2005, Hitachi, Ltd.

Chapter 6. Adding Optional Components

6.1 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 Disk Array Management Program 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.

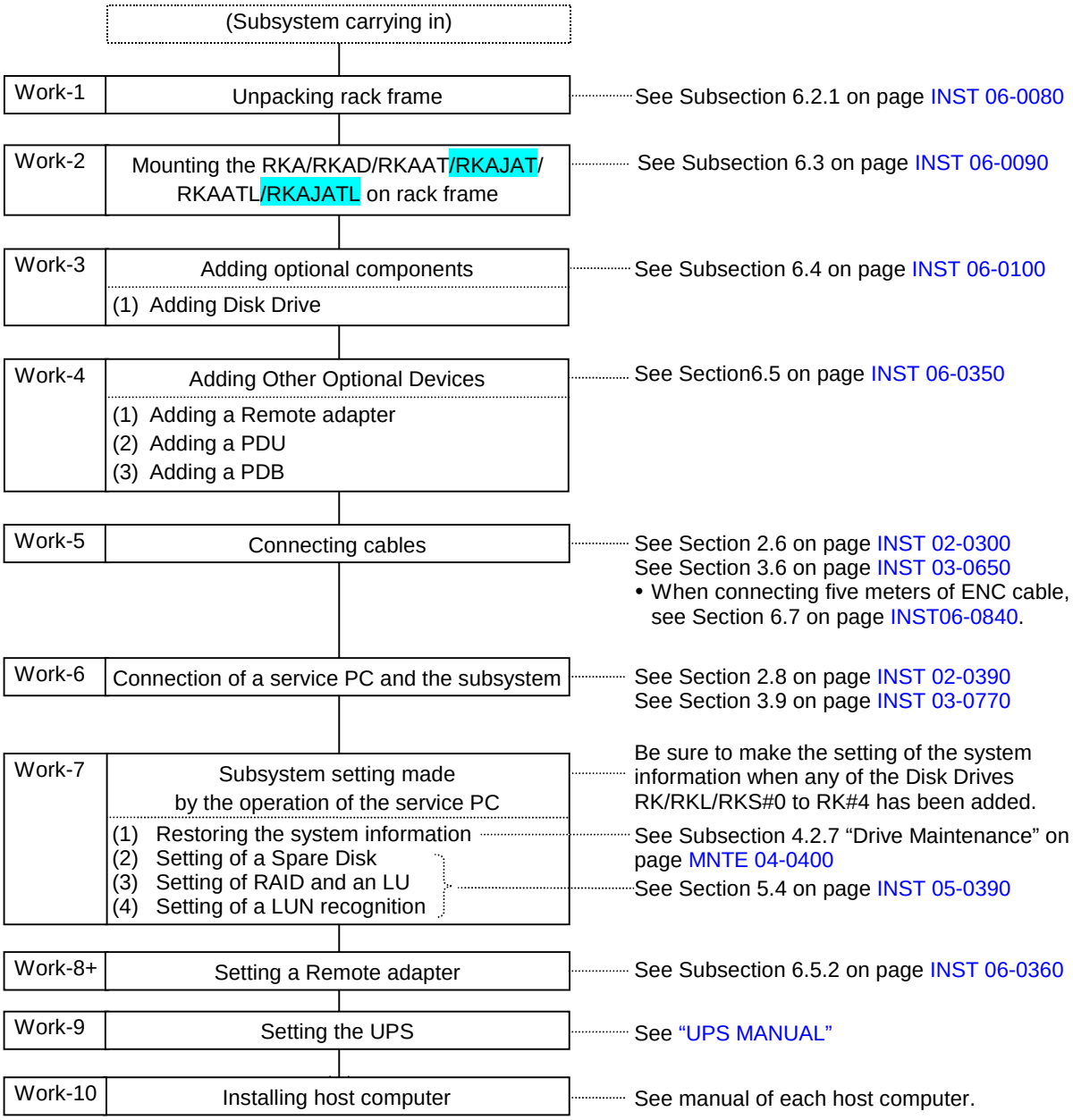
(6) Do not make the addition work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the addition work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

Copyright © 2002, 2005, Hitachi, Ltd.

6.2 Procedures for Adding Optional Components

(1) Procedure for adding an optional component while the subsystem power on

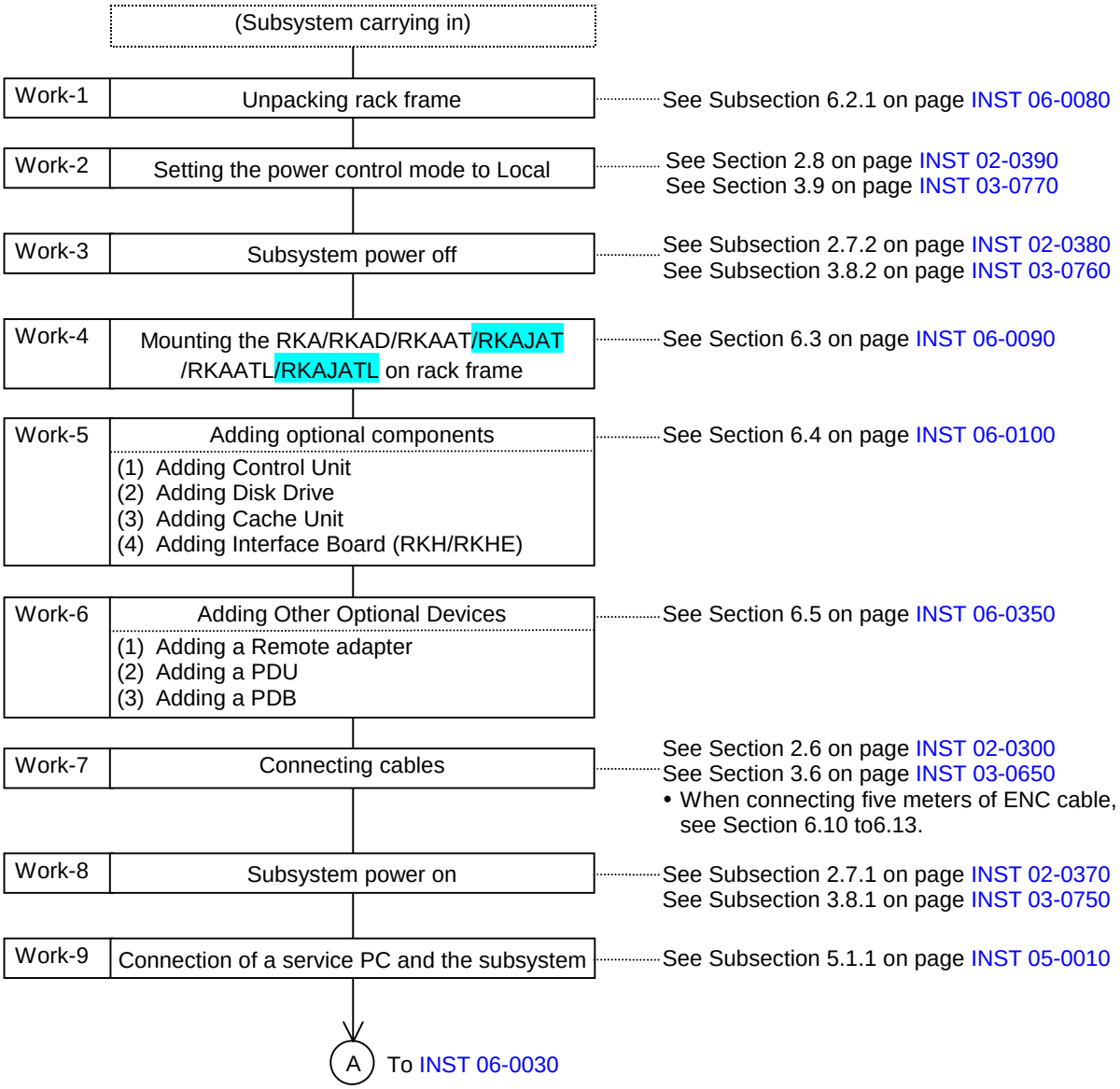
NOTE : • For safety use, always close the front bezel after the operation.
• Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer's permission.



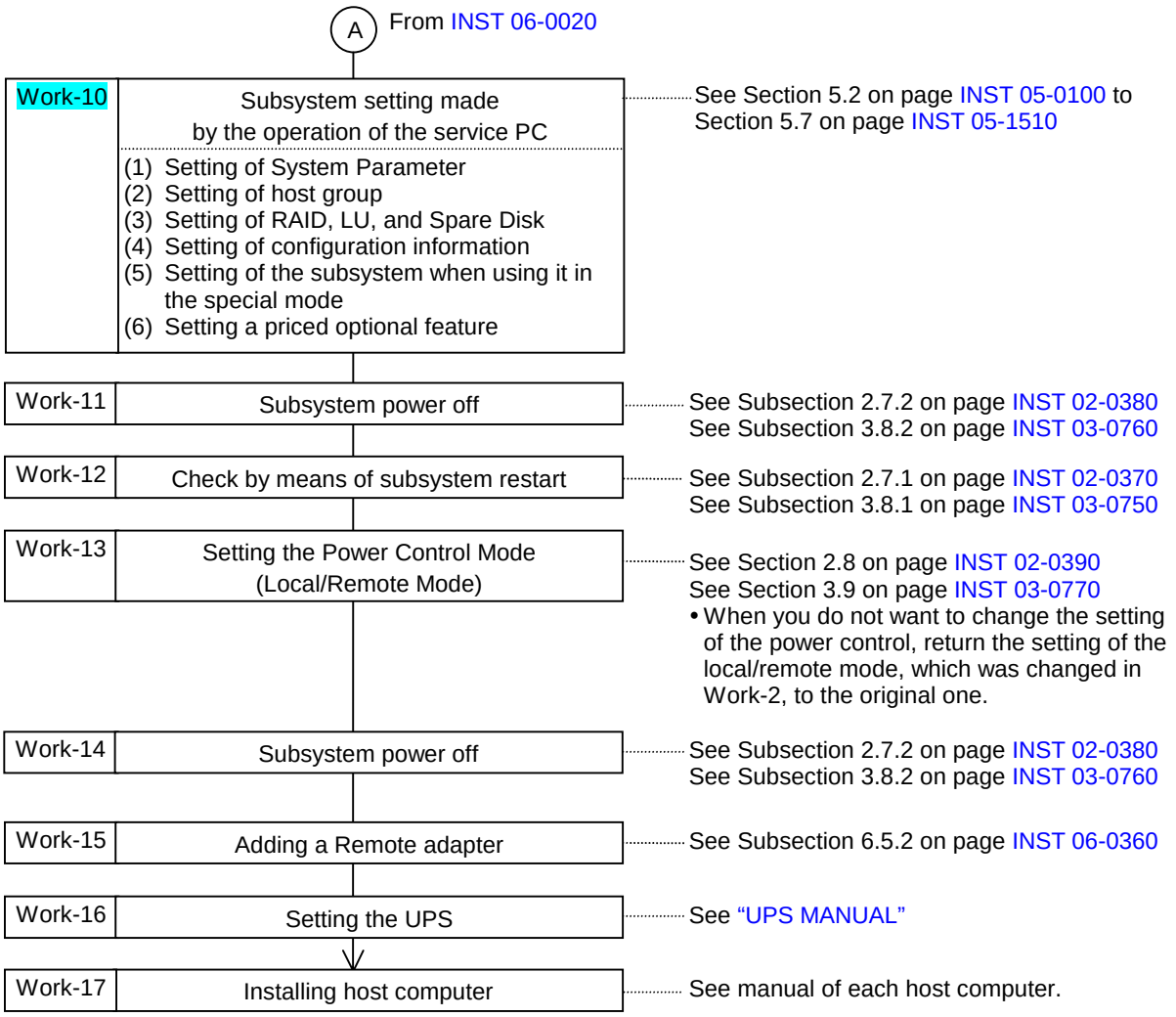
Copyright © 2002, 2005, Hitachi, Ltd.

(2) Procedure for adding an optional component while the subsystem power off

NOTE : • For safety use, always close the front bezel after the operation.
• For the "Power On/Off Procedure", see 2.7.2 (INST 02-0370), 3.8.2 (INST 03-0750).
• 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.



Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

(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 on (A host is in operation (*1).)	Power off
Rackmount disk array for extension	DF600-RKA DF600-RKAD DF600-RKAAT DF600-RKAJAT DF600-RKAATL 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 nine RKAs/RKADs can be added to the one RK/RKD. • Up to 30 RKAs can be connected to the one RKH/RKHE • Up to 14 RKAATs/RKAJATs can be connected to the one RK. • Up to 28 RKAATs/RKAJATs can be connected to the one RKH/RKHE When connecting the RKAAT/RKAJAT to the RKH/RKHE, be sure to connect the RKA first. • Up to 3 RKAATLs/ RKAJATLs can be connected to the one RKL.	Possible 6.6 (INST 06-0530)	Possible 6.6 (INST 06-0530)

*1 : Data is exchanged between a host computer and the subsystem.

Copyright © 2002, 2005, Hitachi, Ltd.

(3-2) Optional components for addition

To the RKH/RKHE, the Cache Memories and/or the Interface Boards can be added.

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation (*2).)	Power off
Control Unit	DF-F600-F1H	Array Control Unit (2port) for duplication For RK/RKD	• Install the Cache memory with a capacity same as that of the Cache memory of the installed Control Unit (#0 side).	Impossible	Possible 6.4.2 (INST 06-0110)
	DF-F600-F1HS (*1)	Array Control Unit (1port) for duplication For RKS/RKSD			
	DF-F600-F1HL	Array Control Unit (2port) for duplication For RKL			
Disk Drive(*3) (Including Spare Disk)	DF-F600-AEH36	3.5-inch Disk Drive (35.4 G bytes)	• Select from the Disk Drives shown on the left according to the intended total capacity of the subsystem. • Up to fifteen Spare Disks can be set up in the whole subsystem (Up to 3 Spare Disks can be defined for RKS/RKSD). • Up to 30 Spare Disks, which are to be connected to the RKH/RKHE, can be installed in the whole subsystem.	Varies depending on the disk array to be added. 6.4.3 (INST 06-0140)	Varies depending on) the disk array to be added. 6.4.3 (INST 06-0140)
	DF-F600-AEF72	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEH72	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEF146	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-AEF300	3.5-inch Disk Drive (287.6 G bytes)			
	DF-F600-ATE146L (RKL)	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-ATE250 (RKAAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250R (RKAAT/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250L (RKAATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE400R (RKAAT/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes)			
	DF-F600-ATE400LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (393.4 G bytes)			

*1 : It is not the model name for the arrangement. Make the arrangement with the collective model name including this model name; DF-F600-RSS36, DF-F600-RSD36, DF-F600-RSD3D, DF-F600-RSDS36, DF-F600-RSDD36, DF-F600-RSDD3D, DF-F600-RSS75, DF-F600-RSD75, DF-F600-RSD79, DF-F600-RSD7D, DF-F600-RSDS75, DF-F600-RSDD75, DF-F600-RSDD79, and DF-F600-RSDD7D.

*2 : Data is exchanged between a host computer and the subsystem.

*3 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation (*1).)	Power off
Cache Unit	DF-F600-C1GX2	Cache memory 2,048 M bytes (1,024 M bytes×2)	• The two memory boards make one set. Install them in sets of two.	Impossible	Possible 6.4.4 (INST 06-0330)
	DF-F600-C512X2	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C5122H (RKH/RKHE)	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C1GX2H (RKH/RKHE)	Cache memory 2,048 M bytes (1,024 M bytes×2)			
Interface Board (RKH/RKHE)	DF-F600-DH2G2	Interface Board	• Add the Interface Board after removing the Dummy Interface Board.	Impossible	Possible 6.4.5 (INST 06-0340)

*1 : Data is exchanged between a host computer and the subsystem.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(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 on (A host is in operation(*4).)	Power off	Power on (A host is in operation (*4).)	Power off
1	Disk array	RKA/RKAD (RK/RKD is connected)	Possible(*1) (The final RKA/RKD only)	Possible(*1) (The final RKA only)	_(*2)	_(*2)
			Refer to 6.6 INST 06-0530	Refer to 6.6 INST 06-0530	–	–
2		RKA (RKH/RKHE is connected)	Possible(*1) (The final RKA only)	Possible(*1) (The final RKA only)	_(*2)	_(*2)
			Refer to 6.7 INST 06-0840	Refer to 6.7 INST 06-0840	–	–
3		RKA/RKAAT/RKAJAT/RKAATL/RKAJATL (RK is connected)	Possible(*1) (The final RKA/ RKAAT/RKAJAT/ RKAATL/RKAJATL only)	Possible(*1) (The final RKA/ RKAAT/RKAJAT/ RKAATL/RKAJATL only)	_(*2)	_(*2)
			Refer to 6.8 INST 06-1080	Refer to 6.8 INST 06-1080	–	–
4		RKA/RKAAT/RKAJAT (RKH/RKHE is connected)	Possible(*1) (The final RKA/ RKAAT/RKAJAT only)	Possible(*1) (The final RKA only)	_(*2)	_(*2)
			Refer to 6.9 INST 06-1420	Refer to 6.9 INST 06-1420	–	–
5	Disk Drive	RK/RKL/RKS/RKD /RKSD #0 to 4	Possible	Impossible	Possible(*3)	Impossible
			Refer to 6.4.3 (2-1) INST 06-0190	–	Refer to 6.4.3 (3-1) INST 06-0230	–
6		RK/RKL/RKS/RKD /RKSD #5 to 13	Possible	Possible	Possible	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250

*1 : The RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL can be added at the end of the configuration. An addition in the middle of the configuration cannot be done.

*2 : 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.

*3 : When performing an addition or replacement of any of the Disk Drives #0 to #4 in the RK/RKL/RKS/RKD/RKSD in order to expand a storage capacity, a restoration of the system information on the added Disk Drive must be done. Be sure to perform the addition or replacement while the subsystem power is on and restore the system information.

*4 : Data is exchanged between a host computer and the subsystem.

Copyright © 2002, 2005, Hitachi, Ltd.

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 on (A host is in operation(*1).)	Power off	Power on (A host is in operation (*1).)	Power off
7	Disk Drive	RKA/RKAD #0 to 3	Possible(*2)	Possible(*2)	Possible	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
8		RKA/RKAD #4 to 14	Possible	Possible	Possible	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
9		The RKA (unit ID #0) connected to the RKH/RKHE #0 to 4	Possible	Impossible	Possible(*3)	Impossible
			Refer to 6.4.3 (2-1) INST 06-0190	–	Refer to 6.4.3 (3-1) INST 06-0230	–
10		The RKA (unit ID #0) connected to the RKH/RKHE #5 to 13	Possible	Possible	Possible	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
11		RKAAT/RKAJAT/ RKAATL/RKAJATL #0 to 3	Possible(*2)	Possible	Possible(*3)	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
12		RKAAT/RKAJAT/ RKAATL/RKAJATL #4 to 14	Possible	Possible	Possible	Possible
			Refer to 6.4.3 (2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250

*1 : Data is exchanged between a host computer and the subsystem.

*2 : If the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not mounted when adding any of the Disk Drives #0 to #3 to the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL, add it first.

*3 : When any of the Disk Drives #0 to #4 of the RKA (unit ID #0) connected to the RKH/RKHE is added for the purpose of addition or replacement, it is required to restore the system information of the disk drive added. Be sure to make the addition with the subsystem power on and restore the system information.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(3-4) Other optional additional device

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation(*1).)	Power off
Remote adapter	DF-F600-VR3A	Remote adapter (Main unit)	Device for interlocking the DF600 with a host computer	Possible 6.5.2 (INST 06-0360)	Possible 6.5.2 (INST 06-0360)
	DF-F600-VR3H	Remote adapter (Hub)			
	DF-F600-HVR3	Remote adapter (Rack)	Rack for installing the Remote adapter on the subsystem		
PDU	DF-F600-UPDU	For U4	PDU for U4 rack frame	Possible 6.5.3 (INST 06-0480)	Possible 6.5.3 (INST 06-0480)
PDB	DF-F600-UPDU6	For U6/U4	Additional PDB for U6/U4 rack frame	Possible 6.5.4 (INST 06-0500)	Possible 6.5.4 (INST 06-0500)

*1 : Data is exchanged between a host computer and the subsystem.

(4) Tool for optional work

Table 6.2.1 Tool for Optional Work

Division	Tool name	Specification	Floor Model	Rackmount Model (U6 rack frame)	Rackmount Model (U4 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	LAN cross cable	Category 5	○	○	○
	PC for maintenance(*1)	Pentium	○	○	○
	Safekeeping box	-	○	○	○

*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.

Copyright © 2002, 2005, Hitachi, Ltd.

6.2.1 Unpacking

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

6.3 Mounting RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL on Rack Frame

In the case of adding Disk Drives to a subsystem of the rackmount model, the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem.
There are two procedures for adding the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL, that is, an addition to be done while the subsystem power is on and that to be done while the subsystem power is off.
For the procedures, refer to the following items.
For the procedure for the addition performed when the RK/RKD is connected, refer to Subsection “6.6.1 Procedure for adding the RKA/RKAD to the subsystem of rackmount model with U6/U4 rack frame” on page INST 06-0530.

For the procedure for the addition performed when the RKH/RKHE is connected, refer to Subsection “6.7.1 Procedure for adding the RKA to the subsystem of rackmount model with U6/U4 rack frame” on page INST 06-0840.

For the procedure for the addition performed when the RK/RKL is connected, refer to Subsection “6.8.1 Procedure for adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the subsystem of rackmount model with U6/U4 rack frame” on page INST 06-1080.

For the procedure for the addition performed when the RKH/RKHE is connected, refer to Subsection “6.9.1 Procedure for adding the RKA/RKAAT/RKAJAT to the subsystem of rackmount model with U6/U4 rack frame” on page INST 06-1420.

Copyright © 2002, 2005, Hitachi, Ltd.

6.4 Adding Optional Components

6.4.1 Subsystems optional components for addition

To the RKH/RKHE, the Cache Memories and/or the Interface Boards can be added.

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation (*2).)	Power off
Control Unit	DF-F600-F1H	Array Control Unit for duplication (2port) In the RK/RKD	• Install the Cache memory with a capacity same as that of the Cache memory of the installed Controller (#0 side).	Impossible	Possible 6.4.2 (INST 06-0110)
	DF-F600-F1HS (*1)	Array Control Unit for duplication (1port). In the RKS/RKSD			
	DF-F600-F1HL	Array Control Unit (2port) for duplication For RKL			
Disk Drive(*3) (including Spare Disk)	DF-F600-AEH36	3.5-inch Disk Drive (35.4 G bytes)	• Select from the Disk Drives shown on the left according to the intended total capacity of the subsystem. • Up to fifteen Spare Disks can be set up in the whole subsystem (Up to 3 Spare Disks can be defined for RKS/RKSD). • Up to 30 Spare Disks, which are to be connected to the RKH/RKHE, can be installed in the whole subsystem.	Varies depending on the disk array to be added. 6.4.3 (INST 06-0140)	Varies depending on) the disk array to be added. 6.4.3 (INST 06-0140)
	DF-F600-AEF72	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEH72	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEF146	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-AEF300	3.5-inch Disk Drive (287.6 G bytes)			
	DF-F600-ATE146L (RKL)	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-ATE250 (RKAAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250R (RKAAT/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250L (RKAATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE400R (RKAAT/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes)			
	DF-F600-ATE400LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (393.4 G bytes)			

*1 : It is not the model name for the arrangement. Make the arrangement with the collective model name including this model name; DF-F600-RSS36, DF-F600-RSD36, DF-F600-RSD3D, DF-F600-RSDS36, DF-F600-RSDD36, DF-F600, RSDD3D, DF-F600-RSS75, DF-F600-RSD75, DF-F600-RSD79, DF-F600-RSD7D, DF-F600-RSDS75, DF-F600-RSDD75, DF-F600-RSDD79, and DF-F600-RSDD7D.

*2 : Data is exchanged between a host computer and the subsystem.

*3 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation (*1).)	Power off
Cache Unit	DF-F600-C1GX2	Cache memory 2,048 M bytes (1,024 M bytes×2)	• The two memory boards make one set. Install them in sets of two.	Impossible	Possible 6.4.4 (INST 06-0330)
	DF-F600-C512X2	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C5122H (RKH/RKHE)	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C1GX2H (RKH/RKHE)	Cache memory 2,048 M bytes (1,024 M bytes×2)			
Interface Board (RKH/RKHE)	DF-F600-DH2G2	Interface Board	• Add the Interface Board after removing the Dummy Interface Board.	Impossible	Possible 6.4.5 (INST 06-0340)

*1 : Data is exchanged between a host computer and the subsystem.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

6.4.2 Adding a Control Unit

An addition of the Control Unit is done when duplicating the Control Unit.

⚠ CAUTION

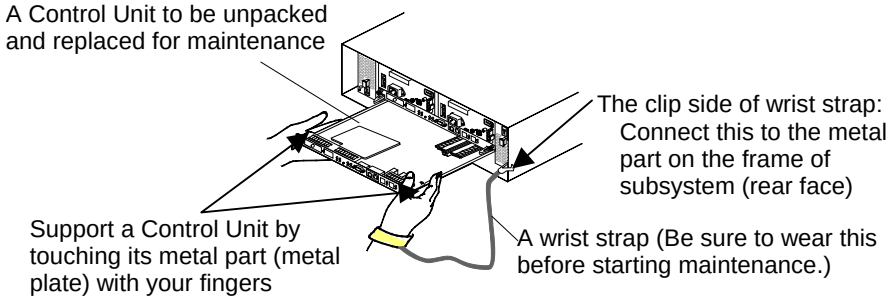
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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 Subsection 5.1.1, "Confirming cancellation of the cache backup state" on page MNTE 05-0030.) 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 (DC Power Unit Switch) of the Power Unit (Power Unit (DC)) (#0, #1).
(5) Remove the dummy (controller). To remove it loosen the right and left fixing screws it and pull it toward you.
(6) Install the Cache memory, which has the same capacity as that of the installed Control Unit#0, in the Control Unit#1 to be added by the set of two boards.
(7) Insert the Control Unit#1 in the predetermined position with its right and left levers being raised. Then, return the right and left levers in the respective directions shown by the arrows (⟶) at the same time.
(8) Tighten the left and right fixing screws of the Control Unit.
(9) 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.

(10) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the Power Unit (Power Unit (DC)).
(11) Turn on the main switch.
(12) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.

Copyright © 2002, 2005, Hitachi, Ltd.

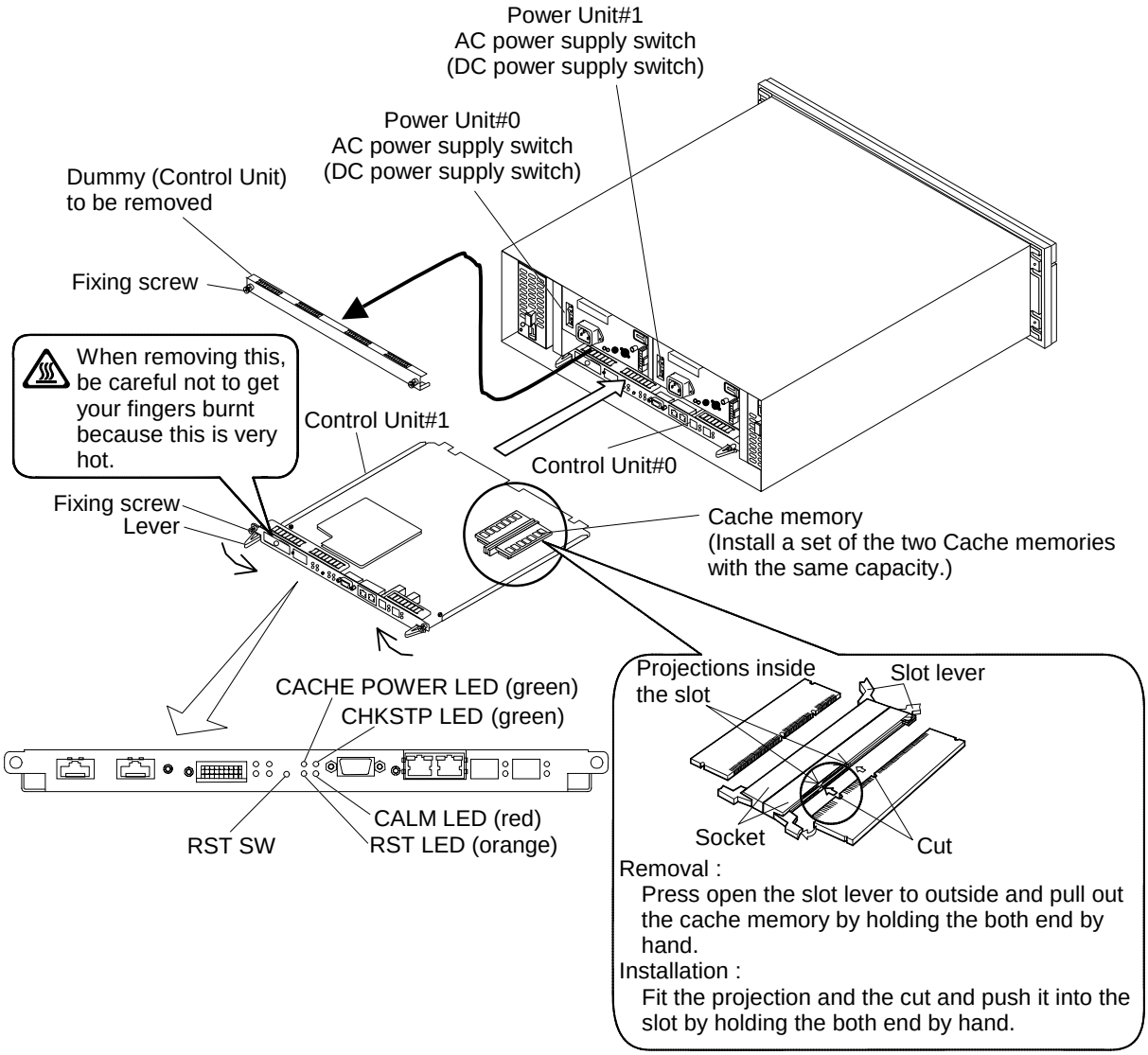
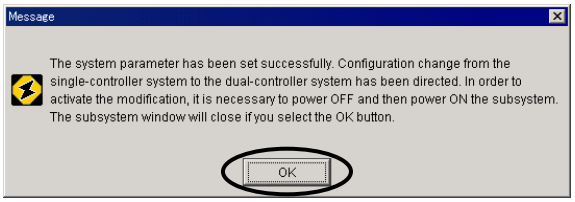


Figure 6.4.1 Adding the Cache Memory

Copyright © 2002, 2005, Hitachi, Ltd.

(13) Connect the PC to be connected with Disk Array Management Program and the Control Unit #0 with a LAN cable. (“5.1.1 Procedure for connecting Disk Array Management Program with the subsystem” (INST 05-0010))

(14) Set the system starting attribute of the system parameters in order to operate the subsystem as that having the dual controller system. (“5.2 Setting System Parameters” (INST 05-0100))
Besides, since the following message is displayed after the system parameters have been set, click the [OK] button.



(15) Turn off the main switch.

(16) Make sure that the PWR (POWER) LED (green) on the panel goes out.

(17) Turn on the main switch after waiting for one minute or longer.

(18) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.

(19) Because the subsystem configuration was changed form single controller to the dual controller, register the disk array subsystem as having the dual controller configuration with Disk Array Management Program. (“5.1.1 Procedure for connecting Disk Array Management Program with the subsystem” (INST 05-0010))

(20) Reset the system parameters for the Control Unit #1.

NOTE : A setup for the dual controller is necessary for the controller 1.
(“5.2 Setting System Parameters” (INST 05-0100))
When the cache is in the cache backup state, cancel the status.

(21) Turn off the main switch.

(22) Make sure that the PWR (POWER) LED (green) on the panel goes out.

(23) Remove the LAN cable connected to the Disk Array Management Program from the Control Unit#0.

(24) Turn on the main switch.

(25) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

6.4.3 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 6.4.1 Kinds of Disk Drive Addition and Subtraction

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 on (A host is in operation(*3).)	Power off	Power on (A host is in operation(*3).)	Power off
1	Disk Drive	RK/RKL /RKS/RKD /RKSD #0 to 4	Possible	Impossible	Possible(*1)	Impossible
			Refer to 6.4.3(2-1) INST 06-0190	–	Refer to 6.4.3 (3-1) INST 06-0230	–
2		RK/RKL /RKS/RKD /RKSD #5 to 13	Possible	Possible	Possible	Possible
			Refer to 6.4.3(2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
3		RKA/RKAD #0 to 3	Possible(*2)	Possible(*2)	Possible	Possible
			Refer to 6.4.3(2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
4		RKA/RKAD #4 to 14	Possible	Possible	Possible	Possible
			Refer to 6.4.3(2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
5		RKAAT/ RKAJAT/ RKAATL/ RKAJATL #0 to 3	Possible(*2)	Possible(*2)	Possible	Possible
			Refer to 6.4.3(2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250
6		RKAAT/ RKAJAT/ RKAATL/ RKAJATL #4 to 14	Possible	Possible	Possible	Possible
			Refer to 6.4.3(2-1) INST 06-0190	Refer to 6.4.3 (2-2) INST 06-0200	Refer to 6.4.3 (3-1) INST 06-0230	Refer to 6.4.3 (3-2) INST 06-0250

*1 : When performing an addition or replacement of any of the Disk Drives #0 to #4 in the RK/RKL/RKS/RKD/RKSD in order to expand a storage capacity, a restoration of the system information on the added Disk Drive must be done. Be sure to perform the addition or replacement while the subsystem power is on and restore the system information.

*2 : If the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not mounted when adding any of the Disk Drives #0 to #3 to the RKA/RKAD /RKAAT/RKAJAT/RKAATL/RKAJATL, add it first.

*3 : Data is exchanged between a host computer and the subsystem.

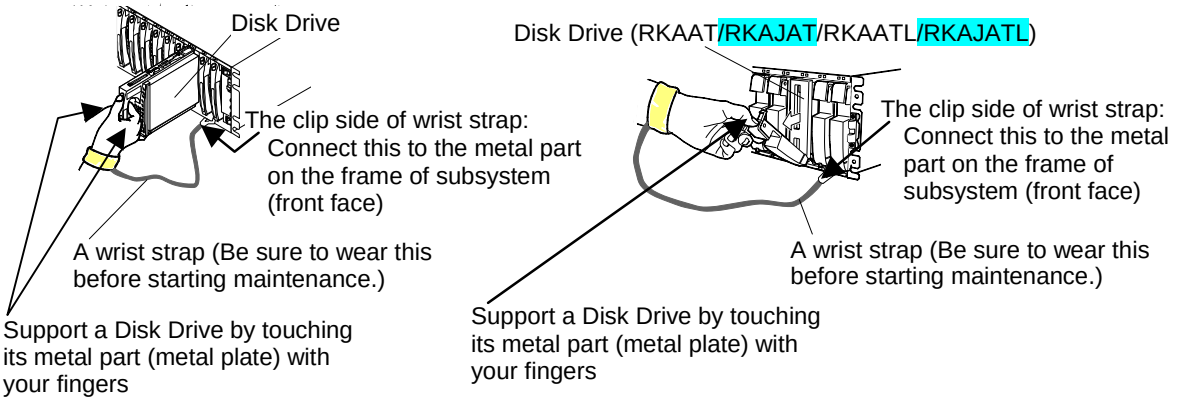
Copyright © 2002, 2005, Hitachi, Ltd.

(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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(a) Disk Drive number corresponding to the mounting location

Mounting location number of Disk Drive is a combination of a device number (Device ID) and a Disk Drive number which is assigned within the each RK/RKA/RKD/RKAD individually.

As the device IDs, #0 is assigned to the RK/RKD and one of numbers 1 to 14 are assigned to each RKA/RKAD connected.

In the case of the connection to the RKH/RKHE, the Disk Drive location numbers are given when the Device ID of the first one of the RKAs connected to the RKH/RKHE is numbered as #00 and the second and the following ones, #10, #01, and #11 through #1E.

In the case of a configuration of one RK+ RKAs + RKAATs/RKAJATs, set the device IDs of the RKA, the RKAATs/RKAJATs connected to the PATH #0, and the RKAATs/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 RKA and RKAAT/RKAJAT.

In the case of a configuration of one RKH/RKHE + RKAs + RKAATs/RKAJATs, set the device IDs of the RKA, the RKAATs/RKAJATs connected to the PATH #0, and the RKAATs/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 RKA and RKAAT/RKAJAT.
Set the device IDs of the RKA, the RKAATs/RKAJATs connected to the PATH #2, and the RKAATs/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 RKA and RKAAT/RKAJAT.

In the case of a configuration of one RKL + RKAATLs/RKAJATLs, set the device IDs of the RKAATLs/RKAJATLs connected to the PATH #0, and the RKAATLs/RKAJATLs connected to the PATH #1 as #2x, and #3x respectively.
Set the "x" as an ascending serial number in each of the PATH #0 and PATH #1.

For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

Copyright © 2002, 2005, Hitachi, Ltd.

For Disk Drive number, #0 to #13 are assigned to RK/RKS/RKD/RKSD, and #0 to #14 to RKA/RKAD from left to right in sequence. (‡1)

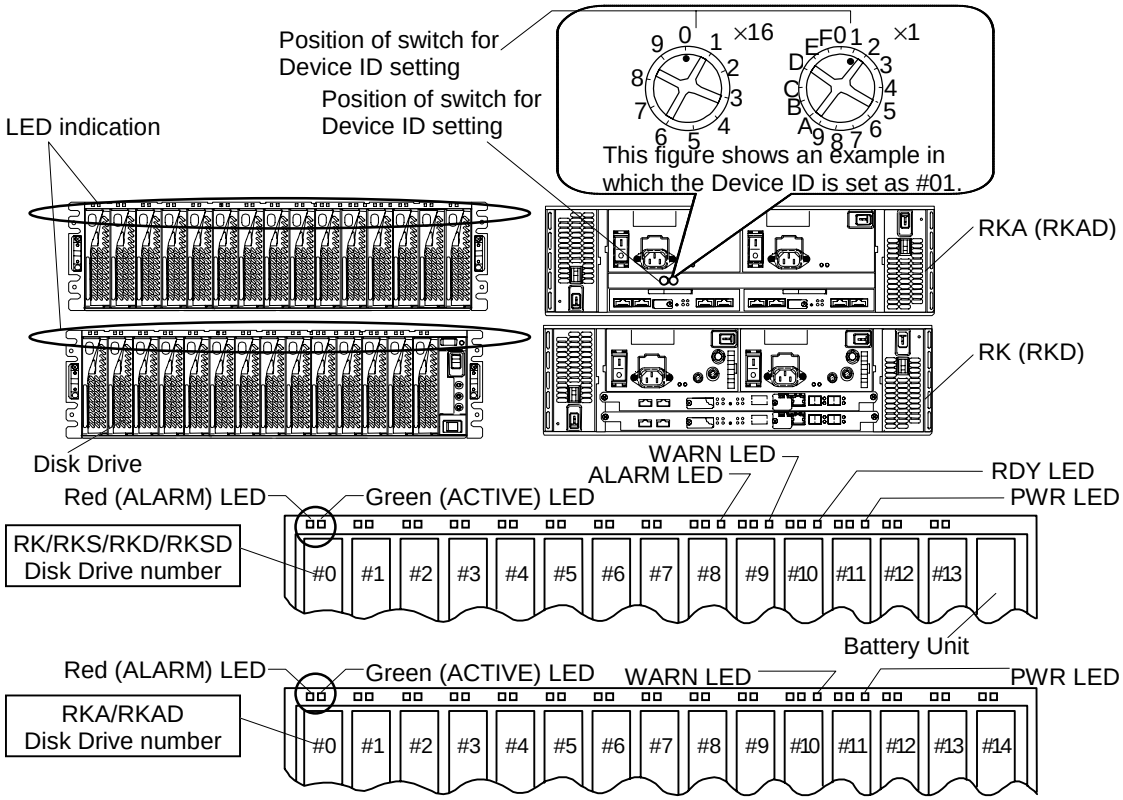


Figure 6.4.2 Disk Drive Mounting Location

‡1 : From top to bottom, in the case of the floor model.

Copyright © 2002, 2005, Hitachi, Ltd.

In the case of the connection to the RKH/RKHE, the Disk Drive location numbers are #0 through #13 in serial order counting from left to right for the first one of the RKAs connected when the RKA is put horizontally, and #0 through #14 for the second and the following ones of the RKAs connected. The rightmost location in the first one of the RKAs connected is for the Dummy Disk Drive.

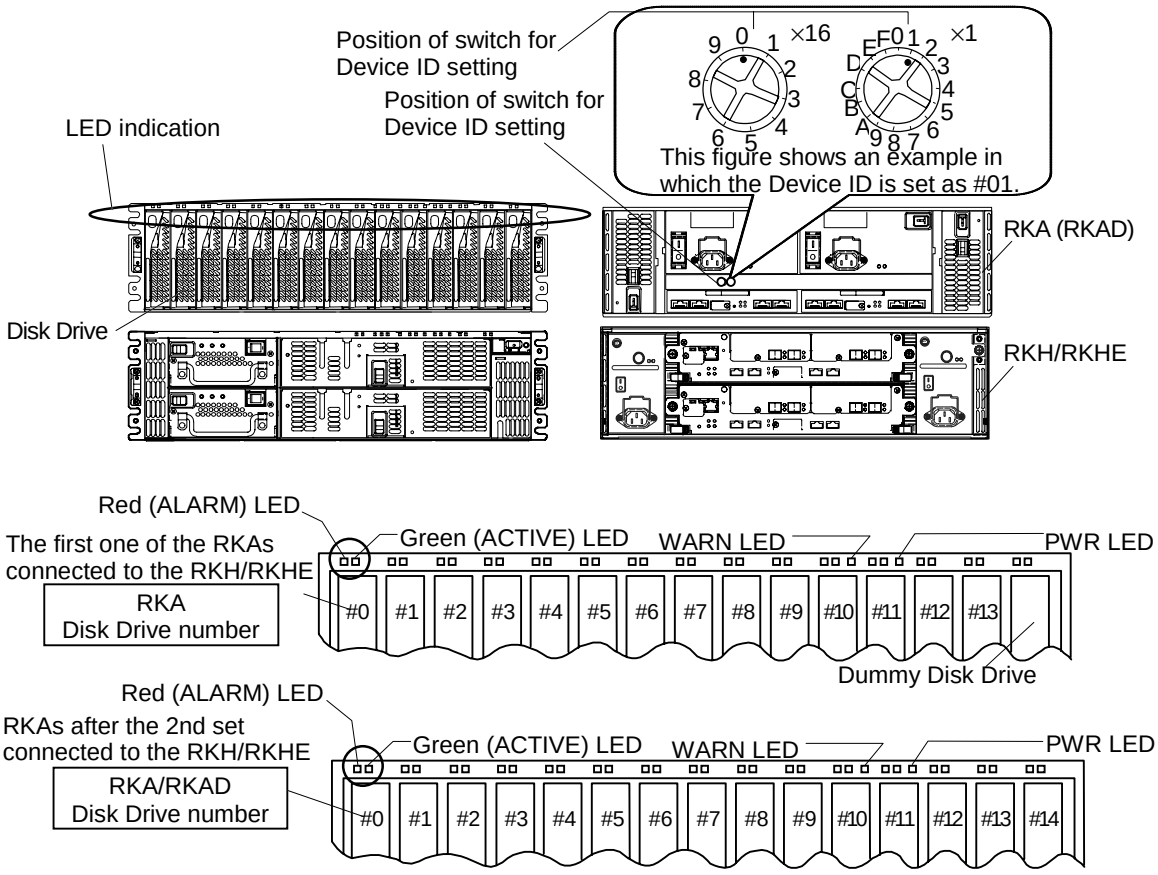


Figure 6.4.2.1 Disk Drive Mounting Location (RKAs connected to the RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

In the case of the connection to the RK/RKL, the Disk Drive location numbers are #0 through #14 in serial order counting from left to right when the RKAAT/RKAJAT/ RKAATL/RKAJATL is put horizontally. The RKL can be connected only to the RKAATL/RKAJATL.

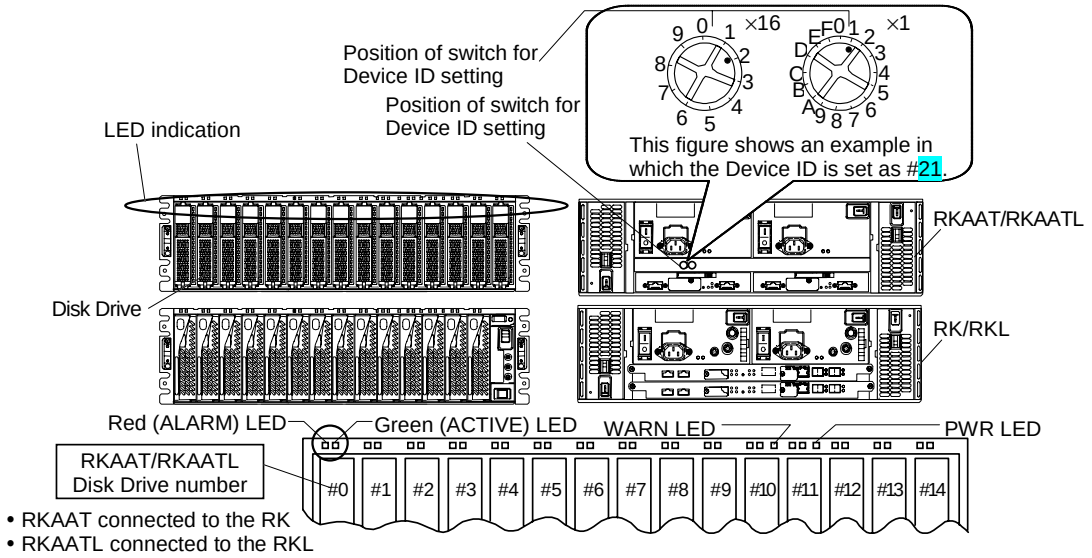


Figure 6.4.2.2 Disk Drive Mounting Location (RKAATs/RKAATLs connected to the RK/RKL)

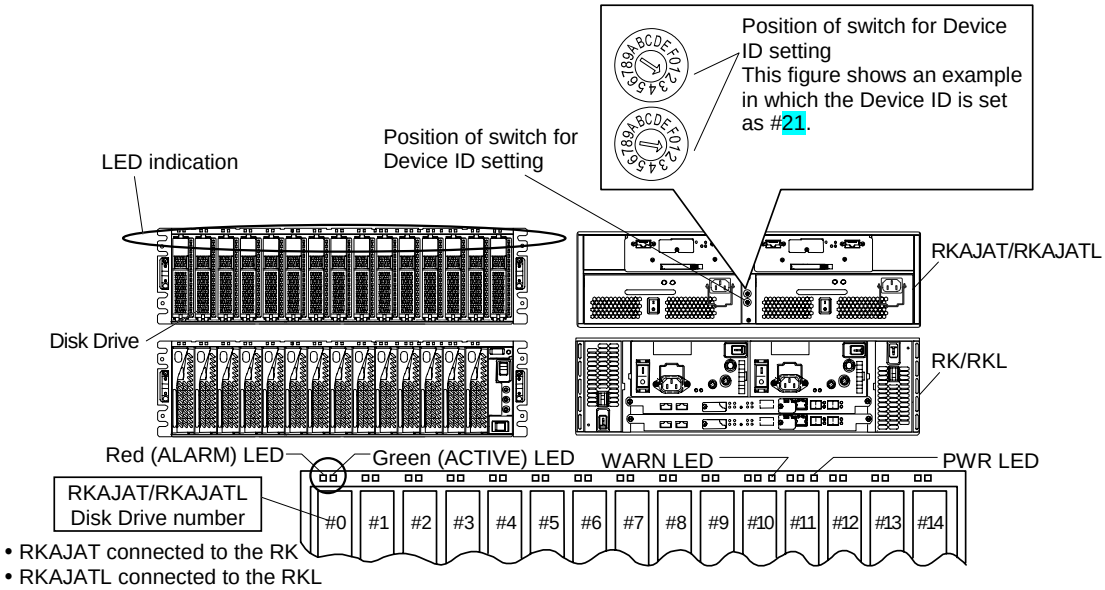


Figure 6.4.2.3 Disk Drive Mounting Location (RKAJATs/RKAJATLs connected to the RK/RKL)

Copyright © 2004, 2005, Hitachi, Ltd.

In the case of the connection to the RKH/RKHE, the Disk Drive location numbers are #0 through #14 in serial order counting from left to right when the RKAAT/RKAJAT is put horizontally.

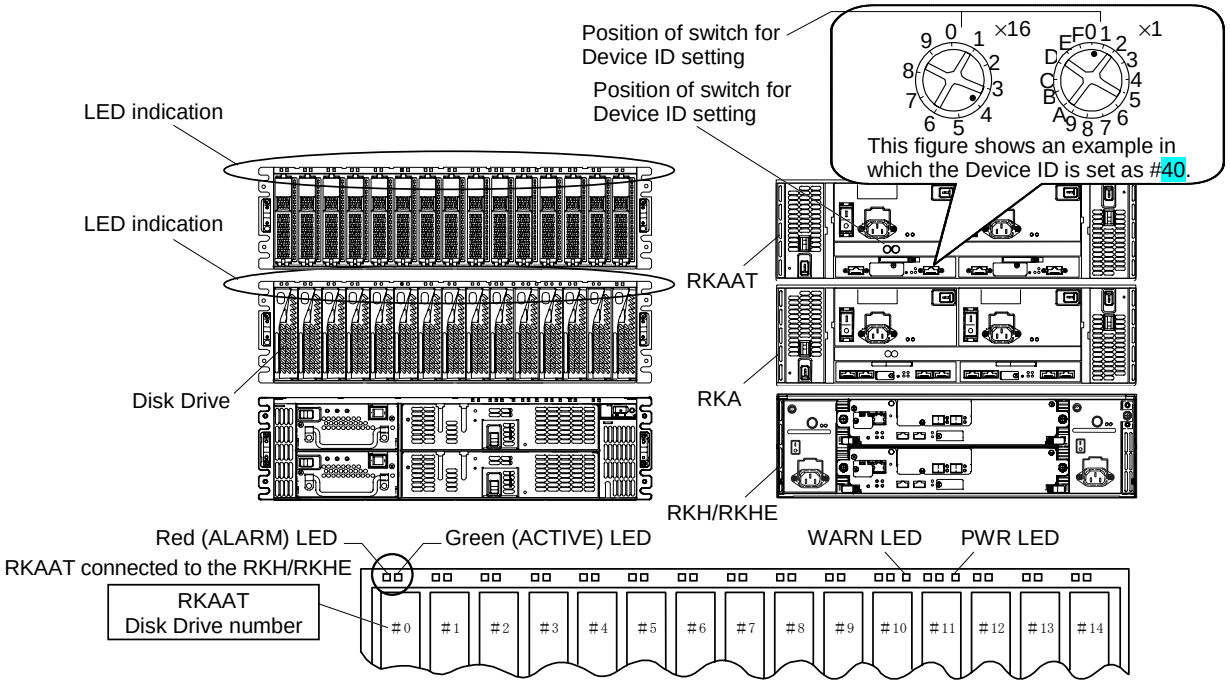


Figure 6.4.2.4 Disk Drive Mounting Location (RKAATs connected to the RKH/RKHE)

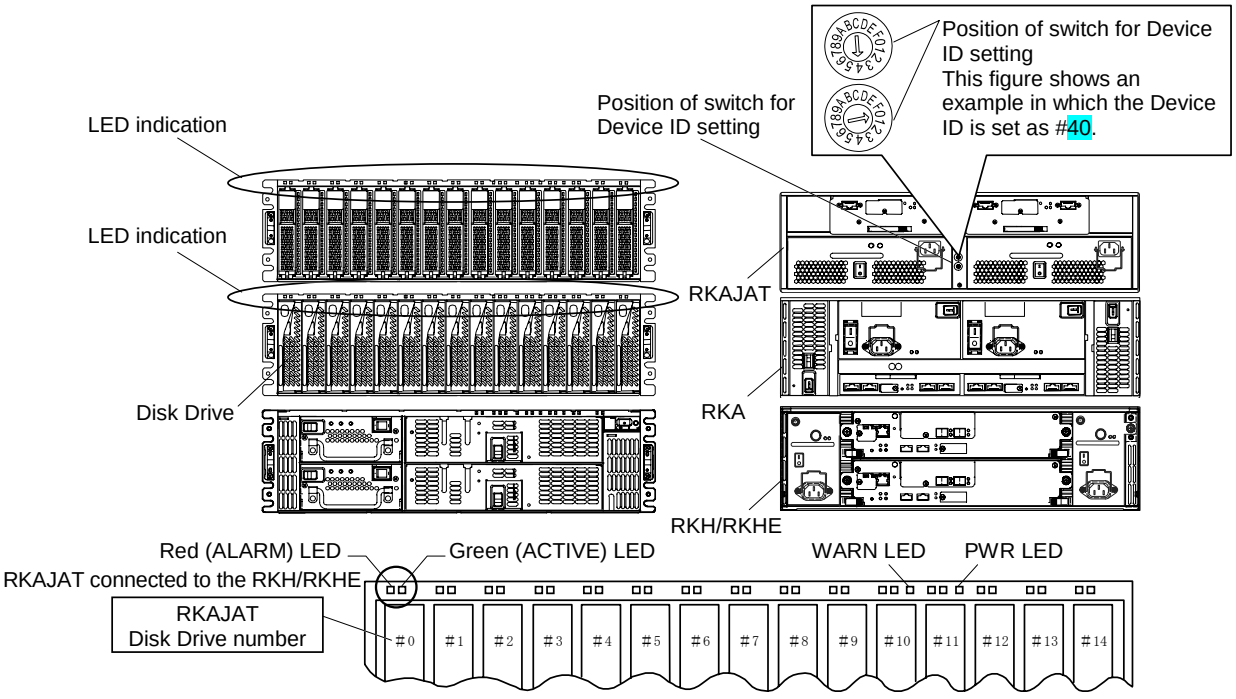


Figure 6.4.2.5 Disk Drive Mounting Location (RKAJATs connected to the RKH/RKHE)

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)
A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be added (set).

(b) If necessary number of vacant slots do not exist in the subsystem to which the Disk Drives are to be added(‡1).
Arrange to mount two or more Disk Drives(‡2) on the added RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL.
Set the Device ID number of the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL to be added.
When the RKH/RKHE is connected, the Disk Drive cannot be installed in the rightmost location in the first one of the RKAs.

(c) Up to 15 Disk Drives to be set as the Spare Disks can be mounted in any locations (Up to 3 Spare Disks can be defined for RKS/RKSD) (‡3).
In the first one of the RKAs connected to the RKH/RKHE, 14 Disk Drives can be installed. (‡4)
Assign the Disk Drive, which has not been assigned to be a data disk, to be a Spare Disk.

(d) Confirm the space of the Spare Disk in subsystem
The Disk Drive (for data disk) to be added must have a space equal to or less than that of the Spare Disk in the subsystem. Otherwise, the Disk Drive cannot be added.
Confirm the space of the Spare Disk in advance.
- Referring to Subsection 5.4.5 “Checking the status of Disk Drive” (INST 05-0761).

‡1 : In the case of adding RKA/RKAD to RK/RKD, refer to “6.6 Adding the RKA/RKAD to the Rack Frame (In the case of the connection to the RK/RKD)” (INST 06-0530).
In the case of adding RKA to RKH/RKHE, refer to “6.7 Adding the RKA to the Rack Frame (In the case of the connection to the RKH/RKHE)” (INST 06-0840).
In the case of adding RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to RK/RKL, refer to “6.8 Adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the Rack Frame (In the case of the connection to the RK/RKL)” (INST 06-1080).
In the case of adding RKA/RKAAT/RKAJAT to RKH/RKHE, refer to “6.9 Adding the RKA/RKAAT/RKAJAT to the Rack Frame (In the case of the connection to the RKH/RKHE)” (INST 06-1430).
‡2 : The two of them must be installed in the slots Disk Drive #0 and Disk Drive #1.
‡3 : No Spare Disk can be set for the Disk Drives #0 to #4 of the RK/RKD and RKS/RKSD.
‡4 : Any of the disk drives #0 to #4 of the RKA (unit ID #0) connected to the RKH/RKHE cannot be set.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 RK/RKL/RKS/RKA/RKD/RKSD/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is shown below.
- When an addition of the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is necessary because of insufficient vacant slots, add the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL first following the procedure explained in the item shown below.
  Section “6.6 Adding the RKA/RKAD to the Rack Frame
  (In the case of the connection to the RK/RKD)” on page INST 06-0530.
  Section “6.7 Adding the RKA to the Rack Frame
  (In the case of the connection to the RKH/RKHE)” on page INST 06-0840.
  Section “6.8 Adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the Rack Frame
  (In the case of the connection to the RK)” on page INST 06-1080.
  Section “6.9 Adding the RKA/RKAAT/RKAJAT to the Rack Frame
  (In the case of the connection to the RKH/RKHE)” on page INST 06-1430.
- An addition of a Disk Drive to any of the vacant slots #2 to #4 cannot be done while the subsystem power is off. Make the addition following the procedure shown in Item (2-1), and be sure to perform a system copy to the added Disk Drive.
- 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.

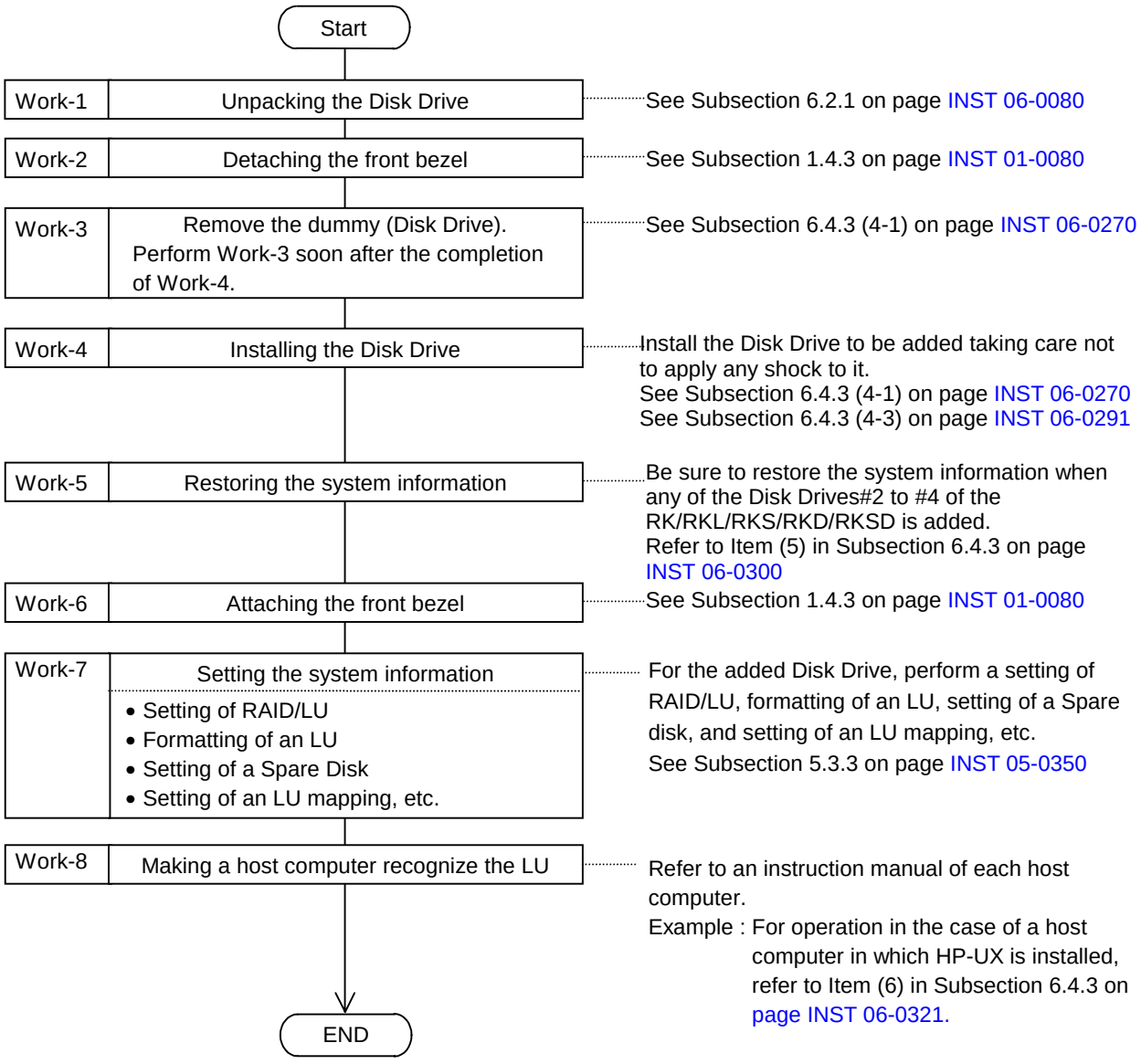
- Procedure for adding a Disk Drive while the power is turned on: See Item (2-1) on page INST 06-0190.
- Procedure for adding a Disk Drive while the power is turned off: See Item (2-2) on page INST 06-0200.

Copyright © 2002, 2005, Hitachi, Ltd.

(2-1) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is on

A procedure for adding the Disk Drive (in order to expand a storage capacity) without shutting down the subsystem is shown below.

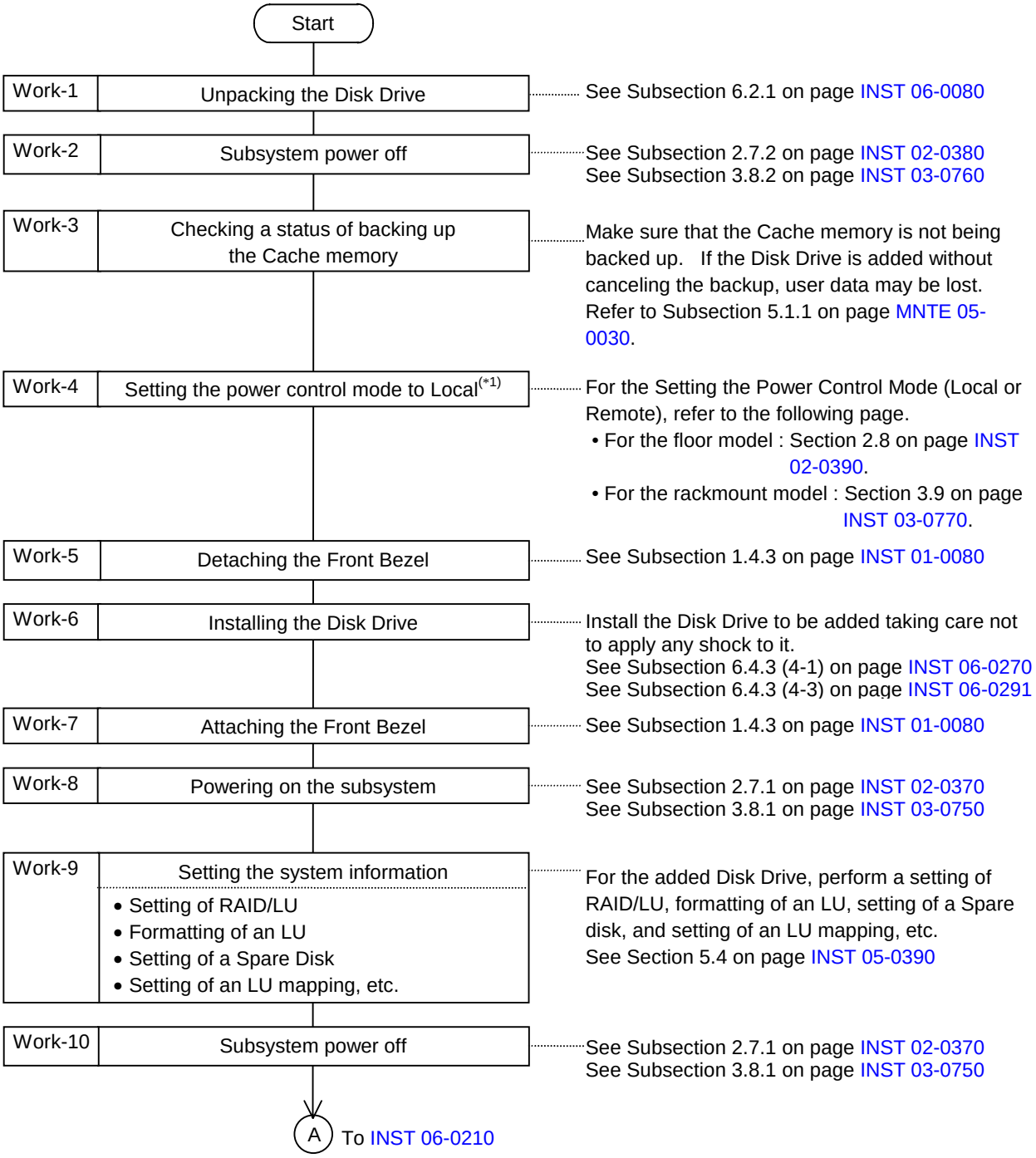
NOTE : When adding the two or more Disk Drives in the installation of the Disk Drives (Work-4), complete the restoration of the system information (Work-5) for the each Disk Drive one by one, and then install the Disk Drives one by one.



Copyright © 2002, 2005, Hitachi, Ltd.

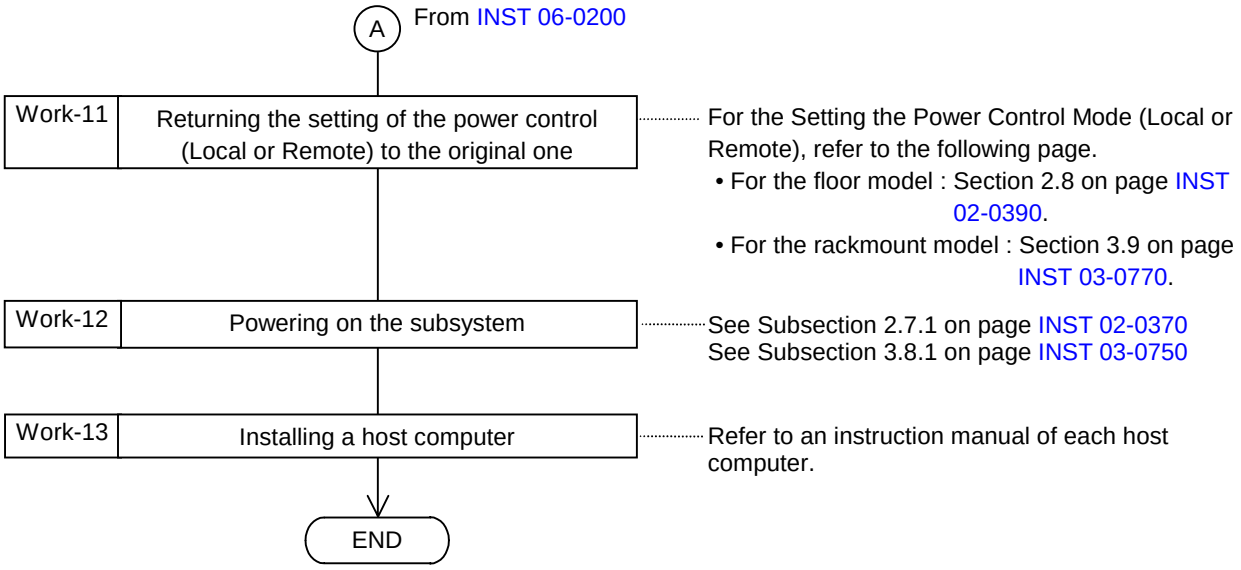
(2-2) Procedure for adding Disk Drive (in order to expand a storage capacity) while the subsystem power is off

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.

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

(3) Procedure for replacing Disk Drive (in order to expand a storage) capacity

- A procedure for replacing the Disk Drive installed in the RK/RKL/RKS/RKA/RKD/RKSD/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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.
- The replacement of any of the Disk Drives#0 to #4 of the RK/RKL/RKS/RKD/RKSD cannot be done while the subsystem power is off. Therefore, perform the replacement following the procedure shown in Item (2-1), and be sure to perform a system copy to the added Disk Drive.
- 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 on or off.

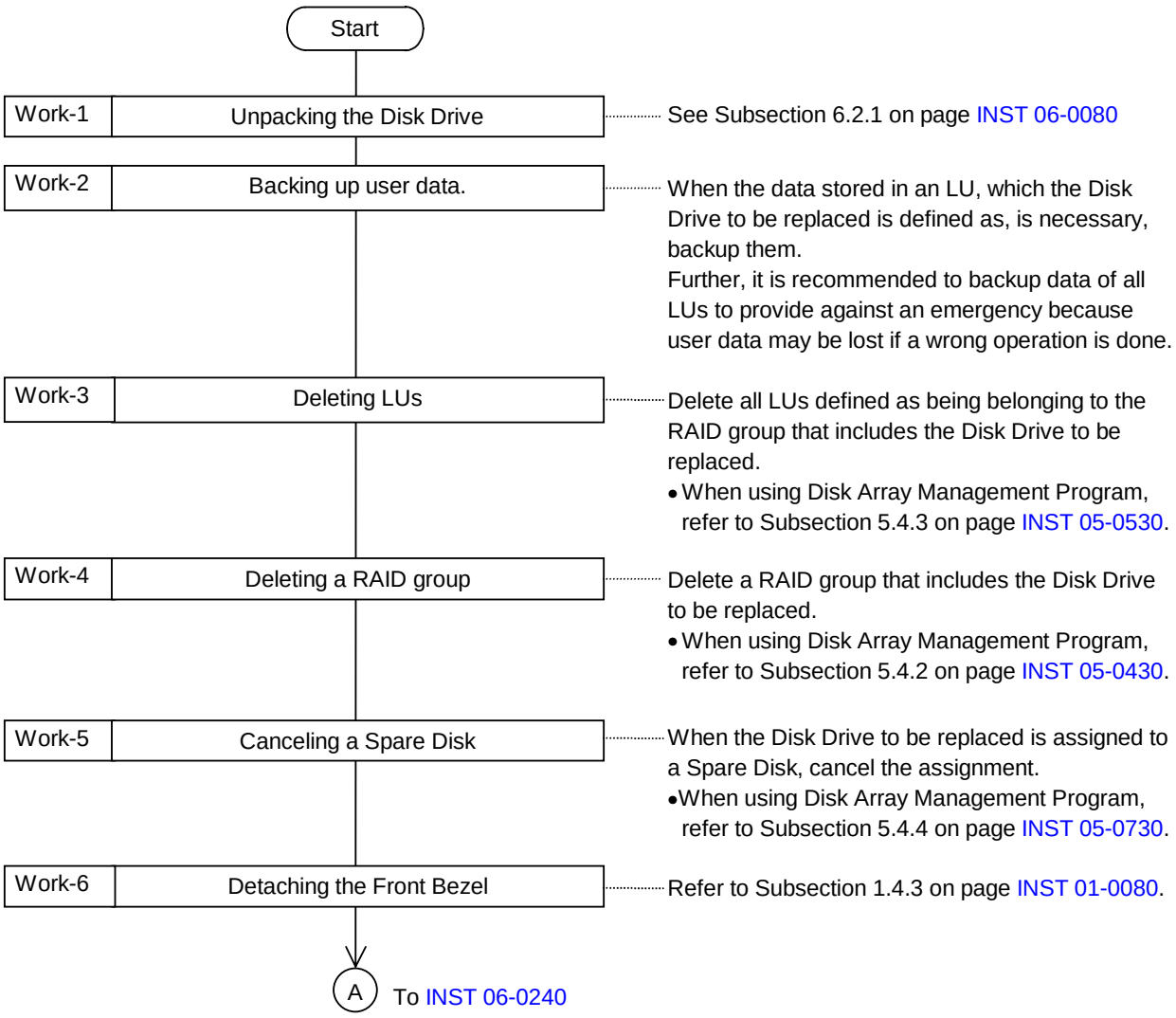
- Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is on .....(3-1) on page INST 06-0230
- Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is off.....(3-2) on page INST 06-0250

Copyright © 2002, 2005, Hitachi, Ltd.

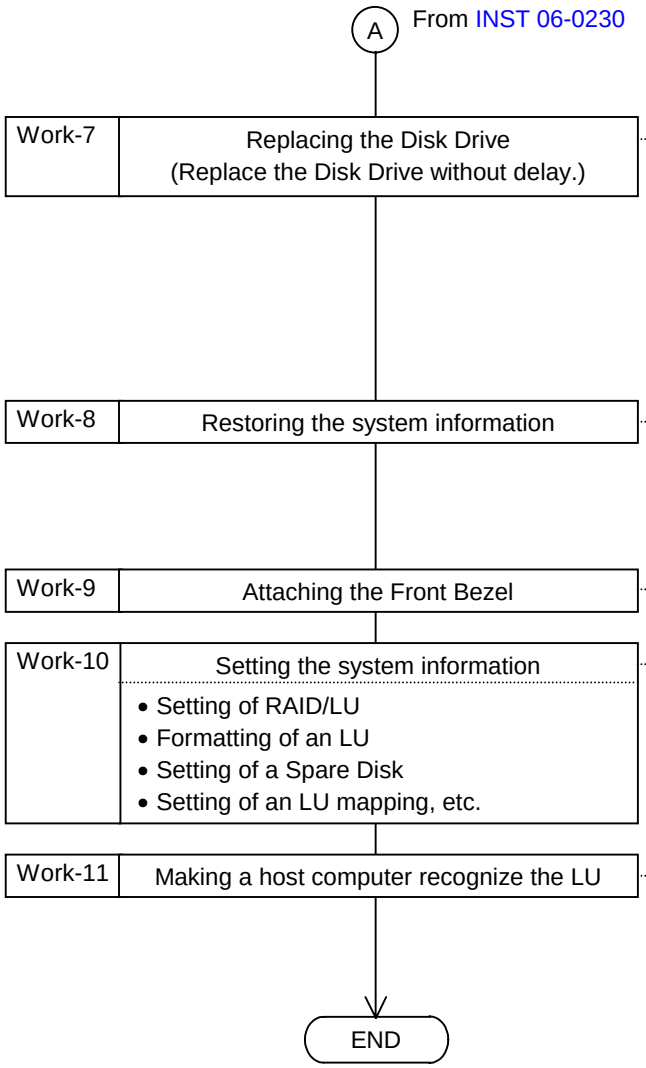
(3-1) Procedure for replacing Disk Drive (in order to expand a storage capacity) while the subsystem power is on

A procedure for replacing 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-7), complete the restoration of the system information (Work-8) for the each Disk Drive one by one, and then install the Disk Drives one by one.



Copyright © 2002, 2005, Hitachi, Ltd.



When replacing two or more Disk Drives, be sure to replace them one by one.
Remove the Disk Drive to be replaced and install the new one taking care not to apply any shock to it.
See Subsection 6.4.3 (4-2) on page INST 06-0290
See Subsection 6.4.3 (4-4) on page INST 06-0293

When you have replaced any of the Disk Drives #2 to #4, be sure to restore the system information.
Refer to Item (5) in Subsection 6.4.3 on page INST 06-0300.

Refer to Subsection 1.4.3 on page INST 01-0080.

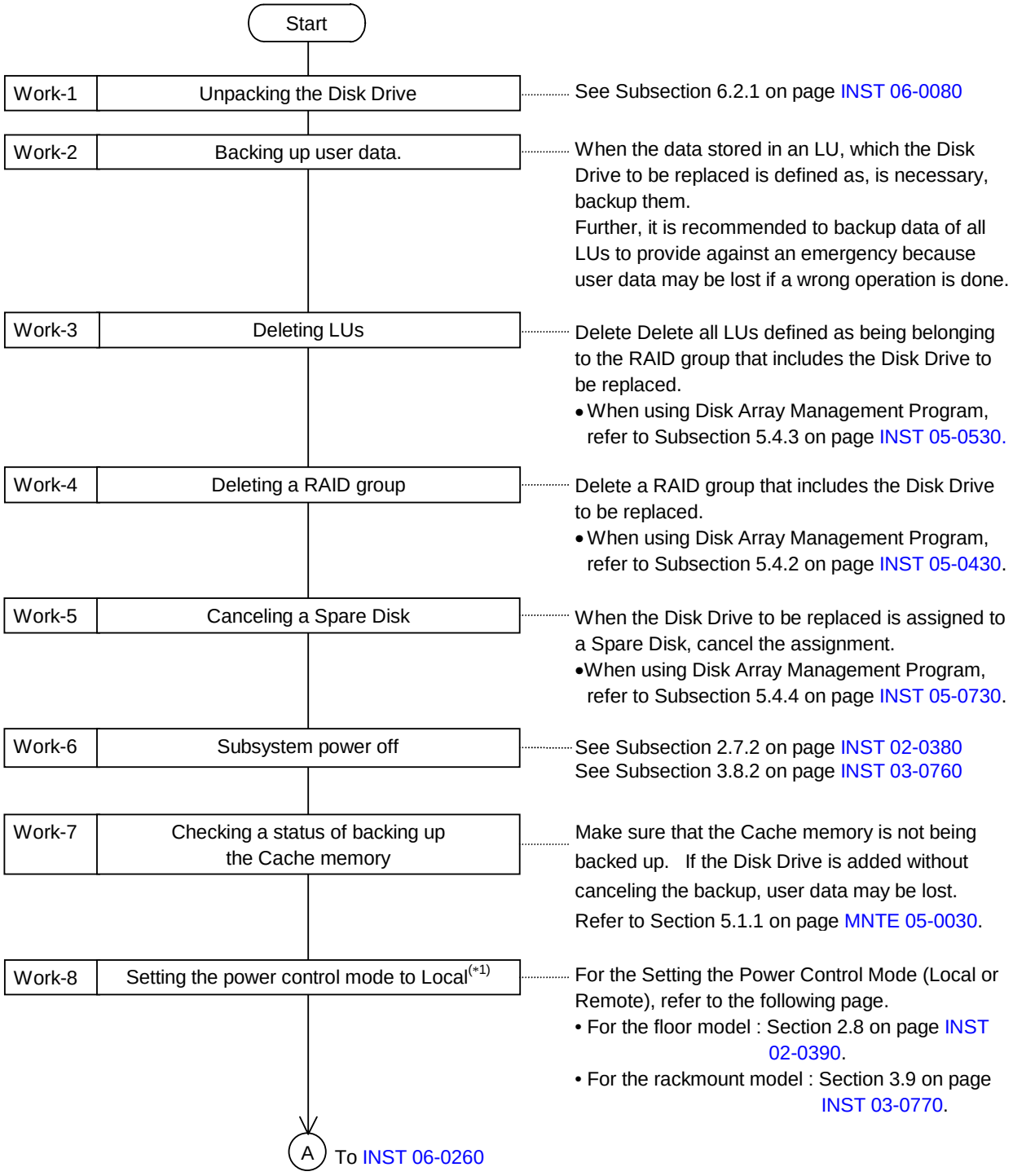
For the added Disk Drive, perform a setting of RAID/LU, formatting of an LU, setting of a Spare Disk, and Setting of an LU mapping, etc.
Refer to Section 5.4 on page INST 05-0390.

Refer to an instruction manual of each host computer.
Example : For operation in the case of a host computer in which HP-UX is installed, refer to Item (6) in Subsection 6.4.3 on page INST 06-0321.

Copyright © 2002, 2005, Hitachi, Ltd.

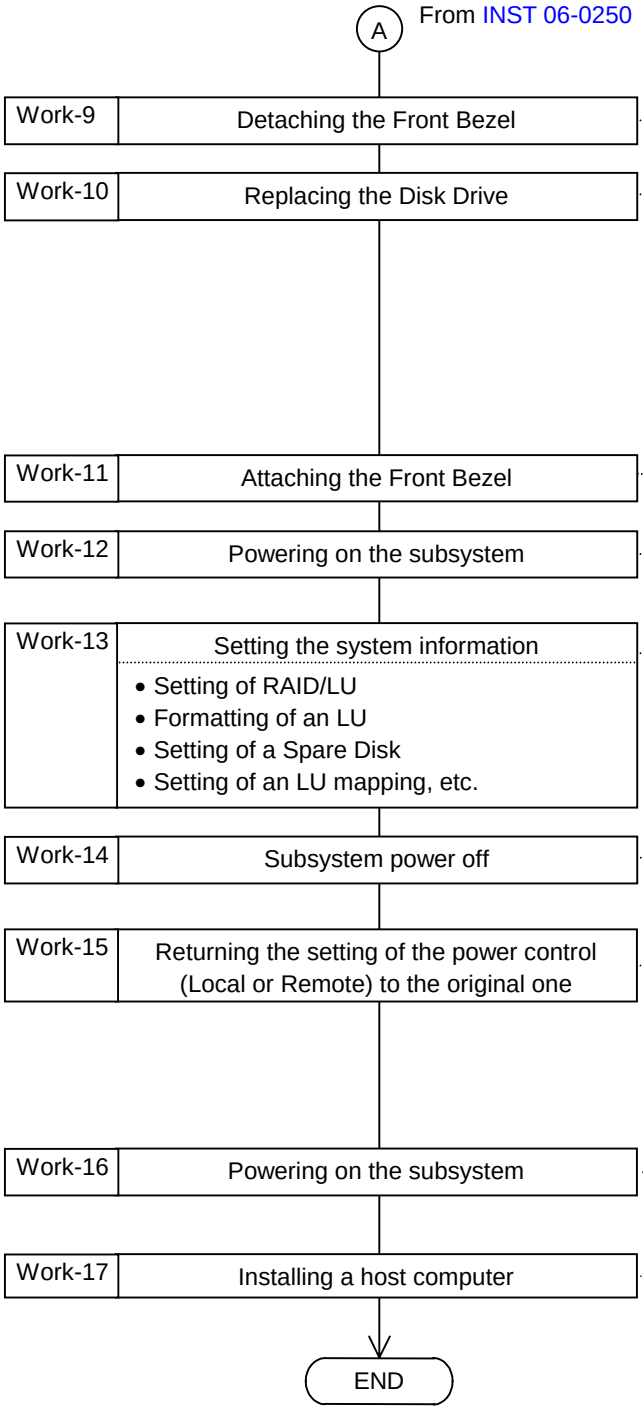
(3-2) Procedure for replacing the Disk Drive (in order to expand a storage capacity) while the subsystem power is off

A procedure for replacing the Disk Drive (in order to expand a storage capacity) after powering off the subsystem 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.

Copyright © 2002, 2005, Hitachi, Ltd.



Refer to Subsection 1.4.3 on page INST 01-0080.

When replacing two or more Disk Drives, be sure to replace them one by one.
Replacing the Disk Drive to be replaced and install the new one taking care not to apply any shock to it.
See Subsection 6.4.3 (4-2) on page INST 06-0290
See Subsection 6.4.3 (4-4) on page INST 06-0293

Refer to Subsection 1.4.3 on page INST 01-0080.

See Subsection 2.7.1 on page INST 02-0370
See Subsection 3.8.1 on page INST 03-0750

For the replaced Disk Drive (in order to expand a storage capacity), perform a setting of RAID/LU, formatting of an LU, setting of a Spare Disk, and setting of an LU mapping, etc.
Refer to Section 5.4 on page INST 05-0390.

See Subsection 2.7.2 on page INST 02-0380
See Subsection 3.8.2 on page INST 03-0760

For the Setting the Power Control Mode (Local or Remote), refer to the following page.
• For the floor model : Section 2.8 on page INST 02-0390.
• For the rackmount model : Section 3.9 on page INST 03-0770.

See Subsection 2.7.1 on page INST 02-0370
See Subsection 3.8.1 on page INST 03-0750

Refer to an instruction manual of each host computer.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 (RK/RKL/RKD/RKA/RKAD/RKS/RKSD):
  See Item (4-1) on page INST 06-0270.
- Procedure for replacing a (RK/RKL/RKD/RKA/RKAD/RKS/RKSD):
  See Item (4-2) on page INST 06-0290.
- Procedure for adding a Disk Drive (RKAAT/RKAJAT/RKAATL/RKAJATL):
  See Item (4-3) on page INST 06-0291.
- Procedure for replacing a Disk Drive (RKAAT/RKAJAT/RKAATL/RKAJATL):
  See Item (4-4) on page INST 06-0292.

(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) Remove the dummy (Disk Drive) by operating the lock release button.

Keep the removed dummy (Disk Drive) carefully because it will be used again when the added Disk Drive is removed.

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 : A label bearing the model name and revision number is affixed to the portion near the handle.

Dummy (Disk Drive) : No label is affixed to the portion near the handle.

(b) Install the Disk Drive to be added taking care not to apply any shock to it (see Figure 6.4.3).

Copyright © 2002, 2005, Hitachi, Ltd.

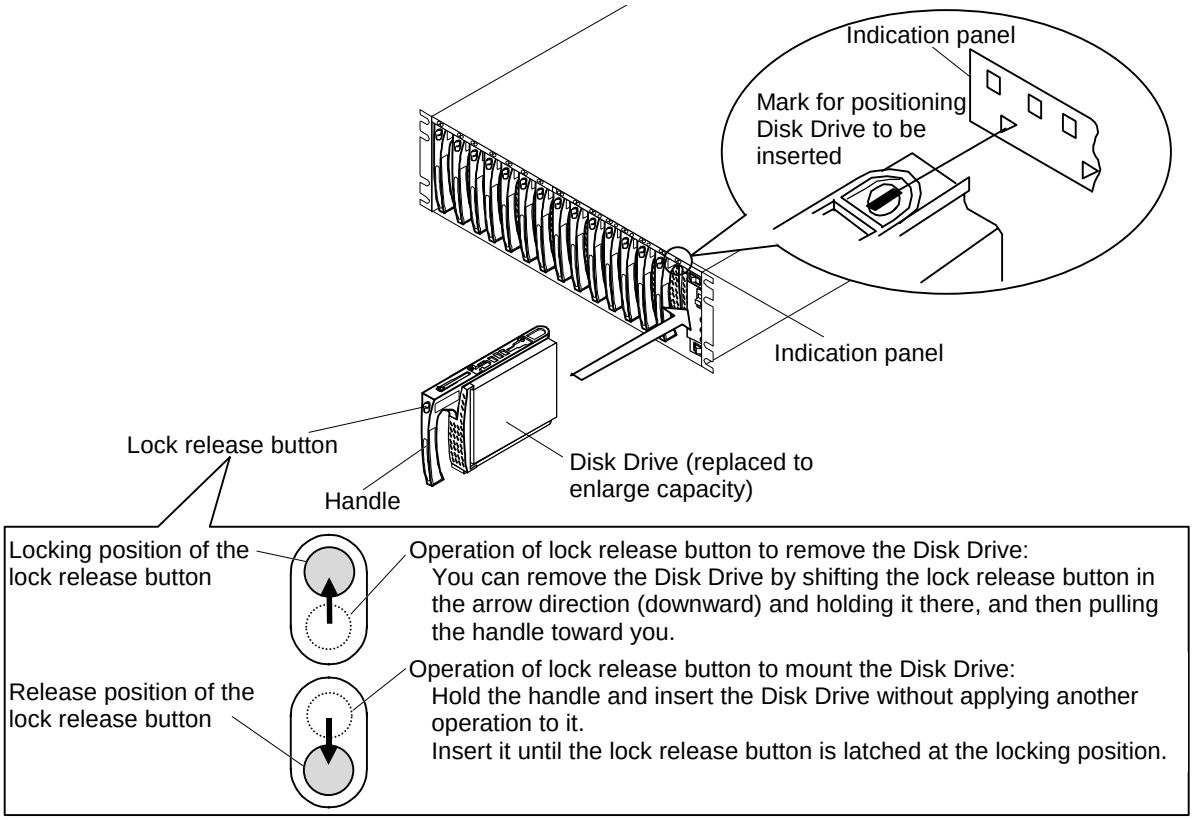


Figure 6.4.3 Operation of Lock Release Button to Mount/Remove the Disk Drive

(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.

(d) When newly adding Disk Drive in the vacant slot #2 to #4 of RK/RKL/RKS/RKD /RKSD, restore the system information. (See Subsection 6.4.3 (5) “Restoring the system information” on page INST06-0300.)

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

CAUTION

When adding Disk Drives#0 to #4 in RK/RKL/RKS/RKD /RKSD for replacement, restore the system information with every replacing one Disk Drive.

(a) Remove the Disk Drive to be removed by operating the lock release button taking care not to apply any shock to it (see Figure 6.4.4).
When the removed Disk Drive is to be used in another disk array as an additional Disk Drive, keep it in custody taking care not to apply any shock to it.
(b) Install the Disk Drive to be added taking care not to apply any shock to it (see Figure 6.4.4).

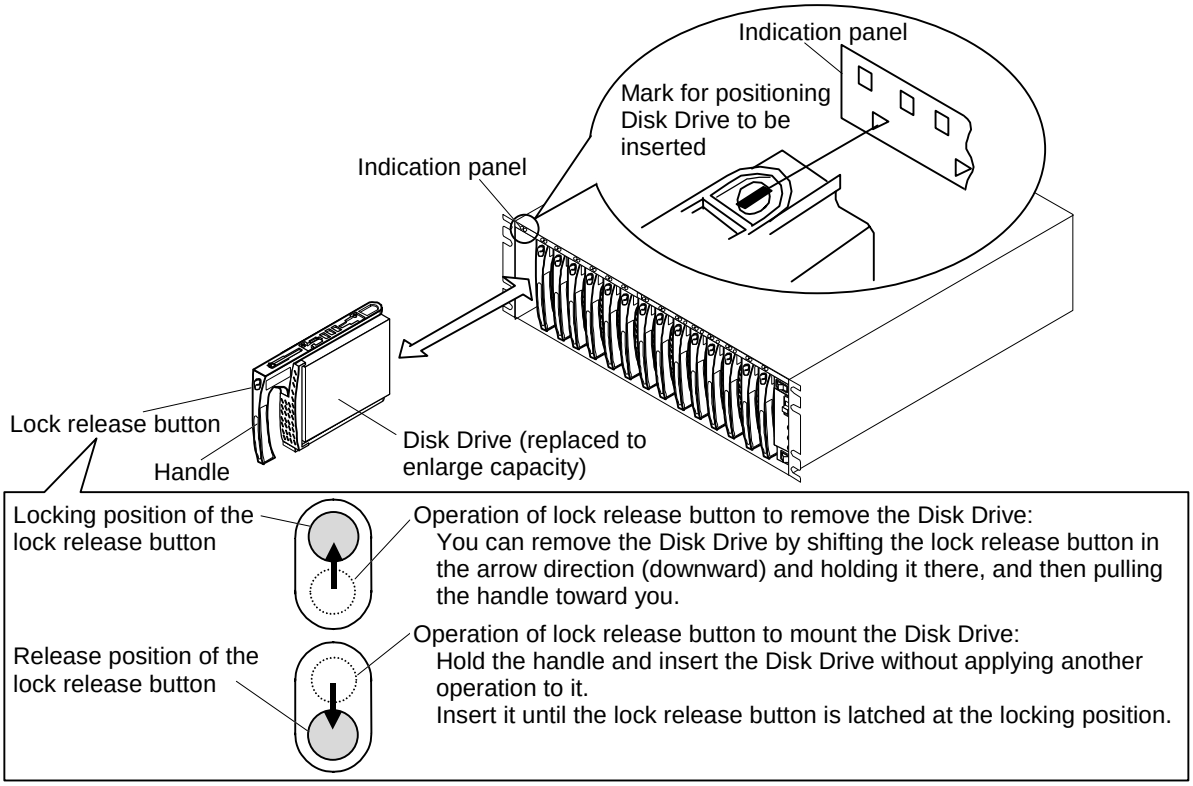


Figure 6.4.4 Remove the Disk Drive

(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.
(d) When adding Disk Drives #0 to #4 in RK/RKL/RKS/RKD/RKSD for replacement, restore the system information with every replacing one Disk Drive. (See Subsection 6.4.3 (5) “Restoring the system information” on page INST06-0300.)

Copyright © 2002, 2005, Hitachi, Ltd.

(4-3) When adding the Disk Drive (in order to expand a storage capacity) (RKAAT/RKAJAT /RKAATL/RKAJATL)
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.

NOTE : DF-F600-ATE250 and DF-F600-ATE250L cannot be installed in RKAJAT/RKAJATL.

(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 dummy (Disk Drive) by pulling 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).

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 : A label bearing the model name and revision number is affixed to the portion near the handle.
Dummy (Disk Drive) : No label is affixed to the portion near the handle.

(b) Install the Disk Drive to be added taking care not to apply any shock to it (see Figure 6.4.4.1).

(i) Fit the Disk Drive in the guide rail of the RKAAT/RKAJAT/RKAATL/RKAJATL 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.

Copyright © 2004, 2005, Hitachi, Ltd.

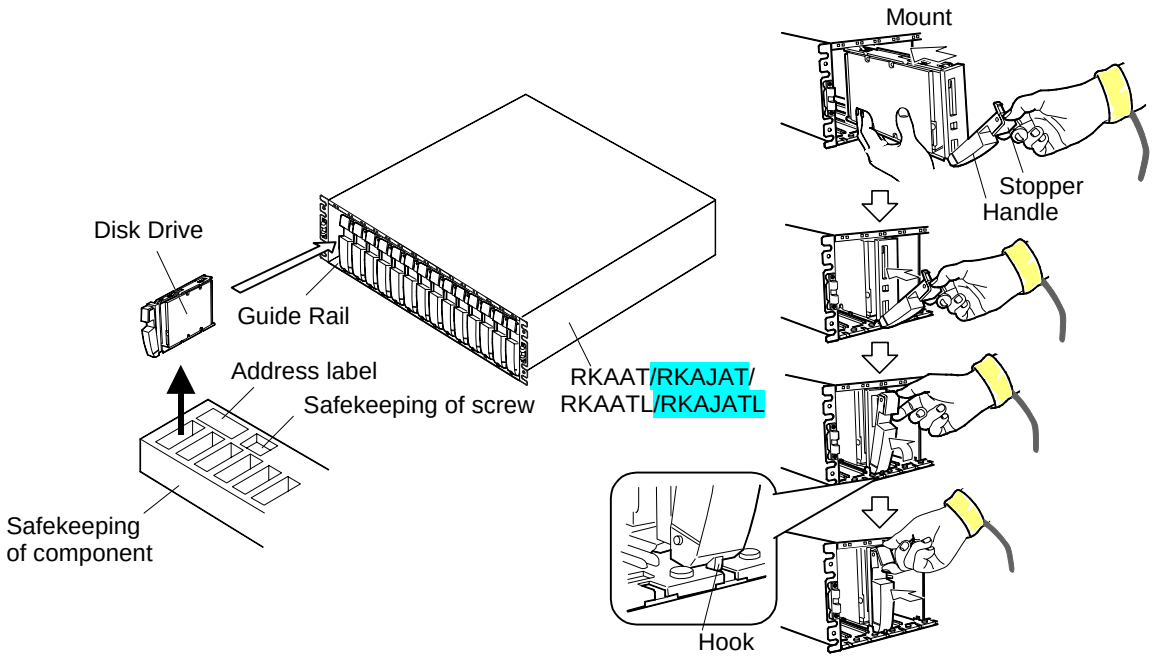


Figure 6.4.4.1 Operation of Mount the Disk Drive

(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.

Copyright © 2004, 2005, Hitachi, Ltd.

(4-4) 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 6.4.4.2).
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 6.4.4.2).
(i) Fit the Disk Drive in the guide rail of the RKAAT/RKAJAT/RKAATL/RKAJATL 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.

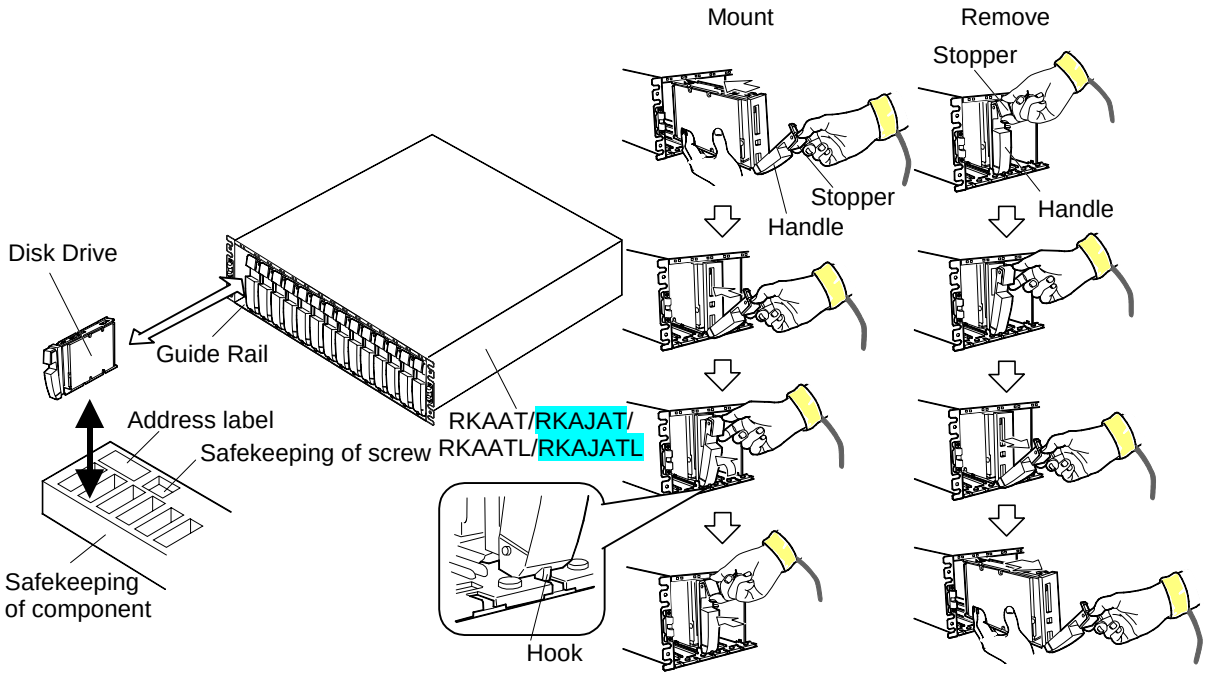


Figure 6.4.4.2 Operation of Mount/Remove the Disk Drive

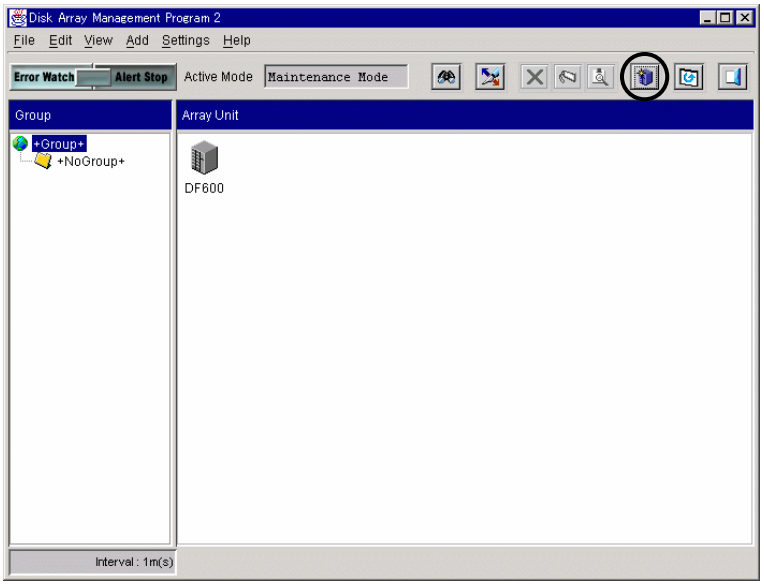
Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, Hitachi, Ltd.

(5) Restoring the system information
A restoration of the system information can be done by using either of the Disk Array Management Program.

(5-1) Restoring the system information using Disk Array Management Program
(a) Start Disk Array Management Program, 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.

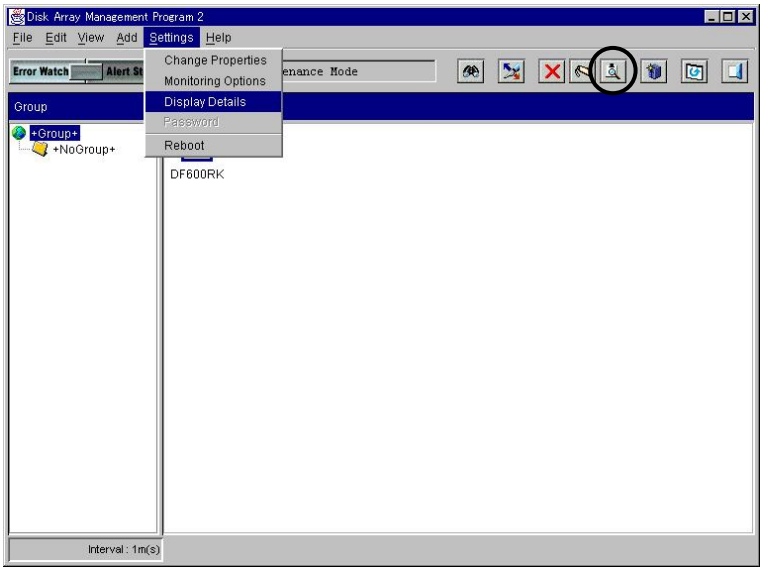


Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

Copyright © 2002, 2005, Hitachi, Ltd.

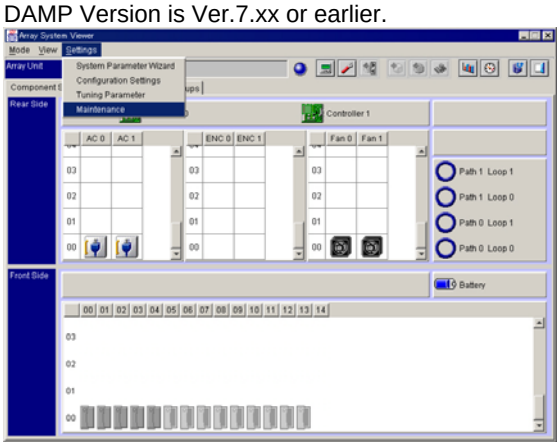
(b) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.

- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

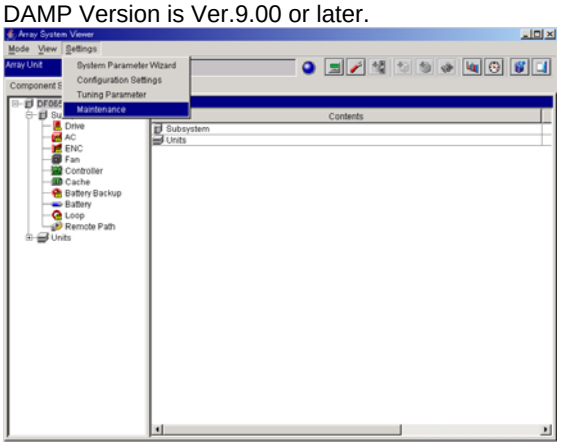


(c) Select [Settings] – [Maintenance] in the unit window.

DAMP Version is Ver.7.xx or earlier.



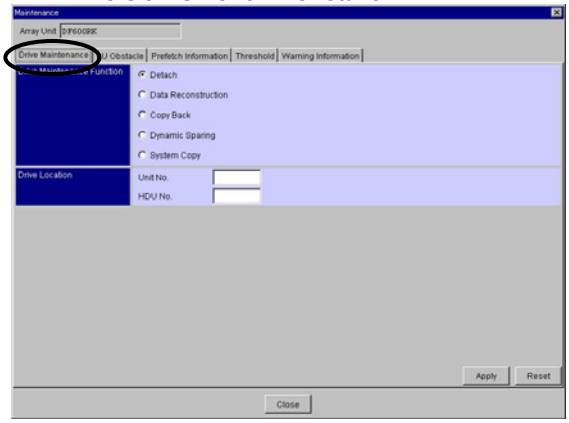
DAMP Version is Ver.9.00 or later.



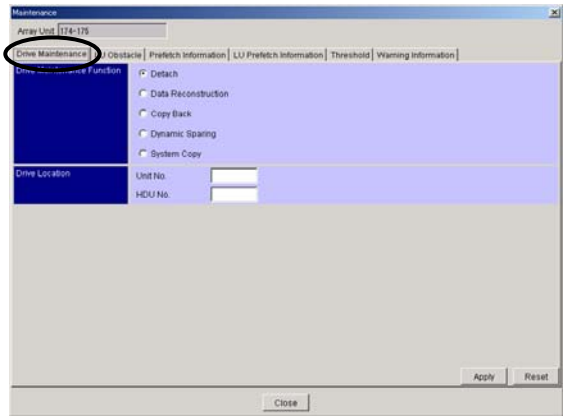
Copyright © 2002, 2005, Hitachi, Ltd.

(d) Click the [Drive Maintenance] tab.

DAMP Version is Ver.9.1x or earlier.

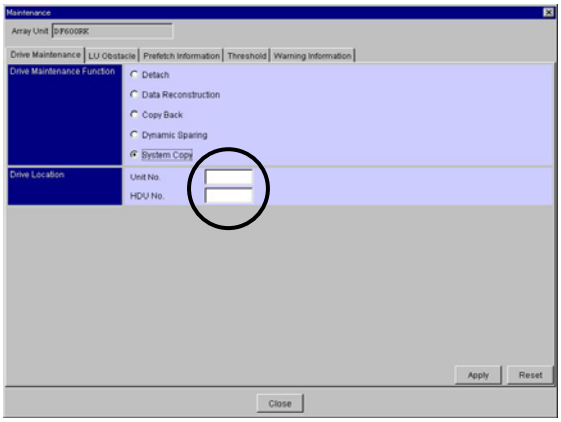


DAMP Version is Ver.9.20 or later.

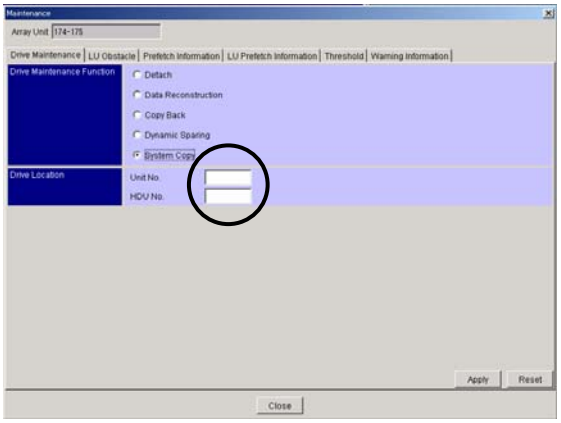


(e) Select the [System Copy] and set the number of the Disk Drive that has been added.

DAMP Version is Ver.9.1x or earlier.

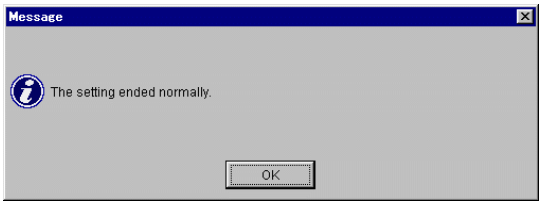


DAMP Version is Ver.9.20 or later.



(f) Click the [Apply] button.

(g) A window showing that the setting has been completed is displayed.
Press the [OK] button.



(h) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(6) Making a host computer recognize an LU while the subsystem power is on

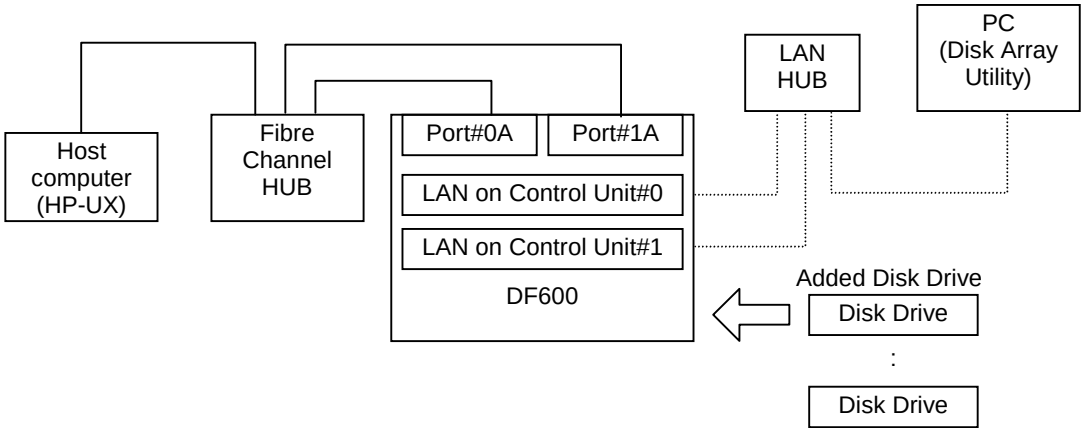
< An example of the case of a host in which HP-UX is installed >

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.

NOTE : In the case where the subsystem is configured with the dual system, when executing an LU formatting using the Disk Array Management Program connecting the program to one of the Controllers via a LAN, connect the LU concerned to the Controller which controls it. If the LU formatting is done by another Controller, it will terminate abnormally.

(a) System configuration

Connect the PC, in which the Disk Array Management Program is installed, to the Control Unit executing the LU formatting via a LAN.



Copyright © 2003, 2005, Hitachi, Ltd.

(b) Operation procedure

(i) Make sure that the host computer and the DF600 are in the Ready status. (I/Os host computer can be continued)
(ii) Install the Disk Drive to be added in the DF600.
(iii) Set a new RAID group for the installed Disk Drive.
(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 DF600 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 DF600 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.

Copyright © 2003, 2005, Hitachi, Ltd.

6.4.4 Adding a Cache Unit

(1) Adding Cache Memory to the RK/RKS/RKD/RKSD

⚠ CAUTION

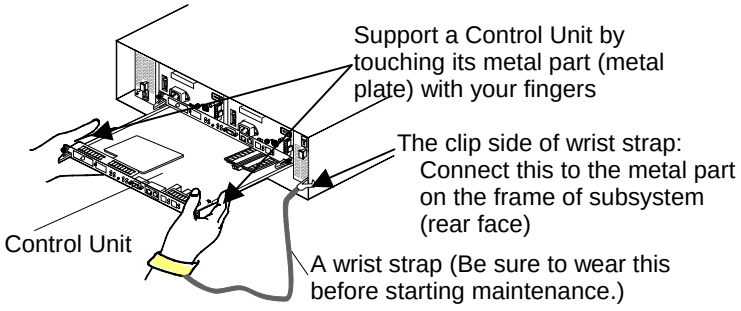
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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

Copyright © 2002, 2005, Hitachi, Ltd.

configuration, return the Control Unit to a location of the Control Unit #0.

Copyright © 2002, 2005, Hitachi, Ltd.

<Working Procedure>

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).) 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.

(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you (see Figure 6.4.5).

(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.

⚠ 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) Remove the Cache Unit.
Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2003, 2005, Hitachi, Ltd.

(g) Install the Cache Unit in the Control Unit.
(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶) (see Figure 6.4.5).
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.
(i) Tighten the left and right fixing screws of the Control Unit.
(j) Connect the removed all cables to the Control Unit.
(k) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(l) Turn on the main switch.
(m) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(n) Make sure that the READY LED (green) on the Front Bezel is on.

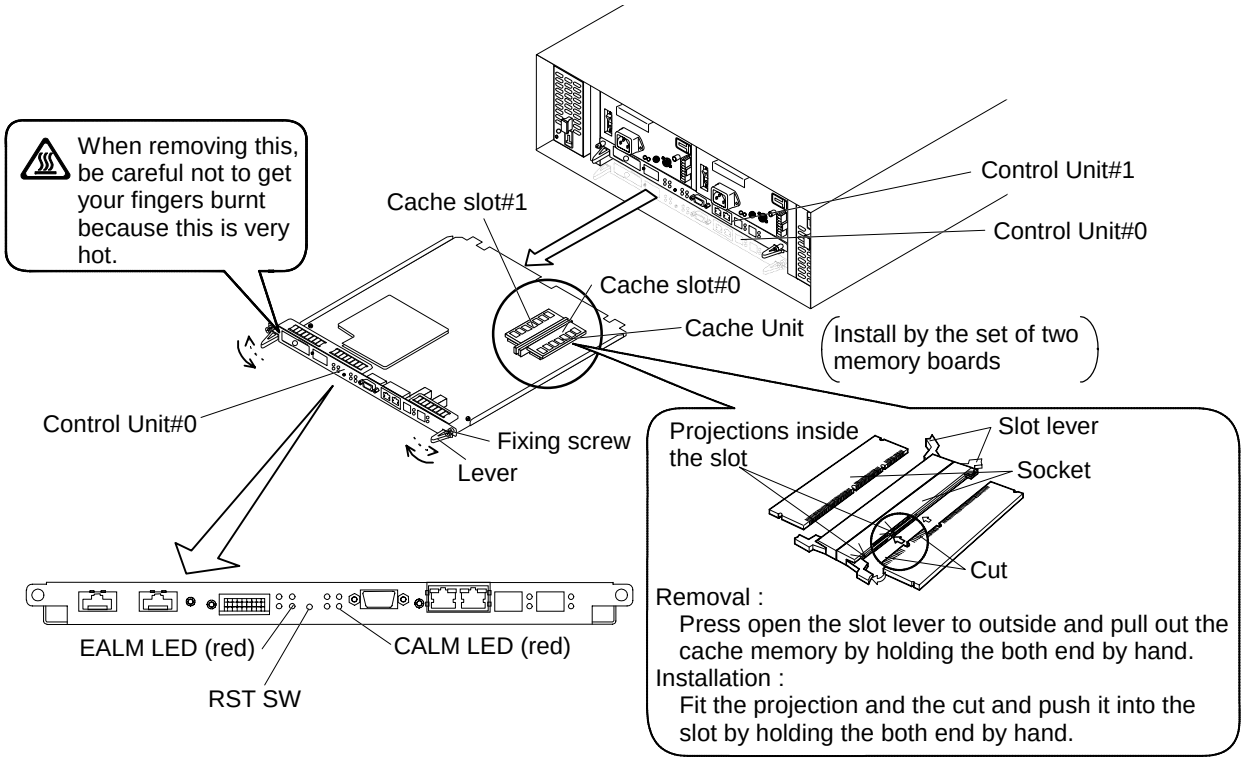


Figure 6.4.5 Replacing Cache Unit (RK/RKD)

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Adding Cache Memory to the RKH/RKHE

CAUTION

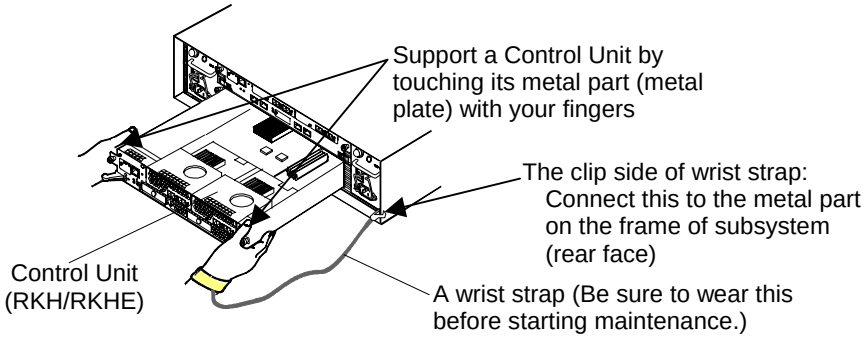
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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 : • Make the addition for both of the Control Unit #0 and #1.
• After the addition is completed, be sure to return the Control Units #0 and #1 to their original installation positions.

Copyright © 2003, 2005, Hitachi, Ltd.

<Working Procedure>

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).) 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.

(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

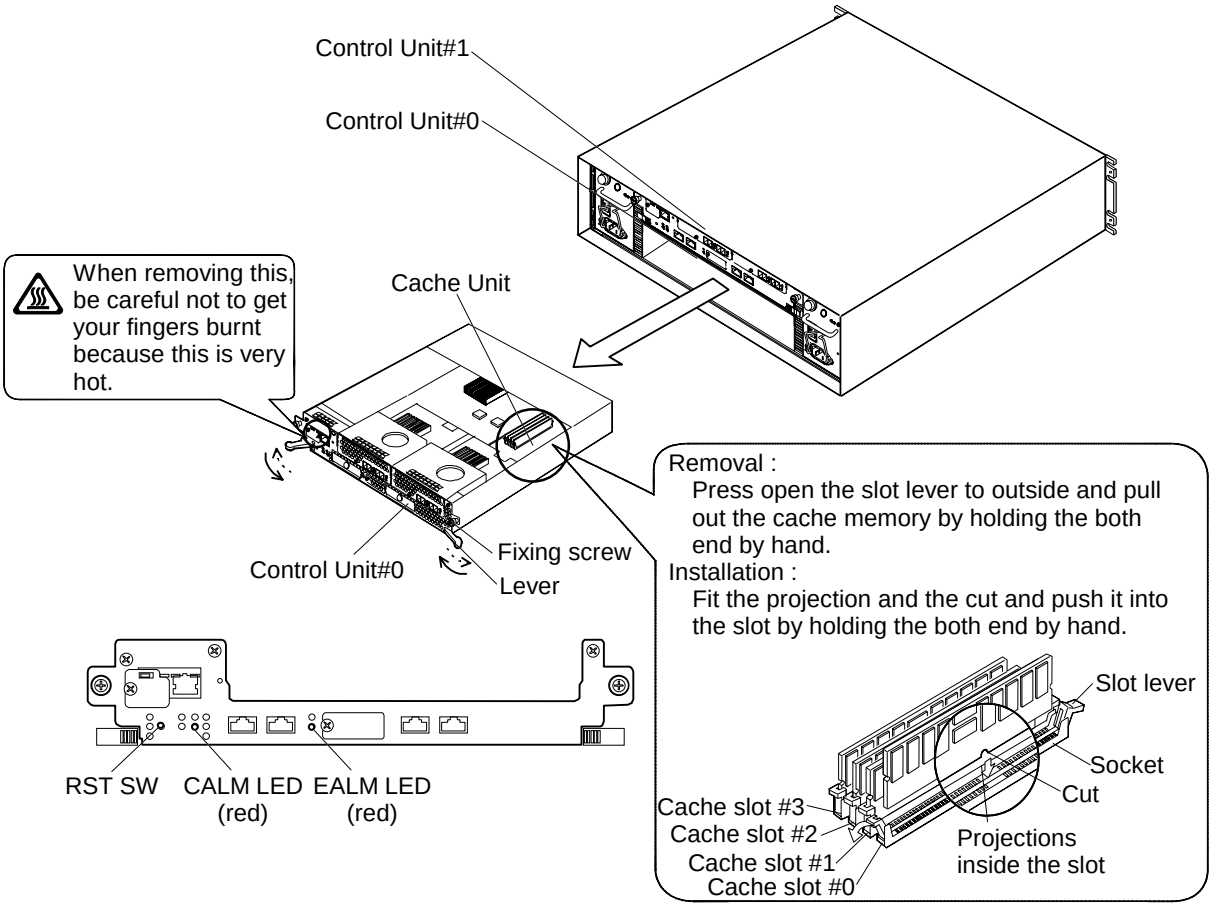


Figure 6.4.6 Replacing Cache Unit (RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

(c) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you (see Figure 6.4.6).

(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.

⚠ 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) Remove the Cache Unit.
Place the removed Cache Unit in the place where anti-static measures are taken.

(g) Install the Cache Unit in the Control Unit.
- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the case of RKH/RKHE, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶) (see Figure 6.4.6).
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.

(i) Tighten the left and right fixing screws of the Control Unit.

(j) Connect the removed all cables to the Control Unit.

(k) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(l) Turn on the main switch.

(m) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).

(n) Make sure that the READY LED (green) on the Front Bezel is on.

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

6.4.5 Adding Interface Boards

This work is for the RKH/RKHE only.

⚠ CAUTION

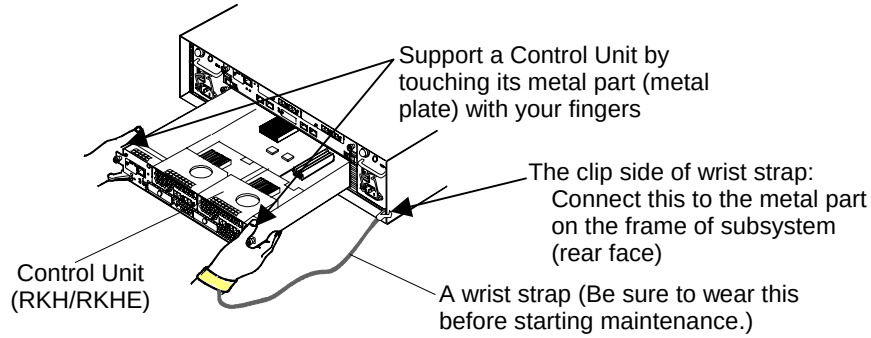
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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 : • Make the addition for both of the Control Unit #0 and #1.

Copyright © 2002, 2005 Hitachi, Ltd.

- After the addition is completed, be sure to return the Control Units #0 and #1 to their original installation positions.

Copyright © 2002, 2005 Hitachi, Ltd.

<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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(3) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you (see Figure 6.4.7).

(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.

⚠ 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) Removing the three screws (on the Control Unit) that is securing the Dummy Interface Board. Pull up the Dummy Interface Board and remove it from the Control Unit.

(7) Install the Interface Board to be added on the Control Unit fitting it to the positioning pin and fasten it by tightening the three mounting screws.

(8) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (——>) (see Figure 6.4.7).
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.

(9) Tighten the left and right fixing screws of the Control Unit.

Copyright © 2003, 2005, Hitachi, Ltd.

(10) Connect the removed all cables to the Control Unit.
(11) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(12) Turn on the main switch.
(13) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(14) Make sure that the READY LED (green) on the Front Bezel is on.
(15) Make the setting for the Interface Board that has been added. (See Item (7), "Setting of Fibre Channel" in Subsection 5.5.2 on page INST05-0900.)

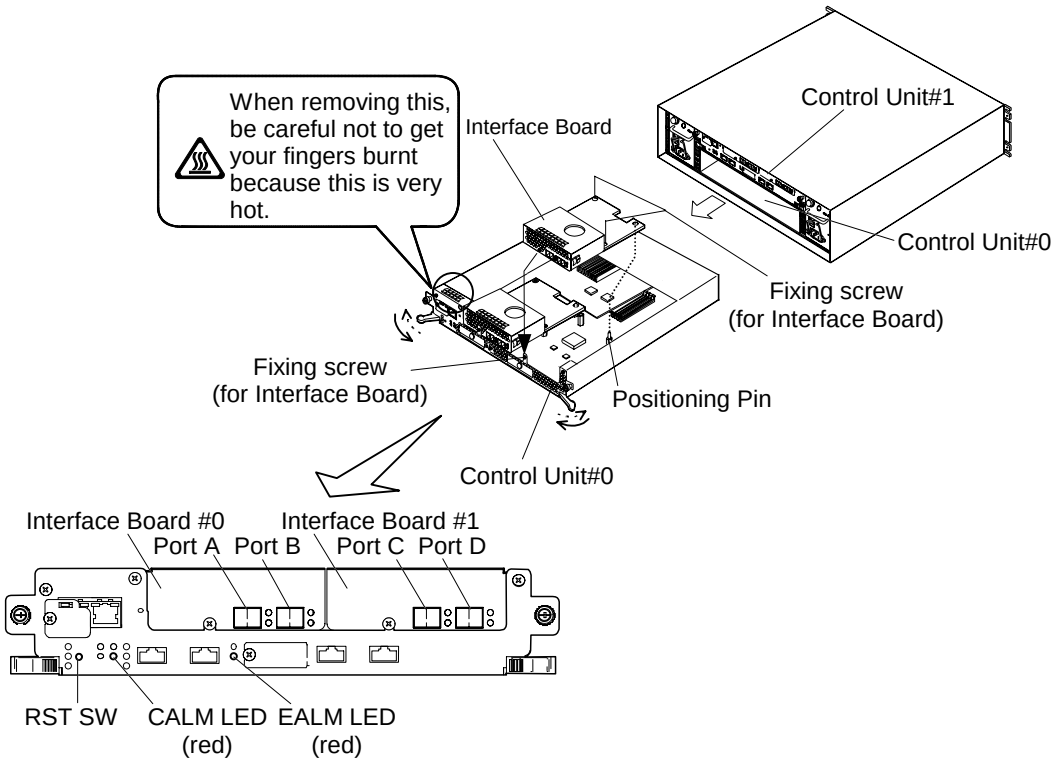


Figure 6.4.7 Replacing Interface Board (RKH/RKHE)

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

6.5 Adding Other Optional Devices

6.5.1 Other optional additional devices

Component name	Model name	Specification	Requirements of addition	Condition of addition and number of item for referring to procedure	
				Power on (A host is in operation(*1).)	Power off
Remote adapter	DF-F600-VR3A	Remote adapter (Main unit)	Device for interlocking the DF600 with a host computer	Possible 6.5.2 (INST 06-0360)	Possible 6.5.2 (INST 06-0360)
	DF-F600-VR3H	Remote adapter (Hub)			
	DF-F600-HVR3	Remote adapter (Rack)	Rack for installing the Remote adapter on the subsystem		
PDU	DF-F600-UPDU	For U4	PDB for U4 rack frame	Possible 6.5.3 (INST 06-0480)	Possible 6.5.3 (INST 06-0480)
PDB (UPDU6)	DF-F600-UPDU6	For U6/ U4	Additional PDB for U6/U4 rack frame	Possible 6.5.4 (INST 06-0500)	Possible 6.5.4 (INST 06-0500)

*1 : Data is exchanged between a host computer and the subsystem.

Copyright © 2002, 2005, Hitachi, Ltd.

6.5.2 Adding a Remote adapter

(1) Before adding Remote adapter

The Remote adapter enables remote power on/off control of the DF600 equipped with the Fibre Channel interface.

Installation highlights and precautions are as follows:

- By attaching each component of the Remote adapter (Main unit and Hub in separate chassis) to a Rack option (DF-F600-HVR3), the Remote adapter can be mounted in a U6 or U4 rack frame.
- Each component of the Remote adapter must be laid out horizontally as shown in Figure 6.5.1. Do not place it vertically, obliquely, or upside down.
- Keep the chassis and the cables free from heavy load. Do not put anything heavy on the Remote adapter.
- Certain cable routing may cause an adverse effect on the DF600. Observe the rules provided in Item in (2) Section 1.1 “Note on cable routing” on page INST 01-0010.

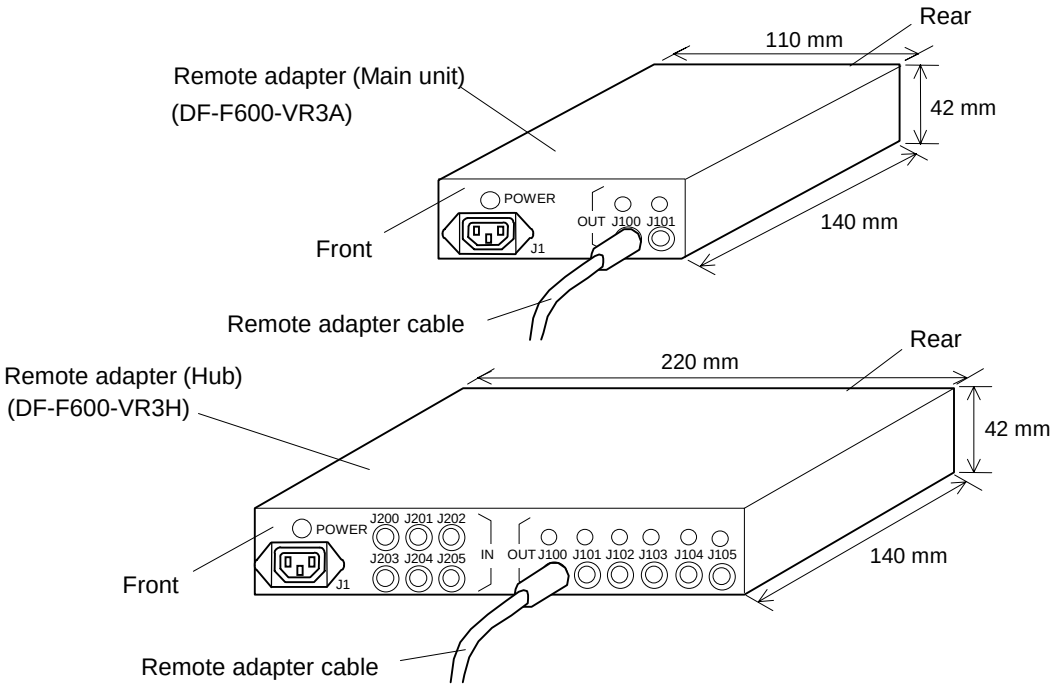
(2) Adding Process for the Remote adapter

Select a procedure from the following and execute it.

No.	Model	Power status during the addition	Restriction	Addition Process section
1	Floor model	Addition with the power turned on	• The addition for duplicating the Remote adapter (main unit, Hub) can be performed. • When connecting a new Remote adapter (main body, HUB), the operation of connecting devices can be performed with the subsystem power on. However, powering on/off including the rear switch of the subsystem is required for making the subsystem recognize the remote setting.	Refer to 6.5.2 (2) to (7).
2		Addition with the power turned off	-	
3	Rackmount model	Addition with the power turned on	• The addition for duplicating the Remote adapter (main unit, Hub) can be performed. • When connecting a new Remote adapter (main body, HUB), the operation of connecting devices can be performed with the subsystem power on. However, powering on/off including the rear switch of the subsystem is required for making the subsystem recognize the remote setting. • The installation of Rack (DF-F600-HVR3) in the section 6.5.2 (8) is required.	Refer to 6.5.2 (2) to (8).
4		Addition with the power turned off		

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Appearance, dimensions, and indicator functions
See Figure 6.5.1 and Table 6.5.1 below.



Part Name	Part No.	Model	Remarks
Remote adapter (Main unit)	5507067-34	DF-F600-VR3A	
Remote adapter (Hub)	5507067-45	DF-F600-VR3H	

Figure 6.5.1 Appearance and Dimensions of Remote Adapter

Table 6.5.1 Indicator Functions on Remote Adapter

Name	Type	Color	Function
POWER	LED	Green	This LED, when lit, shows that the power is supplied and the Remote adapter is operable.
J100 to J105	LED	Green	Each of these LEDs, when lit, shows that the corresponding remote ON signal is being output.

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Connection schematics with Remote adapters

Turning on the Power Unit (Power Unit (DC)) to the Remote adapter (Main unit) (VR3A) causes the ON signal to be sent out from the signal output connectors J100 and J101.

Accordingly, if the Power Unit (Power Unit (DC)) of the Remote adapter is connected to a service outlet that turns on/off its power feeding in synchronism with the host computer, then the DF600 can be powered on/off in synchronization with the host computer as shown in Figure 6.5.2.

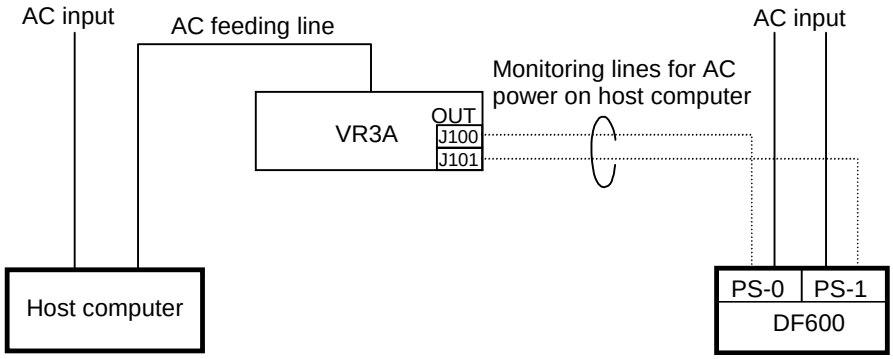


Figure 6.5.2 Simple Connection Example Only with VR3A

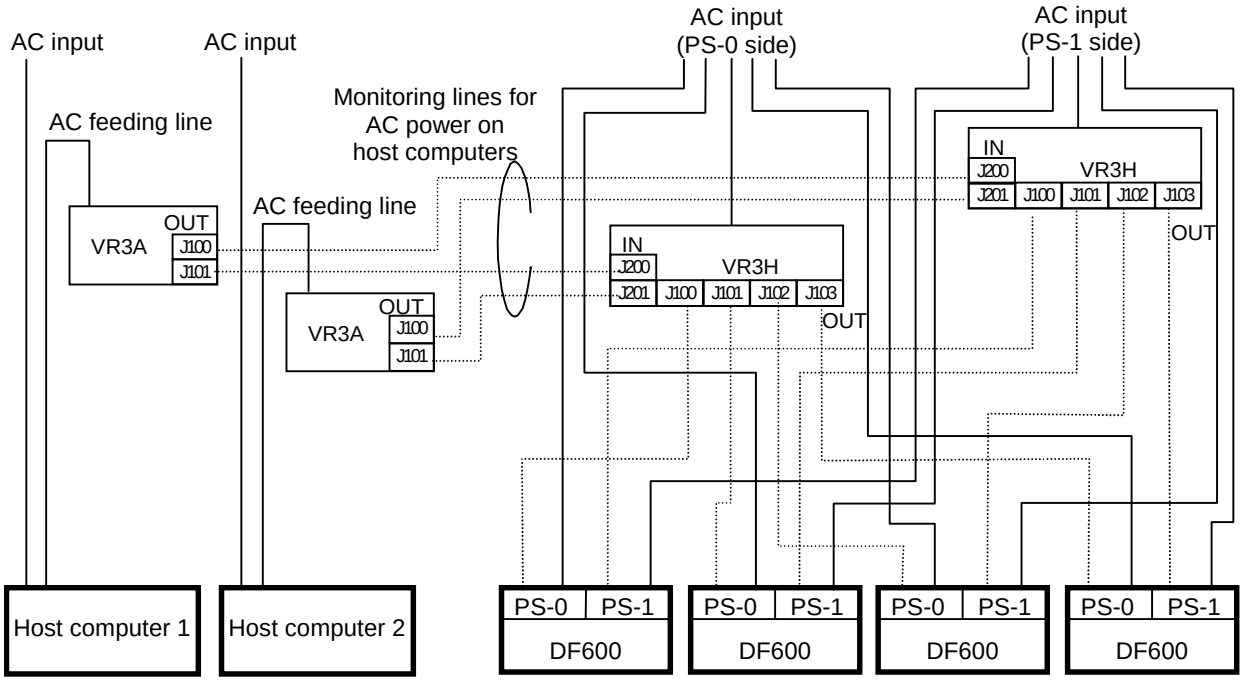


Figure 6.5.3 Complex Connection Example with VR3A and VR3H

Copyright © 2002, 2005, Hitachi, Ltd.

(5) Notes on Remote adapter connection

- There is a time delay of one second or less from when the Remote adapter receives an input signal to when the Remote adapter sends out an output signal.
- All four DF600 start if either host computer is turned on when connecting it like the Complex Connection Example with VR3A and VR3H in Figure 6.5.3.
  All four DF600 stop if two host computers are turned off.
- When the Remote adapter is used to activate the DF600 and if a host computer attempts to access the DF600 before it is ready, it may fail to respond to the access request.
- When connecting the Remote adapter to the DF600, duplex the remote adapter cable connections.

When connecting the Remote adapter to the DF600-RK/RKL/RKS/RKD/RKSD/RKH /RKHE, connect the Connector in the Power Unit (Power Unit (DC)). (See Figure 6.5.4.)

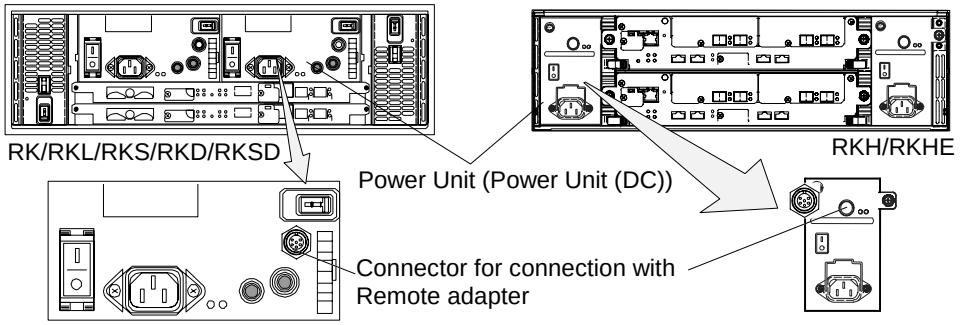
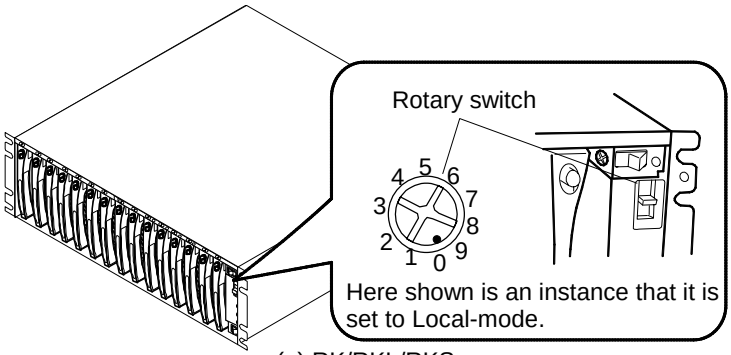


Figure 6.5.4 Physical Location of Connector on Subsystems for Remote Adapter Connection

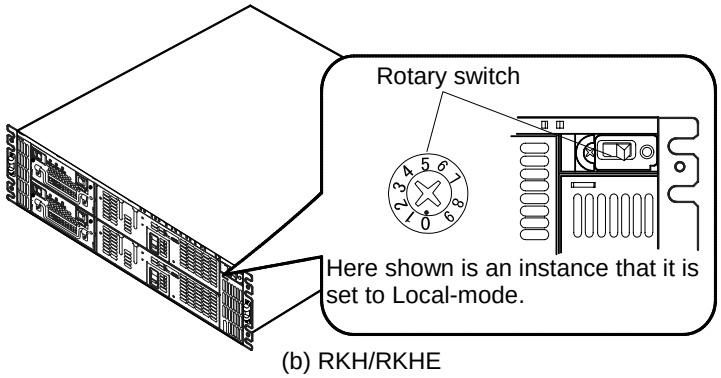
- Note on the power cable
  In some of the remote adapter, the power cable (J2F) is fastened with a retainer and a binder. When the 100V-power is supplied, replace the cable by cutting the binder using a nipper. Incidentally, collect the power cable (J2F) that has been removed.

Copyright © 2002, 2005, Hitachi, Ltd.

(6) Setting the power control mode of the DF600 to remote
  (a) Turn off the main switch.
  (b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the Power Unit (Power Unit (DC)).
  (c) Make sure that the cache memory is not in the state in which it is backed up by the batteries (that the CACHE POWER LED (green) on the Control Unit is off).
  When it is being backed up, cancel the backup.
  (See Subsection 5.1.1, "Checking cache memory in the back-up state" on page MNTE 05-0030. If a Disk Drive is added without canceling the backup, it is feared that user data is lost.
  (d) Remove the front bezel according to Subsection 1.4.3 "How to attach/remove front bezel of the Rackmount Model" on page INST 01-0080.
  (e) Setting the Rotary switch.
  Set the mode of power control. Either Local mode or Remote mode is set by the Rotary switch.
  Set the Rotary Switch mode to 2 (Fibre Channel Remote). (See Table 6.5.2.)
  (f) Attach the front bezel according to Subsection 1.4.3 "How to attach/remove front bezel of the Rackmount Model" on page INST 01-0080.



(a) RK/RKL/RKS



(b) RKH/RKHE

Figure 6.5.5 Rotary Switch

Copyright © 2002, 2005, Hitachi, Ltd.

Table 6.5.2 Power Control Mode Settings and Corresponding Operation Modes

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment)
1	—	—
2	Fibre Channel 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 U6 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.
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.

(7) Ensuring the power control operation in Fibre Channel Remote mode

Turn on/off every host computer connected to the Remote adapter, and ensure that every DF600/DF600H is accordingly powered on/off.

Copyright © 2002, 2005, Hitachi, Ltd.

(8) Installing the Remote adapter

The Remote adapter can be mounted in a U6 or U4 rack frame by attaching each component of the Remote adapter to a Rack option (DF-F600-HVR3) as shown in Figure 6.5.6 on next page. Specifically, one Rack accommodates up to four Remote adapters (Main unit) or up to two Remote adapters (Hub). (Refer to Figure 6.5.7 and Figure 6.5.8 on subsequent pages.)

Table 6.5.3 shows the composition of one DF-F600-HVR3 Rack.

Table 6.5.3 Composition of DF-F600-HVR3 Rack

No.	Part No.	Part name	Q'ty	Remarks
1	2104491-1	Rack	1	-
2	SB306B	Brass binding screw M3×6	10	Used for fixation of the Remote adapter to the rack. The quantity includes spare.
3	SC306S	Screw M3×6	6	Used for fixation of the Remote adapter to the rack. The quantity includes spare.
4	3261303-1	Support metal bracket	2	Applicable to a U6 rack frame only.
5	5510146-1	Fastener	5	Applicable to both U6 and U4 rack frames. The quantity includes spare (one).
6	BS520	Socket bolt M5×20	5	Applicable to a U6 rack frame only. The quantity includes spare (one).
7	2051001-513	LL washer	5	Applicable to a U6 rack frame only. The quantity includes spare (one).
8	SB516	Binding screw M5×16	5	Used for fixation of the rack (HVR3) to a rack frame. The quantity includes spare (one).

Copyright © 2002, 2005, Hitachi, Ltd.

(8-1) Attaching the Remote adapter to the Rack
Attach the Remote adapter (Main unit) and/or the Remote adapter (Hub) to the rack referring to the physical layouts shown in Figures 6.5.7 through 6.5.11. General steps are as follows.

(a) Fix the target Remote adapter components to the rack with screws of M3×6 size.
(b) Fix the rear of the Remote adapter components to the rack with brass binding screws of M3×6 size.
(c) Mount the rack-attached Remote adapter components onto a U6 or U4 rack frame.
The standard location for the Remote adapter in the rack frame is the rear area.
For mounting the Remote adapter in the rear area of a U4 rack frame, see (8-2).
For mounting the Remote adapter in the rear area of a U6 rack frame, see (8-3).

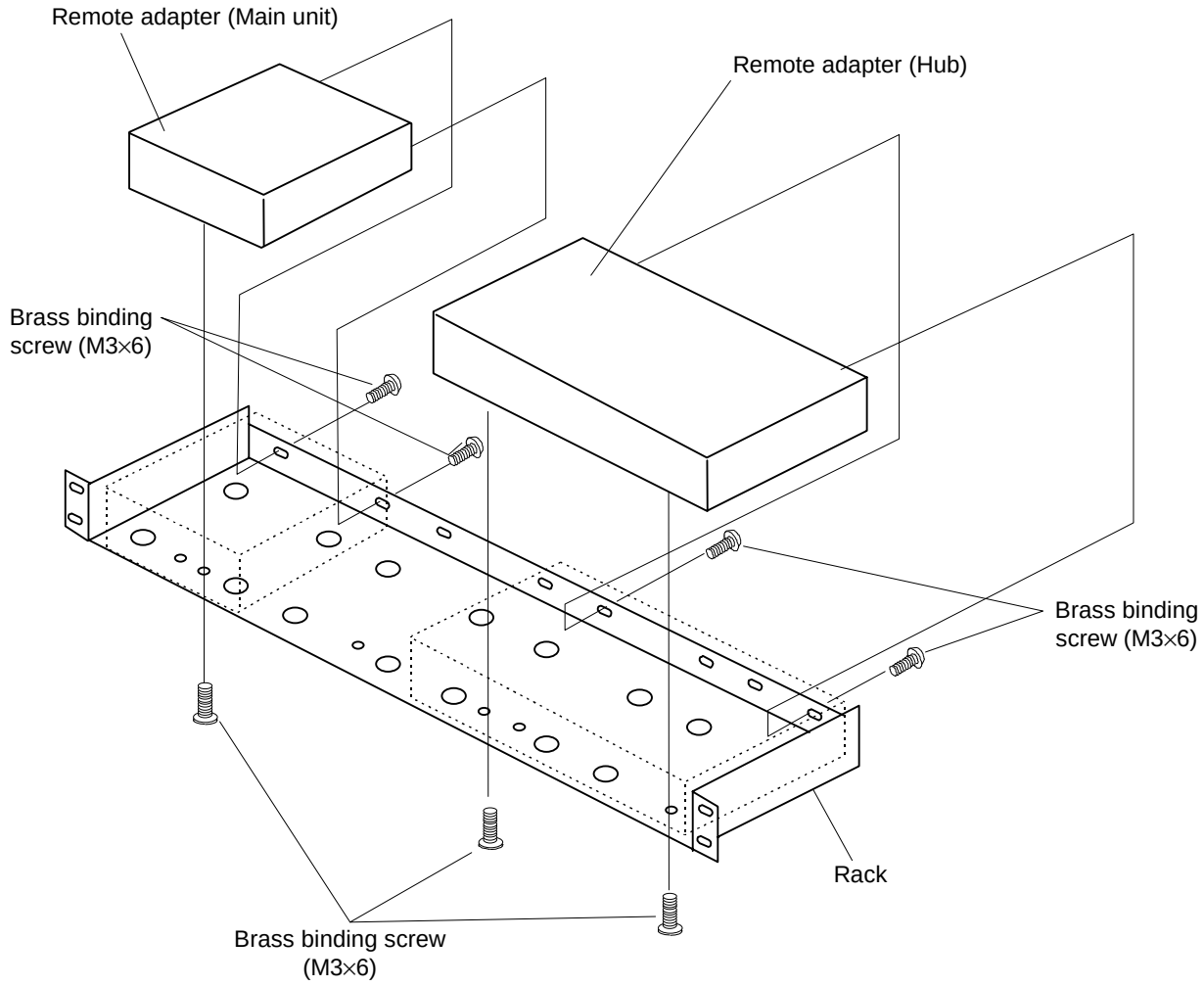


Figure 6.5.6 Fixation of Remote Adapter to Rack

Copyright © 2002, 2005, Hitachi, Ltd.

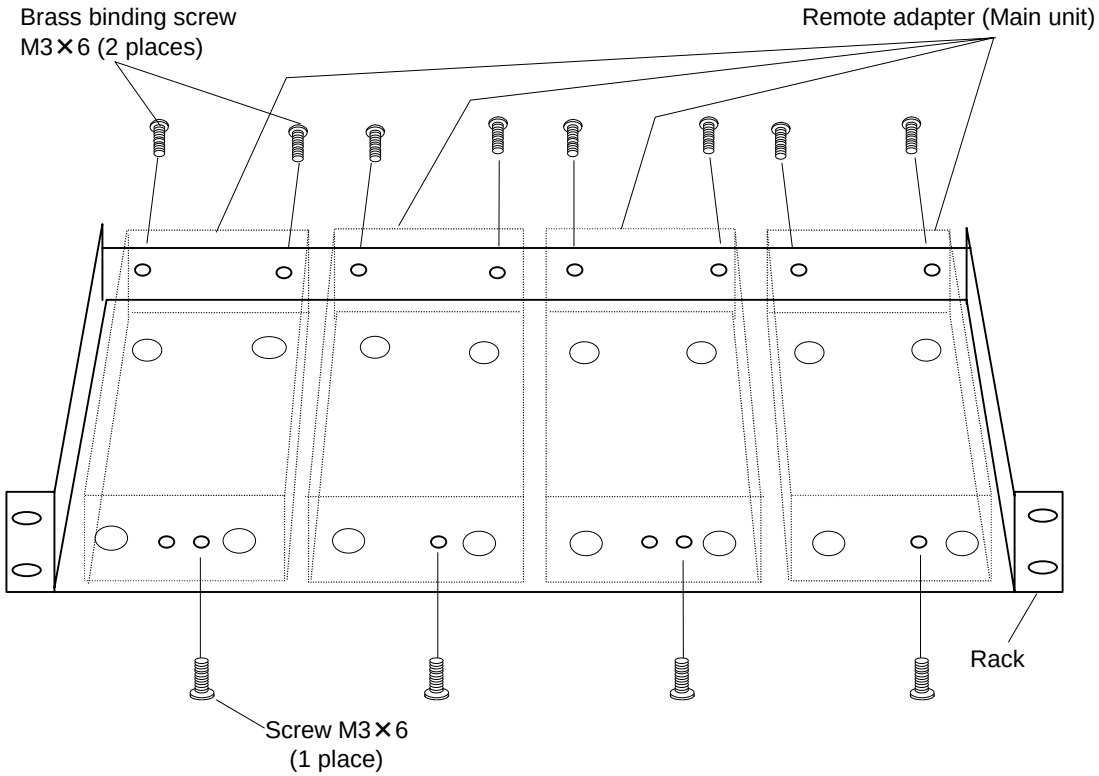


Figure 6.5.7 Physical Layout for Attachment of Remote Adapter Main Units to Rack

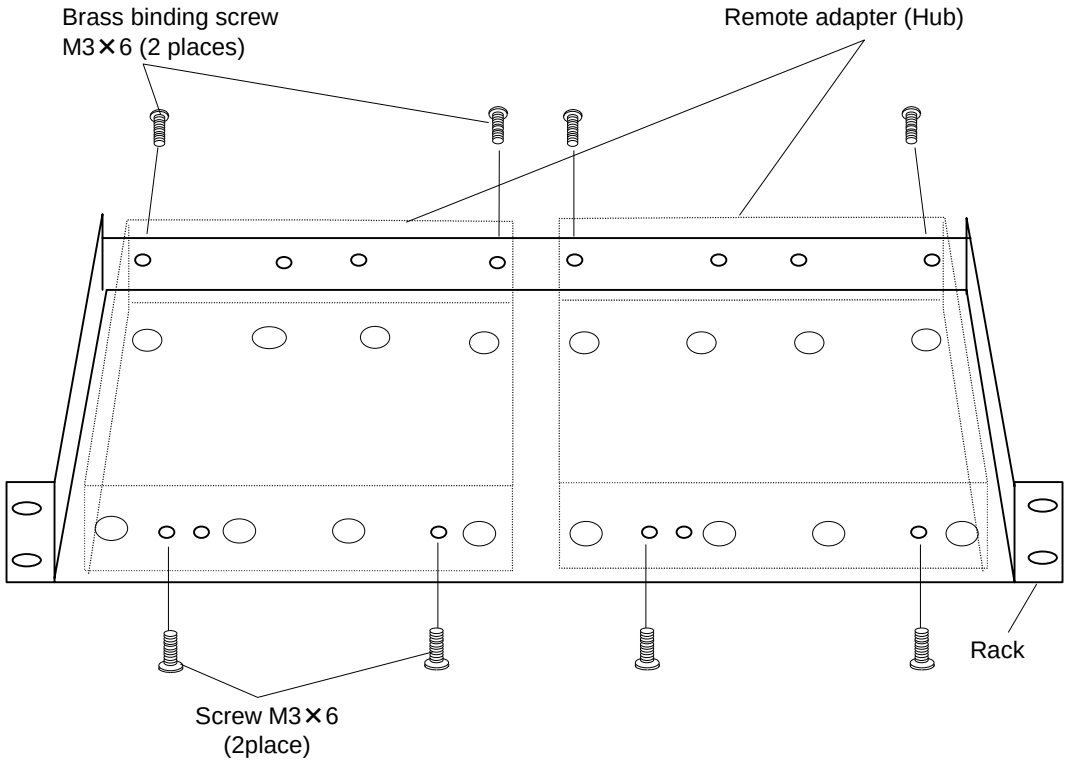


Figure 6.5.8 Physical Layout for Attachment of Remote Adapter Hubs to Rack

Copyright © 2002, 2005, Hitachi, Ltd.

(8-2) Mounting the Remote adapter in the rear area of U4

(a) Attach the fasteners (four places) to the positions where the rack accommodating the Remote adapter components is to be mounted: rear of the U4 rack frame.

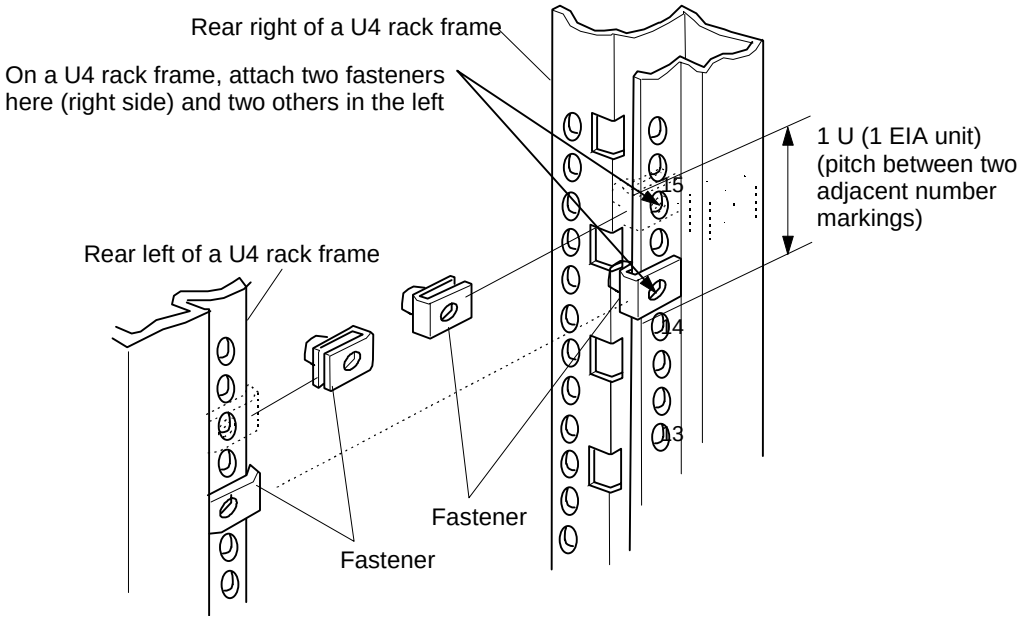


Figure 6.5.9 Attaching Fasteners in Rear Area of U4

(b) Mount the rack accommodating the Remote adapter components onto the rack frame, engaging the front holes of the rack with those of the fasteners attached in Step (a). Then, fix the rack with binding screws of M5×16 size.

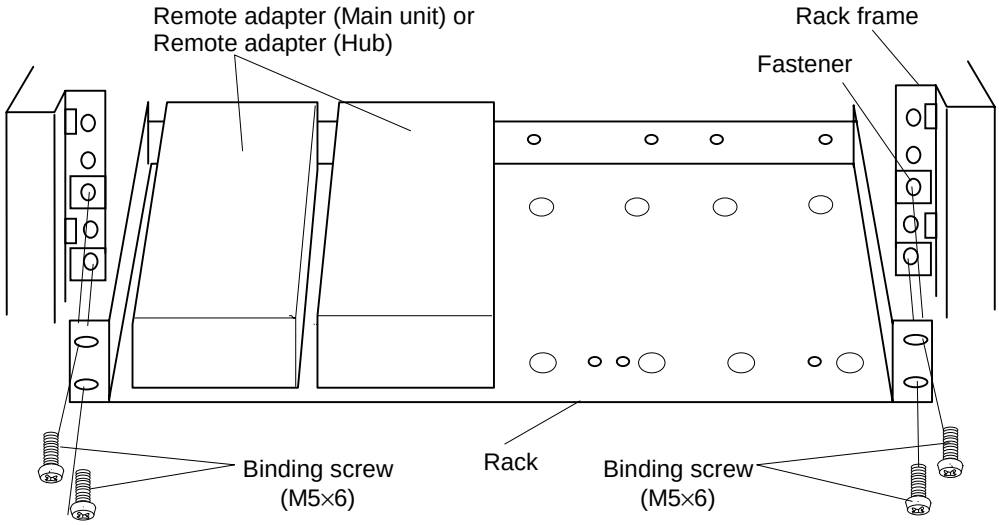


Figure 6.5.10 Installing rack frame

(c) Route and connect cables, observing the rules provided in Section 1.1 (2) “Note on cable routing” on page INST 01-0010.

Copyright © 2002, 2005, Hitachi, Ltd.

(8-3) Mounting the Remote adapter in the rear area of U6

(a) Attach the fasteners (four places) to the positions in the rear of the U6 rack frame where the rack accommodating the Remote adapter components is to be mounted. (See Figure 6.5.11.)

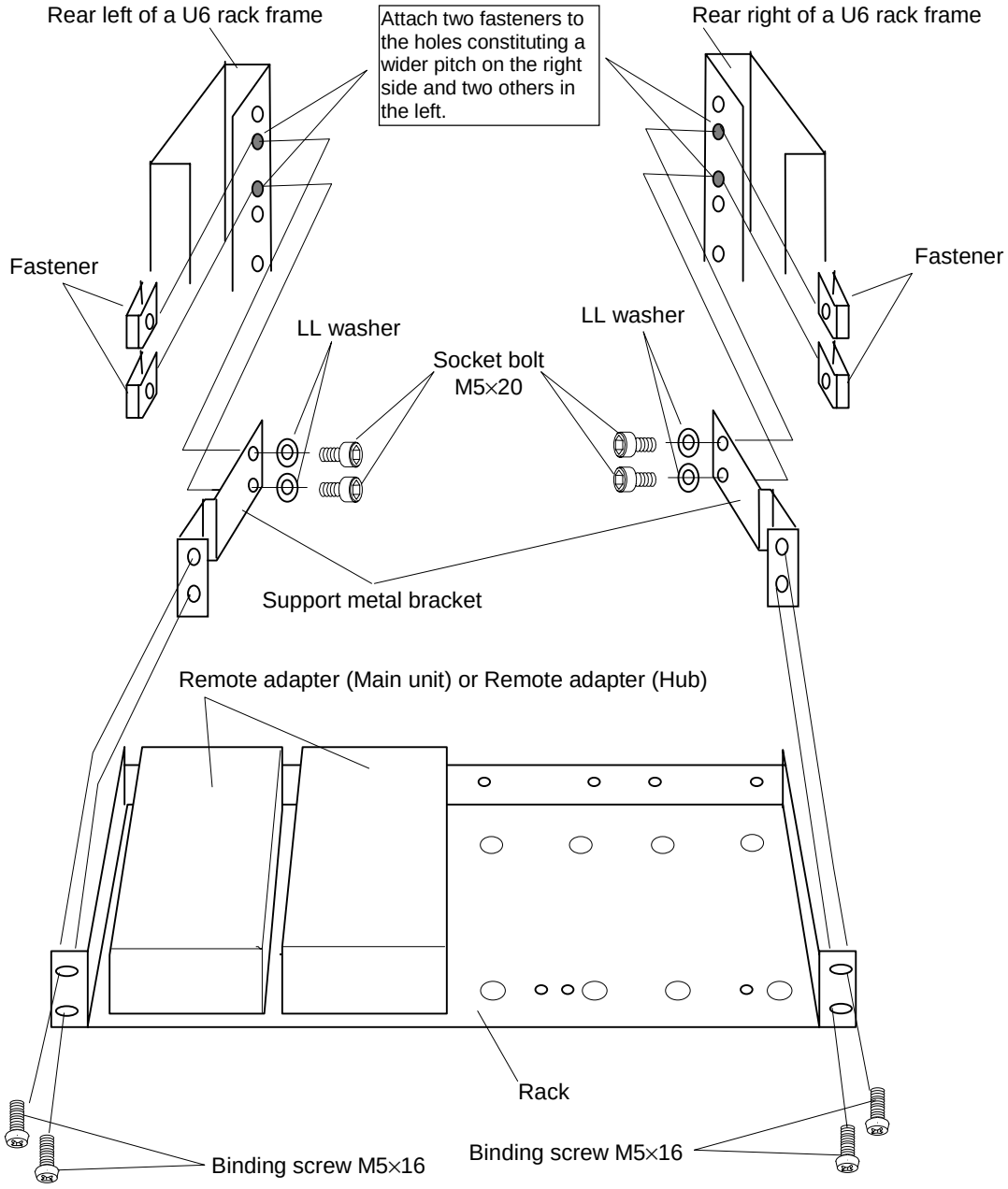


Figure 6.5.11 Mounting Rack in Rear Area of U6

Copyright © 2002, 2005, Hitachi, Ltd.

(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) Mount the rack accommodating the Remote adapter 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 M5×16 size (four places).
(d) Route and connect cables, observing the rules provided in Subsection 1.1 (2) “Note on cable routing” on page INST 01-0010.

Copyright © 2002, 2005, Hitachi, Ltd.

6.5.3 Mounting a PDU

(1) Height of Required Space in Rack Frame
The height of the space required for mounting PDU on a Rack frame.
- For U4 frame : 1 U (EIA standard)

(2) Optional Parts for Mounting (Model Name : DF-F600-UPDU)
The optional parts and their quantities required to mount the one PDU are shown below.

NOTE : The current capacity for a PDU is limited to up to 16 amperes. When mounting the multiple RKs/RKLs/RKSs/RKHs/RKHEs, and RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs, connect them avoiding applying the current of more than 16 amperes to a PDU.
Up to four subsystems in total combining 0 to 1 RKs/RKLs and 0 to 4 RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs can be connected to a single PDU.
Up to three RKS can be connected to a single PDU.

Table 6.5.4 Composition of DF-F600-UPDU (per UPDU) (REV.B or C)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	PDU	5514903-3	1	PDU (C13×6L, C19×2)	
2	Power cable	5514903-2	1	L6-30P 4.5 m	
3	Cage nut (For GND)	5490841-20	3	M4	Rev.B only
4	Cage nut (For GND)	5490841-25	3	M4	Rev.C only
5	Bind screw (M4 × 16)	SB416	3	M4	
6	Name plate	3264992-28	2	Already affixed to PDU	
7	Washer (For GND)	5490841-13	6	For securing the PDU (2 spare is included)	
8	Nut (M5)	NF005	3	For securing the PDU (1 spare is included)	
9	Bind screw (M5 × 16)	SB516	3	For securing the PDU (1 spare is included)	

(3) Tool Required
- Phillips screwdriver (No.1, No.2)
- Wrench (nominal size : 8 × 10)

(4) Installing UPDU in rack frame (U4 rack frame)
(a) When installing the PDU horizontally on the rear face of the rack frame, install it making the outlet face the rear of the subsystem.
(i) Align each mounting hole of the PDU with the hole on each pillar of the rack frame located at the center of the position for mounting the unit.
(ii) When installing the PDU horizontally, fasten it with the M5×16 binding screws and the washers (Figure 6.5.13).

Copyright © 2002, 2005, Hitachi, Ltd.

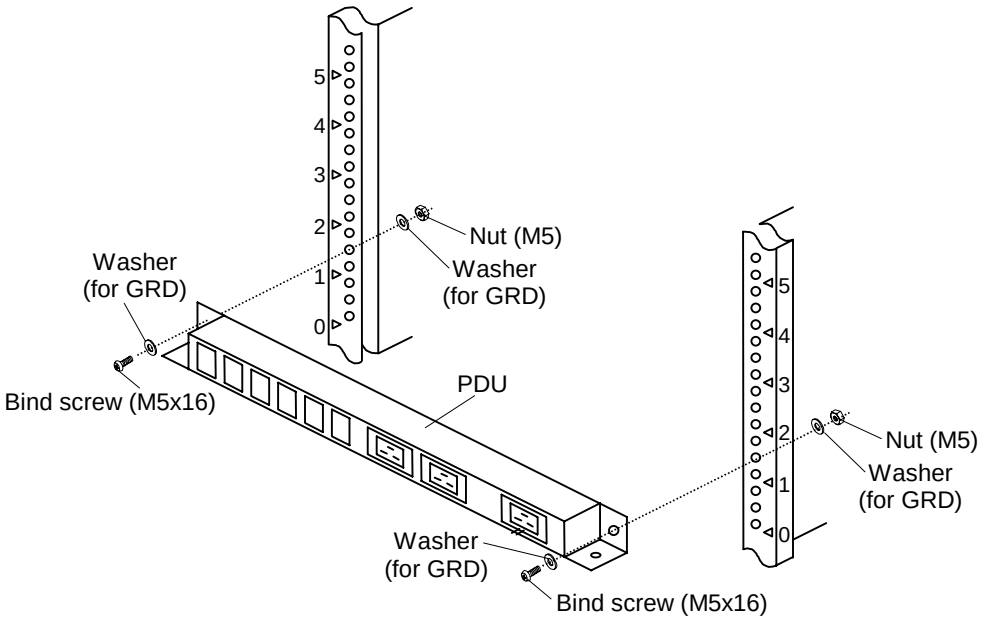


Figure 6.5.12 Installing the UPDU (Horizontally)

(b) When installing the PDU vertically on the rear face of the rack frame, install it making the outlet face the rear of the subsystem.

(i) Align each mounting hole of the PDU with the hole on each pillar of the rack frame located at the center of the position for mounting the unit.

(ii) When installing the PDU vertically, fasten it with the M5×16 binding screws and the washers using the screw holes on the rack frame.

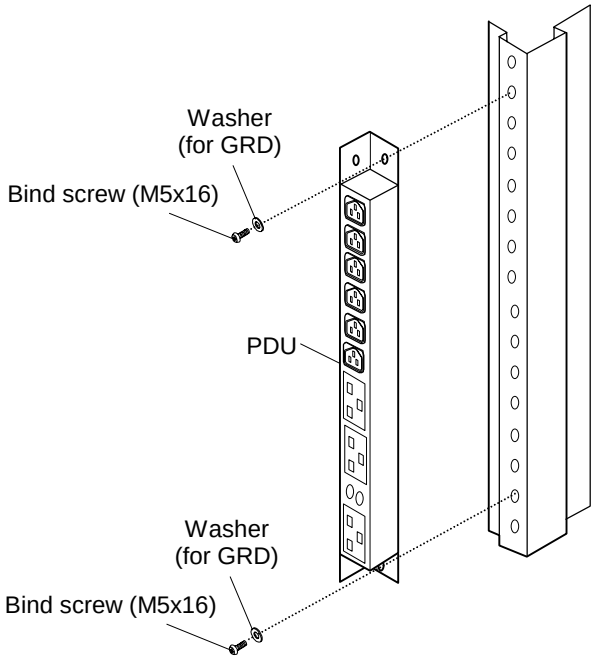


Figure 6.5.13 Installing the UPDU (Vertically)

Copyright © 2002, 2005, Hitachi, Ltd.

6.5.4 Mounting a PDB (UPDU6)

(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-F600-UPDU6)

NOTE : The current capacity for a PDB is limited to up to 16 amperes. When mounting the multiple RKs/RKLs/RKSs and RKAs/RKAATs/RKAJATLs/RKAATLs/RKAJATLs, connect them avoiding applying the current of more than 16 amperes to a PDB.
Up to four subsystems in total combining 0 to 1 RKs/RKLs and 0 to 4 RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs can be connected to a single PDB.
Up to three RKSs can be connected to a single PDB.

The optional parts and their quantities required to mount the one PDB are shown below.

Table 6.5.5 Composition of DF-F600-UPDU6 (per set)

No.	Product name	Parts No.	Quantity	Comment	Remarks
1	PDB	—	2	Adding rack frame in PDB	—
2	Power cable	3259166-A	2	L6-30P 4.5 m	—
3	Support metal bracket	32663121-1	4	U6 rack frame	For U6 rack
4	RAC NUT (Fastener)	5510146-1	10	U6 rack frame or U4 rack frame (2 spare is included)	—
5	LL Washer	2051001-513	10	U6 rack frame (2 spare is included)	For U6 rack
6	Socket bolt (M5 × 20)	BS520	10	U6 rack frame (2 spare is included)	For U6 rack
7	Bind screw (M5 × 10)	SB510	10	For securing the PDB (2 spare is included)	—
8	Name plate	3243319-232	2	Already affixed to PDB	—
9	Cable holder	3230194-1	2	Adding PDB	—
10	Socket bolt (M4 × 30)	BS430	6	For securing the cable holder	—
11	Plate holder	5519109-1	1	Adding PDB	—
12	Socket bolt (M4 × 8)	BS408	4	For securing the plate holder	—

(3) Tool Required
- Phillips screwdriver (No.1, No.2)
- Allen wrench (No.4)
- Allen wrench (No.5)

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Installing UPDU6 in U6 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 U6 rack frame where the rack accommodating the UPDU6 components is to be mounted. (See Figure 6.5.14.)
(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 Section 1.1 (2) "Note on cable routing" on page INST 01-0010.

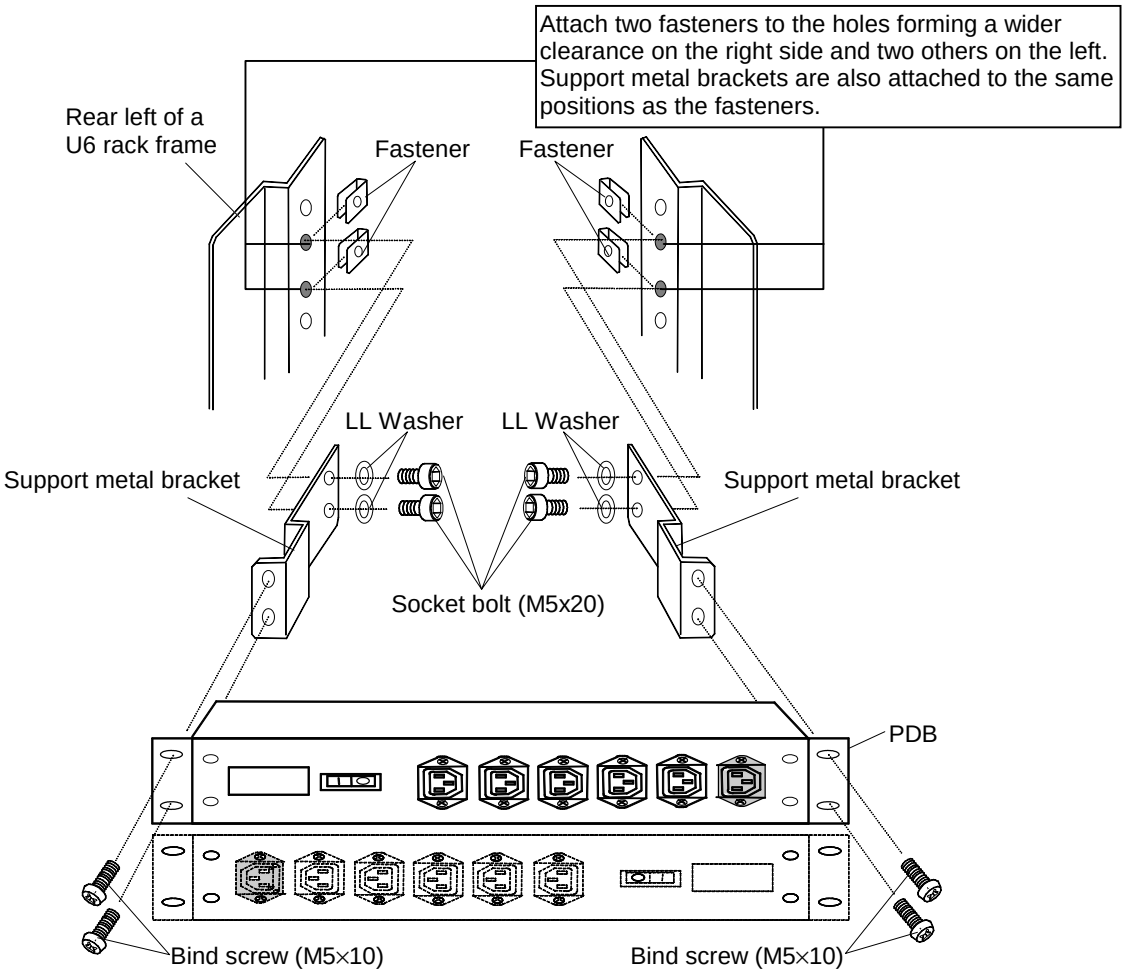


Figure 6.5.14 Installing the PDB(UPDU6)

Copyright © 2002, 2005, Hitachi, Ltd.

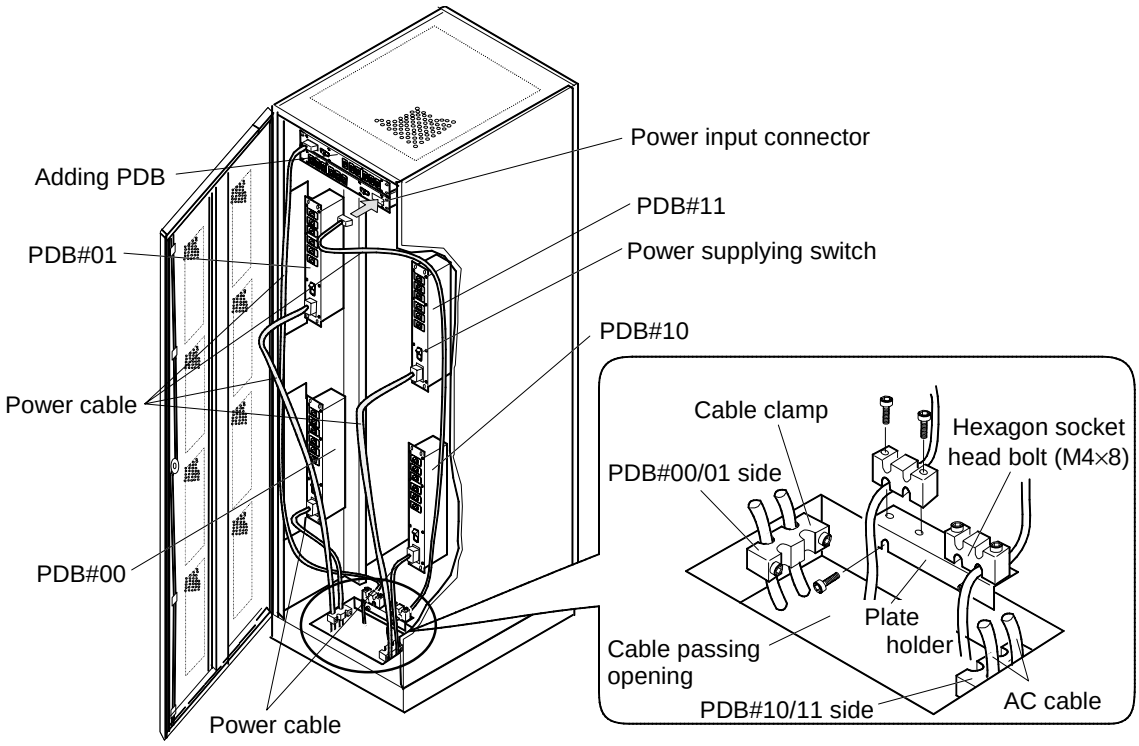
(5) Installing the power Cable (Added PDB append parts) and cable holder.

⚠ 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 : 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 Subsection 1.4.4, "How to open/close the rear door of U6 rack frame" on page INST 01-0100.)
(b) Make sure that the power supply switches of the PDBs are turned off.
(c) Fix the plate holder in the cable passing opening with the hexagon socket head bolt M4×8.
(d) Insert the power cable (attached to Rack frame) into the Rack through the opening for cables at the bottom of the Rack.
(e) Shape the cable (attached to Rack frame) to the Rack frame and connect it to the inlet connecter on the PDB.
(f) Fasten the power cables to the rack frame by attaching the cable holders with the hexagon socket head bolt M4×30.
(g) Make sure that the connecter is securely fixed after the assembly work.



Copyright © 2002, 2005 Hitachi, Ltd.

Figure 6.5.14 Installing the PDB (UPDU6)

Copyright © 2002, 2005 Hitachi, Ltd.

6.6 Adding the RKA/RKAD to the Rack Frame (In the case of the connection to the RK/RKD)

In the case of adding Disk Drives to a subsystem of the rackmount model, the RKA/RKAD must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem.
A procedure for adding the RKA/RKAD on the U6 rack frame while the subsystem power is on or power is off(‡1) is shown below.
When mounting the RKA/RKAD on the rack frame, installation of as many rack rail kits (URHT5) as the RKAs/RKADs to be added are required.

6.6.1 Procedure for adding the RKA/RKAD to the subsystem of rackmount model with U6/U4 rack frame

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) At least the following components must have been installed in the RKA/RKAD to beaded.
- Two Disk Drives (a combination of the Disk Drives #0 and #1)
- Two ENC Unit (Standard installation, Four ENC cables are included.)
- Two Power Unit (Power Unit (DC)) (RKA)'s (RKAD)'s (Standard installation)

(b) Two ENC cables per ENC Unit must have been connected between the RKA and the RK or RKA.

(c) Restriction of number of the RKAs/RKADs allowed to be added is that the total number of the RK/RKD and RKAs/RKADs must not exceed the allowable maximum of fifteen after the addition.

(d) 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 go out. (Refer to Chapter 2, "Trouble Analysis" on page MNTE 02-0000 in the Maintenance Manual (Volume of Maintenance).)

(e) No part replacement can be done while operation to make the RKA/RKAD recognized is being done.

(f) A number of installed Disk Drives when making an addition.
The installed Disk Drives when making an addition must be the #0 to #3 only.
When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must have been installed.
- When the two Disk Drives are added, install them in the Disk Drive slots #0 and #1.
- When the three Disk Drives are added, install them in the Disk Drive slots #0 to #2.
- When the four or more Disk Drives are added, install them in the Disk Drive slots #0 to #3 only.

‡1 : 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.).

Copyright © 2002, 2005, Hitachi, Ltd.

(g) Install them after all the RKAs/RKADs have been recognized(‡1) (Work-10), connect the ENC cables between the existing subsystem and the added RKA/RKAD adjacent to the subsystem for the each loop one by one. (See Subsection 6.6.3 on page INST 06-0650.)

(h) When failures occur in both of the existing subsystem and the added RKA/RKAD while the operation to make the RKA/RKAD recognized(‡1) (Work-10 to Work-11) is being done, take a recovery action against the failure of the existing subsystem preferentially after the RKA/RKAD has been recognized(‡1).
After that, take a recovery action against the failure of the added RKA/RKAD, and then resume the operation.

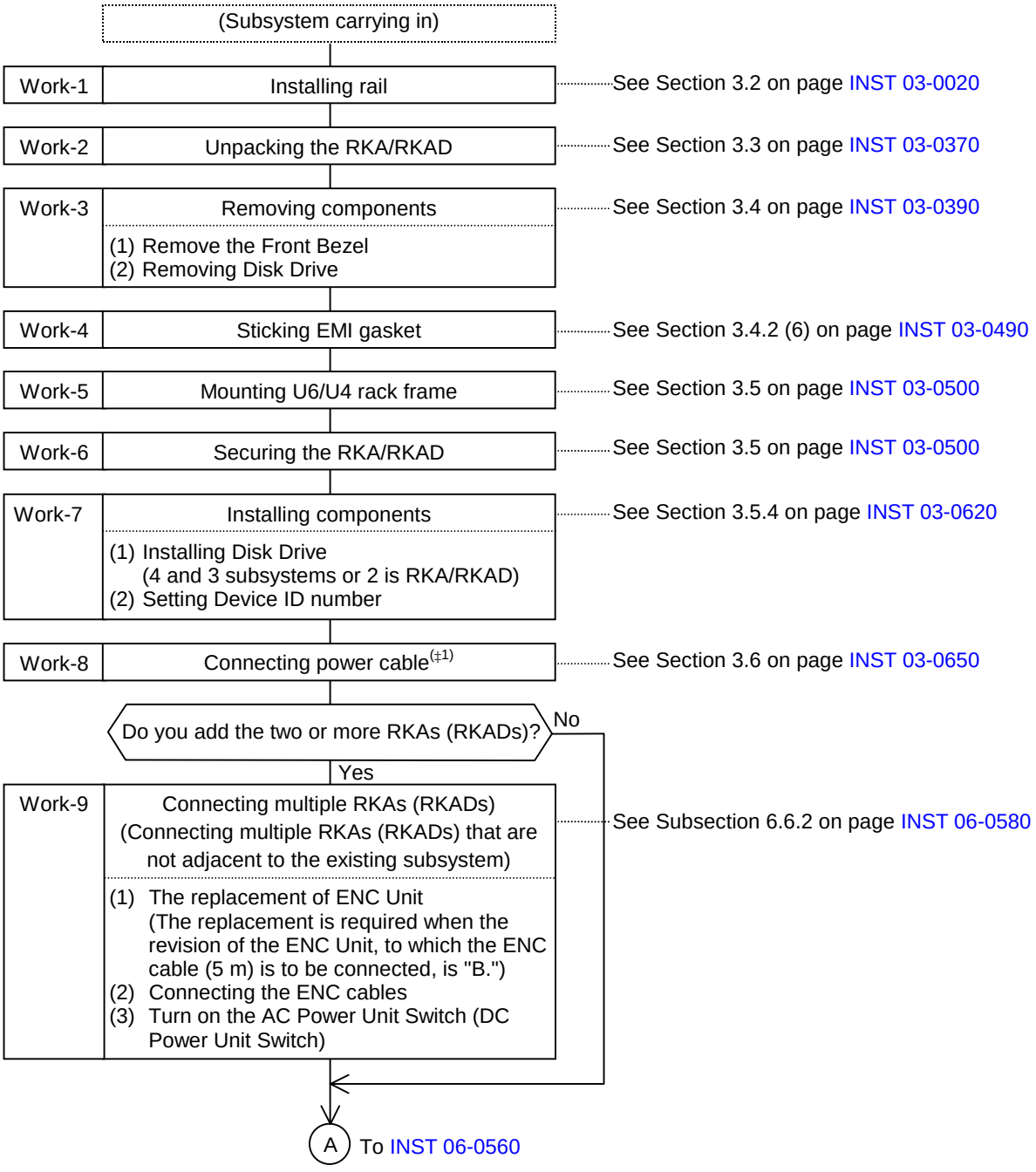
(i) Do not perform an LU formatting while the operation to make the RKA/RKAD recognized(‡1) is being done (Work-10 to Work-11). Also, do not perform the operation to make the RKA/RKAD recognized(‡1) while an LU formatting is in progress.

(j) Do not make the addition work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the addition work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

‡1 : The expression “recognized” described here means that the Controller of the existing RK/RKD recognizes the added RKA/RKAD.

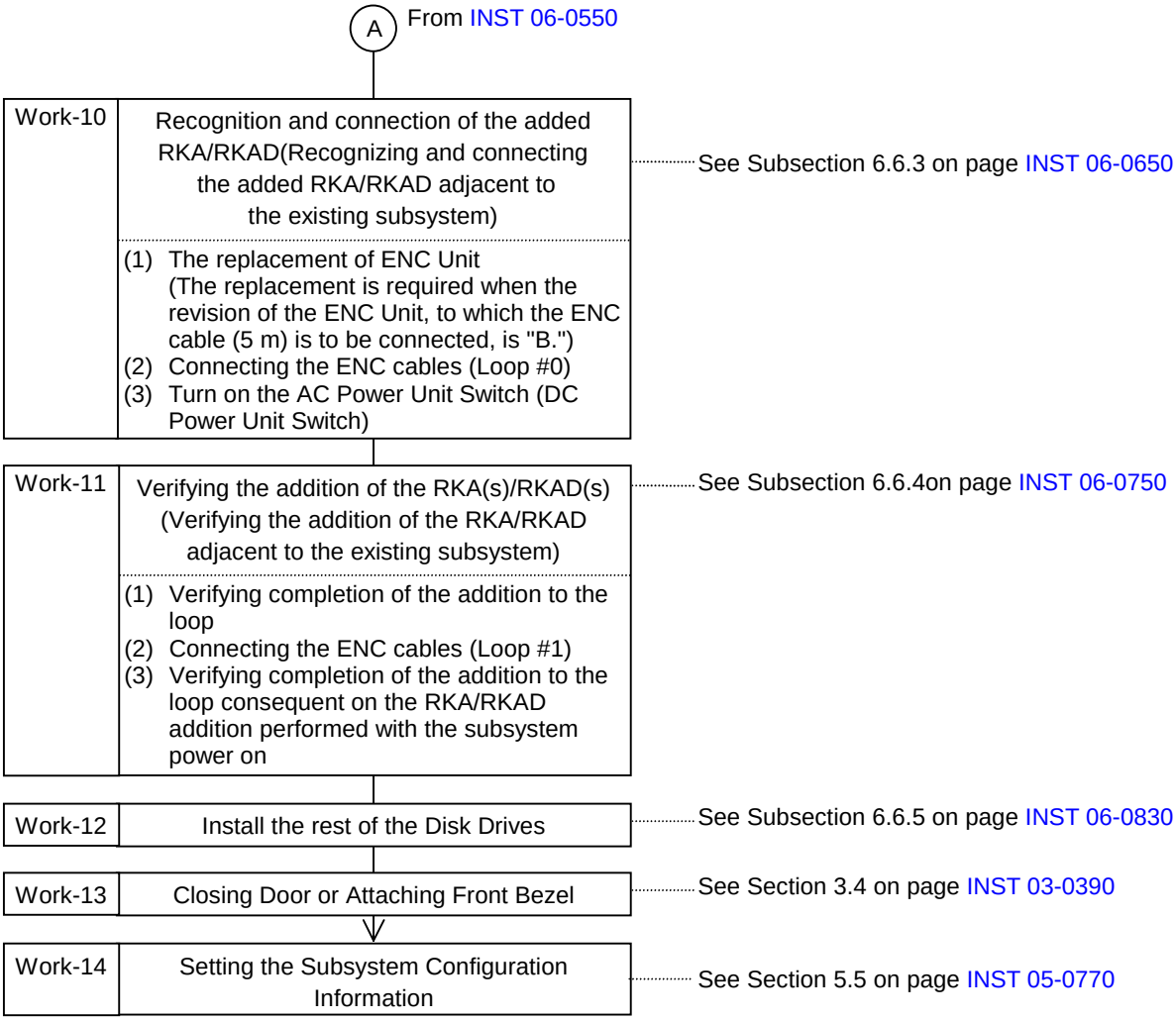
Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedures for installation the RKA/RKAD on Rack Frame while the subsystem power is on (Available only in the dual controller configuration.)
When adding the RKA/RKAD on the rack frame while the subsystem power is on, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

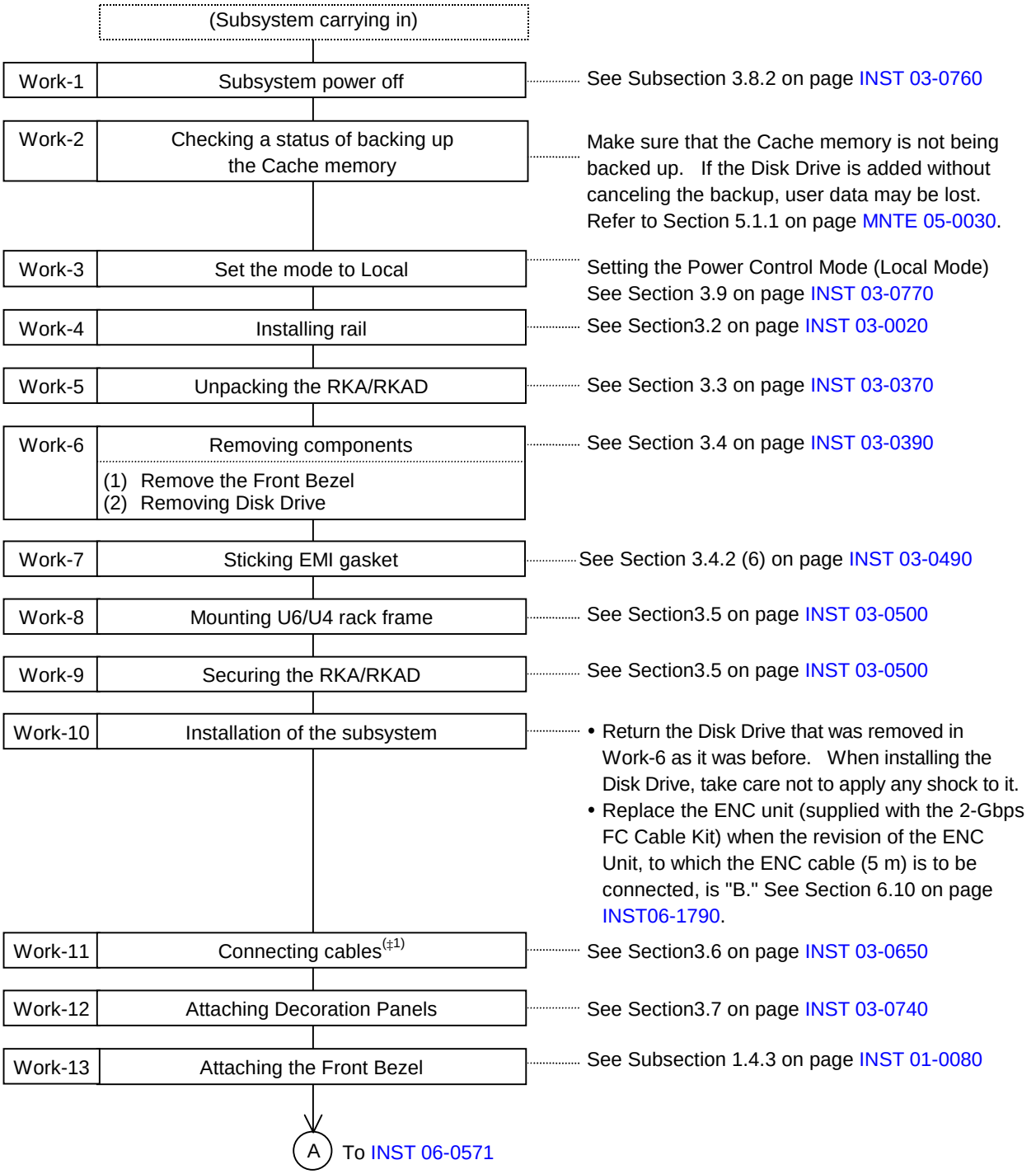
Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

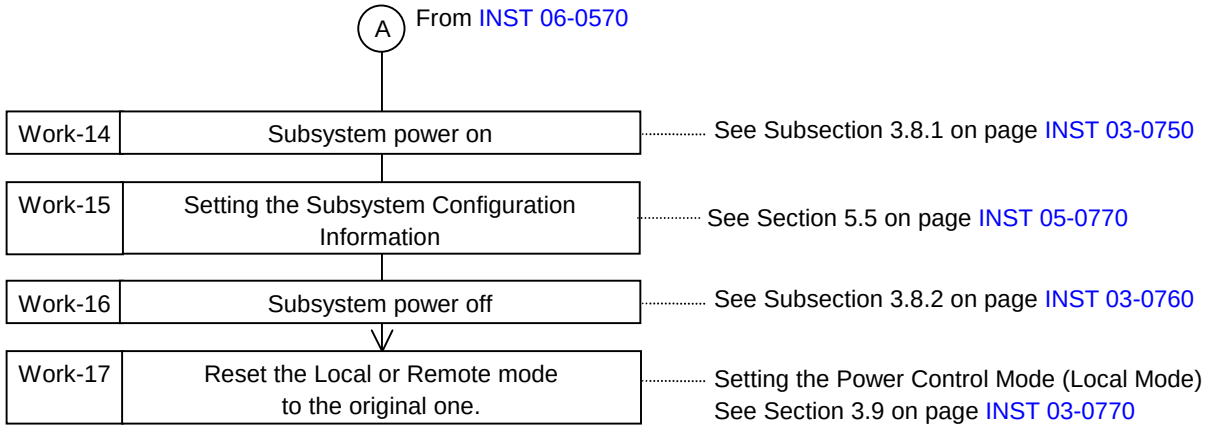
(2) Procedures for installation the RKA/RKAD on Rack Frame while the Subsystem Power Is Off

When adding the RKA/RKAD on the rack frame while the subsystem power is off, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

6.6.2 Connecting multiple RKAs/RKADs

When connecting the multiple RKAs/RKADs at a time, perform the following. According to the cable figure to be output from ACE Tool, connect the ENC cable. For the operation method of ACE Tool, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

When adding only a single RKA/RKAD, proceed to Subsection 6.6.3 on page INST 06-0650.

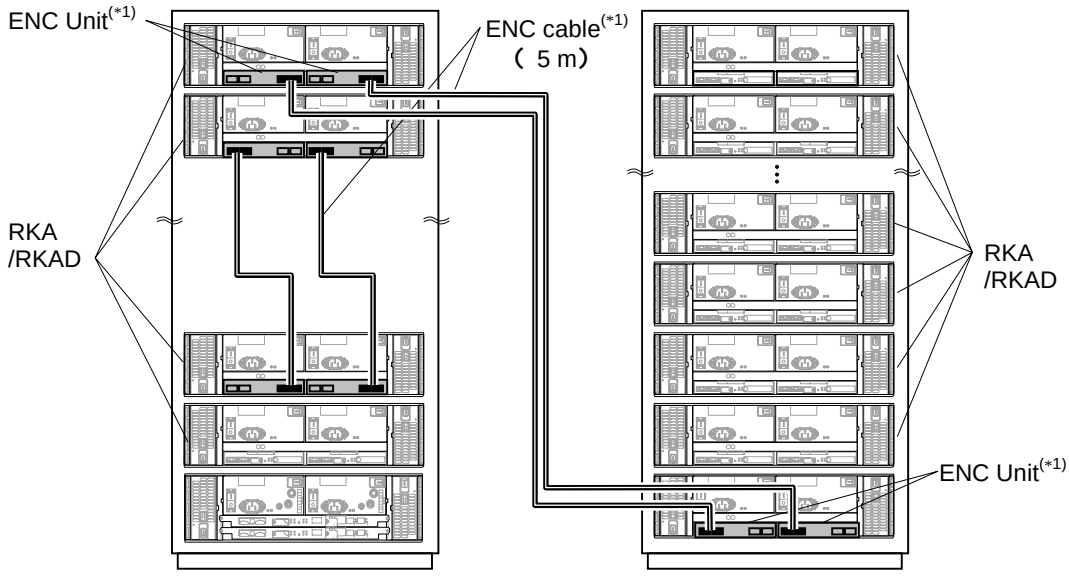
(1) Replacing the ENC Unit

Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.

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 RKA are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should be connected for the RKA.

- When the revision is "B": Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)
- When the revision is "C" or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For a single configuration, one set is included. • For a dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For a single configuration, one set is included. • For a dual configuration, two sets are included.



Copyright © 2002, 2005, Hitachi, Ltd.

*1 : FC cable assembly for 2Gbps is used for only one point in the system.

Figure 6.6.1 Replaceable Part Locations of ENC Unit

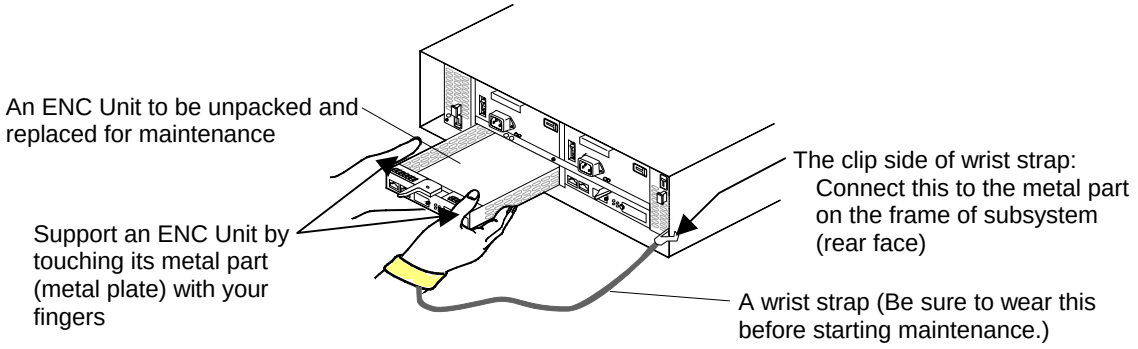
Copyright © 2002, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(a) The procedures for replacing ENC Unit (RKA/RKAD which is not adjacent to the existing unit)

NOTE : Perform the replacement when the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected, is "B."

(i) Raise the lever on the ENC Unit to be replaced in the direction shown by the arrow ① (←——) and remove the ENC Unit a little way toward you (See Figure 6.6.1.1).
(ii) Insert a new ENC Unit attached to FC cable assembly for 2 Gbps into the specified location with the levers on the ENC Unit raised shown by the arrow ① (←——) (See Figure 6.6.1.1).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (See Figure 6.6.1.1).

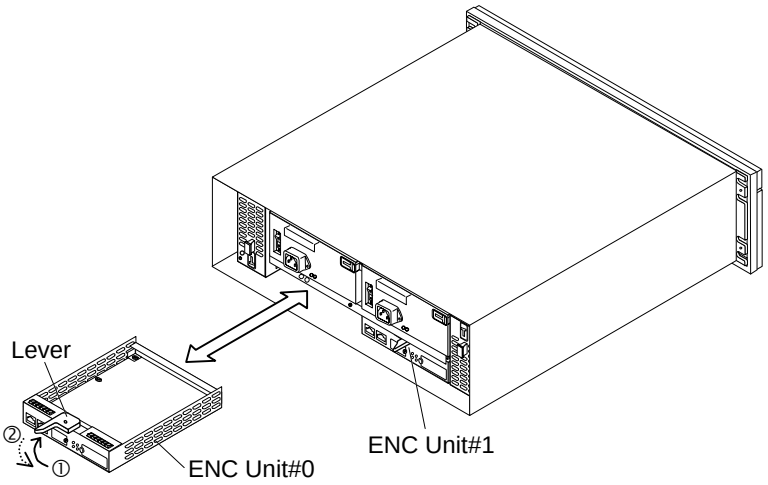


Figure 6.6.1.1 Replacing of ENC Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Connecting ENC cables (Connecting RKA/RKAD which is not adjacent to the existing unit)

When adding the RKA/RKAD, the ENC Unit has to be connected using the ENC cable(‡1). Connect all the ENC cables except those between the existing subsystem and the RKA/RKAD which is to be connected to the existing subsystem. (Following the instruction given in the procedure (3) in Subsection 6.6.3 on page INST06-0710.)

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAD
- When connecting 5 m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps.

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 ENC cables are connected to the two paths (PATH#0 and PATH#1) of the ENC Unit #0 side (Loop #0), and the two paths (PATH#0 and PATH #1) 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 the PATH #0 in milky white and the PATH #1 in yellow.

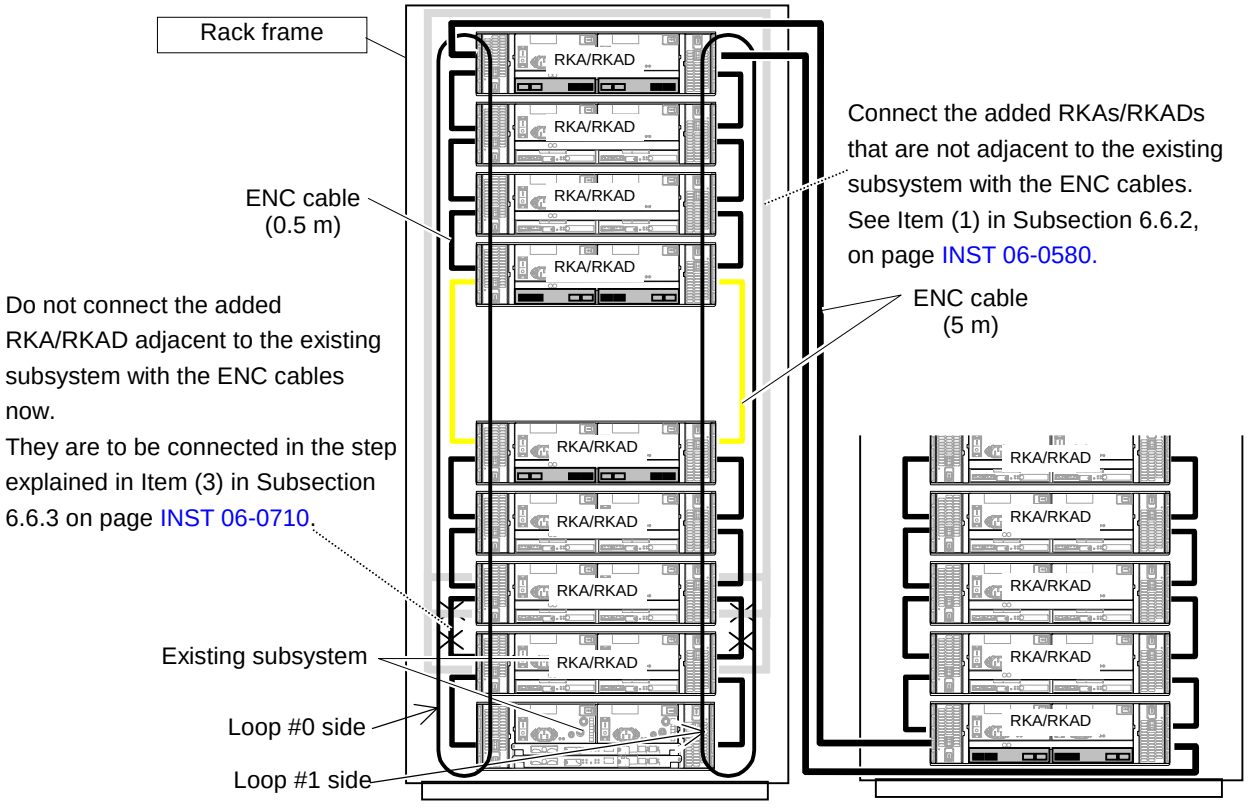


Figure 6.6.1 Connecting the ENC cables

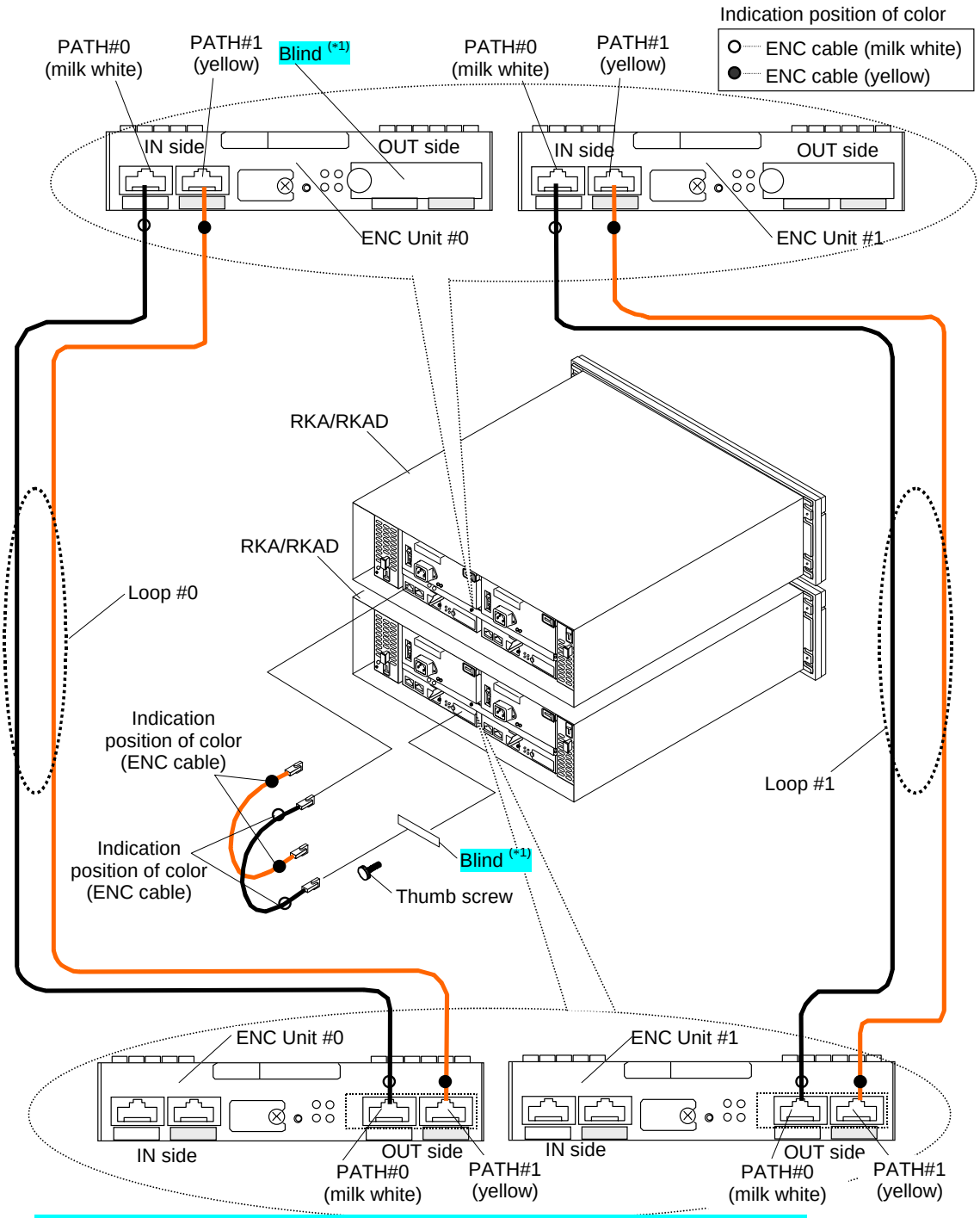
Copyright © 2002, 2005, Hitachi, Ltd.

‡1 : Keep unused cables carefully to prepare for an occasion to use them.

Copyright © 2002, 2005, Hitachi, Ltd.

<Working Procedure>

(a) Remove the blinds (‡1) on the ENC Units of each added RKA/RKAD.
The blinds (‡1) on the ENC Units finally connected are not required to be removed.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.6.2 Connecting ENC Cables

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Connect the ENC Units of the added RKAs/RKADs that are not adjacent to the existing subsystem (see Figure 6.6.2).

NOTE : Keep the same color indication when connecting the ENC cables as shown below.
Connect the both ENC Unit #0 (Loop #0) and #1 (Loop #1).

(i) Connect the ENC cable marked in milky white to the PATH #0 (in milky white) in the IN side of the ENC Unit #0 in the RKA adjacent to the PATH #0 (in milky white) in the OUT side of the ENC Unit #0.
(ii) Connect the ENC cable marked in yellow to the PATH #1 (in yellow) in the IN side of the ENC Unit #0 in the RKA adjacent to the PATH #1 (in yellow) in the OUT side of the ENC Unit #0.
(iii) For the ENC Unit #1, perform the same work as the above.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Turn on breakers of the upper PDBs (#01 and #11).
(3) Turn on AC Power Unit Switch (DC Power Unit Switch) of all the Power Units of the added RKAs/RKADs that are not adjacent to the existing subsystem.
The ALM LED on the ENC Unit of the added RKA/RKAD concerned comes on.
Do not turn on AC Power Unit Switch (DC Power Unit Switch) of the added RKA/RKAD adjacent to the existing subsystem.

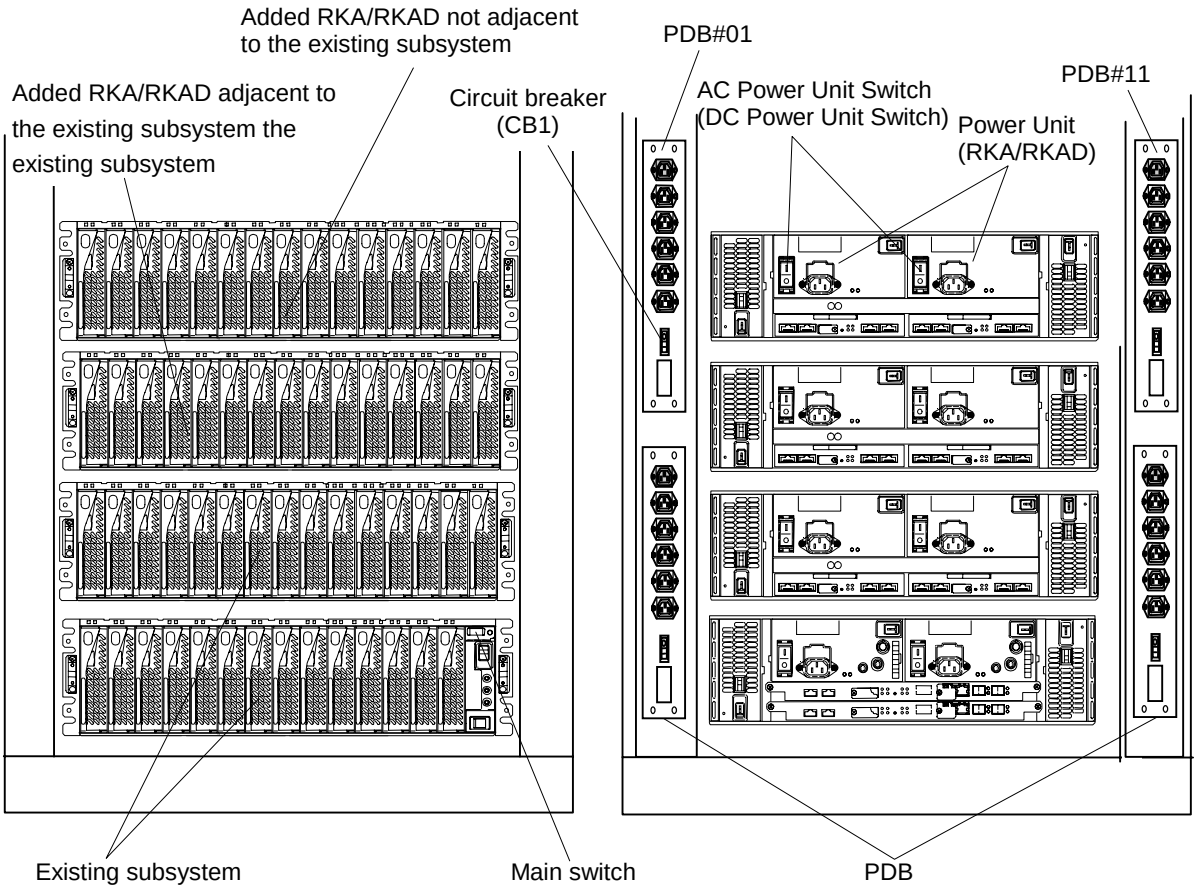


Figure 6.6.3 Locations of Switches for Power On

Copyright © 2002, 2005, Hitachi, Ltd.

6.6.3 Recognition and connection of the added RKA/RKAD

To make the added RKA/RKAD recognized, satisfy the following requirements.

No.	Item to be checked	Matter to be checked	Check result
1	Disk Drive	The Disk Drives #0 to #3 must be installed in the RKA/RKAD to be added. When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must be installed in the RKA/RKAD.	
2		The Disk Drives #4 to #14 must not be installed in the RKA/RKAD to be added	
3	ENC Unit	The two units must be installed in the RKA/RKAD to be added.	
4	Power Unit (RKA)	The two units must be installed in the RKA/RKAD to be added.	
5	WARNING (WARN) LED of the subsystem	No WARNING (WARN) LED must be on	
6	Device ID	The device ID must be set correctly (Refer to page INST 03-0643.)	
7	Number of connectable	The addition must not make the total number of the RK/RKD and RKAs/RKADs exceed the allowable maximum of fifteen.	
8	Formatting	No LU formatting must be in progress.	
9	Other maintenance works	No other maintenance work must be in progress.	

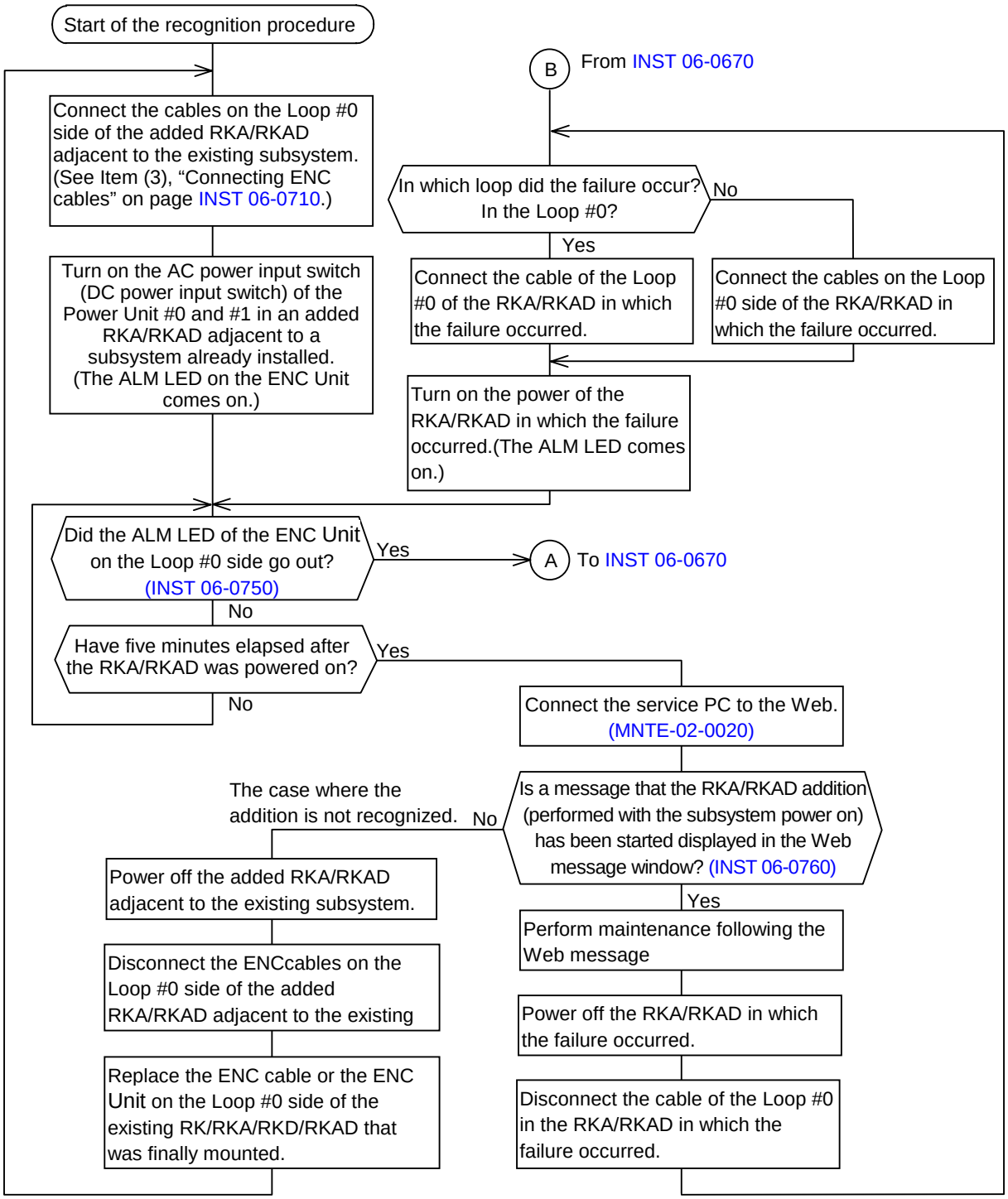
When the requirements above are satisfied, perform the operation following the "procedure for making the RKA/RKAD recognized" shown below.

When making the multiple RKAs/RKADs recognized at a time, satisfy the following requirements in addition.

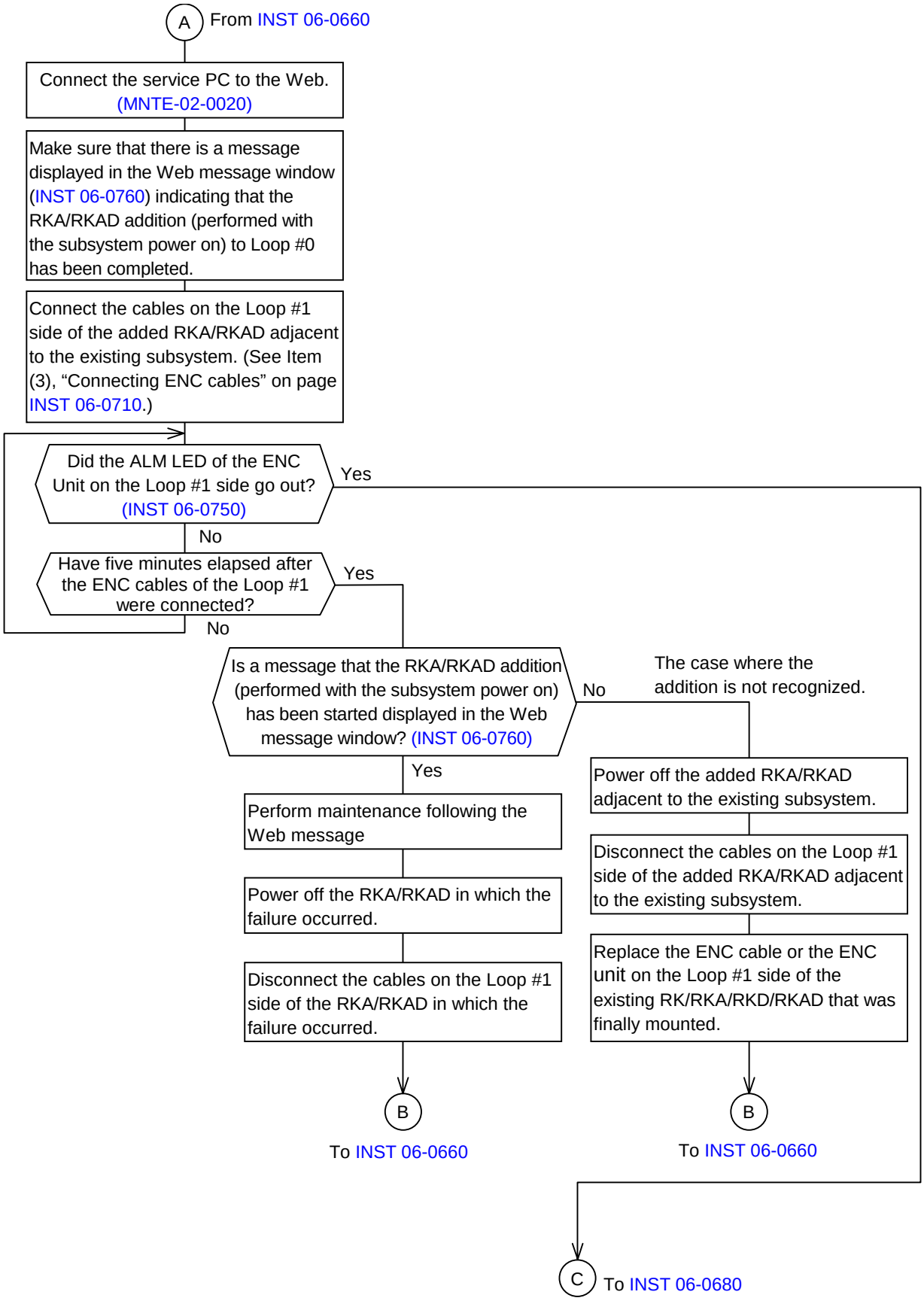
No.	Item to be checked	Matter to be checked	Check result
1	Making the multiple RKAs/RKADs recognized at a time	Are the ENC cables connected correctly to the added RKAs/RKADs other than the RKA/RKAD connected with the existing subsystem?	
2		Are the Power Units of the added RKAs/RKADs other than the RKA/RKAD connected with the existing subsystem turned on?	

Copyright © 2002, 2005, Hitachi, Ltd.

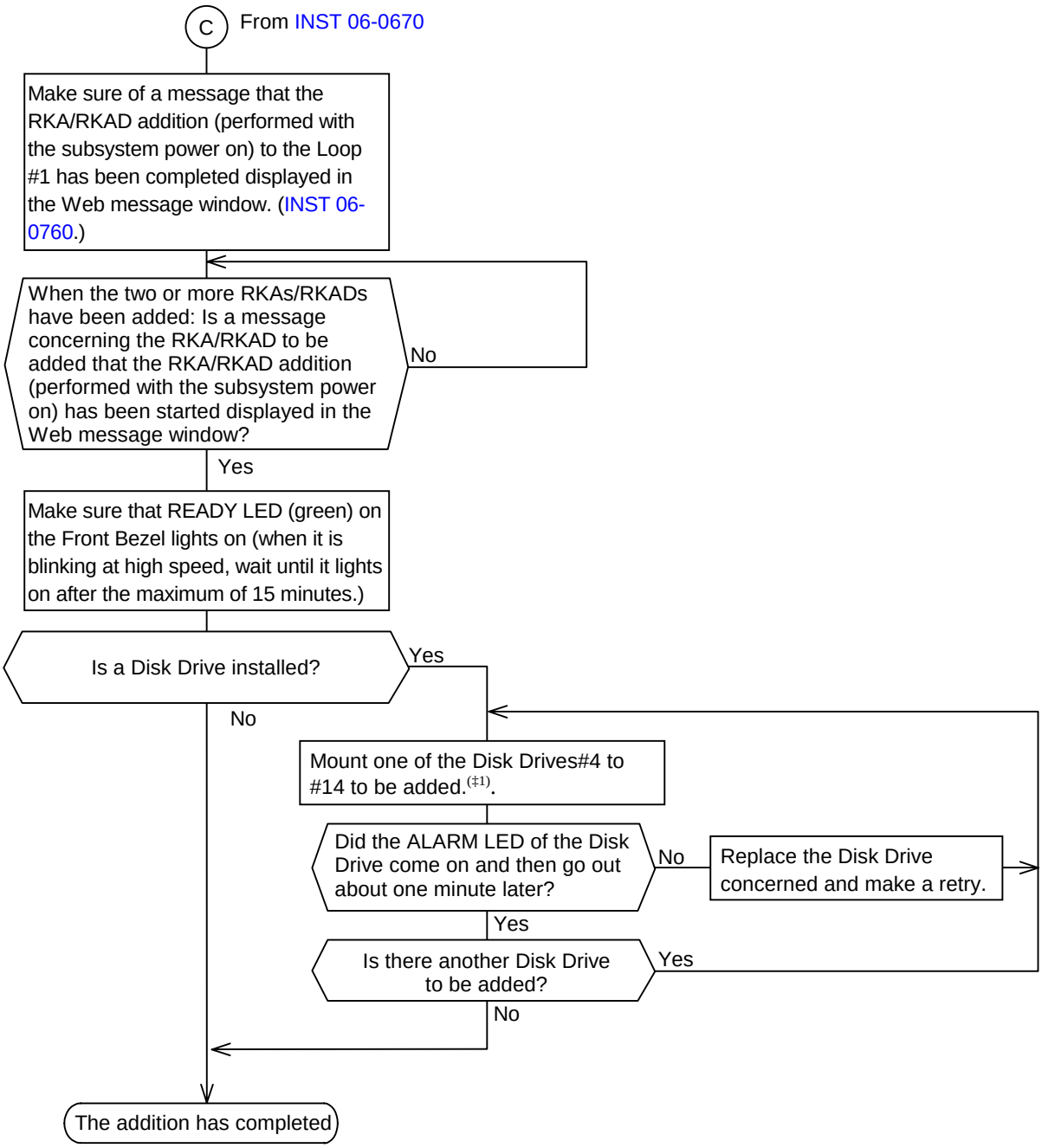
(1) Procedure for making the added RKA/RKAD recognized
Perform the RKA/RKAD recognition operation following the flowchart below.
If a failure occurs during the work, check a Web message and take an action for recovery from the failure referring to Item (4), “Troubleshooting” on page INST 06-0800.



Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.



‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Replacing ENC Unit

NOTE : Replace the ENC Unit (supplied with the 2-Gbps FC Cable Kit) when the revision of the ENC Unit is “B”.

(a) Replacing the ENC Unit of the existing unit (RKA/RKAD).
For the Loop #0 side, perform the following procedures.

(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (See Figure 6.6.3.1).

(ii) Remove the ENC cable (0.5 m) connected to the ENC 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.

(iii) Remove the ENC Unit by pulling it out toward you.

(iv) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——)(See Figure 6.6.3.1). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

(v) Connect the ENC cable (0.5 m) removed in procedure (ii) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.6.5.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

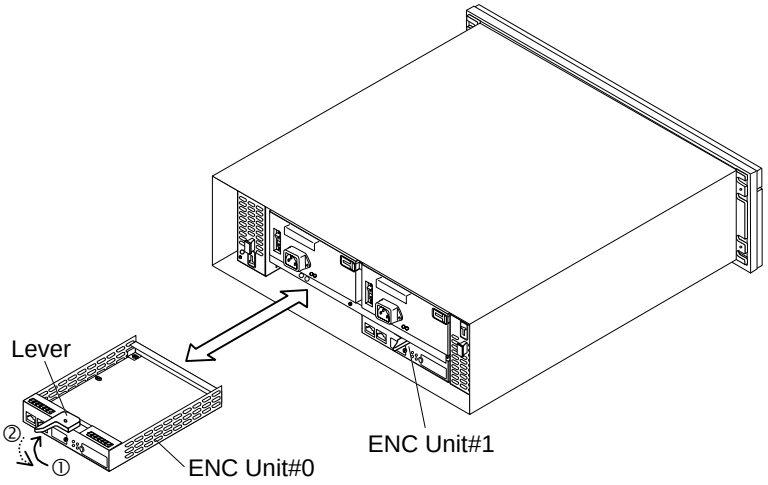


Figure 6.6.3.1 Replacing of ENC Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(vi) Return the levers in the direction shown by the arrows ② (·····>) (See Figure 6.6.3.1).

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 because the ENC Unit is considered to have failed.

(vii) Make sure that the ALM LED (red) on the ENC Unit is off.
(viii) For the Loop #1 side, perform the operation from (i) to (vii) as in the above procedures.

(b) Replacing the ENC Unit of the existing unit (RKA/RKAD) to added RKA/RKAD adjacent to the existing unit.
For the Loop #0 side and Loop #1 side, perform the following procedures.
(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (See Figure 6.6.3.1).
(ii) Insert a new ENC Unit attached to FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——) (See Figure 6.6.3.1).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (See Figure 6.6.3.1).
(iv) Connect the ENC cable (0.5 m) to the IN side of the ENC Unit attached to FC Cable Assembly for 2Gbps, and connect the ENC cable (5 m) to the OUT side of that. (However, for the OUT side of ENC Unit that will be last connected, the connection with ENC cable is not required.)

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.6.5.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Connecting ENC cables (on the Loop #0 side)
When adding the RKA/RKAD while the subsystem power is on, it is required to connect the ENC Unit for the Loop #0 (ENC #0) of the RKA/RKAD to be added and the ENC Unit with the ENC cables (‡1).

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAD
- When connecting 5m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps (RK/RKD cannot be connected by ENC cable (5 m).).

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.

NOTE :
- Be sure to connect the ENC cable from the subsystem to be added. If it is connected from the existing subsystem, the loop failures occur.
- For the single Control Unit configuration, connect the Loop #0 (ENC Unit #0) side only, and do not connect the Loop #1 (ENC Unit #1) side. When the multiple RKAs are mounted, however, connect the both ENC Unit #0 and #1 among the RKAs 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.
- The ENC cables are connected to the two paths (PATH#0 and PATH#1) of the ENC Unit #0 side (Loop #0), and the two paths (PATH#0 and PATH #1) 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 the PATH #0 in milky white and the PATH #1 in yellow.

Copyright © 2002, 2005, Hitachi, Ltd.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

Copyright © 2002, 2005, Hitachi, Ltd.

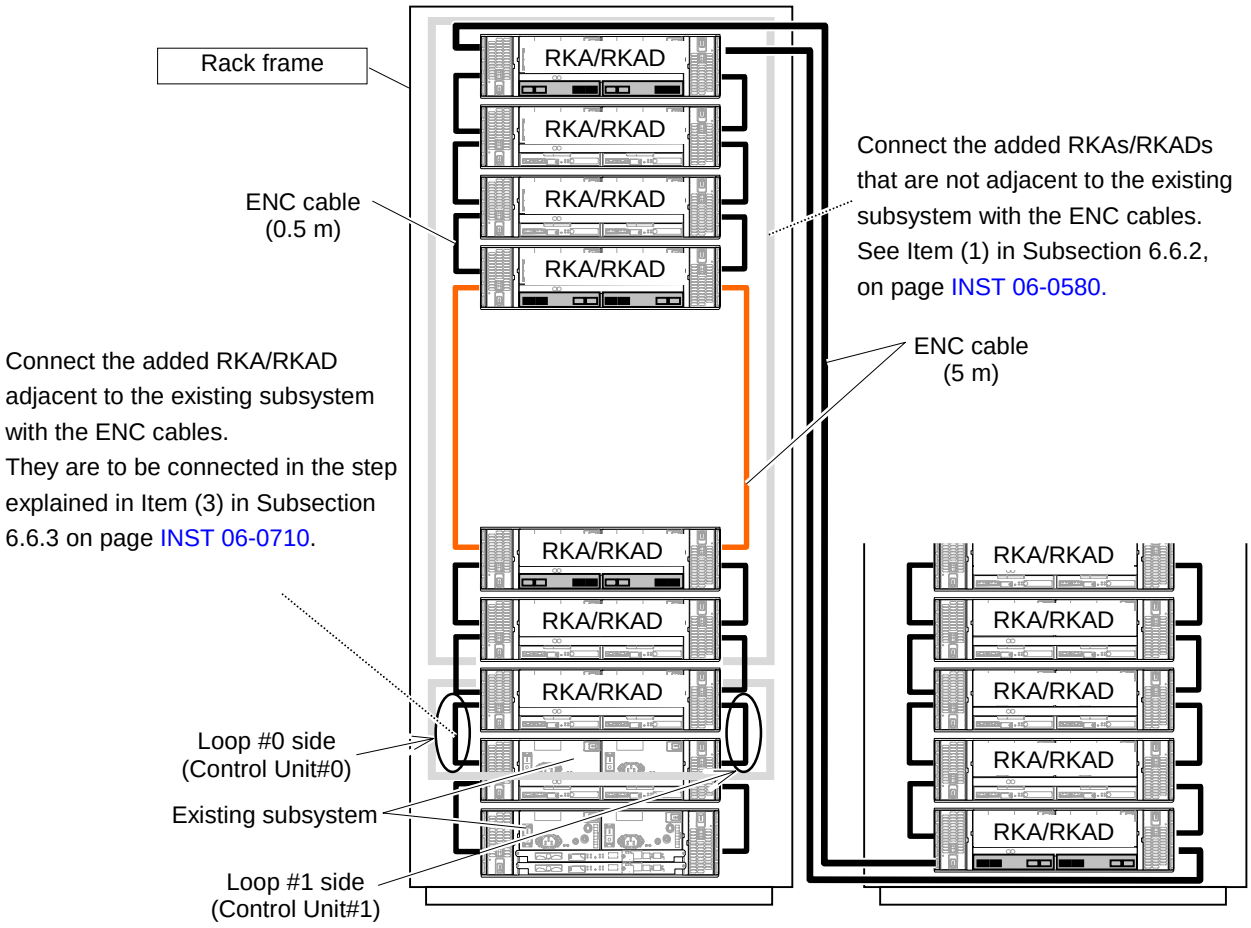


Figure 6.6.4 Connecting the ENC cables

<Working Procedure>

(a) Remove the blinds (‡1) on the FC-AL (RK/RKA/RKD/RKAD) connectors of the existing RK/RKA/RKD/RKAD that was finally mounted.

(b) Connect the ENC Unit on the Loop #0 side in the added RKA/RKAD adjacent to the disk array unit already installed to the output connector of the FC-AL on the Loop #0 side in the disk array unit already installed (RK/RKA/RKD/RKAD) with the ENC cables (see the Loop #0 in Figure 6.6.5).

NOTE : Keep the same color indication when connecting the ENC cables as shown below.

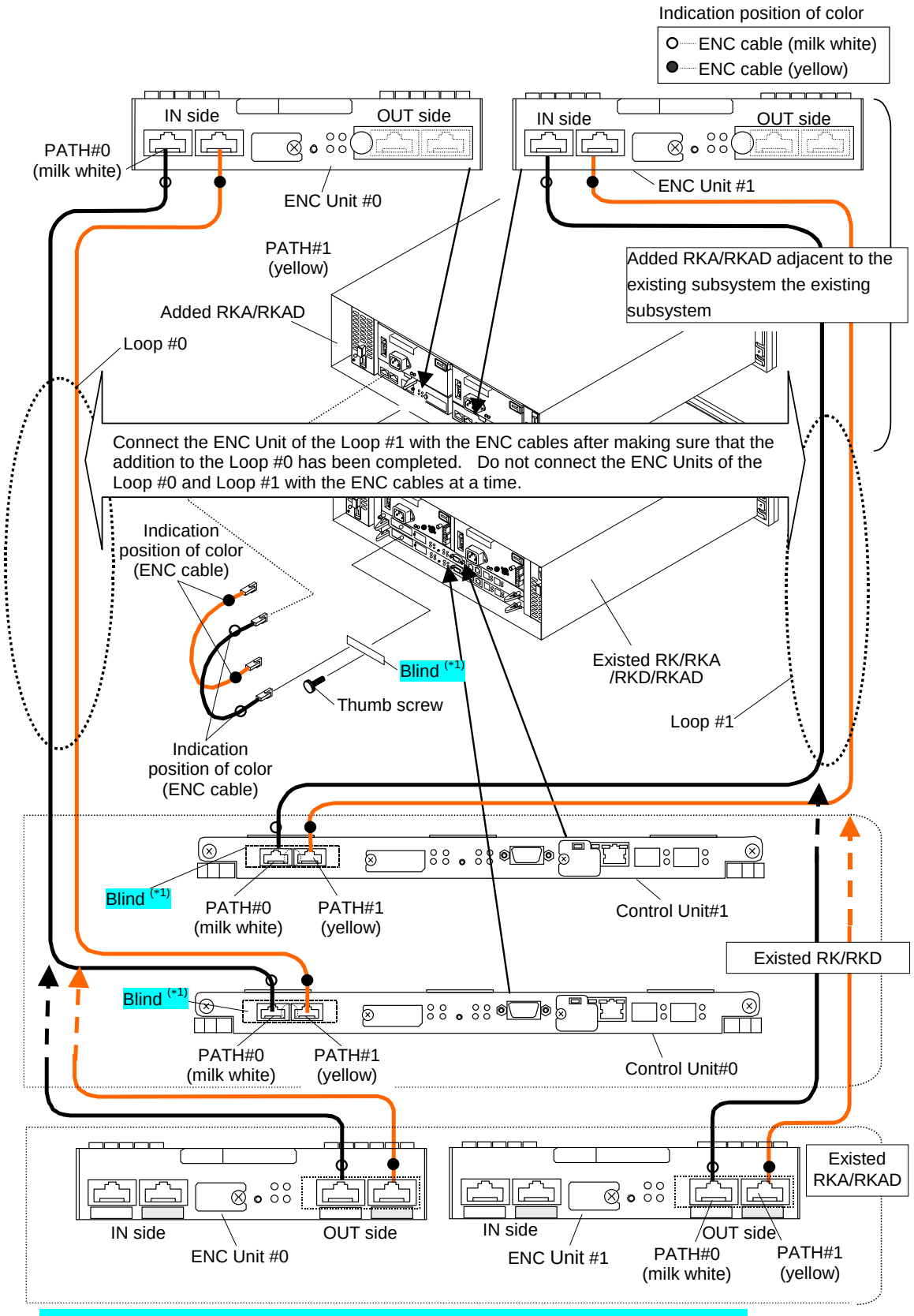
(i) Connect the ENC cable marked in milky white to the PATH #0 (in milky white) in the IN side of the ENC Unit #0 in the RKA adjacent to the PATH #0 (in milky white) in the OUT side of the ENC Unit #0.

(ii) Connect the ENC cable marked in yellow to the PATH #1 (in yellow) in the IN side of the ENC Unit #0 in the RKA adjacent to the PATH #1 (in yellow) in the OUT side of the ENC Unit #0.

(c) Connect the ENC cables of the Loop #1 after verifying the completion of the addition to the Loop #0.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.6.5 Connecting ENC Cables

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the Power Units (Power Unit (DC)) (#0, #1) of the added RKA/RKAD adjacent to the existing subsystem.

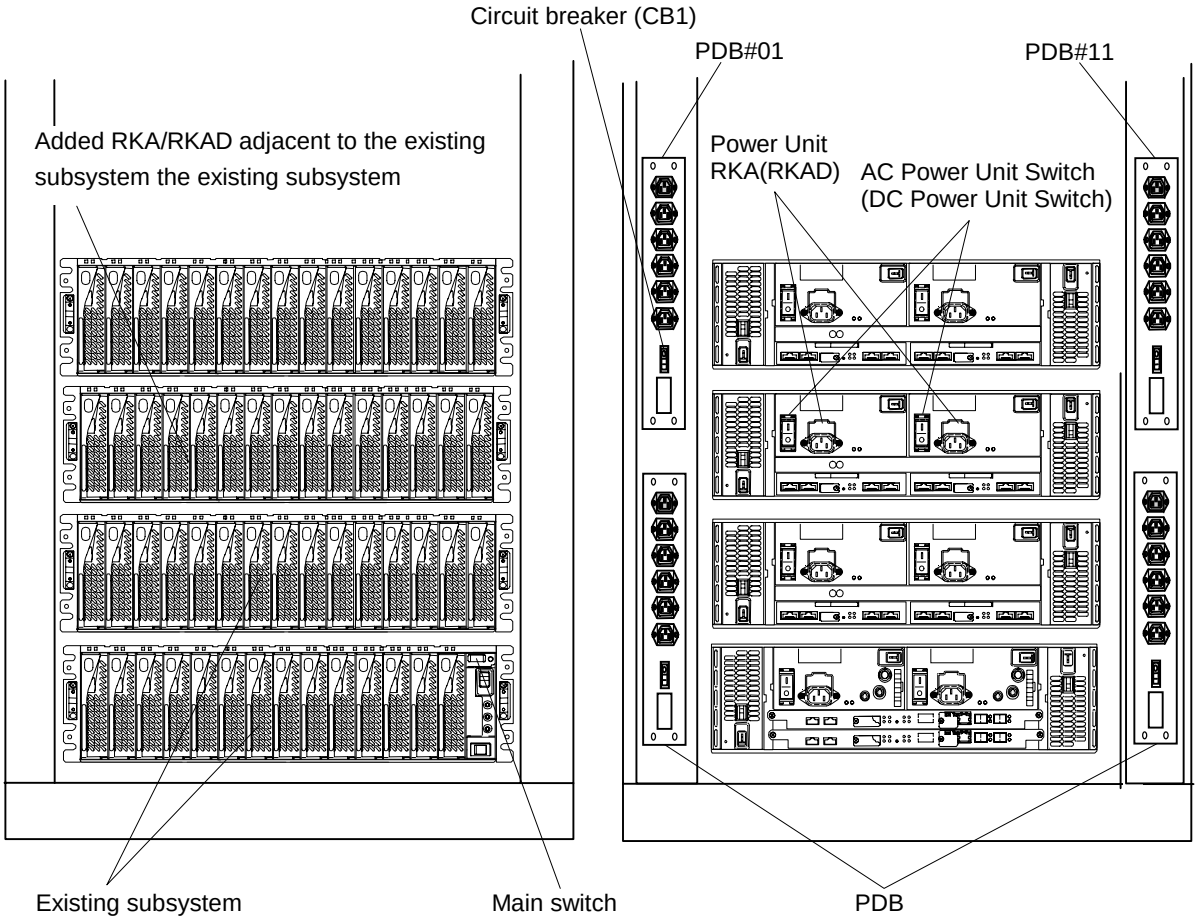


Figure 6.6.6 Locations of Switches for Power On

Copyright © 2002, 2005, Hitachi, Ltd.

6.6.4 Verifying the addition

(1) Verifying completion of the addition to the loop

(a) Procedure for verifying completion of the addition to the loop

When the ALM LED on the ENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAD are off, the addition to the loop has been completed normally.

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.

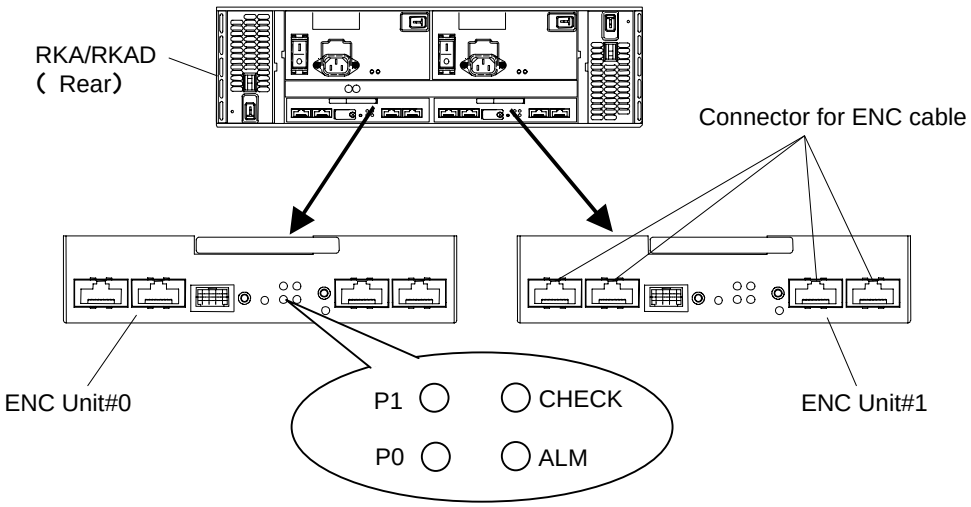
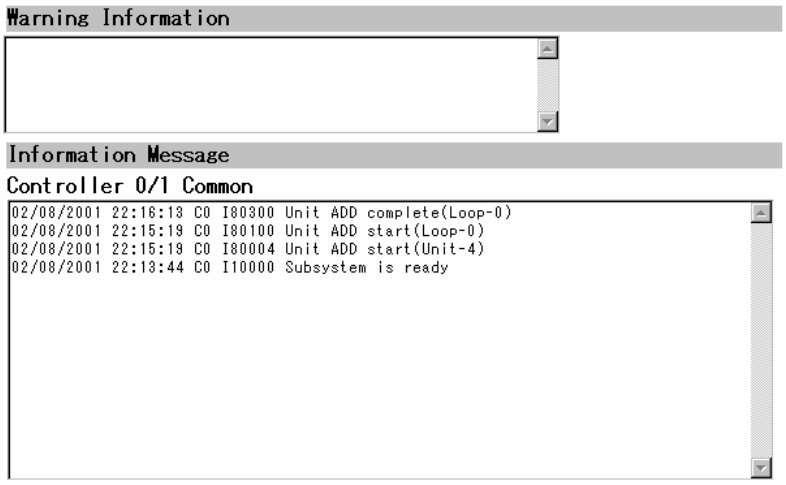


Figure 6.6.7 Locations of LED for ENC Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Contents of the WEB message
[In the case of normal termination]



MM/DD/YYYY HH:MM:SS Cx I80300 Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80100 Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80004 Unit ADD start (Unit-x)

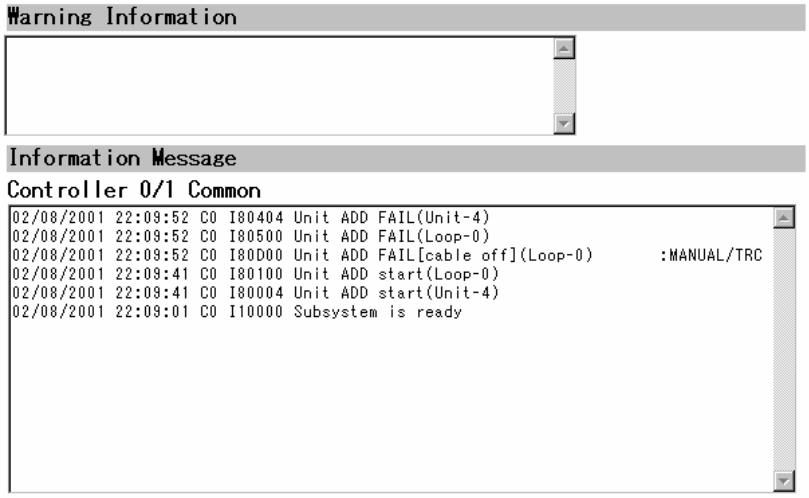
Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAD addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

Copyright © 2002, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80D0y Unit ADD FAIL [cable off] (Loop-y) :MANUAL/TRC
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAD addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).
- A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of an abnormal termination of the RKA/RKAD addition performed with the subsystem power on

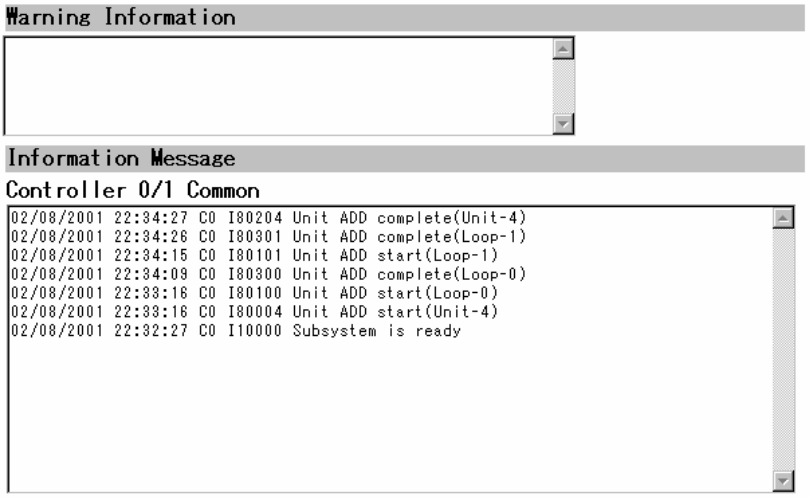
Copyright © 2002, 2005, Hitachi, Ltd.

(2) Connecting ENC cables (on the Loop #1 side)
Connect the ENC cables on the Loop #1 side in the same way as the Loop #0.
Refer to Item (3) “Connecting ENC cables (on the Loop #0 side)” on page INST 06-0710 (In the case of the connection to the RK/RKD), INST 06-1020 (In the case of the connection to the RKH/RKHE).

(3) Verifying completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

(a) Procedure for verifying completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on.
When the ALM LED of the ENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAD 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 Cx I8020x Unit ADD complete (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

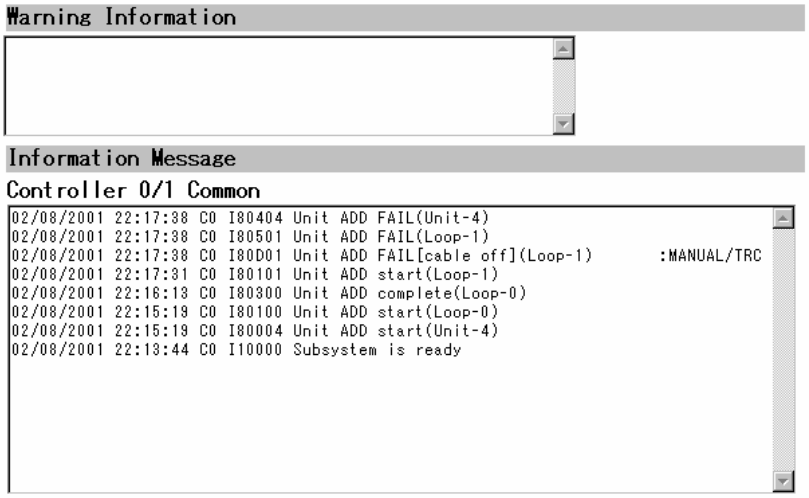
Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAD addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on
- A message informing of an l termination of the RKA/RKAD addition performed with the subsystem power on

Copyright © 2002, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD FAIL [cable off] (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

A message informing of a start of the RKA/RKAD addition performed with the system power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

A message informing of completion of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).

A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAD addition performed with the subsystem power on

A message informing of an abnormal termination of the RKA/RKAD addition performed with the subsystem power on

Copyright © 2002, 2005, Hitachi, Ltd.

(4) Troubleshooting

(a) When the ENC cable is connected to the Loop #1 first

It causes the recognition operation itself no problem if the Loop #0 is connected following the connection of the Loop #1.

It is written in the maintenance procedure that the Loop #1 is to be connected after the Loop #0 has been connected.

(b) When a failure occurs while the operation to make the RKA/RKAD recognized is in progress Take a recovery action against the failure, that occurs in the existing subsystem or added RKA/RKAD when the operation to make the RKA/RKAD recognized is in progress, after checking the message informing of a normal or abnormal termination of the addition.

If the recovery action is taken when the operation to make the RKA/RKAD recognized is in progress, an abnormal termination of the addition or a subsystem down may be caused.

(c) Failures that occur when the operation to make the RKA/RKAD recognized is in progress

- When a failure occurs in the existing part while the operation to make the RKA/RKAD recognized is in progress.

  Perform the recovery action, which is against a trouble occurs in the existing subsystem while operation to make the RKA/RKAD recognized is being done, after the addition terminates (normally or abnormally) because the action can affect the recognition of the RKA/RKAD.
- When failures occur in both of the existing and added parts while the operation to make the RKA/RKAD recognized is in progress.

  When failures occur in both of the existing and added parts while the operation to make the RKA/RKAD recognized is in progress, take a recovery action against the failure of the existing part preferentially after the addition completes, take a recovery action against the failure of the added part next, and then resume the operation for making the RKA/RKAD recognized.

(d) In the case where the operation for making the RKA/RKAD recognized is started in the state in which the Disk Drives other than the #0 to #3 have been installed.

NOTE : Install the Disk Drives #4 to #13 (#4 to #14 other than the unit ID#0) after the addition is completed. When adding the multiple subsystems at the same time, install the Disk Drives after all the RKAs/RKADs are recognized.

The following message is output in the “Information message” window in the WEB window.

I80E00 Unit ADD warning [HDU number over]

When the message above is displayed, it is possible that the addition does not complete within the predetermined time (five minutes).

Besides, do not pull out the Disk Drive while the RKA/RKAD is being made to be recognized.

Otherwise, an abnormal termination or a subsystem down may be caused.

Copyright © 2002, 2005, Hitachi, Ltd.

(e) Procedure for recovery from a system down that occurs while operation to make the RKA/RKAD recognized is being done.
To recover from a system down that occurs while operation to make the RKA/RKAD recognized is being done, remove the RKA/RKAD which is intended to be added and in which the failure has occurred, start up the subsystem again in the original state before the addition has been done, and then resume the addition of the RKA/RKAD.
If the system down recurs after the retrying, perform the addition (addition performed with the subsystem power off) after the down occurs, and then start up the subsystem again.

(f) Loop failure that occurs while the operation to make the RKA/RKAD recognized is in progress (in the case where no part is blocked)
When the addition terminates abnormally because a loop failure occurs while the operation to make the RKA/RKAD recognized is in progress, a disconnection of a cable of the blocked loop can recover the subsystem from the failure.
If the recovery fails, recover the subsystem from the loop failure by performing dummy replacement (‡1) the finally installed ENC Unit of the existing RK/RKA/RKD/RKAD.

(g) When a loop failure occurs while the operation to make the RKA/RKAD recognized is in progress and a recovery from it fails even though the cable concerned has been disconnected.
Dummy replacement of the ENC Unit, which is connected to the related loop, of the existing RK/RKA/RKD/RKAD finally mounted can recover the subsystem from the failure.

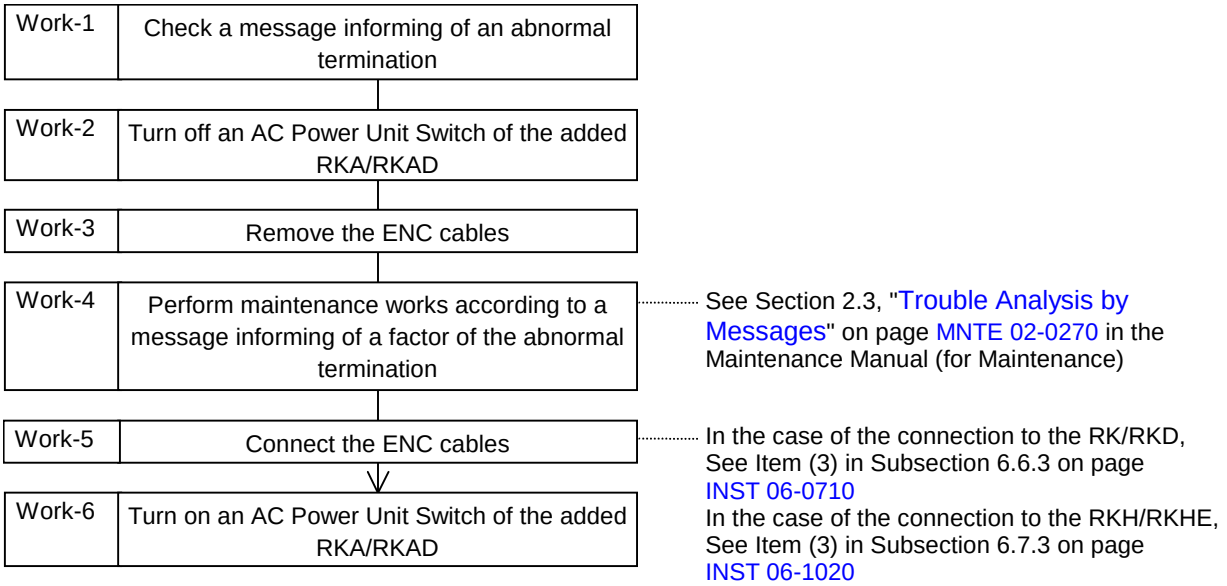
(5) Procedure for interrupting the operation for making the RKA/RKAD recognized and notes on it
When the RKA/RKAD recognition was interrupted, disconnect the ENC cables which were in the process of being added; disconnect the cables of the one loop at a time.
If you disconnect all the cables at a time, the addition may be completed causing a loop detachment or even an ENC detachment depending on the time when the disconnection is done.
When you want to remove the RKA/RKAD that has been added once after the addition has been completed, perform a sequential shutdown before an LU is constructed, and then remove the RKA/RKAD with the subsystem power off.
When the LU has already been constructed, delete the LU and perform a sequential shutdown (That is because the subsystem will go down at the time of the next powering on if the LU is left.)
It causes no problem if a RAID group is constructed before the de-installation, however, the RAID group will not be deleted after the next powering on.

‡1 : To remove the part concerned once, and then to reinstall it (after waiting for 20 seconds)

Copyright © 2002, 2005, Hitachi, Ltd.

(6) Procedure for resuming an RKA/RKAD addition with the subsystem power on when the addition has terminated abnormally.
When you want to add the RKA/RKAD again while the subsystem power is on after the addition has terminated abnormally, operate following the procedure shown below.

NOTE : • Turn off the AC Input Power Unit Switch (DC Input Power Unit Switch) of the added RKA/RKAD which was terminated abnormally, wait for 20 seconds or more, and turn it on again.
• When turning off the AC Power Unit Switch (DC Power Unit Switch) of the added RKA/RKAD, do not turn off the AC Power Unit Switch (DC Power Unit Switch) of the RKA/RKAD that has been normally recognized (the ALM LEDs of whose ENC Units for the both loops are off).
When turning off the AC Power Unit Switch (DC Power Unit Switch) or removing the ENC cable of the failed RKA/RKAD only, operate in the same way. Never turn off the AC power switch of the recognized RKA/RKAD or disconnect the ENC cable of it because each of the above operations causes a system down.



Wait for 20 seconds after turning off an AC Power Unit Switch (DC Power Unit Switch) of the added RKA/RKAD, and then turn on the AC Power Unit Switch (DC Power Unit Switch) again.

Copyright © 2002, 2005, Hitachi, Ltd.

6.6.5 Install the rest of the Disk Drives

Install the rest of the Disk Drives in the Disk Drive slots #4 to #14 of the RKA/RKAD. Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed. (‡1)

(1) Pull the parts out of the Disk Drives safekeeping of component.
(2) Insert the Disk Drive into the position (address) where it was by holding it with the handle.
Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.
(3) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270

Copyright © 2002, 2005, Hitachi, Ltd.

6.7 Adding RKA to Rack Frame (In the case of the connection to the RKH/RKHE)

If there are not enough empty slots in the existing subsystems to add more Disk Drives to the Rackmount model, the RKA shall be added to the frame.
The procedures for adding the RKA to a U6 rack frame when the power to the subsystem is on or off(‡1) are shown below.
When mounting the RKA onto the rack frame, use the number of rack rail kits (URHT5) as the RKAs to be added are required.

6.7.1 Procedure for adding the RKA to the subsystem of rackmount model with U6/U4 rack frame

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) At least the following components must have been installed in the RKA to beaded.
- Two Disk Drives (a combination of the Disk Drives #0 and #1)
- Two ENC Unit (Standard installation, Four ENC cables are included.)
- Two Power Unit (Power Unit (DC)) (RKA)'s (Standard installation)

(b) Two ENC cables per ENC Unit must have been connected between the RKA and the RKH/RKHE or RKA.

(c) Restriction of number of the RKAs allowed to be added is that the total number of the RKH/RKHE and RKAs must not exceed the allowable maximum of fifteen after the addition.

(d) 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 go out. (Refer to Chapter 2, "Trouble Analysis" on page MNTE 02-0000 in the Maintenance Manual (Volume of Maintenance).)

(e) No part replacement can be done while operation to make the RKA recognized is being done (Work-10).

(f) A number of installed Disk Drives when making an addition.
The installed Disk Drives when making an addition must be the #0 to #3 only.
When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must have been installed.
- When the two Disk Drives are added, install them in the Disk Drive slots #0 and #1.
- When the three Disk Drives are added, install them in the Disk Drive slots #0 to #2.
- When the four or more Disk Drives are added, install them in the Disk Drive slots #0 to #3 only.

(g) Install them after all the RKAs have been recognized(‡2) (Work-10), connect the ENC cables between the existing subsystem and the added RKA to be connected to the subsystem for the each loop one by one. (See Subsection 6.7.3 on page INST 06-0960.)

‡1 : 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.).

‡2 : The expression "recognized" described here means that the Controller of the existing RKH/RKHE recognizes the added RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

(h) When failures occur in both of the existing subsystem and the added RKA while the operation to make the RKA recognized(‡1) (Work-10) is being done, take a recovery action against the failure of the existing subsystem preferentially after the RKA has been recognized(‡1).
After that, take a recovery action against the failure of the added RKA, and then resume the operation.

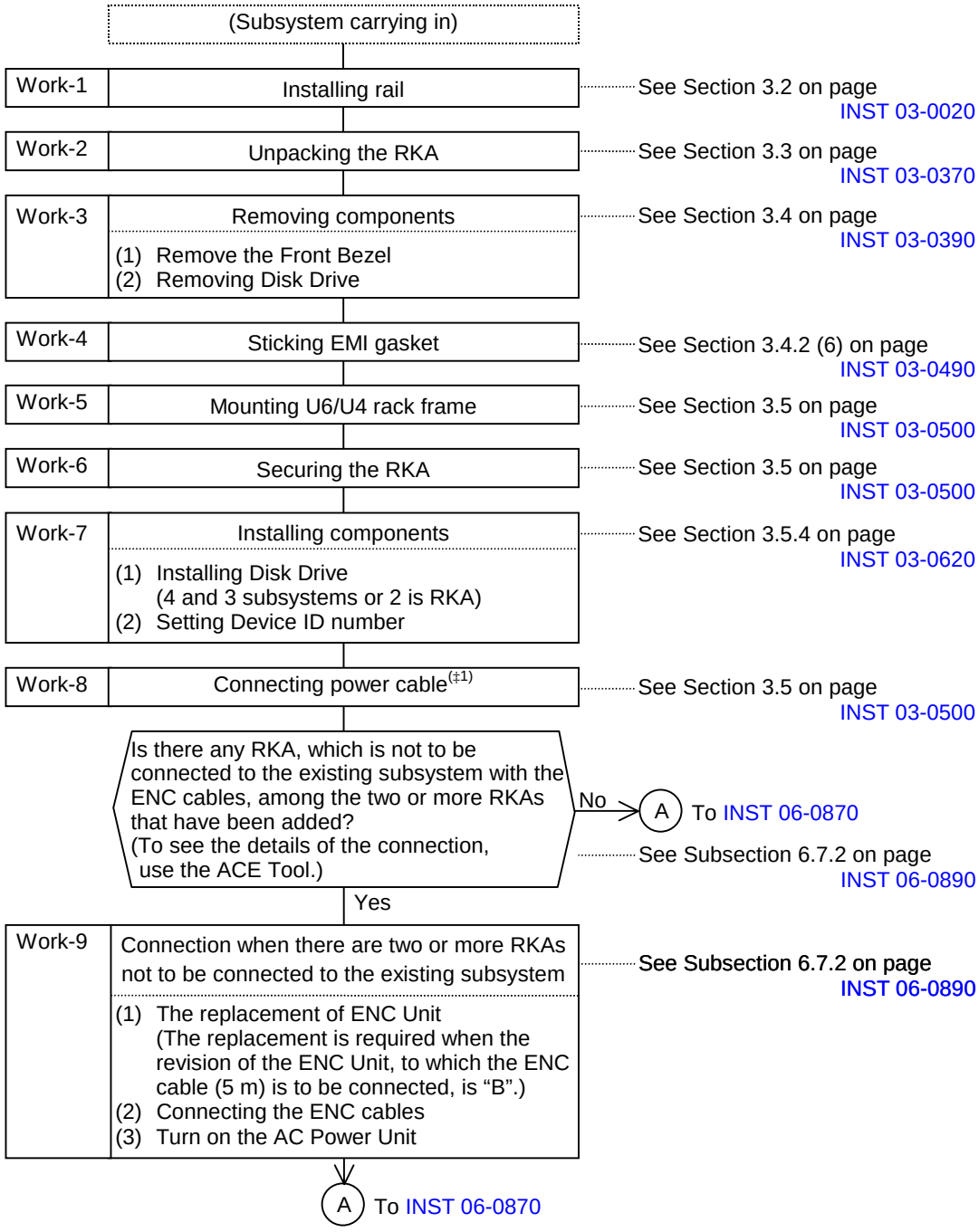
(i) Do not perform an LU formatting while the operation to make the RKA recognized(‡1) is being done (Work-10). Also, do not perform the operation to make the RKA recognized(‡1) while an LU formatting is in progress.

(j) Do not make the addition work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the addition work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

‡1 : The expression “recognized” described here means that the Controller of the existing RKH/RKHE recognizes the added RKA.

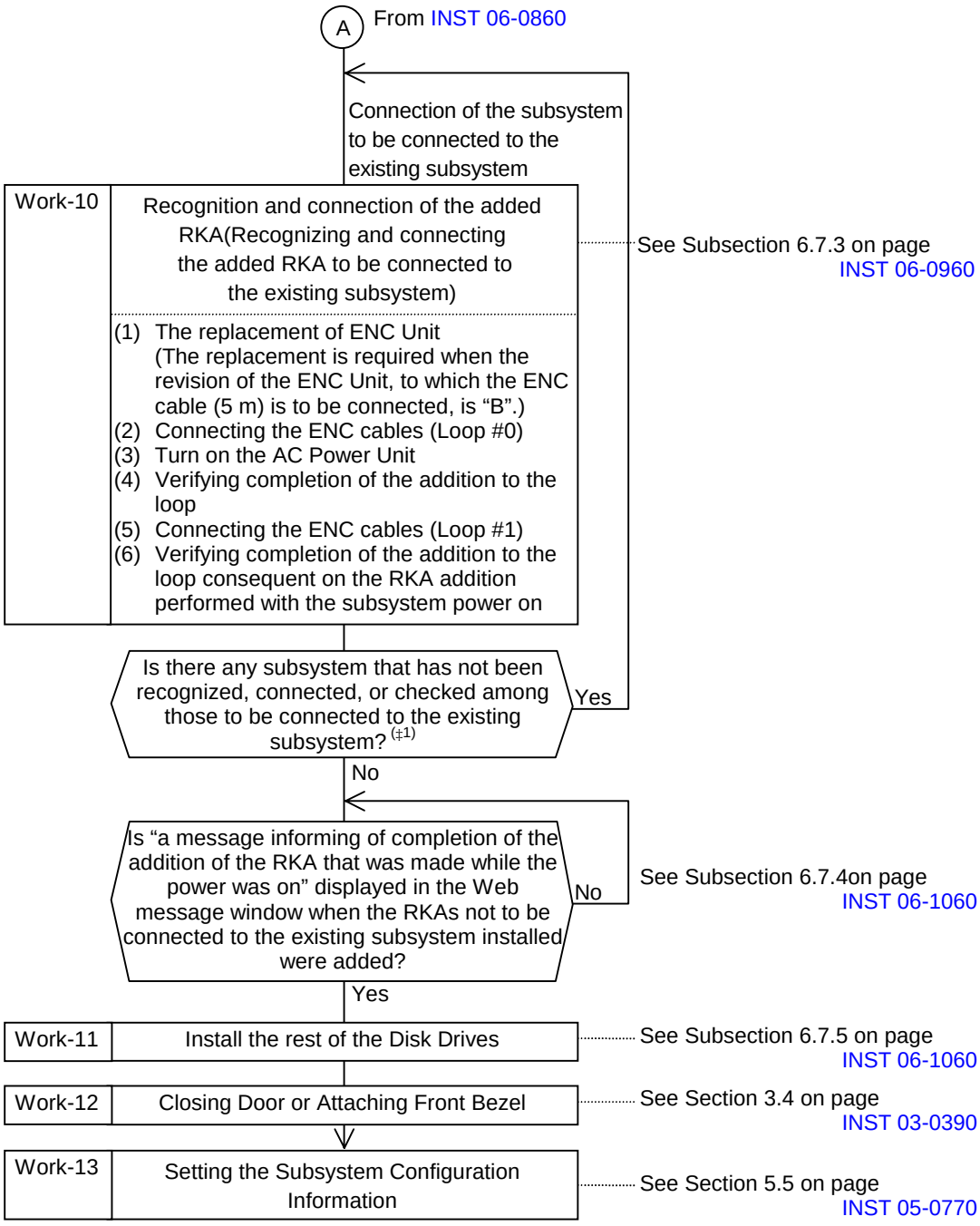
Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedures for installation the RKA on Rack Frame while the subsystem power is on (Available only in the dual controller configuration.)
When adding the RKA on the rack frame while the subsystem power is on, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

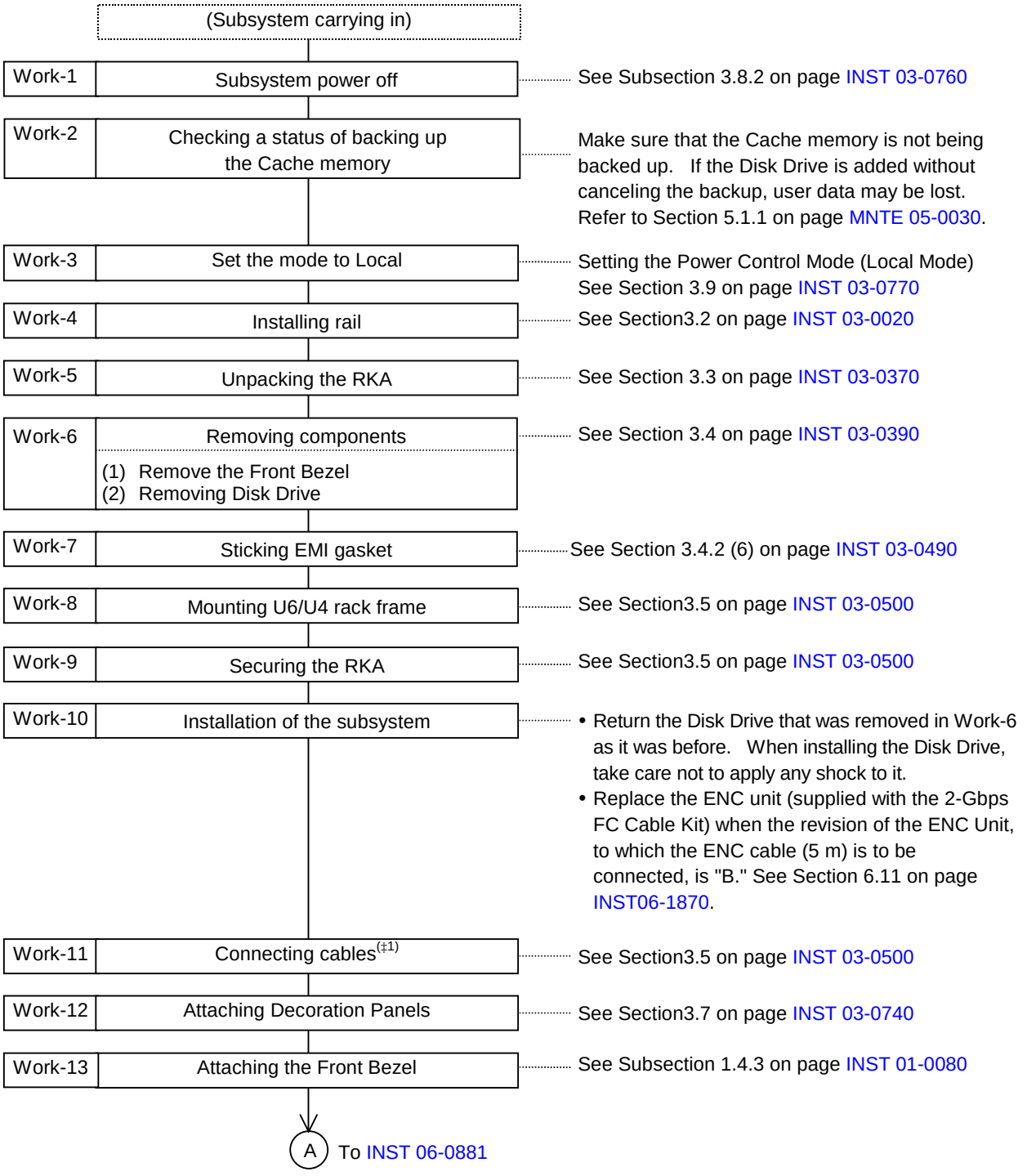
Copyright © 2002, 2005, Hitachi, Ltd.



‡1 : Perform the operation Work-10 to the adding subsystem (in an order from the subsystem nearest to the basic subsystem) to be connected to the existing subsystem (two RKAs at maximum).

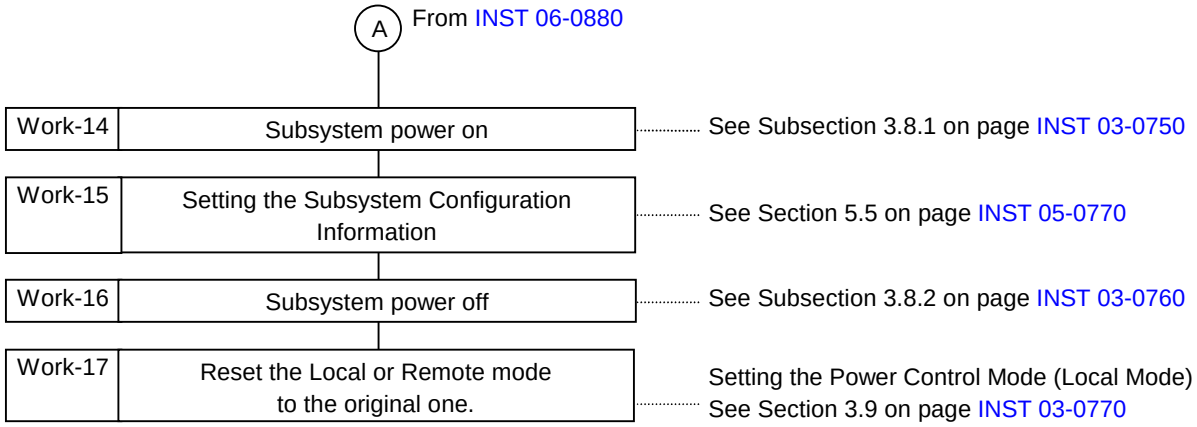
Copyright © 2002, 2005, Hitachi, Ltd.

(2) Procedures for installation the RKA on Rack Frame while the Subsystem Power Is Off
When adding the RKA on the ack frame while the subsystem power is off, make sure of the following work items before starting the addition.



‡ 1: When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

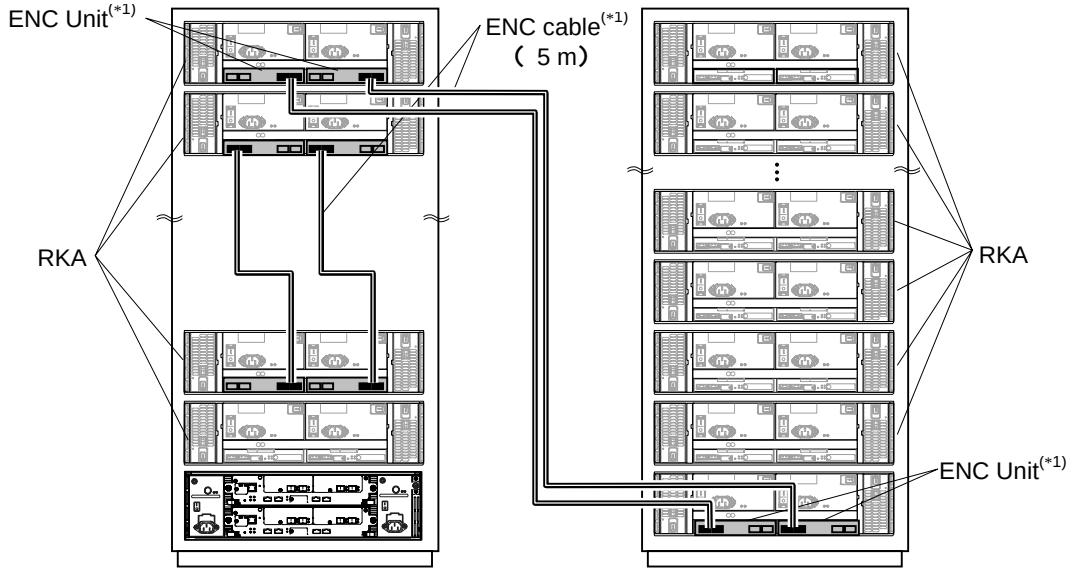
Copyright © 2004, 2005, Hitachi, Ltd.

6.7.2 Connecting multiple RKAs

When connecting the multiple RKAs at a time, perform the following.
According to the cable figure to be output from ACE Tool, connect the ENC cable.
For the operation method of ACE Tool, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).
When adding only a single RKA, proceed to Subsection 6.7.3 on page INST 06-0960.

(1) Replacing the ENC Unit
Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.
- When the revision is "B" : Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)
- When the revision is "C" or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.



*1 : FC cable assembly for 2Gbps is used for only one point in the system.

Figure 6.7.1 Replaceable Part Locations of ENC Unit

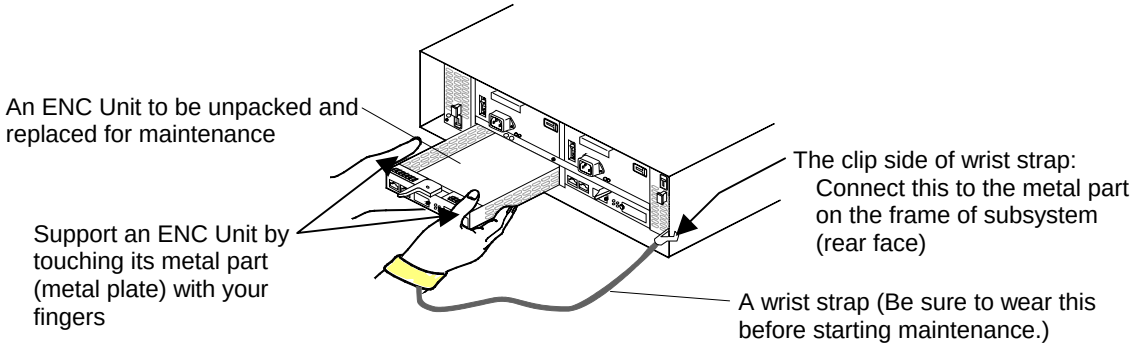
Copyright © 2002, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(a) The procedures for replacing ENC Unit (RKA which is not adjacent to the existing unit)

NOTE : Perform the replacement when the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected, is “B”.

(i) Raise the lever on the ENC Unit to be replaced in the direction shown by the arrow ① (←——) and remove the ENC Unit a little way toward you (see Figure 6.7.1.1).
(ii) Insert a new ENC Unit attached to FC cable assembly for 2 Gbps into the specified location with the levers on the ENC Unit raised shown by the arrow ① (←——) (see Figure 6.7.1.1).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.7.1.1).

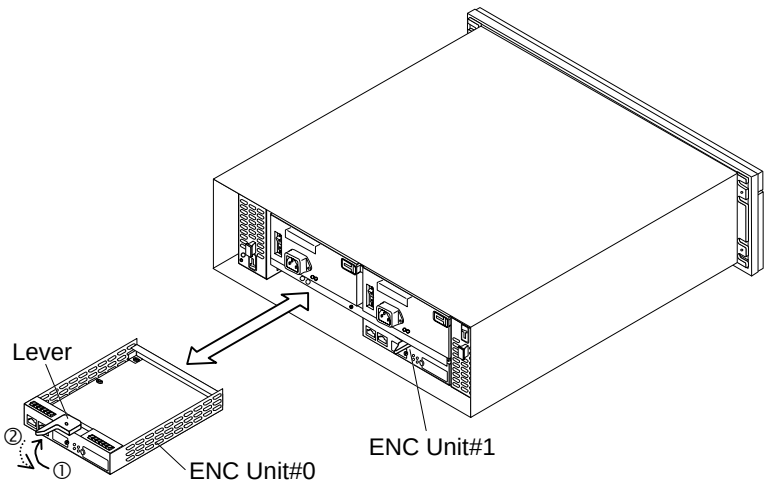


Figure 6.7.1.1 Replacing of ENC Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Connecting ENC cables (Connecting RKA which is not adjacent to the existing unit)
When adding the RKA, the ENC Unit has to be connected using the ENC cable(‡1).
Connect all the ENC cables except those between the existing subsystem and the RKA which is to be connected to the existing subsystem. (Following the instruction given in the procedure (3) in Subsection 6.7.3 on page INST06-1020.)

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA
- When connecting 5 m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps.

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 ENC cables are connected to the two paths, PATH#0 (or PATH #2) and PATH#1 (or PATH #3) of the ENC Unit #0 side (Loop #0), and the two paths, PATH#0 (or PATH #2) and PATH #1 (or PATH #3) 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 the PATH #0 in milky white and the PATH #1 in yellow.

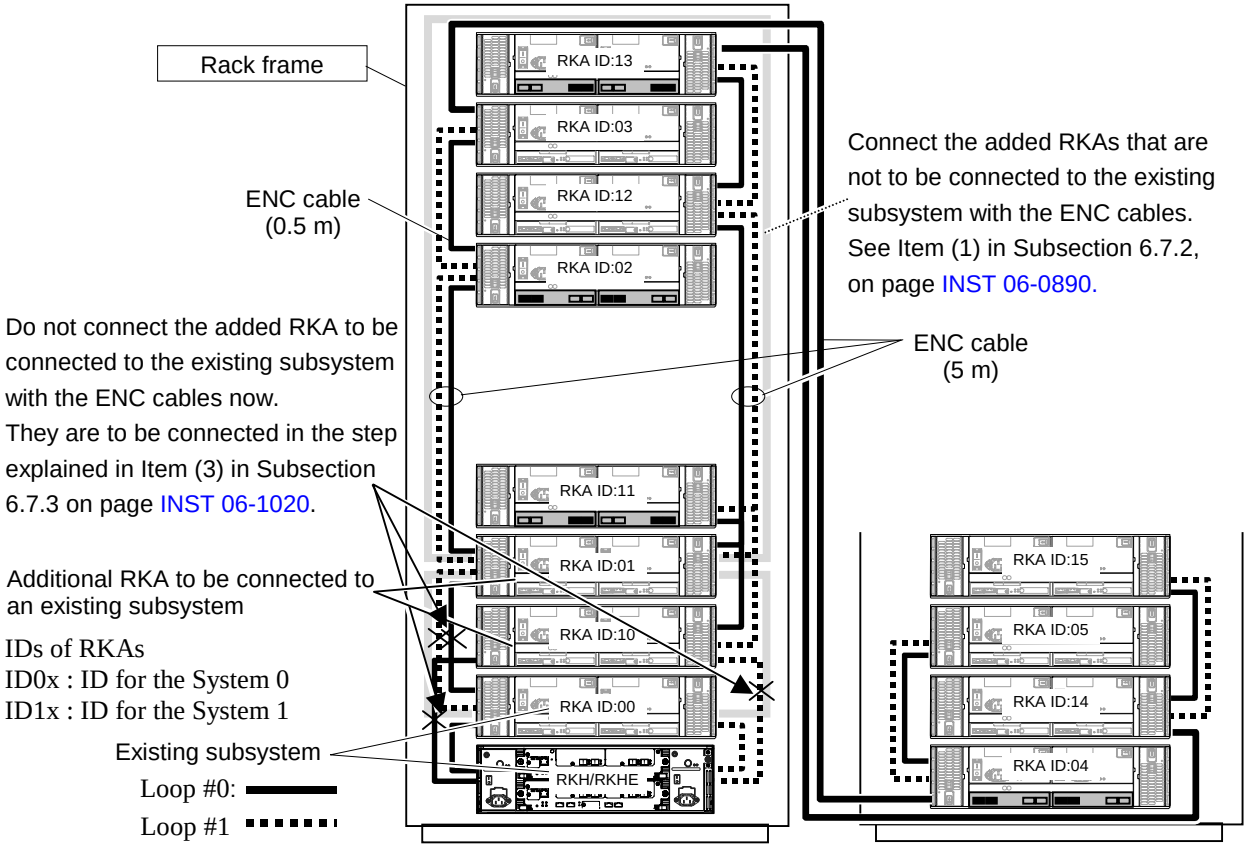


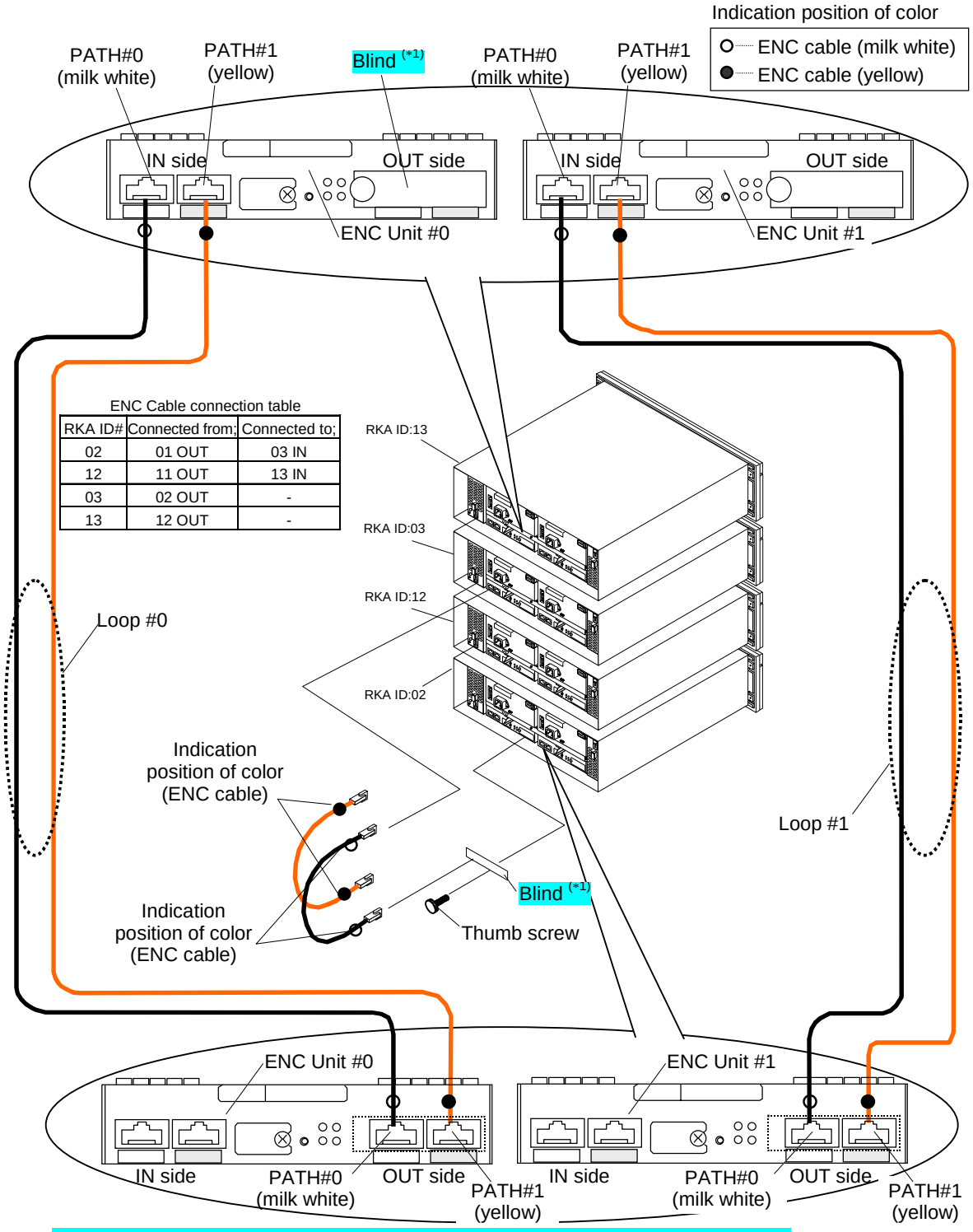
Figure 6.7.1.2 Connecting the ENC cables

‡1 : Keep unused cables carefully to prepare for an occasion to use them.

Copyright © 2003, 2005, Hitachi, Ltd.

<Working Procedure>

(a) Remove the blinds (‡1) on the ENC Units of each added RKA.
The blinds (‡1) on the ENC Units finally connected are not required to be removed.



RKA ID#	Connected from;	Connected to;
02	01 OUT	03 IN
12	11 OUT	13 IN
03	02 OUT	-
13	12 OUT	-

*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.7.2 Connecting ENC Cables

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2003, 2005, Hitachi, Ltd.

(b) Connect the ENC Units of the added RKAs that are not to be connected to the existing subsystem (see Figure 6.7.2).

NOTE : • Keep the same color indication when connecting the ENC cables as shown below. Connect the both ENC Unit #0 (Loop #0) and #1 (Loop #1).
• When making connections between the RKAs, connect the RKAs having device IDs of the same system (ID0x: System 0; ID1x: System 1).

(i) Connect the ENC cable marked in milky white to the PATH #0 (or PATH #2) in milky white in the IN side of the ENC Unit #0 in the RKA of the same ID from the PATH #0 (or PATH #2) in milky white in the OUT side of the ENC Unit #0.
(ii) Connect the ENC cable marked in yellow to the PATH #1 (or PATH #3) in yellow in the IN side of the ENC Unit #0 in the RKA of the same ID from the PATH #1 (or PATH #3) in yellow in the OUT side of the ENC Unit #0.
(iii) For the ENC Unit #1, perform the same work as the above.

(c) An example of the case where the two or more RKAs are connected is shown below.
(i) Example of connection 1 (A case where the two or more RKAs are connected to a combination of the one RKH/RKHE and the one RKA)

NOTE : Do not connect ENC cable to the added RKA to be connected to the current subsystem before executing the RKA recognizing operation.
The locations in which the ENC cable is not connected are the RKH/RKHE Control Units (PATH #2, PATH #3) and RKA#1 ENC Unit (IN side), and also RKA#0 ENC Unit (OUT side) and RKA#2 ENC Unit (IN side).

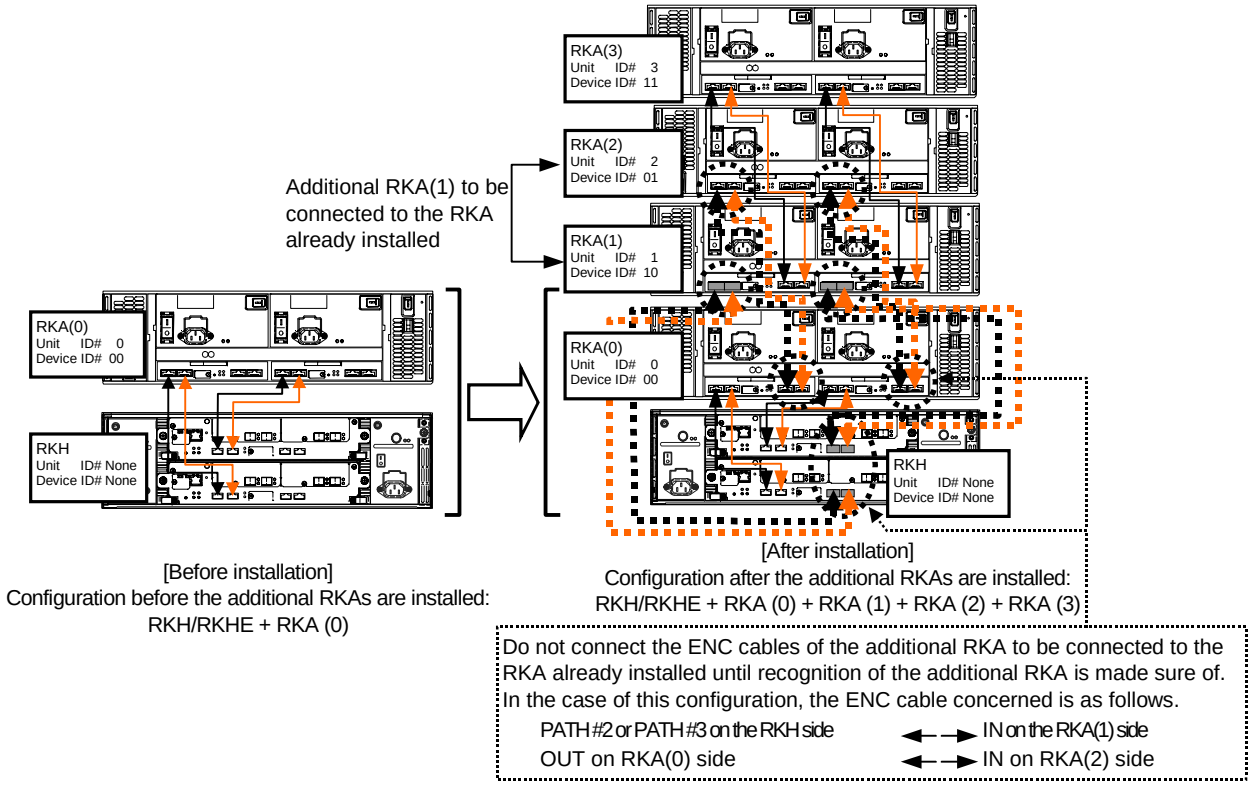


Figure 6.7.2.1 Example of Detailed Connection Diagram 1 before Recognition of Installed RKAs

Copyright © 2003, 2005, Hitachi, Ltd.

(ii) Example of connection 2 (A case where the two or more RKAs are connected to a combination of the one RKH/RKHE and the five RKAs)

NOTE : Do not connect ENC cable to the added RKA to be connected to the current subsystem before executing the RKA recognizing operation. The locations in which the ENC cable is not connected are the RKA#3 ENC Units (OUT side) and RKA#5 ENC Unit (IN side), and also RKA#4 ENC Unit (OUT side) and RKA#6 ENC Unit (IN side).

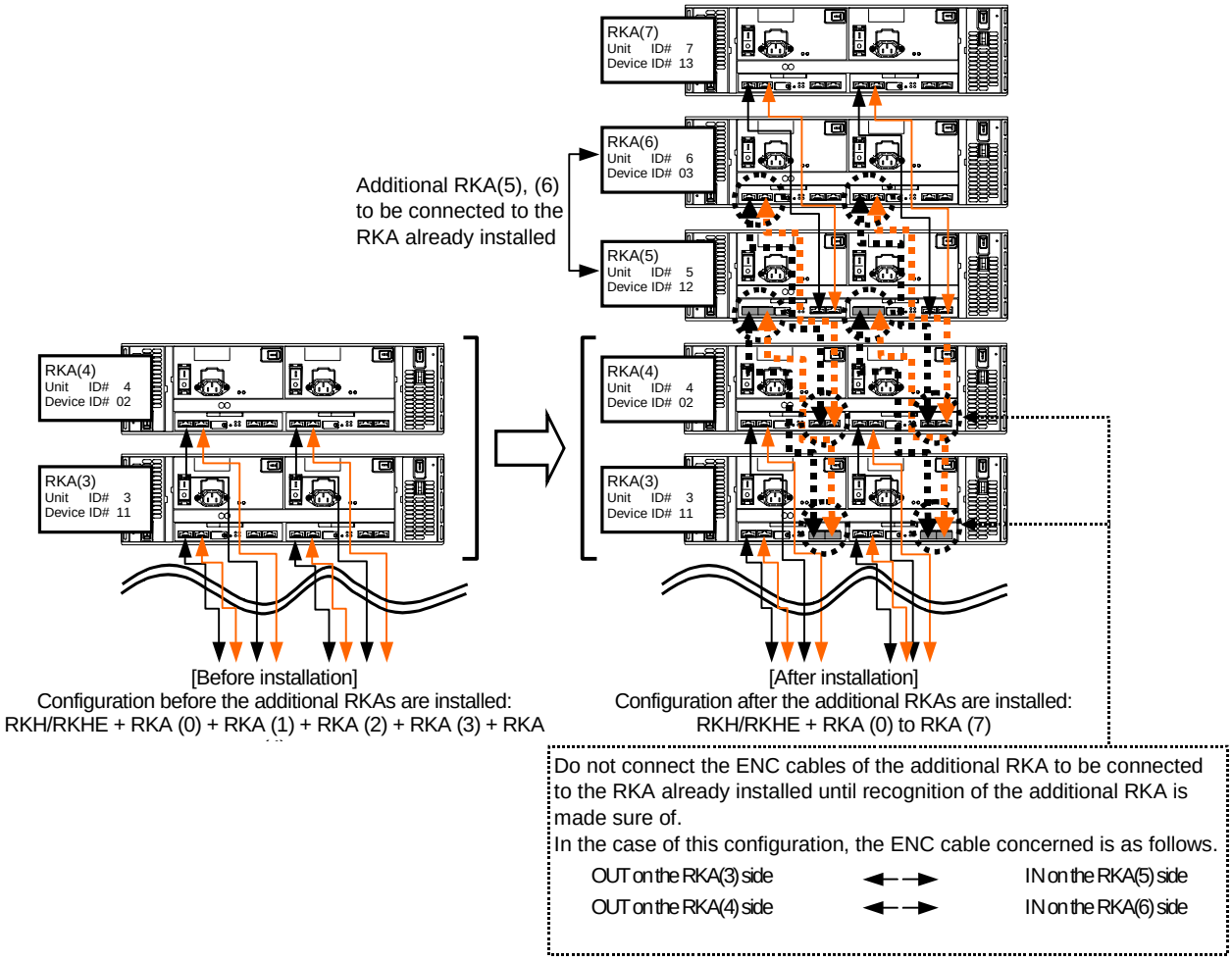


Figure 6.7.2.2 Example of Detailed Connection Diagram 2 before Recognition of Installed RKAs

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Turn on breakers of the upper PDBs (#01 and #11).
(3) Turn on AC Power Unit Switch (DC Power Unit Switch) of all the Power Units of the added RKAs that are not to be connected to the existing subsystem.
The ALM LED on the ENC Unit of the added RKA concerned comes on.
Do not turn on AC Power Unit Switch (DC Power Unit Switch) of the added RKA to be connected to the existing subsystem.

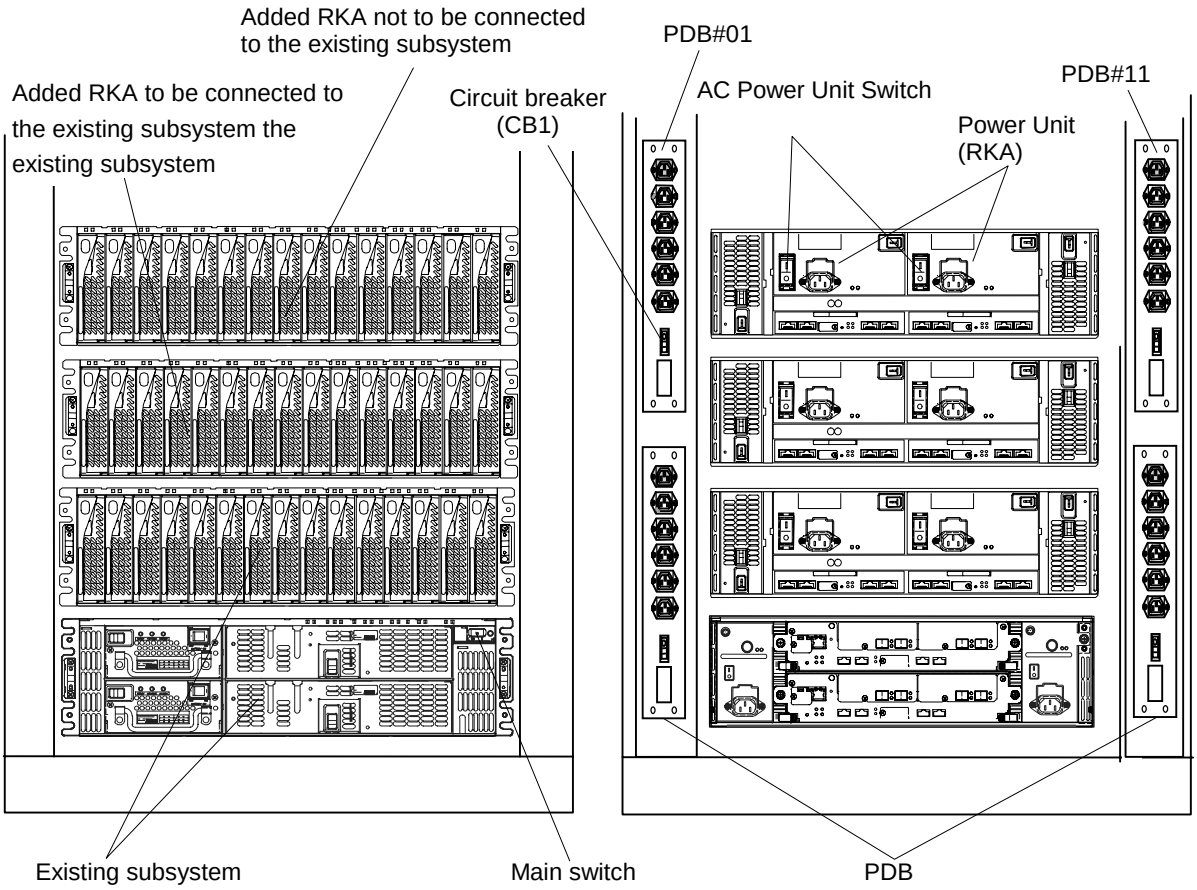


Figure 6.7.3 Locations of Switches for Power On

Copyright © 2003, 2005, Hitachi, Ltd.

6.7.3 Recognition and connection of the added RKA

To make the added RKA recognized, satisfy the following requirements.

No.	Item to be checked	Matter to be checked	Check result
1	Disk Drive	The Disk Drives #0 to #3 must be installed in the RKA to be added. When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must be installed in the RKA.	
2		The Disk Drives #4 to #14 must not be installed in the RKA to be added	
3	ENC Unit	The two units must be installed in the RKA to be added.	
4	Power Unit (RKA)	The two units must be installed in the RKA to be added.	
5	WARNING (WARN) LED of the subsystem	No WARNING (WARN) LED must be on	
6	Device ID	The device ID must be set correctly (Refer to page INST 03-0643.)	
7	Number of connectable	The addition must not make the total number of the RKH/RKHE and RKAs exceed the allowable maximum of fifteen.	
8	Formatting	No LU formatting must be in progress.	
9	Other maintenance works	No other maintenance work must be in progress.	

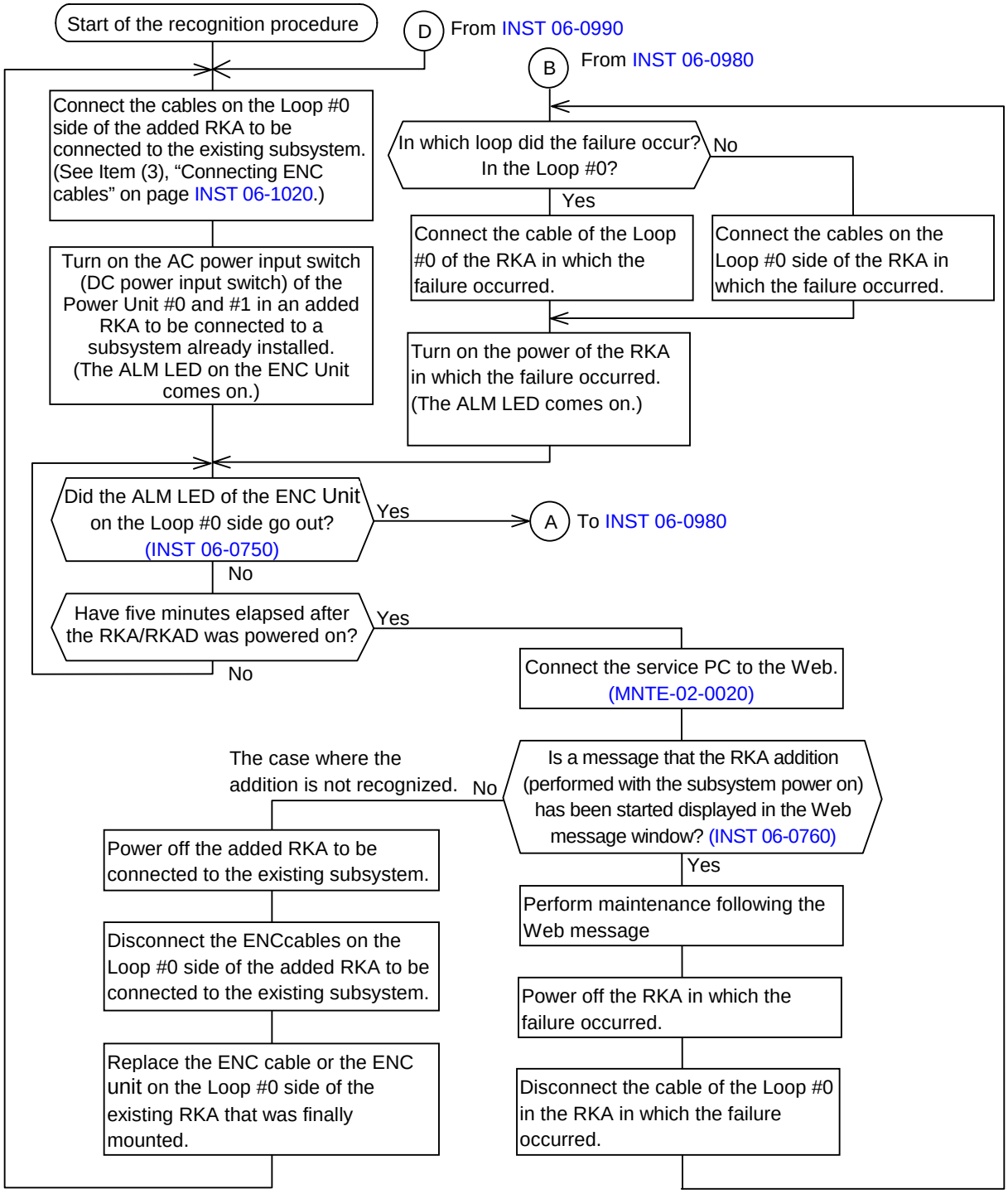
When the requirements above are satisfied, perform the operation following the "procedure for making the RKA recognized" shown below.

When making the multiple RKAs recognized at a time, satisfy the following requirements in addition.

No.	Item to be checked	Matter to be checked	Check result
1	Making the multiple RKAs recognized at a time	Are the ENC cables connected correctly to the added RKAs other than the RKA connected with the existing subsystem?	
2		Are the Power Units of the added RKAs other than the RKA connected with the existing subsystem turned on?	

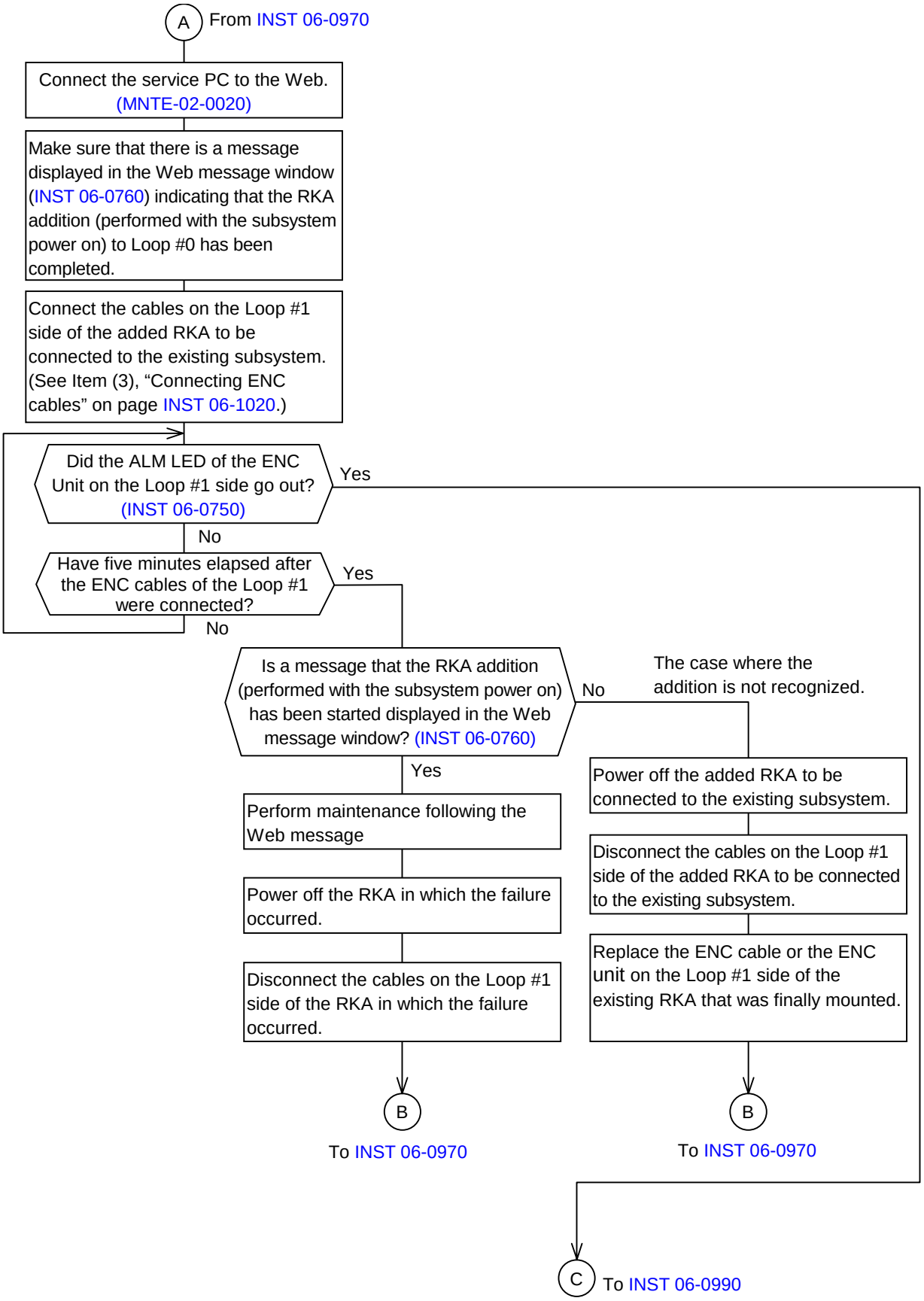
Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedure for making the added RKA recognized
Perform the RKA recognition operation following the flowchart below.
If a failure occurs during the work, check a Web message and take an action for recovery from the failure referring to Item (4), "Troubleshooting" on page INST 06-0800.
Perform the recognition operation for the adding subsystems to be connected to the existing subsystems one by one starting from the adding subsystem nearest to the basic subsystem.

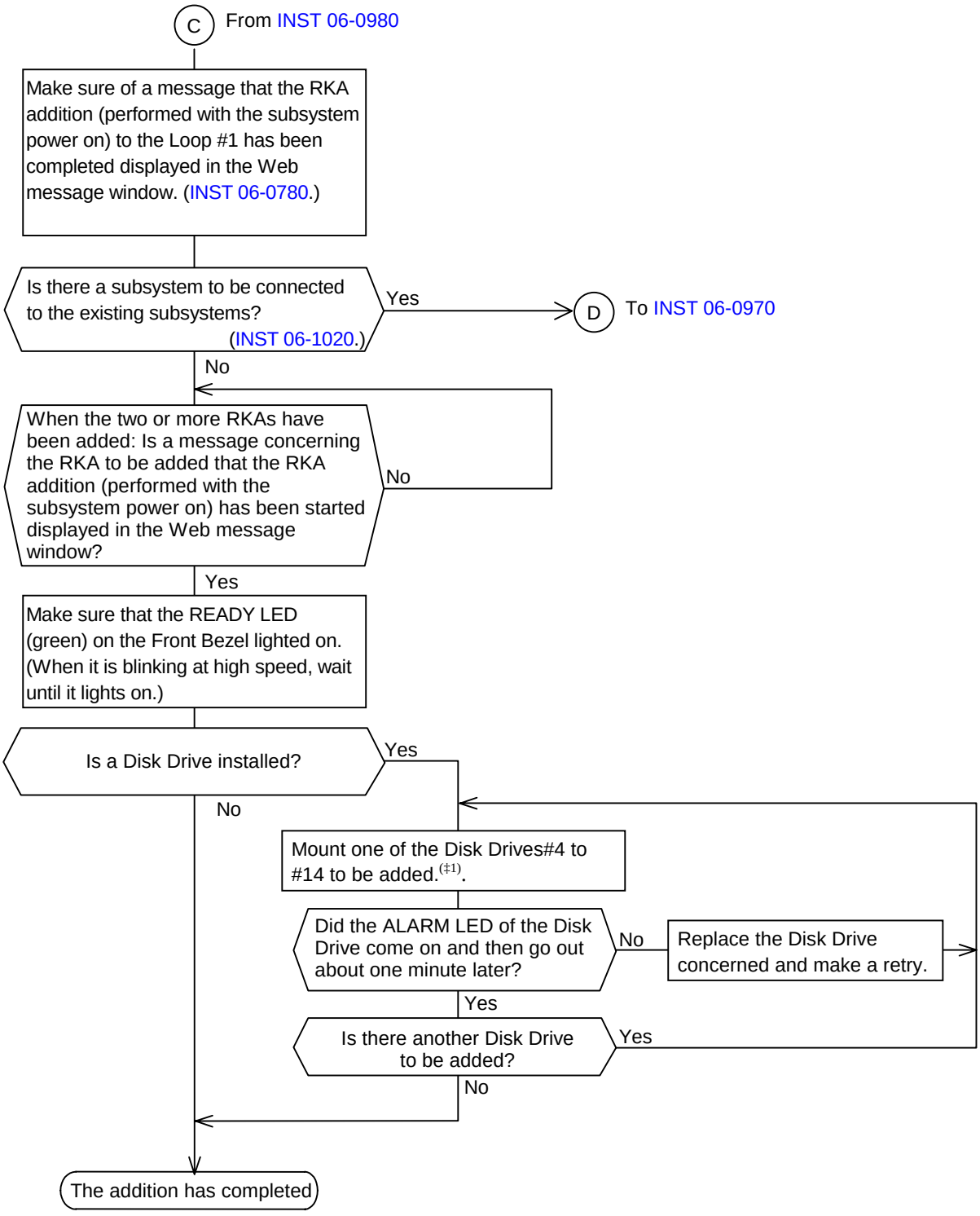


Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.



Copyright © 2003, 2005, Hitachi, Ltd.



‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Replacing ENC Unit

NOTE : Replace the ENC Unit (supplied with the 2-Gbps FC Cable Kit) when the revision of the ENC Unit is “B”.

(a) Replacing the ENC Unit of the existing unit (RKA).
For the Loop #0 side, perform the following procedures.

(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.7.3.1).

(ii) Remove the ENC cable (0.5 m) connected to the ENC 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.

(iii) Remove the ENC Unit by pulling it out toward you.

(iv) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——) (see Figure 6.7.3.1). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

(v) Connect the ENC cable (0.5 m) removed in procedure (ii) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.7.5.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

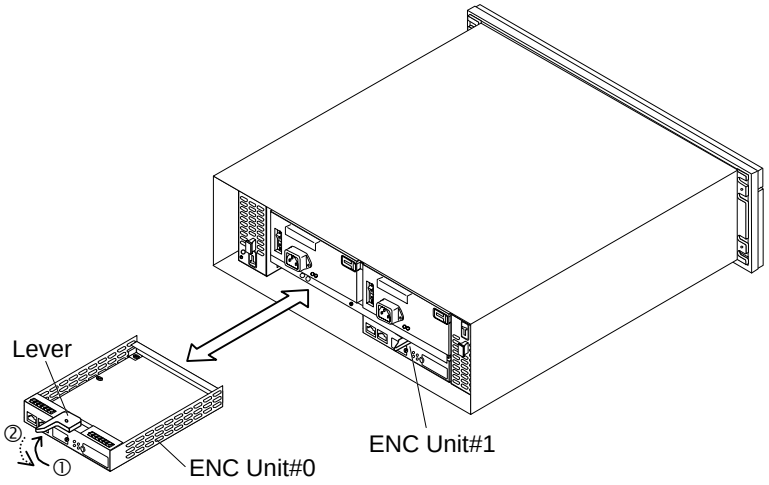


Figure 6.7.3.1 Replacing of ENC Unit

Copyright © 2003, 2005, Hitachi, Ltd.

(vi) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.7.3.1).

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 because the ENC Unit is considered to have failed.

(vii) Make sure that the ALM LED (red) on the ENC Unit is off.
(viii) For the Loop#1 side, perform the operation from (i) to (vii) as in the above procedures.

(b) Replacing the ENC Unit of the existing unit (RKA) to added RKA adjacent to the existing unit.
For the Loop #0 side and Loop#1 side, perform the following procedures.
(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.7.3.1).
(ii) Insert a new ENC Unit attached to FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——) (see Figure 6.7.3.1).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.7.3.1).
(iv) Connect the ENC cable (0.5m) to the IN side of the ENC Unit attached to FC Cable Assembly for 2Gbps, and connect the ENC cable (5m) to the OUT side of that. (However, for the OUT side of ENC Unit that will be last connected, the connection with ENC cable is not required.)

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.7.5.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Connecting ENC cables (on the Loop #0 side)
When adding the RKA while the subsystem power is on, it is required to connect the ENC Unit for the Loop #0 (ENC #0) of the RKA to be added and the ENC Unit with the ENC cables (‡1).

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA
- When connecting 5m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps (RKH/RKHE cannot be connected by ENC cable (5 m).).

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.

NOTE :
- Be sure to connect the ENC cable from the subsystem to be added. If it is connected from the existing subsystem, the loop failures occur.
- 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 ENC cables are connected to the two paths, PATH#0 (or PATH #2) and PATH#1 (or PATH #3) of the ENC Unit #0 side (Loop #0), and the two paths, PATH#0 (or PATH #2) and PATH #1 (or PATH #3) 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 the PATH #0 in milky white and the PATH #1 in yellow.
- When making connections between the RKH/RKHE and the RKA, connect those having device IDs of the both systems (ID0x: System 0; ID1x: System 1). When making connections between the RKAs, connect the RKAs having device IDs of the same system.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

Copyright © 2003, 2005, Hitachi, Ltd.

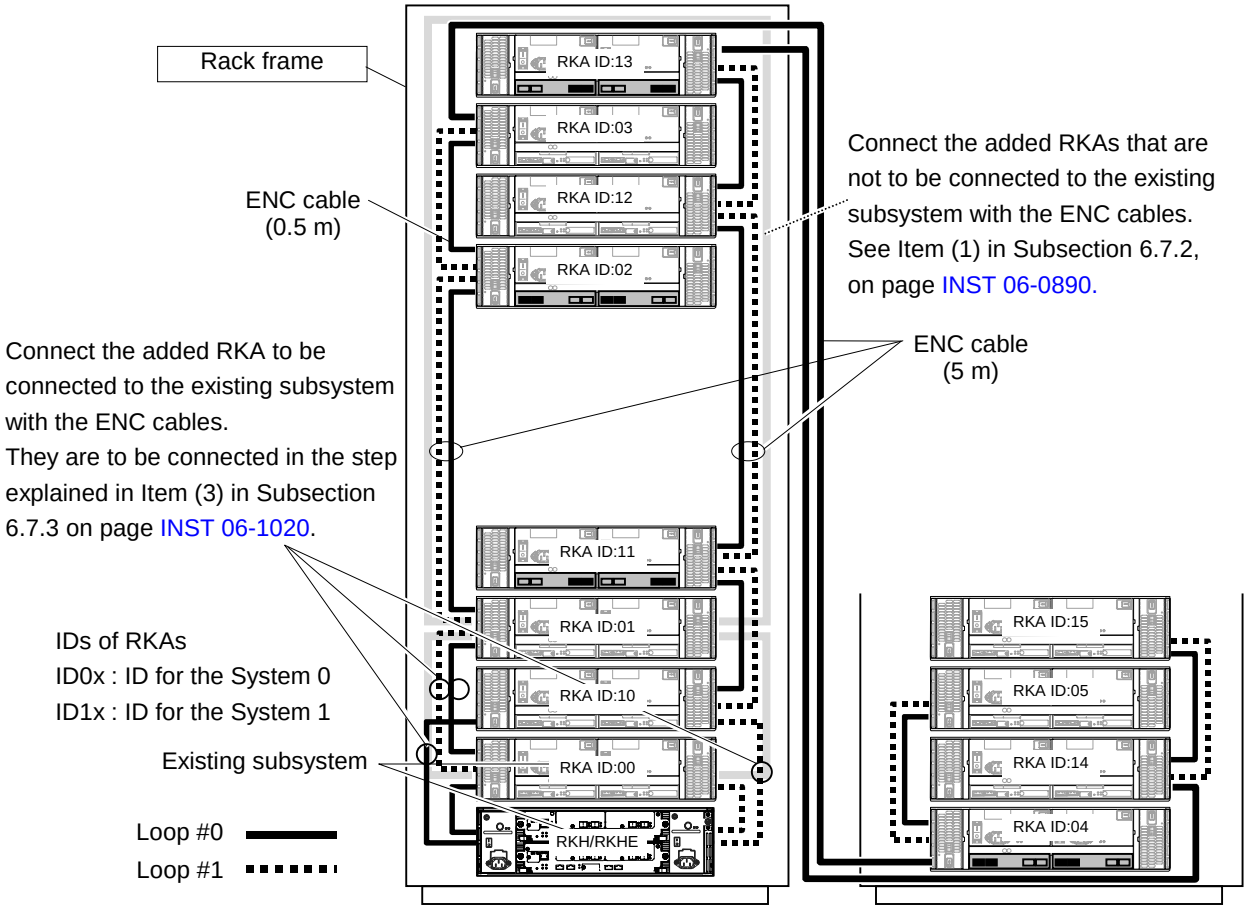


Figure 6.7.4 Connecting the ENC cables

<Working Procedure>

(a) Remove the blinds (‡1) on the FC-AL (RKH/RKHE/RKA) connectors of the existing RKH/RKHE/RKA that was finally mounted.

(b) Connect the ENC Unit on the Loop #0 side in the added RKA to be connected to the disk array unit already installed to the output connector of the FC-AL on the Loop #0 side in the disk array unit already installed (RKH/RKHE/RKA) with the ENC cables (see the Loop #0 in Figure 6.7.5).

NOTE : Keep the same color indication when connecting the ENC cables as shown below.

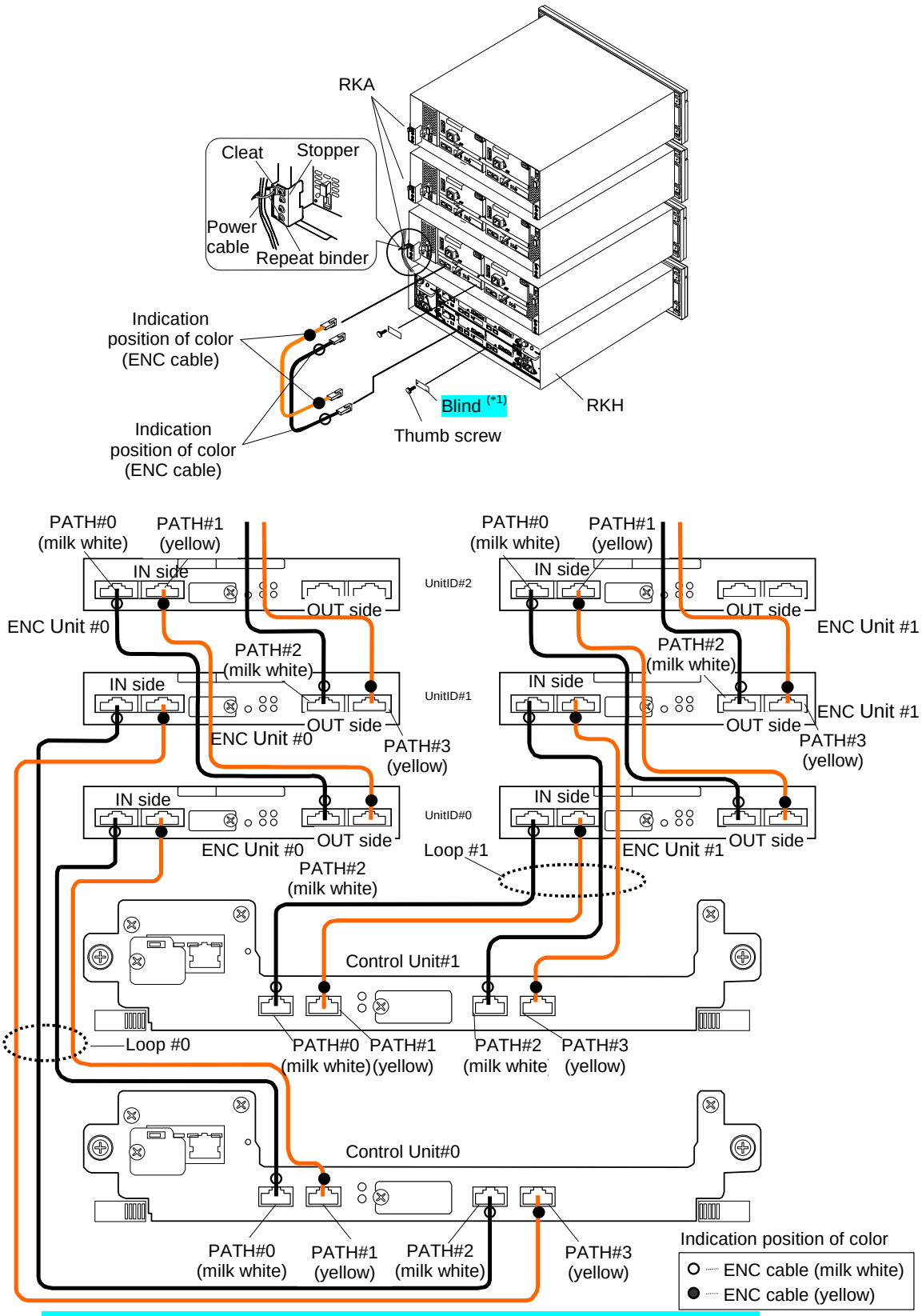
(i) Connect the ENC cable marked in milky white to the PATH #0 (or PATH #2) in milky white in the IN side of the ENC Unit #0 in the RKA of the same ID from the PATH #0 (or PATH #2) in milky white in the OUT side of the ENC Unit #0.

(ii) Connect the ENC cable marked in yellow to the PATH #1 (or PATH #3) in yellow in the IN side of the ENC Unit #0 in the RKA of the same ID from the PATH #1 (or PATH #3) in yellow in the OUT side of the ENC Unit #0.

(c) Connect the ENC cables of the Loop #1 after verifying the completion of the addition to the Loop #0.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.7.5 Connecting ENC Cables

Copyright © 2003, 2005, Hitachi, Ltd.

(4) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the Power Units (Power Unit (DC)) (#0, #1) of the added RKA to be connected to the existing subsystem.

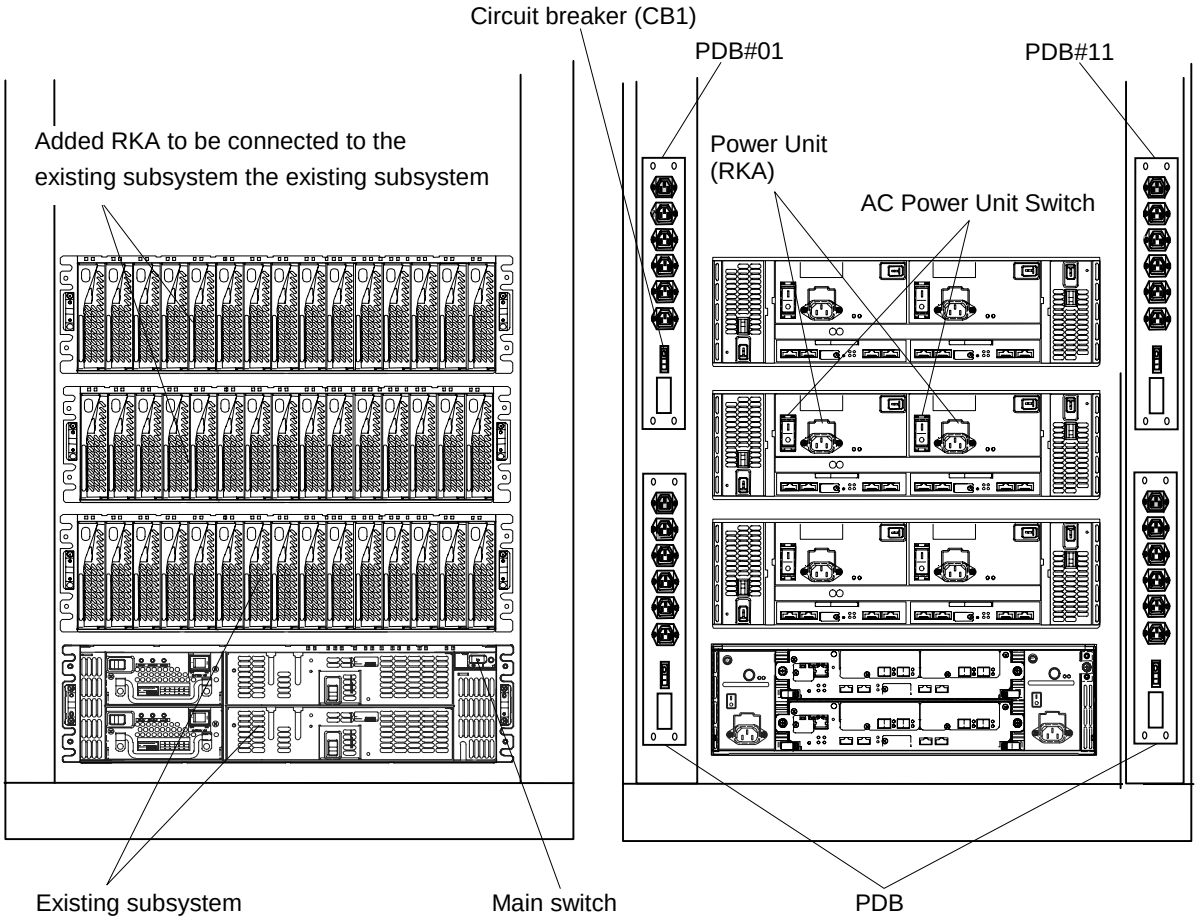


Figure 6.7.6 Locations of Switches for Power On

Copyright © 2003, 2005, Hitachi, Ltd.

6.7.4 Verifying the addition

Refer to Subsection 6.6.4, “Verifying the addition” on page INST 06-0750.

The RKH/RKHE cannot be connected to the RKAD.

6.7.5 Install the rest of the Disk Drives

Refer to Subsection 6.6.5, “Install the rest of the Disk Drives” on page INST 06-0830.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

6.8 Adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the Rack Frame (In the case of the connection to the RK/RKL)

The RKL can be connected only to the RKAATL/RKAJATL.
In the case of adding Disk Drives to a subsystem of the rackmount model, the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL must be added when vacant slots for the Disk Drives to be added are insufficient in the existing subsystem.
A procedure for adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on the U6 rack frame while the subsystem power is on or power is off(‡1) is shown below.
When mounting the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on the rack frame, installation of as many rack rail kits (URHT5) as the RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs to be added are required.

6.8.1 Procedure for adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to the subsystem of rackmount model with U6/U4 rack frame

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) At least the following components must have been installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to beaded.
- Two Disk Drives (a combination of the Disk Drives #0 and #1)
- Two ENC Unit/SENC Unit (Standard installation, four ENC cables (ENC Unit), two ENC cables (SENC Unit) are included.)
- Power Unit (AC) (RKA)'s (RKAAT)'s (RKAJAT)'s (RKAATL)'s (RKAJATL)'s (Standard installation)

(b) Two ENC cables per ENC Unit/SENC Unit must have been connected between the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL and the RK/RKL or RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.

(c) Restriction of number of the RKAATs/RKAJATs/RKAATs/RKAJATLs allowed to be added is that the total number of the RK/RKL and RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs must not exceed the allowable maximum of fifteen after the addition.

(d) 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 go out. (Refer to Chapter 2, "Trouble Analysis" on page MNTE 02-0000 in the Maintenance Manual (Volume of Maintenance).)

(e) No part replacement can be done while operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is being done (Work-10).

‡1 : 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.).

Copyright © 2003, 2005, Hitachi, Ltd.

(f) A number of installed Disk Drives when making an addition.
The installed Disk Drives when making an addition must be the #0 to #3 only.
When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must have been installed.
- When the two Disk Drives are added, install them in the Disk Drive slots #0 and #1.
- When the three Disk Drives are added, install them in the Disk Drive slots #0 to #2.
- When the four or more Disk Drives are added, install them in the Disk Drive slots #0 to #3 only.

(g) Install them after all the RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs have been recognized(‡1) (Work-10), connect the ENC cables between the existing subsystem and the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be connected to the subsystem for the each loop one by one. (See Subsection 6.8.3 on page INST 06-1220.)

(h) When failures occur in both of the existing subsystem and the added RKA/RKAAT/RKAJAT /RKAATL/RKAJATL while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized(‡1) (Work-10) is being done, take a recovery action against the failure of the existing subsystem preferentially after the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL has been recognized(‡1).
After that, take a recovery action against the failure of the added RKA/RKAAT/RKAJAT /RKAATL/RKAJATL, and then resume the operation.

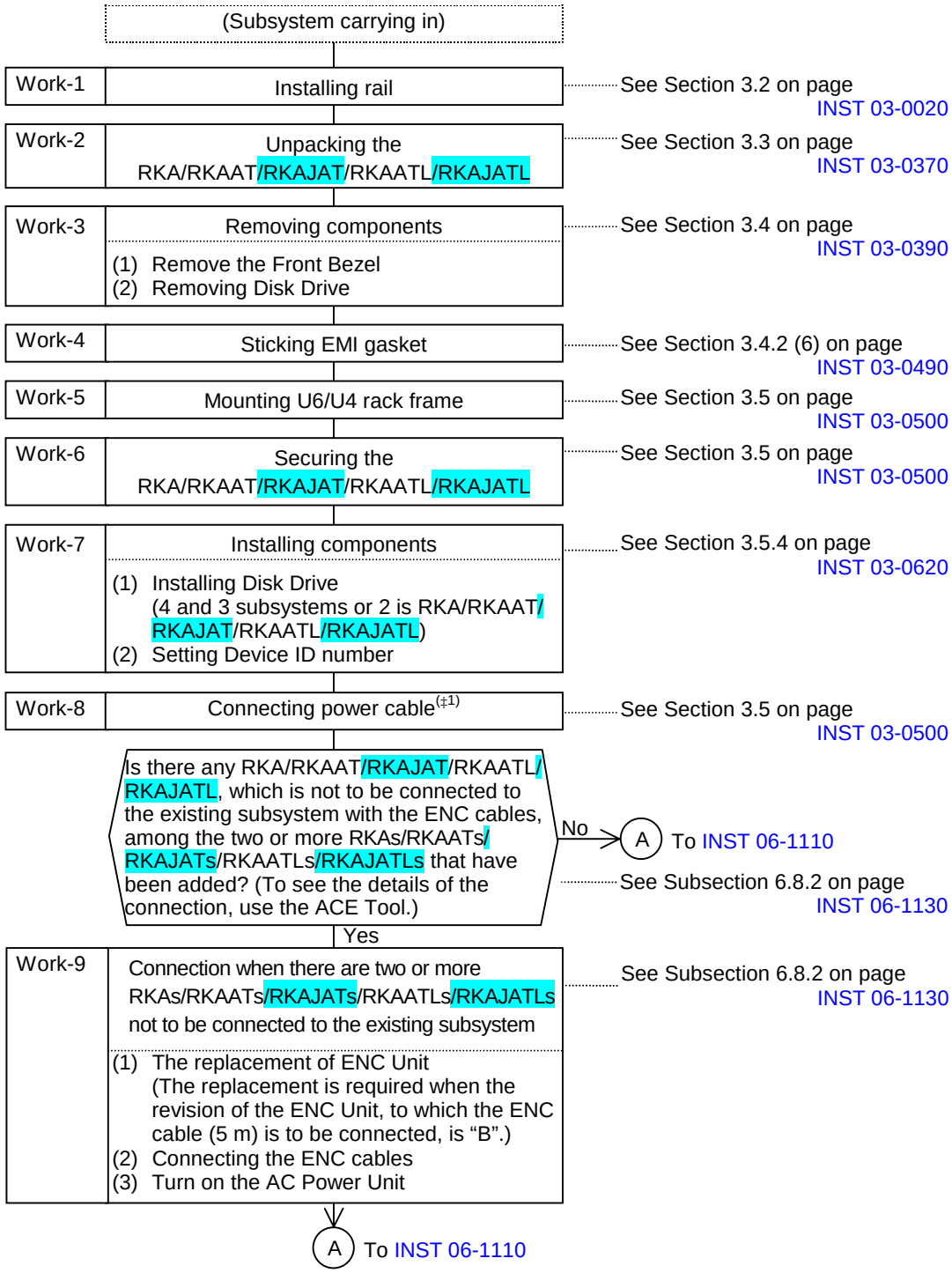
(i) Do not perform an LU formatting while the operation to make the RKA/RKAAT/RKAJAT /RKAATL/RKAJATL recognized(‡1) is being done (Work-10). Also, do not perform the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized(‡1) while an LU formatting is in progress.

(j) Do not make the addition work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the addition work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

‡1 : The expression “recognized” described here means that the Controller of the existing RK/RKL recognizes the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.

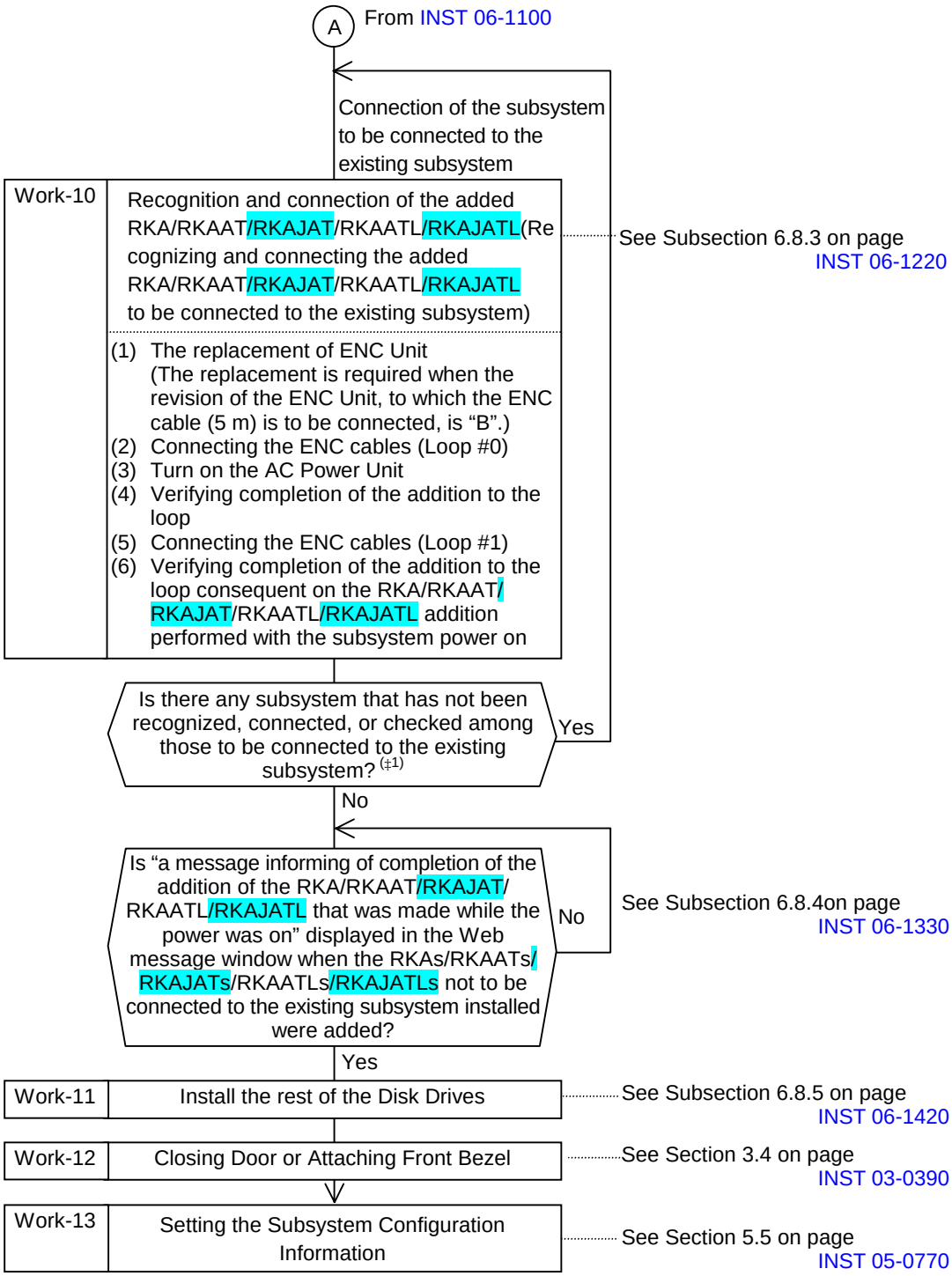
Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedures for installation the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on Rack Frame while the subsystem power is on (Available only in the dual controller configuration.)
When adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on the rack frame while the subsystem power is on, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2003, 2005, Hitachi, Ltd.

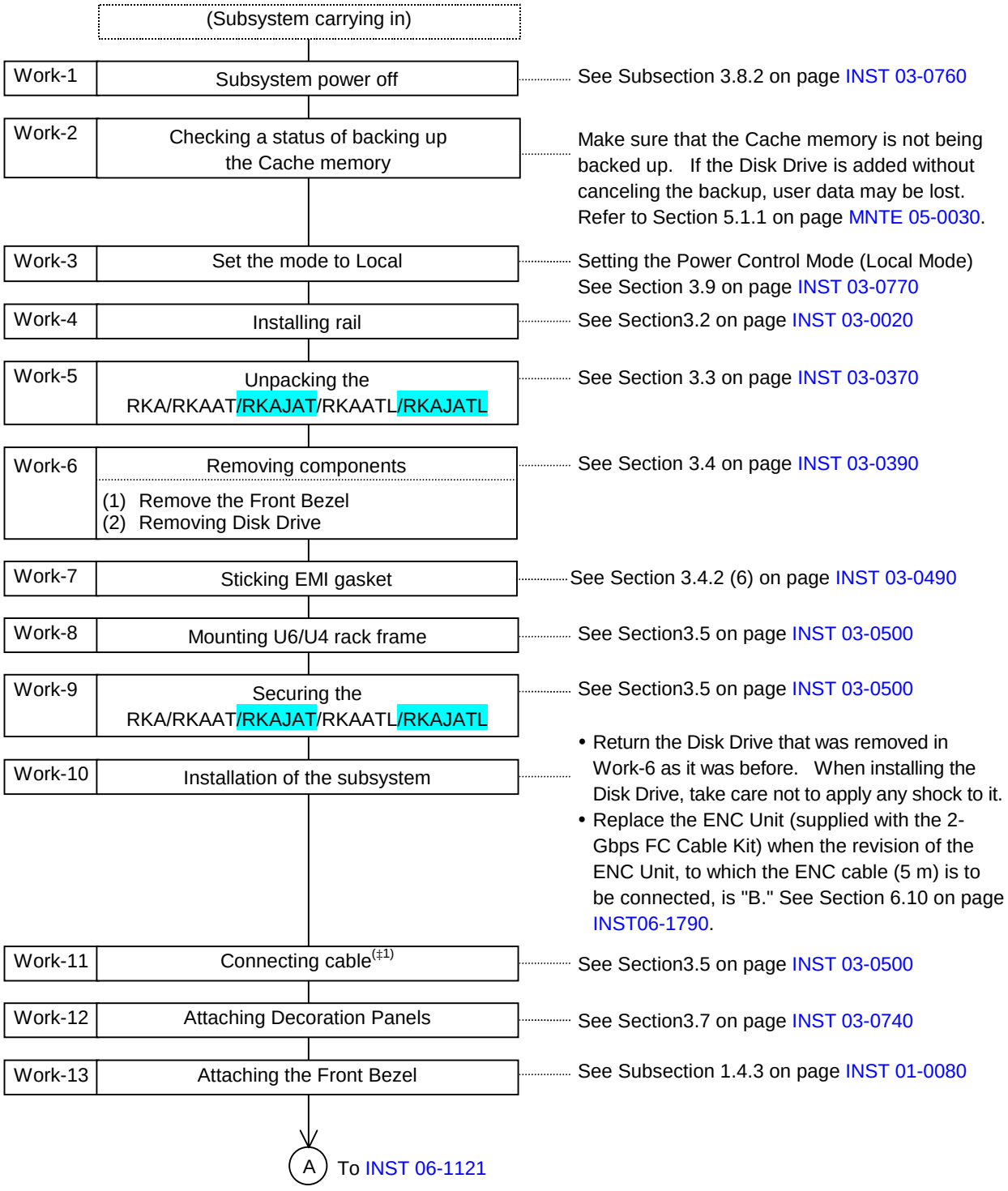


‡1 : Perform the operation Work-10 to the adding subsystem (in an order from the subsystem nearest to the basic subsystem) to be connected to the existing subsystem (two RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs at maximum).

Copyright © 2003, 2005, Hitachi, Ltd.

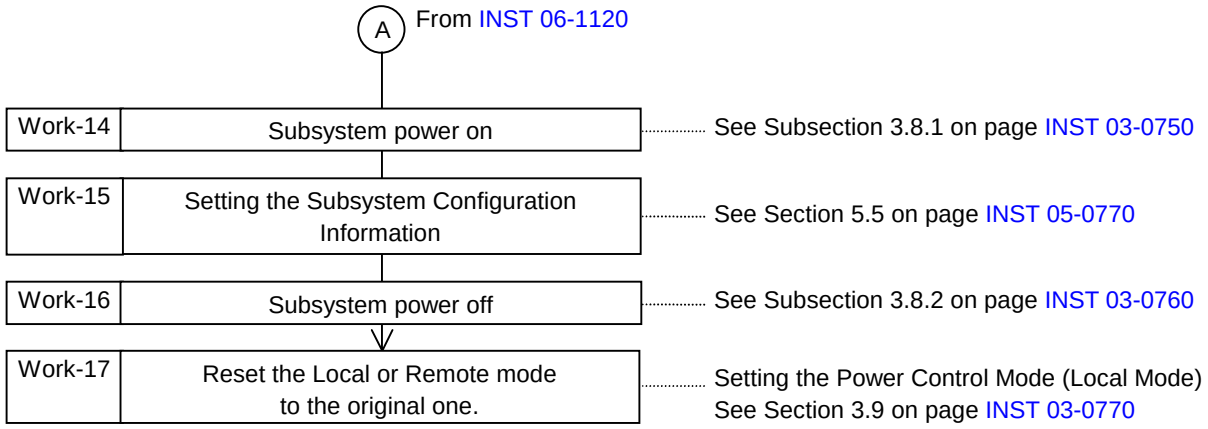
(2) Procedures for installation the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on Rack Frame while the Subsystem Power Is Off

When adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL on the rack frame while the subsystem power is off, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2003, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

6.8.2 Connecting multiple RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs

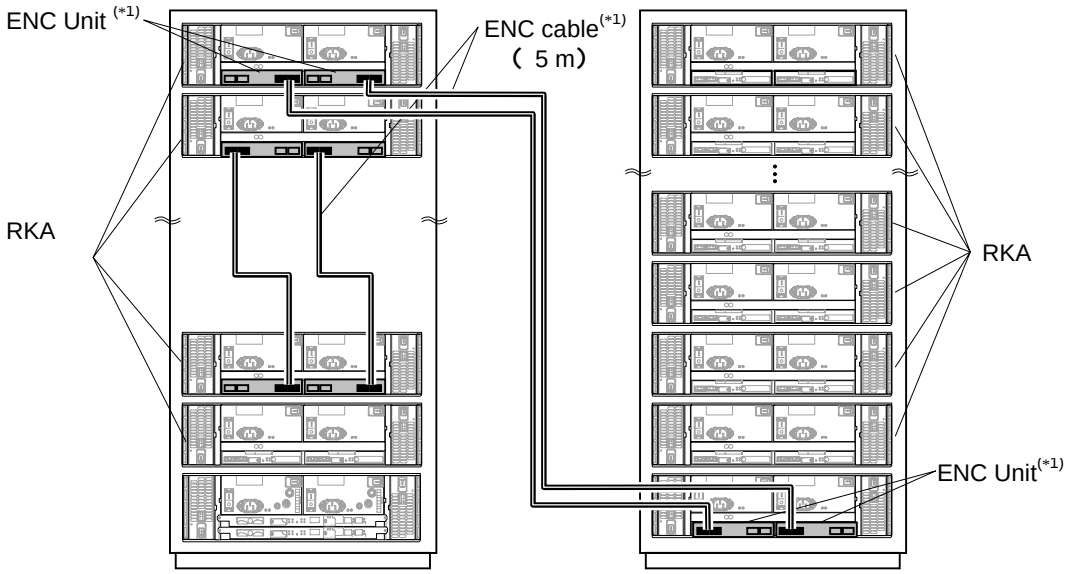
When connecting the multiple RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs at a time, perform the following.
According to the cable figure to be output from ACE Tool, connect the ENC cable.
For the operation method of ACE Tool, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).
When adding only a single RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, proceed to Subsection 6.8.3 on page INST 06-1220.
Refer to an example of the connection of the RKA/RKAAT made using the ACE Tool (INST 06-1211).

(1) Replacing the ENC Unit
Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.

NOTE : • When the revision is "B": Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)
• When the revision is "C" or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For a single configuration, one set is included. • For a dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For a single configuration, one set is included. • For a dual configuration, two sets are included.

Copyright © 2003, 2005, Hitachi, Ltd.



*1 : FC cable assembly for 2Gbps is used for only one point in the system.

Figure 6.8.1 Replaceable Part Locations of ENC Unit

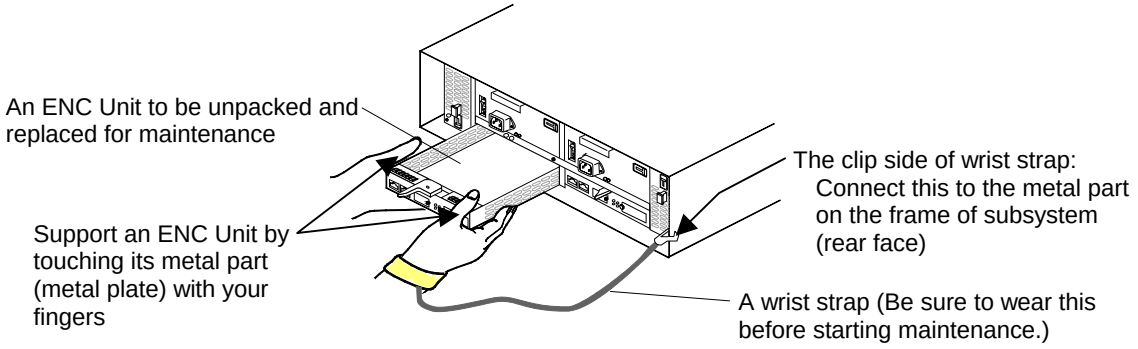
Copyright © 2003, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2003, 2005, Hitachi, Ltd.

(a) The procedures for replacing ENC Unit (RKA which is not to be connected to the existing unit)

NOTE : Perform the replacement when the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected, is “B”.

(i) Raise the lever on the ENC Unit to be replaced in the direction shown by the arrow ① (←——) and remove the ENC Unit a little way toward you (see Figure 6.8.2).
(ii) Insert a new ENC Unit attached to FC cable assembly for 2 Gbps into the specified location with the levers on the ENC Unit raised shown by the arrow ① (←——) (see Figure 6.8.2).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.8.2).

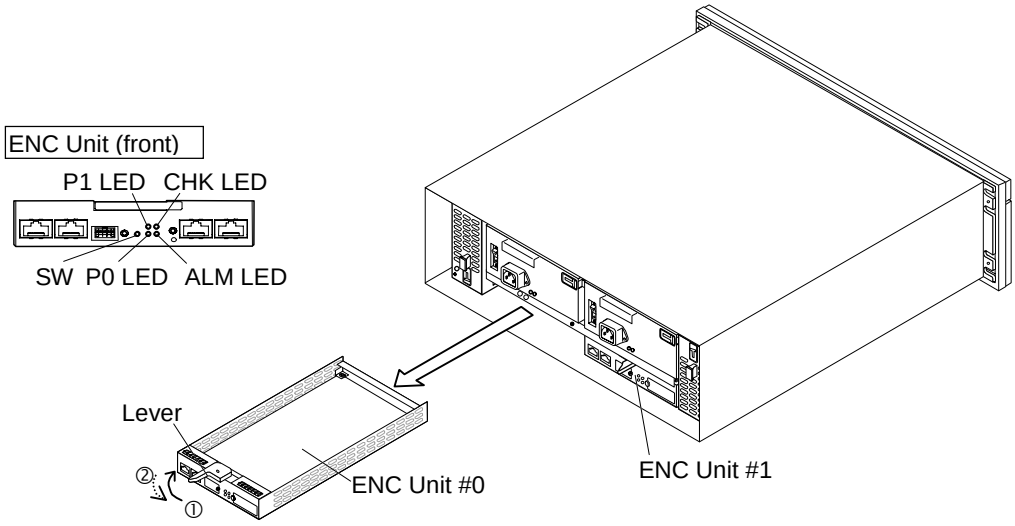


Figure 6.8.2 Replacing of ENC Unit

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Displaying the procedure for connecting the ENC cables using the ACE Tool.
  (a) Start the ACE Tool through the service PC.
  (b) Select the subsystem (9520V or 9570V).
  (c) Make the configuration setting that conforms to the subsystem that have been installed on the rack frame.
  (d) Display the diagram of the ENC cable connections.

(3) Checking the ENC cables not to be connected to the existing subsystems.
Select all the adding subsystems (select the subsystems while the Ctrl key is pressed) in a state where the diagram of the ENC cable connection is displayed. The color of the displays of the selected subsystems is changed from gray to orange and the color of the existing subsystems and connected to the subsystem displayed in orange is changed from gray to white. Cables other than those that connect subsystem displayed in white and orange or cables between the subsystems displayed in orange are the ENC cables that are not to be connected to the existing subsystems.

(4) Connecting ENC cables (Connecting RKA/RKAAT/RKAJAT/RKAATL/RKAJATL which is not to be connected to the existing unit)
When adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, the ENC Unit/SENC Unit has to be connected using the ENC cable(‡1). Connect all the ENC cables except those between the existing subsystem and the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL which is to be connected to the existing subsystem. (Following the instruction given in the procedure (3) in Subsection 6.8.3 on page INST06-1280.)
- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL
- When connecting 5 m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps.

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.
- For RKA, the ENC cables are connected to the two paths, PATH#0 and PATH#1 of the ENC Unit #0 side (Loop #0), and the two paths, PATH#0 and PATH #1 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 the PATH #0 in milky white and the PATH #1 in yellow.
  For RKAAT/RKAJAT/RKAATL/RKAJATL, the ENC cables are connected to the PATH#0 (or PATH #1) of the SENC Unit #0 (Loop #0) and the PATH#0 (or PATH #1) of the SENC Unit #1 (Loop #1) (total of two).
- The IN and OUT connectors of the SENC Unit of the RKAAT/RKAJAT /RKAATL/RKAJATL have indications by means of blue and green labels respectively.

‡1 : Keep unused cables carefully to prepare for an occasion to use them.

Copyright © 2003, 2005, Hitachi, Ltd.

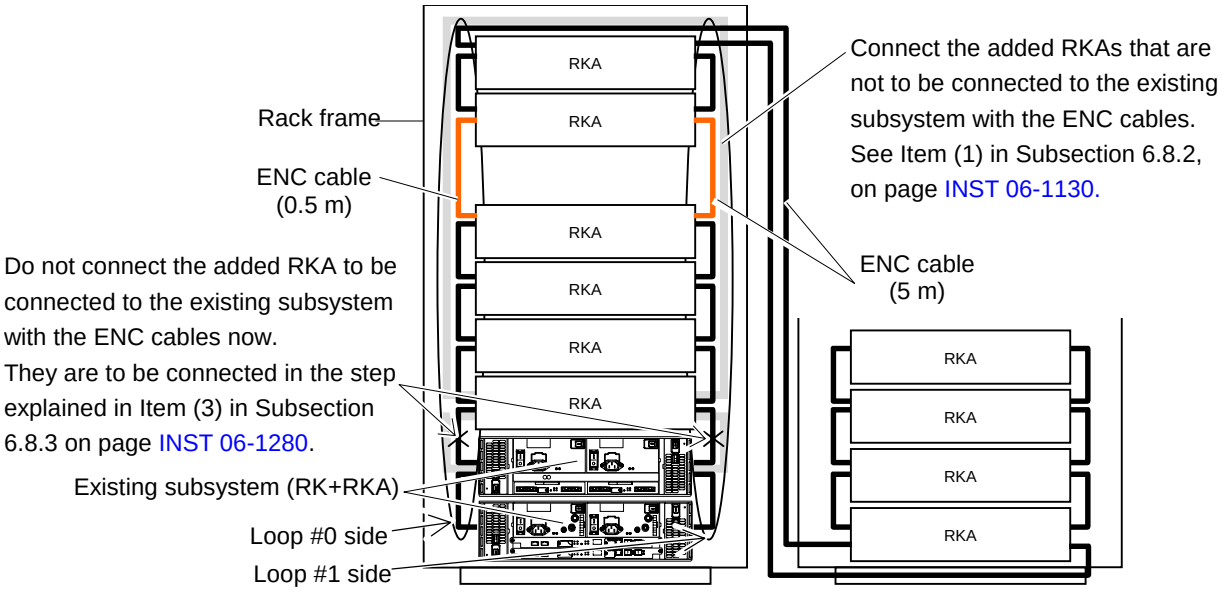


Figure 6.8.3 Connecting the ENC cables (RK+RKA+RKAs)

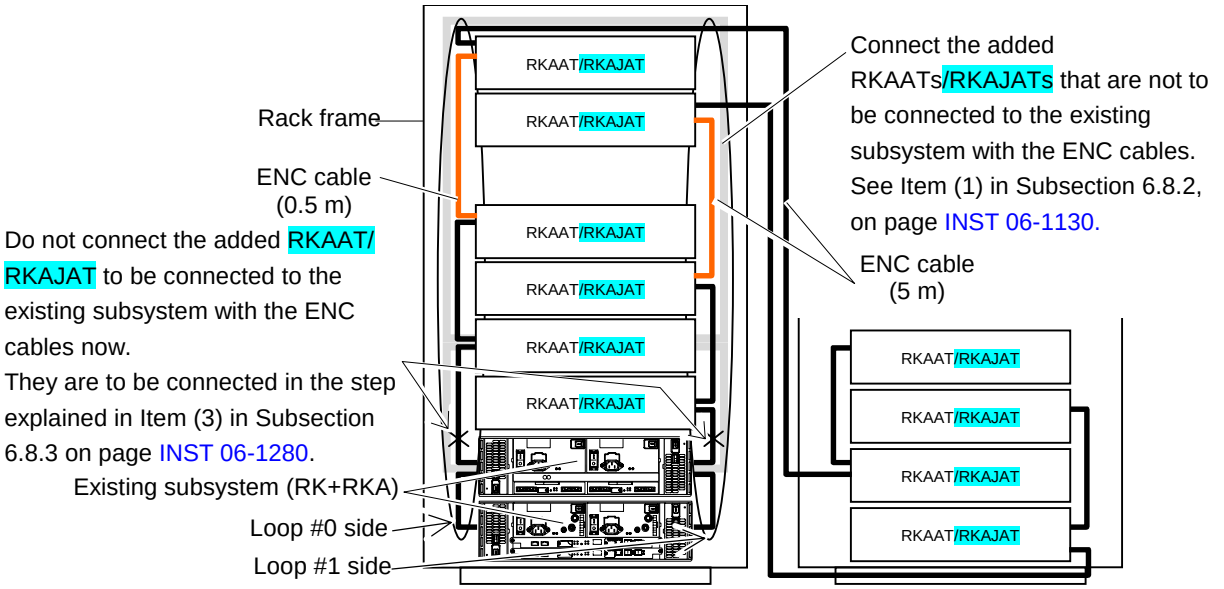


Figure 6.8.3.1 Connecting the ENC cables (RK+RKA+RKAATs/RKAJATs)

Copyright © 2003, 2005, Hitachi, Ltd.

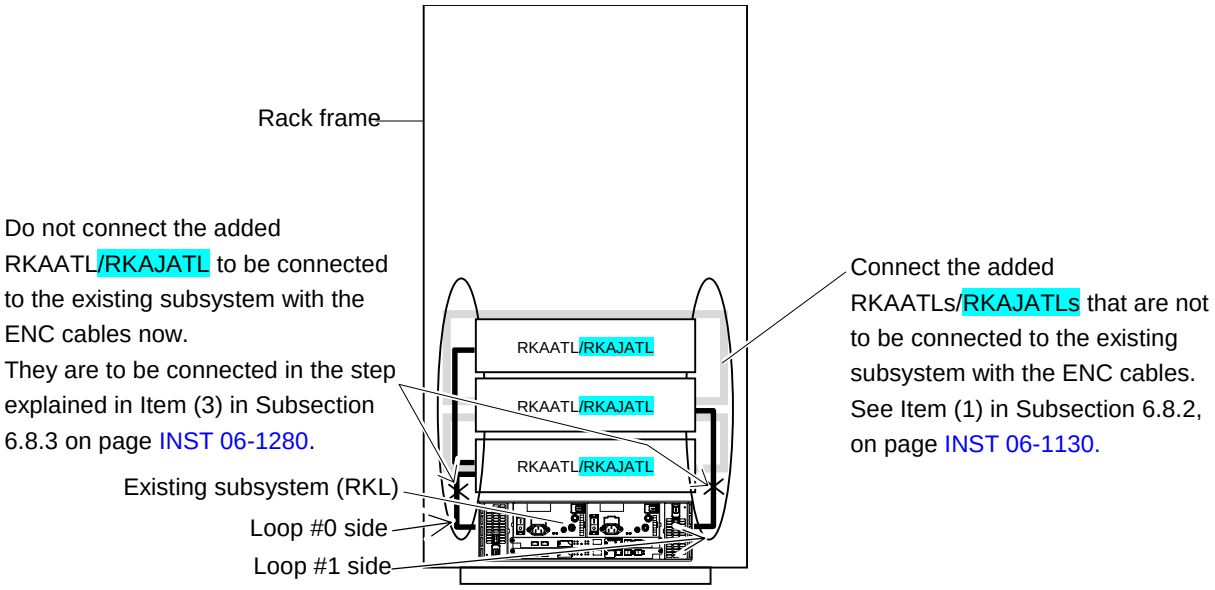


Figure 6.8.3.2 Connecting the ENC cables (RKL+RKAATLs/RKAJATLs)

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(a) See the details of the connections with the ACE Tool.
Connect the ENC cables of the PATH #0 having milk white indications and the ENC cables of the PATH #1 having yellow indications (see Figure 6.8.5).
Though the connectors of the RKAAT/RKAJAT/RKAATL/RKAJATL have indications of blue and green, connect the cables of the paths as directed by the ACE Tool.

(b) The ENC cables to be connected to the RKAAT/RKAJAT/RKAATL/RKAJATL have no Mini-Binders attached when they were shipped from the factory. Attach the Mini-Binders to the ENC cables of the each path as directed by the ACE Tool

(c) Attach the milk white or yellow Mini-Binders to the ENC cables not to be connected to the existing subsystems. 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.

(d) Attach milk white or yellow Mini-Binders to the ENC cable.
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.

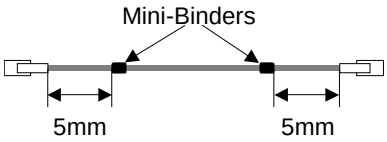


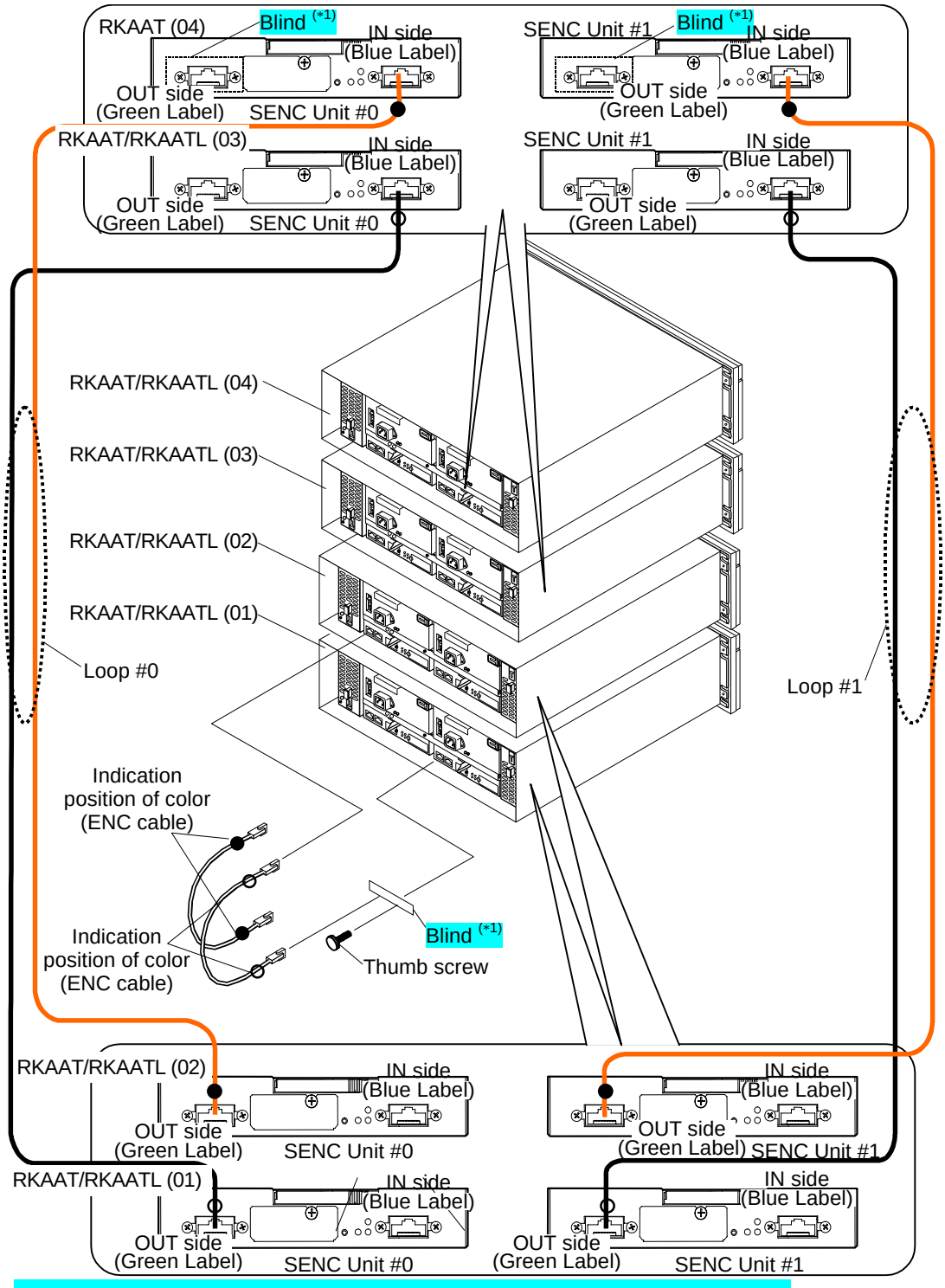
Figure 6.8.4 Positions for attaching Mini-Binders

(e) Remove the Blind (‡1) of the ENC Unit/SENC Unit of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL. However, it is not needed to remove the Blind (‡1) of the terminal ENC Unit/SENC Unit. (see Figure 6.8.5.)

(f) Connect the paths as directed by the ACE Tool.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

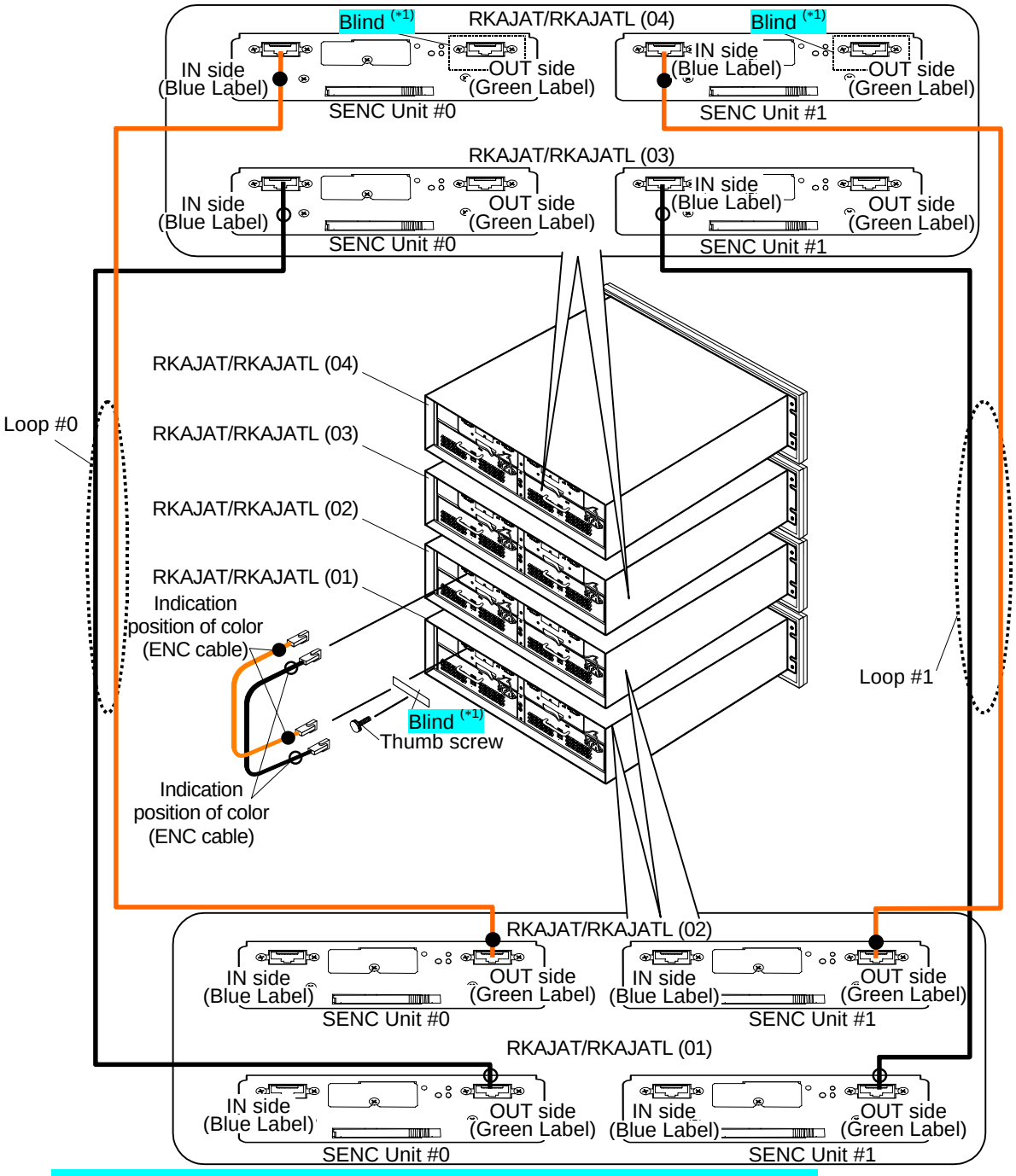
Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.8.5 Connecting ENC Cables (RKAAT/RKAATL)

Copyright © 2003, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.8.5.1 Connecting ENC Cables (RKAJAT/RKAJATL)

Copyright © 2005, Hitachi, Ltd.

(5) Turn on breakers of the upper PDBs (#01 and #11).

(6) Turn on AC Power Unit Switch (DC Power Unit Switch) of all the Power Units of the added RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs that are not to be connected to the existing subsystem.
The ALM LED on the ENC Unit/SENC Unit of the added RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL concerned comes on.
Do not turn on AC Power Unit Switch (DC Power Unit Switch) of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be connected to the existing subsystem.

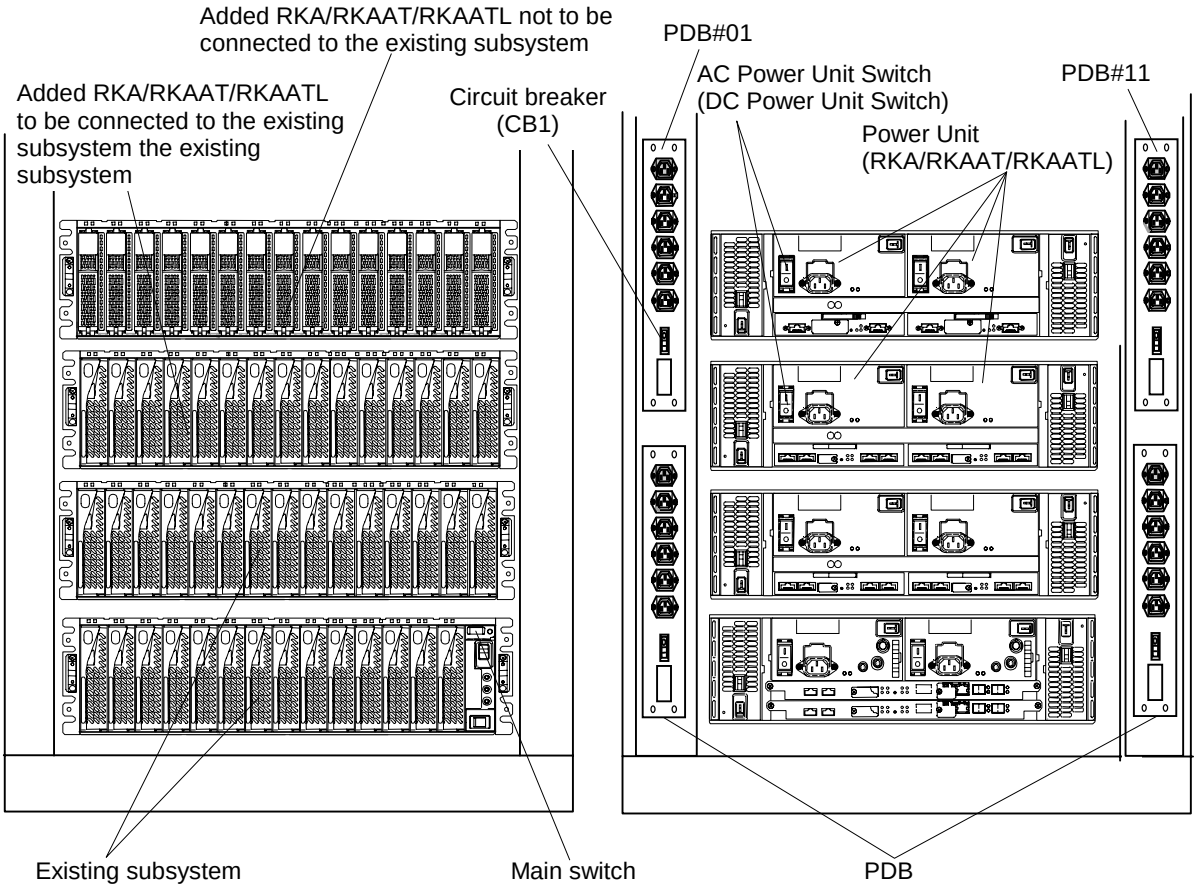


Figure 6.8.6 Locations of Switches for Power On (RKA/RKAAT/RKAATL)

Copyright © 2005, Hitachi, Ltd.

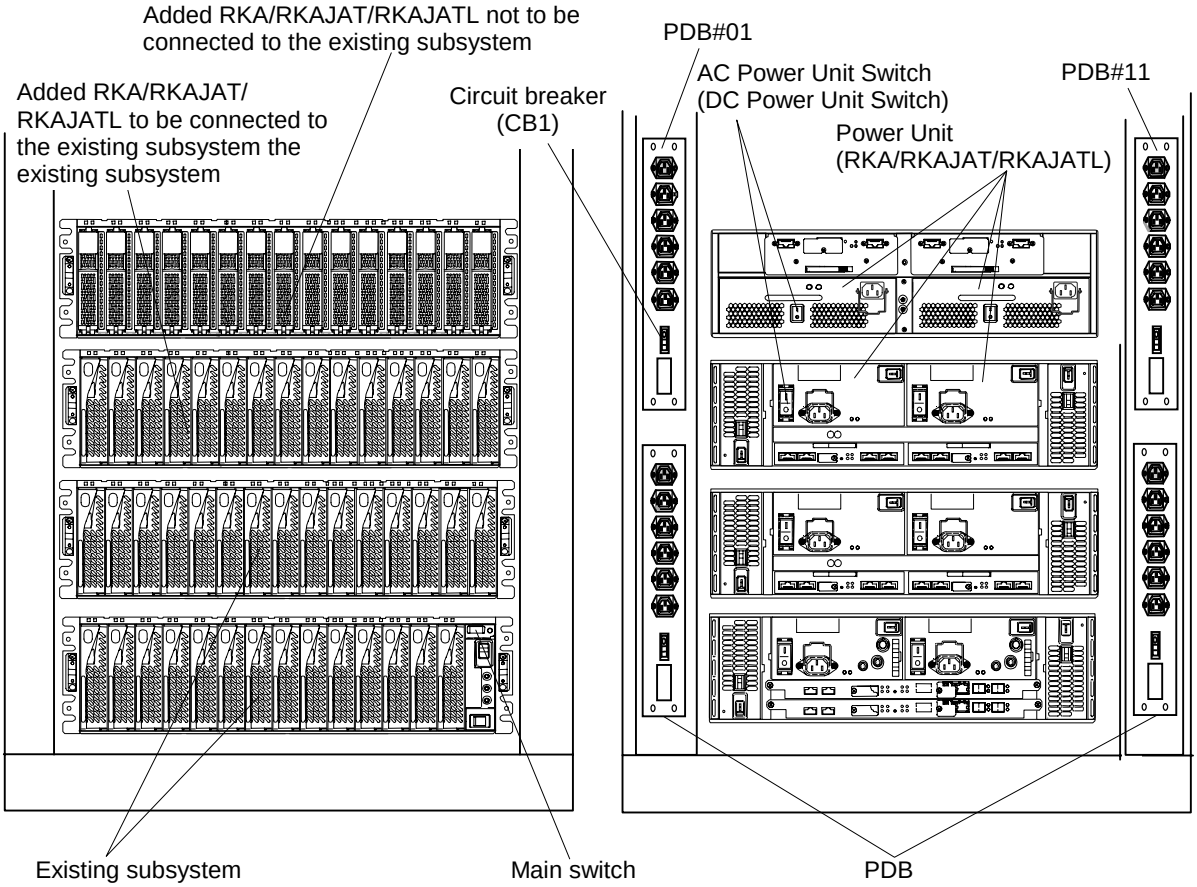


Figure 6.8.6.1 Locations of Switches for Power On (RKA/RKAJAT/RKAJATL)

Copyright © 2003, 2005, Hitachi, Ltd.

<Example of connection>

- Before the addition: Configuration of RK + Two RKAs
- After the addition: Configuration of RK + Two RKAs + Two RKAATs + Two RKAs + Five RKAATs

Refer to Figure 6.8.6.1, “Example of ENC Cable Connections Directed by ACE Tool.”

(1) When all the adding subsystems are selected while the Ctrl Key is pressed, the color of the displays of the selected subsystems is changed from gray to orange.
Cables other than those that connect subsystems displayed in the color changed from gray to white and the units displayed in orange or cables between the subsystems displayed in orange are the ENC cables not to be connected to the existing subsystems.

(2) Connect the ENC cables from the adding subsystem not to be connected to the existing subsystems in the following order.
① SATA #23 (RKAAT) and Fibre #05 (RKA)
② SATA #34 (RKAAT) and Fibre #05 (RKA)
③ Fibre #05 (RKA) and Fibre #06 (RKA)
④ Fibre #06 (RKA) and SATA #27 (RKAAT)
⑤ Fibre #06 (RKA) and SATA #38 (RKAAT)
⑥ SATA #27 (RKA) and SATA #29 (RKAAT)
⑦ SATA #38 (RKAAT) and SATA #3A (RKAAT)
⑧ SATA #29 (RKAAT) and SATA #2B (RKAAT)

There are four kinds of cable connections as shown below.

- From the Fibre (RKA) to the SATA (RKAAT) :
  From the OUT connector of the Fibre (RKA) to the IN connector of the SATA (RKAAT) (Up to the two SATAs (RKAATs) can be connected to the one Fibre (RKA).)
- From the SATA (RKAAT) to the Fibre (RKA) :
  From the OUT connector of the SATA (RKAAT) to the IN connector of the Fibre (RKA) (The one Fibre (RKA) can be connected to the two SATAs (RKAATs).)
- From the Fibre (RKA) to the Fibre (RKA) :
  From the OUT connector of the Fibre (RKA) to the IN connector of the Fibre (RKA) (The one Fibre (RKA) can be connected to the one Fibre (RKA).)
- From the SATA (RKAAT) to the SATA (RKAAT) :
  From the OUT connector of the SATA (RKAAT) to the IN connector of the SATA (RKAAT) (The one SATA (RKAAT) can be connected to the one SATA (RKAAT).)

Copyright © 2004, 2005, Hitachi, Ltd.

(3) Turn on all the AC Power Unit Switches of the added RKAs/RKAATs not to be connected to the existing subsystems (the units displayed in a color to be changed to gray when all the units already installed are selected while the Ctrl key is pressed). In this case, the subsystems to be powered on are Fibre #05 (RKA), Fibre #06 (RKA), SATA #27 (RKAAT), SATA #38 (RKAAT), SATA #29 (RKAAT), SATA #3A (RKAAT) and SATA #2B (RKAAT).

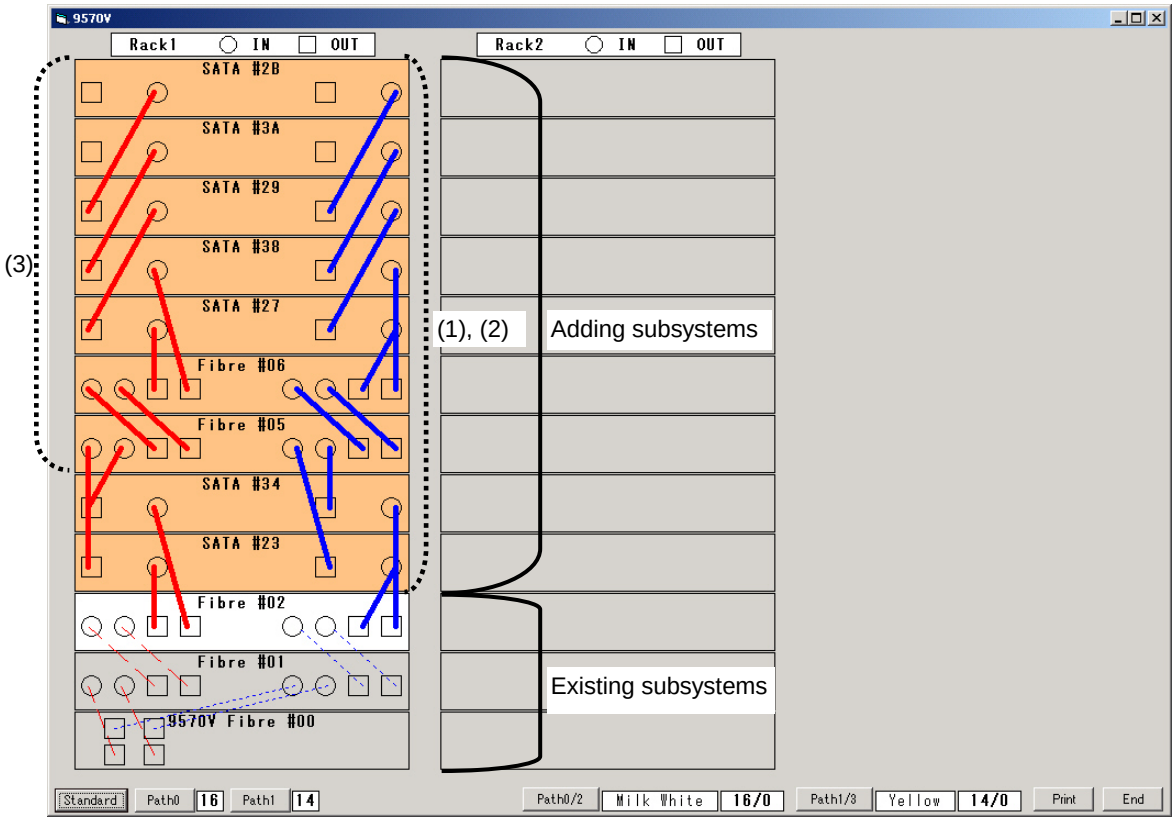


Figure 6.8.6.1 Example of ENC Cable Connections Directed by ACE Tool

Copyright © 2004, 2005, Hitachi, Ltd.

6.8.3 Recognition and connection of the added RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL

To make the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized, satisfy the following requirements.

No.	Item to be checked	Matter to be checked	Check result
1	Disk Drive	The Disk Drives #0 to #3 must be installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be added. When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must be installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.	
2		The Disk Drives #4 to #14 must not be installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be added	
3	ENC Unit/SENC Unit	The two units must be installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be added.	
4	Power Unit (RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL)	The two units must be installed in the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be added.	
5	WARNING (WARN) LED of the subsystem	No WARNING (WARN) LED must be on	
6	Device ID	The device ID must be set correctly (Refer to page INST 03-0643.)	
7	Number of connectable	The addition must not make the total number of the RK/RKL and RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs exceed the allowable maximum of fifteen.	
8	Formatting	No LU formatting must be in progress. (Excluding Quick Format)	
9	Other maintenance works	No other maintenance work must be in progress.	

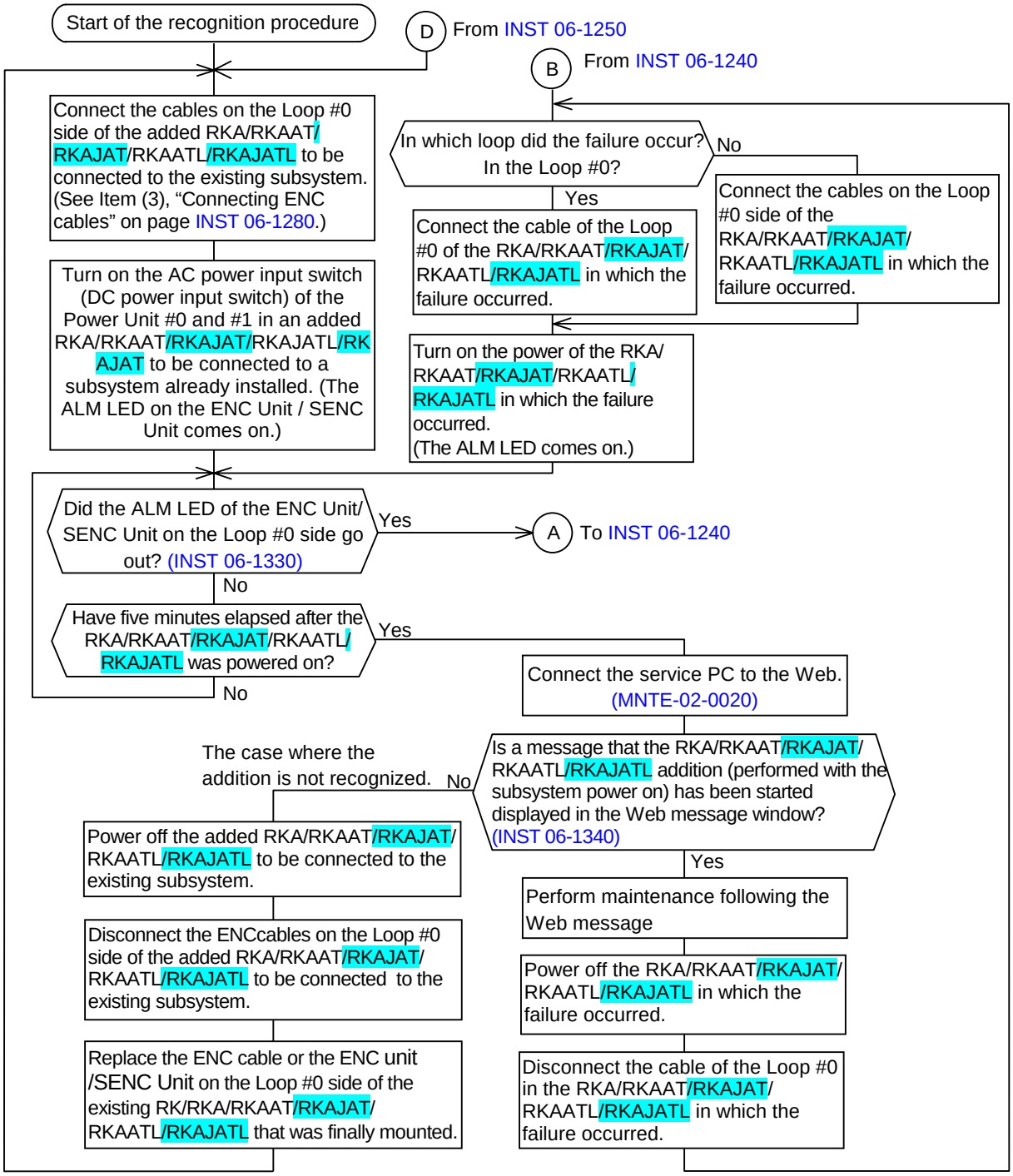
When the requirements above are satisfied, perform the operation following the "procedure for making the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized" shown below.

When making the multiple RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs recognized at a time, satisfy the following requirements in addition.

No.	Item to be checked	Matter to be checked	Check result
1	Making the multiple RKAs/RKAATs/RKAJATs/ RKAATLs/RKAJATLs recognized at a time	Are the ENC cables connected correctly to the added RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs other than the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL connected with the existing subsystem?	
2		Are the Power Units of the added RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs other than the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL connected with the existing subsystem turned on?	

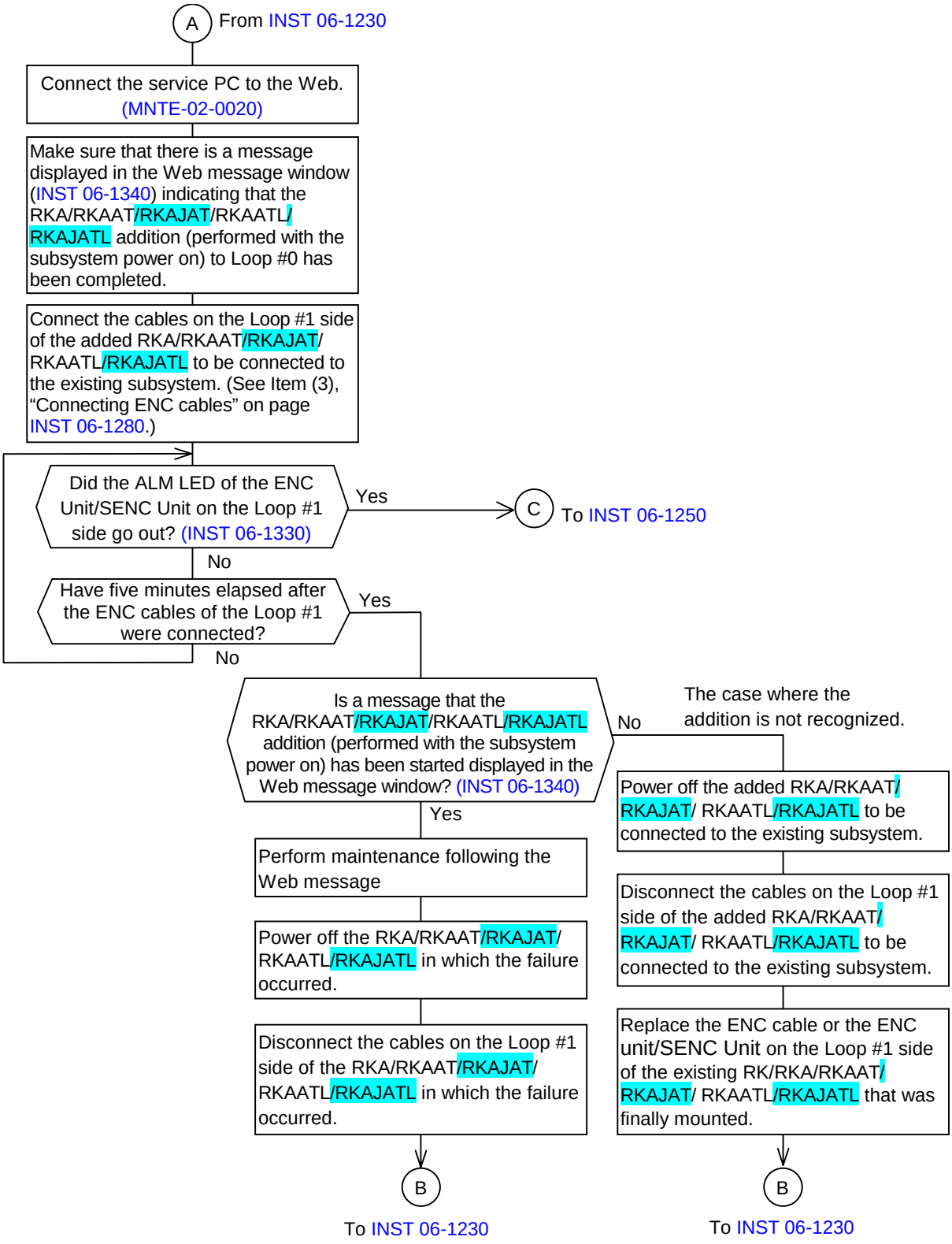
Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedure for making the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized
Perform the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognition operation following the flowchart below.
If a failure occurs during the work, check a Web message and take an action for recovery from the failure referring to "6.8.4 (4) Troubleshooting" on page INST 06-1320.
Perform the recognition operation for the adding subsystems to be connected to the existing subsystems one by one starting from the adding subsystem nearest to the basic subsystem.

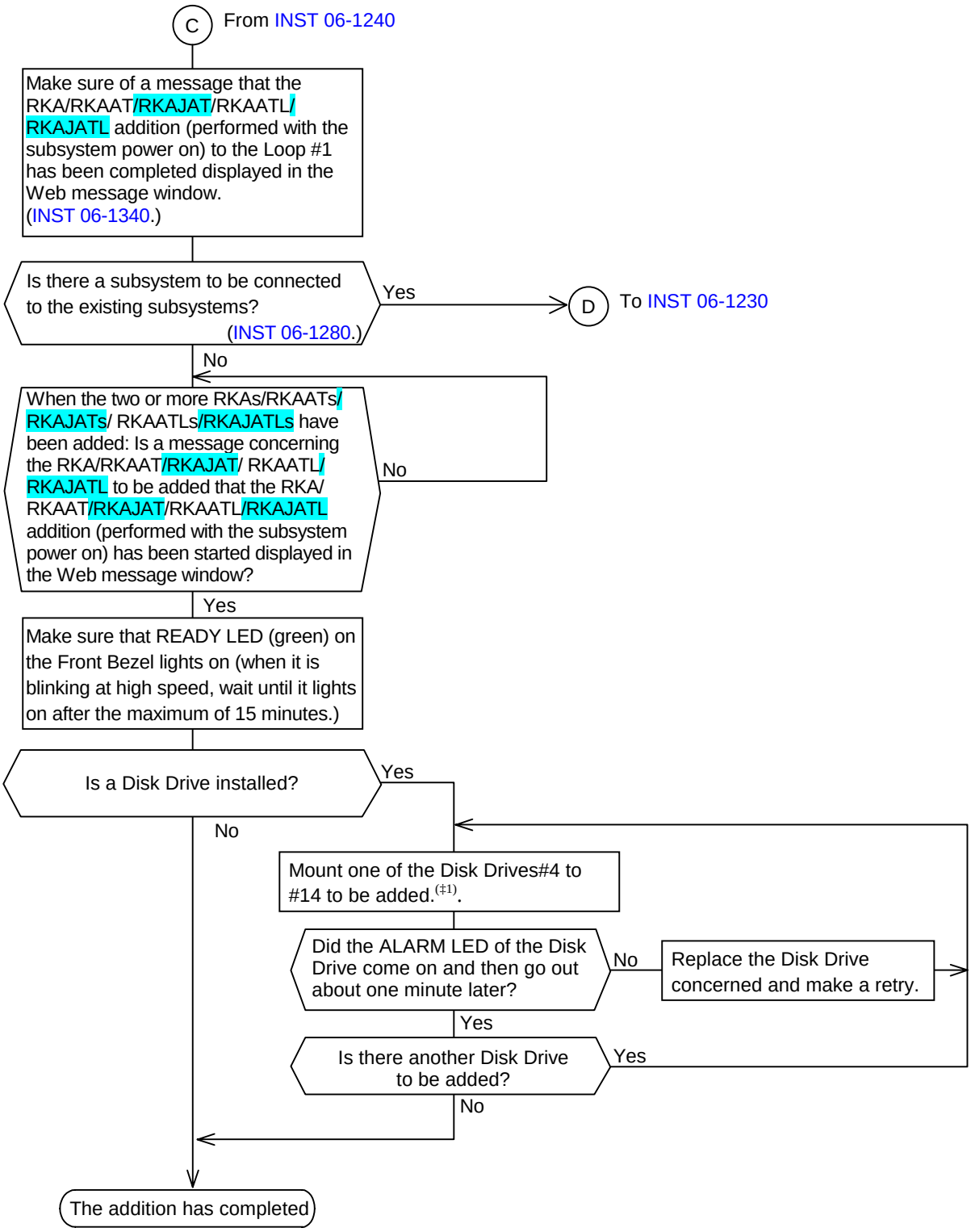


Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.



‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270.

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Replacing ENC Unit

NOTE : Replace the ENC Unit (supplied with the 2-Gbps FC Cable Kit) when the revision of the ENC Unit is “B”.

(a) Replacing the ENC Unit of the existing unit (RKA).
For the Loop #0 side, perform the following procedures.

(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.8.7).

(ii) Remove the ENC cable (0.5 m) connected to the ENC 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.

(iii) Remove the ENC Unit by pulling it out toward you.

(iv) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——)(see Figure 6.8.7). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

(v) Connect the ENC cable (0.5 m) removed in procedure (ii) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.8.5.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

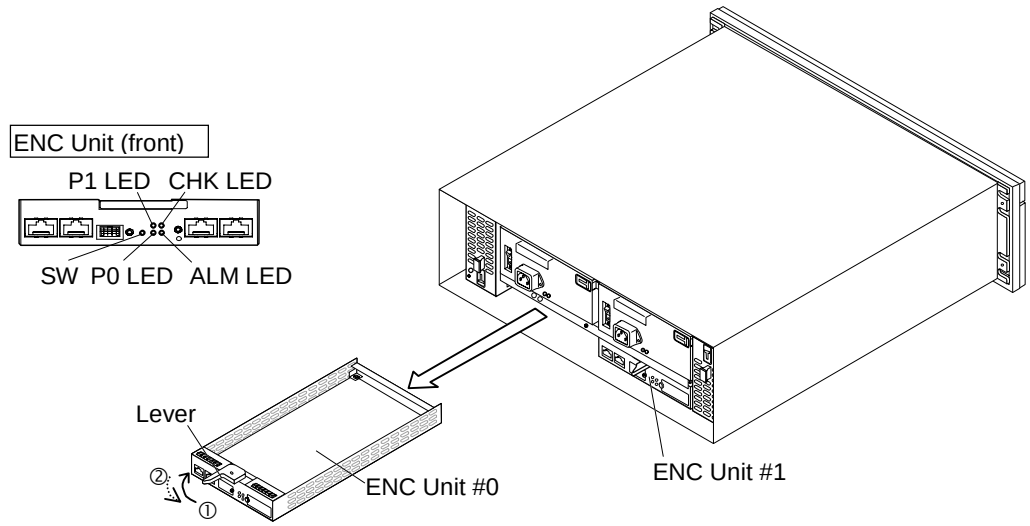


Figure 6.8.7 Replacing of ENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(vi) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.8.7).

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 because the ENC Unit is considered to have failed.

(vii) Make sure that the ALM LED (red) on the ENC Unit is off.
(viii) For the Loop #1 side, perform the operation from (i) to (vii) as in the above procedures.

(b) Replacing the ENC Unit of the existing unit (RKA) to added RKA to be connected to the existing unit.
For the Loop #0 side and Loop #1 side, perform the following procedures.
(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.8.7).
(ii) Insert a new ENC Unit attached to FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——) (see Figure 6.8.7).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.8.7).
(iv) Connect the ENC cable (0.5 m) to the IN side of the ENC Unit attached to FC Cable Assembly for 2Gbps, and connect the ENC cable (5 m) to the OUT side of that. (However, for the OUT side of ENC Unit that will be last connected, the connection with ENC cable is not required.)

NOTE : • Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.8.5.).
• To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
• To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2004, 2005, Hitachi, Ltd.

(3) Connecting ENC cables (on the Loop #0 side)
When adding the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL while the subsystem power is on, it is required to connect the ENC Unit/SENC Unit for the Loop #0 (ENC #0) of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be added and the ENC Unit/SENC Unit with the ENC cables (‡1).

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL
- When connecting 5m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps (RK cannot be connected by ENC cable (5 m).).

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.

NOTE :
- Be sure to connect the ENC cable from the subsystem 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 RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs are mounted, however, connect the ENC Unit #1/SENC Unit #1 as well as the ENC Unit #0/SENC Unit #0 among the RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs 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 RKA, the ENC cables are connected to the to two paths, PATH#0 and PATH#1 of the ENC Unit #0 side (Loop #0) and the two paths, PATH#0 and PATH #1 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 the PATH #0 in milky-white and the PATH #1 in yellow.
  For RKAAT/RKAJAT/RKAATL/RKAJATL, the ENC cables are connected to the PATH#0 (or PATH #1) of the SENC Unit #0 (Loop #0) and the PATH#0 (or PATH #1) of the SENC Unit #1 (Loop #1) (total of two).
- The IN and OUT connectors of the SENC Unit of the RKAAT/RKAJAT/RKAATL/RKAJATL have indications by means of blue and green labels respectively.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

Copyright © 2004, 2005, Hitachi, Ltd.

(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 "1.7 Device ID setting and ENC cable connection" (INST 01-0180).
Refer to an example of the connection of the RKA/RKAAT made using the ACE Tool (INST 06-1321).

(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 RKAAT/RKAJAT/RKAATL/RKAJATL, 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.

(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.

Copyright © 2004, 2005, Hitachi, Ltd.

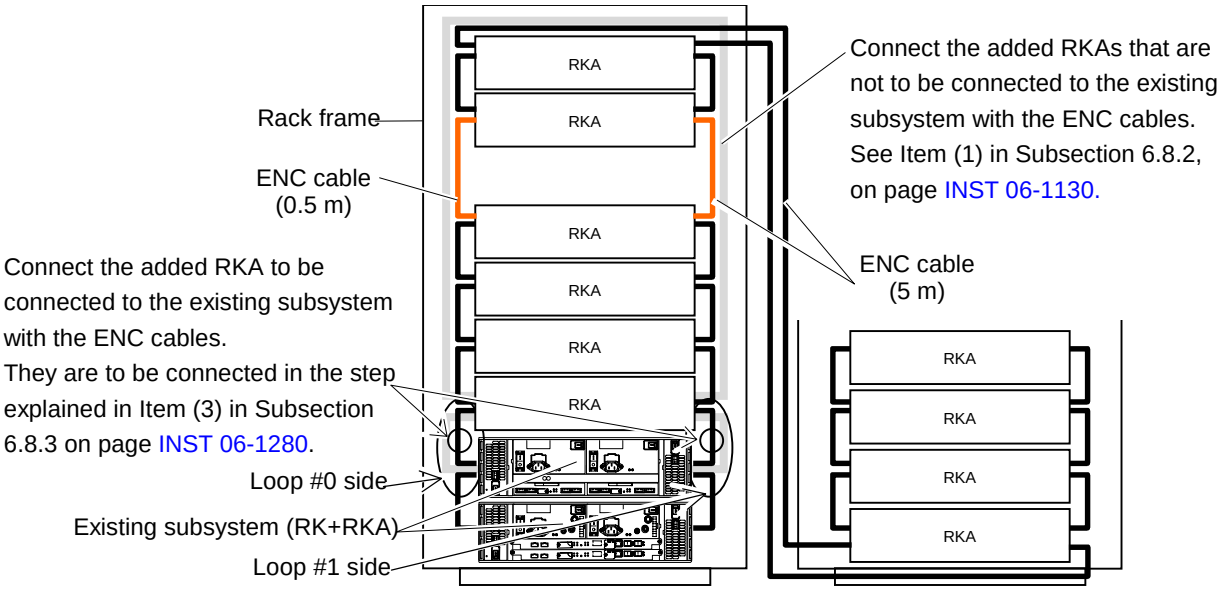


Figure 6.8.8 Connecting the ENC cables (RK+RKA+RKAs)

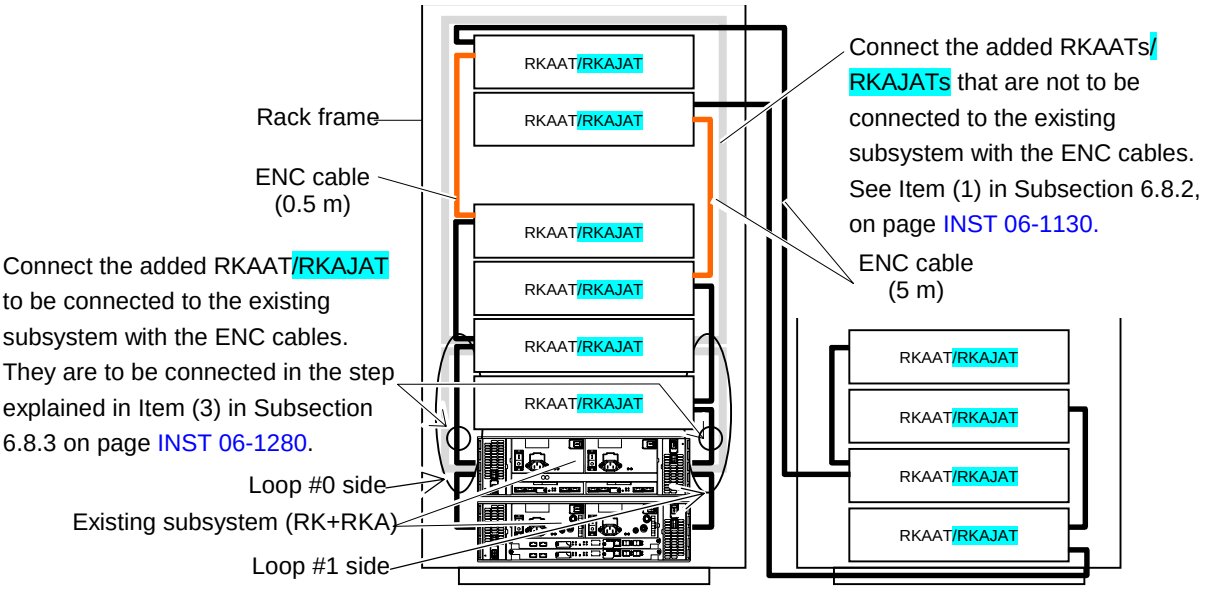


Figure 6.8.8.1 Connecting the ENC cables (RK+RKA+RKAATs/RKAJATs)

Copyright © 2004, 2005, Hitachi, Ltd.

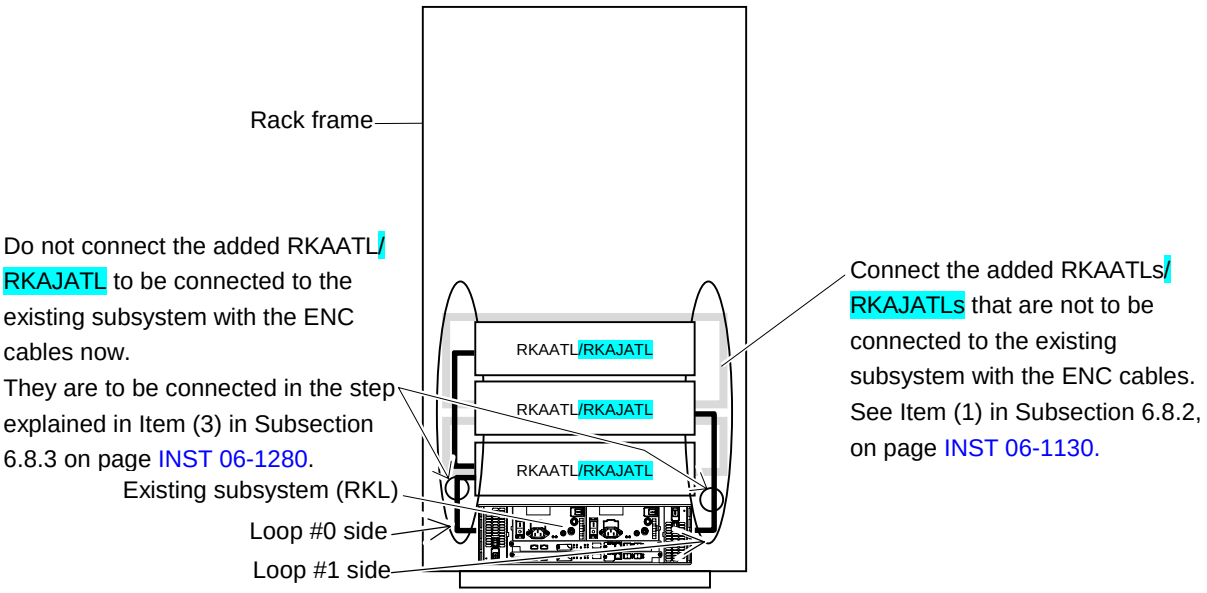


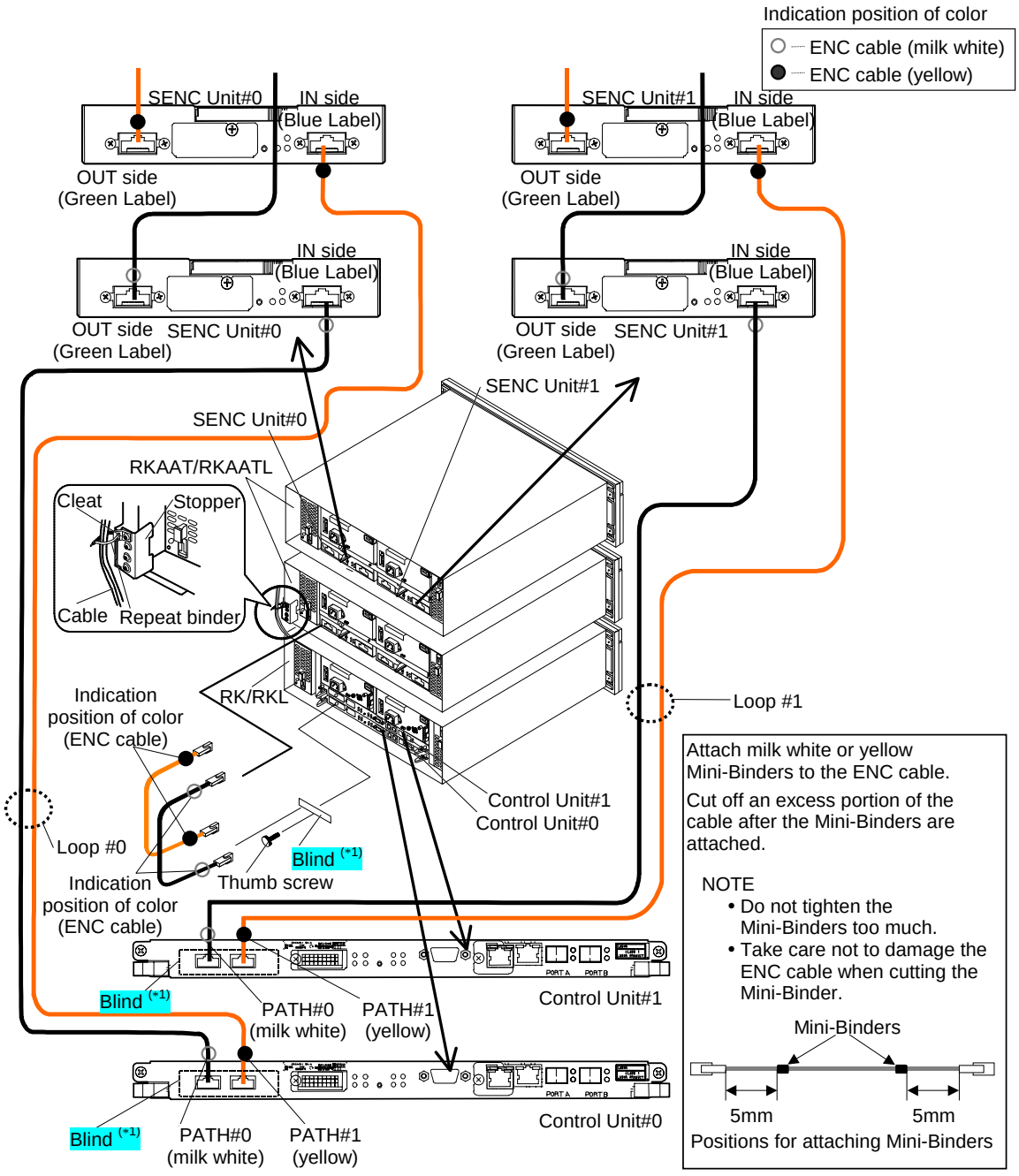
Figure 6.8.8.2 Connecting the ENC cables (RKL+RKAATLs/RKAJATLs)

Copyright © 2004, 2005, Hitachi, Ltd.

(b) Attach the milk white or yellow Mini-Binders to the ENC cables (see Figure 6.8.9).
(c) Remove the Blind (‡1) of the output connector of the FC-AL of the terminal existing subsystems (RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL).
(d) Make connections on the Loop #0 side as directed by the ACE Tool (see the Loop #0 in Figure 6.8.9).
Connect the ENC Unit/SENC Unit in the Loop #0 of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be connected to the existing subsystem and the output connector of the FC-AL in the Loop #0 of the existing subsystem (RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL) with the ENC cables.
(e) Perform the work on the Loop #1 side after completing the Loop #0 side.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

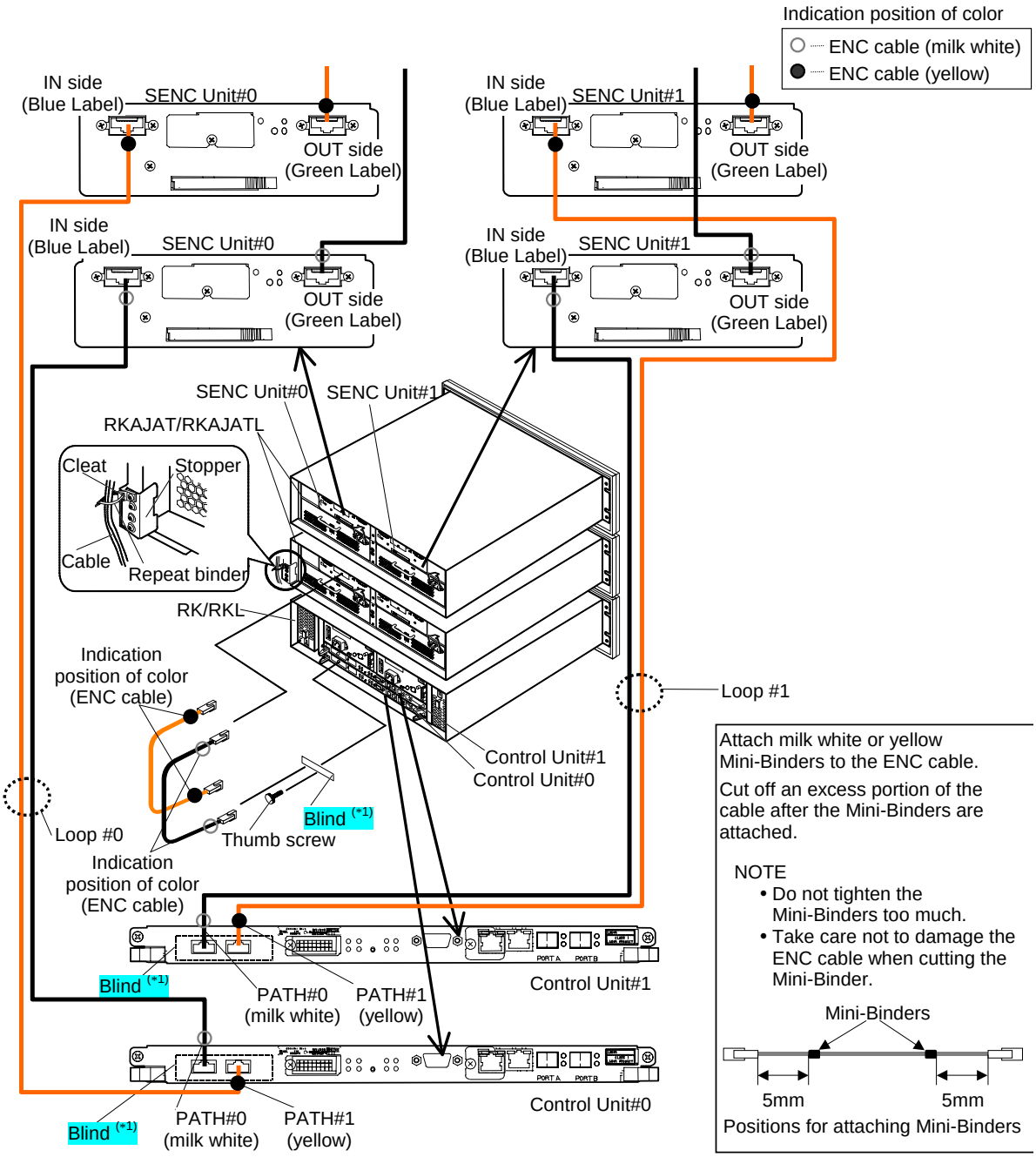
Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.8.9 Connecting ENC Cables (RK/RKL/RKAAT/RKAATL)

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.8.9.1 Connecting ENC Cables (RK/RKL/RKAJAT/RKAJATL)

Copyright © 2005, Hitachi, Ltd.

(4) Turn on the AC Power Unit Switch of the Power Units (#0, #1) of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL to be connected to the existing subsystem.

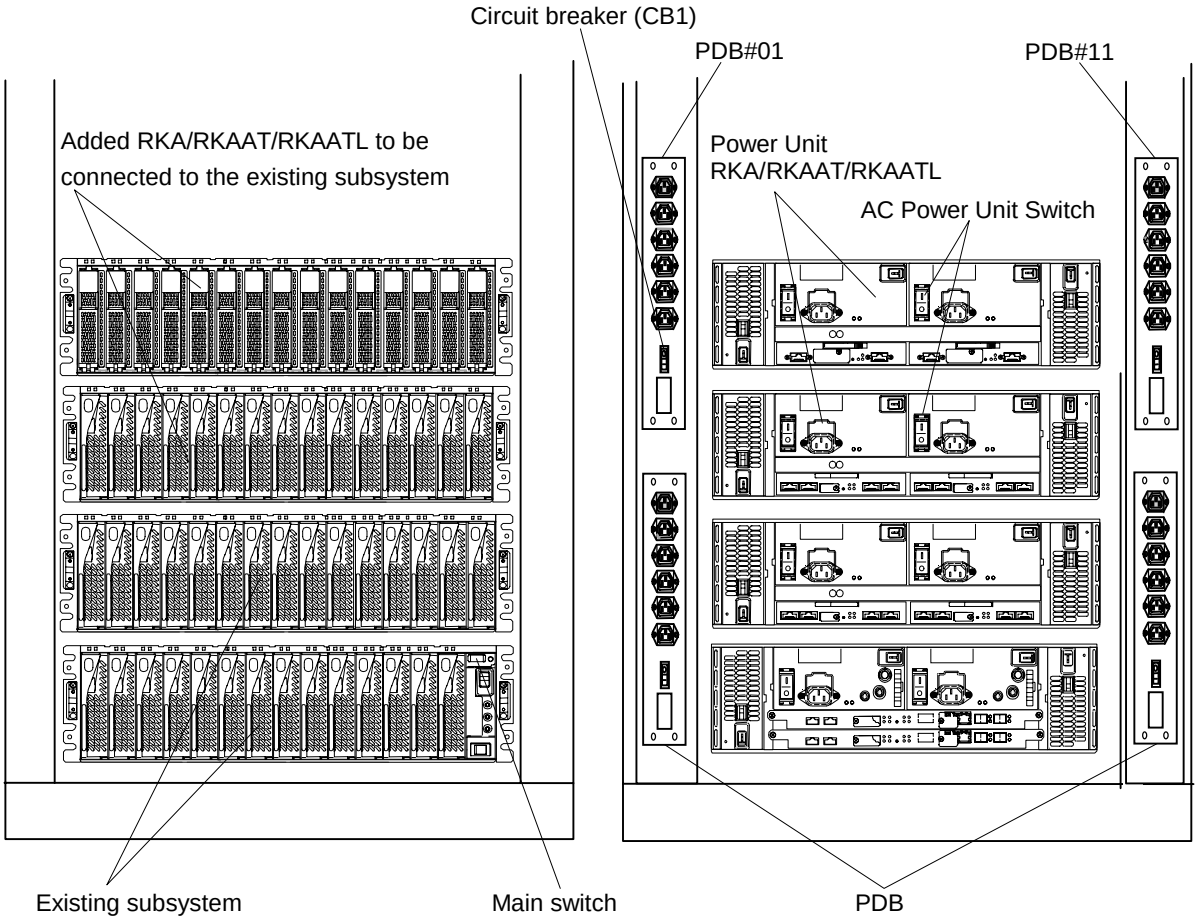


Figure 6.8.10 Locations of Switches for Power On (RKA/RKAAT/RKAATL)

Copyright © 2005, Hitachi, Ltd.

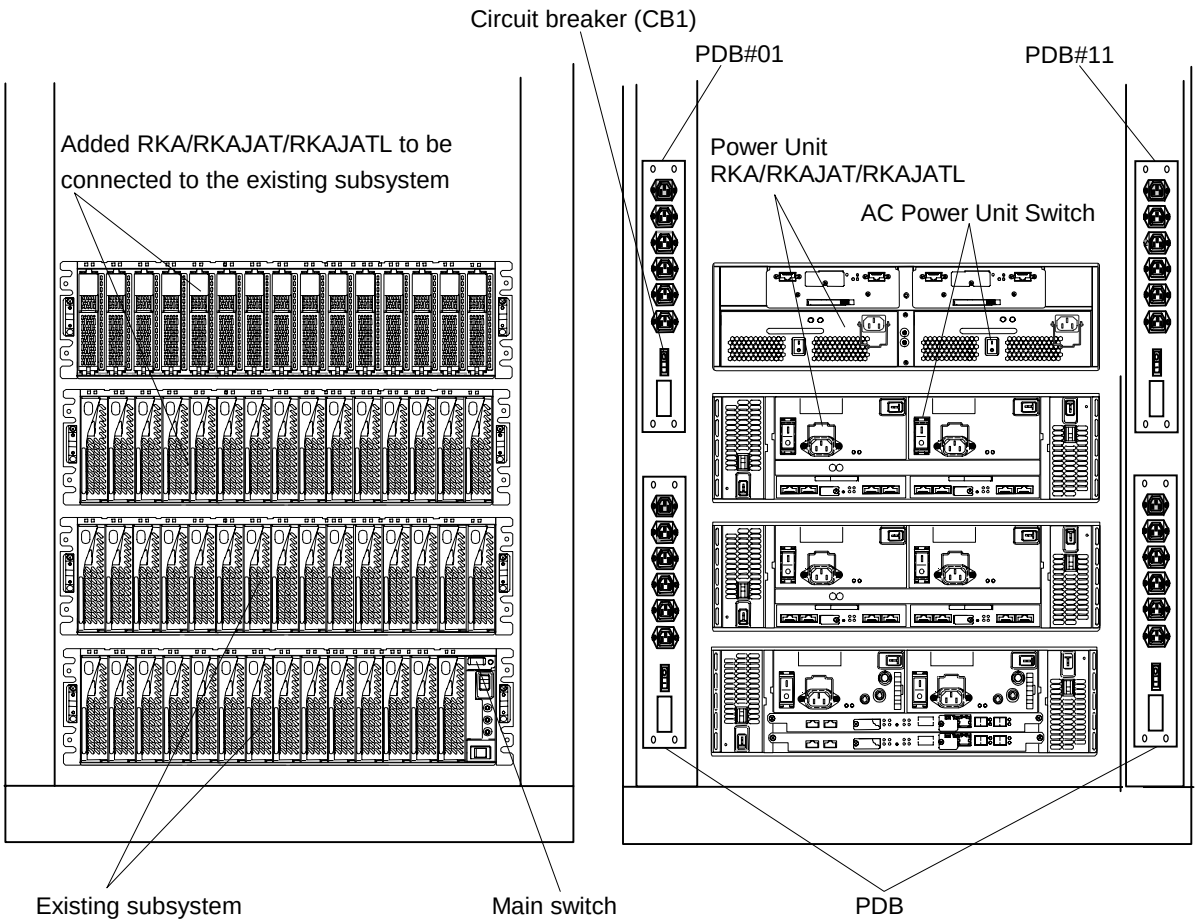


Figure 6.8.10.1 Locations of Switches for Power On (RKA/RKAJAT/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

<Example of connection>

- Before the addition: Configuration of RK + Two RKAs
- After the addition: Configuration of RK + Two RKAs + Two RKAATs + Two RKAs + Five RKAATs

Refer to Figure 6.8.10.1, “Example of ENC Cable Connections Directed by ACE Tool.”
When all the adding subsystems are selected while the Ctrl key is pressed, the color of the displays of the selected subsystems is changed from gray to orange.
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.
Check the recognition of the adding subsystems to be connected to the existing subsystems 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 (RKA) and SATA #23 (RKAAT)
(ii) The second recognition : Fibre #02 (RKA) and SATA #34 (RKAAT)

NOTE : • Do not connect the ENC cables of the Loops #0 and #1 at the same time because the system may go down otherwise.
• 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.

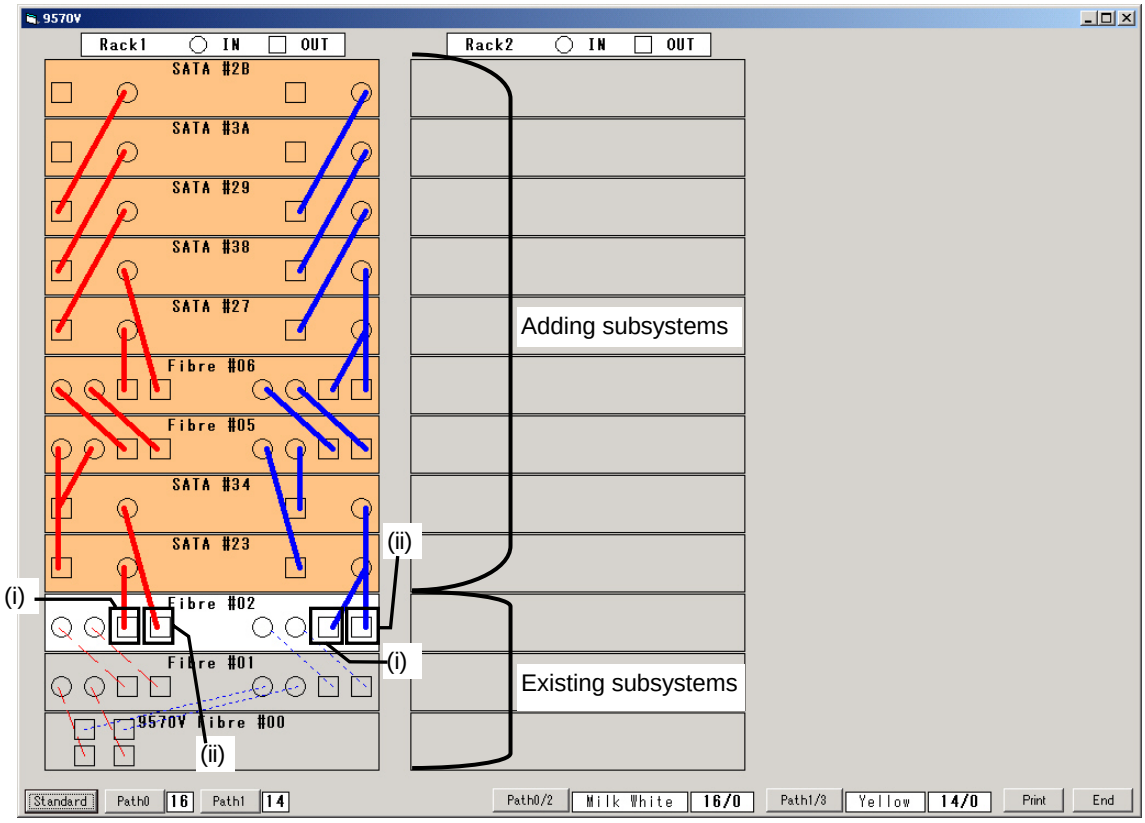


Figure 6.8.10.1 Example of ENC Cable Connections Directed by ACE Tool

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

6.8.4 Verifying the addition

(1) Verifying completion of the addition to the loop

(a) Procedure for verifying completion of the addition to the loop

When the ALM LED on the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL are off, the addition to the loop has been completed normally. 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.

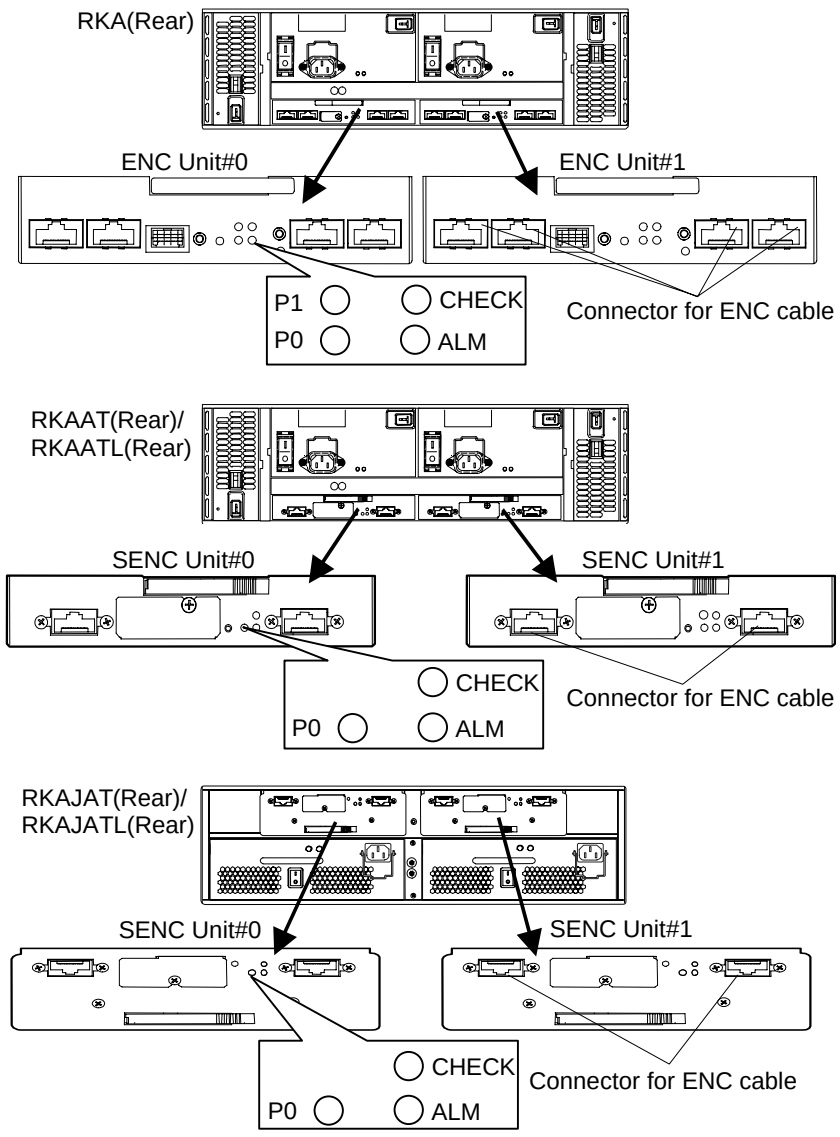
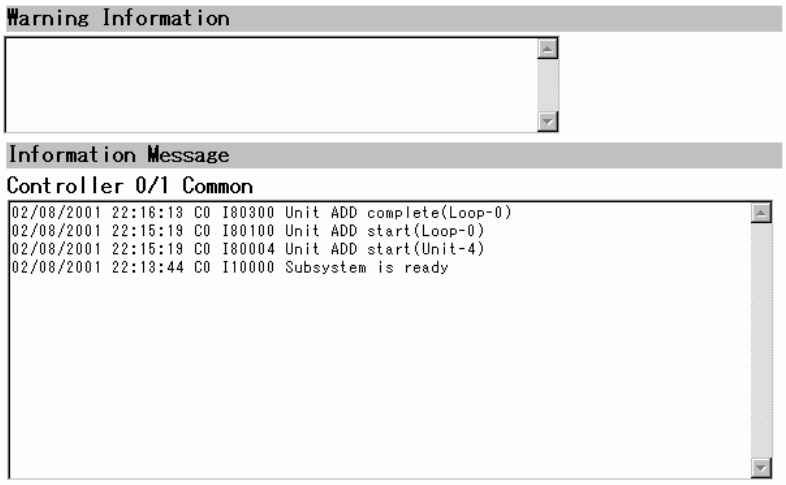


Figure 6.8.11 Locations of LED for ENC Unit/SENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(b) Contents of the WEB message

[In the case of normal termination]



MM/DD/YYYY HH:MM:SS Cx I80300 Unit ADD complete (Loop-y)

MM/DD/YYYY HH:MM:SS Cx I80100 Unit ADD start (Loop-y)

MM/DD/YYYY HH:MM:SS Cx I80004 Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

A message informing of a start of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the system power on

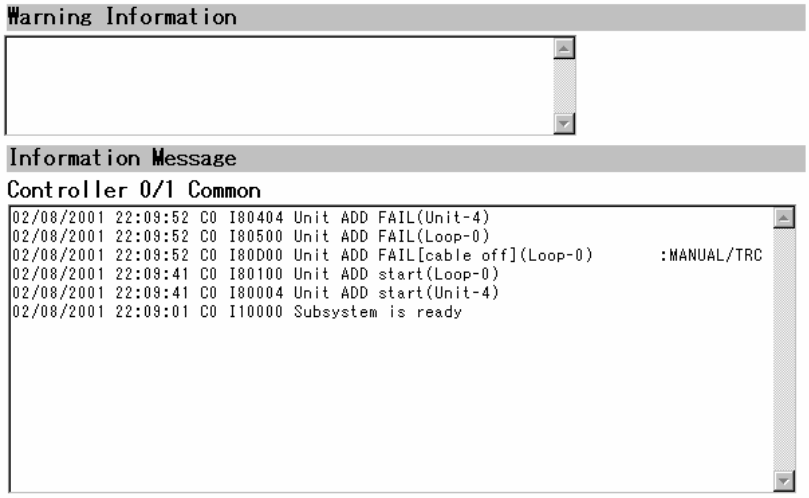
A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

Copyright © 2004, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80D0y Unit ADD FAIL [cable off] (Loop-y) :MANUAL/TRC
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on
- A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).
- A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on
- A message informing of an abnormal termination of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

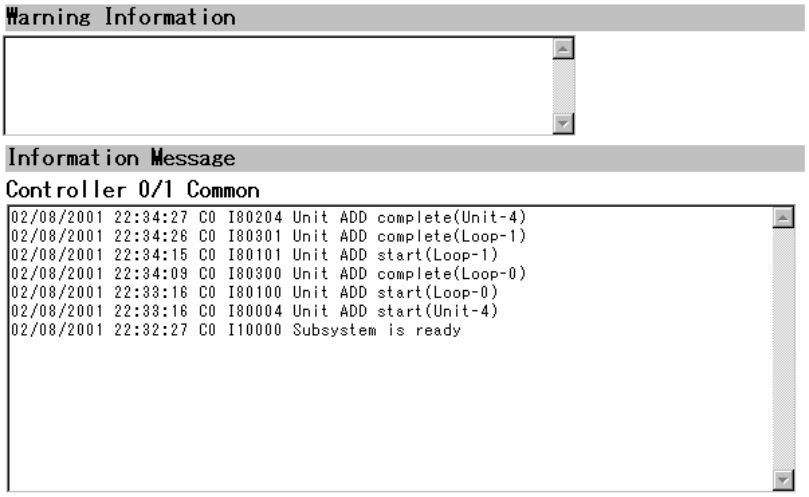
Copyright © 2004, 2005, Hitachi, Ltd.

(2) Connecting ENC cables (on the Loop #1 side)
Connect the ENC cables on the Loop #1 side in the same way as the Loop #0.
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. For the procedure for connecting the ENC cables, refer to Figure 6.8.8 and 6.8.8.1, "Connecting the ENC cables" on page INST 06-1291, refer to Figure 6.8.8.2, "Connecting the ENC cables" on page INST 06-1292.

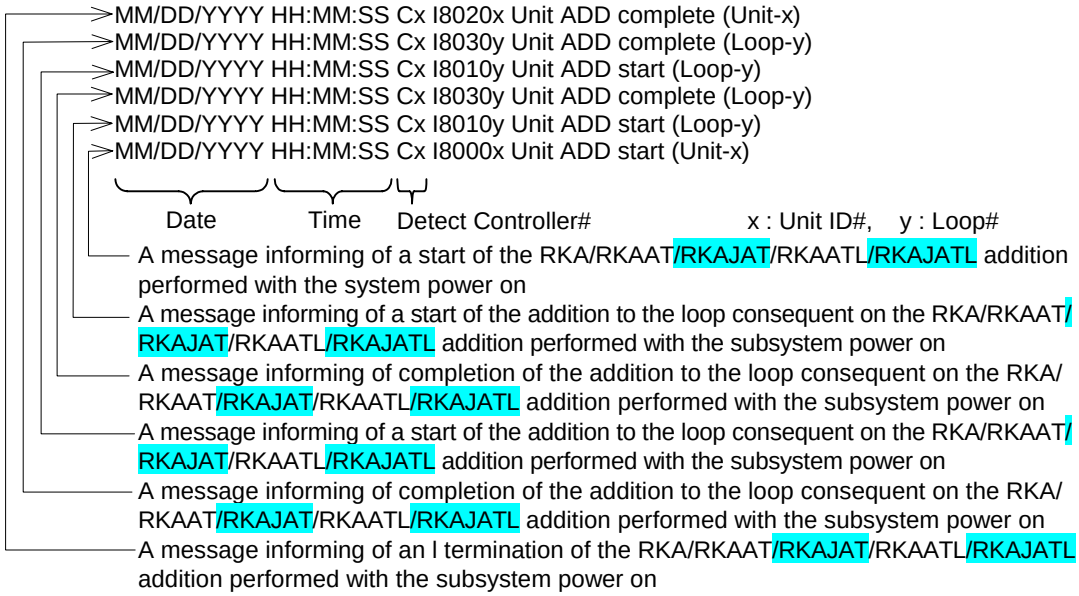
(3) Verifying completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL addition performed with the subsystem power on

(a) Procedure for verifying completion of the addition to the loop consequent on the RKA/ RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on.
When the ALM LED of the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAAT/RKAJAT/RKAATL/ RKAJATL 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]



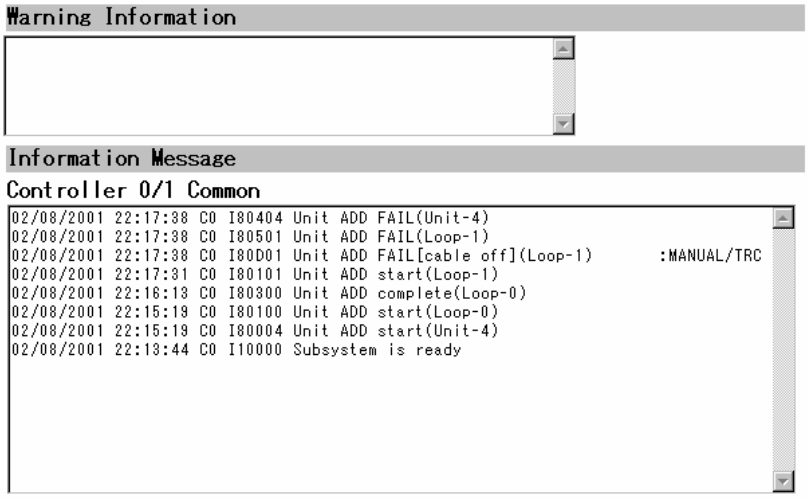
Copyright © 2004, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD FAIL [cable off] (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

A message informing of a start of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the system power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).

A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

A message informing of an abnormal termination of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition performed with the subsystem power on

Copyright © 2004, 2005, Hitachi, Ltd.

(4) Troubleshooting

(a) When the ENC cable is connected to the Loop #1 first

It causes the recognition operation itself no problem if the Loop #0 is connected following the connection of the Loop #1.

It is written in the maintenance procedure that the Loop #1 is to be connected after the Loop #0 has been connected.

(b) When a failure occurs while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress Take a recovery action against the failure, that occurs in the existing subsystem or added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL when the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress, after checking the message informing of a normal or abnormal termination of the addition. If the recovery action is taken when the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress, an abnormal termination of the addition or a subsystem down may be caused.

(c) Failures that occur when the operation to make the RKA/RKAAT/RKAATL/RKAJATL recognized is in progress

- When a failure occurs in the existing part while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress. Perform the recovery action, which is against a trouble occurs in the existing subsystem while operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is being done, after the addition terminates (normally or abnormally) because the action can affect the recognition of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.
- When failures occur in both of the existing and added parts while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress. When failures occur in both of the existing and added parts while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress, take a recovery action against the failure of the existing part preferentially after the addition completes, take a recovery action against the failure of the added part next, and then resume the operation for making the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized.

Copyright © 2004, 2005, Hitachi, Ltd.

(d) In the case where the operation for making the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is started in the state in which the Disk Drives other than the #0 to #3 have been installed.

NOTE : Install the Disk Drives #4 to #13 (#4 to #14 other than the unit ID#0) after the addition is completed.
When adding the multiple subsystems at the same time, install the Disk Drives after all the RKAs/RKAATs/RKAJATs/RKAATLs/RKAJATLs are recognized.

The following message is output in the "Information message" window in the WEB window.

I80E00 Unit ADD warning [HDU number over]

When the message above is displayed, it is possible that the addition does not complete within the predetermined time (five minutes).
Besides, do not pull out the Disk Drive while the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL is being made to be recognized.
Otherwise, an abnormal termination or a subsystem down may be caused.

(e) Procedure for recovery from a system down that occurs while operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is being done.
To recover from a system down that occurs while operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is being done, remove the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL which is intended to be added and in which the failure has occurred, start up the subsystem again in the original state before the addition has been done, and then resume the addition of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.
If the system down recurs after the retrying, perform the addition (addition performed with the subsystem power off) after the down occurs, and then start up the subsystem again.

(f) Loop failure that occurs while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress (in the case where no part is blocked)
When the addition terminates abnormally because a loop failure occurs while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress, a disconnection of a cable of the blocked loop can recover the subsystem from the failure.
If the recovery fails, recover the subsystem from the loop failure by performing dummy replacement (‡1) the finally installed ENC Unit/SENC Unit of the existing RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.

(g) When a loop failure occurs while the operation to make the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized is in progress and a recovery from it fails even though the cable concerned has been disconnected.
Dummy replacement of the ENC Unit/SENC Unit, which is connected to the related loop, of the existing RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL finally mounted can recover the subsystem from the failure.

‡1 : To remove the part concerned once, and then to reinstall it (after waiting for 20 seconds)

Copyright © 2004, 2005, Hitachi, Ltd.

(5) Procedure for interrupting the operation for making the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognized and notes on it

When the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL recognition was interrupted, disconnect the ENC cables which were in the process of being added; disconnect the cables of the one loop at a time.

If you disconnect all the cables at a time, the addition may be completed causing a loop detachment or even an ENC detachment depending on the time when the disconnection is done.

When you want to remove the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL that has been added once after the addition has been completed, perform a sequential shutdown before an LU is constructed, and then remove the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL with the subsystem power off.

When the LU has already been constructed, delete the LU and perform a sequential shutdown (That is because the subsystem will go down at the time of the next powering on if the LU is left.)

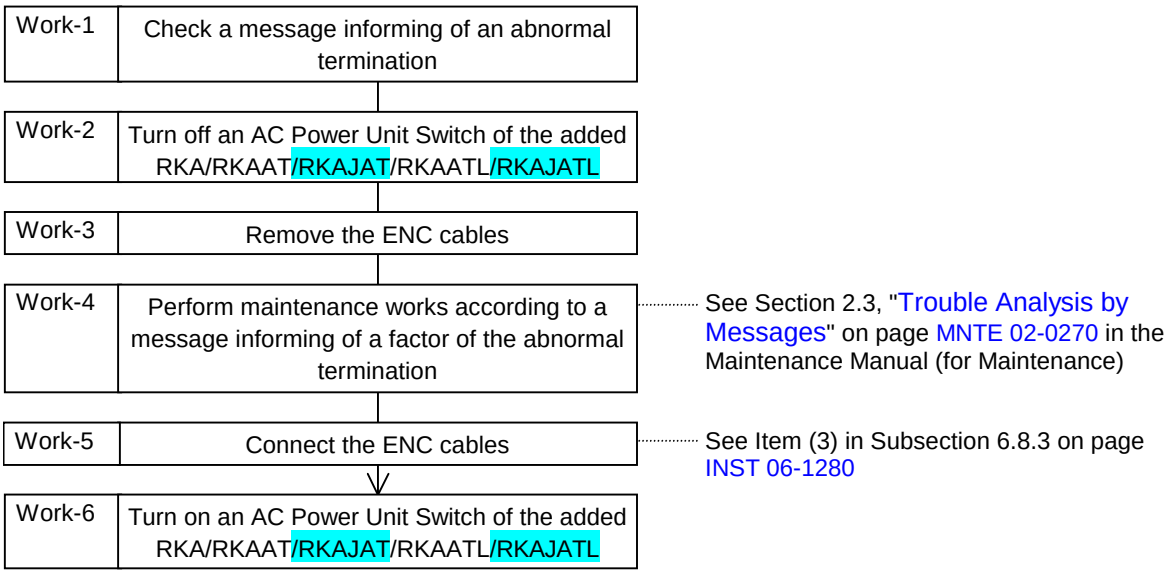
It causes no problem if a RAID group is constructed before the de-installation, however, the RAID group will not be deleted after the next powering on.

Copyright © 2004, 2005, Hitachi, Ltd.

(6) Procedure for resuming an RKA/RKAAT/RKAJAT/RKAATL/RKAJATL addition with the subsystem power on when the addition has terminated abnormally.
When you want to add the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL again while the subsystem power is on after the addition has terminated abnormally, operate following the procedure shown below.

NOTE : • Turn off the AC Input Power Unit Switch (DC Input Power Unit Switch) of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL which was terminated abnormally, wait for 20 seconds or more, and turn it on again.

• When turning off the AC Power Unit Switch of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, do not turn off the AC Power Unit Switch of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL that has been normally recognized (the ALM LEDs of whose ENC Units/SENC Units for the both loops are off).
When turning off the AC Power Unit Switch or removing the ENC cable of the failed RKA/RKAAT/RKAJAT/RKAATL/RKAJATL only, operate in the same way.
Never turn off the AC power switch of the recognized RKA/RKAAT/RKAJAT/RKAATL/RKAJATL or disconnect the ENC cable of it because each of the above operations causes a system down.



Wait for 20 seconds after turning off an AC Power Unit Switch of the added RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, and then turn on the AC Power Unit Switch again.

Copyright © 2004, 2005, Hitachi, Ltd.

6.8.5 Install the rest of the Disk Drives

Install the rest of the Disk Drives in the Disk Drive slots #4 to #14 of the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL.
Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed. (‡1)

(1) Pull the parts out of the Disk Drives safekeeping of component
(2) Insert the Disk Drive into the position (address) where it was by holding it with the handle.
Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.
(3) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270

Copyright © 2004, 2005, Hitachi, Ltd.

6.9 Adding RKA/RKAAT/RKAJAT to Rack Frame (In the case of the connection to the RKH/RKHE)

If there are not enough empty slots in the existing subsystems to add more Disk Drives to the Rackmount model, the RKA/RKAAT/RKAJAT shall be added to the frame.
The procedures for adding the RKA/RKAAT/RKAJAT to a U6 rack frame when the power to the subsystem is on or off(‡1) are shown below.
When mounting the RKA/RKAAT/RKAJAT onto the rack frame, use the number of rack rail kits (URHT5/URHP5) as the RKAs to be added are required.

6.9.1 Procedure for adding the RKA/RKAAT/RKAJAT to the subsystem of rackmount model with U6/U4 rack frame

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) At least the following components must have been installed in the RKA/RKAAT/RKAJAT to beaded.
- Two Disk Drives (a combination of the Disk Drives #0 and #1)
- Two ENC Unit/SENC Unit (Standard installation, four ENC cables (ENC Unit), two ENC cables (SENC Unit) are included.)
- Two Power Unit (RKA/RKAAT/RKAJAT)'s (Standard installation)

(b) Two ENC cables per ENC Unit/SENC Unit must have been connected between the RKH/RKHE or RKA/RKAAT/RKAJAT.

(c) Restriction of number of the RKAs/RKAATs/RKAJATs allowed to be added is that the total number of the RKAs/RKAATs/RKAJATs must not exceed the allowable maximum of 30 (RKAAT/RKAJAT is 28) after the addition.

(d) 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 go out. (Refer to Chapter 2, "Trouble Analysis" on page MNTE 02-0000 in the Maintenance Manual (Volume of Maintenance).)

(e) No part replacement can be done while operation to make the RKA/RKAAT/RKAJAT recognized is being done (Work-10).

(f) A number of installed Disk Drives when making an addition.
The installed Disk Drives when making an addition must be the #0 to #3 only.
When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must have been installed.
- When the two Disk Drives are added, install them in the Disk Drive slots #0 and #1.
- When the three Disk Drives are added, install them in the Disk Drive slots #0 to #2.
- When the four or more Disk Drives are added, install them in the Disk Drive slots #0 to #3 only.

‡1 : 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.).

Copyright © 2004, 2005, Hitachi, Ltd.

(g) Install them after all the RKAs/RKAATs/RKAJATs have been recognized(‡1) (Work-10), connect the ENC cables between the existing subsystem and the added RKA/RKAAT/RKAJAT to be connected to the subsystem for the each loop one by one. (See Subsection 6.9.3 on page INST 06-1580.)

(h) When failures occur in both of the existing subsystem and the added RKA/RKAAT/RKAJAT while the operation to make the RKA/RKAAT/RKAJAT recognized(‡2) (Work-10) is being done, take a recovery action against the failure of the existing subsystem preferentially after the RKA/RKAAT/RKAJAT has been recognized(‡1).
After that, take a recovery action against the failure of the added RKA/RKAAT/RKAJAT, and then resume the operation.

(i) Do not perform an LU formatting while the operation to make the RKA/RKAAT/RKAJAT recognized(‡1) is being done (Work-10). Also, do not perform the operation to make the RKA/RKAAT/RKAJAT recognized(‡1) while an LU formatting is in progress.

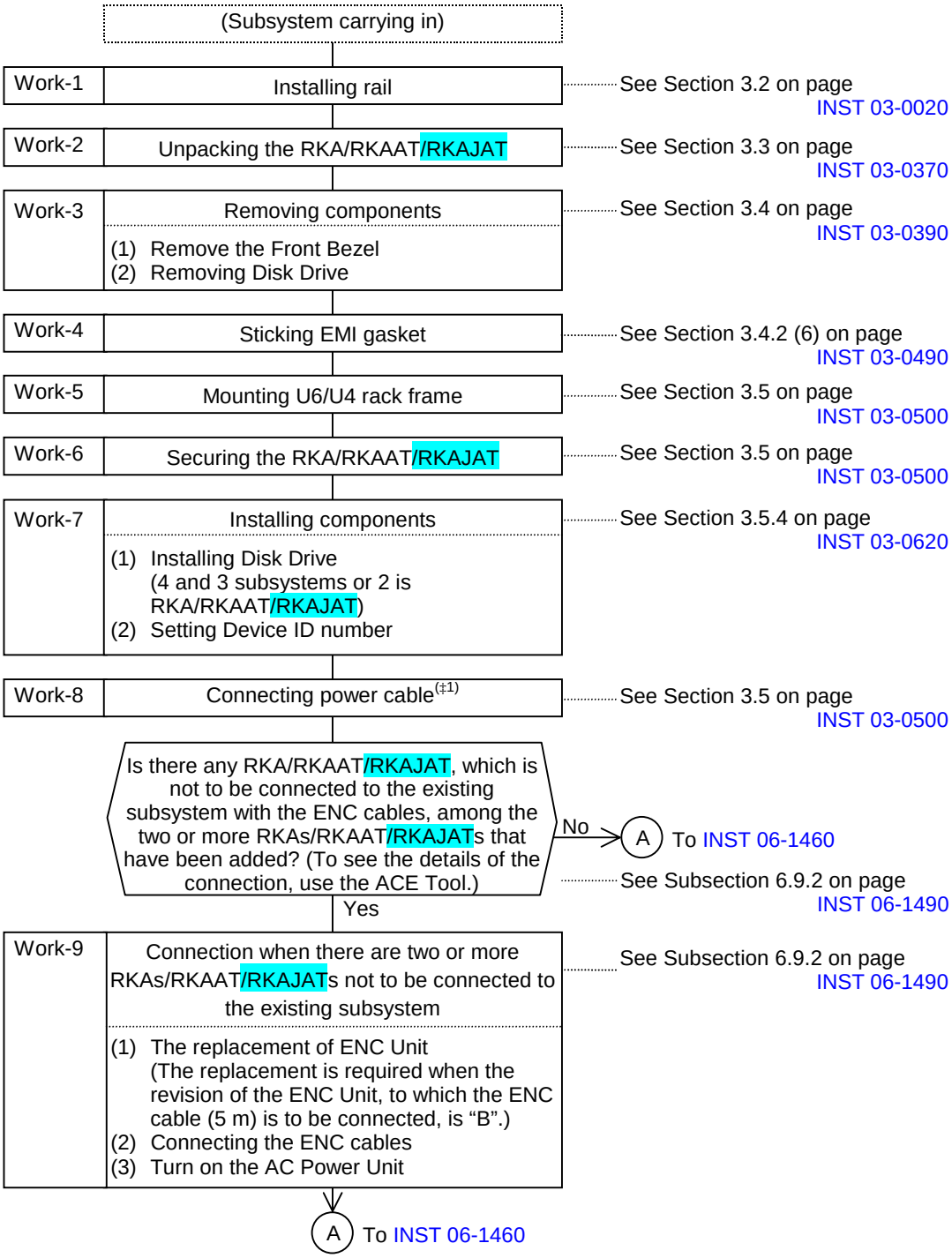
(j) Do not make the addition work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the addition work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

‡1 : The expression “recognized” described here means that the Controller of the existing RKH/RKHE recognizes the added RKA.

‡2 : The expression “recognized” described here means that the Controller of the existing RKH/RKHE recognizes the added RKA/RKAAT/RKAJAT.

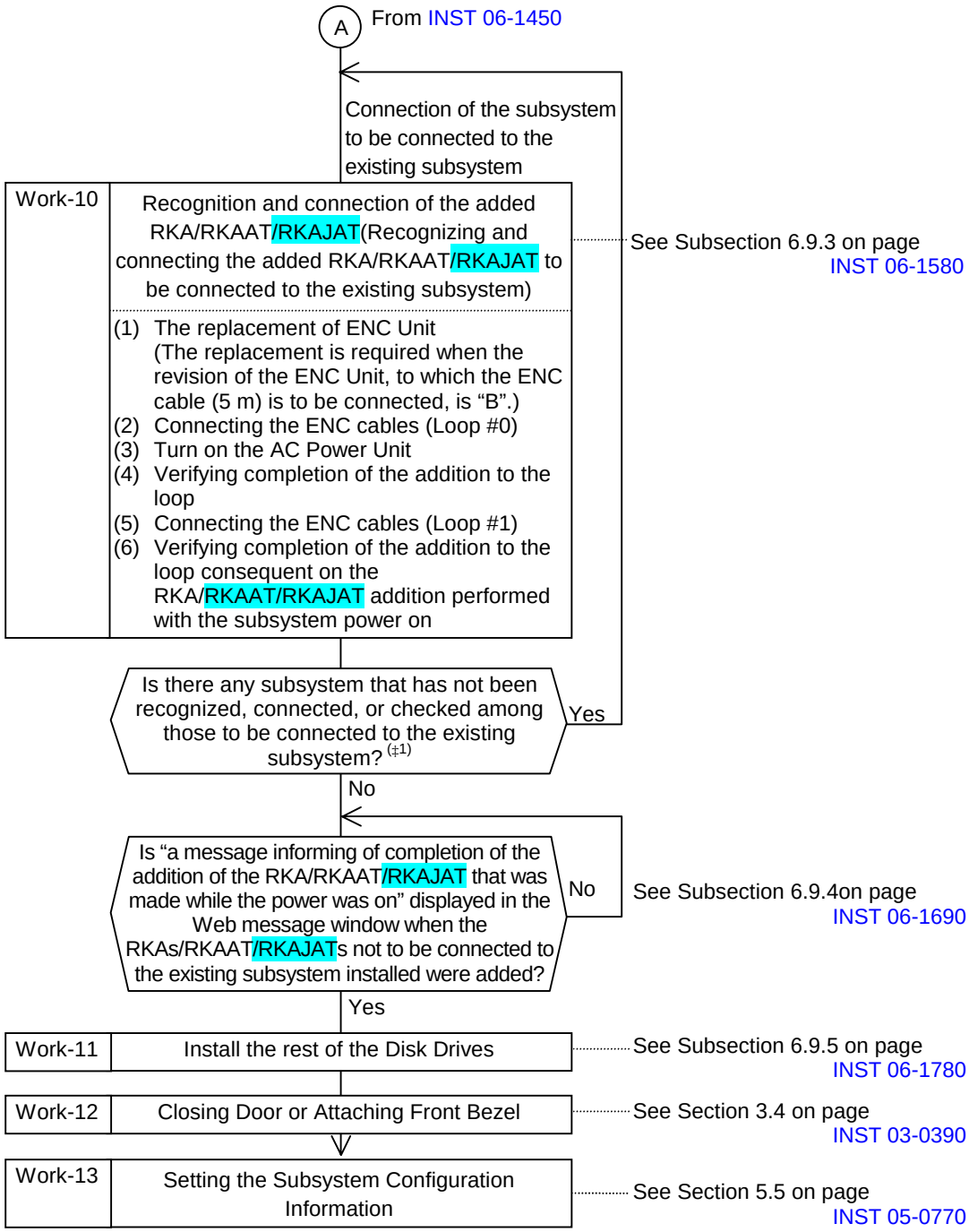
Copyright © 2004, 2005, Hitachi, Ltd.

(1) Procedures for installation the RKA/RKAAT/RKAJAT on Rack Frame while the subsystem power is on (Available only in the dual controller configuration.)
When adding the RKA/RKAAT/RKAJAT on the rack frame while the subsystem power is on, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2004, 2005, Hitachi, Ltd.

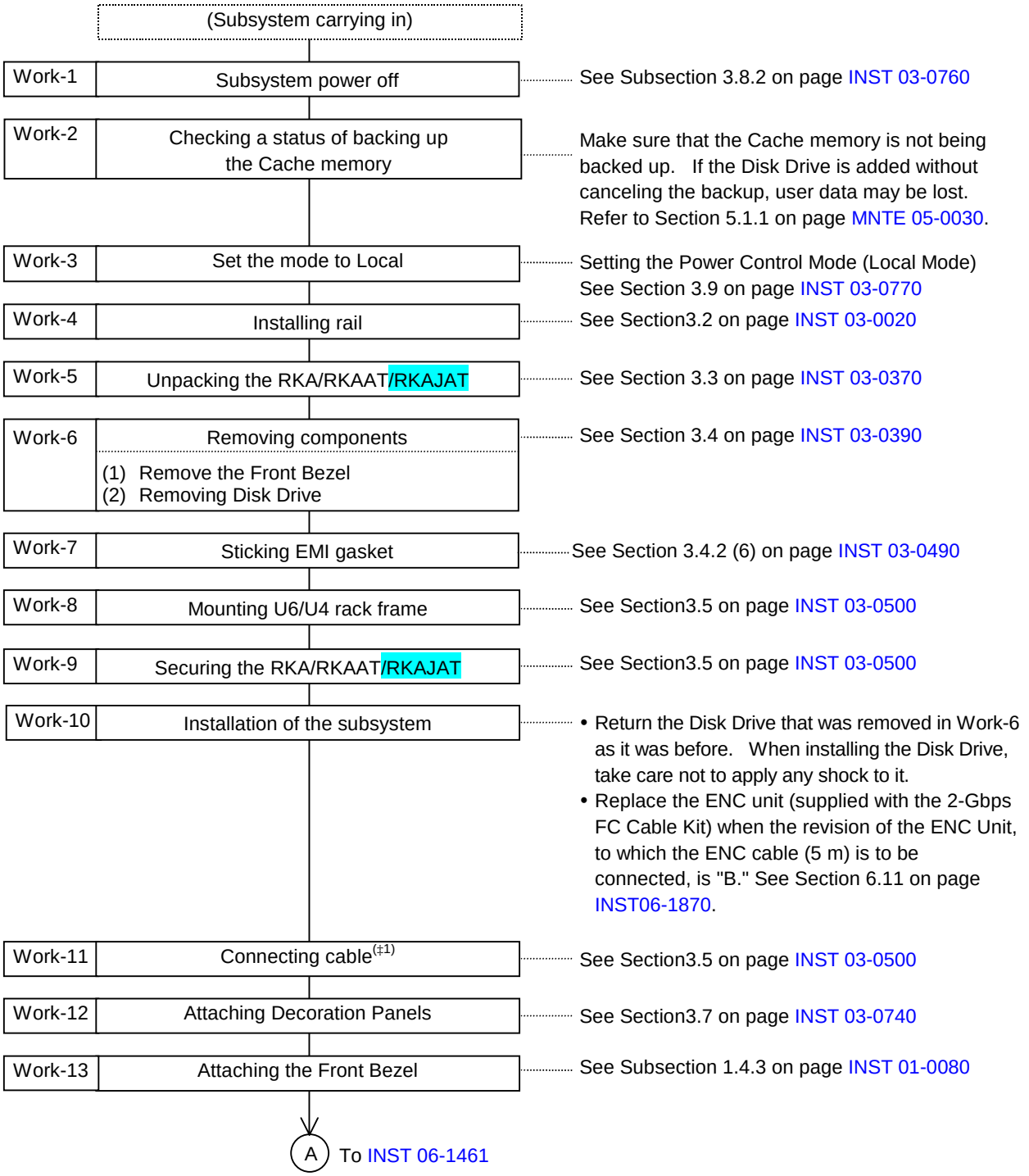


‡1 : Perform the operation Work-10 to the adding subsystem (in an order from the subsystem nearest to the basic subsystem) to be connected to the existing subsystem (fore RKAs/RKAATs/RKAJATs at maximum).

Copyright © 2004, 2005, Hitachi, Ltd.

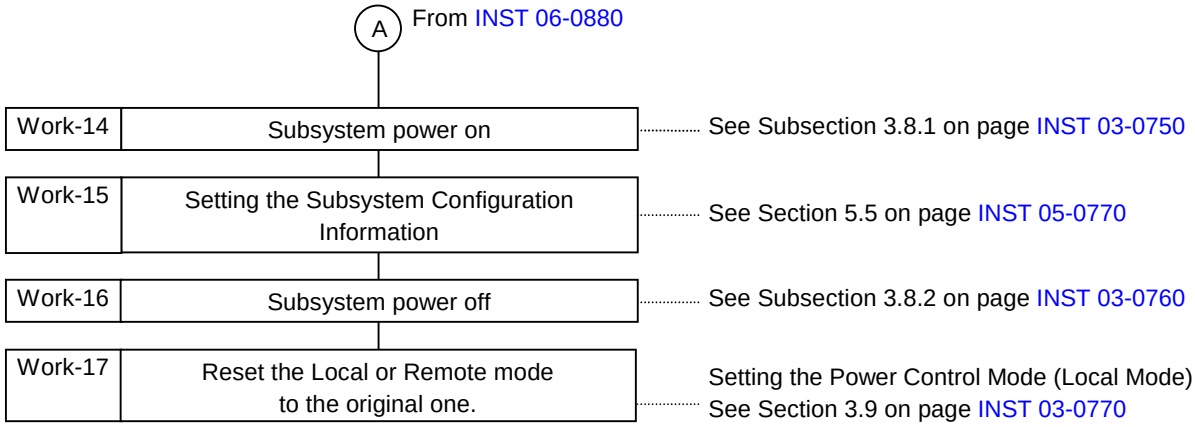
(2) Procedures for installation the RKA/RKAAT/RKAJAT on Rack Frame while the Subsystem Power Is Off

When adding the RKA/RKAAT/RKAJAT on the rack frame while the subsystem power is off, make sure of the following work items before starting the addition.



‡1 : When using the UPS for the exclusive use, install and connect the UPS referring to the UPS manual.

Copyright © 2004, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.

6.9.2 Connecting multiple RKAs/RKAATs/RKAJATs

When connecting the multiple RKAs/RKAATs/RKAJATs at a time, perform the following. According to the cable figure to be output from ACE Tool, connect the ENC cable. For the operation method of ACE Tool, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

When adding only a single RKA, proceed to Subsection 6.9.3 on page INST 06-1640. Refer to an example of the connection of the RKA/RKAAT made using the ACE Tool (INST 06-1560).

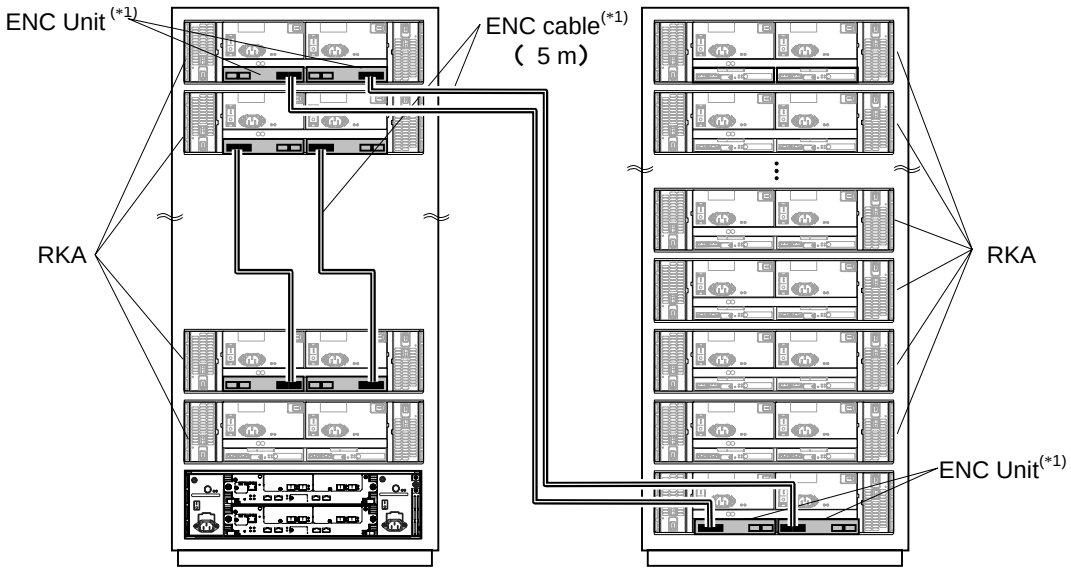
(1) Replacing the ENC Unit

Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.

NOTE : • When the revision is "B" : Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

• When the revision is "C" or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.



*1 : FC cable assembly for 2Gbps is used for only one point in the system.

Figure 6.9.1 Replaceable Part Locations of ENC Unit

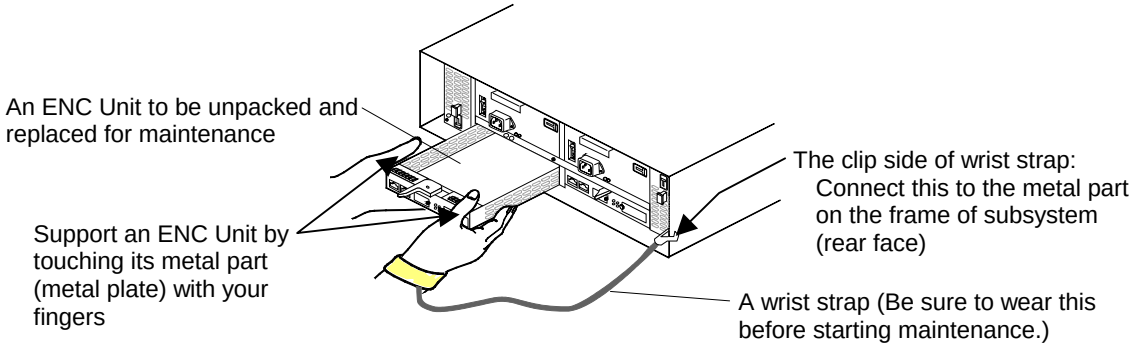
Copyright © 2004, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2004, 2005, Hitachi, Ltd.

(a) The procedures for replacing ENC Unit (RKA which is not to be connected to the existing unit)

NOTE : Perform the replacement when the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected, is "B."

(i) Raise the lever on the ENC Unit to be replaced in the direction shown by the arrow ① (←——) and remove the ENC Unit a little way toward you (see Figure 6.9.2).
(ii) Insert a new ENC Unit attached to FC cable assembly for 2 Gbps into the specified location with the levers on the ENC Unit raised shown by the arrow ① (←——) (see Figure 6.9.2).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.9.2).

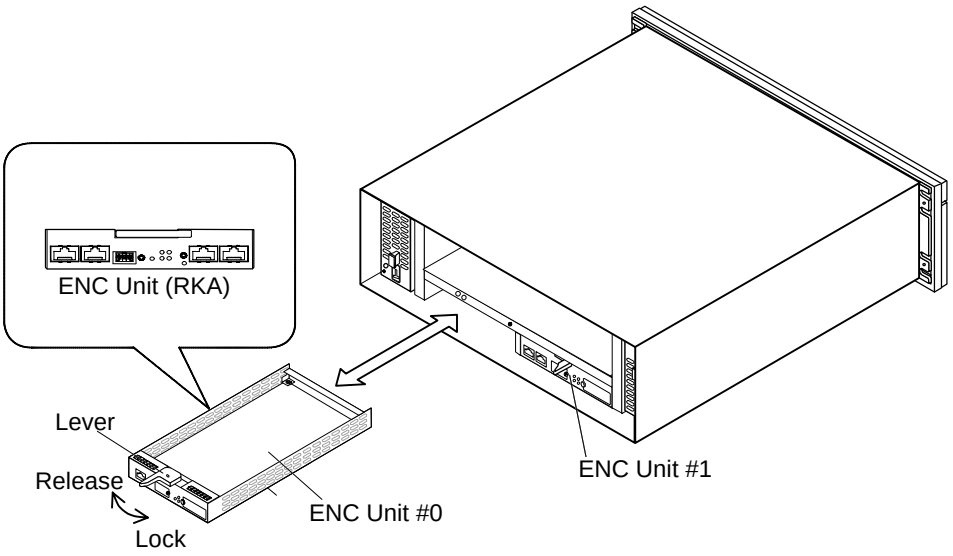


Figure 6.9.2 Replacing of ENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Displaying the procedure for connecting the ENC cables using the ACE Tool.
  (a) Start the ACE Tool through the service PC.
  (b) Select the subsystem (9580V/9585V).
  (c) Make the configuration setting that conforms to the subsystem that have been installed on the rack frame.
  (d) Display the diagram of the ENC cable connections.

(3) Checking the ENC cables not to be connected to the existing subsystems.
Select all the adding subsystems (select the subsystems while the Ctrl key is pressed) in a state where the diagram of the ENC cable connection is displayed. The color of the displays of the selected subsystems is changed from gray to orange and the color of the existing subsystems and connected to the subsystem displayed in orange is changed from gray to white. Cables other than those that connect subsystem displayed in white and orange or cables between the subsystems displayed in orange are the ENC cables that are not to be connected to the existing subsystems.

(4) Connecting ENC cables (Connecting RKA/RKAAT/RKAJAT which is not to be connected to the existing unit)
When adding the RKA/RKAAT/RKAJAT, the ENC Unit/SENC Unit has to be connected using the ENC cable(‡1). Connect all the ENC cables except those between the existing subsystem and the RKA/RKAAT/RKAJAT which is to be connected to the existing subsystem. (Following the instruction given in the procedure (3) in Subsection 6.9.3 on page INST06-1640.)
- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAAT/RKAJAT.
- When connecting 5 m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps.

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.
- For RKA, the ENC cables are connected to the two paths, PATH #0 (or PATH #2) and PATH#1 (or PATH #3) of the ENC Unit #0 side (Loop #0), and the two paths, PATH#0 (or PATH #2) and PATH #1 (or PATH #3) 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 the PATH #0 in milky white and the PATH #1 in yellow.
  For RKAAT/RKAJAT, the ENC cables are connected to the PATH#0 (or PATH #1) of the SENC Unit #0 (Loop #0), and the PATH#0 (or PATH #1) of the SENC Unit #1 (Loop #1) (total of two).
- The IN and OUT connectors of the SENC Unit of the RKAAT/RKAJAT have indications by means of blue and green labels respectively.

‡1 : Keep unused cables carefully to prepare for an occasion to use them.

Copyright © 2004, 2005, Hitachi, Ltd.

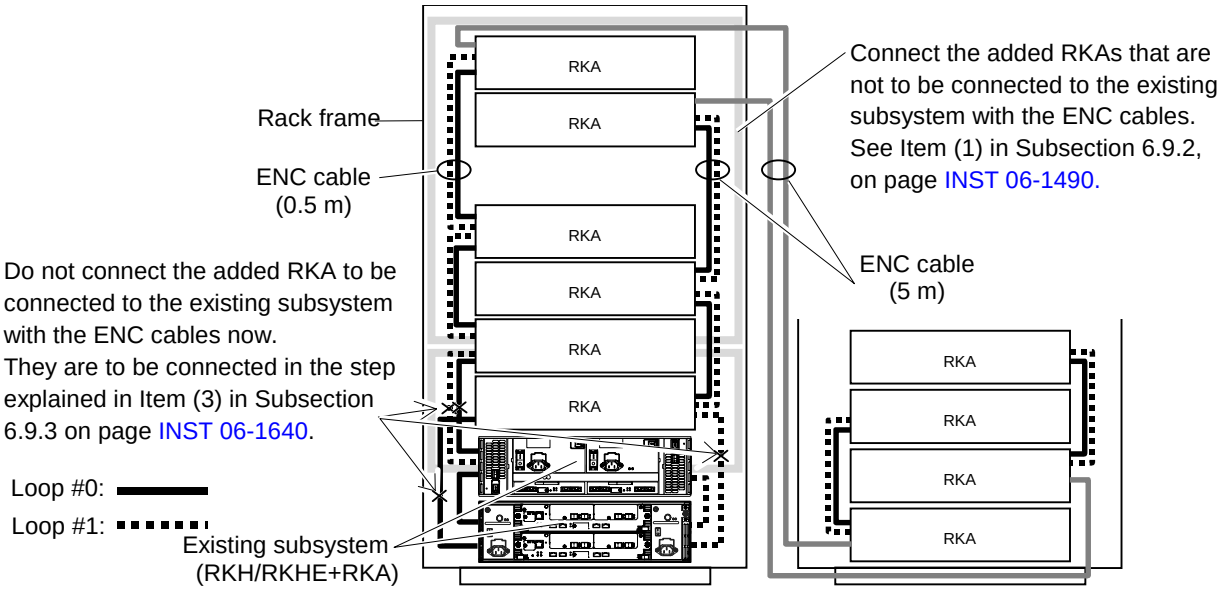


Figure 6.9.3 Connecting the ENC cables (RKH/RKHE+RKA+RKAs)

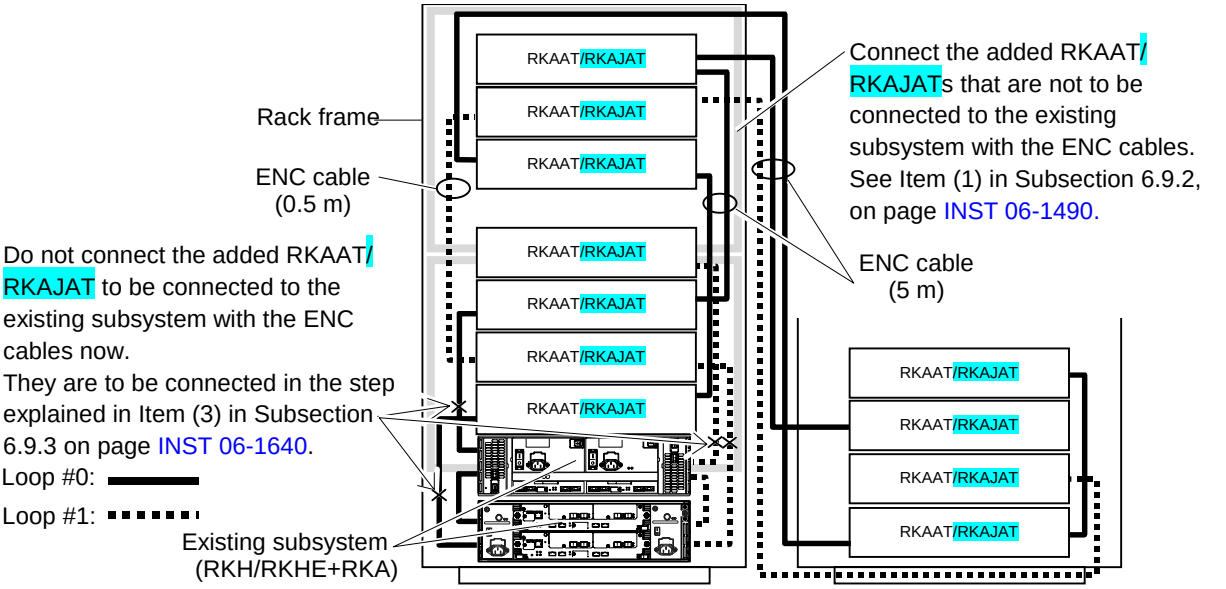


Figure 6.9.3.1 Connecting the ENC cables (RKH/RKHE+RKA+RKAATs/RKAJATs)

Copyright © 2004, 2005, Hitachi, Ltd.

(a) See the details of the connections with the ACE Tool (see Figure 6.9.5).
Connect the ENC cables of the PATH #0 and PATH #2 having milk white indications and the ENC cables of the PATH #1 and PATH #3 having yellow indications.
Though the connectors of the RKAAT/RKAJAT have indications of blue and green, connect the cables of the paths as directed by the ACE Tool.

(b) The ENC cables to be connected to the RKAAT/RKAJAT have no Mini-Binders attached when they were shipped from the factory. Attach the Mini-Binders to the ENC cables of the each path as directed by the ACE Tool

(c) Attach the milk white or yellow Mini-Binders to the ENC cables not to be connected to the existing subsystems.
Attach the milk white Mini-Binders to the ENC cables of the PATH #0 and PATH #2 and the yellow Mini-Binders to those of the PATH #1 and PATH #3.

(d) Attach milk white or yellow Mini-Binders to the ENC cable.
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.

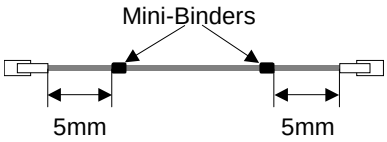


Figure 6.9.4 Positions for attaching Mini-Binders

(e) Remove the Blind (‡1) of the ENC Unit/SENC Unit of the added RKA/RKAAT/RKAJAT. However, it is not needed to remove the Blind (‡1) of the terminal ENC Unit/SENC Unit. (see Figure 6.9.5.)

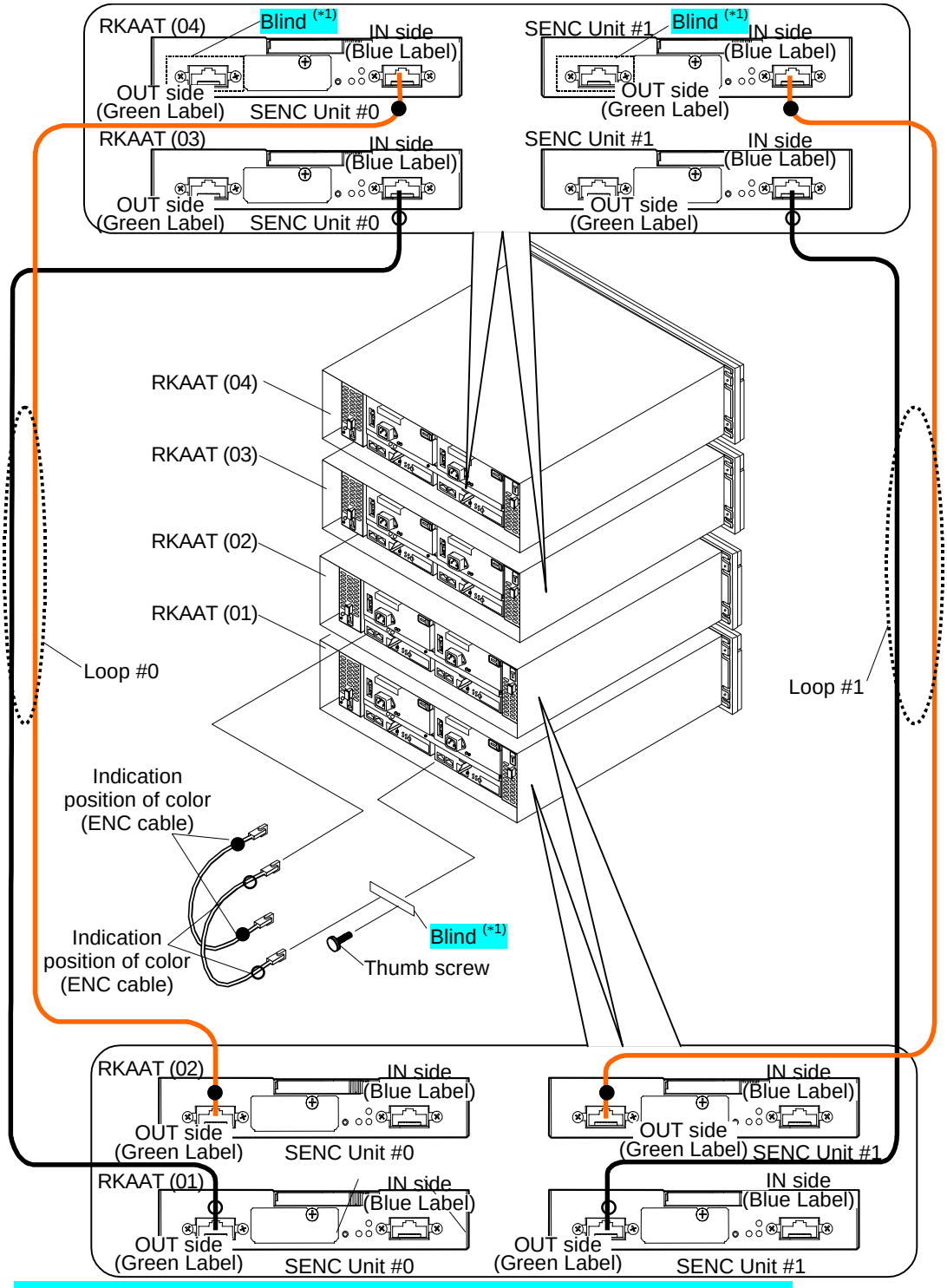
(f) Connect the paths as directed by the ACE Tool.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

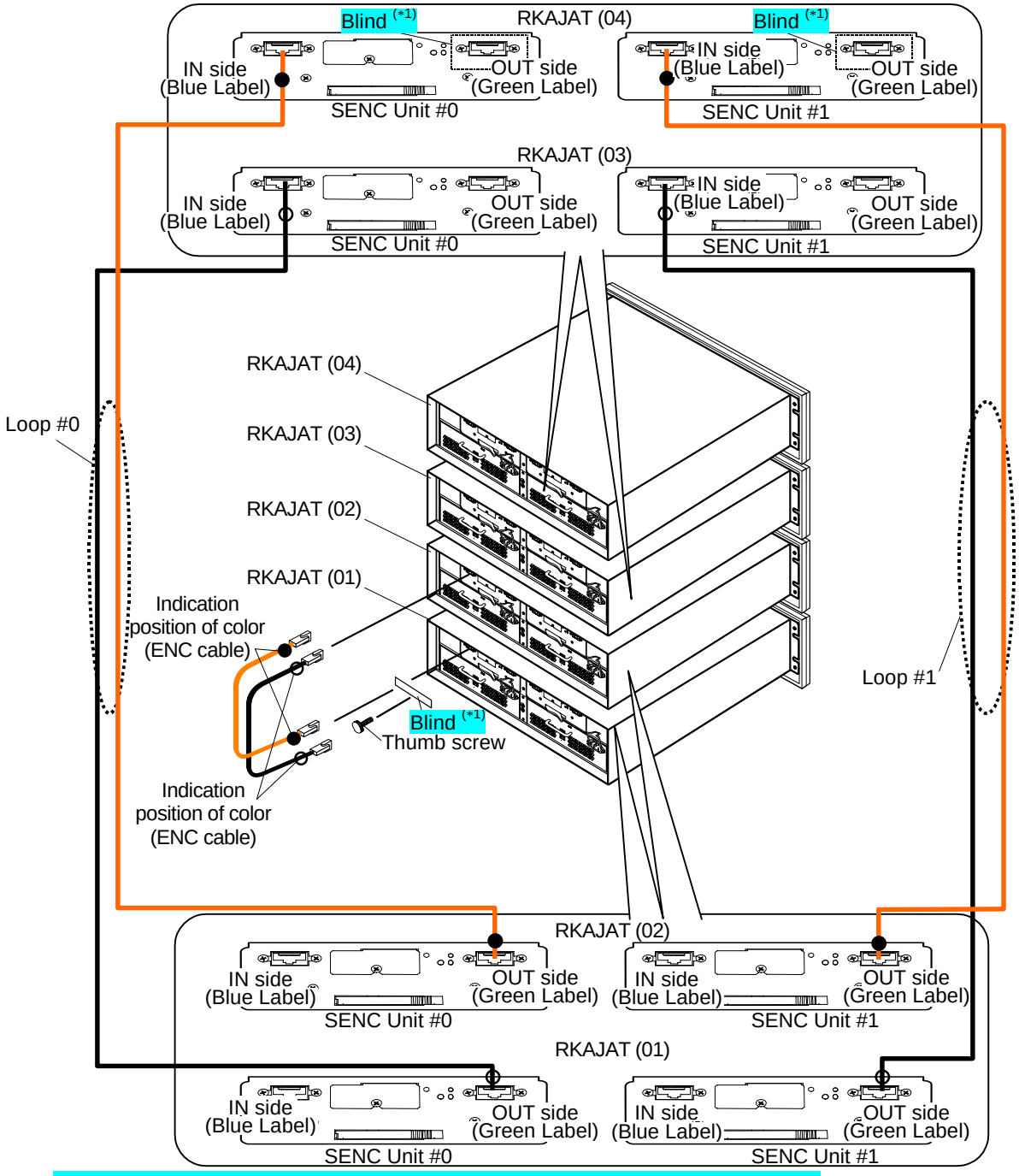
Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.9.5 Connecting ENC Cables (RKAAT)

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.9.5.1 Connecting ENC Cables (RKAJAT)

Copyright © 2005, Hitachi, Ltd.

(5) Turn on breakers of the upper PDBs (#01 and #11).
(6) Turn on AC Power Unit Switch of all the Power Units of the added RKAs/RKAATs/RKAJATs that are not to be connected to the existing subsystem.
The ALM LED on the ENC Unit/SENC Unit of the added RKA/RKAAT/RKAJAT concerned comes on.
Do not turn on AC Power Unit Switch of the added RKA/RKAAT/RKAJAT to be connected to the existing subsystem.

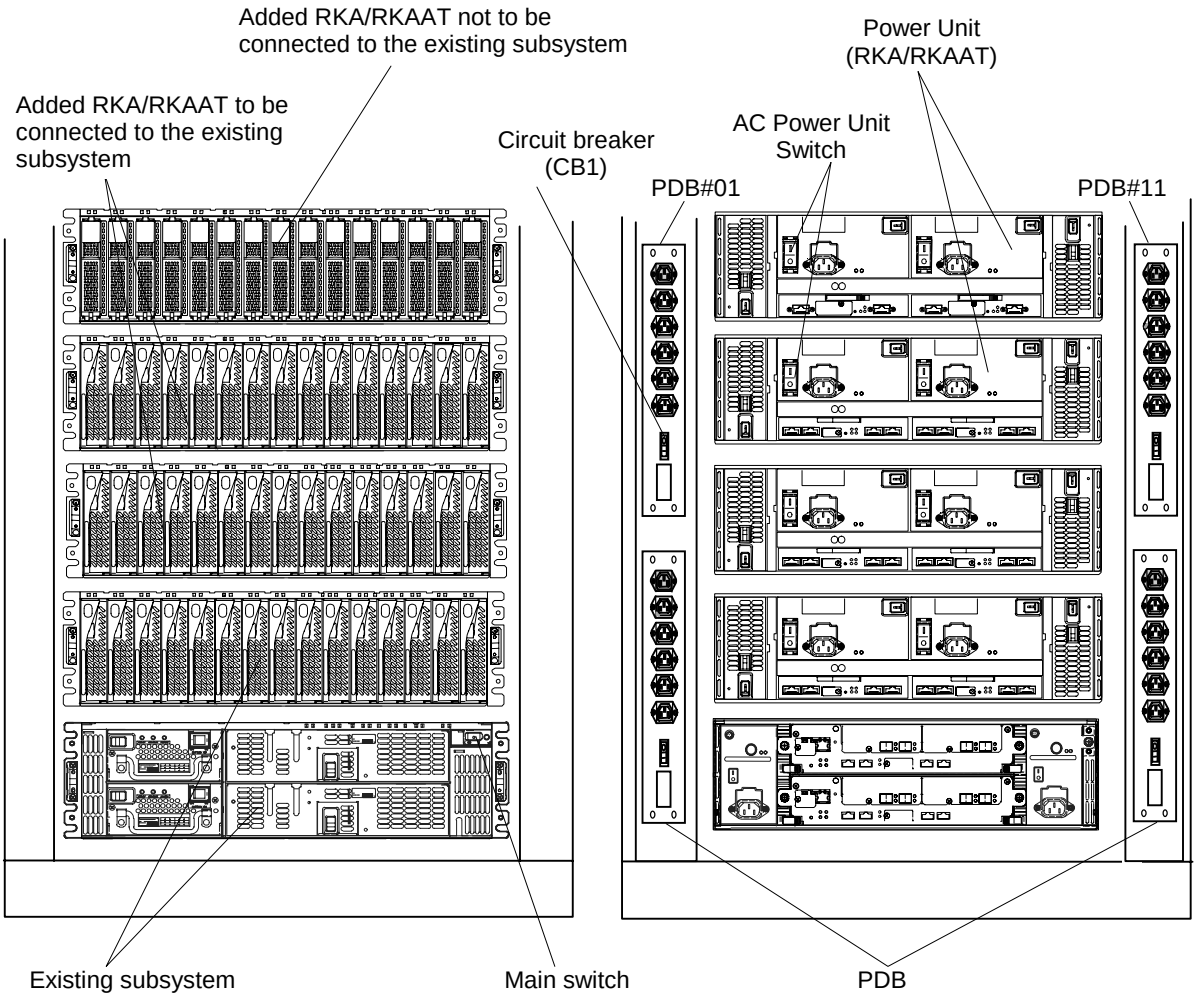


Figure 6.9.6 Locations of Switches for Power On (RKA/RKAAT)

Copyright © 2005, Hitachi, Ltd.

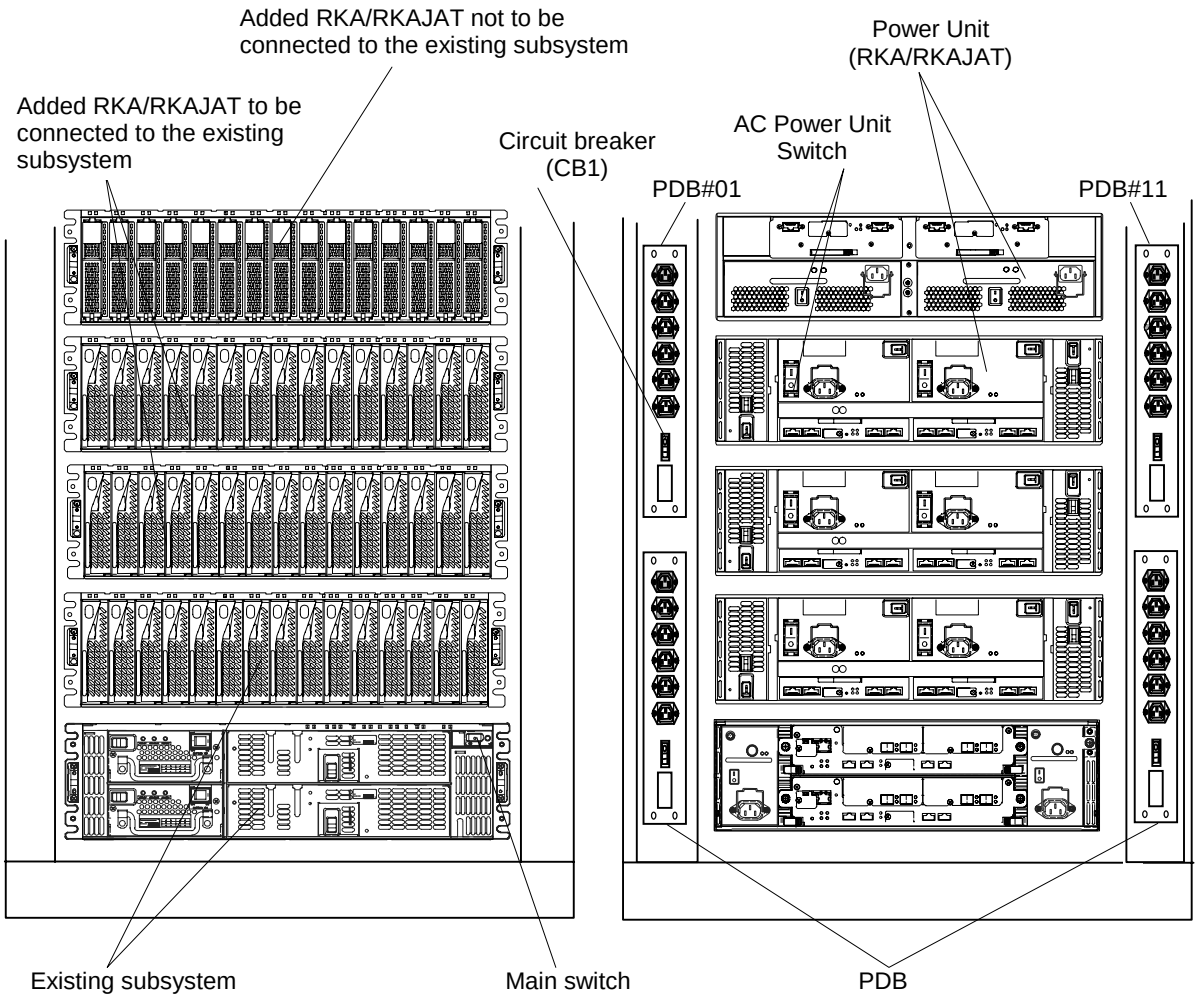


Figure 6.9.6.1 Locations of Switches for Power On (RKA/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

<Example of connection>

- Before the addition: Configuration of RKH/RKHE + Two RKAs
- After the addition: Configuration of RKH/RKHE + Two RKAs + Two RKAATs + Two RKAs + Five RKAATs

Refer to Figure 6.9.6.1, “Example of ENC Cable Connections Directed by ACE Tool.”

(1) When all the adding subsystems are selected while the Ctrl Key is pressed, the color of the displays of the selected subsystems is changed from gray to orange.
Cables other than those that connect subsystems displayed in the color changed from gray to white and the units displayed in orange or cables between the subsystems displayed in orange are the ENC cables not to be connected to the existing subsystems.

(2) Connect the ENC cables from the adding subsystem not to be connected to the existing subsystems in the following order.
① SATA #21 (RKAAT) and Fibre #03 (RKA)
② SATA #32 (RKAAT) and Fibre #03 (RKA)
③ Fibre #11 (RKA) and SATA #42 (RKAAT)
④ Fibre #11 (RKA) and SATA #53 (RKAAT)
⑤ Fibre #03 (RKA) and SATA #24 (RKAAT)
⑥ Fibre #03 (RKA) and SATA #35 (RKAAT)
⑦ SATA #42 (RKAAT) and SATA #44 (RKAAT)

There are four kinds of cable connections as shown below.

- From the Fibre (RKA) to the SATA (RKAAT) :
From the OUT connector of the Fibre (RKA) to the IN connector of the SATA (RKAAT) (Up to the two SATAs (RKAATs) can be connected to the one Fibre (RKA).)
- From the SATA (RKAAT) to the Fibre (RKA) :
From the OUT connector of the SATA (RKAAT) to the IN connector of the Fibre (RKA) (The one Fibre (RKA) can be connected to the two SATAs (RKAATs).)
- From the Fibre (RKA) to the Fibre (RKA) :
From the OUT connector of the Fibre (RKA) to the IN connector of the Fibre (RKA) (The one Fibre (RKA) can be connected to the one Fibre (RKA).)
- From the SATA (RKAAT) to the SATA (RKAAT) :
From the OUT connector of the SATA (RKAAT) to the IN connector of the SATA (RKAAT) (The one SATA (RKAAT) can be connected to the one SATA (RKAAT).)

Copyright © 2004, 2005, Hitachi, Ltd.

(3) Turn on all the AC Power Unit Switches of the added RKAs/RKAATs/RKAATLs not to be connected to the existing subsystems (the units displayed in a color to be changed to gray when all the units already installed are selected while the Ctrl key is pressed). In this case, the subsystems to be powered on are Fibre #03 (RKA), SATA #42 (RKAAT), SATA #53 (RKAAT), SATA #24 (RKAAT), SATA #35 (RKAAT) and SATA #44 (RKAAT).

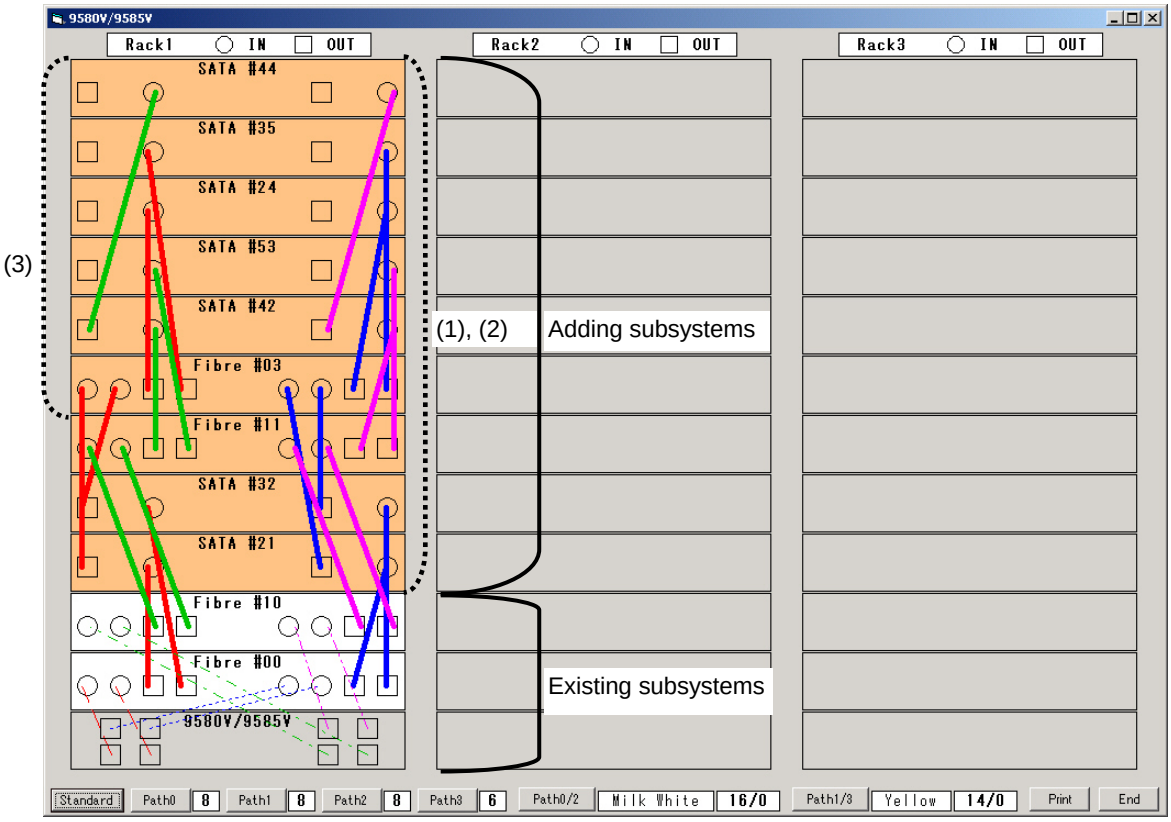


Figure 6.9.6.1 Example of ENC Cable Connections Directed by ACE Tool

Copyright © 2004, 2005, Hitachi, Ltd.

6.9.3 Recognition and connection of the added RKA/RKAAT/RKAJAT

To make the added RKA/RKAAT/RKAJAT recognized, satisfy the following requirements.

No.	Item to be checked	Matter to be checked	Check result
1	Disk Drive	The Disk Drives #0 to #3 must be installed in the RKA/RKAAT/RKAJAT to be added. When less than four Disk Drives are to be added, the Disk Drives #0 and #1 must be installed in the RKA/RKAAT/RKAJAT.	
2		The Disk Drives #4 to #14 must not be installed in the RKA/RKAAT/RKAJAT to be added	
3	ENC Unit/SENC Unit	The two units must be installed in the RKA/RKAAT/RKAJAT to be added.	
4	Power Unit (RKA)	The two units must be installed in the RKA/RKAAT/RKAJAT to be added.	
5	WARNING (WARN) LED of the subsystem	No WARNING (WARN) LED must be on	
6	Device ID	The device ID must be set correctly (Refer to page INST 03-0643.)	
7	Number of connectable	The addition must not make the total number of the RKH/RKHE and RKAs/RKAATs/RKAJATs exceed the allowable maximum of fifteen.	
8	Formatting	No LU formatting must be in progress. (Excluding Quick Format)	
9	Other maintenance works	No other maintenance work must be in progress.	

When the requirements above are satisfied, perform the operation following the "procedure for making the RKA/RKAAT/RKAJAT recognized" shown below.

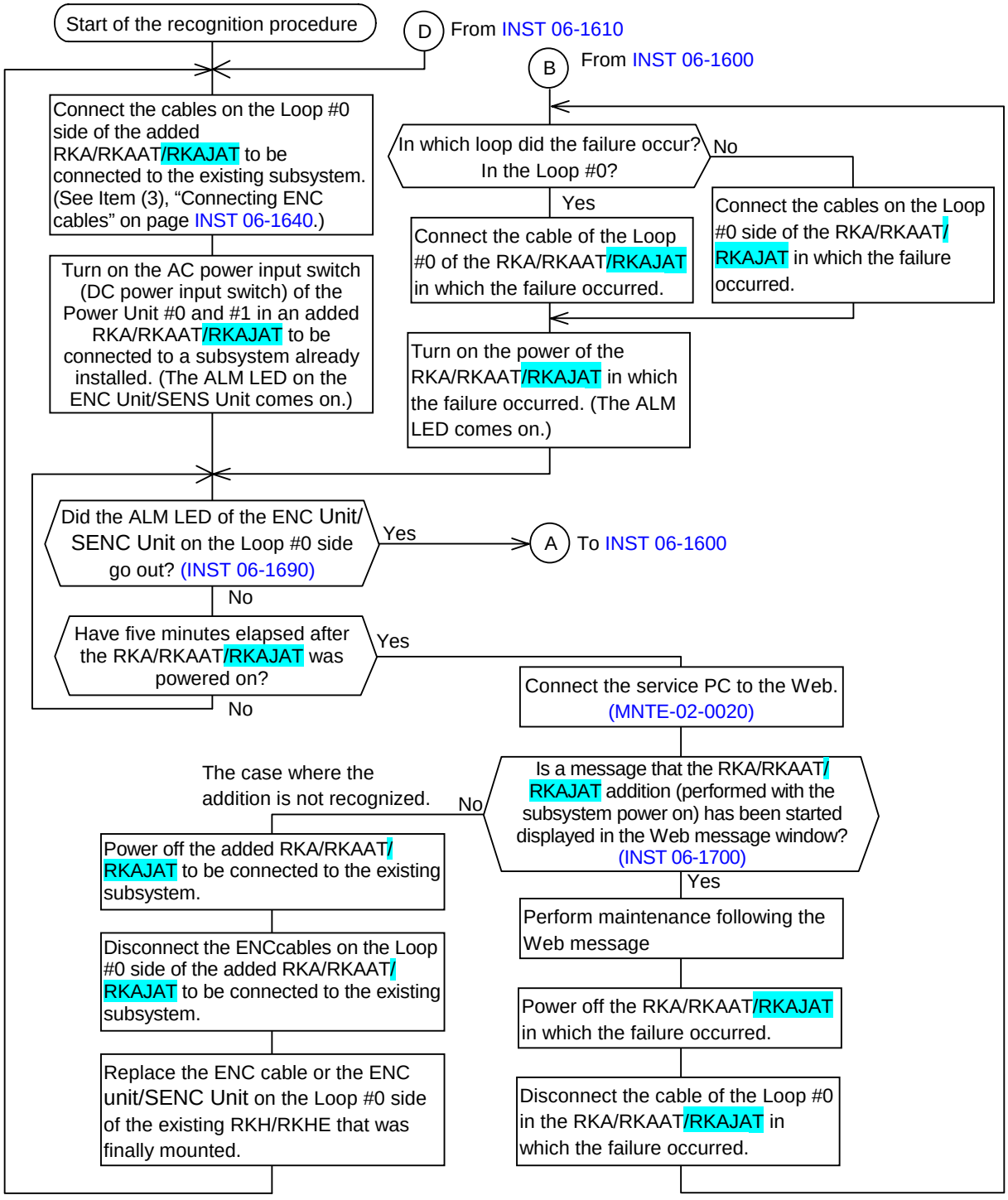
When making the multiple RKAs/RKAAT/RKAJATs recognized at a time, satisfy the following requirements in addition.

No.	Item to be checked	Matter to be checked	Check result
1	Making the multiple RKAs recognized at a time	Are the ENC cables connected correctly to the added RKAs/RKAATs/RKAJATs other than the RKA connected with the existing subsystem?	
2		Are the Power Units of the added RKAs/RKAATs/RKAJATs other than the RKA/RKAAT/RKAJAT connected with the existing subsystem turned on?	

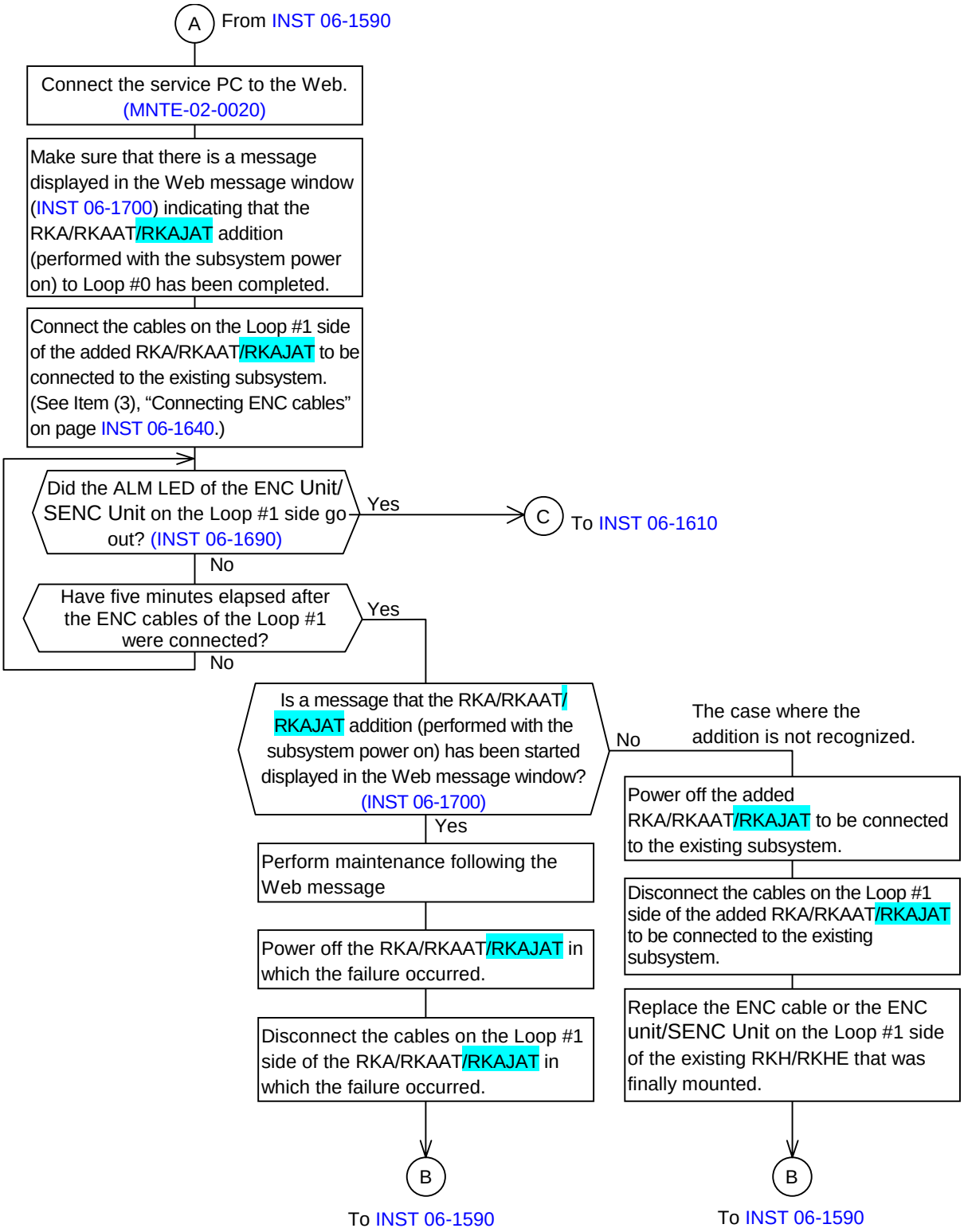
Copyright © 2004, 2005, Hitachi, Ltd.

(1) Procedure for making the added RKA/RKAAT/RKAJAT recognized
Perform the RKA/RKAAT/RKAJAT recognition operation following the flowchart below.
If a failure occurs during the work, check a Web message and take an action for recovery from the failure referring to “6.9.4 (4) Troubleshooting” on page INST 06-1740.
Perform the recognition operation for the adding subsystems to be connected to the existing subsystems one by one starting from the adding subsystem nearest to the basic subsystem.

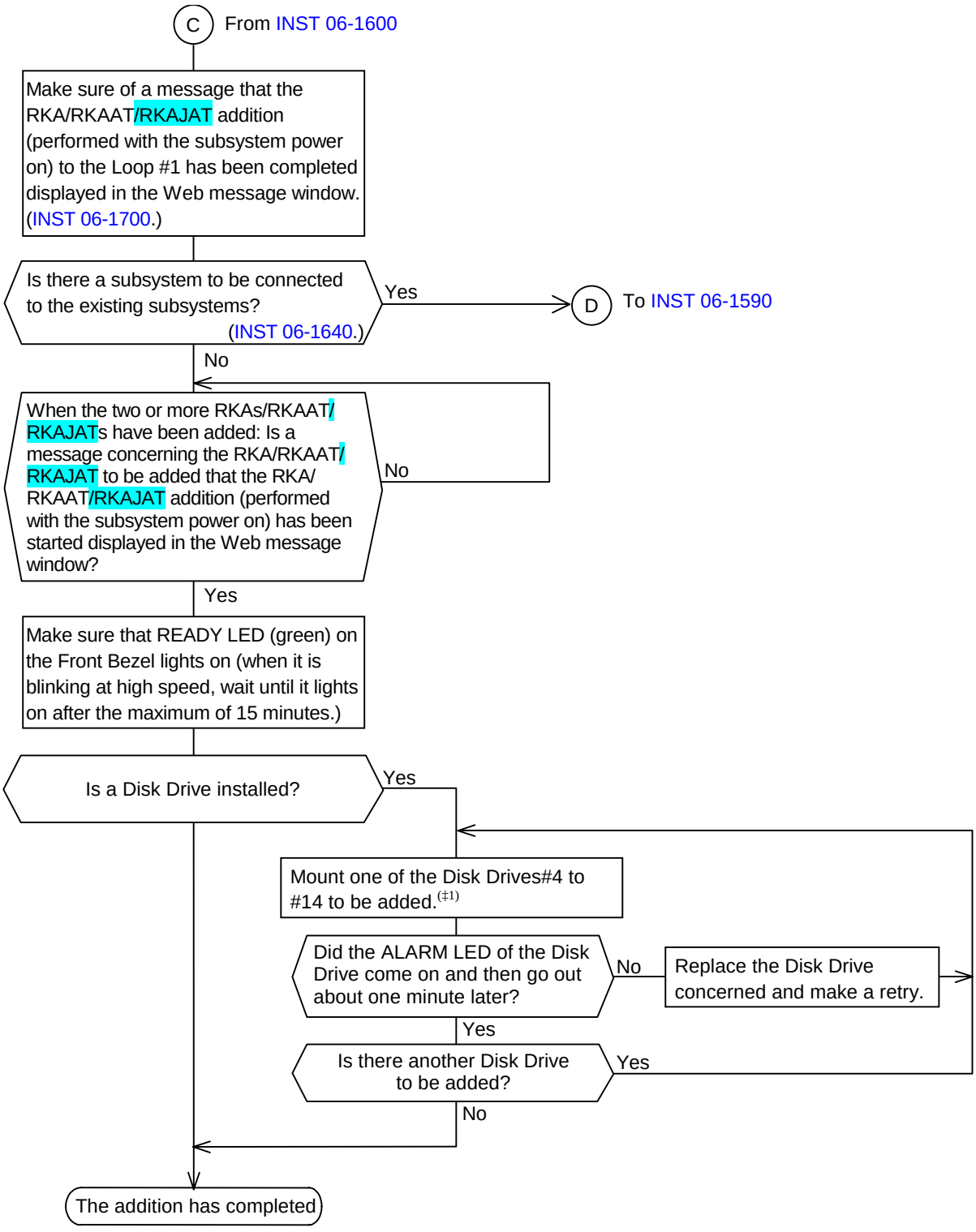
Copyright © 2004, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.



Copyright © 2004, 2005, Hitachi, Ltd.



‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270.

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Replacing ENC Unit

NOTE : Replace the ENC Unit (supplied with the 2-Gbps FC Cable Kit) when the revision of the ENC Unit is “B”.

(a) Replacing the ENC Unit of the existing unit (RKA).
For the Loop #0 side, perform the following procedures.

(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.9.7).

(ii) Remove the ENC cable (0.5 m) connected to the ENC 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.

(iii) Remove the ENC Unit by pulling it out toward you.

(iv) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——)(see Figure 6.9.7). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

(v) Connect the ENC cable (0.5 m) removed in procedure (ii) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.9.11.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

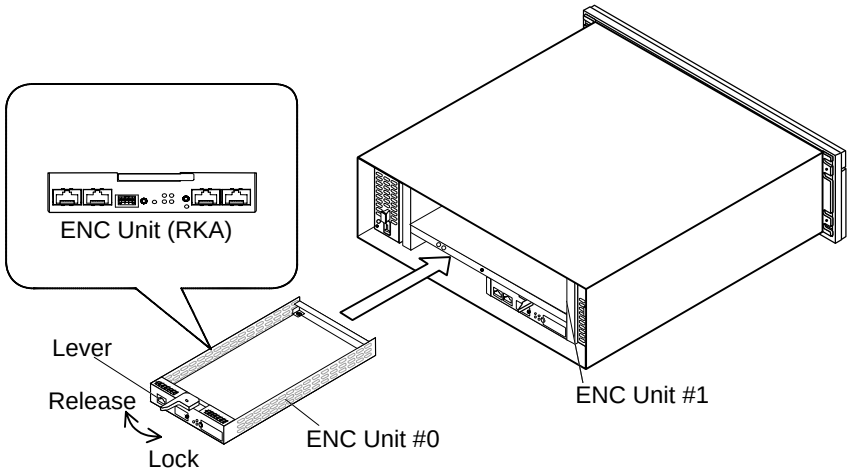


Figure 6.9.7 Replacing of ENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(vi) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.9.7).

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 because the ENC Unit is considered to have failed.

(vii) Make sure that the ALM LED (red) on the ENC Unit is off.
(viii) For the Loop #1 side, perform the operation from (i) to (vii) as in the above procedures.

(b) Replacing the ENC Unit of the existing unit (RKA) to added RKA to be connected to the existing unit.
For the Loop #0 side and Loop #1 side, perform the following procedures.
(i) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you (see Figure 6.9.7).
(ii) Insert a new ENC Unit attached to FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——) (see Figure 6.9.7).
(iii) Return the levers in the direction shown by the arrows ② (·····>) (see Figure 6.9.7).
(iv) Connect the ENC cable (0.5 m) to the IN side of the ENC Unit attached to FC Cable Assembly for 2 Gbps, and connect the ENC cable (5 m) to the OUT side of that. (However, for the OUT side of ENC Unit that will be last connected, the connection with ENC cable is not required.)

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.9.11.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2004, 2005, Hitachi, Ltd.

(3) Connecting ENC cables (on the Loop #0 side)
When adding the RKA/RKAAT/RKAJAT while the subsystem power is on, it is required to connect the ENC Unit/SENC Unit for the Loop #0 (ENC #0) of the RKA/RKAAT/RKAJAT to be added and the ENC Unit/SENC Unit with the ENC cables (‡1).

- When connecting the ENC cable (0.5 m) between the nearby subsystems, connect using the ENC cable attached to the RKA/RKAAT/RKAJAT
- When connecting 5 m of the ENC cable between the racks, connect using the ENC cable attached to the FC Cable Assembly for 2 Gbps (RKH/RKHE cannot be connected by ENC cable (5 m).).

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.

NOTE :
- Be sure to connect the ENC cable from the subsystem to be added. If it is connected from the existing subsystem, the loop failure occurs.
- 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 RKA, the ENC cables are connected to the two paths, PATH #0 (or PATH #2) and PATH#1 (or PATH #3) of the ENC Unit #0 side (Loop #0), and the two paths, PATH#0 (or PATH #2) and PATH #1 (or PATH #3) 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 the PATH #0 in milky white and the PATH #1 in yellow.
  For RKAAT/RKAJAT, the ENC cables are connected to the PATH#0 (or PATH #1) of the SENC Unit #0 (Loop #0), and the PATH#0 (or PATH #1) of the SENC Unit #1 (Loop #1) (total of two).
- The IN and OUT connectors of the SENC Unit of the RKAAT/RKAJAT have indications by means of blue and green labels respectively.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

Copyright © 2004, 2005, Hitachi, Ltd.

(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 "1.7 Device ID setting and ENC cable connection" (INST 01-0180).
Refer to an example of the connection of the RKA/RKAAT made using the ACE Tool (INST 06-1681).

(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 RKAAT/RKAJAT, 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 PATH #2 and the yellow Mini-Binders to those of the PATH #1 and PATH #3.

(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.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

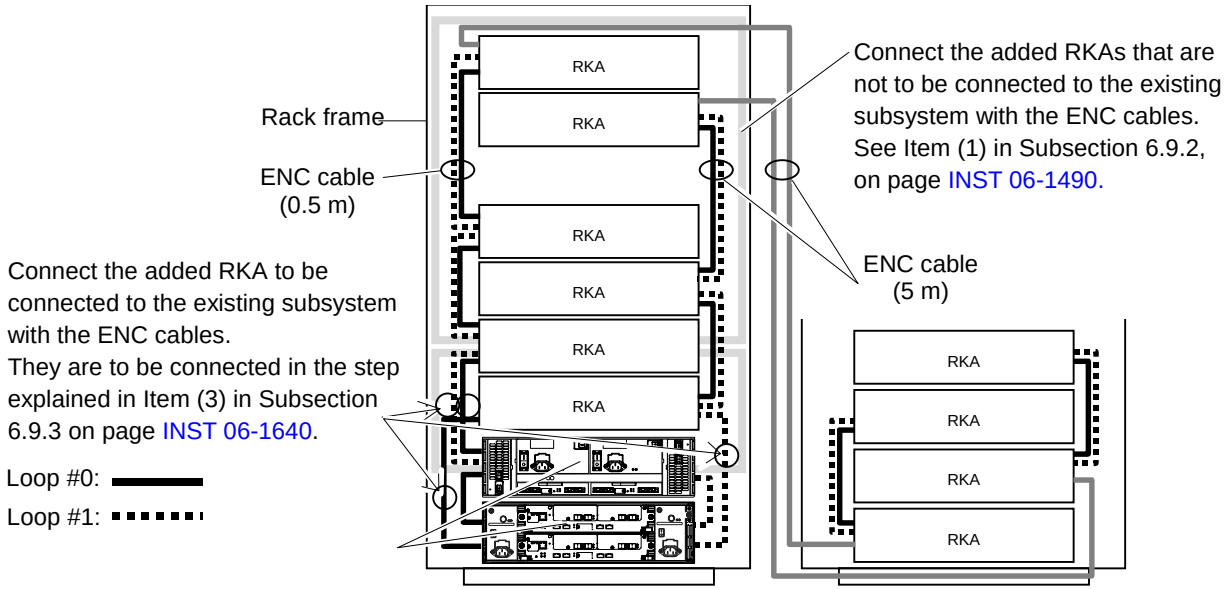


Figure 6.9.8 Connecting the ENC cables (RKH/RKHE+RKA+RKAs)

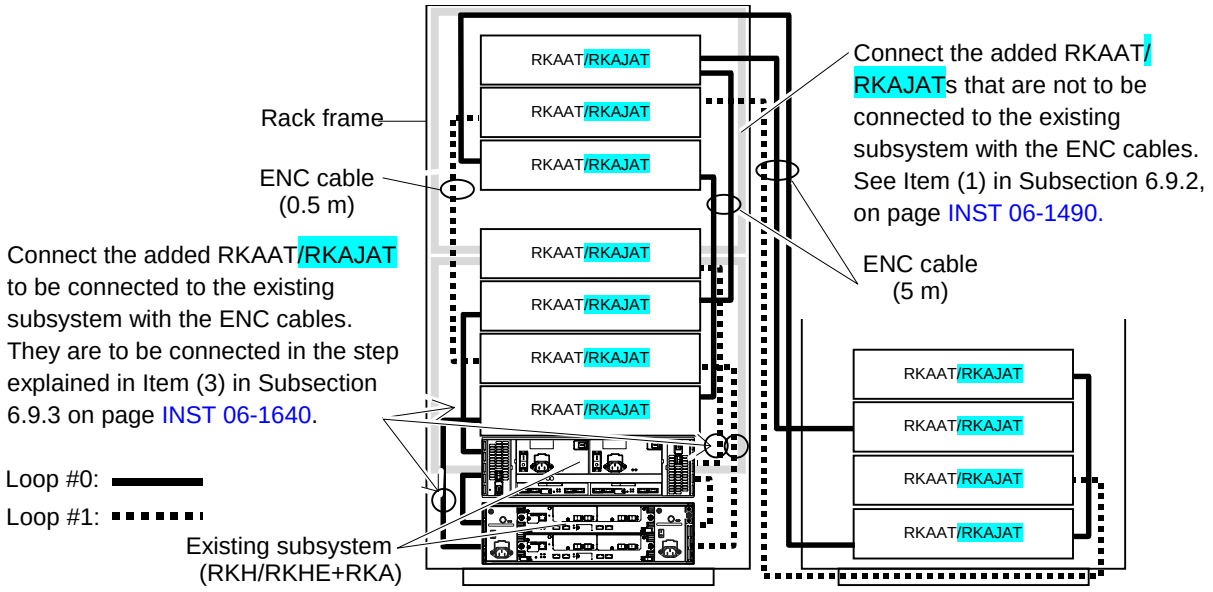


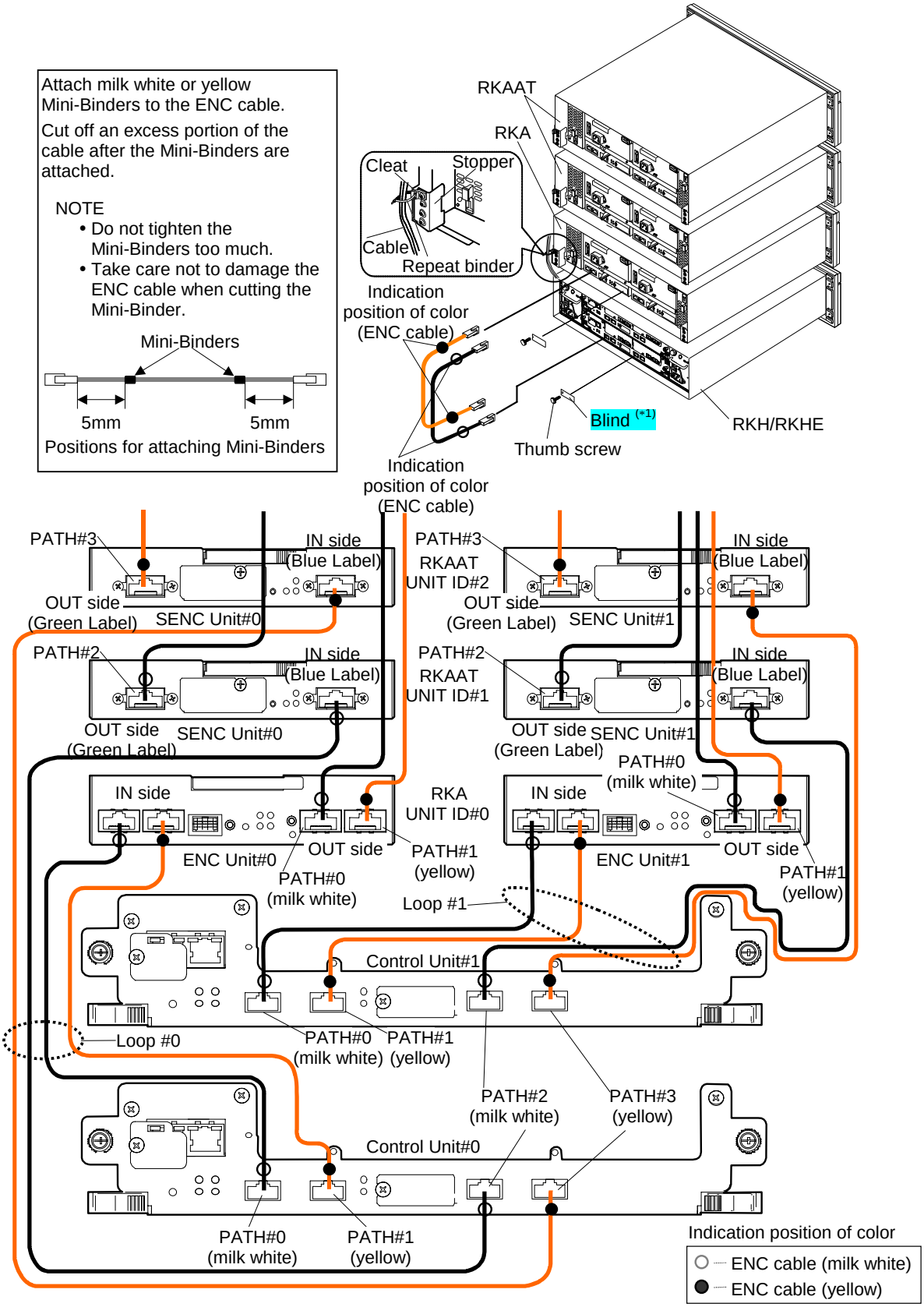
Figure 6.9.8.1 Connecting the ENC cables (RKH/RKHE+RKA+RKAATs/RKAJATs)

Copyright © 2004, 2005, Hitachi, Ltd.

(b) Attach the milk white or yellow Mini-Binders to the ENC cables. (see Figure 6.9.9.)
(c) Remove the Blind (‡1) of the output connector of the FC-AL of the terminal existing subsystems (RKH/RKHE/RKA/RKAAT/RKAJAT).
(d) Make connections on the Loop #0 side as directed by the ACE Tool (see the Loop #0 in Figure 6.9.9).
Connect the ENC Unit/SENC Unit in the Loop #0 of the added RKA/RKAAT/RKAJAT to be connected to the existing subsystem and the output connector of the FC-AL in the Loop #0 of the existing subsystem (RKH/RKHE/RKA/RKAAT/RKAJAT) with the ENC cables.
(e) Perform the work on the Loop #1 side after completing the Loop #0 side.

‡1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

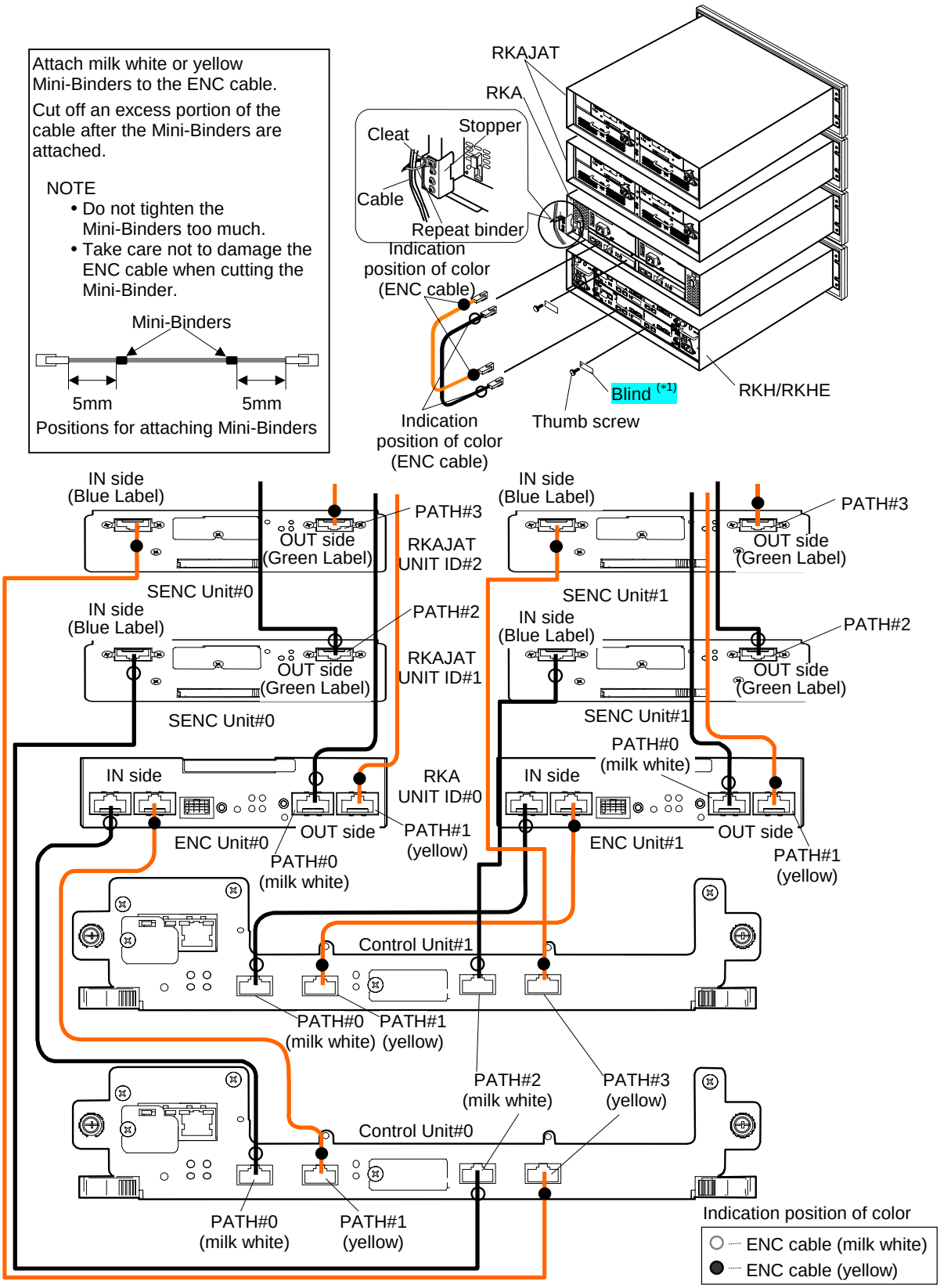
Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.9.9 Connecting ENC Cables (RKH/RKHE/RKA/RKAAT)

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.9.9.1 Connecting ENC Cables (RKH/RKHE/RKA/RKAJAT)

Copyright © 2005, Hitachi, Ltd.

(4) Turn on the AC Power Unit Switch of the Power Units (#0, #1) of the added RKA/RKAAT/RKAJAT to be connected to the existing subsystem.

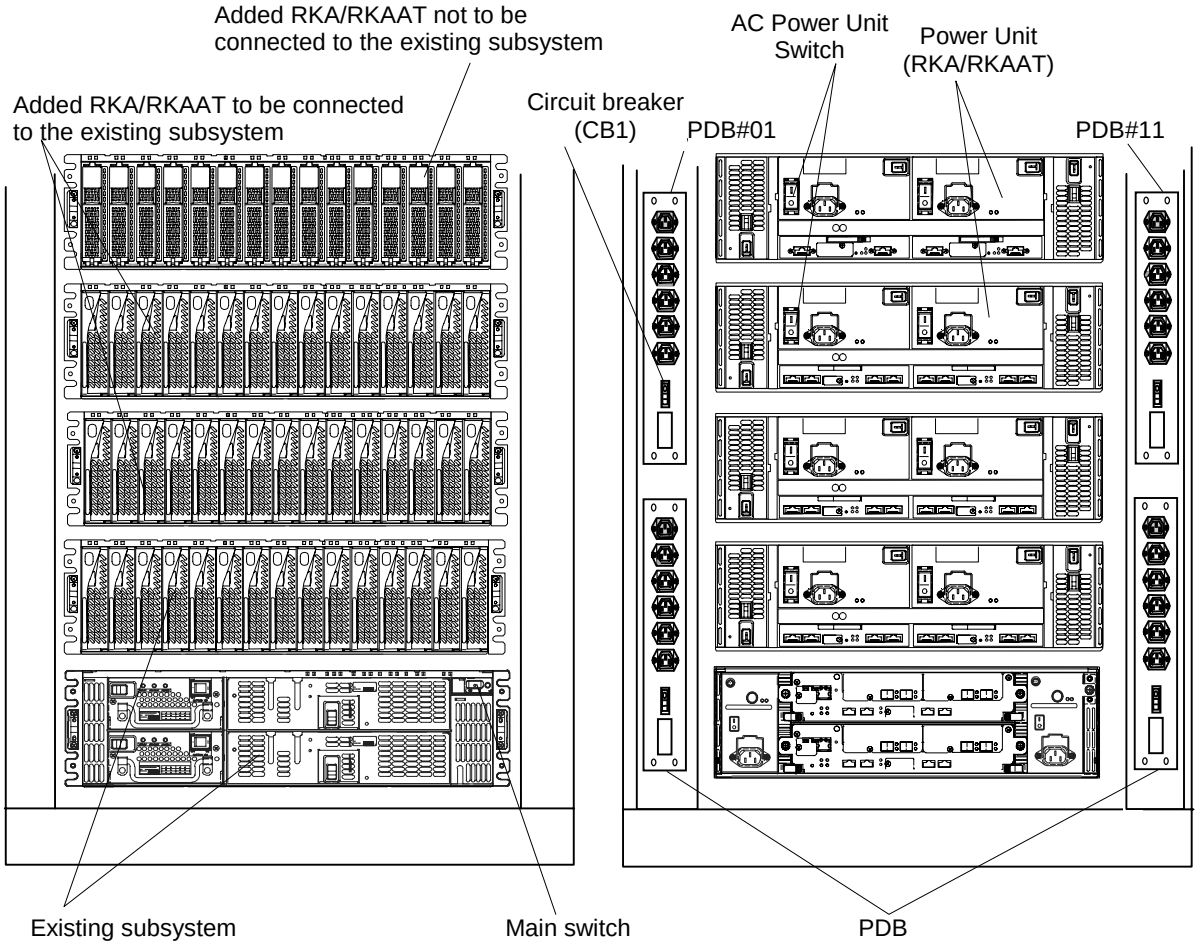


Figure 6.9.10 Locations of Switches for Power On (RKA/RKAAT)

Copyright © 2005, Hitachi, Ltd.

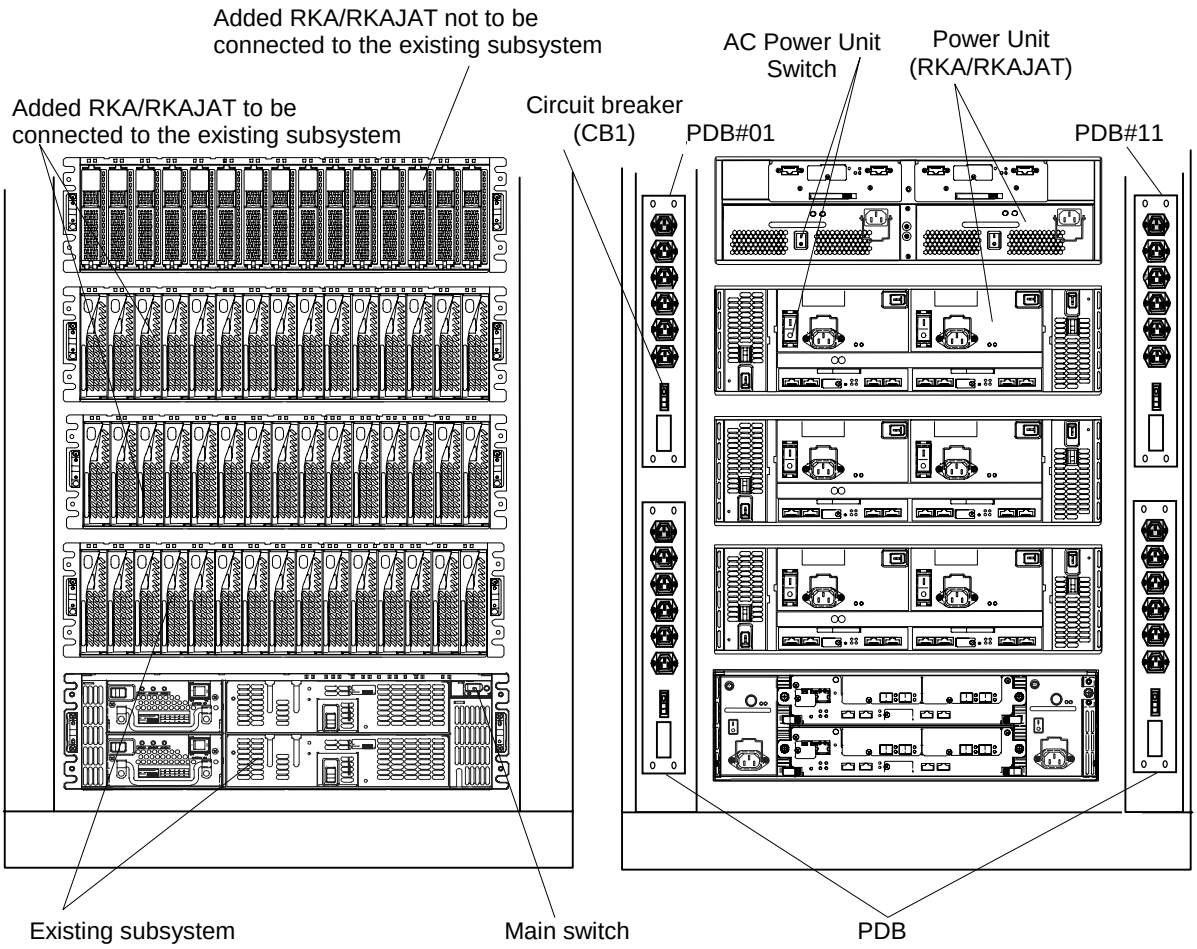


Figure 6.9.10.1 Locations of Switches for Power On (RKA/RKAJAT)

Copyright © 2004, 2005, Hitachi, Ltd.

<Example of connection>

- Before the addition: Configuration of RKH/RKHE + Two RKAs
- After the addition: Configuration of RKH/RKHE + Two RKAs + Two RKAATs + Two RKAs + Five RKAATs

Refer to Figure 6.9.10.1, “Example of ENC Cable Connections Directed by ACE Tool.”
When all the adding subsystems are selected while the Ctrl key is pressed, the color of the displays of the selected subsystems is changed from gray to orange.
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.
Check the recognition of the adding subsystems to be connected to the existing subsystems 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 #00 (RKA) and SATA #21 (RKAAT)
(ii) The second recognition : Fibre #00 (RKA) and SATA #32 (RKAAT)
(iii) The third recognition : Fibre #10 (RKA) and Fibre #11 (RKA)

NOTE : • Do not connect the ENC cables of the loops Loop #0 and Loop #1 at the same time because the system may go down otherwise.
• 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.

Copyright © 2004, 2005, Hitachi, Ltd.

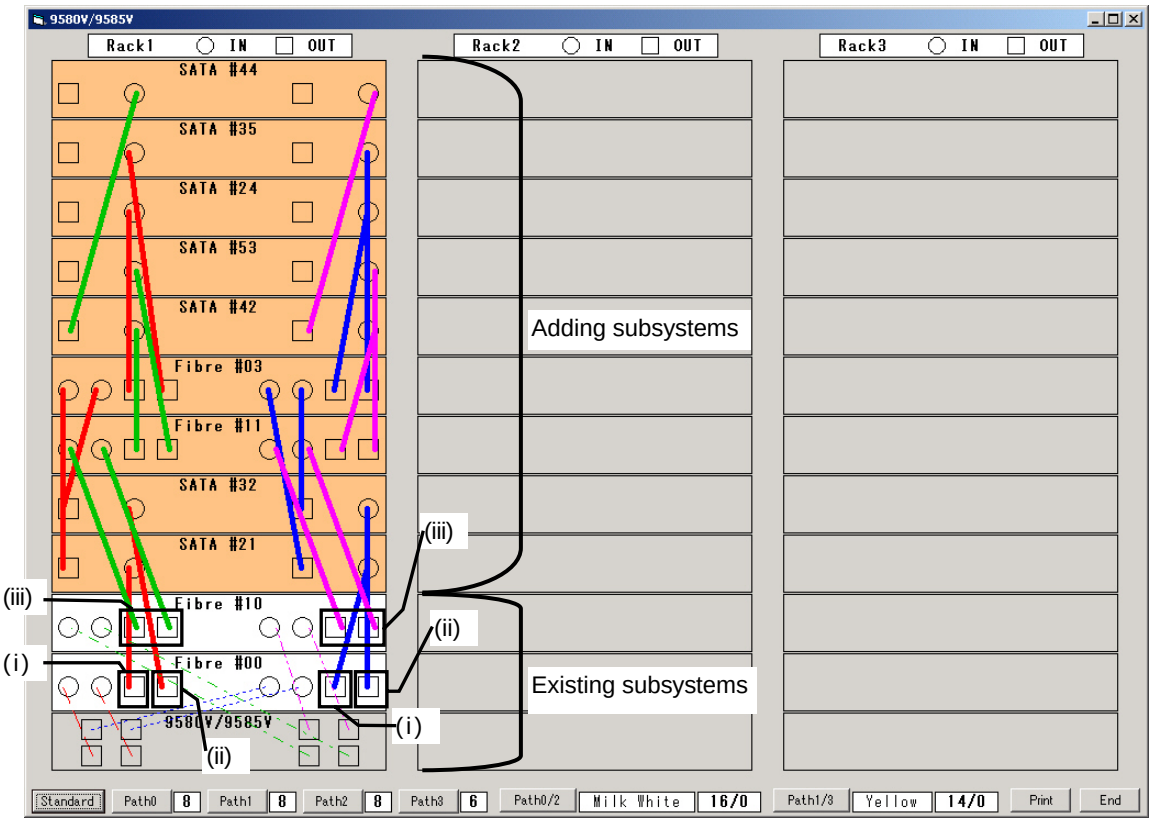


Figure 6.9.10.1 Example of ENC Cable Connections Directed by ACE Tool

Copyright © 2004, 2005, Hitachi, Ltd.

6.9.4 Verifying the addition

(1) Verifying completion of the addition to the loop

(a) Procedure for verifying completion of the addition to the loop

When the ALM LED on the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAAT/RKAJAT are off, the addition to the loop has been completed normally.

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.

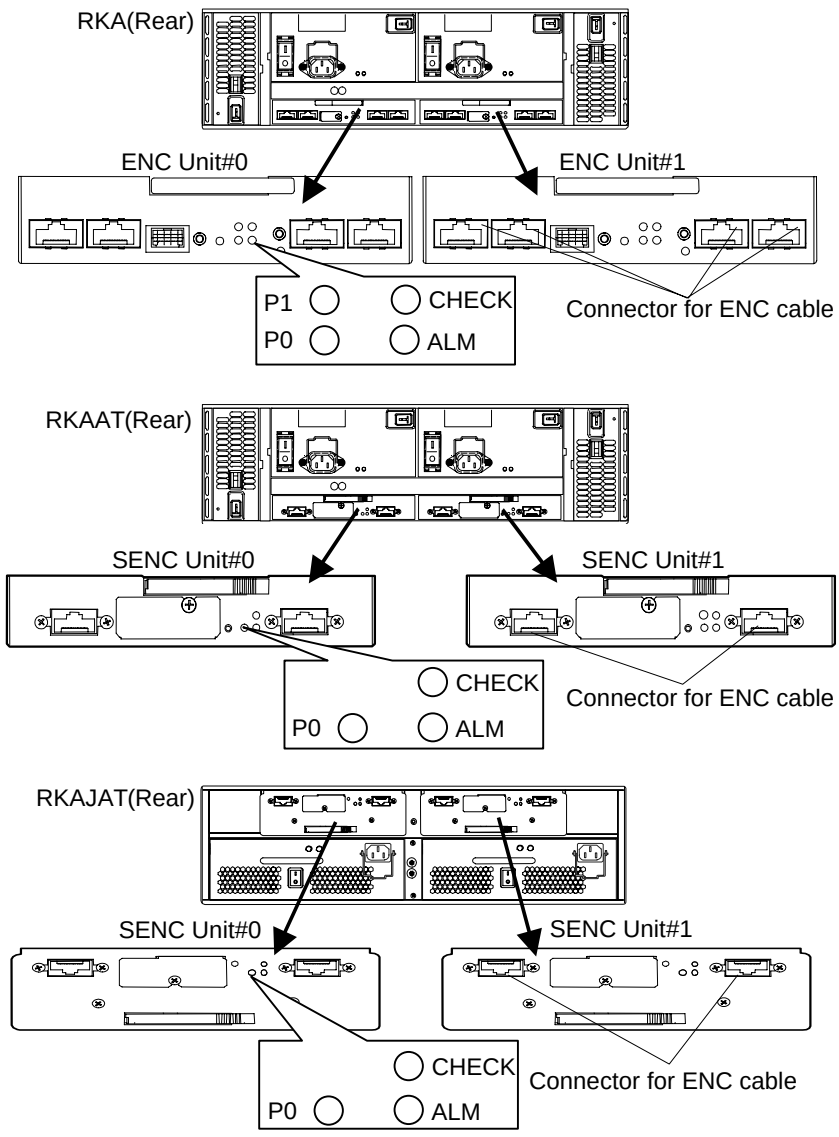
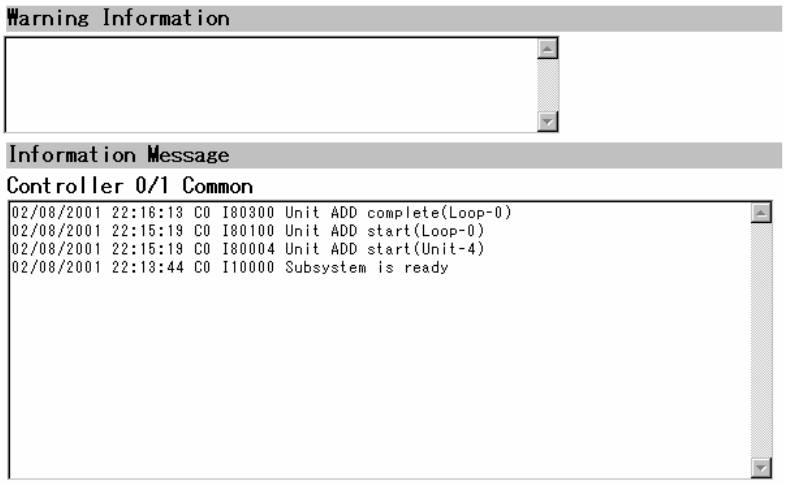


Figure 6.9.11 Locations of LED for ENC Unit/SENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(b) Contents of the WEB message
[In the case of normal termination]



MM/DD/YYYY HH:MM:SS Cx I80300 Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80100 Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80004 Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

A message informing of a start of the RKA/RKAAT/RKAJAT addition performed with the system power on

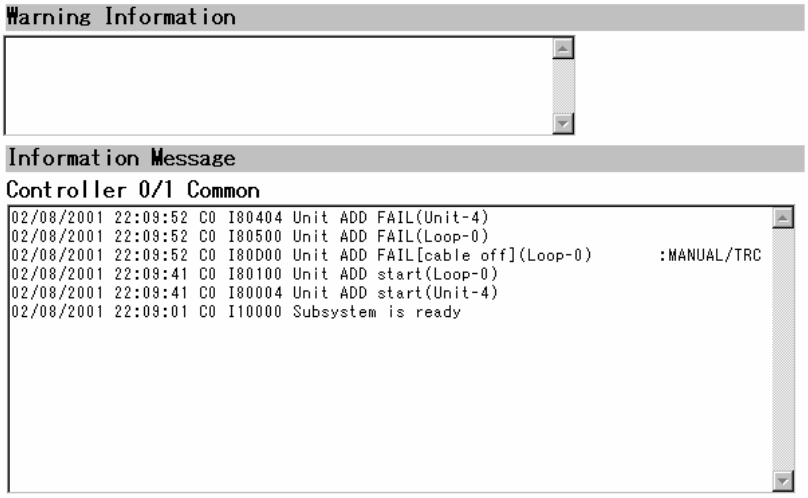
A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

Copyright © 2004, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I80D0y Unit ADD FAIL [cable off] (Loop-y) :MANUAL/TRC
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAAT/RKAJAT addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).
- A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of an abnormal termination of the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

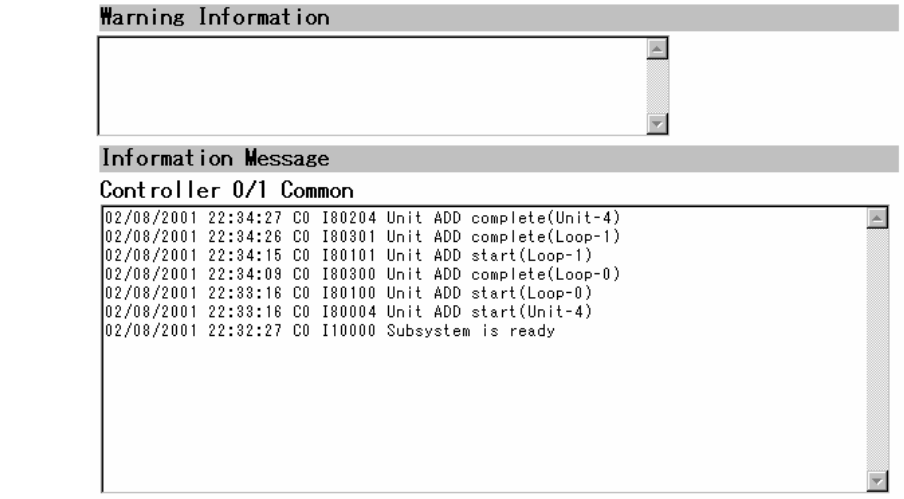
Copyright © 2004, 2005, Hitachi, Ltd.

(2) Connecting ENC cables (on the Loop #1 side)
Connect the ENC cables on the Loop #1 side in the same way as the Loop #0. 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. For the procedure for connecting the ENC cables, refer to Figure 6.9.8 and 6.9.8.1, "ENC Cable Connections" on page INST 06-1650.

(3) Verifying completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

(a) Procedure for verifying completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on.
When the ALM LED of the ENC Unit/SENC Unit to which the ENC cables have been connected and the WARNING (WARN) LED of the RKA/RKAAT/RKAJAT 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 Cx I8020x Unit ADD complete (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

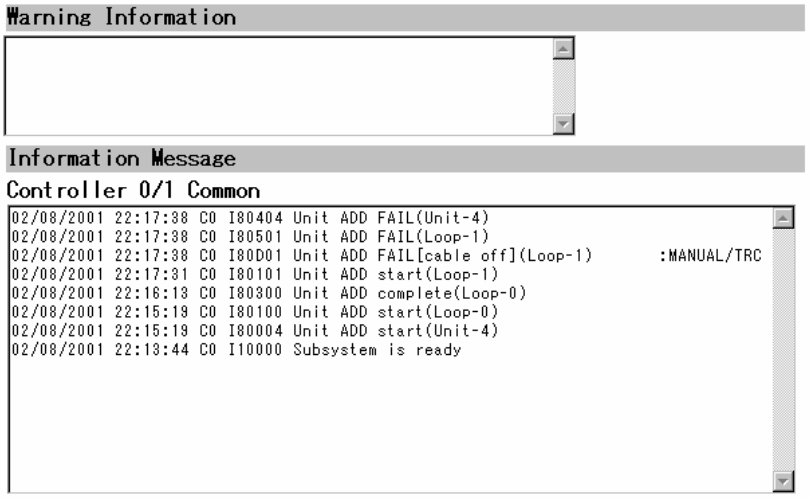
Date Time Detect Controller# x : Unit ID#, y : Loop#

- A message informing of a start of the RKA/RKAAT/RKAJAT addition performed with the system power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on
- A message informing of an l termination of the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

Copyright © 2004, 2005, Hitachi, Ltd.

[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 Cx I8040x Unit ADD FAIL (Unit-x)
MM/DD/YYYY HH:MM:SS Cx I8050y Unit ADD FAIL (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD FAIL [cable off] (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8030y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8010y Unit ADD complete (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000y Unit ADD start (Loop-y)
MM/DD/YYYY HH:MM:SS Cx I8000x Unit ADD start (Unit-x)

Date Time Detect Controller# x : Unit ID#, y : Loop#

A message informing of a start of the RKA/RKAAT/RKAJAT addition performed with the system power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

A message informing of completion of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

A message informing of a start of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

A message informing of a factor of an abnormal termination (See Section 2.4, "Details of Recovery Procedures" on page MNTE 02-1360 in the Maintenance Manual (for Maintenance).

A message informing of an abnormal termination of the addition to the loop consequent on the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

A message informing of an abnormal termination of the RKA/RKAAT/RKAJAT addition performed with the subsystem power on

Copyright © 2004, 2005, Hitachi, Ltd.

(4) Troubleshooting

(a) When the ENC cable is connected to the Loop #1 first

It causes the recognition operation itself no problem if the Loop #0 is connected following the connection of the Loop #1.

It is written in the maintenance procedure that the Loop #1 is to be connected after the Loop #0 has been connected.

(b) When a failure occurs while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress Take a recovery action against the failure, that occurs in the existing subsystem or added RKA/RKAAT/RKAJAT when the operation to make the RKA/RKAAT/RKAJAT recognized is in progress, after checking the message informing of a normal or abnormal termination of the addition.

If the recovery action is taken when the operation to make the RKA/RKAAT/RKAJAT recognized is in progress, an abnormal termination of the addition or a subsystem down may be caused.

(c) Failures that occur when the operation to make the RKA/RKAAT/RKAJAT recognized is in progress

- When a failure occurs in the existing part while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress.

  Perform the recovery action, which is against a trouble occurs in the existing subsystem while operation to make the RKA/RKAAT/RKAJAT recognized is being done, after the addition terminates (normally or abnormally) because the action can affect the recognition of the RKA/RKAAT/RKAJAT.

- When failures occur in both of the existing and added parts while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress.

  When failures occur in both of the existing and added parts while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress, take a recovery action against the failure of the existing part preferentially after the addition completes, take a recovery action against the failure of the added part next, and then resume the operation for making the RKA/RKAAT/RKAJAT recognized.

Copyright © 2004, 2005, Hitachi, Ltd.

(d) In the case where the operation for making the RKA/RKAAT/RKAJAT recognized is started in the state in which the Disk Drives other than the #0 to #3 have been installed.

NOTE : Install the Disk Drives #4 to #13 (#4 to #14 other than the unit ID#0) after the addition is completed. When adding the multiple subsystems at the same time, install the Disk Drives after all the RKAs/RKAATs/RKAJATs are recognized.

The following message is output in the "Information message" window in the WEB window.

I80E00 Unit ADD warning [HDU number over]

When the message above is displayed, it is possible that the addition does not complete within the predetermined time (five minutes).

Besides, do not pull out the Disk Drive while the RKA/RKAAT/RKAJAT is being made to be recognized.

Otherwise, an abnormal termination or a subsystem down may be caused.

(e) Procedure for recovery from a system down that occurs while operation to make the RKA/RKAAT/RKAJAT recognized is being done.

To recover from a system down that occurs while operation to make the RKA/RKAAT/RKAJAT recognized is being done, remove the RKA/RKAAT/RKAJAT which is intended to be added and in which the failure has occurred, start up the subsystem again in the original state before the addition has been done, and then resume the addition of the RKA/RKAAT/RKAJAT.

If the system down recurs after the retrying, perform the addition (addition performed with the subsystem power off) after the down occurs, and then start up the subsystem again.

(f) Loop failure that occurs while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress (in the case where no part is blocked)

When the addition terminates abnormally because a loop failure occurs while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress, a disconnection of a cable of the blocked loop can recover the subsystem from the failure.

If the recovery fails, recover the subsystem from the loop failure by performing dummy replacement (‡1) the finally installed ENC Unit/SENC Unit of the existing RK/RKA/RKAAT/RKAJAT.

(g) When a loop failure occurs while the operation to make the RKA/RKAAT/RKAJAT recognized is in progress and a recovery from it fails even though the cable concerned has been disconnected.

Dummy replacement of the ENC Unit/SENC Unit, which is connected to the related loop, of the existing RK/RKA/RKAAT/RKAJAT finally mounted can recover the subsystem from the failure.

‡1 : To remove the part concerned once, and then to reinstall it (after waiting for 20 seconds)

Copyright © 2004, 2005, Hitachi, Ltd.

(5) Procedure for interrupting the operation for making the RKA/RKAAT/RKAJAT recognized and notes on it

When the RKA/RKAAT/RKAJAT recognition was interrupted, disconnect the ENC cables which were in the process of being added; disconnect the cables of the one loop at a time.

If you disconnect all the cables at a time, the addition may be completed causing a loop detachment or even an ENC detachment depending on the time when the disconnection is done.

When you want to remove the RKA/RKAAT/RKAJAT that has been added once after the addition has been completed, perform a sequential shutdown before an LU is constructed, and then remove the RKA/RKAAT/RKAJAT with the subsystem power off.

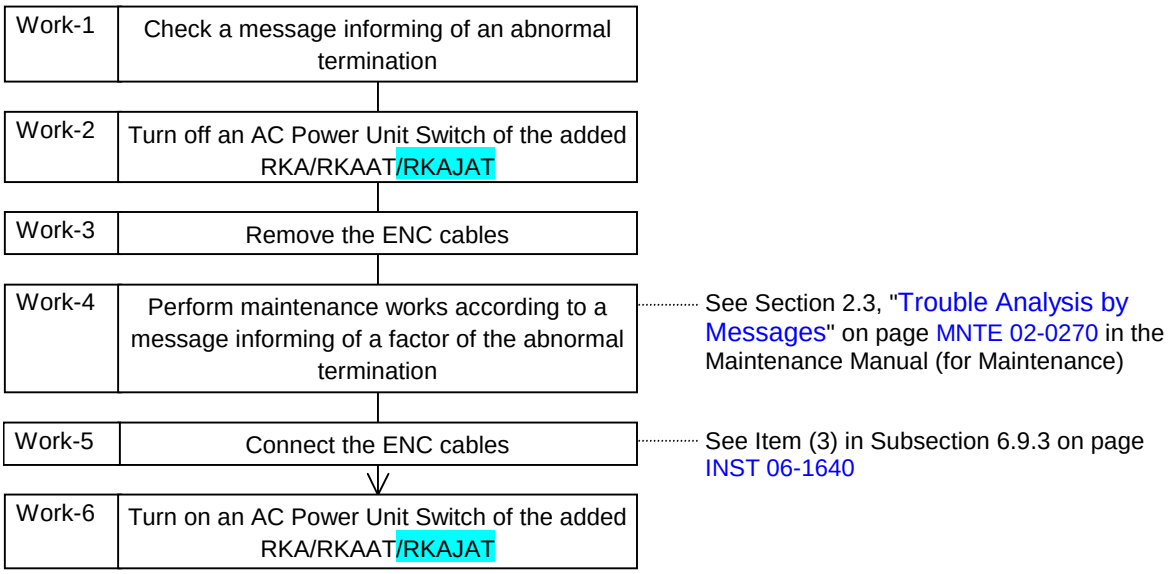
When the LU has already been constructed, delete the LU and perform a sequential shutdown (That is because the subsystem will go down at the time of the next powering on if the LU is left.)

It causes no problem if a RAID group is constructed before the de-installation, however, the RAID group will not be deleted after the next powering on.

Copyright © 2004, 2005, Hitachi, Ltd.

(6) Procedure for resuming an RKA/RKAAT/RKAJAT addition with the subsystem power on when the addition has terminated abnormally.
When you want to add the RKA/RKAAT/RKAJAT again while the subsystem power is on after the addition has terminated abnormally, operate following the procedure shown below.

NOTE : • Turn off the AC Input Power Unit Switch (DC Input Power Unit Switch) of the added RKA/RKAAT/RKAJAT which was terminated abnormally, wait for 20 seconds or more, and turn it on again.
• When turning off the AC Power Unit Switch of the added RKA/RKAAT/RKAJAT, do not turn off the AC Power Unit Switch of the RKA/RKAAT/RKAJAT that has been normally recognized (the ALM LEDs of whose ENC Units/SENC Units for the both loops are off).
When turning off the AC Power Unit Switch or removing the ENC cable of the failed RKA/RKAAT/RKAJAT only, operate in the same way.
Never turn off the AC power switch of the recognized RKA/RKAAT/RKAJAT or disconnect the ENC cable of it because each of the above operations causes a system down.



Wait for 20 seconds after turning off an AC Power Unit Switch of the added RKA/RKAAT/RKAJAT, and then turn on the AC Power Unit Switch again.

Copyright © 2004, 2005, Hitachi, Ltd.

6.9.5 Install the rest of the Disk Drives

Install the rest of the Disk Drives in the Disk Drive slots #4 to #14 of the RKA/RKAAT/RKAJAT.
Attach the dummy (Disk Drive) to the each Disk Drive slot in which no Disk Drive is installed. (‡1)

(1) Insert the Disk Drive into the position (address) where it was by holding it with the handle.
Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.
(2) Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

‡1 : Refer to Item (4-1) in Subsection 6.4.3, “When adding the Disk Drive (in order to expand a storage capacity)” on page INST 06-0270.

Copyright © 2004, 2005, Hitachi, Ltd.

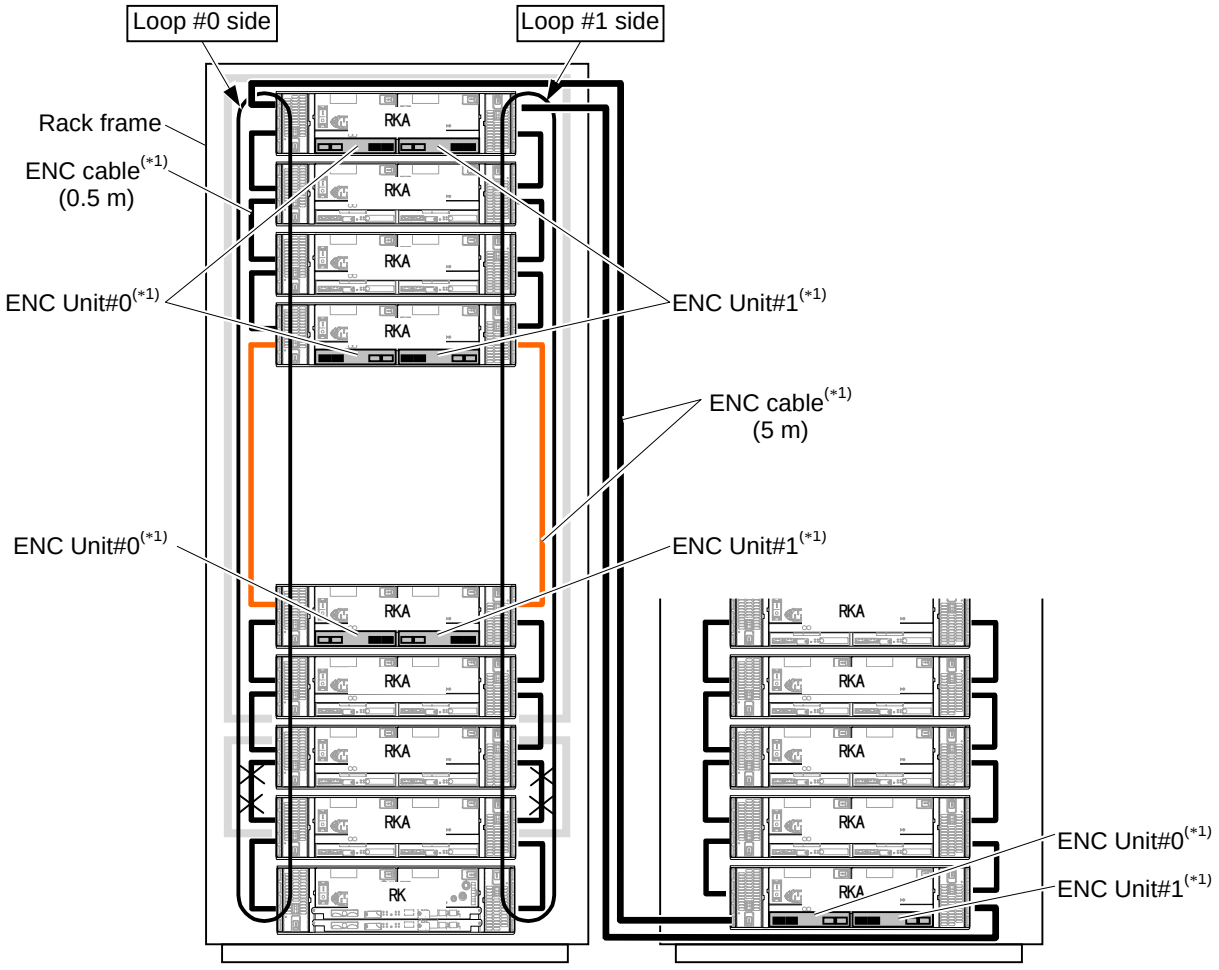
6.10 Connecting ENC Cable (5 m) by means of FC Cable Assembly for 2Gbps (In the case of RK/RKD/RKA/RKAD)

If the distance between subsystems is distant, ENC Unit needs to be replaced and ENC cable (5 m) needs to be connected. (When the revision is "C" or later: Replacement of the ENC Unit is not required.) The procedures for replacing ENC Unit and connecting ENC cable (5 m) by means of FC Cable Assembly for 2 Gbps is described below.

6.10.1 FC Cable Assembly for 2Gbps components

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.

6.10.2 Replacing the ENC Unit and connecting ENC cable



*1:FC cable assembly for 2 Gbps is used for only one point in the system.

Figure 6.10.1 Replaceable Part Locations of ENC Unit

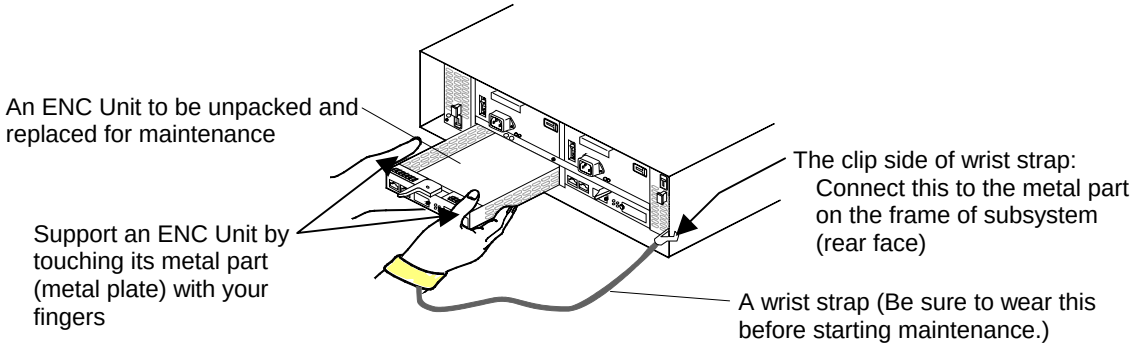
Copyright © 2004, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2004, 2005, Hitachi, Ltd.

Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.

- When the revision is “B”: Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)
- When the revision is “C” or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	• Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. • When replacing the ENC Unit, the subsystem must be in the status shown below. - Hot replacement of the microprogram is not being performed. - Hot replacement of the Control Unit is not being performed. - Any part other than the above is not being replaced. • In the case of the dual configuration, after finishing the replacement operation of Loop #0 side, be sure to perform that of Loop #1 side. • When adding RKA/RKAD using ENC cable (5 m), see Section 6.6 “Adding the RKA/RKAD to the Rack Frame” on page INST 06-0530.	See (1).
2	Replacement with the power turned off	After finishing the replacement operation of Loop #0 side, be sure to perform that of Loop #1 side.	See (2).

Copyright © 2004, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on

NOTE : • Be sure to perform the operation according to the following procedures. Otherwise, the system down may occur.
• During the following operation, a loop blockage will occur.
• When the revision is “C” or later: Replacement of the ENC Unit is not required.

For the Loop #0 side, perform the following procedures.
In the dual configuration, perform the above (1-1) and (1-2) for the Loop #1 side in the same way.

(1-1) Replacing the ENC Unit of the RKA/RKAD of which the device ID number is the smallest (closer to RK/RKD) of the devices to be replaced.

(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (⟵) and pull out the ENC Unit a little way toward you.

(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.

(d) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (⟵). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

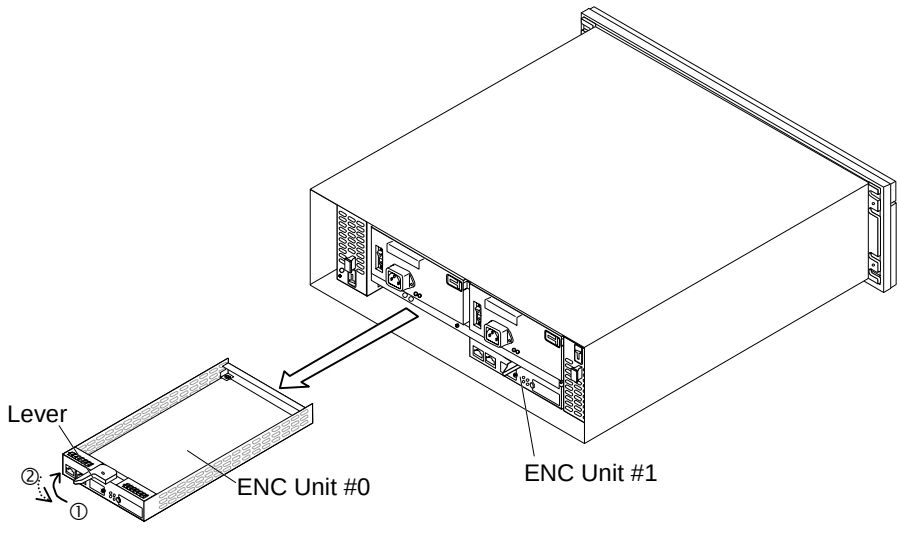


Figure 6.10.2 Replacing of ENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(e) Connect the ENC cable (0.5 m) removed in procedure (b) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.10.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(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 because the ENC Unit is considered to have failed.

(g) Make sure that the ALM LED (red) on the ENC Unit is off.

(1-2) Replacing the ENC Unit of the RKA/RKAD of which the device ID number is higher than the one in (1-1) among the devices to be replaced.

(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you.

(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.

(d) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

(e) Connect the ENC cable (0.5 m) removed in procedure (b) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.10.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2004, 2005, Hitachi, Ltd.

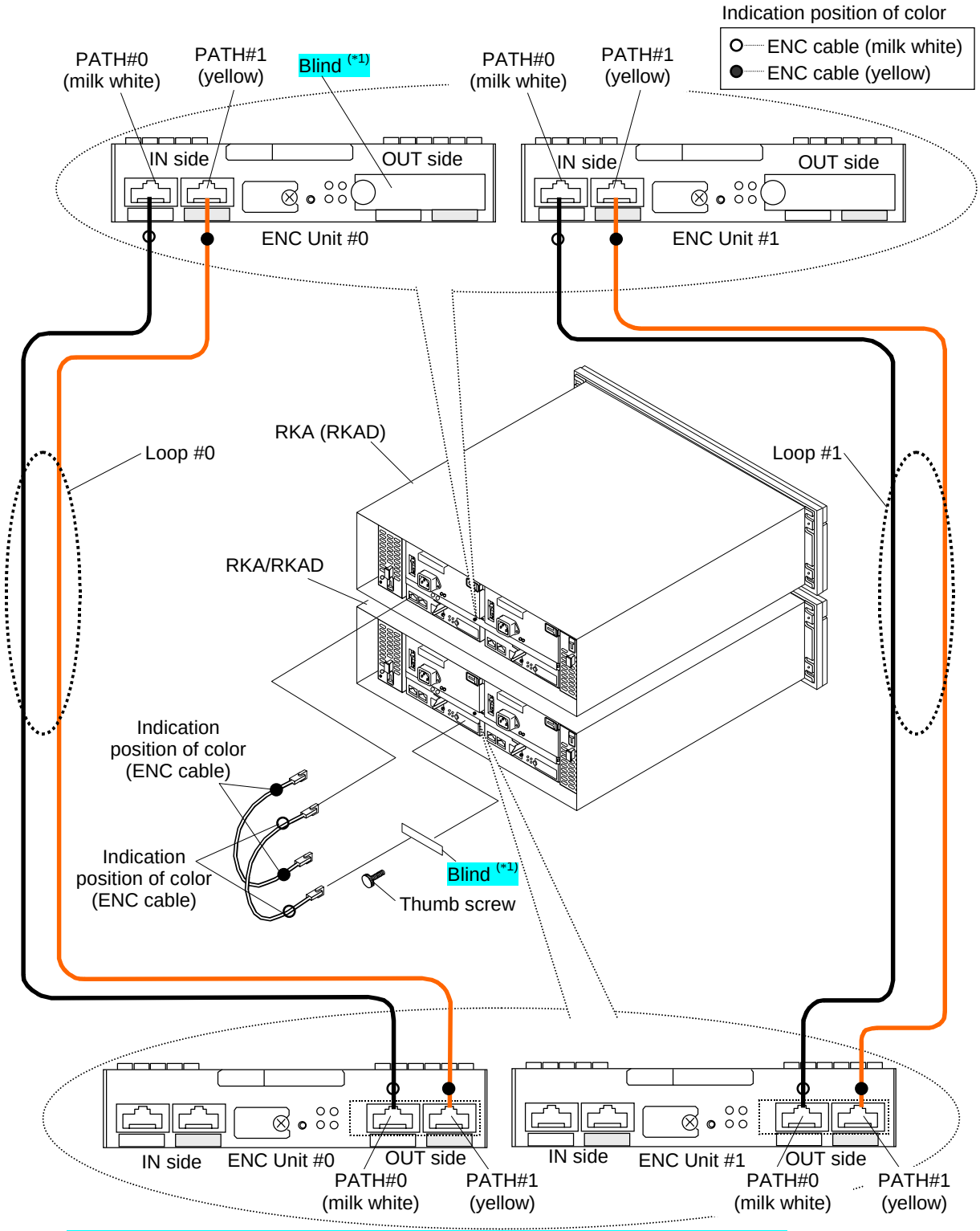
(f) Remove the ENC cable (0.5 m) connected to the OUT side of the ENC Unit replaced in (1-1), and connect the ENC cable (5 m).

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.10.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(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 because the ENC Unit is considered to have failed.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.

Figure 6.10.3 Connecting ENC Cables

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off

NOTE : When the revision is “C” or later: Replacement of the ENC Unit is not required.

Perform the following procedures referring to Figure 6.7.2 and Figure 6.7.3.
For the Loop #0 side, perform the following procedures.

(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you.
(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.
(d) Insert a new ENC Unit attached to the FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——).
(e) Return the levers in the direction shown by the arrows ② (·····>).
(f) Connect the ENC cable (0.5 m) and ENC cable (5 m) to the ENC Unit attached to the FC Cable Assembly for 2Gbps (ENC cable (5 m) is used for the connection between RKAs/RKADs. Excluding here, normally ENC cables (0.5 m) are used for the connection with ENC cables.).

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.10.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(g) For the Loop #1 side, perform the operation from (a) to (f) as in the above procedures.

Copyright © 2004, 2005, Hitachi, Ltd.

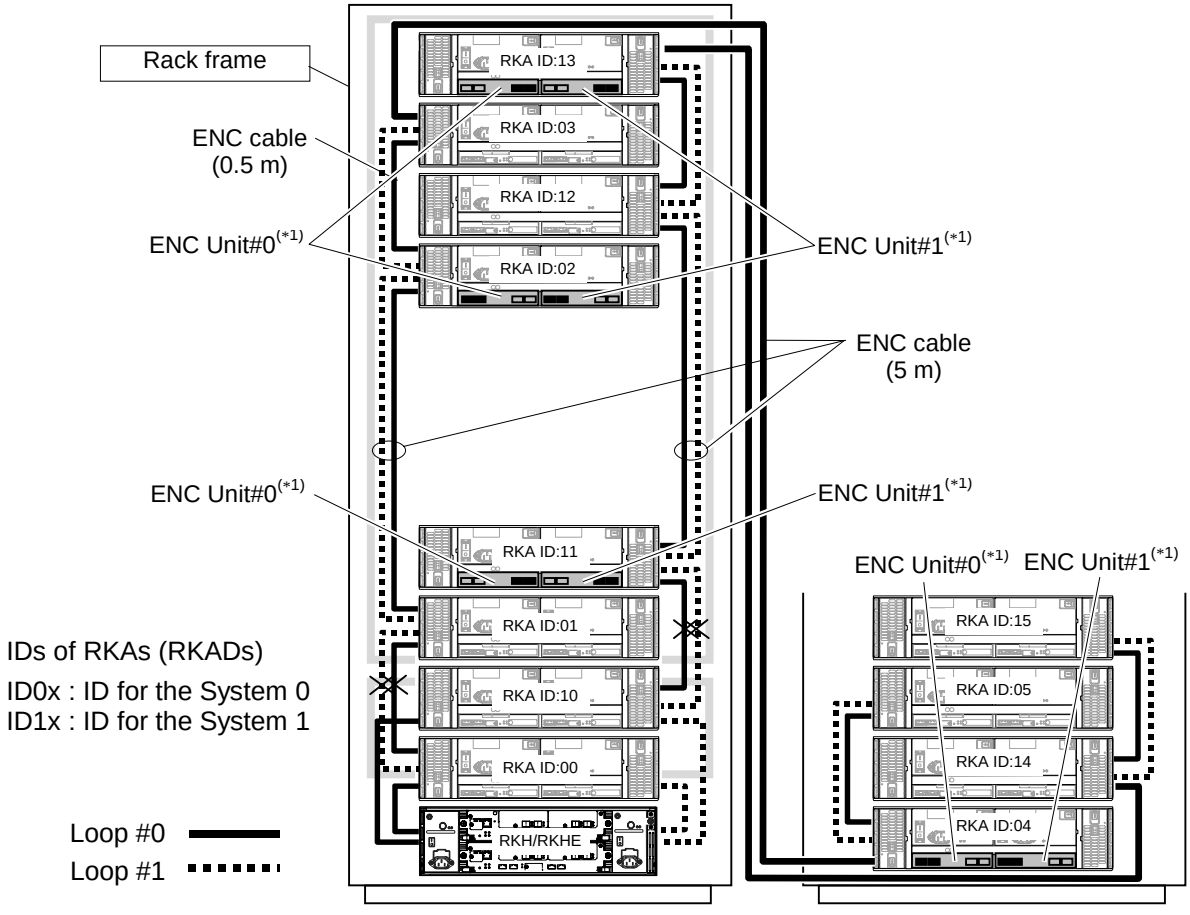
6.11 Connecting ENC Cable (5 m) by means of FC Cable Assembly for 2Gbps (In the case of RKH/RKHE/RKA)

If the distance between subsystems is distant, ENC Unit needs to be replaced and ENC cable (5 m) needs to be connected. (When the revision is "C" or later: Replacement of the ENC Unit is not required.) The procedures for replacing ENC Unit and connecting ENC cable (5 m) by means of FC Cable Assembly for 2 Gbps is described below.

6.11.1 FC Cable Assembly for 2Gbps components

Model name	Model	Configuration	Remake
FC Cable Assembly for 2 Gbps	DF-F600-K5B	• ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.
FC Cable Assembly kit	DF-F600-K5BUP	• ENC Unit (2) • ENC cable 5 m (2)	• For single configuration, one set is included. • For dual configuration, two sets are included.

6.11.2 Replacing the ENC Unit and connecting ENC cable



*1:FC cable assembly for 2 Gbps is used for only one point in the system.

Figure 6.11.1 Replaceable Part Locations of ENC Unit

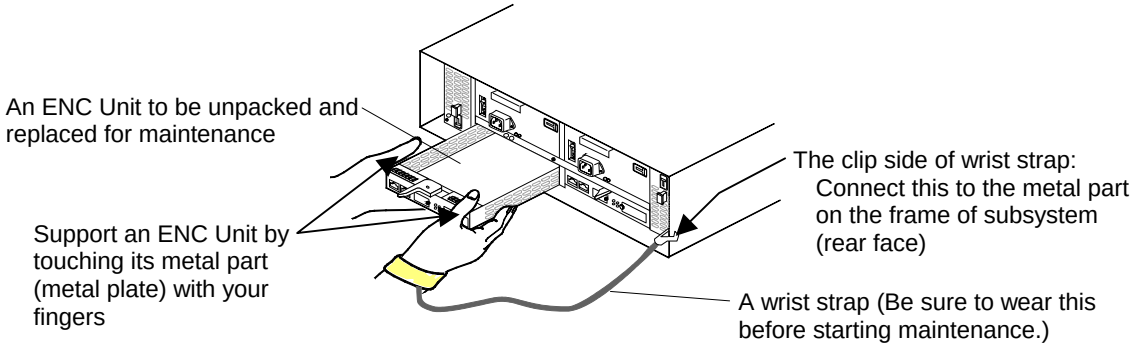
Copyright © 2004, 2005, Hitachi, Ltd.

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.
- **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.



Copyright © 2004, 2005, Hitachi, Ltd.

Check the revision of the ENC Unit, to which the ENC cable (5 m) is to be connected.

- When the revision is “B”: Replacement of the ENC Unit is required. (The ENC Unit and ENC cable (5 m) are supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)
- When the revision is “C” or later: Replacement of the ENC Unit is not required. (The ENC cable (5 m) is supplied with the 2-Gbps FC Cable Kit (DF-F600-K5BUP).)

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement)	• Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. • When replacing the ENC Unit, the subsystem must be in the status shown below. - Hot replacement of the microprogram is not being performed. - Hot replacement of the Control Unit is not being performed. - Any part other than the above is not being replaced. • In the case of the dual configuration, after finishing the replacement operation of Loop #0 side, be sure to perform that of Loop #1 side. • When adding RKA using ENC cable (5 m), see Section 6.6 “Adding the RKA to the Rack Frame” on page INST 06-0530.	See (1).
2	Replacement with the power turned off	After finishing the replacement operation of Loop #0 side, be sure to perform that of Loop #1 side.	See (2).

Copyright © 2004, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on

NOTE : • Be sure to perform the operation according to the following procedures. Otherwise, the system down may occur.
• During the following operation, a loop blockage will occur.
• When the revision is “C” or later: Replacement of the ENC Unit is not required.

For the Loop #0 side, perform the following procedures.
In the dual configuration, perform the above (1-1) and (1-2) for the Loop #1 side in the same way.

(1-1) Replacing the ENC Unit of the RKA of which the device ID number is the smallest (closer to RKH/RKHE) of the devices to be replaced.

(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (⟵) and pull out the ENC Unit a little way toward you.

(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.

(d) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (⟵). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.

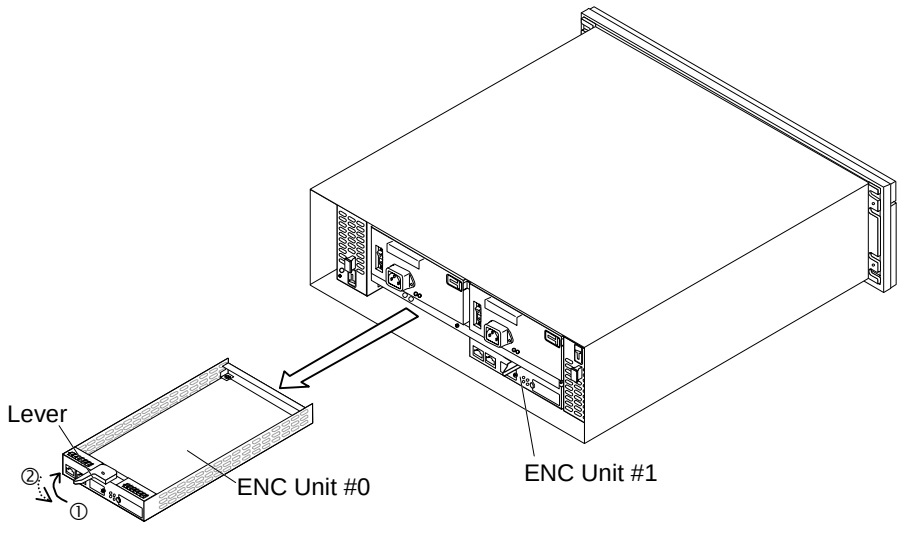


Figure 6.11.2 Replacing of ENC Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(e) Connect the ENC cable (0.5 m) removed in procedure (b) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.11.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(f) Return the levers in the direction shown by the arrows ② (·····>).
(g) Make sure that the ALM LED (red) on the ENC Unit is off.

(1-2) Replacing the ENC Unit of the RKA of which the device ID number is higher than the one in (1-1) among the devices to be replaced.
(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you.
(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.
(d) After waiting for 20 seconds or longer, insert a new ENC Unit (attached to FC Cable Assembly for 2Gbps) into the specified location with its lever raised in the direction shown by the arrow ① (←——). When doing this, do not insert the ENC Unit completely.
If the ENC Unit is inserted without waiting for 20 seconds or longer, it is possible that the ENC Unit is not recovered from the failure normally.
(e) Connect the ENC cable (0.5 m) removed in procedure (b) to the ENC Unit attached to FC Cable Assembly for 2Gbps.

NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.11.3.).
- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

Copyright © 2004, 2005, Hitachi, Ltd.

(f) Remove the ENC cable (0.5 m) connected to the OUT side of the ENC Unit replaced in (1-1), and connect the ENC cable (5 m).

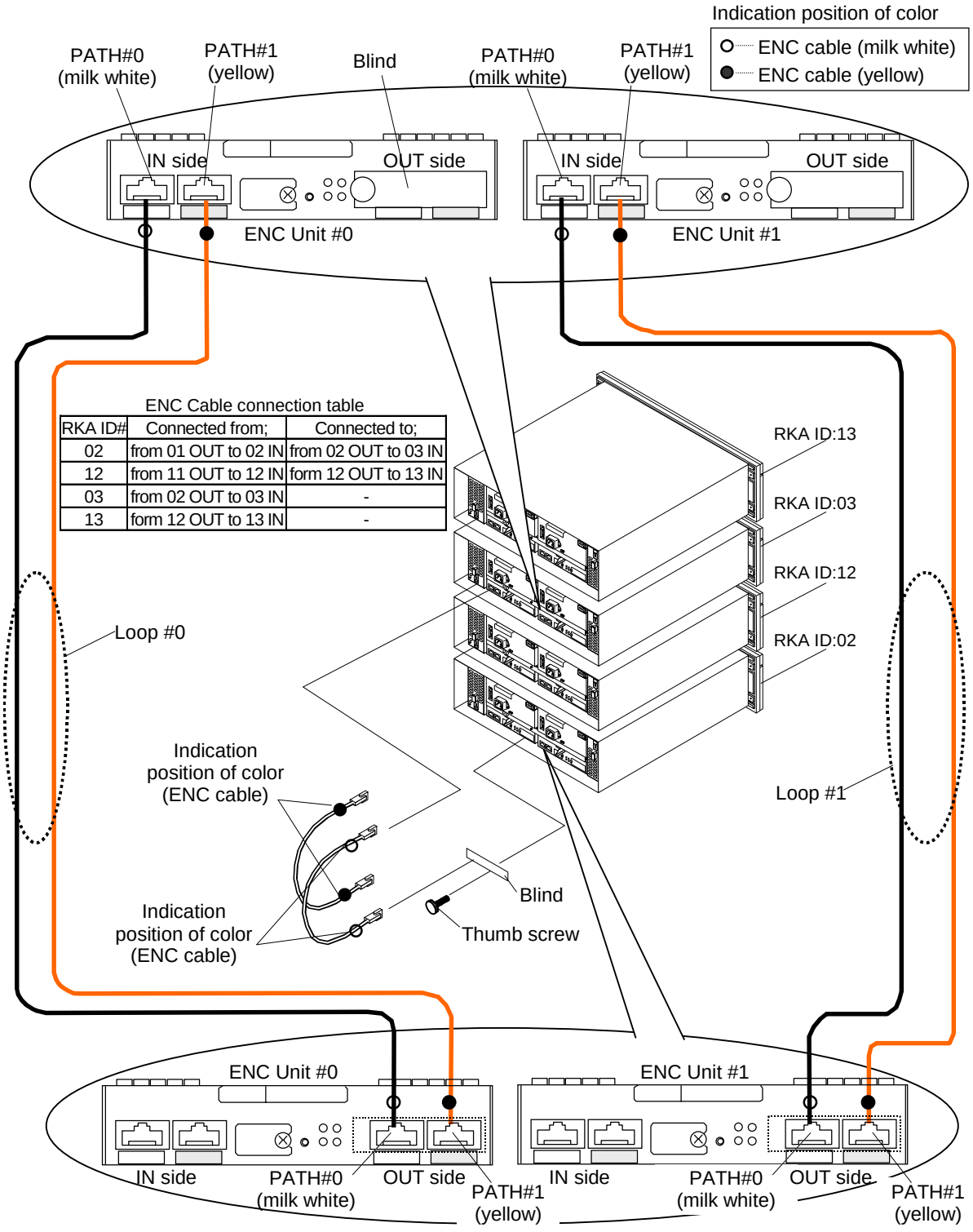
NOTE : Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.11.3.).

- To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
- To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(g) Return the levers in the direction shown by the arrows ② (·····>).

(h) Repeat the same procedures (1-1 and 1-2) for those in Loop #1.

Copyright © 2004, 2005, Hitachi, Ltd.



RKA ID#	Connected from;	Connected to;
02	from 01 OUT to 02 IN	from 02 OUT to 03 IN
12	from 11 OUT to 12 IN	form 12 OUT to 13 IN
03	from 02 OUT to 03 IN	-
13	form 12 OUT to 13 IN	-

Figure 6.11.3 Connecting ENC Cables

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off

NOTE : When the revision is “C” or later: Replacement of the ENC Unit is not required.

Perform the following procedures referring to Figure 6.11.2 and Figure 6.11.3.
For the Loop #0 side, perform the following procedures.

(a) Raise the lever on the ENC Unit in the direction shown by the arrow ① (←——) and pull out the ENC Unit a little way toward you.
(b) Remove the ENC cable (0.5 m) connected to the ENC Unit to be replaced.

NOTE : Perform this replacement operation for the ENC Unit connected with five meters of ENC cables.

(c) Remove the ENC Unit by pulling it out toward you.
(d) Insert a new ENC Unit attached to the FC Cable Assembly for 2Gbps into the specified location with its lever raised in the direction shown by the arrow ① (←——).
(e) Return the levers in the direction shown by the arrows ② (·····>).
(f) Connect the ENC cable (0.5 m) and ENC cable (5 m) to the ENC Unit attached to the FC Cable Assembly for 2Gbps (ENC cable (5 m) is used for the connection between RKAs. Excluding here, normally ENC cables (0.5 m) are used for the connection with ENC cables.).

NOTE : • Connect the ENC cables to the connectors of the PATH 0 (marked in milk white) and PATH1 (marked in yellow) (See Figure 6.7.3.).
• To the PATH#0 (marked in milk white), connect the ENC cable led from the PATH#0 (marked in milk white).
• To the PATH#1 (marked in yellow), connect the ENC cable led from the PATH#1 (marked in yellow).

(g) For the Loop #1 side, perform the operation from (a) to (f) as in the above procedures.

Copyright © 2004, 2005, Hitachi, Ltd.

Chapter 7. Subtracting Optional Components

7.1 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 Disk Array Management Program 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.

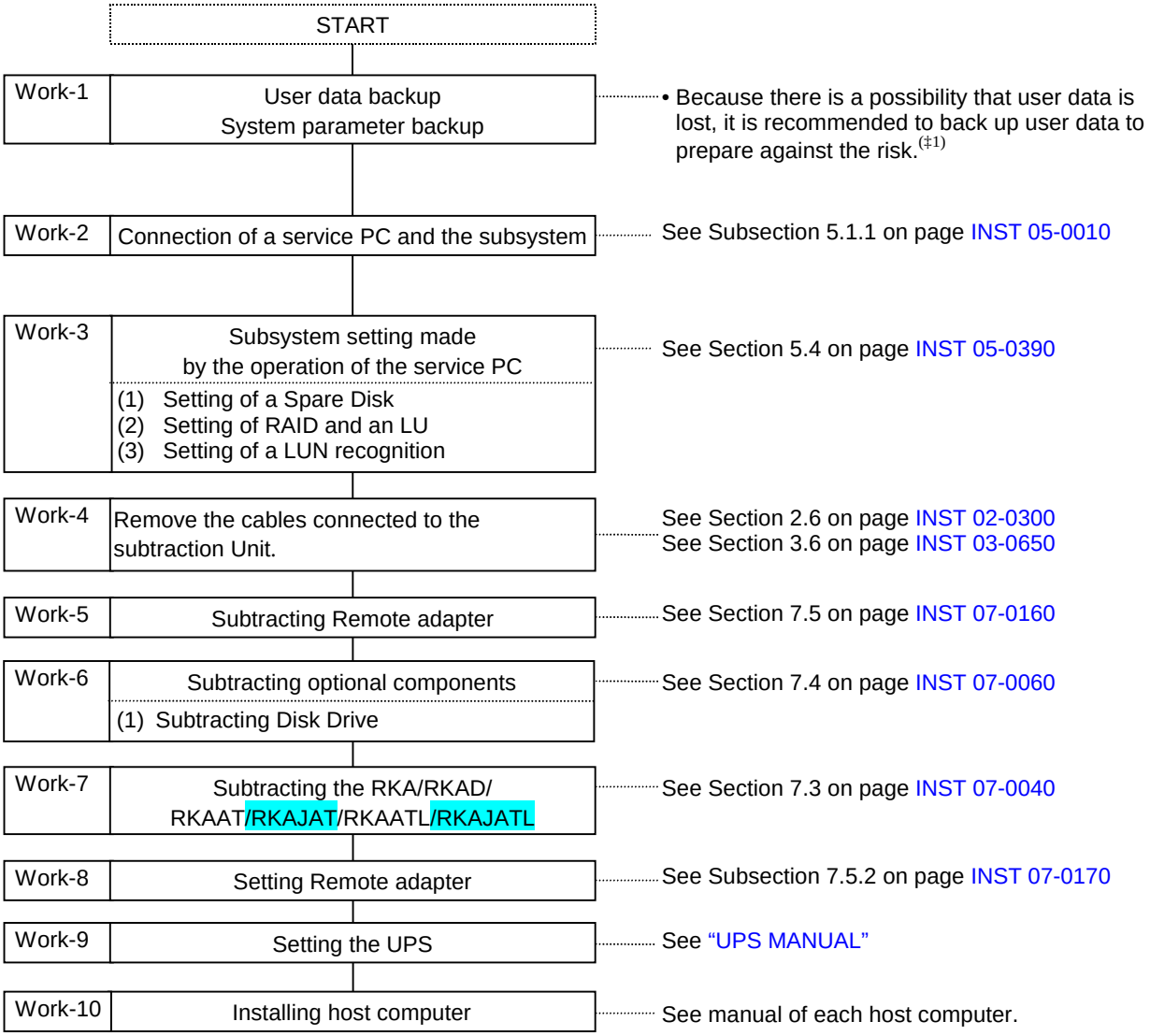
(5) Be sure to install a dummy Control Unit and a dummy Disk Drive in a vacant slot because dummy Control Unit and dummy Disk Drive are required for adjusting the cooling air flow.
When subtracting the optional component with the subsystem power on, the operation replacing Disk Drive with dummy Disk Drive has to be finished within 10 minutes.

Copyright © 2002, 2005, Hitachi, Ltd.

7.2 Procedures for Subtracting Optional Components

(1) Procedure for subtracting an optional component while the subsystem power on

NOTE : For safety use, always close the front bezel after the operation.

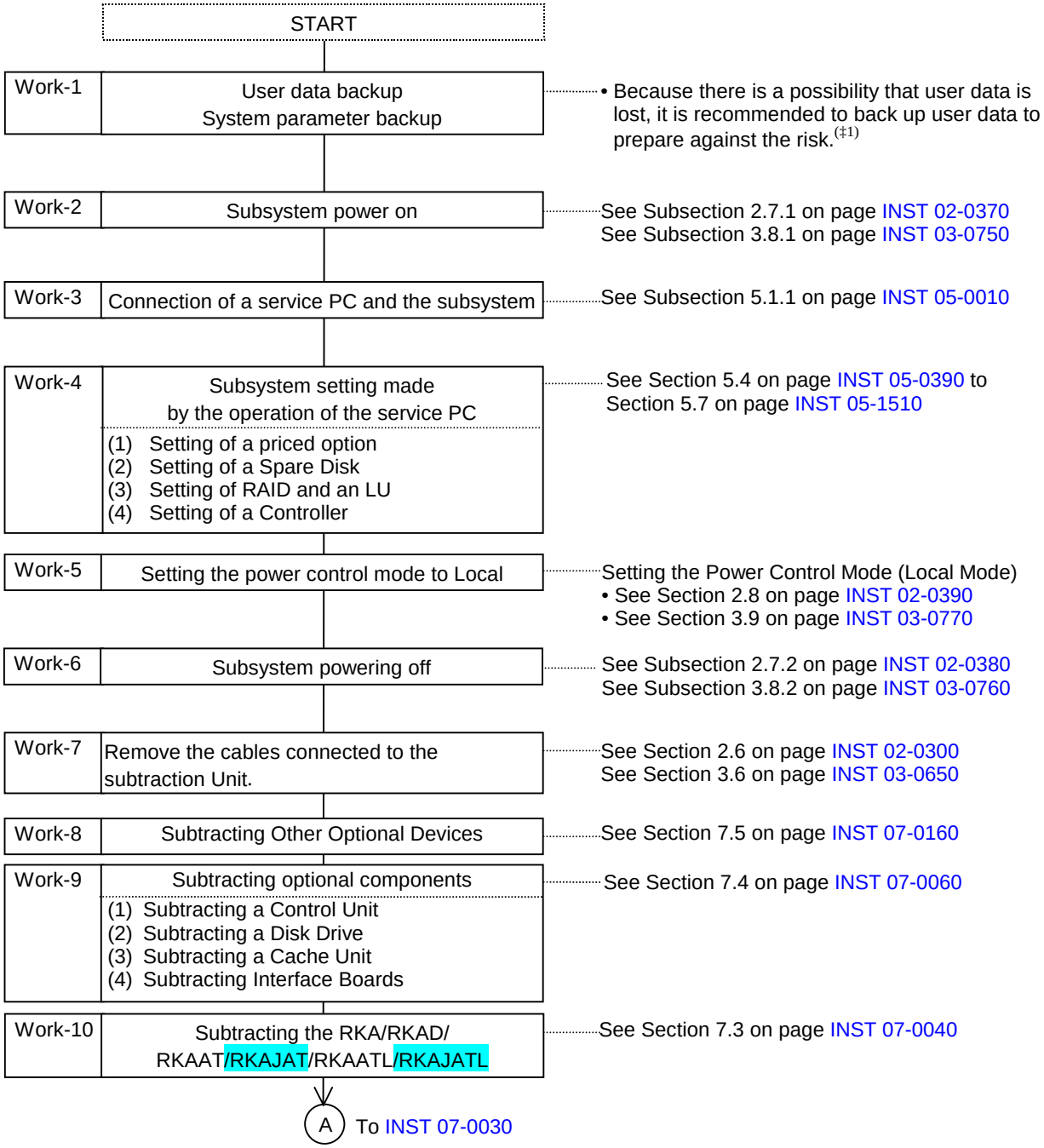


‡1 : Service personnel must check if a customer has backed up user data. If the customer does not perform the backup, start the work after getting customer’s permission.

Copyright © 2002, 2005, Hitachi, Ltd.

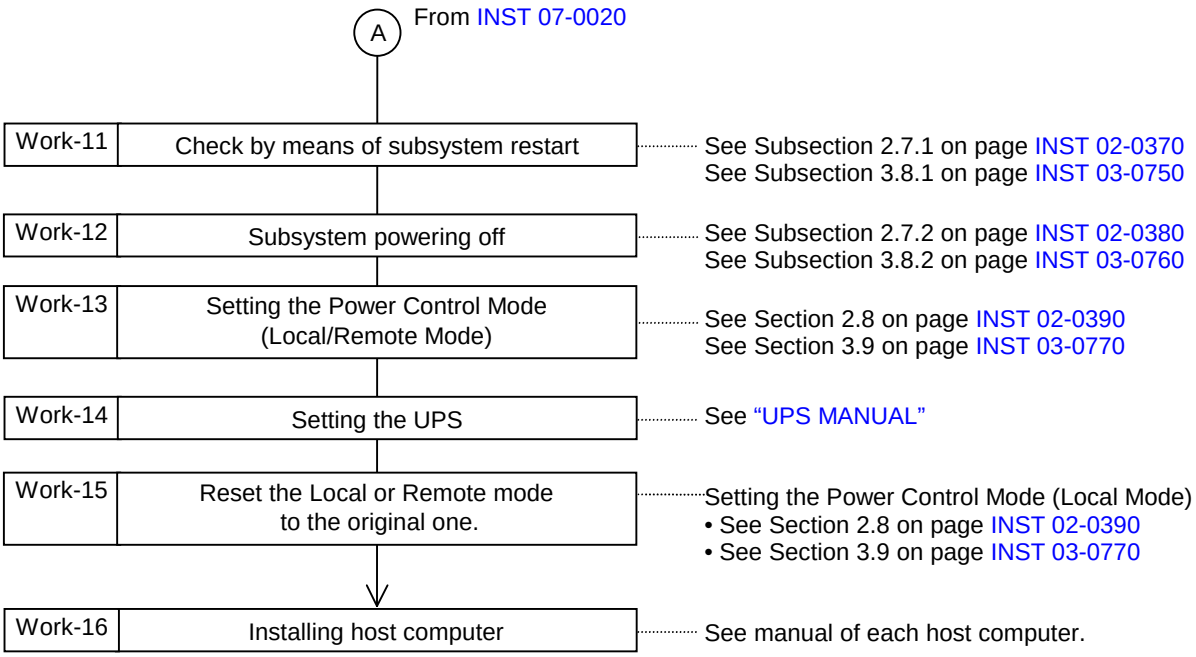
(2) Procedure for subtracting an optional component while the subsystem power off

NOTE : • For safety use, always close the front bezel after the operation.
• For the "Power On/Off Procedure", see (INST 02- 0370, INST 03-0750).



‡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.

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

7.3 Subtracting RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL on Rack Frame

Select a procedure from the following and execute it.

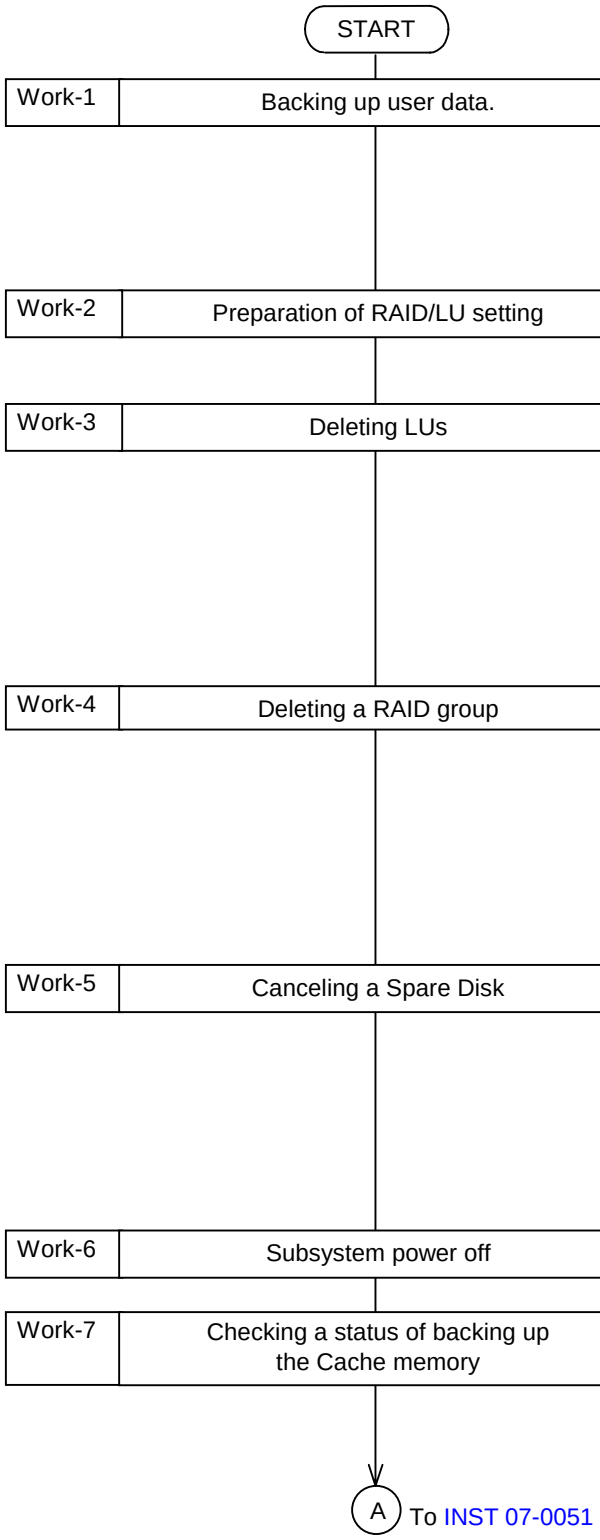
No.	Model	Power status during the subtraction	Restriction	Subtraction Process section
1	Rackmount model	Subtraction with the power turned on	–	Impossible(*1)
2		Subtraction with the power turned off	• Remove the Disk Drive. • When subtracting RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL with subsystem power turned off, only the last added RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL can be removed. While configuring RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL, the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL cannot be removed. • Turn off the AC Power Unit Switch (DC Power Unit Switch) of the subsystem. • Subtract the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL in the opposite procedure of the operation of adding the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL to the rack frame. • The RKA (Unit ID #0) connected to the RKH/RKHE cannot be de-installed.	Refer to 6.3 (INST 06-0090) Refer to 7.4.3 (INST 07-0100)

*1 : RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL cannot be removed while the subsystem power is on.
RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL should be removed while subsystem power is off.
When removing RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL with subsystem power turned on, system may go down since the subsystem recognizes that a failure occurs in the removed RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL.

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for subtracting RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL while the subsystem power is off

A procedure for subtracting the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL after powering off the subsystem is shown below.



When the data stored in an LU, which the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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 "5.4.1 Preparation of RAID/LU setting" on page INST 05-0410.
- [Procedure ①] Preparing of setting ((1) to (3))

Delete all LUs defined as being belonging to the RAID group that includes the Disk Drive to be removed.
Refer to "5.4.3 Setting of LU" on page INST 05-0530.
- [Procedure ③-A] Preparing of setting LU (INST 05-0530)
- [Procedure ③-D] Deleting LU (INST 05-0600)

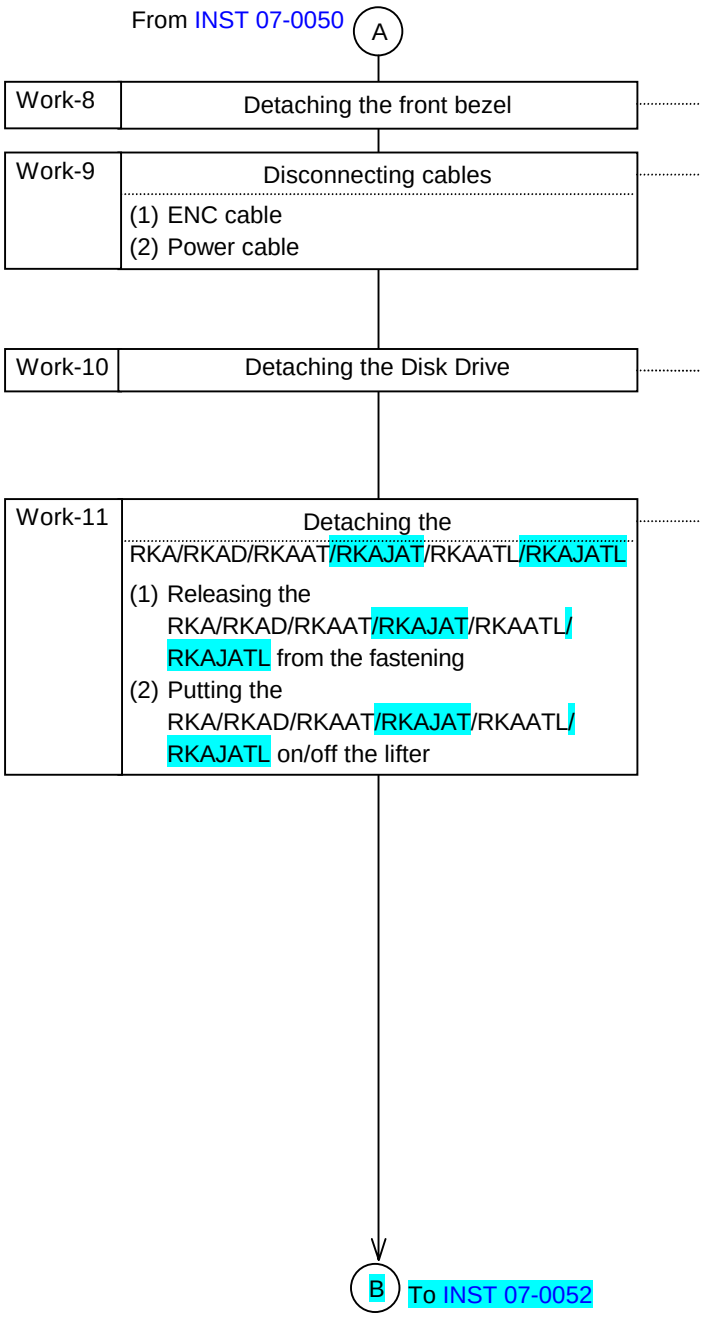
Delete a RAID group that includes the Disk Drive to be removed.
Refer to "5.4.2 RAID group setting" on page INST 05-0430.
- [Procedure ②-A] RAID group setting preparation or confirmation (INST 05-0430)
- [Procedure ②-C] Deleting RAID group (INST 05-0464)

When the Disk Drive to be removed is assigned to a Spare Disk, cancel the assignment.
Refer to "5.4.4 Setting of Spare Disk" on page INST 05-0730.
- [Procedure ④-A] Preparing of setting Spare Disk (INST 05-0730)
- [Procedure ④-C] Deleting Spare Disk (INST 05-0750)

See Subsection 3.8.2 on page INST 03-0760

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 Subsection 5.1.1 on page MNTE 01-0030.

Copyright © 2002, 2005, Hitachi, Ltd.



See Subsection 1.4.3 on page INST 01-0080

Remove the cables in the reverse order of the installation referring to the following items.

(1) ENC cable (Refer to "3.6.2 Connecting the ENC cables" on page INST 03-0680.

(2) Power cable (Refer to "3.6.3 Connecting the power cables" on page (INST 05-0700)

Install the Disk Drive to be added taking care not to apply any shock to it.

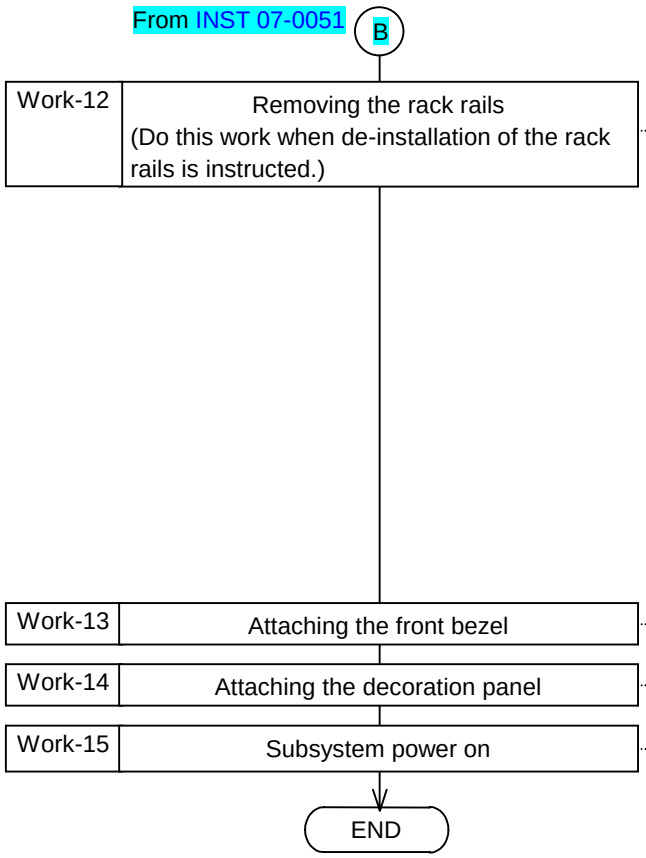
- Refer to Item (3) in "7.4.3 Subtracting a Disk Drive" on page INST 07-0143.

Perform the removal in the reverse order of the installation referring to the following items.

(1) Releasing the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL from the fastening
- U6 Rack frame (Refer to "3.5.3 (1)" on page INST 03-0540.)
- U4 Rack frame (Refer to "3.5.3 (2)" on page INST 03-0550.)
- HP Rack frame (Refer to "3.5.3 (3)" on page INST 03-0560.)
- Sun StorEdge Rack frame (Refer to "3.5.3 (4)" on page INST 03-0580.)
- IBM RS6000 Rack Frame (Refer to "3.5.3 (5)" on page INST 03-0600.)
- SONY Rack Frame (Refer to "3.5.3 (6)" on page INST 03-0611.)

(2) Putting the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL on/off the lifter
- Refer to "3.5.2 Mounting subsystem on rack frame" on page INST 03-0520.)

Copyright © 2003, 2005, Hitachi, Ltd.



Perform the removal in the reverse order of the installation referring to the following items.

(1) Releasing the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL from the fastening

- U6 Rack frame (URHT5) (Refer to "3.2.1 (10)" on page INST 03-0090.)
- U4 Rack frame (URHP5) (Refer to "3.2.2 (8)" on page INST 03-0200.)
- HP Rack frame (URHP5) (Refer to "3.2.3 (2)" on page INST 03-0260.)
- Sun StorEdge Rack frame (USU5) (Refer to "3.2.4 (2)" on page INST 03-0330.)
- IBM RS6000 Rack Frame (UR6) (Refer to "3.2.5 (1)" on page INST 03-0350.)
- SONY Rack Frame (URSY) (Refer to "3.2.6 (3)" on page INST 03-0364.)

See Subsection 1.4.3 on page INST 01-0080

See Section 3.7 on page INST 03-0740

See Subsection 3.8.2 on page INST 03-0760

Copyright © 2003, 2005, Hitachi, Ltd.

7.4 Subtracting Optional Components

7.4.1 Subsystems optional components for subtraction

From the RKH/RKHE, the Cache Memories and/or the Interface Boards can be subtracted.

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power on (A host is in operation(*2).)	Power off
Control Unit	DF-F600-F1H	Array Controller (2port) for duplication. For RK/RKD	–	Impossible	Possible 7.4.2 (INST 07-0070)
	DF-F600-F1HS(*1)	Array Controller (1port) for duplication. For RKS/RKSD			
Disk Drive(*3) (including Spare Disk)	DF-F600-AEH36	3.5-inch Disk Drive (35.4 G bytes)	–	Varies depending on the disk array to be subtraction. 7.4.3 (INST 07-0100)	Varies depending on) the disk array to be subtraction. 7.4.3 (INST 07-0100)
	DF-F600-AEF72	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEH72 (Disk rotational speed : 15,000 min-1)	3.5-inch Disk Drive (71.3 G bytes)			
	DF-F600-AEF146	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-AEF300	3.5-inch Disk Drive (287.6 G bytes)			
	DF-F600-ATE146L (RKL)	3.5-inch Disk Drive (143.3 G bytes)			
	DF-F600-ATE250 (RKAAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250R (RKAAT/RKAJAT)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250L (RKAATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE250LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (245.7 G bytes)			
	DF-F600-ATE400R (RKAAT/RKAJAT)	3.5-inch Disk Drive (393.4 G bytes)			
	DF-F600-ATE400LR (RKAATL/RKAJATL)	3.5-inch Disk Drive (393.4 G bytes)			

*1 : It is not the model name for the arrangement. Make the arrangement with the collective model name including this model name; DF-F600-RSS36, DF-F600-RSD36, DF-F600-RSD3D, DF-F600-RSDS36, DF-F600-RSDD36, DF-F600-RSDD3D, DF-F600-RSS75, DF-F600-RSD75, DF-F600-RSD79, DF-F600-RSD7D, DF-F600-RSDS75, DF-F600-RSDD75, DF-F600-RSDD79, and DF-F600-RSDD7D.

*2 : Data is exchanged between a host computer and the subsystem.

*3 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power on (A host is in operation(*2).)	Power off
Cache Unit	DF-F600-C1GX2	Cache memory 2,048 M bytes (1,024 M bytes×2)	• The two memory boards make one set. Install them in sets of two.	Impossible	Possible 7.4.4 (INST 07-0150)
	DF-F600-C512X2	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C5122H (RKH/RKHE)	Cache memory 1,024 M bytes (512 M bytes×2)			
	DF-F600- C1GX2H (RKH/RKHE)	Cache memory 2,048 M bytes (1,024 M bytes×2)			
Interface Board (RKH/RKHE)	DF-F600-DH2G2	Interface Board	• Add the Interface Board after removing the Dummy Interface Board.	Impossible	Possible 7.4.5 (INST 07-0156)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

7.4.2 Subtracting a Control Unit

CAUTION

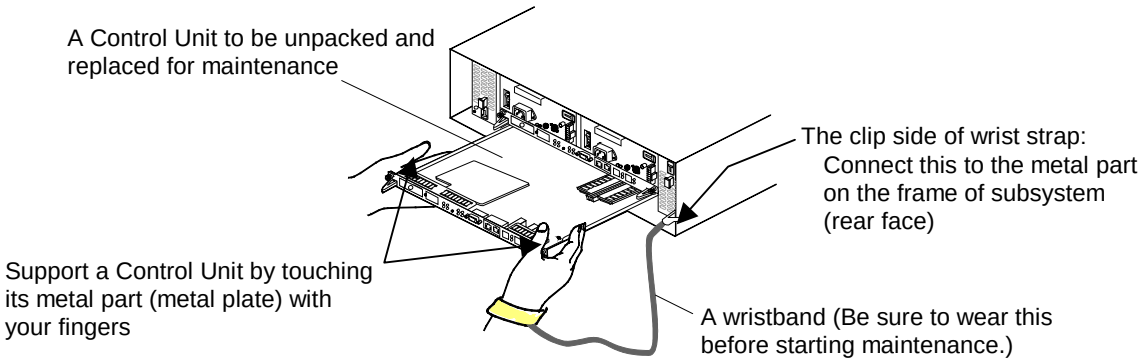
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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	RK/RKD	Subtraction with the power turned on	–	Impossible
2		Subtraction with the power turned off	The case of the dual Controller configuration only	Refer to 7.4.2 (2) (INST 07-0080)
3	RKS /RKSD	Subtraction with the power turned on	–	Impossible
4		Subtraction with the power turned off	The case of the dual Controller configuration only	Refer to 7.4.2 (2) (INST 07-0080)

(2) Procedure for subtraction with the power turned off

(a) Connect the PC to be connected with Disk Array Management Program and the Control Unit #0 with a LAN cable. ("5.1.1 Procedure for connecting Disk Array Management Program with the subsystem" (INST 05-0010))
(b) Set the system starting attribute of the system parameters in order to operate the subsystem as that having the single controller system. ("5.2 Setting System Parameters" (INST 05-0100))
(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 Subsection 5.1.1, "Checking cache memory in the back-up state" on page MNTE 05-0030.)
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 (DC Power Unit Switch) of the Power Unit (Power Unit (DC)).
(g) Remove the Fibre Channel cable, LAN, ENC cable, and RS232C cables connected to the Control Unit#1.

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 RKA are connected, however, both cables in ENC Unit #0 and ENC Unit #1 should be connected for the RKA.

Copyright © 2002, 2005, Hitachi, Ltd.

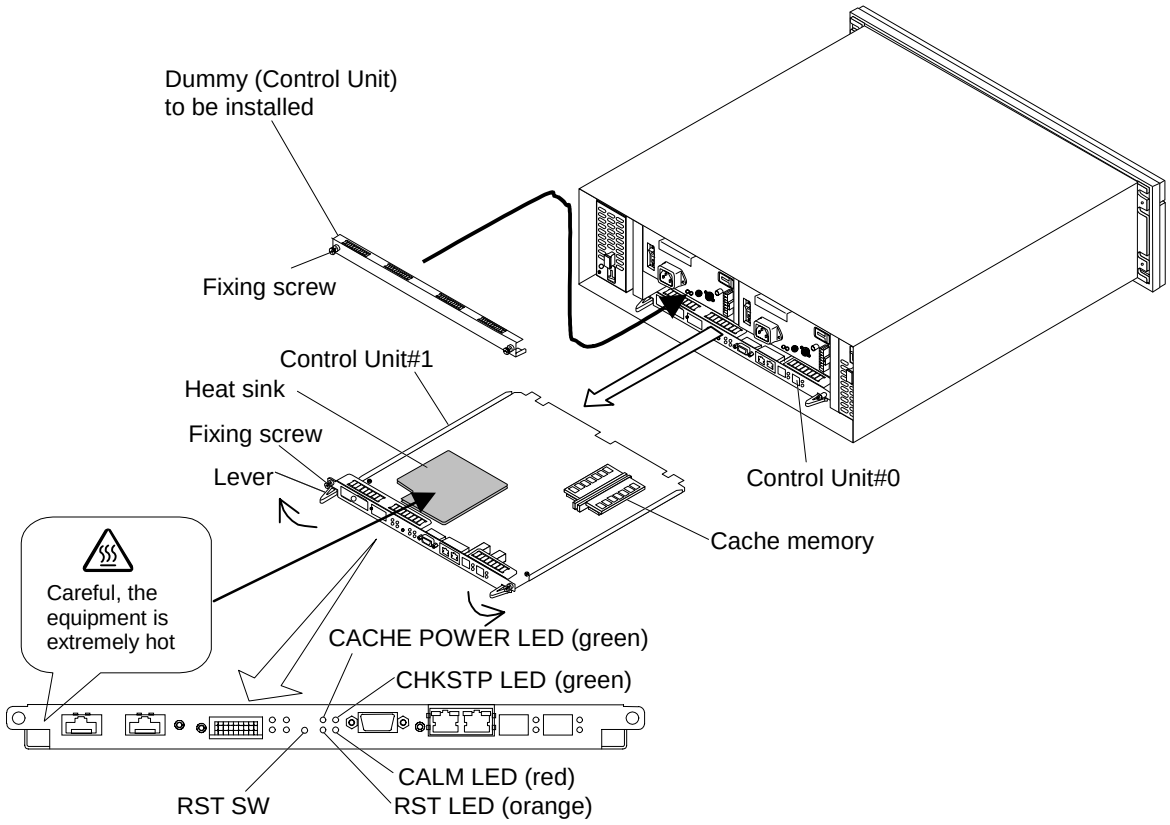


Figure 7.4.1 Subtracting Controller

(h) Remove the Control Unit#1.
Loosen the right and left setscrews of the Control Unit#1 to be subtracted. Open the right and left lever, and pull the controller toward you and remove it.

(i) Install the dummy (controller). To install it tighten the right and left fixing screws it and insert it toward you.

(j) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the Power Unit (Power Unit (DC)).

(k) Turn on the main switch.

(l) Make sure that the RDY (READY) LED (green) on the front side of the subsystem comes on.

NOTE : Because the subsystem configuration was changed to the single controller, register the disk array subsystem as having the single controller configuration with Disk Array Management Program. (“5.1.1 Procedure for connecting Disk Array Management Program with the subsystem” (INST 05-0010))

Copyright © 2002, 2005, Hitachi, Ltd.

7.4.3 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 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 7.4.1 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 on (A host is in operation (*3).)	Power off
1	Disk Drive	RK/RKL/RKS/ RKD/RKSD #0 to 4	Impossible (*1)	Impossible(*1)
			–	–
2		RK/RKL/RKS/ RKD/RKSD #5 to13	Possible	Possible
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)
3		RKA/RKAD #0 to 3	Possible(*2)	Impossible(*2)
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)
4		RKA/RKAD #4 to 14	Possible	Possible
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)
5		The RKA (unit ID #0) connected to the RKH/RKHE #0 to 4	Impossible (*4)	Impossible(*4)
			–	–
6		The RKA (unit ID #0) connected to the RKH/RKHE #5 to13	Possible	Possible
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)
7		RKAAT/RKAJAT/RKAATL/RKAJATL #0 to 3	Possible(*2)	Possible(*2)
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)
8		RKAAT/RKAJAT/RKAATL/RKAJATL #4 to 14	Possible	Possible
			Refer to 7.4.3 (2-1) (INST 07-0130)	Refer to 7.4.3 (2-2) (INST 07-0140)

*1 : The Disk Drives #0 to #4 of the RK/RKL/RKS/RKD/RKSD cannot be decreased because the microprogram is stored in them.

*2 : Since the Disk Drives #0 to #3 of the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL are used for monitoring the RKA/RKAD/RKAAT/RKAJAT /RKAATL/RKAJATL, be sure to decrease them so that either set of the two Disk Drives, #0 and #1 or #2 and #3, is left.
All of the Disk Drives #0 to #3 cannot be removed from the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL at the middle of a configuration.
When you want to remove all of the Disk Drives #0 to #3 of the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL at the end of a configuration, remove them together with the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL while the subsystem power is off.

*3 : Data is exchanged between a host computer and the subsystem.

*4: Any of the disk drives #0 to #4 of the RKA (unit ID #0) connected to the RKH/RKHE cannot be de-installed because the microprogram is stored in it.

Copyright © 2002, 2005, Hitachi, Ltd.

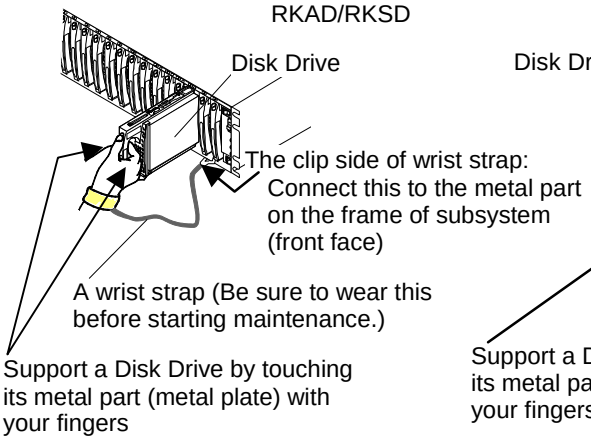
(1) Before starting subtraction of Disk Drive

CAUTION

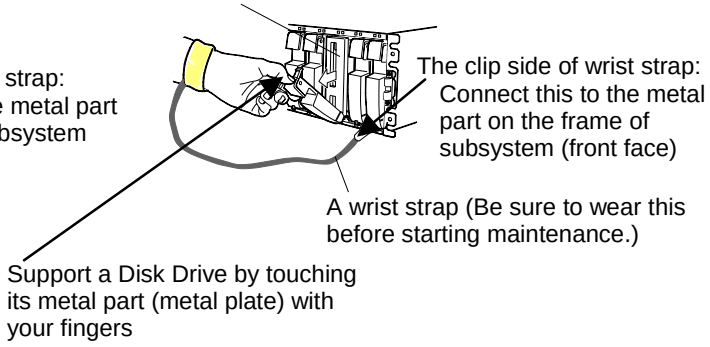
- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **Be sure to 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.

• In the case of RK/RKL/RKA/RKS/RKD/ RKAD/RKSD



• In the case of RKAAT/RKAJAT/RKAATL/RKAJATL



Copyright © 2002, 2005, Hitachi, Ltd.

(a) Locations and numbers of Disk Drives installed in the RK/RKS/RKD/RKSD
Mounting location number of Disk Drive is a combination of a device number (device ID) and a Disk Drive number which is assigned within the each RK/RKS/RKA/RKD/RKSD/RKAD individually.
As the Device IDs, #0 is assigned to the RK/RKD and one of numbers 1 to 14 are assigned to each RKA/RKAD connected.
For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

For Disk Drive number, #0 to #13 are assigned to RK/RKS/RKD/RKSD, and #0 to #14 to RKA/RKSD from left to right in sequence.
The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)
A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

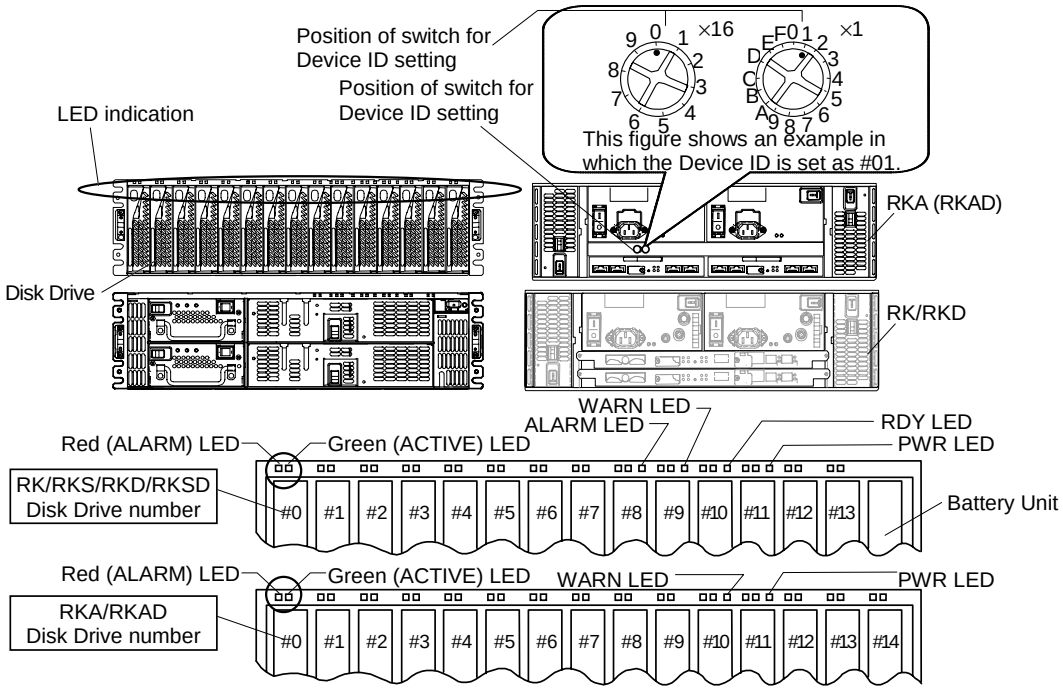


Figure 7.4.2 Disk Drive Mounting Location

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Locations and numbers of Disk Drives installed in the RKAs connected to the RKH/RKHE

Mounting location number of Disk Drive is a combination of a Device number (device ID) and a Disk Drive number which is assigned within the each RKH/RKHE/RKA individually.

As for the Device IDs, the ID of the first one of the RKAs connected to the RKH/RKHE is numbered as #00 and those of the second and the following ones are numbered as #10, #01, and #12 through #1E.

For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

The numbers of the Disk Drives installed in the first one of the RKAs connected to the RKH/RKHE are #0 through #13 and numbers of those installed in the second and the following ones are #0 through #14 in serial order counted from left to right when the RKAs are put horizontally. The rightmost location in the first one of the RKAs connected is for the Dummy Disk Drive.

The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)

A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

Copyright © 2003, 2005, Hitachi, Ltd.

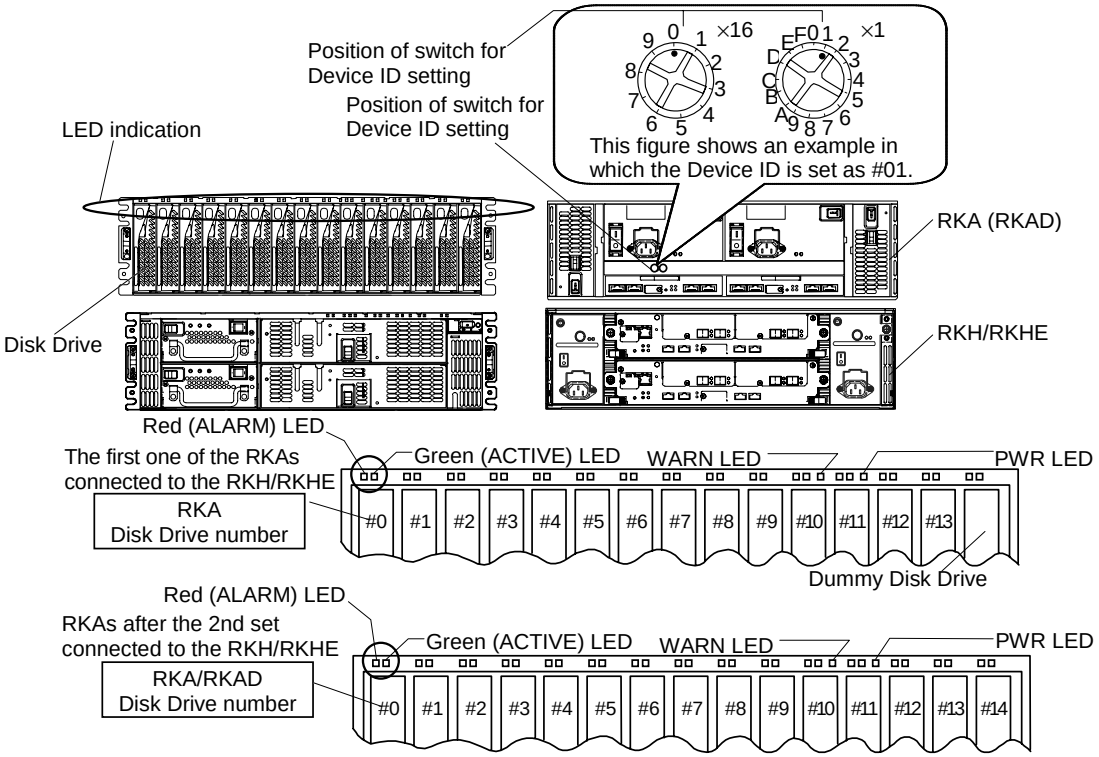


Figure 7.4.2.1 Disk Drive Mounting Location (RKAs connected to the RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

(c) Locations and numbers of Disk Drives installed in the RKAAT/RKAJAT/RKAATL/RKAJATL connected to the RK/RKL
The RKL can be connected only to the RKAAT/RKAJATL.
Mounting location number of Disk Drive is a combination of a device number (device ID) and a Disk Drive number which is assigned within the each RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL individually. .
As the Device IDs, #0 is assigned to the RK/RKL and one of numbers 1 to 14 are assigned to each RKA/RKAAT/RKAJAT/RKAATL/RKAJATL connected.
For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

For Disk Drive number, #0 to #14 to RKAAT/RKAJAT/RKAATL/RKAJATL from left to right in sequence.
The Disk Drives which compose a RAID group must be installed continuously.
(A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)
A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

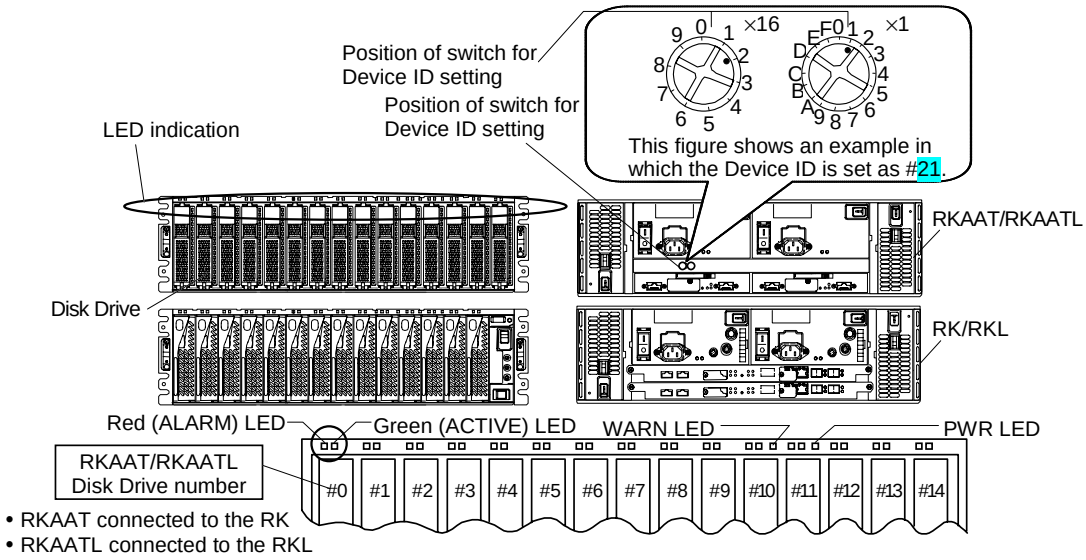


Figure 7.4.2.2 Disk Drive Mounting Location (RKAATs/RKAATLs connected to the RK/RKL)

Copyright © 2004, 2005, Hitachi, Ltd.

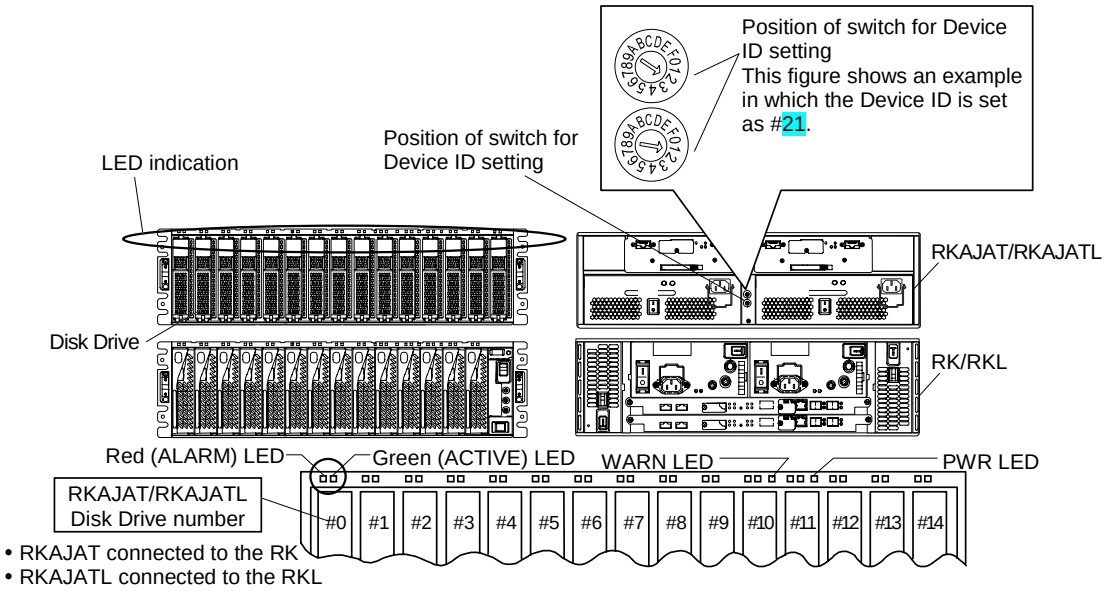


Figure 7.4.2.3 Disk Drive Mounting Location (RKAJATs/RKAJATLs connected to the RK/RKL)

Copyright © 2004, 2005, Hitachi, Ltd.

(d) Locations and numbers of Disk Drives installed in the RKAAT/RKAJAT connected to the RKH/RKHE

Mounting location number of Disk Drive is a combination of a Device number (device ID) and a Disk Drive number which is assigned within the each RKH/RKHE/RKA/RKAAT/RKAJAT individually. The device IDs set as shown below.

When connecting the RKAATs/RKAJATs to the RKH/RKHE, be sure to connect the RKA as a starter.

For details of the device ID setting, refer to "1.7 Device ID setting and ENC cable connection" (INST 01-0180).

The numbers of the Disk Drives installed in the RKAATs/RKAJATs connected to the RKH/RKHE are #0 through #14 in serial order counted from left to right when the RKAAT/RKAJATs are put horizontally

The Disk Drives which compose a RAID group must be installed continuously.

(A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)

A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

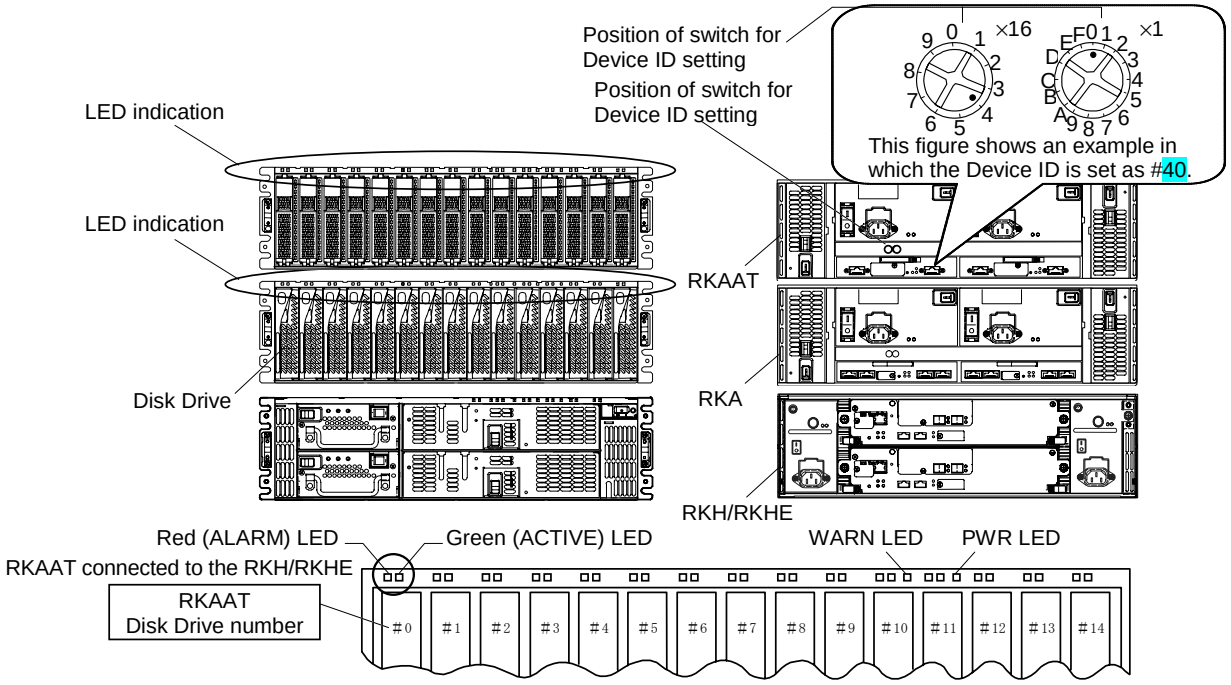


Figure 7.4.2.4 Disk Drive Mounting Location (RKAATs connected to the RKH/RKHE)

Copyright © 2005, Hitachi, Ltd.

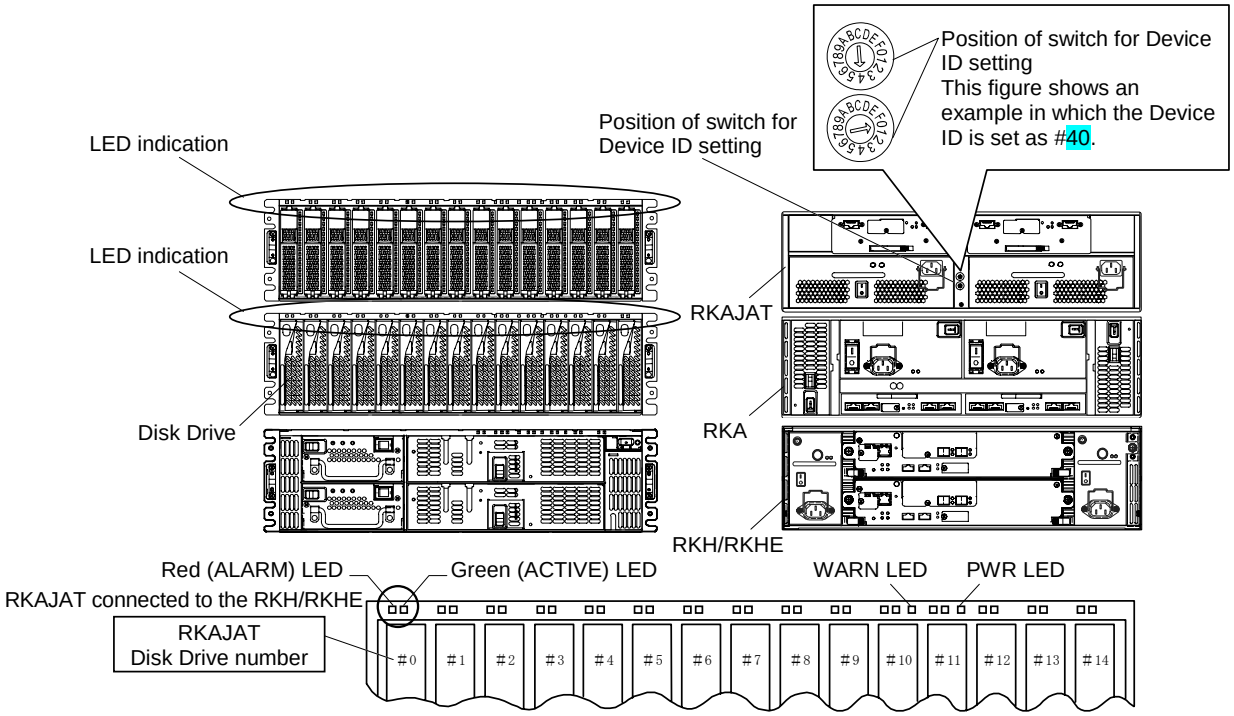


Figure 7.4.2.5 Disk Drive Mounting Location (RKAJATs connected to the RKH/RKHE)

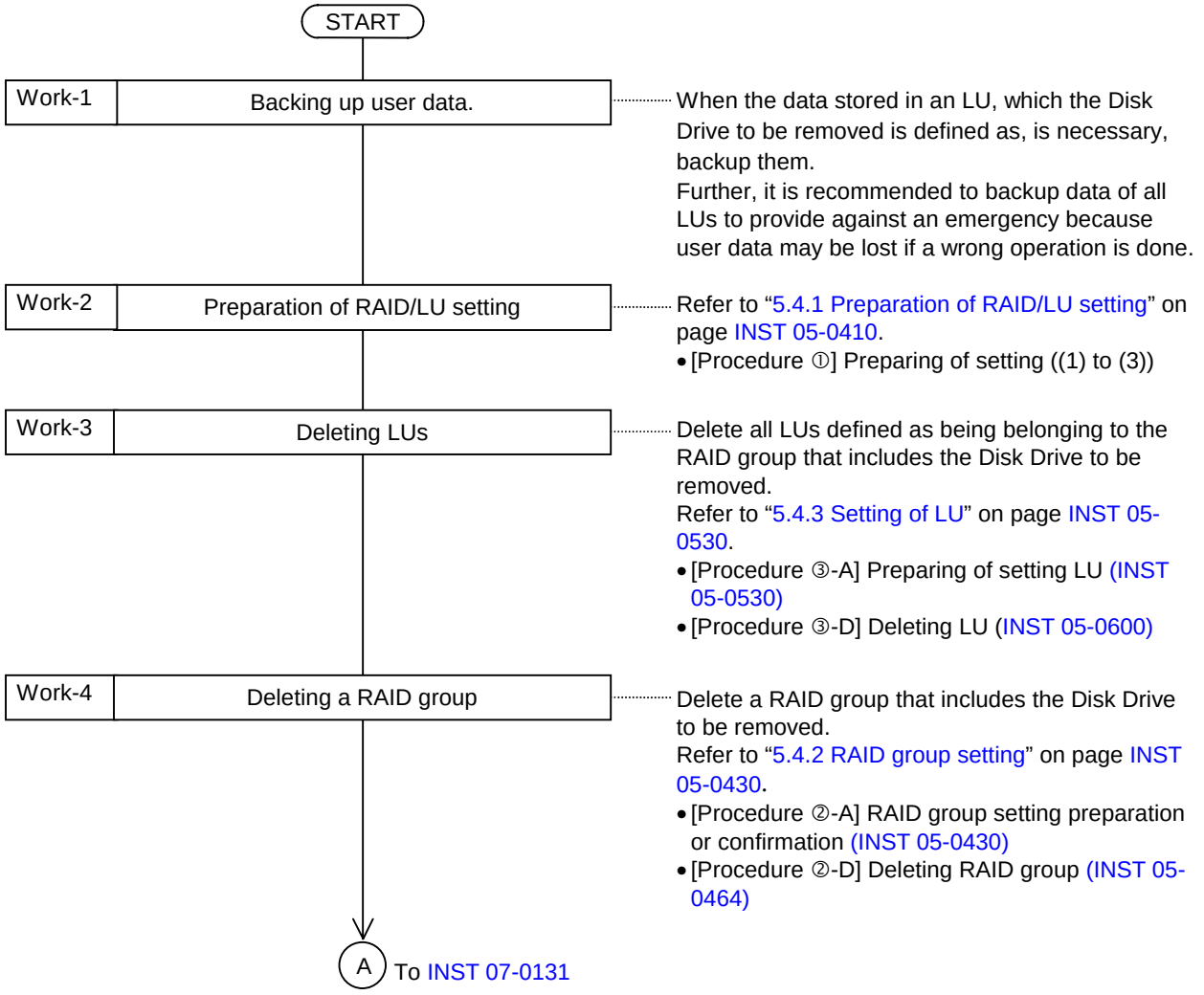
Copyright © 2005, Hitachi, Ltd.

(2) Procedure for subtracting Disk Drive

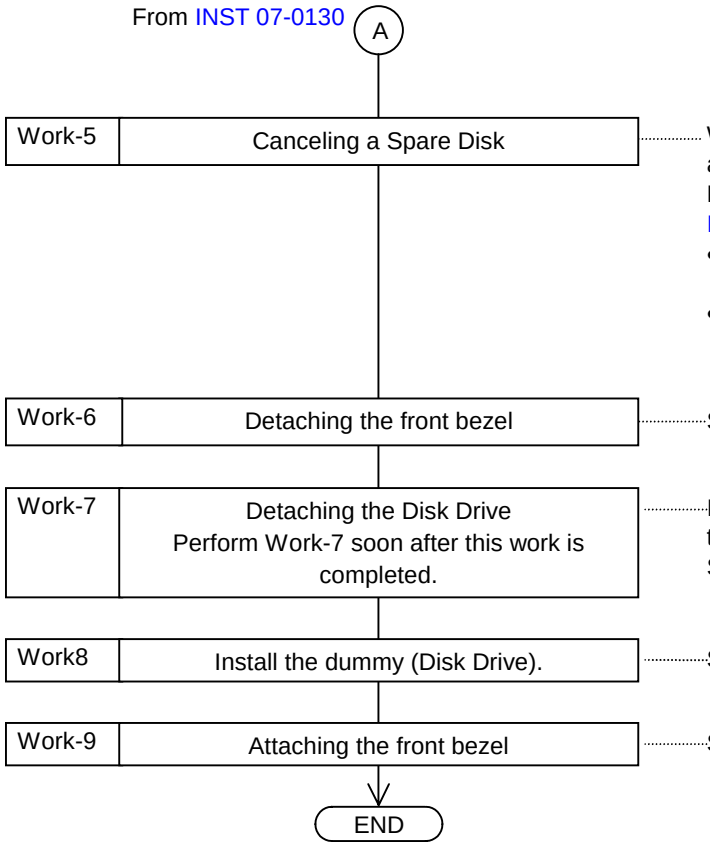
- A procedure for subtracting the Disk Drive installed in the RK/RKL/RKS/RKA/RKD/RKSD/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is shown below.
- Any of the Disk Drives #0 to #4 of the RK/RKS/RKD/RKSD cannot be subtracted.
- To remove all of the Disk Drives #0 and #1 of the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL, it is required to remove them together with the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL in which they are installed.
- Any of the Disk Drives #0 to #4 of the RKA (unit ID #0) connected to the RKH/RKHE cannot be subtracted.
- 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 on Procedure for subtracting Disk Drive while the subsystem power is on

A procedure for subtracting the Disk Drive without shutting down the subsystem is shown below.



Copyright © 2002, 2005, Hitachi, Ltd.

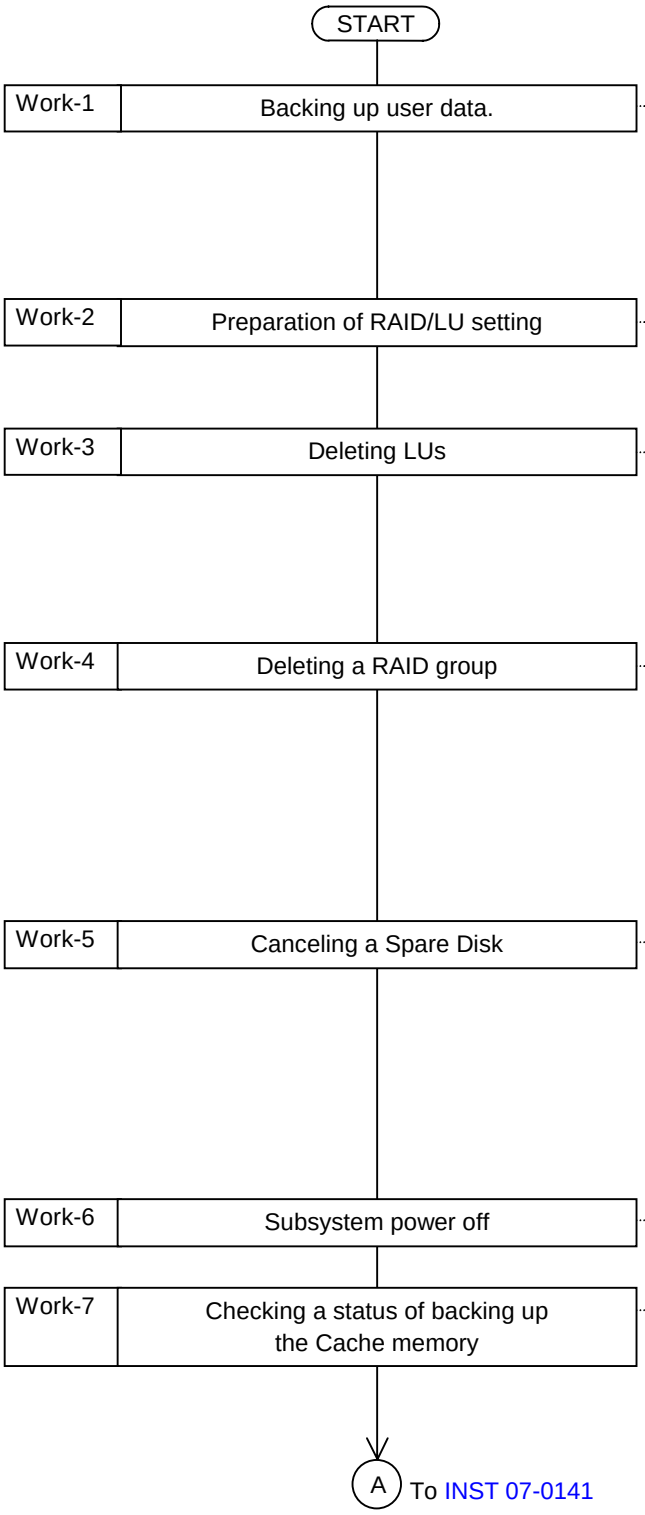


Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2-2) Procedure for subtracting Disk Drive while the subsystem power is 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 "5.4.1 Preparation of RAID/LU setting" on page INST 05-0410.
- [Procedure ①] Preparing of setting ((1) to (3))

Delete all LUs defined as being belonging to the RAID group that includes the Disk Drive to be removed.
Refer to "5.4.3 Setting of LU" on page INST 05-0530.
- [Procedure ③-D] Deleting LU (INST 05-0600)

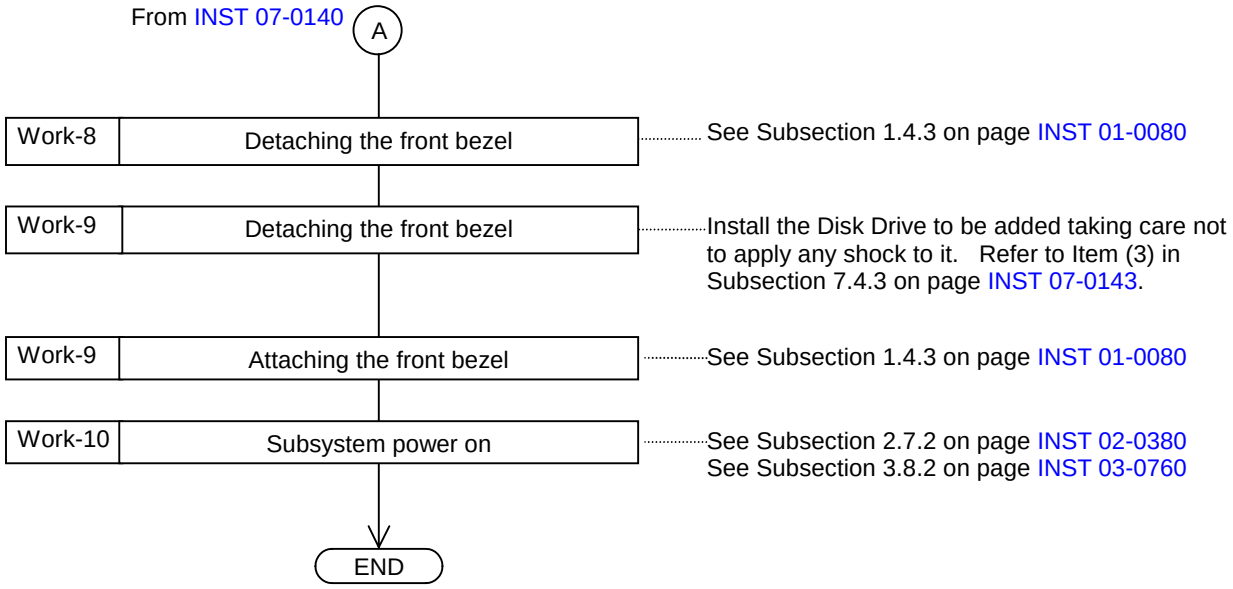
Delete a RAID group that includes the Disk Drive to be removed.
Refer to "5.4.2 RAID group setting" on page INST 05-0430.
- [Procedure ②-A] RAID group setting preparation or confirmation (INST 05-0430)
- [Procedure ②-C] Deleting RAID group (INST 05-0464)

When the Disk Drive to be removed is assigned to a Spare Disk, cancel the assignment.
Refer to "5.4.4 Setting of Spare Disk" on page INST 05-0730.
- [Procedure ④-A] Preparing of setting Spare Disk (INST 05-0730)
- [Procedure ④-C] Deleting Spare Disk (INST 05-0750)

See Subsection 2.7.2 on page INST 02-0380
See Subsection 3.8.2 on page INST 03-0760

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 "5.1.1 Checking cache memory in the back-up state" on page MNTE 05-0030.

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2003, 2005, Hitachi, Ltd.

(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.

(3-1) When subtracting the Disk Drive (RK/RKL/RKA/RKS/RKD/RKAD/RKSD)

Perform the following operations (a) and (b) for each of the slots, where the Disk Drive is to be replaced, one by one.

(a) Remove the Disk Drive to be removed by operating the lock release button taking care not to apply any shock to it (see Figure 7.4.3).

When the removed Disk Drive is to be used in another disk array as an additional Disk Drive, keep it in custody taking care not to apply any shock to it.

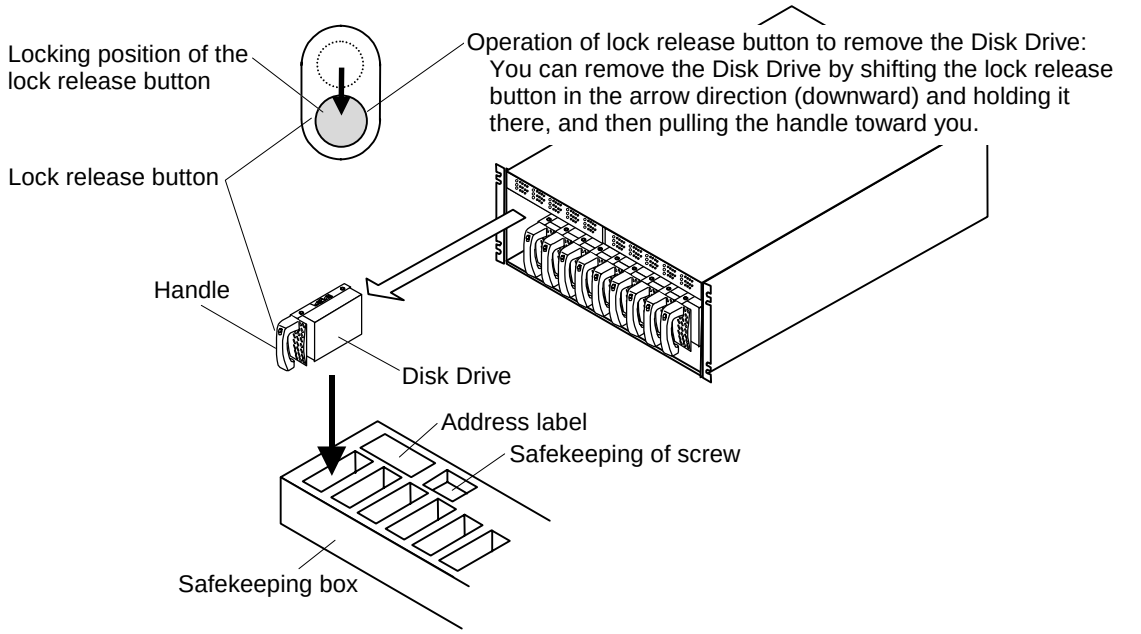


Figure 7.4.3 Remove the Disk Drive

(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.

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 : A label bearing the model name and revision number is affixed to the portion near the handle.

Dummy (Disk Drive) : No label is affixed to the portion near the handle.

Copyright © 2003, 2005, Hitachi, Ltd.

(3-2) When subtracting the Disk Drive (RKAAT/RKAJAT/RKAATL/RKAJATL)
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 7.4.3.1).
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.

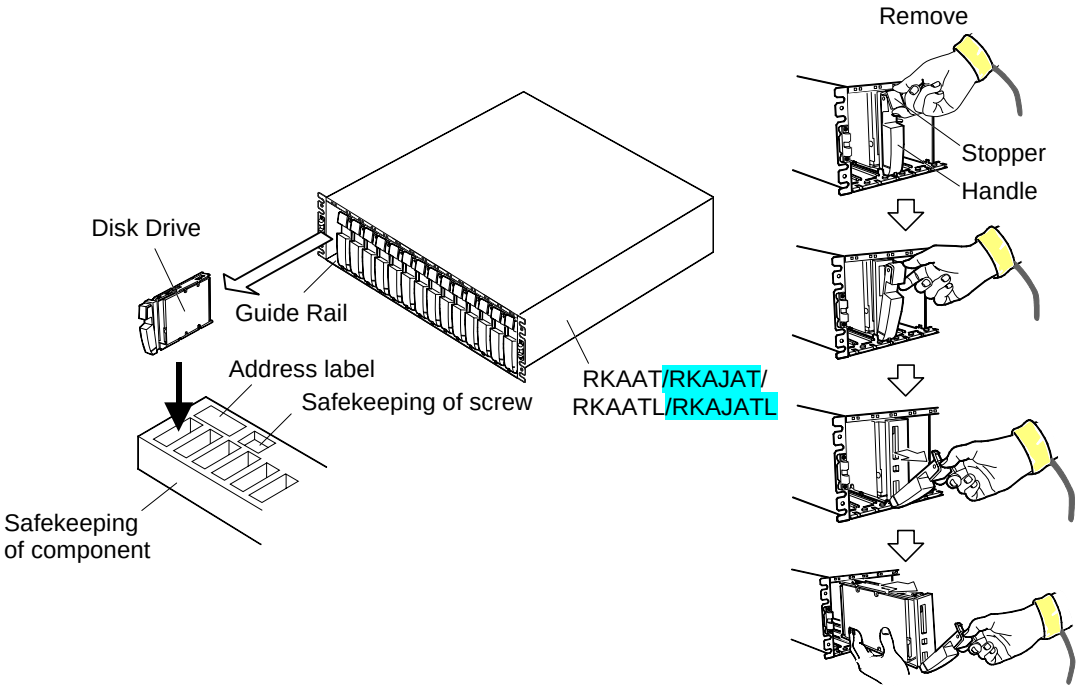


Figure 7.4.3.1 Remove the Disk Drive

(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.

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 : A label bearing the model name and revision number is affixed to the portion near the handle.
Dummy (Disk Drive) : No label is affixed to the portion near the handle.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

7.4.4 Subtracting a Cache Unit

(1) Subtracting Cache Memory from the RK/RKS/RKD/RKSD

⚠ CAUTION

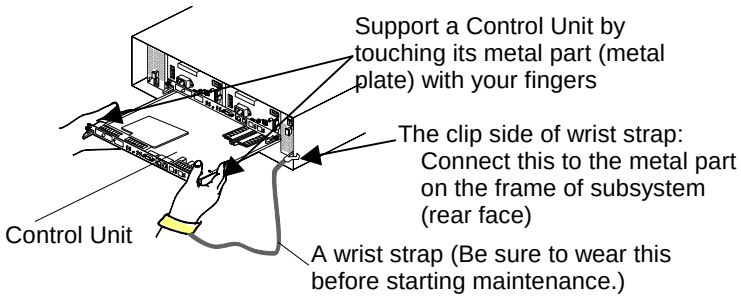
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005 Hitachi, Ltd.

<Working Procedure>

(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: When the subsystem power has already been turned off, make sure that the cache memory is not being backed up. (Refer to "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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.

(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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) Remove the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(g) Install the Cache Unit in the Control Unit.

Copyright © 2003, 2005, Hitachi, Ltd.

(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.
(i) Tighten the left and right fixing screws of the Control Unit.
(j) Connect the removed all cables to the Control Unit.
(k) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(l) Turn on the main switch.
(m) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(n) Make sure that the READY LED (green) on the Front Bezel is on.

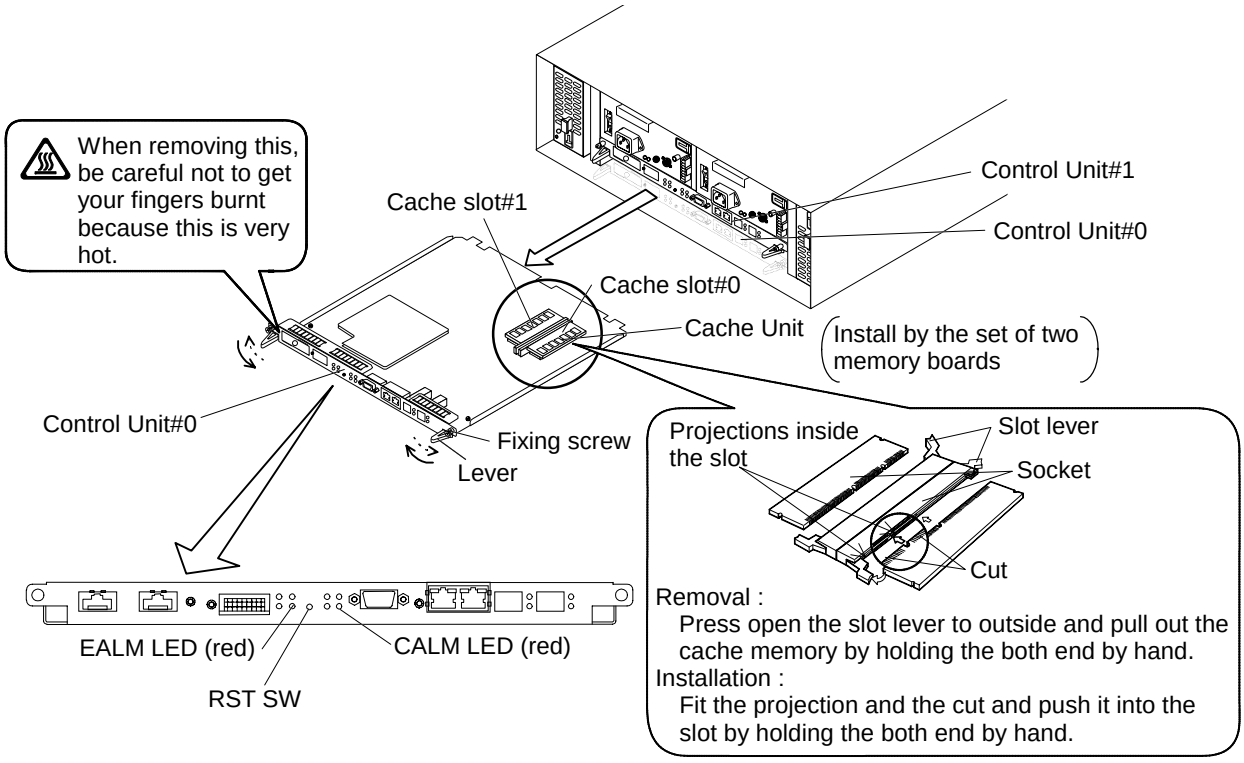


Figure 7.4.4.1 Replacing Cache Unit (RK/RKD)

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Subtracting Cache Memory from the RKH/RKHE

⚠ CAUTION

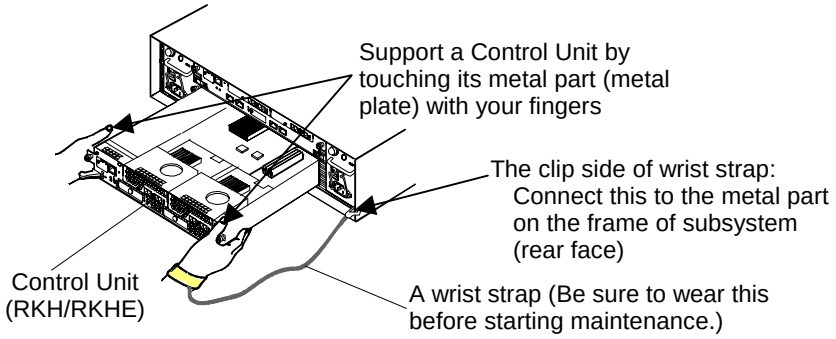
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2003, 2005, Hitachi, Ltd.

<Working Procedure>

(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: When the subsystem power has already been turned off, make sure that the cache memory is not being backed up. (Refer to "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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.

(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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) Remove the Cache Unit.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2003, 2005, Hitachi, Ltd.

(g) Install the Cache Unit in the Control Unit.
- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the same way, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.

(i) Tighten the left and right fixing screws of the Control Unit.

(j) Connect the removed all cables to the Control Unit.

(k) Turn on the AC Power Unit Switch of the both Power Units.

(l) Turn on the main switch.

(m) Make sure that the WARNING LED (orange) on the Front Bezel is off[‡1].

(n) Make sure that the READY LED (green) on the Front Bezel is on.

(o) Check if the capacity of the installed Cache Unit is correct. (Double click "Controller" on the window referring to Subsection 4.2.1, “Maintenance with the Disk Array Management Program (GUI version)” on page MNTE 04-0090 in the Maintenance Manual (Volume of Maintenance).

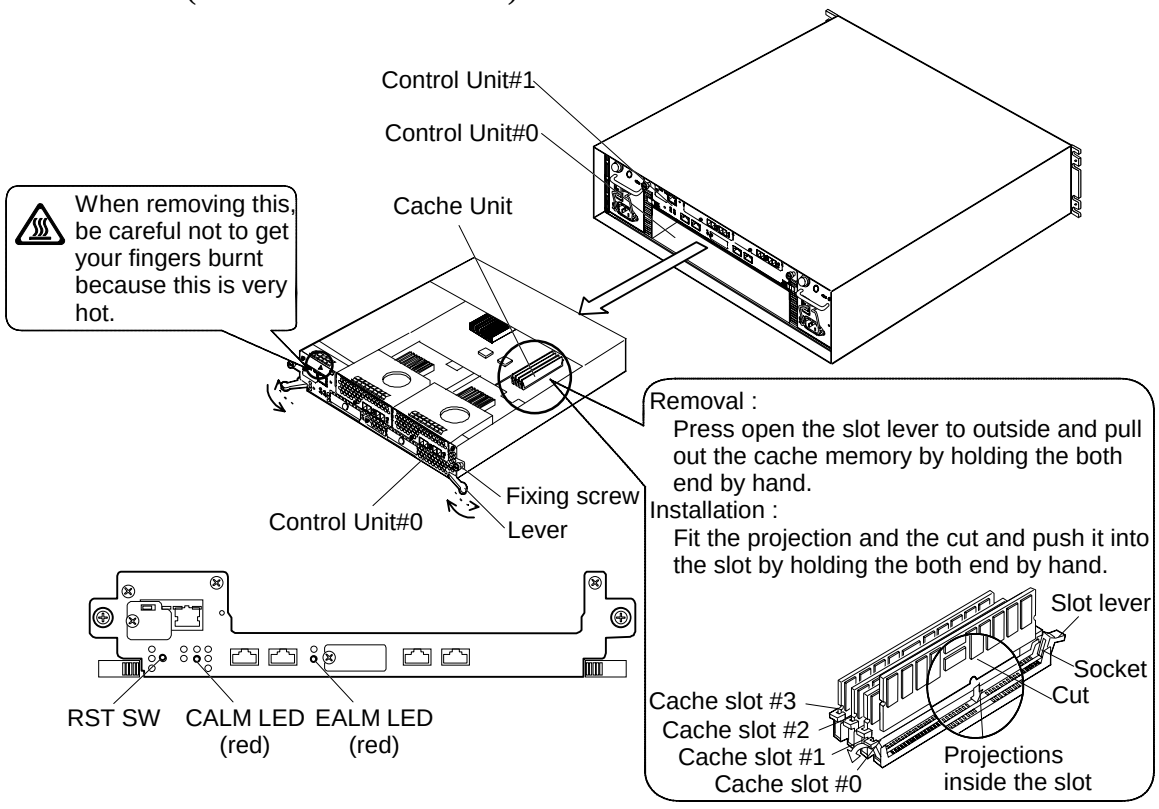


Figure 7.4.4.2 Replacing Cache Unit

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

7.4.5 Subtracting Interface Boards

This work is for the RKH/RKHE only.

⚠ CAUTION

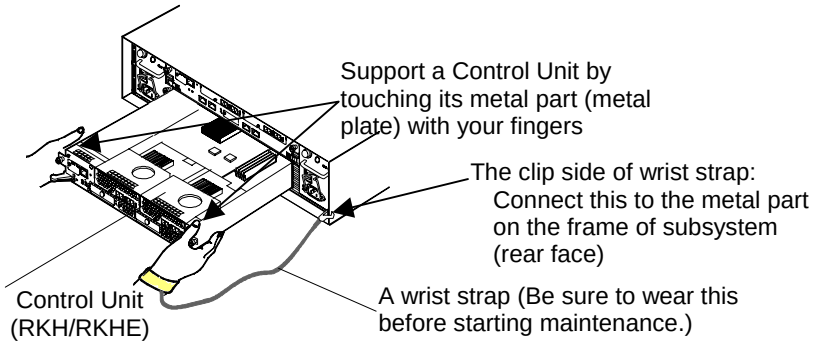
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish. Please be sure to keep a wrist strap near the subsystem.**
- **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 : • Make the addition for both of the Control Unit #0 and #1.
• After the addition is completed, be sure to return the Control Units #0 and #1 to their original installation positions.

Copyright © 2003, 2005, Hitachi, Ltd.

<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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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.

(2) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(3) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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) Remove the Interface Board #1(Port C/Port D) by removing the three screws fastening it.

Copyright © 2003, 2005, Hitachi, Ltd.

(7) Install the Dummy Interface Board on the Control Unit fitting it to the positioning pin and fasten it by tightening the three mounting screws.
(8) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.
(9) Tighten the left and right fixing screws of the Control Unit.
(10) Connect the removed all cables to the Control Unit.
(11) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(12) Turn on the main switch.
(13) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(14) Make sure that the READY LED (green) on the Front Bezel is on.

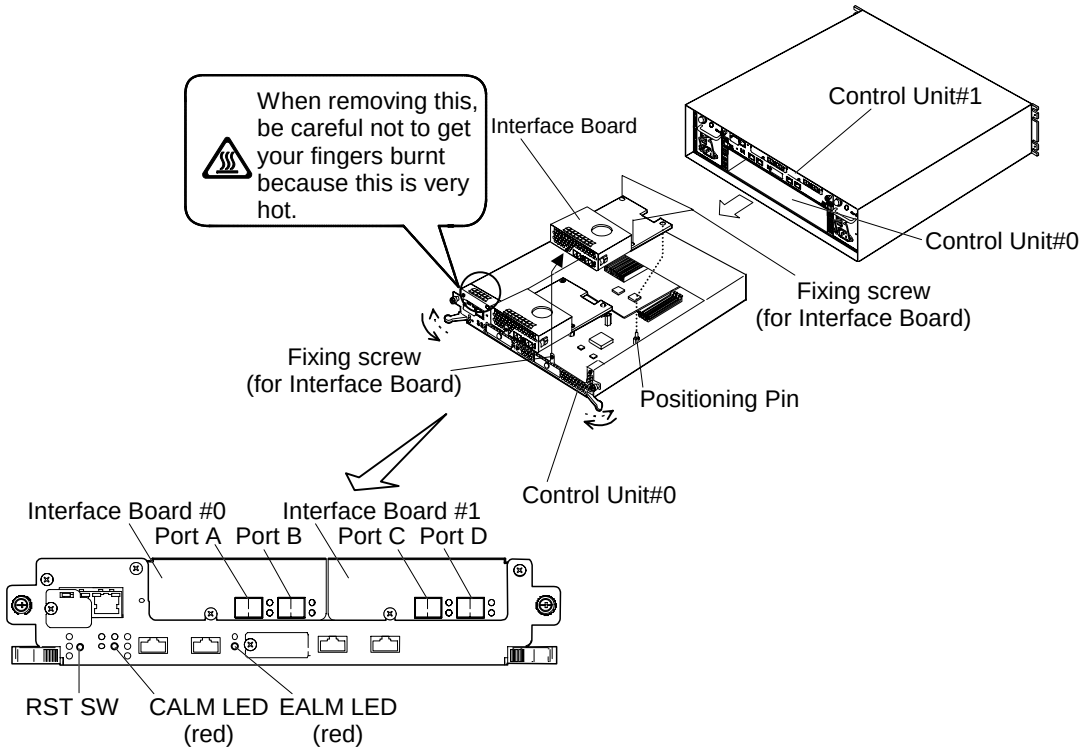


Figure 7.4.5.1 Replacing Interface Board (RKH/RKHE)

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

7.5 Subtracting Other Optional Devices

7.5.1 Other optional subtraction devices

Component name	Model name	Specification	Requirements of subtraction	Condition of subtraction and number of item for referring to procedure	
				Power on (A host is in operation(*2).)	Power off
Remote adapter	DF-F600-VR3A	Remote adapter (Main unit)	Device for interlocking the DF600 with a host computer	The operation of powering on /off is required. Refer to 7.5.2 (INST 07-0170)	
	DF-F600-VR3H	Remote adapter (Hub)			
	DF-F600-HVR3	Remote adapter (Rack)	Rack for installing the Remote adapter on the subsystem		
PDU	DF-F600-UPDU	For U4	PDU for U4 rack frame	Possible Refer to 7.5.3 (INST 07-0180)	Possible Refer to 7.5.3 (INST 07-0180)
PDB (UPDU6)	DF-F600-UPDU6	For U6/U4	Additional PDB for U6/U4 rack frame	Possible Refer to 7.5.4 (INST 07-0190)	Possible Refer to 7.5.4 (INST 07-0190)

*1 : Data is exchanged between a host computer and the subsystem.

Copyright © 2002, 2005, Hitachi, Ltd.

7.5.2 Subtracting a Remote adapter

(1) Before subtracting Remote adapter
Appearance, dimensions, and indicator functions according to in Subsection 6.5.2 "Adding Remote adapter" (INST 06-0360).
When de-installing the remote adapter, it is required that the mode set for the remote adapter to be de-installed is recognized as "Local" before starting the de-installation. The recognition of the setting mode is executed by the operation of powering on/off. After the recognition operation, remove the Remote adapter devices, and change the connection of the cable.

(2) Subtracting Process for the Remote adapter
Select a procedure from the following and execute it.

No.	Model	Power status during the subtraction	Restriction	Subtraction Process section
1	Floor model	Subtraction with the power turned on	• When performing the de-installation, powering on/off is required to make the control mode set as Local recognized.	Refer to 7.5.2. (2) to (3)
2		Subtraction with the power turned off		
3	Rackmount model	Subtraction with the power turned on	• When performing the de-installation, powering on/off is required to make the control mode set as Local recognized. • The Rack (DF-F600-HVR) installed in the section 6.5.2 (8) "Installing the Remote adapter" on page INST 06-0420 needs to be removed.	
4		Subtraction with the power turned off		

(3) Setting the power control mode of the DF600 to local
(a) Turn off the main switch.
(b) Turn off the AC Power Unit Switch of the Power Unit.
(c) Set the Rotary Switch mode to 0 (Fibre Channel Local) or 7 (Additional Battery mode/ Local mode when using the destage battery). (See Table 6.5.2.)

(4) Subtracting Remote adapter
(a) Remove the cables connected to the remote adapter.
For the rack mount model, the Rack (DF-F600-HVR) installed in the section 6.5.2 (8) "Installing the Remote adapter" on page INST 06-0420 needs to be removed.
(b) Keep the subtracted components as the occasion demands.

(5) Ensuring the power control operation in Fibre Channel Local mode
(a) Turn on the AC Power Unit Switches of the Power Unit.
(b) Turn on the main switch.
(c) Turn on/off every host computer connected to the Remote adapter, and ensure that every DF600 is accordingly powered on/off.

Copyright © 2002, 2005, Hitachi, Ltd.

7.5.3 Subtracting a PDU

(1) Subtracting Process for the PDU
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 rack frame. • Only the PDU whose all the outlets for output to which the power cable plugs are not connected can be subtracted.	Refer to 7.5.3 (2) (INST 07-0180)
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 PDU to be subtracted.
(b) Remove the power cable connected to the PDU to be subtracted for feeding. And pull out the plug in the power supply side.
(c) Remove the PDU to be subtracted from the rack frame.
Remove the PDU in the opposite procedure of the installing operation referring to Subsection 6.5.3 “Mounting a PDU” (INST 06-0480).
Keep the subtracted components as the occasion demands.

Copyright © 2002, 2005, Hitachi, Ltd.

7.5.4 Subtracting a PDB (UPDU6)

(1) Subtracting Process for the PDB (UPDU6)
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/U6 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 7.5.4 (2) (INST 07-0190)
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 Subsection 6.5.4 “Mounting a PDB” (INST 06-0500).
Keep the subtracted components as the occasion demands.

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 8. Relocation/Removal Work

8.1 Before Starting Relocation/Removal Work

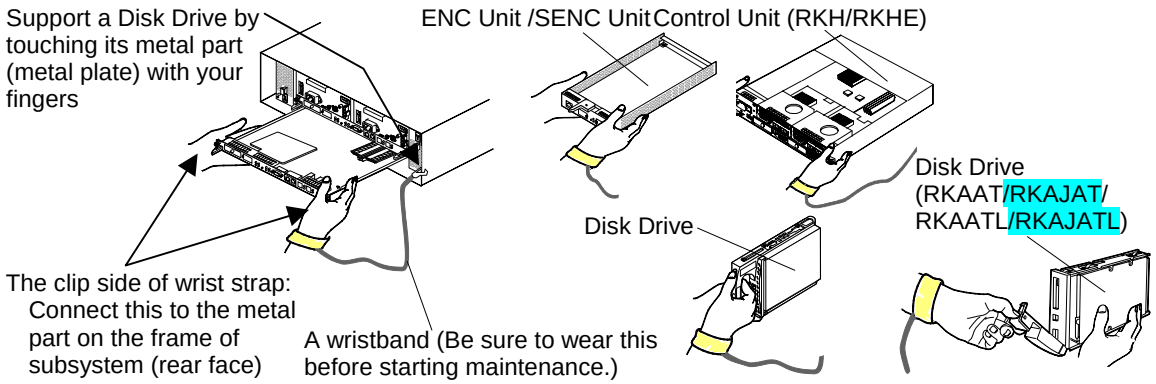
Take notice of the following when performing a installation work for the subsystem. When moving or removing a subsystem, take care of the following matters.

(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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

(2) Note on cable routing

(a) Handling of cables laid 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 excess lengths to cables taking earthquakes, etc. in consideration.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cables and power cable (DC) 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 AC Power Unit Switch (DC Power Unit Switch) after waiting more than one minute after the AC Power Unit Switch (DC Power Unit Switch) is turned off (after the POWER LED goes out).

(4) Note on completing a maintenance work

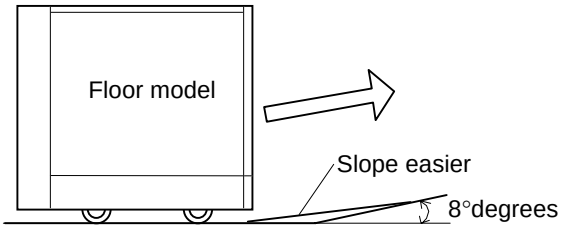
Close all the external covers when a maintenance work is completed.
It is required to make all the external covers closed to operate the subsystem properly. (Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

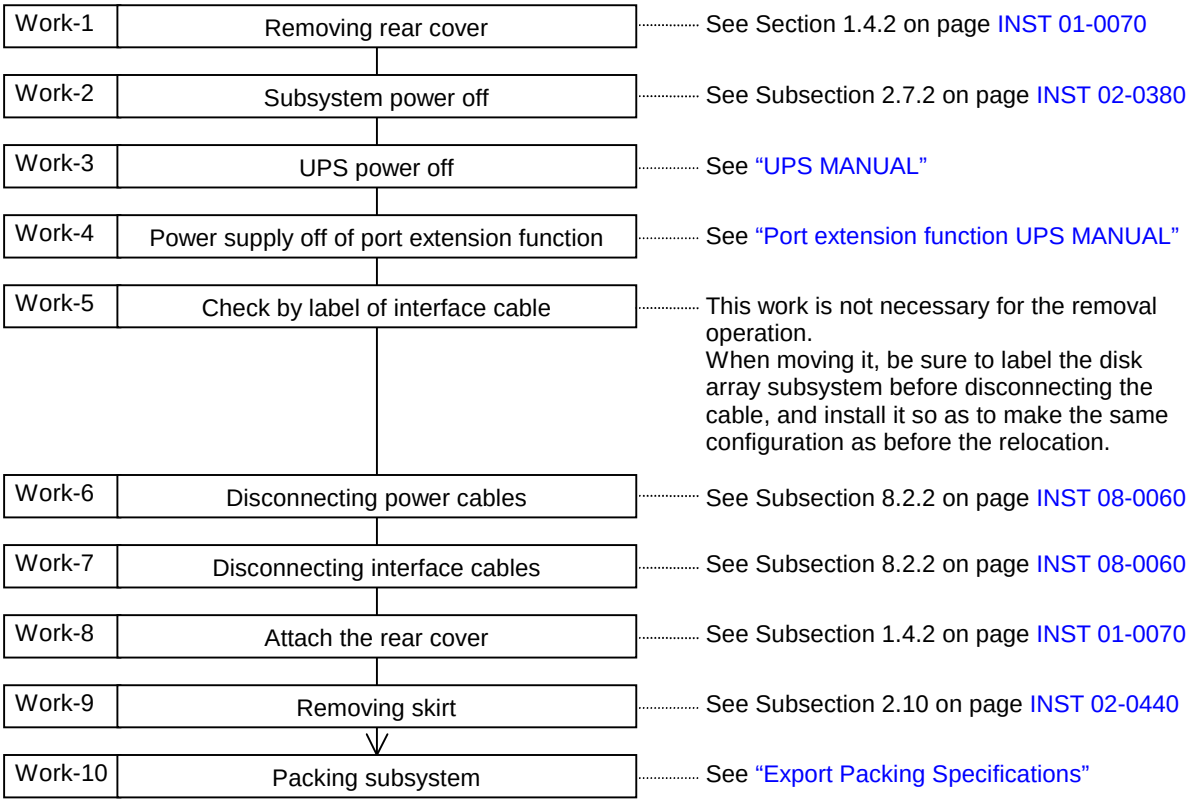
When moving the floor model through a slope steeper than the above or across a level difference of the floor, use a gangway, etc. to make the slope easier.



Copyright © 2002, 2005, Hitachi, Ltd.

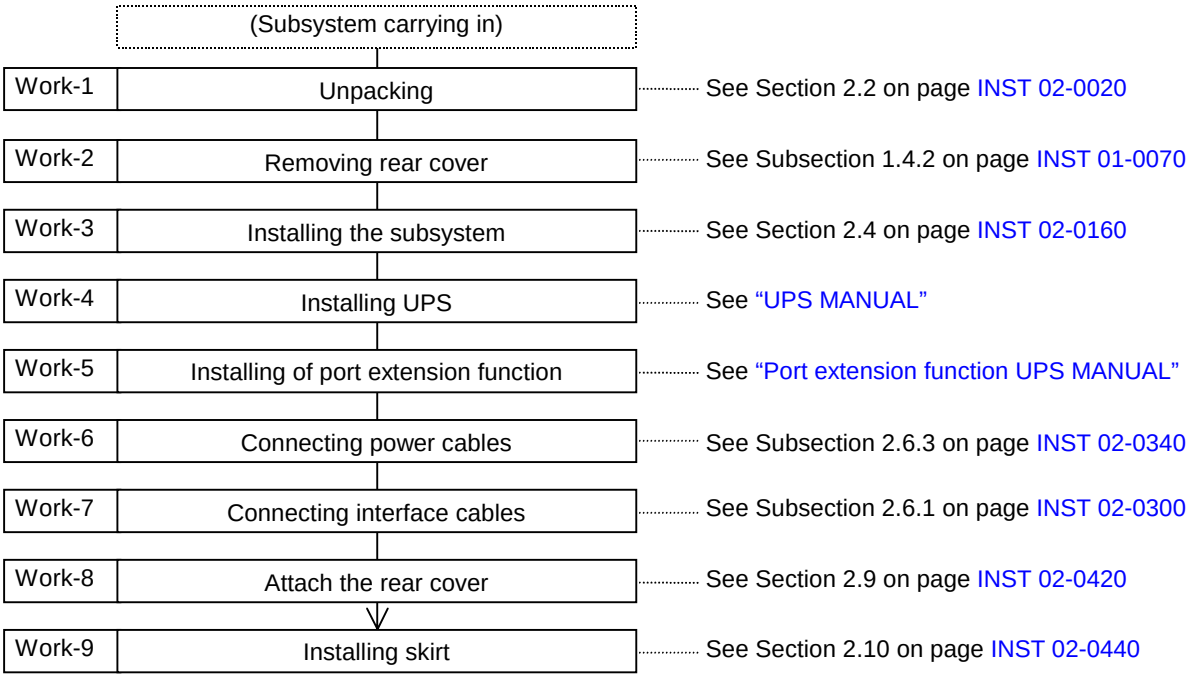
8.2 Procedure for Relocating or Removing Floor Model

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

8.2.1 Disconnecting power cable

(1) Disconnecting the power cable of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on the 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 (Power Unit (DC)) a little, and then perform the cable removal again.

(a) Make sure that AC/DC power input switches (breakers) on the Power Unit have been all turned off.
(b) Disconnecting the power cable to the power outlet.
(c) Disconnecting the connectors (Power Unit (Power Unit (DC)) side) of the power cables (white, yellow) to the receptacle of the Power Unit (Power Unit (DC)).

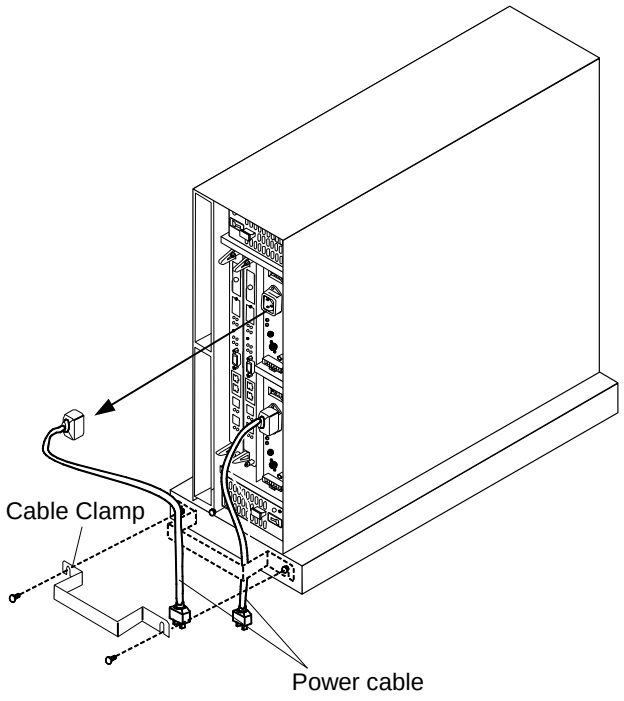


Figure 8.2.1 Disconnecting Power Cable

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Disconnecting the power cable (DC) of Power Unit (DC)

⚠ CAUTION

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

⚠ CAUTION

Here exists a hazard that can cause an electric shock. Start the work after making sure that the breaker in the power distribution box has been turned off.

(a) Make sure that DC power input switches (breakers) on the Power Unit (DC) have been all turned off.
(b) Make sure that the breaker in the power distribution box has been turned off.
(c) Remove the strain relief.
(d) Remove the cover of the terminal block.
(e) Remove the FG cable from the frame ground (FG).
(f) Remove the cable connected to the plus and minus power input terminals on the terminal block.
(g) Remove the cable clamp.

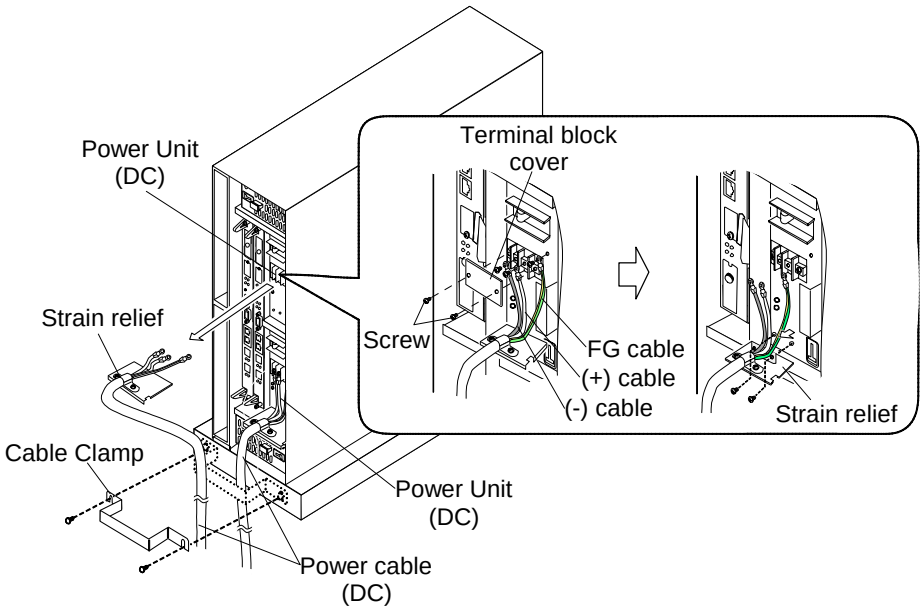


Figure 8.2.1.1 Disconnecting Power Cable (DC)

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

8.2.2 Disconnecting 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.

(1) Disconnecting the interface cable to the Control Unit

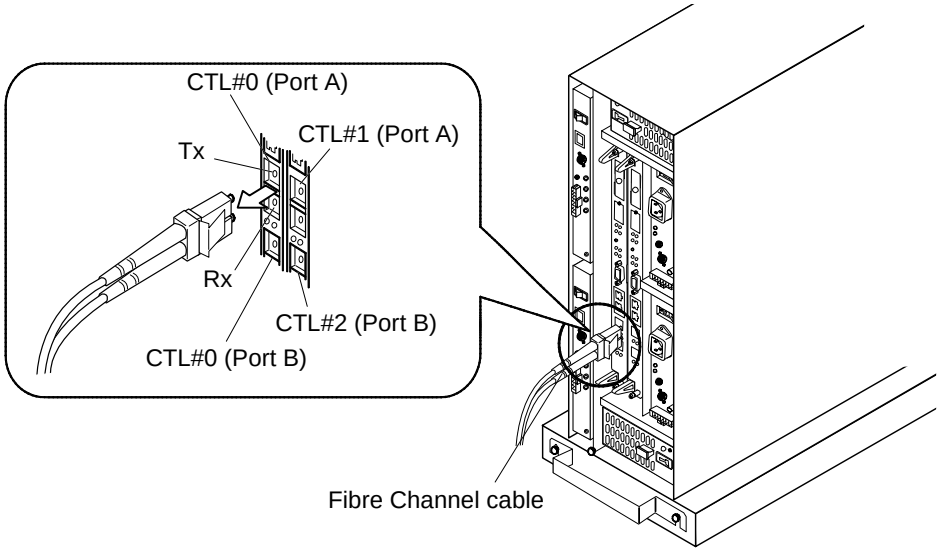


Figure 8.2.2 Disconnecting Interface Cable

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

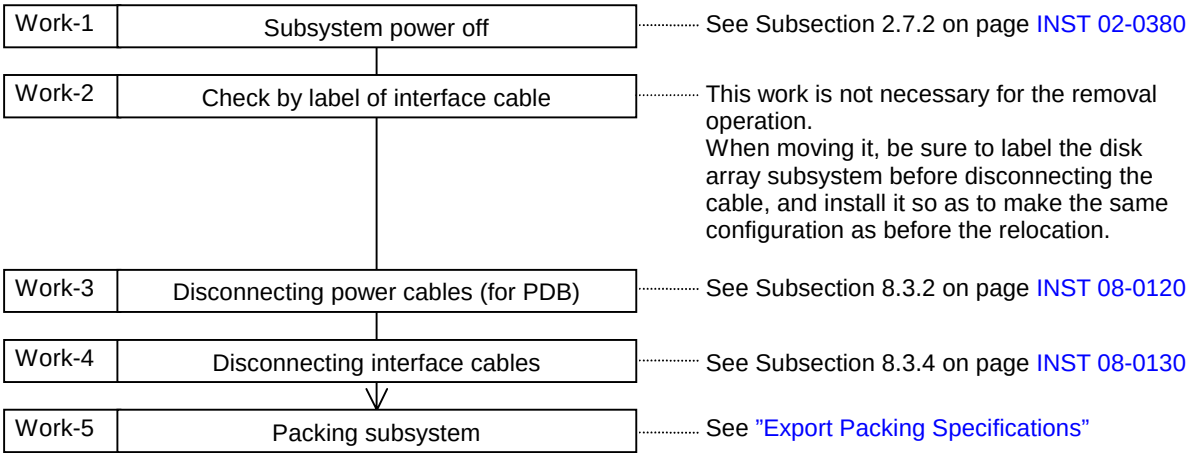
Copyright © 2002, 2005, Hitachi, Ltd.

8.3 Procedure for Relocating or Removing Rackmount Model

(1) When moving the subsystem together with a rack frame

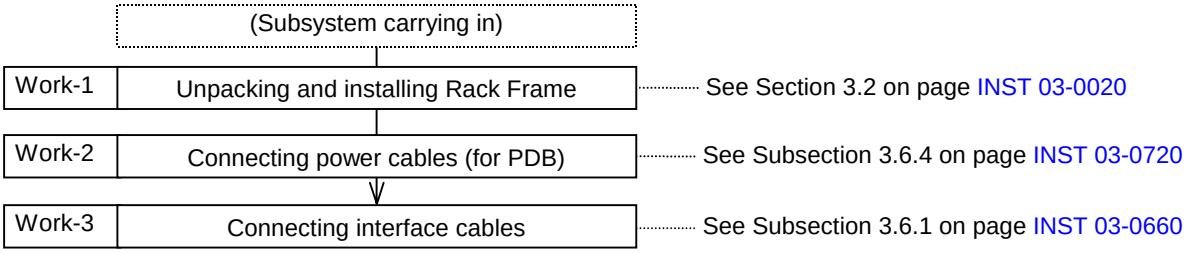
(a) Procedure for removal from where the subsystem is currently installed

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.

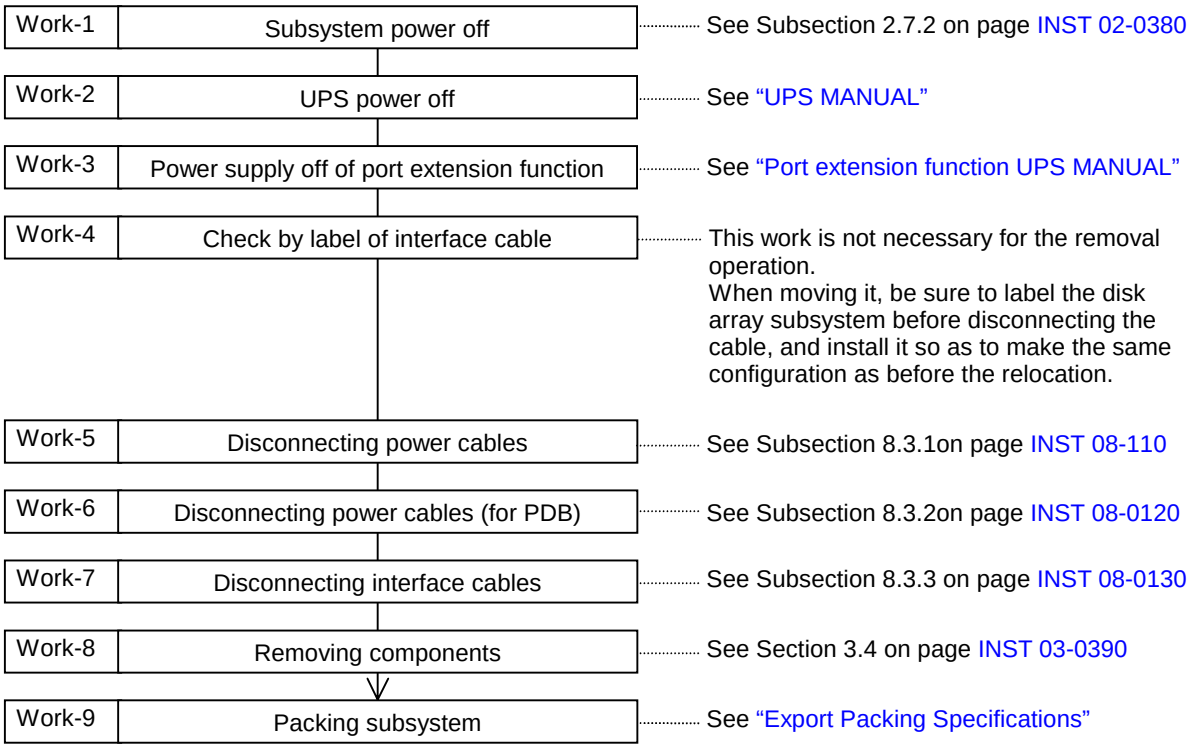


Copyright © 2002, 2005, Hitachi, Ltd.

(2) When moving the subsystem together with removing of parts

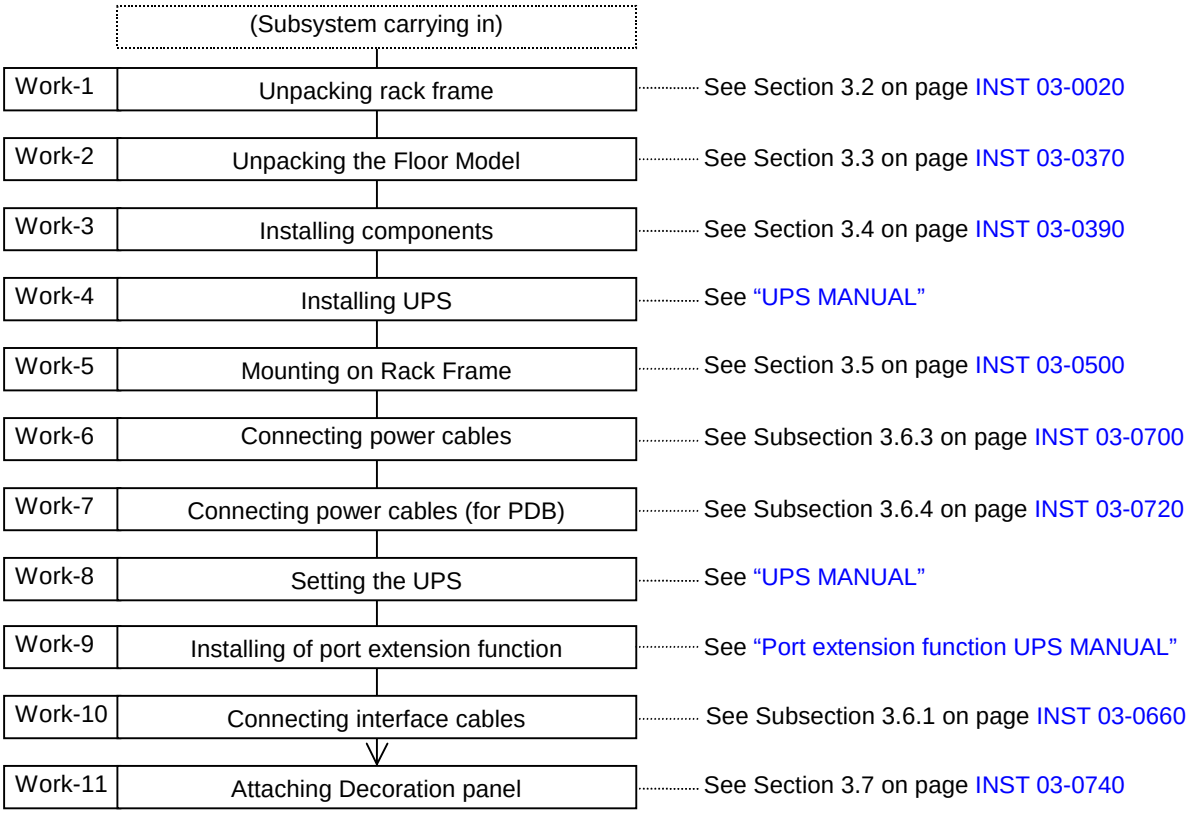
(a) Procedure for removal from where the subsystem is currently installed

Before performing the removal from where the subsystem is currently installed, make sure of work items to be done shown below.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

8.3.1 Disconnecting the power cables

(1) Disconnecting the power cable of Power Unit

⚠ CAUTION

Make sure that there is no scratch or flaw on the 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 RKA/RKAAT/RKAJAT/RKAATL/RKAJATL, 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.

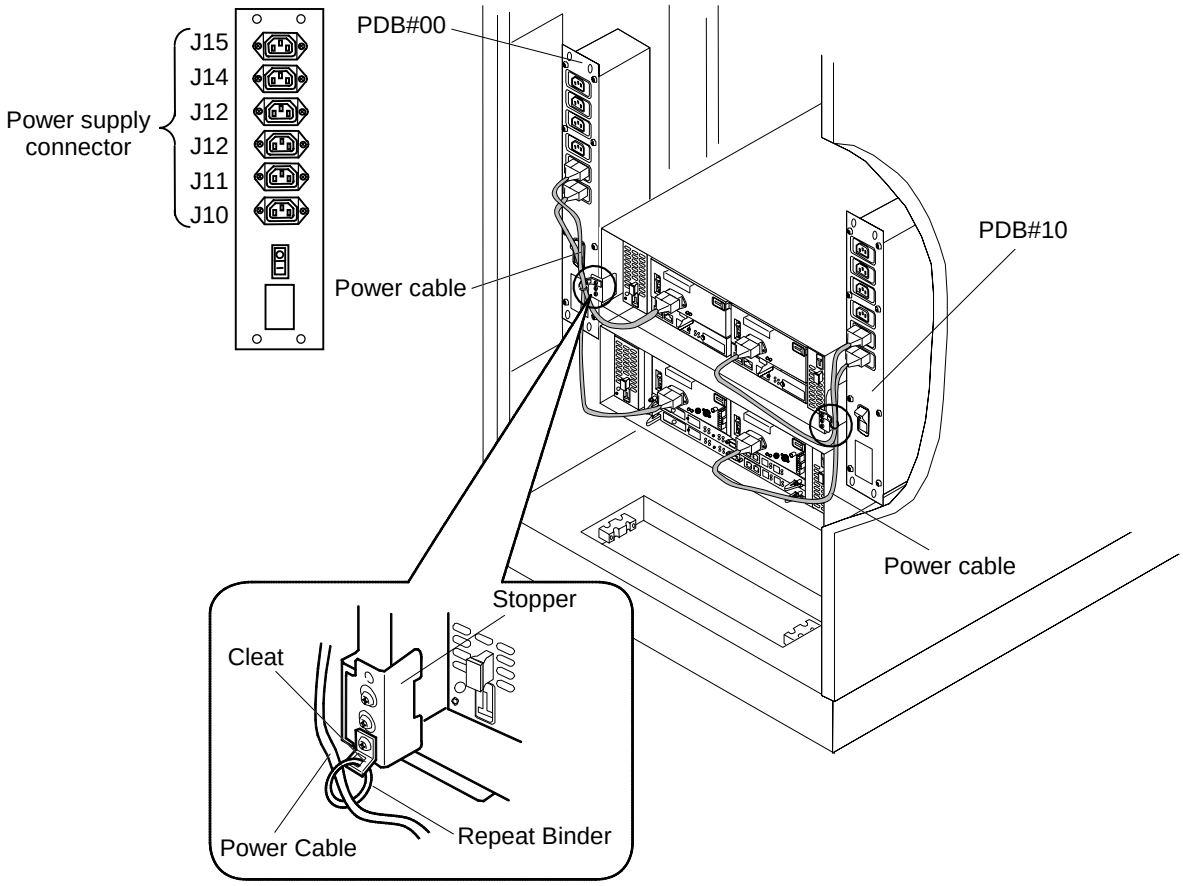


Figure 8.3.1 Disconnecting Power Cables

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Disconnecting the power cable (DC) of Power Unit (DC)

⚠ CAUTION

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

⚠ CAUTION

Here exists a hazard that can cause an electric shock. Start the work after making sure that the breaker in the power distribution box has been turned off.

(a) Make sure that DC power input switches (breakers) on the Power Unit (DC) have been all turned off.
(b) Make sure that the breaker in the power distribution box has been turned off.
(c) Remove the strain relief.
(d) Remove the cover of the terminal block.
(e) Remove the FG cable from the frame ground (FG).
(f) Remove the cable connected to the plus and minus power input terminals on the terminal block.

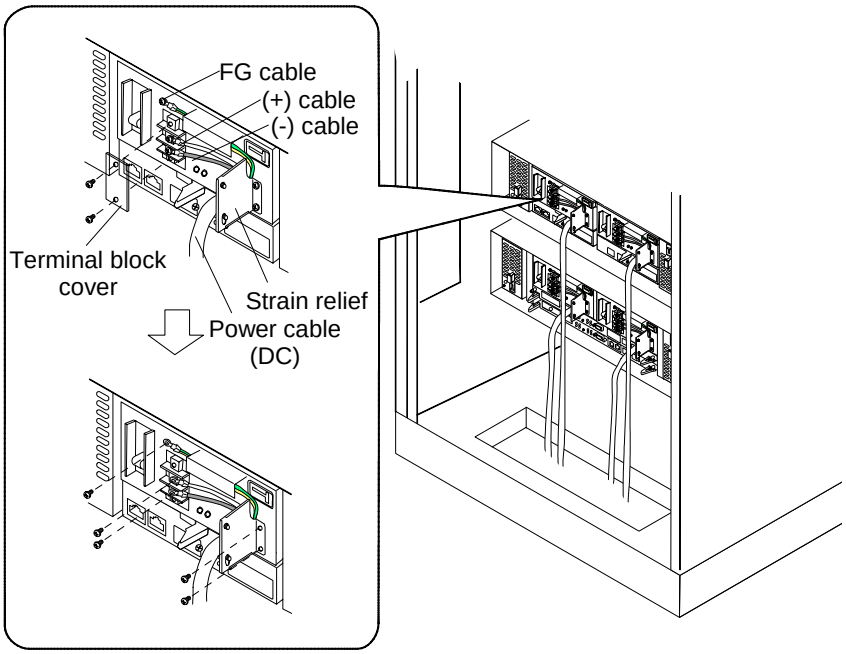


Figure 8.3.1.1 Disconnecting Power Cables (DC)

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

8.3.2 Disconnecting the power cable (for supplying power to Rack frame)

(1) Open the rear door. (See Subsection 1.4.4, "How to open/close the rear door of U6 rack frame" on page INST 01-0100.)
(2) Remove the cable holders from the rack frame by removing the hexagon socket head bolts① and ②.
(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.

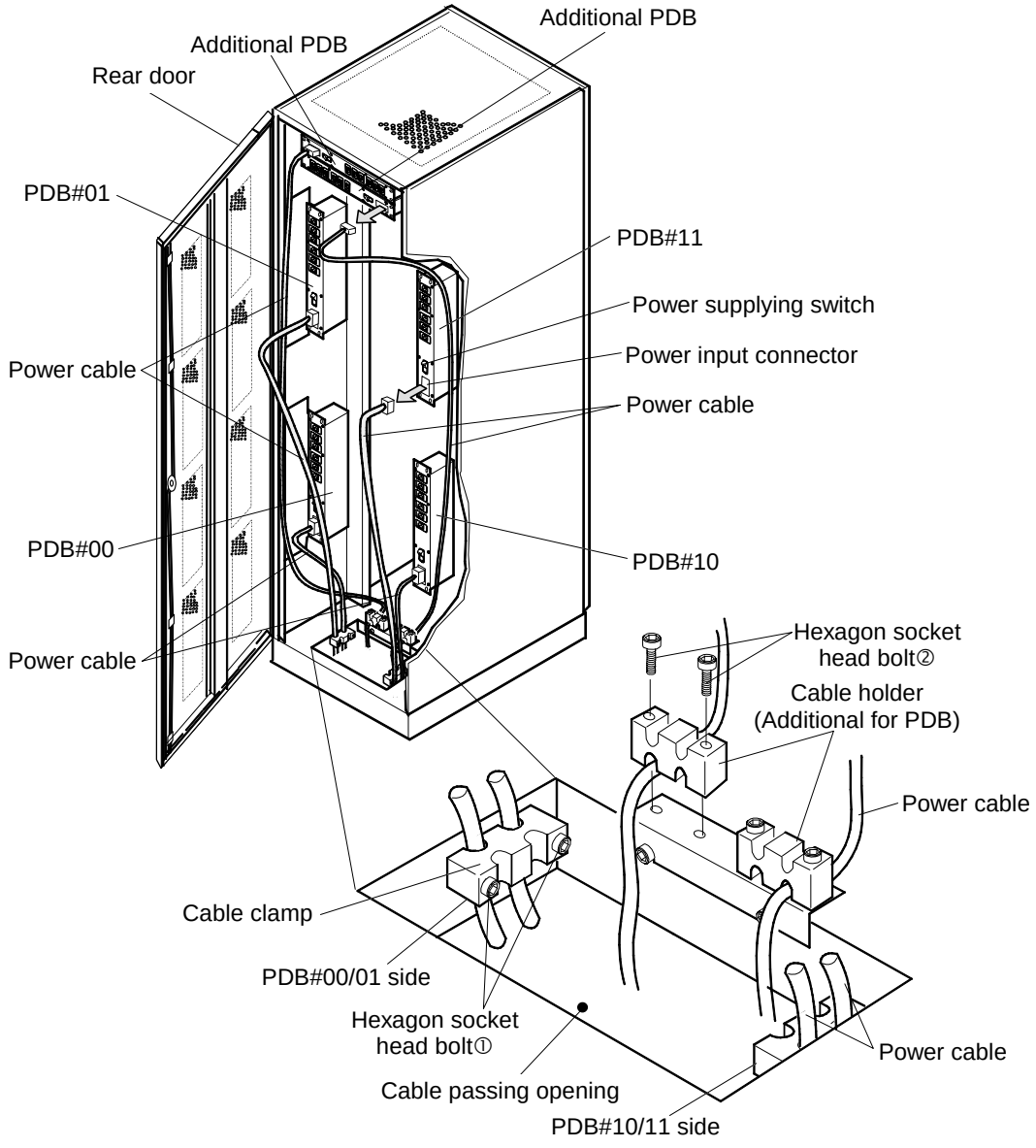


Figure 8.3.2 Disconnecting Power Cables

Copyright © 2002, 2005, Hitachi, Ltd.

8.3.3 Disconnecting 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.

(1) Disconnecting the Fibre Channel interface cable to the clamp
(2) Disconnect the Fibre Channel interface cable connected to the Control Unit.

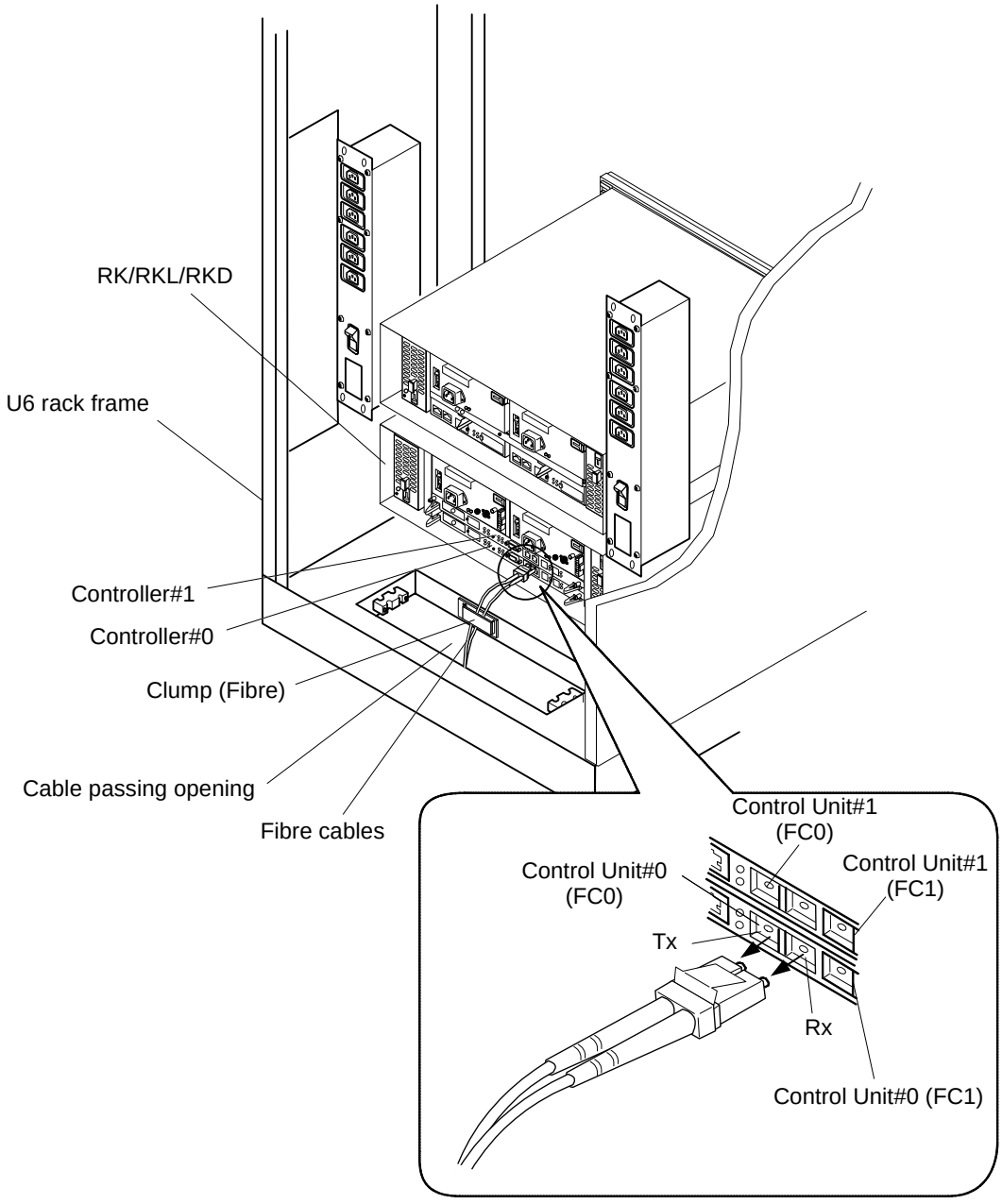


Figure 8.3.2 Disconnecting Interface Cable (RK/RKL/RKD)

Copyright © 2002, 2005, Hitachi, Ltd.

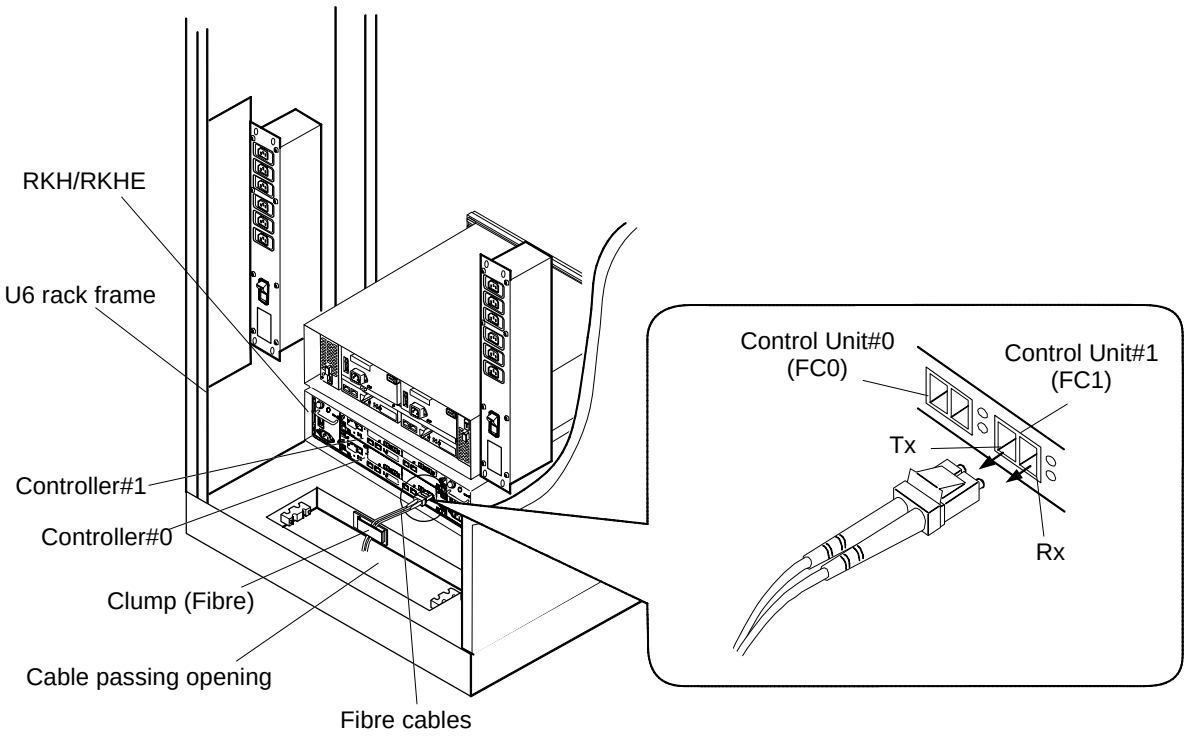


Figure 8.3.3 Disconnecting Interface Cable (RKH/RKHE)

Copyright © 2004, 2005, Hitachi, Ltd.

Chapter 9 ACE (Assist the Connection of Enclosure) Tool

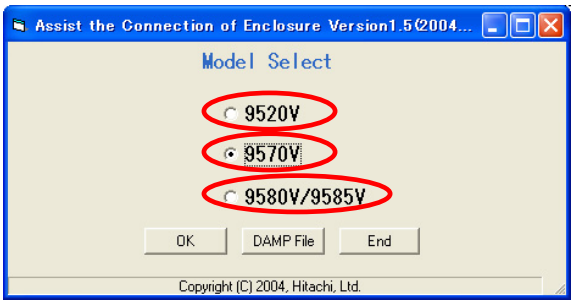
The unit models that are represented by “Fibre” and “SATA” displayed in windows differ by 9520V, 9570V, and 9580V/9585V. For the represented unit models, refer to the following table.

	9520V (RKL)	9570V (RK)	9580V/9585V (RKH/RKHE)
Fibre	—	RK/RKA	RKA
SATA	RKAATL/RKAJATL	RKAAT/RKAJAT	RKAAT/RKAJAT

9.1 Starting and Quitting the Tool

(1) Method for starting the tool
Select [Start] – [Program] – [DF600Configuration] – [DF600Configuration].
The ACE tool starts up and the device model selection window is displayed.

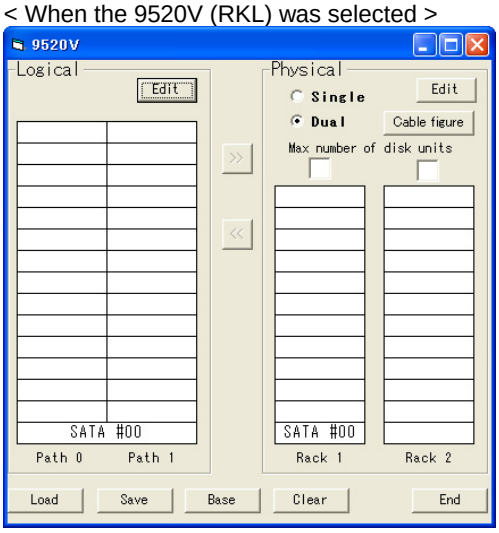
(2) Selecting the subsystem
When the 9520V, 9570V or 9580V/9585V is selected in the subsystem selection window, and then the [OK] button is clicked, the window for making the corresponding configuration diagrams is displayed.



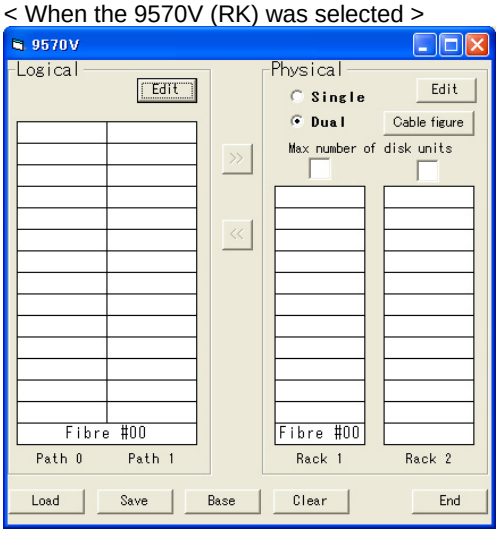
Copyright © 2004, 2005, Hitachi, Ltd.

Version 1.5

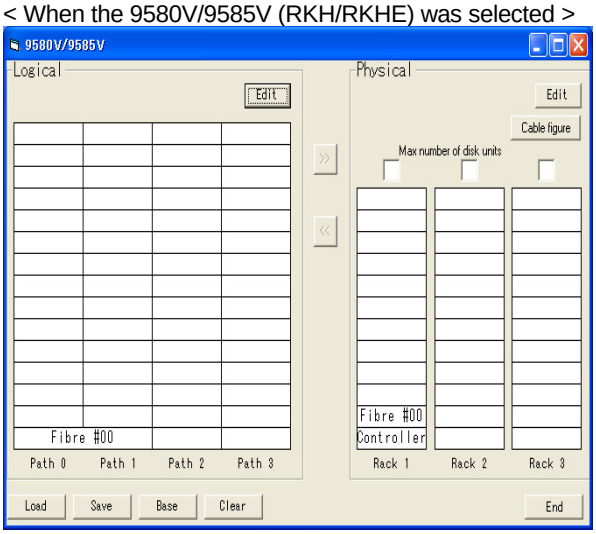
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



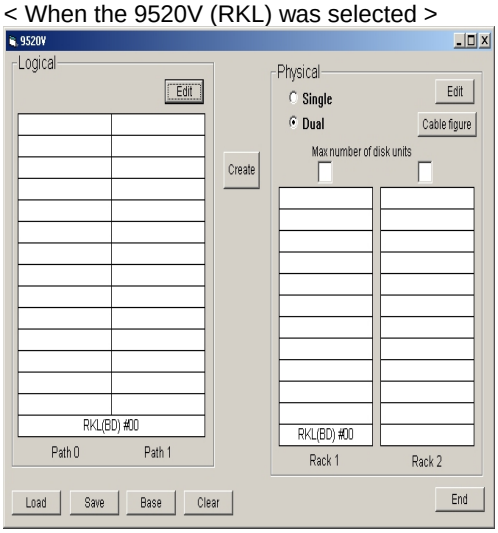
< When the 9580V/9585V (RKH/RKHE) was selected >



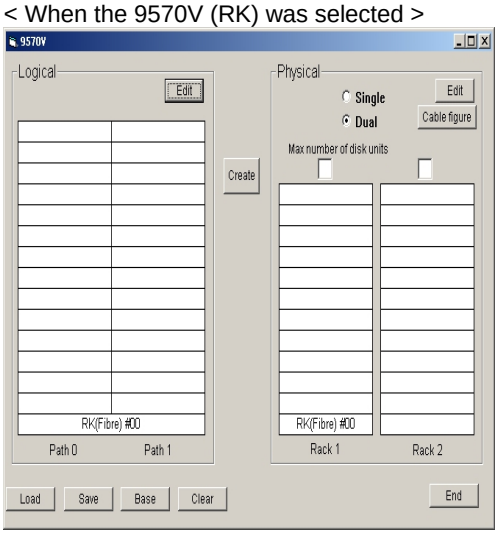
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

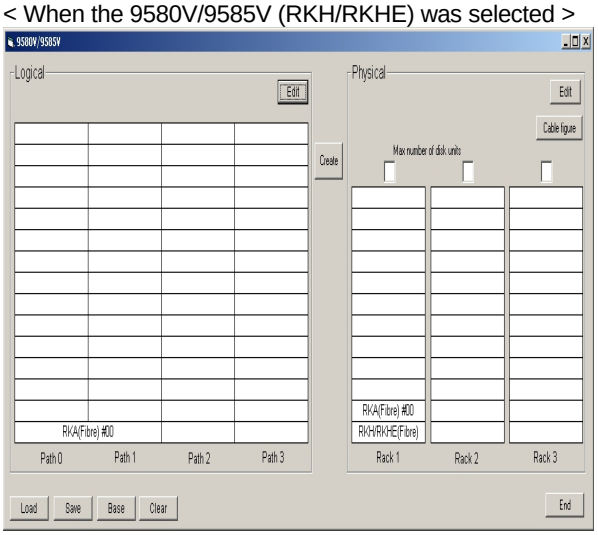
< When the 9520V (RKL) was selected >



< When the 9570V (RK) was selected >



< When the 9580V/9585V (RKH/RKHE) was selected >



(3) Quitting the tool

When the [End] button is clicked in the subsystem selection window, the tool is quit.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

9.2 Making of the Configuration Diagram

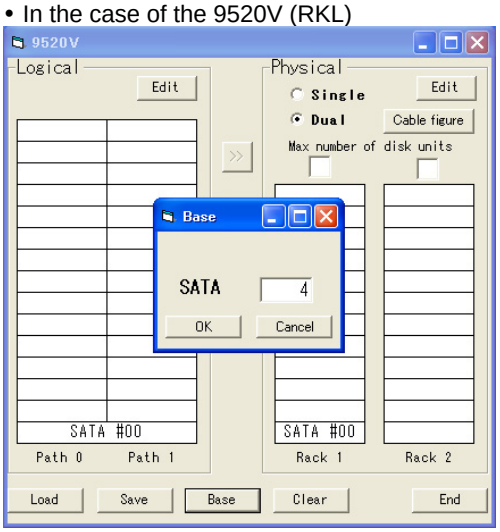
9.2.1 Automatic making of configuration diagrams

(1) Procedure for making the configuration diagram automatically
Both of the logical and physical configuration diagrams can be made automatically when the [Base] button is clicked in the "9520V, 9570V or 9580V/9585V Configuration" window.

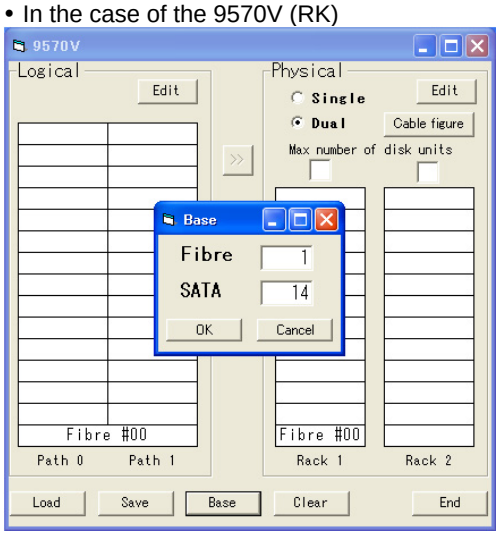
(a) Click the [Base] button in the "9520V, 9570V or 9580V/9585V Configuration" window. The window for entering the number of the disk units that compose the subsystem (shown below) is displayed. The window for entering the number of the disk units (shown below) is displayed.

Version 1.5

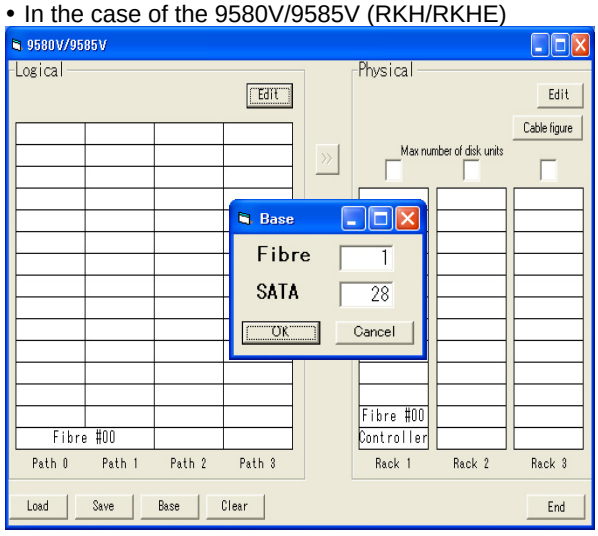
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



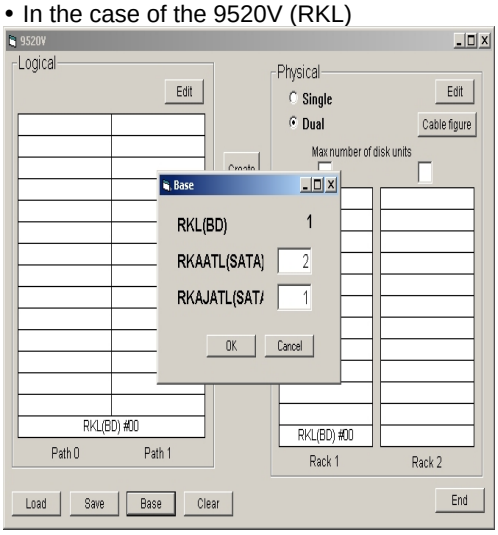
• In the case of the 9580V/9585V (RKH/RKHE)



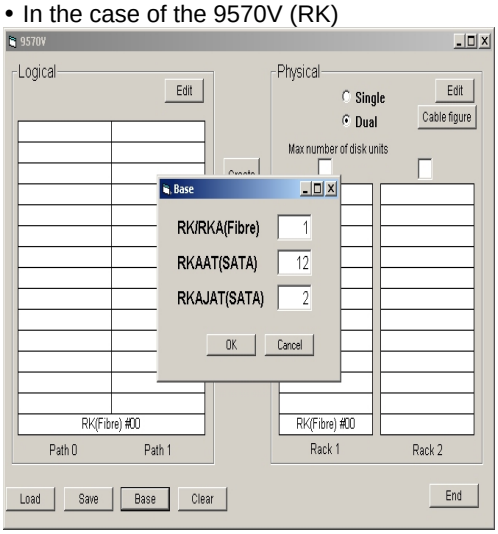
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

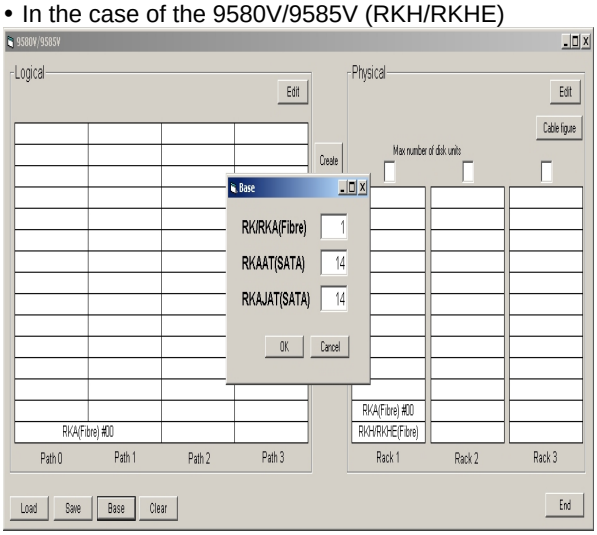
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



• In the case of the 9580V/9585V (RKH/RKHE)



(b) Enter the number of the disk units that can accommodate the HDDs. (The number differs between the 9570V (RK) and 9580V/9585V (RKH/RKHE).)
Notes on the entry

- For the Fibre disk unit(s), enter a numerical value larger than one(‡1).
- For the SATA disk unit(s), enter a numerical value larger than zero.
- If the number of the Fibre/SATA disk units exceeds the maximum allowable number, an error is caused.

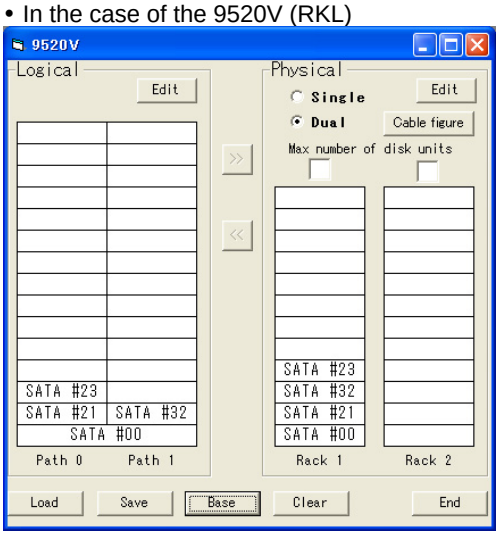
‡1 : Because only the Fibre disk unit can be installed in the basic frame of the 9570V (RK), enter a numerical value larger than one for the Fibre disk unit.

Copyright © 2004, 2005, Hitachi, Ltd.

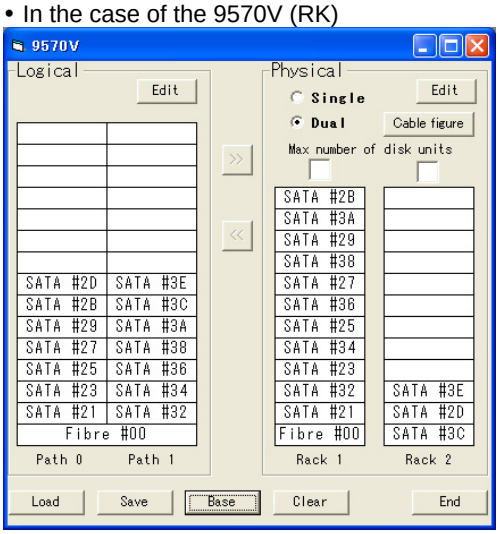
(c) Click the [OK] button in the Base window. The logical and physical configuration diagrams are made automatically(‡1).

Version 1.5

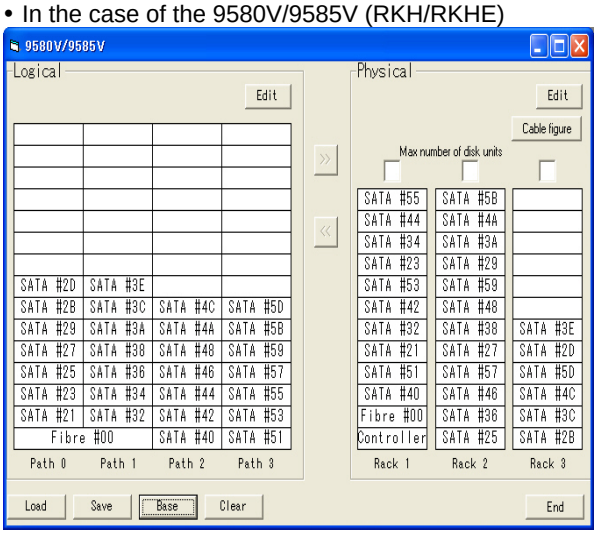
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



• In the case of the 9580V/9585V (RKH/RKHE)

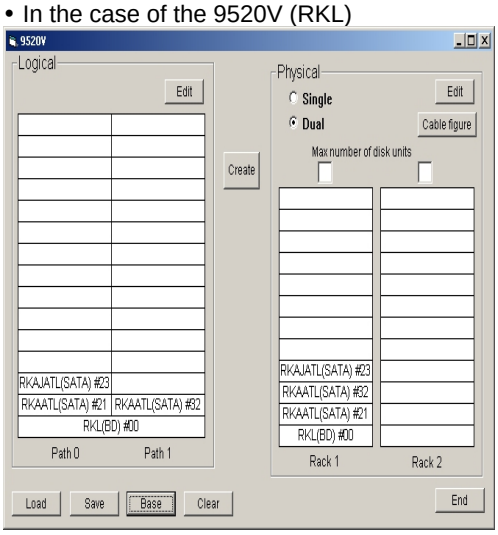


‡1 : When making the configuration diagram automatically, mount the RKA (Fibre disk unit) first and then mount the RKAATs/RKAJATs/RKAATLs/RKAJATLs (SATA disk units).

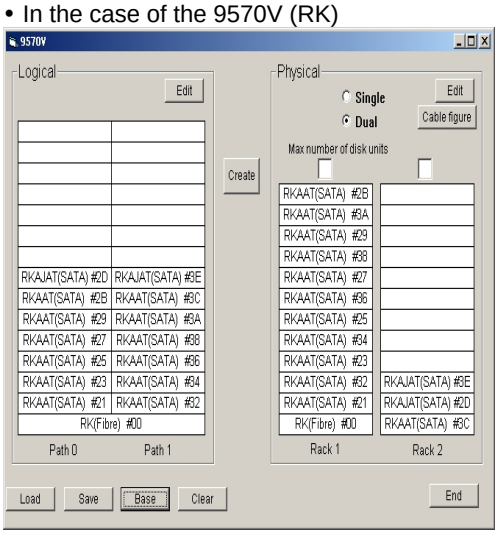
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

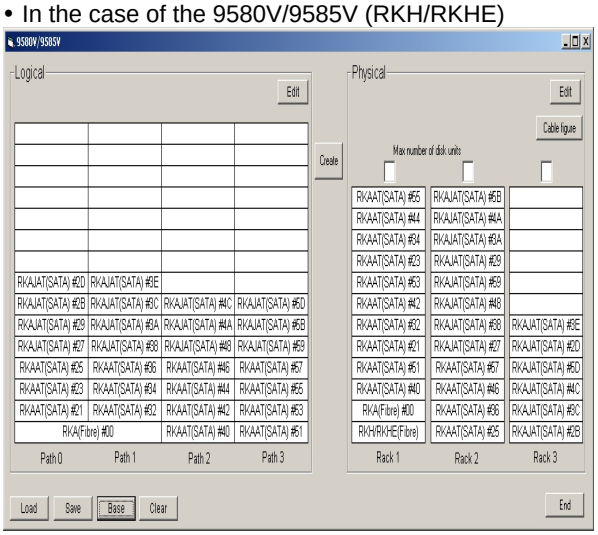
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)



(d) The configuration diagram that has been made can be saved in a file. Refer to Section 9.4, “Saving and Reading the Configuration Diagram” on page INST 09-0270.

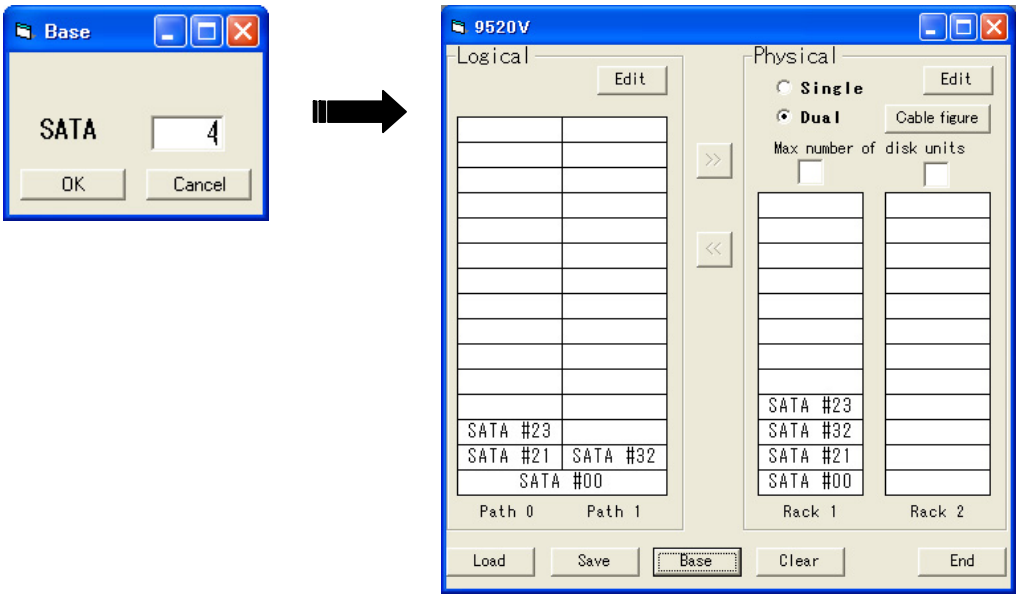
Copyright © 2004, 2005, Hitachi, Ltd.

(2) Samples of the configuration diagrams that have been made automatically

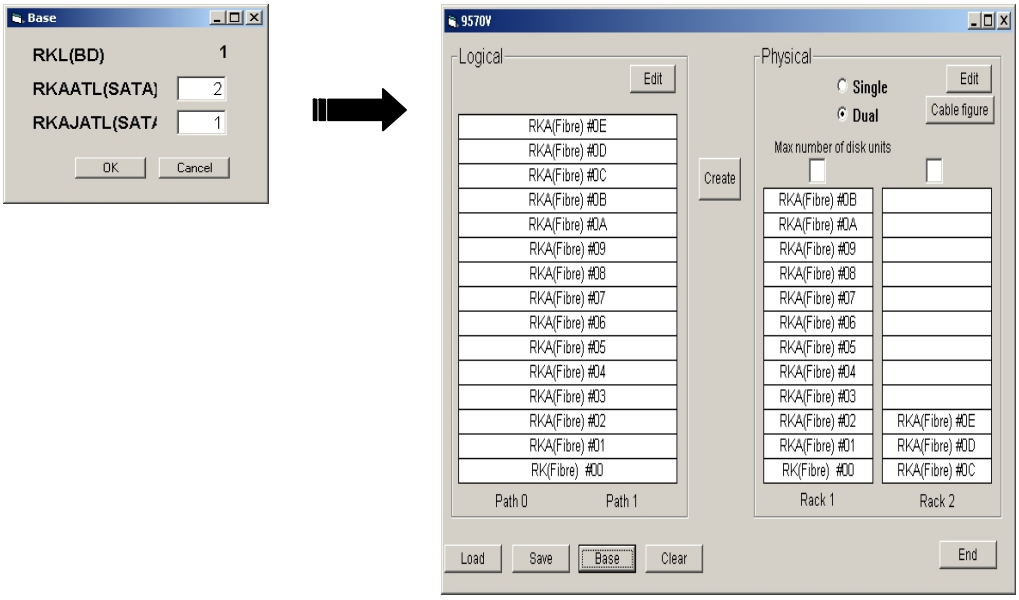
• Samples of the 9520V (RKL)

① Configuration with the SATA disk unit(s) only

Version 1.5



Version 2.0

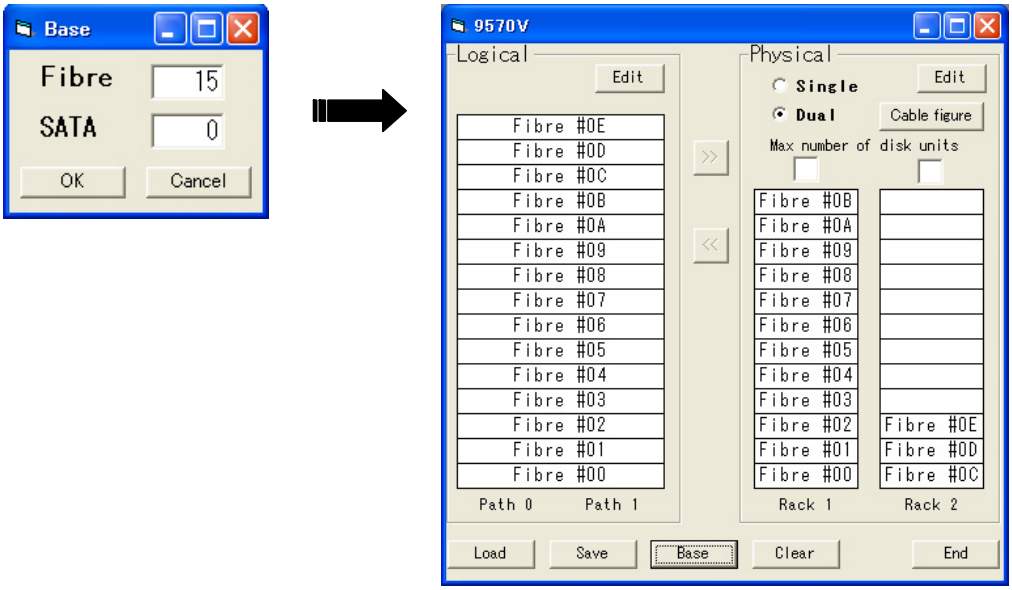


Copyright © 2004, 2005, Hitachi, Ltd.

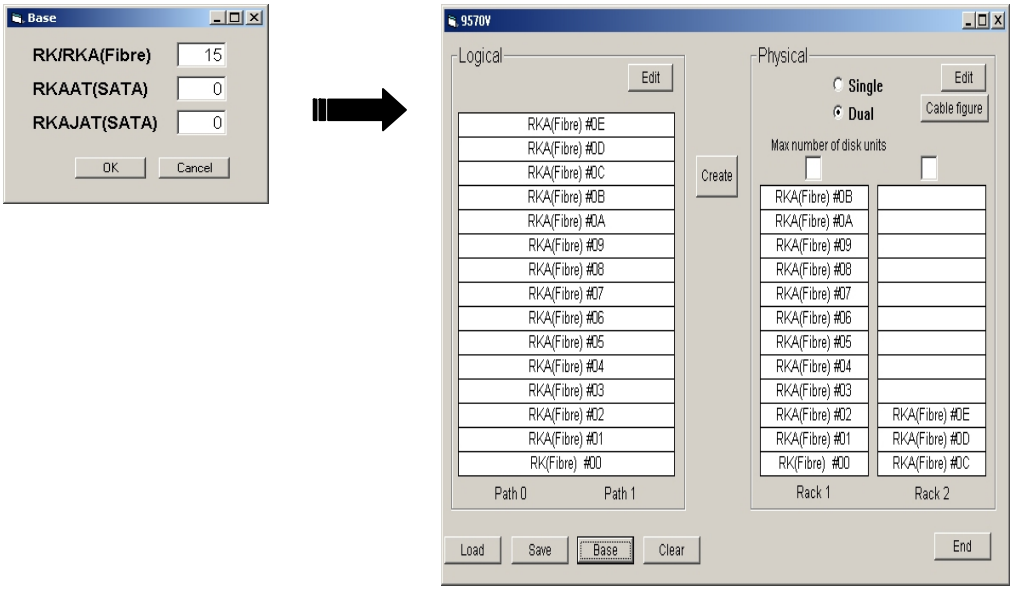
• Samples of the 9570V (RK)

① Configuration with the Fibre disk unit(s) only

Version 1.5



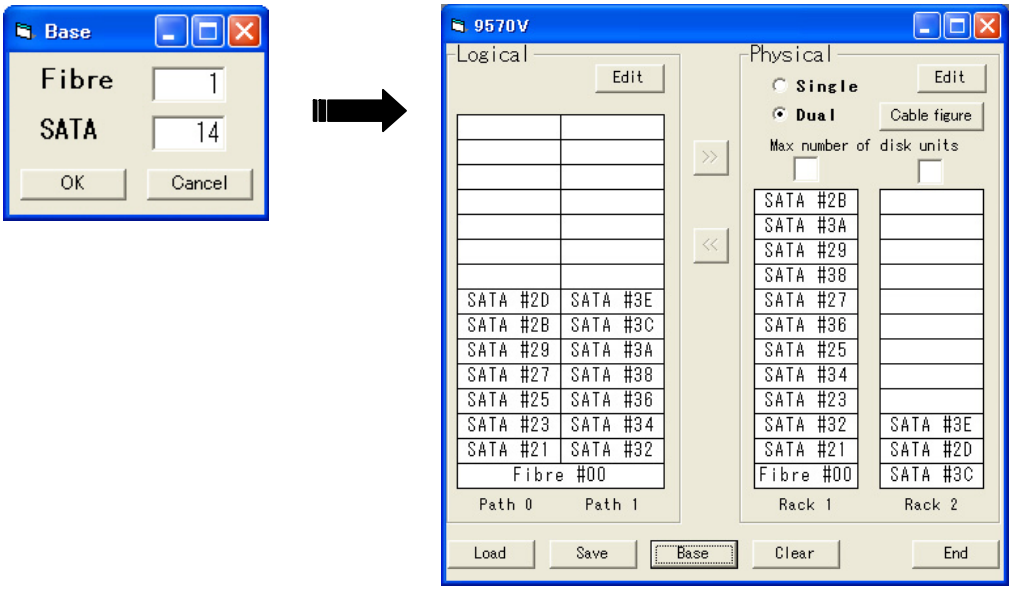
Version 2.0



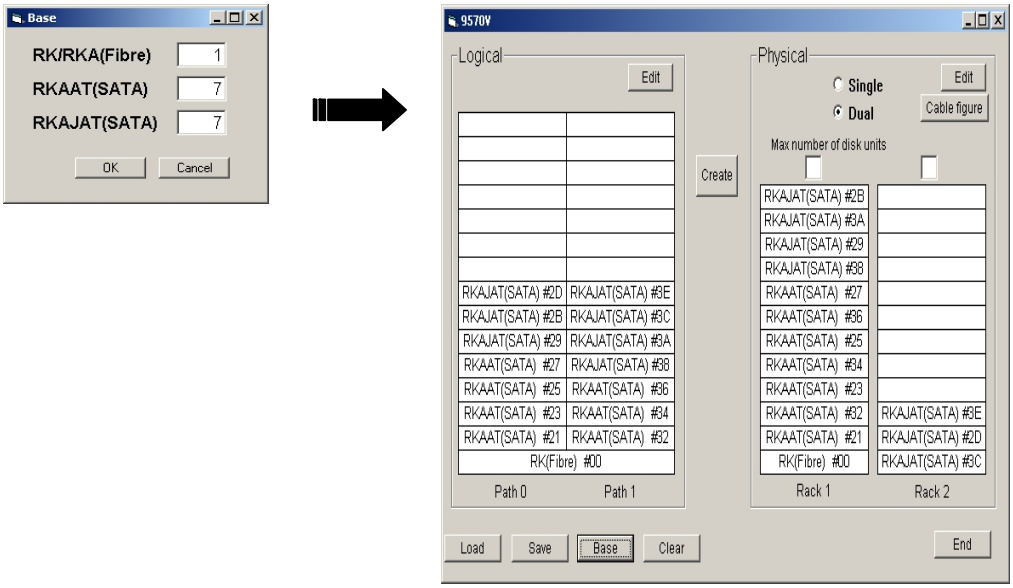
Copyright © 2004, 2005, Hitachi, Ltd.

② Configuration with the SATA disk unit(s) only (excluding the one Fibre disk unit)

Version 1.5



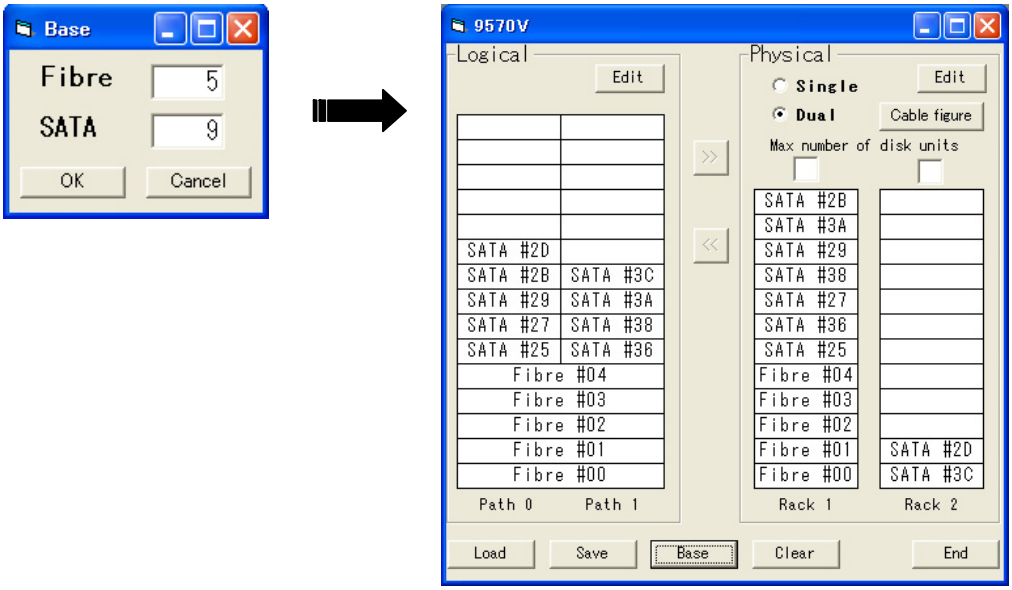
Version 2.0



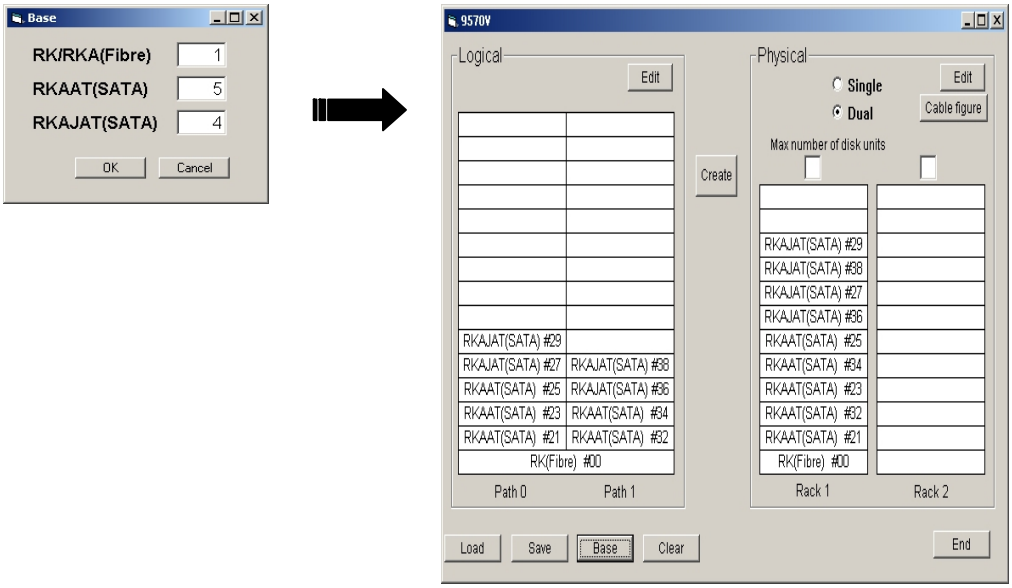
Copyright © 2005, Hitachi, Ltd.

③ Configuration in which the Fibre and SATA disk units coexist

Version 1.5



Version 2.0

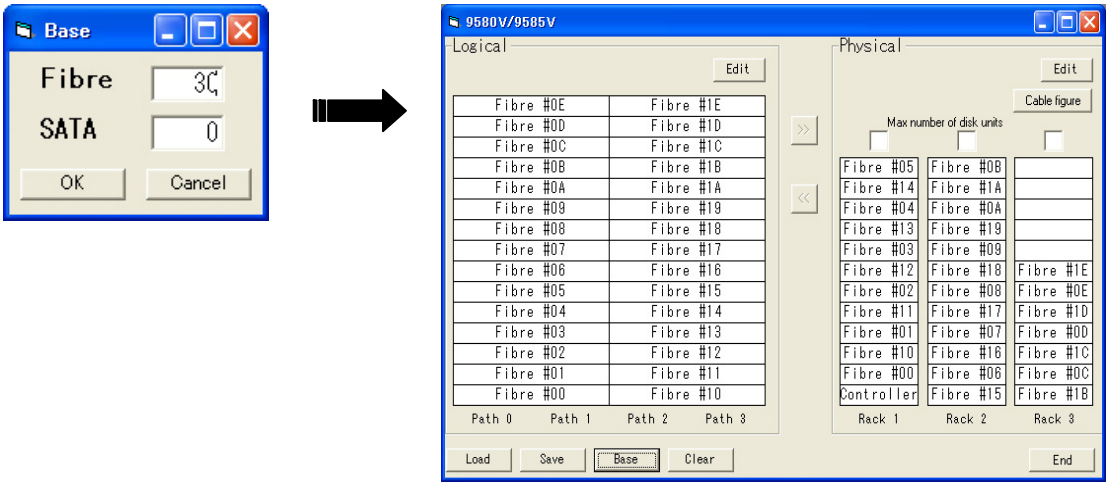


Copyright © 2005, Hitachi, Ltd.

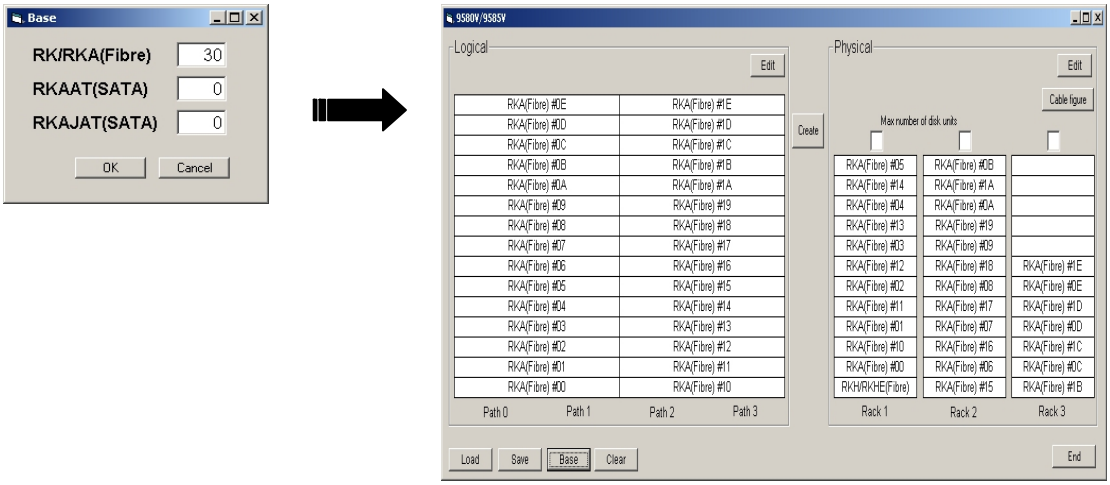
• Samples of the 9580V/9585V (RKH/RKHE)

① Configuration with the Fibre disk unit(s) only

Version 1.5



Version 2.0

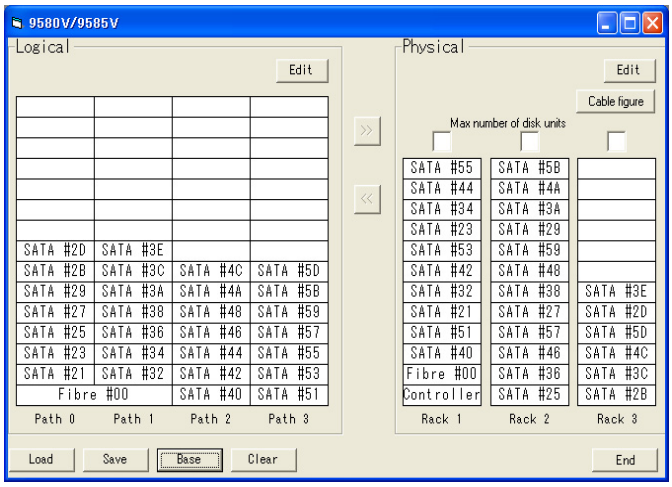


Copyright © 2004, 2005, Hitachi, Ltd.

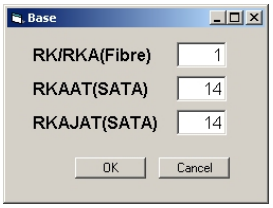
② Configuration with the SATA disk unit(s) only (excluding the one Fibre disk unit)

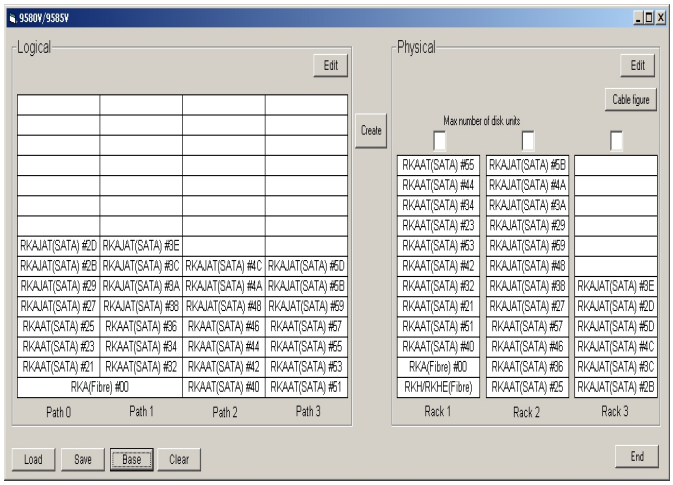
Version 1.5





Version 2.0

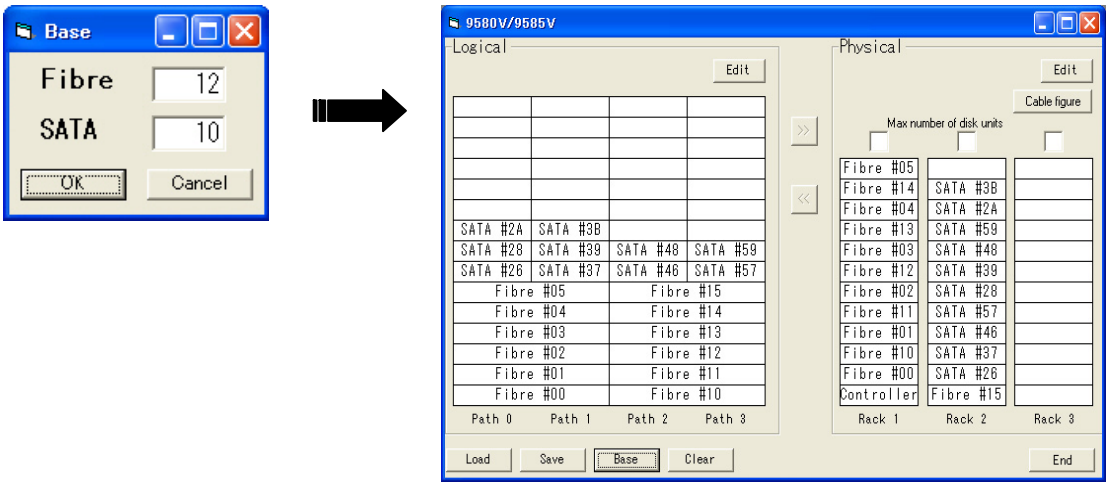




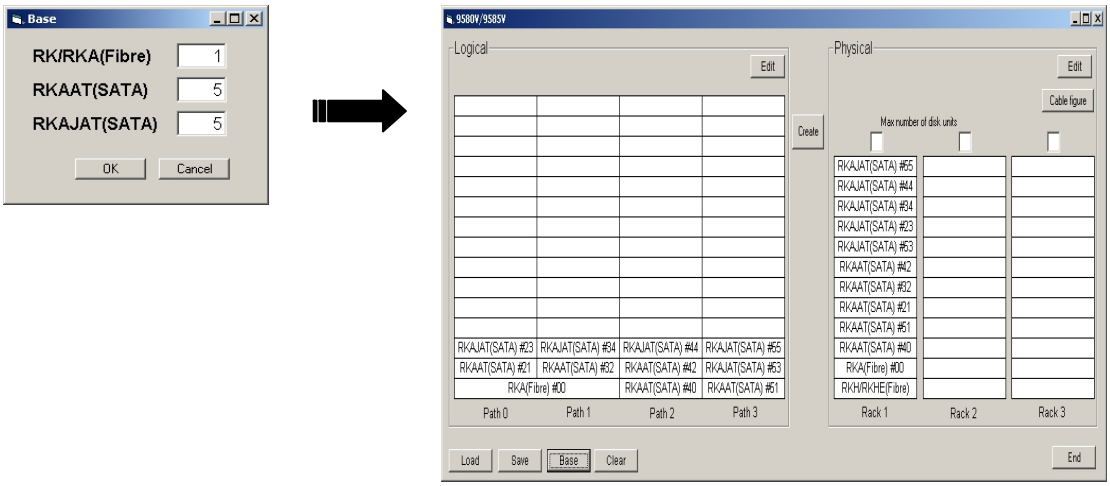
Copyright © 2005, Hitachi, Ltd.

③ Configuration in which the Fibre and SATA disk units coexist

Version 1.5



Version 2.0



Copyright © 2005, Hitachi, Ltd.

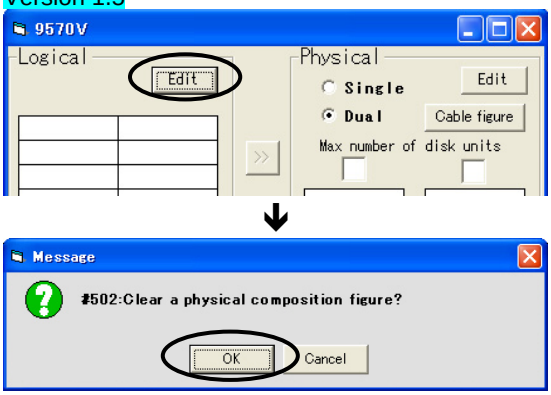
9.2.2 Manual making of configuration diagrams

(1) Edition of the logical configuration diagram and making of the physical configuration diagram

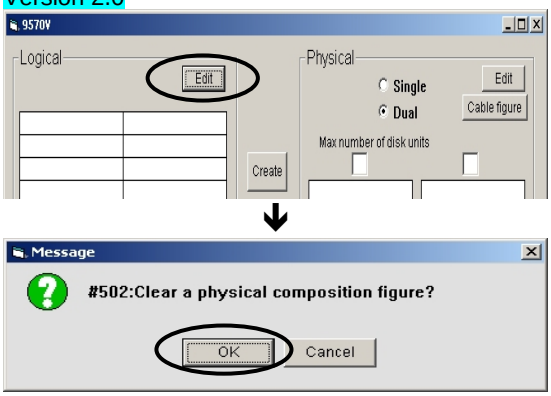
(a) Procedure for editing the logical configuration diagram

(i) Click the [Edit] button on the logical configuration side. A confirmation message is displayed.

Version 1.5



Version 2.0

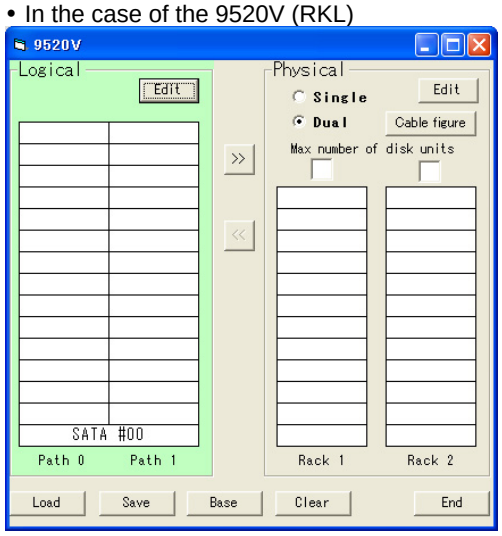


Copyright © 2004, 2005, Hitachi, Ltd.

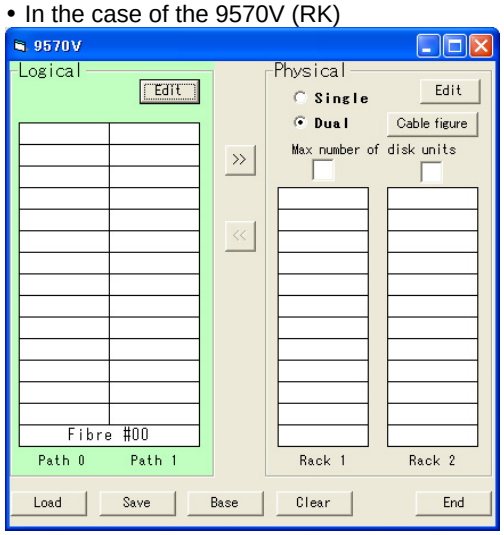
(ii) Click the [OK] button.
The whole data on the physical configuration side is cleared and the logical configuration side becomes ready for edition.

Version 1.5

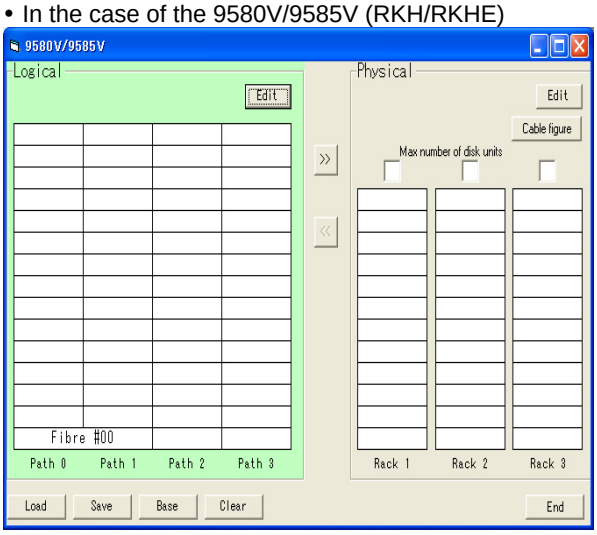
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



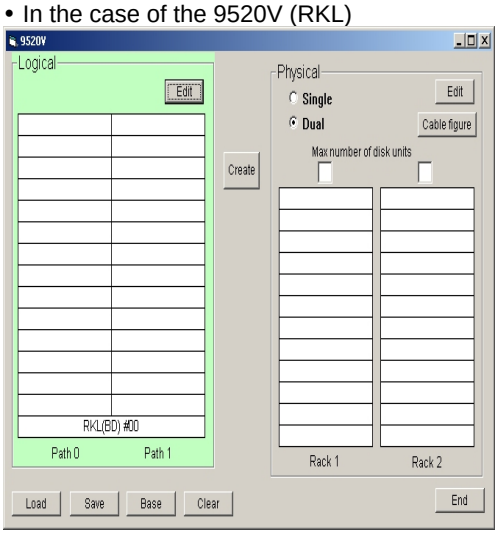
• In the case of the 9580V/9585V (RKH/RKHE)



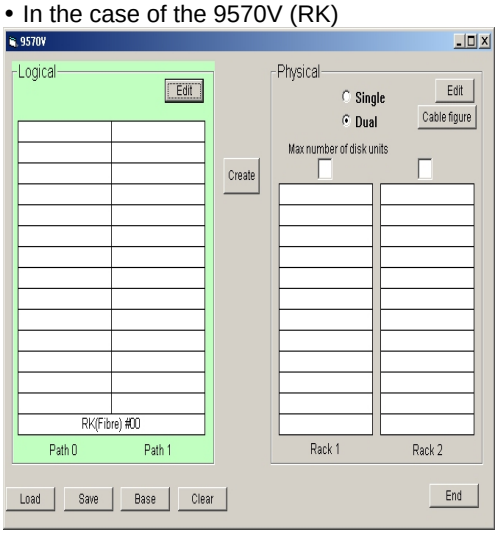
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

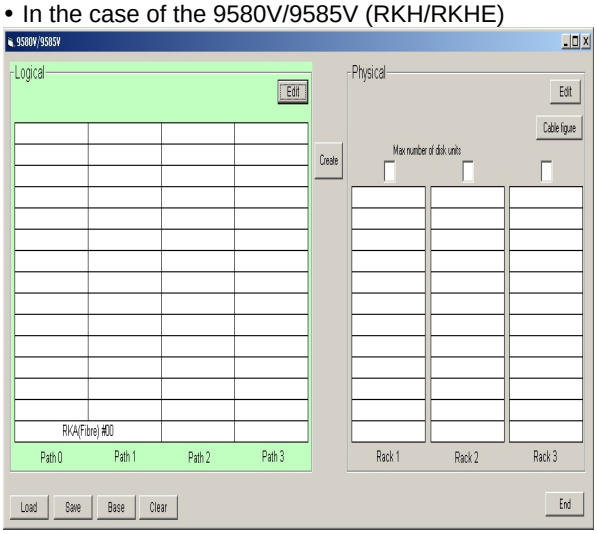
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)

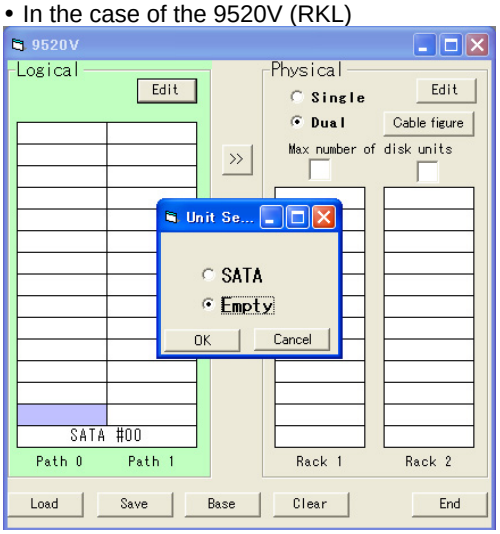


Copyright © 2004, 2005, Hitachi, Ltd.

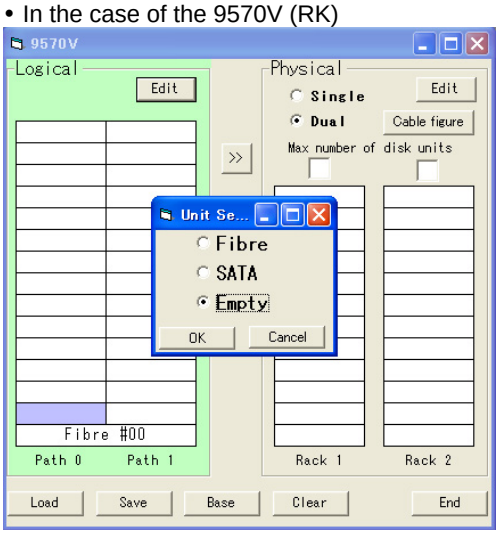
(iii) When the disk unit you want to edit is clicked, the selection window is displayed.
(iv) Select one of the Fibre, SATA, and Empty, and then click the [OK] button.
The selection is reflected on the logical configuration diagram.

Version 1.5

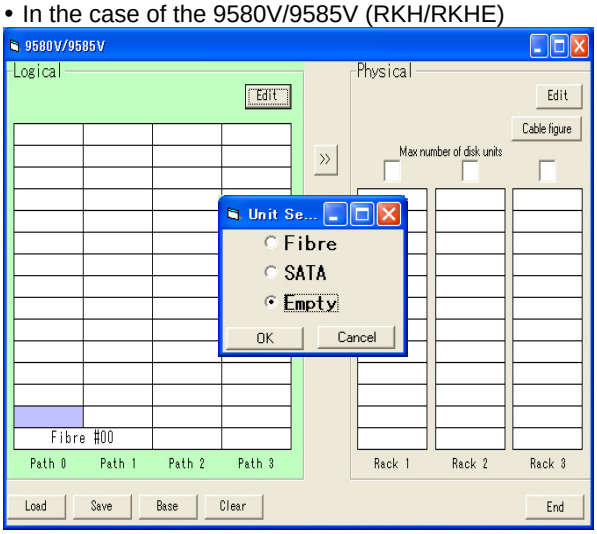
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



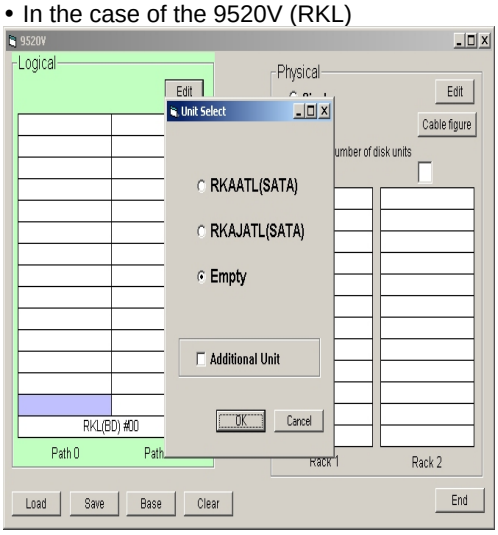
• In the case of the 9580V/9585V (RKH/RKHE)



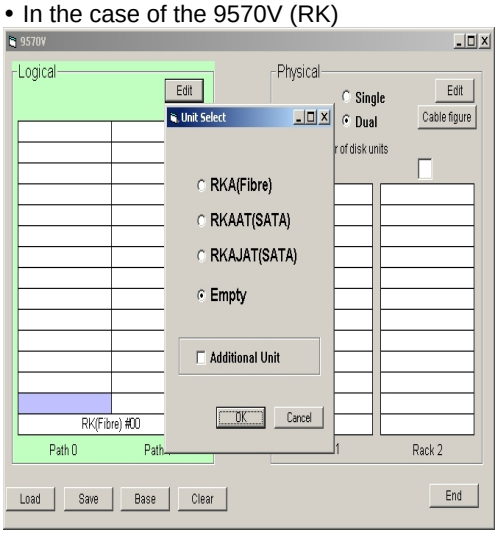
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

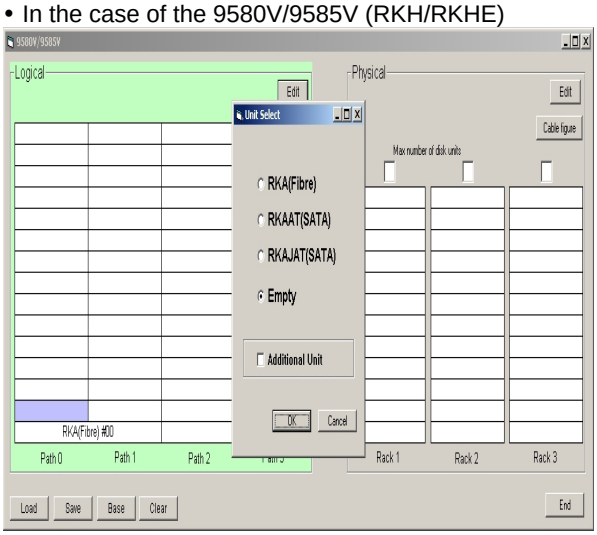
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)



Copyright © 2004, 2005, Hitachi, Ltd.

(b) Method for deriving the physical configuration diagram from the logical configuration diagram.

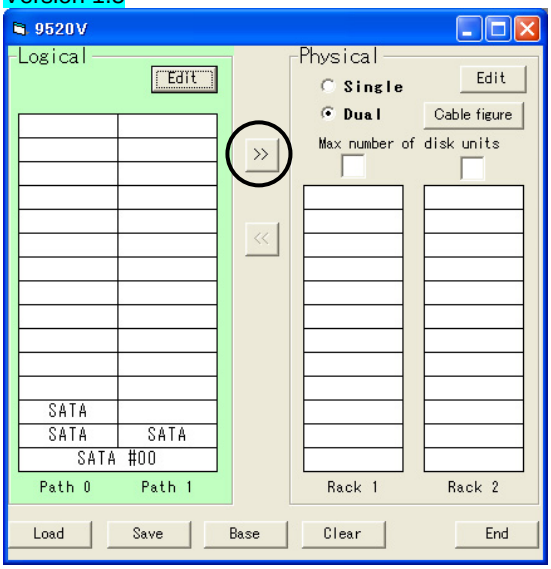
When the [»] button (in the case of Version 2.0, [Create] button) is clicked, the Device ID# is set based on the logical configuration diagram that has been edited and the physical configuration diagram is made. However, if the configuration does not conform to the rule, an error message will be displayed.

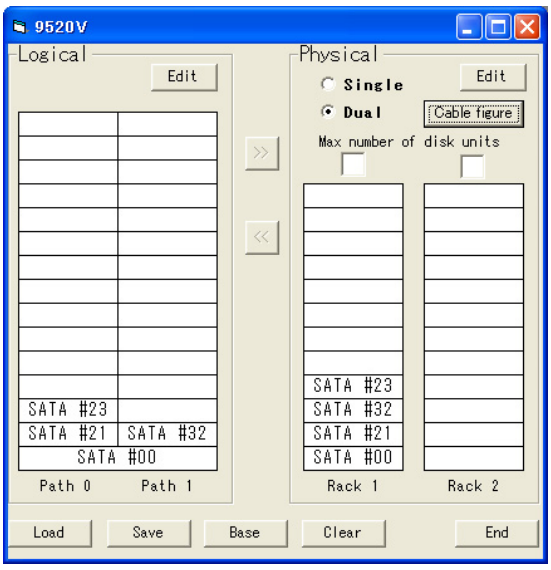
When the physical configuration diagram has been made successfully, the logical configuration diagram becomes unable to be edited.

The configuration diagram that has been made can be saved in a file. Refer to Section 9.4, “Saving and Reading the Configuration Diagram” on page INST 09-0270.

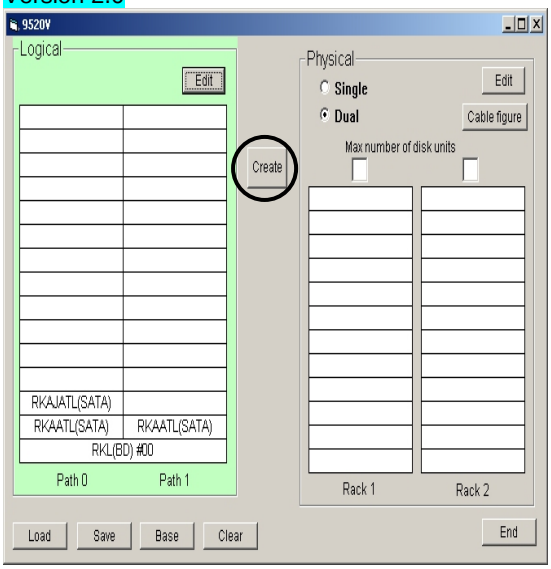
- Samples of the 9520V (RKL)

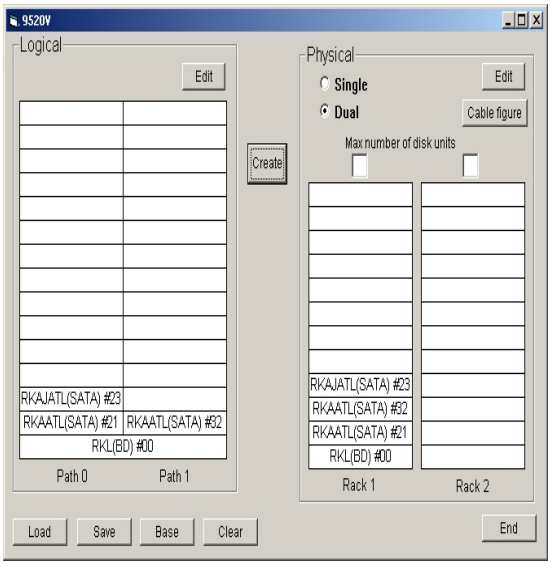
Version 1.5





Version 2.0

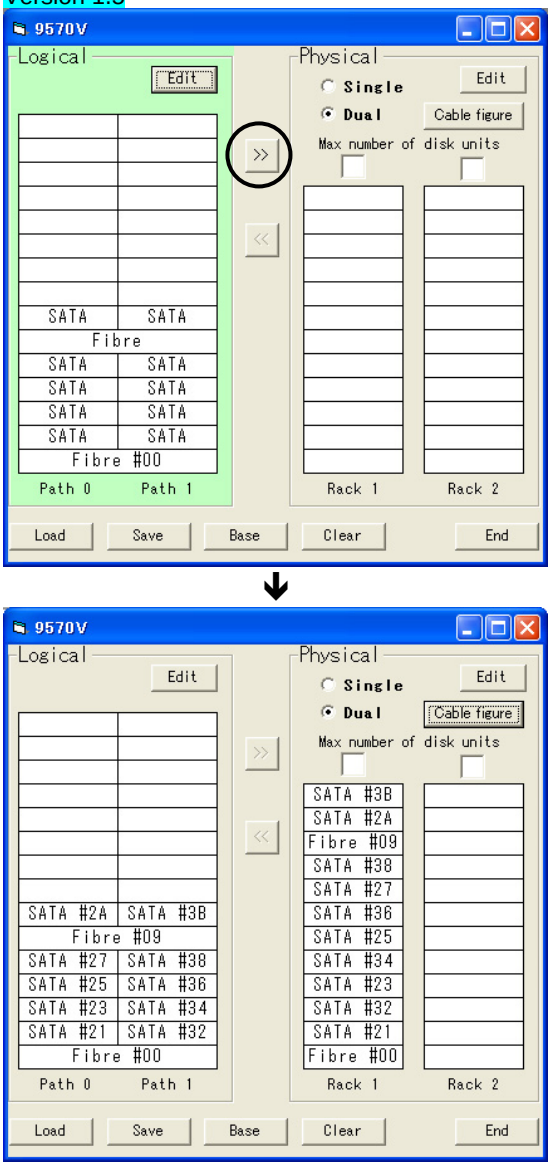




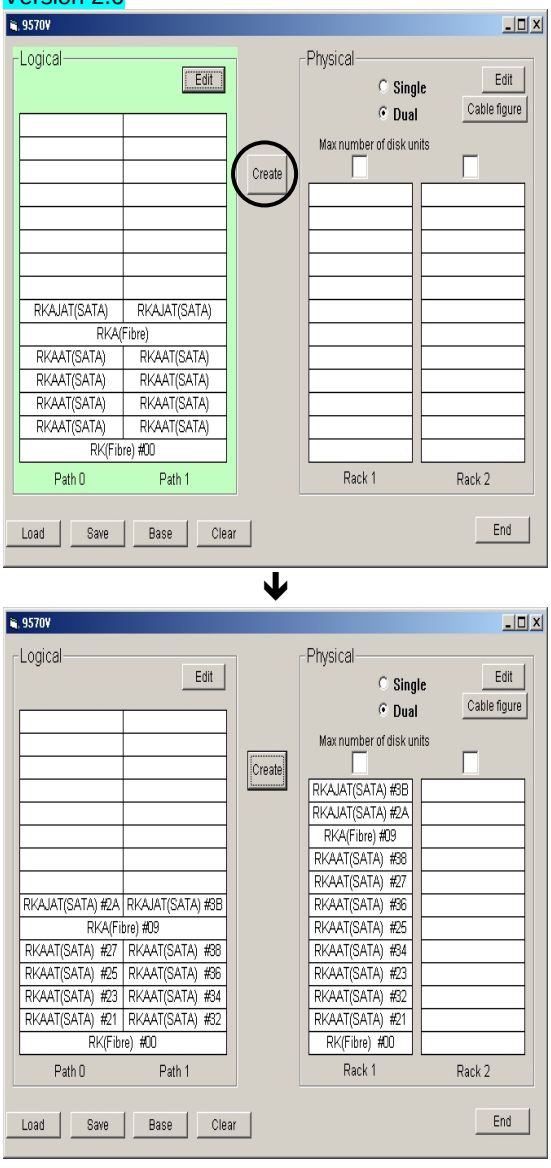
Copyright © 2005, Hitachi, Ltd.

• Samples of the 9570V (RK)

Version 1.5



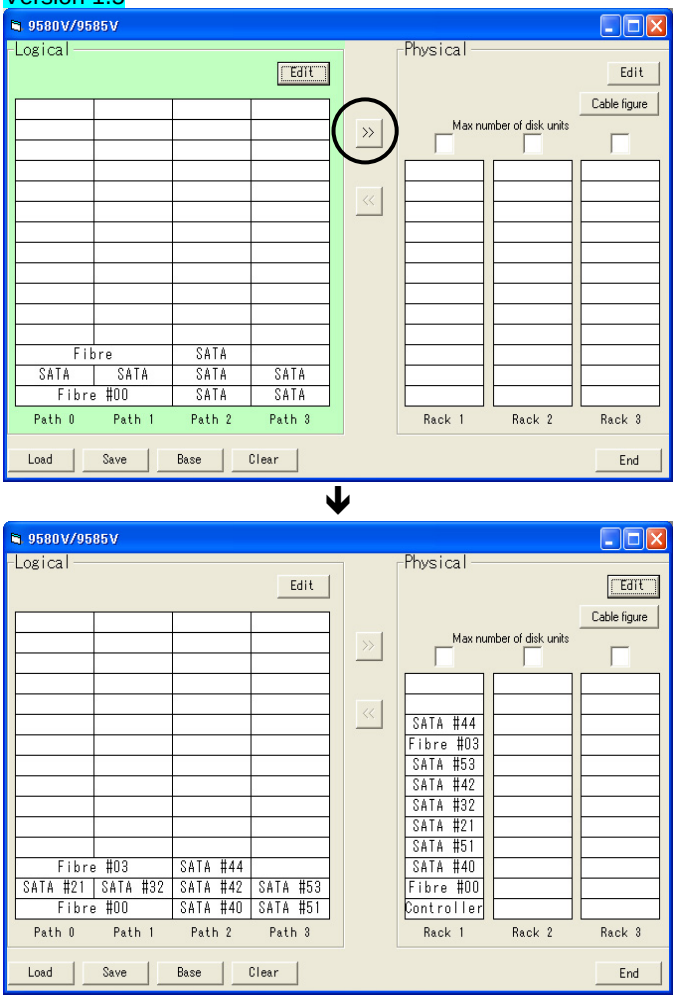
Version 2.0



Copyright © 2005, Hitachi, Ltd.

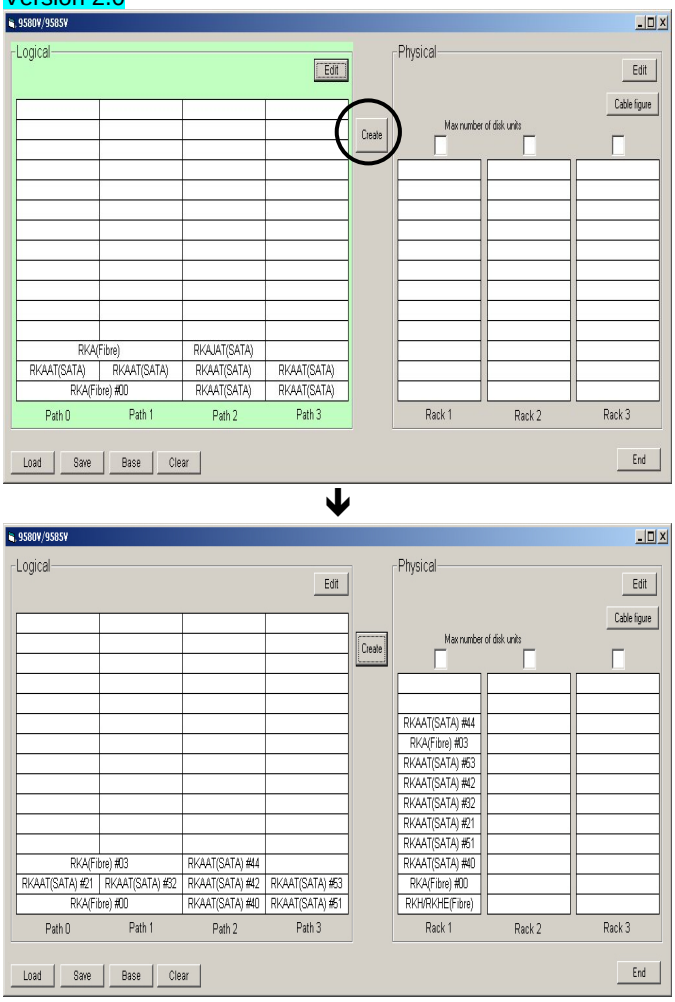
- Samples of the 9580V/9585V (RKH/RKHE)

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



Copyright © 2004, 2005, Hitachi, Ltd.

(c) Specification of the maximum number of disk units per rack

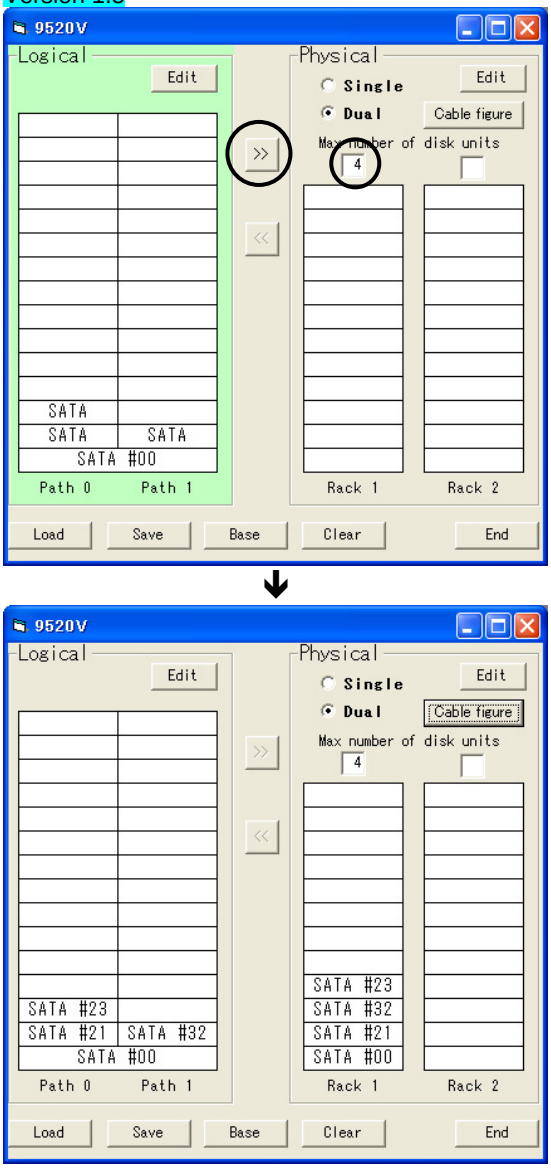
The maximum number of disk units per rack can be specified in order to balance numbers of disk units on the two racks.

The configuration diagram that has been made can be saved in a file. Refer to Section 9.4, “Saving and Reading the Configuration Diagram” on page INST 09-0270.

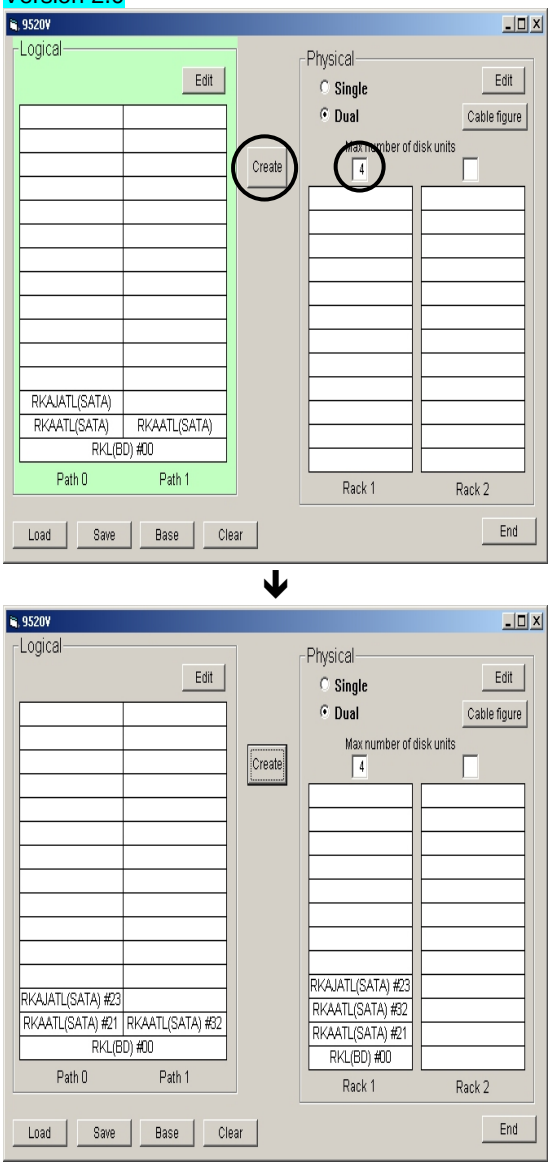
- In the case of the 9520V (RKL)

  Specify the maximum number of disk units mounted on the Rack 1, and then click the [>>] button (in the case of Version 2.0, [Create] button). The physical configuration diagram will be edited.

Version 1.5



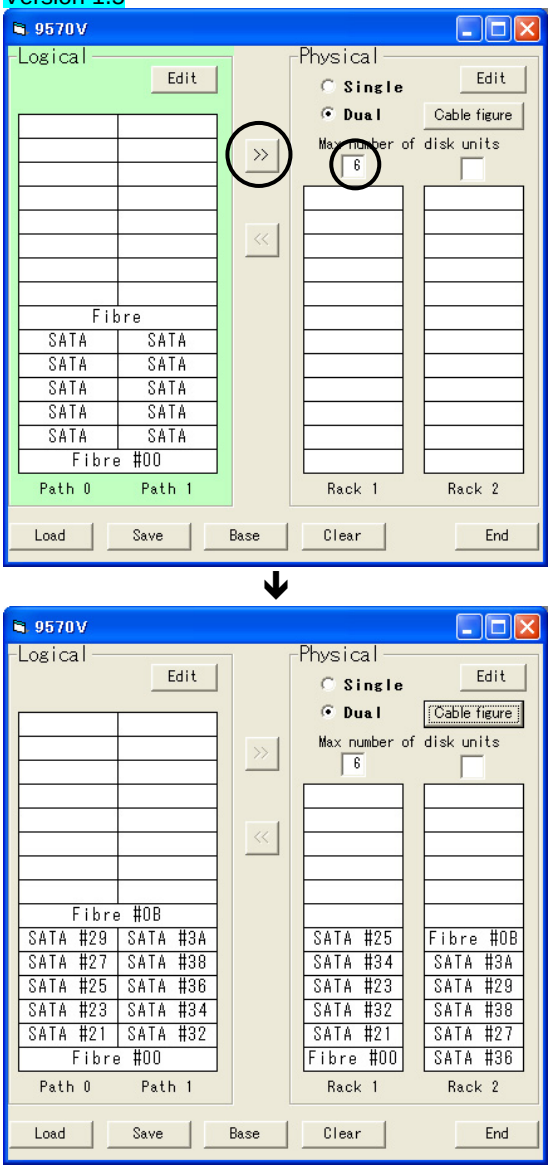
Version 2.0



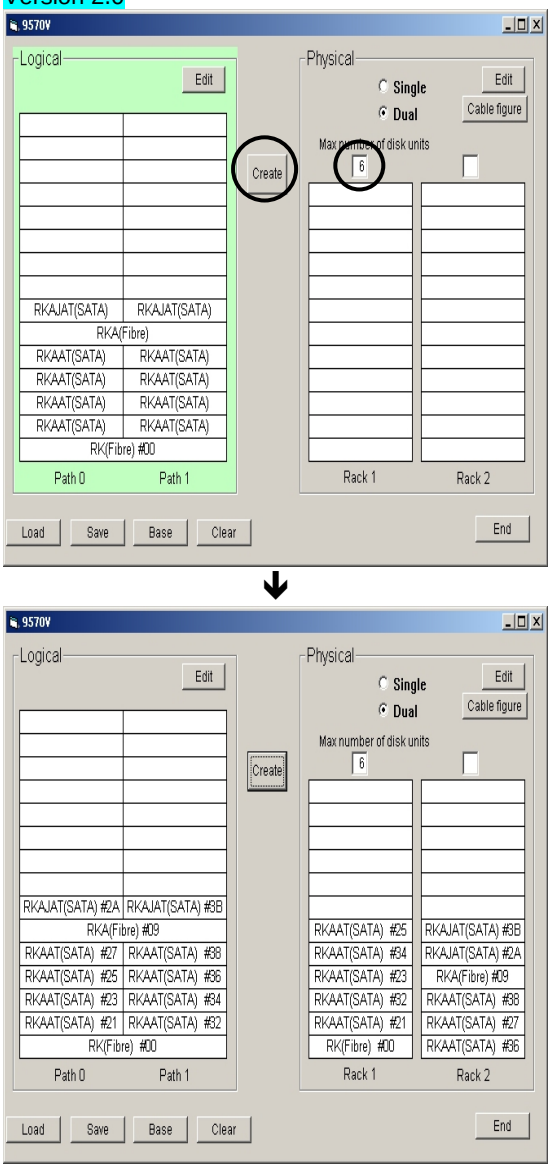
Copyright © 2004, 2005, Hitachi, Ltd.

- In the case of the 9570V (RK)
  Specify the maximum number of disk units mounted on the Rack 1, and then click the [»] button (in the case of Version 2.0, [Create] button). The physical configuration diagram will be edited.

Version 1.5



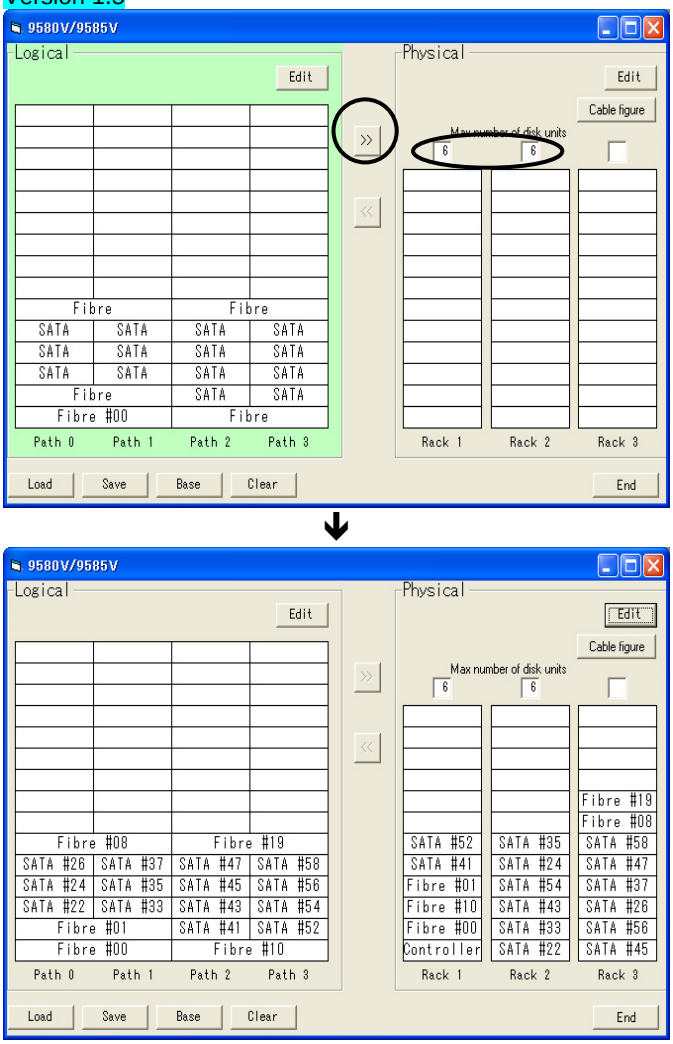
Version 2.0



Copyright © 2004, 2005, Hitachi, Ltd.

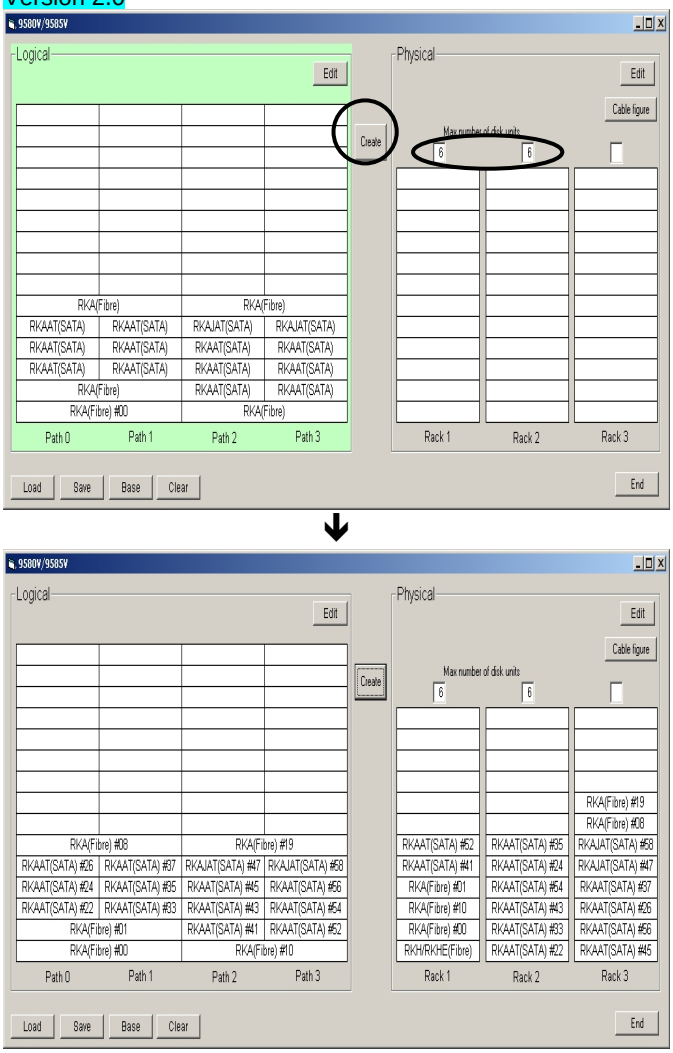
- In the case of the 9580V/9585V (RKH/RKHE)
  Specify the maximum number of disk units mounted on the Rack 1/Rack 2, and then click the [»] button (in the case of Version 2.0, [Create] button). The physical configuration diagram will be edited.

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

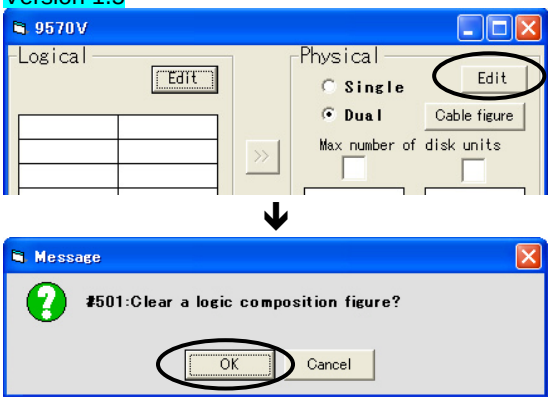
Copyright © 2005, Hitachi, Ltd.

(2) Edition of the physical configuration diagram and making of the logical configuration diagram

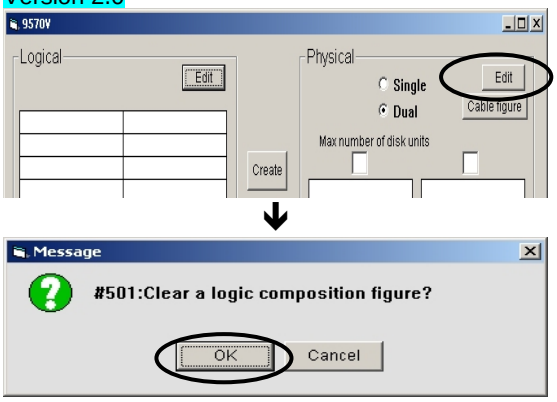
(a) Procedure for editing the physical configuration diagram

(i) Click the [Edit] button on the physical configuration side. A confirmation message is displayed.

Version 1.5



Version 2.0

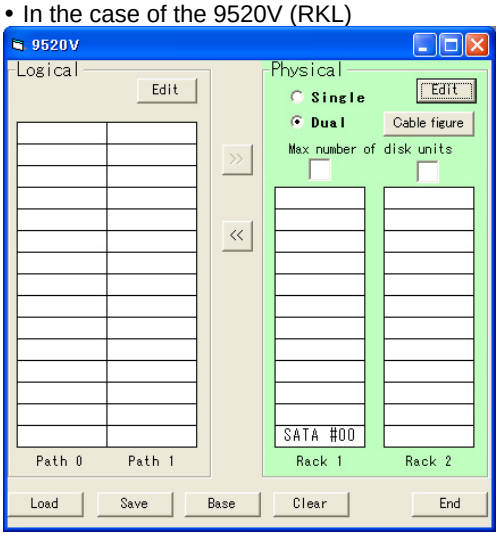


Copyright © 2004, 2005, Hitachi, Ltd.

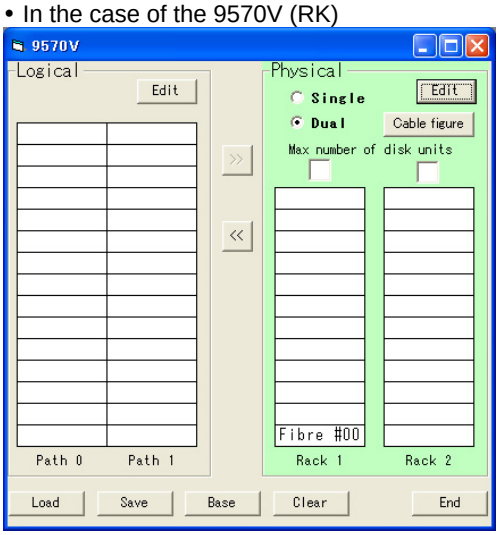
(ii) Click the [OK] button.
The whole data on the logical configuration side is cleared and the physical configuration side becomes ready for edition.

Version 1.5

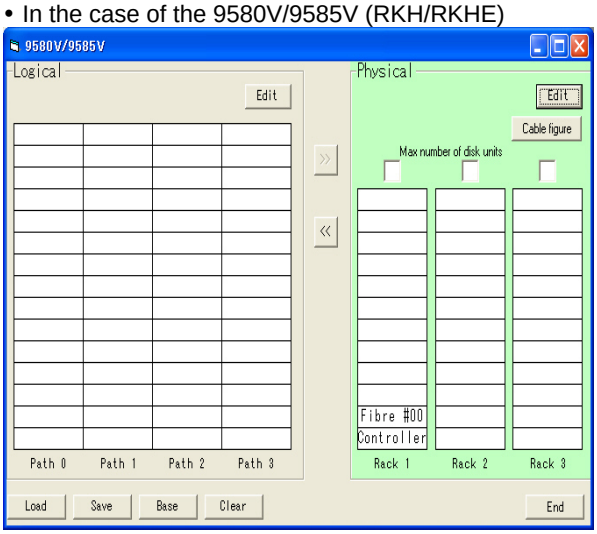
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



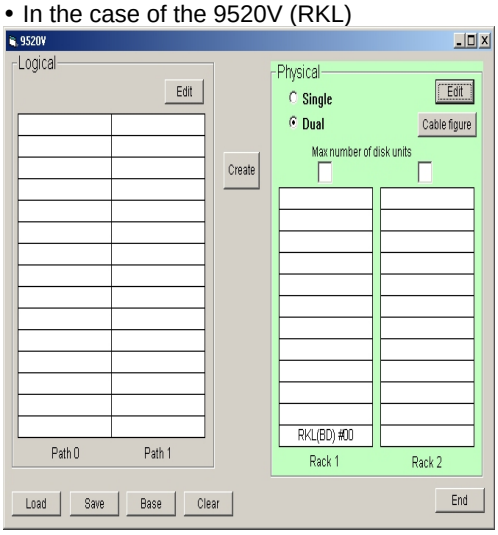
• In the case of the 9580V/9585V (RKH/RKHE)



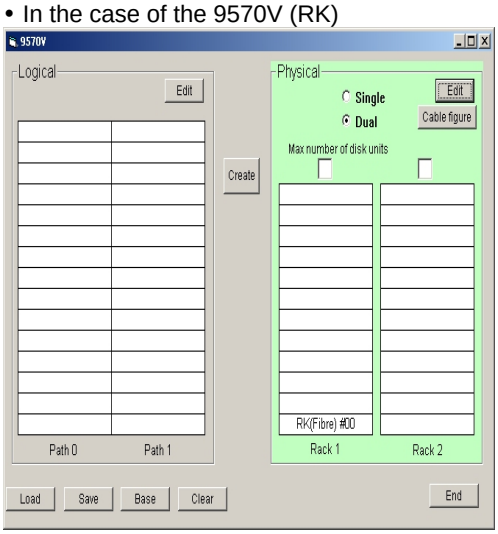
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

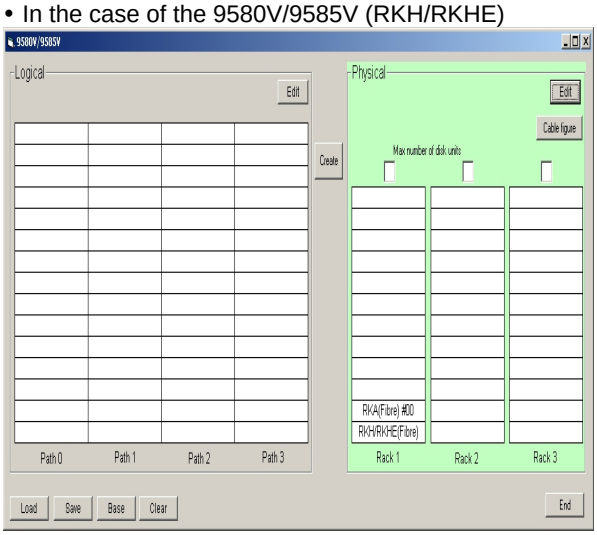
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)

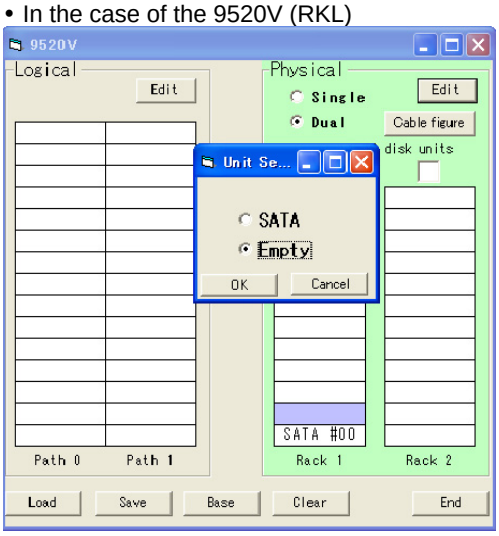


Copyright © 2004, 2005, Hitachi, Ltd.

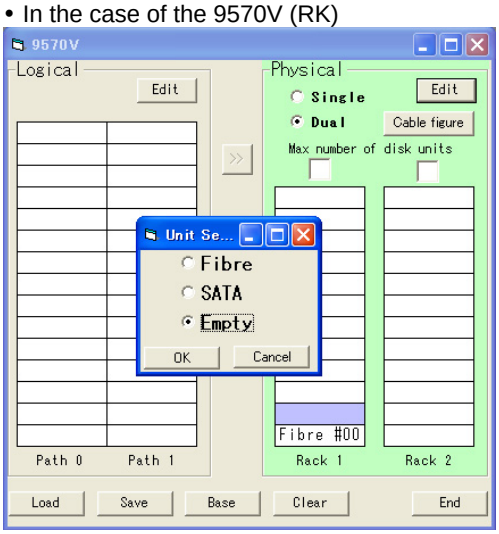
(iii) When the disk unit you want to edit is clicked, the selection window is displayed.
(iv) Select one of the Fibre, SATA, and Empty, and then click the [OK] button.
The selection is reflected on the physical configuration diagram.

Version 1.5

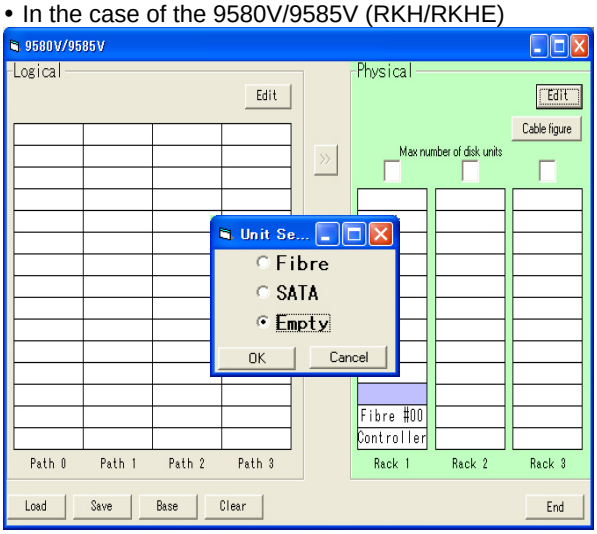
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



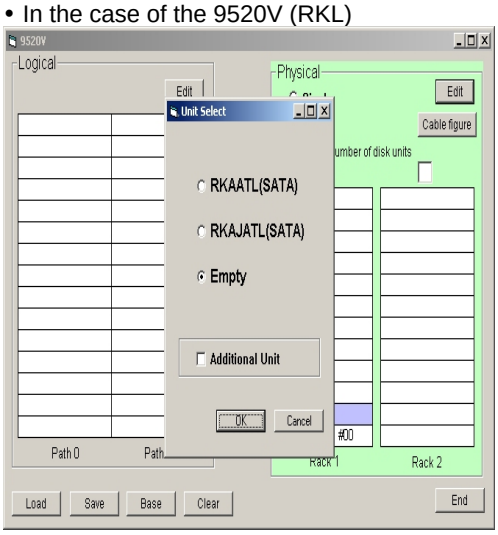
• In the case of the 9580V/9585V (RKH/RKHE)



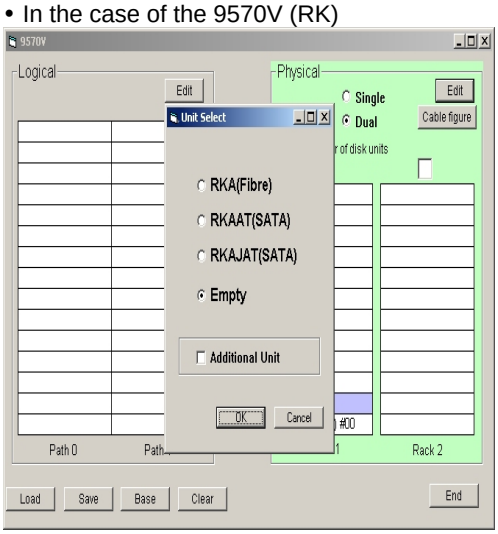
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

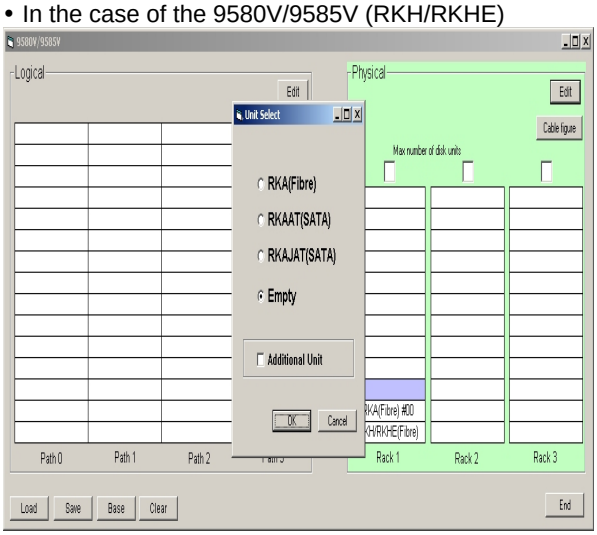
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)



Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

(b) Method for deriving the logical configuration diagram from the physical configuration diagram

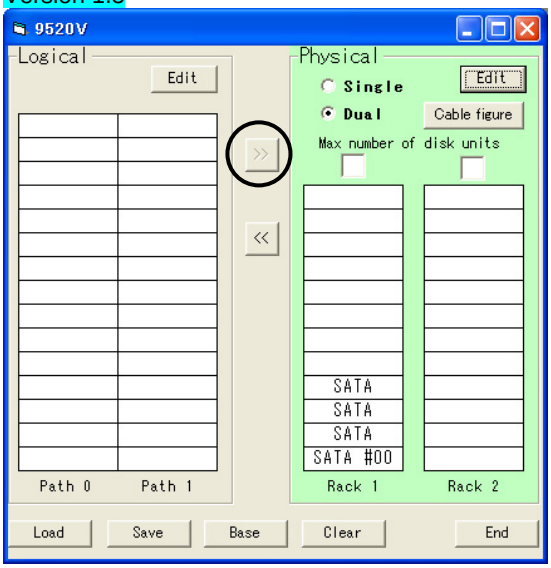
When the [<<] button (in the case of Version 2.0, [Create] button) is clicked, the Device ID# is set based on the physical configuration diagram that has been edited and the logical configuration diagram is made. However, if the configuration does not conform to the rule, an error message will be displayed.

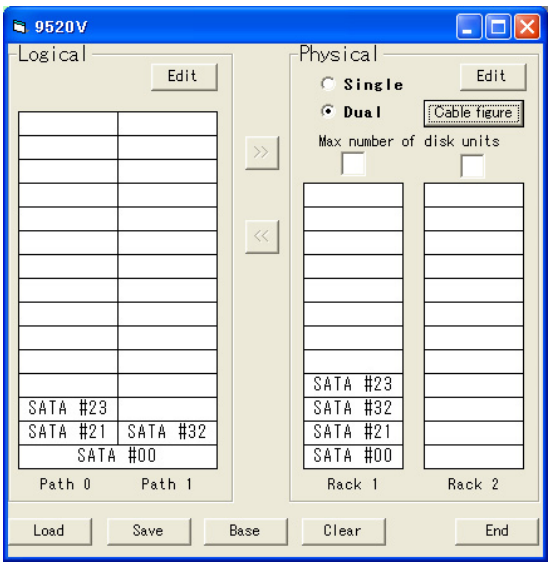
When the logical configuration diagram has been made successfully, the physical configuration diagram becomes unable to be edited.

The configuration diagram that has been made can be saved in a file. Refer to Section 9.4, “Saving and Reading the Configuration Diagram” on page INST 09-0270.

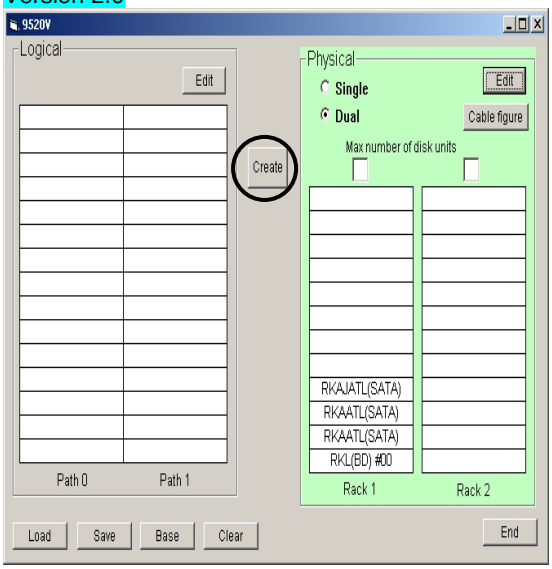
• In the case of the 9520V (RKL)

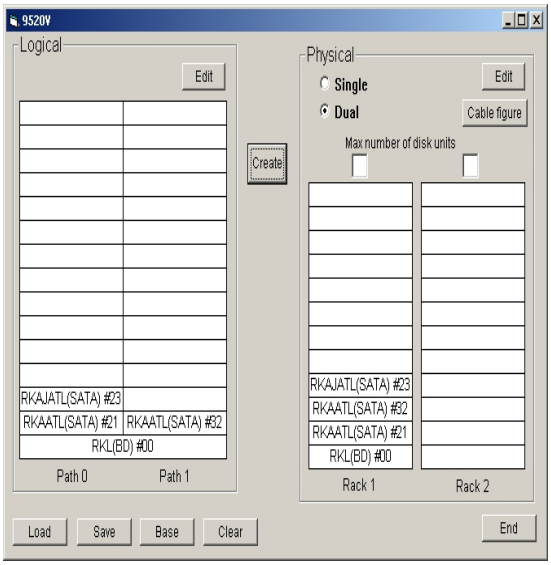
Version 1.5





Version 2.0

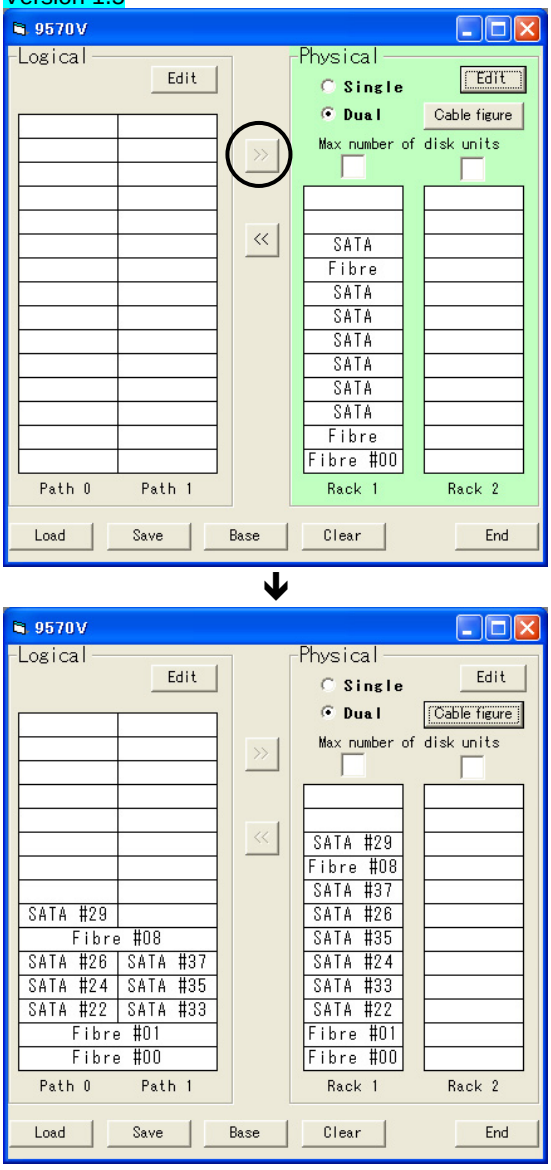




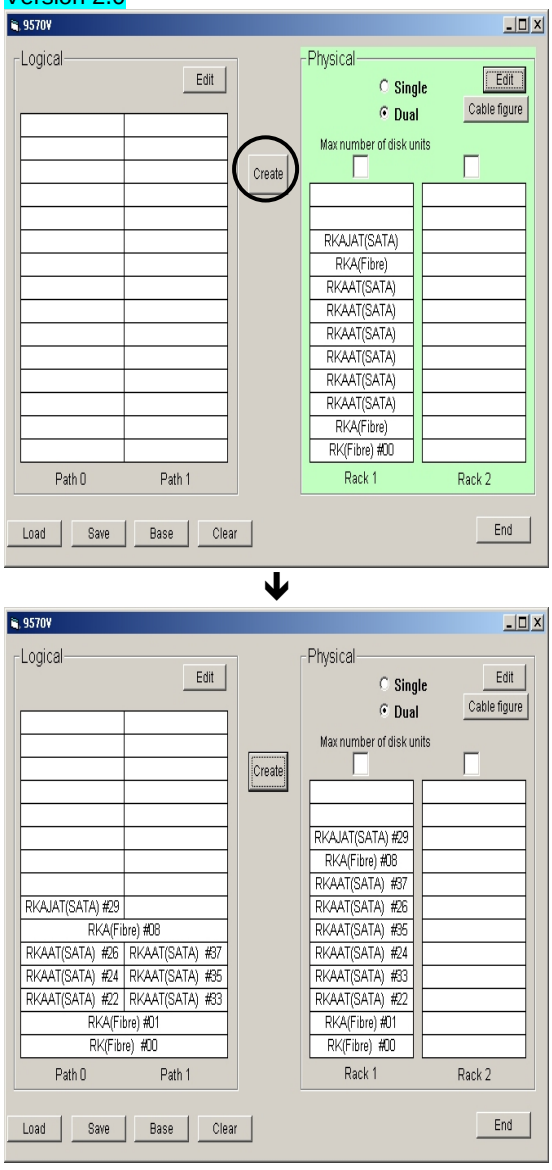
Copyright © 2004, 2005, Hitachi, Ltd.

• In the case of the 9570V (RK)

Version 1.5



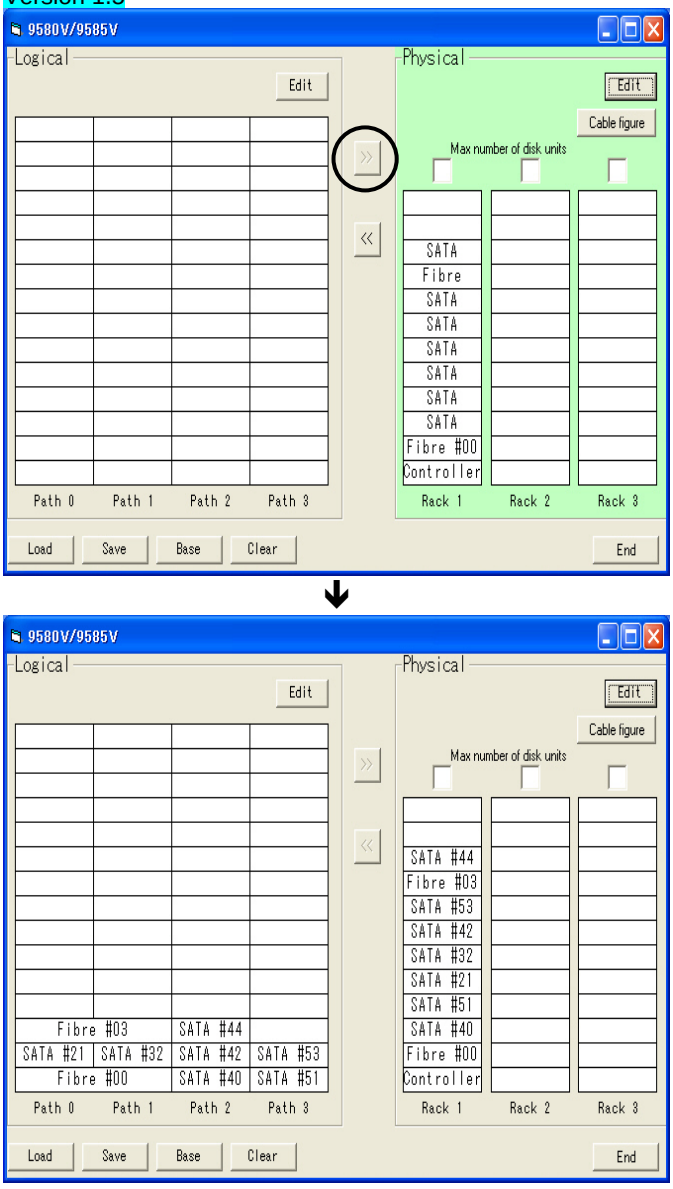
Version 2.0



Copyright © 2004, 2005, Hitachi, Ltd.

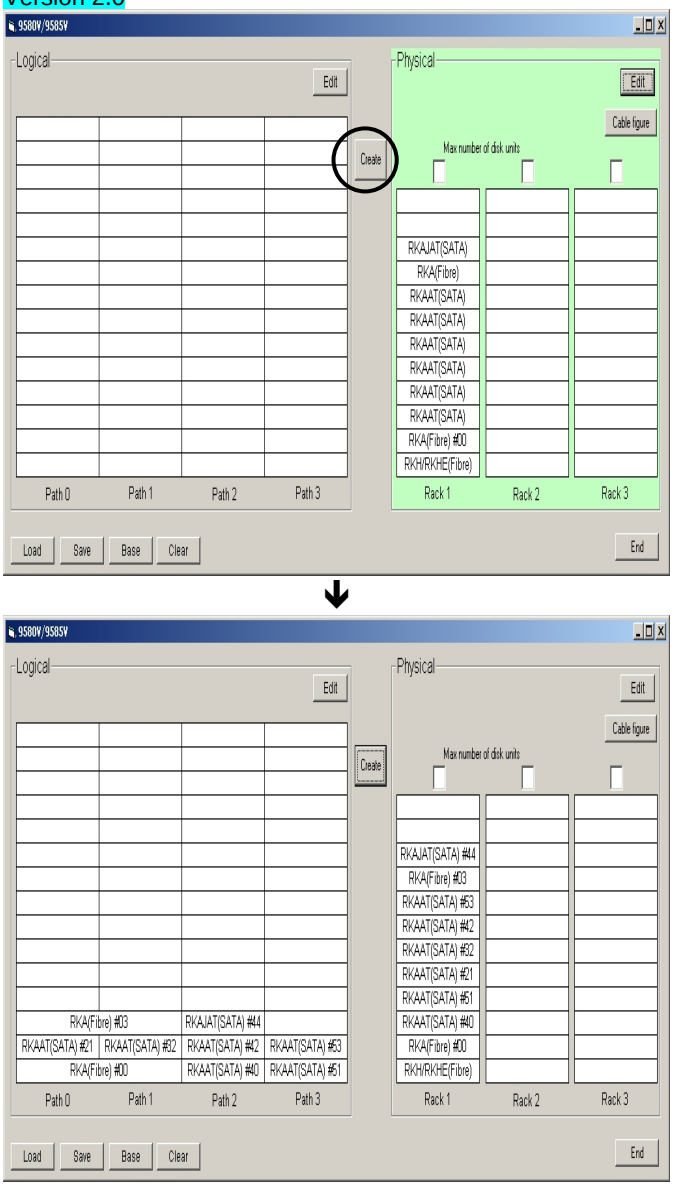
- In the case of the 9580V/9585V (RKH/RKHE)

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

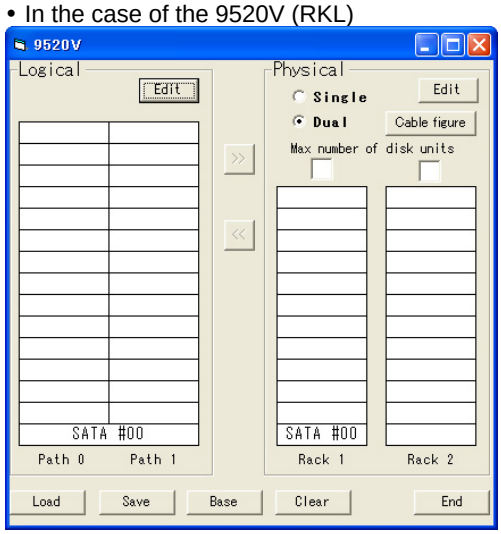
Copyright © 2005, Hitachi, Ltd.

(3) Initial configuration diagram

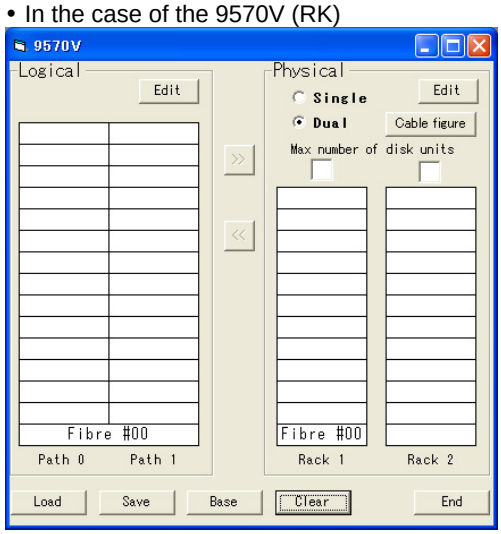
When the [Clear] button is clicked in the middle of the making of the configuration diagram, the result of the current work that has been done is cleared and the initial configuration diagram (shown in the following figure) is displayed.

Version 1.5

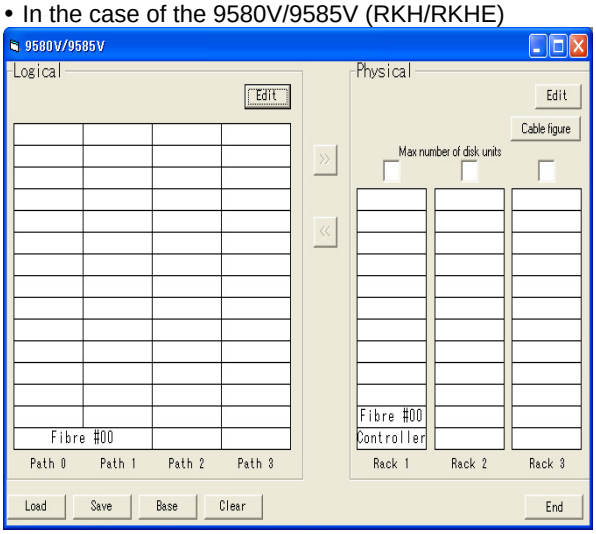
• In the case of the 9520V (RKL)



• In the case of the 9570V (RK)



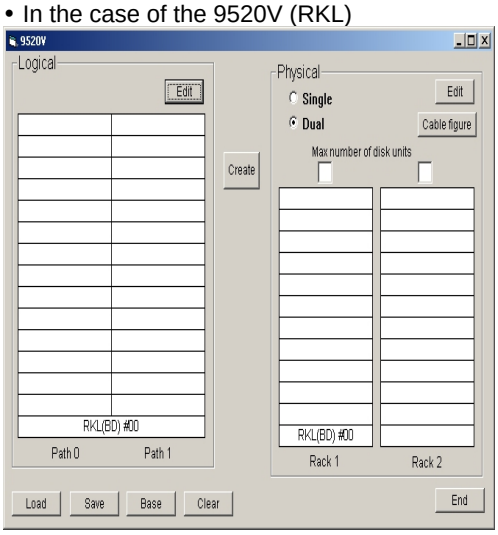
• In the case of the 9580V/9585V (RKH/RKHE)



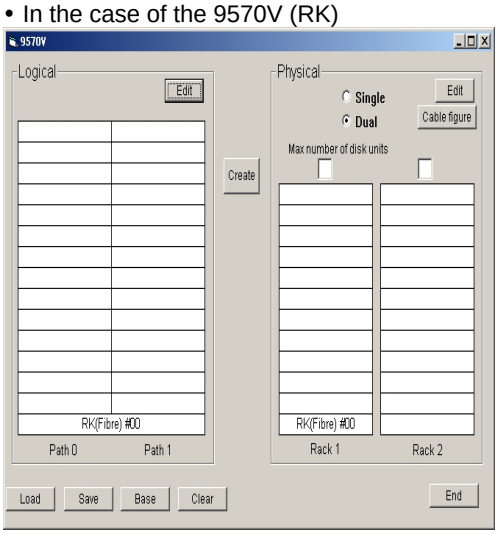
Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0

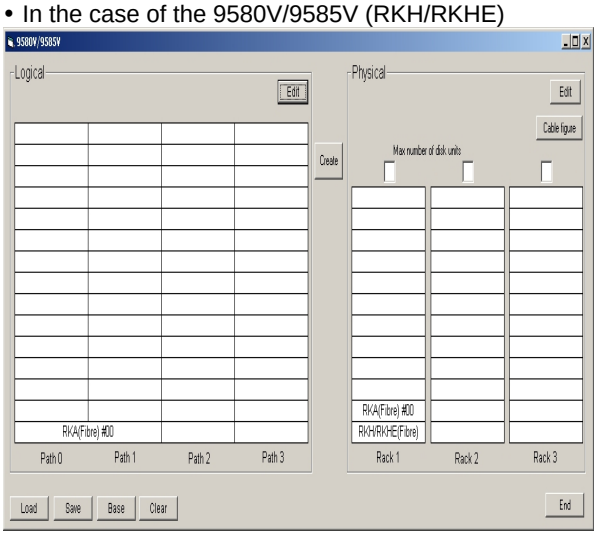
- In the case of the 9520V (RKL)



- In the case of the 9570V (RK)



- In the case of the 9580V/9585V (RKH/RKHE)



Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

9.2.3 Cooperation with Disk Array Management Program

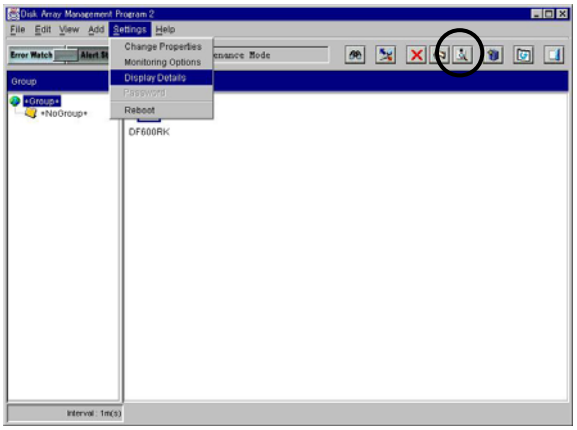
Display the logical/physical configuration with Disk Array Management Program, which is an application program for setting the 9520V, 9570V or 9580V/9585V, using the configuration information output by the configuration copying function.

NOTE : • When the configuration information is got from the system, to which the RKAJAT is connected, using the configuration copy function of Disk Array Management Program 2 and the ACE Tool is made to read in the file, the ACE Tool displays RKAAT instead of RKAJAT. Change the RKAAT to RKAJAT manually because their cable connections are different from each other though their device IDs are the same.
• When the RKAJAT is connected, use the ACE Tool of Version 2.0 because that of Version 1.0 does not support it.

(1) For the installation method of the ACE tool, refer to "1.7.2 (1) Procedure for Installation" (INS 01-0220).

(2) Start the Disk Array Management Program and set the Active Mode in the "Maintenance Mode".
For the procedure for changing to the Maintenance mode, refer to Step (b), "Changing the Maintenance Mode" on page INST 05-0050 in Item (3), "Registering the newly introduced DF in the Disk Array Management Program" in Subsection 5.1.1.

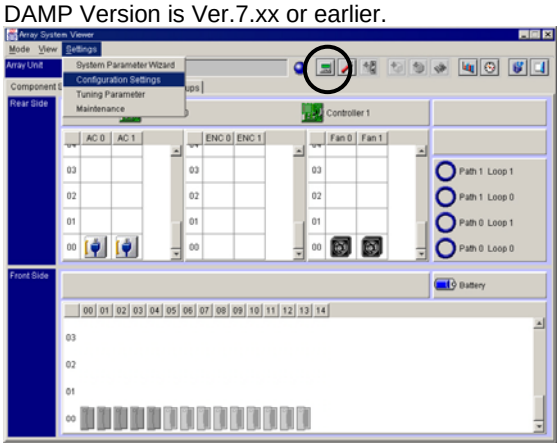
(3) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.
• Selecting [Settings] – [Display Details]
• Double-clicking an icon of the disk array subsystem you want to set
• Clicking [ : Display Details]



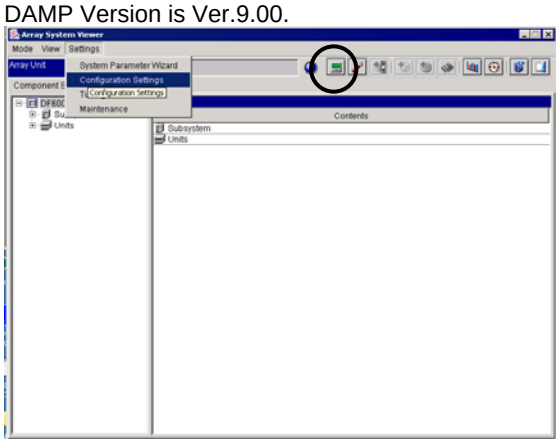
Copyright © 2004, 2005, Hitachi, Ltd.

(4) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] in the tool bar.

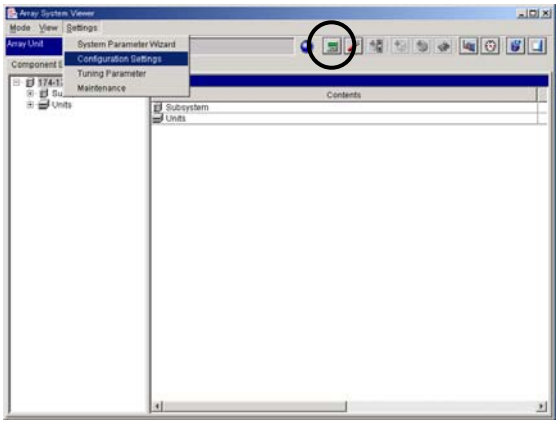
DAMP Version is Ver.7.xx or earlier.



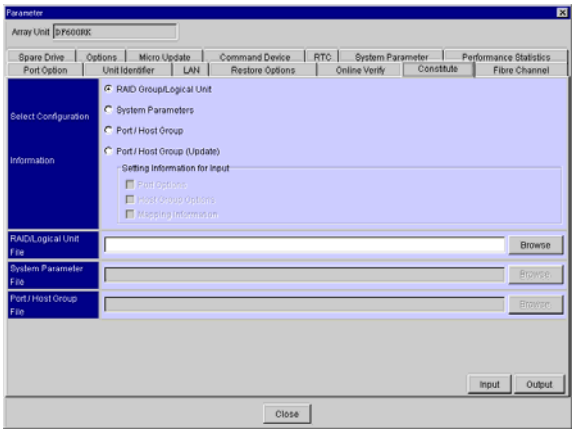
DAMP Version is Ver.9.00.



DAMP Version is Ver.9.10 or later.

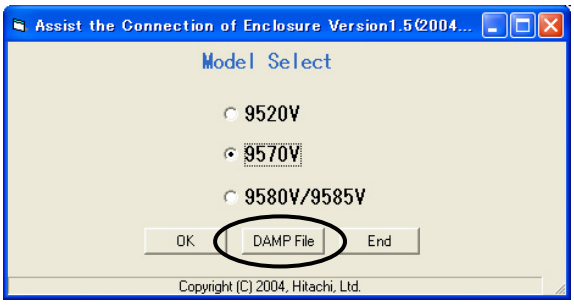


(5) Click the [Constitute] tab.
Get the configuration information by selecting [RAID Group/Logical Unit].

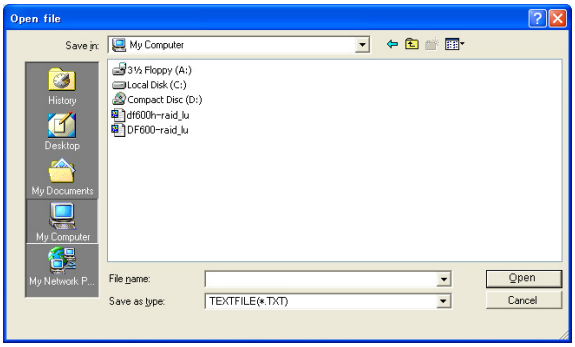


Copyright © 2004, 2005, Hitachi, Ltd.

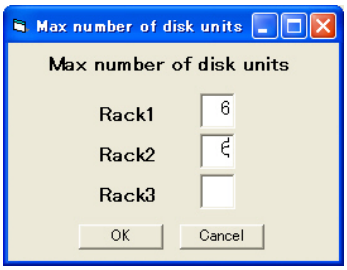
(6) Click the [DAMP File] in the subsystem selection window.



(7) Since the file selection window is displayed, select the file output by Disk Array Management Program.



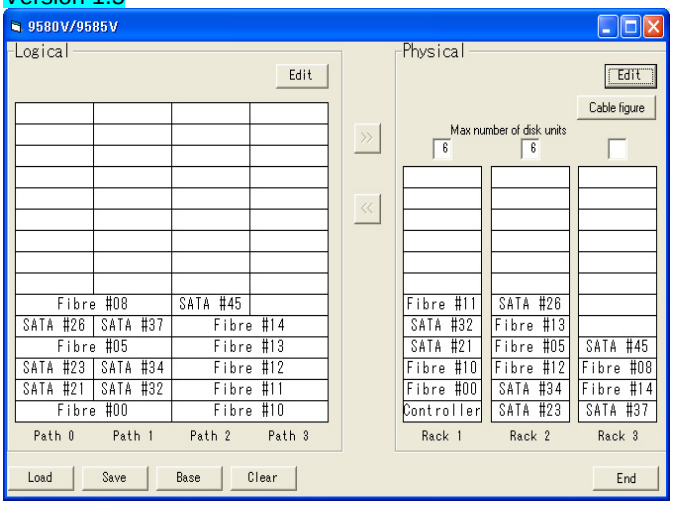
(8) Since the following dialog box is displayed, enter the maximum number of mountable disk units for each rack. (The following shows a case where a file of the DF600H was read. In the case of the DF600, Rack3 is not displayed.)



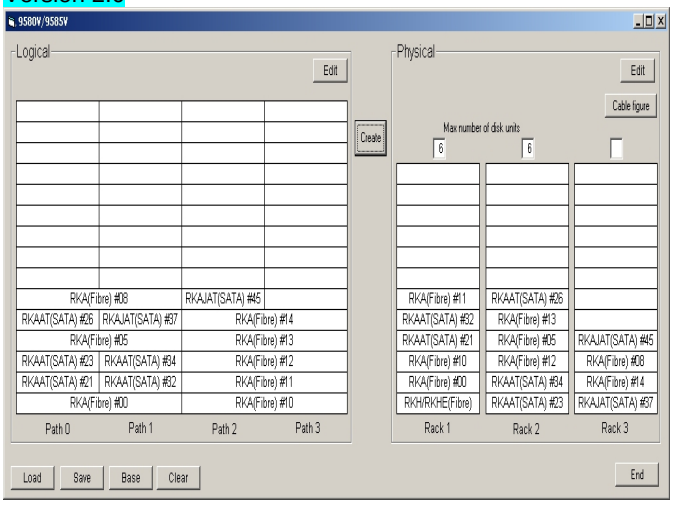
Copyright © 2004, 2005, Hitachi, Ltd.

(9) A configuration diagram is made taking the maximum number of disk units specified in Step (8) in consideration.

Version 1.5



Version 2.0



(10) The configuration diagram that has been made can be saved in a file. Refer to Section 9.4, “Saving and Reading the Configuration Diagram” on page INST 09-0270.

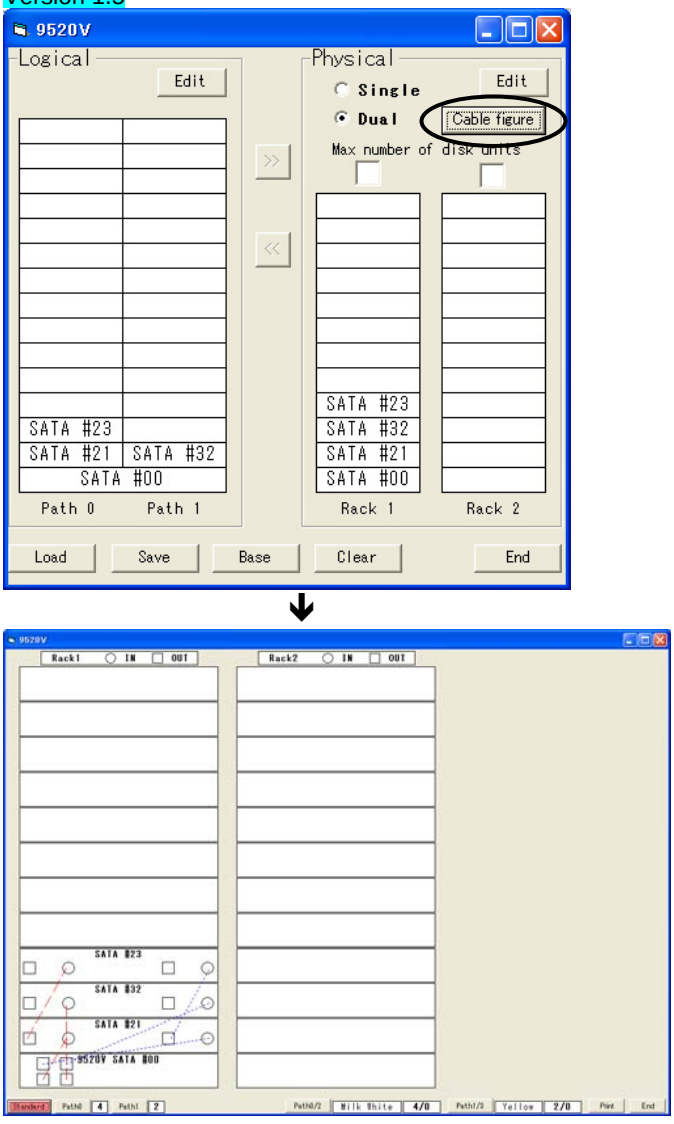
Copyright © 2004, 2005, Hitachi, Ltd.

9.3 Displaying the ENC Cable Connection Diagram

9.3.1 Displaying the ENC cable connection diagram in the 9520V (RKL)

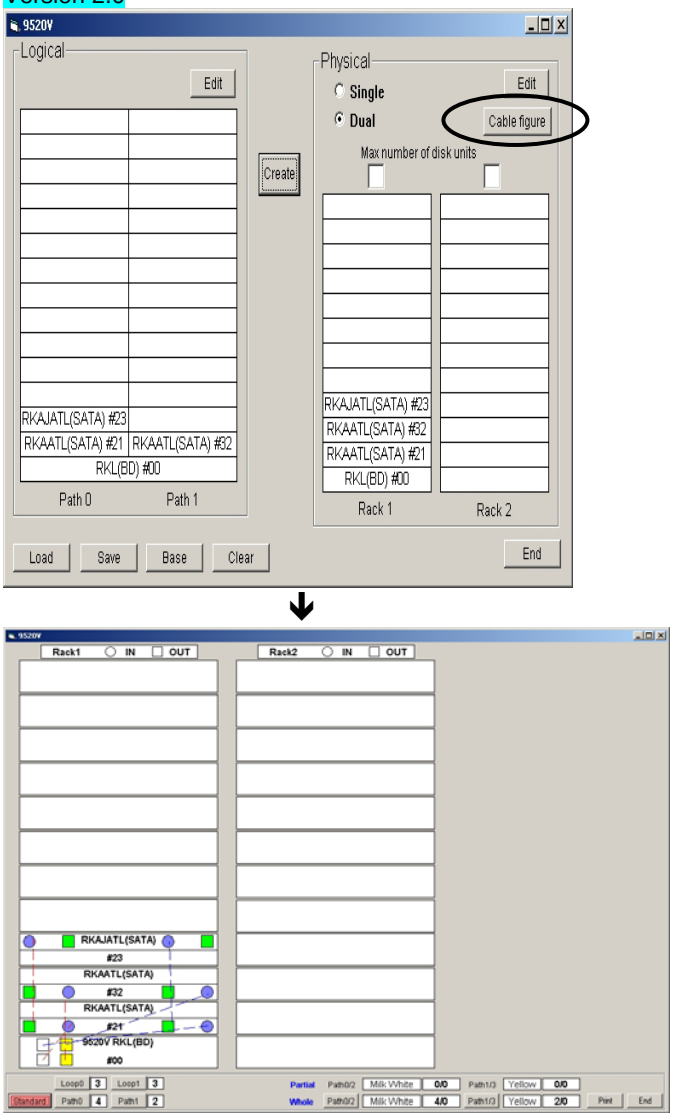
(1) When the [Cable figure] button is clicked, the ENC cable connection figure is displayed. Also, the installing number of the Control Unit can be specified.
The number of the installed Control Unit PCBAs can be specified.
- When the one Control Unit PCBA is installed, select [Single].
- When the two Control Unit PCBAs are installed, select [Dual].

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

(3) When the [End] button is clicked, the window is returned to the original one.

Copyright © 2005, Hitachi, Ltd.

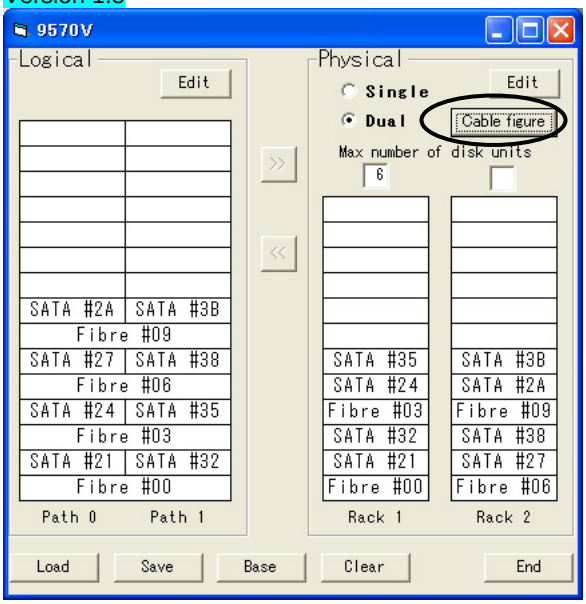
This page is for editorial purpose only.

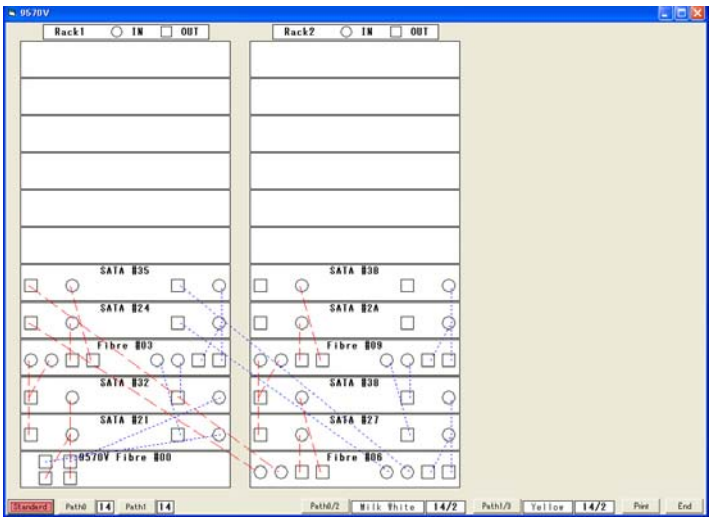
Copyright © 2005, Hitachi, Ltd.

9.3.2 Displaying the ENC cable connection diagram in the 9570V (RK)

(1) When the [Cable figure] button is clicked, the ENC cable connection figure is displayed.
Also, the installing number of the Control Unit can be specified.
The number of the installed Control Unit PCBAs can be specified.
- When the one Control Unit PCBA is installed, select [Single].
- When the two Control Unit PCBAs are installed, select [Dual].

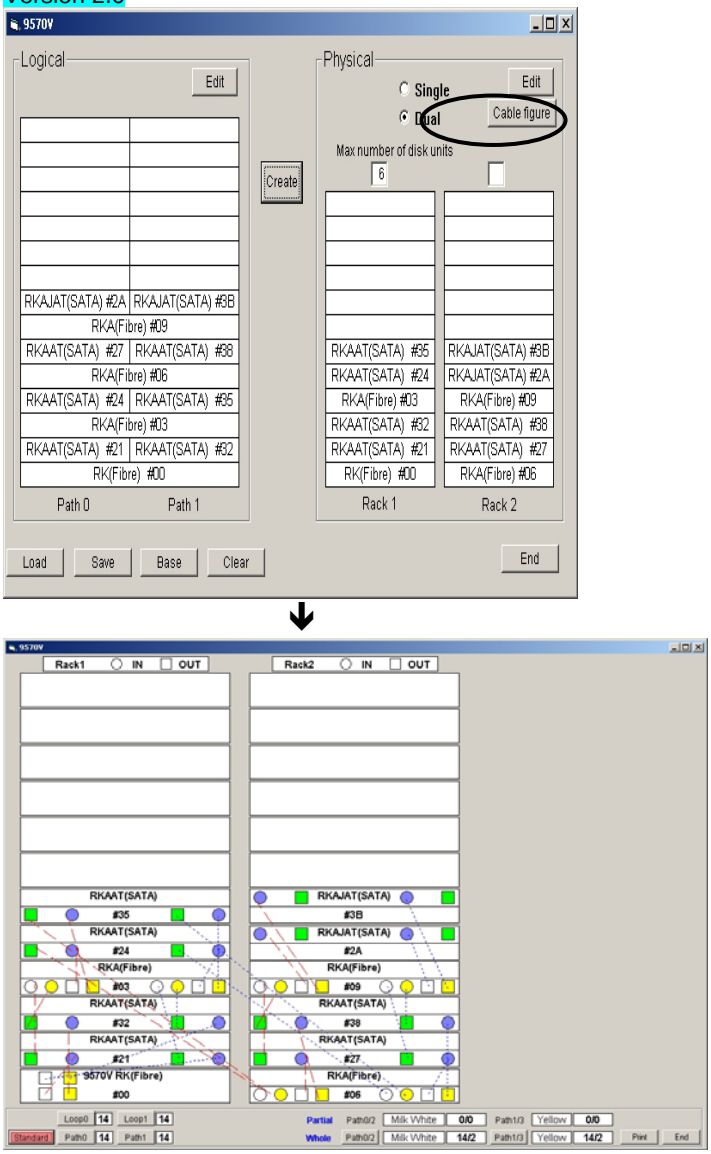
Version 1.5





Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

(3) When the [End] button is clicked, the window is returned to the original one.

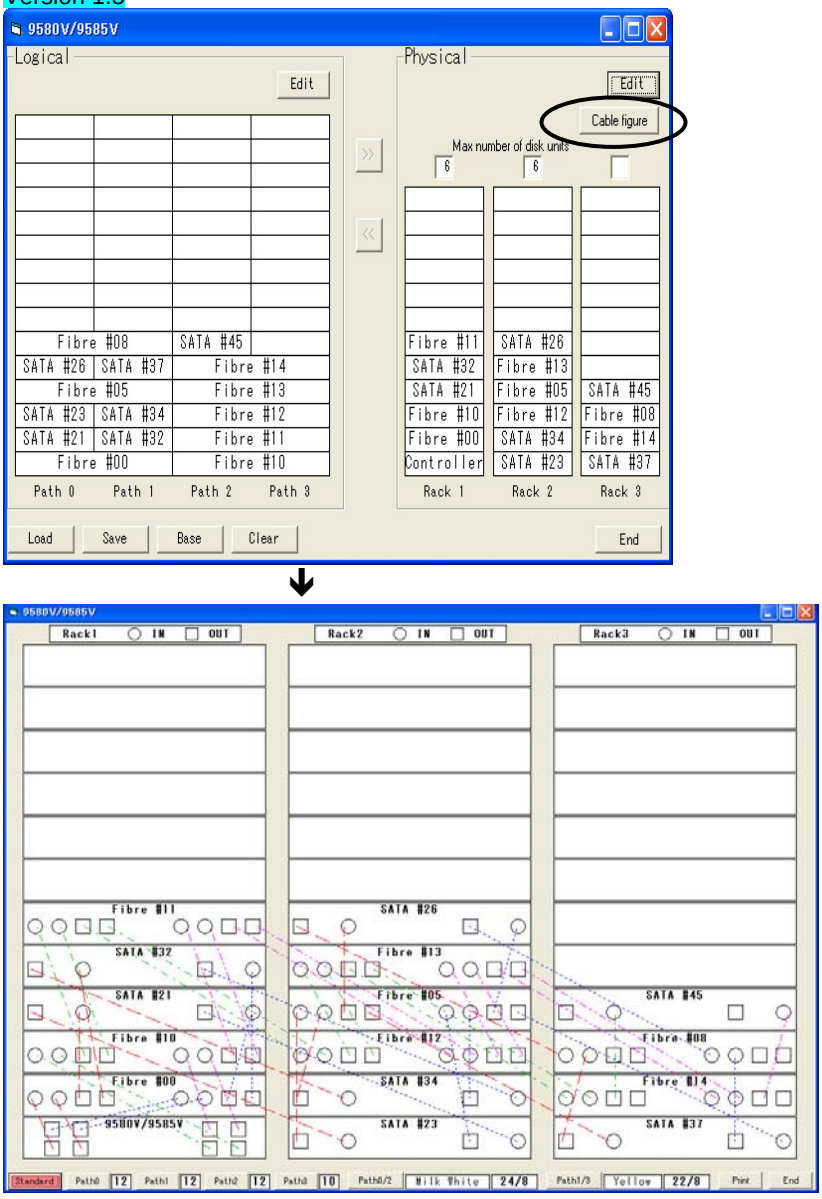
Copyright © 2004, 2005, Hitachi, Ltd.

9.3.3 Displaying the ENC cable connection diagram in the 9580V/9585V (RKH/RKHE)

(1) When the [Cable figure] button is clicked, the ENC cable connection diagram is displayed.

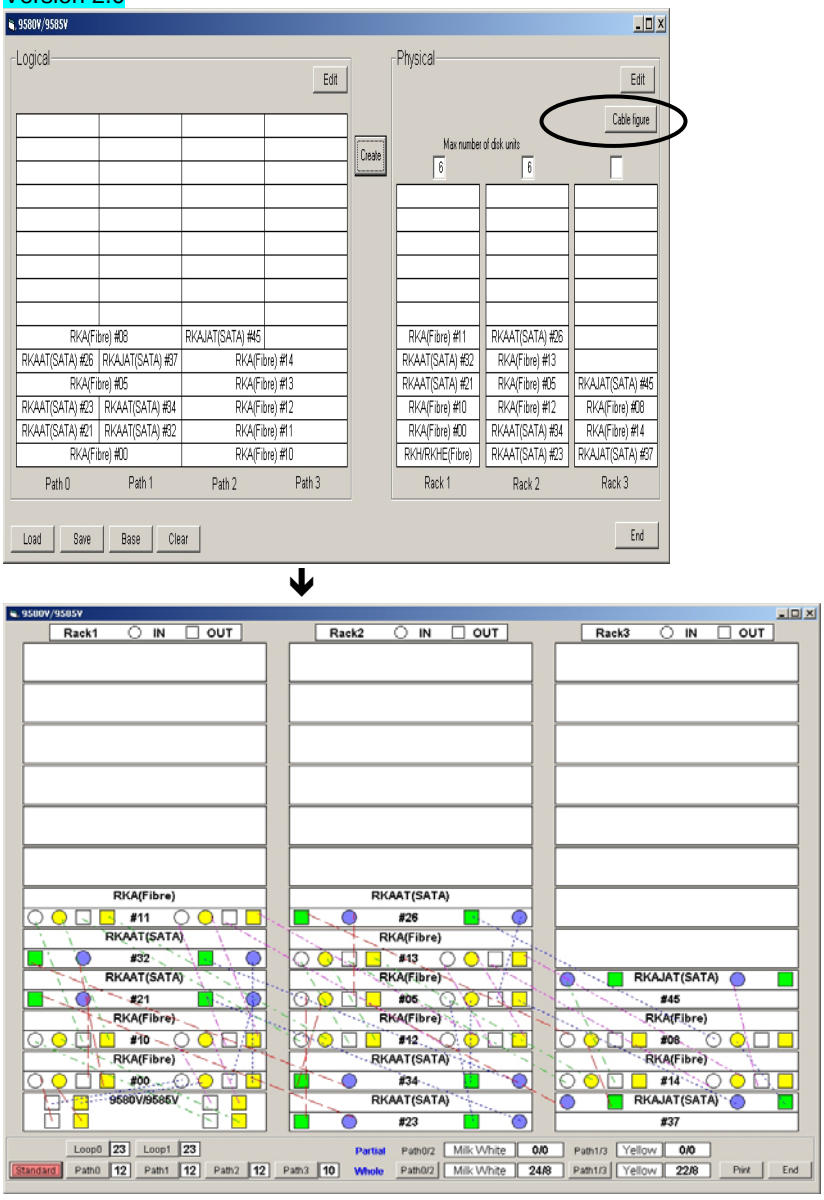
NOTE : In regard to the 9580V/9585V (RKH/RKHE), the selection of the controller like that of the 9570V (RK) is not required because the dual controller is compulsory.

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

(3) When the [End] button is clicked, the window is returned to the original one.

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

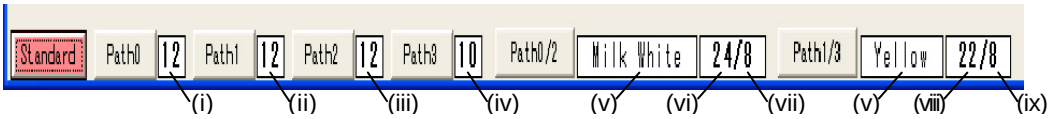
Copyright © 2005, Hitachi, Ltd.

9.3.4 Selecting the path

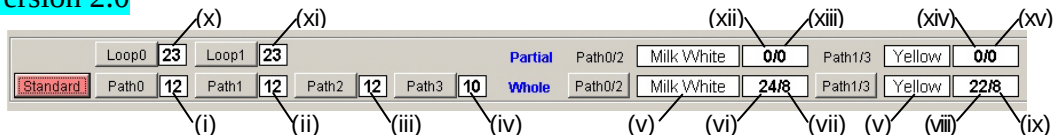
When the each [Path] button is clicked, the displayed lines connected to the path are highlighted, disk units connected to the lines are displayed in white, and disk units not connected to the lines are displayed in gray.
To cancel the highlighting, click the [Standard] button.

The explanations of the buttons are shown below.

Version 1.5



Version 2.0



[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 9520V (RKL)/9570V (RK)).
[Path3] button : The line connected to Path3 is highlighted (it is not displayed in the 9520V (RKL)/9570V (RK)).
[Path0/2] button : The lines connected to Path0 and Path2 are highlighted (Path2 does not exist in the 9520V (RKL)/9570V (RK)).
[Path1/3] button : The lines connected to Path1 and Path3 are highlighted (Path3 does not exist in the 9520V (RKL)/9570V (RK)).
[Loop0] button : The line connected to Loop0 is highlighted.
[Loop1] button : The line connected to Loop1 is highlighted.

Copyright © 2004, 2005, Hitachi, Ltd.

[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 number of ENC cables of Path2 is displayed (it is not displayed in the 9520V (RKL)/9570V (RK)).
(iv) The number of ENC cables of Path3 is displayed (it is not displayed in the 9520V (RKL)/9570V (RK)).
(v) The color of the binders attached to both ends of the ENC cable is displayed.
(vi) The number of ENC cables of Path0 and Path2 is displayed (only the number of Path0 is displayed in the 9520V (RKL)/9570V (RK) because Path2 does not exist).
(vii) The number of ENC cables (long ENC cables) between the racks of Path0 and Path2 is displayed.
(viii) The number of ENC cables of Path1 and Path3 is displayed (only the number of Path1 is displayed in the 9520V (RKL)/9570V (RK) because Path3 does not exist).
(ix) The number of ENC cables (long ENC cables) between the racks of Path1 and Path3 is displayed.
(x) The number of ENC cables of Loop0 is displayed.
(xi) The number of ENC cables of Loop1 is displayed.
(xii) 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.
(xiii) 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.
(xiv) 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.
(xv) 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.

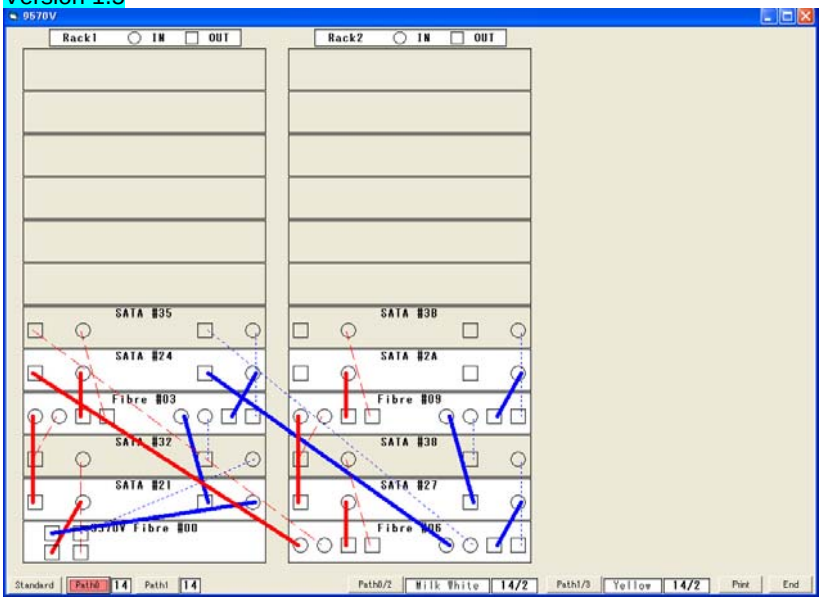
Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

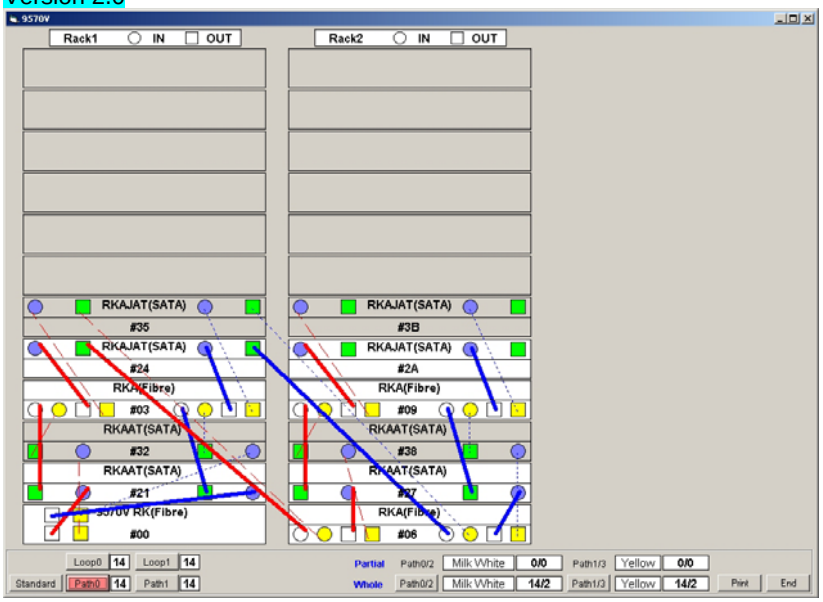
Copyright © 2005, Hitachi, Ltd.

(1) When Path 0 is selected, the Path 0 is highlighted and the disk units connected to its lines are displayed in white.

Version 1.5



Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

(3) When the [End] button is clicked, the window is returned to the original one.

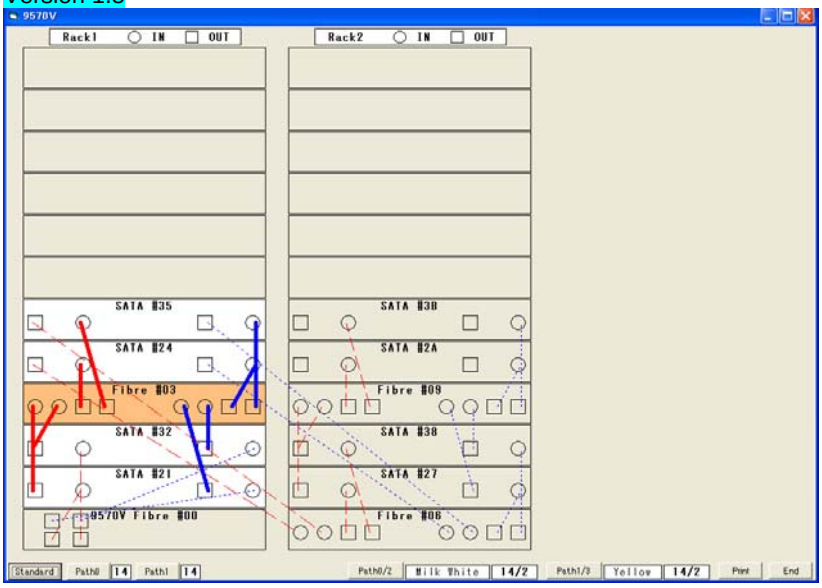
Copyright © 2004, 2005, Hitachi, Ltd.

9.3.5 Selecting the disk unit

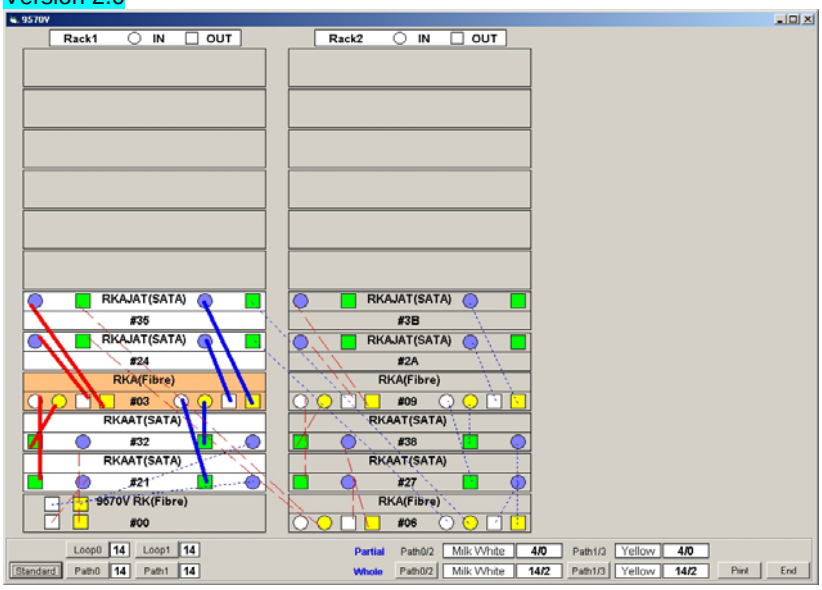
When a disk unit is selected, displayed ENC cables connected to the selected disk unit are highlighted. Besides, the selected disk unit is displayed in orange, disk units connected to it are displayed in white, and the other disk units not connected to it are displayed in gray.
To cancel the selection of the disk unit, click the [Standard] button.

(1) When "Fibre #03" is selected, the Fibre #03 disk unit is displayed in orange and disk units connected to the Fibre #03 disk unit are displayed in white.
Besides, the displayed ENC cables connected to the Fibre #03 disk unit are highlighted.

Version 1.5



Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

Copyright © 2004, 2005, Hitachi, Ltd.

(3) When the [End] button is clicked, the window is returned to the original one.

Copyright © 2004, 2005, Hitachi, Ltd.

9.3.6 Selecting two or more chassis frames

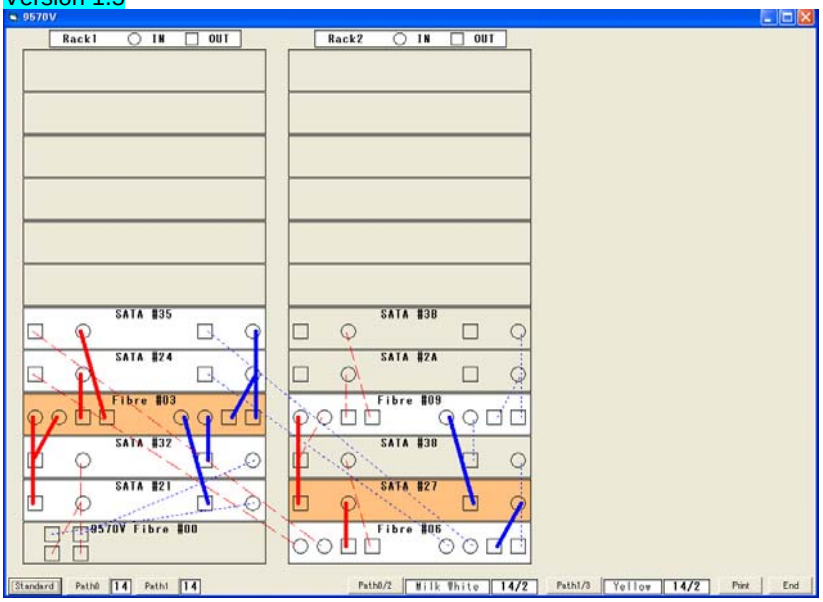
When the optional chassis frame is clicked while the control [Ctrl] key is pressed, two or more chassis frames can be selected. The connecting ENC cables from the selected chassis frames are highlighted.

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.

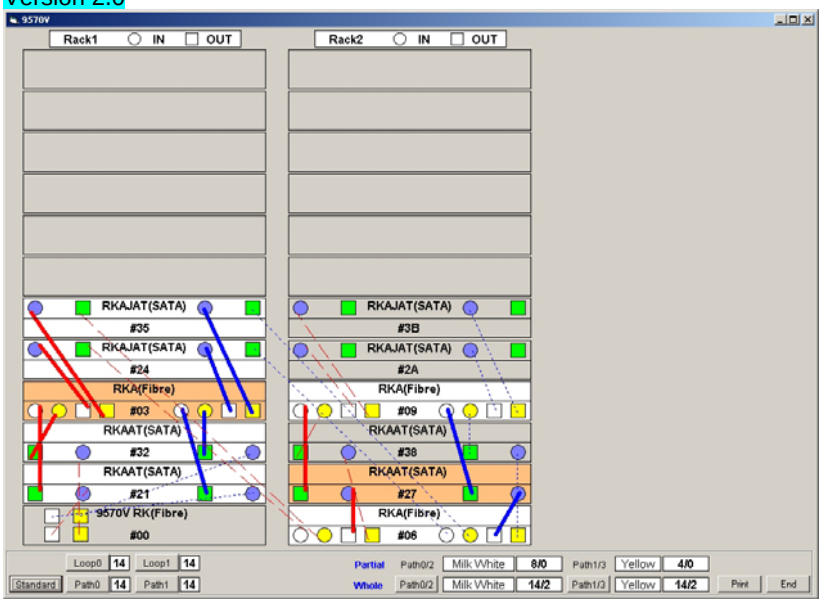
(1) When [Fibre#03] is selected and [SATA#27] is clicked while the control [Ctrl] key is pressed, the chassis frame connected to the [Fibre#03 and SATA#27] chassis frame is displayed in white. Also, the connecting ENC cable from the [Fibre#03 and SATA#27] chassis frame is highlighted.

Version 1.5



Copyright © 2004, 2005, Hitachi, Ltd.

Version 2.0



(2) When the [Print] button is clicked, the information displayed in the window is printed as it is.

(3) When the [End] button is clicked, the window is returned to the original one.

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

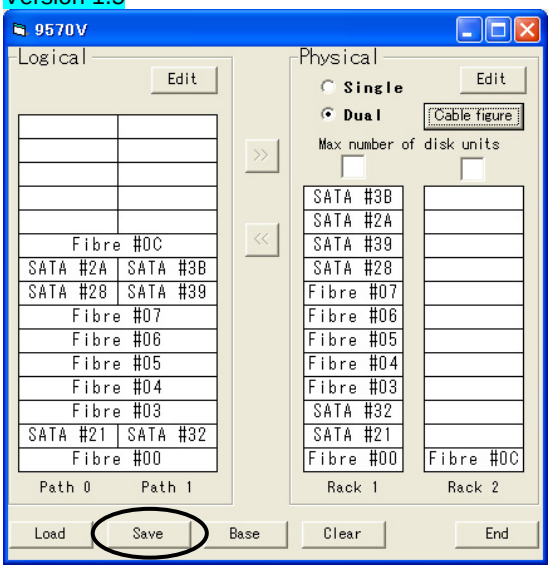
9.4 Saving and Reading the Configuration Diagram

9.4.1 Saving the configuration diagram

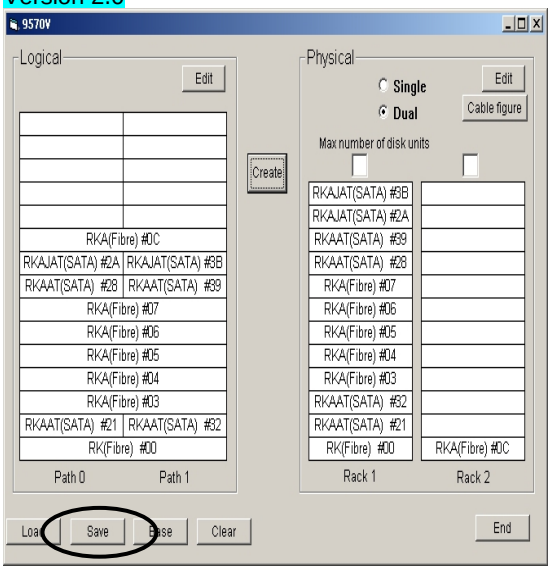
The configuration diagram that has been made can be saved in a file at any time.

(1) Click the [Save] button. The “Save As” dialog box is displayed.

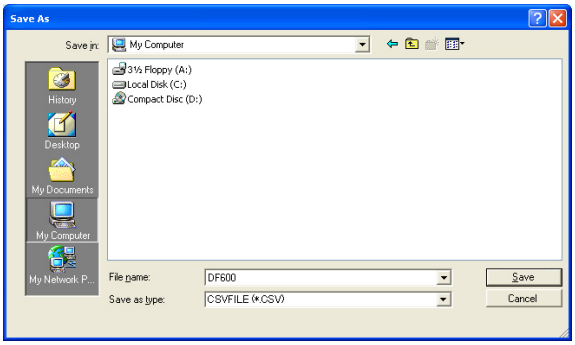
Version 1.5



Version 2.0

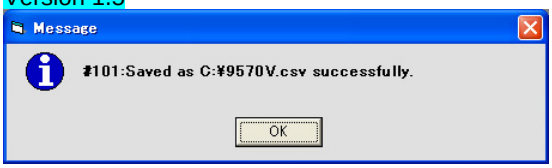


(2) Specify an optional file name.
(The default name is displayed as “9520V” in the case of the 9520V (RKL), “9570V” in the case of the 9570V (RK) or “958xV” in the case of the 9580V/9585V (RKH/RKHE).)
Specify the file type as CSV file.

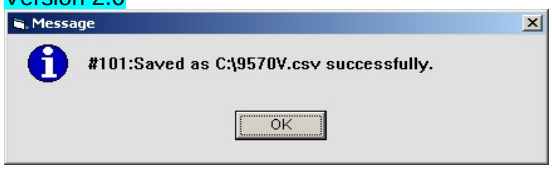


(3) Click the [OK] button.

Version 1.5



Version 2.0



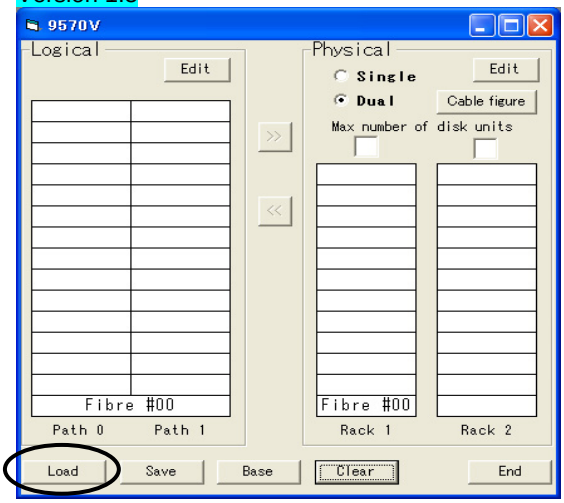
Copyright © 2004, 2005, Hitachi, Ltd.

9.4.2 Reading the configuration diagram

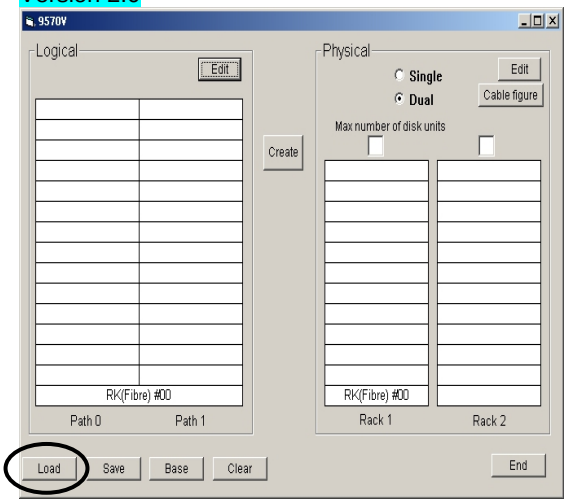
When the configuration diagram is in the initial state, it can be read in a file with a name optionally specified.

(1) Click the [Lord] button.

Version 1.5

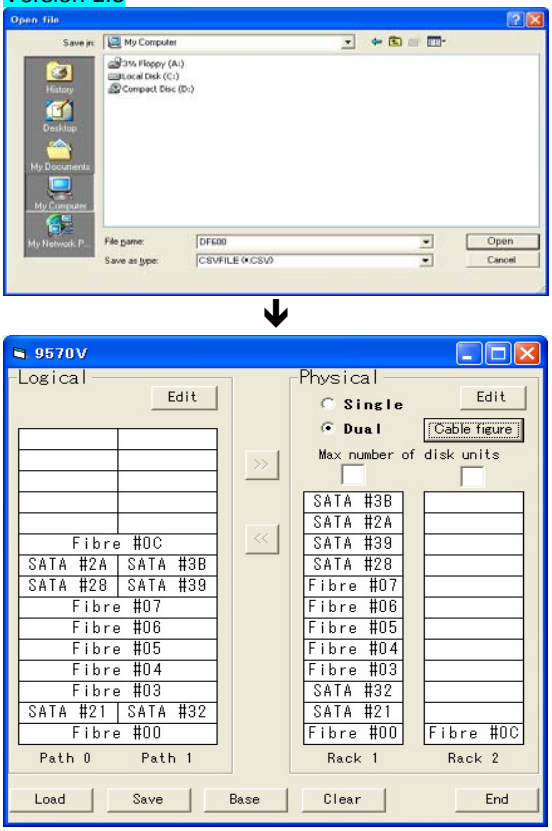


Version 2.0

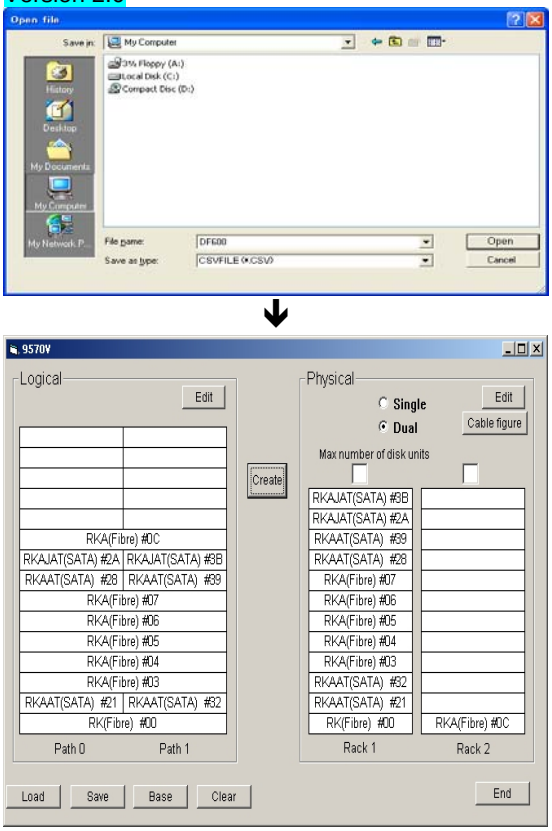


(2) Since the “Open File” dialog box is displayed, specify an optional file name.

Version 1.5



Version 2.0



Copyright © 2004, 2005, Hitachi, Ltd.

The configuration diagram is read in a file and the logical and physical configuration diagrams are made. You can edit the file in which the diagram has been read.

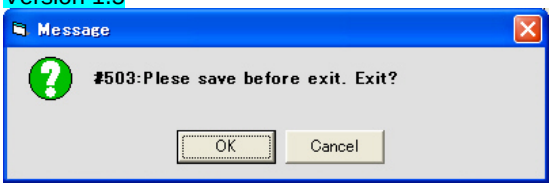
NOTE :
- If the file is read in the status that the configuration figure is formed, the loaded configuration figure is displayed and the previous configuration figure is cleared.
- If the file is read in the status of editing the logical configuration figure (Logical), the loaded configuration is displayed in the logical configuration figure, and the physical configuration figure (Physical) is cleared.
  Also, if the file is read in the status of editing the physical configuration figure (Physical), the loaded configuration is displayed in the physical configuration figure, and the logical configuration figure (Logical) is cleared
- Errors occur if the 9570V (RK) or 9580V/9585V (RKH/RKHE) file is loaded while the 9520V (RKL) is operated.
- Errors occur if the 9520V (RKL) or 9580V/9585V (RKH/RKHE) file is loaded while the 9570V (RK) is operated.
- Errors occur if the 9520V (RKL) or 9570V (RK) file is loaded while the 9580V/9585V (RKH/RKHE) is operated.

Copyright © 2004, 2005, Hitachi, Ltd.

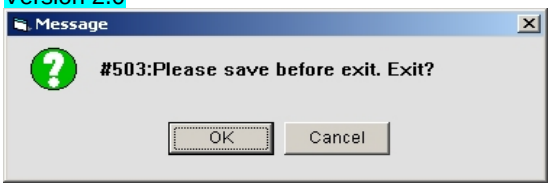
9.5 Termination of Making the Configuration Diagram

Clicking of the [End] button in the window for making the configuration diagram completes the making of the configuration diagram.
A message asking for a confirmation of quitting is displayed

Version 1.5



Version 2.0



- To save the configuration diagram in a file, click the [Cancel] button. (Refer to Subsection 9.4.1, “Saving the configuration diagram” on page INST 09-0270.)
- To terminate the making of the configuration diagram, click the [OK] button.
- For the quitting of the tool, refer to Item (3) in Section 9.1, “Starting and quitting the tool” on page INST 09-0010.

Copyright © 2004, 2005, Hitachi, Ltd.

9.6 Error Message List

No.	Message	Description	Recovery action
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.	
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.
303	Please install Fibre Unit in the first Unit.	When the physical configuration of the 9570V was made, the [OK] button was pressed without specifying the first disk unit.	Check if the setting is correct.
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.

Copyright © 2004, 2005, Hitachi, Ltd.

No.	Message	Description	Recovery action
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.
312	Two or more Units to PATH2 than PATH3 are installed.	The disk units set for Path 2 were more than those set for Path 3 by two or more.	
313	More Units to PATH3 than PATH2 are installed.	More disk units were set for Path 3 than those for Path 2.	
314	Two or more Units to PATH0 than PATH2 are installed.	The disk units set for Path 0 were more than those set for Path 2 by two or more.	
315	Two or more Units to PATH0 than PATH3 are installed.	The disk units set for Path 0 were more than those set for Path 3 by two or more.	
316	One or more Units on the PATH2 are skipped.	The disk units were set for Path 2 leaving an empty space for the one or more disk units.	Set the disk units in regular order starting from the bottom without leaving an empty space.
317	One or more Units on the PATH3 are skipped.	The disk units were set for Path 3 leaving an empty space for the one or more disk units.	
318	Please install Controller Unit and Fibre Unit or Controller Unit and SATA Unit.	When the physical configuration of the 9580V/9585V was made, the [OK] button was pressed without specifying the first disk unit.	Check if the setting is correct.
319	More Units to PATH2 than PATH0 are installed.	More disk units were set for Path 2 than those for Path 0.	
320	More Units to PATH3 than PATH0 are installed.	More disk units were set for Path 3 than those for Path 0.	
321	It is possible only with the equipment which installed the corresponding Micro-program (X659 later).	When the physical configuration of the 9580V/9585V was made, the SATA disk unit was set as the first disk unit.	Check the microprogram version of the subsystem because the version that can support the SATA disk unit as the first disk unit is x659 or later.
322	Please install Fibre Unit or SATA Unit in the first Unit	When the physical configuration of the 9580V/9585V was made, the [OK] button was pressed without specifying the first disk unit.	Check if the setting is correct.
323	Please install Fibre Unit or SATA Unit.	When the numbers of the disk units were entered, zero was entered for each of the Fibre and SATA disk units.	
324	Please install Fibre Unit in the first Unit.	When the physical configuration of the 9570V was made, the SATA disk unit was set as the first disk unit.	Set the FC disk unit as the first disk unit.
326	Please be sure to input one or more numerical values into SATA Unit.	When the numbers of the disk units were entered, zero was entered for each of the SATA disk units.	Check if the setting is correct.
327	Please install SATA Unit in the first Unit.	When the physical configuration of the 9520V (RKL) was made, the [OK] button was pressed without specifying the first disk unit.	

Copyright © 2004, 2005, Hitachi, Ltd.

No.	Message	Description	Recovery action
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.	—
701	It can't be printed. Please confirm the battery of your printer. Please confirm the connection of your printer. Please confirm the driver of your printer.	The Print button was pressed but print failed because the printer was not connected to the PC in use or the printer driver was not installed correctly.	Confirm the connection of the printer, and that the printer driver is installed correctly.
702	The size of your selected form is not suitable.	When the Print button was pressed to print, it failed because the size of the selected form was not suitable.	Confirm the size of the selected form.

Copyright © 2004, 2005, Hitachi, Ltd.

MAINTENANCE

Chapter 1. Before Maintenance Work 01-0000
Chapter 2. Trouble Analysis 02-0000
Chapter 3. Data Collection When a Failure Occurs in Program Product (P.P.) 03-0000
Chapter 4. Trouble Analysis by Error Notification Program 04-0000
Chapter 5. Parts Replacement 05-0000
Chapter 6. Updating Microprogram 06-0000
Chapter 7. Periodic Maintenance 07-0000
Chapter 8. Parts Catalog 08-0000
Chapter 9. Maintenance Tools 09-0000

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 1. Before Maintenance Work

1.1 Before Starting Maintenance Work

Take notice of the following when performing a maintenance work for the subsystem. Illustrations in this section show cases of the rackmount model. They are the same for the Floor Model.
Take notice of the following when performing a maintenance work for the subsystem. Read and understand them well before performing the maintenance.

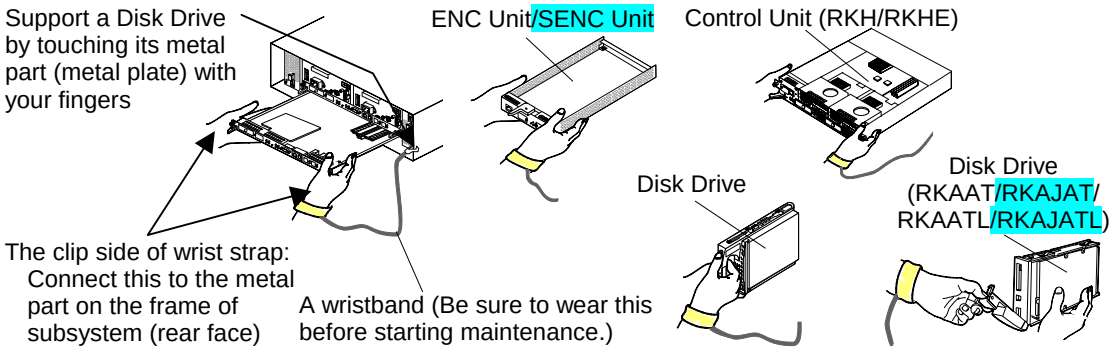
1.1.1 Precautions

(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.

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.

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.
- **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.**



Copyright © 2002, 2005, Hitachi, Ltd.

(2) Note on cable routing

(a) Handling of cables laid 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 excess lengths to cables taking earthquakes, etc. in consideration.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cable and power cable (DC) 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) Do not make the maintenance work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Make the maintenance work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.

Copyright © 2002, 2005, Hitachi, Ltd.

1.2 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.

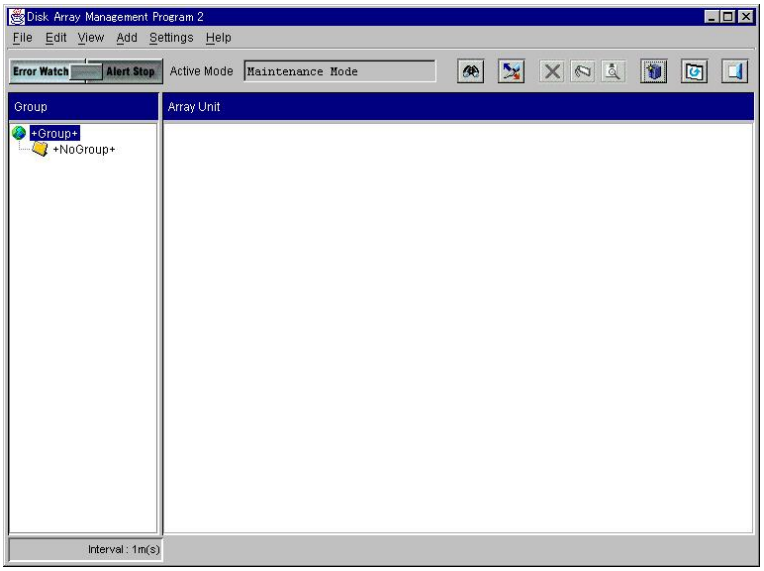
In the following cases, check the RTC and reset it if it varies.

- 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 Disk Array Management Program to set the RTC, please refer to the Installation "5.1.1 Procedure for the connection to the Disk Array Management Program" (INST 05-0010).
The setting of RTC can be made without rebooting the array unit.

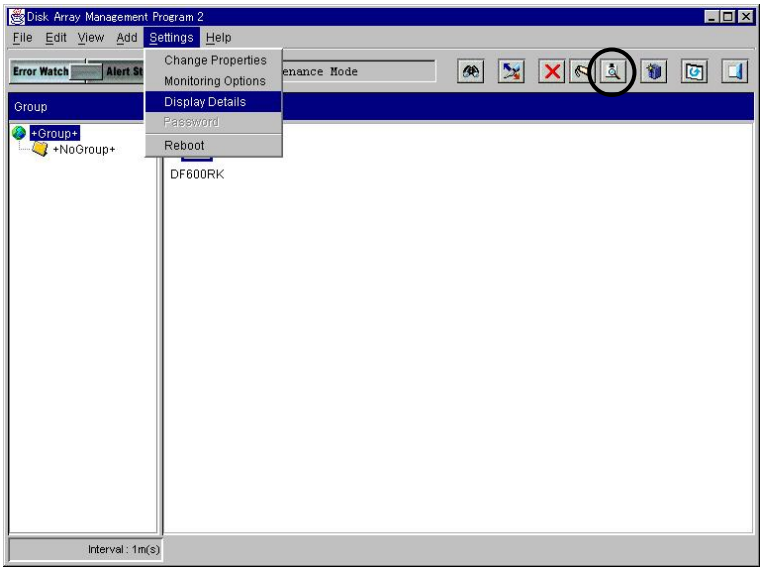
(1) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.



(2) Click the DF600 icon for setting parameters in the main window.

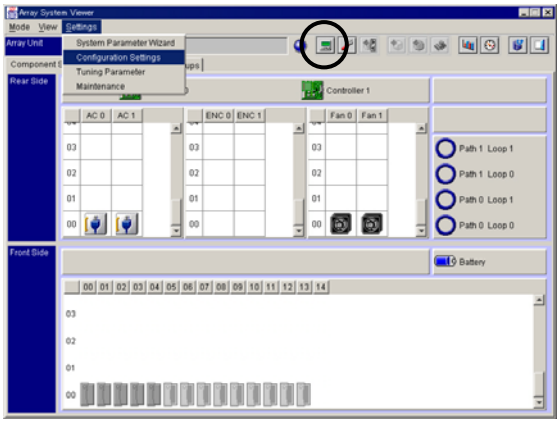
Copyright © 2002, 2005, Hitachi, Ltd.

(3) Click the icon of an array unit on the Main window, and then select the [Settings] – [Display Details]. Or, click the [: Display Details]button in the tool bar.

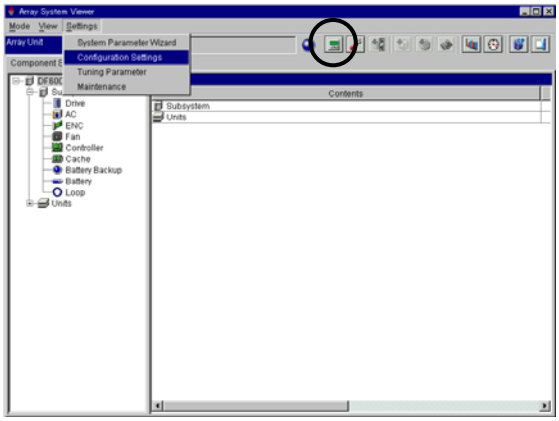


(4) Select [Settings] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.

DAMP Version is Ver.7.xx or earlier.

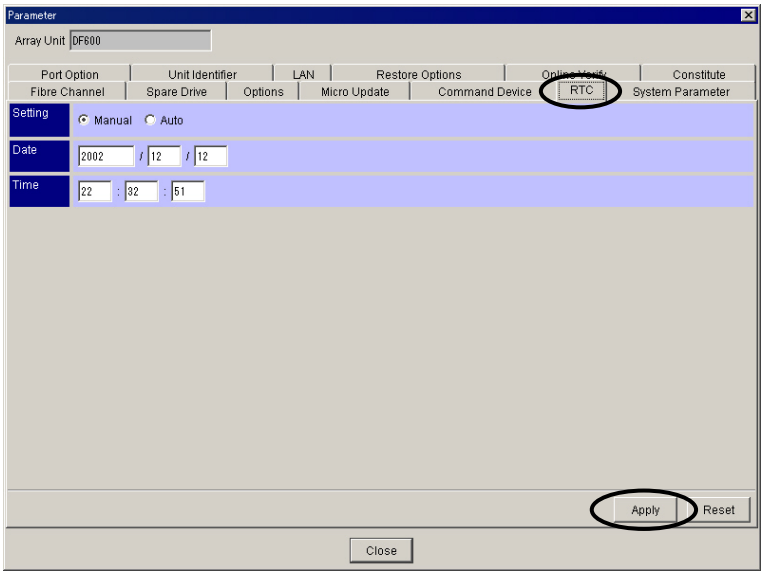


DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

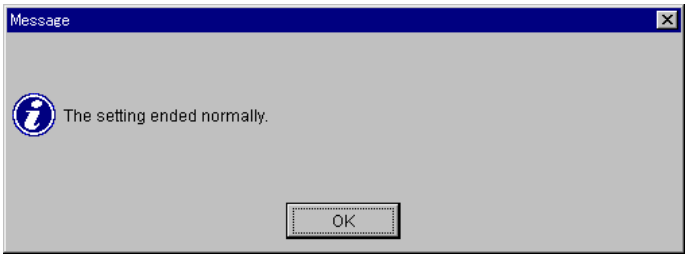
(5) Click the [RTC] tab.



(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 Disk Array Management Program.
Date : Displays date.
Time : Displays time.

(7) Click the [Apply] button.

(8) A message appears, stating that the setting is complete. Click the [OK] button.



Copyright © 2002, 2005, Hitachi, Ltd.

1.3 Indications and their Functions

Figures 1.3.1 to 1.3.5 show locations of indications on the front bezel and those of functional components of the Floor Model and Rackmount Model respectively. Further, functions of the indication are explained in Table 1.3.1.

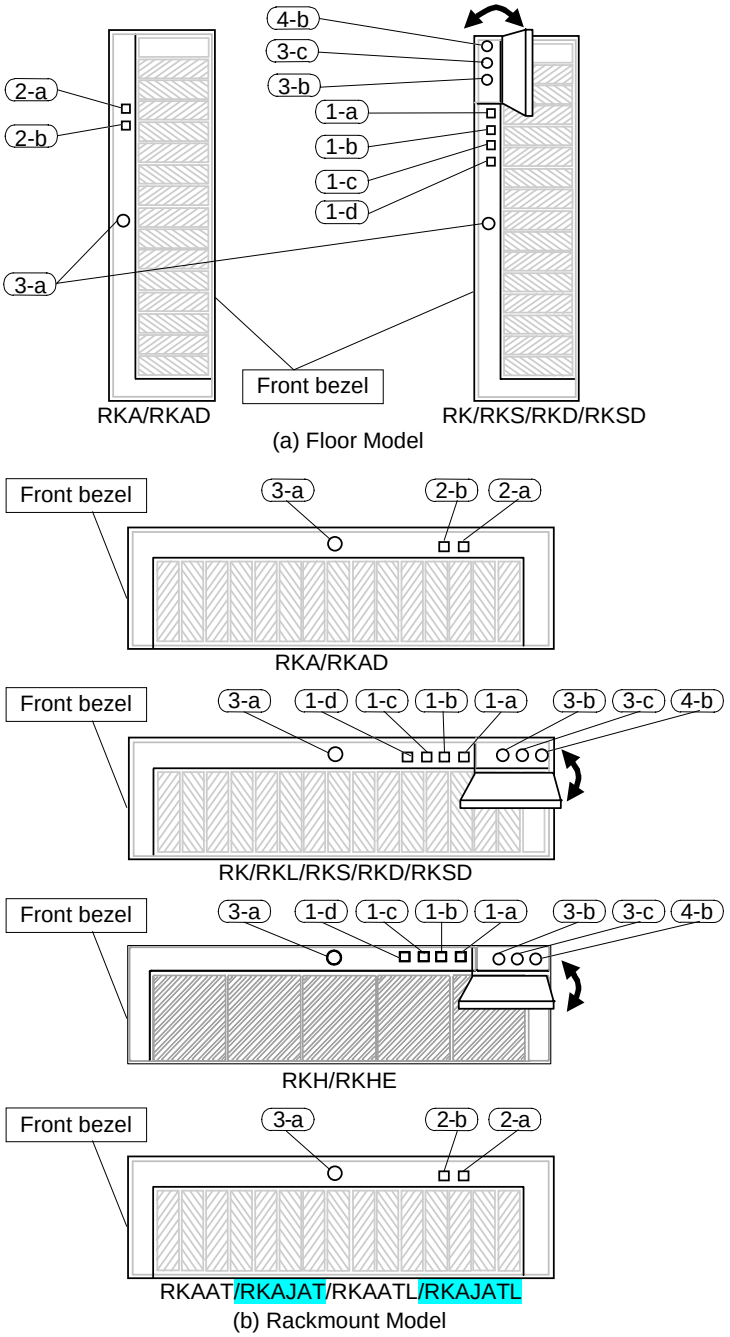


Figure 1.3.1 Indication Locations of Front Bezel

Copyright © 2002, 2005, Hitachi, Ltd.

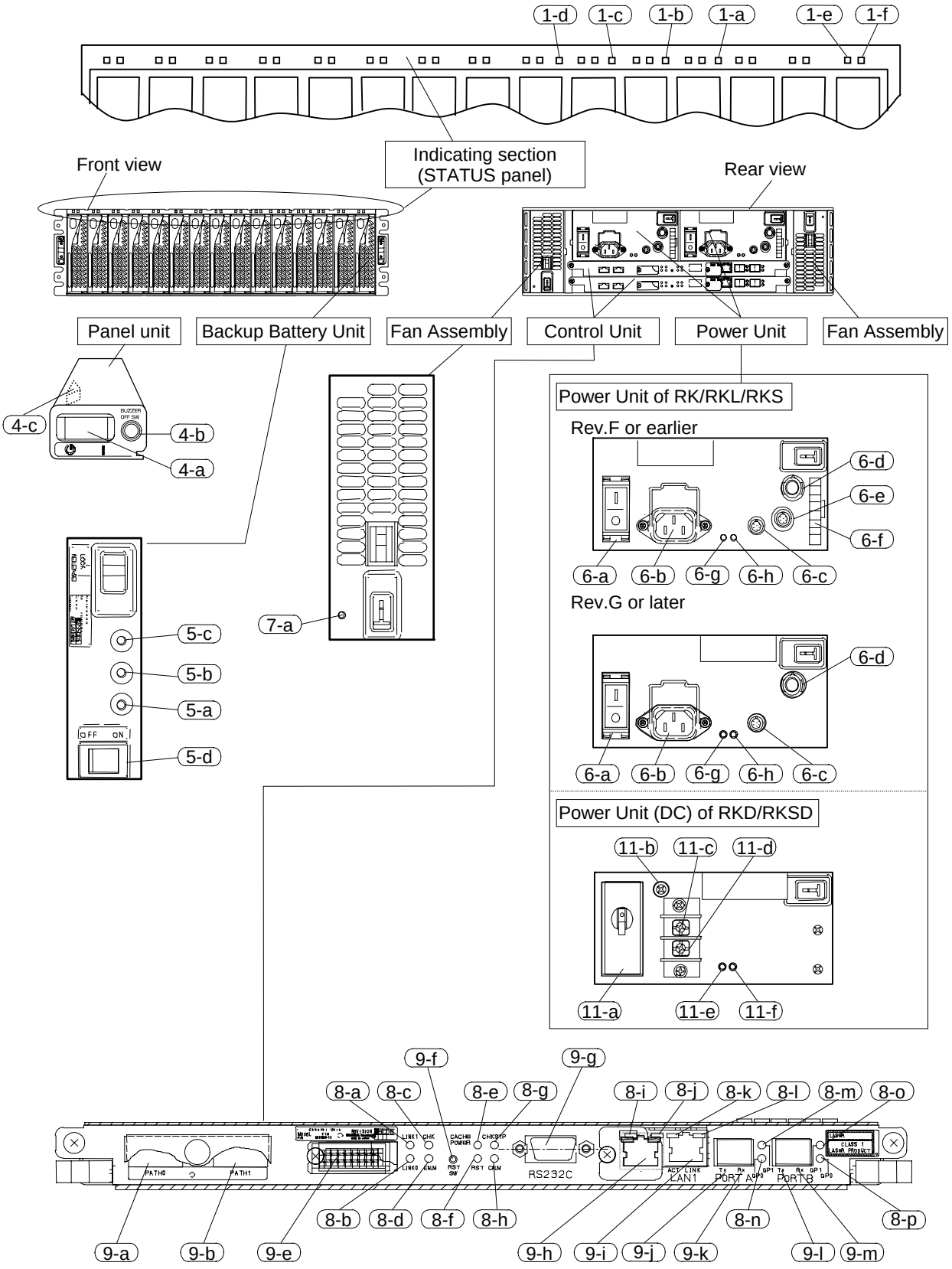


Figure 1.3.2 Indication Locations of Functional Components (RK/RKL/RKS/RKD/RKSD)

Copyright © 2002, 2005, Hitachi, Ltd.

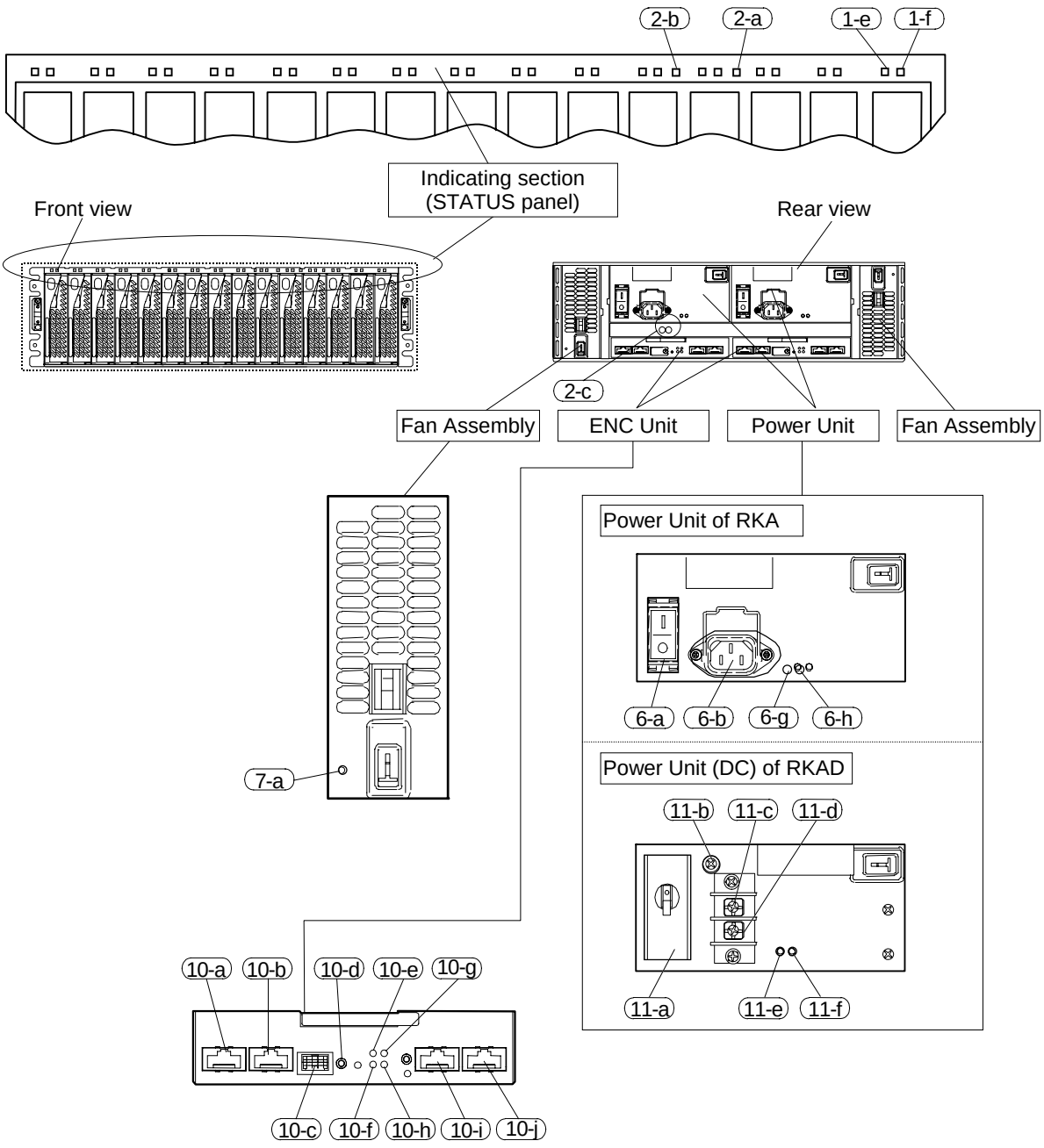


Figure 1.3.3 Indication Locations of Functional Components (RKA/RKAD)

Copyright © 2002, 2005, Hitachi, Ltd.

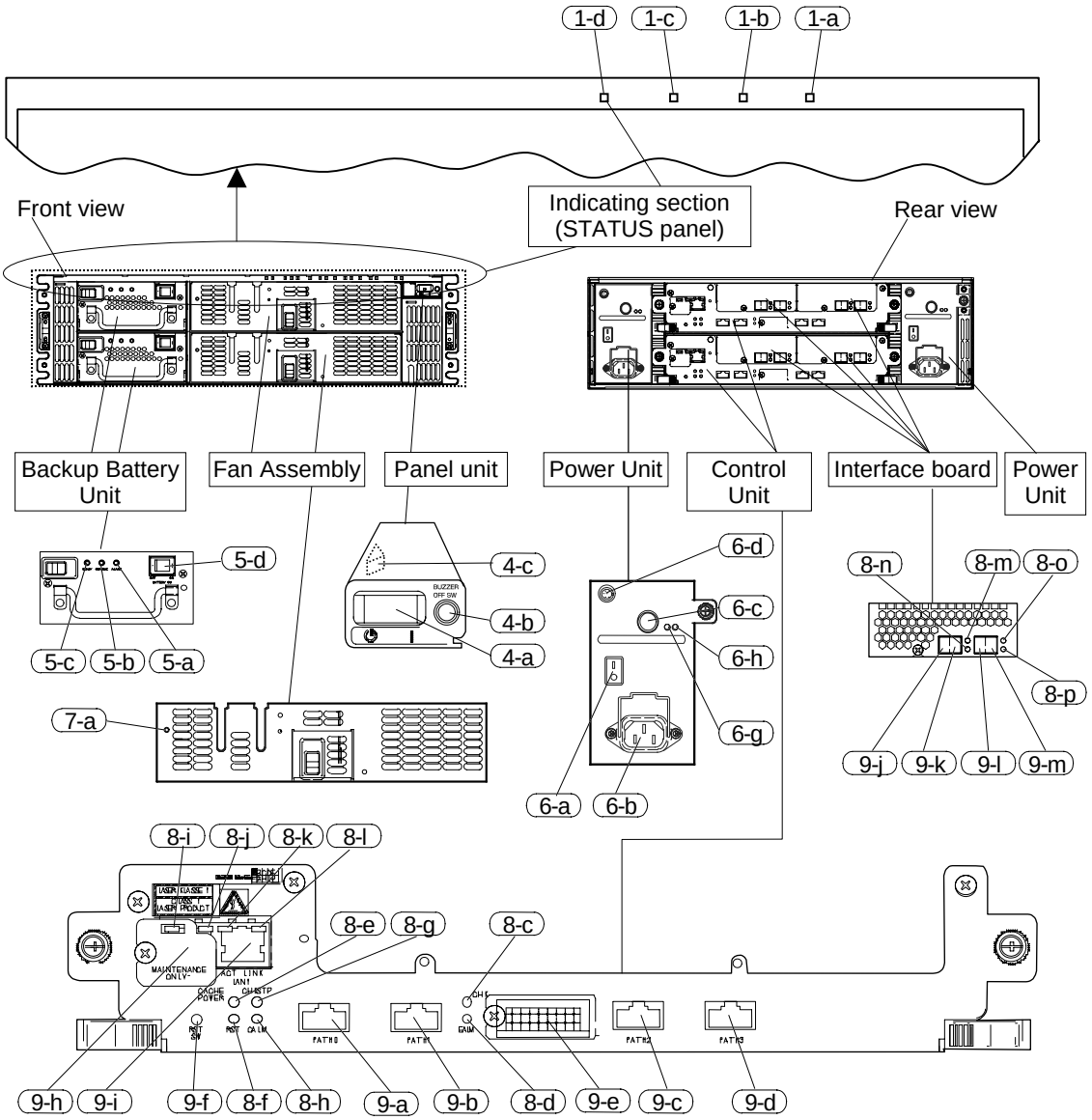


Figure 1.3.4 Indication Locations of Functional Components (RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

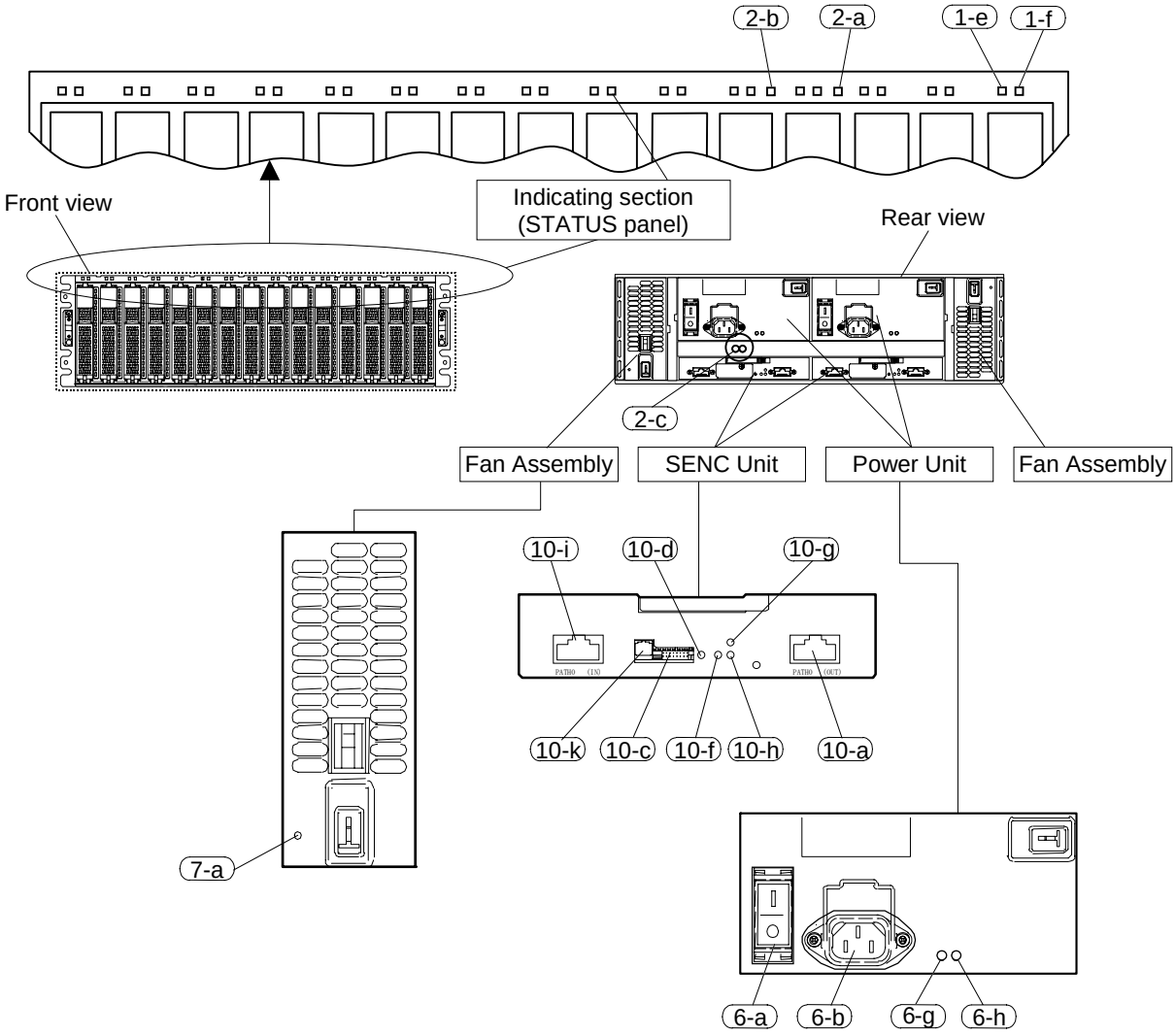


Figure 1.3.5 Indication Locations of Functional Components (RKAAT/RKAATL)

Copyright © 2003, 2005, Hitachi, Ltd.

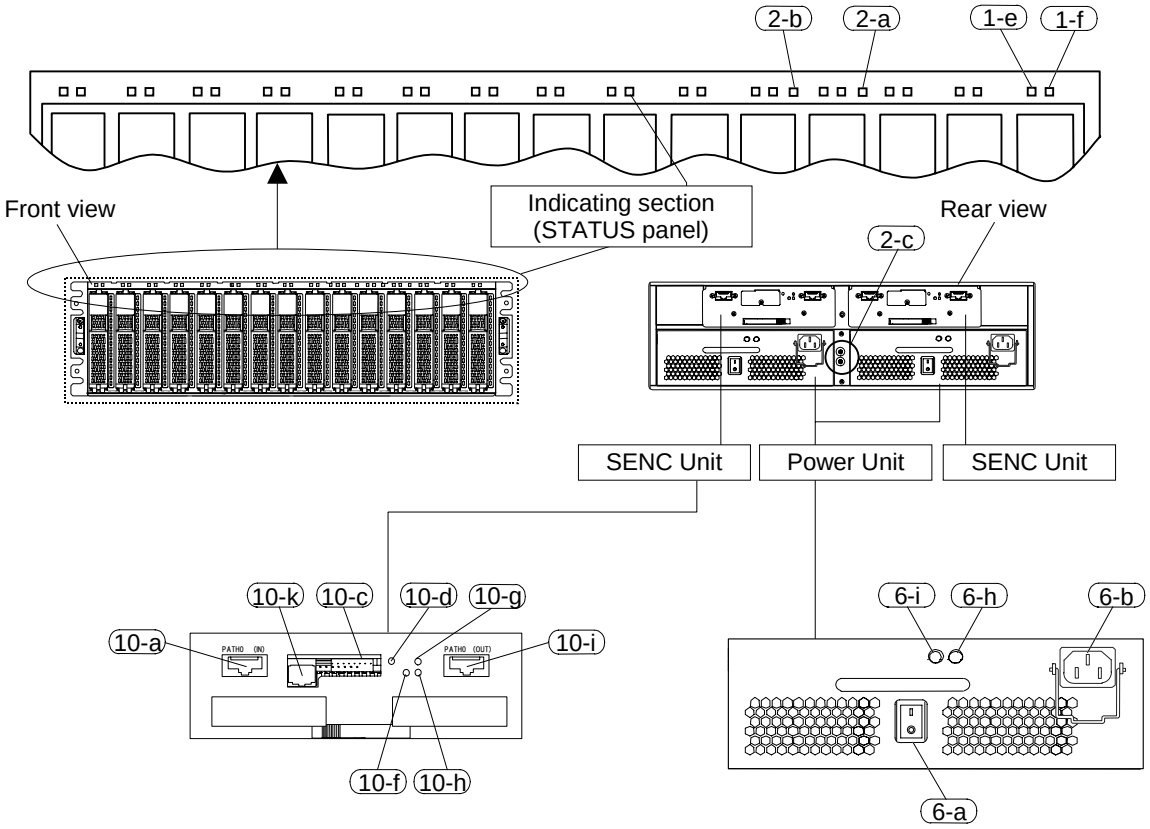


Figure 1.3.6 Indication Locations of Functional Components (RKAJAT/RKAJATL)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

Table 1.3.1 Functions of Indications

No.	Section	Name	Classification	Color	Function
1-a	STATUS Panel (RK/RKL/RKS/ RKD/RKSD/ RKH/RKHE)	PWR (POWER)	LED	Green	Indicates that the power is supplied to the subsystem.
1-b		RDY (READY)	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking High-speed blinking : Indicates that the SENC firmware is being downloaded. Low-speed blinking : Indicates that the download processing with the power turned off is completed.
1-c		WARN (WARNING)	LED	Orange	Lighting Indicates that a failure which allows the subsystem operation occurred. Blinking High-speed blinking : Indicates that a failure which does not stop operation occurred in unit (It must be detected with WEB). Low-speed blinking : Indicates that a latest revision maintenance function of flash program is executed.
1-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.
1-e		FAIL	LED	Red	Indicates that a failure which makes the unable to operate occurred.
1-f		ACTIVE	LED	Green	<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>During seek on.</td></tr></table>
2-a	STATUS Panel (RKA/RKAD/ RKAAT/RKAJAT/ RKAATL/ RKAJATL)	PWR (POWER)	LED	Green	Indicates that the power is supplied to the RKA/ RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL.
2-b		WARN (WARNING)	LED	Orange	Indicates that a failure which allows the RKA/ RKAD/RKAAT /RKAATL/RKAJATL operation occurred.
2-c		ID	Switch	—	Sets the device ID (*1) of the RKA/RKAD/RKAAT/ RKAJAT/RKAATL/RKAJATL.
(1-e)		FAIL	LED	Red	See 1-e
(1-f)		ACTIVE	LED	Green	See 1-f
3-a	Front Bezel	KEY	Key	—	Locks the front bezel.
3-b		Main switch (ON)	Switch	—	ON : Presses on the power.
3-c		Main switch (OFF)	Switch	—	OFF : Presses off the power.
(1-a)		POWER	LED	Green	Indicates that the power is supplied to the subsystem.
(1-b)		READY	LED	Green	Lighting Indicates that the subsystem can be operated. Blinking Indicates that the offline download process is completed.

*1 : "0" is used for the subsystem in default.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Section	Name	Classification	Color	Function
(1-c)	Front Bezel	WARNING	LED	Orange	Lighting Indicates that a failure which allows the subsystem operation occurred. Blinking High-speed blinking : Indicates that a failure which does not stop operation occurred in unit (It must be detected with WEB). Low-speed blinking : Indicates that a latest revision maintenance function of flash program is executed.
(1-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.
(2-a)		POWER	LED	Green	Indicates that the power is supplied to the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL.
(2-b)		WARNING	LED	Orange	Indicates that a failure which allows the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL operation occurred.
(4-b)		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep. (*2)
4-a	Panel Unit	Main switch	Switch	—	Turns on/off the power. | : Power on ⏻ : Power off
4-b		BUZZER OFF SW	Switch	—	Pressing of this switch while the buzzer sounds stops the beep.
4-c		Mode switch	Switch	—	Sets the local/remote mode by the combination of turning on and off of the four mode switches.
5-a	Backup Battery Unit	ALARM	LED	Red	Lights when the Backup Battery unit is in trouble. • The battery is not installed. • The BATTERY switch is turned off • Battery voltage is abnormal. • Battery temperature abnormal.
5-b		CHARGE	LED	Orange	Charging Battery (On)
5-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 switch is turned off. • The battery is not installed. • Battery voltage is abnormal. • Temperature of the battery is abnormal.
5-d		BATTERY Switch	Switch	—	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

*2 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Section	Name	Classification	Color	Function
6-a	Power Unit	AC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on O: Power off
6-b		Receptor (J1)	Connector	—	Connector on the subsystem side to connect the power cable.
6-c		Connector for connecting the UPS interlocking cable (J4)	Connector	—	Used to connect the UPS for the DF600.
6-d		Connector for connecting the Remote adapter (J3)	Connector	—	Used to connect the Remote adapter.
6-e		Connector (J2)	Connector	—	Not used.
6-f		Connector (J5)	Connector	—	Not used.
6-g		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
6-h		ALARM	LED	Red	Lights when the Power Unit is in trouble.
6-i		READY	LED	Green	Shows the operation state of the Power Unit. On : Normal operation Off : Abnormal operation or out of operation
7-a	Fan Assembly	ALM	LED	Red	Shows the state of the Fan Assembly On : Abnormal Off : Normal
8-a	Control Unit Interface Board(*1) (LED)	P1	LED	Green	Indicates that the link status of the FC-AL (loop 1 side) is normal. (RKS/RKSD : None)
8-b		P0	LED	Green	Indicates that the link status of the FC-AL (loop 0 side) is normal. (RKS/RKSD : None)
8-c		CHK (CHECK)	LED	Red	Shows error factors by means of a number of times of blinking. Once : Logic +5 V voltage is abnormal. Twice : Drive +12 V voltage is abnormal. Three times : Logic +3.3 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: BS1.8V, BS3.3V, or BS12V voltage is abnormal. Eight times : Rotation failure in two or more fans of both Fan Assemblies. (RK/RKL/RKS/RKD/RKSD) Nine times : FAN is abnormal. (RKH/RKHE only) 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.

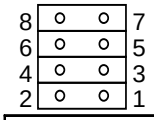
*1 : Only RKH can be mounted.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Section	Name		Classification	Color	Function
8-d	Control Unit Interface Board(*1) （LED）	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.)
8-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 (DC 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.
8-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
8-g		CHKSTP		LED	Red	A failure occurred at Controller and it became not operational.
8-h		CALM		LED	Red	Indicates that a failure which makes in the Controller unable to operate occurred in it.
8-i		LAN0	ACT	LED	Orange	Indicates that data is being transferred via a LAN0.
8-j			LINK	LED	Green	Indicates that the link status of the LAN0 is normal.
8-k		LAN1	ACT	LED	Orange	Indicates that data is being transferred via a LAN1.
8-l			LINK	LED	Green	Indicates that the link status of the LAN1 is normal.
8-m		Port A(*2)	GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port A side(*2).
8-n			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port A side(*2).
8-o		Port B(*3)	GP1	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port B side(*3). (RKS/RKS : None)
8-p			GP0	LED	Green	Shows status of the standard Interface Board mounted on the Controller in the Port B side(*3). (RKS/RKSD : None)

*1 : Only RKH/RKHE can be mounted.
*2 : The Interface Board#1 side of RKH/RKHE is Port C.
*3 : The Interface Board#1 side of RKH/RKHE is Port D.

Copyright © 2002, 2005, Hitachi, Ltd.

<table>
<tr><th>No.</th><th>Section</th><th>Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>9-a</td><td rowspan="15">Control Unit Interface Board(*1) (Except LED)</td><td colspan="2">PATH0</td><td>Connector</td><td>—</td><td>Connection connector for ENC cable (PATH0 side). (RKS/RKSD : None)</td></tr>
<tr><td>9-b</td><td colspan="2">PATH1</td><td>Connector</td><td>—</td><td>Connection connector for ENC cable (PATH1 side). (RKS/RKSD : None)</td></tr>
<tr><td>9-c</td><td colspan="2">PATH2</td><td>Connector</td><td>—</td><td>Connection connector for ENC cable (PATH2 side). (RKH/RKHE only)</td></tr>
<tr><td>9-d</td><td colspan="2">PATH3</td><td>Connector</td><td>—</td><td>Connection connector for ENC cable (PATH3 side). (RKH/RKHE only)</td></tr>
<tr><td>9-e</td><td colspan="2">Voltage Check Connector</td><td>Connector</td><td>—</td><td>
<table>
<tr><th>Pin No.</th><th>Meaning</th></tr>
<tr><td>1</td><td>Lowers all voltages by 5% to9% when short pins 1and 2.</td></tr>
<tr><td>2</td><td>GND</td></tr>
<tr><td>3</td><td>Raises all voltages by 5% to9% when short pins 3and 4.</td></tr>
<tr><td>4</td><td>GND</td></tr>
<tr><td>5</td><td>Logic +12 V</td></tr>
<tr><td>6</td><td>BS +12</td></tr>
<tr><td>7</td><td>Logic +5 V</td></tr>
<tr><td>8</td><td>BS +5 V</td></tr>
<tr><td>9</td><td>Logic +3.3 V</td></tr>
<tr><td>10</td><td>BS +3.3 V</td></tr>
<tr><td>11</td><td>For Cache 3.3 V (RKH/RKHE: 2.5 V)</td></tr>
<tr><td>12</td><td>BS +1.8 V</td></tr>
<tr><td>13</td><td>Battery Voltage (+5~9V)
(RKH/RKHE: Battery #0 voltage (+5~9V))</td></tr>
<tr><td>14</td><td>For BS destage +5V</td></tr>
<tr><td>15</td><td>(RKH/RKHE: Battery #1 voltage (+5~9V))</td></tr>
<tr><td>16</td><td>GND</td></tr>
</table>
</td></tr>
<tr><td>9-f</td><td colspan="2">RST SW</td><td>Switch</td><td>—</td><td>Used to perform a memory dump.</td></tr>
<tr><td>9-g</td><td colspan="2">RS232C</td><td>Connector</td><td>—</td><td>Connects the RS232C cable. (RKH/RKHE: None)</td></tr>
<tr><td>9-h</td><td colspan="2">LAN0</td><td>Connector</td><td>—</td><td>Connects the LAN0 cable. (For maintenance)</td></tr>
<tr><td>9-i</td><td colspan="2">LAN1</td><td>Connector</td><td>—</td><td>Connects the LAN1 cable. (For User's)</td></tr>
<tr><td>9-j</td><td rowspan="2">Port A(*2)</td><td>Tx</td><td>Connector</td><td>—</td><td>Connector on the signal output side to connect the Fibre Channel interface cable in the Port A side. (*2)</td></tr>
<tr><td>9-k</td><td>Rx</td><td>Connector</td><td>—</td><td>Connector on the signal input side to connect the Fibre Channel interface cable in the Port A side. (*2)</td></tr>
<tr><td>9-l</td><td rowspan="2">Port B(*3)</td><td>Tx</td><td>Connector</td><td>—</td><td>Connector on the signal output side to connect the Fibre Channel interface cable in the Port B side. (*3) (RKS/RKSD : None)</td></tr>
<tr><td>9-m</td><td>Rx</td><td>Connector</td><td>—</td><td>Connector on the signal input side to connect the Fibre Channel interface cable in the Port B side. (*3) (RKS/RKSD : None)</td></tr>
<tr><td>—</td><td colspan="2">Jumper switch (JP14)</td><td>Switch</td><td>—</td><td>


<table>
<tr><th colspan="2">Type</th><th>RK</th></tr>
<tr><th colspan="2">Pin No.</th><th>Meaning</th></tr>
<tr><td>1-2</td><td>-</td><td>Not used.</td></tr>
<tr><td>3-4</td><td>-</td><td>Not used.</td></tr>
<tr><td>5-6</td><td>Short circuit</td><td>Lowers all voltages output from the power supplies by 5%.</td></tr>
<tr><td>7-8</td><td>Short circuit</td><td>Raises all voltages output from the power supplies by 5%.</td></tr>
</table>
</td></tr>
</table>

*1 : Only RKH/RKHE can be mounted.

*2 : The Interface Board#1 side of RKH/RKHE is Port C.

*3 : The Interface Board#1 side of RKH/RKHE is Port D.

Copyright © 2002, 2005, Hitachi, Ltd.

<table>
<tr><th>No.</th><th>Section</th><th colspan="2">Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>10-a</td><td rowspan="4">ENC Unit /
SENC Unit</td><td>PATH0</td><td>(IN side)</td><td>Connector</td><td>—</td><td>Connection (for input) connector for ENC cable (PATH0 side).</td></tr>
<tr><td>10-b</td><td>PATH1</td><td></td><td>Connector</td><td>—</td><td>Connection connector (for input) for ENC cable (PATH1 side).
(RKAAT/RKAJAT/RKAATL/RKAJATL : None)</td></tr>
<tr><td>10-c</td><td colspan="2">Output pin
(J30 : RKA/RKAD)
(J4, J5 : RKAAT/
RKAJAT/
RKAATL/
RKAJATL)</td><td>Pin</td><td>—</td><td>• RKA/RKAD
<table>
<tr><th>J30 Pin No.</th><th>Meaning</th></tr>
<tr><td>1</td><td>Logic +12 V</td></tr>
<tr><td>2</td><td>BS+12 V</td></tr>
<tr><td>3</td><td>Logic +5 V</td></tr>
<tr><td>4</td><td>BS+ 5 V</td></tr>
<tr><td>5</td><td>—</td></tr>
<tr><td>6</td><td>BS +3.3 V</td></tr>
<tr><td>7</td><td>GND</td></tr>
<tr><td>8</td><td>BS +1.8 V</td></tr>
<tr><td>9</td><td>—</td></tr>
<tr><td>10</td><td>—</td></tr>
<tr><td>11</td><td>—</td></tr>
<tr><td>12</td><td>—</td></tr>
</table>
• RKAAT/RKAATL
<table>
<tr><th>J4, J5 Pin No.</th><th>Meaning</th></tr>
<tr><td>J4-1</td><td>Logic +12 V</td></tr>
<tr><td>J4-2</td><td>Logic +5 V</td></tr>
<tr><td>J4-3</td><td>Logic +3.3 V</td></tr>
<tr><td>J4-4</td><td>Logic +2.5 V</td></tr>
<tr><td>J4-5</td><td>+1.25 V</td></tr>
<tr><td>J4-6</td><td>+2.5 V PBC</td></tr>
<tr><td>J5-1</td><td>FCCTL 1.8 V</td></tr>
<tr><td>J5-2</td><td>SATA1 1.8 V</td></tr>
<tr><td>J5-3</td><td>SATA2 1.8 V</td></tr>
<tr><td>J5-4</td><td>1.3 V CORE</td></tr>
<tr><td>J5-5</td><td>H8 3.3 V</td></tr>
<tr><td>J5-6</td><td>GND</td></tr>
</table>
• RKAJAT/RKAJATL
<table>
<tr><th>J4 Pin No.</th><th>Meaning</th></tr>
<tr><td>J4-1</td><td>Logic +12 V</td></tr>
<tr><td>J4-2</td><td>Logic +5 V</td></tr>
<tr><td>J4-3</td><td>Logic +3.3 V</td></tr>
<tr><td>J4-4</td><td>Logic +2.5 V</td></tr>
<tr><td>J4-5</td><td>Logic +1.8 V</td></tr>
<tr><td>J4-6</td><td>—</td></tr>
<tr><td>J4-7</td><td>—</td></tr>
<tr><td>J4-8</td><td>GND</td></tr>
</table></td></tr>
<tr><td>10-d</td><td colspan="2">SW</td><td>Switch</td><td>—</td><td>Not used (The switch has nothing to do with maintenance because it is used for evaluation.)</td></tr>
<tr><td>10-e</td><td colspan="2">P1</td><td>LED</td><td>Green</td><td>Indicates that the link status of the FC-AL (loop 1 side) is normal.
(RKAAT/RKAJAT/RKAATL/RKAJATL : None)</td></tr>
<tr><td>10-f</td><td colspan="2">P0</td><td>LED</td><td>Green</td><td>Indicates that the link status of the FC-AL (loop 0 side) is normal.</td></tr>
</table>

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Section	Name	Classification	Color	Function
10-g	ENC Unit / SENC Unit	CHK	LED	Red	ENC Unit (RKA/RKAD) 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. SENC Unit (RKAAT/RKAJAT/RKAATL/RKAJATL) 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 in SENC Unit. 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

Copyright © 2004, 2005, Hitachi, Ltd.

<table>
<tr><th>No.</th><th>Section</th><th colspan="2">Name</th><th>Classification</th><th>Color</th><th>Function</th></tr>
<tr><td>10-h</td><td>ENC Unit /
SENC Unit</td><td colspan="2">ALM</td><td>LED</td><td>Red</td><td>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.)</td></tr>
<tr><td>10-i</td><td></td><td>PATH0</td><td>(OUT side)</td><td>Connector</td><td>—</td><td>Connection connector (for output) for ENC cable (PATH0 side).</td></tr>
<tr><td>10-j</td><td></td><td>PATH1</td><td></td><td>Connector</td><td>—</td><td>Connection connector (for output) for ENC cable (PATH1 side).
(RKAAT/RKAJAT/RKAATL/RKAJATL : None)</td></tr>
<tr><td>10-k</td><td></td><td colspan="2">Connector for connecting a processor</td><td>Connector</td><td>—</td><td>To be used when connecting the console cable of a processor.
(For setup before shipment)</td></tr>
<tr><td>—</td><td></td><td colspan="2">Jumper switch
(JP6 : RKA/RKAD)
(J3 : RKAAT/RKAJAT/RKAATL/RKAJATL)</td><td>Switch</td><td>—</td><td>• JP6
4 ○ ○ 3
2 ○ ○ 1
<table>
<tr><th colspan="2">Type</th><th>RKA/RKAD</th></tr>
<tr><th colspan="2">Pin No.</th><th>Meaning</th></tr>
<tr><td>1-2</td><td>Short circuit</td><td>The voltage on LG/BS +12 V and +5 V is increased by 5%.</td></tr>
<tr><td>3-4</td><td>Short circuit</td><td>The voltage on LG/BS +12 V and +5 V is dropped by 5%.</td></tr>
</table>
• J3
1 ○ ○ 2
3 ○ ○ 4
5 ○ ○ 6
<table>
<tr><th colspan="2">Type</th><th>RKAAT/RKAJAT/RKAATL/RKAJATL</th></tr>
<tr><th colspan="2">Pin No.</th><th>Meaning</th></tr>
<tr><td>1-2</td><td>—</td><td>—</td></tr>
<tr><td>3-4</td><td>Short circuit</td><td>The voltage on LG +12 V to 2.5 V and 1.25 V is increased by 5%.</td></tr>
<tr><td>5-6</td><td>Short circuit</td><td>The voltage on LG +12 V to 2.5 V and 1.25 V is dropped by 5%.</td></tr>
</table></td></tr>
</table>

Copyright © 2004, 2005, Hitachi, Ltd.

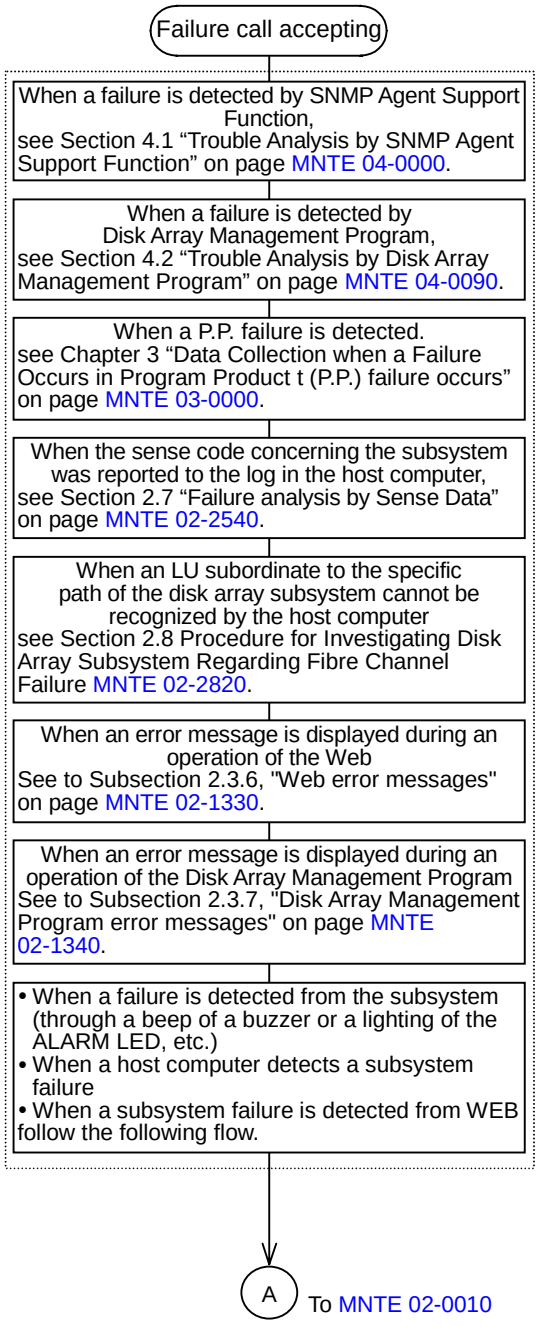
No.	Section	Name	Classification	Color	Function
11-a	Power Unit (DC)	DC Power Unit Switch	Switch	—	Controls the power applied to the subsystem. | : Power on ○: Power off
11-b		Terminal (FG)	Terminal	—	Connector on the subsystem side to connect the power cable.
11-c		Terminal (+)	Terminal	—	Connector on the subsystem side to connect the power cable.
11-d		Terminal (–)	Terminal	—	Connector on the subsystem side to connect the power cable.
11-e		READY	LED	Green	Shows the operation state of the Power Unit (DC). On : Normal operation Off : Abnormal operation or out of operation
11-f		ALARM	LED	Red	Lights when the Power Unit (DC) is in trouble.

Copyright © 2004, 2005, Hitachi, Ltd.

Chapter 2. Trouble Analysis

This chapter contains information on troubleshooting and recovery measures 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.

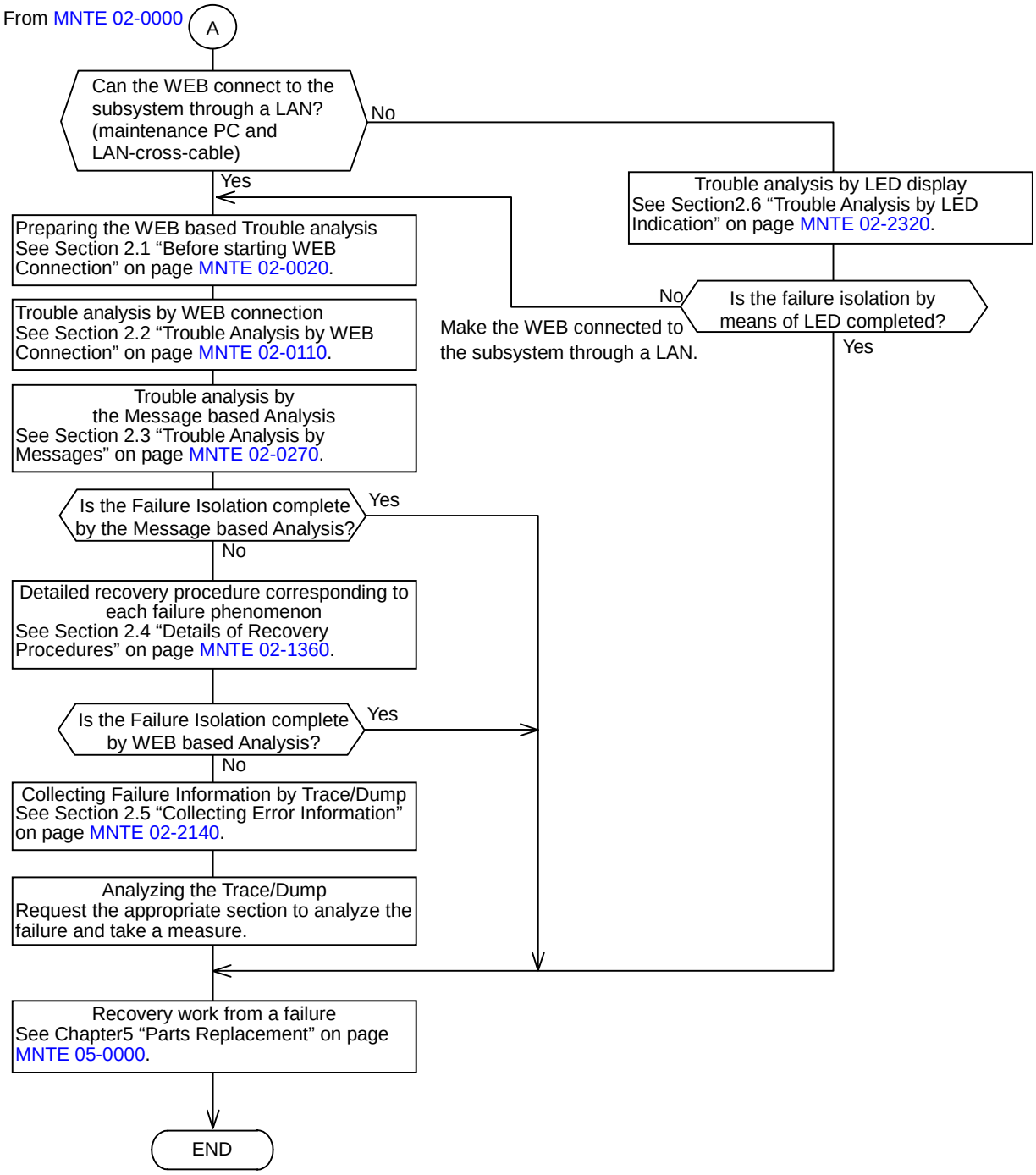
The following is the flow of troubleshooting to be used when a failure occurs in the unit.



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 RKA(s)/RKAAT(s)/RKAJAT(s)/RKAATL(s)/RKAJATL(s)/RKAD(s), replace the RKA/RKAD/RKAAT/RKAATL by priority of unit ID number.
In the case where the RKAATs/RKAATLs are installed, perform the replacement taking notice of the unit ID number.
When failures occurs in two or more RKAs (RKADs), replace the RKAs (RKADs), 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).

1. Backup Battery Unit (RK/RKL/RKS/RKH/RKHE/RKD/RKSD)
2. Power Unit (RK/RKL/RKS)
3. Power Unit (RKA), Power Unit (RKAAT/RKAJAT/RKAATL/RKAJATL)
4. Power Unit (DC) (RKD/RKAD/RKSD)
5. Fan Assembly (RK/RKL/RKS/RKD/RKSD)
6. Fan Assembly (RKA/RKAD)
7. Control Unit (RK/RKL/RKS/RKD/RKSD)
8. SENC Unit (RKAAT/RKAJAT/RKAATL/RKAJATL)
9. Disk Drive (RK/RKL/RKS/RKD/RKSD)
10. ENC Unit (RK/RKL/RKS/RKD/RKSD)

Copyright © 2002, 2005, Hitachi, Ltd.



Copyright © 2002, 2005, Hitachi, Ltd.

2.1 Before Starting WEB Connection

2.1.1 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 Section 2.6 “Trouble Analysis Based on LED Indication” on page MNTE02-2320.

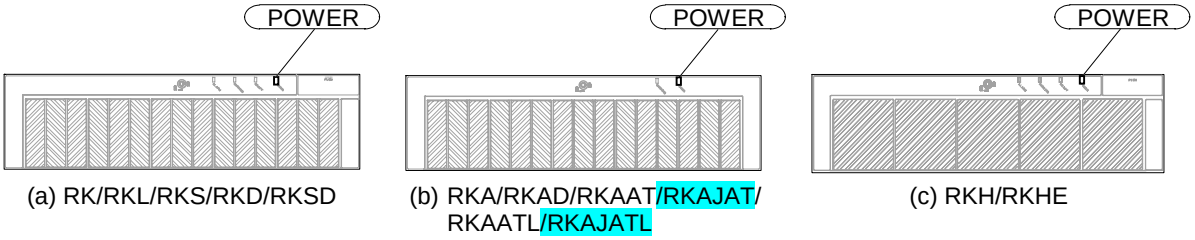


Figure 2.1.1 Locations and Name of LED

- 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 subsection “5.3.5 Replacement Control Unit” (MNTE 05-0380) for replacing a Control Unit.

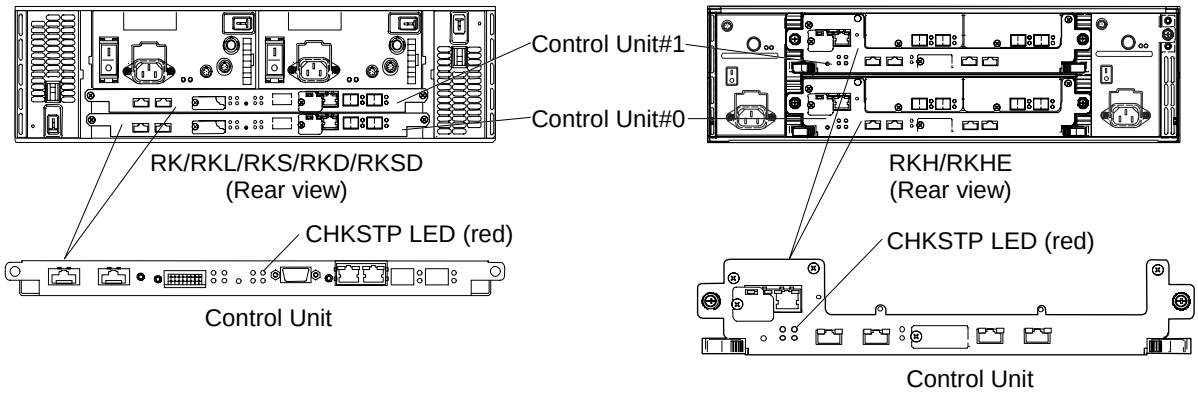


Figure 2.1.2 Locations and Name of LED

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Preparation of maintenance terminal to be used

Table 2.1.1 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 service PC via a LAN.	• PC for maintenance(*1) • LAN cross cable	2.1.1 (4) Procedure to connect portable maintenance PC to WEB (MNTE 02-0030).
*1: Refer to "2.1.3 Note on WEB connecting" (MNTE 02-0080) 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.

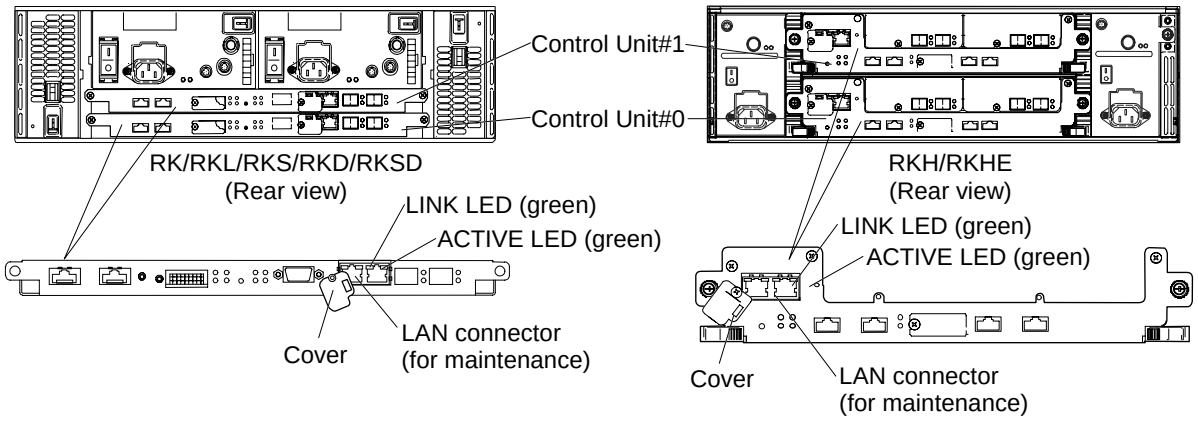


Figure 2.1.3 LAN Connector Position

(b) Start up the maintenance PC.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 2.1.2 below.
If the maintenance PC cannot be connected, set the value in No. 2.

Table 2.1.2 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)	2550.0.0/ 255.255.255.224(*1) (At the time of shipment)	**10.0.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0/ 255.255.255.224(*1)	**192.168.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**
*1 : Micro revision is 0653/C or later.				

- Automatic change of network parameters of the Port 0 (for maintenance)
  Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
  When the network address of the Port 1 (for users) is set as "10.*.*.*", that of the Port 0 (for maintenance) is changed as shown below.

  NOTE : However, if the network address of the LAN device connected to Port 1 (Users) via the Gate Way accords with that of Port 0 (Maintenance), they will collide each other, disabling to communicate normally.
  Microprogram revision 0653/B or earlier
  (1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.*.*.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "10.*.*.*".
  (2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "192.168.0.*".
  Microprogram revision 0653/C or later
  (1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.0.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "10.0.0.(0 to 31)".
  (2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "192.168.0.(0 to 31)".

Network parameter	Control Unit#0 Port 0 (Maintenance) < Fixed IP >	Control Unit#1 Port 0 (Maintenance) < Fixed IP >
IP Address	192.168.0.16	192.168.0.17
Subnet Mask	255.255.255.0/ 255.255.255.224(*1)	255.255.255.0/ 255.255.255.224(*1)
Default Gateway	0.0.0.0	0.0.0.0
DHCP	OFF	OFF
*1 : Micro revision is 0653/C or later.		

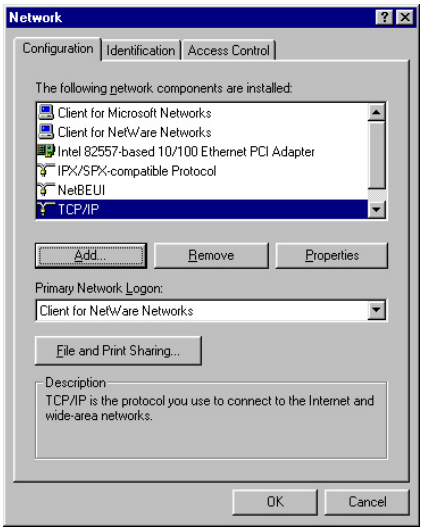
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Setting method of IP Address on Windows 95

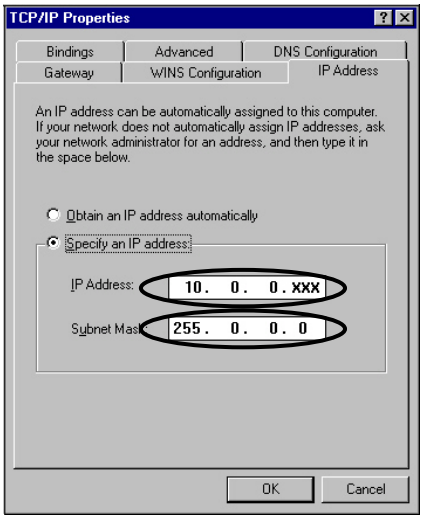
The procedure for setting an IP Address of the PC in Windows 95 is shown below. Also in Windows 98, the IP Address of the PC can be set by the similar operation.

(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].

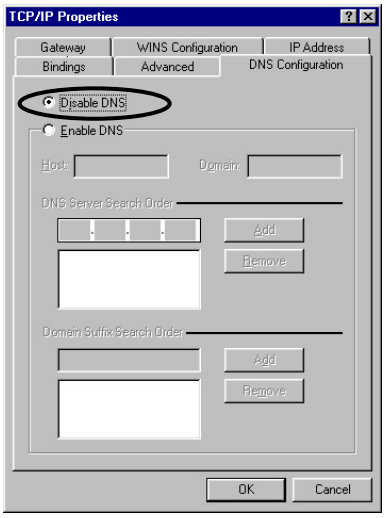


(c) Select [TCP/IP Properties]-[IP Address]-[Specify an IP address] and set the [IP Address] and press the [OK] button.



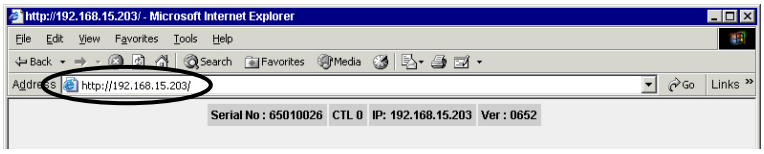
Copyright © 2002, 2005, Hitachi, Ltd.

(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 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 : The Web may be unable to be connected for two to three minutes after a detachment of the Control Unit because the CTL Alarm Trace is being made.



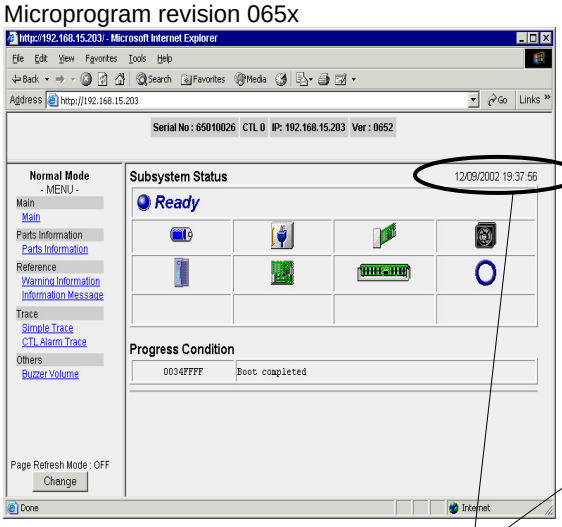
(h) Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used.
To make sure the setting, refer to the instruction manual of the browser to be used.

Copyright © 2002, 2005, Hitachi, Ltd.

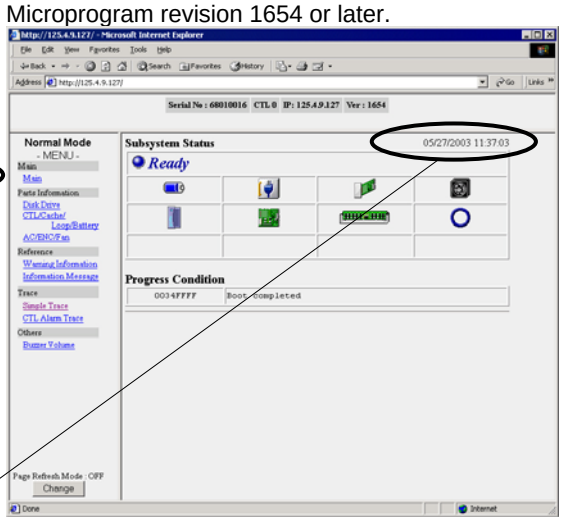
2.1.2 When the WEB has already been connected

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.

Microprogram revision 065x



Microprogram revision 1654 or later.



(‡1)

‡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 “1.2 Confirming and setting RTC” (MNTE 01-00020).

Copyright © 2002, 2005, Hitachi, Ltd.

2.1.3 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 DF600, use the following browsers.

Table2.1.3 Recommended WEB hardware

No.	Item	Description	Remark
1	OS	Microsoft Windows 95, 98, NT 4.0, 2000, ME, XP, 2003 Solaris2.6, 8, AIRIX6.4	
2	PC	Pentium (Pentium Ⅱ(233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended)	
3	WS	Turbo Sparc 170 M Hz, Memory 256 Mbytes or more R10000 195 M Hz, Memory 128 Mbytes or more	
4	Disk requirement	• 50 Mbytes, under ordinary maintenance work • 480 Mbytes per one Controller, under memory dump collection(*1) {Storing temporary file of Browser : 240 Mbytes Storing dumped memory : 240 Mbytes}	Data compression tool is required for memory dumping.
*1 : Memory dump collection may be requested by the Technical Support Center at the time of a tough failure.			

Copyright © 2002, 2005, Hitachi, Ltd.

Table2.1.4 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		System version : x65A	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×
					4.7	○	×
					4.76	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×
					4.76	○	×
			8	Netscape Navigator	4.76	○	×
2	PC	Windows	95	Internet Explorer	5.0	○	×
					5.5	○	×
					6.0	○	×
			98	Internet Explorer	5.0	○	○
					5.5	○	○
					6.0	○	○
			NT/2000	Internet Explorer	5.0	○	×
					5.5	○	○
					6.0	○	○
			ME	Internet Explorer	5.0	×	×
					5.5	○	○
					6.0	○	○
			XP	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	○
			2003 (IA64)	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	×
					6.0 (32 Bit)	○	○
		Windows	95	Netscape Navigator	4.7	×	×
					4.73	×	×
					4.74	×	×
					4.75	×	×
					4.76	×	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×
			98	Netscape Navigator	4.7	○	×
					4.73	○	×
					4.74	○	×
					4.75	○	×
					4.76	○	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version : x659A	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	ME/NT/ 2000/XP	Netscape Navigator	4.7	○	×
					4.73	○	×
					4.74	○	×
					4.75	○	×
					4.76	○	×
					6.0	×	×
					6.1	×	×
					6.2	○	×
					7.0	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×
					4.73	×	×
					4.74	×	×
					4.75	×	×
					4.76	×	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×

*1 : Service Pack 1 is included.

*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.

*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

Notices on (restriction of) the support browser

In the case of Win2003, 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.

- In the case of using Netscape 6.2

Select the “Edition”, “Setting”, “Details”, and “Cache” in this order.

If a setup of [comparison of the page in cash and the page on a network] has become [whenever it accesses a page], the re-display of a screen will take time.

- 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 service 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.

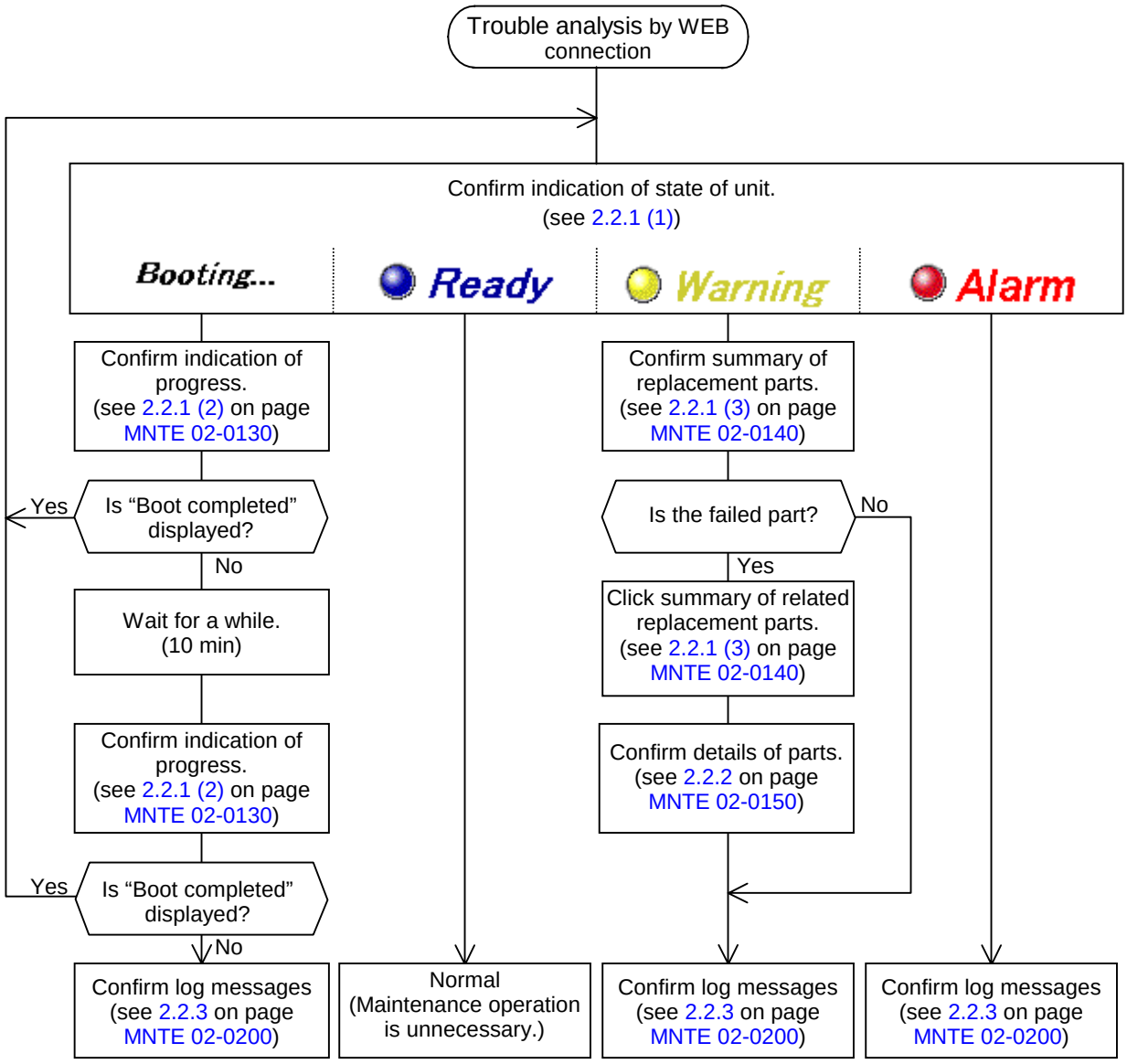
(3) User authentication when connecting the Web
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].

Copyright © 2002, 2005, Hitachi, Ltd.

2.2 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 : In case the log message is checked while the WARNING LED on the front side of the subsystem is blinking, the WARNING LED goes out when the warning is cancelled and stays on when the warning is not cancelled.

Copyright © 2002, 2005, Hitachi, Ltd.

2.2.1 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 measures, see the log messages ("2.2.3 Confirm log messages" (MNTE 02-0200)).

(1) Confirm indication of state of unit

The state of the unit can be confirmed in the following window.

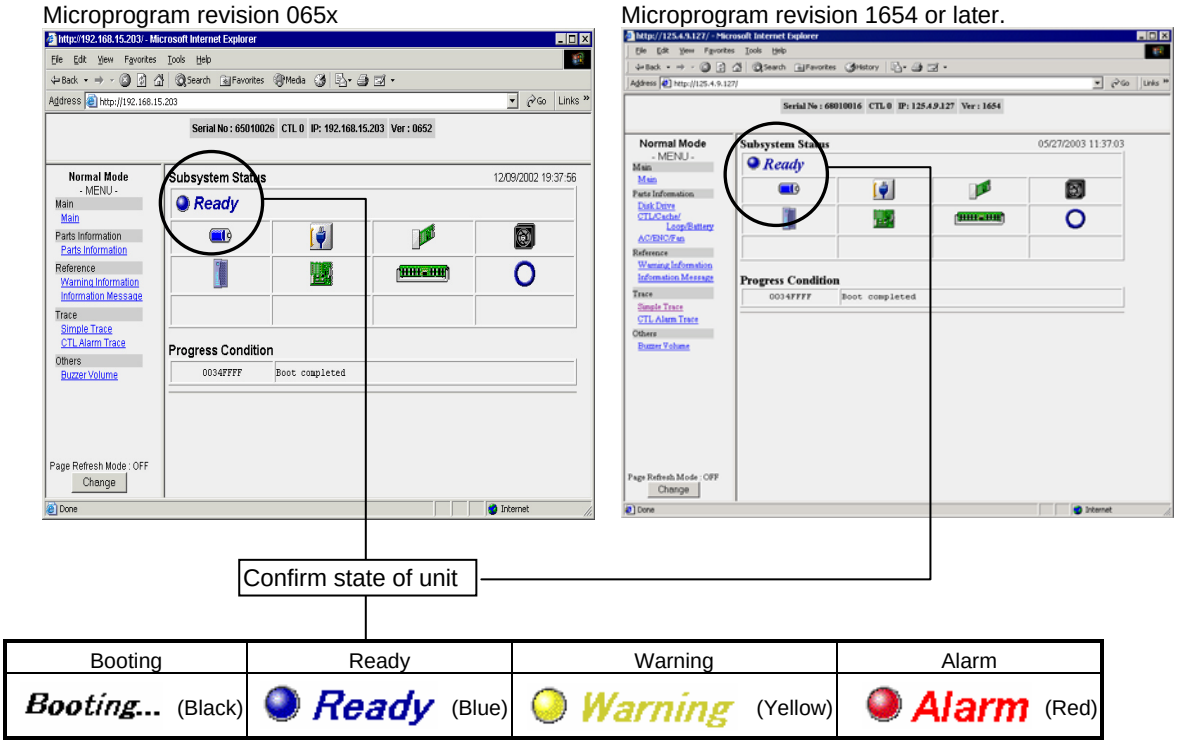
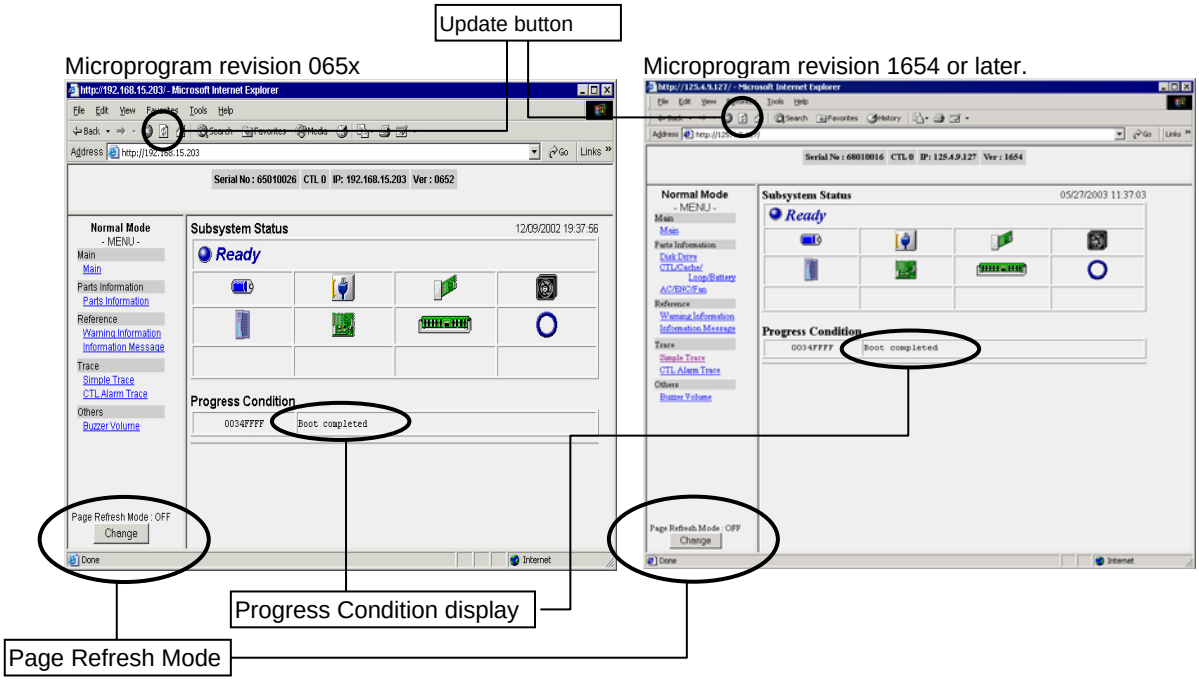


Figure 2.2.1 Main Window in the Normal Mode

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

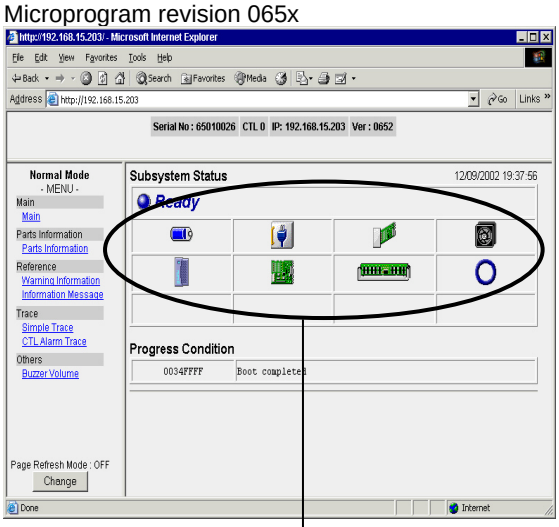
If the start-up operation is completed, “Boot completed” is indicated in this part.

Copyright © 2002, 2005, Hitachi, Ltd.

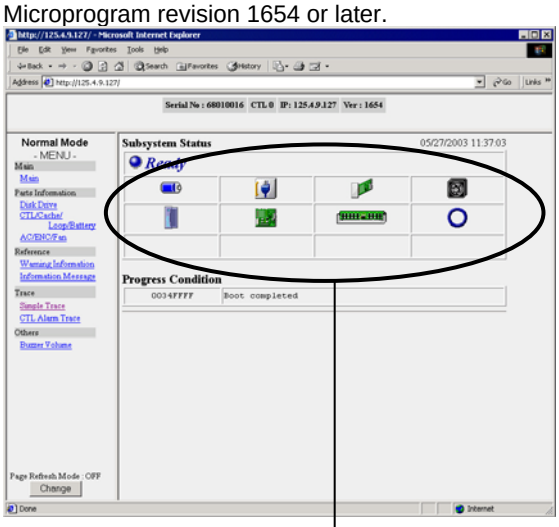
(3) Confirm replacement part summary

The state of each replacement parts can be confirmed with the replacement part summary.

Microprogram revision 065x

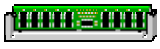


Microprogram revision 1654 or later.



Summary of exchange parts status

Backup Battery Unit	Power Unit (Power Unit (DC))	ENC Unit	SENC Unit	Fan Assembly
				

Disk Drive (FC)	Disk Drive (RKL)	Disk Drive (S-ATA)	Control Unit	Cache Unit	Loop
					

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. Also, when the menu frame “Warning Information” is clicked, status of each component is displayed (see Subsection 2.2.2, “Confirm state of each part” (MNTE 02-0150)) and the status of each component can be checked.

Copyright © 2002, 2005, Hitachi, Ltd.

2.2.2 Confirm state of each part

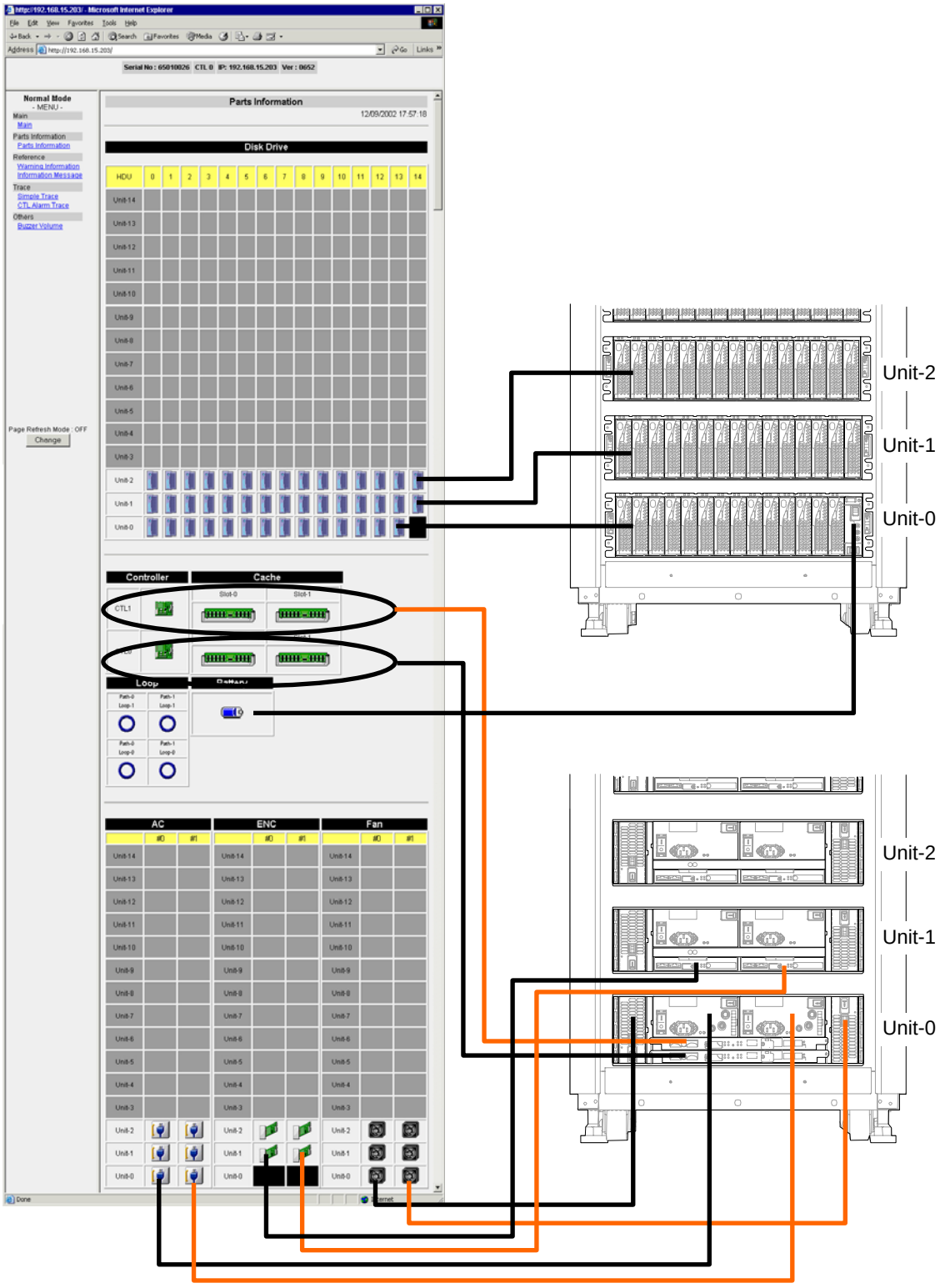
When checking the status of a component through an image, a clicking on each component of the “Summary of replacement component statuses” in the main window changes the window to that shown in Item (1) below and a detailed component status is displayed.
In this case, the window is changed in the state 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) below 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 “Subsection 2.2.3, Confirm log messages” (MNTE 02-0200)) and perform a recovery action following the procedure given by the each log message.

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for checking the status through an image

<Microprogram 0657 or earlier>

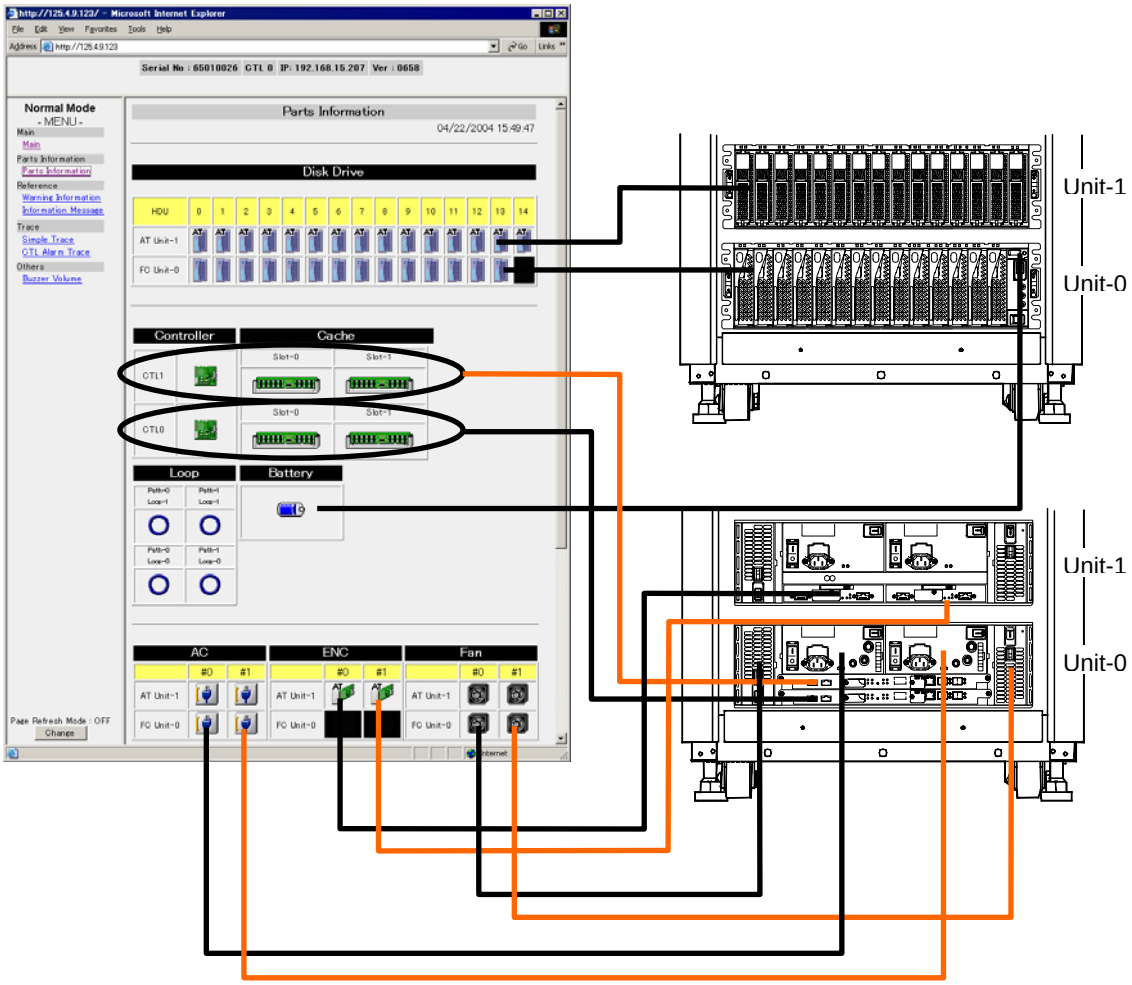
When there is a component in which a failure has occurred, the image of the component is displayed in red.



Copyright © 2002, 2005, Hitachi, Ltd.

<Microprogram 0658 or later, less than 0659>

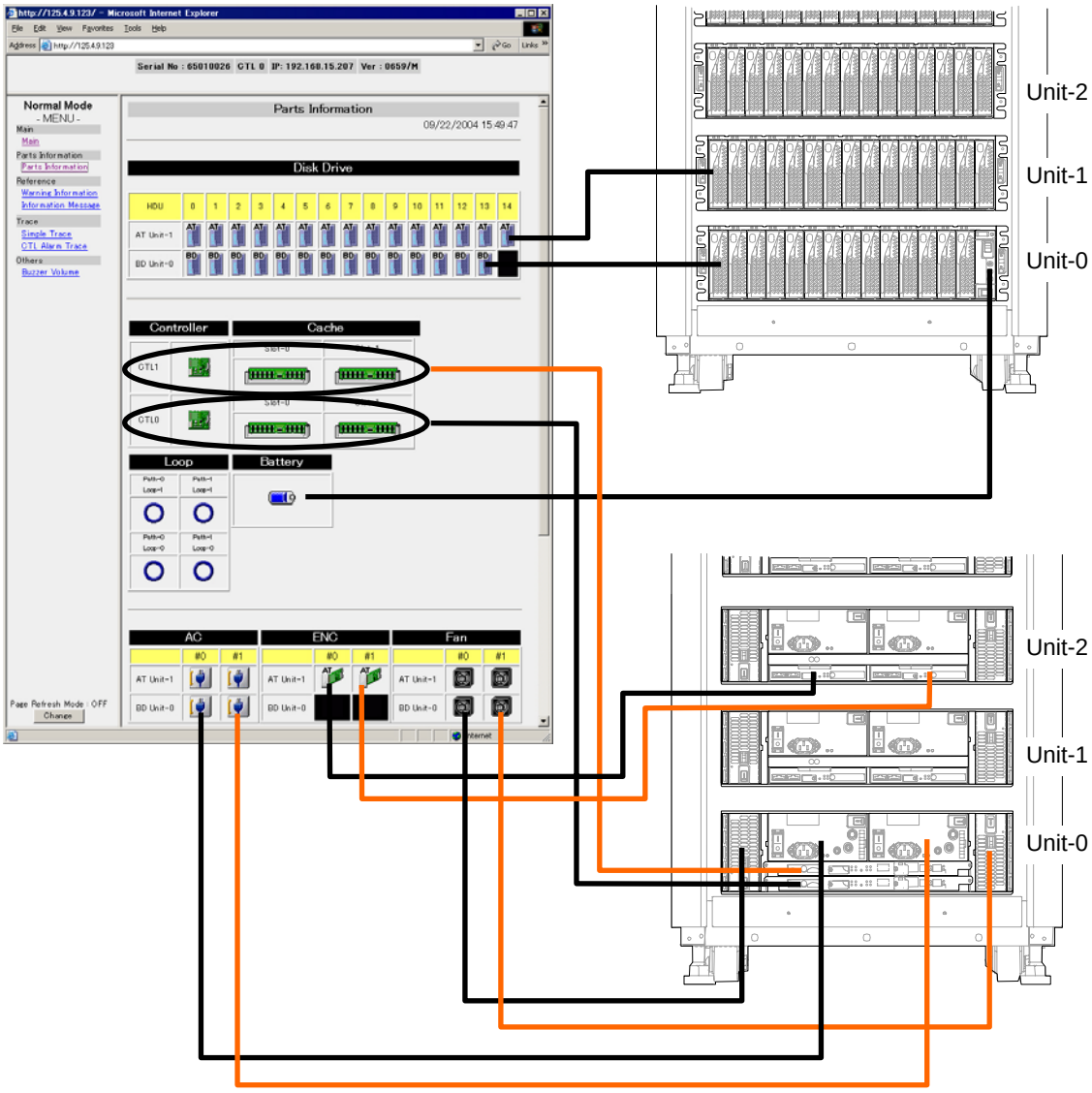
When there is a component in which a failure has occurred, the image of the component is displayed in red.



Copyright © 2003, 2005, Hitachi, Ltd.

<Microprogram 0659/M>

When there is a component in which a failure has occurred, the image of the component is displayed in red.

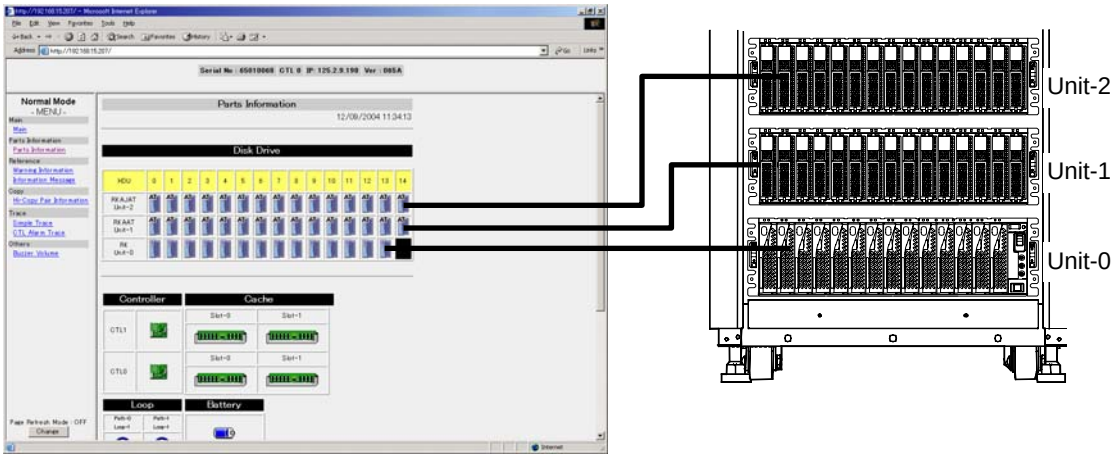


Copyright © 2003, 2005, Hitachi, Ltd.

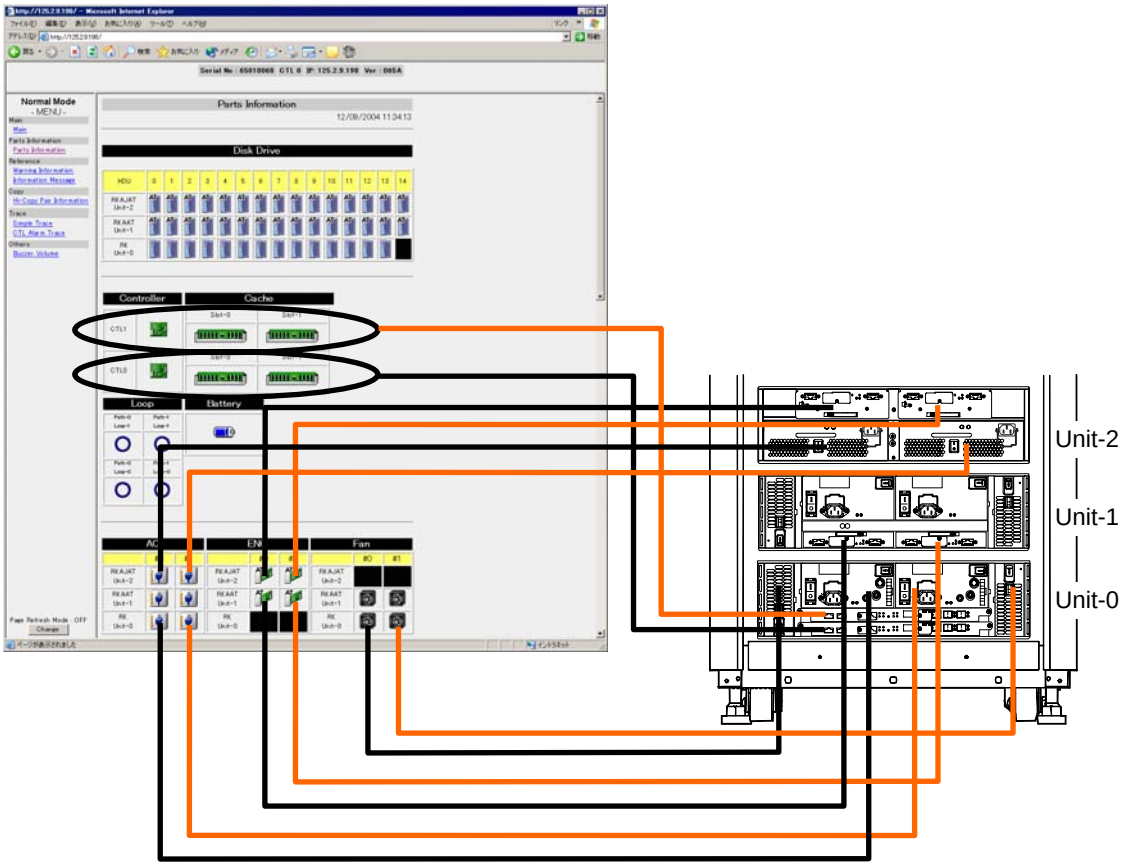
<Microprogram 065Aor later>

When there is a component in which a failure has occurred, the image of the component is displayed in red.

• Disk Drive/Battery



• CTL/Cache/Loop/AC/ENC/Fan

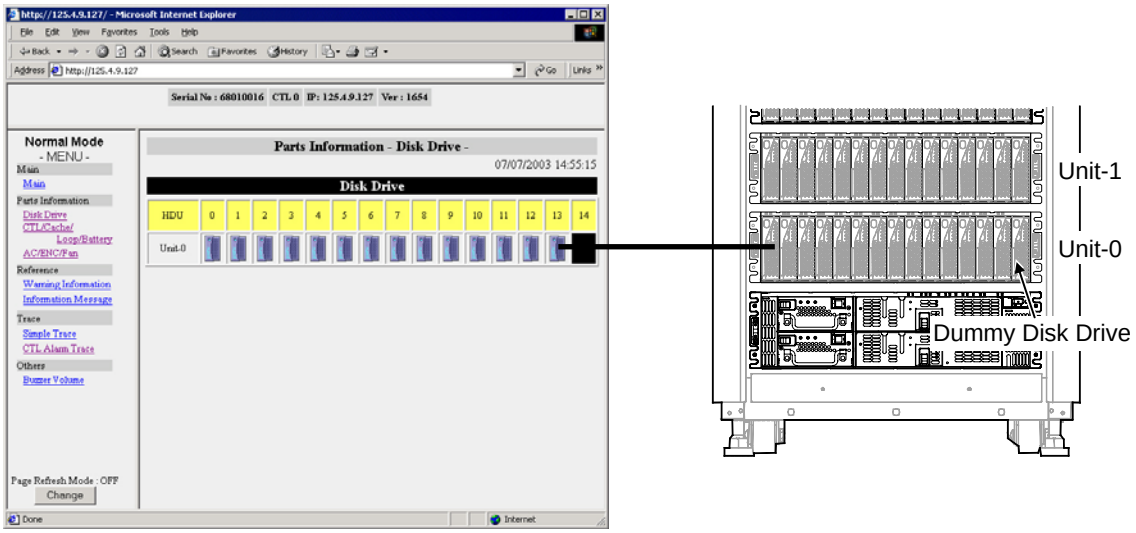


Copyright © 2003, 2005, Hitachi, Ltd.

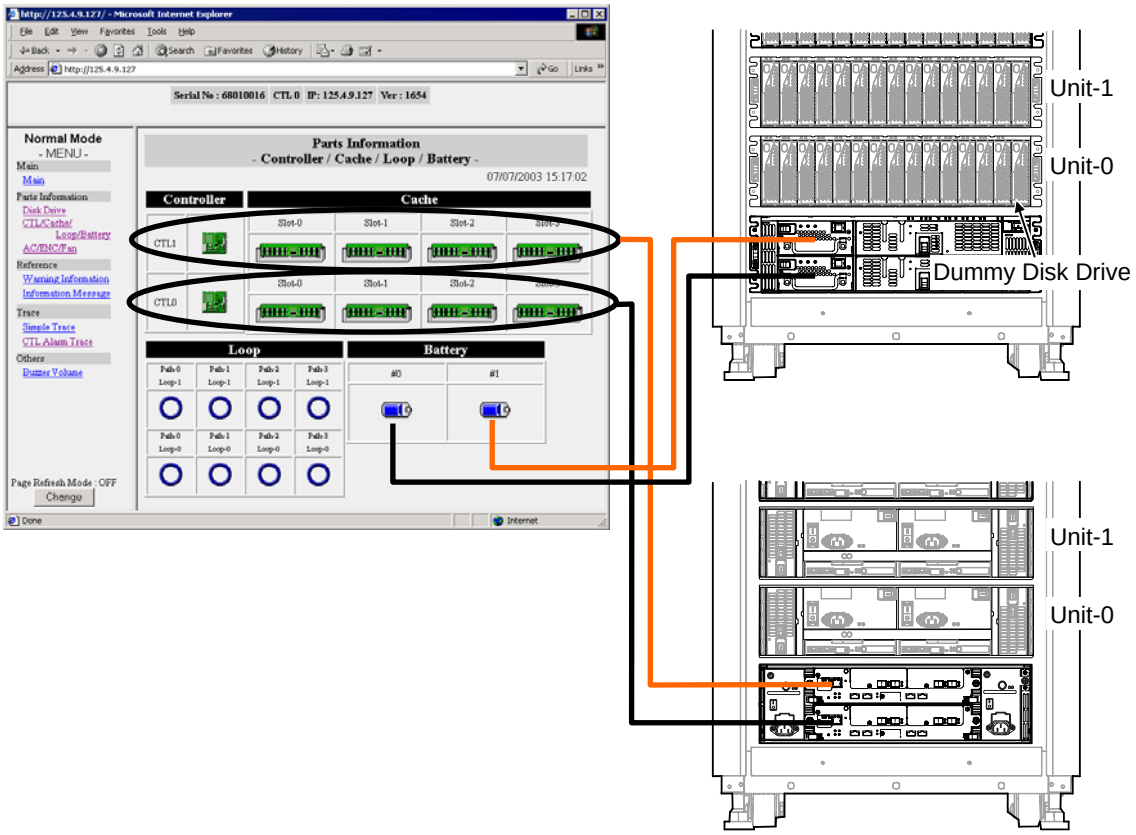
<Microprogram 1654 or later, less than 1657>

When there is a component in which a failure has occurred, the image of the component is displayed in red.

- Disk Drive

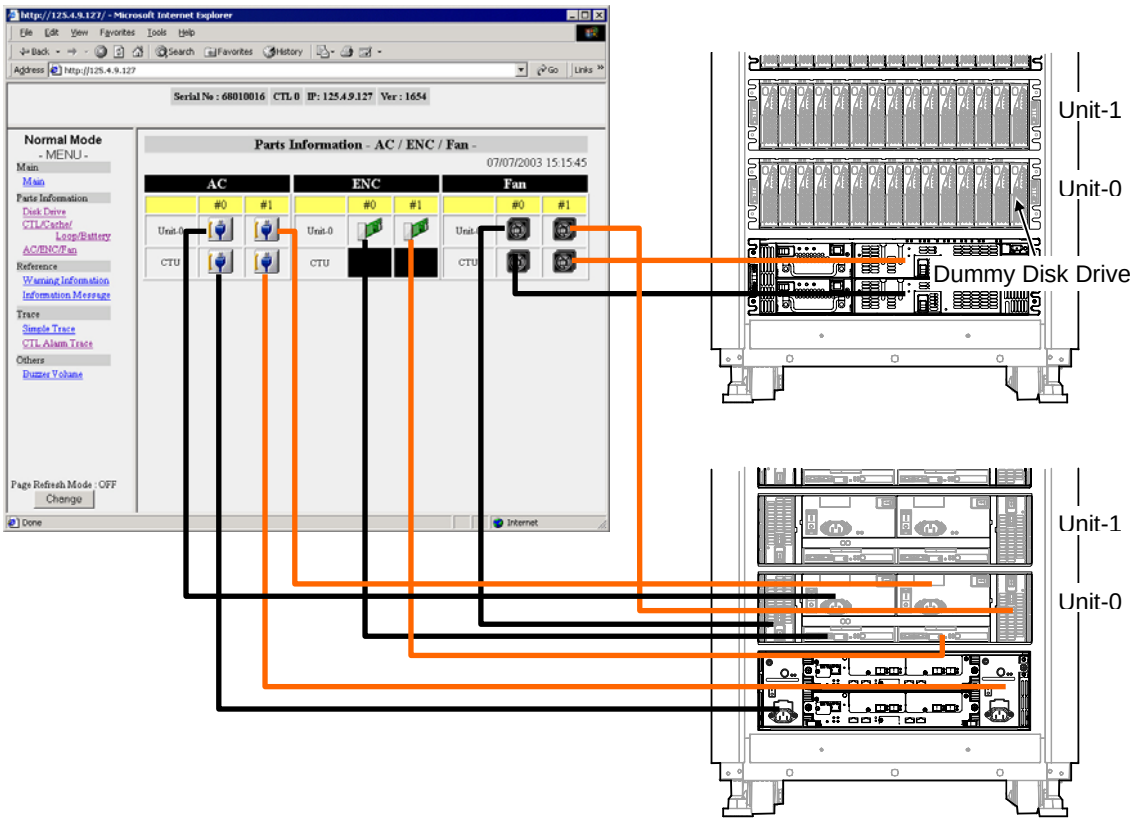


- CTL/Cache/Loop/Battery



Copyright © 2004, 2005, Hitachi, Ltd.

• AC/ENC/Fan

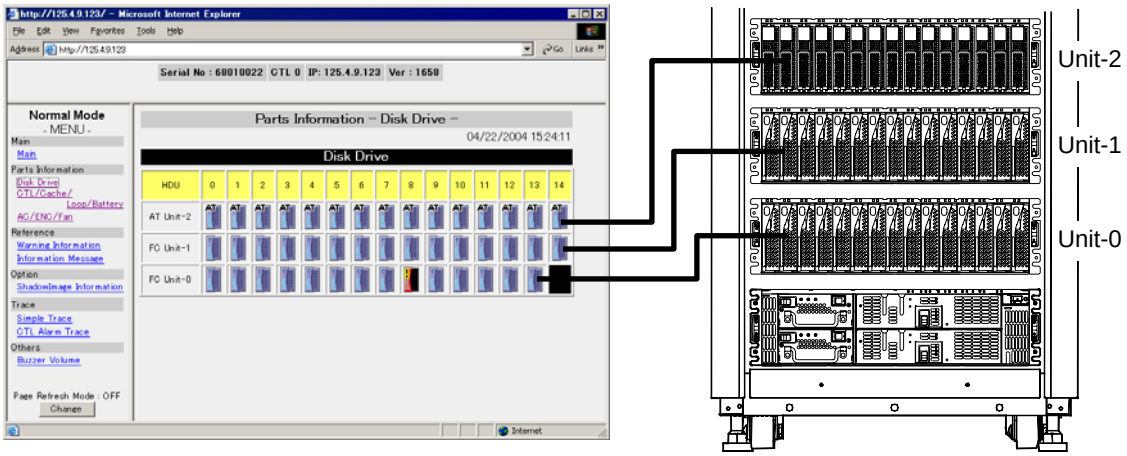


Copyright © 2002, 2005, Hitachi, Ltd.

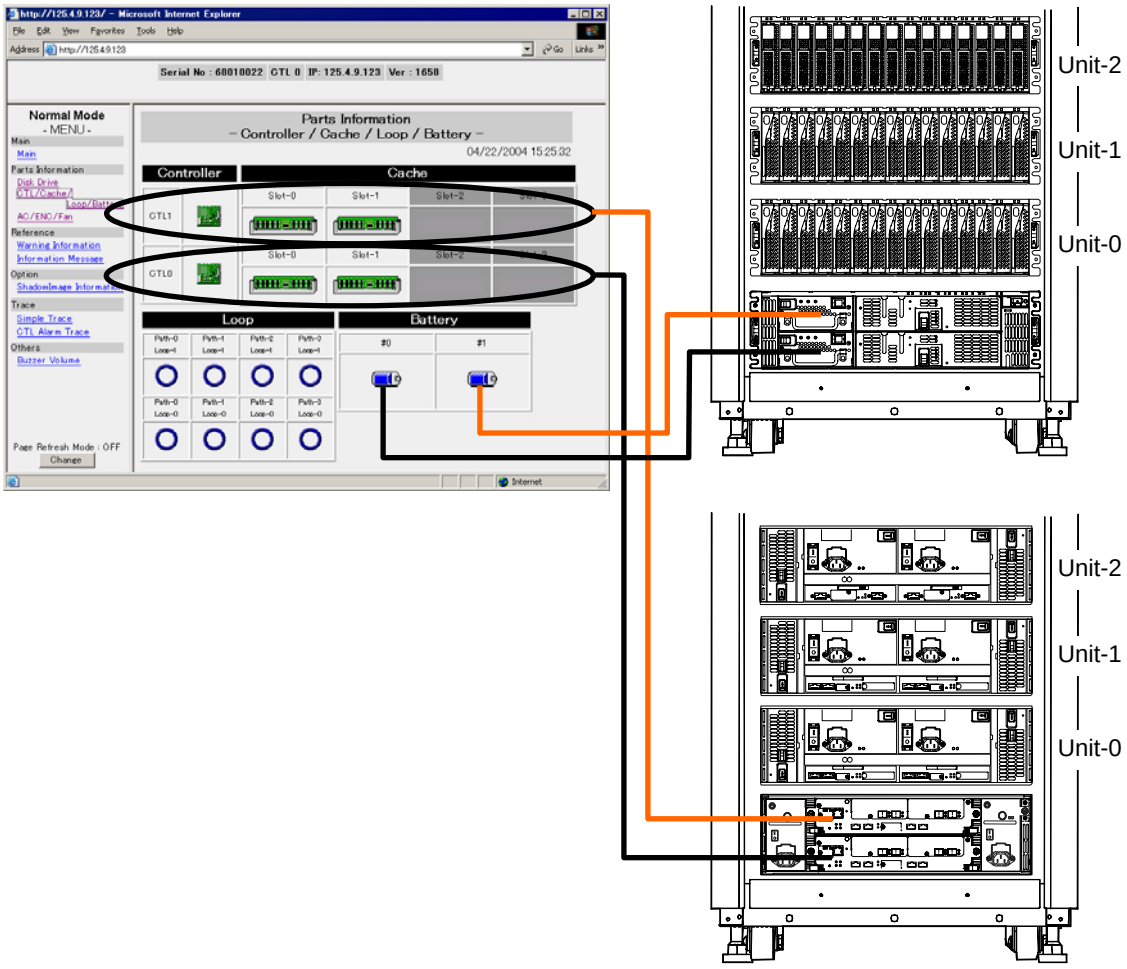
<Microprogram 1658 or later, less than 1659>

When there is a component in which a failure has occurred, the image of the component is displayed in red.

- Disk Drive

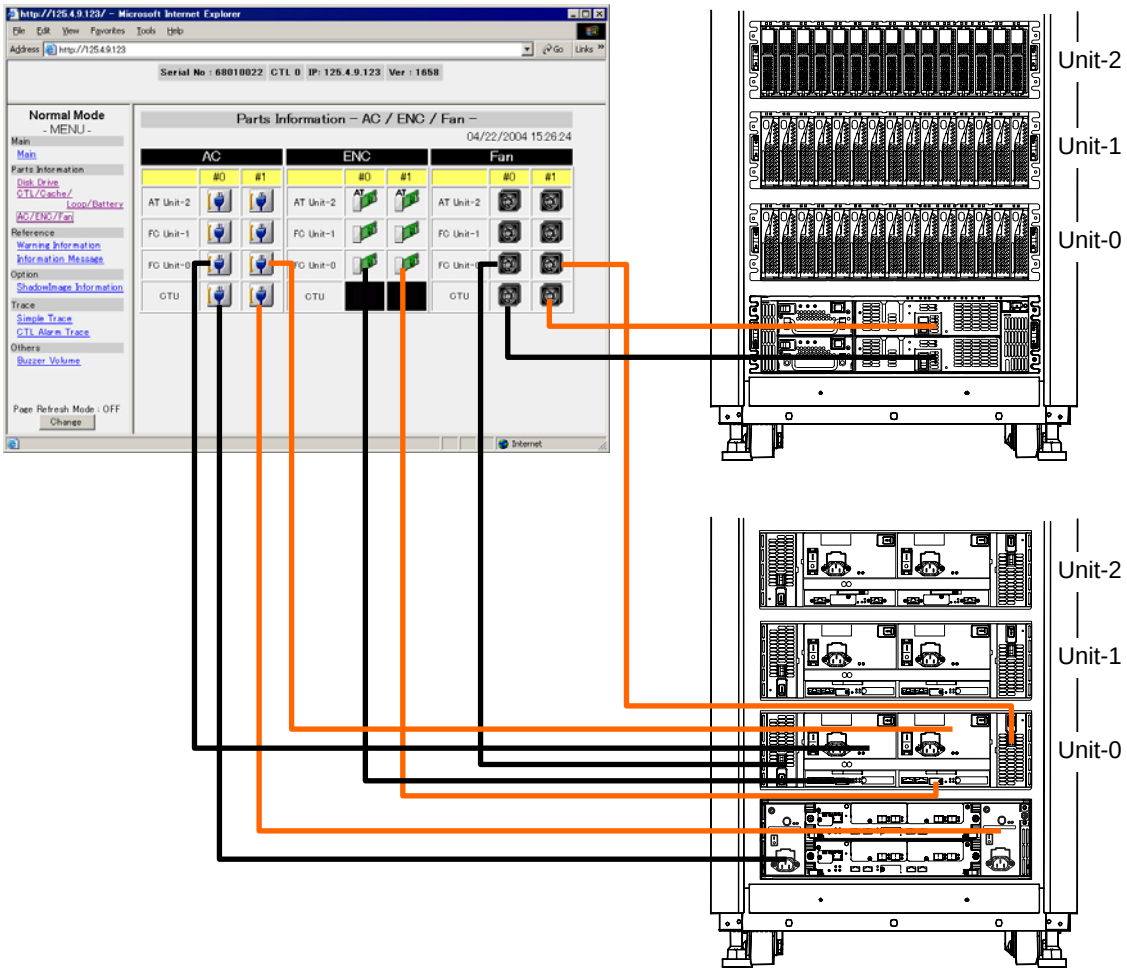


- CTL/Cache/Loop/Battery



Copyright © 2004, 2005, Hitachi, Ltd.

• AC/ENC/Fan

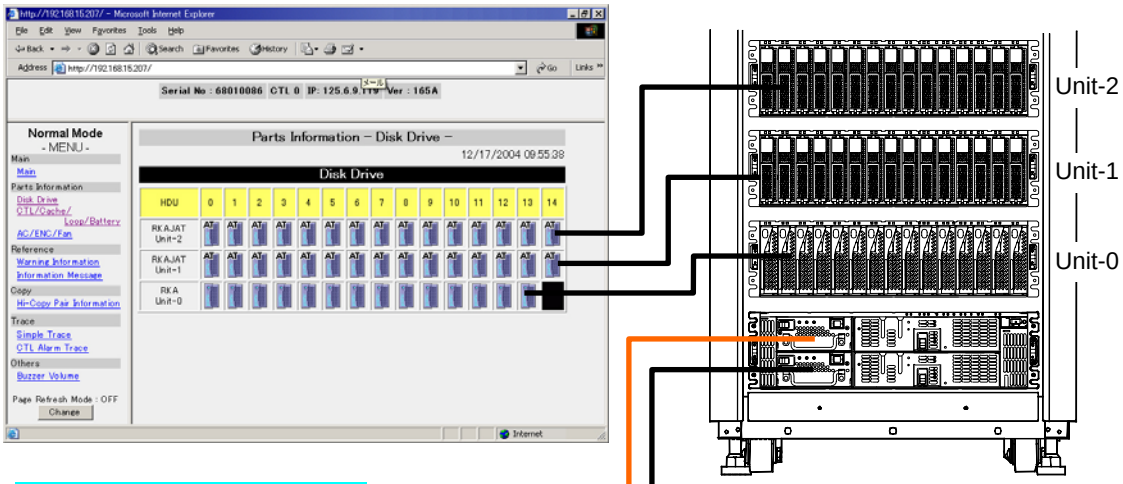


Copyright © 2004, 2005, Hitachi, Ltd.

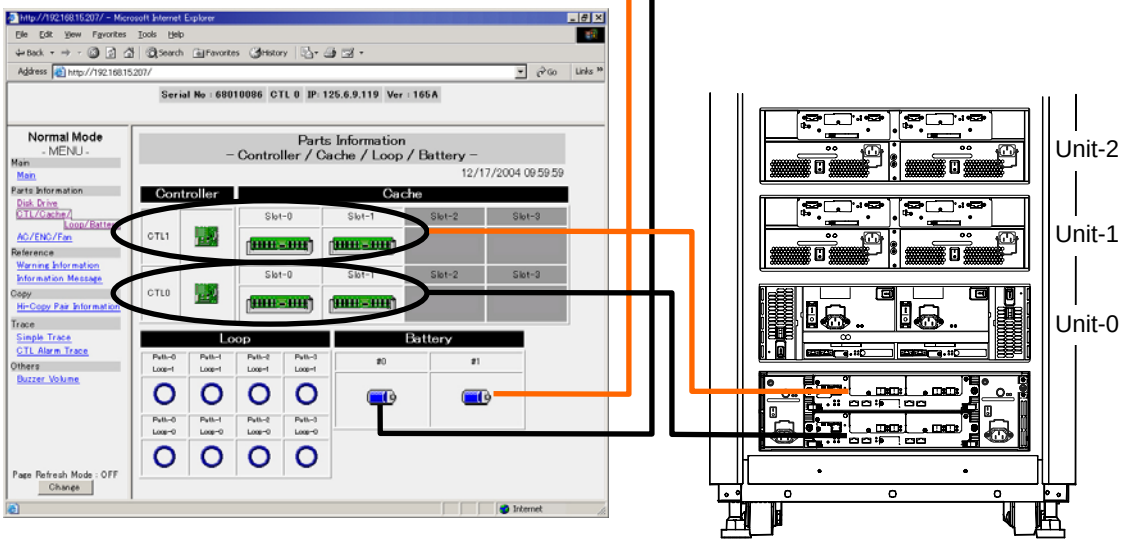
<Microprogram 165Aor later>

When there is a component in which a failure has occurred, the image of the component is displayed in red.

• Disk Drive

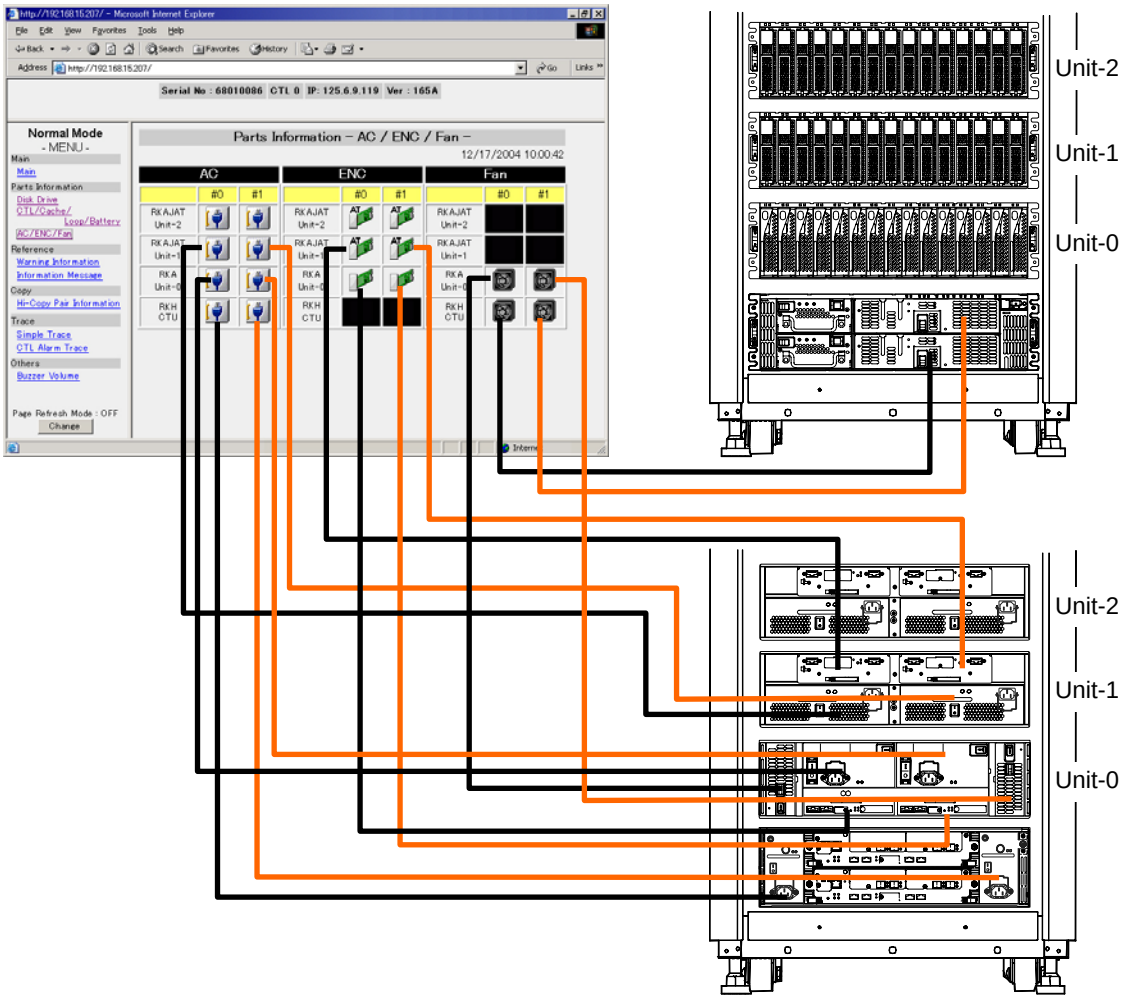


• Battery/CTL/Cache/Loop



Copyright © 2005, Hitachi, Ltd.

• AC/ENC/Fan



Copyright © 2005, Hitachi, Ltd.

The meaning of the image that displays it with the display screen of exchange part status is shown below.

(a) Disk Drive (FC)

Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 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)

(b) Disk Drive (RKL)

Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 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)

(c) Disk Drive (S-ATA)

Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 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)

Copyright © 2002, 2005, Hitachi, Ltd.

(d) 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

(e) 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

(f) Backup Battery Unit

Image	Status
 Green	• Normal
 Red	• There is a fault or not implemented

(g) Fan Assembly

Image	Status
 Black	• Normal
 Red	• There is a fault or not implemented

(h) Power Unit (Power Unit (DC))

Image	Status
 Blue	• Normal
 Red	• It is fault occurred or not implemented

Copyright © 2004, 2005, Hitachi, Ltd.

(i) ENC Unit

Image	Status
 Green	• Normal
 Red	• It is fault occurred or not implemented

(j) SENC Unit

Image	Status
 Green	• Normal
 Red	• It is fault occurred or not implemented

(k) Fibre loop

Image	Status
 Blue	• Normal
 Red	• Fault

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Procedure of the Status checking by messages

A warning message about the failed part is displayed.

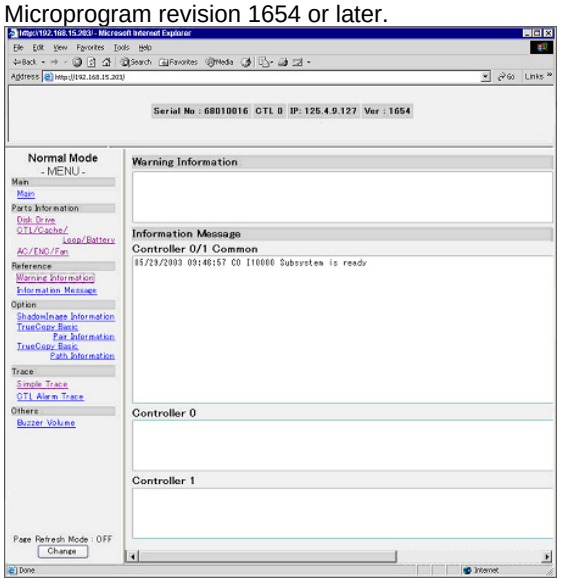
Refer to “2.2.3 Confirm log messages” for detail of the warning messages. (MNTE 02-0200)

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.

Microprogram revision 065x



Microprogram revision 1654 or later.



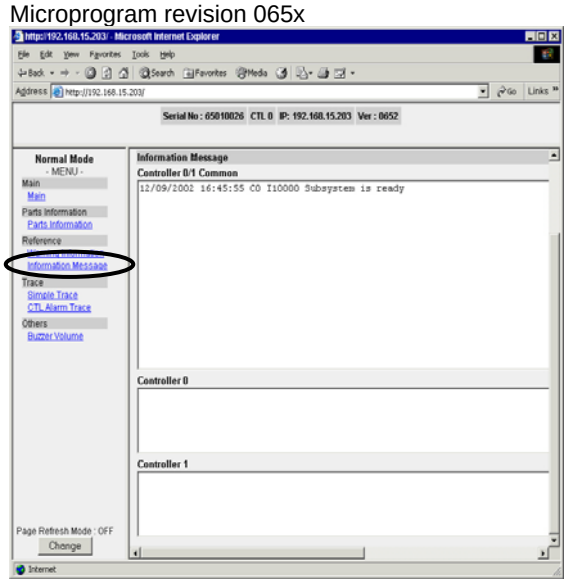
Copyright © 2002, 2005, Hitachi, Ltd.

2.2.3 Confirm log messages

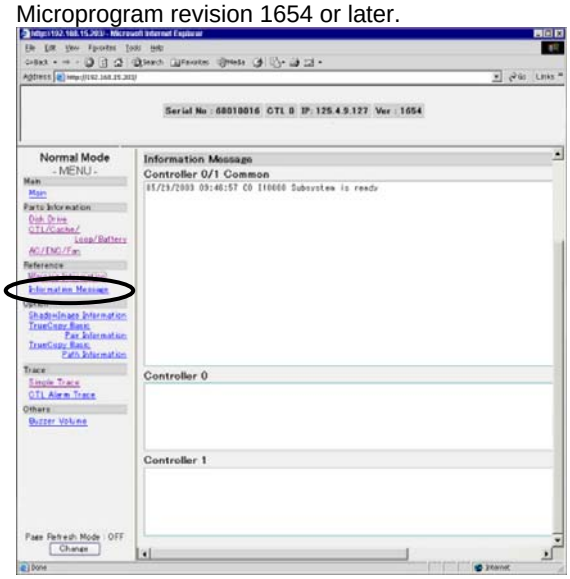
(1) Procedure for confirming log messages
Click the [Information Message] menu in the main window, and the “Information Message window” appears.

In the “Information Message window”, you can identify the cause of the failure and confirm the recovery measures.

Microprogram revision 065x



Microprogram revision 1654 or later.



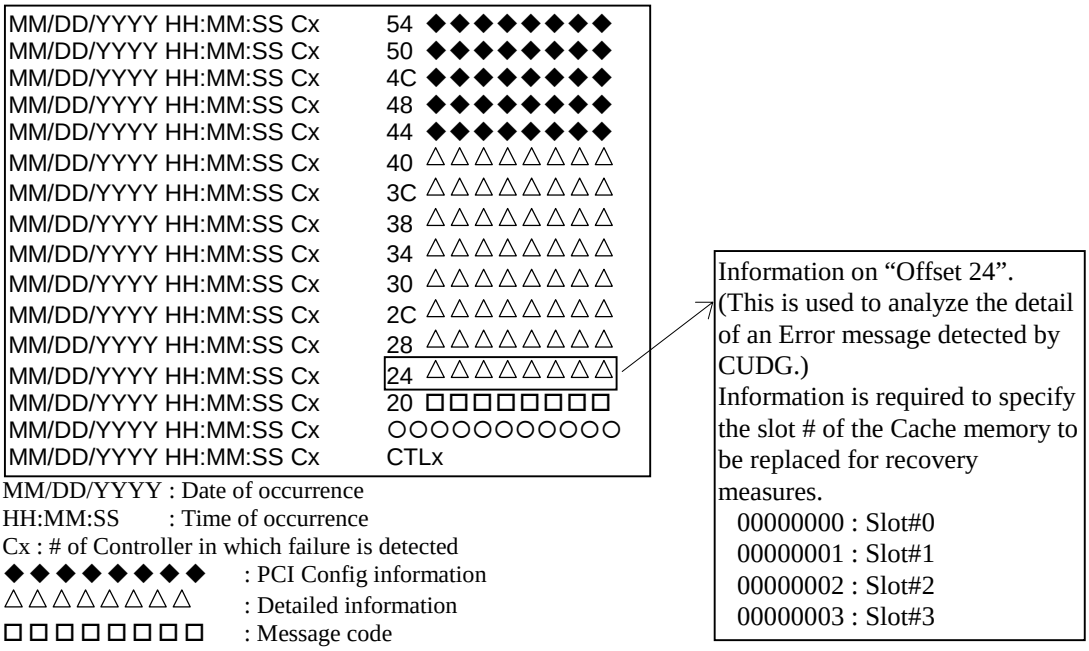
The information on the failures which were detected during operation of the unit and state of the unit s indicated in the above window.
The information on the failures and state after the unit starts up is indicated in the [Controller 0/1 Common] box.
The information on the failures and state at the 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.



(ii) Recovery measures

Recover from the failure according to the recovery measures for each message code. (For the recovery measures for each message, see "2.3.1 CUDG detected messages" (MNTE 02-0310).)

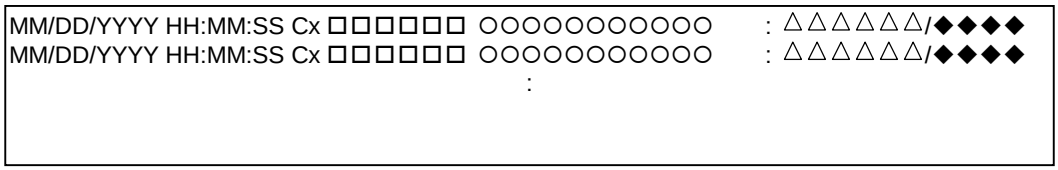
Copyright © 2002, 2005, Hitachi, Ltd.

(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 : Confirmed date
HH:MM:SS : Confirmed times
Cx : Error detected Controller#
□□□□□□□□ : Message Code(‡1)
Hxxxxx : Failure messages (MNTE 02-0460)
Ixxxxx : Progress messages (MNTE 02-0810)
Rxxxxx : Flash detected messages (MNTE 02-1160)
Wxxxxx : Warning messages (MNTE 02-1290)
○○○○○○○○○○ : Message text (Optional font number)
△△△△△△△△ : Recovery measures 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(ii) Recovery measures

① Collect the failure information according to " (◆◆◆◆)".

Table 2.2.1 Collecting Failure Information List

Display code	Error information you must collect
STRC	Simple trace
CTRC	Controller shutdown trace
FDMP	Memory dump
No display	None

For the details of the message, see "2.5 Collecting Error information" (MNTE 02-2140).

②Recover from the failure according to "Recovery measure code (△△△△△△△△)". For the details of the message, see "2.3 Trouble Analysis by Messages" (MNTE 02-0270).

Table 2.2.2 Recovery Measure Code List

Display code	Recovery measures	Reference
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.	5.3.5 (MNTE 05-0380)
BAT	Replace the Backup Battery Unit.	5.3.2 (MNTE 05-0260)
CACHE	Replace the Cache Unit indicated in the message text.	5.3.6 (MNTE 05-0470)
CTL	Replace the Control Unit, the CALM LED of which is on.	5.3.5 (MNTE 05-0380)
ENC	Replace the ENC Unit/SENC Unit indicated in the message text.	5.3.8 (MNTE 05-0640)
FAN	Replace the Fan Assembly.	5.3.3 (MNTE 05-0320)
HDU	Replace the Disk Drive indicated in the message text.	5.3.1 (MNTE 05-0120)
MANUAL	Referring to the manual ("2.3 Trouble Analysis by Messages" (MNTE 02-0270)), recover from the failure according to the recovery measures for each message code. Hxxxxx : Failure messages (MNTE 02-0460) Ixxxxx : Progress messages (MNTE 02-0810) Rxxxxx : Flash detected messages (MNTE 02-1160) Wxxxxx : Warning messages (MNTE 02-1290)	—
PON	Turn on the power again.	—
PS	Replace the Power Unit (Power Unit (DC) indicated in the message text.	5.3.4 (MNTE 05-0340)
RETRY	① Retry the operation. ② If the same failure occurs again, see the messages list in the manual "2.3 Trouble Analysis by messages" (MNTE 02-0270)) and recover from the failure according to the recovery measures for each message code.	—
SYSPM	Set the system parameter in the WEB maintenance mode correctly.	For WEB 03-0020
UPS	When a UPS is connected, take a recovery action referring to the UPS manual.	—
No display	This is not a problem. Recovery operation is not necessary.	—

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

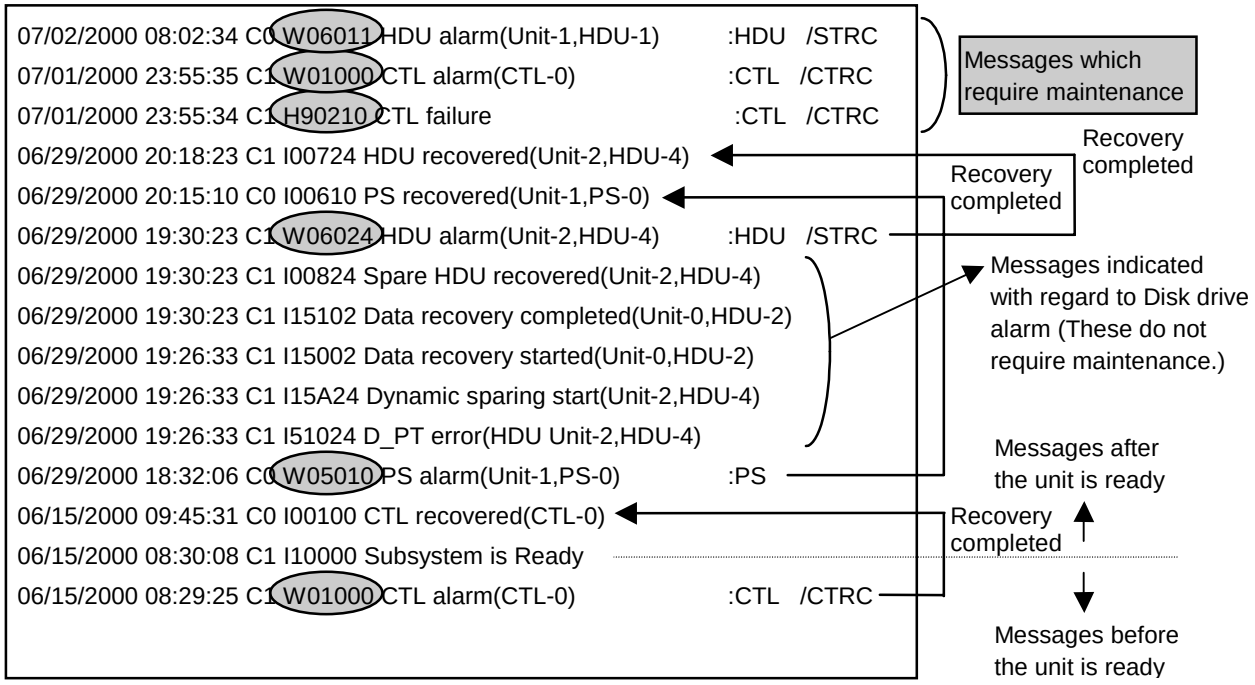
Table 2.2.3 Failure Message List

No.	Description	Failure detected messages		Failure recovery messages	
1	Controller error/recovery	W00100	CTL alarm (CTL-x)	I0010x	CTL recovered (CTL-x)
2	Cache memory error/ recovery	W0D0xy	CACHE alarm (CTL-x, CACHE-y)	I0020x	CACHE recovered (CACHE-x)
3	Battery error/recovery	W0300x	Battery alarm	I0030x	Battery recovered
		W0310x	Battery removed		
		W0320x	Battery SW off		
		W0330x	Battery Thermal alarm		
4	Battery backup circuit error/ recovery	W0340x	Battery backup circuit alarm (CTL-x)	I0040x	Battery backup circuit recovered (CTL-x)
5	Fan error/recovery	W040xy	FAN alarm (Unit-x, FAN-y)	I005HH	FAN recovered (Unit-xx, FAN-y)
				I00500	FAN recovered (CTL-Unit, FAN-x)
		W04100	FAN alarm (CTL-Unit, FAN-x)	I005xy	FAN recovered (Unit-xx, FAN-y)
		W042HH	FAN alarm (Unit-x, FAN-y)		
6	Power supply error/ recovery	W050HH W050xy	PS alarm (Unit-x, PS-y)	I006HH I006xy	PS recovered (Unit-x, PS-y)
		W05100	PS alarm (CTL-Unit, PS-x)	I00600	PS recovered (CTL-Unit, FAN-x)
7	Disk Drive error/recovery	W060HH W060xy	HDU alarm (Unit-x, HDU-y)	I007HH I007xy	HDU recovered (Unit-x, HDU-y)
		W060AT	SATA HDU alarm (Unit-x, HDU-y)		
8	Spare Disk error/recovery	W061HH W061xy	Spare HDU alarm (Unit-x, HDU-y)	I009HH I009xy	Spare HDU recovered (Unit-x, HDU-y)
		W061AT	SATA Spare HDU alarm (Unit-x, HDU-y)		
9	Loop error/recovery	W080xy	Loop alarm (Path-x, Loop-y)	I00Axy	Loop recovered (Path-x, Loop-y)

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Description	Failure detected messages		Failure recovery messages	
10	ENC Unit error/SENC Unit error/recovery	W090HH W090xy	ENC alarm (Unit-x, ENC-y)	I00BHH I00Bxy	ENC recovered (Unit-x, ENC-y)
		W090AT	SENC alarm (Unit-x, ENC-y)		
11	UPS	W0C000	UPS alarm (UPS-x)	I00D00	UPS recovered (UPS-x)
12	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

Example of message analysis :



Copyright © 2002, 2005, Hitachi, Ltd.

2.2.4 TrueCopy Basic path confirm state

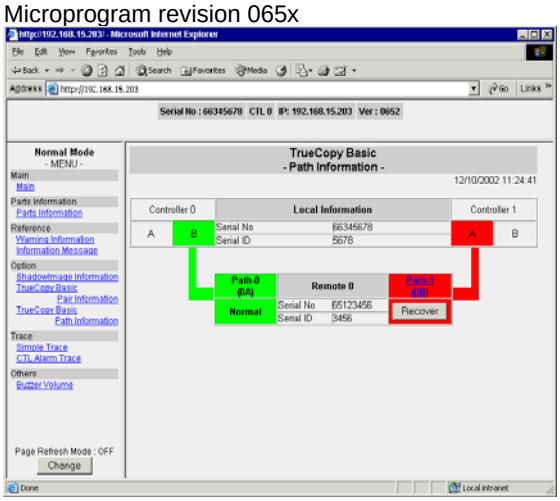
(1) Procedure for confirming log messages

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.

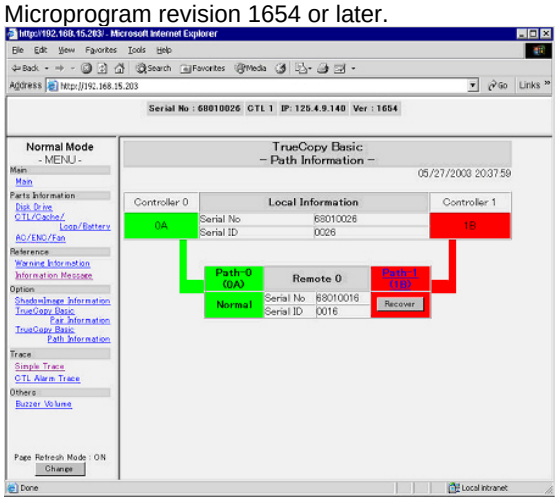
Also by clicking [TrueCopy Basic Path Information] on the menu frame in the main screen, the window is changed to the following window. And the details about the path state are displayed.

Perform the maintenance operation for replacement and the recovery operation referring to Section 2.4.3 “Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used” (MNTE 02-2030).

Microprogram revision 065x



Microprogram revision 1654 or later.



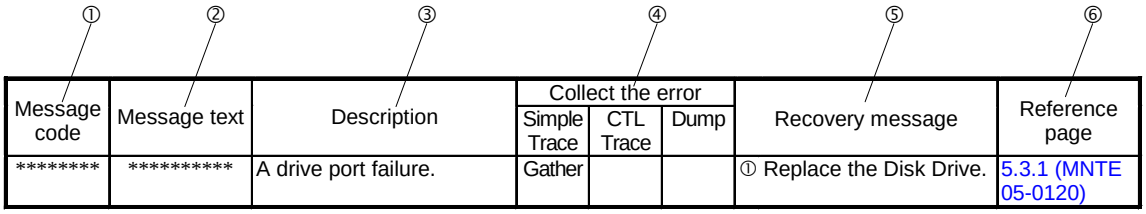
Copyright © 2002, 2005, Hitachi, Ltd.

2.3 Trouble Analysis by Messages

The contents of each failure detected during operation are reported by a message.
The failures detected during operation after the main switch of this unit is turned on and the state of the unit are reported.

When the device is powered off, this message is deleted.

(1) How to read table



Message code	Message text	Description	Collect the error			Recovery message	Reference page
			Simple Trace	CTL Trace	Dump		
********	**********	A drive port failure.	Gather			① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)

① The following messages are indicated.
- CUDG detected message.... : 018××××× (MNTE 02-0310)
- Flash detected messages
  Failure messages..... : H××××× (MNTE 02-0460)
  Progress messages ..... : I××××× (MNTE 02-0810)
  Flash detected messages..... : R××××× (MNTE 02-1160)
  Warning messages..... : W××××× (MNTE 02-1290)

② Message text : Message text is indicated.

③ Description : Contents of failure are described concretely.

④ Collection of errors
Simple trace.. : Collect simple trace
CTL Trace .... : Collect CTL trace
Dump..... : Collect memory dump.
Gather : Must be collected.
Space : Does not need to be collected.

⑤ Recovery measures : How to recover from failure is indicated.
①,②… : Recovery measure No.
When "-" is written here, no recovery operation is required.
Resides this, when another message is indicated, analyze the another failure.

⑥ Reference page : No. of page in which the recovery measures are described.

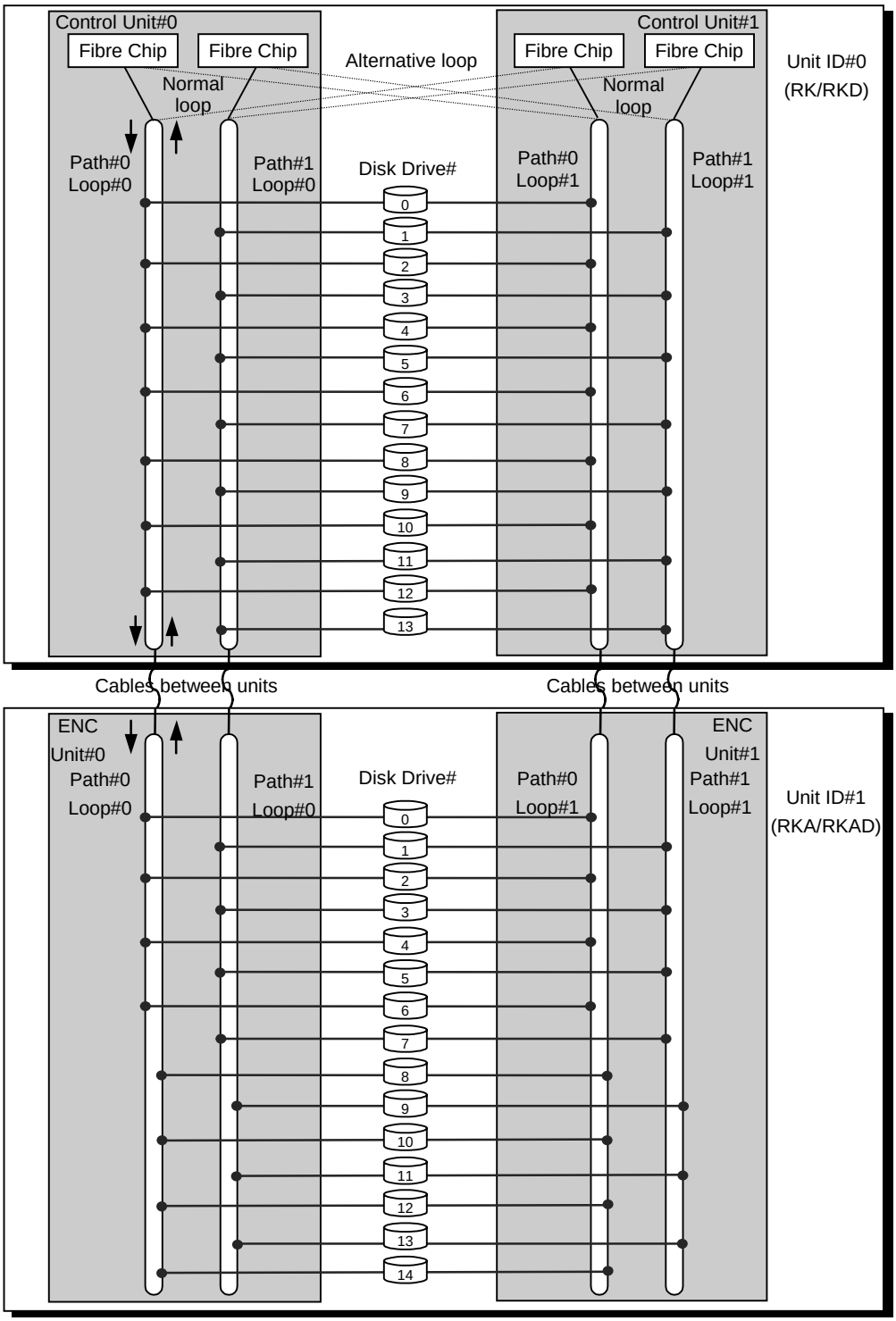
Copyright © 2002, 2005, Hitachi, Ltd.

(2) Names of failed parts

The failed parts of the internal Fibre Channel of DF600 are classified into the path and loop.

The respective configurations of these items are shown below.

- In the case of RK/RKA/RKD/RKAD



Copyright © 2002, 2005, Hitachi, Ltd.

RK, RKA, RKD, RKAD 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

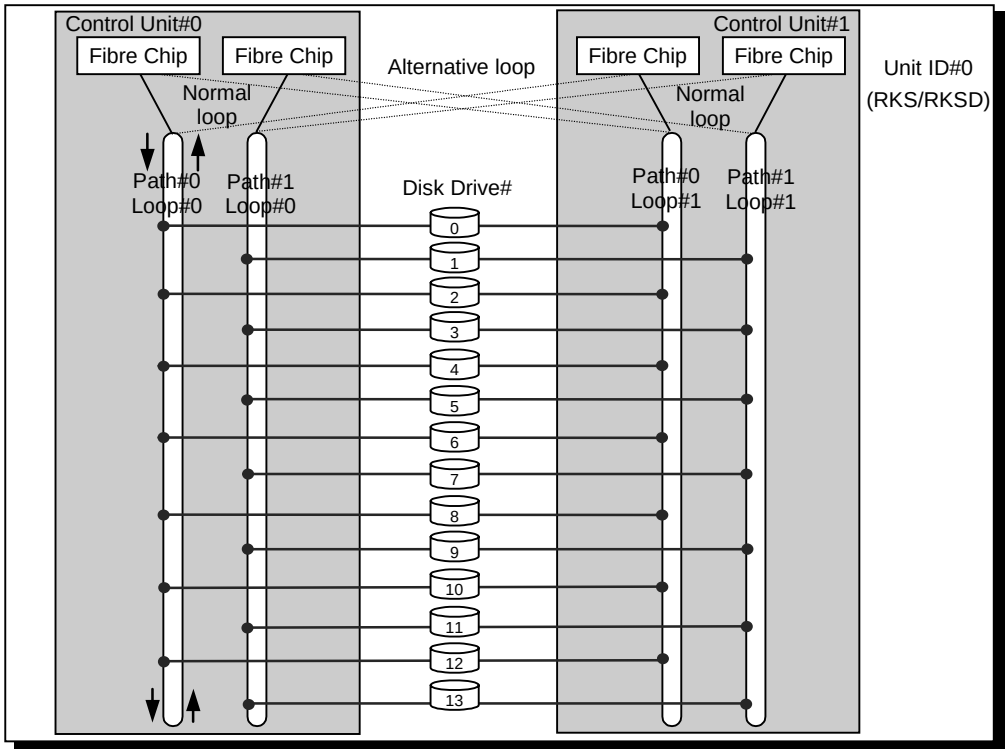
Path	Meaning
Path#0	2 Fibre lines connected to Disk Drive of even number
Path#1	2 Fibre lines connected to Disk Drive of odd number

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

Copyright © 2002, 2005, Hitachi, Ltd.

- In the case of RKS/RKSD



RKS/RKSD 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

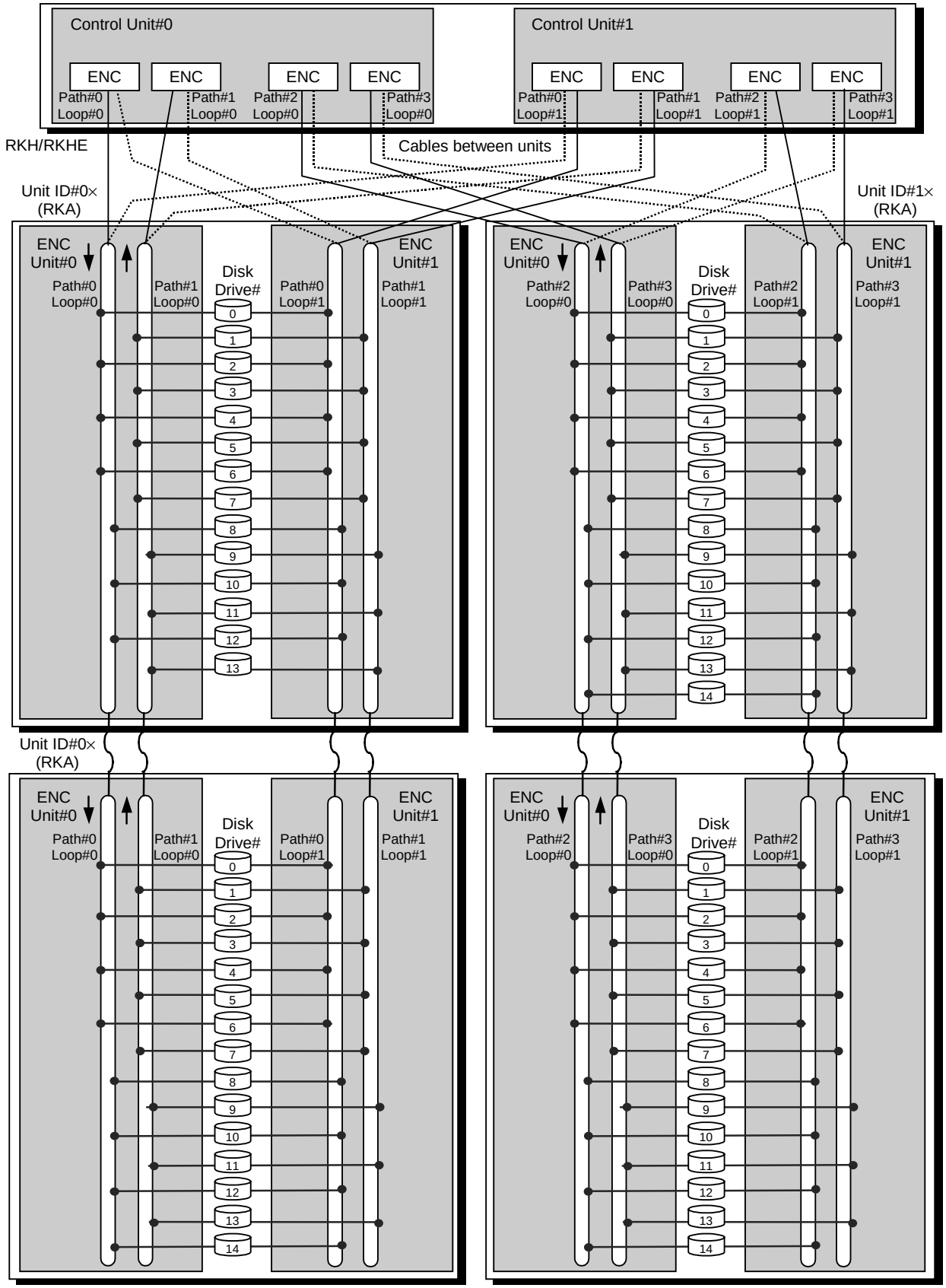
Path	Meaning
Path#0	2 Fibre lines connected to Disk Drive of even number
Path#1	2 Fibre lines connected to Disk Drive of odd number

Loop

Loop	Meaning
Loop#0	2 Fibre lines on Control Unit#0
Loop#1	2 Fibre lines on Control Unit#1

Copyright © 2002, 2005, Hitachi, Ltd.

- In the case of RKH/RKHE



Copyright © 2003, 2005, Hitachi, Ltd.

RKH/RKHE 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

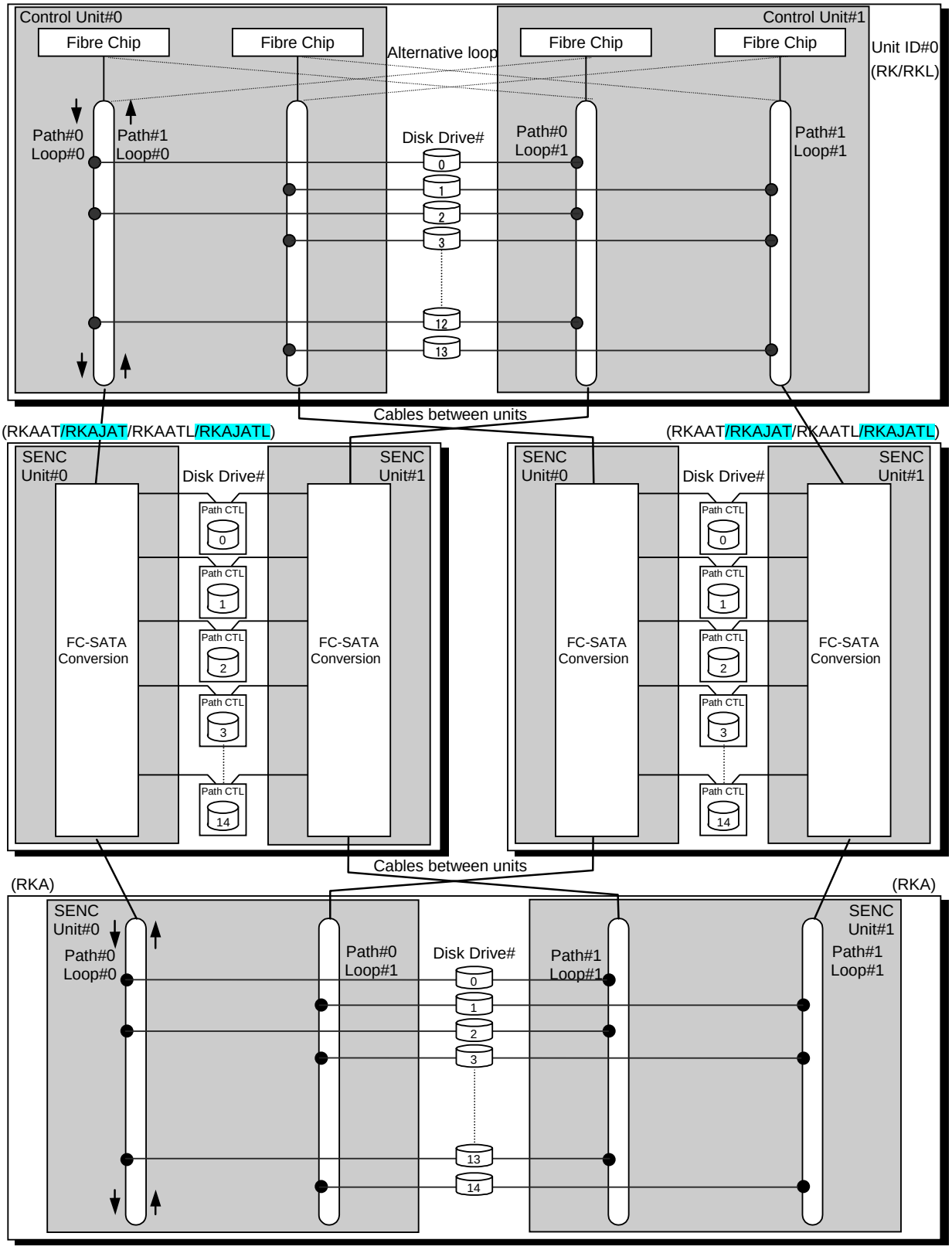
Path	Meaning
Path#0	Two Fibre Lines connected to the Disk Drives with even numbers on the side of the device ID #0x
Path#1	Two Fibre Lines connected to the Disk Drives with odd numbers on the side of the device ID #1x
Path#2	Two Fibre Lines connected to the Disk Drives with even numbers on the side of the device ID #1x
Path#3	Two Fibre Lines connected to the Disk Drives with odd numbers on the side of the device ID #1x

Loop

Loop	Meaning
Loop#0	4 Fibre lines on Control Unit#0
Loop#1	4 Fibre lines on Control Unit#1

Copyright © 2003, 2005, Hitachi, Ltd.

- A case where the RK+RKAATs+RKAs/RK+RKAJATs+RKAs/RKL+RKAATLs/RKL+RKAJATLs are connected
  The RKL can be connected only to the RKAATL/RKAJATL.



Copyright © 2004, 2005, Hitachi, Ltd.

RK, RKL, RKA, RKAAT, RKAJAT, RKAATL, RKAJATL 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.

- In the case of RK/RKL/RKA/RKAAT/RKAJAT/RKAATL/RKAJATL

Path

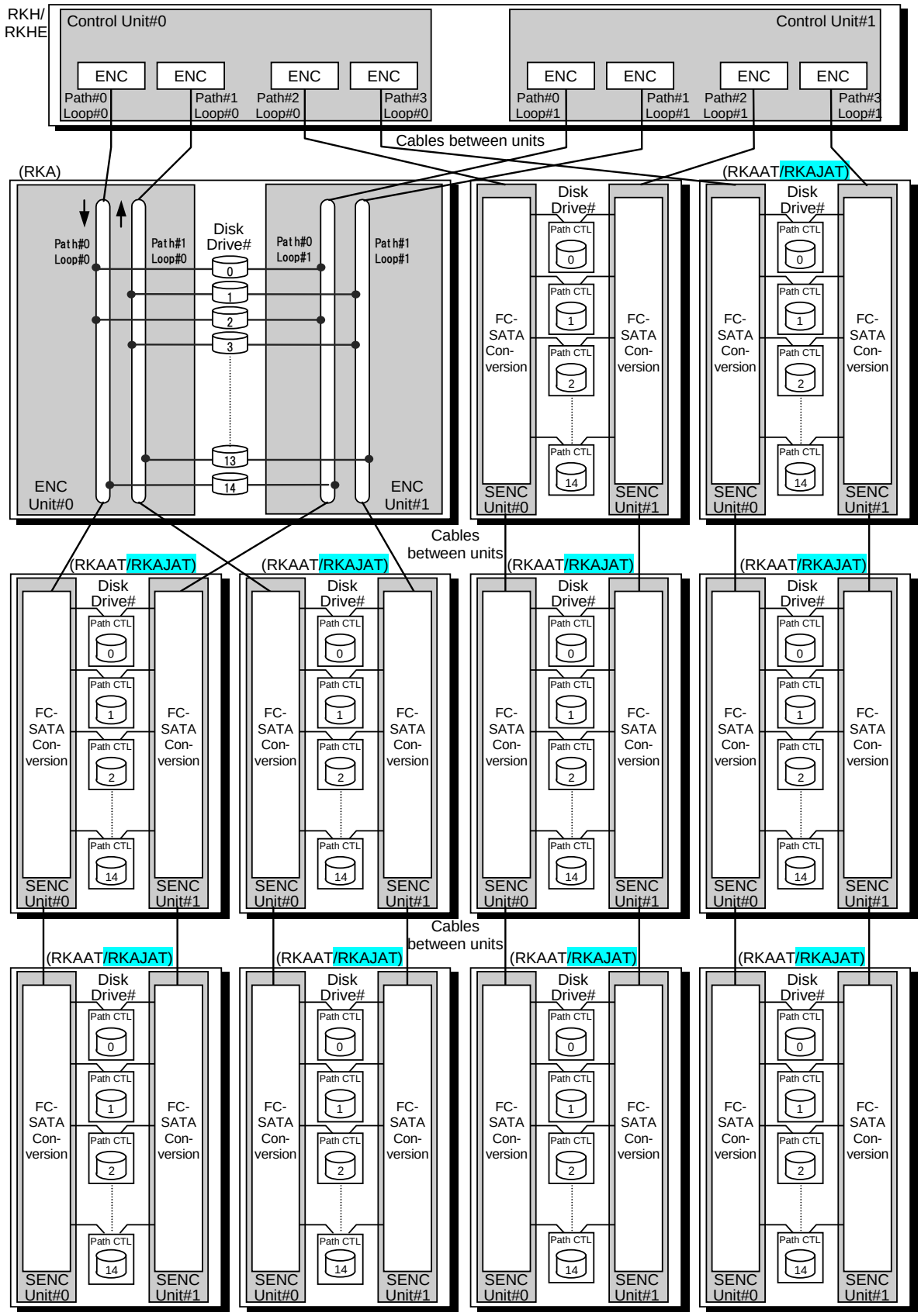
Path	Meaning
Path#0	Two Fibre lines connected to Disk Drives with even numbers, or two Fibre lines connected to the FC-SATA converter on the device ID #2x side in the case of a connection to the RKAAT/RKAJAT/RKAATL/RKAJATL.
Path#1	Two Fibre lines connected to Disk Drives with odd numbers, or two Fibre lines connected to the FC-SATA converter on the device ID #3x side in the case of a connection to the RKAAT/RKAJAT/RKAATL/RKAJATL.

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 RKAAT/RKAJAT/RKAATL/RKAJATL, 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 RKAAT/RKAJAT/RKAATL/RKAJATL, the FC-SATA converter is connected to the Fibre lines.)

Copyright © 2004, 2005, Hitachi, Ltd.

- A case where the RKH/RKHE+RKAs+RKAATs/RKAJATs are connected



Copyright © 2004, 2005, Hitachi, Ltd.

RKH, RKA, RKAAT/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.

- In the case of RKH/RKA/RKAAT/RKAJAT

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 RKAAT/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 RKAAT/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 RKAAT/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 RKAAT/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 RKAAT/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 RKAAT/RKAJAT, the FC-SATA converter is connected to the Fibre lines.)

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.1 CUDG detected messages

Table 2.3.1 CUDG detected messages

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01814001	FM1 SELERR	SUM1 value does not match.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01814002	FM1 SELERR	SUM2 value does not match.					
01814101	FM1 INS ERR	SUM1 value does not match.					
01814102	FM1 INS ERR	SUM2 value does not match.					
01814201	FM1 MAIN ERR	SUM1 value does not match.					
01814202	FM1 MAIN ERR	SUM2 value does not match.					
01815B01	FM1 INS ERR	SUM1 value does not match.					
01815B02	FM1 INS ERR	SUM2 value does not match.					
01824301	CSDS RW1 ERR	The CS/DS 4-byte R/W test showed that the Write value differed from the Read value.					
01824302	CSDS RW1 ERR	The CS/DS 2-byte R/W test showed that the Write value differed from the Read value.					
01824303	CSDS RW1 ERR	The CS/DS 2-byte R/W test showed that the Write value differed from the Read value.					
01824304	CSDS ADR ERR	The CS/DS address line test showed that the Write value differed from the Read value.					
01824305	CSDS ECC ERR	An invalid status was detected during the CS/DS ECC Force Test.					
01824601	CSDS RW2 ERR	The CS/DS 4-byte R/W test showed that the Write value differed from the Read value.					
01824602	CSDS RW2 ERR	An invalid status was detected in the Status Check after the CS/DS 4-byte R/W test.					
01834401	L1 RW ERR	An invalid status was detected during the L1 Data Cache R/W Test.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01834501	L2 RW1 ERR	An invalid status was detected during the L2 R/W Test 1.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01834502	L2 RW2 ERR	An invalid status was detected during the L2 R/W Test 2.					
01844701	MCTL RW ERR	An invalid status was detected during R/W on the M-CTL register.					
01844702	MCTL RW ERR	An invalid status was detected during R/W on the M-CTL register.					
01844801	MCTL FORCE ERR	No error was detected during the writing on the M-CTL read-only register. Alternatively, the error was not cleared.					
01844802	MCTL FORCE ERR	An MPCTL1 Input Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared.					
01844803	MCTL FORCE ERR	An MPCTL1 Output Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared.					
01844804	MCTL FORCE ERR	An INVDIN Input Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared.					
01844805	MCTL FORCE ERR	An INVDOUT Output Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared.					
01844806	MCTL FORCE ERR	An PCI_INVAIN Input Address Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
01844807	MCTL FORCE ERR	An PCI_INVAIN Input Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
01844808	MCTL FORCE ERR	An PCI_INVDOUT Output Data Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01844809	MCTL FORCE ERR	An PCI_INVC Parity Error was not detected with the error force setting. Alternatively, the error was not cleared				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
0184480A	MCTL FORCE ERR	An PCI_INVP Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
0184480B	MCTL FORCE ERR	An MPCTL1 CTCCH0 Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
0184480C	MCTL FORCE ERR	An MPCTL1 CTCCH1 Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
0184480D	MCTL FORCE ERR	An MPCTL1 WCDGCNT Parity Error was not detected with the error force setting. Alternatively, the error was not cleared					
01845101	CTC CH0 ERR	The count for CTC CH0 exceeded the specified period of time.					
01845102	CTC CH0 ERR	A CTC CH0 count parity error occurred.					
01845103	CTC CH0 ERR	The counting for CTC CH0 does not terminate.					
01845104	CTC CH1 ERR	The count for CTC CH1 exceeded the specified period of time.					
01845105	CTC CH1 ERR	A CTC CH1 count parity error occurred.					
01845106	CTC CH1 ERR	The counting for CTC CH1 does not terminate.					
01845E01	CTL NO ERR	The number of Controller cannot be obtained.				① Pull out the Control Unit which CALM LED has turned on and insert it again.	—
01845E02	CTL NO ERR	When the number of Controller was obtained, hardware error was detected.				② If the system is still abnormal, replace the Control Unit.	5.3.5 (MNTE 05-0380)
01845E03	CTL NO ERR	When the number of another Controller was obtained, hardware error was detected.					
01845E04	CTL NO ERR	The number of Controller is invalid.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01854901	LAN LPBK ERR	An invalid status was detected during the LAN Loop Back Test.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01854902	LAN LPBK ERR	The LAN Loop Back Test showed that the transfer source and destination data was inconsistent.					
01854A03	SIO CTL LB ERR	An invalid status was detected during the SI0 Loop Back Test.					
01854A04	SIO CTL LB ERR	The SI0 Loop Back Test showed that the transfer source and destination data was inconsistent.					
01854B01	BRIGE DMA ERR	An invalid status was detected during the Bridge DMA Test.					
01854B02	BRIGE DMA ERR	The Bridge DMA Test showed that the transfer source and destination data was inconsistent.					
01874C01	DCTL1 RW ERR	The Read Test for the D-CTL Register showed an invalid Read value.					
01874C02	DCTL1 RW ERR	The R/W Test 1 for the D-CTL Register showed that the Write value differed from the Read value.					
01874C03	DCTL1 RW ERR	An invalid Status was detected during the R/W Test on the D-CTL Register.					
01874C04	PBUF RW ERR	A Read or Write on the Primary PCI Buffer was not completed.					
01874C05	PBUF RW ERR	A parity error was detected during the reading of the Primary PCI Buffer.					
01874C06	PBUF RW ERR	The Primary PCI Buffer R/W Test showed that the Write value differed from the Read value.					
01874C07	H0BUF RW ERR	A Read or Write on the HOST PCI#0 Buffer was not completed.					
01874C08	H0BUF RW ERR	A parity error was detected during the reading of the HOST PCI#0 Buffer.					
01874C09	H0BUF RW ERR	The HOST PCI#0 Buffer R/W Test showed that the Write value differed from the Read value.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01874C0A	D0BUF RW ERR	A Read or Write on the DRV PCI#0 Buffer was not completed.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01874C0B	D0BUF RW ERR	A parity error was detected during the reading of the DRV PCI#0 Buffer.					
01874C0C	D0BUF RW ERR	The DRV PCI#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01874C0D	DUALBUF RW ERR	A read or write on the DUAL Buffer (local system) was not completed.					
01874C0E	DUALBUF RW ERR	A parity error was detected during the reading of the DUAL Buffer (local system).					
01874C0F	DUALBUF RW ERR	The R/W Test on the DUAL Buffer (local system) showed that the Write value differed from the Read value.					
01874C10	H1BUF RW ERR	A Read or Write on the HOST PCI#0 Buffer was not completed.					
01874C11	H1BUF RW ERR	A parity error was detected during the reading of the HOST PCI#0 Buffer.					
01874C12	H1BUF RW ERR	The HOST PCI#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01874C13	D1BUF RW ERR	A Read or Write on the DRV PCI#0 Buffer was not completed.					
01874C14	D1BUF RW ERR	A parity error was detected during the reading of the DRV PCI#0 Buffer.					
01874C15	D1BUF RW ERR	The DRV PCI#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01874D01	DUAL RW ERR	The R/W Test for the D-CTL DUAL Register (remote system) showed that the Write value differed from the Read value.				① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01874D02	DUAL RW ERR	An invalid status was detected during the R/W test for the D-CTL DUAL Register (remote system).					
01874D03	DUALBUF RW ERR	A read or write on the DUAL Buffer (remote system) was not completed.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01874D04	DUALBUF RW ERR	A parity error was detected during the reading of the DUAL Buffer (remote system).				① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01874D05	DUALBUF RW ERR	The R/W Test on the DUAL Buffer (remote system) showed that the Write value differed from the Read value.					
01874D06	DUAL FR ERR	An invalid status was detected during the force test for the D-CTL dual remote system.					
01874D07	DUALM FR ERR	An invalid status was detected during the force test for the D-CTL dual local system.					
01875001	DCTL FR1 ERR	A Read or Write on the MDMA Buffer was not completed.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875002	DCTL FR1 ERR	A parity error was detected during the reading of the MDMA Buffer.					
01875003	DCTL FR1 ERR	The MDMA Buffer R/W Test showed that the Write value differed from the Read value.					
01875004	DCTL FR1 ERR	An invalid status was detected during the D-CTL MPU Access Force Test.					
01875401	DCTL2 RW ERR	The D-CTL Register R/W Test 2 showed that the Write value differed from the Read value.					
01875402	DCTL2 RW ERR	An invalid Status was detected during the R/W Test 2 on the D-CTL Register.					
01875403	HP00BUF RW ERR	A Read or Write on the Host Port#00 Buffer was not completed.					
01875404	HP00BUF RW ERR	A parity error was detected during the reading of the Host Port#00 Buffer.					
01875405	HP00BUF RW ERR	The Host Port#00 Buffer R/W Test showed that the Write value differed from the Read value.					
01875406	HP01BUF RW ERR	A Read or Write on the Host Port#01 Buffer was not completed.					
01875407	HP01BUF RW ERR	A parity error was detected during the reading of the Host Port#01 Buffer.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01875408	HP01BUF RW ERR	Host Port#01 Buffer R/W Test showed that the Write value differed from the Read value.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875409	DP00BUF RW ERR	A Read or Write on the DRV Port#00 Buffer was not completed.					
0187540A	DP00BUF RW ERR	A parity error was detected during the reading of the DRV Port#00 Buffer.					
0187540B	DP00BUF RW ERR	DRV Port#00 Buffer R/W Test showed that the Write value differed from the Read value.					
0187540C	DP01BUF RW ERR	A Read or Write on the DRV Port#01 Buffer was not completed.					
0187540D	DP01BUF RW ERR	A parity error was detected during the reading of the DRV Port#01 Buffer.					
0187540E	DP01BUF RW ERR	DRV Port#01 Buffer R/W Test showed that the Write value differed from the Read value.					
0187540F	DMA0BUF RW ERR	A Read or Write on the DMA#0 Buffer was not completed.					
01875410	DMA0BUF RW ERR	A parity error was detected during the reading of the DMA#0 Buffer.					
01875411	DMA0BUF RW ERR	DMA#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01875412	HP10BUF RW ERR	A Read or Write on the Host Port#0 Buffer was not completed.					
01875413	HP10BUF RW ERR	A parity error was detected during the reading of the DMA#0 Buffer.					
01875414	HP10BUF RW ERR	Host Port#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01875415	HP11BUF RW ERR	A Read or Write on the Host Port#0 Buffer was not completed.					
01875416	HP11BUF RW ERR	A parity error was detected during the reading of the Host Port#0 Buffer.					
01875417	HP11BUF RW ERR	Host Port#0 Buffer R/W Test showed that the Write value differed from the Read value.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01875418	DP10BUF RW ERR	A Read or Write on the DRV Port#0 Buffer was not completed.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875419	DP10BUF RW ERR	A parity error was detected during the reading of the DRV Port#0 Buffer.					
0187541A	DP10BUF RW ERR	DRV Port#0 Buffer R/W Test showed that the Write value differed from the Read value.					
0187541B	DP11BUF RW ERR	A Read or Write on the DRV Port#0 Buffer was not completed.					
0187541C	DP11UF RW ERR	A parity error was detected during the reading of the DRV Port#0 Buffer.					
0187541D	DP11BUF RW ERR	DRV Port#0 Buffer R/W Test showed that the Write value differed from the Read value.					
01875601	DMA0 XFER ERR	The D-CTL DMA#0 transfer was not completed.					
01875602	DMA0 XFER ERR	An invalid status was detected during the D-CTL DMA#0 transfer.					
01875603	DMA0 XFER ERR	An error was found in the data transferred using D-CTL DMA#0.					
01875604	DP00 XFER ERR	An error occurred during loop initialization for the drive FPC#0 required for the Drive Port#00 DMA Transfer.					
01875605	DP00 XFER ERR	A transfer error occurred during the Drive Port#00 DMA Transfer Test 1.					
01875606	DP00 XFER ERR	The transfer did not terminate during the Drive Port#00 DMA Transfer Test 1.					
01875607	DP00 XFER ERR	An invalid status was detected after the transfer during the Drive Port#00 DMA Transfer Test 1.					
01875608	DP00 XFER ERR	An error was found in the data transferred during the Drive Port#00 DMA Transfer Test 1.					
01875609	DP00 XFER ERR	A transfer error occurred during the Drive Port #00 DMA Transfer Test 2.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
0187560A	DP00 XFER ERR	The transfer did not terminate during the Drive Port#00 DMA Transfer Test 2.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
0187560B	DP00 XFER ERR	An invalid status was detected after the transfer during the Drive Port #00 DMA Transfer Test 2.					
0187560C	DP00 XFER ERR	An error was found in the data transferred during the Drive Port #00 DMA Transfer Test 2.					
0187560D	DP01 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #01 required for the Drive Port#01 DMA Transfer.					
0187560E	DP01 XFER ERR	A transfer error occurred during the Drive Port #01 DMA Transfer Test 2.					
0187560F	DP01 XFER ERR	The transfer did not terminate during the Drive Port#01 DMA Transfer Test 1.					
01875610	DP01 XFER ERR	An invalid status was detected after the transfer during the Drive Port #01 DMA Transfer Test 1.					
01875611	DP01 XFER ERR	An error was found in the data transferred during the Drive Port #01 DMA Transfer Test 1.					
01875612	DP01 XFER ERR	A transfer error occurred during the Drive Port #01 DMA Transfer Test 2.					
01875613	DP01 XFER ERR	The transfer did not terminate during the Drive Port#01 DMA Transfer Test 2.					
01875614	DP01 XFER ERR	An invalid status was detected after the transfer during the Drive Port #01 DMA Transfer Test 2.					
01875615	DP01 XFER ERR	An error was found in the data transferred during the Drive Port #01 DMA Transfer Test 2.					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01875616	DP10 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #2 required for the Drive Port#10 DMA Transfer.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875617	DP10 XFER ERR	A transfer error occurred during the Drive Port #10 DMA Transfer Test 2.					
01875618	DP10 XFER ERR	The transfer did not terminate during the Drive Port#10 DMA Transfer Test 1.					
01875619	DP10 XFER ERR	An invalid status was detected after the transfer during the Drive Port #10 DMA Transfer Test 1.					
0187561A	DP10 XFER ERR	An error was found in the data transferred during the Drive Port #10 DMA Transfer Test 1.					
0187561B	DP10 XFER ERR	A transfer error occurred during the Drive Port #10 DMA Transfer Test 2.					
0187561C	DP10 XFER ERR	The transfer did not terminate during the Drive Port#10 DMA Transfer Test 2.					
0187561D	DP10 XFER ERR	An invalid status was detected after the transfer during the Drive Port #10 DMA Transfer Test 2.					
0187561E	DP10 XFER ERR	An error was found in the data transferred during the Drive Port #10 DMA Transfer Test 2.					
0187561F	DP11 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #2 required for the Drive Port#11 DMA Transfer.					
01875620	DP11 XFER ERR	A transfer error occurred during the Drive Port #11 DMA Transfer Test 2.					
01875621	DP11 XFER ERR	The transfer did not terminate during the Drive Port#11 DMA Transfer Test 1.					
01875622	DP11 XFER ERR	An invalid status was detected after the transfer during the Drive Port #11 DMA Transfer Test 1.					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01875623	DP11 XFER ERR	An error was found in the data transferred during the Drive Port #11 DMA Transfer Test 1.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875624	DP11 XFER ERR	A transfer error occurred during the Drive Port #11 DMA Transfer Test 2.					
01875625	DP11 XFER ERR	The transfer did not terminate during the Drive Port#11 DMA Transfer Test 2.					
01875626	DP11 XFER ERR	An invalid status was detected after the transfer during the Drive Port #11 DMA Transfer Test 2.					
01875627	DP11 XFER ERR	An error was found in the data transferred during the Drive Port #11 DMA Transfer Test 2.					
01875630	DFPC SRESET ERR	A trouble was detected in the software reset operation of the DFPC.					
01875701	DCTL FR2 ERR	An invalid status was detected during the D-CTL DMA#0 Access Force Test.					
01875702	DCTL FR2 ERR	An illegal status was detected in the DMA Access Force Test on the Drive Ports #00, #10, or #11.					
01875703	DCTL FR2 ERR	An invalid status was detected during the Force Test for the Primary PCI Bridge.					
01875704	DCTL FR2 ERR	An illegal status was detected in the Force Test on the Drive PCI #0 Bridge or Drive PCI #1 Bridge.					
01875705	DCTL FR2 ERR	An invalid status was detected during the DMA Access Force Test for the D-CTL MDMA Access Force Test.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01875901	HP00 XFER ERR	An error occurred during Loop Initialization for the Host FPC#A required for the Host Port#00 DMA Transfer.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
01875902	HP00 XFER ERR	A transfer error occurred during the Host Port#00 DMA Transfer Test 1.					
01875903	HP00 XFER ERR	The transfer did not terminate during the Host Port#00 DMA Transfer Test 1.					
01875904	HP00 XFER ERR	An invalid status was detected after the transfer during the Host Port#00 DMA Transfer Test 1.					
01875905	HP00 XFER ERR	An error was found in the data transferred during the Host Port#00 DMA Transfer Test 1.					
01875906	HP00 XFER ERR	A transfer error occurred during the Host Port#00 DMA Transfer Test 2.					
01875907	HP00 XFER ERR	The transfer did not terminate during the Host Port#00 DMA Transfer Test 2.					
01875908	HP00 XFER ERR	An invalid status was detected after the transfer during the Host Port#00 DMA Transfer Test 2.					
01875909	HP00 XFER ERR	An error was found in the data transferred during the Host Port#00 DMA Transfer Test 2.					
0187590A	HP01 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #1 required for the Host Port #01 DMA Transfer.					
0187590B	HP01 XFER ERR	A transfer error occurred during the Host Port#01 DMA Transfer Test 1.					
0187590C	HP01 XFER ERR	The transfer did not terminate during the Host Port#01 DMA Transfer Test 1.					
0187590D	HP01 XFER ERR	An invalid status was detected after the transfer during the Host Port#01 DMA Transfer Test 1.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
0187590E	HP01 XFER ERR	An error was found in the data transferred during the Host Port#01 DMA Transfer Test 1.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
0187590F	HP01 XFER ERR	A transfer error occurred during the Host Port#01 DMA Transfer Test 2.					
01875910	HP01 XFER ERR	The transfer did not terminate during the Host Port#01 DMA Transfer Test 2.					
01875911	HP01 XFER ERR	An invalid status was detected after the transfer during the Host Port#01 DMA Transfer Test 2.					
01875912	HP01 XFER ERR	An error was found in the data transferred during the Host Port#01 DMA Transfer Test 2.					
01875913	HP10 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #C required for the Host Port #10 DMA Transfer.					
01875914	HP10 XFER ERR	A transfer error occurred during the Host Port#10 DMA Transfer Test 1.					
01875915	HP10 XFER ERR	The transfer did not terminate during the Host Port#10 DMA Transfer Test 1.					
01875916	HP10 XFER ERR	An invalid status was detected after the transfer during the Host Port#10 DMA Transfer Test 1.					
01875917	HP10 XFER ERR	An error was found in the data transferred during the Host Port#10 DMA Transfer Test 1.					
01875918	HP10 XFER ERR	A transfer error occurred during the Host Port#10 DMA Transfer Test 2.					
01875919	HP10 XFER ERR	The transfer did not terminate during the Host Port#10 DMA Transfer Test 2.					
0187591A	HP10 XFER ERR	An invalid status was detected after the transfer during the Host Port#10 DMA Transfer Test 2.					
0187591B	HP10 XFER ERR	An error was found in the data transferred during the Host Port#10 DMA Transfer Test 2.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
0187591C	HP11 XFER ERR	An error occurred during Loop Initialization for the Drive FPC #D required for the Host Port #11 DMA Transfer.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
0187591D	HP11 XFER ERR	A transfer error occurred during the Host Port#11 DMA Transfer Test 1.					
0187591E	HP11 XFER ERR	The transfer did not terminate during the Host Port#11 DMA Transfer Test 1.					
0187591F	HP11 XFER ERR	An invalid status was detected after the transfer during the Host Port#11 DMA Transfer Test 1.					
01875920	HP11 XFER ERR	An error was found in the data transferred during the Host Port#11 DMA Transfer Test 1.					
01875921	HP11 XFER ERR	A transfer error occurred during the Host Port#11 DMA Transfer Test 2.					
01875922	HP11 XFER ERR	The transfer did not terminate during the Host Port#11 DMA Transfer Test 2.					
01875923	HP11 XFER ERR	An invalid status was detected after the transfer during the Host Port#11 DMA Transfer Test 2.					
01875924	HP11 XFER ERR	An error was found in the data transferred during the Host Port#11 DMA Transfer Test 2.					
01875930	HFPC SRESET ERR	A trouble was detected in the software reset operation of the HPPC.					
01875940	READ ERR	The value of the MCTL register was illegal though it was read three times.					
01875950	HFPC EQUIP ERR	There was an error in the Host I/F information.					
01875A01	DCTL FR3 ERR	An invalid status was detected during the DMA Access Force Test for the Host Port#00 or Drive Port #01.					
01875A02	DCTL FR3 ERR	An invalid status was detected during the Force Test for the Host PCI#0 Bridge.					
01875A03	DCTL FR3 ERR	There was an error in the Host I/F information.					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01884F01	CACHE1 ECC ERR	The R/W Test for Cache ECC showed that the Write value differed from the Read value.				① Check the mounting condition of the Cache memory of the Controller, the CALM LED which is on. If it is normal, replace the all Cache Units.	5.3.6 (MNTE 05-0470)
01884F02	CACHE1 ECC ERR	An invalid Status was detected during the R/W Test on the Cache ECC.				② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01884F03	CACHE1 ECC ERR	The expected ECC error did not occur during the Cache check of the ECC circuit.					
01884F04	CACHE1 ECC ERR	The Cache check of the ECC circuit showed that the data on the cache differed from the expected data.					
01885501	CACHE2 INF ERR	Cache mount information was obtained three times, but the obtained values differed from one another.				① Check the mounting condition of the Cache Unit of the Control Unit# indicated by "Cx" (x:Control Unit#) in the log message. If it is normal, replace the Cache Unit of the slot # indicated in Offset 24 of the indicated message (See (MNTE 02-0210)).	5.3.6 (MNTE 05-0470)
01885502 (*1)	CACHE2 INF ERR	Invalid Cache mount information was obtained.					
01885503 (*1)	CACHE2 RW ERR	The R/W Test on the cache showed that the Write value differed from the Read value.					
01885504 (*1)	CACHE2 RW ERR	An ECC error occurred during the R/W Test on the Cache.				② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01885505 (*1)	CACHE2 ADR ERR	The address Line Test on the Cache showed that the Write value differed from the Read value.					
01885506 (*1)	CACHE2 ADR ERR	An ECC error occurred during the Address Line Test on the Cache.					
01884E01	CACHE INF ERR	An interrupt did not occur when Cache mounting information was obtained.				① Try again after pull out and insert the Cache Unit of the Control Unit, the CALM LED which is on and. If it is abnormal, replace the all Cache Units.	5.3.6 (MNTE 05-0470)
01884E02	CACHE INF ERR	An invalid status was obtained when Cache mounting information was obtained.				② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01884E03	CACHE IMP ERR	Invalid mount information was obtained.				① Check the mounting condition of the Cache Unit of the Control Unit, the CALM LED of which is on. If it is normal, replace the Cache Units of slots #0 and #1.	5.3.6 (MNTE 05-0470)
						② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)

*1 : Cache slot # (0 - 1) is reported to Offset 24 of error code 01885502 to 01885506.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01884E04	CACHE IMP ERR	The caches mounted in the paired slots (Slots #0 and #1) differed in size.				① Check the mounting condition of the Cache Unit of the Control Unit, the CALM LED of which is on (See if the capacities of each pair of Cache Unit are the same). If it is normal, replace the all Cache Unit. ② If the system is still abnormal, replace the above Control Unit.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
01884E05 (*1)	CACHE SIZE ERR	Cache Image Map was obtained three times, but the obtained values differed from one another.				① Check the mounting condition of the Cache Unit of the Control Unit, the CALM LED of which is on. If it is normal, replace the Cache Unit of the slot # indicated in Offset 24 of the indicated message. (See (MNTE 02-0210)) ② If the system is still abnormal, replace the above Control Unit.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
01884E06 (*1)	CACHE SIZE ERR	Impossible Cache Image Map was obtained.					
01884E07 (*1)	CACHE SIZE ERR	The cache size shown by hardware differs from the Cache Size detected by the CUDG.					
01884E08 (*1)	CACHE RW ERR	The R/W Test on the cache showed that the Write value differed from the Read value.					
01884E09 (*1)	CACHE RW ERR	An ECC error occurred during the R/W test on the cache.					
01884E0A (*1)	CACHE ADR ERR	The address line test on the cache showed that the Write value differed from the Read value.					
01884E0B (*1)	CACHE ADR ERR	An ECC error occurred during the address line test on the cache.					
01884E0C (*1)	CACHE ECC ERR	The Write value differed from the Read value during cache access using the RMW method.					
01884E0D (*1)	CACHE ECC ERR	The Write value differed from the Read value during access to the cache using the DUMY adding method.					
01884E0E (*1)	CACHE ACES ERR	The Read value differed from the expected value during cache access using the RMW method.					
01884E0F (*1)	CACHE ACES ERR	An ECC error occurred during cache access using the RMW method and the DUMY adding method.					

*1 : Cache slot # (0 - 1) is reported to Offset 24 of error code 01884E05 to 01884E0F.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
01884E10 (*1)	CACHE SIZE ERR	The Cache are not installed in the Slots #0 and #1.				① Check the installation status of the Cache Memories of the Control Unit whose CALM LED is on (check whether the Cache Memories are inserted in the paired Cache Slots #0 and #1). If it is normal, replace the Cache Memories inserted in the Cache Slots #0 and #1.	5.3.6 (MNTE 05-0470)
						② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01884E11	CACHE SIZE ERR	The Caches whose sizes are different from each other were installed in the pair slots (Slots #0 and #1).				① Check the installation status of the Cache Memories of the Controller whose CALM LED is on (check whether capacities of the Caches inserted in the paired Cache Slots #0 and #1 are the same or not). If it is normal, replace the Cache Memories in the Slots #0 and #1.	5.3.6 (MNTE 05-0470)
						② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01884E12	CACHE SIZE ERR	The Cache is not installed in one of the Pair Slots (Slots #2 and #3).				① Check the installation status of the Cache Memories of the Control Unit whose CALM LED is on (check whether the Cache Memories are inserted in the paired Cache Slots #2 and #3). If it is normal, replace the Cache Memories inserted in the Cache Slots #2 and #3.	5.3.6 (MNTE 05-0470)
						② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
01884E13	CACHE SIZE ERR	The Caches whose sizes are different from each other were installed in the pair slots (Slots #0 and #1).				① Check the installation status of the Cache Memories of the Control Unit whose CALM LED is on (whether capacities of the Caches inserted in the paired Cache Slots #2 and #3 are the same or not). If it is normal, replace the Cache Memories inserted in the Slots #2 and #3.	5.3.6 (MNTE 05-0470)
						② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)

*1 : Cache slot # (0 - 1) is reported to Offset 24 of error code 01884E10.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018A5201	DFPC0 RW ERR	The R/W Test for the DRIVE FPC#0 showed that the Write value differed from the Read value.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018A5202	DFPC0 RW ERR	An invalid status was detected during R/W Test on the DRIVE FPC #0.					
018A5203	DFPC0 LPINI ERR	An error occurred during in Loop Initialize in Loop Back Test for the DRIVE FPC#0.					
018A5204	DFPC0 LPBK ERR	A transfer error occurred during the Loop Back Test for the Drive FPC#0.					
018A5205	DFPC0 LPBK ERR	The transfer did not terminate during the Loop Back Test for the DRIVE FPC#0.					
018A5206	DFPC0 LPBK ERR	An invalid status was detected after the transfer during the Loop Back Test for the DRIVE FPC#0.					
018A5207	DFPC0 LPBK ERR	An error was found in the data transferred during the Loop Back Test for the DRIVE FPC#0.					
018A5208	DFPC1 RW ERR	The R/W Test for the DRIVE FPC#1 showed that the Write value differed from the Read value.					
018A5209	DFPC1 RW ERR	An invalid status was detected during the R/W Test for the DRIVE FPC#1.					
018A520A	DFPC1 LPINI ERR	An error occurred during in Loop Initialize in Loop Back Test for the DRIVE FPC#1.					
018A520B	DFPC1 LPBK ERR	A transfer error occurred during the Loop Back Test for the Drive FPC#1.					
018A520C	DFPC1 LPBK ERR	The transfer did not terminate during the Loop Back Test for the DRIVE FPC#1.					
018A520D	DFPC1 LPBK ERR	An invalid status was detected after the transfer during the Loop Back Test for the DRIVE FPC#1.					
018A520E	DFPC1 LPBK ERR	An error was found in the data transferred during the Loop Back Test for the DRIVE FPC#1.					
018A520F	DFPC2 W ERR	The R/W Test for the DRIVE FPC#0 showed that the Write value differed from the Read value.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018A5210	DFPC2 RW ERR	An invalid status was detected during R/W Test on the DRIVE FPC #2.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018A5211	DFPC2 RW ERR	An error occurred during in Loop Initialize in Loop Back Test for the DRIVE FPC#2.					
018A5212	DFPC2 LPINI ERR	A transfer error occurred during the Loop Back Test for the Drive FPC#2.					
018A5213	DFPC2 LPBK ERR	The transfer did not terminate during the Loop Back Test for the DRIVE FPC#2.					
018A5214	DFPC2 LPBK ERR	An invalid status was detected after the transfer during the Loop Back Test for the DRIVE FPC#2.					
018A5215	DFPC2 LPBK ERR	An error was found in the data transferred during the Loop Back Test for the DRIVE FPC#2.					
018A5216	DFPC3 RW ERR	The R/W Test for the DRIVE FPC#3 showed that the Write value differed from the Read value.					
018A5217	DFPC3 RW ERR	An invalid status was detected during the R/W Test for the DRIVE FPC#3.					
018A5218	DFPC3 LPINI ERR	An error occurred during in Loop Initialize in Loop Back Test for the DRIVE FPC#3.					
018A5219	DFPC3 LPBK ERR	A transfer error occurred during the Loop Back Test for the Drive FPC#3.					
018A521A	DFPC3 LPBK ERR	The transfer did not terminate during the Loop Back Test for the DRIVE FPC#3.					
018A521B	DFPC3 LPBK ERR	An invalid status was detected after the transfer during the Loop Back Test for the DRIVE FPC#3.					
018A521C	DFPC3 LPBK ERR	An error was found in the data transferred during the Loop Back Test for the DRIVE FPC#3.					
018A5230	DFPC SRESET ERR	A trouble was detected in the software reset operation of the DRIVE FPC.					

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018C5301	RTC RW ERR	The R/W Test for the RTC showed that the Write value differed from the Read value.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018C5302	RTC RW ERR	An invalid status was detected during the R/W Test for the RTC.					
018D5801	HFPC IMP ERR	The mount check of the HOST FPC showed that the VENDER_ID or DEVICE_ID differed.					
018D5802	HFPCA RW ERR	The R/W Test for the HOST FPC#0 showed that the Write value differed from the Read value.					
018D5803	HFPCA RW ERR	An invalid status was detected during the R/W Test for the HOST FPC#0.					
018D5804	HFPCA LPINI ERR	An invalid status was detected during the Loop Back Test for the HOST FPC#0.					
018D5805	HFPCA LPBK ERR	An error occurred during in Loop Initialize in Write Loop Back for the HOST FPC#0.					
018D5806	HFPCA LPBK ERR	A transfer error occurred during the Write Loop Back for the HOST FPC#0.					
018D5807	HFPCA LPBK ERR	The transfer did not terminate during the Write Loop Back for the HOST FPC#0.					
018D5808	HFPCA LPBK ERR	An invalid status was detected after the transfer during the Write Loop Back for the HOST FPC#0.					
018D5809	HFPCB RW ERR	The R/W Test for the HOST FPC#1 showed that the Write value differed from the Read value.					
018D580A	HFPCB RW ERR	An invalid status was detected during the R/W Test for the HOST FPC#1.					
018D580B	HFPCB LPINI ERR	An invalid status was detected during the Loop Back Test for the HOST FPC#1.					
018D580C	HFPCB LPBK ERR	An error occurred during in Loop Initialize in Write Loop Back for the HOST FPC#1.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018D580D	HFPCB LPBK ERR	A transfer error occurred during the Write Loop Back for the HOST FPC#1.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018D580E	HFPCB LPBK ERR	The transfer did not terminate during the Write Loop Back for the HOST FPC#1.					
018D580F	HFPCB LPBK ERR	An invalid status was detected after the transfer during the Write Loop Back for the HOST FPC#1.					
018D5810	HFPCC RW ERR	The R/W Test for the HOST FPC#2 showed that the Write value differed from the Read value.					
018D5811	HFPCC RW ERR	An invalid status was detected during the R/W Test for the HOST FPC#2.					
018D5812	HFPCC LPINE ERR	An invalid status was detected during the Loop Back Test for the HOST FPC#2.					
018D5813	HFPCC LPBK ERR	An error occurred during in Loop Initialize in Write Loop Back for the HOST FPC#2.					
018D5814	HFPCC LPBK ERR	A transfer error occurred during the Write Loop Back for the HOST FPC#2.					
018D5815	HFPCC LPBK ERR	The transfer did not terminate during the Write Loop Back for the HOST FPC#2.					
018D5816	HFPCC LPBK ERR	An invalid status was detected after the transfer during the Write Loop Back for the HOST FPC#2.					
018D5817	HFPCD RW ERR	The R/W Test for the HOST FPC#3 showed that the Write value differed from the Read value.					
018D5818	HFPCD RW ERR	An invalid status was detected during the R/W Test for the HOST FPC#3.					
018D5819	HFPCD LPINI ERR	An invalid status was detected during the Loop Back Test for the HOST FPC#3.					
018D581A	HFPCD LPBK ERR	An error occurred during in Loop Initialize in Write Loop Back for the HOST FPC#3.					
018D581B	HFPCD LPBK ERR	A transfer error occurred during the Write Loop Back for the HOST FPC#3.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018D581C	HFPCD LPBK ERR	The transfer did not terminate during the Write Loop Back for the HOST FPC#3.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018D581D	HFPCD LPBK ERR	An invalid status was detected after the transfer during the Write Loop Back for the HOST FPC#3.					
018D5830	HFPC SRESET ERR	A trouble was detected in the software reset operation of the HOST FPC.					
018E5D01	ECTL PCIFR ERR	In the Force test on the E-CTL PCI I/F, no error was detected although the Error Force had been set.					
018E5D02	ECTL PCIFR ERR	In the Force test on the E-CTL PCI1 I/F, an error had been detected before the Error Force was set, or an error was not cleared after it had been detected.					
018E5D03	ECTL REG RW ERR	In the R/W test on the E-CTL Register, written and read data were not the same.					
018E5D04	ECTL REG RW ERR	An illegal status was detected in the R/W test on the E-CTL Register.					
018E5D05	ECTL RAM RW ERR	In the Data Line Test on the internal RAM of the E-CTL, written and read data were not the same.					
018E5D06	ECTL RAM RW ERR	In the Data Line Test on the internal RAM of the E-CTL, an illegal status was detected.					
018E5D07	ECTL RAM RW ERR	In the Address Line Test on the internal RAM or the E-CTL, written and read data was not the same.					
018E5D08	ECTL RAM RW ERR	In the Address Line Test on the internal RAM or the E-CTL, an illegal status was detected.					
018E5D09	ECTL SH CODE ERR	The value of the fixed code of the SH microprogram was different from the normal one.					
018E5D0A	ECTL CMD CNT ERR	The count-up of the CMD Nos. was not performed normally.					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018E5D0B	ECTL CMD CNT ERR	An illegal status was detected in the count-up performed when the CMD Nos. were 0x00 to ox1D and 0x1F.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018E5D0C	ECTL CMD CNT ERR	The error interruption was not detected in the count-up performed when the CMD No. was 0x1E.					
018E5D0D	ECTL REG FR ERR	In the Force Test on the E-CTL Register, no error was detected although the Error Force had been set.					
018E5D0E	ECTL REG FR ERR	In the Force Test on the E-CTL Register, an error was not cleared after it had been detected.					
018E5D0F	ECTL SH IF ERR	Data written in the internal RAM WRITE area of the E-CTL was not reflected on the READ area within the prescribed time.					
018E5DC0	ECTL SH MEM ERR	An error occurred between the SH microprogram and the E-CTL was detected when the E-CTL Test was started.					
018E5DC1	ECTL SH MEM ERR	An error occurred between the SH microprogram and the E-CTL was detected when the E-CTL Test was terminated.					
018E5DC2	ECTL STS CLR ERR	Though the clearing of the APERR_STS0 and DPERR_STS0 was attempted, they were not cleared.					
018xxxD0 (*1)	CACHE ACCESS ERR	In the CUDG item using the cache, the R/W test for checking the cache access showed that the write data differed from the read data.				① Check the mounting condition of the Cache Unit of the Control Unit, the CALM LED of which is on. If it is normal, replace the Cache Unit of the slot # indicated in Offset 24 of the indicated message. (See (MNTE 02-0210))	5.3.6 (MNTE 05-0470)
018xxxD1 (*1)	CACHE ACCESS ERR	In the CUDG item using the cache, an invalid status was detected during the R/W test for checking the cache access.				② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
*1 : Cache slot # (0 - 1) is reported to Offset 24 of error code 018xxxD0 and 018xxxD1.							

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
018xxxE0	HARDERR	A Hard Error was detected when the CUDG items started.				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
018xxxE1	HARDERR	A Hard Error was detected when the CUDG items terminated.					
018xxxF0	PCI STS ERR	A PCI Status Register was detected error when the CUDG items started.					
018xxxF1	PCI STS ERR	A PCI Status Register was detected error when the CUDG items terminated.					

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

2.3.2 Failure messages

Table 2.3.2 Failure messages

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H00000	INTSTACK back over [REG80000014, Bit26]	The stack-back was executed in the state in which no stack exists in the INTSTACK.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H00100	INTSTACK register over [REG80000014, Bit24]	The INTSTACK of 20 layers in the memory was exceeded.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			
H00600	MCTL REG access error [RDRGWR] [REG80000014, Bit11]	A writing was done on the read-only register of the M-CTL.		Gather			
H00700	CTC parity error (CH-0) [REG80000014, Bit5]	A parity error was detected in the timer CH0 of the M-CTL	Gather				
H00800	CTC parity error (CH-1) [REG80000014, Bit4]	A parity error was detected in the timer CH1 of the M-CTL	Gather				
H00900	Watchdog-timer counter parity error [REG80000014, Bit0]	A parity error occurred in the counter for the watchdog timer.	Gather				
H10000	MCTL PCI bus retry over [REG80040010, Bit29]	An excess of the PCI bus retry count was detected.	Gather				
H10100	MCTL PCI bus time-out [REG80040010, Bit28]	A PCI bus time-out was detected.	Gather				
H10200	MCTL PCI bus deadlock [REG80040010, Bit21]	A PCI bus deadlock was detected.	Gather				
H10300	VIPER CNOW ADR counter parity error [REG80040034, Bit31]	A parity error was detected in the CNOW_ADR counter.	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H10400	VIPER CTCON REG ADR counter parity error [REG80040034, Bit28]	A parity error was detected in the CTCON_REG_ADR counter.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H10500	VIPER CTGO STOP CNT counter parity error [REG80040034, Bit27]	A parity error was detected in the CTGO_STOP_CNT counter.	Gather				
H10600	VIPER CSTOP CNT counter parity error [REG80040034, Bit26]	A parity error was detected in the CSTOP_CNT counter.	Gather				
H10700	VIPER CPCIBUS DED CNT counter parity error [REG80040034, Bit23]	A parity error was detected in the CPCIBUS_DED_CNT counter.	Gather				
H10800	VIPER CTGO ADR counter parity error [REG80040034, Bit22]	A parity error was detected in the CTGO_ADR counter.	Gather				
H10900	VIPER target write parity error [TW3ERR] [REG80040034, Bit15]	A parity error was detected in data bits 31 to 24 during the VIPER internal transfer target write (PIO).		Gather			
H10A00	VIPER target write parity error [TW2ERR] [REG80040034, Bit14]	A parity error was detected in data bits 23 to 16 during the VIPER internal transfer target write (PIO).		Gather			
H10B00	VIPER target write parity error [TW1ERR] [REG80040034, Bit13]	A parity error was detected in data bits 15 to 08 during the VIPER internal transfer target write (PIO).		Gather			
H10C00	VIPER target write parity error [TW0ERR] [REG80040034, Bit12]	A parity error was detected in data bits 07 to 00 during the VIPER internal transfer target write (PIO).		Gather			
H10D00	VIPER target read parity error [TR3ERR] [REG80040034, Bit11]	A parity error was detected in data bits 31 to 24 during the VIPER internal transfer target read (PIO).		Gather			
H10E00	VIPER target read parity error [TR2ERR] [REG80040034, Bit10]	A parity error was detected in data bits 23 to 16 during the VIPER internal transfer target read (PIO).		Gather			
H10F00	VIPER target read parity error [TR1ERR] [REG80040034, Bit9]	A parity error was detected in data bits 15 to 08 during the VIPER internal transfer target read (PIO).		Gather			
H10G00	VIPER target read parity error [TR0ERR] [REG80040034, Bit8]	A parity error was detected in data bits 07 to 00 during the VIPER internal transfer target read (PIO).		Gather			
H10H00	MCTL PCI parity error [CONFIG04, Bit31]	A parity error was detected in the MCTL.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H10I00	MCTL PCI system error [CONFIG04, Bit30]	A system error was detected in the MCTL.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H10J00	MCTL PCI master abort [CONFIG04, Bit29]	A master abortion was received in the MCTL.	Gather				
H10K00	MCTL PCI received target abort [CONFIG04, Bit28]	A target abortion was received in the MCTL.	Gather				
H10L00	MCTL PCI signaled target abort [CONFIG04, Bit27]	The target abortion was executed in the MCTL.	Gather				
H10M00	MCTL PCI data parity error [CONFIG04, Bit24]	A data parity error was detected in the MCTL.		Gather			
H10N00	DCTL PPCI parity error [REG8200127C, Bit31]	The parity error was detected in the DCTL (PPCI).		Gather			
H10P00	DCTL PPCI system error [REG8200127C, Bit30]	A system error was detected in the DCTL (PPCI).	Gather				
H10Q00	DCTL PPCI master abort [REG8200127C, Bit29]	A master abortion was received in the DCTL (PPCI).	Gather				
H10R00	DCTL PPCI received target abort [REG8200127C, Bit28]	A target abortion was received in the DCTL (PPCI).	Gather				
H10S00	DCTL PPCI signaled target abort [REG8200127C, Bit27]	The target abortion was executed in the DCTL (PPCI).	Gather				
H10T00	DCTL PPCI PERR assert or reception [REG8200127C, Bit24]	A PERR was asserted or received in the DCTL (PPCI) in the case of the bus master.		Gather			
H10U00	DCTL PPCI ADR parity error [REG8200127C, Bit23]	An address parity error was detected in the DCTL (PPCI).		Gather			
H10V00	DCTL PPCI DRD parity error [REG8200127C, Bit22]	A parity error was detected in the DCTL (PPCI) in the data read from the data FIFO.		Gather			
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.	Gather				
H10X00	DCTL PPCI CNT parity error [REG8200127C, Bit20]	A parity error was detected in the DCTL (PPCI) during counting by the FIFO control counter.	Gather				
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.	Gather				
H10Z00	DCTL PPCI target illegal termination [REG8200127C, Bit18]	An illegal termination of a target was detected in the DCTL (PPCI) in the case of the DCTL master.	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H11000	DCTL H0PCI parity error [REG82001280, Bit31]	The parity error was detected in the DCTL (H#0).	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H11100	DCTL H0PCI system error [REG82001280, Bit30]	A system error was detected in the DCTL (H#0).	Gather				
H11200	DCTL H0PCI master abort [REG82001280, Bit29]	A master abortion was received in the DCTL (H#0).	Gather				
H11300	DCTL H0PCI received target abort [REG82001280, Bit28]	A target abortion was received in the DCTL (H#0).	Gather				
H11400	DCTL H0PCI signaled target abort [REG82001280, Bit27]	The target abortion was executed in the DCTL (H#0).	Gather				
H11500	DCTL H0PCI PERR assert or reception [REG82001280, Bit24]	A PERR was asserted or received in the DCTL (H#0) in the case of the bus master.	Gather				
H11600	DCTL H0PCI ADR parity error [REG82001280, Bit23]	An address parity error was detected in the DCTL (H#0).	Gather				
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.	Gather				
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.	Gather				
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.	Gather				
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.	Gather				
H11B00	DCTL H0PCI target illegal termination [REG82001280, Bit18]	An illegal termination of a target was detected in the DCTL (H#0) in the case of the DCTL master.	Gather				
H11C00	DCTL D0PCI parity error [REG82001288, Bit31]	The parity error was detected in the DCTL (D#0).	Gather				
H11D00	DCTL D0PCI system error [REG82001288, Bit30]	A system error was detected in the DCTL (D#0).	Gather				
H11E00	DCTL D0PCI master abort [REG82001288, Bit29]	A master abortion was received in the DCTL (D#0).	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H11F00	DCTL D0PCI received target abort [REG82001288, Bit28]	A target abortion was received in the DCTL (D#0).	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H11G00	DCTL D0PCI signaled target abort [REG82001288, Bit27]	The target abortion was executed in the DCTL (D#0).	Gather				
H11H00	DCTL D0PCI PERR assert or reception [REG82001288, Bit24]	A PERR was asserted or received in the DCTL (D#0) in the case of the bus master.	Gather				
H11I00	DCTL D0PCI ADR parity error [REG82001288, Bit23]	An address parity error was detected in the DCTL (D#0).	Gather				
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.	Gather				
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.	Gather				
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.	Gather				
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.	Gather				
H11N00	DCTL D0PCI target illegal termination [REG82001288, Bit18]	An illegal termination of a target was detected in the DCTL (D#0) in the case of the DCTL master.	Gather				
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.		Gather			
H20100	Parity generation LA error [DRR]	Illegal LA was detected when the (DRR Failure)		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)
H20200	DCTL access error [BYTEWRERR] [REG82001238, Bit27]	Writing access beyond the 4-byte boundary was detected.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H203A0	DCTL time-out [H_PORT]	D-CTL finish time-out was detected.		Gather			
H204A1	DCTL time-out [D_PORT]	D-CTL finish time-out was detected.		Gather			
H205B0	DMA forced stop failed	Forced stopping of DMA failed.		Gather			
H206B1	DMA#0 hard error end reset failed	Resetting of factors after hardware error end of DRR failed.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H20700	DCTL access error [DUMYAREAWRERR] [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.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H20800	DCTL REF counter parity error [REG82001238, Bit1]	A parity error was detected in the counter for the cache memory refreshment.	Gather				
H20900	DCTL access error [WRPROTECT] [REG82001238, Bit22]	Write access to a write-protected area occurred.		Gather			
H2091x	CACHE address over [OTH_CTL] (CTL-x)	A cache address over error occurred in another Control Unit. x : Control Unit# (0-1)		Gather			
H20A00	DCTL address over [MPU] [REG82001238, Bit21]	The cache address over was detected when the MPU accessed the cache.		Gather			
H20B00	DCTL address parity error [MPU] [REG82001238, Bit20]	An address parity error was detected in the transfer address received by the cache Control Unit.	Gather				
H20C00	DCTL LEN parity error [REG82001238, Bit19]	A word length parity error was detected in the transfer word length received by the cache Control Unit.	Gather				
H20D00	DCTL address over [DMA] [REG82001238, Bit18]	The cache address over was detected when the H/D_PORT, DMA#0 or MDMA accessed the cache.		Gather			
H21000	DCTL address over [DMA#0]	The cache address over occurred.	Gather				
H21100	DCTL address over [D_PORT]	The cache address over occurred.	Gather				
H21200	DCTL address over [H_PORT]	The cache address over occurred.	Gather				
H21300	PCI address boundary error	A DMA transfer was done beyond the 8-byte boundary.		Gather			
H30000	ECC write parity error [MPU] [REG82001238, Bit31]	A parity error was detected in the ECC adding part during a writing on the cache.		Gather			
H301xx	ECC write parity error (DMA-xx)	A parity error was detected when the Cache memory was written. xx : DMA#		Gather			
H302xx	ECC generate error (DMA-xx)	A failure was detected in generation of ECC when the Cache memory was written. xx : DMA#		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H3030x	ECC uncorrectable error (CACHE-x)	An uncorrectable ECC failure was detected when the Cache memory was read. x : Cache memory slot# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather		① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
H3040x	ECC correction failed (CACHE -x)	A failure was detected while the Cache memory was read and ECC was corrected. x : Cache memory slot# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather			
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.		Gather			
H30600	ECC generate error [MPU] [REG82001238, Bit30]	An ECC generation error was detected in the ECC adding part during a writing on the cache.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H3070x	ECC uncorrectable error (CACHE-x) [MPU] [REG82001238, Bit29]	A uncorrectable error of the ECC was detected during a readout from the cache. x : Cache memory slot# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather		① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
H3080x	ECC correction failed (CACHE-x) [MPU] [REG82001238, Bit28]	A correction inconsistency of the ECC was detected during a readout from the cache. x : Cache memory slot# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather			
H3090x	CACHE read BUS ERR [OTH_CTL] (CTL-x)	A bus error occurred during a readout from the cache. x : Control Unit# (0-1)			Gather	① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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)			Gather		
H30B0x	CACHE uncorrectable ERR [OTH_CTL] (CTL-x)	Cache uncorrectable error x : Control Unit# (0-1)			Gather	① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
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, 1, 2, 3, *)			Gather	① Replace the Cache Memory designated in the message. When the Cache Memory number displayed is "*", replace all the Cache Memories mounted on the Controller designated.	5.3.6 (MNTE 05-0470)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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)			Gather	① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H30D0x	CACHE write BUS ERR [OTH_CTL] (CTL-x)	A bus error occurred during a writing on the cache. x : Control Unit# (0-1)			Gather		
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)			Gather		
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)			Gather		
H30Gxx	ECC uncorrectable error (CACHE-x/x)	ECC uncorrectable error (D-DMA/DRR) (One slot concerned cannot be specified.) x/x : Cache memory package# (0/1),(2/3)	Gather			① Replace the two cache memories concerned in a pair. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
H30Hxx	ECC correction failed (CACHE-x/x)	ECC correction error (D-DMA/DRR) (One slot concerned cannot be specified.) x/x : Cache memory package# (0/1),(2/3)	Gather				
H30Ixy	CACHE uncorrectable ERR [OTH_CTL] (CTL-x, CACHE-y, y)	A Cache uncorrectable error occurred. (The slot concerned cannot be specified.) x : Control Unit# (0-1) y,y : Cache memory package# (0/1),(2/3)			Gather	① Replace the Cache Memories designated 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.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
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, 1, 2, 3, *)			Gather	① Replace the Cache Memory designated in the message. When the Cache Memory number displayed is "*", replace all the Cache Memories mounted on the Controller designated. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
H40000	DUAL I/F clock error [INT/HP#00] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit	5.3.5 (MNTE 05-0380)
H40200	DUAL I/F address parity error [INT/HP#00] [REG82001414, Bit19]	An address parity error was detected when the HP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F address parity error [INT/HP#00] [REG82001414, Bit31]	An address parity error was detected when the HP#00 wrote on a certain part in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H40300	DUAL I/F write data parity error [INT/HP#00] [REG82001414, Bit18]	A data parity error was detected when the HP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F write data parity error [INT/HP#00] [REG82001414, Bit30]	A data parity error was detected when the HP#00 wrote on a certain part in another system.		Gather			
H40400	DUAL I/F write ready time-out [INT/HP#00] [REG82001414, Bit17]	An ready time-out was detected when the HP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
	DUAL I/F write ready time-out [INT/HP#00] [REG82001414, Bit29]	An ready time-out was detected when the HP#00 wrote on a certain part in another system.		Gather			
H40500	DUAL I/F CNT parity error [INT/HP#00] [REG82001414, Bit16]	A CNT parity error was detected when the HP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F CNT parity error [INT/HP#00] [REG82001414, Bit28]	A CNT parity error was detected when the HP#00 wrote on a certain part in another system.		Gather			
H40600	DUAL I/F clock error [INT/HP#01] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system (HP#01).		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40700	DUAL I/F address parity error [INT/HP#01] [REG82001414, Bit23]	An address parity error was detected when the HP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F address parity error [INT/HP#01] [REG82001414, Bit27]	An address parity error was detected when the HP#01 wrote on a certain part in another system.		Gather			
H40800	DUAL I/F write data parity error [INT/HP#01] [REG82001414, Bit22]	A data parity error was detected when the HP#01 wrote on a certain part in another system.		Gather			
	DUAL I/F write data parity error [INT/HP#01] [REG82001414, Bit26]	A data parity error was detected when the HP#01 wrote on a certain part in another system.		Gather			
H40900	DUAL I/F write ready time-out [INT/HP#01] [REG82001414, Bit21]	A ready time-out was detected when the HP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
	DUAL I/F write ready time-out [INT/HP#01] [REG82001414, Bit25]	A ready time-out was detected when the HP#01 wrote on a certain part in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H40A00	DUAL I/F CNT parity error [INT/HP#01] [REG82001414, Bit20]	A CNT parity error was detected when the HP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F CNT parity error [INT/HP#01] [REG82001414, Bit24]	A CNT parity error was detected when the HP#01 wrote on a certain part in another system.		Gather			
H40B00	DUAL I/F clock error [INT/DP#00] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system (DP#01).		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40C00	DUAL I/F address parity error [INT/DP#00] [REG82001410, Bit31]	An address parity error was detected when the DP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40D00	DUAL I/F write data parity error [INT/DP#00] [REG82001410, Bit30]	A data parity error was detected when the DP#00 wrote on a certain part in another system.		Gather			
H40E00	DUAL I/F write ready time-out [INT/DP#00] [REG82001410, Bit29]	A ready time-out was detected when the DP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40F00	DUAL I/F CNT parity error [INT/DP#00] [REG82001410, Bit28]	A CNT parity error was detected when the DP#00 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40G00	DUAL I/F clock error [INT/DP#01] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system (DP#01).		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40H00	DUAL I/F address parity error [INT/DP#01] [REG82001410, Bit27]	An address parity error was detected when the DP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40I00	DUAL I/F write data parity error [INT/DP#01] [REG82001410, Bit26]	A data parity error was detected when the DP#01 wrote on a certain part in another system.		Gather			
H40J00	DUAL I/F write ready time-out [INT/DP#01] [REG82001410, Bit25]	A ready time-out was detected when the DP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40K00	DUAL I/F CNT parity error [INT/DP#01] [REG82001410, Bit24]	A CNT parity error was detected when the DP#01 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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).		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40M00	DUAL I/F address parity error [INT/DMA#0] [REG82001410, Bit15]	An address parity error was detected when the DMA#0 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40N00	DUAL I/F write data parity error [INT/DMA#0] [REG82001410, Bit14]	A data parity error was detected when the DMA#0 wrote on a certain part in another system.		Gather			
H40P00	DUAL I/F write ready time-out [INT/DMA#0] [REG82001410, Bit13]	A ready time-out was detected when the DMA#0 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40Q00	DUAL I/F CNT parity error [INT/DMA#0] [REG82001410, Bit12]	A CNT parity error was detected when the DMA#0 wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40R00	DUAL I/F clock error [INT/MP] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system (MP).		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40S00	DUAL I/F address parity error [INT/MP] [REG82001414, Bit11]	An address parity error was detected when the MP wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40T00	DUAL I/F write data parity error [INT/MP] [REG82001414, Bit10]	A data parity error was detected when the MP wrote on a certain part in another system.		Gather			
H40U00	DUAL I/F write ready time-out [INT/MP] [REG82001414, Bit9]	An ADR sending ready time-out was detected when the MP wrote/read on/from a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40V00	DUAL I/F CNT parity error [INT/MP] [REG82001414, Bit8]	A CNT parity error was detected when the MP wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H40W00	DUAL I/F read parity error [INT/MP] [REG82001414, Bit7]	A data parity error was detected when the MP read from a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H40X00	DUAL I/F read ready time-out [INT/MP] [REG82001414, Bit6]	A data ready time-out was detected when the MP read from a certain part in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H40Y00	DUAL I/F PLL INI counter error [REG82001228, Bit1]	An error in the PLL initialization counter of the DUAL (A failure in the own system) (Occurs only when the DUAL_IORDY is cancelled.)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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. Note: The ERR_ST of each port is set when this error occurs. (HP#00)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H41000	DUAL I/F address parity error [EXT/HP#00] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (HP#00)		Gather			
H41100	DUAL I/F write data parity error [EXT/HP#00] [REG82001814, Bit7]	A PTY error was detected in write data when the HP#00 wrote on a certain part in another system.		Gather			
	DUAL I/F write data parity error [EXT/HP#00] [REG82001814, Bit31]	A PTY error was detected in write data when the HP#00 wrote on a certain part in another system.		Gather			
H41200	DUAL I/F ECC write parity error [EXT/HP#00] [REG82001814, Bit6]	An ECC_WPTY error was detected when the HP#00 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F ECC write parity error [EXT/HP#00] [REG82001814, Bit30]	An ECC_WPTY error was detected when the HP#00 wrote on the cache in another system.		Gather			
H41300	DUAL I/F ECC GEN error [EXT/HP#00] [REG82001814, Bit5]	An ECC_GEN error was detected when the HP#00 wrote on the cache in another system.		Gather			
	DUAL I/F ECC GEN error [EXT/HP#00] [REG82001814, Bit29]	An ECC_GEN error was detected when the HP#00 wrote on the cache in another system.		Gather			
H41400	DUAL I/F CACHE address parity error [EXT/HP#00] [REG82001814, Bit4]	A cache address PTY error was detected when the HP#00 wrote on the cache in another system.		Gather			
	DUAL I/F CACHE address parity error [EXT/HP#00] [REG82001814, Bit28]	A cache address PTY error was detected when the HP#00 wrote on the cache in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H41500	DUAL I/F WLEN parity error [EXT/HP#00] [REG82001814, Bit3]	A WLEN_PTY error was detected when the HP#00 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F WLEN parity error [EXT/HP#00] [REG82001814, Bit27]	A WLEN_PTY error was detected when the HP#00 wrote on the cache in another system.		Gather			
H41600	DUAL I/F CNT parity error [EXT/HP#00] [REG82001814, Bit2]	A counter PTY error was detected when the HP#00 wrote on the cache in another system.		Gather			
	DUAL I/F CNT parity error [EXT/HP#00] [REG82001814, Bit26]	A counter PTY error was detected when the HP#00 wrote on the cache in another system.		Gather			
H41700	DUAL I/F address over [EXT/HP#00] [REG82001814, Bit1]	A CADROV was detected when the HP#00 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
	DUAL I/F address over [EXT/HP#00] [REG82001814, Bit25]	A CADROV was detected when the HP#00 wrote on the cache in another system.		Gather			
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. Note: The ERR_ST of each port is set when this error occurs. (HP#01)		Gather			
H41900	DUAL I/F address parity error [EXT/HP#01] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (HP#01)		Gather			
H41A00	DUAL I/F write data parity error [EXT/HP#01] [REG82001814, Bit15	A PTY error was detected in write data when the HP#01 wrote on a certain part in another system.		Gather			
	DUAL I/F write data parity error [EXT/HP#01] [REG82001814, Bit23]	A PTY error was detected in write data when the HP#01 wrote on a certain part in another system.		Gather			
H41B00	DUAL I/F ECC write parity error [EXT/HP#01] [REG82001814, Bit14	An ECC_WPTY error was detected when the HP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F ECC write parity error [EXT/HP#01] [REG82001814, Bit22]	An ECC_WPTY error was detected when the HP#01 wrote on the cache in another system.		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H41C00	DUAL I/F ECC GEN error [EXT/HP#01] [REG82001814, Bit13]	An ECC_GEN error was detected when the HP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	DUAL I/F ECC GEN error [EXT/HP#01] [REG82001814, Bit21]	An ECC_GEN error was detected when the HP#01 wrote on the cache in another system.		Gather			
H41D00	DUAL I/F CACHE address parity error [EXT/HP#01] [REG82001814, Bit12	A cache address PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
	DUAL I/F CACHE address parity error [EXT/HP#01] [REG82001814, Bit20]	A cache address PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
H41E00	DUAL I/F WLEN parity error [EXT/HP#01] [REG82001814, Bit11	A WLEN_PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
	DUAL I/F WLEN parity error [EXT/HP#01] [REG82001814, Bit19]	A WLEN_PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
H41F00	DUAL I/F CNT parity error [EXT/HP#01] [REG82001814, Bit10	A counter PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
	DUAL I/F CNT parity error [EXT/HP#01] [REG82001814, Bit18]	A counter PTY error was detected when the HP#01 wrote on the cache in another system.		Gather			
H41G00	DUAL I/F address over [EXT/HP#01] [REG82001814, Bit9]	A CADROV was detected when the HP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
	DUAL I/F address over [EXT/HP#01] [REG82001814, Bit17]	A CADROV was detected when the HP#01 wrote on the cache in another system.		Gather			
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. Note: The ERR_ST of each port is set when this error occurs. (DP#00)		Gather			
H41I00	DUAL I/F address parity error [EXT/DP#00] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (DP#00)		Gather			
H41J00	DUAL I/F write data parity error [EXT/DP#00] [REG82001818, Bit31]	A PTY error was detected in write data when the DP#00 wrote on a certain part in another system.		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H41K00	DUAL I/F ECC write parity error [EXT/DP#00] [REG82001818, Bit30]	An ECC_WPTY error was detected when the DP#00 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H41L00	DUAL I/F ECC GEN error [EXT/DP#00] [REG82001818, Bit29]	An ECC_GEN error was detected when the DP#00 wrote on the cache in another system.		Gather			
H41M00	DUAL I/F CACHE address parity error [EXT/DP#00] [REG82001818, Bit28]	A cache address PTY error was detected when the DP#00 wrote on the cache in another system.		Gather			
H41N00	DUAL I/F WLEN parity error [EXT/DP#00] [REG82001818, Bit27]	A WLEN_PTY error was detected when the DP#00 wrote on the cache in another system.		Gather			
H41P00	DUAL I/F CNT parity error [EXT/DP#00] [REG82001818, Bit26]	A counter PTY error was detected when the DP#00 wrote on the cache in another system.		Gather			
H41Q00	DUAL I/F address over [EXT/DP#00] [REG82001818, Bit25]	A CADROV was detected when the DP#00 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
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. Note: The ERR_ST of each port is set when this error occurs. (DP#01)		Gather			
H41S00	DUAL I/F address parity error [EXT/DP#01] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (DP#01)		Gather			
H41T00	DUAL I/F write data parity error [EXT/DP#01] [REG82001818, Bit23]	A PTY error was detected in write data when the DP#01 wrote on a certain part in another system.		Gather			
H41U00	DUAL I/F ECC write parity error [EXT/DP#01] [REG82001818, Bit22]	An ECC_WPTY error was detected when the DP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H41V00	DUAL I/F ECC GEN error [EXT/DP#01] [REG82001818, Bit21]	An ECC_GEN error was detected when the DP#01 wrote on the cache in another system.		Gather			
H41W00	DUAL I/F CACHE address parity error [EXT/DP#01] [REG82001818, Bit20]	A cache address PTY error was detected when the DP#01 wrote on the cache in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H41X00	DUAL I/F WLEN parity error [EXT/DP#01] [REG82001818, Bit19]	A WLEN_PTY error was detected when the DP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H41Y00	DUAL I/F CNT parity error [EXT/DP#01] [REG82001818, Bit18]	A counter PTY error was detected when the DP#01 wrote on the cache in another system.		Gather			
H41Z00	DUAL I/F address over [EXT/DP#01] [REG82001818, Bit17]	A CADROV was detected when the DP#01 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
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. Note: The ERR_ST of each port is set when this error occurs. (DMA#0)		Gather			
H42100	DUAL I/F address parity error [EXT/DMA#0] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (DMA#0)		Gather			
H42200	DUAL I/F write data parity error [EXT/DMA#0] [REG8200181C, Bit31]	A PTY error was detected in write data when the DMA#0 wrote on a certain part in another system.		Gather			
H42300	DUAL I/F ECC write parity error [EXT/DMA#0] [REG8200181C, Bit30]	An ECC_WPTY error was detected when the DMA#0 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42400	DUAL I/F ECC GEN error [EXT/DMA#0] [REG8200181C, Bit29]	An ECC_GEN error was detected when the DMA#0 wrote on the cache in another system.		Gather			
H42500	DUAL I/F CACHE address parity error [EXT/DMA#0] [REG8200181C, Bit28]	A cache address PTY error was detected when the DMA#0 wrote on the cache in another system.		Gather			
H42600	DUAL I/F WLEN parity error [EXT/DMA#0] [REG8200181C, Bit27]	A WLEN_PTY error was detected when the DMA#0 wrote on the cache in another system.		Gather			
H42700	DUAL I/F CNT parity error [EXT/DMA#0] [REG8200181C, Bit26]	A counter PTY error was detected when the DMA#0 wrote on the cache in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H42800	DUAL I/F address over [EXT/DMA#0] [REG8200181C, Bit25]	A CADROV was detected when the DMA#0 wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42900	DUAL I/F clock error [EXT/MP] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system. Note: The ERR_ST of each port is set when this error occurs. (MP)		Gather			
H42A00	DUAL I/F address parity error [EXT/MP] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs. (MP)		Gather			
H42B00	DUAL I/F address over [EXT/DMA] [REG8200181C, Bit11]	The CADROV was detected when the H/D_ PORT, DMA#0, or MDMA accessed the cache.		Gather			
H42C00	DUAL I/F read data parity error [EXT/MP] [REG8200181C, Bit10]	A data PTY error was detected when the MP read from a certain part in another system.		Gather			
H42D00	DUAL I/F ECC correction error [EXT/MP] [REG8200181C, Bit9]	An ECC_COR error was detected when the MP read from a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42E00	DUAL I/F ECC uncorrectable error [EXT/MP] [REG8200181C, Bit8]	An ECC_UNCORRE error was detected when the MP read from a certain part in another system.		Gather			
H42F00	DUAL I/F write parity error [EXT/MP] [REG8200181C, Bit7]	A PTY error was detected in write data when the MP wrote on a certain part in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42G00	DUAL I/F ECC write parity error [EXT/MP] [REG8200181C, Bit6]	An ECC_WPTY error was detected when the MP wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42H00	DUAL I/F ECC GEN error [EXT/MP] [REG8200181C, Bit5]	An ECC_GEN error was detected when the MP wrote on the cache in another system.		Gather			
H42I00	DUAL I/F CACHE address parity error [EXT/MP] [REG8200181C, Bit4]	A cache address PTY error was detected when the MP wrote on the cache in another system.		Gather			
H42J00	DUAL I/F WLEN parity error [EXT/MP] [REG8200181C, Bit3]	A WLEN_PTY error was detected when the MP wrote on the cache in another system.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H42K00	DUAL I/F CNT parity error [EXT/MP] [REG8200181C, Bit2]	A counter PTY error was detected when the MP wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42L00	DUAL I/F address over [EXT/MP] [REG8200181C, Bit1]	A CADROV error was detected when the MP wrote on the cache in another system.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42M00	DUAL I/F access error [EXT/MP/WRPROTECT] [REG8200181C, Bit0]	The WR protection was detected when the MP wrote on a certain part in another system.		Gather			
H42N00	DUAL I/F error [MDTDCHK] [REG82001228, Bit17]	An error was detected when the MP accessed another system.		Gather			
H42P00	DUAL I/F clock error [INT/DP#2] [REG82001225, Bit0]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (DP#02)		Gather			
H42Q00	DUAL I/F address parity error [INT/DP#02] [REG82001410, Bit23]	An address parity error was detected during a writing into another system performed via the DP#02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42R00	DUAL I/F write data parity error [INT/DP#02] [REG82001410, Bit22]	An data parity error was detected during a writing into another system performed via the DP#02.		Gather			
H42S00	DUAL I/F write ready time-out [INT/DP#02] [REG82001410, Bit21]	An ready time-out was detected during a writing into another system performed via the DP#02.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42T00	DUAL I/F CNT parity error [INT/DP#02] [REG82001410, Bit20]	An CNT parity error was detected during a writing into another system performed via the DP#02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42U00	DUAL I/F clock error [INT/DP#03] [REG82001228, Bit0]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (DP#03)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42V00	DUAL I/F address parity error [INT/DP#03] [REG82001410, Bit19]	An address parity error was detected during a writing into another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H42W00	DUAL I/F write data parity error [INT/DP#03] [REG82001410, Bit18]	An data parity error was detected during a writing into another system performed via the DP#03.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H42X00	DUAL I/F write ready time-out [INT/DP#03] [REG82001410, Bit17]	An ready time-out was detected during a writing into another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H42Y00	DUAL I/F CNT parity error [INT/DP#03] [REG82001410, Bit16]	An CNT parity error was detected during a writing into another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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. (Every PORT ERR_ST was set.) (DP#02)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43000	DUAL I/F address parity error [EXT/DP#02] [REG82001810, Bit0]	An address parity error was detected during DUAL access. (DP#02)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43100	DUAL I/F write data parity error [EXT/DP#02] [REG82001818, Bit15]	A PTY error was detected in write data during a writing into another system performed via the DP#02.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43200	DUAL I/F ECC write data parity error [EXT/DP#02] [REG82001818, Bit14]	An ECC_WPTY error was detected during a writing onto a cache of another system performed via the DP #02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H43300	DUAL I/F ECC GEN error [EXT/DP#02] [REG82001818, Bit13]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the DP#02.		Gather			
H43400	DUAL I/F CACHE address parity error [EXT/DP#02] [REG82001818, Bit12]	An cache address parity PTY error was detected during a writing onto a cache of another system performed via the DP#02.		Gather			
H43500	DUAL I/F WLEN parity error [EXT/DP#02] [REG82001818, Bit11]	An WLEN_PTY error was detected during a writing onto a cache of another system performed via the DP#02.		Gather			
H43600	DUAL I/F CNT parity error [EXT/DP#02] [REG82001818, Bit11]	An CNT parity error was detected during a writing onto a cache of another system performed via the DP#02.		Gather			
H43700	DUAL I/F address over [EXT/DP#02] [REG82001818, Bit9]	An CADROV error was detected during a writing onto a cache of another system performed via the DP#02.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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. (Every PORT ERR_ST was set.) (DP#03)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43900	DUAL I/F address parity error [EXT/DP#03] [REG82001810, Bit0]	An address parity error was detected during DUAL access. (DP#03)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43A00	DUAL I/F write data parity error [EXT/DP#03] [REG82001818, Bit7]	A PTY error was detected in write data during a writing into another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43B00	DUAL I/F ECC write data parity error [EXT/DP#03] [REG82001818, Bit16]	An ECC_WPTY error was detected during a writing onto a cache of another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H43C00	DUAL I/F ECC GEN error [EXT/DP#03] [REG82001818, Bit5]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the DP#03.		Gather			
H43D00	DUAL I/F CACHE address parity error [EXT/DP#03] [REG82001818, Bit4]	An cache address parity PTY error was detected during a writing onto a cache of another system performed via the DP#03.		Gather			
H43E00	DUAL I/F WLEN parity error [EXT/DP#03] [REG82001818, Bit3]	An WLEN_PTY error was detected during a writing onto a cache of another system performed via the DP#03.		Gather			
H43F00	DUAL I/F CNT parity error [EXT/DP#03] [REG82001818, Bit2]	An CNT parity error was detected during a writing onto a cache of another system performed via the DP#03.		Gather			
H43G00	DUAL I/F address over [EXT/DP#03] [REG82001818, Bit1]	An CADROV error was detected during a writing onto a cache of another system performed via the DP#03.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43H00	DUAL I/F clock error [EXT/HP#02] [REG82001228, Bit0]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (HP#02)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H43I00	DUAL I/F clock error [EXT/HP#03] [REG82001228, Bit0]	A clock error was detected in the DUAL_CLK signal sent from a CTL of another system. (HP#03)		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43J00	DUAL I/F address parity error [INT/HP#02] [REG82001414, Bit27]	An address parity error was detected during a writing into another system performed via the HP#02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H43K00	DUAL I/F address parity error [INT/HP#03] [REG82001414, Bit31]	An address parity error was detected during a writing into another system performed via the HP#03.		Gather			
H43L00	DUAL I/F write data parity error [INT/HP#02] [REG82001414, Bit26]	An data parity error was detected during a writing into another system performed via the HP#02.		Gather			
H43M00	DUAL I/F write data parity error [INT/HP#03] [REG82001414, Bit30]	An data parity error was detected during a writing into another system performed via the HP#03.		Gather			
H43N00	DUAL I/F write ready time-out [INT/HP#02] [REG82001414, Bit25]	An ready time-out was detected during a writing into another system performed via the HP#02.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43P00	DUAL I/F write ready time-out [INT/HP#03] [REG82001414, Bit29]	An ready time-out was detected during a writing into another system performed via the HP#03.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the above Control Unit.	5.3.5 (MNTE 05-0380)
H43Q00	DUAL I/F CNT parity error [INT/HP#02] [REG82001414, Bit24]	An CNT parity error was detected during a writing into another system performed via the HP#02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H43R00	DUAL I/F CNT parity error [INT/HP#03] [REG82001414, Bit28]	An CNT parity error was detected during a writing into another system performed via the HP#03.		Gather			
H43S00	DUAL I/F address parity error [EXT/HP#02] [REG82001810, Bit0]	An address parity error was detected during DUAL access. (DP#02)		Gather			
H43T00	DUAL I/F address parity error [EXT/HP#03] [REG82001810, B0it0]	An address parity error was detected during DUAL access. (DP#02)		Gather			
H43U00	DUAL I/F write data parity error [EXT/HP#02] [REG82001814, Bit23]	A PTY error was detected in write data during a writing into another system performed via the HP#02.		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H43V00	DUAL I/F write data parity error [EXT/HP#03] [REG82001814, Bit31]	A PTY error was detected in write data during a writing into another system performed via the HP#03.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H43W00	DUAL I/F ECC write data parity error [EXT/HP#02] [REG82001814, Bit22]	An ECC_WPTY error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H43X00	DUAL I/F ECC write data parity error [EXT/HP#03] [REG82001814, Bit30]	An ECC_WPTY error was detected during a writing onto a cache of another system performed via the HP#03.		Gather			
H43Y00	DUAL I/F ECC GEN error [EXT/HP#02] [REG82001814, Bit21]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H43Z00	DUAL I/F ECC GEN error [EXT/HP#03] [REG82001814, Bit29]	An ECC_GEN error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H44000	DUAL I/F CACHE address parity error [EXT/HP#02] [REG82001814, Bit20]	An cache address parity PTY error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H44100	DUAL I/F CACHE address parity error [EXT/HP#03] [REG82001814, Bit28]	An cache address parity PTY error was detected during a writing onto a cache of another system performed via the HP#03.		Gather			
H44200	DUAL I/F WLEN parity error [EXT/HP#02] [REG82001814, Bit19]	An WLEN_PTY error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H44300	DUAL I/F WLEN parity error [EXT/HP#03] [REG82001814, Bit27]	An WLEN_PTY error was detected during a writing onto a cache of another system performed via the HP#03.					
H44400	DUAL I/F CNT parity error [EXT/HP#02] [REG82001814, Bit18]	An CNT parity error was detected during a writing onto a cache of another system performed via the HP#02.		Gather			
H44500	DUAL I/F CNT parity error [EXT/HP#03] [REG82001814, Bit26]	An CNT parity error was detected during a writing onto a cache of another system performed via the HP#03.		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H44600	DUAL I/F address over [EXT/HP#02] [REG82001814, Bit17]	An CADROV error was detected during a writing onto a cache of another system performed via the HP#02.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H44700	DUAL I/F address over [EXT/HP#03] [REG82001814, Bit25]	An CADROV error was detected during a writing onto a cache of another system performed via the HP#03.		Gather			
H44800	DUAL I/F ready error [INT/MP] [REG82001454, Bit21]	The EXT_IORDY became 0.		Gather			
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.		Gather		① Replace the Control Unit whose CALM LED is on. ② When the trouble is not solved, replace the Control Unit on the reverse side. (Hot replacement is not allowed.)	5.3.5 (MNTE 05-0380)
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.		Gather		③ If the trouble is not solved in spite of the above operation, call the department for coping with troubles.	—
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.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			
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.		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H50000	BRG burst violation [REG140004B0, Bit0] BRG burst violation [REGF10004B0, Bit0]	A burst violation occurred. [BRG]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H50100	BRG ready timer expired [REG140004B0, Bit1] BRG ready timer expired [REGF10004B0, Bit1]	A ready timer expired occurred. [BRG]	Gather				
H50200	BRG CPU address out of range [REG14000140, Bit0] BRG CPU address out of range [REGF1000140, Bit0]	A CPU address out of range occurred. [BRG]		Gather			
H50300	BRG CPU bad address parity detected [REG14000140, Bit1] BRG CPU bad address parity detected [REGF1000140, Bit1]	A bad address parity occurred. [BRG]	Gather				
H50400	BRG CPU transfer type violation [REG14000140, Bit2] BRG CPU transfer type violation [REGF1000140, Bit2]	A transfer type violation occurred. [BRG]	Gather				
H50500	BRG CPU access to a protected region [REG14000140, Bit3] BRG CPU access to a protected region [REGF1000140, Bit3]	Access to a protected region was detected. [BRG CPU]		Gather			
H50600	BRG CPU write to a write protected region [REG14000140, Bit4] BRG CPU write to a write protected region [REGF1000140, Bit4]	A writing on a write-protected region occurred. [BRG CPU]		Gather			
H50700	BRG CPU read from a caching protected region [REG14000140, Bit5] BRG CPU read from a caching protected region [REGF1000140, Bit5]	A readout from a caching-protected region occurred. [ERG CPU]		Gather			
H50800	BRG CPU bad write data parity detected [REG14000140, Bit6] BRG CPU bad write data parity detected [REGF1000140, Bit6]	The “bad write data parity” was detected. [BRG CPU]		Gather			
H50900	BRG CPU bad read data parity detected [REG14000140, Bit7] BRG CPU bad read data parity detected [REGF1000140, Bit7]	The “bad read data parity” was detected. [BRG CPU]		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H50A00	BRG PCI0 the PCI slave detected bad address parity [REG14001D58, Bit0] BRG PCI0 the PCI slave detected bad address parity [REGF1001D58, Bit0]	The slave PCI detected the “bad address parity”. [BRG CPU]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H50B00	BRG PCI0 the PCI slave detected bad write data parity [REG14001D58, Bit1] BRG PCI0 the PCI slave detected bad write data parity [REGF1001D58, Bit1]	The slave PCI detected the “bad write data parity”. [BRG CPU]		Gather			
H50C00	BRG PCI0 PERR response to read data driven by PCI slave [REG14001D58, Bit2] BRG PCI0 PERR response to read data driven by PCI slave [REGF1001D58, Bit2]	The “PERR response to read data” by the slave PCI occurred. [BRG PC10]		Gather			
H50D00	BRG PCI0 PERR response to address driven by the PCI master [REG14001D58, Bit4] BRG PCI0 PERR response to address driven by the PCI master [REGF1001D58, Bit4]	The “PERR response to address” by the slave PCI occurred. [BRG PC10]	Gather				
H50E00	BRG PCI0 PERR response to write data driven by the PCI master [REG14001D58, Bit5] BRG PCI0 PERR response to write data driven by the PCI master [REGF1001D58, Bit5]	The “PERR response to write data” by the slave PCI occurred. [BRG PC10]	Gather				
H50F00	BRG PCI0 bad data parity detected during the PCI master read [REG14001D58, Bit6] BRG PCI0 bad data parity detected during the PCI master read [REGF1001D58, Bit6]	The “bad data parity” was detected during a readout by the master PCI. [BRG PC10]		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H50G00	BRG PCI0 the PCI master generated master abort [REG14001D58, Bit8] BRG PCI0 the PCI master generated master abort [REGF1001D58, Bit8]	A master abortion occurred in the master PCI. [BRG PC10]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H50H00	BRG PCI0 the PCI master detected target abort [REG14001D58, Bit9] BRG PCI0 the PCI master detected target abort [REGF1001D58, Bit9]	The master PCI detected a target abortion. [BRG PC10]	Gather				
H50I00	BRG PCI0 generate transaction while master is not enabled [REG14001D58, Bit10] BRG PCI0 generate transaction while master is not enabled [REGF1001D58, Bit10]	A PCI process occurred while the master is not enabled. [BRG PC10]		Gather			
H50J00	BRG PCI0 the PCI master reached retry counter limit [REG14001D58, Bit11] BRG PCI0 the PCI master reached retry counter limit [REGF1001D58, Bit11]	The threshold value of the retry counter was exceeded in the master PCI.	Gather				
H50K00	BRG PCI0 the PCI slave detects an illegal master termination [REG14001D58, Bit16] BRG PCI0 the PCI slave detects an illegal master termination [REGF1001D58, Bit16]	The slave PCI detected the “illegal master termination”. [BRG PC10]	Gather				

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H50L00	BRG PCI0 the PCI slave terminates a transaction with target abort [REG14001D58, Bit17]	The slave PCI terminated the process because of a target abortion. [BRG PCIO]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	BRG PCI0 the PCI slave terminates a transaction with target abort [REGF1001D58, Bit17]						
H50M00	BRG PCI0 a PCI slave access protect violation [REG14001D58, Bit18]	Access by the slave PCI to the area where the protection was violated occurred. [BRG PCIO]	Gather				
	BRG PCI0 a PCI slave access protect violation [REGF1001D58, Bit18]						
H50N00	BRG PCI0 a PCI slave write protect violation [REG14001D58, Bit19]	A violation against write-protection by the slave PCI occurred. [BRG PCIO]	Gather				
	BRG PCI0 a PCI slave write protect violation [REGF1001D58, Bit19]						
H50P00	BRG PCI0 a PCI slave read buffer discard timer expired [REG14001D58, Bit20]	The "read buffer discard timer expired" occurred in the slave PCI. [BRG PCIO]	Gather				
	BRG PCI0 a PCI slave read buffer discard timer expired [REGF1001D58, Bit20]						
H50Q00	BRG PCI0 internal PCI arbiter detection of a broken master [REG14001D58, Bit21]	Internal PCI arbiter detection of “broken” master occurred. [BRG PCIO]	Gather				
	BRG PCI0 internal PCI arbiter detection of a broken master [REGF1001D58, Bit21]						
H50R00	BRG PCI0 PCI BIST interrupt [REG14001D58, Bit24]	A PCI BIST interrupt occurred. [BRG PCIO]	Gather				
	BRG PCI0 PCI BIST interrupt [REGF1001D58, Bit24]						

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H50S00	BRG PCI0 PCI power management interrupt [REG14001D58, Bit25] BRG PCI0 PCI power management interrupt [REGF1001D58, Bit25]	A PCI Power Management Interrupt occurred. [BRG PCIO]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H50T00	BRG PCI0 PCI reset assert [REG14001D58, Bit26] BRG PCI0 PCI reset assert [REGF1001D58, Bit26]	A PCI Reset Assert occurred. [BRG PCIO]	Gather				
H50U00	BRG SDRAM two or more error [REG14000490, Bit1] BRG SDRAM two or more error [REGF1000490, Bit1]	A Two or more error occurred. [BRG PCIO]		Gather			
H50V00	SDRAM error over [ECC_ONE] [REG14000490, Bit0] SDRAM error over [ECC_ONE] [REGF1000490, Bit0]	The threshold value of the SDRAM correctable error count was exceeded.		Gather			
H50W00	BRG PCI1 the PCI slave detected bad address parity [REGF1001DD8, Bit0]	The slave PCI detected a bad address parity. [BRG PCI1]	Gather				
H50X00	BRG PCI1 the PCI slave detected bad write data parity [REGF1001DD8, Bit1]	The slave PCI detected a bad write data parity. [BRG PCI1]	Gather				
H50Y00	BRG PCI1 PERR response to read data driven by PCI master [REGF1001DD8, Bit2]	The PERR response to address made by the slave PCI occurred. [BRG PCI1]	Gather				
H50Z00	BRG PCI1 PERR response to read data driven by the PCI master [REGF1001DD8, Bit4]	The PERR response to read data made by the slave PCI occurred. [BRG PCI1]	Gather				
H51000	BRG PCI1 PERR response to write data driven by the PCI master [REGF1001DD8, Bit5]	The PERR response to write data made by the slave PCI occurred. [BRG PCI1]	Gather				
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 master PCI. [BRG PCI1]	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H51200	BRG PCI1 the PCI master generated master abort [REGF1001DD8, Bit8]	The master abort occurred in the master PCI. [BRG PCI1]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H51300	BRG PCI the PCI master detected target abort [REGF1001DD8, Bit9]	The master PCI detected the target abort. [BRG PCI1]	Gather				
H51400	BRG PCI1 generate transaction while master is not enabled [REGF1001DD8, Bit10]	A PCI transaction occurred while the master PCI was not enabled. [BRG PCI1]	Gather				
H51500	BRG PCI1 the PCI master reached retry counter limit [REGF1001DD8, Bit11]	The threshold value of the retry counter was exceeded in the master PCI. [BRG PCI1]	Gather				
H51600	BRG PCI1 the PCI slave detects an illegal master termination [REGF1001DD8, Bit16]	The master PCI detected the illegal master termination. [BRG PCI1]	Gather				
H51700	BRG PCI1 the PCI slave terminates a transaction with target abort [REGF1001DD8, Bit17]	The slave PCI terminated a transaction with the target abort. [BRG PCI1]	Gather				
H51800	BRG PCI1 a PCI slave access protect violation [REGF1001DD8, Bit18]	The slave PCI accessed an area that involves a violation of write protection. [BRG PCI1]	Gather				
H51900	BRG PCI1 a PCI slave write protect violation [REGF1001DD8, Bit19]	A violation of write protection by the slave PCI occurred. [BRG PCI1]	Gather				
H51A00	BRG PCI1 a PCI slave read buffer discard timer expired [REGF1001DD8, Bit20]	The read buffer discard timer expired occurred in the master PCI. [BRG PCI1]	Gather				
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]	Gather				
H51C00	BRG PCI1 PCI BIST interrupt [REGF1001DD8, Bit22]	The PCI BIST interrupt occurred. [BRG PCI1]	Gather				
H51D00	BRG PCI1 power management interrupt [REGF1001DD8, Bit23]	The PCI Power Management Interrupt occurred. [BRG PCI1]	Gather				
H51E00	BRG PCI1 reset assert [REGF1001DD8, Bit24]	The PCI Reset Assert occurred. [BRG PCI1]	Gather				

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H70000	E-CTL access error [READ_AREA_ WRITE_ERR] [REGF0002009, Bit7]	Write access to a read area occurred.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H70100	E-CTL MEM address parity error [REGF0002009, Bit6]	An address parity error occurred when the ECTL internal RAM was accessed.		Gather			
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.		Gather			
H70300	E-CTL SH CNT parity error [REGF000202E, Bit3]	An error occurred in the CMD counter on the SH microprogram side.		Gather			
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.		Gather			
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.		Gather			
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).		Gather			
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.		Gather			
H70800	E-CTL CNT parity error [REGF0002009, Bit2]	A parity error occurred in the CMD counter.		Gather			
H70900	E-CTL access error [CMD_OVWT] [REGF0002009, Bit1]	The CMD information was overwritten throughout.		Gather			
H70A00	E-CTL RAM parity error [REGF0002009, Bit0]	A parity error occurred during a reading from the ECTL internal RAM.	Gather				

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
H90210	CTL failure	The Control Unit was blocked		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
H90320	Watch-dog time-out	A watchdog time-out occurred.		Gather		① The Cache memory may have failures. Judge from the following operation and replace it. Perform “Displaying Cache Memory Failures Statistical Information” in Disk Array Management Program for maintenance, and check the accumulated occurrence number 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.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
H90330	Connection unit excess	The number of connected units exceeded limit.		Gather		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.	5.3.5 (MNTE 05-0380)
H90500	Backend down [Unit_ Construction _ ERR] (Unit-x)	The both systems failed due to violating the specification of the RKL-RKAATL/RKAJATL connection. x : Unit ID# (RKAATL/RKAJATL =1-3)				① Check that the RKAATL/RKAJATL (added subsystem) is connected to the RKL (basic subsystem), and restart the system.	For Installation “1.7, (INST 01-0180)
HA0100	CUDG error	A CUDG error was detected during the start-up operation. (RAM CUDG)	Gather			① Solve the failure according to the CUDG detection message indicated before the message.	2.3.1 (MNTE 02-0310)
HA020x	RTC alarm (CTL-x)	A RTC failure occurred or the RTC battery was used up. x : Control Unit# (0-1)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HA0310	IDMA transfer time-out	IDMA transfer time-out occurred. (2 msec)		Gather			
HA0311	IDMA retry error	IDMA failed in retry.		Gather			
HA0312	IDMA multiple run	The system was running when IDMA was started.		Gather			
HA0313	IDMA stop time-out	IDMA forced stop time-out occurred. (2 msec)		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HA0530	SERIAL open error	An OPEN error was caused by RS232C.		Gather		① Replace the RS232C cable.	—
						② Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HA0531	SOCKET open error	An OPEN error was caused by the socket.		Gather		① Replace the LAN cable.	—
HA0532	ACCEPT open error	An OPEN error was caused by the accept.		Gather		② Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HA060x	Kernel monitoring check NG (CTL-x)	The stop of the Kernel monitoring was detected. x : Control Unit# (0-1)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HB0210	Target abort INT status error	The target abortion INT status is illegal.		Gather			
HB0421	H-FPC PCI STS REG error [RMA]	A master abortion occurred when Tachyon made a master access to the PCI.		Gather			
HB0522	H-FPC PCI STS REG error [DPE]	Tachyon PCI Status Reg error. (DPE)		Gather			
HB0623	H-FPC PCI INT STS REG err [UBE]	An access was attempted in units of other than four bytes to the Tachyon Chip resistor disregarding that accesses to which must be done in units of four bytes.		Gather			
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.		Gather			
HB0900	Target abort INI INT status error	Inconsistency of termination status of a command issued from the local DF to the remote DF occurred. (Tachyon detected a target abortion whereas the DMA did not.)		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HB0A0x	H-FPC hardware error (Port-x)	Operations which the Tachyon DX2 did not expect occurred more times than the threshold value. xx : Port # (RK/RKS/RKD/RKSD/RKL=A-B) (RKH/RKHE=A-D)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HB0B0x	H-FPC soft reset has ended in failure (Port-x)	A soft reset of the H-FPC failed. xx : Port # (RK/RKS/RKD/RKSD/RKL=A-B) (RKH/RKHE=A-D)	Gather				
HB0Cxy	H-FPC is not detected (Port-xy)	Though the Interface Board is installed, the HFPC cannot be recognized on the PCI. 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)		Gather		① Replace an Interface Board designated in the message. ② If the problem is not solved in spite of the replacement, replace a controller in which the Interface Board concerned is installed.	5.3.7 (MNTE 05-0560) 5.3.5 (MNTE 05-0380)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HD0100	DFPC error over [DFPCINM]	The Control Unit was blocked since the failure of D-FPC exceeded the threshold value.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HD020x	D-FPC hardware error (Path-x, Code-yyyy)	A soft reset of the D-FPC failed. x : Path# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) yyyy : Detailed code		Gather			
HD1100	HDU CDB check code error [RETRY]	The Control Unit was blocked since the retry NG occurred in the drive check code.		Gather			
HD1200	HDU CDB check code error [OVER]	The Control Unit was blocked since the drive check code exceeded the threshold value.		Gather			
HD21xx	Host transfer DMA error over (DMA-xx)	The number of DMA hardware failure occurrences exceeded its threshold value in the host transfer. xx : DMA# (0-1)		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)
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# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather		① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
HD230x	Buffer to Cache copy failed (CTL-x)	A failure occurred in a copying between the buffer and cache. x : Control Unit# (0-1)	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HD2400	DRR time-out	A time-out of the waiting for DRR completion occurred.		Gather			
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.		Gather			
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.		Gather			
HD27xx	Drive transfer DMA error over (DMA-xx)	Number of DMA hardware failures concerning data transfer to a drive exceeded the threshold value. xx : DMA number (0 or 1)		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HE0100	Backend down [All Loop NG]	Backend blockage: The subsystem cannot be controlled/monitored since usable LOOP is unavailable in the subsystem.		Gather		① 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 Section 2.4, “Details of Recovery Procedures”.	2.4 (MNTE 02-1360)
						③ If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	5.3.8 (MNTE 05-0640)
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 controlled or monitored. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29)		Gather		① Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	—
						② If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	5.3.8 (MNTE 05-0640)
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# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)		Gather		① Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	—
						② If the Unit is 0, that is, the basic frame, replace the Control Unit for which the CALM LED is lit.	5.3.5 (MNTE 05-0380)
						③ If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	5.3.8 (MNTE 05-0640)
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# (RKA=0-29) (RKAAT/RKAJAT =1-29)		Gather		① Because there may be a wrong connection of the ENC cable, check all the connection points of the ENC cables.	Installation “1.7.2, (INST 01-0220)
						② Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	—
						③ If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	5.3.8 (MNTE 05-0640)
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# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)		Gather		① Because there may be a wrong connection of the ENC cable, check all the connection points of the ENC cables.	Installation “1.7.2, (INST 01-0220)
						② Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	—
						③ If the Unit is 0, that is, the basic frame, replace the Control Unit for which the CALM LED is lit.	5.3.5 (MNTE 05-0380)
						④ If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	5.3.8 (MNTE 05-0640)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HE04HH	Backend down [NO ENC] (Unit-x)	The back end was blocked : There are no usable ENC. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29)		Gather		① Check if the HDUs #0 to #3 of the subsystem concerned are installed accurately.	—
						② If a failure has occurred in any of the HDUs #0 to #3 of the subsystem concerned, replace the Disk Drive and restart the subsystem.	5.3.1 (MNTE 05-0120)
HE040x	Backend down [NO ENC] (Unit-x)	The back end was blocked : There are no usable ENC. x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)		Gather		① If the Unit is 0, that is, the basic frame, replace the Control Unit for which the CALM LED is lit.	5.3.5 (MNTE 05-0380)
						② Check if the HDUs #0 to #3 of the subsystem concerned are installed accurately.	—
						③ If a failure has occurred in any of the HDUs #0 to #3 of the subsystem concerned, replace the Disk Drive and restart the subsystem.	5.3.1 (MNTE 05-0120)
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# (RKA=0-29) (RKAAT/RKAJAT =1-29)		Gather		① Check if the subsystem is connected in the correct device connection order.	Installation "1.7.2, (INST 01-0220)
						② Check if the device ID of the subsystem is set correctly.	6.7.2 (INST 06-0890)
						③ ENC cable may have been misconnected. Check the ENC cable connection.	—
						④ Refer to "2.6 Trouble Analysis by LED Indication".	2.6 (MNTE 02-2320)
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# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)		Gather		① Check if the subsystem is connected in the correct device connection order.	Installation "1.7.2, (INST 01-0220)
						② Check if the device ID of the subsystem is set correctly.	
						③ ENC cable may have been misconnected. Check the ENC cable connection.	
						④ If the Unit is 0, that is, the basic chassis, replace the Control Unit for which the CALM LED is lit.	5.3.5 (MNTE 05-0380)
						⑤ Turn off the main switch and turn off all the AC Input Power Switches on the subsystem. Then, turn on all the AC Input Power Switches on the subsystem and turn on the main switch.	—
						⑥ Refer to "2.6 Trouble Analysis by LED Indication".	2.6 (MNTE 02-2320)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)		Gather		① Check if the subsystem is connected in the correct device connection order. ② Check if the device ID of the subsystem is set correctly.	Installation “1.7.2, (INST 01-0220)
HE0710	Backend loop change error [OWN]	The loop switch was changed and the newly selected loop had a failure, too.		Gather		① When an alarm has been issued to the subsystem, refer to Section 2.4, “Details of Recovery Procedures”.	2.4 (MNTE 02-1360)
						② When any one of the following: • W0100x CTL alarm • W060AT SATA HDU alarm • W060HH HDU alarm • W060xy HDU alarm • W090AT SENC alarm • W090HH ENC alarm • W090xy ENC alarm • I301AT SATA HDU error • I01HH HDU error • I301xy HDU error is displayed in advance of this message, replace the part concerned following the message displayed and restart the subsystem.	—
HE0711	Backend loop change error [OTH]	The loop switch was changed and the newly selected loop had a failure, too		Gather		③ If the section to be replaced is not displayed before this message, see “2.4 Details of Recovery Procedures”.	2.4 (MNTE 02-1360)
						④ Refer to “2.6 Trouble Analysis by LED Indication”.	2.6 (MNTE 02-2320)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HE0930	BKD job time-out	Back end diagnosis job time-out occurred.		Gather			
HE0A31	BKW job time-out	Back end monitoring job finish waiting time-out occurred.		Gather			
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# (RKA=0-29) y : ENC Unit# (0-1)	Gather			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. ③ Replace the ENC Unit.	— 5.3.8 (MNTE 05-0640)
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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD= 1-14) y : ENC Unit# (0-1)	Gather				
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)	Gather			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. ③ Replace the Control Unit whose CALM LED is on.	— 5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HE0C00	Controller thermal alarm [OWN]	The Control Unit of own system was blocked because a temperature error was detected in the Control Unit.	Gather			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.	—
HE0D00	Controller thermal alarm [OTH]	The Control Unit of another system was blocked because a temperature error was detected in the Control Unit.	Gather			③ Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HE0E00	Controller thermal alarm [PSOFF]	The sequential shutdown was executed because a temperature error was detected in the Control Unit.	Gather			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.	—
						③ Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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# (RKA=0-29) y : ENC Unit# (0-1)		Gather		① Check 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 "1.7.2, (INST 01-0220)
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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD= 1-14) y : ENC Unit# (0-1)		Gather			
HE100x	ENC error [ENC NG] (CTL-x)	An ENC Unit error (SW malfunction) occurred. x : Control Unit# (0-1)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HE110x	ENC error [NO SES HDU] (CTL-x)	An ENC Unit error (unusable SES drive) occurred. x : Control Unit# (0-1)		Gather			
HE120x	ENC error [ENC check NG] (CTL-x)	An ENC Unit error (detection of a link trouble or request for the ENC unit replacement) occurred. x : Control Unit# (0-1)		Gather			
HE200x	ENC recovery failed (CTL-x)	The insertion of the ENC Unit failed (Basic Chassis). x : Control Unit# (0-1)	Gather			① Verify that the ENC cable is correctly connected.	Installation "1.7.2, (INST 01-0220)
						② Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HF0100	Data transfer check error [SEGP0SERR]	(Data assurance check) An illegal cache writing segment position was detected.		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)
HF0101	Data transfer check error [WRN0DTYBK]	(Data assurance check) A block which was not dirty was written in the Disk Drive.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HF0102	Data transfer check error [RDDTYBLK]	(Data assurance check) Data were read into a dirty block.		Gather			
HF0103	Data transfer check error [RDSEGERR]	(Input/Output data assurance check) An illegal segment to be read was detected.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0104	Data transfer check error [WSGQATERR]	(Data assurance check) Contradiction occurred in the queue attribute of the write segment.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HF0105	Data transfer check error [WSEGPDEV]	(Input/Output data assurance check) An illegal Disk Drive to be written was detected.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the all Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0106	Data transfer check error [WSEGLOCK]	(Input/Output data assurance check) An illegal Disk Drive to be written was detected.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0107	Data transfer check error [CCPLUNERR]	(Data assurance check) An illegal LUN was detected when data were copied between Cache memories.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0108	Data transfer check error [CCPLBAERR]	(Data assurance check) An illegal LBA was detected when data were copied between Cache memories.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0109	Data transfer check error [PARLUNERR]	(Data assurance check) An illegal LUN was detected when parity was generated.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF010A	Data transfer check error [PARLBAERR]	(Data assurance check) An illegal LBA was detected when parity was generated.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HF010B	Data transfer check error [QUEUEERR]	(Data assurance check) Contradiction occurred in transfer of the queue.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF010C	Data transfer check error [COWDRVERR]	(Data assurance check) Data to be written together are dispersed in multiple Disk Drives.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the all Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF010D	Data transfer check error [LACHEKMOD]	(Data assurance check) Contradiction occurred in specification of LA check.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HF010E	Data transfer check error [DSTP0SERR]	(Data assurance check) An illegal writing position was detected during destaging.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the system is still abnormal, replace the Cache Unit.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF010F	Data transfer check error [SEGP0SOTH]	(Data assurance check) An illegal cache writing segment position was detected.		Gather			
HF0110	Data transfer check error [CMPNGHE]	(Data assurance check) A duplex compare of SGCB was detected. (Non-specialized writing)		Gather			
HF0111	Data transfer check error [CMPNGSP]	Data assurance check) A duplex compare of SGCB was detected. (Specialized writing)		Gather			
HF0112	Data transfer check error [CMPNGSP]	Data assurance check) A duplex compare of SGCB was detected. (Generation of parity)		Gather			
HF0113	Data transfer check error [CMPNGCP]	Data assurance check) A duplex compare of SGCB was detected. (Copying between Cache memories)		Gather			
HF0114	Data transfer check error [CMPNGDC]	Data assurance check) A duplex compare of SGCB was detected. (Transfer from disk to Cache memory)		Gather			
HF0115	Data transfer check error [CMPNGCD]	Data assurance check) A duplex compare of SGCB was detected. (Transfer from Cache memory to disk)		Gather			
HF0116	Data transfer check error [SSGQATERR]	(Data assurance check) An illegal segment queue attribute was detected in the intermediate skip mode.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2002, 2004, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HF0117	Data transfer check error [BUFSGQATERR]	A contradiction in the queue attribute of the buffer segment occurred.		Gather		① Replace the Control Unit whose CALM LED is on. ② A If the system is still abnormal, replace the Cache Units.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0118	Data transfer check error [WRBUFTODTY]	(Data assurance check) A writing of data in a buffer segment into a dirty block was attempted.		Gather			
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.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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.		Gather			
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.		Gather			
HF011C	Data transfer check error [PAIRERR]	(Data assurance check) An illegal operation, in which a data transfer was attempted although the status of the RVRF pair did not allow it, was detected.		Gather			
HF020x	Directory check error (CTL-x)	An uncorrectable contradiction was detected in a cache directory. x : Control Unit# (0-1)		Gather		① Replace the Control Unit whose CALM LED is on. ② A If the system is still abnormal, replace the Cache Units.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0300	Data transfer check error [STGLUNERR]	(Data assurance check) A LUN error was detected during a staging.		Gather			
HF0400	Data transfer check error [NTMPRD]	(Data assurance check) A LUN error was detected during a staging.		Gather		① Replace the Control Unit whose CALM LED is on. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
HF0500	Data transfer check error [DTYMPERR]	(Data assurance check) An incorrect dirty map was detected.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HG0100	CTL communication send time-out	Communication receiving waiting time-out occurred.		Gather			
HG0210	OTH CTL Response time-out [CMDFMWR]	Time-out occurred in communication of request for updating the flash memory of the other system. (CMD)		Gather			
HG0311	OTH CTL Response time-out [OFW]	Communication waiting time-out occurred in the other system during off-line monitoring.		Gather			
HG0312	Resource release time-out	General resource release waiting time-out occurred.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HG0413	Data share job time-out	Job time-out occurred for request for share.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HG0514	LU-CTL change time-out	Time-out occurred while LU was changed.		Gather			
HGA000	Staging job time-out	A time-out occurred because a staging job was not completed within a certain period.	Gather				
HGA100	Data staging time-out	A time-out of waiting for staging completion occurred during the QuickShadow restoration copy job.		Gather			
HGA200	Data pool copy time-out	A time-out of waiting for QuickShadow copy completion occurred during the QuickShadow restoration control job.		Gather			
HGA300	Data restore time-out	A time-out of waiting for restore copy completion occurred during the QuickShadow restoration control job.		Gather			
HGA400	Data pool wait time-out	A time-out of waiting for the pool resource ensuring occurred during the QuickShadow restoration control job.		Gather			
HH010x	System parameter undefined (CTL-x)	A system parameter is not set. x : Control Unit# (0-1)		Gather		① Set the system parameter correctly in the WEB maintenance mode.	For WEB Chapter 3
HH020x	Flash revision mismatch (CTL-x)	A Control Unit which the currently installed microprogram could not operate was detected. x : Control Unit# (0-1)		Gather		① Check setting of the system parameter in the WEB maintenance mode to see if a function which the currently installed microprogram cannot operate is set. ② If setting is correct, replace the Control Unit, the CALM LED of which is lighting up.	For WEB Chapter 3 5.3.5 (MNTE 05-0380)
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)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH0400	Unsupported function enabled	A function which the system did not support was set.		Gather		① Set the system parameter correctly in the WEB maintenance mode.	For WEB Chapter 3
HH0510	Task make error [INMTSKERR]	Generation of the initial setting task failed.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH0620	JOB make error	Generation of a job at start up failed.		Gather			
HH0930	No system HDU	The system area of the all Disk Drives became unavailable.		Gather		① Contact the Technical Support Center	—
HH0931	No system HDU	Information on takeover in the system area for all Disk Drives became unusable.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH0CAT	SATA HDU removed before PS ON (Unit-xx, HDU-yy)	The Disk Drive used until previous operation is not mounted when P/S is turned on. xx : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) yy : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)	Gather			① Check the mounting position of the Disk Drive.	—
HH0CHH	HDU removed before PS ON (Unit-xx, HDU-yy)	The Disk Drive used until previous operation is not mounted when P/S is turned on. xx : Unit ID# (RKA/RKAD=0-29) yy : Disk Drive# (RKA/RKAD=0-14)	Gather				
HH0Cxy	HDU removed before PS ON (Unit-xx, HDU-yy)	The Disk Drive used until previous operation is not mounted when P/S is turned on. xx : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) yy : Disk Drive# (RK/RKS/RKD/RKSD =0-13) (RKA/RKAD=0-14)	Gather				
HH0E0x	CACHE access error (CACHE-x) [PON]	A cache access error (unrecoverable) occurred when P/S was turned on. x : Cache Unit slot# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3)		Gather		① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
HH0FAT	RKAAT removed before PS ON (Unit-xx)	The additional frame which the Disk Drive used last time belonged to was not connected when the power was turned on. xx : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3)	Gather			① Make sure that the Additional Chassis is installed and connected, and then start up the subsystem again. ② Analyze the failure following "2.6.1 Trouble Analysis by LED Indication of Front Bezel" for the Unit# concerned.	— 2.6.1 (MNTE 02-2320)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH0FHH	RKA removed before PS ON (Unit-xx)	The additional frame which the Disk Drive used last time belonged to was not connected when the power was turned on. xx : Unit ID# (RKA=0-29)	Gather			① Make sure that the Additional Chassis is installed and connected, and then start up the subsystem again.	—
						② Analyze the failure following "2.6.1 Trouble Analysis by LED Indication of Front Bezel" for the Unit# concerned.	2.6.1 (MNTE 02-2320)
HH0Fxx	RKA removed before PS ON (Unit-xx)	The additional frame which the Disk Drive used last time belonged to was not connected when the power was turned on. xx : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD=1-14)	Gather				
HH1070	PIN segment error [PINSEGOV]	Cache segments are insufficient for recovery of the PIN data of the information taken over.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH1180	DCTL hard error [PS ON]	A DMA hardware failure occurred while PS is turned on.		Gather			
HH1290	System down selected [USRDATLST]	When data were lost, system shutdown was selected by the user.		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)
HH12A0	Forced parity correction time-out	Time-out occurred during forced parity correction operation while P/S is turned on.		Gather		① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
						③ Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH13B0	System change failed [PIN]	Since a PIN segment exists, the system cannot be changed.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH13B1	System change failed [PSOFF]	Since the plan was not stopped, the system cannot be changed.		Gather			
HH16D0	CTL recovery failed [DRR ERR]	When the Control Unit was recovered in the ON state, a DRR failure was detected during recovery operation of the Cache memory.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH17HH	Unit which cannot be managed (Unit-xx)	A frame with no drive installed was detected in the powering on diagnosis. xx : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29)		Gather		① Make sure of installation of Disk Drives in the frame concerned and start up the subsystem again.	—
						② ENC cable may have been misconnected. Check the ENC cable connection.	Installation "1.7.2, (INST 01-0220)
HH17xx	Unit which cannot be managed (Unit-xx)	A frame with no drive installed was detected in the powering on diagnosis. xx : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)		Gather			
HH19HH	ENC alarm (Unit-x, ENC-y)	An ENC failure occurred in the back end diagnostic mode. (Additional Chassis) x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) y : ENC Unit/SENC Unit# (0-1)		Gather		① Power off the added RKA (RKAD) and replace the ENC Unit.	5.3.8 (MNTE 05-0640)
						② Then execute the back end diagnosis again	—
HH19xy	ENC alarm (Unit-x, ENC-y)	An ENC failure occurred in the back end diagnostic mode. (Additional Chassis) x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit # (0-1)		Gather			
HH190x	ENC alarm (CTL-x)	An ENC failure occurred in the back end diagnostic mode. (Basic Chassis) x : Control Unit# (0-1)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
						② Then execute the back end diagnosis again	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKD=0-29) y or z : Disk Drive# (RK/RKD=0-13)		Gather		① Insert the Control Unit again after making the recovery by replacing the Disk Drive (y or z).	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE 05-0380)
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 (Always 0) y or z : Disk Drive# (RK/RKD=0-13)		Gather			
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)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH1J00	ENC error inf. [CUDG ECTLREGERR]	The Control Unit was detached because an CUDG ECTL register error occurred in the ENC.		Gather			
HH1K00	ENC error inf. [CUDG ENC RDYTOV]	A ready time-out of the ENC in another system was detected.		Gather			
HH1L00	ENC error inf. [CUDG SRAMERR]	The Control Unit was detached because an CUDG SRAM Parity error occurred in the ENC.		Gather			
HH1M00	ENC error inf. [CUDG ENCCOMERR]	The Control Unit was detached because an CUDG ENCCOMERR error occurred in the ENC.		Gather		① Replace the Control Unit whose CALM LED is on. ② If not recovered yet, contact the Technical Support Center. (*1)	5.3.5 (MNTE 05-0380)
HH1N00	ENC error inf. [ENCCOMERR]	The Control Unit was detached because an CUDG ENCCOMERR error occurred in the ENC.		Gather			
HH1P00	ENC error inf. [ECTL force test]	The Control Unit was detached because an parity error occurred in the ENC.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH1Q00	SES error inf. [SES-HDU error]	The Control Unit was detached because both of the two SES drives could not access the ENC.		Gather			

*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.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH1R00	[Additional Battery Unit Mode] Subsystem changed before PS On [Dual Active]	Inconsistent system operation mode1 System operation mode (Dual Active) at the time of the deliberate shutdown owing to a power failure was not consistent with that at the time of the restart after the shutdown.		Gather		① Return the system operation mode to Dual Active, and then restart the subsystem.	—
HH1S00	[Additional Battery Unit Mode] Subsystem changed before PS On [Hot Stand-by]	Inconsistent system operation mode2 System operation mode (Hot Stand-by) at the time of the deliberate shutdown owing to a power failure was not consistent with that at the time of the restart after the shutdown.		Gather		① Return the system operation mode to Hot Stand-by, and then restart the subsystem.	—
HH1T00	[Additional Battery Unit Mode] Subsystem changed before PS On [Single]	Inconsistent system operation mode3 System operation mode (Single) at the time of the deliberate shutdown owing to a power failure was not consistent with that at the time of the restart after the shutdown.		Gather		① Return the system operation mode to Single, and then restart the subsystem.	—
HH1U00	[Additional Battery Unit Mode] Cache size changed [1 GB]	Inconsistent cache capacity 1 Cache capacity (1GB) at the time of the deliberate shutdown owing to a power failure was not consistent with that at the time of the restart after the shutdown.		Gather		① Return the cache capacity to 1GB, and then restart the subsystem.	—
HH1V00	[Additional Battery Unit Mode] Cache size changed [2 GB]	Inconsistent cache capacity 2 Cache capacity (2GB) at the time of the deliberate shutdown owing to a power failure was not consistent with that at the time of the restart after the shutdown.		Gather		① Return the cache capacity to 2GB, and then restart the subsystem.	—
HH1W00	ENC inf. [REGPERR]	REGPERR occurred in ENC and the corresponding CTL was detached.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH1X00	ENC inf. [RAMPERR]	RAMPERR occurred in ENC and the corresponding CTL was detached.		Gather			
HH1Y00	ENC inf. [WDTCNTPERR]	WDTCNTPERR occurred in ENC and the corresponding CTL was detached.		Gather			
HH1Z0x	ENC recovery NG Loop-NG (CTL-x,)	An ENC recovery failure (Basic Chassis) x : Control Unit# (0-1)				① Collect Simple trace and contact the Technical Support Center.	2.5.3 MNTE (02-2180)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH2000	DUAL I/F SELF_IORDY error [REG82001454,Bit22]	A failure (SELF_IORDY) of the impedance adjustment circuit of own system occurred during a readjustment of the impedance.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH2100	DUAL I/F EXT_IORDY error [REG82001454,Bit21]	A failure (EXT_IORDY) of the impedance adjustment circuit of another system occurred during a readjustment of the impedance.	Gather				
HH2200	DUAL I/F DUAL_IORDY error [REG82001454,Bit29]	A failure (DUAL_IORDY) of the impedance adjustment circuit of own system occurred during a readjustment of the impedance.	Gather				
HH2300	Up grade check NG	The upgrade check of the microprogram was not passed. (An upgrade of a microprogram that is not eligible for the updated was attempted.)	Gather			① Install the microprogram newly.	Installation "Chapter 4", (INST 04-0000)
HH2400	Microprogram upgrade is failed	Upgrade the microprogram that was not supported.				① Do not upgrade the microprogram because it is not supported.	6.1.4 (MNTE 06-0060)
HH250x	Rotary switch number is not supported	The not supported rotary switch number is set. x : Rotary switch (7 or 8 =1, other=0)	Gather			① Confirm the setting of the rotary switch.	2.8 (INST 02-0270) 3.9 (INST 03-0610)
HH2600	ID succession failed	The numbers of Interface Boards installed in respective CTL's are inconsistent in the ID Takeover mode.	Gather			① Install the same number of Interface Boards in each Control Unit.	6.4.5 (INST 06-0340) 7.4.5 (INST 07-0156)
						② Replace the controller in which the failure is not detected.	5.3.5 (MNTE 05-0380)
HH270x	Interface Board is not installed (CTL-x)	The Interface Board is not installed. x : Control Unit# (0-1)	Gather			① Install at least one Interface Board in this Control Unit.	3.4.2 (3) (INST 03-0440)
HH2900	Cache capacity reduced although QuickShadow enable	The Cache capacity is reduced from that at the time when the pool was produced.			Gather	① Return the Cache capacity to that at the time when the pool was produced.	5.3.6 (MNTE 05-0470)
HH2A00	Single or Hot Stand-by although QuickShadow enable	The Single/Hot Standby mode was set although the QuickShadow function was enabled when the subsystem was started up.			Gather	① Return the system parameters of the subsystem to those for the Dual Active mode and restart the subsystem.	5.2 (INST 05-0100)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH2B00	Upgrade failed [PSOFF]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the deliberate shutdown had not been executed.				① Set the downgrade check as Disable, and then install the RK microprogram to update it.	Chapter 6 (MNTE 06-0000)
						② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.	—
						③ Turn on the AC Power Unit Switches (DC 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 RK to the RKH/RKHE again.	
HH2C00	Upgrade failed [Single]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the System Startup Attribute was set as the Single mode.				① Install the RK microprogram to update it.	Chapter 6 (MNTE 06-0000)
						② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.	—
						③ Turn on the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and place the units in the Maintenance mode after the units become ready. Then select the Dual Active or Hot Standby mode for the System Startup Attribute of the system parameter.	Installation “5.2.2”, (INST 05-0130)
						④ Make the upgrade from the RK to the RKH/RKHE again.	—
HH2D00	Upgrade failed [microprogram revision]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the microprogram revisions of the RK and RKH/RKHE were not the same.				① Install the RKH/RKHE microproram revision 165x, which is the same as the RK microprogram revision 065x in the drive.	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH2E00	Upgrade failed [RS232C]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the setting of the system parameter related to the RS232C had been made.				① Install the RK microprogram to update it.	Chapter 6 (MNTE 06-0000)
						② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.	—
						③ Turn on the AC Power Unit Switches of all the disk array units and place the units in the Maintenance mode after the units become ready. Then set the RS232C error information transmission mode of the system parameter to “OFF” and make the status report mode of the “SCSI/ Fibre Channel Common Option” unselected.	Installation “5.2.2”, (INST 05-0130)
						④ Make the upgrade from the RK to the RKH/RKHE again.	—
HH2F00	Downgrade failed [Subsystem can not take over the user data]	The subsystem cannot be started normally because the basic disk array unit was returned to the RK after it had been upgraded to the RKH/RKHE.				① When operating the disk array unit as the RK, start the subsystem after making the initial setting up for it. In this case, user data cannot be retained.	—
						② When operating the disk array unit as the RKH/RKHE, return it to the state in which it is upgraded to the RKH/RKHE, and then turn on the power to start the subsystem.	
HH2G00	Upgrade failed [SATA]	When upgrading from RK to RKH/RKHE, the upgrade failed because the SATA chassis frame was connected.				① Install the RK microprogram to update it.	Chapter 6 (MNTE 06-0000)
						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 RK.	—
						③ Reduce the SATA chassis frame in RK (delete RG if necessary)..	
						④ Make the upgrade from the RK to the RKH/RKHE again.	

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH30xx	Obstacle HDU search failed	Automatic diagnosis of backend loop cannot be continued. (Both system are blocked) xx : Optional code			Gather	① When any one of the following: • W0100x CTL alarm • W060AT SATA HDU alarm • W060HH HDU alarm • W060xy HDU alarm • W090AT SENC alarm • W090HH ENC alarm • W090xy ENC alarm • I301AT SATA HDU error • I301HH HDU error • I301xy HDU error is displayed in advance of this message, replace the part concerned following the message displayed and restart the subsystem	—
HH31xx	Backend loop change error [OWN]	Automatic diagnosis of backend loop cannot be continued. (Own system is blocked) xx : Optional code		Gather		② If the section to be replaced is not displayed before this message, see "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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.	5.3.5 (MNTE 05-0380)
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.					
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.	5.3.5 (MNTE 05-0380)
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)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HH3A00	ENC error inf. [BKD ENCCOMERR]	The read SES information was incorrect. (ENCCOMERR)				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HH3B00	ENC error inf. [BKD FIXEDNG]	The read SES information was incorrect. (FIXEDNG)					
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)					
HH4100	Unit missing (Unit-xx)	The disk drive in the chassis frame cannot be detected from both Loops at the back end. xx : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD=0-29) (RKAAT=1-29) (RKAATL=1-3)				① Analyze the failure following “2.6.1 Trouble Analysis by LED Indication of Front Bezel” for the Unit# concerned. ② Check the mounting and connecting conditions of the subsystem. ③ Follow the recovery method of W080xy.	2.6.1 (MNTE 02-2320) — —
HH4000	Unsupported unit is connected [RKAJAT] (Unit-x)	The unsupported subsystem was detected when the subsystem started up. In the case of RK x : Unit ID# (RKAJAT=1-14) In the case of RKH/RKHE x : Unit ID# (RKAJAT=1-29)				① The unsupported chassis frame was connected and the subsystem went down, so that disconnect the unsupported chassis frame connection and start it again.	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	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. In the case of RK/RKS/ RKD/RKSD/RKL x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3) In the case of RKH/RKHE x : Unit ID# (RKA=0-29) (RKAAT/RKAJATL =1-29)		Gather		① Check if the subsystem is connected in the correct device connection order.	1.7.2 (INST 01-0220)
						② Check if the device ID of the subsystem is set correctly.	
						③ Because there may be a wrong connection of the ENC cable, check all the connection points of the ENC cables.	—
						④ Check if the ENCs #0 and #1 of the subsystem concerned are installed accurately.	—
						⑤ If the Unit0 is the basic frame (RK/RKS/RKD/RKSD/RKL), replace the Control Unit for which the CALM LED is lit.	5.3.5 (MNTE 05-0380)
						⑥ When the unit ID number is other than 0, replace the ENC Unit whose number is the same as that of the detached Control Unit.	5.3.8 (MNTE 05-0640)
						⑦ If any of the ENCs #0 and #1 of the subsystem concerned is blocked, replace the ENC Unit and restart the subsystem.	
HI0100	PS OFF failed [DSTG HUNG]	Hang-up of destaging processing of the other system was detected when the plan was stopped.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HI0201	PS OFF failed [POFNONCLD]	When PS is turned off, the information taken over is not set in the COLD state.		Gather			
HI0202	PS OFF failed [POFNOJOB]	When PS is turned off, the plan stopping job has not been executed.		Gather			
HI0310	OTHPS OFF time-out	Time-out in waiting for communication of the other system occurred while the plan was being stopped.		Gather			
HI0420	System down selected [PS OFF]	When the plan could not be stopped, system shutdown was selected by the user.		Gather		① See "2.4 Details of Recovery procedures".	2.4 (MNTE 02-1360)
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# (RK/RKS/RKD/RKSD /RKL=0-1)		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HI0600	PS OFF failed [PIN]	The sequential shutdown could not be done because of the too much pinned data.		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HJ01xx	Microprogram error [INM]	Logical illegality was detected in the microprogram. (Initial setting) xx : Optional code		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HJ02xx	Microprogram error [POF]	Logical illegality was detected in the microprogram. (Stop of plan) xx : Optional code		Gather			
HJ03xx	Microprogram error [RST]	Logical illegality was detected in the microprogram. (Reset) xx : Optional code		Gather			
HJ04xx	Microprogram error [SCK]	Logical illegality was detected in the microprogram. (Kernel) xx : Optional code		Gather			
HJ05xx	Microprogram error [CIT]	Logical illegality was detected in the microprogram. (Interruption) xx : Optional code		Gather			
HJ06xx	Microprogram error [RSM]	Logical illegality was detected in the microprogram. (Resource control) xx : Optional code		Gather			
HJ07xx	Microprogram error [FTD]	Logical illegality was detected in the microprogram. (Tachyon driver control) xx : Optional code		Gather			
HJ08xx	Microprogram error [FSM]	Logical illegality was detected in the microprogram. (Sequence Manager) xx : Optional code		Gather			
HJ09xx	Microprogram error [LSM]	Logical illegality was detected in the microprogram. (Link service control) xx : Optional code		Gather			
HJ0Axx	Microprogram error [HSC]	Logical illegality was detected in the microprogram. xx : Optional code		Gather			
HJ0Bxx	Microprogram error [NCR]	Logical illegality was detected in the microprogram. (NCR) xx : Optional code		Gather			
HJ0Dxx	Microprogram error [SCP]	Logical illegality was detected in the microprogram. (SCP control) xx : Optional code		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HJ0Exx	Microprogram error [CMD]	Logical illegality was detected in the microprogram. (Command) xx : Optional code		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HJ0Fxx	Microprogram error [PRS]	Logical illegality was detected in the microprogram. (Reading first) xx : Optional code		Gather			
HJ10xx	Microprogram error [COW]	Logical illegality was detected in the microprogram. (Writing together) xx : Optional code		Gather			
HJ11xx	Microprogram error [RCH]	Logical illegality was detected in the microprogram. (Cache control) xx : Optional code		Gather			
HJ12xx	Microprogram error [RAD]	Logical illegality was detected in the microprogram. (RAID control) xx : Optional code		Gather			
HJ13xx	Microprogram error [DSC]	Logical illegality was detected in the microprogram. (Execution of input/output) xx : Optional code		Gather			
HJ14xx	Microprogram error [DMA]	Logical illegality was detected in the microprogram. (Data transfer control) xx : Optional code		Gather			
HJ15xx	Microprogram error [ERR]	Logical illegality was detected in the microprogram. (Assistance in failure processing) xx : Optional code		Gather			
HJ16xx	Microprogram error [RCF]	Logical illegality was detected in the microprogram. (Configuration control) xx : Optional code		Gather			
HJ17xx	Microprogram error [DRC]	Logical illegality was detected in the microprogram. (Recovery of Disk Drive) xx : Optional code		Gather			
HJ18xx	Microprogram error [OFW]	Logical illegality was detected in the microprogram. (Off-line monitoring) xx : Optional code		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HJ19xx	Microprogram error [ONW]	Logical illegality was detected in the microprogram. (On-line monitoring) xx : Optional code		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HJ1Axx	Microprogram error [DST]	Logical illegality was detected in the microprogram. (Emergency destaging) xx : Optional code		Gather			
HJ1Bxx	Microprogram error [CPR]	Logical illegality was detected in the microprogram. (Forced recovery of parity) xx : Optional code		Gather			
HJ1Cxx	Microprogram error [COM]	Logical illegality was detected in the microprogram. (Common function) xx : Optional code		Gather			
HJ1Dxx	Microprogram error [SV1]	Logical illegality was detected in the microprogram. (SVP I/F) xx : Optional code		Gather			
HJ1Exx	Microprogram error [LUC]	Logical illegality was detected in the microprogram. (Common function) xx : Optional code		Gather			
HJ1Fxx	Microprogram error [PR0]	Logical illegality was detected in the microprogram. (Communication between Control Units) xx : Optional code		Gather			
HJ20xx	Microprogram error [BKW]	Logical illegality was detected in the microprogram. (Back end control) xx : Optional code		Gather			
HJ21xx	Microprogram error [BKD]	Logical illegality was detected in the microprogram. (Back end diagnosis) xx : Optional code		Gather			
HJ22xx	Microprogram error [CCP]	Logical illegality was detected in the microprogram. (Coupling copy job) xx : Optional code		Gather			
HJ23xx	Microprogram error [MDU]	A logical illegality of the microprogram was detected (during an execution of drive firmware renewal job). xx : Optional code		Gather			

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HJ24xx	Microprogram error [SDW]	A logical illegality of the microprogram was detected (Takeover writing job). xx : Optional code		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HJ25xx	Microprogram error [RVD]	A logical illegality of the microprogram was detected (RVR data transfer job). xx : Optional code		Gather			
HJ26xx	Microprogram error [RVP]	A logical illegality of the microprogram was detected (RVR communication job). xx : Optional code		Gather			
HJ27xx	Microprogram error [RVM]	A logical illegality of the microprogram was detected (RVR management). xx : Optional code		Gather			
HJ28xx	Microprogram error [STG]	A logical illegality of the microprogram was detected (Staging job). xx : Optional code		Gather			
HJ29xx	Microprogram error [SPL]	Logical incorrectness of microprogram was detected (mistake specializing control). xx : Optional code		Gather			
HJ2Axx	Microprogram error [SML]	Logical incorrectness (in the SendMail control) of the microprogram was detected. xx : Optional code		Gather			
HJ2Bxx	Microprogram error [SNP]	A logical error occurred. (Snapshot job) xx : Optional code		Gather			
HJ2Cxx	Microprogram error [POM]	A logical error occurred. (Pool management) xx : Optional code		Gather			
HJ2Dxx	Microprogram error [SNR]	A logical error occurred. (Snapshot restoration control) xx : Optional code		Gather			
HJ2Exx	Microprogram error [SAM]	A logical error occurred. (S-Vol area management control) xx : Optional code		Gather			
HJ2Fxx	Microprogram error [QFM]	Self contradiction of Quick Format. xx : Optional code		Gather			
HJ30xy	Microprogram error [SMR]	A logical error occurred. (SMART control) xy : Optional code		Gather			
HJ31xy	Microprogram error [DRF]	A logical error occurred. (Drive flash control) xy : Optional code		Gather			
HJ32xx	Microprogram error [OPR]	Self contradiction of forced parity correction in the ON State. xx : Optional code		Gather			

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
HL0000	Other CTL workQPanic	The processing became unable to be continued because a capacity of the task control queue became full.		Gather		① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
HL010x	Machine check occurred (CTL-x) [200]	Machine check occurred. (Internal bus parity error occurred.) x : Control Unit# (0-1)		Gather			
HZ0300	Not enough Cache memory to use QuickShadow function	The capacity of the cache memory is not sufficient to use the QuickShadow function.		Gather		① Increase the cache memory capacity to 2 Gbytes per controller.	Installation “6.4.4”, (INST 06-0330)

Copyright © 2003, 2005, Hitachi, Ltd.

2.3.3 Progress message

Table 2.3.3 Progress message

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I0010x	CTL recovered (CTL-x)	The Control Unit recovered by replacing the board in the ON state. x : Control Unit# (0-1)				—	—
I0020x	CACHE recovered (CACHE-x)	The cache package recovered from blockage by replacing the board in the ON state. x : Cache Unit slot# (0,1,*) (* means the recovery of both 0 and 1.)				—	—
I0030x	Battery recovered (Battery-x)	The battery voltage became normal. x : Backup Battery Unit # (0-1)				—	—
I0040x	Battery backup circuit recovered (CTL-x)	The battery charging circuit recovered. x : Control Unit# (0-1)				—	—
I00500	FAN recovered (CTL-Unit, FAN-x)	The fan failure was recovered. x : FAN Assembly # (0-1)				—	—
I005HH	FAN recovered (Unit-xx, FAN-y)	The fan failure was recovered. xx : Unit ID# (RKA=0-29) (RKAAT=1-29) y : FAN Assembly# (0-1)				—	—
I005xy	FAN recovered (Unit-xx, FAN-y)	The fan failure was recovered. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT=1-14) (RKAATL=1-3) y : FAN Assembly# (0-1)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I00600	PS recovered (CTL-Unit, FAN-x)	The Power Unit (CTL/DRV PS) voltage became normal. x : Power Unit # (0-1)				—	—
I006HH	PS recovered (Unit-x, PS-y)	The Power Unit (CTL/DRV PS) voltage became normal. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT=1-29) y : Power Unit # (0-1)					
I006xy	PS recovered (Unit-x, PS-y)	The Power Unit (Power Unit (DC)) (CTL/DRV PS) voltage became normal. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Power Unit (Power Unit (DC)) # (0-1)					
I007HH	HDU recovered (Unit-x, HDU-y)	The Disk Drive was recovered. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
I007xy	HDU recovered (Unit-x, HDU-y)	The Disk Drive was recovered. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I008HH	Spare HDU recovered (Unit-x, HDU-y)	Data was recovered to the Spare Disk. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
I008xy	Spare HDU recovered (Unit-x, HDU-y)	Data was recovered to the Spare Disk. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I009HH	Spare HDU recovered (Unit-x, HDU-y)	The Spare Disk was recovered. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
I009xy	Spare HDU recovered (Unit-x, HDU-y)	The Spare Disk was recovered. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I00Axy	Loop recovered (PATH-x, LOOP-y)	The loop recovered. x : Path# (RK/RKS/RKD/RKSD/RKL=0-1) y : Loop# (0-1)				—	—
I00BHH	ENC recovered (Unit-x, ENC-y)	A SW P/K failure was solved. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT=1-29) y : ENC Unit/SENC Unit# (0-1)					
I00Bxy	ENC recovered (Unit-x, ENC-y)	A SW P/K failure was solved. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) 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.	5.3.2 (MNTE 05-0260)
I00E0x	Battery removed (Battery-x)	The Backup Battery Unit was removed from the subsystem when a battery failure had occurred. x : Backup Battery Unit# (0-1)					
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.	5.3.2 (MNTE 05-0260)
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# (0-1)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I01000	Battery Thermal alarm	Abnormal temperature was detected in the battery.				① Replace the Backup Battery Unit concerned.	5.3.2 (MNTE 05-0260)
I0100x	Battery Thermal alarm (Battery-x)	Abnormal temperature was detected in the battery. x : Backup Battery Unit# (0-1)					
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# (0-1)					
I02100	FAN status (CTL-Unit, FAN-x, Code-yy)	Detailed information at the time of the fan module failure. x : FAN Assembly # (0-1) yy : Detail code				—	

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I021HH	FAN status (Unit-xx, FAN-y, Code-zz)	Detailed information at the time of the fan module failure. xx : Unit ID# (RKA=0-29) (RKAAT=1-29) y : FAN Assembly# (0-1) zz : Detail code				—	
I021xy	FAN status (Unit-xx, FAN-y, Code-zz)	Detailed information at the time of the fan module failure. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT=1-14) (RKAATL=1-3) y : FAN Assembly# (0-1) zz : 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 # (RK/RKD/RKS/RKSD/RKL=0-1) (RKH/RKHE=0-3)					
I031xy	Path recovered automatically (Remote-x, Path-y)	The path recovered automatically. x : Remote DF# (0) y : Path # (RK/RKD/RKS/RKSD/RKL=0-1) (RKH/RKHE =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-xx)	All LUs were deleted. xx : RAID group# (RK/RKD/RKS/RKSD/RKL=0-44) (RKH/RKHE =0-89)					
I12000	ALL LU initialized	All LUs were deleted. (This is also displayed when the LU#0 is created.)					
I12100	LU deleted (LU-xxx)	LUs were deleted. xxx : LU# (RK/RKD/RKS/RKSD/RKL=0-511) (RKH/RKHE=0-2047)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I12200	LU format completed (LU-xxx)	LU formatting was completed. xxx : LU# (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)				—	—
I12300	LU format failed (LU-xxx)	LU formatting stopped abnormally. xxx : LU# (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)	Gather			① If “W060HH HDU alarm (Unit-x, HDU-y)” or "W060xy HDU alarm (Unit-x, HDU-y) is indicated at this time, follow the instruction of “W060HH” or “W060xy”.	—
						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-xxx)	An LU formatting was started. xxx : LU# (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)				—	—
I12500	Unified LUs separated (UNI:LU-xxx)	Dissolution of all LU unification (to dissolve unification of all the unified LUs and to split them into internal LUs) was executed. xxx : LU# of a unified LU to be spitted. (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)					
I12600	Last LU separated from unified LU (UNI:LU-xxx)	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. xxx : LU# of a unified LU to be spitted. (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)					
I12700	LU reappeared (LU-xxx)	An internal LU(s) was validated again through splitting of all unified LUs or a separation of a final LU. xxx : An LU# of an internal LU which has been separated and validated. (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE=0-2047)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I12800	LU format start [Host I/O is not executable] (LU-xxxx)	An I/O instructed by a host cannot be executed because multiple formatting is to be started.				① Start execution of the I/O instructed by a host after making sure that all the LUs have been formatted.	—
I130HH	Spare HDU defined (Unit-x, HDU-y)	A Spare Disk is registered. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
I130xy	Spare HDU defined (Unit-x, HDU-y)	A Spare Disk is registered. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I131HH	Spare HDU deleted (Unit-x, HDU-y)	Registration of a disk is called off. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
I131xy	Spare HDU deleted (Unit-x, HDU-y)	Registration of a disk is called off. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I140HH	System copy started (Unit-x, HDU-y)	System copy was started. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)				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.	—
I140xy	System copy started (Unit-x, HDU-y)	System copy was started. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD=0-14)					
I141HH	System copy completed (Unit-x, HDU-y)	System copy terminated normally. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)				—	—
I141xy	System copy completed (Unit-x, HDU-y)	System copy terminated normally. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD=0-14)					
I142HH	System copy failed (Unit-x, HDU-y)	System copy failed. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)	Gather			① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
I142xy	System copy failed (Unit-x, HDU-y)	System copy failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD=0-14)	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I150HH	Data recovery started (Unit-x, HDU-y)	Data recovery was started. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
I150xy	Data recovery started (Unit-x, HDU-y)	Data recovery was started. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I151HH	Data recovery completed (Unit-x, HDU-y)	Data recovery terminated normally. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
I151xy	Data recovery completed (Unit-x, HDU-y)	Data recovery terminated normally. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I152HH	Data recovery failed (Unit-x, HDU-y)	Data recovery failed. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			① See "2.4 Details of Recovery Procedures".	2.4(MNTE 02-1360)
I152xy	Data recovery failed (Unit-x, HDU-y)	Data recovery failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				
I153HH	Data recovery partial (Unit-x, HDU-y)	Recovery of data is finished normally. (Incomplete writing is registered.) x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather				
I153xy	Data recovery partial (Unit-x, HDU-y)	Recovery of data is finished normally. (Incomplete writing is registered.) x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I15AHH	Dynamic sparing start (Unit-x, HDU-y) [zzzzzzzzzz]	Dynamic sparing started. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14) z : Detailed code				—	—
I15Axy	Dynamic sparing start (Unit-x, HDU-y) [zzzzzzzzzz]	Dynamic sparing started. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14) z : Detailed code					
I160xx	FLASH other revision edit (REV-xx)	Version-up of flash was detected when Control Unit in the ON state is inserted. xx : Micro (Rev.)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I17001	Default LU-CTL change failed [PIN]	The charge LU is not changed. (Pin exists)	Gather			① If any Disk Drive failed, replace it, then restart the unit.	5.3.1 (MNTE 05-0120)
I17002	Default LU-CTL change failed [PS OFF]	The charge LU is not changed. (Plan is not stopped)				① Set the unit in the ready state and turn off the power, then turn on the power again.	—
I17003	Default LU-CTL change failed [HOT]	The charge LU is not changed. (System hot standby)				① Use the system as it is. (A change of the charge LU is ignored in the hot standby mode.)	—
I17004	Dafault LU-CTL change failed [LU]	The charge LU is not changed. (LU is not defined)				① Use the system as it is. (A change of the charge LU is ignored since LU is not defined.)	—
I18000	PIN-over recovered	The PIN threshold value lowered.				—	—
I19000	Online micro-update completed	Micro-replacement is completed in the ON state.				—	—
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)				—	—
I1A2xy	Permanent LU warning recovered (CTL-x, ERR-y)	LU residence OFF warning was called off. x : Default Control Unit # 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.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I1C0xy	Loop diagnostic start (Path-x, Loop-y)	Loop diagnosis was started. x : Path# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				—	—
I1C1xy	Loop diagnostic end (Path-x, Loop-y)	Loop diagnosis was finished. x : Path# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				—	—
I1D000	[Additional Battery Unit Mode] Cache data load failed	Cache data loading failed. When the restoration of cache data was attempted at the time of the restart after the deliberate shutdown owing to a power failure, loading of cache data failed in all the system drives.	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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-xxxx)	Read/Write to P-VOL enabled. xxxx : LU# (0-2047)	Gather			—	—
I1E300	LU access disable [QuickShadow restore failed] (LU-xxxx)	Read/Write to P-VOL disabled. xxxx : LU# (0-2047)	Gather			① Cancel all the pairs of the V-VOL in the P-VOL.	—
I1F000	Data pool load failed	The loading of pool information failed.	Gather			—	—
I1G00x	PSUE occurred [QuickShadow] (Data pool-x)	All pairs in the data pool changed to PSUE status. x : Data pool# (0-1)	Gather			① Cancel the pair being PSUE once, and then make a pair again.	—
I1G100	PSUE occurred (LU-xxxx)	All pairs to which P-VOL belongs changed to PSUE status. xxxx: LU# (0-2047)	Gather				
I1G200	PSUE occurred (ShadowImage)	A pair, whose status was changed to PSUE, exists.	Gather			① Refer to “Chapter 3 Data Collection when a Program Duct (P.P) failure occurs” to collect necessary information..	Chapter 3 (MNTE 03-0000)
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-xxxx)	The Quick Format started a job that executes a formatting in the background. xxxx : LU# (0-2047)				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

I1G500	Quick Format completed (LU-xxxx)	A formatting of the whole area in the LU was completed. xxxx : LU# (0-2047)				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.	5.4.3 (INST 05-0530)
I1G70x	FC I/F ports remain offline (CTL-x)	The ports of the Fibre Channel interface were made offline under an instruction issued by Disk Array Management Program at the time of the hot replacement of the microprogram. x : Control Unit# (0-1)				① The ports of the Fibre Channel interface will be online when the hot replacement of the microprogram instructed by Disk Array Management Program is completed.	—
I1G80x	FC I/F ports change to online (CTL-x)	The ports of the Fibre Channel interface were made online under an instruction issued by Disk Array Management Program at the time of the hot replacement of the microprogram. 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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
I1GA00	Forced parity correction is stopped [user directions]	The forced parity correction was suspended because the Disk Array Management Program instructed for the suspension during the forced parity correction process.				—	—
I1GB00	Forced parity correction is started (LU-xxxx)	The forced restoration by means of parity, which was made while the subsystem power was turned on, was started. xxxx : LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-2047)				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I1GC00	Forced parity correction is completed (LU-xxxx)	The forced restoration by means of parity, which is made while the subsystem power is turned on, was completed. xxxx : LU# (RK/RKS/RKD/RKSD/RKL=0-511) (RKH/RKHE=0-2047)				—	—
I1GD00	Forced parity correction is stopped [HDU alarm]	The forced restoration by means of parity was stopped because of a drive detachment.				① Refer to " Subsection 2.4.1 (3) Recovery measures ".	2.4.1(3) (MNTE 02-1370)
I1GE00	Forced parity correction is stopped [Too Many Unreadable PINs] (LU-xxxx)	The forced restoration by means of parity was stopped because a number of registered unwritten data per LU exceeded a certain value.					
I1GF00	Forced parity correction is stopped [Too Many PINs] (LU-xxxx)	The forced restoration by means of parity was aborted because the amount of pinned data nearly reached the limit.					
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# (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/RKAATL/RKAJATL=0-14) (RKL=0-13)	Gather			① See "2.4 Details of Recovery Procedures".	2.4(MNTE 02-1360)
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# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)	Gather				
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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I30200	System HDU error	There is a drive which cannot handle the system before the system is ready.	Gather			① Solve the failure according to "I142xy System copy failed (Unit-x, HDU-y)" indicated before the message.	—
I303HH	HDU read capacity failed (Unit-x, HDU-y)	The capacity of the current Disk Drive is not matched to the capacity of the Disk Drive used when RG was set. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive with one having proper capacity.	5.3.1 (MNTE 05-0120)
I303xy	HDU read capacity failed (Unit-x, HDU-y)	The capacity of the current Disk Drive is not matched to the capacity of the Disk Drive used when RG was set. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJAT=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJAL=0-14)					
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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.	5.3.1 (MNTE 05-0120)

*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 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. (However, the owner authority cannot be changed in on-line status under Microrevision 0653).

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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.	5.3.1 (MNTE 05-0120)
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I306HH	Response time over (Unit-x, HDU-y)	The drive took longer than 200 ms or 300 ms to respond. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			—	—

*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 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. (However, the owner authority cannot be changed in on-line status under Microrevision 0653).

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I306xy	Response time over (Unit-x, HDU-y)	The drive took longer than 200 ms or 300 ms to respond. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJTAL=0-14)	Gather			—	—
I30700	Details information (xxxx ms: WRITE)	The drive took longer than 200 ms or 300 ms to respond. (WRITE) xxxx : Time taken for the drive to respond	Gather				
I30800	Details information (xxxx ms: READ)	The drive took longer than 200 ms or 300 ms to respond. (READ) xxxx : Time taken for the drive to respond	Gather				
I30900	HDU startup diag failed	Insertion of the Disk Drive failed when it was inserted with the power turned on.	Gather			① Replace the blocked Disk Drive.	5.3.1 (MNTE 05-0120)

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
I41FHH	HDU error over (Unit-x, HDU-y) [REAOV]	An excess over the threshold value of the reassignment execution count occurred. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I4200x	Online micro-update (CTL-x)	The Control Unit was micro-replaced in the ON state. x : Control Unit# (0-1)				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I430HH	HDU byte check error (Unit-x, HDU-y)	A failure was detected by the disk drive diagnosis. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
I430xy	HDU byte check error (Unit-x, HDU-y)	A failure was detected by the disk drive diagnosis. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				
I501HH	ENC change Info (Unit-xx, ENC-y)	Report on SW P/K to be replaced. (Additional Chassis) xx : Unit ID# (RKA=0-29) (RKAAT/RKAJAT=1-29) y : ENC Unit /SENC Unit# (0-1)				① Replace the ENC Unit on which the EALM LED lights up.	5.3.8 (MNTE 05-0640)
I501xy	ENC change Info (Unit-xx, ENC-y)	Report on SW P/K to be replaced. (Additional Chassis) xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : ENC Unit/SENC Unit# (0-1)					
I5010x	ENC change Info (CTL-x)	The Control Unit was micro-replaced in the ON state. (Basic Chassis) x : Control Unit# (0-1)				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I502HH	HDU change Info (Unit-x, HDU-y)	Report on a drive to be replaced. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
I502xy	HDU change Info (Unit-x, HDU-y)	Report on a drive to be replaced. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I5030x	Change Info (CTL-x)	Report on CTL to be replaced. x : Control Unit# (0-1)				① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
I510HH	D_PT error (HDU Unit-x, HDU-y)	A drive port failure. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
I510xy	D_PT error (HDU Unit-x, HDU-y)	A drive port failure. x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)					
I511HH	D_PT error 1 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 1) x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)					
I511xy	D_PT error 1 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 1) x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I512HH	D_PT error 2 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 2) x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
I512xy	D_PT error 2 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 2) x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)					
I513HH	D_PT error 3 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 3) x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)					
I513xy	D_PT error 3 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 3) x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)					
I515HH	D_PT error 5 (HDU Unit-x, HDU-y)	Drive port failure 5 occurred. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)				—	—
I515xy	D_PT error 5 (HDU Unit-x, HDU-y)	Drive blockade factor report (Drive port failure 5) x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD=0-13) (RKA/RKAD=0-14)				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I516HH	D_PT error 6 (HDU Unit-x, HDU-y)	Drive port failure 6 occurred. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
I516xy	D_PT error 6 (HDU Unit-x, HDU-y)	Drive port failure 6 occurred. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				—	—
I51700	D_PT error 7 (HDU Unit-x, HDU-y)	Drive port failure 7 occurred. x : Unit ID# (RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① When the message W060AT is displayed at the same time, follow the recovery method.	—
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# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=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# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				—	—

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				—	—
I523xy	Loop error5 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 4. x : Path# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				—	—
I524HH	HDU response timeout (Unit-x, HDU-y)	An Disk Drive failure was detected by frame sending diagnosis. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
I524xy	HDU response timeout (Unit-x, HDU-y)	An Disk Drive failure was detected by frame sending diagnosis. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
I525xy	Loop error 7 (Path-x, Loop-y)	Exceeded threshold value of the loop failure 7. x : Path# (RK=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				① When the message W080xy is displayed at the same time, follow the recovery method.	—
I530HH	ENC error [ENC NG] (Unit-x, ENC-y)	An ENC Unit error (SW malfunction) occurred. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)				—	—
I530xy	ENC error [ENC NG] (Unit-x, ENC-y)	An ENC Unit error (SW malfunction) occurred. x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : ENC Unit# (0-1)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I531HH	ENC error [NO SES HDU] (Unit-x, ENC-y)	An ENC Unit error (unusable SES drive) occurred. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)				—	—
I531xy	ENC error [NO SES HDU] (Unit-x, ENC-y)	An ENC Unit error (unusable SES drive) occurred. x : Unit ID# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=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# (RKA=0-29) y : ENC Unit# (0-1)					
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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=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# (RKA=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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=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# (RKA=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# (RK/RKS/RKD/RKSD=0) (RKA/RKAD=1-14) y : ENC Unit# (0-1)					
I53500	PSUE occurred [QuickShadow]	When QuickShadow was executed, it was moved to PSUE.	Gather			① Refer to “Chapter 3 Data Collection when a Program Duct (P.P) failure occurs” to collect necessary information.	Chapter 3 (MNTE 03-0000)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.	5.3.8 (MNTE 05-0640)
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.					
I540HH	ENC recovery failed (Unit-x, ENC-y)	The insertion of the ENC Unit failed (Additional Chassis) x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			① Verify that the ENC cable is correctly connected. ② Replace the ENC Unit designated in the message.	— 5.3.8 (MNTE 05-0640)
I540xy	ENC recovery failed (Unit-x, ENC-y)	The insertion of the ENC Unit failed (Additional Chassis) x : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) y : ENC Unit# (0-1)					
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.					
I5Y2HH	Obstacle HDU bypassed (HDU Unit-x, HDU-y)	Failed part (HDU) of backend loop was identified. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) y : Disk Drive# (RKA/RKAAT/RKAJAT =0-14)				① It plans it according to the message of HDU alarm or HDU error.	—
I5Y2xy	Obstacle HDU bypassed (HDU Unit-x, HDU-y)	Failed part (HDU) of backend loop was identified. x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RK/RKS/RKD/RKSD /RKL=0-13) (RKA/RKAD/RKAAT/ RKAJAT/RKAATL/ RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA=0-29) (RKAD=1-14) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather			① Follow the procedure 2.4.1 (15) for the maintenance.	2.4.1(15) (MNTE 02-1590)
I5Y500	BKE diagnostic result (Unit-x, ENC-y)	It is possible that the loop failure was caused by an ENC Unit. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA=0-29) (RKAD=1-14) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : ENC Unit/SENC Unit# (0-1)	Gather				
I5Y60x	BKE diagnostic result (CTL-x)	It is possible that the loop failure was caused by a Control Unit. x : Control Unit# (0-1)	Gather				
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# (RKA=0-1) (RKAAT/RKAJAT=1-2) y : ENC Unit/SENC Unit# (0-1)	Gather				
	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# (RK/RKD/RKL=0) (RKA=0-29) (RKAD=1-14) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) z : ENC Unit/SENC Unit# (0-1)	Gather				

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5Y800	BKE diagnostic result (unknown)	Failed part cannot be identified.				① Collect Simple trace and contact the Technical Support Center.	2.5.3 MNTE (02-2180)
I5Y900	Part change priority (number-x)	Indicates priorities of failed parts to be replaced.				① Follow the procedure 2.4.1 (15) for the maintenance.	2.4.1(15) (MNTE 02-1590)
I5YA00	SENC error over (Unit-x,ENC-y)	The count of SENC errors exceeded its threshold value. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)				① Replace the SENC Unit concerned whose EALM LED is on.	5.3.8 (MNTE 05-0640)
I5YB00	Loop S1 error (Path-x,Loop-y)	The error count of LOOP S1 exceeded its threshold value. x : Path# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-1) y : Loop# (0-1)				—	—
I5YC00	Obstacle ENC detected (Unit-x,ENC-y)	Failed part of backend loop (SENC) was identified. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit# (0-1)				① Replace the SENC Unit concerned whose EALM LED is on.	5.3.8 (MNTE 05-0640)
I5YD00	ENC Error [LPF0 occurred]	A fail-over of the SENC internal path occurred.					
I5YE00	ENC Error [SPF occurred]	A SATA port failure occurred.					
I5YF00	ENC Error [MPF occurred]	A SATA management port failure occurred.					
I5YG00	Unit# ERR (Unit-x, Loop-y)	An incorrect order of connecting the disk array units (in one of the systems) x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Loop# (0-1)				① Check connections of cables to/from the unit concerned. ② Check the device ID of the unit concerned. ③ Check the state of the ENC Unit in the relevant loop of the relevant unit. ④ Solve the trouble found in the checks above and restart the subsystem. ⑤ Analyze the failure following “2.6.1 Trouble Analysis by LED Indication of Front Bezel” for the Unit# concerned.	— 5.3.8 (MNTE 05-0640) — 2.6.1 (MNTE 02-2320)
I5YJ00	ENC error [SES access error] (Unit-x, ENC-y)	An ENC Unit error (unusable SES drive) occurred. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)				① When the message “W090AT”, W090HH or W090xy is displayed at the same time, follow the recovery method.	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5YH00	Unit ADD Connect error (Unit-x, Loop-y)	An incorrect order of connecting the disk array units (occurred during addition of the disk array unit made while the power is turned on) x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Loop# (0-1)				① Check connections of cables from the unit concerned and between the following units. ② Check the device IDs of the unit concerned and the following units. ③ Reset the faulty part found in the checks above and make the addition again.	— For Installation Chapter 6
I5YL00	ENC microprogram download info. [SENC] (Unit-x, ENC-y)	A drive error (5/2x00) was detected during a downloading of the ENC microprogram (SR firmware). x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)				① Replace the ENC Unit/SENC Unit on which the EALM LED lights up.	5.3.8 (MNTE 05-0640)
I5YM00	ENC microprogram download info. [Revision Check NG] (Unit-x, CTL-y)	Replacement of the ENC microprogram was completed normally, however, the microprogram that replaced was not the expected one. x : Unit ID# (RKA=0-29) y : Control Unit # (0-1)					
I5YP00	ENC microprogram download info. [Revision Check NG] (Unit-x, ENC-y)	Replacement of the ENC microprogram was completed normally, however, the microprogram that replaced was not the expected one. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)					
I5YPAT	ENC microprogram download info. [SENC] [Revision Check NG] (Unit-x, ENC-y)	Replacement of the ENC microprogram was completed normally, however, the microprogram that replaced was not the expected one. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)					
I5YQ00	Loop errorS1 (Path-x, Loop-y)	Number of the loop S1 errors exceeded its threshold value. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Loop# (0-1)				① Follow the procedure 2.4.1 (15) for the maintenance.	2.4.1(15) (MNTE 02-1590)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5YR00	D_PT errorS1 (Unit-x, HDU-y)	Number of the drive S1 errors exceeded its threshold value. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
I5YS0x	CTL-X doesn't support Unit#0 SATA (CTL-x)	The Control Unit, which the S-ATA system drive is unsupported, was inserted. x : Control Unit# (0-1)	Gather			① Replace it with the Control Unit in which the Micro revision x659/M or later that supports the S-ATA system drive is installed.	5.3.5 (MNTE 05-0380)
I5YT00	BAD_ALPA error (Unit-x, ENC-y)	The RTR was blocked due to the BAD_ALPA failure. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit# (0-1)				① When the message W090AT 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# (RKAAT/RKAJAT =1-30) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit# (0-1)					
I5YV00	FAN speed error [Too low despite Middle-speed setting] (Unit-x, FANYY)	A failure occurred in the rotational speed of RKAJAT. x : Unit ID# (RKAJAT=1-29) (RKAJATL=1-3) YY : Power Unit# (00 : Power Unit#0, FAN#0) (01 : Power Unit#0, FAN#1) (10 : Power Unit#1, FAN#0) (11 : Power Unit#1, FAN#1)				① Perform the maintenance work following the messages of W054AT and W05600.	—
I5YW00	FAN speed error [Too high despite Middle-speed setting] (Unit-x, FANYY)						
I5YX00	FAN speed error [Too low despite High-speed setting] (Unit-x, FANYY)						

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5YY00	Frame time-out detected in SENC (Unit-x, ENC-y)	When the subsystem was booted, an FTO failure of the SENC Unit pointed out in the message was detected. It is possible that the SENC Unit got into a permanent trouble. x : Unit ID# (RKAAT/RKAJAT =1-30) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)				① When a Control Unit or a loop was detached before the subsystem became ready and this message was displayed immediately before the trouble above, replace the SENC Unit pointed out in this message.	5.3.8 (MNTE 05-0640)
I5Z0HH	Loop test start (Unit-x, ENC-y)	Loop test was started. (Additional Chassis) x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) y : ENC Unit/SENC Unit# (0-1)				—	—
I5Z0xy	Loop test start (Unit-x, ENC-y)	Loop test was started. (Additional Chassis) x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit# (0-1)					
I5Z00x	Loop test start (Unit-x, ENC-y)	Loop test was started. (Basic Chassis) x : Control Unit # (0-1)					
I5Z1xy	Fail bypassed (Path-x, Loop-y)	Loop test terminated normally. x : Path# (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)					
I5Z2xy	Fail remains (Path-x, Loop-y)	Loop test failed. x : Path # (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)					
I5Z3xy	Failure search start (Path-x, Loop-y)	The failed part isolation started. x : Path # (RK/RKS/RKD/RKSD /RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				① Refer to "Subsection 2.4.1 (15) Recovery measures".	2.4.1(15) (MNTE 02-1590)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5Z4xy	Failure search end (Path-x, Loop-y)	The failed part isolation terminated. x : Path # (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				① Refer to "Subsection 2.4.1 (15) Recovery measures".	2.4.1(15) (MNTE 02-1590)
I5Z5xy	Failure check OK (Path-x, Loop-y)	The diagnosis terminated normally (without a failed part). x : Path # (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)					
I5Z6xy	Failure check NG (Path-x, Loop-y)	The diagnosis terminated abnormally (with a failed part). x : Path # (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)					
I5Z7HH	Failure search aborted [NOSES] (Unit-x)	The SES drive cannot be used during the diagnosis. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT=1-29)					
I5Z70x	Failure search aborted [NOSES] (Unit-x)	The SES drive cannot be used during the diagnosis. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3)					
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 # (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)				① Select the detached loop correctly and execute the diagnosis for it. Refer to "Subsection 2.4.1 (15) Recovery measures".	2.4.1(15) (MNTE 02-1590)
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				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I5ZDHH	HDD bypass aborted [NO SES] (Unit-xx)	The SES drive was disabled during a bypassing. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29)				—	—
I5ZD0x	HDD bypass aborted [NO SES] (Unit-xx)	The SES drive was disabled during a bypassing. x : Unit ID# (RK/RKS/RKD/RKSD /RKL=0) (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3)					
I5ZE00	HDD bypass end	The failed drive bypassing ended.				—	—
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.	5.3.5 (MNTE 05-0380)
I60200	Link failure [LIMIT OVER]	Link failures were detected more than the threshold value.	Gather			① When the failure occurs during an addition of the RKA/RKAD performed while the subsystem power is turned on, make sure of the procedure referring to Subsection 6.6.2, "Connecting multiple RKAs/RKADs."	6.6.2 (INST 06-0580) 6.7 (RKH/RKHE) (INST 06-0840)
						② When any of the following messages is displayed before this message, perform maintenance following it. • W0100x CTL alarm • W060AT SATA HDU alarm • W060HH HDU alarm • W060xy HDU alarm • W090AT SENC alarm • W090HH ENC alarm • W090xy ENC alarm • I301AT SATA HDU error • I301HH HDU error • I301xy HDU error	—
						③ When a part to be replaced is not displayed before this message, refer to Section 2.4, “Details of Recovery Procedures”.	2.4 (MNTE 02-1360)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I603xy	Obstacle part unknown (Path-x, Loop-y)	Failed part was not identified by Loop diagnosis. x : Path# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)	Gather			① When any of the following messages is displayed before this message, perform maintenance following it. • W0100x CTL alarm • W060AT SATA HDU alarm • W060HH HDU alarm • W060xy HDU alarm • W090AT SENC alarm • W090HH ENC alarm • W090xy ENC alarm • I301AT SATA HDU error • I301HH HDU error • I301xy HDU error	—
						② When a part to be replaced is not displayed before this message, refer to Section 2.4, “Details of Recovery Procedures”.	2.4 (MNTE 02-1360)
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# (RKA=0-29) (RKAAT/RKAJAT=1-29) y or z : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			① Replace the Disk Drive (y or z) to recover it, then insert the ENC Unit again.	5.3.1 (MNTE 05-0120)
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# (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y or z : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				
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# (RKA=0-29) (RKAAT/RKAJAT=1-29) y : ENC Unit/SENC Unit# (0-1)	Gather			① Replace the ENC Unit on which the EALM LED lights up.	5.3.8 (MNTE 05-0640)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : ENC Unit/SENC Unit# (0-1)				① Replace the ENC Unit on which the EALM LED lights up.	5.3.8 (MNTE 05-0640)
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)	Gather				
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# (RKA=0-29) (RKAAT/RKAJAT=1-29) y : ENC Unit/SENC Unit# (0-1)				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.	— 5.3.8 (MNTE 05-0640)
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# (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : ENC Unit/SENC Unit# (0-1)					
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# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3)				① Remove the Cache Unit in which the failure occurred after the sequential shutdown.	5.3.6 (MNTE 05-0470)
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.	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I609HH	ENC cable error (Unit-x, ENC-y)	The cable disconnection caused a blockade of the corresponding ENC. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			① Insert the ENC cable again, and then remove and insert the blocked ENC.	—
I609xy	ENC cable error (Unit-x, ENC-y)	The cable disconnection caused a blockade of the corresponding ENC. x : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) y : ENC Unit# (0-1)	Gather				
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)	Gather			—	—
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 the message "W090AT", W090HH or W090xy is displayed at the same time, follow the recovery method.	—
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.	Gather			—	—
I61F00	ENC error inf. [CUDG ENC RDYTOV]	A ready time-out of the ENC in another system was detected.				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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 or D)	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
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 # (RK/RKD/RKS/RKSD/ RKL=0-1) (RKH/RKHE=0-3) y : Target ID (0)	Gather				
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 or B)	Gather				
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.	Gather				
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.	Gather				
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 or D)	Gather				

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
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.	Gather				
I62800	Path alarm for CTL alarm	The path was detached as a result of the CTL detachment.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
I62900	Remote equipment ID error	Path detach occurred due to inconsistency of remote equipment IDs.	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I62B00	Port un-mounting error	A path detachment occurred because the port was not installed.	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
I62D00	Remote option disable [TrueCopy Basic]	A path detachment occurred because the optional SRC function of the remote DF was locked.					
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.	Gather			① Reformat the LU concerned. Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
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.	Gather			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.	Gather			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.	Gather				
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.				—	—
I6A300	Power failure occurred	Power failure was detected while Additional Battery Unit Mode.	Gather			① Collect a simple trace. Refer to "2.5.3 Collecting simple trace".	2.5.3 MNTE (02-2180)
I6B0xy	ENC recovery NG Loop-NG (Unit-x, ENC-y)	An ENC recovery failure (Additional Chassis) x : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) y : ENC Unit# (0-1)				① Collect Simple trace and contact the Technical Support Center.	2.5.3 MNTE (02-2180)
I6B0HH	ENC recovery NG Loop-NG (Unit-x, ENC-y)	An ENC recovery failure (Additional Chassis) x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I6D00x	Data pool no free (Data pool-x)	The free capacity of the pool ran short. x : pool#（0, 1）	Gather			—	—
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）	Gather			① Secure the data pool free capacity	
I6D300	Unreadable PIN resisted (Unit-x, HDU-y, LU-z)	During a restoration using QuickShadow, an incomplete writing is registered with the P-Vol, which is a copying destination, because there is unreadable area on the pool side. (Unit/HDU is a drive that is a source of the copying; LU is a destination of the copying.) x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA=0-29) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14) z : LU# (RK/RKS/RKD/RKSD/RKL=0-511) (RKH/RKHE=0-2047)	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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.	Gather			① The configuration is not supported by the Microrevision installed in the subsystem. Check the configuration again.	—
I6D500	PSUE occurred [TrueCopy Basic]	The subsystem was started up with the cache that had volatilized owing to a power failure when a TrueCopy pair is in the status other than SMPL.	Gather			① Refer to Section 2.4.3, “Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used”.	2.4.3 (MNTE 02-2030)
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# (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : SENC Unit# (0-1)				① Replace the SENC Unit concerned whose EALM LED is on.	5.3.8 (MNTE 05-0640)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I6D700	SENC error [Communication Path] (Unit-x, ENC-y)	The SENC was detached because of a communication path failure. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) 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 the trouble is not solved in spite of the above operation, call the department for coping with troubles.	5.3.8 (MNTE 05-0640)
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)				① Replace the SENC Unit concerned whose EALM LED is on.	5.3.8 (MNTE 05-0640)
I6D900	SENC logic error (Unit-x, ENC-y)	SENC self contradiction. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) 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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)					
I6DB00	Unit Type Error (Unit-x)	A unit of inappropriate FC/SATA type was added. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3)				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.				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)					
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I6DH00	Staging failed [Forced parity correction] (LU-xxxx)	The correction cannot be made because of the forced restoration by means of parity which is made while the subsystem power is turned on xxxx : LU# (RK/RKD/RKS/ RKSD/RKL=0-511) (RKH/RKHE =0-2047)	Gather			① After the forced restoration by means of parity, which is made while the subsystem power is turned on, is completed, get the simple trace and contact the department for coping with problems.	2.5.3 (MNTE 02-2180)
I6DJ00	Forced parity correction LU is gone	The LU that required the forced restoration by means of parity disappeared.				—	—
I6DK00	Incomplete differential data detected	An incomplete DDCB was detected in the cascade connection of QuickShadow with TrueCopy Basic.	Gather			① Split the TrueCopy Basic pair. When forming the pair again, form a QuickShadow pair first and then form a TrueCopy Basic pair.	—
I6DL00	P-VOL read failed [TrueCopy Basic]	The P-VOL became unable to be read.					
I6DM00	QuickShadow SMPL command received [TrueCopy Basic]	QuickShadow 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 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 Tbytes or larger, is in the PSUE status. If an LU next to the LU concerned is in the PSUE status, split it also.	—
I6DQ00	Unit ADD start FAIL [Online micro-update]	Addition of the disk array unit, which was made while the power was turned on, failed to be started because microprogram replacement in the online mode was in progress.				① Make the addition after the microprogram replacement in the online mode is completed.	For Installation Chapter 6
I6DR00	Unit ADD start FAIL [cable error] (Loop-x)	Addition of the disk array unit, which was made while the power was turned on, failed because the cables required for adding the relevant loop of the FC disk array unit were not connected.				① Correctly connect the two cables required for adding the relevant loop of the FC disk array unit.	For Installation Chapter 3 Chapter 6

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : SENC Unit# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-1) z : Path # (RK/RKD/RKS/RKSD/ RKL=0-1)				—	—
I6DT00	Cable connection detected (CTL-Unit, ENC-y, Path-z)	The ENC cable was connected to the ENC Unit path of the subsystem. CTL Unit : RKH/RKHE y : SENC Unit# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-1) z : Path # (RKH/RKHE =0-3)				—	—
I6DU00	ERR occurred [Hi-Copy]	The Hi-copy pair changes to ERR.				① Re-synchronize (RAID operation) or split (RAID operation or forced pair release in DAMP) the Hi-Copy pair.	—
I6DV00	QuickShadow SMPL command received [Hi-Copy]	The pair split command of QuickShadow was received (Hi-Copy cascade).				① Split the Hi-Copy pair. When forming the pair again, form a QuickShadow pair, and then form a Hi-Copy pair.	—
I6DW00	P-VOL read failed [Hi-Copy]	The P-VOL of the Hi-Copy pair became unreadable.					
I6DY00	Drive Response Diag NG (Unit-xx, HDU-yy)	Drive response time delay was detected. xx : Unit ID# (RK/RKS/RKD/RKSD/ RKL=0) (RKA/RKAD=0-29) (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) yy : Disk Drive# (RK/RKS/RKD/RKSD/ RKL=0-13) (RKA/RKAD/RKAAT/ RKAJAT/RKAATL/ RKAJATL=0-14)	Gather			—	—

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I6DZ00	Unit missing (Unit-xx, Loop-y)	Position mapping mismatch was detected (the subsystem unit was missing). xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Loop# (0 or 1)				① If 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. ② Analyze the failure following "2.6.1 Trouble Analysis by LED Indication of Front Bezel" for the Unit# concerned. ③ Check the mounting and connecting conditions of the subsystem. ④ Follow the recovery method of W080xy.	— 2.6.1 (MNTE 02-2320) — —
I6E100	Automatic SENC microprogram down load start	The automatic ENC microprogram downloading started. (It is also displayed when all parts of the RKAAT/RKJAT configuration are replaced).				① Suspend the maintenance work. The READY LED is in the high-speed blinking status during downloading the SENC firmware. ② Then, restart the maintenance work after checking that the message code I6E200 or I6E300 was displayed.	—
I6E200	Automatic SENC microprogram down load completed successfully	The automatic ENC microprogram downloading terminated normally. (It is also displayed when all parts of the RKAAT/RKJAT configuration are replaced).				—	—
I6E300	Automatic ENC microprogram down load failed	The automatic ENC microprogram downloading terminated abnormally.	Gather			① Check that IZY20x and IZY40x are displayed before this message. ② Follow the recovery procedure of the error message displayed between the IZY20x (download start) message and the IZY40x (download end) message.	—
I6E401	PS status (Unit-xx, PS-y) [PS]	Indication of the PS status xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD=0-29) (RKAAT=1-29) (RKAATL=1-3) y : Power Unit# (0 or 1)				① Follow the recovery method when the messages, "W050xy", "W05100" or "W052HH", are displayed at the same time.	—
I6E402	PS status (Unit-xx, PS-y) [FAN0]						
I6E403	PS status (Unit-xx, PS-y) [PS, FAN0]						
I6E404	PS status (Unit-xx, PS-y) [FAN1]						
I6E405	PS status (Unit-xx, PS-y) [PS, FAN1]						
I6E406	PS status (Unit-xx, PS-y) [FAN0, FAN1]						
I6E407	PS status (Unit-xx, PS-y) [PS, FAN0, FAN1]						
I6E408	PS status (Unit-xx, PS-y)						

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I6E500	HDU write/read error (Unit-x, HDU-y)	A failure was detected by the Disk Drive diagnosis. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA=0-29) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather			① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I800HH	Unit ADD start (Loop-x)	A process of an RKA/RKAD addition performed with the subsystem power on was started. x : Unit ID# (RKH/RKHE =0-29)				—	—
I8000x	Unit ADD start (Loop-x)	A process of an RKA/RKAD addition performed with the subsystem power on was started. x : Unit ID# (RKA/RKAD=1-14)				—	—
I8010x	Unit ADD start (Loop-x)	An addition to a loop was started. x : Loop# (1-14)				—	—
I802HH	Unit ADD complete (Loop-x)	An RKA/RKAD addition performed with the subsystem power on completed normally. x : Unit ID# (RKA/RKAD=0-29)				—	—
I8020x	Unit ADD complete (Loop-x)	An RKA/RKAD addition performed with the subsystem power on completed normally. x : Unit ID# (RKA/RKAD=1-14)				—	—
I8030x	Unit ADD complete (Loop-x)	An addition to a loop completed normally. x : Loop# (0 or 1)				—	—
I804HH	Unit ADD FAIL (Loop-x)	An RKA/RKAD addition performed with the subsystem power on terminated abnormally. x : Unit ID# (RKA/RKAD=0-29)				—	—
I8040x	Unit ADD FAIL (Loop-x)	An RKA/RKAD addition performed with the subsystem power on terminated abnormally. x : Unit ID# (RKA/RKAD=1-14)				—	—
I8050x	Unit ADD FAIL (Loop-x)	An addition to a loop terminated abnormally. x : Loop# (0 or 1)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I806HH	Unit ADD ENC INIT FAIL (Unit-x, ENC-y)	An ENC failure was detected in an initialization of an added ENC Unit or when the CALM LED was turned off. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			① Power off the added RKA/RKAD and replace the ENC Unit ② If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Units that were installed finally.	5.3.8 (MNTE 05-0640)
I806xy	Unit ADD ENC INIT FAIL (Unit-x, ENC-y)	An ENC failure was detected in an initialization of an added ENC Unit or when the CALM LED was turned off. x : Unit ID# (RKA/RKAD=1-14) y : ENC Unit# (0-1)					
I807HH	Unit ADD ENC INIT FAIL (Unit-x, HDU-y/z)	An SES HDU failure was detected in an initialization of an added ENC Unit or when the CALM LED was turned off. x: Unit ID# (RKA/RKAD=0-29) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)	Gather			① Replace either one of the Disk Drives displayed. ② If the same message appears again, replace the Disk Drive remaining.	5.3.1 (MNTE 05-0120)
I807xy	Unit ADD ENC INIT FAIL (Unit-x, HDU-y/z)	An SES HDU failure was detected in an initialization of an added ENC Unit or when the CALM LED was turned off. x: Unit ID# (RKA/RKAD=1-14) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)					
I808HH	Unit ADD start FAIL (Unit-x)	An RKA/RKAD addition performed with the subsystem power on could not be done. x : Unit ID# (RKA/RKAD=0-29)				① A cause of the addition failure is displayed in another message. Take a recovery action following the message.	—
I8080x	Unit ADD start FAIL (Unit-x)	An RKA/RKAD addition performed with the subsystem power on could not be done. x : Unit ID# (RKA/RKAD=1-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I80900	Unit ADD start FAIL (Command)	An RKA/RKAD addition performed with the subsystem power on could not be done because the Format/SyncCache command was being executed.				① Wait until execution of the Format/SyncCache command completes. ② Or, abort the execution of the Format/Sync Cache command.	— —
I80A0x	Unit ADD start FAIL [Loop] (Loop-x)	Though an RKA/RKAD addition was attempted while the subsystem power was on, it could not be started because a loop failure had occurred. x : Loop# (0-1)				① Retry the addition after completing the recovery from the loop failure.	—
I80BHH	Unit ADD FAIL no SES (Unit-x, HDU-y/z)	No SES drive was found. x : Unit ID# (RKA/RKAD=0-29) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)	Gather			① Power off the added RKA/RKAD and replace the Disk Drive. ② If the same message is displayed in spite of the replacement, replace the ENC Unit after powering off the added RKA/RKAD. ③ If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Unit that was installed finally.	5.3.1 (MNTE 05-0120) 5.3.8 (MNTE 05-0640)
I80Bxy	Unit ADD FAIL no SES (Unit-x, HDU-y/z)	No SES drive was found. x : Unit ID# (RKA/RKAD=1-14) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)					
I80C0x	Unit ADD FAIL [Loop alarm](Loop-x)	A loop was blocked during the addition. x : Loop# (0 or 1)	Gather			① Power off the added RKA/RKAD and replace the ENC Unit. ② If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Units that were installed finally.	5.3.8 (MNTE 05-0640)
I80D0x	Unit ADD FAIL [cable off](Loop-x)	A disconnection from a loop was detected. x : Loop# (0 or 1)	Gather			① Power off the added RKA/RKAD and replace the ENC cable and retry. ② If the same message is displayed in spite of the replacement, replace the ENC Unit of the existing RKA/RKAD, that was mounted finally, after powering off the added RKA/RKAD, and then make a retry.	— 5.3.8 (MNTE 05-0640)
I80E00	Unit ADD warning [HDU number over]	Drives other than the SES drive are installed.				—	
I80F00	Unit ADD FAIL [Command]	The Format/SyncCache command was executed during an addition of the RKA/RKAD performed with the subsystem power on.				① Wait until execution of the Format/SyncCache command completes. ② Or, abort the execution of the Format/Sync Cache command.	— —

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I81700	Unit ADD ENC INIT data error [CUDGECTLR]	During an addition of the RKA/RKAD performed with the subsystem power on, an SWCUDG (E-CTL Register error) was detected when the ENC was initialized.	Gather			① Power off the added RKA/RKAD and replace the ENC Unit.	5.3.8 (MNTE 05-0640)
I81800	Unit ADD ENC INIT data error [CUDGECTLF]	During an addition of the RKA/RKAD performed with the subsystem power on, an SWCUDG (E-CTL Force Test error) was detected when the ENC was initialized.	Gather				
I81900	Unit ADD ENC INIT data error [CUDGSRAM]	During an addition of the RKA/RKAD performed with the subsystem power on, an SWCUDG (SRAM Test error) was detected when the ENC was initialized.	Gather				
I81A00	Unit ADD ENC INIT data error [CUDGENCCOM]	During an addition of the RKA/RKAD performed with the subsystem power on, an SWCUDG (ENC COM RS232C Test error) was detected when the ENC was initialized.	Gather				
I81B00	Unit ADD ENC INIT data error [ENCCOMERR]	During an addition of the RKA/RKAD performed with the subsystem power on, an ENCCOMERR was detected when the ENC was initialized.	Gather				
I82000	Unit ADD Unit number over	A number of the RKAs/RKADs to be connected are too large.				① Connection disabled. Confirm how many RKAs/RKADs are connected	—
I8210x	Unit ADD Loop error (Loop-x)	A failure was detected in the added loop (loop-x). x : Loop number (0-1)	Gather			① Make a retry after recovering the subsystem from the loop failure.	—
I8220x	Unit ADD cable error (Loop-x)	A cable connection error was detected in the loop-x during an addition to the loop. x : Loop# (0-1)				① Confirm the order of cables that are connected to the device (check whether the color of connectors and cables matches together)	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I823HH	Unit ADD HDU nothing (Unit-x)	No HDU exists in the added loop-x. x : Unit ID# (RKA=0-29)	Gather			① ENC cable of the last cabinet has been misconnected. Check the ENC cable connection.	3.6.2 (INST 03-0680)
						② Check if the device ID is correct.	—
I8230x	Unit ADD HDU nothing (Unit-x)	No HDU exists in the added loop-x. x : Unit ID# (RKA/RKAD=1-14)				③ Power off the added RKA/RKAD and replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						④ If the same message is displayed in spite of the replacement, replace the ENC Unit after powering off the added RKA/(RKAD.	5.3.8 (MNTE 05-0640)
						⑤ If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Units that were installed finally.	
I824HH	Unit ADD ENC DIAG FAIL (Unit-x, ENC-y)	An ENC failure was detected in a diagnosis of the added ENC. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			① When the failure occurs during an addition of the RKA/RKAD performed while the subsystem power is turned on, make sure of the procedure referring to Subsection 6.6.2, "Connecting multiple RKAs/RKADs".	6.6.2 (INST 06-0580) 6.7 (RKH/RKHE) (INST 06-0840)
I824xy	Unit ADD ENC DIAG FAIL (Unit-x, ENC-y)	An ENC failure was detected in a diagnosis of the added ENC. x : Unit ID# (RKA/RKAD=1-14) y : ENC Unit# (0-1)				② Power off the added RKA/RKAD and replace the ENC Unit.	5.3.8 (MNTE 05-0640)
						③ If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Units that were installed finally.	
I825HH	Unit ADD ENC DIAG FAIL (Unit-x, HDU-y/z)	An Disk Drive failure was detected in a diagnosis of the added ENC. x : Unit ID# (RKA/RKAD=0-29) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)	Gather			① Power off the added RKA/RKAD and replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						② Power off the added RKA/RKAD and replace the ENC Unit.	5.3.8 (MNTE 05-0640)
I825xy	Unit ADD ENC DIAG FAIL (Unit-x, HDU-y/z)	An Disk Drive failure was detected in a diagnosis of the added ENC. x : Unit ID# (RKA/RKAD=1-14) y, z : Disk Drive# (RKA/RKAD=0-2, 1-3)				③ If the same message is displayed although the ENC Unit has been replaced, replace the existing ENC Units that were installed finally.	
I82600	Unit ADD ENC DIAG data error [H8SIOERR]	An H8SIOERR was detected in a diagnosis of the added ENC.	Gather			① Power off the added RKA/RKAD and replace the ENC Unit.	5.3.8 (MNTE 05-0640)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I82C00	Unit ADD DIAG data error [RAMPERR]	An RAMPERR was detected in a diagnosis of the added ENC.	Gather			① Power off the added RKA/RKAD and replace the ENC Unit.	5.3.8 (MNTE 05-0640)
I82E00	Unit ADD DIAG data error [CUDGECTLR]	An CUDGECTLR was detected in a diagnosis of the added ENC.	Gather				
I82F00	Unit ADD DIAG data error [CUDGECTLF]	An CUDGCTLF was detected in a diagnosis of the added ENC.	Gather				
I83000	Unit ADD DIAG data error [CUDGSRAM]	An CUDGSRAM was detected in a diagnosis of the added ENC.	Gather				
I83100	Unit ADD DIAG data error [CUDGH8SIO]	An CUDGH8SIO was detected in a diagnosis of the added ENC.	Gather				
I83200	Unit ADD ENC INIT data error [CUDGRDYTOV]	The added ENC detected a ready time-out of the ENC in another system.				—	—
I83300	Unit ADD ENC INIT data error [REGPERR]	A REGPERR occurred in the added ENC.				—	—
I83400	Unit ADD ENC INIT data error [RAMPERR]	A RAMPERR occurred in the added ENC.				—	—
I83500	Unit ADD ENC INIT data error [WDTCNTPERR]	A WDTCNTPERR occurred in the added ENC.				—	—
I83600	Unit ADD ENC DIAG data error [REGPERR]	An E-CTL register parity error was detected in a diagnosis of the added ENC.				—	—
I83700	Unit ADD ENC DIAG data error [WDTCNTPERR]	An E-CTL register parity error was detected in a diagnosis of the added ENC.				—	—
I83800	Unit ADD Construction error (Unit-x)	The online addition failed due to violating the specification of the RKL-RKAATL/RKAJATL connection. x : Unit ID# (RKAATL/RKAJATL =1-3)				① Check that the RKAATL/RKAJATL (added subsystem) is connected to the RKL (basic subsystem), and perform the online addition again.	For Installation “1.7, (INST 01-0180)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I83A00	Unsupported unit is connected [RKAJAT] (Unit-x)	The unsupported subsystem was detected when the subsystem started up. In the case of RK x : Unit ID# (RKAJAT=1-14) In the case of RKH/RKHE x : Unit ID# (RKAJAT=1-29)	Gather			① The unsupported chassis frame was connected and the subsystem went down, so that disconnect the unsupported chassis frame connection and start it again.	—
I83B00	Unit ADD FAIL info. [CTLALM]	The master controller was detached during unit addition that was made while the power is on.				① When I8000x or I800HH (a message informing of a start of the RKA/RKD/RKAAT/RKAJAT addition that is made while the power is on) is not displayed following this message, power off the added RKA/RKAD/RKAAT/RKAJAT and perform the operation over again from the check of the prior conditions of the addition.	For Installation "6.3 (INST 06-0090)
						② When I8000x or I800HH (a message informing of a start of the RKA/RKD/RKAAT/RKAJAT addition that is made while the power is on) is displayed following this message, take according to the subsequent messages.	—
I83C00	Unit ADD FAIL info. [CHK1]	The CHK1 reset occurred in the master controller during the unit addition that was made while the power is on.				① When I8000x or I800HH (a message informing of a start of the RKA/RKD/RKAAT/RKAJAT addition that is made while the power is on) is not displayed following this message, power off the added RKA/RKAD/RKAAT/RKAJAT and replace the controller that is detached.	For Installation "6.3 (INST 06-0090)
						② When I8000x or I800HH (a message informing of a start of the RKA/RKD/RKAAT/RKAJAT addition that is made while the power is on) is displayed following this message, take according to the subsequent messages.	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I840HH	Unit ADD no SES HDU (Unit-x, HDU-y)	A drive non-installation error of the added RKA/RKAD. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=1-14)				① Apply the recovery measures only when the following is displayed next to this message. • I80BHH Unit ADD FAIL no SES • I80Bxy Unit ADD FAIL no SES	—
I840xy	Unit ADD no SES HDU (Unit-x, HDU-y)	A drive non-installation error of the added RKA (RKAD). x : Unit ID# (RKA/RKAD=1-14) y : Disk Drive# (RKA/RKAD=1-14)				② Power off the added RKA/RKAD and replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						③ If the same message is displayed in spite of the replacement, replace the ENC Unit after powering off the added RKA/RKAD.	5.3.8 (MNTE 05-0640)
I841HH	Unit ADD SES spinup error (Unit-x, HDU-y)	A spin up error of a drive in the added RKA/RKAD. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=1-14)	Gather			① Apply the recovery measures only when the following is displayed next to this message. • I80BHH Unit ADD FAIL no SES • I80Bxy Unit ADD FAIL no SES	—
I841xy	Unit ADD SES spinup error (Unit-x, HDU-y)	A spin up error of a drive in the added RKA/RKAD. x : Unit ID# (RKA/RKAD=1-14) y : Disk Drive# (RKA/RKAD=1-14)				② Power off the added RKA/RKAD and replace the Disk Drive.	5.3.1 (MNTE 05-0120)
						③ If the same message is displayed in spite of the replacement, replace the ENC Unit after powering off the added RKA/RKAD.	5.3.8 (MNTE 05-0640)

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I900xx	RSP abort command P (Key [OB], Code [xxyy])	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. xx : Upper two figures of a sense code yy : Lower two figures of a sense code	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
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.					
I902xx	RSP abort command C (Key [OB], Code [xxyy])	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. xx : Upper two figures of a sense code yy : Lower two figures of a sense code					
I903xx	RSP etc. (Key [xx])	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. xx : Sense key					
I904xx	RSP hard error (Key [04, Code [xxyy])	The response failure (Hard Error) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. xx : Upper two figures of a sense code yy : Lower two figures of a sense code					
I905xx	RSP medium error (Key [03], Code [xxyy])	The response failure (Medium Error) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. xx : Upper two figures of a sense code yy : Lower two figures of a sense code					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
I906xx	RSP illegal request (Key [05], Code [xxyy])	The response failure (Illegal Request) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. xx : Upper two figures of a sense code yy : Lower two figures of a sense code	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
I907xx	RSP miscompare (Key [0E], Code [xxyy])	The response failure (Miscompare) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. xx : Upper two figures of a sense code yy : Lower two figures of a sense code					
I908xx	RSP not ready (Key [02], Code [xxyy])	The response failure (Not Ready) exceeds the threshold value in an execution of a command issued from the local DF to the remote DF. xx : Upper two figures of a sense code yy : Lower two figures of a sense code					
I909xx	RSP status error [xx]	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. xx : 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-xxxx/yyyy)	An initial copy was started. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD=0-511) (RKH/RKHE =0-0247)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IB0000	Coupling completed (LU- xxxx/yyyy)	An initial copy completed normally. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH=0-0247)				—	—
IC0000	Coupling failed (LU- xxxx/yyyy)	An initial copy terminated abnormally. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				① Define the pair of the Shadow Image again.	—
ID0000	Resync started (LU- xxxx/yyyy)	A resynchronization was started. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH=0-0247)				—	—
IE0000	Resync completed (LU- xxxx/yyyy)	A resynchronization completed normally. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IF0000	Resync failed (LU- xxxx/yyyy)	A resynchronization terminated abnormally. xxxx : Copy source LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Copy destination LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				① Define the pair of the Shadow Image again.	—

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IG0000	PSUE occurred (LU- xxxx/yyyy)	The pair status was changed to PSUE when the Shadow Image function was being used. xxxx : Primary LU# (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH=0-0247) yyyy : Secondary LU # (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)	Gather			① Make a recovery from the failure already occurred. Refer to “Chapter 3 Data Collection when a Failure Occurs in Program Product (P.P.)” to collect necessary information.	Chapter 3 (MNTE 03-0000)
IH0000	LU unified (UNI : LU-xxxx, M : LU-xxxx, S : LU-yyyy)	LUs were unified. xxxx : LU# of the unified LU after the unification and a Main LU (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : LU# of a Sub LU before the unification (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—
IQ0000	Remote copy started (LU- xxxx/yyyy)	The TrueCopy Basic initial copy was started. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IR0000	Remote copy completed (LU- xxxx/yyyy)	The initial copy by the TrueCopy Basic was completed normally. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—
IS0000	Remote copy failed (LU- xxxx/yyyy)	The initial copy by the TrueCopy Basic terminated abnormally. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)	Gather			① Define the pair of the TrueCopy Basic again.	—
IT0000	Remote resync started (LU- xxxx/yyyy)	The re-synchronization by the S TrueCopy Basic RC was started. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IU0000	Remote resync completed (LU- xxxx/yyyy)	The re-synchronization by the TrueCopy Basic was completed normally. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)				—	—
IV0000	Remote resync failed (LU- xxxx/yyyy)	The re-synchronization by the TrueCopy Basic terminated abnormally. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)	Gather			① Perform the re-synchronization using the TrueCopy Basic again.	
IW0000	Remote PSUE occurred (LU-xxxxP/yyyyS)	In the local DF (own DF) controlled by the TrueCopy Basic, the pair status of the primary LU was changed to PSUE. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/ RKSD/RKL=0-511) (RKH/RKHE =0-0247)	Gather			① Refer to Section 2.4.3, “Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used”.	2.4.3 (MNTE 02-2030)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IX0000	SRC PSUE occurred (LU-xxxxS/yyyyP)	In the local DF (own DF) controlled by the SRC, the pair status of the secondary LU was changed to PSUE. xxxx : Number of an internal LU of the local DF (RK/RKS/RKD/RKSD/RKL=0-511) (RKH/RKHE=0-0247) yyyy : Number of an internal LU of the remote DF (RK/RKS/RKD/RKSD/RKL=0-511) (RKH/RKHE=0-0247)	Gather			① Refer to Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	2.4.3 (MNTE 02-2030)
IY00HH	HDU error report (Unit-xx, HDU-y) [zz-zzzz]	Drive detachment because of a failure (bad ALPA) drive error report receipt xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14) zz-zzzz : Detail code				—	—
IY00xy	HDU error report (Unit-xx, HDU-y) [zz-zzzz]	Drive detachment because of a failure (bad ALPA) drive error report receipt xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14) zz-zzzz : Detail code				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY01HH	DFPC error detect (Unit-xx, HDU-y) [Bad ALPA]	Drive detachment because of a failure (bad ALPA) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY01xy	DFPC error detect (Unit-xx, HDU-y) [Bad ALPA]	Drive detachment because of a failure (bad ALPA) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY03HH	DFPC error detect (Unit-xx, HDU-y) [WWN NG]	Drive detachment because of a failure (WWN inconsistency) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=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. 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.	— 5.3.1 (MNTE 05-0120)
IY03xy	DFPC error detect (Unit-xx, HDU-y) [WWN NG]	Drive detachment because of a failure (WWN inconsistency) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				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 Because there may be a wrong connection of the ENC cable, check all the connection points of the ENC cables.	1.7.2 (INST 01-0220) —
IY04HH	DFPC error detect (Unit-xx, HDU-y) [HDU BUSY]	Drive detachment because of a failure (Drive busy status) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY04xy	DFPC error detect (Unit-xx, HDU-y) [HDU BUSY]	Drive detachment because of a failure (Drive busy status) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY05HH	DFPC error detect (Unit-xx, HDU-y) [QUEUE FULL]	Drive detachment because of a failure (Drive queue full status) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY05xy	DFPC error detect (Unit-xx, HDU-y) [QUEUE FULL]	Drive detachment because of a failure (Drive queue full status) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY06HH	DFPC error detect (Unit-xx, HDU-y) [HDU TIME OUT]	Drive detachment because of a failure (PDEV time-out) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY06xy	DFPC error detect (Unit-xx, HDU-y) [HDU TIME OUT]	Drive detachment because of a failure (PDEV time-out) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY07HH	DFPC error detect (Unit-xx, HDU-y) [LOGOUT]	Drive detachment because of a failure (Exceeded drive log-out threshold value) detected by the DFPC. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY07xy	DFPC error detect (Unit-xx, HDU-y) [LOGOUT]	Drive detachment because of a failure (Exceeded drive log-out threshold value) detected by the DFPC. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY08HH	HDU online verify error (Unit-xx, HDU-y) [04-3200]	Drive detachment owing to detection of sector exhaustion in the online verification. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY08xy	HDU online verify error (Unit-xx, HDU-y) [04-3200]	Drive detachment owing to detection of sector exhaustion in the online verification. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY09HH	HDU removed (Unit-xx, HDU-y)	Drive detachment because of pulling out of the drive. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY09xy	HDU removed (Unit-xx, HDU-y)	Drive detachment because of pulling out of the drive. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0AHH	HDU detach command receive (Unit-xx, HDU-y)	Drive detachment instructed by the Mode Select command. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Axy	HDU detach command receive (Unit-xx, HDU-y)	Drive detachment instructed by the Mode Select command. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0BHH	Dynamic sparing command receive (Unit-xx, HDU-y)	Drive detachment owing to a dynamic sparing instructed by the Mode Select command. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Bxy	Dynamic sparing command receive (Unit-xx, HDU-y)	Drive detachment owing to a dynamic sparing instructed by the Mode Select command. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0CHH	Staging error (Unit-xx, HDU-y)	Drive detachment because of a staging failure. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Cxy	Staging error (Unit-xx, HDU-y)	Drive detachment because of a staging failure. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0DHH	HDU intermittent error over (Unit-xx, HDU-y)	Drive detachment because of the exceeded threshold value of the HDU intermittent failure count. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Dxy	HDU intermittent error over (Unit-xx, HDU-y)	Drive detachment because of the exceeded threshold value of the HDU intermittent failure count. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0EHH	Dynamic sparing error (Unit-xx, HDU-y) [MEDIUM]	Drive detachment because of the exceeded threshold value of media error count occurs in the dynamic sparing. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Exy	Dynamic sparing error (Unit-xx, HDU-y) [MEDIUM]	Drive detachment because of the exceeded threshold value of media error count occurs in the dynamic sparing. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0FHH	LA error [errcode:LUN] (Unit-xx, HDU-y)	Drive detachment because of an LA error. (LUN) xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Fxy	LA error [errcode:LUN] (Unit-xx, HDU-y)	Drive detachment because of an LA error. (LUN) xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0GHH	LA error [errcode:LBA] (Unit-xx, HDU-y)	Drive detachment because of an LA error. (LBA) xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Gxy	LA error [errcode:LBA] (Unit-xx, HDU-y)	Drive detachment because of an LA error. (LBA) xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0HHH	LRC error (Unit-xx, HDU-y)	Drive detachment because of an LA error. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Hxy	LRC error (Unit-xx, HDU-y)	Drive detachment because of an LA error. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0IHH	Backend diagnostic error (Unit-xx, HDU-y) [HDU ERROR]	Drive detachment because of a backend diagnostic error. xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Ixy	Backend diagnostic error (Unit-xx, HDU-y) [HDU ERROR]	Drive detachment because of a backend diagnostic error. xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0JHH	Backend diagnostic error (Unit-xx, HDU-y) [DUAL PORT]	Drive detachment because of a dual port failure of a drive xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Jxy	Backend diagnostic error (Unit-xx, HDU-y) [DUAL PORT]	Drive detachment because of a dual port failure of a drive xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IY0KHH	HDU inquiry failed (Unit-xx, HDU-y)	Drive detachment because of a failure of the Inquiry command at the time of the drive start-up xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IY0Kxy	HDU inquiry failed (Unit-xx, HDU-y)	Drive detachment because of a failure of the Inquiry command at the time of the drive start-up xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY0LHH	HDU read capacity failed (Unit-xx, HDU-y)	Drive detachment because of a failure of the ReadCapacity command at the time of the drive start-up xx : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IY0Lxy	HDU read capacity failed (Unit-xx, HDU-y)	Drive detachment because of a failure of the ReadCapacity command at the time of the drive start-up xx : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Replace the Disk Drive. ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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# (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
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# (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =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# (RK/RKS/RKD/RKSD/ RKL=0) (RKA/RKAD/RKAAT/ RKAJAT/RKAATL/ RKAJATL=1-29) y : Disk Drive# (RK/RKS/RKD/RKSD/ RKL=0-13) (RKA/RKAD/RKAAT/ RKAJAT/RKAATL/ RKAJATL=0-14)	Gather				
IY0U00	SMART sequence error over [SMR] (Unit-x, HDU-y)	Detachment of a drive under the SMART control. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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 P-VOL.				① Refer to "Subsection 2.4.1 (10) or (11) Recovery measures".	2.4.1 (10) (MNTE 02-1520) 2.4.1 (11) (MNTE 02-1530)
IY0W00	HDU intermittent error over 3 (Unit-x, HDU-y)	Drive blockade 3 due to the exceeded threshold value of the HDU intermittent failure.				① When the message “I301AT”, “I301HH” or “I301xy” is displayed at the same time, follow the recovery method.	—
						② If the message “I301AT”, “I301HH” or “I301xy” is not displayed, replace the Disk Drive.	5.2.1 (MNTE 05-0120)
						③ When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
IY1000	Unsupported HDU inserted (Unit-x, HDU-y)	It was blocked because the inserted disk drive was out of the target for support. x : Unit ID# (RKA/RKAD=1-29) (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) y: Disk Drive# (RKA/RKAD=0-13) (RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather			① Do maintenance work following the message displayed after this message. • W060AT SATA HDU alarm • W060xy HDU alarm • W061AT SATA Spare HDU alarm • W061xy Spare HDU alarm At this time, replace it to a supported Disk Drive.	5.2.1 (MNTE 05-0120)

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IY2000	Restore started (LU-xxxx/yyyy)	The restoration copy started.				—	—
IY2100	Restore completed (LU-xxxx/yyyy)	The restoration copy terminated normally.				—	—
IY2200	Restore failed (LU-xxxx/yyyy)	The restoration copy terminated abnormally.	Gather			① Restore the data using the backup data after splitting the pair.	—
IY3000	Subsystem is going to re-boot to recognize additional Units	The subsystem will be rebooted in order to recognize the additional unit again while it is rebooted. (This message may be issued when the subsystem is booted immediately after the additional unit is powered on.)				—	—
IZ0000	HDU firmware download start	A renewal of the drive firmware was started.				—	—
IZ0100	HDU firmware download end	A renewal of the drive firmware was completed.				① Turn off the subsystem power, and turn it on again.	—
IZ02HH	HFWD completed (Unit-x, HDU-y)	A renewal of the drive firmware was completed normally. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IZ02xy	HFWD completed (Unit-x, HDU-y)	A renewal of the drive firmware was completed normally. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZ03HH	HFWD failed (Unit-x, HDU-y)	A rewriting of the drive firmware terminated abnormally. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)		Gather		① Turn off the subsystem power, turn it on again, and replace the Disk Drive that has caused the abnormal termination with a new one after the subsystem enters the Ready status. ② After the drive is restored, renew the drive firmware again.	5.3.1 (MNTE 05-0120) —
IZ03xy	HFWD failed (Unit-x, HDU-y)	A rewriting of the drive firmware terminated abnormally. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)		Gather		① Turn off the subsystem power, turn it on again, and replace the Disk Drive that has caused the abnormal termination with a new one after the subsystem enters the Ready status. ② After the drive is restored, renew the drive firmware again.	5.3.1 (MNTE 05-0120) —
IZ0600	HFWD no target HDU	When an attempt is made to rewrite 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 the target drive for rewrite. Then, rewrite the drive firmware again.	—
IZ07HH	HFWD no redundance [PG] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of a parity group. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZ07xy	HFWD no redundance [PG] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of a parity group. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				—	—
IZ08HH	HFWD no redundance [SYS] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of the system drive. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
IZ08xy	HFWD no redundance [SYS] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of the system drive. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZ09HH	HFWD no redundance [SES] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of the SES drive. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				—	—
IZ09xy	HFWD no redundance [SES] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal was aborted because it was impossible to preserve redundancy of the SES drive. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
IZ0AHH	HFWD aborted [CTL] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal failed because of a blockade of the Control Unit. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Turn off the subsystem power, turn it on again, and replace the Disk Drive, a renewal of whose firmware has failed, with a new one after the subsystem enters the Ready status. ② After the drive is restored, renew the drive firmware again.	5.3.1 (MNTE 05-0120)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZ0Axy	HFWD aborted [CTL] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal failed because of a blockade of the Control Unit. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① Turn off the subsystem power, turn it on again, and replace the Disk Drive, a renewal of whose firmware has failed, with a new one after the subsystem enters the Ready status. ② After the drive is restored, renew the drive firmware again.	5.3.1 (MNTE 05-0120)
IZ0B00	CACHE destage check error	Execution is impossible because unsaved information remains on the cache.			Gather	① Perform the regular sequential shutdown. ② Then, turn on again and retry rewriting of the drive firmware.	—
IZ0CHH	HFWD aborted [Loop] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal failed because of a loop failure. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① Turn off the subsystem power, turn it on again, and replace the Disk Drive, a renewal of whose firmware has failed, with a new one after the subsystem enters the Ready status. ② After the drive is restored, renew the drive firmware again.	5.3.1 (MNTE 05-0120)
IZ0Cxy	HFWD aborted [Loop] (Unit-x, HDU-y)	Though the drive was the one whose firmware was to be renewed, the renewal failed because of a loop failure. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.					
IZY3HH	ENC microprogram download FAIL (Unit-x)	An ENC microprogram downloading failed. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT=1-29)					
IZY300	ENC microprogram download FAIL (CTL-Unit)	An ENC microprogram downloading failed.					
IZY30x	ENC microprogram download FAIL (Unit-x)	An ENC microprogram downloading failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=1-14)					
IZY40x	ENC#x microprogram download complete	An ENC microprogram downloading was completed.					
IZY5AT	ENC microprogram download Info.[SENC] (Unit-x, ENC-y)	A SENC microprogram downloading failed. x : Unit ID# (RKAAT/RKAJAT=1-29) (RKAATL/RKAJATL=1-3) (RKL=0) y : SENC Unit# (0-1)				① Replace the SENC Unit.	5.3.7 (MNTE 05-0560)
IZY5HH	ENC microprogram download info. (Unit-x, ENC-y)	A failure was detected in the ENC during an ENC downloading. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)				① Replace the ENC Unit.	5.3.8 (MNTE 05-0640)
IZY5xy	ENC microprogram download info. (Unit-x, ENC-y)	A failure was detected in the ENC during an ENC downloading. x : Unit ID# (RKA/RKAD=1-14) y : ENC Unit# (0-1)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZY6AT	ENC microprogram download Info.[SENC] (SES Unit-x)	A job timeout was detected during an SENC downloading. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0)				① Perform replacement of components in the following order to specify the failed component. • Control Unit replacement • SENC Unit replacement	5.3.5 (MNTE05-0380) 5.3.7 (MNTE 05-0560)
IZY6HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A job timeout was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=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	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE 05-0380) 5.3.8 (MNTE 05-0640)
IZY6xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A job timeout was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=1-14) y : Disk Drive# (RK/RKD=0-13) (RKA/RKAD=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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)				① Perform replacement of components in the following order to specify the failed component. • Disk Drive replacement • Control Unit replacement • SENC Unit replacement	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE05-0380) 5.3.7 (MNTE 05-0560)
IZY7HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (other than xx/35xx) was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=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	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE05-0380) 5.3.7 (MNTE 05-0560)
IZY7xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (other than xx/35xx) was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=1-14) y : Disk Drive# (RK/RKD=0-13) (RKA/RKAD=0-14)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)				① Perform replacement of components in the following order to specify the failed component. • Disk Drive replacement • Control Unit replacement • SENC Unit replacement	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE05-0380) 5.3.7 (MNTE 05-0560)
IZY8HH	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (incorrect post) was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=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	5.3.1 (MNTE 05-0120) 5.3.5 (MNTE05-0380) 5.3.7 (MNTE 05-0560)
IZY8xy	ENC microprogram download info. (SES Unit-x, HDU-y)	A drive error (incorrect post) was detected during an ENC downloading. x : SES Unit ID# (RKA/RKAD=1-14) y : Disk Drive# (RK/RKD=0-13) (RKA/RKAD=0-14)					
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# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : SENC Unit# (0-1)				① Replace the data file and the SENC Unit in this order to specify the failed part.	5.3.7 (MNTE 05-0560)
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# (RKA=0-29) y : ENC Unit# (0-1)				① Replace the data file and the ENC Unit in this order to specify the failed part.	5.3.8 (MNTE 05-0640)
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# (RKA/RKAD=1-14) y : ENC Unit# (0-1)					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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.				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.					
IZYB02	ENC microprogram file size over [xxxxxxxxxxxx]	The display file size exceeds the specified value.					
IZYB03	ENC microprogram file size mismatch [xxxxxxxxxxxx]	The display file size and the designated value are mismatched.					
IZYB04	ENC microprogram read data error [xxxxxxxxxxxx]	A contents error in the file occurred.					
IZYE00	ENC microprogram download info. [Data transfer time-out xx] (CTL-y)	CTL-Unit ENC microgram download time out occurred.			Gather	① Retry the download after powering off and on. ② If the same message appears again, replace the Control Unit remaining.	— 5.3.5 (MNTE 05-0380)
IZYF00	ENC microprogram download info. [Write data found xx] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because unprocessed data existed in the write area.			Gather		
IZYG00	ENC microprogram download info. [Start bit clear NG xx] (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.			Gather		
IZYH00	ENC microprogram download info. [Status error xx] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because of a status error.			Gather		
IZYI00	ENC microprogram download info. [Data write error xx] (CTL-y)	When a download of the microprogram was attempted, the download could not be done because of a write error.			Gather		
IZYJ00	ENC microprogram download info. [Download file error xx]	The file to be downloaded is illegal.			Gather	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.			Gather	—	—
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.			Gather		

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
IZYMHH	ENC microprogram download error detected (Unit-x)	An ENC microprogram downloading failed. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29)			Gather	—	—
IZYM00	ENC microprogram download error detected (CTL-Unit)	An ENC microprogram downloading failed.			Gather		
IZYM0x	ENC microprogram download error detected (Unit-x)	An ENC microprogram downloading failed. x : Unit ID# (RKA=1-14) (RKAAT/RKAJAT/ RKAATL/RKAJATL =1-14)			Gather		
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# (RKA=0-29) (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) y : ENC Unit# (RKA=0-1) SENC Unit# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-1)	Gather			① Download the ENC microprogram again.	—
IZZ000	HFWD file open error [xxxxxxxxxxx]	A file open error was detected. xxxxxxxxxxx : 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 the trouble is not solved in spite of the above operation, call the department for coping with troubles.	—
IZZ001	HFWD file read error [xxxxxxxxxxx]	A file read error was detected. xxxxxxxxxxx : A name of the file concerning the error					
IZZ002	HFWD file size over [xxxxxxxxxxx]	A file size over occurred. xxxxxxxxxxx : A name of the file concerning the error					
IZZ003	HFWD read data over [xxxxxxxxxxx]	Data read from the file was illegal. xxxxxxxxxxx : A name of the file concerning the error					
IZZ004	HFWD file size mismatch [xxxxxxxxxxx]	A file size is different from the estimated one. xxxxxxxxxxx : A name of the file concerning the error					

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.4 Flash detected messages

Table 2.3.4 Flash detected messages

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R00000	INTSTACK back over [REG80000014, Bit26]	A stackback occurred in the state in which no stack exists.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R00100	INTSTACK register over [REG80000014, Bit24]	The INTSTACK of 20 layers was exceeded.					
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.					
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.					
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.					
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.					
R00600	MCTL REG access error [RDRGWR] [REG80000014, Bit11]	A writing was attempted on the read-only register of the M-CTL internal register.					
R00700	CTC parity error (CH-0) [REG80000014, Bit5]	A parity error occurred in the timer CH0.					
R00800	CTC parity error (CH-1) [REG80000014, Bit4]	A parity error occurred in the timer CH1.					
R00900	Watchdog-timer counter parity error [REG80000014, Bit0]	A parity error occurred in the counter for the watchdog timer.					
R00A00	MCTL PCI bus retry over [REG80040010, Bit29]	An excess of the PCI bus retry count was detected.					
R00B00	MCTL PCI bus time-out [REG80040010, Bit28]	A PCI bus time-out was detected.					
R00C00	MCTL PCI bus deadlock [REG80040010, Bit21]	A PCI bus deadlock was detected.					
R00D00	VIPER CNOW ADR counter parity error [REG80040034, Bit31]	A parity error was detected in the CNOW_ADR counter.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R00E00	VIPER CTCON REG ADR counter parity error [REG80040034, Bit28]	A parity error was detected in the CTCON_REG ADR counter	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R00F00	VIPER CTGO STOP CNT counter parity error [REG80040034, Bit27]	A parity error was detected in the CTGO_REG_CNT counter					
R00G00	VIPER CSTOP CNT counter parity error [REG80040034, Bit26]	A parity error was detected in the CSTOP_CNT counter					
R00H00	VIPER CPCIBUS DED CNT counter parity error [REG80040034, Bit23]	A parity error was detected in the CPCIBUS_DED_CNT counter					
R00I00	VIPER CTGO ADR counter parity error [REG80040034, Bit22]	A parity error was detected in the CTGO_ADR counter					
R00J00	VIPER target write parity error [TW3ERR] [REG80040034, Bit15]	A parity error was detected in bits 31 to 24 of VIPER internal transfer target write (PIO) data.					
R00K00	VIPER target write parity error [TW2ERR] [REG80040034, Bit14]	A parity error was detected in bits 23 to 16 of VIPER internal transfer target write (PIO) data.					
R00L00	VIPER target write parity error [TW1ERR] [REG80040034, Bit13]	A parity error was detected in bits 15 to 08 of VIPER internal transfer target write (PIO) data.					
R00M00	VIPER target write parity error [TW0ERR] [REG80040034, Bit12]	A parity error was detected in bits 07 to 00 of VIPER internal transfer target write (PIO) data.					
R00N00	VIPER target read parity error [TR3ERR] [REG80040034, Bit11]	A parity error was detected in bits 31 to 24 of VIPER internal transfer target read (PIO) data.					
R00P00	VIPER target read parity error [TR2ERR] [REG80040034, Bit10]	A parity error was detected in bits 23 to 16 of VIPER internal transfer target read (PIO) data.					
R00Q00	VIPER target read parity error [TR1ERR] [REG80040034, Bit9]	A parity error was detected in bits 15 to 08 of VIPER internal transfer target read (PIO) data.					
R00R00	VIPER target read parity error [TR0ERR] [REG80040034, Bit8]	A parity error was detected in bits 07 to 00 of VIPER internal transfer target read (PIO) data.					
R00S00	Register 3rd read failed	The third readout from specified register failed.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R00T00	MCTL hard register error [DIPSW]	The value that the DIPSW register read was incorrect (the read value was unsteady).	Gather			① Put only the controller, whose CALM LED(s) is on, in the Maintenance mode and get a simple trace.	2.5.3 (MNTE 02-2180)
						② Insert the same Control Unit again.	—
						③ If the error is not solved in spite of the re-insertion, replace the Control Unit.	5.3.5 (MNTE 05-0380)
						④ If the error is not solved in spite of the replacement, replace the other Control Unit.	
						⑤ If the error is not solved in spite of the replacement above, contact the division for coping wit the problem.	—

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R10000	MCTL PCI parity error [CONFIG04, Bit31]	A parity error was detected.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R10100	MCTL PCI system error [CONFIG04, Bit30]	A system error was output.					
R10200	MCTL PCI master abort [CONFIG04,Bit29]	A master abortion was received.					
R10300	MCTL PCI received target abort [CONFIG04, Bit28]	A target abortion was received.					
R10400	MCTL PCI signaled target abort [CONFIG04, Bit27]	The target abortion was executed.					
R10500	MCTL PCI data parity error [CONFIG04, Bit24]	A data parity error.					
R20000	DCTL access error [BYTEWRERR] [REG82001238, Bit27]	A writing done beyond the 4-byte boundary was detected.					
R20100	DCTL data parity error [DRDPTYERR] [REG82001238, Bit23]	A data parity error was detected during an output from the data buffer to the PCI bus.					
R20200	DCTL access error [WRPROTECT] [REG82001238, Bit22]	A writing was attempted on a write-protected area.					
R20300	DCTL address over [MPU] [REG82001238, Bit21]	A CADROV was detected when the MPU accessed the cache.					
R20400	DCTL address parity error [MPU] [REG82001238, Bit20]	An address parity error was detected in the transfer address received by the cache.					
R20500	DCTL LEN parity error [REG82001238, Bit19]	An LEN parity error was detected in the transfer word length received by the cache.					
R20600	DCTL address over [DMA] [REG82001238, Bit18]	A CADROV was detected when the H/D_PORT, DMA#0 or MDMA accessed the cache.					
R20700	DCTL access error [DUMYAREAWRERR] [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.					
R20800	DCTL REF counter parity error [REG82001238, Bit1]	A parity error was detected in the counter for the cache memory refreshment timing.					
R20900	DCTL PPCI parity error [REG8200127C, Bit31]	A parity error was detected.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R20A00	DCTL PPCI system error [REG8200127C, Bit30]	An assertion of a system error was detected.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R20B00	DCTL PPCI master abort [REG8200127C, Bit29]	A master abortion was executed.					
R20C00	DCTL PPCI received target abort [REG8200127C, Bit28]	A target abortion was received.					
R20D00	DCTL PPCI signaled target abort [REG8200127C, Bit27]	A target abortion was executed.					
R20E00	DCTL PPCI PERR assert or reception [REG8200127C, Bit24]	A parity error was asserted or received in the case of the bus master.					
R20F00	DCTL PPCI ADR parity error [REG8200127C, Bit23]	An address parity error was detected.					
R20G00	DCTL PPCI DRD parity error [REG8200127C, Bit22]	A parity error was detected in the data read from the data FIFO.					
R20H00	DCTL PPCI CMD parity error [REG8200127C, Bit21]	A parity error was detected when the ADR/CMD was read from the CMD buffer.					
R20I00	DCTL PPCI CNT parity error [REG8200127C, Bit20]	A parity error was detected during counting by the FIFO control counter.					
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.					
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.)					
R30000	ECC write parity error [MPU] [REG82001238, Bit31]	A parity error was detected in the ECC adding part during a writing on the cache.					
R30100	ECC generate error [MPU] [REG82001238, Bit30]	An ECC generation error was detected in the ECC adding part during a writing on the cache.					
R3020x	ECC uncorrectable error (CACHE-x) [MPU] [REG82001238, Bit29]	A uncorrectable error of the ECC was detected during a readout from the cache. x : Cache Unit slot# (0,1,*) (* means the detection of both 0 and 1.)				① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R3030x	ECC correction failed (CACHE-x) [MPU] [REG82001238, Bit28]	An inconsistent correction of the ECC was detected during a readout from the cache. x : Cache Unit slot# (0,1,*) (* means the detection of both 0 and 1.)	Gather			① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
R3120x	ECC uncorrectable error (CTL-x)	An uncorrectable error occurred at the time of checking hard error interruption. x : Control Unit# (0-1)			Gather		
R40000	DUAL I/F clock error [INT/MP] [REG82001228, Bit0]	A clock trouble was detected in the DUAL_CLK from the CTL in another system.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R40100	DUAL I/F address parity error [INT/MP] [REG82001414, Bit11]	An address parity error was detected when the MP wrote on a certain part in another system.					
R40200	DUAL I/F write data parity error [INT/MP] [REG82001414, Bit10]	A data parity error was detected when the MP wrote on a certain part in another system.					
R40300	DUAL I/F write ready time-out [INT/MP] [REG82001414, Bit9]	An ADR sending ready time-out was detected when the MP wrote/read on/from a certain part in another system.					
R40400	DUAL I/F CNT parity error [INT/MP] [REG82001414, Bit8]	A count parity error was detected when the MP wrote on a certain part in another system.					
R40500	DUAL I/F read parity error [INT/MP] [REG82001414, Bit7]	A data parity error was detected when the MP read from a certain part in another system.					
R40600	DUAL I/F read ready time-out [INT/MP] [REG82001414, Bit6]	A data ready time-out was detected when the MP read from a certain part in another system.					
R40700	DUAL I/F PLL INI counter error [REG82001228, Bit1]	An error in the PLL initialization counter of the DUAL (A failure in the own system) (Occurs only when the DUAL_IORDY is cancelled.)					
R40800	DUAL I/F clock error [EXT/MP] [REG82001810, Bit1]	A clock trouble of the DUAL_CLK was detected in the CTL in another system. Note: The ERR_ST of each port is set when this error occurs.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R40900	DUAL I/F address parity error [EXT/MP] [REG82001810, Bit0]	A PTY error was detected in the address used for access by each port to another system. Note: The ERR_ST of each port is set when this error occurs.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R40A00	DUAL I/F address over [EXT/DMA] [REG8200181C, Bit11]	The CADROV was detected when the H/D_ PORT, DMA#0, or MDMA accessed the cache.					
R40B00	DUAL I/F read data parity error [EXT/MP] [REG8200181C, Bit10]	A data parity error was detected when the MP read from a certain part in another system.					
R40C00	DUAL I/F ECC correction error [EXT/MP] [REG8200181C, Bit9]	An ECC_COR error was detected when the MP read from a certain part in another system.					
R40D00	DUAL I/F ECC uncorrectable error [EXT/MP] [REG8200181C, Bit8]	An ECC_UNCORRE error was detected when the MP read from a certain part in another system.					
R40E00	DUAL I/F write parity error [EXT/MP] [REG8200181C, Bit7]	A parity error was detected in write data when the MP wrote on a certain part in another system.					
R40F00	DUAL I/F ECC write parity error [EXT/MP] [REG8200181C, Bit6]	An ECC_WPTY error was detected when the MP wrote on the cache in another system.					
R40G00	DUAL I/F ECC GEN error [EXTMP] [REG8200181C, Bit5]	An ECC_GEN error was detected when the MP wrote on the cache in another system.					
R40H00	DUAL I/F CACHE address parity error [EXT/MP] [REG8200181C, Bit4]	A cache address parity error was detected when the MP wrote on the cache in another system.					
R40I00	DUAL I/F WLEN parity error [EXT/MP] [REG8200181C, Bit3]	An WLEN parity error was detected when the MP wrote on the cache in another system.					
R40J00	DUAL I/F CNT parity error [EXT/MP] [REG8200181C, Bit2]	A counter parity error was detected when the MP wrote on the cache in another system.					
R40K00	DUAL I/F address over [EXT/MP] [REG8200181C, Bit1]	A CARDOV error was detected when the MP wrote on the cache in another system.					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R40L00	DUAL I/F access error [EXT/MP/WRPROTECT] [REG8200181C, Bit0]	WR protection was detected when the MP wrote on a certain part in another system.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R40M00	DUAL I/F error [MDTDCHK] [REG82001228, Bit17]	An error was detected when the MP accessed another system.					
R40N00	DUAL I/F SELF_IORDY error [REG82001454, Bit22]	A failure of the impedance adjustment circuit in the own system was detected.					
R40P00	DUAL I/F SELF_IORDY error [REG82001454, Bit21]	A failure of the impedance adjustment circuit in another system was detected.					
R50000	BRG burst violation [REG140004D0, Bit0]	A burst violation occurred. [BRG]					
	BRG burst violation [REGF10004D0, Bit0]						
R50100	BRG ready timer expired [REG140004D0, Bit1]	The “ready timer expired” occurred. [BRG]					
	BRG ready timer expired [REGF10004D0, Bit1]						
R50200	BRG CPU address out of range [REG14000140, Bit0]	The “CPU address out of range” was detected. [BRG CPU]					
	BRG CPU address out of range [REGF1000140, Bit0]						
R50300	BRG CPU bad address parity detected [REG14000140, Bit1]	The “Bad Address Parity” was detected. [BRG CPU]					
	BRG CPU bad address parity detected [REGF1000140, Bit1]						
R50400	BRG CPU transfer type violation [REG14000140, Bit2]	The “transfer type violation” was detected. [BRG CPU]					
	BRG CPU transfer type violation [REGF1000140, Bit2]						
R50500	BRG CPU access to a protected region [REG14000140, Bit3]	Access to a protected region was detected. [BRG CPU]					
	BRG CPU access to a protected region [REGF1000140, Bit3]						

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R50600	BRG CPU write to a write protected region [REG14000140, Bit4] BRG CPU write to a write protected region [REGF1000140, Bit4]	A writing on a write-protected region occurred. [BRG CPU]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R50700	BRG CPU read from a caching protected region [REG14000140, Bit5] BRG CPU read from a caching protected region [REGF1000140, Bit5]	A readout from a caching-protected region occurred. [BRG CPU]					
R50800	BRG CPU bad write data parity detected [REG14000140, Bit6] BRG CPU bad write data parity detected [REGF1000140, Bit6]	The “bad write data parity” was detected. [BRG CPU]					
R50900	BRG CPU bad read data parity detected [REG14000140, Bit7] BRG CPU bad read data parity detected [REGF1000140, Bit7]	The “bad read data parity” was detected. [BRG CPU]					
R50A00	BRG PCI0 the PCI slave detected bad address parity [REG14001D58, Bit0] BRG PCI0 the PCI slave detected bad address parity [REGF1001D58, Bit0]	The slave PCI detected the “bad address parity”. [BRG CPU]					
R50B00	BRG PCI0 the PCI slave detected bad write data parity [REG14001D58, Bit1] BRG PCI0 the PCI slave detected bad write data parity [REGF1001D58, Bit1]	The slave PCI detected the “bad write data parity”. [BRG CPU]					
R50C00	BRG PCI0 PERR response to read data driven by PCI slave [REG14001D58, Bit2] BRG PCI0 PERR response to read data driven by PCI slave [REGF1001D58, Bit2]	The “PERR response to read data” by the slave PCI occurred. [BRG PCIO]					

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R50D00	BRG PCI0 PERR response to address driven by the PCI master [REG14001D58, Bit4]	The “PERR response to address” by the slave PCI occurred. [BRG PCIO]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
	BRG PCI0 PERR response to address driven by the PCI master [REGF1001D58, Bit4]						
R50E00	BRG PCI0 PERR response to write data driven by the PCI master [REG14001D58, Bit5]	The “PERR response to write data” by the slave PCI occurred. [BRG PCIO]					
	BRG PCI0 PERR response to write data driven by the PCI master [REGF1001D58, Bit5]						
R50F00	BRG PCI0 bad data parity detected during the PCI master read [REG14001D58, Bit6]	The “bad data parity” was detected during a readout by the master PCI. [BRG PCIO]					
	BRG PCI0 bad data parity detected during the PCI master read [REGF1001D58, Bit6]						
R50G00	BRG PCI0 the PCI master generated master abort [REG14001D58, Bit8]	A master abortion occurred in the master PCI. [BRG PCIO]					
	BRG PCI0 the PCI master generated master abort [REGF1001D58, Bit8]						
R50H00	BRG PCI0 the PCI master detected target abort [REG14001D58, Bit9]	The master PCI detected a target abortion. [BRG PCIO]					
	BRG PCI0 the PCI master detected target abort [REGF1001D58, Bit9]						
R50I00	BRG PCI0 generate transaction while master is not enabled [REG14001D58, Bit10]	A PCI process occurred while the master is not enabled. [BRG PCIO]					
	BRG PCI0 generate transaction while master is not enabled [REGF1001D58, Bit10]						
R50J00	BRG PCI0 the PCI master reached retry counter limit [REG14001D58, Bit11]	The threshold value of the retry counter was exceeded in the master PCI. [BRG PCIO]					
	BRG PCI0 the PCI master reached retry counter limit [REGF1001D58, Bit11]						

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R50K00	BRG PCI0 the PCI slave detects an illegal master termination [REG14001D58, Bit16] BRG PCI0 the PCI slave detects an illegal master termination [REGF1001D58, Bit16]	The slave PCI detected the "illegal master termination". [BRG PCIO]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R50L00	BRG PCI0 the PCI slave terminates a transaction with Target Abort [REG14001D58, Bit17] BRG PCI0 the PCI slave terminates a transaction with Target Abort [REGF1001D58, Bit17]	The slave PCI terminated the process because of a target abortion. [BRG PCIO]					
R50M00	BRG PCI0 a PCI slave access protect violation [REG14001D58, Bit18] BRG PCI0 a PCI slave access protect violation [REGF1001D58, Bit18]	Access by the slave PCI to the area where the protection was violated occurred. [BRG PCIO]					
R50N00	BRG PCI0 a PCI slave write protect violation [REG14001D58, Bit19] BRG PCI0 a PCI slave write protect violation [REGF1001D58, Bit19]	A violation against write-protection by the slave PCI occurred. [BRG PCIO]					
R50P00	BRG PCI0 a PCI slave read buffer discard timer expired [REG14001D58, Bit20] BRG PCI0 a PCI slave read buffer discard timer expired [REGF1001D58, Bit20]	The "read buffer discard timer expired" occurred in the slave PCI. [BRG PCIO]					
R50Q00	BRG PCI0 Internal PCI arbiter detection of a broken master [REG14001D58, Bit21] BRG PCI0 Internal PCI arbiter detection of a broken master [REGF1001D58, Bit21]	The "internal PCI arbiter detection of a "broken" master" occurred. [BRG PCIO]					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
R50R00	BRG PCI0 PCI BIST interrupt [REG14001D58, Bit24] BRG PCI0 PCI BIST interrupt [REGF1001D58, Bit24]	The “PCI BIST interrupt” occurred. [BRG PCIO]	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
R50S00	BRG PCI0 PCI power management interrupt [REG14001D58, Bit25] BRG PCI0 PCI power management interrupt [REGF1001D58, Bit25]	The “PCI power management interrupt” occurred. [BRG PCIO]					
R50T00	BRG PCI0 PCI reset assert [REG14001D58, Bit26] BRG PCI0 PCI reset assert [REGF1001D58, Bit26]	The “PCI reset assert” occurred. [BRG PCIO]					
R50U00	BRG SDRAM two or more error [REG14000490, Bit1] BRG SDRAM two or more error [REGF1000490, Bit1]	The “Two or more error” occurred. [BRG PCIO]					
RA00xx	Microprogram error [FLS]	A system shutdown occurred because of a logical contradiction. xx : Any code			Gather	① Turn on the power again.	—
RA0410	Host name delete error	The network download function failed to delete the host name.			Gather	① Check the directory, in which the main system is stored, entered in the WEB window. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)
RA0411	NFS unmount error	An NFS unmounting resulted in an error during operation of the network download function.			Gather	① Check the directory, in which the main system is stored, entered in the WEB window. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)
RA0412	NFS mount error	An NFS mounting resulted in an error during operation of the network download function.			Gather	① Check the directory, in which the main system is stored, entered in the WEB window. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)
RA0413	Host name add error	The network download function failed to add the host name.			Gather	① Check the directory, in which the main system is stored, entered in the WEB window. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)
RA0414	NFS file open error	A file opening resulted in an error during operation of the network download function.			Gather	① Check the directory, in which the main system is stored, entered in the WEB window. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	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.			Gather	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. ② Replace the Control Unit if the error recurs.	— 5.3.5 (MNTE 05-0380)
RA1000	Loop error	A system shutdown occurred because of a loop failure.			Gather	① Collect and analyze memory dump and specify the failed part. ② When the failed part cannot be identified, refer to Section 2.4, “Details of Recovery Procedures”.	2.5.5 (MNTE 02-2260) 2.4 (MNTE 02-1360)
RA30xy	CACHE size mismatch b/w. CTL (CACHE-x/y)	A cache mounting error occurred. x, y : Cache Unit slot# (0-3)				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. ② Replace the Cache Unit.	4.2.1 (MNTE 04-0090) 5.3.6 (MNTE 05-0470)
RA4000	CTL synchronized error	Synchronization failed.			Gather	① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
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
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.	Gather			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 DF600 RKS (RKSD).	Gather			① Check the cache capacity and replace the cache memory with that supported by the DF600 RKS (RKSD).	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RA780x	Unsupported CACHE (CACHE-x)	A start-up was attempted using a unsupported cache. x : Cache slot# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3)	Gather			① Replace the Cache Unit. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
RA7900	System HDU spin up failed	Spin-up of the system drive failed.	Gather			① Replace the part in which the failure occurred, and then turn on the power again.	—
RA7A00	CACHE installation error (CACHE-0/1)	Cache memories are not installed in both of the Slots #0 and #1.	Gather			① Install the cache memories in both of the Slots #0 and #1.	5.3.6 (MNTE 05-0470)
RA7B0x	CACHE size get error (CACHE-x)	Acquisition of the cache capacity failed. x : Cache slot# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE =0-3)	Gather			① Replace a cache memory inserted in the cache slot whose number was shown in the message. ② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.6 (MNTE 05-0470) 5.3.5 (MNTE 05-0380)
RA7C00	Unsupported unit is connected	A unsupported disk array unit is connected.	Gather			① When the RKAAT/RKAJAT is mounted, disconnect the connected RKA. ② When the RKH is mounted, replace the controller for the RKH.	— 5.3.5 (MNTE 05-0380)
RA7D00	MAC address error [usrport]/[mntport]	MAC address is illegal	Gather			① Because a controller detachment is caused by the MAC address error, replace a controller whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RA7E00	Frame time-out detected in SENC (Unit-x, ENC-y)	When the subsystem was booted, an FTO failure of the SENC Unit pointed out in the message was detected. It is possible that the SENC Unit got into a permanent trouble. x : Unit ID# (RKAAT/RKAJAT =1-30) (RKAATL/RKAJATL =1-3) y : SENC Unit# (0-1)				In the case of Control Unit detachment	
						① When the "W0100x CTL alarm" was displayed, take a recovery action according to the message.	(MNTE 02-1290)
						② When this message was displayed at the time of a boot of the subsystem, replace the SENC Unit concerned.	5.3.8 (MNTE 05-0640)
						③ If the trouble is not solved in spite of the actions above, replace the Control Unit concerned.	5.3.5 (MNTE 05-0380)
						In the case of loop detachment	
						① When the "W080xy Loop alarm" was displayed, take a recovery action according to the message.	(MNTE 02-1290)
						② When this message was displayed at the time of a boot of the subsystem but a failed part could not be specified, replace the SENC Unit concerned.	5.3.8 (MNTE 05-0640)
						③ If the trouble is not solved in spite of the actions above, follow the procedure for recovering the loop.	2.4.1(15) (MNTE 02-1590)
RA9000	Task make error	Generation of a task or a semaphore failed.			Gather	① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	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.	Gather			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.	Gather			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	— 5.3.5 (MNTE 05-0380)
RB0200	Utility program extract error	A de-compression of the utility program failed. (An incorrect program (with an incorrect file) was specified when the utility was loaded.)	Gather			① Check the utility program you want to install and install it over again. ② If the system is still abnormal, replace the above Control Unit.	— 5.3.5 (MNTE 05-0380)
RB0300	Utility program SUM check error	A sum check error of the utility program (An incorrect program (with an incorrect file) was specified when the utility was loaded.)	Gather			① Check the utility program you want to install and install it over again.	—
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.)	Gather			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.	— 5.3.5 (MNTE 05-0380)
RB0500	System parameter load failed	Reading of the system parameter information from the system area failed.	Gather			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.	— 5.3.5 (MNTE 05-0380)
RB0600	No micro program	No microprogram is present in the system drive.	Gather			① Install the microprogram newly.	—
RB0700	NO micro program	No system parameter information is present in the system drive.	Gather			① Reset the system parameters correctly in the Maintenance mode of the Web.	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RB0800	System parameter update failed	Writing on all drives failed.	Gather			① Reset the system parameters correctly in the Maintenance mode of the Web. ② If the problem is not solved in spite of the above operation, replace the Disk Drives #0 to #4 of the RK (RKD).	— 5.3.1(MNTE 05-0120)
RB0900	System parameter update partially complete	Writing on one to four system drives failed.	Gather			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.	Gather			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 slot# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3)	Gather			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 and Slot #1 are different each other.) x, y : Cache slot# (RK/RKS/RKD/RKSD/RKL=0-1)	Gather			① Make the caches in the two slots the same.	
RB0D00	RAM disk create failed	Creation of the RAM disk failed.			Gather	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	— 5.3.5 (MNTE 05-0380)
RB0E00	Up grade check NG	The upgrade check of the microprogram failed. (A upgrade of a microprogram, whose version does not conform to the update, was attempted.)	Gather			① Install the microprogram newly.	—
RB0H00	Bad LBA in START60H.DAT	The top LBA of the START60H.DAT file is incorrect.	Gather			① Perform the installation again after acquiring the system again because the START60H.DAT has been destroyed.	—

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RB3000	File size error	An error was detected in file size.	Gather			① Check the microprogram you want to install	—
RB3100	File open error	Opening of file failed.					
RB3200	File read error	Reading of file failed.					
RB3500	Bad block ID	An illegal block ID was detected.					
RB3600	Bad LBA in START600.DAT	An illegal writing LBA was caused by illegal contents of file.					
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.	For Installation Chapter 5
						② When the data in the Disk Drive need to be saved, stop the work and perform update installation.	For Maintenance Chapter 6
RB8100	Install failed	Installation failed.			Gather	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.			Gather	① See [Procedure of locating failed part when the message of “Install partially complete” is output].	For Maintenance Chapter 6
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.	Gather			① See "2.4 Details of Recovery Procedures". Besides, use the FC disk array unit for the Unit #0.	2.4 (MNTE 02-1360)
RB8500	Microprogram extract error	Depression of main microprogram failed.				① Execute update installation.	For Maintenance Chapter 6
						② If the system is still abnormal, replace the Control Unit, the CALM LED of which is lighting up.	5.3.5 (MNTE 05-0380)
RBA000	Down grade check NG	Down-grade check result was NG.				① The present microprogram version cannot be updated to a specified microprogram version. Check the work procedure.	For Maintenance Chapter 6

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RBC000	No drive available	There is not a Disk Drive to install.	Gather			① Replace the disk drives #0 to #4 of the RK/RKD disk array unit. Besides, use the FC disk array unit for the Unit #0.	5.3.1 (MNTE 05-0120)
RBC10x	Drive block size error (Unit-0, HDU-x)	Illegal drive block size was detected during read capacity check. x : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)				① Replace the Disk Drive.	5.3.1 (MNTE 05-0120)
RBC2HH	Unknown drive (Unit-x, HDU-y)	Writing a program in FM0 failed. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)					
RBC2xy	Unknown drive (Unit-x, HDU-y)	Writing a program in FM0 failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)					
RBE000	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)	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
RBE100	Flash memory SUM check error	A sum check error is detected in the flash memory.			Gather		
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 the system is still abnormal, replace the above Control Unit.	For Maintenance Chapter 6 5.3.5 (MNTE 05-0380)
RBE300	Flash program update start	Updating of the FM1 flash program was started by the latest REV maintenance function of the flash program.				—	—
RBE301	Flash program update end	Updating of the FM1 flash program was started by the latest REV maintenance function of flash program.				—	—

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RBE400	Down grade install NG (ownership change by LU)	Down grade install of Microprogram to Rev.0652/x or former failed. (Ownership change by LU is not supported				① ThThe present microprogram version cannot be up dated to a specified microprogram version. Check the work procedure.	
RBE500	Initial setup error by LU access restriction	The Initial setup failed because access to the LU was restricted.	Gather			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.	Gather			① The Config clear restart is impossible. To reboot, specify the TakeOver (takeover reboot).	—
RBE700	Bad LBA in START60A.DAT	The LBA to be written, which is stored in the START60A.DAT file, is incorrect.	Gather			① Perform a updating installation.	For Maintenance Chapter 6
RBE800	Upgrade failed [the uploaded microprogram does not support the upgrade]	Upgrade from the RK to the RKH/RKHE failed.				① Update the RK microprogram to revision 0656 or later.	—
RBE900	Upgrade failed[the installed microprogram incorrect]	Upgrade from the RK to the RKH/RKHE failed.				① Install the microprogram revision 165x, which is the same as the RK microprogram revision 065x, in the RKH/RKHE.	—
RBEA00	Downgrade failed [the installed microprogram is incorrect]	Downgrade from the RKH/RKHE to the RK failed.				① Install the microprogram revision 065x, which is the same as the RKH/RKHE microprogram revision 165x in the drive, in the RK.	—
RBEB00	Downgrade failed [the uploaded microprogram does not support the downgrade]	Downgrade from the RKH/RKHE to the RK failed.				① Update the RK microprogram to revision 0656 or later.	—
RBEC00	Down grade install NG (high-speed sequential write mode)	The installation for downgrade failed because the high-speed sequential write mode was effective.	Gather			① A update from the current microprogram version to the specified one cannot be done. Refer to the work procedure.	—
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.)	Gather			① Assign an FC disk array unit to the Unit #0, or make sure of the rule of the connection.	—
RBEE00	Down grade install NG [extended spare HDU is defined]	The installation for downgrade failed because an expanded spare disk existed.	Gather			① Eliminate all the spare disks once after the subsystem becomes ready, and then define the spare disks (15 or less spare disks) over again. ② Perform the installation for downgrade.	For Installation Chapter 5 For Installation Chapter 6

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
RBEF00	Initial setup error [unsupported Unit is connected]	The initial setup for the microprogram that did not support the S-ATA disk array unit failed.	Gather			① Install the microprogram that supports the S-ATA disk array unit, or install the microprogram that does not support the S-ATA disk array unit after removing the S-ATA disk array unit from the configuration.	For Installation Chapter 3, Chapter 6
RBEG00	Download failed [unsupported Unit is connected]	The startup failed because the microprogram did not support the S-ATA disk array unit.	Gather			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, Chapter 6
RBEH00	Down grade install NG [unsupported Unit is connected]	The installation for downgrade to the microprogram that did not support the SATA disk array unit failed.	Gather			① Install the microprogram that supports the S-ATA disk array unit, or install the microprogram that does not support the S-ATA disk array unit after removing the S-ATA disk array unit from the configuration.	For Installation Chapter 3, Chapter 6
RBEJ00	Down grade install NG [ShadowImage I/O switch mode]	When the ShadowImage I/O Switching mode is valid, downgrade installation of the microprogram that does not support the mode was performed.	Gather			① Invalidate the ShadowImage I/O Switching mode.	—
RBEK00	Down grade install NG [QuickShadow and FlashAccess are both valid] (*1)	Both of QuickShadow and Cache Management are operating at the same time.	Gather			① Lock up and reboot QuickShadow or Cache Management following the manual after the subsystem enters the Ready status. ② After the subsystem enters the Ready status, change the mode to the Maintenance mode and perform the downgrade.	—
RBEL00	Initial setup error [installing unsupported microprogram]	Initial Setup was suspended when installing the unsupported microprogram in the Control Unit of the RKL.	Gather			① It cannot be installed under the microprogram revision x659.	—
RBEM00	Down grade install NG [installing unsupported microprogram]	The process was suspended when installing the downgrade of the unsupported microprogram in the Control Unit of the RKL.	Gather			① The downgrade installation cannot be performed under the micorprogram revision x659.	—

*1 : The term FlashAccess means Cache Management.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.5 Warning messages

Table 2.3.5 Warning messages

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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)		Gather		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 Item (13) in Section 2.4.1, "Recovery measures".	2.4.1 (13) (MNTE 02-1570)
						③ If H3030x, H3040x, H3050x, H3070x, H3080x, H30B0x, HB0Cxy, HD220x, or HH0Ex is also indicated, follow the recovery measures for it.	—
						④ If only H90210 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.	5.3.5 (MNTE 05-0380)
						⑥ When this message was displayed at the time of a boot of the subsystem, replace the ENC Unit/SENC Unit concerned.	
W02000	Other CTL removed	A shutdown occurred in MPU on the Control Unit of another system.	Gather			① Replace the Control Unit whose CALM LED is on.	5.3.5 (MNTE 05-0380)
W03000	Battery alarm	Abnormal battery voltage or a failure in the battery charging circuit was detected.				① Replace the Backup Battery Unit. (*1)	5.3.2 (MNTE 05-0260)
W0300x	Battery alarm (Battery-x)	Abnormal battery voltage or a failure in the battery charging circuit was detected. x : Backup Battery Unit # (0-1)					

*1 : 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).

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W03100	Battery removed	A Backup Battery Unit has been removed from an subsystem.				① Attach a Backup Battery Unit to an subsystem.	5.3.2 (MNTE 05-0260)
W0310x	Battery alarm (Battery-x)	A Backup Battery Unit has been removed from an array unit. x : Backup Battery Unit # (0-1)					
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.	5.3.2 (MNTE 05-0260)
W0330x	Battery Thermal alarm (Battery-x)	The battery thermal failed. x : Backup Battery Unit # (0-1)					
W0340x	Battery back up circuit alarm (CTL-x)	The battery backup circuit failed. x : Control Unit# (0-1)				① If one of W0300x, W0310x, W0320x and W0330x is displayed, follow the recovery procedure of displayed code. If only W0340x is displayed, replace a Control Unit that has the number "x".	5.3.5 (MNTE 05-0380)
W040xy	FAN alarm (Unit-x, FAN-y)	The Fan Assembly failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT=1-14) (RKAATL=1-3) y : FAN Assembly# (0-1)				① Replace the Fan Assembly immediately since the subsystem can go down because of thermal alarm if the subsystem is left in this state. ② Replace the Power Unit (Power Unit (DC)).	5.3.3 (MNTE 05-0320) 5.3.4 (MNTE 05-0340)
W04100	FAN alarm (CTL-Unit, FAN-x)	The Fan Assembly failed. x : FAN Assembly# (0-1)				① Replace the Fan Assembly immediately since the subsystem can go down because of thermal alarm if the subsystem is left in this state.	5.3.3 (MNTE 05-0320)
W042HH	FAN alarm (Unit-x, FAN-y)	The Fan Assembly failed. x : Unit ID# (RKA=0-29) (RKAAT=1-29) y : FAN Assembly# (0-1)					

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W050xy	PS alarm (Unit-x, PS-y)	The Power Unit (Power Unit (DC)) failed. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJAT=1-3) y : Power Unit (Power Unit (DC)) # (0-1)				① When W040xy "FAN alarm" occurs at the same time, maintain them first. ② Replace the Power Unit (Power Unit (DC)).	— 5.3.4 (MNTE 05-0340)
	PS alarm [RKA] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID# (RKA=01-14) y : Power Unit # (0-1)					
	PS alarm [RKAAT] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID# (RKAAT/RKAJAT=01-14) y : Power Unit # (0-1)					
W05100	PS alarm (CTL-Unit, PS-x)	The Power Unit (Power Unit (DC)) failed. x : Power Unit (Power Unit (DC)) # (0-1)				① When W04100 and W042HH "FAN alarm" occurs at the same time, maintain them first. ② Replace the Power Unit (Power Unit (DC)).	— 5.3.4 (MNTE 05-0340)
W052HH	PS alarm (Unit-x, PS-y)	The Power Unit (Power Unit (DC)) failed. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Power Unit (Power Unit (DC)) # (0-1)					
	PS alarm [RKA] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID# (RKA=00-29) y : Power Unit # (0-1)					
	PS alarm [RKAAT] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID# (RKAAT/RKAJAT=01-29) y : Power Unit # (0-1)					

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W054AT	PS alarm [RKAJAT] (Unit-x, PS-y)	The Power Unit failed. x : Unit ID# (RKAJAT=01-14 or 29) y : Power Unit # (0-1)				① There may be coat of dust in front and rear sides of the subsystem and cooling is blocked. Clean the front and rear sides of the subsystem.	Chapter 7. (MNTE 07-0000)
						② If not recovered, replace the Power Unit.	5.3.4 (MNTE 05-0340)
W05600	PS alarm [RKAAT/RKAJAT] (Unit-x, PS-y)	The Power Unit of either RKAAT or RKAJAT failed. x : Unit ID# (RKAAT/RKAJAT =01-14 or 29) y : Power Unit # (0-1)				① Follow W050xy, W052HH and W054AT displayed after this message for the maintenance.	—
W060AT	SATA HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)	Gather			① Replace the Disk Drive.(*1)	5.3.1 (MNTE 05-0120)
						② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
						③ 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.	5.3.8 (MNTE 05-0640)
W060HH	HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)	Gather			① Replace the Disk Drive.(*1)	5.3.1 (MNTE 05-0120)
						② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
	HDU alarm [RKA] (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID# (RKA=0-29) y : Disk Drive# (RKA=0-14)	Gather				
W060xy	HDU alarm (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD =0-13) (RKA/RKAD=0-14)	Gather				
	HDU alarm [RKA] (Unit-x, HDU-y)	The Disk Drive is blocked. x : Unit ID# (RKA=1-14) y : Disk Drive# (RKA=0-14)	Gather				

*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.

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W061AT	SATA Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID# (RKAAT/RKAJAT =1-29) (RKAATL/RKAJATL =1-3) (RKL=0) y : Disk Drive# (RKAAT/RKAJAT/ RKAATL/RKAJATL =0-14) (RKL=0-13)	Gather			① Replace the Disk Drive.(*1)	5.3.1 (MNTE 05-0120)
						② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	2.9 (MNTE 02-2930)
W061HH	Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID# (RKA/RKAD=0-29) y : Disk Drive# (RKA/RKAD=0-14)	Gather				
	Spare HDU alarm [RKA] (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID# (RKA=0-29) y : Disk Drive# (RKA=0-14)	Gather				
W061xy	Spare HDU alarm (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID# (RK/RKS/RKD/RKSD =0) (RKA/RKAD=1-14) y : Disk Drive# (RK/RKS/RKD/RKSD =0-13) (RKA/RKAD=0-14)	Gather				
	Spare HDU alarm [RKA] (Unit-x, HDU-y)	The Spare Disk failed. x : Unit ID# (RKA=1-14) y : Disk Drive# (RKA=0-14)	Gather				

*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.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			① Replace the Disk Drive.(*1) ② When you want to make sure of a model name and drive firmware revision of the Disk Drive, refer to Section 2.9.	5.3.1 (MNTE 05-0120) 2.9 (MNTE 02-2930)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				
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# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)				① When HDU alarm (Unit-x, HDU-y) is displayed following this message, replace the Disk Drive (FC Disk Drive). ② When S-ATA HDU alarm (Unit-x, HDU-y) 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.	5.3.1 (MNTE 05-0120)
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# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=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.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W080xy	Loop alarm (Path-x, Loop-y)	Since the Fibre Channel loop failed, the operation is continued with the alternative loop. x : Path# (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=0-3) y : Loop# (0-1)	Gather			① When any of the following messages is displayed before this message, perform maintenance following it. • W0100x CTL alarm • W060AT SATA HDU alarm • W060HH HDU alarm • W060xy HDU alarm • W090AT SENC alarm • W090HH ENC alarm • W090xy ENC alarm • I301AT SATA HDU error • I301HH HDU error • I301xy HDU error	—
						② When a part to be replaced is not displayed before this message, refer to Section 2.4, “Details of Recovery Procedures”.	2.4 (MNTE 02-1360)
						③ When this message and RA7E00 were displayed at the time of a boot of the subsystem but a failed part could not be specified, replace the ENC Unit/SENC Unit concerned.	5.3.8 (MNTE 05-0640)
W090AT	SENC alarm (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID# (RKAAT/RKAJAT=1-29) y : SENC Unit# (0-1)	Gather			① If this message is displayed when the subsystem is started up, there may also be a wrong connection of the ENC cable. Check all the ENC cable connections.	—
	SENC alarm [RKAAT] (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID# (RKAAT/RKAJAT=1-14 or 29) y : SENC Unit# (0-1)	Gather			② Replace the SENC Unit concerned whose EALM LED is on.	
W090HH	ENC alarm (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			① When the HDU alarm occurs at the same time as the ENC alarm, replace the Disk Drive.	5.3.1 (MNTE 05-0120)
	ENC alarm [RKA] (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID# (RKA=0-29) y : ENC Unit# (0-1)	Gather			② If this message is displayed when the subsystem is started up, there may also be a wrong connection of the ENC cable. Check all the ENC cable connections.	—
W090xy	ENC alarm (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID# (RKA/RKAD=1-14) y : ENC Unit# (0-1)	Gather				
	ENC alarm [RKA] (Unit-x, ENC-y)	The ENC Unit failed. x : Unit ID# (RKA=1-14) y : ENC Unit# (0-1)	Gather			③ Replace the ENC Unit.	5.3.8 (MNTE 05-0640)
*1 : If the message I61A00 is displayed in the same ENC Unit in spite of replacing the ENC Unit in ③, the ENC Unit on the opposite side may have a failure. Replace the ENC Unit on the opposite side with the power turned off after checking with the customer.							

Copyright © 2002, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W091AT	SENC alarm [RKAJAT] (Unit-x, ENC-y)	The SENC Unit failed. x : Unit ID# (RKAJAT=1-14 or 29) y : SENC Unit# (0-1)	Gather			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 Replace the SENC Unit concerned whose EALM LED is on.	5.3.8 (MNTE 05-0640)
W09300	SENC alarm [RKAAT/RKAJAT] (Unit-x, ENC-y)	The failure occurred in either SENC unit of RKAAT or RKAJAT. x : Unit ID# (RKAAT/RKAJAT =1-14 or 29) y : SENC Unit# (0-1)	Gather			① Follow “W090AT SENC alarm” and “W091 SENC alarm” displayed after this message for the maintenance.	—
W0B0HH	ENC recovery failed (Unit-x, ENC-y)	The ENC Unit was inserted but recovery failed. x : Unit ID# (RKA=0-29) (RKAAT/RKAJAT =1-29) y : ENC Unit/SENC Unit# (0-1)	Gather			① The cause of failure in recovery is indicated by another message. Maintain according to that message.	—
W0B0xy	ENC recovery failed (Unit-x, ENC-y)	The ENC Unit was inserted but recovery failed. x : Unit ID# (RKA/RKAD/RKAAT/ RKAJAT=1-14) (RKAATL/RKAJATL =1-3) y : ENC Unit/SENC Unit# (0-1)	Gather				
W0C00x	UPS alarm (UPS-x)	A trouble of the UPS was detected. x : UPS# (0-1)				① When the UPS is connected, 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# (RK/RKS/RKD/RKSD/ RKL=0-1) (RKH/RKHE=0-3)	Gather			① Replace the Cache Unit.	5.3.6 (MNTE 05-0470)
						② If the problem is not solved in spite of the replacement, replace a controller in which the cache memory concerned is installed.	5.3.5 (MNTE 05-0380)
W0E000	LU alarm (LU-xxx)	LU was blocked. xxx : LU# (0-511)	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W0F0xy	Path alarm (Remote-x, Path-y)	A detachment of the path between the DF's occurred. x : Remote DF # (0) y : Path # (RK/RKS/RKD/RKSD/RKL=0-1) (RKH/RKHE=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 Section 2.4.3, "Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used".	— 2.4.3 (MNTE 02-2030)
W0G0HH	Unreadable PIN detected (Unit-x, HDU-y)	Data has been restored due to recovery of the drives from the unreadable PIN. x : Unit ID# (RKA/RKAD=0-29) (RKAAT/RKAJAT=1-29) y : Disk Drive# (RKA/RKAD/RKAAT/RKAJAT=0-14)	Gather			① When the message code H20100 is displayed following this message, take a recovery action following the instruction given in the message. ② When this message is displayed during a restoration of the drive and the code I153xy or I153HH is displayed at the time when the drive restoration is completed, take an action following Procedure (8) in Section 2.4, "Details of Recovery Procedures." ③ When this message is displayed during a restoration of the drive and the code I152xy or I152HH is displayed at the time when the drive restoration is completed, take an action following Procedure (9) or (10) in Section 2.4, "Details of Recovery Procedures."	— 2.4.1 (7) (MNTE 02-1500) 2.4.1 (9) (MNTE 02-1510), 2.4.1 (10) (MNTE 02-1520),
W0G0xy	Unreadable PIN detected (Unit-x, HDU-y)	A unreadable PIN with a failed drive identified has occurred. x : Unit ID# (RK/RKS/RKD/RKSD/RKL=0) (RKA/RKAD/RKAAT/RKAJAT=1-14) (RKAATL/RKAJATL=1-3) y : Disk Drive# (RK/RKS/RKD/RKSD/RKL=0-13) (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL=0-14)	Gather				
W0G100	Unreadable PIN detected (Unit-*, HDU-*)	A unreadable PIN without a failed drive identified has occurred.	Gather				
W0G20x	Parity generation LA error [DRR] (CTL-x)	An LA error occurred during the parity generation. (DRR failure) x : Control Unit# (0-1)	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
W0H000	LU alarm	LU blockage occurred.	Gather				

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W12000	User data lost (LU-xxxx)	The user data were lost since the Cache memory was volatilized. (*1) xxxx : LU# (RK/RKS/RKL =0-511) (RKH/RKHE =0-2047)	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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.	Gather				
W23000	PS OFF failed [CACHE ERR]	The plan was not stopped since a cache failure occurred and the PIN data could not be saved.	Gather				
W310xx	DMA error (DMA-xx)	DMA failed. xx : DMA#	Gather			① Control Unit of the No. indicated by "Cx" (x: Control Unit #) in the log message.	5.3.5 (MNTE 05-0380)
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	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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	Gather				
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	Gather				
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	Gather				

*1 : 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 Disk Array Management Program, and if LU#0 has errors, follow the recovery measures ①.
If it is normal, the recovery operation is not needed.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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	Gather				
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	Gather				
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	Gather				
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	Gather				
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	Gather				
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	Gather				
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	Gather				

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
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	Gather				
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	Gather				
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	Gather				
W330xy	LRC error (D_PT-00, CTL-x, TRNS-y)	An 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	Gather				
W331xy	LRC error (D_PT-01, CTL-x, TRNS-y)	An 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	Gather				
W332xy	LRC error (D_PT-02, CTL-x, TRNS-y)	A LRC error occurred. (D_PORT#2) x : Control Unit# (0-1) y : Transfer direction R: Read direction W : Write direction	Gather				
W333xy	LRC error (D_PT-03, CTL-x, TRNS-y)	A LRC error occurred. (D_PORT#3) x : Control Unit# (0-1) y : Transfer direction R: Read direction W : Write direction	Gather				
W334xy	LRC error (H_PT-02, CTL-x, TRNS-y)	A LRC error occurred. (H_PORT#2) x : Control Unit# (0-1) y : Transfer direction R: Read direction W : Write direction	Gather				

Copyright © 2004, 2005, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
W335xy	LRC error (H_PT-03, CTL-x, TRNS-y)	A LRC error occurred. (H_PORT#3) x : Control Unit# (0-1) y : Transfer direction R: Read direction W : Write direction	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
W3360x	Data transfer check error [SEGPOSERR] (CTL-x)	(Data assurance check) An illegal cache writing segment position was detected.		Gather			
W340xy	LRC error (H PT-00, CTL-x, TRNS-y)	An 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	Gather				
W341xy	LRC error (H PT-01, CTL-x, TRNS-y)	An 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	Gather				
W41000	PIN write error	PIN data were not saved in the Disk Drive since a hardware error occurred.	Gather			① See "2.4 Details of Recovery Procedures".	2.4 (MNTE 02-1360)
W41100	PIN over [PNLEVLOV]	The number of the PIN segments exceeded the threshold value PIN.					
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)				① Install the information for SNMP.	—
W43000	SNMP invalid [RAM Device MAKE ERR]	When SNMP was initialized, making of a RAM device failed.	Gather			① Control Unit of the No. indicated by “Cx” (x: Control Unit#) in the log message.	5.3.5 (MNTE 05-0380)
W43100	SNMP invalid [RAM Device INIT ERR]	When SNMP was initialized, initialization of a RAM device failed.					
W43200	SNMP invalid [RAM Device CREATE ERR]	When SNMP was initialized, generation of a RAM device failed.					
W43300	SNMP invalid [RAM Device WRITE ERR]	When SNMP was initialized, writing in a RAM device failed.					
W43400	SNMP failure [APL ERR]	An application error of SNMP was detected.					

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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	Gather			① y=0 : Return the configuration of Cache memory. (Add cache memory.) y=1 : Perform maintenance described in message code "W0D0x0". 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". y=3 : Perform maintenance described in message code"W0300x", "W0310x",. "W0320x", and "W0330x". y=4 : Perform maintenance described in message code"W0340x". y=5 : Perform maintenance described in message code "W41100".	—
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.				—	—
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.	5.2.2 (INST 05-0090)
W48000	Forced parity correction LU is detected	An LU, which required the forced restoration by means of parity, was detected.				① Refer to " Subsection 2.4.1 (3) Recovery measures ".	2.4.1(3) (MNTE 02-1370)

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Collect the error			Recovery measures	Reference page
			Simple Trace	CTL Trace	Dump		
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 DAMP. 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 DAMP. 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.	—

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.6 Web error messages

Table 2.3.6 Web error messages (Uploading Function)

Message code	Message text	Description	Recovery measures
-	Abnormal End AT xxxx ******** Upload System Error	The number of areas is other than either of one and two.	① Check the system to be installed, and reinstall it. (START600. DAT may be damaged.)
-	Abnormal End Bad Block ID	The block ID is illegal.	① Check the system to be installed, and reinstall it.
-	Abnormal End Bad LBA In START600.DAT 0x******** xxxx	The LBA, in which the installation is to be done, is abnormal because of an illegal contents of the "START600. DAT."	① Check the system to be installed, and reinstall it. (START600. DAT may be damaged.)
-	Abnormal End Config Clear Restart Error by LU Access Restriction	Config clear restart failed due to the LU access restriction.	① Config clear restart cannot be done. Select Take Over from Configuration Clear Mode and restart. However, if “raidvchkset-vg idb” is set from the RAID Manager, “Config Clear” cannot be executed. Release the setting from the RAID Manager by “raidvchkset-vg” requesting it to the user (it cannot be released from the Disk Array Management Program 2).
-	Abnormal End Down Grade Check NG	The downgrade check was not passed.	① You cannot update the microprogram from the current version to the specified version. Refer to the update procedure.
-	Abnormal End Downgrade Failed (The Uploaded Microprogram Does Not Support The Downgrade)	Downgrade in the DF600H chassis failed.	① Execute data transfer after updating to the microprogram with data transfer support (V6.0 or above) in the DF600 chassis.
-	Abnormal End Downgrade Failed (The Installed Microprogram is Incorrect) Uploaded Microprogram Revision:XXXX/X Installed Microprogram Revision:XXXX/X	Downgrade in the DF600H chassis failed.	① Install the DF600 microprogram which has the same system revision with the microprogram in the Disk Drive.
-	Abnormal End Down grade Install NG (Extended Spare HDU is defined)	An extended Spare Disk Drive exists.	① After the subsystem enters the Ready status, cancel all Spare Disk Drives once, define the Spare Disk Drives (15 or less Spare Disk Drives) over again, and perform the downgrade installation.
-	Abnormal End Down Grade Install NG (High-Speed Sequential Write Mode)	Downgrade installation failed because the high-speed sequential write mode was valid.	① The present microprogram version cannot be updated to the specified microprogram version. Check the work procedure.
-	Abnormal End Down Grade Install NG (installing unsupported microprogram)	The downgrade was installed in the unsupported microprogram of the CTL operating in the RKL.	① The downgrade cannot be installed in the microprogram under V9.0.
-	Abnormal End Down Grade Install NG (Ownership Change by LU)	An update installation for downgrading the microprogram to that of the Rev. 0652 or earlier was executed, but the installation failed because the execution of downloading for each LU was not supported yet.	① You cannot update the microprogram from the current version to the specified version. Refer to the update procedure.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text	Description	Recovery measures
-	Abnormal End Down Grade Install NG (QuickShadow and FlashAccess are Both Valid)	QuickShadow and FlashAccess operate at the same time.	① After the subsystem becomes ready, lock Quickshadow or FlashAccess following the manual. Reboot while it is locked and downgrade by changing it to the maintenance mode after the subsystem becomes ready.
-	Abnormal End Down Grade Install NG (Unsupported Unit is Connected)	The downgrade installation of the microprogram, which did not support the S-ATA disk array unit, was interrupted.	① Install the microprogram that supports the S-ATA disk array unit, or install the microprogram that does not support the S-ATA disk array unit after removing the S-ATA disk array unit from the configuration.
-	Abnormal End Drive Block Size Error AT CDEV **	The drive block size is other than 520 bytes.	① Replace a disk drive whose unit ID number is 0 and disk drive number is **.
-	Abnormal End Empty System Retry Full Install	The update installation could not be done because no existing system was found.	① Make sure that the status of system copy complete by "Information Message" window in the WEB window. If it has been in the middle of system copy, please reboot the Disk Array Subsystem. Then wait until system copy which is restarted after the status of Disk Array Subsystem becomes ready is completed and update installation of microprogram. ② When the normal completed of system copy, please execute the initial setting up.
-	Abnormal End File Open Error	File open error	① Make sure of the system you want to install and execute the installation again.
-	Abnormal End File Read Error	File read error	
-	Abnormal End File Remove Failed	File elimination error	① Execute the utility program load after restarting the subsystem.
-	Abnormal End Install Failed	All the drives became abnormal after the installation had been completed.	① Make sure of the system you want to install and the system drive, and then execute the installation again.
-	Abnormal End Initial Setup Error by LU Access Restriction	Initial Setup failed due to the LU access restriction.	① Initial Setup cannot be done. Execute update installation for updating the microprogram. However, if “raidvchkset-vg idb” is set from the RAID Manager, “Initial Setup” cannot be executed. Release the setting from the RAID Manager by “raidvchkset-vg” requesting it to the user (it cannot be released from the Disk Array Management Program 2).
-	Abnormal End Initial Setup Error (installing unsupported microprogram)	The Initial Setup was performed in the unsupported microprogram of the CTL operating in the RKL.	① The Initial Setup cannot be performed in the microprogram under V9.0.
-	Abnormal End Initial Setup Error (Unsupported Unit is Connected)	The initial setting up of the microprogram, which did not support the S-ATA disk array unit, was interrupted.	① Install the microprogram that supports the S-ATA disk array unit, or install the microprogram that does not support the S-ATA disk array unit after removing the S-ATA disk array unit from the configuration.
-	Abnormal End Initial Setup of Microprogram Failed	Initial Setup was done when the installation check on the microprogram for DF600 was “Disable”.	① Execute installation after changing the installation classification to “Update”.
-	Abnormal End Loop Error	A loop failure occurred.	① Execute the installation again after making sure of the ENC and the loop.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Recovery measures
-	Abnormal End No Drives Available	No normal drive is available.	① Replace the system drive.
-	Abnormal End PGMS **** Too Large	The program size is larger than the allowable limit.	① Make sure of the system you want to install and execute the installation again.
-	Abnormal End Program extract error	Utility program decompression error	① Specify a normal utility program and re-execute the utility program load.
-	Abnormal End Program SUM check error	Sum check error of the utility program that has been decompressed	
-	Abnormal End Unknown Drive AT CDEV **	The system area capacity is larger than the drive capacity.	① Replace a disk drive whose unit ID number is 0 and disk drive number is **.
-	Abnormal End Upgrade Failed (The Installed Microprogram is Incorrect) Uploaded Microprogram Revision:XXXX/X Installed Microprogram Revision:XXXX/X	Upgrade from DF600 to DF600H failed.	① Install the DF600H microprogram which has the same system revision with the DF600 microprogram.
-	Abnormal End Upgrade Failed (The Uploaded Microprogram Does Not Support The Upgrade)	Upgrade from DF600 to DF600H failed.	① Execute data transfer after updating to the microprogram with data transfer support (V6.0 or above) in the DF600 chassis.
-	Abnormal End Upload File SUM Check Error	Read file sum check error	① Make sure of the system you want to install and execute the installation again.
-	Abnormal End Upload System Error	The "PRGMAG. DAT" file does not exist. The "START600. DAT" file does not exist. The "END DAT" file does not exist. The file required does not exist.	① Make sure of the system you want to install and execute the installation again.
-	Cannot Execute Upload	Java Applet cannot be activated.	① Check if the Java Plug-in is installed. ② Check 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. ④ Check if the (NN) Java plug-in setting is valid.
-	Complete MICRO REV:065*/*	The installation was completed normally.	-
-	Complete Utility Program REV:	The utility program load was completed.	-
-	Drive firmware download start	The drive firmware (microprogram) downloading of the firmware was started.	-
-	Drive mode parameter change & format start	A drive parameter change and formatting were started.	-
-	Drive mode parameter change start	A drive parameter change was started.	-
-	ENC microprogram download start	A microprogram downloading for replacing the microprogram was started.	-
-	File open error [file name]	File open error	① Make sure of the system you want to install.
-	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	

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Recovery measures
-	Install revision	Display of a revision of the installed program	-
-	Initial Setup (Config and System Parameter Clear) Install Microprogram Rev.065*/*	Make sure that the initial setting up has been done.	-
-	Microprogram download ENC#	Microprogram replacement was started. [ENC number]	-
-	Micro Update Install Microprogram Rev.065*/*	Make sure that the update installation of the microprogram has been done.	-
-	Old System Exists	A system had already been installed when an installation of a new system was attempted.	-
-	Partially Completed MICRO REV:065*/*	The installation was terminated abnormally.	① Refer 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.	① Reset the system parameters. If the trouble recurs, replace the system drive.
-	Target HDU not found	The target HDU is not found.	① Make sure of the drive to be rewritten.
-	Utility Load Utility Program Rev.655*/*	Make sure that the utility program has been loaded.	-
1003	Cannot Upload File.	Write error of the RAM disk.	① Perform 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.)	① Reload the page. ② If 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.	① Operate over again after waiting for a while.
1006	System is Executing Other Event.	The subsystem is already executing the process.	① Make 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.	① Reload the page.
1008	System is Down.	The subsystem cannot execute the process (it has gone down).	① Perform the operation over again from the software reset.
1009	Please. Retry Again.	The subsystem stands ready to start the microprogram installation.	① Install the microprogram over again.
1010	Please. Retry Again on Other CTL.	Have the CTL 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 Check if the specification is correct and if the designated file exists. ② Check if the microprogram to be installed is that fits this subsystem.
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.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text	Description	Recovery measures
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.	① Check if the specification is correct.
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.	① Set up the service PC again.
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.	① Set up the service PC again.
1217	A security wrong matter occurred. Confirm the setup of the security policy.	A security trouble occurred.	① Set up the service PC again.
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.	① Make 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 an I/O operation to/from the subsystem.	① Make 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.	① Specify 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.	① Specify 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.	① Specify the path to the drive firmware program.
1223	A HTTPClient library isn't found. Confirm the execution environment.	The HITTPClient library is not found.	① Activate the browser again after setting up the service PC, and then re-execute the microprogram installation.
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.	① Specify the path to the ENC microprogram.
2000	File upload was cancelled.	The installation of the file was interrupted (artificially).	① Re-execute the installation after activating the browser again.
2001	Microprogram installation was cancelled.	The installation of the microprogram was interrupted (artificially).	① Re-execute the microprogram installation after activating the browser again.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

Table 2.3.7 Web error messages (Simple Trace)

Message code	Message text	Description	Recovery measures
-	Executing [Simple Trace]	The simple trace is already being executed.	① 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	① Retry after making sure of the subsystem status.
-	Simple trace failed	The simple trace could not be executed because the subsystem status was abnormal.	① Make sure of the subsystem status.
-	Simple trace interrupt	The simple trace was interrupted (because the automatic dump operation was done).	① Perform maintenance after making sure of the subsystem status.

Table 2.3.8 Web error messages (Web Control Management)

Message code	Message text	Description	Recovery measures
-	Booting. Please Retry Again.	A boot is in progress.	① Retry after making sure of the subsystem status.
-	CTL Alarm.	CTL detachment	① Replacing the Control Unit.
-	Executing [Simple Trace]	The simple trace is being executed.	① Retry after making sure of the subsystem status.
-	"Invalid machine status."	Illegal status	① Restart the subsystem.
-	Invalid Parameter.	When the restriction placed on inputting is not followed.	① Reset the parameter.
-	Not Ready	When the drive separating function exclusive check and the trace collection check are abnormal.	① Retry after making sure of the subsystem status.
-	Subsystem is Executing Other Event. [OWN]	The process is being executed in the self system.	① Retry after making sure of the subsystem status.
-	"Web Task" is executing other request.	The Web task is executing another request.	① Retry after making sure of the subsystem status.
-	Web Task Booting..	The Web task is being booted.	① Retry after making sure of the subsystem status.
-	Web Task Down!	The Web task cannot be executed.	① Restart the subsystem.
1003	Cannot Upload File.	Write error of the RAM disk	① Perform 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.)	① Reload the page. ② If 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.	① Operate over again after waiting for a while.
1006	System is Executing Other Event.	The subsystem is already executing the process.	① Make 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.	① Reload the page.
1008	System is Down.	The subsystem cannot execute the process (it has gone down).	① Perform the operation over again from the software reset.
1009	Please. Retry Again.	The subsystem stands ready to start the microprogram installation.	① Install the microprogram over again.
1010	Please. Retry Again on Other CTL.	Have the CTL 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.

Copyright © 2004, 2005, Hitachi, Ltd.

2.3.7 Disk Array Management Program error messages

Table 2.3.9 Disk Array Management Program error messages

Message code	Message text/Recovery measures
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 specified 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	An e-mail information cannot be saved. Please check the permission and available capacity of the install directory.
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.
DMEA001017	An error occurred during the file I/O. Confirm the status of the specified file.
DMEA001018	Invalid disk directory path order. Confirm the disk directory path order.
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: DAMP_ROOT_DIR_PATH is not defined. Specify DAMP_ROOT_DIR_PATH.
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.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
DMEA001028	Failed to restart the subsystem.
DMEA001029	Environment variable: DAMP_ROOT_DIR_PATH does not match. Confirm DAMP_ROOT_DIR_PATH.
DMEA00102A	The JRE (Java Runtime Environment) version in use is not supported. Confirm the JRE version.
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.
DMEA001043	The parameter for RS232C Error Information Outflow Mode, 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.
DMEA00104C	The parameter for FD Back UP, or the item name 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.
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	The Disk Array Management 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	Can't 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 on the Manager. Please check the permission and available capacity of the install directory.
DMEA00107C	The micro program is not read on the Manager.
DMEA001080	Can't set the LU mapping in case of mapping mode is off.
DMEA001081	Failed to get drive information.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
DMEA001082	The parameter for Additional Battery Unit Mode or the item name is invalid.
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 Management 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.
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.
DMEA00112A	The hardware configuration of the subsystem differs from the configuration in the input file. Confirm the subsystem status and try again.
DMEA00112B	The specified port is not available because it is physically unequipped. Confirm the port status and try again.
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 more than current value.
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 on the Manager. Please check the permission and available capacity of the install directory.
DMEA001138	The ENC micro program is not read on the Manager.
DMEA001139	The ENC micro program for the specified subsystem is not read on the Manager.
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 for the array unit name or group name is incorrect.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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.
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	Delete file path name is over 250 characters. A path name is made into 250 or less characters and then try again.
DMEA001157	The monitoring data cannot be read because the data version is new. Confirm the Disk Array Management Program version 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.
DMEC002000	Cannot write the directory specified DAMP_ROOT_DIR_PATH.
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	Can't use this command for the specified device.
DMEC002029	Can't 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.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 information 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 the subsystem.
DMEC002058	The process cannot be performed because no logical units 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.
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.
DMEC002064	The process cannot be performed because the Multiple Stream Mode of system parameter is disabled. Please set the Multiple Stream Mode to enable then 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 FlashAccess function cannot be used because it is not installed, locked, or disabled.
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.
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. Define the 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.
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.
DMED02000B	The process cannot be performed because the Multiple Stream Mode of system parameter is disabled. Please set the Multiple Stream Mode to enable then 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.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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. NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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. NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
DMED050001	The process cannot be performed because the specified LU is in a PIN exceeded state. Restore PIN data and try again.
DMED050002	The process cannot be performed because another LU is changing the Default Controller. Wait for a while and then try again.
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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.
DMED070001	Cannot set dual ID success because either mounted numbers or types of the host interface boards are different between controllers. Confirm the interface boards status and try again.
DMED070002	The specified IP address is incorrect. Please specify a right IP address.
DMED070003	The specified default gateway address is incorrect. Please specify a right default gateway address.
DMED070004	The High-speed Sequential Write Mode cannot be disabled because process of Write command from the hosts is not completed. Please wait for a while and then try again, or use the system parameter setting with reboot.
DMED070005	The Multiple Stream Mode and the High-speed Sequential Write Mode cannot be specified at the same time.
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.
DMED080001	The data pool cannot be used. Please restart the subsystem.
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.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 QuickShadow pair. Cancel the QuickShadow 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.
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 QuickShadow pair exists in the specified data pool. Cancel the QuickShadow 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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.
DMED080022	The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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.
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.
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 QuickShadow pair. Cancel the QuickShadow pair and try again.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 QuickShadow 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 QuickShadow pair reached the maximum. Delete unnecessary QuickShadow 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 under 1GB.
DMED09001E	The process cannot be performed because a management area of QuickShadow is shortage. Delete unnecessary QuickShadow 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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.
DMED090021	The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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.
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.
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 performing. Please wait a moment and then try again.
DMED0A0008	The process cannot be performed because QuickShadow is performing. 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 QuickShadow pair is not PSUS. Please retry after changing the status of pair.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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.
DMED0D0001	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.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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.
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, then try again.
	NOTE : If "raidvchkset-vg svd" and "raidvchkset-vg idb" are set from the RAID Manager, the LU operation (deletion of LU, etc.) cannot be performed from the Disk Array Management Program 2. Release the setting from the RAID Manager by "raidvchkset-vg" requesting it to the user (it cannot be released from the Disk Array Management Program 2).
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.
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.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
DMED130001	The process cannot be performed because the path is not set up.
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.
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.
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 QuickShadow. 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 process cannot be performed because the specified logical unit contain a blocked drive. Confirm the drive status and try again.
DMED400007	The process cannot be performed because ShadowImage, TrueCopy, or QuickShadow 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. It is completed and try again.
DMED400012	The process cannot be performed because parity correction is not executed or is aborted. It is completed and try again.
DMED400013	The process cannot be performed because parity correction is not completed. It is completed and try again.
DMED400014	The process cannot be performed because parity correction is not completed. It is completed and try again.
DMED400015	The process cannot be performed because parity correction is not executed or is aborted. It is completed and try again.
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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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.
DMES000000	Please retry.
DMES010200	Please retry.
DMES010600	Please retry.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 is required to confirm a setup.
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	Please retry.
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 the subsystem, then try again.
DMES029501	The process cannot be performed because the subsystem is under shutdown. Please restart the subsystem and then try again.
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.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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.
DMES04A000	Please retry.
DMES04E400	Please retry.
DMES04EA01	Please retry.
DMES04EA02	Please retry.
DMES04EA10	An error was detected in microprogram downgrade check. Please retry by using another microprogram.
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.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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.
DMES052000	Please retry.
DMES052100	Please retry.
DMES052400	Please retry.
DMES052500	The process cannot be performed because no LU exists. Retry after setting LU0.
DMES052580	Failed to allocate LU. Confirm the specified value.
DMES052581	The RAID group is not defined. Please specify an existing RAID group.
DMES052583	The FlashAccess 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.
DMES059521	Change in HotStandbyMode from DualActiveMode and change in DualActiveMode from HotStandbyMode cannot be performed because the PIN exceeded state. Restore PIN data and try again.
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.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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.
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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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 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.
DMES059615	The process cannot be performed because the specified logical unit is a part of QuickShadow pair. Cancel the QuickShadow 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.

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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.
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 microprogram downgrade check. Please retry by using another microprogram.
DMES05EA12	It is impossible to change from the 128LU version microprogram to the 64LU version microprogram.
DMES05EA14	The micro program cannot be downgraded because the High-speed Sequential Write Mode is enabled. Please set the High-speed Sequential Write Mode to disable then try again.
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 because the 16 or more spare drives are set up. Please set spare drives equal to or less than 15 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 QuickShadow and FlashAccess are unlocked together or not restarted the subsystem after locked. Please lock either option and restart the subsystem, and then 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.
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.

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Message code	Message text/Recovery measures
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 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.

Copyright © 2004, 2005, Hitachi, Ltd.

2.4 Details of Recovery Procedures

2.4.1 Recovery measures

Table 2.4.1 shows error recovery methods(‡1). Errors are classified into power-on errors, operation errors, data recovery errors, and power-off errors.

Table 2.4.1 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.	MNTE 02-1570
2		POWER LED on the subsystem lighted off because a Drive short-circuit failure (on the Basic Chassis or the Additional Chassis) occurred.	MNTE 02-2320
3	The subsystem does not become ready.	A loading of information from a Disk Drive failed.	MNTE 02-1363
4		User data was lost because Cache memory was volatile. (Forced parity correction (*1)) When the WARNING LED blinks before the subsystem enters the Ready status in the case where the subsystem is not in the environment with the connectable WEB, the forced parity recovery is done when the buzzer switch is pressed.	MNTE 02-1364
5		POWER LED on the subsystem lighted off because a Drive short-circuit failure (on the Basic Chassis or the Additional Chassis) occurred.	MNTE 02-2320
6	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).)	MNTE 02-1370
7	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.)	MNTE 02-1410
8		An attempt was made to save PIN data to the Disk Drive during planned shutdown but failed because a hardware error occurred.	MNTE 02-1440
9		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.	MNTE 02-1460
10		Planned shutdown cannot be performed because PIN data cannot be saved due to a Cache memory error, etc.	MNTE 02-1480
11	Data recovery does not terminate normally.	Forced recovery was performed because a RD error occurred in the copy source during a correction copy.	MNTE 02-1500
12		Data recovery terminated abnormally because a Disk Drive error occurred in the copy source during a correction copy.	MNTE 02-1510
13		Data recovery terminated abnormally because a Spare Disk error occurred during a copyback.	MNTE 02-1520

*1 : When user data is lost because of volatilization of data in the cache memory, restore it in the procedure given in Item (4) when the microprogram version is earlier than x657 or Item (6) when the version is x657 or later.

‡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.)

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Classification	Description	Reference page
14	A failure occurred during operation.	The number of PIN segments exceeded its threshold value.	MNTE 02-1530
15		Data containing a LA/LRC error was detected.	MNTE 02-1550
16		Actions to be taken when a LU blockade occurs.	MNTE 02-1580
17		A loop failure occurred, however, the failed part cannot be located.	MNTE 02-1590
18	QuickShadow failure occurred.	When QuickShadow is restored, a write error was recorded to the primary VOL to be copied since the unreadable area exists on the pool side.	MNTE 02-1979

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

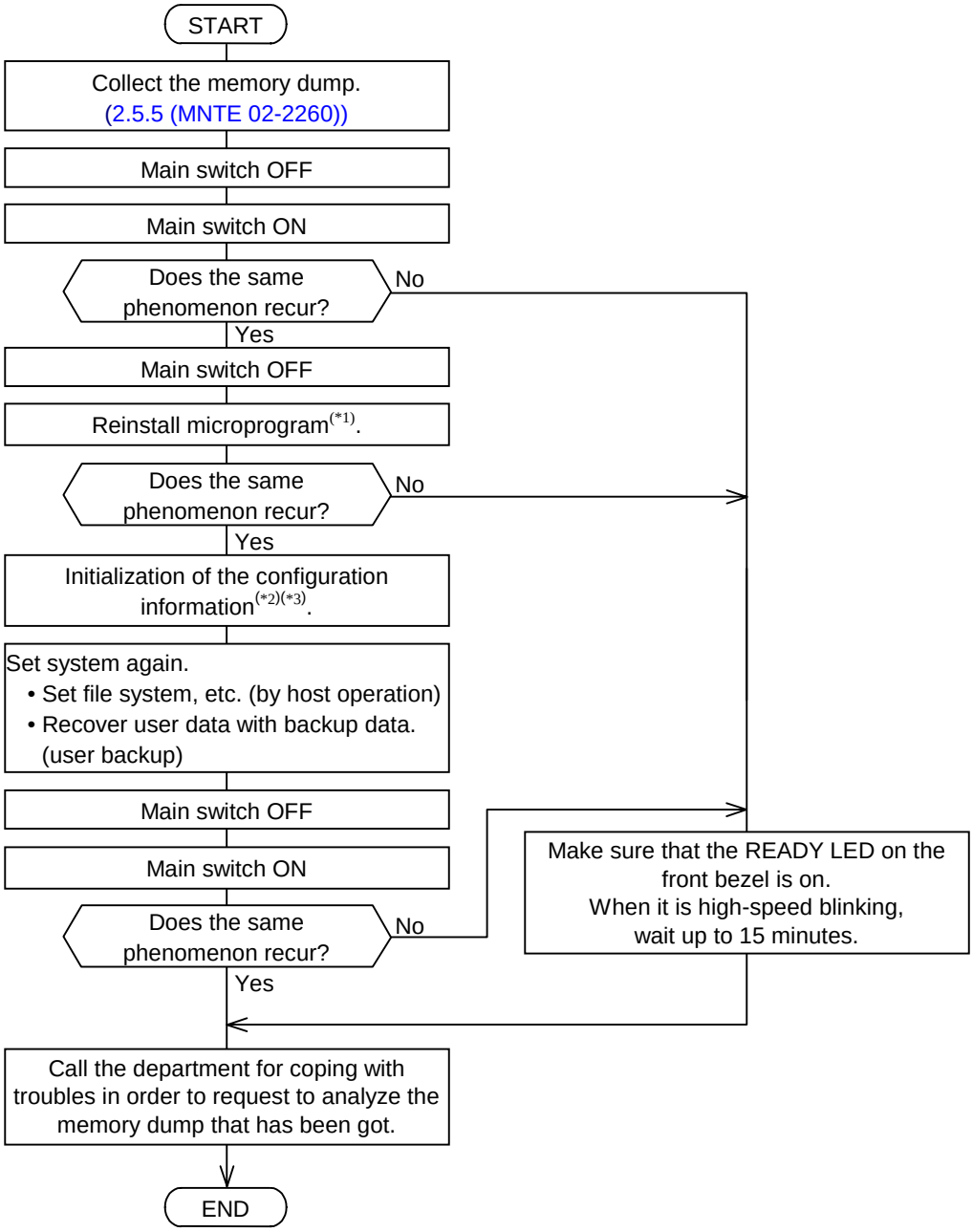
(1) The PS cannot be turned on : Case 1
(Information could not be loaded from the Disk Drive.)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx RB8400 Download fail :MANUAL

Date Time Detect Controller#

[Recovery measures]



*1 : For the installation procedure of the microprogram, see "Chapter 6 Update Installation Microprogram" (MNTE 06-0000).

*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, see "2.4.2 Initialization procedure for configuration information" (MNTE 02-1980).

Copyright © 2004, 2005, Hitachi, Ltd.

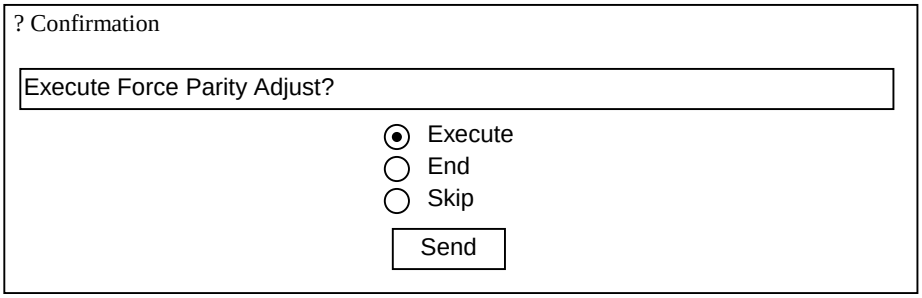
(2) The PS cannot be turned on : Case 2 (forced parity correction)
(User data was lost because Cache memory was volatile.)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W12000 User data lost :MANUAL/STRC
Date Time Detect Controller#

[Display of the WEB main window] (For the connection of the Web, refer to Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.)

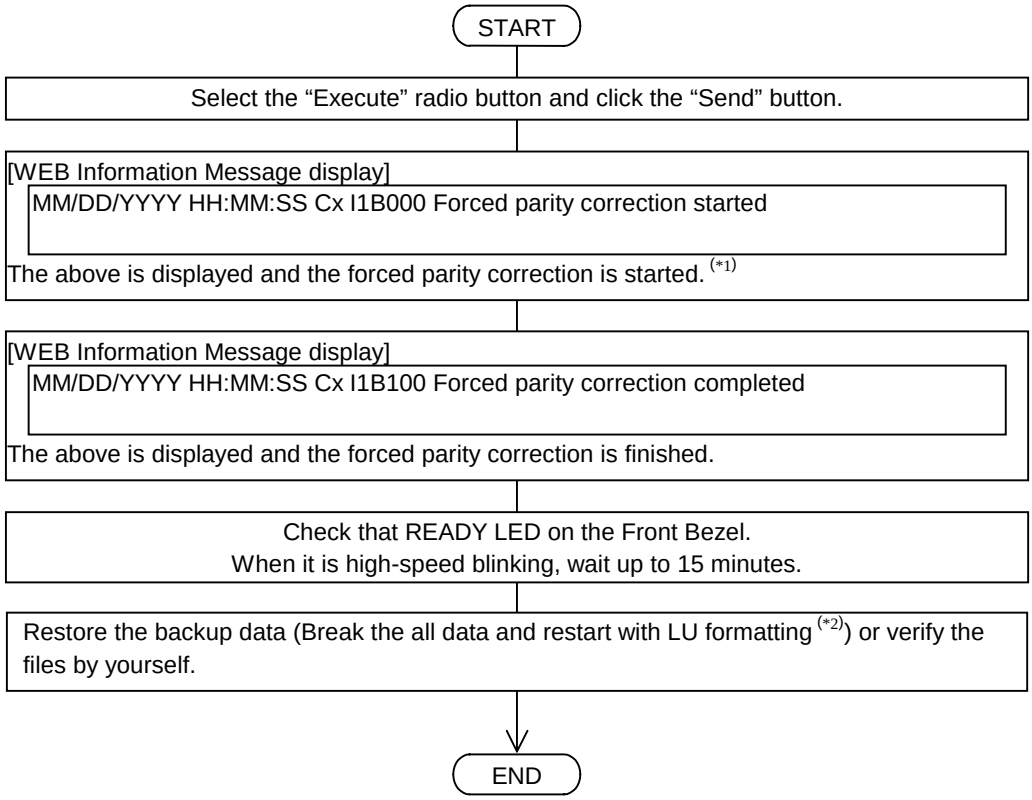
The following questions are displayed on the main window.
These questions are displayed on only the master controller in the dual system mode.
The master Controller is Controller#0 usually. If Controller#0 is blocked and the Controller in the hot replacement mode is replaced, the master Controller may be Controller#1, however.
If the Controller#0 (or Controller#1 when Controller#0 is blocked) is connected to the WEB first and above "WEB Information Message" window is displayed but the following questions are not displayed on the main window, the master Controller has been changed. In this case, connect Controller#1 to the WEB.



Copyright © 2004, 2005, Hitachi, Ltd.

[Recovery measures]

1. Execute the forced parity correction.
   To execute the forced parity correction means to match the data in the Disk Drive to each other and the data cannot be recovered completely by executing it.
   After the following operation, restore the backup data.

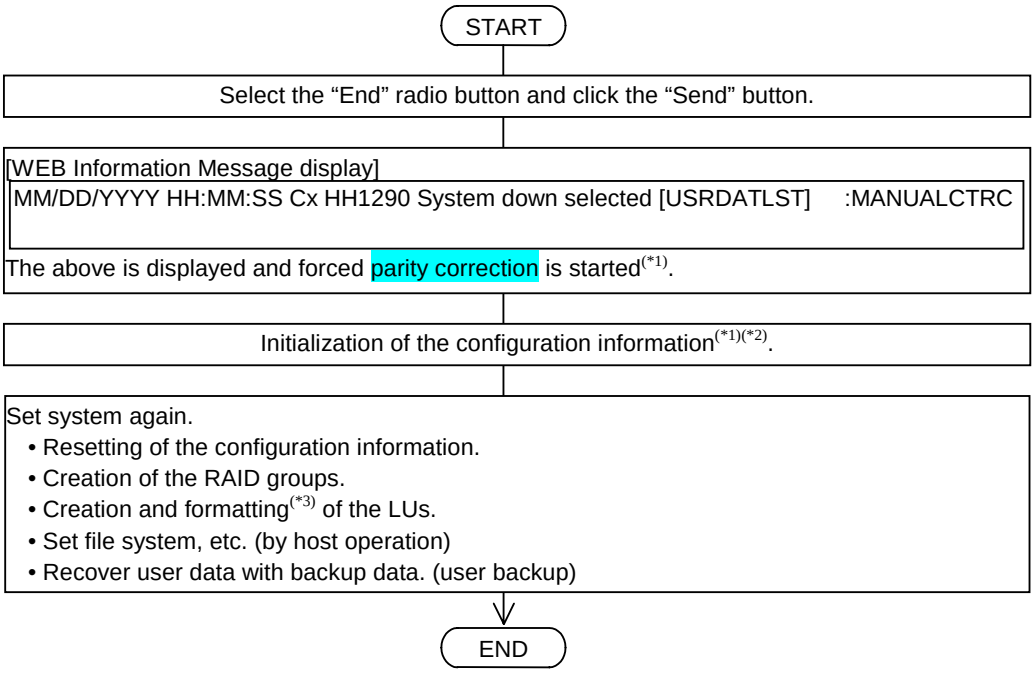


*1 : For a standard time required for the forced parity correction, refer to Table 5.1.1, “Standard Time Required for the Forcible Parity Recovery or an LU Formatting” on page MNTE 05-0061.

*2 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, “Formatting LU” (on page INST 05-0650) in Subsection 5.4.3, “Setting of LU” of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

2. Executing no forced parity correction. (System down)

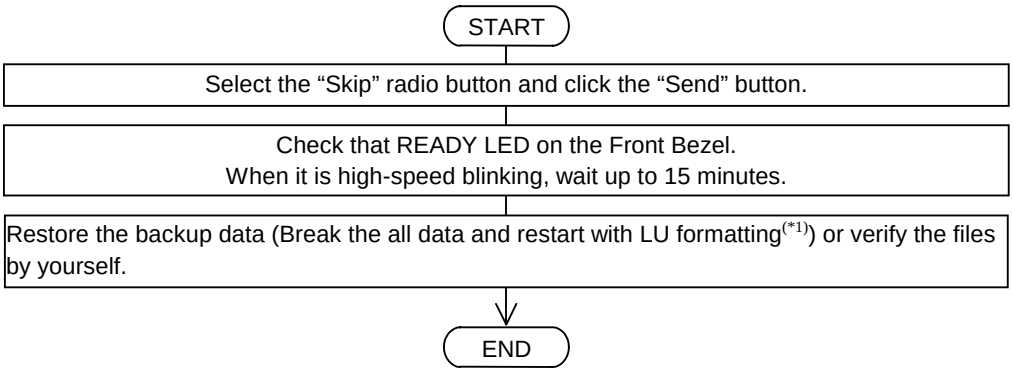


*1 : When this operation is performed, data on the Disk Drive is all erased (the RAID group and LU definition are initialized).

*2 : For the initialization of the configuration information, refer to Subsection 2.4.2, “Initialization procedure for configuration information” (MNTE 02-1980). But, if there is a LU whose access attribute is set by Open LDEV Guard, initialization of configuration information is not possible. Therefore, forced parity correction must be done.

*3 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, “Formatting LU” (on page INST 05-0650) in Subsection 5.4.3, “Setting of LU” of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

3. Do not execute the forced parity correction (Skip the forced parity correction).

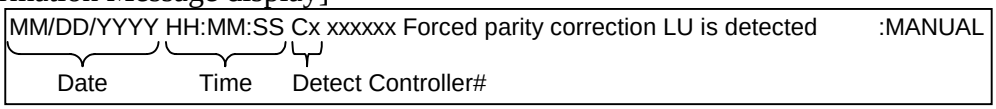


*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, “Formatting LU” (on page INST 05-0650) in Subsection 5.4.3, “Setting of LU” of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

(3) 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]



< 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.

< Notes on making forced parity correction >

- Disk Array Management Program Version 9.40 or later is required to make the forced parity correction. The restoration is made using the maintenance function of Disk Array Management Program. For the procedure concerned, refer to Subsection 4.2.4, “Displaying Logical Unit Failure Data Information” on page MNTE 04-0290.
- For a failure of a part other than the drive that occurs during forced parity correction, refer to Section 5.2, “Locations of Replacement Components” on page MNTE 05-0080. For a drive failure, refer to Subsection 5.3.1, “Replacing Disk Drive” on page MNTE 05-0120.
- The dynamic sparing cannot be instructed in the Disk Array Management Program 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 Disk Array Management Program 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 Disk Array Management Program 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” (MNTE02-1405). Also, for the standard time required for the recovery, refer to “Standard time required for the forced parity correction” (MNTE02-1407).
- 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 (see MNTE 02-1393).

Copyright © 2002, 2005, Hitachi, Ltd.

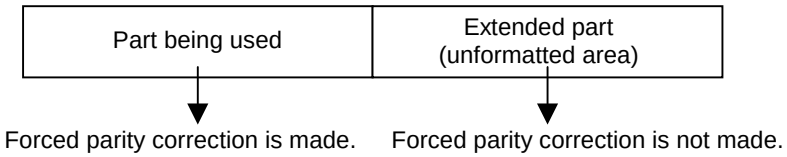
- If the data on the Cache memory is volatilized due to a power failure within one minute after performing the following work, all LUs may be required for the forced parity correction.
  ① The configuration setting in the Disk Array Management Program (LU formation, LU mapping, etc.)
  ② The pair operation by RAID Manager
- If the data on the Cache memory is volatilized due to a power failure within one minute after performing the configuration setting in the Disk Array Management Program (LU formation, LU mapping, etc.), the set information may not be reflected. Check the configuration. When a power failure occurs, be sure to check the configuration. If the configuration is not reflected, execute the configuration setting again.

(a) Data reading/writing instructed by a host

- An LU, a status of which concerning the forced parity correction is "Being Restored" or "On standby", can be instructed by a host to be read or written, however, performance of the host I/Os may be lowered because the forced parity correction is in progress.
- 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.

(b) The relation between the forced parity correction and the format

- For the expanded part (unformatted area) of the expanded LU, the forced parity correction is performed only for the used part of the expanded LU.



In this case, make the forced parity correction again after formatting the extended part.

- If the LU in the forced parity correction exists, the multiple format cannot be performed for other LUs.

Copyright © 2004, 2005, Hitachi, Ltd.

(c) 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		
		Parity correcting / Waiting parity correction	Uncorrected / Correction aborted	Skip / Restored
1	The delete of LU	×	×	○
2	LU Extension	×	×	○
3	LU Unification	×	×	○
4	LU Invalidate	×	×	○
5	LU Splitting	×	×	○
6	The change of the controller in charge of a default LU	○	○	○
7	Instruction to make an LU resident	○	○	○
8	LU mapping	○	○	○
9	Setting a prefetch size	○	○	○
10	ShadowImage pair formation	○(*1)	×	○
11	ShadowImage pair restoration	○(*2)	×	○
12	TrueCopy pair formation	○(*1)	×	○
13	TrueCopy pair restoration	○(*2)	×	○
14	QucikShadow pair formation(*3)	○	×	○
15	QuickShadow pair restoration(*4)	×	×	○
16	Command device registration	○	×	○
17	Ordinary format	×	×	○
18	Batch format	×	×	○
19	LUN security setting	○	○	○
20	LUN Management setting	○	○	○
21	Password protection	○	○	○
22	Quick format instruction	×	×	○
23	Hot replacement of the microprogram	×	×	○
24	Pseudo deliberate shutdown	○	○	○
25	Open LDEV Guard	○	○	○
26	Instruction to make forced parity correction	×	○	○
27	Instruction to skip forced parity correction	×	○	○
28	Instruction to abort forced parity correction	○	×	×
29	The delete of RAID Group	×	×	○
30	Hi-Copy pair formation	×	×	○
31	Hi-Copy pair restoration	×	×	○

*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.

Copyright © 2004, 2005, Hitachi, Ltd.

- In contrast with the above, instructions to make the forced parity correction are partially restricted while the other function is operating.

No.	Function in operation	Possibility of forced parity correction	Description
1	Extension LU	Partially impossible	Unformatted part that has been extended is excluded.
2	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.
3	Invalidate LU	Partially impossible	Only the skip can be instructed for the invalidated LU.
4	Splitting LU	Impossible	The instruction to make the restoration cannot be issued because an LU becomes unformatted after it is split.
5	Normal format reception	Impossible	An instruction to make the restoration cannot be issued to an LU being formatted.
6	Batch format reception	Impossible	An instruction to make the restoration cannot be issued to an LU being formatted.
7	Quick Format instruction	Impossible	An instruction to make the restoration cannot be issued to an LU being formatted.
8	Microprogram hot replacement	Impossible	An instruction to make the parity correction cannot be issued during replacement of the microprogram.
9	Pseudo deliberate shutdown	Impossible	An instruction to make the restoration cannot be issued because the disk array subsystem is shut down deliberately.

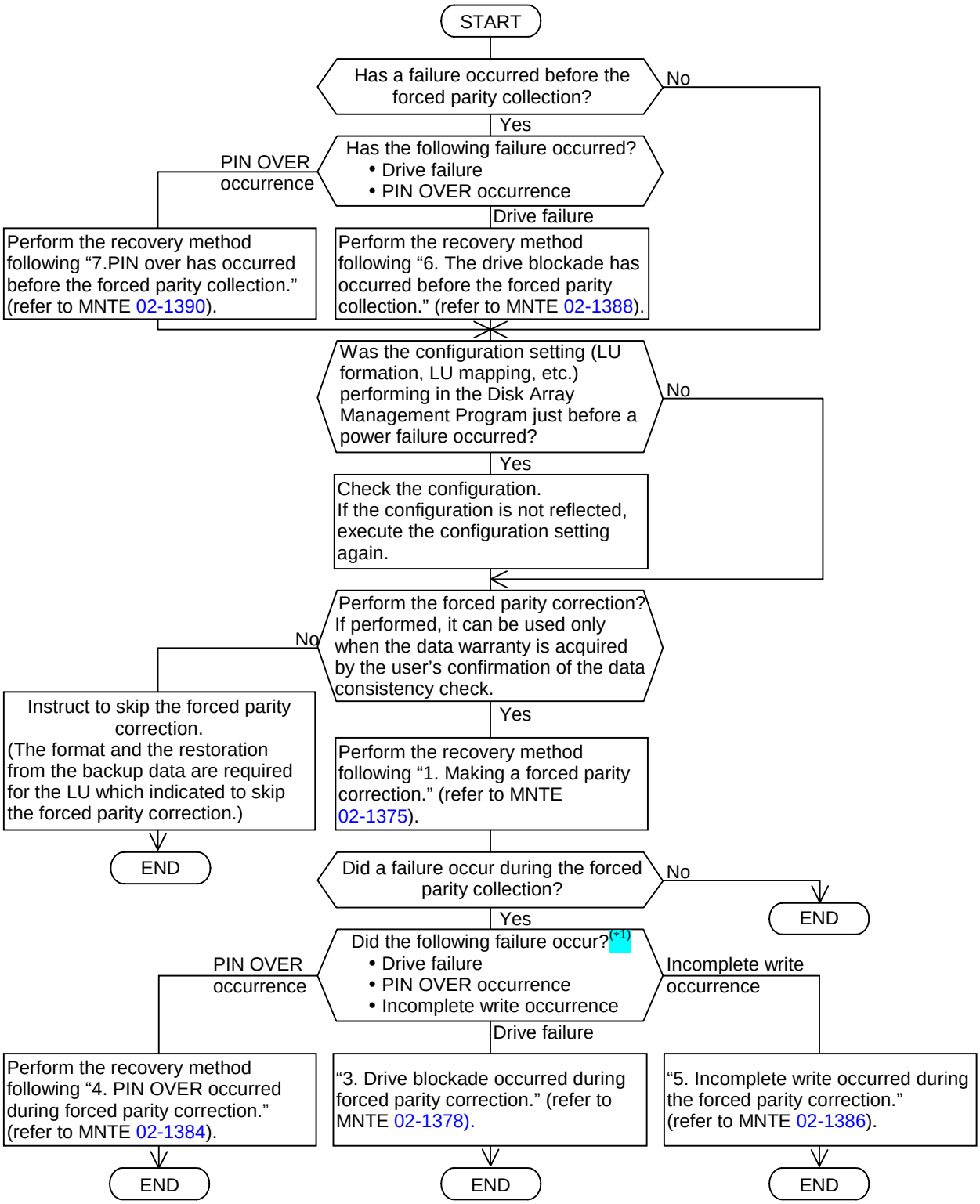
(d) Process of forced parity correction

- If data in the cache memory volatilizes again because the subsystem is powered off without execution of the deliberate shutdown when a power failure, etc. occurs, all the LUs are restored by 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. When the failed Control Unit is recovered, it makes the parity correction.

Copyright © 2004, 2005, Hitachi, Ltd.

< Forced Parity Collection Maintenance Flow >

Perform the maintenance operation for the forced parity collection following the flow shown below.

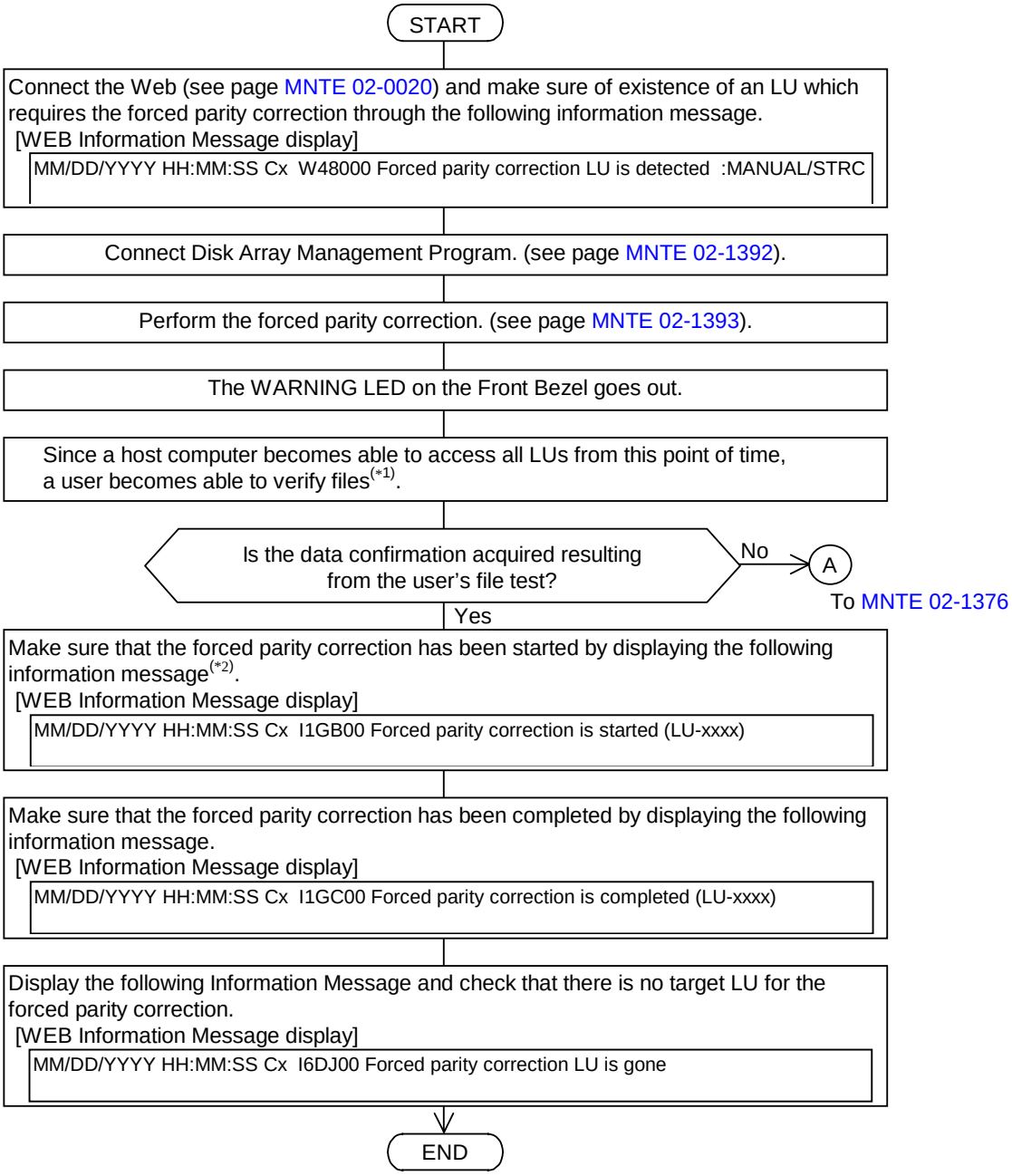


*1 : When the LA/LRC error was occurred, instruct the LU in the "Uncorrected 2" status to skip the parity correction using Disk Array Management Program. In the next, perform the backup restoration (Cancel all the data and retry from the LU format.).

Copyright © 2004, 2005, Hitachi, Ltd.

[Recovery measures]

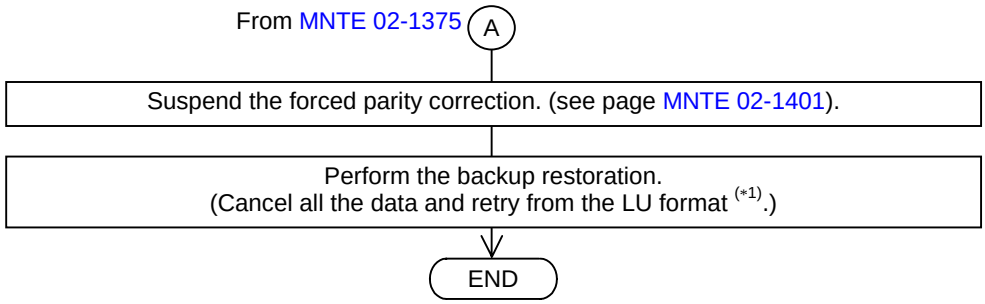
1. Making a forced parity correction.
   The forced parity correction resynchronizes data in Disk Drives, however, it cannot restore the data completely. Ask a user to verify the data and restore data that could not be restored using the backup data.



*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 Item 3, "Drive blockade occurred during the forced parity correction." (on page MNTE 02-1378), Item 4, "PIN OVER occurred during forced parity correction." (on page MNTE 02-1384), or Item 5, "Incomplete write occurred during the forced parity correction." (on page MNTE 02-1386).

*2 : For a standard time required for the forced parity correction, refer to "Standard time required for the forced parity correction" (on page MNTE 02-1407).

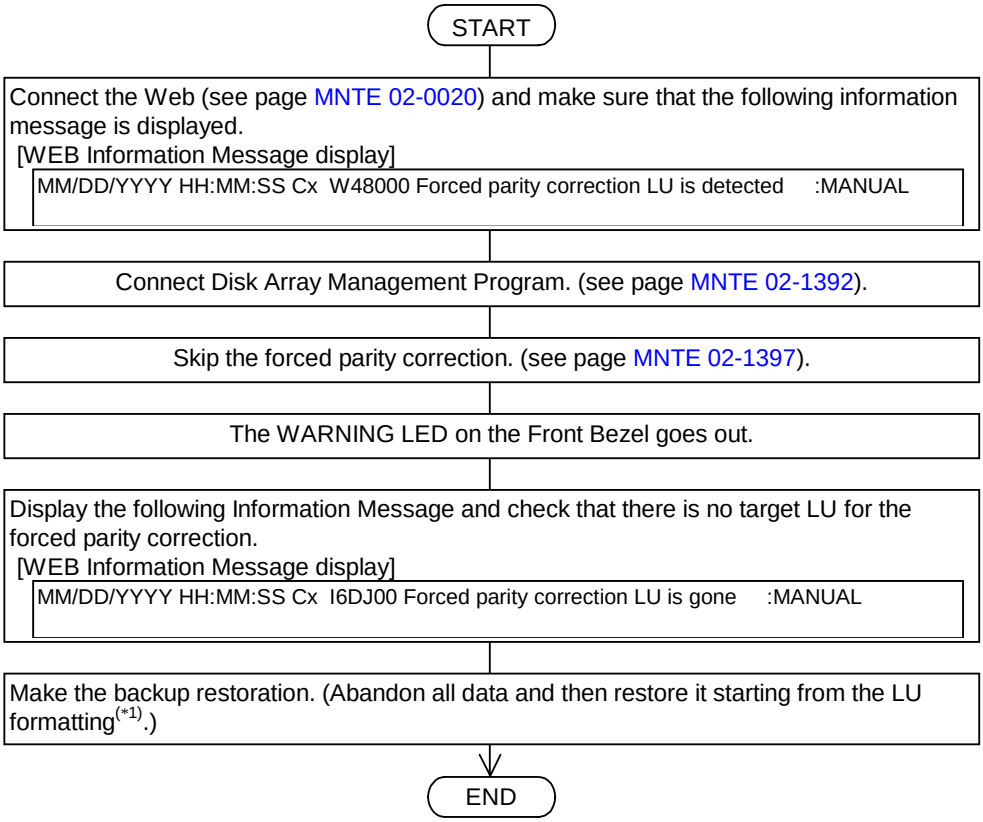
Copyright © 2004, 2005, Hitachi, Ltd.



*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

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 Disk Array Management Program, format the LU, and then make a backup restoration.



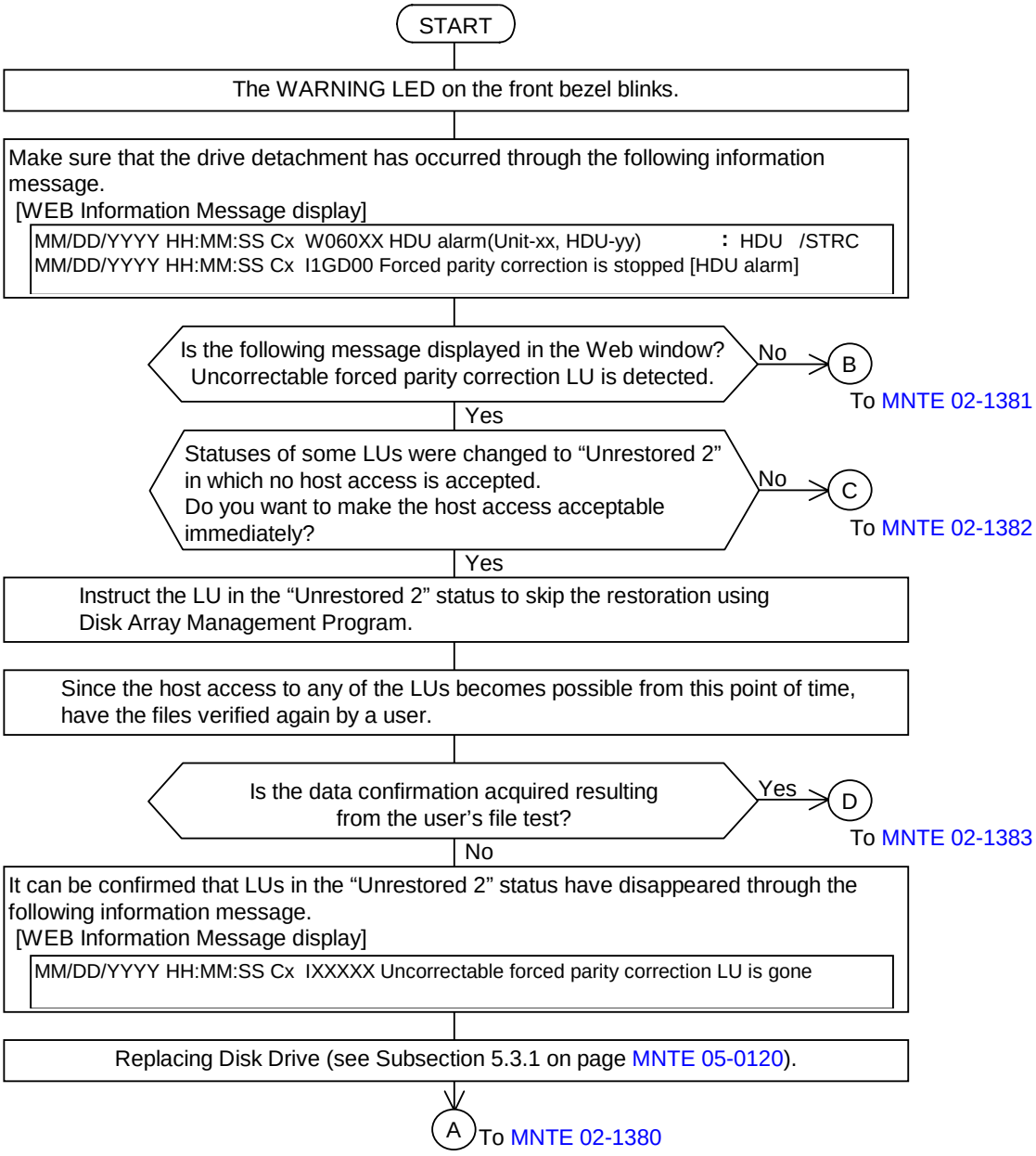
*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

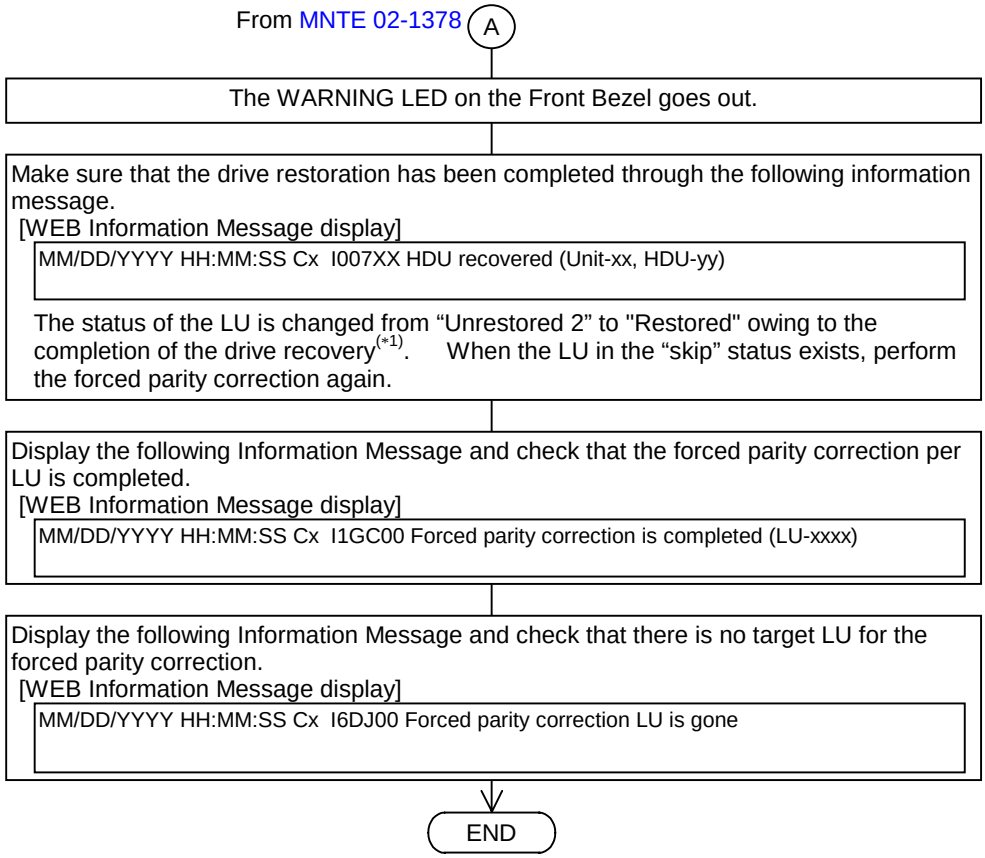
3. Drive blockade occurred during the forced parity correction.
   When a Disk Drive is detached during forced parity correction, the restoration is interrupted and a drive recovery action is taken. When a drive, which belongs to a RAID group including an LU for which the forced parity correction is being made, is detached, a status of the LU concerned is changed to “Unrestored 2”. The LU status in the other RAID Group is not transferred.

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W060XX HDU alarm (Unit-xx, HDR-yy) :HDU /STRC
Date Time Detect Controller#



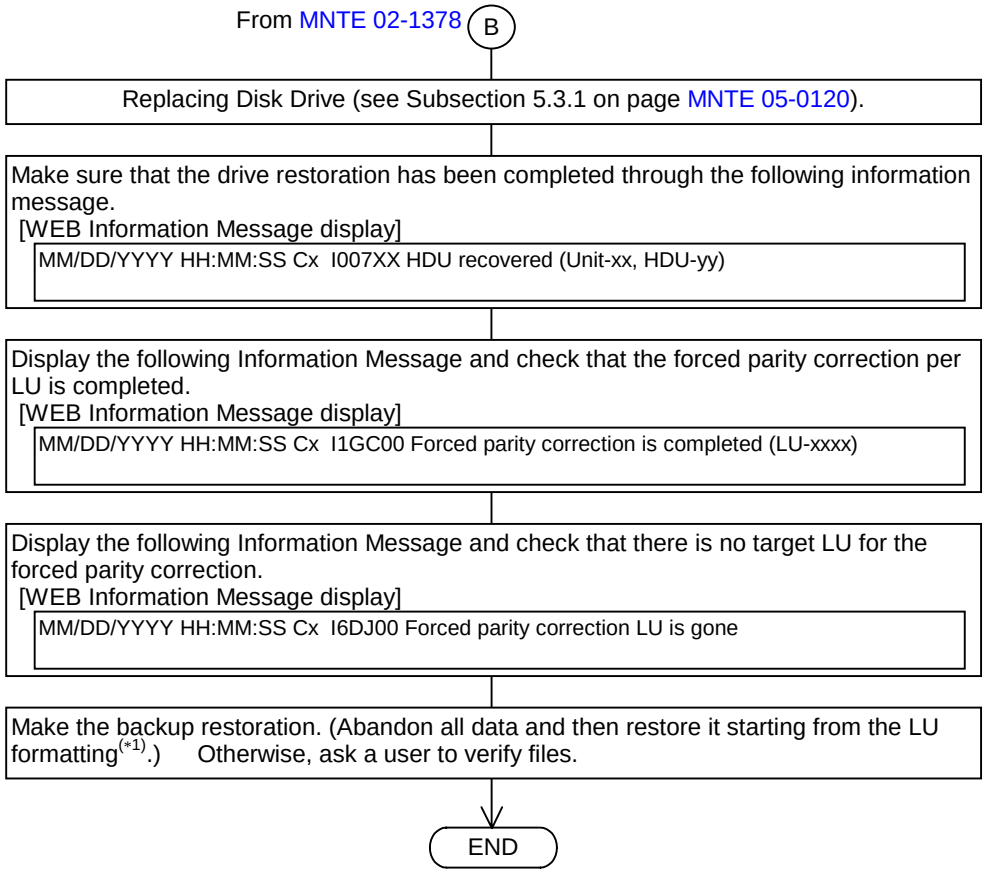
Copyright © 2004, 2005, Hitachi, Ltd.



*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.

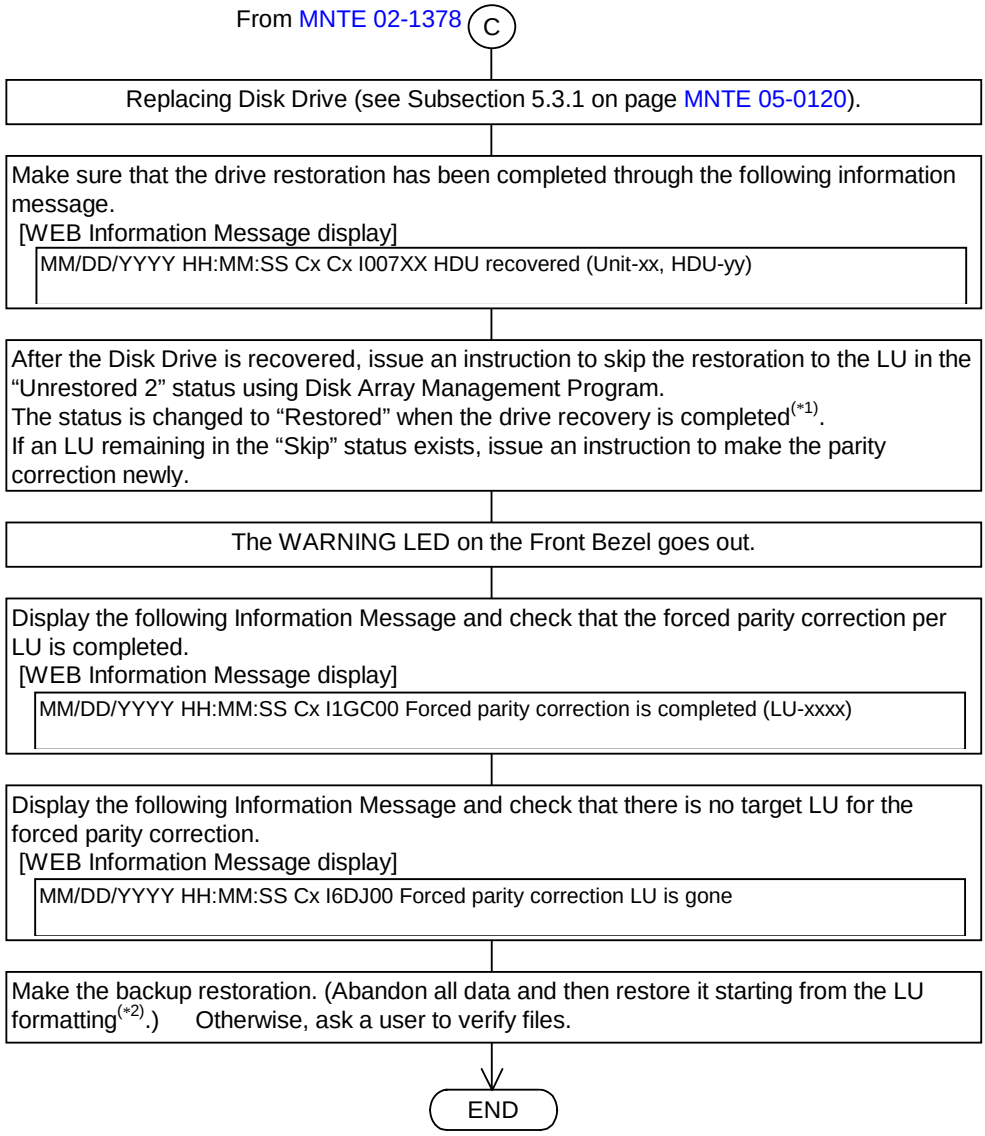
- An LU of RAID 1+0
- A unified LU a part of which is included in a RAID group having a drive detachment
- An LU whose parity group is deeper than 1

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

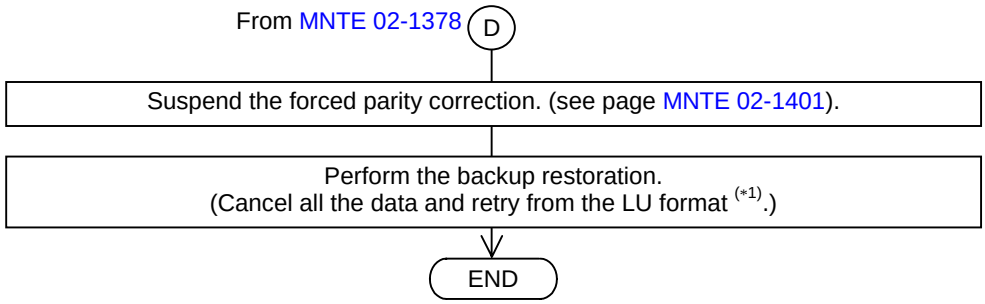


*1 : An LU that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Skip" status. If an LU remaining in the "Skip" status exists, issue an instruction to make the forced parity correction newly.

- An LU of RAID 1+0
- 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 where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.

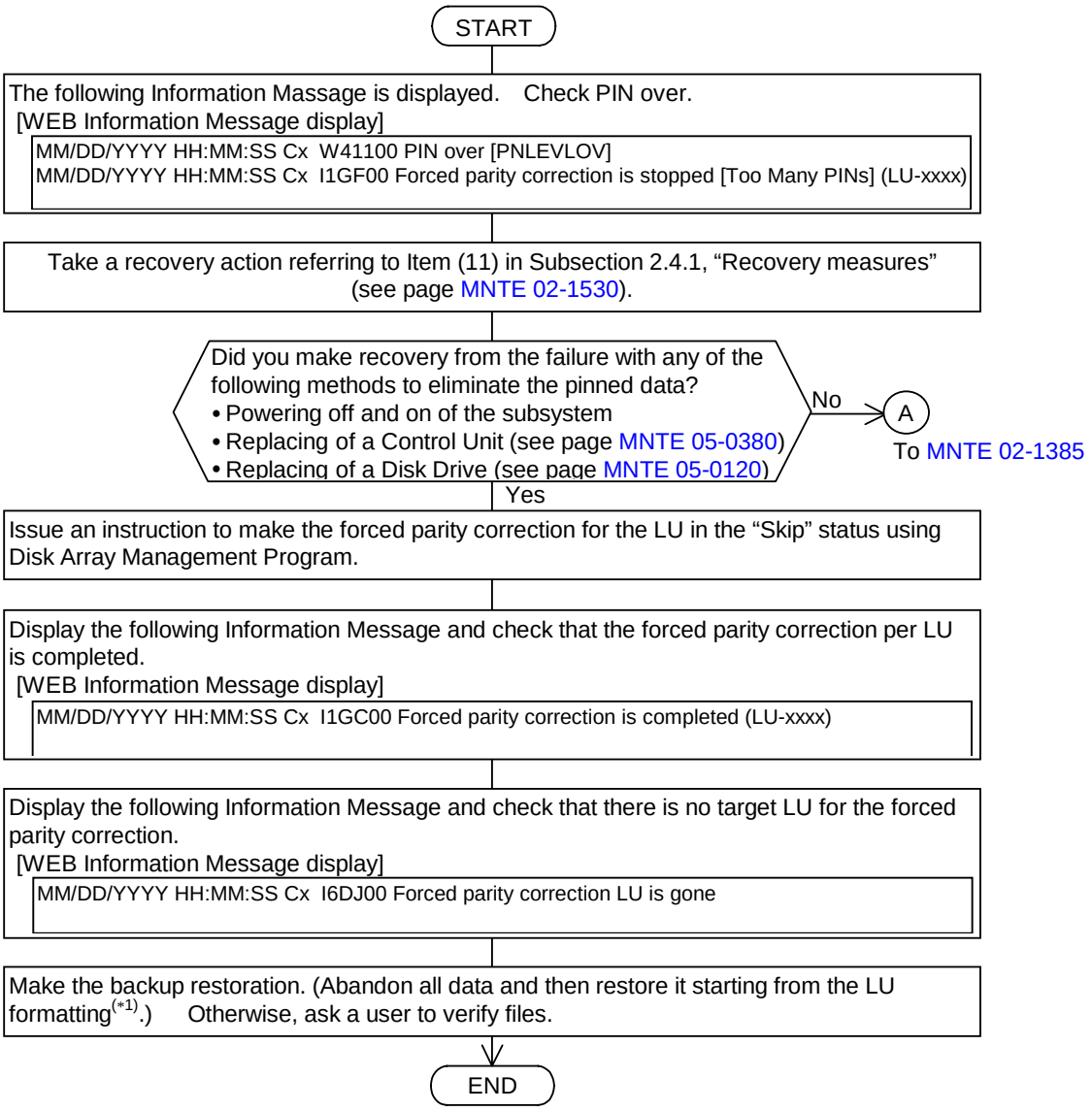
4. PIN OVER occurred during the forced parity correction.
   When a pin over occurs, the status of the LU, the forced parity correction for which has been instructed to be made, is changed to “Unrestored”.

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W41100 PIN over [PNLEVLOV]

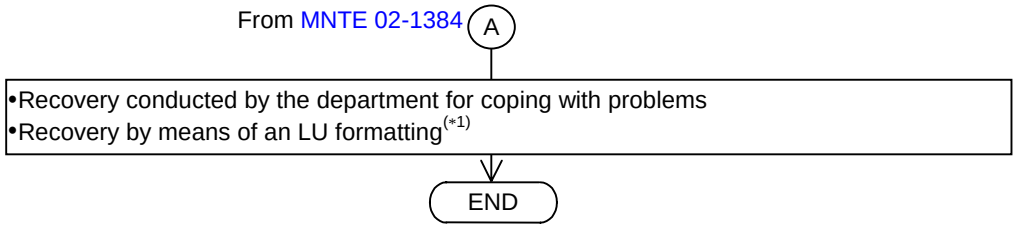
MM/DD/YYYY HH:MM:SS Cx Ixxxxx Forced Parity correction stopped [Too Many PINs] (LU-xxxx)

Date Time Detect Controller#



*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, “Formatting LU” (on page INST 05-0650) in Subsection 5.4.3, “Setting of LU” of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : To perform recovery by the LU format, skip the LU which is in the “not performed” status in the Disk Array Management Program before the LU format.

Copyright © 2004, 2005, Hitachi, Ltd.

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”.

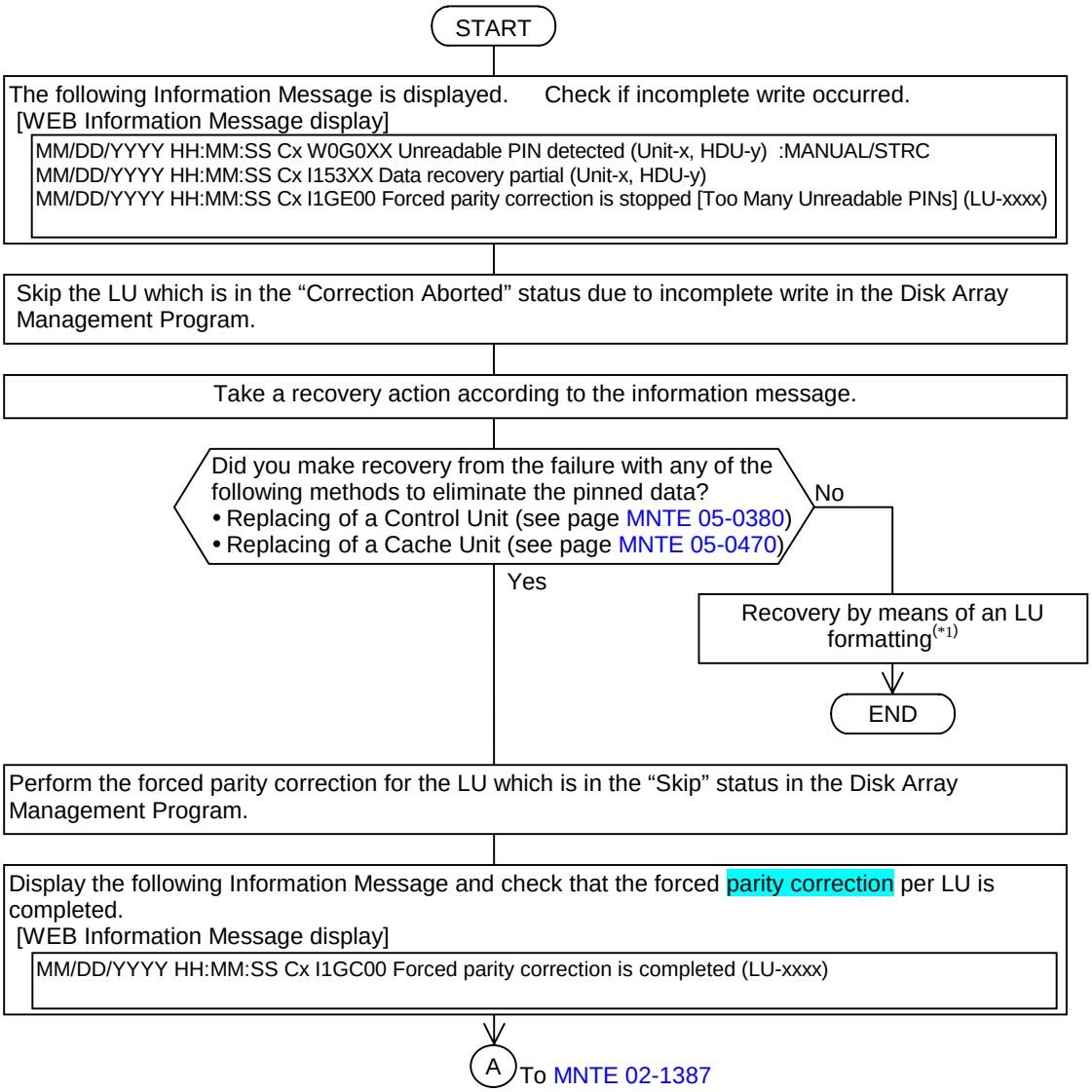
[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W0G0HH Unreadable PIN detected (Unit-x,HDU-y) :MANUAL/STRC

MM/DD/YYYY HH:MM:SS Cx I153HH Data recovery partial (Unit-x, HDU-y)

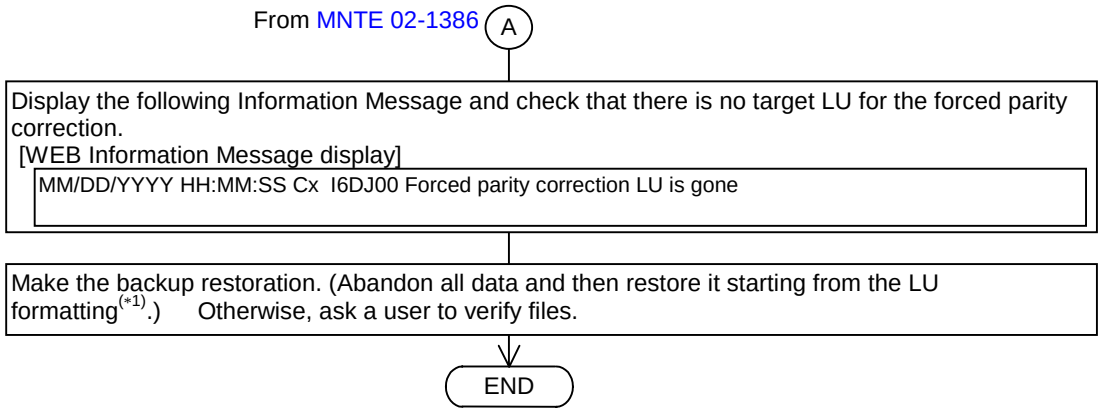
MM/DD/YYYY HH:MM:SS Cx I1GE00 Forced parity correction is stopped [Too Many Unreadable PINs] (LU-xxxx)

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 Disk Array Management Program before formatting the LU.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

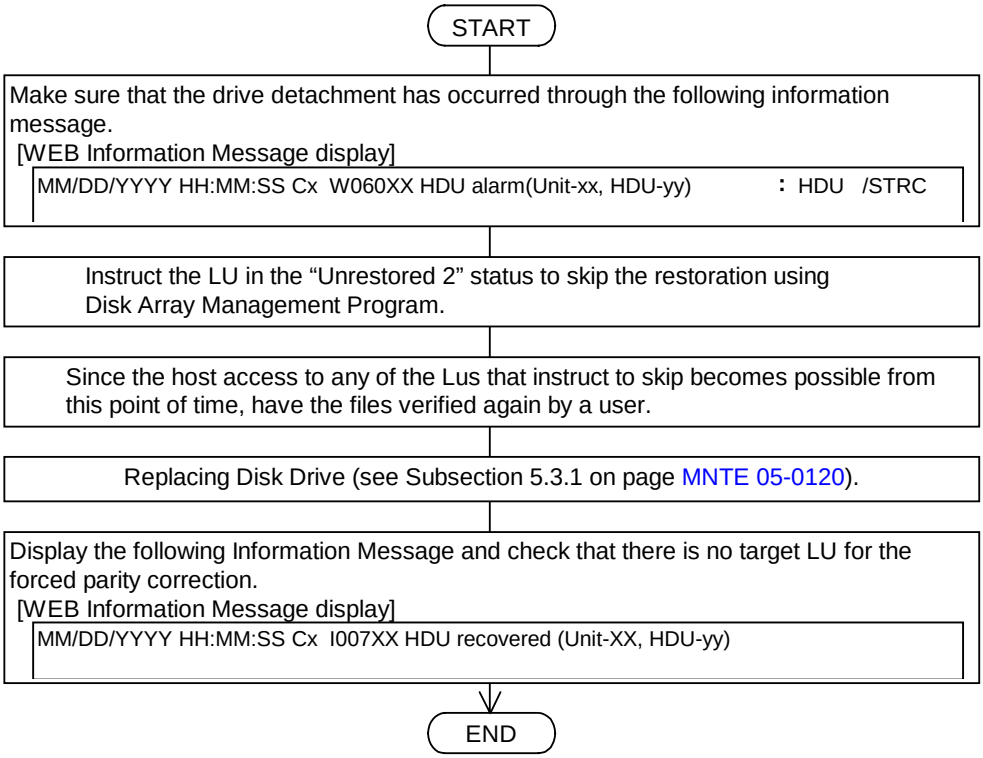
Copyright © 2004, 2005, Hitachi, Ltd.

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]

MM/DD/YYYY HH:MM:SS Cx W060XX HDU alarm (Unit-xx, HDR-yy) :HDU /STRC

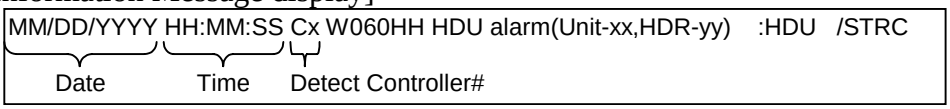
Date Time Detect Controller#

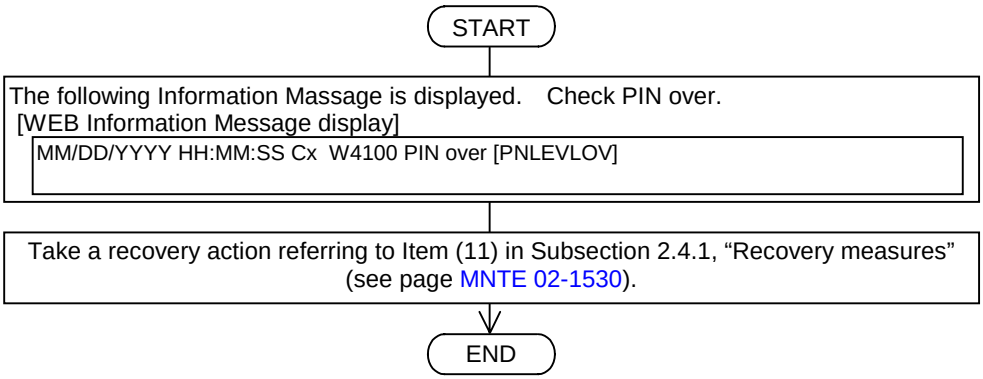


Copyright © 2004, 2005, Hitachi, Ltd.

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]

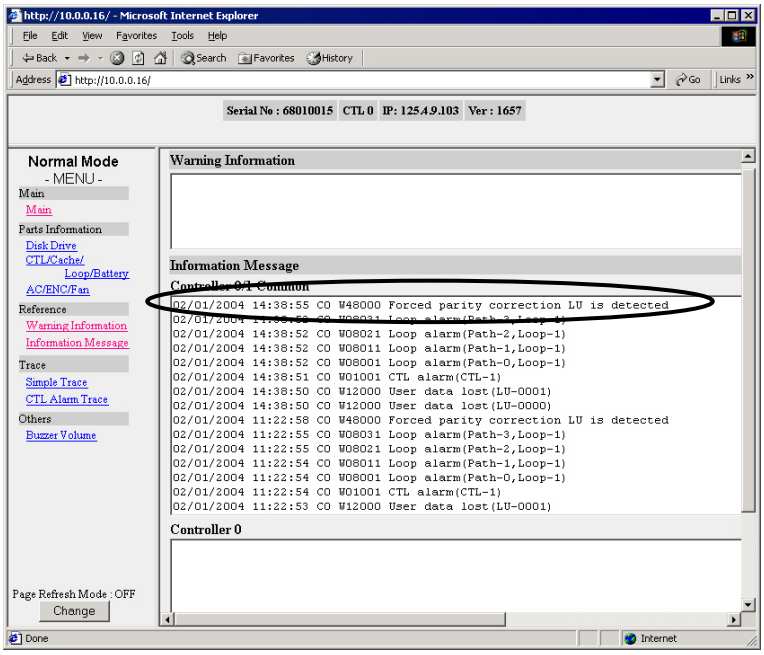




Copyright © 2002, 2005, Hitachi, Ltd.

< Procedure given in windows >

(a) Connect the Web.
(b) Refer to a message in the Web window.

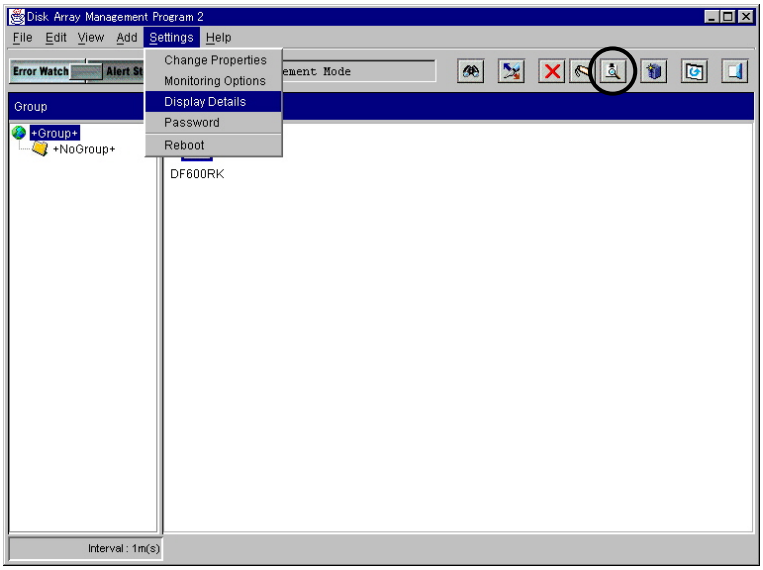


Copyright © 2004, 2005, Hitachi, Ltd.

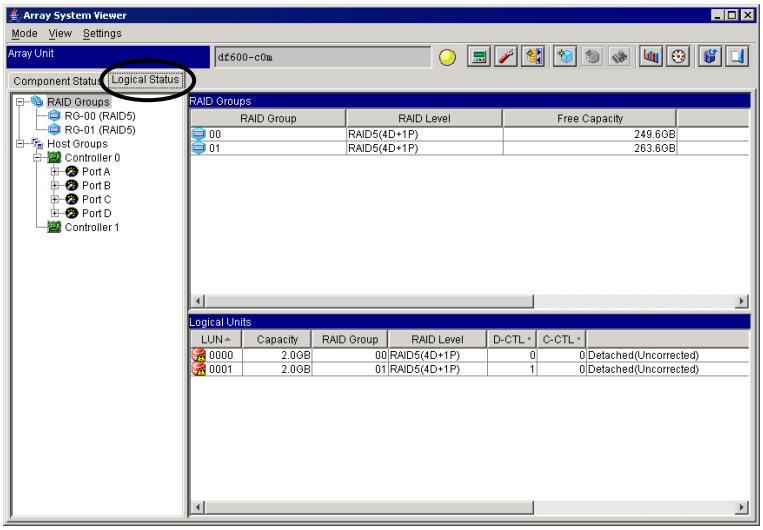
(c) Connect Disk Array Management Program.

(i) Start the Disk Array Management Program and set the operation mode in the "Management Mode".
For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), "Changing the Maintenance Mode" on page INST 05-0050

(ii) Click an icon of the disk array subsystem you want to set in the main window.
There are three ways of the setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

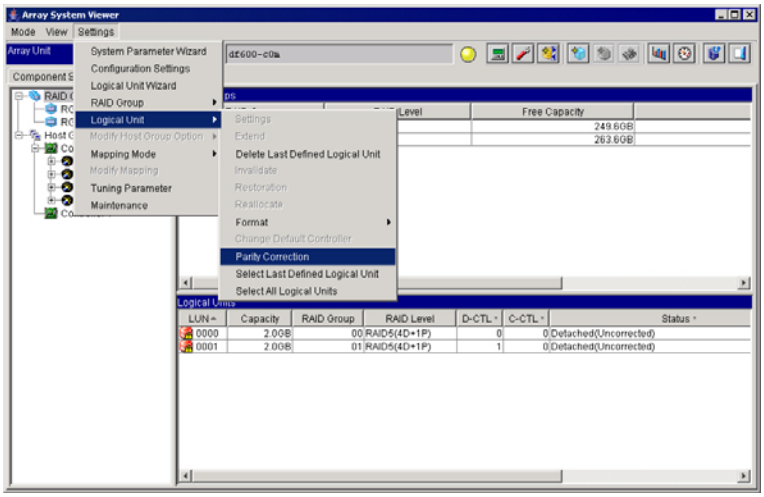


(d) Double click the [Logical Status] tab in the unit window.

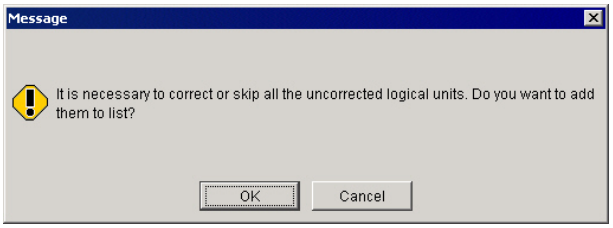


Copyright © 2004, 2005, Hitachi, Ltd.

(e) Since the LU requiring the forced parity correction is displayed, issue an instruction to make the restoration.
Select [Settings] – [Logical Unit] – [Parity Correction] in this order.



(f) It is shown that an LU requiring the forced parity correction exists.
Click the [OK] button.



Copyright © 2004, 2005, Hitachi, Ltd.

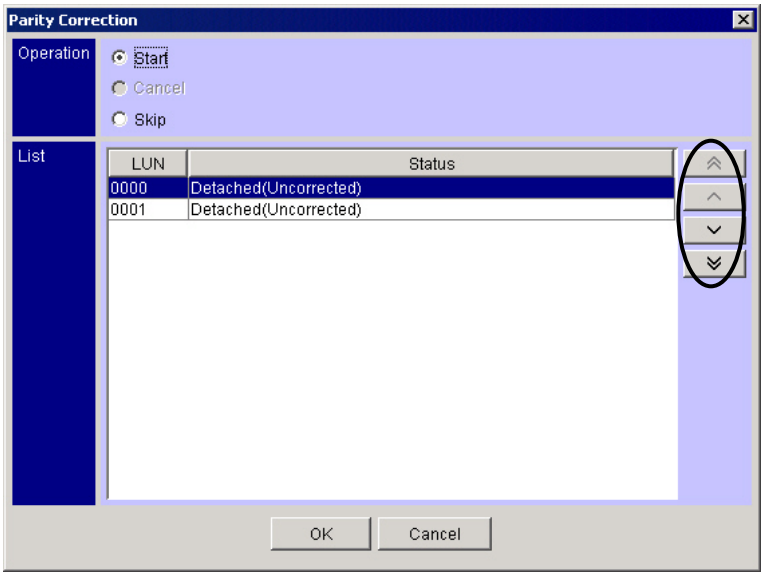
Status	Display by DAMP	Meaning	Status seen from a host	Recovery method
Uncorrected	Uncorrected	A status in which the subsystem is waiting for an instruction to make or skip the forced parity correction issued by Disk Array Management Program.	A status in which a host cannot instruct the LU to read or write.	Disk Array Management Program issue an instruction to make or skip the forced parity correction.
Parity Correcting	Parity Correcting (n%)	A status in which Disk Array Management Program 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	Waiting Parity Correction(o) (n%)	A status in which Disk Array Management Program 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.	–
Skip	Correction Skipped	A status in which Disk Array Management Program 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 and backup restoration.
Restored	(None)	A status in which Disk Array Management Program 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.	–
Correction Aborted	Correction Aborted	A status in which the forced parity correction is interrupted because of a drive detachment although Disk Array Management Program has issued an instruction to make the restoration.	A status in which a host cannot instruct the LU to read or write.	Make Disk Array Management Program issue instruction to skip the forced parity correction and then make it newly issue instruction to make the restoration.

Copyright © 2004, 2005, Hitachi, Ltd.

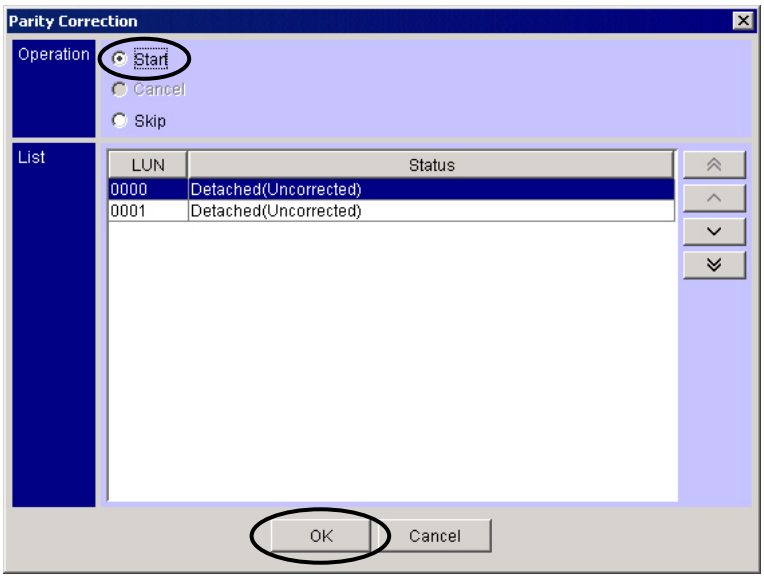
(g) Select whether or not to make the forced parity correction.

- When making the forced parity correction
  When aborting the forced parity correction while it is in progress, refer to “Instruction to abort a forced parity correction for an LU being restored by means of parity” (on page MNTE 02-1401).

(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.

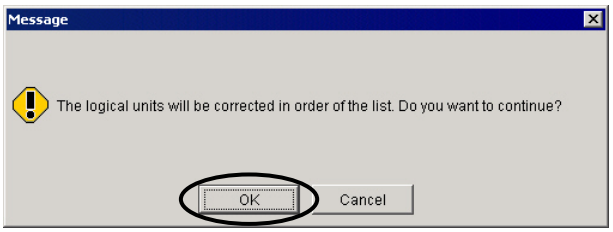


‡1 : The forced parity correction operates LU one by one in order for each Control Unit in charge of LU. Therefore, the Control Unit in charge of the LU which performs the forced parity correction should be considered to decide the sorting order.

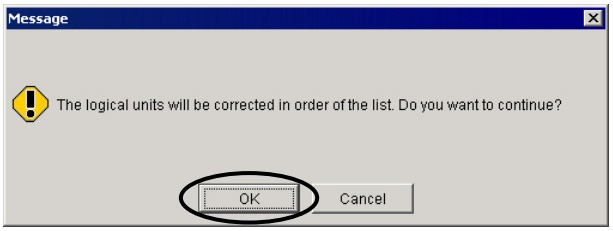
‡2 : The forced parity correction is performed in order of the sorted LU.
However, if the LU belongs in the same RAID Group, it may not be executed in the sorted order because the process is not performed in each Control Unit.
If the forced parity correction order of the LU which belongs in the same 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.

Copyright © 2004, 2005, Hitachi, Ltd.

(iii) Click the [OK] button.



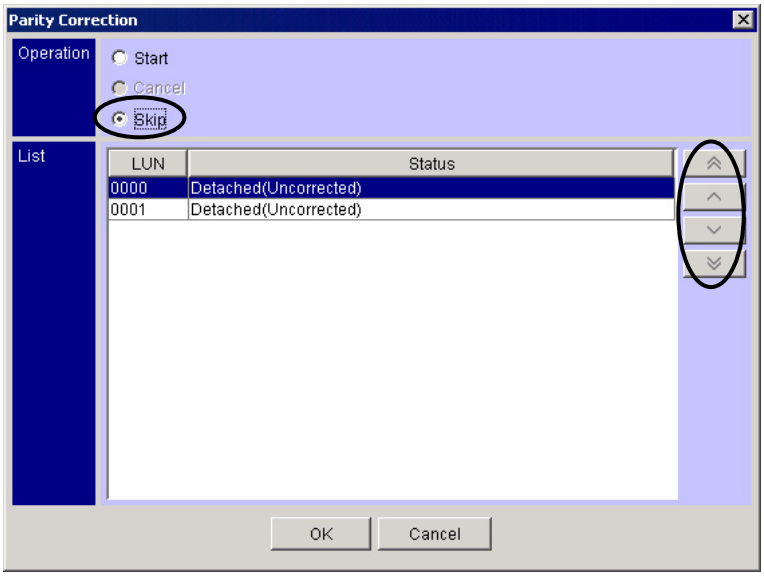
(iv) Click the [OK] button.



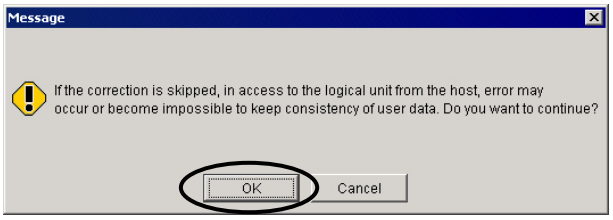
Copyright © 2004, 2005, Hitachi, Ltd.

• When skipping the forced parity correction

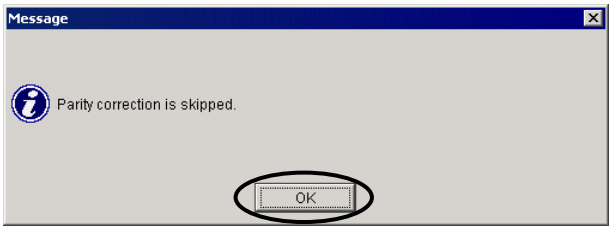
(i) Select the [Skip] radio button and click the [OK] button.



(ii) Click the [OK] button.

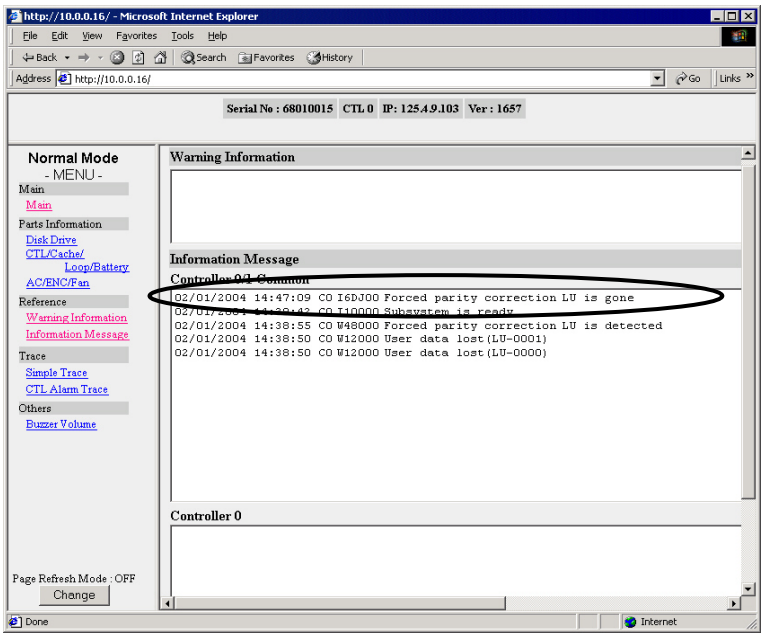


(iii) Click the [OK] button.

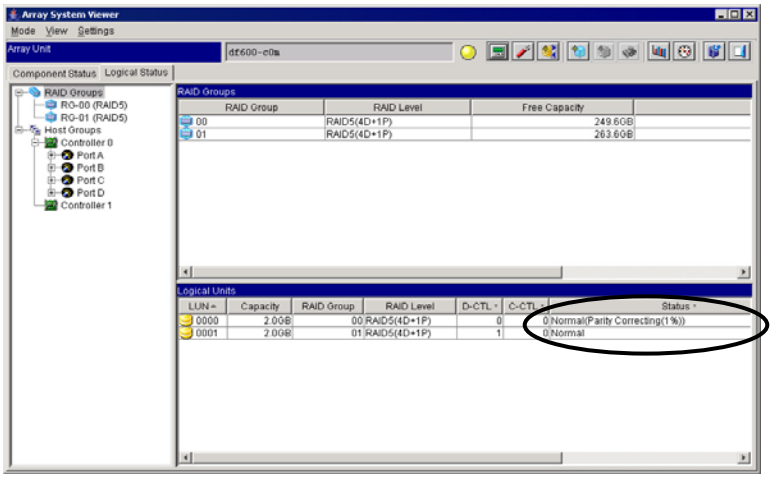


Copyright © 2004, 2005, Hitachi, Ltd.

(h) Refer to a message in the Web window.



- 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.

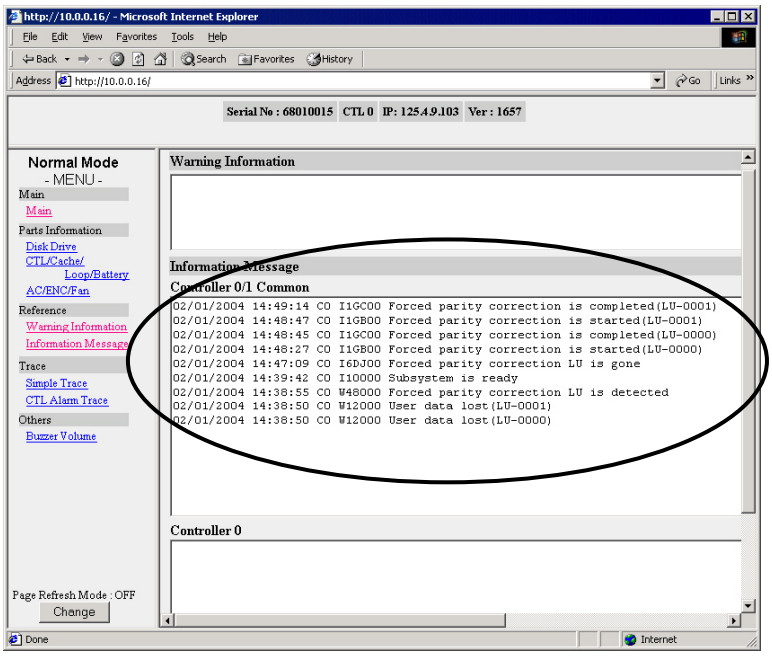


LU statuses concerning a forced parity correction and display of statuses by Disk Array Management Program (DAMP)

#	Status	Display by DAMP	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	Unrestored	Uncorrected	
4	Unrestored 2	Correction Aborted	
5	Restored	(No display)	
6	Skip	Correction Skipped	

Copyright © 2004, 2005, Hitachi, Ltd.

(i) 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 “Skip: Correction Skipped” or “Restored” status” on page MNTE 02-1403.

(j) Make sure that the WARNING LED on the Front Bezel has gone out.

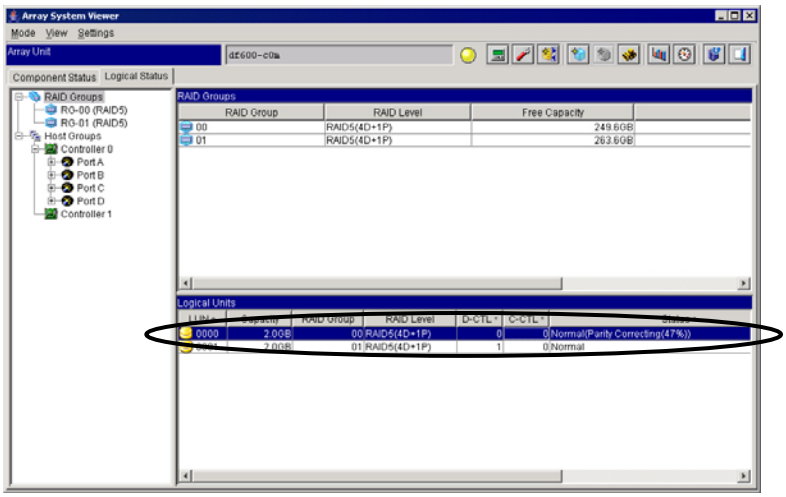
(k) Make the backup restoration. (Abandon all data and then restore it starting from the LU formatting.) Otherwise, ask a user to verify files.

Copyright © 2002, 2005, Hitachi, Ltd.

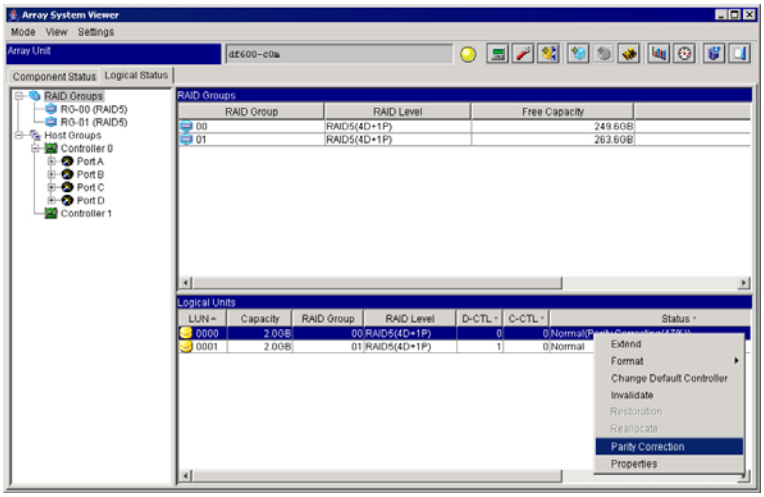
- Instruction to abort a forced parity correction for an LU being restored by means of parity

  It is possible to abort a forced parity correction after it has been instructed.

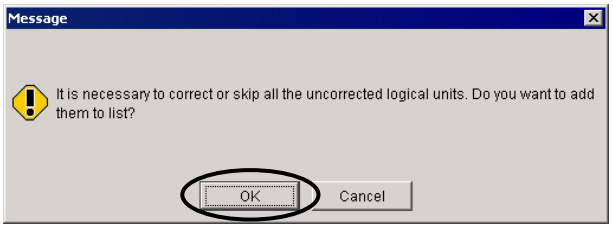
(i) Select an LU for which the “Being Restored : Parity Correction (n%)” or “On Standby : Waiting Parity Correction(o) (n%)” status is displayed in the column of the logical unit state.



(ii) In the state in which the selection above is made, select [Parity Correction] by clicking the right mouse button.

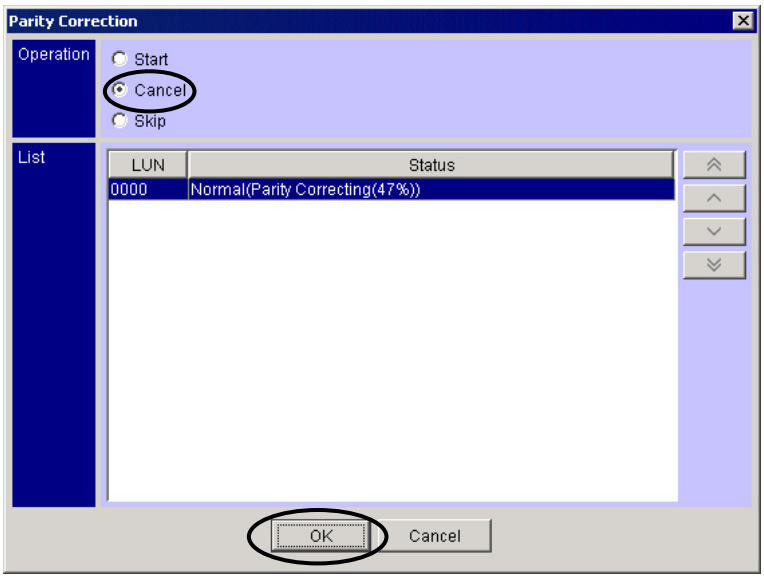


(iii) Click the [OK] button.

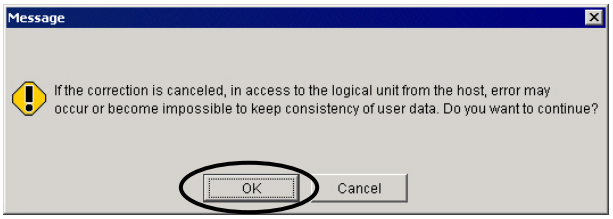


Copyright © 2004, 2005, Hitachi, Ltd.

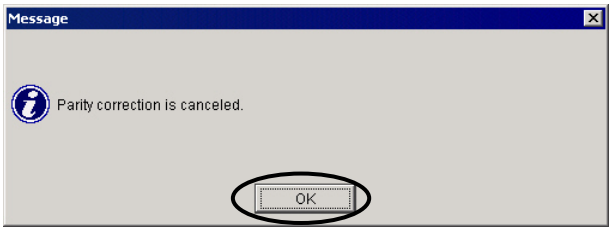
(iv) Select [Cancel] and press the [OK] button.



(v) Click the [OK] button.



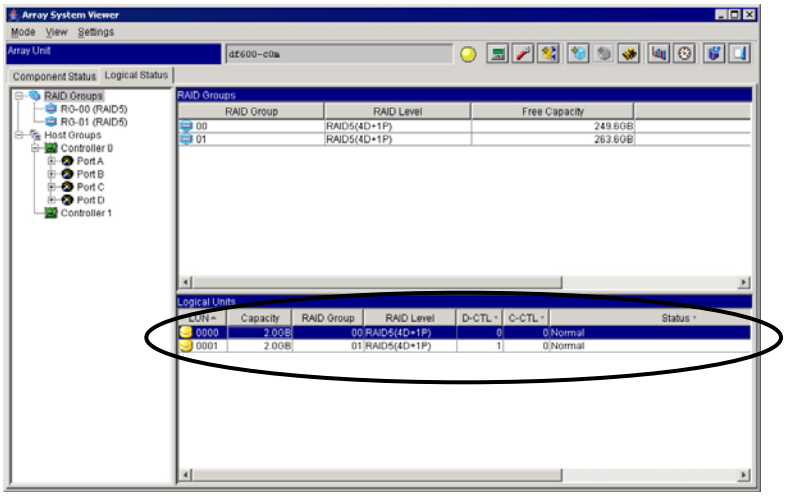
(vi) Click the [OK] button.



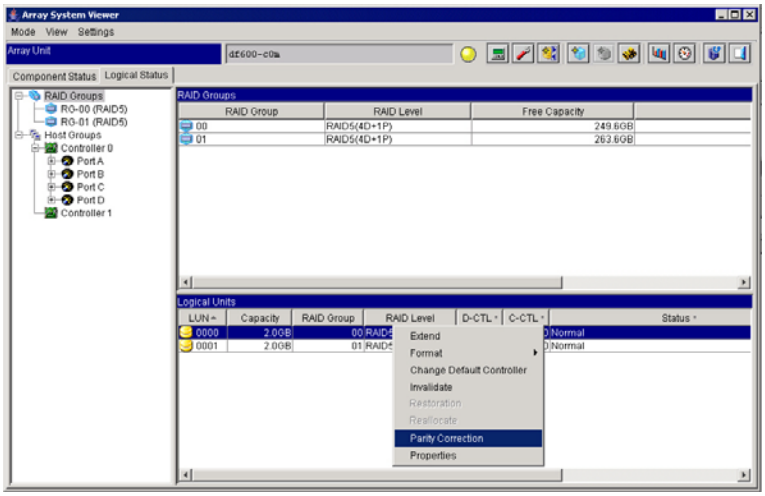
Copyright © 2004, 2005, Hitachi, Ltd.

- Instruction to make a forced parity correction for an LU in the “Skip: Correction Skipped” or “Restored” status
  A forced parity correction can be made for an LU in the “Skip : Correction Skipped” status (for which no forced parity correction has been made) or for an LU for which the forced parity correction has been made.

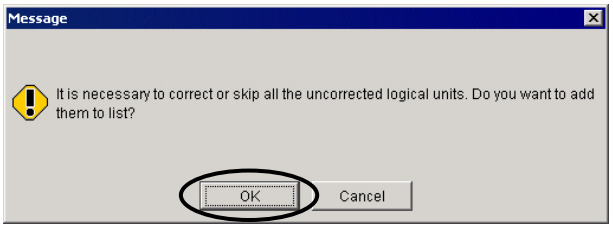
(i) Select an LU for which the “Skip : Correction Skipped” status is displayed in the column of the logical unit state.



(ii) In the state in which the selection above is made, select [Parity Correction] by clicking the right mouse button.

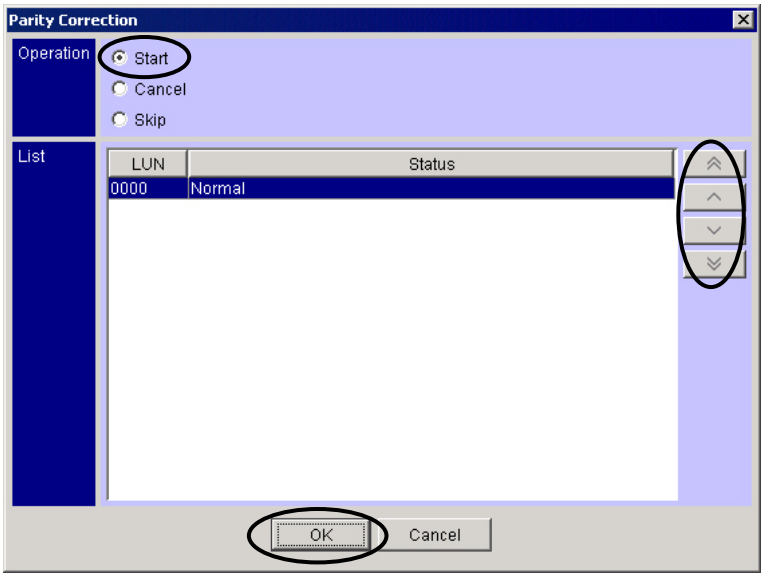


(iii) Click the [OK] button.

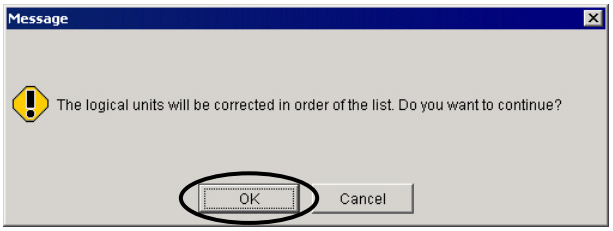


Copyright © 2004, 2005, Hitachi, Ltd.

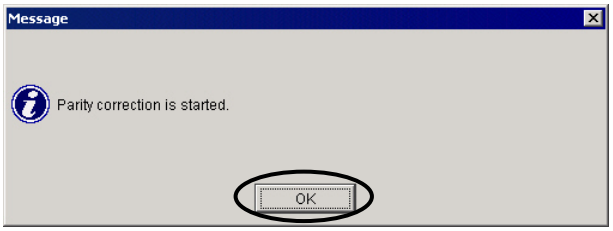
(iv) Select [Start], specify an order of making the forced parity correction, and press the [OK] button.



(v) Click the [OK] button.



(iv) Click the [OK] button.

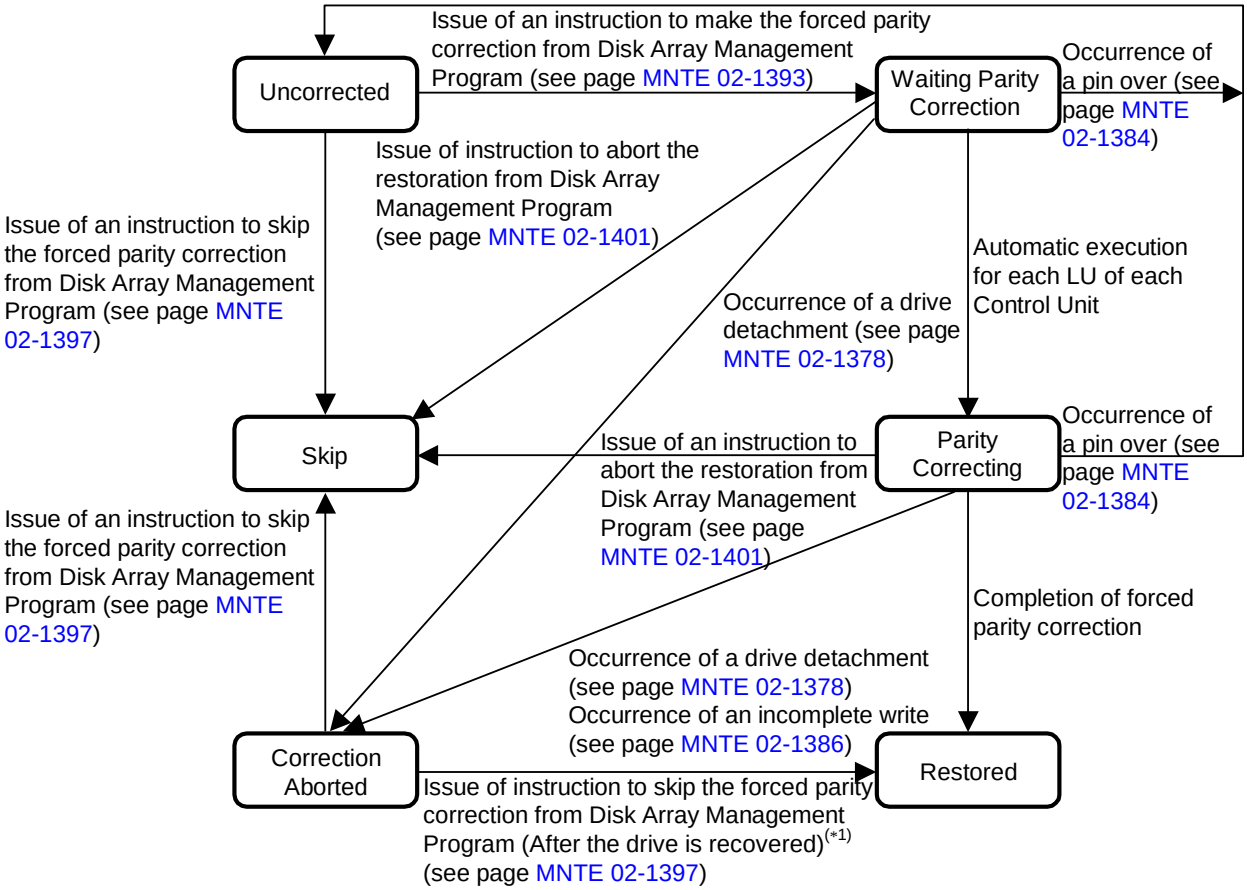


Copyright © 2004, 2005, Hitachi, Ltd.

< 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 Disk Array Management Program.

(a) Change of the status after user data is lost

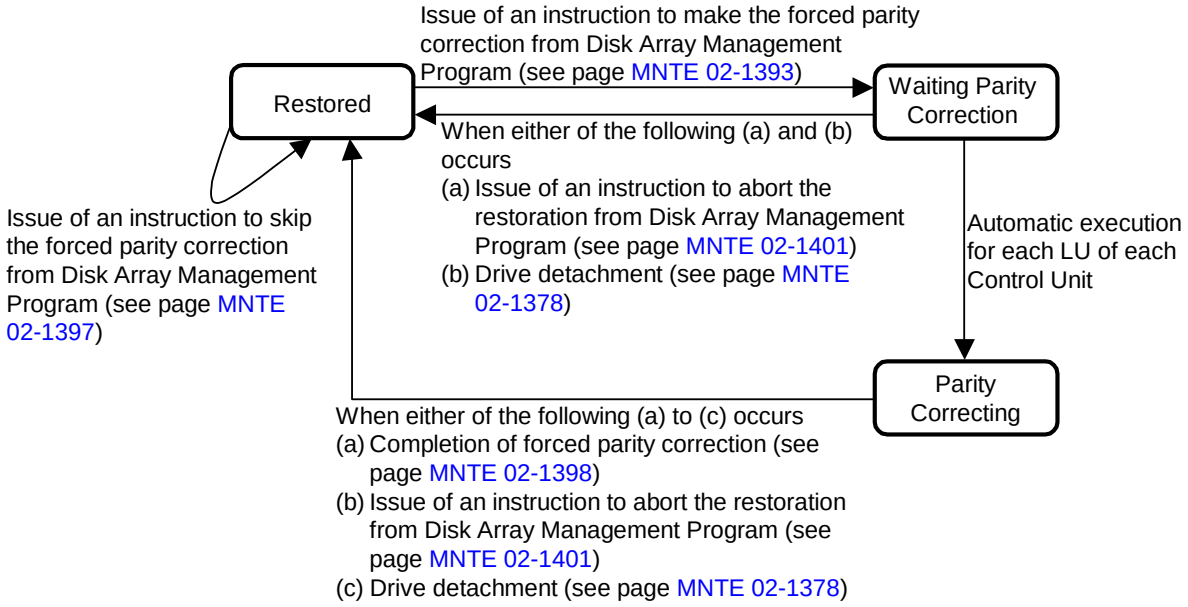


*1 : An LU that conforms to any of the following conditions does not enter the "Restored" status and remains in the "Skip" status. In this case, issue an instruction to skip the forced parity correction and then issue an instruction to make the restoration.

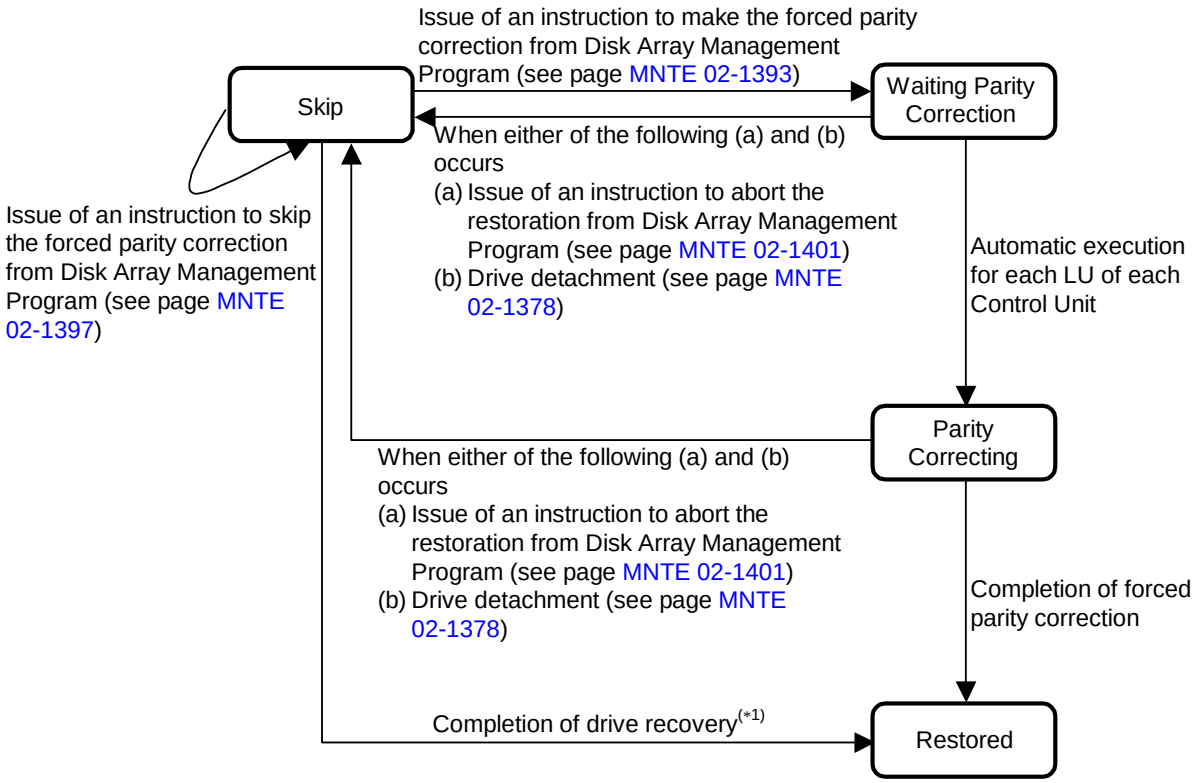
- An LU of RAID 1+0
- A unified LU a part of which is included in a RAID group having a drive detachment
- An LU whose parity group is deeper than 1

Copyright © 2004, 2005, Hitachi, Ltd.

(b) Forced parity correction for an LU in the "Restored" status



(c) Forced parity correction for an LU in the "Skip" status



*1 : 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

Copyright © 2004, 2005, Hitachi, Ltd.

< Standard time required for the forced parity correction >

A forced parity correction takes a long time from start to completion. (Refer to Tables 2.4.2 and 2.4.3.)

Standard times required for the forced parity correction are shown below.

RAID 5 (In the case of nD+1P):

For DF600: 23+9×n minutes (n= 2 to 15)

For DF600H: 36+n minutes (n= 2 to 15)

RAID 1+0 (In the case of nD+nP):

For DF600: 35×n×10,000/Revolution speed of Disk Drive (min^{-1}) minutes (n= 1 to 8)

For DF600H: 20×n×10,000/Revolution speed of Disk Drive (min^{-1}) minutes (n= 1 to 8)

RAID 1 (In the case of 1D+1P):

For DF600: 30×10,000/Revolution speed of Disk Drive (min^{-1}) minutes

For DF600H: 20×10,000/Revolution speed of Disk Drive (min^{-1}) minutes

NOTE : The data above are standard times required for a forced parity correction for one RAID group in the case where 72-Gbyte Disk Drives are used. The times required for the restoration vary in proportion to the Disk Drive capacity.
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 2.4.2 Standard Times Required for Forced Parity Correction (When No Host I/O Is Executed)

	RAID level		Capacity(*1)	1LU/Systwm	2LU/System
DF600 (71.3 Gbytes)	RAID 5	4D+1P	265 Gbytes	57 min	61 min
		15D+1P	990 Gbytes	163 min	156 min
	RAID 1+0	2D+2P	130 Gbytes	69 min	66 min
		8D+8P	530 Gbytes	283 min	277 min
	RAID 1	1D+1P	65 Gbytes	28 min	—
DF600H (71.3 Gbytes)	RAID 5	4D+1P	265 Gbytes	39 min	47 min
		15D+1P	990 Gbytes	105 min	137 min
	RAID 1+0	2D+2P	130 Gbytes	37 min	42 min
		8D+8P	530 Gbytes	144 min	163 min
	RAID 1	1D+1P	65 Gbytes	19 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

Copyright © 2004, 2005, Hitachi, Ltd.

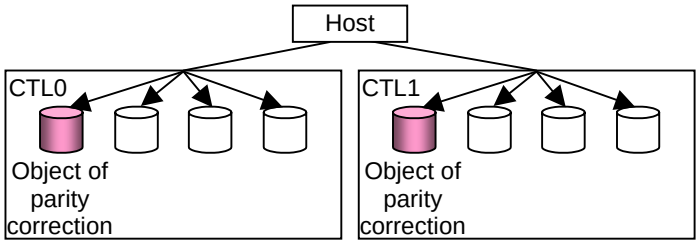
Table 2.4.3 Standard Times Required for Forced Parity Correction (When Host I/Os Are Executed)

	RAID level		Capacity(*1)	2LU/System	
				Host performance	Parity correction
DF600 (71.3 Gbytes)	RAID 5	4D+1	265 Gbytes	623 IOPS	110 min
		15D+1P	990 Gbytes	645 IOPS	201 min
	RAID 1+0	2D+2P	130 Gbytes	624 IOPS	135 min
		8D+8P	530 Gbytes	690 IOPS	434 min
DF600H (71.3 Gbytes)	RAID 5	4D+1	265 Gbytes	1120 IOPS	111 min
		15D+1P	990 Gbytes	1190 IOPS	203 min
	RAID 1+0	2D+2P	130 Gbytes	1065 IOPS	108min
		8D+8P	530 Gbytes	1280 IOPS	352min

*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.



Copyright © 2004, 2005, Hitachi, Ltd.

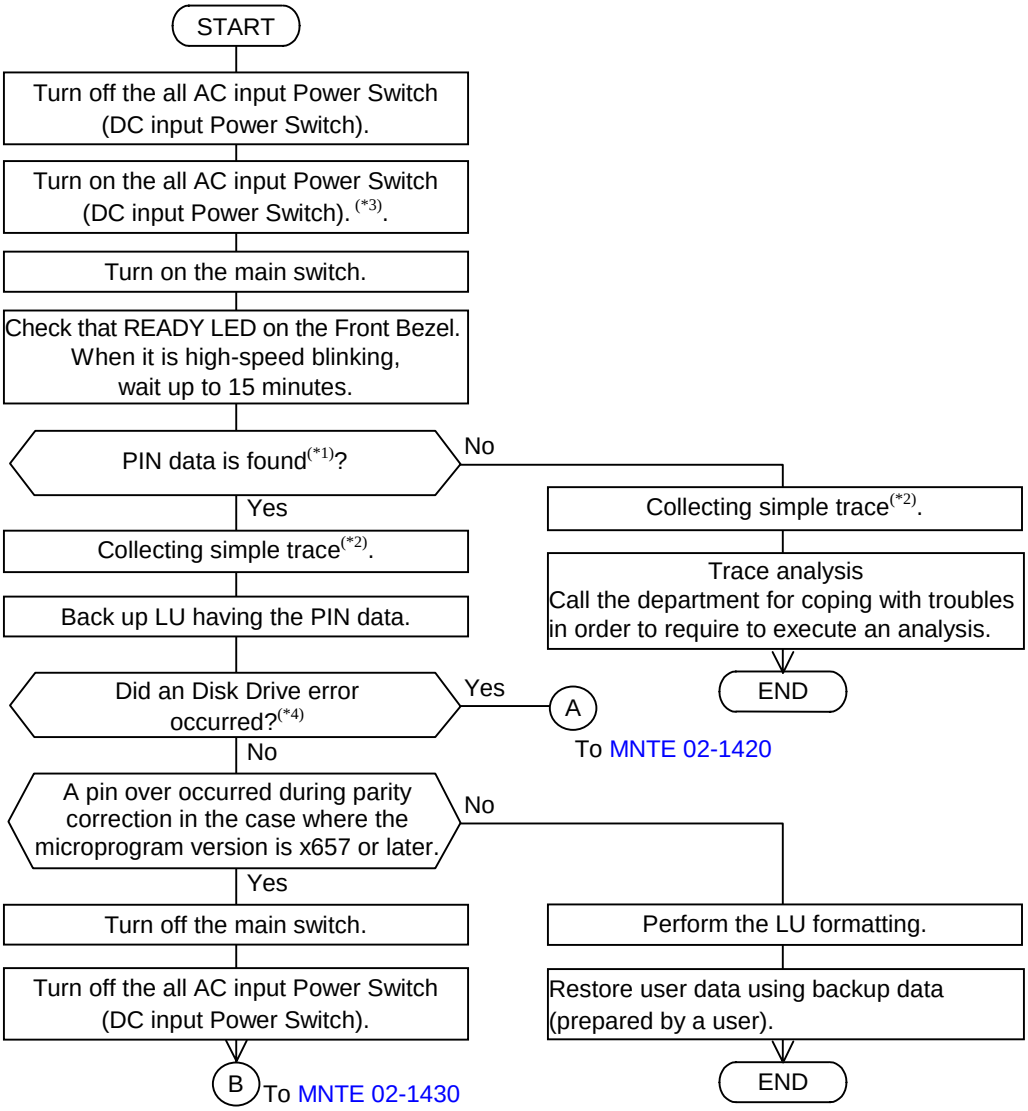
(4) An error occurred during operation: Case 1
(Planned shutdown cannot be performed because the number of PIN data is too large.
(due to Disk Drive/Controller error))

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx HI0600 PS OFF failed [PIN] :MANUAL/CTRC

Date Time Detect Controller#

[Recovery measures]



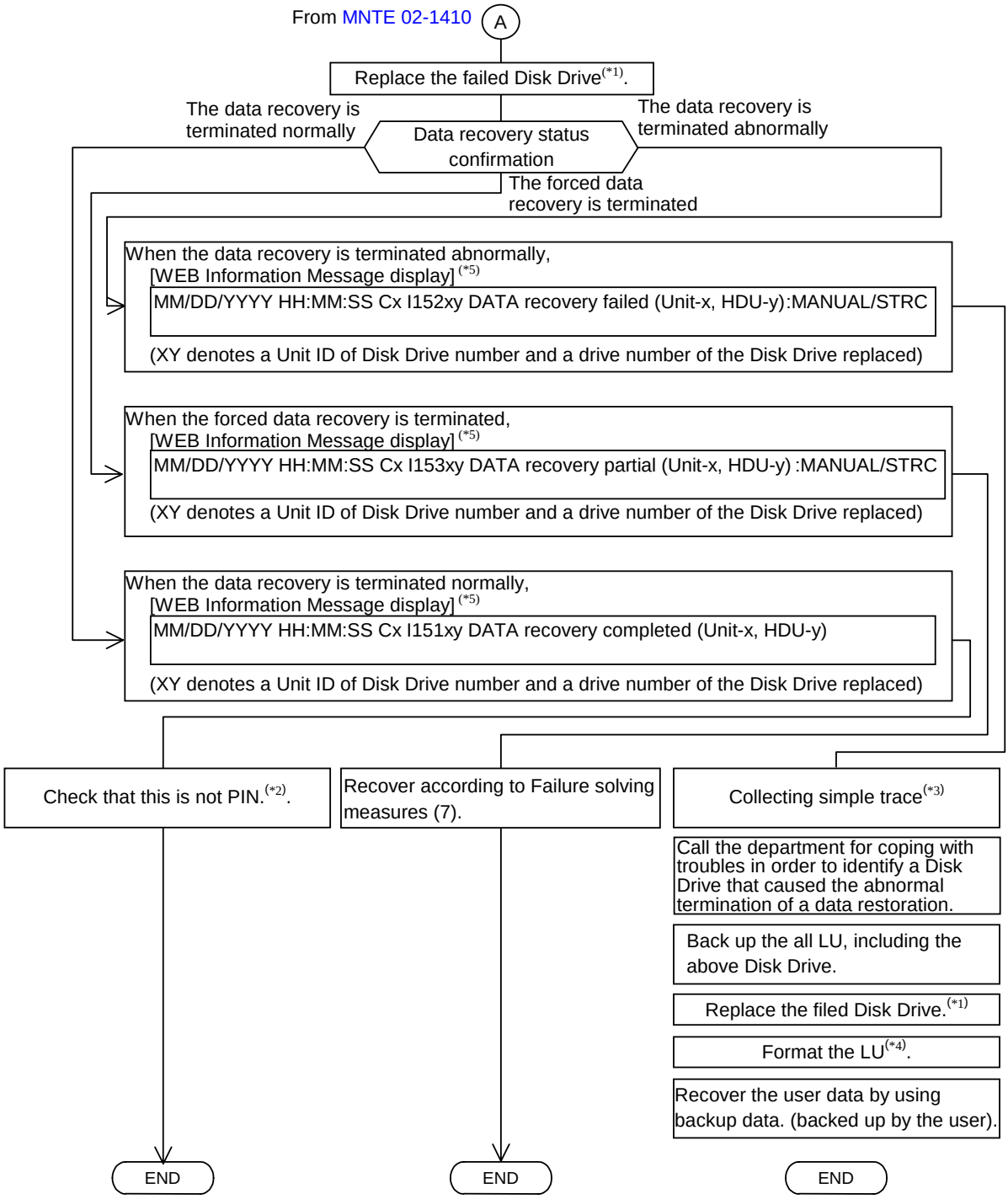
*1 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*2 : For the Error trace with power on, see "2.5.3 Collection simple trace" (MNTE 02-2180).

*3 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

*4 : For checking a Disk Drive error, refer to "2.6.2 (2) Trouble analysis based on LED indication of Disk Drive" (MNTE 02-2410) or "2.2 Trouble analysis by WEB connection" (MNTE 02-0110).

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : For the replacement of the Controller, see "Chapter 5 Parts Replacement".

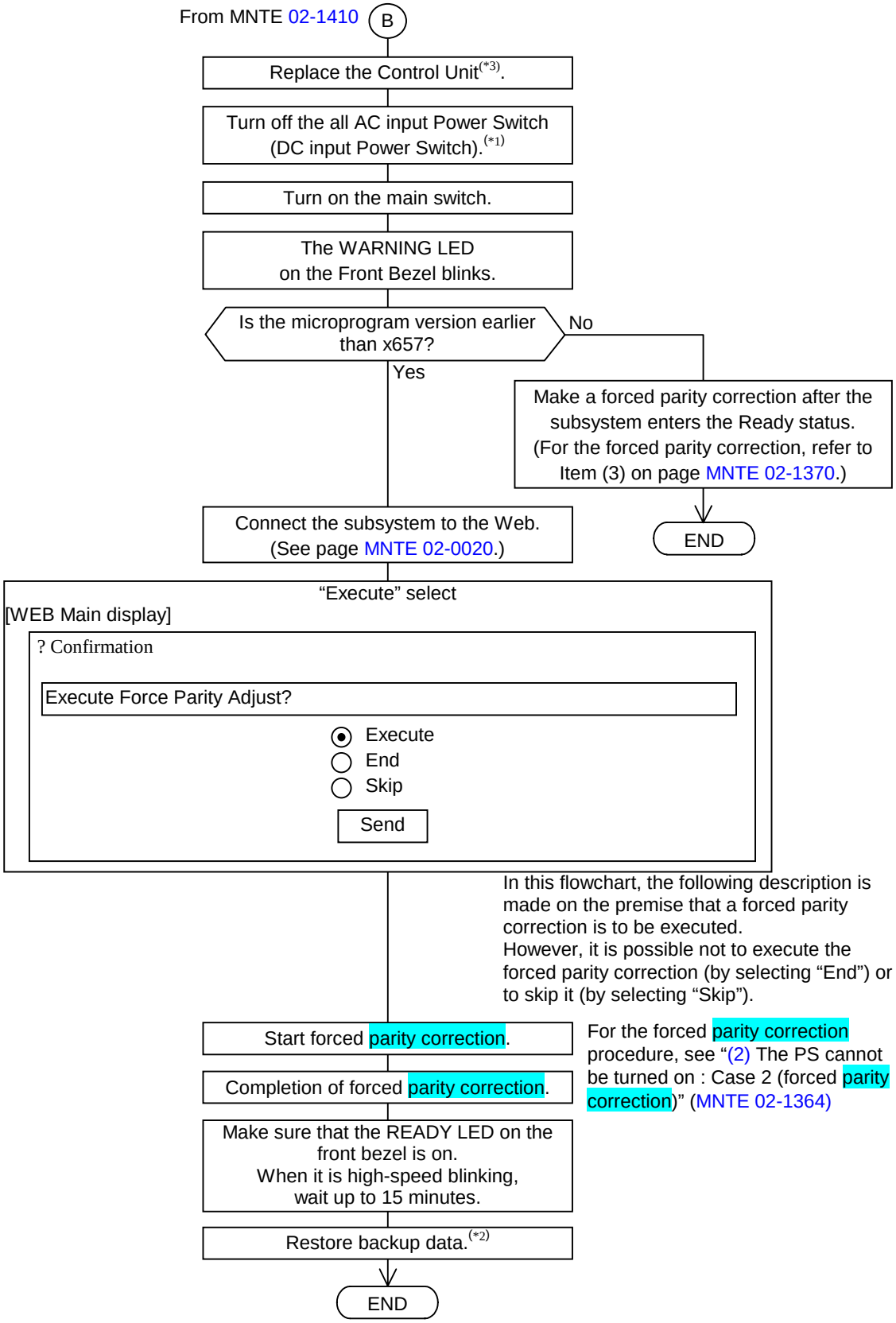
*2 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*3 : For the Error trace with power on, see "2.5.3 Collection simple trace" (MNTE 02-2180).

*4 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

*5 : For the connection of the WEB, refer to Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

*2 : Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

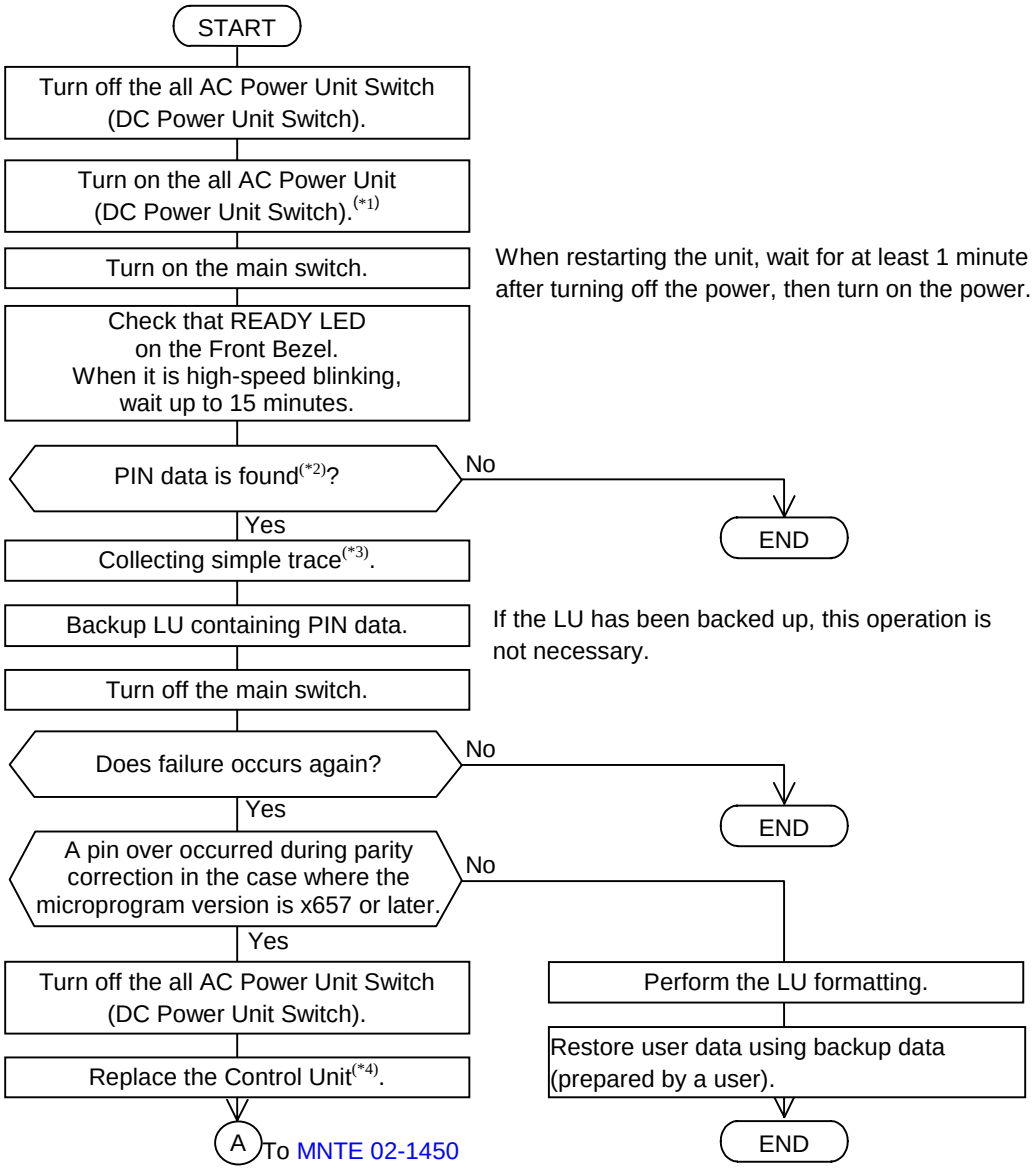
Copyright © 2002, 2005, Hitachi, Ltd.

(5) When the PS cannot be turned off : Case 2
(An attempt was made to save PIN data to the Disk Drive during planned shutdown but failed because a hardware error occurred.)

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W41000 PIN write error :MANUAL/STRC
Date Time Detect Controller#

[Recovery measures]



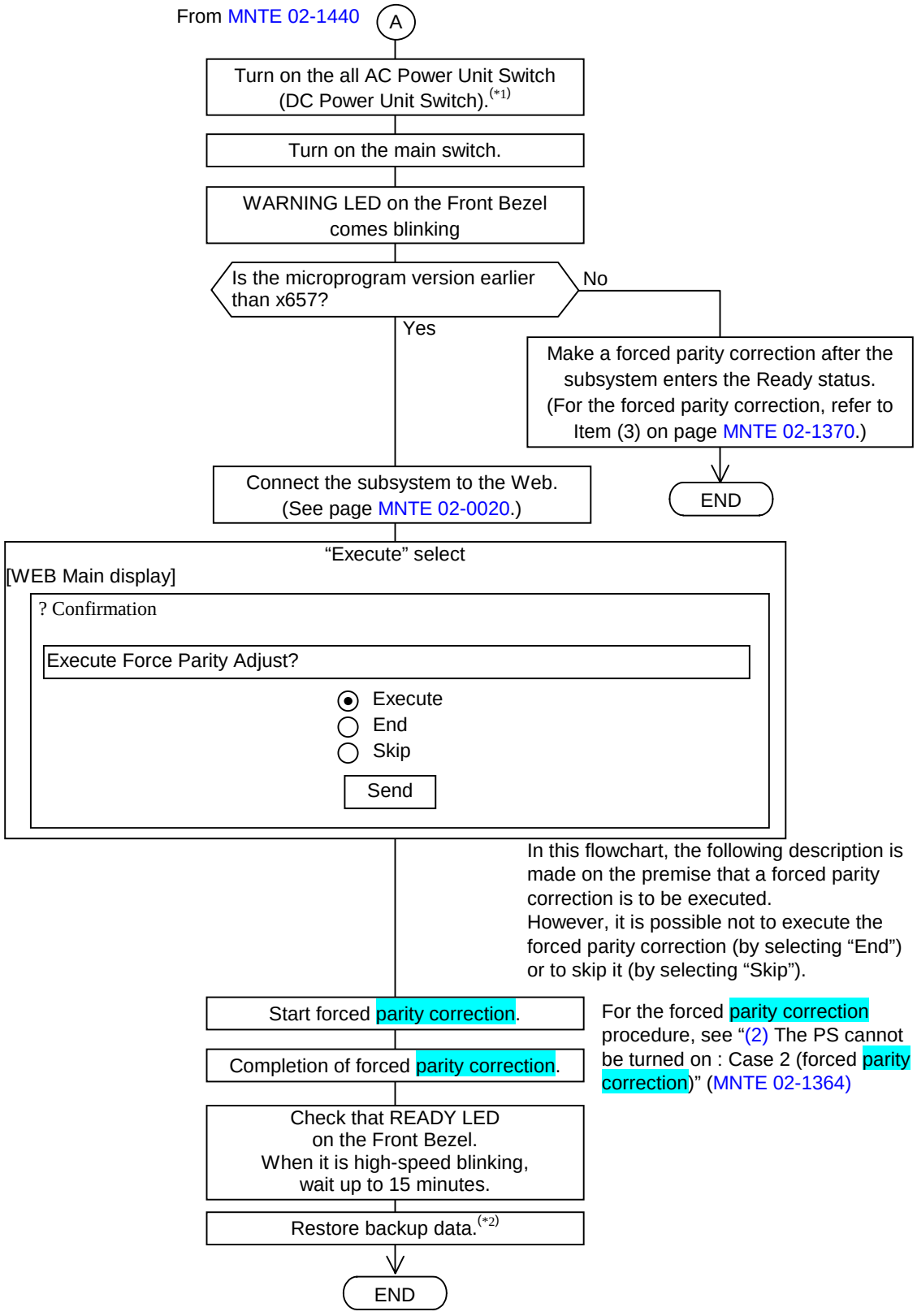
*1 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

*2 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*3 : For the Error trace with power on, see "2.5.3 Collection simple trace" (MNTE 02-2180).

*4 : For the replacement of the Control Unit, see "5.3.5 Replacing Control Unit" (MNTE 05-0380).

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

*2 : Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

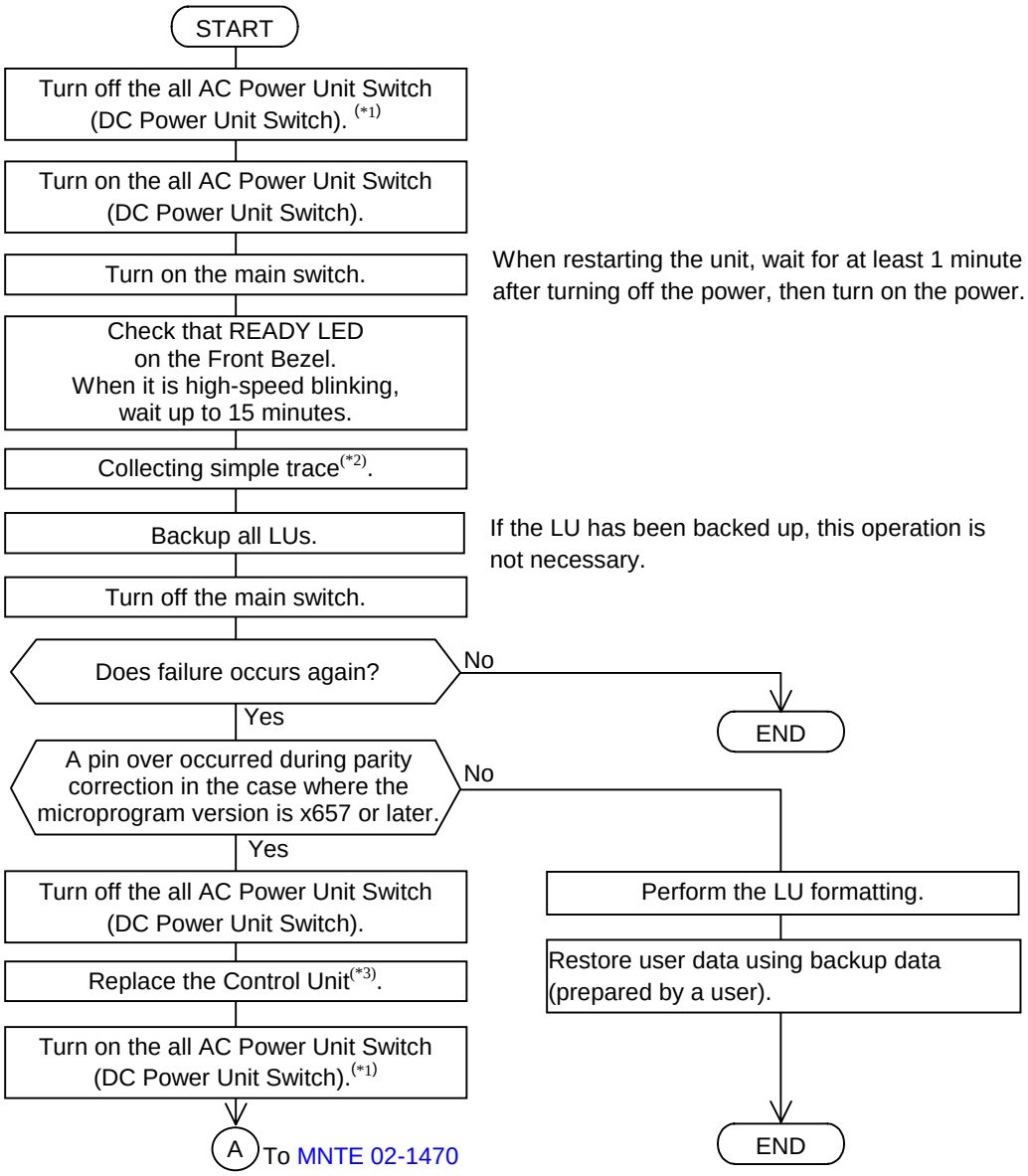
Copyright © 2002, 2005, Hitachi, Ltd.

(6) When the PS cannot be turned off : Case 3
(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 measures]

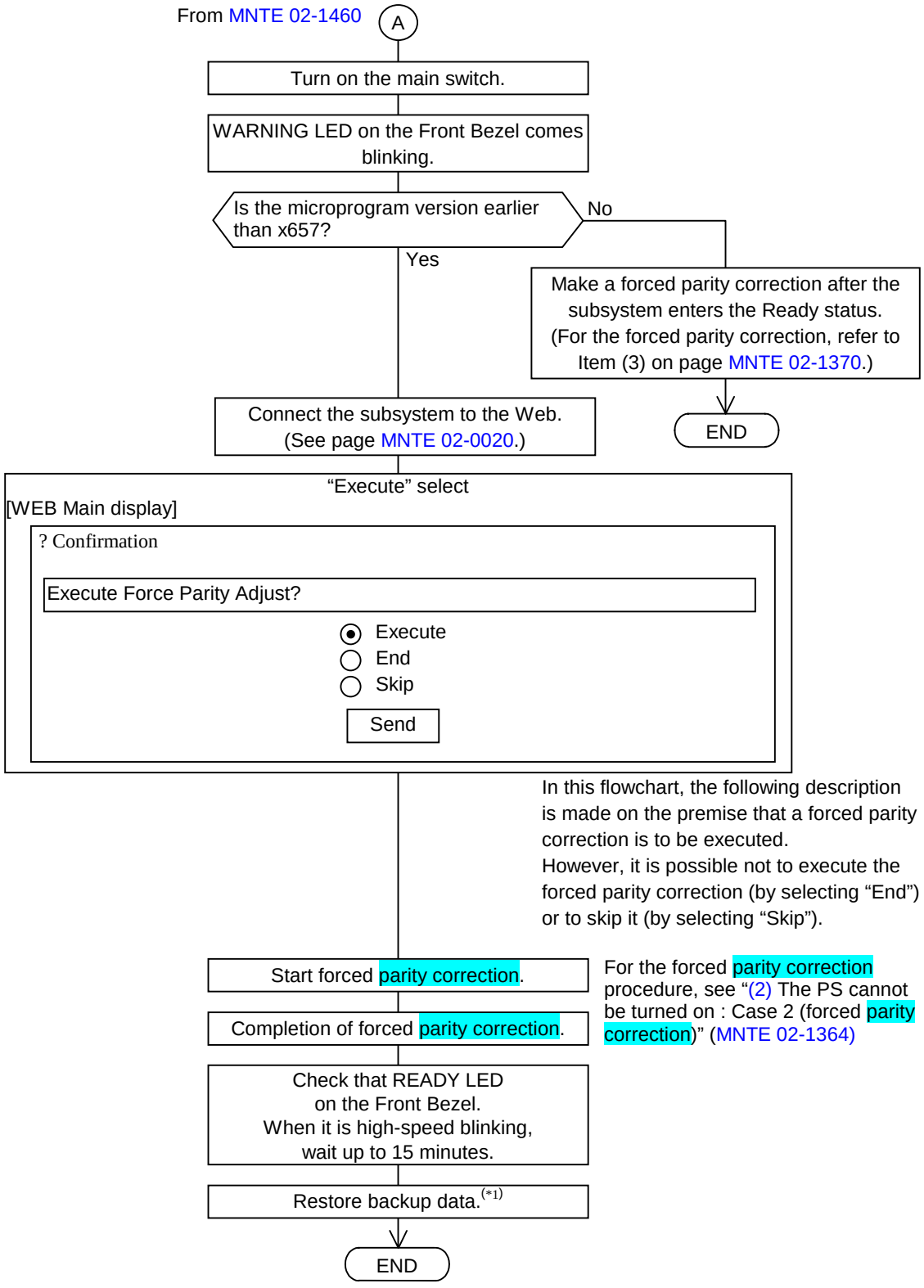


*1 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

*2 : For the Error trace with power on, "2.5.3 Collection simple" (MNTE 02-2180).

*3 : For the replacement of the Control Unit, see "5.3.5 Replacing Control Unit" (MNTE 05-0380).

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

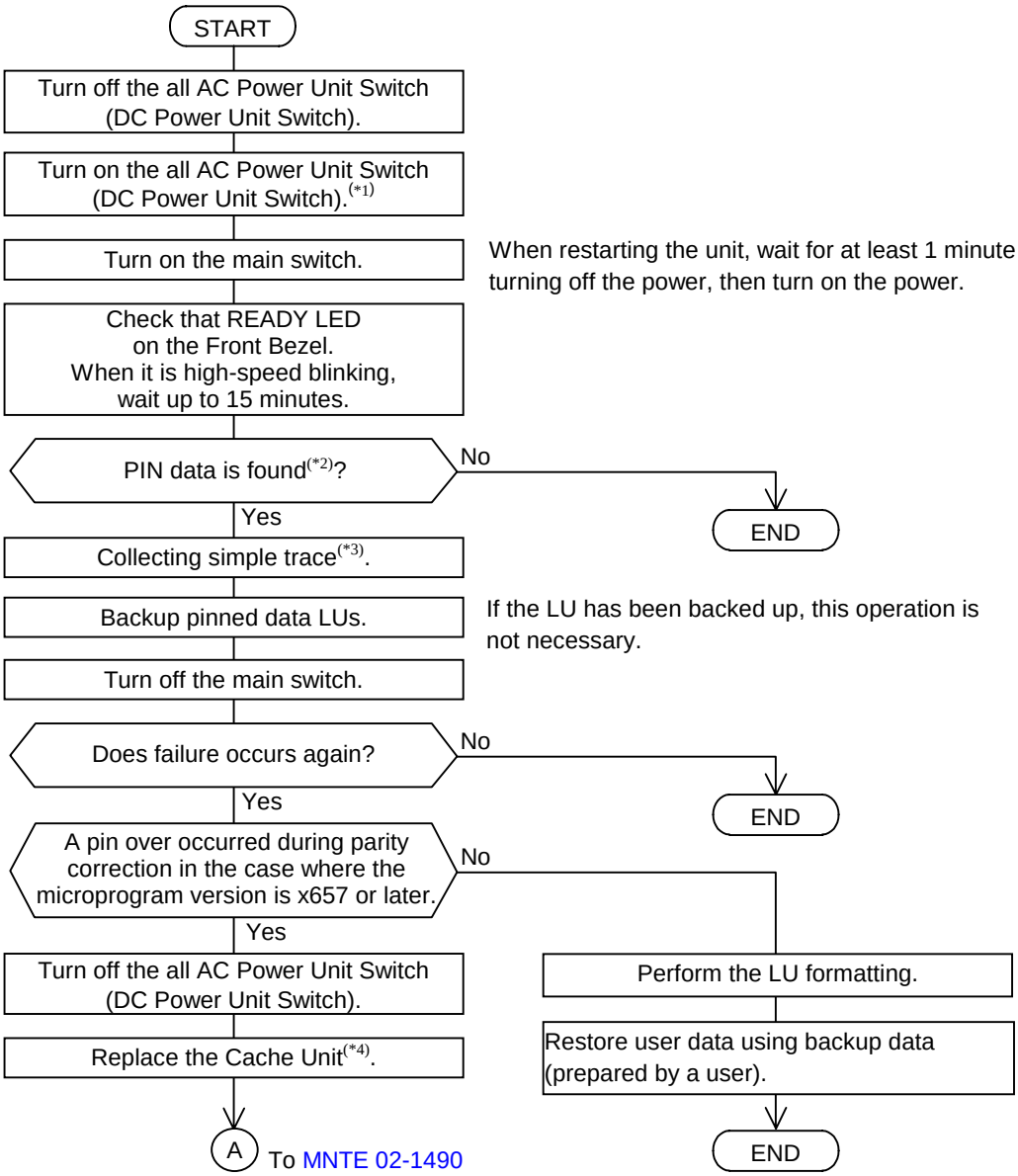
Copyright © 2002, 2005, Hitachi, Ltd.

(7) When the PS cannot be turned off : Case 4
(Planned shutdown cannot be performed because PIN data cannot be saved due to a Cache memory error, etc.)

[WEB Information Message display]

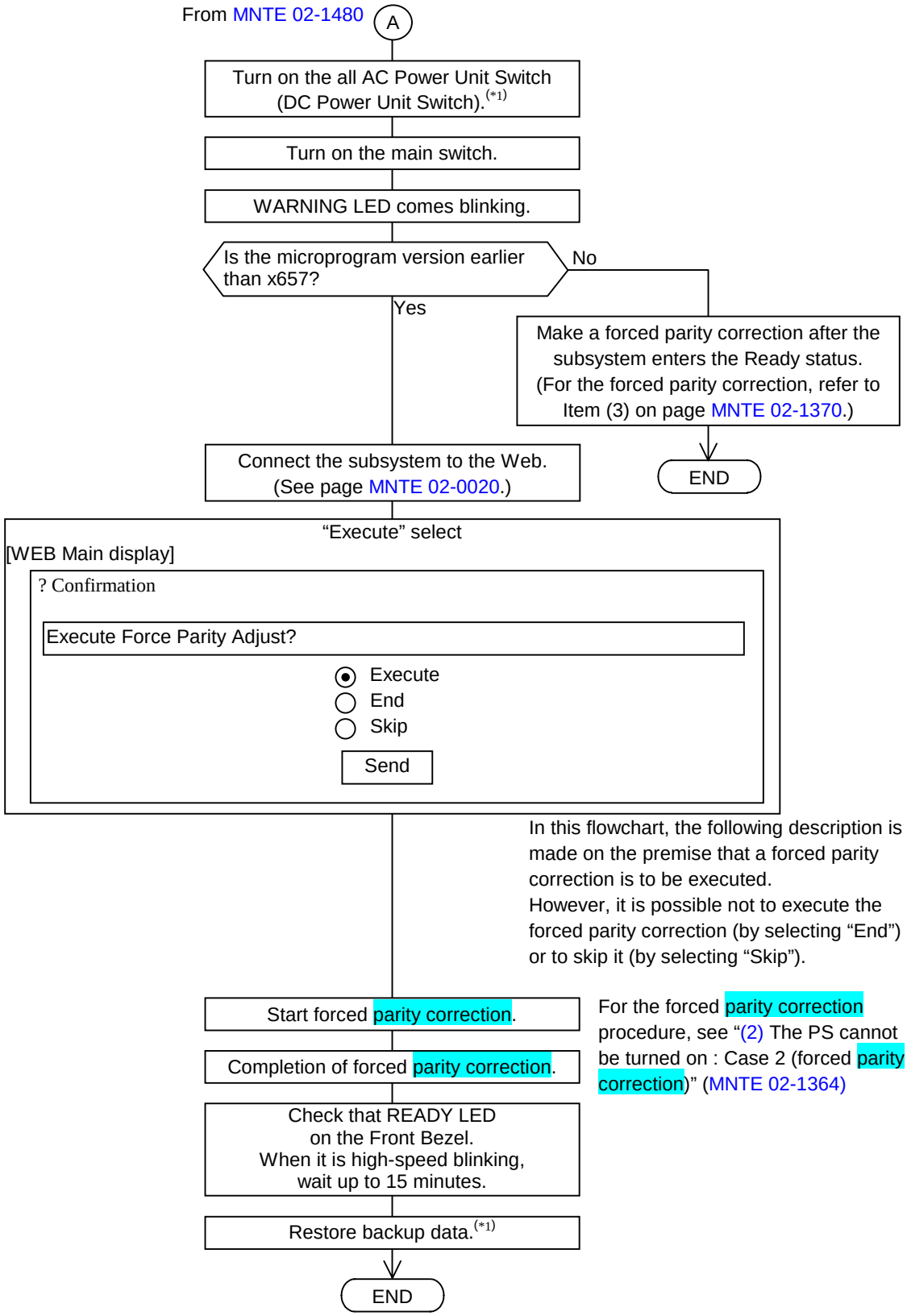
MM/DD/YYYY HH:MM:SS Cx W23000 PS OFF failed [CACHE ERR] :MANUAL/STRC
Date Time Detect Controller#

[Recovery measures]



*1: If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.
*2: Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).
*3: For the Error trace with power on, see "2.5.3 Collection simple trace" (MNTE 02-2180).
*4: For the replacement of the Cache Unit, see "5.3.6 Replacing Cache Unit" (MNTE 05-0470).

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

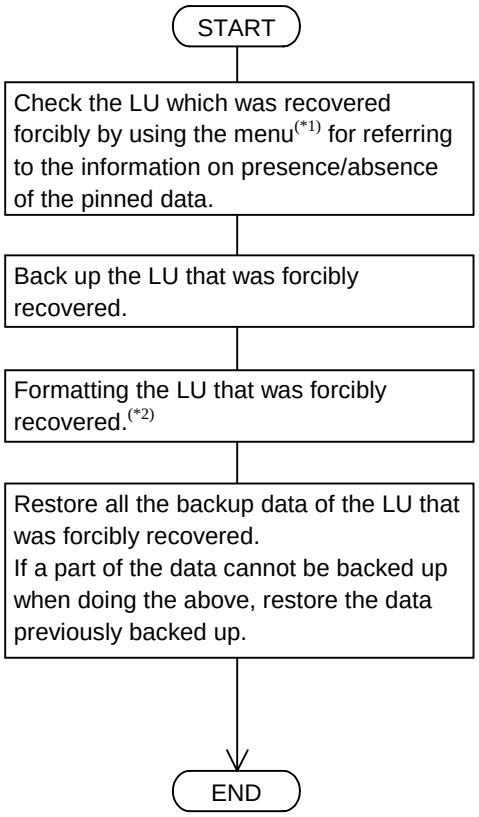
Copyright © 2002, 2005, Hitachi, Ltd.

(8) Data restoration and copy back do not terminate normally : Case 1
(Forced recovery was performed because an 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]

MM/DD/YYYY HH:MM:SS Cx I153xy Data recovery partial :MANUAL/STRC
Date Time Detect Controller#

[Recovery measures]



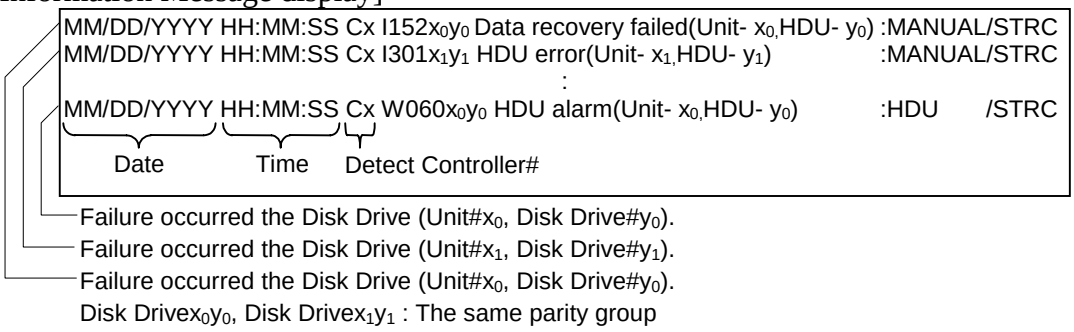
*1 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*2 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

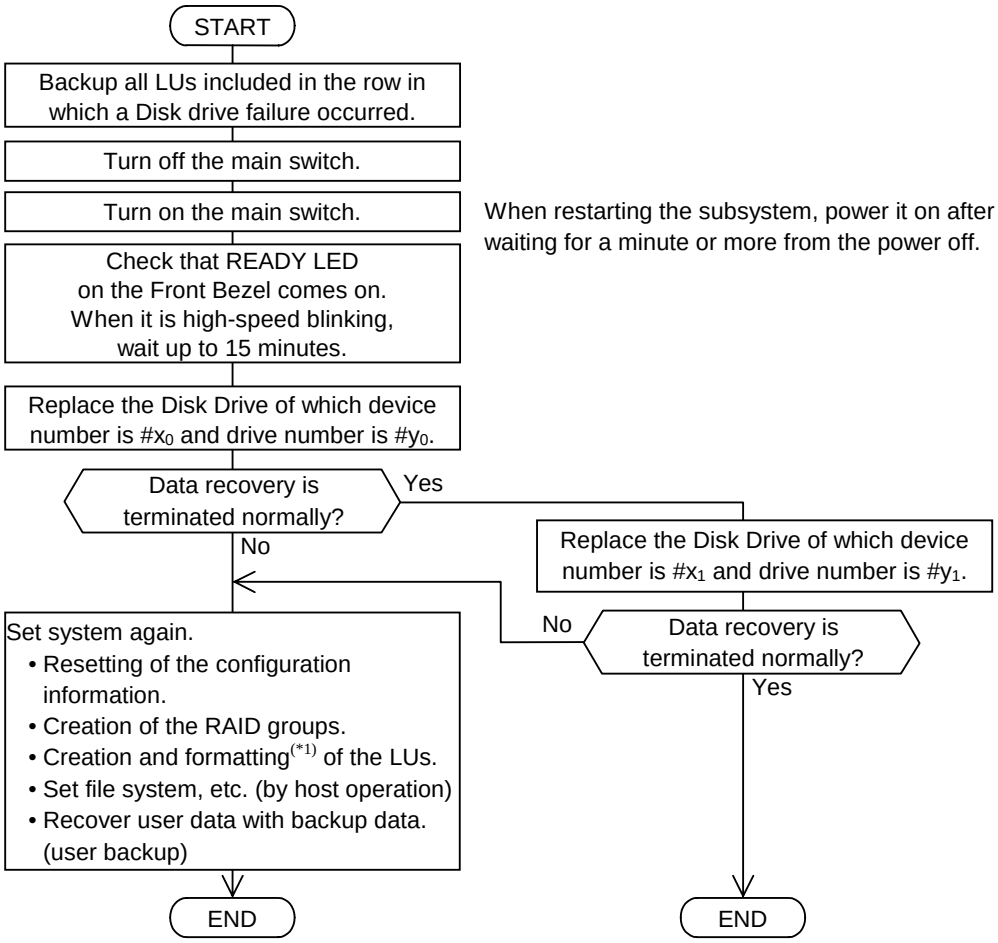
Copyright © 2002, 2005, Hitachi, Ltd.

(9) Data restoration and copy back do not terminate normally : Case 2
(Recovery was terminated abnormally because a Disk Drive error occurred in the copy source during a correction copy)

[WEB Information Message display]



[Recovery measures]

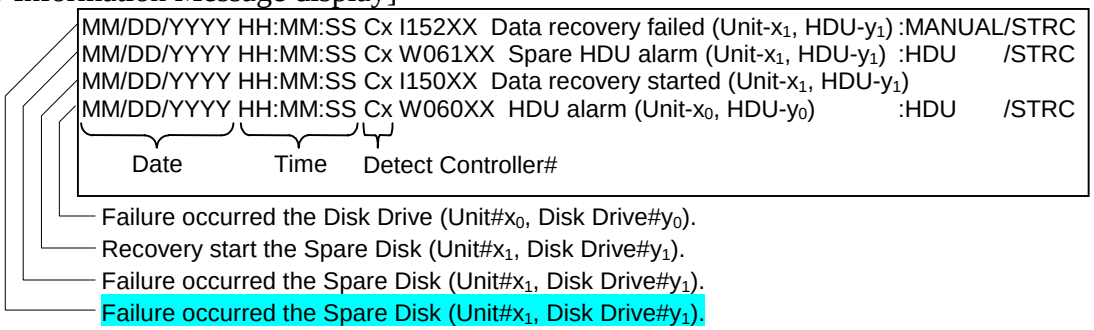


*1 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

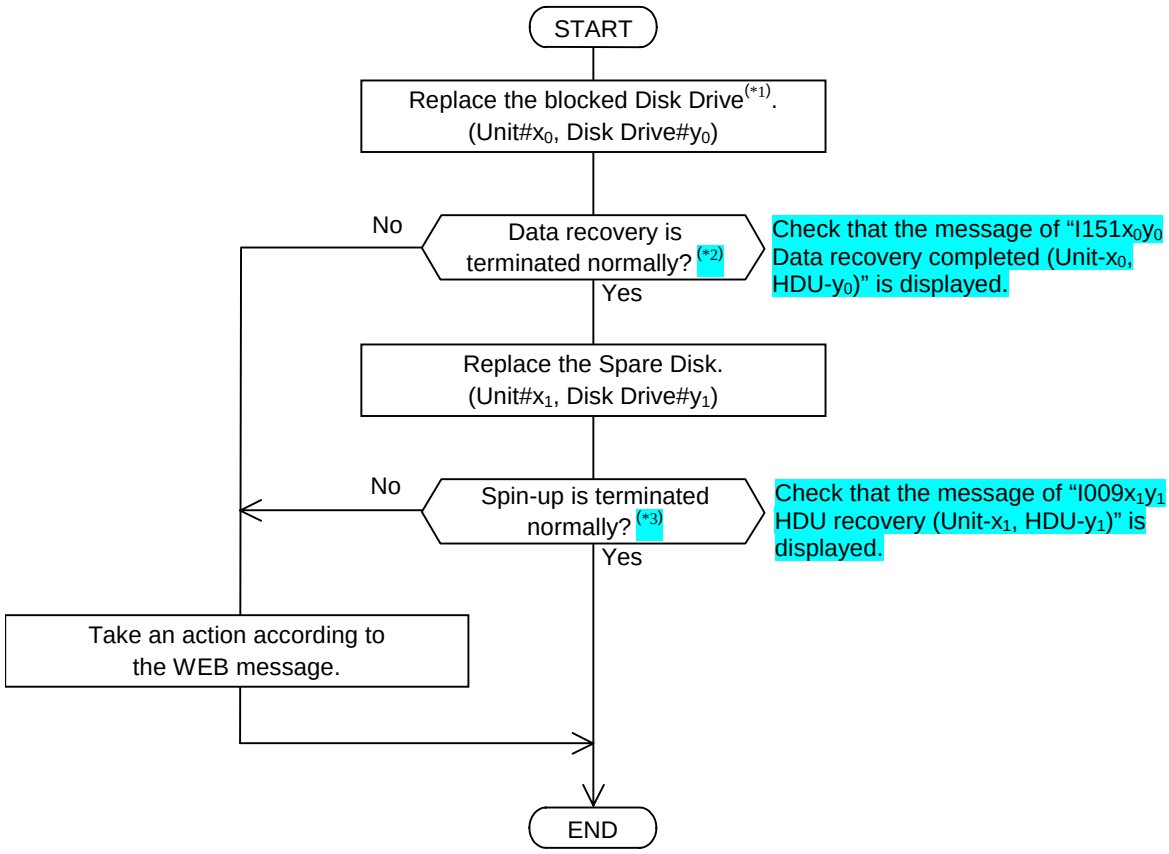
Copyright © 2002, 2005, Hitachi, Ltd.

(10) Data restoration and copy back do not terminate normally : Case 3
(A Spare Disk failure occurred while the correction is copied and the recovery failed.)

[WEB Information Message display]



[Recovery measures]



*1 : For the replacement of the Disk Drive, see "5.3.1 Replacing Disk Drive" (MNTE 05-0120).
*2 : Check that the message of "I151x0y0 Data recovery completed (Unit-x0, HDU-y0)" is displayed.
*3 : Check that the message of "I009x1y1 HDU recovery (Unit-x1, HDU-y1)" is displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

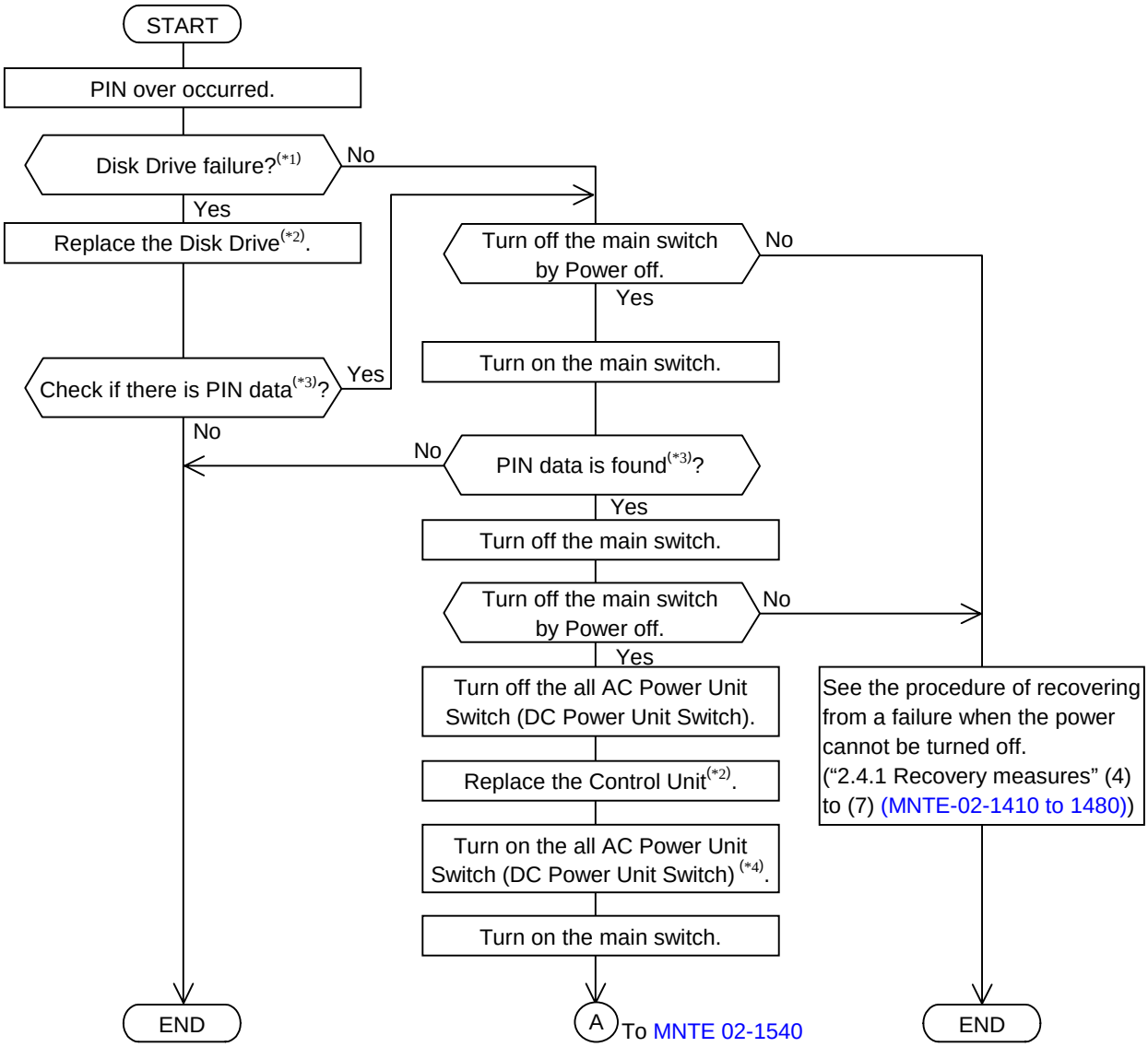
(11) Recovery procedure for PIN OVER.

[WEB Information Message display]

MM/DD/YYYY HH:MM:SS Cx W41100 PIN over[PNLEVLOV] :MANUAL/STRC

Date Time Detect Controller#

[Recovery measures]



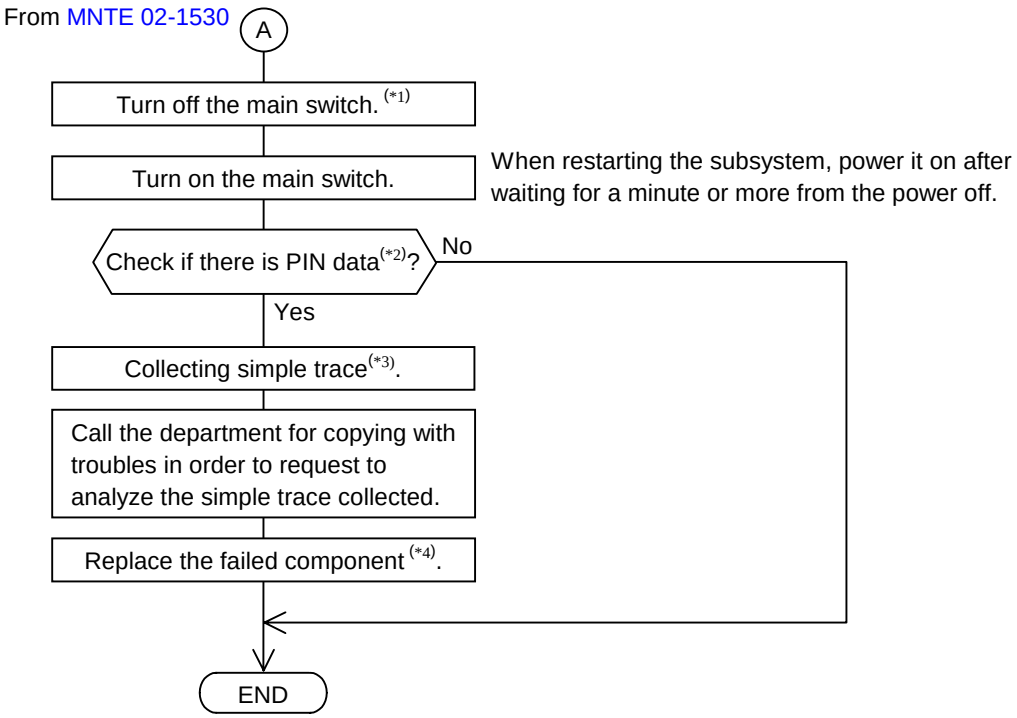
*1 : For checking a Disk Drive error, refer to "2.6.2 (2) Trouble analysis based on LED indication of Disk Drive" (MNTE 02-2410) or "2.2 Trouble analysis by WEB connection" (MNTE 02-0110).

*2: For the replacement of the failed component, see "Chapter 5".

*3 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*4 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

Copyright © 2002, 2005, Hitachi, Ltd.



*1 : To write pinned data on a drive, replace the Control Unit, and then execute the deliberate shutdown.

*2 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

*3 : For the replacement of the failed component, see "Chapter 5".

*4 : For the replacement of the Control Unit, see "5.3.5 Replacing Control Unit" (MNTE 05-0380).

Copyright © 2002, 2005, Hitachi, Ltd.

(12) An error occurred during operation : Case 1
(Data containing an LA/LRC error was detected)

[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

Date Time Detect Controller#

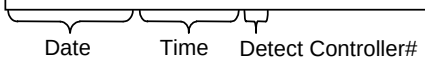
x : Controller# (0-1)
y : Transfer direction (R : Read, W : Write)

Copyright © 2002, 2005, Hitachi, Ltd.

[WEB Information Message display]

Any one of the following is displayed.

MM/DD/YYYY HH:MM:SS Cx W3360x Data transfer check error [SEGPOSERR] (CTL-x)	:MANUAL/DMP
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



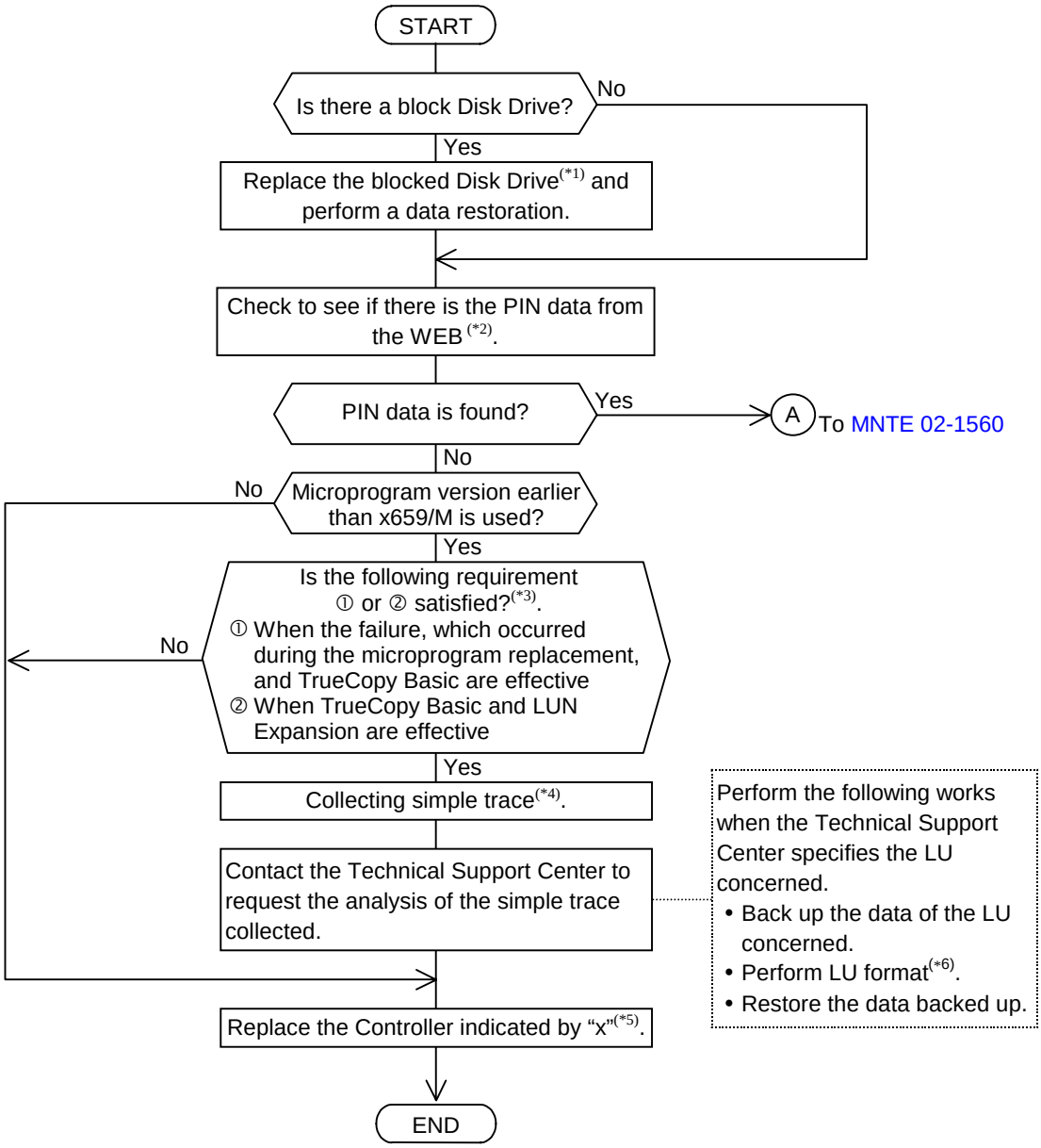
x : Controller# (0-1)

y : Transfer direction (R : Read, W : Write)

xx : DMA#(0-1)

Copyright © 2004, 2005, Hitachi, Ltd.

[Recovery measures]



*1 : For the replacement of the Disk Drive, see "5.3.1 Replacing Disk Drive" (MNTE 05-0120).

*2 : Checking the presence of PIN data is performed by the Maintenance function of Disk Array Management Program. Refer to "4.2.4 Displaying Logical Unit Failure Data Information" (MNTE 04-0290).

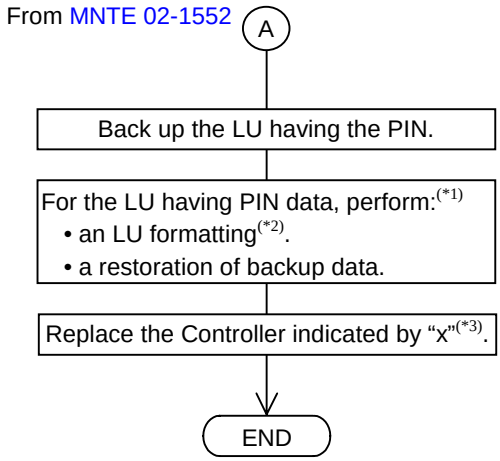
*3: Refer to the Installation "5.5.2 Setting the subsystem configuration information (9) Setting of Options" (INST 05-0960) to check if TrueCopy Basic and LUN Expansion are effective.

*4: For the Error trace with power on, see "2.5.3 Collection simple trace" (MNTE 02-2180).

*5 : For the replacement of the Control Unit, see "5.3.5 Replacing Control Unit" (MNTE 05-0380).

*6 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : 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.

*2 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

*3 : For the replacement of the Control Unit, see "5.3.5 Replacing Control Unit" (MNTE 05-0380).

Copyright © 2002, 2005, Hitachi, Ltd.

(13) System down.

[WEB Information Message display]

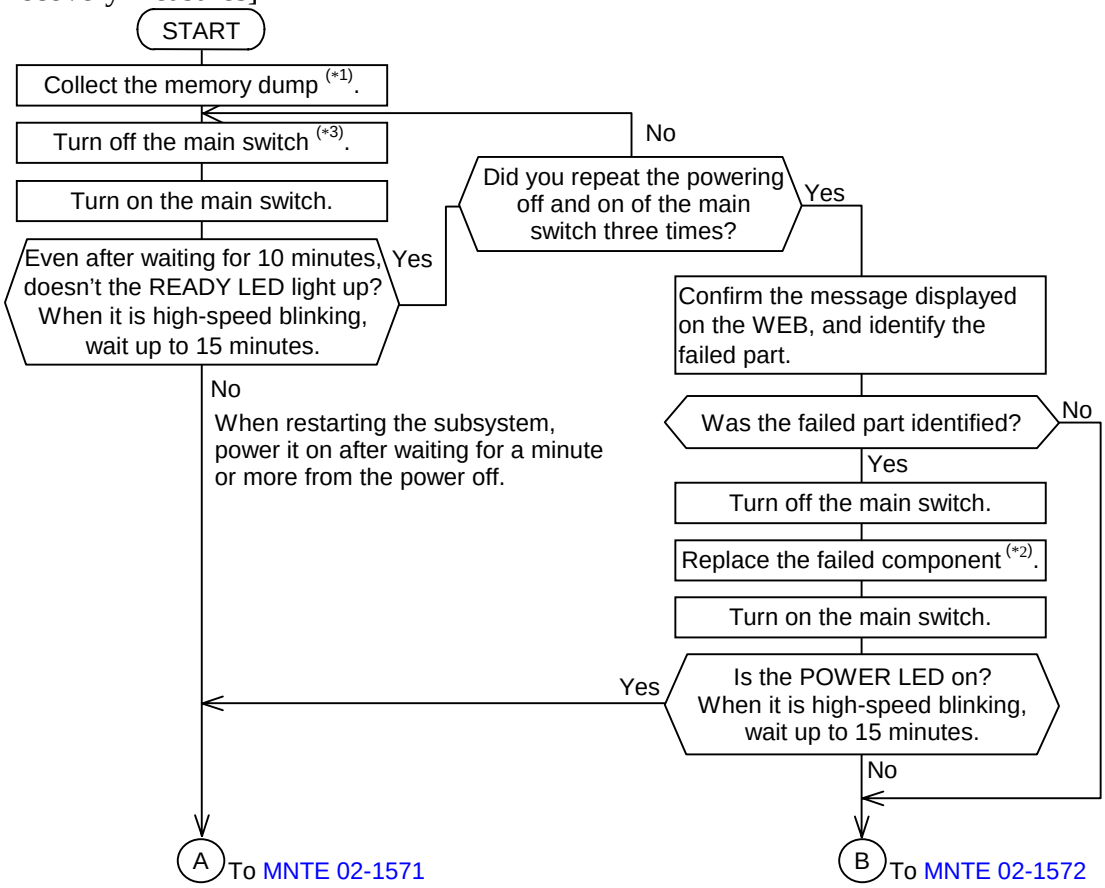
MM/DD/YYYY HH:MM:SS Cx Hxxxxxx ○○○○○○○ : △△△△△△/□□□□

Date Time Detect Controller#

xxxxx, ○○○○○○○ : △△△△△△/□□□□ Optional

NOTE : • When the ALARM LED lights off, refer to "2.6 Trouble Analysis by LED Indication" (MNTE 02-2320) to recover the failures.
• The recovery procedure 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 frame 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 measures]

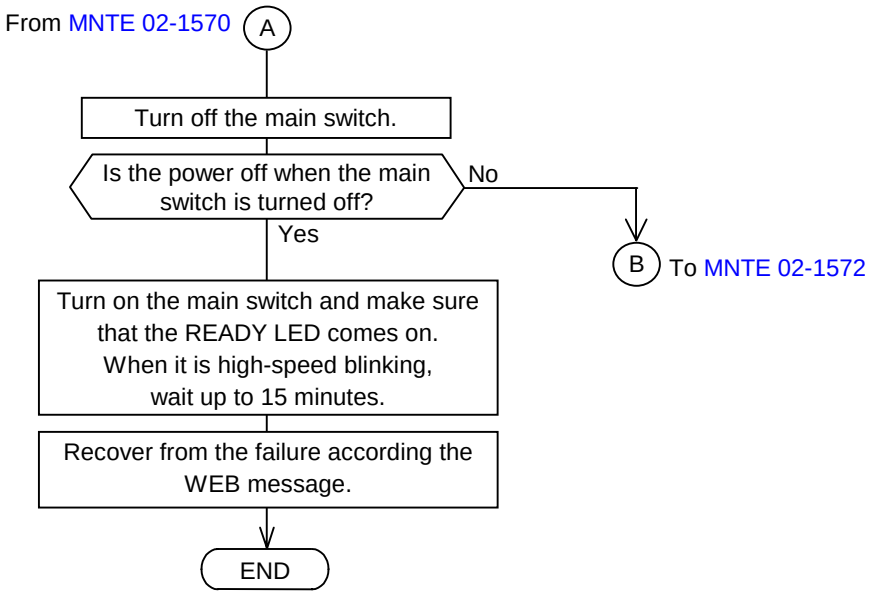


*1: For the Error trace with power on, see "2.5.5 Collect memory dump" (MNTE 02-2260).

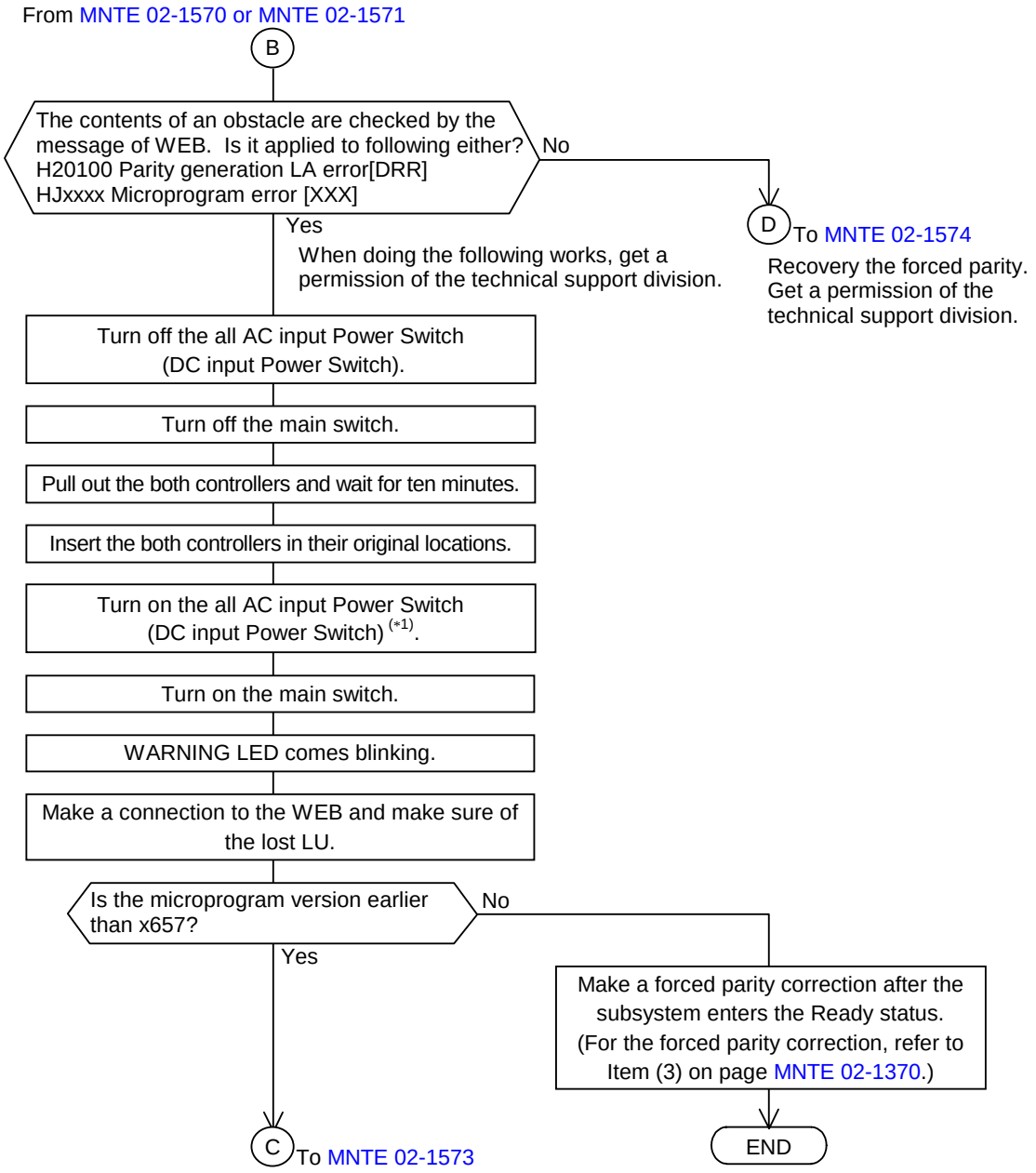
*2: For the replacement of the failed component, see "Chapter 5".

*3: When the ALARM LED does not go out five minutes or longer after the main switch is turned off, turn off the AC input power switch (DC input power switch).

Copyright © 2002, 2005, Hitachi, Ltd.

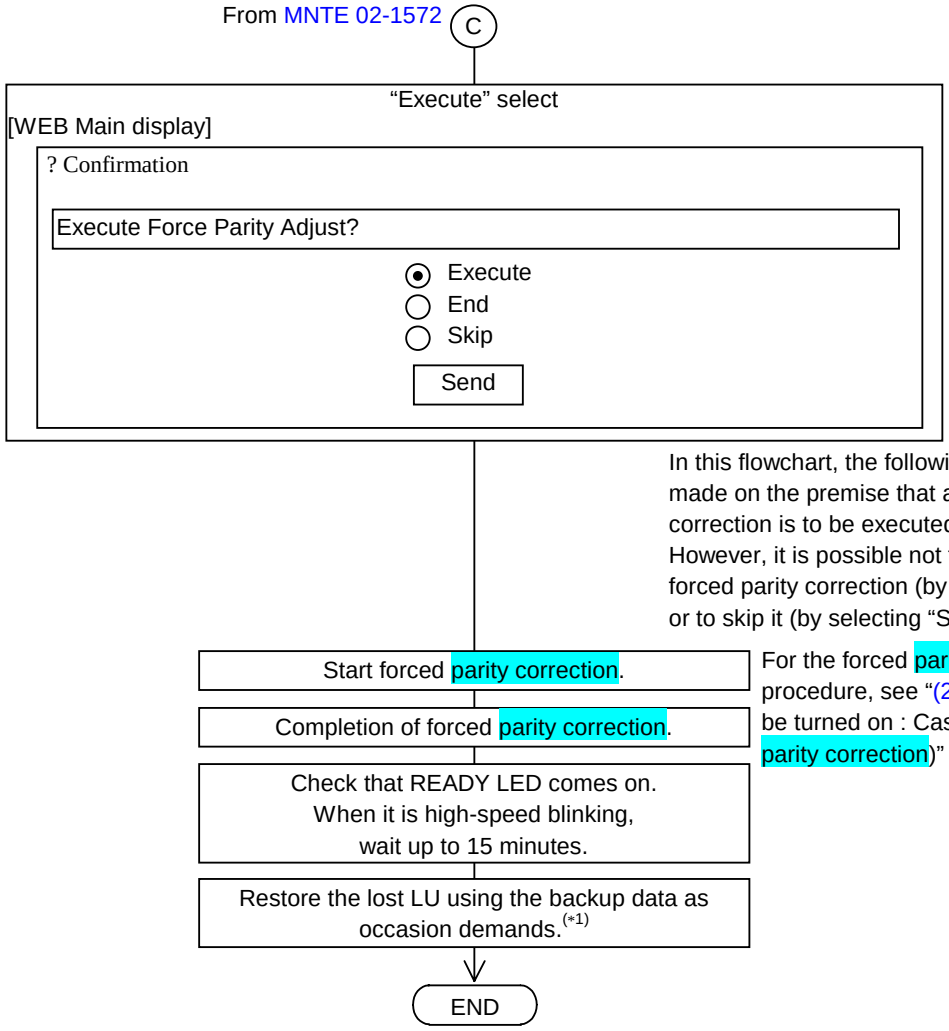


Copyright © 2003, 2005, Hitachi, Ltd.



*1: If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

Copyright © 2003, 2005, Hitachi, Ltd.



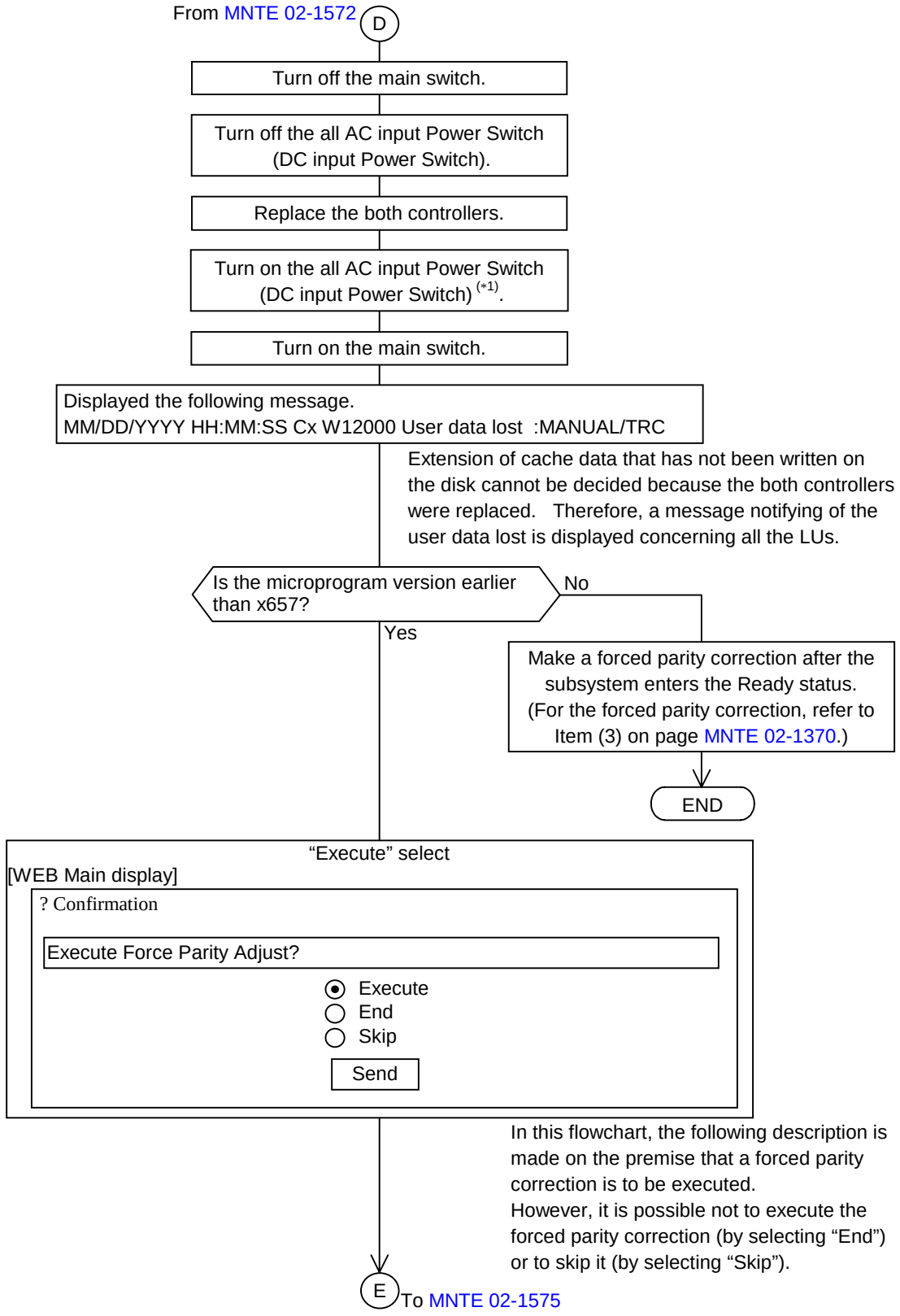
In this flowchart, the following description is made on the premise that a forced parity correction is to be executed.
However, it is possible not to execute the forced parity correction (by selecting "End") or to skip it (by selecting "Skip").

For the forced parity correction procedure, see "(2) The PS cannot be turned on : Case 2 (forced parity correction)" (MNTE 02-1364)

*1 : Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

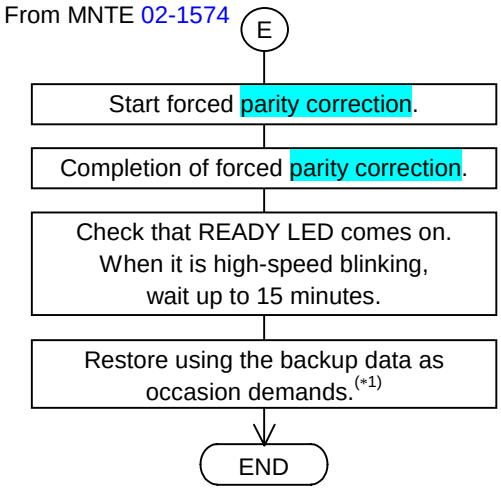
Copyright © 2003, 2005, Hitachi, Ltd.

[Recovery measures] (forced parity correction)



*1 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

Copyright © 2003, 2005, Hitachi, Ltd.



For the forced parity correction procedure, see "(2) The PS cannot be turned on : Case 2 (forced parity correction)" (MNTE 02-1364)

*1: Restore to LU whose access attribute is set by Open LDEV Guard is not possible.

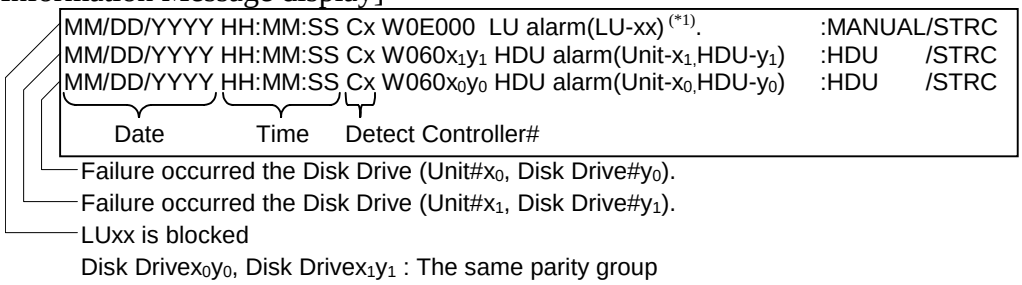
Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

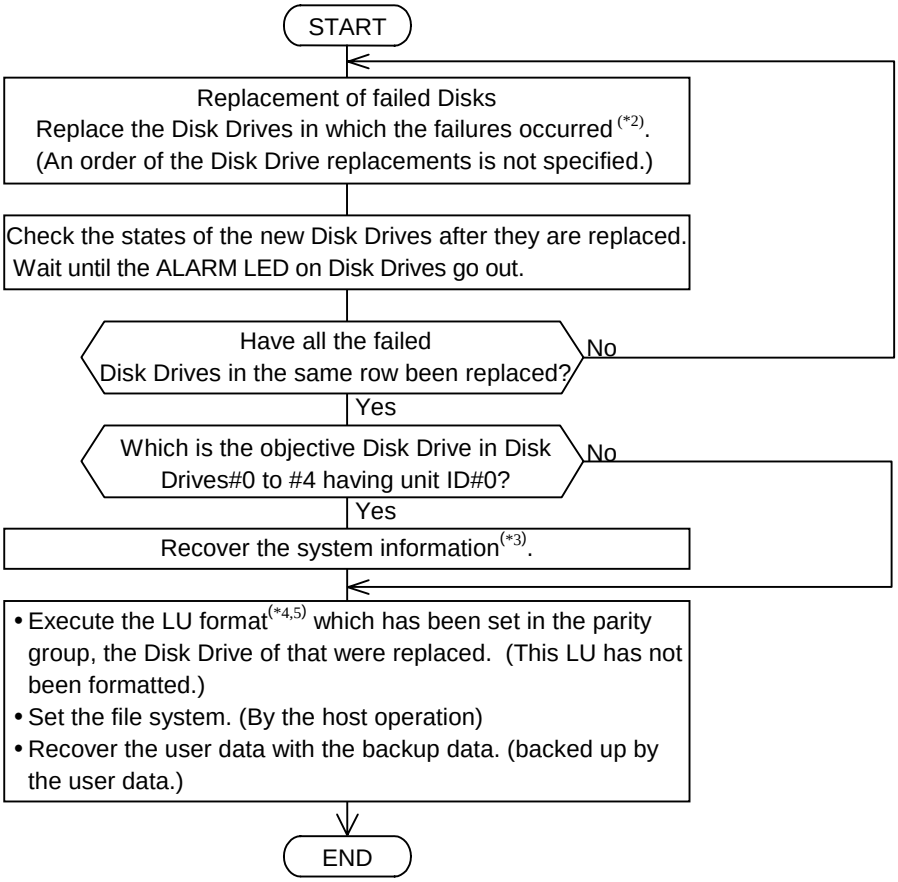
(14) Actions to be taken when an LU blockade occurs.

[WEB Information Message display]



[Recovery measures]

- The recovery operation must be reformed with the subsystem power turned on.



*1 : If Microversion is after x655, the blocked LU number is not displayed, with the message code "W0H000" . Check the blocked LU in the Disk Array Management Program.

*2 : For the replacement of the Disk Drive,. see "5.3.1 Replacing Disk Drive" (MNTE 05-0120).

*3 : Recover the system information with the maintenance function of the Disk Array Management Program. For the operating procedure, see "6.4.3 (5) Restoring the system information" (INST 06-0300)..

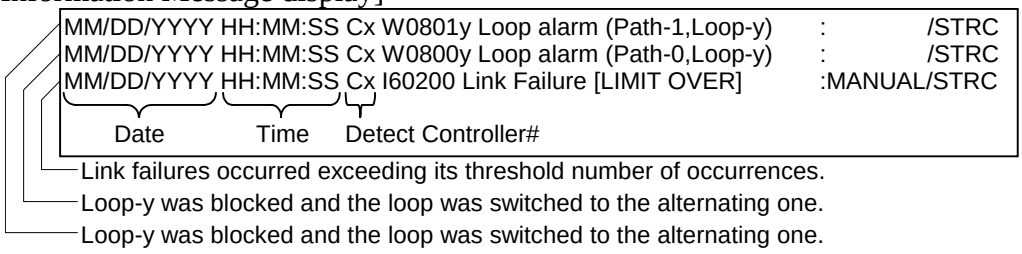
*4 : For the operating procedure, see "5.4.3 Setting of LU" (INST 05-0530).

*5 : There may be a case where the LU formatting fails. In such a case, ask a user to check if a sense key code is reported in the log of a host computer, etc. When the reported sense key code is 05-9552 or 05-9577, it means that the LU concerned is an object of ShadowImage, TrueCopy Basic, or QuickShadow. Therefore, ask a user to split the pair and execute the LU formatting again after the pair is split. (For the LU formatting, refer to the procedure ③-I, "Formatting LU" (on page INST 05-0650) in Subsection 5.4.3, "Setting of LU" of the Volume of Installation. Besides, for an LU whose access attribute is set as that other than Read/Write by Open LDEV Guard, the backup restoration cannot be made because it can neither be formatted nor written.

Copyright © 2002, 2005, Hitachi, Ltd.

(15) 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 "(15-4) Actions to be taken when one of the message codes I5Y400 through I5Y700 is displayed" (MNTE 02-1977) for the maintenance.

If one of the phrases described below is indicated in a string of the messages above, do maintenance work following the messages.

W0100x	CTL alarm				
W060xy	HDU alarm,	W060HH	HDU alarm,	W060AT	SATA HDU alarm
W090xy	ENC alarm,	W090HH	ENC alarm,	W090AT	SENC alarm
I301xy	HDU error,	I301HH	HDU error,	I301AT	SATA HDU error

When the failed part cannot be identified because the above message is not displayed, go to Step (15-1), "Procedure for Recovery from Loop Failure" 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 (15-2), "Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the dual controller configuration)". When a subsystem down has occurred in the case of the single controller configuration, go to Step (15-3), "Procedure for Recovery from a Loop Failure (in the case of a subsystem down occurs in the single controller configuration)" and take a recovery action explained in it.

Copyright © 2002, 2005, Hitachi, Ltd.

- 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.

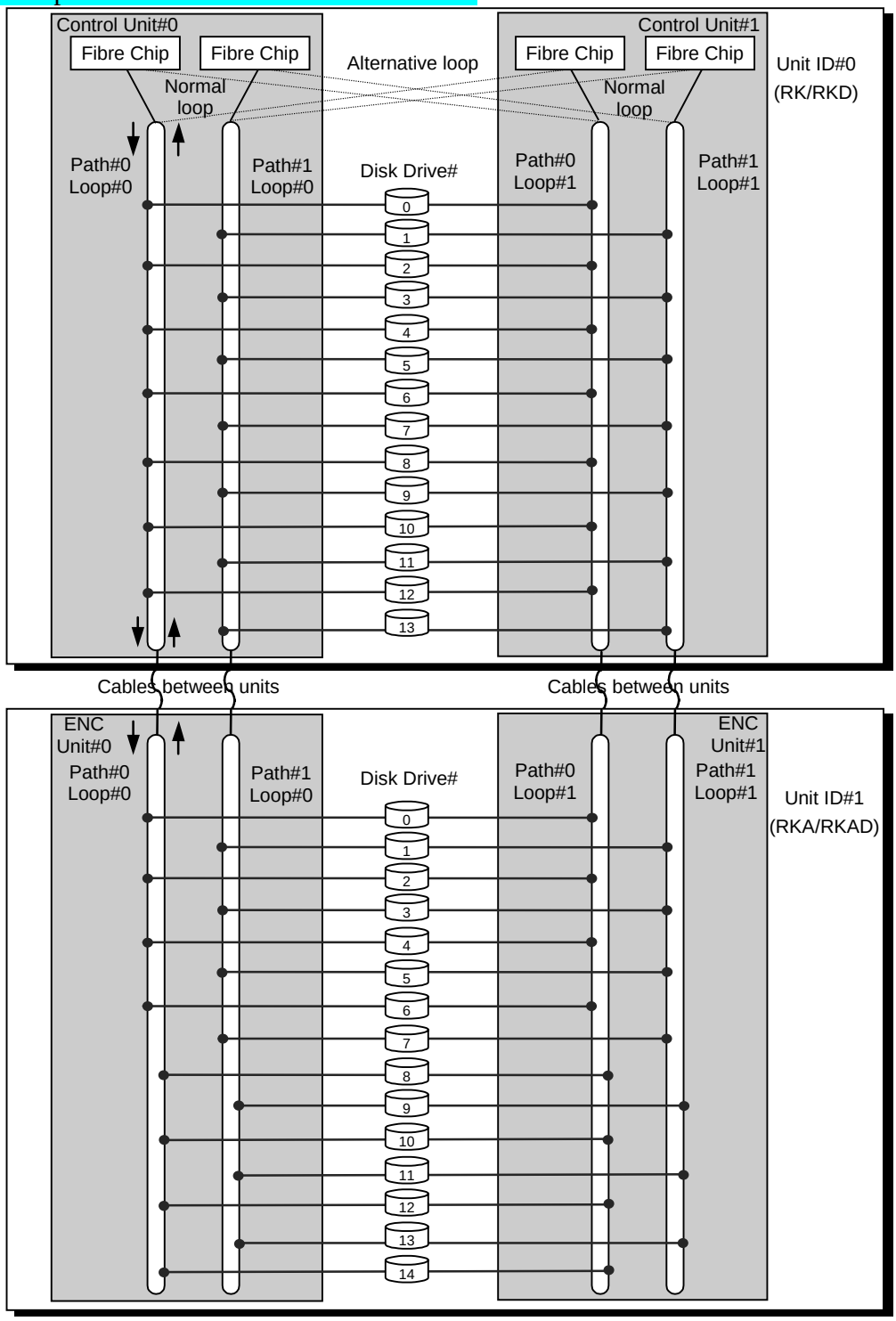
	Control Unit to be used normally	Usage of loop (For HDDs)	RK+RKA × 14/ RKD+RKAD × 14	RKS, RKSD	RKH/RKHE+RKA × 30
			Number of HDDs in the same loop		
LOOP#0	Controller#0	Path #0	Max. 119	Max. 7	Max. 119
		Path #1	Max. 105	Max. 7	Max. 105
		Path #2	—	—	Max. 120
		Path #3	—	—	Max. 105
LOOP#1	Controller#1	Same as the above	Same as the above	Same as the above	Same as the above
	Control Unit to be used normally	Usage of loop (For HDDs)	RK+RKAAT × 14 RK+RKAJAT × 14	RKH/RKHE+RKA × 2 + RKAAT × 28 RKH/RKHE+RKA × 2 + RKAJAT × 28	RKL+RKAATL × 3 RKL+RKAJATL × 3
			Number of HDDs in the same loop		
LOOP#0	Controller#0	Path #0	Max. 112	Max. 112	Max. 37
		Path #1	Max. 112	Max. 112	Max. 22
		Path #2	—	Max. 112	—
		Path #3	—	Max. 112	—
LOOP#1	Controller#1	Same as the above	Same as the above	Same as the above	Same as the above

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

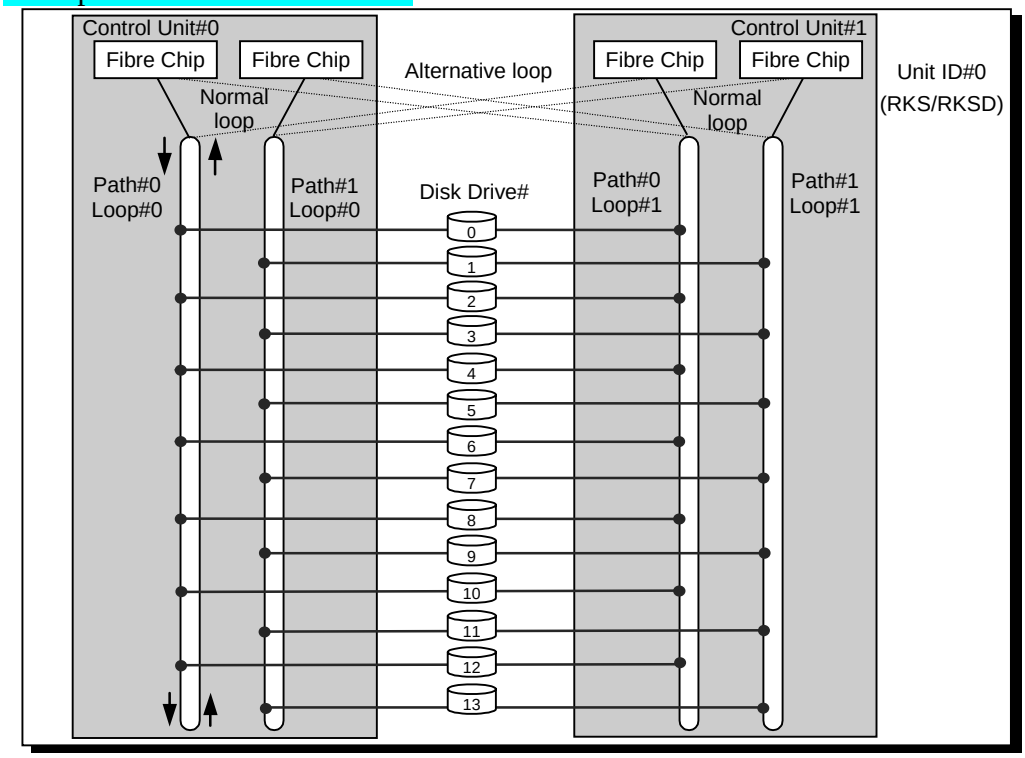
• Loop structure of RK/RKA/RKD/RKAD



When a loop failure occurs, the controller that detects the failure uses a path used by another system as an alternating path.

Copyright © 2002, 2005, Hitachi, Ltd.

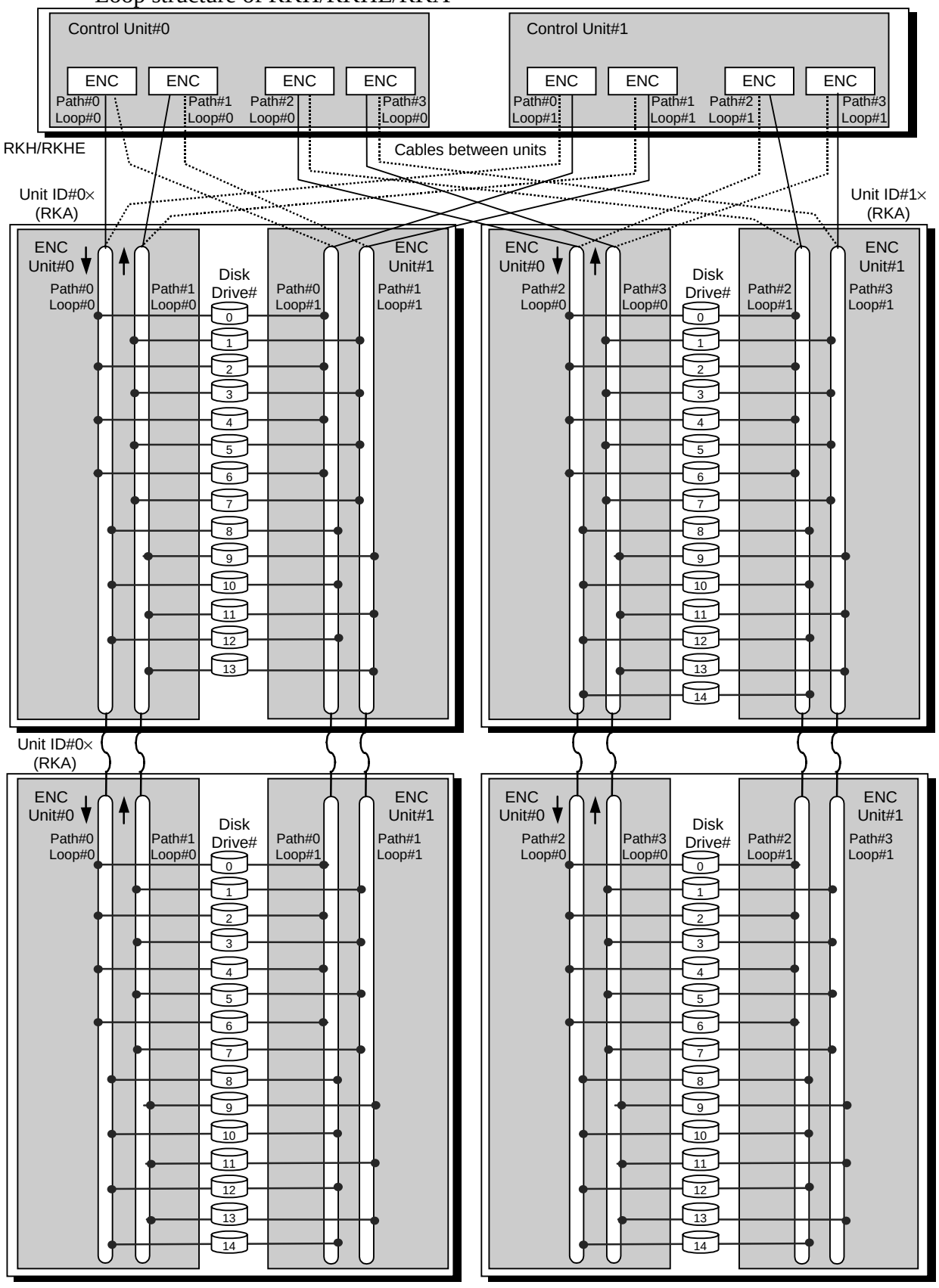
• Loop structure of RKS/RKSD



When a loop failure occurs, the controller that detects the failure uses a path used by another system as an alternating path.

Copyright © 2002, 2005, Hitachi, Ltd.

- Loop structure of RKH/RKHE/RKA

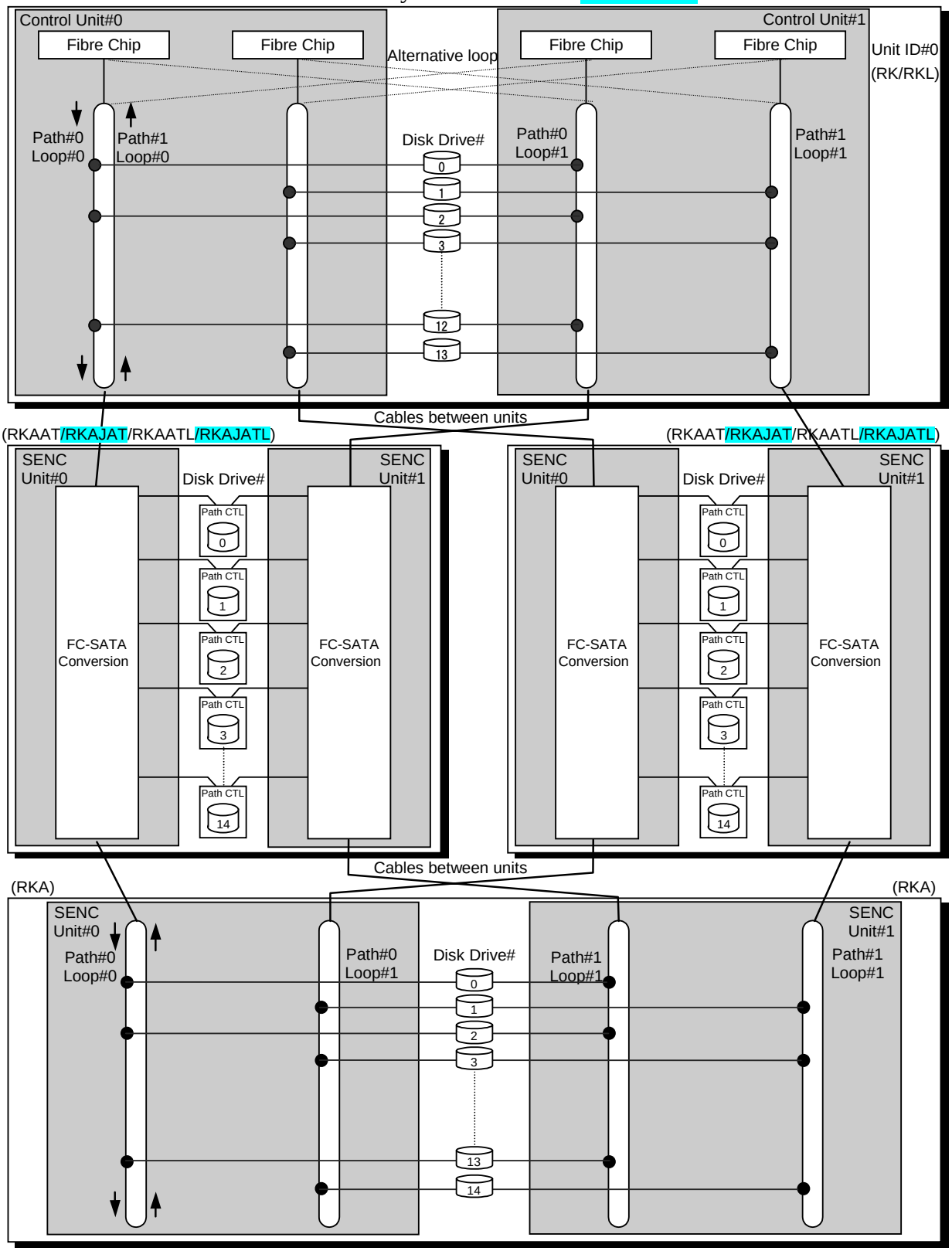


Copyright © 2003, 2005, Hitachi, Ltd.

When a loop failure occurs, the controller that detects the failure uses a path used by another system as an alternating path.

Copyright © 2003, 2005, Hitachi, Ltd.

- A case where the RK+RKAATs+RKAs/ RK+RKAJATs+RKAs/RKL+RKAATLs/ RKL+RKAJATLs are connected
  The RKL can be connected only to the RKAATL/RKAJATL.

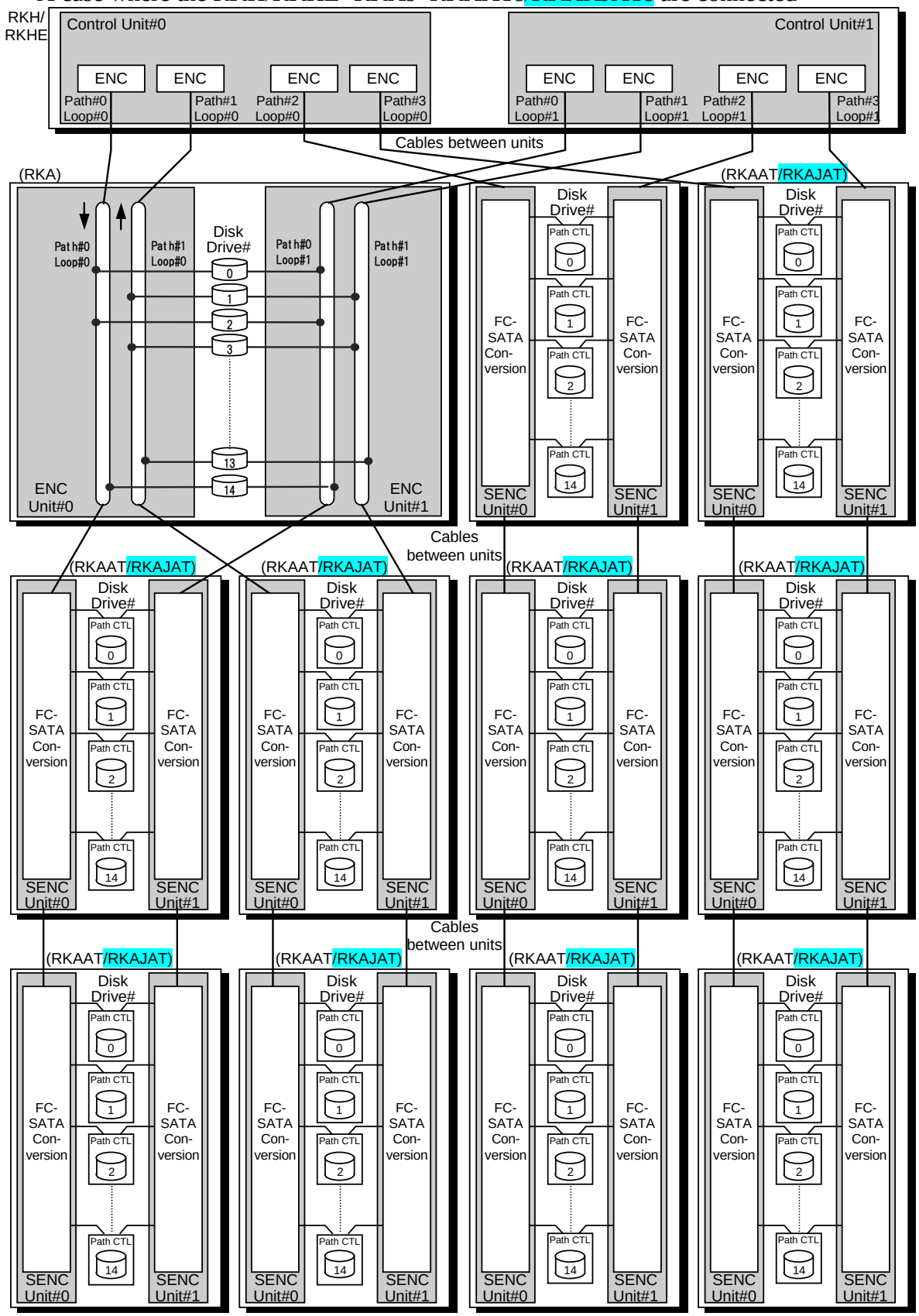


Copyright © 2004, 2005, Hitachi, Ltd.

When a loop failure occurs, the controller that detects the failure uses a path used by another system as an alternating path.

Copyright © 2004, 2005, Hitachi, Ltd.

A case where the RKH/RKHE+RKAs+RKAATs/RKAAJATs are connected



Copyright © 2004, 2005, Hitachi, Ltd.

When a loop failure occurs, the controller that detects the failure uses a path used by another system as an alternating path.

Copyright © 2004, 2005, Hitachi, Ltd.

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.

Perform a diagnosis with a loop test after the W080xy loop alarm was given. 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. If "W0100x CTL alarm/W060xy HDU alarm/W060HH HDU alarm/W060AT SATA HDU alarm/W090xy ENC alarm/ W090HH ENC alarm/W090AT SENC alarm/1301xy HDU/I301HH HDU error/ I301AT SATA HDU error" is displayed among a series of messages as shown in ②, take an action following the message. (In this case, a loop failure was caused by a faulty HDD.)

Copyright © 2002, 2005, Hitachi, Ltd.

(15-1) 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 it when single execution of the Loop Failure Detection Function is completed.
(Replacement components: Disk Drive, Backup Battery Unit, Power Unit (Power Unit (DC), Fan Assembly, and Control Unit, ENC Unit, SENC Unit)

(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. Re-execute the recovery operation using the Loop Failure Detection Function after the recovery from the new failure is completed.

[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 “Check List #1 and #2 for Failed HDU Isolation” (MNTE 02-1740, MNTE 02-1750) appended to the Maintenance Manual.
To use the “Check List #1 and #2 for Failed HDU Isolation” (MNTE 02-1740, MNTE 02-1750), make as many copies of it as necessary for the recovery operation.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 a failure other than the loop failure (an HDU failure (W060xy, I301xy), a CTL failure (W0100x) or an ENC Unit failure (W070xy)) has also occurred, take a recovery action against it according to the message before using the Loop Failure Detection Function.

(ix) Do not turn off the AC Power Unit Switch (DC Power Unit Switch) of the subsystem while the Loop Failure Detection Function is being executed.
If the AC Power Unit Switch (DC 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 (DC Power Unit Switch) of the added RKA (RKAD) one, turn it on again, then turn on the AC Power Unit Switch (DC Power Unit Switch) of the subsystem.

(b) How to open the "Failed Drive Diagnosis window"

(i) Connect a PC and the DF600 subsystem via a LAN (in order to use the WEB function).

(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 subsection 2.1.1 "(4) Procedure to connect portable maintenance PC to WEB" (MNTE 02-0030).

Copyright © 2002, 2005, Hitachi, Ltd.

(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 box. 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].

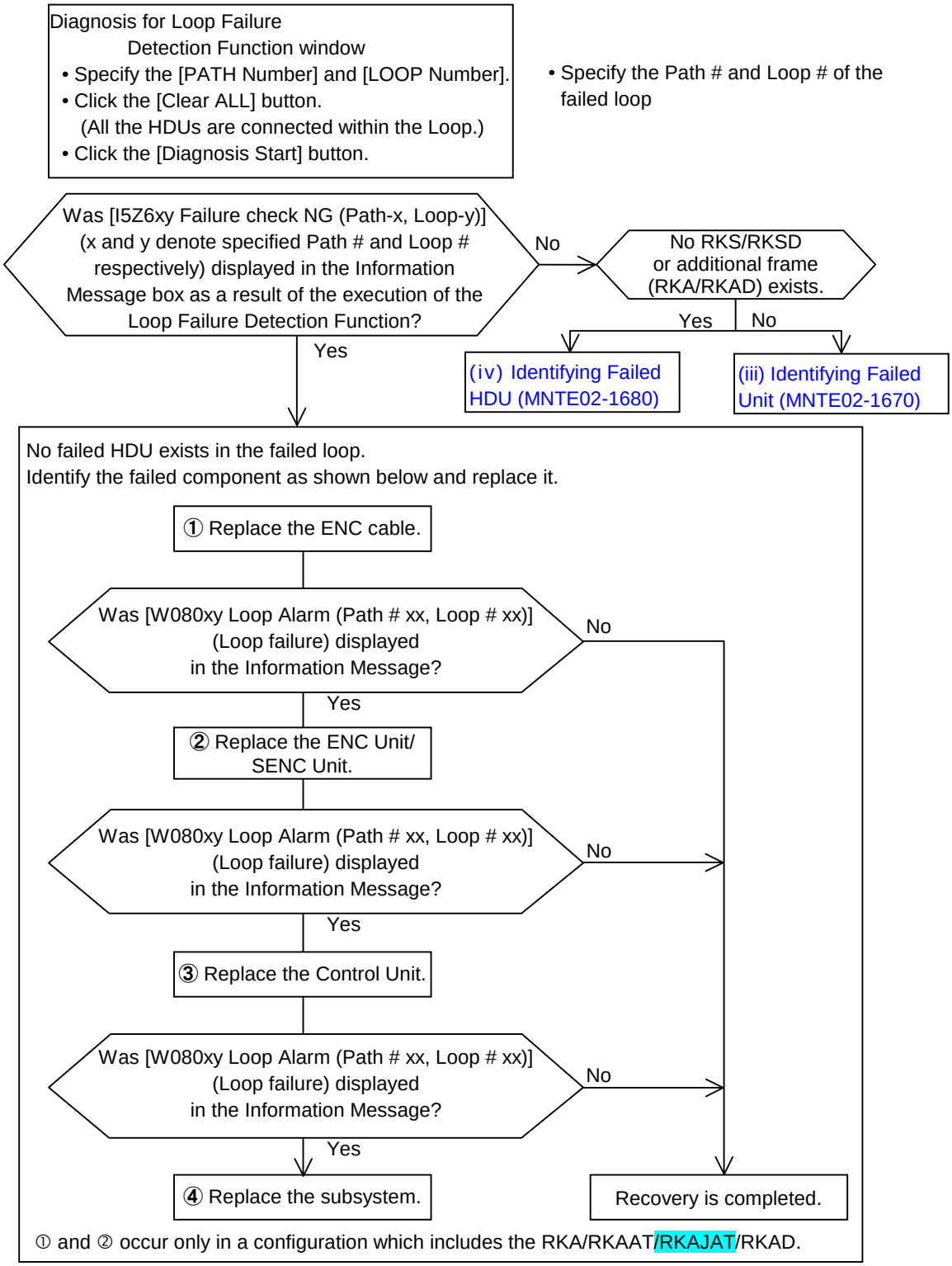
③ When [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the Information Message box as a result of the execution of the Loop Failure Detection Function, the Path # and Loop # shown in parentheses represent the failed loop. Enter the 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 (i), “Identifying Failed HDU” in Item (c-2) on page MNTE 02-1690. (When doing that, use the Check List #2 for Failed HDU Isolation (For checking all HDUs).)

Copyright © 2002, 2005, Hitachi, Ltd.

(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).



Copyright © 2002, 2005, Hitachi, Ltd.

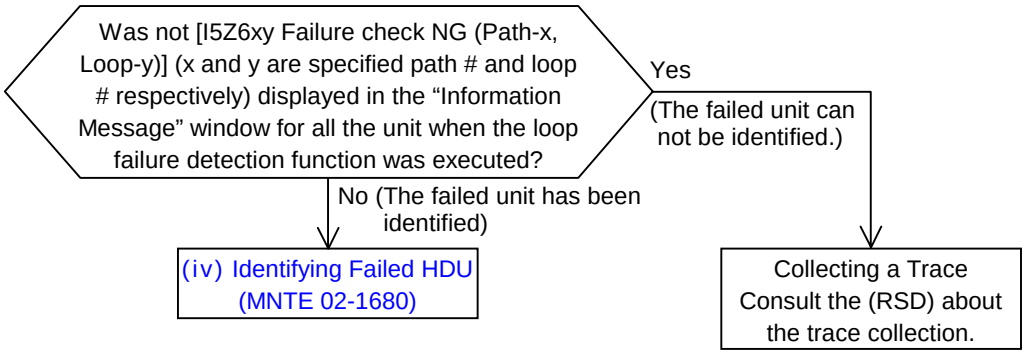
(iii) Identifying Failed Unit

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 box, in the check sheet. (It is determined that the failed component exists in the failed unit.)



Copyright © 2002, 2005, Hitachi, Ltd.

(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.

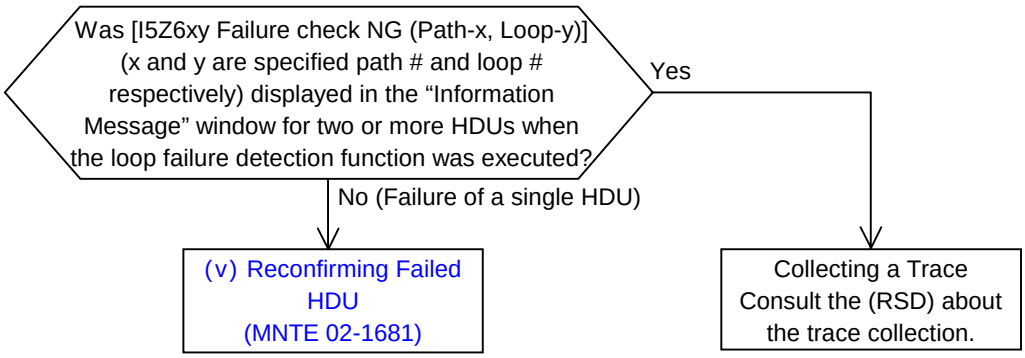
- Execute the Loop Failure Detection Function for all the HDUs of the Unit-x.

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.

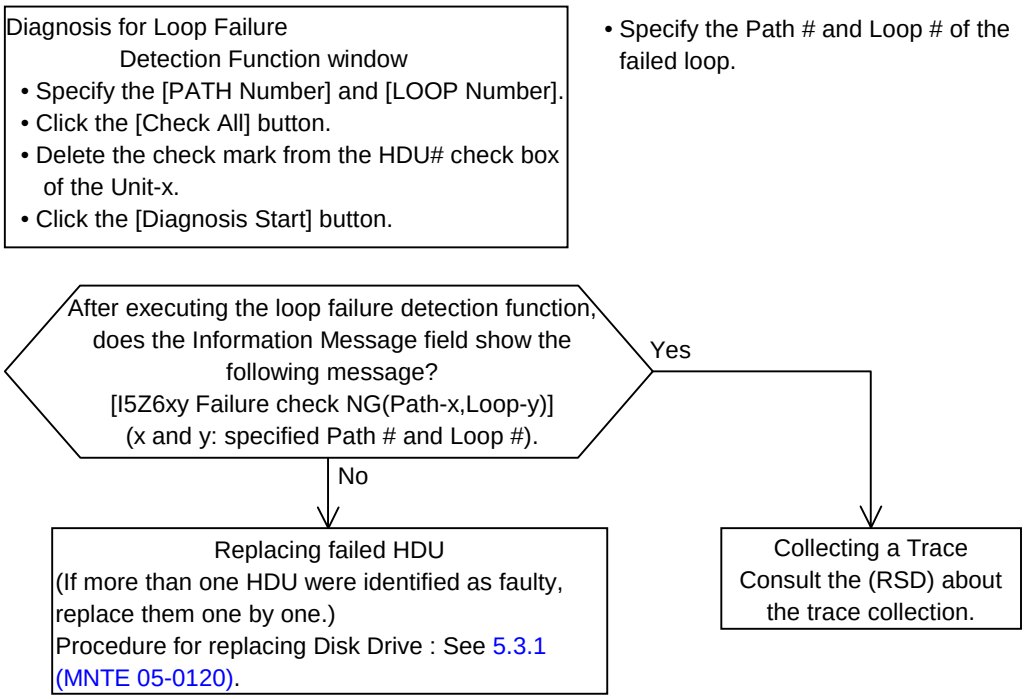
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the Information Message box, in the check sheet.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(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 (i), "Isolating Failed Loop" in Item (c-1), "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.

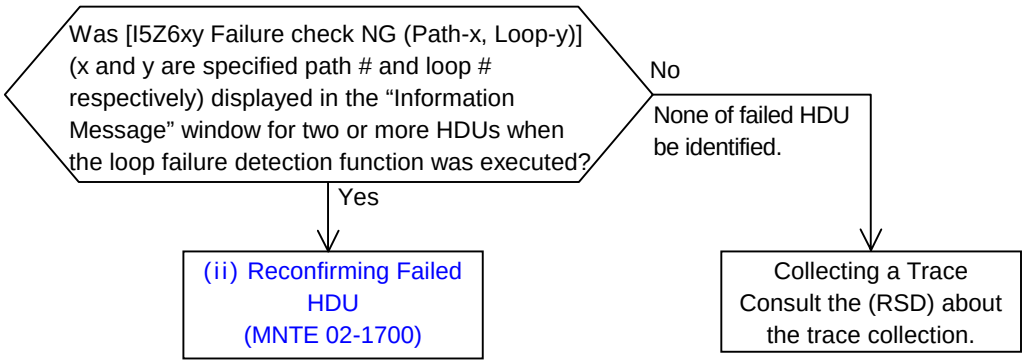
- Execute the Loop Failure Detection Function for all the HDUs of the each unit.

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 those operations for both of the Path#0 and Path#1 of the loop for which [w080xy] was indicated in the Information Message box.

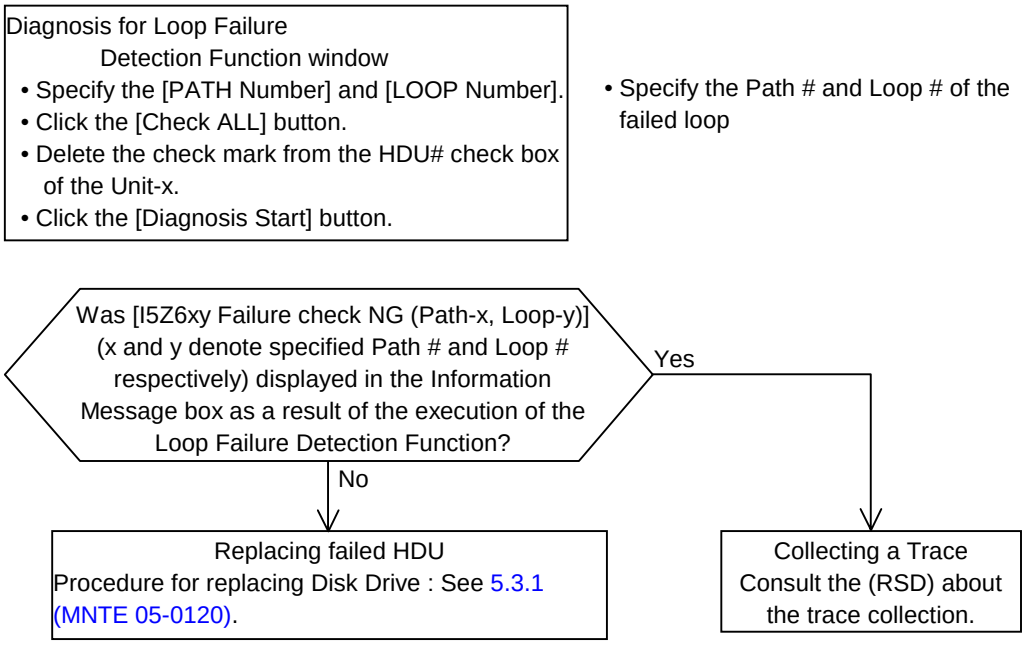
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the Information Message box, in the check sheet.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.

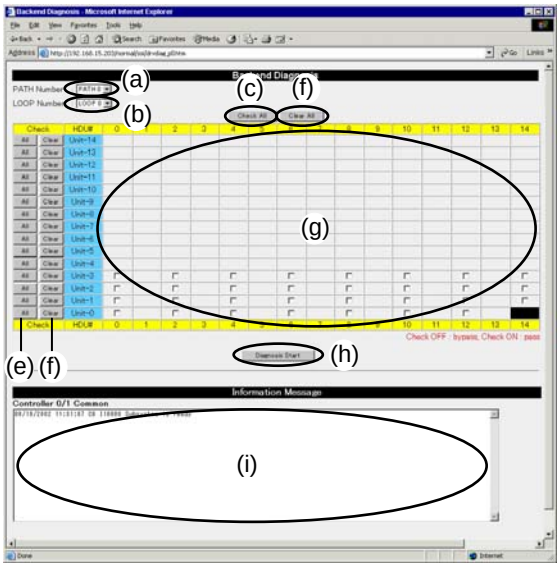


Copyright © 2002, 2005. Hitachi, Ltd.

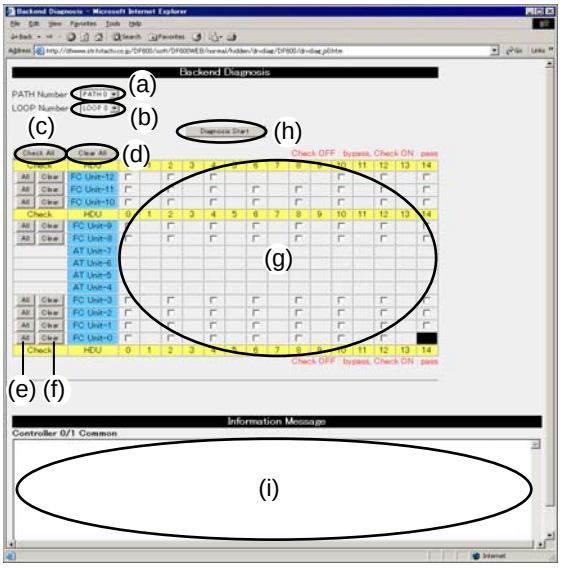
(d) WEB window of the Loop Failure Detection Function

(i) Window for instructing the Loop Failure Detection Function

Micro revision is x657 or earlier.



Micro revision is x658 or later.

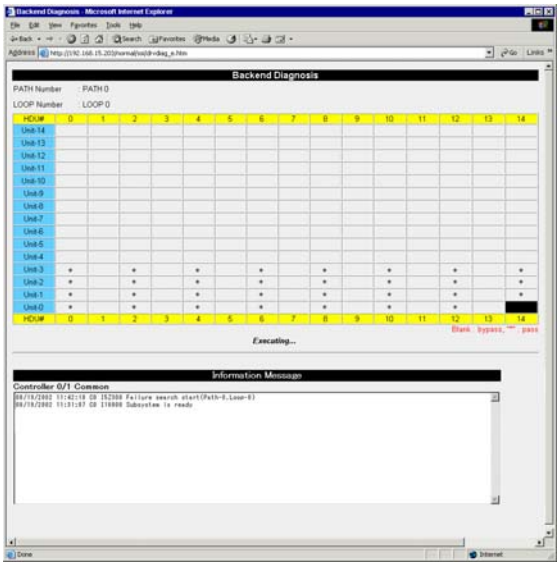


	Element in the window	Description
(a)	A list for selecting a path number	To be used to select a path number of a loop to be diagnosed.
(b)	A list for selecting a loop number	To be used to select a number of a loop to be diagnosed.
(c)	“Check All” button	Makes all check boxes selected.
(d)	“Clear All” 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.

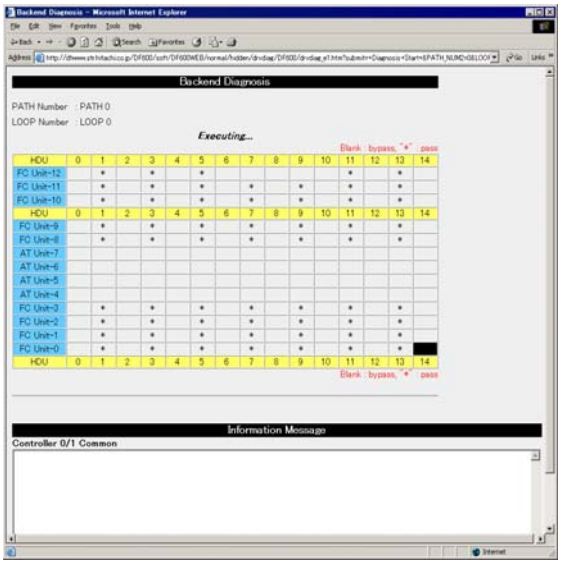
Copyright © 2002, 2005, Hitachi, Ltd.

(ii) Window displayed during execution of the Loop Failure Detection Function

Micro revision is x657 or earlier.



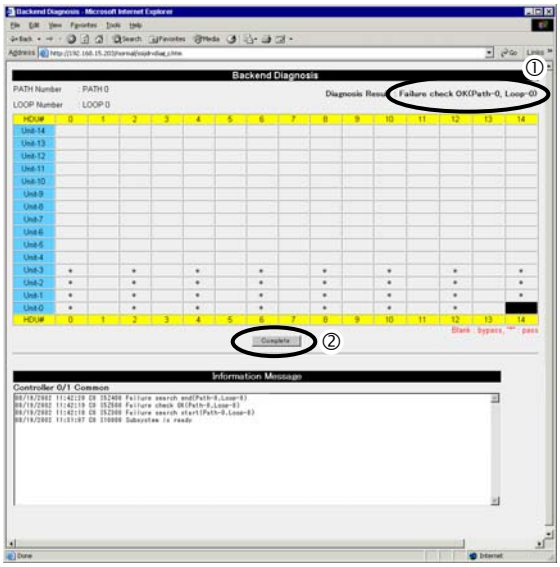
Micro revision is x658 or later.



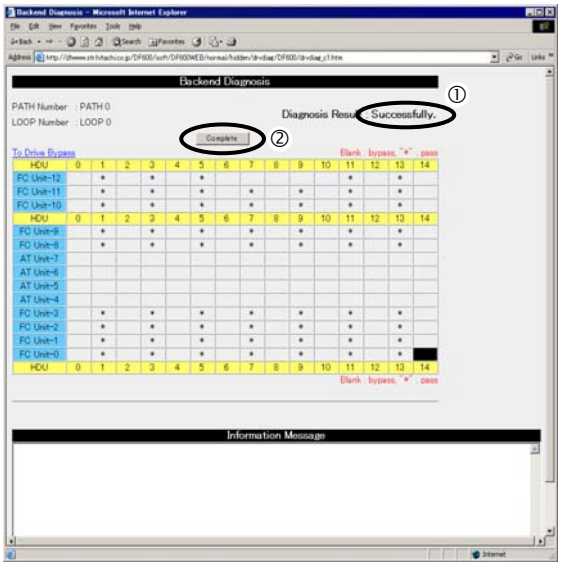
Copyright © 2002, 2005, Hitachi, Ltd.

(iii) Window displayed when the Loop Failure Detection Function ends

Micro revision is x657 or earlier.



Micro revision is x658 or later.



	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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 (with [Check ALL] clicked)	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
PATH Number( ) LOOP Number( )	With All HDUs connected (with [Check ALL] clicked)	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐

Failed Loop: PATH ( ), LOOP( )

2. Isolating an HDU that caused the failure

PATH Number( ) LOOP Number( )	With All HDUs bypass (with [Clear ALL] clicked)	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐

3. Identifying a failed unit

PATH Number( ) LOOP Number( )

Unit-0 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-1 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-2 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-3 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-4 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-5 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-6 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-7 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-8 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-9 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-10 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-11 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-12 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-13 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-14 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-15 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-16 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-17 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-18 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-19 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-20 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-21 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-22 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-23 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-24 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-25 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-26 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-27 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-28 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	
Unit-29 with all HDUs Connected	☐ →	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	

Failed Unit: Unit( ), (Unit( ), Unit( ))

Copyright © 2002, 2005, Hitachi, Ltd.

4. Identifying an HDU that caused the failure
PATH Number( ) LOOP Number( )
(with [Clear] clicked)

With HDU-0 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-1 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-2 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-3 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-4 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-5 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-6 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-7 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-8 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-9 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-10 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-11 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-12 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result OK □	NG □	With HDU-13 Connected	□ → 1st diagnosis result OK □ NG □ 2nd diagnosis result OK □ NG □
With HDU-14 Connected	□ →	1st diagnosis result OK □	NG □	2nd diagnosis result 結 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 OK □ NG □ 2nd diagnosis result OK □ NG □

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(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		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		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		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		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		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		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	→ ☐	☐	☐	☐	☐						

Copyright © 2002, 2005, Hitachi, Ltd.

CL#2-2

Unit (6) 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 (7) 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 (8) 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 (9) 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 (10) 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 (11) 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 (12) 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	→ ☐	☐	☐	☐	☐						

Copyright © 2002, 2005, Hitachi, Ltd.

CL#2-3

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	→ ☐	☐	☐	☐	☐						

Copyright © 2003, 2005, Hitachi, Ltd.

CL#2-4

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	→ ☐	☐	☐	☐	☐						

Copyright © 2003, 2005, Hitachi, Ltd.

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
☐	☐	☐	☐

Copyright © 2002, 2005, Hitachi, Ltd.

(15-2) 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 it when single execution of the Loop Failure Detection Function is completed.

(Replacement components: Disk Drive, Backup Battery Unit, Power Unit (Power Unit (DC)), 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. Re-execute the recovery operation using the Loop Failure Detection Function after the recovery from the new failure is completed.

[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 “Check List #1 and #2 for Failed HDU Isolation” (MNTE 02-1940, MNTE 02-1950) appended to the Maintenance Manual.

To use the “Check List #1 and #2 for Failed HDU Isolation” (MNTE 02-1940, MNTE 02-1950), 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”.

Copyright © 2002, 2005, Hitachi, Ltd.

(v) When a failure other than the loop failure (an HDU failure (W060xy, I301xy), a CTL failure (W0100x) or an ENC Unit failure (W070xy)) has also occurred, take a recovery action against it according to the message before using the Loop Failure Detection Function.
(vi) If the failure occur in all of the four loops, the Loop Failure Detection function cannot be used.
(vii) 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.
(viii) 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 (15-3), "Procedure for Recovery from Loop Failure (in the case of a subsystem down occurs in the single controller configuration)".

(b) How to start the loop failure detection function
(i) Connect the PC and the subsystem via the LAN (for using the Web function).
(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 of the device.
- 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 (RSD) (for replacing the subsystem).

‡1 : As for the IP address of the subsystem, refer to subsection 2.1.1 "(4) Procedure to connect portable maintenance PC to WEB" (MNTE 02-0030).

Copyright © 2002, 2005, Hitachi, Ltd.

(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 all the loops.

Diagnosis for Loop Failure Detection Function window
- 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.

When "Wxxxx Loop Alarm (Path #0, Loop #0)" is displayed.
- 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 box 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

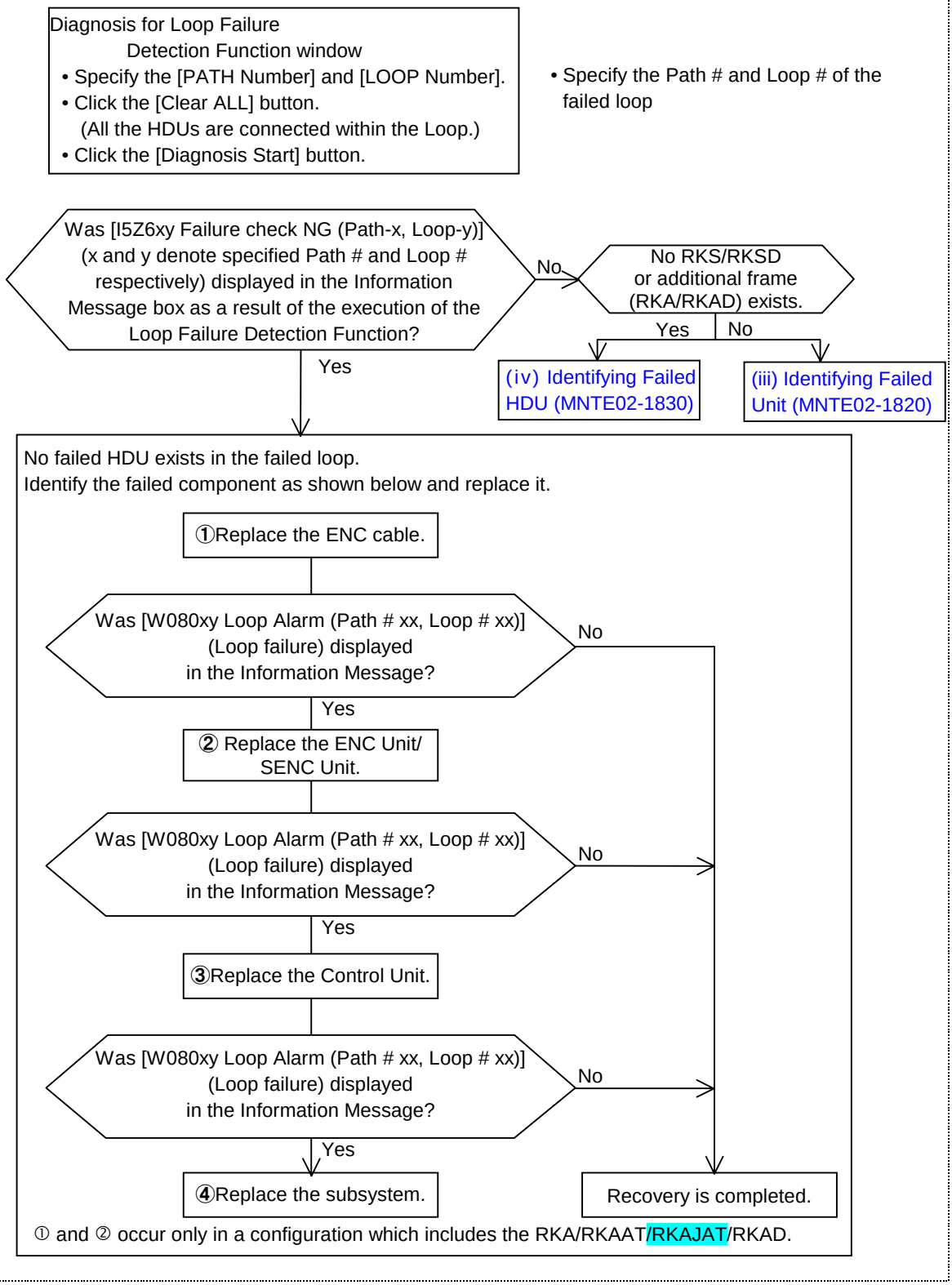
④ Perform the procedures from (ii) Judging whether or not the HDU caused the failure to (v) Reconfirming Failed HDU, and identify the failed HDU for each one of the failed loops.

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 (i), “Identifying Failed HDU” in Item (c-2) on page MNTE 02-1850. (When doing that, use the Check List #2 for Failed HDU Isolation (For checking all HDUs).)

Copyright © 2002, 2005, Hitachi, Ltd.

(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).



Copyright © 2002, 2005, Hitachi, Ltd.

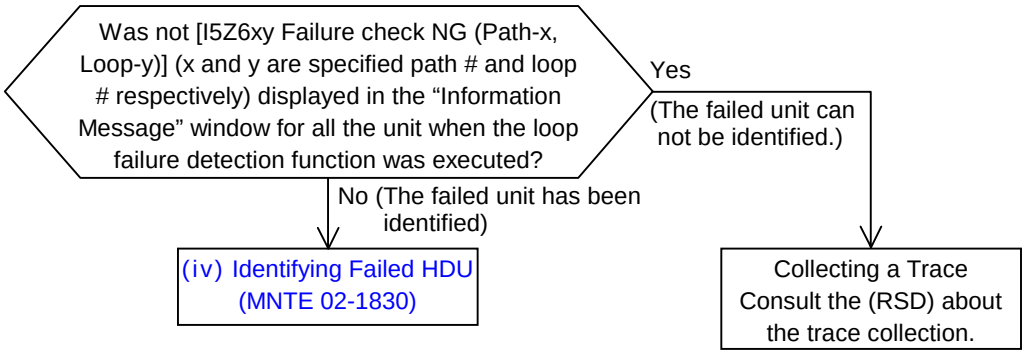
(iii) Identifying Failed Unit

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 box, in the check sheet. (It is determined that the failed component exists in the failed unit.)



Copyright © 2002, 2005, Hitachi, Ltd.

(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.

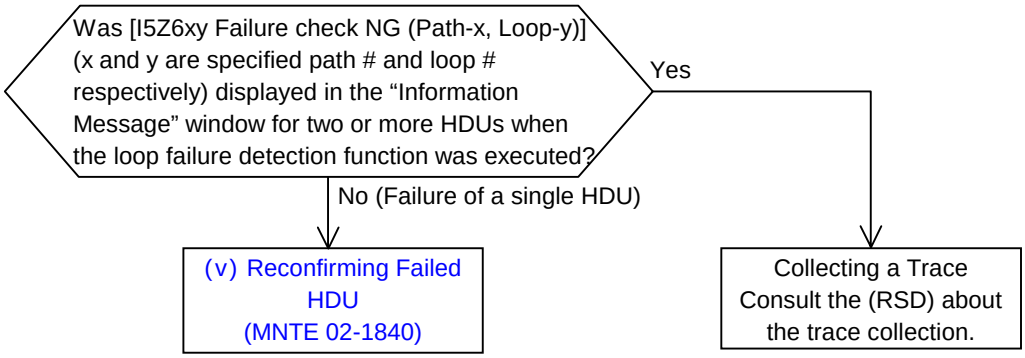
- Execute the Loop Failure Detection Function for all the HDUs of the Unit-x.

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.

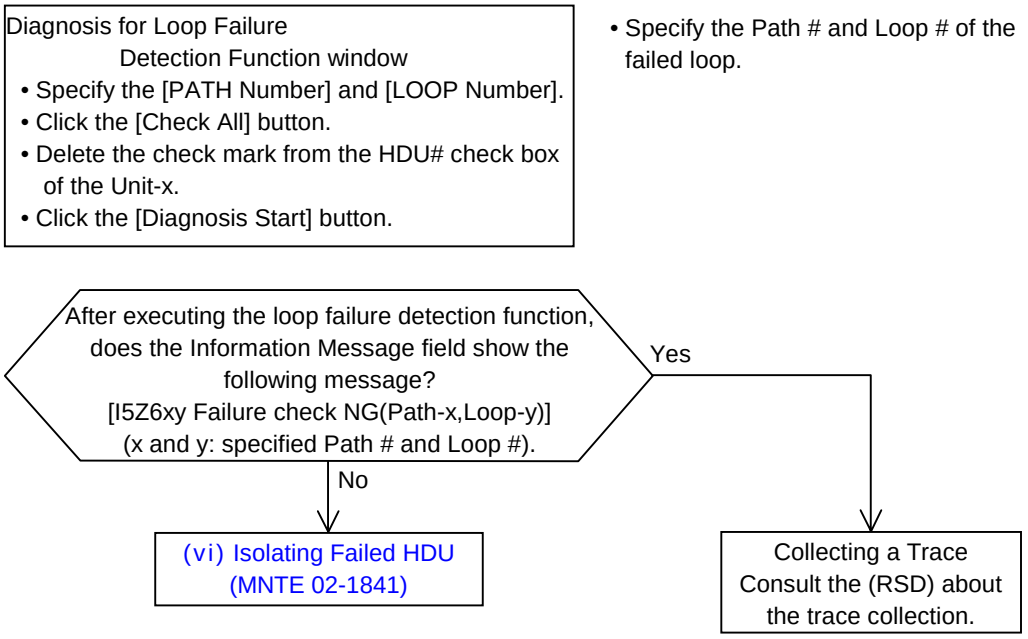
② Enter the HDU number for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the Information Message box, in the check sheet.



Copyright © 2002, 2005, Hitachi, Ltd.

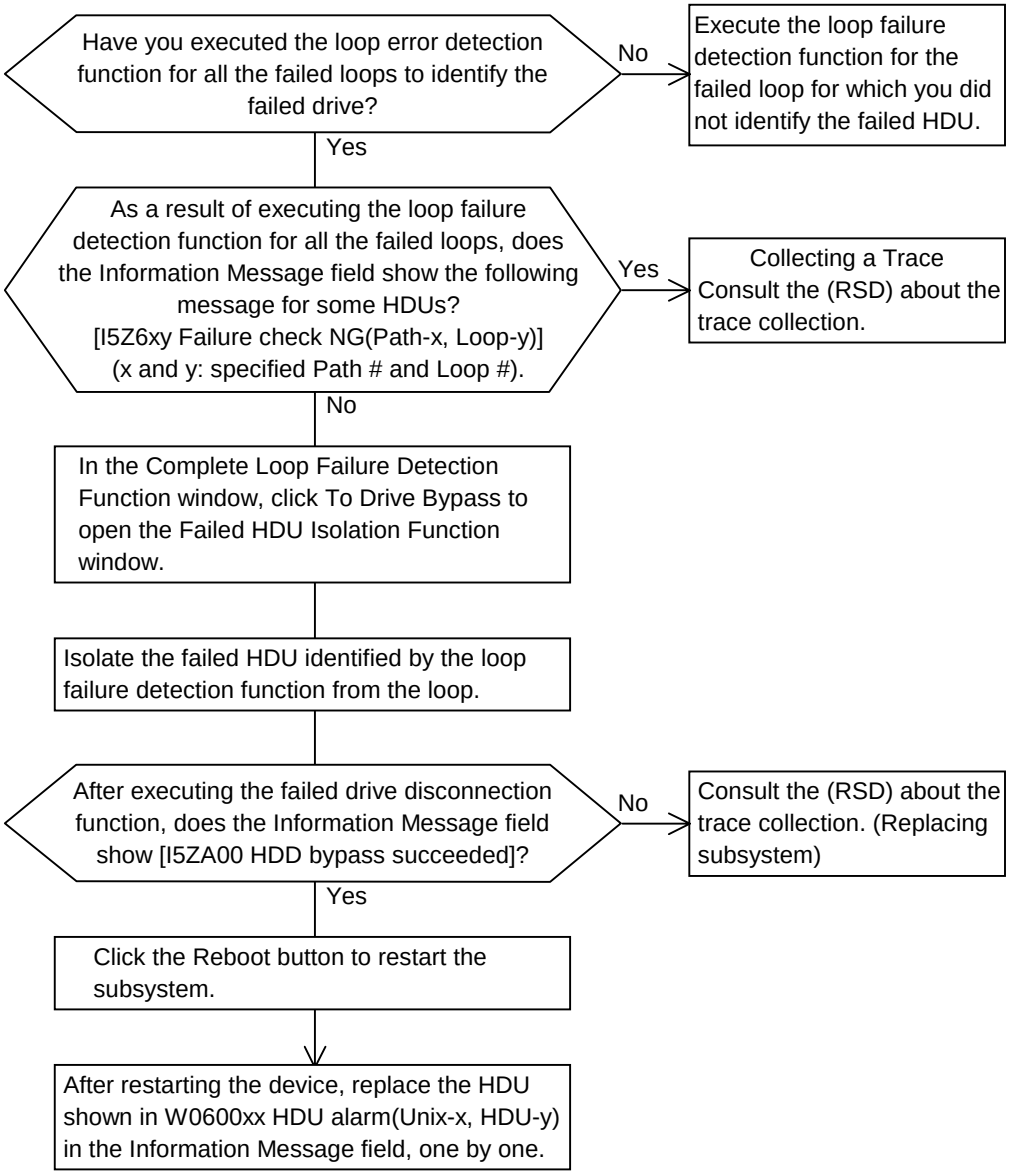
(v) Reconfirming Failed HDU

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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(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 (i), "Isolating Failed Loop" in Item (c-1), "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.

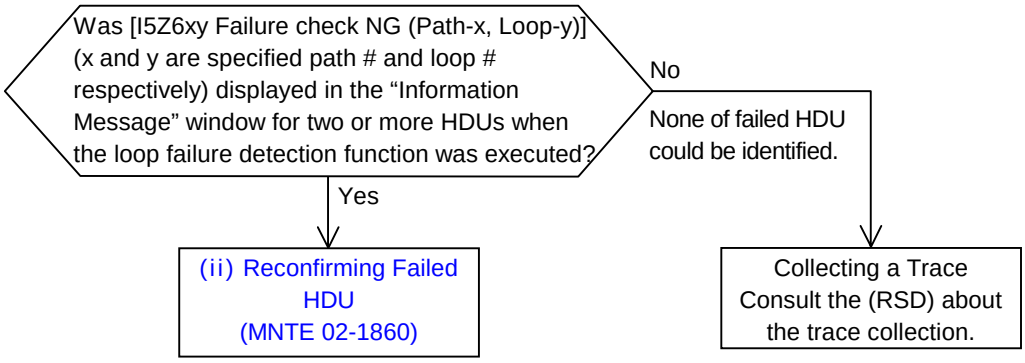
- Execute the Loop Failure Detection Function for all the HDUs of the each unit.

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 those operations for both of the Path#0 and Path#1 of the loop for which [w080xy] was indicated in the Information Message box.

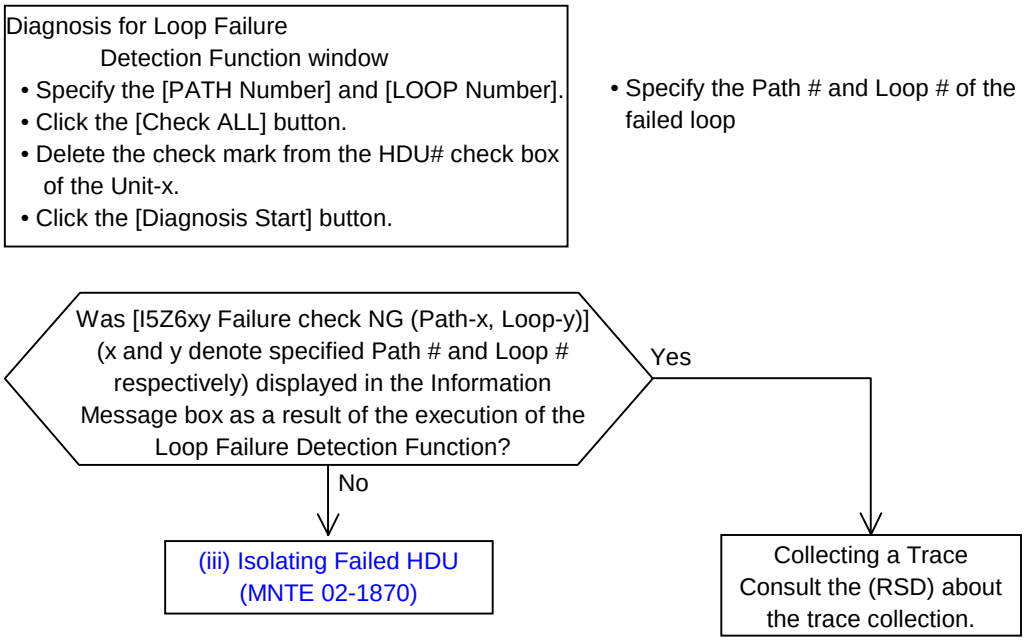
② Enter the HDU number, for which [I5Z6xy Failure check NG (Path-x, Loop-y)] (x and y denote specified Path # and Loop # respectively) is displayed in the Information Message box, in the check sheet.



Copyright © 2002, 2005, Hitachi, Ltd.

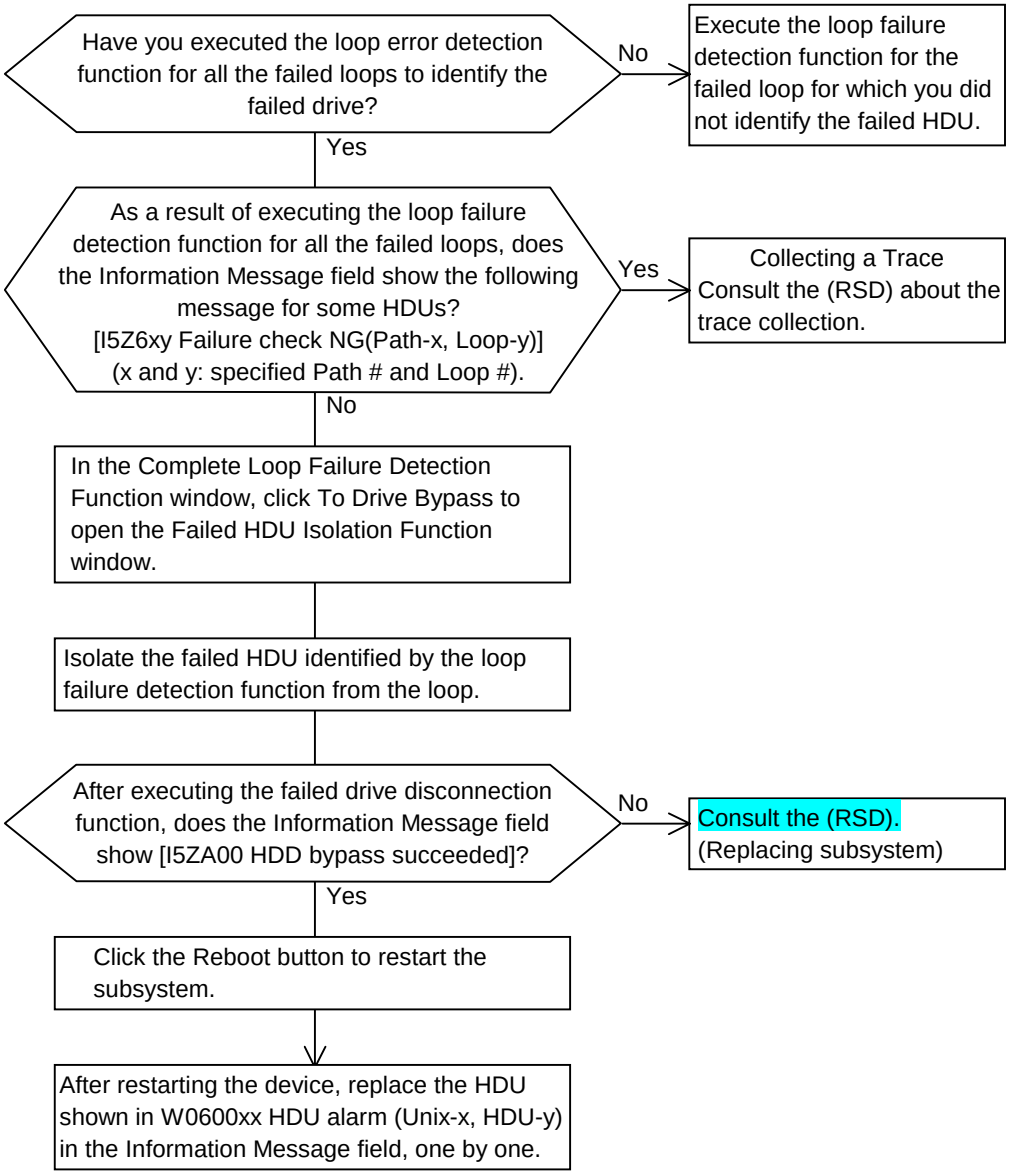
(ii) Reconfirming Failed HDU

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.



Copyright © 2002, 2005, Hitachi, Ltd.

(iii) Isolating Failed HDU



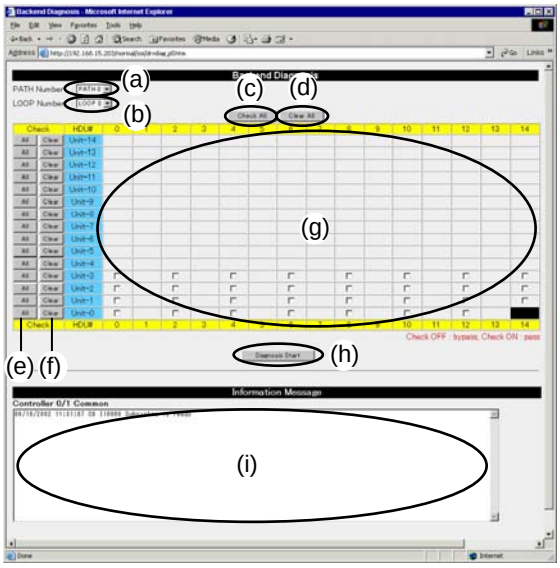
NOTE : If you isolated multiple HDU in the same RAID group from the loop, restarting the subsystem deletes the user data.

Copyright © 2002, 2005, Hitachi, Ltd.

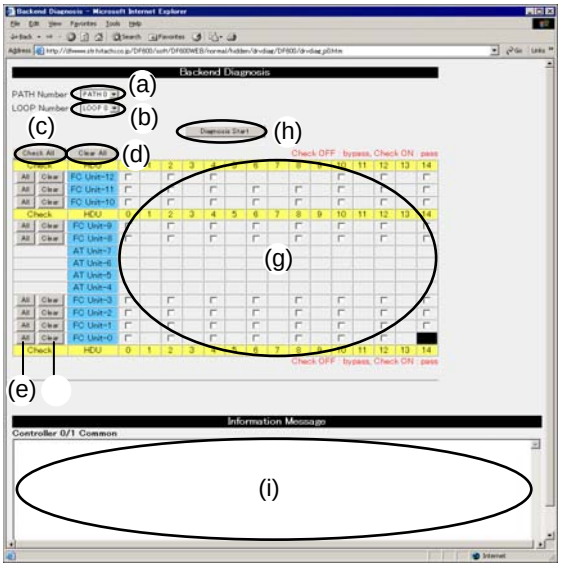
(d) WEB window of the Loop Failure Detection Function

(i) Window for instructing the Loop Failure Detection Function

Micro revision is x657 or earlier.



Micro revision is x658 or later.

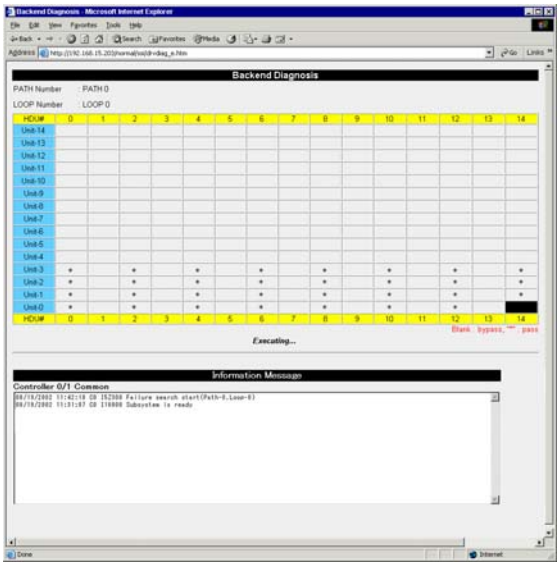


	Element in the window	Description
(a)	A list for selecting a path number	To be used to select a path number of a loop to be diagnosed.
(b)	A list for selecting a loop number	To be used to select a number of a loop to be diagnosed.
(c)	“Check All” button	Makes all check boxes selected.
(d)	“Clear All” 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.

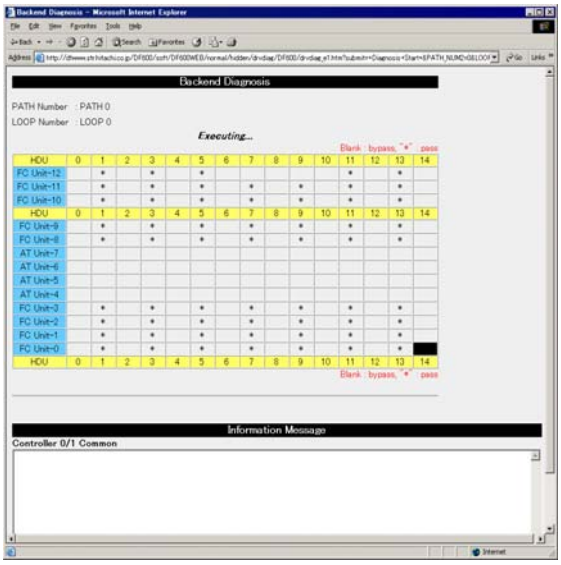
Copyright © 2002, 2005, Hitachi, Ltd.

(ii) Window displayed during execution of the Loop Failure Detection Function

Micro revision is x657 or earlier.



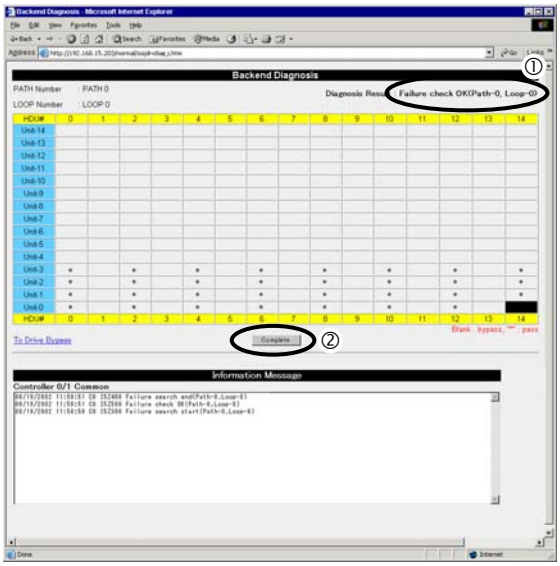
Micro revision is x658 or later.



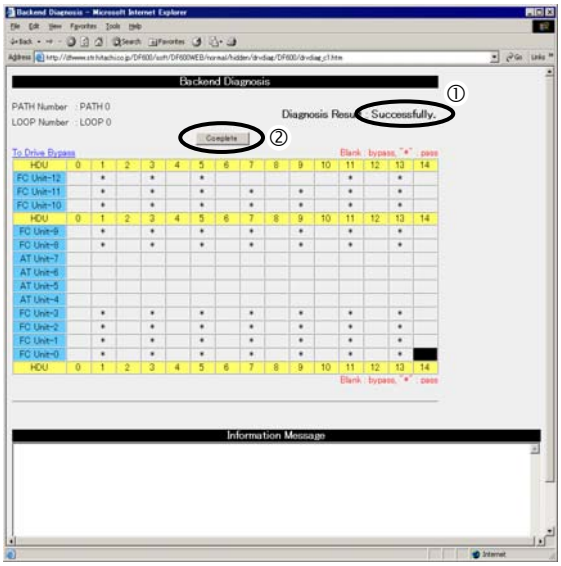
Copyright © 2002, 2005, Hitachi, Ltd.

(iii) Window displayed when the Loop Failure Detection Function ends

Micro revision is x657 or earlier.



Micro revision is x658 or later.



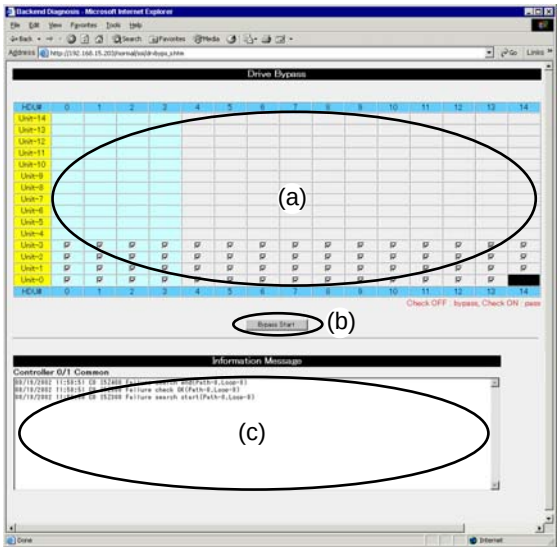
	Element in the window	Description
①	Display of a summary of a diagnosis result	Displays a result of a diagnosis.
②	A linkage with the Failed HDU Disconnection function	Change a window to that of the Failed HDU Disconnection function.
③	“Complete” button	Changes a window to that of a diagnosis of the Loop Failure Detection functions.

Copyright © 2002, 2005, Hitachi, Ltd.

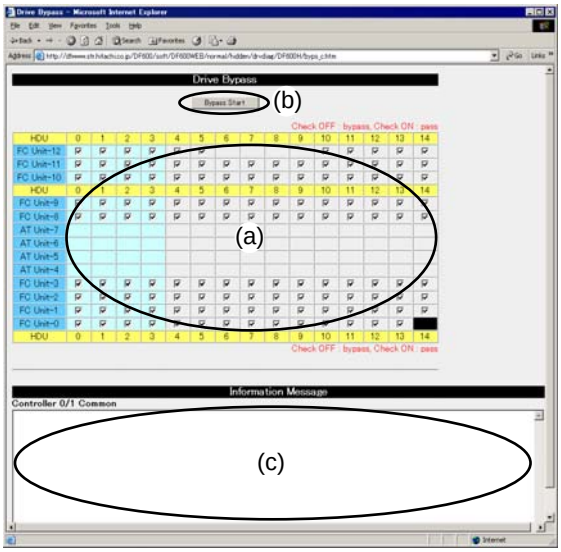
(e) WEB window of the Failed HDU Isolation Function

(i) Starting window of Failed HDU Isolation Function

Micro revision is x657 or earlier.



Micro revision is x658 or later.

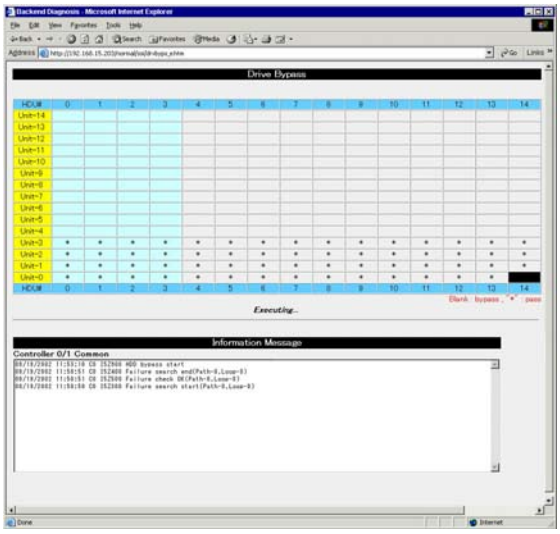


	Element in the window	Description
①	Each check box	To be used to specify whether to bypass the drive concerned (whether to remove the check mark).
②	“Bypass Start” button	Starts the bypassing operation.
③	Information Message	Displays progress of the bypassing operation.

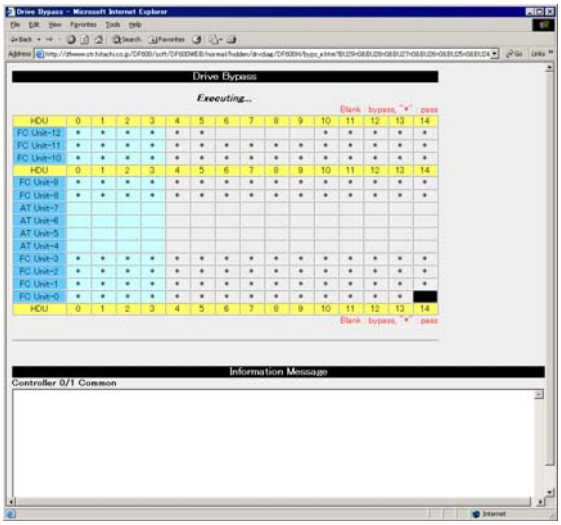
Copyright © 2002, 2005, Hitachi, Ltd.

(ii) Window showing a running state of the Failed HDU Isolation Function

Micro revision is x657 or earlier.



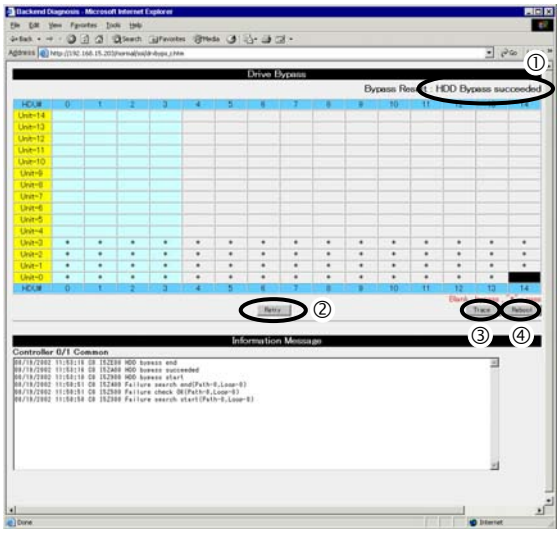
Micro revision is x658 or later.



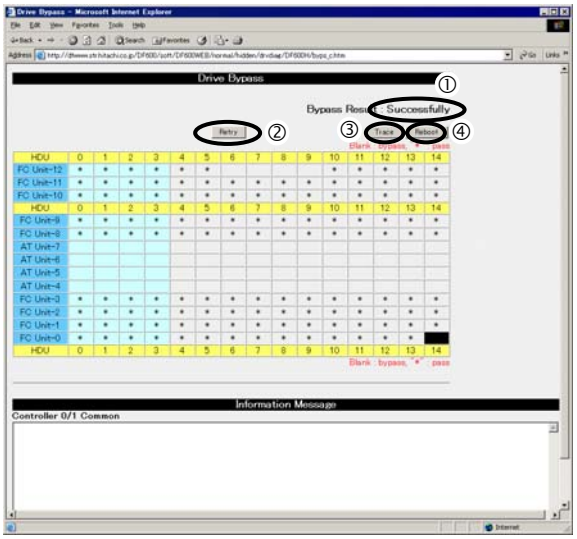
Copyright © 2002, 2005, Hitachi, Ltd.

(iii) Completion window of the Failed HDU Isolation Function

Micro revision is x657 or earlier.



Micro revision is x658 or later.



	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.(*1)
④	"Reboot" button	Restarts the subsystem.

*1: Perform the prior preparation necessary for the simple trace before clicking the "Trace" button (refer to "(1) Before collecting the simple trace" (MNTE 02-2190)).
For the procedure after starting the trace collection, refer to "(2) Procedure for a simple trace collection" (MNTE 02-2191).

Copyright © 2002, 2005, Hitachi, Ltd.

(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 ☐ ☐

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		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 ☐ ☐	Unit-15 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-16 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-17 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-18 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-19 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-20 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-21 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-22 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-23 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-24 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-25 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-26 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-27 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐
Unit-28 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐	Unit-29 with all ☐ → HDUs Connected	OK NG ☐ ☐	OK NG ☐ ☐

Failed Unit: Unit( ), (Unit( ), Unit( ))

Copyright © 2002, 2005, Hitachi, Ltd.

4. Identifying an HDU that caused the failure
PATH Number( ) LOOP Number( )
(with [Clear] clicked)

With HDU-0 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-1 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-2 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-3 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-4 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-5 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-6 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-7 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-8 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-9 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-10 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-11 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-12 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐	With HDU-13 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result OK ☐ NG ☐
With HDU-14 Connected	→	1st diagnosis result OK ☐ NG ☐	2nd diagnosis result 結 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 OK ☐ NG ☐ 2nd diagnosis result OK ☐ NG ☐

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(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		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		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		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		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		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		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 →	☐	☐	☐	☐	☐						

Copyright © 2002, 2005, Hitachi, Ltd.

CL#2-2

Unit (6) 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 (7) 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 (8) 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 (9) 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 (10) 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 (11) 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 (12) 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 →	☐	☐	☐	☐	☐						

Copyright © 2002, 2005, Hitachi, Ltd.

CL#2-3

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	→ ☐	☐	☐	☐	☐						

Copyright © 2003, 2005, Hitachi, Ltd.

CL#2-4

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 →	☐	☐	☐	☐	☐						

Copyright © 2003, 2005, Hitachi, Ltd.

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	→ ☐	☐	☐	☐	☐						

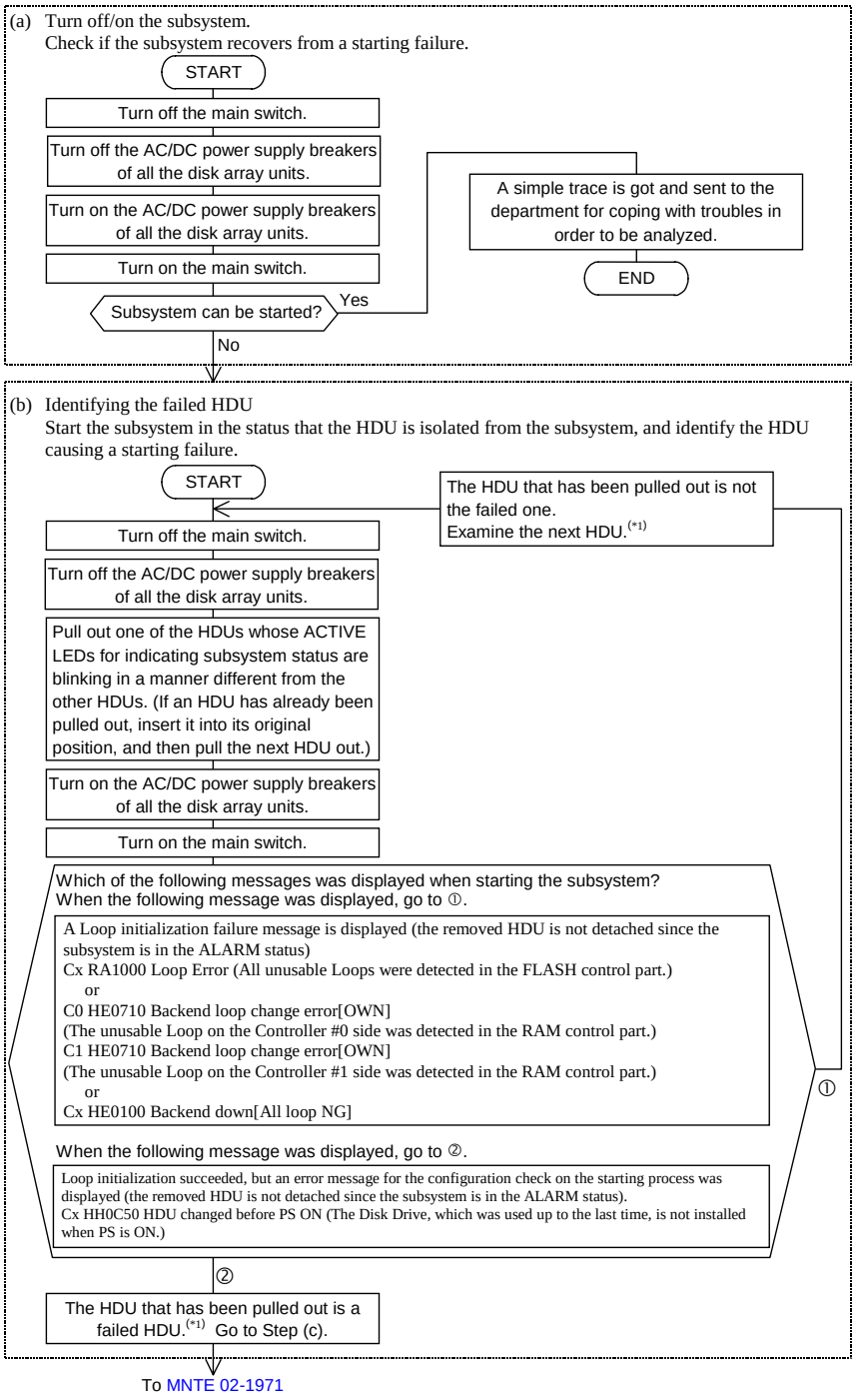
2. Confirming the HDU that caused the failure
PATH Number( ) LOOP Number( )
(with [Chek ALL] clicked)
With the failed HDU separated ☐ → 1st diagnosis result 2nd diagnosis result

OK	NG	OK	NG
☐	☐	☐	☐

Copyright © 2004, 2005, Hitachi, Ltd.

(15-3) 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 Check List for Failed HDU Isolation on page MNTE 02-1972 thru. MNTE 02-1976.



*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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

START

Turn off the main switch.

Turn off the AC/DC power supply breakers of all the disk array units.

Insert the HDU identified in Step (b) into its original position.

Turn on the AC/DC power supply breakers of all the disk array units.

Turn on the main switch.

Check that the following message is displayed.

The following displayed message confirms that the HDU identified in the procedure (b) is a cause of the failure.

A Loop initialization failure message is displayed (the removed HDU is not detached since the subsystem is in the ALARM status)
Cx RA1000 Loop Error (All unusable Loops were detected in the FLASH control part.)
or
C0 HE0710 Backend loop change error[OWN]
(The unusable Loop on the Controller #0 side was detected in the RAM control part.)
C1 HE0710 Backend loop change error[OWN]
(The unusable Loop on the Controller #1 side was detected in the RAM control part.)
or
Cx HE0100 Backend down[All loop NG]
(The subsystem cannot be controlled/monitored since usable Loop is unavailable in the subsystem.)

Processed to Step (d) and replace the HDU.

(d) Replacing a failed HDU

START

Turn off the main switch.

Turn off the AC/DC power supply breakers of all the disk array units.

Replace the failed HDU with a new HDU.

Turn on the AC/DC power supply breakers of all the disk array units.

Turn on the main switch.

The subsystem is started in the state in which a WARNING has been issued to it.

The new disk drive that has been replaced is detached because of inconsistency of the WWN.

Because the disk drive is detached, data restoration to the spare disk is started.

After the data restoration to the spare disk is completed, pull out the detached disk drive (replaced disk drive) and insert it again.

Restoration of the disk drive is started and the WARNING has been issued to the subsystem is removed after the restoration is completed.

END

Copyright © 2003, 2005, Hitachi, Ltd.

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 →	☐	☐	☐

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 →	☐	☐	☐				

Copyright © 2003, 2005, Hitachi, Ltd.

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 →	☐	☐	☐				

Copyright © 2003, 2005, Hitachi, Ltd.

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	→ ☐	☐	☐				

Copyright © 2003, 2005, Hitachi, Ltd.

CL#3-4

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 →	☐	☐	☐				

Copyright © 2004, 2005, Hitachi, Ltd.

CL#3-5

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 →	☐	☐	☐				

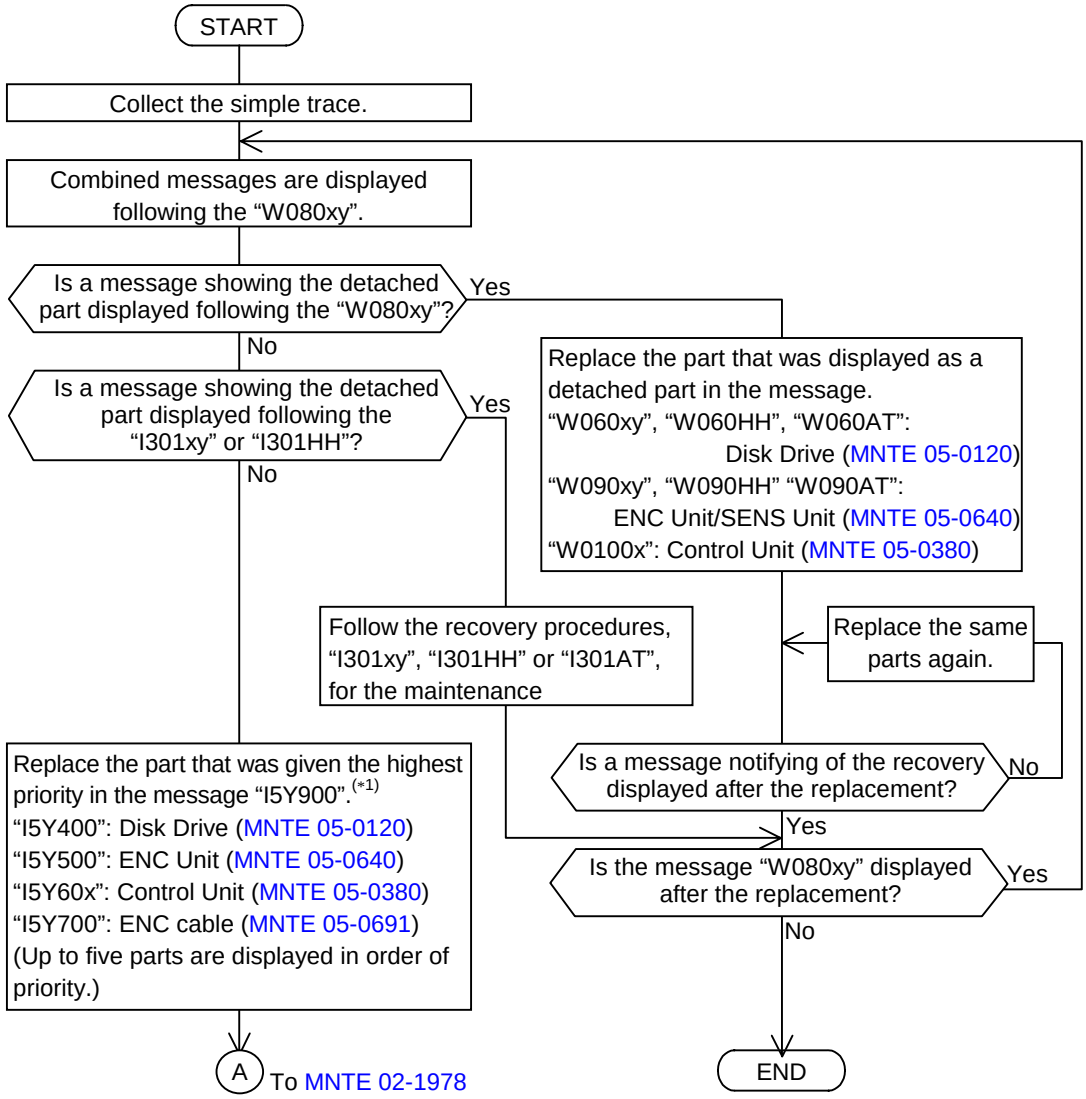
Unit (29)

	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 →	☐	☐	☐				

Copyright © 2004, 2005, Hitachi, Ltd.

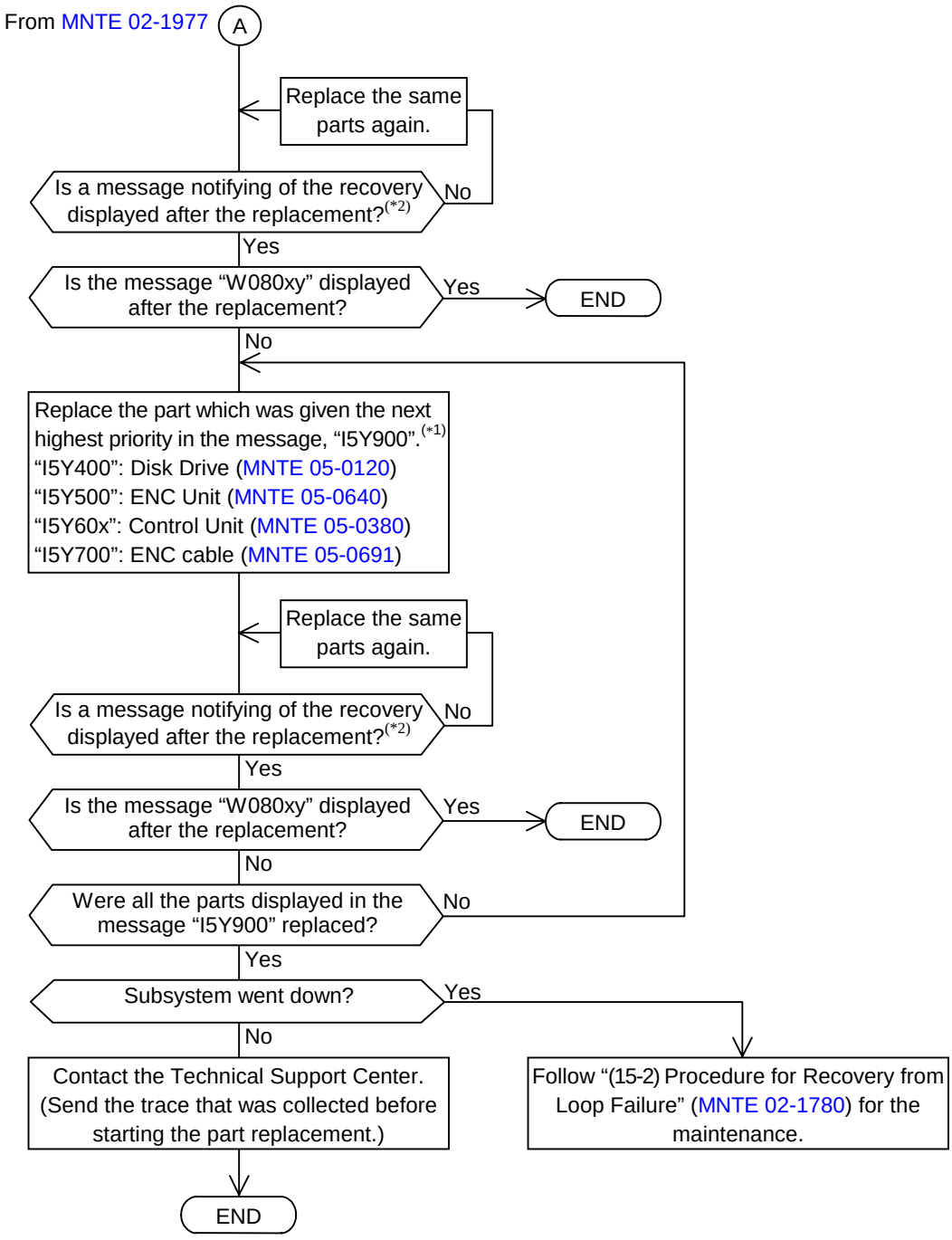
(15-4) Actions to be taken when one of the message codes I5Y400 through I5Y700 is displayed

[Recovery measures]



*1 : 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.

Copyright © 2004, 2005, Hitachi, Ltd.



*1 : 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.

*2 : The message on recovery displayed for each part is shown below.
"I007HH", "I007xy", "I009HH", "I009xy": Disk Drive
"I00BHH", "I00Bxy": 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.
"W073HH", "W073xy": Disk Drive
"I605HH", "I605xy", "W0B0HH", "W0B0xy": ENC Unit or ENC cable
"W0100x": Control Unit

Copyright © 2004, 2005, Hitachi, Ltd.

(16) QuickShadow

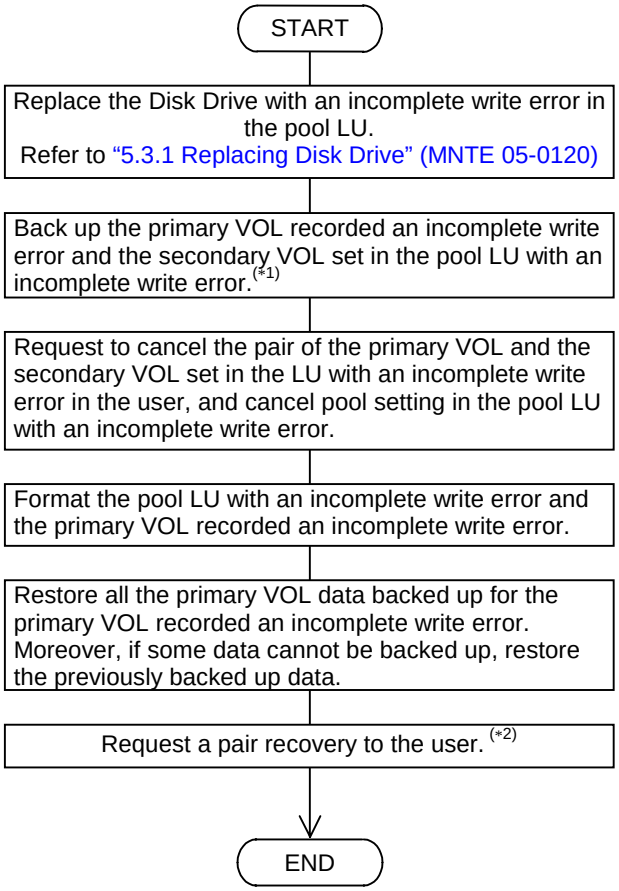
When QuickShadow is restored, an incomplete write error was recorded to the primary VOL to be copied since the unreadable area exists on the pool side.

[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 measures]



*1 : If the pair is cancelled, the secondary VOL data is lost. Back up the secondary VOL before canceling the pair.

*2 : 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.

Copyright © 2004, 2005, Hitachi, Ltd.

2.4.2 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.

NOTE: Be careful that if there is a LU whose access attribute is set by Open LDEV Guard, 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).
- 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 2.5.1.)

(3) Make sure that the WARNING LED (orange) on the Front Bezel of RK/RKL/RKS/RKD/ RKSD/RKH/RKHE is not blinking fast (at intervals of 125 ms). 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).

(4) 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 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 Front Bezel turns off, it transfers to Maintenance mode.

Copyright © 2002, 2005, Hitachi, Ltd.

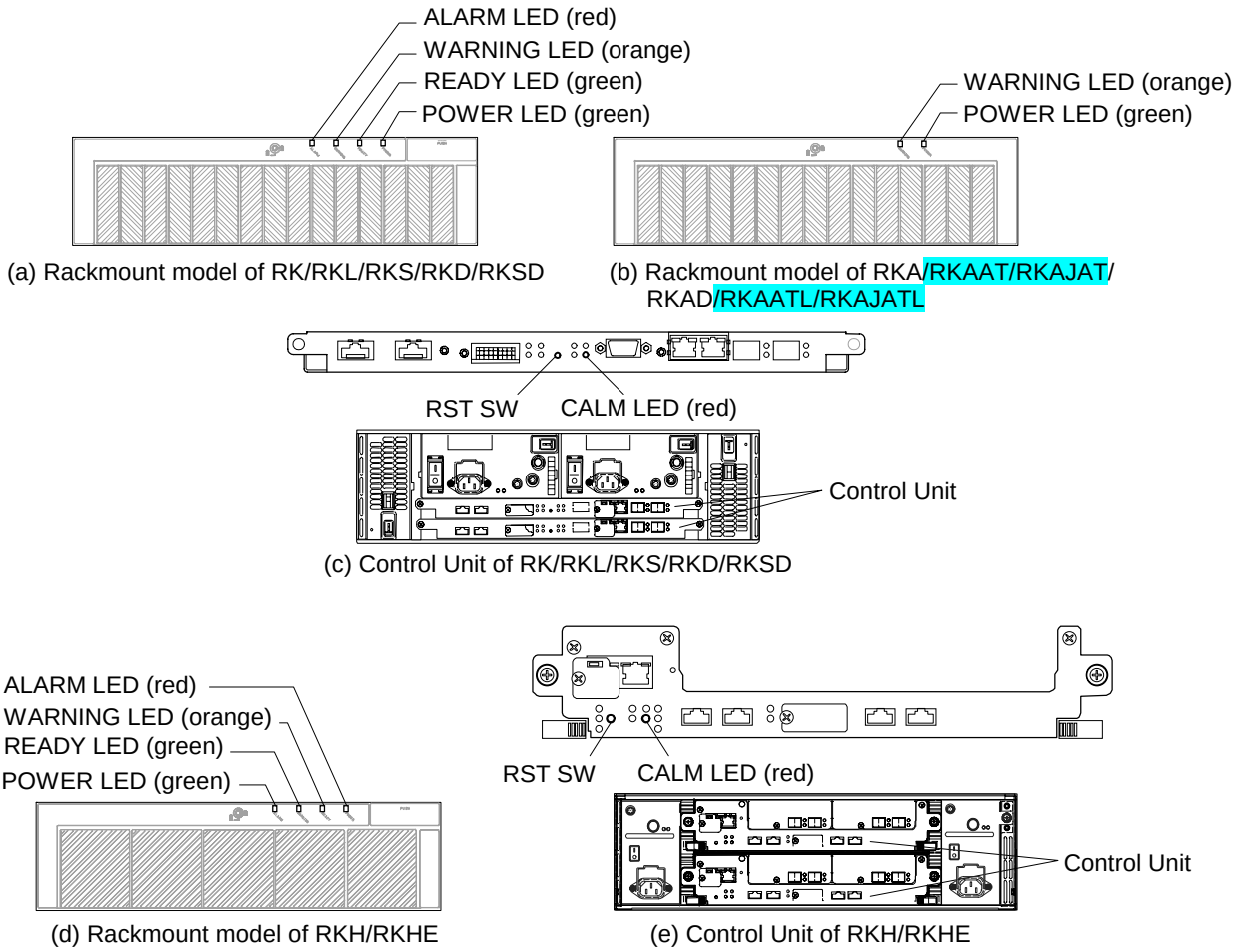
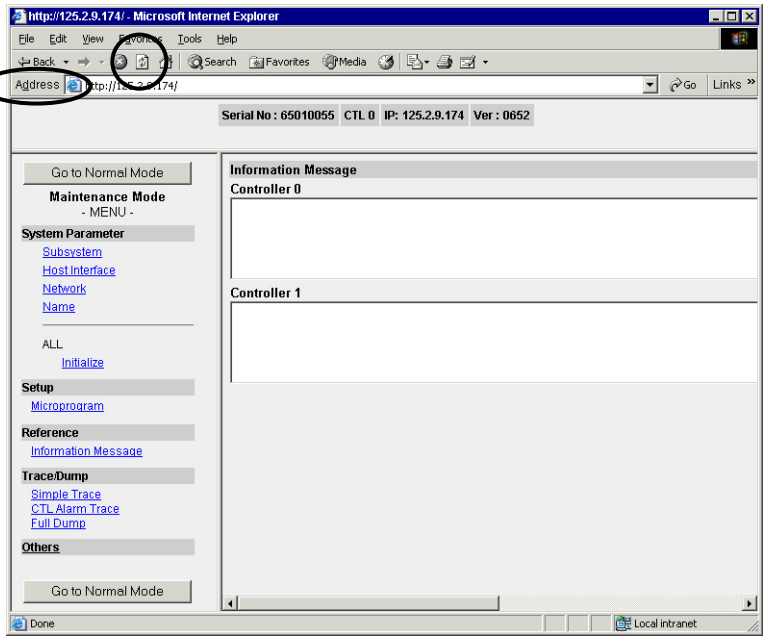


Figure 2.4.1 Indication Locations of LED

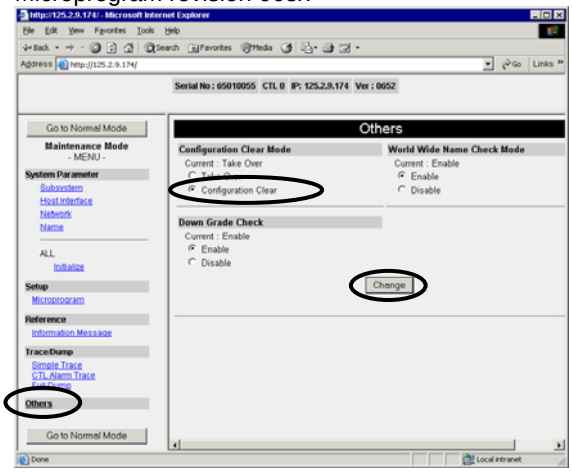
Copyright © 2002, 2005, Hitachi, Ltd.

(5) 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 Section 2.1, “Before Starting WEB Connection” on page MNTE 02-0020.)
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].

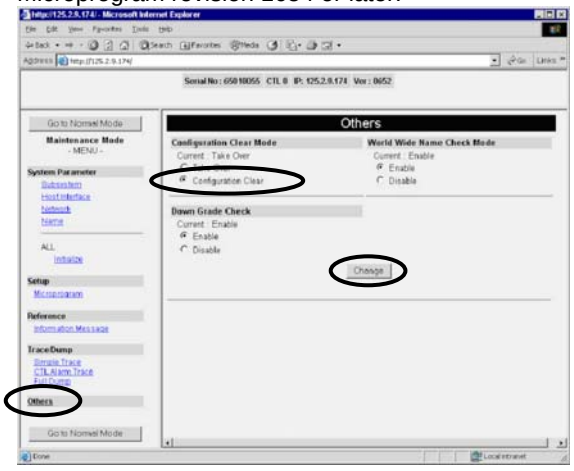


(6) Click “Others” in the menu frame.
The following window appears.

Microprogram revision 065x



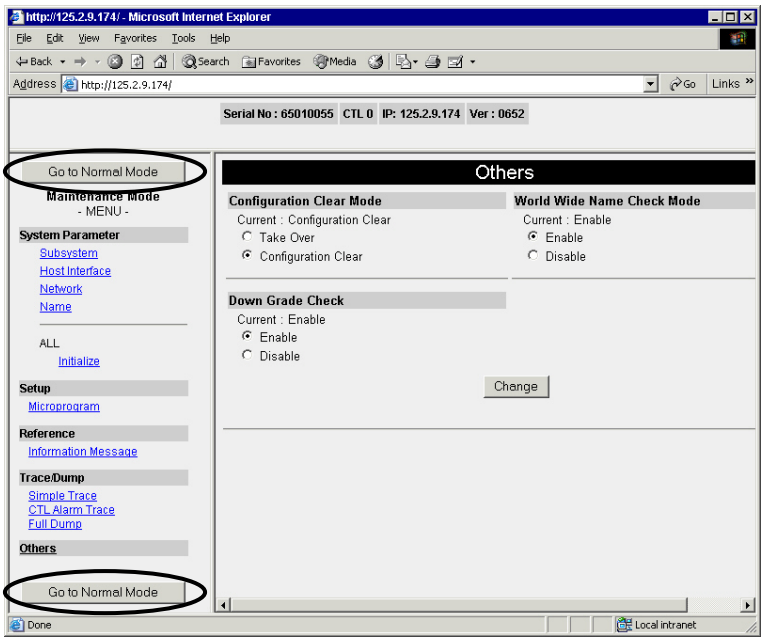
Microprogram revision 1654 or later.



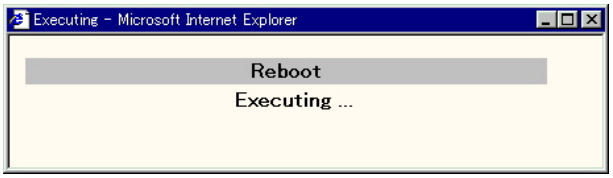
Copyright © 2002, 2005, Hitachi, Ltd.

(7) 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.”

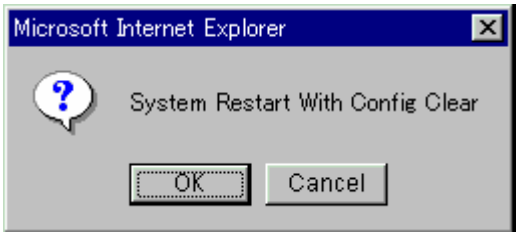
(8) Click “Go To Normal Mode”. There are two “Go To Normal Mode” buttons, one at the top of the menu frame and the other at the bottom. Select either of them.



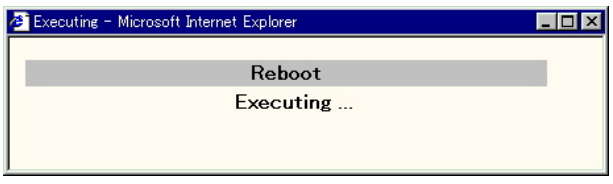
The following window is displayed while the above operation is executed.



(9) 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.



Copyright © 2002, 2005, Hitachi, Ltd.

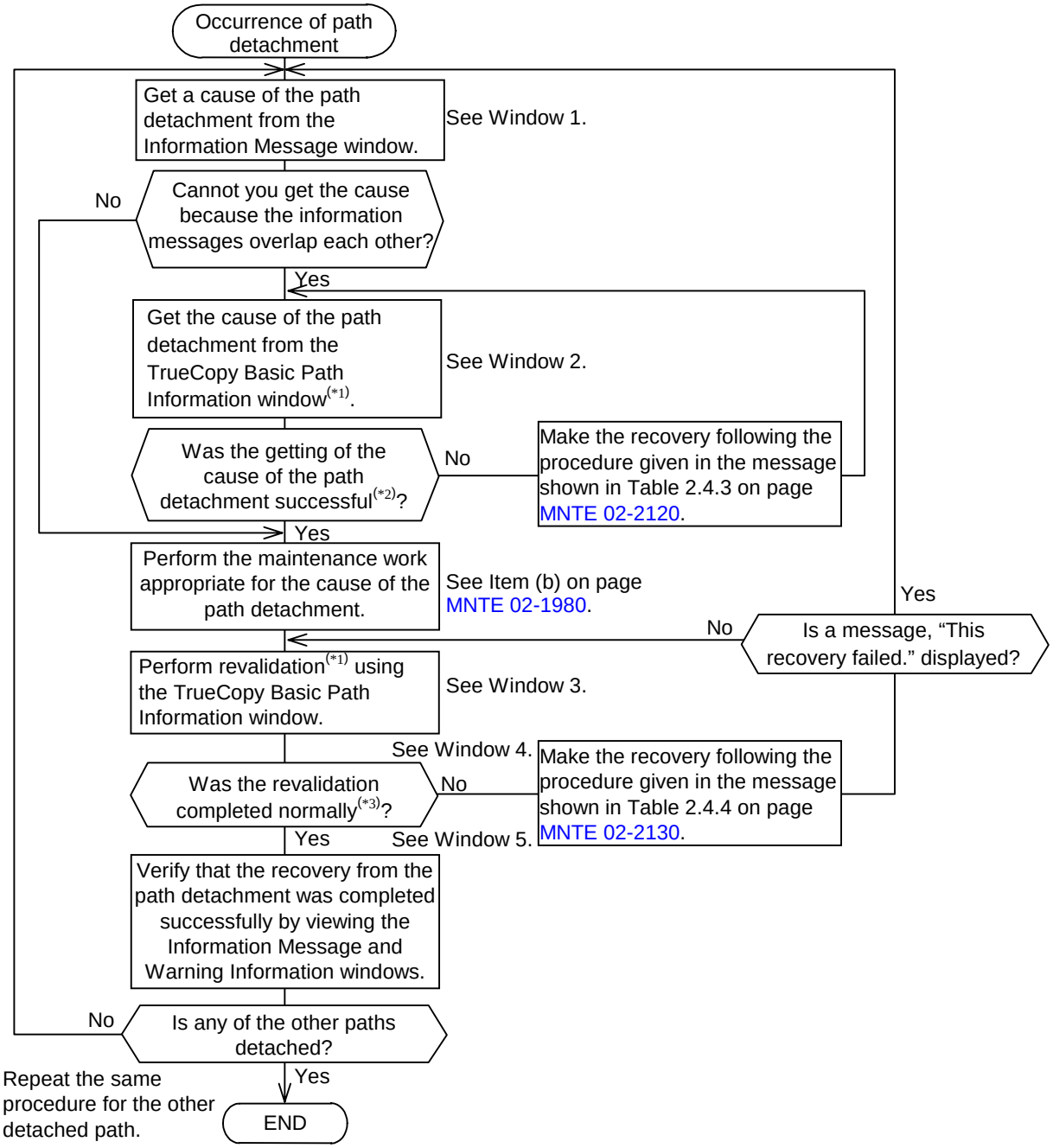
(10) If rebooting is finished, the subsystem is ready. (It takes about three minutes usually to get Ready.)
Make sure that the READY LED on the front side of the subsystem comes on.
When it is blinking at high speed, make sure that it lights on after waiting for the maximum of 15 minutes.

Copyright © 2002, 2005, Hitachi, Ltd.

2.4.3 Procedure for Recovery from Path Blockade when the TrueCopy Basic Function Is Used

(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.

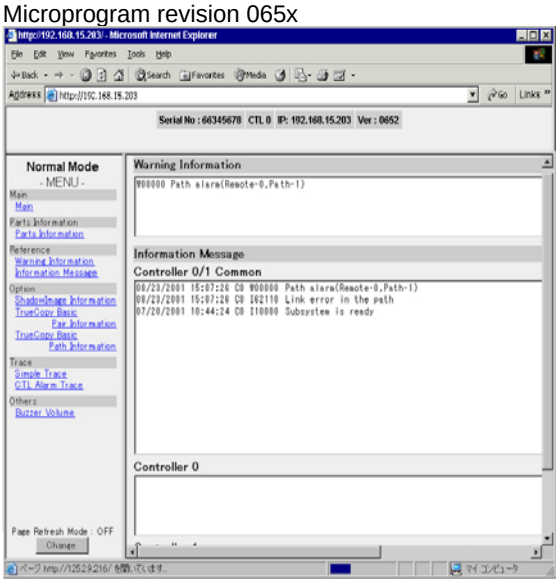
*2 : For the message when the acquisition of the cause of the path detachment was unsuccessful, see Table 2.4.3 on page MNTE 02-2120.

*3 : For the message when the revalidation is performed, see Table 2.4.4 on page MNTE 02-2130.

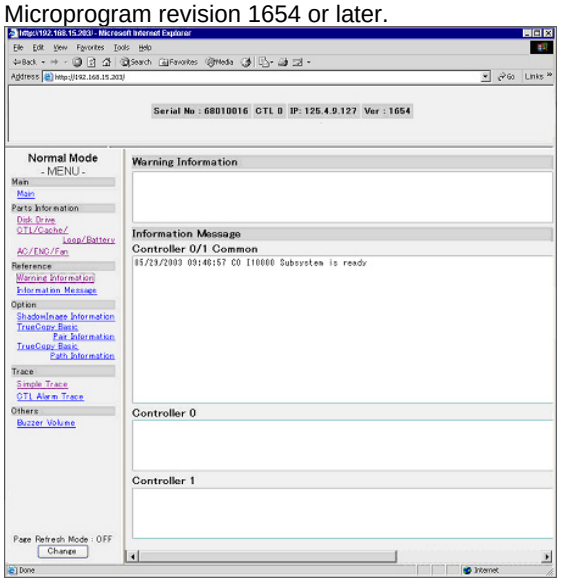
Copyright © 2002, 2005, Hitachi, Ltd.

[Window 1] Image of Information Message window

Microprogram revision 065x

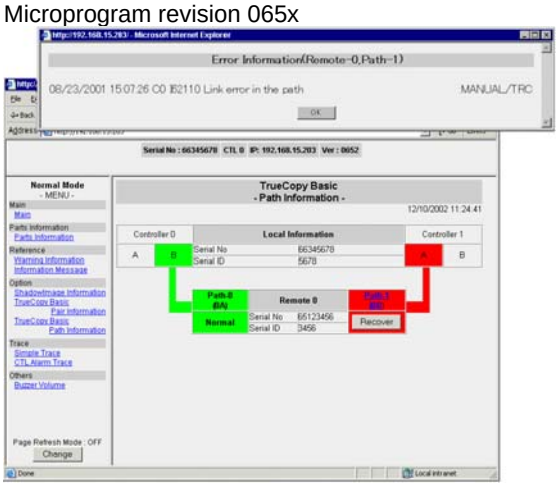


Microprogram revision 1654 or later.

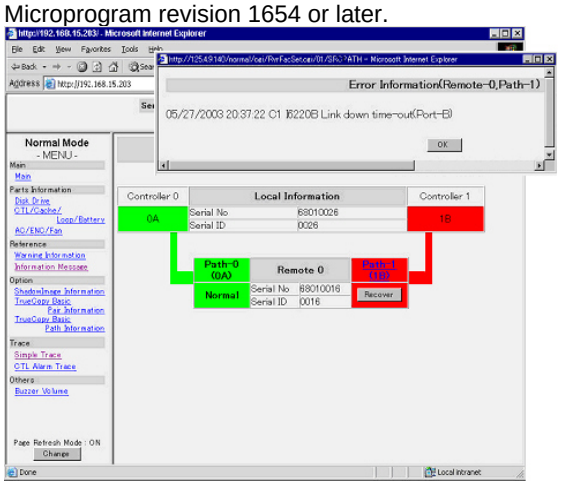


[Window 2] Image of Path Detachment Cause window

Microprogram revision 065x



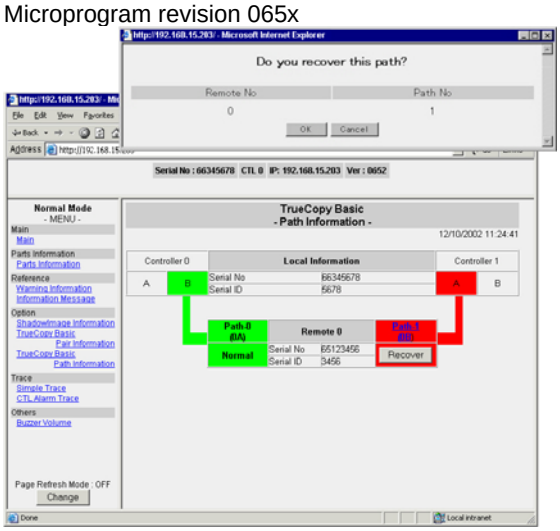
Microprogram revision 1654 or later.



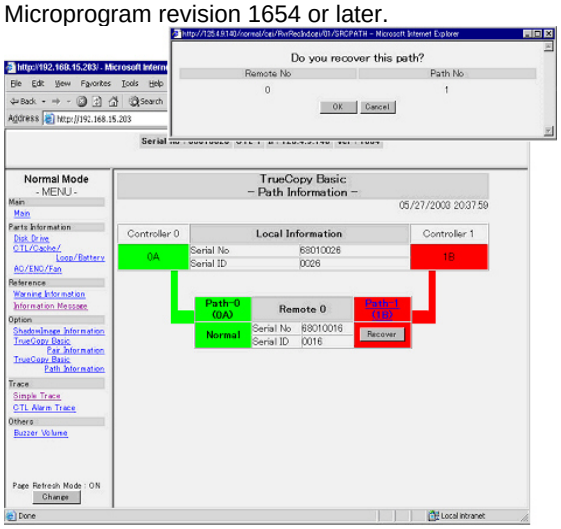
Copyright © 2002, 2005, Hitachi, Ltd.

[Window 3] Image of revalidation direction window

Microprogram revision 065x

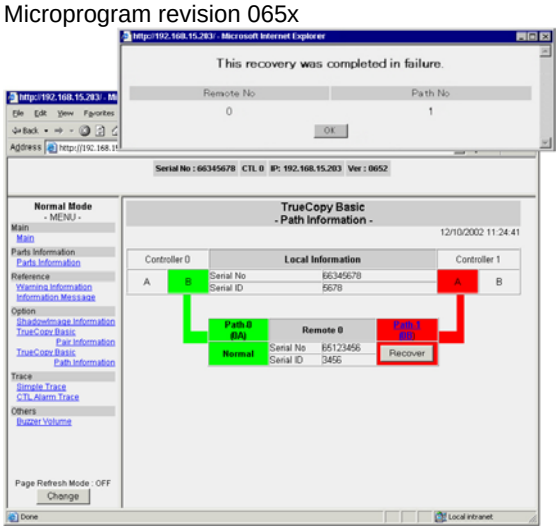


Microprogram revision 1654 or later.

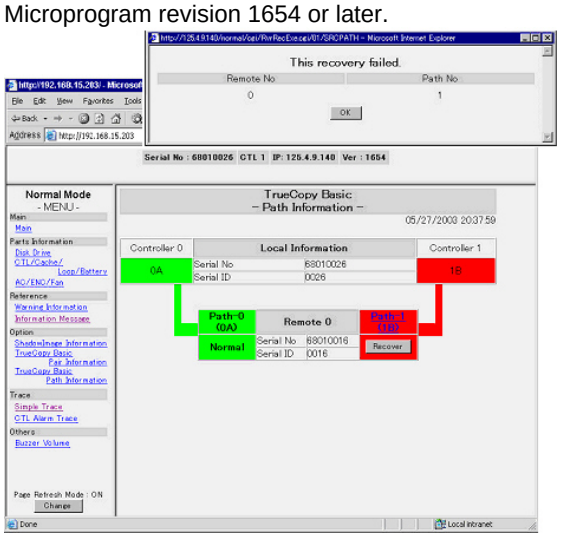


[Window 4] Image of revalidation result window (in the case of abnormal termination)

Microprogram revision 065x



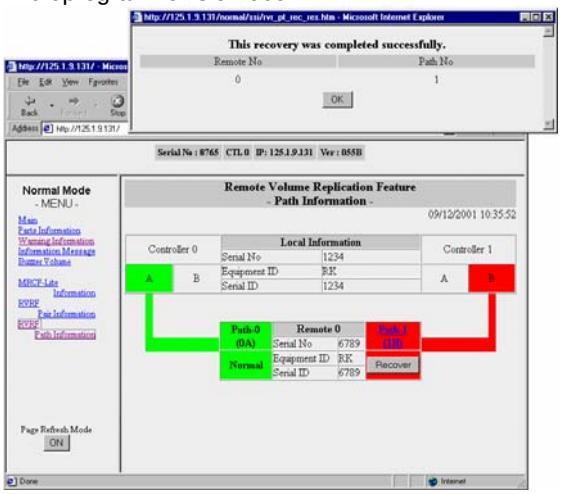
Microprogram revision 1654 or later.



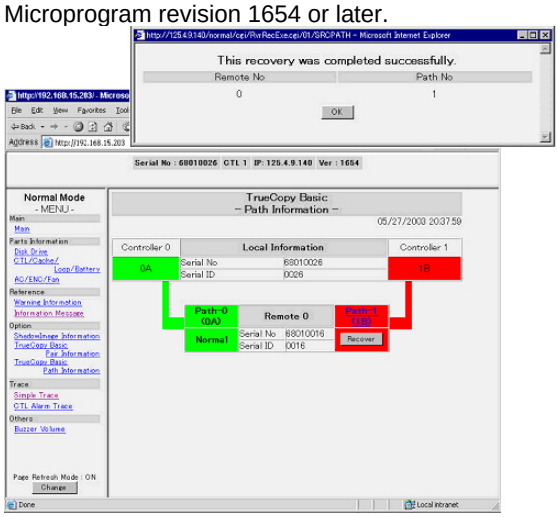
Copyright © 2002, 2005, Hitachi, Ltd.

[Window 5] Image of revalidation result window (in the case of normal termination)

Microprogram revision 065x



Microprogram revision 1654 or later.



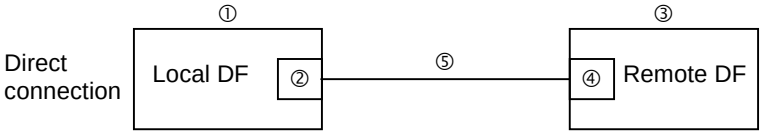
Copyright © 2002, 2005, Hitachi, Ltd.

(b) Maintenance to be done against each cause of path detachment

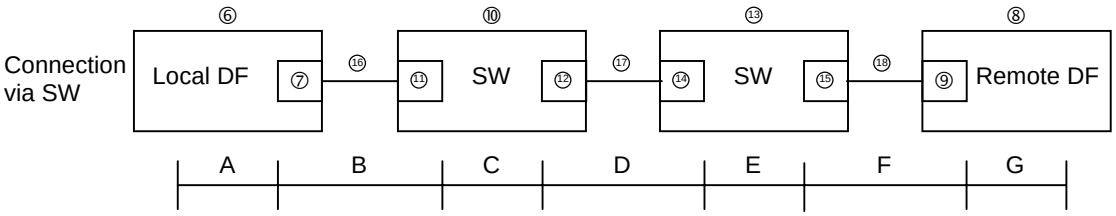
The failed part cannot be ascertained depending on the type of the failure because the path detachment is a route failure.

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.



① : Local DF main body
② : Local DF interface
③ : Remote DF main body
④ : Remote DF interface
⑤ : Connecting cable between the DF's



⑥ : Local DF main body
⑦ : Local DF interface
⑧ : Remote DF main body
⑨ : Remote DF 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 DF and the local side SW
⑰ : Connection cable between the local side SW and the remote side SW
⑱ : Connection cable between the remote DF and the remote side SW

Zone A : ⑥
Zone B : ⑦⑪⑯
Zone C : ⑩
Zone D : ⑫⑭⑰
Zone E : ⑬
Zone F : ⑨⑮⑱
Zone G : ⑧

Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure 2] Perform a maintenance work referring to the priority order of zones and parts shown in Table 2.4.2 according to a cause of the path detachment.

NOTE : • Each time when a part is replaced in order of priority, proceed to the procedure 3 (on page MNTE 02-2120) and perform the revalidation using the RVRF Path Information or SRC Path Information window of the WEB following Item (1) in Subsection 2.4.3, "General flowchart of procedure for recovery from path detachment" (on page MNTE 02-2030).

• 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 DF600 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 2.4.2 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 measures
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 DF concerned is not connected.	• No remote DF, 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.	Direct : a → ④ → ③ → ② → ⑤ SW : a → G → F →D → E → C a : Firstly, check if the remote DF 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.)	

*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.

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery measures
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 DF to another DF)	Not Ready	Direct : ③ SW : ⑧	
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	

*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

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Message text	Path detachment cause	Failure symptom	Priority order of maintenance objects(*1)	Path recovery measures
15	Command time out	Command time-out (Failure of the command issued from a DF to another DF)	• 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 DF sequence No.	• The sequence No. of the remote DF 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 [SRC]	Locking of the remote DF [SRC]	• The optional SRC function of the remote DF is locked.	Direct : ③ SW : ⑧	• The path revalidation from the WEB must be done
20	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 x655/D 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

Copyright © 2002, 2005, Hitachi, Ltd.

[Procedure 3] Proceed to the procedure subsequent to (1) in Subsection 2.4.3, “General flowchart of procedure for recovery from path detachment” on page MNTE 02-2030.

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 Tables 2.4.3 and 2.4.4 according to the message displayed.

Table 2.4.3 List of Messages Displayed when Getting of Path Detachment Cause Failed

No.	Sub-window message	Meaning of message	Recovery procedure
1	Cannot get alarm information because specified function is lock.	The cause cannot be get because the [RVRF] or [SRC] function is locked.	Unlock and validate the [RVRF] or [SRC] 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 [RVRF] or [SRC] function is invalid although it is unlocked.	Validate the [RVRF] or [SRC] 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 2.4.4 List of Messages Displayed when Path Is Revalidated

No.	Sub-window message	Meaning of message	Recovery procedure
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 [RVRF] or [SRC] function is locked.	Unlocked and validate the [RVRF] or [SRC] 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 [RVRF] or [SRC] function is invalid though it is unlocked.	Execute the path revalidation again after validating the [RVRF] or [SRC] 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.

Copyright © 2002, 2005, Hitachi, Ltd.

2.5 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 Subsection 2.5.3 "Collection simple trace" (MNTE 02-2180).

(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 Subsection 2.5.4, "Collecting CTL alarm trace" (MNTE 02-2220).

NOTE : The Web may be unable to be connected for two to three minutes after a detachment of the Control Unit because the CTL Alarm Trace is being made.

(3) Collecting memory 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 Subsection 2.5.5, "Collecting memory dump" (MNTE 02-2260).

The failure information is collected by different methods, depending on the configuration and condition of the unit.
Collect the failure information securely according to "2.5.2 Judge collection of failure information" (MNTE 02-2160).

Copyright © 2002, 2005, Hitachi, Ltd.

2.5.1 Time to collect failure information

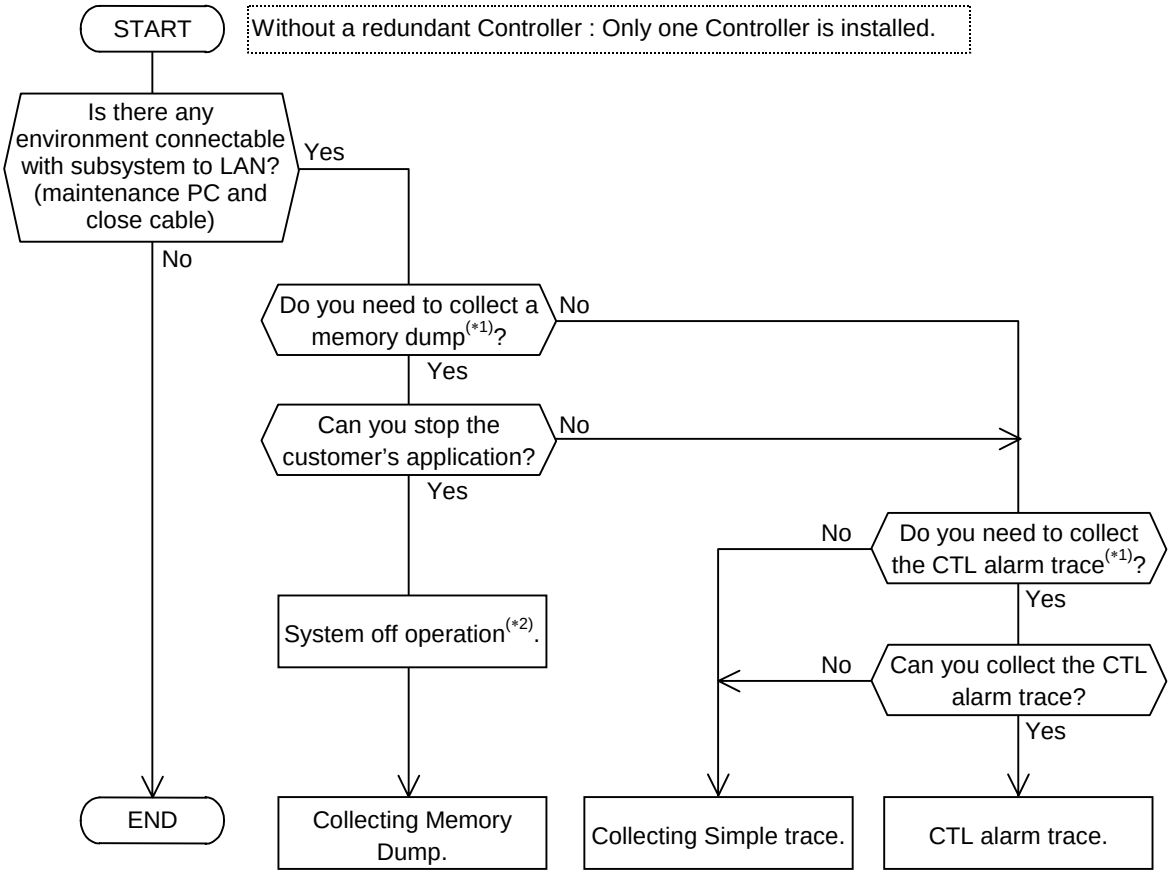
Collect the failure information in the following cases.

(1) A failure was reported to the work-station server, client for maintenance, WEB browser, or Disk Array Management Program.
(2) The WARNING LED (Orange) of the unit blinked or lighted up.
(3) The ALARM LED (Red) of the unit lighted up.

Copyright © 2002, 2005, Hitachi, Ltd.

2.5.2 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 memory dump and controller shutdown trace for a log message

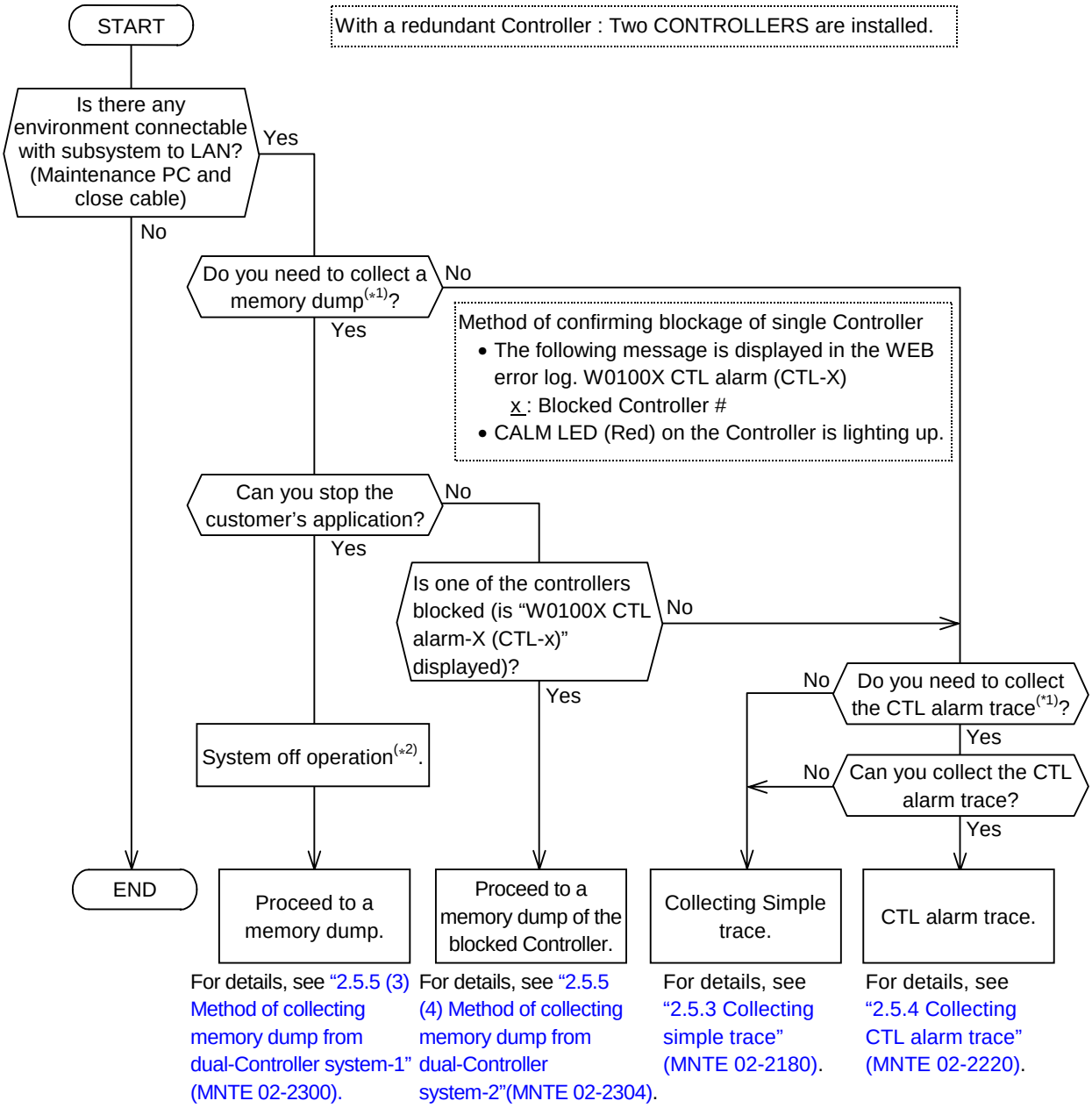
① See the last five characters (124th to 128th characters) in the log message.
(For details about the log messages, see "2.2.3 Confirm log messages" (MNTE 02-0200).)

② /STRC : You need to collect the simple trace.
/CTRC : You need to collect the controller shutdown trace.
/FDMP : You need to collect the memory 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. (See Item (2), "Setting the Rotary switch" in "Setting the Power Control Mode (Local/Remote Mode)" on pages INST 02-0390 and INST 03-0770 in the Maintenance Manual for Installation.) When the subsystem is powered off, a memory dump cannot be done.)
When the mode is Remote, perform the memory dump in the state in which no access (I/O) from the host computer is made. (See Subsection 2.5.5, "Collecting memory dump" on page MNTE 02-2260.)

Copyright © 2002, 2005, Hitachi, Ltd.

(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 memory 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, see "2.2.3 Confirm log messages" (MNTE 02-0200).)

② /STRC : You need to collect the simple trace.
/CTRC : You need to collect the controller shutdown trace.
/FDMP : You need to collect the memory 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. (See Item (2), "Setting the Rotary switch" in "Setting the Power Control Mode (Local/Remote Mode)" on pages INST 02-0390 and INST 03-0790 in the Maintenance Manual for Installation.) When the subsystem is powered off, a memory dump cannot be done.)
When the mode is Remote, perform the memory dump in the state in which no access (I/O) from the host computer is made. (See Subsection 2.5.5, "Collecting memory dump" on page MNTE 02-2260.)

Copyright © 2002, 2005, Hitachi, Ltd.

2.5.3 Collecting simple trace

Using Simple Trace Collection, the trace information stored in the controller and the configuration information are collected.
The trace information files shown in Table 2.5.1 are output. They are binary files.

Table 2.5.1 Output Trace Information List

No.	Collect item	Output file name (*1)
1	FLASH trace (Controller#0)	GIJ0cxx.lzh
2	FLASH trace (Controller#1)	GIJ1cxx.lzh
3	CUDG trace	CUDGTcxx.lzh
4	CUDG diagnostic information	CUDGDcxx.lzh
5	FLASH use area	CHKcxx.lzh
6	Message buffer (Controller#0)	MSG0cxx.lzh
7	Message buffer (Controller#1)	MSG1cxx.lzh
8	Trace information in powering on process (Controller#0)	MBTR0cxx.lzh
9	Trace information in powering on process (Controller#1)	MBTR1cxx.lzh
10	Trace information (Controller#0)	TRC0cxx.lzh
11	Trace information (Controller#1)	TRC1cxx.lzh
12	Take-over information	VRScxx.lzh
13	SES drive management information	SESDRcxx.lzh
14	Back end diagnostic information	BKDcxx.lzh
15	Drive WWW current information	WWWcxx.lzh
16	INQUIRY service information	DRVTYcxx.lzh
17	Link service log-in information	LOGINcxx.lzh
18	FLASH CTL information	CTLSEcxx.lzh
19	Information on check code error temporary saving (Controller#0)	SHEL0cxx.lzh
20	Information on check code error temporary saving (Controller#1)	SHEL1cxx.lzh
21	Watchdog time-out analysis information (Controller#0)	WTDG0cxx.lzh
22	Watchdog time-out analysis information (Controller#1)	WTDG1cxx.lzh
23	Watchdog time-out information2 (Controller#0)	WTD20cxx.lzh
24	Watchdog time-out information2 (Controller#1)	WTD21cxx.lzh
25	LA- error in information (JOB) (Controller#0)	LAJB0cxx.lzh
26	LA- error in information (JOB) (Controller#1)	LAJB1cxx.lzh
27	LA- error in information (RCH) (Controller#0)	LARH0cxx.lzh
28	LA- error in information (RCH) (Controller#1)	LARH1cxx.lzh
29	Sequential buffer LA error information (Controller#0)	SLA0cxx.lzh
30	Sequential buffer LA error information (Controller#1)	SLA1cxx.lzh
31	DHCP LAN correspondence information	LANcxx.lzh
32	Reserve information	RSVcxx.lzh
33	LCD table	LCDcxx.lzh

*1 : Extension of collection file
c : Master Controller No. (Controller from which trace was collected) (0 or 1)
xx : An incremental No. from 00 to 99.

The method of collecting the simple trace is shown below.

Copyright © 2002, 2005, Hitachi, Ltd.

(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. Follow "Notices on (restriction of) the support browser" in the "for WEB" (WEB 01-0010) for the cautionary notes of the browser.
For collecting the simple trace, a Disk Drive with a space of 5 Mbytes at least is necessary.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN-cross-cable.

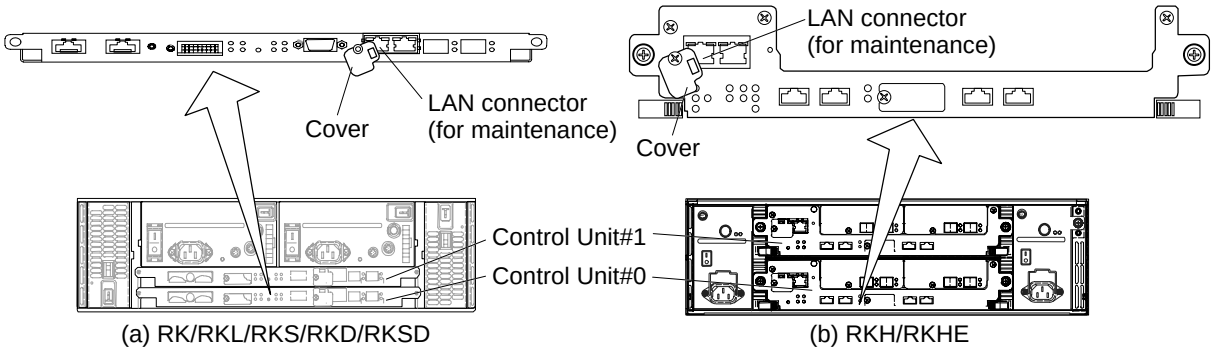


Figure 2.5.1 LAN Connector Position

(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 Controller #0, and "simpl_trc1.dat" for the collection from Controller #1".)

(d) Make sure that the WARNING LED (orange) on the Front Bezel of RK/RKL/RKS/ RKD/RKSD/RKH/RKHE is not blinking fast (at intervals of 125 ms). 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], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

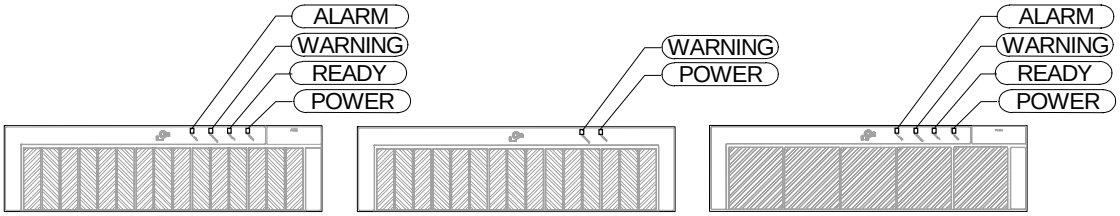
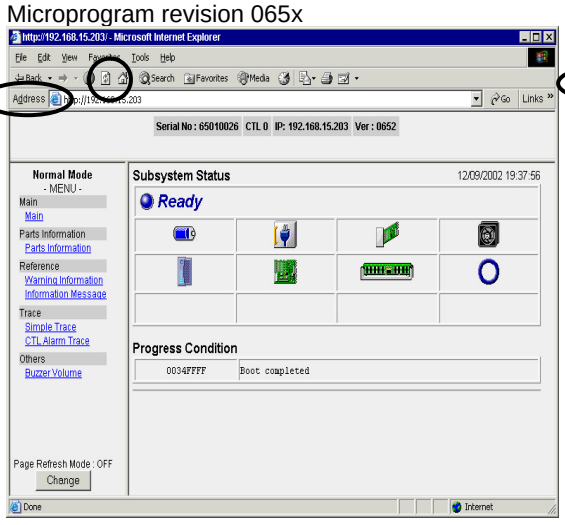


Figure 2.5.2 Indication Locations and Names of LED (Front Bezel)

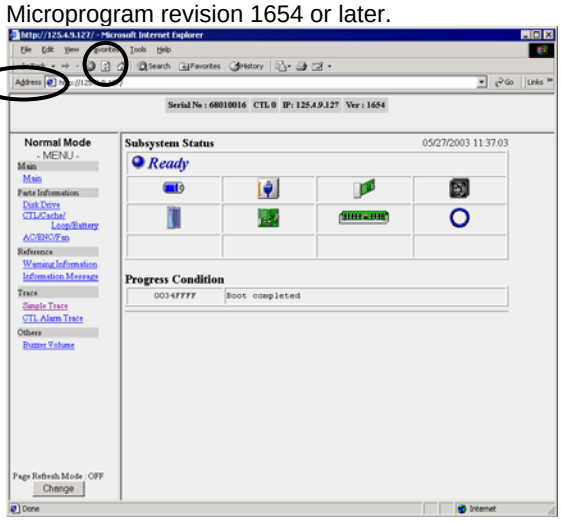
(2) Procedure for a simple trace collection

(a) Enter the IP address of the LAN connector for maintenance, to which the 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 Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.)

Microprogram revision 065x



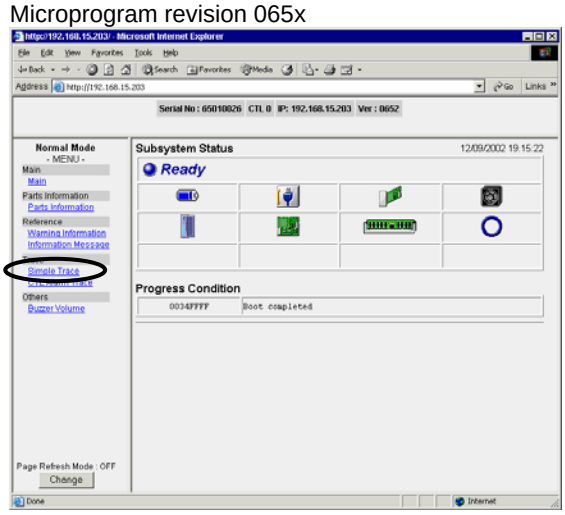
Microprogram revision 1654 or later.



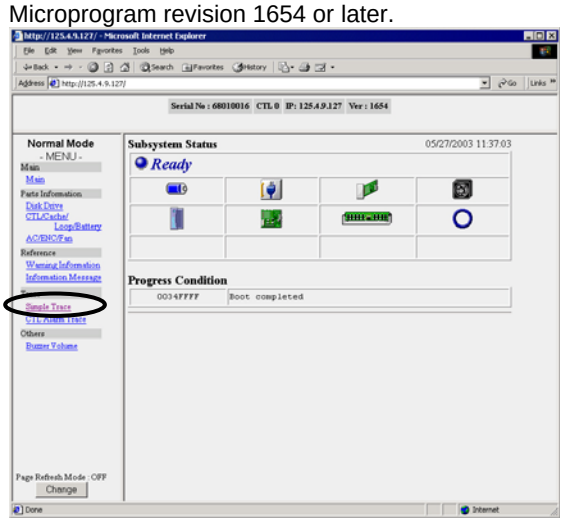
Copyright © 2004, 2005, Hitachi, Ltd.

(b) Collect the simple trace according to the WEB and the following procedure.
Click “Trace” in the menu frame of “Simple Trace”.

Microprogram revision 065x



Microprogram revision 1654 or later.



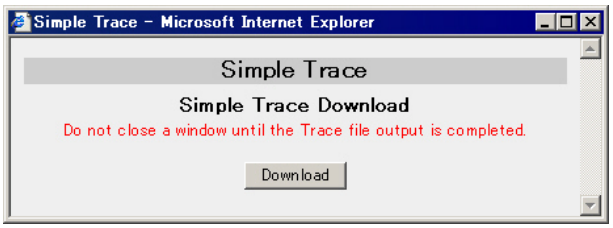
(c) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



(d) The following window is displayed.(‡1)



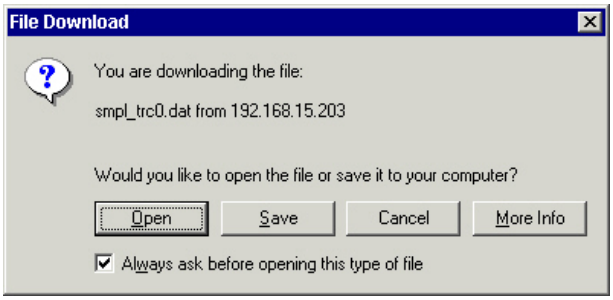
(e) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



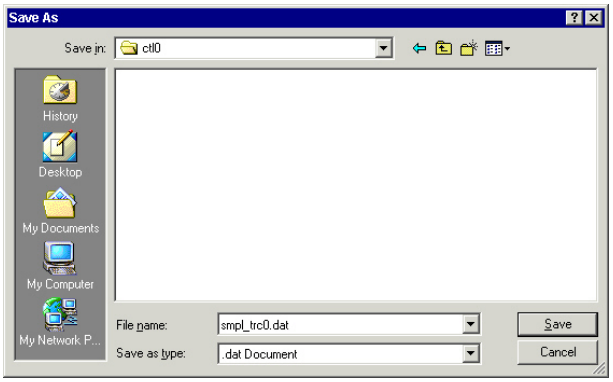
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the simple trace again after waiting for a while.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) The following dialog is displayed.
Click the [Save] button.



(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. When the down-loading completes, the progress indicating message window is closed.

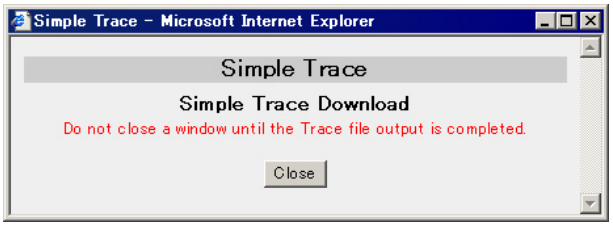
‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

Copyright © 2002, 2005, Hitachi, Ltd.

(h) When the simple trace collection is completed, the following window is displayed. (If is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the simple trace collection is completed. It may not be collected.

Click [Close] to close the window.



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 “3.1 Transferring to the Maintenance Mode” (WEB 03-0000) in the “for WEB”.

When the USB memory needs to store the simple trace information, refer to “2.5.6 Storing simple trace information in the USB memory” (MNTE02-2310).

Copyright © 2004, 2005, Hitachi, Ltd.

2.5.4 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 : The Web may be unable to be connected for two to three minutes after a detachment of the Control Unit because the CTL Alarm Trace is being made.

Since the above-mentioned CTL alarm trace information is taken over from the blocked Controller to the replaced Controller, it can be collected after the Controller is recovered from the failure. If the Controller is blocked while collecting the Controller 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. Follow "Notices on (restriction of) the support browser" in the "for WEB" (WEB 01-0010) for the cautionary notes of the browser.

For collecting the CTL alarm trace, a Disk Drive with a space of 10 Mbytes at least is necessary.

(b) Connect the Device LAN Port for maintenance and the PC terminal with a LAN cross cable.

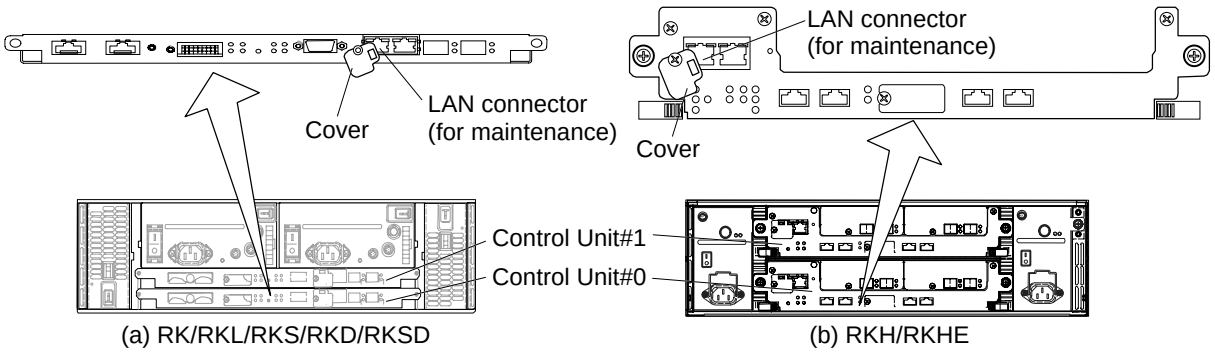


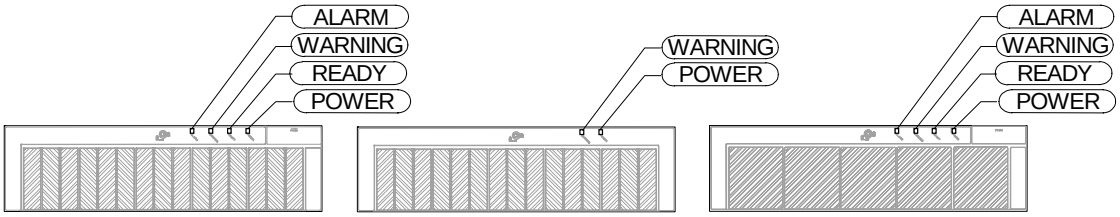
Figure 2.5.3 LAN Connector Position

(c) Collect the CTL Alarm trace information from each Controller.

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.

Copyright © 2002, 2005, Hitachi, Ltd.

(d) Make sure that the WARNING LED (orange) on the Front Bezel of RK/RKL/RKS/ RKD/RKSD/RKH/RKHE is not blinking fast (at intervals of 125 ms). 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) RK/RKL/RKS/RKD/RKSD (b) RKA/RKAD/RKAAT/RKAJAT/ RKAATL/RKAJATL (c) RKH/RKHE

Figure 2.5.4 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], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

(f) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

Copyright © 2003, 2005, Hitachi, Ltd.

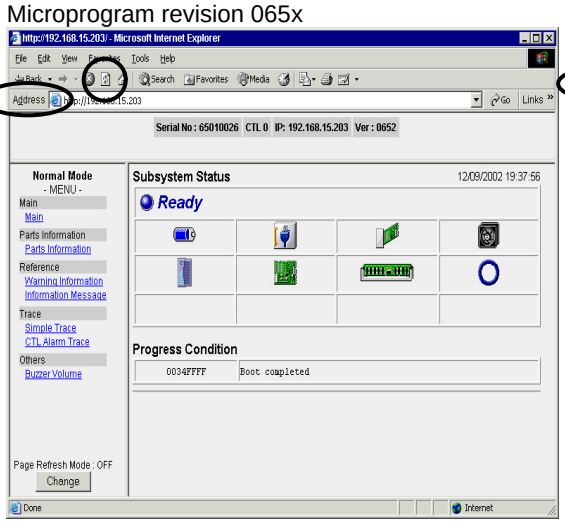
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

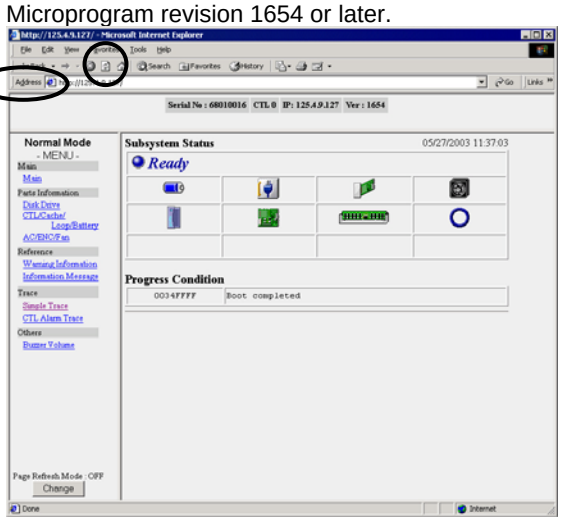
(2) Procedure for collecting a CTL Alarm trace

(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 Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.)

Microprogram revision 065x

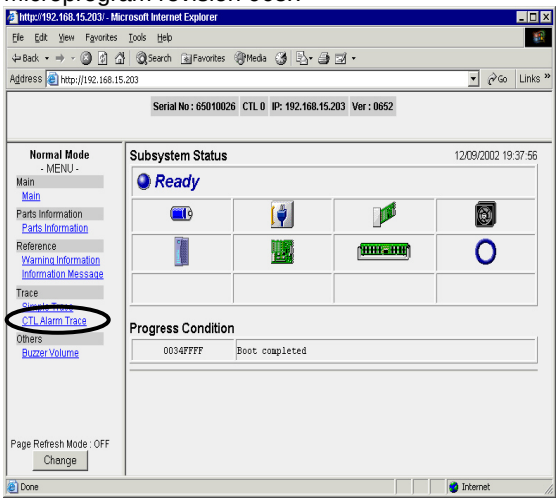


Microprogram revision 1654 or later.

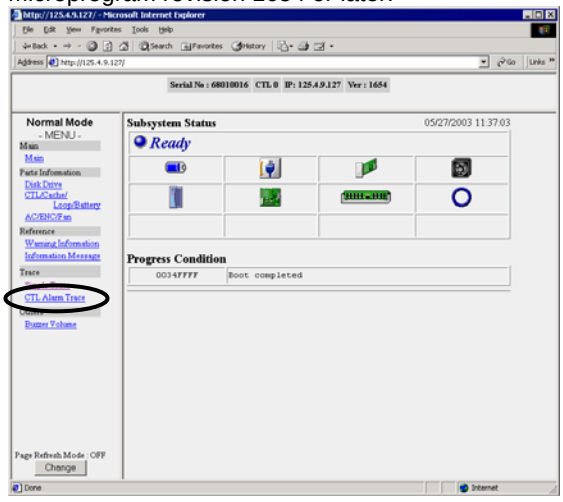


(b) Collect the memory dump according to the WEB and the following procedure. Click "CTL Alarm Trace" in the menu frame of "Trace".

Microprogram revision 065x



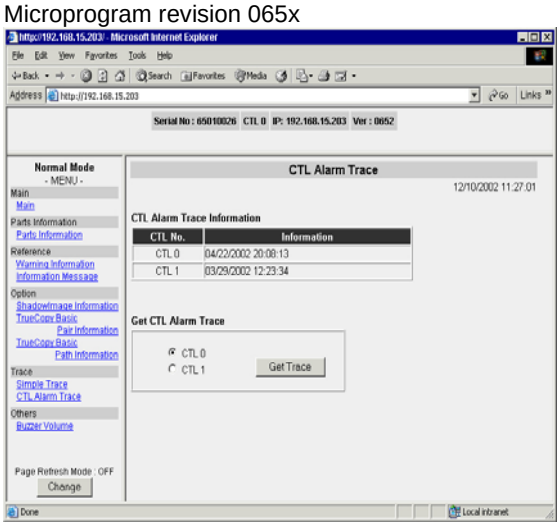
Microprogram revision 1654 or later.



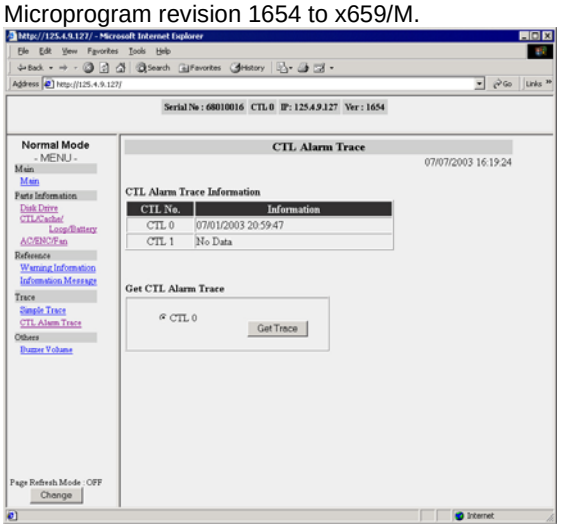
Copyright © 2002, 2005, Hitachi, Ltd.

If CTL Alarm trace exists, the CTL Alarm trace information window is displayed.

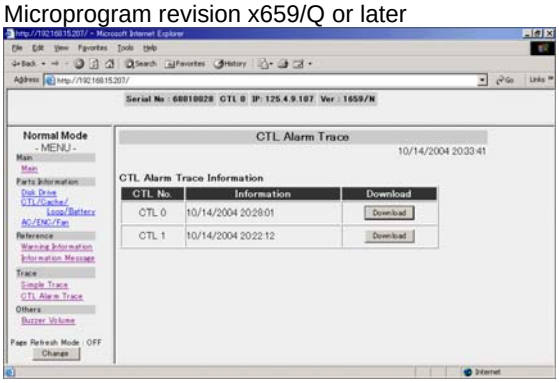
Microprogram revision 065x



Microprogram revision 1654 to x659/M.



Microprogram revision x659/Q or later



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.

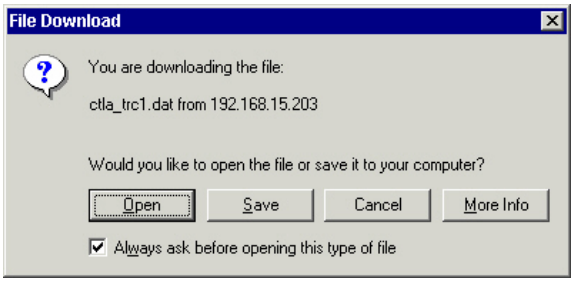
NOTE : When "Not Ready" or "No Data" is displayed on the description of "Information", or when the date of the information is different from that of the collection of this time, the CTL alarm trace may not be collected normally. Therefore, collect the simple trace.
If simple trace cannot be obtained through detached Controller, connect the Maintenance PC to the Controller at the opposite side, and collect the simple trace.

Copyright © 2002, 2005, Hitachi, Ltd.

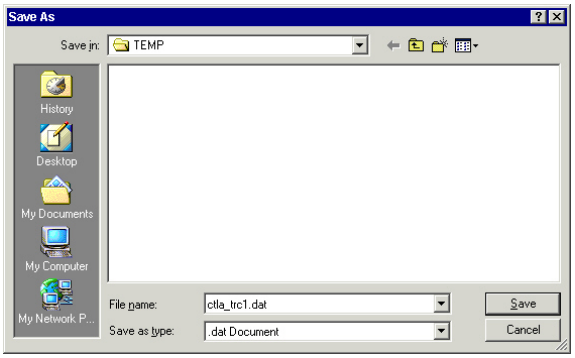
(c) When downloading the CTL Alarm Trace information, perform the following.

- For the Microprogram revision x659/M or earlier:
  Select a controller (CTL 0 or CTL 1) in the "Get CTL Alarm Trace", and then press the "Get Trace" button.
- For the Microprogram revision x659/Q or later:
  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.



(e) Select the place to save the file and file name (Default file name: ctla_trc0.dat) and click [Save](‡2).



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 "3.1 Transferring to the Maintenance Mode" (WEB 03-0000) in the "for WEB".

‡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.

‡2 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

2.5.5 Collecting memory dump

The method of collecting the memory dump is shown below.

(1) Before collecting the memory dump

(a) Items to be prepared

The memory dump is collected in the maintenance mode of the WEB.
For connecting to the WEB, a PC terminal with Browser installed is necessary. Follow "Notices on (restriction of) the support browser" in the "for WEB" (WEB 01-0010) for the cautionary notes of the browser.
For collecting memory dump information, disk space of 480 Mbytes per one Control Unit is required (RK/RKS/RKD/RKSD). (240 Mbytes for temporary data and 240 Mbytes for dumped memory data)
For collecting memory dump information, disk space of 160 Mbytes per one Control Unit is required (RKH/RKHE). (80 Mbytes for temporary data and 80 Mbytes for dumped memory data)
Under ordinary maintenance works, disk space of no less than 50 Mbytes is required.

(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.

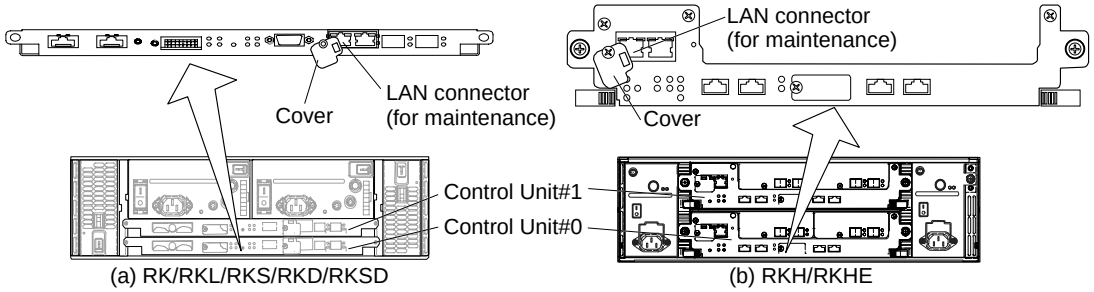


Figure 2.5.5 LAN Connector Position

(c) Collect the memory 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) Make sure that the WARNING LED (orange) on the Front Bezel of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is not blinking fast (at intervals of 125 ms). 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], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

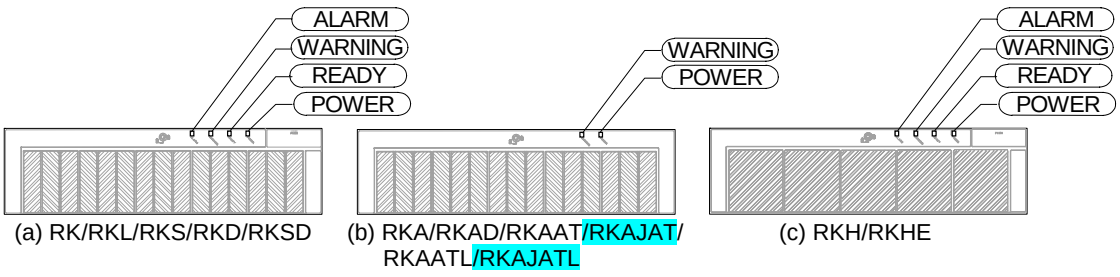
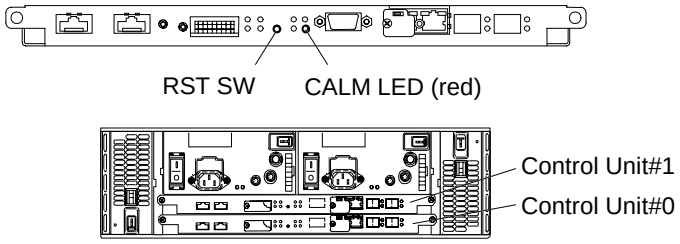


Figure 2.5.6 Indication Locations and Names of LED (Front Bezel)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Procedure for a memory dump collection in the single system (for RK/RKS/RKD/RKSD)

(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.)

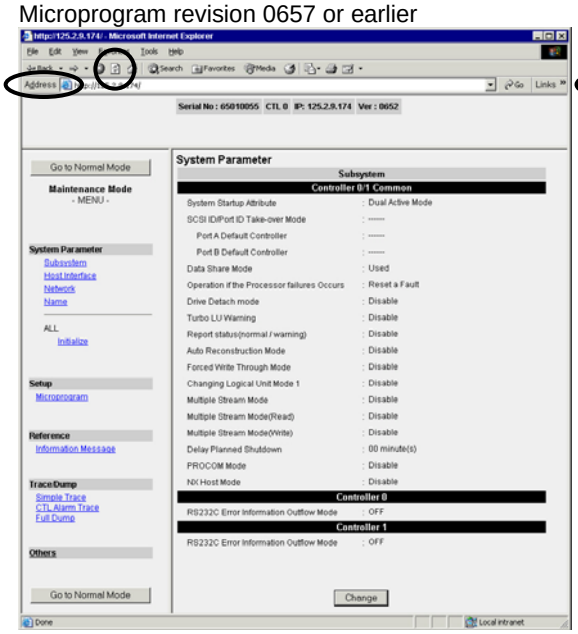


(a) RK/RKS/RKD/RKSD (Rear view)

Figure 2.5.7 Indication Locations of Control Unit

(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 Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.)
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].

Microprogram revision 0657 or earlier



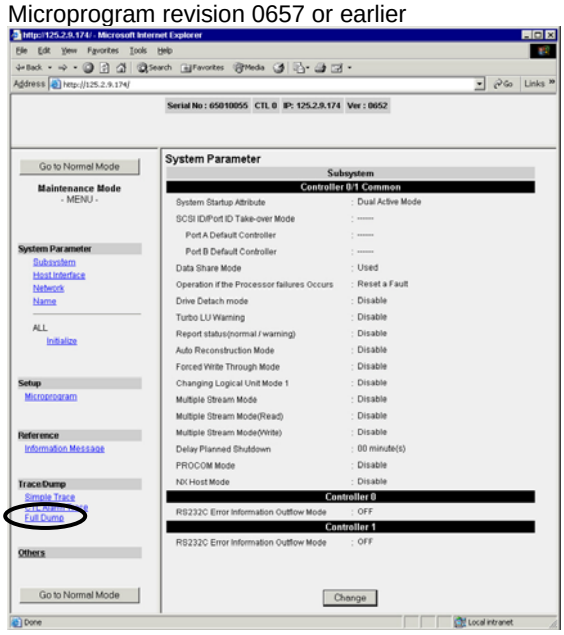
Microprogram revision 0658 or later.



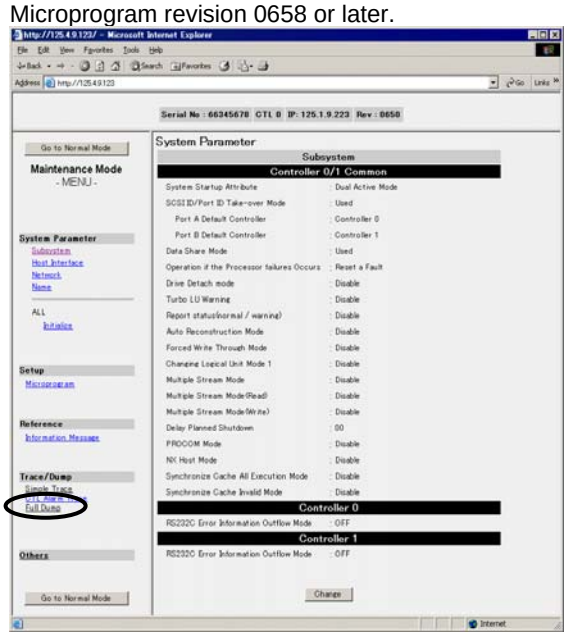
Copyright © 2002, 2005, Hitachi, Ltd.

(c) Collect the memory dump according to the WEB and the following procedure.
Click “Full Dump” in the menu frame of “Trace/Dump”.

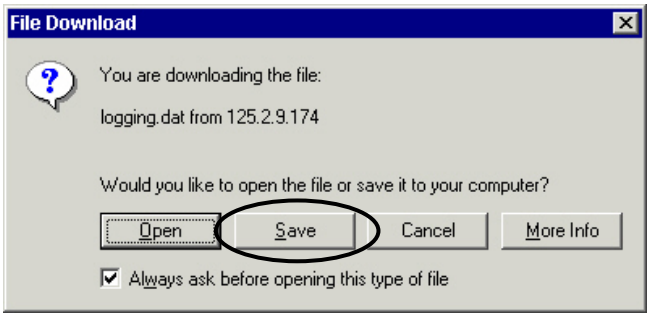
Microprogram revision 0657 or earlier



Microprogram revision 0658 or later.

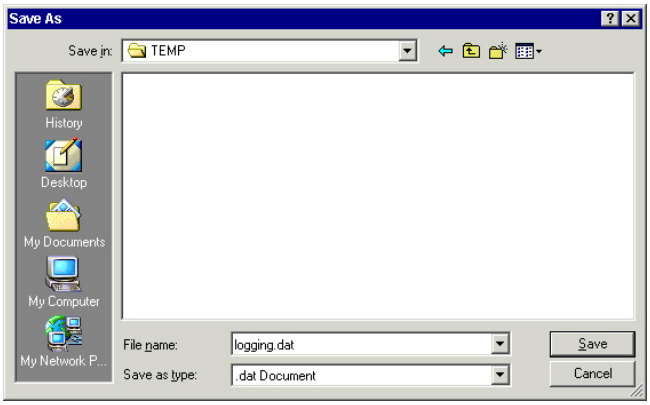


The following dialog is displayed. Click the [Save] button.



Copyright © 2002, 2005, Hitachi, Ltd.

Select the place to save the file and file name (Default file name: logging.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.

(d) Turn the power off.
(e) Compress the collected information. (for RK/RKL/RKS/RKD/RKSD)
Provide each personal computer with a data compression tool and compress the collected information.

‡1 : There may be a case where the default file name is given as “logging.dat..dat” depending on the setting of the PC. In this case, reset the file name to “logging.dat” or any other name.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(3) Interrupting the customer operation and collecting memory-dump information of the both Control Units under dual system configuration

NOTE : If either Control Unit is blocked, collect the memory dump from that Controller first.

(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.

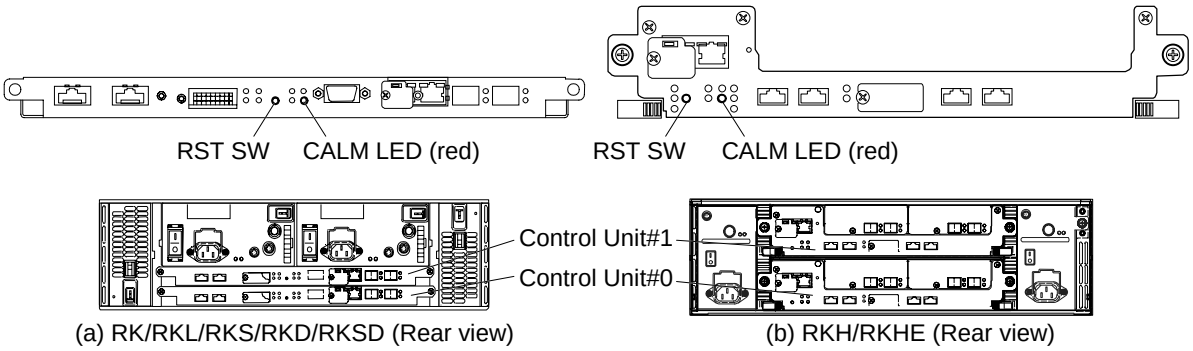


Figure 2.5.8 Indication Locations of Control Unit

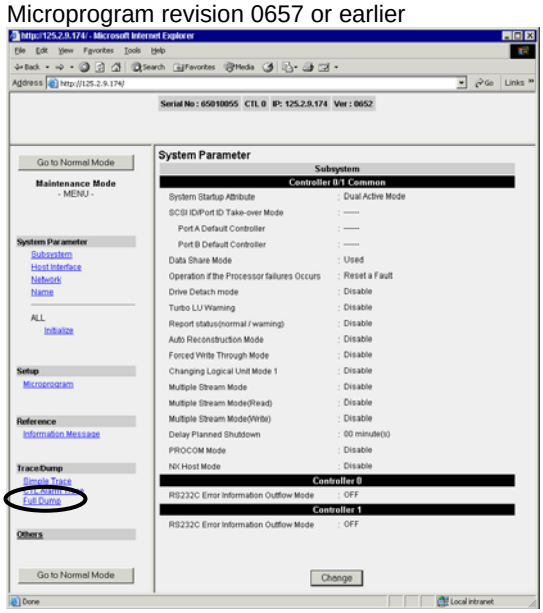
(for RK/RKL/RKS/RKD/RKSD)

(b) Input the IP address of the controller from which the memory 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].

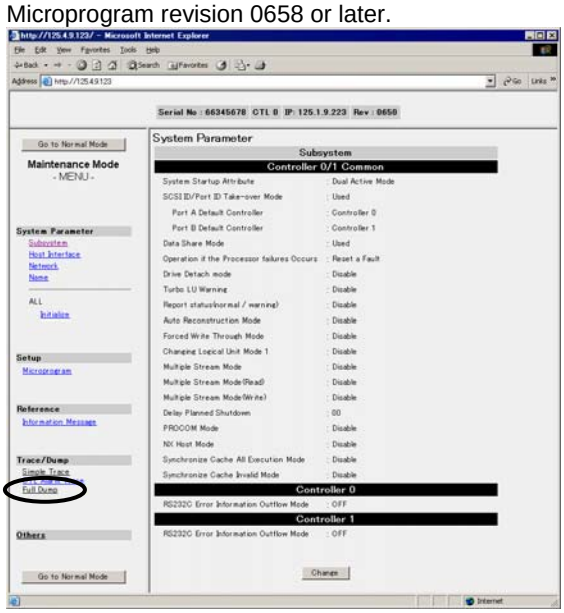
Copyright © 2002, 2005, Hitachi, Ltd.

(c) Collect the memory dump according to the WEB and the following procedure.
Click “Full Dump” in the menu frame of “Trace/Dump”.

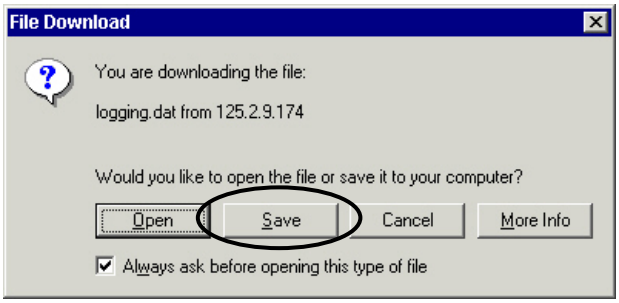
Microprogram revision 0657 or earlier



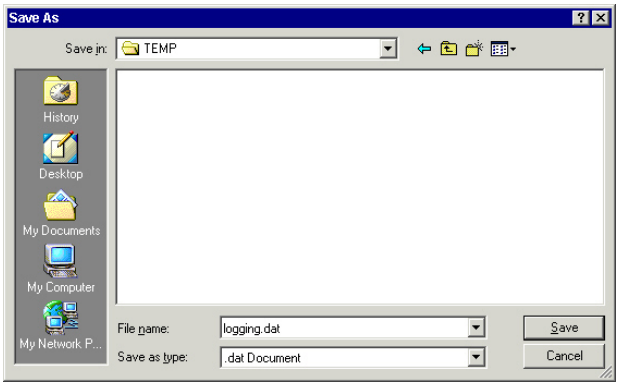
Microprogram revision 0658 or later.



The following dialog is displayed. Click the [Save] button.



Select the place to save the file and file name (Default file name: logging.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.

‡1 : There may be a case where the default file name is given as “logging.dat..dat” depending on the setting of the PC. In this case, reset the file name to “logging.dat” or any other name.

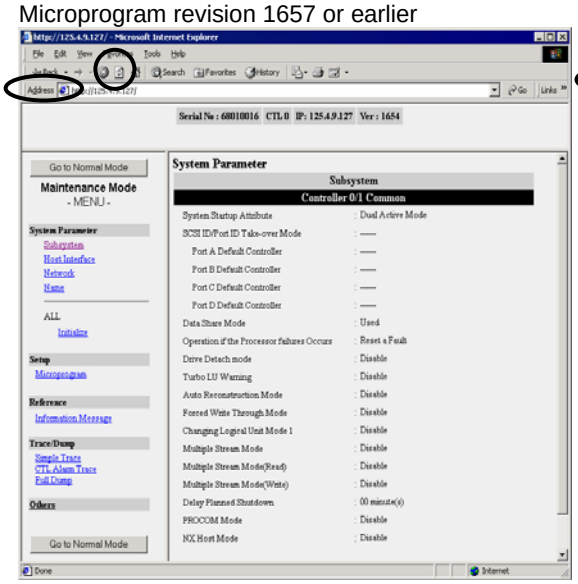
Copyright © 2003, 2005, Hitachi, Ltd.

(d) Return to (b) and collect the memory dump from the other Control Unit.
(Save the memory 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.)
(e) Turn off the power of the unit.
(f) Compress the collected information.
Provide each personal computer with a data compression tool and compress the collected information.

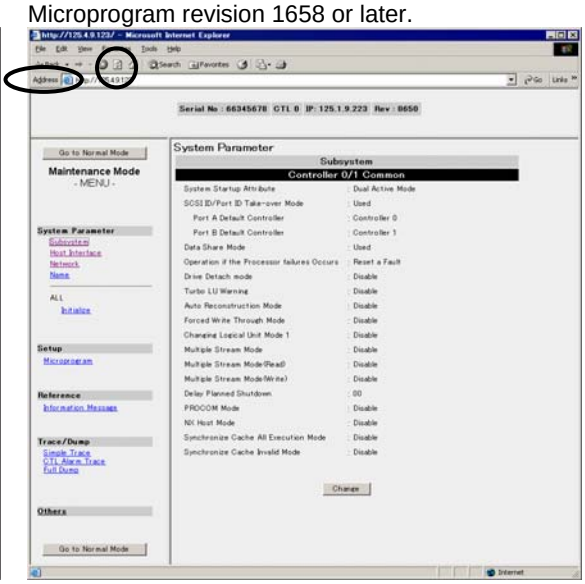
(for RKH/RKHE)

(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 Section 2.1, "Before Starting WEB Connection" on page MNTE 02-0020.)
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].

Microprogram revision 1657 or earlier



Microprogram revision 1658 or later.

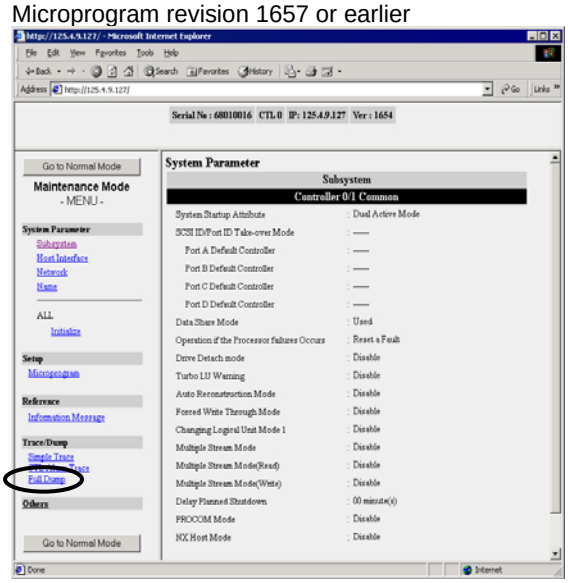


(c) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service PC, collect the simple trace after changing the setting of the following Internet Explorer.
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

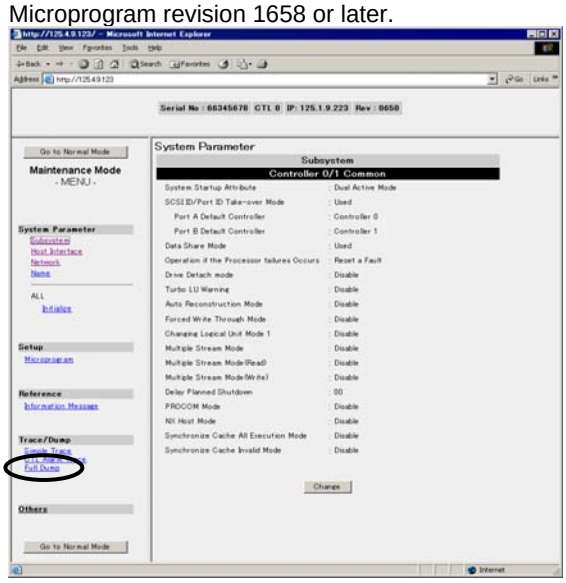
Copyright © 2003, 2005, Hitachi, Ltd.

(d) Collect the memory dump according to the WEB and the following procedure. Collect of memory dump takes about 12 minutes per one controller. Click "Full Dump" in the menu frame of "Trace/Dump".

Microprogram revision 1657 or earlier



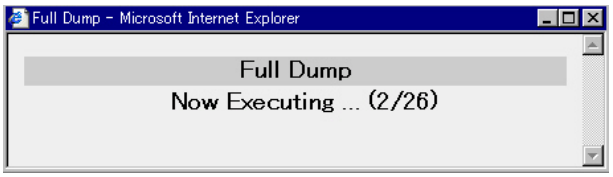
Microprogram revision 1658 or later.



(e) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



(f) The following screen is displayed while having compressed the file.(‡1)



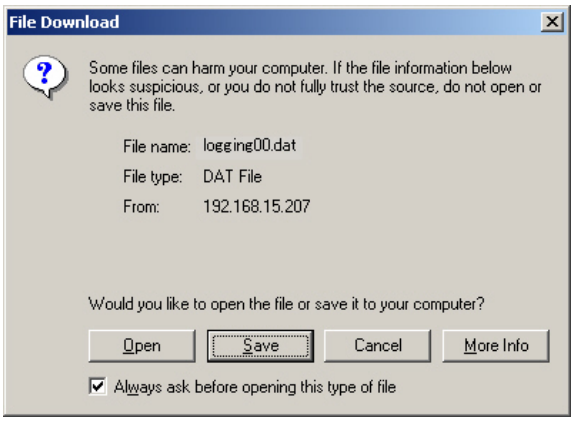
(g) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



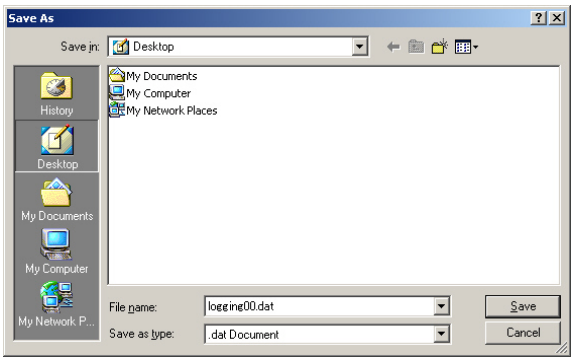
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the Full Dump again after waiting for a while.

Copyright © 2004, 2005, Hitachi, Ltd.

(h) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(i) Select the place to save the file and file name (Default file name: logging.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.

(j) When the compression of the data to be collected by Full Dump is not completed, the following window is displayed.
[Next File] to start compression of the remaining file. The (f) window is displayed during the compression.



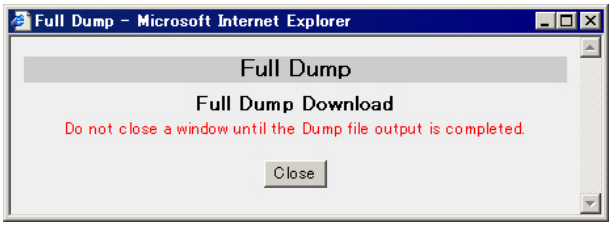
‡1 : There may be a case where the default file name is given as "loggingXX.dat.dat" depending on the setting of the PC (XX=00: controller 0, XX=01: controller 1). In this case, reset the file name to "loggingXX.dat" or any other name.

Copyright © 2004, 2005, Hitachi, Ltd.

(k) When the Full Dump collection is completed, the following window is displayed. (It is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the Full Dump collection is completed. It may not be collected.

Click [Close] to close the window.



(l) Return to (b) and collect the memory dump from the other Control Unit.
(Save the memory 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.)

(m) Turn off the power of the unit.

(4) Collecting memory-dump information of detached Control Unit under dual system configuration

NOTE : Precaution: Collect the memory 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.)

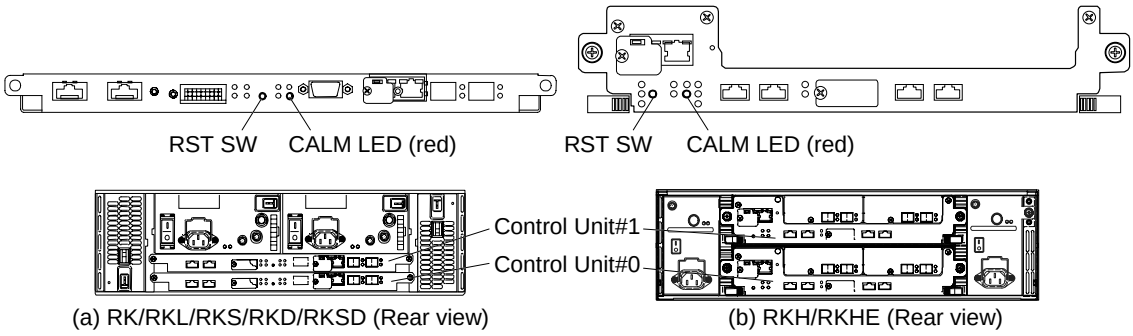


Figure 2.5.9 Indication Locations of Control Unit

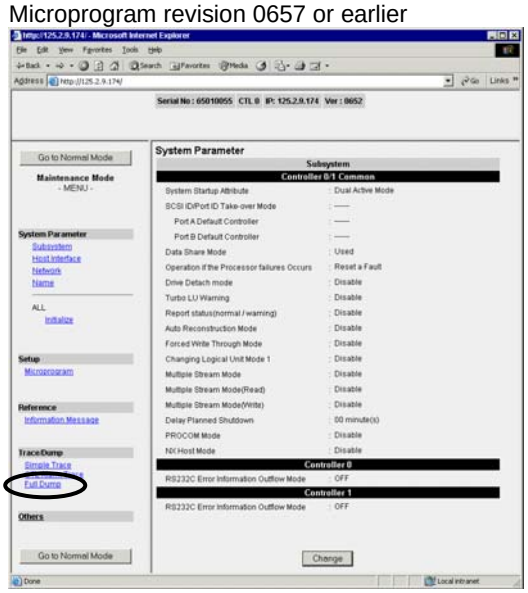
Copyright © 2004, 2005, Hitachi, Ltd.

(for RK/RKL/RKS/RKD/RKSD)

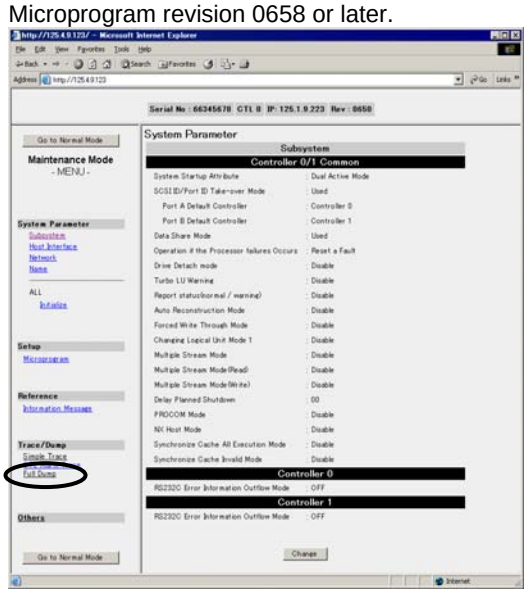
(b) Input the IP address of the Control Unit from which the blocked Control Unit, through the browser.
If the system has been connected to the WEB, press the update button to update the page.
A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input "maintenance" for the [User Name] and "hosyu9500" for the [Password].

(c) Collect the memory dump according to the WEB and the following procedure.
Click "Full Dump" in the menu frame of "Trace/Dump".

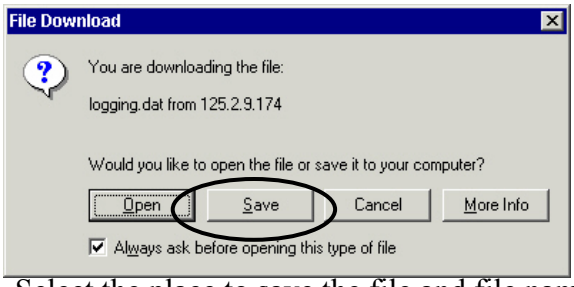
Microprogram revision 0657 or earlier



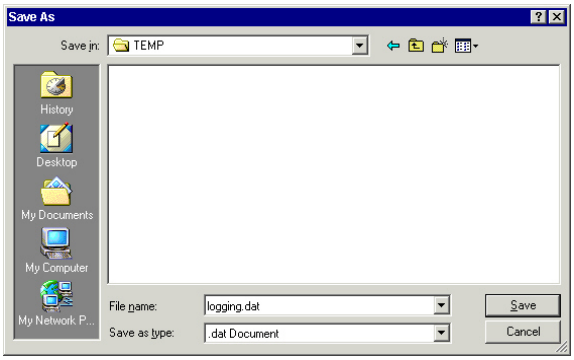
Microprogram revision 0658 or later.



The following dialog is displayed. Click the [Save] button.



Select the place to save the file and file name (Default file name: logging.dat) and click [Save](‡1).



‡1 : There may be a case where the default file name is given as "logging.dat..dat" depending on the setting of the PC. In this case, reset the file name to "logging.dat" or any other name.

Copyright © 2004, 2005, Hitachi, Ltd.

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.

(d) Compress the collected information.
Provide each personal computer with a data compression tool and compress the collected information.

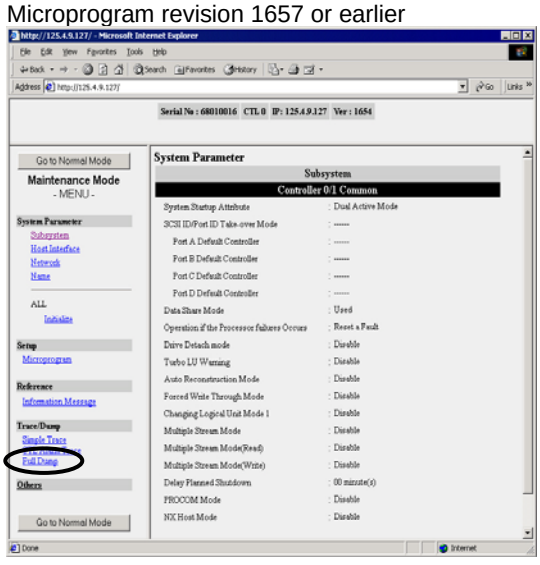
(for RKH/RKHE)

(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].

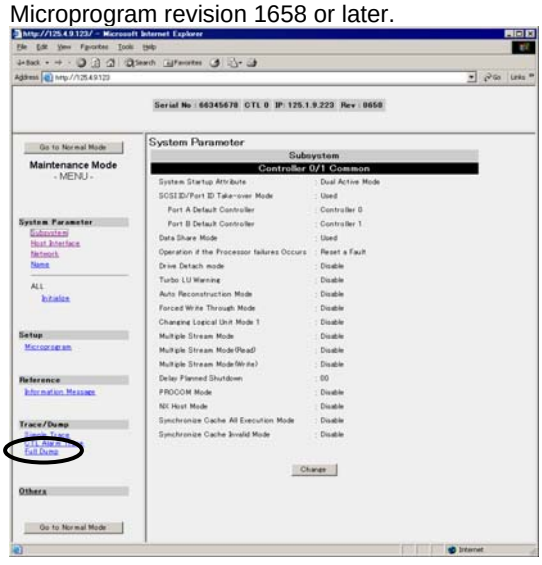
(c) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service PC, collect the simple trace after changing the setting of the following Internet Explorer.
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

(d) Collect the memory dump according to the WEB and the following procedure.
Collect of memory dump takes about 12 minutes per one controller. Click "Full Dump" in the menu frame of "Trace/Dump".

Microprogram revision 1657 or earlier



Microprogram revision 1658 or later.

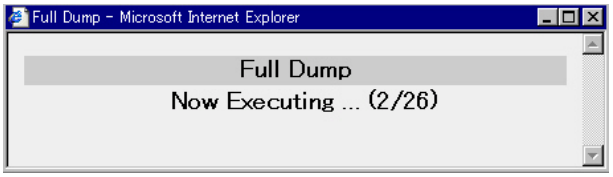


Copyright © 2004, 2005, Hitachi, Ltd.

(e) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



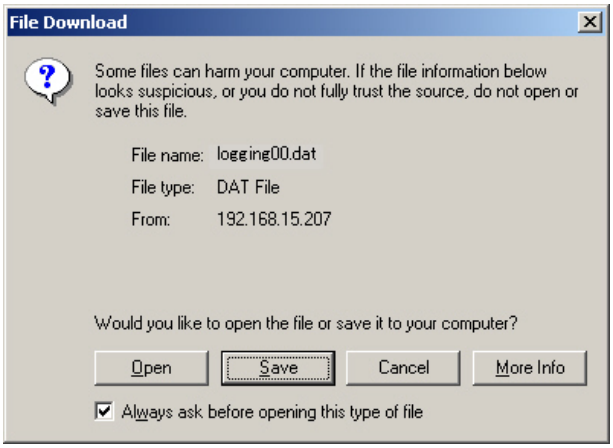
(f) The following screen is displayed while having compressed the file.(‡1)



(g) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



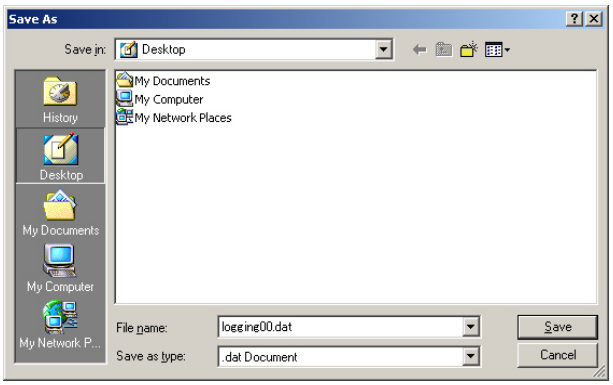
(h) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the Full Dump again after waiting for a while.

Copyright © 2004, 2005, Hitachi, Ltd.

(i) Select the place to save the file and file name (Default file name: logging.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.

(j) When the compression of the data to be collected by Full Dump is not completed, the following window is displayed.
[Next File] to start compression of the remaining file. The (f) window is displayed during the compression. (It is displayed in the Microprogram revision x659/Q or later.)



(k) When the Full Dump collection is completed, the following window is displayed. (It is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the Full Dump collection is completed. It may not be collected.

Click [Close] to close the window.



‡1 : There may be a case where the default file name is given as "loggingXX.dat.dat" depending on the setting of the PC (XX=00: controller 0, XX=01: controller 1). In this case, reset the file name to "loggingXX.dat" or any other name.

Copyright © 2004, 2005, Hitachi, Ltd.

2.5.6 Storing simple trace information in the USB memory

Insert the USB memory in a service PC and give procedure to store the collected simple trace in the USB memory.

NOTE : When Windows 98/98 Second Edition is used for the OS of the service PC, download the USB memory driver on the service PC in advance.

(1) The USB memory outline
Data read/write is enabled only by inserting the USB memory in the USB port in the service PC.

(a) How to use the USB memory

NOTE :
- When using the USB memory in Window 98/98 Second Edition for the first time, perform "driver installation" before connecting the USB memory to a service PC (only connecting the USB memory to the service PC is necessary from the next time).
- When using the USB memory in Windows XP/2000/ME 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 service PC.

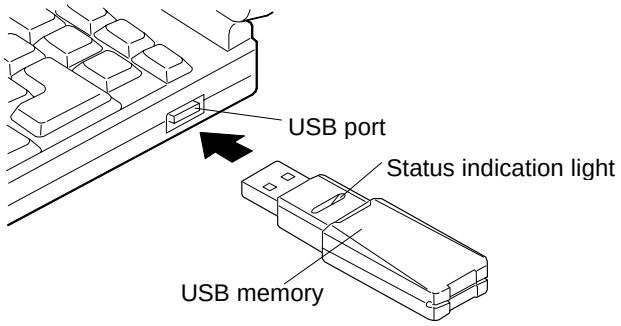


Figure 2.5.10 USB Memory Insertion

(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 identifis the USB memory operation
The status indication light can identify the USB memory operation status inserted in the service 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".

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Installing the driver (for Window98/98 Second Edition only)

When using the USB memory in Windows 98/98 Second Edition for the first time, the driver needs to be installed in a service PC. Not needed for Windows XP/2000/ME.

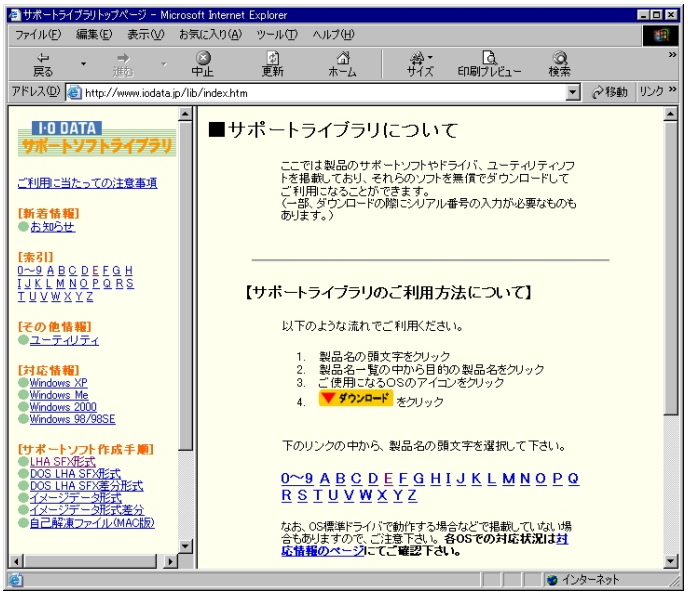
NOTE : Perform the following work before connecting the USB memory to the USB port in the service PC.

(c-1) Downloading the driver

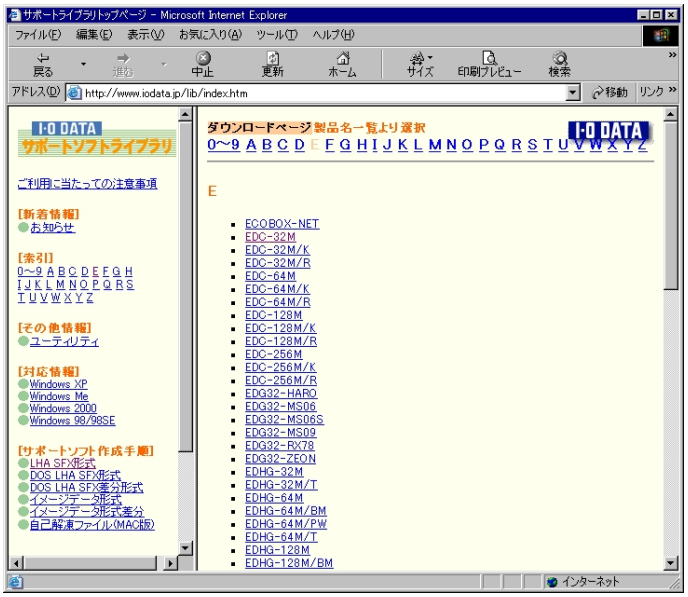
(i) Start Windows 98/98 Second Edition.

(ii) Input "http://www.iodata.jp/lib/index.htm" to "Address" on the WEB browser.

(iii) The following window is displayed. Select the first letter "E" of the product name.

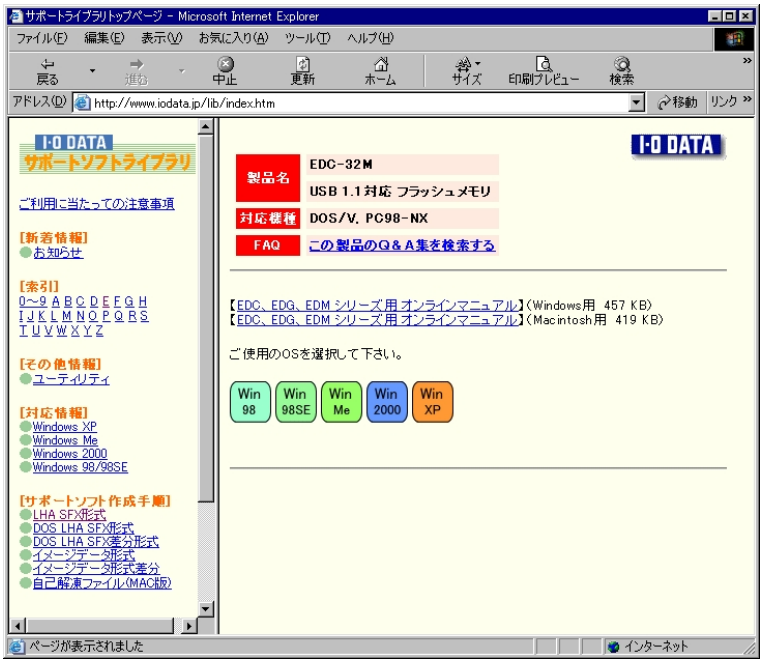


(iv) Select the product name "EDC-32M".



Copyright © 2004, 2005, Hitachi, Ltd.

(v) Select the OS used.
Windows 98: Win98
Windows 98 Second Edition: Win 98SE



(vi) [2] Click "▼ Download" of the driver for Easy Disk Windows 98.



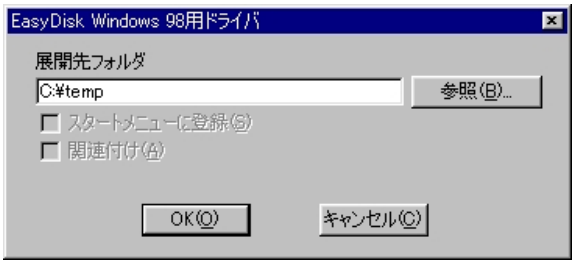
Copyright © 2004, 2005, Hitachi, Ltd.

(c-2) How to install the driver

(i) Double click the downloaded file “xxxx.exe” (ex. usb2cc122.exe).

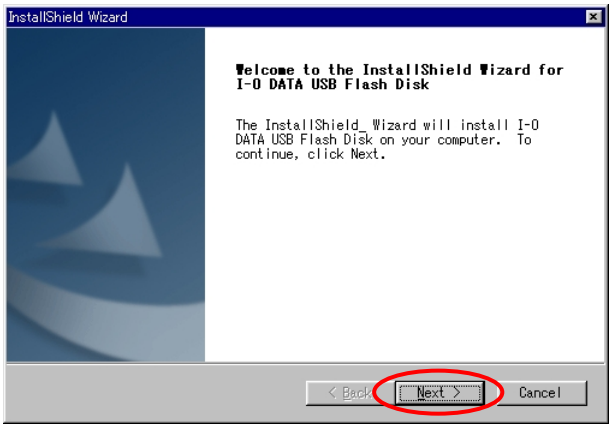
(ii) Click the [Yes] button.

(iii) Click the [OK] button with [Expanded Folder] unchanged.
The [Driver] folder is created in the place specified in [Expanded Folder].

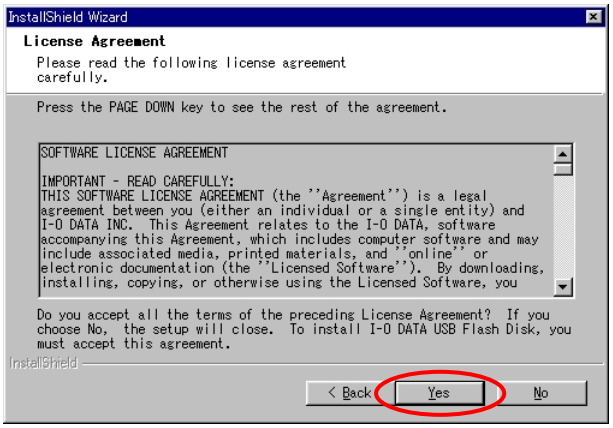


(iv) Double click [IO DATA USB Flash Disk.exe] in the [Driver] folder.

(v) InstallShield Wizard window is displayed. Click the [Next] button.

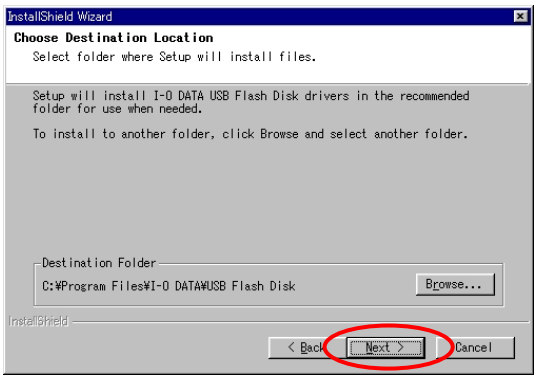


(vi) License Agreement window is displayed. Click the [Yes] button.

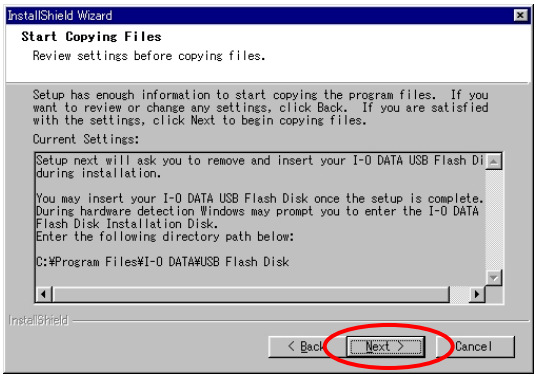


Copyright © 2004, 2005, Hitachi, Ltd.

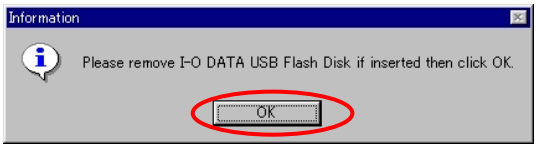
(vii) Choose Destination Location window is displayed. Click the [Next] button.



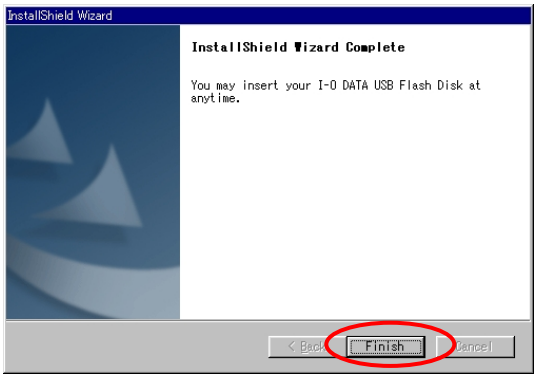
(viii) Start Copying Files window is displayed. Click the [Next] button.



(ix) When the USB memory is connected, remove the USB memory and click the [OK] button.



(x) Click the [Finish] button.



(xi) Restart the service PC.
The driver installation is completed here.

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Procedure for storing in the USB memory

(a) Store simple trace in the USB memory.

Store the simple trace information collected in "2.5.3 Simple Trace Collection" (MNTE02-2180) 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 service PC power is on.

The following procedure is not necessary when removing the memory with the service PC power turned off.

(i) Click the [ icon] in the task tray.

NOTE : For Windows 98/98 Second Edition, the icon is not displayed. Check that the status light is slowly blinking and then remove the memory.

(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.

Copyright © 2004, 2005, Hitachi, Ltd.

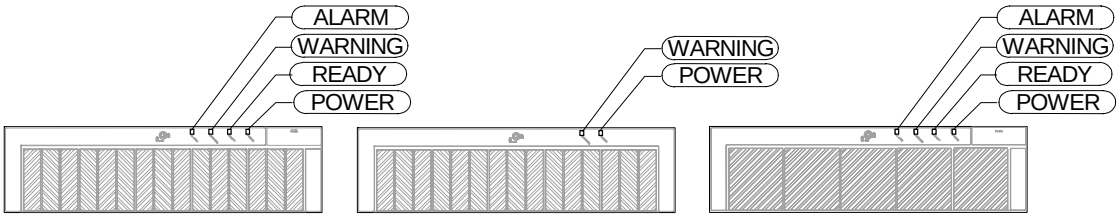
This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

2.6 Trouble Analysis by LED Indication

2.6.1 Trouble Analysis by LED Indication of Front Bezel

(1) LED positions on Front Bezel
The positions on LED's are shown below.



(a) RK/RKL/RKS/RKD/RKSD (b) RKA/RKAD/RKAAT/RKAJAT/ RKAATL/RKAJATL (c) RKH/RKHE

Figure 2.6.1 Locations and Name of LED

(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 2.6.1 LED Indication Patterns on Front Bezel

(○ : On ✧ : Blinking × : Off — : Not depend)

No (*1)	LEDs						State of unit	Actions to take	Failure
	RK/RKL/RKS/RKD/RKSD/RKH/RKHE				RKA/RKAD/RKAAT /RKAJAT/RKAATL/ RKAJATL				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
1	×	×	○	○	○	×	Normal.	Recovery operation is not necessary.	—
2	×	×	×	×	—	×	Power is off or a Power Unit (Power Unit (DC)) failure or each part short-circuit failure occurs.	Analyze the failure following "2.6.1 (3) Trouble analysis by the indication of the POWER LED (a) Trouble analysis on the indication on the POWER LED of RK/RKL/RKS/RKD/ RKSD/RKH/RKHE. (MNTE 02-2350).	Parts failure: (Basic Chassis) Drive failure: (Basic Chassis) (RK/RKL/RKS/ RKD/RKSD/ RKH/RKHE)
	○	×	×	○	×	×		Analyze the failure following "2.6.1 (3) Trouble analysis by the indication of the POWER LED (b) Trouble analysis on the indication on the POWER LED of RKA/RKAD/RKAAT/RKAJAT/ RKAATL/RKAJATL (MNTE 02-2370).	Parts failure: (Additional Chassis) Drive failure: (Additional Chassis) (RKA/RKAD/ RKAAT/ RKAJAT/ RKAATL/ RKAJATL)

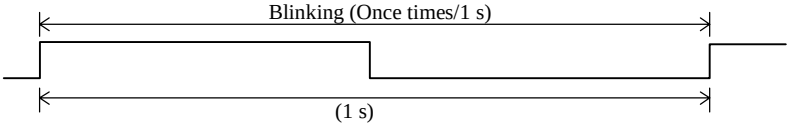
*1 : : This is not a failure status

Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	RK/RKL/RKS/RKD/RKSD/RKH/RKHE				RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
3	○	×	×	×	×	×	Power Unit (Power Unit (DC)), 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 (Power Unit (DC)). (see Table 2.6.4.) 3. Check LED indication of Control Unit. (see Table 2.6.5, Table 2.6.6.) 4. Check LED indication of ENC Unit/SENC Unit. (see Table 2.6.7.)	Parts failure. (RK/RKL/RKA/RKS/RKD/RKAD/RKS/RKH/RKHE/RKAAT/RKAJAT/RKAATL/RKAJATL)
4	×	×	×	○	—	—	A failure occurred during power-on process.	1. Check LED indication of Control Unit. (see Table 2.6.6.) 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).	Parts failure. (RK/RKL/RKS/RKD/RKSD)
								3. Proceed to "2.1 Before Starting WEB Connection" (MNTE02-0020), and then detect a failure with WEB.	Failure must be detected with WEB.
5	✧(*1) (slowly blinking)	×	×	○	—	—	A serious failure occurred while power on. Example: User data was lost.	Proceed to "2.1 Before Starting WEB Connection" (MNTE02-0020), 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. (see Table 2.6.6.)	Parts failure. (RK/RKL/RKS/RKD/RKSD/RKH/RKHE)

*1 : Slowly blinking



Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	RK/RKL/RKS/RKD/RKSD/RKH/RKHE				RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
7	×	○	○	○	○	×	A failure which does not stop operation occurred in RK/RKL/RKS/RKD/RKSD.	Check LED indication of each RK/RKL/RKS/RKD/RKSD/RKH/RKHE part. (See "2.6.2 Trouble Analysis by LED Indication of Each Part" (MNTE 02-2400)).	Parts error. (RK/RKL/RKS/RKD/RKSD/RKH/RKHE)
					○	○	A failure which does not stop operation occurred in RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL. (*1)	Check LED indication of each RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL part. (See "2.6.2 Trouble Analysis by LED Indication of Each Part" (MNTE 02-2400)).	Parts error. (RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL)
8	×	✧(*2) (slowly blinking)	○	○	—	—	A failure which does not stop operation occurred in unit (It must be detected with WEB).	Proceed to "2.1 Before Starting WEB Connection" (MNTE02-0020), and then detect a failure with WEB.	Failure must be detected with WEB.
9	○	✧(*2) (slowly blinking)	×	○	—	—	A failure which does not stop operation occurred in unit.	Proceed to "2.1 Before Starting WEB Connection" (MNTE02-0020), and then detect a failure with WEB.	Failure must be detected with WEB.

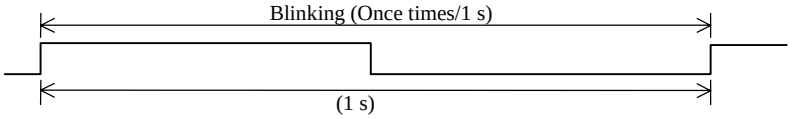
*1 : Under the following conditions, RKA's/RKAAT's/RKAJAT's/RKAATL's/RKAJATL's/RKAD's WARNING LED could not light up. However, the each part's ALARM LED or ALM LED lights up. (Excluding the condition (2) below.)

(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.)

*2 : Slowly blinking

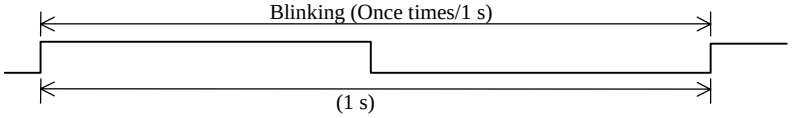


Copyright © 2002, 2005, Hitachi, Ltd.

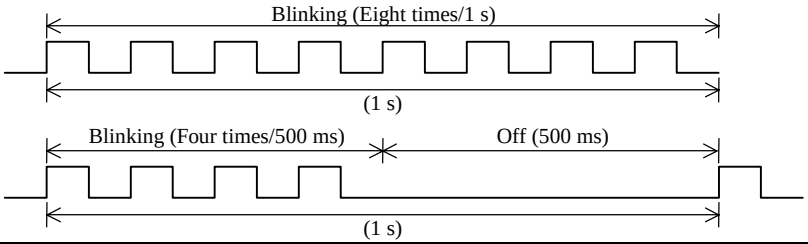
(○ : On ✧ : Blinking × : Off — : Not depend)

No	LEDs						State of unit	Actions to take	Failure
	RK/RKL/RKS/RKD/RKSD/RKH/RKHE				RKA/RKAD/RKAAT /RKAJAT/RKAATL/ RKAJATL				
	ALARM (Red)	WARNING (Orange)	READY (Green)	POWER (Green)	POWER (Green)	WARNING (Orange)			
10	—	✧(*2) (fast blinking)	—	—	—	—	Latest revision maintenance function of flash program is executed.	Wait until fast blinking stops.	No error.
11	×	○	×	×	—	—	A state in which the subsystem was deliberately shut down because the two Fan Units became out of order (This state occurs in the configuration of the RKH/RKHE + RKA only.)	Replace the two faulty Fan Units. 5.3.3 (MNTE05-0320)	
12	×	×	✧(*1) (slowly blinking)	○	—	—	The offline download process is completed.	Restart a device.	—
13	×	○	✧(*1) (slowly blinking)	○	—	—	The offline download process is terminated abnormally.	Proceed to “2.1 Before Starting WEB Connection” (MNTE02-0020), and then detect a failure with WEB.	Failure must be detected with WEB.
14	×	×	✧(*2) (fast blinking)	○	—	—	The SENC firmware is being downloaded.	Wait as it is until there is no high-speed blinking (up to 15 minutes).	—

*1 : Slowly blinking



*2 : Fast blinking



Copyright © 2003, 2005, Hitachi, Ltd.

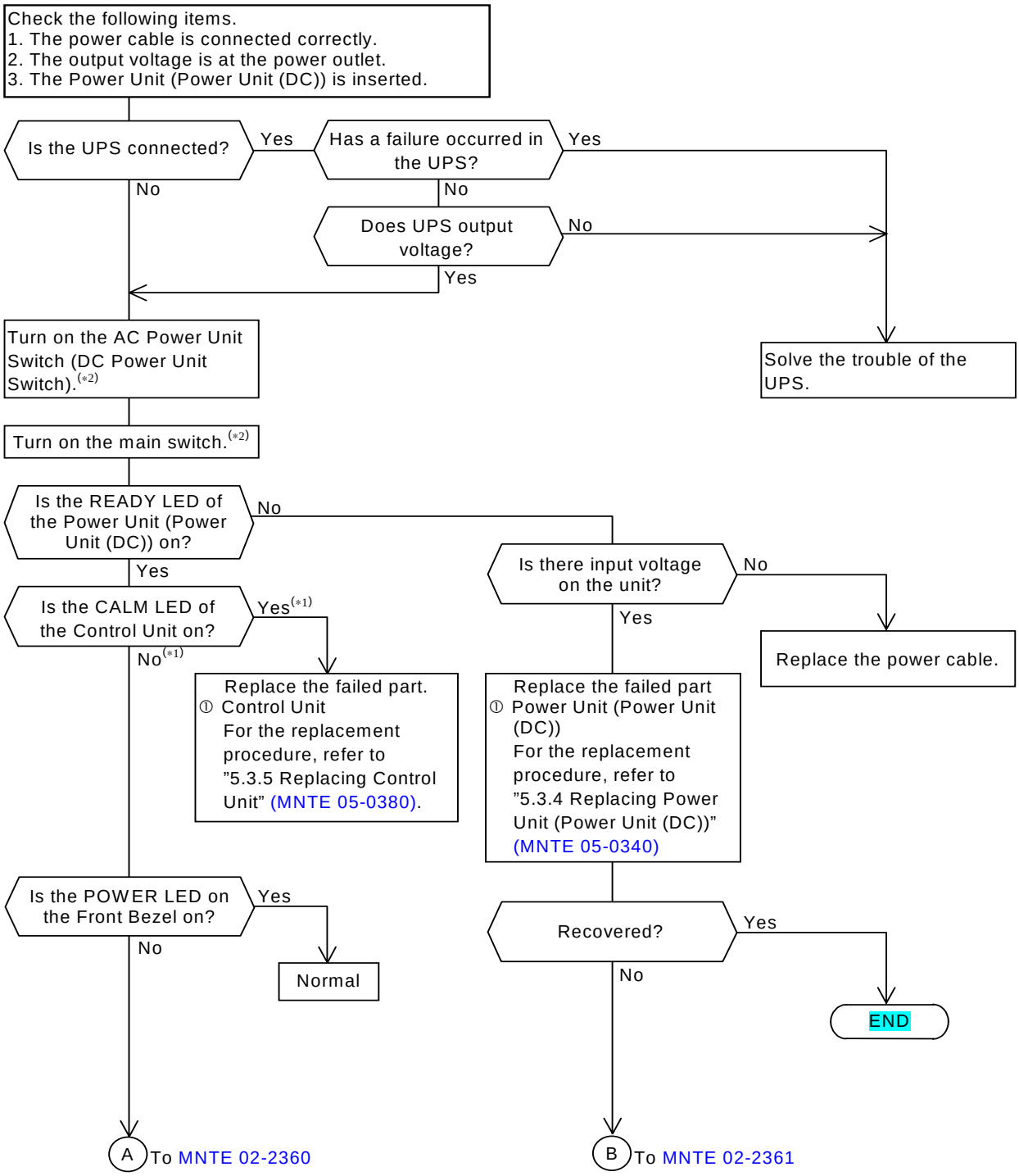
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Trouble analysis by the indication of the POWER LED

Analyze the cause of the POWER LED failure following the flowchart.

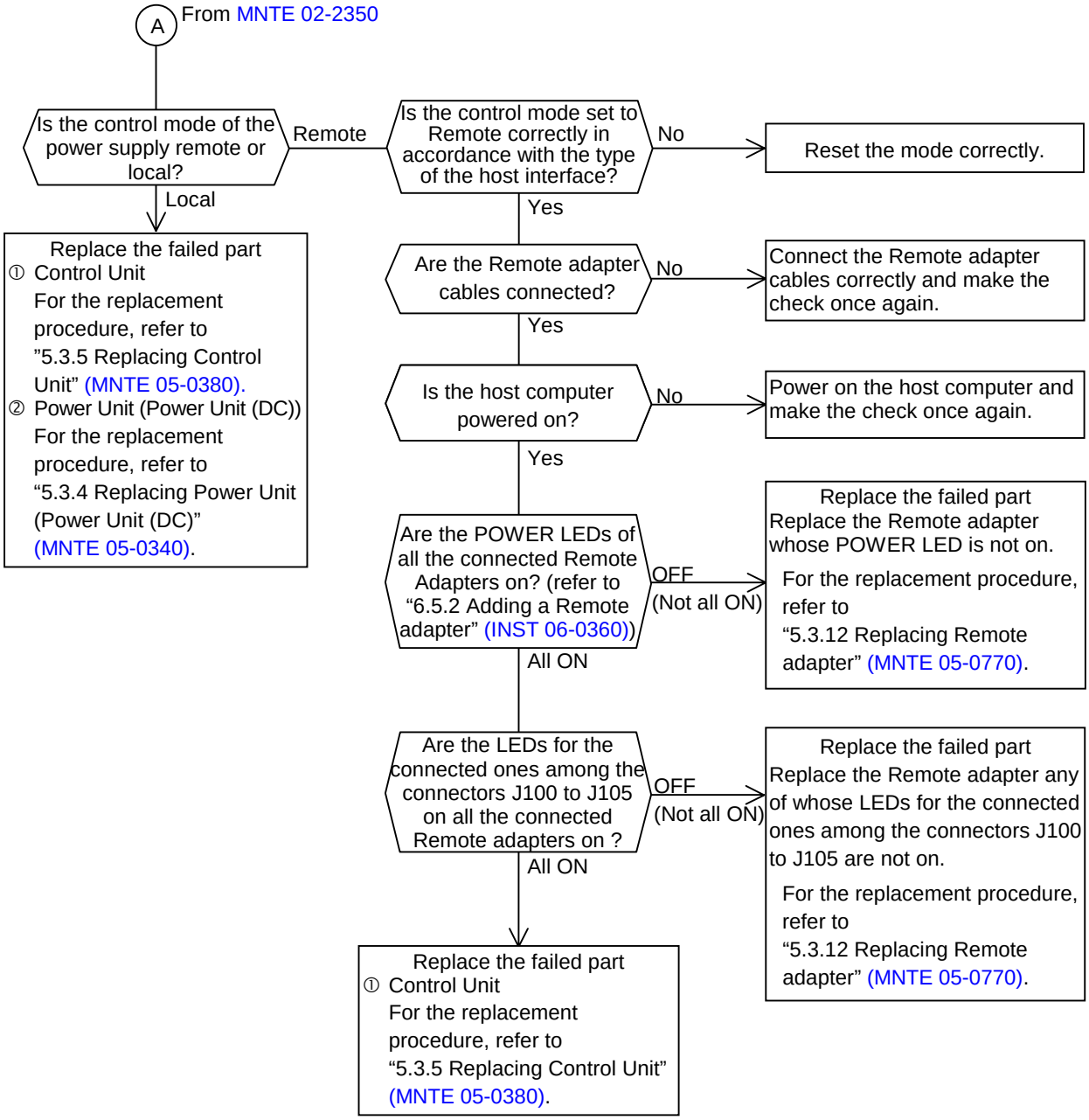
(a) Trouble analysis on the indication on the POWER LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE. (When the POWER LED is not on)



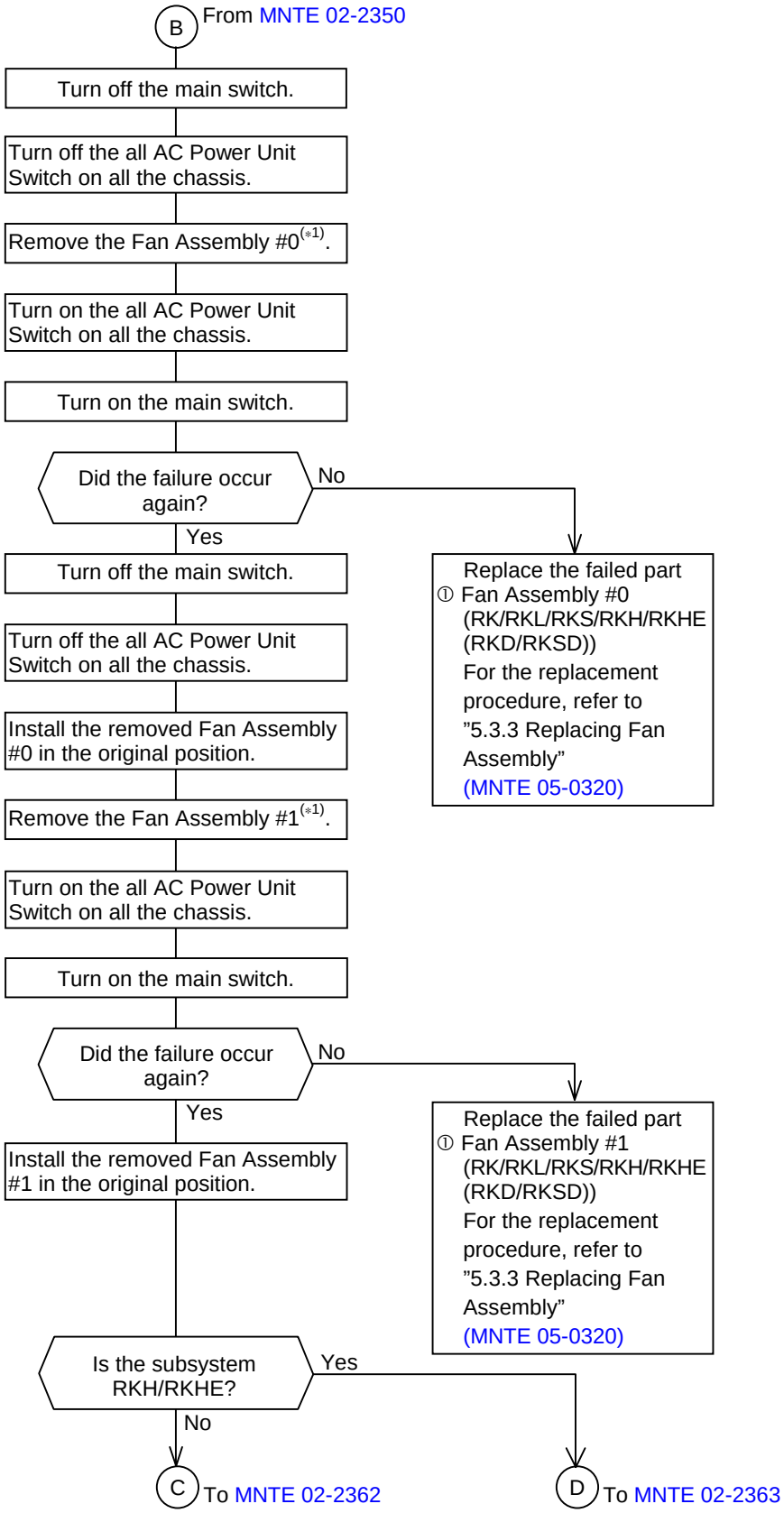
*1 : The CALM LED of the Control Unit is on until the subsystem becomes ready, however, this does not mean that the Control Unit is faulty. If the CALM LED does not go out after the subsystem has become ready, replace the Control Unit.

*2 : This operation is not needed when the AC Power Unit Switch (DC Power Unit Switch) and the main switch have already been turned on.

Copyright © 2002, 2005, Hitachi, Ltd.

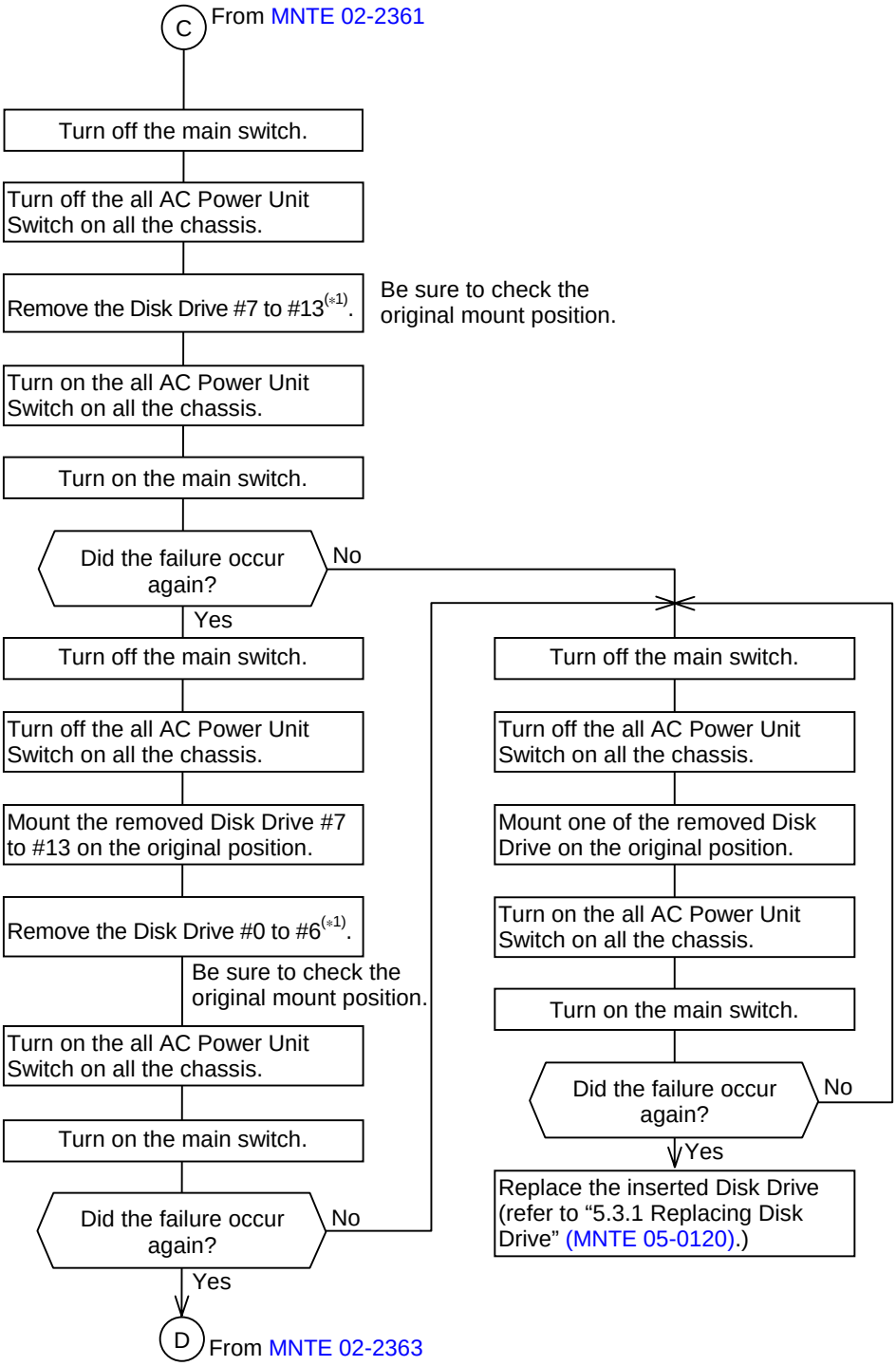


Copyright © 2002, 2005, Hitachi, Ltd.



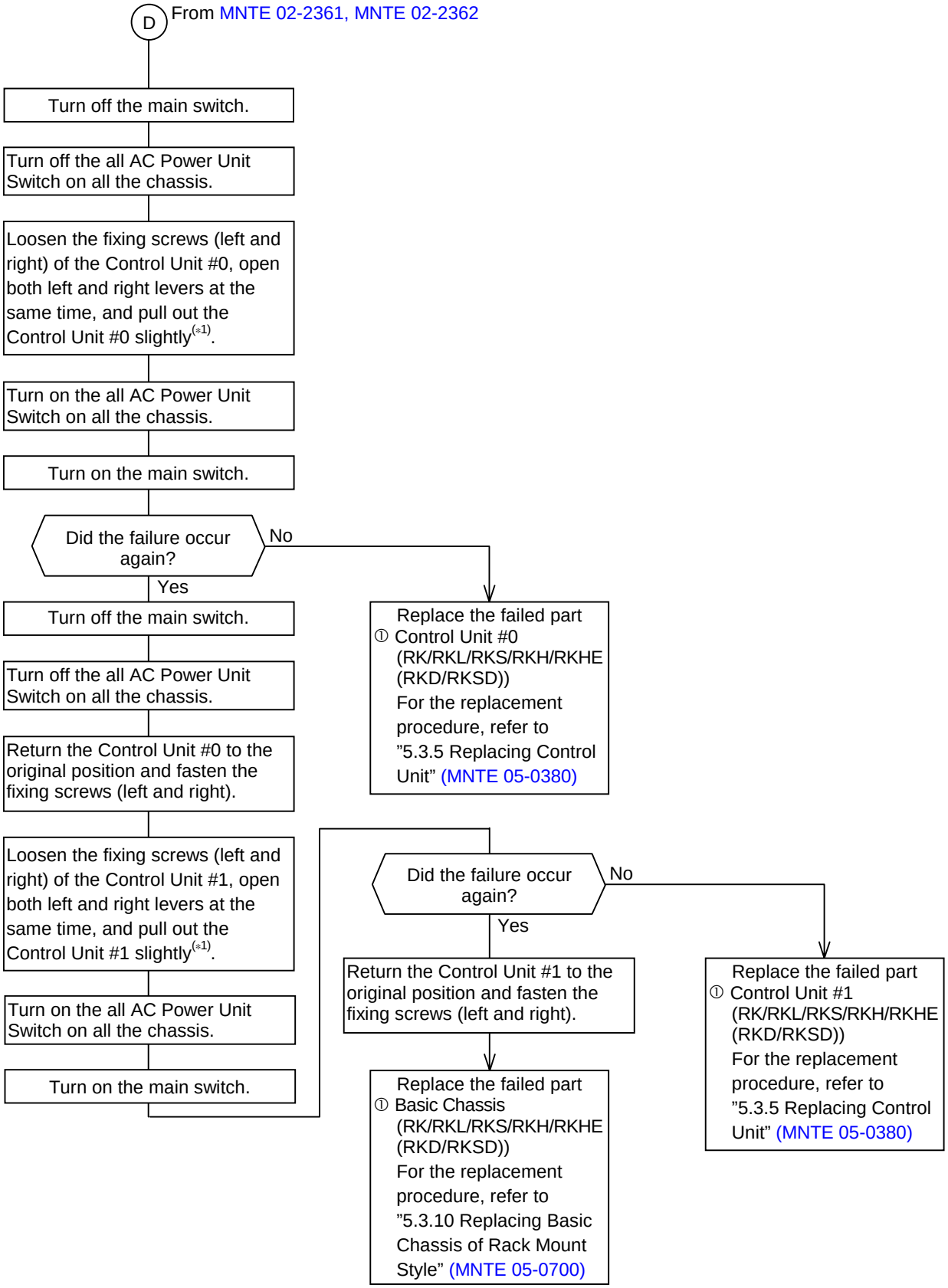
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

Copyright © 2003, 2005, Hitachi, Ltd.



*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.

Copyright © 2003, 2005, Hitachi, Ltd.



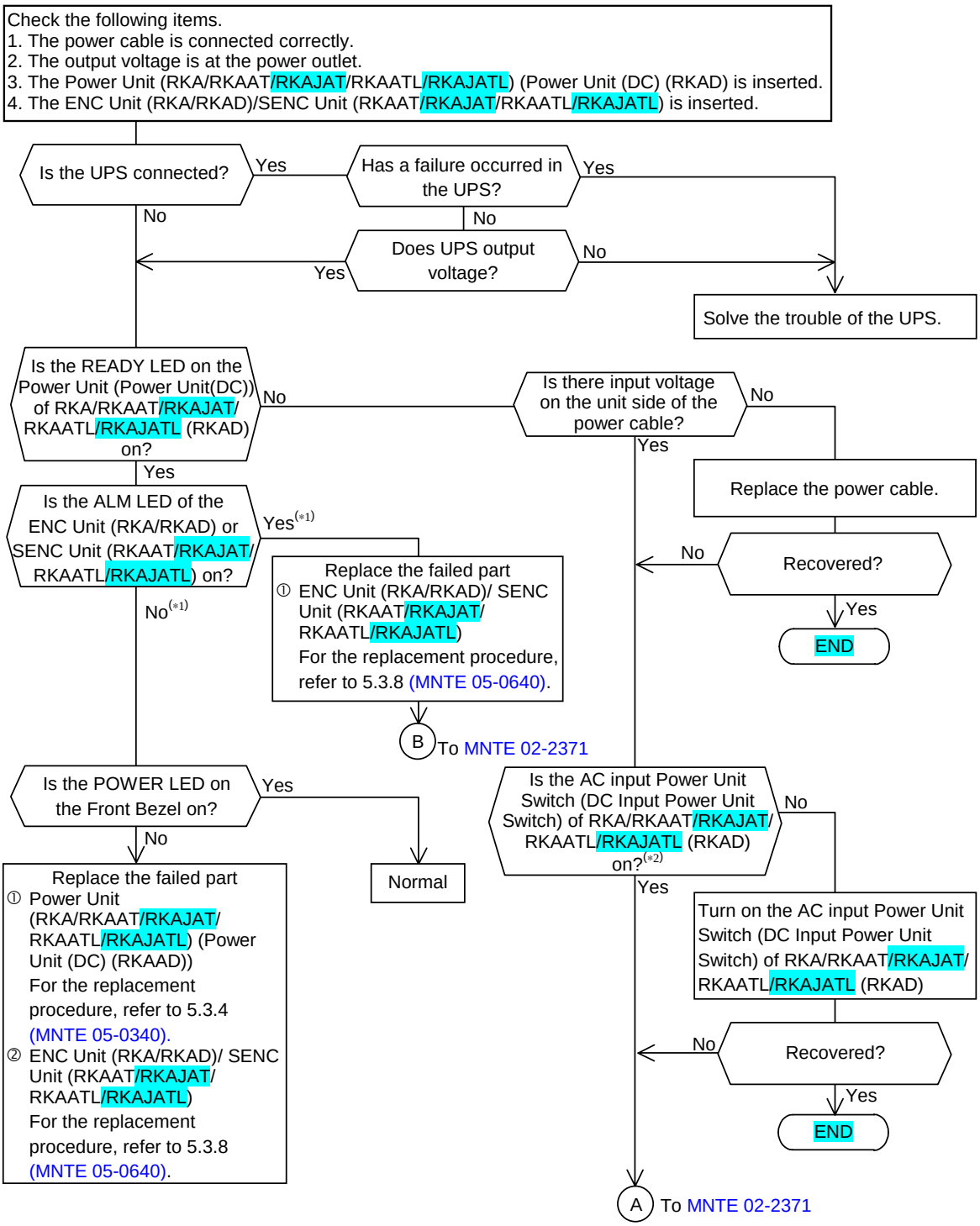
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

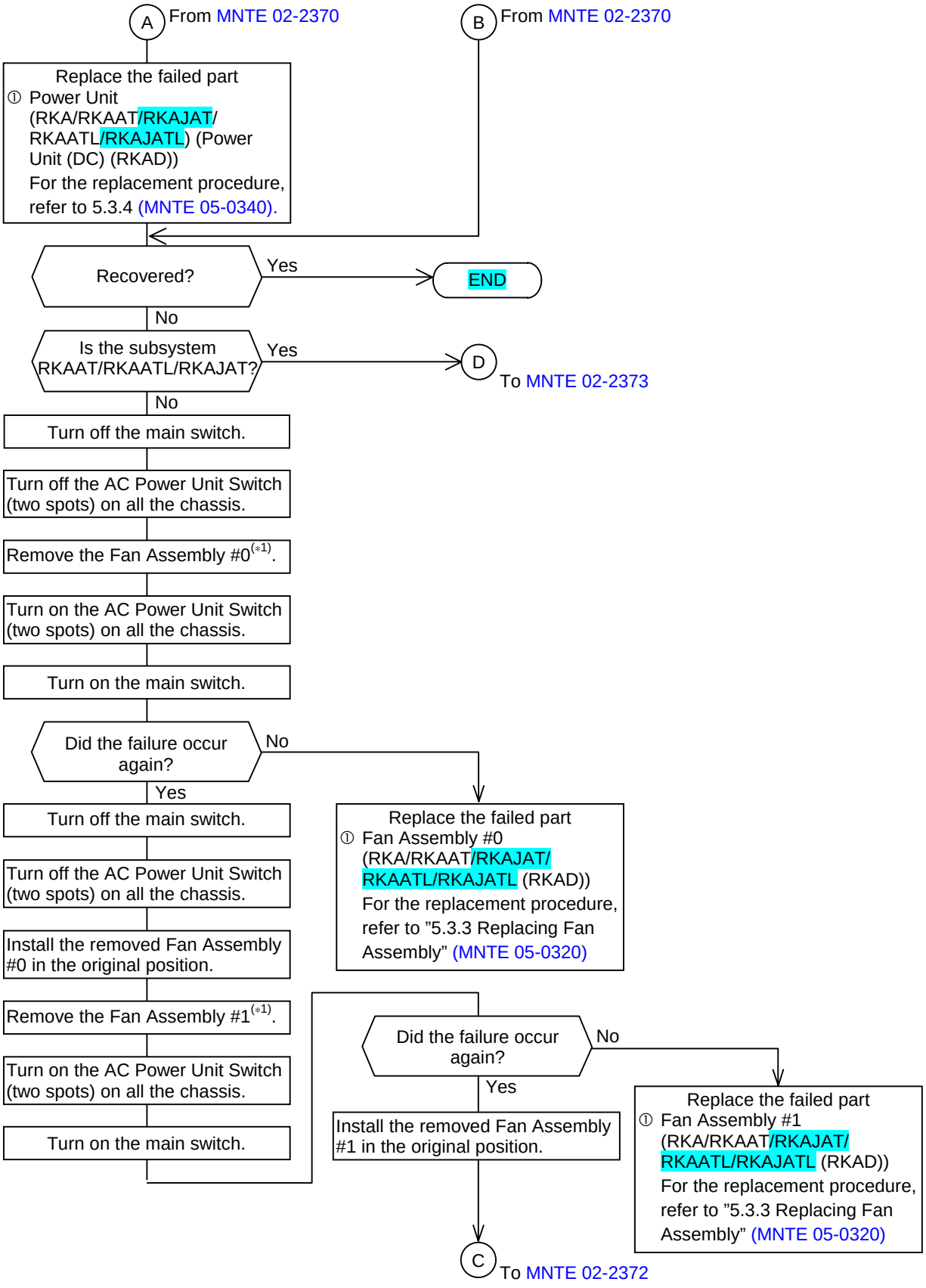
(b) Trouble analysis on the indication on the POWER LED of RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL. (Not POWER LED on)



*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.

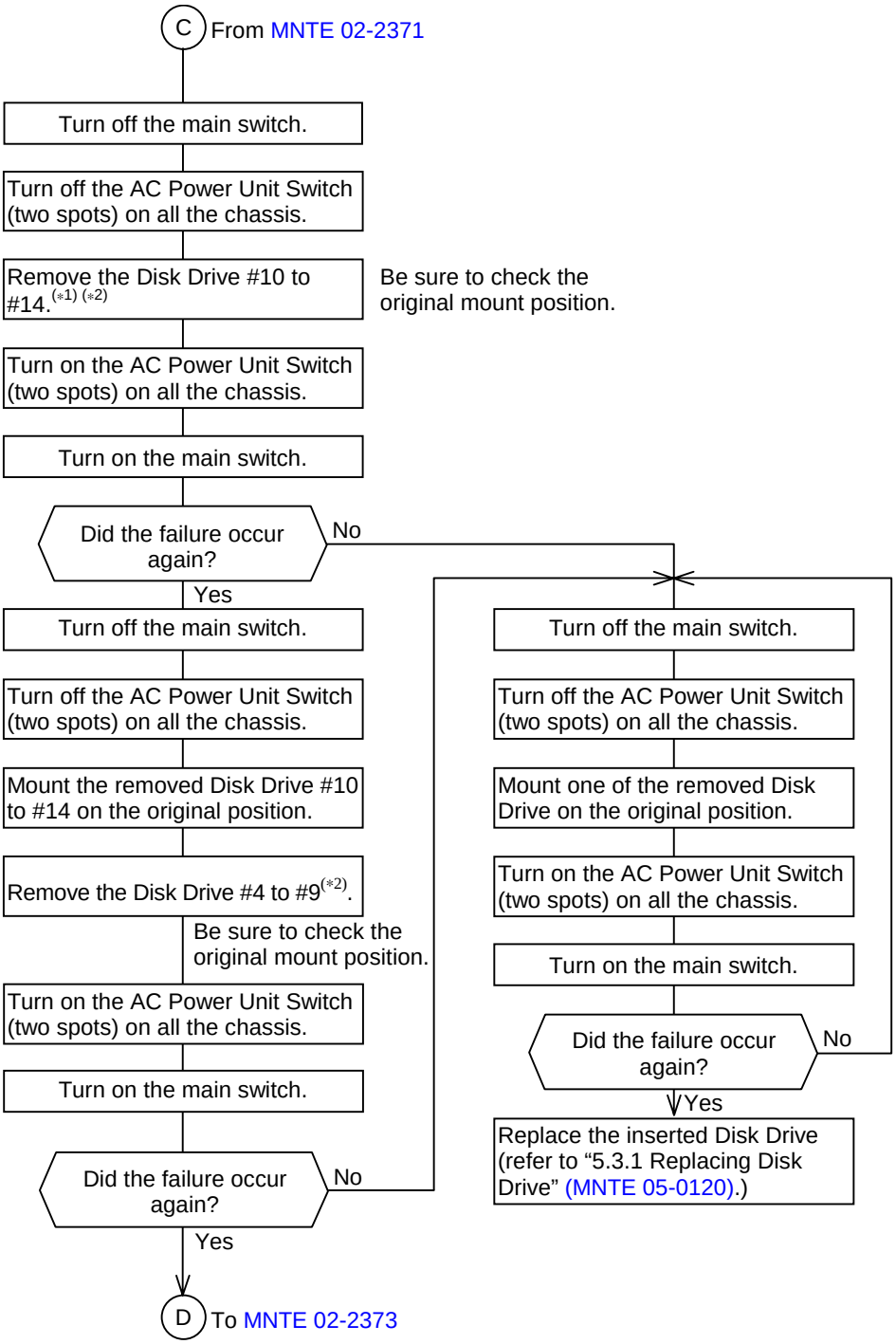
*2 : When two or more sets of Disk Drive are not mounted, please give an AC Power Unit Switch (DC Power Unit Switch) as off.

Copyright © 2002, 2005, Hitachi, Ltd.



*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.

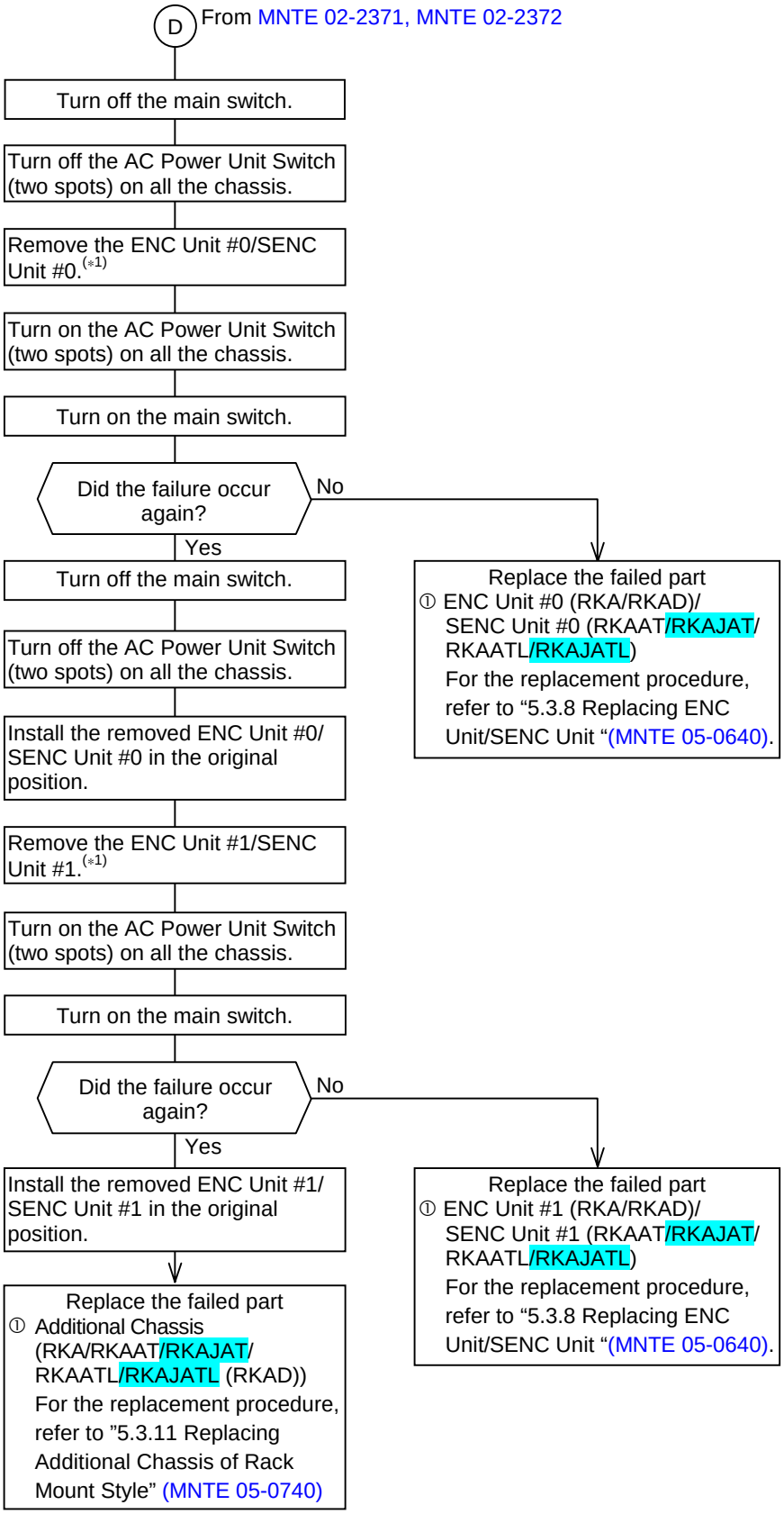
Copyright © 2003, 2005, Hitachi, Ltd.



*1 : RKA of Disk Drive nearest to RK/RKH/RKHE (RKD).

*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.

Copyright © 2003, 2005, Hitachi, Ltd.



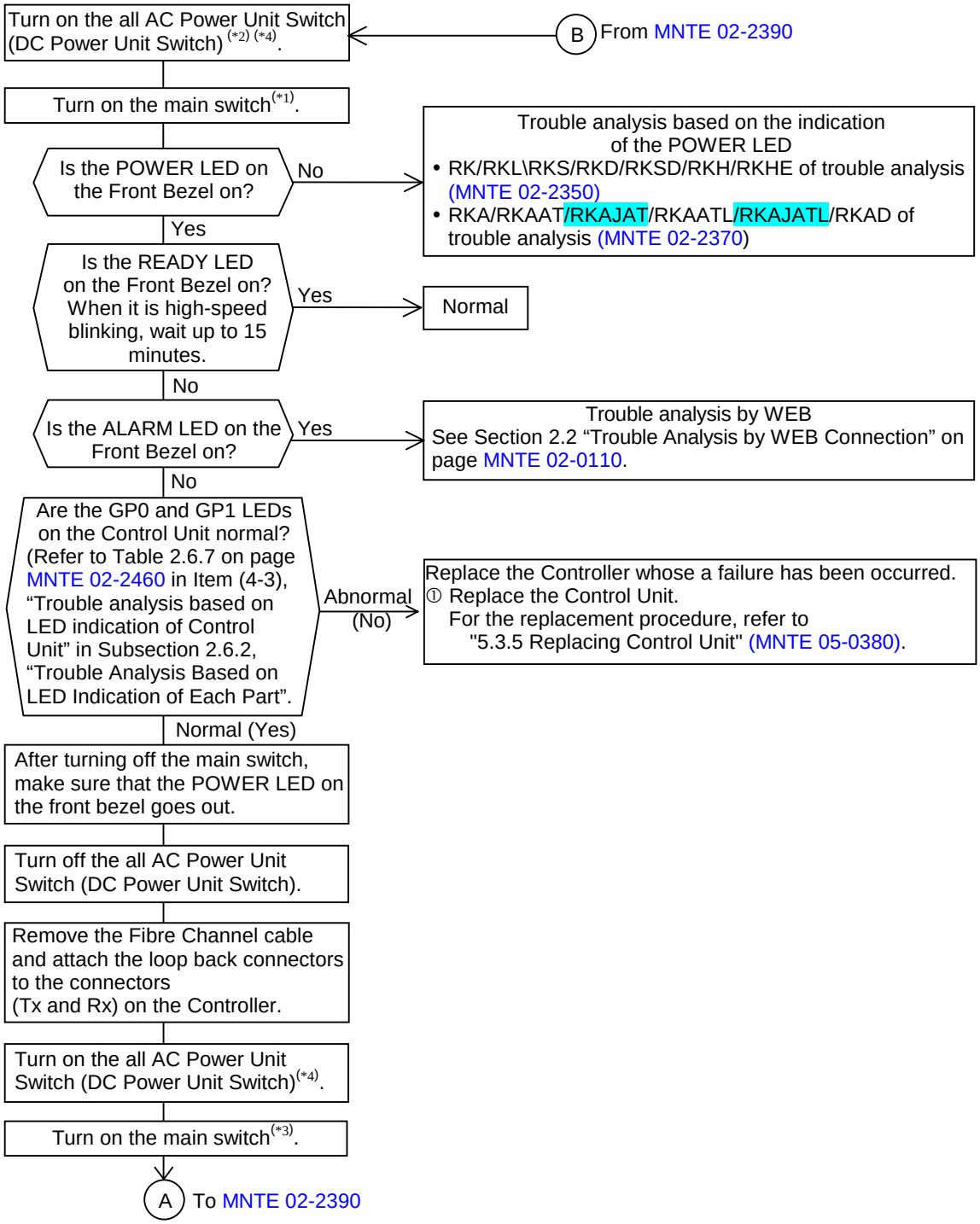
*1 : If leaving it as this part removed for 10 or more minutes, the thermal alarm is detected and the subsystem stops. Check the condition within 10 minutes and turn off the power supply.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

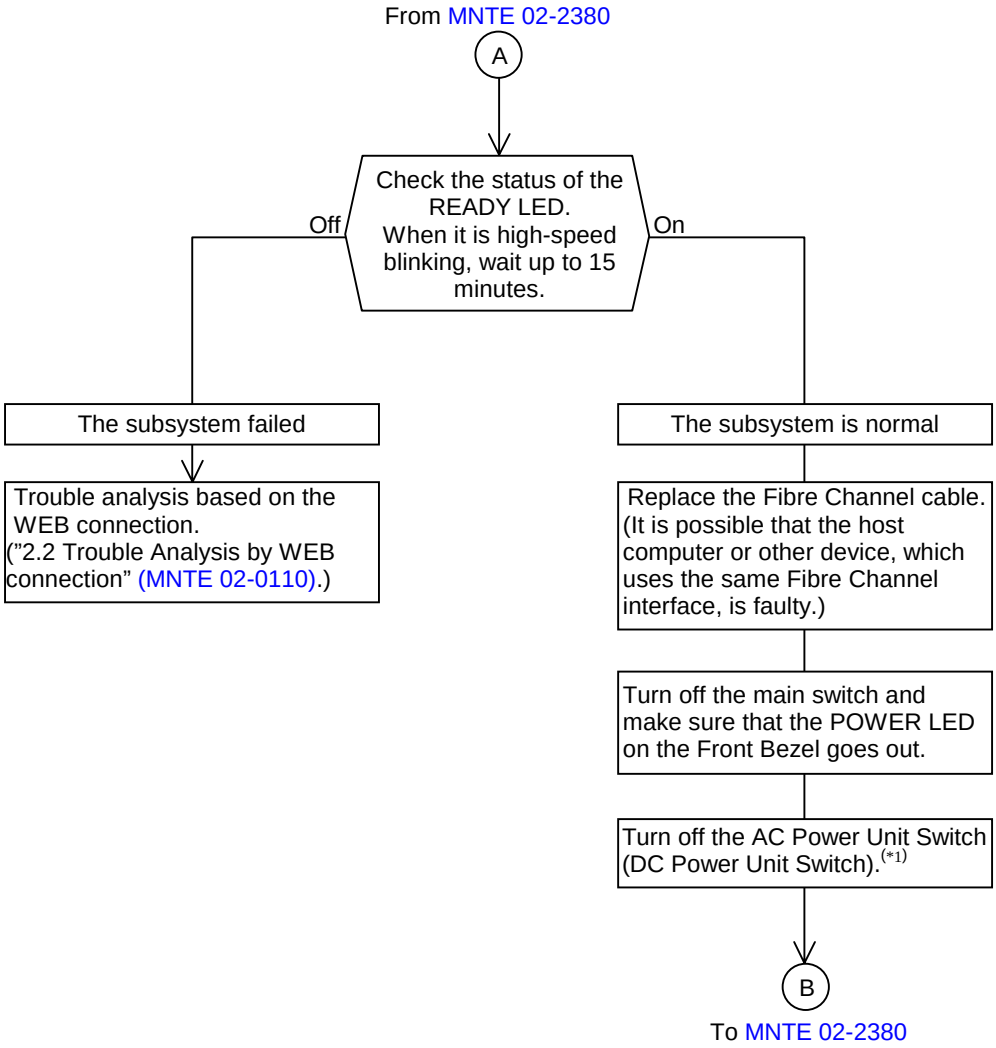
Copyright © 2004, 2005, Hitachi, Ltd.

(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 : When in the remote mode, the host computer must be turned on.
*2 : This operation is not needed when the AC Power Unit Switch (DC Power Unit Switch) and the main switch have already been turned on.
*3 : When the mode is Remote, change it to Local.
*4 : If two or more Disk Drive are not mounted on RKA/RKAD in the Floor models (RK+RKA+H2H/RKD+RKAD+H2H), turn off the AC input power switch (DC input power switch) of RKA/RKAD.

Copyright © 2002, 2005, Hitachi, Ltd.



*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 Installation "Setting the Power Control Mode (Local/Remote Mode)" (INST 02-0390) or (INST 03-0770).

Copyright © 2002, 2005, Hitachi, Ltd.

2.6.2 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

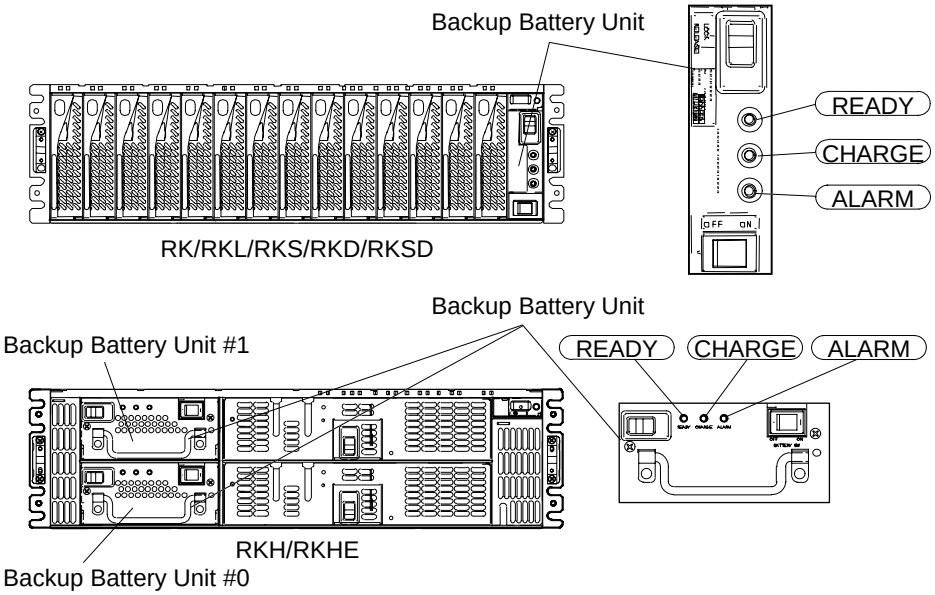


Table 2.6.2 LED Indication Patterns on Backup Battery Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No (*1)	LEDs			Cause or status	Action(s) to be taken	Reference page
	ALARM (Red)	CHARGE (Orange)	READY (Green)			
1 (*2)	×	×	○	Normal.	Recovery operation is unnecessary	—
2 (*2)	×	○	○	Under periodical charge (every 12 hours).		
3	×	○	✧	Under initial charge. (Up to two hours)		
4 (*3)	×	×	✧	It indicates that the subsystem is energized and that a failure occurs in two FAN Assembly on the subsystem side.	Replace the failure FAN Assembly.	5.3.3 (MNTE 05-0320)
5	○	×	×	A trouble occurred in setting of the Backup Battery Unit. 1. The battery is not installed. 2. The battery switch is turned off.	Check the presence/absence of the Backup Battery Unit and setting of the battery switch.	—
6	○	×	×	1. Battery voltage is abnormal. 2. Battery temperature abnormal.	Replace the Backup Battery Unit (battery). (*4)	5.3.2 (MNTE 05-0260)

*1 : [ ] : This is not a failure status.

*2 : RK/RKL/RKS/RKD/RKSD: Backup time is 24 hours if both of batteries are in the state of 1 or 2.
RKH/RKHE: Backup time is 48 hours if both of batteries are in the state of 1 or 2.

*3 : This display function is only RKH/RKHE+RKA/RKAAT….

*4 : If the ALARM LED on the Back up Battery Unit (ASSY) lights on, be sure to replace the Back up Battery Unit (it cannot be recharged).

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Trouble analysis based on LED indication of Disk Drive

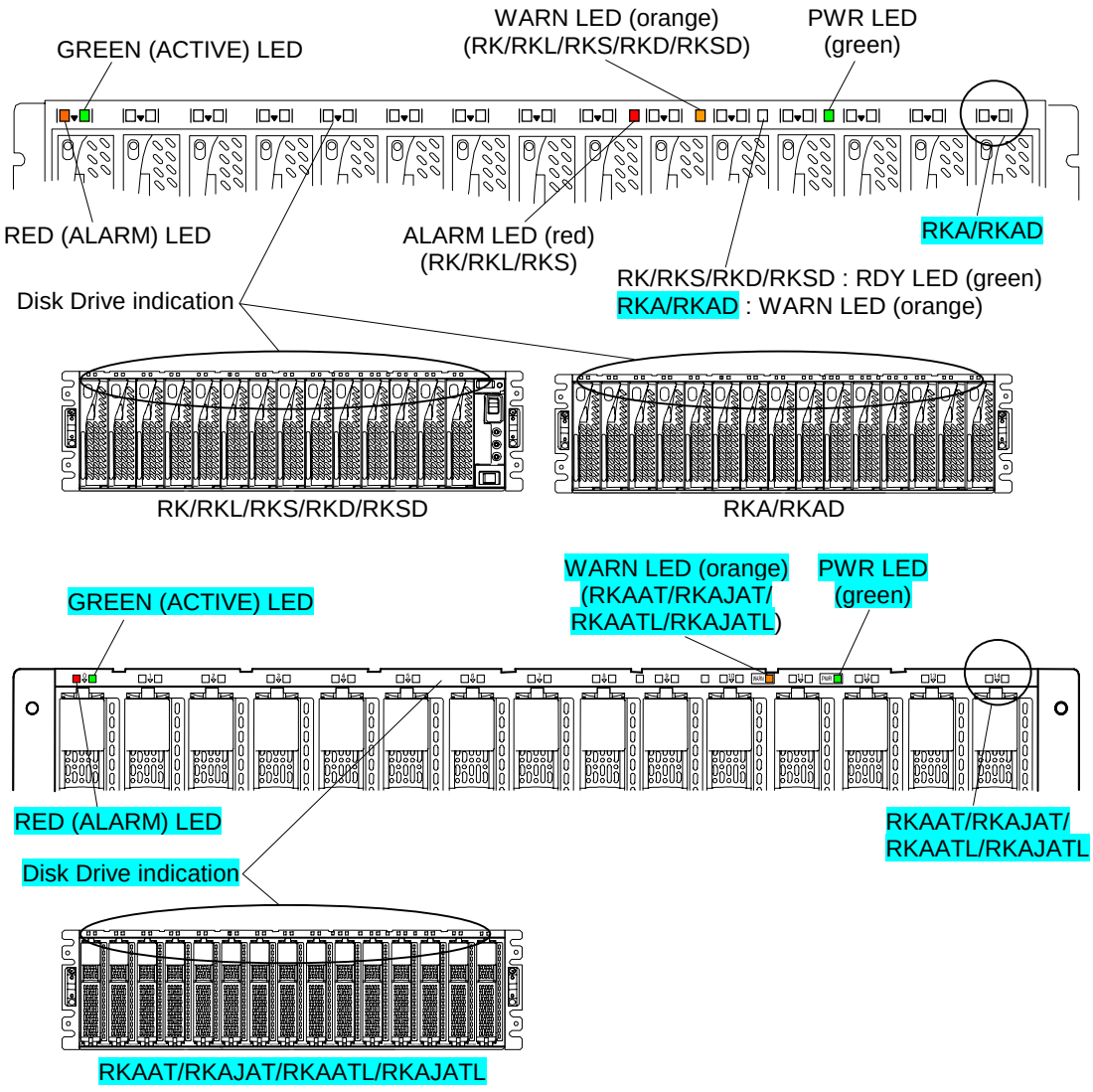


Table 2.6.3 LED Indication Patterns on Disk Drive

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	Green (ACTIVE)	Red (ALARM)			
1	✧	—	The Disk Drive is being accessed/spun up.	This is not a problem.	—
2	○	×	Completed spin up.	This is not a problem.	—
3	×	—	Seeking.	This is not a problem.	—

*1 : : This is not a failure status.

Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs		Cause or status	Action(s) to be taken	Reference page
	Green (ACTIVE)(*2)	Red (ALARM)			
4	—	○	A failure that makes the Disk Drive of lighting LED unable to operate occurred in it.	1. When the WARN LED of RK/ RKL/RKS/RKD/RKSD/RKH/ RKHE is blinking, refer to the LOG Message by WEB connection, and check the backup status to the Spare Disk.(*1). 2. Replace the Disk Drive.	5.3.1 (MNTE 05-0120)

*1 : The WARN LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE blinks when a data recovery on a Spare Disk fails, a data recovery on a replaced Disk Drive fails, or a writing of recovery data is not completed. The blinking of WARN LED stops after referring to the LOG Message by WEB.

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

(3) Trouble analysis based on LED indication of Power Unit (Power Unit (DC))

(a) Power Unit

NOTE : When the READY LED is off, it shows that a failure has occurred even if the fan rotating.

(i) RK/RKL/RKS/RKA/RKAAT/RKAATL/RKH/RKHE

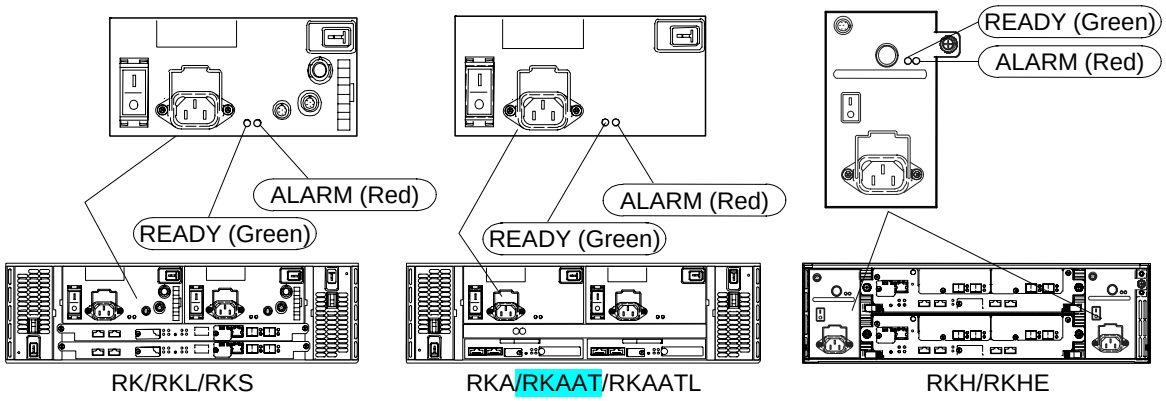


Table 2.6.4 LED Indication Patterns on Power Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	READY (Green)	ALARM (Red)			
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.	5.3.4 (MNTE 05-0340)
3	×	○	In trouble.	Replace the Power Unit.	5.3.4 (MNTE 05-0340)
4	○	○			

*1 : : This is not a failure status.

Copyright © 2002, 2005, Hitachi, Ltd.

(ii) RKAJAT/RKAJATL

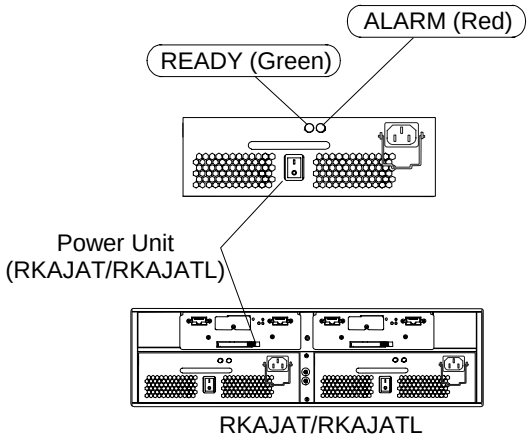


Table 2.6.4.1 LED Indication Patterns on Power Unit (RKAJAT/RKAJATL)

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	READY (Green)	ALARM (Red)			
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.	5.3.4 (MNTE 05-0340)
3	×	○	In trouble.	Replace the Power Unit.	5.3.4 (MNTE 05-0340)
4	○	○			

*1 : : This is not a failure status.

Copyright © 2003, 2005, Hitachi, Ltd.

(b) Power Unit (DC)

NOTE : When the READY LED is off, it shows that a failure has occurred even if the fan rotating.

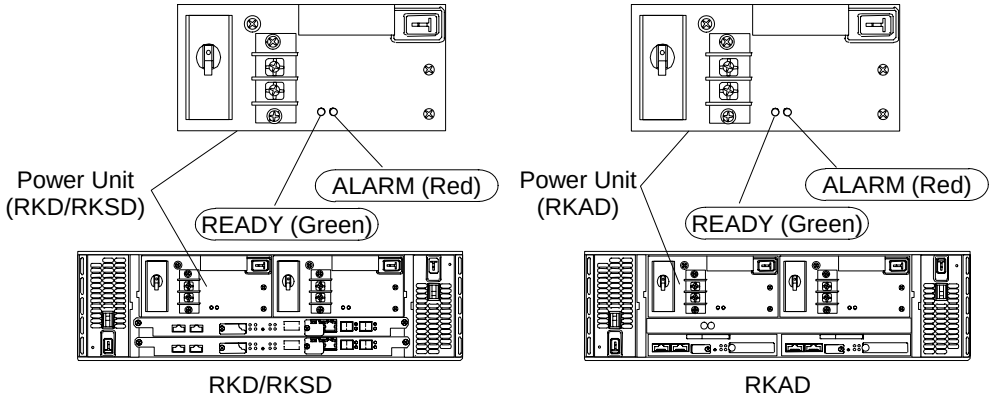


Table 2.6.4.2 LED Indication Patterns on Power Unit (RKD/RKSD/RKAD)

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	READY (Green)	ALARM (Red)			
1	○	×	This shows the normal operation of the Power Unit (DC).	This is not a problem.	—
2	×	×	In resting.	Make sure that the DC Power Unit Switch is turned on. 1. If the READY LED is kept off when the DC Power Unit Switch is turned on, replace the Power Unit (DC).	5.3.4 (MNTE 05-0340)
3	×	○	In trouble.	Replace the Power Unit (DC).	5.3.4 (MNTE 05-0340)
4	○	○			

*1 : : This is not a failure status.

Copyright © 2003, 2005, Hitachi, Ltd.

(4) Trouble analysis based on LED indication of Control Unit

(4-1) LED Indication Pattern-1 on Control Unit (RK/RKL/RKS/RKD/RKSD/RKH/RKHE)

NOTE : If all the LEDs on the Control Unit are turned off, connect to WEB (See MNTE 02-0020) and check if the control unit is blocked. If the Control Unit is blocked, replace the blocked Control Unit (See MNTE 05-0380).

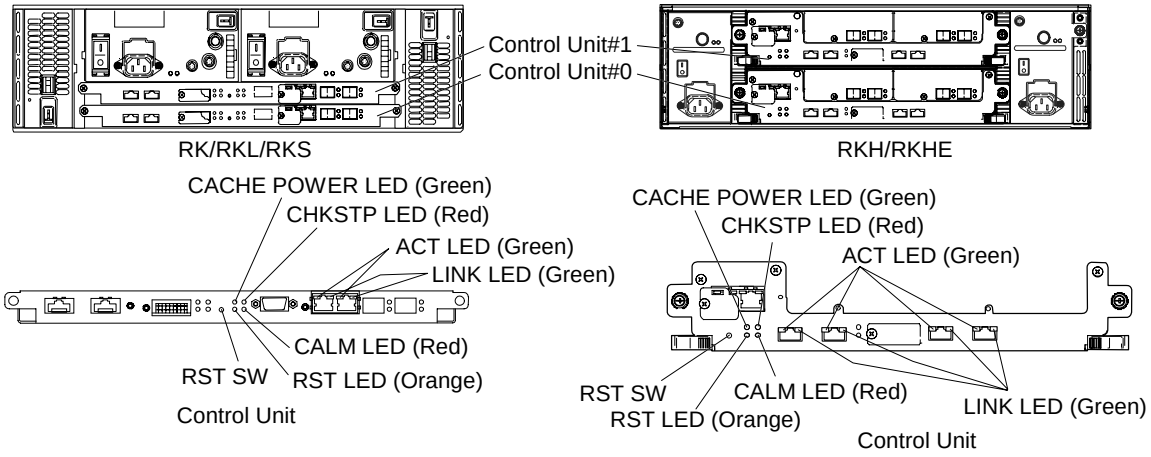


Table 2.6.5 LED Indication Pattern-1 on Control Unit (RK/RKL/RKS/RKD/RKSD/RKH/RKHE)

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs						Cause or status	Action(s) to be taken	Reference page
	CACHE POWER (Green)	CALM (Red)	CHK STP (Red)	RST (Orange)	LINK (Green)	ACT (Green)			
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.)	5.1.1 (MNTE 05-0030)
2	×	—	—	—	—	—	This shows that the Cache memory is not being backed up.	This is not a problem.	—
3	—	—	—	○	—	—	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	—	—	—	—	○	—	This shows that the linkage of LAN is normal.	This is not a problem.	—
5	—	—	—	—	—	○	This shows that data is being transferred via LAN.	This is not a problem.	—

*1 : : This is not a failure status.

Copyright © 2002, 2005, Hitachi, Ltd.

(○ : 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 (Green)			
6	—	—	○	—	×	—	While an active LAN cable is connected, LINK LED does not on.	Check the LAN cable. If it is normal, replace the Control Unit.	5.3.5 (MNTE 05-0380)
7	—	○	—	—	—	—	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 “2.3 Trouble Analysis Based on Messages” on page.) 1. Replace the Control Unit. If the operation is not recovered, replace the following items in order. 2. Replace the Cache Unit.	2.3 (MNTE 02-0270) 5.3.5 (MNTE 05-0380) 5.3.6 (MNTE 05-0470)
8	—	—	○	—	—	—	A failure that makes the Control Unit unable to operate occurred in it.	Replace the Control Unit.	5.3.5 (MNTE 05-0380)

Copyright © 2002, 2005, Hitachi, Ltd.

(4-2) LED Indication Pattern-2 on Control Unit (RK/RKL/RKS/RKD/RKSD/RKH/RKHE)

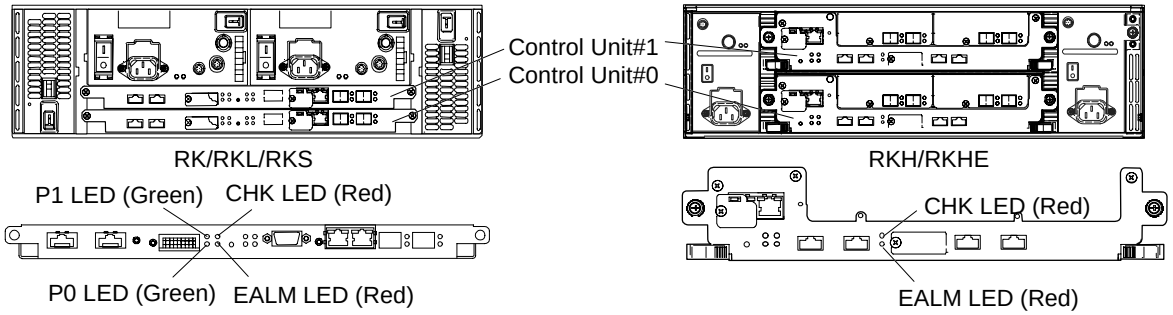
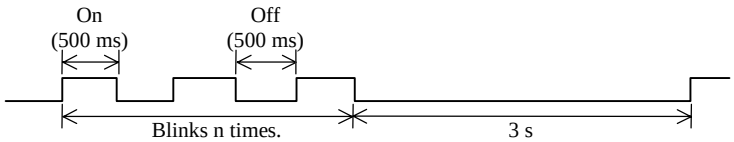


Table 2.6.6 LED Indication Pattern-2 on Control Unit

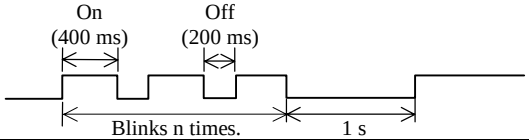
(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs				Cause or status	Action(s) to be taken	Reference page
	CHK (Red)	EALM (Red)	P1 (Green)	P0 (Green)			
1	✧(*1) (Once)	—	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). Logic +5 V voltage is abnormal.	Replace the Power Unit (Power Unit (DC)) on which the same READY as that of Control Unit is turned off.	5.3.4 (MNTE 05-0340)
2	✧(*1) (Twice)	—	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). Drive +12 V voltage is abnormal.		
3	✧(*1) (Three)	—	—	—	This shows a trouble in the Power Unit (Power Unit (DC)). Logic +3.3 V voltage is abnormal.		
4	✧(*1) (Five)	—	—	—	Battery is abnormal	Confirm the LED indication on the Backup Battery Unit. (See Table 2.6.2)	
5	✧(*1) (Six)	—	—	—	Voltage on the controller is abnormal. (Resetting of the Control Unit cannot be cancelled.)	Replace the Control Unit	5.3.5 (MNTE 05-0380)
6	✧(*1) (Seven)	—	—	—	BS1.8V, BS3.3V or BS12V voltage is abnormal.	Replace the Power Unit (Power Unit (DC)).	5.3.4 (MNTE 05-0340)
7	✧(*1) (Eight)	—	—	—	Rotation failure in two or more fans of both Fan Assemblies. (RK/RKS/RKD/RKSD)	Replace the Fan Assembly.	5.3.3 (MNTE 05-0320)
8	✧(*1) (Nine)	—	—	—	Fan Assembly is abnormal. (RKH/RKHE only)	Replace the Fan Assembly.	5.3.3 (MNTE 05-0320)
9	○	—	—	—	ENC Unit CUDG error is occurred. BOOT section of ENC microprogram. RAM error ENC Unit configuration error	Replace the Control Unit	5.3.5 (MNTE 05-0380)
10	✧(*2) (Once)	—	—	—	ENC Unit CUDG error is occurred. SRAM error		
11	✧(*2) (Twice)	—	—	—	ENC Unit CUDG error is occurred. ENC Unit error		

*1 : Indication of status with LED.



*2 : Indication of status with LED.



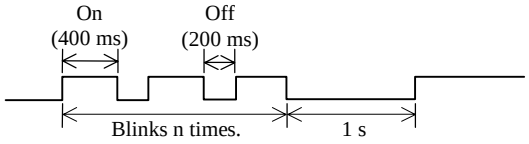
Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

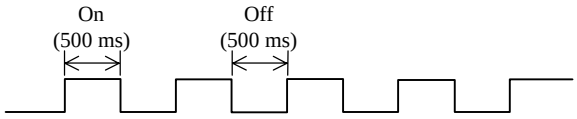
No. (*1)	LEDs CHK (Red)	LEDs EALM (Red)	LEDs P1 (Green)	LEDs P0 (Green)	Cause or status	Action(s) to be taken	Reference page
12	✧(*2) (Three)	—	—	—	ENC Unit CUDG error is occurred. Microprogram error in flash memory.	Replace the Control Unit	5.3.5 (MNTE 05-0380)
13	—	○	—	—	A failure that makes the ENC Unit unable to operate occurred in it.		
14	○	✧(*3)	—	—	An exceptional process error detected by the ENC microprogram.		
15	○	✧(*4)	—	—	An exceptional process error detected by the ENC microprogram. (stack over)		
16	—	✧(*3)	—	—	Indicates that FLASH write is performed during the ENC microprogram download.	Recovery operation is unnecessary.	—
17	—	—	×	—	The input on loop PATH-0 side is abnormal.	Replace the Control Unit	5.3.5 (MNTE 05-0380)
18	—	—	—	×	The input on loop PATH-1 side is abnormal.		

*1 : : This is not a failure status.

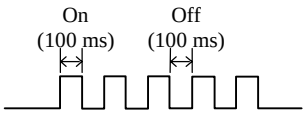
*2 : Indication of status with LED.



*3 : Indication of status with LED.



*4 : Indication of status with LED.



Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(4-3) LED Indication Patterns on Control Unit (Fibre Channel)

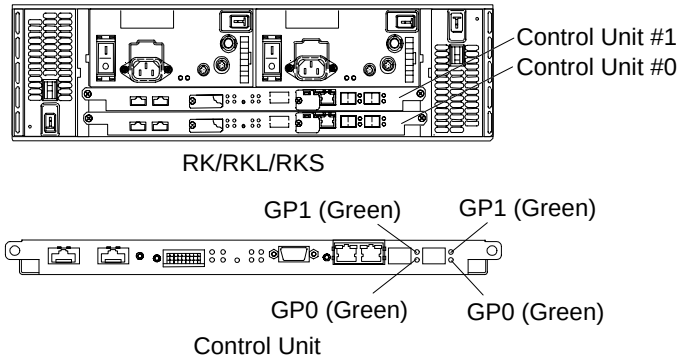


Table 2.6.7 LED Indication Patterns on Control Unit (Fibre Channel)

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs GP1 (Green)	LEDs GP0 (Green)	Cause or status	Action(s) to be taken	Reference page
1	○	○	Link-up state.	This is not a problem.	—
2	×	×	Interface is in initial state. Interface is in reset state. Waiting for ID to be taken over. Loop port is bypassed.	This is not a problem.	—
3	○	×	Loop (Link) is being initialized.	This is not a problem.	—
4	×	○	Link failed.	1. If the Fibre Channel cable is not connected, no troubles occur in this state. If this port is not used, it should not be mounted on the unit, however. 2. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected) 3. Replace the following devices in order from the nearest one to this unit and see if the interface is linked up. • Control Unit • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected)	—

*1 : ▭ : This is not a failure status.

Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	GP1 (Green)	GP0 (Green)			
5	✧	○	Link failure often occurs.	1. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected) 2. Replace the following devices in order from the nearest one to this unit and see if the interface is linked up. • Control Unit • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected)	—
6	○	✧	Loop (Link) is often initialized.		
7	✧	✧	Link failure often occurs. Loop (Link) is often initialized.		

Copyright © 2002, 2005, Hitachi, Ltd.

(4-4) LED Indication Patterns on Interface Board (RKH/RKHE)

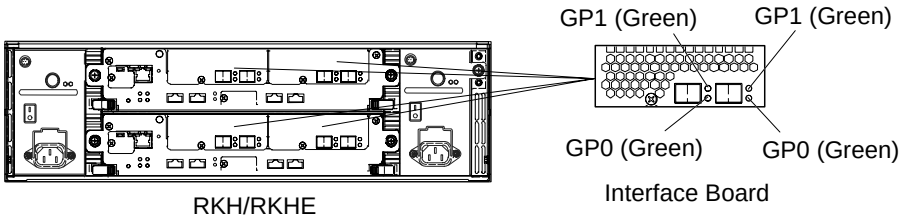


Table 2.6.7.1 LED Indication Patterns on Interface Board

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	GP1 (Green)	GP0 (Green)			
1	○	○	Link-up state.	This is not a problem.	—
2	×	×	Interface is in initial state. Interface is in reset state. Waiting for ID to be taken over. Loop port is bypassed.	This is not a problem.	—
3	○	×	Loop (Link) is being initialized.	This is not a problem.	—
4	×	○	Link failed.	1. If the Fibre Channel cable is not connected, no troubles occur in this state. If this port is not used, it should not be mounted on the unit, however. 2. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected) 3. Replace the following devices in order from the nearest one to this unit and see if the interface is linked up. • Control Unit • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected)	—

*1 : : This is not a failure status.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	GP1 (Green)	GP0 (Green)			
5	✧	○	Link failure often occurs.	1. Check the connections of the following Fibre Channel interfaces. • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected) 2. Replace the following devices in order from the nearest one to this unit and see if the interface is linked up. • Control Unit • Fibre Channel Cable • Fibre Channel HUB • Fibre Channel Switch • Host Adapter • GBIC (When Fibre Channel HUB or Fibre Channel switch is connected)	—
6	○	✧	Loop (Link) is often initialized.		
7	✧	✧	Link failure often occurs. Loop (Link) is often initialized.		

Copyright © 2003, 2005, Hitachi, Ltd.

(5) Trouble analysis based on LED indication of ENC Unit/SENC Unit

(a) ENC Unit

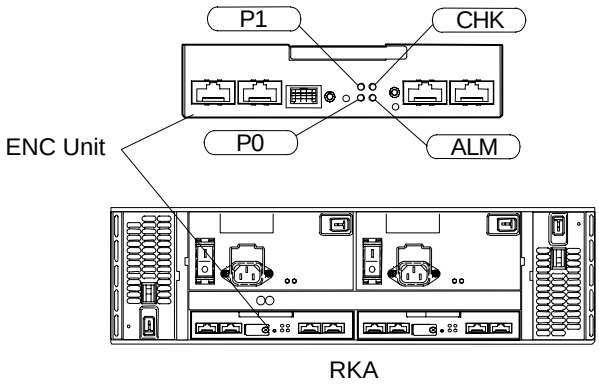


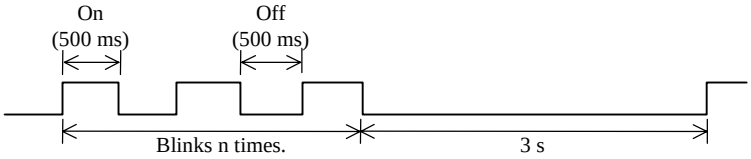
Table 2.6.8 LED Indication Patterns on ENC Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs				Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHK (Red)	P0 (Green)	P1 (Green)			
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 (Power Unit (DC)) on which the same READY LED as that of ENC Unit is turned off.	5.3.4 (MNTE 05-0340)
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.



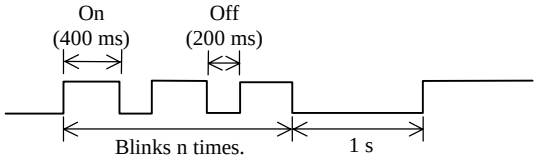
Copyright © 2002, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

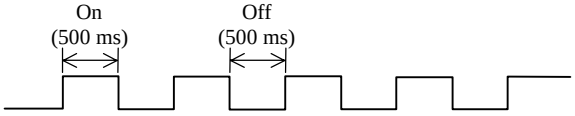
No. (*1)	LEDs				Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHECK (Red)	LINK 0 (Green)	LINK 1 (Green)			
5	—	○	—	—	ENC unit CUDG error is occurred. 1. BOOT section of ENC microprogram. 2. RAM error 3. ENC Unit configuration error.	Replace the ENC Unit.	5.3.8 (MNTE 05-0640)
6	—	✧(*2) (Once time)	—	—	ENC unit CUDG error is occurred. 1. SRAM error		
7	—	✧(*2) (Twice time)	—	—	ENC unit CUDG error is occurred. 1. ENC Unit error		
8	—	✧(*2) (Three time)	—	—	ENC unit CUDG error is occurred. 1. Microprogram error in flash memory.		
9	○	—	—	—	A failure that makes the ENC Unit unable to operate occurred in it.	Replace the ENC Unit.	5.3.8 (MNTE 05-0640)
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	✧(*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.	5.3.5 (MNTE 05-0380)
14	—	—	—	×	The input on loop PATH-1 side is abnormal.		

*1 : ▭ : This is not a failure status.

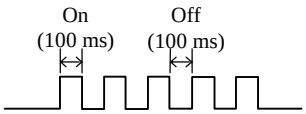
*2 : Indication of status with LED.



*3 : Indication of status with LED.



*4 : Indication of status with LED.



Copyright © 2002, 2005, Hitachi, Ltd.

(b) SENC Unit

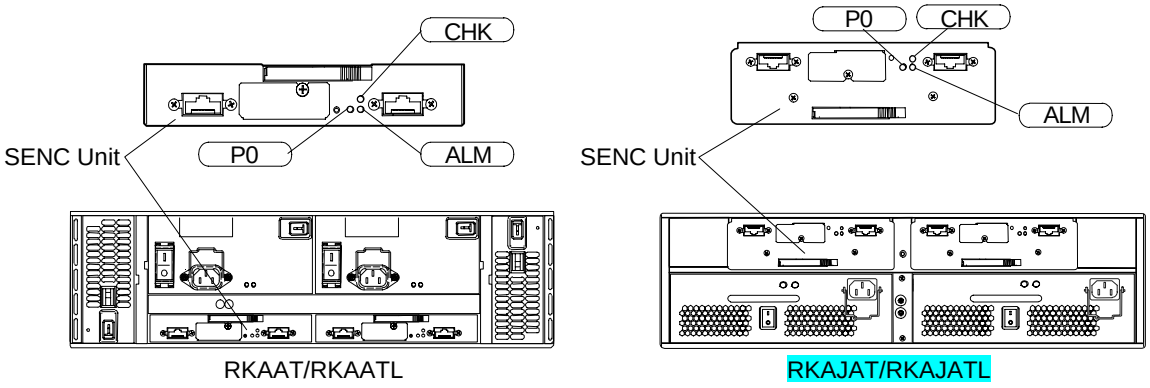


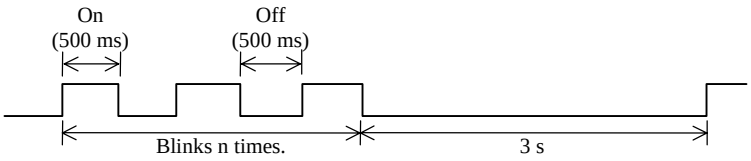
Table 2.6.8.1 LED Indication Patterns on SENC Unit

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs			Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHK (Red)	P0 (Green)			
1	×	×	○	Normal.	Recovery operation is unnecessary.	—
2	—	✧(*2) (Two times)	—	SENC Unit CUDG error is occurred.	Replace the SENC Unit.	5.3.8 (MNTE 05-0640)
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.		
6	—	✧(*4) (Six times)	—	Significant surface error in flash memory.		
7	—	✧(*4) (Seven times)	—	SUM check error in flash memory.		
8	○	—	—	A failure that makes the SENC Unit unable to operate occurred in it.		

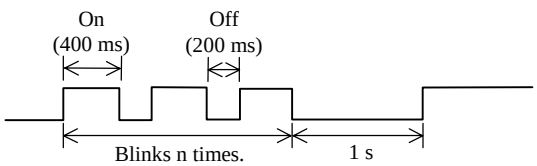
*1 : : This is not a failure status.

*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.



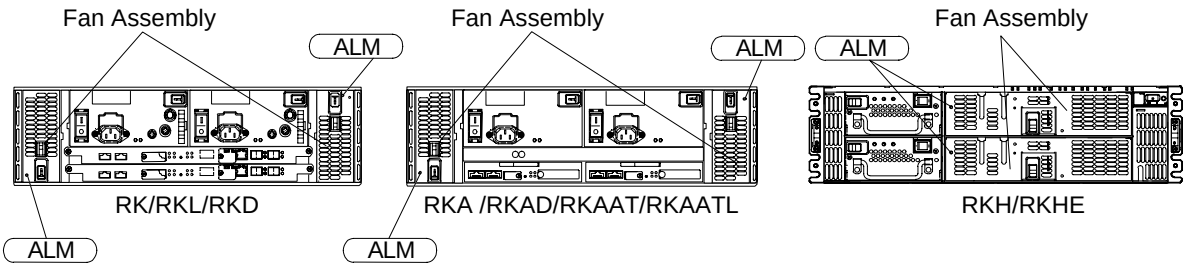
Copyright © 2004, 2005, Hitachi, Ltd.

(○ : On ✧ : Blinking × : Off — : Not depend)

No.	LEDs			Cause or status	Action(s) to be taken	Reference page
	FAIL (Red)	CHK (Red)	P0 (Green)			
9	—	—	×	The input on loop PATH-0/1/2/3 side is abnormal.	Replace the Control Unit whose EALM LED is on.	5.3.5 (MNTE 05-0380)

Copyright © 2004, 2005, Hitachi, Ltd.

(6) 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 2.6.9 LED Indication Patterns on Fan Assembly

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs ALM (Red)	Cause or status	Action(s) to be taken	Reference page
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.	5.3.3 (MNTE 05-0320)
*1 : [ ] : This is not a failure status.				

Copyright © 2002, 2005, Hitachi, Ltd.

(7) Trouble analysis based on LED indication of Remote Adapter

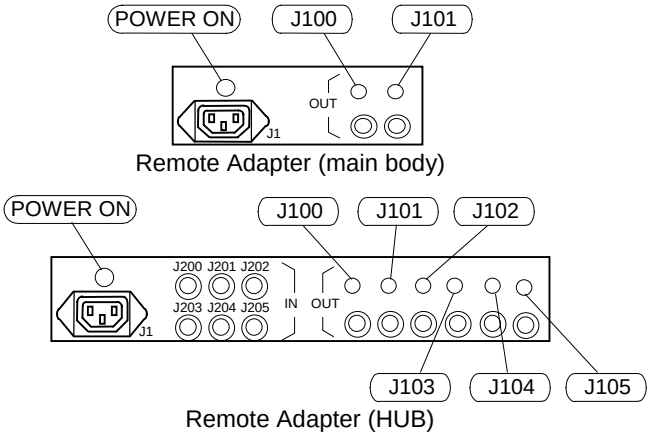


Table 2.6.10 LED Indication Patterns on Remote Adapter

(○ : On ✧ : Blinking × : Off — : Not depend)

No. (*1)	LEDs		Cause or status	Action(s) to be taken	Reference page
	Power ON (Green)	J100～J105 (Green)			
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	
4	×	×	The remote adapter is not in operation.	Check the connection of the power cable. If the cable is connected, replace the Remote Adapter.	5.3.12 (MNTE 05-0770)

*1 : : This is not a failure status.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

2.7 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.

2.7.1 Details of sense code

The details of Sense Code are shown below.

Sense key	Sense code	Error name	Description	Recovery Procedure
0/5	00 00	NO ADDITIONAL SENSE INFORMATION	• There is no valid additional sense information.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
-	00 06	I/O PROCESS TERMINATED	(Does not occur.)	–
4	01 00	NO INDEX/SECTOR SIGNAL	• The INDEX signal cannot be detected. • The SECTOR signal cannot be detected.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1/4	02 00	NO SEEK COMPLETE	• Seek operation in the Disk Drive cannot be executed correctly.	
4	03 00	PERIPHERAL DEVICE WRITE FAULT	• A Write Fault was detected in the Disk Drive.	
2	04 00	LOGICAL UNIT NOT READY, CAUSE NOT REPORTABLE	• 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 appropriate section to analyze the failure.
2	04 01	LOGICAL UNIT IS IN PROCESS OF BECOMING READY	• The Disk Drive will soon become ready although it is currently not ready.	
2	04 02	LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED	• The Disk Drive is currently not ready; it has not been spun-up.	
2	04 03	LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED	(Does not occur.)	–
2	04 04	LOGICAL UNIT NOT READY, FORMAT IN PROGRESS	• 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 appropriate section to analyze the failure.
2	04 80	LOGICAL UNIT NOT READY, PARITY RECOVER IN PROCESS	(Does not occur.)	–
2	04 81	LOGICAL UNIT NOT READY, PARITY RECOVER IN PROCESS	(Does not occur.) • The logical unit is currently not ready. Data is being reconstructed.	
2	04 82	LOGICAL UNIT NOT READY, DATA RECONSTRUCTION IN PROCESS	(Does not occur.)	
2	04 83	LOGICAL UNIT NOT READY	(Does not occur.) • The logical unit concerned is blocked. (There is an uninstalled drive.)	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
2	04 84	POWER OFF IN PROCESS	• A sequential shutdown is in progress.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
2	05 00	LOGICAL UNIT DOES NOT RESPOND TO SELECTION	• An error occurred in the drive interface in the logical unit.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1/4	06 00	NO REFERENCE POSITION FOUND	• The positioning to Track 0 failed.	
4	07 00	MULTIPLE PERIPHERAL DEVICES SELECTED	• Two or more Disk Drives were selected at the same time.	
4	08 00	LOGICAL UNIT COMMUNICATION FAILURE	• An error occurred in the drive interface in the logical unit.	
4	08 01	LOGICAL UNIT COMMUNICATION TIME-OUT	• A time-out error occurred in the drive interface in the logical unit.	
1/4	08 02	LOGICAL UNIT COMMUNICATION PARITY ERROR	• A parity error occurred in the drive interface in the logical unit.	
1/4	09 00	TRACK FOLLOWING ERROR	• A track positioning failed.	
-	0A 00	ERROR LOG OVERFLOW	(Does not occur.)	–
-	0B 00	(RESERVED)	(Does not occur.)	
1	0C 01	WRITE ERROR RECOVERED WITH AUTO REALLOCATION	(Does not occur.) • The write error was recovered by the automatic reallocation.	
3	0C 02	WRITE ERROR-AUTO REALLOCATION FAILED	• An automatic allocation was executed against the write error but failed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
-	0D to 0F	(RESERVED)	(Does not occur.)	–
3	10 00	ID CRC OR ECC ERROR	• A CRC error occurred in the ID field.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3	11 00	UNRECOVERED READ ERROR	• An error occurred in the data field.	
3	11 01	READ RETRIES EXHAUSTED	• Reading of the data field was retried but the error was not recovered. (An error correction was not applied.)	
3	11 02	ERROR TOO LONG TO CORRECT	• The read error in the data field could not be corrected by means of the ECC.	
3	11 03	MULTIPLE READ ERROR	(Does not occur.)	–
3	11 04	UNRECOVERED READ ERROR : AUTO REALLOCATION FAILED	• An automatic reallocation was executed against the recoverable error but failed	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
3	11 0A	MISCORRECTED ERROR	(Does not occur.)	–
3	11 0B	UNRECOVERED READ ERROR: RECOMMEND REASSIGNMENT	(Does not occur.)	
3	11 0C	UNRECOVERED READ ERROR: RECOMMEND REWRITE THE DATA	(Does not occur.)	
3	12 00	ADDRESS MARK NOT FOUND FOR ID FIELD	• The address mark of the ID field could not be detected.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1/3	13 00	ADDRESS MARK NOT FOUND FOR DATA FIELD	• The address mark of the data field could not be detected.	
1/3	14 00	RECORDED ENTITY NOT FOUND	(Does not occur.)	–
1/3	14 01	RECORD NOT FOUND	• The block with the identical ID field could not be detected.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3	15 00	RANDOM POSITIONING ERROR	(Does not occur.)	–
1/4	15 01	MECHANICAL POSITIONING ERROR	• A seek error occurred.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1/4	15 02	POSITIONING ERROR DETECTED BY READ OF MEDIUM	• The seek operation terminated normally but the head was positioned at an address not intended.	
1/3	16 00	DATA SYNCHRONIATION MARK ERROR	(Does not occur.)	–
1	17 00	RECOVERED DATA WITH NO ERROR CORRECTION APPLIED	• The error was recovered by a retry.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
1	17 01	RECOVERED DATA WITH RETRIES	• The error was recovered by a retry (without a head offset).	
1	17 02	RECOVERED DATA WITH POSITIVE HEAD OFFSET	• The error was recovered by a retry with a head offset in the positive direction.	
1	17 03	RECOVERED DATA WITH NEGATIVE HEAD OFFSET	• The error was recovered by a retry with a head offset in the negative direction.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
1	17 05	RECOVERED DATA USING PREVIOUS SECTOR	(Does not occur.)	–
1	17 06	RECOVERED DATA WITHOUT EC: DATA AUTO REALLACATD	(Does not occur.)	
1	17 07	RECOVERED DATA WITH ECC: RECOMMED REASSIGNMENT	(Does not occur.)	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
1	18 00	RECOVERED DATA WITH ERROR CORRECTION APPLIED	• The error was recovered by the ECC (without a retry).	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
1	18 01	RECOVERED DATA WITH ERROR CORRECTION AND RETRIES APPLIED	• The error was recovered by the ECC applied in a retry.	
1	18 02	RECOVERED DATA-DATA AUTO-REALLOCATED	• Data was recovered by an automatic reallocation.	
1	18 05	RECOVERED DATA: RECOMMED REASSIGNMENT	(Does not occur.)	–
1/3	19 00	DEFECT LIST ERROR	(Does not occur.)	
1/3	19 01	DEFECT LIST NOT AVAILABLE	(Does not occur.)	
1/3	19 02	DEFECT LIST ERROR IN PRIMARY LIST	• An error occurred during an access to the Primary (P) list.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1/3	19 03	DEFECT LIST ERROR IN GROWN LIST	• An error occurred during an access to the Grown (G) list.	
5	1A 00	PARAMETER LIST LENGTH ERROR	• The parameter list length is illegal.	
4	1B 00	SYNCHRONOUS DATA TRANSFER ERROR	• A synchronous data transfer error occurred in a data transfer.	
3	1C 00	DEFECT LIST NOT FOUND	(Does not occur.)	–
3	1C 01	PRIMARY DEFECT LIST NOT FOUND	• The positioning to the Primary (P) list failed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3	1C 02	GROWN DEFECT LIST NOT FOUND	• The positioning to the Primary (P) list failed.	
3	1D 00	MISCOMPARE DURING VERIFY OPERATION	• A data compare error occurred during write or read buffer verify processing.	
1	1E 00	RECOVERED ID WITH ECC CORRECTION	(Does not occur.)	–
-	1F	(RESERVED)	(Does not occur.)	
5	20 00	INVALID COMMAND OPERATION CODE	• The operation code is invalid.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
5	21 00	LOGICAL BLOCK ADDRESS OUT OF RANGE	• An attempt was made to access beyond the logical block address reported with Read Capacity (PMI bit=0).	Collect Simple trace and request the appropriate section 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 OPEN LDEV GUARD	• The Read command could not be executed because the access level had been set with Open LDEV Guard.	–
-	23 00	(RESERVED)	(Does not occur.)	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	24 00	INVALID FIELD IN CDB	• 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 appropriate section to analyze the failure.
5	25 00	LOGICAL UNIT NOT SUPPORTED	• The LUN shown by the CDB or Identify message is not supported.	
5	25 80	LOGICAL UNIT ALLOCATE ERROR	• The logical unit allocation failed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	25 81	RAID GROUP NOT DEFINE	• The RAID group (RG) is not defined.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
5	25 83	COULD NOT ENABLE P-CACHE	• P The Turbo LU specification was rejected by the specification condition check.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	25 84	ROW LAST LBA IN RAID GROUP DEFINED RAID 1+0 FULL MAPPING IS CHANGED	• 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	LU ACCESSED THROUGH NON OWNER CONTROLLER	• 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 appropriate section to analyze the failure.
5	25 A0	MODE SELECT COMMAND DIVISIONAL TRANSFER ERROR	• The divisional transfer failed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	26 00	INVALID FIELD IN PARAMETER LIST	• There is an invalid field in the parameter list.	
5	26 01	PARAMETER NOT SUPPORTED	• An unsupported parameter was received.	
5	26 02	PARAMETER VALUE INVALID	• The parameter value is invalid.	
5	26 03	THRESHOLD PARAMETERS NOT SUPPORTED	(Does not occur.)	–
5	26 04	INVALID RELEASE OF PERSISTENT RESERVATION	• The release from the Persistent Reservation failed because the type of the Persistent Reserve command was different.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
7	27 00	THE WRITE COMMAND COULD NOT BE EXECUTED BECAUSE THE ACCESS LEVEL HAD BEEN SET WITH OPEN LDEV GUARD	• The write command could not be executed because the access level had been set with Open LDEV Guard.	–
7	28 00	NOT READY TO READY TRANSITION	(Does not occur.)	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
6	29 00	POWER ON RESET, RESET, BUS DEVICE RESET OR HARD ERROR RESET OCCURRED	• 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 appropriate section to analyze the failure.
6	2A 00	PARAMETERS CHANGED	• 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.	
6	2A 01	MODE PARAMETERS CHANGED	(Does not occur.)	–
6	2A 02	LOG PARAMETERS CHANGED	(Does not occur.)	
6	2A 03	ALL RESERVATIONS HAVE BEEN CLEARED	• The Reservation Key and Persistent Reservation of the LU concerned were all cleared by the Clear service action of the Persistent Reserve command.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
6	2A 04	RESERVATION HAS BEEN RELEASED	• 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	REGISTRATIONS HAVE BEEN PREEMPTED	• The Reservation Key was deleted by the Preempt or Preempt & Abort service action of the Persistent Reserve command.	
5	2B 00	COPY CANNOT EXECUTE SINCE HOST CANNOT DISCONNECT	(Does not occur.)	–
5	2C 00	COMMAND SEQUENCE ERROR	(Does not occur.)	
-	2D to 2E	(RESERVED)	(Does not occur.)	
6	2F 00	COMMANDS CLEARED BY ANOTHER INITIATOR	• 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.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
3	30 00	INCOMPATIBLE MEDIUM INSTALLED	(Does not occur.)	–
3	30 01	CANNOT READ MEDIUM: UNKNOWN FORMAT	(Does not occur.)	
3	30 02	CANNOT READ MEDIUM: INCOMPATIBLE FORMAT	(Does not occur.)	
3	30 03	CLEANING CARTRIDGE INSTALLED	(Does not occur.)	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
3	31 00	MEDIUM FORMAT CORRUPTED	• The medium is not formatted correctly; it must be reformatted by the Format Unit command	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3	31 01	FORMAT COMMAND FAILED	• The Format command terminated abnormally; it must be reformatted by the Format Unit command.	
3	31 80	DATA FORMAT CORRUPTED	• The data format for the disk array is not established.	
3	31 81	FORMAT COMMAND NOT EXECUTE	• 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	NO DEFECT SPARE LOCATION AVAILABLE	• The reallocation cannot be done because the alternative area is insufficient.	
1/3	32 01	DEFECT LIST UPDATE FAILURE	• The update of the Grown (G) list failed.	
-	33 to 34	(RESERVED)	(Does not occur.)	–
5	35 01	ENC TIME OUT(FC) INVALID FRAME (SATA)	• An ENC time-out (FC) or an illegal frame was sent (SATA).	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
-	36	(RESERVED)	(Does not occur.)	–
1	37 00	ROUNDED PARAMETER	(Does not occur.) • The processing was executed with the parameter value rounded because it could not be executed with the original value.	
-	38	(RESERVED)	(Does not occur.)	
5	39 00	SAVING PARAMETERS NOT SUPPORTED	(Does not occur.)	
-	3A 00	MEDIUM NOT PRESENT	(Does not occur.)	
-	3B to 3C	(RESERVED)	(Does not occur.)	
B	3D 00	INVALID BITS IN IDENTIFY MESSAGE	• An invalid bit was detected in the Identify message.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
2	3E 00	LOGICAL UNIT HAS NOT SELF-CONFIGURED YET	• The self- configuration of the Disk Drive is not established yet.	
6	3F 00	TARGET OPERATING CONDITIONS HAVE CHANGED	(Does not occur.)	–

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
6	3F 01	MICROCODE HAS BEEN CHANGED	• The microprogram was downloaded.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
6	3F 02	CHANGED OPERATING DEFINITION	(Does not occur.)	–
6	3F 03	INQUIRY DATA HAS CHANGED	(Does not occur.)	
4	40 00	RAM FAILURE	(Does not occur.)	
4	41 00	DATA PATH FAILURE	(Does not occur.)	
4	42 00	POWER-ON OR SELF-TEST FAILURE	(Does not occur.)	
B	43 00	MESSAGE ERROR	• The operation cannot be continued because the message was rejected or an error occurred in the Message phase.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
4	44 00	INTERNAL TARGET FAILURE	• A hardware or firmware error was detected in the Controller during the command execution.	
4	44 00	A ABNORMAL END OF THE QUICK FORMATTING JOB GENERATED BY THE READ COMMAND WAS DETECTED	• A abnormal end of the Quick Formatting job generated by the read command was detected.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	44 00	A ABNORMAL END OF THE QUICK FORMATTING JOB GENERATED BY THE WRITE COMMAND WAS DETECTED	• A abnormal end of the Quick Formatting job generated by the write command was detected.	
4	44 A0	NO REASSIGN SECTOR	• No sector to be reassigned cannot be detected.	
B	45 00	SELECT OR RESELECT FAILURE	• A Select/ Reselect time-over was detected. • An invalid selection was detected.	
-	46 00	UNSUCCESSFUL SOFT RESET	(Does not occur.)	–
B	47 00	Fibre Channel : CRC ERROR DETECTED	• A Fibre Channel bus on CRC error occurred.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
B	48 00	INITIATOR DETECTED ERROR MESSAGE RECEIVED	• The Initiator Detected Error message was received from the initiator.	
B	49 00	INVALID MESSAGE ERROR	• An invalid message was detected.	
		COMMAND SEQUENCE ERROR	• Multiple commands were issued from a LAN. (Example: Failure Monitoring Program and Disk Array Management Program were used at the same time.) • The communication via a LAN was not done normally because of a LAN failure.	
B	4A 00	COMMAND PHASE ERROR	• An error occurred during accepting of the command.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
B	4B 00	DATA PHASE ERROR	• An error occurred during data transfer.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	4C 00	LOGICAL UNIT FAILED SELF-CONFIGURATION	• A loading of a microcode or parameter failed when starting up the controller.	
4	4C 80	LOGICAL UNIT FAILED SELF-CONFIGURATION	(Does not occur.)	–
-	4D	(RESERVED)	(Does not occur.)	
B	4E 00	OVERLAPPED COMMANDS ATTEMPTED	• 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.)	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
-	4F to 52	(RESERVED)	(Does not occur.)	–
-	53 00	MEDIA LOAD OR EJECT FAILED	(Does not occur.)	
-	53 02	MEDIUM REMOVAL PREVENTED	(Does not occur.)	
-	54	(RESERVED)	(Does not occur.)	
5	55 04	RESERVATION KEY CAN NOT BE ENROLLED TO A LU BECAUSE MORE THAN 32 RESERVATION KEYS HAVE BEEN ENROLLED	• A registration of 32 or more Reservation Keys in an LU was attempted.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
-	56 to 59	(RESERVED)	(Does not occur.)	–
-	5A 00	OPERATOR REQUEST OR STATE CHANGE INPUT	(Does not occur.)	
-	5A 01	OPERATOR MEDIUM REMOVAL REQUEST	(Does not occur.)	
-	5A 02	OPERATOR SELECTED WRITE PROTECT	(Does not occur.)	
-	5A 03	OPERATOR SELECTED WRITE PERMIT	(Does not occur.)	
1	5B 00	LOG EXCEPTION	• An exceptional log in the Disk Drive was detected.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1	5B 01	THRESHOLD CONDITION MET	(Does not occur.)	–
1	5B 02	LOG COUNTER AT MAXIMUM	• The log counter in the Disk Drive reached its maximum value.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1	5B 03	LOG LIST CODES EXHAUSTED	• All log list codes in the Disk Drive were used up.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4/6	5C 00	RPL STATUS CHANGE	(Does not occur.)	–
6	5C 01	SPINDLES SYNCHRONIZED	(Does not occur.)	
1/6	5C 02	SPINDLES NOT SYSNHRONIZED	(Does not occur.) • A synchronous withdrawal failure or an off-synchronization after a passing synchronization was detected.	
-	5D to 7F	(RESERVED)	(Does not occur.)	
1	80 00	RECOVERED DATA WITH PARITY DATA WITHOUT AUTO-REALLOCATION	(Does not occur.) • Data was recovered using parity disk data. (Data on the medium is not recovered yet.)	
1	80 01	RECOVERED DATA WITH RECOVERED PARITY DISK ERROR	(Does not occur.) • Data was recovered using parity disk data which had been recovered from an error.	
1	80 02	DATA WRITE IN DRIVE REGRESSION	(Does not occur.)	
1	81 00	AUTO-REALLOCATION COMPLETE WITH DATA CORRECTION	(Does not occur.) • A correctable error was detected in a data restoration was detected although an automatic reallocation terminated normally.	
1	81 01	AUTO-REALLOCATION COMPLETE WITH DATA CORRECTION	(Does not occur.) • Data was recovered using parity disk data. (Data on the medium was recovered.)	
6	82 00	DRIVE RECOVER COMPLETE	• 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 appropriate section to analyze the failure.
6	82 01	DRIVE RECOVER ERROR FOR UNCORRECTABLE DATA ERROR	• Unrecoverable data was generated although the disk recovery by means of a drive recovery completed normally.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
6	82 02	DRIVE RECOVER COMPLETE (EXIST UNCORRECTABLE DATA ERROR)	• 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 03	DRIVE RECOVER ERROR FOR DISK MEDIA ERROR (FROM)	(Does not occur.) • A media error was detected in the recovery source data disk during a Disk Drive recovery.	–

*1 : The sense code is not reported to the host. (It is reported as the Sense Information on Mode Sense page 34_H.)

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
6	82 04	DRIVE RECOVER ERROR FOR DISK MEDIA ERROR (TO)	(Does not occur.) • A media error was detected in the recovery destination data disk during a Disk Drive recovery.	–
6	82 05	DRIVE RECOVER ERROR FOR DISK HARD ERROR (FROM)	(Does not occur.) • A hardware error was detected in the recovery source data disk during a Disk Drive recovery	
6	82 06	DRIVE RECOVER ERROR FOR DISK HARD ERROR (TO)	(Does not occur.) • A hardware error was detected in the recovery destination data disk during a Disk Drive recovery.	
6	82 08	DRIVE RECOVER FORCE STOP	(Does not occur.) • The drive recovery was forcibly terminated by an operator instruction.	
6	82 0A	DRIVE RECOVER COMPLETES WITH UNRECOVERED DATA	(Does not occur.) • Unrecoverable data was generated although the data disk recovery by means of a Disk Drive recovery completed normally.	
6	82 0B	DRIVE RECOVER ERROR FOR DATA REGRESSION (FROM)	(Does not occur.) • The recovery source data disk was blocked during a Disk Drive recovery.	
6	82 0C	DRIVE RECOVER ERROR FOR DATA REGRESSION (TO)	(Does not occur.) • The recovery destination data disk was blocked during a Disk Drive recovery.	
6	82 0D	DRIVE RECOVER ERROR FOR CACHE HARD ERROR	(Does not occur.) • A hardware error was detected in the inter-cache control during a Disk Drive recovery.	
6	82 0E	STRUCTURE INFORMATION CHANGE	(Does not occur.) • The state of the configuration information changed.	
6	82 0F	DRIVE RECOVER ERROR FOR SPARE DISK USED	(Does not occur.) • The Disk Drive recovery cannot be started because data for write-after remains in the recovery destination Spare Disk.	
6	82 10	DRIVE RECOVER FORCIBLY TERMINATE	• 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 appropriate section to analyze the failure.
6	82 11	DRIVE RECOVER FORCIBLY TERMINATE (MEDIA ERR DETECT : FROM)	• 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 appropriate section to analyze the failure and take a measure.

*1 : The sense code is not reported to the host. (It is reported as the Sense Information on Mode Sense page 34_H.)

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
6	82 12	DRIVE RECOVER FORCIBLY TERMINATE (MEDIA ERR DETECT : TO)	• 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).	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
6	82 13	DRIVE RECOVER FORCIBLY TERMINATE (HARD ERR DETECT : FROM)	• 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	DRIVE RECOVER FORCIBLY TERMINATE (HARD ERR DETECT : TO)	• 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	DRIVE RECOVER FORCIBLY TERMINATE (DISK BLOCKED : FROM)	• 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	DRIVE RECOVER FORCIBLY TERMINATE (DISK BLOCKED : TO)	• 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	DRIVE RECOVER FORCIBLY TERMINATE (CACHE HARD ERRDETECT)	• 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	DRIVE RECOVER FORCIBLY TERMINATE (CONFIGURATION CHANGE)	• The Disk Drive recovery was forcibly terminated because the status of the configuration information changed (*1).	
6	82 19	DRIVE RECOVER FAIL (WRITE AFTER DATA REMAIN)	• The Disk Drive could not be started because data for write-after remains in the recovery destination Spare Disk(*1).	
6	82 1A	TIME OUT DETECTED IN CONTROLLER	• The Disk Drive recovery was forcibly terminated because an time-out occurred in an internal process(*1).	
B	83 00	DRIVE DUMP INFORMATION CHANGE	• The dump information was changed because another controller was blocked during a collection of the Send Diag drive dump.	
3	88 00	READ ATENPTED TO NOT INITIALIZED AREA IN REGRESSION MODE	(Does not occur.)	–
3	89 00	WRITE UNABLE IN PARITY INCONSISTENT AREA IN REGRESSION MODE	(Does not occur.)	

*1 : The sense code is not reported to the host. (It is reported as the Sense Information on Mode Sense page 34_H.)

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	8A 01	PARITY ERROR DETECTED DURING MEDIUM PARITY CERTIFICATION	• A parity error was detected during a medium parity consistency check.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	8A 02	CHECK CODE ERROR DETECTED DURING MEDIUM LA CERTIFICATION	• A parity error was detected during a medium LA consistency check.	
1	8A 03	DIRTY DATA EXIST DURING MEDIUM PARITY CERTIFICATION	• Intermediate pinned data and dirty data were found during a parity consistency check.	
1	8A 04	DIRTY DATA EXIST DURING MEDIUM LA CERTIFICATION	• Remaining intermediate or physical dirty data and pinned data were found during an LA consistency check of a medium.	
1	8B 01	COMMAND ATTEMPTED TO BLOCKED LOGICAL UNIT	• An inoperable command was issued to the blocked logical unit.	
5	8C 01	PARITY CHECK REQUESTED DURING REGRESSION MODE	• Parity check was required in the Regression mode.	
5	8D 01	DETACH IS REJECTED BEDAUSE THE LOGICAL UNIT WILL BE BLOCKD	(Does not occur.)	–
3	8E 01	READ ATTEMPTED TO WRITE-UNCOMPLETED BLOCK	• An instruction to read or verify was given to the block on which a writing has not completed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3	8E 02	READING ON THE V-VOL WAS ATTEMPTED IT COULD NOT BE DONE BECAUSE OF THE INCOMPLETE DDCB	• 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	• Writing on the V-Vol was attempted it could not be done because of the incomplete DDCB.	
3	8E 04	DISK DIRECT WRITE BY PS, UPS AND CONTROLLER ALARM	• 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 appropriate section to analyze the failure.
3	8E 05	A COPY BY A GENERAL-PURPOSE ASYNC JOB WAS NOT COMPLETED IN EXECUTION OF QUICKSHADOW	• A copy or restore by a general purpose ASYNC job was not completed in execution of QuickShadow.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
1	8F 00	SYSTEM AREA WRITE ERROR	(Does not occur.)	–
4	8F 01	SYSTEM AREA WRITE ERROR OCCURED AT ONE OF SYSTEM DRIVE	(Does not occur.)	
4	90 00	UNRECOVERED DATA ERROR WITH PARITY DISK DATA	• An unrecoverable data error occurred during a data recovery with parity disk data.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
3/4	90 01	UNRECOVERED DATA ERROR WITH PARITY DISK DATA IN REGRESSION MODE	• An unrecoverable data error occurred during operation in the Regression mode.	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
4	91 00	AUTO-REALLOCATION NOT COMPLETE FOR UNCORRECTABLE ERROR	• Data could not be reconstructed because an unrecoverable error was detected during an automatic allocation	
4	91 01	AUTO-REALLOCATION NOT COMPLETE FOR UNCORRECTABLE ERROR	• The alternative block could not be reallocated in an automatic reallocation.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	92 00	UNRECOVERED ERROR IN REGRESSION MODE	(Does not occur.)	–
3	93 00	PARITY ADJUSTMENT ERROR ON CACHE MEMORY	• A parity adjustment error occurred in the Cache memory.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	94 01	LU ACCESSED THROUGH NON OWNER CONTROLLER	• 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 appropriate section to analyze the failure.
2	95 00	COMMAND NOT EXECUTED BECAUSE ARRAY UNIT SHUTDOWN IN PROGRESS	• The pseudo sequential shutdown is in progress.	
2	95 01	COMMAND NOT EXECUTED BECAUSE ARRAY UNIT SHUTDOWN HAS BEEN COMPLETED	• The pseudo sequential shutdown terminated normally.	
4	95 02	ARRAY UNIT SHUTDOWN ERROR	• The pseudo sequential shutdown terminated abnormally.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 10	COMMAND NOT EXECUTED BECAUSE ONLINE MICROPROGRAM REPLACEMENT IN PROGRESS	• 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 appropriate section to analyze the failure.
5	95 20	MODE SELECT / MODE SENSE WAS RECEIVED IN THE COMMAND EXECUTION IMPOSIBLE CONDITION	• 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 appropriate section to analyze the failure and take a measure.
4	95 36	PROGRAM PRODUCT IS NOT INSTALLED	• The priced option function is in the unsupported status.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 40	SPARE DISK FIELD WAS INVALID	• 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 appropriate section to analyze the failure and take a measure.
5	95 41	DRIVE CAPACITY OF RAID GROUP IS INVALID, OR RAID GROUP CAPACITY IS TOO LARGE	• 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.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	95 42	DESIGNATED DISK DOES NOT DEFINE SPARE DISK	• The designated Disk Drive is that which cannot be defined as a Spare Disk (at the time of the Spare Disk designation).	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 43	SPARE DISK IS OVER	• The number of the specified Spare Disks exceeds maximum definable value (at the time of the Spare Disk designation).	
5	95 44	DESIGNATED DISK WAS ALREADY DEFINED	• 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	DESIGNATED DISK CAPACTIY IS SMALL	• 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	LINVALID ORDER THAT NON-SPARE DISK RECIVER TO RELEASD SPARE DISK ORDER	• 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	SPARE DISK RECIVES TO RELEASD SPARE DISK ORDER, but SPARE DISK IS USED	• 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 appropriate section to analyze the failure.
5	95 48	RECIVES KEY-CLOSE ORDER, but KEY WAS ALREADY OPEND	• An unlocking instruction was given to the drive which was not locked.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 49	RECIVES KEY-CLOSE ORDER, but KEY WAS ALREADY CLOSED	• A locking instruction was given to the drive which was already locked.	
5	95 4A	INVALID KEY CODE	• 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.	
5	95 4D	THE PROCESS CANNOT BE PERFORMED BECAUSE THE TARGET MODE IS MODE IS NOT M-TID, M-LUN (MAPPIND MODE)	• The process cannot be performed because the target mode is mode is not M-TID, M-LUN. (Mapping mode)	
5	95 4E	THE PROCESS CANNOT BE PERFORMED BECAUSE THE TARGET INFORMATION ARE CHANGED OR DELETED.	• The process cannot be performed because the target information are changed or deleted.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
7	95 50	COMMAND NOT EXECUTE FOR WRITE PROHIBITION	• Command not execute for write prohibition.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 51	COMMAND NOT EXECUTE FOR CONCEALMENT MODE	• Command not execute for concealment mode.	
5	95 52	COMMAND NOT EXECUTE FOR COUPLING LU OR COMMAND DEVICE EXIST	• Command not execute for coupling LU or Command Device exist.	
5	95 53	AP DISTINCTION NUMBER IS FULL	• Ap distinction number is full.	
5	95 54	COMMAND RESPONSE CAN NOT BE DONE BECAUSE COMMAND DEVICE IS NOT SET	• Command response can not be done because command device is not set.	
5	95 56	COMMAND NOT EXECUTE BECAUSE FAILRE OCCURRED IN REVERSE RESYNC	• Command not execute because failure occurred in reverse resync.	
5	95 57	PAIRCREATE COMMAND NOT EXECUTE BECAUSE THE LU SIZE OF PRIMARY AND SECONDARY DOES NOT CORRESPOND	• (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	COMMAND NOT EXECUTED BECAUSE OF LU EXPANSION WITHOUT REBOOT IN PROGRESS	• The command cannot be issued because LU unification is in progress.	
5	95 59	LU UNIFIED, LU DELETE OR LAST LU DELETE CANNOT PERFORMED BECAUSE. THE LU ARE USED FOR TURBO LU RESIDENCE FUNCTION	• 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	LU UNIFICATION CANNOT BE PERFORMED BECAUSE TWO LUS BELONG TO DIFFERENT CONTROLLERS	• The LU unification could not be done because Controllers that control LUs to be unified were not the same.	
5	95 5B	LU UNIFICATION CANNOT BE PERFORMED WHILE OWN CONTROLLER CHANGING IS PERFORMED	• The LU unification could not be done because a Controller that controls the LUs to be unified was being changed.	
5	95 5C	LU UNIFICATION CANNOT BE PERFORMED BECAUSE THE RAID LEVEL OF MAIN LU (OR SUB LU) IS RAID	• The LU unification could not be done because a RAID level of the LUs to be unified was RAID 0.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	95 5D	LU UNIFICATION CANNOT BE PERFORMED BECAUSE THE SIZE OF UNIFIED LU EXCEEDS 2TB	• The LU unification could not be done because an LU size after the unification would be larger than 2 Tbytes.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 5E	THE PROCESS CANNOT BE PERFORMED BECAUSE THE LU IS NOT UNIFIED LU	• 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	LU UNIFICATION CANNOT BE PERFORMED BECAUSE SUB LU IS UNIFIED LU	• 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, UNIFIED LUS SEPARATED OR LAST LU SEPARATED FROM UNIFIED LU CANNOT BE PERFORMED BECAUSE THE LU IS SUB LU	• 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	LU UNIFICATION CANNOT BE PERFORMED BECAUSE SUB LU IS LU#0	• The LU unification could not be done because the LU #0 was selected as the Sub LU.	
7	95 65	LU UNIFICATION CANNOT BE PERFORMED BECAUSE THE MAIN LU (OR SUB LU) STATUS IS UNFORMATTED	• The LU unification could not be done because an LU status was other than normal or regression.	
5	95 66	LU UNIFICATION CANNOT BE PERFORMED BECAUSE MORE THE 63 LUS ARE UNIFIED	• The LU unification could not be done because the number of the internal LU that configures the unfied LU exceeded 51.	
5	95 67	LU UNIFICATION, UNIFIED LUS SEPARATED OR LAST LU SEPARATED FROM UNIFIED LU CANNOT BE PERFORMED BECAUSE LU EXPANSION WITHOUT REBOOT FUTURE IS NOT AVAILABLE	• 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	LU CANNOT BE DELETED BECAUSE THE LU IS NOT CONFIGURED LAST	• The final LU could not be deleted because it was not specified.	
5	95 6B	DIFFERENTIAL DATA SIZE IS TOO LARGE TO MAKE PAIR (P-VOL AND S-VOL) OF MRCF-LITE	• Because the differential bit could not be assigned, the pair forming command of the MRCF-Lite could not be executed.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	95 71	PATHS SETUP FAILURE	• The path could not be set.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	95 72	PATHS DELETION FAILURE	• The path could not be deleted.	
5	95 73	KEY-OPEN FAILURE FOR ADDITIONAL FUNCTION HAS KEY-OPEN ALREADY	• 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	COMMAND NOT EXECUTE FOR REMOTE COPY FUNCTION USE	• The command could not be executed because the remote copy function was being used.	
5	95 75	COMMAND NOT EXECUTE BECAUSE PATHS ARE DEFINED	• The command could not be executed because the path was already defined.	
5	95 76	PAIR OPERATION COMMAND NOT EXECUTE FROM RAID MANAGER	• The pair operation command from RAID Manager could not be executed.	
5	95 77	COMMAND NOT EXECUTE BECAUSE PAIR IS BEING MADE	• The command (host or Disk Array Management Program) could not be executed because the pair was being generated.	
7	95 78	COMMAND NOT EXECUTE BECAUSE PAIR IS DURING THE DATA COPY	• The host command could not be executed because data copy was on progress.	
5	95 79	COMMAND NOT EXECUTE FOR P-VOL WRITE PROHIBITION CONDITION	• The host command could not be executed because the primary volume was write-protected.	
5	95 7A	COMMAND NOT EXECUTE BECAUSE PAIR CONDITION IS PSUE CONDITION	• The host command could not be executed because the pair status is PSUE (suspended due to failure).	
5	95 7B	COMMAND NOT EXECUTE BECAUSE PAIR CONDITION IS INVALID	• The command could not be executed between the devices because the pair status was invalid.	
5	95 7C	COMMAND NOT EXECUTE BECAUSE REMOTE DF600 MAKE PAIR WITH OTHER DF600	• The command could not be executed between the devices because the remote device was already paired with another device.	
5	95 7D	COMMAND NOT EXECUTE FOR INFLOW LIMITATION OVER	• The command issued by a DF to another DF cannot be executed because the limit of the inflow has been exceeded.	
5	95 7E	COMMAND NOT EXECUTE BECAUSE SHADOW IMAGE PAIR IS INVALID	• The command issued by a DF to another DF cannot be executed because a status of the pair formed by the Shadow Image is invalid.	
5	95 80	COMMAND NOT EXECUTE FOR RAID MANAGER COMMAND EXECUTION	• The command cannot be executed because the command from RAID Manager is being received.	
B	95 81	COMMAND NOT EXECUTE FOR HI-COPY COMMAND CONSECUTIVELY	• Any further processing cannot be executed because the SEL command is received consecutively.	Execute it again after waiting for a while.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	95 91	PAIR CAN NOT BE MADE MORE THAN 32 MRCF PAIRS	• The setting of or reference to the pairs, number of which exceeds the allowable maximum value, was attempted.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
7	95 95	WRITE COMMAND NOT EXECUTE FOR FENCE LEVEL “DATA”	• The write command could not be executed because the fence level was data.	
5	95 96	READ COMMAND NOT EXECUTE FOR CONCEALMENT MODE IN SRC FUNCTION	• The read command could not be executed because the concealment mode was turned on for the remote copy function.	
7	95 97	WRITE COMMAND NOT EXECUTE FOR S-VOL PAIR CONDITION IN SRC FUNCTION	• The write command could not be executed because the secondary volume was in the paired status in the remote copy function.	
7	95 98	WRITE COMMAND NOT EXECUTE FOR S-VOL ACCESS QUALIFICATION IN SRC FUNCTION	• The write command could not be executed due to the restriction on the secondary volume access in the remote copy function.	
4	95 99	PAIR STATE WAS TRANSITED TO PSUE BECAUSE WRITE COMMAND	• The pair status transited to PSUE because the write command failed duplicate write.	
2	95 9A	VENDER UNIQUE COMMAND NOT EXECUTE FOR DEADLOCK AVOIDANCE BY THE WRITE COMMAND	• The vendor unique command cannot be executed in order to avoid a deadlock owing to a duplex writing.	
2	95 9B	READ/WRITE COMMAND NOT EXECUTE FOR READ ACCESS MODE ENABLE IN FENCE LEVEL “DATA”	• The read/write command cannot be executed because the read access mode is “Enable” when the fence level is "data."	
5	96 00	COMMAND SEQUENCE ERROR (ANOTHER COMMAND IS RUNNING IN AN ARRAY UNIT.)	• Resource Manager command sequence error (Another command is being executed in the disk array subsystem.)	
5	96 01	INVALID HOST GROUP	• The setting was made for a host group other than 0.	
5	96 02	COMMAND DISAPPROVAL BECAUSE OF LOCK OR UNLOCK OPERATION FOR THE FEATURE OTHER THAN PURCHASABLE OPTIONAL FEATURE	• The command could not be executed because locking or unlocking operation for the feature other than purchasable optional features was attempted.	
5	96 03	DEFINITION AND EXPANSION DISAPPROVAL FOR A LOGICAL UNIT BECAUSE OF OVER 2 TBYTES OF NON-DEFINITION CAPACITY IN THE CORRESPONDING RAID GROUP.	• The command could not be executed because locking or unlocking operation for the feature other than purchasable optional features was attempted.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	96 04	WRITE OPERATION FAILURE FOR SYSTEM PARAMETER ON (5) DRIVES	• Writing of the system parameters on five drives failed.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	96 05	THE EXECUTION WAS IMPOSSIBLE FOR CONCEALMENT	• The execution could not be done because the LU concerned was concealed.	
5	96 07	THE EXECUTION WAS IMPOSSIBLE FOR QUICKSHADOW PAIR	• The execution could not be done because the pair was a QuickShadow pair.	
5	96 08	PAIR OPERATION COMMAND NOT EXECUTE FROM RAID MANAGER	• The pair operation command issued by RAID Manager could not be executed.	
2	96 09	PAIR OPERATION COMMAND NOT EXECUTE FROM RAID MANAGER (WAITING FOR RETRYING THE COMMAND)	• The pair operation command cannot be executed from RAID Manager. (Waiting for a command to be retried from RAID Manager.)	
5	96 0A	COMMAND NOT EXECUTE FOR POOL FIELD LU	• The command could not be executed because the LU was that in the pool filed.	
5	96 0B	INVALID POOL MANAGEMENT FIELD	• The pool management filed is invalid.	
5	96 0C	COMMAND NOT EXECUTE FOR READ PROHIBITION CONFIDITION	• The command could not be executed because a reading was prohibited.	
5	96 0D	READ TO S-VOL IS IMPROPER AT THE TIME OF SPECIAL PSUE	• 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	• The access level could not be changed.	
5	96 12	THE EXECUTION WAS IMPOSSIBLE BECAUSE THE QUICK FORMAT WAS IN PROGRESS	• The execution was impossible because the Quick Format was in progress.	
5	96 13	THE EXECUTION WAS IMPOSSIBLE BECAUSE THE ACCESS LEVEL HAD BEEN SPECIFIED	• The execution was impossible because the access level had been specified.	
7	96 14	THE WRITE COMMAND COULD NOT BE EXECUTED	• The write command could not be executed because the LU forming the QuickShadow pair was in the status in which writing to it was prohibited.	
7	96 15	THE LU COULD NOT BE FORMATTED	• The LU could not be formatted because it formed a QuickShadow pair.	
5	96 16	THE PAIR FORMATION IS IMPOSSIBLE FOR 33 PAIRS IN THE SAME GROUP.	• No pair formation enabled because more than 33 pairs existed in the same group ID with the specified group ID.	
5	96 17	RAID GROUP CAN NOT BE SET FOR RAID 0	• 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 FORCED PARITY CORRECTION WAS NOT EXECUTED	• The execution was impossible because the status of the LU concerning the restoration by means of parity was Unrestored or Unrestored 2.	Retry after issuing an instruction to make or skip the restoration by means of parity using the DAMP.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	96 19	JUKE BOX FUNCTION WAS NOT EXECUTED	• The command of the Juke Box function could not be executed.	Get the simple trace and ask the department for coping with problems for analysis of it.
5	96 1A	THE EXECUTION WAS IMPOSSIBLE BECAUSE FORCED PARITY CORRECTION DOES NOT END	• 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 restoration by means of parity using the DAMP and retry after the restoration for the LU by means of parity is completed or skipped.
7	96 1B	THE COMMAND REQUEST TO AN ACCESS IMPOSSIBLE AREA WHILE THE ONLINE COMPULSION ODD PARITY RECOVERS	• A command was issued to an inaccessible area while the forced restoration by means of parity, which was made with the subsystem power turned on, was in progress.	Execute the forced restoration by means of parity or skip it.
5	96 1D	IT IS IMPOSSIBLE TO DEFINE RG INCLUDING BOTH FC AND SATA HDD	• 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	SPECIAL PSUE OCCURRED	• 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	THE EXECUTION WAS IMPOSSIBLE FOR HI-COPY PAIR	• It cannot be executed due to the Hi-Copy pair.	Execute it again after releasing the Hi-Copy pair.
5	96 20	HI-COPY OPERATION EXECUTION IS IMPOSSIBLE	• The Hi-Copy operation cannot be executed.	Check the status of the subsystem on the other side.
4	97 00	COPY JOB OF SNAPSHOT FINISHED UNUSUALLY	• A copy job of QuickShadow terminated abnormally.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	97 01	RESTORE JOB OF SNAPSHOT FINISHED UNUSUALLY	• A restoration job of QuickShadow terminated abnormally.	
4	97 02	PAIR CONDITION CHANGE TO PSUE	• The status of the QuickShadow pair was changed to PSUE.	
4	97 03	PAIR CONDITION CHANGE TO PSUE BECAUSE RESTORE FAILED	• The status of the QuickShadow pair was changed to PSUE because the restoration failed.	
1	98 00	DRIVE DETACHED AND LOST IN PARITY INCONSISTENT AREA	(Does not occur.)	–
4	99 00	DATA WRITE ERROR ON SYNCHRONIZE CACHE	• Data in the cache cannot be written on the drive in a synchronized cache.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
5	9F FF	–	• A sense key and sense code to be used exclusively for responding to Resource Manager 2 and RAID Manager.	Take a recovery action referring to Subsection 2.7.2, “List of detail codes of sense code (05/9FFFF)” on page MNTE 02-2800.
4	9A 01	READ COMMAND COULD NOT CHECK DISK FOR INTERNAL TARGET FAILURE	• A DMA (DRR) hardware error was detected during the Disk Drive diagnosis.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	A0 00	CACHE MEMORY HARDWARE ERROR	• A failure occurred in the cache circuit.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
B	A1 00	ADDRESS BOUNDARY ERROR OCCURRED IN DMA TRANSFER	• An invalid boundary error occurred during DMA transfer.	
4	A2 00	NO SEEK COMPLETE IN WRITEAFTER	(Does not occur.)	–
4	A3 00	WRITE FAULT IN WRITEAFTE	(Does not occur.)	
4	A4 00	DRIVE NOT READY IN WRITEAFTER	(Does not occur.)	
4	A6 00	NO TRACK ZERO FOUND IN WRITEAFTER	(Does not occur.)	
4	A8 00	LOGICAL UNIT COMMUNICATION ERROR IN WRITEAFTER	(Does not occur.)	
4	A8 01	LOGICAL UNIT COMMUNICATION TIME OUT IN WRITEAFTER	(Does not occur.)	
4	A8 02	LOGICAL UNIT COMMUNICATION PARITY ERROR IN WRITEAFTER	(Does not occur.)	
4	A9 00	TRACK FOLLOWING ERROR IN WRITEAFTER	(Does not occur.)	
4	AC 02	WRITE ERROR AUTO-REALLOCATION FAILED IN WRITEAFTE	(Does not occur.)	
4	AE 00	PIN DATA MORETHAN THRESHOLD	(Does not occur.)	
4	AF 00	WRITE ERROR AUTO-REALLOCATIONFAILED BY NO DEFECT SPARE IN WRITEAFTER	(Does not occur.)	
4	B0 00	INTERNAL TARGET ERROR IN WRITEAFTER	(Does not occur.)	
4	B2 00	NO ADDRESS MARK FOUND IN ID FIELD AT WRITEAFTER	(Does not occur.)	
4	B3 00	NO ADDRESS MARK FOUND IN DATA FIELD AT WRITEAFTER	(Does not occur.)	
4	B4 00	NO RECORD FOUND IN WRITEAFTER	(Does not occur.)	
4	B5 02	POSITIONING ERROR DETECTED BY READ OF MEDIUM IN WRITEAFTER	(Does not occur.)	
4	BF 01	DISK DIRECT WRITE BYBATTERY ALARM	(Does not occur.) • Data was written on the disk in the Write-Through mode (without write-after process) because the voltage of the battery for the cache backup became lower than the specified value.	
4	BF 02	DISK DIRECT WRITE BY PIN DATA OVER	(Does not occur.) • Data was written on the disk in the Write-Through mode (without write-after process) because the number of pinned data exceeded the specified value.	

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	BF 03	WRITE THROUGH FOR DMA ERROR	(Does not occur.) • Data was written on the disk in the Write-Through mode (without write-after process) because an DMA failure occurred.	–
4	BF 04	WRITE THROUGH FOR PIN DATA	(Does not occur.) • Data was written on the disk in the Write-Through mode (without write-after process) because pinned data existed in the area where the data was to be written.	
B	C0 00	TIME OUT DETECTED IN CONTROLLER	• A time-out occurred during an internal processing.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
0/B	C0 00	DRR TIME-OUT DETECTED IN QUICK FORMAT PROCESS	• DRR time-out detected in Quick Format process.	
B	C0 01	TIME OUT DETECTED IN HOST DATA TRANSFER	• A time-out occurred during a data transfer between a host computer.	
B	C0 02	TIME OUT DETECTED IN HOST DATA TRANSFER	• A time-out occurred during communication between the Controllers.	
B	C0 03	TIME OUT DETECTED IN HOST DATA TRANSFER	• A time-out occurred during a data transfer between a host computer.	
B	C0 04	A TIME-OUT OF THE QUICK FORMATTING JOB GENERATED BY THE READ COMMAND WAS DETECTED	• A time-out of the Quick Formatting job generated by the read command was detected.	
B	C0 04	A TIME-OUT OF THE QUICK FORMATTING JOB GENERATED BY THE WRITE COMMAND WAS DETECTED	• A time-out of the Quick Formatting job generated by the write command was detected.	
B	C0 0A	CRC ERROR DETECTED IN HOST DATA TRANSFER	• A CRC error occurred during a data transfer between a host computer.	
B	C1 00	CACHE MEMORY UNASSIGNED FOR FORMAT	• The cache necessary for the formatting cannot be assigned.	
B	C2 00	SYSTEM DRIVE CHANGED	• The system current drive was changed	
5	DA 00	DRIVE RECOVERY REQUEST IS REJECTED, SINCE ANOTHER DRIVE RECOVERY IN PROCESS	• The new data recovery request cannot be accepted because another Disk Drive is being recovered	
6	DB 00	ONLINE RECOVERY COMMAND ABORTED	(Does not occur.)	–
6	E0 00	BATTERY ALARM	(Does not occur.)	
6	E2 00	FAN ALARM	(Does not occur.)	
4	E4 00	NVS INTERNAL TABLE OVERFLOW, WRITE INCOMPLETE MANAGEMENT AREA	• The system area overflowed(*1). (Pinned data management area)	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
6	E5 00	POWER SUPPLY FAILURE	(Does not occur.)	–
6	E5 01	DC VOLTAGE DECREASED	(Does not occur.)	
4	E8 00	SYSTEM FLOPPY DISK ERROR	(Does not occur.)	
4	E9 00	BACK UP FLOPPY DISK ERROR	(Does not occur.)	

*1 : In the case where WAR = 1 in the Mode Select command when reporting the sense code to a host, Sense key: 4/ Code: F804 $_H$ are also reported.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	EA 00	CONTROL INFORMATION WRITE ERROR ON A DISK	(Does not occur.) • There was a Disk Drive on which the take-over information could not be written.	–
4	EA 01	PROGRAM SIZE OUT OF RANGE	• The program size which the write buffer received was larger than that of the program area.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	EA 02	CONTROL INFORMATION SIZE OUT OF RANGE	• The take-over information size which the write buffer received was larger than that of the take-over information of the system.	
5	EA 03	ONLINE MICROPROGRAM DOWNLOAD ERROR	• A microprogram download error was detected.	
5	EA 04	ONLINE MICROPROGRAM REPLACEMENT ERROR	• An error was detected when online microprogram replacement was specified.	
1	EA 05	PARTIALLY COMPLETED ONLINE MICROPROGRAM DOWNLOAD	• A microprogram installation is in the state in which it has been partially completed.	
4	EA 10	MICROPROGRAM DOWN GRADE CHECK ERROR	• An error in the microprogram downgrade check.	
5	EA 13	MICROPROGRAM UPGRADE CHECK ERROR	• An error in the microprogram upgrade check.	
5	EA 14	IN THE CASE OF THE HIGH-SPEED SEQUENTIAL WRITE MODE IS ON, THE DOWN GRADE UNDER ON IS GUARDED	• A downgrade was made though the high-speed sequential write mode was turned on.	Replace the microprogram after turning off the high-speed sequential write mode.
5	EA 15	RANDOM SIMPLE EFFECTIVELY BUFFER SIZE 0% SPECIFICATION WAS NOT CONCERNED, BUT THE DOWN GRADE WAS CARRIED OUT	• A downgrade was made though a specification for the random simple buffer size as 0% was validated.	Replace the microprogram after invalidating the size of the random simple buffer specified as 0%.
5	EA 16	MICRO DOWNGRADE EXECUTION DURING 16 OR MORE SPARE DRIVE USE US IMPOSSIBLE	• 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	THE MICRO DOWN GRADE EXECUTION BY FC CASE / SATA CASE MIXTURE IS IMPOSSIBLE	• 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 30	A COMMAND CAN'T BE CARRIED OUT FOR THE ABNORMALITY LOOP	• The ENC microprogram download or replacement in the online mode could not be performed because of a loop trouble or the Single mode.	Perform the ENC microprogram download or replacement in the online mode after solving the loop trouble.
5	EA 31	A COMMAND CAN'T BE CARRIED OUT FOR ENC MICROCODE EXCHANGE	• The command cannot be executed because ENC microprogram replacement in the online mode is in progress.	Execute the command after the ENC microprogram replacement in the online mode is completed.
5	EA 32	ENC MICROCODE DOWNLOAD CANNOT BE PERFORMED	• The ENC microprogram download in the online mode cannot be performed.	Perform the ENC microprogram download in the online mode again.
5	EA 33	ENC MICROCODE DOWNLOAD REVISION CHECK ERROR	• A revision check error occurred in the ENC microprogram download in the online mode.	Check the ENC microprogram revision again and perform the ENC microprogram download in the online mode again.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
5	EA 34	ENC MICROCODE DOWNLOAD SUM CHECK	• A sum check error occurred in the ENC microprogram download in the online mode occurred.	Check the ENC microprogram again and perform the ENC microprogram download in the online mode again.
5	EA 35	ENC MICROCODE DOWNLOAD IS NOT PERFORMED	• The ENC microprogram replacement in the online mode cannot be performed because the ENC microprogram download in the online mode has not been performed.	Perform the microprogram replacement in the online mode after performing the ENC microprogram download in the online mode.
5	EA 36	ENC MICROCODE EXCHANGE PARAMETER INJUSTICE	• A parameter for the ENC microprogram replacement in the online mode is illegal.	Perform the ENC microprogram replacement in the online mode again.
5	EA 40	SINCE AUTOMATIC DOWNLOAD OPTION IS ENABLE A COMMAND CONNOT BE EXECUTED	• The command cannot be executed because the automatic download option is enabled.	Disable the option and execute the command again.
5	EA 41	SINCE AUTOMATIC DOWNLOAD IS EXECUTING, A COMMAND CANNOT BE EXECUTED	• The command cannot be executed because the automatic download is being executed.	Execute the command after the automatic download is completed.
4	F4 00	CACHE MEMORY FAILURE	• The cache module was blocked because a Cache memory error occurred.	Replace the Cache Unit. (MNTE 05-0470)
4	F6 10	DRIVE SEEK RECOVERED ERROR	• A Disk Drive emerged in which the number of recovered mechanical errors exceeded the threshold value(*1).	Replace the Disk Drive. (MNTE 05-0120)
4	F6 11	DRIVE SEEK UNRECOVERED ERROR	• A Disk Drive emerged in which the number of unrecovered mechanical errors exceeded the threshold value(*1).	
4	F6 20	DRIVE MEDIUM RECOVERED ERROR	• A Disk Drive emerged in which the number of recovered medium errors exceeded the threshold value(*1).	
4	F6 21	DRIVE MEDIUM UNRECOVERED ERROR	• A Disk Drive emerged in which the number of unrecovered medium errors exceeded the threshold value(*1).	
4	F6 30	DRIVE R/W RECOVERED ERROR	• • A Disk Drive emerged in which the number of recovered R/W errors exceeded the threshold value(*1).	
4	F6 31	DRIVE R/W UNRECOVERED	• A Disk Drive emerged in which the number of unrecovered R/W errors exceeded the threshold value(*1).	
4	F6 40	DRIVE I/F RECOVERED ERROR	• A Disk Drive emerged in which the number of recovered interface errors exceeded the threshold value(*1).	
4	F6 41	DRIVE I/F UNRECOVERED ERROR	• A Disk Drive emerged in which the number of unrecovered interface errors exceeded the threshold value(*1).	
4	F6 50	DRIVE CONTROLLER HARD RECOVERED ERROR	• A Disk Drive emerged in which the number of recovered hardware errors exceeded the threshold value(*1).	
4	F6 51	DRIVE CONTROLLER HARD UNRECOVERED ERROR	• 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.

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	F6 70	ONLINE VERIFY CORRECTABLE ERROR	• A Disk Drive emerged in which the number of correctable errors in the online verify exceeded the threshold value(*1).	Replace the Disk Drive. (MNTE 05-0120)
4	F6 71	ONLINE VERIFY UNCORRECTABLE ERROR	• A Disk Drive emerged in which the number of uncorrectable errors in the online verify exceeded the threshold value(*1).	
4	F8 00	BATTERY ALARM	• Battery failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Backup Battery Unit. (MNTE 05-0260)
4	F8 01	FAN ALARM	• Fan failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Fan Assembly. (MNTE 05-0320)
4	F8 02	DC POWER SUPPLY FAILURE	• DC failure(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Power Unit (Power Unit (DC)). (MNTE 05-0340)
4	F8 03	DRIVE FAILURE	• Drive failure (regression)(*1)	Specify a part to be replaced by checking the log message of the subsystem and replace the Disk Drive. (MNTE 05-0120)
4	F8 04	PIN DATA OVER	• Pin data over(*2)	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	F8 05	CACHE MEMORY FAILURE	• Module blockade(*2)	Specify a part to be replaced by checking the log message of the subsystem and replace the Cache Unit. (MNTE 05-0470)
4	F8 07	AC LINE/IN BOX FAILURE	(Does not occur.)	–
4	F8 08	UPS FAILURE	• 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.)
4	F8 09	BK FAILURE	• Battery backup circuit failure	Specify a part to be replaced by checking the log message of the subsystem and replace the Backup Battery Unit. (MNTE 05-0260)
4	F8 0A	SW P/K UNIT FAILURE	• ENC blockade	Specify a part to be replaced by checking the log message of the subsystem and replace the ENC Unit. (MNTE 05-0560)

*1 : The sense code is reported to the host only when WAR = 1 in the Mode Select command (page35_H).

*2 : The sense code is reported to the host only when RCVRV = 1 in the Mode Select command (page35_H).

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	F8 0B	LOOP FAILURE	• Loop failure	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
4	F8 0C	PATH ALARM	• A path detachment occurred.	Replace the LOOP.
4	F8 0D	SATA DRIVE FAILURE	• SATA Drive failure (regression)	Specify a part to be replaced by checking the log message of the subsystem and replace the Disk Drive. (MNTE 05-0120)
4	F8 0E	SENC FAILURE	• SENC failure	Specify a part to be replaced by checking the log message of the subsystem and replace the ENC Unit/SENC Unit. (MNTE 05-0640)
4	F8 F0	ANOTHER CONTROLLER NOT READY	• The controller of another system was blocked(*1).	Get the CTL alarm trace (MNTE 02-2220) of the detached Control Unit and replace the Control Unit (MNTE 05-0380).
4	F9 00	BATTERY RECOVERY	• Battery failure recovery(*1)	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
4	F9 01	FAN RECOVERY	• Fan failure recovery(*1)	
4	F9 02	DC POWER SUPPLY RECOVERY	• DC failure recovery(*1)	
4	F9 03	DRIVE RECOVERY	• Drive failure (regression) recovery(*1)	
4	F9 04	PIN DATA RECOVERY	• Pin data over recovery(*1)	
4	F9 05	CACHE MEMORY RECOVERY	• Module blockade release(*1)	
4	F9 06	OWN CONTROLLER RECOVERY	• Own Controller recovery(*1)	
4	F9 07	AC LINE/ IN BOX RECOVERY	(Does not occur.)	–
4	F9 08	UPS FAILURE RECOVERY	• UPS failure recovery	This is not failure. If this error code frequently appears, collect Simple trace and request the appropriate section to analyze the failure.
4	F9 09	BK FAILURE RECOVERY	• Battery backup circuit failure recovery	
4	F9 0A	SW P/K UNIT RECOVERY	• ENC failure recovery	
4	F9 0B	LOOP RECOVERY	• Loop failure recovery	
4	F9 0C	PATH RECOVERY	• The path recovered from the detachment.	
4	F9 0D	SATA DRIVE RECOVERY	• SATA Drive failure (regression) recovery	
4	F9 0E	SENC RECOVERY	• SENC failure recovery	
4	F9 F0	ANOTHER CONTROLLER RECOVERY	• Another system Controller failure recovery	
4	FA 00	LOGICAL UNIT INTERNAL ERROR	(Does not occur.)	–
4	FB 00	LOGICAL UNIT INTERFACE UNMATCH	(Does not occur.)	

*1 : The sense code is reported to the host only when RCVRV = 1 in the Mode Select command (page35_H).

Copyright © 2002, 2005, Hitachi, Ltd.

Sense key	Sense code	Error name	Description	Recovery Procedure
4	FC 00	LOGICAL UNIT INTERFACE ERROR	(Does not occur.)	–
B	FD 00	COMMAND NOT EXECUTED BY CHANGING LOGICAL UNIT	• Command execution was disabled because the LU was switched.	Collect Simple trace and request the appropriate section to analyze the failure and take a measure.
B	FD 01	COMMAND PAUSE BY CHANGING LOGICAL UNIT	• The command execution was interrupted owing to an LU switching.	

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

2.7.2 List of detail codes of sense code (05/9FFF)

Detail code	DAMP(*1) indication	Recovery procedure	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. Define the 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 Management function for all ports, and then lock or disable the LUN Management function.	–
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 511.	–
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.	–
02000B	DMED02000B : The process cannot be performed because the Multiple Stream Mode of system parameter is disabled. Please set the Multiple Stream Mode to enable then try again.	Validate the multiple stream mode or the multiple streaming for RD mode.	–

*1 : Disk Array Management Program.

Copyright © 2002, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
030001	DMED030001 : The specified LU is already invalid. Confirm the LU status and try again.	Check if the specified LUN is the same as the LUN you wanted to invalidate. Besides, check if the specified LUN is not invalidated.	–
030002	DMED030002 : The number of LU reached the maximum. Delete unnecessary LUs and try again.	Check the LUN organization.	–
030003	DMED030003 : The specified LU is not invalid. Specify the invalid LU and try again.	Execute the LU reallocation again after invalidating the specified LU.	•For the LU invalidation, refer to Procedure ③-E, “Invalidate LU” on page INST 05-0621. •For the LU reallocation, refer to Procedure ③-G, “Reallocate LU” on page INST 05-0625.
030004	DMED030004 : The specified LU capacity is equal to or more than the capacity of original LU. Confirm the LU capacity and try again.	Specify the LU capacity as a multiple of 512 kbytes × n (n is a component of the description, “nD +mP”) and smaller than the capacity of the LU concerned.	–
030006	DMED030006 : The specified LU is not invalid. Specify the invalid LU and try again.	Execute the restoration again after invalidating the specified LU.	•For the LU invalidation, refer to Procedure ③-E, “Invalidate LU” on page INST 05-0621. •For the LU reallocation, refer to Procedure ③-F, “Restoration LU” on page INST 05-0623.
030007	DMED030007 : The specified LU is unformatted. Specify a formatted LU and try again.	Allocate all the areas by reallocating the LUs.	•For the LU reallocation, refer to Procedure ③-G, “Reallocate LU” on page INST 05-0625.
030008	DMED030008 : The number of LU reached the maximum. Delete unnecessary LUs and try again.	Check the LU configuration.	–
030009	DMED030009 : The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.	Make the setting again after canceling the residence of the specified LU.	–
03000A	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.	Check the LU configuration.	–
03000B	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.	Make the invalidation of the LU again changing the access level to the normal mode.	•For the LU invalidation, refer to Procedure ③-E, “Invalidate LU” on page INST 05-0621.

*1 : Disk Array Management Program.

Copyright © 2004, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
040001	DMED040001 : The specified LUs contain Sub LU. Confirm the LU status and try again.	When formatting the unified LU, specify the Main LU.	–
040005	DMED040005 : The specified LUs contain invalid LU. Confirm the LU status and try again.	The registered LUs include invalidated LU(s). Restore the LU(s) or execute the “allocation of all areas” by reallocating the LU(s), and then execute the batch formatting again.	•For the LU invalidation, refer to Procedure ③-E, “Invalidate LU” on page INST 05-0621. •For the LU reallocation, refer to Procedure ③-G, “Reallocate LU” on page INST 05-0625. •For the LU reallocation, refer to Procedure ③-I, “Formatting LU” on page INST 05-0650.
040006	DMED040006 : Someone already logged in. Set password protection function to disabled and try again.	Re-execute the batch formatting after disabling the password protection, and then enable the password protection again after the batch formatting is completed.	•For the LU reallocation, refer to Procedure ③-I, “Formatting LU” on page INST 05-0650.
040008	DMED040008 : Format of the logical unit cannot be performed under drive blockage mode. Please turn off the drive blockade mode system parameter.	Re-execute the batch formatting after turning off the drive blockade mode, and then turn on the drive blockade mode again after the batch formatting is completed.	•For the LU reallocation, refer to Procedure ③-I, “Formatting LU” on page INST 05-0650.
040009	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.	Make the batch formatting again after changing the access level to the normal mode.	•For the LU reallocation, refer to Procedure ③-I, “Formatting LU” on page INST 05-0650.
050001	DMED050001 : The process cannot be performed because the specified LU is in a PIN exceeded state. Restore PIN data and try again.	The controller that controls the LU cannot be changed because the number of pinned segments exceeded its threshold value. Eliminate the pinned segments of the specified LU referring to Section 2.4, "Details of Recovery Procedures," and then change the controller that controls the LU again.	–
050002	DMED050002 : The process cannot be performed because another LU is changing the Default Controller. Wait for a while and then try again.	Change the controller that controls the LU 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.	Change the controller that controls the LU again after waiting for a while.	–
050004	DMED050004 : The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.	Retry after eliminating the Turbo or reserved Turbo LU.	–
070001	DMED070001 : Cannot set dual ID success because either mounted numbers or types of the host interface boards are different between controllers. Confirm the interface boards status and try again.	Make the numbers of installed I/F boards of Control Unit the same, and then set the dual ID success mode again.	–
070002	DMED700002 : The specified IP address is incorrect. Please specify a right IP address	Set a correct IP address.	–
070003	DMED700003 : The specified default gateway address is incorrect. Please specify a right default gateway address.	Set a correct default gateway.	–

*1 : Disk Array Management Program.

Copyright © 2004, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
070004	DMED700004 : The High-speed Sequential Write Mode cannot be disabled. Please use the system parameter setting with reboot.	The High-speed Sequential Write Mode cannot be disabled because process of Write command from the hosts is not completed. Please wait for a while and then try again, or use the system parameter setting with reboot.	–
070005	DMED700005 : The Multiple Stream Mode and the High-speed Sequential Write Mode cannot be specified at the same time.	Since both system parameters, the Multi-Stream mode and the High-Speed Sequential Writing mode, are turned on, reset either of them only.	–
080001	DMED080001 : The data pool cannot be used. Please restart the subsystem.	Restart 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 511 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 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 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.	–
08000E	DMED08000E : The process cannot be performed because the specified logical unit is a part of QuickShadow pair. Cancel the QuickShadow pair and try again.	Split the specified LU from the QuickShadow pair, and then assign it to the data pool.	–
08000F	DMED08000F : The process cannot be performed because the specified logical unit is defined as a Snapshot image. Specify another logical unit and try again.	The specified LU is a Snapshot image. Check the LU structure.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
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.	–
080013	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.	Assign it to the data pool again after waiting for a while.	–
080014	DMED080014 : The process cannot be performed because other logical unit is changing the Default Controller. Wait for a while and then try again.	Assign it to the data pool again after waiting for a while.	–
080015	DMED080015 : The process cannot be performed because the specified logical unit is in the PIN exceeded state. Restore PIN data and try again.	The assign it to the data pool cannot be set because the number of pinned segments exceeded its threshold value. Eliminate the pinned segments of the specified LU referring to Section 2.4, "Details of Recovery Procedures," and then set the assign 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 QuickShadow pair exists in the specified data pool. Cancel the QuickShadow 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 %.	–
08001C	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.	The pool LU capacity is set to less than 2 GB. Set the specified LU capacity to 2 GB or more and execute it.	–
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 afain.	–
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.	

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
080021	DMED080021: The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess LU, and then try again.	Release the Turbo LU of the LU specified for the pool LU, and execute it again.	–
080023	DMED080023 : The logical units in the data pool cannot be mixed with ones in Unit0 or in the latter units.	Execute again by specifying the LU on the drive of the same type.	–
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 511.	–
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 511.	–
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 pair, and then set the Snapshot image.	–
09000D	DMED09000D : The process cannot be performed because the specified P-VOL is a part of TrueCopy pair. Cancel the TrueCopy pair and try again.	Split the LU assigned to the P-VOL from the TrueCopy pair, and then set the Snapshot image.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
09000E	DMED09000E : The process cannot be performed because the specified P-VOL is a part of QuickShadow pair. Cancel the QuickShadow pair and try again.	Split the LU assigned to the P-VOL from the QuickShadow 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.	–
090014	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.	Set the Snapshot image again after waiting for a while.	–
090015	DMED090015 : The process cannot be performed because other logical unit is changing the Default Controller. Wait for a while and then try again.	Set the Snapshot image again after waiting for a while.	–
090016	DMED090016 : The process cannot be performed because the specified P-VOL is in the PIN exceeded state. Restore PIN data and try again.	The Snapshot image cannot be set because the number of pinned segments exceeded its threshold value. Eliminate the pinned segments of the specified LU referring to Section 2.4, "Details of Recovery Procedures," and then set the Snapshot image again.	–
090018	DMED090018 : The process cannot be performed because the specified Snapshot image has been creating the pair. Cancel the QuickShadow pair and try again.	Split the pair of the specified Snapshot image, and then perform the elimination again.	–
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 QuickShadow pair reached the maximum. Delete unnecessary QuickShadow 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 QuickShadow is shortage. Delete unnecessary QuickShadow pair(s) and try again.	Execute again after deleting unnecessary QuickShadow pairs.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
09001F	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.	Execute again by specifying the V-VOL on the drive of the same type.	–
090020	DMED090020: The process cannot be performed because the specified LU is a FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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 pair.	–
090023	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.	Execute it again after canceling the Hi-Copy pair.	–
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 performing. Please wait a moment and then try again.	Make the setting of the access level again after the reverse resynchronization is completed.	–
0A0008	DMED0A0008 : The process cannot be performed because QuickShadow is performing. 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.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
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 QuickShadow 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, then 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, then 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, then 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.	–
0C0004	DMED0C0004 : The logical unit in Unit0 cannot be unified with the latter units.	Execute again by specifying the LU on the drive of the same type.	–
0D0001	DMED0D0001 : 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.	Make the setting of Priced Optional Features again after changing the access level to the normal mode.	–
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, then try again.	Execute the LU deletion again during LU deleting after changing the access level to the normal mode. Execute the V-VOL deletion again during V-VOL deleting.	–
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, then 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.	–
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, then try again.	Retry after changing the access level to the normal mode.	–
100002	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.	Retry after specifying an LU whose RAID level is other than RAID 0.	–
100003	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.	Retry after dissolving the unified LU or make an ordinary formatting.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
100004	DMED100004 :The process cannot be performed because the specified logical unit is extended and not formatted. Please execute online/offline formatting.	Make an ordinary formatting.	–
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.	–
130001	DMED130001 : The process cannot be performed because the path is not set up.	Set the time-out value after the path is defined.	–
200001	DMED200001 : The process cannot be performed because cache memory size 1GB or less. Please increase the cache memory and try again.	Make the cache capacity 1 GB or larger (for the RKH/RKHE only).	–
200002	DMED200002 : This function is unsupported in the single-controller system	Review the system configuration.	–
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.	–
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.	–

*1 : Disk Array Management Program.

Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
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 restoration by means of parity is required.)	–
400002	DMED400002 : The process cannot be performed because the specified logical units contain V-VOL of QuickShadow. 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 restoration by means of parity 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 restoration by means of parity specifying a parent LU of a unified LU.	–
400005	DMED400005 : The process cannot be performed because the specified logical units contain an invalid LU. Confirm the logical unit status and try again.	Remove the hiding after giving instructions to skip, and then instruct again to make a restoration by means of parity.	–
400006	DMED400006 : The process cannot be performed because the specified logical unit contain a blocked drive. Confirm the drive status and try again.	Issue an instruction to make the restoration by means of parity after the drive is recovered.	–
400007	DMED400007 : The process cannot be performed because ShadowImage, TrueCopy, or QuickShadow is performed. Please wait a moment and then try again.	Instruct again to make a restoration by means of parity 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. It is completed and try again.	As to an LU for which the restoration by means of parity 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 restoration by means of parity 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. It is completed and try again.	Instruct to skip the restoration or make the restoration by means of parity and wait for completion of the restoration. Retry after performing the operation above.	–

*1 : Disk Array Management Program.

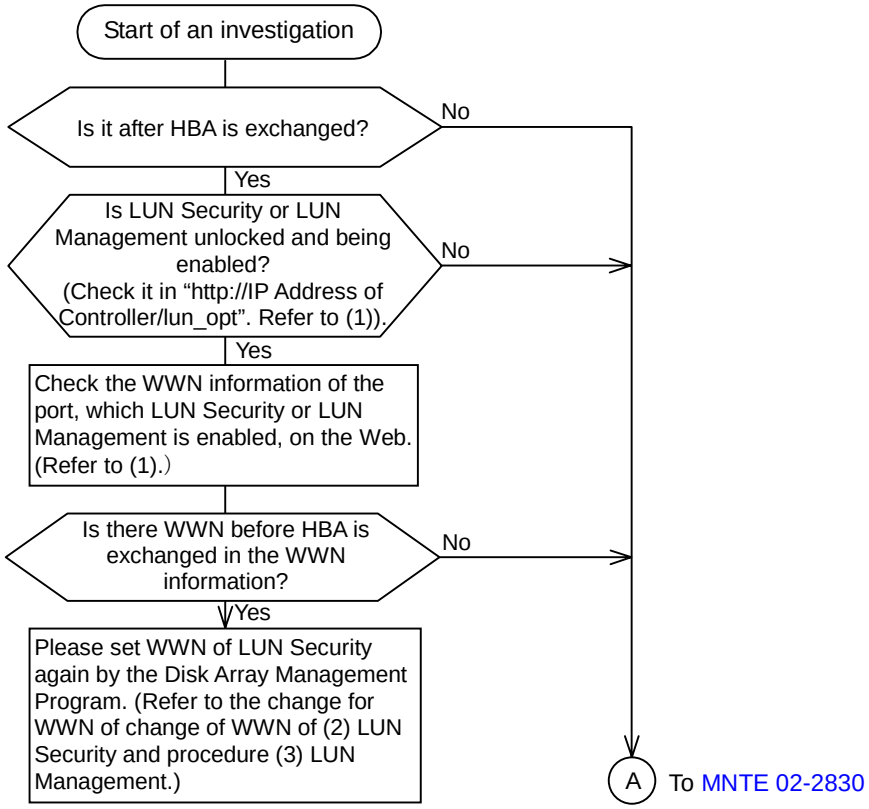
Copyright © 2003, 2005, Hitachi, Ltd.

Detail code	DAMP(*1) indication	Recovery procedure	Reference page
400013	DMED400013: The process cannot be performed because parity correction is not completed. It is completed and try again.	Issue an instruction to make or skip the restoration by means of parity 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. It is completed and try again.	Issue an instruction to make or skip the restoration by means of parity 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. It is completed and try again.	Issue an instruction to make or skip the restoration by means of parity 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 restoration by means of parity 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 restoration by means of parity 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 restoration by means of parity 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 restoration by means of parity 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 FlashAccess LU or a reserved FlashAccess LU. Disable the FlashAccess LU or the reserved FlashAccess 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.	–

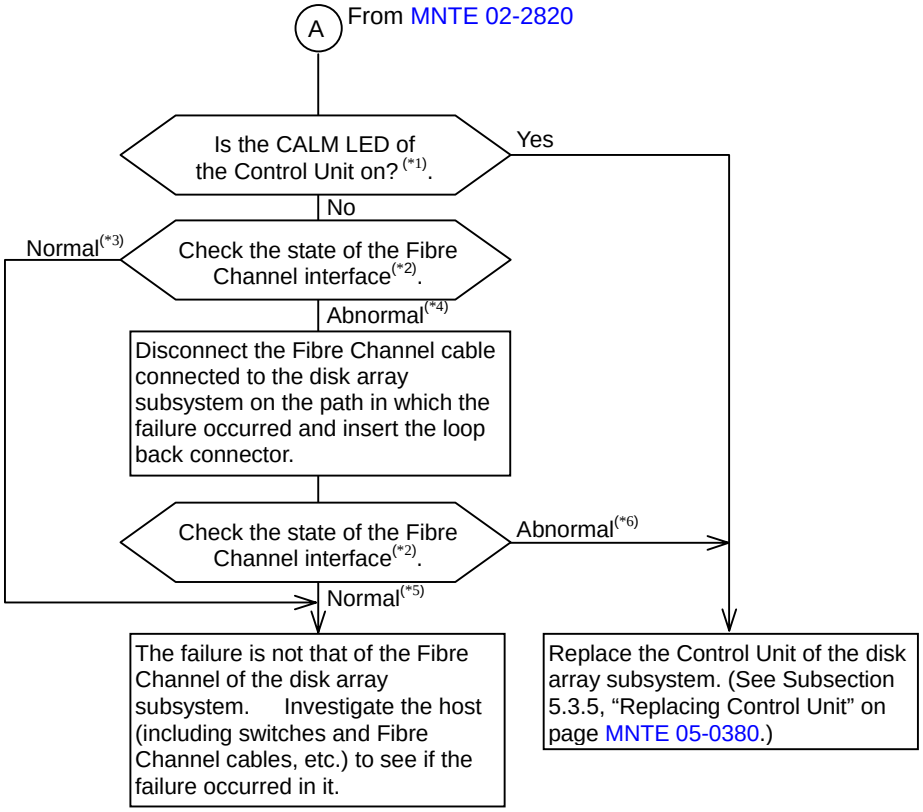
Copyright © 2003, 2005, Hitachi, Ltd.

2.8 Procedure for Investigating Disk Array Subsystem Regarding Fibre Channel Failure

When a failure occurs in a Fibre Channel loop between a host computer and the disk array subsystem, judge whether or not the failure has occurred in the interface portion of the disk array subsystem following the flowchart shown below.



Copyright © 2003, 2005, Hitachi, Ltd.



*1 : Refer to Table 2.6.5, "LED Indication Patterns on Control Unit (RK/RKL/RKS/RKD/RKSD)" on page MNTE 02-2430 in Item (4-1) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part".

*2 : Refer to Table 2.6.7 "LED Indication Patterns on Control Unit (Fibre Channel)" on page MNTE 02-2460 in Item (4-3) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part".

*3 : This is the status of No. 1 to No. 3 in Table 2.6.7, "LED Indication Patterns on Control Unit (Fibre Channel)" on page MNTE 02-2460 in Item (4-3) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part".

*4 : This is the status of No. 4 to No. 7 in Table 2.6.7, "LED Indication Patterns on Control Unit (Fibre Channel)" on page MNTE 02-2460 in Item (4-3) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part".

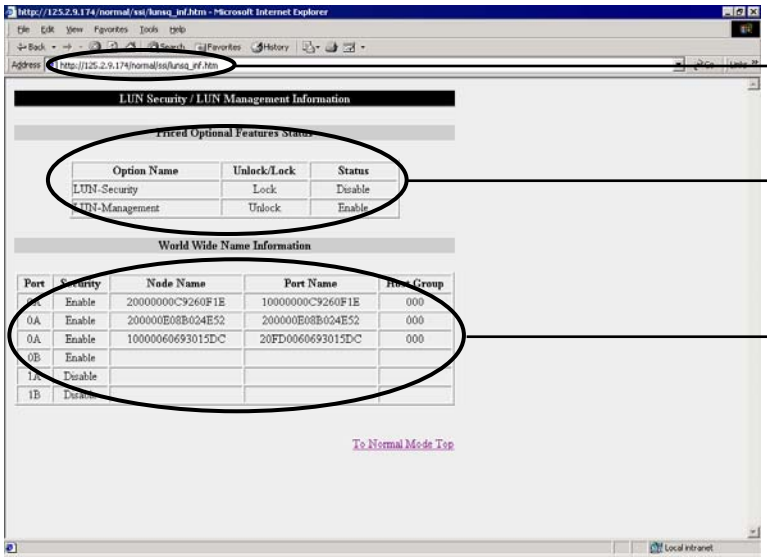
*5 : This is the status of No. 1 in Table 2.6.7, "LED Indication Patterns on Control Unit (Fibre Channel)" on page MNTE 02-2460 in Item (4-3) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part."

*6 : This is the status of No. 2 to No. 7 in Table 2.6.7, "LED Indication Patterns on Control Unit (Fibre Channel)" on page MNTE 02-2460 in Item (4-3) of Subsection 2.6.2, "Troubleshooting Based on LED Indication of Each Part".

Copyright © 2003, 2005, Hitachi, Ltd.

(1) World Wide Name of LUN Security and LUN Management
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].

Micro revision 065x

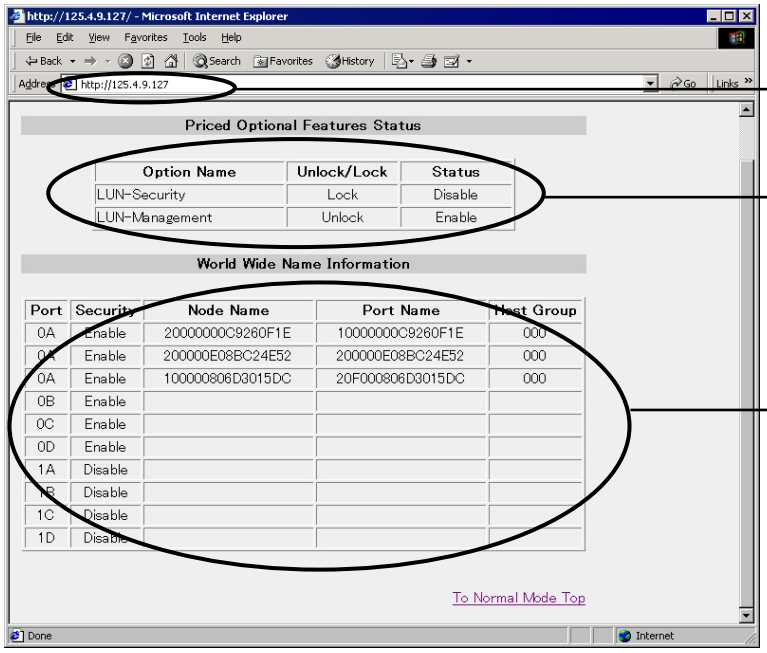


http://IP address of controller/lun_opt

unlock and lock state display
enable and disable state display

Display of state of security of each port, name of node, name of port, and host group

Micro revision 1654 or later



http://IP address of controller/lun_opt

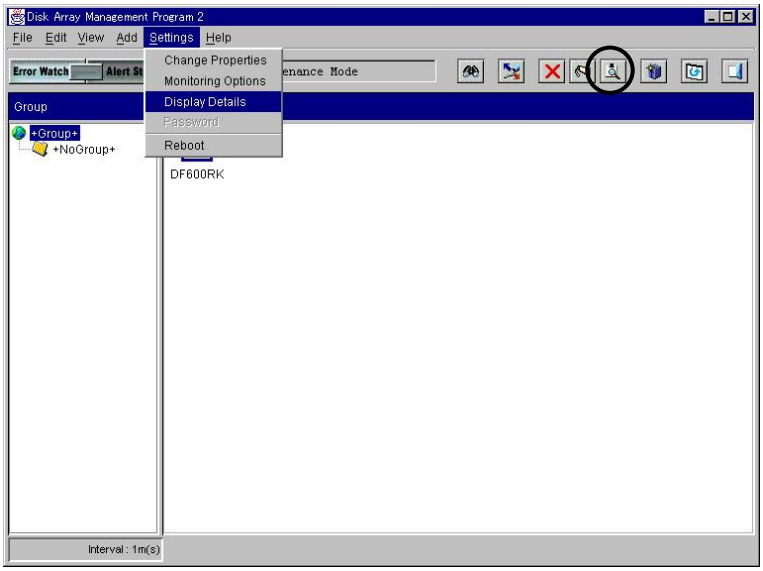
unlock and lock state display
enable and disable state display

Display of state of security of each port, name of node, name of port, and host group

Copyright © 2003, 2005, Hitachi, Ltd.

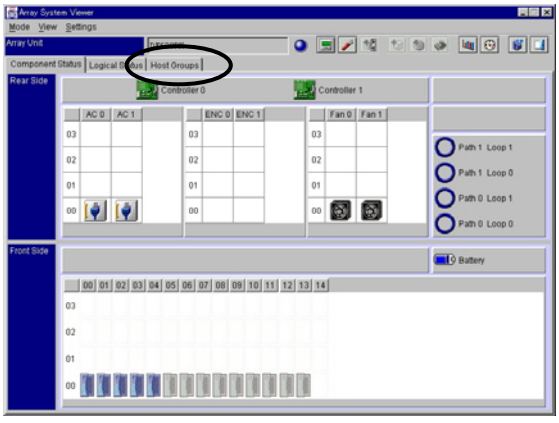
(2) Change of WWN of host HBA of LUN Security

(a) Turn on the power supply.
(b) Start the Disk Array Management Program 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 setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Display Details]

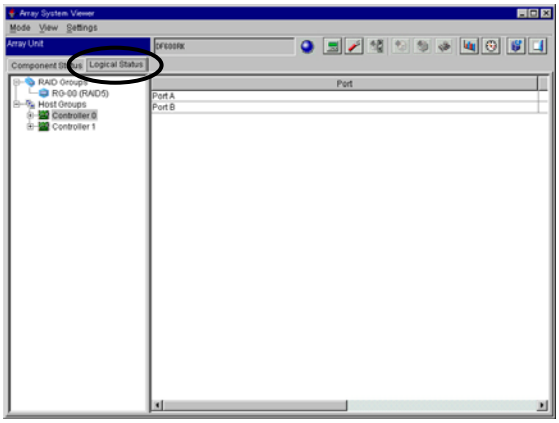


(d) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

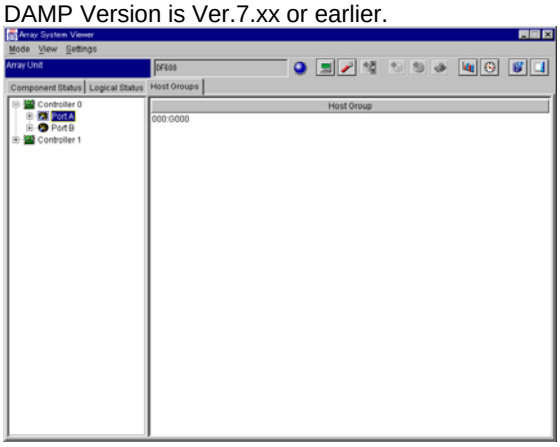


‡1 : For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), "Changing the Maintenance Mode" on page INST 05-0050.

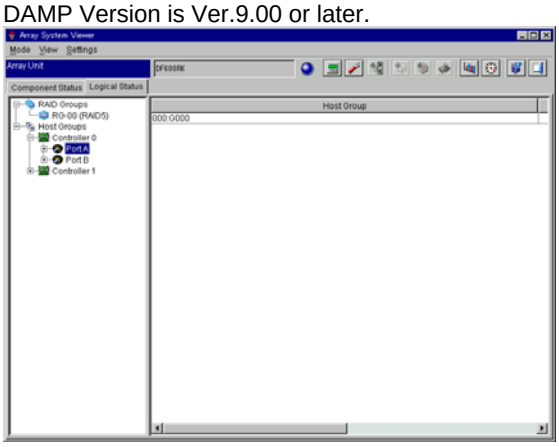
Copyright © 2003, 2005, Hitachi, Ltd.

(e) Click the port you want to change the WWN Information.

DAMP Version is Ver.7.xx or earlier.

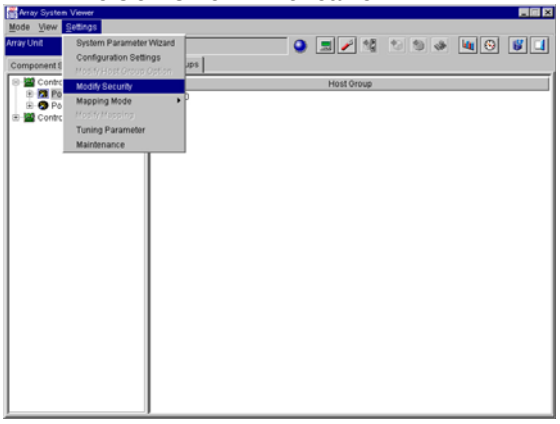


DAMP Version is Ver.9.00 or later.

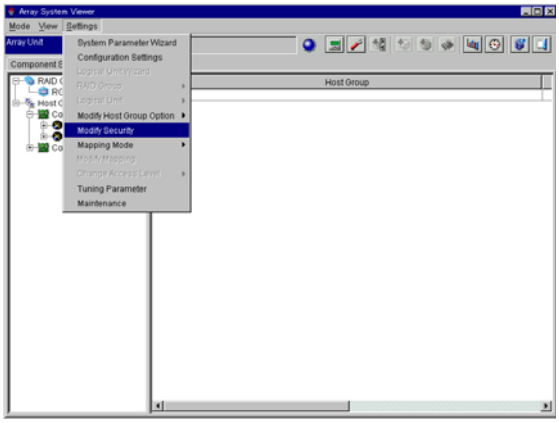


(f) Selecting [Settings] – [Modify Security].

DAMP Version is Ver.7.xx or earlier.

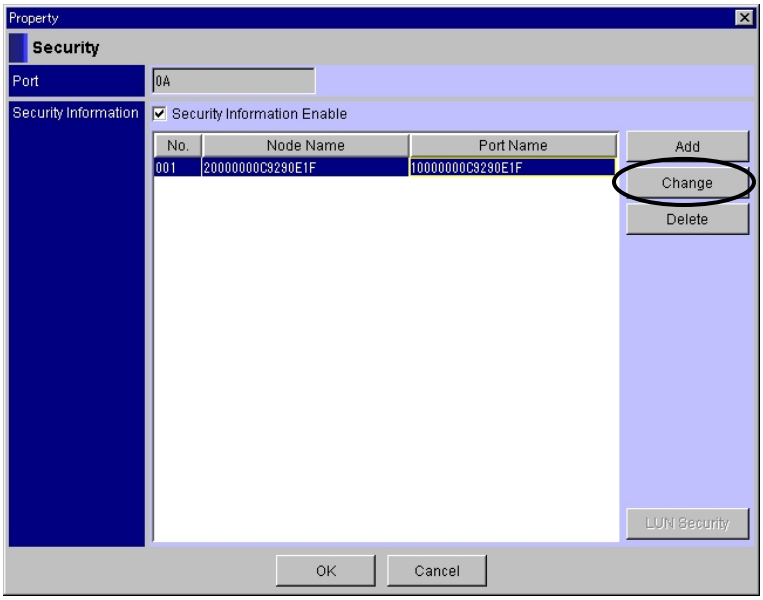


DAMP Version is Ver.9.00 or later.

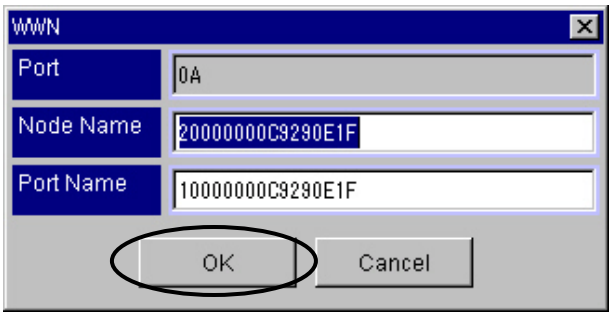


Copyright © 2003, 2005, Hitachi, Ltd.

(g) Click the change the security information about the ports in the Security Information box. Click the [Change] button.

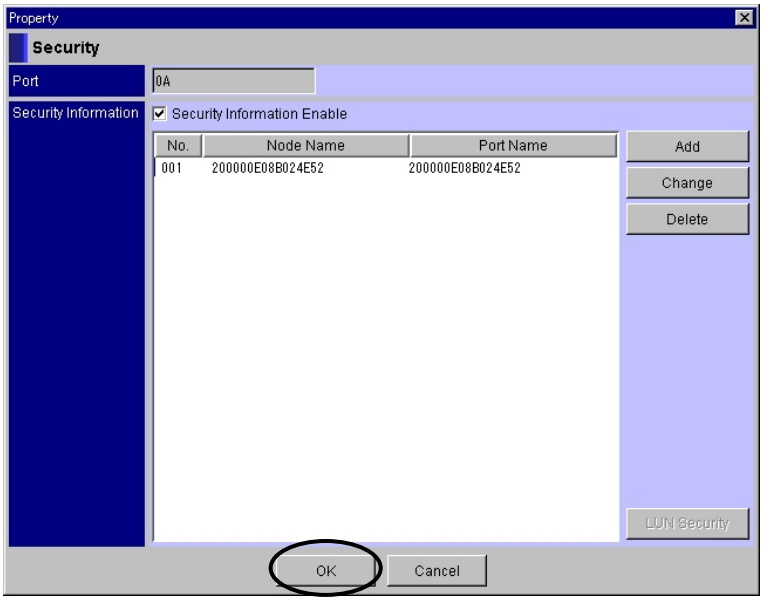


(h) Enter the [Node Name] and [Port Name] of the host's WWN from the keyboard. Click the [OK] button.
[Node Name] and [Port Name] are 16 hexadecimal digits.

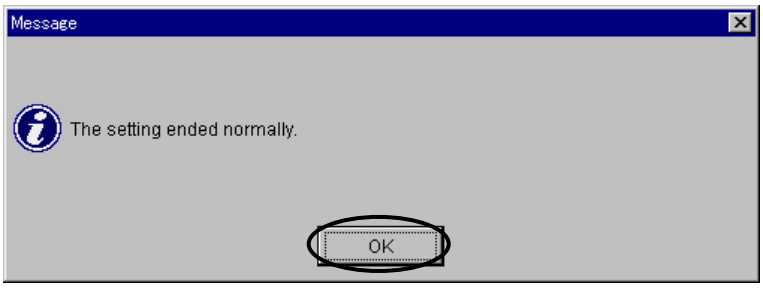


Copyright © 2003, 2005, Hitachi, Ltd.

(i) The [Security] dialog box displays the contents set.
(j) After [Security information Enable] is checked, the [OK] button is clicked.



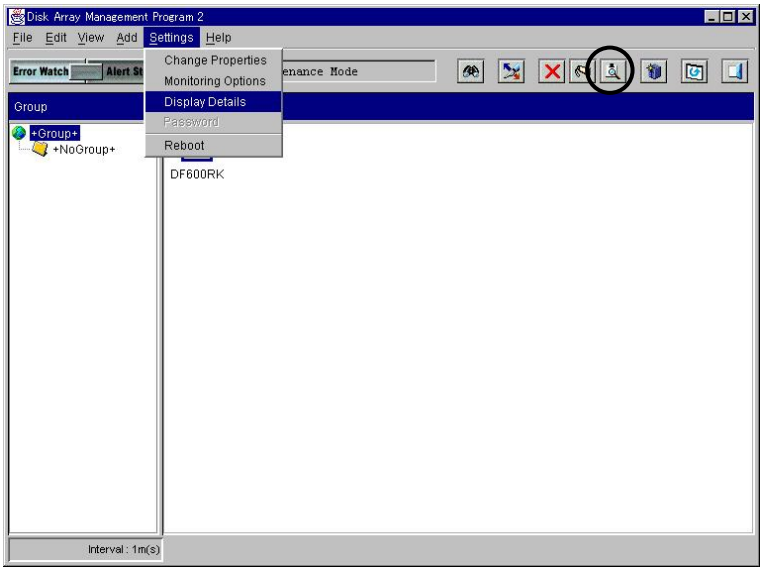
(k) The message appears. Click the [OK] button.



Copyright © 2003, 2005, Hitachi, Ltd.

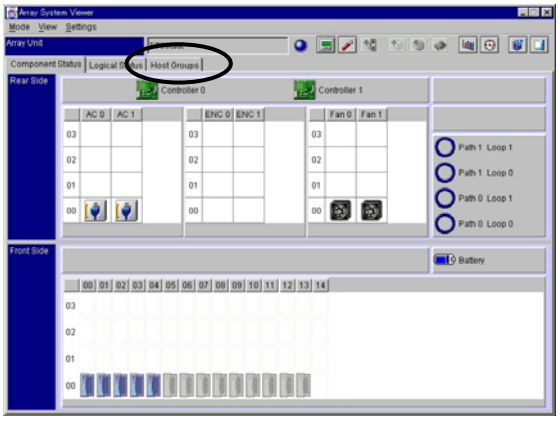
(3) Change of WWN of LUN Management

(a) Turn on the power supply.
(b) Start the Disk Array Management Program 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 setting as shown below.
- Selecting [Settings] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]

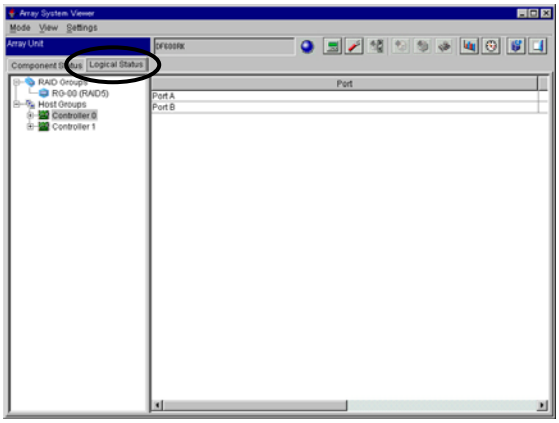


(d) DAMP Ver.7.xx or earlier: On the unit window, click the [Host Groups] tab.
DAMP Ver.9.00 or later: On the unit window, click the [Logical Status] tab.

DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.

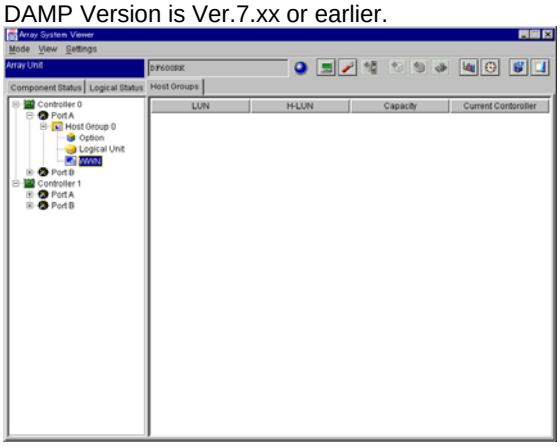


‡1 : For details of the setting method, refer to the Subsection 5.1.1 (3)-(b), "Changing the Maintenance Mode" on page INST 05-0050.

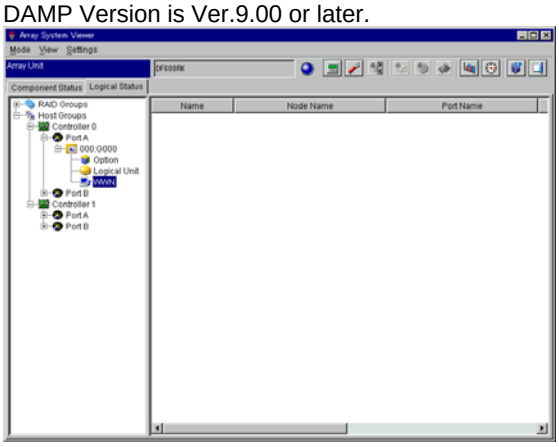
Copyright © 2003, 2005, Hitachi, Ltd.

(e) Select a WWN icon.

DAMP Version is Ver.7.xx or earlier.

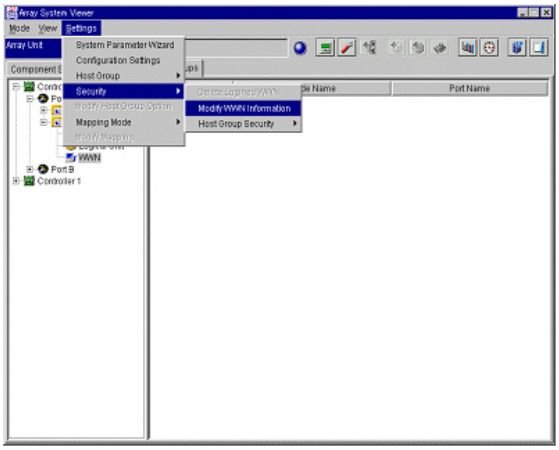


DAMP Version is Ver.9.00 or later.

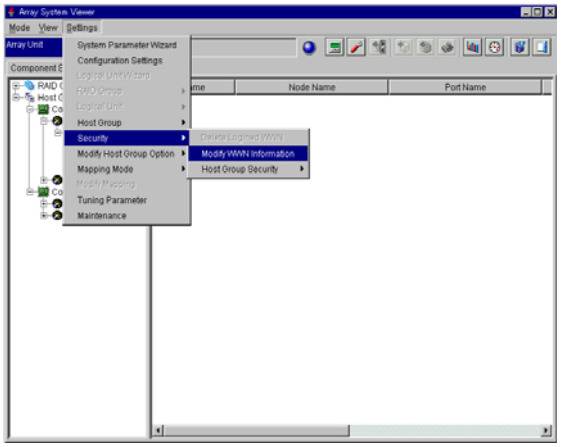


(f) Selecting [Settings] – [Security] – [Modify WWN Information].

DAMP Version is Ver.7.xx or earlier.

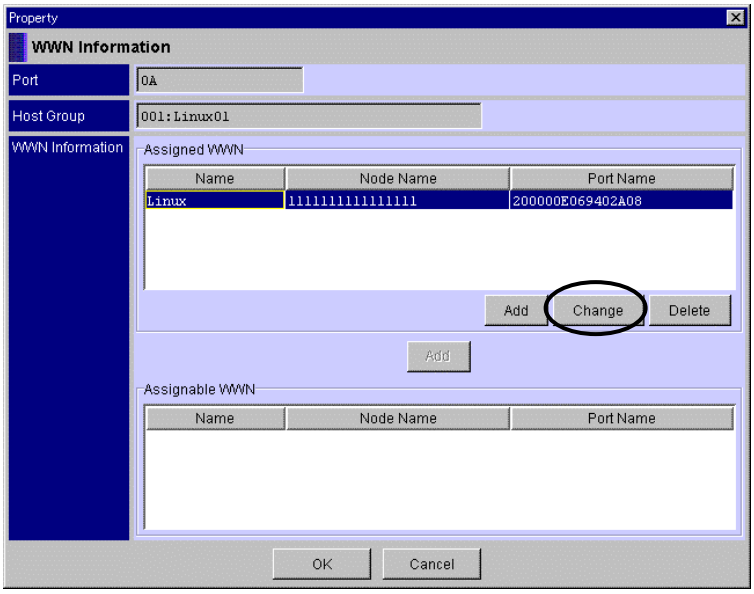


DAMP Version is Ver.9.00 or later.

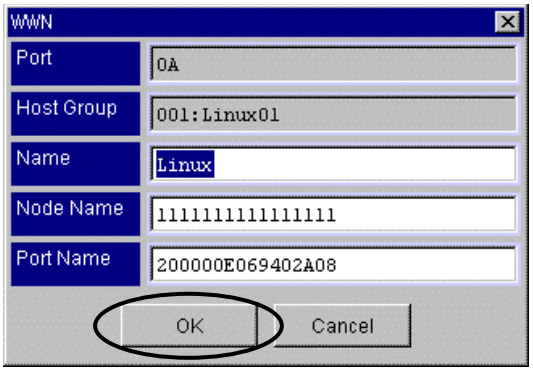


Copyright © 2003, 2005, Hitachi, Ltd.

(g) Select a Name to be changed, and click the [Change] button.



(h) Enter the [Name], the [Node Name] or the [Port Name]. Then click the [OK] button.



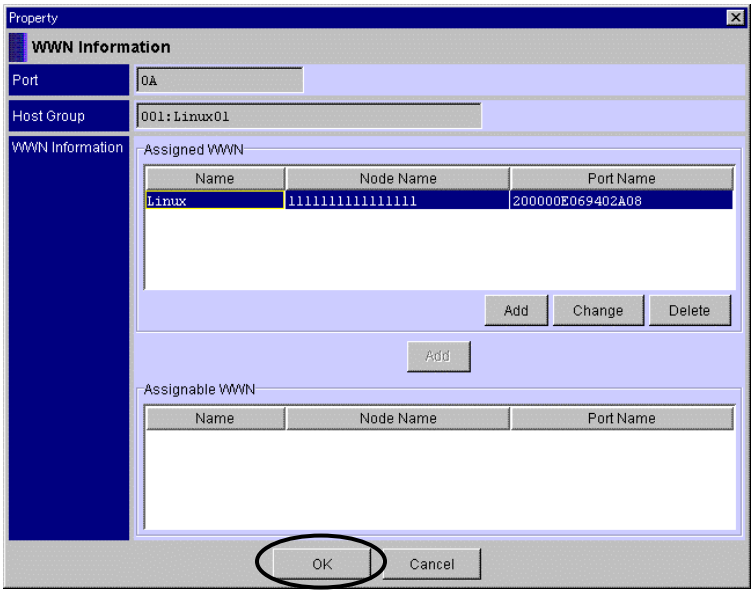
① Name : Enter the name with half size alphabetic characters and/or numerals.
(Excluding \, /, : , , , ;, *, ?, ", <, >, | and ')
Spaces at the top or end are ignored.
An identical name cannot be used in an identical Port.
The number of characters which can be set is shown in the table below.

Microprogram version	The number of characters which can be set
earlier than x659/M	8 characters
x659/M or later	16 characters

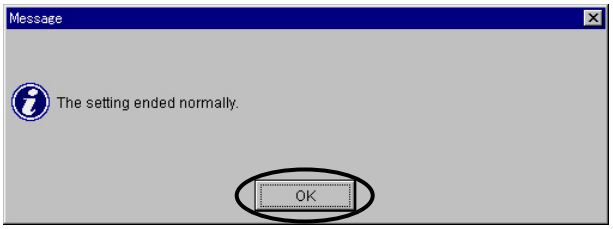
② Node Name : Enter the Node Name with sixteen hexadecimal numerals.
③ Port Name : Enter the Port Name with sixteen hexadecimal numerals

Copyright © 2003, 2005, Hitachi, Ltd.

(i) Click the [OK] button on WWN Information Property.



(j) The confirmation message is displayed. Click the [OK] button.



Copyright © 2003, 2005, Hitachi, Ltd.

2.9 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.

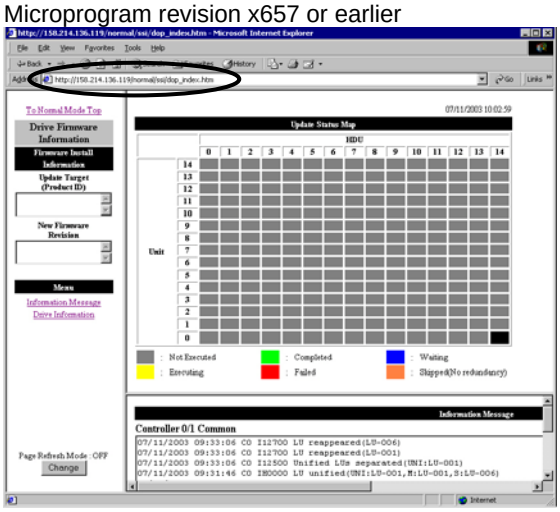
(1) Displaying the reference window

To display the reference window, enter “http://(IP address)/drvfirm” in the [Address] of the WEB browser.

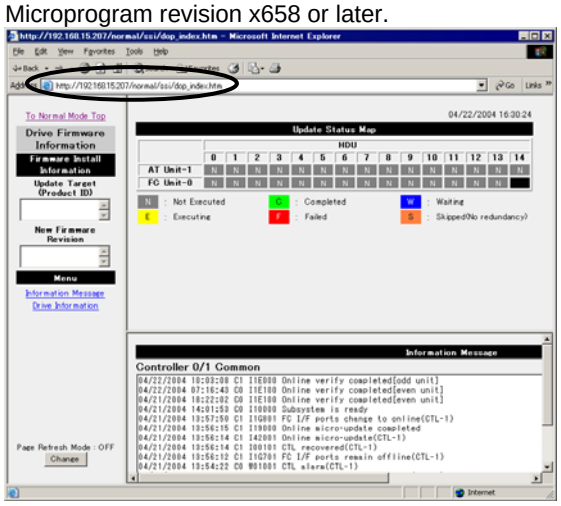
In the case of the dual system configuration, enter an IP address of any one of the control units. When the connection is made, the following window is displayed.

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].

Microprogram revision x657 or earlier



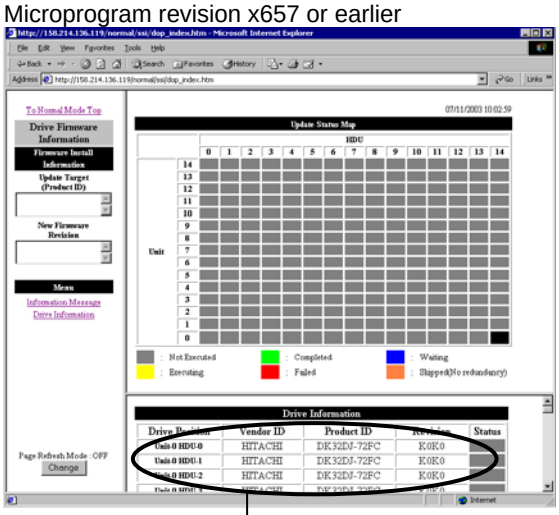
Microprogram revision x658 or later.



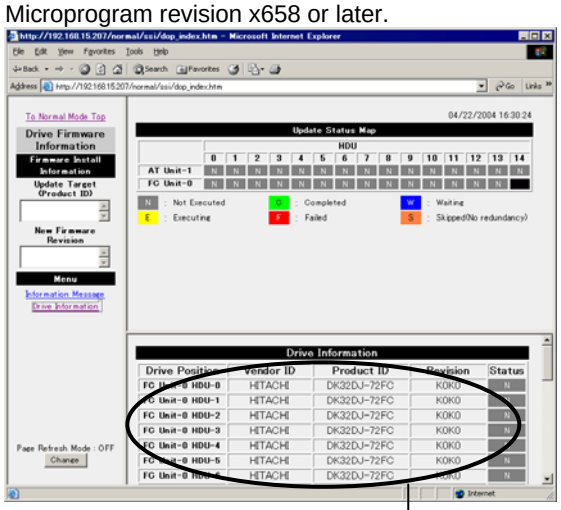
Copyright © 2003, 2005, Hitachi, Ltd.

(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].

Microprogram revision x657 or earlier



Microprogram revision x658 or later.

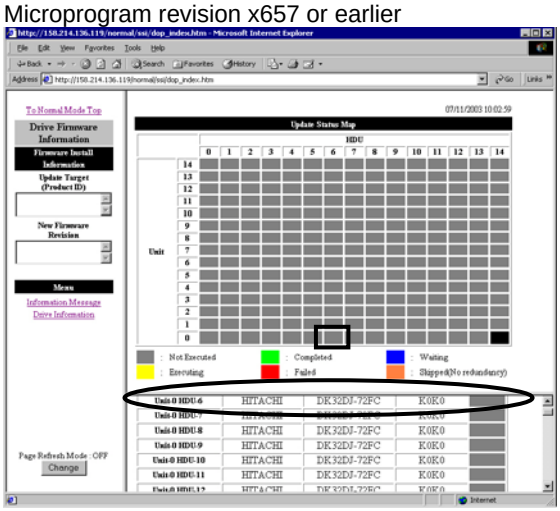


List of model names and drive firmware revisions of the Disk Drives.

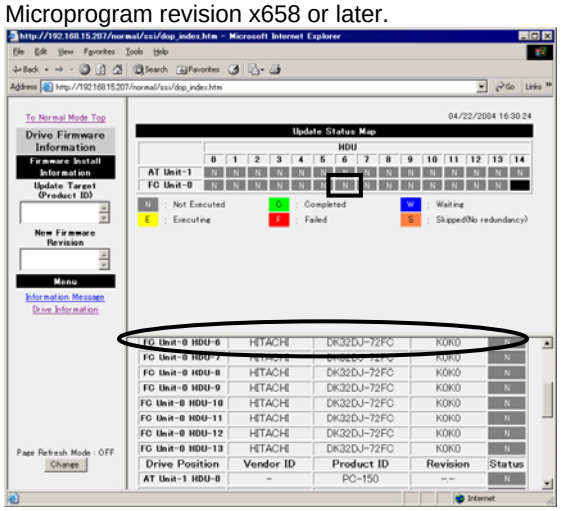
Product ID : Disk Drive Model name.
Revision : Drive firmware revision.

(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 UNIT-0 and HDU-6 are selected.)

Microprogram revision x657 or earlier



Microprogram revision x658 or later.



When the two or more disk drives concern, make sure of the necessary information by clicking each position of them.

Copyright © 2003, 2005, Hitachi, Ltd.

Chapter 3. Data Collection when a Failure Occurs in Program Product (P.P.)

3.1 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 DF600 in every case.

Table 3.1.1 Program Product To Be Recovered

No.	Program product	Type	Object for maintenance (*1)	Related part			Related manual
				Basic Microprogram	Host computer	Monitoring	
1	Disk Array Management Program	P-002D-J211	③	○	-	○	• Disk Array Management Program 2 (for GUI) User's Guide • Disk Array Management Program 3 (for GUI) User's Guide
2	Failure monitoring program	P-222Z-J001	③	○	-	○	• Failure monitoring program User's Guide
3	Hitachi ShadowImage (include RAID Manager)	P-002D-J201 P-002D-J201S	①,②	○	○	-	• Hitachi ShadowImage User's Guide • Hitachi RAID System Manager Guide
4	Hitachi TrueCopy Basic (include RAID Manager)	P-002D-J202 P-002D-J202U	①,②	○	○	-	• Hitachi TrueCopy Basic User's Guide • Hitachi RAID System Manager Guide
5	Hitachi QuickShadow (include RAID Manager)	P-002D-J205 P-002D-J205S	①,②	○	○	-	• Hitachi QuickShadow User's Guide • Hitachi RAID System Manager Guide
6	Open LDEV Guard (include RAID Manager)	P-002D-J206 P-002D-J206S	①,②	○	○	-	• Open LDEV Guard User's Guide • Hitachi RAID System Manager Guide
7	LUN Security	P-002D-J203, P-002D-J203S	①	○	-	-	• LUN Security User's Guide
8	Cache Management	P-002D-J215	①	○	-	-	• Cache Management User's Guide
9	Dual ID Succession	P-002D-J216	①	○	-	-	• Dual ID Succession User's Guide
10	SNMP Agent Support Function	P-002D-J213	①	○	-	-	• SNMP Agent Support Function User's Guide
11	LUN Expansion	P-002D-J214	①	○	-	-	• LU Concatenation User's Guide
12	Password Protection	P-002D-J212	①	○	-	-	• Password Protection User's Guide
13	LUN Management	P-002D-J204, P-002D-J204S	①	○	-	-	• LUN Magagemt User's Guide
14	Performance Management -Base Monitor	P-002D-J217	①	○	-	-	• Performance Management -Base Monitor User's Guide

*1 : ①: DF600 main body (See 3.2.1.)
②: Host system server connected to the DF600 (See 3.2.2.)
③: Server for monitoring and setting connected to the DF600 (See 3.2.3.)

Copyright © 2002, 2005, Hitachi, Ltd.

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 DF600 and types of program products being used because they may be important.

Copyright © 2002, 2005, Hitachi, Ltd.

3.1.1 When a failure occurs in the DF600 main body

Take recovery actions referring to Chapter 2, “Troubleshooting” on page MNTE 02-0000 in the Maintenance Manual for Maintenance.

3.1.2 When a failure occurs in a host system server

(1) In the case of Hitachi RAID Manager

① If a failure has occurred in the DF600, give priority to investigation of it (see 3.1.1).

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
See Section 5.2, “System Log and Command Error Message” in the “Hitachi RAID Manager System Administrator's 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 RAID Manager, 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 “Hitachi RAID Manager System Administrator's Guide” and collect the information.

Copyright © 2002, 2005, Hitachi, Ltd.

3.1.3 When a failure occurs in a server for monitoring and setting

(1) In the case of Resource Manager

① Taking an action following an error message
Since an error message is displayed when an error occurs in operation of Resource Manager, take a recovery action following the message.

② Collecting log files
Collect log files of Resource Manager
They are three files, that is, svplog, apilog, and applog in the case of the GUI or svplog, apilog, and cuilog in the case of the CLI. The log files are stored in the program installation directory or a log directory under a directory specified with the environment variable, DAMP_ROOT_DIR_PATH, in the case of Ver. 5.60 or later.

③ Getting operation environment
Get a version number, operation environment (OS and model) and operation of Resource Manager.

(2) In the case of Failure Monitoring Program

① Take an action according to the chapter, “Troubleshooting” in the Failure Notification Program User's Guide.

② Get all the files under the installation directory of Failure Notification Program together with the installation directory itself.

Default installation directory: \REMOTE (Capacity: Approx. 500 kbytes)

Copyright © 2002, 2005, Hitachi, Ltd.

3.2 List of Data to Be Collected when a P.P. Failure Occurs

Table 3.2.1 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	Resource Manager	○	Log file name GUI: svplog, apilog, applog CLI: svplog, apilog, cuilog Storage directory P.P. installation directory or a log directory under a directory specified with the environmental variable, DAMP_ROOT_DIR_PATH	-	○	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
2	Failure monitoring program	○	Collect all files of the P.P. installation directory together with the installation directory itself. Default installation directory: \REMOTE	-	-	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
3	Hitachi ShadowImage (include RAID Manager)	○	(See Table 3.2.2)			
4	Hitachi TrueCopy Basic (include RAID Manager)	○				
5	Hitachi QuickShadow (include RAID Manager)	○				
6	Open LDEV Guard (include RAID Manager)	○				
7	LUN Security	○	-	○	-	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
8	Cache Management	○	-	-	-	-
9	Dual ID Succession	○	-	-	-	-
10	SNMP Agent Support Function	○	-	-	-	-
11	LUN Expansion	○	-	-	-	-
12	Password Protection	○	-	-	-	-
13	LUN Management	○	-	○	-	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details
14	Performance Management - Base Monitor	○	-	○	-	P.P. version Operation environment (OS and model) Connection configuration diagram Operation details

Copyright © 2002, 2005, Hitachi, Ltd.

Table 3.2.2 List of Hitachi ShadowImage / Hitachi TrueCopy Basic to Be Collected

No.	Program product	Information to be collected	Collection method/Storage	
1	Hitachi ShadowImage (include RAID Manager)	Trace (dump)	Refer to “2.5 Collecting Error Information” (MNTE 02-2140).	
		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 “Hitachi RAID Manager System Administrator 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	Hitachi TrueCopy Basic (include RAID Manager)	Trace (dump) of two units of SANRISE9500V which make-up a pair	Refer to “2.5 Collecting Error Information” (MNTE 02-2140).	
		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 “Hitachi RAID Manager System Administrator 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.	

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Program product	Information to be collected	Collection method/Storage	
3	Hitachi QuickShadow (include RAID Manager)	Trace (dump)	Refer to “2.5 Collecting Error Information” (MNTE 02-2140).	
		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 “Hitachi RAID Manager System Administrator 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	Open LDEV Guard (include RAID Manager)	Trace (dump)	Refer to “2.5 Collecting Error Information” (MNTE 02-2140).	
		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 “Hitachi RAID Manager System Administrator 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	

Copyright © 2003, 2005, Hitachi, Ltd.

Chapter 4. Trouble Analysis by Error Notification Program

4.1 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.

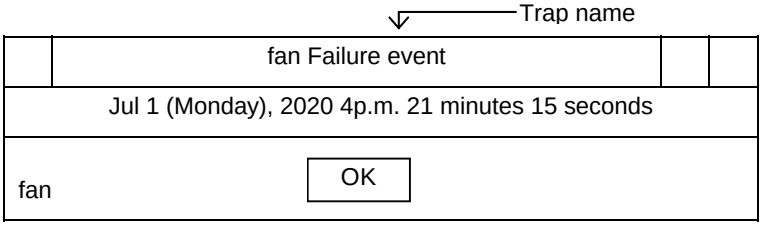
4.1.1 Maintenance with TRAP Codes

(1) Ascertaining failure information

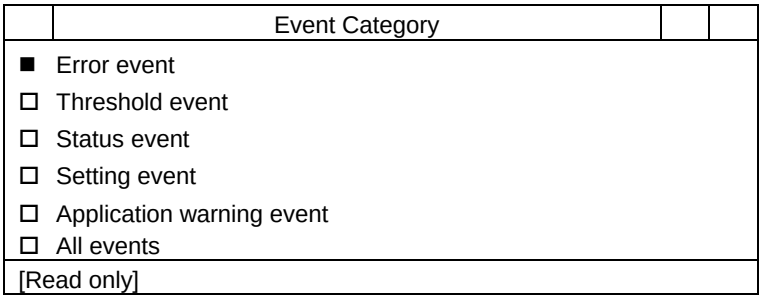
An example of an output bay the TRAP issued by the disk array subsystem. (a) is an example of output by HP OpenView/NetM*COMET. (b) is an example of output by SunNet Manager.

(a) Example of trapped output by HP OpenView/NetM*COMET

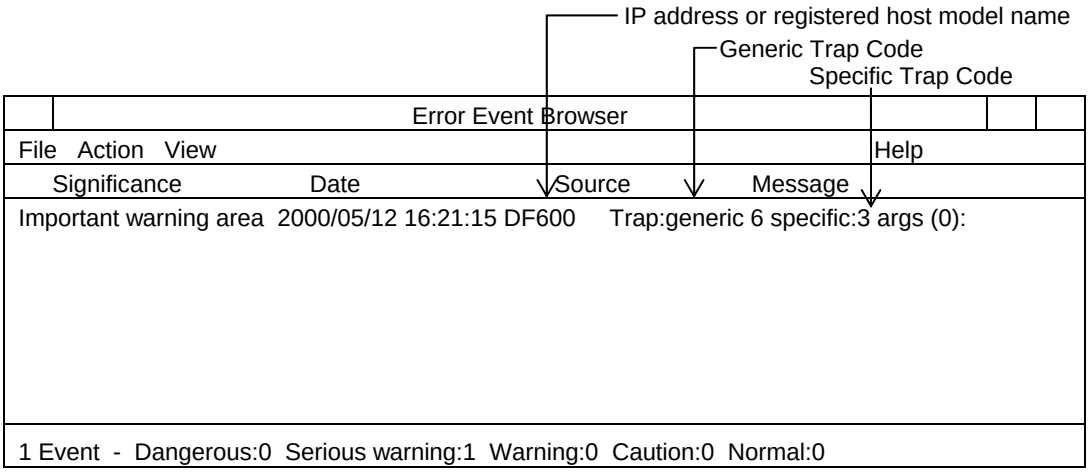
If an error occurs, the following screen is popped up.



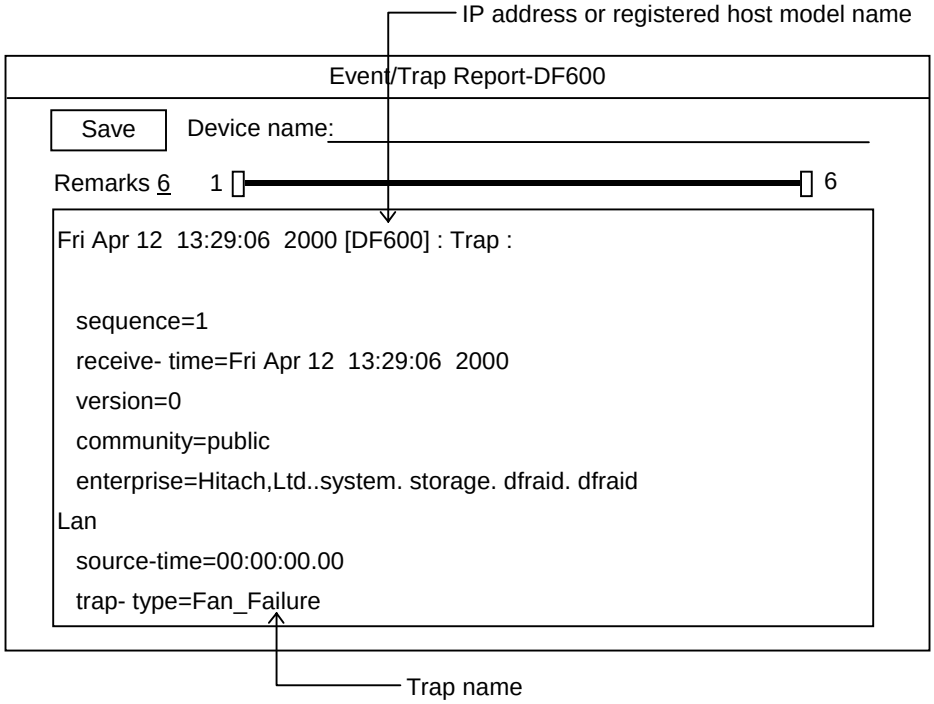
"Error event" in the "Event Category" box changes to "■". Double-clicking this box displays an Error Event browser. For detailed information refer to the browser.



Copyright © 2002, 2005, Hitachi, Ltd.



(b) Example of trapped output by SunNet Manager



Copyright © 2002, 2005, Hitachi, Ltd.

(2) Trouble analysis method
Perform maintenance referring to the output examples in (1) and according to Table 4.1.1, “Recovery Procedure for Each Trap Code”.

Table 4.1.1 Recovery Procedure for Each Trap Code

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
1	0	0	coldStart	Power-on	This is not an error. Recovery operation is not necessary.	
2	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.	
3	6	1	systemDown	Controller down	It is shown that a failure indicated by a message code with “H” 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 H#####. “#####” is optional.	Refer to “2.3 Trouble Analysis Based on Message” (MNTE 02-0270).
4	6	2	driveFailure	Disk shutdown	Perform the maintenance instructed. Message code : W060AT, W060HH, W060xy Message text : HDU alarm (Unit-x, HDU-y) 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.	
5	6	3	fanFailure	Fan failure	Perform the maintenance instructed. Message code : W040xy Message text : FAN alarm (Unit-x, FAN-y) 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.	

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
6	6	4	powerSupply-Failure	Power supply failure	Perform the maintenance instructed. Message code : W050xy Message text : PS alarm (Unit-x, PS-y) 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.	Refer to "2.3 Trouble Analysis Based on Message" (MNTE 02-0270).
7	6	5	batteryFailure	Battery voltage error	Perform the maintenance instructed. Message code : W0300x, W0310x, W0320x, W0330x Message text : Battery alarm, Battery alarm, Battery SW off, Battery Thermal alarm 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.	
8	6	6	cacheFailure	Cache access error occurred	Perform the maintenance written. Message code : W0D0xy Message text : CACHE alarm (CTL-x, CACHE-y) The information corresponding to x, y, and z, in the manual is not notified regarding the trap. Refer to the display of the WEB log message of the subsystem.	
9	6	7	upsFailure	UPS error	Perform the maintenance instructed. Message code : W0C00x Message text : UPS alarm (UPS-x)	
10	6	9	backupCircuit-Failure	Battery circuit failure	Perform the maintenance instructed. Message code : W0340x Message text : Battery back up circuit alarm (CTL-x) 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.	

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
11	6	10	other-controller-Failure	Another side controller blockade (For dual configuration only)	Perform the maintenance instructed. Message code : W0100x Message text : CTL alarm (CTL-x) 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.	Refer to “2.3 Trouble Analysis Based on Message” (MNTE 02-0270).
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.	
13	6	12	spareDrive-Failure	Spare Disk blockade	Perform the maintenance instructed. Message code : W061AT, W061HH, W061xy Message text : Spare HDU alarm (Unit-x, HDU-y) 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.	
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.	

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
15	6	14	encFailure	ENC failure	Perform the maintenance instructed. Message code : W090AT, W090HH, W090xy Message text : ENC alarm (Unit-x, ENC-y) 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.	Refer to "2.3 Trouble Analysis Based on Message" (MNTE 02-0270).
16	6	15	loopFailure	Loop failure	Perform the maintenance instructed. Message code : W080xy Message text : Loop alarm (Path-x, Loop-y) 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 Message text : Path alarm (Remote-x, Path-y) 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.	

Copyright © 2002, 2005, Hitachi, Ltd.

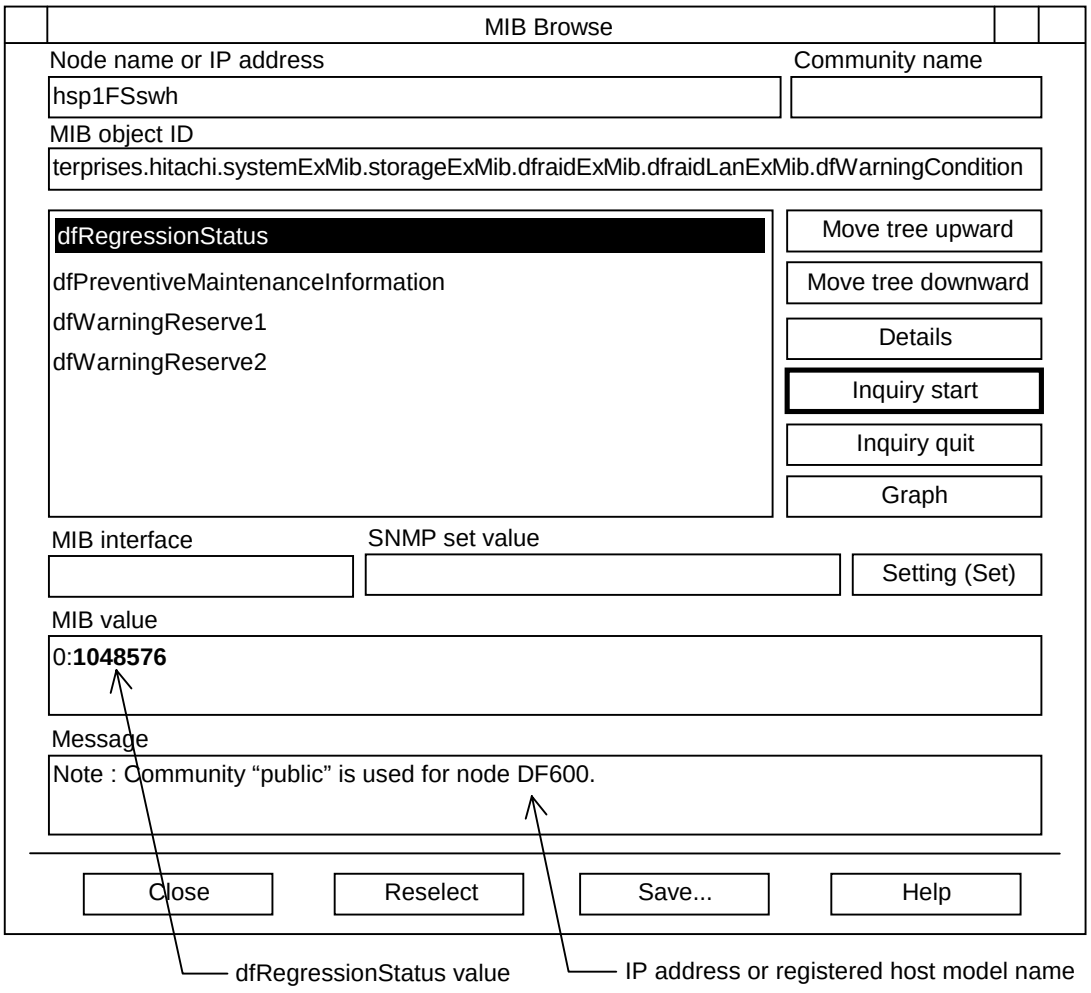
4.1.2 Maintenance with MIB (df Regression) Values

(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, see Table 3.1.3 “dfRegressionStatus Values and Failed Components”.

(a) Example of MIB value output by HP OpenView/NetM*COMET



Copyright © 2002, 2005, Hitachi, Ltd.

(b) Example of MIB value output by SunNet Manager

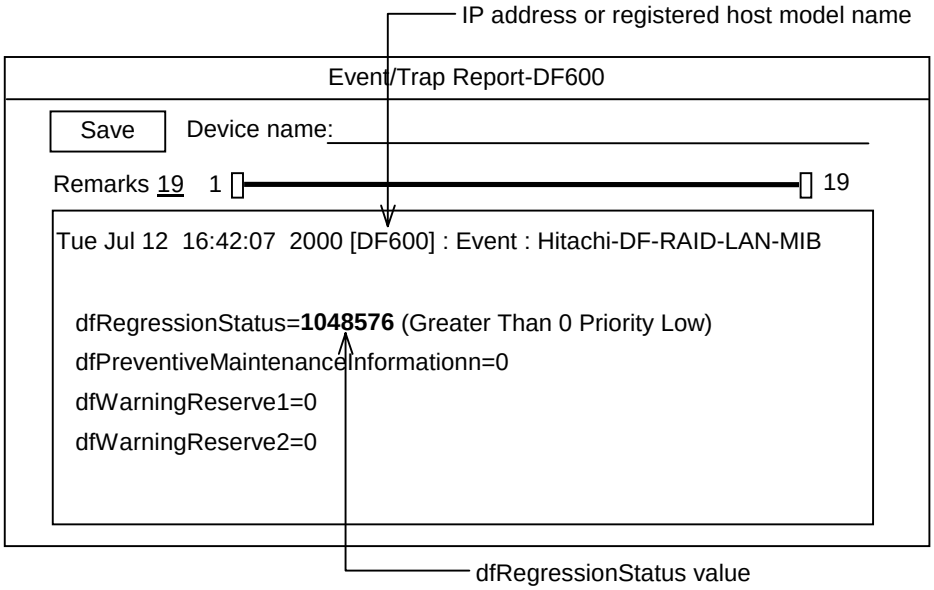


Table 4.1.2 Format of dfRegressionStatus

Byte \ Bit	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	Cache
1	0	0	0	Fan	BK	0	D.C.PS	Battery
2	0	0	NAS UPS	NAS Path	NAS Sever	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 3.1.3.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 4.1.3 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 (Power Unit (DC)) error.
16	1	3	524288	Battery circuit error.
17	1	4	1048576	Fan error.
18	0	0	16777216	Cache access error.

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 4.1.2.

(2) Troubleshooting procedure

Perform a maintenance by associating the item in the description column in Table 4.1.3 with the contents of Table 4.1.1.

Copyright © 2002, 2005, Hitachi, Ltd.

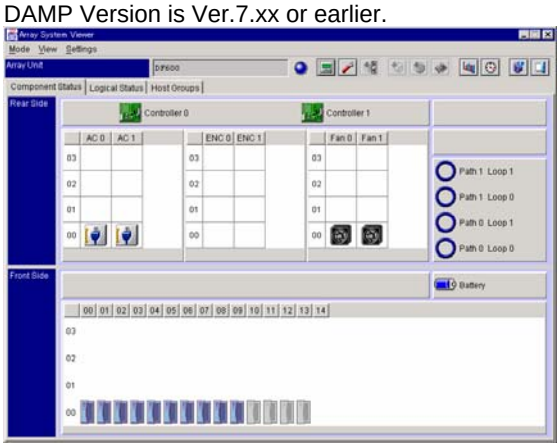
4.2 Trouble Analysis by Disk Array Management Program

The Disk Array Management Program 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 Disk Array Management Program is used.

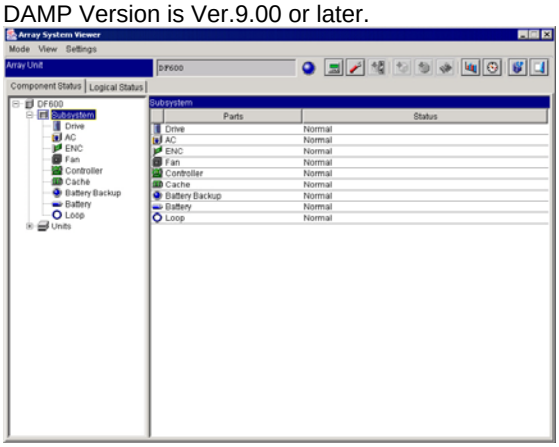
4.2.1 Maintenance with the Disk Array Management Program (GUI version)

(1) Display of subsystem status
A screen which indicates the status of components of Array device under Disk Array Management Program is shown below.

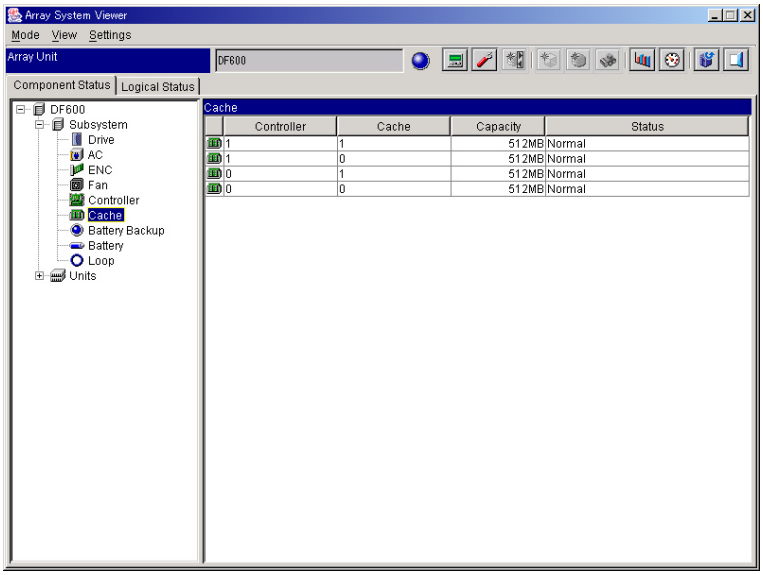
DAMP Version is Ver.7.xx or earlier.



DAMP Version is Ver.9.00 or later.



An example of the window for referring to the information on installation and capacities of the Cache Units is shown below. (DAMP Version is Ver.9.00 or later)



When a failure occurs in a component such as the Disk Drive, Control Unit, Backup Battery Unit, Fan Assembly, and Cache Unit in the disk array subsystem, the component concerned is displayed with an icon colored in red.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Trouble analysis method

Perform maintenance referring to the display examples in (1) and according to Table 4.2.1, “Recovery Procedure for Each Error Display” (Refer to “2.3 Trouble Analysis Based on Message” (MNTE 02-0270).).

Table 4.2.1 Recovery Procedure for Each Error Display (1)

No.	Error Display			Description	Recovery procedure
	Ver.7.xx or earlier	Ver.9.00 or later	Ver.9.50 or later		
1	: Red	: Red		•Busy or Disk Drive detached for Restoring/Waiting for Restore •Inserted Disk Drive did not spin-up (RAID group defined)	Perform the maintenance instructed. Message code : W060HH, W060xy Message text : HDU alarm (Unit-x, HDU-y)
2	: Red + Black	: Red + Black		•The Disk Drive is blocked and uninstalled	
3	: Red	: Red		• Busy or Spare Disk detached for Restoring/Waiting for Restore	Perform the maintenance instructed. Message code : W061HH, W061xy Message text : Spare HDU alarm (Unit-x, HDU-y)
4	: Red + Black	: 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)	Perform the maintenance instructed. Message code : W060AT Message text : HDU alarm (Unit-x, HDU-y)
6	-	-	: Red + Black	•The Disk Drive is blocked and uninstalled	
7	-	-	: Red	• Busy or Spare Disk detached for Restoring/Waiting for Restore	Perform the maintenance instructed. Message code : W061AT Message text : HDU alarm (Unit-x, HDU-y)
8	-	-	: Red + Black	• Though the disk array subsystem is set to use a Spare Disk, but the Spare Disk is not installed	
9	: Yellow	: Yellow		• A cache backup circuit error occurred	Perform the maintenance instructed. Message code : W0340x Message text : Battery back up circuit alarm (CTL-x)
10	: Red	: 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	: Red		• Fan error	Perform the maintenance instructed. Message code : W040xy Message text : FAN alarm (Unit-x, FAN-y)
12	: Red	: Red		• Power Unit (Power Unit (DC)) error	Perform the maintenance instructed. Message code : W050xy Message text : PS alarm (Unit-x, PS-y)

Copyright © 2002, 2005, Hitachi, Ltd.

No.	Error Display			Description	Recovery procedure
	Ver.7.xx or earlier	Ver.9.00 or later	Ver.9.50 or later		
13	 : Red	 : Red		• Battery voltage error	Perform the maintenance instructed. Message code : W0300x, W0310x, W0320x, W0330x Message text : Battery alarm, Battery alarm, Battery SW off, Battery Thermal alarm The information corresponding to xy in the manual is not notified regarding the trap. See the WEB log message display of the subsystem.
14	 : Red	 : Red		• Cache access error	Perform the maintenance instructed. Message code : W0D0xy Message text : CACHE alarm (CTL-x, CACHE-y)
15	 : Red	 : Red		• ENC error	Perform the maintenance instructed. Message code : W090HH, W090xy Message text : ENC alarm (Unit-x, ENC-y)
16	-	-	 : Red	• SENC error	Perform the maintenance instructed. Message code : W090AT Message text : ENC alarm (Unit-x, ENC-y)
17	 : Red	 : Red		• Loop error	Perform the maintenance instructed. Message code : W080xy Message text : Loop alarm (Path-x, Loop-y)
18	 : Red			• Path detachment	Perform the maintenance instructed. Message code : W0F0xy Message text : Path alarm (Remote-x, Path-y)

Copyright © 2002, 2005, Hitachi, Ltd.

Table 4.2.1.1 Recovery Procedure for Each Error Display (2)

No.	Error Display Ver.10.05 or later	Description	Recovery procedure
1	 : Red	•Busy or Disk Drive detached for Restoring/Waiting for Restore •Inserted Disk Drive did not spin-up (RAID group defined)	Perform the maintenance instructed. Message code : W060HH, W060xy Message text : HDU alarm (Unit-x, HDU-y)
	 : Red		
2	 : Red + Black	•The Disk Drive is blocked and uninstalled	
	 : Red + Black		
3	 : Red	• Busy or Spare Disk detached for Restoring/Waiting for Restore	Perform the maintenance instructed. Message code : W061HH, W061xy Message text : Spare HDU alarm (Unit-x, HDU-y)
	 : Red		
4	 : Red + Black	• Though the disk array subsystem is set to use a Spare Disk, but the Spare Disk is not installed	
	 : Red + Black		
5	 : Red	•Busy or Disk Drive detached for Restoring/Waiting for Restore •Inserted Disk Drive did not spin-up (RAID group defined)	Perform the maintenance instructed. Message code : W060AT Message text : HDU alarm (Unit-x, HDU-y)
6	 : Red + Black	•The Disk Drive is blocked and uninstalled	
7	 : Red	• Busy or Spare Disk detached for Restoring/Waiting for Restore	Perform the maintenance instructed. Message code : W061AT Message text : HDU alarm (Unit-x, HDU-y)
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 Message text : Battery back up circuit alarm (CTL-x)
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	Perform the maintenance instructed. Message code : W040xy Message text : FAN alarm (Unit-x, FAN-y)
12	 : Red	• Power Unit (Power Unit (DC)) error	Perform the maintenance instructed. Message code : W050xy Message text : PS alarm (Unit-x, PS-y)

Copyright © 2004, 2005, Hitachi, Ltd.

No.	Error Display Ver.10.05 or later	Description	Recovery procedure
13	 : Red	• Battery voltage error	Perform the maintenance instructed. Message code : W0300x, W0310x, W0320x, W0330x Message text : Battery alarm, Battery alarm, Battery SW off, Battery Thermal alarm The information corresponding to xy in the manual is not notified regarding the trap. See the WEB log message display of the subsystem.
14	 : Red	• Cache access error	Perform the maintenance instructed. Message code : W0D0xy Message text : CACHE alarm (CTL-x, CACHE-y)
15	 : Red	• ENC error	Perform the maintenance instructed. Message code : W090HH, W090xy Message text : ENC alarm (Unit-x, ENC-y)
16	 : Red	• SENC error	Perform the maintenance instructed. Message code : W090AT Message text : ENC alarm (Unit-x, ENC-y)
17	 : Red	• Loop error	Perform the maintenance instructed. Message code : W080xy Message text : Loop alarm (Path-x, Loop-y)
18	 : Red	• Path detachment	Perform the maintenance instructed. Message code : W0F0xy Message text : Path alarm (Remote-x, Path-y)

Copyright © 2004, 2005, Hitachi, Ltd.

4.2.2 Disk Array Management Program Maintenance Function

Maintenance functions of the Disk Array Management Program are listed in Table 4.2.2.

Table 4.2.2 Disk Array Management Program 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:

Copyright © 2002, 2005, Hitachi, Ltd.

No	Classification	Function name	Outline of function	Notes
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	Reconstructs data on a specified 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.	–
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 ENC Micro Program	ENC Micro Program Download	Download the micro program from the CD-R into the array unit.	–
		Replacing the ENC Micro Program	Replace the micro program of the ENC with the micro program downloaded in the array unit.	–
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.	Supported in Micro revision x659/M or later

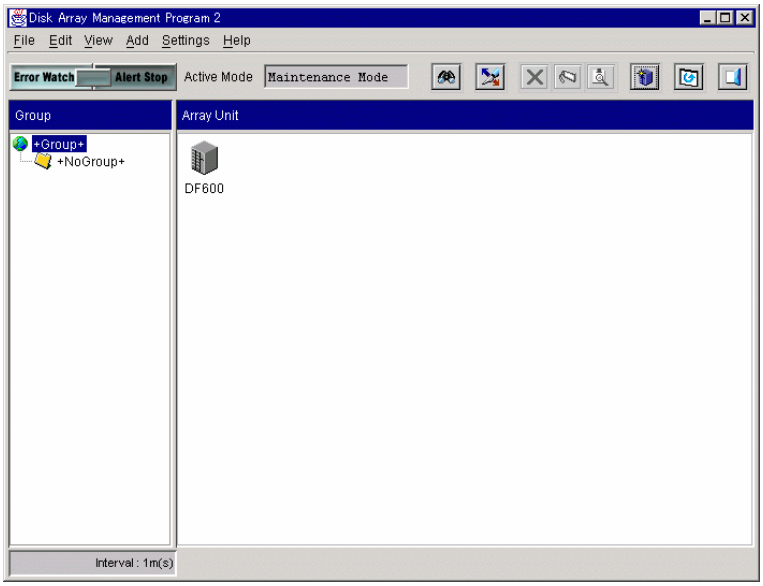
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.3 Displaying Statistical Information

You can display the statistical information in the array unit.

(1) Start the Disk Array Management Program.

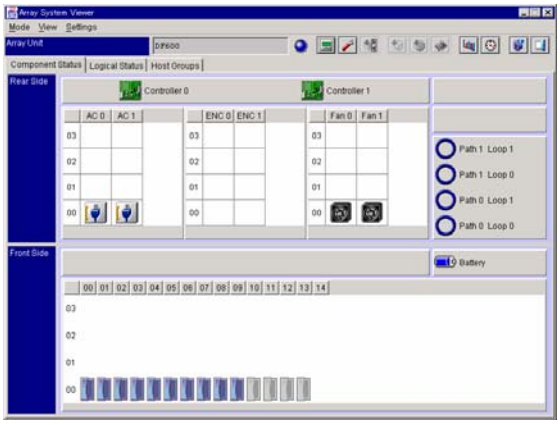
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



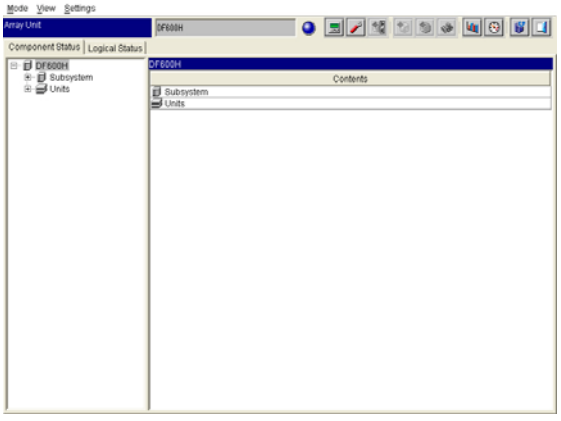
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



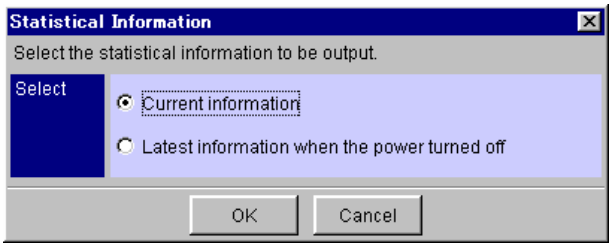
DAMP Version is Ver.9.00 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the View menu select Statistical Information or click  : Statistical Information in the tool bar.

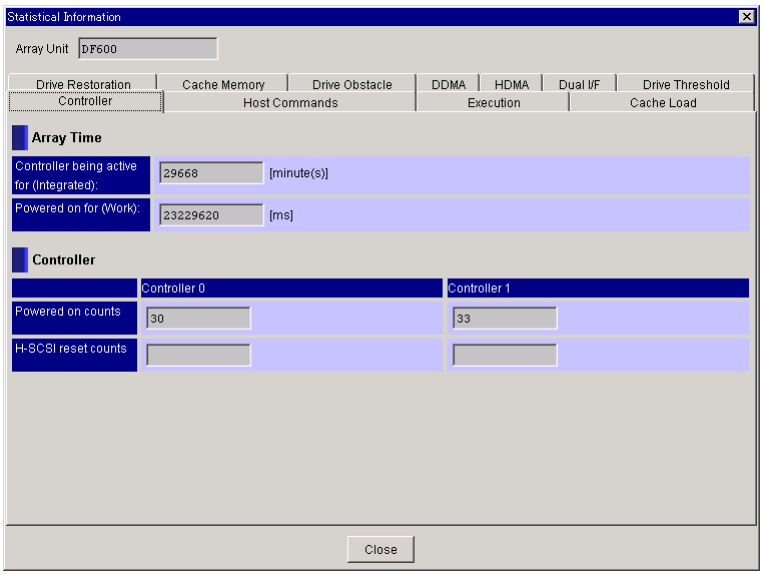
(5) Specifies statistical information which to display by Select, and click the [OK] button.



- Select : Statistical information to be displayed
  Current Information : Current information
  Latest Information when the power turned off: Information when starting up an array unit.

Copyright © 2002, 2005, Hitachi, Ltd.

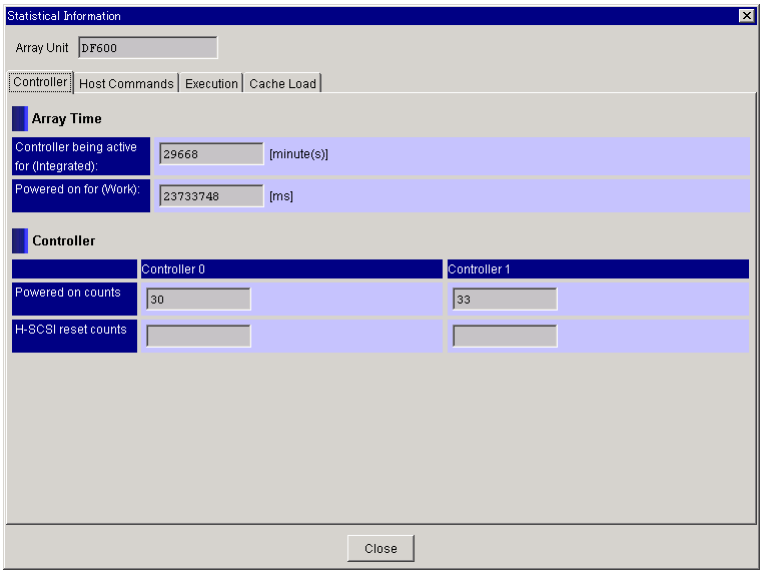
The Statistical Information dialogue box is displayed.



- Statistical Information : Type of statistical information
  - Controller : State of the controller operation ----------(a)
  - Host Commands : Number of host command receptions ----------(b)
  - Execution : State of command execution ----------(c)
  - Cache Load : State of the cache load ----------(d)
  - Drive Restorations : Number of drive restoration starting ----------(e)
  - Cache Memory : Cache memory failures statistical information ----------(f)
  - Drive Obstacle : Drive failures statistical information ----------(g)
  - DDMA : Drive DMA failures statistical information ----------(h)
  - HDMA : Host DMA failures statistical information ----------(i)
  - DUAL I/F : DUAL I/F system failures statistical information ----------(j)
  - Drive Threshold : Preventive maintenance failures statistical information -----(k)

Copyright © 2002, 2005, Hitachi, Ltd.

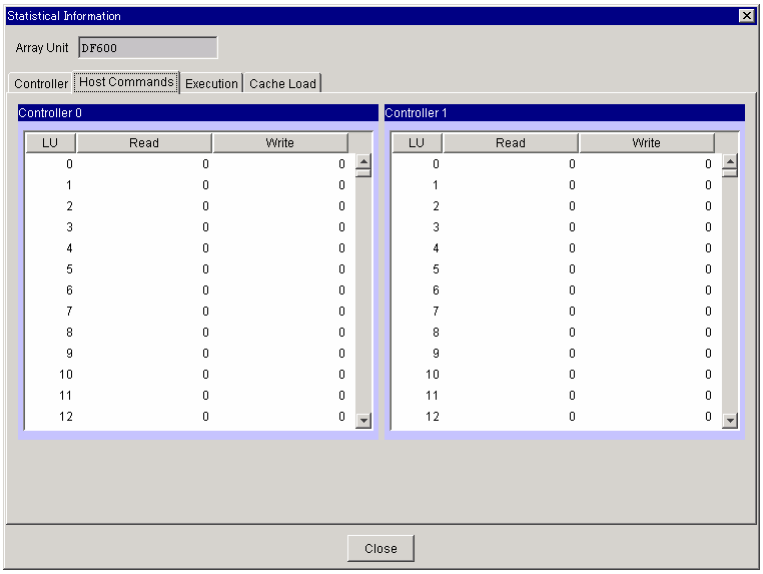
(a) Displaying the Controller Use Condition
Click the Controller tab.



- Array Time:
  Controller being active for (Integrated) : Integrated acting time of the array unit (minute)
  Power on for (Work) : Power ON time of the array unit (PS/ON to PS/OFF) time (ms)
- Controller:
  Powered on counts : Integrated number of power ON times (at interruption) of the controller.
  Accumulated number of host SCSI bus resets : An accumulated number of SCSI bus resets received from a host computer is displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

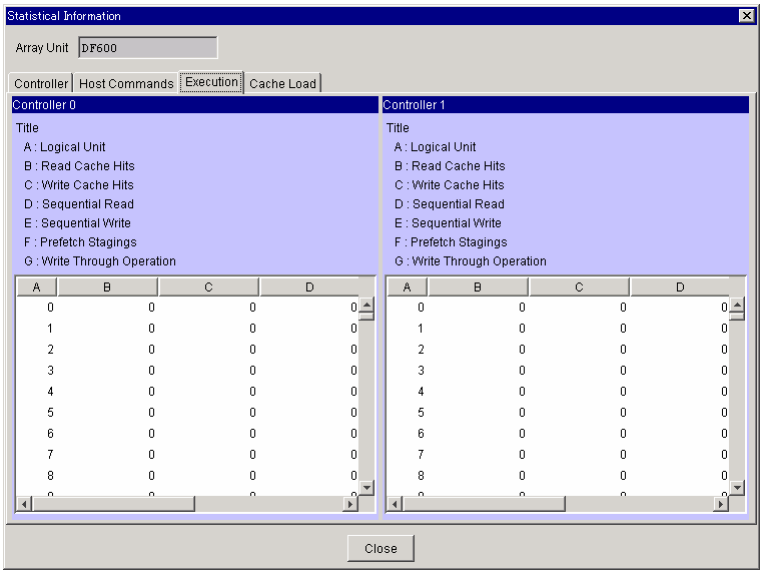
(b) Displaying the Numbers of Host Commands Received
Click the Host Commands tab.



- 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

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Displaying the Command Execution Condition
Click the Execution tab.

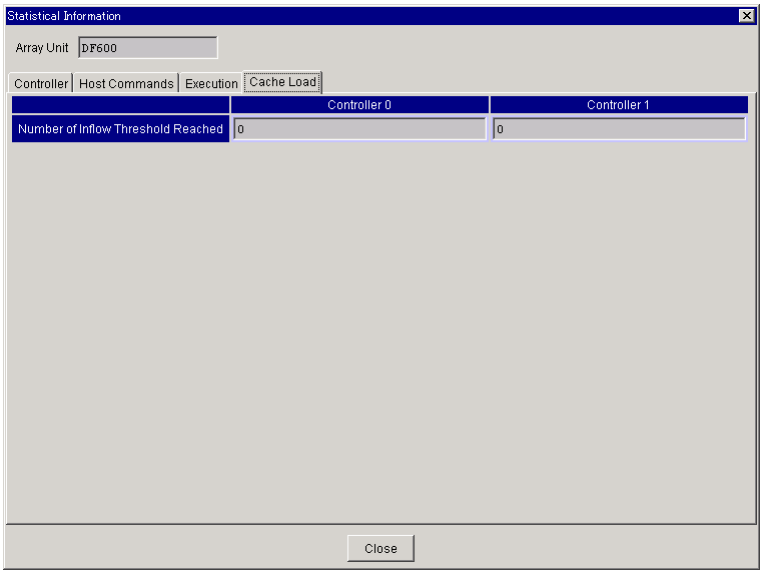


- A:Logical Unit : Logical unit number
- B:Read Cache Hits : Total of READ commands (hitting cache or partially hitting cache)
- C:Write Cache Hits : Total of WRITE commands (cache read hits)
- D:Sequential Read : Total of READ commands (recognized as sequential reading)
- E:Sequential Write : Total 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)
- H:Reassigned Blocks : Number of re-assigned blocks (Not supported)

Copyright © 2002, 2005, Hitachi, Ltd.

(d) Displaying the Cache Load Condition

Click the Cache Load tab.

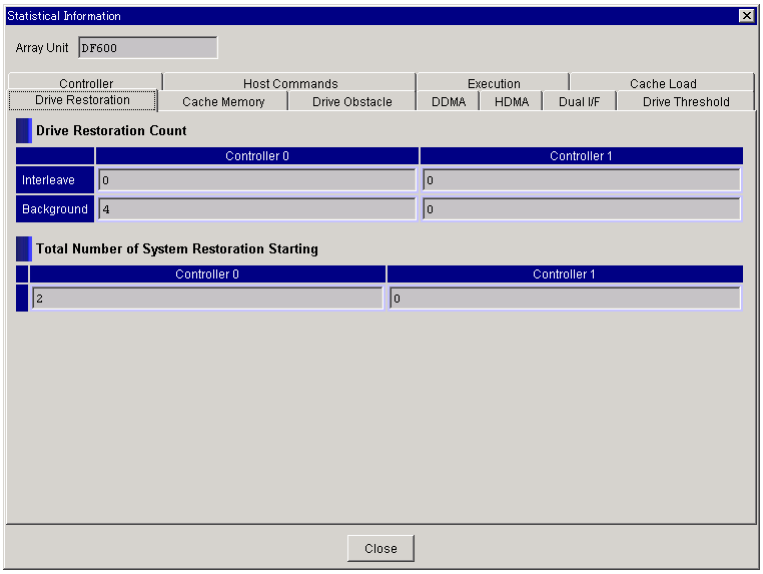


- Number of Inflow Threshold Reached : Total number of occurrences of inflow limitations.

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.

Copyright © 2002, 2005, Hitachi, Ltd.

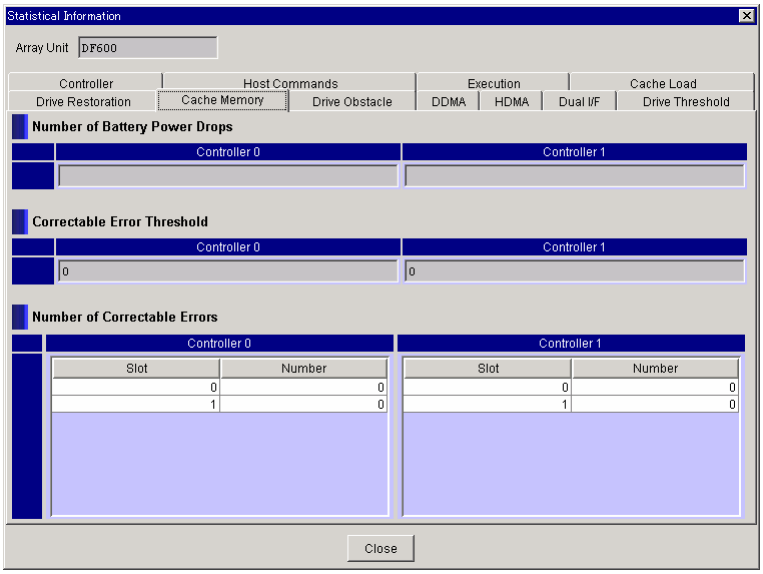
(e) Displaying Number of Drive Restoration Starting
Click the Drive Restoration tab.



- 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

Copyright © 2002, 2005, Hitachi, Ltd.

(f) Displaying Cache Memory Failures Statistical Information
Click the Cache Memory tab.

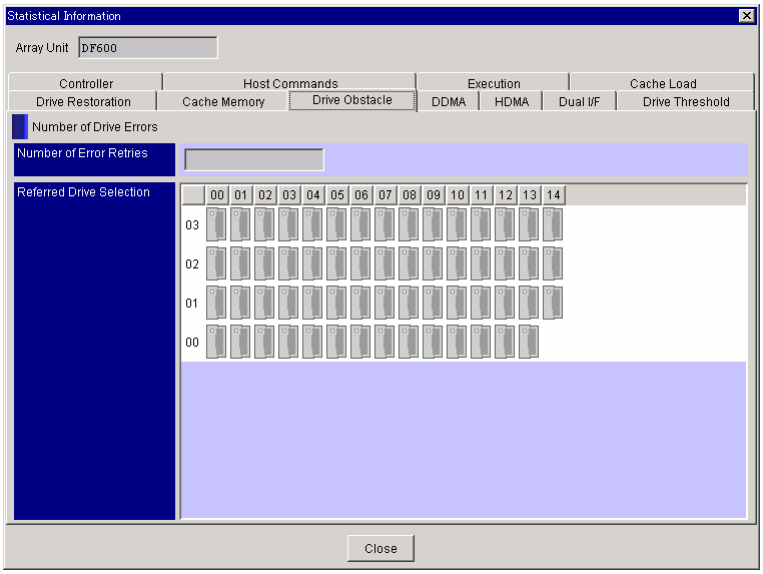


- Number of Battery Power Drops : Accumulated number of cache battery voltage drops
- Correctable Error Threshold : Threshold number of correctable errors
- Number of Correctable Errors : Accumulated number of correctable errors per cache slot

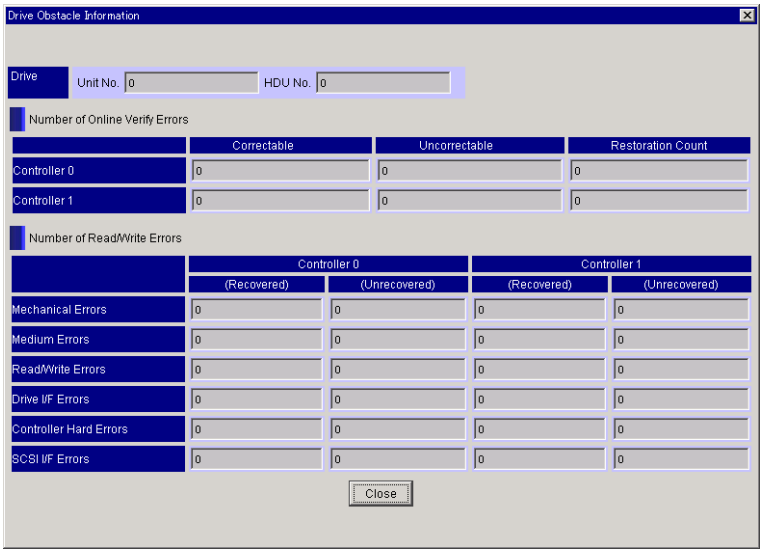
Copyright © 2002, 2005, Hitachi, Ltd.

(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.

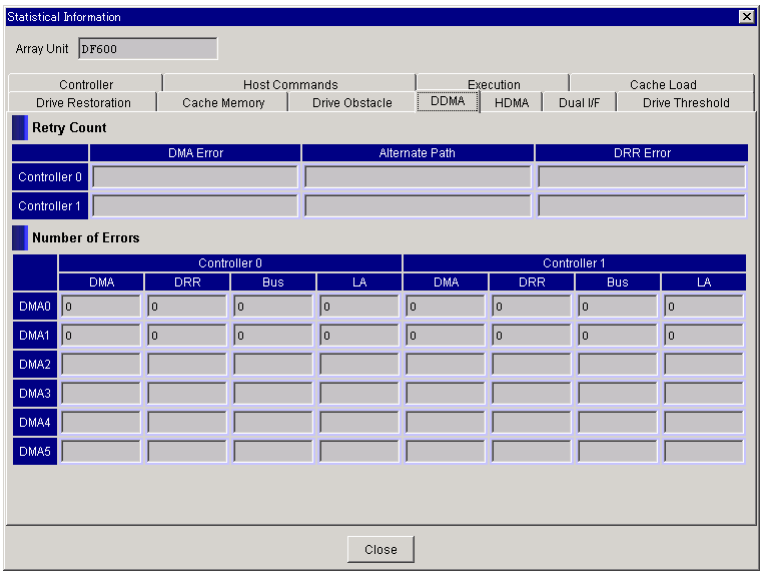


- Drive:
  Unit No. : Unit No. of the selected drive.
  HDU No. : HDU No. of the selected drive.

Copyright © 2002, 2005, Hitachi, Ltd.

- Number of Online Verify Errors : Accumulated number of errors that occurred when executing the read/write operations.
  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
  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

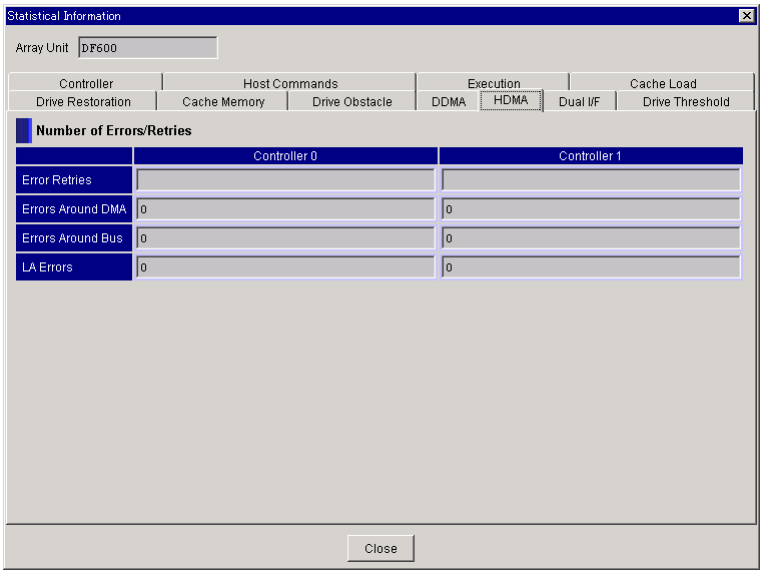
(h) Displaying Drive DMA failures statistical information
Click the DDMA tab.



- 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

Copyright © 2002, 2005, Hitachi, Ltd.

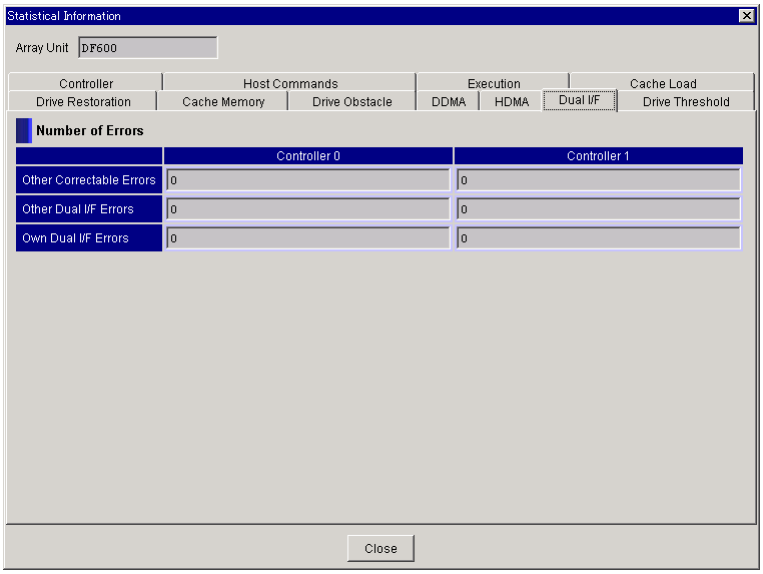
(i) Displaying Host DMA Failures Statistical Information
Click the HDMA tab.



- 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

Copyright © 2002, 2005, Hitachi, Ltd.

(j) Displaying DUAL I/F System Failures Statistical Information
Click the Dual I/F tab.

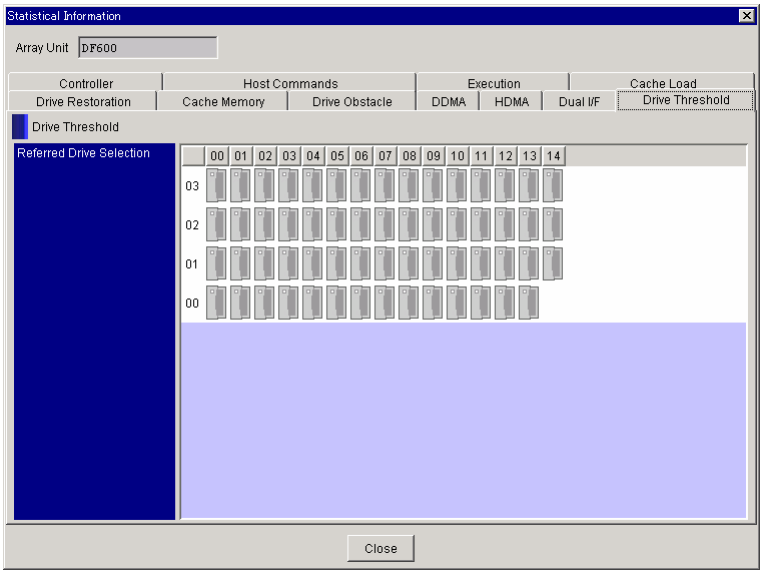


- Other Correctable Errors : Accumulated number of correctable errors occurred in the controller of another system
- Other Dual I/F Errors : Accumulated number of Dual I/F errors occurred in the controller of another system
- Own Dual I/F Errors : Accumulated number of Dual I/F errors occurred in the controller of own system

Copyright © 2002, 2005, Hitachi, Ltd.

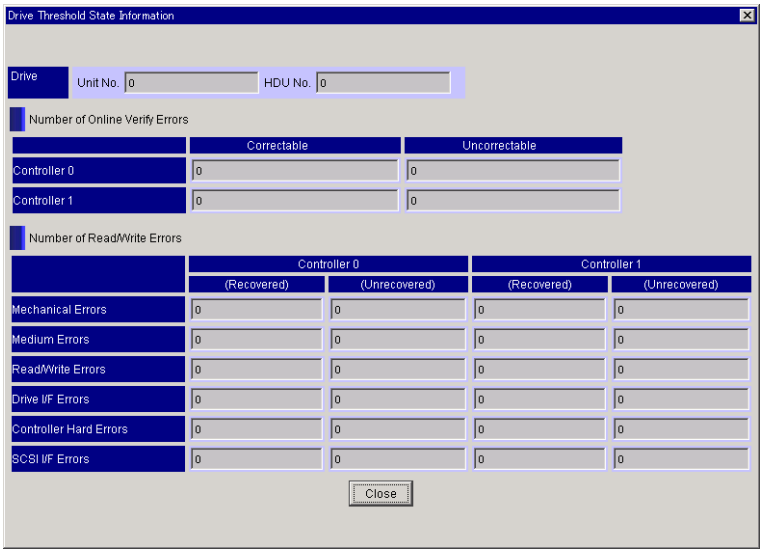
(k) Displaying Preventive Maintenance Failures Statistical Information

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.

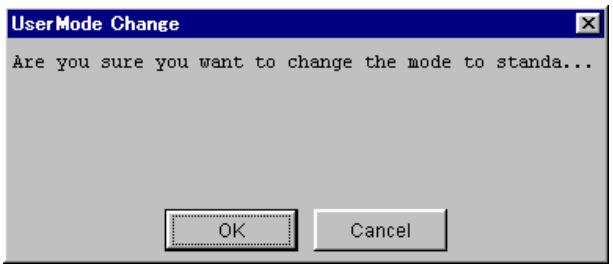
Copyright © 2002, 2005, Hitachi, Ltd.

- Number of Online Verify Errors : Accumulated number of errors that occurred when executing the read/write operations.
  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
  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

(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

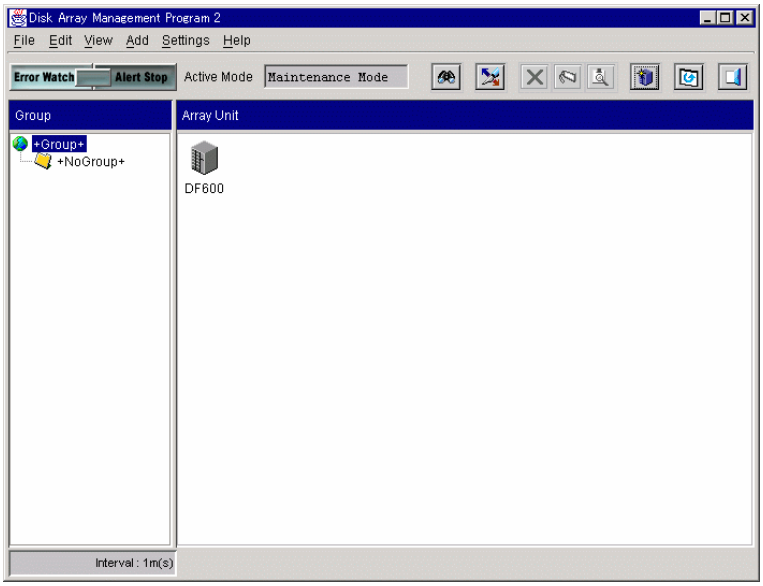
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.4 Displaying Logical Unit Failure Data Information

The PIN information of each logical unit is displayed.

(1) Start the Disk Array Management Program.

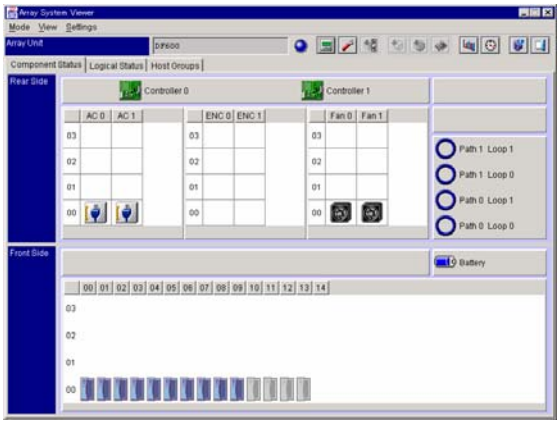
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



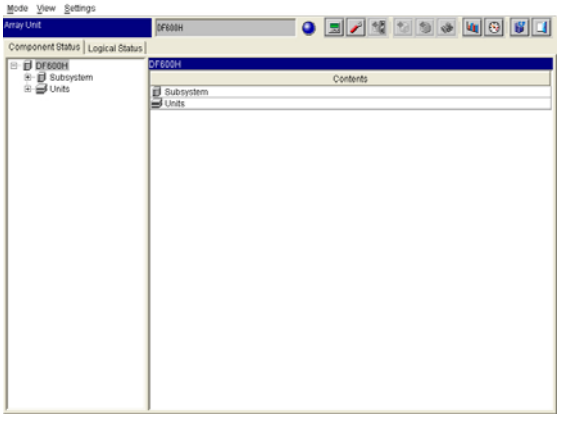
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



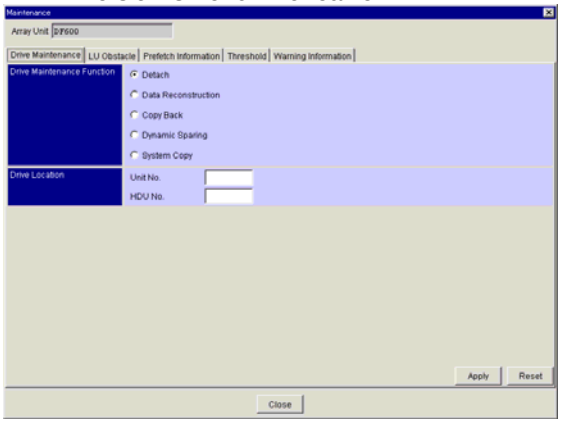
DAMP Version is Ver.9.00 or later.



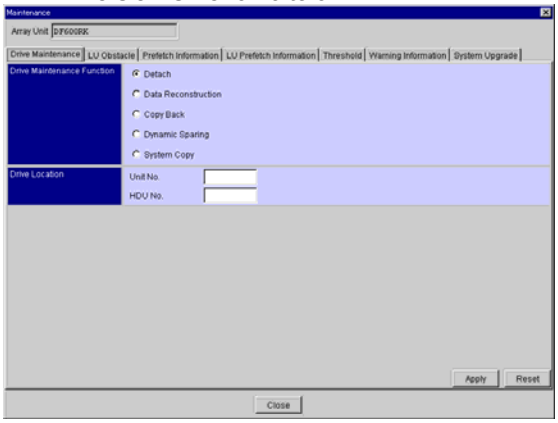
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

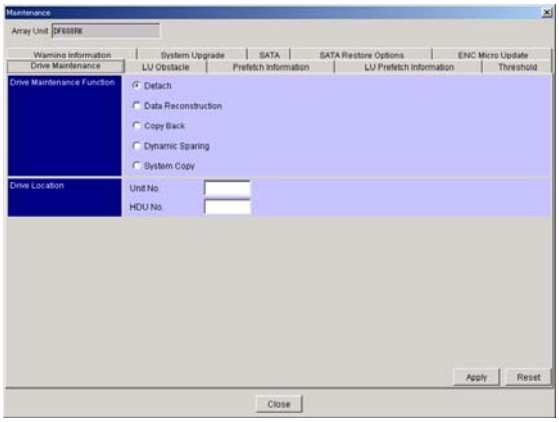
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



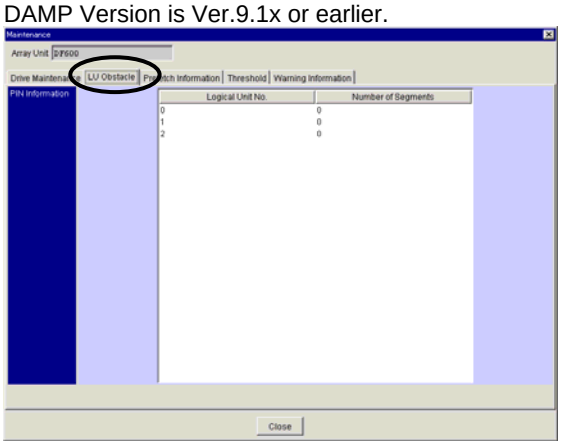
DAMP Version is Ver.9.50 or later.



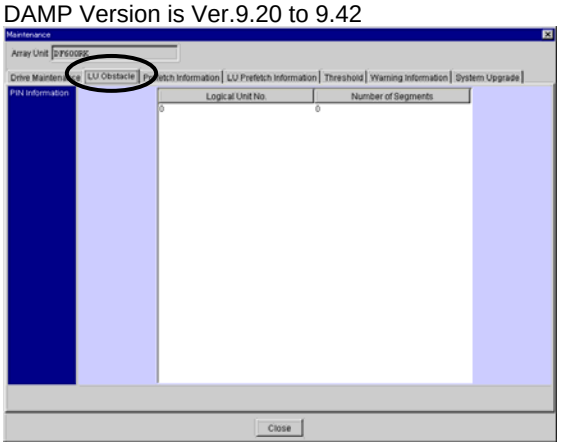
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Click the LU Obstacle tab on the Maintenance dialogue box.

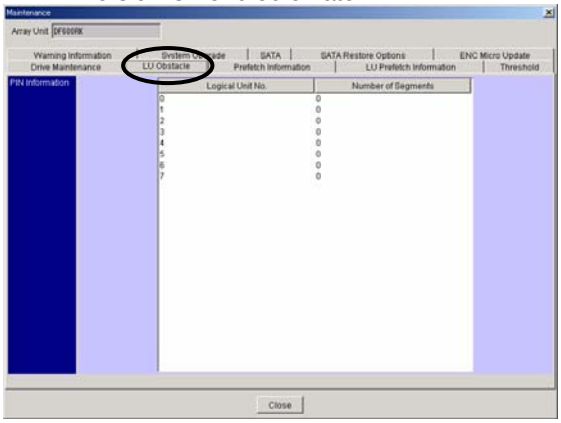
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



DAMP Version is Ver.9.50 or later.

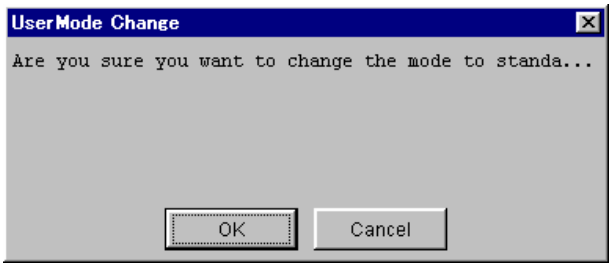


The number of segments, including PIN, in each logical unit is displayed.

(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

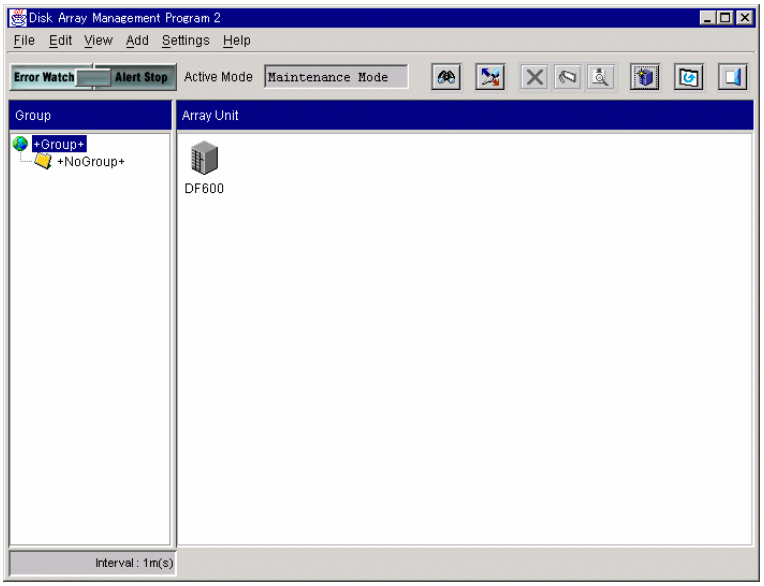
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.5 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 Disk Array Management Program.

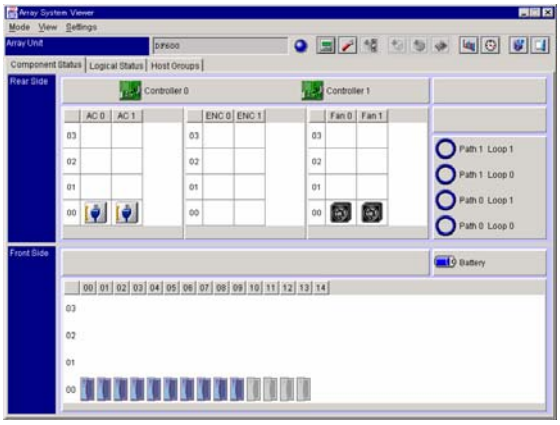
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



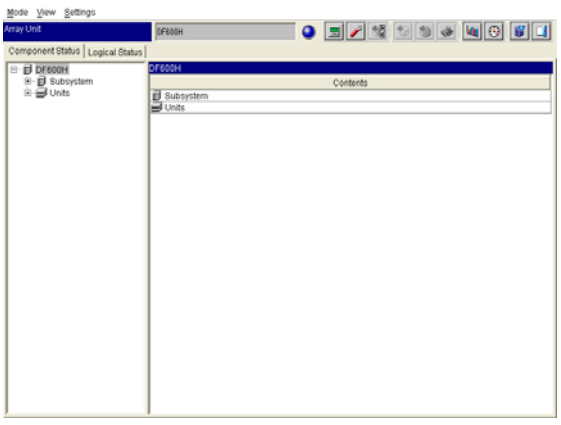
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



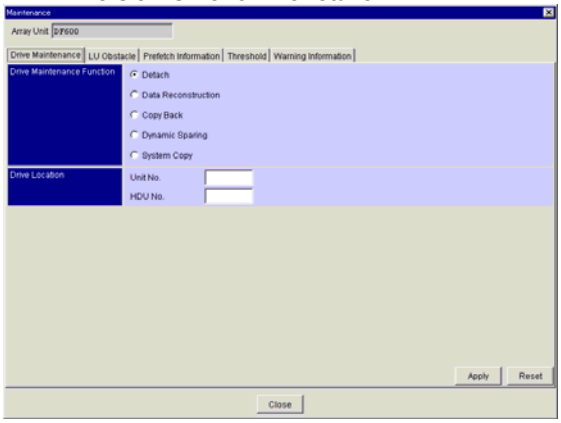
DAMP Version is Ver.9.00 or later.



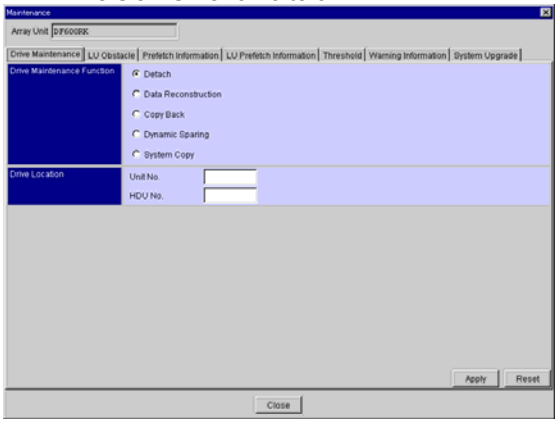
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

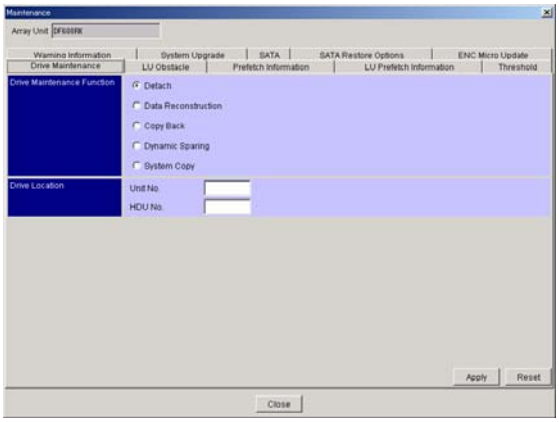
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



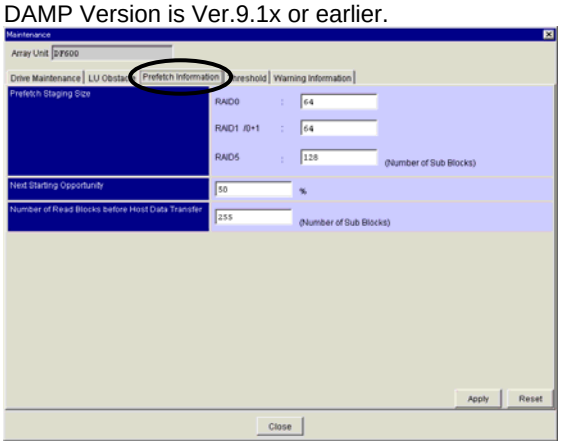
DAMP Version is Ver.9.50 or later.



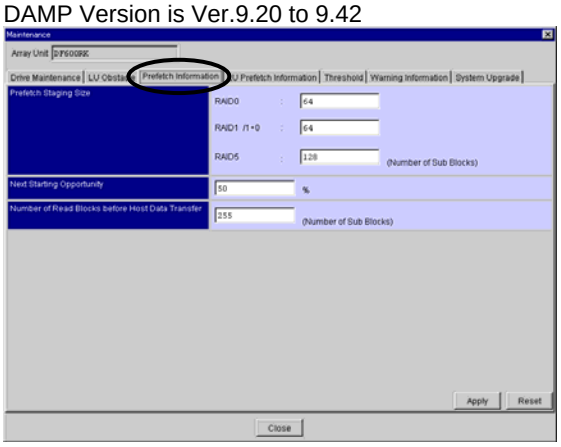
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Click the Prefetch Information tab on the Maintenance dialogue box.

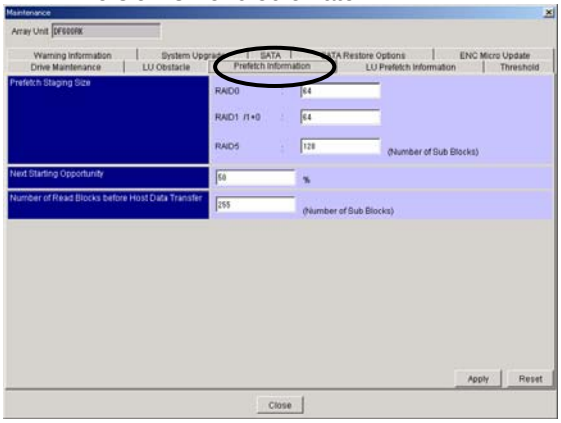
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



DAMP Version is Ver.9.50 or later.



(The description may be given as RAID 0+1, however, it has the same meaning as RAID 1+0.)

- Prefetch Staging Size : Specifies a prefetch staging size (base) value when performing sequential read.
  RAID0 : The prefetch staging size (base value) and the actual prefetch staging size are the same.
  RAID1 /1+0 : The actual prefetch staging size will be as follows.
  Prefetch staging size (base value) × 4 times.
  RAID5 : The actual prefetch staging size will be as follows depending on the stripe size.
  Stripe size 64 kbytes : Prefetch staging size (base value) × 4 times
- Next Starting Opportunity : When prefetching by sequential read, specify a next starting opportunity. If you specify 50 [%], a next prefetch is performed on the opportunity of having transferred to the host 50 [%] of the prefetched data amount.

Copyright © 2002, 2005, Hitachi, Ltd.

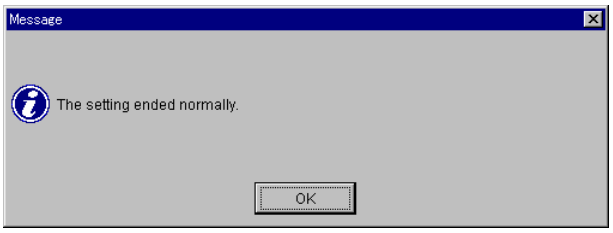
- Number of Read Blocks before Host Data Transfer:

  Reading transfers data from a disk to the host via cache. Data transfer to the host is started on the opportunity of the number of blocks of the data transferred from a disk to the cache. It specifies an opportunity to start data transfer to the host.

  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) Change the value and click Apply button.

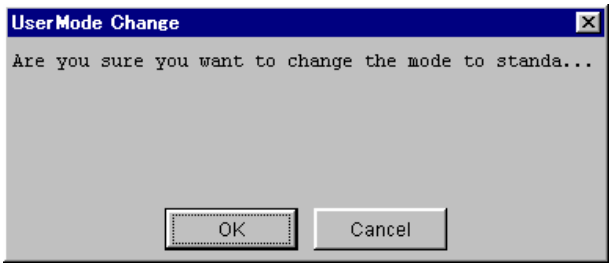
(7) A confirming message appears. Click [OK] button.



(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.

(10) A confirming message appears. Click the [OK] button.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

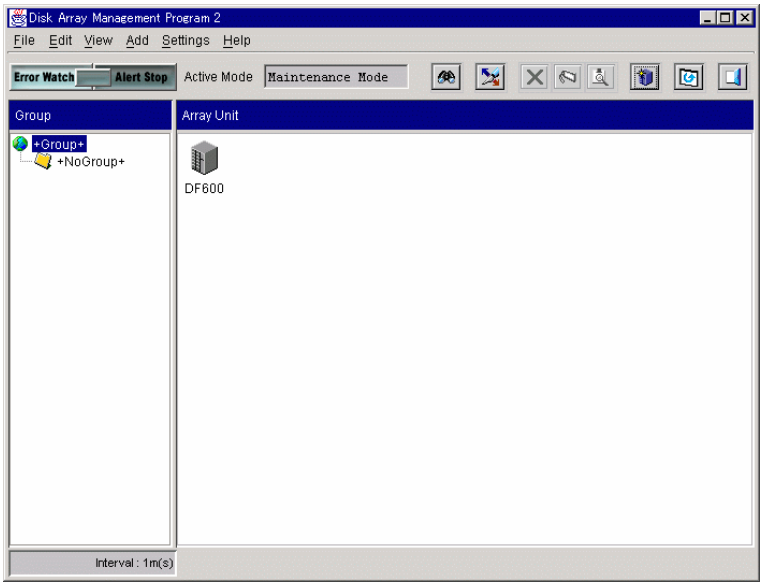
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.6 Setting a Threshold for Preventive Maintenance

A threshold for the number of drive failure managed in preventive maintenance is set.

(1) Start the Disk Array Management Program.

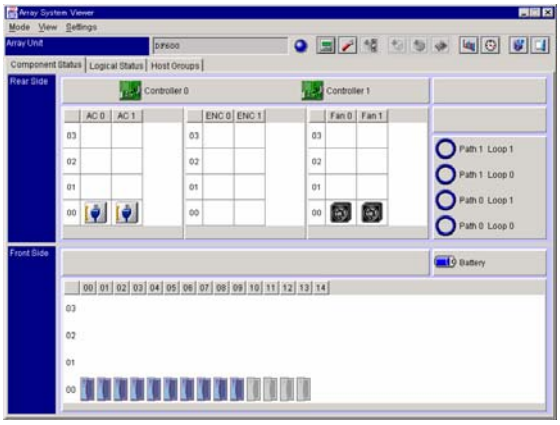
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



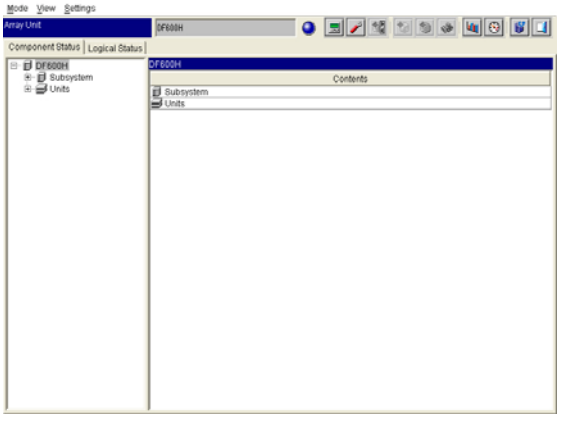
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



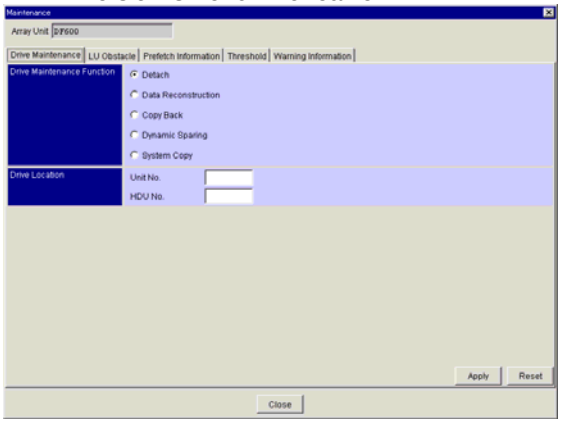
DAMP Version is Ver.9.00 or later.



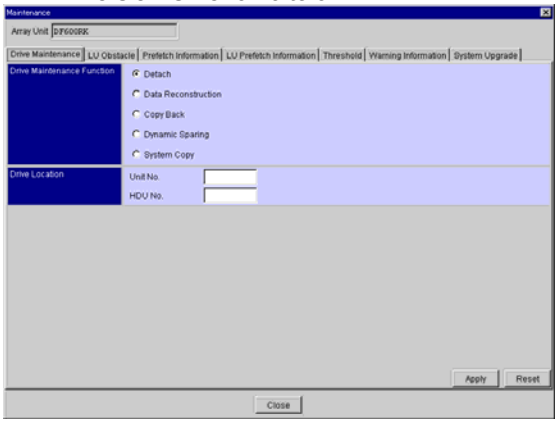
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

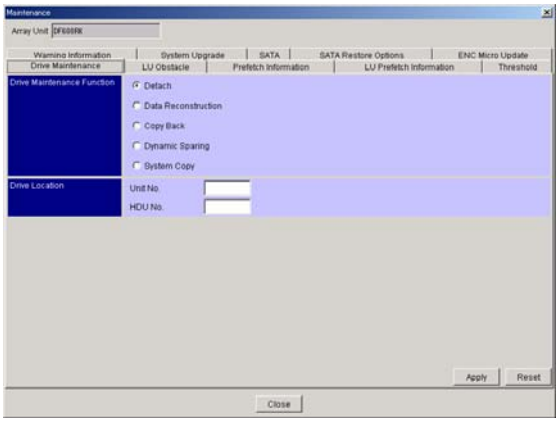
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



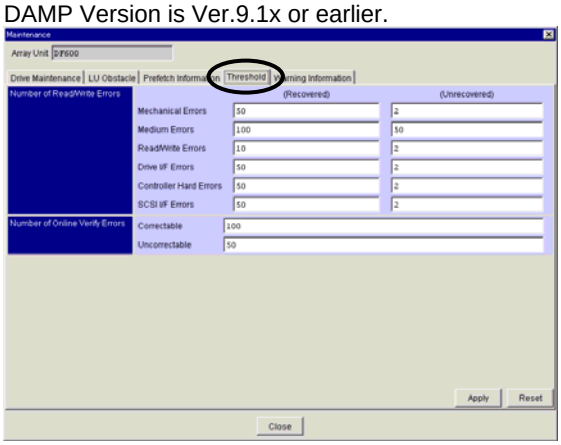
DAMP Version is Ver.9.50 or later.



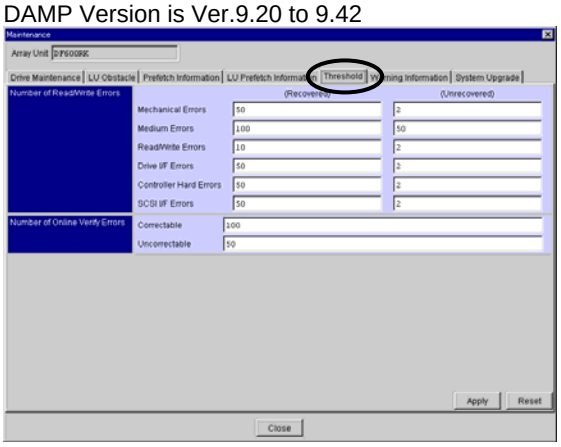
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Click the Threshold tab on the Maintenance dialogue box.

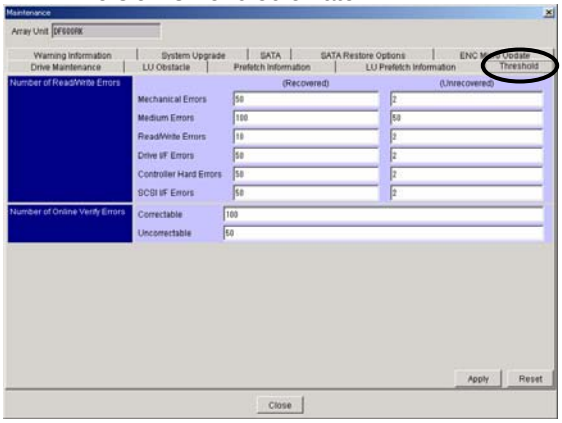
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



DAMP Version is Ver.9.50 or later.



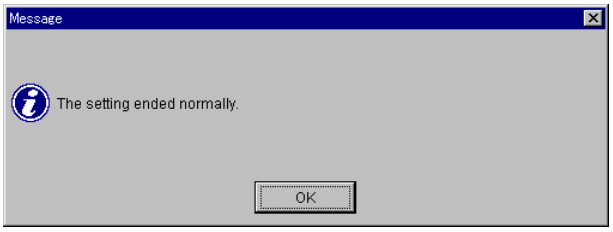
- Number of Read/Write Errors : Specifies a threshold of a read/write error.
  Mechanical Errors : Accumulated number of mechanical error occurrences
  Medium Errors : Accumulated number of medium error occurrences
  Read/Write Errors : Accumulated number of read/write error occurrences
  Drive I/F Errors : Accumulated number of drive interface error occurrences
  Controller Hard Errors : Accumulated number of controller hardware error occurrences
- 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.

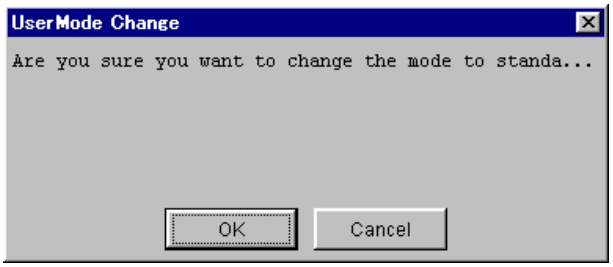
NOTE : A threshold is set at an optimum value : If the setting is changed unpreparedly, it may perform preventive maintenance operation outside the range of it or may not operate even though there is an object for it: When changing it, contact the manufacturer in advance.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

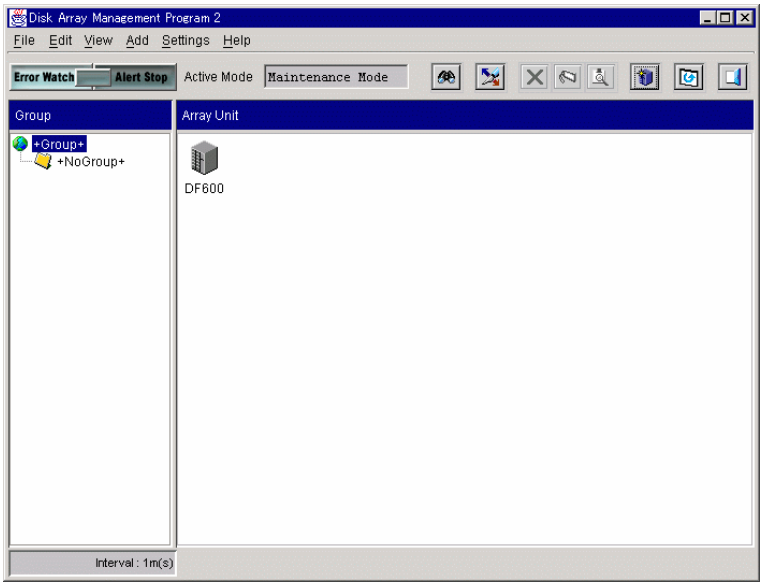
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.7 Drive Maintenance

Performs maintenance functions on drives mounted in array units such as blocking a drive forcibly and instructing to restore.

(1) Start the Disk Array Management Program.

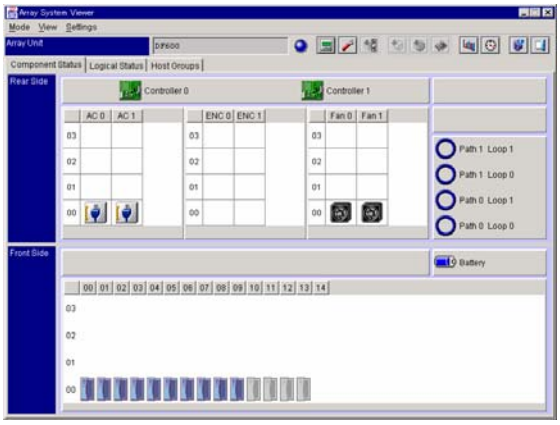
(2) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



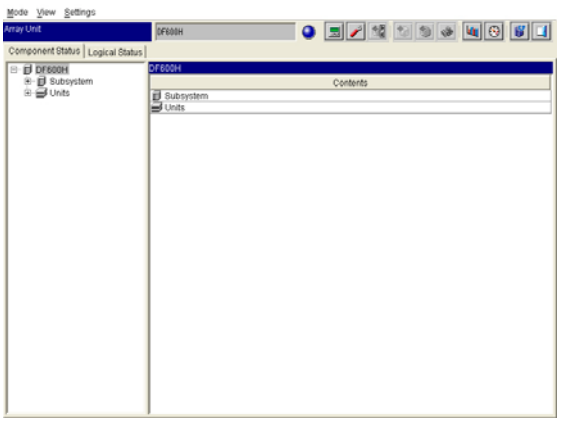
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



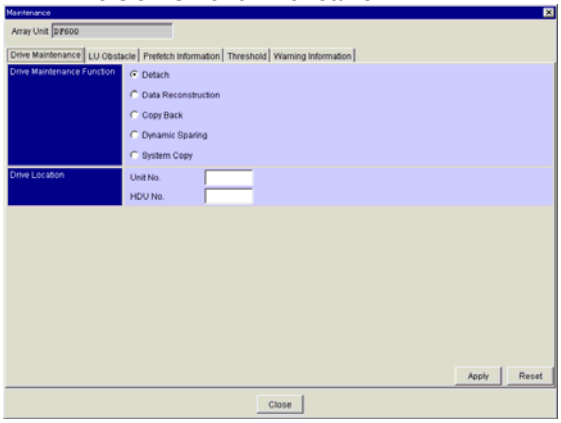
DAMP Version is Ver.9.00 or later.



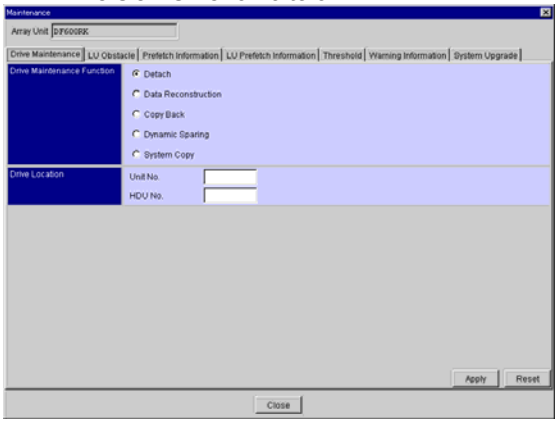
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

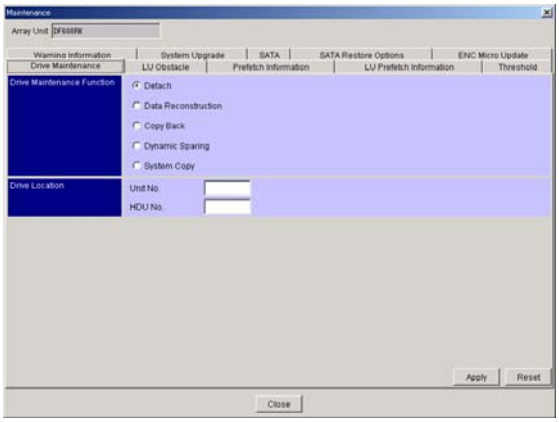
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



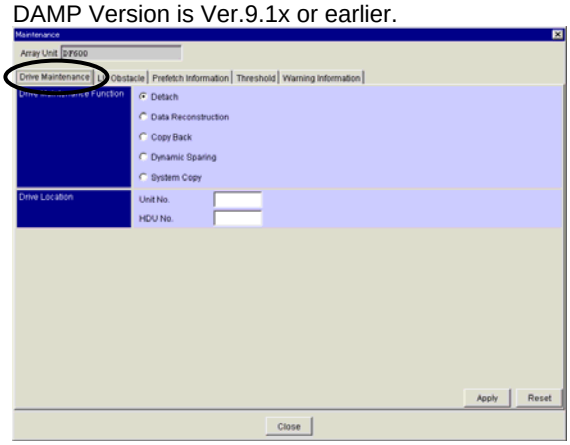
DAMP Version is Ver.9.50 or later.



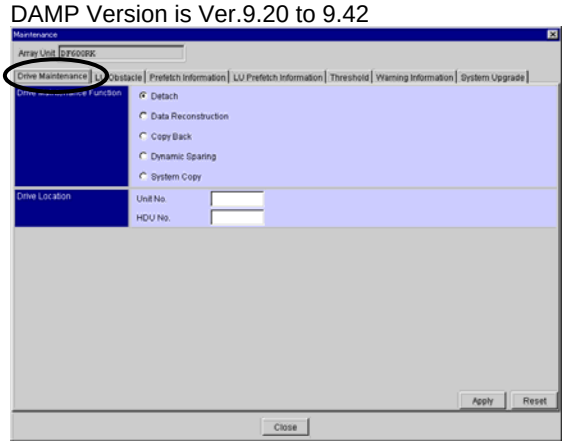
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Click the Drive Maintenance tab on the Maintenance dialogue box.

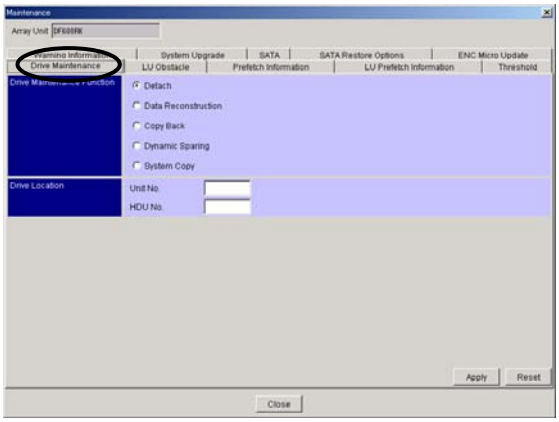
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



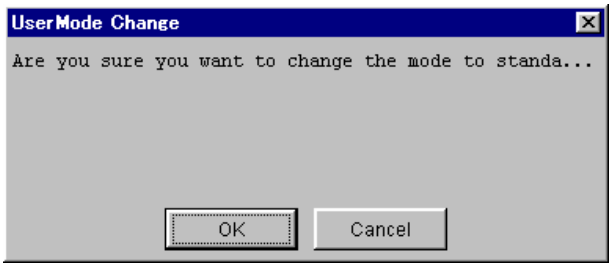
DAMP Version is Ver.9.50 or later.



- Drive Maintenance Function:
  Detach : Blocks a drive specified in the Drive Location box forcibly.
  Data Reconstruction : Reconstructs data on a drive specified in the Drive Location box. To a drive specified in the Drive Location box, execute reconstruction after replacing its HDU. If executing without replacing an HD, this results in an error without executing the reconstruction.
  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

Copyright © 2002, 2005, Hitachi, Ltd.

(6) Select the Drive Maintenance Function to perform, and specifies the Drive Location of a drive on which to perform a selected function.
(7) If you click the Apply button, a selected function will be performed.
(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

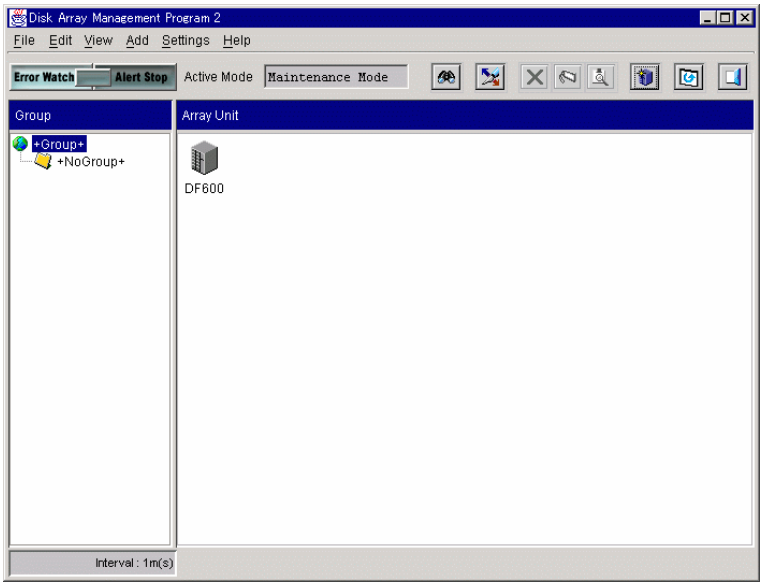
Copyright © 2002, 2005, Hitachi, Ltd.

4.2.8 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 Disk Array Management Program.

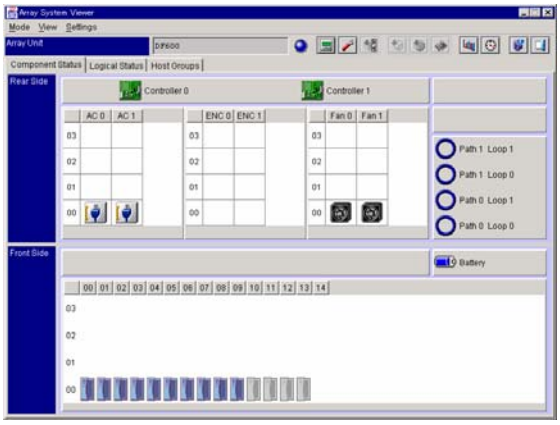
(2) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



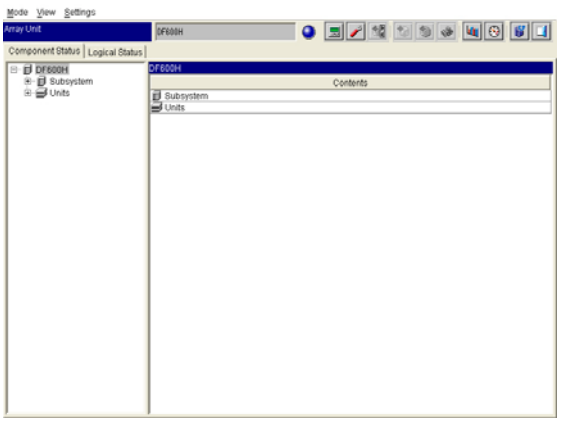
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

DAMP Version is Ver.7.xx or earlier.



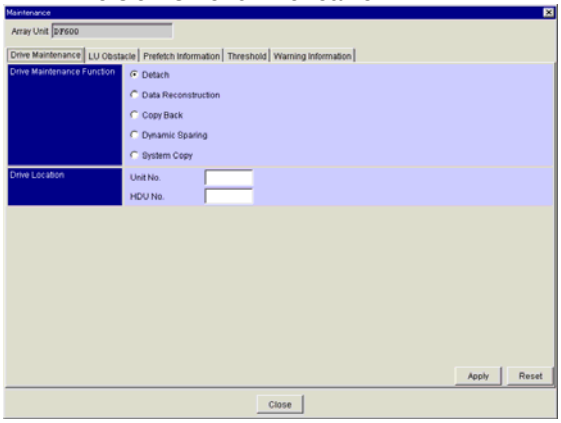
DAMP Version is Ver.9.00 or later.



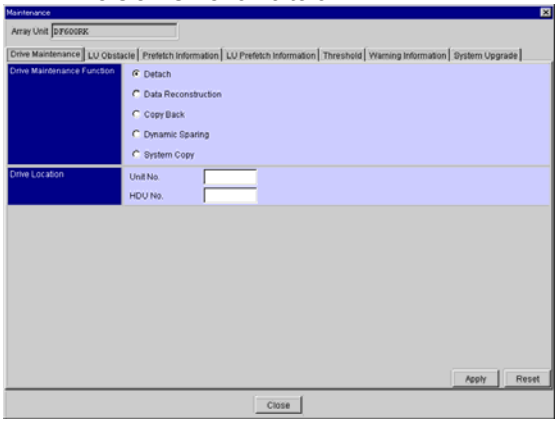
Copyright © 2002, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

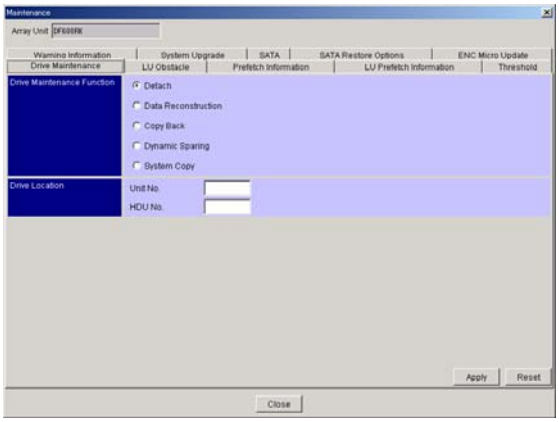
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



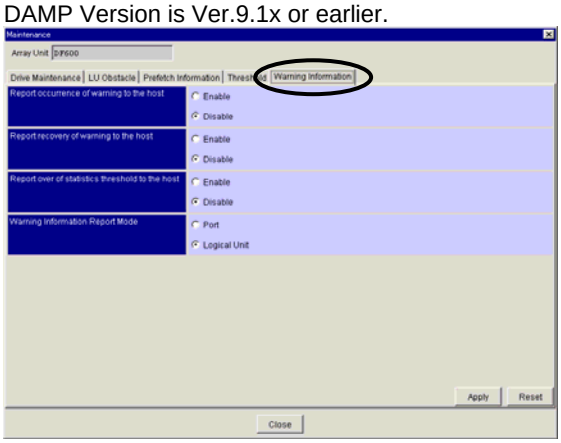
DAMP Version is Ver.9.50 or later.



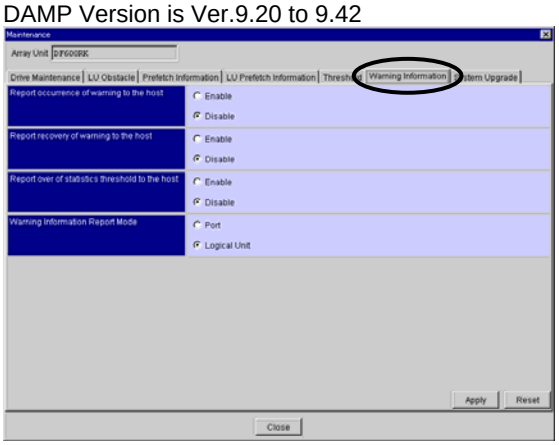
Copyright © 2002, 2005, Hitachi, Ltd.

(5) Click the Warning Information tab on the Maintenance dialogue box.

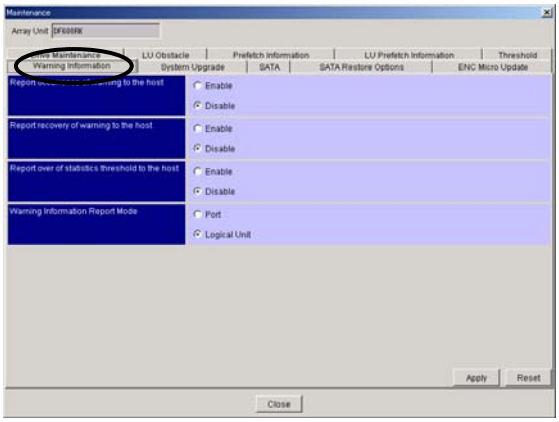
DAMP Version is Ver.9.1x or earlier.



DAMP Version is Ver.9.20 to 9.42



DAMP Version is Ver.9.50 or later.

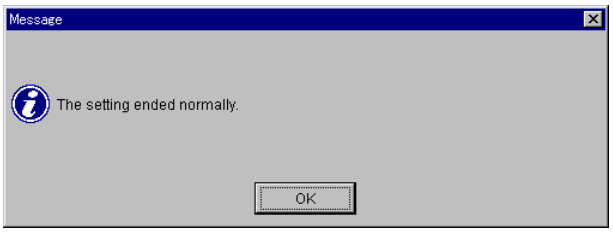


- Report occurrence of warning to the host : Reporting an SSB to the host when a failure that causes a warning occurs.
- Report recovery of warning to the host : Reporting an SSB to the host when the subsystem recovers from a failure which caused a warning.
- Report over of statistics threshold to the 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.

Copyright © 2002, 2005, Hitachi, Ltd.

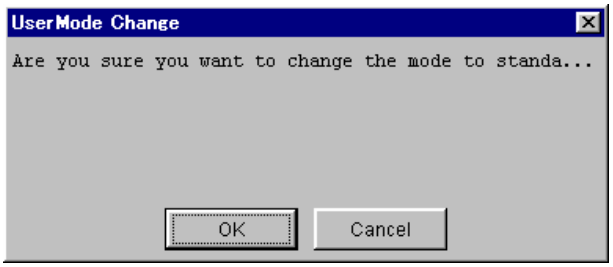
(7) A confirming message appears. Click the [OK] button.



(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

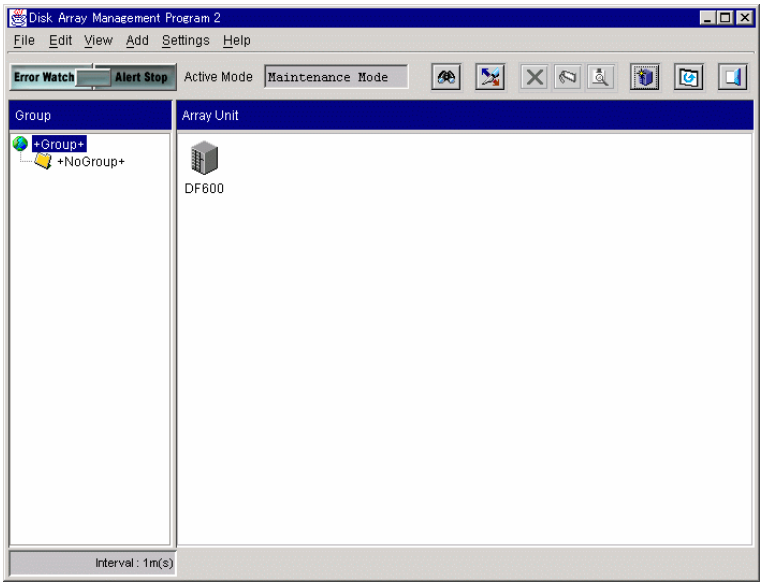
Copyright © 2004, 2005, Hitachi, Ltd.

4.2.9 System Upgrade

When upgrading a subsystem, with reference to the variety of information of partner equipment, the information is set as self-equipment. (Disk Array Management Program Ver.9.20 or later, Microprogram revision x656 or later)

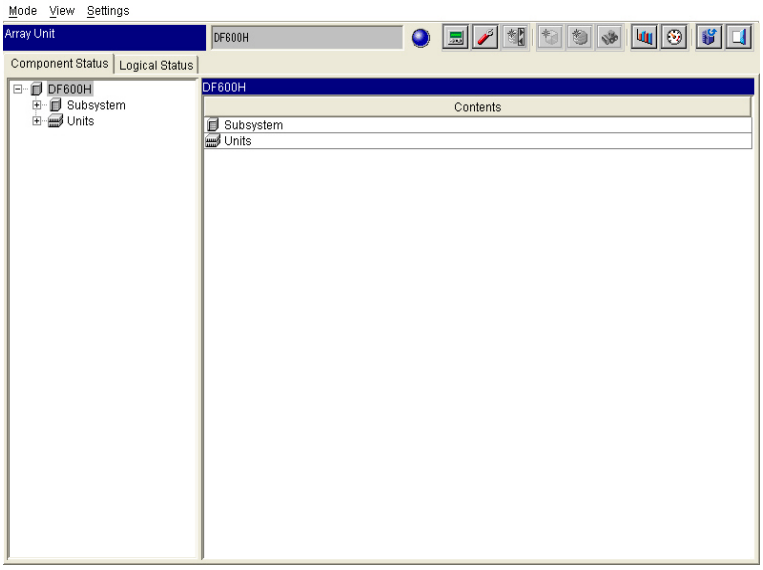
(1) Start the Disk Array Management Program.

(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 Disk Array Management Program operates in the maintenance mode.

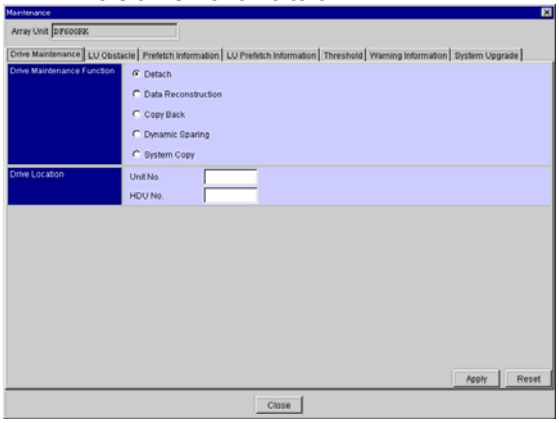
(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.



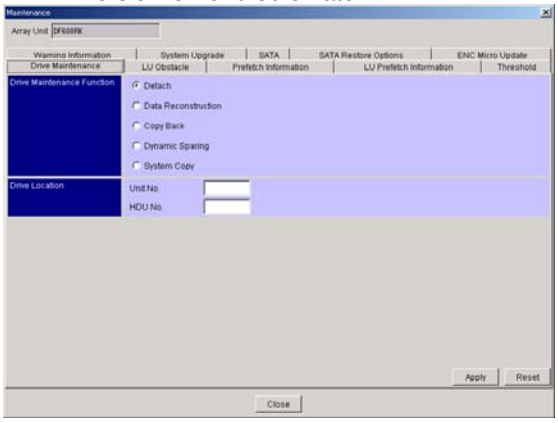
Copyright © 2004, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

DAMP Version is Ver.9.20 to 9.42

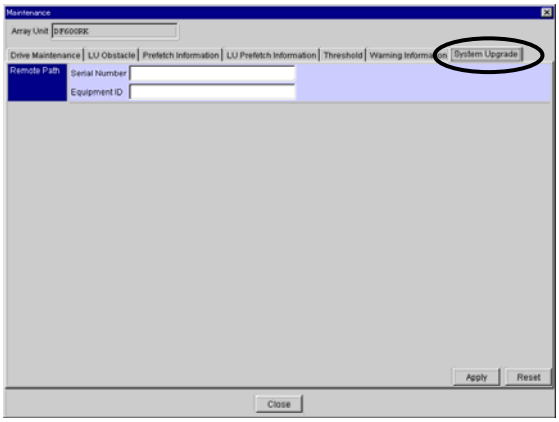


DAMP Version is Ver.9.50 or later.

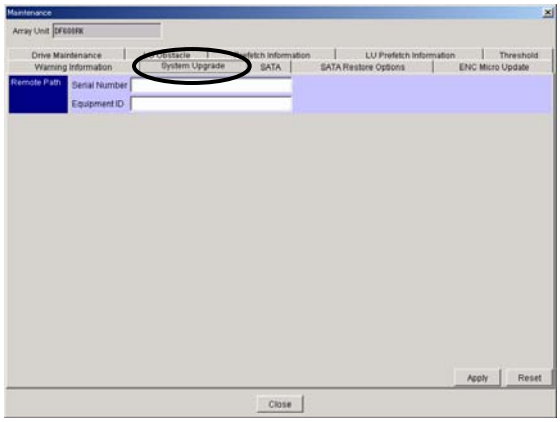


(5) Click the System Upgrade tab on the Maintenance dialogue box.

DAMP Version is Ver.9.20 to 9.42



DAMP Version is Ver.9.50 or later.

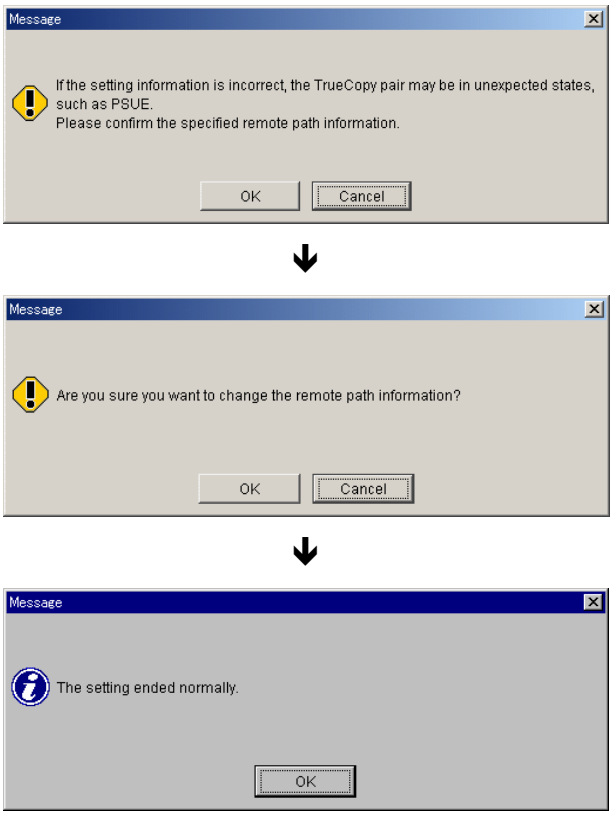


- Serial Number: Specify the serial number of a subsystem to refer to in eight digits.
- Equipment ID: Specify the equipment ID of a subsystem to refer to in four digits.

(6) Enter the Serial Number and the Equipment ID, and then click the [Apply] button.

Copyright © 2004, 2005, Hitachi, Ltd.

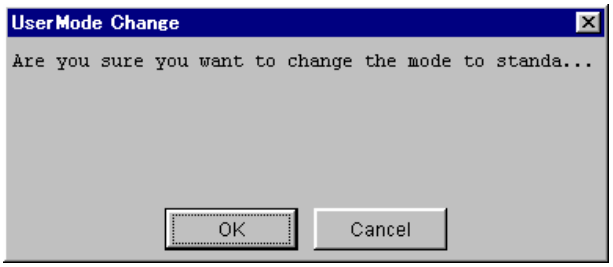
(7) A confirming message appears. Click the [OK] button.



(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

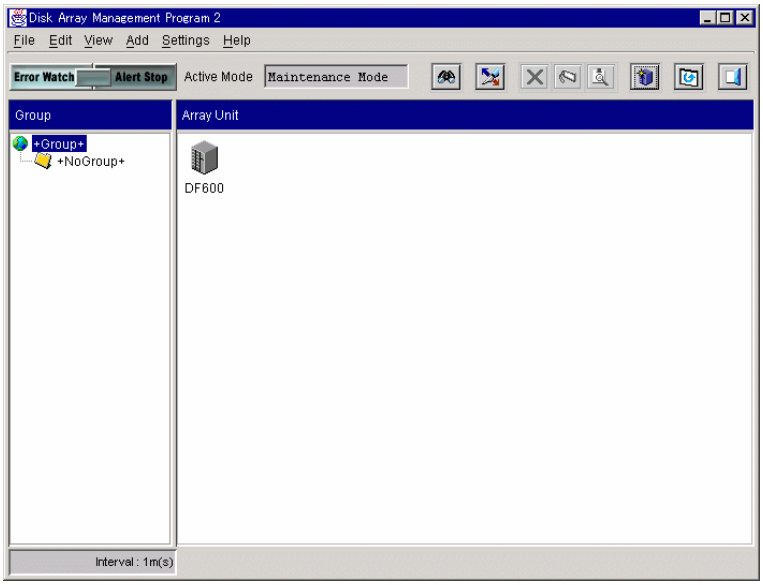
Copyright © 2004, 2005, Hitachi, Ltd.

4.2.10 Setting SATA Drive Options

Refer to or set the SATA drive option. (Disk Array Management Program Ver.9.51 or later, Microprogram revision x658 or later)

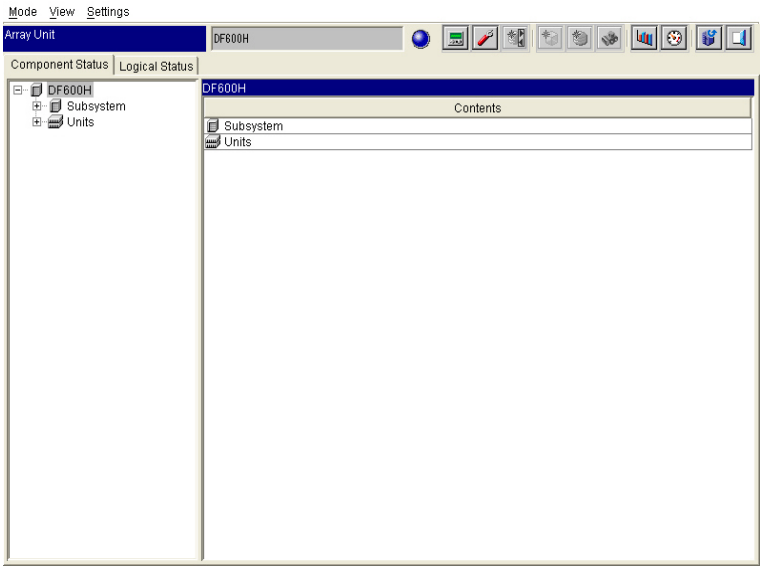
(1) Start the Disk Array Management Program.

(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.



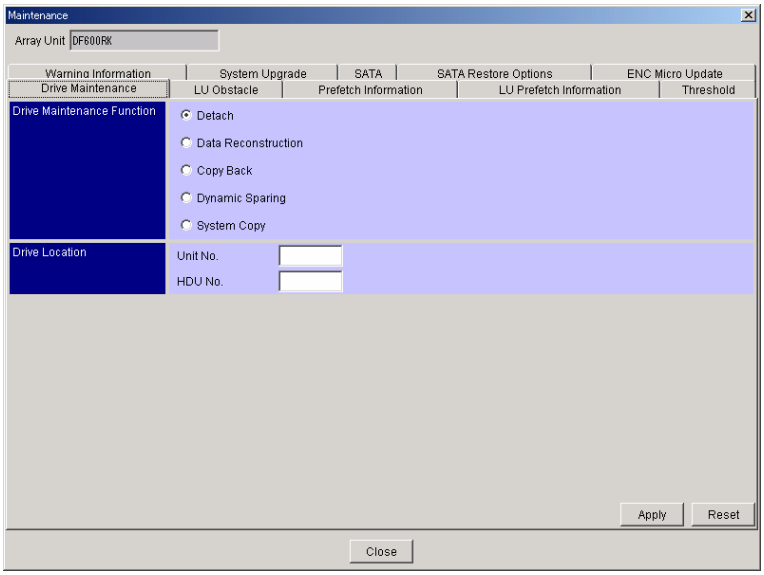
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

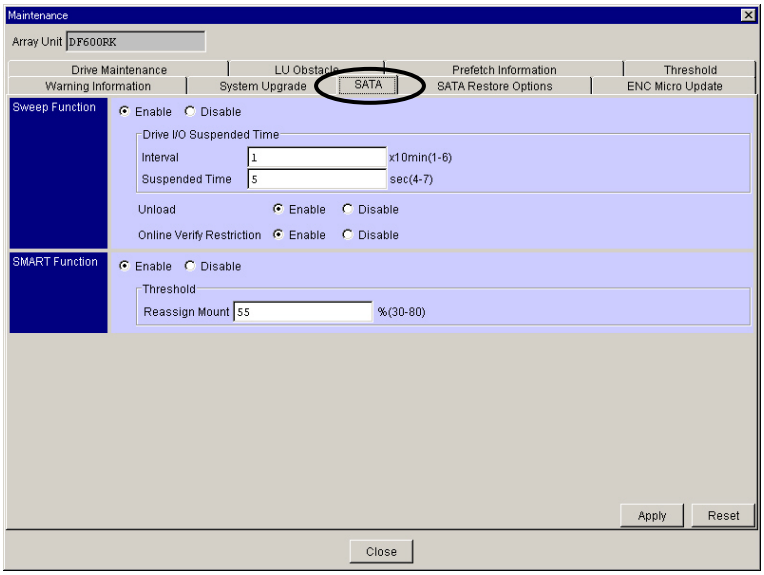


Copyright © 2004, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



(5) Click the SATA tab on the Maintenance dialogue box.

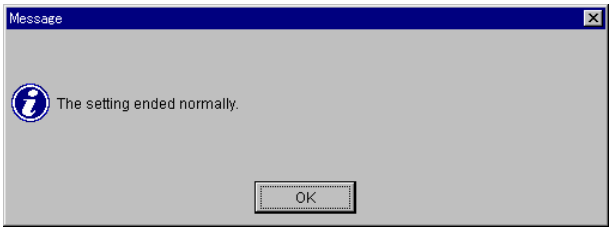


- Sweep Function:
  Enable/Disable: Make a selection whether to enable or disable the Sweep Function.
  Drive I/O Suspended Time: Specify the drive I/O Suspended Time for the SATA drive with Interval and Suspended Time.
  Unload: Make a selection whether to enable or disable the Unload Function.
  Online 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.

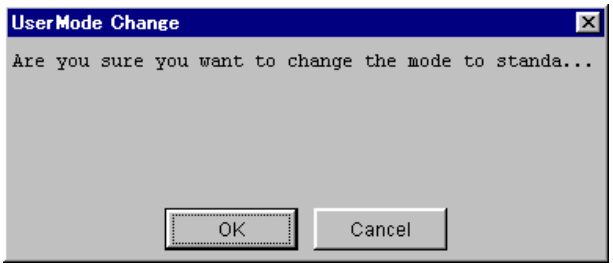
Copyright © 2004, 2005, Hitachi, Ltd.

- 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.
(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.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

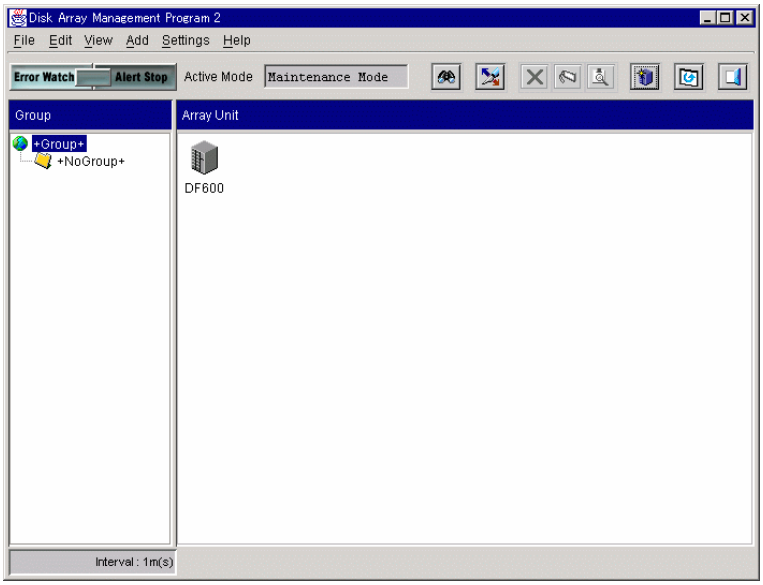
Copyright © 2004, 2005, Hitachi, Ltd.

4.2.11 Setting SATA Drive Restore Options

Refer to or set the SATA drive restore option. (Disk Array Management Program Ver.9.50 or later, Microprogram revision x658 or later)

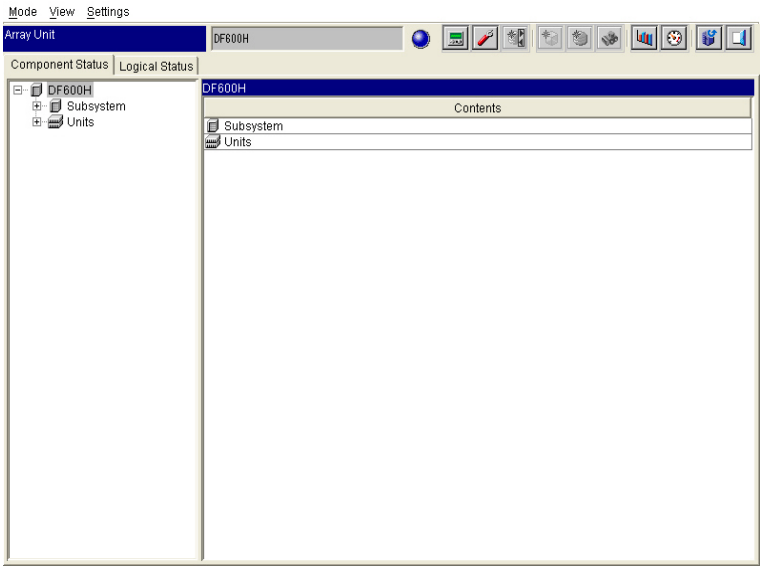
(1) Start the Disk Array Management Program.

(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.



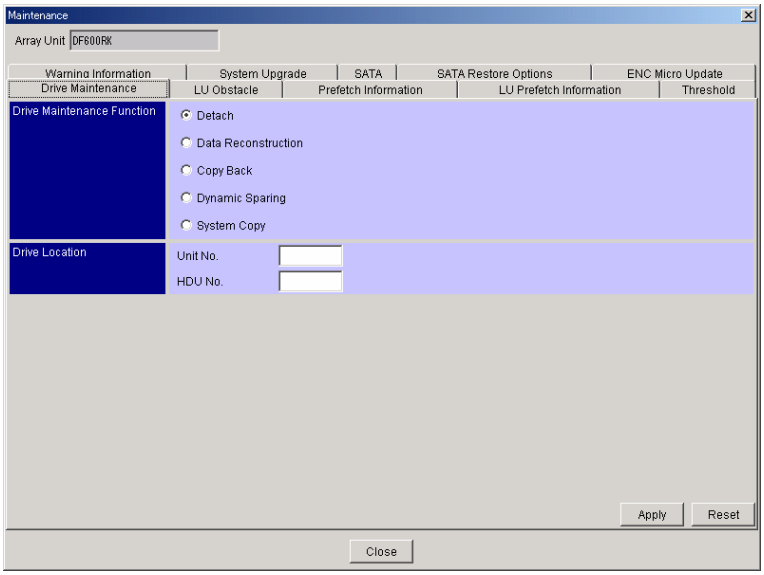
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(3) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

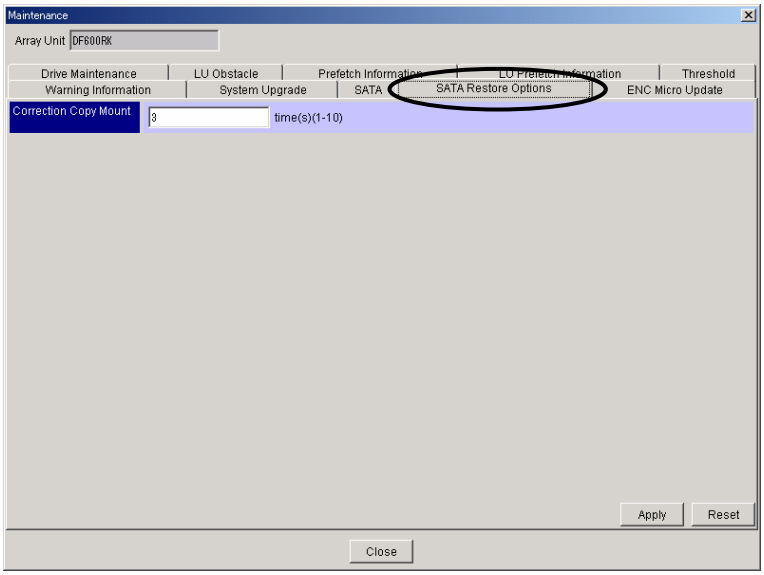


Copyright © 2004, 2005, Hitachi, Ltd.

(4) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



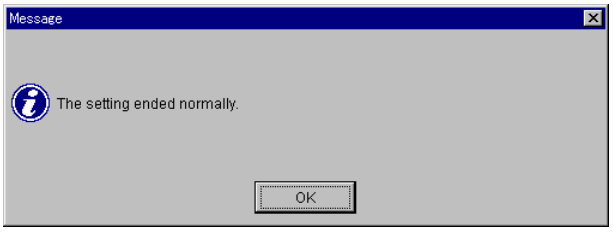
(5) Click the SATA Restore Options tab on the Maintenance dialogue box.



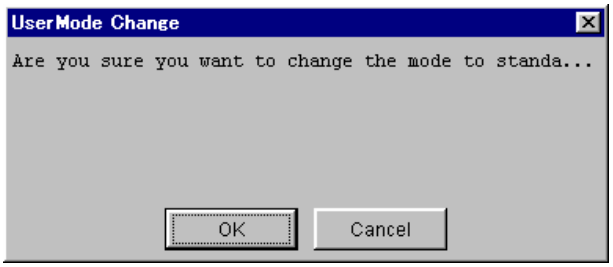
- Correction Copy Mount: Specify the size of data to be restored at a time with by means of a correction copy as a multiple n of the FC drive capacity.

Copyright © 2004, 2005, Hitachi, Ltd.

(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.
(10) A confirming message appears. Click the [OK] button.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

Copyright © 2004, 2005, Hitachi, Ltd.

4.2.12 Replacing the ENC Micro Program

The function downloads and replaces the ENC micro program in the array unit. When replacing the ENC micro program, download it, and then replace it. (Disk Array Management Program Ver.9.50 or later, Microprogram revision x658 or later)

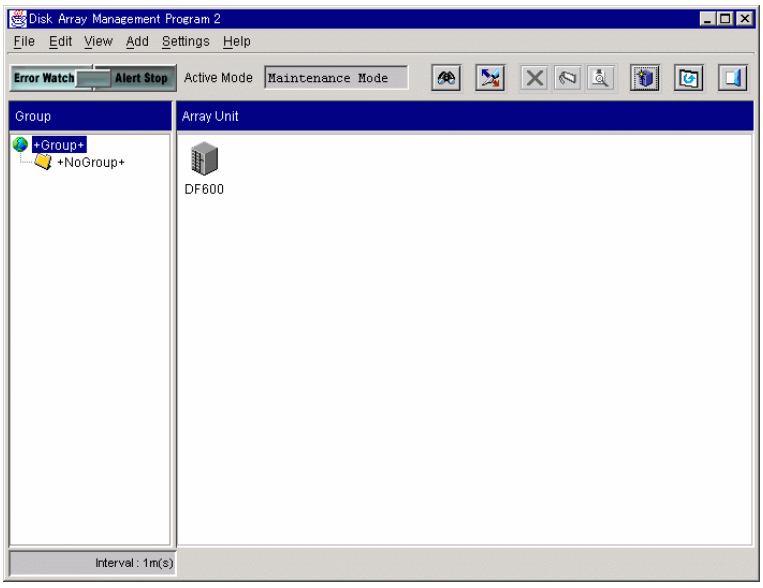
(1) ENC Micro Program Download
Download the micro program from the CD-R into the array unit. In the download, the micro program is stored in the array unit; the micro program of the array unit is not replaced.

(a) Copy the micro program from the CD-R to the hard disk.
When using Windows®, the micro program can be stored from the CD-R; the micro program is not copied when it is stored from the CD-R.
When using Solaris™, IRIX®, HP-UX®, or Red Hat Linux® the micro program is copied. CD-R is copied to the hard disk using a different directory.

NOTE : For a directory where the Disk Array Management Program is installed, do not copy the micro program directly to the CD-R. Create a sub-directory and copy it under this sub-directory. Specify the name of a directory in the hard disk drive to which the micro program is copied, with a one-byte coded alphanumeric.

(b) Start the Disk Array Management Program.

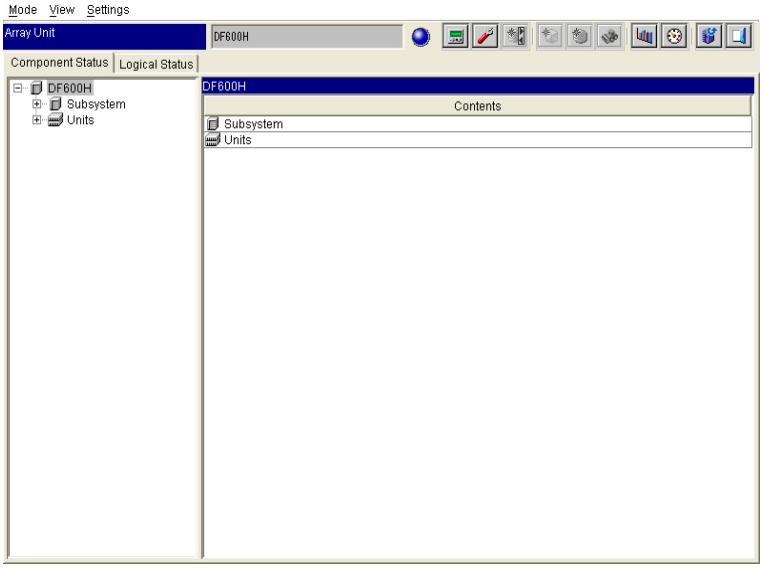
(c) In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



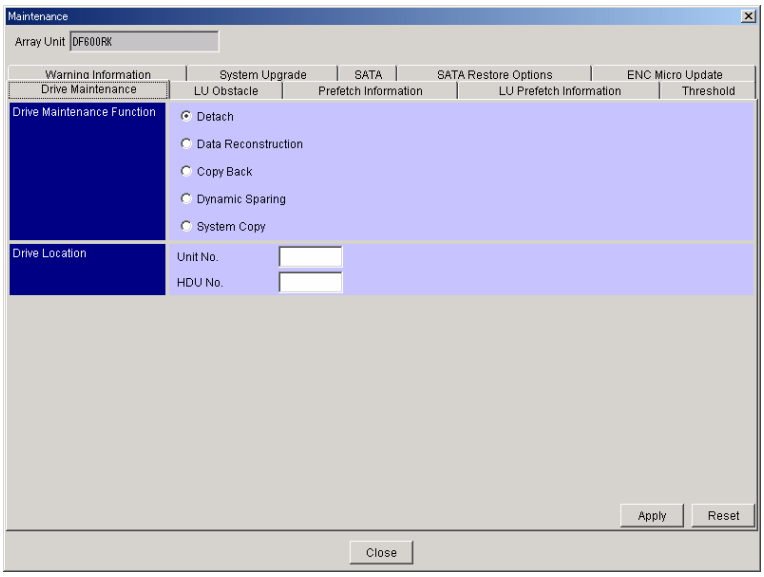
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

Copyright © 2004, 2005, Hitachi, Ltd.

(d) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

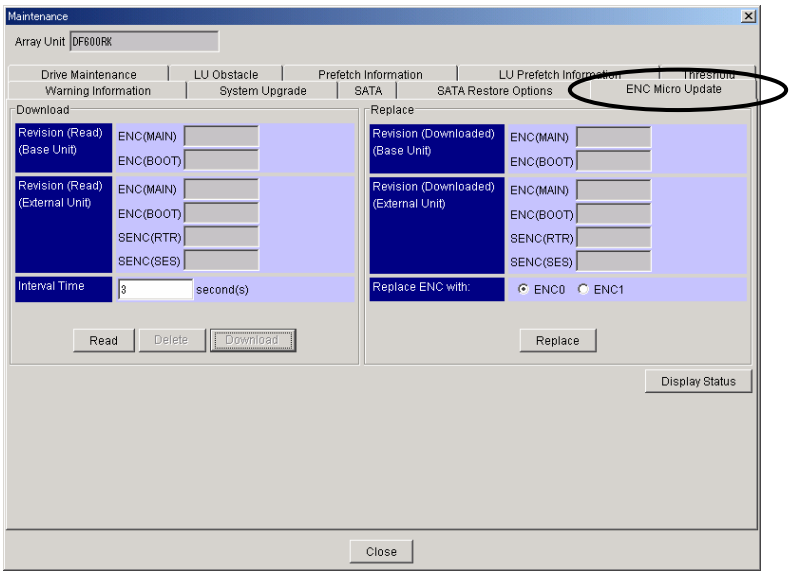


(e) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



Copyright © 2004, 2005, Hitachi, Ltd.

(f) Click the ENC Micro Update tab on the Maintenance dialogue box.



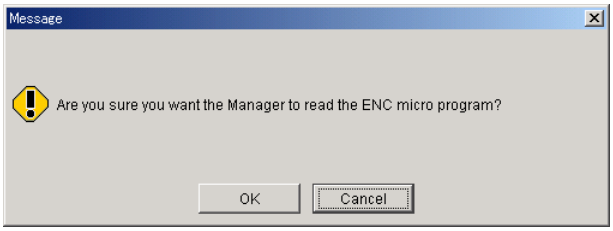
- Revision (Read) (Base Unit): A base unit micro program revision stored in the computer in which the Manager 2 is installed. When the micro program is not read, a blank is displayed.
- Revision (Read) (External Unit): An external unit micro program revision stored in the computer in which the Manager 2 is installed. When the micro program 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 micro program revision downloaded in the subsystem. When the micro program is not downloaded, a blank is displayed.
- Revision (Downloaded) (External Unit): An external unit micro program revision downloaded in the subsystem. When the micro program is not downloaded, a blank is displayed.

When no micro program is read, the Delete and Download buttons are displayed in gray and cannot be selected.

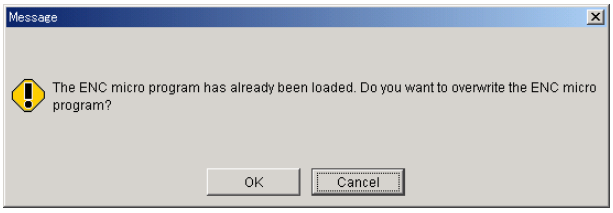
Copyright © 2004, 2005, Hitachi, Ltd.

(g) The micro program is read into the PC or Server/Workstation in which the Disk Array Management Program is installed. Click the [Read] button. When a revision is displayed in Revision (Read), the micro program is already read. To download the micro program that is already read, execute Download. When you have clicked the [Read] button, specify the directory in which the micro program is installed.

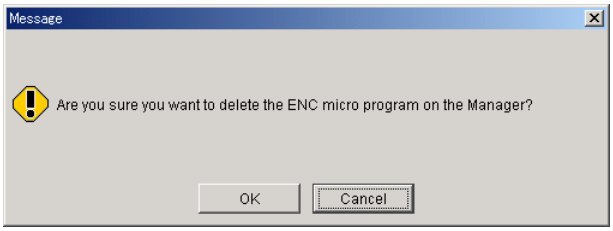
(h) When a confirmation message appears, asking whether or not to read the micro program appears, click the [OK] button.



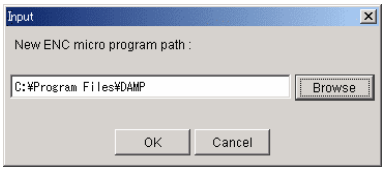
If the micro program is already read, a confirmation message is displayed. When the [OK] button is clicked, the micro program is overwritten. To stop reading the micro program, click the [Cancel] button.



To delete the micro program that is already read in the PC or Server/Workstation, click the [Delete] button. When a confirmation message appears, click the [OK] button.

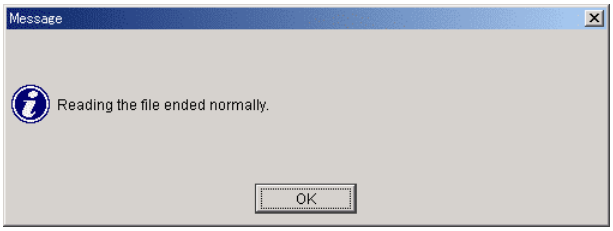


(i) When the Input window for specifying a directory in which the read micro program exits appears, enter the directory or click the [Browse] button, and specify the directory. When the [OK] button is clicked, reading the micro program is started.

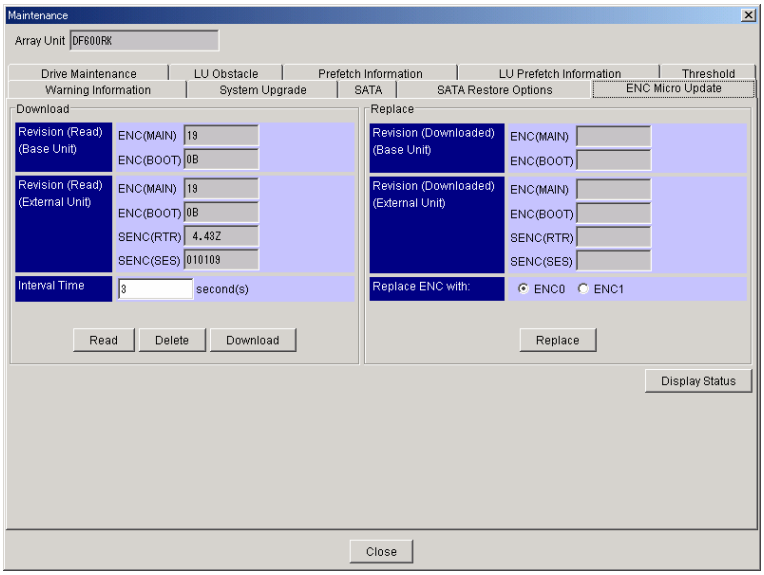


Copyright © 2004, 2005, Hitachi, Ltd.

(j) When a message indicating that the micro program has been read appears, click the [OK] button.

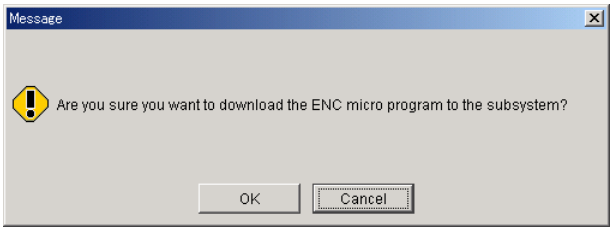


The revision of the read micro program is displayed in the Revision (Read) field.



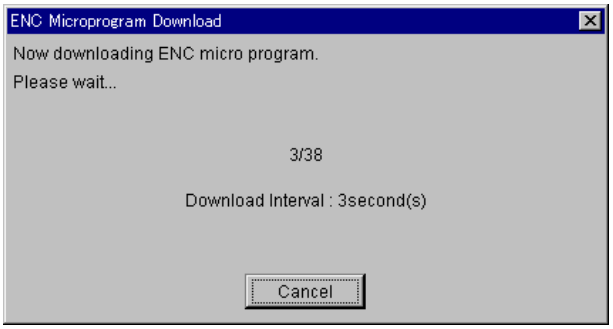
(k) To download the micro program, click the [Download] button.

(l) When a confirmation message appears, requesting confirmation to download the micro program appears, click the [OK] button.

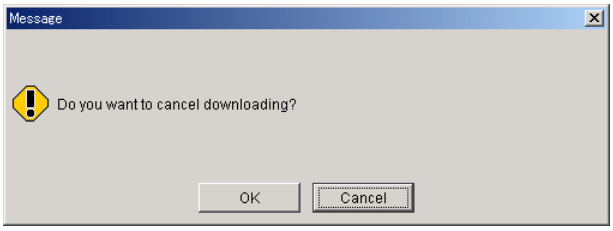


Copyright © 2004, 2005, Hitachi, Ltd.

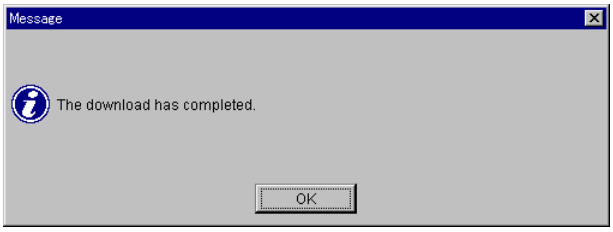
A message appears, stating that the download is being executed. This message displays progress and interval time.



The download can be aborted. To abort the download halfway, click [Cancel]. A confirmation message is displayed. When the [OK] button is clicked, the download is aborted. When the [Cancel] button is clicked, the download is continued.



(m) When the micro program is normally downloaded, a confirmation message appears. Click the [OK] button.



NOTE : After the micro program is downloaded, restart the array unit or replace the micro program. If a hot replacement of the ENC is done before restarting the array unit or the micro program replacement, the replaced new ENC may be blocked. The download may terminate with a DMES05EA32 message when the array unit is heavy host I/Os; perform the download operation again.

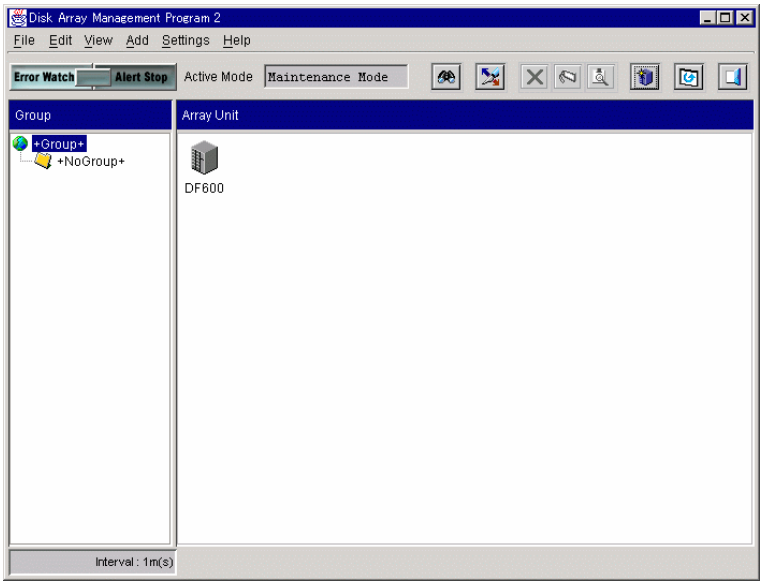
Copyright © 2004, 2005, Hitachi, Ltd.

(2) Replacing the ENC Micro Program

Replace the micro program of the ENC with the micro program downloaded in the array unit. When replacing the micro program, replace both ENC0 and ENC1 micro programs. Replacing takes place in the order of ENC0 and then ENC1.

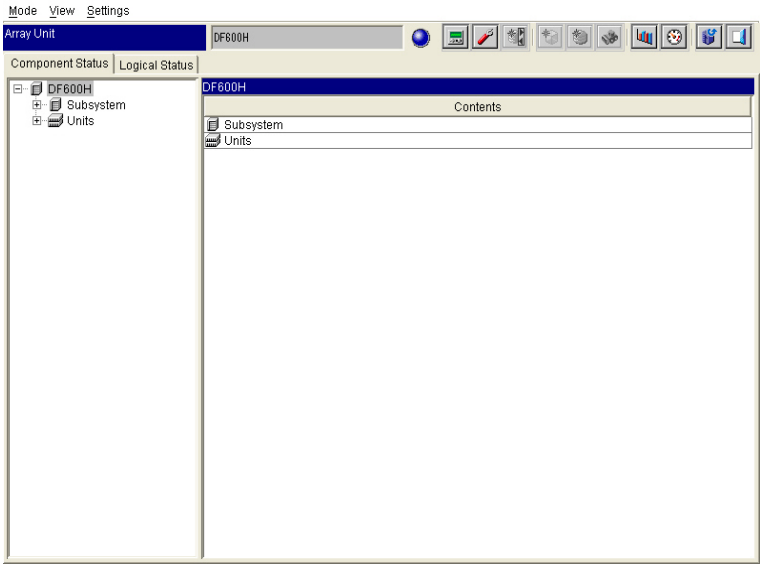
(a) Start the Disk Array Management Program.

(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.



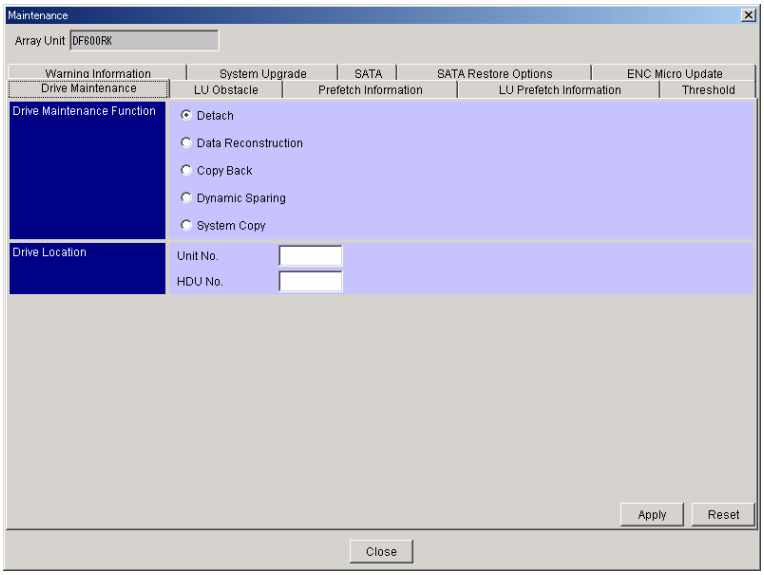
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

(c) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.

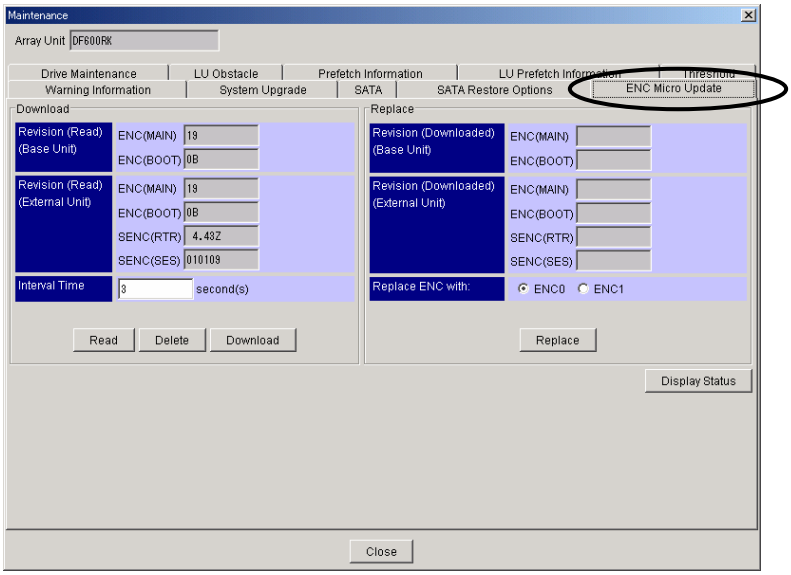


Copyright © 2004, 2005, Hitachi, Ltd.

(d) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.



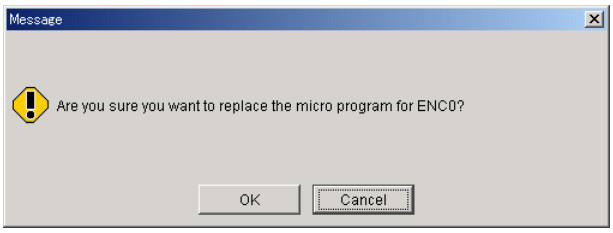
(e) Click the ENC Micro Update tab on the Maintenance dialogue box.



(f) Select the ENC whose micro program is to be replaced and click the [Replace] button.

Copyright © 2004, 2005, Hitachi, Ltd.

(g) A message is displayed, requesting confirmation to replace the micro program. The message displays the number of the selected ENC. When the [OK] button is clicked, replacement of the micro program starts.



The following message, stating that the replacement of the micro program is being executed, is displayed



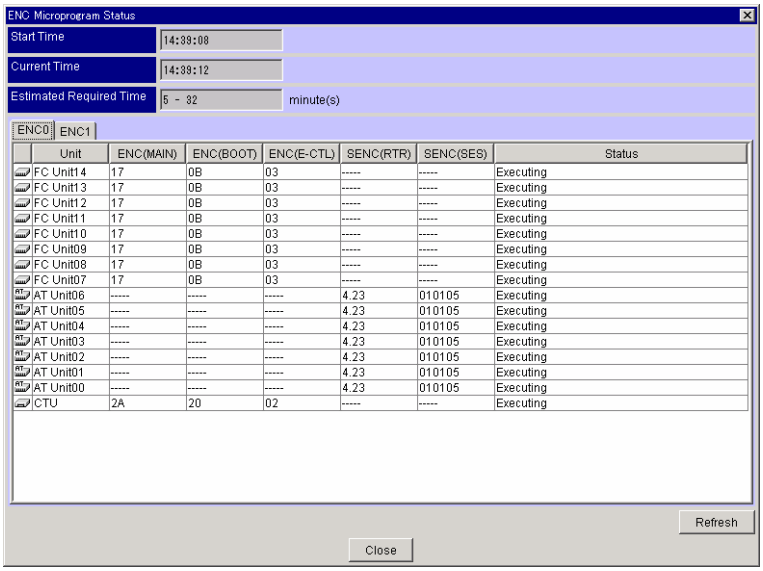
It takes about max. 80 minutes to replace the ENC0 micro program.

(h) Replace the micro program of the other ENC using the procedure from step (f). When the replacements for both ENCs terminate normally, replacement of the array unit micro programs is complete.

NOTE : When the micro programs are replaced, if the micro program of only one of the ENCs is replaced, the array unit is placed in a warning state. When the micro program of the other ENC is replaced, the array unit recovers from the warning state. When replacing the micro programs, replace the micro programs for both ENCs.

Copyright © 2004, 2005, Hitachi, Ltd.

(i) To display the progress state of replacing of the micro programs, click the [Display Status] button.



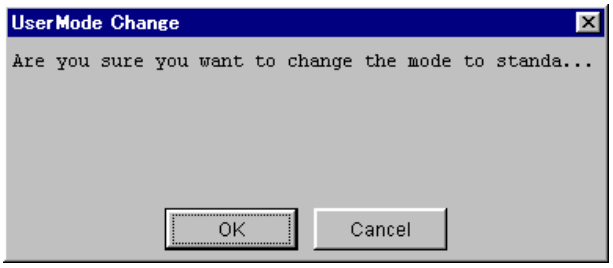
- Status: Shows the following status.
  Executing: Replacing in progress
  Normal: Normal or not necessary replacing
  Failed: Failed (error occurred)
  Cannot Update: Cannot replace

(j) Since a progress state is not updated automatically, click the [Refresh] button as necessary and acquire the newest information.

(k) On the Mode menu, click the Exit. The Main screen is displayed.

(l) Click  : Change Mode in the tool bar on the Main screen.

(m) A confirming message appears. Click the [OK] button.



Disk Array Management Program enters Normal Mode, and Normal Mode appears at Active Mode at the upper of the Main screen.

Copyright © 2004, 2005, Hitachi, Ltd.

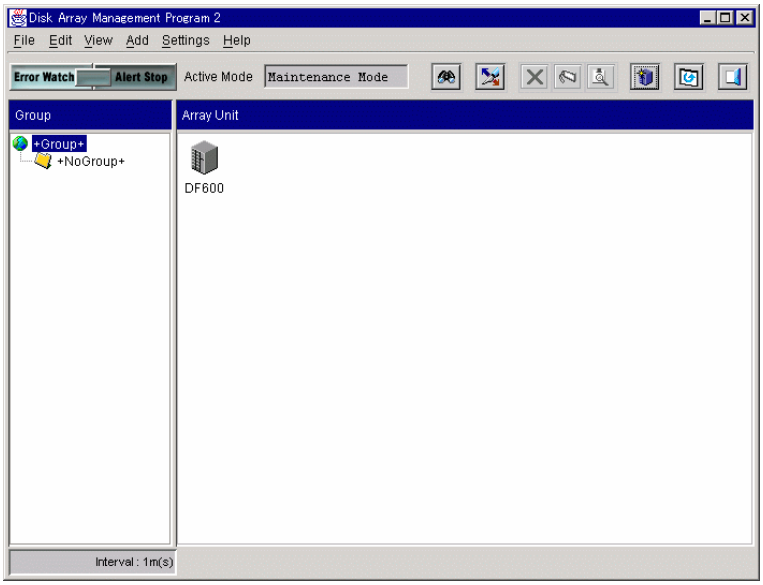
4.2.13 Drive Performance Delay Diagnostic Function (supported in Micro revision x659/M or later)

When it is clear that the performance delay problem attributes to the drive, give notice of the drive number of which causing the problem by the message, and execute the dynamic sparing. (Disk Array Management Program Ver.10.01 or later)

(1) Setting the drive performance delay diagnostic function in the Disk Array Management Program.

(a) Start the Disk Array Management Program.

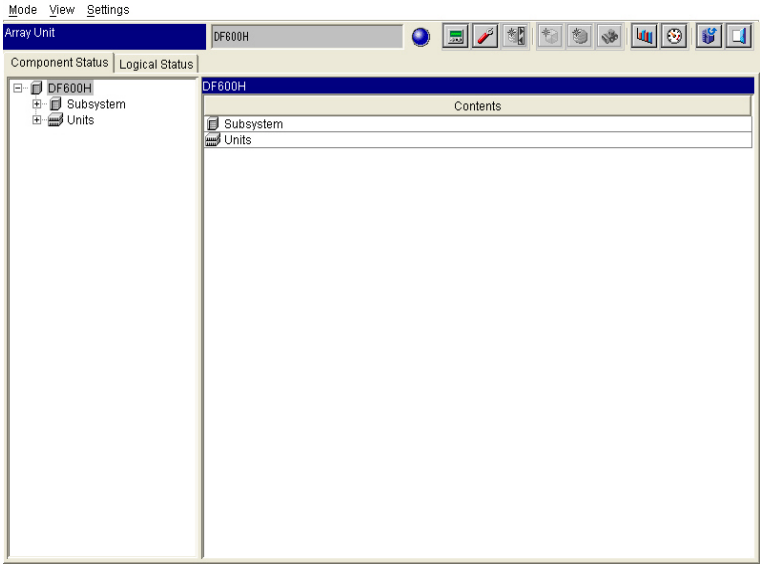
(b) In the main window, position the focus ([ ]) on the icon [ ] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.



Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.

Copyright © 2004, 2005, Hitachi, Ltd.

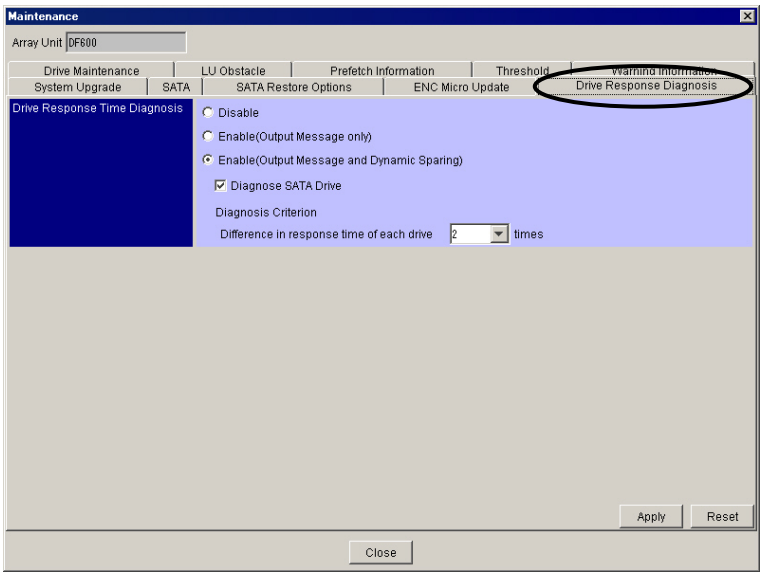
(c) Double-click the icon of an array unit on the Main screen.
The Unit screen is displayed.



(d) On the Settings menu, click the Maintenance.
Maintenance dialogue box is displayed.

Copyright © 2004, 2005, Hitachi, Ltd.

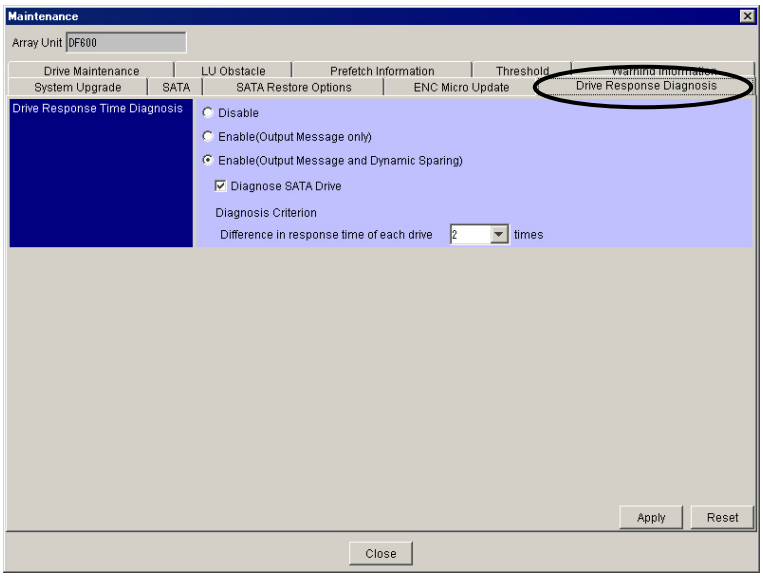
(e) Click the Drive Response Diagnosis tab on the Maintenance dialogue box.



- 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:
  If it is checked, diagnose the SATA drive. (Check is in default.)
  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 : For the Difference in response time of each drive, two is set. If setting the value other than 2, contact the Technical Support Center.

Copyright © 2004, 2005, Hitachi, Ltd.



- 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:
  If it is checked, diagnose the SATA drive. (Check is in default.)
  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 : For the Difference in response time of each drive, two is set. If setting the value other than 2, contact the Technical Support Center.

(f) Click the [Apply] button.

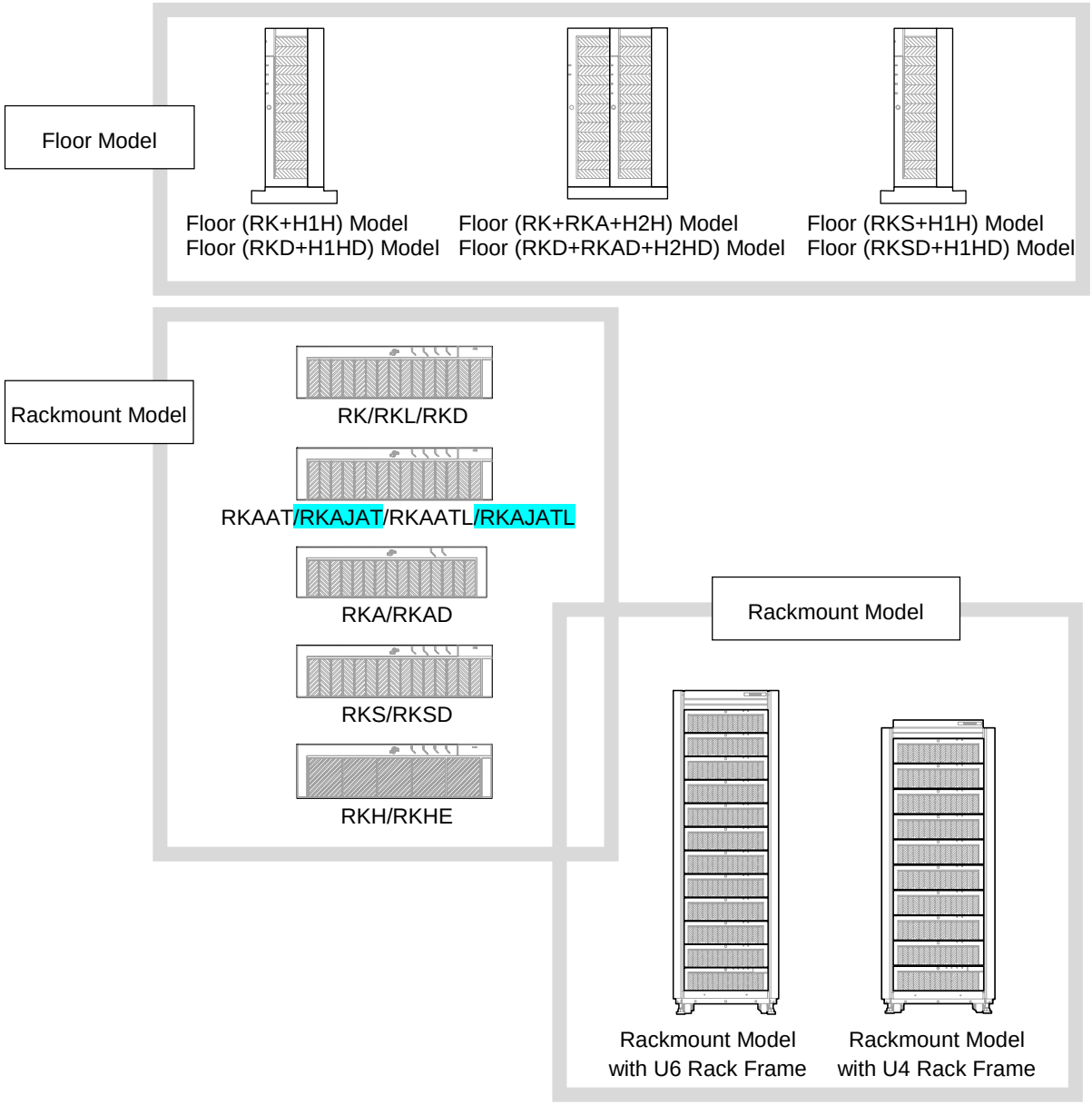
Copyright © 2004, 2005, Hitachi, Ltd.

Chapter 5. Parts Replacement

This chapter explains procedures for replacing parts which is specified as maintenance parts and identified as failed parts through troubleshooting, etc..

5.1 Before Starting Maintenance Work

(1) The DF600 is used in a form of floor model, which is a combination of the subsystem(s) and a kit for exclusive use or in a form of rackmount model.
The RKH/RKHE/RKAAT/RKAJAT/RKAATL/RKAJATL is used in a form of rackmount model only; it has no floor model.



Copyright © 2002, 2005, Hitachi, Ltd.

(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 (DC Power Unit Switch) of the both systems when turning on/off the Power Unit (Power Unit (DC)).

⚠ 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.**

(3) Before starting operation, be sure to wear a wrist strap connected to the chassis and do not take it off until you finish.

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.
- **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.**

Copyright © 2002, 2005, Hitachi, Ltd.

(4) When you install a Disk Drive, hold its metal part with your hand with the wrist strap.

CAUTION

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.

(5) When you install a Control Unit, hold its metal part with your hand with the wrist strap.

CAUTION

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

(6) When you install an ENC Unit/SENC Unit, hold its metal part with your hand with the wrist strap.

CAUTION

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.

(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 (Power Unit (DC)) 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 (Power Unit (DC)) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(10) When the Power Unit (Power Unit (DC)) and another module fail at the same time, replace the Power Unit (Power Unit (DC)) 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.
(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 perform the maintenance work when the READY LED (green) on the Front Bezel is blinking at high speed. When it is high-speed blinking, the SENC firmware is being downloaded. Perform the maintenance work after making sure that the READY LED (green) lights on after the maximum of 15 minutes.
(15) The ALARM (ALM, CALM or EALM) LED (red) on the subsystem may not light on according to the status of the subsystem. Check the failed part displayed in the WEB message, and do the recovery work.

Copyright © 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2005, Hitachi, Ltd.

5.1.1 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.

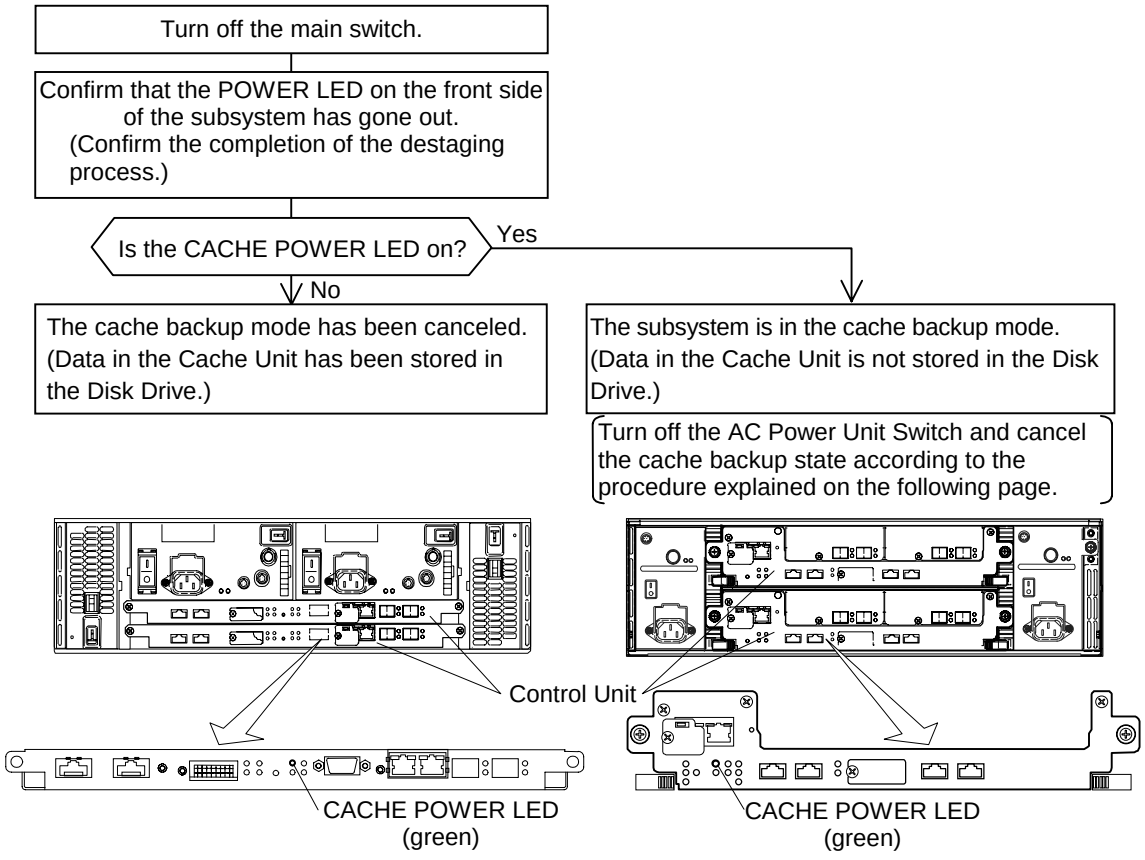


Figure 5.1.1 Procedure for Confirming State of Cache Backup

Copyright © 2002, 2005, Hitachi, Ltd.

- 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 Fig.5.1.3 (MNTE 05-0050), Fig.5.1.3.1 (MNTE 05-0051) and Fig.5.1.3.2 (MNTE 05-0052).

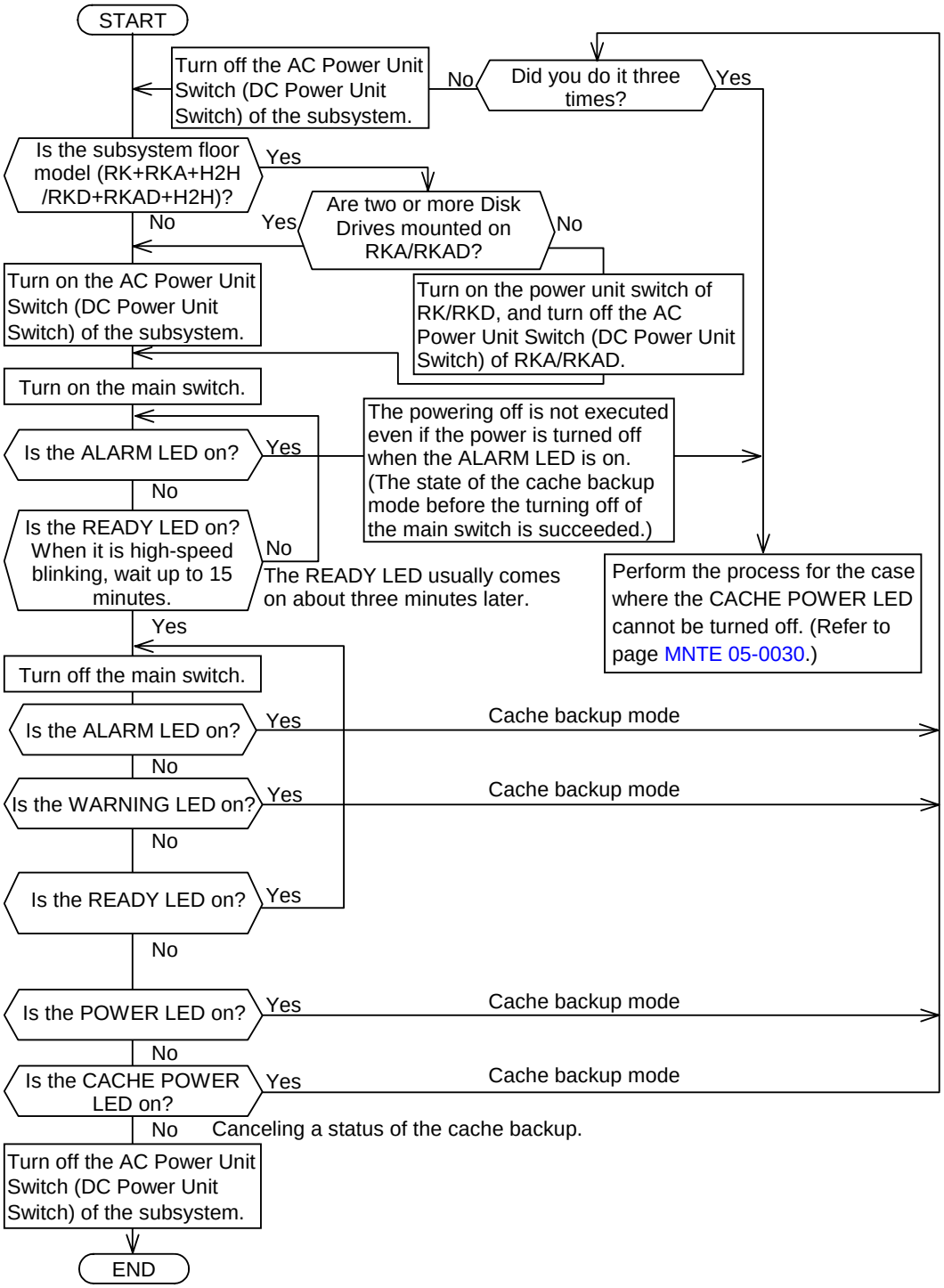


Figure 5.1.2 Procedure for Canceling the Cache Backup Mode of the Cache Memory

Copyright © 2002, 2005, Hitachi, Ltd.

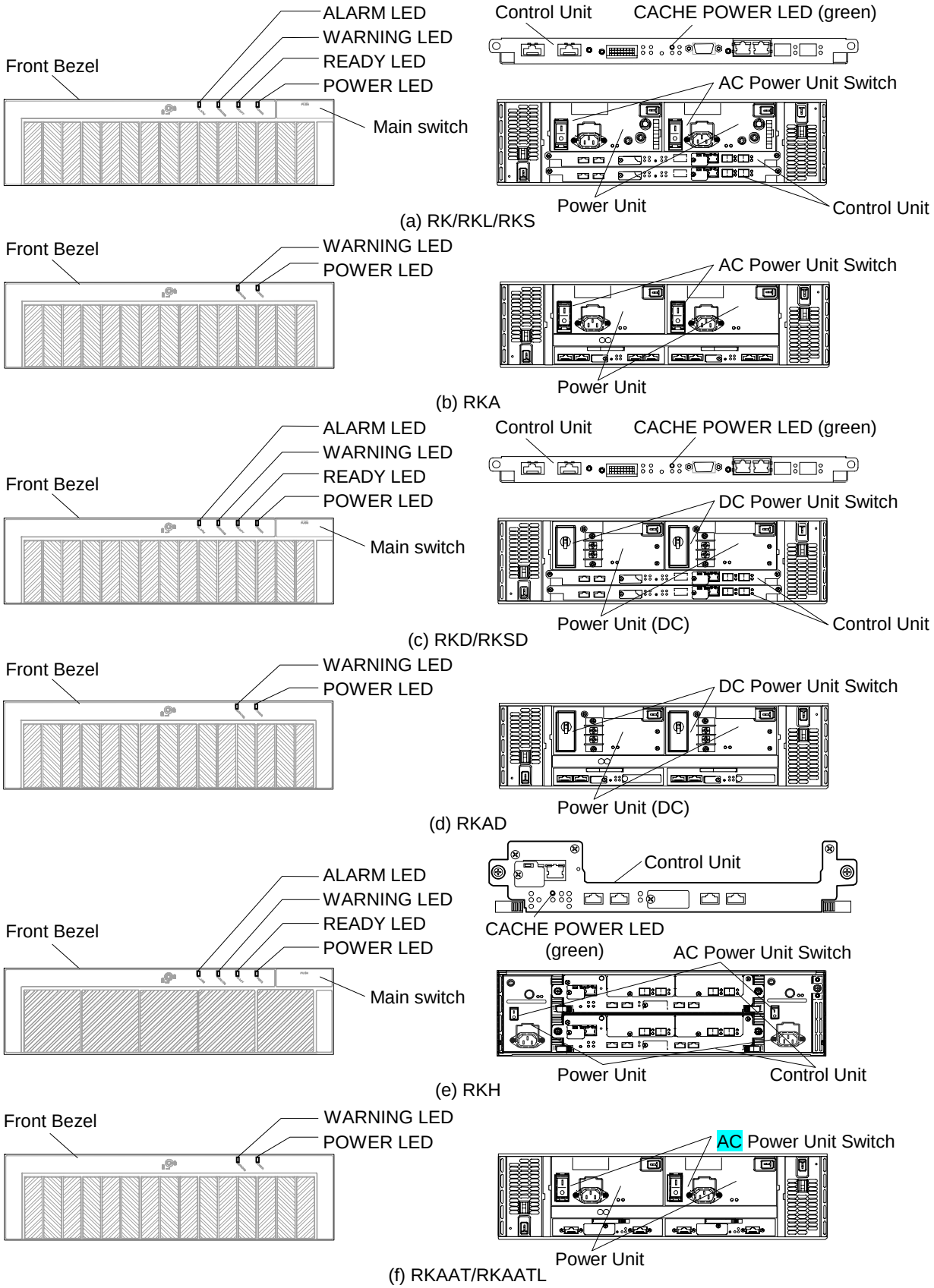
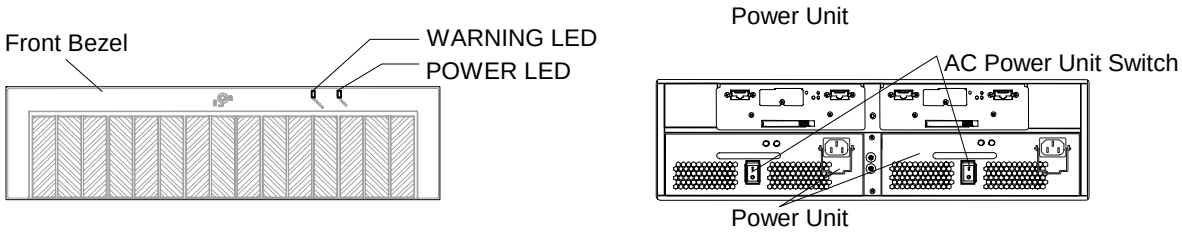


Figure 5.1.3 Indication Name (Rackmount Model)

Copyright © 2002, 2005, Hitachi, Ltd.



(g)RKAJAT/RKAJATL

Figure 5.1.3.1 Indication Name (Rackmount Model)

Copyright © 2003, 2005, Hitachi, Ltd.

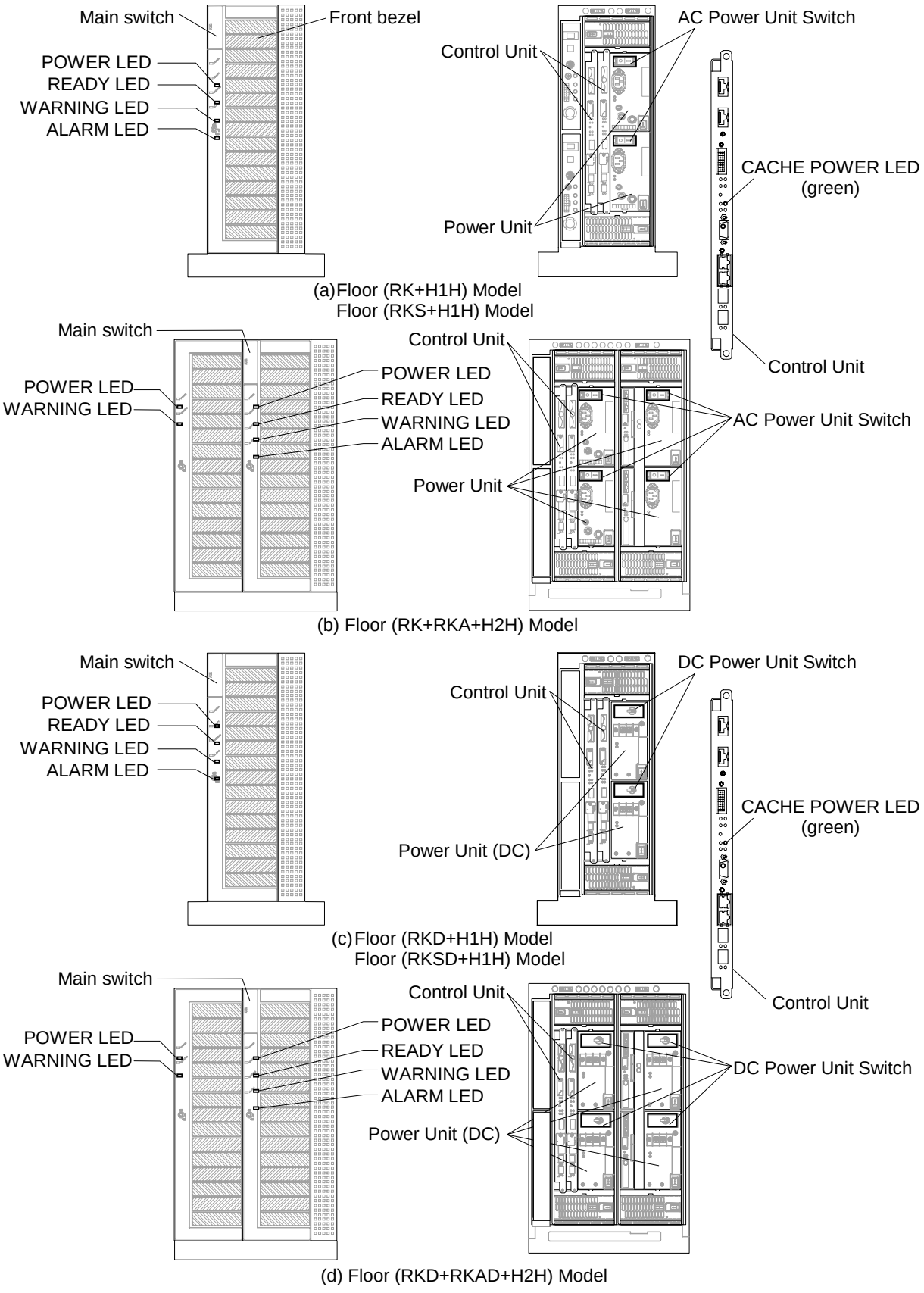


Figure 5.1.3.2 Indication Name (Floor Model)

Copyright © 2003, 2005, Hitachi, Ltd.

• 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 forcible parity correction(‡1) or that in which the data is entirely erased once, and then recovered.

(1) Procedure using the forcible parity correction

It takes long times at the longest from start to completion of the process to execute the forcible parity correction. (Refer to Table 5.1.1)
The following describes standard time required for the focible parity correction.

RAID5	:nD+1P	: 40+6×n [minute] (n=2-15)
RAID1+0	:nD+nP	: 145×n×10,000/Rotational speed of the Disk Drive (min^{-1}) [minute] (n=1-8)
RAID1	:1D+1P	: 145×10,000/Rotational speed of the Disk Drive (min^{-1}) [minute]

NOTE : The time is standard time required for the focible parity correction per a RAID group with 72 GB Disk Drive.
The time change in proportion to the Disk Drive capacity.
The time required for the recovery process varies depending on the Disk Drive capacity and number of rows.
The time decrease the ratio 1-2 of 10 depend on the kind of the disk drive.

Copyright © 2002, 2005, Hitachi, Ltd.

‡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.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 5.1.1 Standard Time Required for the Forcible Parity Correction or an LU Formatting

Unit : min

Item	Disk Drives(*3)		35.4 G byte	71.3 G byte	143.3 G byte	245.7 G byte	287.6 G byte	393.4 G byte
Forcible parity recovery	5 Disk Drives	RAID 5 (4D+1P)	30	60	120	-	-	-
	16 Disk Drives	RAID 5 (15D+1P)	70	130	260	-	-	-
	4 Disk Drives	RAID 1+0 (2D+2P)	100	290	580	-	-	-
	16 Disk Drives	RAID 1+0 (8D+8P)	380	1080	2160	-	-	-
	2 Disk Drives	RAID 1 (1D+1P)	60	150	300	-	-	-
LU formatting (*1) (*2)	5 Disk Drives	RAID 5 (4D+1P)	30	70	140	550	220	830
	16 Disk Drives	RAID 5 (15D+1P)	90	200	400	1270	620	1800
	4 Disk Drives	RAID 1+0 (2D+2P)	30	80	160	480	170	750
	16 Disk Drives	RAID 1+0 (8D+8P)	90	210	420	2200	450	3500
	2 Disk Drives	RAID 1 (1D+1P)	30	70	140	510	160	800

*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 : The time shown above is a general guideline of a formatting time when LUs are formatted one by one.
When two or more LUs (n LUs) are formatted in a multiplexed manner, the formatting time becomes shorter than n times the time shown above.

*3 : 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) Procedure not using the forcible parity correction
When the forcible 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. If formatting is not performed, parity consistency is lost and data inconsistency may occur.

Copyright © 2003, 2005, Hitachi, Ltd.

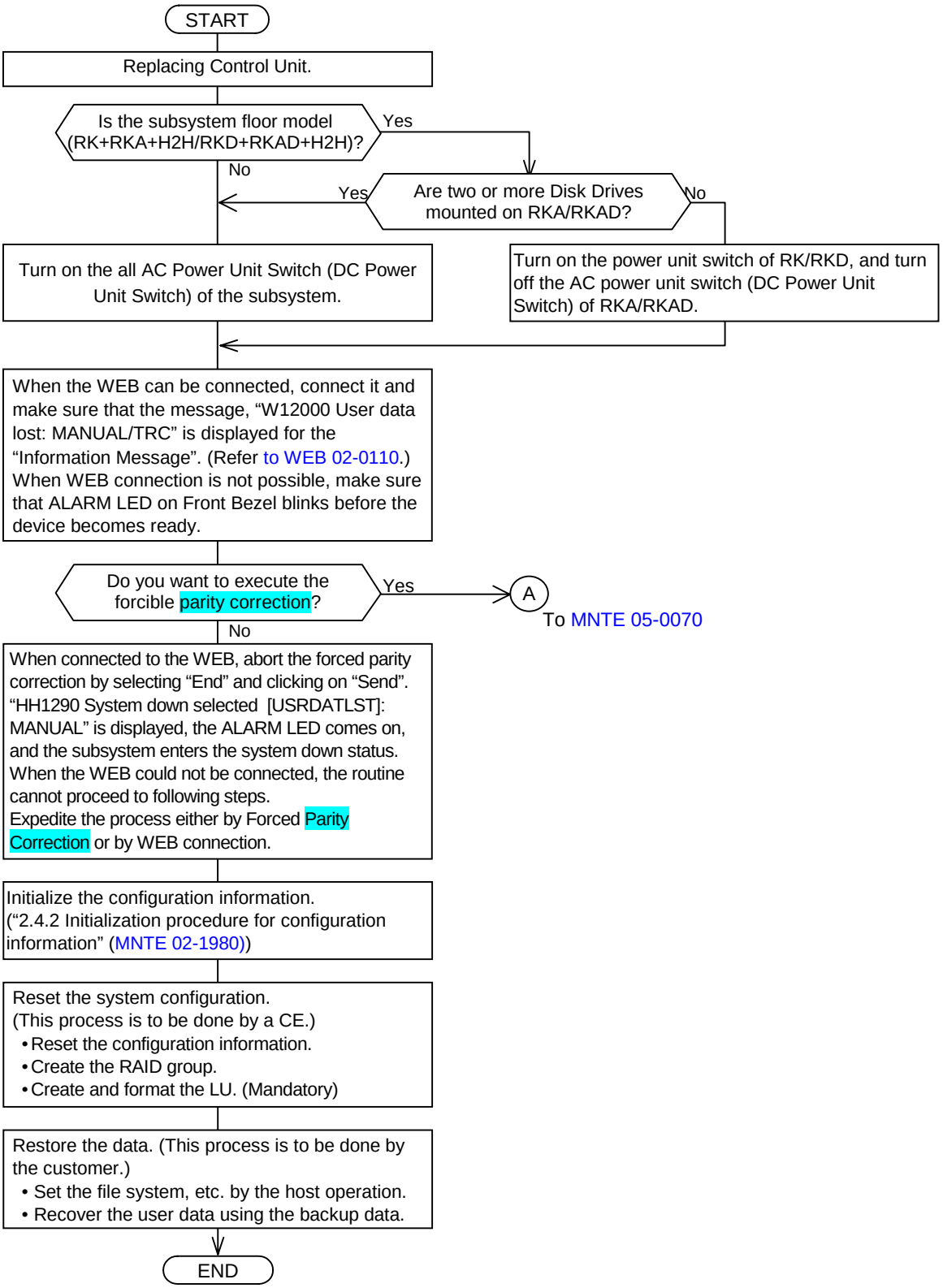
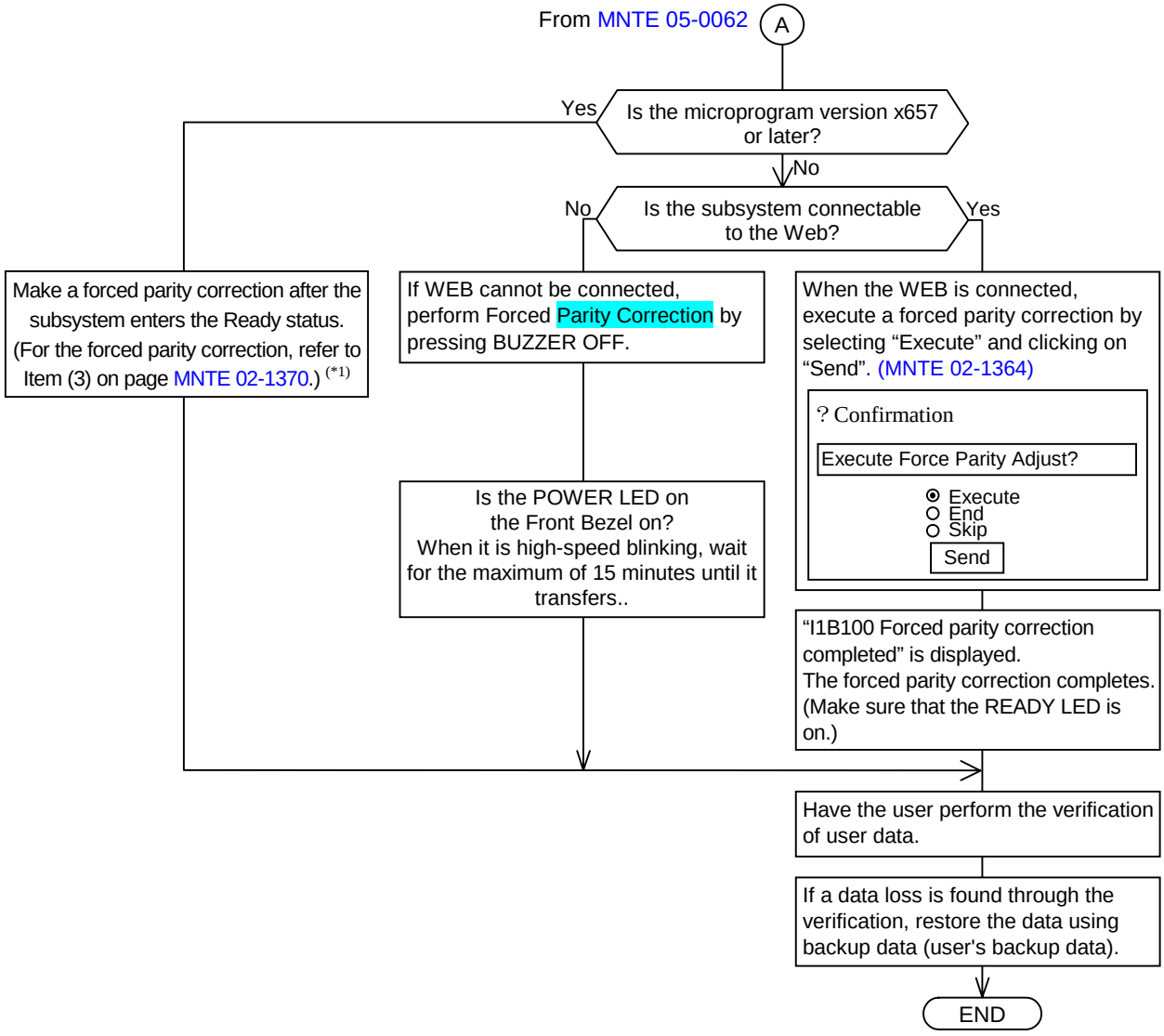


Figure 5.1.4 Procedure for the Process to be Performed when the BACK UP LED cannot be turned off (1)

Copyright © 2003, 2005, Hitachi, Ltd.



*1 :The Disk Array Management Program Ver.9.40 or later is required.

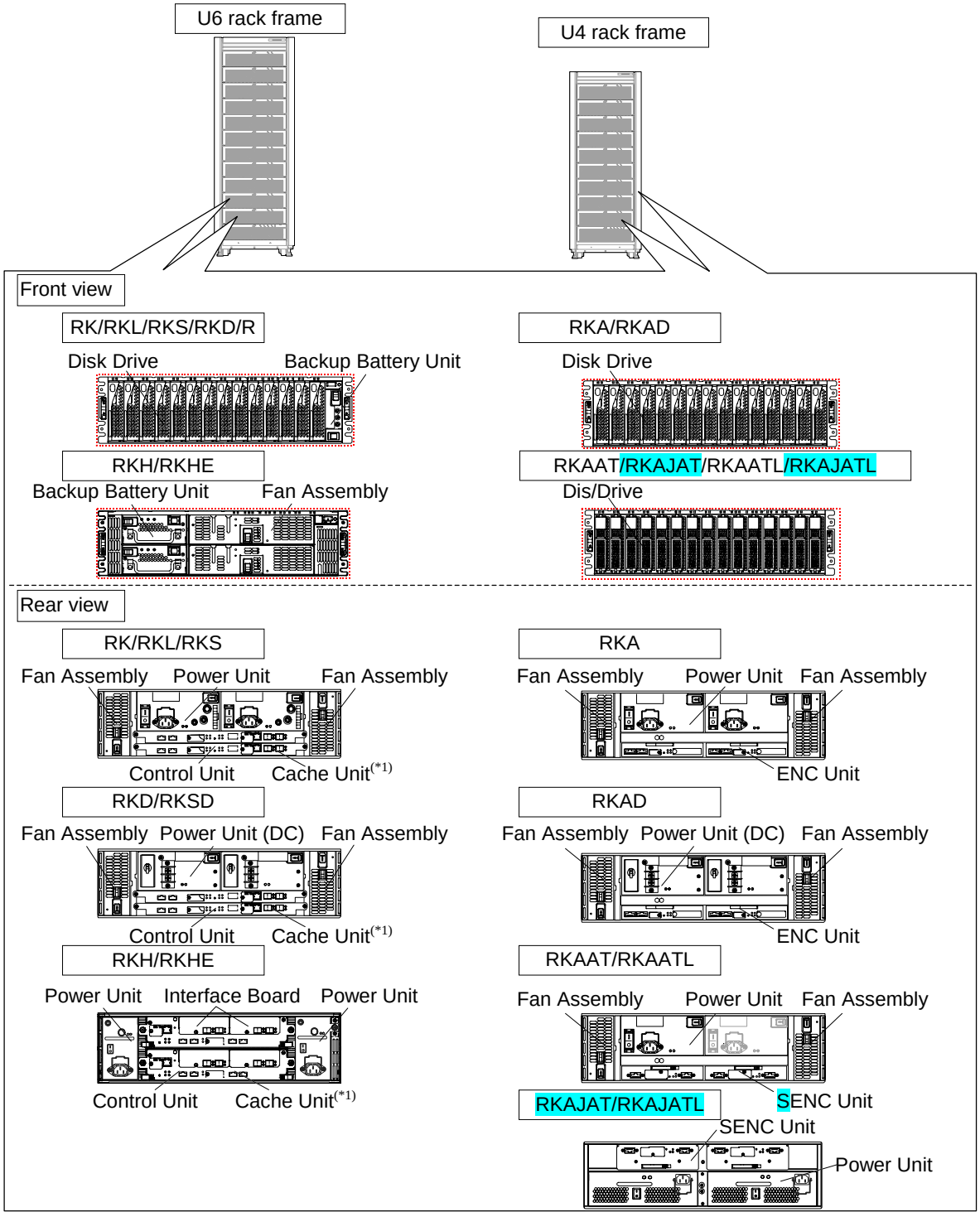
Figure 5.1.4 Procedure for the Process to be Performed when the BACK UP LED cannot be turned off (2)

Copyright © 2002, 2005, Hitachi, Ltd.

5.2 Locations of Replacement Components

Floor model is installed on the floor in combination with the dedicated kit to RK/RKA/RKD/RKAD. The RKH/RKHE/RKAAT/RKAJAT has no floor model.

5.2.1 Part Locations of Rackmount Model



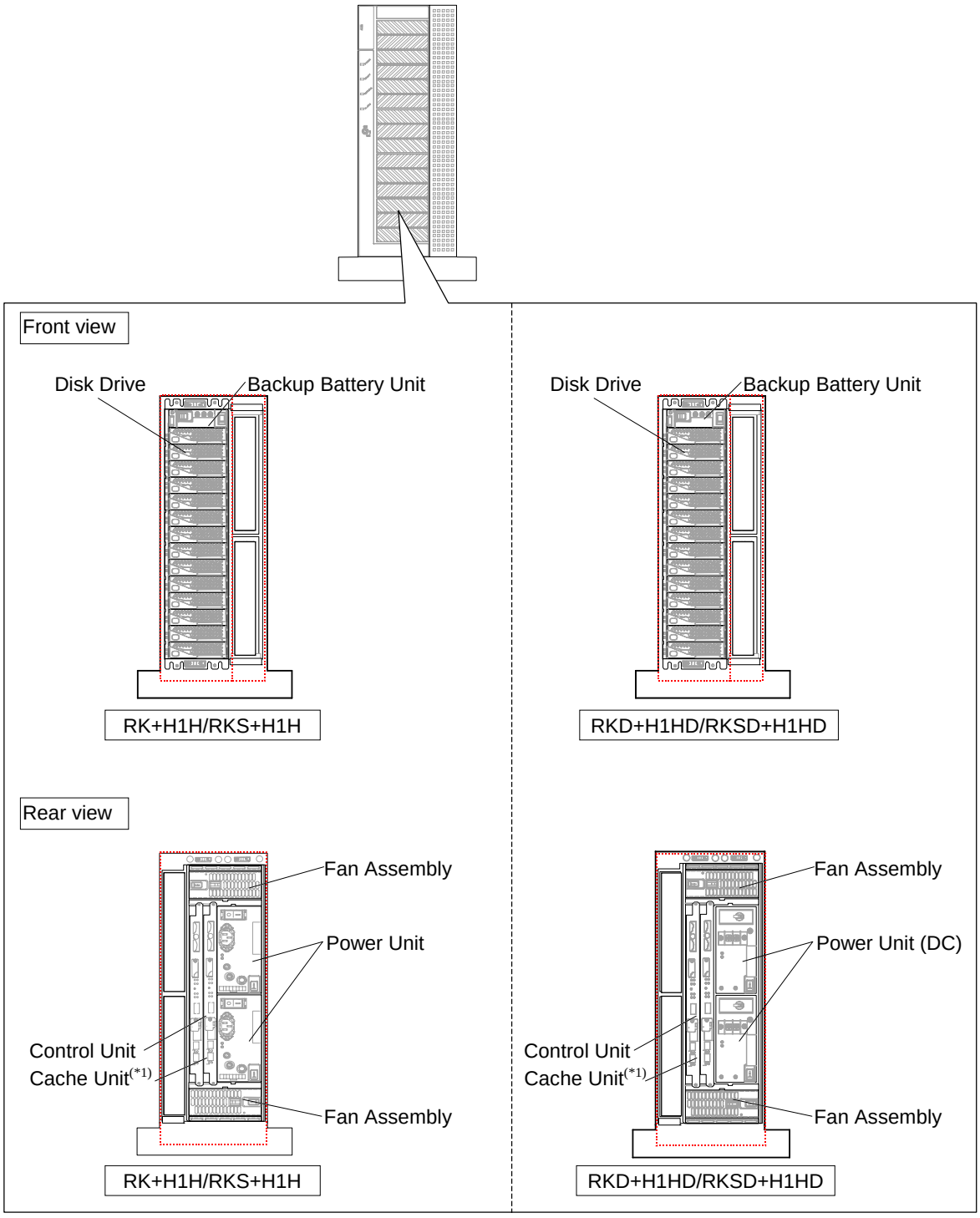
*1 : Installed in the Control Unit.

Figure 5.2.1 Replaceable Part Locations of Rackmount Model

Copyright © 2002, 2005, Hitachi, Ltd.

5.2.2 Part Locations of Floor Model

(1) Floor (H1H/H1HD) Model

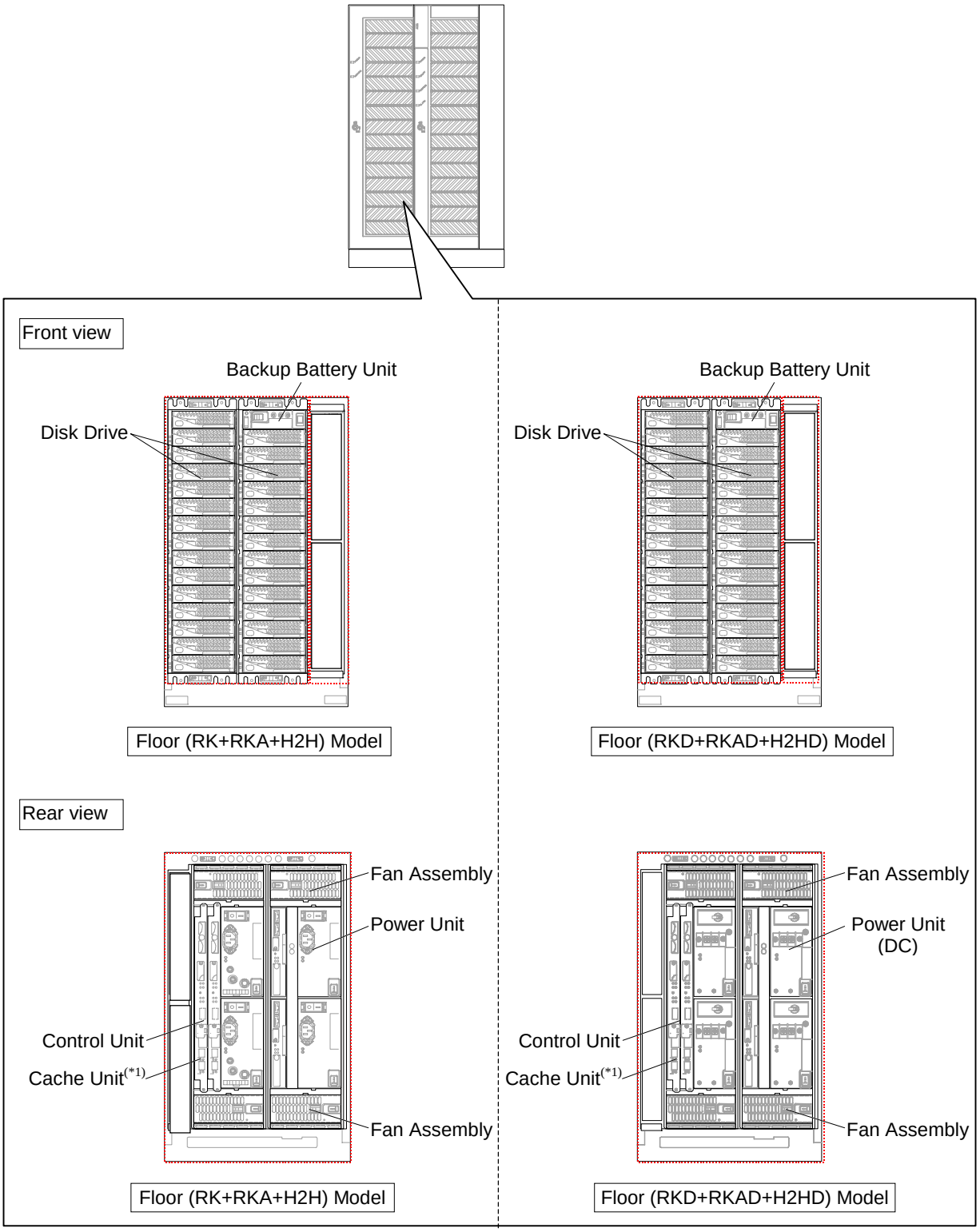


*1 :Installed in the Controller Unit.

Figure 5.2.2 Replaceable Part Locations of Floor Model (H1H/H1HD)

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Floor (H2H/H2HD) Model



*1 :Installed in the Control Unit.

Figure 5.2.3 Replaceable Part Locations of Floor Model (H2H/H2HD)

Copyright © 2002, 2005, Hitachi, Ltd.

Table 5.2.1 Locations of the parts to be replaced and power supply status

	No.	Part name	Part No.	Model	Power supply state	Reference section
Parts	1	Disk Drive (35.4 G bytes)	5507353-1	DF-F600-AEH36	ON(*1) (*2)	5.3.1 (05-0120)
		Disk Drive (71.3 G bytes)	5507353-2	DF-F600-AEF72	ON(*1) (*2)	
		Disk Drive (71.3G bytes)	5507353-3	DF-F600-AEH72	ON(*1) (*2)	
		Disk Drive (143.3 G bytes)	5507353-4	DF-F600-AEF146	ON(*1) (*2)	
		Disk Drive (143.3 G bytes)	5507353-5	DF-F600-AEH146	ON(*1) (*2)	
		Disk Drive (287.6 G bytes)	5507353-79	DF-F600-AEF300	ON(*1) (*2)	
		Disk Drive (143.3 G bytes)	5507353-76	DF-F600-ATE146L	ON(*1) (*2)	
		Disk Drive (245.7 G bytes) (RKAAT)	5507353-69	DF-F600-ATE250	ON(*1) (*2)	
		Disk Drive (245.7 G bytes) (RKAAT/RKAJAT)	5507353-83	DF-F600-ATE250R	ON(*1) (*2)	
		Disk Drive (245.7 G bytes) (RKAATL)	5507353-77	DF-F600-ATE250L	ON(*1) (*2)	
		Disk Drive (245.7 G bytes) (RKAATL/RKAJATL)	3272215-C	DF-F600-ATE250LR	ON(*1) (*2)	
		Disk Drive (393.4 G bytes) (RKAAT/RKAJAT)	5507353-81	DF-F600-ATE400R	ON(*1) (*2)	
		Disk Drive (393.4 G bytes) (RKAATL/RKAJATL)	3272215-D	DF-F600-ATE400LR	ON(*1) (*2)	
	2	Backup Battery Unit	5507353-13	—	ON(*1)/OFF	5.3.2 (05-0260)
		Backup Battery Unit (RKH/RKHE)	5507353-64	—	ON(*1)/OFF	
	3	Fan Assembly	5507353-14	—	ON(*1)/OFF	5.3.3 (05-0320)
		Fan Assembly (RKH/RKHE)	5507353-65	—	ON(*1)/OFF	
	4	Power Unit (RK/RKS)	5507353-6	—	ON(*1) (*3)/OFF	5.3.4 (05-0340)
		Power Unit (RKA)	5507353-7	—	ON(*1) (*3)/OFF	
		Power Unit (RKAAT/RKAATL)	5507353-73	—	ON(*1) (*3)/OFF	
		Power Unit (RKAJAT/RKAJATL)	3272170-A	—	ON(*1) (*3)/OFF	
		Power Unit (RKH/RKHE)	5507353-56	—	ON(*1) (*3)/OFF	
	5	Power Unit (DC) (RKD/RKSD/RKAD)	—	—	ON(*1) (*3)/OFF	5.3.4 (05-0340)
	6	Control Unit	5507353-10	DF-F600-F1H	ON(*1) (*3)/OFF(*4)	5.3.5 (05-0380)
			5507353-51	DF-F600-F1HS	ON(*1) (*3)/OFF(*4)	
			5507353-78	DF-F600-F1HL	ON(*1) (*3)/OFF(*4)	
		Control Unit (RKH)	5507353-60	—	ON(*1) (*3)/OFF(*4)	
		Control Unit (RKHE)	5507353-70	—	ON(*1) (*3)/OFF(*4)	
	7	Cache Unit (512 M bytes)	5507353-8	DF-F600-C512X2	ON(*1) (*5)/OFF	5.3.6 (05-0470)
		Cache Unit (1,024 M bytes)	5507353-9	DF-F600-C1GX2	ON(*1) (*5)/OFF	
		Cache Unit (512 M bytes) (RKH/RKHE)	5507353-58	DF-F600-C512X2H	ON(*1) (*5)/OFF	
		Cache Unit (1,024 M bytes) (RKH/RKHE)	5507353-59	DF-F600-C1GX2H	ON(*1) (*5)/OFF	
	8	Interface Board	5507353-63	—	ON(*1) (*5)/OFF	5.3.7 (05-0560)

*1 : It can be replaced during host operation (i.e. during data transfer between a host and a device)
*2 : The power must be on.
*3 : The power can be on as long as the Power Unit (Power Unit (DC)) is duplicated.
*4 : When Web cannot be connected, Control Unit, which is powering off in the dual controller configuration, cannot be replaced.
*5 : The power can be off if the Control Unit is duplicated.

Copyright © 2002, 2005, Hitachi, Ltd.

	No.	Part name	Part No.	Model	Power supply state	Reference section
Parts	9	ENC Unit	5507353-12	DF-F600-Y1HA	ON(*1) (*3)/OFF	5.3.8 (05-0640)
	10	SENC Unit (RKAAT/RKAATL)	5507353-67	—	ON(*1) (*3)/OFF	5.3.8 (05-0640)
		SENC Unit (RKAJAT/RKAJATL)	3272170-C	—	ON(*1) (*3)/OFF	5.3.8 (05-0640)
	11	ENC Cable (0.5 m)	5507353-15	—	ON(*1)/OFF	5.3.9 (05-0692)
		ENC Cable (5 m)	5507353-55	DF-F4063-K5B		
		ENC Cable (0.75 m)	5507353-20	DF-F4063-K075B		
		ENC Cable (1 m)	3272185-A	—		
	12	Basic Chassis of Rack Mount Style	5507353-35	DF-F600-RK/RKL/ RKS/RKD/RKSD	OFF	5.3.10 (05-0700)
			5507353-75	DF-F600-RKH/RKHE	OFF	5.3.10 (05-0700)
	13	Additional Chassis of Rack Mount Style	5507353-36	DF-F600-RKA/RKAD	OFF	5.3.11 (05-0740)
			5507353-72	DF-F600-RKAAT/ RKAATL	OFF	
			5523443-D	DF-F600-RKAJAT/ RKAJATL	OFF	
	14	Remote Adapter	—	DF-F600-VR3A DF-F600-VR3H (Hub)	ON(*1) (*2)/OFF	5.3.12 (05-0770)
	15	UPS	—	DF-F600-X11K DF-F600-X11C DF-F600-X21K DF-F600-X23K	ON(*1)/OFF	Refer to UPS Manual

*1 : It can be replaced during host operation (i.e. during data transfer between a host and a device)
*2 : The power can be off if the Control Unit is duplicated.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

5.3 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 "5.2 Locations of Replacement Components" (MNTE 05-0080).

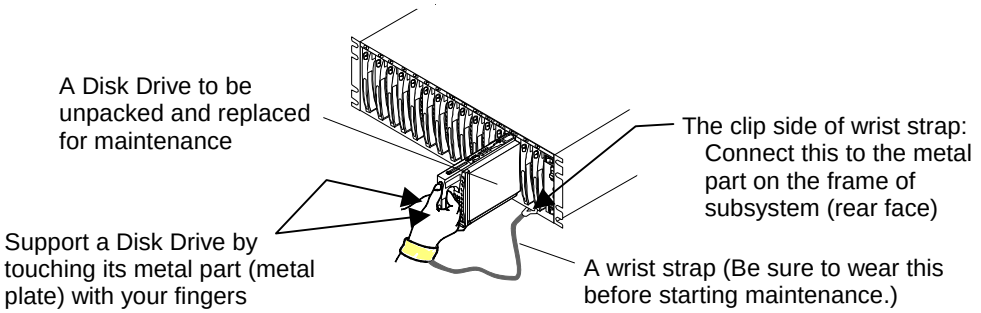
5.3.1 Replacing Disk Drive

Procedure for replacing the Disk Drive varies depending on the RAID configuration and the set mode for data restoration. Confirm the RAID configuration and the set mode for data restoration of the subsystem, and then perform the replacement following the procedure shown below.

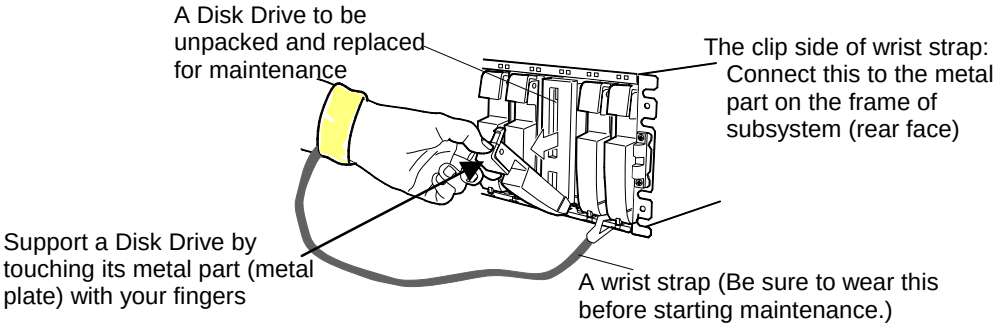
The Disk Drive is a precision machine that may have troubles because of electrostatic discharge. Be sure to put on the wristband before star Sting work in order to protect Disk Drives from electrostatic discharge.

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 RK/RKL/RKS/RKD/RKSD/RKA/RKAD



- In the case of RKAAT/RKAJAT/RKAATL/RKAJATL



Copyright © 2002, 2005, Hitachi, Ltd.

(a) Locations and numbers of Disk Drives installed in the RK/RKS/RKD/RKSD
Mounting location number of Disk Drive is a combination of a Device number (device ID) and a Disk Drive number which is assigned within the each RK/RKS/RKA/RKD/RKSD/RKAD individually.
As the Device IDs, #0 is assigned to the RK/RKD and one of numbers 1 to 14 are assigned to each RKA/RKAD connected.

For details of the device ID setting, refer to Installation "Chapter 1 1.7 Device ID setting and ENC cable connection" (INST 01-0180).

For Disk Drive number, #0 to #13 are assigned to RK/RKS/RKD/RKSD, and #0 to #14 to RKA/RKSD from left to right in sequence. (‡1)
The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)
A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

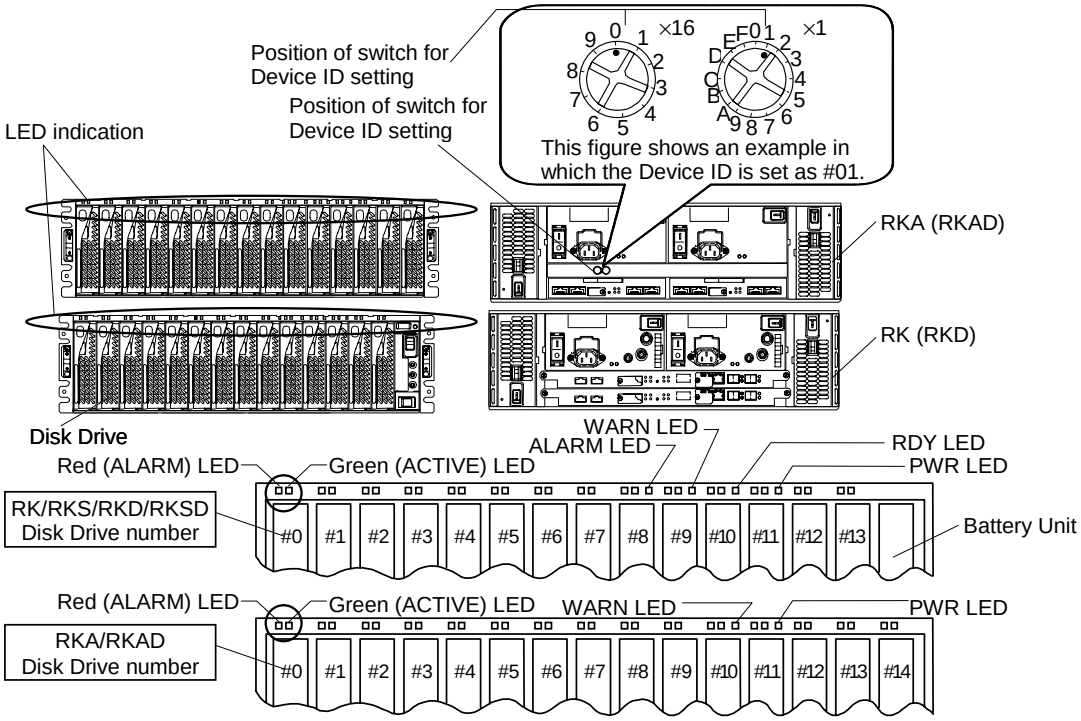


Figure 5.3.1 Disk Drive Mounting Location

‡1 : From top to bottom, in the case of the floor model.

Copyright © 2002, 2005, Hitachi, Ltd.

(b) Locations and numbers of Disk Drives installed in the RKAs connected to the RKH/RKHE

Mounting location number of Disk Drive is a combination of a Device number (Device ID) and a Disk Drive number which is assigned within the each RKH/RKHE /RKA individually.

As for the Device IDs, the ID of the first one of the RKAs connected to the RKH/RKHE is numbered as #00 and those of the second and the following ones are numbered as #10, #01, and #12 through #1E.

For details of the device ID setting, refer to Installation "Chapter 1 1.7 Device ID setting and ENC cable connection" (INST 01-0180).

The numbers of the Disk Drives installed in the first one of the RKAs connected to the RKH/RKHE are #0 through #13 and numbers of those installed in the second and the following ones are #0 through #14 in serial order counted from left to right when the RKAs are put horizontally. The rightmost location in the first one of the RKAs connected is for the Dummy Disk Drive.

The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)

A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

Copyright © 2003, 2005, Hitachi, Ltd.

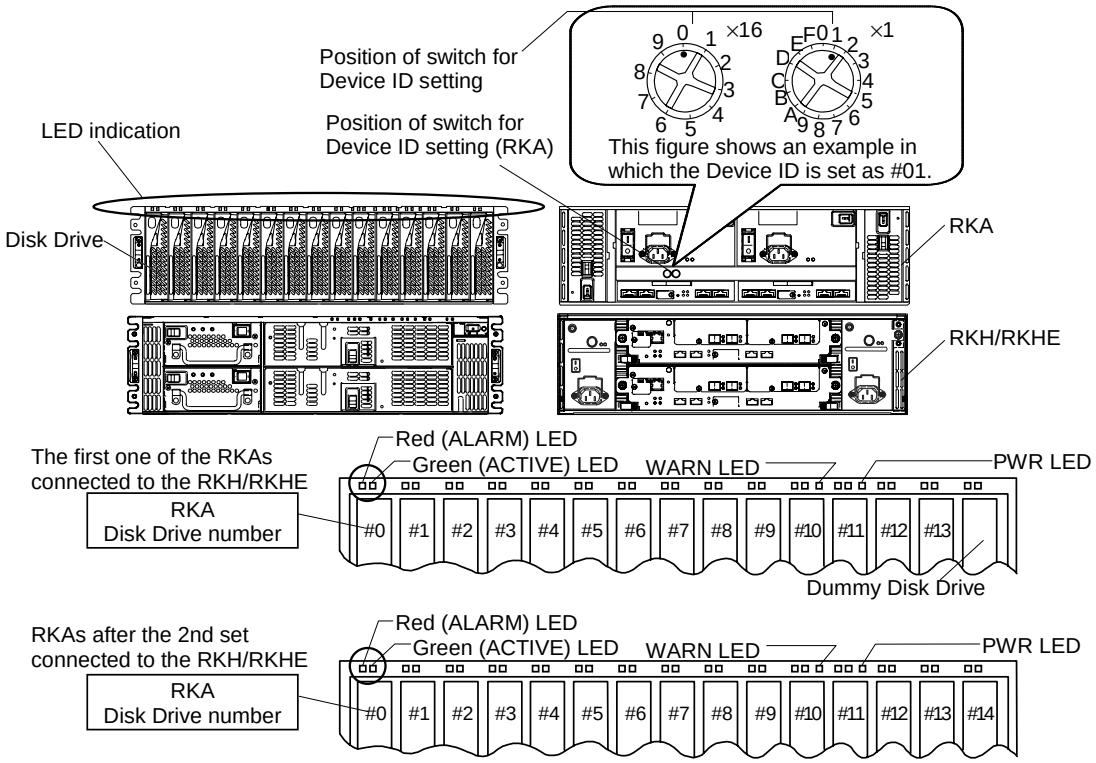


Figure 5.3.1.1 Disk Drive Mounting Location (RKAs connected to the RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

(c) Locations and numbers of Disk Drives installed in the RKAAT/RKAJAT/RKAATL/RKAJATL connected to the RK/RKL
The RKL can be connected only to the RKAATL/RKAJATL.
Mounting location number of Disk Drive is a combination of a device number (device ID) and a Disk Drive number which is assigned within the each RK/RKL/RKA/ RKAAT/RKAJAT/RKAATL/RKAJATL individually.
As the Device IDs, #0 is assigned to the RK/RKL and one of numbers 1 to 14 are assigned to each RKA/RKAAT/RKAJAT/RKAATL/RKAJATL connected.

For details of the device ID setting, refer to Installation "Chapter 1 1.7 Device ID setting and ENC cable connection" (INST 01-0180).

For Disk Drive number, #0 to #14 to RKAAT/RKAJAT/RKAATL/RKAJATL from left to right in sequence.
The Disk Drives which compose a RAID group must be installed continuously.
(A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)
A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

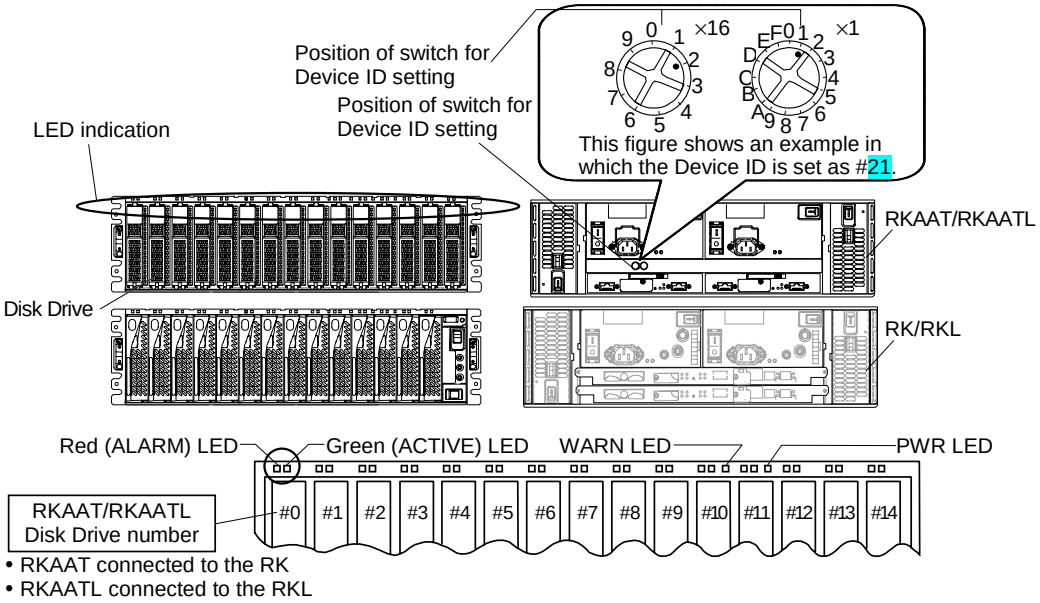


Figure 5.3.1.2 Disk Drive Mounting Location (RKAATs/RKAATLs connected to the RK/RKL)

Copyright © 2004, 2005, Hitachi, Ltd.

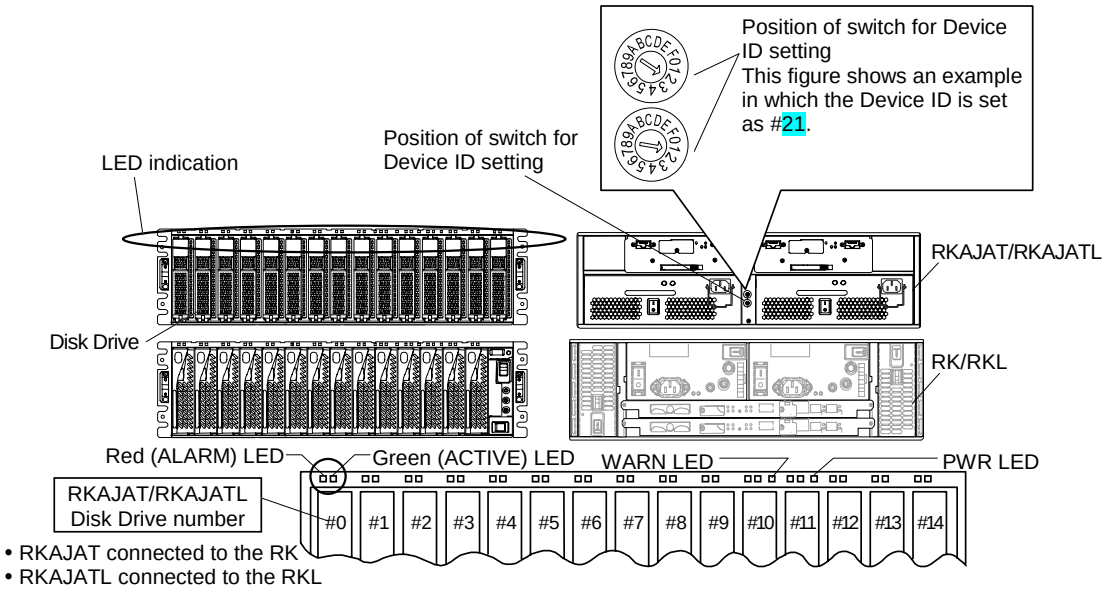


Figure 5.3.1.3 Disk Drive Mounting Location (RKAJATs/RKAJATLs connected to the RK/RKL)

Copyright © 2004, 2005, Hitachi, Ltd.

(d) Locations and numbers of Disk Drives installed in the RKAAT/RKAJAT connected to the RKH/RKHE

Mounting location number of Disk Drive is a combination of a Device number (device ID) and a Disk Drive number which is assigned within the each RKH/RKHE/RKA/RKAAT/RKAJAT individually. The device IDs set as shown below.

When connecting the RKAATs/RKAJATs to the RKH/RKHE, be sure to connect the RKA as a starter.

For details of the device ID setting, refer to Installation "Chapter 1 1.7 Device ID setting and ENC cable connection" (INST 01-0180).

The numbers of the Disk Drives installed in the RKAATs/RKAJATs connected to the RKH/RKHE are #0 through #14 in serial order counted from left to right when the RKAATs/RKAJATs are put horizontally.

The Disk Drives which compose a RAID group must be installed continuously. (A Disk Drive number #a in a device whose Device ID is #14 and a Disk Drive number #0 in a device whose Device ID is #n+1 are considered to be continuous.)

A RAID group (including (a) Spare Disk(s)) and another RAID group (including (a) Spare Disk(s)) are not required to be installed continuously. However, care should be taken because only a RAID group (including (a) Spare Disk(s)) corresponding to the number of continuous vacant slots left uninstalled can be set.

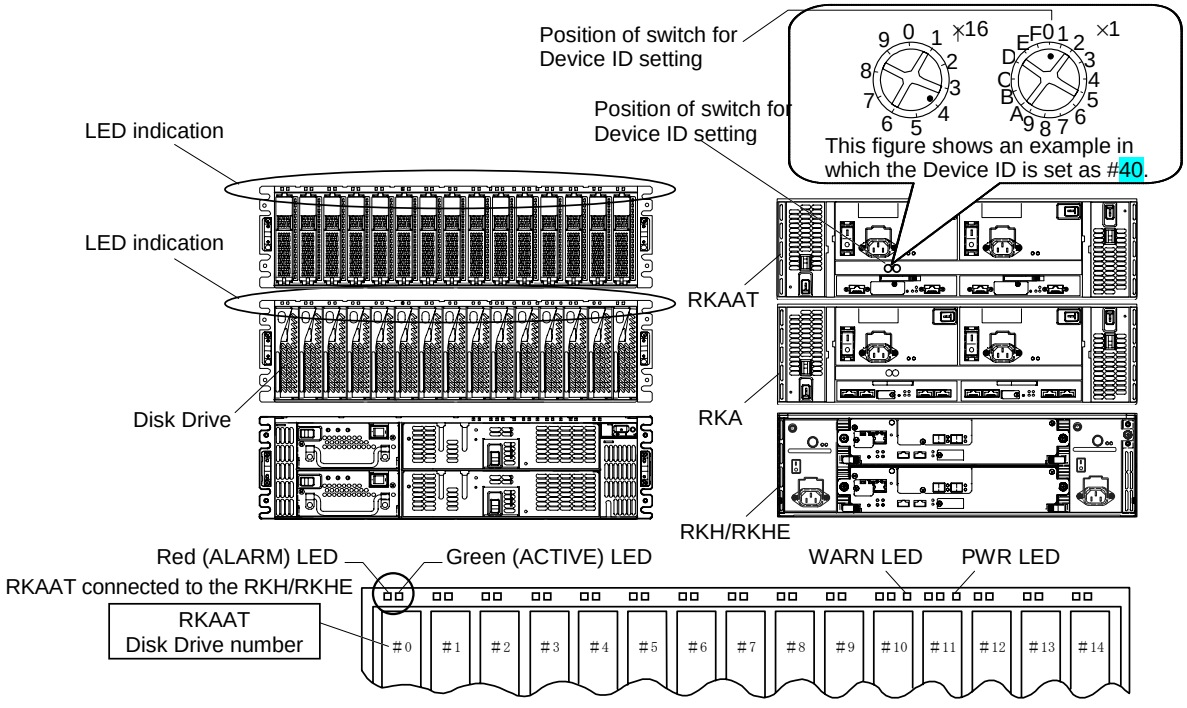


Figure 5.3.1.4 Disk Drive Mounting Location (RKAATs connected to the RKH/RKHE)

Copyright © 2005, Hitachi, Ltd.

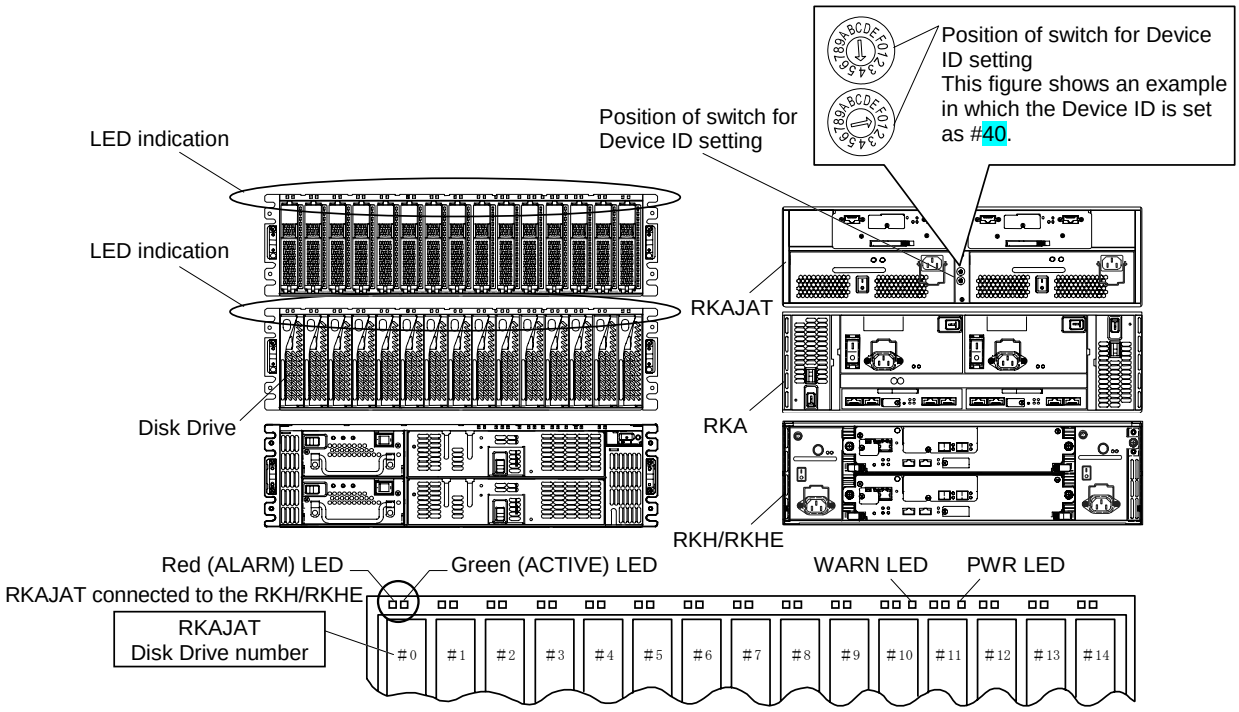


Figure 5.3.1.5 Disk Drive Mounting Location (RKAJATs connected to the RKH/RKHE)

Copyright © 2005, Hitachi, Ltd.

(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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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 :• 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.

Copyright © 2002, 2005, Hitachi, Ltd.

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)	• Replaceable only while power is on • Complete the replacement within five minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. • If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on. • DF-F600-ATE250 and DF-F600-ATE250L cannot be installed in RKAJAT/RKAJATL.	With the Spare Disk (s)	RAID 0(*2)	When the red (ALARM) LED on the disk drive to be replaced is on. See 5.3.1 (a-1).
				RAID 1, RAID 5, and RAID 1+0	When the red (ALARM) LED on the disk drive to be replaced is off. See 5.3.1 (a-2).
			Without the Spare Disk	RAID 0(*1)	See 5.3.1 (b-3).
				RAID 1, RAID 5, and RAID 1+0	When the red (ALARM) LED on the disk drive to be replaced is on. See 5.3.1 (b-1).
					When the red (ALARM) LED on the disk drive to be replaced is off. See 5.3.1 (b-2).
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.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

If no Spare Disk is provided, go to (b).

(a) When Spare Disk is provided

(a-1) When the red (ALARM) LED on the disk drive to be replaced is on.

Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(i) Make sure of the state of the data restoration to the Spare Disk.
Refer to "Information Message" on WEB, and check to see that [I008xy Data recovery to spare HDU (Unit-x, HDU-y)] or [I008HH Data recovery to spare HDU (Unit-x, HDU-y)] is indicated. When this is indicated, the recovery to the Spare Disk is performed normally.

(ii) Remove the Front Bezel. (INST 01-0050)

(iii) Make sure that the Red (ALARM) LED on the Disk Drive to replace is lit and it is detached.

(iv) Operate the lock release button of the Disk Drive to be replaced and remove the Disk Drive taking care not to apply any shock to it.

(v) Wait for more than 20 seconds, and then insert the replacement Disk Drive.
Operate the lock release button on the Disk Drive and mount the Disk Drive slowly taking care not to apply any shock to it.
If the Disk Drive is inserted without waiting for 20 seconds, it is possible that the Disk Drive is not recovered from the failure normally.

(vi) The Red (ALARM) LED of the replaced Disk Drive goes out.

(vii) The data is restored automatically on the replaced Disk Drive.(‡1) (‡2)
If the Red (ALARM) LED of the Disk Drive concerned is still on after the replacement, execute the powering off procedure and replace the Disk Drive again.

(viii) Select "Information Message" from the WEB (MNTE 02-0200) and make sure that the data recovery is completed normally ("I151xy Data recovery completed" or "I151HH Data recovery completed").

(ix) Make sure that the WARN LED (orange) on the front side of the subsystem is off(‡3).

(x) Make sure that the RDY LED (green) on the front side of the subsystem is on. The RDY LED (green) may blink at high speed (up to 15 minutes).

(xi) Attach the Front Bezel.

(xii) Refer to "Information Message" on WEB, and check to see that [I151xy Data recovery completed (Unit-x, HDU-y)] or [I151HH Data recovery completed (Unit-x, HDU-y)] is indicated. When this is indicated, the replacement of Disk Drive has completed. If 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 indicated, the procedure has abnormally ended. Refer to "2.3.3 Progress Messages" (MNTE 02-0810) and perform the recovery procedure.

‡1 : In case of it is set to automatic recovery mode.

‡2 : Open the Unit screen in the Disk Array Management Program. 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 Subsection 5.4.5 "Checking the status of Disk Drive" (INST 05-0761).)

Copyright © 2002, 2005, Hitachi, Ltd.

‡3 : When the WARN LED (orange) on the front side of RK/RKL/RKS/RKD/RKSD/RKH/RKHE blinks, refer to WEB or collect the Trace, and check to see that the WARN LED turns off.

Copyright © 2002, 2005, Hitachi, Ltd.

(a-2) When the red (ALARM) LED on the disk drive to be replaced is off.

(i) Perform the dynamic sparing for the Disk Drive to be replaced. Refer to "4.2.7 Drive Maintenance" (MNTE 04-0400).

(ii) Replace the Disk Drive following the procedure (a-1).

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

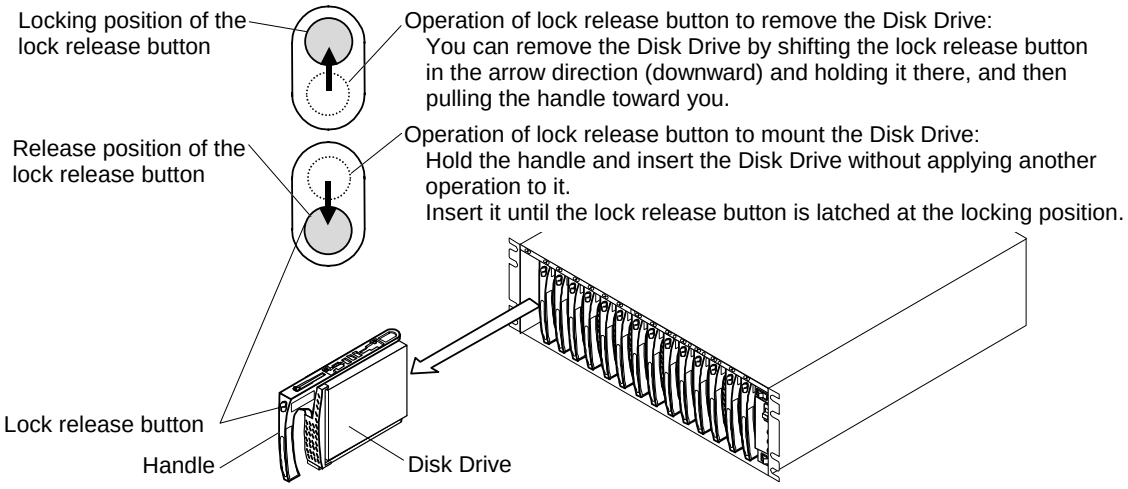


Figure 5.3.2 Removing Disk Drive and Operation of Lock Release Button

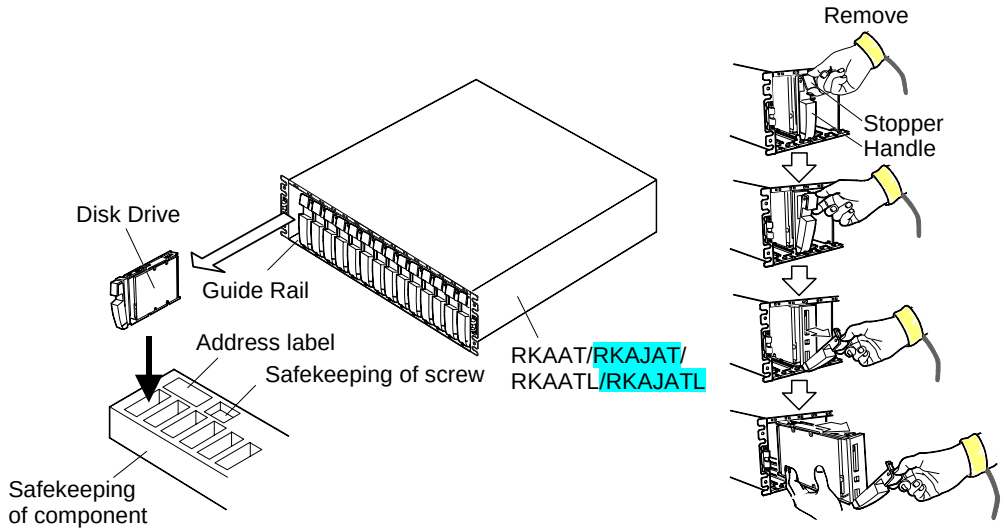


Figure 5.3.2.1 Remove the Disk Drive (RKAAT/RKAJAT/RKAATL/RKAJATL)

(b) When no Spare Disk is set

(b-1) Replacing Disk Drive in RAID 1, 5, or 1+0 configuration
(When the red (ALARM) LED is on)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(i) Remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050))

(ii) Make sure that the Red (ALARM) LED on the Disk Drive to replace is lit and it is detached.

(iii) Operate the lock release button of the Disk Drive to be replaced and remove the Disk Drive taking care not to apply any shock to it. (See Figure 5.3.2.)

Copyright © 2002, 2005, Hitachi, Ltd.

(iv) Wait for more than 20 seconds, and then insert the replacement Disk Drive.
Operate the lock release button on the Disk Drive and mount the Disk Drive slowly taking care not to apply any shock to it.
If the Disk Drive is inserted without waiting for 20 seconds, it is possible that the Disk Drive is not recovered from the failure normally.

(v) The Red (ALARM) LED of the replaced Disk Drive goes out.

(vi) The data is restored automatically on the replaced Disk Drive.(‡1) (‡2)
If the Red (ALARM) LED of the Disk Drive concerned is still on after the replacement, execute the powering off procedure and replace the Disk Drive again.

(vii) Select "Information Message" from the WEB (MNTE 02-0200) and make sure that the data recovery is completed normally ("I151xy Data recovery completed" or "I151HH Data recovery completed").

(viii) Make sure that the WARN LED (orange) on the front side of the subsystem is off(‡3).

(ix) Make sure that the RDY LED (green) on the front side of the subsystem is on. The RDY LED (green) may blink at high speed (up to 15 minutes).

(x) Attach the Front Bezel.

(xi) Refer to "Information Message" on WEB, and check to see that [115xy Data recovery completed (Unit-x, HDU-y)] or [I151HH Data recovery completed (Unit-x, HDU-y)] is indicated. When this is indicated, the replacement of Disk Drive has completed. If 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 indicated, the procedure has abnormally ended. Refer to "2.3.3 Progress Messages" (MNTE 02-0810) and perform the recovery procedure.

(b-2) Replacing a Disk Drive in the RAID 1, RAID 5, or RAID 1+0 configuration (when the red (ALARM) LED is off)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(i) Detach the Disk Drive to be replaced forcibly. Refer to "4.2.7 Drive Maintenance" (MNTE 04-0400)

(ii) Replace the Disk Drive following the procedure (b-1).

‡1 : In case of it is set to automatic recovery mode.

‡2 : Open the Unit screen in the Disk Array Management Program. 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 Subsection 5.4.5 "Checking the status of Disk Drive" (INST 05-0761).)

‡3 : When the WARN LED (orange) on the front side of RK/RKL/RKS/RKD/RKSD/RKH/RKHE blinks, refer to WEB or collect the Trace, and check to see that the WARN LED turns off.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(b-3) Replacement of Disk Drive under RAID 0 configuration
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(i) Make a backup of user data.
(ii) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))
(iii) Make sure whether the Disk Drive to be replaced is blocked or not by viewing the message of the WEB.
(iv) Remove the Disk Drive to be replaced. (See Figure 5.3.2.)
Operate the lock release button of the Disk Drive and remove the Disk Drive taking care not to apply any shock to it.
(v) Wait for more than 20 seconds, and then insert a new Disk Drive taking care not to apply any shock to it.
(If the Disk Drive is inserted without waiting for 20 seconds, it is possible that the Disk Drive is not recovered from the failure normally. In that case, remove the Disk Drive, keep holding the Disk Drive for twenty seconds or more, then install the Disk Drive again.)
(vi) If the Red (ALARM) LED of the Disk Drive concerned is still on after the replacement, execute the powering off procedure and replace the Disk Drive again.
(vii) Format the LU. (for Installation "5.4.3 Setting of LU" (INST 05-0530))
(viii) Restore the user data using the backup data collected in step (i).
(ix) Attach the Front Bezel.

Copyright © 2002, 2005, Hitachi, Ltd.

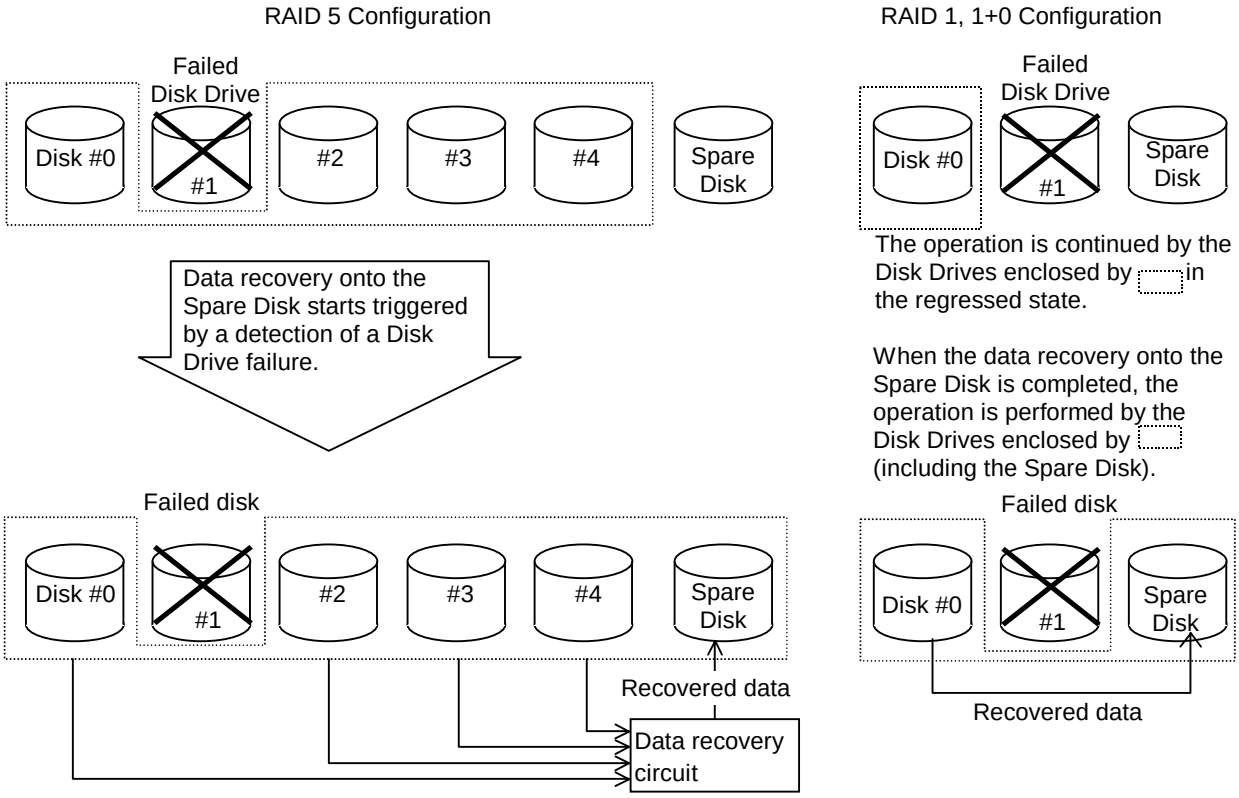
(2) Spare recovery operation description using the Spare Disk

(a) Data recovery (Recovery to a Spare Disk after detection of disk failure)

As to data recovery onto the Spare Disk, as shown in the drawing on the following page, when a disk failure occurs, the data of the failed disk is recovered automatically onto the Spare Disk.

Automatic recovery onto the Spare Disk is executed only under the following condition.

Condition : "When a disk failure is detected, the Spare Disk is an unused disk".



In the following cases, the data recovery onto the Spare Disk will not start automatically.

An action to start the data recovery is required.

- When the drive recovery option in the Disk Array Management Program (‡1) the disk recovery mode is specified to is set to "not automatic mode", the data recovery will not start automatically when the disk is replaced.
  In this case, it is necessary to instruct recovery onto the Spare Disk using the Disk Array Management Program.
- If a further disk failure occurs while the Spare Disk is used already (data of a Disk Drive has been already recovered onto the Spare Disk), the data of the nearly failed Disk Drive will not be recovered onto the Spare Disk.
  Data of the second failed Disk Drive is also not restored on the Spare Disk automatically even if the copy back is completed in the above status and the Spare Disk goes out of use.

‡1 : For the details of the Disk Array Management Program, refer to the "Disk Array Management Program 2 (for GUI) User's Guide" or "Disk Array Management Program 3 (for GUI) User's Guide".

Copyright © 2002, 2005, Hitachi, Ltd.

- If a Disk Drive with no failure (a Disk Drive which is not blocked) is removed, no data recovery onto the Spare Disk will be executed. In this case, to recover data onto the Spare Disk, it is necessary to instruct a recovery using the Disk Array Management Program (‡1).

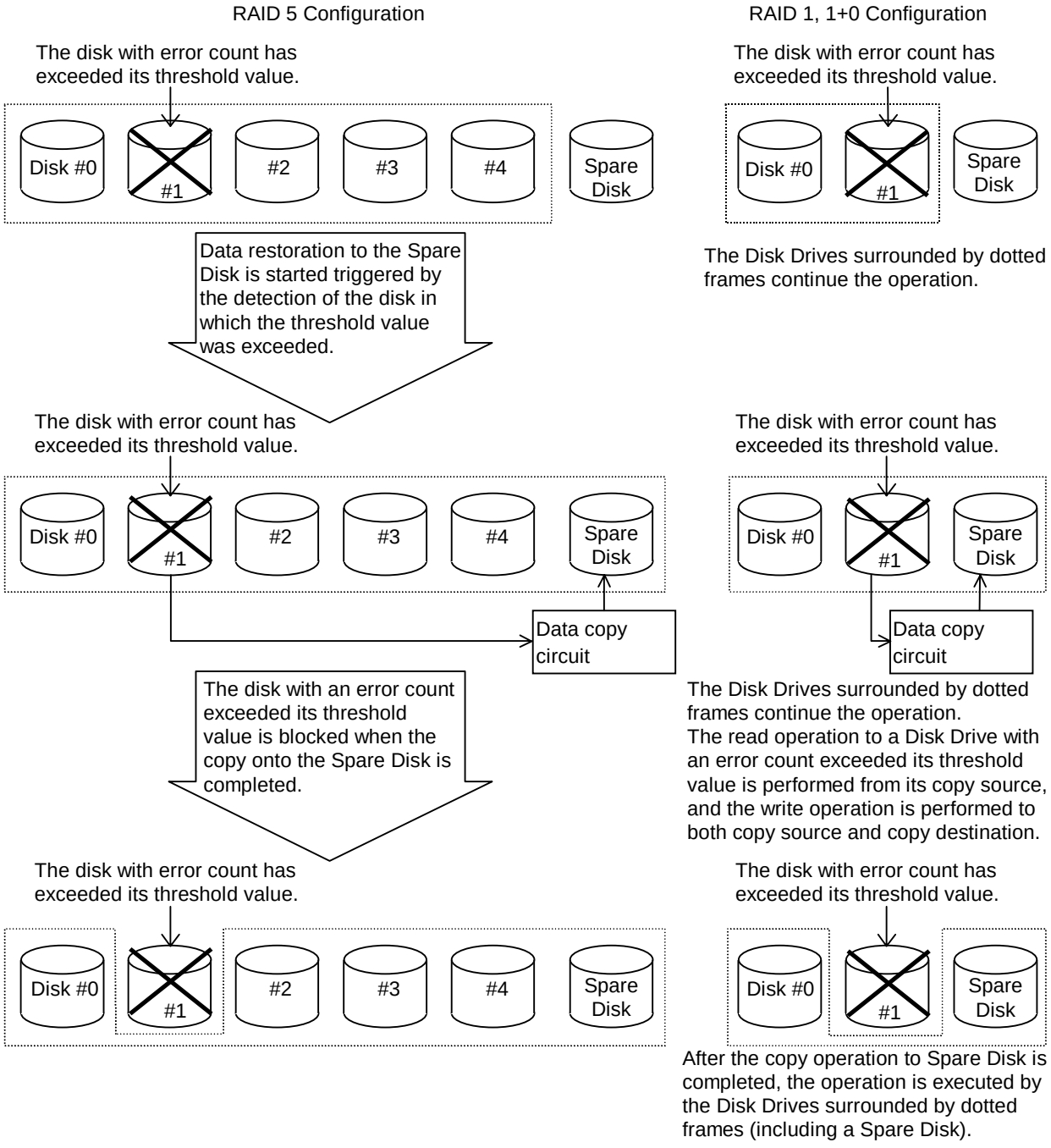
Copyright © 2002, 2005, Hitachi, Ltd.

(b) Data recovery (Dynamic sparing from a Data disk to a Spare Disk)

Data recovery onto the Spare Disk is performed as shown below. When a Disk Drive is detected in which the error count has exceeded its threshold value, data stored in the Disk Drive is copied automatically onto the Spare Disk.

The automatic data recovery onto the Spare Disk is performed only when the following condition is met.

Condition : The Spare Disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



Copyright © 2002, 2005, Hitachi, Ltd.

The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

```
MM/DD/YYYY HH:MM:SS Cx I41■XY HDU error over (Unit-X, HDU-Y)        : MANUAL / TRC
     Date          Time    Detect Controller#          ■: 0 to 9 or A to D
```

At the time when an excess of the error occurrence count over threshold value is detected, only the display of the above message is done in the "Information Message" window of the WEB (WEB 02-0110), no regression of the Disk Drive occurs, and the dynamic sparing is started.
The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.
Refer to (3)-(e) "Information Message" transition when the dynamic sparing is performed. (MNTE 05-0250),

In the following cases in which a disk with an error count exceeded its threshold value is detected, the Disk Drive is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the Spare Disk is being used for the data recovery.
- Another Disk Drive with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, a disk with an error count exceeded its threshold value is blocked. Procedures for data recovery and replacement are the same procedures as when a Spare Disk is mounted or not mounted.

Errors counted in this subsystem and default threshold values are listed below.

Table 5.3.1 Error and threshold value

No.	Kind of error	Threshold (Default)
1	Disk mechanical error. (Recovered)	50
2	Disk mechanical error. (Un-recovered)	2
3	Disk medium error. (Recovered)	100
4	Disk medium error. (Un-recovered)	50
5	Disk R/W error. (Recovered)	10
6	Disk R/W error. (Un-recovered)	2
7	Disk I/F error. (Recovered)	50
8	Disk I/F error. (Un-recovered)	2
9	Disk hardware error. (Recovered)	50
10	Disk hardware error. (Un-recovered)	2
11	Disk SCSI I/F error. (Recovered)	50
12	Disk SCSI I/F error. (Un-recovered)	2
13	Collectable errors in online verify.	100
14	Un-correctable errors in online verify.	50

There threshold values above can be referred to and updated from the Disk Array Management Program (‡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.

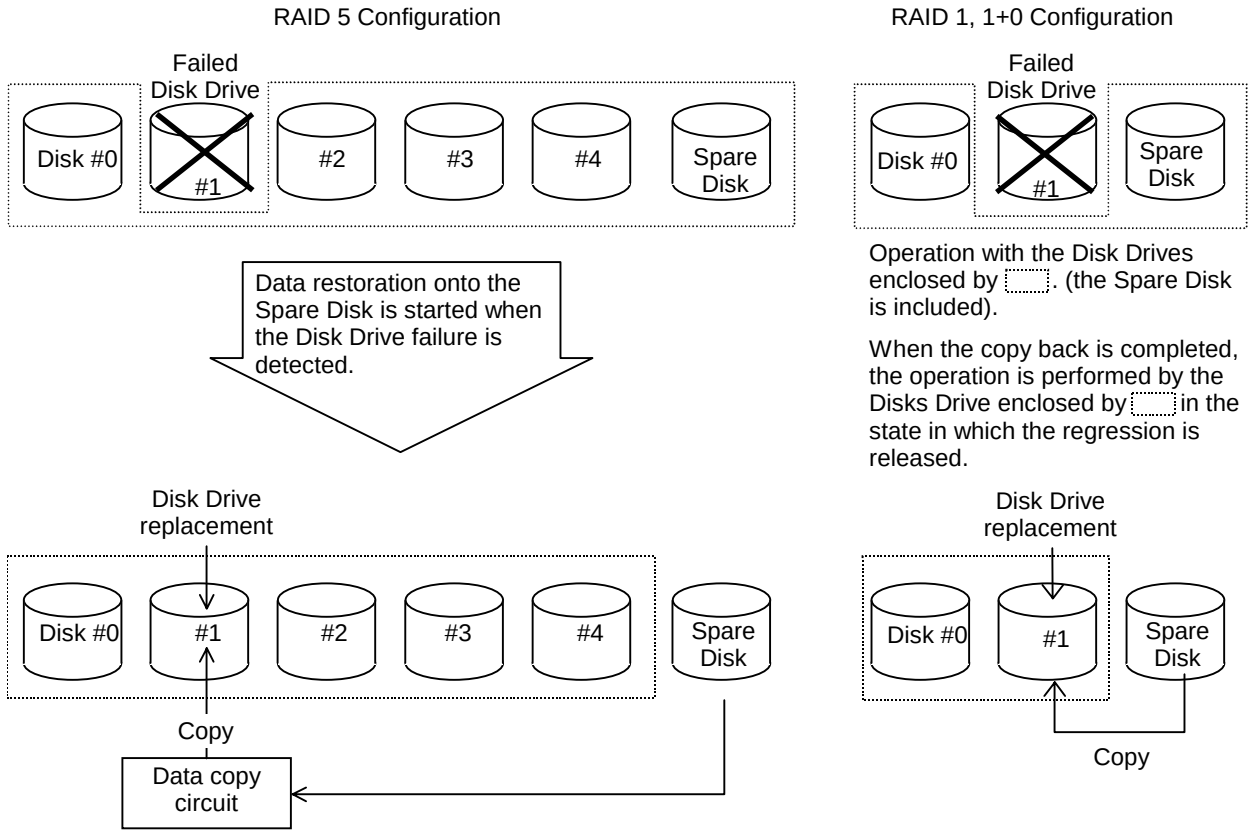
‡1 : For the details of the Disk Array Management Program, refer to the "Disk Array Management Program 2 (for GUI) User's Guide" or "Disk Array Management Program 3 (for GUI) User's Guide".

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Copy back

When a new Disk Drive is inserted to where a failure occurred as shown in the drawing below, the copy back will be executed automatically.

When the failed Disk Drive is replaced during the data recovery onto the Spare Disk, after the data recovery is completed, the copy back will be executed automatically.



In the following cases, the copy back will not start automatically. Operation to start the copy back is required.

- When the drive recovery opportunity of the drive recovery option in the Disk Array Management Program is not set to “automatic start” (automatic), the continuous start is not done. To make the continuous start be done, the drive recovery opportunity of the drive recovery option in the Disk Array Management Program must be set to “automatic start” (automatic).

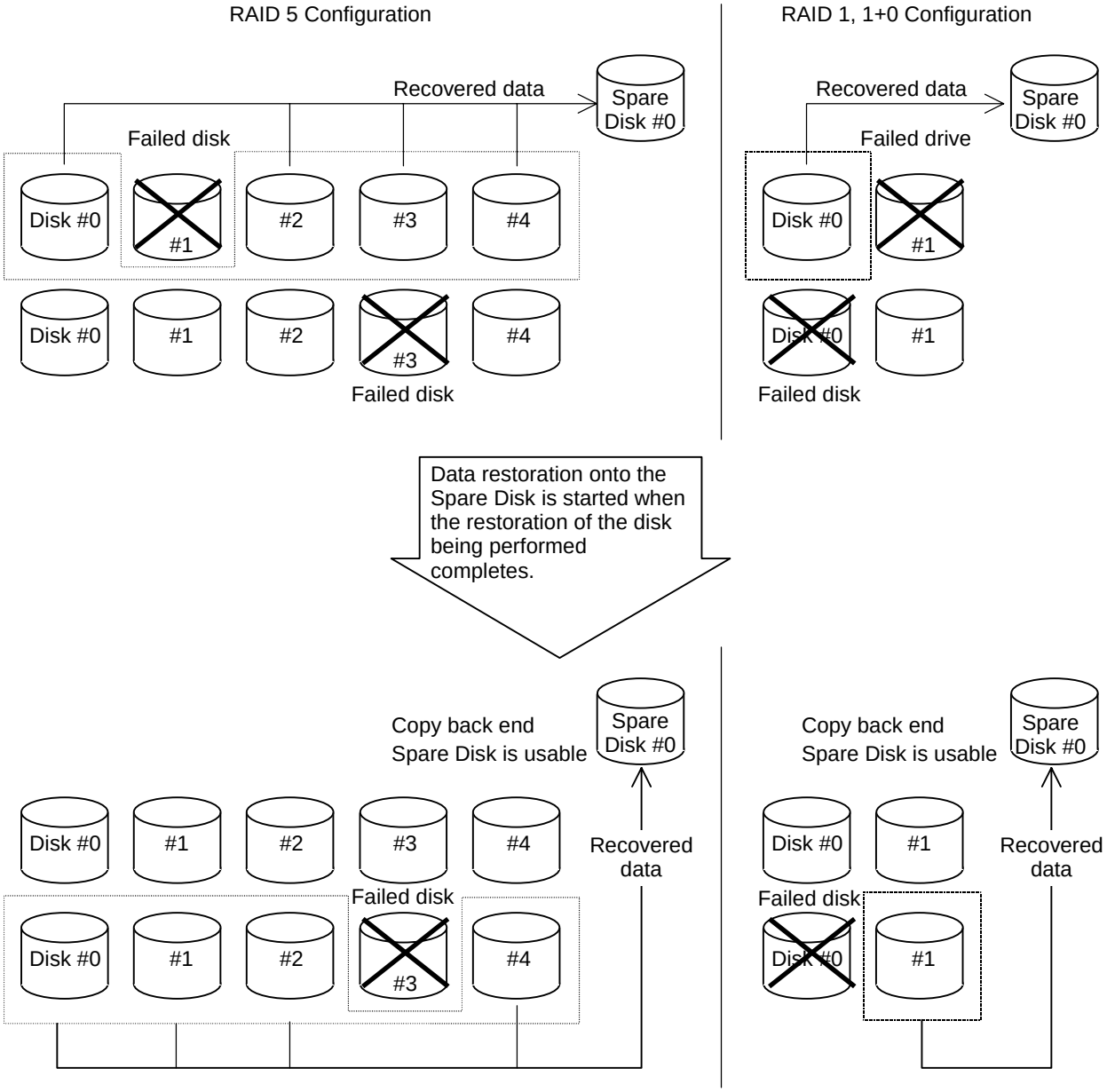
Copyright © 2002, 2005, Hitachi, Ltd.

(d) The continuous data recovery

When failures occurred in plural disks, after the data recovery of the first disk is completed, the data recovery of the second disk will start automatically by the continuous data recovery.

The continuous start is performed (the specified mode is activated) only when the disk recovery mode is specified as “automatic start”.

Continuous starting is initiated not only when restoring using Spare Disk, but also when making a collection copy to the original Disk Drive, and when recovering with no Spare Disk mounted.



Copyright © 2002, 2005, Hitachi, Ltd.

In the following cases, the continuous data recovery will not start.

- When the drive recovery opportunity of the drive recovery option in the Disk Array Management Program is not set to “automatic start” (automatic), the continuous start is not done. To make the continuous start be done, the drive recovery opportunity of the drive recovery option in the Disk Array Management Program must be set to “automatic start” (automatic).
- When all Spare Disks are used, if the blocked Disk Drive is not replaced, the continuous data recovery will not start. If the Spare Disk can be used or the blocked Disk Drive is replaced, the continuous data recovery will start.
- The continuous data recovery will not start for detached Disk Drive and uninstalled Disk Drive.

Copyright © 2002, 2005, Hitachi, Ltd.

(e) Transition of WEB of spare recovery operation of the "Information Message"
When the recovery completes normally, the "Information Message" from the WEB (WEB 02-0110) change successively as shown below.

(i) Data recover (Data recovery onto the Spare Disk when a disk failure is detected)
W060xy HDU alarm / W060HH HDU alarm / W060AT SATA HDU alarm
·····: 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

(ii) 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
W060xy HDU alarm / W060HH HDU alarm / W060AT SATA HDU alarm
·····: Data Disk blocked

(iii) 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.

‡1 : This message is displayed only when replacing Disk Drive (#0 to #3) on the RK/RKL/RKS/RKD/RKSD.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) Confirming completion of data recovery or copy back
Select “Information Message” from the WEB (WEB 02-0110) and make sure that the data recovery is completed normally.

Table 5.3.2 Standard Time Required for the Correction copy or Copy back (Microprogram revision is earlier than x659/M)

Unit : min

Item \ Disk Drive(*2)			35.4 G byte	71.3 G byte	143.3 G byte	245.7 G byte
Correction copy (*1)	5 Disk Drives	RAID 5 (4D+1P)	40	100	170	320
	16 Disk Drives	RAID 5 (15D+1P)	80	170	310	500
	4 Disk Drives	RAID 1+0 (2D+2P)	40	100	170	200
	16 Disk Drives	RAID 1+0 (8D+8P)	40	100	170	200
	2 Disk Drives	RAID 1 (1D+1P)	40	100	170	200
Copy back(*1)	5 Disk Drives	RAID 5 (4D+1P)	40	100	170	200
	16 Disk Drives	RAID 5 (15D+1P)	50	100	170	200
	4 Disk Drives	RAID 1+0 (2D+2P)	50	100	170	200
	16 Disk Drives	RAID 1+0 (8D+8P)	50	100	170	200
	2 Disk Drives	RAID 1 (1D+1P)	50	100	170	200

*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 : 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.

Table 5.3.2.1 Standard Time Required for the Correction copy or Copy back (Microprogram revision is x659/M or later)

Unit : min

Item \ Disk Drives(*2)			35.4 G byte	71.3 G byte	143.3 G byte	245.7 G byte	287.6 G byte	393.4 G byte
Correction copy (*1)	5 Disk Drives	RAID 5 (4D+1P)	40	100	170	320	300	470
	16 Disk Drives	RAID 5 (15D+1P)	80	170	310	500	570	800
	4 Disk Drives	RAID 1+0 (2D+2P)	20	50	90	200	150	400
	16 Disk Drives	RAID 1+0 (8D+8P)	20	50	90	200	150	400
	2 Disk Drives	RAID 1 (1D+1P)	20	50	90	200	150	400
Copy back(*1)	5 Disk Drives	RAID 5 (4D+1P)	20	50	90	200	150	400
	16 Disk Drives	RAID 5 (15D+1P)	20	50	90	200	150	400
	4 Disk Drives	RAID 1+0 (2D+2P)	20	50	90	200	150	400
	16 Disk Drives	RAID 1+0 (8D+8P)	20	50	90	200	150	400
	2 Disk Drives	RAID 1 (1D+1P)	20	50	90	200	150	400

*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 : 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.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.2 Replacing Backup Battery Unit

Select a procedure from the following and execute it.
When replacing the Backup Battery Unit, remove or install it with its battery switch turned off.

No.	Power status during the replacement	Restriction	Reference section
1	Replacement with the power turned on (hot replacement) (In the case of RK/RKD/RKS/RKSD)	• 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. • Complete the replacement within ten minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. • The Cache becomes a write through mode and some R/W performance is lowered during the Backup Battery Unit replacement. Therefore, replace it promptly. • If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	Refer to 5.3.2 (1).
2	Replacement with the power turned on (hot replacement) (In the case of RKH/RKHE)	• Be sure to replace the Battery Units one by one. If the two Battery Units are removed at the same time, the operation performance may be lowered or user data on the cache memory may be lost at the time of a power failure.	Refer to 5.3.2 (1).
3	Replacement with the power turned off	—	Refer to 5.3.2 (2).

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.**

Copyright © 2002, 2005, Hitachi, Ltd.

- **Do not discard a used battery at the site where it was removed for replacement.**

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on (Refer to Figure 5.3.3.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(a) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050).)

(b) Turn off the battery switch of the Backup Battery Unit to be replaced.

(c) In the case of the RK/RKL/RKS/RKD/RKSD, 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 the case of the RKH/RKHE, shift the latch on the Battery Unit to the Release position and pull the Battery Unit toward you holding its handle until the drawing restraint marker line on the label affixed on it appears.

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.

(f) Wait for more than 20 seconds, and then insert the Backup Battery Unit in the specified location in the subsystem to the position where it is completely fixed until latch moves to Lock side.
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.

(g) Turn on the battery switch of the Backup Battery Unit.
Make sure that the WARN LED (orange) on the front side of the subsystem goes out(‡1).

(h) Keep the power on for two hours or longer to charge the battery. If Power Unit (Power Unit (DC)) has not been powered on for no less than two hours, the battery does not function well.

(i) Make sure that the READY LED (green) on the Backup Battery Unit is on.

(j) Attach the front bezel.

(k) Dispose of recycling the battery in the removed Backup Battery Unit. For recycling, refer to "Appendix B Recycling" (APP B-0000).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

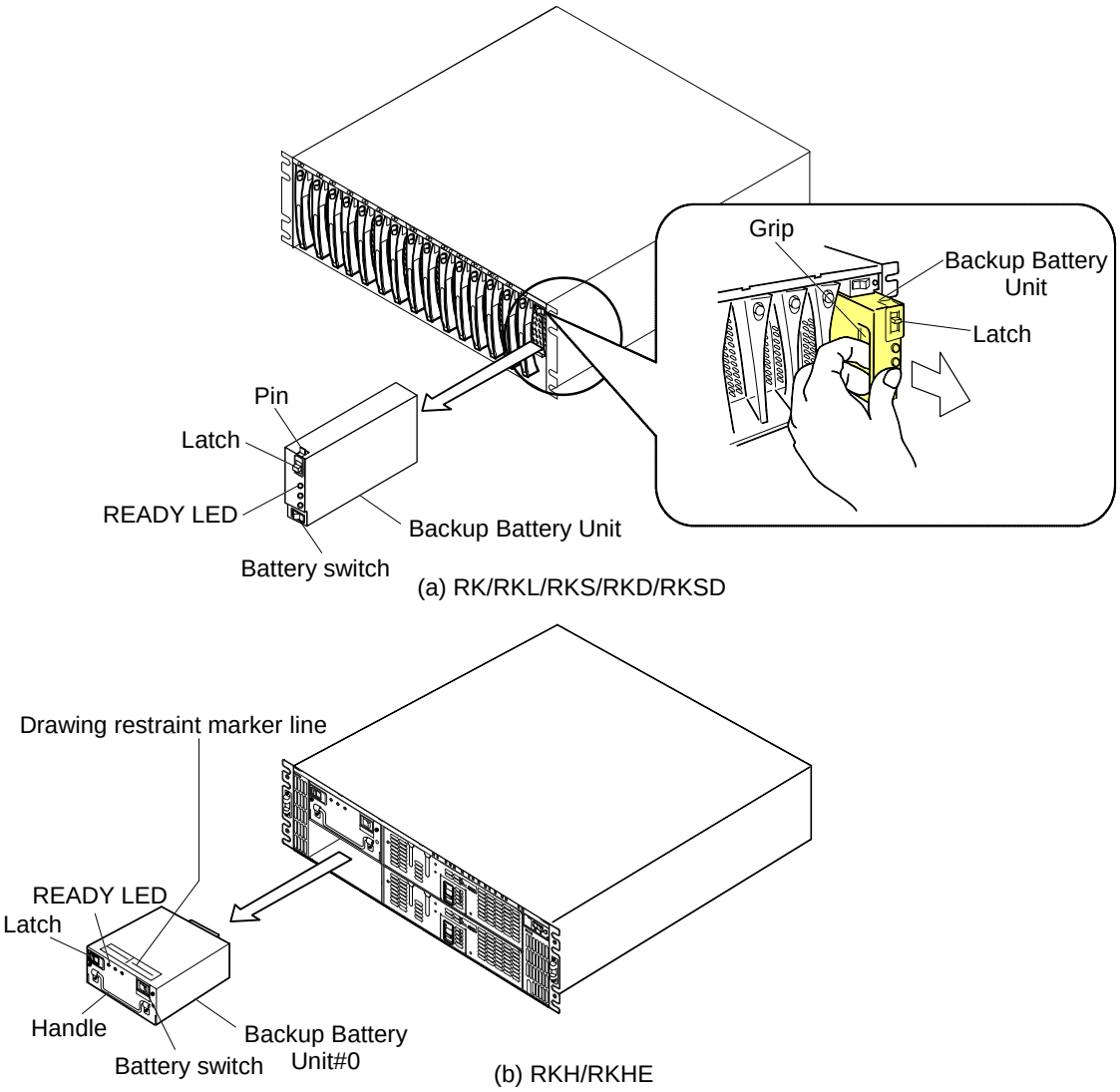


Figure 5.3.3 Replacing Backup Battery Unit

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off (Refer to Figure 5.3.3.)
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
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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 MNTE 02-0020), 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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)

(d) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(e) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))

(f) Turn off the battery switch of the Backup Battery Unit to be replaced.

(g) In the case of the RK/RKL/RKS/RKD/RKSD, shift the latch of the Battery Unit to the Release position and pull out the unit toward you.
In the case of the RKH/RKHE, shift the latch of the Battery Unit to the Release position, hold the handle of the unit, and pull out the unit toward you.
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.

(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.

(j) 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.

(k) Turn on the battery switch of the Backup Battery Unit.

(l) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

Copyright © 2002, 2005, Hitachi, Ltd.

(m) Turn on the main switch.
(n) Make sure that the READY LED (green) on the Backup Battery Unit is on.
(o) Attach the Front Bezel.
(p) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1).
The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).
(q) Keep the power on for two hours or longer to charge the battery. If Power Unit (Power Unit (DC)) has not been powered on for no less than two hours, the battery does not function well.
(r) Recycle the removed battery. For the recycling procedure, refer to "Appendix B Recycling" (APP B-0000).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2-2) When main switch is off

Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(a) 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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))

(d) Turn off the battery switch of the Backup Battery Unit to be replaced.

(e) In the case of the RK/RKL/RKS/RKD/RKSD, shift the latch of the Battery Unit to the Release position and pull out the unit toward you.
In the case of the RKH/RKHE, shift the latch of the Battery Unit to the Release position, hold the handle of the unit, and pull out the unit toward you.
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.

(h) 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.

(i) Turn on the battery switch of the Backup Battery Unit.

(j) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(k) Turn on the main switch.

(l) Make sure that the READY LED (green) on the Backup Battery Unit is on.

(m) Attach the Front Bezel.

(n) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

(o) Keep the power on for two hours or longer to charge the battery. If Power unit (Power Unit (DC)) has not been powered on for no less than two hours, the battery does not function well.

(p) Recycle the removed battery. For the recycling procedure, refer to "Appendix B Recycling" (APP B-0000).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

<Supplement 1> Replacing the Battery of RK/RKL/RKS/RKD/RKSD

⚠ CAUTION

- **Do not disassemble the battery. Otherwise, a burn or electric shock may be caused.**
- **If a battery is handled wrongly, it is feared that an explosion is caused.**
- **Do not allow the battery and Battery Unit to be physically damaged. Otherwise, a short circuit in the battery, which creates an exothermic heat, a bursting and an ignition, may be caused.**
- **Replace with the specified battery only. If not, it may cause an explosion.**

CAUTION



Notes on recycling

For this product, the closed nickel-hydride battery is used. The closed nickel-hydride battery is a valuable resource which can be recycled. When you dispose of a used product, please cooperate in the recycling. (This closed nickel and hydride battery, which is designated as recycling product by a recycling promotion low, needs to be recycled.)

Table 5.3.3 Specifications of sealed Nickel-hydride rechargeable battery

Manufacturer	Hitachi Maxell, Ltd.	Matsushita Battery Industrial Co., Ltd
Model	5HR-SC-2001	HHR-30P10W5
Voltage (V)	6	
Capacity (mAh)	5500 min	5600 min

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.**

Copyright © 2002, 2005, Hitachi, Ltd.

Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(1) Unfasten the binding screws (3 places) and the flat-head screw (1 place), and remove the top cover.
(2) Open the insulating paper cover in the center of the Backup Battery Unit.
(3) Make sure that the cable wired from the battery is connected to the connector at the side of bare board.
(4) Remove the connector at the side of cable wired from the battery.
(5) Remove the battery from the Backup Battery Unit.
(6) Install the new battery facing up the labeled side in the Backup Battery Unit.
When you perform this operation, be careful about the fold of the insulating paper.
(7) Connect the battery to the connector.
(8) Return the insulating cover to the position where it was before.
(9) Fix the top cover with the screws (3 places) and the flat-head screw (1 place).
(10) Recycle the removed battery. For the recycling procedure, refer to "Appendix B Recycling" (APP B-0000).

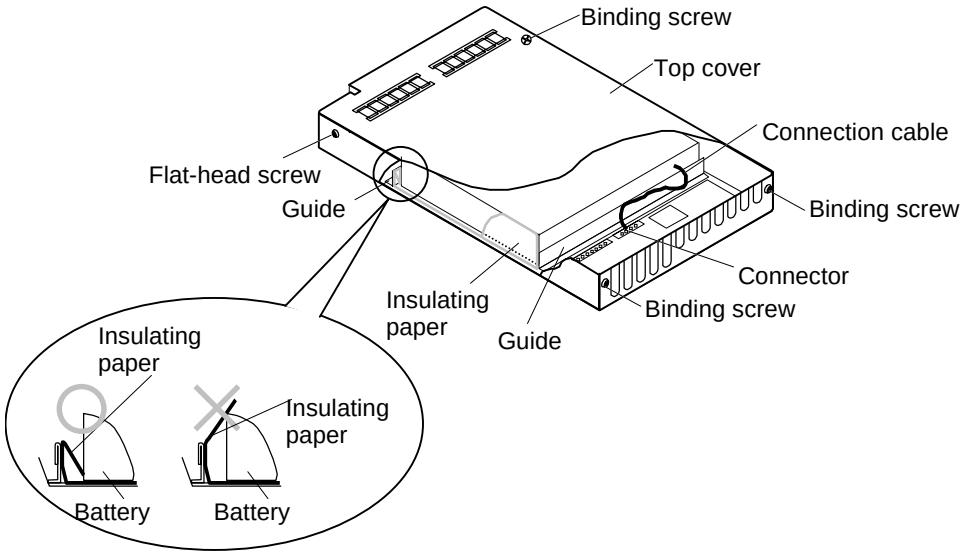


Figure 5.3.4.1 Replacing Backup Battery Unit of RK/RKL/RKS/RKD/RKSD

Copyright © 2002, 2005, Hitachi, Ltd.

<Supplement 2> Replacing the Battery of RKH/RKHE

⚠ CAUTION

- **Do not disassemble the battery. Otherwise, a burn or electric shock may be caused.**
- **If a battery is handled wrongly, it is feared that an explosion is caused.**
- **Do not allow the battery and Battery Unit to be physically damaged. Otherwise, a short circuit in the battery, which creates an exothermic heat, a bursting and an ignition, may be caused.**
- **Replace with the specified battery only. If not, it may cause an explosion.**

CAUTION



Notes on recycling

For this product, the closed nickel-hydride battery is used. The closed nickel-hydride battery is a valuable resource which can be recycled. When you dispose of a used product, please cooperate in the recycling. (This closed nickel and hydride battery, which is designated as recycling product by a recycling promotion low, needs to be recycled.)

Table 5.3.4 Specifications of sealed Nickel-hydride rechargeable battery

Specification	RKH/RKHE
Manufacturer	Matsushita Battery Industrial Co., Ltd
Model	HHR-30P15W3
Voltage (V)	6
Capacity (mAh)	8400 min

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.**

Copyright © 2003, 2005, Hitachi, Ltd.

Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(1) Unfasten the binding screws (2 places) and the flat-head screw (2 place).
(2) Open and remove to pull up a top cover. (See Figure 5.3.4.2)
(3) Make sure that the cable wired from the battery is connected to the connector at the side of bare board.
(4) Disconnect the cable, one of whose ends is connected to the battery, from the connector on the PCBA.
(5) Remove the battery from the Backup Battery Unit.
(6) Install the new battery facing up the labeled side in the Backup Battery Unit.
(7) Connect the battery to the connector.
(8) As you push insulating paper, put and attach the top cover of the Backup Battery Unit.
(9) Fix the top cover with the screws (2 places) and the flat-head screw (2 places).
(10) Recycle the removed battery. For the recycling procedure, refer to "Appendix B Recycling" (APP B-0000).

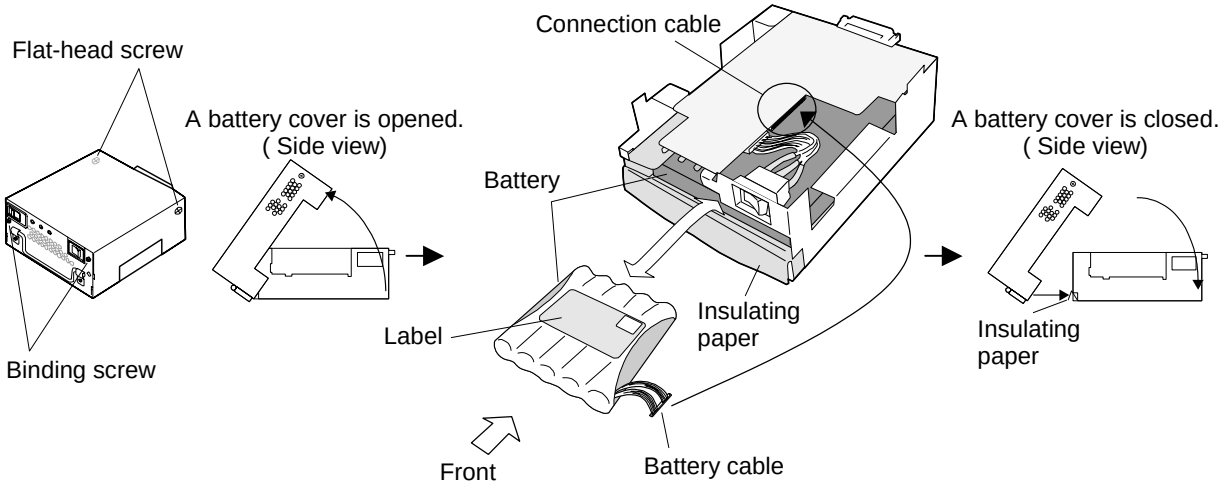


Figure 5.3.4.2 Replacing Backup Battery Unit of RKH/RKHE

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.3 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 5 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 a trouble of the Power Unit (Power Unit (DC)) is detected during replacement of the Fan Assembly, pull out and then insert the Power Unit (Power Unit (DC)).**
- **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 RK/RKL/RKS/RKA/RKAAT/RKAATL/RKD/RKSD/RKAD. 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)	• Complete the replacement within five 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. • When the Power Unit (Power Unit (DC)) and another module fail at the same time, replace the Power Unit (Power Unit (DC)) first. Otherwise, a powering off may occur because of an abnormal temperature rise. • If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	See 5.3.3 (1)
2	Replacement with the power turned off	—	See 5.3.3 (2)

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on (Refer to Figure 5.3.5.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(a) In the case of the RKH/RKHE, remove the Front Bezel. (See Section 1.4, "How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" in the Maintenance Manual for Installation. (INST 01-0050))

(b) Make sure that the ALM LED (red) on the Fan Assembly is on.

(c) In the case of the RK/RKL/RKS/RKA/RKAAT/RKAATL/RKD/RKSD/RKAD, 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).
In the case of the RKH/RKHE, slide the latch to the Release position and pull out the Fan Assembly.

(d) Remove the Fan Assembly by pulling it out holding its main body with your both hands.

(e) After waiting for longer than 20 seconds, push in the new Fan Assembly until it clicks the latch. 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.

NOTE : Do not catch a ENC cable, when Fan Assembly for the adding subsystem is inserted.

(f) Make sure that the status of the ALM LED (red) on the Fan Assembly changes from on to off.

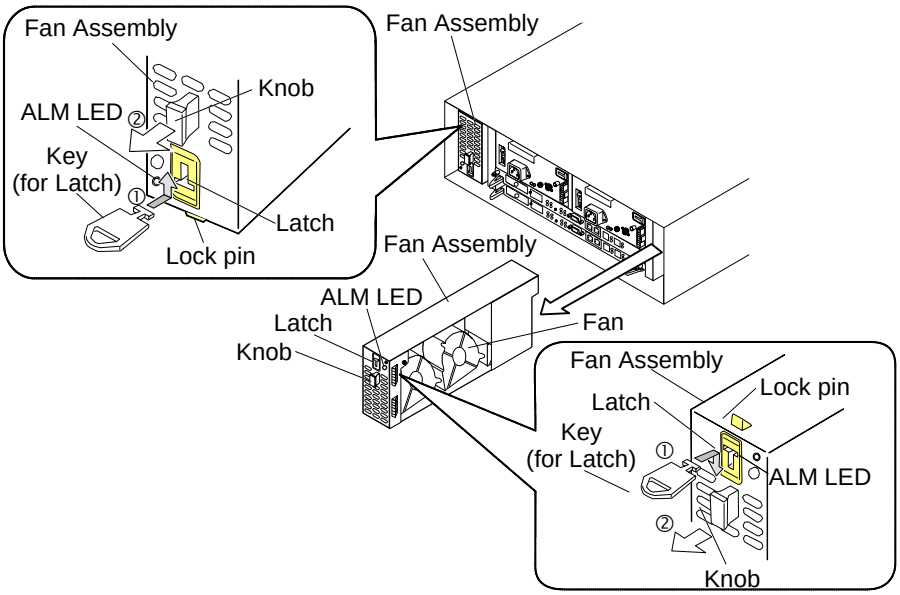
(g) Check if the fans of the mounted Fan Assembly are rotating.

(h) In the case of the RKH/RKHE, attach the Front Bezel.

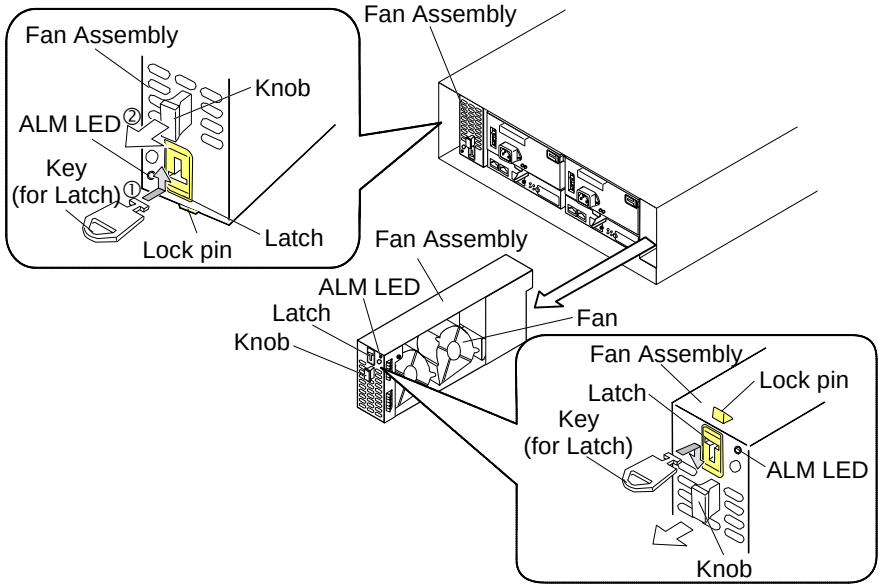
(i) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

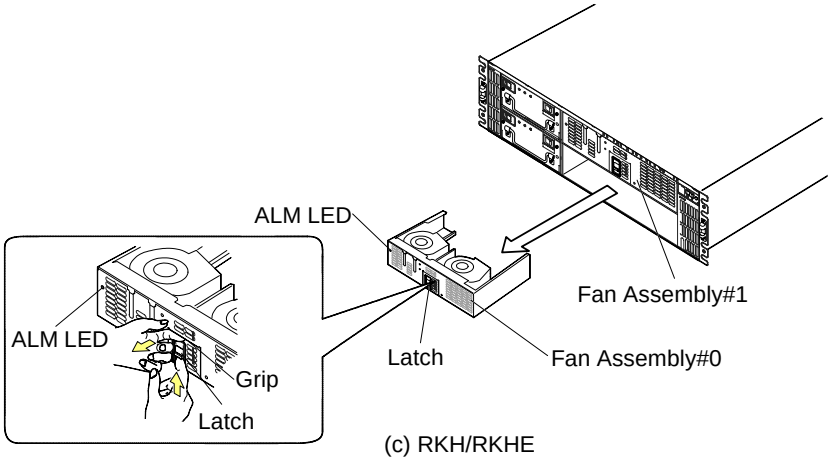
Copyright © 2002, 2005, Hitachi, Ltd.



(a) RK/RKL/RKS/RKD/RKSD



(b) RKA/RKAD/RKAAT/RKAATL



(c) RKH/RKHE

Figure 5.3.5 Replacing Fan Assembly

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off (Refer to Figure 5.3.5.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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.

(b) In the case of the RKH/RKHE, remove the Front Bezel. (See Section 1.4, "How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" in the Maintenance Manual for Installation. (INST 01-0050))

(c) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(d) In the case of the RK/RKL/RKS/RKA/RKAAT/RKAATL/RKD/RKSD/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).
In the case of the RKH/RKHE, slide the latch to the Release position and pull out the Fan Assembly.

NOTE : Do not catch a ENC cable, when Fan Assembly for the adding subsystem is inserted.

(e) Remove the Fan Assembly by pulling it out holding its main body with your both hands.

(f) After waiting for longer than 20 seconds, push in the new Fan Assembly until it clicks the latch.

(g) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(h) Turn on the main switch.
Make sure that the status of the ALM LED (red) changes from on to off.

(i) Check if the fans of the mounted Fan Assembly are rotating.

(h) In the case of the RKH/RKHE, attach the Front Bezel.

(k) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.4 Replacing Power Unit (Power Unit (DC))

CAUTION

The front and left sides of the Power Unit in the RKH/RKHE may become very hot depending on operation and/or ambient temperature; they can burn your finger when they are touched. When replacing the Power Unit, replace it after waiting for about five minutes later than the AC Power Unit Switch turned off.

- Replacing Power Unit .....(1) on page MNTE 05-0340
- Replacing Power Unit (DC).....(2) on page MNTE-05-0371

(1) Replacing Power Unit

The Power Units differ among the RK/RKS, RKA and RKAAT/RKAJAT/RKAJATL. 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 5 minutes, it will stop by detecting the thermal alarm.**
- **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 five 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 If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	Refer to 5.3.4 (1-1)(1-2)
		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 5.3.4 (1-1)
		When the Remote adapter is connected.	Refer to 5.3.4 (1-2)
2	Replacement with the power turned off	—	Refer to 5.3.4 (1-3)

Copyright © 2002, 2005, Hitachi, Ltd.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 5.3.6.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(a) Make sure ALARM LED (Red) of the Power Unit to be replaced is on.
Make sure 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 RK/RKL/RKS/RKA/RKAAT/RKAATL, 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).
In the case of the RKAJAT/RKAJATL, loosen the Latch (fixing screw)of the Power Unit and move it forward by holding the handle after pushing down the latch to the Release side.
In the case of the RKH/RKHE, loosen the securing screw and pull out the AC/DC Power Unit holding the handle.
(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 of the new Power Unit is turned off.
(g) Wait for 20 seconds or longer, and then insert the new AC/DC Power Unit.
If you insert the Power Unit without waiting for more than 20 seconds, Power Unit may not be recovered.
In the case of the RK/RKL/RKS/RKA/RKAAT/RKAATL, push the unit in until the latch makes with a click.
In the case of the RKAJAT/RKAJATL, insert the two Power Unit into the specified position in the subsystem after making a Latch (fixing screw) to the Release side, and tighten the fixing screw.
In the case of the RKH/RKHE, push the unit in, and then tighten the securing screw.

NOTE : Do not catch a ENC cable, when Power Unit for the adding subsystem is inserted.

(h) Connect all the removed cables.
(i) Turn on the AC Power Unit Switch of the installed Power Unit.
Make sure that the READY LED (green) of the Power Unit is on.
(j) Make sure that the WARNING LED (orange) on the Front Bezel gone out(‡1).
(k) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED of RK/RKL/RKS/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

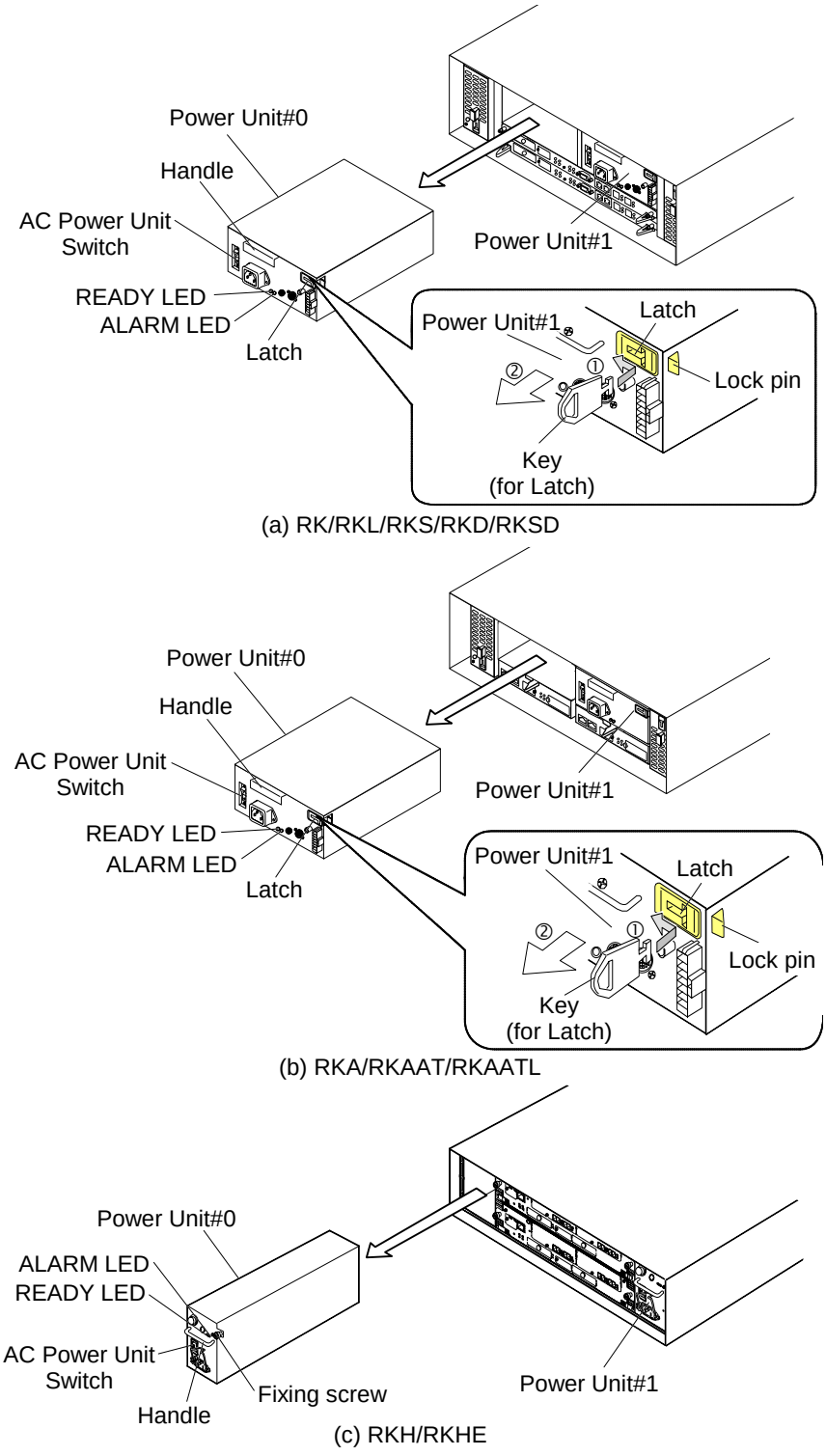


Figure 5.3.6 Replacing Power Unit (RK/RKL/RKS/RKD/RKSD/RKA/RKAAT/RKAATL/RKH/RKHE)

Copyright © 2003, 2005, Hitachi, Ltd.

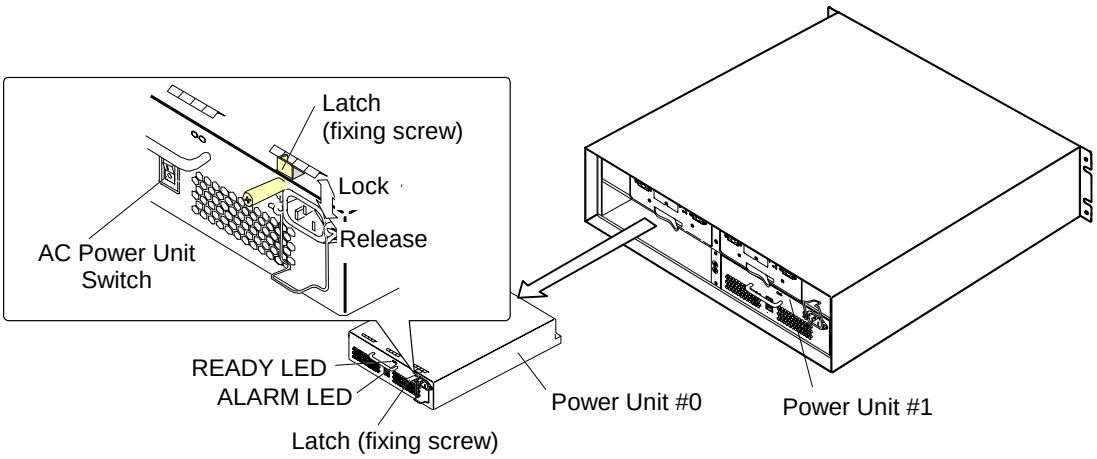
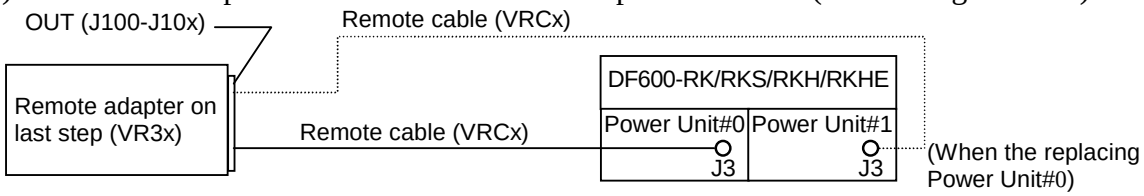


Figure 5.3.6.1 Replacing Power Unit (RKAJAT/RKAJATL)

Copyright © 2003, 2005, Hitachi, Ltd.

(1-2) Procedure for replacement when the Remote adapters connected (Refer to Figure 5.3.6.)



Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(a) Connect the OUT (J100-J10x) of the last Remote Adapter and the connecter (J3) of the DF600 Power Unit which is not to be replaced with Remote Cable (VRCx).
When the Remote Cable has been already connected, check to see that the LED of the Remote Adapter connected is on.

(b) Disconnect the remote cable connected to the Power Unit to be replaced.

(c) Make sure that the READY LED (green) of the power supply not to be replaced is on. (The power supply to be replaced is off.)

NOTE : When the ALARM LED of the Power Unit which is not to be replaced is on, replace the Power Unit in the state in which the power is turned off.

(d) Turn off the AC Power Unit Switch of the Power Unit to be replaced.

(e) Disconnect the power cable connected to the Power Unit to be replaced.

(f) In the case of the RK/RKL/RKS/RKD/RKSD, 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).
In the case of the RKAJAT/RKAJATL, loosen the latch (fixing screw) of the Power Unit and move it forward by holding the handle after pushing down the latch to the Release side.
In the case of the RKH/RKHE, loosen the securing screw and pull out the AC/DC Power Unit holding the handle.

(g) Remove the Power Unit by pulling it out holding its main body with your both hands.

(h) Make sure that the AC Power Unit Switch on the Power Unit is off.

(i) Wait for 20 seconds or longer, and then insert the new AC/DC Power Unit.
If you insert the Power Unit without waiting for more than 20 seconds, Power Unit may not be recovered.
In the case of the RK/RKL/RKS/RKD/RKSD, push the unit in until the latch makes with a click.
In the case of the RKAJAT/RKAJATL, insert the two Power Unit into the specified position in the subsystem after making a Latch (fixing screw) to the Release side, and tighten the fixing screw.
In the case of the RKH/RKHE, push the unit in, and then tighten the securing screw.

NOTE : Do not catch a ENC cable, when Power Unit for the adding subsystem is inserted.

Copyright © 2002, 2005, Hitachi, Ltd.

(j) Attach the power cable as they were before.
(k) Connect the remote cable as they were before.
(l) Turn on the AC Power Unit Switch of the Power Unit newly mounted power supply.
(m) Make sure that the READY LED (green) of the Power Unit is on.
(n) Make sure that the WARNING LED (orange) on the Front Bezel gone out(‡1).
(p) Make sure that the LED of the Remote Adapter connected to the replaced Power Unit is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).
(o) Make sure that the READY LED (green) on the Front Bezel is on.

‡1 : When the WARNING LED of RK/RKL/RKS/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2005, Hitachi, Ltd.

(1-3) Procedure for replacement with the power turned off (Refer to Figure 5.3.6.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 RK/RKL/RKS/RKD/RKSD, 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).
In the case of the RKAJAT/RKAJATL, loosen the latch (fixing screw) of the Power Unit and move it forward by holding the handle after pushing down the latch to the Release side.
In the case of the RKH/RKHE, loosen the securing screw and pull out the AC/DC Power Unit holding the handle.
(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 RK/RKL/RKS/RKD/RKSD, push the unit in until the latch makes with a click.
In the case of the RKAJAT/RKAJATL, insert the two Power Unit into the specified position in the subsystem after making a Latch (fixing screw) to the Release side, and tighten the fixing screw.
In the case of the RKH/RKHE, push the unit in, and then tighten the securing screw.

NOTE : Do not catch a ENC cable, when Power Unit for the adding subsystem is inserted.

Copyright © 2005, Hitachi, Ltd.

(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.
Make sure that the READY LEDs (green) of the both Power Units are on.
(j) Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).
(k) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).
(l) When the remote adapter is connected, make sure that the LED of the Remote Adapter connected is on.

‡1 : When the WARNING LED of RK/RKL/RKS/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Replacing Power Unit (DC)

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 5 minutes, it will stop by detecting the thermal alarm.**
- **When a trouble of the Power Unit (DC) is detected during replacement of the Fan Assembly, pull out and then insert the Power Unit (DC).**
- **When replacing the Power Unit (DC), do it in haste after preparing a replacement Power Unit (DC) 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 five minutes. ② When the Power Unit (DC) and another module fail at the same time, replace the Power Unit (DC) first. Otherwise, a powering off (subsystem down) may occur because of an abnormal temperature rise. ③ If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	Refer to 5.3.4 (2-1)(2-2)
		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 5.3.4 (2-1)
2	Replacement with the power turned off	—	Refer to 5.3.4 (2-2)

Copyright © 2003, 2005, Hitachi, Ltd.

(2-1) Procedure for replacement with the power turned on (Be sure to perform the following operations (a) to (j) within 10 minutes.)

Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(a) Make sure ALARM LED (Red) of the Power Unit (DC) to be replaced is on.
Make sure that READY LED (Green) of the Power Unit (DC) not to be replaced is on.

NOTE : When the ALARM LEDs of Power Unit (DC) of the both systems are on, replace the Power Unit (DC) in the state in which the power is turned off.

(b) Turn on the DC Power Unit Switch of the Power Unit (DC) to be replaced.

⚠ CAUTION

Here exists a hazard that can cause an electric shock. Start the work after turning off the breaker in the power distribution box connected to the Power Unit (DC) to be replaced.

(c) Turn off the breaker in the power distribution box connected to the Power Unit (DC) to be replaced.
(d) Measure the terminal with a tester, and verify that the power is not supplied (0 V).
(e) Record the relation of terminals and cable connection (The location of FG and positive and negative terminals, and the color of cables).
(f) After waiting for one minute or longer, remove the terminal block cover of the Power Unit (DC) to be replaced.
(g) Remove the cable connected to the plus and minus power input terminals on the terminal block.
(h) Remove the FG cable from the frame ground (FG).
(i) Remove the cable stay from the Power Unit (DC). (Remove it with the power cable fastened to it.)
(j) Insert the key (for Latches) into Latch on the Power Unit (DC) and slide to Release side, then pull Power Unit (DC) by holding the finger grip (handle) toward you until the Latch pin appears (released).
(k) Remove the Power Unit (DC) by pulling it out holding its main body with your both hands.

Copyright © 2003, 2005, Hitachi, Ltd.

(l) Remove a Hexagon socket head bolt for preventing an incorrect insertion of new Power Unit (DC). (The Hexagon socket head bolt to be removed is different depending on subsystem to be mounted.)
When mounting the Power Unit (DC) on RKD/RKSD : Remove the Hexagon socket head bolt A
When mounting the Power Unit (DC) on RKAD : Remove the Hexagon socket head bolt B

(m) Make sure that the DC Power Unit Switch of the new Power Unit (DC) is turned off.

(n) After waiting for longer than 20 seconds, push in the new Power Unit (DC) until it clicks the latch.
If you insert the Power Unit (DC) without waiting for more than 20 seconds, Power Unit (DC) may not be recovered.

NOTE : Do not catch a ENC cable, when Power Unit (DC) for the adding subsystem is inserted.

(o) Remove the cover of the terminal block.

⚠ CAUTION

- **This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.**
- **This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.**
- **A readily accessible disconnect device should be incorporated in the building installation wiring.**
- **The d.c. supply source is to be located within the same premises as this subsystem.**
- **Use this model in a RESTRICTED ACCESS LOCATION only.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.**

Copyright © 2003, 2005, Hitachi, Ltd.

(p) Connect the FG cable to the frame ground (FG).
When doing this, route the FG cable making it run under the handle.
(q) Connect the cable to the plus and minus power input terminals on the terminal block.
When doing this, take care not to confuse the plus and minus terminals.

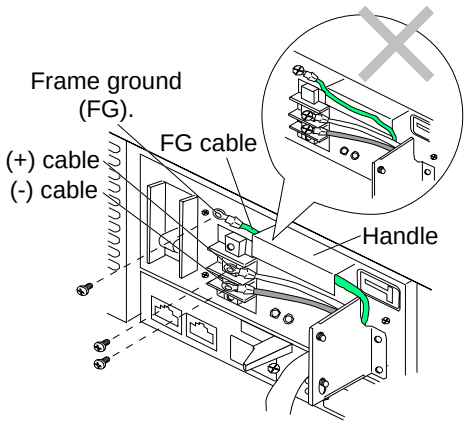


Figure 5.3.6.1 Power Cable Connection

(r) Reinstall the cover of the terminal block.
(s) Reinstall the cable stay.
(t) Turn on the breaker in the power distribution box.
(u) Turn on the DC Power Unit Switch of the installed Power Unit (DC).
Make sure that the READY LED (green) of the Power Unit (DC) is on.
(v) Make sure that the WARNING LED (orange) on the Front Bezel gone out(‡1).
(w) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

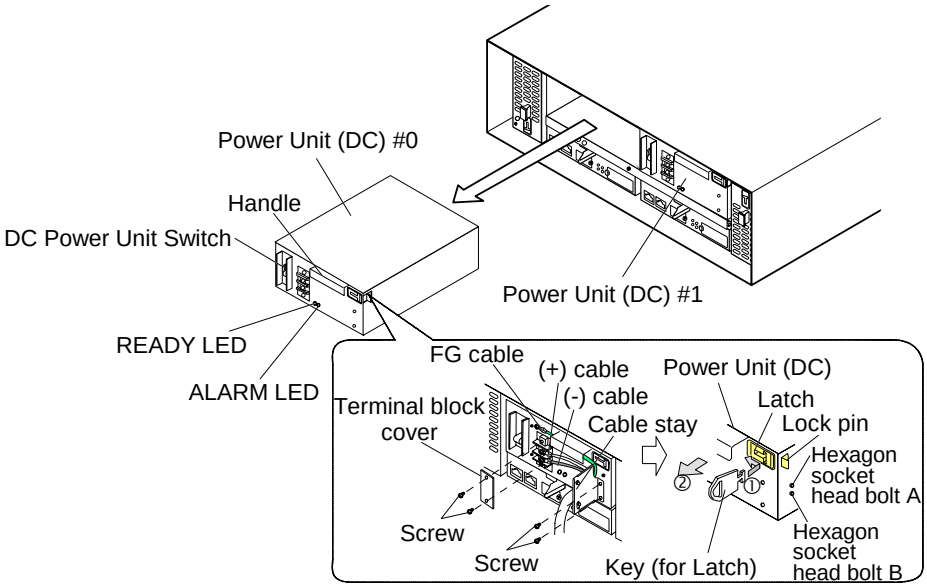


Figure 5.3.6.2 Replacing Power Unit (DC)

‡1 : When the WARNING LED of RKD/RKSD is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

(2-2) Procedure for replacement with the power turned off
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 DC Power Unit Switch of the both Power Units.

⚠ CAUTION

Here exists a hazard that can cause an electric shock. Start the work after turning off the breaker in the power distribution box connected to the Power Unit (DC) to be replaced.

(c) Turn off the breaker in the power distribution box connected to the Power Unit (DC) to be replaced.
(d) Measure the terminal with a tester, and verify that the power is not supplied (0 V).
(e) Record the relation of terminals and cable connection (The location of FG and positive and negative terminals, and the color of cables).
(f) After waiting for one minute or longer, remove the terminal block cover of the Power Unit (DC) to be replaced.
(g) Remove the cable connected to the plus and minus power input terminals on the terminal block.
(h) Remove the FG cable from the frame ground (FG).
(i) Remove the cable stay the Power Unit (DC). (Remove it with the power cable fastened to it.)

Copyright © 2003, 2005, Hitachi, Ltd.

(j) Insert the key (for Latches) into Latch on the Power Unit (DC) and slide to Release side, then pull Power Unit (DC) by holding the finger grip (handle) toward you until the Latch pin appears (released).
(k) Remove the Power Unit (DC) by pulling it out holding its main body with your both hands.
(l) Remove a Hexagon socket head bolt for preventing an incorrect insertion of new Power Unit (DC). (The Hexagon socket head bolt to be removed is different depending on subsystem to be mounted.)
When mounting the Power Unit (DC) on RKD/RKSD : Remove the Hexagon socket head bolt A
When mounting the Power Unit (DC) on RKAD : Remove the Hexagon socket head bolt B
(m) Make sure that the DC Power Unit Switch on the Power Unit (DC) is off.
(n) Push in the new Power Unit (DC) until it clicks the latch.

NOTE : Do not catch a ENC cable, when Power Unit (DC) for the adding subsystem is inserted.

(o) Remove the cover of the terminal block.

⚠ CAUTION

- **This subsystem shall be connected directly to the d.c. supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the d.c. supply system earthing electrode conductor is connected.**
- **This subsystem shall be located in the same immediate area (such as, adjacent cabinets) as any other subsystem that has a connection between the earthed conductor of the same d.c. supply circuit and the earthing conductor, and also the point of earthing of the d.c. system. The d.c. system shall not be earthed elsewhere.**
- **A readily accessible disconnect device should be incorporated in the building installation wiring.**
- **The d.c. supply source is to be located within the same premises as this subsystem.**
- **Use this model in a RESTRICTED ACCESS LOCATION only.**
- **Switching or disconnecting devices shall not be in the earthed circuit conductor between the d.c. source and the point of the connection of the earthing electrode conductor.**

Copyright © 2003, 2005, Hitachi, Ltd.

(p) Connect the FG cable to the frame ground (FG).
When doing this, route the FG cable making it run under the handle.
(q) Connect the cable to the plus and minus power input terminals on the terminal block.
When doing this, take care not to confuse the plus and minus terminals.
(r) Reinstall the cover of the terminal block.
(s) Reinstall the cable stay.
(t) Turn on the breaker in the power distribution box.
(u) Turn on the DC Power Unit Switch of the both Power Units (DC), and then turn on the main switch.
Make sure that the READY LEDs (green) of the both Power Units (DC) are on.
(v) Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).
(w) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED of RKD/RKSD is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.5 Replacing Control Unit

⚠ CAUTION

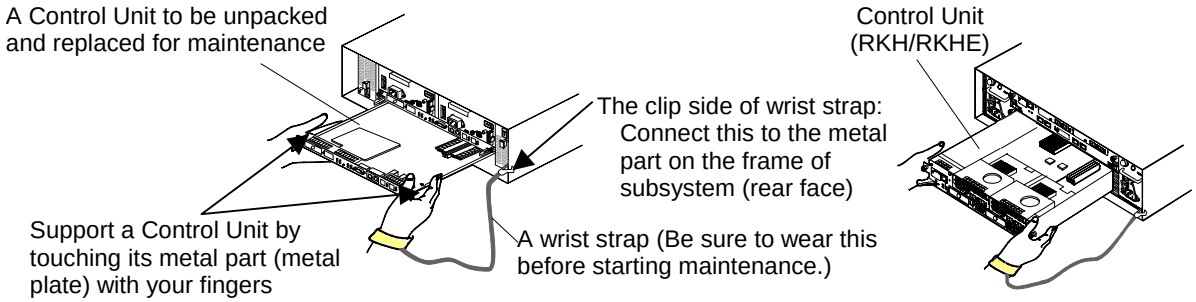
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

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. 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. If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	When the CALM LED is on • In the case of the RK/ RKL/RKS/RKD/RKSD : See 5.3.5 (1-1). • In the case of the RKH/RKHE : See 5.3.5 (1-3). When the CALM LED is off (Preventive replacement) • In the case of the RK/ RKL/RKS/RKD/RKSD : See 5.3.5 (1-2). • In the case of the RKH/RKHE : See 5.3.5 (1-4).
2	Replacement with the power turned off	—	• In the case of the RK/ RKL/RKS/RKD/RKSD : See 5.3.5 (2-1). • In the case of the RKH/RKHE : See 5.3.5 (2-2).
3	Replacement to be made with the power turned off (with the cache memory data volatilized forcibly)	Make the replacement after getting a permission of the technical support division because user data in the cache will be lost.	• In the case of the RK/ RKL/RKS/RKD/RKSD: See 5.3.5 (3-1). • In the case of the RKH/RKHE : See 5.3.5 (3-2).

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on (for the case of the dual Controller configuration only)

(1-1) When the CALM LED or EALM LED of the RK/RKL/RKS/RKD/RKSD is on
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

NOTE : • Do not replace the Control Unit which operates normally.
Before replacing the Control Unit, confirm that it is the CALM LED (RED) or EALM LED (RED) 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" on page MNTE 05-0450.
• 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.

(a) Make sure that the CALM LED (RED) or EALM LED (RED) on the Control Unit to be replaced is on.

(b) Loosen the fixing screws of the Control Unit.
Raise the both upper and lower levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(c) 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.

CAUTION

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

Copyright © 2002, 2005, Hitachi, Ltd.

(d) Remove the Control Unit by pulling it out toward you.
(e) 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.

(f) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
(g) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out.
(h) When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is connected, connect the ENC cable. When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not connected, go to Step (h).

NOTE : When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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.

(i) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (⟵) at the same time.
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.

NOTE : 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.

(j) Tighten the left and right fixing screws of the Control Unit.
(k) 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.)
(l) Connect the removed all cables to the Control Unit.
(m) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

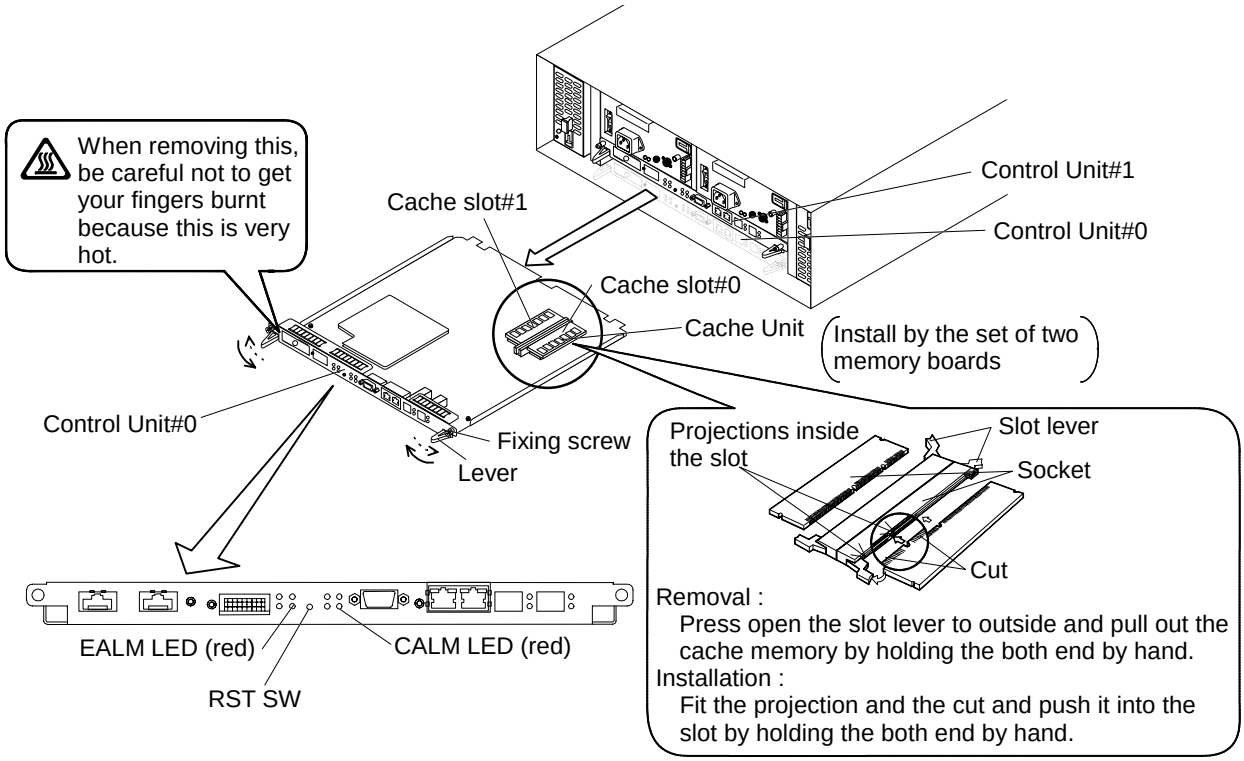


Figure 5.3.7 Control Unit replacement and LED locations

Copyright © 2002, 2005, Hitachi, Ltd.

(1-2) When the CALM LED or EALM LED of the RK/RKL/RKS/RKD/RKSD is off (Refer to Figure 5.3.7.)

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" on page MNTE 05-0450.
• 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.

(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) or EALM LED (red) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.

(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(c) Remove the all cables connected to the Control Unit to be 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.

(e) 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.

(f) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.

Copyright © 2002, 2005, Hitachi, Ltd.

(g) When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is connected, connect the ENC cable. When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not connected, go to Step (h).

NOTE : When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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.

(h) Wait for more than 20 seconds, and then insert the Control Unit into the specified position with its right and left levers being raised, then return the both levers to the direction shown by the arrows (⟶) at the same time.
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.

NOTE : 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.

(i) Tighten the left and right fixing screws of the Control Unit.
(j) 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.
(k) Connect the removed all cables to the Control Unit.
(l) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(1-3) When the CALM LED or EALM LED of the RKH/RKHE is on
(Refer to Figure 5.3.7.1.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

NOTE : • Do not replace the Control Unit which operates normally.
Before replacing the Control Unit, confirm that it is the CALM LED (RED) or EALM LED (RED) 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" on page MNTE 05-0450.
• 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.
• When replacing the Control Unit in the RKH, use the Control Unit for RKH, and when replacing the Control Unit in the RKHE, use the Control Unit for RKHE.

(a) Make sure that the CALM LED (RED) or EALM LED (RED) on the Control Unit to be replaced is on.
(b) Loosen the fixing screws of the Control Unit.
Raise the both upper and lower levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.
(e) Removing the three screws (on the Control Unit) that is securing the Interface Board.
Pull up the Interface Board and remove it from the Control Unit.

Copyright © 2003, 2005, Hitachi, Ltd.

(f) 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.

(g) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
(h) Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit fitting it to the positioning pin.
(i) Make sure that 20 seconds or longer has elapsed after the Control Unit was taken out.
(j) When the RKA/RKAAT/RKAJAT is connected, connect the ENC cable. When the RKA/RKAAT/RKAJAT is not connected, go to Step (k).

NOTE : When the RKA/RKAAT/RKAJAT 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.

(k) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←——) at the same time.
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.

NOTE : 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.

(l) Tighten the left and right fixing screws of the Control Unit.
(m) 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.)
(n) Connect the removed all cables to the Control Unit.
(o) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

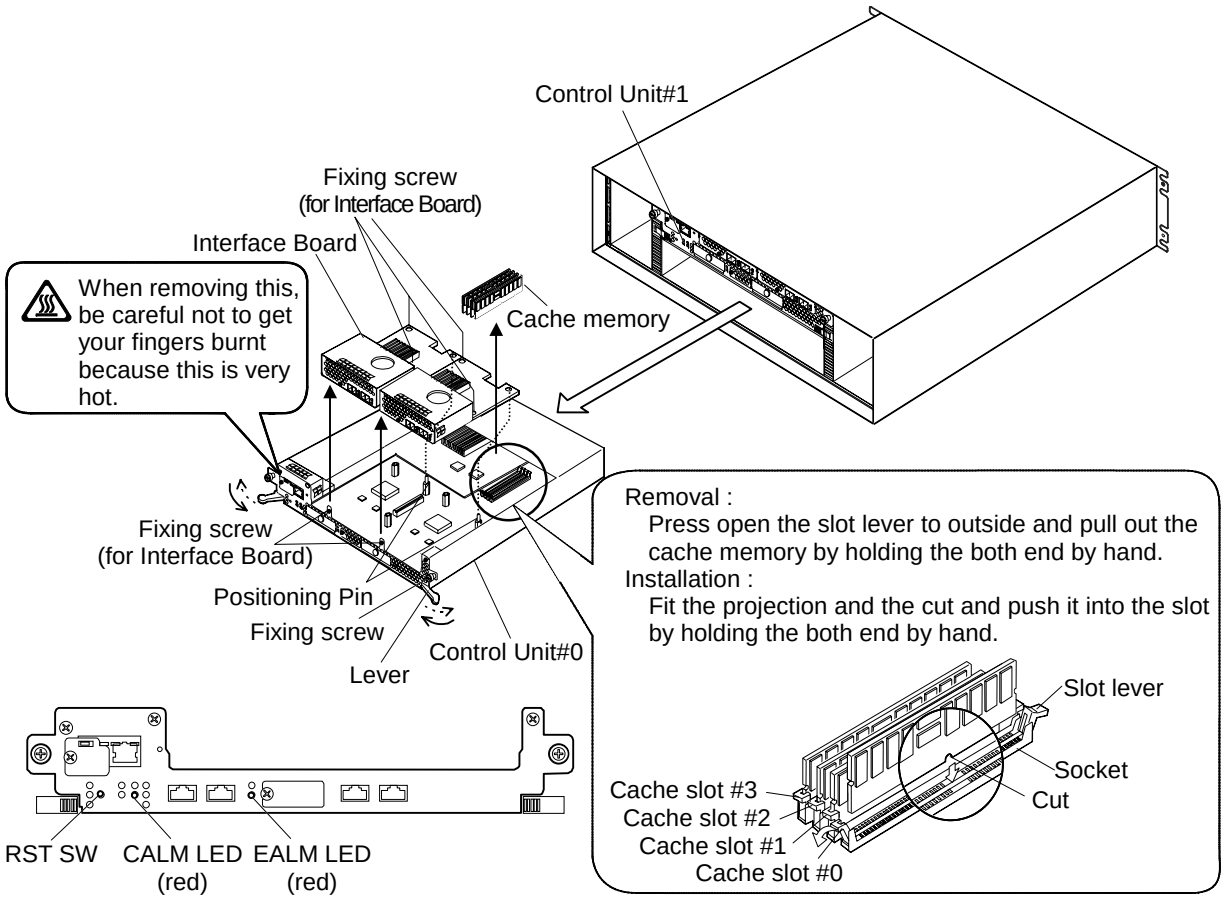


Figure 5.3.7.1 Control Unit replacement and LED locations

Copyright © 2003, 2005, Hitachi, Ltd.

(1-4) When the CALM LED or EALM LED of the RKH/RKHE is off
(Refer to Figure 5.3.7.1.)

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" on page MNTE 05-0450.
• 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.
• When replacing the Control Unit in the RKH, use the Control Unit for RKH, and when replacing the Control Unit in the RKHE, use the Control Unit for RKHE.

(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) or EALM LED (red) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.
(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(c) Remove the all cables connected to the Control Unit to be 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.
(e) Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit.
(f) 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.

Copyright © 2003, 2005, Hitachi, Ltd.

(g) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
(h) Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit fitting it to the positioning pin.
(i) When the RKA/RKAAT/RKAJAT is connected, connect the ENC cable.
When the RKA/RKAAT/RKAJAT is not connected, go to Step (j).

NOTE : When the RKA/RKAD/RKAAT/RKAJAT 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.

(j) Wait for more than 20 seconds, and then insert the Control Unit into the specified position with its right and left levers being raised, then return the both levers to the direction shown by the arrows (⟶) at the same time.
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.

NOTE : 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.

(k) Tighten the left and right fixing screws of the Control Unit.
(l) 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.
(m) Connect the removed all cables to the Control Unit.
(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off

(2-1) In the case of RK/RKL/RKS/RKD/RKSD (Refer to Figure 5.3.7.2.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(a) Confirm the installation location of the Control Unit whose CALM LED 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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(d) Loosen the right and left fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

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.

Copyright © 2002, 2005, Hitachi, Ltd.

(g) 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.

(h) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
(i) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrows (⟶).
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.
(j) Tighten the left and right fixing screws of the Control Unit.
(k) Connect the removed all cables to the Control Unit.
(l) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(m) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.) Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).
(n) Make sure that the READY LED (green) on the Front Bezel is off. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

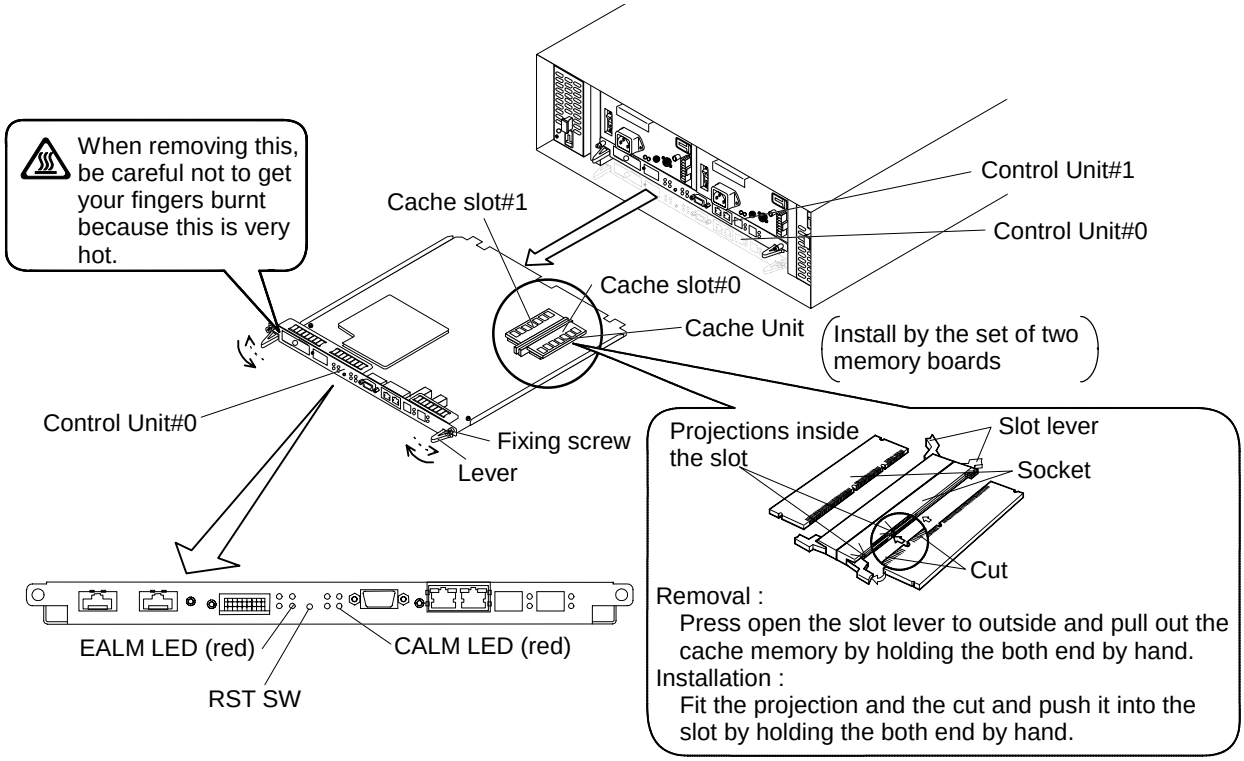


Figure 5.3.7.2 Control Unit replacement and LED locations

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(2-2) In the case of RKH/RKHE (Refer to Figure 5.3.7.3.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

NOTE : When replacing the Control Unit in the RKH, use the Control Unit for RKH, and when replacing the Control Unit in the RKHE, use the Control Unit for RKHE.

(a) Confirm the installation location of the Control Unit whose CALM LED 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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch).

(d) Loosen the right and left fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(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.

⚠ 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) Removing the three screws (on the Control Unit) that is securing the Interface Board.
Pull up the Interface Board and remove it from the Control Unit.

Copyright © 2003, 2005, Hitachi, Ltd.

(h) 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.

(i) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.

(j) Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit fitting it to the positioning pin.

(k) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrows (⟶).
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.

(l) Tighten the left and right fixing screws of the Control Unit.

(m) Connect the removed all cables to the Control Unit.

(n) Turn on the AC Power Unit Switch of the both Power Units.

(o) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.)
Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).

(p) Make sure that the READY LED (green) on the Front Bezel is off. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

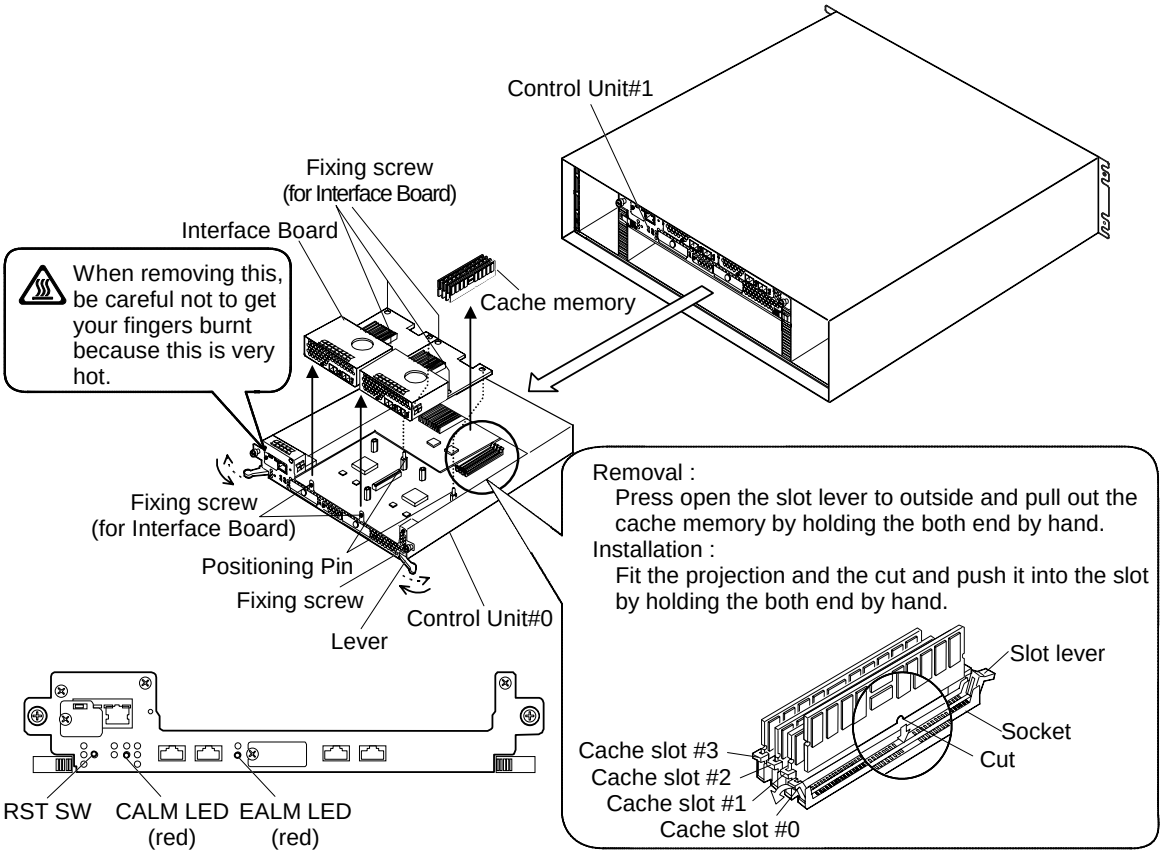


Figure 5.3.7.3 Control Unit replacement and LED locations

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

(3) Procedure for replacement with the power turned off (with the cache memory data volatilized forcibly)

(3-1) In the case of RK/RKL/RKS/RKD/RKSD (Refer to Figure 5.3.7.4.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

NOTE: When doing the following works, get a permission of the technical support division. When replacing the controller with the power turned on (with the cache memory data not volatilized) in a maintenance work, refer to procedure (2-1) in subsection 5.3.5.

(a) Confirm the installation location of the Control Unit whose CALM LED is on.
(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(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 right and left fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(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.

⚠ 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 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.

Copyright © 2003, 2005, Hitachi, Ltd.

(h) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.

(i) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrows (⟶).
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.

(j) Tighten the left and right fixing screws of the Control Unit.

(k) Connect the removed all cables to the Control Unit.

(l) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(m) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.) Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).

(n) Make sure that the READY LED (green) on the Front Bezel is off. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

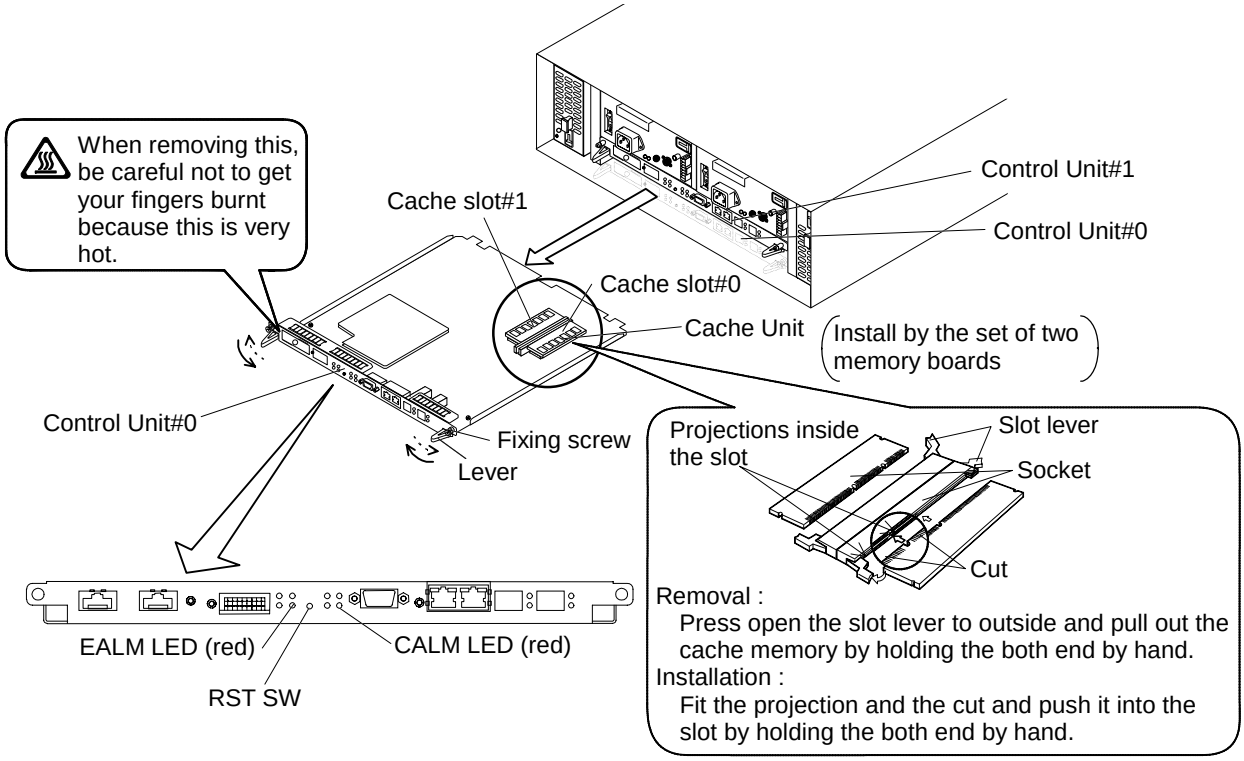


Figure 5.3.7.4 Control Unit replacement and LED locations

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

(3-2) In the case of RKH/RKHE (Refer to Figure 5.3.7.5.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

NOTE : • When doing the following works, get a permission of the technical support division. When replacing the controller with the power turned on (with the cache memory data not volatilized) in a maintenance work, refer to procedure (2-2) in subsection 5.3.5 (MNTE 05-0461).
• When replacing the Control Unit in the RKH, use the Control Unit for RKH, and when replacing the Control Unit in the RKHE, use the Control Unit for RKHE.

(a) Confirm the installation location of the Control Unit whose CALM LED is on.
(b) Turn off the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(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 right and left fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(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.

⚠ 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) Removing the three screws (on the Control Unit) that is securing the Interface Board.
Pull up the Interface Board and remove it from the Control Unit.
(h) 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.

Copyright © 2003, 2005, Hitachi, Ltd.

(i) Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
(j) Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit fitting it to the positioning pin.
(k) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrows (⟶).
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.
(l) Tighten the left and right fixing screws of the Control Unit.
(m) Connect the removed all cables to the Control Unit.
(n) Turn on the AC Power Unit Switch of the both Power Units.
(o) Turn on the main switch. (Usually the Control Unit recovers in about five minutes.) Make sure that the WARNING LED (orange) on the Front Bezel has gone out(‡1).
(p) Make sure that the READY LED (green) on the Front Bezel is off. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

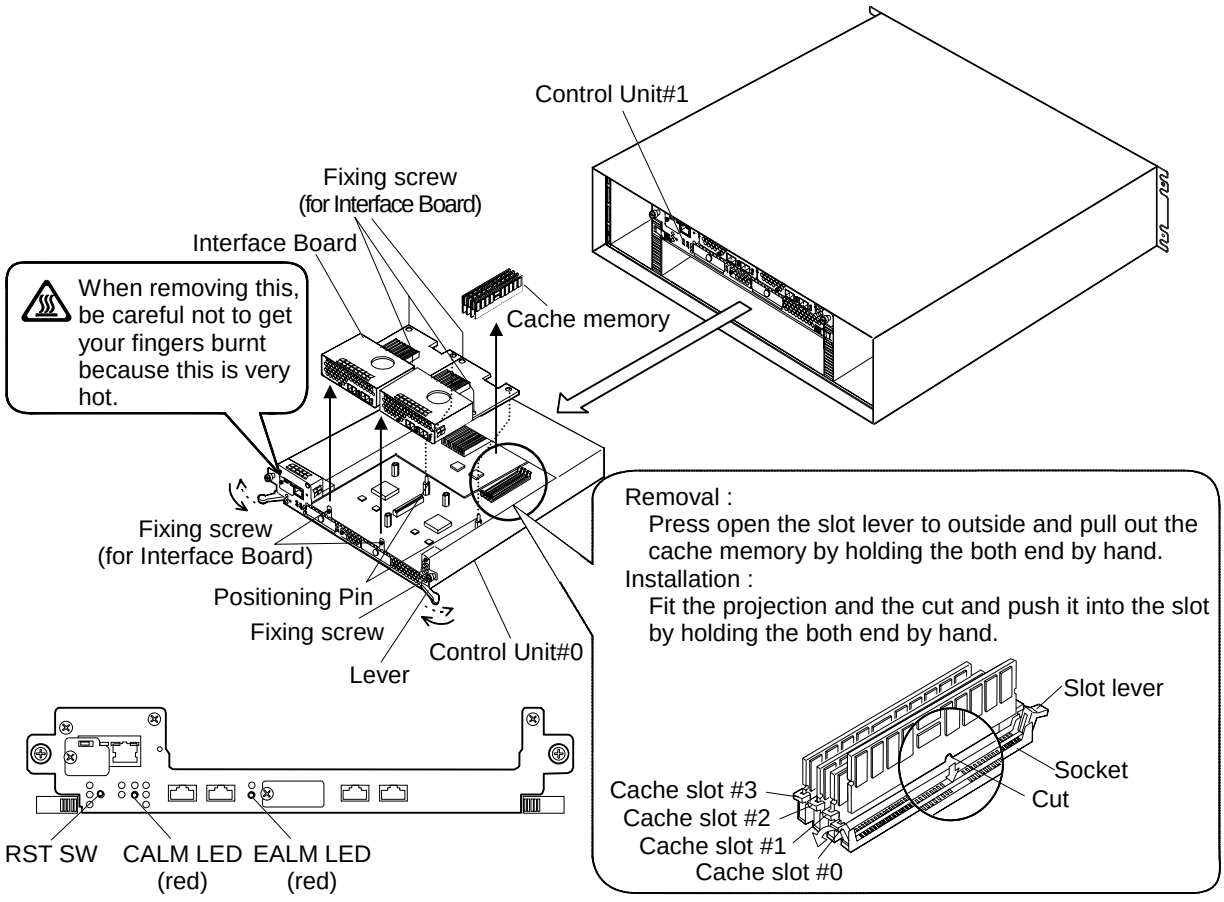


Figure 5.3.7.5 Control Unit replacement and LED locations

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.6 Replacing Cache Unit

⚠ CAUTION

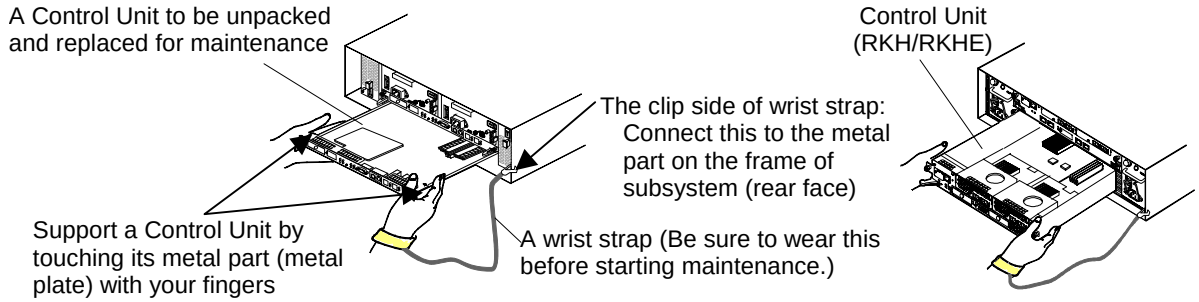
Touching heat sinks or ICs may cause getting burned.
Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

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 five 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. If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	When the CALM LED is on • In the case of the RK/ RKL/RKS/RKD/RKSD : See 5.3.6 (1-1). • In the case of the RKH/RKHE : See 5.3.6 (1-3). When the CALM LED is off (Preventive replacement) • In the case of the RK/ RKL/RKS/RKD/RKSD: See 5.3.6 (1-2). • In the case of the RKH/RKHE : See 5.3.6 (1-4).
2	Replacement with the power turned off	—	• In the case of the RK/ RKL/RKS/RKD/RKSD: See 5.3.6 (2-1). • In the case of the RKH/RKHE : See 5.3.6 (2-2).

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on

(1-1) When the CALM LED of the RK/RKL/RKS/RKD/RKSD on the Control Unit is on (Refer to Figure 5.3.8.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

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.

(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 Control is off" (MNTE 05-0520).

(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.

(e) 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.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) Install the new Cache Unit to the Control Unit.
- Install a new Cache Unit with the same capacity as that of the former one in the same slot.

(g) 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.

(h) When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is connected, connect the ENC cable. When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not connected, go to Step (i).

NOTE : When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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.

(i) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE :
- The CALM and EALM LEDs of the controller inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
- 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.

(j) Tighten the left and right fixing screws of the Control Unit.

(k) Make sure that the CALM LED (red) on the Control Unit is off.

(l) 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.)

(m) Connect the removed all cables to the Control Unit.

(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

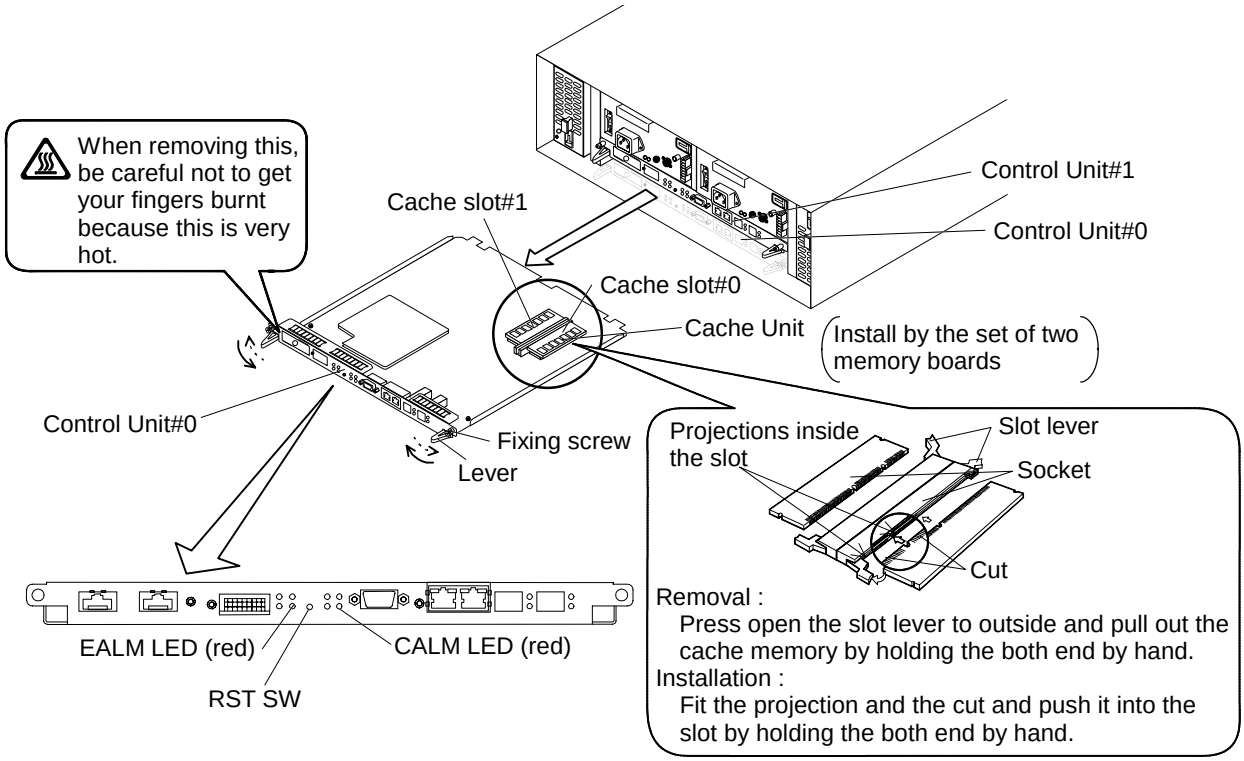


Figure 5.3.8 Replacing Cache Unit

Copyright © 2002, 2005, Hitachi, Ltd.

(1-2) When the CALM LED of the RK/RKL/RKS/RKD/RKSD on the Control Unit is off (Refer to Figure 5.3.8.)

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.

(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 "Procedure for replacement with the power turned off" in Item (2) on page MNTE 05-0540.
(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.
(e) Remove the Cache Unit to be replaced for the purpose of preventive maintenance after recording its installation location, capacity, and model name.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(f) Install the Cache Unit in the Control Unit.
• Install a new Cache Unit with the same capacity as that of the former one in the same slot.
(g) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(h) When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is connected, connect the ENC cable. When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL is not connected, go to Step (i).

NOTE : When the RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL 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.

(i) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE : • The CALM and EALM LEDs of the Control Unit inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
• 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.

(j) Tighten the left and right fixing screws of the Control Unit.
(k) Make sure that the CALM LED (red) on the Control Unit is off.
(l) 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.)
(m) Connect the removed all cables to the Control Unit.
(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(1-3) When the CALM LED of the RKH/RKHE on the Control Unit is on
(Refer to Figure 5.3.8.1.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

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.

(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 Control is off" (MNTE 05-0520).
(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.
(e) 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.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2003, 2005, Hitachi, Ltd.

(f) Install the new Cache Unit to the Control Unit.
- Install a new Cache Unit with the same capacity as that of the former one in the same slot.
- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the same way, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(g) 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.

(h) When the RKA/RKAAT/RKAJAT is connected, connect the ENC cable.
When the RKA/RKAAT/RKAJAT is not connected, go to Step (k).

NOTE : When the RKA/RKAAT/RKAJAT 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.

(i) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE :
- The CALM and EALM LEDs of the controller inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
- 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.

(j) Tighten the left and right fixing screws of the Control Unit.

(k) Make sure that the CALM LED (red) on the Control Unit is off.

(l) 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.)

(m) Connect the removed all cables to the Control Unit.

(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

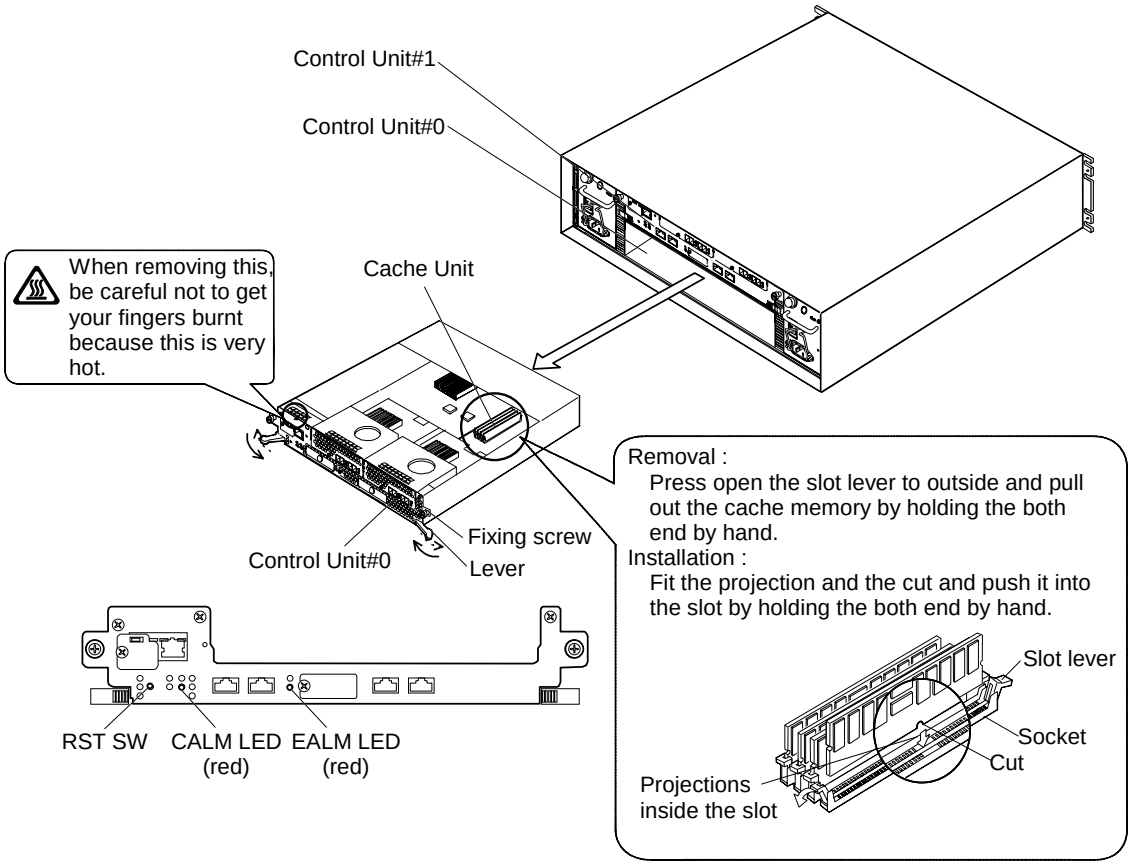


Figure 5.3.8.1 Replacing Cache Unit

Copyright © 2003, 2005, Hitachi, Ltd.

(1-4) When the CALM LED of the RK/RKL/RKS/RKD/RKSD on the Control Unit is off (Refer to Figure 5.3.8.1.)

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.

(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 "Procedure for replacement with the power turned off" in Item (2) on page MNTE 05-0540.

(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.

(e) Remove the Cache Unit to be replaced for the purpose of preventive maintenance after recording its installation location, capacity, and model name.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2003, 2005, Hitachi, Ltd.

(f) Install the Cache Unit in the Control Unit.
- Install a new Cache Unit with the same capacity as that of the former one in the same slot.
- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the case of RKH/RKHE, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(g) 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.

(h) When the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL is connected, connect the ENC cable.
When the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL is not connected, go to Step (k).

NOTE : When the RKA/RKAAT/RKAJAT/RKAATL/RKAJATL 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.

(i) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE :
- The CALM and EALM LEDs of the Control Unit inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
- 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.

(j) Tighten the left and right fixing screws of the Control Unit.

(k) Make sure that the CALM LED (red) on the Control Unit is off.

(l) 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.)

(m) Connect the removed all cables to the Control Unit.

(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off

(2-1) In the case of RK/RKL/RKS/RKD/RKSD (Refer to Figure 5.3.8.2.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Loosen the right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(f) Remove the Cache Unit, in which the failure occurred, after recording its installation location, capacity, and model name.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

(g) Install the Cache Unit in the Control Unit.
- Install a new Cache Unit with the same capacity as that of the former one in the same slot.

(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.

(i) Tighten the left and right fixing screws of the Control Unit.

(j) Connect the removed all cables to the Control Unit.

(k) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(l) Turn on the main switch.

(m) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).

(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

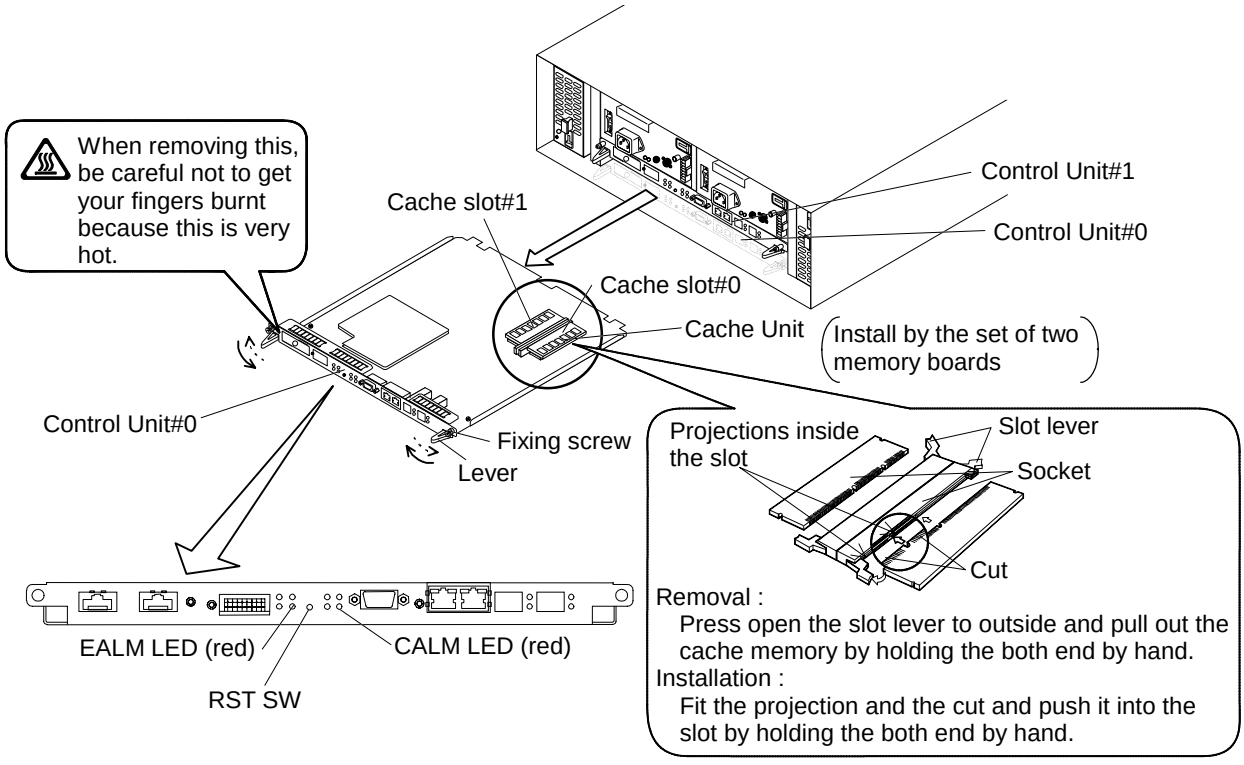


Figure 5.3.8.2 Replacing Cache Unit

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(2-2) In the case of RKH/RKHE (Refer to Figure 5.3.8.3.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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) Remove the Cache Unit, in which the failure occurred, after recording its installation location, capacity, and model name.

NOTE : Place the removed Cache Unit in the place where anti-static measures are taken.

Copyright © 2003, 2005, Hitachi, Ltd.

(g) Install the Cache Unit in the Control Unit.
- Install a new Cache Unit with the same capacity as that of the former one in the same slot.
- Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
- 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.
- Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the case of RKH/RKHE, install the two Cache Units with the same capacities in the cache slots #2 and #3.

(h) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.

(i) Tighten the left and right fixing screws of the Control Unit.

(j) Connect the removed all cables to the Control Unit.

(k) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(l) Turn on the main switch.

(m) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).

(n) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

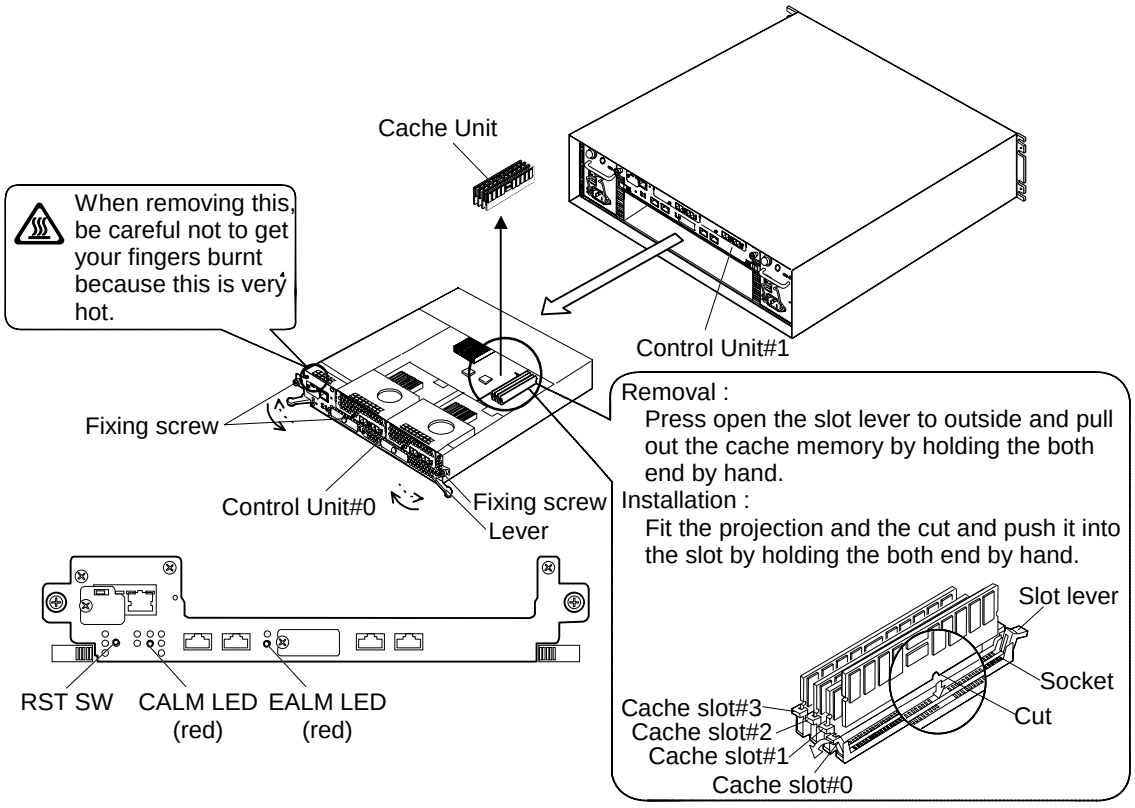


Figure 5.3.8.3 Replacing Cache Unit

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.7 Replacing Interface Board

This work is for the RKH/RKHE only.

⚠ CAUTION

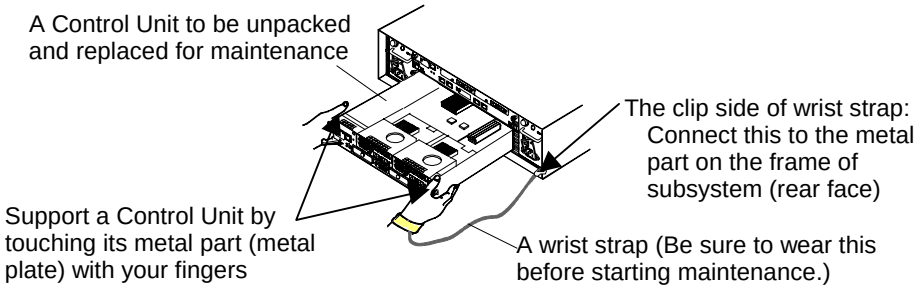
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

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. 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. If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	When the CALM LED is on • See 5.3.7 (1-1). When the CALM LED is off (Preventive replacement) • See 5.3.7 (1-2).
2	Replacement with the power turned off	—	See 5.3.7 (2).

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on

(1-1) When the CALM LED of the RKH/RKHE on the Control Unit is on
(Refer to Figure 5.3.8.4.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

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.

(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 Control is off" (MNTE 05-0520).

(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.

(e) Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit

(f) Install a new Interface Board on the Control Unit fitting it to the positioning pin. When doing this, make sure that the Interface Board is inserted in the connector firmly.

(g) Tighten the three screws (on the Control Unit) for securing the Interface Board.

(h) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(i) When the RKA/RKAAT/RKAJAT is connected, connect the ENC cable.
When the RKA/RKAAT/RKAJAT is not connected, go to Step (j).

NOTE : When the RKA/RKAAT/RKAJAT 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.

(j) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE : • The CALM and EALM LEDs of the controller inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
• 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.

(k) Tighten the left and right fixing screws of the Control Unit.
(l) Make sure that the CALM LED (red) on the Control Unit is off.
(m) 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.)
(n) Reconnect all cables that were disconnected.
(o) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

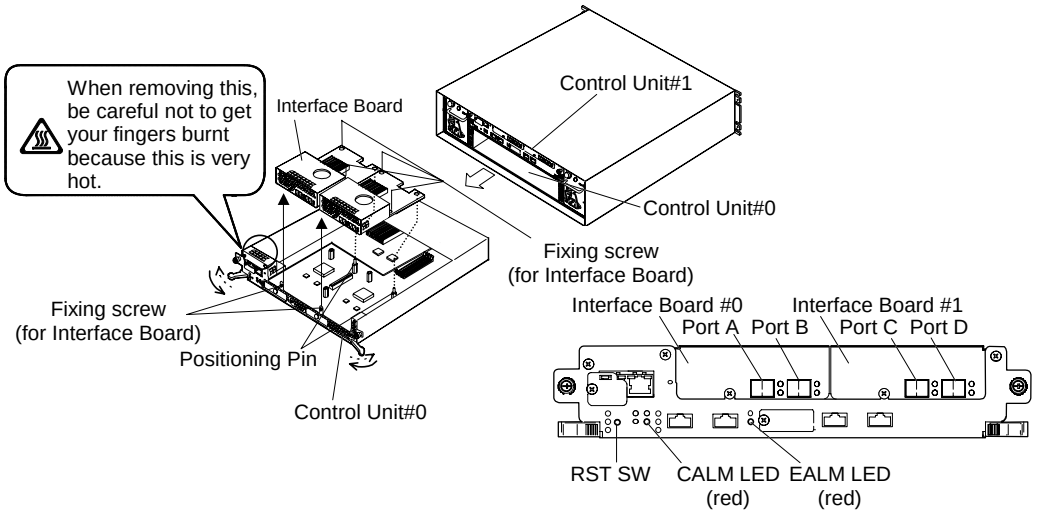


Figure 5.3.8.4 Replacing Interface Board

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(1-2) When the CALM LED of the RKH/RKHE on the Control Unit is off
(Refer to Figure 5.3.8.4.)

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.

(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 "Procedure for replacement with the power turned off" in Item (2) on page MNTE 05-0548.
(b) Loosen the left and right fixing screws of the Control Unit.
Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.
(c) 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.

⚠ CAUTION

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

(d) Remove the Control Unit by pulling it out toward you.
(e) Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit
(f) Install a new Interface Board on the Control Unit fitting it to the positioning pin. When doing this, make sure that the Interface Board is inserted in the connector firmly.
(g) Tighten the three screws (on the Control Unit) for securing the Interface Board.
(h) 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(i) When the RKA/RKAAT/RKAJAT is connected, connect the ENC cable.
When the RKA/RKAAT/RKAJAT is not connected, go to Step (j).

NOTE : When the RKA/RKAAT/RKAJAT 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.

(j) Insert a new Control Unit in the specified location with its left and right levers raised, and then return the levers in the directions shown by the arrows (←) at the same time.

NOTE : • The CALM and EALM LEDs of the Control Unit inserted come on. Then the EALM LED goes out first and the CALM LED goes out subsequently.
• 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.

(k) Tighten the left and right fixing screws of the Control Unit.
(l) Make sure that the CALM LED (red) on the Control Unit is off.
(m) 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.)
(n) Reconnect all cables that were disconnected.
(o) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off (Refer to Figure 5.3.8.4.)
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 right and left fixing screws of the Control Unit.
Pull both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

(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.

⚠ 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) Removing the three screws (on the Control Unit) that is securing the Interface Board.
Pull up the Interface Board and remove it from the Control Unit

(g) Install a new Interface Board on the Control Unit fitting it to the positioning pin.
When doing this, make sure that the Interface Board is inserted in the connector firmly.

(h) Tighten the three screws (on the Control Unit) for securing the Interface Board.

Copyright © 2002, 2005, Hitachi, Ltd.

(i) Insert the Control Unit in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrow (⟶).
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.
(j) Tighten the left and right fixing screws of the Control Unit.
(k) Reconnect all cables that were disconnected.
(l) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
(m) Turn on the main switch.
(n) Make sure that the WARNING LED (orange) on the Front Bezel is off(‡1).
(o) Make sure that the READY LED (green) on the Front Bezel is on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

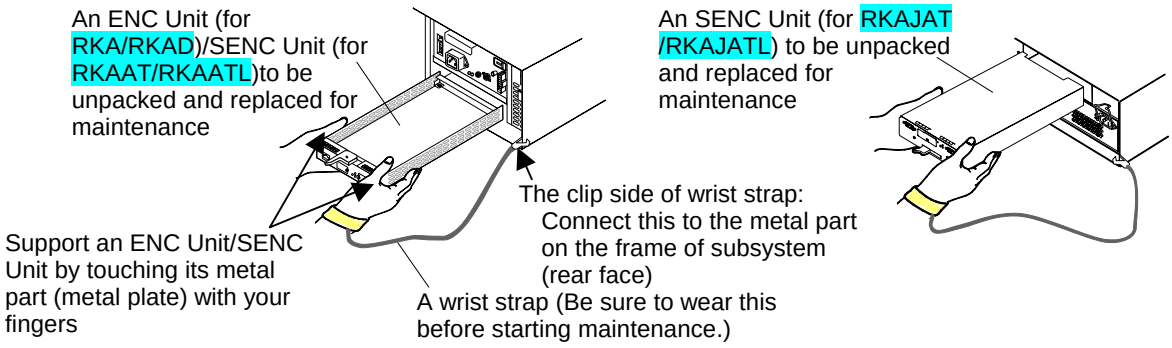
5.3.8 Replacing ENC Unit/SENC Unit

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



Copyright © 2002, 2005, Hitachi, Ltd.

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)	• Complete the replacement within five minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. • When replacing the ENC Unit/SENC Unit, the subsystem must be in the status shown below. • Hot replacement of the microprogram is not being performed. • Hot replacement of the Control Unit is not being performed. • Any part other than the above is not being replaced. • If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	Refer to 5.3.8 (1-1) When the ALM LED (red) of the ENC Unit/ SENC Unit to be replaced is on Refer to 5.3.8 (1-2) When the ALM LED (red) of the ENC Unit/ SENC Unit to be replaced is off (Preventive replacement)
2	Replacement with the power turned off	—	Refer to 5.3.8 (2)

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 it is required to replace the two or more ENC Units/SENC Units in the same loop, replace the Control Unit of the RK/RKL/RKH/RKHE/ RKD first, then the ENC Unit/SENC Unit of the RKA/RKAAT/RKAJAT/ RKAATL/RKAJATL/RKAD next.
When replacing the ENC Units/SENC Units of the two or more RKAs/RKADs/RKAATs/RKAJATs/RKAATLs/RKAJATLs, replace them in ascending order of the device ID number.

• 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.)

Copyright © 2002, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on
In the case of replacement of ENC Unit (RKA/RKAD) and SENC Unit (RKAAT/RKAATL), refer to Figure 5.3.9 (MNTE 05-0670).
In the case of replacement of SENC Unit (RKAJAT/RKAJATL), refer to Figure 5.3.9.1 (MNTE 05-0670).

(1-1) When the ALM LED of the ENC Unit/SENC Unit to be replaced is on
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).

(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 ALM LED on the ENC Unit/SENC Unit to be replaced is off" (MNTE 05-0670).

(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.

NOTE : Do not catch a ENC cable, when 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.

‡1 : When the WARNING LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2002, 2005, Hitachi, Ltd.

(h) Make sure that the ALM LED (red) on the ENC Unit/SENC Unit is off.
(i) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

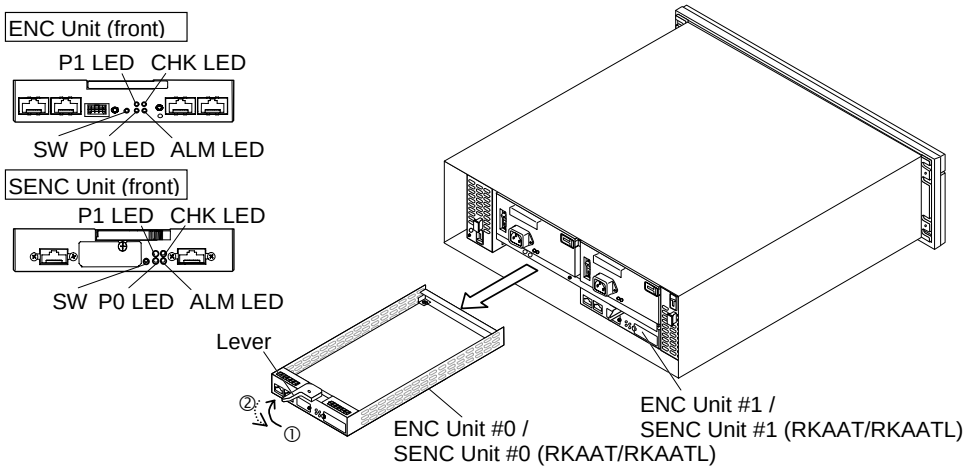


Figure 5.3.9 Replacing of ENC Unit (RKA/RKAD)/SENC Unit (RKAAT/RKAATL)

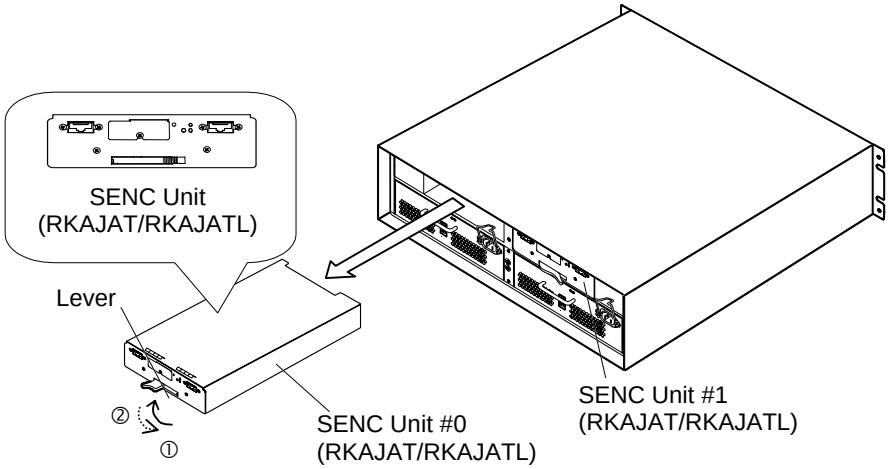


Figure 5.3.9.1 Replacing of SENC Unit (RKAJAT/RKAJATL)

Copyright © 2002, 2005, Hitachi, Ltd.

(1-2) When the ALM LED of the ENC/SENC Unit to be replaced is off

(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.

(e) Connect the ENC cable to new ENC Unit/SENC Unit.

NOTE : Do not catch a ENC cable, when ENC Unit/SENC Unit is inserted.

(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.

(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 RK/RKL/RKH/RKHE/RKD 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.

(i) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
Store the collected simple trace information in the USB memory (refer to MNTE02-2310).
In the case of replacement of ENC Unit (RKA/RKAD) and SENC Unit (RKAAT/RKAATL), refer to Figure 5.3.9 (MNTE 05-0670).
In the case of replacement of SENC Unit (RKAJAT/RKAJATL), refer to Figure 5.3.9.1 (MNTE 05-0670).

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
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 (DC 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 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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

Copyright © 2002, 2005, Hitachi, Ltd.

(j) Turn on the main switch.
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 (DC Power Unit Switch) of the Power Unit (Power Units (DC)) (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) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out.

Copyright © 2003, 2005, Hitachi, Ltd.

5.3.9 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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.

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	• When replacing the ENC Unit/SENC Unit, the subsystem must be in the status shown below. • Hot replacement of the microprogram is not being performed. • Hot replacement of the Control Unit is not being performed. • Any part other than the above is not being replaced. • If the READY LED (green) on the Front Bezel is blinking at high speed for the preventive replacement work, do not make the replacement because the SENC firmware is being downloaded. Make the replacement after the LED lights on.	Refer to 5.3.9 (1)
2	Replacement with the power turned off	—	Refer to 5.3.9 (2)

NOTE : • 50 cm, 70 cm, and 1 m ENC cables exist (excluding ENC cables between racks).
There is no problem if 1 m ENC cables, which are different from the existing cables, are connected when replacing 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.
- 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.)

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned on
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
In the case of replacement of ENC cable (RKA/RKAD/RKAAT/RKAATL), refer to Figure 5.3.9.2 (MNTE 05-0670).
In the case of replacement of ENC cable (RKAJAT/RKAJATL), refer to Figure 5.3.9.3 (MNTE 05-0670).

(a) Pull out the ENC Unit/SENC Unit, which has a larger ID number between the ENC Units/SENC Units connected to the ENC cable to be replaced, a little raising its lever in the allow direction ① (←).

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 Subsection 3.6.2, "Connecting the ENC cables" on page INST 03-0680 in the Maintenance Manual (Volume of Installation).)

(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.

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 ENC Unit/SENC Unit is inserted.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Make sure that the ALM LED (red) on the ENC Unit/SENC Unit is off.
(f) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

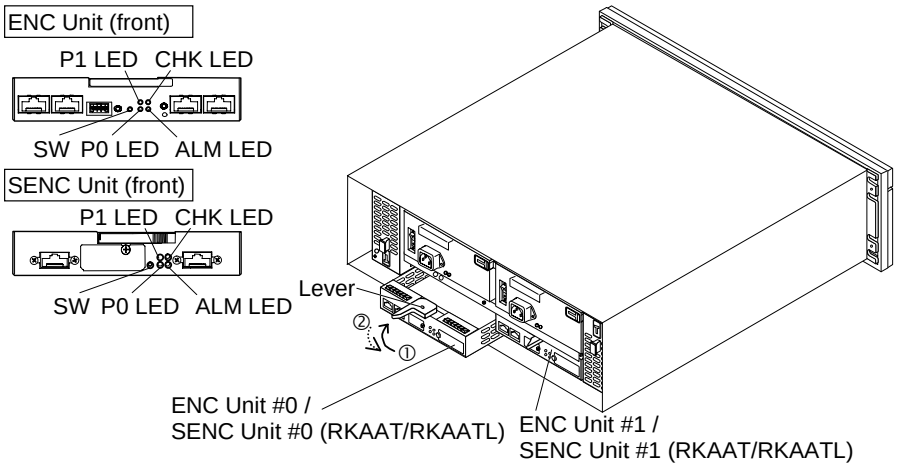


Figure 5.3.9.2 Locations of the Lever and LEDs on the ENC Unit (RKA/RKAD)/SENC Unit (RKAAT/RKAATL)

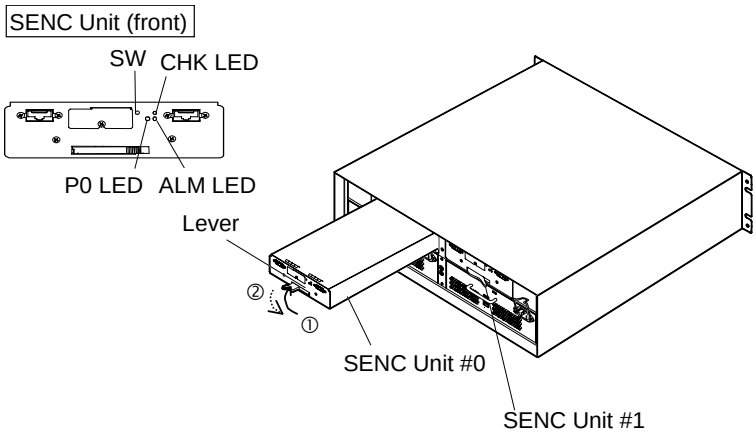


Figure 5.3.9.3 Locations of the Lever and LEDs on the SENC Unit (RKAJAT/RKAJATL)

‡1 : When the WARNING LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out..

Copyright © 2003, 2005, Hitachi, Ltd.

(2) Procedure for replacement with the power turned off
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.
In the case of replacement of ENC cable (RKA/RKAD/RKAAT/RKAATL), refer to Figure 5.3.9.2 (MNTE 05-0670).
In the case of replacement of ENC cable (RKAJAT/RKAJATL), refer to Figure 5.3.9.3 (MNTE 05-0670).

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).
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 (DC Power Unit Switch).

(c) Pull out the ENC Unit/SENC Unit, which has a larger ID number between the ENC Units/SENC Units connected to the ENC cable to be replaced, a little raising its lever in the allow direction ① (←).

(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 Subsection 3.6.2, "Connecting the ENC cables" on page INST 03-0680 in the Maintenance Manual (Volume of Installation).)

(f) Return the lever in the arrow direction ②.

NOTE : Do not catch a ENC cable, when ENC Unit/SENC Unit is inserted.

Copyright © 2005, Hitachi, Ltd.

(g) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(h) Turn on the main switch.

After doing this, make sure that the ALM LED (red) on the ENC Unit/SENC Unit is not on.

(i) Make sure that the READY LED on the Front Bezel is on and the ALARM and WARNING LEDs are off(‡1). The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

‡1 : When the WARNING LED of RK/RKL/RKS/RKD/RKSD/RKH/RKHE is blinking, refer to the WEB or collect the trace, and then check if the LED goes out

Copyright © 2005, Hitachi, Ltd.

5.3.10 Replacing Basic Chassis of Rack Mount Style

(Perform this work only when an instructed to do so is given by the department for coping with troubles.)

⚠ CAUTION

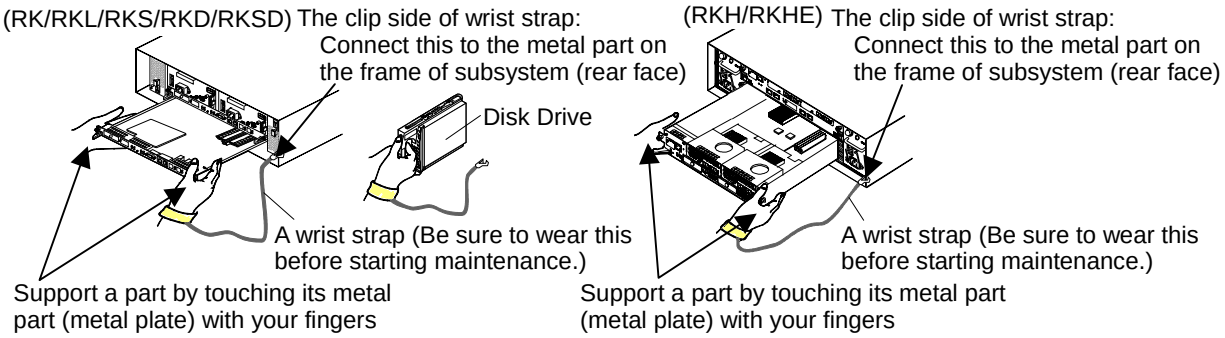
Be sure to perform the operation with two or more workers.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.**

When replacing the additional chassis, a failure may be caused by the electric shock since the Disk Drive or Control Unit 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.
RKH/RKHE does not have a Disk Drive.

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.



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	—	Refer to 5.3.10 (1)

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned off
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

NOTE : • When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))

(d) Remove all the cables connected to the components (Control Unit, and Power Unit (Power Unit (DC))).

NOTE : When the cable cannot be removed easily, do not pull it by force.
Pull out the Control Unit and Power Unit (Power Unit (DC)) a little, and then perform the cable removal again. Besides, the cable can be damaged if it is bent upward or downward forcibly.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Remove parts (Disk Drives, Backup Battery Unit, Fan Assembly, Control Unit, Power Unit (Power Unit (DC)), 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.

NOTE : RKH/RKHE does not have a Disk Drive.

(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 Section 2.3, “Installing Floor Stand Kit” on page INST 02-0050 in the for Installation.
In the case of the rackmount model, refer to Section 3.5, “Mounting on Rack Frame” on page INST 03-0500 in the for Installation.

(g) Reinstall the parts. (Refer to Section 5.3, “Replacement of Components” on page MNTE 05-0120.)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(j) Turn on the main switch.

(k) Attach the Front Bezel.

(l) Make sure that the READY LED (green) on the Front Bezel comes on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

(m) Affix the device type label of the same type as the removed subsystem on the new subsystem and write down the same serial number as the removed subsystem.

Copyright © 2003, 2005, Hitachi, Ltd.

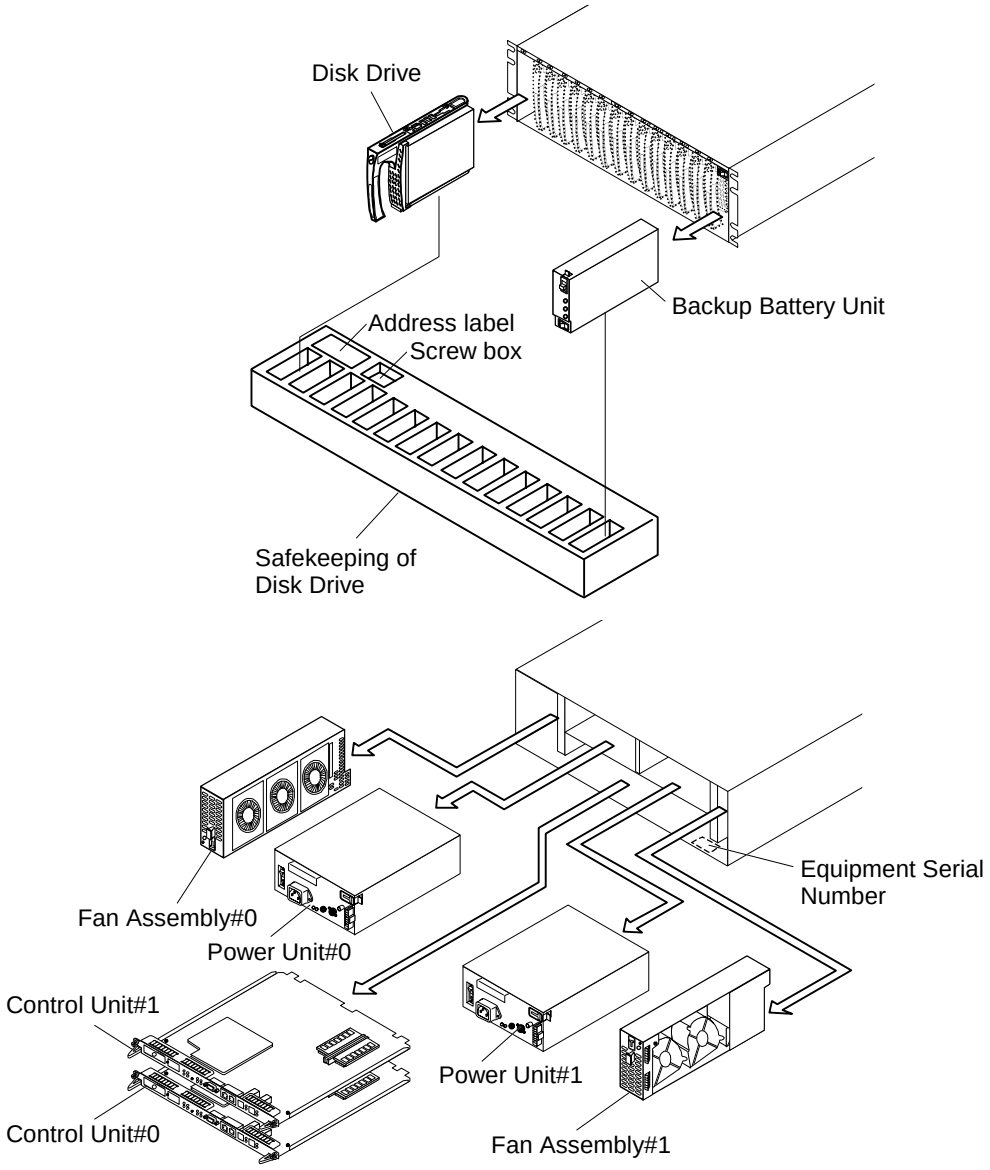


Figure 5.3.10 Replacing Basic Chassis of Rack Mount Style (RK/RKL/RKS/RKD/RKSD)

Copyright © 2003, 2005, Hitachi, Ltd.

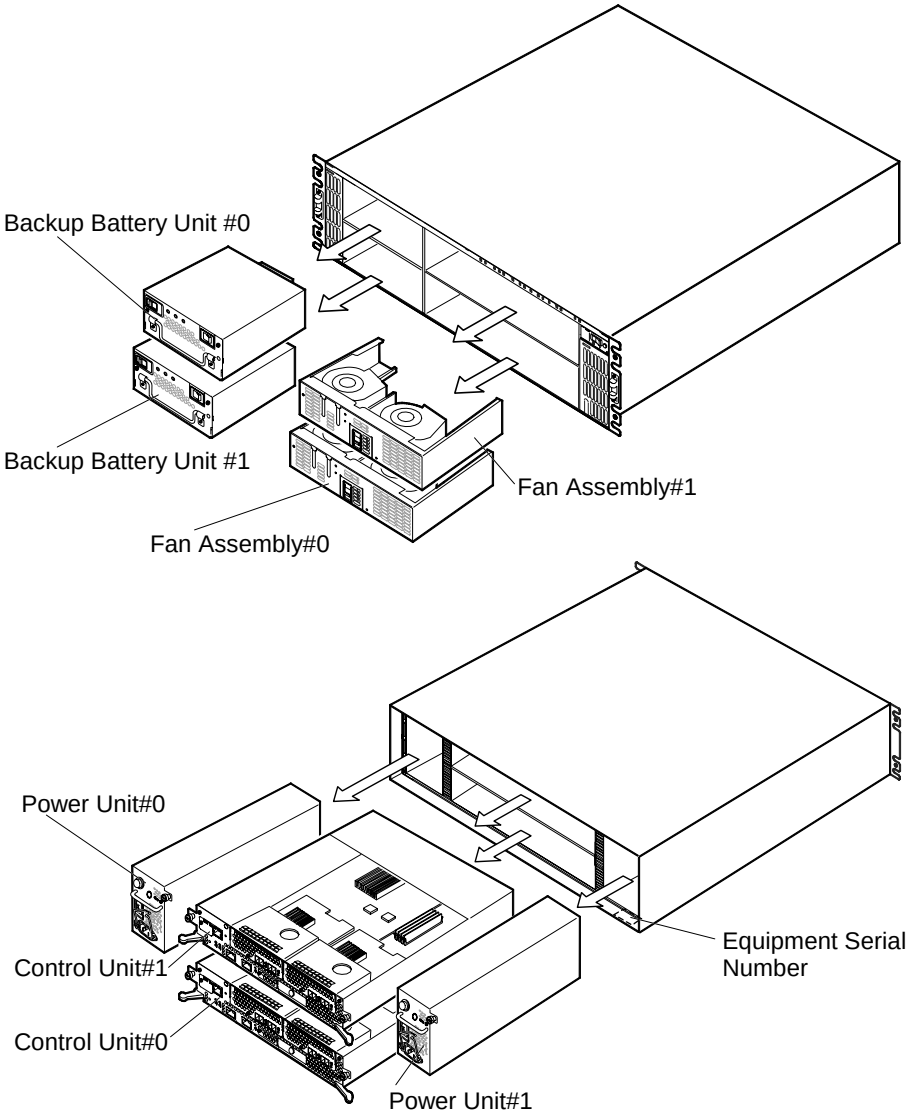


Figure 5.3.10.1 Replacing Basic Chassis of Rack Mount Style (RKH/RKHE)

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

5.3.11 Replacing Additional Chassis of Rack Mount Style

(Perform this work only when an instructed to do so is given by the department for coping with troubles.)

CAUTION

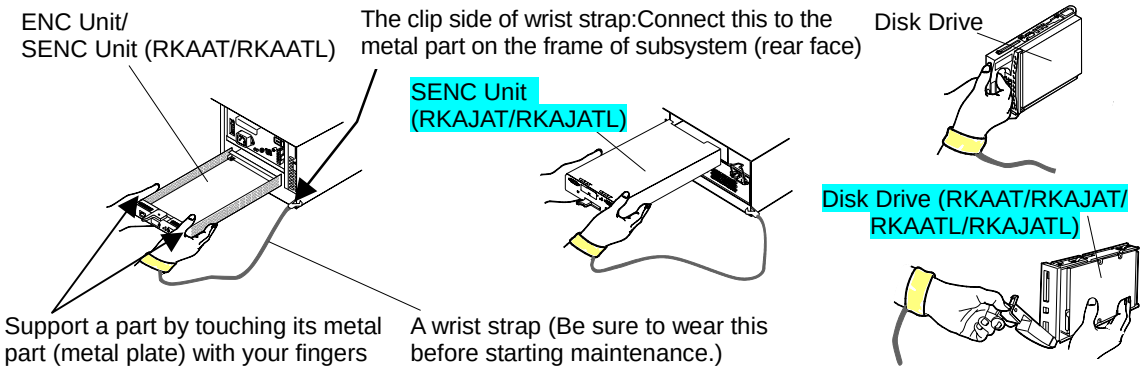
Be sure to perform the operation with two or more workers.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **When you install a Disk Drive 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 replacing the additional chassis, a failure may be caused by the electric shock since the Disk Drive and ENC Unit/SENC Unit are 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.



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	—	Refer to 5.3.11 (1)

Copyright © 2003, 2005, Hitachi, Ltd.

(1) Procedure for replacement with the power turned off
The RKAAT/RKAJAT/RKAATL/RKAJATL has no Power Unit (DC).
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

NOTE : • When the power has already been turned off, make sure that the cache is not in the cache backup mode. (Refer to "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).)
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 of RK/RKD/RKH/RKHE 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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

NOTE : It is possible that the recovery is not made normally if the replacement is done without turning off the AC Power Unit Switch (DC Power Unit Switch).

(c) Remove the Front Bezel. ("1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))

(d) Remove all the cables connected to the components (Control Unit, Power Unit (Power Unit (DC)), 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 (Power Unit (DC)), 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.

Copyright © 2003, 2005, Hitachi, Ltd.

(e) Remove parts (Disk Drives, Fan Assembly, Power Unit (Power Unit (DC)), 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.
The RKAJAT/RKAJATL has no Fan Assembly.

(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 Section 2.3, “Installing Floor Stand Kit” on page INST 02-0050 in the Maintenance Manual for Installation.
In the case of the rackmount model, refer to Section 3.5, “Mounting on Rack Frame” on page INST 03-0500 in the Maintenance Manual for Installation.

(g) Reinstall the parts. (Refer to Section 5.3, “Replacement of Components” on page MNTE 05-0120.)
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 (DC Power Unit Switch) of the both Power Units (Power Units (DC)).

(j) Turn on the main switch.

(k) Make sure that the READY LED (green) on the Front Bezel comes on. The READY LED (green) on the Front Bezel may blink at high speed (up to 15 minutes).

(l) Attach the Front Bezel.

(m) Affix the device type label of the same type as the removed subsystem on the new subsystem and write down the same serial number as the removed subsystem.

Copyright © 2003, 2005, Hitachi, Ltd.

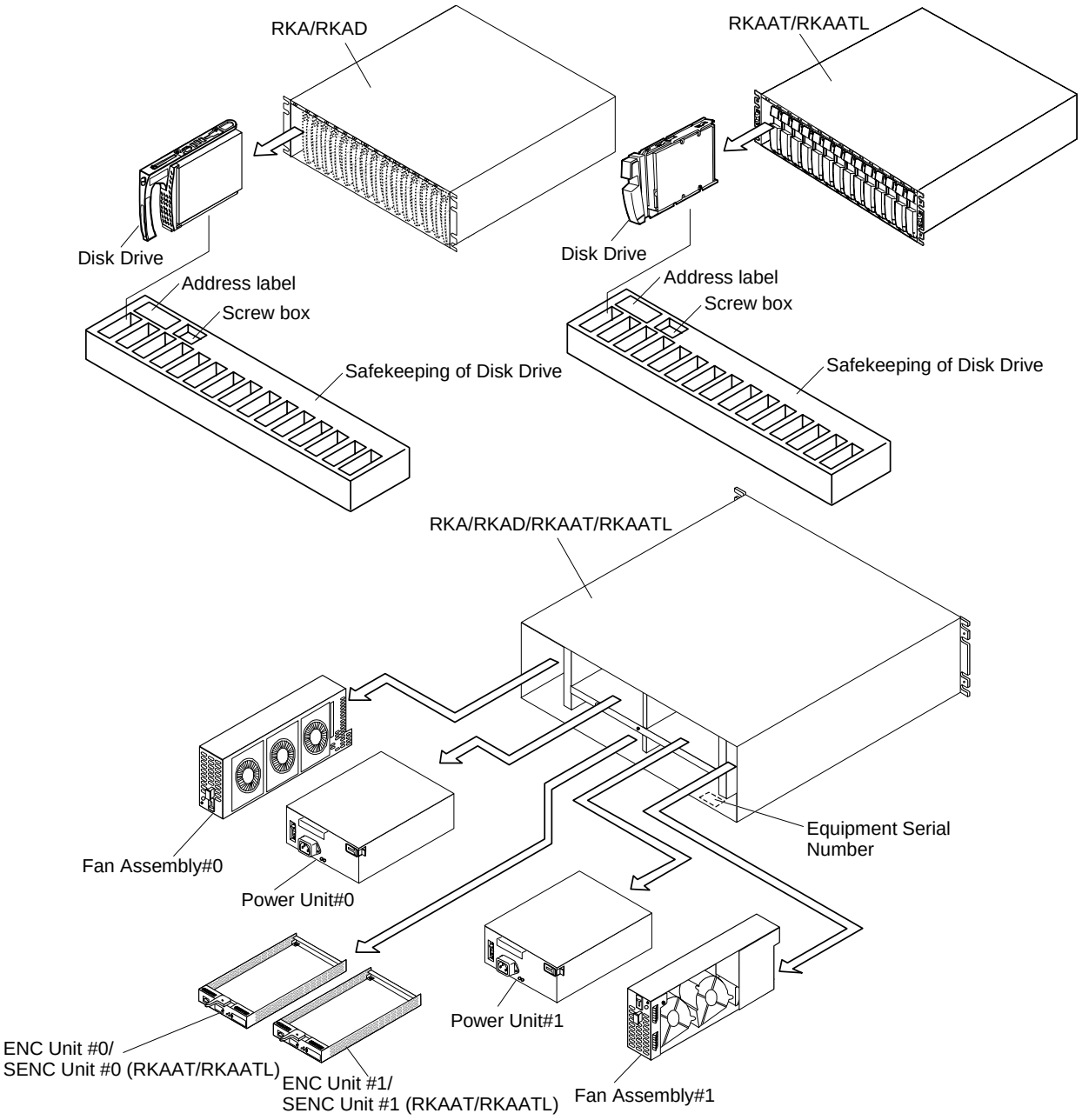


Figure 5.3.11 Replacing Additional Chassis of Rack Mount Style (RKA/RKAD/RKAAT/RKAATL)

Copyright © 2004, 2005, Hitachi, Ltd.

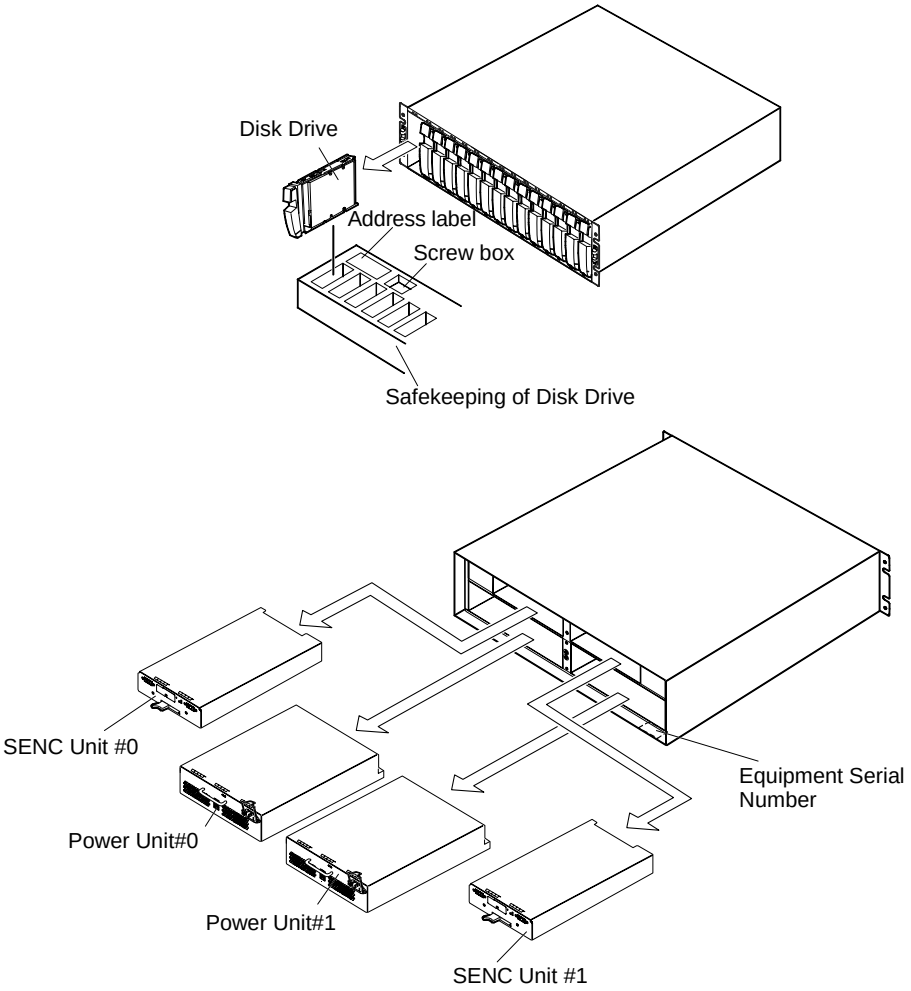


Figure 5.3.11.1 Replacing Additional Chassis of Rack Mount Style (RKAJAT/RKAJATL)

Copyright © 2004, 2005, Hitachi, Ltd.

5.3.12 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 5.3.12 (1).
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 5.3.12 (2).

(1) Replacement procedure with the one Remote Adapter
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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 "5.1.1 Checking cache memory in the back-up state" (MNTE-05-0030).) 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 all the Power Units connected to the Remote adapter to be replaced.
(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.

Copyright © 2003, 2005, Hitachi, Ltd.

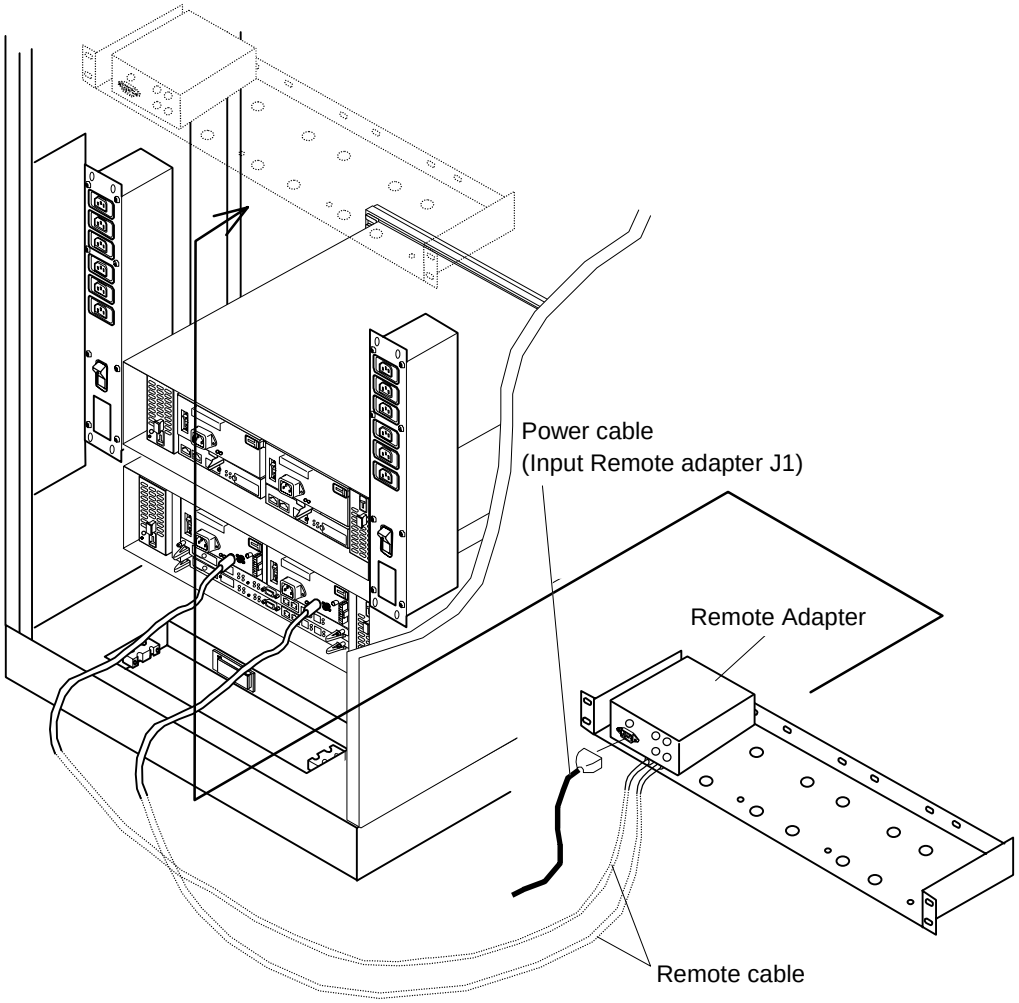


Figure 5.3.12 Replacing Remote Adapter

(2) Replacement procedure to be used when the Remote Adapter is duplicated
Collect errors of simple trace (MNTE 02-2180), CTL alarm trace (MNTE 02-2220), and memory dump (MNTE 02-2260) following the generated error message, and then perform the replacement operation following the procedure shown below.

(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.

Copyright © 2003, 2005, Hitachi, Ltd.

Chapter 6. Updating Microprogram

6.1 Update Installation of Microprogram

The update installation is performed to update the microprogram stored in the Disk Drive.

NOTE : Install the microprogram after the Control Unit is replaced while the subsystem power is turned off and the subsystem enters the Ready status as a result of the replacement. Do not perform the updating installation of the microprogram while the READY LED is high-speed blinking (up to 15 minutes).

6.1.1 Materials necessary for the update installation

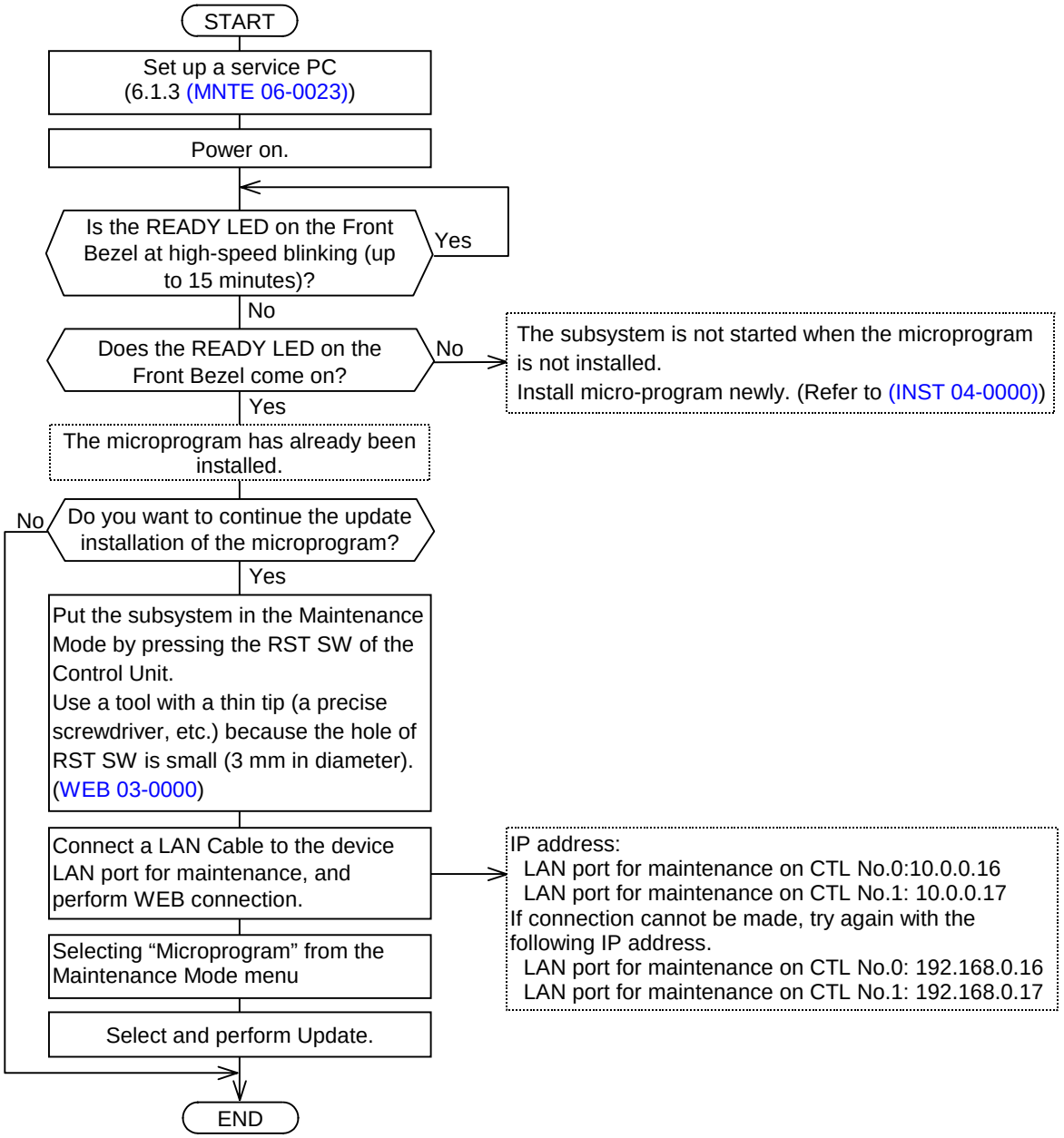
- Service PC(‡1)
- LAN cross cable
- CD-ROM for microprogram installation

‡1 : The service PC must have a CD-ROM drive for the microprogram installation. If the service PC has no CD-ROM drive, it must be set up beforehand via a network.
(See Item (4) in Subsection 6.1.3, “Preparation for update installation of microprogram” on page INST 06-0023.)

Copyright © 2002, 2005, Hitachi, Ltd.

6.1.2 Outline of procedure for update installation

(1) Install the update microprogram using a service PC via the Web connection.
(2) The microprogram updating installation can be done only when the subsystem is in the Maintenance mode. (It cannot be done when the subsystem is operating online.)
(3) In the service PC, JRE (‡1) 1.3.1 03 must be installed. (See Item (4) in Subsection 6.1.3, “Preparation for update installation of microprogram” on page INST 06-0023.)
(4) 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 : Java runtime environment.

Copyright © 2002, 2005, Hitachi, Ltd.

6.1.3 Preparation for update installation of microprogram

(1) Outline

Set up the service 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 service 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 service 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 service 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) in Subsection 6.1.3, “Preparation for update installation of microprogram” a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

Copyright © 2002, 2005, Hitachi, Ltd.

Table 6.1.1 Java error codes

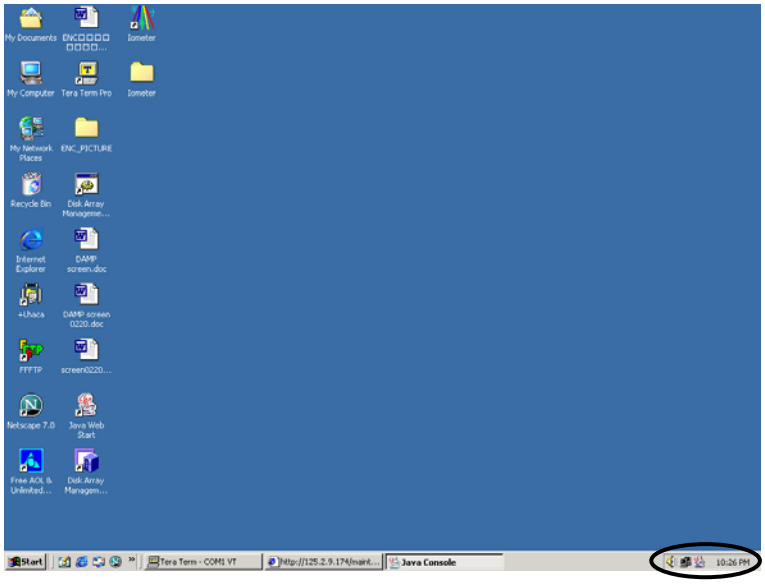
Message code	Message text	Time when the error occurs/ Cause estimated	Action for coping with the error
1216	Access to the property information was rejected. Confirm the setup of the security policy.	Time when the error occurs • The error occurs immediately after the [Select] key is pressed when the microprogram 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 service 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 6.1.3.) 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 service 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 service PC is insufficient.	① Reboot the subsystem and the service 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 service PC and perform the installation over again from the beginning. Use a PC whose memory capacity is as large as possible.

Copyright © 2003, 2005, Hitachi, Ltd.

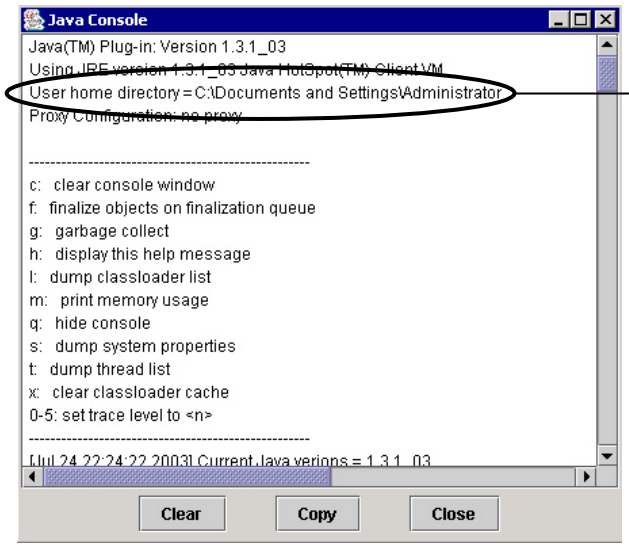
(a) Method for checking the drive for booting the OS

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 Service PC window.



(ii) Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: *****…).



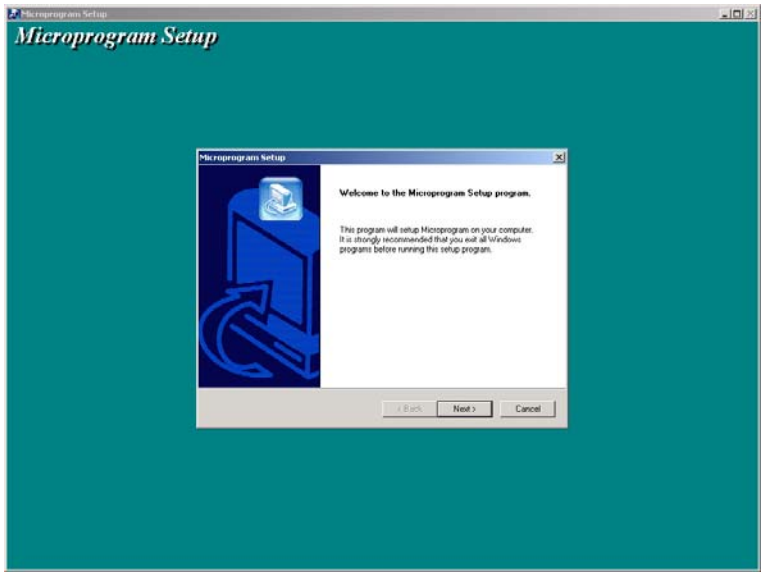
If "=C:***** …" is displayed here, the boot drive is the c drive.

Copyright © 2003, 2005, Hitachi, Ltd.

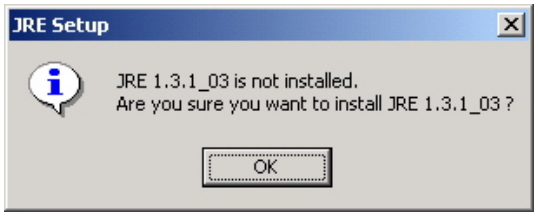
(4) Procedure for setting up the service PC

(a) Double click the “Program\micro upload\micro setup\Setup. exe” of the CD-ROM for microprogram installation.

(b) 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 (c) to (g) are not displayed.



(c) A dialog box for asking confirmation of starting the JRE 1.3.1 03 installer. Click the [OK] button.

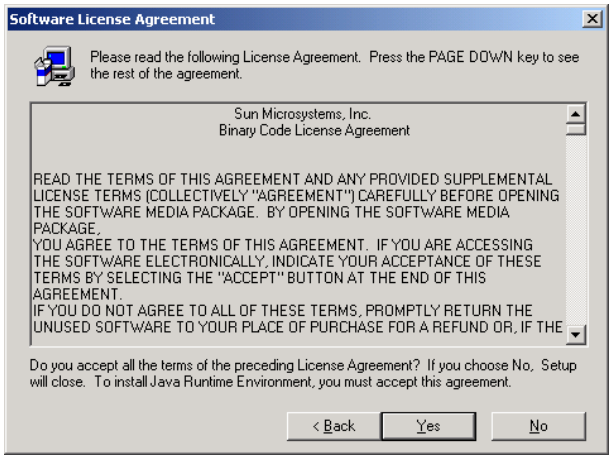


Copyright © 2003, 2005, Hitachi, Ltd.

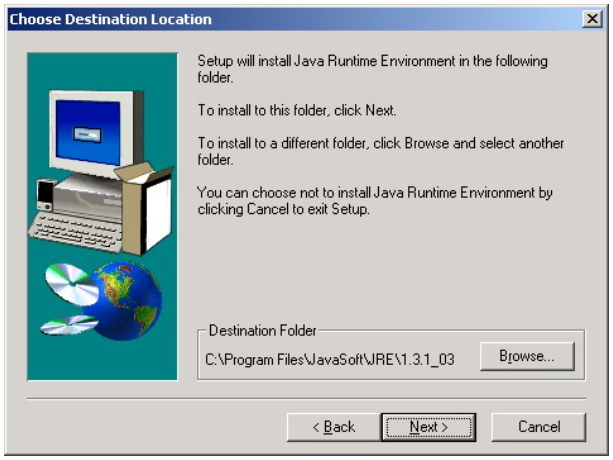
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

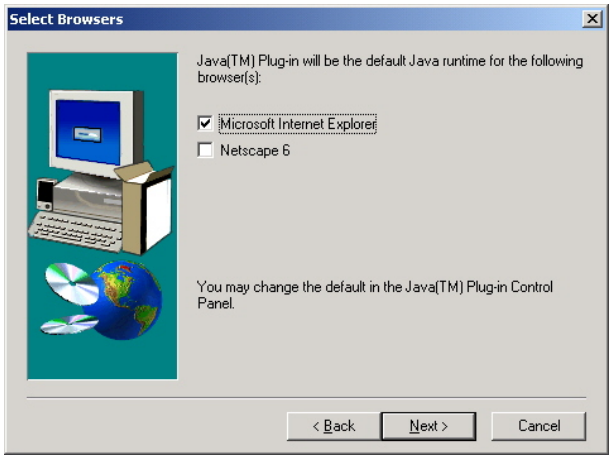
(d) A window of product licensing contract is displayed. Click the [Yes] button.



(e) 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.

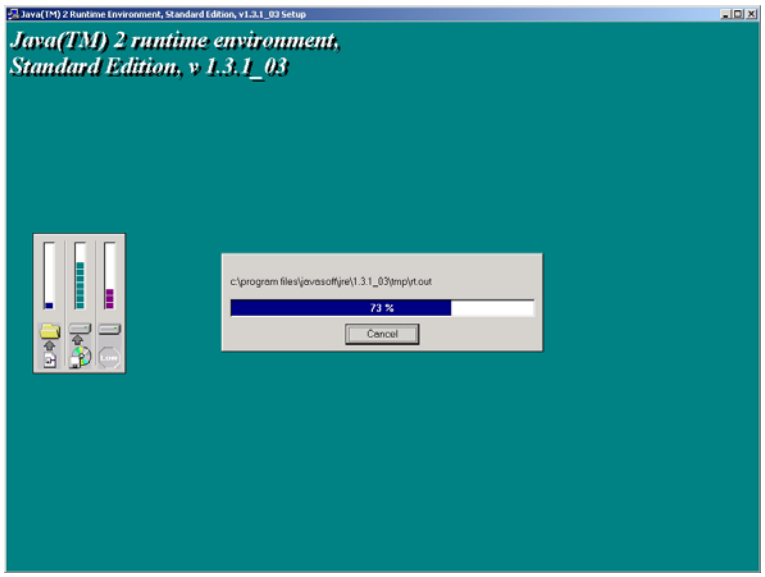


(f) A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



Copyright © 2002, 2005, Hitachi, Ltd.

(g) Installation of the JRE 1.3.1 03 is started.



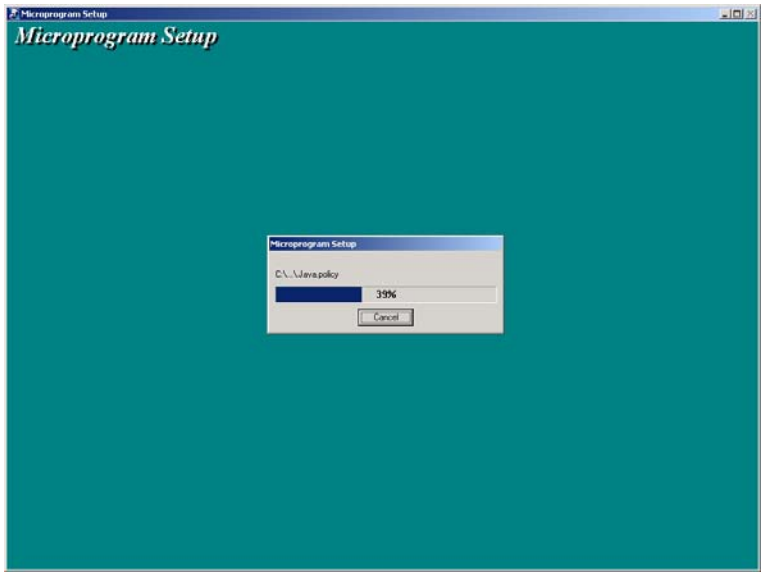
(h) After the installation of the JRE 1.3.1 03 is completed, set the security policy file.
When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed.
Click the [Yes] button.



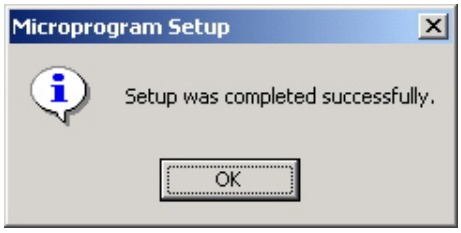


Copyright © 2002, 2005, Hitachi, Ltd.

(i) The microprogram is copied on the service 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 (disk01, disk02, ---) into the directory.



(j) 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 service 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.

Copyright © 2002, 2005, Hitachi, Ltd.

6.1.4 Procedure for update installation

(1) Matters to be made sure of before starting update installation

Make sure of the following before starting the update installation

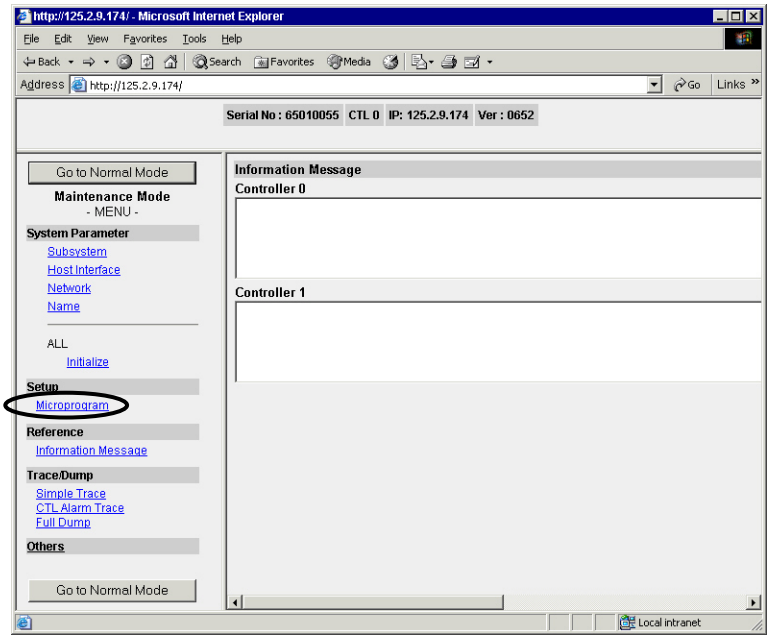
- Make sure that the main switch of the subsystem is turned on. If it is turned off, turn it on to start the subsystem.
- Make sure that the microprogram has already been installed in the subsystem and the READY LED (green) on the front bezel is on. When it is blinking at high speed, do not make the updating work at the maximum of 15 minutes until it lights on because the SENC firmware is being downloaded.
  Besides, make sure that the WARNING LED (yellow) on the front bezel is not on.
  When the microprogram is not installed, install it newly referring to Chapter 4, "Newly Installing Microprogram" on page INST 04-0000.
- Make sure that the status of system copy complete by "Information Message" window in the WEB window.
  If it is in the middle of system copy, please wait until that is completed and update installation of microprogram.

(2) Procedure for update installation

(a) Set the operation mode in the Maintenance Mode. (See Chapter 3, "The Maintenance Mode Operation Procedure" in the Maintenance Manual for Web. (WEB 03-0000))

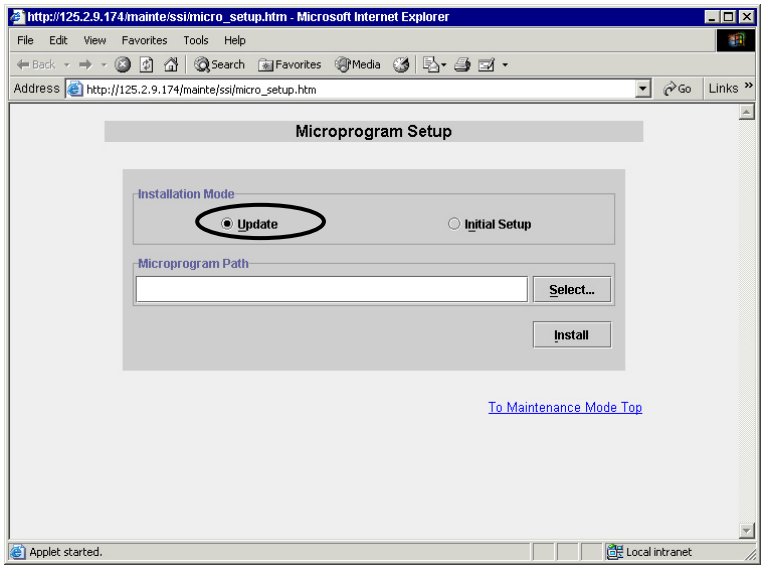
(b) Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web. (See Subsection 2.1.1, "Procedure to WEB connection" on page MNTE 02-0020.)

(c) 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].



Copyright © 2002, 2005, Hitachi, Ltd.

(d) When the Microprogram Setup window is displayed, check the “Update” radio button of the “Installation Mode.”



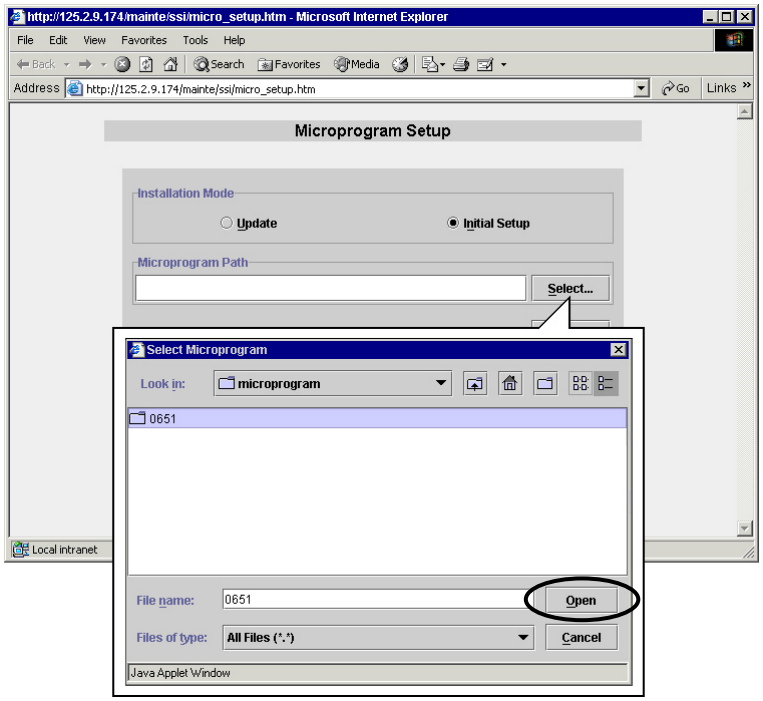
Copyright © 2002, 2005, Hitachi, Ltd.

(e) Set the microprogram path.

Specify the directory in which the microprogram that has been copied to the service PC is stored.

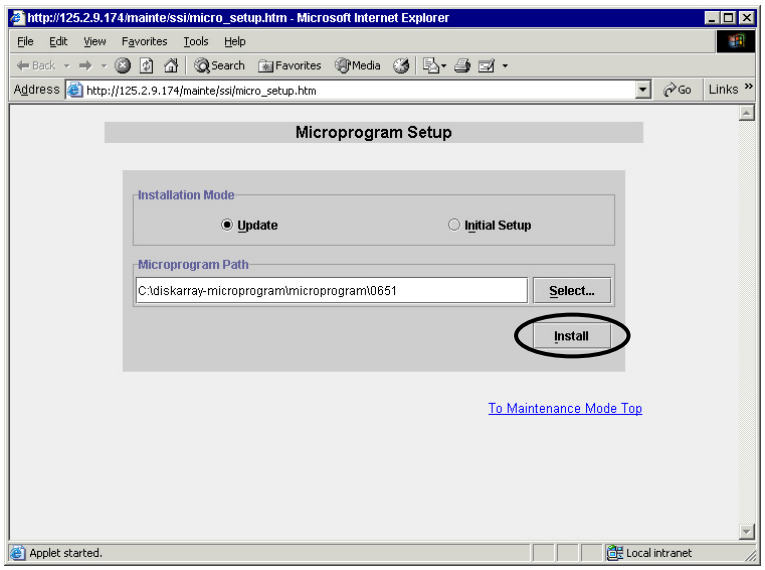
When the “Select” button is clicked, the “Select Microprogram” window is displayed. Select the directory in which the microprogram is stored and click the “Open” button.

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 Item (2) in Subsection 6.1.3, “Preparation for update installation of microprogram” on page MNTE 06-0020) again.

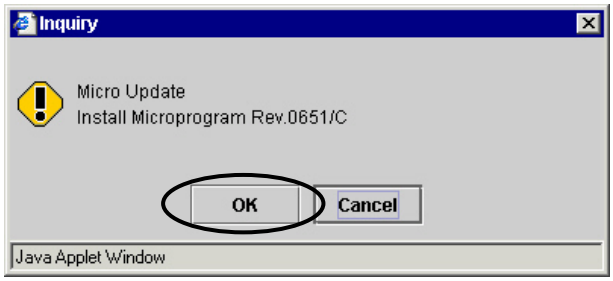


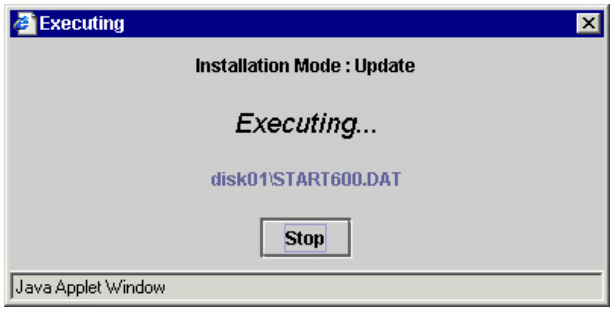
Copyright © 2002, 2005, Hitachi, Ltd.

(f) Click the “Install” button to install the microprogram.



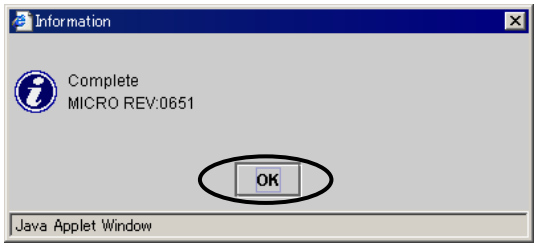
(g) The following window that asks for confirmation is displayed. When the [OK] button in the window is clicked, the installation is started.



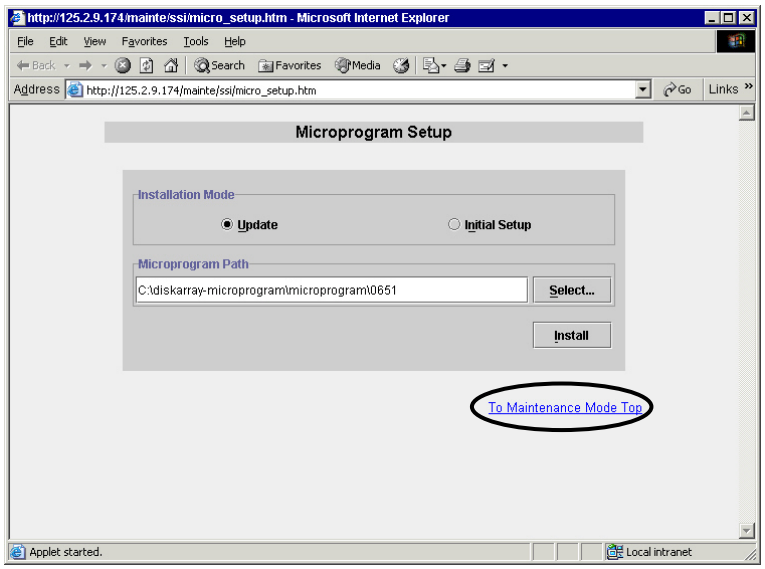


Copyright © 2002, 2005, Hitachi, Ltd.

(h) When the installation is completed, the completion window is displayed. Click the [OK] button.

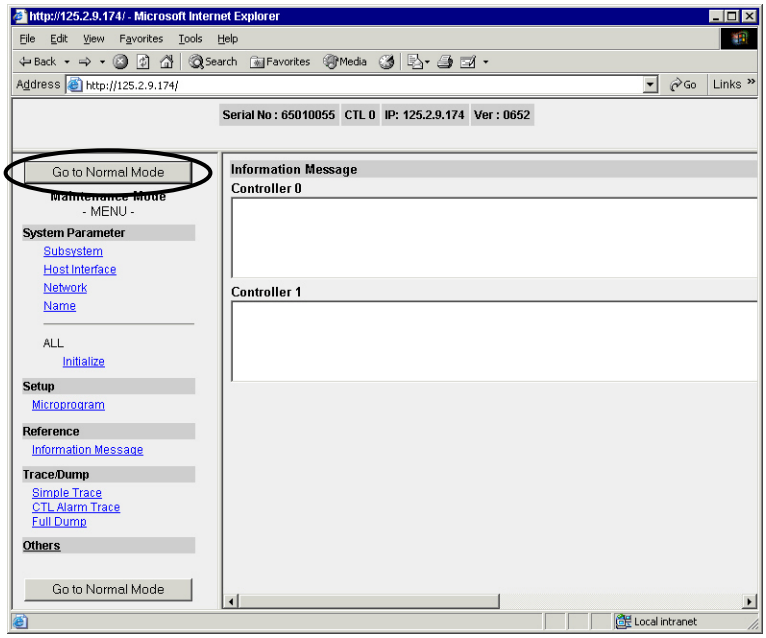


(i) Go to the “Maintenance Mode” window by clicking “To Maintenance Mode Top” in the Microprogram Setup” window.

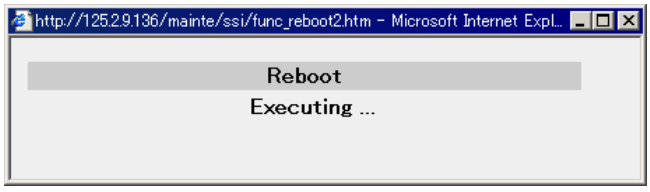


Copyright © 2002, 2005, Hitachi, Ltd.

(j) Change the mode from Maintenance to Normal by clicking the [Go to Normal Mode] button.



(k) When the [Go to Normal Mode] button is clicked, the following window is displayed.



(l) Click the [OK] button.



(m) The subsystem becomes ready in about four minutes.
Make sure that the READY LED of the Front Bezel is on. When it is blinking at high speed, make sure that it lights on after waiting for the maximum of 15 minutes.
If the READY LED does not come on, the installation may have failed. Perform the installation over again.

Copyright © 2002, 2005, Hitachi, Ltd.

6.1.5 Checking the start and the termination of the SENC firmware automatic download

The SENC firmware is a function that is managed as a part of the microprogram and checks the version of all SENC firmware in the subsystem when the subsystem starts or the SENC is replaced, and downloads it automatically if necessary.

NOTE : The object of the SENC firmware automatic download is only the SR firmware of RKAAT/RKAATL/RKAJAT/RKAJATL.
For downloading other ENC Unit/SENC Unit firmware, refer to "Procedure for ENC/SENC Firmware Download (Offline)" and "Procedure for ENC/SENC Firmware Download (Online)".

(1) Opportunity to start the automatic download
The SENC firmware starts the download automatically in the following opportunities.

<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

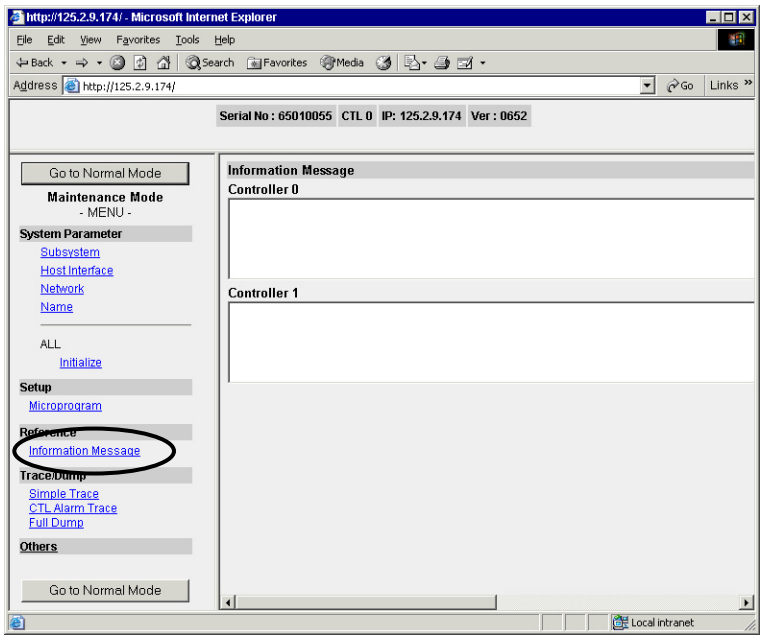
Copyright © 2005, Hitachi, Ltd.

(2) Checking the start messages and the termination messages of the automatic download. When the download starts, it takes up to 15 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 (“2.2 Trouble Analysis by WEB Connection” (MNTE 02-0110)).
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 (refer to “2.1.1 Procedure to WEB connection” (MNTE 02-0020).)

(b) Click [Information Message] in the main window menu frame in the normal mode.



Copyright © 2005, Hitachi, Ltd.

(c) Check that there are the start message and the normal termination message displayed in "Information Message".

Table 6.1.2 Message Check

Message	Content	Reference
I6E100 Automatic SENC microprgram download start	Indicates that the automatic download started.	
I6E200 Automatic SENC microprogram download completed successfully	Indicate that the automatic download terminated normally.	
I6E300 Automatic SENC microprogram download failed	Indicate that the automatic download terminated abnormally.	

<Message Check Example>

- When it is normal (SENC Unit #0 and #1 are objects)
  - Automatic SENC microprogram download start
  - SENC#0 microprogram download start
  - SENC#0 microprogram download complete
  - SENC#1 microprogram download start
  - SENC#1 microprogram download complete
  - Automatic SENC microprogram download completed successfully
- When it is normal (when there is no object SENC Unit)
  - Automatic SENC microprogram download start
  - Automatic SENC microprogram download completed successfully
- When it is abnormal
  - Automatic SENC microprogram download start
  - SENC#0 microprogram download start
  - SENC#0 microprogram download complete
  - SENC#1 microprogram download start
  - SENC alarm (Unit-01, SENC-1)
  - Loop alarm (Path-0, Loop-1)
  - :
  - SENC microprogram download error detected (Unit-01)
  - :
  - SENC#1 microprogram download complete
  - Automatic SENC microprogram download failed

Copyright © 2005, Hitachi, Ltd.

(3) 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.

NOTE : When the automatic download does not start, perform the enable setting after setting the automatic download disable in the Disk Array Management Program 2. The automatic download starts in the enabled opportunity. (Refer to “Procedure for ENC/SENC Firmware Download (Online)” for disable or enable.)

Copyright © 2005, Hitachi, Ltd.

6.2 Procedure for Recovery from a Failure

6.2.1 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	Turn on the power again, and perform the operation over again from the beginning. If a recovery from the failure is not successful nevertheless, connect the WEB and recover from the failure following the recovery procedure against each WEB message. For the details, refer to Section 2.2, "Trouble Analysis by WEB connection" (MNTE 02-0110).

- Details of WEB error logs (Refer to "2.3.4 Flash detected message" (MNTE 02-1160) for the detail of content or recovery procedure.)

Message code	Message text	Recovery procedure	Remark
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.	
RB3600	Bad LBA in START600. DAT	The content of the "START600.DAT" is incorrect.	
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	A downgrade of the program was detected.	
RBC000	No drive available	The access to all the system drives is disabled.	
RBC1HH	Drive block size error (Unit-0, HDU-X)	The drive block size is the other than 512 bytes.	
RBC1xy	Drive block size error (Unit-0, HDU-X)	The drive block size is the other than 512 bytes.	
RBC2HH	Unknown drive (Unit-0, HDU-X)	The system area size is larger than the drive capacity.	
RBC2xy	Unknown drive (Unit-0, HDU-X)	The system area size is larger than the drive capacity.	

Copyright © 2002, 2005, Hitachi, Ltd.

<Install partially complete (The installation of some of the Disk Drives failed.)>

- LED status

WARNING LED	ALARM LED	Recovery procedure
Off(*1)	Off	It may be a Disk Drive failure. For the details, refer to Section 6.3, “Procedure for Isolating Cause of Disk Drive Failure when” Install partially complete “ Message Is Output” on page MNTE 06-0140.

*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

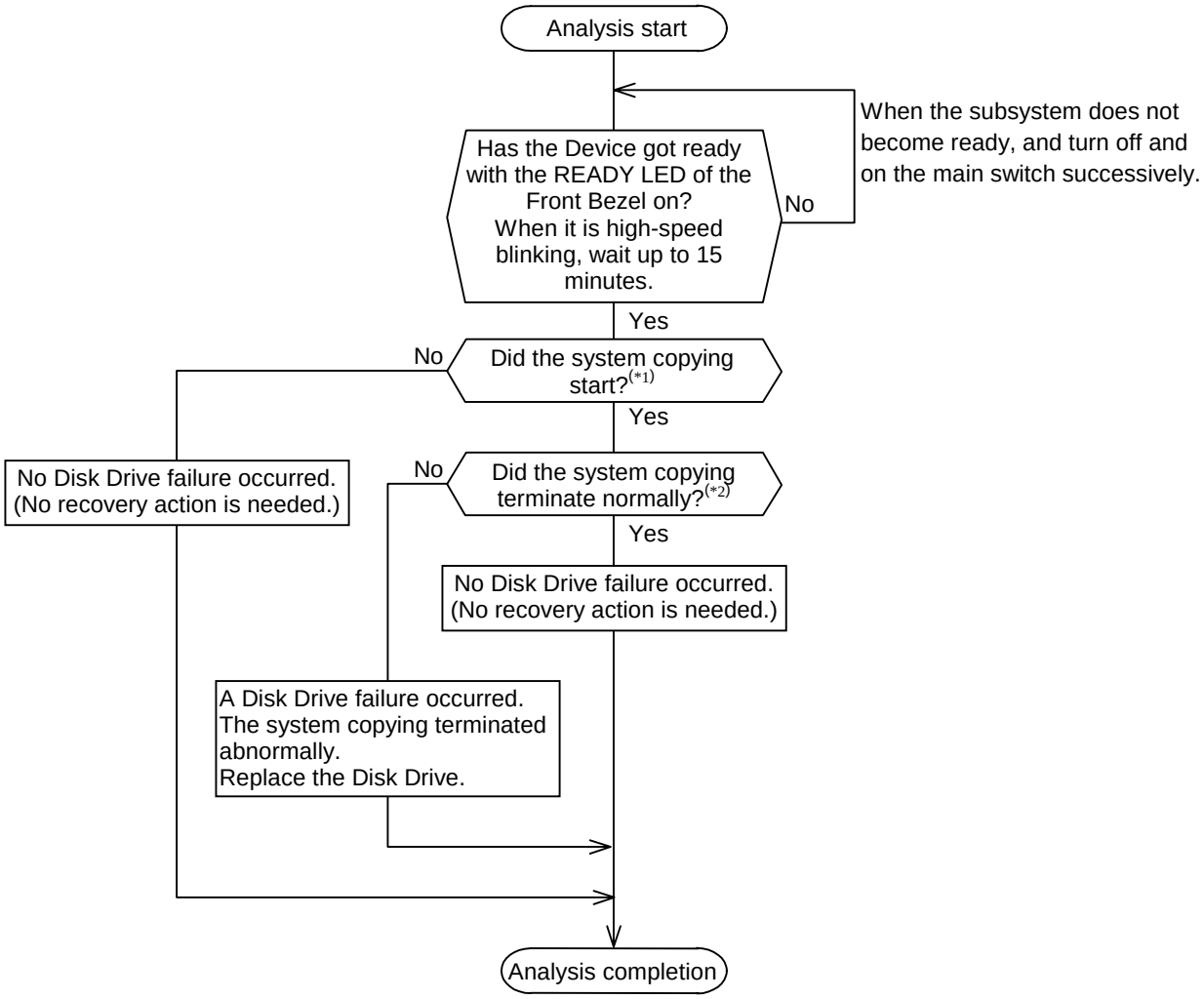
Message code	Message text	Recovery procedure	Remake
RB8200	Install partially complete	The installation of some of the Disk Drives failed.	

Copyright © 2002, 2005, Hitachi, Ltd.

6.3 Procedure for Isolating Cause of Disk Drive Failure when "Install partially complete" Message Is Output

The message "Install partially complete" is displayed on the WEB window when the subsystem detects either of the following statuses. The "Install partially complete" status can be known through the status of the LED.

- When at least one Disk Drive among the Disk Drives#0 to #4 in the RK/RKL/RKS/RKD/RKSD or RKA of the unit ID#0 connected to RKH/RKHE frame is not installed.
  Because this is not a failure, no recovery action is required.
- One or more Disk Drive (s) failed to install a program.
  This may be a Disk Drive failure. Analyze the phenomena following the procedure below and take necessary action.



*1 : Refer to "6.3.1 Procedure for Checking whether system copy operation occurred" (MNTE 06-0150).

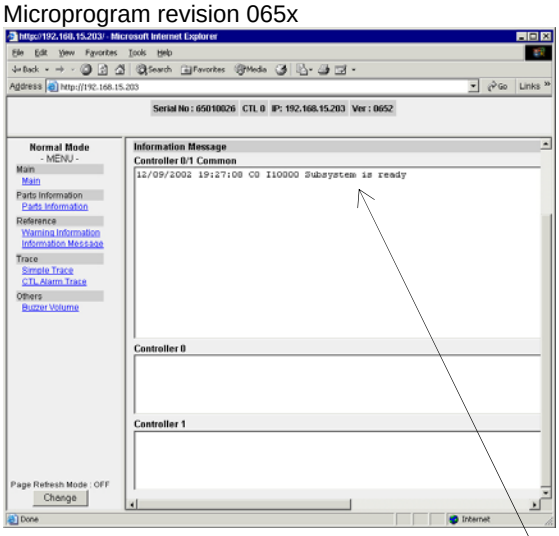
*2 : Refer to "6.3.2 Procedure for checking the status of system copy complete" (MNTE 06-0160).

Copyright © 2002, 2005, Hitachi, Ltd.

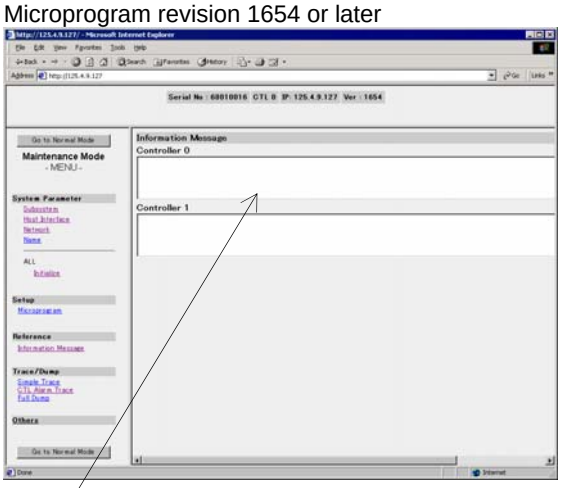
6.3.1 Procedure for Checking whether system copy operation occurred

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.

Microprogram revision 065x



Microprogram revision 1654 or later



Refer to this place.

- When the occurred of system copy

MM/DD/YYYY HH:MM:SS Cx I140xy System copy started (Unit-x, HDU-y)

Date Time Detect Controller#

x : Unit ID#
y : Disk Drive#

In the case of the RKH/RKHE, "I140HH System copy started (Unit-x, HDU-y)".

- When the not occurred of system copy

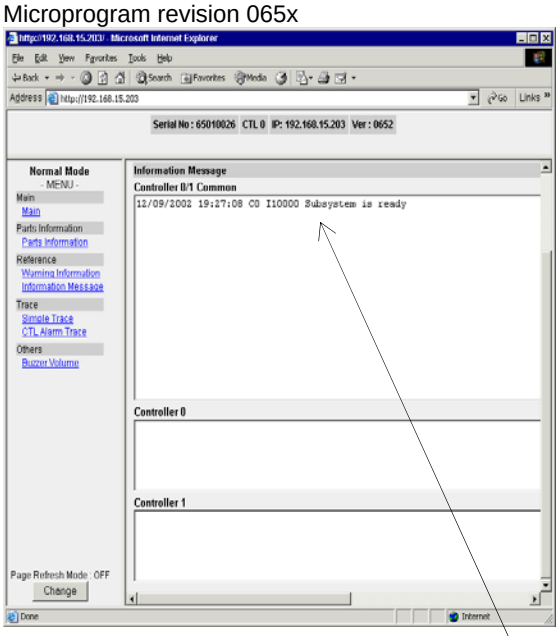
The message above is not displayed but a message "I10000 Subsystem is Ready" is displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

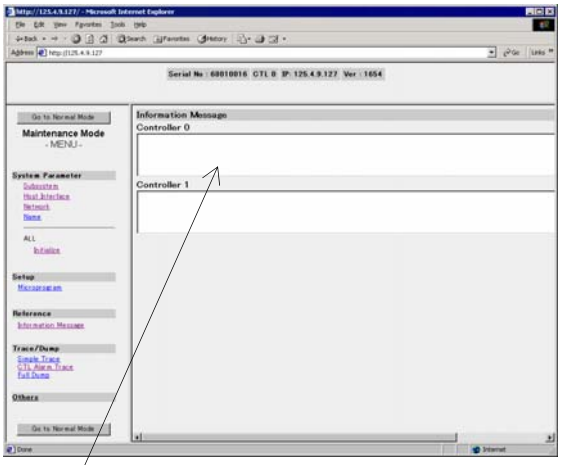
6.3.2 Procedure for checking the status of system copy complete

You can verify whether the system copy operation has occurred by viewing the "Information Message" window in the WEB window.

Microprogram revision 065x

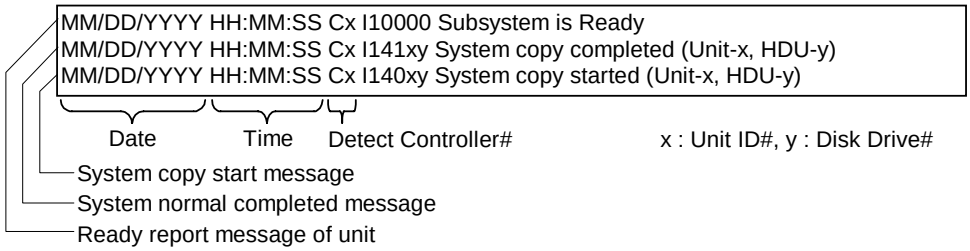


Microprogram revision 1654 or later



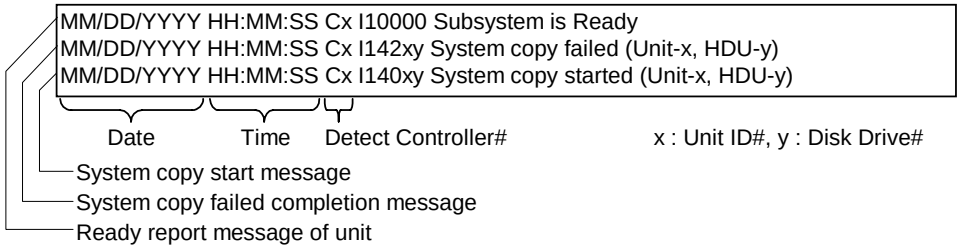
Refer to this place.

- When the normal completed of system copy



In the case of the RKH/RKHE, "I140HH System copy started (Unit-x, HDU-y)", "I141HH System copy completed (Unit-x, HDU-y)".

- When the not occurred of system copy



In the case of the RKH/RKHE, "I140HH System copy started (Unit-x, HDU-y)", "I142HH System copy failed (Unit-x, HDU-y)".

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 7. 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.

7.1 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 7.1.1 Periodic Maintenance Items

No.	Item			Interval (*1)	Inspection item for each model				Standard time required (*2)
					Floor Model		Rackmount Model		
					H1F	H2F	Rackmount Model (U6)	Rackmount Model (U4)	
1	Inspection	Inspecting FANs	Fan Assembly	Y1	Section 7.2.1	Section 7.2.1	Section 7.3.1	Section 7.4.1	5 min
2	Cleaning	Cleaning the subsystem	Front bezel	Y1	Section 7.2.2	Section 7.2.2	Section 7.3.2	Section 7.4.2	5 min
			Rear cover	Y1	Section 7.2.2	Section 7.2.2	–	–	5 min
			Rear door	Y1	–	–	Section 7.3.2	Section 7.4.2	5 min
3	Replacement of periodical replacement part		Battery	Y2	Section 7.5.1	Section 7.5.1	Section 7.5.1	Section 7.5.1	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 7.1.2.)

*2 : Working hours change by the case where one RK/RKL/RKS/RKH/RKHE/RKD/RKSD is checked, and the number of RKA/RKAD/RKAAT/RKAJAT/RKAATL/RKAJATL.

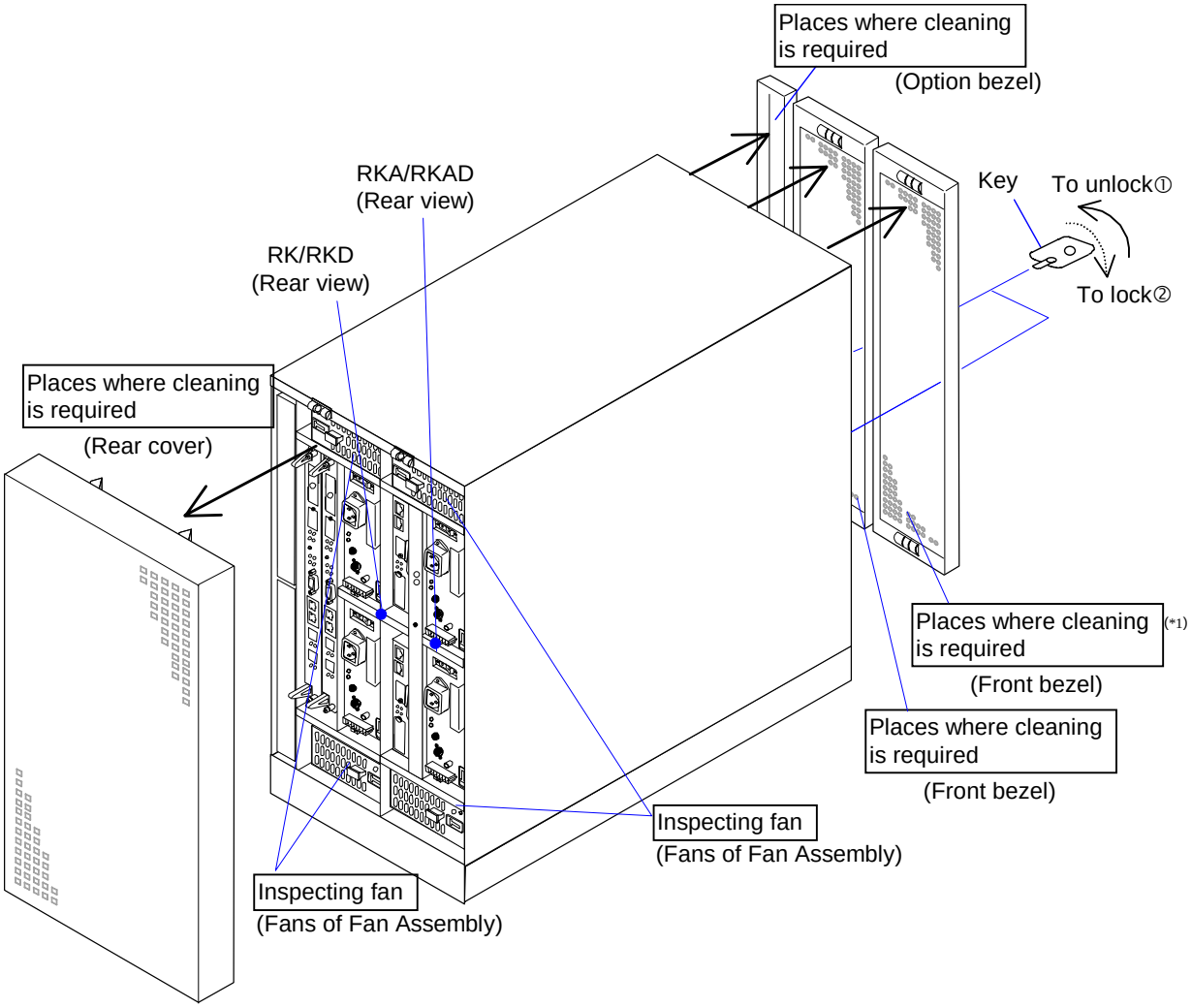
Table 7.1.2 Change of Maintenance Interval

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.

Copyright © 2002, 2005, Hitachi, Ltd.

7.2 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 7.2.1 (for the RK+RKA+H2H /RKD+RKAD+H2HD).



*1 : The floor model H1F does not have this part.

Figure 7.2.1 Inspecting and Cleaning of Floor Model (RK+RKA+H2H/RKD+RKAD+H2HD)

Copyright © 2002, 2005, Hitachi, Ltd.

7.2.1 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 (RK+H1H/RKS+H1H/RK+RKA+H2H/RKD+H1HD /RKSD+H1HD/RKD+RKAD+H2HD) 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 (RK+H1H/RKS+H1H/RK+RKA+H2H/RKD+H1HD /RKSD+H1HD/RKD+RKAD+H2HD) Model, reinstall the rear cover after the inspection and cleaning are completed.

Copyright © 2002, 2005, Hitachi, Ltd.

7.2.2 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 "1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem" (INST 01-0050))
(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 (RK+H1H/RKS+H1H/RK+RKA+H2H/RKD+H1HD/ RKSD+H1HD/RKD+RKAD+H2HD) Model, remove the rear cover.
(8) Clean the outer and inner sides of the rear cover.
(9) In the case of the Floor (RK+H1H/RKS+H1H/RK+RKA+H2H/RKD+H1HD/ RKSD+H1HD/RKD+RKAD+H2HD) Model, reinstall the rear cover after the inspection and cleaning are completed.

Copyright © 2002, 2005, Hitachi, Ltd.

7.3 Inspecting and Cleaning Rackmount Model with U6 Rack Frame

7.3.1 Inspecting fans

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 7.3.1.)
(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.

Copyright © 2002, 2005, Hitachi, Ltd.

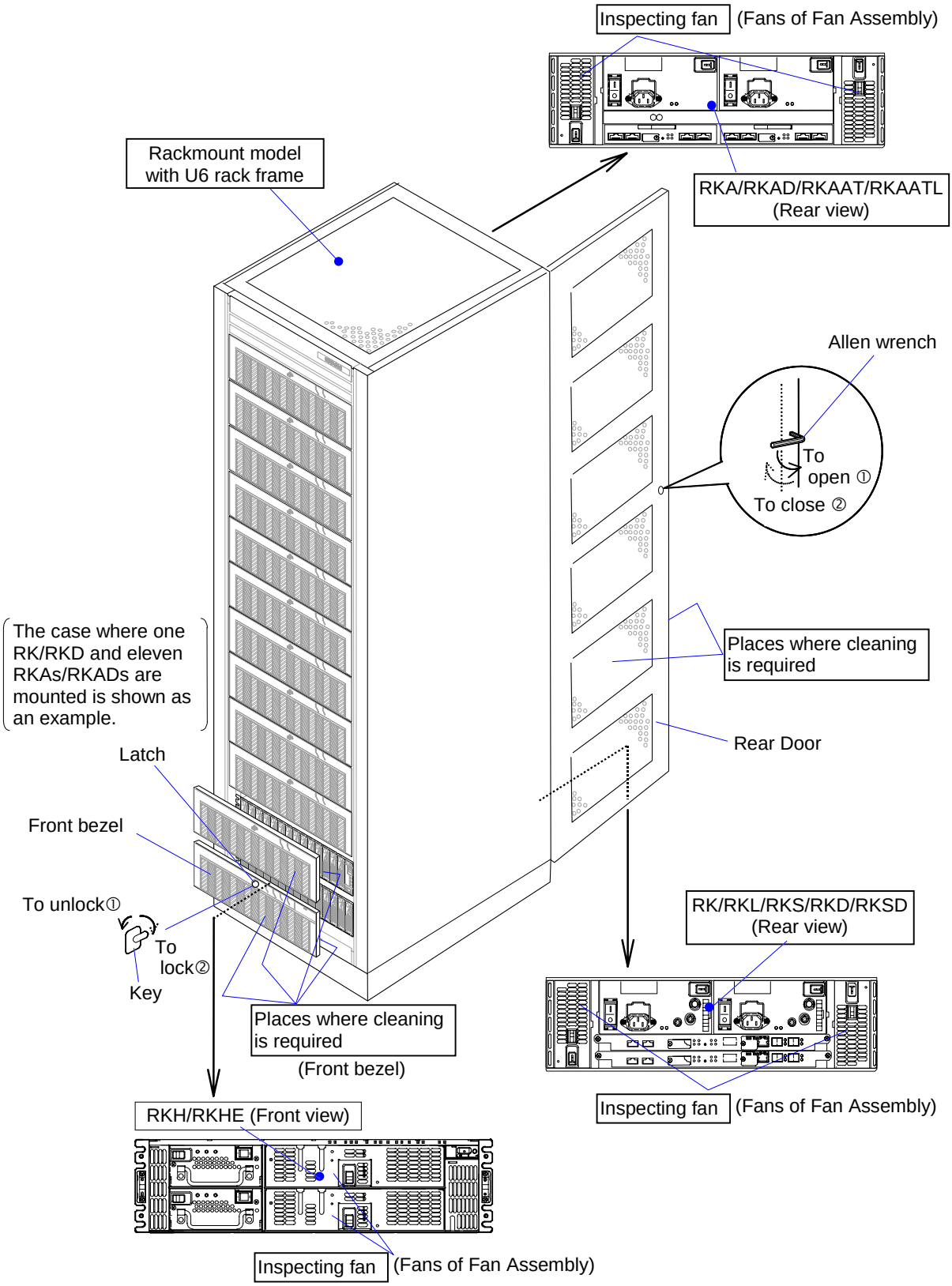


Figure 7.3.1 Inspecting and Cleaning Rackmount Mode with U6 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

7.3.2 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.

⚠ CAUTION

Install or remove the front bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(3) Slide the latch and remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050).)
(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) Clean the external surfaces of the rear door.
(8) Open the rear doors. (“1.4.4 How to open/close the rear door of U6 rack frame ”See page (INST 01-0100).)
(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.

Copyright © 2002, 2005, Hitachi, Ltd.

7.4 Cleaning Rackmount Model with U4 Rack Frame

Perform inspection and cleaning periodically. Parts to be inspected and cleaned are shown in Figure 7.4.1.

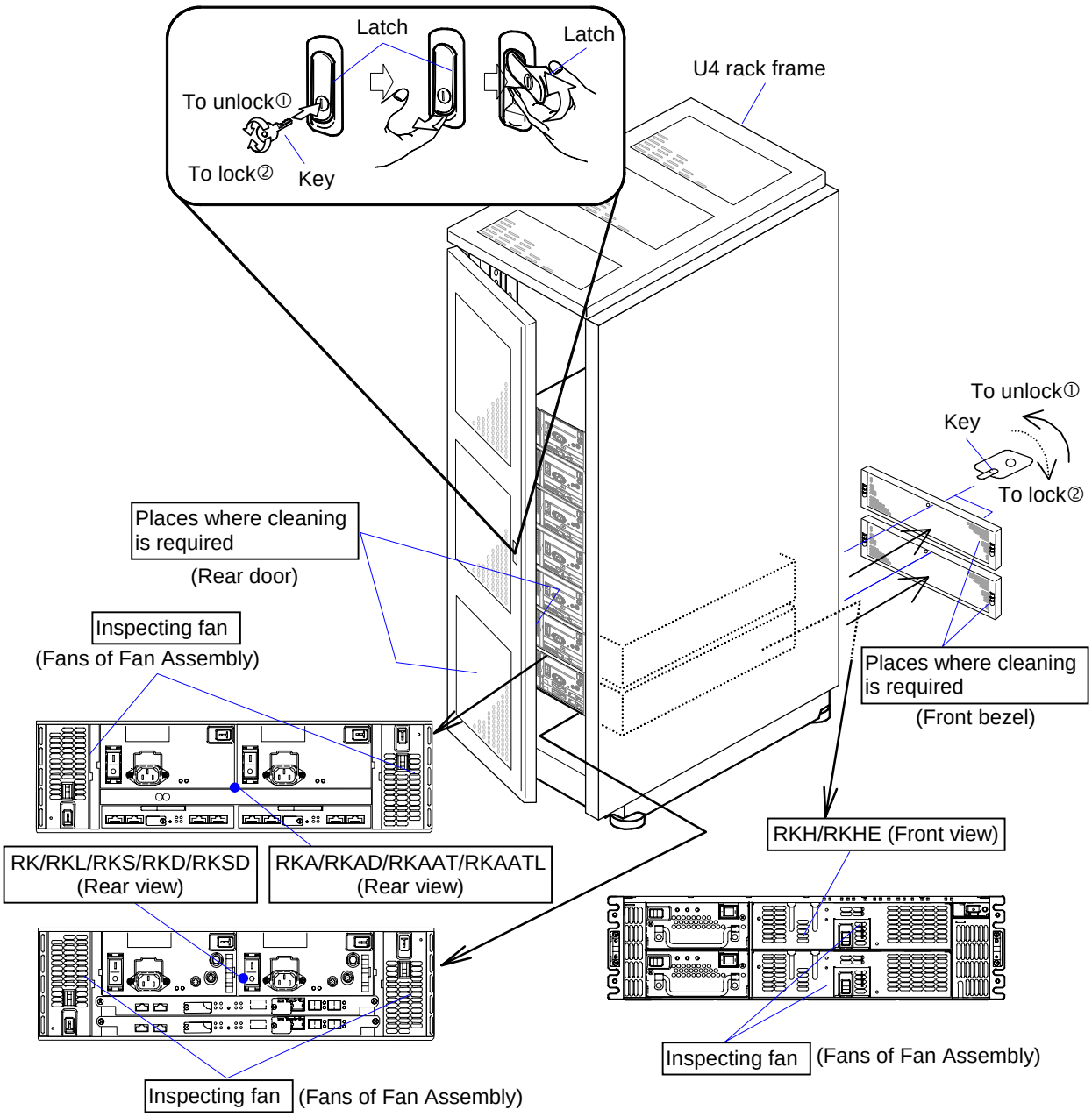


Figure 7.4.1 Inspecting and Cleaning Rackmount Mode with U4 Rack Frame

Copyright © 2002, 2005, Hitachi, Ltd.

7.4.1 Inspecting fans

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 7.4.1.)
(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.

Copyright © 2002, 2005, Hitachi, Ltd.

7.4.2 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.

CAUTION

Install or remove the front bezel carefully following the procedure. Otherwise, you may hurt your fingers by pinching them.

(2) Slide the latch and remove the Front Bezel. (“1.4 How to Open/Close Door or Attach/Remove Front Bezel of the Subsystem” (INST 01-0050).)
(3) Clean the internal surfaces of the Front Bezel.
(4) Attach the Front Bezel.
(5) Clean the external surfaces of the rear door.
(6) Open the rear doors. (“How to open/close the rear door of U4 rack frame” (INST 01-0110).)
(7) Clean the internal surfaces of the rear door.
(8) Close the rear door. To close it, insert the key 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.

Copyright © 2002, 2005, Hitachi, Ltd.

7.5 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.
The Backup Battery Unit can be replaced during its operation (while the customer is using it on business) for periodic maintenance, but the Cache becomes a write through mode and some R/W performance is lowered.

7.5.1 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 18 days, the battery may be excessively discharged, and it may cause an unrecoverable damage. In such a storing condition, either charge the battery at least once a month for more than two 2 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 three months for more than two 2 hours.

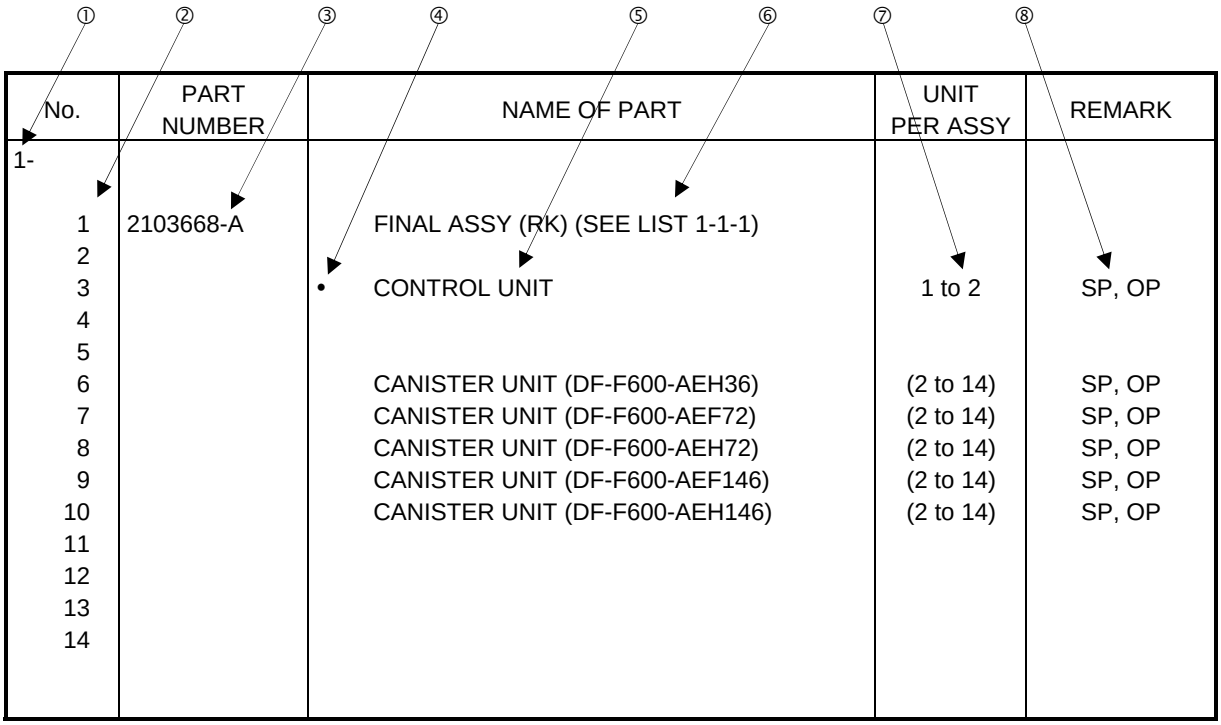
(1) Procedure for replacing a Disk Drive is Subsection “5.3.2, Replacing Backup Battery Unit” on page MNTE 05-0260.
(2) For disposing and keeping the used battery, refer to “Appendix B Recycling” on page APP B-0000.

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 8. 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.

8.1 How to Use this Parts Catalog



No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-				
1	2103668-A	FINAL ASSY (RK) (SEE LIST 1-1-1)		
2				
3		• CONTROL UNIT	1 to 2	SP, OP
4				
5				
6		CANISTER UNIT (DF-F600-AEH36)	(2 to 14)	SP, OP
7		CANISTER UNIT (DF-F600-AEF72)	(2 to 14)	SP, OP
8		CANISTER UNIT (DF-F600-AEH72)	(2 to 14)	SP, OP
9		CANISTER UNIT (DF-F600-AEF146)	(2 to 14)	SP, OP
10		CANISTER UNIT (DF-F600-AEH146)	(2 to 14)	SP, OP
11				
12				
13				
14				

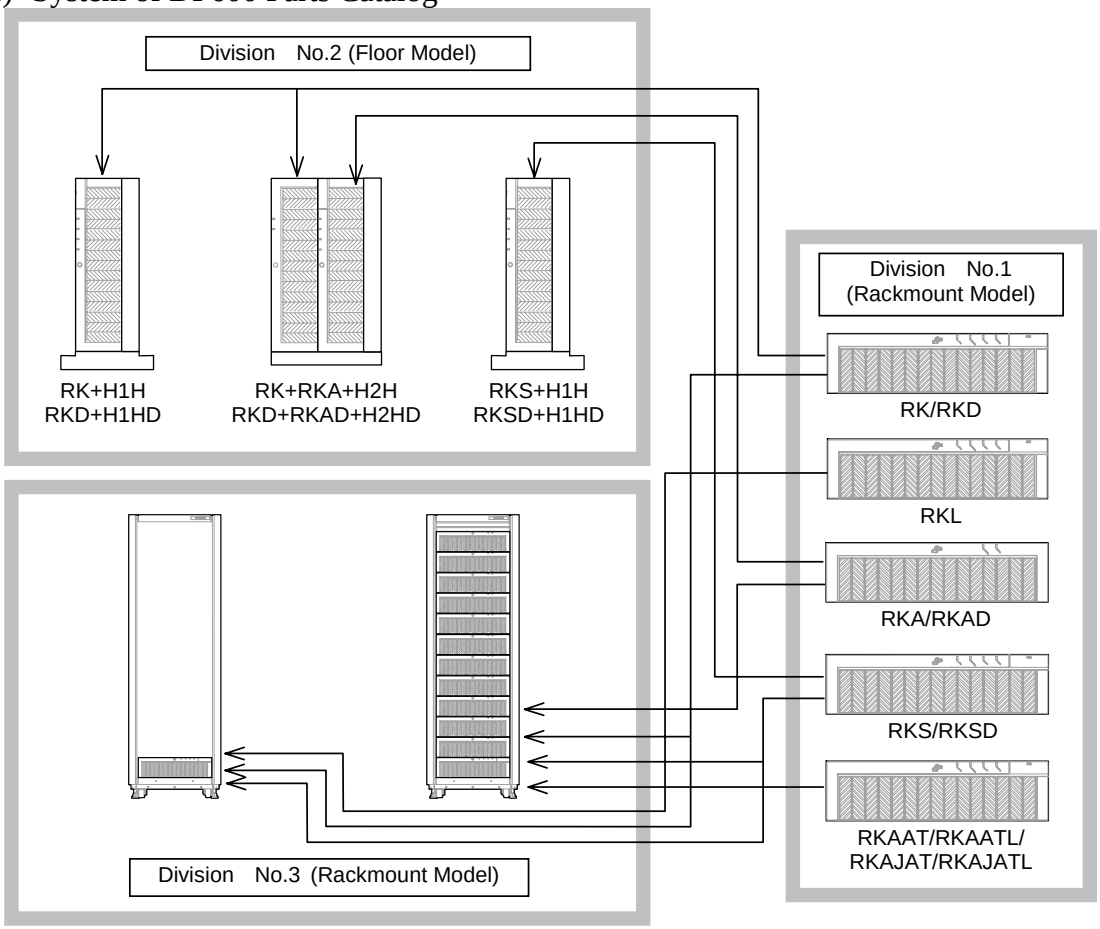
① : Indicates a list number of an assembly which is a broad division of the subsystem.
② : Indicates a serial number of a part listed in the above list.
③ : Indicates a part number (drawing number).
④ : Indicates relationship of parts as follows.
No dots: Main assembly
• : Detail part of a main assembly
•• : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

8.2 System of Parts Catalog

The parts and devices which composes the system are classified as shown below.

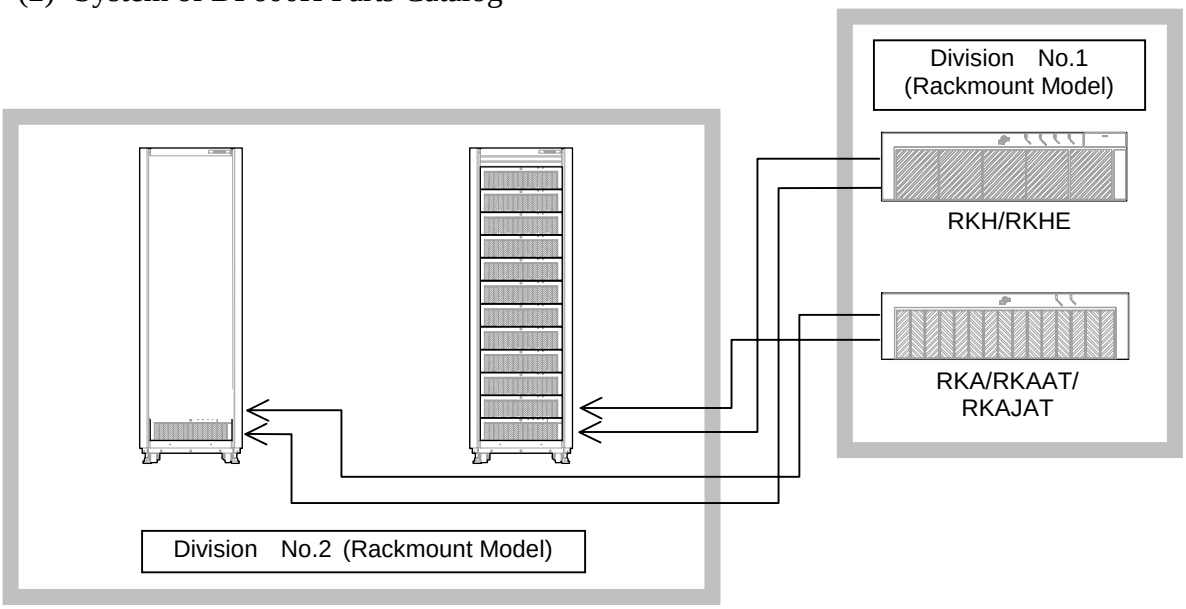
(1) System of DF600 Parts Catalog



Division	Classification	Name of Part	No.	Sheet No.
1	RK, RKL, RKA, RKAAT, RKAATL, RKAJAT, RKAJATL,RKS RKD, RKAD, RKSD	DF600-RK	1-1	08-0030
		DF600-RKL	1-2	08-0060
		DF600-RKA	1-4	08-0120
		DF600-RKAAT	1-5	08-0150
		DF600-RKAATL	1-6	08-0180
		DF600-RKAJAT	1-7	08-0210
		DF600-RKAJATL	1-8	08-0240
		DF600-RKS	1-1	08-0030
		DF600-RKD	1-9	08-0270
		DF600-RKAD	1-10	08-0300
		DF600-RKSD	1-9	08-0270
2	Floor Model	Floor (RK+H1H) model	2-1	08-0330
		Floor (RK+RKA+H2H) model	2-2	08-0350
		Floor (RKS+H1H) model	2-3	08-0360
		Floor (RKD+H1HD) model	2-4	08-0380
		Floor (RKD+RKAD+H2HD) model	2-5	08-0400
		Floor (RKSD+H1HD) model	2-6	08-0410
3	Rackmount Model	U6 Rack frame	3-1	08-0430
		U4 Rack frame	3-2	08-0450

Copyright © 2002, 2005, Hitachi, Ltd.

(2) System of DF600H Parts Catalog

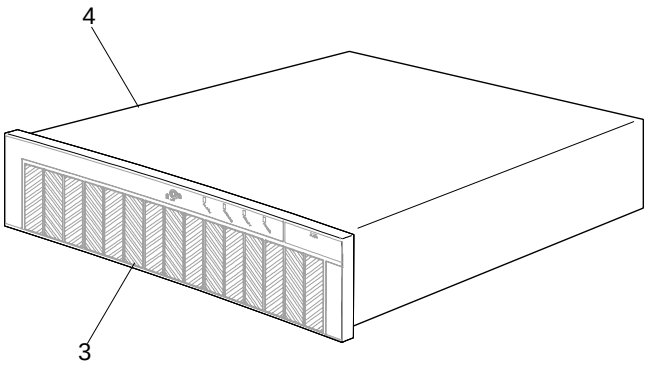


Division	Classification	Name of Part	No.	Sheet No.
1	RKH/RKHE, RKA, RKAAT, RKAJAT	DF600-RKH / DF600-RKHE	1-3	08-0090
		DF600-RKA	1-4	08-0120
		DF600-RKAAT	1-5	08-0150
		DF600-RKAJAT	1-7	08-0210
2	Rackmount Model	U6 Rack frame	3-1	08-0430
		U4 Rack frame	3-2	08-0450

Copyright © 2003, 2005, Hitachi, Ltd.

8.3 Parts Catalog

No. 1-1 DF600-RK/RKS

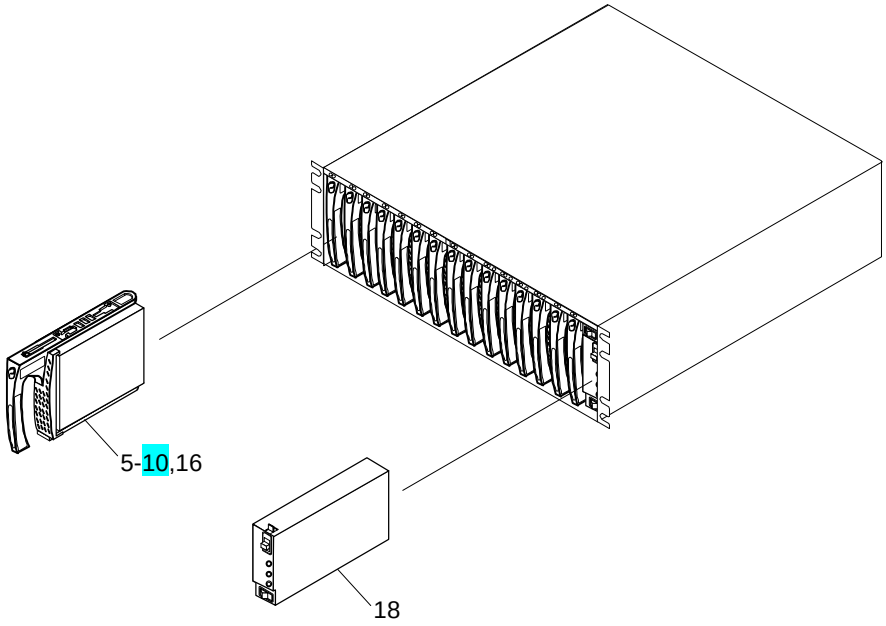


No.1-1 RK/RKS (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF600-RK / DF600-RKS		
1				
2				
3	5507353-130	• FRONT BEZEL	1	
4	5507353-35	• EXCHANGE CHASSIS	1	

Copyright © 2002, 2005, Hitachi, Ltd.

No. 1-1 DF600-RK/RKS



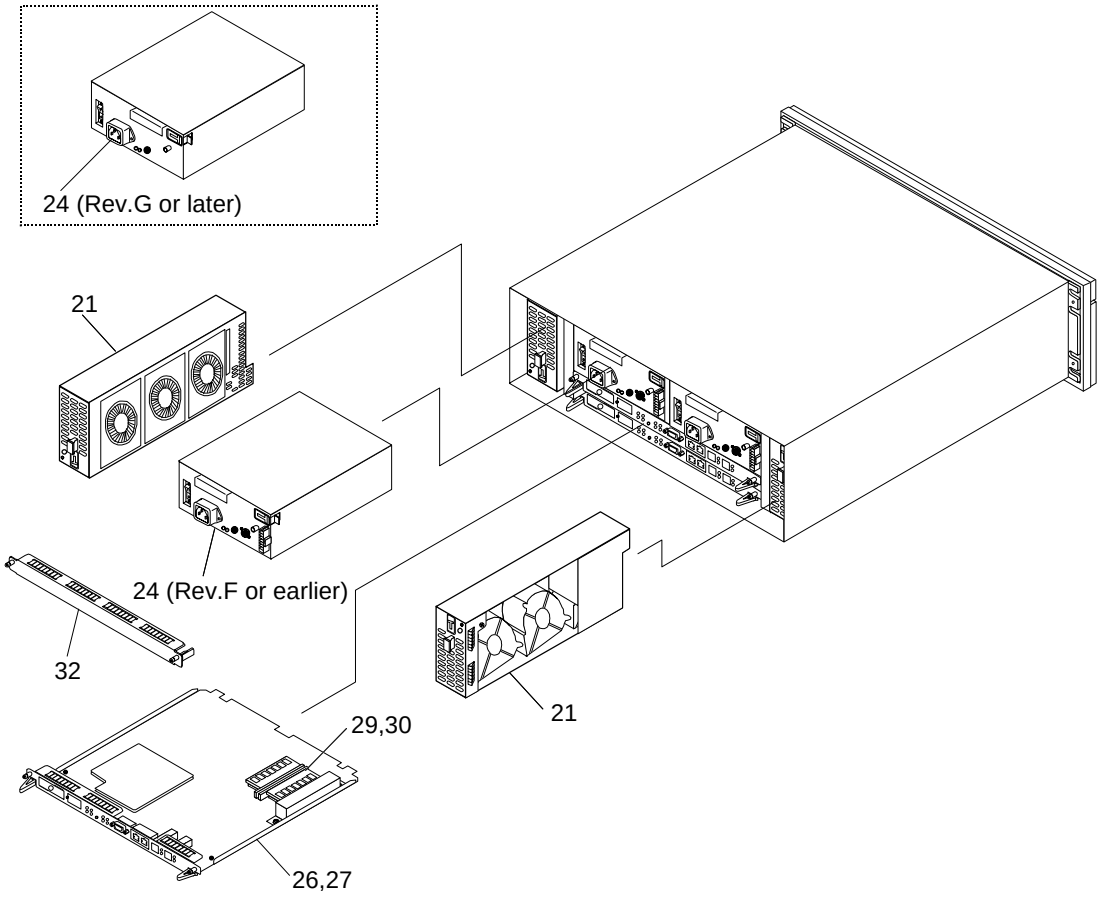
No.1-1 RK/RKS (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF600-RK / DF600-RKS		
5	5507353-1	CANISTER UNIT (DF-F600-AEH36)	2 to 14	SP, OP
6	5507353-2	CANISTER UNIT (DF-F600-AEF72)	2 to 14	SP, OP
7	5507353-3	CANISTER UNIT (DF-F600-AEH72)	2 to 14	SP, OP(*1)
8	5507353-4	CANISTER UNIT (DF-F600-AEF146)	2 to 14	SP, OP(*1)
9	5507353-5	CANISTER UNIT (DF-F600-AEH146)	2 to 14	SP, OP(*1)
10	5507353-79	CANISTER UNIT (DF-F600-AEF300)	2 to 14	SP, OP
11				
12				
13				
14				
15				
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 12	
17				
18	5507353-13	• BACKUP BATTERY UNIT	1	SP
19				
20				

*1 : RKS is not support.

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-1 DF600-RK/RKS

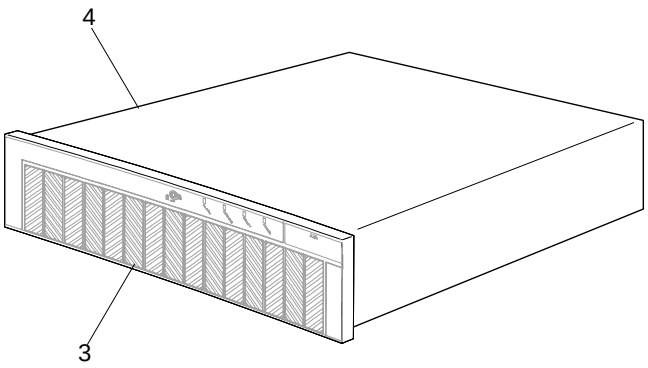


No.1-1 RK/RKS (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-1-		DF600-RK / DF600-RKS		
21	5507353-14	• FAN ASSEMBLY	2	SP
22				
23				
24	5507353-6	• POWER UNIT	2	SP
25				
26	5507353-10	• CONTROL UNIT (RK : DF-F600-F1H)	1 to 2	SP, OP
27	5507353-51	• CONTROL UNIT (RKS : DF-F600-F1HS)	1 to 2	SP, OP
28				
29	5507353-8	•• CACHE UNIT (DF-F600-C512X2)	1 to 4	SP, OP
30	5507353-9	•• CACHE UNIT (DF-F600-C1GX2)	1 to 4	SP, OP
31				
32	3266277-A	• DUMMY (CONTROL UNIT)	1 to 2	
33				

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-2 DF600-RKL

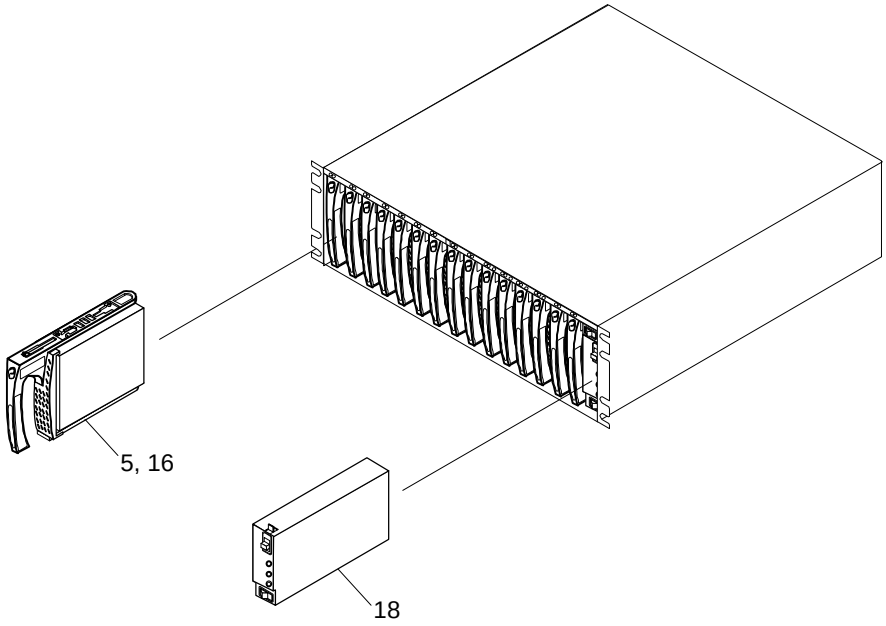


No.1-2 RKL (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF600-RKL		
1				
2				
3	5507353-130	• FRONT BEZEL	1	
4	5507353-35	• EXCHANGE CHASSIS	1	

Copyright © 2002, 2005, Hitachi, Ltd.

No. 1-2 DF600-RKL

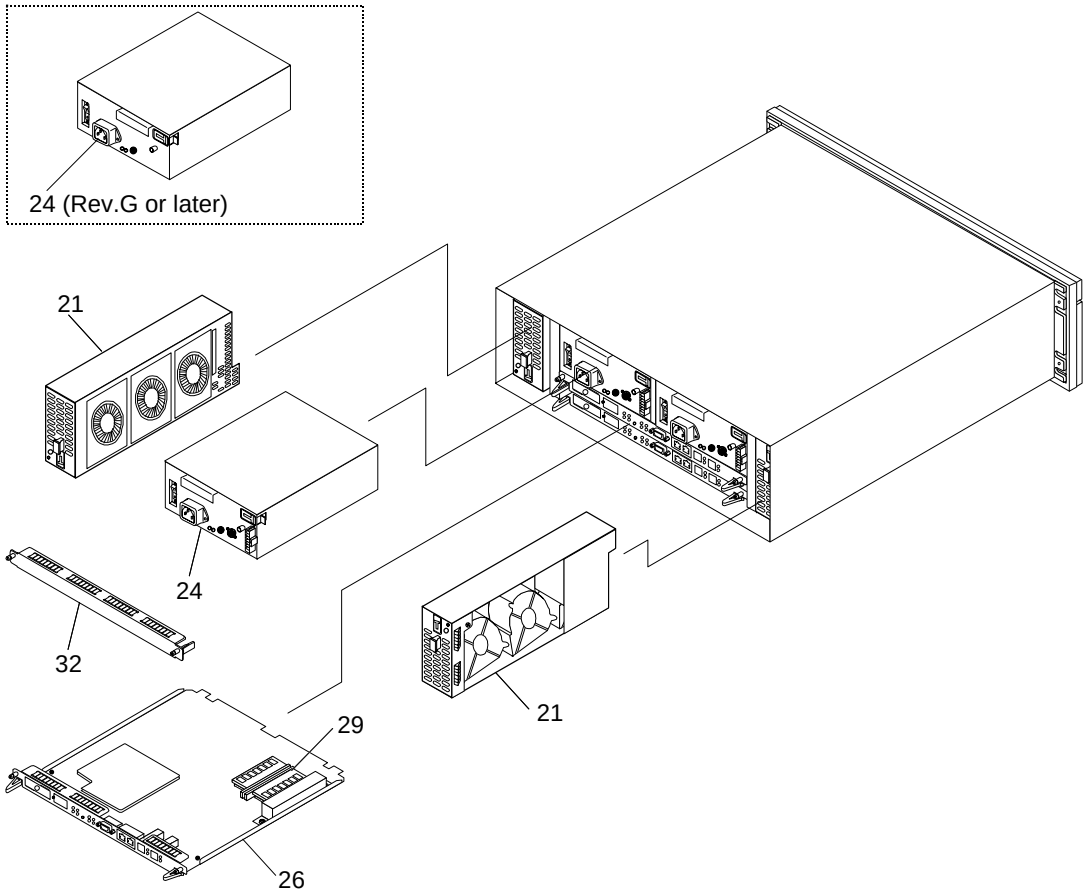


No.1-2 RKL (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF600-RKL		
5	5507353-76	CANISTER UNIT (DF-F600-ATE146L)	2 to 14	SP, OP
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 12	
17				
18	5507353-13	• BACKUP BATTERY UNIT	1	SP
19				
20				

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-2 DF600-RKL

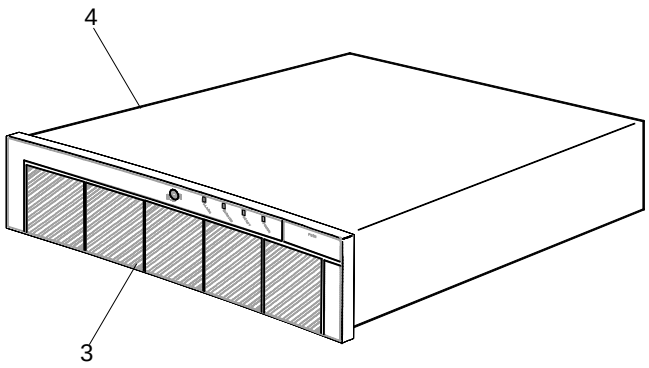


No.1-2 RKL (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-2-		DF600-RKL		
21	5507353-14	• FAN ASSEMBLY	2	SP
22				
23				
24	5507353-6	• POWER UNIT	2	SP
25				
26	5507353-78	• CONTROL UNIT (RKL : DF-F600-F1HL)	1 to 2	SP, OP
27				
28				
29	5507353-8	•• CACHE UNIT (DF-F600-C512X2)	1 to 2	SP, OP
30				
31				
32	3266277-A	• DUMMY (CONTROL UNIT)	1 to 2	
33				
34				

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-3 DF600-RKH/RKHE

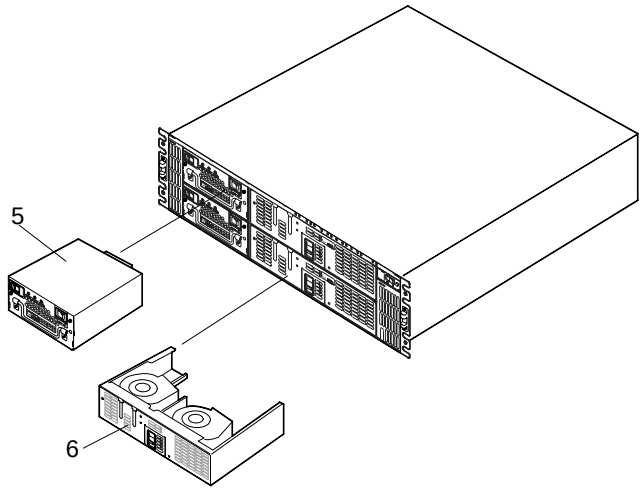


No.1-3 RKH/RKHE (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF600-RKH / DF600-RKHE		
1				
2				
3	5507353-132	• FRONT BEZEL	1	
4	5507353-75	• EXCHANGE CHASSIS	1	

Copyright © 2002, 2005, Hitachi, Ltd.

No. 1-3 DF600-RKH/RKHE

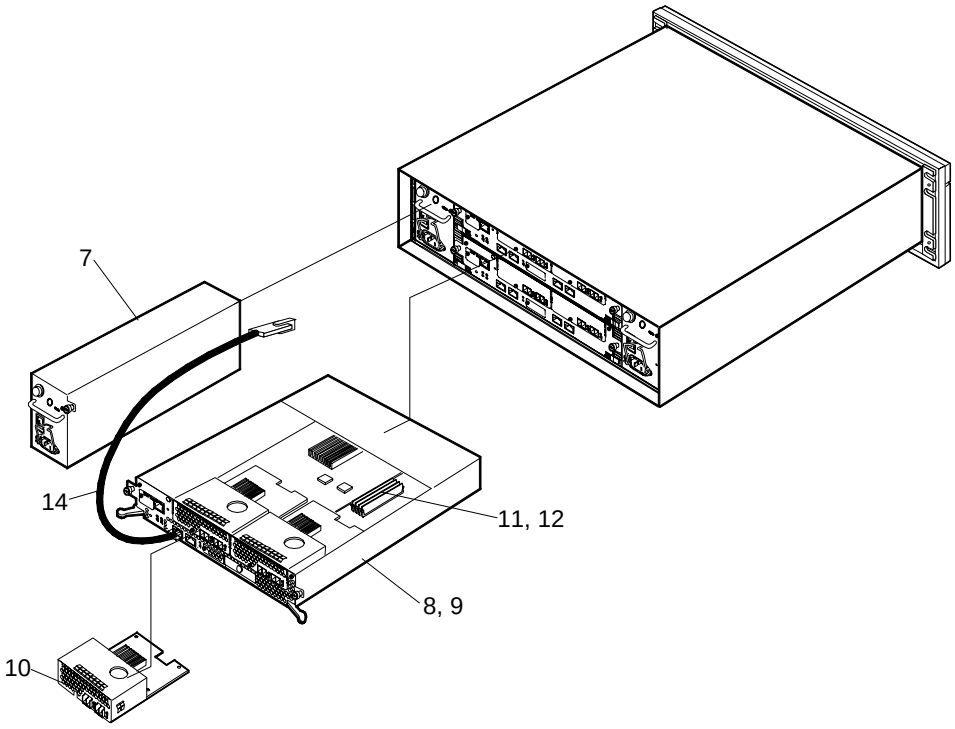


No.1-3 RKH/RKHE (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF600-RKH / DF600-RKHE		
5	5507353-64	• BACKUP BATTERY UNIT	2	SP
6	5507353-65	• FAN ASSEMBLY	2	SP

Copyright © 2003, 2005, Hitachi, Ltd.

No. 1-3 DF600-RKH/RKHE



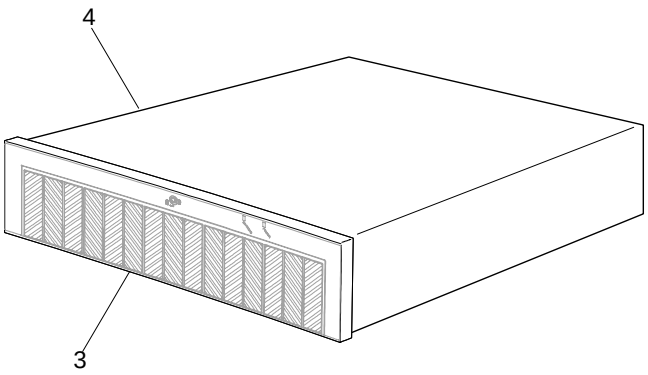
No.1-3 RKH/RKHE (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		DF600-RKH / DF600-RKHE		
7	5507353-56	• POWER UNIT	2	SP
8	5507353-60	• CONTROL UNIT (RKH)	2	SP
9	5507353-70	• CONTROL UNIT (RKHE)	2	SP
10	5507353-63	•• Interface Board	4	SP
11	5507353-58	•• CACHE UNIT (DF-F600-C5122H)	4 to 8	SP, OP
12	5507353-59	•• CACHE UNIT (DF-F600-C1GX2H)	4 to 8	SP, OP
14	5507353-20	• ENC CABLE (0.75 m) (DF-F600-K075B) (*1)	2	OP

*1 : The ENC cable is manufactured by Hitachi, Ltd. It cannot be used for other products.

Copyright © 2003, 2005, Hitachi, Ltd.

No. 1-4 DF600-RKA

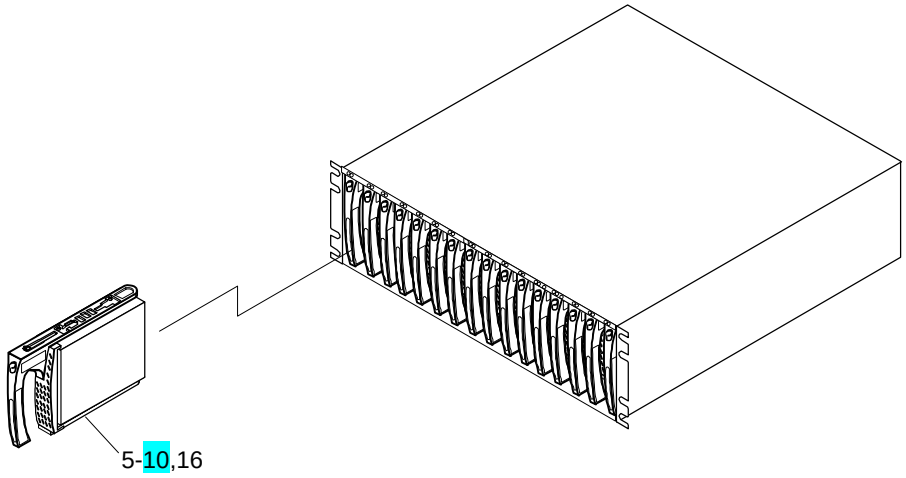


No.1-4 RKA (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-4-		DF600-RKA		
1				
2				
3	5507353-134	• FRONT BEZEL	1	
4	5507353-36	• EXCHANGE CHASSIS	1	

Copyright © 2002, 2005, Hitachi, Ltd.

No. 1-4 DF600-RKA

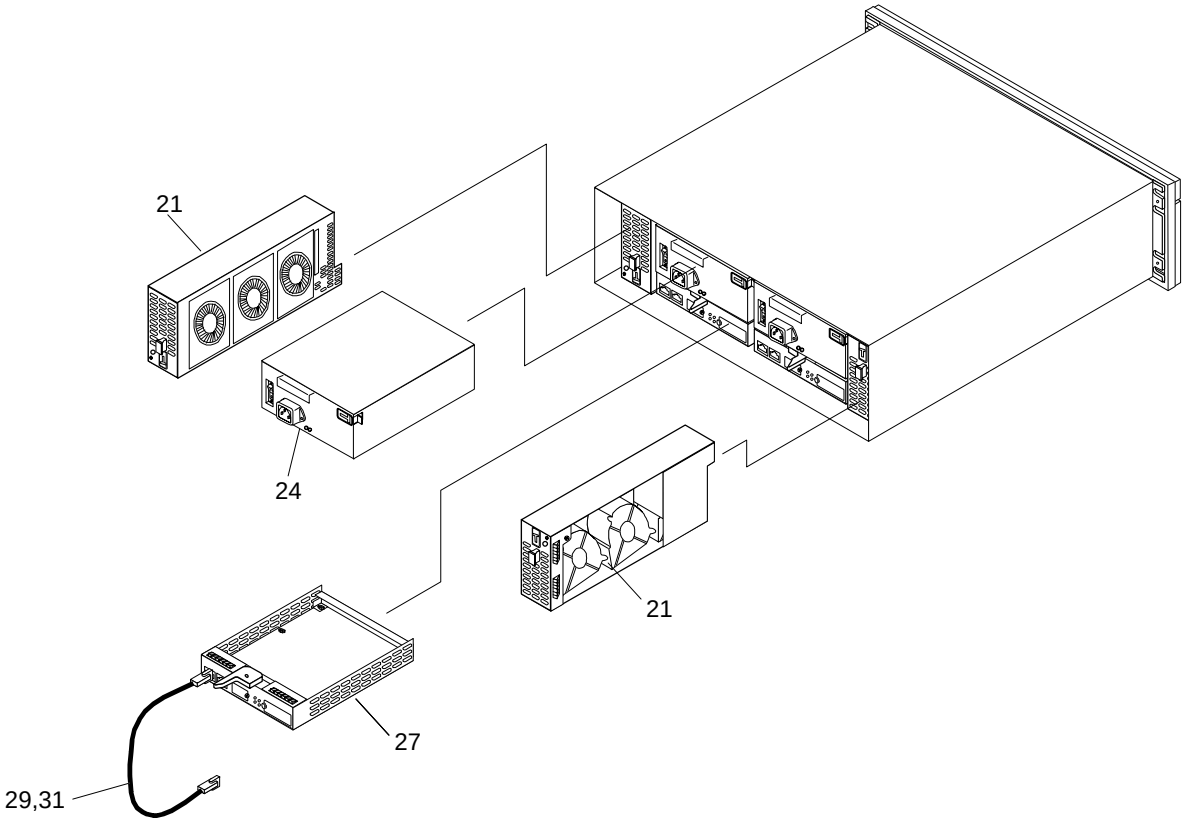


No.1-4 RKA (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-3-		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				

Copyright © 2002, 2005, Hitachi, Ltd.

No. 1-4 DF600-RKA



No.1-4 RKA (3)

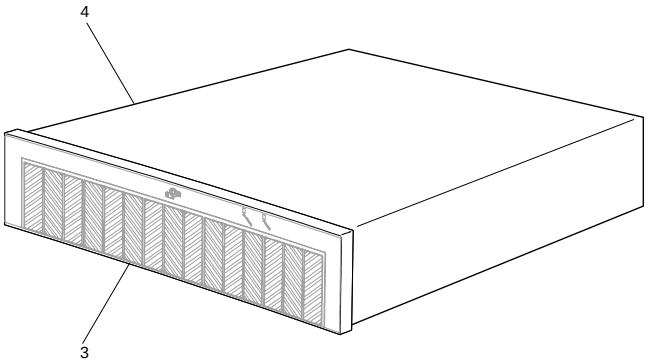
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-4-		DF600-RKA		
21	5507353-14	• FAN ASSEMBLY	2	
22				
23				
24	5507353-7	• POWER UNIT (RKA)	2	SP
25				
26				
27	5507353-12	• ENC UNIT (DF-F600-Y1H)	2	SP
28				
29	5507353-15	• ENC CABLE (0.5 m) (*1)	2	SP
30				
31	5507353-55	• ENC CABLE (5 m) (DF-F600-K5B) (*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.

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-5 DF600-RKAAT

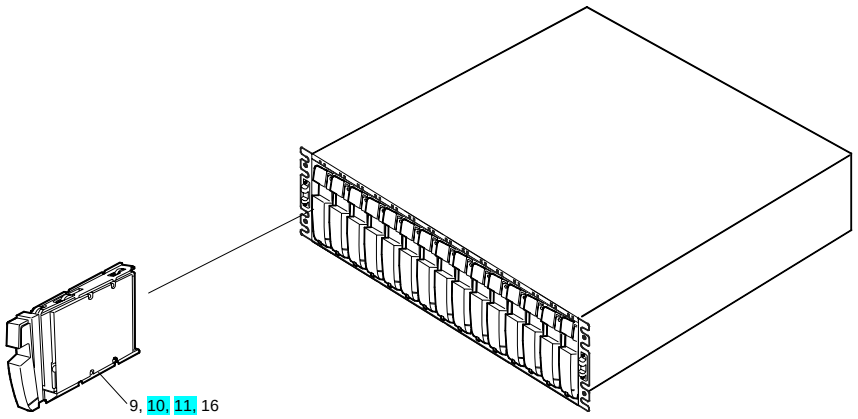


No.1-5 RKAAT (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF600-RKAAT		
1				
2				
3	5507353-176	• FRONT BEZEL	1	
4	5507353-72	• EXCHANGE CHASSIS	1	

Copyright © 2004, 2005, Hitachi, Ltd.

No. 1-5 DF600-RKAAT

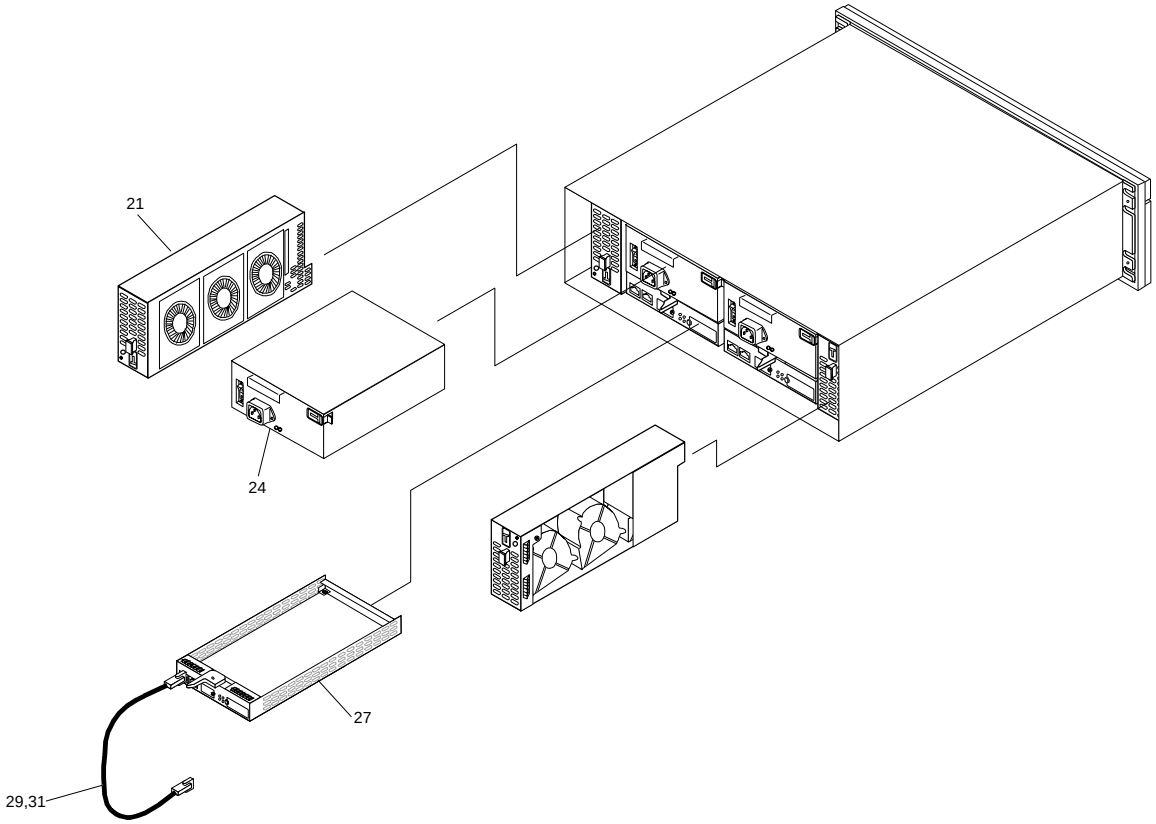


No.1-5 RKAAT (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF600-RKAAT		
5				
6				
7				
8				
9	5507353-69	CANISTER UNIT (DF-F600-ATE250)	2 to 15	SP, OP
10	3272215-A	CANISTER UNIT (DF-F600-ATE250R)	2 to 15	SP, OP
11	3272215-B	CANISTER UNIT (DF-F600-ATE400R)	2 to 15	SP, OP
12				
13				
14				
15				
16	3256813-E	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

Copyright © 2005, Hitachi, Ltd.

No. 1-5 DF600-RKAAT



No.1-5 RKAAT (3)

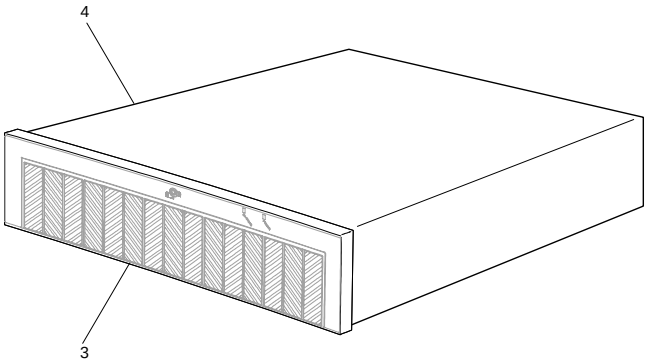
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-5-		DF600-RKAAT		
21	5507353-14	• FAN ASSEMBLY	2	
22				
23				
24	5507353-73	• POWER UNIT (RKAAT)	2	SP
25				
26				
27	5507353-67	• SENC UNIT	2	SP
28				
29	5507353-20	• ENC CABLE (0.75 m) (*1)	2	SP
30				
31	5507353-55	• ENC CABLE (5 m) (DF-F600-K5B) (*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.

Copyright © 2005, Hitachi, Ltd.

No. 1-6 DF600-RKAATL

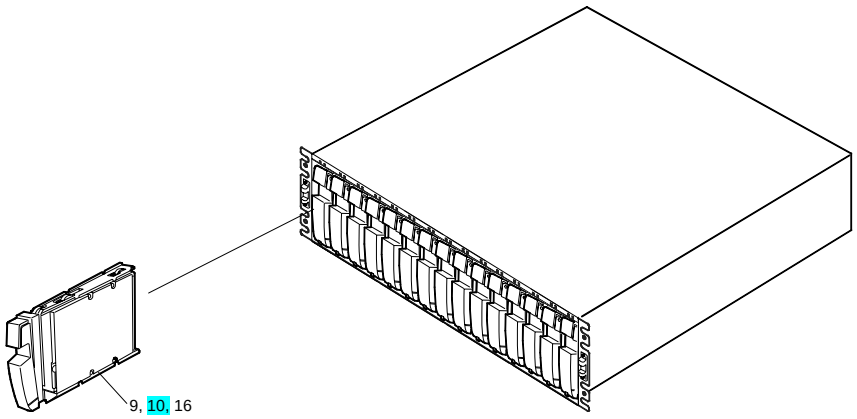


No.1-6 RKAATL (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF600-RKAATL		
1				
2				
3	5507353-176	• FRONT BEZEL	1	
4	5507353-72	• EXCHANGE CHASSIS	1	

Copyright © 2005, Hitachi, Ltd.

No. 1-6 DF600-RKAATL

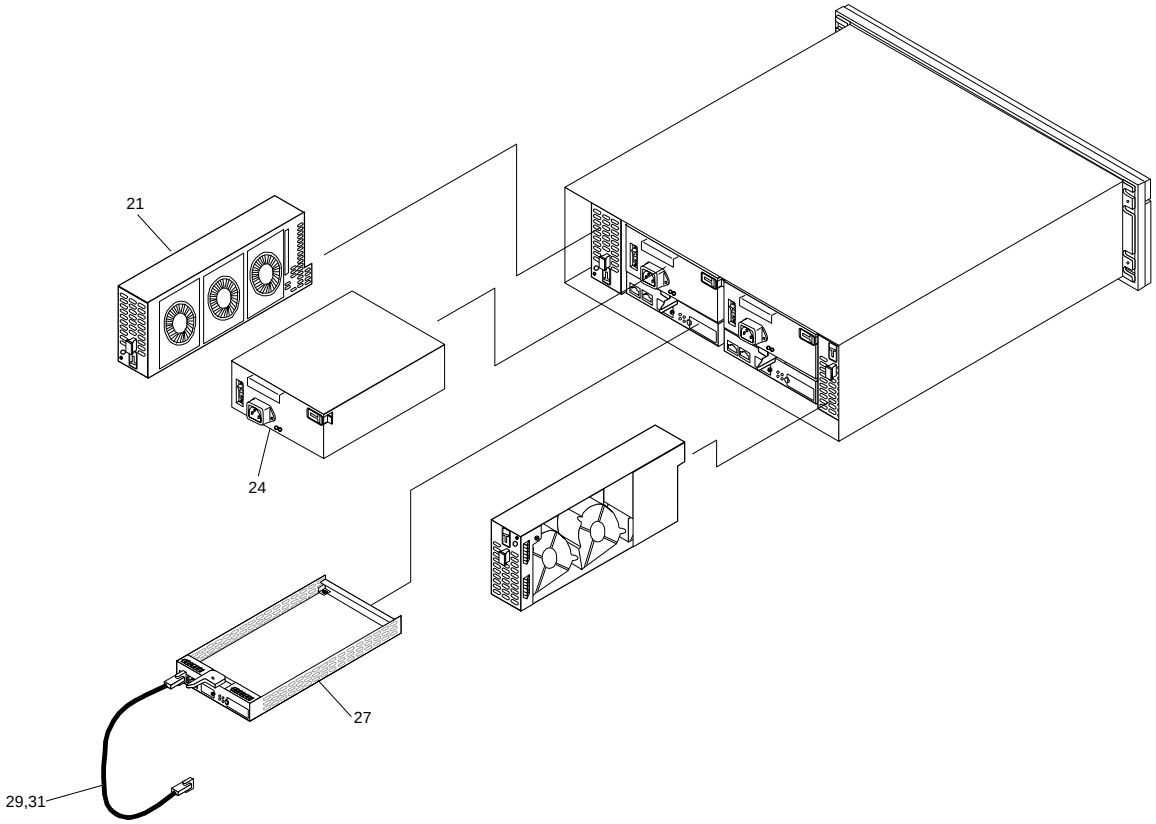


No.1-6 RKAATL (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF600-RKAATL		
5				
6				
7				
8				
9	5507353-77	CANISTER UNIT (DF-F600-ATE250L)	2 to 15	SP, OP
10	3272215-C	CANISTER UNIT (DF-F600-ATE250LR)	2 to 15	SP, OP
11	3272215-D	CANISTER UNIT (DF-F600-ATE400LR)	2 to 15	SP, OP
12				
13				
14				
15				
16	3256813-E	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

Copyright © 2005, Hitachi, Ltd.

No. 1-6 DF600-RKAATL



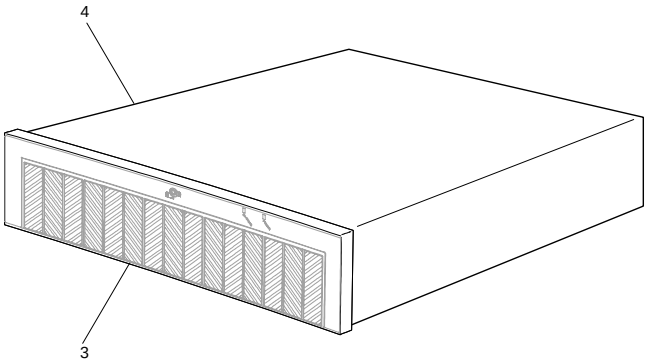
No.1-6 RKAATL (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-6-		DF600-RKAATL		
21	5507353-14	• FAN ASSEMBLY	2	
22				
23				
24	5507353-73	• POWER UNIT (RKAATL)	2	SP
25				
26				
27	5507353-67	• SENC UNIT	2	SP
28				
29	5507353-20	• ENC CABLE (0.75 m) (*1)	2	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.

Copyright © 2005, Hitachi, Ltd.

No. 1-7 DF600-RKAJAT

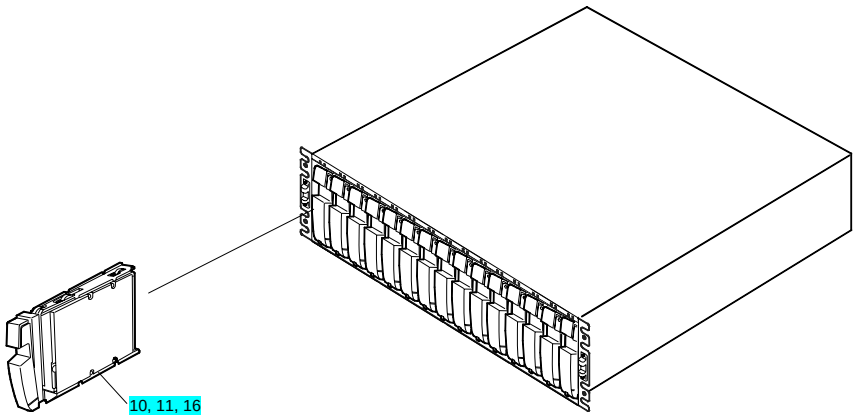


No.1-7 RKAJAT (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKAJAT		
1				
2				
3	5507353-176	• FRONT BEZEL	1	
4	5523443-D	• EXCHANGE CHASSIS	1	

Copyright © 2005, Hitachi, Ltd.

No. 1-7 DF600-RKAJAT

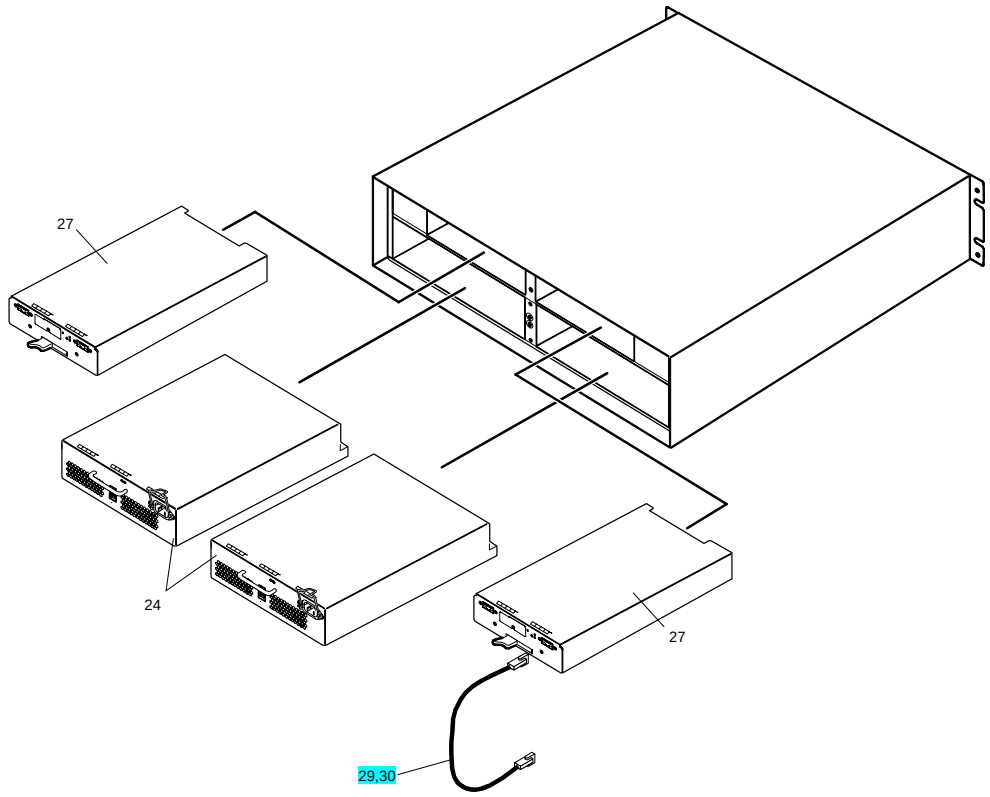


No.1-7 RKAJAT (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKAJAT		
5				
6				
7				
8				
9				
10	3272215-A	CANISTER UNIT (DF-F600-ATE250R)	2 to 15	SP, OP
11	3272215-B	CANISTER UNIT (DF-F600-ATE400R)	2 to 15	SP, OP
12				
13				
14				
15				
16	3256813-E	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

Copyright © 2005, Hitachi, Ltd.

No. 1-7 DF600-RKAJAT



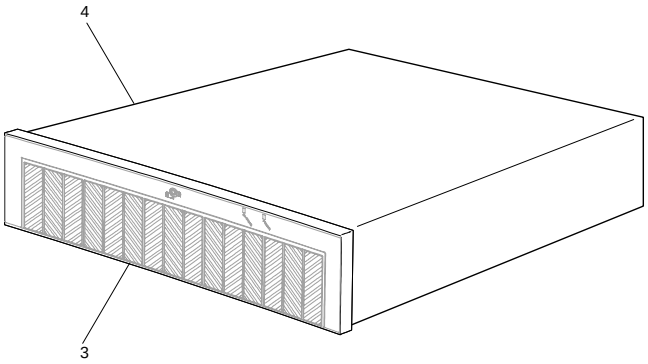
No.1-7 RKAJAT (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-7-		DF600-RKAJAT		
21				
22				
23				
24	3272170-A	• POWER UNIT (RKAJAT)	2	SP
25				
26				
27	3272170-C	• SENC UNIT	2	SP
28				
29	3272185-A	• ENC CABLE (1 m)	2	SP
30	5507353-55	• ENC CABLE (5 m) (DF-F600-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.

Copyright © 2005, Hitachi, Ltd.

No. 1-8 DF600-RKAJATL

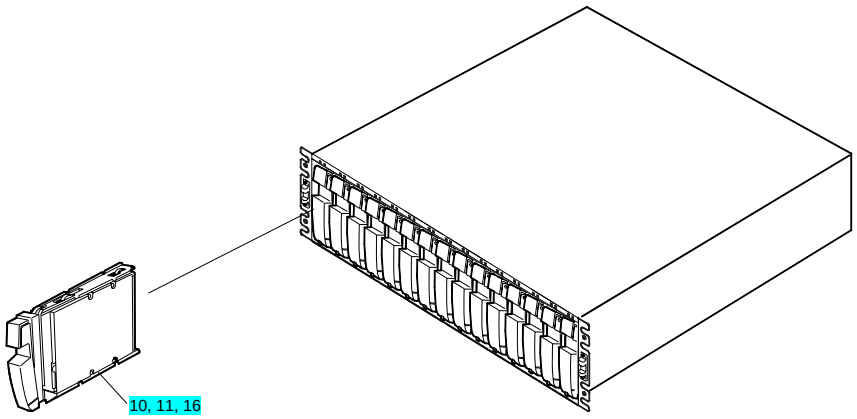


No.1-8 RKAJATL (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-8-		DF600-RKAJATL		
1				
2				
3	5507353-176	• FRONT BEZEL	1	
4	5523231-34	• EXCHANGE CHASSIS	1	

Copyright © 2005, Hitachi, Ltd.

No. 1-8 DF600-RKAJATL

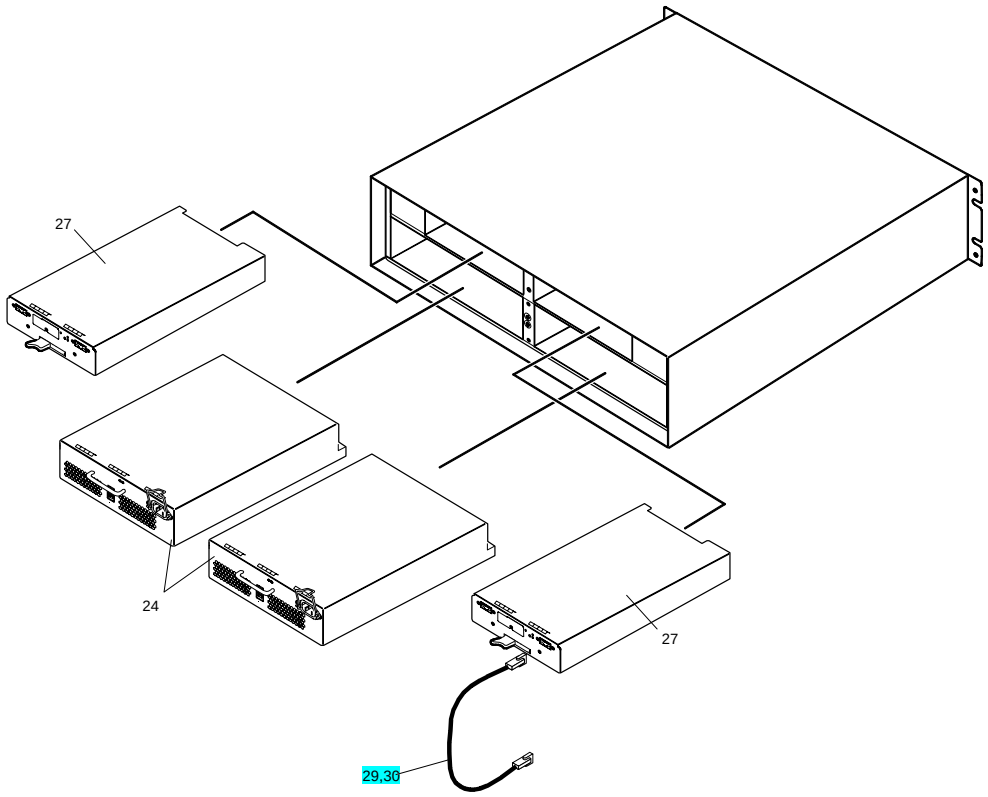


No.1-8 RKAJATL (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-8-		DF600-RKAJATL		
5				
6				
7				
8				
9				
10	3272215-C	CANISTER UNIT (DF-F600-ATE250LR)	2 to 15	SP, OP
11	3272215-D	CANISTER UNIT (DF-F600-ATE400LR)	2 to 15	SP, OP
12				
13				
14				
15				
16	3256813-E	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

Copyright © 2005, Hitachi, Ltd.

No. 1-8 DF600-RKAJATL



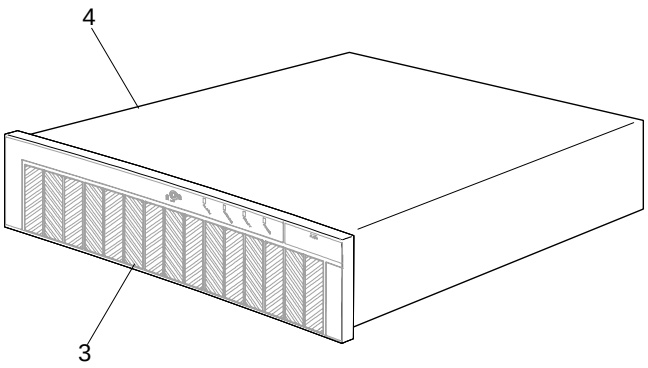
No.1-8 RKAJATL (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-8-		DF600-RKAJATL		
21				
22				
23				
24	3272170-A	• POWER UNIT (RKAJATL)	2	SP
25				
26				
27	3272170-C	• SENC UNIT	2	SP
28				
29	3272185-A	• ENC CABLE (1 m)	2	SP
30	5507353-55	• ENC CABLE (5 m) (DF-F600-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.

Copyright © 2005, Hitachi, Ltd.

No. 1-9 DF600-RKD/RKSD

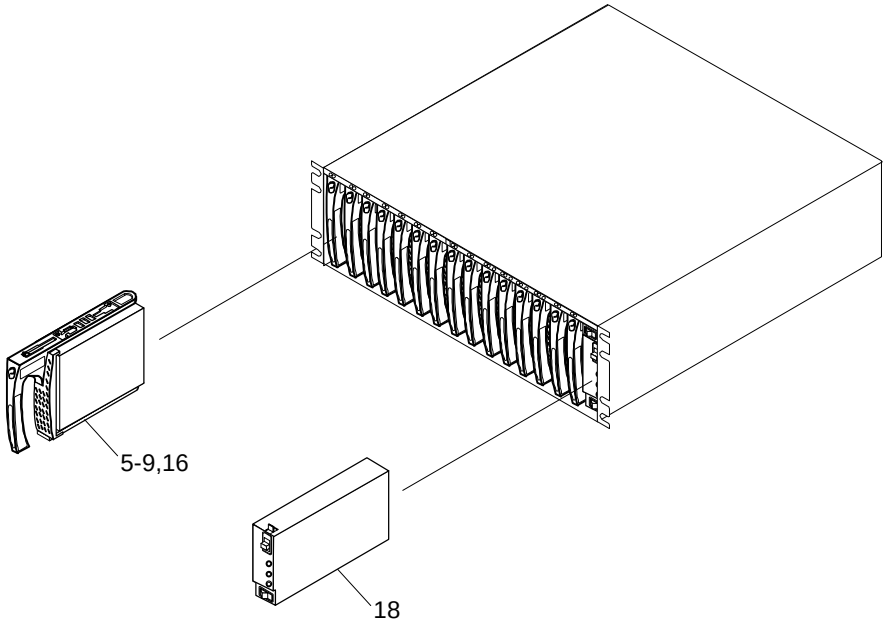


No.1-9 RKD/RKSD (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-9-		DF600-RKD / DF600-RKSD		
1				
2				
3	5507353-130	• FRONT BEZEL	1	
4	5507353-35	• EXCHANGE CHASSIS	1	

Copyright © 2005, Hitachi, Ltd.

No. 1-9 DF600-RKD/RKSD



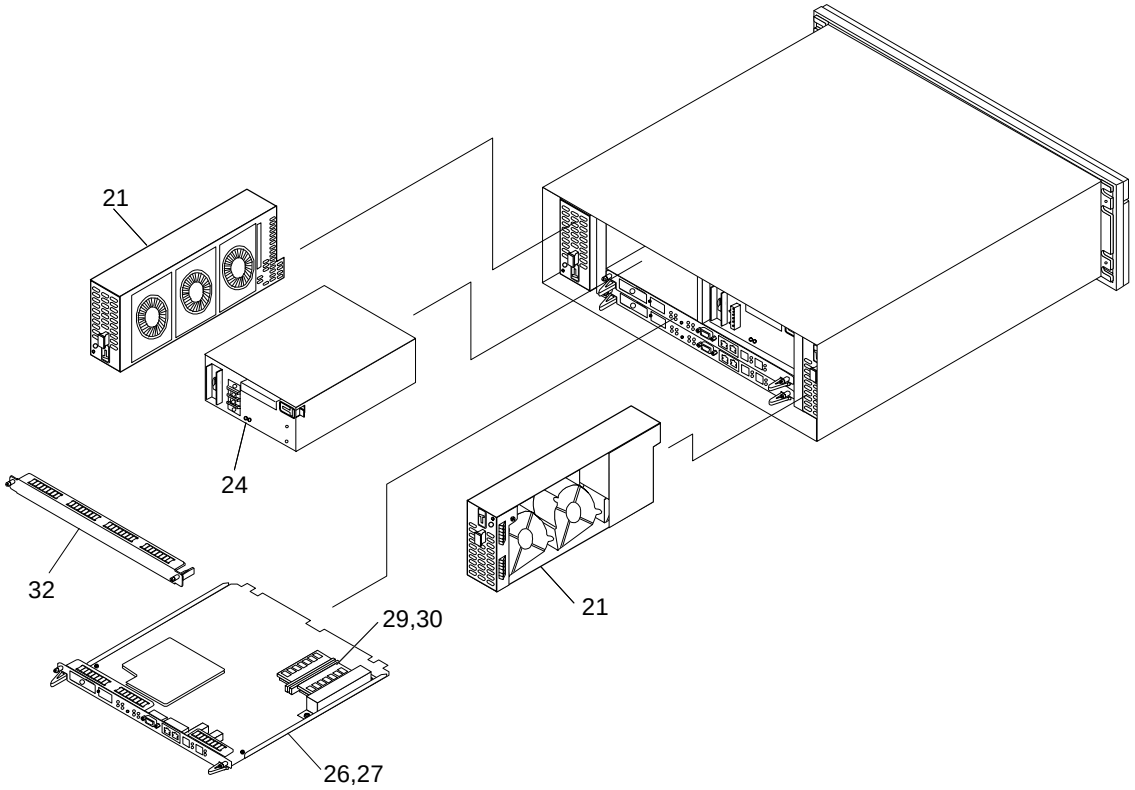
No.1-9 RKD/RKSD (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-9-		DF600-RKD / DF600-RKSD		
5	5507353-1	CANISTER UNIT (DF-F600-AEH36)	2 to 14	SP, OP
6	5507353-2	CANISTER UNIT (DF-F600-AEF72)	2 to 14	SP, OP
7	5507353-3	CANISTER UNIT (DF-F600-AEH72)	2 to 14	SP, OP(*1)
8	5507353-4	CANISTER UNIT (DF-F600-AEF146)	2 to 14	SP, OP(*1)
9	5507353-79	CANISTER UNIT (DF-F600-AEF300)	2 to 14	SP, OP
10				
11				
12				
13				
14				
15				
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 12	
17				
18	5507353-13	• BACKUP BATTERY UNIT	1	SP
19				
20				

*1 : RKSD is not support.

Copyright © 2005, Hitachi, Ltd.

No. 1-9 DF600-RKD/RKSD

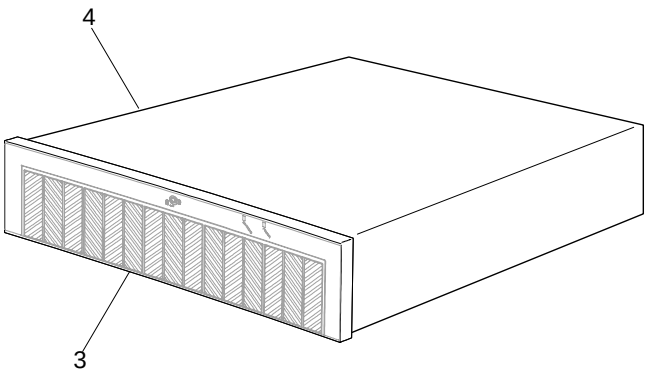


No.1-9 RKD/RKSD (3)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-9-		DF600-RKD / DF600-RKSD		
21	5507353-14	• FAN ASSEMBLY	2	
22				
23				
24	5507353-61	• POWER UNIT (DC)	2	SP
25				
26	5507353-10	• CONTROL UNIT	1 to 2	SP, OP
27	5507353-51	• CONTROL UNIT	1 to 2	SP, OP
28				
29	5507353-8	•• CACHE UNIT (DF-F600-C512X2)	1 to 4	SP, OP
30	5507353-9	•• CACHE UNIT (DF-F600-C1GX2)	1 to 4	SP, OP
31				
32	3266277-A	• DUMMY (CONTROL UNIT)	0 to 1	
33				
34				
35				

Copyright © 2005, Hitachi, Ltd.

No. 1-10 DF600-RKAD

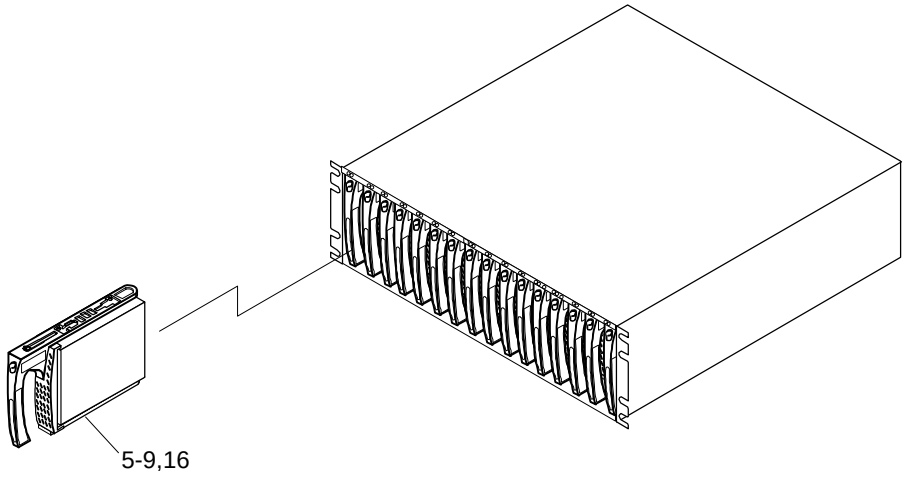


No.1-10 RKAD (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-10-		DF600-RKAD		
1				
2				
3	5507353-134	• FRONT BEZEL	1	
4	5507353-36	• EXCHANGE CHASSIS	1	

Copyright © 2005, Hitachi, Ltd.

No. 1-10 DF600-RKAD

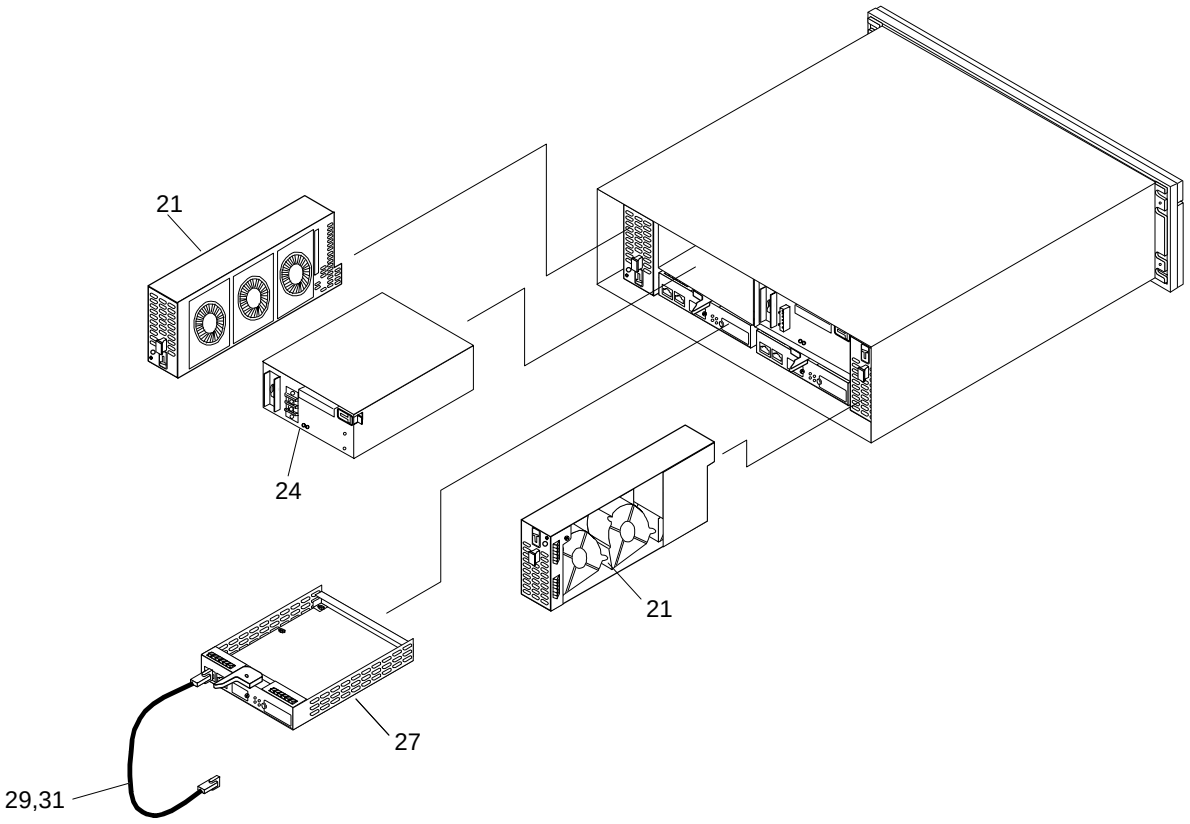


No.1-10 RKAD (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-10-		DF600-RKAD		
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	5507353-79	CANISTER UNIT (DF-F600-AEF300)	2 to 15	SP, OP
10				
11				
12				
13				
14				
15				
16	2105109-A	• DUMMY (DISK DRIVE)	0 to 13	
17				
18				
19				
20				

Copyright © 2005, Hitachi, Ltd.

No. 1-10 DF600-RKAD



No.1-10 RKAD (3)

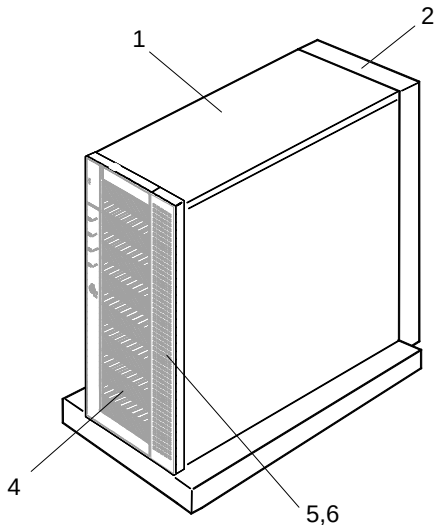
No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
1-10-		DF600-RKAD		
21	5507353-14	• FAN ASSEMBLY	2	
22				
23				
24	5507353-61	• POWER UNIT (DC)	2	SP
25				
26				
27	5507353-12	• ENC UNIT (DF-F600-Y1H)	2	SP
28				
29	5507353-15	• ENC CABLE (0.5 m) (*1)	2	SP
30				
31	5507353-24	• ENC CABLE (5 m) (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 one place in the system.

Copyright © 2005, Hitachi, Ltd.

No. 2-1 Floor (RK+H1H) Model

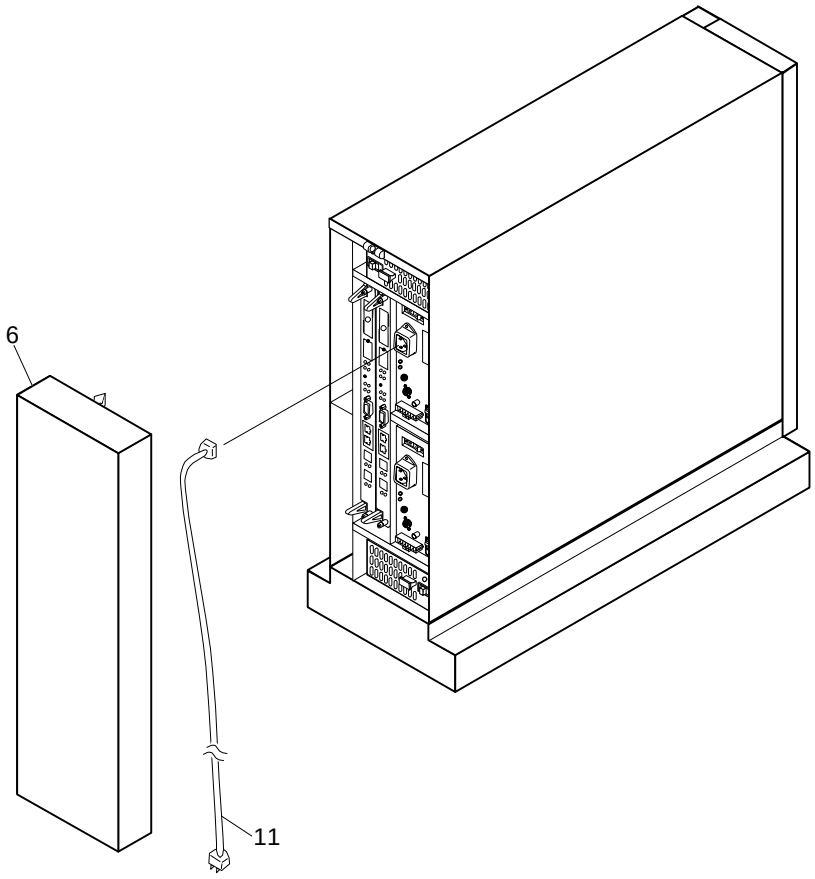


No.2-1 Floor (RK+H1H) Model (1)

No.	PART NUMBER		NAME OF PART	UNIT PER ASSY	REMARK
2-1-			Floor (RK+H1H) model		Catalog No.2-1
1	5507353-126		FLOOR STAND KIT	1	
2	3266241-A	•	REAR COVER	1	
3					
4			DF600-RK	1	Catalog No.1-1
5	3266232-A		OPTION BEZEL	1	
6	3266231-A		OPTION TRAY	1	

Copyright © 2005, Hitachi, Ltd.

No. 2-1 Floor (RK+H1H) Model

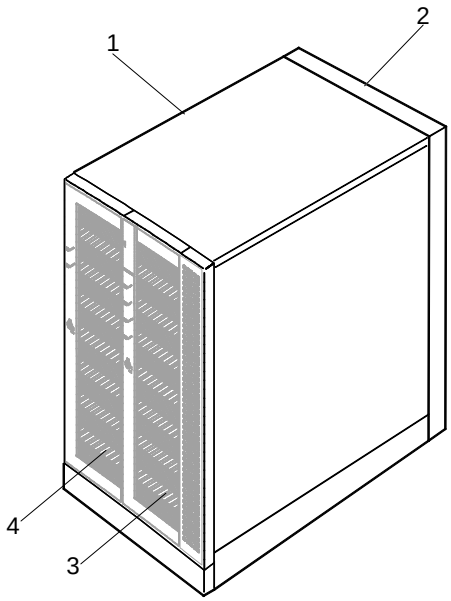


No.2-1 Floor (RK+H1H) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-1-		Floor (RK+H1H) Model		
6	3266241-A	• REAR COVER	1	
7				
8				
9				
10				
11	5507353-16	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

Copyright © 2005, Hitachi, Ltd.

No. 2-2 Floor (RK+RKA+H2H) Model

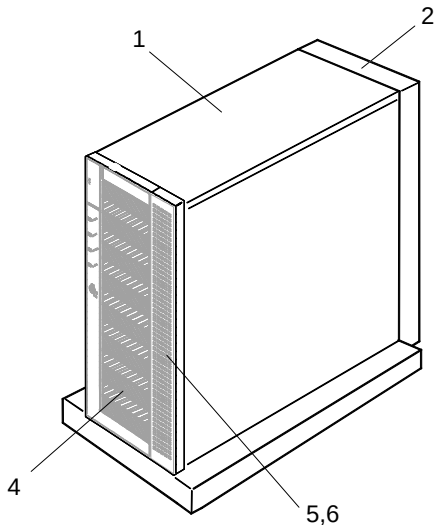


No.2-2 Floor (RK+RKA+H2H) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-2-		Floor (RK+RKA+H2H) Model		
1	5507353-127	FLOOR STAND KIT	1	
2	3266234-A	REAR COVER	1	
3		DF600-RK	1	Catalog No.1-1
4		DF600-RKA	1	Catalog No.1-2

Copyright © 2005, Hitachi, Ltd.

No. 2-3 Floor (RKS+H1H) Model

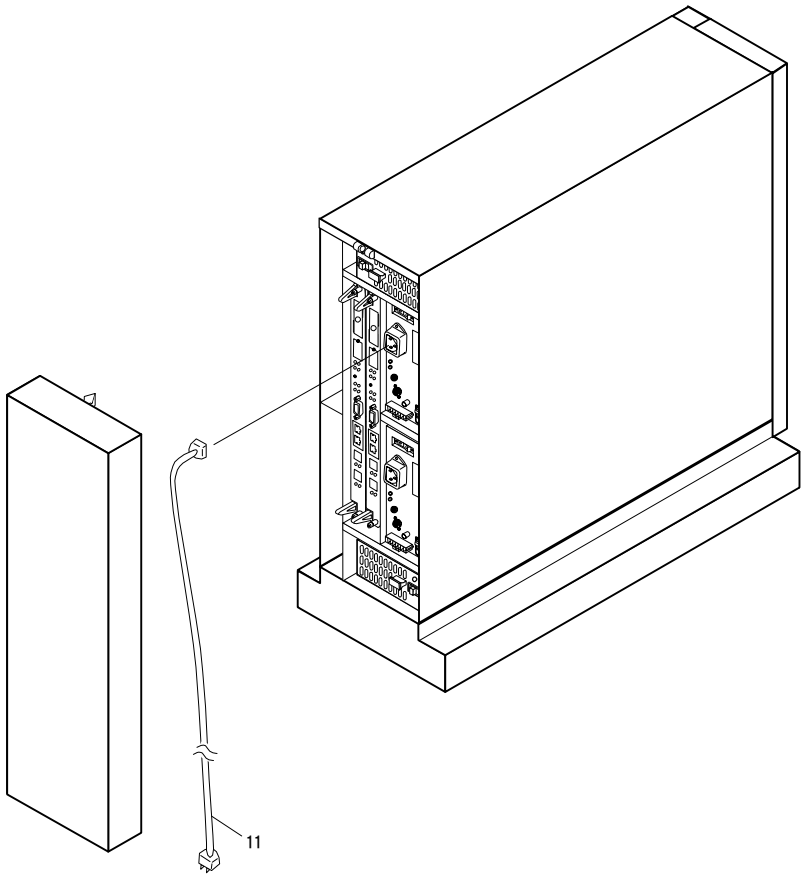


No.2-3 Floor (RKS+H1H) Model (3)

No.	PART NUMBER		NAME OF PART	UNIT PER ASSY	REMARK
2-3-			Floor (RKS+H1H) model		Catalog No.1-1
1	5507353-126		FLOOR STAND KIT	1	
2	3266241-A	•	REAR COVER	1	
3					
4			DF600-RKS	1	Catalog No.1-1
5	3266232-A		OPTION BEZEL	1	
6	3266231-A		OPTION TRAY	1	

Copyright © 2005, Hitachi, Ltd.

No. 2-3 Floor (RKS+H1H) Model

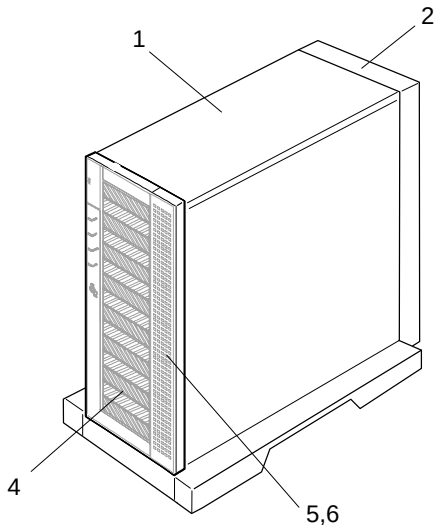


No.2-3 Floor (RKS+H1H) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-3-		Floor (RKS+H1H) Model		
7				
8				
9				
10				
11	5507353-16	• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

Copyright © 2005, Hitachi, Ltd.

No. 2-4 Floor (RKD+H1HD) Model

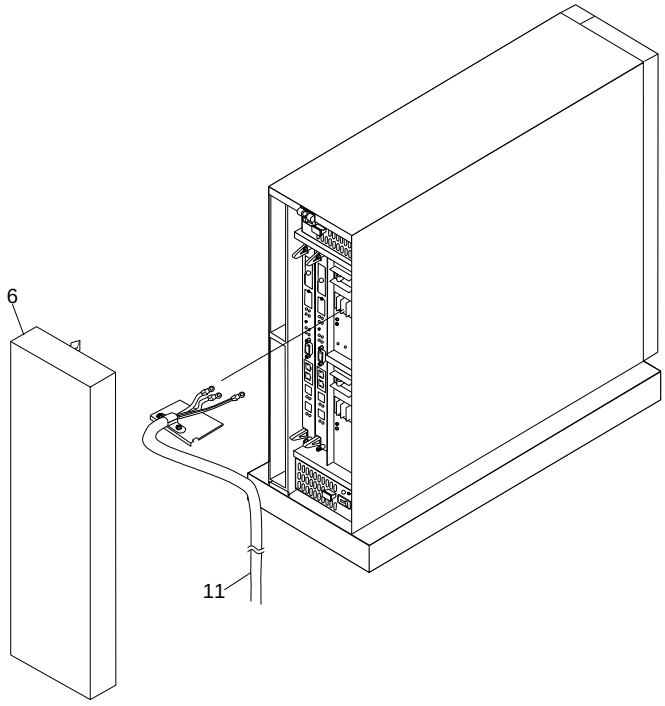


No.2-4 Floor (RKD+H1HD) Model (1)

No.	PART NUMBER		NAME OF PART	UNIT PER ASSY	REMARK
2-4-			Floor (RKD+H1HD) model		Catalog No.2-1
1	5507353-126		FLOOR STAND KIT	1	
2	3266241-B	•	REAR COVER	1	
3					
4			DF600-RKD	1	Catalog No.1-3
5	3266232-A		OPTION BEZEL	1	
6	3266231-A		OPTION TRAY	1	

Copyright © 2005, Hitachi, Ltd.

No. 2-4 Floor (RKD+H1HD) Model

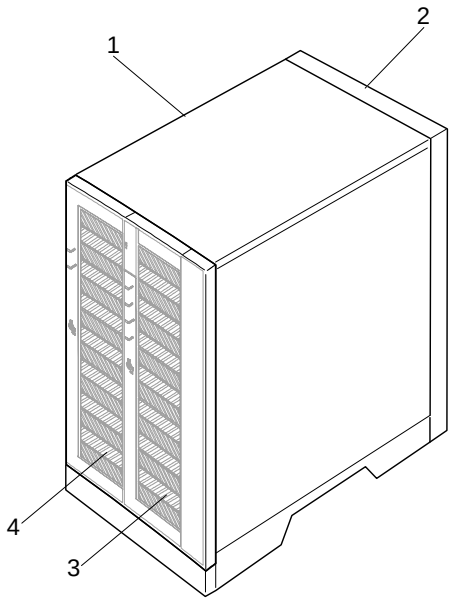


No.2-4 Floor (RKD+H1HD) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-4-		Floor (RKD+H1HD) Model		
6	3266241-B	• REAR COVER	1	
7				
8				
9				
10				
11		• POWER CABLE (J1H)	2	SP
12				
13				
14				
15				

Copyright © 2005, Hitachi, Ltd.

No. 2-5 Floor (RKD+RKAD+H2HD) model

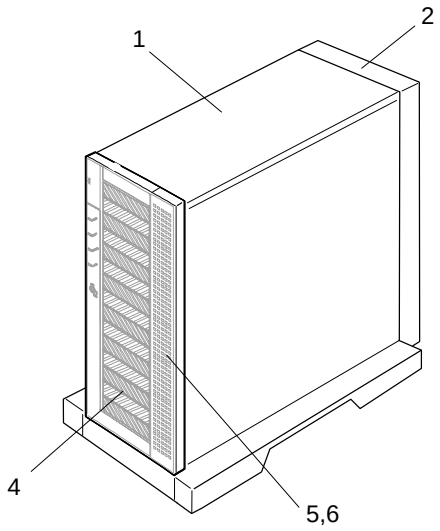


No.2-5 Floor (RKD+RKAD+H2HD) model (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-5-		Floor (RKD+RKAD+H2HD) model		
1	5507353-127	FLOOR STAND KIT	1	
2	3266234-B	REAR COVER	1	
3		DF600-RKD	1	Catalog No.1-3
4		DF600-RKAD	1	Catalog No.1-4

Copyright © 2005, Hitachi, Ltd.

No. 2-6 Floor (RKSD+H1HD) Model

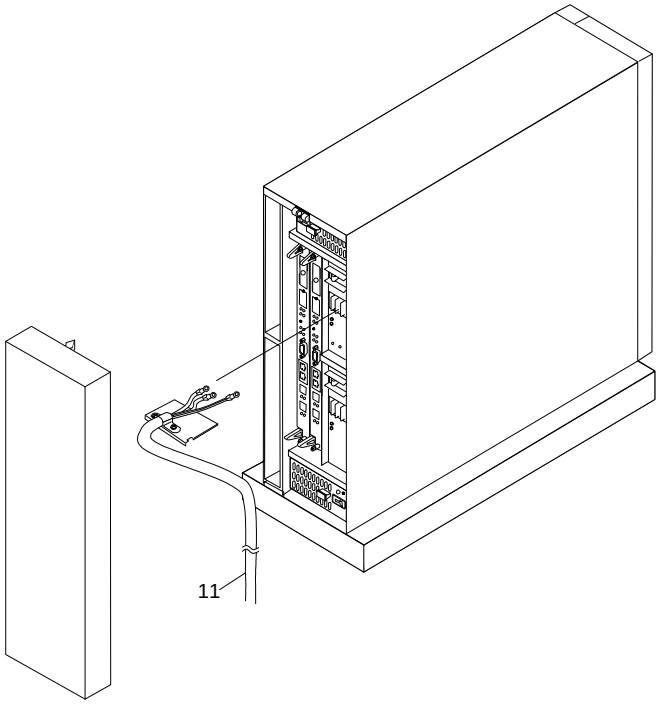


No.2-6 Floor (RKSD+H1HD) Model (3)

No.	PART NUMBER		NAME OF PART	UNIT PER ASSY	REMARK
2-6-			Floor (RKSD+H1HD) model		Catalog No.1-3
1	5507353-126		FLOOR STAND KIT	1	
2	3266241-B	•	REAR COVER	1	
3					
4			DF600-RKSD	1	Catalog No.1-3
5	3266232-A		OPTION BEZEL	1	
6	3266231-A		OPTION TRAY	1	

Copyright © 2005, Hitachi, Ltd.

No. 2-6 Floor (RKSD+H1HD) Model

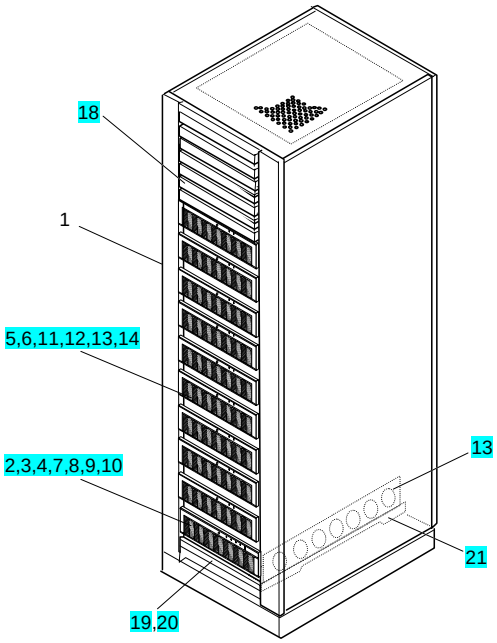


No.2-6 Floor (RKSD+H1HD) Model (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
2-6-		Floor (RKSD+H1HD) Model		
7				
8				
9				
10				
11		• POWER CABLE	2	SP
12				
13				
14				
15				

Copyright © 2005, Hitachi, Ltd.

No. 3-1 Rackmount Model with U6 Rack Frame

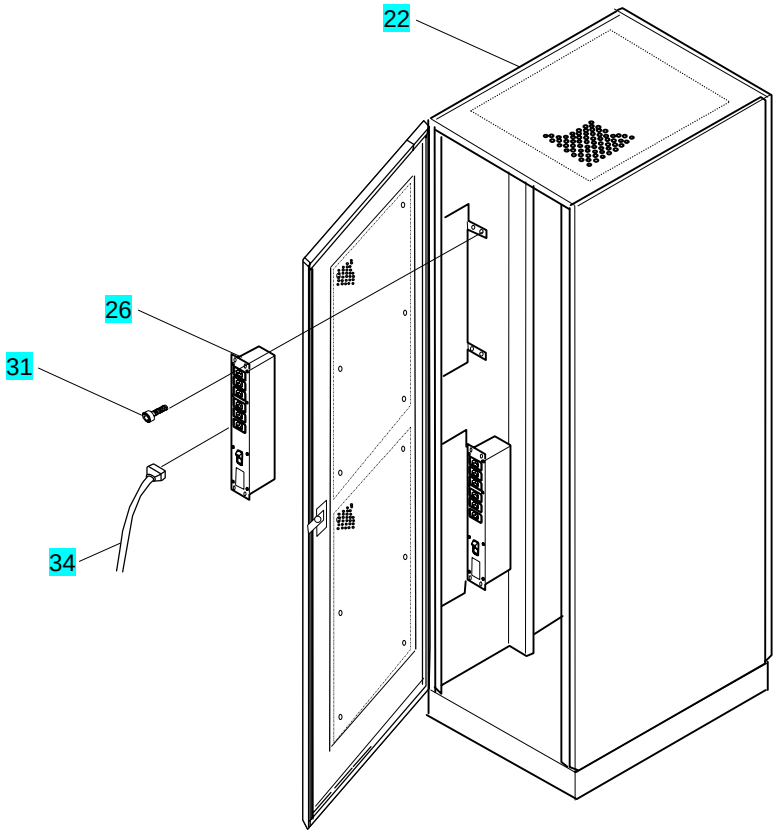


No.3-1 Rackmount Model with U6 Rack Frame (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-1-		U6 RACK FRAME		
1		DF-F600-U6	1	OP
2		DF600-RK	1 to 6	Catalog No.1-1
3		DF600-RKD	1 to 6	Catalog No.1-9
4		DF600-RKL	1 to 6	Catalog No.1-2
5		DF600-RKA	0 to 11	Catalog No.1-4
6		DF600-RKAD	0 to 11	Catalog No.1-10
7		DF600-RKS	1 to 6	Catalog No.1-1
8		DF600-RKSD	1 to 6	Catalog No.1-9
9		DF600-RKH	1 to 6	Catalog No.1-3
10		DF600-RKHE	1 to 6	Catalog No.1-3
11		DF600-RKAAT	0 to 11	Catalog No.1-5
12		DF600-RKAATL	0 to 3	Catalog No.1-6
13		DF600-RKAJAT	0 to 11	Catalog No.1-7
14		DF600-RKAJATL	0 to 3	Catalog No.1-8
15				
16				
17	5507067-28	RAIL KIT (DF-F600-URHT5)	1-10	OP
18	5507087-27	DECORATION PANEL (DF-F600-U10D) (1U)	0 to 34	OP
19	3266232-A	OPTION BEZEL	1	
20	3266231-A	OPTION TRAY	1	
21	2106509-A	BATTERY RAIL	1	

Copyright © 2005, Hitachi, Ltd.

No. 3-1 Rackmount Model With U6 Rack Frame

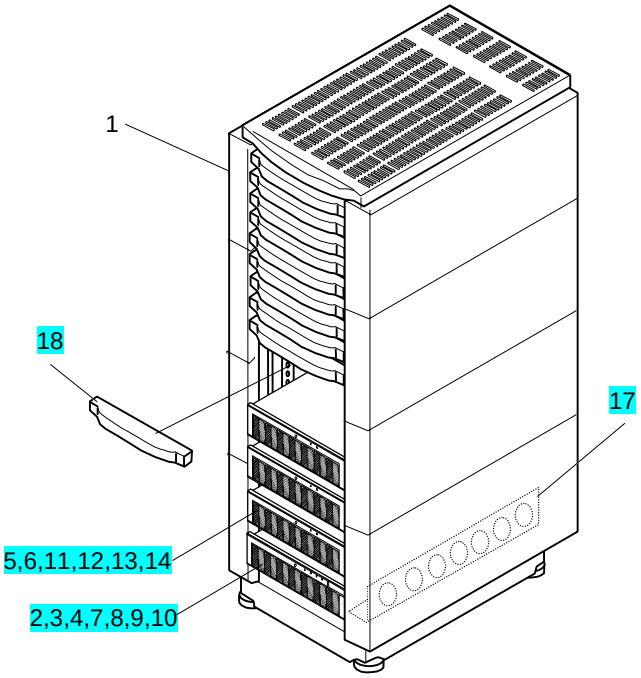


No.3-1 Rackmount Model with U6 Rack Frame (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-1-		DF-F600-U6		
22		FINAL ASSY (U6)	1	
23				
24				
25				
26	5507067-15	• PDB	4	SP
27				
28				
29				
30				
31		• HEXAGON SOCKET BOLT (M5x8)	16	
32				
33				
34	5507067-30	• POWER CABLE	4	

Copyright © 2005, Hitachi, Ltd.

No. 3-2 Rackmount Model With U4J Rack Frame

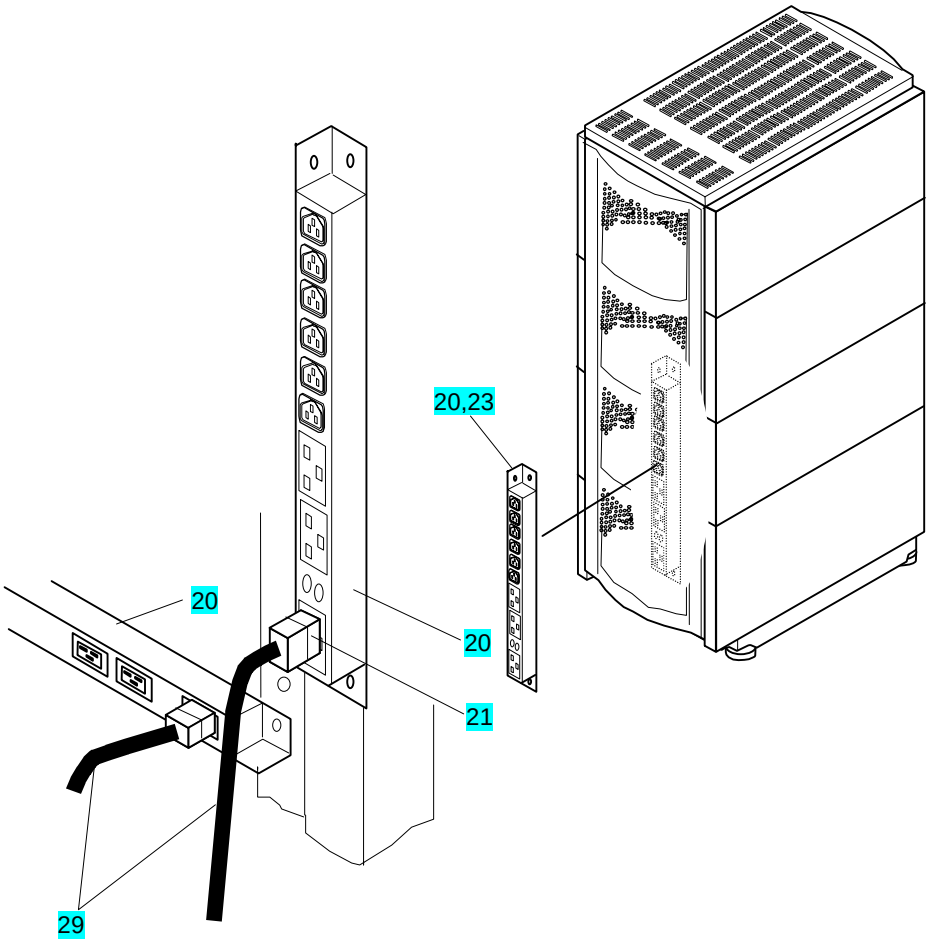


No.3-2 Rackmount Model with U4 Rack Frame (1)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-2-		U4 RACK FRAME		
1		DF-F600-U4	1	OP
2		DF600-RK	1 to 5	Catalog No.1-1
3		DF600-RKD	1 to 5	Catalog No.1-9
4		DF600-RKL	1 to 5	Catalog No.1-2
5		DF600-RKA	0 to 9	Catalog No.1-4
6		DF600-RKAD	0 to 9	Catalog No.1-10
7		DF600-RKS	1 to 5	Catalog No.1-1
8		DF600-RKSD	1 to 5	Catalog No.1-9
9		DF600-RKH	1 to 5	Catalog No.1-3
10		DF600-RKHE	1 to 5	Catalog No.1-3
11		DF600-RKAAT	0 to 9	Catalog No.1-5
12		DF600-RKAATL	0 to 3	Catalog No.1-6
13		DF600-RKAJAT	0 to 9	Catalog No.1-7
14		DF600-RKAJATL	0 to 3	Catalog No.1-8
15				
16				
17	5507067-20	RAIL KIT (DF-F600-URHP5)	1 to 10	OP
18	5500750-14	FILLER PANEL	1 to 24	
19				

Copyright © 2005, Hitachi, Ltd.

No. 3-2 Rackmount Model With U4 Rack Frame



No.3-2 Rackmount Model with U4J Rack Frame (2)

No.	PART NUMBER	NAME OF PART	UNIT PER ASSY	REMARK
3-2-		DF-F600-U4J		
20	5500750-12	• PDU	2	SP
21		•• STRAIN RELIEF	2	
22				
23		PDU (DF-F600-UPDU)	0 to 2	OP
24				
25				
26				
27				
28				
29	5507067-30	• POWER CABLE	2	SP

Copyright © 2005, Hitachi, Ltd.

Chapter 9. Maintenance Tools

9.1 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	Set the local/remote mode and device ID
2	Phillips screwdriver	No.2	General use
3	Allen wrench	No.3	For installing floor stand kit
4	Allen wrench	No.4	For fastening of AC power cable.
5	Allen wrench	No.6	For opening/closing doors (of rack frame)
6	Spanner	No.13	For adjusting leveling bolt (of U4 rack frame)
7	Spanner	No.22	For adjusting leveling bolt (of U6 rack frame)
8	USB memory	-	For storing simple trace information
9	Slotted screwdriver	No.1	For Device ID Setting Switch (RKAJAT)

Copyright © 2002, 2005, Hitachi, Ltd.

9.2 Maintenance Tools for Software

Maintenance tool consists of Disk Array Management Program 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) Disk Array Management Program
Disk Array Management Program is operated on the terminal device (RC and WEB etc) connected through a LAN or RS232C 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 "Disk Array Management Program 2 (for GUI) User's Guide" or "Disk Array Management Program 3 (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 section 2.4.1 "Recovery measures (15) A loop failure occurred, however, the failed part cannot be located" (MNTE 02-1590).

Connection of maintenance tools for software is shown in Figure 9.2.1.

Copyright © 2002, 2005, Hitachi, Ltd.

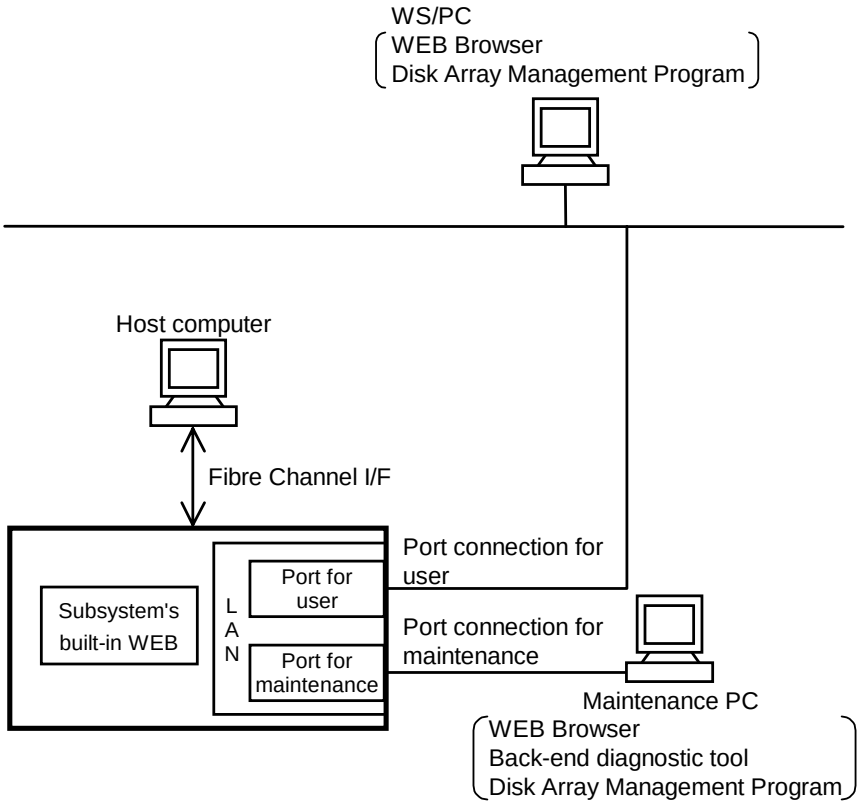


Figure 9.2.1 Connection of maintenance tool for software

Copyright © 2002, 2005, Hitachi, Ltd.

WEB

Chapter 1. Before Using WEB 01-0000
Chapter 2. The Normal Mode Operation Procedure 02-0000
Chapter 3. The Maintenance Mode Operation Procedure 03-0000

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 1. Before Using WEB

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 95, 98, NT 4.0, 2000, ME, XP, 2003 Solaris2.6, 8, AIRIX6.4	
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	• 50 Mbytes, under ordinary maintenance work • 480 Mbytes per one Controller, under memory dump collection(*1) {Storing temporary file of Browser : 240 M bytes Storing dumped memory : 240 M bytes}	Data compression tool is required for memory dumping.
*1 : Memory dump collection may be requested by the Technical Support Center at the time of a tough failure.			

Copyright © 2002, 2005, Hitachi, Ltd.

Table 1.1.2 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		System version : x65A	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×
					4.7	○	×
					4.76	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×
					4.76	○	×
			8	Netscape Navigator	4.76	○	×
2	PC	Windows	95	Internet Explorer	5.0	○	×
					5.5	○	×
					6.0	○	×
			98	Internet Explorer	5.0	○	○
					5.5	○	○
					6.0	○	○
			NT/2000	Internet Explorer	5.0	○	×
					5.5	○	○
					6.0	○	○
			ME	Internet Explorer	5.0	×	×
					5.5	○	○
					6.0	○	○
			XP	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	○
			2003 (IA64)	Internet Explorer	5.0	×	×
					5.5	×	×
					6.0	○	×
					6.0 (32 Bit)	○	○
		Windows	95	Netscape Navigator	4.7	×	×
					4.73	×	×
					4.74	×	×
					4.75	×	×
					4.76	×	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×
			98	Netscape Navigator	4.7	○	×
					4.73	○	×
					4.74	○	×
					4.75	○	×
					4.76	○	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version : x65A	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	ME/NT/ 2000/XP	Netscape Navigator	4.7	○	×
					4.73	○	×
					4.74	○	×
					4.75	○	×
					4.76	○	×
					6.0	×	×
					6.1	×	×
					6.2	○	×
					7.0	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×
					4.73	×	×
					4.74	×	×
					4.75	×	×
					4.76	×	×
					6.0	×	×
					6.1	×	×
					6.2	×	×
					7.0	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

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 Windows2003 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.

Copyright © 2002, 2005, Hitachi, Ltd.

- 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.
- In the case of using Netscape 6.2
  Select the “Edition”, “Setting”, “Details”, and “Cache” in this order.
  If a setup of [comparison of the page in cash and the page on a network] has become [whenever it accesses a page], the re-display of a screen will take time.
- 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.

Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

1.2 The Characteristic of the Network Function

- LAN interface
  The connector for 10Base-T/100Base-TX is equipped with the Controller. 10Base-T/100Base-TX is selected automatic.
- Network parameter
  DF600 has the following network parameters and they can be set or changed by Web Browser or Disk Array Management Program concerning only the Port 1 (for users) of each Controller.

Network parameter	Description	Values set when shipped from the factory				Remark
		Control Unit#0		Control Unit#1		
		Port 0 (Maintenance) < Fixed IP >	Port 1 (Users) <Variable IP>	Port 0 (Maintenance) < Fixed IP >	Port 1 (Users) <Variable IP>	
IP Address	The IP Address is changed/set up.	10.0.0.16	192.168.0.16	10.0.0.17	192.168.0.16	(*1)
Subnet Mask	The Subnet Mask is changed/set up.	255.0.0.0 /255.255.255 .224(*3)	255.255.255.0	255.0.0.0 /255.255.255 .224(*3)	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”. (Disk Array Management Program 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 this device is used as an external Disk Drive of the DHCP server and the device IP address is obtained by DHCP function, and if the IP address of “10.x.x.x” is assigned to the device, IP addresses of Ports for Users and Maintenance may conflict with each other and the device may not function normally.
Request the system administrator that the DHCP server does not assign IP address of “10.x.x.x” to the device..

*3 : Micro revision is 0653/C or later.

Copyright © 2002, 2005, Hitachi, Ltd.

- Automatic change of network parameters of the Port 0 (for maintenance)
  Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
  When the network address of the Port 1 (for users) is set as "10.*.*.*", that of the Port 0 (for maintenance) is changed as shown below.

NOTE : However, if the network address of the LAN device connected to Port 1 (Users) via the Gateway accords with that of Port 0 (Maintenance), they will collide each other, disabling to communicate normally.
Microprogram revision 0653/B or earlier
(1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.*.*.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "10.*.*.*".
(2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "192.168.0.*".
Microprogram revision 0653/C or later
(1) When the Port 1(Users) address is set to other than "10.*.*.*", "10.0.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "10.0.0.(0 to 31)".
(2) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a Gateway. Therefore, set the IP address to other than "192.168.0.(0 to 31)".

Network parameter	Control Unit#0 Port 0 (Maintenance) < Fixed IP >	Control Unit#1 Port 0 (Maintenance) < Fixed IP >
IP Address	192.168.0.16	192.168.0.17
Subnet Mask	255.255.255.0/ 255.255.255.224(*3)	255.255.255.0/ 255.255.255.224(*3)
Default Gateway	0.0.0.0	0.0.0.0
DHCP	OFF	OFF
*1 : Micro revision is 0653/C or later.		

Copyright © 2002, 2005, Hitachi, Ltd.

Chapter 2. The Normal Mode Operation Procedure

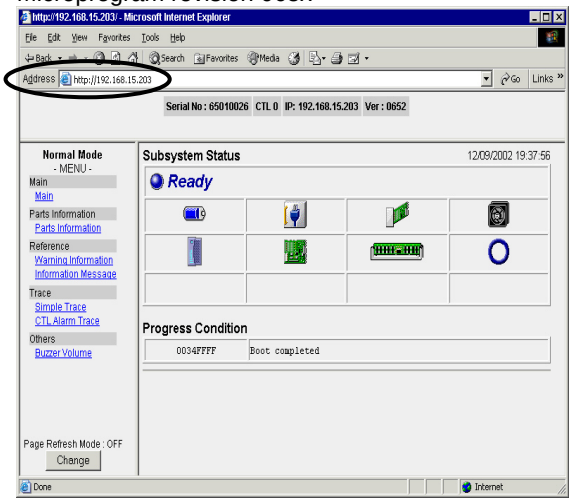
2.1 Transferring to the Normal Mode

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.

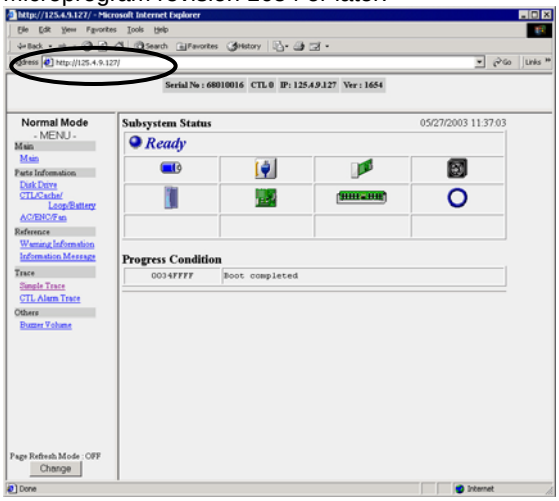
Under dual system configuration, input one of IP addresses of LAN-Connecter for maintenance. The status of the devices (both Controllers) can be monitored from one controller.
If it is connected, the next screen is displayed.

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.

Microprogram revision 065x



Microprogram revision 1654 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

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.

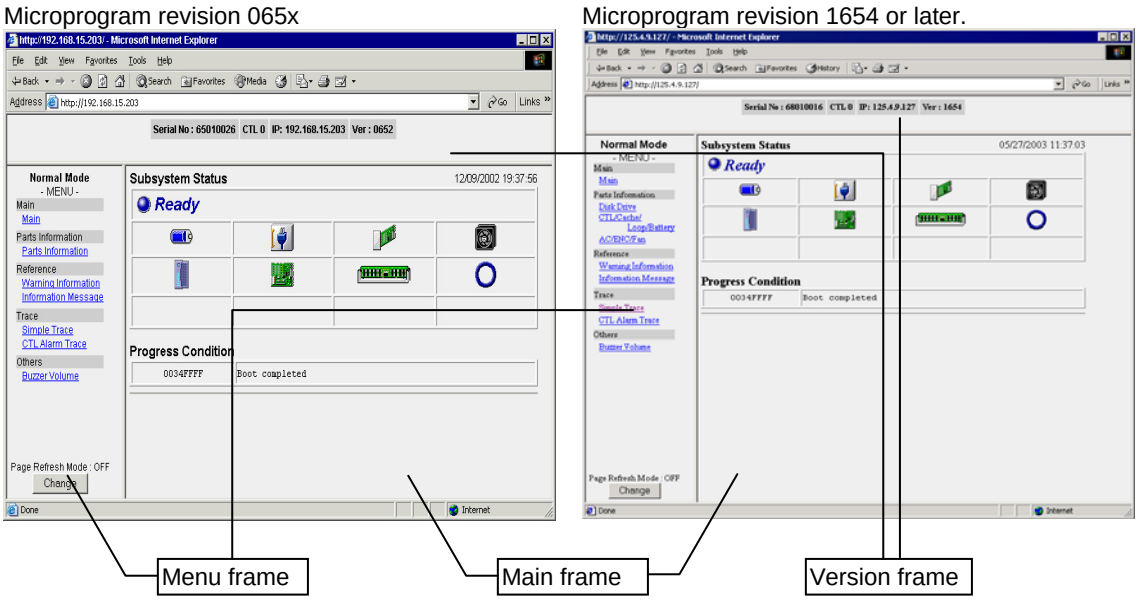


Figure 2.2.1 Main screen outline of the Normal Mode

(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.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.
- 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.

Copyright © 2002, 2005, Hitachi, Ltd.

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.

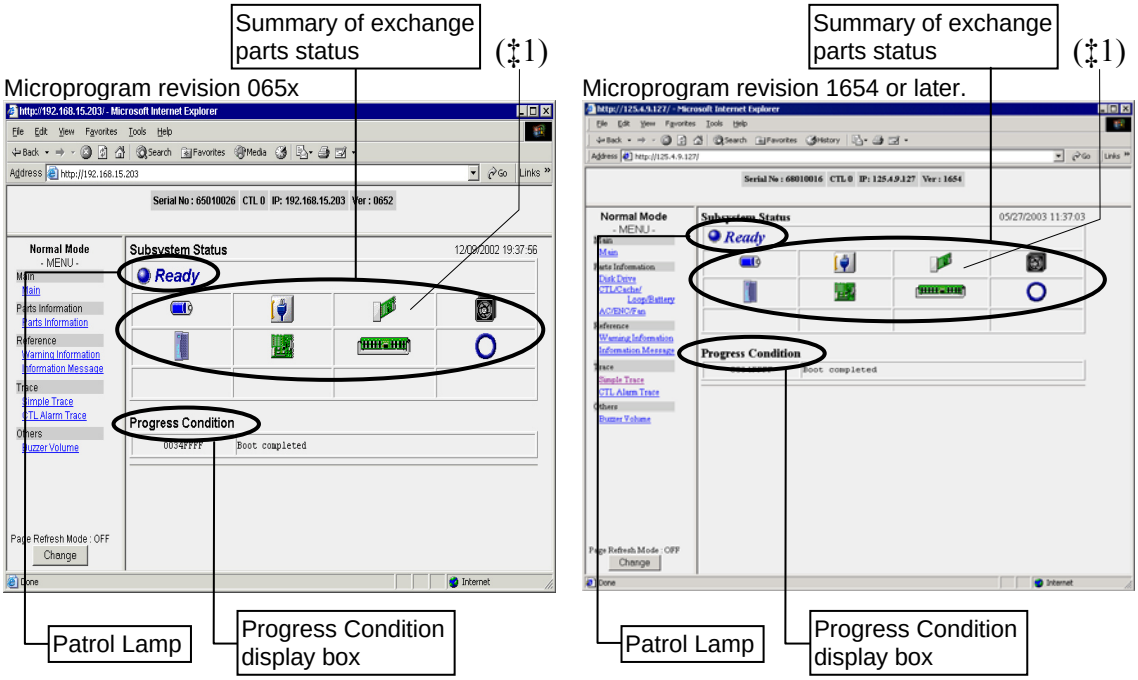


Figure 2.3.1 Main screen of the Normal Mode

‡1 : For the RKS/RKDS, this is not displayed because the ENC Unit is not installed in it.

Copyright © 2002, 2005, Hitachi, Ltd.

(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 (Power Unit (DC))

Image	Status
 Blue	• Normal
 Red	• Power Unit (Power Unit (DC)) error

Copyright © 2002, 2005, Hitachi, Ltd.

ENC Unit

Image	Status
 Green	• Normal
 Red	• ENC Unit error

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 (RKL)

Image	Status
 Blue	• Normal
 Red	• Disk Drive error

Copyright © 2002, 2005, Hitachi, Ltd.

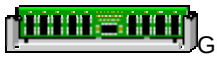
Disk Drive (S-ATA)

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

Fibre loop

Image	Status
 Blue	• Normal
 Red	• Fibre loop error

Path loop

Image	Status
 Orange	• Normal
 Red	• Path loop error

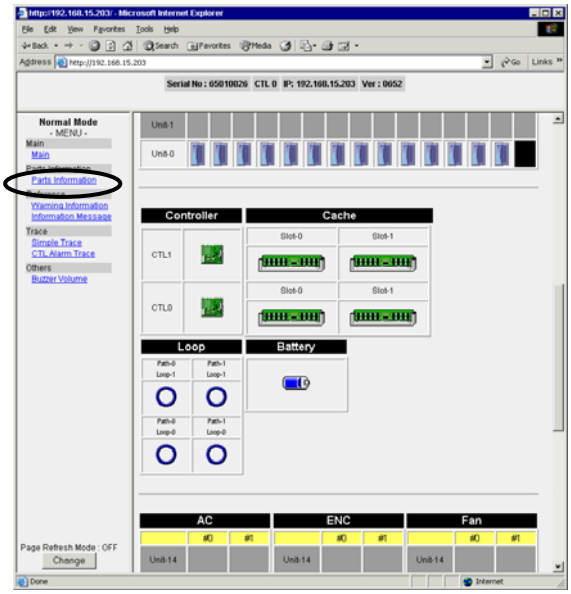
Copyright © 2002, 2005, Hitachi, Ltd.

2.4 Display of Exchangeable Parts Status (Parts Information)

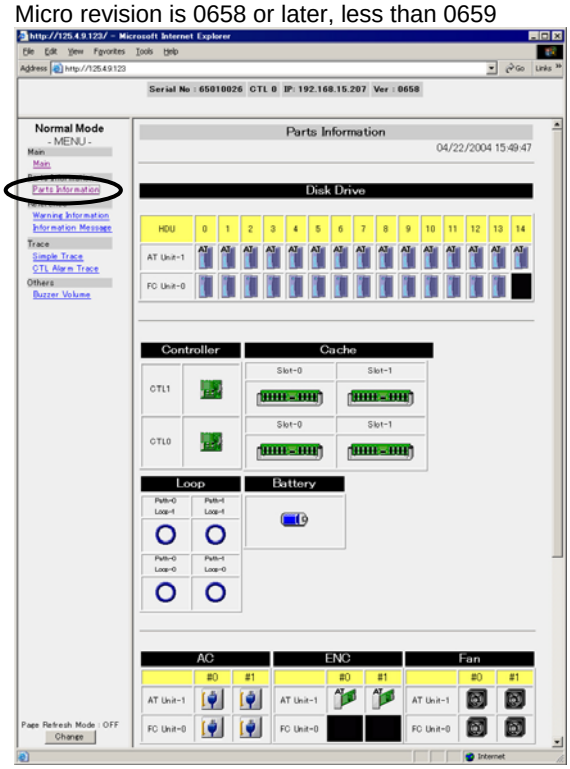
The display screen of exchange part status displays the status of the Disk Drive, Control Unit, Cache Unit, Fan Assembly, Backup Battery Unit, Power Unit (Power Unit (DC)), ENC Unit (SENC Unit), Fiber loop that are implemented. Furthermore, this is not displayed, if it is not implemented.
Also, the exchange part of abnormal status displays a red image. The Parts Information screen is shown below.
And, it is divided into three screen of Disk Drive, CTL/Cache/Loop/Battery and AC/ENC/Fan in the Microprogram version 1654 or later.

- Parts Information (Micro revision 065×)

Micro revision is 0657 or earlier.

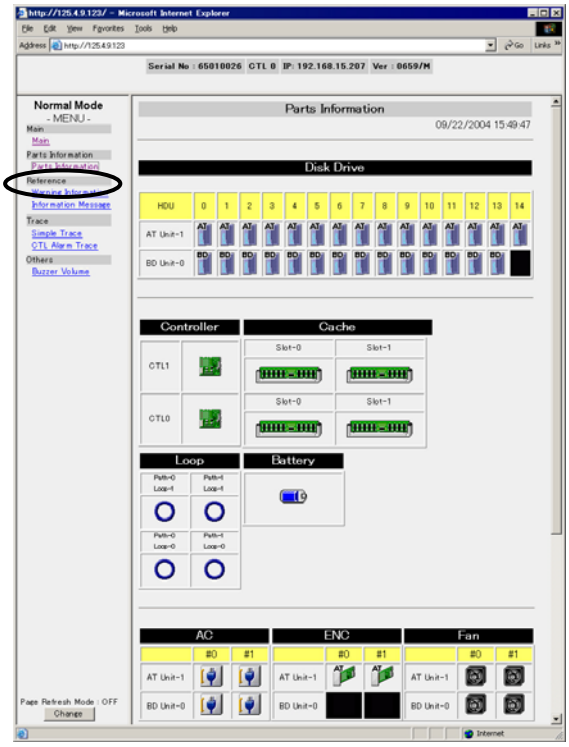


Micro revision is 0658 or later, less than 0659

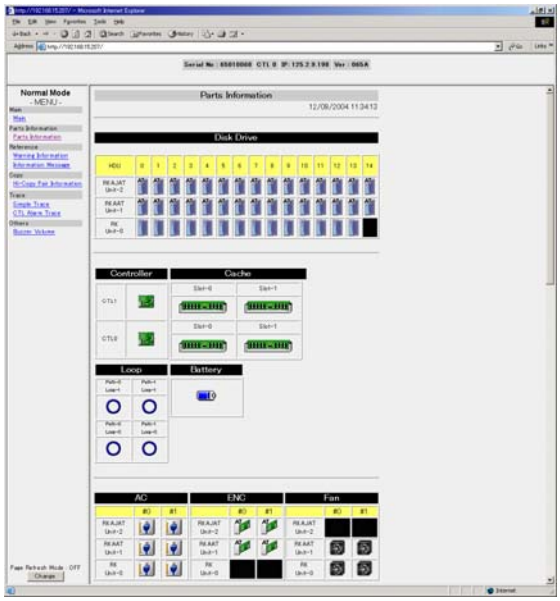


Copyright © 2002, 2005, Hitachi, Ltd.

Micro revision is 0659/M or earlier.



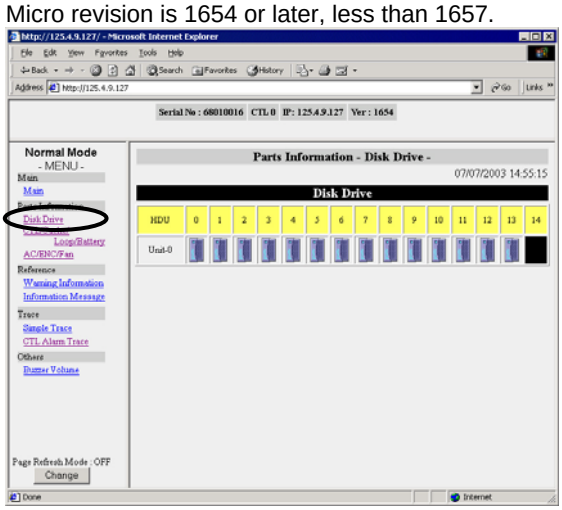
Micro revision is 065A or later.



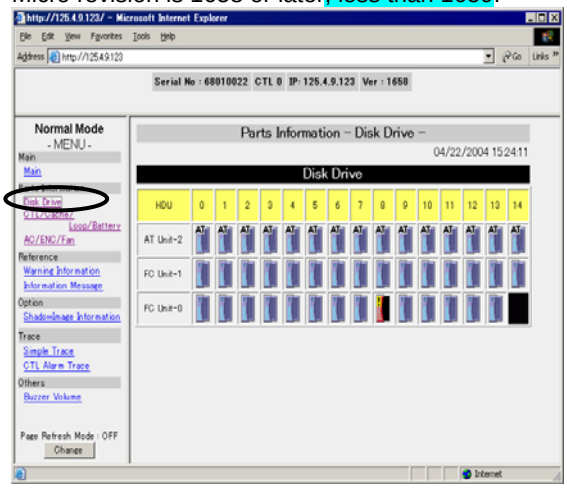
Copyright © 2003, 2005, Hitachi, Ltd.

- Parts Information (Micro revision 165×)
- Disk Drive

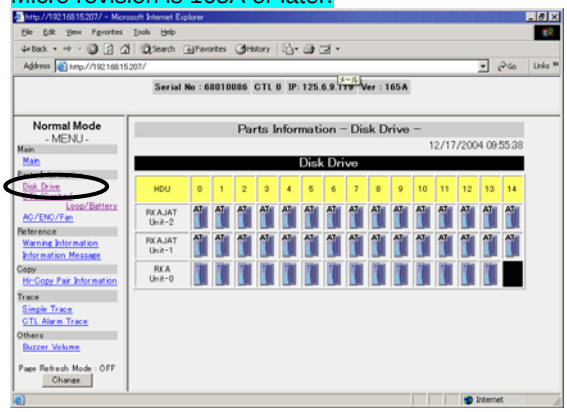
Micro revision is 1654 or later, less than 1657.



Micro revision is 1658 or later, less than 1659.



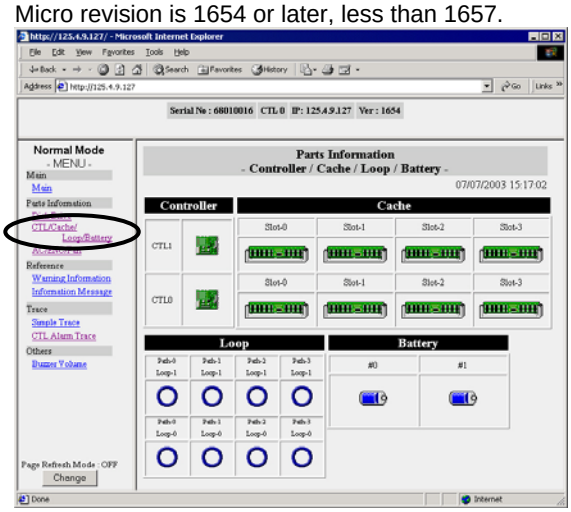
Micro revision is 165A or later.



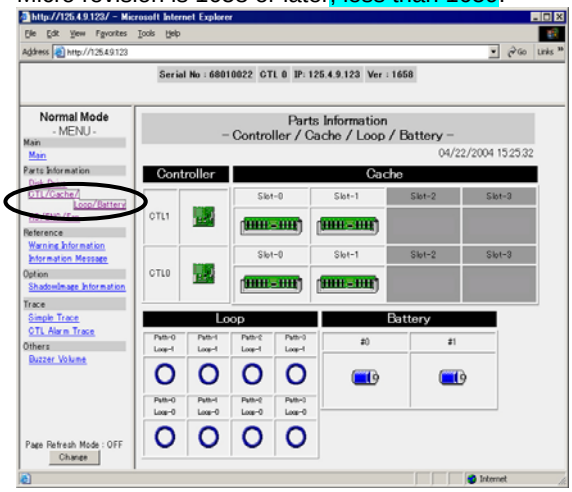
Copyright © 2003, 2005, Hitachi, Ltd.

- CTL/Cache/Loop/Battery

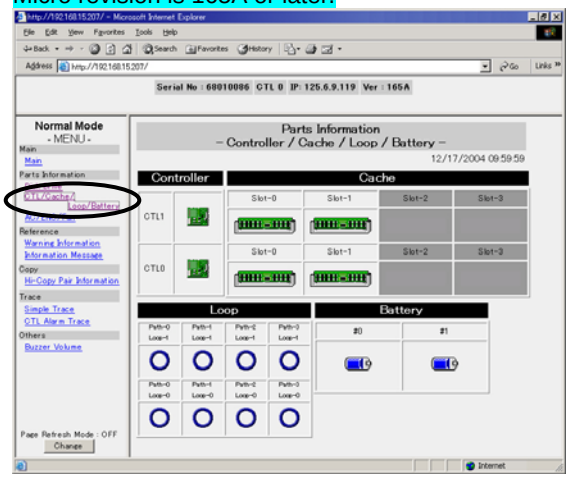
Micro revision is 1654 or later, less than 1657.



Micro revision is 1658 or later, less than 1659.



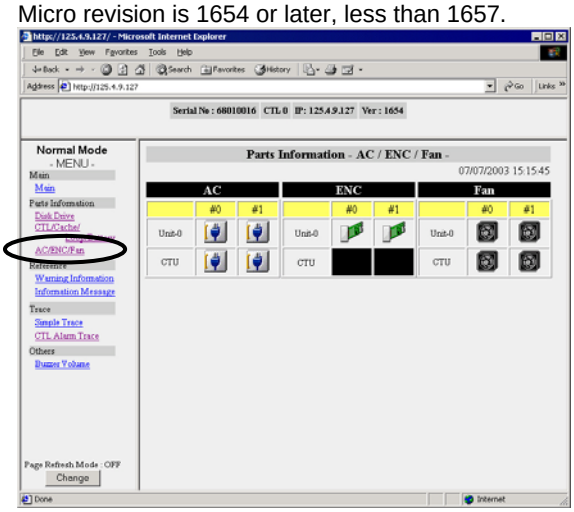
Micro revision is 165A or later.



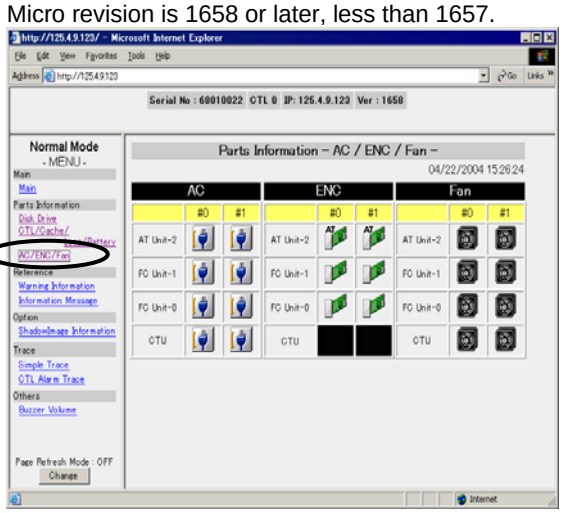
Copyright © 2005, Hitachi, Ltd.

- AC/ENC (SENC)/Fan

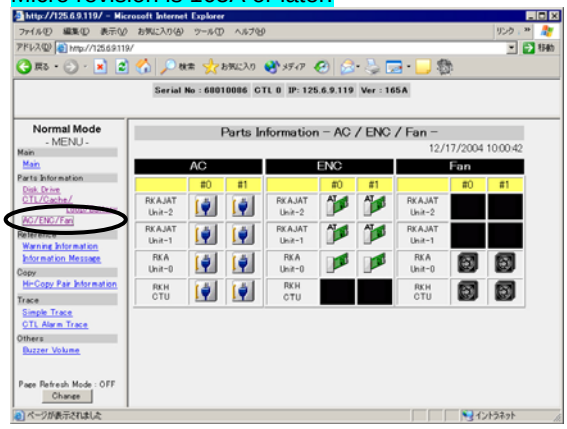
Micro revision is 1654 or later, less than 1657.



Micro revision is 1658 or later, less than 1657.



Micro revision is 165A or later.



Copyright © 2005, Hitachi, Ltd.

The meaning of the image that displays it with the display screen of exchange part status is shown below.

(1) Disk Drive (FC)

Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 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)

(2) Disk Drive (RKL)

Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 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)

(3) Disk Drive (S-ATA)

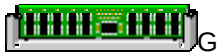
Image	Status
 Blue	• Normal
 Red	• Fault has occurred to the Disk Drive
 Red and Black	• Disk Drive port that the fault occurred is not implementing the Disk Drive
No display	• Disk Drive is not implemented (Except for the status where the Disk Drive that the fault occurred was drawn out)

Copyright © 2002, 2005, Hitachi, Ltd.

(4) 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

(5) 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

(6) Backup Battery Unit

Image	Status
 Green	• Normal
 Red	• There is a fault or not implemented

(7) Fan Assembly

Image	Status
 Black	• Normal
 Red	• There is a fault or not implemented

(8) Power Unit (Power Unit (DC))

Image	Status
 Blue	• Normal
 Red	• It is fault occurred or not implemented

Copyright © 2002, 2005, Hitachi, Ltd.

(9) ENC Unit

Image	Status
 Green	• Normal
 Red	• It is fault occurred or not implemented

(10) SENC Unit

Image	Status
 Green	• Normal
 Red	• It is fault occurred or not implemented

(11) Fibre loop

Image	Status
 Blue	• Normal
 Red	• Fault

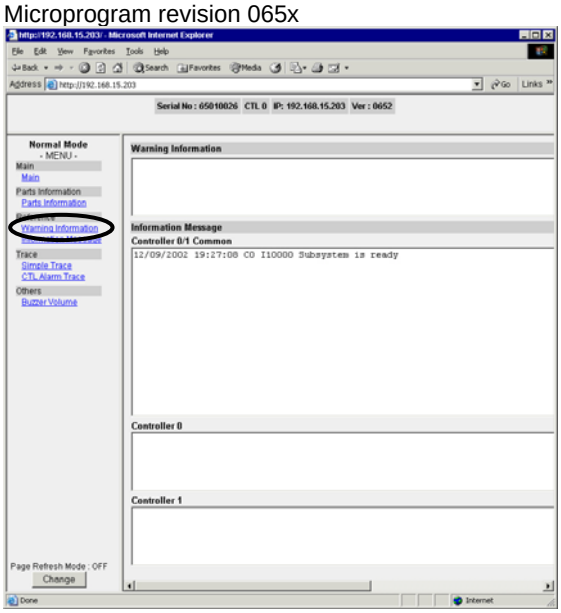
Copyright © 2004, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

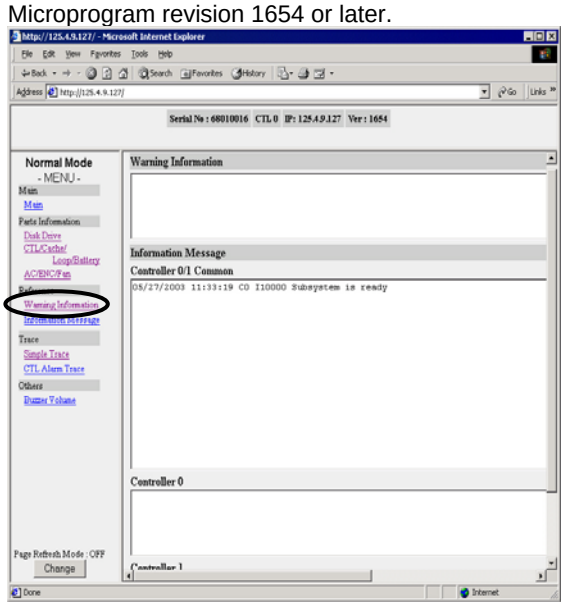
Copyright © 2004, 2005, Hitachi, Ltd.

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.

Microprogram revision 065x



Microprogram revision 1654 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

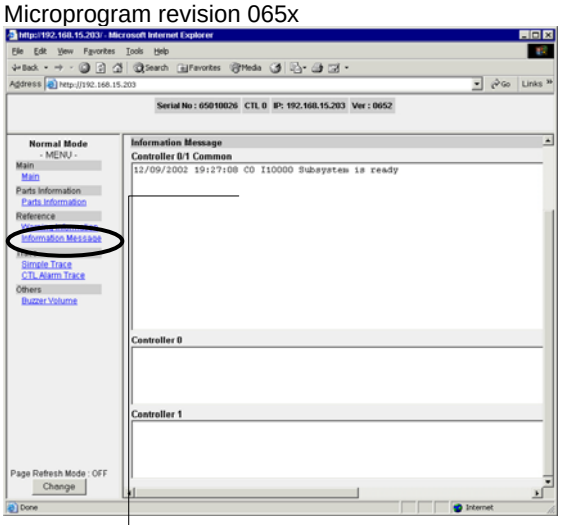
2.5 Information Message

The fault information and status information of the device that detected it in during the device operation are displayed.

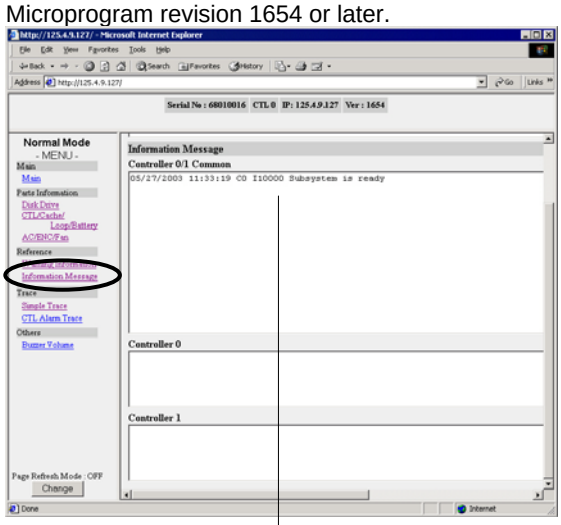
The fault information and status information after the device booting are displayed in the Controller 0/1 Common box.
The fault information and status information as the device booting are displayed in the box of Controller 0 and Controller 1 every the controller.

The Information Message screen is shown below.

Microprogram revision 065x



Microprogram revision 1654 or later.



The fault information and status information are displayed.

Copyright © 2002, 2005, Hitachi, Ltd.

2.6 Collecting Simple Trace

This is a function to download current trace information.
To perform the down-lord, a free capacity of approximately 5 Mbytes is required in the PC.

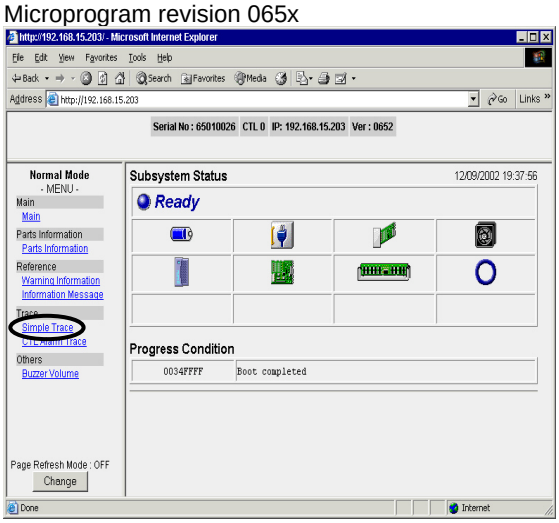
Simple Trace of both the Control Units can be collected through one Control Unit.
It is not necessary to collect from both the controllers. (When it is collected from Control Unit#0, File name is “smpl_trc0.dat”. When collected from Control Unit#1, file name is “smpl_trc1.dat.”)

(1) 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], and [Clear Cache] in this order.

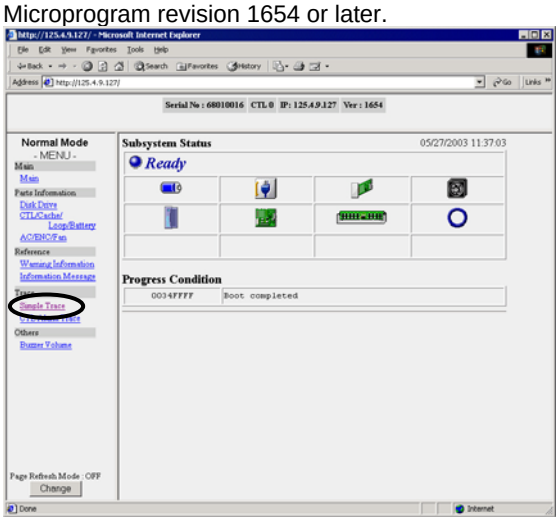
(2) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service PC, collect the simple trace after changing the setting of the following Internet Explorer.
- Select [Tools] - [Internet Options] from the Internet Explorer menu.
- Select the [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

(3) Click “Simple Trace” in the menu frame.

Microprogram revision 065x



Microprogram revision 1654 or later.



Copyright © 2002, 2005, Hitachi, Ltd.

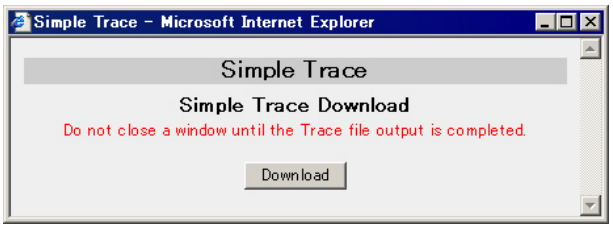
(4) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



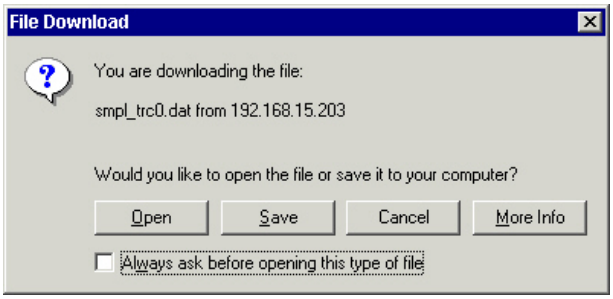
(5) The following window is displayed.(‡1)



(6) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



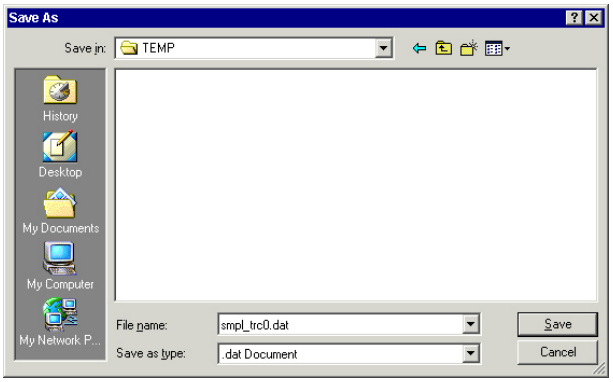
(7) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



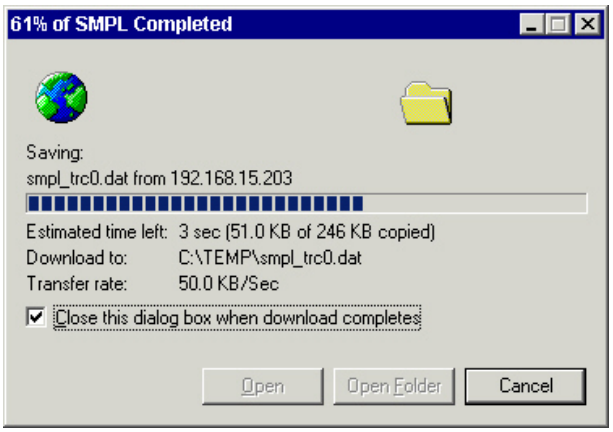
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the simple trace again after waiting for a while.

Copyright © 2004, 2005, Hitachi, Ltd.

(8) 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.



(9) The following window is displayed during execution download.

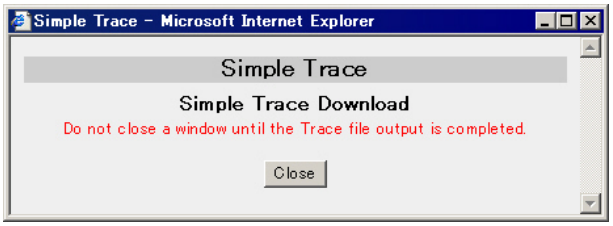


(10) The down-loading is started and the progress indicating message window is displayed. When the down-loading completes, the progress indicating message window is closed.

(11) When the simple trace collection is completed, the following window is displayed. (It is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the simple trace collection is completed. It may not be collected.

Click [Close] to close the window.



‡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.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

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 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 : The Web may be unable to be connected for two to three minutes after a detachment of the Control Unit because the CTL Alarm Trace is being made.

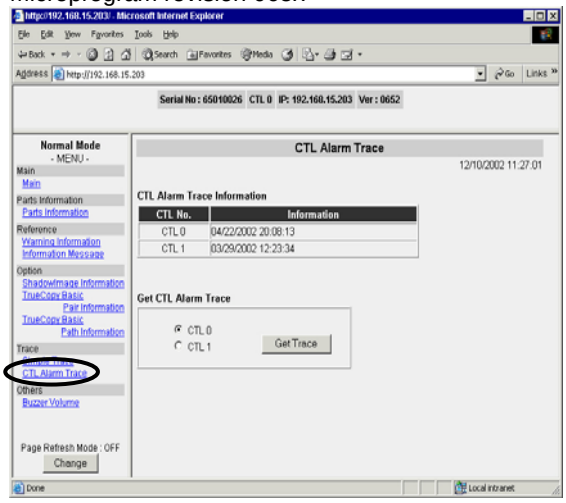
(1) Clear the cache of the browser following the procedure shown below so that the old data, which was collected at the preceding time, should not be saved.
- In the case of Internet Explorer, select the [Tools], [Internet Options], [General], [Temporary Internet files], and [Delete Files] in this order.
- In the case of Netscape, select the [Edit], [Preferences], [Cache], and [Clear Cache] in this order.

(2) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

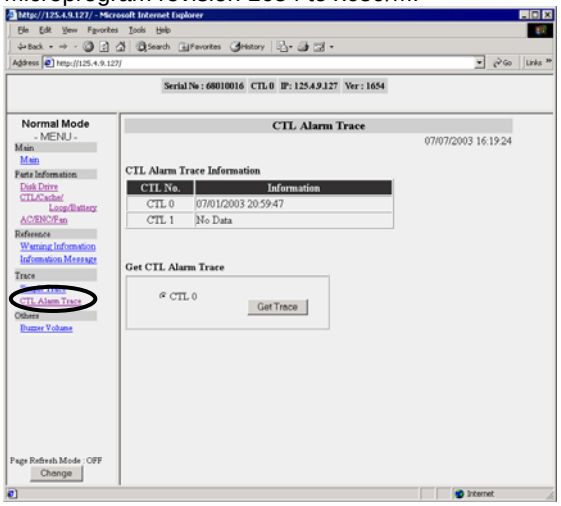
Copyright © 2002, 2005, Hitachi, Ltd.

(3) Click “CTL Alarm Trace” in the menu frame.
The CTL Alarm Trace Information window is displayed when the CTL alarm trace information is present.

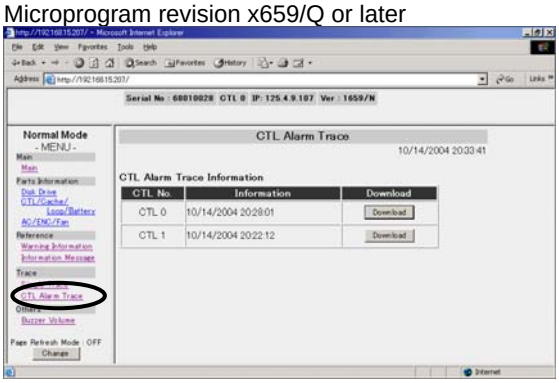
Microprogram revision 065x



Microprogram revision 1654 to x659/M.



Microprogram revision x659/Q or later



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

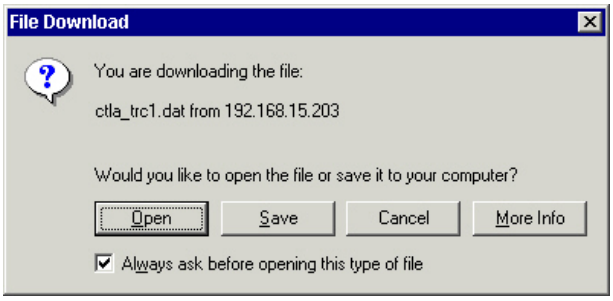
[MM/DD/20XY hh:mm:ss].....: A status in which the CTL alarm trace information is present

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.

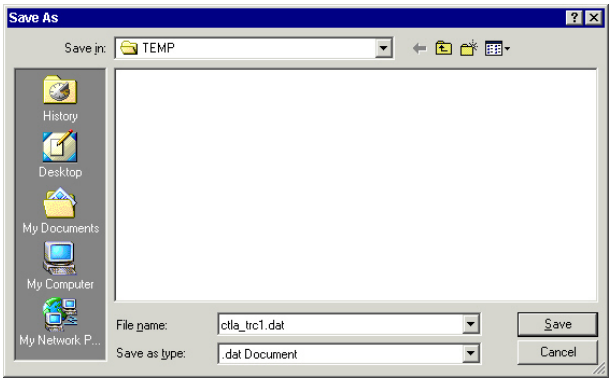
Copyright © 2004, 2005, Hitachi, Ltd.

(4) When downloading the CTL Alarm Trace information, perform the following.
- For the Microprogram revision x659/M or earlier:
  Select a controller (CTL 0 or CTL 1) in the “Get CTL Alarm Trace”, and then press the “Get Trace” button.
- For the Microprogram revision x659/Q or later:
  Press the “Download” button on the Control Unit side to be collected in “CTL Alarm Trace information”.(‡1)

(5) The following window is displayed. 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.(‡2) Please click [Cancel], if it is stopped.

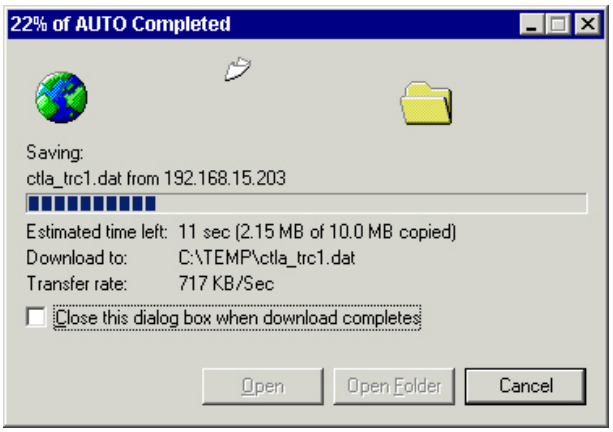


‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

‡2 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(7) The following window is displayed during execution download.



(8) The download completes.

Copyright © 2004, 2005, Hitachi, Ltd.

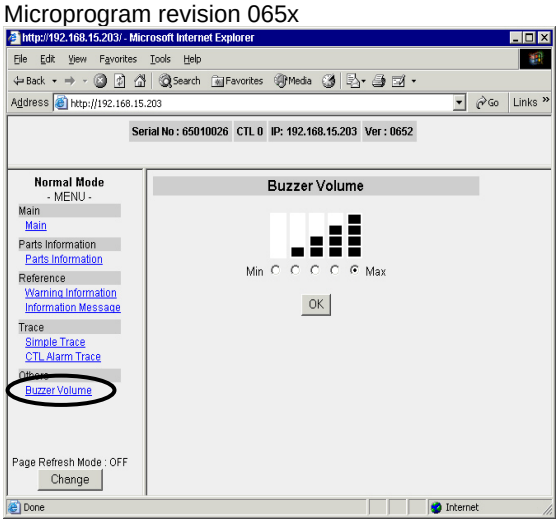
2.8 Setting of the Buzzer Volume

The Buzzer Volume can be adjusted with 5 stages.

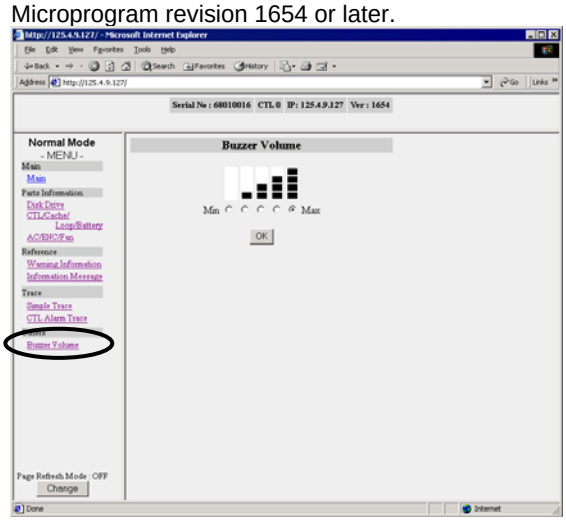
NOTE : Make this setting in the environment in which I/O's from a host computer are not issued while the system is maintained or before the host is started up.

Please click "Buzzer Volume" of menu frame to enter into the Buzzer Volume setting screen.
The Buzzer Volume setting screen is shown below.

Microprogram revision 065x



Microprogram revision 1654 or later.



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.

Copyright © 2002, 2005, Hitachi, Ltd.

2.9 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 service 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.
- "6.1.3 Preparation for update installation of microprogram" (MNTE 06-0020) is performed and the service PC is set up.
- The Microversion is x659/M or later.

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 service PC is 100Base-TX or the superior.

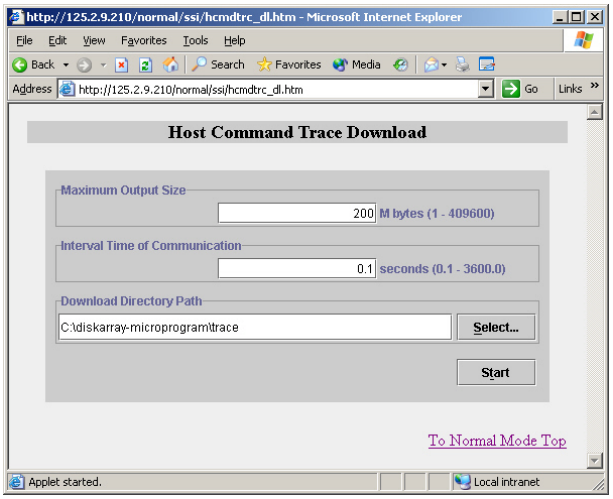
Incidentally, the size of the data that can be downloaded varies depending on the load of I/O's issued to the disk array subsystem.

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].

Copyright © 2004, 2005, Hitachi, Ltd.

(2) Input of "Maximum Output Size", "Interval Time of Communication" and "Download Directory Path".



[Maximum Output Size] : Check the empty drive space of the service PC and input the maximum output size (the initial value is 200 M-bytes).

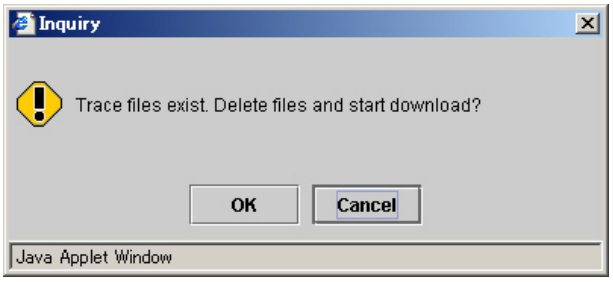
[Interval Time of Communication] : Input the interval time of downloading the host command trace (the initial value is 0.1 second).

[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.

(4) The following window is displayed when the stored file exists.



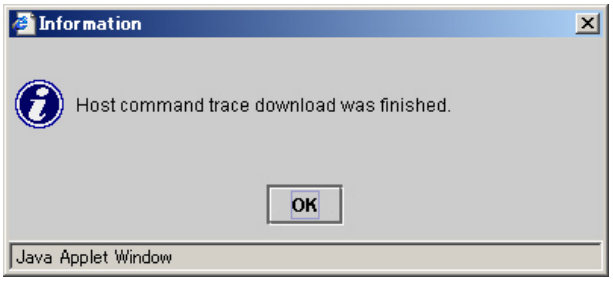
Click the [OK] button.
Click [Cancel] if stopping it.

Copyright © 2004, 2005, Hitachi, Ltd.

(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.

$$\text{Required disk capacity (M bytes)} = \frac{2 \times \text{Host command trace collection time (second)}}{\text{Interval time of communication (second)}}$$

Table 2.9.1 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	20	10	4
10	200	100	40
60	1200	600	240
The collection time and the disk capacity vary depending on the issue interval of the command from the host.			

Copyright © 2004, 2005, Hitachi, Ltd.

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.

- 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 (at intervals of 125 ms). 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.

When CALM LED on Control Unit#0 turns off and READY LED on Front Bezel turns off, it transfers to Maintenance mode.

Copyright © 2002, 2005, Hitachi, Ltd.

(c) Start the setting after making sure that the subsystem has entered the Ready status.

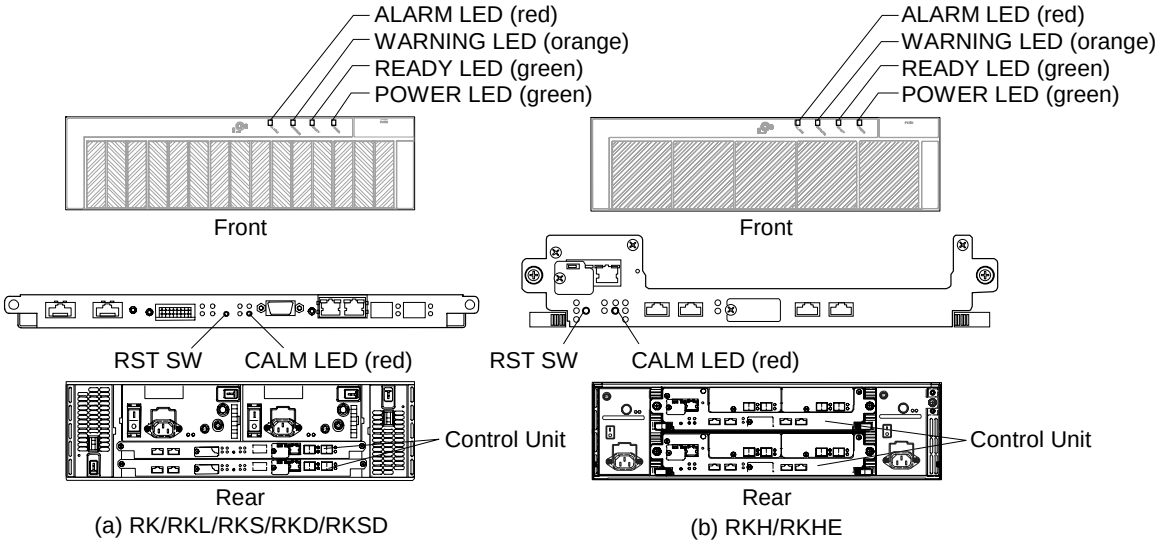


Figure 3.1.1 Indication Position

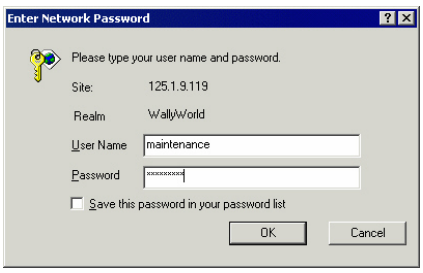
Illustrations in Figure 3.1.1 show cases of the rackmount model. They are the same for the floor model.

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.

(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].



Copyright © 2002, 2005, Hitachi, Ltd.

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 03-0030)).

(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 03-0090)).

(3) Network
Reference and setting of the system parameter regarding the network are executed (refer to Subsection “3.2.3 Network” (WEB 03-0140)).

(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 03-0190)).

(5) ALL
The system parameter information is initialized. (refer to Subsection “3.2.5 ALL” (WEB 03-0230)).

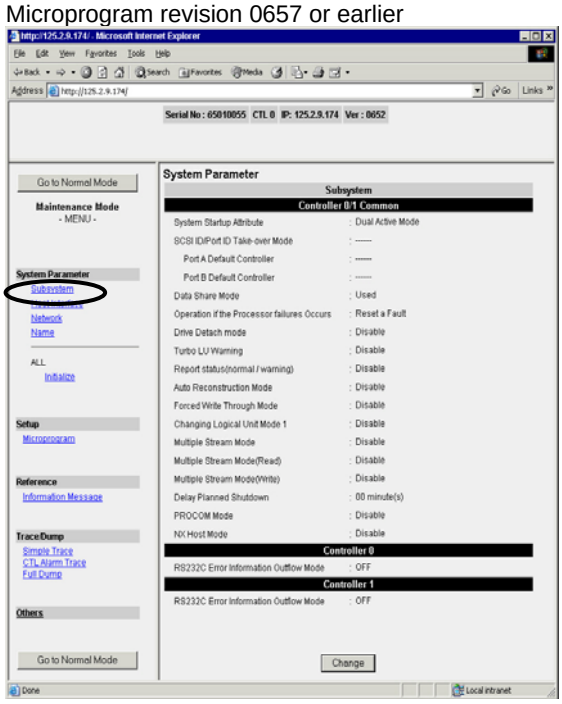
Copyright © 2002, 2005, Hitachi, Ltd.

3.2.1 Subsystem

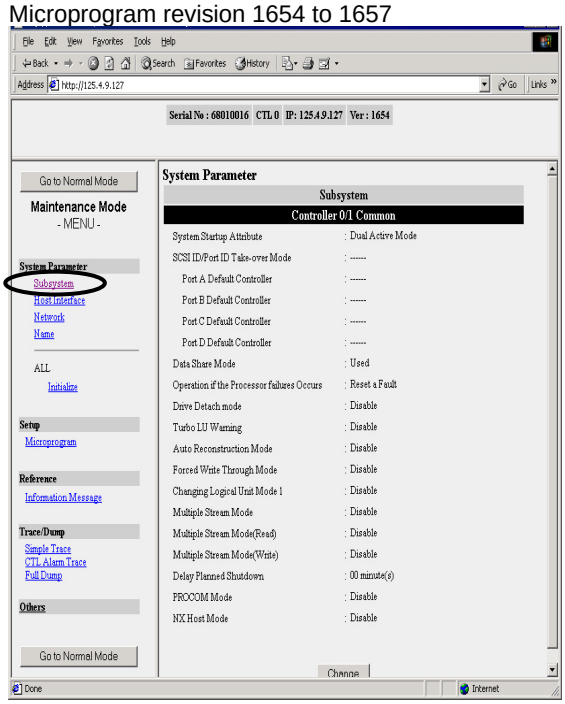
This function sets up/refer to the item regarding the Subsystem in the device.

(1) Please click “Subsystem”.

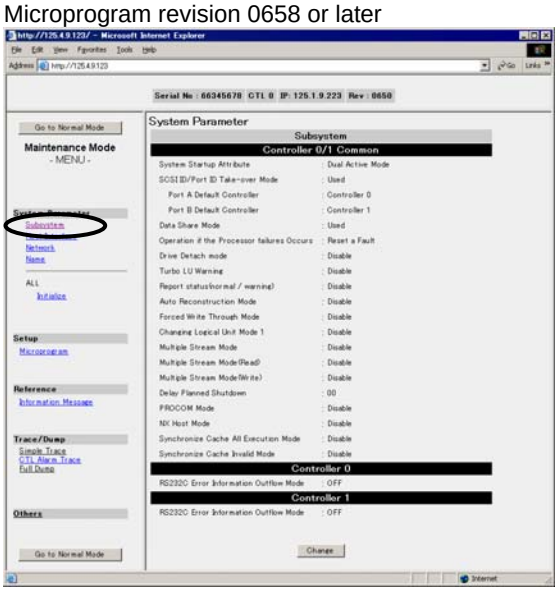
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later



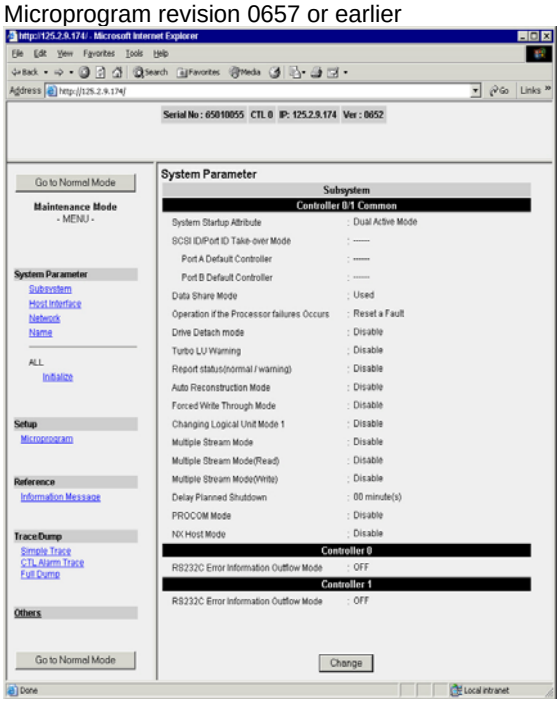
Microprogram revision 1658 or later



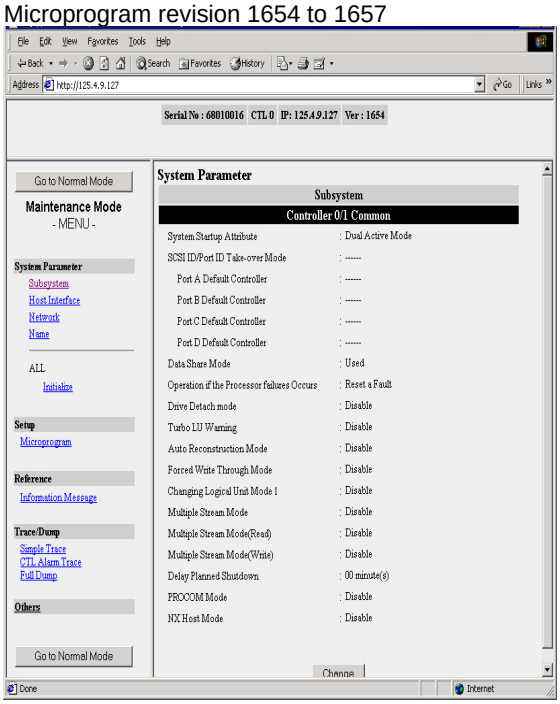
Copyright © 2002, 2005, Hitachi, Ltd.

(2) The present setting value (the current value) is displayed.

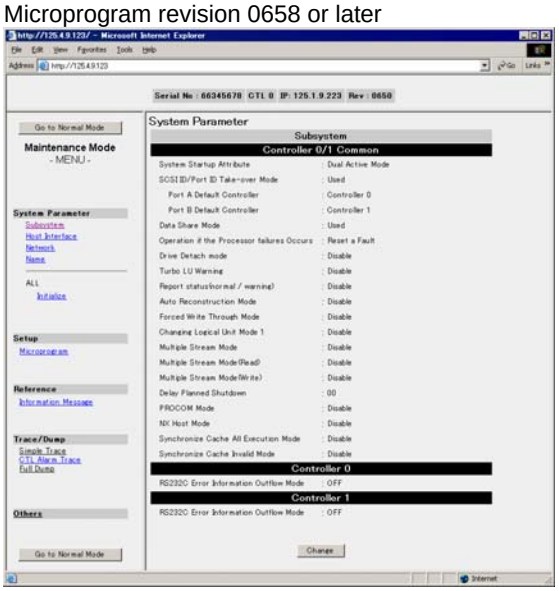
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later



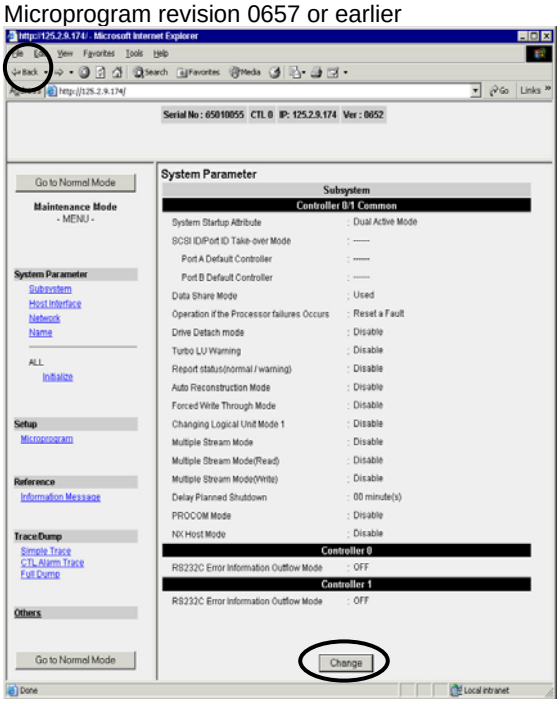
Microprogram revision 1658 or later



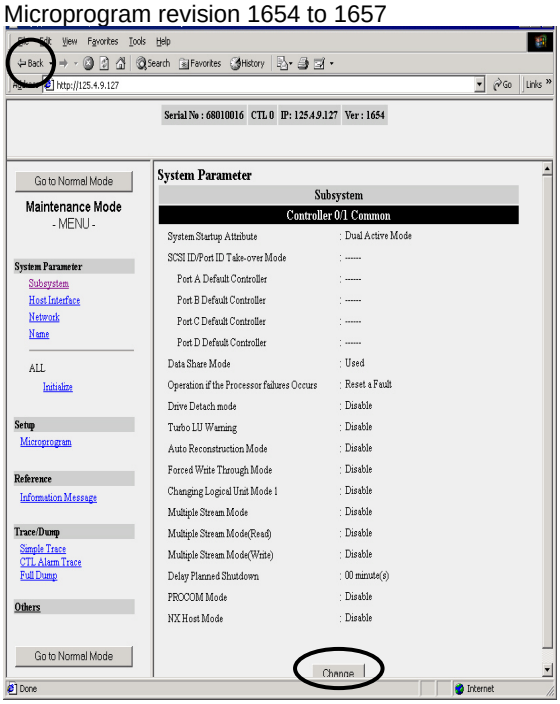
Copyright © 2004, 2005, Hitachi, Ltd.

(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.

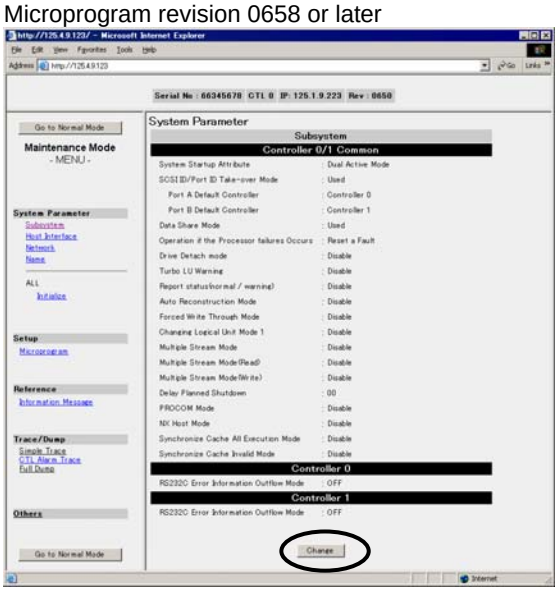
Microprogram revision 0657 or earlier



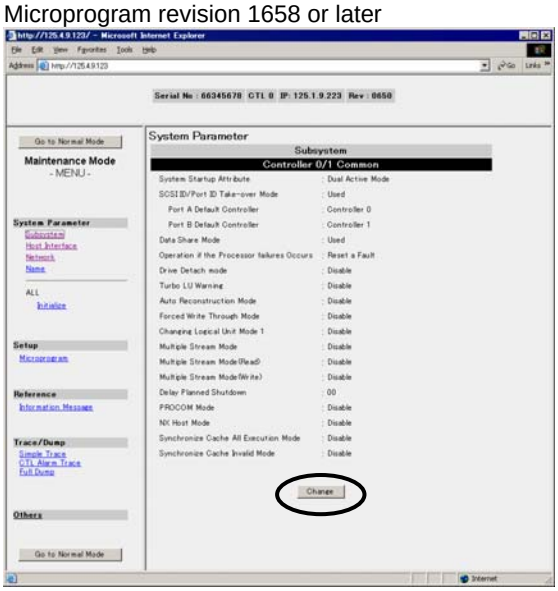
Microprogram revision 1654 to 1657



Microprogram revision 0658 or later



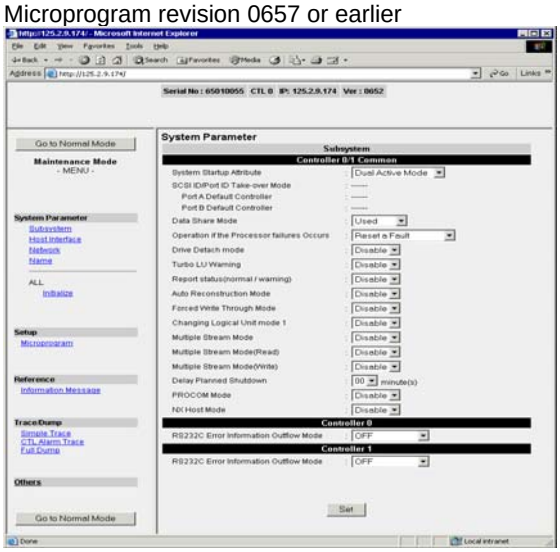
Microprogram revision 1658 or later



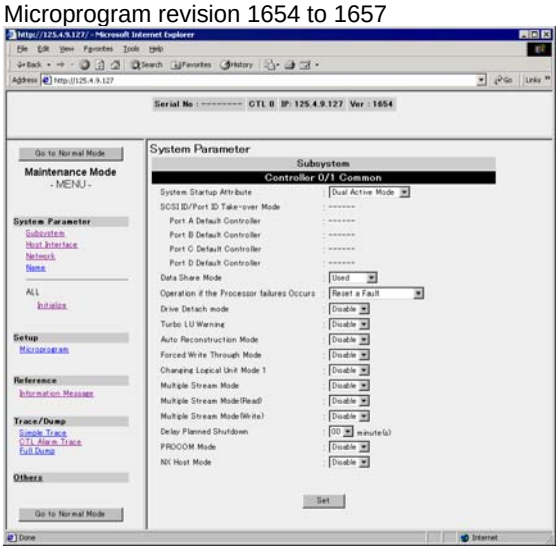
Copyright © 2004, 2005, Hitachi, Ltd.

(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.

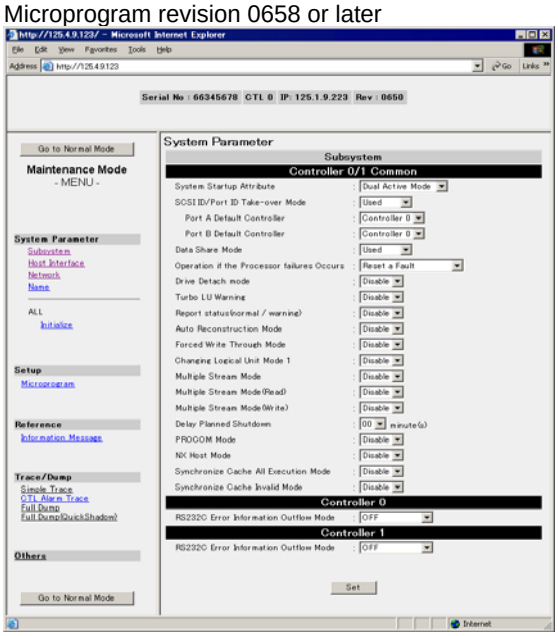
Microprogram revision 0657 or earlier



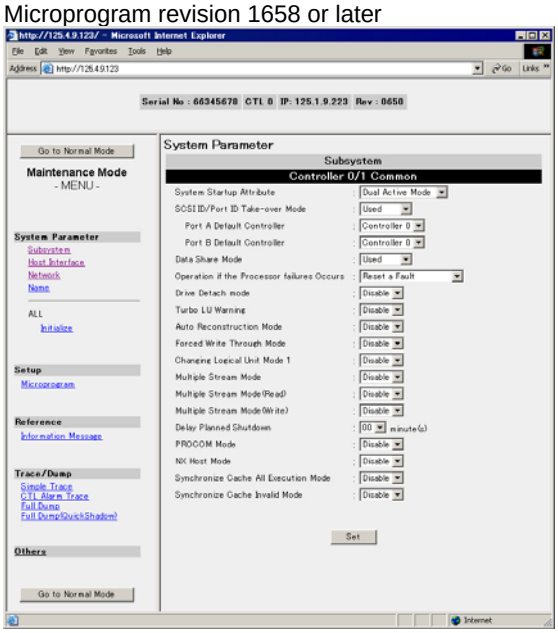
Microprogram revision 1654 to 1657



Microprogram revision 0658 or later



Microprogram revision 1658 or later



Copyright © 2002, 2005, Hitachi, Ltd.

Explanation with regard to each item

[Controller 0/1 Common]

- System Startup Attribute
  The System Operation Attribute is designated.
  [Single Mode] : This is Single controller configuration.
  (RKH+RKA/RKAAT/RKAJAT,
  RKHE+RKA/RKAAT/RKAJAT, is not supported.)
  [Dual Active Mode] : This is Dual controllers configuration.
  [Hot Standby Mode] : This is Hot standby configuration.
- SCSI ID/Port ID Take_over Mode
  ID Take_over Mode is assigned.
  Port A Default Controller : Port A is assigned to the default Control number.
  Port B Default Controller : Port B is assigned to the default Control number.
- Data Share Mode
  The Data Share Mode Attribute is designated.
  [Used] : This is used with the Data Share Mode.
  [Not Used] : This is not used with the Data Share Mode.
- Operation if the Processor Failures Occurs
  The operation as the processor fault occurrence is designated.
  [Reset a Faule] : 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
- Report status (normal/warning)
  The Report Mode of the Warning Status is designated.
  [Enable] : The Report Mode of the Warning Status is effectively.
  [Disable] : The Report Mode of the Warning Status is ineffectively.
- 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.

Copyright © 2002, 2005, Hitachi, Ltd.

- Changing Logical Unit Mode 1
  The Changing Logical Unit Mode 1 (A mode in which no LU switching is done during operation in the Data Shearing mode) is designated.
  [Enable] : The Changing Logical Unit Mode 1 is effectively.
  [Disable] : The Changing Logical Unit Mode 1 is ineffectively.
- Multiple Stream Mode
  The mode to speed up two or more stream accesses (sequential read/write) to an LU is specified.
  [Enable] : Two or more stream modes are validated.
  [Disable] : Two or more stream modes are invalidated.
- Multiple Stream Mode (Write)
  The mode to speed up two or more stream accesses (sequential read/write) to an LU is specified.
  [Enable] : Two or more stream modes (Write) are validated.
  [Disable] : Two or more stream modes (Write) are invalidated.
- Multiple Stream Mode (Read)
  The mode to speed up two or more stream accesses (sequential read/write) to an LU is specified.
  [Enable] : Two or more stream modes (Read) are validated.
  [Disable] : Two or more stream modes (Read) are invalidated.
- Delay Planned Shutdown
  The Delay Planned Shutdown (Time from the power switch turning off to the deliberate shutdown) is designated.
  00 to 60 minute
- PROCOM Mode
  The PROCOM Mode is designated. Do not specify this unless the PROCOM host computer is to be connected.
  [Enable] : PROCOM host computer is to be connected.
  [Disable] : A host computer other than PROCOM computer is to be connected.
- NX Host Mode
  Specify this when setting the NX Host mode.
  [Enable] : The NX Host Mode is effectively.
  [Disable] : The NX Host Mode is ineffectively.

Copyright © 2002, 2005, Hitachi, Ltd.

- Synchronize Cache All Execution Mode (Support is available in the microprogram Ver.x658 or later)
  This is specified when the Synchronize Cache command is all executed.
  [Enable] : The Synchronize Cache All Execution Mode is effectively.
  [Disable] : The Synchronize Cache All Execution Mode is ineffectively.
- Synchronize Cache Invalid Mode (Support is available in the microprogram Ver.x658 or later)
  Specify this when setting the Synchronize Cache Invalid Mode.
  [Enable] : The Synchronize Cache Invalid Mode is effectively.
  [Disable] : The Synchronize Cache Invalid Mode is ineffectively.

NOTE : When both Synchronize Cache All Execution Mode and Synchronize Cache Invalid Mode are [Enable], Synchronize Cache All Execution Mode will be enabled.

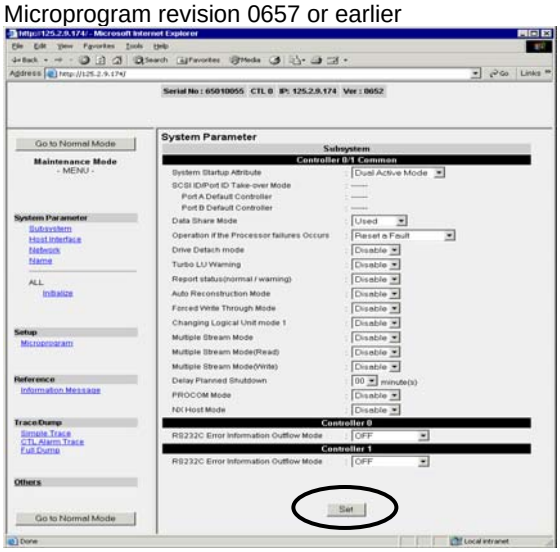
[Controller 0] / [Controller 1]

- RS232C Error Information Outflow Mode (RKH+RKA/RKAAT/RKAJAT, RKHE+RKA/RKAAT/RKAJAT is not supported.)
  The Error Information Outflow Mode to RS232C is designated.
  [OFF] : The output of the error information is controlled.
  [ON (NORMAL)] : The output of the error information is not controlled.
  [ON (HITRACK)] : The output of the error information in HITRACK is controlled.

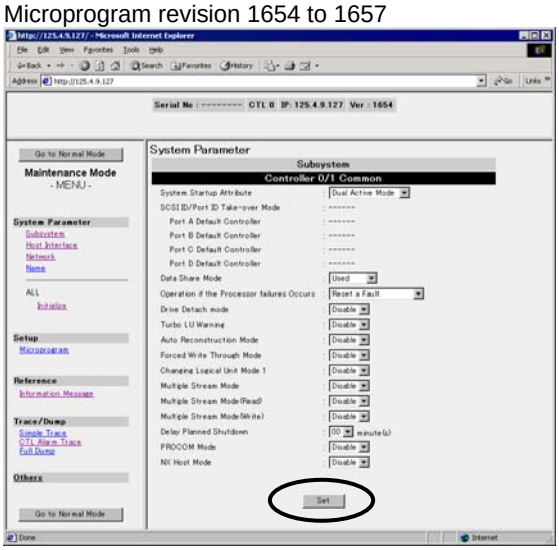
Copyright © 2004, 2005, Hitachi, Ltd.

(5) Please click [Set] after setting completion.

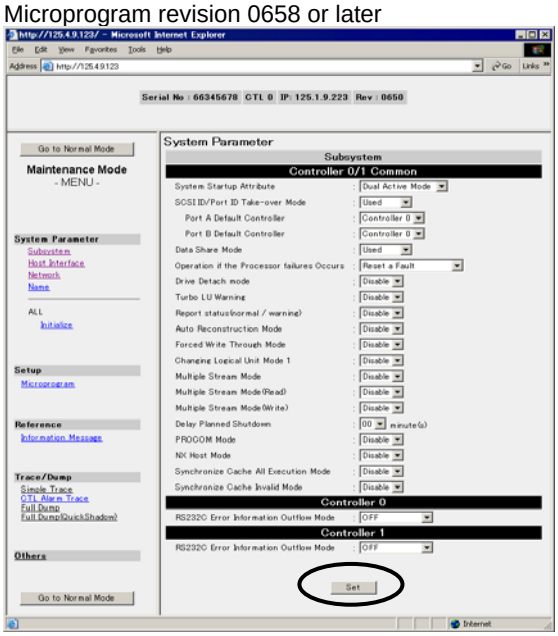
Microprogram revision 0657 or earlier



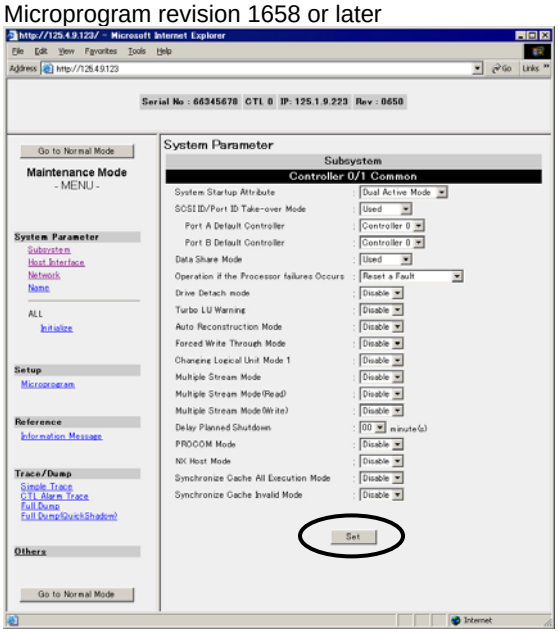
Microprogram revision 1654 to 1657



Microprogram revision 0658 or later



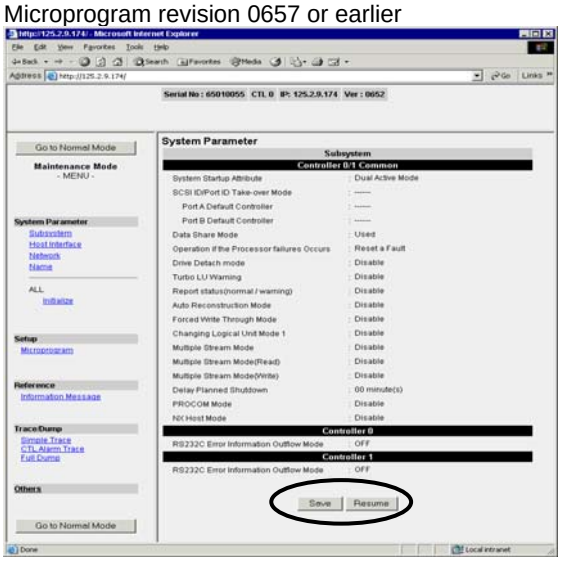
Microprogram revision 1658 or later



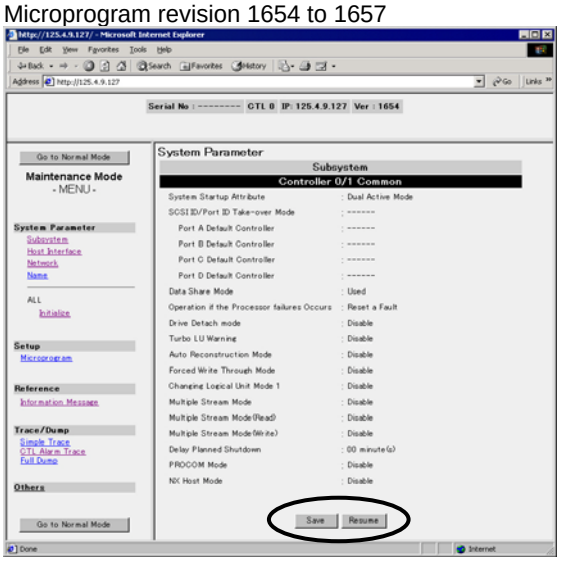
Copyright © 2004, 2005, Hitachi, Ltd.

(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.

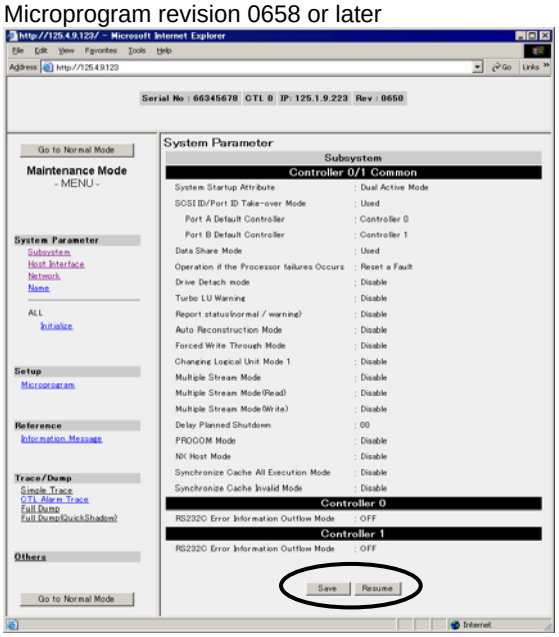
Microprogram revision 0657 or earlier



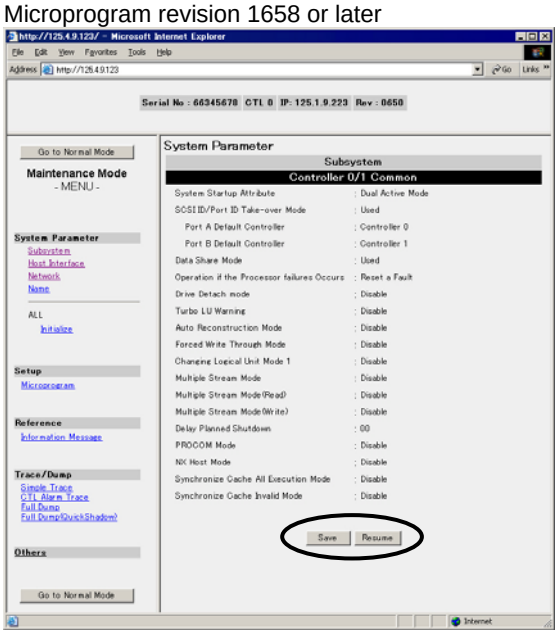
Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

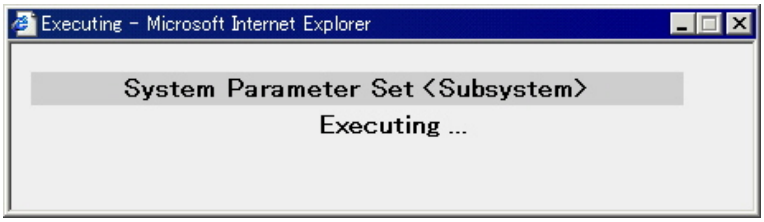


Microprogram revision 1658 or later



Copyright © 2002, 2005, Hitachi, Ltd.

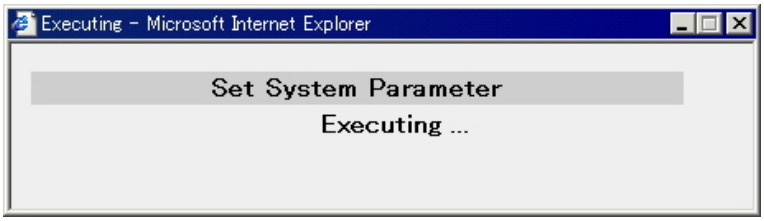
(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



(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.



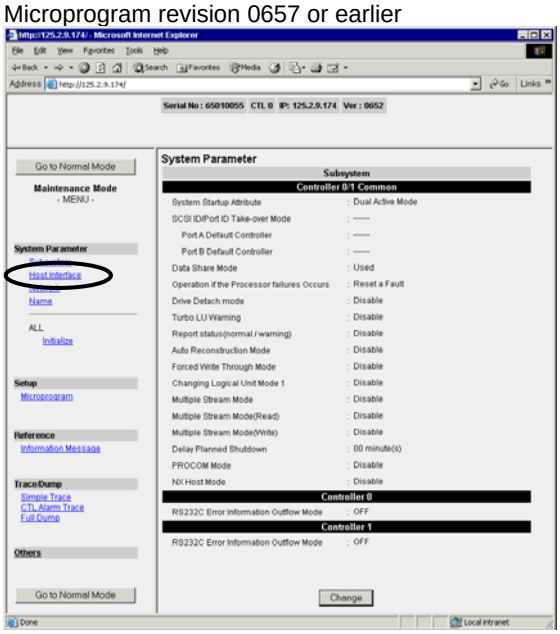
Copyright © 2002, 2005, Hitachi, Ltd.

3.2.2 Host Interface

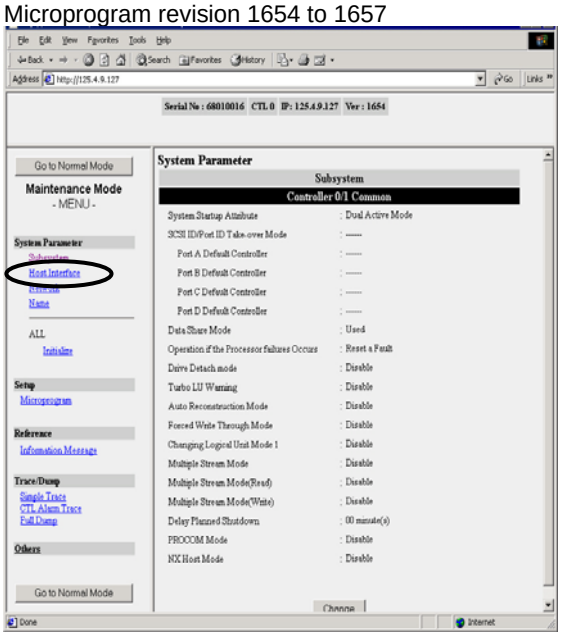
This function sets up/refer to the item regarding the host interfacing of the device.

(1) Please click “Host Interface”.

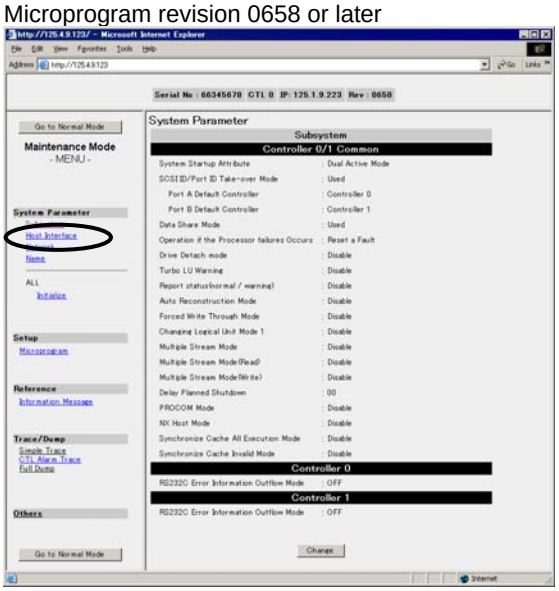
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

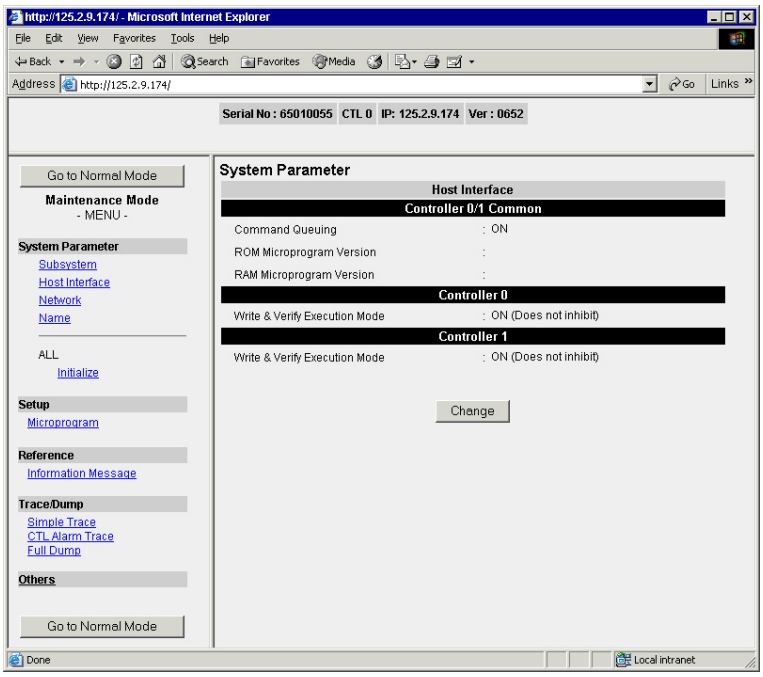


Microprogram revision 1658 or later

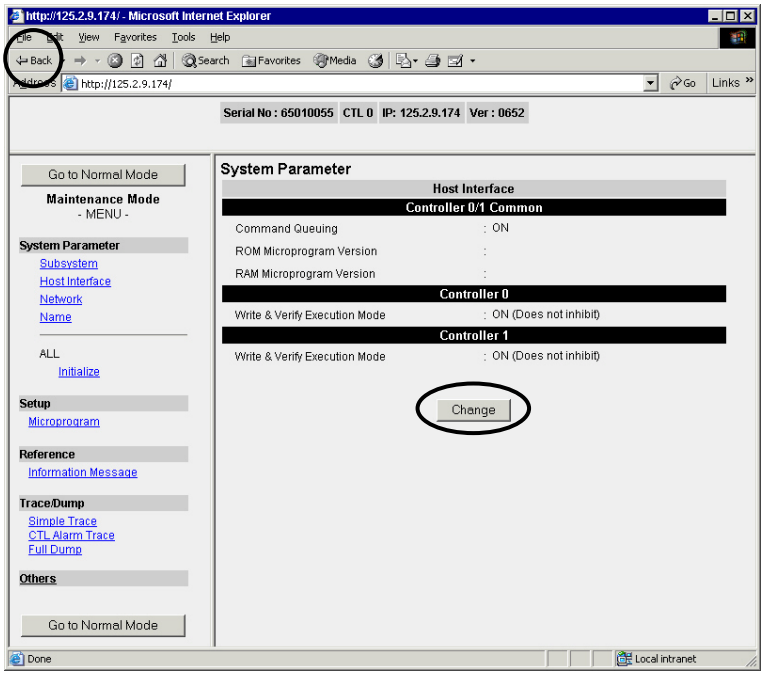


Copyright © 2002, 2005, Hitachi, Ltd.

(2) The present setting value (the current value) is displayed.

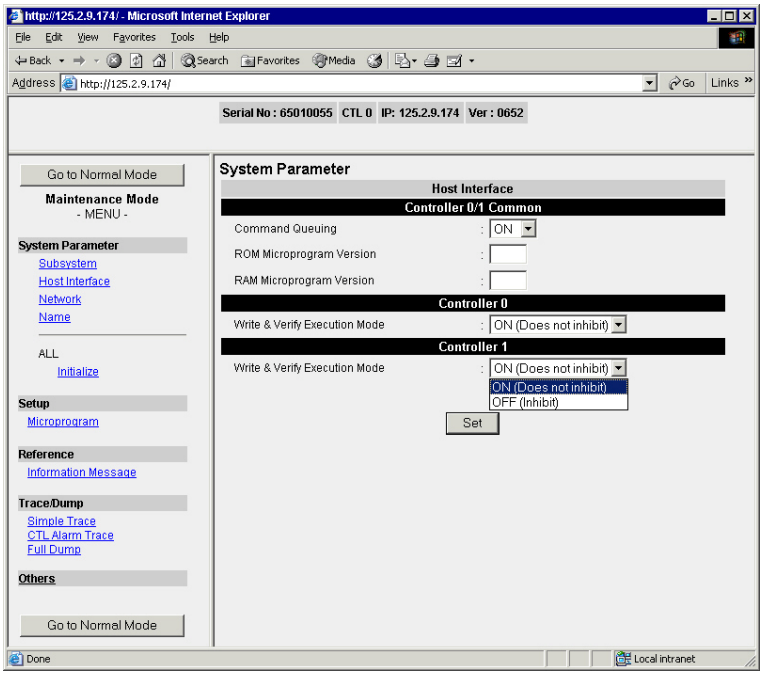


(3) Please click [Change] for the setting.
Please click [Back] of the browser for the unsetting.



Copyright © 2002, 2005, Hitachi, Ltd.

(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]

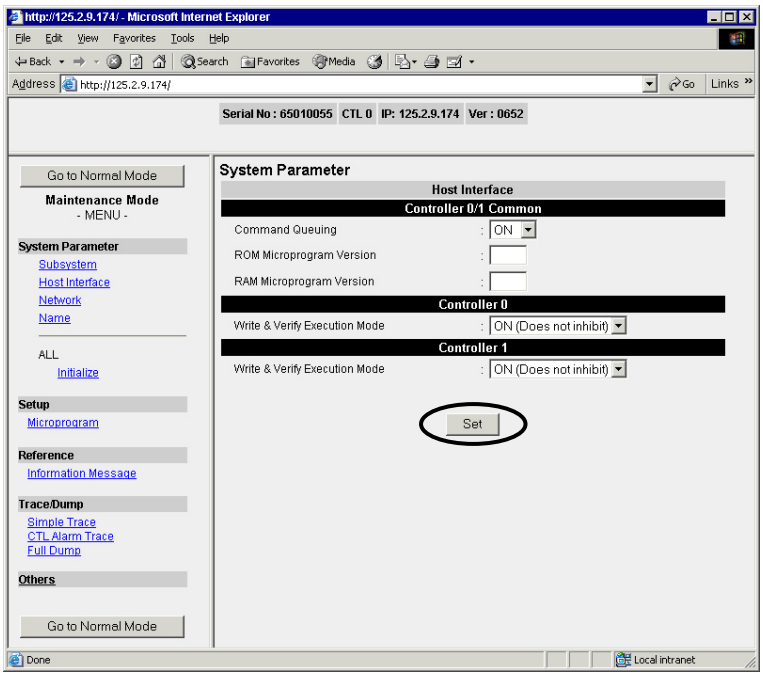
- Command Queuing : The response value in the Inquiry command is shown.
  [ON] : The command queuing is executed.
  [OFF] : The command queuing is controlled.
- ROM Microprogram Version :
  The response value of Product Revision Level (ROM Microprogram Version) in the Inquiry command is shown.
- RAM Microprogram Version :
  The response value of Product Revision Level (RAM Microprogram Version) in the Inquiry command is shown.

[Controller]

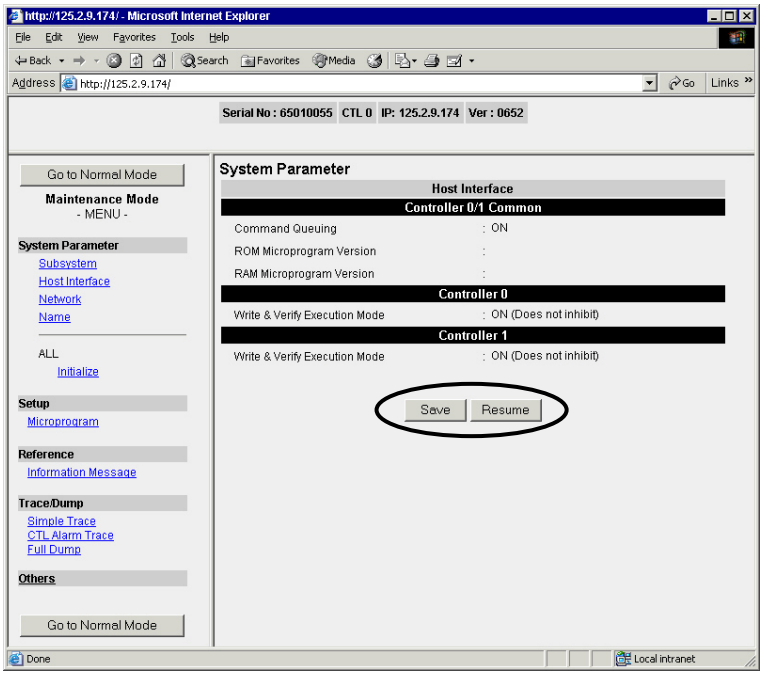
- Write & Verify Execution Mode
  The operations inside the Write & Verify command from the host are shown.
  [ON (Does not inhibit)] : The Write & Verify are executed.
  [OFF (Inhibit)] : This is executed and replace to the Write.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

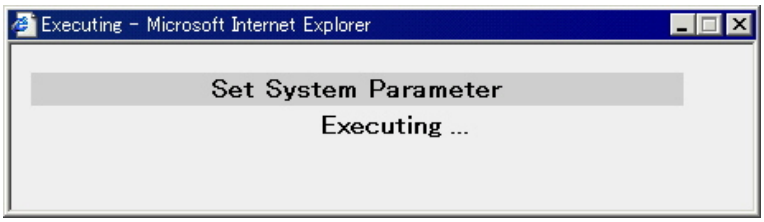
(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



(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.



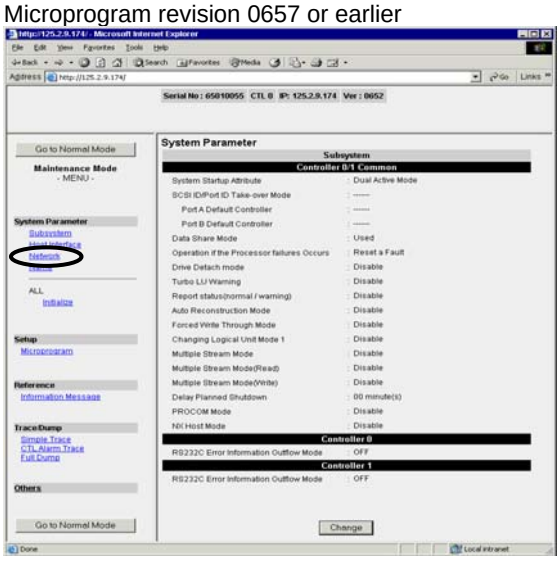
Copyright © 2002, 2005, Hitachi, Ltd.

3.2.3 Network

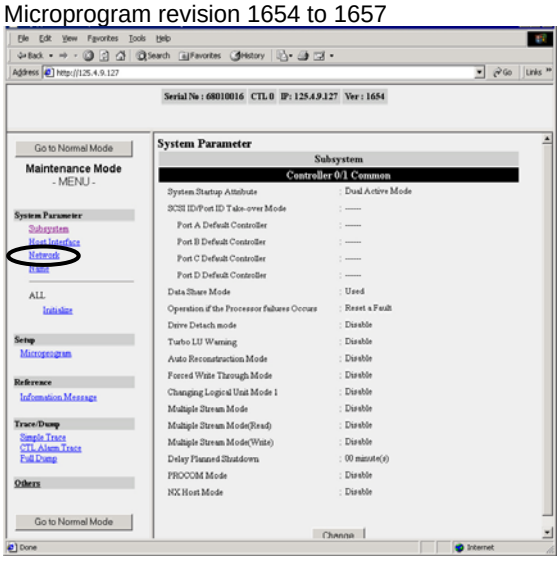
This function sets up/refer to the item regarding the network (Setting the user LAN port) of the device.

(1) Please click “Network”.

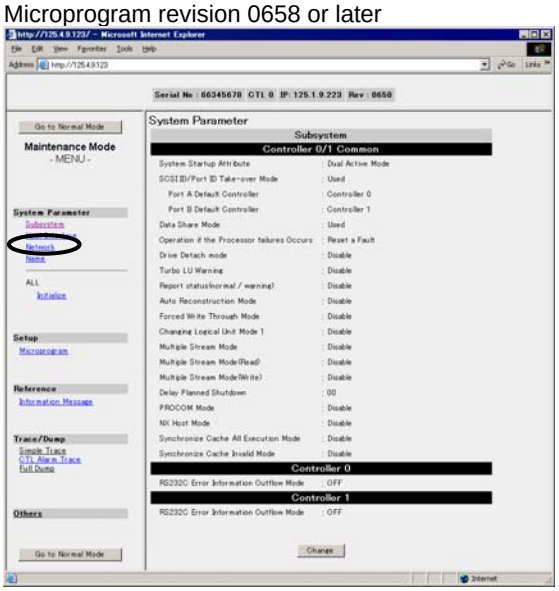
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

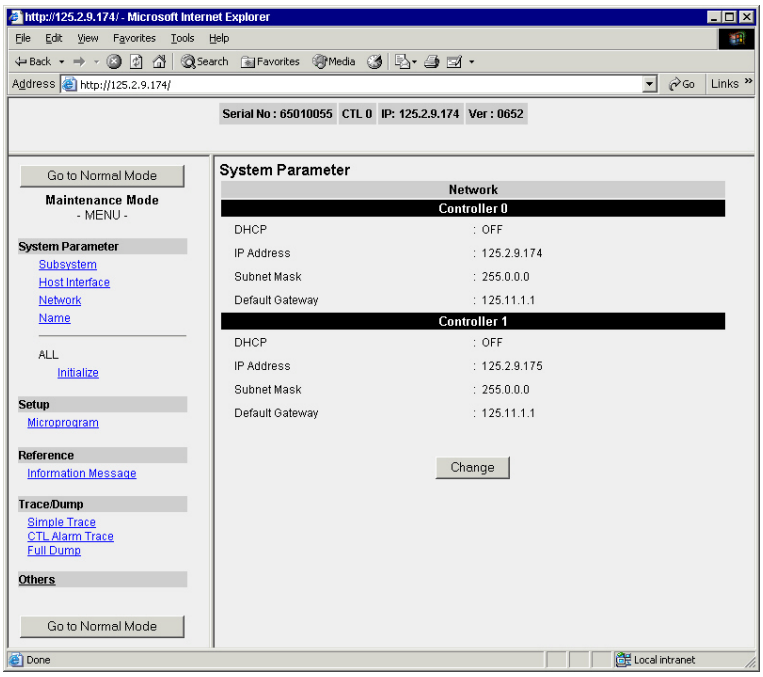


Microprogram revision 1658 or later



Copyright © 2002, 2005, Hitachi, Ltd.

(2) The present setting value (the current value) is displayed.

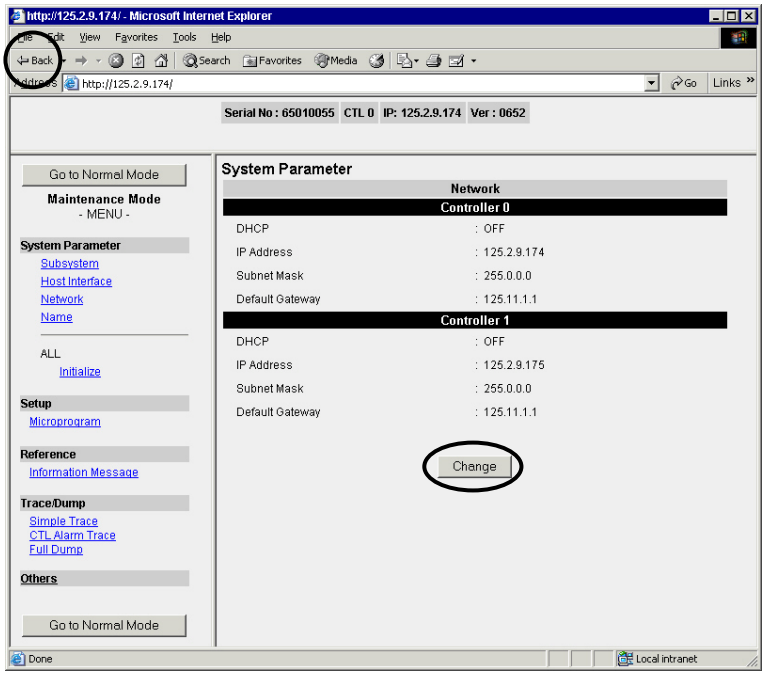


Copyright © 2004, 2005, Hitachi, Ltd.

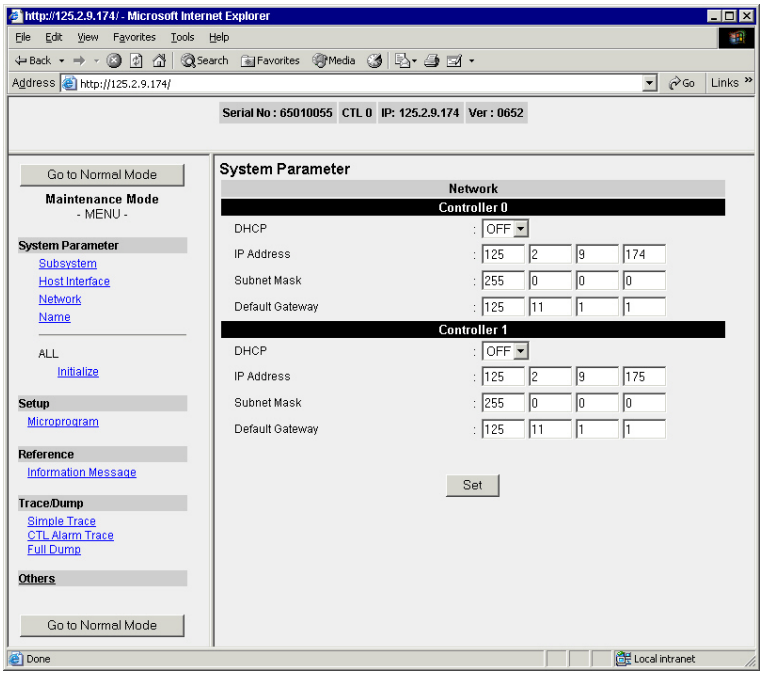
This page is for editorial purpose only.

Copyright © 2004, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

Explanation with regard to each item

[Controller 0]/[Controller 1]

- DHCP(‡1)

  [OFF]

  Valid the DHCP mode.

  [ON]

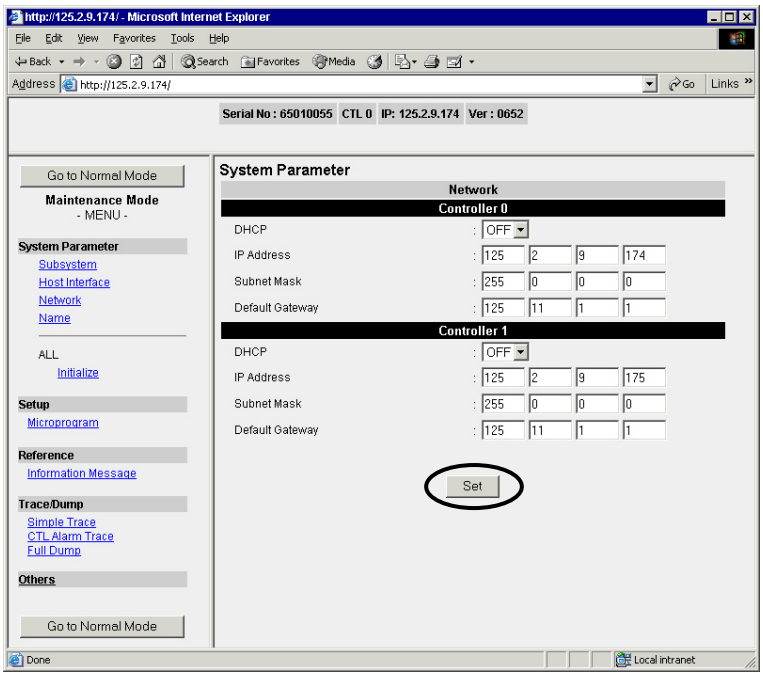
  Identifier the DHCP mode.
- IP Address

  Sets the IP ADDRESS.
- Subnet Mask

  Sets the SUB NET MASK.
- Default Gateway

  Sets the DEFAULT GATEWAY.

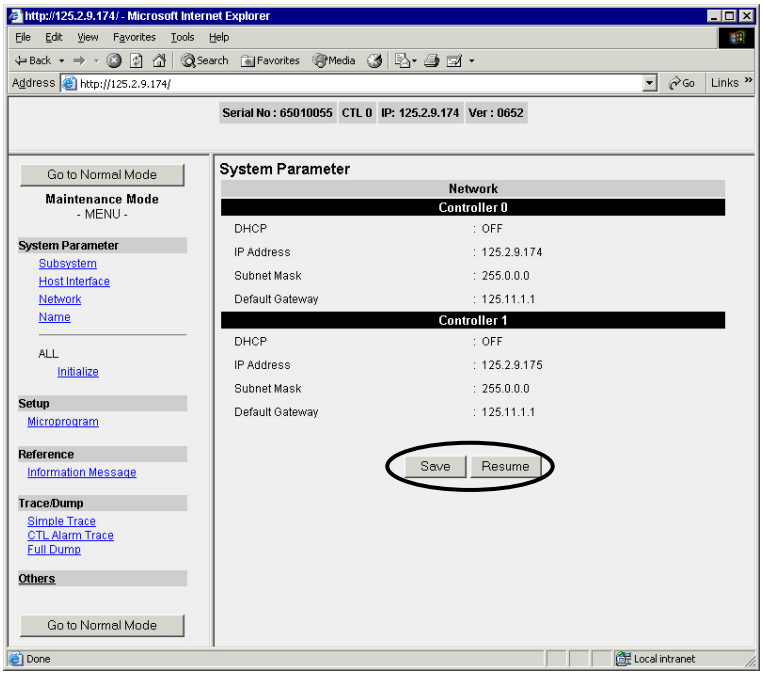
(5) Please click [Set] after setting completion.



*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”. (Disk Array Management Program 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 this device is used as an external Disk Drive of the DHCP server and the device IP address is obtained by DHCP function, and if the IP address of “10.x.x.x” is assigned to the device, IP addresses of Ports for Users and Maintenance may conflict with each other and the device may not function normally.
Request the system administrator that the DHCP server does not assign IP address of “11.x.x.x” to the device.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

(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.

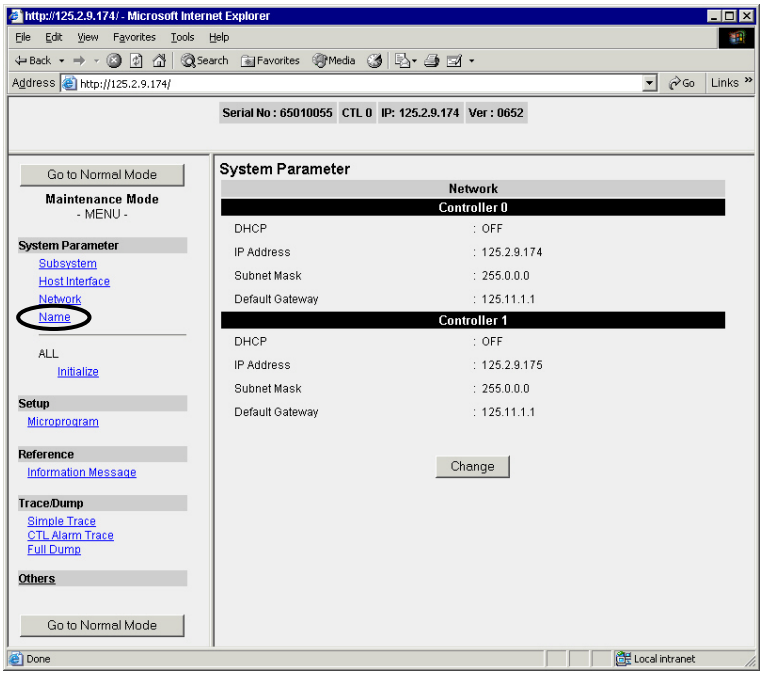


Copyright © 2002, 2005, Hitachi, Ltd.

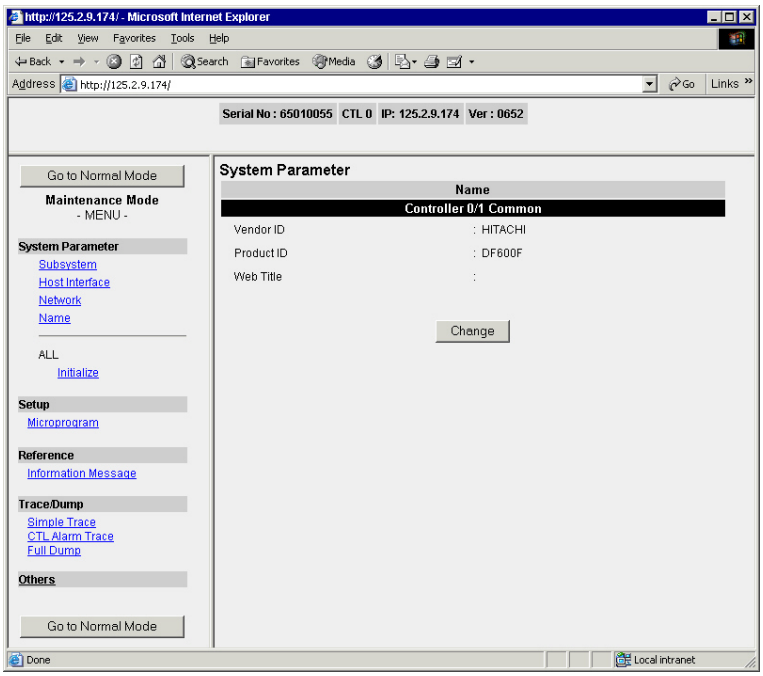
3.2.4 Name

This function can set up/refer to the item of the vendor name, model name etc. of the device.

(1) Please click “Name”.

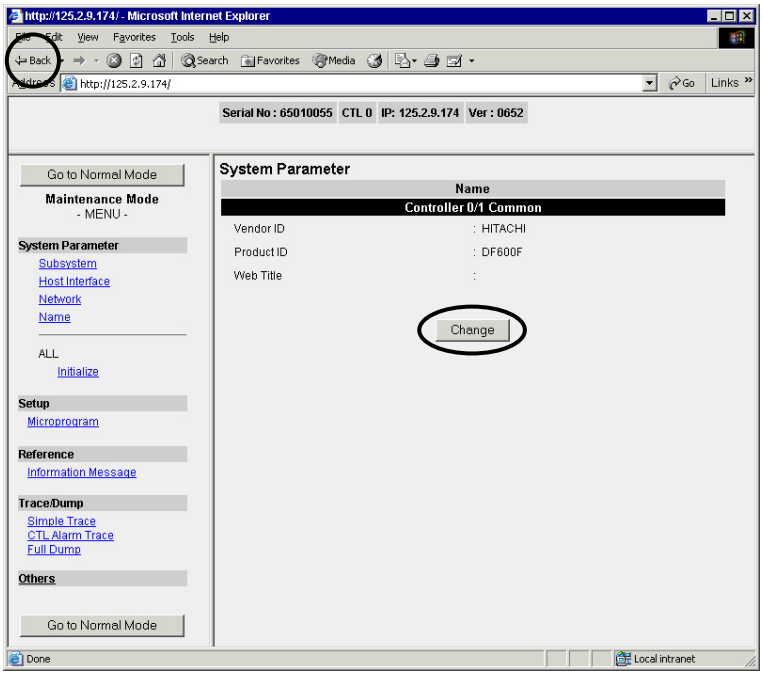


(2) The present setting value (the current value) is displayed.

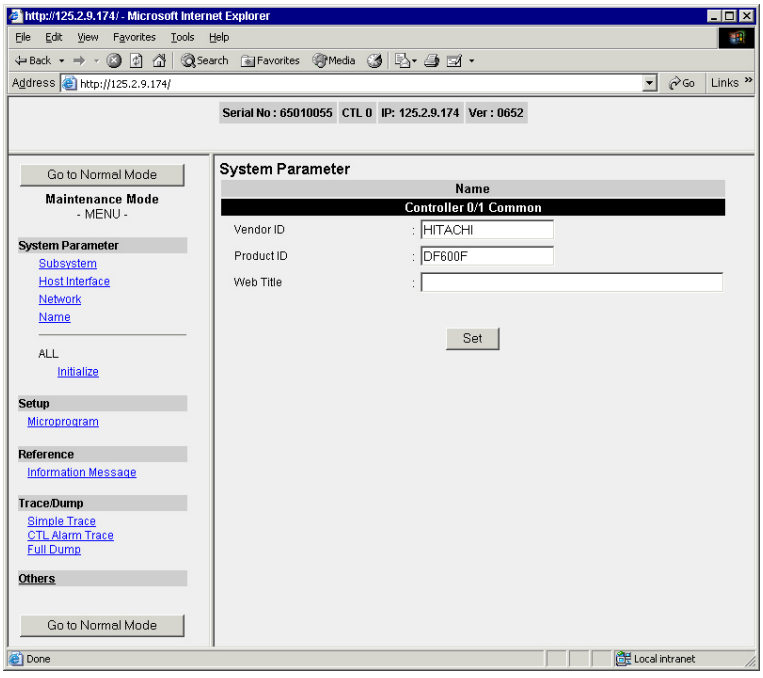


Copyright © 2002, 2005, Hitachi, Ltd.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

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.

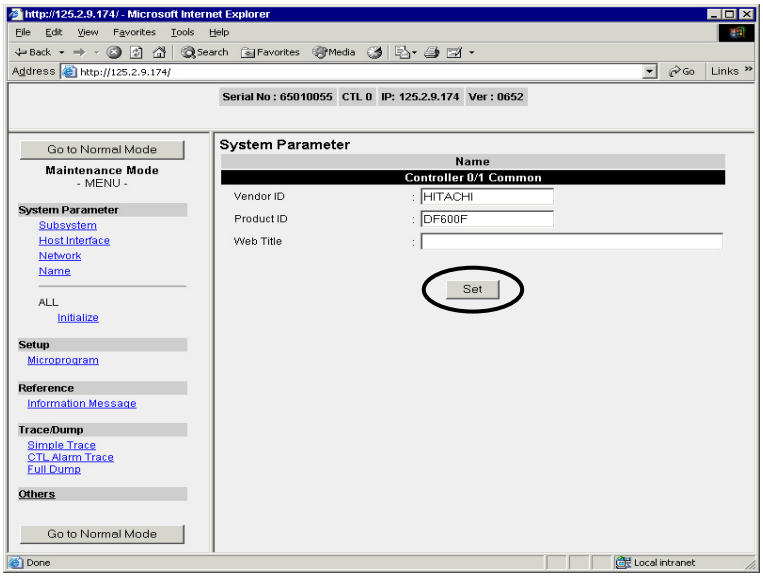
- Product ID

  The model name that is reported with the Inquiry command is set up.

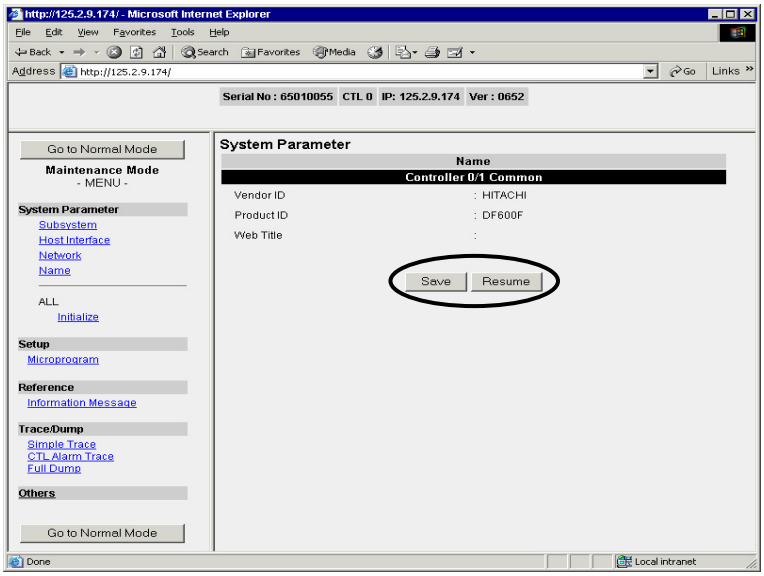
- Web Title

  Sets the Web Title.

(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.



Copyright © 2002, 2005, Hitachi, Ltd.

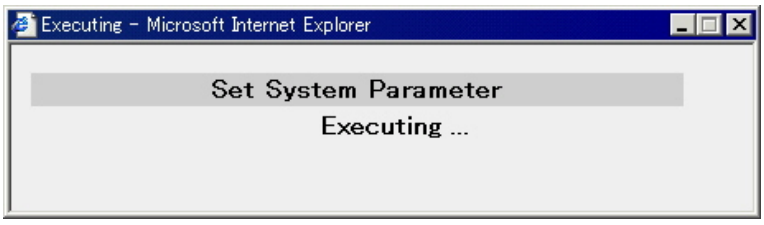
(7) If [Resume] is clicked, it returns to the setting window of before.
If [Save] is clicked, the following window is displayed.



(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.



Copyright © 2002, 2005, Hitachi, Ltd.

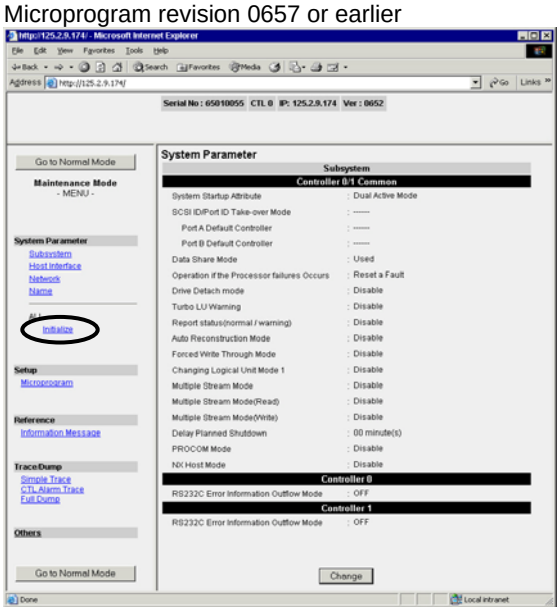
3.2.5 ALL

(1) Initialize

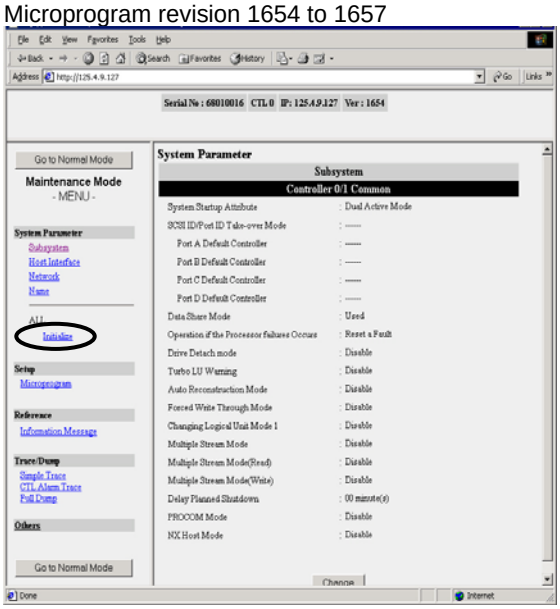
This function sets up the system parameter information of the device to the initial state. If this function was executed, the resetting of the system parameter becomes needed, because the system parameter becomes the initial state.

(a) Please click “Initialize”.

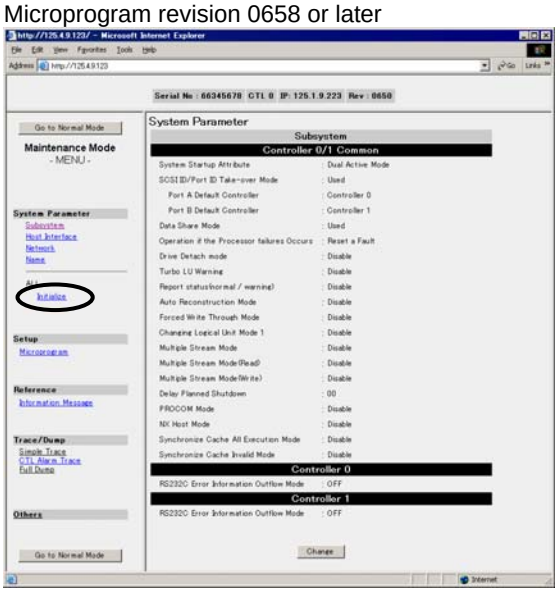
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

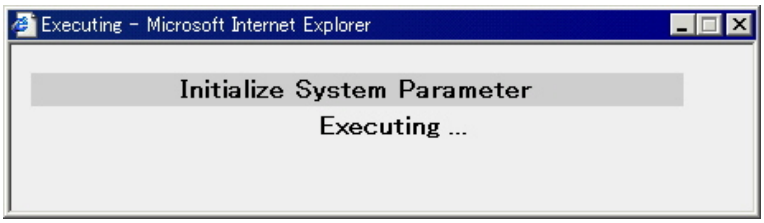


Microprogram revision 1658 or later



Copyright © 2002, 2005, Hitachi, Ltd.

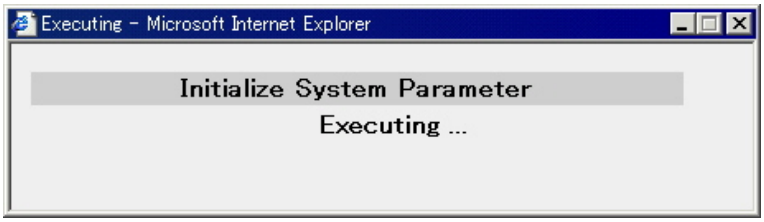
(b) If [Initialize] is clicked, the following window is displayed.



(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.



(e) The system parameter becomes the initial state, the following window is displayed. If [OK] is clicked, it returns to the menu.



Copyright © 2002, 2005, Hitachi, Ltd.

3.3 Setup

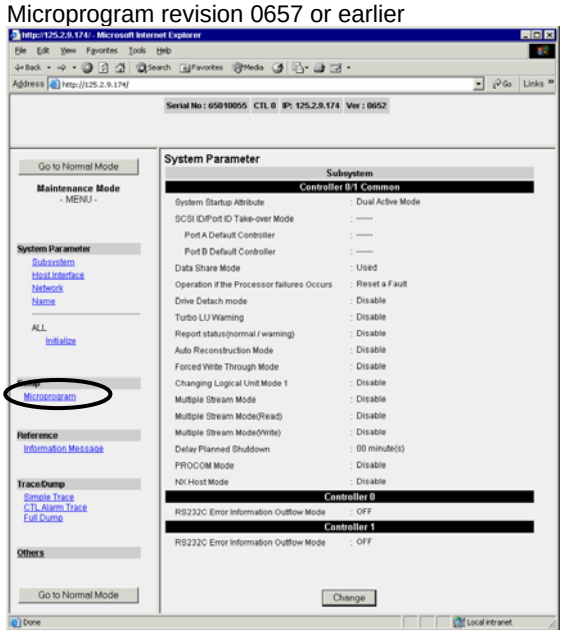
3.3.1 Microprogram

This function installs microprograms of the subsystem. There are two types of installation as shown below.

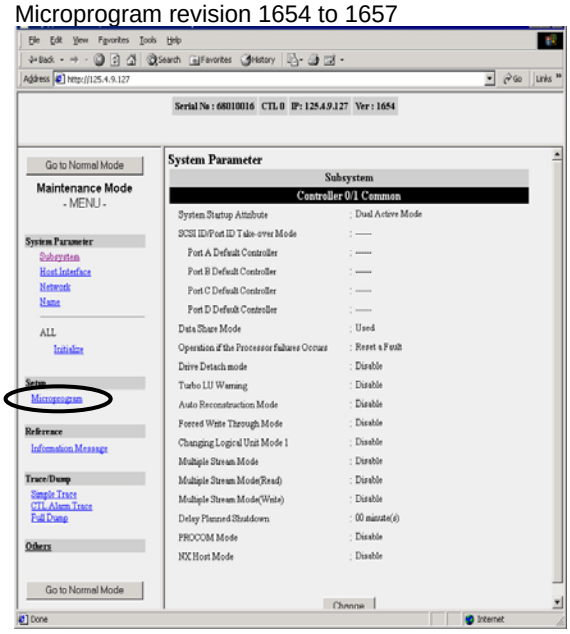
- Update installation ..... To install the microprograms with configuration information and system parameters taken over
- Initial setting up ..... To install the microprograms with configuration information and system parameters cleared

(1) Click “Microprogram”.

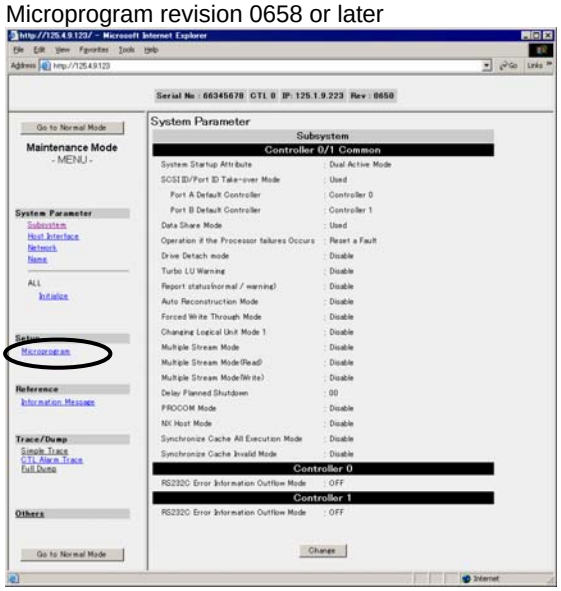
Microprogram revision 0657 or earlier



Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

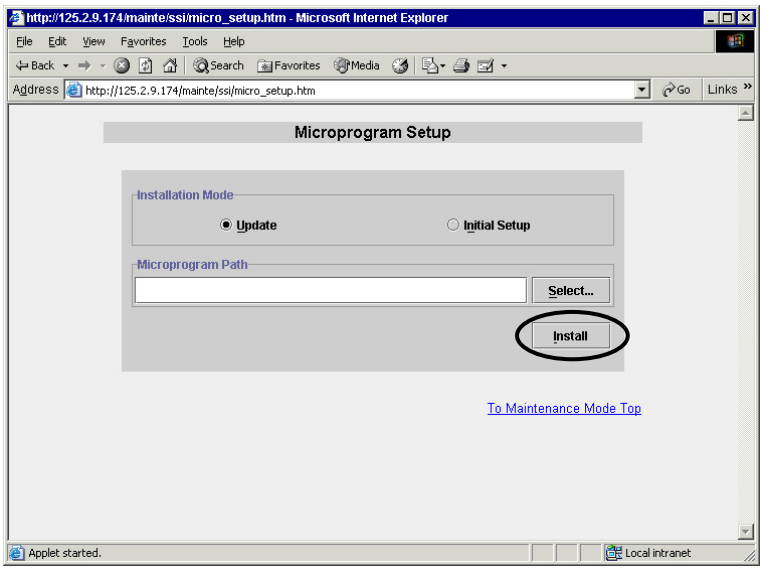


Microprogram revision 1658 or later



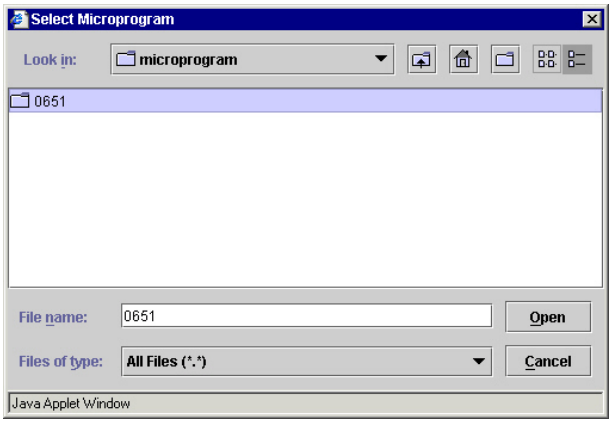
Copyright © 2002, 2005, Hitachi, Ltd.

(2) When the “Microprogram” is clicked, the following window is displayed.



(3) Select the installation type in the “Install Mode”.
- Update..... Update installation
- Initial Setup..... Initial setting up

In the Microprogram Path field, specify the directory in which the microprogram to be installed is stored.
Enter the path character string directly into the entrance field or operate the [Select...] button and select the directory from the file chooser (shown below).

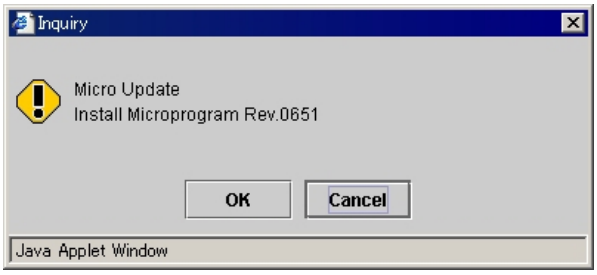


The path that can be specified is a set of directories directly under the “C:\diskarray-microprogram\microprogram” for each revision.

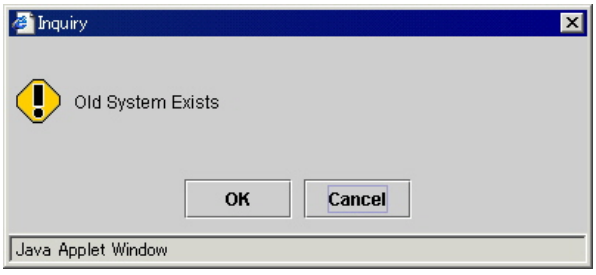
(4) Press the [Install] button.

Copyright © 2002, 2005, Hitachi, Ltd.

(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.

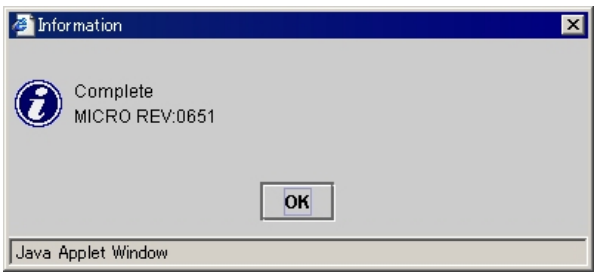


(7) When you want to continue the installation, press the [OK] button. When you want to abort the installation, press the [Cancel] button.

(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.



(9) Since the following completion message is displayed when the installation is completed, press the [OK] button.



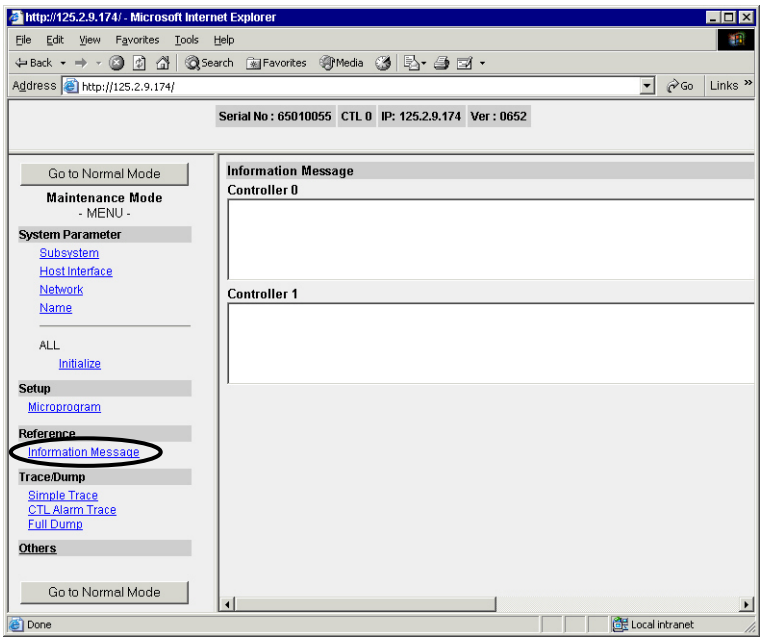
Copyright © 2002, 2005, Hitachi, Ltd.

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”.



Copyright © 2002, 2005, Hitachi, Ltd.

3.5 Trace/Dump

3.5.1 Collecting Simple Trace

This is a function to download current trace information.
To perform the down-lord, a free capacity of approximately 10 Mbytes is required in the PC.

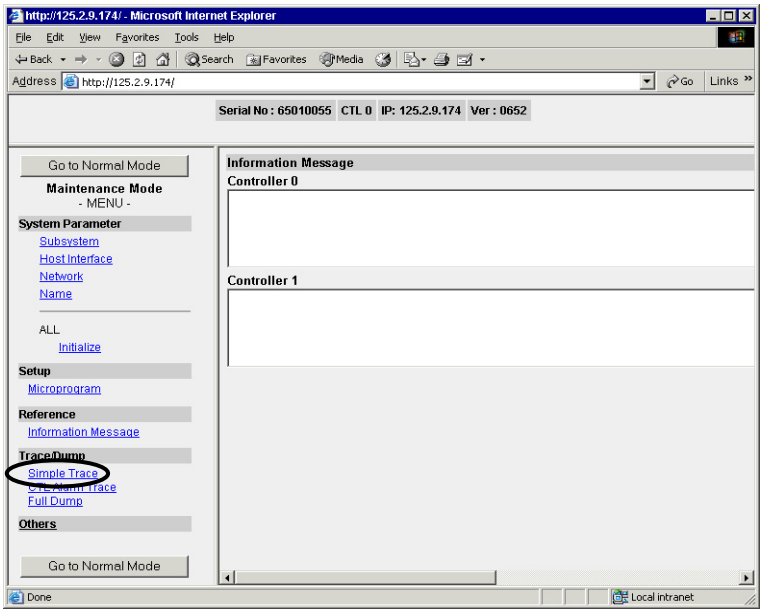
Simple Trace of both the Controllers can be collected through one Controller. It is not necessary to collect from both the controllers. (When it is collected from Control Unit#0, File name is "smpl_trc0.dat". When collected from Control Unit#1, file name is "smpl_trc1.dat.")

(1) Clear the cache of the browser 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], and [Clear Cache] in this order.

(2) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

Copyright © 2002, 2005, Hitachi, Ltd.

(3) Click “Simple Trace” in the menu frame.



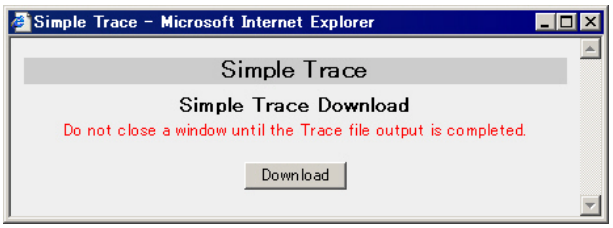
(4) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



(5) The following window is displayed.(‡1)



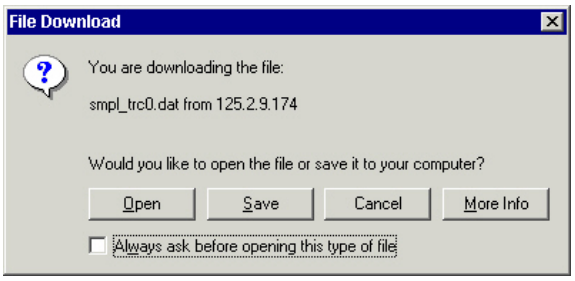
(6) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



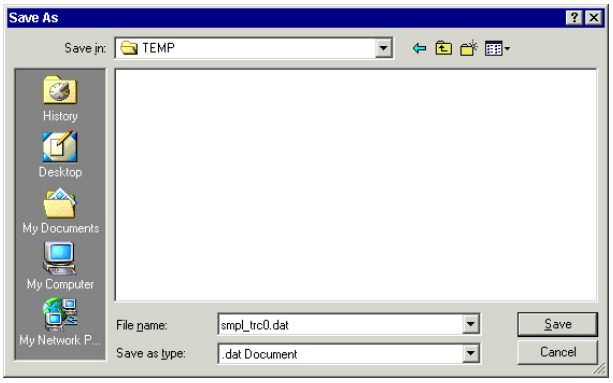
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the simple trace again after waiting for a while.

Copyright © 2004, 2005, Hitachi, Ltd.

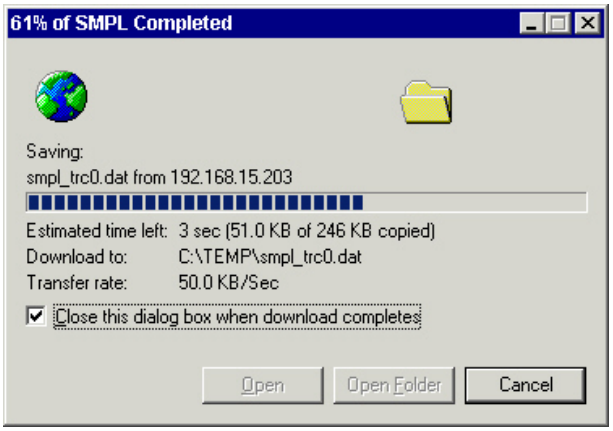
(7) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(8) 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.



(9) The following window is displayed during execution download.



(10) 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.

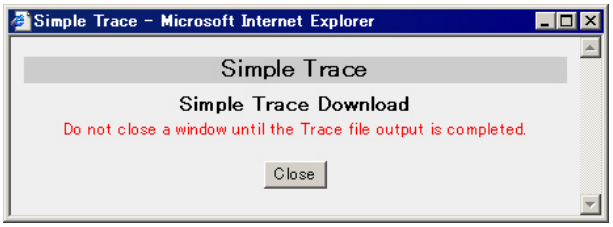
‡1 : There may be a case where the default file name is given as “ctla_trc0.dat..dat” depending on the setting of the PC. In this case, reset the file name to “ctla_trc0.dat” or any other name.

Copyright © 2002, 2005, Hitachi, Ltd.

(11) When the simple trace collection is completed, the following window is displayed. (It is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the simple trace collection is completed. It may not be collected.

Click [Close] to close the window.



Copyright © 2004, 2005, Hitachi, Ltd.

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 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.

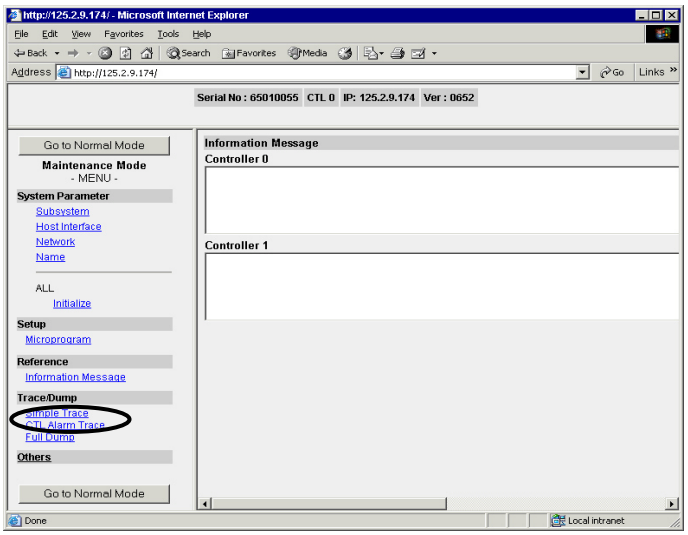
NOTE : The Web may be unable to be connected for two to three minutes after a detachment of the Control Unit because the CTL Alarm Trace is being made.

(1) 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], and [Clear Cache] in this order.

(2) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

Copyright © 2002, 2005, Hitachi, Ltd.

(3) 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

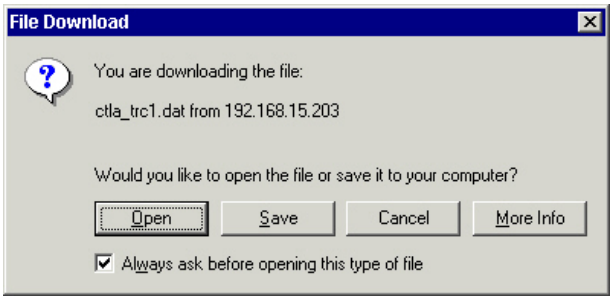
[MM/DD/20XY hh:mm:ss].. : A status in which the CTL alarm trace information is present

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. 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.

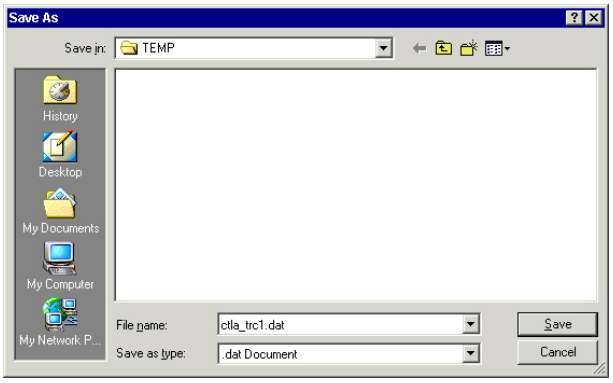
Copyright © 2004, 2005, Hitachi, Ltd.

(4) When downloading the CTL Alarm Trace information, perform the following.
- For the Microprogram revision x659/M or earlier:
  Select a controller (CTL 0 or CTL 1) in the “Get CTL Alarm Trace”, and then press the “Get Trace” button.
- For the Microprogram revision x659/Q or later:
  Press the “Download” button on the Control Unit side to be collected in “CTL Alarm Trace information”.(‡1)

(5) The following window is displayed. 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.(‡2) Please click [Cancel], if it is stopped.

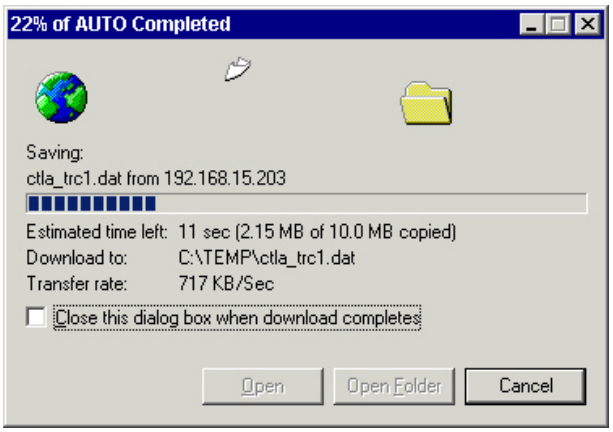


‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the CTL Alarm Trace again after waiting for a while.

‡2 : 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.

Copyright © 2002, 2005, Hitachi, Ltd.

(7) The following window is displayed during execution download.



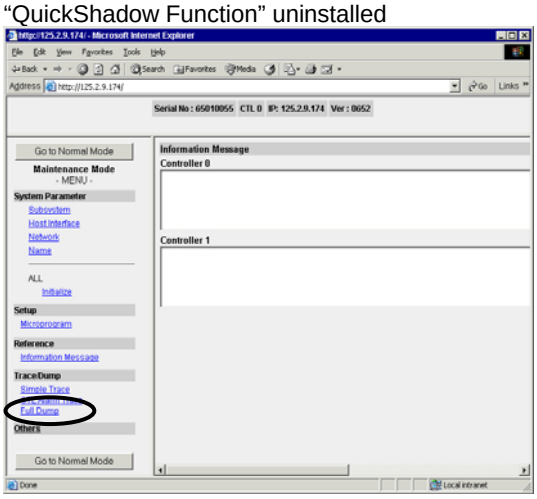
(8) The download completes.

Copyright © 2004, 2005, Hitachi, Ltd.

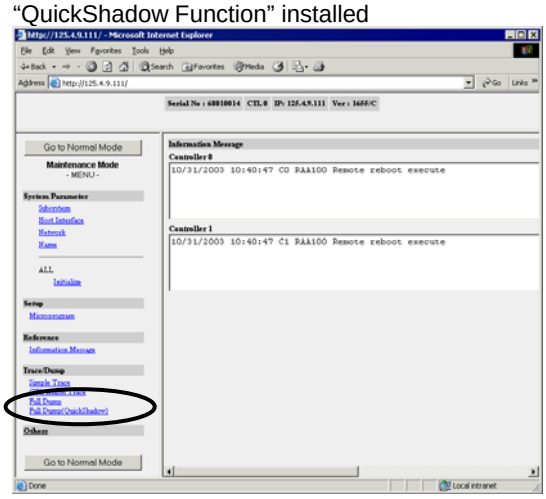
3.5.3 Collecting Full Dump

This function (Full Dump) is to download the logging information of the subsystem. The menu frame differs whether the priced optional feature, "QuickShadow Function", is installed or not.

"QuickShadow Function" uninstalled



"QuickShadow Function" installed



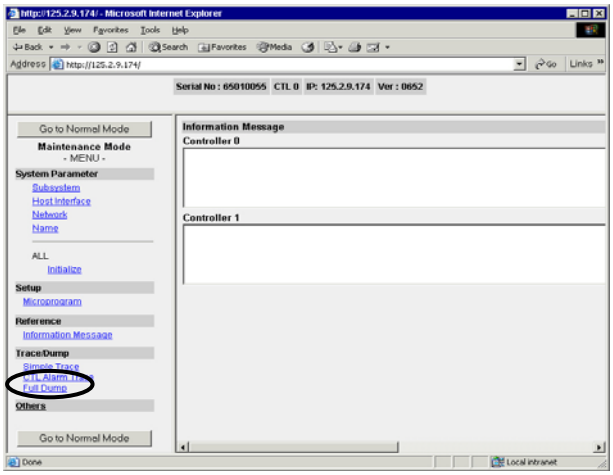
(1) For RK/RKL/RKS/RKD/RKSD
When QuickShadow Function is installed, the information downloaded by this function (Full Dump) does not include the information in QuickShadow.
The vacancy capacity of about 480 M bytes (1 controller) is necessary on the PC to download. Collect Full Dump from each Control Unit.
In order to distinguish from which Control Unit it is collected, store the collected data in different directories or with different file names.

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.

(a) 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], and [Clear Cache] in this order.

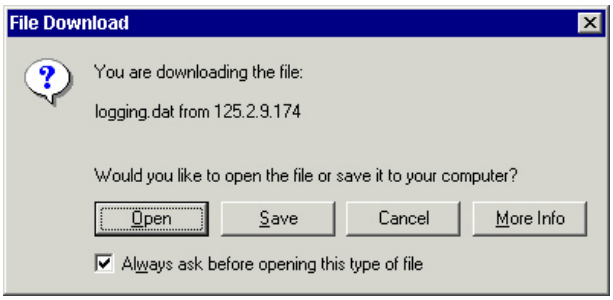
(b) Please click "Full Dump".

Copyright © 2002, 2005, Hitachi, Ltd.

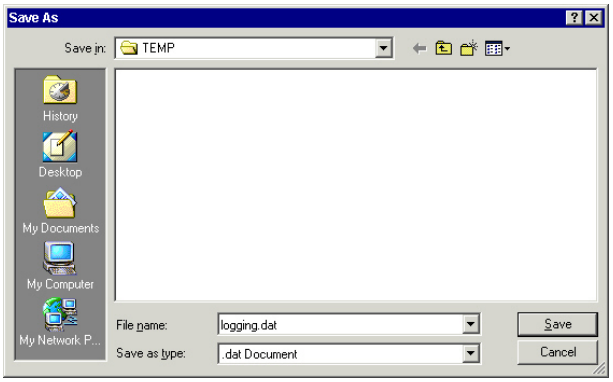


Copyright © 2002, 2005, Hitachi, Ltd.

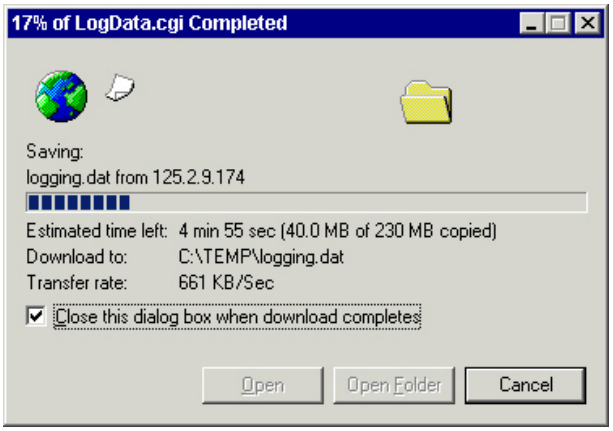
(c) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(d) 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.



(e) The following window is displayed during execution download.



(f) The download completes.

‡1 : There may be a case where the default file name is given as "logging.dat.dat" depending on the setting of the PC. In this case, reset the file name to "logging.dat" or any other name.

Copyright © 2004, 2005, Hitachi, Ltd.

(2) For RKH/RKHE
When QuickShadow Function is installed, the information downloaded by this function (Full Dump) does not include the information in QuickShadow.
The vacancy capacity of about 160 M bytes (1 controller) is necessary on the PC to download.

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. Collect of memory dump takes about 12 minutes per one controller.

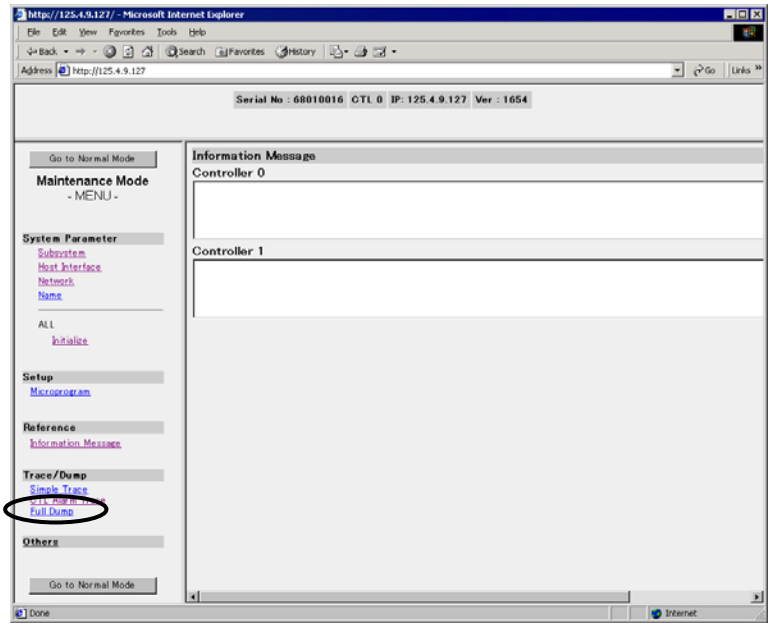
NOTE : When this function is used, the menu other than Logging Data comes not to use it.
Please enter into the Maintenance Mode again by the reset switch of the Controller, once again, if other menus are used, after this function was used.

(a) 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], and [Clear Cache] in this order.

(b) When the Microprogram revision is x659/M or earlier, and Windows XP Service Pack2 is used for OS of the service 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 [Security] tab, and click [Custom Level].
- Select [Enable] for [Downloads] – [File download] in the setting.
- Click the [OK].
- 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] in the [Internet Options] window.

Copyright © 2004, 2005, Hitachi, Ltd.

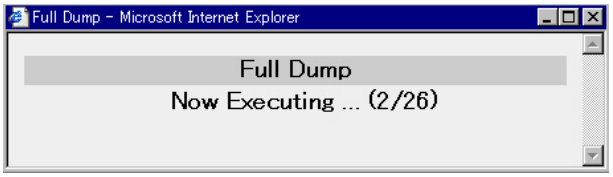
(c) Please click “Full Dump”.



(d) The confirmation window of collection starting is displayed. Click [OK] if collecting it. Click [Cancel] if stopping it. (It is displayed in the Microprogram revision x659/Q or later.)



(e) The following screen is displayed while having compressed the file.(‡1)



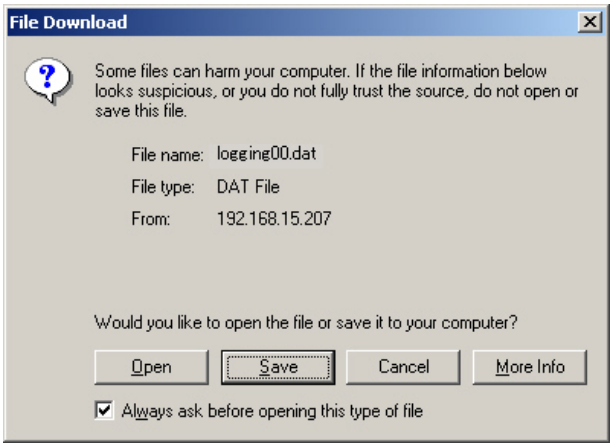
(f) The download confirmation window is displayed. Click the [Download]. (It is displayed in the Microprogram revision x659/Q or later.)



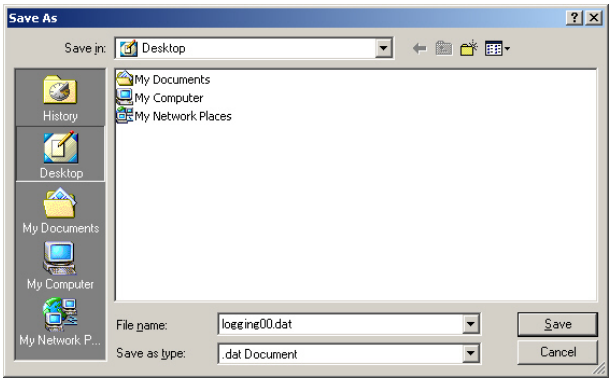
‡1 : An error message may be displayed. If it is displayed, click [OK], and collect the Full Dump again after waiting for a while.

Copyright © 2002, 2005, Hitachi, Ltd.

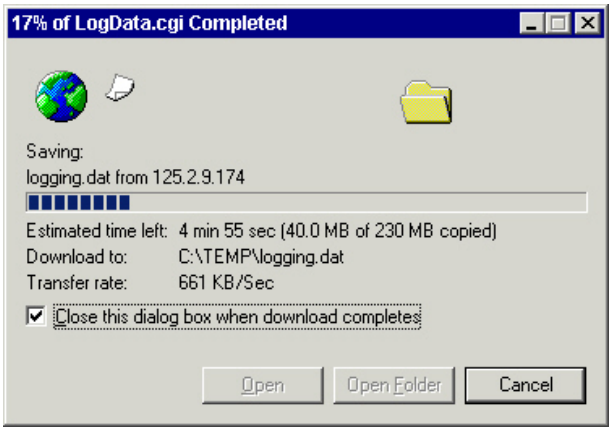
(g) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(h) 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.



(i) The following window is displayed during execution download.



‡1 : There may be a case where the default file name is given as "loggingXX.dat.dat" depending on the setting of the PC (XX=00: controller 0, XX=01: controller 1). In this case, reset the file name to "loggingXX.dat" or any other name.

Copyright © 2003, 2005, Hitachi, Ltd.

(j) 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.

(k) When the compression of the data to be collected by Full Dump is not completed, the following window is displayed.
[Next File] to start compression of the remaining file. The (e) window is displayed during the compression. (It is displayed in the Microprogram revision x659/Q or later.)



(l) When the Full Dump collection is completed, the following window is displayed. (It is displayed in the Microprogram revision x659/Q or later.)

NOTE : Do not click [Close] until it is confirmed that the Full Dump collection is completed. It may not be collected.

Click [Close] to close the window.



Copyright © 2003, 2005, Hitachi, Ltd.

3.5.4 Collecting Full Dump(Full Dump(QuickShadow))

This function (Full Dump(QuickShadow)) is effective only when the priced optional feature, "QuickShadow Function", is installed. If not, this menu frame may not be displayed.

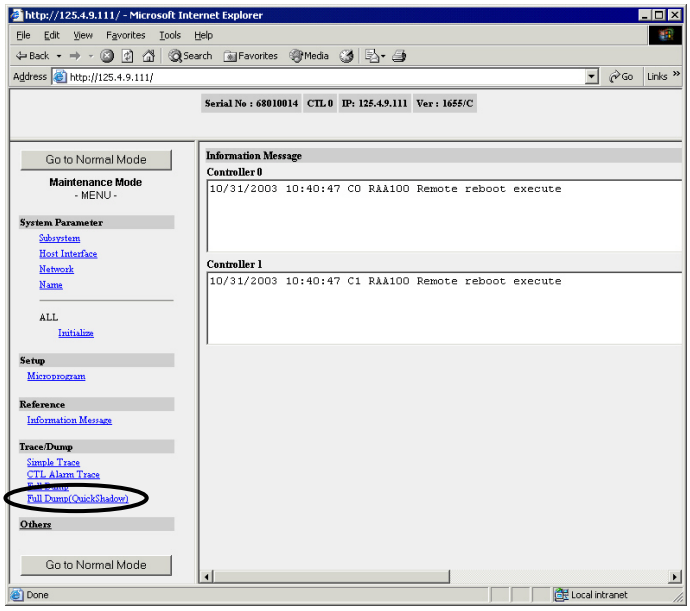
(1) For RK/RKL/RKS/RKD/RKSD

This function (Full Dump(QuickShadow)) downloads the logging information of the subsystem. The downloaded information includes the information in QuickShadow.
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.

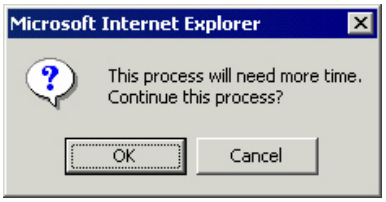
Installed cache of the subsystem	Free Capacity needed on PC	Collection time
1 G bytes/1 controller	1.1 G bytes/1 controller	About 7 minutes/1 controller
2 G bytes/1 controller	2.6 G bytes/1 controller	About 15 minutes/1 controller

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.

(a) Please click "Full Dump(QuickShadow)".

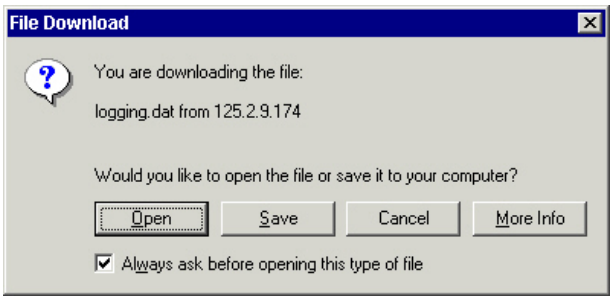


(b) The following window is displayed. Please click [OK], if it is continued. Please click [Cancel], if it is stopped.

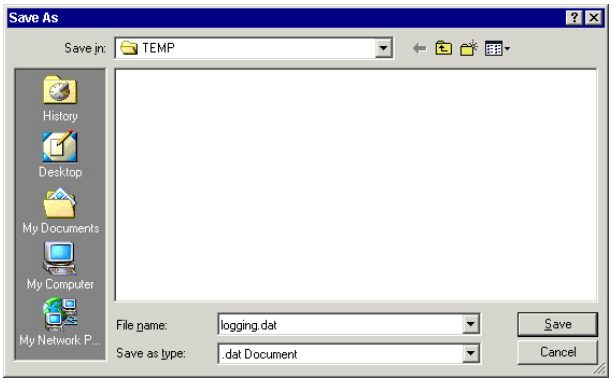


Copyright © 2003, 2005, Hitachi, Ltd.

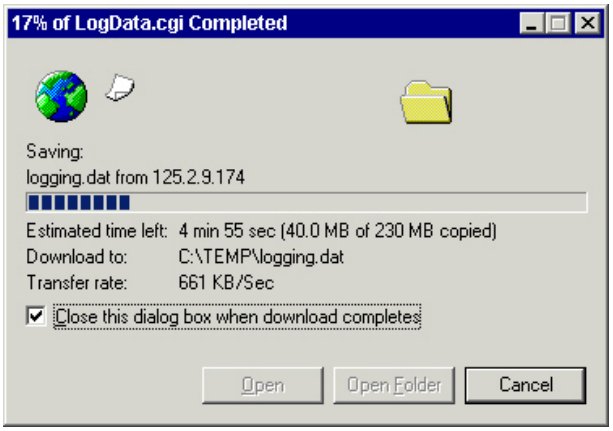
(c) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(d) 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.



(e) The following window is displayed during execution download.



(e) The download completes.

‡1 : There may be a case where the default file name is given as “logging.dat.dat” depending on the setting of the PC. In this case, reset the file name to “logging.dat” or any other name.

Copyright © 2003, 2005, Hitachi, Ltd.

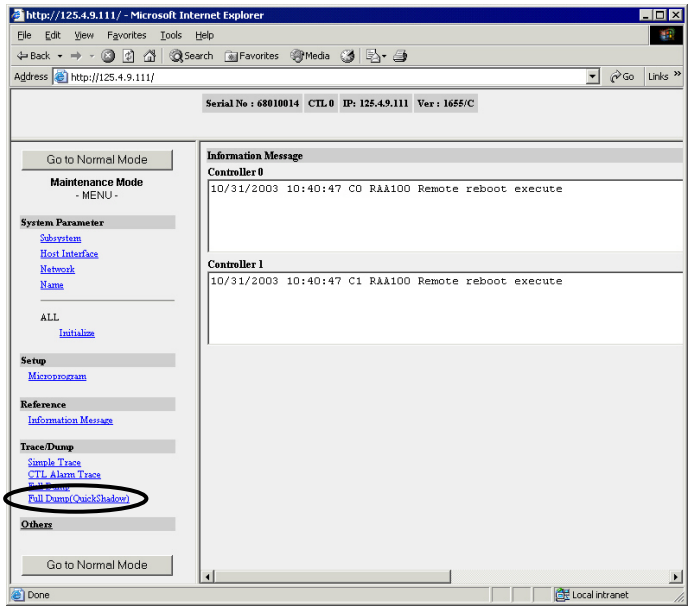
(2) For RKH/RKHE

This function (Full Dump(QuickShadow)) downloads the logging information of the subsystem. The downloaded information includes the information in QuickShadow. 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.

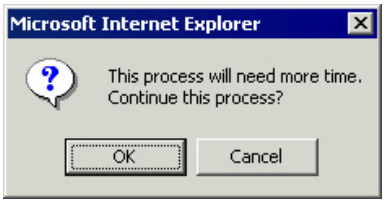
Installed cache of the subsystem	Free Capacity needed on PC	Collection time
2 G bytes/1 controller	320 M bytes/1 controller	About 38 minutes/1 controller
3 G bytes/1 controller	480 M bytes/1 controller	About 50 minutes/1 controller
4 G bytes/1 controller	640 M bytes/1 controller	About 60 minutes/1 controller

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.

(a) Please click “Full Dump(QuickShadow)”.

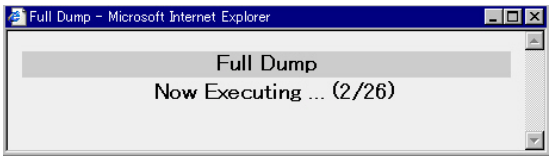


(b) The following window is displayed. Please click [OK], if it is continued. Please click [Cancel], if it is stopped.

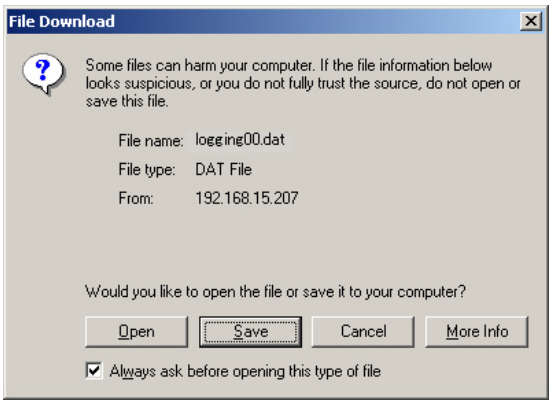


Copyright © 2003, 2005, Hitachi, Ltd.

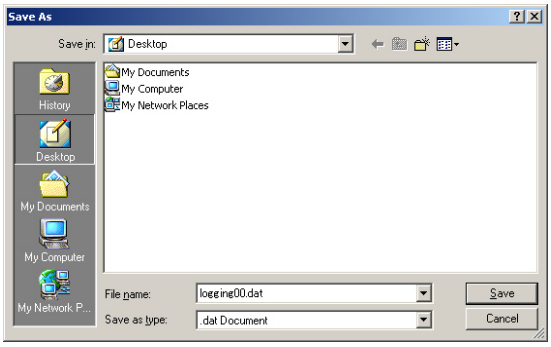
(c) The following screen is displayed while having compressed the file. (about 10 minutes)



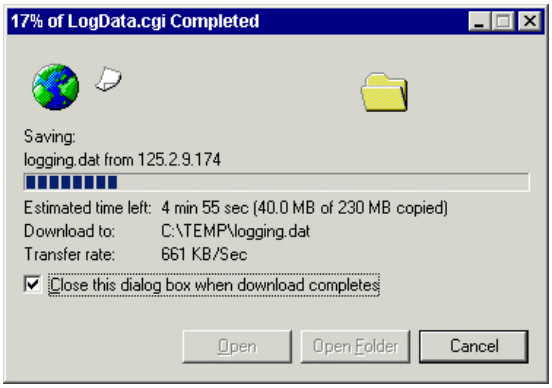
(d) The following window is displayed. Please click [Save], if it is continued. Please click [Cancel], if it is stopped.



(e) 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.



(f) The following window is displayed during execution download.



‡1 : There may be a case where the default file name is given as “loggingXX.dat.dat” depending on the setting of the PC (XX=00: controller 0, XX=01: controller 1). In this case, reset the file name to “loggingXX.dat” or any other name.

Copyright © 2003, 2005, Hitachi, Ltd.

(g) When compression of the data to be collected by Memory Dump is not completed, the following window is displayed. Click [Next File] to start compression of the remaining file. ((c) window is displayed during compression.)



(h) When compression of the data to be collected by Memory Dump is completed, the following window is displayed. Click [OK] to close the completion window.



Copyright © 2003, 2005, Hitachi, Ltd.

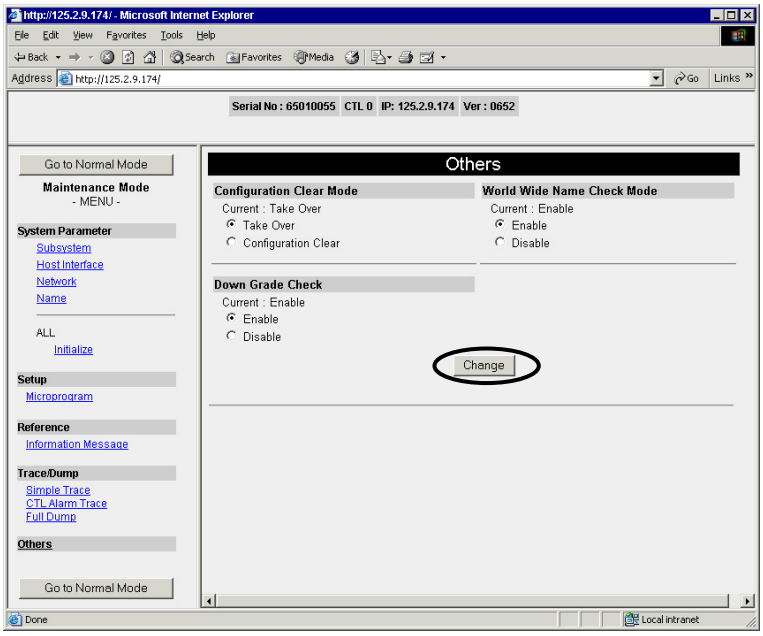
This page is for editorial purpose only.

Copyright © 2003, 2005, Hitachi, Ltd.

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
  The Data Down Grade Check as the Update Microprogram (update) installation is designated.
  [Enable] : The Down Grade Check is executed (default).
  [Disable] : The Down Grade Check is not executed.

(2) Please confirm that the setting value was updated.

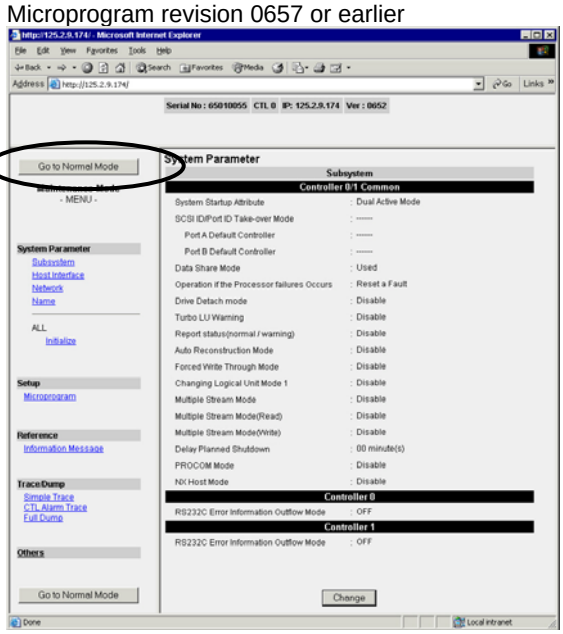
Copyright © 2002, 2005, Hitachi, Ltd.

3.7 Return Method to the Normal Mode

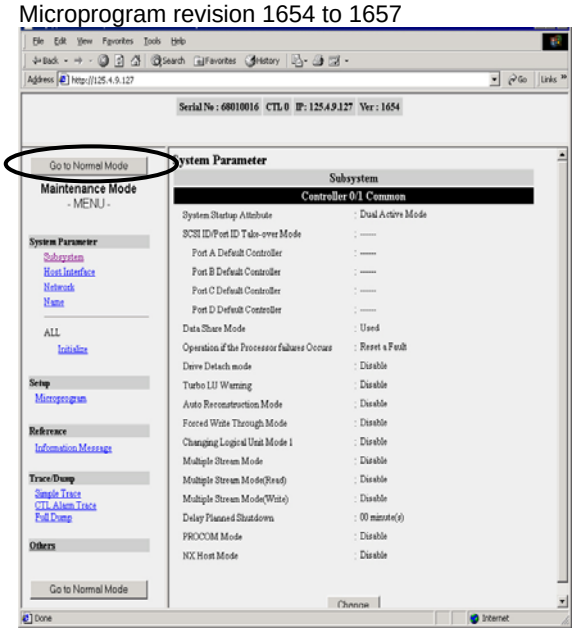
The method that returns from the Maintenance Mode to the Normal Mode is shown.

(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.

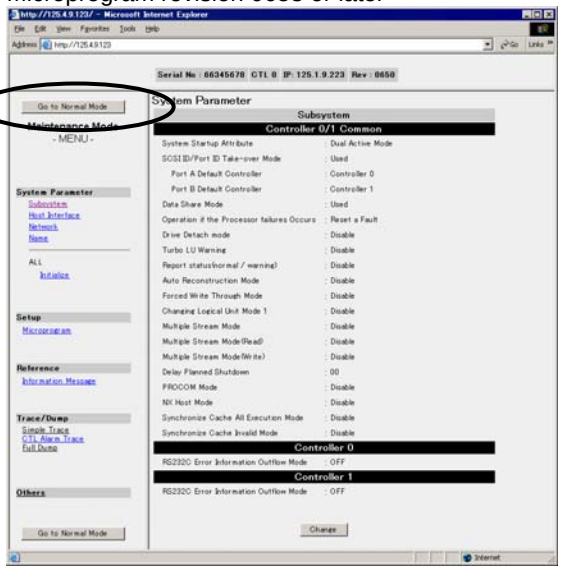
Microprogram revision 0657 or earlier



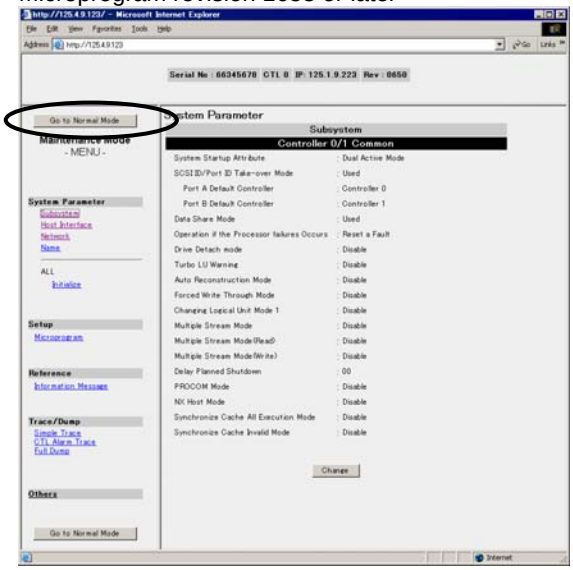
Microprogram revision 1654 to 1657



Microprogram revision 0658 or later

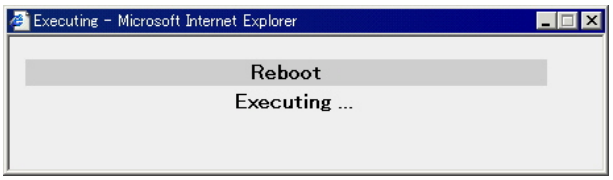


Microprogram revision 1658 or later



Copyright © 2002, 2005, Hitachi, Ltd.

(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.



(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 three minutes.)

Copyright © 2002, 2005, Hitachi, Ltd.

Appendix

Appendix A System Parameter Setting List..... APP A-0000
Appendix B Recycling ..... APP B-0000
Appendix C Support Browser List ..... APP C-0000

Copyright © 2002, 2005, Hitachi, Ltd.

Appendix

Appendix A System Parameter Setting List

(1) DF600 system parameter setting

System Parameter Setting for DF600

	System Parameter	
1	System Startup Attribute	Depends on System Configuration(*1)
2	Data Share Mode	Depends on System Configuration(*2)
3	Drive Detach mode enable	Disable (Standard setting)
4	Report status (normal/warning) (*4)	Enable (Standard setting)
5	Turbo LU Warning	Disable (Standard setting)
6	Operation if the Processor failures Occurs	Reset a Fault (Standard setting)
7	Command Queuing Mode	On (Standard setting)
8	ROM Microprogram Version	No change is needed
9	RAM Microprogram Version	No change is needed
10	RS232C Error Information Outflow Mode(*4)	When RS232C is used: On When RS232C is not used: Off (Standard setting)
11	Write & Verify Executing Mode	On (Standard setting)
12	DHCP(*5)	OFF (Standard setting)
13	IP Address	To be set according to the network setting
14	Subnet Mask	To be set according to the network setting
15	Default Gateway	To be set according to the network setting
	Host Group	
4	Logical Unit Mapping Mode	Depends on System Configuration(*3)

*1 : The Hot Standby mode is used when only one of the two Controllers is normal.

*2 : The Data Share mode is used to prevent performance deterioration caused by the LU ownership switching to be done when a host computer issues commands frequently to a Controller, to which the computer has no ownership, in the normal or regression status (owing to a path or host computer failure).
It is recommended to use the subsystem in the Data Share mode in the case where the LU ownership switching may occur.

*3 : When the DF600 is connected, the LU which is not wanted to be accessed by the port must be masked by means of the LU mapping mode.

*4 : RKH/RKHE+RKA is not supported.

*5 : 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”. (Disk Array Management Program 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 this device is used as an external Disk Drive of the DHCP server and the device IP address is obtained by DHCP function, and if the IP address of “10.x.x.x” is assigned to the device, IP addresses of Ports for Users and Maintenance may conflict with each other and the device may not function normally.
Request the system administrator that the DHCP server does not assign IP address of “11.x.x.x” to the device.

Copyright © 2002, 2005, Hitachi, Ltd.

This page is for editorial purpose only.

Copyright © 2002, 2005, Hitachi, Ltd.

(2) Host Connection Parameters setting

Host Connection Parameters Setting (1/3)

Host Group Options(*1)										
Simple Setting										
1	Platform	HP-UX			Solaris					
2	Alternative path	None	PV Link	None	None			HDLM(*2)	VxVM (V3.2P2+PP or later)(*3)	
3	Fail-over	None		MC/ServiceGuard	None	VCS(*4)		SC(*5)	None	VCS(*4)
4	Host Connection Mode 1	Standard Mode			Standard Mode					
5	Host Connection Mode 2	Without setting			Without setting			SUN Cluster Mode	Without setting	
Additional Parameters (Host Connection Mode 2)										
6	Logical Unit Number more than or equals to 8 can be recognized by HP-UX.(*9)	HP Connection Mode 2			Without setting					
7	Logical Unit Number more than or equals to 8 can be recognized by Windows 2000/2003(*9)	Without setting			Without setting					
8	TrueCopy is used by HP-UX	SRC Read Command Suppression Mode			Without setting					
9	VERITAS DBE_AC(*6) is used	Without setting			Without setting	Persistent RSV Cluster Mode(*6) / No_RSV_Conf Mode(*6)		Without setting	Persistent RSV Cluster Mode(*6) / No_RSV_Conf Mode(*6)	
10	Egenera Bladeframe is used	Without setting			Without setting					
11	GF825/825C is used	Without setting			Without setting					
Detail Setting (Host Connection Mode 2)										
12	Target Reset (Bus Device Reset) Mode	Without setting			Without setting					
13	Reset Logout of Third Party Process Mode	Without setting			Without setting					
Configuration Information										
Port Option										
1	Reset ALL LIP Port Mode	OFF			OFF					
2	Read Frame Min 128 Byte Mode	OFF(*7)			OFF					
Unit Identifier										
3	Controller Identifier	Disable				Enable			Enable	
4	Controller ID	---				DF600-00(*8) (Standard setting)			DF600-00(*8) (Standard setting)	
Online Verify										
5	Skip Verify	OFF			OFF					
System Parameter										
INQUIRY Setting										
1	Vendor ID	HITACHI (Standard setting)			HITACHI (Standard setting)					
2	Product ID	DF600F (Standard setting)			DF600F (Standard setting)					

*1 : When making the simple setting of the host group options, select items shown on gray backgrounds.

*2 : Hitachi Dynamic Link Manager
When using HDLM, take notice of the following. Also, refer to the HDLM hardware note of each version for the subsystem detail setting of the HDLM.
① Data Share Mode : Indispensable selection
② Vender ID : If this text is changed, it cannot be managed by HDLM. Do not change this text.
③ Serial Number : When the multiple storages of same types exist, a different Serial Number needs to be allocated for each disk array subsystem.

*3 : Array Support Library (ASL) : Indispensable selection
Please download from included CD-R or the Web screen of VERITAS. When connecting to RKH/RKHE, use ASL Rev.2 or later.

*4 : Veritas Cluster Server

*5 : SUN Cluster 3.0

*6 : Set the Persistent RSV Cluster mode and the No_RSV_Conf Mode when using the "VERITAS Database Edition/Advanced Cluster for Oracle9i" (abbreviated as DBE AC). The setting can be made through a specification of the additional parameter using the simple setting of Disk Array Management Program Ver.9.50.
When the version of Disk Array Management Program is Ver.9.50 or earlier, use the detail setting, but not the additional parameter using the simple setting.
When using the DBE_AC with direct connection, set the PortID Conversion Mode. Make the setting with the detail setting.
When using the IO fencing function supported from the VCS Ver4.0, the Persistent RSV Cluster Mode needs to be set. Make the setting using the detail setting.

*7 : This mode is specified when connecting the device as a boot disk or dump device of HP server. There is no problem for the operation if a device other than a boot disk or dump device of HP server is connected to the port to which this mode is set.
When the performance is required, use a different port from a boot disk and dump device of HP server for the other purpose.

*8 : Make the controller ID's of the CTL-00 and CTL-01 of the DF600 identical.
When the two or more DF-600's are connected to the system, set the Controller ID's which are not the duplications of each other.
When one of the host computers connected to the DF600 requires the Controller ID, set the Controller identifier to Enabled.

*9 : Up to 256 LUs from LUN0 to LUN255 can be mapped for each host group. However, the maximum number of LUs a server can recognize is different depending on the platform.

Copyright © 2002, 2005, Hitachi, Ltd.

Host Connection Parameters Setting (2/3)

Host Group Options(*1)																
Simple Setting																
1	Platform	AIX			NT/Windows2000/2003											
2	Alternative path	None		HDLM	None		HDLM(*2)	None		VxVM (*3) [Only Windows2000]			VxVM (*3)			
										(VxVM V3.0SP1/ 3.1)		(VxVM3.1SP1 +DDI)(*4)	(VxVM4.0)			
3	Fail-over	None	HACMP	None	None		MSCS			None		MSCS (*8)	VCS (*8)	None		
4	Host Connection Mode 1	Standard Mode			Standard Mode			Wolfpac k Mode		TRESPASS Mode				Standard Mode		
5	Host Connection Mode 2	UA(06/2A00) suppress mode enable NACA mode enable(*5) Logical Unit Reset Mode			Without setting		Target Reset (Bus Device Reset) Mode Reset Logout of Third Party Process Mode			Without setting		Persis-tent RSV cluster mode (*8)		Without setting		
Additional Parameters (Host Connection Mode 2)																
6	Logical Unit Number more than or equals to 8 can be recognized by HP-UX(*9)	Without setting			Without setting											
7	Logical Unit Number more than or equals to 8 can be recognized by Windows 2000/2003(*9)	Without setting			HISUP Mode											
8	TrueCopy is used by HP-UX	Without setting			Without setting											
9	VERITAS DBE_AC(*7) is used	Without setting			Without setting											
10	Egenera Bladeframe is used	Without setting			Without setting											
11	GF825/825C is used	Without setting			Without setting											
Detail Setting (Host Connection Mode 2)																
12	Target Reset (Bus Device Reset) Mode(*8)	Without setting	(*10)		Without setting					Without setting				ON		Without setting
13	Reset Logout of Third Party Process Mode(*8)	Without setting			Without setting									ON		Without setting
Configuration Information																
Port Option																
1	Reset ALL LIP Port Mode	OFF			OFF		ON			OFF		ON		OFF		
2	Read Frame Min 128 Byte Mode	OFF			OFF											
Unit Identifier																
3	Controller Identifier	Disable			Disable					Enable						
4	Controller ID	---			---					DF600-00(*6) (Standard setting)						
Online Verify																
5	Skip Verify	OFF			OFF(*11)											
System Parameter																
INQUIRY Setting																
1	Vendor ID	HITACHI (Standard setting)			HITACHI (Standard setting)											
2	Product ID	DF600F (Standard setting)			DF600F (Standard setting)					DF500F		DF600F (Standard setting)				

Copyright © 2002, 2005, Hitachi, Ltd.

*1 : When making the simple setting of the host group options, select items shown on gray backgrounds.

*2 : Hitachi Dynamic Link Manager When using HDLM, take notice of the following. Also, refer to the HDLM hardware note of each version for the subsystem detail setting of the HDLM.

① Data Share Mode : Indispensable selection

② Vender ID : If this text is changed, it cannot be managed by HDLM. Do not change this text.

③ Serial Number : When the multiple storages of same types exist, a different Serial Number needs to be allocated for each disk array subsystem.

*3 : VERITAS Volume manager for Windows (Ver.3.x supports only Windows 2000. Ver.4.x or later supports Windows 2003.)

*4 : DDI=VERITAS Volume manager for Windows Dynamic MultiPathing driver. Please download from the Web screen of VERITAS.

*5 : Set the NACA mode in the case where the subsystem is connected to the AIX server.

- When LUN Management is not used (when LUN Security is used)

  Do not connect a server other than the AIX server, to a port of the DF600 for which the NACA mode has been set. (In the Fibre Channel Loop connection or Fabric connection, do not connect the AIX server, together with another type server to a port of the DF600 for which the NACA mode has been set.)

- When LUN Management is used

  By registering the AIX server and the other servers at the separate host groups, you can connect the each server to the same port.

*6 : Make the controller ID's of the CTL-00 and CTL-01 of the DF600 identical.

When the two or more DF-600's are connected to the system, set the Controller ID's which are not the duplications of each other.

When one of the host computers connected to the DF600 requires the Controller ID, set the Controller identifier to Enabled.

*7 : Set the Persistent RSV Cluster mode and the No_RSV_Conf Mode when using the "VERITAS Database Edition/Advanced Cluster for Oracle9i" (abbreviated as DBE AC). The setting can be made through a specification of the additional parameter using the simple setting of Disk Array Management Program Ver.9.50.

When the version of Disk Array Management Program is Ver.9.50 or earlier, use the detail setting, but not the additional parameter using the simple setting.

When using the DBE_AC with direct connection, set the PortID Conversion Mode. Make the setting with the detail setting.

When using the IO fencing function supported from the VCS Ver4.0, the Persistent RSV Cluster Mode needs to be set. Make the setting using the detail setting.

*8 : Set the necessary mode from the detail setting (Host Connection Mode 2). The Persistent RSV Cluster Mode needs to be set.

*9 : Up to 256 LUs from LUN0 to LUN255 can be mapped for each host group. However, the maximum number of LUs a server can recognize is different depending on the platform.

*10:If HACMP version corresponds to the following cases, set the Target Reset to ON. In other cases, set it to OFF.

- When HACMP version is HACMP 5.2
- When HACMP 5.1 file set (cluster.es.server.events, cluster.base.server.events) version is 5.1.0.5 or later
- When HACMP 4.5 file set (cluster.es.server.events) version is 4.5.0.13 or later

*11: When an NTFS full format is done in Windows OS, Verify commands are issued abundantly, and performance deterioration of the subsystem occurs for this processing. When this made is set to ON, Verify operation is skipped. And, performance deterioration of a subsystem can be prevented.

In addition, please set it in OFF when down grade is done to microcode older than x65A/N after having made this setting ON.

Copyright © 2002, 2005, Hitachi, Ltd.

Host Connection Parameters Setting (3/3)

Host Group Options(*1)							
Simple Setting							
1	Platform	Linux			Tru64		Others
2	Alternative path	None	VxVM (VxVM3.2 update2)(*2)		None		None
3	Fail-over	None		VCS	None	TrueCluster	None
4	Host Connection Mode 1	Standard Mode			Standard Mode		Standard Mode
5	Host Connection Mode 2	Without setting			Without setting	True Cluster Connection Mode	Without setting
Additional Parameters (Host Connection Mode 2)							
6	Logical Unit Number more than or equals to 8 can be recognized by HP-UX(*5)	None			None		None
7	Logical Unit Number more than or equals to 8 can be recognized by Windows 2000/2003(*5)	None			None		None
8	TrueCopy is used by HP-UX	None			None		None
9	VERITAS DBE_AC(*4) is used	None			None		None
10	Egenera Bladeframe is used	None			None		None
11	GF825/825C is used	None			None		None
Detail Setting (Host Connection Mode 2)							
12	Target Reset (Bus Device Reset) Mode	None			None		None
13	Reset Logout of Third Party Process Mode	None			None		None
Configuration Information							
Port Option							
1	Reset ALL LIP Port Mode	OFF			OFF		OFF
2	Read Frame Min 128 Byte Mode	OFF			OFF		OFF
Unit Identifier							
3	Controller Identifier	Disable	Enable		Disable		Disable
4	Controller ID	---	DF600-00 (*3) (Standard setting)		---		---
Online Verify							
5	Skip Verify	OFF			OFF		OFF
System Parameter							
INQUIRY Setting							
1	Vendor ID	HITACHI (Standard setting)			HITACHI (Standard setting)		HITACHI (Standard setting)
2	Product ID	DF600F (Standard setting)			DF600F (Standard setting)		DF600F (Standard setting)

*1 : When making the simple setting of the host group options, select items shown on gray backgrounds.

*2 : Array Support Library (ASL) : Indispensable selection
Please download from included CD-R or the Web screen of VERITAS. When connecting with RKH/RKHE, use ASL Rev.2 or later.

*3 : Make the controller ID's of the CTL-00 and CTL-01 of the DF600 identical.
When the two or more DF-600's are connected to the system, set the Controller ID's which are not the duplications of each other.
When one of the host computers connected to the DF600 requires the Controller ID, set the Controller identifier to Enabled.

*4 : Set the Persistent RSV Cluster mode and the No_RSV_Conf Mode when using the "VERITAS Database Edition/Advanced Cluster for Oracle9i" (abbreviated as DBE AC). The setting can be made through a specification of the additional parameter using the simple setting of Disk Array Management Program Ver.9.50.
When the version of Disk Array Management Program is Ver.9.50 or earlier, use the detail setting, but not the additional parameter using the simple setting.
When using the DBE_AC with direct connection, set the PortID Conversion Mode. Make the setting with the detail setting.
When using the IO fencing function supported from the VCS Ver4.0, the Persistent RSV Cluster Mode needs to be set. Make the setting using the detail setting.

*5 : Up to 256 LUs from LUN0 to LUN255 can be mapped for each host group. However, the maximum number of LUs a server can recognize is different depending on the platform.

Copyright © 2002, 2005, Hitachi, Ltd.

Appendix B 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.**

Copyright © 2002, 2005, Hitachi, Ltd.

- **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.**
- **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.

Copyright © 2002, 2005, Hitachi, Ltd.

⚠ 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.



Copyright © 2002, 2005, Hitachi, Ltd.

(3) Specifications of lead battery

Table B.1 Specifications of sealed Nickel-hydride rechargeable battery (RK/RKD/RKS/RKSD)

No.	Specification	Backup Battery Unit	
1	Manufacturer	Hitachi Maxell, Ltd	Matsushita Battery Industrial Co., Ltd
2	Model	5HR-SC-2001	HHR-30P10W5
3	Voltage (V)	6	
4	Capacity (mAh)	5500 min	5600 min

Table B.2 Specifications of sealed Nickel-hydride rechargeable battery(RKH/RKHE)

No.	Specification	RKH/RKHE
1	Manufacturer	Matsushita Battery Industrial Co., Ltd
2	Model	HHR-30P15W3
3	Voltage (V)	
4	Capacity (mAh)	8400 min

(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 B.2 Storage method

No.	Item	Requirement
1	Storage method	Store a battery or 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 10 to 30 ^{o}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 battery or Backup Battery Unit, check the usable time limit of it following Item (6), "Checking usable time limit of maintenance part".		

Copyright © 2002, 2005, Hitachi, Ltd.

(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	-20°~30°
3	Supplemental charge interval	Once per six months

Copyright © 2003, 2005, Hitachi, Ltd.

Appendix C Support Browser List

Table C.1 Support Browser List

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						0651		0652	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×	×	×
					4.7	○	×	○	×
					4.76	○	×	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×	○	×
					4.76	○	×	○	×
			8	Netscape Navigator	4.76	○	×	○	×
2	PC	Windows	95	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	×	×
			98	Internet Explorer	5.0	○	○	○	○
					5.5	○	○	○	○
					6.0	○	○	○	○
			NT/2000	Internet Explorer	5.0	○	×	○	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			ME	Internet Explorer	5.0	×	×	×	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			XP	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	○	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	×	×
			2003 (IA64)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	×	×
					6.0 (32 Bit)	×	×	×	×
		Windows	95	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×
			98	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						0651		0652	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	NT/2000/ ME/XP	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	○	×	○	×
					7.0	×	×	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						0653		1654	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×	×	×
					4.7	○	×	○	×
					4.76	○	×	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×	○	×
					4.76	○	×	○	×
			8	Netscape Navigator	4.76	○	×	○	×
2	PC	Windows	95	Internet Explorer	5.0	○	○	○	×
					5.5	○	○	○	×
					6.0	○	○	○	×
			98	Internet Explorer	5.0	○	○	○	○
					5.5	○	○	○	○
					6.0	○	○	○	○
			NT/2000	Internet Explorer	5.0	○	×	○	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			ME	Internet Explorer	5.0	×	×	×	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			XP	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	○	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	×	×
			2003 (IA64)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	×	×
					6.0 (32 Bit)	×	×	×	×
		Windows	95	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×
			98	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						0653		1654	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	NT/2000/ ME/XP	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	○	×	○	×
					7.0	×	×	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						x655		x656	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×	×	×
					4.7	○	×	○	×
					4.76	○	×	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×	○	×
					4.76	○	×	○	×
			8	Netscape Navigator	4.76	○	×	○	×
2	PC	Windows	95	Internet Explorer	5.0	○	×	○	×
					5.5	○	×	○	×
					6.0	○	×	○	×
			98	Internet Explorer	5.0	○	○	○	○
					5.5	○	○	○	○
					6.0	○	○	○	○
			NT/2000	Internet Explorer	5.0	○	×	○	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			ME	Internet Explorer	5.0	×	×	×	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			XP	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	○	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	○	○
			2003 (IA64)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	×	×	○	×
					6.0 (32 Bit)	×	×	○	○
		Windows	95	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×
			98	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						x655		x656	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	NT/2000/ ME/XP	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	○	×	○	×
					7.0	×	×	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2003, 2005, Hitachi, Ltd.

(○ : support × : not support)

No.	Platform	OS		Browser		System version			
						x657/x658		x659	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
1	WS	IRIX	6.5	Netscape Navigator	3.02	×	×	×	×
					4.7	○	×	○	×
					4.76	○	×	○	×
		Solaris	2.6	Netscape Navigator	4.7	○	×	○	×
					4.76	○	×	○	×
			8	Netscape Navigator	4.76	○	×	○	×
2	PC	Windows	95	Internet Explorer	5.0	○	×	○	×
					5.5	○	×	○	×
					6.0	○	×	○	×
			98	Internet Explorer	5.0	○	○	○	○
					5.5	○	○	○	○
					6.0	○	○	○	○
			NT/2000	Internet Explorer	5.0	○	×	○	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			ME	Internet Explorer	5.0	×	×	×	×
					5.5	○	○	○	○
					6.0	○	○	○	○
			XP	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	○	○	○
			2003 (IA32)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	○	○	○
			2003 (IA64)	Internet Explorer	5.0	×	×	×	×
					5.5	×	×	×	×
					6.0	○	×	○	×
					6.0 (32 Bit)	○	○	○	○
		Windows	95	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×
			98	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2004, 2005, Hitachi, Ltd.

No.	Platform	OS		Browser		System version			
						x657/x658		x659	
		Type	Ver.	Type	Ver.(*1)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)	Supported or not supported	Java Aplet supported or not supported (*2) (*3)
2	PC	Windows	NT/2000/ ME/XP	Netscape Navigator	4.7	○	×	○	×
					4.73	○	×	○	×
					4.74	○	×	○	×
					4.75	○	×	○	×
					4.76	○	×	○	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	○	×	○	×
					7.0	×	×	×	×
			2003 (IA32/IA64)	Netscape Navigator	4.7	×	×	×	×
					4.73	×	×	×	×
					4.74	×	×	×	×
					4.75	×	×	×	×
					4.76	×	×	×	×
					6.0	×	×	×	×
					6.1	×	×	×	×
					6.2	×	×	×	×
					7.0	×	×	×	×

*1 : Service Pack 1 is included.
*2 : When installing the microprogram, the service PC must be started by the OS from the drive C in order to prevent a problem of security from occurring.
*3 : Java Aplet is used for the following cases.
Microprogram installation, Host command trace download, and Online ENC/SENC firmware download.

Copyright © 2004, 2005, Hitachi, Ltd.

Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Dec.20.2002	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	Issued	-
					SAFE 0130	The time was changed to five minutes from ten minutes. (Pages MNTE 05-0020, 05-0140, 05-0260, 05-0320, 05-0340, 05-0390, 05-0480, and 05-570 were changed by the same reason.)	CH
1	Dec.27.2002	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.0 → Rev.1	CH
					GENE 0060	4.8.4 was changed.	CH
					GENE 0100	6.7 was added.	AD
						7.5.4 and 7.5.5 were moved to page GENE 0110.	DL
					GENE 0110	7.5.4 and 7.5.5 were moved to this page from page GENE 0100.	AD
					GENE 0120, INTO 04-0120, MNTE 02-0260, MNTE 02-2030	"True Copy" was corrected to "TrueCopy".	CR
					SAFE 0130, SAFE 0140, MNTE 07-0100	Charge was changed.	CH
					SAFE 0090	Reference page was added to "Rack mounting and lifter operation…"	AD
					SAFE 0110	"INST 07-0200" was corrected to "INST 07-0210". (Careful, the …)	CR
						Reference page was added to "To prevent part failures…"	AD
					SAFE 0120	"INST 08-0020" was corrected to "INST 08-0000". (Be sure to wear…)	CR
						Reference page was added to "Be sure to wear a wrist strap…"	AD
					SAFE 0150, SAFE 0160, SAFE 0180, INTO 02-0100, INTO 02-0130, INTO 02-0140, INTO 02-0180, INTO 03-0000, INTO 04-0300 to INTO 03-0330, INST 01-0050, INST 01-0060, INST 01-0070, INST 02-0040, INST 02-0070, INST 02-0090, INST 02-0110, INST 02-0130, INST 02-0150, INST 02-0180, INST 02-0230, INST 02-0250, INST 02-0280, INST 02-0290, INST 02-0310, INST 02-0330 to INST 02-0370, INST 02-0390 to INST 02-0430, INST 03-0730, INST 03-0770 to INST 03-0790, INST 05-0180, INST 06-0070, INST 06-0350, INST 06-0410, INST 06-0530, INST 06-0540, INST 06-0550, INST 06-0560 to INST 06-0580, INST 07-0160, INST 07-0200, INST 08-0050, INST 08-0060, INST 08-0070, INST 08-0130, MNTE 05-0050, MNTE 05-0090, MNTE 05-0100, MNTE 07-0010, MNTE 08-0080, MNTE 08-0090, MNTE 08-0110, MNTE 08-0120, WEB 03-0060	Description of Additional Battery Unit was changed.	CH
					INTO 02-0040	‡1 was added to text.	AD

Copyright © 2002, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0200	"INST 03-00140" was corrected to "INST 03-0140".	CR
					INST 03-0260	"URHT5" was corrected to "URHP5".	CR
					INST 03-0490	Reference Figure number of text was corrected.	CR
					INST 03-0650	Reference Item of text was corrected.	CR
					INST 03-0730	Text was changed.	CH
					INST 05-0140	"Multi Stream Mode (Write/Read)" was added to No.4.	AD
						No.6 was moved to page INST 05-0150.	DL
					INST 05-0150	No.6 was moved to this page from page INST 05-0140.	AD
						Reference page of No.8 was corrected.	CR
					INST 05-0180	‡1 was added.	AD
					INST 05-0200	"Multi Stream Mode (Write/Read)" was added to ①.	AD
						(b) was moved to page INST 05-0210.	DL
					INST 05-0210	(b) was moved to this page from page INST 05-0200.	AD
					INST 05-0810	[Read Frame Min 128 Byte Mode] was added to ③.	AD
					INST 05-1020	No.11 was added.	AD
					INST 05-1311, INST 05-1312, INST 06-0641, INST 06-0642, INST 06-0721, INST 06-0722, INST 06-0860 to INST 06-0930, MNTE 08-0111, MNTE 08-0112, WEB 03-0061, WEB 03-0062	There pages were newly added.	AD
					INST 06-0010	Description was added to Work-5.	AD
					INST 06-0020	Description was added to Work-7.	AD
					INST 06-0020, INST 06-0030, INST 06-0200, INST 06-0210, INST 06-0240, INST 06-0250, INST 06-0260	Reference page was corrected.	CR
					INST 06-0360	Reference Item of text was corrected.	CR
					INST 06-0610	Text was added to Work-9 and Work-10.	AD
						Work-11 was moved to page INST 0620.	DL
					INST 06-0620	Work-11 was moved to this page from page INST 06-0610.	AD
					INST 06-0630	Text was added to Work-10.	AD
					INST 06-0640	(1) was added.	AD
						Previous text was moved to page INST 0650.	DL
					INST 06-0650	(2) was moved to this page from page INST 06-0640.	AD
						(a) was moved to page INST 0660.	DL
					INST 06-0660	(a) was moved to this page from page INST 06-0650.	AD
					INST 06-0680	Position of AC Power Unit Switch and Power Unit were moved.	CH
					INST 06-0700	Description of "When connecting with five…" was added.	AD
					INST 06-0710	Reference No. was changed. (2) → (3)	CH
					INST 06-0730	Item No. was changed. (2) → (3)	CH
						Text was added.	AD

Copyright © 2002, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0740	Figure was changed.	CH
					INST 06-0760	Position of AC Power Unit Switch and Power Unit were moved.	CH
					INST 06-0850	Reference Item of ‡1was corrected.	CR
					INST 07-0050, INST 08-0030, INST 08-0040	Reference page was corrected.	CR
					INST 07-0170	Text was added to (4)-(a).	AD
					MNTE 02-0230	Reference page of “SYSPM” was corrected.	CR
					MNTE 02-0290, MNTE 02-0300	Description of Meaning was changed to table (Loop).	CH
					MNTE 02-1290	Simple trace of “W0100x” was deleted.	DL
					MNTE 02-1310	Reference page of “W0C00x” was corrected.	CR
					MNTE 02-2000, MNTE 02-2270, MNTE 02-2280, WEB 03-0030, WEB 03-0040, WEB 03-0070, WEB 03-0090, WEB 03-0140, WEB 03-0230, WEB 03-0250, WEB 03-0300 to WEB 03-0360	Window designs were modified.	CH
					MNTE 02-2030, MNTE 02-2380	Reference page was corrected.	CR
					MNTE 02-2300, MNTE 02-2310	Figure number was corrected.	CR
					MNTE 02-2450	LEDs indication was added.	AD
						“ENC Unit” of Action(s) to be taken was corrected to “Control Unit”.	CR
					MNTE 02-2520	No.8 was moved to page MNTE 02-2530.	DL
					MNTE 02-2530	No.8 was moved to this page from page MNTE 02-2520.	AD
					MNTE 02-2800	Reference Item of *2was corrected.	CR
					MNTE 05-0540	(c) was added.	AD
					MNTE 05-0720, MNTE 05-0740	“battery unit” was corrected to “Additional Battery Unit”.	CR
					MNTE 05-0610	(g) was deleted.	DL
					MNTE 06-0080	“INST” was corrected to “MNTE” in NOTE.	CR
					MNTE 08-0020, MNTE 08-0050	No.4 was added.	AD
					MNTE 08-0030	No.19 was deleted.	DL
					MNTE 08-0040	“5507353-124” of No.27 was corrected to “5507353-51”.	CR
					WEB 01-0020	Port 1 (Users) <Variable IP> was corrected in table.	CR
					WEB 03-0060	Multiple Stream Mode (Write/Read) was added.	AD
						[RS232C error …] was moved to page WEB 03-0061.	DL
					WEB 03-0061	[RS232C error …] was moved to this page from page WEB 03-0061.	AD
					APP A-0000, APP A-0020	No.7 was added to Configuration Information	AD
					APP A-0010	*14 was added.	AD
					APP B-0030	Additional Battery Unit was added to Table B-1	AD
2	Feb.14.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.1 → Rev.2	CH
					GENE 0020	Text was added to General Cautionary Notes.	AD
						Trademarks was moved to page GENE 0021	DL
					GENE 0021, GENE 0022	There pages were newly added.	AD
					GENE 0110	Title of 8.3.2 was changed.	CH

Copyright © 2002, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					GENE 0130	"Sence" was corrected to "Sense".	CR
						2.7.2 was added.	AD
						Page of 7.8 was changed.	CH
					SAFE 0080	Reference page (INST 06-0520) was added to "Make sure that there is no scratch …"	AD
					SAFE 0110	Reference page (INST 06-0870) was added to "To prevent part failures …"	AD
					SAFE 0120	Reference page was added. ("Be sure to wear …" , "When you install an ENC …" (INST 06-0870), "When adding Disk …" (INST 06-0290)	AD
					SAFE 0150, SAFE 0160, SAFE 0170, SAFE 0180,	Warning Label of Figure was changed	CH
					INTO 01-0010	Description was added to Treatment.	AD
					INTO 02-0020, INTO 02-0030, INTO 02-0050, INTO 02-0060, INTO 03-0010, INTO 03-0050, INTO 04-0140, INTO 04-0150, INTO 04-0170, INTO 04-0180, INTO 04-0250, INTO 04-0270, INTO 04-0290, INST 05-0140, INST 05-0560, INST 05-0570, MNTE 02-2580, MNTE 04-0340, MNTE 05-0060, MNTE 05-0140, MNTE 05-0160, MNTE 05-0180, MNTE 05-0200, MNTE 05-0220, MNTE 05-0230, MNTE 05-0250,	RAID0+1 → RAID1+0 was changed.	CH
					INTO 02-0050	Text was added to (1). (However, the HDUs 0 to …)	AD
					INTO 02-0100, INST 01-0070, INST 02-0040, INST 02-0090, INST 02-0100, INST 02-0110, INST 02-0350,INST 02-0360, INST 02-0370, INST 02-0420, INST 02-0430, INST 02-0440, INST 03-0730,INST 06-0540, INST 08-0050,INST 08-0060, INST 08-0070,INST 08-0130, MNTE 02-2520,MNTE 05-0050, MNTE 05-0090,MNTE 05-0720, MNTE 07-0010, MNTE 08-0080, MNTE 08-0100, MNTE 08-0110, MNTE 08-0111,	Figure was changed. (Additional Battery Unit, CART)	CH
					INTO 02-0140, INTO 02-0150	Figure was changed.	CH
					INTO 03-0020, INTO 03-0060	"Physical specification" was changed.	
					INTO 03-0030	*2 was changed.	CH
					INTO 03-0070	*1 was changed.	CH
					INTO 04-0000	Description of (2) and (4) were changed.	CH
					INTO 04-0010	Flow chart was changed.	CH
					INTO 04-0121, INTO 04-0122, INST 03-0652, INST 05-0381, INST 05-0391, INST 05-0461, INST 05-0462, INST 05-0621 to INST 05-0628, INST 05-0661, INST 05-0662, INST 05-0691, INST 05-0692, INST 05-0701, INST 05-0702, INST 05-0801, INST 05-0802, INST 05-1001, INST 05-1002, INST 07-0131, INST 07-0132, INST 07-0141, INST 07-0142, MNTE 02-1151, MNTE 02-1152, MNTE 02-2221,	There pages were newly added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2222, MNTE 02-02810 MNTE 02-2820 to MNTE 02-2910	There pages were newly added.	AD
					INTO 05-0010	No.11 was added.	AD
					INST 01-0000, INST 01-0050 INST 01-0080, INST 02-0050, INST 02-0210, INST 02-0240, INST 02-0260, INST 03-0390, INST 03-0440, INST 03-0460, INST 03-0620, INST 06-0110, INST 06-0150, INST 07-0070, INST 07-0110, INST 08-0000, MNTE 01-0000, MNTE 05-0140, MNTE 05-0380, MNTE 05-0470, MNTE 05-0560, MNTE 05-0620, MNTE 05-0650,	Description of “To prevent part failures …” was changed.	CH
					INST 02-0070	No.16 was added.	AD
					INST 02-0180	Quantity of No.7 was changed. (Table 2.5.1)	CH
					INST 02-0390, INST 02-0400, INST 03-0770, INST 03-0780	Flow chart was changed.	CH
					INST 03-0210, INST 03-0270	Whole Layout of Installation Position Addresses was changed.	CH
					INST 03-0650	Description was added to Item 4.	AD
						Figure 3.6.1 was moved to page INST 03-0651.	DL
					INST 03-0651	Figure 3.6.1 was moved to this page from page INST 03-0650.	AD
					INST 03-0720	“cable clamps” was changed to “cable holders”.	CH
					INST 02-0390	(a) was added.	AD
						Flow chart was changed.	CH
					INST 02-0400	Flow chart was changed.	CH
					INST 02-0401	(b) was added.	AD
						Flow chart was changed.	CH
					INST 02-0402	Flow chart was changed.	CH
					INST 03-0760	‡1 was added	AD
					INST 03-0770	(a) was added.	AD
						Flow chart was changed.	CH
					INST 03-0780	Flow chart was changed.	CH
					INST 03-0781	(b) was added.	AD
						Flow chart was changed.	CH
					INST 03-0782	Flow chart was changed.	CH
					INST 05-0390	Flow chart was changed.	CH
					INST 04-0060 to INST 04-0110, INST 04-0150, INST 04-0160, INST 05-0110, INST 05-0270, INST 05-0280, INST 05-0350, INST 05-0370, INST 05-0450, INST 05-0470, INST 05-0500, INST 05-0540, INST 05-0590, INST 05-0600, INST 05-0630, INST 05-0670, INST 05-0730 to INST 05-0750, INST 05-0780, INST 05-0810 to INST 05-0850, INST 05-0870, INST 05-0880, INST 05-0900 to INST 05-0940, INST 05-0960, INST 05-0970, INST 05-0990, INST 05-1000, INST 05-1040 to INST 05-1070, INST 05-1090, INST 05-1110 to INST 05-1150, INST 05-1170, INST 05-1180, INST 05-1200, INST 05-1210, INST 05-1230,	Window design was modified.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-1240, INST 05-1260, INST 05-1270, INST 05-1290, INST 05-1300, INST 06-0310, MNTE 01-0030, MNTE 02-0060, MNTE 02-0070, MNTE 02-0120 to MNTE 02-0140, MNTE 02-0160, MNTE 02-0190, MNTE 02-0200, MNTE 02-0260, MNTE 02-1710 to MNTE 02-1730, MNTE 02-1880 to MNTE 02-1930, MNTE 02-2000, MNTE 02-2010, MNTE 02-2040, MNTE 02-2050, MNTE 02-2200, MNTE 02-2210, MNTE 02-2230 to MNTE 02-2250, MNTE 02-2280, MNTE 02-2290, MNTE 06-0060 to MNTE 06-0110, MNTE 06-0150, MNTE 06-0160, WEB 02-0000, WEB 02-0010, WEB 02-0030, WEB 02-0070, WEB 02-0100 to WEB 02-0160, WEB 03-0080, WEB 03-0100 to WEB 03-0170, WEB 03-0190 to WEB 03-0230, WEB 03-0260, WEB 03-0280, WEB 03-0290, WEB 03-0360	Window design was modified.	CH
					INST 05-0390, INST 05-0400	Flow and Figure No. were changed.	CH
					INST 05-0460, INST 05-0470	Procedure ②-C → Procedure ②-D	CH
					INST 05-0550, INST 05-0590, INST 05-0630, INST 05-0650	Procedure ③-E → Procedure ③-H Procedure ③-F → Procedure ③-I	CH
					INST 05-0590	(2) was added.	AD
					INST 05-0650	Table and (1) were added.	AD
						The description following after “Offline Format” is moved to page INST 05-0660.	DL
					INST 05-0660	(2) was added. “Offline Format” was moved from page INST05-0650.	AD
						Offline (Queue) was added.	AD
						Table and NOTE were moved to page INST 05-0661.	DL
					INST 05-0661	Table and NOTE were moved to this page from page INST 03-0550.	AD
					INST 06-0150, INST 07-0110	Description of “Disk Drives are precisions. …” was changed.	AD
					INST 05-0670	Item No. and text were changed.	CH
					INST 05-0680, INST 05-0690	Item No. was changed.	CH
					INST 05-0690, INST 05-0700	“Offline Format mode” was corrected to “Offline”	CR
					INST 05-0730	Text was added.	AD
					INST 05-0830	“port option” was corrected to “Unit Identifier”	CR
					INST 05-0840	“port option” was corrected to “LAN”	CR
					INST 05-0850	“port option” was corrected to “Restore Option”	CR
					INST 05-0870	“port option” was corrected to “Online Verify”	CR
					INST 05-0880	“port option” was corrected to “Constitute”	CR
					INST 05-0890	(c) was added.	AD
					INST 05-0930	“port option” was corrected to “Fibre Channel”	CR
					INST 05-0960	“port option” was corrected to “Option”	CR
					INST 05-0970	“port option” was corrected to “Micro Update”	CR

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0990	"port option" was corrected to "Command Device"	CR
					INST 05-1000	"port option" was corrected to "RTC"	CR
					INST 05-1310	Figure was changed.	CH
					INST 06-0010	Description of Work-4 was changed.	CH
					INST 06-0020	Description of Work-6 was changed.	CH
					INST 06-0270	"0A" was changed to "Port 0A" etc.	CH
					INST 06-0280	(d) was added.	AD
					INST 06-0290	CAUTION and (d) were added.	AD
					INST 06-0500	No. 9 to No.12 was added to Table 6.5.5.	AD
					INST 06-0510	(4-1) was deleted.	DL
						Figure 6.5.14 was moved to this page from page INST 06-0520.	AD
					INST 06-0520	Figure 6.5.14 was moved to page INST 06-0510.	DL
						(5) was added.	AD
					INST 06-0530	Text was added.	AD
					INST 06-0550	Description was added to (f).	AD
					INST 06-0641, INST 06-0870,	CAUTION was changed.	CH
					INST 06-0700	Text was added.	AD
						Flow chart was changed.	CH
					INST 06-0710	Flow chart was changed.	CH
					INST 06-0720	Flow chart was changed.	CH
					INST 06-0740	Figure was changed.	CH
					INST 06-0750	"Controller#0" was corrected to "Control Unit#0".	CR
					INST 06-0760	Power Units → Power Units (#0,#1)	CH
					INST 07-0050	Correction was deleted.	DL
					INST 07-0130	Description of flow chart was changed.	CH
						The description following after Work-5 is moved to page 07-0131.	DL
					INST 07-0140	Description of flow chart was changed.	CH
						The description following after Work-8 is moved to page 07-0141.	DL
					INST 08-0120	"cable clamps" was changed to "cable holders". Figure was changed.	CH
					MNTE 02-0000	Reference page of 2.8 was changed.	CH
					MNTE 02-0280, MNTE 02-0300	Figure was changed.	CH
					MNTE 02-0630	Description was added to "HA042x".	AD
					MNTE 02-0720	Collect the error was added to "HH931".	AD
					MNTE 02-0750	"HH2300" was moved to this page from page MNTE 02-0760.	AD
					MNTE 02-0760	"HH2300" was moved to page MNTE 02-0750.	DL
						"HH30xx" and "HH31xx" was added.	AD
					MNTE 02-0910	"I4200x" was moved to this page from page MNTE 02-0920.	AD
					MNTE 02-0920	"I4200x" was moved to page MNTE 02-0910.	DL
						"I1515xy" was added.	AD
					MNTE 02-0930	"1523xy" was added.	AD
						"I534xy" was moved to page MNTE 02-0940.	DL
					MNTE 02-0940	"I534xy" was moved to this page from page MNTE 02-0930.	AD
						"I5Y000", "I5Y100" and "I5Y2xy" was added.	AD
						"I5Z5xy" to "I5Z8xy" were moved to page MNTE 02-0950.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0950	"I5Z5xy" to "I5Z8xy"were moved to this page from page MNTE 02-0940.	AD
						"I604xy" was moved to page MNTE 02-0960.	DL
					MNTE 02-0960	"I604xy" was moved to this page from page MNTE 02-0950.	AD
						"I60900" was moved to page MNTE 02-0970.	DL
					MNTE 02-0970	"I900" was moved to this page from page MNTE 02-0960.	AD
					MNTE 02-1150	"IZY000" to "IZYA00" was added.	AD
						"IZZ000", "IZZ004" were moved to page MNTE 02-1151.	DL
					MNTE 02-1151	"IZZ000", "IZZ004" were moved to this page from page MNTE 02-1150.	AD
						"IZY20x" to "IZY9xy" was added.	AD
					MNTE 02-1600, MNTE 02-1610	Figure was changed.	CH
					MNTE 02-2140, MNTE 02-2220, WEB 03-0310	NOTE was added.	AD
					MNTE 02-2220	(d) was moved to page MNTE 02-2221.	DL
					MNTE 02-2540	"Sence" was corrected to "Sense".	CR
					MNTE 02-2730	"9F FF" was added.	AD
						"B4 00" was moved to page MNTE 02-2740.	DL
					MNTE 02-2740	"B4 00" was moved to this page from page MNTE 02-2730.	AD
						"C0 0A" was added.	AD
					MNTE 02-2800	Subsection 2.7.2 was added.	AD
						Section 2.8 was moved to page MNTE 02-2820.	DL
					MNTE 02-2820	Section 2.8 was moved to this page from page MNTE 02-2800.	AD
					MNTE 03-0000	"LUN Management" was added.	AD
					MNTE 03-0030	"LUN Management" was added.	AD
						"- → O", "- → P.P. version…" of No.5 and No.11 were corrected Table 3.2.1.	CR
					MNTE 04-0340	Strip size (16, 32 bytes) of RAID was deleted.	DL
					MNTE 05-0090, MNTE 05-0100	"Controller Unit" of *1 was corrected to "Control Unit".	CR
					MNTE 05-0140	NOTE was added.	AD
						Table was moved to page MNTE 05-0141.	DL
					MNTE 05-0141	Table was moved to this page from page MNTE 05-0140. "If no Spare Disk…" was moved to this page from page NMTE 05-0150.	AD
					MNTE 05-0142	This page was newly added.	AD
					MNTE 05-0150	"If no Spare Disk…" was moved to page MNTE 05-0141.	DL
					MNTE 05-0250	Description of Table 5.3.2 was added.	AD
					MNTE 05-0300	"Table 5.3.1" was corrected to "Table 5.3.3".	CR
						Description of Table 5.3.3 was changed.	CH
					MNTE 05-0610	"(i) → (j)" of (4) was corrected to "(h) → (i)".	CR
					MNTE 05-0720	Figure was changed.	CH
					MNTE 05-0730	Description was added to (b).	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 06-0020	micro upload\… → Program\micro upload\…	CH
					MNTE 08-0070	No.31 was corrected.	CR
					MNTE 08-0080	"RK+H1F" of table was corrected to "RK+H1H".	CR
					MNTE 08-0100	"Floor Model H2H" was corrected to "Floor (RK+RKA+H2H) Model".	CR
					WEB 03-0310	NOTE was added.	AD
					WEB 03-0320, WEB 03-0330	Description of (3) was changed.	CH
					APP A-0000	*15 was added.	AD
						HP Connection mode enable of Host Connection Mode2 (Host Group) was deleted.	DL
					APP A-0010	*15 was added.	AD
					APP A-0040	VVM V3.1SP/V3.1 was added.	AD
					APP A-0050	*8 was added.	AD
3	Apr.10.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.2 → Rev.3	CH
					GENE 0040	Title of Table 1 was changed.	AD
						Table 2 was moved to page GENE 0041.	AD
					GENE 0041, GENE 0042, SAFE 0210 to SAFE 0240, INTO 02-0091, INTO 02-0092, INTO 02-0121, INTO 02-0122, INTO 02-0131, INTO 02-0132, INTO 02-0151, INTO 02-0152, INTO 02-0201 to INTO 02-0204, INTO 03-0001, INTO 03-0002, INTO 03-0090 to INTO 03-0150, INST 02-181, INST 02-182, INST 02-0231, INST 02-0232, INST 02-0341 to INST 02-0344, INST 02-0371, INST 02-0372, INST 03-0711 to INST 03-0714, INST 03-0751, INST 03-0752, INST 07-0051, INST 07-0052, INST 08-0051, INST 08-0052, INST 08-0111, INST 08-0112, MNTE 02-0761, MNTE 02-0762, MNTE 02-0871, MNTE 02-0872, MNTE 02-0941, MNTE 02-0942, MNTE 02-0961, MNTE 02-0962, MNTE 02-1281, MNTE 02-1282, MNTE 02-1571, MNTE 02-1572, MNTE 02-1681, MNTE 02-1682, MNTE 02-1841, MNTE 02-1842, MNTE 02-2421, MNTE 02-2422, MNTE 02-2451, MNTE 02-2452, MNTE 02-2920, MNTE 05-0051, MNTE 05-0052, MNTE 05-0061, MNTE 05-0062, MNTE 05-0251, MNTE 05-0252, MNTE 05-0371 to MNTE 05-0376, MNTE 08-0071 to MNTE 08-0076, MNTE 08-0113 to MNTE 08-0116	There pages were newly added.	AD
					GENE 0050	2.4.1 was deleted.	AD
					GENE 0060	4.8 was deleted.	DL
					GENE 0070	2.6.4 was deleted.	DL
						2.6.5 wad changed to 2.6.4.	CH
					GENE 0080	3.6.5 was deleted.	DL
					GENE 0090	"… the CTL cable and DC cable" was deleted.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					GENE 0100	6.5.5 was deleted.	DL
						6.4.4 was added.	AD
						Page number of 6.6 to 6.7.2 was changed.	CH
						7.5.4 was moved GENE 0110.	AD
					GENE 0110	7.5.4 was moved to page GENE 0100.	DL
						7.5.5, 8.2.2, and 8.3.3 were deleted.	DL
						"AC cable" of 8.2.1, and 8.3.1 were corrected to "power cable".	CR
					GENE 0140	5.3.11 was deleted.	DL
					SAFE 0090	MNTE 05-0700 of "A closed type nickel-…" was deleted.	DL
						"This subsystem …" to "Switching or disconnecting …" was added.	AD
					SAFE 0100	"The mass of the Additional …" was deleted.	DL
					SAFE 0110	"Careful, the equipment …", "Since sheet steel parts …" and "If you touch a live part, …" were deleted.	DL
						Reference page of INST 06-0341 was added.	AD
						"Here exists a hazard …" was added.	AD
						Reference page was changed. (INST 06-0641 → INST 06-0590, INST 06-0870 → INST 06-0850)	CH
						"2.6 CAUTION statements" was moved to page SAFE 0120.	DL
					SAFE 0120	"2.6 CAUTION statements" was moved from page SAFE 0120.	AD
						Reference page of INST 06-0341 was added.	AD
						"When you install …" to "When adding Disk …" were moved to page SAFE 0130.	AD
						Reference page was changed. (INST 06-0641 → INST 06-0590, INST 06-0870 → INST 06-0850)	CH
					SAFE 0130	"When you install …" to "When adding Disk …" were moved from page SAFE 0120.	AD
						"When you install a Disk …" to "When a device is …" were moved to page SAFE 0140.	DL
					SAFE 0140	"When a Additional Battery …" was deleted.	DL
						"When you install a Disk …" to "When a device is …" were moved from page SAFE 0130.	AD
					SAFE 06-150 to SAFE 06-0200	The page from SAFE 0150 to SAFE 0200 were revised owing to deleting "3.5 Adding an Additional Battery Unit" and RKD/RKAD/RKSD. (Reallocating page number.)	CH
					INTO 01-0000, INTO 02-0100, INTO 02-0130, INTO 02-0140, INTO 02-0180 to INTO 02-0210, INTO 03-0000, INST 02-0040, INST 02-0180, INST 02-0350, INST 02-0360, INST 02-0380, INST 02-0430, INST 03-0380, INST 06-0020, INST 06-0070, INST 06-0360, INST 07-0160	Description of Additional Battery Unit was deleted.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 07-0200, MNTE 05-0090, MNTE 05-0110, WEB 03-0060, APP B-0030	Description of Additional Battery Unit was deleted.	CH
					INTO 02-0010 to INTO 02-0110, INTO 02-0140, INTO 02-0150, INTO 02-0210, INTO 02-0220, INTO 02-0260, INTO 04-0050, INTO 04-0180, INTO 04-0200, INTO 04-0280, INST 01-0010, INST 01-0040, INST 01-0050, INST 01-0070, INST 01-0080, INST 01-0100, INST 02-0020 to INST 02-0040, INST 02-0070 to INST 02-0160, INST 02-0240 to INST 02-0280, INST 02-0300, INST 02-0320, INST 02-0370, INST 02-0380, INST 02-0410, INST 02-0420, INST 02-0440, INST 02-0450, INST 03-0000, INST 03-0020, INST 03-0100, INST 03-0110, INST 03-0120, INST 03-0140, INST 03-0210, INST 03-0220, INST 03-0250, INST 03-0270, INST 03-0280, INST 03-0310 to INST 03-0380, INST 03-0400 to INST 03-0420, INST 03-0440, INST 03-0460, INST 03-0480, INST 03-0490, INST 03-0510 to INST 03-0530, INST 03-0630 to INST 03-0690, INST 04-0140, INST 05-0030, INST 06-0010, INST 06-0020, INST 06-0050, INST 06-0060, INST 06-0090, INST 06-0100, INST 06-0120 to INST 06-0140, INST 06-0160 to INST 06-0190, INST 06-0220, INST 06-0280, INST 06-0290, INST 06-0390, INST 06-0530 to INST 06-0580, INST 06-0600 to INST 06-0830, INST 06-0860 to INST 06-0880, INST 06-0900, INST 06-0910, INST 07-0010, INST 07-0020, INST 07-0040, INST 07-0060, INST 07-0080 to INST 07-0100, INST 07-0120, INST 07-0130, INST 08-0010, INST 08-0050, INST 08-0100, INST 08-0110, INST 08-0130, MNTE 01-0010, MNTE 01-0050 to MNTE 01-0080, MNTE 01-0100, MNTE 01-0120, MNTE 02-0000, MNTE 02-0020, MNTE 02-0040, MNTE 02-0140, MNTE 02-0180, MNTE 02-0230, MNTE 02-0280 to MNTE 02-0300, MNTE 02-0520, MNTE 02-0650 to MNTE 02-0680, MNTE 02-0700 to MNTE 02-0740, MNTE 02-0810, MNTE 02-0820, MNTE 02-0840 to MNTE 02-0960, MNTE 02-1000 to MNTE 02-1040, MNTE 02-1090 to MNTE 02-1151, MNTE 02-1250, MNTE 02-1260, MNTE 02-1280 to MNTE 02-1300, MNTE 02-1410, MNTE 02-1430 to MNTE 02-1460	Description of Model (RKD, RKAD, RKSD, and Power Unit (DC)) was added.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1480, MNTE 02-1530, MNTE 02-1590 to MNTE 02-1610, MNTE 02-1630, MNTE 02-1640, MNTE 02-1660, MNTE 02-1780, MNTE 02-1810, MNTE 02-1990, MNTE 02-2190, MNTE 02-2221, MNTE 02-2320 to MNTE 02-2400, MNTE 02-2420, MNTE 02-2430, MNTE 02-2450, MNTE 02-2480, MNTE 02-2770, MNTE 02-2830, MNTE 04-0080 to MNTE 04-0100, MNTE 05-0000 to MNTE 05-0020, MNTE 05-0040, MNTE 05-0062, MNTE 05-0080 to MNTE 05-0110, MNTE 05-0130, MNTE 05-0250, MNTE 05-0270 to MNTE 05-0300, MNTE 05-0320, MNTE 05-0330, MNTE 05-0410, MNTE 05-0440 to MNTE 05-0460, MNTE 05-0500, MNTE 05-0520, MNTE 05-0540, MNTE 05-0550, MNTE 05-0570, MNTE 05-0600, MNTE 05-0610, MNTE 05-0630, MNTE 05-0640, MNTE 05-0660 to MNTE 05-0670, MNTE 06-0140, MNTE 07-0000 to MNTE 07-0030, MNTE 07-0050, MNTE 07-0070, MNTE 08-0010, MNTE 09-0000, WEB 02-0030, WEB 02-0040, WEB 02-0070, WEB 02-0090	Description of Model (RKD, RKAD, RKSD, and Power Unit (DC)) was added.	CH
					INTO 02-0120	Note (*1) was changed.	CH
					INTO 03-0010	*4 was added.	AD
					INTO 03-0030, INTO 03-0060, INTO 03-0110, INTO 03-0140	Description of Heat value was added.	AD
					INTO 03-0050	*3 was added.	AD
					INTO 03-0100, INST 03-0130	Description of *2 was changed.	CH
					INTO 04-0300 to INTO 04-0330, INST 06-0641, INST 06-0642, INST 06-0721, INST 06-0722, INST 06-0920, INST 06-0930, INST 07-0200, INST 08-0140, WEB 03-0061, WEB 03-0062	Page was eliminated.	DL
					INTO 03-0030	ENC Unit (RKA) → ENC Unit	CR
					INST 01-0010, INST 02-0340, INST 02-0350, INST 03-0650, INST 03-0651, INST 03-0710, INST 03-0720, INST 06-0520, INST 08-0010, INST 08-0030 to INST 08-0050, INST 08-0080 to INST 08-0120, MNTE 01-0010, MNTE 08-0090, MNTE 08-0111, MNTE B08-0130, MNTE 08-0150	AC cable → Power cable	CR
					INST 01-0070	Reference section of (b) was changed.	CH
					INST 01-0100	Text was changed.	CH
					INST 02-0000	Reference section of Work-8 was changed. (2.6.5 → 2.6.4)	CH
					INST 02-0180	RK+H1H/RKS+H1H → Floor models	CH
					INST 02-0230	(a) was added.	AD
					INST 02-0290	(8) was deleted.	DL
					INST 02-0300	Reference section was changed. (2.6.5 → 2.6.4)	CH
					INST 02-0340	(1) was added.	AD
						(c) was deleted.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 02-0350	2.6.4 was deleted.	DL
						2.6.4 was moved from page INST 02-0360.	AD
					INST 02-0360	2.6.5 → 2.6.4	CH
						2.6.4 was moved to page INST 02-0350.	DL
					INST 02-0370	(1) was added.	AD
						(d) and (f) were deleted.	DL
					INST 02-0380	(2) was added.	AD
					INST 02-0390	Text was added.	AD
						(a) and ‡1 were deleted.	DL
						Flow chart was changed.	CH
						Flow chart was moved from page INST 02-0400.	AD
					INST 02-0400	Flow chart was changed, and moved to page INSR 02-0390.	DL
					INST 02-0401	(b) was deleted. Due to the deletion, this page was eliminated.	DL
					INST 02-0402	Page was eliminated.	DL
					INST 02-0410	No.7, 8 of Table 2.8.1 was changed.	CH
						*2 was deleted.	DL
					INST 02-0430	Reference section of (2) was changed.	CH
					INST 03-0130	Figure was changed.	CH
					INST 03-0170	Area size was changed.	CH
					INST 03-0310	“HT-F-USU5” was corrected to “HT-F-URSU5”.	CR
					INST 03-0380	(e) was deleted.	CH
					INST 03-0480	(a) and (b) was added.	AD
					INST 03-0650	“AC cable” was corrected to “Power cable”.	CR
						No.5 of Table 3.6.1 was deleted.	DL
					INST 03-0700	(1) was added.	AD
					INST 03-0730	Subsection 3.6.5 was deleted.	DL
					INST 03-0750	(1) was added.	AD
						(b) and (f) were changed.	CH
					INST 03-0760	(2) was added.	AD
					INST 03-0770	Text was added.	AD
						(a) and ‡1 were deleted.	DL
						Flow chart was changed.	CH
						Flow chart was moved from page INST 02-0400.	AD
					INST 03-0780	Flow chart was changed, and moved to page INSR 02-0390.	DL
					INST 03-0781	(b) was deleted. Due to the deletion, this page was eliminated.	DL
					INST 03-0782	Page was eliminated.	DL
					INST 03-0790	No.7, 8 of Table 2.8.1 was changed.	CH
						*2 was deleted.	DL
					INST 04-0000	Description of text was changed.	CH
					INST 05-0130	Additional Battery Unit Mode of No.2 “Common 1” was deleted.	DL
					INST 05-0180	Window design was modified.	CH
						③ was deleted.	DL
					INST 05-0570	*2 was added to table.	AD
					INST 05-0580	*1 was added to table.	AD
					INST 05-0801	② was deleted.	DL
					INST 05-1001	Window design was modified.	CH
						② was deleted.	DL
						⑥ was moved from page INST 05-1002.	AD
					INST 05-1002	⑥ was moved to page INST 05-1001.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0000	Description of (5) was changed.	CH
					INST 06-0020	(3) was added to Work-5.	AD
					INST 06-0040, INST 06-0060, INST 06-0090, INST 06-0170, INST 06-0180	Reference page of 6.6 was changed.	CH
					INST 06-0050, INST 0100	*3 and Cache Unit was added.	AD
					INST 06-0130	Description of (18) was changed.	CH
					INST 06-0190, INST 06-0200, INST 06-0240, INST 06-0260	Description of “using an SVP” was deleted.	DL
					INST 06-0400	Description of (e) was changed.	CH
					INST 06-0410	No.7, 8 of Table 6.5.2 was changed.	CH
						*2 was deleted.	DL
					INST 06-0480	Parts No. of Table 6.5.4 was changed.	CH
						(a) was added	AD
					INST 06-0490	(b) was added	AD
					INST 06-0530 to INST 06-0930	The page from INST 06-0530 to INST 06-0930 were revised owing to deleting “6.5.5 Adding an Additional Battery Unit”. (Reallocating page number.)	CH
					INST 07-0000	Description of (5) was changed.	CH
					INST 07-0050	Flow chart was changed.	CH
					INST 07-0060	*3 was added.	AD
					INST 07-0140	Description of Work-3 was changed.	CH
					INST 08-0030, INST 08-0040, INST 08-0080 to INST 08-0100	“… DC cables and CTL cable” of flow chart was deleted.	DL
					INST 08-0060	8.2.2 was deleted.	DL
						8.2.2 was moved from page INST 08-0070.	AD
					INST 08-0070	8.2.3 → 8.2.2	CH
						8.2.2 was moved to page INST 08-0070.	DL
					INST 08-0110	(1) was added.	AD
					INST 08-0130	8.3.3 was deleted.	DL
						8.3.3 was moved from page INST 08-0140.	AD
					INST 08-0140	8.3.4 → 8.3.3	CH
						8.3.3 was moved to page INST 08-0130. Page was eliminated.	DL
					MNTE 01-0090	Descriptions of 6-e and 6-f were changed.	AD
					MNTE 01-0130	No.11 (Power Unit (DC)) was added.	AD
					MNTE 02-0000	8 and 9 of NOTE was changed.	CH
					MNTE 02-0080	“Netcape” of table was corrected to “Netscape”.	CR
					MNTE 02-0230	② of UPS was deleted.	DL
					MNTE 02-0240	Description of No.12 was changed.	CH
					MNTE 02-0520	“H30E0X” was moved to page MNTE 02-0530.	DL
					MNTE 02-0530	“H30E0X” was moved from page MNTE 02-0520.	AD
						“H40B00” was moved to page MNTE 02-0540.	DL
					MNTE 02-0540	“H40B00” was moved from page MNTE 02-0530.	AD
						“H40N00” was moved to page MNTE 02-0540.	DL
					MNTE 02-0550	“H40N00” was moved from page MNTE 02-0530.	AD
					MNTE 02-0720	“HH0Fxx” was moved to page MNTE 02-0730.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0730	"HH0Fxx" was moved from page MNTE 02-0720.	AD
						"HH1Axy" was moved to page MNTE 02-0740.	DL
					MNTE 02-0740	"HH1Axy" was moved from page MNTE 02-0730.	AD
						"HH1S00" was moved to page MNTE 02-0750.	DL
					MNTE 02-0750	"HH1S00" was moved from page MNTE 02-0740.	AD
						"HH2200", "HH2300"were moved to page MNTE 02-0750.	DL
					MNTE 02-0760	"HH2200", "HH2300"were moved from page MNTE 02-0750.	AD
						Description of "HH24xy" was changed.	CH
						"HH250x" was added.	AD
						"HI0420" to "HI0600" were moved to page MNTE 02-0761.	DL
					MNTE 02-0761	"HI0420" to"HI0600" were moved from page MNTE 02-0750.	AD
					MNTE 02-0850	"I17001" to "I17003" were moved to page MNTE 02-0860.	DL
					MNTE 02-0860	"I17001" to "I17003" were moved from page MNTE 02-0850.	AD
						"I1C1xy" to "I1E100" were moved to page MNTE 02-0870.	DL
					MNTE 02-0870	"I1C1xy" to "I1E100" were moved from page MNTE 02-0860.	AD
						"I304xy" was moved to page MNTE 02-0871.	DL
					MNTE 02-0871	"I304xy" was moved from page MNTE 02-0870.	AD
					MNTE 02-0910	"I41Fxy", "I4200x" were moved to page MNTE 02-0920.	DL
					MNTE 02-0920	"I41Fxy", "I4200x" were moved from page MNTE 02-0910.	AD
						"I512xy" to "I515xy" were moved to page MNTE 02-0930.	DL
					MNTE 02-0930	"I512xy" to "I515xy" were moved to this page from page MNTE 02-0920.	AD
						"I523xy" to "I533xy" were moved to page MNTE 02-0940.	DL
					MNTE 02-0940	"I523xy" to "I533xy" were moved from page MNTE 02-0930.	AD
						"I524xy" was added.	AD
						"I5Y000" to "15Z4xy" were moved to page MNTE 02-0941.	DL
					MNTE 02-0941	"I5Y000" to "15Z4xy" were moved from page MNTE 02-0940.	AD
						"I5Y300" was added.	AD
					MNTE 02-0950	"I6010x", "I60200", "I603xy" were moved to page MNTE 02-0960.	DL
					MNTE 02-0960	"I6010x" to"I603xy" were moved from page MNTE 02-0950.	AD
						"I60800" to "I61800" were moved to page MNTE 02-0961.	DL
					MNTE 02-0961	"I60800" to "I61800" were moved from page MNTE 02-0960.	AD
						"I61900" was moved from page MNTE 02-0970.	AD
					MNTE 02-0970	"I61900" was moved to page MNTE 02-0961.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1000	"I80A0x" was moved to page MNTE 02-1010.	DL
					MNTE 02-1010	"I80A0x" was moved from page MNTE 02-1000.	AD
						"I81700", "I81800" were moved to page MNTE 02-1020.	DL
					MNTE 02-1020	"I81700", "I81800" were moved from page MNTE 02-1010.	AD
						"I8230x" was moved to page MNTE 02-1030.	DL
					MNTE 02-1030	"I8230x" was moved from page MNTE 02-1020.	AD
						"I83200" to "I83700" were moved to page MNTE 02-1040.	DL
					MNTE 02-1040	"I83200" to "I83700" were moved from page MNTE 02-1030.	AD
						"I900xx" to "I902xx" were moved to page MNTE 02-1050.	DL
					MNTE 02-1050	"I900xx" to "I902xx" were moved from page MNTE 02-1040.	AD
						"I906xx", "I907xx" were moved to page MNTE 02-1060.	DL
					MNTE 02-1060	"I906xx", "I907xx" were moved from page MNTE 02-1050.	AD
						"IC0000", "ID0000" were moved to page MNTE 02-1070.	DL
					MNTE 02-1070	"IC0000", "ID0000" were moved from page MNTE 02-1060.	AD
						"IR0000" was moved to page MNTE 02-1080.	DL
					MNTE 02-1080	"IR0000" was moved from page MNTE 02-1070.	AD
					MNTE 02-1100	"IY08xy" was moved to page MNTE 02-1110.	DL
					MNTE 02-1110	"IY08xy" was moved to this page from page MNTE 02-1100.	AD
						"IY0Dxy" was moved to page MNTE 02-1120.	DL
					MNTE 02-1120	"IY0Dxy" was moved from page MNTE 02-1110.	AD
						"IY0Ixy", "IY0Jxy" were moved to page MNTE 02-1130.	DL
					MNTE 02-1130	"IY0Ixy", "IY0Jxy" were moved from page MNTE 02-1120.	AD
						"IZ0000" to "IZ03xy" were moved to page MNTE 02-1140.	DL
					MNTE 02-1140	"IZ0000" to "IZ03xy" were moved from page MNTE 02-1130.	AD
						"IZ08xy", "IZ09xy" were moved to page MNTE 02-1150.	DL
					MNTE 02-1150	"IZ08xy", "IZ09xy" were moved from page MNTE 02-1140.	AD
						"IZ0Cxy" to "IZYA00" were moved to page MNTE 02-1151.	DL
					MNTE 02-1151	"IZ0Cxy" to "IZYA00" were moved from page MNTE 02-1150.	AD
						"IZY6xy" to "IZZ004" were moved to page MNTE 02-1152.	DL
					MNTE 02-1152	"IZY6xy" to "IZZ004" were moved to from page MNTE 02-1151.	AD
					MNTE 02-1270	Description of RB3600 was changed.	CH
					MNTE 02-1280	"RBE300", "RBE301" were moved to page MNTE 02-1281.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1281	"RBE300", "RBE301" were moved from page MNTE 02-1280.	AD
						"RBE400" was added.	AD
					MNTE 02-1300	"W090xy", "W0B0xy" were moved to page MNTE 02-1310.	DL
					MNTE 02-1310	"W0B0xy" was moved from page MNTE 02-1300.	AD
						A recovery measure of "W0C00x" was changed.	CH
					MNTE 02-1350	Description of "W4700x" was changed.	CH
					MNTE 02-1570	Flow chart was changed.	CH
						Description following after "Turn off the main switch" is moved to page MNTE 02-1571.	DL
					MNTE 02-1571	Description following after "Turn off the main switch" was moved from page MNTE 02-1570.	AD
					MNTE 02-1590	Message display was changed.	CH
					MNTE 02-1670	② of (iii) was added to flow chart.	AD
						(iv) was moved to page MNTE 02-1680.	DL
					MNTE 02-1680	(iv) was moved from page MNTE 02-1670.	AD
						(v) was moved to page MNTE 02-1681.	DL
					MNTE 02-1681	(v) was moved from page MNTE 02-1680.	AD
					MNTE 02-1820	② of (iii) was added to flow chart.	AD
						(iv) was moved to page MNTE 02-1830.	DL
					MNTE 02-1830	(iv) was moved from page MNTE 02-1820.	AD
						(v) was moved to page MNTE 02-1840.	DL
					MNTE 02-1840	(v) was moved from page MNTE 02-1830.	AD
						(vi) was moved to page MNTE 02-1841.	DL
					MNTE 02-1841	(vi) was moved from page MNTE 02-1840.	AD
					MNTE 02-2000, MNTE 02-2270, MNTE 02-2280, WEB 03-0030, WEB 03-0040, WEB 03-0070, WEB 03-0090, WEB 03-0140, WEB 03-0230, WEB 03-0250, WEB 03-0360	Window design was modified.	CH
					MNTE 02-2400	Cause or status of No.3 was added to description.	AD
					MNTE 02-2420	(a) was added.	AD
					MNTE 02-2430	"LED Indication Patterns" was changed to "LED Indication Pattern-1".	CH
					MNTE 02-2450	"LED Indication Patterns" was changed to "LED Indication Pattern-2".	CH
						No.11 to No.13 were moved to page MNTE 02-2451.	DL
					MNTE 02-2451	No.11 to No.13 were moved to from page MNTE 02-2452.	AD
					MNTE 02-2520, MNTE 02-2530	(8) was deleted. ("This page is for editorial purpose only" was added.)	DL/AD
					MNTE 02-2570	"Prinary" was corrected to "Primary".	CR
					MNTE 02-2670	"95 11" was deleted.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2710	Sense key of “95 76” was changed to 5.	CH
					MNTE 02-2730	“96 09” was added.	AD
						“B2 00” and “B3 00” were moved to page MNTE 02-2740.	DL
					MNTE 02-2740	“B2 00” and “B3 00” were moved to from page MNTE 02-2730.	AD
						“DA 00” and “DB 00” were moved to page MNTE 02-2740.	DL
					MNTE 02-2750	“DA 00” and “DB 00” were moved to from page MNTE 02-2730.	AD
					MNTE 02-2770	*2 was corrected to *1.	CR
						Description of “F8 08” was changed.	CH
					MNTE 02-2900	(e) was added to window.	AD
						(g) was moved to page MNTE 02-2910.	DL
					MNTE 02-2910	(g) was moved to from page MNTE 02-2900.	AD
						(i) and (j) were moved to page MNTE 02-2920.	DL
					MNTE 02-2920	(i) and (j) were moved to from page MNTE 02-2910.	AD
					MNTE 05-0050	Floor Model was moved to page MNTE 05-0051.	DL
					MNTE 05-0051	Floor Model moved to this page from page MNTE 05-0050.	AD
					MNTE 05-0060	*3 was added.	AD
						143.3 G byte was added to Table 5.1.1.	AD
						(2) was moved to page MNTE 05-0061.	DL
					MNTE 05-0070	Figure 5.1.4 was moved to page MNTE 05-0062.	DL
						This page is blank due to the movement of Figure 5.1.4.	CH
					MNTE 05-0110	No.5 was added.	AD
						No.11 was deleted.	DL
					MNTE 05-0250	Table 5.3.2 was moved to page MNTE 05-0251.	DL
					MNTE 05-0251	Table 5.3.2 was moved to from page MNTE 05-0250, and *2 was added.	AD
					MNTE 05-0340	Text and (1) were added.	AD
					MNTE 05-0350	(1) → (1-1)	CH
					MNTE 05-0360	(2) → (1-2)	CH
					MNTE 05-0370	(3) → (1-3)	CH
					MNTE 05-0490, MNTE 05-0520	“System parameters are …”of NOTE was changed.	CH
					MNTE 05-0700	5.3.11 was deleted. Due to the deletion, this page was eliminated.	DL
					MNTE 07-0100	“When a Additional Battery …” of CAUTION was deleted.	DL
					MNTE 08-0040	UNIT PER ASSY of No.29 and No.30 were changed.	CH
					MNTE 08-0060	“13” of figure was corrected to “9”.	CR
					MNTE 08-0090	Figure was changed.	CH
					MNTE 08-0100	Title of No.2-2 was changed.	CH
					MNTE 08-0111	Figure was changed.	CH
						No.9, No.13, and No.15 were deleted.	DL
					MNTE 08-0112	No.2-4 was added.	AD
					WEB 03-0060	“RS232C Error Information …” was moved to from page WEB 03-0060.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0061	"RS232C Error Information …" was moved to page WEB 03-0061.	DL
					APP A-0030	Description of *6 was added.	AD
					—	The style of description was unified. (Disk Drive, Spare Disk, Control Unit, Fan Assembly, Backup Battery Unit, Power Unit, ENC Unit)	CR
4	May.12.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.3 → Rev.4	CH
					SAFE 0090	"A readily accessible…" and "Use this model…" were added.	AD
					INTO 03-0110	AC 1,500 → AC 1,000	CH
					INTO 03-0150	AC 1,500 → AC 1,000	CH
					INST 02-0342	"A readily accessible…" and "Use this model…" were added.	AD
					INST 02-0343 and INST 02-0344	These page were newly added.	AD
					INST 03-0680	"In single controller configuration,…" was added.	AD
						(c) was moved to page INST 03-0690.	DL
					INST 03-0690	(c) was moved to from page INST 03-0680.	AD
					INST 03-0712	"A readily accessible…" and "Use this model…" were added.	AD
					MNTE 05-0372	(l) was added.	AD
						(m) to (o) were moved to page MNTE 05-0373.	DL
					MNTE 05-0373	(m) to (o) were moved to from page MNTE 05-0373.	AD
						"A readily accessible…" and "Use this model…" were added.	AD
					MNTE 05-0374	"Hexagon socket head bolt" was added.	AD
					MNTE 05-0375	(k) was moved to from page MNTE 05-0376.	AD
					MNTE 05-0376	(k) was moved to page MNTE 05-0375.	DL
						(l) was added.	AD
						"A readily accessible…" and "Use this model…" were added.	AD
5	May.26.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.4 → Rev.5	CH
					GENE 0040, GENE 0070, SAFE 0180, INTO 02-0040, INTO 02-0092, INTO 02-0121, INTO 02-0131, INTO 03-0001, INTO 03-0090, INTO 03-0100, INTO 03-0110, INTO 03-0120, INTO 03-0130, INTO 03-0140, INTO 03-0150, INST 01-0040, INST 01-0070, INST 02-0000, INST 02-0030, INST 02-0040, INST 02-0070, INST 02-0080, INST 02-0160, INST 02-0161, INST 02-0162, INST 02-0180, INST 02-0181, INST 02-0320, INST 02-0350, INST 02-0371, INST 02-0380, INST 02-0430, INST 02-0440, INST 02-0450, MNTE 05-0000, MNTE 05-0090, MNTE 05-0100, MNTE 07-0010, MNTE 07-0020, MNTE 07-0030, MNTE 08-0010, MNTE 08-0112, MNTE 08-0113, MNTE 08-0114, MNTE 08-0115, MNTE 08-0116	H1H→H1HD, H2H→H2HD	CH
					GENE 0070	Added 1.6.	AD
					GENE 0100	Added "7.4.4 Subtracting a Cache Unit"	AD
					SAFE 0110, SAFE 0120, SAFE 0130	Added INST 07-0151, INST 07-0152	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 03-0020, INTO 03-0060, INTO 03-0100, INTO 03-0130	"The current value in the…" was added.	AD
					INST 01-0130, INST 01-0140, INST 01-0150, INST 01-0160	These pages were newly added.	AD
					INST 02-0341	Description of (b) was changed.	CH
					INST 02-0342	(d) was added.	AD
						(e) and (f) were moved to page INST 02-0343.	DL
					INST 02-0343	(e) and (f) were moved to from page INST 02-0342.	AD
						(i) and (j) was added.	AD
					INST 03-0711	Description of (b) was changed.	CH
					INST 03-0712	(c) and (d) were added.	AD
						(e) to (h) were moved to page INST 03-0713.	DL
					INST 03-0713	(e) to (h) were moved to from page INST 03-0712.	AD
					INST 04-0050	Added "The microprogram…" in (i)	AD
					INST 04-0060	Added "Set the operation…" in (2)(a).	AD
					INST 05-0010, INST 05-0020	Added *1.	AD
					INST 05-0150, INST 05-0790	Added 255.255.255.224 on Factory setting.	AD
					INST 05-0310, INST 05-0320, INST 05-0330, INST 05-0340, INST 05-0850, INST 05-1030, INST 05-1040, INST 05-1100, INST 05-1110, INST 05-1160 INST 05-1170, INST 05-1190, INST 05-1200, INST 05-1220, INST 05-1230, INST 05-1250, INST 05-1260, INST 05-1280, INST 05-1290	Changed DAMP screen.	CH
					INST 06-0120	Deleted the (5) to (8).	DL
					INST 06-0130	Added (5) to (8).	AD
						Changed (11), (12).	CH
					INST 06-0131, INST 06-0132	These pages were newly added.	AD
					INST 06-0341	Added NOTE.	AD
					INST 06-0342	Added Figure 6.4.4.1.	AD
					INST 06-0343	Added "Make sure that the READY LED …".	AD
					INST 06-0550	Work-9 (1) (...) was changed.	CH
						Work-10(1) (...) was changed.	CH
					INST 06-0570	Work-9 "When connecting...2 Gaps)." was changed.	CH
					INST 06-0580	6.2.2 (1) (perform ...cable.) was deleted.	DL
						6.2.2 (1) "When connecting ...following table" was changed.	CH
						6.2.2 (1) "FC Cable Assenbly for 2G-bps table was added	AD
						6.2.2 (1) table:for 2 Gbps was changed.	CH
					INST 06-0600	(a) "Perform this...cables." was changed	CH
						Figure 6.1.1.1 → 6.6.1.1	CH
					INST 06-0690	(2) "Note:..is "B"" was added.	AD
					INST 06-0740	(3) → (4)	CH
					INST 06-0840	6.7 (When...required.) was added.	AD
						6.7.1 "For details...table." was deleted.	DL
						6.7.1 "FC Cable Assembly for 2G-bps table was added	AD
						6.7.1 table:"for 2 Gbps" was changed.	CH
						6.7.2 "When...Unit." was deleted.	DL
						6.7.2 "*1:FC...system." was added.	AD
					INST 06-0860	"Check...DF-F600-K5BUP).)" was added	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0870	(1) "•When...required." was added.	AD
					INST 06-0910	(2) "NOTE:When...reqired." was added.	AD
					INST 07-0080	Changed (a), (b).	CH
					INST 07-0090	Added NOTE.	AD
					INST 07-0151, INST 07-0152, INST 07-0153, INST 07-0154	Added "7.4.4 Subtracting a Cache Unit" (4 new pages)	AD
					MNTE 02-0030	Added (4)(a) – (b) from next page.	AD
					MNTE 02-0040	Added the *1.	AD
					MNTE 02-0920	Added the "I430xy".	AD
					MNTE 05-0150, MNTE 05-0160, MNTE 05-0330, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0373, MNTE 05-0376, MNTE 05-0410, MNTE 05-0440, MNTE 05-0460, MNTE 05-0500, MNTE 05-0530, MNTE 05-0550, MNTE 05-0580, MNTE 05-0590, MNTE 05-0610	Added "Make sure that the READY LED …".	AD
					MNTE 05-0372	"strain relief" of (i) was changed to "cable stay".	CH
					MNTE 05-0373	(o) to (u) were moved to page MNTE 05-0374.	DL
					MNTE 05-0374	(o) to (u) were moved to from page MNTE 05-0373.	AD
						Figure 5.3.7.1 was added.	AD
					MNTE 05-0375	"strain relief" of (i) was changed to "cable stay".	CH
					MNTE 05-0376	Description of (l) and (p) was added.	AD
						(t) to (v) were moved to page MNTE 05-0377.	DL
					MNTE 05-0377	(t) to (v) were moved to from page MNTE 05-0375.	AD
					MNTE 05-0378	This page was newly added.	AD
					MNTE 06-0050	Added "The microprogram…" in (i)	AD
					MNTE 06-0060	Added "Set the operation…" in (2)(a).	AD
					MNTE 08-0070, MNTE 08-0076	Add "*1:The ENC...."	AD
					WEB 01-0020	Added the *1.	AD
					WEB 01-0030	Added the *1.	AD
					WEB 03-0070	Window design was modified.	CH
					APP A-0000	No.4 (Serial Number) of Configuration Information was deleted.	DL
						*6 was deleted causing changes on the succeeding step numbers were changed.	DL/CH
					APP A-0010	*6 was deleted and numbers were changed.	DL/CH
					APP A-0020	No.4 (Serial Number) of Configuration Information was deleted.	DL
						*5 was deleted causing changes on the succeeding step numbers were changed.	DL/CH
					APP A-0030	*5 was deleted and numbers were changed.	DL/CH
					APP A-0040	No.4 (Serial Number) of Configuration Information was deleted.	DL
						*4 was deleted causing changes on the succeeding step numbers were changed.	DL/CH
					APP A-0050	*4 was deleted and numbers were changed.	DL/CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
6	July.1.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.5 → Rev.6	CH
					GENE 0041	Added “DF600-RSDE5”, “DF600-RSDE9”, “DF600-RSDED”.	AD
					INTO 02-0140	Added “DF-F600-AEF146” on *3.	AD
					INTO 03-0050	Added “143.3” on Data capacity.	AD
					INST 01-0140	Added “DF-F600-AEF146” on No.6.	AD
					INST 06-0050, INST 06-0100	Added “DF600-RSDE5”, “DF600-RSDE9”, “DF600-RSDED” on *1.	AD
7	Sep.2.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.6 → Rev.7 (Description of RKH and I/F Board were added.)	CH
					GENE 0041	DF-F600-F1HS→DF-F600-F1HS×2	CH
					GENE 0042	Added Table 3.	AD
					GENE 0060 INTO 04-0100 to INTO 04-0130	Cache Memory was added to description.	AD
					GENE 0080	SONY rack frame was added.	AD
					GENE 0100	6.7 → 6.9, 6.7 , 6.8 was added	CH/AD
					GENE 0110	INST 07-0151 → 07-0150 7.4.5 was added	CH/AD
					GENE 0120	Added 2.3.6, 2.3.7.	AD
					GENE 0130	Added 2.9.	AD
					GENE 0140	5.3.7 - 5.3.12 were added	AD
					SAFE 0090	“RKH is about 44 kg” was added to “Work care fully because … ”	AD
						Reference of “Be sure to perform …” was changed.	CH
					SAFE 0110	Reference page was added and changed.	AD/CH
						“Here exists a hazard …” was added.	AD
						" The Front and left ..." was added.	AD
					SAFE 0120, SAFE 0130, SAFE 0140	Reference page was added and changed.	AD/CH
						"Since Front Bezels…" was added.	AD
					SAFE 0220	3.9 Rackmount model (RKH) was added.	CH
					SAFE 0230, SAFE 0240,	3.9 → 3.10, 3.10 → 3.11	CH
					INTO 02-0040 to INTO 02-0091, INTO 02-0180, INTO 02-0204, INTO 02-0210, INTO 02-0220, INTO 02-0240, INTO 02-0260, INTO 03-0002, INTO 04-0010 to INTO 04-0040, INTO 04-0180, INTO 04-0200	Description of Model (RKH) was added.	CH
					INTO 02-0123, INTO 02-0124, INTO 02-0153, INTO 02-0154, INTO 02-0221, INTO 02-0222, INTO 03-0160 to INTO 03-0190, INTO 04-0041 to INTO 04-0044, INTO 04-0181, INTO 04-0182, INST 01-0041, INST 01-0042, INST 03-0411, INST 03-0412, INST 03-0451, INST 03-0452, INST 03-0481, INST 03-0462, INST 03-0671, INST 03-0672, INST 03-0691 to INST 03-0694, INST 03-0715, INST 03-0716, INST 05-0031, INST 05-0032, INST 05-0463, INST 05-0464, INST 05-0880, INST 05-0890, INST 05-1002, MNTE 02-2471, MNTE 02-2472, MNTE 05-0271, MNTE 05-0272, MNTE 05-0281, MNTE 05-0311, MNTE 05-0312, MNTE 05-0331, MNTE 05-0332, MNTE 05-0351, MNTE 05-0352, MNTE 05-0441 to MNTE 05-0446, MNTE 05-0461, MNTE 05-0462, MNTE 05-0531 to MNTE 05-0536, MNTE 05-0551, MNTE 05-0552, MNTE 08-0011, MNTE 08-0012, MNTE 08-0041 to MNTE 08-0044, WEB 02-0071, WEB 02-0072	These pages were newly added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 01-0000	Disk drive of limited life part was deleted.	CH
					INTO 03-0020, INTO 03-0060, INTO 03-0100, INTO 03-0130	Chassis size. 430 → 483	CH
					INTO 03-0040, INTO 03-0070, INTO 03-0110, INTO 03-0140	Added "No Spare Disk can be set for the Disk Drives #0 to #4 ・・・"	AD
					INTO 04-0101 to INTO 04-0104	These pages were newly added.	AD
					INTO 04-0290	Changed figure of (e)..	CH
					INST 01-0000, INST 01-0050, INST 01-0080, INST 02-0050, INST 02-0210, INST 02-0240, INST 02-0260, INST 03-0390, INST 03-0440, INST 03-0460, INST 03-0620, INST 06-0110, INST 06-0150, INST 06-0330, INST 06-0590, INST 06-0900, INST 07-0070, INST 07-0110, INST 07-0150, INST 08-0000, MNTE 01-0000,MNTE 05-0010, MNTE 05-0140, MNTE 05-0380, MNTE 05-0470, MNTE 05-0640, MNTE 05-0700	"To prevent part failures …(rear face) …" of CAUTION text was changed to. "To prevent part failures …".	CH
					INST 01-0040	Description of text was added.	AD
						Figure No. was added.	AD
					INST 01-0041	Figure No. was added.	AD
					INST 01-0050	The cautions sentence was added.	AD
					INST 01-0080, INST 03-0380, INST 03-0420, INST 03-0430, INST 03-0650, INST 03-0652, INST 03-0660, INST 03-0752, INST 03-0760, INST 03-0790, INST 05-0010 to INST 05-0030, INST 05-0110, INST 05-0130 to INST 05-0150, INST 05-0200, INST 05-0160, INST 05-0250, INST 05-0300, INST 05-0310, INST 05-0340, INST 05-0350, INST 05-0360, INST 05-0380, INST 05-0390, INST 05-0410, INST 05-0430, INST 05-0440, INST 05-0461, INST 05-0462, INST 05-0470, INST 05-0490, INST 05-0500, INST 05-0520, INST 05-0530, INST 05-0540, INST 05-0560, INST 05-0580, INST 05-0590, INST 05-0600, INST 05-0620, INST 05-0621 to INST 05-0625, INST 05-0627, INST 05-0640, INST 05-0650, INST 05-0670, INST 05-0701, INST 05-0720, INST 05-0730, INST 05-0760, INST 05-0780, INST 05-0790, INST 05-0801, INST 05-0810, INST 05-0820, INST 05-0990, INST 05-1001, INST 05-1030, INST 05-1040, INST 05-1050, INST 05-1070, INST 05-1100, INST 05-1130, INST 05-1140, INST 05-1160, INST 05-1170, INST 05-1190, INST 05-1200, INST 05-1220, INST 05-1230, INST 05-1250, INST 05-1280, INST 05-1290, INST 05-1311, INST 06-0161, INST 06-0390, INST 06-0400, INST 07-0121, INST 07-0152	Description and figure of RKH was added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0130, INST 01-0140, INST 01-0150, INST 01-0160	The RKH related item was added.	AD
					INST 08-0131	Description and figure of RKH was added.	AD
					INST 01-0170	This page was added. The RKH related item was added.	AD
					INST 01-0160	*2 was added to table.	AD
					INST 02-0280	ID number was changed.	AD
					INST 02-0350, INST 08-0050, INST 08-0051	Changed figure.	CH
					INST 03-0370, INST 03-0510, INST 03-0520	Description of RKH was added to CAUTION text.	AD
					INST 03-0361 to INST 03-0364, INST 03-0611,INST 03-0612	Description of SONY Rack Frame was resembled and the pages were added more.	AD
					INST 03-0440	Description of I/F Board was added to (3).	AD
					INST 03-0450	(a) was added. (The succeeding step numbers were changed.)	AD
					INST 03-0480	(5-1) was added.	AD
					INST 03-0530	Label of RKH was added.	AD
					INST 03-0630, INST 03-0640 to INST 03-0642	Unit ID# explanation was added. 2 pages were added.	AD
					INST 03-0640	Text and table was added.	AD
					INST 03-0650	Figure title was added to text.	AD
					INST 03-0651	*1 was added.	AD
					INST 03-0660	I/F Board was added to table 3.6.2.	AD
					INST 03-0670	RK/RKA was added to figure title.	AD
					INST 03-0680	(1) was added. (The succeeding step numbers were changed.)	AD
					INST 03-0690	(e) was added.	AD
					INST 03-0700	(1) was added.	AD
					INST 03-0711	(2) → (b)	CH
					INST 03-0712, INST 03-0713	Item numbers was changed.	CH
					INST 03-0714	(2) was added.	AD
					INST 04-0000, INST 04-0010	4.1.3(2) → 4.1.3(4)	CH
					INST 04-0021 to INST 04-0024	These pages were newly added.	AD
					INST 04-0050	(3) → (5)	CH
					INST 04-0060	Added ("RB840 Downloal… on (1).	AD
					INST 05-0830	Added “Change the device …” on ①.	AD
					INST 05-1020	Added 12.	AD
					INST 05-1313 to INST 05-1316	These pages were newly added.	AD
					INST 06-0020	Description of (4) was added to work5.	AD
					INST 06-0060	RKH connection RKA expression was added.	AD
					INST 06-0040	The extension number of RKA to RKH was added.	AD
					INST 06-0050, INST 06-0100, INST 07-0060	Description of a cache memory and an interface board was added.	AD
					INST 06-0090	Description of a reference place was added.	AD
					INST 06-0160, INST 06-0170, INST 07-0120	Description of a setup of RKA connected to RKH was added.	AD
					INST 06-0160 to INS 06-0162 , INST 06-0170	Unit ID# explanation was added. 2 pages were added.	AD
					INST 06-0300	Description of (a) was changed.	CH
						(b) was moved to page INST 06-0310.	DL
					INST 06-0310	(b) was moved to from page INST 06-0300.	AD
						(d) was moved to page INST 06-0320.	DL
					INST 06-0320	(d) was moved to from page INST 06-0310.	DL
					INST 06-0330 INST 07-0150	(1) Description of the cache memory to RK/RKD was added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0331	The title of a figure was changed.	CH
					INST 06-0332, INST 07-0151, INST 07-0152	(1)…(15)→(a)…(n)	CH
					INST 06-0333, INST 06-0334, INST 06-0335, INST 06-0340, INST 06-0341, INST 06-0342	Extension of a cache memory and an I/F board was added.	AD
					INST 06-0410	Description of DF600H was added.	AD
					INST 06-0530 , INST 06-0840	(Refer to Capter 2…) was added.	AD
					INST 06-0760 to INST 06-0790	The variable publication was corrected.	CH
					INST 06-0800	(4) (d) Note was changed.	CH
					INST 06-0840	6.7 was moved to page INST 06-1070.	CH/AD
					INST 06-0840 - INST 06-1060	6.7 was were newly added from page INST 06-0840.	AD
					INST 06-1150 to INST 06-1220	6.9 was were newly added from page INST 06-1150.	AD
					INST 07-0040,INST 07-0100,INST 07-0130	RKH connection RKA expression was added.	AD
					INST 07-0120 to INST 07-0122, INST 07-0130	Unit ID# explanation was added. 2 pages were added.	AD
					INST 07-0153 to INST 07-0158	Subtraction of a cache memory and an I/F board was added.(New pages)	AD
					INST 07-0155	(o) was added.	AD
					INST 08-0130	The title of a figure was changed	CH
					MNTE 01-0020	Added (1).	AD
					MNTE 01-0030	Added (3).	AD
					MNTE 01-0040	Added (5) to (7).	AD
					MNTE 01-0050, MNTE 01-0060, MNTE 01-0071, MNTE 01-0072, MNTE 01-0080, MNTE 01-0100, MNTE 01-0110, MNTE 01-0120, MNTE 02-0040, MNTE 02-1770, MNTE 02-1970, MTE 02-1990, MNTE 02-2190, MNTE 02-2220, MNTE 02-2221, MNTE 02-2240, MNTE 02-2260, MNTE 02-2270, MNTE 02-2300 to MNTE 02-2380, MNTE 02-2400, MNTE 02-2420, MNTE 02-2430, MNTE 02-2450, MNTE 02-2500, MNTE 02-2770, MNTE 05-0000, MNTE 05-0030, MNTE 05-0050, MNTE 05-0080, MNTE 05-0110, MNTE 05-0270, MNTE 05-0280, MNTE 05-0290, MNTE 05-0300, MNTE 05-0310, MNTE 05-0340, MNTE 05-0360, MNTE 05-0370, MNTE 05-0380, MNTE 05-0390, MNTE 05-0470, MNTE 05-0480, MNTE 06-0060, MNTE 06-0110, MNTE 06-0140 to MNTE 06-0160, MNTE 07-0000, MNTE 07-0050, MNTE 07-0070, WEB 01-0030, WEB 02-0000, WEB 02-0070, WEB 02-0100, WEB 02-0110, WEB 02-0140, WEB 03-0010, WEB 03-0330, WEB 03-0340, APP B-0030	Description and figure of RKH was added.	AD
					MNTE 02-0000, MNTE 02-0020, MNTE 02-0030, MNTE 02-1030,	Description of RKH was added.	AD
					MNTE 02-0010	Changed flow.	CH
					MNTE 02-0080	Added *3 on table 2.1.4.	AD
					MNTE 02-0090	Added 'In the case of using Netscape 6.2'	AD
					MNTE 02-0230	"2CTL"→"CTL" on Table 2.2.2.	CR
					MNTE 02-0240	Message code was added.	AD
					MNTE 02-0301, MNTE 02-0302, MNTE 02-1611, MNTE 02-1612	There pages were newly added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0350 to MNTE 02-0451	Message codes were added. (0187C11 to 0187C15, 01875412 to 0187541D, 01875616 to 01875630, 01875913 to 01875950, 01875A03, 01884E10 to 01884E13, 018A520F to 018A5230, 018D5810 to 018E5DC2)	AD
					MNTE 02-0381, MNTE 02-0382, MNTE 02-0411, MNTE 02-0412, MNTE 02-0421, MNTE 02-0422, MNTE 02-0451 to MNTE 02-0454	There pages were newly added.	AD
					MNTE 02-0520 to MNTE 02-0762	RKH was added to description.	AD
						Message codes were added. (H30Bxy, H30Gxx, H30Hxx, H30Ixx, H42P00 to H44700, H50W00 to H70A00, HB0Cxz, HE0BHH, HE0FHH, HH0CHH, HH0FHH, HH17HH, HH19HH, HH1AHH, HH2600, HH270x, HH3200 to HH3D00)	AD
					MNTE 02-0571, MNTE 02-0572, MNTE 02-0611 to MNTE 02-0618, MNTE 02-0631, MNTE 02-0632, MNTE 02-0741, MNTE 02-0742	There pages were newly added.	AD
					MNTE 02-0810 to MNTE 02-1156	RKH was added to description.	AD
						Message codes were added. (I005HH, I006HH, I007HH, I008HH, I009HH, I00BHH, I04000, I021HH, I130HH	AD
					MNTE 02-0810 to MNTE 02-1156	RKH was added to description.	AD
						Message codes were added. (I131HH, I140HH, I141HH, I142HH, I150HH, I151HH, I152HH, I153HH, I15AHH, I301HH, I303HH, I304HH, I305HH, I306HH, I306xy, I30700, I30800, I5Y4HH, I5Y4xy, I5Y5HH, I5Y5xy, I5Y60x, I5Y700, IZYK00, IZYL00, I410HH, I411HH, I412HH, I413HH, I414HH, I415HH, I416HH, I417HH, I418HH, I419HH, I41AHH, I41BHH, I41CHH, I41DHH, I41EHH, I41FHH, I430HH, I501HH, I502HH, I510HH, I511HH, I512HH, I513HH, I524HH, I530HH, I531HH, I532HH, I533HH, I534HH, I540HH, I5Y2HH, I5Z0HH, I5Z70H, I5ZD0H, I604HH, I605HH, I606HH, I609HH, I8000H, I8020H, I8040H, I806HH, I807HH, I8080H, I80BHH, I8230H, I824HH, I825HH, I840HH, I841HH, I12800, IY00HH, IY01HH, IY02HH, IY03HH, IY04HH, IY05HH, IY06HH, IY07HH, IY08HH, IY09HH, IY0AHH, IY0BHH, IY0CHH, IY0DHH, IY0EHH, IY0FHH, IY0GHH, IY0HHH, IY0IHH, IY0JHH, IY0KHH, IY0LHH, IY0MHH, IZ02HH, IZ03HH, IZ07HH, IZ08HH, IZ09HH, IZ0AHH, IZ0CHH, IZY3HH, IZY5HH, IZY6HH, IZY7HH, IZY8HH, IZY9HH)	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0161, MNTE 02-0162, MNTE 02-0661, MNTE 02-0662, MNTE 02-0841, MNTE 02-0842, MNTE 02-0911, MNTE 02-0912, MNTE 02-0931, MNTE 02-0932, MNTE 02-0933, MNTE 02-0934, MNTE 02-0943, MNTE 02-0944, MNTE 02-1041, MNTE 02-1042, MNTE 02-1091, MNTE 02-1092, MNTE 02-1111, MNTE 02-1112, MNTE 02-1131, MNTE 02-1132, MNTE 02-1153 to MNTE 02-1156, MNTE 02-1321, MNTE 02-1322, MNTE 02-1343 to MNTE 02-1348, MNTE 02-1351 to MNTE 02-1358, MNTE 02-1761, MNTE 02-1762, MNTE 02-1961, MNTE 02-1962, NMTE 02-1221, MNTE 02-1222, MNTE 02-2301, MNTE 02-2302	There pages were newly added.	AD
					MNTE 02-1220 to MNTE 02-1282	RKH was added to description.	AD
						Message codes were added. (RA7900, RA7A00, RA7B0x, RB0G00, RB0H00, RBC1HH, RBC2HH.etc.)	AD
					MNTE 02-1290 to MNTE 02-	RKH was added to description.	AD
						Message codes were added. (W040HH, W050HH, W060HH, W061HH, W071HH, W073HH, W090HH, W0B0HH, W328xy to W32Fxy, W332xy to W335xy)	AD
					MNTE 02-1341, MNTE 02-1342,	There pages were newly added.	AD
					MNTE 02-1500	Changed Recovery measures.	CH
					MNTE 02-1550	Message codes were added. (W328xy to W32Fxy, W332xy to W335xy)	AD
					MNTE 02-1580	Changed *2, *3.	CH
					MNTE 02-1600	Description was added.	AD
					MNTE 02-2000	Changed figure on (5).	CH
					MNTE 02-2490, MNTE 02-2510	Reference page was changed.	CH
					MNTE 02-2560	“1/3 1501”→“1/4 1501”, “1/3 1502” →“1/4 1502”	CR
					MNTE 02-2710	Changed error name of 95 7C.	CH
					MNTE 02-2930, MNTE 02-2940	These pages were newly added.	AD
					MNTE 04-0020, MNTE 04-0030, MNTE 04-0040, MNTE 04-0050, MNTE 04-0100, MNTE 04-0110	Message code was added to recovery procedure.	AD
					MNTE 05-0020	I/F Board was added to (8) and (9).	AD
					MNTE 05-0110	No.8 (I/F Board) was added.	AD
					MNTE 05-0110	No.10 (ENC cable) was added.	AD
					MNTE 05-0120	Figure of wrist strap was changed.	CH
					MNTE 05-0130	ID number was changed.	CH
					MNTE 05-0130 to INST 07-0132	Unit ID# explanation was added. 2 pages were added.	AD
					MNTE 05-0141	The table was changed.	CH
					MNTE 05-0150, MNTE 05-0160, MNTE 05-0250	Added “****HH” message code.	AD
					MNTE 05-0150 to MNTE 05-0170	(a-1),(a-2),(b-2) were added. (b-2) was changed to (b-3). 2 pages were added.	AD/CH
					MNTE 05-0160,MNTE 05-070	(See Figure 5.3.2.) was added.	AD
					MNTE 05-0260	Restriction (No.2) was changed.	CH
					MNTE 05-0270	Figure was moved to page MNTE 05-0271.	DL
						(c) and (d) were changed.	CH
					MNTE 05-0271	Figure 5.3.3 was changed.	CH
					MNTE 05-0312	Battery unit explanation was changed.	CH
					MNTE 05-0320	Text was changed.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0330	Figure 5.3.5 was moved to page MNTE 05-0331, and (2) was moved to page MNTE 05-0332.	DL
					MNTE 05-0350	Figure 5.3.6 was moved to page MNTE 05-0351.	DL
					MNTE 05-0400	Description of (1-1) was changed.	CH
					MNTE 05-0420	"Figure 5.3.8" was corrected to "Figure 5.3.7".	CR
					MNTE 05-0430	Description of (1-2) was changed.	CH
					MNTE 05-0450	(2-1) was added.	AD
						(h) was moved to page MNTE 05-0460.	DL
					MNTE 05-0460	(h) were moved to from page MNTE 05-0450.	AD
						Figure 5.3.7.2 was added.	AD
					MNTE 05-0490	Description of (1-1) was changed.	CH
					MNTE 05-0510	"Figure 5.3.9" was corrected to "Figure 5.3.8".	CR
					MNTE 05-0520	Description of (1-2) was changed.	CH
					MNTE 05-0540	(2-1) was added.	AD
						(g) was moved to page MNTE 05-0460.	DL
					MNTE 05-0550	(g) were moved to from page MNTE 05-0550.	AD
						Figure 5.3.7.2 was added.	AD
					MNTE 05-0560 to MNTE 05-0690	The pages from MNTE 05-0560 to MNTE 05-0690 were revised owing to adding "5.3.7 Replacing I/F Board". (Reallocating Subsection number)	AD/CH
					MNTE 05-0590	Port # was added.	AD
					MNTE 05-0691 to MNTE 05-0694	There pages were newly added.	AD
					MNTE 05-0700 to MNTE 05-0780	There pages were newly added.	AD
					MNTE 05-0700, MNTE 05-0740, MNTE-05-0770	5.3.9 → 5.3.10, 5.3.10 → 5.3.11, 5.3.11 → 5.3.12	CH
					MNTE 06-0000, INST 06-0010	4.1.3(2) → 4.1.3(4)	CH
					MNTE 06-0021 to MNTE 06-0024	These pages were newly added.	AD
					MNTE 06-0050	(3) → (5)	CH
					MNTE 06-0120	"RBC1HH" and "RBC2HH" were added to table.	AD
					MNTE 08-0010	(1) was added.	AD
					MNTE 08-0050 to MNTE 08-0070	No.1-2 → No.1-3	CH
					MNTE 08-0070	*1 was added.	AD
					MNTE 08-0071 to MNTE 08-0073	No.1-3 → No.1-4	CH
					MNTE 08-0073	*1 was added.	AD
					MNTE 08-0074 to MNTE 08-0076	No.1-4 → No.1-5	CH
					MNTE 08-0076	*1 was added.	AD
					WEB 01-0000	Added *3 on table 1.1.2.	AD
					WEB 01-0010	Added 'In the case of using Netscape 6.2'	AD
					WEB 03-0050, WEB 03-0060	Added "RKH+RKA is not supported"	AD
					WEB 03-0341, WEB 03-0342	These pages were newly added.	AD
					WEB 03-0030, WEB 03-0040, WEB 03-0070, WEB 03-0090, WEB 03-0140, WEB 03-0230, WEB 02-0250, WEB 03-0360,	Added microprogram 1654 screen.	AD
					APP A-0000 to APP A-0050	Changed table.	CH
					APP B-0040	These page was newly added	AD
8	Sep.12.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.7 → Rev.8	CH
					GENE 0030	Added "The EMI test was…".	AD
					GENE 0100	Added "(In the case…)" on 6.6.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 02-0140, INTO 02-0150, INTO 02-0151, INTO 02-0152	Added "DF-F600-AEH72".	AD
					INTO 03-0010, INTO 03-0050, INTO 03-0090	The kind of drive was added.	AD
					INTO 04-0290	"RAID 0 coexist" → "RAID coexist".	CR
					INST 01-0000, INST 03-0440, INST 03-0451, INST 06-0333, INST 06-0334, INST 06-0335, INST 06-0340, INST 06-0341, INST 06-0342, INST 07-0153, INST 07-0153, INST 07-0155, INST 07-0156, INST 07-0157, INST 07-0158, INST 08-0000	The form of Control Unit was changed.	CH
					INST 01-0130, INST 01-0160, INST 02-0300, INST 03-0411, INST 03-0660, INST 06-0050, INST 06-0100, INST 06-0340, INST 07-0060	I/F or interface board → Interface Board.	CR
					INST 03-0390	The work procedure was added.	AD
					INST 03-0451	(iii) was changed.	CH
					INST 03-0451, INST 06-0335, INST 07-0155	Notes at the time of Cache Memory loading were added.	AD
					INST 06-0341	The figure was changed.	CH
					INST 06-0530	6.6 was changed.	CH
					INST 06-0920	The connection method was added. The figure was changed.	AD CH
					INST 07-0157	(6) was changed.	CH
					INST 07-0158	The figure was changed.	CH
					MNTE 01-0000, MNTE 05-0380, MNTE 05-0441, MNTE 05-0442, MNTE 05-0443, MNTE 05-0444, MNTE 05-0445, MNTE 05-0461, MNTE 05-0462, MNTE 05-0470, MNTE 05-0533, MNTE 05-0552, MNTE 05-0560, MNTE 05-0580, MNTE 05-0590, MNTE 05-0600, MNTE 05-0610, MNTE 05-0620, MNTE 05-0630, MNTE 08-0043	The form of Control Unit was changed.	CH
					MNTE 01-0100, MNTE 01-0110, MNTE 01-0120, MNTE 02-0641, MNTE 02-0760, MNTE 02-2080, MNTE 02-2471, MNTE 05-0020, MNTE 05-0110, MNTE 05-0430, MNTE 05-0441, MNTE 05-0444, MNTE 05-0461, MNTE 05-0560, MNTE 05-0580, MNTE 05-0600, MNTE 05-0620	I/F or interface board → Interface Board.	CR
					MNTE 02-0680	Added ② at Recovery measures.	AD
					MNTE 02-0840	The line was added to the table.	CR
					MNTE 02-0871	Added "I1G300".	AD
					MNTE 02-0941	Added "I5Y2xy" and "I5Y300".	AD
						Added ② at Recovery measures.	AD
					MNTE 02-0942	Changed "I5Y400" to "I5Y700".	CH
						Delete "I5Y2xy", "I5Y300", "I5Y4HH", and "I5Y5HH".	DL
					MNTE 02-1240	Added ① at Recovery measures.	AD
					MNTE 02-1290	Added ③ at Recovery measures.	AD
					MNTE 04-0090	Added "An example of the…".	AD
					MNTE 05-0141	Description was corrected.	CR
					MNTE 05-0360	The figure of (1-2) was changed.	CH
					MNTE 05-0490	(e) was changed.	CH
					MNTE 05-0520	(e) was changed.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0531	(e) was changed.	CH
					MNTE 05-0532	Four sentences were added.	AD
					MNTE 05-0534	(e) was changed.	CH
					MNTE 05-0535	Four sentences were added.	AD
					MNTE 05-0540	(f) was changed.	CH
					MNTE 05-0551	(f) was changed.	CH
					MNTE 05-0552	Four sentences were added.	AD
					MNTE 05-0730	It was changed into the blank page.	CH
					APP A-0000, APP A-0010	Added *14.	AD
					APP A-0040, APP A-0050	Added *10.	AD
9	Sep.22.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.8 → Rev.9	CH
					INTO 02-0050, INTO 02-0080, INTO 02-0140, INTO 02-0151, INTO 02-0210, INTO 03-0070, INTO 03-0140	"Up to 9 Spare…" → "Up to 3 Spare…".	CH
					INTO 03-0050, INTO 03-0120	The kind of disk drive is added.	AD
					INST 01-0150	The kind of disk drive is added.	AD
					INST 01-0160	The publication upgraded to 9532V is added.	AD
					INST 06-0050, INST 06-0100, INST 06-0170	"Up to 9 Spare…" → "Up to 3 Spare…".	CH
					MNTE 02-0871	Added "I1G70x" and "I1G80x".	AD
					MNTE 02-0872	Added "I301xy" and "I30200".	AD
					MNTE 02-0942	Changed Recovery measures.	CH
					MNTE 02-1640	"/bkdial" → "drvdiag"	CR
					MNTE 05-0141	Deleted *2.	DL
					MNTE 08-0030, MNTE 08-0072	Deleted *1.	DL
10	-	-	-	-	-	-	-
11	Oct.14.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.10 → Rev.11	CH
					GENE 0080	3.3 was changed.	CH
					GENE 0100	6.4.1 was changed.	CH
						6.4.5 was added, and 0341→ 0330.	AD/CR
					GENE 0110	7.4.1 was changed.	CH
					GENE 0160	Added 3.5.4.	AD
					SAFE 0070, INST 03-0100, INST 03-0210, INST 03-0270, INST 03-0520, INST 03-0650, INST 03-0660, INST 03-0714	RKH was added.	AD
					SAFE 0110	"Touching heat sinks…"MNT05-0463, MNT05-0465 was added.	AD
					SAFE 0130	"Press the rail against the rack frame…" was added.	AD
						"When the CALM LED…", "When a trouble of…" were moved to page SAFE 0140.	DL
					SAFE 0140	When the CALM LED…", "When a trouble of…" were moved from to page SAFE 0140.	AD
					INTO 02-0050	‡1 was added.	AD
					INTO 02-0070	Deleted "Widely enhanced performance of internal bus"	DL
					INTO 02-0091, INTO 03-0002	Figure of RKH was changed.	CH
					INTO 02-0123, INTO 02-0154	"I/F Board" was corrected to "Interface Board".	CR
					INTO 02-0154, INTO 02-0222, MNTE 02-0301, MNTE 02-1611	Alternative loop was added.	AD
					INTO 02-0222	"Interface" was corrected to "Interface Board".	CR
					INTO 03-0020, INTO 03-0060, INTO 03-0100, INTO 03-0130, INTO 03-0170	Deleted "Control OS" and "Data bus performance" at the "Internal logic specification".	DL
					INTO 03-0040, INTO 03-0080, INTO 03-0110, INTO 03-0150	"perfor-mance" was corrected to "perform-ance".	CR

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 03-0160 to INTO 03-0190	Description of "←" was changed.	CH
					INTO 04-0100	Reference page was added to (4).	AD
					INTO 04-0104	"chche" was corrected to "cache".	CR
						Reference page was added to (2).	AD
					INST 03-0000	Model name of Work-3 was changed to rackmount model.	CH
					INST 03-0020, INST 03-0120, INST 03-0140, INST 03-0250, INST 03-0340, INST 03-0361, INST 03-0363, INST 03-0510, INST 06-0100, INST 06-0390, INST 07-0060	Model name was changed to "subsystems".	CH
					INST 03-0020	*1 was deleted.	DL
					INST 03-0140	"5507394-1" of No.2 Spacer was changed to "5507394-2".	CH
						*2 was deleted.	DL
					INST 03-0340	Description of table was changed.	CH
					INST 03-0350	Description of (1) was changed.	CH
						Description of (2) was deleted.	DL
					INST 03-0351 to INST 03-0354	There pages were newly added.	AD
					INST 03-0360	Description (Figure) was deleted.	DL
					INST 03-0361	Use of No.6 on table was changed.	CH
						(1) was moved to page INST 03-0362.	DL
					INST 03-0362	(1) was moved from page INST 03-0361.	AD
						(2) was moved to page INST 03-0363.	DL
					INST 03-0363	(2) was moved from page INST 03-0362.	AD
						(3) was moved to page INST 03-0364.	DL
					INST 03-0364	(3) was moved from page INST 03-0363. Figure 3.2.37 was changed.	AD/CH
						Description was deleted.	DL
					INST 03-0370	Model name of 3.3 was changed to rackmount model.	CH
					INST 03-0550	"M5×32" of (a) was changed to "M5×10". Table 3.5.6 was changed.	CH
					INST 03-0600, INST 03-0610	Fastening procedure was changed.	CH
					INST 04-0010, INST 04-0060	Added "A [User Name] and…".	AD
					INST 04-0140	Changed an expression	CH
					INST 05-0310	Description of (1) and (2) were moved to page INST 05-0315 and INST 05-0316.	DL
						Text and (1) were added.	AD
					INST 05-0311 to INST 05-0316	There pages were newly added.	AD
					INST 05-0315	(1) was moved from page INST 05-0310, and (2) was added.	AD
						The succeeding step numbers were changed.	CH
					INST 05-0316	(2) was moved from page INST 05-0310.	AD
					INST 05-0320	Parameter was added to Table 5.3.1.2.	AD
					INST 05-0330	(d) was moved from page INST 05-0340.	AD
					INST 05-0340	(d) was moved to page INST 05-0330	DL
						"Ver.9.10 or later." was added.	AD
					INST 05-0390	Changed Figure.	CH
					INST 05-0650 to INST 05-0720	Contents of the "[Procedure ③-I] Formatting LU" were reedited because of addition of "Quick".	CH
					INST 05-0651 to INST 05-0656	These pages were newly added.	AD
					INST 05-0750	Added (3).	AD
					INST 05-0820	Added (d).	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-1020	Mode name of No.5 and No.6 were changed	CH
						"Eqenera" was corrected to "Egenera".	CR
					INST 05-1030, INST 05-1040, INST 05-1060, INST 05-1070, INST 05-1100, INST 05-1110, INST 05-1120, INST 05-1130, INST 05-1140, INST 05-1170, INST 05-1180, INST 05-1190, INST 05-1200, INST 05-1220, INST 05-1230, INST 05-1250, INST 05-1260, INST 05-1280, INST 05-1290, INST 05-1311, INST 05-1313, INST 05-1314	Window of "DAMP Version is Ver.9.10 or later" was added.	AD
					INST 05-1050	(g) was moved to page INST 05-1060.	DL
					INST 05-1060	(g) was moved from page INST 05-1050.	AD
						(h) to (l) were moved to page INST 05-1061.	DL
					INST 05-1061, INST 05-1062, INST 05-1131, INST 05-1132, INST 05-1181, INST 05-1182	These pages were newly added.	AD
					INST 05-1061	(h) to (l) were moved from page INST 05-1060.	AD
					INST 05-1130	(j) to (n) were moved to page INST 05-1131.	DL
					INST 05-1131	(j) to (n) were moved from page INST 05-1130.	AD
					INST 05-1160	Description of "LU" was changed to "logical unit number".	CH
						(b) was moved to page INST 05-1170.	DL
					INST 05-1170	(b) was moved from page INST 05-1160.	AD
						(c) and (d) were moved to page INST 05-1180.	DL
					INST 05-1180	(c) and (d) were moved from page INST 05-1170.	AD
						(e) to (g) were moved to page INST 05-1181.	DL
					INST 05-1181	(e) to (g) were moved from page INST 05-1180.	AD
					INST 05-1190	Description of (6) was changed.	CH
					INST 05-1311	(b) and (c) were moved to page INST 05-1312.	DL
					INST 05-1312	(b) and (c) were moved from page INST 05-1311.	AD
					INST 05-1313	"Eqenera" was corrected to "Egenera".	CR
					INST 06-0010, INST 06-0020	Description of flow chart was changed.	CH
					INST 06-0190	Description of Work-3 was changed.	CH
					INST 06-0010, INST 06-0020, INST 06-0050, INST 06-0060, INST 06-0090, INST 06-0100, INST 06-0131, INST 06-0140, INST 06-0250, INST 06-0270, INST 06-0330, INST 06-0570	Clerical error correction.	
					INST 06-0670, INST 06-0680, INST 06-0770, INST 06-0790, INST 06-0820, INST 06-0880, INST 06-0920, INST 06-0970, INST 06-0980, INST 06-1030, INST 06-1060	Clerical error correction.	CR

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0162, INST 07-0120, MNTE 05-0132	The front figure of RKH was changed.	CH
					INST 06-0300	"Management Program" was corrected to "management program".	CR
					INST 06-0341	The figure was changed.	CH
					INST 06-0342	(7) was changed.	CH
					INST 06-0570, INST 06-0880	Description of Work-9 was changed.	CH
					INST 06-0680	The work flow figure was corrected.	CR
					INST 06-0860 to INST 06-0880	The procedure was corrected.	CR
					INST 06-0940 to INST 06-0942	The example of RKA connection was added.	AD
					INST 06-1200	(f) was added.	AD
					INST 07-0158	(7) and the figure were changed.	CH
					INST 07-0010, INST 07-0020, INST 07-0030, INST 07-0050, INST 07-0051, INST 07-0060, INST 07-0080, INST 07-0100, INST 07-0130, INST 07-0131, INST 07-0140, INST 07-0141, INST 07-0150	Clerical error correction.	CR
					INST 08-0090	Clerical error correction.	CR
					MNTE 02-0100	Added "A [User Name] and…".	AD
					MNTE 02-0412	Changed Recovery measures at "011884E01".	CH
					MNTE 02-0421	Changed Recovery measures at "011884E10".	CH
					MNTE 02-0490	Message text of "H11600" was changed.	CH
					MNTE 02-0500	Message text of "H11G00" was changed.	CH
					MNTE 02-0520	Added "②If the problem…".	AD
						"H30Bxy" was moved from page MNTE 02-0530.	AD
					MNTE 02-0530	Recovery measures of "H30Hxx" and "H30Ixx" were added.	AD
						"H30Bxy" was moved to page MNTE 02-0520.	DL
						"H30Jxy" was added.	AD
						Description of H30Gxx and H30Hxx was changed.	CH
					MNTE 02-0572	Message text of "H41C00" was changed.	CH
					MNTE 02-0616	Message text of "H50A00" to "H50E00" was changed.	CH
					MNTE 02-0617	Message text of "H50F00" to "H50K00" was changed.	CH
					MNTE 02-0620	"Recovery measures" was added.	AD
						Message text of "H50L00" to "H50R00" was changed.	CH
					MNTE 02-0630	Message text of "H50S00" to "H50T00" was changed.	CH
					MNTE 02-0641	Collect the error of "HB0B0x" was changed.	CH
					MNTE 02-0650	Added "HD250X" and "HD260X". Added "②If the problem…".	AD
						"HE02HH" was moved to page MNTE 02-0660.	DL
					MNTE 02-0660	"HE02HH" was moved from page MNTE 02-0650.	AD
						"HE0100" was added.	AD
						"HE04HH" was moved to page MNTE 02-0661.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0661	"HE04HH" was moved from page MNTE 02-0660.	AD
					MNTE 02-0670	Changed Recovery measures of HE0BHH	CH
					MNTE 02-0680	Collect the error of "HE200x" was changed.	CH
					MNTE 02-0710	"HF0300" was added.	AD
					MNTE 02-0720	"HGA100" to "HGA400" were added.	AD
						"HH0A40" was deleted.	DL
					MNTE 02-0730	"HH0A40" was added. "②If the problem…" was added.	AD
					MNTE 02-0760	"HH2400", "HH2900", and "HH2A00" were added.	AD
						"HH24xy", "HH30xx", and "HH31xx" were deleted.	DL
					MNTE 02-0761	"HH30xx", "HH31xx" were added.	AD
						"HH3B00" to "HI0202" was deleted.	DL
					MNTE 02-0762	"HH3B00" to "HI0202" was added..	AD
					MNTE 02-0800	"HJ2BXX" to "HJ2Fxx" was added..	AD
					MNTE 02-0830	"I00E00", "I00F00", "I01000", "I02000", were added.	AD
						"I02100", "I021HH", "I021xy" were moved to page MNTE 02-0840.	DL
					MNTE 02-0840	"I02100", "I021HH", "I021xy" were moved from page MNTE 02-0830.	AD
						"I122xx", "I123xx" were moved to page MNTE 02-0841.	DL
					MNTE 02-0841	"I122xx", "I123xx" were moved from page MNTE 02-0840.	AD
						Message text of "I12500", "I12600" and "I12700" were changed.	CH
						"I12800", "I130HH", "I130xy" were moved to page MNTE 02-0842.	DL
					MNTE 02-0842	"I12800", "I130HH", "I130xy" were moved from page MNTE 02-0841.	AD
					MNTE 02-0860	Message text of "I160××" was changed.	CH
					MNTE 02-0871	Description of "I1E000", "I1E100" was changed.	CH
						"I1E200" to "I1G200", "I1G400" to "I1G600" were added.	AD
						"I1G70x" and "I301HH" were deleted..	DL
						Description of "I1E200", "I1E300", "I1G100", "I1G400" and "I1G500"were changed.	CH
						"I1G200" was changed.	CH
					MNTE 02-0872	"I1G600" and "I301HH" were added..	AD
						"I303HH" to "I304xy" were moved to page MNTE 02-0883.	DL
					MNTE 02-0873, MNTE 02-0874	These pages were newly added. ("I303HH" to "I304xy" were added.)	AD
					MNTE 02-0880 to MNTE 02-0930	"Recovery measures" was changed.	CH
					MNTE 02-0930	Message text of "I41EHH" and "I41Exy" were changed.	CH
					MNTE 02-0931	Message text of "I430HH" and "I430xy" were changed.	CH
						Recovery measures of "I501HH", "I501xy" and "I5010x" were added.	AD
					MNTE 02-0932	Recovery measures of "I5030x" was added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0941	“Collect the error” of “I5030x” was added.	AD
						"I153500" was added.	AD
					MNTE 02-0942	Description of “I5Y400”, “I5Y500”were added to “connected”.	AD
						"I15Y300" was moved from MNTE 02-0941.	CH
					MNTE 02-0943	“I5Y2xy”, “I5Y300” were deleted.	DL
					MNTE 02-0961	“I60500” was added.	AD
						“I60800” was moved to page MNTE 02-0962.	DL
					MNTE 02-0962	“I60800” was moved from page MNTE 02-0961.	AD
						“Reference page” of “I61900” was added to “—”.	AD
					MNTE 02-0970	“Collect the error” of “I61E00” was added.	AD
					MNTE 02-0980	Message text of “I628xy” was changed.	CH
					MNTE 02-0990	Message text of “162D00” was changed.	CH
						“I6B0xy”, “I6B0HH” were added.	AD
						“I800HH” was moved to page MNTE 02-1000.	DL
					MNTE 02-0991, MNTE 02-0992	These pages were newly added. (Message “I6D00x” to “I6D500” were added)	AD
						Description of "I6D500" and "I6D500" were changed.	CH
					MNTE 02-1000	“I800HH” was moved from page MNTE 02-0990.	AD
						Description of “I8000x”, “I8020x”, “I8040x” were changed.	CH
					MNTE 02-1010	Description of “I806xy”, “I807xy”, “I8080x” were changed.	CH
					MNTE 02-1020	Description of “I80Bxy”was changed.	CH
					MNTE 02-1030	Message text of “I8220x” was changed.	CH
					MNTE 02-1040	Description of “I823HH”, “I8230x”, “I824xy”, “I825xy” were corrected.	CH
						Collect the error was added.	AD
					MNTE 02-1041	Collect the error was added.	AD
						Message text of “I82F00” was changed.	CH
						Description of “I840xy”was changed.	CH
					MNTE 02-1042	Collect the error was added.	AD
						Description of “I841xy”was changed.	CH
					MNTE 02-1080	Message text of “IH0000” was changed.	CH
						Recovery Message of "IG0000" was changed.	CH
					MNTE 02-1090	Collect the error of “IS0000” was added.	AD
					MNTE 02-1091	Collect the error of “IV0000” and “IX0000” were added.	AD
					MNTE 02-1112	“IY0Cxy” was moved from page MNTE 02-1120.	AD
					MNTE 02-1120	“IY0Cxy” was moved to page MNTE 02-1112.	DL
						“IY0Exy” was moved from page MNTE 02-1130.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1130	"IY0Exy" was moved to page MNTE 02-1120.	DL
					MNTE 02-1132	Recovery measures of "IY0MHH", and "IY0Mxy" were added.	AD
					MNTE 02-1140	Collect the error of "IZ03HH" was changed.	CH
						"IY0NHH" to "IY2200" was added.	AD
					MNTE 02-1153	Message text of "IZY5HH" and "IZY5xy" were changed.	CH
					MNTE 02-1154	Message text of all was changed.	CH
						"IZY8xy" was moved from page MNTE 02-1155.	AD
					MNTE 02-1155	"IZY8xy" was moved to page MNTE 02-1154.	DL
						Message text of "IZY9HH" and "IZY9xy" were changed.	CH
						"IZYA00" to "IZYG00" was added.	AD
						"IZYK00" to "IZZ004" were moved to page MNTE 02-1156.	DL
					MNTE 02-1156	"IZYK00" to "IZZ004" were moved from page MNTE 02-1155.	AD
					MNTE 02-1160	Message text of "R00100" was changed.	CH
					MNTE 02-1190	"Reference page" of "R3020x" was added.	AD
					MNTE 02-1200	Recovery measures of "R3030x" was added.	AD
					MNTE 02-1230	Message text of "R50N00" was changed.	CH
					MNTE 02-1240	"(0-1)" of "RA30xy" was corrected to "(0-3)".	CR
					MNTE 02-1250	Recovery measures of "RA780x" was added.	AD
					MNTE 02-1270	Collect the error of "RB0D00" was changed.	CH
					MNTE 02-1280	Collect the error of "RB8400" was deleted.	DL
					MNTE 02-1281	Collect the error of "RBE100" was changed.	CH
					MNTE 02-1282	"RBE300" to "RBE600" were added	AD
					MNTE 02-1290	"W03000", "W03100"and "W03200" were added.	AD
						"W0330x"and "W0340x" were moved to page MNTE 02-1300.	DL
					MNTE 02-1300	"W03300" was added.	AD
						"W0330x"and "W0340x" were moved from page MNTE 02-1290.	AD
						"Recovery measures" of "W060HH" was added.	AD
						"W060HH"to "W061xy" were moved to page MNTE 02-1310.	DL
					MNTE 02-1310	"W060HH"to "W061xy" were moved from page MNTE 02-1300.	AD
						"Recovery measures" of "W071HH" was added.	AD
						"W080xy" was moved to page MNTE 02-1320.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1320	"W080xy" were moved from page MNTE 02-1310.	AD
						Description of "W090xy", "W0B0xy" were changed.	CH
						"②If the problem…" was added to "W0D0xy".	AD
						"W0F0xy" was moved to page MNTE 02-1321.	DL
					MNTE 02-1321	"W0F0xy" were moved from page MNTE 02-1320.	AD
						Collect the error of "W0F0xy" was deleted.	DL
						"W0H000" was added.	AD
					MNTE 02-1353	"DMES01EA05" was added.	AD
						"DMES040900" and "DMES041B00" were moved to page MNTE 02-1354.	DL
					MNTE 02-1354	"DMES040900" and "DMES041B00" were moved from page MNTE 02-1353.	AD
						"DMES04F908" and "DMES04F909" were moved to page MNTE 02-1355.	DL
					MNTE 02-1355	"DMES04F908" and "DMES04F909" were moved from page MNTE 02-1354.	AD
						"DMES05955B" and "DMES05955C" were moved to page MNTE 02-1356.	DL
					MNTE 02-1356	"DMES05955B" and "DMES05955C" were moved from page MNTE 02-1355.	AD
						"DMES068202" to "DMES068212" were moved to page MNTE 02-1357.	DL
					MNTE 02-1357	"DMES068202" to "DMES068212" were moved from page MNTE 02-1356.	AD
					MNTE 02-1390	Changed *2.	CH
					MNTE 02-1400	Changed *3.	CH
					MNTE 02-1420	Changed *4.	CH
					MNTE 02-1410, MNTE 02-1430	"..the all " were added	AD
					MNTE 02-1560	Flow chart was changed.	CH
					MNTE 02-1570, MNTE 02-1571, MNTE 02-1572,	Flow chart was changed.	CH
					MNTE 02-1573, MNTE 02-1574	These pages were newly added.	AD
					MNTE 02-1580	"*1" was added. "*5" was changed.	AD/CH
					MNTE 02-1590	Added "When the codes,…".	AD
					MNTE 02-1360	"No 15" was added.	AD
					MNTE 02-1611	Text was moved to page MNTE 02-1612.	DL
					MNTE 02-1612	Text was moved from page MNTE 02-1611.	AD
					MNTE 02-1640, MNTE 02-1790, MNTE 02-2000, MNTE 02-2270	Added "A [User Name] and…".	AD
					MNTE 02-1612	Text was moved from page MNTE 02-1611.	AD
					MNTE 02-1971 to MNTE 02-1974	These pages were newly added.	AD
						Deleted (e), (f).	DL
					MNTE 02-2300	Added "A [User Name] and …".	AD
					MNTE 02-2301	Added (e), (f), and "A [User Name] and…"	AD
					MNTE 02-2310	Added "A [User Name] and…".	AD
					MNTE 02-2471, MNTE 05-0080	"I/F Board" was corrected to "Interface Board".	CR
					MNTE 02-2472, MNTE 02-2660, MNTE 05-0030, MNTE 05-0260	"2003" or Rev. No were added.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2610	Added “4 44 00”.	AD
					MNTE 02-2660	Added “3 8E 02” and “3 8E 03”.	AD
						Added "3 8E 05".	AD
					MNTE 02-2730	Sense key of “96 09” was changed.	CH
						Added “5 96 0A” to “4 97 03”.	AD
						Deleted “4 A3 00” to “4 B0 00”.	DL
					MNTE 02-2740	Added “4 A3 00” to “4 B0 00”.	AD
						Deleted “B C0 00” to “B C2 00”.	DL
					MNTE 02-2750	Added “B C0 00” to “B C2 00”.	AD
						Deleted “4 EA 02” to “4 F4 00”.	DL
					MNTE 02-2760	Added “4 EA 02” to “4 F4 00”.	AD
					MNTE 02-2810	Added “030008” to “03000B”.	AD
					MNTE 02-2811 to MNTE 02-2818	These pages were newly added. (Added “040009” to “200001”)	AD
					MNTE 02-2840, MNTE 02-2930	Added “A [User Name] and…”.	AD
					MNTE 03-0000, MNTE 03-0030	“Hitachi QuickShadow” was added.	AD
					MNTE 03-0050	This page is newly added.	AD
					MNTE 05-0060	“focible parity” was added Table was moved to page MNTE 05-0061.	AD DL
					MNTE 05-0061	Table was moved from page MNTE 05-0060.	AD
					MNTE 05-0132	Figure of RKH was changed.	CH
					MNTE 05-0141	“(hot replacement)” of table was moved.	CH
					MNTE 05-0312, MNTE 05-0552	Figure was changed.	CH
					MNTE 05-0390	Table was changed.	CH
					MNTE 05-0463 to MNTE 05-0466	These pages were newly added.	AD
					MNTE 05-0480	Deleted the “Restriction” at “No.2”.	DL
					MNTE 05-0670, MNTE 05-0692	Added “NOTE:When raising”	AD
					MNTE 06-0010, MNTE 06-0060	Added “A [User Name] and…”.	AD
					MNTE 06-0020	“Preparation for new…” of (3) was corrected to “Preparation for update…”.	CR
					MNTE 06-0140	“sustem” of (3) was corrected to “system”.	CR
					MNTE 07-0050	Description of figure was added.	AD
					MNTE 07-0070	Description of RKH was added.	AD
					MNTE 08-0020, MNTE 08-0041, MNTE 08-0050, MNTE 08-0071, MNTE 08-0074	Description of No.4 was changed.	CH
					MNTE 08-0042	“DF600-RK / DF600-RKS”of table was corrected to “DF600-RKH”.	CR
					MNTE 09-0000	Usage of No.1 was changed.	CH
					WEB 03-0010	Added “A [User Name] and…”.	AD
					WEB 03-0330, WEB 03-0340, WEB 03-0341	Added QuickShadow Function.	AD
					WEB 03-0343 to WEB 03-0348	These pages were newly added.	AD
					APP A-0000 to APP A-0050	Contents of the chapter were reedited because of addition of Host Connection Parameters List.	CH
12	Nov.28.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.11 → Rev.12	CH
					INTO 04-0130	Added (11) Hitachi QuickShadow function.	AD
					INTO 05-0010	Added “Hitachi QuickShadow”.	AD
					INST 03-0680, INST 06-0580, INST 06-0610, INST 06-0710, INST 07-0080	Added “In single controller …” at Note.	AD
					INST 03-0694	Description of RKH was corrected to “None”.	CR
					INST 05-0320	Description was added to Tru Cluster Connection Mode of Host Connection Mode 2	AD
						“Product ID DF400 Mode” was moved to page INST 05-0330.	DL

Copyright © 2003, 2005, Hitachi, Ltd.

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0330	"Product ID DF400 Mode" was moved from page INST 05-0320.	AD
					INST 05-1020	No.13 was added.	AD
					INST 05-1316	"(13) When using Tru Cluster" was added.	AD
					INST 05-1317, INST 05-1318, MNTE 02-1361, MNTE 02-1362, MNTE 02-2361, MNTE 02-2362, MNTE 02-2371, MNTE 02-2372	These pages were newly added.	AD
					MNTE 02-0661	Recovery measures of "HE05HH" and "HE050x" were added.	AD
					MNTE 02-0670	Recovery measures of "HE0710" and "HE0711" were added.	AD
					MNTE 02-0990	Description and Recovery measures of "I6B0xy", "I6B0HH" were changed.	CH
					MNTE 02-1360	No.2 and No.5 were added.	AD
						No.17 was moved to page MNTE 02-1361.	DL
					MNTE 02-2320	Description was added to No.2.	AD
						No.3 was moved to page MNTE 02-2330.	DL
					MNTE 02-2330	No.3 was moved from page MNTE 02-2320.	AD
						No.7 was moved to page MNTE 02-2340.	DL
					MNTE 02-2340	No.7 was moved from page MNTE 02-2330.	AD
					MNTE 02-2350	Description of flow chart and RKH were added.	AD
					MNTE 02-2360	Flow chart was changed.	CH
					MNTE 02-2370	Flow chart was changed.	CH
					MNTE 03-0000	Added "P-002D-J202U" at No.4.	AD
13	Dec.24.2003	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.12 → Rev.13	CH
					GENE 0090, INST 02-0000, INST 03-0000, INST 05-0000, INST 06-0020	Page of Section 5.7 was changed.	CH
					GENE 0170	Appendix C was added.	AD
					INTO 04-0130	Added (12).	AD
					INTO 05-0010	Added "Open LDEV Guard Function".	AD
					INST 02-0280, INST 03-0641	"Unit ID" was corrected to "Device ID".	CR
					INST 03-0340	Text and (1) was added.	AD
					INST 03-0350, INST 03-0351, INST 03-0352, INST 03-0353, INST 03-0354	Item number was changed.	CH
					INST 03-0355, INST 03-0356	These pages were newly added.	AD
					INST 03-0360	Figure 3.2.33.4 was added.	AD
					INST 04-0140	Text of "•" was changed.	CH
					INST 05-0311	"Tru64" and "Tru Cluster" was added to Platform of Table 5.3.1.	AD
					INST 05-0312	Window of (f) was changed.	CH
						Items were added to Table 5.3.1.1.	AD
					INST 05-1020	No.14 and No.15 were added to table.	AD
					INST 05-1030, INST 05-1100, INST 05-1170, INST 05-1190, INST 05-1220, INST 05-1250, INST 05-1280	Description of (b) was changed.	CH
					INST 05-1311 to INST 05-1318	These pages were deleted.	DL
					INST 05-1320	Subsection 5.7 was moved to page INST 05-1510.	DL
						(11) was moved from page INST 05-1311.	AD

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-1330 to INST 05-1510	These pages were newly added. ((11) to (13) were moved and changed. (14) and (15) were added.)	AD
					INST 05-1510	Subsection 5.7 was moved from page INST 05-1320.	AD
					INST 06-0161, INST 06-0162, INST 07-0120, INST 07-0122	"Unit ID" was corrected to "Device ID".	CR
					INST 06-0320	Window of (d) and (e) were added.	AD
					INST 07-0020	Reference page of Work –4 was changed.	CH
					MNTE 02-0080	Table2.1.4 was moved to MNTE 02-0081.	DL
					MNTE 02-0081, MNTE 02-0082	These pages were newly added.	AD
					MNTE 02-0090	Description of text was added.	AD
					MNTE 02-0330	"01845E01" to "01845E04" were added.	AD
						"01854901" to "01854902" were moved to page MNTE 02-0340.	DL
					MNTE 02-0340	"01854901" to "01854902" were moved from page MNTE 02-00330.	AD
					MNTE 02-0650	"HD27xx" was added.	AD
					MNTE 02-0710	"HF0500" was added.	AD
					MNTE 02-0730	Reference page of "HH1290" was changed.	CH
					MNTE 02-0761	"HH2B00", "HH2C00" and "HH2D00" were added.	AD
						"HH30xx" to "HH3900" were moved to page MNTE 02-0763. "HH3A00" was moved to page MNTE 02-0764.	DL
					MNTE 02-0762	"HH30xx" to "HH3A00" were moved from page MNTE 02-0761.	AD
						"HH2E00" and "HH2F00" was added.	AD
						"HH3B00" to "HI0600" were moved to page MNTE 02-0764.	DL
					MNTE 02-0763, MNTE 02-0764, MNTE 02-0801, MNTE 02-0802, MNTE 02-1171, MNTE 02-1172	These pages were newly added.	AD
					MNTE 02-0763	"HH3A00" to "HI0600" were moved from page previous.	AD
					MNTE 02-0801	"HZ0300" was added.	AD
					MNTE 02-0930	[ONVHDR] the Message text of "I41EHH" and "I41Exy"were corrected to [ONVHER].	CR
					MNTE 02-0942	Reference section of Recovery measures was corrected. (2.5.1→2.4.1)	CR
					MNTE 02-1140	Description of "IY0Txy" was added.	AD
						"IZ03HH" was moved to page MNTE 02-1150	DL
					MNTE 02-1150	"IZ03HH" was moved from page MNTE 02-1140.	AD
					MNTE 02-1171	"R00T00" was added.	AD
					MNTE 02-1282	"RBE800" to "RBEB00" were added	AD
					MNTE 02-1321	Reference page of "W0G0HH" to "W0G100" were added.	AD
						"W0G20x" was added.	AD
					MNTE 02-1344	Recovery measures of "Abnormal End Empty …" Message text was changed.	CH
						"Abnormal End Down Grade Check NG" was moved to page MNTE 02-1345.	DL
					MNTE 02-1345	"Abnormal End Down Grade Check NG" was moved from page MNTE 02-1344.	AD
						"1011" was moved to page MNTE	DL

Copyright © 2003, 2005, Hitachi, Ltd.

						02-1346.	

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1346	"1011" was moved from page MNTE 02-1345.	AD
					MNTE 02-1390, MNTE 02-1400, MNTE 02-1420, MNTE 02-1430, MNTE 02-1450, MNTE 02-1470, MNTE 02-1490, MNTE 02-1500, MNTE 02-1510, MNTE 02-1560, MNTE 02-1572, MNTE 02-1574, MNTE 02-1580, MNTE 02-1980	Open LDEV Guard Function was added to description.	AD
					MNTE 02-1971	Description of "I301xy" and "I301HH" was added.	AD
						A part of description was moved to page MNTE 02-1972	DL
					MNTE 02-1972	A part of description was moved from page MNTE 02-1971.	AD
					MNTE 02-2110	No.20 was added.	AD
					MNTE 02-2330	*2 was moved to page MNTE 02-2340.	DL
					MNTE 02-2340	*2 was moved from page MNTE 02-2330. (*2→*1. *The succeeding * number was changed.)	AD/CH
						No.11 was moved to page MNTE 02-2341.	DL
					MNTE 02-2341, MNTE 02-2342	These pages were newly added.	AD
					MNTE 02-2570, MNTE 02-2580	"5/22 00"and "7/27 00" were added.	AD
					MNTE 02-2670	"5/95 36" was added.	AD
					MNTE 02-2690	"5/95 52" was changed.	CH
					MNTE 02-2730	"5/96 05" to "5/96 08" were added.	AD
						"5/9F FF" to "5/A2 00" were moved to page MNTE 02-2740.	DL
					MNTE 02-2740	"5/9F FF" to "5/A2 00" were moved from page MNTE 02-2730.	AD
						"4/BF 03", "4/BF 04" were moved to page MNTE 02-2750.	DL
					MNTE 02-2750	"4/BF 03", "4/BF 04" were moved from page MNTE 02-2740.	AD
						"1/EA 00", "4/EA 01" were moved to page MNTE 02-2760.	DL
					MNTE 02-2760	"1/EA 00", "4/EA 01" were moved from page MNTE 02-2750.	AD
						"4/ F6 70", "4/F6 71" were moved to page MNTE 02-2770.	DL
					MNTE 02-2770	"4/ F6 70", "4/F6 71" were moved from page MNTE 02-2760.	AD
					MNTE 03-0000, MNTE 03-0030, MNTE 03-0050	Open LDEV Guard Function was added to description.	AD
					MNTE 04-0300	Window of (4) and (5) were added.	AD
					MNTE 04-0330	Window of (4) was added.	AD
					MNTE 04-0340	Window of (5) was added.	AD
					MNTE 04-0370	Window of (4) was added.	AD
					MNTE 04-0380	Window of (5) was added.	AD
					MNTE 04-0410	Window of (4) was added.	AD
					MNTE 04-0420	Window of (5) was added.	AD
					MNTE 04-0450	Window of (4) and (5) were added.	AD
					MNTE 05-0110	Part No. of No.1, No6, No10 were changed.	CH
					MNTE 05-0130, MNTE 05-0132	"Unit ID" was corrected to "Device ID".	CR
					MNTE 06-0060	Text of "•" was added. ("Make sure that the status of system…")	CH
					MNTE 06-0140	Text of "•" was changed.	CH

Copyright © 2003, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 01-0000	Table 1.1.2 was moved to WEB 01-0001.	DL
					WEB 01-0001, WEB 01-0002	These pages were newly added.	AD
					WEB 01-0010	Description of text was added.	AD
					APP A-0020, APP A-0030, APP A-0040	No.9, No.10, No.11 were added to Additional Parameters	AD
					APP A-0020	Description of *5 was changed.	CH
					APP D-0000 to APP D-0050	These pages were newly added. (Appendix C Support Browser List)	AD
14	-	-	-	-	-	-	-
15	Mar.29.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.13 → Rev.15	CH
					GENE 0020	"The subsystem is a …" was added.	AD
					GENE 0030, GENE 0040	RKHE was added.	AD
					GENE 0130	4.2.2 was corrected to "4.2.2 Disk Array management program 2…"	CR
					GENE 0120	MNTE 02-1344 was changed to MNTE 02-1330	CH
						MNTE 02-1348 was changed to MNTE 02-1344	CH
					GENE 0140	Page of 5.3.9 was change.	CH
					SAFE 0070, SAFE 0090, SAFE 0110, SAFE 0120, SAFE 0220	RKHE was added.	AD
					INTO 01-0160, INTO 02-0170	‡1, ‡2 was deleted.	DL
					INTO 02-0020, INTO 02-0040, INTO 02-0050, INTO 02-0060, INTO 02-0070, INTO 02-0080, INTO 02-0090, INTO 02-0123, INTO 02-0153, INTO 02-0154, INTO 02-0180, INTO 02-0204, INTO 02-0210, INTO 02-0222, INTO 02-0240, INTO 02-0260	RKHE was added.	AD
					INTO 02-0040	Description was moved from page INTO 02-0050. (Up to nine …)	AD
					INTO 02-0050	Description was moved to page INTO 02-0050. (Up to nine …)	DL
					INTO 02-0070	"RKH is POWER PC 7457…" was changed to "RKH is POWER PC 7455…".	CH
					INTO 02-0091	(a) was added	AD
					INTO 02-0092	(b) was added.	AD
						(2) was moved to page INTO 02-0093.	DL
					INTO 02-0093	This page was newly added.((2) was moved from page INTO 02-0091.)	AD
					INTO 02-0094	This page was newly added.	AD
					INTO 03-0002	RKH of Figure 3.2 was deleted.	DL
						*1 was added.	AD
					INTO 03-0003	This page was newly added. ((c) was added.)	AD
					INTO 03-0004	This page was newly added.	AD
					INTO 03-0180	Corrected 2,048 → 4,096 in Backup duration.	CR
					INTO 04-0091, INTO 05-0000	Performance Management -Base Monitor function was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0000, INST 01-0040, INST 01-0041, INST 01-0080, INST 01-0130, INST 01-0160, INST 01-0170, INST 03-0100, INST 03-0210, INST 03-0270, INST 03-0340, INST 03-0352, INST 03-0370, INST 03-0380, INST 03-0411, INST 03-0420, INST 03-0430 to INST 03-0451, INST 03-0481, INST 03-0510, INST 03-0520, INST 03-0530, INST 03-0600, INST 03-0640, INST 03-0641, INST 03-0650, INST 03-0652, INST 03-0660, INST 03-0671, INST 03-0680	RKHE was added.	AD
					INST 03-0692 to INST 03-0694, INST 03-0714, INST 03-0752, INST 03-0760, INST 03-0790	RKHE was added.	AD
					INST 01-0040	Description of figure was added.	AD
					INST 01-0041	Figure was changed.	CH
					INST 01-0090	Text was moved.	CR
					INST 01-0100	Figure 1.4.4 was corrected.	CR
					INST 01-0110	Figure 1.4.5 was corrected.	CR
					INST 01-0130	SANRISE 9585V was added.	AD
					INST 01-0160	SANRISE 9580V upgrade kit was added.	AD
					INST 02-0050	Figure was corrected.	CR
					INST 02-0070	H2H→H1H(from No.13 to No.16)	CR
					INST 02-0210	Figure was corrected.	CR
					INST 02-0231	Figure 2.5.4.1 was corrected.	CR
					INST 02-0240	Figure was corrected.	CR
					INST 02-0260	Figure was corrected.	CR
					INST 02-0370	Figure 2.7.1 was corrected.	CR
					INST 02-0371	Figure 2.7.1.1 was corrected.	CR
					INST 03-0050	Figure 3.2.3 was corrected.	CR
					INST 03-0130	Figure 3.2.11 was corrected.	CR
					INST 03-0140, INST 03-0250	“Spacer (5507394-2)” was added.	AD
					INST 03-0310	Table 3.2.6 was corrected.	CR
					INST 03-0355	Table 3.2.7.1 was corrected.	CR
					INST 03-0390	Figure was corrected.	CR
					INST 03-0400	Figure 3.4.2 was corrected.	CR
					INST 03-0450	(iii),(iv) were corrected.	CR
					INST 03-0460	Figure was corrected.	CR
					INST 03-0760	Note was added to the (1) – (3).	AD
					INST 04-0022	Figure was corrected.	CR
					INST 04-0120	Description of a loop obstacle was corrected.	CR
					INST 04-0140, INST 05-0031, INST 05-0130 to INST 05-0160, INST 05-0200, INST 05-0250, INST 05-0560, INST 05-0650, INST 05-0651, INST 05-0801, INST 05-1001, INST 06-0020, INST 06-0040 to INST 06-0060, INST 06-0090, INST 06-0100, INST 06-0160, INST 06-0162, INST 06-0170, INST 06-0333, INST 06-0334, INST 06-0340, INST 06-0341, INST 06-0390, INST 06-0400, INST 06-0840, INST 06-0920, INST 06-0940, INST 06-0941, INST 06-0960, INST 06-1020 to INST 06-1040, INST 06-1060, INST 06-1150, INST 06-1180, INST 07-0040,	RKHE was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0100, INST 05-0290, INST 05-0311, INST 05-0316, INST 05-0410, INST 05-0540, INST 05-0630, INST 05-0670, INST 05-0140, INST 05-0701, INST 05-0730, INST 05-0770, INST 05-0780, INST 05-1010, INST 05-1060, INST 05-1130, INST 05-1140, INST 05-1320, INST 05-1350, INST 05-1470, INST 05-0140, INST 06-0310	[Set] → [Settings] was changed.	CH
					INST 05-0260	"(At the ...be caused.)" was added.	AD
					INST 05-0140, INST 05-0200	"High-Speed Sequential write Mode" was added.	AD
					INST 05-0311	[Modify Host Group Option] was corrected to [Host Group Option Change].	AD
					INST 05-0316	"Modify Host Group Option" was corrected to "Modify Host Group Option".	AD
					INST 05-0320	"Same Node Name Mode" was added.	AD
					INST 05-0350	Description of (1) was changed.	CH
					INST 05-0410, INST 05-0520, INST 05-0580, INST 05-0624, INST 05-0627, INST 05-0660, INST 05-0720, INST 05-0760	Window design of "DAMP Version is Ver.9.00 or later." was modified.	CH
					INST 05-0461	[Select Drives] was corrected to [Selected Drives].	AD
					INST 05-0560, INST 05-0570	The RAID level notation was corrected.	CR
					INST 05-0630	Ver.7xx window of (1) was changed.	CH
					INST 05-0651	Restriction of No.2 of Table 5.4.4 was changed.	CH
						Description of NOTE (The standard ...16) was added.	AD
						"When Pin ..." was moved to INST 05-0651	DL
					INST 05-0652	"When Pin ...""" was moved from INST 05-0651.	AD
						Description of 3 NOTES was added.	AD
						Descriptions of Microrevision were added. (①, ②, ③)	AD
					INST 05-0652 to INST 05-0657	INST 05-0652 (a) to INST 05-0656 were moved to INST 05-0653 to INST 05-0657	CH
					INST 05-0657, INST 05-0658	New pages were added.	AD
					INST 05-0670	Table No was corrected.	CR
					INST 05-0680	Note is added.(if ...)	AD
					INST 05-0690	Window of Ver.7xx was changed.	CH
					INST 05-0701	"Progress Display" was corrected to "Quick Format Priority Mode".	CR
					INST 05-0720	"If Multiple ... "Quick"." was added.	AD
					INST 05-0800	Description of *3 was changed.	CH
						Description of *1 was changed.	CH
					INST 05-0860	Description of ③ and ④ was changed.	CH
					INST 05-0890	Maker was added to window.	AD
					INST 05-1020	"16" was added.	AD
					INST 05-1501, INST 05-1502, INST 05-1503, INST 05-1504	These pages were newly added. (16) (a) to (i) were added.	AD
					INST 06-1210	The ENC cable connection table was corrected.	CR
					INST 07-0060, INST 07-0100, INST 07-0121, INST 07-0122, INST 07-0130, INST 07-0153, INST 07-0156, INST 07-0158, INST 08-0000, INST 08-0131	RKHE was added.	AD
					INST 07-0120	Figure 7.4.2 was corrected.	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 01-0000	Description of text was moved.	CH
						Control Unit was added to text.	AD
					MNTE 01-0000, MNTE 01-0050, MNTE 01-0071, MNTE 01-0080, MNTE 01-0100 to MNTE 01-0120, MNTE 02-0301, MNTE 02-0302, MNTE 02-0520, MNTE 02-0641, MNTE 02-0650, MNTE 02-0661, MNTE 02-0730, MNTE 02-0761, MNTE 02-0762, MNTE 02-0840, MNTE 02-0841, MNTE 02-0871, MNTE 02-0933, MNTE 02-0934, MNTE 02-0942, MNTE 02-0943,	RKHE was added.	AD
					MNTE 02-0520, MNTE 02-0530, MNTE 02-0640, MNTE 02-0650, MNTE 02-0740, MNTE 02-0842, MNTE 02-0871, MNTE 02-0932, MNTE 02-0961, MNTE 02-0980, MNTE 02-0991, MNTE 02-1010, MNTE 02-1020, MNTE 02-1092, MNTE 02-1130, MNTE 02-1140, MNTE 02-1155, MNTE 02-1270, MNTE 02-1321, MNTE 02-1342	Parameter x and y were corrected.	CR
					MNTE 02-0950 to MNTE 02-0961, MNTE 02-0970, MNTE 02-0990, MNTE 02-0991, MNTE 02-1000, MNTE 02-1040, MNTE 02-1060, MNTE 02-1070, MNTE 02-1071, MNTE 02-1080 to MNTE 02-1092, MNTE 02-1251, MNTE 02-1270, MNTE 02-1282, MNTE 02-1320, MNTE 02-1321, MNTE 02-1590, MNTE 02-1611, MNTE 02-1990, MNTE 02-2190, MNTE 02-2220, MNTE 02-2221, MNTE 02-2260, MNTE 02-2300, MNTE 02-2301, MNTE 02-2310 to MNTE 02-2341, MNTE 02-2350, MNTE 02-2371, MNTE 02-2380, MNTE 02-2400, MNTE 02-2420, MNTE 02-2430, MNTE 02-2450, MNTE 02-2471, MNTE 02-2471, MNTE 02-2500, MNTE 02-2817	RKHE was added.	AD
					MNTE 01-0030,	[Set] → [Settings] was changed.	CH
						"DAMP Version is Ver.9.00 or later." was added to (4).	AD
					MNTE 01-0070	RKAD → RKA	CR
					MNTE 01-0120, MNTE 01-0130	No. of Jumper switch was changed to corrected.	CR
					MNTE 02-0010	Line of flow was changed.	CH
					MNTE 02-0070, MNTE 02-0120, MNTE 02-0130, MNTE 02-0140, MNTE 02-0190, MNTE 02-0200, MNTE 02-0260, MNTE 02-2000, MNTE 02-2040, MNTE 02-2050, MNTE 02-2060, MNTE 02-2200, MNTE 02-2230, MNTE 02-2240	"Microprogram revision 1654 or later." was added	AD
					MNTE 02-0000	MNTE 02-1344 was changed to MNTE 02-1330	CH
						MNTE 02-1348 was changed to MNTE 02-1344	CH
					MNTE 02-0040	"gateway" was corrected to "Gateway".	CR
					MNTE 02-0080	Description of *1 was changed.	CH
					MNTE 02-0081, MNTE 02-0082	x656 was changed to x657.	CH
					MNTE 02-0120	Title of Figure 2.2.1 was added.	AD
					MNTE 02-0230	Display code "ENC" of Table 2.2.2 was reference was corrected	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0420	"01884E09 to 01884E09" of *1 was.	CR
					MNTE 02-0421	"01884E09 to 01884E10" of *1 was corrected to "01884E10".	CR
					MNTE 02-0500	Recovery measures ② of H20100 was corrected to "all Cache Unit".	CR
					MNTE 02-0615	"H44800" to "H45100" were added.	CH
						"H50000" to "H50700" were moved to page MNTE 02-0616.	DL
					MNTE 02-0616	"H50000" to "H50700" were moved from page MNTE 02-0615.	AD
						"H50A00" to "H50E00" were moved to page MNTE 02-0617.	DL
					MNTE 02-0617	"H50A00" to "H50E00" were moved from page MNTE 02-0616.	AD
						"H50G00" to "H50K00" were moved to page MNTE 02-0618.	DL
					MNTE 02-0618	"H50G00" to "H50K00" were moved from page MNTE 02-0617.	AD
					MNTE 02-0660	"5.3.7 (MNTE 05-0560)" of was corrected to "5.3.8 (MNTE 05-0640)".	CR
						Recovery measures ② of HE0100 was added.	AD
					MNTE 02-0661	Reference page of "HE04HH" and "HE040x"were corrected.	CR
						HE050x-③ : frame → chassis.	CH
						HE050x-④ was added.	AD
					MNTE 02-0670	"5.3.7 (MNTE 05-0560)" of was corrected to "5.3.8 (MNTE 05-0640)".	CR
						Recovery measures ① of HE0710 was added.	AD
					MNTE 02-0730	"HH0Exy" → "HH0E0x".	CR
					MNTE 02-0740	Reference page of "HH19HH was corrected to "5.3.8 (MNTE 05-0640)".	CR
					MNTE 02-0741	"(Basic Chassis)" of "HH1AHH"and "HH1Axy" were deleted.	DL
						Recovery measures of "HH1M00"and "HH1N00" were changed.	CH
					MNTE 02-0761	Reference page of "HH2C00"was added.	AD
					MNTE 02-0762	Reference page of "HH2E00"was added.	AD
					MNTE 02-0764	"HH3E0x"was added.	AD
					MNTE 02-0800	"HJ32xx"was added.	AD
						"HL000"and "HL010x" were moved to page MNTE 02-0801.	DL
					MNTE 02-0801	"HL000"and "HL010x" were moved from page MNTE 02-0800.	AD
					MNTE 02-0840	"I121xx" of was corrected to "I12100".	CR
					MNTE 02-0841	"I122xx" → "I12200" "I123xx" → "I12300"	CR
					MNTE 02-0842	Recovery measures of "I140HH" and "I140xy" was changed.	CH
					MNTE 02-0872	"I1GA00" to I1GF00 "" were added.	AD
						"I301HH"to "I30200" were moved to page MNTE 02-0873.	DL
					MNTE 02-0873	"I301HH"to "I30200" were moved from page MNTE 02-0872.	AD
						"I304HH"to "I304xy" were moved to page MNTE 02-0874.	DL
					MNTE 02-0874	"I304HH"to "I304xy" were moved from page MNTE 02-0873.	AD
					MNTE 02-0941	Description (HDU) of "I5Y2HH", "I5Y2xy" were added.	AD
					MNTE 02-0942, MNTE 02-0943, MNTE 02-0950,	Reference number was changed. ((14) → (15))	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0961	Reference page of “I605HH” and “I606xy” were corrected.	CR
						Simple Trace of “I6070x” was deleted.	DL
					MNTE 02-0970	Recovery measures of “I61A00” was changed.	CH
					MNTE 02-0992	“I6DH00” to “I6DP00” were added.	AD
					MNTE 02-1010	Reference page of “I806HH” and “I806xy”were corrected to “5.3.8 (MNTE 05-0640)”.	CR
					MNTE 02-1020, MNTE 02-1030, MNTE 02-1040, MNTE 02-1041, MNTE 02-1042, MNTE 02-1154	“5.3.7 (MNTE 05-0560)” of was corrected to “5.3.8 (MNTE 05-0640)”.	CR
					MNTE 02-1070	“IF000” was moved to page MNTE 02-1071.	DL
					MNTE 02-1071, MNTE 02-1072	These pages were newly added. (Moved from page MNTE 02-1070.)	AD
					MNTE 02-1092	“IY02HH” was moved to page MNTE 02-1100.	DL
					MNTE 02-1100	“IY02HH” was moved from page MNTE 02-1092.	AD
					MNTE 02-1152	“IZ0Bxy” was corrected to “IZ0B00”.	CR
					MNTE 02-1153	“IZYB00” to “IZYA00” were deleted.	DL
						Reference page of “IZY5HH” and “IZY5xy”were corrected to “5.3.8 (MNTE 05-0640)”.	CR
					MNTE 02-1155	Reference page of “IZY9HH” and “IZY9xy”were corrected to “5.3.8 (MNTE 05-0640)”.	CR
					MNTE 02-1200	“R3120x” was added.	AD
						“R40900” was moved to page MNTE 02-1210.	DL
					MNTE 02-1210	“R40900” was moved from page MNTE 02-1200.	AD
						“R40L00” to “R40N00” were moved to page MNTE 02-1220.	DL
					MNTE 02-1220	“R40L00” to “R40N00” were moved from page MNTE 02-1210.	AD
						“R50600” to “R50700” were moved to page MNTE 02-1221.	DL
					MNTE 02-1221	“R50600” to “R50700” were moved from page MNTE 02-1220.	AD
						“R50D00” to “R50E00” were moved to page MNTE 02-1222.	DL
					MNTE 02-1222	“R50D00” to “R50E00” were moved from page MNTE 02-1221.	AD
						“R50K00” to “R50L00” were moved to page MNTE 02-1230.	DL
					MNTE 02-1230	“R50K00” to “R50L00” were moved from page MNTE 02-1222.	AD
						“R50R00” to “R50S00” were moved to page MNTE 02-1240.	DL
					MNTE 02-1240	“R50R00” to “R50S00” were moved from page MNTE 02-1230.	AD
						“RA0415” to “RA30xy” were moved to page MNTE 02-1250.	DL
					MNTE 02-1250	“RA0415” to “RA30xy” were moved from page MNTE 02-1240.	AD
						Recovery measures ② of RA1000 was added.	AD
						Description of “RA7600” was changed.	CH
						“RA780x” to “RA9000” were moved to page MNTE 02-1251.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1251	This page was newly added. ("RA780x" to "RA9000" were moved from page MNTE 02-1250. "RA7D00" was added.)	AD
					MNTE 02-1252	This page was newly added.	AD
					MNTE 02-1280	Reference page of "RB8000" and "RB8200" were corrected to "For Maintenance Chapter 6".	CR
					MNTE 02-1282	Reference page of "RBE200" was corrected to "For Maintenance Chapter 6".	CR
						"RBEC00" was added.	AD
					MNTE 02-1310	(*1) was added at recovery measures.	AD
					MNTE 02-1320	Recovery measures of "W090HH" and "W090xy" were added.	AD
						"W0D000" and"W0E000" was moved to page MNTE 02-1321.	DL
					MNTE 02-1321	"W0D000" and "W0E000" were moved from page MNTE 02-1320.	AD
						"W0G20x" to "W12000" were moved to page MNTE 02-1322.	DL
					MNTE 02-1322	"W0G20x" to "W12000" moved from page MNTE 02-1321.	AD
						"W22000" to "W323xy" were moved from page MNTE 02-1330.	AD
					MNTE 02-1323	This page was newly added.	AD
						"W32Exy" to "W335xy" were moved to page MNTE 02-1340.	DL
						"W324xy" to "W325xy" were moved to page MNTE 02-1330.	DL
						"W326xy" to "W32Bxy" were moved to page MNTE 02-1340.	AD
					MNTE 02-1324	This page was newly added.	AD
						"W32Cxy" to "W32Dxy" were moved from page MNTE 02-1340.	AD
						"W32Exy" to "W333xy" were moved to page MNTE 02-1341.	AD
					MNTE 02-1325	This page was newly added.	AD
						"W334xy" to "W335xy" were moved from page MNTE 02-1341.	AD
						"W340xy" to "W43400" were moved from page MNTE 02-1342.	AD
						"W340xyxy" to "W43400" were moved to page MNTE 02-1342.	DL
					MNTE 02-1326	This page was newly added.	AD
						"W440xy" to "W4700x" were moved from page MNTE 02-1343.	AD
					MNTE 02-1327	This page was newly added.	AD
						"W4800" and "W48100" was added.	AD
					MNTE 02-1328	This page was newly added. (blank)	AD
					MNTE 02-1330	"W2200" to "W323xy" were moved to MNTE 02-1322.	DL
						"W24xy" to "W325xy" were moved to MNTE 02-1323.	DL
						Description of 2.3.6 was moved from page MNTE 02-1344.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1340	"W32Exy" to "W333xy" were moved to page MNTE 02-1324.	DL
						"W32Exy" to "W333xy" were moved to page MNTE 02-1324.	DL
						"Abnormal END Down…" to "Abnormal END Install…" of 9 were moved from MNTE 02-1345.	AD
						"Abnormal END Install Setup…" to "Abnormal END Down Grade…" of 8 were added.	AD
					MNTE 02-1341	"W32Exy" to "W333xy" were moved to page MNTE 02-1324.	DL
						"W334xy" to "W335xy"were moved to page MNTE 02-1325.	DL
						9 messages were moved from MNTE 02-1345.	AD
						8 messages were moved from MNTE 02-1346.	AD
					MNTE 02-1342	"W340xyxy" to "W43400" were moved to page MNTE 02-1325.	DL
						Code "1212" to "1224" were added form MNTE 02-1325.	AD
					MNTE 02-1343	"W440xy" to "W4700x" were moved to page MNTE 02-1326.	DL
						Table 2.3.7, 2.3.8 were moved form MNTE 02-1347.	AD
						Code "1003" to "10112 were added.	AD
					MNTE 02-1344	Table 2.3.6 was moved to MNTE 02-1340.	DL
						Table 2.3.9 was moved from MNTE 02-1348.	AD
						DMEA000001 to DMEA000003, DMEA000008 to DMEA00000A, DMEA001005, DMEA00100D, DMEA 001010, DMEA001020, DMEA001021, DMEA001025 and DMEA001027 were changed.	CH
					MNTE 02-1345	9 Web messages were moved to MNTE 02-1340.	DL
						20 Web messages were moved to MNTE 02-1341.	DL
						DMEA001028 to DMEA001080 were moved from MNTE 02-1350.	AD
						DMEA001056, DMEA00107A, DMEA00107B, DMEA00107C were added.	AD
						DMEA001076 was changed.	CH
					MNTE 02-1346	Web messages (1011 to 1210) were moved to MNTE 02-1341.	DL
						Web messages (1212 to 1224) were moved to MNTE 02-1342.	DL
						DMEA001081 to DMEA001087 were moved from MNTE 02-1351.	AD
						DMEA001088 to DMEC001351 were moved from MNTE 02-1351.	AD
						DMEA00110A to DMEA001134 were added.	AD
						DMEA001094, DMEA001107 were changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1347	Messages (2000, 2001) were moved to MNTE 02-1342.	DL
						Table 2.3.7, 2.3.8 were moved to MNTE 02-1343.	DL
						DMEC002023 to DMEC002046 were moved from MNTE 02-1351.	AD
						DMEC002047 to DMEC020001 were moved from MNTE 02-1352.	AD
						DMEC002054 to DMEC002103 were added.	AD
						DMEC002033, DMEC002035, DMEC002039, DMEC002041, DMEC002043, DMEC002047, DMEC002049, DMED010003, DMED010004, DMED020001 were changed.	CH
					MNTE 02-1348	Table 2.3.9 was moved to MNTE 02-1344.	DL
						DMED020002 to DMED050004 were moved from MNTE 02-1352.	AD
						DMED03000B, DMED040009, DMED020007 to DMED02000B, DMED070001 to DMED080006 were added.	AD
						DMED020002, DMED030002, DMED030008, DMED030009, DMED040005, DMED040008, DMED050004, DMEC020002 were changed.	CH
					MNTE 02-1350	DMEA001028 to DMEA001080 were moved to MNTE 02-1345.	DL
						DMEA001081 to DMEA001087 were moved to MNTE 02-1346.	DL
						DMED080007 to DMED09000A were added.	AD
					MNTE 02-1351	DMEA001088 to DMEC002022 were moved to MNTE 02-1346.	DL
						DMEC002023 to DMEC002046 were moved to MNTE 02-1347.	DL
						DMED09000B to DMED0D00001 were added.	AD
					MNTE 02-1352	DMEC002047 to DMED030001 were moved to MNTE 02-1347.	DL
						DMED0300002 to DMED050004 were moved to MNTE 02-1348.	DL
						DMED400024 to DMES011802 were moved to MNTE 02-1353.	DL
						DMED0F0001 to DMED400023 were added.	AD
					MNTE 02-1353	DMES031300 to DMES040802 were moved to MNTE 02-1354.	DL
						DMED400024 to DMES011802 were moved from MNTE 02-1352.	DL
						DMED400024 to DMED500001, DMES01EA05 was added.	AD
						DMES020404, DMES020484, DMES029500, DMES029501, DMES033101, DMES033180 were changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1354	DMES04F903 to DMES04F907 were moved to MNTE 02-1355.	DL
						DMES031300 to DMES040802 were moved from MNTE 02-1353.	AD
						DMES049502 was changed.	CH
					MNTE 02-1355	DMES059533 to DMES05955A were moved to MNTE 02-1356.	DL
						DMES04F630 to DMES04F907 were moved from MNTE 02-1354.	AD
						DMES059531 was added.	AD
						DMES055504, DMES059520, DMES059521, were changed.	CH
					MNTE 02-1356	DMES05EA03 to DMES068201 were moved to MNTE 02-1357.	DL
						DMES059533 to DMES05955A were moved from MNTE 02-1355.	AD
						DMES05960A to DMES05961A were added.	AD
						DMES059540, DMES059543, DMES059551, DMES05955A, DMES05955C, DMES059565, DMES059571 to DMES059574, DMES05957A, DMES05957B, DMES05957D, DMES059591, DMES059602, DMES059606 were changed.	CH
					MNTE 02-1357	DMES079597 to DMES0BFD01 were moved to MNTE 02-0138	DL
						DMES05957E to DMES068201 were moved from MNTE 02-1357.	AD
						DMES05EA14, DMEA05EA15 were added.	AD
						DMES05957E, DMES05957F, DMES059580, DMES059591, DMES059602, DMES059606 were changed.	CH
					MNTE 02-1358	DMES079597 to DMES0BFD01 were moved to MNTE 02-0138	AD
						DMES0BDA00, DMES0BFD11 were changed.	CH
					MNTE 02-1353	“DMES01EA05” was deleted.	DL
					MNTE 02-1356	“DMES05EA13” was added.	AD
					MNTE 02-1360	No.6 was added. (The succeeding step numbers were changed.)	
						No.15 to No.18 were moved to page MNTE 02-1361.	DL
					MNTE 02-1361	No.15 to No.18 were moved from page MNTE 02-1360.	AD
						Reference page was changed of No.18.	CH
					MNTE 02-1363 to MNTE 02-1366	These pages were newly added.	AD
					MNTE 02-1365, MNTE 02-1366, MNTE 02-1380, MNTE 02-1420, MNTE 02-1500, MNTE 02-1510, MNTE 02-1560, MNTE 02-1580	Description of asterisk was changed. (There may be a case…)	CH
					MNTE 02-1370	Description of (1) was moved to page MNTE 02-1363.	DL
						(3) was added. (The succeeding step numbers were changed.)	AD
					MNTE 02-1371 to MNTE 02-1378	These pages were newly added.	AD
					MNTE 02-1380	Description of (2) was moved to page MNTE 02-1364.	DL
						No.2 of (3) was added.	AD
					MNTE 02-1381 to MNTE 02-1388	These pages were newly added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1390	Description of No.1 was moved to page MNTE 02-1365.	DL
						Procedure of "Procedure given in …" was added.	AD
					MNTE 02-1391 to MNTE 02-1398	These pages were newly added.	AD
					MNTE 02-1400	Description of No.2 and No.3 were moved to page MNTE 02-1366.	DL
						Procedure of "Procedure given in …" was added.	AD
					MNTE 02-1401 to MNTE 02-1408	These pages were newly added.	AD
					MNTE 02-1410, MNTE 02-1430, MNTE 02-1440, MNTE 02-1450, MNTE 02-1460, MNTE 02-1480, MNTE 02-1530, MNTE 02-1572, MNTE 02-1573	Description of "If two or more RKA's (RKAD's) are …" of was corrected to "If two or more Disk Drive are…".	CH
					MNTE 02-1410, MNTE 02-1440, MNTE 02-1460, MNTE 02-1480, MNTE 02-1500, MNTE 02-1510, MNTE 02-1520, MNTE 02-1530, MNTE 02-1550, MNTE 02-1570, MNTE 02-1580, MNTE 02-1590, MNTE 02-1630, MNTE 02-1780, MNTE 02-1970, MNTE 02-1977, MNTE 02-1979	Item number was changed.	CH
					MNTE 02-1410	Description was added to flow.	AD
						Description of flow was moved to page MNTE 1430.	DL
					MNTE 02-1420, MNTE 02-1590, MNTE 02-1620, MNTE 02-1640, MNTE 02-1650, MNTE 02-1660, MNTE 02-1670, MNTE 02-1680, MNTE 02-1681, MNTE 02-1690, MNTE 02-1700, MNTE 02-1740, MNTE 02-1750, MNTE 02-1780, MNTE 02-1800, MNTE 02-1810, MNTE 02-1820, MNTE 02-1830, MNTE 02-1840, MNTE 02-1841, MNTE 02-1850, MNTE 02-1860, MNTE 02-1870, MNTE 02-1940, MNTE 02-1950	Description of a loop obstacle was corrected.	CR
					MNTE 02-1430	Description of flow moved from page MNTE 02-1410.	AD
					MNTE 02-1430, MNTE 02-1450, MNTE 02-1470, MNTE 02-1490, MNTE 02-1572, MNTE 02-1574	Reference page of (2) was changed.	CH
					MNTE 02-1440	Description was added to flow.	AD
						Description of flow was moved to page MNTE 1450.	DL
					MNTE 02-1450	Description of flow moved from page MNTE 02-1440.	AD
					MNTE 02-1460	Description was added to flow.	AD
						Description of flow was moved to page MNTE 1470.	DL
					MNTE 02-1470	Description of flow moved from page MNTE 02-1460.	AD
						Reference page of (2) was changed.	CH
					MNTE 02-1480	Description before of "Collecting simple trace" was deleted.	DL
						Description was added to flow.	AD
						Description of flow was moved to page MNTE 1490.	DL
					MNTE 02-1490	Description of flow moved from page MNTE 02-1480.	AD
						Reference page of (2) was changed.	CH
					MNTE 02-1520	*2 and *3 were deleted.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1530	Description of *1 to *3 were changed.	CH
						Description of “Turn off the main switch.” was added to flow.	AD
						Reference number of flow was changed.	CH
					MNTE 02-1540	Description of *2 to *3 were changed.	CH
					MNTE 02-1572	Description was added to flow.	AD
						“C” → “D”	CH
						Description of flow was moved to page MNTE 1573.	DL
					MNTE 02-1573	“C” → “D”	CH
						Description of flow was moved from page MNTE 02-1572.	AD
						Description of flow was moved to page MNTE 02-1574	DL
					MNTE 02-1574	Description of flow was moved from page MNTE 02-1573.	AD
						Description of “Turn off the main switch.” of flow was moved.	CH
						“Is the micro program … ×657?” and “E” were added.	AD
						Description of flow was moved to page MNTE 02-1575	DL
					MNTE 02-1575	This page was newly added. (Description of flow was moved from page MNTE 02-1574.)	AD
					MNTE 02-1576	This page was newly added.	AD
					MNTE 02-1590	(14-3) and (14-4) were added.	AD
					MNTE 02-1630, MNTE 02-1780	Reference page was changed.	CH
					MNTE 02-1740	Check List was changed.	CH
						"4" and "5" were moved to page MNTE 02-1741	DL
					MNTE 02-1741	New page was added.	AD
						"4" and "5" were moved from page MNTE 02-1740	AD
					MNTE 02-1742	New pages were added.	AD
					MNTE 02-1780	(iv) was added.	AD
						(vi) to (viii) were moved to page MNTE 02-1790.	DL
					MNTE 02-1780	Reference item of flow was changed. ((14-2) → (15-2))	CH
					MNTE 02-1790	(v) was added.	AD
						(vi) to (viii) were moved from page MNTE 02-1780.	AD
						(a) (viii) and (b) (ii) was changed.	CH
					MNTE 02-1940	Check List was changed.	CH
						"4" and "5" were moved to page MNTE 02-1941	DL
					MNTE 02-1941	New page was added.	AD
						"4" and "5" were moved from page MNTE 02-1940	AD
					MNTE 02-1942	New pages were added.	AD
					MNTE 02-1950	(f) was corrected to (g).	CR
					MNTE 02-1963	New page was added. Check list was moved from page MNTE 02-1970.	AD
					MNTE 02-1970 to MNTE 02-1974	(14-3) was added.	AD
					MNTE 02-1975 to MNTE 02-1979	New pages were added. (14-4) and (15) were added.	AD
					MNTE 02-1990	(c) was deleted.	DL
					MNTE 02-2030	*3 in flow was moved.	CH
					MNTE 02-2090, MNTE 02-2100, MNTE 02-2110	Description of *1 was changed.	CH
					MNTE 02-2270	RKH of Figure 2.5.7 was deleted.	DL
					MNTE 02-2360	5.3.7 (MNTE 05-0560)→ 5.3.8 (MNTE 05-0640) 5.3.11 → 5.3.12	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2361, MNTE 02-2371	5.3.3 → 5.3.1	CR
					MNTE 02-2370, MNTE 02-2371	Changed the flowchart.	CH
					MNTE 02-2380	*4 was added.	AD
					MNTE 02-2510	Reference page of table was corrected. (5.3.11 → 5.3.12)	CR
					MNTE 02-2540	Table title was deleted.	DL
					MNTE 02-2620	"4D 00" → "4D", "54 00" → "5D"	CR
					MNTE 02-2730	The font of Error name of "96 16" was corrected.	CR
						"96 18" and "96 19" were added.	AD
						"97 00" to "99 00" were moved to page MNTE 02-2731.	DL
					MNTE 02-2731, MNTE 02-2732	These pages were newly added. ("96 1A" and "96 1B" were added. "97 00" to "99 00" were moved from page MNTE 02-2730. "9F FF" was moved from page MNTE 02-2740)	AD
					MNTE 02-2740	"9F FF" was moved to page MNTE 02-2731.	DL
					MNTE 02-2760	"EA 14" and "EA 15" were added.	AD
						"F6 40" to "F6 51" were moved to page MNTE 02-2770.	DL
					MNTE 02-2770	"F6 40" to "F6 51" were moved from page MNTE 02-2760.	AD
						"F8 09" was moved to page MNTE 02-2780.	DL
					MNTE 02-2780	"F8 09" was moved from page MNTE 02-2770.	AD
					MNTE 02-2790	Reference item of (viii) was changed. ((14-3) → (15-3))	CH
					MNTE 02-2800 to MNTE 02-2818	"2.7.2" were reedited because of addition of Detail code, Table size was changed and description of DAMP indication was changed.	CH
						*1 was added.	AD
						Detail code "020007" to "02000B", "070002" to "070005", "09001E", "100006", "100007", "200002", "300001" to "30000A", "400001" to "400029", "500001" were added.	AD
						Detail code "080003", "080004", "080019", "08001A", "08001E", "090004", "090005", "090017", "09001A", were deleted.	DL
					MNTE 02-2801, MNTE 02-2802	This page was newly added.	AD
					MNTE 02-2850, MNTE 02-2860, MNTE 02-2890, MNTE 02-2900	"DAMP Version is Ver.9.00 or later." was added	AD
					MNTE 02-2850, MNTE 02-2890	[Set]→[Settings] was changed.	CH
					MNTE 02-2880	(i) was added.	AD
					MNTE 03-0000, MNTE 03-0030	Performance Management -Base Monitor function was added.	AD
					MNTE 04-0090	Text was added.	AD
					MNTE 04-0120	Title was corrected to "4.2.2 Disk Array management program 2…".	CR
					MNTE 04-0140, MNTE 04-0290, MNTE 04-0320, MNTE 04-0360, MNTE 04-0400, MNTE 04-0440	"DAMP Version is Ver.9.00 or later." was added	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0000, MNTE 05-0050, MNTE 05-0080, MNTE 05-0110, MNTE 05-0131, MNTE 05-0132, MNTE 05-0260, MNTE 05-0270, MNTE 05-0271, MNTE 05-0280, MNTE 05-0290, MNTE 05-0311, MNTE 05-0312, MNTE 05-0330, MNTE 05-0340, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0380, MNTE 05-0390, MNTE 05-0441, MNTE 05-0444, MNTE 05-0461, MNTE 05-0465, MNTE 05-0470, MNTE 05-0480, MNTE 05-0531, MNTE 05-0551, MNTE 05-0580, MNTE 05-0600 MNTE 06-0140 to MNTE 06-0160, MNTE 07-0000, MNTE 07-0050, MNTE 07-0070, MNTE 08-0011, MNTE 08-0041 to MNTE 08-0043	RKHE was added.	AD
					MNTE 05-0050	(c) → (d) RKAD, (d) → (e)	CH
					MNTE 05-0062	Description a part of flow was moved to page MNTE 05-0070.	DL
					MNTE 05-0070	Description a part of flow was moved from page MNTE 05-0062.	AD
					MNTE 05-0090	(1) was changed.	CH
					MNTE 05-0100	(2) was changed.	CH
					MNTE 05-0110	Reference page of No.10 was changed.	CH
					MNTE 05-0132	Description of RKAD was deleted.	DL
					MNTE 05-0150	‡1, ‡2 and ‡3 were added.	AD
					MNTE 05-0150, MNTE 05-0160, MNTE 05-0161, MNTE 05-0170, MNTE 05-0270, MNTE 05-0280, MNTE 05-0290, MNTE 05-0310, MNTE 05-0312, MNTE 05-0330, MNTE 05-0332, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0372, MNTE 05-0375, MNTE 05-0400, MNTE 05-0441, MNTE 05-0450, MNTE 05-0461, MNTE 05-0463, MNTE 05-0465, MNTE 05-0490, MNTE 05-0520, MNTE 05-0531, MNTE 05-0534, MNTE 05-0540, MNTE 05-0551, MNTE 05-0580, MNTE 05-0620, MNTE 05-0660, MNTE 05-0690, MNTE 05-0691, MNTE 05-0693, MNTE 05-0694, MNTE 05-0710, MNTE 05-0720, MNTE 05-0750, MNTE 05-0760, MNTE 05-0770, MNTE 05-0780	“Collect errors of ..... shown below”. was added.	AD
					MNTE 05-0151, MNTE 05-0152	This page was newly added. (a-2) was moved form MNTE 05-0150 to MNTE 05-0151.	AD
					MNTE 05-0161	(vi) was moved form MNTE 05-0150.	AD
					MNTE 05-0170	(x) was deleted.	DL
					MNTE 05-0230	Figure was deleted. (Figure of #1)	DL
					MNTE 05-0281	(m), (n), (,o) were moved form MNTE 05-0280.	AD
					MNTE 05-0300	Item of Table 5.3.3 was deleted.	DL
					MNTE 05-0311	Item of Table 5.3.3 was deleted.	DL
						Value of “Voltage (V)” was added.	AD
					MNTE 05-0373	(l) were moved form MNTE 05-0372.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0376	(j), (k) were moved form MNTE 05-0375.	AD
						(t) was added.	AD
					MNTE 05-0377	(p), (q), (r), (s), (t) were moved form MNTE 05-0376.	AD
						Item numbers were changed	CH
					MNTE 05-0410	(d), (e), (f) were moved form MNTE 05-0400.	AD
						"The CALM LED...goes out." was deleted.	DL
					MNTE 05-0440	"The CALM LED...goes out." was deleted.	DL
					MNTE 05-0441	"When replacing ...for RKHE." was added.	AD
					MNTE 05-0442	(f) was moved form MNTE 05-0441.	AD
						"The CALM LED...goes out." was deleted.	DL
					MNTE 05-0443, MNTE 05-0462, MNTE 05-0466	Front figure of Control Unit was added.	AD
					MNTE 05-0444	"When replacing ...for RKHE." was added.	AD
						(g) was moved to MNTE 05-445.	DL
					MNTE 05-0445	(g) was moved from MNTE 05-444.	AD
						"The CALM LED...goes out." was deleted.	DL
					MNTE 05-0460	(g) was moved form MNTE 05-0450.	AD
					MNTE 05-0461	"When replacing ...for RKHE." was added.	AD
						(h) was moved to MNTE 05-462.	DL
					MNTE 05-0462	(h) was moved from MNTE 05-461.	AD
					MNTE 05-0465	"When replacing ...for RKHE." was added.	AD
					MNTE 05-0480	“Replace the …” was added.	AD
					MNTE 05-0500	(f) was moved form MNTE 05-0490.	AD
					MNTE 05-0520, MNTE 05-0534	"on" was changed to "off"	CH
					MNTE 05-0550	(f) was moved form MNTE 05-0540.	AD
					MNTE 05-0570	Restriction of No.2 was changed.	CH
					MNTE 05-0650	The message code was corrected.	CR
					MNTE 05-0670	(h) was corrected to (i)	CR
						(i) and ‡1 were moved to page MNTE 05-0680.	DL
					MNTE 05-0680	(i) and ‡1 were moved from page MNTE 05-0670.	AD
					MNTE 05-0690	(g) was added. (The following items Nos. were changed accordingly.)	AD
						(j), (k) and ‡1 were moved to page MNTE 05-0691.	DL
					MNTE 05-0691	(j), (k) and ‡1 were moved from page MNTE 05-0690.	AD
						The message code was corrected.	CR
						5.3.9 were moved to page MNTE 05-0692.	DL
					MNTE 05-0692	5.3.9 were moved from page MNTE 05-0691. Added Note.	AD
						Descriptions of (1) were moved to page MNTE 05-0693.	DL
					MNTE 05-0693	Descriptions of (1) were moved from page MNTE 05-0692.	AD
						Descriptions of (2) were moved to page MNTE 05-0694.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0694	Descriptions of (2) were moved from page MNTE 05-0693.	AD
					MNTE 05-0700	5.3.9 of Reference section in table was corrected to 5.3.10.	CR
					MNTE 05-0710	Description was added to (c).	AD
						(e), (f) was moved to page MNTE 05-0720.	DL
					MNTE 05-0720	(g) was moved from page MNTE 05-0710.	AD
						Figure 5.3.10 was moved to page MNTE 05-0730.	DL
						(e), (f) were moved form MNTE 05-0710.	AD
					MNTE 05-0730	Figure 5.3.10 was moved from page MNTE 05-0720.	AD
					MNTE 05-0740	5.3.10of Reference section in table was corrected to 5.3.11.	CR
					MNTE 05-0750	(b) was added. (The following items Nos. were changed accordingly.)	AD
						Description was added to (c).	AD
						(e), (f) was moved to page MNTE 05-0760.	DL
					MNTE 05-0760	(e), (f) was moved from page MNTE 05-0750.	AD
						Figure 5.3.11 was moved to page MNTE 05-0761.	DL
					MNTE 05-0761	This page was newly added. (Figure 5.3.11 was moved from page MNTE 05-0760.)	AD
					MNTE 05-0762	This page was newly added.	AD
					MNTE 06-0010	(2) was deleted.	DL
					MNTE 06-0022	"If "=C:***** ..."…"was added in (ii).	AD
					MNTE 06-0060, MNTE 06-0110	Screen of "Microprogram revision 1654 or later." was deleted.	DL
					MNTE 06-0120	Description of a loop obstacle was corrected.	CR
					MNTE 08-0030, MNTE 08-0072	*1 was added.	AD
					MNTE 08-0043	No.9 "CONTROL UNIT (RKHE)" was added.	AD
					MNTE 08-0072	Description of No.9 was deleted.	DL
					MNTE 08-0073	UNIT PER ASSY of No.32 was corrected to "0-1".	CR
						Description of No.35 was deleted.	DL
					MNTE 08-0075	UNIT PER ASSY of No.16 was corrected to "0-13".	CR
					MNTE 08-0076	Description of No.35 was deleted.	DL
					MNTE 08-0080	PART NUMBER of No.1 was corrected to "-126".	CR
					MNTE 08-0100	No.2 to No.4 were changed.	CH
					MNTE 08-0112	PART NUMBER of No.1 was corrected to "-126".	CR
					MNTE 08-0114	No.2 to No.4 were changed.	CH
					MNTE 08-0120	UNIT PER ASSY of No.3 and No.4 were corrected to "9".	CR
					MNTE 08-0140	PART NUMBER of No.3 and No. 6 was changed.	CH
					MNTE 09-0010	Reference item of flow was changed. ((14) → (15))	CH
					WEB 01-0000	Description of *1 was changed.	CH
					WEB 01-0001, WEB 01-0002	x656 was changed to x657.	CH
					WEB 01-0020	"Resource Manager" was corrected to "Disk Array management program".	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 01-0030	"gateway" was corrected to "Gateway".	CR
					WEB 02-0000	"concerts" of text was corrected to "LAN-Connecter for maintenance".	AD
					WEB 02-0010	Window of Microprogram revision 1654 or later was added.	AD
					WEB 02-0030	Description was added to text.	AD
					WEB 03-0010, WEB 03-0050, WEB 03-0060, WEB 03-0341, WEB 03-0345	RKHE was added.	AD
					APP 00-0000	Appendix C was corrected.	CR
					APP A-0000, APP A-0020, APP A-0030, APP A-0040, APP B-0030	RKHE was added.	AD
					APP A-0020, APP A-0030, APP A-0040	Port Option-1 was changed.	CH
					APP A-0020, APP A-0030, APP A-0040	"12" was changed.	CH
					APP C-0040, APP C-0050	x656 was added.	AD
16	May.20.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.15 → Rev.16	CH
					GENE 0030, GENE 0040	Description of RKAAT was added.	AD
					GENE 0041	Description of DF600-***36 was added.	AD
					GENE 0070 to GENE 0190	Contents of GENE 0070 to GENE 0190 were reedited because of addition of Section 1.7 and Chapter 9 of Installation.	AD
					GENE 0180 and GENE 0190	There pages were newly added.	AD
					SAFE 0090	Description of "Work carefully because …" was added to RKAAT.	AD
					SAFE 0110	INST 06-0332 and INST 06-0342 of "Touching heat …" was changed to INST 06-0331 and INST 06-0341.	CH
					SAFE 0120	Description of "When you install are Disk …" was added to SENC Unit.	AD
						Description of "Since Front Bezels of the…" was added to RKAAT.	AD
						Reference page were added.	AD
					SAFE 0130	"When you …ENC Unit/SENC Unit, support …" was added.	AD
						"The replacement component…" was moved to page SAFE 0140.	DL
						INST 06-1150, INST 06-1480, INST 06-1930, INST 06-2010 were added.	AD
					SAFE 0140	"The replacement of the component…" was moved from page SAFE 0130.	AD
						Description of "When you install a …" was added to SENC Unit.	AD
					SAFE 0221, SAFE 0222	There pages were newly added. (3.10 RKAAT was added.)	AD
					SAFE 0230	3.10 → 3.11	CH
					SAFE 0240	3.11 → 3.12	CH
					INTO 01-0000	"…is three years…" → "…is one year…".	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 01-0000, INTO 01-0010, INTO 02-0020, INTO 02-0040, INTO 02-0050, INTO 02-0060, INTO 02-0070, INTO 02-0080, INTO 02-0090, INTO 02-0091, INTO 02-0092, INTO 02-0124, INTO 02-0140, INTO 02-0152, INTO 02-0154, INTO 02-0180, INTO 02-0210, INTO 03-0002, INTO 03-0003, INTO 04-0010, INTO 04-0020, INTO 04-0030, INTO 04-0040, INTO 04-0044, INTO 04-0180, INTO 04-0182, INTO 04-0200	Description of RKAAT was added.	AD
					INTO 02-0040	"fifteen Disk Drives…" → "29 Disk Drives…"	CR
					INTO 02-0041, INTO 02-0042, INTO 02-0125, INTO 02-0126, INTO 02-0141, INTO 02-0142, INTO 02-0191, INTO 02-0192, INTO 02-0223, INTO 02-0224, INTO 03-0200 to INTO 03-0270, INTO 04-0045, INTO 04-0046	There page were newly added. (Description of RKAAT was added.)	AD
					INTO 02-0050	"Up to nine RKA" → "Up to 14 RKA"	CR
					INTO 02-0060	"100 M" → "200 M" at (3).	CR
					INTO 02-0070	"667 MHz" → "677 MHz"	CR
					INTO 02-0093	Figure was changed.	CH
					INTO 02-0131, INTO 03-0001	"H1H" → "H1HD"	CR
					INTO 02-0140, INTO 02-0210	"3 Spare" → "1 Spare"	CR
					INTO 02-0150	(2) was moved from INTO 02-0151.	AD
					INTO 02-0151	Figure 2.3.11.2 was moved from INTO 02-0152.	AD
					INTO 02-0153	Figure 2.3.11.3 was moved from INTO 02-0154.	AD
					INTO 02-0160	Added "(1 RK and 11 RKAs)"	AD
					INTO 02-0170	Added "(1 RK and 9 RKAs)"	AD
					INTO 02-0200	Figure 2.4.2 was moved to page INTO 02-0191.	DL
					INTO 02-0260	"(RKSD" → "(RKSD)"	CR
					INTO 03-0010	Corrected table at "Host interface".	CR
					INTO 03-0020	Deleted *3, *4.	DL
					INTO 03-0050, INTO 03-0120	Deleted "143.3 G bytes".	DL
					INTO 03-0070, INTO 03-0140	"2,048 M bytes" → "1,024 M bytes"	CR
					INTO 03-0090	Added "optional"at Number of ports.	AD
					INTO 03-0160 to INTO 03-0190	RKA was added on the table 3.1.5.	AD
					INTO 04-0041 to INTO 04-0043	"RKH/RKHE+RKA" → "RKH+RKA/RKHE+RKA".	CR
					INTO 04-0050	"Battery unit" → "Backup Battery unit" at Figure 4.1.3.	CR
					INTO 04-0080	"hub" → "HUB"	CR
					INTO 04-0101	"RKH/RKHE is not supported" was added.	AD
					INTO 04-0122	Added "It can suspend…".	AD
					INTO 04-0170	"writing from/on" → "writing from on"	CR
					INTO 04-0181	Deleted "The system can have …" at (2-3).	DL
					INTO 04-0200	Deleted "The system can have …" at (4).	DL
					INTO 04-0240	7D → 6D, 7D → 3D	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0000, INST 03-0411, INST 03-0460, INST 03-0470, INST 08-0000	Description of SENC was added.	AD
					INST 01-0130, INST 01-0140, INST 03-0641, INST 03-0642, INST 07-0060, INST 07-0110	Description of SATA Disk was added.	AD
					INST 01-0040, INST 01-0043, INST 01-0044, INST 01-0080, INST 01-0130, INST 01-0140, INST 03-0370, INST 03-0380, INST 03-0430, INST 03-0480, INST 03-0510, INST 03-0520, INST 03-0530, INST 03-0600, INST 03-0650, INST 03-0670, INST 03-0671, INST 03-0680, INST 03-0690, INST 03-0691, INST 03-0692, INST 03-0693, INST 03-0694, INST 03-0714, INST 03-0750, INST 06-0040, INST 06-0060, INST 06-0090, INST 06-0140, INST 06-0150, INST 06-0161, INST 06-0170, INST 06-0180, INST 06-0220, INST 06-0270, INST 07-0040, INST 07-0050, INST 07-0051, INST 07-0100, INST 07-0130	Description of RKAAT was added.	AD
					INST 01-0040	Figure 1.3.1 was moved to page INST 01-0041.	DL
					INST 01-0041	Figure 1.3.1 was moved from page INST 01-0040.	AD
						Figure 1.3.2 was moved to page INST 01-0042.	DL
					INST 01-0042	Figure 1.3.2 was moved from page INST 01-0041.	AD
					INST 01-0130	Description of RKH and RKHE was added to Power Unit for RKH/RKHE.	AD
					INST 01-0160	No.1 and No.11 were added.	AD
						No.2 and *2 were deleted.	DL
						No.7 → No.4, No.8 → No.5, No.11 → No.12	CH
						Specification of No.11 was added.	AD
					INST 01-0180 to INST 01-0350	These pages were newly added. (Section 1.7 was added.)	AD
					INST 02-0000	“Work-12” was added.	AD
					INST 02-0010	“Work-13” to “Work-22” were changed to “Work-14” to “Work-23”	CH
					INST 03-0000	“Work-13” was added.	AD
					INST 03-0010	“Work-14” to “Work-22” were changed to “Work-15” to “Work-23”	CH
					INST 03-0020	Line was added to comment of No.13.	AD
					INST 03-0100, INST 03-0210, INST 03-0270	Model name of *1 was changed to subsystem.	CH
					INST 03-0130	“Frame … to be” of figure was corrected to “Frame … to be installed”.	AD
					INST 03-0355	Model name was changed to subsystem.	CH
					INST 03-0380	‡1 was deleted.	DL
					INST 03-0390	Description of (1) was added.	AD
					INST 03-0400	Descriptions (1), (2), (3) were changed to (a), (b), (c).	CH
					INST 03-0401, INST 03-0402	Description of (2) was added (These pages were newly added).	AD
					INST 03-0410	Table 3.4.2 was changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0440	"Control" of figure was corrected to "Control Unit".	CR
					INST 03-0451	Arrow of figure was moved.	CH
					INST 03-0460	Description of SENC Unit was added.	AD
						Description of text was changed.	CH
					INST 03-0470	Description of (a) was added.	AD
					INST 03-0490	Type name was changed to subsystem.	CH
					INST 03-0610	Figure 3.5.14 was changed.	CH
					INST 03-0620	Description of (1) was added.	AD
					INST 03-0630	Description of (a) was changed.	CH
					INST 03-0643, INST 03-0644	Description of "Device ID setting" was added (These pages were newly added).	AD
						refer to "1.7 ..." was added.	AD
					INST 03-0650	Reference page of table No.4 was corrected to "INST 06-0520".	CR
					INST 03-0651, INST 03-0652	Figure 3.6.1 to 3.6.1.2 were modified.	CH
					INST 03-0653, INST 03-00654	Figure 3.6.1.3, 3.6.1.4 were added (These pages were newly added).	AD
					INST 03-0680	Reference page of table No.4 was corrected to "INST 06-0520".	CR
					INST 03-0681 to INST 03-0684	These pages were newly added.	AD
					INST 03-0695, INST 03-0696	These pages were newly added. (Description of RKAAT was added.)	AD
					INST 03-0715	"Power cable" of figure was moved.	CH
					INST 03-0720	"(Rack frame append parts)" was added to title of Figure 3.6.6.	AD
					INST 03-0752	Description of reference item of (h) was corrected.	CR
					INST 03-0753, INST 03-0754	There pages were newly added. ((4) was added.)	AD
					INST 03-0760	(4) was added.	AD
					INST 04-0021	Item style of figure was changed.	CH
					INST 04-0060	"INST 05-0680" of footer was corrected to "INST 03-0680".	CR
					INST 04-0110, INST 04-0150, INST 04-0160	Corrected Web screen.	CR
					INST 04-0120	"Based on" of reference item of LED status was corrected to "by".	CR
						"X" of "RBC10X" and "RBC20X" were corrected to "x".	CR
					INST 05-0000	"5.7 Setting a Priced…" was corrected to "5.7 Setting an Extra-cost…by".	CR
					INST 05-0010	Description of "Resource Manager 2" was corrected to "Disk Array Management Program 2".	CR
					INST 05-0030	"Controller#0" of text was corrected to "Control Unit#0".	CR
						RKA (RKAD) of figure was deleted.	DL
					INST 05-0031	Control Unit#0 was added to figure.	AD
					INST 05-0040	Description of (3-1) was deleted.	DL
					INST 05-0130	Description of parameter of "Data Share Mode" was corrected.	CR
						Description of "Drive blocking mode" was changed.	CR
					INST 05-0140	"ShadowImage…", "Synchronize…" were added.	AD
						"Data Striping" of No.5 was moved to page INST 05-0150.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0150	"Data Striping" of No.5 was moved from page INST 05-0140.	AD
						*4 of Controller Option was changed to *2.	CH
						"LUN Setting" of No.8 was moved to page INST 05-0151.	DL
					INST 05-0151, INST 05-0152	There pages were newly added. ("LUN Setting" of No.8 was moved from page INST 05-0150.)	AD
					INST 05-0200	Description of [Turbo LU Warning] was changed.	CH
						"② [Fibre-Channel Options]" was moved to page INST 05-0210.	DL
					INST 05-0210	"ShadowImage…", "Synchronize…" were added.	AD
						"② [Fibre-Channel Options] was moved from page INST 05-0200.	AD
					INST 05-0290	"Resource Manager 2" of (2) was corrected to "Disk Array Management Program 2".	CR
					INST 05-0310	(c) was moved from page INST 05-0311.	AD
					INST 05-0311	(c) was moved to page INST 05-0310.	DL
						Window was added to (d).	AD
						"Sun Cluster" was added to Fail-over of Table.	AD
					INST 05-0314	Arrow was added.	AD
					INST 05-0330	Description of (d) was changed.	CH
					INST 05-0360	Description of (4) was changed.	CH
					INST 05-0370	Window was added to (7).	AD
					INST 05-0380	Description of (8) was changed.	CH
					INST 05-0381	This page was deleted.	DL
					INST 05-0392	This page was newly added. (Figure 5.4.1 (3/3) was moved from INST 05-0392.)	AD
					INST 05-0400	Figure 5.4.1 (3/3) was moved to page INST 05-0392.	DL
					INST 05-0440, INST 05-0461	Style of "Disk Array Management…" was changed.	CH
					INST 05-0460, INST 05-0463, INST 05-0464	"③-A] "Preparation…" of text was corrected to "③-A] "Preparing…".	CR
					INST 05-0461	Window was added to (3).	AD
						A part of (3) was moved to page INST 05-0462.	DL
					INST 05-0462	(4) was added.	AD
						Description of (6) was changed.	CH
					INST 05-0463	(6) was moved to page INST 05-0463.	DL
						(8) of text was corrected to (7).	CR
					INST 05-0490, INST 05-0520	"(2)-B] "Configuring …" of text was corrected to "(2)-B] "Setting …".	CR
					INST 05-0530	Description of "DAMP Version is Ver.7.xx or earlier." was added.	AD
					INST 05-0531, INST 05-0532	These pages were newly added.	AD
					INST 05-0570	Table 5.4.2 was changed.	CH
					INST 05-0571, INST 05-0572	Description of SATA Disk was added (These pages were newly added).	AD
					INST 05-0580	(v) was moved to page INST 05-0572.	DL
						Window was added to (3).	AD
					INST 05-0590	"③-I] "LU formatting" of text was corrected to "(③-I) "Formatting LU". "③-H] "Changing…" of text was corrected to "③-H] "The change …".	CR
					INST 05-0622	Description was added to (c).	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0640	Window designs “DAMP Version is Ver.9.00 or later.” was modified.	CH
					INST 05-0651	“joined or separated” was changed to “unified or extended”	CR
						“It is supported…” was added in 2.	AD
					INST 05-0653	NOTE was added.	AD
					INST 05-0656	Description of ‡1 was added.	AD
					INST 05-0657, INST 05-0710	““Result” column” of table was corrected to “Status”	CR
						Description of text was changed.	CH
					INST 05-0750	“④-B] “Setting of Spare …” of text was corrected to “④-B] “Setting Spare…”.	CR
					INST 05-0800	“Factory setting” of No.4 was changed.	CH
						“*3” was added.	AD
					INST 05-0850	Window designs were modified.	CH
					INST 05-0890	Description of “DAMP Version is Ver.9.00 or later.” was added.	AD
					INST 05-1002	Description of “DAMP Version is Ver.7.50 or…” was added.	AD
						Description of (b) was moved to page INST 05-1003.	DL
					INST 05-1003, INST 05-1004	There pages were newly added. (“DAMP Version is Ver.9.40 or….” was added.)	AD
					INST 05-1010	‡1 of (2) was deleted.	DL
					INST 05-1020	Reference page of No.11 to No.13 was changed.	CH
					INST 05-1050, INST 05-1181, INST 05-1210, INST 05-1240, INST 05-1270, INST 05-1300, INST 05-1380, INST 05-1410, INST 05-1500	Description of (e) was changed.	CH
					INST 05-1090	“Click the [OK] button.” of (f) was deleted.	DL
					INST 05-1120, INST 05-1503	Description of (f) was changed.	CH
					INST 05-1440	Description of (g) was changed.	CH
					INST 05-1503	Window was added to (f).	AD
					INST 06-0010	“RKAAT” was added to Work-2.	CR
					INST 06-0020	Reference number was added to NOTE.	AD
						“RKAAT” was added to Work-4.	CR
					INST 06-0030	Work-17 and description of text were deleted.	DL
					INST 06-0050	Description of SATA Disk was added.	AD
						Description of support Disks were added.	AD
						Cache and I/F were moved to page INST 06-0051.	DL
						Cache and I/F were moved from page INST 06-0050. (This is new page)	AD
					INST 06-0051, INST 06-0052	There pages were newly added. (Cache and I/F were moved from page INST 06-0050.)	AD
					INST 06-0061, INST 06-0062	There pages were newly added. (No.8, 9 were added.)	AD
					INST 06-0070	Lifter and Safekeeping box were added to Table 6.2.1.	AD
					INST 06-0090	Title of 6.3 was added to RKAAT.	AD
					INST 06-0100	Description of SATA Disk was added.	AD
						Description of Cache and I/F were moved to INST 06-0101.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0101	This page was newly added. (Description of Cache and I/F were moved to INST 06-0100.)	AD
					INST 06-0102	This page was newly added.	AD
					INST 06-0130	(12) : "on the front side of the subsystem" was added.	AD
					INST 06-0131	"5.2 Setting of System …" of (14) was corrected to "5.2 Setting System …".	CR
						(21) to (24) were correct to (22) to (25).	CR
						(25) : "on the front side of the subsystem" was added.	AD
					INST 06-0160	refer to "1.7 ..." was added.	AD
					INST 06-0162	INST 06-0162 was moved from page INST 06-0161.	AD
					INST 06-0163	This page was newly added. (INST 06-0163 was moved from INST 06-0162.)	AD
					INST 06-0164	This page was newly added.	AD
					INST 06-0190	Corrected "Work-3" → "Work-4".	CR
					INST 06-0220	"#2 to #4" of "•The replacement of …" was corrected to "#0 to #4".	CR
					INST 06-0280	Figure No. was changed.	CH
					INST 06-0291, INST 06-0292, INST 06-0293, INST 06-0294	Description of SATA Disk was added. (These pages were added.)	AD
					INST 06-0310	"DAMP Version is Ver.9.00 or later." was added to (c).	AD
					INST 06-0331, INST 06-0341, INST 06-0400	"5.1.1 (Checking…" of NOTE was to corrected "5.1.1 Checking…".	CH
					INST 06-0331	Figure 6.4.4.1 was moved to page INST 06-0332.	DL
						(c) to (f) were moved from page INST 06-0332.	AD
					INST 06-0332	(c) to (f) were moved to page INST 06-0331.	DL
						"• Install a new…" of (g) was deleted.	DL
						Figure 6.4.4.1 was moved from page INST 06-0331.	AD
						"Figure 6.4.4.1" was corrected to "Figure 6.4.5".	CR
					INST 06-0334	"Figure 6.4.4.2" was corrected to "Figure 6.4.6".	CR
					INST 06-0335	Description of (g) was changed.	CH
					INST 06-0340	"•" was added to NOTE.	AD
					INST 06-0341	Figure 6.4.5.1 was moved to page INST 06-0342.	DL
						(3) to (9) were moved from page INST 06-0342.	AD
					INST 06-0342	(3) to (9) were moved to page INST 06-0341.	DL
						Figure 6.4.5.1 was moved from page INST 06-0341.	AD
						"Figure 6.4.5.1" was corrected to "Figure 6.4.7".	CR
					INST 06-0380	Description of "Figure 6.5.3 provides a …" was deleted.	DL
					INST 06-0400	NOTE of (c) was deleted.	DL
						Description of (c) was changed.	CH
					INST 06-0480	Parts No.5490841-25 was added.	AD
					INST 06-0500	"Allen wrench (No.5)" was added to (3).	AD
					INST 06-0520	"Power cables each having…"of text was deleted.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0530	‡1 was deleted.	AD
						(g) was moved to page INST 06-0540.	DL
					INST 06-0540	(g) was moved from page INST 06-0630.	AD
					INST 06-0550	Description of Work-3 and Work-8 were changed.	CH
						Work-4 and ‡1 were added.	AD
						Work-10 was moved to page INST 06-0560.	DL
					INST 06-0560	Work-10 was moved from page INST 06-0550.	AD
					INST 06-0570	“ack frame” of (f) was corrected to “rack frame”.	CR
						Description of Work-6 was changed.	CH
						Work-7 and ‡1 were added.	AD
						Work-14 was moved to page INST 06-0571.	DL
						Refer page was changed in Work-10.	CH
					INST 06-0571	This page was newly added. (Work-14 was moved to page INST 06-0570.)	AD
					INST 06-0572	This page was newly added.	AD
					INST 06-0580, INST 06-0890	Description of “Refer to...” was added.	AD
						Refer to “1.7 ...” was added.	AD
					INST 06-0620, INST 06-0730, INST 06-0930, INST 06-1040	ENC cable color was changed.	CR
					INST 06-0610	Deleted single system in NOTE.	DL
						“Connect all...” was added in (2) of text.	AD
					INST 06-0660	“Check the Web message” of flow was deleted.	DL
					INST 06-0710, INST 06-1020, INST 06-1280, INST 06-1620	“When connecting ... occur.” was added to Note.	AD
					INST 06-0720, INST 06-1030, INST 06-1290, INST 06-1630	“(b)” was changed.	CH
					INST 06-0780	Refer page was added in (2).	AD
					INST 06-0810	“replacement (‡1)f the” of (f) was corrected to “replacement (‡1) the”.	CR
						(h) was added, but it was deleted.	AD/DL
					INST 06-0820	“ENCs” of (f) was corrected to “ENC Units”.	CR
						Refer page was added in Work 5.	AD
					INST 06-0830	(1) was added.	AD
					INST 06-0840	Title was changed.	CH
						“‡1” of (g) was corrected to “‡2”.	CR
						‡1 and ‡2 were added.	AD
						(g) was changed.	CH
					INST 06-0860	Description of Work-3 and Work-8 were changed.	CH
						Work-4, Work-7 and ‡1 were added.	AD
						Work-10 was moved to page INST 06-0870.	DL
						Figure was changed.	CH
					INST 06-0870	Work-10 was moved from page INST 06-0860.	AD
						Description of Work-13 was changed.	CH
						Figure was changed.	CH
					INST 06-0880	Description of Work-6 was changed.	CH
						‡1 was added.	AD
						Work-14 was moved to page INST 06-0881.	DL
						Link page of Work-10 was changed.	CH
						Refer page was changed in Work 10.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0881	This page was newly added. (Work-14 was moved to page INST 06-05880.)	AD
					INST 06-0882	This page was newly added.	AD
					INST 06-0920	(2) was changed.	CH
					INST 06-0940	Description of NOTE was added.	AD
						NOTE and Figure were changed.	CH
					INST 06-0941	NOTE and Figure were changed.	CH
					INST 06-0950	(3) and Figure were changed.	CH
					INST 06-0970	"Check the Web message" of flow was deleted.	DL
						Refer page was changed in figure.	CH
					INST 06-0980, INST 06-0990	Refer page was changed in figure.	CH
					INST 06-1020	Description of NOTE was added.	AD
					INST 06-1030	Figure was changed.	CH
					INST 06-1050	(4) and Figure were changed.	CH
					INST 06-1070	6.8 was moved to page INST 06-1080.	DL
					INST 06-1080 to INST 06-1940	Descriptions of 6.8 to 6.11 were added.	AD
					INST 06-1390, INST 06-1750	(h) was added, but it was deleted.	AD/DL
					INST 07-0051	Reference page of SONY Rack of Work-12 was changed.	CH
					INST 07-0080, INST 07-0140, INST 07-0151, INST 07-0154, INST 07-0157	"5.1.1 Confirming cancellation …" of NOTE was corrected to "5.1.1 Checking cache …".	CR
					INST 07-0090	NOTE of (h) was deleted.	DL
						(l) : READY was corrected to RDY.	CR
						(l) : "on the front side of the subsystem" was added.	AD
					INST 07-0100	No.7, 8 were added.	AD
					INST 07-0120	Description was changed.	CH
						‡1 was deleted.	DL
						refer to "1.7 ..." was added.	AD
					INST 07-0121	Description was changed.	CH
						refer to "1.7 ..." was added.	AD
					INST 07-0122	Front view was added.	AD
					INST 07-0123, INST 07-0124, INST 07-0143, INST 07-0144	These pages were newly added. (Description of "Device ID setting" was added.)	AD
						refer to "1.7 ..." was added.	AD
					INST 07-0130	"[Procedure ②-C]" of Work-4 was corrected to "[Procedure ②-D]".	CR
					INST 07-0142	(3-1) was moved from page INST 07-0143.	AD
					INST 07-0143	(3-1) was moved to page INST 07-0142.	DL
					INST 07-0144	This page was newly added.	AD
					INST 07-0151	"•Install a new…" of (g) was deleted.	DL
					INST 07-0156	Text and NOTE were added.	AD
					INST 07-0159	This page was deleted page.	DL
					INST 08-0000	Text was added.	AD
					INST 08-0051	(g) was added.	AD
					INST 08-0110	Description of "Repeat Binder" was added to figure.	AD
					INST 08-0131	This page was deleted. (Figure 8.3.3 was moved to page INST 08-0140.)	DL
					INST 08-0140	This page was newly added. (Figure 8.3.3 was moved from INST 08-0131.)	AD
					INST 09-0000 to INST 09-0330	There pages were newly added. (Chapter 9 was added.)	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 01-0000, MNTE 01-0050, MNTE 01-0080, MNTE 01-0120, MNTE 01-0130, MNTE 01-0140, MNTE 02-0000, MNTE 02-0020, MNTE 02-1780, MNTE 02-1810, MNTE 02-2190, MNTE 02-2221, MNTE 02-2260, MNTE 02-2320, MNTE 02-2330, MNTE 02-2340, MNTE 02-2341, MNTE 02-2370, MNTE 02-2371, MNTE 02-2380, MNTE 02-2410, MNTE 02-2420, MNTE 02-2500, MNTE 05-0000, MNTE 05-0050, MNTE 05-0080, MNTE 05-0120, MNTE 05-0160, MNTE 05-0320, MNTE 05-0330, MNTE 05-0331, MNTE 05-0332, MNTE 05-0340, MNTE 05-0350, MNTE 05-0351, MNTE 05-0410, MNTE 05-0440, MNTE 05-0442, MNTE 05-0445, MNTE 05-0500, MNTE 05-0520, MNTE 05-0532, MNTE 05-0535, MNTE 05-0590, MNTE 05-0610, MNTE 05-0650, MNTE 05-0761, MNTE 07-0000, MNTE 07-0050, MNTE 07-0070, MNTE 08-0010, MNTE 08-0011	Description of RKAAT was added.	AD
					MNTE 01-0000, MNTE 01-0120, MNTE 01-0130, MNTE 01-0140, MNTE 02-0000, MNTE 02-0140, MNTE 02-0180, MNTE 02-0230, MNTE 02-1630, MNTE 02-1660, MNTE 02-1780, MNTE 02-1810, MNTE 02-2330, MNTE 02-2340, MNTE 02-2490, MNTE 02-2491, MNTE 02-2492, MNTE 05-0020, MNTE 05-0640, MNTE 05-0650, MNTE 05-0660, MNTE 05-0670, MNTE 05-0680, MNTE 05-0690, MNTE 05-0691, MNTE 05-0692, MNTE 05-0693, MNTE 05-0694, MNTE 05-0740, MNTE 05-0750, MNTE 05-0760	Description of SENC Unit was added.	AD
					MNTE 01-0050	Figure 1.3.4 of text was changed to figure 1.3.5.	CH
					MNTE 01-0070	“1-a” and “1-b” were changed to “2-a” and “2-b”	CH
					MNTE 01-0072	Figure 1.3.5 was added.	AD
						“1-a” and “1-b” were changed to “2-a” and “2-b”	CH
					MNTE 01-0110	“(*2)” and “(*3)” were added.	AD
					MNTE 01-0120	10-g was moved to page MNTE 01-0130.	DL
					MNTE 01-0130	10-g was moved from page MNTE 01-0120.	AD
						10-k was added	AD
						“Jumper switch” and 11 was moved to page MNTE 01-0140.	DL
						“10-l” was changed to “10-i”.	CH
					MNTE 01-0140	This page was newly added. (“Jumper switch” and 11 was moved from page MNTE 01-0130.)	AD
					MNTE 02-0000	Description of item and reference page of 2.3.7 were changed.	CH
					MNTE 02-0010	Description of item was changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0081, MNTE 02-0082	"x657" → "x658"	CH
					MNTE 02-0110	NOTE : "on the front side of the subsystem" was added.	AD
					MNTE 02-0140	Disk Drive (S-ATA) and SENC Unit were added.	AD
						"Disk Drive" was changed to "Disk Drive (FC)"	CH
					MNTE 02-0160	Figure and Micro version was changed.	CH
					MNTE 02-0161	Description was moved to page MNTE 02-0162.	DL
						Description of Micro version 0658 or later.	AD
					MNTE 02-0162	Description was moved to page MNTE 02-0163.	DL
						Description was moved from page MNTE 02-0161 and Micro version was changed.	AD/ CH
					MNTE 02-0163	This page was newly added. (Description was moved from page MNTE 02-0162 and Figure was changed.)	AD
					MNTE 02-0164	This page was newly added. (Description of Micro version 1658 or later.)	AD
					MNTE 02-0170	Description was moved to MNTE 02-0171.	DL
						Description of Micro version 1658 or later.	AD
					MNTE 02-0171, MNTE 02-0172, MNTE 02-0180	MNTE 02-0171 and MNTE 02-0172 were newly page was added.	AD
						Description of MNTE 02-0171 and MNTE 02-0180 were rewritten to MNTE 02-0171 to MNTE 02-0180. ((b), (i) were added.)	CH
					MNTE 02-0230	Description of "2.3 Trouble Analysis Based on …" was changed to "2.3 Trouble Analysis by …".	CH
					MNTE 02-0260	"2.4.3 …from Path Detachment …" of text was changed to "2.4.3 … from Path Blockade …".	CH
					MNTE 02-0302	2 Fibre → 4 Fibre	CH
					MNTE 02-0303 to MNTE 02-0306	There pages were newly added. (Loop of RKAAT was added.)	AD
					MNTE 02-0616	Recovery measures line of "H50800" was deleted.	DL
					MNTE 02-0640	① of recovery measures of "H90320" was added.	AD
						"H90400" was added.	AD
						"HA0530" to "HB0623" were moved to page MNTE 02-0641.	DL
					MNTE 02-0641	"HA0530" to "HB0623" were moved from page MNTE 02-0640.	AD
						"HB0Cxy" were moved to page MNTE 02-0642.	DL
					MNTE 02-0642	"HB0Cxy" were moved from page MNTE 02-0641.	AD
						② of recovery measures of "HB0Cxy" was changed.	CH
					MNTE 02-0660	Reference page ① of "HE03HH" and "HE030x" were changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0661	Reference page ① of “HE05HH” and “HE050x” were changed.	CH
						③ of “HE05HH” and “HE050x” was added.	AD
						“HE06xy” was moved to page MNTE 02-0662.	DL
					MNTE 02-0662	“HE06xy” was moved from page MNTE 02-0661.	AD
					MNTE 02-0680	Reference page ① of “HE0FHH”, “HE0F0x” and “HE200x” were changed.	CH
					MNTE 02-0710	“HF0400” was added.	AD
					MNTE 02-0730	“HH0CAT” was added.	AD
						“HH1070”, “HH1180”, “HH1290” were moved to page MNTE 02-0740.	DL
					MNTE 02-0740	“HH1070”, “HH1180”, “HH1290” were moved from page MNTE 02-0730.	AD
						Description ② of “HH17HH” and “HH17xx” was changed.	AD
					MNTE 02-0750	“HH1Z0x” was added.	AD
						“HH2000” was moved to page MNTE 02-0760.	DL
					MNTE 02-0760	“HH2000” was moved from page MNTE 02-0750.	AD
					MNTE 02-0762	“HH2G00” was added.	AD
					MNTE 02-0764	“HH4E00” was added.	AD
					MNTE 02-0800	“HJ30xy” and “HJ31xy” were added.	AD
					MNTE 02-0830	“battery unit” of Recovery measures was corrected to “Backup Battery Unit”.	CR
					MNTE 02-0872	Reference page of “I1G600” was changed.	CH
						“I1G900” was added.	AD
						“I1GD00”, “I1GE00”, “I1GF00” were moved to page MNTE 02-0873.	DL
					MNTE 02-0873	“I1GD00”, “I1GE00”, “I1GF00” were moved from page MNTE 02-0872.	AD
						“I301AT” was added.	AD
						“I303HH” and “I303xy” were moved to page MNTE 02-0873.	DL
					MNTE 02-0874	“I303HH” and “I303xy” were moved from page MNTE 02-0872.	AD
					MNTE 02-0880	“I30900” was added.	AD
						“I410HH” and “I410xy” was moved to page INST 02-0890.	DL
					MNTE 02-0890	“I410HH” and “I410xy” was moved from page MNTE 02-0872.	AD
					MNTE 02-0941	“I53600”, “I53700”, “I53800” were added.	AD
						“I5Y000” to “I5Y2xy” were moved to page MNTE 02-0942.	DL
					MNTE 02-0942	“I5Y000” to “I5Y2xy” were moved from page MNTE 02-0941.	AD
						“I5Y700” and “I5Y900” were moved to page MNTE 02-0943.	DL
					MNTE 02-0943	“I5Y700” and “I5Y900” were moved from page MNTE 02-0942.	AD
						“I5Y800”, “I5YA00” to “I5YG00” were added.	AD
						“15Z0HH” to “15Z3xy” were moved to page MNTE 02-0945.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0944	"I5YH00" to "I5YR00" were added.	AD
						Recovery measures of "I5YH00" was changed.	CH
					MNTE 02-0945	This page was newly added. ("15Z0HH" to "15Z3xy" were moved from page MNTE 02-0943.)	AD
					MNTE 02-0946	This page was newly added.	AD
					MNTE 02-0970	Reference page of "I61A00" was changed.	CH
						"Recovery measures" of "I6200x" was changed.	CH
					MNTE 02-0980	"Recovery measures" of "I62300" and "I62900" were changed.	CH
					MNTE 02-0990	"Recovery measures" of "I62B00" was changed.	CH
					MNTE 02-0991	"I6D600" was added.	AD
						"Recovery measures" of "I6D500" was changed.	CH
					MNTE 02-0992	"I6D700" to "I6DF00" were added.	AD
						"I6DH00" to "I6DP00" were moved to page MNTE 02-0993.	DL
					MNTE 02-0993	This page was newly added. ("I6DH00" to "I6DP00" were moved from page MNTE 02-0992. "I6DG00" and "I6DQ00" were added.)	AD
					MNTE 02-0994	This page was newly added. ("I6DR00", "I6DS00" and "I6DT00" were added.)	AD
					MNTE 02-1040	② and ③were added to recovery measures of "I825HH" and "I825xy".	AD
					MNTE 02-1050, MNTE 02-1060, MNTE 02-1080, MNTE 02-1091, MNTE 02-1092	Description of Recovery measures was changed.	CH
					MNTE 02-1100	Recovery measures of "IY03HH" and "IY03xy" were changed.	CH
					MNTE 02-1140	"IY0P00" to "IY0S00" were added.	AD
						Description of "IY0T00" was changed.	CH
						"IY2000" to "IZ02xy" were moved to page MNTE 02-1150.	DL
					MNTE 02-1141	This page was newly added. ("IY0U00" to "IY0W00" were added.)	AD
					MNTE 02-1142	This page was newly added.	AD
					MNTE 02-1150	"IY2000" to "IZ02xy" were moved from page MNTE 02-1140.	AD
						"IZ07HH" and "IZ07xy" were moved to page MNTE 02-1151.	DL
					MNTE 02-1151	"IZ07HH" and "IZ07xy" were moved from page MNTE 02-1150.	AD
						"IZ09HH" and "IZ09xy" were moved to page MNTE 02-1152.	DL
					MNTE 02-1152	"IZ09HH" and "IZ09xy" were moved from page MNTE 02-1151.	AD
						"IZ0CHH" and "IZ0Cxy" were moved to page MNTE 02-1153.	DL
					MNTE 02-1153	"IZ0CHH" and "IZ0Cxy" were moved from page MNTE 02-1152.	AD
						"IZY300" was added.	AD
						"IZY5AT" was added.	AD
					MNTE 02-1154	"IZY6AT" and "IZY7AT" was added.	AD
						"IZY8HH" and "IZY8xy" were moved to page MNTE 02-1155.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1155	"IZY8AT" and "IZY9AT" were added.	AD
						"IZY8HH" and "IZY8xy" were moved from page MNTE 02-1154.	AD
						"IZYE00" to "IZYG00" were moved to page MNTE 02-1156.	DL
					MNTE 02-1156	"IZYE00" to "IZYG00" were moved from page MNTE 02-1155.	AD
						"IZYMHH" to "IZYM0x" were added.	AD
						"IZZ000" to "IZZ004" were moved to page MNTE 02-1157.	DL
					MNTE 02-1157, MNTE 02-1158	There pages were newly added. ("IZZ000" to "IZZ004" were moved from page MNTE 02-1156.)	AD
					MNTE 02-1250	Reference page of "RA1000" was changed.	CH
					MNTE 02-1251	"RA7C00" was added.	AD
					MNTE 02-1280	"Recovery measures" of "RB8400" was changed.	CH
					MNTE 02-1281	"Recovery measures" of "RBC000" was changed.	CH
						"RBE200" to "RBE301" were moved from page MNTE 02-1281.	AD
					MNTE 02-1282	"RBE200" to "RBE301" were moved to page MNTE 02-1281.	DL
						"RBE700", "RBED00" and "RBEE00" were added.	AD
					MNTE 02-1283	This page was newly added. ("RBEF00" to "RBEK00" were added.)	AD
					MNTE 02-1284	This page was newly added.	AD
					MNTE 02-1290	Description was added to "Recovery measures" of "W0100".	AD
						*1 was added in W03000.	AD
						"W03200" and "W0320x" were moved to page MNTE 02-1300.	DL
					MNTE 02-1300	"W03200" and "W0320x" were moved from page MNTE 02-1290.	AD
					MNTE 02-1310	"W060AT", "W061AT" was added.	AD
						"W073HH" to "W073xy" were moved to page MNTE 02-1320.	DL
					MNTE 02-1320	"W073HH" to "W073xy" were moved from page MNTE 02-1310.	AD
						Recovery measures of "W073HH" and "W073xy" were changed.	CH
						"W090AT" was added.	AD
						"W0B0HH" to "W0C00x" were moved to page MNTE 02-1321.	DL
						"*1" was deleted.	DL
						"*2" was changed to "*1".	CH
					MNTE 02-1321	"W0B0HH" to "W0C00x" were moved from page MNTE 02-1320.	AD
						"Recovery measures" of "W0F0xy" was changed.	CH
						"W0G0HH" to "W0G100" were moved to page MNTE 02-1322.	DL
					MNTE 02-1322	"W0G0HH" to "W0G100" were moved from page MNTE 02-1321.	AD
						"W310xx" to "W323xy" were moved to page MNTE 02-1323.	DL
						*1 was added.	AD
					MNTE 02-1323	"W310xx" to "W323xy" were moved from page MNTE 02-1322.	AD
						"W327xy" to "W32Bxy" were moved to page MNTE 02-1324.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1324	"W327xy" to "W32Bxy" were moved from page MNTE 02-1323.	AD
						"W330xy" to "W333xy" were moved to page MNTE 02-1325.	DL
					MNTE 02-1325	"W330xy" to "W333xy" were moved from page MNTE 02-1324.	AD
						"W41000" to "W43400" were moved to page MNTE 02-1326.	DL
					MNTE 02-1326	"W41000" to "W43400" were moved from page MNTE 02-1325.	AD
						"W4500x" to "W4700x" were moved to page MNTE 02-1327.	DL
					MNTE 02-1327	"W4500x" to "W4700x" were moved from page MNTE 02-1326.	AD
					MNTE 02-1330 to MNTE 02-1358	Subsection 2.3.6 of MNTE 02-1330 to MNTE 02-1343 were rearranged and reedited.	CH
						Message of subsection 2.3.6 was added. "Abnormal END Downgrade Install NG (Extended…)", "Abnormal END Downgrade Install NG (Unsupported…)" "Abnormal END Initial Setup Error (Unsupported…)"	AD
						Subsection 2.3.7 of MNTE 02-1344 to MNTE 02-1358 were reedited.	CH
						Message of subsection 2.3.7 was added. "DMEA00110C", "DMEA001135" to "DMEA001139", "DMEA001140" to "DMEA001145", "DMEC002066", "DMED070006", "DMED080020" to "DMED080022", "DMED09001F" to "DMED090021", "DMED0C0003", "DMED600001", "DMES05961D", "DMES05EA16" to "DMES05EA19" and "DMES05EA30" to "DMES05EA36"	AD
						Message code "DMES04EA11" was deleted.	DL
					MNTE 02-1331 to MNTE 02-1336	There pages were newly added.	AD
					MNTE 02-1345 to MNTE 02-1348	There pages were newly added.	AD
					MNTE 02-1355 to MNTE 02-1358	There pages were deleted page.	DL
					MNTE 02-1363	Description of reference item of *3 was changed.	CH
					MNTE 02-1365	Reference page of *1 was changed.	CH
					MNTE 02-1366	Description of reference item of *2 was changed.	CH
					MNTE 02-1395	‡2 was added.	AD
					MNTE 02-1410	Description of reference item of *1 and *5 was changed.	CH
					MNTE 02-1420, MNTE 02-1440, MNTE 02-1480, MNTE 02-1540, MNTE 02-1560	Description of reference item of *2 was changed.	CH
					MNTE 02-1430, MNTE 02-1450, MNTE 02-1470, MNTE 02-1490	Reference page "MNTE 02-0010" of flow was corrected "MNTE 02-0020".	CR
					MNTE 02-1500	Description of reference item of *1 was changed.	CH
					MNTE 02-1530	Description of reference item of *1 and *3 was changed.	CH
					MNTE 02-1580	Reference page of *4 was changed.	CH
					MNTE 02-1613 to MNTE 02-1616	There pages were newly added. (Loop of RKAAT was added.)	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1640, MNTE 02-1790	Description of reference item of *1 was changed.	CH
					MNTE 02-1710, MNTE 02-1720, MNTE 02-1730, MNTE 02-1880, MNTE 02-1890, MNTE 02-1900, MNTE 02-1910, MNTE 02-1920, MNTE 02-1930, MNTE 02-2270, MNTE 02-2280, MNTE 02-2301,	Window of “Micro revision is *658 or later.…” was added.	AD
					MNTE 02-1980	Description of (2) was changed.	CH
					MNTE 02-2190, MNTE 02-2221, MNTE 02-2260	Description of (d) was changed.	CH
					MNTE 02-2210, MNTE 02-2250	“refer to “WEB 3.1…”” of description of (d) was changed.	CH
					MNTE 02-2301	(c) was moved to page MNTE 02-2302.	DL
					MNTE 02-2302, MNTE 02-2303, MNTE 02-2840, MNTE 06-0150, MNTE 06-0160	Corrected Web screen.	CR
					MNTE 02-2302	(c) was moved from page MNTE 02-2301.	AD
						“Select the place to.…” was moved to page MNTE 02-2303.	DL
					MNTE 02-2303, MNTE 02-2304	There pages were newly added. (“Select the place to.…” was moved from page MNTE 02-2302.)	AD
					MNTE 02-2340	“2.6.2 Trouble Analysis Based on …” of Actions to take was corrected to “2.6.2 Trouble Analysis by …”.	CR
					MNTE 02-2360	Reference item of “6.5.2 Adding Remote …” was corrected to “6.5.2 Adding a Remote…”.	CR
					MNTE 02-2380	“2.2 Trouble Analysis Based on …” of Actions to take was corrected to “2.2 Trouble Analysis by …”.	CR
					MNTE 02-2390	“INST 02-0770” of *1 was corrected to “INST 03-0770”.	CR
					MNTE 02-2400	Description of Note *2 was deleted. (The succeeding step numbers were changed.)	DL
						*2 was added to No.1 and 2. *4 was added to No.6.	AD
						“RKHE +RKA” of *3 was corrected to “RKHE+RKA/RKAAT….”	CR
					MNTE 02-2410	“Cause or status” was corrected at No.1, 2.	CR
					MNTE 02-2451	*2 was corrected to *1.	CR
					MNTE 02-2470, MNTE 02-2472	*1 was deleted.	DL
					MNTE 02-2491, MNTE 02-2492	There pages were newly added. (SENC Unit was added.)	AD
					MNTE 02-2730	“96 0D” and “96 17” were added.	AD
					MNTE 02-2731	“96 1D” and “96 1E” were added.	AD
					MNTE 02-2760	“EA 16”, “EA 17” and “EA 30” to “EA 33” were added.	AD
						“F4 00” to “F6 31” were moved to page MNTE 02-2770.	DL
					MNTE 02-2770	“F4 00” to “F6 31” were moved from page MNTE 02-2760.	AD
						“EA 34” to “EA 36” were added.	AD
						“F8 00” to “F8 08” were moved to page MNTE 02-2780.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2780	"F8 00" to "F8 08" were moved from page MNTE 02-2770.	AD
						"F8 0D" was added.	AD
						"F8 F0" to "FC 00" were moved to page MNTE 02-2790.	DL
					MNTE 02-2790	"F8 0E", "F9 0D" and "F9 0E" were added.	AD
						"F8 F0" to "FC 00" were moved from page MNTE 02-2780.	AD
					MNTE 02-2801, MNTE 02-2802	"③-G, "Restoration LU"" of Reference page was corrected to "③-G, "Reallocate LU"".	CR
					MNTE 02-2930, MNTE 02-2940	Window of "Micro revision is *658 or later…" was added.	AD
					MNTE 02-2930	(2) was moved to page MNTE 02-2940.	DL
					MNTE 02-2940	(2) was moved from page MNTE 02-2930.	AD
					MNTE 04-0020	No.4 : "W060AT" was added.	AD
						No.5 : "W040HH" was deleted.	DL
						No.6 : "W050HH" was deleted.	DL
					MNTE 04-0030	No.6 : "W0Dx" was changed to "W0Dxy".	CH
						No.9 : "W0C000" was changed to "W0C00x" and "UPS-x" was added.	CH/ AD
					MNTE 04-0040	No.13 : "W061AT" was added.	AD
					MNTE 04-0050	No.15 : "W090xy" was added.	AD
					MNTE 04-0100	Recovery procedure of No.1 to No.4 were added to W***AT.	AD
						Added Ver.9.00/9.50 at "Error display".	AD
					MNTE 04-0110	"SENC error" and "W090AT" were added to No.11.	AD
						Recovery procedure of No.11 was added to W090AT.	AD
						Added Ver.9.00/9.50 at "Error display".	AD
					MNTE 05-0030	Title of 5.1.1 was changed.	CH
						Figure 5.1.1 : "on the front side of the subsystem" was added.	AD
					MNTE 05-0061	"245.7 G bytes" was added to table.	AD
					MNTE 05-0062	Reference item "2.4.2 "" of flow was changed.	CH
					MNTE 05-0070	*1 was added.	AD
					MNTE 05-0110	Description of SATA Disk and Power Unit for RKAAT were added.	AD
					MNTE 05-0130, MNTE 05-0131	Description of "Device ID setting" was added.	AD
						refer to "1.7 ..." was added.	AD
					MNTE 05-0133, MNTE 05-0134	Description of "Device ID setting" was added (These pages were newly added).	AD
						refer to "1.7 ..." was added.	AD
					MNTE 05-0141	*1 : "(A backing ...)" was added.	AD
						"If no ..." was moved to page MNTE 05-0150.	DL
					MNTE 05-0150	WEB 02-0110→MNTE 02-0200	CR
						(x) : READY was corrected to RDY.	CR
						(ix), (x) : "on the front side of the subsystem" was added.	AD
						"If no ..." was moved from page MNTE 05-0141.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0160	(iv) to (vii) were moved to MNTE 05-0161.	AD
					MNTE 05-0161	WEB 02-0110→MNTE 02-0200	CR
						(iv) to (vii) were moved from MNTE 05-0160.	AD
						(viii), (ix) : "on the front side of the subsystem" was added.	AD
						(x) : READY was corrected to RDY.	CR
					MNTE 05-0251	"245.7 G bytes" was added to table.	AD
					MNTE 05-0270	(g) : "on the front side of the subsystem" was added.	AD
					MNTE 05-0290	"5.1.1 Confirming cancellation …" of (a) was corrected to "5.1.1 Checking cache …".	CR
					MNTE 05-0290, MNTE 05-0370, MNTE 05-0375, MNTE 05-0450, MNTE 05-0461, MNTE 05-0540, MNTE 05-0551, MNTE 05-0620, MNTE 05-0690, MNTE 05-0694, MNTE 05-0710, MNTE 05-0750, MNTE 05-0770	"5.1.1 (Checking…" of NOTE was to corrected "5.1.1 Checking…".	CR
					MNTE 05-0320	Text was changed.	AD
					MNTE 05-0330	Types were added to (c).	AD
						(b), (f) : "on the Fan Assembly" was added.	AD
					MNTE 05-0331	RKA/RKAD/RKAAT was to (b).	AD
					MNTE 05-0351	RKA/ RKAAT was to (b).	AD
					MNTE 05-0370, MNTE 05-0375, MNTE 05-0450, MNTE 05-0461, MNTE 05-0540, MNTE 05-0551, MNTE 05-0620, MNTE 05-0690, MNTE 05-0694, MNTE 05-0710, MNTE 05-0750, MNTE 05-0770	"5.1.1 Confirming cancellation …" of NOTE was corrected to "5.1.1 Checking cache …".	CR
					MNTE 05-0465	Reference page was added to NOTE.	AD
					MNTE 05-0552	Description of (g) was changed.	CH
					MNTE 05-0660	Description of "For the SENC Unit, the …" was added to NOTE of (g).	AD
					MNTE 05-0670	Description of "For the SENC Unit, the …" was added to NOTE of (f).	AD
					MNTE 05-0691	NOTE was added to (j).	AD
					MNTE 05-0692	ENC description of second and third of NOTE was changed.	CH
					MNTE 05-0700	"RKH/RKHE ...Drive." was added.	AD
						The figure was changed.	CH
					MNTE 05-0720	Note was added to (e).	AD
					MNTE 05-0731	Figure 5.3.10.1 was added. (Newly page)	AD
					MNTE 05-0732	This is a blank page. (Newly page)	AD
					MNTE 05-0770	Reference No. was changed.	CR
					MNTE 06-0000	Description of ‡1 was changed.	CH
					MNTE 06-0060	Reference title of Chapter 4 of (1) and Chapter 3 of (2) were corrected.	CR
					MNTE 08-0041	Part number of RKH/RKHE was added.	AD
					MNTE 08-0061, MNTE 08-0062, MNTE 08-0063, MNTE 08-0064	Description of RKAAT was added. (new pages)	AD
					MNTE 08-0070	No.1-3 was moved from MNTE 08-0061.	AD
					MNTE 08-0071 to MNTE 08-0073	No.1.4 → No.1.5.	CH
					MNTE 08-0074 to MNTE 08-0076	No.1.5 → No.1.6.	CH
					MNTE 08-0120, MNTE 08-0140	DF600-RKH/RKHE/RKAAT was added.	AD
					WEB 01-0001, WEB 01-0002	"x657" → "x658"	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 01-0030	"Gate Way" → "Gateway"	CR
					WEB 02-0050, WEB 02-0070, WEB 02-0090	Description of SENC Unit was added.	AD
					WEB 02-0050	Disk Drive (S-ATA) was added.	AD
						"Control Unit" and "Cache Unit" were moved to page WEB 02-0060.	DL
					WEB 02-0060	"Control Unit" and "Cache Unit" were moved from page WE 02-0050.	AD
					WEB 02-0070, WEB 02-0071	Window of "Micro revision is *658 or later r.…" was added.	AD
						Figure number was deleted.	DL
					WEB 02-0080	Disk Drive (S-ATA) was added.	AD
						"Cache Unit" was moved to page WEB 02-0090.	DL
					WEB 02-0090	"Cache Unit" was moved from page WE 02-0080.	AD
						"Fibre loop" was moved to page WEB 02-0091.	DL
					WEB 02-0091, WEB 02-0092	There pages were newly added. ("Fibre loop" was moved from page WE 02-0090.)	AD
					WEB 02-0140	"10 M bytes" → "20 M bytes"	CR
					WEB 03-0000	Added "Rebooting of the…" at the NOTE.	AD
						"3.1(2)(b)…after the CALM LED (red) of the Control Unit#0 comes on." of text was changed to "…checking the CALM LED (red) of the Control Unit#0 comes on.".	CH
					WEB 03-0020	"Reference/setting" → "Reference and setting"	CR
					WEB 03-0030, WEB 03-0031, WEB 03-0032, WEB 03-0040, WEB 03-0062, WEB 03-0090, WEB 03-0140, WEB 03-0230, WEB 03-0250, WEB 03-0360	Added the screen of microprogram revision 0658/1658.	AD
					WEB 03-0030	(2) was moved to page WEB 03-0031.	DL
					WEB 03-0031	This page was newly added. ((2) was moved from WEB 03-0030.)	AD
					WEB 03-0032	This page was newly added. ((3) was moved from WEB 03-0040.)	AD
					WEB 03-0040	(3) was moved to page WEB 03-0032.	DL
					WEB 03-0040, WEB 03-0072, WEB 03-0070, WEB 03-0341	Corrected Web screen.	CR
					WEB 03-0050, WEB 03-0060	Description of RKAAT was added.	AD
					WEB 03-0060	"RS232C Error Information Outflow Mode" was deleted.	DL
						[Controller 0] / [Controller 1] was moved to page WEB 03-0061.	DL
					WEB 03-0061	This page was newly added. (New item was added.)	AD
					WEB 03-0062	This page was newly added.	AD
					WEB 03-0070	(5) was moved to page WEB 03-0062.	DL
					WEB 03-0140	(2) was moved to page WEB 03-0141.	DL
					WEB 03-0141, WEB 03-0142	These pages were newly added.	AD
					WEB 03-0160	"[Controller 0/1 Common]" → "[Controller 0]/[Controller 1]"	CR
					WEB 03-0170	Deleted "…at the later time for a while." at (8).	DL
					WEB 03-0220	Deleted "The following window is displayed at the later time for a while" at (8).	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					WEB 03-0230	(b) and (c) were moved to page WEB 03-0240.	DL
					WEB 03-0240	(b) and (c) were moved from page WEB 03-0230.	AD
					WEB 03-0290	"5 M bytes" → "10 M bytes"	CR
					WEB 03-0320	Deleted "‡1" at (4).	DL
					WEB 03-0330	"160 M bytes" → "480 M bytes (1 controller)"	CR
					WEB 03-0340, WEB 03-0344	Corrected ‡1.	CR
					WEB 03-0341	"160 M bytes" → "160 M bytes (1 controller)"	CR
					WEB 03-0342	Changed the screen at (c).	CH
					WEB 03-0346	Changed the screen at (d).	CH
					WEB 03-0360	(2) and (3) were moved to page WEB 03-0370.	DL
					WEB 03-0370	(2) and (3) were moved from page WEB 03-0360.	AD
					APP A-0000	Rev. was corrected to 16.	CR
					APP A-0020	"When the version…" was added to *6.	AD
					APP A-0030	"VxVM" was added. "Ver.3.X supports…" was added to *3.	AD
					APP A-0040	"When connecting with…" was added to *2.	AD
					APP C-0060, APP C-0070	x657 was added.	AD
17	Jun.11.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.16 → Rev.17	CH
					GENE 0150	4.2.9 – 4.2.12 were added.	AD
					SAFE 0150 to SAFE 0221	Changed figure.	CH
					INST 00-0000	Chapter 9 was added.	AD
					INST 05-0270	"Note" was added to (2).	AD
					INST 05-0801	No.15 was added.	AD
					INST 05-1004	(15)Setting LU Pre-fetch Information was added.	AD
					INST 06-1050	"Rev. 07"was corrected to "Rev.17".	CR
					MNTE 01-0080	Description of 1-b to 1-d and (1-b) were changed.	CH
						(1-c) to 4-c were moved to page MNTE 01-0090.	DL
					MNTE 01-0090	(1-c) to 4-c were moved from page MNTE 01-0080.	AD
						Description of (1-c) and (1-d) were changed.	CH
						6-a to 6-h were moved to page MNTE 01-0100.	DL
					MNTE 01-0100	6-a to 6-h were moved from page MNTE 01-0090.	AD
						8-d to 8-j were moved to page MNTE 01-0110.	DL
					MNTE 01-0110	8-d to 8-j were moved from page MNTE 01-0100.	AD
						Description of 8-d was changed.	CH
						9-a to 9-m were moved to page MNTE 01-0120.	DL
					MNTE 01-0120	9-a to 9-m were moved from page MNTE 01-0110.	AD
						10-a to 10-f were moved to page MNTE 01-0130.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 01-0130	10-a to 10-f were moved from page MNTE 01-0120.	AD
						"Name" and "Function" of 10-c were changed.	CH
						10-g was moved to page MNTE 01-0140.	DL
						10-h to 10-k were moved to page MNTE 01-0141.	DL
					MNTE 01-0140	10-g was moved from page MNTE 01-0130.	AD
						Description of Jumper switch was moved to page MNTE 01-0141.	DL
						11-a to 11-f were moved to page MNTE 01-0142.	DL
					MNTE 01-0141	This is new page.	AD
						10-h to 10-k were moved from page MNTE 01-0130.	AD
						Description of Jumper switch was moved from page MNTE 01-0140.	AD
						"Name" and "Function" of Jumper switch were changed.	CH
					MNTE 01-0142	This is new page.	AD
						11-a to 11-f were moved from page MNTE 01-0140.	AD
					MNTE 02-0933	"I516HH" and, "I516xy" were added.	AD
						"I520xy" was moved to page MNTE 02-934.	DL
					MNTE 02-0934	"I520xy" was moved from page MNTE 02-0933.	AD
					MNTE 02-1157	"IZYN00" was added.	AD
					MNTE 02-1370	Description of "The dynamic…" and "The copy back…" were change.	CH
					MNTE 02-1371	Description of "If the data on…" were added.	AD
					MNTE 02-1374	Description of "Was the configuration…" and "Check the…" in the flow was added.	AD
					MNTE 02-1590	"• Explanation of a…" was moved to page MNTE 02-1591.	DL
					MNTE 02-1591	This page was newly added. ("• Explanation of a…" was moved from page MNTE 02-1591.)	AD
					MNTE 02-1592	This page was newly added.	AD
					MNTE 02-2341	Description of No.12 and No.13 were added.	AD
					MNTE 02-2451	Description of No.14 and No.15 were moved to No.17 and No.18.	CH
						Description of No.14 to No.16 were added.	AD
						*1 and *2 were changed.	CH
						Figure of *3 and *4 were added.	AD
					MNTE 02-2490	Description of No.12 and No.13 were moved to No.15 and No.16.	CH
						Description of No.12 to No.14 were added.	AD
						*1 and *2 were changed.	CH
						Figure of *3 and *4 were added.	AD
					MNTE 04-0130	No.7 – 10 were added.	AD
					MNTE 04-0300	DAMP screen (Ver.9.50 or later) was added.	AD
						(5) – (7) were moved to page MNTE 04-0310.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 04-0310	DAMP screen (Ver.9.50 or later) was added.	AD
						(5) – (7) were moved from page MNTE 04-0300.	AD
					MNTE 04-0330, MNTE 04-0340, MNTE 04-0370, MNTE 04-0380, MNTE 04-0410, MNTE 04-0420, MNTE 04-0450,	DAMP screen (Ver.9.50 or later) was added.	AD
					MNTE 04-0350	NOTE was added.	AD
					MNTE 04-0430	(6) – (9) were moved from page MNTE 04-0420.)	AD
					MNTE 04-0460 to MNTE 04-0660	These pages were newly added. (4.2.9 – 4.2.12 were added.)	AD
					MNTE 05-0660	The Under line was added to (e).	CH
						(f) was corrected to “Connected... ENC Unit/SENC Unit”.	CR
					MNTE 05-0670	The Under line was added to (d).	CH
						(e) was corrected to “Connected... ENC Unit/SENC Unit”.	CR
					MNTE 05-0690	The Under line was added to (f).	CH
						(g) was corrected to “Connected... ENC Unit/SENC Unit”.	CR
					Rev 0570 to REV 0760	Reedited due to correcting the description.	CR
18	July.26.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.17 → Rev.18	CH
					GENE 0030, GENE 0040, GENE 0041, GENE 0100, GENE 0110	Description of RKL or RKAATL was added.	AD
					GENE 0050, GENE 0080, GENE 0090, GENE 0120, GENE 0160, GENE 0180	The clerical error was corrected.	CR
					GENE 0120	Title of 9.3, 9.3.2 and 9.3.3 were changed.	CH
						9.3.1 was added.	AD
						The item number is changed afterwards.	CH
						9.3.4 and 9.3.5 were moved to page GENE 0130.	DL
					GENE 0130	9.3.4 and 9.3.5 were moved from page GENE 0120.	AD
						9.3.5 → 9.3.6	CH
					GENE 0140	2.5.6 was added.	AD
					SAFE 0070, SAFE 0080, SAFE 0090, SAFE 0120, SAFE 0190, SAFE 0221	Description of RKL or RKAATL was added.	AD
					SAFE 0150 to SAFE 0221	Changed figure.	CH
					INTO 02-0010, INTO 02-0020, INTO 02-0040, INTO 02-0041, INTO 02-0050, INTO 02-0070, INTO 02-0080, INTO 02-0090, INTO 02-0093, INTO 02-0094, INTO 02-0100, INTO 02-0110, INTO 02-0124, INTO 02-0140, INTO 02-0142, INTO 02-0180, INTO 02-0190, INTO 02-0192, INTO 02-0210, INTO 02-0220, INTO 02-0224, INTO 02-0260, INTO 03-0003, INTO 04-0010, INTO 04-0122, INTO 04-0180, INTO 04-0181, INTO 04-0182, INTO 04-0200	Description of RKL or RKAATL was added.	AD
					INTO 02-0225, INTO 02-0226, INTO 03-0280, INTO 03-0290, INTO 03-0300, INTO 03-0310, INTO 04-0047, INTO 04-0048, INTO 04-0049, INTO 04-0051	There pages were newly added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0000, INST 01-0050, INST 01-0080, INST 01-0150, INST 01-0160, INST 01-0220, INST 01-0221, INST 01-0320, INST 03-0310, INST 03-0370, INST 03-0390, INST 03-0400, INST 03-0401, INST 03-0402, INST 03-0410, INST 03-0411, INST 03-0420, INST 03-0430, INST 03-0450, INST 03-0460, INST 03-0470, INST 03-0480, INST 03-0490, INST 03-0510, INST 03-0520, INST 03-0530, INST 03-0600, INST 03-0611, INST 03-0620, INST 03-0630, INST 03-0640, INST 03-0641, INST 03-0642, INST 03-0643, INST 03-0650, INST 03-0653, INST 03-0660, INST 03-0670, INST 03-0680, INST 03-0690, INST 03-0691, INST 03-0692, INST 03-0700, INST 03-0750, INST 03-0753, INST 03-0760, INST 04-0140, INST 05-0030, INST 05-0140, INST 05-0370, INST 05-0651, INST 06-0010, INST 06-0020, INST 06-0040, INST 06-0050, INST 06-0060, INST 06-0061, INST 06-0090, INST 06-0100, INST 06-0140, INST 06-0150, INST 06-0160, INST 06-0163, INST 06-0170, INST 06-0180, INST 06-0190, INST 06-0220, INST 06-0270, INST 06-0280, INST 06-0290, INST 06-0291, INST 06-0293, INST 06-0390, INST 06-0400, INST 06-0480, INST 06-0500, INST 06-1080, INST 06-1090, INST 06-1100, INST 06-1110, INST 06-1120, INST 06-1130, INST 06-1170, INST 06-1190, INST 06-1200, INST 06-1210, INST 06-1220, INST 06-1230, INST 06-1240, INST 06-1250, INST 06-1280, INST 06-1300, INST 06-1310, INST 06-1320, INST 06-1330, INST 06-1340, INST 06-1350, INST 06-1360, INST 06-1370, INST 06-1380, INST 06-1390, INST 06-1400, INST 06-1410, INST 06-1420, INST 07-0010, INST 07-0020, INST 07-0040, INST 07-0050, INST 07-0051, INST 07-0060, INST 07-0100, INST 07-0110, INST 07-0123, INST 07-0130, INST 07-0142, INST 07-0143, INST 08-0000, INST 08-0110, INST 08-0130, INST 09-0000, INST 09-0030	Description of RKL or RKAATL was added.	AD
					INST 01-0045, INST 01-0046, INST 01-0222, INST 06-1181, INST 06-1182, INST 06-1291, INST 06-1292	There pages were newly added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0220	Description of table was changed.	CH
					INST 01-0240, INST 01-0250, INST 01-0260, INST 01-0270, INST 01-0271, INST 01-0272, INST 01-0280, INST 01-0290, INST 01-0300, INST 01-0310, INST 01-0340, INST 01-0350	Window of 9520V (RKL) was added.	AD
						DF600 → 9570V (RK), DF600H → 9580V/9585V (RKH/RKHE)	CH
					INST 01-0240	"device model selection" of (1) was changed to "Model Select".	CH
						"type" of (2) was changed to "subsystem".	CH
						(a) to (e) were moved to page INST 01-0241.	DL
					INST 01-0241, INST 01-0272, INST 01-0290, INST 01-0300, INST 01-0350	"cable" was corrected to "ENC cable".	CR
					INST 01-0241	This page was newly added. ((a) to (e) were moved from page INST 01-0240 and INST 01-0250.)	AD
						Description of "chassis frame type" was changed to "subsystem".	CH
					INST 01-0242	This page was newly added.	AD
					INST 01-0250	(f) to (l) were moved to page INST 01-0241.	DL
						"chassis frame type selection" of (5) was changed to "Unit Select".	CH
					INST 01-0260	(7) was moved to page INST 01-0270.	DL
					INST 01-0270	(7) was moved from page INST 01-0260.	DL
						(8) was moved to page INST 01-0271.	DL
						(9) was moved to page INST 01-0272.	DL
					INST 01-0271	This page was newly added. ((8) was moved from page INST 01-0270.)	AD
					INST 01-0272	This page was newly added. ((9) was moved from page INST 01-0270.)	AD
					INST 01-0280, INST 01-0290	"DF600" was changed to "9520V (RKL)/9570V (RK)"	CH
					INST 01-0300	(11) was moved to page INST 01-0310.	DL
					INST 01-0310	(11) was moved from page INST 01-0300.)	AD
					INST 01-0320	Description of table was changed.	CH
					INST 01-0340	"device model selection" of (6) was changed to "Model Select".	CH
						"type" of (7) was changed to "subsystem".	CH
					INST 02-0240	"a ENC Unit" was corrected to "an ENC Unit".	CR
					INST 02-0320	"Loop" was added to "#0 and #1" in the second NOTE.	AD
					INST 02-0330	"Loop #0" and "Loop #1" were added to Figure 2.6.2.	AD
					INST 02-0340	"Power Unit" was added to "#0 and #1" in NOTE.	AD
					INST 02-0341	"Power Unit (DC)" was added to "#0 and #1" in NOTE.	AD
					INST 03-0390	The clerical error was corrected.	CR
					INST 03-0683	"#2" and "#3" were added to (c) and (d).	AD
					INST 03-0684, INST 03-0695	"PATH#0, PATH#1" → "PATH#2, PATH#3" at Control Unit #0.	CR
						Description of "PATH #xx" was added.	AD
					INST 03-0690	(a) was added newly.	AD
						(a) to (c) was changed to (b) to (d).	CH
						(i) and (ii) of (d) was changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0691	(d) and (e) was changed to (e) and (f).	CH
						(e) and (ii) of (e) was changed.	CH
						(iii) of (e) was deleted.	DL
					INST 03-0692	"RKAAT/RAATL (Unit ID #xx)" was added to Figure 3.6.4.2.	AD
					INST 03-0693	(a) was added newly.	AD
						(a) to (c) was changed to (b) to (d).	CH
						"#2" and "#3" were added to (d).	AD
					INST 03-0694	(d) and (e) was changed to (e) and (f).	CH
						(e) and (ii) of (e) was changed.	CH
						(iii) of (e) was deleted.	DL
					INST 03-0750, INST 03-0751	"MNTE 02-2310" → "MNTE 02-2320"	CR
					INST 03-0752	Added "RKAAT"	CR
					INST 06-0050	Description of (3-2) was changed.	CH
					INST 06-0051, INST 06-0101	*2 was corrected to *1.	CR
						Description of *1 was added to note.	AD
					INST 06-0060	"RK/RKD is…" of No.4 was corrected to "RKH/RKHE is…"	CR
					INST 06-0061	*4 was corrected to *3.	CR
						Description of note was deleted.	DL
					INST 06-0120	(5) to (12) were moved from page INST 06-0130.	AD
						(2) Note was modified.	CH
						Style of (3) Note was changed.	CH
						(9) and (9) Note was Changed.	CH
					INST 06-0130	(5) to (12) were moved to page INST 06-0120.	DL
					INST 06-0131	(20) Note was changed.	CH
					INST 06-0160	"Path" was changed to "PATH #".	CH
						PATH#2, #3 of RKH/RKHE was added.	AD
					INST 06-0170	"Disk Drive" was added to ‡2.	AD
					INST 06-0190	(2-1) Note was chenged.	CH
					INST 06-0230	(3-1) Note was chenged.	CH
					INST 06-0270	"(see Figure...)" was added. to (b).	AD
					INST 06-0291	"(see Figure...)" was added. to (b).	AD
					INST 06-0293	"(see Figure...)" was added. to (b).	AD
					INST 06-0321	(6) Note was chenged.	CH
						"...LU formatting..." was added to (a).	AD
					INST 06-0330	The end of Note style was changed to "•" style.	CH
					INST 06-0331	"(see Figure...)" was added. to (c).	AD
						"<Working Procedure>" was added.	AD
						(a) Note was changed.	CH
						Style of (f) Note was changed.	CH
					INST 06-0332	"(see Figure...)" was added. to (h).	AD
					INST 06-0333	Model name of figure was moved.	CH
						The end of Note style was changed to "•" style.	CH
					INST 06-0334	Style of (a) was changed.	CH
						"<Working Procedure>" was added.	AD
						(a) Note was changed.	CH
					INST 06-0335	"(see...)" was added. to (c) and (h).	AD
						Style of (f) Note was changed.	CH
					INST 06-0340	Model name of figure was moved.	CH
					INST 06-0341	"(see...)" was added. to (3) and (8).	AD
						"<Working Procedure>" was added.	AD
						(1) Note was changed.	CH
					INST 06-0380	Size of figure was changed.	CH
					INST 06-0480	(2) Note was modified.	CH
						(a) Note was connected to (a).	CH
					INST 06-0490	(b) Note was connected to (b).	CH
					INST 06-0500	(2) Note was modified.	CH
					INST 06-0510	Style of (4) Note 1 was changed.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

					INST 06-0560	“loop” → “Loop”	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0590	“a ENC Unit” was corrected to “an ENC Unit”.	CR
					INST 06-0600	“(see...)” was added. to (i) to (iii).	AD
					INST 06-0610	“PATH” was added to the second NOTE.	AD
						(1) Note 2 was wholly changed.	CH
					INST 06-0620	“<Working.Procedure>” was added.	AD
						Figure 6.2.2 was modified.	CH
					INST 06-0630	“<see...>” was added to (b).	AD
						(b) Note, (i) and (ii) were wholly changed and (iii) was added.	CH/ AD
					INST 06-0650	“(Refer to page INST 03-0643)” was added to No. 6.	AD
					INST 06-0660, INST 06-0670	“loop” → “Loop”	CR
					INST 06-0690	“(see...)” was added. to (i) and (iv).	AD
						“loop” → “Loop”	CR
					INST 03-0695	“PATH#0, PATH#1” → “PATH#2, PATH#3” at Control Unit #0.	CR
					INST 06-0700	“(see...)” was added. to (vi),(i),(ii),(iii).	AD
						“loop” → “Loop”	CR
					INST 06-0710	(3) Note 1, 2 and 4 were wholly changed.	CH
						“loop” → “Loop”	CR
					INST 06-0720	“<Working.Procedure>” was added.	AD
						“(see...)” was added. to (b).	AD
						(b) Note , (i) and (ii) were wholly changed and (c) was added..	CH/ AD
						“loop” → “Loop”	CR
					INST 06-0730	Figure 6.6.5 was modified.	CH
						“loop” → “Loop”	CR
					INST 06-0780	“loop” → “Loop”	CR
					INST 06-0800, INST 06-1380, INST 06-1740	Description of (4) (a) was changed totally.	CH
					INST 06-0800	(d) Note was wholly changed.	CH
					INST 06-0820	(6) Note 1 was wholly changed.	CH
					INST 06-0840	“Work-11” was deleted on (e).	DL
					INST 06-0850	“Work-11” was deleted on (h) and (i).	DL
					INST 06-0860	Work-9 was moved from page INST 06-0870 and modify.	AD
					INST 06-0870	Work-9 was moved to page INST 06-0860 and modify.	DL
						‡1 was added.	AD
						“loop” → “Loop”	CR
					INST 06-0900	“a ENC Unit” was corrected to “an ENC Unit”.	CR
					INST 06-0910	“(see...)” was added. to (i) to (iii).	AD
					INST 06-0920	PATH #2, #3 were added to NOTE.	AD
						(2) Note was wholly changed.	CH
					INST 06-0930	“<Working.Procedure>” was added.	AD
						Figure 6.7.2 was modified.	CH
					INST 06-0940	PATH #2, #3 were added to (i) and (ii).	AD
						“PATH #” was added to Figure 6.7.2.1	AD
						“#” was added to NOTE.	AD
						“<see...>” was added to (b).	AD
						(b) Note, (i) and (ii) were wholly changed and (iii) was added..	CH/ AD
					INST 06-0960	“(Refer to page INST 03-0643)” was added.to No. 6.	AD
					INST 06-0970	“Perform...subsystem” was added to (1).	AD
						Figure was modified. (add D)	CH
						“loop” → “Loop”	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0980	Figure was modified. (add D)	CH
						"loop" → "Loop"	CR
					INST 06-0990	Figure was modified. (add D)	CH
					INST 06-1000	"(see...)" was added. to (i) and (iv).	AD
						"loop" → "Loop"	CR
					INST 06-1010	"(see...)" was added. to (vi), (i), (ii), and (iii).	AD
						"loop" → "Loop"	CR
					INST 06-1020	PATH #2, #3 were added to NOTE.	AD
						(3) Note 3 was wholly changed.	CH
						"loop" → "Loop"	CR
					INST 06-1030	PATH #2, #3 were added to (i) and (ii).	AD
						"<Working.Procedure>" was added.	AD
						"<see...>" was added to (b).	AD
						(b) Note, (i) and (ii) were wholly changed and (c) was added..	CH/ AD
						"loop" → "Loop"	CR
					INST 06-1040	"Loop #0" and "Loop #1" were added to Figure 6.7.5.	AD
						Description of "PATH #xx" was added.	AD
					INST 06-1080	"Work-11" was deleted on (e).	DL
					INST 06-1090	"Work-11" was deleted on (h) and (i).	DL
					INST 06-1100	Work-9 was moved from page INST 06-1110 and modify.	AD
					INST 06-1110	Work-9 was moved to page INST 06-1100 and modify.	DL
						‡1 was added.	AD
						"loop" → "Loop"	CR
					INST 06-1130	"Refer ...(INST 06-1211)" was added.	AD
					INST 06-1150	"a ENC Unit" was corrected to "an ENC Unit".	CR
					INST 06-1160	"(see...)" was added. to (i) to (iii).	AD
					INST 06-1180	"RKAAT" of Figure 6.8.3.1 was corrected to "RKA".	CR
					INST 06-1170	(2) was changed to (4).	CH
						(2) and (3) were added.	AD
						(4) Note 2 was wholly changed.	CH
					INST 06-1190	(a) was moved to (d).	CH
						(a) to (c), (e) and (f) were added.	AD
						"(see...)" was added. to (a).	AD
					INST 06-1200	Figure 6.8.5 was modified.	CH
					INST 06-1210	Figure 6.8.6 was modified.	CH
					INST 06-1211, INST 06-1212	This page was newly added. ("Example..." was added.)	AD
					INST 06-1220	"(Refer to page INST 03-0643)" was added to No. 6.	AD
					INST 06-1230	"Perform...subsystem" was added to (1).	AD
						Figure was modified. (add D)	CH
						"loop" → "Loop"	CR
					INST 06-1240	"loop" → "Loop"	CR
					INST 06-1250	Figure was modified. (add D)	CH
					INST 06-1260	Description of RKAAT was deleted.	DL
						"(see...)" was added. to (i) and (iv).	AD
						"loop" → "Loop"	CR
					INST 06-1270	"(see...)" was added. to (vi), (i), (ii), and (iii).	AD
						"loop" → "Loop"	CR
					INST 06-1280	"PATH" was added to the fourth NOTE.	AD
						(3) Note 1, 2 and 4 were wholly changed.	CH
						"loop" → "Loop"	CR
					INST 06-1290	Figures were moved to page INST 06-1291 and modify.	DL
						(a) was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-1291	Figures were moved from page INST 06-1290.	AD
					INST 06-1300	(a) and (b) was deleted, and newly (b) to (d) were added.	DL AD
					INST 06-1310	“Loop #0” and “Loop #1” were added to Figure 6.8.9.	AD
					INST 06-1320	Figure 6.8.10 was modified.	CH
					INST 06-1321	This page was newly added. (“Example...” was added.)	AD
					INST 06-1322	This page was newly added. (Blank)	AD
					INST 06-1360	“When ... INST 06-1292” was added to (2).	AD
						“loop” → “Loop”	CR
					INST 06-1390	(d) Note was wholly changed.	CH
					INST 06-1410	“a AC Power Unit” was corrected to “an AC Power Unit”.	CR
						(6) Note was wholly changed.	CH
					INST 06-1430	“Work-11” was deleted on (e).	DL
					INST 06-1440	“Work-11” was deleted on (h) and (i).	DL
					INST 06-1450	Work-9 was moved from page INST 06-1460 and modified.	AD
					INST 06-1460	Work-9 was moved to page INST 06-1450 and modified.	DL
						‡1 was added.	AD
						“loop” → “Loop”	CR
					INST 06-1490	“Refer ...(INST 06-1560)” was added.	AD
					INST 06-1500	“a ENC Unit” was corrected to “an ENC Unit”.	CR
					INST 06-1520	(2) was changed to (4).	CH
						(2) and (3) were added.	AD
						PATH #2, #3 were added to NOTE.	AD
						(3) Note 2 was wholly changed.	CH
					INST 06-1530	Fluorescence pen of Figure 6.9.3 was corrected.	CR
						(a) and (c) were deleted.	DL
					INST 06-1531	This page was newly added. ((a) to (f) were added.)	AD
					INST 06-1532	This page was newly added. (Blank)	AD
					INST 06-1540	Figure 6.9.5 was modified.	CH
					INST 06-1550	All description was deleted.	DL
						Description on page INST 06-1570 was moved to this page.	AD
					INST 06-1510	“(see...)” was added. to (i) to (iii).	AD
					INST 06-1560	All description was deleted.	DL
						“Example... (1) and (2)” was added.	AD
					INST 06-1570	All description on was moved to page INST 06-1550.	DL
						“Example... (3)” was added.	AD
					INST 06-1580	“(Refer to page INST 03-0643)” was added to No. 6.	AD
					INST 06-1590	“Perform...subsystem” was added to (1).	AD
						Figure was modified. (add D)	CH
						“loop” → “Loop”	CR
					INST 06-1600	“RKAT ” was corrected to “RKAAT” in flow chart.	CR
						“loop” → “Loop”	CR
					INST 06-1610	Figure was modified. (add D)	CH
					INST 06-1620	Figure # 6.9.9 was changed to 6.9.7.	CH
						“(see...)” was added. to (i) and (iv).	AD
						“loop” → “Loop”	CR
					INST 06-1630	“(see...)” was added. to (vi),(i),(ii),(iii).	AD
						“loop” → “Loop”	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-1640	PATH #2, #3 were added to NOTE.	AD
						"SENC unit" was corrected to "SENC Unit".	CR
						(3) Note 1 and 3 were wholly changed.	CH
						"loop" → "Loop"	CR
					INST 06-1641	This page was newly added. ((a) was added.)	AD
					INST 06-1642	This page was newly added. (Blank)	AD
					INST 06-1650	Figure # 6.9.10 was changed to 6.9.8 and 6.9.8.1.	CH
					INST 06-1660	(a) and (b) were deleted, and newly (b) to (d) were added.	DL AD
					INST 06-1670	Figure # 6.9.11 was changed to 6.9.9.	CH
						"PATH#0, PATH#1" → "PATH#2, PATH#3" at Control Unit #0.	CR
						"Loop #0" and "Loop #1" were added to Figure 6.9.9.	AD
						Description of "PATH #xx" was added.	AD
					INST 06-1680	Figure # 6.9.12 was changed to 6.9.10.	CH
						Figure 6.9.10 was modified.	CH
					INST 06-1681, INST 06-1682	This page was newly added. ("Example..." was added.)	AD
					INST 06-1690	Figure # 6.9.13 was changed to 6.9.11.	CH
						Figure # 6.9.14 was changed to 6.9.12.	CH
					INST 06-1720	"When ... INST 06-1650" was added to (2).	AD
						"loop" → "Loop"	CR
					INST 06-1740	"loop" → "Loop"	CR
					INST 06-1750	(d) Note was wholly changed.	CH
					INST 06-1770	"a AC Power Unit" was corrected to "an AC Power Unit".	CR
						(6) Note 1 was wholly changed.	CH
					INST 06-1800, INST 06-1880	"a ENC Unit" was corrected to "an ENC Unit".	CR
					INST 06-1810, INST 06-1820, INST 06-1860, INST 06-1890, INST 06-1900, INST 06-1920, INST 06-1940	"loop" → "Loop"	CR
					INST 06-1850, INST 06-1930	Figure 6.10.3 and 6.11.3 were modified.	CH
					INST 09-0000, INST 09-0010,	Window of 9520V (RKL) was added.	AD
					INST 09-0011, INST 09-0020, INST 09-0030, INST 09-0031,	DF600 → 9570V (RK), DF600H → 9580V/9585V (RKH/RKHE)	CH
					INST 09-0040, INST 09-0050, INST 09-0060, INST 09-0070, INST 09-0080, INST 09-0081, INST 09-0082, INST 09-0090, INST 09-0100, INST 09-0102, INST 09-0110, INST 09-0120, INST 09-0130, INST 09-0150, INST 09-0160, INST 09-0170, INST 09-0190, INST 09-0221, INST 09-0230, INST 09-0240, INST 09-0250, INST 09-0260, INST 09-0270, INST 09-0280, INST 09-0290, INST 09-0310	Window design was modified.	CH
					INST 09-0000	Description of table was changed.	CH
						Window of 9570V (RK) was moved to page INST 09-0010 and 9580V/9585V (RKH/RKHE) was moved to page INST 09-0011.	DL
					INST 09-0010	Window of 9520V (RKL) was added.	AD
						Window of 9570V (RK) was moved from page INST 09-0000.	AD
						(3) was moved to page INST 09-0011.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 09-0011	This page was newly added. (Window of 9580V/9585V (RKH/ RHKE) was moved from page INST 09-0000. (3) was moved from page INST 09-0010.)	AD
					INST 09-0012	This page was newly added.	AD
					INST 09-0020	(b) was moved to page INST 09-0030.	DL
					INST 09-0030	9580V/9585V was added.	AD
						(b) was moved from page INST 09-0020.	AD
						Description of ‡1 was changed.	CH
						(c) was moved to page INST 09-0031.	DL
						(d) was moved to page INST 09-0032.	DL
					INST 09-0031	This page was newly added. ((c) and (d) were moved from page INST 09-0030.)	AD
					INST 09-0032	This page was newly added. ((d) was moved from page INST 09-0030.)	AD
					INST 09-0040	9520V (RKL) was added.	AD
						② of 9570V (RK) was moved to page INST 09-0050.	DL
					INST 09-0050	② of 9570V (RK) was moved from page INST 09-0050.	AD
					INST 09-0070	Window of 9570V (RK) was moved to page INST 09-0080.	DL
					INST 09-0080	Window of 9570V (RK) was moved from page INST 09-0070.	
						9580V/9585V was added.	AD
						(iii) and (iv) were moved to page INST 09-0081.	DL
					INST 09-0081	This page was newly added. ((iii) and (iv) were moved from page INST 09-0080.)	AD
					INST 09-0082	This page was newly added. (9580V/9585V was added.)	AD
					INST 09-0090	Description of (c) was moved to (b).	CH
						9570V (RK) was moved to INST 09-0100.	DL
					INST 09-0100	9570V (RK) was moved from INST 09-0090.	AD
						9580V/9585V (RKH/RKHE) was moved to INST 09-0101.	DL
					INST 09-0101	This page was newly added. (9580V/9585V (RKH/RKHE) was moved from page INST 09-0100.)	AD
					INST 09-0102	This page was newly added. ((c) was moved from page INST 09-0110.)	AD
					INST 09-0110	(d) was changed to (c) and description was moved to page INST 09-0102..	CH/DL
						9570V (RK) was moved to INST 09-0120.	DL
					INST 09-0130	9570V (RK) was moved to INST 09-0140.	DL
					INST 09-0140	9570V (RK) was moved from INST 09-0140.	AD
						9580V/9585V was added.	AD
						(iii) and (iv) were moved to page INST 09-0141.	DL
					INST 09-0141	This page was newly added. ((iii) and (iv) were moved from page INST 09-0140.)	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 09-0142	This page was newly added. (9580V/9585V was added.)	AD
					INST 09-0150	Description of (c) was moved to (b).	CH
						9570V (RK) was moved to INST 09-0151.	DL
					INST 09-0151	This page was newly added. (9570V (RK) was moved from INST 09-0150.)	AD
					INST 09-0152	This page was newly added. (9580V/9585V was added.)	AD
					INST 09-0160	9580V/9585V (RKH/RKHE) was moved to INST 09-0161.	DL
					INST 09-0161	This page was newly added. (9580V/9585V (RKH/RKHE) was moved from page INST 09-0120.)	AD
					INST 09-0162	This page was newly added.	AD
					INST 09-0190	(9) was moved to INST 09-0190.	DL
					INST 09-0200	(9) was moved from INST 09-0200.	AD
					INST 09-0210	“cable” of 9.3 title was corrected to “ENC Cable”.	AD
						“9.3.1 9520V” was added.	AD
						“9.3.2 9570V” was moved form INST 09-0220.	DL
					INST 09-0220	“9.3.2 9570V” was moved from INST 09-0210.	AD
						Title of 9.3.2 was changed.	CH
						“9.3.3 9580V/9585V” was moved form INST 09-0221.	DL
					INST 09-0221	This page was newly added. (“9.3.3 9580V/9585V” was moved form INST 09-0220.)	AD
					INST 09-0222	This page was newly added.	AD
					INST 09-0230, INST 09-0250, INST 09-0260	“cables” was corrected to “ENC cables”.	CR
					INST 09-0230	9.3.3 → 9.3.4	CH
					INST 09-0250	9.3.4 → 9.3.5	CH
					INST 09-0260	9.3.5 → 9.3.6	CH
					INST 09-0270	Description of (2) was added to 9520V.	AD
					INST 09-0290	Description of NOTE was changed.	CH
						Description of 9520V in the NOTE was added.	AD
					INST 09-0320	“326” and “327” were added.	AD
						“501”, “502”, and “503” were moved form INST 09-0330.	DL
					INST 09-0330	“501”, “502”, and “503” were moved from INST 09-0210.	AD
					MNTE 00-0000, MNTE 02-0030, MNTE 02-1590	The clerical error was corrected.	CR
					MNTE 01-0000, MNTE 01-0050, MNTE 01-0060, MNTE 01-0072, MNTE 01-0080, MNTE 01-0090, MNTE 01-0100, MNTE 01-0120, MNTE 01-0130, MNTE 01-0140, MNTE 01-0141, MNTE 02-0000, MNTE 02-0020, MNTE 02-0030, MNTE 02-0303, MNTE 02-0304, MNTE 02-0520, MNTE 02-0641, MNTE 02-0650, MNTE 02-0660, MNTE 02-0661, MNTE 02-0662, MNTE 02-0730, MNTE 02-0740, MNTE 02-0741, MNTE 02-0742, MNTE 02-0764, MNTE 02-0810, MNTE 02-0820, MNTE 02-0830, MNTE 02-0831, MNTE 02-0832, MNTE 02-0840, MNTE 02-0841	Description of RKL or RKAATL was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0842, MNTE 02-0850, MNTE 02-0860, MNTE 02-0861, MNTE 02-0871, MNTE 02-0872, MNTE 02-0873, MNTE 02-0874, MNTE 02-0880, MNTE 02-0890, MNTE 02-0891, MNTE 02-0900, MNTE 02-0910, MNTE 02-0911, MNTE 02-0912, MNTE 02-0920, MNTE 02-0930, MNTE 02-0931, MNTE 02-0932, MNTE 02-0933, MNTE 02-0934, MNTE 02-0935, MNTE 02-0936, MNTE 02-0940, MNTE 02-0941, MNTE 02-0942, MNTE 02-0943, MNTE 02-0944, MNTE 02-0945, MNTE 02-0950, MNTE 02-0960, MNTE 02-0961, MNTE 02-0962, MNTE 02-0970, MNTE 02-0991, MNTE 02-0992, MNTE 02-0993, MNTE 02-0994, MNTE 02-1070, MNTE 02-1071, MNTE 02-1080, MNTE 02-1090, MNTE 02-1091, MNTE 02-1092, MNTE 02-1100, MNTE 02-1110, MNTE 02-1110, MNTE 02-1111, MNTE 02-1112, MNTE 02-1113, MNTE 02-1114, MNTE 02-1120, MNTE 02-1130, MNTE 02-1131, MNTE 02-1132, MNTE 02-1140, MNTE 02-1141, MNTE 02-1142, MNTE 02-1150, MNTE 02-1151, MNTE 02-1152, MNTE 02-1153, MNTE 02-1154, MNTE 02-1155, MNTE 02-1156, MNTE 02-1157, MNTE 02-1158, MNTE 02-1251, MNTE 02-1270, MNTE 02-1281, MNTE 02-1300, MNTE 02-1310, MNTE 02-1311, MNTE 02-1312, MNTE 02-1320, MNTE 02-1321, MNTE 02-1322, MNTE 02-1591, MNTE 02-1613, MNTE 02-1990, MNTE 02-2190, MNTE 02-2220, MNTE 02-2221, MNTE 02-2260, MNTE 02-2300, MNTE 02-2310, MNTE 02-2330, MNTE 02-2340, MNTE 02-2341, MNTE 02-2350, MNTE 02-2370, MNTE 02-2380, MNTE 02-2400, MNTE 02-2410, MNTE 02-2420, MNTE 02-2430, MNTE 02-2450, MNTE 02-2460, MNTE 02-2491, MNTE 02-2500, MNTE 02-2830, MNTE 05-0000, MNTE 05-0050, MNTE 05-0080, MNTE 05-0110, MNTE 05-0120, MNTE 05-0133, MNTE 05-0160, MNTE 05-0250, MNTE 05-0270, MNTE 05-0271, MNTE 05-0280, MNTE 05-0290, MNTE 05-0300, MNTE 05-0310, MNTE 05-0320, MNTE 05-0330, MNTE 05-0331, MNTE 05-0332, MNTE 05-0350, MNTE 05-0351, MNTE 05-0360, MNTE 05-0370, MNTE 05-0390, MNTE 05-0400, MNTE 05-0410, MNTE 05-0430, MNTE 05-0440, MNTE 05-0450, MNTE 05-0463	Description of RKL or RKAATL was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0480, MNTE 05-0490, MNTE 05-0500, MNTE 05-0520, MNTE 05-0534, MNTE 05-0535, MNTE 05-0540, MNTE 05-0650, MNTE 05-0670, MNTE 05-0680, MNTE 05-0693, MNTE 05-0700, MNTE 05-0730, MNTE 05-0740, MNTE 05-0750, MNTE 05-0761, MNTE 06-0140, MNTE 07-0000, MNTE 07-0050, MNTE 07-0070, MNTE 08-0010, MNTE 08-0011	Description of RKL or RKAATL was added.	AD
					MNTE 02-0831, MNTE 02-0832, MNTE 02-0861, MNTE 02-0862, MNTE 02-0891, MNTE 02-0892, MNTE 02-0935, MNTE 02-0936, MNTE 02-1113, MNTE 02-1114, MNTE 02-1311, MNTE 02-1312	There pages were newly added.	AD
					MNTE 02-0140	Corrected “SENC Unit” icon.	CR
					MNTE 02-0240	“W0***AT” was added to the No.7 and No.8.	AD
						No.10 to No.12 were moved to page MNTE 02-0250.	DL
					MNTE 02-0250	No.10 to No.12 were moved from page MNTE 02-0240.	AD
						“W090AT” was added to the No.10.	AD
					MNTE 02-0620	“protct” of “H50N00” was corrected to “protect”.	AD
					MNTE 02-0640	“H90500” was added.	AD
					MNTE 02-0662	“HE0710” and “HE0711” were moved from page MNTE 02-0670.	AD
						“****AT” were added on the Recovery measures of “HE0710”.	AD
					MNTE 02-0670	“HE0710” and “HE0711” were moved to page MNTE 02-0662.	DL
					MNTE 02-0730, MNTE 02-0742, MNTE 02-0820, MNTE 02-0830, MNTE 02-0842, MNTE 02-0850, MNTE 02-0860, MNTE 02-0861, MNTE 02-0873, MNTE 02-0874, MNTE 02-0880, MNTE 02-0890, MNTE 02-0891, MNTE 02-0900, MNTE 02-0910, MNTE 02-0911, MNTE 02-0912, MNTE 02-0920, MNTE 02-0930, MNTE 02-0931, MNTE 02-0932, MNTE 02-0933, MNTE 02-0934, MNTE 02-0935, MNTE 02-0990, MNTE 02-1000, MNTE 02-1010, MNTE 02-1020, MNTE 02-1030, MNTE 02-1040, MNTE 02-1041, MNTE 02-1042, MNTE 02-1092, MNTE 02-1100, MNTE 02-1110, MNTE 02-1111, MNTE 02-1112, MNTE 02-1113, MNTE 02-1114, MNTE 02-1120, MNTE 02-1130, MNTE 02-1131, MNTE 02-1132, MNTE 02-1140, MNTE 02-1141, MNTE 02-1142, MNTE 02-1150, MNTE 02-1151, MNTE 02-1152, MNTE 02-1153, MNTE 02-1155, MNTE 02-1156, MNTE 02-1281, MNTE 02-1310, MNTE 02-1311, MNTE 02-1322	RKS, RKSD or RKD was added to the “Description”.	AD
					MNTE 02-0730	“HH0FHH” and “HH0Fxx” were moved to page MNTE 02-0740.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0740	"HH0FHH" and "HH0Fxx" were moved from page MNTE 02-0730.	AD
						"HH17HH" to "HH190x" were moved to page MNTE 02-0741.	DL
					MNTE 02-0741	"HH17HH" to "HH190x" were moved from page MNTE 02-0740.	AD
						"HH1AHH" to "HH1Q00" were moved to page MNTE 02-0742.	DL
					MNTE 02-0742	"HH1AHH" to "HH1Q00" were moved from page MNTE 02-0741.	AD
					MNTE 02-0763	"****AT" were added on the Recovery measures of "HH30xx" and "HH31xx".	AD
					MNTE 02-0810	"I00600" to "I006xy" were moved to page MNTE 02-0820.	DL
					MNTE 02-0820	"I00600" to "I006xy" were moved from page MNTE 02-0810.	AD
						"I008HH" to "I009xy" were moved to page MNTE 02-0830.	DL
					MNTE 02-0830	"I008HH" to "I009xy" were moved from page MNTE 02-0820.	AD
						"I00Axy" to "I0200x" were moved to page MNTE 02-0831.	DL
					MNTE 02-0831	This page was newly added. ("I00Axy" to "I0200x" were moved from page MNTE 02-0830.)	AD
					MNTE 02-0841	"****HH" were added on the Recovery measures of "I12300".	AD
					MNTE 02-0842	"I141HH" and "I141xy" were moved to page MNTE 02-0842.	DL
					MNTE 02-0850	"I141HH" to "I141xy" were moved from page MNTE 02-0842.	AD
						"I151HH" and "I151xy" were moved to page MNTE 02-0860.	DL
					MNTE 02-0860	"I151HH" to "I151xy" were moved from page MNTE 02-0850.	AD
						"I153HH" to "I160xx" were moved to page MNTE 02-0861.	DL
					MNTE 02-0861	"I153HH" to "I160xx" were moved from page MNTE 02-0860.	AD
					MNTE 02-0872	"I1GC00" was moved to page MNTE 02-0873.	DL
					MNTE 02-0873	"I1GC00" was moved from page MNTE 02-0872.	AD
					MNTE 02-0880	"I30800" and "I30900" were moved to page MNTE 02-0881.	DL
						Recovery measures of "I305HH" was changed.	CH
					MNTE 02-0881	This page was newly added. ("I30800" and "I30900" were moved from page MNTE 02-0880.)	AD
					MNTE 02-0882	This page was newly added.	AD
					MNTE 02-0890	"I412HH" and "I412xy" were moved to page MNTE 02-0891.	DL
					MNTE 02-0891	This page was newly added. ("I412HH" and "I412xy" were moved from page MNTE 02-0890.)	AD
					MNTE 02-0931	"I501HH" to "I5010x" were moved to page MNTE 02-0932.	DL
					MNTE 02-0932	"I501HH" to "I5010x" were moved from page MNTE 02-0931.	AD
						"I511HH" to "I512xy" were moved to page MNTE 02-0933.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0933	"I511HH" to "I512xy" were moved from page MNTE 02-0934.	AD
						"I515HH" to "I516xy" were moved to page MNTE 02-0934.	DL
					MNTE 02-0934	"I515HH" to "I516xy" were moved from page MNTE 02-0933.	AD
						"I51700" was added.	AD
						"I521xy" to "I524xy" were moved to page MNTE 02-0935.	DL
					MNTE 02-0935	This page was newly added. ("I521xy" to "I524xy" were moved from page MNTE 02-0934. "I525xy" was added.)	AD
					MNTE 02-0936	This page was newly added. ("I530HH" to "I533xy" were moved from page MNTE 02-0940.)	AD
					MNTE 02-0940	"I530HH" to "I533xy" were moved to page MNTE 02-0936.	DL
						"I534HH" to "I540xy" were moved from page MNTE 02-0941.	AD
					MNTE 02-0941	"I534HH" to "I540xy" were moved to page MNTE 02-0940.	DL
						"I5Y000" to "I5Y400" were moved from page MNTE 02-0942.	AD
					MNTE 02-0942	"I5Y000" to "I5Y400" were moved to page MNTE 02-0941.	DL
						"a ENC" was corrected to "an ENC".	CR
						"I5Y500" to "I5Y900" were moved from page MNTE 02-0943.	AD
					MNTE 02-0943	"I5Y500" to "I5Y900" were moved to page MNTE 02-0942.	DL
						"a ENC" was corrected to "an ENC".	CR
						"I5YH00" and "I5YL00" were moved from page MNTE 02-0944.	AD
					MNTE 02-0944	"I5YH00" and "I5YL00" were moved to page MNTE 02-0943.	DL
						"I5YT00" and "I5YU00" was added.	AD
					MNTE 02-0960	"****AT" were added on the Recovery measures of "I60200".	AD
						"I603xy" and "I604HH" were moved to page MNTE 02-0961.	DL
					MNTE 02-0961	"I603xy" and "I604HH" were moved from page MNTE 02-0960.	AD
						"****AT" were added on the Recovery measures of "I603xy".	AD
						"I6050x" to "I6070x" were moved to page MNTE 02-0962.	DL
					MNTE 02-0962	"I6050x" to "I6070x" were moved from page MNTE 02-0961.	AD
						"I61700" and "I61900" were moved to page MNTE 02-0970.	DL
					MNTE 02-0970	"I61700" and "I61900" were moved from page MNTE 02-0962.	AD
						"a ENCCOM" of "I61A00" was corrected to "an ENCCOM".	CR
						"W090AT" were added on the Recovery measures of "I61A00".	AD
						"I6220x" was moved to page MNTE 02-0980.	DL
					MNTE 02-0980	"I6220x" was moved from page MNTE 02-0970.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0990	Description (Unit ID#) of "I6B0HH" was changed.	CH
					MNTE 02-0992	"I6DE00" and "I6DF00" were moved to page MNTE 02-0993	DL
					MNTE 02-0993	"I6DE00" and "I6DF00" were moved from page MNTE 02-0992.	AD
						"I6DN00" to "I6DQ00" were moved to page MNTE 02-0964.	DL
					MNTE 02-0994	"I6DN00" to "I6DQ00" were moved from page MNTE 02-0963.	AD
					MNTE 02-1041	"I83800" was added.	AD
						"I840HH" and "I840xy" were moved to page MNTE 02-1042.	DL
					MNTE 02-1042	"I840HH" and "I840xy" were moved from page MNTE 02-1041.	AD
						"I80BHH …" were added on the Recovery measures of "I840HH" to "I840xy".	AD
					MNTE 02-1092	"IY01HH" and "IY01xy" were moved to page MNTE 02-1100.	DL
					MNTE 02-1100	"IY01HH" and "IY01xy" were moved from page MNTE 02-1092.	AD
						"IY03HH" to "IY04xy" were moved to page MNTE 02-1110.	DL
					MNTE 02-1110	"IY03HH" to "IY04xy" were moved from page MNTE 02-1100.	AD
						"IY05HH" to "IY06xy" were moved to page MNTE 02-1111.	DL
						"IY07HH" was moved to MNTE 02-1112.	DL
					MNTE 02-1111	"IY05HH" to "IY06xy" were moved from page MNTE 02-1110.	AD
						"IY07xy" to "IY09xy" were moved to page MNTE 02-1112.	DL
						"IY09HH" and "IY09xy" were moved to page MNTE 02-1113.	DL
					MNTE 02-1112	"IY07HH" was moved from MNTE 02-1110.	AD
						"IY07xy" to "IY08xy" were moved from page MNTE 02-1111.	AD
						"IY0AHH" and "IY0Axy" were moved to page MNTE 02-1113.	DL
						"IY0BHH" to "IY0Cxy" were moved to page MNTE 02-1114.	DL
					MNTE 02-1113	This page was newly added. ("IY09HH", "IY09xy", "IY0AHH" and "IY0Axy" were moved.)	AD
					MNTE 02-1114	This page was newly added. ("IY0BHH" to "IY0Cxy" were moved from page MNTE 02-1112.)	AD
					MNTE 02-1131	"IY0JHH" and "IY0Jxy" were moved to page MNTE 02-1132.	DL
					MNTE 02-1132	"IY0JHH" and "IY0Jxy" were moved from page MNTE 02-1131.	AD
						"IY0LHH" to "IY0Mxy" were moved to page MNTE 02-1140.	DL
					MNTE 02-1140	"IY0LHH" to "IY0Mxy" were moved from MNTE 02-1132.	AD
						"IY0NHH" to "IY0R00" were moved to page MNTE 02-1141.	DL
						"IY0S00" and "IY0T00" were moved to page MNTE 02-1142.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1141	"IY0NHH" to "IY0R00" were moved from MNTE 02-1140.	AD
						"IY0U00" to "IY0W00" were moved to page MNTE 02-1142.	DL
					MNTE 02-1142	"IY0S00" and "IY0T00" were moved from page MNTE 02-1140.	AD
						"IY0U00" to "IY0W00" were moved from MNTE 02-1141.	AD
						"I301AT" were added on the Recovery measures of "IY0W00".	AD
					MNTE 02-1150	"IZ0600" was moved to page MNTE 02-1151.	DL
					MNTE 02-1151	"IZ0600" was moved from page MNTE 02-1150.	AD
						"IZ08HH" and "IZ08xy" were moved to page MNTE 02-1152.	DL
					MNTE 02-1152	"IZ08HH" and "IZ08xy" were moved from page MNTE 02-1151.	AD
						"IZ0AHH" to "IZ0B00" were moved to page MNTE 02-1153.	DL
					MNTE 02-1153	"IZ0AHH" to "IZ0B00" were moved from MNTE 02-1152.	AD
						"IZY000" to "IZY5xy" were moved to page MNTE 02-1154.	DL
					MNTE 02-1154	"IZY000" to "IZY5xy" were moved from MNTE 02-1153.	AD
						"IZY6AT" to "IZY7xy" were moved to page MNTE 02-1155.	DL
					MNTE 02-1155	"IZY6AT" to "IZY7xy" were moved from MNTE 02-1154.	AD
						"IZY8AT" to "IZYB02" were moved to page MNTE 02-1155.	DL
						"IZYB03" and "IZYB04" were moved to page MNTE 02-1157.	DL
					MNTE 02-1156	"IZY8AT" to "IZYB02" were moved from MNTE 02-1156.	AD
						"IZYE00" to "IZYM0x" were moved to page MNTE 02-1157.	DL
					MNTE 02-1157	"IZYB03" and "IZYB04" were moved from MNTE 02-1155.	AD
						"IZYE00" to "IZYM0x" were moved from MNTE 02-1156.	AD
						"IZYN00" to "IZZ004" were moved to page MNTE 02-1158.	DL
					MNTE 02-1158	"IZYN00" to "IZZ004" were moved from MNTE 02-1157.	AD
					MNTE 02-1200	Recovery measures of "R3120x" and "R40000" were changed.	CH
					MNTE 02-1283	"RBEL00" and "RBEM00" were added.	AD
					MNTE 02-1310	"W071HH" and "W071xy" were moved to page MNTE 02-1311.	DL
					MNTE 02-1311	This page was newly added. ("W071HH" to"W073xy" were moved from MNTE 02-1320.)	AD
					MNTE 02-1320	"W073HH" and "W073xy" were moved to page MNTE 02-1311.	DL
						"****AT" was added on the Recovery measures of "W080xy".	AD
					MNTE 02-1327	Message code "W4800" was corrected to "W48000".	CR

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1330	"Abnormal End Down Grade Install NG (installing …)" and "Abnormal End Down Grade Install NG (QuickShadow …)" was added.	AD
						"Abnormal End Down Grade Install NG (Unsupported …)" and "Abnormal End Drive Block …" was moved to page MNTE 02-1331.	DL
					MNTE 02-1331	"Abnormal End Down Grade Install NG (Unsupported …)" and "Abnormal End Drive Block …" was moved from page MNTE 02-1330.	DL
						"Abnormal End Initial Setup Error (installing …)" was added .	AD
						Recovery measures of "Abnormal End Unknown Drive…" was added.	AD
						"Abnormal End Upgrade Failed" was moved to page MNTE 02-1332.	DL
					MNTE 02-1332	"Abnormal End Upgrade Failed" was moved from page MNTE 02-1331.	AD
					MNTE 02-1341	"DMEA00102A" was added.	AD
					MNTE 02-1344	"to enable" of DMED010004 was corrected to "to enabled".	CR
					MNTE 02-1345	"DMED080023" was added.	AD
					MNTE 02-1347	"DMED0C0004", "DMED0F0002", "DMED0F0003" and "DMED120001"were added.	AD
						"DMED400001" to "DMED400004" were moved to page MNTE 02-1348.	DL
					MNTE 02-1348	"DMED400001" to "DMED400004" were moved from MNTE 02-1347.	AD
						"DMES013200" to "DMES018B01" were moved to page MNTE 02-1350.	DL
					MNTE 02-1350	"DMES013200" to "DMES018B01" were moved from MNTE 02-1348.	AD
						"DMES044400" to "DMES049101" were moved to page MNTE 02-1351.	DL
					MNTE 02-1351	"DMES044400" to "DMES049101" were moved from MNTE 02-1350.	AD
						"DMES052000" to "DMES052590" were moved to page MNTE 02-1352.	DL
					MNTE 02-1352	"DMES052000" to "DMES052590" were moved from MNTE 02-1351.	AD
						"DMES05955E" to "DMES059564" were moved to page MNTE 02-1353.	DL
					MNTE 02-1353	"DMES05955E" to "DMES059564" were moved from MNTE 02-1352.	AD
						"DMES05EA17" to "DMES05EA20" were moved to page MNTE 02-1354.	DL
					MNTE 02-1354	"DMES05EA17" to "DMES05EA20" were moved from MNTE 02-1353.	AD
						"DMES0BC100" to "DMES0BFD01" were moved to page MNTE 02-1355.	DL
					MNTE 02-1355	This page was newly added. ("DMES0BC100" to "DMES0BFD01" were moved from MNTE 02-1354.)	AD
					MNTE 02-1356	This page was newly added.	
					MNTE 02-1378, MNTE 02-1388	"W060HH" of WEB Information Message display was changed "W060XX".	AD
					MNTE 02-1520	"****XX" of WEB Information Message display was changed "****xy".	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1590, MNTE 02-1620	Description of "****HH" and "****AT" in the text was added.	AD
					MNTE 02-1600, MNTE 02-1610, MNTE 02-1611	"•" was added to text.	AD
					MNTE 02-1977	Description of "****HH" and "****AT" in the flow was added.	AD
					MNTE 02-1980	"on the Front .../RKHE" was added to (3).	AD
					MNTE 02-2170	"MNTE 02-2310" → "MNTE 02-2304"	CR
					MNTE 02-2190, MNTE 02-2221, MNTE 02-2260	"of RK/.../RKHE" was added to (d).	AD
					MNTE 02-2210	"When the USB memory…" was added.	AD
					MNTE 02-2290, MNTE 02-2301	"Provide each personal…" was added.	AD
					MNTE 02-2304	"(4)" was moved from page MNTE 02-2310.	AD
					MNTE 02-2310	"(4)" was moved to page MNTE 02-2304.	AD
						2.5.6 was added.	AD
					MNTE 02-2311 to MNTE 02-2318	These pages were newly added. (2.5.6 was added.)	AD
					MNTE 02-2320	"a Disk Drive" was changed to "each part" in Table2.6.1(No1-State of unit).	CH
						"Power supply" was changed to "Parts" in Table2.6.1(No2-Falure).	CH
					MNTE 02-2330	"Power supply" was corrected to "Parts" in Table2.6.1(No3-Falure).	CR
					MNTE 02-2350	Decision of RKH/RKHE was deleted.	DL
					MNTE 02-2360	Local process was corrected.	CR
					MNTE 02-2361	The flowchart was modified and "*1" was added.	CH/ AD
					MNTE 02-2362	The flowchart and "*1" were added.	AD
					MNTE 02-2363	The flowchart and "*1" were added. (New page)	AD
					MNTE 02-2364	Blank page was added. (New page)	AD
					MNTE 02-2370	"Replace the failed part" of flow was moved to MNTE 02-2371.	DL
						"a AC Power Unit" was corrected to "an AC Power Unit".	CR
					MNTE 02-2371	"Replace the failed part" of flow was moved from MNTE 02-2370.	AD
						The flowchart was modified and "*1" was added.	CH/ AD
					MNTE 02-2372	The flowchart and "*1" were added.	AD
					MNTE 02-2373	The flowchart and "*1" were added. (New page)	AD
					MNTE 02-2374	Blank page was added. (New page)	AD
					MNTE 02-2410	"WARN LED.../RKHE" was added to the Table 2.6.3.	AD
					MNTE 02-2430	No.6 was moved to MNTE 02-2440.	DL
					MNTE 02-2440	No.6 was moved from MNTE 02-2430.	AD
					MNTE 02-2811	"080023" was added.	AD
					MNTE 02-2813	"09001F" was added.	AD
						"0A0001" to "0A0003" were moved from MNTE 02-2814.	AD
					MNTE 02-2814	"0A0001" to "0A0003" were moved to page MNTE 02-2813.	DL
						"0C0004", "0F0002" and "0F0003" were added.	AD
					MNTE 05-0061	Font of table was corrected.	CR
					MNTE 05-0110	Description of "Parts" was corrected.	CR
						No.14 and No.15 were moved to page MNTE 05-0111.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0111	This page was newly added. (No.14 and No.15 were moved from page MNTE 05-0110.)	AD
					MNTE 05-0112	This page was newly added.	AD
					MNTE 05-0150, MNTE 05-0161	"the WARN.../RKHE" was added to ‡3.	AD
					MNTE 05-0150, MNTE 05-0160, MNTE 05-0170, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0372, MNTE 05-0375, MNTE 05-0400, MNTE 05-0441, MNTE 05-0450, MNTE 05-0461, MNTE 05-0463, MNTE 05-0465, MNTE 05-0660, MNTE 05-0690	"Store the collected simple trace information in the USB memory." was added.	AD
					MNTE 05-0210	"Beside ...errors." was changed to "However, ...effective.".	CH
					MNTE 05-0250	Description of "W060AT" in the (i) and (ii) was added.	AD
					MNTE 05-0251	"35.4 G byte" and "143.3 G byte" of table was corrected.	CR
					MNTE 05-0410, MNTE 05-0440, MNTE 05-0442, MNTE 05-0445, MNTE 05-0500, MNTE 05-0530, MNTE 05-0532, MNTE 05-0535, MNTE 05-0590, MNTE 05-0610	"Usually …minutes." was changed to "The Control Unit … recover". Written position was corrected. (MNTE 05-0530, MNTE 05-0535, MNTE 05-0610)	CH/ CR
					MNTE 05-0330, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0660, MNTE 05-0680, MNTE 05-0691, MNTE 05-0693, MNTE 05-0694	"RK/.../RKHE" was added to ‡1.	AD
					MNTE 05-0374, MNTE 05-0377	"RKD/RKSD" was added to ‡1.	AD
					MNTE 05-0560	Description of text was added.	AD
					MNTE 05-0640	"a ENC" was corrected to "an ENC".	CR
					MNTE 05-0670	"ENC Unit Unit" of (1-2) was corrected to "ENC Unit".	CR
					MNTE 05-0694	The font of ①, ② of (c) and (f) were corrected.	CR
					MNTE 08-0010	RKL, RKAAT, RKAATL were added.	AD
					MNTE 08-0021	This page was newly added. (No. 1-1 (2) was moved from page MNTE 08-0030.)	AD
					MNTE 08-0022	This page was newly added. (No. 1-1 (3) was moved from page MNTE 08-0040.)	AD
					MNTE 08-0030	No. 1-1 (2) was moved to page MNTE 08-0021.	DL
						No.1-2 (1) DF600-RKL was added.	AD
					MNTE 08-0031, MNTE 08-0032	These pages were newly added. (No.1-2 DF600-RKL was added.)	AD
					MNTE 08-0040	No. 1-1 (3) was moved to page MNTE 08-0022.	DL
						No.1-3 (1) DF600-RKH/RKHE was moved from page MNTE 08-0041.	AD
					MNTE 08-0041	No.1-3 (1) DF600-RKH/RKHE was moved to page MNTE 08-0040.	DL
						No.1-3 (2) DF600-RKH/RKHE was moved from page MNTE 08-0042.	AD
					MNTE 08-0042	No.1-3 (2) DF600-RKH/RKHE was moved to page MNTE 08-0041.	DL
						No.1-3 (2) DF600-RKH/RKHE was moved from page MNTE 08-0043.	AD
					MNTE 08-0043	No.1-3 (2) DF600-RKH/RKHE was moved to page MNTE 08-0042.	DL
						This page was deleted page.	DL
					MNTE 08-0044	This page was deleted page.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 08-0050 to MNTE 08-0061	No.1-3 → No.1-4	CH
					MNTE 08-0062 to MNTE 08-0064	No.1-4 → No.1-5	CH
					MNTE 08-0065, MNTE 08-0066	These pages were newly added. (No.1-6 DF600-RKAATL was added.)	AD
					MNTE 08-0070	No.1-6 (3) DF600-RKAATL was added.	AD
					MNTE 08-0071 to MNTE 08-0073	No.1-5 → No.1-7	CH
					MNTE 08-0074to MNTE 08-0076	No.1-6 → No.1-8	CH
					WEB 01-0001/0002	x 658 → x659	CH
					WEB 03-0010, WEB 03-0330, WEB 03-0343	Description of RKL or RKAATL was added.	AD
					APP C-0060/0070	Added x658.	AD
19	Sep.30.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.18 → Rev.19	CH
					GENE 0090, GENE 0120, GENE 0140, GENE 0150, INTO 04-0122, INTO 05-0010,	"Disk Array Management Program 2" was changed to "Disk Array Management Program".	CH
					GENE 0100	"5.4.5" was added.	AD
					GENE 0150	"4.2.13" was added.	AD
					GENE 0180	"2.9" was added.	AD
					INTO 02-0020, INTO 02-0050, INTO 03-0090, INTO 03-0120	"RAID 0+1" → "RAID 1+0"	CR
					INTO 05-0010	"Resource Manager" was corrected to "Disk Array Management Program".	CR
					INST 00-0000, INST 01-0320, INST 05-0000, INST 05-0010, INST 05-0040, INST 05-0050, INST 05-0060, INST 05-0090, INST 05-0100, INST 05-0151, INST 05-0290, INST 05-0350, INST 05-0410, INST 05-0440, INST 05-0460, INST 05-0461, INST 05-0462, INST 05-0550, INST 05-0650, INST 05-0651, INST 05-0653, INST 05-0660, INST 05-0670, INST 05-0680, INST 05-0770, INST 05-0790, INST 05-1010, INST 05-1030, INST 05-1100, INST 05-1170, INST 05-1190, INST 05-1220, INST 05-1250, INST 05-1280, INST 05-1340, INST 05-1350, INST 05-1360, INST 05-1370, INST 05-1400, INST 05-1460, INST 05-1470, INST 05-1480, INST 05-1490, INST 05-1501, INST 06-0000, INST 06-0131, INST 06-0170, INST 06-0230, INST 06-0250, INST 06-0300, INST 06-0321, INST 07-0000, INST 07-0010, INST 07-0080, INST 07-0090, INST 07-0155, INST 09-0170, INST 09-0190	"Disk Array Management Program 2" was changed to "Disk Array Management Program".	CH
					INST 02-0060, INST 02-0220, INST 03-0402, INST 03-0450, INST 03-0630, INST 03-0642, INST 07-0151, INST 07-0154, INST 07-0157	"<Working Procedure>" was added.	AD
					INST 02-0330	ENC Cable color of Figure 3.6.2 was changed into orange from gray.	CH
					INST 02-0390	"2.7.2 Subsystem power on " is changed into "2.7.2 Subsystem power off."	CH
					INST 03-0280	"Figure 3.2.25" was changed to "Figure 3.2.24".	CH
					INST 03-0650	"INST 08-0050" was deleted.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0682	"Loop#xx" and "ENC Unit#xx" were added to Figure 3.6.4.	AD
					INST 03-0684	"ENC Unit#xx" were added to Figure 3.6.4.1.	AD
					INST 03-0692	"Loop#xx" was added to Figure 3.6.4.2.	AD
					INST 04-0010	"Use a tool... diameter)." was added to Flow Chart.	AD
					INST 05-0320	Changed was Port-ID Conversion Mode.	CH
					INST 05-0460, INST 05-0462	Reference of ‡1 was changed.	CH
					INST 05-0463	(Disk Array Management Program is Ver.9.00 or later) was added.	AD
					INST 05-0761, INST 05-0762	These pages were newly added. (Subsection 5.4.5 was added.)	AD
					INST 06-0170	Reference of (d) was changed.	CH
					INST 06-0190, INST 06-0200	"6.4.3(4-3)" was added.	AD
					INST 06-0240, INST 06-0260	"6.4.3(4-4)" was added.	AD
					INST 06-0670, INST 06-0980, INST 06-1240, INST 06-1600	Flow chart was corrected.	CR
					INST 06-0720	ENC Cable color of Figure 6.6.4 was changed into orange from yellow.	CH
					INST 06-1180	ENC Cable color of Figure 6.8.3 and Figure 6.8.3.1 was changed into orange from yellow.	CH
					INST 06-1291	ENC Cable color of Figure 6.8.8 and Figure 6.8.8.1 was changed into orange from yellow.	CH
					INST 06-1790	ENC Cable color of Figure 6.10.1 was changed into orange from yellow.	CH
					INST 07-0010	Reference item of Work-3 was changed.	CH
					MNTE 01-0020, MNTE 01-0040, MNTE 02-0000, MNTE 02-0640, MNTE 02-0872, MNTE 02-1322, MNTE 02-1340, MNTE 02-1370, MNTE 02-1371, MNTE 02-1374, MNTE 02-1375, MNTE 02-1377, MNTE 02-1378, MNTE 02-1382, MNTE 02-1384, MNTE 02-1385, MNTE 02-1386, MNTE 02-1388, MNTE 02-1392, MNTE 02-1394, MNTE 02-1398, MNTE 02-1405, MNTE 02-1406, MNTE 02-1410, MNTE 02-1420, MNTE 02-1440, MNTE 02-1480, MNTE 02-1500, MNTE 02-1530, MNTE 02-1540, MNTE 02-1560, MNTE 02-1580, MNTE 02-2710, MNTE 02-2850, MNTE 02-2890, MNTE 03-0000, MNTE 04-0090, MNTE 04-0120, MNTE 04-0140, MNTE 04-0290, MNTE 04-0320, MNTE 04-0350, MNTE 04-0360, MNTE 04-0400, MNTE 04-0430, MNTE 04-0440, MNTE 04-0470, MNTE 04-0480, MNTE 04-0500, MNTE 04-0510, MNTE 04-0530, MNTE 04-0540, MNTE 04-0560, MNTE 04-0570, MNTE 04-0600, MNTE 04-0630, MNTE 04-0660, MNTE 05-0070, MNTE 05-0170, MNTE 05-0210, MNTE 09-0010, MNTE 09-0020	"Disk Array Management Program 2" was changed to "Disk Array Management Program".	CH
					MNTE 02-0081, MNTE 02-0082	System version "x659" → "x659/M".	CH
					MNTE 02-0140	BD icon was added to the Table.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0162	This description was moved to page MNTE 02-0163.	DL
						New Figure (Ver 0659/M) was added.	AD
					MNTE 02-0163	This description was moved to page MNTE 02-0164.	DL
						Description of page MNTE 02-0162 was moved to this page. .	AD
					MNTE 02-0164	This description was moved to page MNTE 02-0170.	DL
						Description of page MNTE 02-0163 was moved to this page. .	AD
					MNTE 02-0170	This description was moved to page MNTE 02-0171.	DL
						Description of page MNTE 02-0164 was moved to this page. .	AD
					MNTE 02-0171	This description was moved to page MNTE 02-0172.	DL
						Description of page MNTE 02-0170 was moved to this page. .	AD
					MNTE 02-0172	This description was moved to page MNTE 02-0180.	DL
						Description of page MNTE 02-0171 was moved to this page. .	AD
						Disk Drive (RKL) was added.	AD
					MNTE 02-0180	This description was moved to page MNTE 02-0181.	DL
						Description of page MNTE 02-0172 was moved to this page. .	AD
					MNTE 02-0181	This description was moved to page MNTE 02-0180. (New page)	AD
					MNTE 02-0182	New page was added. (Blank page)	AD
					MNTE 02-0500	Recovery and Refer of “H2100” were changed.	CH
					MNTE 02-0650	Recovery and Refer of “HD21xx” were changed.	CH
					MNTE 02-0690	Recovery and Refer of “HF0100” were changed.	CH
					MNTE 02-0730	Recovery measures ② and Reference page was added to “HH0FAT”.	AD
					MNTE 02-0740	Recovery measures ② and Reference page was added to “HH0FHH” and “HH0Fxx”.	AD
					MNTE 02-0764	Description of “HH4E00” was changed.	CH
						“HI050x” and “HI0600” were moved to page MNTE 02-0770.	DL
					MNTE 02-0770	“HI050x” and “HI0600” were moved from page MNTE 02-0764.	AD
						“HJ0Bxx” was moved to page MNTE 02-0780.	DL
					MNTE 02-0780	“HJ0Bxx” was moved from page MNTE 02-0780.	AD
					MNTE 02-0943	Recovery measures ⑤ and Reference page was added to “I5YG00”.	AD
						“I5YJ00” was added.	
						“I5YL00” was moved to page MNTE 02-0944.	DL
					MNTE 02-0944	“I5YL00” was moved from page MNTE 02-0943.	AD
						“I5YS0x” was added.	AD
						“I5YU00” was moved to page MNTE 02-0945.	DL
					MNTE 02-0945	“I5YU00” was moved from page MNTE 02-0944.	AD
					MNTE 02-0994	“I6DY00” was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0995	"I6DZ00" was added. (New page)	AD
					MNTE 02-0996	New page was added. (blank page)	AD
					MNTE 02-1320	Recovery measures ① or ② was added to "W090AT" and "W090HH".	AD
					MNTE 02-1325	"W3360x" was added.	AD
					MNTE 02-1343	"DMEA001146" to "DMEA00115B" were added.	AD
						"DMEC002042" to "DMEC002066" were moved to page MNTE 02-1344.	DL
					MNTE 02-1344	"DMEC002042" to "DMEC002066" were moved from page MNTE 02-1343.	AD
						"DMED030008" to "DMED070005" were moved to page MNTE 02-1345.	DL
					MNTE 02-1345	"DMED030008" to "DMED070005" were moved from page MNTE 02-1344.	AD
						"DMED080012" to "DMED080023" were moved to page MNTE 02-1346.	DL
					MNTE 02-1346	"DMED080012" to "DMED080023" were moved from page MNTE 02-1345.	AD
						"DMED090013" to "DMED090021" were moved to page MNTE 02-1347.	DL
					MNTE 02-1347	"DMED090013" to "DMED090021" were moved from page MNTE 02-1346.	AD
						"DMED090022" and "DMED0A000B" to "DMED0A000D" were added.	AD
						"DMED0F0001" to "DMED300009" were moved to page MNTE 02-1348.	DL
					MNTE 02-1348	"DMED0F0001" to "DMED300009" were moved from page MNTE 02-1347.	AD
						"DMED400022" to "DMES011903" were moved to page MNTE 02-1350.	DL
					MNTE 02-1350	"DMED400022" to "DMES011903" were moved from page MNTE 02-1348.	AD
						"DMES031104" to "DMES043200" were moved to page MNTE 02-1351.	DL
					MNTE 02-1351	"DMES031104" to "DMES043200" were moved from page MNTE 02-1350.	AD
						"DMES04F631" to "DMES051A00" were moved to page MNTE 02-1352.	DL
					MNTE 02-1352	"DMES04F631" to "DMES051A00" were moved from page MNTE 02-1351.	AD
						"DMES059536" to "DMES05955D" were moved to page MNTE 02-1353.	DL
					MNTE 02-1353	"DMES059536" to "DMES05955D" were moved from page MNTE 02-1352.	AD
						"DMES059580" to "DMES05EA16" were moved to page MNTE 02-1354.	DL
					MNTE 02-1354	"DMES059580" to "DMES05EA16" were moved from page MNTE 02-1353.	AD
						"DMES068201" to "DMES0BC002" were moved to page MNTE 02-1355.	DL
					MNTE 02-1355	"DMES068201" to "DMES068201" were moved from page MNTE 02-1354.	AD
					MNTE 02-1510	"When restarting ..." was moved onto one line.	CH
					MNTE 02-1551	"W3360x" to "HD27xx" Message display were added. (New page)	AD
					MNTE 02-1552	New page was added. (MNTE 02-1560 page was moved, and description of flow was added.)	AD
					MNTE 02-1560	[Recovery measures] was moved to page MNTE 02-1552.	DL
						Description of flow was change.	

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1570	Reference page "2.6" addition.	AD
						"FAIL LED" was changed to "CALM LED".	CH
					MNTE 02-1790	"Use a tool... diameter)." was added to (b) (ii).	AD
					MNTE 02-1980	"Use a tool... diameter)." was added to (4).	AD
					MNTE 02-2190, MNTE 02-2221, MNTE 02-2260	Procedure (e) was added.	AD
					MNTE 02-2270	"Use a tool... diameter)." was added to (a).	AD
					MNTE 02-2300	"Use a tool... diameter)." was added to (a).	AD
						(c) was moved to page MNTE 02-2301.	DL
					MNTE 02-2301	(c) was moved from page MNTE 02-2300.	AD
						(e)(f) were moved to page MNTE 02-2302.	DL
					MNTE 02-2302	(e)(f) were moved from page MNTE 02-2301.	AD
						(c) was moved to page MNTE 02-2303.	DL
					MNTE 02-2303	(c) was moved from page MNTE 02-2302.	AD
						(d)(e) were moved to page MNTE 02-2304.	DL
					MNTE 02-2304	(4)-(a)(b) were moved from page MNTE 02-2303.	AD
						(4)-(a)(b) were moved to page MNTE 02-2305.	DL
					MNTE 02-2305, MNTE 02-2306, MNTE 02-2307, MNTE 02-2308	These pages were newly added.	AD
					MNTE 02-2305	"Use a tool... diameter)." was added to (a).	AD
					MNTE 02-2600	Description of code "33 to 36" was divided to "33 to 34", "35 01", "36".	CH
					MNTE 02-2813	"090022" was added.	AD
						"0A0003" was moved to page MNTE 02-2814.	DL
					MNTE 02-2814	"0A0003" was moved from page MNTE 02-2813.	AD
						Recovery procedure of "0E0001" was changed.	CH
					MNTE 02-2815	"110001" to "130001" were added.	AD
						"300008" to "30000A" were moved to page MNTE 02-2816.	DL
					MNTE 02-2816	"300008" to "30000A" were moved from page MNTE 02-2815.	AD
					MNTE 02-2910	Description was added to (h)-①.	AD
					MNTE 04-0100	"(1)" was added to the Table title.	AD
					MNTE 04-0111, MNTE 04-0112	Table 4.2.1.1 was added. (New pages)	AD
					MNTE 04-0130	"Drive Performance Delay Diagnostic Function" was added at No.11.	AD
					MNTE 04-0670 to MNTE 04-0700	These pages were newly added.	AD
					MNTE 05-0040	"Fig.1.1.3" was changed to "Fig.5.1.3 and Fig.5.1.3.1".	CH
					MNTE 05-0150, MNTE 05-0161	Reference of ‡2 was changed.	CH
					MNTE 05-0170	‡1, ‡2 and ‡3 were deleted.	DL
					MNTE 05-0180	Disk Array Management Program 3 was added to description of ‡1.	AD
					MNTE 05-0251	Description of Microprogram revision was added to Figure 5.3.2.	AD
						Figure 5.3.2.1 was added.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0430	"Use a tool... diameter)." was added to (a).	AD
					MNTE 05-0444	"Use a tool... diameter)." was added to (a).	AD
					MNTE 05-0520	"Use a tool... diameter)." was added to (a).	AD
					MNTE 05-0534	"Use a tool... diameter)." was added to (a).	AD
					MNTE 05-0600	"Use a tool... diameter)." was added to (a).	AD
					MNTE 06-0010	"Use a tool... diameter)." was added to Flow Chart.	AD
					MNTE 08-0042, MNTE 08-0061, MNTE 08-0064, MNTE 08-0070, MNTE 08-0076	(*1) was added.	AD
					WEB 01-0020, WEB 03-0160, APP A-0000, APP A-0020, APP A-0030, APP A-0040	"Disk Array Management Program 2" was changed to "Disk Array Management Program".	CH
					WEB 01-0001, MNTE 01-0002	System version "x659" → "x659/M".	CH
					WEB 02-0050	BD icon was added.	AD
						Disk Drive (S-ATA) was move to page WEB 02-0060	DL
					WEB 02-0060	Disk Drive (S-ATA) was move from page WEB 02-0050	AD
					WEB 02-0071	Parts Information (Ver 0659/M) was added.	AD
						Description of CTL/Cache/Loop/ Battery was moved to page WEB 02-0072.	DL
					WEB 02-0072	Description of CTL/Cache/Loop/ Battery was moved from page WEB 02-0071.	AD
					WEB 02-0080	BD icon was added to Table (2).	AD
						(2) was changed to (3).	CH
						Control Unit was moved to page WEB 02-0090.	DL
					WEB 02-0090	Control Unit was moved from page WEB 02-0080.	AD
						(3) to (7) were changed to (4) to (8).	CH
						ENC Unit was moved to page WEB 02-0091.	DL
					WEB 02-0091	ENC Unit was moved from page WEB 02-0090.	AD
						(8) to (10) were changed to (9) to (11).	CH
					WEB 02-0170 to WEB 02-0190	These pages were newly added.	AD
					WEB 03-0000	"Use a tool... diameter)." was added to (2).	AD
					WEB 03-0290, WEB 03-0310, WEB 03-0330, WEB 03-0341	Clear the cache procedure was added.	AD
					WEB 03-0300, WEB 03-0320, WEB 03-0340, WEB 03-0342	Correction was procedure No.	CR
					APP A-0020 to A-0040	Added "When using the IO…".	AD
					APP A-0020 to A-0040	Added "Up to 256 LUs from…".	AD
					APP A-0030	*10 was added.	AD
					APP C-0060, APP C-0070	System version "x659" was added.	AD
20	Nov.10.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.19 → Rev.20	CH
					GENE 0140	Title of 2.4.3 was changed.	CH
					INTO 04-0100	"unque" and "pept" were corrected to "unique" and "kept" in (1).	CR
					INST 03-0010	Work-17 and Work-18 were replaced.	CH
					INST 03-0750	(‡1) was changed to (f) from (e).	CH
					INST 03-0760	(‡1) was added to (b) of (1) to (4).	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 05-0470	“NOTE : • RAID group ...” was added.	AD
					INST 05-0600	“NOTE : • LU cannot ...” was added.	AD
					INST 05-0621	“NOTE : “Invalidate LU”...” was added.	AD
					INST 05-0625	“NOTE : “Reallocate LU”...” was added.	AD
					INST 06-0720, INST 06-1030, INST 06-1291, INST 06-1650	“Do not connect the added ... ENC cables now” was corrected to “Connect the added ... ENC cables” in Figure.	CR
					INST 09-0031	(d) was deleted.	DL
					MNTE 01-0010	(3) was changed.	CH
					MNTE 01-0060	Rev.G or later of Power Unit was added.	AD
					MNTE 01-0070	Figure size of Power Unit was changed.	CH
					MNTE 02-0020, MNTE 02-0030	The "Front view" in a figure was changed into the "Rear view".	CH
					MNTE 02-0081, MNTE 02-0082	System version “x659/M” → “x659/Q”.	CH
					MNTE 02-0140	"Cache Unit" in a table was changed into "Control Unit."	CH
					MNTE 02-0260, MNTE 02-0970, MNTE 02-0980, MNTE 02-0990, MNTE 02-0991, MNTE 02-1050, MNTE 02-1060, MNTE 02-1091, MNTE 02-1092, MNTE 02-1321	Description of “2.4.3 Procedure for Recovery from Path Blockade…” in the “Recovery measures” was changed.	CH
					MNTE 02-0730, MNTE 02-0740, MNTE 02-0943, MNTE 02-0995	A ruled line is corrected into a dotted line from a solid line.	CR
					MNTE 02-0962	“I60D0x” was added.	AD
						“I61000” was moved to page MNTE 02-0970.	DL
					MNTE 02-0970	“I61000” was moved from page MNTE 02-0962.	AD
					MNTE 02-0991	“I6D20x” was deleted.	DL
					MNTE 02-1330	Description of the “recovery measures” of the upper three items was changed.	CH
					MNTE 02-1410	(*3) was deleted.	DL
					MNTE 02-1450	"B" in an object was changed into "A".	CH
					MNTE 02-1930	(*1) was added.	AD
					MNTE 02-2030	Title of 2.4.3 was changed.	CH
					MNTE 02-2190, MNTE 02-2200, MNTE 02-2210, MNTE 02-2221, MNTE 02-2230, MNTE 02-2240, MNTE 02-2250, MNTE 02-2302, MNTE 02-2303, MNTE 02-2304, MNTE 02-2305, MNTE 02-2306, MNTE 02-2307, MNTE 02-2308	Description of the “Microprogram revision x659/Q or later” of the procedures was changed.	CH
					MNTE 02-2191, MNTE 02-2211, MNTE 02-2291, MNTE 02-2309	These pages were newly added.	AD
					MNTE 02-2220, MNTE 02-2260	Description of the “Notices on the support browser” was changed.	CH
					MNTE 02-2820	Description was changed in the flow chart.	CH
					MNTE 02-2830	"5.3.5 Replacing Controller" was changed into "5.3.5 Replacing Control Unit".	CH
					MNTE 04-0670	The lead sentence was changed.	CH
					MNTE 04-0690, MNTE 04-0700	Changed Screen and NOTE.	CH

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0260	Description of “five” was corrected to “ten” on table.	CR
						“The Cache... promptly.” was added to Restriction (RK/RKD/RKS/RKSD) on table.	AD
					MNTE 07-0100	“It is no ... job).” was changed to “The Backup Battery Unit ... lowered. ”.	CH
					MNTE 08-0022, MNTE 08-0032	“Rev.G or later” of Power Unit was added.	AD
					MNTE 09-0000	USB memory was added to the maintenance tools.	AD
					WEB 01-0001, WEB 01-0002	System version “x659/M” → “x659/Q”.	CH
					WEB 01-0010	Description of the “Notices on the support browser” was changed.	CH
					WEB 01-0011, WEB 01-0012	These pages were newly added.	AD
					WEB 02-0120, WEB 02-0130, WEB 02-0140, WEB 02-0150, WEB 03-0290, WEB 03-0300, WEB 03-0310, WEB 03-0320, WEB 03-0340, WEB 03-0341, WEB 03-0342	Description of the “Microprogram revision x659/Q or later” of the procedures was changed.	CH
					WEB 02-0121, WEB 02-0131, WEB 02-0141, WEB 02-0151, WEB 03-0291, WEB 03-0301, WEB 03-0311, WEB 03-0321, WEB 03-0331, WEB 03-0332	These pages were newly added.	AD
					WEB 03-0000	Corrected procedure (b).	CR
21	Des.27.2004	N.Higashijima	N.Higashijima	M.Kobayashi	GENE 0000	Rev.20→ Rev.21	CH
					MNTE 02-0764	“HH4100” was added.	AD
						“HI0100” to “HI0420” were moved to page MNTE 02-0770.	DL
					MNTE 02-0770	“HI0100” to “HI0420” were moved from page MNTE 02-0764.	AD
						“HJ07xx” to “HJ0Axx” were moved to page MNTE 02-0780.	DL
					MNTE 02-0780	“HJ07xx” to “HJ0Axx” were moved from page MNTE 02-0770.	AD
						“HJ14xx” to “HJ17xx” were moved to page MNTE 02-0790.	DL
					MNTE 02-0790	“HJ14xx” to “HJ17xx” were moved from page MNTE 02-0780.	AD
						“HJ1Fxx” to “HJ22xx” were moved to page MNTE 02-0800.	DL
					MNTE 02-0800	“HJ1Fxx” to “HJ22xx” were moved from page MNTE 02-0790.	AD
						“HJ2Cxx” to “HJ32xx” were moved to page MNTE 02-0801.	DL
					MNTE 02-0801	“HJ2Cxx” to “HJ32xx” were moved from page MNTE 02-0800.	AD
22	Jan.17.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	GENE 0000	Rev.21 → Rev.22	CH
					GENE 0100	5.8 was added.	AD
					GENE 0160	6.1.5 was added.	AD
					INST 03-0750, INST 03-0751, INST 03-0752, INST 03-0753	Added the procedure of SENC firmware automatic download.	AD
					INST 04-0010, INST 04-0140	“When it is...” was added.	AD
					INST 05-0651	“If LU to be…” was added at Restriction of No.2.	AD
					INST 05-0652	“When two or more…” was added at NOTE.	AD
					INST 05-1520, INST 05-1530, INST 05-1540, INST 05-1550	These pages were newly added. (5.8 was added)	AD
					INST 06-0000, INST 06-0540, INST 06-0850, INST 06-0680, INST 06-0990, INST 06-1090, INST 06-1250, INST 06-1440, INST 06-1610	Added the procedure of SENC firmware automatic download.	AD

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-1670	Figure 6.9.9 was corrected. (cable)	CR
					MNTE 01-0010, MNTE 01-0080	Added the procedure of SENC firmware automatic download.	AD
					MNTE 01-0060	"It will be..." was deleted.	DL
					MNTE 02-0081, MNTE 02-0082	x659/Q → x65A	CH
					MNTE 02-0641	"HA060x" was added.	AD
					MNTE 02-0660	"Recovery measures ①" of "HE03HH" or "HE030x" was changed.	CH
					MNTE 02-0764	"Recovery measures ③" of "HE4E00" was changed.	CH
					MNTE 02-0994	"I6DU00", "I6DV00" and "I6DW00" were added.	AD
						"I6DY00" was moved to page MNTE 02-0995.	DL
					MNTE 02-0995	"I6DY00" was moved from page MNTE 02-0994.	AD
					MNTE 02-0996	"I6E100" to "I6E408" were added.	AD
						Added the procedure of SENC firmware automatic download.	AD
					MNTE 02-1042	"I83B00" and "I83C00" were added.	AD
						"I841HH" and "I841xy" were moved to page MNTE 02-1043.	DL
					MNTE 02-1043	This page was newly added. ("I841HH" and "I841xy" were moved from page MNTE 02-1042.)	AD
					MNTE 02-1044	This page was newly added.	AD
					MNTE 02-1110	"Recovery measures ⑤" of "IY03HH" or "IY03xy" was changed.	CH
					MNTE 02-1300	"[RKA]" and "[RKAAT]" were added to "W050xy".	AD
						"W05100" and "W052HH" were moved to page MNTE 02-1310.	DL
					MNTE 02-1310	"W05100" and "W052HH" were moved from page MNTE 02-1300.	AD
						"[RKA]" and "[RKAAT]" were added to "W052HH". "[RKA]" was added to "W060HH".	AD
						"W060xy" to "W061xy" were moved to page MNTE 02-1311.	DL
					MNTE 02-1311	"W060xy" to "W061xy" were moved from page MNTE 02-1310.	AD
						"[RKA]" was added to "W060xy", "W061HH" and "W061xy".	AD
						"W071HH" to "W073xy" were moved to page MNTE 02-1312.	DL
					MNTE 02-1312	"W071HH" to "W073xy" were moved from page MNTE 02-1311.	AD
					MNTE 02-1320	"[RKA]" was added to "W090AT", "W090HH" and "W090xy".	AD
						A description, "the cable connection," in the procedure for recovery from "W090AT," "W090HH," and "W090xy" is changed to "all the ENC cable connections".	AD
					MNTE 02-1347	"DMED090023" was added.	AD
						"DMED0E0001" was moved to page MNTE 02-1348.	DL
					MNTE 02-1348	"DMED0E0001" was moved from page MNTE 02-1347.	AD
						"DMED400021" was moved to page MNTE 02-1350.	DL

Copyright © 2004, 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1350	"DMED400021" was moved from page MNTE 02-1348.	AD
						"DMED700001", "DMED700002" and "DMES019621"were added.	AD
						"DMES02959A" to "DMES031102" were moved to page MNTE 02-1351.	DL
					MNTE 02-1351	"DMES02959A" to "DMES031102" were moved from page MNTE 02-1350.	AD
						"DMES04F400" to "DMES04F630" were moved to page MNTE 02-1352.	DL
					MNTE 02-1352	"DMES04F400" to "DMES04F630" were moved from page MNTE 02-1351.	AD
						"DMES059530" to "DMES059535" were moved to page MNTE 02-1353.	DL
					MNTE 02-1353	"DMES059530" to "DMES059535" were moved from page MNTE 02-1352.	AD
						"DMES05957A" to "DMES05957F" were moved to page MNTE 02-1354.	DL
					MNTE 02-1354	"DMES05957A" to "DMES05957F" were moved from page MNTE 02-1353.	AD
						"DMES05961F", "DMES05EA40" and "DMES05EA41" were added.	AD
						"DMES05EB04" to "DMES068200" were moved to page MNTE 02-1355.	DL
					MNTE 02-1355	"DMES05EB04" to "DMES068200" were moved from page MNTE 02-1354.	AD
					MNTE 02-1363, MNTE 02-1365, MNTE 02-1366, MNTE 02-1410, MNTE 02-1430, MNTE 02-1440, MNTE 02-1450, MNTE 02-1460, MNTE 02-1470, MNTE 02-1480, MNTE 02-1490, MNTE 02-1510, MNTE 02-1570, MNTE 02-1571, MNTE 02-1573, MNTE 02-1575, MNTE 02-2380, MNTE 02-2390	"When it is..." was added.	AD
					MNTE 02-1372	No.30 and 31 were added of (c).	AD
					MNTE 02-1790, MNTE 02-2020, MNTE 02-2341	Added the procedure of SENC firmware automatic download.	AD
					MNTE 02-2370	"A"→"B" at flowchart.	CH
					MNTE 02-2371	"Is the subsystem RKAAT…" was added.	AD
					MNTE 02-2372	RKAAT/RKAATL was deleted at *1.	DL
					MNTE 02-2373	"From MNTE 02-2371" was added.	AD
					MNTE 02-2480	No.4 and No.5 were deleted. (The item number is changed afterwards.)	DL/CH
					MNTE 02-2490	Item numbers were changed.	CH
					MNTE 02-2660	Sense Key of Sense code "90 01" was changed (4→ 3 /4)	CH
					MNTE 02-2710	"95 81" of Sense code was added.	AD
						"95 91" of Sense code was moved to page MNTE 02-2720.	DL
					MNTE 02-2720	"95 91" of Sense code was moved from page MNTE 02-2710.	AD
						"96 04" of Sense code was moved to page MNTE 02-2730.	DL
					MNTE 02-2730	"96 04" of Sense code was moved from page MNTE 02-2720.	AD
						"96 19" of Sense code was moved to page MNTE 02-2731.	DL

Copyright © 2005, Hitachi, Ltd.

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2731	"96 19" Sense code of was moved from page MNTE 02-2730.	AD
						"96 1F" and "96 20" of Sense code were added.	AD
					MNTE 02-2770	"EA 40" and "EA 41" of Sense code were added.	AD
						"F6 70" and "F6 71" of Sense code were moved to page MNTE 02-2780.	DL
					MNTE 02-2780	"F6 70" and "F6 71" of Sense code were moved from page MNTE 02-2770.	AD
						"F8 0B", "F8 0C" and "F8 0D" of Sense code were moved to page MNTE 02-2790.	DL
					MNTE 02-2790	"F8 0B", "F8 0C" and "F8 0D" of Sense code were moved from page MNTE 02-2780.	AD
						"FC 00", "FD 00" and "FD 01" of Sense code were moved to page MNTE 02-2791.	DL
					MNTE 02-2791	This page was newly added. ("FC 00", "FD 00" and "FD 01" of Sense code were moved from page MNTE 02-2790.)	AD
					MNTE 02-2792	This page was newly added.	AD
					MNTE 02-2811	"Recovery procedure" of 08001C was changed.	CH
						"080020" was added.	AD
						"080023" was moved to page MNTE 02-2812.	DL
					MNTE 02-2812	"080023" was moved from page MNTE 02-2811.	AD
						"080021" and "080022" o were added.	AD
						"09000E" to "090011" were moved to page MNTE 02-2813.	DL
					MNTE 02-2813	"09000E" to "090011" were moved from page MNTE 02-2812.	AD
						"09001F" to "0A0002" were moved to page MNTE 02-2814.	DL
					MNTE 02-2814	"09001F" to "0A0002" were moved from page MNTE 02-2813.	AD
						"090020", "090021", "090023" and "0A000B" were added.	AD
						"0B0001" to "0F0003" were moved to page MNTE 02-2815.	DL
					MNTE 02-2815	"0B0001" to "0F0003" were moved from page MNTE 02-2814.	AD
						"0A000C", "0A000D" and "0C0003" were added.	AD
						"100004" to "300007" were moved to page MNTE 02-2816.	DL
					MNTE 02-2816	"100004" to "300007" were moved from page MNTE 02-2815.	AD
						"400001" to "400011" were moved to page MNTE 02-2817.	DL
					MNTE 02-2817	"400001" to "400011" were moved from page MNTE 02-2816.	AD
						"400013" to "500001" were moved to page MNTE 02-2818.	DL

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2818	"400013" to "500001" were moved from page MNTE 02-2817.	AD
						"600001", "700001" and "700002" were added.	AD
					MNTE 05-0020, MNTE 05-0141, MNTE 05-0150, MNTE 05-0161, MNTE 05-0260, MNTE 05-0281, MNTE 05-0290, MNTE 05-0320, MNTE 05-0330, MNTE 05-0332, MNTE 05-0340, MNTE 05-0350, MNTE 05-0360, MNTE 05-0370, MNTE 05-0371, MNTE 05-0374, MNTE 05-0377, MNTE 05-0390, MNTE 05-0410, MNTE 05-0440, MNTE 05-0442, MNTE 05-0445, MNTE 05-0460, MNTE 05-0462, MNTE 05-0464, MNTE 05-0466, MNTE 05-0480, MNTE 05-0500, MNTE 05-0530, MNTE 05-0532, MNTE 05-0535, MNTE 05-0550, MNTE 05-0552, MNTE 05-0570, MNTE 05-0590, MNTE 05-0610, MNTE 05-0630, MNTE 05-0650, MNTE 05-0660, MNTE 05-0670, MNTE 05-0680, MNTE 05-0691, MNTE 05-0692, MNTE 05-0693, MNTE 05-0694, MNTE 05-0720, MNTE 05-0760	Added the procedure of SENC firmware automatic download.	AD
					MNTE 05-0020	(14) was added.	AD
					MNTE 05-0040, MNTE 05-0070	"When it is..." was added.	AD
					MNTE 05-0110	"141.3G" was corrected to "143.3G"	CR
					MNTE 06-0000, MNTE 06-0010, MNTE 06-0060, MNTE 06-0110	Added the procedure of SENC firmware automatic download.	AD
					MNTE 06-0140	"When it is..." was added.	AD
					MNTE 06-0111 to MNTE 06-0114	These pages were newly added.	AD
					MNTE 08-0022, MNTE 08-0032	"It will be..." was deleted.	DL
					MNTE 09-0000	Phillips screwdriver (No.1) was added	AD
					WEB 01-0001, WEB 01-0002	"x659/Q"→"x65A"	CH
					APP A-0020, APP A-0030	"Also, refer…" was added at *2.	AD
23	Mar.17.2005	A.Hirasawa	A.Hirasawa	Y.Takeuchi	ALL	"Hitachi Proprietary" was added to header.	AD
					GENE 0000	Rev.22 → Rev.23	CH
					GENE 0020	The frame of "General Cautionary Notes" was shortened.	CH
					GENE 0030	Description of RKAJAT was added.	AD
					GENE 0040, GENE 0100, GENE 0110, GENE 0120, GENE 0130	Description of RKAJAT and RKAJATL were added.	AD
					GENE 0120	"9.3.3"to"9.3.5" was moved to GENE 0130.	DL
					GENE 0130	"9.3.3"to "9.3.5" was moved from GENE 120.	AD
						INST 09-0221 → INST 09-0222	CH
					GENE 0170	Changed page number at 8.3.	CH
						7.3.2, 7.4.2 were added.	AD
					SAFE 0090, SAFE 0120, SAFE 0222, SAFE 0230, SAFE 0240	Description of RKAJAT and RKAJATL were added.	AD
					INTO 02-0010, INTO 02-0020, INTO 02-0040, INTO 02-0041, INTO 02-0050, INTO 02-0060, INTO 02-0070, INTO 02-0080, INTO 02-0090, INTO 02-0091, INTO 02-0092, INTO 02-0093, INTO 02-0124, INTO 02-0140, INTO 02-0141, INTO 02-0142, INTO 02-0152, INTO 02-0154, INTO 02-0180, INTO 02-0200, INTO 02-0210, INTO 02-0220	Description of RKAJAT and RKAJATL were added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INTO 02-0060, INTO 02-0140, INTO 02-0141, INTO 02-0142, INTO 02-0150, INTO 02-0151	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					INTO 02-0223, INTO 02-0224, INTO 02-0225, INTO 02-0230, INTO 02-0240, INTO 02-0250, INTO 02-0260, INTO 03-0002, INTO 03-0003, INTO 03-0200, INTO 03-0210, INTO 03-0220, INTO 03-0230, INTO 03-0240, INTO 03-0250, INTO 03-0260, INTO 03-0270, INTO 03-0280, INTO 03-0290, INTO 03-0300, INTO 03-0310	Description of RKAJAT and RKAJATL were added.	AD
					INTO 03-0010, INTO 03-0050, INTO 03-0090, INTO 03-0120, INTO 03-0160, INTO 03-0200, INTO 03-0240, INTO 03-0280	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					INTO 03-0030	A part of ruled line in the table was changed.	CH
					INTO 04-0010, INTO 04-0020, INTO 04-0030, INTO 04-0040, INTO 04-0044, INTO 04-0045, INTO 04-0046, INTO 04-0047, INTO 04-0048, INTO 04-0049, INTO 04-0180, INTO 04-0181, INTO 04-0182, INTO 04-0200	Description of RKAJAT and RKAJATL were added.	AD
					INTO 04-0041	“disk drive” was changed to “Disk Drive”.	CH
					INST 01-0000, INST 01-0040, INST 01-0043, INST 01-0044, INST 01-0045, INST 01-0080, INST 01-0130, INST 01-0140, INST 01-0150, INST 01-0151, INST 01-0160, INST 01-0201, INST 01-0202, INST 01-0210, INST 01-0211, INST 01-0212, INST 01-0220, INST 01-0310, INST 01-0320	Description of RKAJAT and RKAJATL were added.	AD
					INST 01-0130, INST 01-0140	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						Description of ATE250R was added.	AD
					INST 01-0150	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						Description of ATE250LR was added.	AD
					INST 01-0150	Table 1.6.3.1 was moved to page INST 01-0151.	DL
					INST 01-0151	This page was newly added. (Table 1.6.3.1 was moved form page INST 01-0150)	AD
					INST 01-0152	This page was newly added.	AD
					INST 01-0201	This page was newly added. (Figure 1.7.4 was added.)	AD
					INST 01-0202	This page was newly added. (Figure 1.7.5 was moved from INST 01-0210.)	AD
					INST 01-0210	Figure 1.7.5 was moved to INST 01-0202.	DL
						Figure 1.7.6 was added.	AD
					INST 01-0211	Figure 1.7.5 was changed to 1.7.7	CH
					INST 01-0212	Figure 1.7.8 was added.	AD
					INST 01-0240, INST 01-0250, INST 01-0271, INST 01-0273, INST 01-0300, INST 01-0311	Description of Version 1.5 was added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 01-0242, INST 01-0250, INST 01-0252, INST 01-0261, INST 01-0260, INST 01-0270, INST 01-0272, INST 01-0274, INST 01-0280, INST 01-0290, INST 01-0300	Description of Version 2.0 was added.	AD
					INST 01-0250	(5) was moved to page INST 01-0251.	DL
					INST 01-0251	This page was newly added. ((5) was moved from page INST 01-0242.)	AD
					INST 01-0252, INST 01-0261	This page was newly added.	AD
					INST 01-0262	This page was newly added. ((7) was moved from page INST 01-0270.)	AD
					INST 01-0270	(7) was moved to page INST 01-0262.	DL
					INST 01-0272	(9) was moved to page INST 01-0273.	DL
					INST 01-0273	This page was newly added. ((9) was moved from page INST 01-0272.)	AD
					INST 01-0310	(12) and (13) were moved to page INST 01-0311.	DL
					INST 01-0311	This page was newly added. ((12) and (13) were moved from page INST 01-0310.)	AD
					INST 01-0312	This page was newly added.	AD
					INST 01-0320	(1) to (3) were moved to page INST 01-0330.	DL
						NOTE was added.	AD
					INST 01-0330	(4) and (5) were moved to page INST 0340.	DL
						(1) to (3) were moved from page INST 01-0320.	AD
					INST 01-0340	(6) to (10) were moved to page INST 01-0350.	DL
						(4) and (5) were moved from page INST 0330.	AD
					INST 01-0350	(11) was moved to page INST 01-0360	DL
						(6) to (10) were moved from page INST 01-0340.	AD
					INST 01-0360	This page was newly added. ((11) was moved from page INST 01-0360.)	AD
					INST 02-0180, INST 02-0181	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					INST 02-0320	"The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted." was added as annotation.	AD
					INST 02-0370, INST 02-0371	Description of "PDY" was corrected to "RDY".	CR
					INST 03-0010	"Slotted screwdriver" for setting Device ID was added.	AD
					INST 03-0310, INST 03-0370, INST 03-0380, INST 03-0401, INST 03-0402, INST 03-0411, INST 03-0460, INST 03-0470, INST 03-0480, INST 03-0481, INST 03-0490, INST 03-0510, INST 03-0520, INST 03-0530, INST 03-0600, INST 03-0611, INST 03-0630, INST 03-0641, INST 03-0642, INST 03-0643, INST 03-0644, INST 03-0650, INST 03-0654, INST 03-0655, INST 03-0656, INST 03-0680, INST 03-0690, INST 03-0691, INST 03-0693, INST 03-0694	Description of RKAJAT and RKAJATL were added.	AD
					INST 03-0340	The character the link ahead was changed to blue.	CH

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 03-0410	Description of “Fan Assembly” was added to Table 3.4.2 and Table 3.4.4.	AD
					INST 03-0480	“(c)” was moved to INST 03-0481.	DL
					INST 03-0481	“(c)” was moved from INST 03-0480.	AD
					INST 03-0490	Figure 3.4.8 was changed.	CH
					INST 03-0491, INST 03-0492	These pages were added. ((6-2)was added.)	AD
					INST 03-0630	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					INST 03-0641	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						Description of ATE250R and ATE250RL were added.	AD
					INST 03-0643	Figure 3.5.3 was moved to INST 03-0644.	DL
					INST 03-0644	Figure 3.5.3 was moved from INST 03-0643.	AD
					INST 03-0654	Figure 3.6.1.5 was moved to INST 03-0655.	DL
						Figure 3.6.1.4 was added.	AD
					INST 03-0655	This page was newly added. (Figure 3.6.1.5 was moved from INST 03-0654.)	AD
					INST 03-0656	This page was newly added (Figure 3.6.1.6 was added.)	AD
					INST 03-0670	Title of Figure was added RK/RKL.	AD
					INST 03-0671	Title of Figure was added RKH/RKHE.	AD
					INST 03-0680, INST 03-0682, INST 03-0683, INST 03-0684, INST 03-0690, INST 03-0691, INST 03-0692, INST 03-0693, INST 03-0694, INST 03-0695, INST 03-0696	“The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted.” was added as annotation.	AD
					INST 03-0693	“(4)” was moved to INST 03-0694.	DL
						Figure 3.6.4.3 was added.	AD
					INST 03-0694	“(4)” was moved from INST 03-0693.	AD
					INST 03-0695	Figure 3.6.4.3 was changed to 3.6.4.4.	CH
					INST 03-0695, INST 03-0696, INST 03-0700, INST 03-0714, INST 03-0752, INST 03-0753, INST 03-0754, INST 03-0755, INST 03-0760	Description of RKAJAT and RKAJATL were added.	
					INST 03-0696	Figure 3.6.4.5 was added.	AD
					INST 03-0700, INST 03-0714	Description of electric power was corrected.	CR
					INST 03-0750, INST 03-0751, INST 03-0752, INST 03-0753, INST 03-0754, INST 03-0755	Description of “PDY” was corrected to “RDY”.	CR
					INST 03-0753	“(4)” was moved to INST 03-0754.	DL
						Figure 3.8.1.3 was added.	AD
						Description of “PDY” was corrected to “RDY”.	CR
					INST 03-0754	“(4)” was moved from INST 03-0753.	AD
					INST 03-0755	This page was newly added. (Figure 3.8.1.5 was added.)	AD
					INST 03-0756	This page was newly added.	AD
					INST 05-0220	① sentences were added.	AD
					INST 05-0570, INST 05-0571, INST 05-0572	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					INST 05-0623	(1) was changed.	CH
					INST 05-0624	(c) moved to INST 05-0623.	CH
					INST 05-0651	The appearance of the table was straightened.	CH

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0010, INST 06-0020, INST 06-0040, INST 06-0050, INST 06-0060, INST 06-0061,, INST 06-0090, INST 06-0100, INST 06-0140, INST 06-0150, INST 06-0160, INST 06-0163 INST 06-0164, INST 06-0170, INST 06-0180, INST 06-0220, INST 06-0270, INST 06-0291, INST 06-0293, INST 06-0480, INST 06-0500, INST 06-1080, INST 06-1090, INST 06-1100, INST 06-1110, INST 06-1120, INST 06-1130, INST 06-1170, INST 06-1180, INST 06-1181, INST 06-1190, INST 06-1200, INST 06-1201, INST 06-1202, INST 06-1210, INST 06-1220, INST 06-1230, INST 06-1240, INST 06-1250, INST 06-1280, INST 06-1290, INST 06-1291, INST 06-1292, INST 06-1300, INST 06-1310, INST 06-1311, INST 06-1312, INST 06-1320, INST 06-1330, INST 06-1340, INST 06-1350, INST 06-1360, INST 06-1370, INST 06-1380, INST 06-1390, INST 06-1400, INST 06-1410, INST 06-1420, INST 06-1430, INST 06-1440, INST 06-1450, INST 06-1460, INST 06-1470, INST 06-1490, INST 06-1520, INST 06-1530, INST 06-1531, INST 06-1540, INST 06-1541, INST 06-1542, INST 06-1550, INST 06-1580, INST 06-1590, INST 06-1600, INST 06-1610, INST 06-1640, INST 06-1641, INST 06-1650, INST 06-1660, INST 06-1670, INST 06-1671, INST 06-1672, INST 06-1680, INST 06-1690, INST 06-1700, INST 06-1710, INST 06-1720, INST 06-1730, INST 06-1740, INST 06-1750, INST 06-1760, INST 06-1770, INST 06-1780	Description of RKAJAT and RKAJATL were added.	AD
					INST 06-0010	The the lower notes was moved to upper row note.	CH
					INST 06-0020	The the lower notes was moved to upper row note.	CH
						“Work-10” was moved to INST 06-0030.	CH
					INST 06-0030	“Work-10” was moved from INST 06-0020.	CH
					INST 06-0050, INST 06-0100	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						Description of ATE250R and ATE250RL were added.	AD
					INST 06-0070	A part of content of “Phillips screwdriver” was changed.	CH
						“Slotted screwdriver” was added.	AD
					INST 06-0120	“Controller#” was changed to “Control Unit#”.	CH

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 06-0163	Figure 6.4.2.3 was moved to INST 06-0164	DL
					INST 06-0164	Figure 6.4.2.3 was moved from INST 06-0164 as Figure 6.4.2.4.	AD
					INST 06-0200	The appearance of figure was straightened.	CH
					INST 06-0291	"NOTE : DF-F600-ATE250R... RKAAT/RKAATL." was added.	AD
						Figure 6.4.4.1 was moved to page INST 06-0292.	DL
						"disk drive" was changed to "Disk Drive".	CH
					INST 06-0292	Figure 6.4.4.1 was moved from page INST 06-0291.	AD
					INST 06-0330	The appearance of Note was straightened.	CH
					INST 06-0360	"powering on/off including the rear switch" was added to Restriction of (2).	AD
					INST 06-0390	"•All ... turned off." was added to (5)	AD
					INST 06-0620, INST 06-0720, INST 06-0730, INST 06-0930, INST 06-1030, INST 06-1040, INST 06-1190, INST 06-1200, INST 06-1201, INST 06-1300, INST 06-1310, INST 06-1311, INST 06-1531, INST 06-1540, INST 06-1541, INST 06-1660, INST 06-1670, INST 06-1671, INST 06-1850	"The blind has the metal type to be fixed with the thumb screw and the rubber cap type to be inserted." was added as annotation.	AD
					INST 06-0840	The error correction was done.	CH
					INST 06-1201	This page was newly added. (Figure 6.8.5.1 was added.)	AD
					INST 06-1202	This page was newly added. ("(5)","(6)" and Figure 6.8.6 were moved from INST 06-1210.)	AD
					INST 06-1210	"(5)","(6)" and Figure 6.8.6 were moved to INST 06-1202.	DL
						Figure 6.8.6.1 was added.	AD
					INST 06-1311	This page was newly added. (Figure 6.8.9.1 was added.)	AD
					INST 06-1312	This page was newly added. ("(4)" and Figure 6.8.10 were moved from INST 06-1320.)	AD
					INST 06-1320	"(4)",Figure 6.8.10 were moved to INST 06-1312.	DL
						Figure 6.8.10.1	AD
					INST 06-1541	This page was newly added. (Figure 6.9.5.1 was added.)	AD
					INST 06-1542	This page was newly added. ("(5)","(6)" and Figure 6.9.6 were moved from INST 06-1550.)	AD
					INST 06-1550	"(5)","(6)" and Figure 6.9.6 were moved to INST 06-1542.	DL
						Figure 6.9.6.1 was added.	AD
					INST 06-1671	Figure 6.9.9.1 was added. (New page)	AD
					INST 06-1672	This page was newly added. ("(4)" and Figure 6.9.10 were moved from INST 06-1680.)	AD
					INST 06-1680	"(4)" and Figure 6.9.10 were moved to INST 06-1672.	DL
						Figure 6.9.10.1 was added.	

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 07-0010, INST 07-0020, INST 07-0040, INST 07-0050, INST 07-0051, INST 07-0052, INST 07-0100, INST 07-0110, INST 07-0123, INST 07-0124, INST 07-0125, INST 07-0126, INST 07-0130, INST 07-0143	Description of RKAJAT and RKAJATL were added.	AD
					INST 07-0051	"work-12" to "END" were moved to INST 07-0052.	DL
					INST 07-0052	"work-12" to "END" were moved from INST 07-0051.	AD
					INST 07-0060	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						"Cache Unit" and "Interface Board" were moved to INST 07-0061.	DL
						Description of ATE250R and ATE250RL were added.	AD
					INST 07-0061	This page was newly added. ("Cache Unit" and "Interface Board" were moved from INST 07-0060.)	AD
					INST 07-0062	This page was newly added.	AD
					INST 07-0124	"(d)",Figure7.4.2.4 were moved to INST 07-0125.	DL
						Figure 7.4.2.3 was added.	AD
					INST 07-0125	This page was newly added. ("(d)" and Figure7.4.2.4 were moved from INST 07-0124.)	AD
					INST 07-0126	This page was newly added. (Figure 7.4.2.5 was added.)	AD
					INST 08-0000, INST 08-0110, INST 08-0130, INST 08-0140	Description of RKAJAT and RKAJATL were added.	AD
					INST 08-0130, INST 08-0140	Adding subsystem name was deleted in Figure.	DL
					INST 09-0000, INST 09-0031	Description of RKAJAT and RKAJATL were added.	AD
					INST 09-0010	Description of Version 1.5 was moved from page INST 09-0011.	AD
					INST 09-0011	Description of Version 1.5 was moved to page INST 09-0010.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0020	Description of Version 1.5 was moved from page INST 09-0030.	AD
					INST 09-0030	Description of Version 1.5 was moved to page INST 09-0020.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0031	Description of Version 1.5 was moved from page INST 09-0032.	AD
					INST 09-0032	Description of Version 1.5 was moved to page INST 09-0031.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0040	Samples of the 9570V were moved to page INST 09-0050.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0050	② was moved to page INST 09-0051.	DL
						③ was moved to page INST 09-0052.	DL
						Samples of the 9570V were moved from page INST 09-0040.	AD
					INST 09-0051	This page was newly added. (② was moved from page INST 09-0050.)	AD
					INST 09-0052	This page was newly added. (③ was moved from page INST 09-0050.)	AD
					INST 09-0060	② was moved to page INST 09-0061.	DL
						③ was moved to page INST 09-0062.	DL
						Description of Version 2.0 was added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 09-0061	② was moved from page INST 09-0060. (New page)	AD
					INST 09-0062	This page was newly added. (③ was moved from page INST 09-0060.)	AD
					INST 09-0070	(ii) was moved to page INST 09-0080.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0080	(ii) was moved from page INST 09-0080.	AD
					INST 09-0081	(iii) and (iv) were moved to page INST 09-0082.	DL
					INST 09-0082	(iii) and (iv) were moved from page INST 09-0081.	AD
					INST 09-0090	(b) was moved to page INST 09-0091.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0091	(b) was moved from page INST 09-0090. (New page)	AD
					INST 09-0092	This page was newly added. (Samples of the 9570V were moved from paged INST 09-0100.)	AD
					INST 09-0100	Samples of the 9570V were moved to page INST 09-0092.	DL
						Samples of the 9580V/9585V were moved from page INST 09-0101.	AD
					INST 09-0101	Samples of the 9580V/9585V were moved to page INST 09-0100.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0102, INST 09-0110, INST 09-0120, INST 09-0150, INST 09-0151, INST 09-0200, INST 09-0230, INST 09-0240, INST 09-0250, INST 09-0270, INST 09-0280, INST 09-0300	Description of Version 2.0 was added.	AD
					INST 09-0121, INST 09-0143, INST 09-0153, INST 09-0211, INST 09-0223, INST 09-0231, INST 09-0261	This page was newly added. (Description of Version 2.0 was added.)	AD
					INST 09-0122, INST 09-0144, INST 09-0154, INST 09-0212, INST 09-0224, INST 09-0232, INST 09-0262	This page was newly added. (Blank page)	AD
					INST 09-0130	(ii) was moved to page INST 09-0140.	DL
						Description of Version 2.0 was added.	AD
					INST 09-0140	(ii) was moved from page INST 09-0140.	AD
					INST 09-0141	(iii) and (iv) were moved to page INST 09-0142.	DL
					INST 09-0142	(iii) and (iv) were moved from page INST 09-0141.	AD
					INST 09-0152, INST 09-0210	Description of Version 1.5 was added.	AD
					INST 09-0160	In the case of the 9580V/9585V (RKH/RKHE) was moved from page INST 09-0161.	AD
					INST 09-0161	In the case of the 9580V/9585V (RKH/RKHE) was moved to page INST 09-0161.	DL
						Description of Version 1.5 was added.	AD
					INST 09-0170	NOTE was added.	AD
					INST 09-0220	(2) and (3) were moved to page INST 09-0221.	DL
					INST 09-0221	9.3.3 was moved to page INST 09-0222.	DL
						(2) and (3) were moved from page INST 09-0220.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					INST 09-0222	9.3.3 was moved from page INST 09-0221	AD
					INST 09-0260	(2) and (3) were moved to page INST 09-0261.	DL
					INST 09-0261	This page was newly added. ((2) and (3) were moved to page INST 09-0260.)	AD
					MNTE 01-0000, MNTE 01-0050, MNTE 01-0073, MNTE 01-0080, MNTE 01-0090, MNTE 01-0100, MNTE 01-0110, MNTE 01-0120, MNTE 01-0130, MNTE 01-0140, MNTE 01-0141	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 01-0073, MNTE 01-0074	These pages were newly added.	AD
					MNTE 01-0100	6-i was added.	AD
					MNTE 01-0110, MNTE 01-0120	Description of “Section” was moved.	CH
					MNTE 02-0000, MNTE 02-0020, MNTE 02-0303, MNTE 02-0304, MNTE 02-0305, MNTE 02-0306, MNTE 02-0640, MNTE 02-0641, MNTE 02-0642, MNTE 02-0660, MNTE 02-0661, MNTE 02-0730, MNTE 02-0741, MNTE 02-0764, MNTE 02-0820, MNTE 02-0830, MNTE 02-0831, MNTE 02-0832, MNTE 02-0842, MNTE 02-0850, MNTE 02-0860, MNTE 02-0861, MNTE 02-0862, MNTE 02-0872, MNTE 02-0873, MNTE 02-0874, MNTE 02-0880, MNTE 02-0881, MNTE 02-0890, MNTE 02-0891, MNTE 02-0900, MNTE 02-0910, MNTE 02-0911, MNTE 02-0912, MNTE 02-0920, MNTE 02-0930, MNTE 02-0931, MNTE 02-0932, MNTE 02-0933, MNTE 02-0934, MNTE 02-0935, MNTE 02-0936, MNTE 02-0940, MNTE 02-0941, MNTE 02-0942, MNTE 02-0943, MNTE 02-0944, MNTE 02-0945, MNTE 02-0946, MNTE 02-0950, MNTE 02-0960, MNTE 02-0961, MNTE 02-0962, MNTE 02-0970, MNTE 02-0980, MNTE 02-0981, MNTE 02-0991, MNTE 02-0992, MNTE 02-0993, MNTE 02-0994, MNTE 02-0995, MNTE 02-0996, MNTE 02-1041, MNTE 02-1042, MNTE 02-1092, MNTE 02-1100, MNTE 02-1110, MNTE 02-1111, MNTE 02-1112, MNTE 02-1113, MNTE 02-1114, MNTE 02-1120, MNTE 02-1130, MNTE 02-1131, MNTE 02-1132, MNTE 02-1140, MNTE 02-1141, MNTE 02-1142, MNTE 02-1143, MNTE 02-1144, MNTE 02-1150, MNTE 02-1151, MNTE 02-1152, MNTE 02-1153, MNTE 02-1154, MNTE 02-1155, MNTE 02-1156, MNTE 02-1157, MNTE 02-1158, MNTE 02-1251, MNTE 02-1281, MNTE 02-1300, MNTE 02-1301, MNTE 02-1310, MNTE 02-1311, MNTE 02-1312, MNTE 02-1320, MNTE 02-1321, MNTE 02-1322, MNTE 02-1591	Description of RKAJAT and RKAJATL were added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0160, MNTE 02-0161, MNTE 02-0162, MNTE 02-0163, MNTE 02-0164, MNTE 02-0170, MNTE 02-0171, MNTE 02-0172	Yellow line was changed to Orange line.	CH
					MNTE 02-0161	“to 0659” was added.	AD
					MNTE 02-0163	“<Microprogram 1654 or later, less than 1657>” was moved to page MNTE 02-0164.	DL
						“<Microprogram 065Aor later>” was added.	AD
					MNTE 02-0164	“<Microprogram 1654 or later, less than 1657>” was moved from page MNTE 02-0163.	AD
						“• AC/ENC/Fan” was moved to page MNTE 02-0170.	DL
					MNTE 02-0170	“• AC/ENC/Fan” was moved from page MNTE 02-0164.	AD
						“<Microprogram 1658 or later, less than 1659>” was moved to page MNTE 02-0171.	DL
					MNTE 02-0171	“<Microprogram 1658 or later, less than 1659>” was moved from page MNTE 02-0170.	AD
						“• AC/ENC/Fan” was moved to page MNTE 02-0172.	DL
					MNTE 02-0172	“• AC/ENC/Fan” was moved from page MNTE 02-0171.	AD
						(a) to (c) were moved to page MNTE 02-0180.	DL
					MNTE 02-173, MNTE 01-0074	These pages were newly added. (“Microprogram 165Aor later” was added.)	AD
					MNTE 02-0180	(a) to (c) were moved from page MNTE 02-0172.	AD
						(d) to (h) were moved to page MNTE 02-0181.	DL
					MNTE 02-0181	(d) to (h) were moved from page MNTE 02-0180.	AD
						(i) to (k) were moved to page MNTE 02-0182.	DL
					MNTE 02-0182	(i) to (k) were moved from page MNTE 02-0181.	AD
					MNTE 02-0350	“0187C10”to “0187C15”was corrected to “***74C**”.	CR
					MNTE 02-0640	“HA042x” was moved to page MNTE 02-0641.	DL
					MNTE 02-0641	“HA042x” was moved from page MNTE 02-0640.	AD
						“HB0A0x” and “HB0B0x” were moved to page MNTE 02-0642.	DL
					MNTE 02-0642	“HB0A0x” and “HB0B0x” were moved from page MNTE 02-0641.	AD
					MNTE 02-0690	② of “HF0104” was deleted.	DL
					MNTE 02-0700	② of “HF010D” was deleted.	DL
					MNTE 02-0740, MNTE 02-0801, MNTE 02-0870, MNTE 02-0872, MNTE 02-0970, MNTE 02-1360, MNTE 02-1364, MNTE 02-1365, MNTE 02-1366, MNTE 02-1375, MNTE 02-1386, MNTE 02-1430, MNTE 02-1450, MNTE 02-1470, MNTE 02-1490, MNTE 02-1573, MNTE 02-1574, MNTE 02-1575	“parity recovery” was changed to “parity correction”.	CH

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0764	"HH4000" were added.	AD
						"HH4E00" was moved to page MNTE 02-0770.	DL
					MNTE 02-0770	"HH4E00" was moved from page MNTE 02-0764.	AD
						The recovery action ⑥ was added concerning the "HH4E00".	AD
						"HJ01xx" to "HJ06xx" were moved to page MNTE 02-0780.	DL
					MNTE 02-0780	"HJ01xx" to "HJ06xx" were moved from page MNTE 02-0770.	AD
						"HJ05x0" was corrected to "HJ05xx".	CR
						"HJ0Exx" to "HJ13xx" were moved to page MNTE 02-0790.	DL
					MNTE 02-0790	"HJ0Exx" to "HJ13xx" were moved from page MNTE 02-0780.	AD
						"HJ19xx" to "HJ1Exx" were moved to page MNTE 02-0800.	DL
					MNTE 02-0800	"HJ19xx" to "HJ1Exx" were moved from page MNTE 02-0790.	AD
						"HJ24xx" to "HJ2Bxx" were moved to page MNTE 02-0801.	DL
					MNTE 02-0801	"HJ24xx" to "HJ2Bxx" were moved from page MNTE 02-0800.	AD
						"HL0000" to "HZ0300" were moved to page MNTE 02-0802.	DL
					MNTE 02-0802	"HL0000" to "HZ0300" were moved from page MNTE 02-0801.	AD
						"HL000" was corrected to "HL0000".	CR
					MNTE 02-0831	"I01000" to "I0200x" were moved to page MNTE 02-0832.	DL
					MNTE 02-0832	"I01000" to "I0200x" were moved from page MNTE 02-0831.	AD
						"I02100" was moved from page MNTE 02-0840.	AD
					MNTE 02-0840	"I02100" was moved to page MNTE 02-0832.	DL
					MNTE 02-0842	"I140HH" and "I140xy" were moved to page MNTE 02-0850.	DL
					MNTE 02-0850	"I140HH" and "I140xy" were moved from page MNTE 02-0842.	AD
						"I150HH" and "I150xy" were moved to page MNTE 02-0860.	DL
					MNTE 02-0860	"I150HH" and "I150xy" were moved from page MNTE 02-0850.	AD
						"I152HH" and "I152xy" were moved to page MNTE 02-0861.	DL
					MNTE 02-0861	"I152HH" and "I152xy" were moved from page MNTE 02-0860.	AD
						"I15AHH" to "I160xx" were moved to page MNTE 02-0862.	DL
					MNTE 02-0862	"I15AHH" to "I160xx" were moved from page MNTE 02-0861.	AD
					MNTE 02-0873	"I30200" was moved to page MNTE 02-0874.	DL
					MNTE 02-0874	"I30200" was moved from page MNTE 02-0873.	AD
						"I304xy" was moved to page MNTE 02-0880.	DL
					MNTE 02-0880	"I304xy" was moved from page MNTE 02-0874.	
						"I306xy" and "I30700" were moved to page MNTE 02-0881.	

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0881	"I306xy" and "I30700" were moved from page MNTE 02-0880.	AD
					MNTE 02-0890	"I411xy" was moved to page MNTE 02-0891.	DL
					MNTE 02-0891	"I411xy" was moved from page MNTE 02-0890.	AD
					MNTE 02-0930	"I430HH" and "I430xy" were moved to page MNTE 02-0931.	DL
					MNTE 02-0931	"I430HH" and "I430xy" were moved from page MNTE 02-0930.	AD
					MNTE 02-0932	"I502HH" to "I510xy" were moved to page MNTE 02-0933.	DL
					MNTE 02-0933	"I502HH" to "I510xy" were moved from page MNTE 02-0932.	AD
						"I512HH" to "I513xy" were moved to page MNTE 02-0934.	DL
					MNTE 02-0934	"I512HH" to "I513xy" were moved from page MNTE 02-0933.	AD
						"I516HH" to "I520xy" were moved to page MNTE 02-0935.	DL
					MNTE 02-0935	"I516HH" to "I520xy" were moved from page MNTE 02-0934.	AD
						"I522xy" to "I525xy" were moved to page MNTE 02-0936.	DL
					MNTE 02-0936	"I522xy" to "I525xy" were moved from page MNTE 02-0935.	AD
						"I531HH" to "I533xy" were moved to page MNTE 02-0940.	DL
					MNTE 02-0940	"I531HH" to "I533xy" were moved from page MNTE 02-0936.	AD
						"I53600" to "I540xy" were moved to page MNTE 02-0941.	DL
					MNTE 02-0941	"I53600" to "I540xy" were moved from page MNTE 02-0940.	AD
						"I5Y300" to "I5Y400" were moved to page MNTE 02-0942.	DL
					MNTE 02-0942	"I5Y300" to "I5Y400" were moved from page MNTE 02-0941.	AD
						"I5Y800" and "I5Y900" were moved to page MNTE 02-0943.	DL
					MNTE 02-0943	"I5Y800" and "I5Y900" were moved from page MNTE 02-0942.	AD
						"I5YH00" was moved to page MNTE 02-0944.	DL
					MNTE 02-0944	"I5YH00" was moved from page MNTE 02-0943.	AD
						"I5YR00" to "I5YT00" were moved to page MNTE 02-0945.	DL
					MNTE 02-0945	"I5YR00" to "I5YT00" were moved from page MNTE 02-0944.	AD
						"I5YV00", "I5YW00" and "I5YX00" were added.	AD
						"15Z0HH" to "15Z3xy" were moved to page MNTE 02-0946.	DL
					MNTE 02-0946	"15Z0HH" to "15Z3xy" were moved from page MNTE 02-0945.	AD
						"I5YY00" was added.	AD
						"15Z0HH" to "15Z3xy" were corrected to "I5Z0HH" to "I5Z3xy".	AD
					MNTE 02-0950	"15Z8xy" to "15Z4xy" were corrected to "I5Z8xy" to "I5Z4xy".	AD
					MNTE 02-0961	"I605xy" was moved to page MNTE 02-0962.	DL

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-0962	"I605xy" was moved from page MNTE 02-0961.	AD
						"I609HH" to "I60D0x" were moved to page MNTE 02-0970.	DL
					MNTE 02-0970	"I609HH" to "I60D0x" were moved from page MNTE 02-0962.	AD
						"I61100" was corrected to "I61700".	CR
						"I6200x" and "I621xy" were moved to page MNTE 02-0980.	DL
					MNTE 02-0980	"I6200x" and "I621xy" were moved from page MNTE 02-0970.	AD
						"I62600" to "I62900" were moved to page MNTE 02-0981.	DL
					MNTE 02-0981	This page was newly added. ("I62600" to "I62900" were moved from page MNTE 02-0980.)	AD
					MNTE 02-0982	This page was newly added.	AD
					MNTE 02-0990	"162D00" was corrected to "I62D00".	CR
					MNTE 02-0991	"I6DD00" was moved to page MNTE 02-0992.	DL
					MNTE 02-0992	"I6DD00" was moved from page MNTE 02-0991.	AD
					MNTE 02-0993	"I6DH00" to "I6DM00" were moved to page MNTE 02-0994.	DL
					MNTE 02-0994	"I6DH00" to "I6DM00" were moved from page MNTE 02-0993.	AD
						"I6DS00" to "I6DW00" were moved to page MNTE 02-0995.	DL
					MNTE 02-0995	"I6DS00" to "I6DW00" were moved from page MNTE 02-0994.	AD
						"I6DZ00" was moved to page MNTE 02-0996.	DL
					MNTE 02-0996	"I6DZ00" was moved from page MNTE 02-0995.	AD
					MNTE 02-1042	"I83A00" was added.	AD
						"I840HH" to "I840xy" were moved to page MNTE 02-1043.	AD
					MNTE 02-1043	"I840HH" to "I840xy" were moved from page MNTE 02-1042.	AD
					MNTE 02-1141	"IY0R00" was moved to page MNTE 02-1142.	DL
					MNTE 02-1142	"IY0R00" was moved from page MNTE 02-1141.	AD
						"IY0V00" and "IY0W00" were moved to page MNTE 02-1143.	DL
					MNTE 02-1143	This page was newly added. ("IY0V00" and "IY0W00" were moved from page MNTE 02-1142. "IY1000" was added.)	AD
					MNTE 02-1144	This page was newly added. ("IY3000" was added. "IY2000" to "IZ02xy" were moved from page MNTE 02-1150.)	AD
					MNTE 02-1150	"IY2000" to "IZ02xy" were moved to page MNTE 02-1144.	DL
						"IZ0600" to "IZ07HH" were moved from page MNTE 02-1151.	AD
					MNTE 02-1151	"IZ0600" to "IZ07HH" were moved to page MNTE 02-1150.	DL
						"IZ08HH" to "IZ08xy" were moved from page MNTE 02-1152.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1152	"IZ08HH" to "IZ08xy" were moved to page MNTE 02-1151.	DL
						"IZ0AHH" was moved from page MNTE 02-1153.	AD
					MNTE 02-1153	"IZ0AHH" was moved to page MNTE 02-1152.	DL
					MNTE 02-1156	"IZYA00" to "IZYB02" were moved to page MNTE 02-1157.	DL
					MNTE 02-1157	"IZ0AHH" to "IZ0B00" were moved from page MNTE 02-1156.	AD
						"IZYMHH" to "IZYM0x" were moved to page MNTE 02-1158.	DL
					MNTE 02-1158	"IZYMHH" to "IZYM0x" were moved from page MNTE 02-1157.	AD
					MNTE 02-1240	"RA00××" was corrected to "RA00xx".	CR
					MNTE 02-1251	"RA9000" were moved to page MNTE 02-1252.	DL
					MNTE 02-1252	"RA9000" were moved from page MNTE 02-1251	AD
						"RA7E00" was added.	AD
					MNTE 02-1290	"W03100" and "W0310x" were moved to page MNTE 02-1300.	DL
						The recovery action ⑥ was added concerning the "W0100x".	AD
					MNTE 02-1300	"W03100" and "W0310x" were moved from page MNTE 02-1290.	AD
						"Recovery measures ①" of W050xy was changed.	CH
						"W050xy" was moved to page MNTE 02-1301.	DL
					MNTE 02-1301	This page was newly added. ("W050xy" was moved from page MNTE 02-1300. "W05100" and "W052HH" were moved from page MNTE 02-1310.)	AD
					MNTE 02-1302	This page was newly added.	AD
					MNTE 02-1310	"W05100" and "W052HH" were moved to page MNTE 02-1301.	DL
						"W054AT" and "W05600" were added.	AD
					MNTE 02-1311	"W060xy" was moved to page MNTE 02-1310.	DL
					MNTE 02-1320	"Recovery measures ①" of W090HH was changed.	CH
						The recovery action ③ was added concerning the "W080xy".	AD
					MNTE 02-1321	"W091AT" and "W09300" were added.	AD
						"W0F0xy" was moved to page MNTE 02-1322.	DL
					MNTE 02-1322	"W0F0xy" was moved from page MNTE 02-1321.	AD
						"W12000" to "W23000" were moved to page MNTE 02-1323.	DL
					MNTE 02-1323	"W12000" to "W23000" were moved from page MNTE 02-1322.	AD
						"W324xy" to "W326xy" were moved to page MNTE 02-1324.	DL
					MNTE 02-1324	"W324xy" to "W326xy" were moved from page MNTE 02-1323.	AD
						"W32Cxy" to "W32Fxy" were moved to page MNTE 02-1325.	DL

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1325	"W32Cxy" to "W32Fxy" were moved from page MNTE 02-1324.	AD
						"W335xy" to "W341xy" were moved to page MNTE 02-1326.	DL
					MNTE 02-1326	"W335xy" to "W341xy" were moved from page MNTE 02-1325.	AD
						"W440xy" was moved to page MNTE 02-1327.	DL
					MNTE 02-1327	"W440xy" was moved from page MNTE 02-1326.	AD
						"W48100" was moved to page MNTE 02-1328.	DL
					MNTE 02-1328	"W48100" was moved from page MNTE 02-1327.	AD
					MNTE 02-1330	Description was added in the recovery measures of "Abnormal End Config Clear…".	AD
						"Abnormal End Down Grade Install NG (QuickShadow…)" was moved to page MNTE 02-1331.	DL
					MNTE 02-1331	"Abnormal End Down Grade Install NG (QuickShadow…)" was moved from page MNTE 02-1330.	AD
						Description was added in the recovery measures of "Abnormal End Initial Setup Error by LU…".	AD
						"Abnormal End No Drives…" to "Abnormal End Unknown…" were moved to page MNTE 02-1332.	DL
					MNTE 02-1332	"Abnormal End No Drives…" to "Abnormal End Unknown…" were moved from page MNTE 02-1331.	AD
						"Install revision…" to "Old System Exists…" were moved to page MNTE 02-1333.	DL
					MNTE 02-1333	"Install revision…" to "Old System Exists…" were moved from page MNTE 02-1332.	AD
						"1207" to "1213" were moved to page MNTE 02-1334.	DL
					MNTE 02-1334	"1207" to "1213" were moved from page MNTE 02-1333.	AD
					MNTE 02-1345	Description was added in the recovery measures of "DMED03000B" and "DMED040009".	AD
						"DMED08000D" to "DMED080010" were moved to page MNTE 02-1346.	DL
					MNTE 02-1346	"DMED08000D" to "DMED080010" were moved from page MNTE 02-1345.	AD
						"DMED09000F" to "DMED090012" were moved to page MNTE 02-1347.	DL
					MNTE 02-1347	"DMED09000F" to "DMED090012" were moved from page MNTE 02-1346.	AD
						Description was added in the recovery measures of "DMED0B0001".	AD
						"DMED0B0001" to "DMED0D0001" were moved to page MNTE 02-1348.	DL

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-1348	"DMED0B0001" to "DMED0D0001" were moved from page MNTE 02-1347.	AD
						Description was added in the recovery measures of "DMED0B0001", "DMED0C0001", "DMED0C0002", "DMED0D0001", "DMED0E0001", "DMED0F0001" and "DMED100001".	AD
						"DMED130001" to "DMED400015" were moved to page MNTE 02-1350.	DL
					MNTE 02-1350	"DMED130001" to "DMED400015" were moved from page MNTE 02-1348.	AD
						"DMES010802" to "DMES029501" were moved to page MNTE 02-1351.	DL
					MNTE 02-1351	"DMES010802" to "DMES029501" were moved from page MNTE 02-1350.	AD
						"DMES03F000" to "DMES04EB03" were moved to page MNTE 02-1352.	DL
					MNTE 02-1352	"DMES03F000" to "DMES04EB03" were moved from page MNTE 02-1351.	AD
						"DMES04F8F0" to "DMES059521" were moved to page MNTE 02-1353.	DL
					MNTE 02-1353	"DMES04F8F0" to "DMES059521" were moved from page MNTE 02-1352.	AD
						"DMES05954E" to "DMES059577" were moved to page MNTE 02-1354.	DL
					MNTE 02-1354	"DMES05954E" to "DMES059577" were moved from page MNTE 02-1353.	AD
						"DMES05961A" to "DMES05EA41" were moved to page MNTE 02-1355.	DL
					MNTE 02-1355	"DMES05961A" to "DMES05EA41" were moved from page MNTE 02-1354.	AD
						"DMES068300" to "DMES0BFD01" were moved to page MNTE 02-1355.	DL
					MNTE 02-1356	"DMES068300" to "DMES0BFD01" were moved from page MNTE 02-1355.	AD
					MNTE 02-1520	The flow chart of "Recovery measures" was changed.	CH
					MNTE 02-1600, MNTE 02-1610	PATH and LOOP was moved.	CH
					MNTE 02-1600, MNTE 02-1610, MNTE 02-1613, MNTE 02-1615, MNTE 02-1660, MNTE 02-1810, MNTE 02-1990, MNTE 02-2191, MNTE 02-2221, MNTE 02-2260, MNTE 02-2320, MNTE 02-2330, MNTE 02-2340, MNTE 02-2341, MNTE 02-2370, MNTE 02-2371, MNTE 02-2373, MNTE 02-2380, MNTE 02-2410, MNTE 02-2411, MNTE 02-2420, MNTE 02-2421, MNTE 02-2422, MNTE 02-2491	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 02-1870	The flow chart was changed.	CH
					MNTE 02-2220, MNTE 02-2230, MNTE 02-2240 MNTE02-2250	"controller blockage trace" was changed to "CTL alarm trace".	CH

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 02-2315	Description of (a) was deleted.	DL
						Description of (b) on MNTE 02-2317 was moved as (a).	AD
						Description of (d) on MNTE 02-2318 was moved as (b).	AD
					MNTE 02-2316	This page was changed to Blank page.	DL
					MNTE 02-2317, MNTE 02-2318	These pages were deleted.	DL
					MNTE 02-2340	No.10 were moved to page MNTE 02-2341.	DL
					MNTE 02-2341	No.10 was moved from page MNTE 02-2340.	AD
					MNTE 02-2350	The flow chart of (3) was changed.	CH
					MNTE 02-2370, MNTE 02-2371	The flow chart of (b) was changed.	CH
					MNTE 02-2400	“FAN Unit” was changed to “Fan Assembly”.	CH
					MNTE 02-2410	No.4 was moved to page MNTE 02-2411.	DL
					MNTE 02-2411	This page was newly added. (No.4 were moved from page MNTE 02-2410.)	AD
					MNTE 02-2412	This page was newly added.	AD
					MNTE 02-2420	(i) was added.	AD
					MNTE 02-2421	(b) was moved to page MNTE 02-2422.	DL
						(ii) was added.	AD
					MNTE 02-2422	(b) was moved from page MNTE 02-2421.	AD
					MNTE 02-2491	The table 2.6.8.1 was changed.	CH
					MNTE 02-2510	“remote adapter”was changed to “Remote Adapter”.	CH
					MNTE 02-2700	5-95-66 description was changed.	CH
					MNTE 02-2570	5-22-00 was deleted.	DL
					MNTE 02-2580	7-27-00 was deleted.	DL
					MNTE 05-0000, MNTE 05-0040, MNTE 05-0051, MNTE 05-0061, MNTE 05-0080, MNTE 05-0110, MNTE 05-0111, MNTE 05-0120, MNTE 05-0133, MNTE 05-0134, MNTE 05-0135, MNTE 05-0136, MNTE 05-0160, MNTE 05-0340, MNTE 05-0350, MNTE 05-0352, MNTE 05-0360, MNTE 05-0361, MNTE 05-0362, MNTE 05-0370, MNTE 05-0410, MNTE 05-0440, MNTE 05-0442, MNTE 05-0445, MNTE 05-0500, MNTE 05-0530, MNTE 05-0532, MNTE 05-0535, MNTE 05-0590, MNTE 05-0610, MNTE 05-0640, MNTE 05-0650, MNTE 05-0660, MNTE 05-0670, MNTE 05-0680, MNTE 05-0690, MNTE 05-0693, MNTE 05-0694, MNTE 05-0695, MNTE 05-0740, MNTE 05-0750, MNTE 05-0760, MNTE 05-0762	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 05-0020	(10) to (14) were moved to page MNTE 05-0021.	DL
					MNTE 05-0021	This page was newly added. ((10) to (14) were moved from page MNTE 05-0020.)	AD
						Description of (15) was added.	AD
					MNTE 05-0022	This page was newly added.	AD
					MNTE 05-0050	“DC” was corrected to “AC”.	CR
					MNTE 05-0051	Figure 5.1.3.2 was moved to page MNTE 05-0052.	DL
						Figure 5.1.3.1 was added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0052	Figure 5.1.3.2 was moved from page MNTE 05-0051.	AD
					MNTE 05-0060, MNTE 05-0061, MNTE 05-0062, MNTE 05-0070	"parity recovery" was changed to "parity correction".	CH
					MNTE 05-0061, MNTE 05-0111, MNTE 05-0251	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					MNTE 05-0110	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
						Description of ATE250R and ATE250RL were added.	AD
						No 9 to 11 were moved to page MNTE 05-0111.	DL
						Changed the PART NUMBER. (3272215-C, 3272215-D)	CH
					MNTE 05-0111	No 9 to 11 were moved from page MNTE 05-0110.	AD
						Description of 1 m ENC cable was added.	AD
					MNTE 05-0134	"(d)" and Figure 5.3.1.4 were moved to page MNTE 05-0135.	DL
						Figure 5.3.1.3 was added.	AD
					MNTE 05-0135	This page was newly added. ("(d)" and Figure 5.3.1.4 were moved from page MNTE 05-0134.)	AD
					MNTE 05-0136	This page was newly added. (Figure 5.3.1.5 was added.)	AD
					MNTE 05-0141	Description of "DF-F600-ATE...in RKAJAT/RKAJATL" was added.	AD
					MNTE 05-0330, MNTE 05-0332, MNTE 05-0350, MNTE 05-0360, MNTE 05-0362, MNTE 05-0373, MNTE 05-0376, MNTE 05-0660, MNTE 05-0680, MNTE 05-0690 MNTE 05-0693, MNTE 05-0695	"NOTE : Do not catch a ENC cable..." was added.	AD
					MNTE 05-0351	Title of figure was to types.	AD
					MNTE 05-0360	"(j)"to"(q)" were moved to page MNTE 05-0361.	DL
					MNTE 05-0361	This page was newly added. ("(j)"to"(q)" were moved to page MNTE 05-0361.)	AD
					MNTE 05-0362	This page was newly added. ("(a)"to"(g)" were moved from page MNTE 05-0370.)	AD
					MNTE 05-0370	"(a)"to"(g)" were moved to page MNTE 05-0362.	DL
					MNTE 05-0410, MNTE 05-0440, MNTE 05-0442, MNTE 05-0445, MNTE 05-0460, MNTE 05-0462, MNTE 05-0464, MNTE 05-0466	‡1 was changed.	CH
					MNTE 05-0660	"(h)"to"(j)" were moved to page MNTE 05-0670.	DL
					MNTE 05-0670	"(h)"to"(j)" were moved from page MNTE 05-0660.	AD
						"(a)"to"(f)" of "(1-2)" were moved to page MNTE 05-0680.	DL
					MNTE 05-0680	"(a)"to"(f)" of "(1-2)" were moved from page MNTE 05-0670.	AD
					MNTE 05-0692	Description of 1 m ENC cable was added.	AD
					MNTE 05-0693	"(e)"to"(g)" were moved to page MNTE 05-0694.	DL

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
					MNTE 05-0694	"(2)" was moved to page MNTE 05-0695 and MNTE 05-0696.	DL
						"(e)"to"(g)" were moved from page MNTE 05-0693.	AD
					MNTE 05-0695, MNTE 05-0696	This page was newly added. ("(2)" was moved from page MNTE 05-0694.)	AD
					MNTE 06-0111	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 07-0000	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 07-0000, MNTE 07-0040 to MNTE 07-0090	Description of "Inspecting power cables of PDGs and PDUs" were added.	AD
					MNTE 07-0050	Description of Front bezel was changed.	CH
					MNTE 08-0010, MNTE 08-0020, MNTE 08-0210, MNTE 08-0220, MNTE 08-0230, MNTE 08-0240, MNTE 08-0250, MNTE 08-0260, MNTE 08-0270, MNTE 08-0280, MNTE 08-0290, MNTE 08-0300, MNTE 08-0310, MNTE 08-0320, MNTE 08-0430, MNTE 08-0440, MNTE 08-0450, MNTE 08-0460	Description of RKAJAT and RKAJATL were added.	AD
					MNTE 08-0011 to MNTE 08-0470	Changed page number.	CH
					MNTE 08-0012	Deleted page.	DL
					MNTE 08-0040, MNTE 08-0130, MNTE 08-0160, MNTE 08-0190, MNTE 08-0280, MNTE 08-0310	Description of 287.6 GB HD and 393.4 GB HD were added.	AD
					MNTE 08-0150 to MNTE 08-0460	These pages were newly added.	AD
					MNTE 08-0190, MNTE 08-0250	Changed the PART NUMBER. (3272215-C, 3272215-D)	CH
					MNTE 08-0220	Description of ATE250R was added.	AD
					MNTE 08-0250	Description of ATE250RL was added.	AD
					MNTE 09-0000	"Slotted screwdriver" for setting Device ID was added.	AD
					WEB 02-0070	"Micro revision 065×" was added.	AD
					WEB 02-0071	"Micro revision is 065A or later." and "Micro revision is 165×" were added.	AD
						"Parts Information (Micro revision 165×)" was moved to page WEB 02-0072	DL
					WEB 02-0072	"Parts Information (Micro revision 165×)" were moved from page WEB 02-0071	AD
						"Micro revision is 165A or later." Was added to Disk Drive.	AD
						"• CTL/Cache/Loop/Battery" was moved to page WEB 02-0073.	DL
						"• AC/ENC (SENC)/Fan" was moved to page WEB 02-0073.	DL
					WEB 02-0073	This page was newly added. ("• AC/ENC (SENC)/Fan" was moved from page WEB 02-0072.)	AD
					WEB 02-0074	This page was newly added. ("• CTL/Cache/Loop/Battery" was moved from page WEB 02-0072.)	AD
					WEB 03-0050, WEB 03-0061	Description of RKAJAT and RKAJATL were added. (New page)	AD
					APP C-0000 to APP C-0070	"Microprogram supported or not supported" was changed to "Java Aplet supported or not supported".	CH
						(*3) was added.	AD

Copyright © 2005, Hitachi, Ltd.

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
24	Apl.28.2005	N.Higashijima	N.Higashijima	M.Kobayashi	GENE 0000	Rev.23 → Rev.24	CH
					INTO 03-0030	(*2) was changed.	CH
					INST 05-0657, INST 05-0710	The error correction.	CR
					INST 05-0800, INST 05-0870	Skip Verify was added.	AD
					MNTE 02-0997	This page was newly added. (“I6E500” was added.)	AD
					MNTE 02-0998	This page was newly added.	AD
					MNTE 02-1322	Reference Item and page of “W0G0HH” to “W0G100” was changed.	CH
					MNTE 02-1374	*1 was added.	AD
					MNTE 02-2680	Sense code “95 4B” was added.	AD
					MNTE 02-2731	Sense code “9A 01” was added.	AD
					MNTE 08-0010, MNTE 08-0020	The number of seats was changed.	CH
					APP A-0020 to APP A-0050	Skip Verify was added.	AD

Copyright © 2005, Hitachi, Ltd.

Thunder 9530V to Thunder 9570V Upgrade Procedures

Rev.0

Contents

1. Outline ····· RSUP-0020

2. Kits Required for Upgrade and Their Compositions · RSUP-0020

3. Upgrade Work ····· RSUP-0030

3.1 Before Starting Upgrade Work ····· RSUP-0030
3.2 Upgrade Work ····· RSUP-0040
3.2.1 Procedure for Upgrading Thunder 9530V (single controller) to Thunder 9570V (single controller) ····· RSUP-0050
3.2.2 Procedure for Upgrading Thunder 9530V (single controller) to Thunder 9570V (dual controller) ····· RSUP-0060
3.2.3 Procedure for Upgrading Thunder 9530V (dual controller) to Thunder 9570V (dual controller) ····· RSUP-0070
3.3 Replace/Addition Work ····· RSUP-0080
3.3.1 Power On/Off Procedure ····· RSUP-0080
3.3.2 Setting Local/Remote Mode ····· RSUP-0130
3.3.3 Procedure for Connecting Disk Array Management Program 2 with the Subsystem ····· RSUP-0160
3.3.4 Connecting Maintenance PC and LAN cables ····· RSUP-0180
3.3.5 Replacing/Adding Control Unit ····· RSUP-0190
3.3.6 Registering Disk Array Subsystem ····· RSUP-0230
3.3.7 Change the Serial Number ····· RSUP-0290
3.3.8 Setting of System Parameters ····· RSUP-0320
3.3.9 Replacing Label ····· RSUP-0390
3.3.10 Affixing Label ····· RSUP-0400
3.4 Appendix ····· RSUP-0410
3.4.1 Back up the system parameters and port/host group information ····· RSUP-0410
3.4.2 For Setting Changes in Host Computer and Others ····· RSUP-0440

1. Outline

This procedures contains information on procedures for upgrading the Thunder 9530V Series to the Thunder 9570V Series.
This procedures contains upgrade procedures listed in the following table.

Before upgrade	⇒	After upgrade
Thunder 9531V	⇒	Thunder 9570V (single controller)
	⇒	Thunder 9570V (dual controller)
Thunder 9531DV	⇒	Thunder 9570V (dual controller)
Thunder 9532V	⇒	Thunder 9570V (dual controller)
Thunder 9533V	⇒	Thunder 9570V (dual controller)

NOTE : The feasible upgrade procedures do not include those for conversions from a model with the Power Unit to a model with the Power Unit (DC) and vice versa.

2. Kits Required for Upgrade and Their Compositions

Model names and components of kits required for upgrade are shown below.

Upgrade	Upgrade Kit model name	Components of Upgrade Kit	
		Part name	Quantity
9530V ⇒ 9570V	HT-F4063-RSUP	WWN label	1
		Model name label	1
		Upgrade Label	2
		Upgrade procedures	1

The Cache Unit and the Control Unit are not contained in the Upgrade kit.
Please arrange a required number.

3. Upgrade Work

3.1 Before Starting Upgrade Work

If a wrong operation is done in a upgrade work, it is feared that user data stored in the subsystem is lost.
In order to provide against the unlikely accident, perform the following before starting upgrade work.

(1) Back up user data.
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. Make the following preparations before starting addition of optional components.
- Prepare a PC in which Disk Array management program 2 is installed. Select the one that can be used in a LAN environment.
- Ask a user whether a LAN connected to the subsystem may be used. If not, ask a user for a permission to use the LAN.

(3) When a failure occurs during the upgrade, refer to Chapter 2, “Trouble Analysis” in the Maintenance Version of the DF600 Disk Array Subsystem Maintenance Manual.

(4) After the upgrade from the DF600S to DF600 has been made, the key code for the DF600S, which is an onerous option, becomes unable to be used. Therefore, the key code for the DF600 is newly required.

(5) When a serial number of the Disk Array Subsystem is changed in the upgrade, a WWN is changed at the same time.
Therefore the WWN must be changed if it is used in the setting for a host computer and Fabric switch.

3.2 Upgrade Work

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.**

Upgrade work differs depending on which upgrade is to be done. Select the correct procedure from those explained in Subsections 3.2.1 to 3.2.3 and execute it.

Upgrade	Reference subsection
9531V (single controller) ⇒ 9570V (single controller)	[Refer to 3.2.1] (RSUP-0050)
9531V (single controller) ⇒ 9570V (dual controller)	[Refer to 3.2.2] (RSUP-0060)
9531DV (dual controller) ⇒ 9570V (dual controller)	[Refer to 3.2.3] (RSUP-0070)
9532V (dual controller) ⇒ 9570V (dual controller)	
9533V (dual controller) ⇒ 9570V (dual controller)	

NOTE : Among upgrade work with the power off irrespective of whether the system (host computer) is powered on or off.

3.2.1 Procedure for Upgrading Thunder 9530V (single controller) to Thunder 9570V (single controller)



3.2.2 Procedure for Upgrading Thunder 9530V (single controller) to Thunder 9570V (dual controller)



3.2.3 Procedure for Upgrading Thunder 9530V (dual controller) to Thunder 9570V (dual controller)



3.3 Replace/Addition Work

3.3.1 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 it does not mean a problem as long as the WARNING or ALARM LED of the basic subsystem is off, please use the subsystem as it is.

(1) Floor model (RKS+H1H)

(1-1) Subsystem power on

(a) Make sure that the AC Power Unit Switch of the Power Unit is turned off.
(b) Make sure that the main switch is turned off.
(c) Turn on the battery switch of the Backup Battery Unit.
(d) Turn on the AC Power Unit Switch of the Power Unit.
(e) Turn on the main switch.
(f) Make sure that the RDY LED (green) comes on about four minutes later normally.

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.

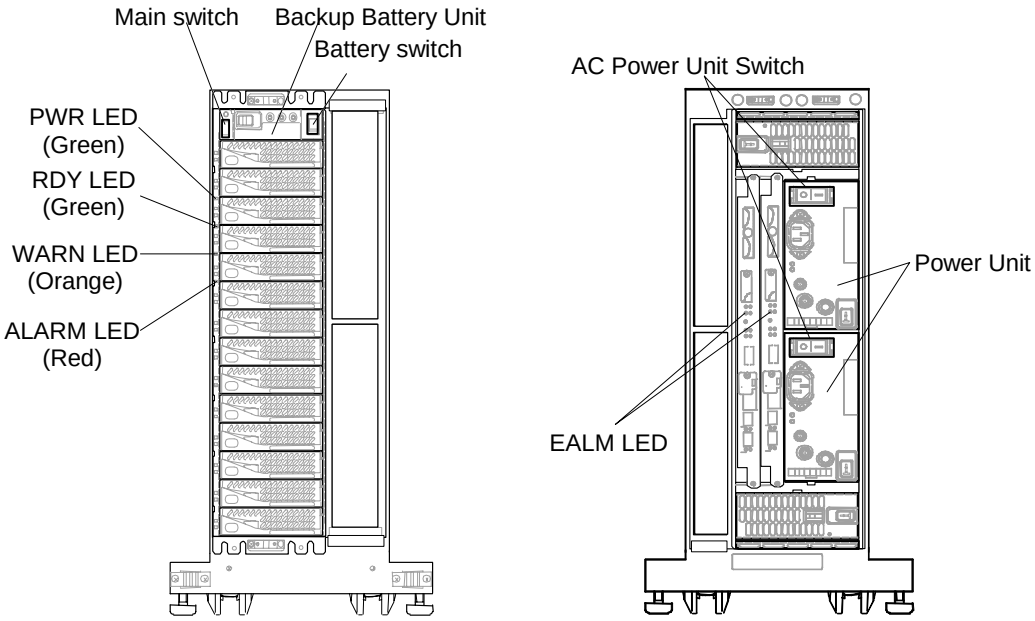


Figure 3.3.1 Location of Switches for Power On

(1-2) Subsystem power off

(a) Turn off the main switch.

(b) Make sure that the PWR LED (green) on the front of the subsystem is off.

(c) Make sure that the CACHE POWER LED (green) is off.

(d) All turn off the AC Power Unit Switch of the Power Unit.

(e) Turn off the battery switch of the Backup Battery Unit.

(2) Floor model (RKSD+H1HD)

(2-1) Subsystem power on

(a) Make sure that the DC Power Unit Switch of the Power Unit is turned off.

(b) Make sure that the main switch is turned off.

(c) Turn on the battery switch of the Backup Battery Unit.

(d) Turn on the DC Power Unit Switch of the Power Unit.

(e) Turn on the main switch.

(f) Make sure that the RDY LED (green) comes on about four minutes later normally.

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.

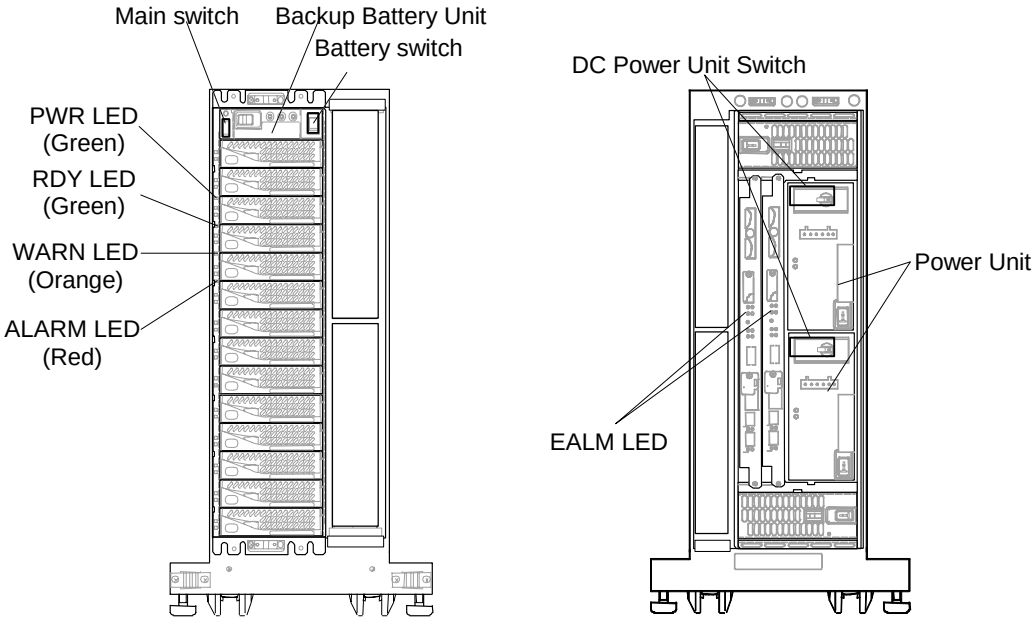


Figure 3.3.2 Location of Switches for Power On

(2-2) Subsystem power off

(a) Turn off the main switch.

(b) Make sure that the PWR LED (green) on the front of the subsystem is off.

(c) Make sure that the CACHE POWER LED (green) is off.

(d) All turn off the DC Power Unit Switch of the Power Unit.

(e) Turn off the battery switch of the Backup Battery Unit.

(3) Rackmount model (RKS)

(3-1) Subsystem power on

(a) Make sure that the circuit breaker (CB1) of the PDB is turned off.
(b) Make sure that the AC Power Unit Switch of the each Power Unit is turned off.
(c) Make sure that the main switch is turned off.
(d) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.
(e) Turn on the circuit breaker (CB1) of the PDB.
(f) Turn on the AC Power Unit Switch of the Power Unit.
(g) Turn on the main switch.
(h) Make sure that the RDY LED (green) comes on about four minutes later normally.

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.

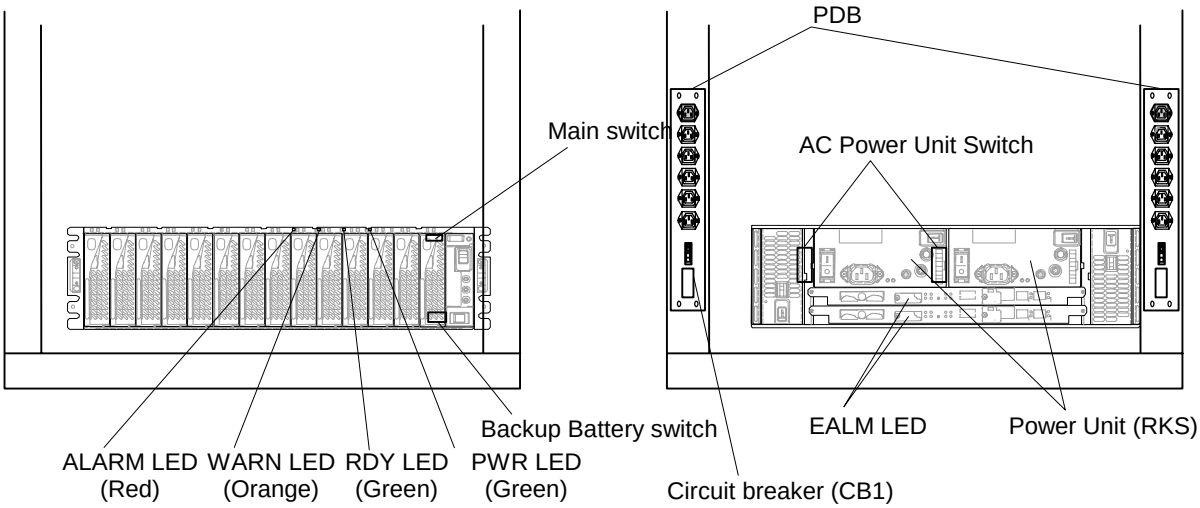


Figure 3.3.3 Location of Switches

(3-2) Subsystem power off

(a) Turn off the main switch.
(b) Make sure that the PWR LED (green) on the front of the subsystem is off.
(c) Make sure that the CACHE POWER LED (green) is off.
(d) All turn off the AC Power Unit Switch of the Power Unit.
(e) Turn off the battery switch of the Backup Battery Unit.
(f) All turn off the circuit breaker (CB1) of the PDB.

(4) Rackmount model (RKSD)

(4-1) Subsystem power on

(a) Make sure that the DC Power Unit Switch of the each Power Unit (DC) is turned off.

(b) Make sure that the main switch is turned off.

(c) Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.

(d) Turn on the DC Power Unit Switch of the Power Unit (DC).

(e) Turn on the main switch.

(f) Make sure that the RDY LED (green) comes on about four minutes later normally.

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.

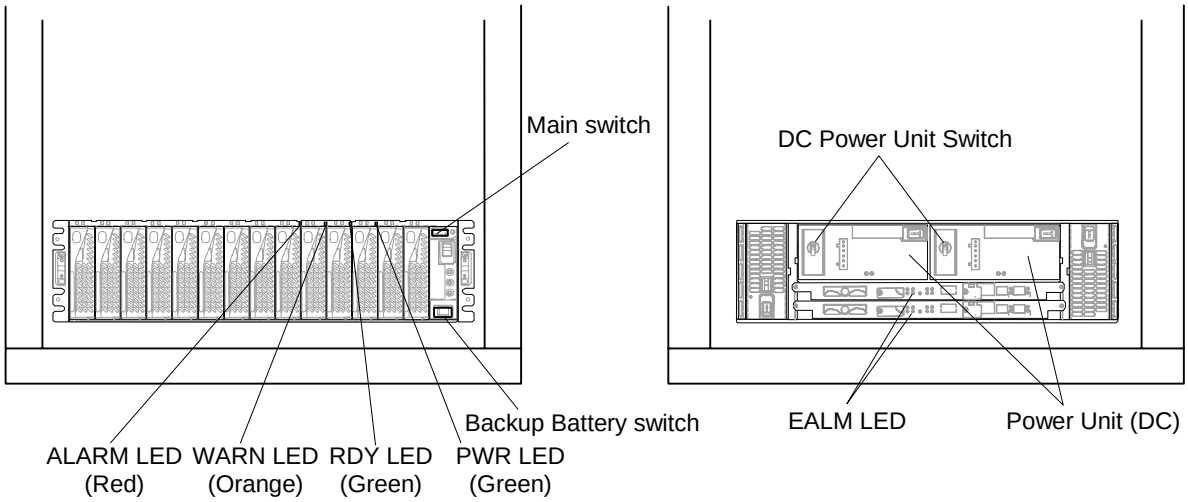


Figure 3.3.4 Location of Switches for Power On

(4-2) Subsystem power off

(a) Turn off the main switch.

(b) Make sure that the PWR LED (green) on the Front Bezel is off.

(c) Make sure that the CACHE POWER LED (green) is off.

(d) All turn off the DC Power Unit Switch of the Power Unit (DC).

(e) Turn off the battery switch of the Backup Battery Unit.

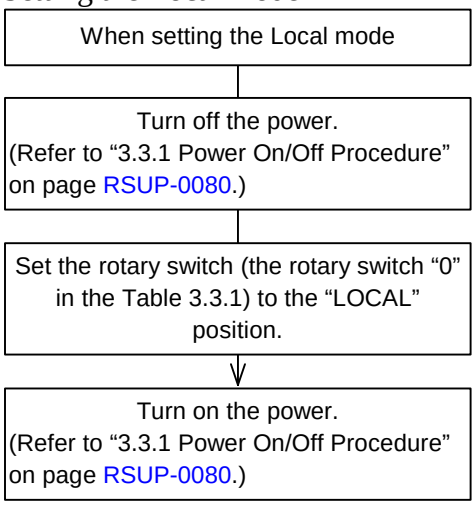
3.3.2 Setting Local/Remote Mode

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.

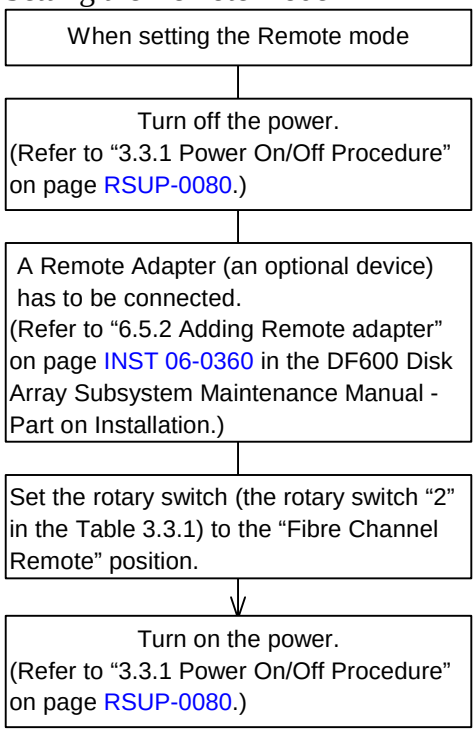
(1) Procedure for setting the Remote/Local mode

When a UPS with the interlock function is used, there may be a case where a remote adapter is not necessary.

(a) Setting the Local mode



(b) Setting the Remote mode



(2) Setting the Rotary switch (The rotary switch is on the side of the main 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 3.3.1.

Table 3.3.1 Power Control Mode Settings and Corresponding Operation Modes

Rotary switch	Operation mode name	Operation mode
0	LOCAL	Local mode (Before shipment)
1	—	—
2	Fibre Channel 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 U6 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.
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.

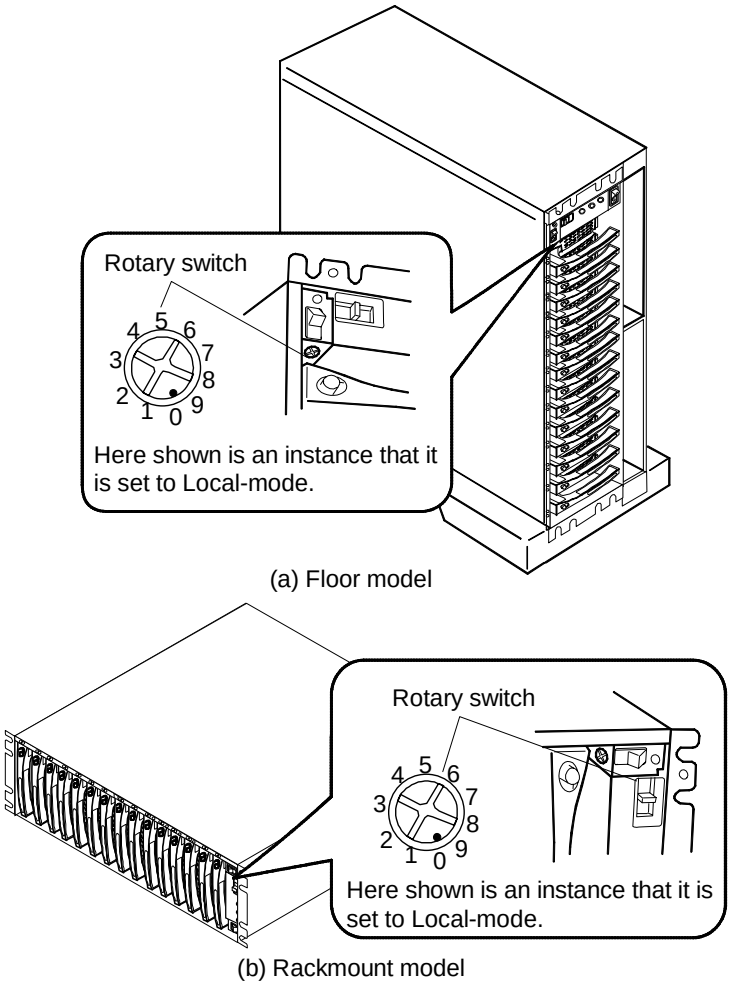
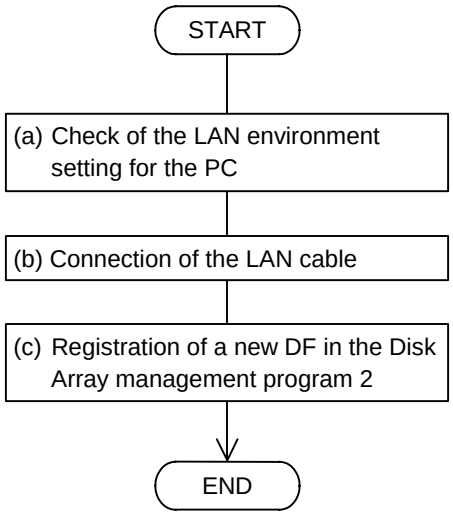


Figure 3.3.5 Location of Rotary Switch for Setting Power Control Mode

3.3.3 Procedure for Connecting Disk Array Management Program 2 with the Subsystem

The procedure for connecting Disk Array Management Program 2 with the subsystem is shown below.



(1) Checking the LAN environment setting

(a) Make sure that the Disk Array management program 2 has been installed. (Make sure that the activation file startmgr2.bat exists.)

(b) Checking 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.
  If the maintenance PC cannot be connected, set the value in No. 2.

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)	2550.0.0/ 255.255.255.224(*1) (At the time of shipment)	Micro revision 0653/B or earlier: 10.0.0.××× ("xxx" is any value from 1 to 254 except 16, 17.) Micro revision 0653/C or later: 10.0.0.××× ("xxx" is any value from 1 to 30 except 16, 17.)	255.0.0.0/ 255.255.255.224(*1) (The value same as that of the subsystem subnet mask is set.)
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0/ 255.255.255.224(*1)	Micro revision 0653/B or earlier: 192.168.0.××× ("xxx" is any value from 1 to 254 except 16, 17.) Micro revision 0653/C or later: 192.168.0.××× ("xxx" is any value from 1 to 30 except 16, 17.)	255.255.255.0/ 255.255.255.224(*1) (The value same as that of the subsystem subnet mask is set.)

*1 : Micro revision is 0653/C or later.

- Automatic change of network parameters of the Port 0 (for maintenance)
  Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
  When the network address of the Port 1o9 (for users) is set as “10.*.*.*”, that of the Port 0 (for maintenance) is changed as shown below.
  However, if the network address of the LAN device connected to Port 1 (Users) via the Gate Way accords with that of Port 0 (Maintenance), they will collide each other, disabling to communicate normally.

  Microprogram revision 0653/B or earlier
  (i) When the Port 1(Users) address is set to other than “10.*.*.*”, “10.*.*.*” cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than “10.*.*.*”.
  (ii) When the Port 1(Users) address is set to “10.*.*.*”, “192.168.0.*” cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than “192.168.0.*”.

  Microprogram revision 0653/C or later
  (i) When the Port 1(Users) address is set to other than “10.*.*.*”, “10.0.0.(0 to 31)” cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than “10.0.0.(0 to 31)”.
  (ii) When the Port 1(Users) address is set to “10.*.*.*”, “192.168.0.(0 to 31)” cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than “192.168.0.(0 to 31)”.

Network parameter	Description	Control Unit#0	Control Unit#1
		Port 0 (Maintenance) < Fixed IP >	Port 0 (Maintenance) < Fixed IP >
IP Address	The IP Address is changed/set up.	192.168.0.16	192.268.0.17
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.0/ 255.255.255.224(*1)	255.255.255.0/ 255.255.255.224(*1)
Default Gateway	The Default Gateway is changed/set up.	0.0.0.0	0.0.0.0
DHCP	Enable/Disable of the DHCP function is set up.	OFF	OFF
*1 : Micro revision is 0653/C or later.			

3.3.4 Connecting Maintenance PC and LAN cables

Prepare a PC in which Disk Array management program 2 is installed.
Remove the LAN Cover of the Control Unit #0 in the subsystem and connect the PC and the subsystem with the LAN cross cable.

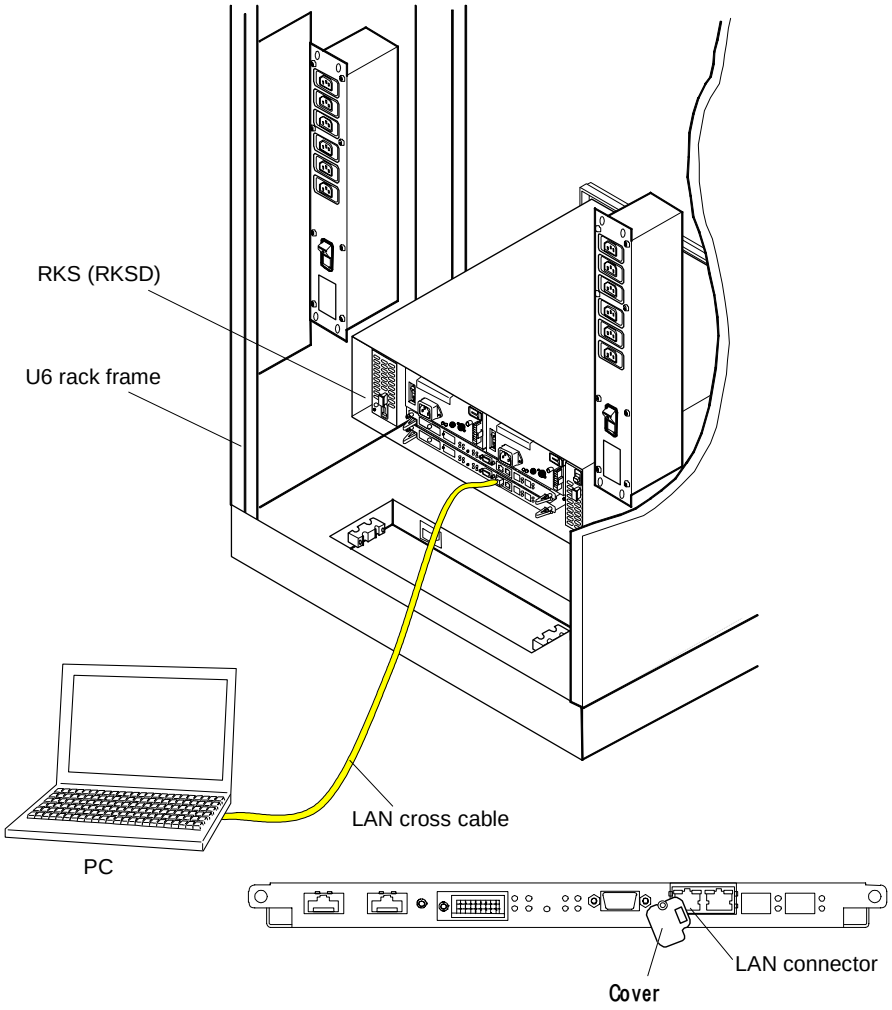


Figure 3.3.6 Connecting the maintenance PC

When removing the PC, disconnect the LAN cross cable from the Control Unit #0 and reinstall the cover.

3.3.5 Replacing/Adding Control Unit

All figures inserted in the work procedure show the rackmount model with the Power Units installed.

⚠ CAUTION

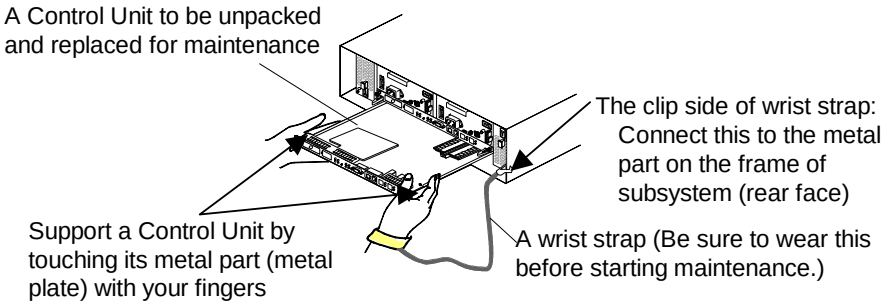
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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.



(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 Subsection 5.1.1, “Confirming cancellation of the cache backup state” on page MNTE 05-0030 in the DF600 Disk Array Subsystem Maintenance Manual -- Part on Maintenance.)
When the cache is in the cache backup state, make the addition after canceling the mode.

(3) Make sure that the CACHE POWER LED (green) on the Controller 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.

(4) Turn off the AC Power Unit Switches/DC Power Unit Switches #0 and #1 of the Power Unit/Power Unit (DC) in the subsystem.
(5) When making upgrade to a subsystem with the single controller system, remove the Control Unit by loosening its left and right fastening screws and pulling it out.
When making upgrade to a subsystem with the dual controller system, remove the Control Unit and the Dummy (Control Unit) by loosening their left and right fastening screws and pulling them out.
(6) Mount the Cache Units, which are mounted on the Cache Unit for the 9530V, on the Control Unit for the 9570V in a set of two.
(7) Insert the Control Unit #0 to be added in the predetermined position with its right and left levers being raised, and then return the levers in the respective directions shown by the arrows (→) at the same time (see Figure 3.3.7).
(8) Tighten the left and right fixing screws of the Control Unit.
(9) Connect the interface cable, and LAN cables.

NOTE: When bending the Fibre Channel 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.

(10) When making upgrade to a subsystem with the dual controller system, return to the item (6) and mount the Cache Units on the Control Unit #1 also.

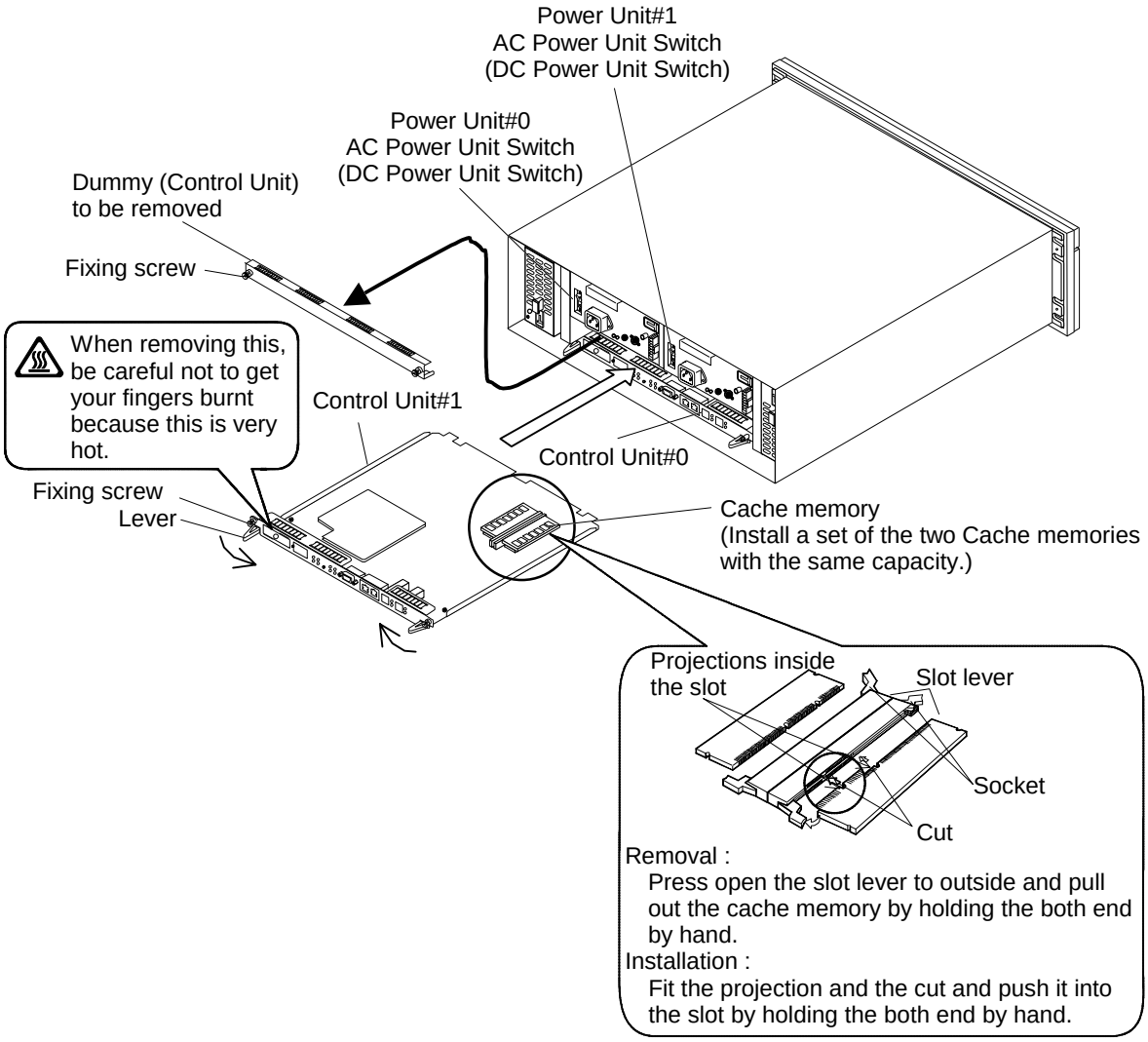
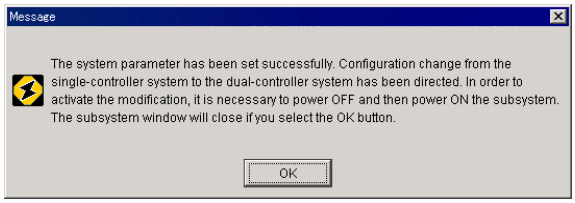


Figure 3.3.7 Adding Control Unit

(11) Turn on the AC Power Unit Switch (DC Power Unit Switch) of the Power Unit (Power Unit (DC)).
(12) Turn on the main switch.
(13) Make sure that the WARN (WARNING) LED (orange) flashes and the buzzer sounds. However, when the Dual ID Succession has been canceled, the RDY (READY) LED (green) comes on.
(14) Stop the buzzer from sounding and place the both Control Units #0 and #1 (in the case of the dual controller system) in the Maintenance mode.
(15) Change the serial number of the subsystem. (Refer to RSUP 0290)

(16) After changing the mode to Normal, turn off the main switch.
(17) Make sure that the PWR (POWER) LED (green) on the panel goes out.
(18) Turn on the main switch after waiting for one minute or longer.
(19) Make sure that the RDY (READY) LED (green) comes on.
(20) Change the system parameters and the port/host group information when necessary. (Refer to RSUP 0320)
(21) When upgrade from the single controller system to the dual controller system was made, set the system parameters in order to enable the subsystem to operate with the dual controller system. (Refer to RSUP 0320)
Besides, since the following message is displayed after the system parameters have been set, click the [OK] button.



(22) Turn off the main switch.
(23) Make sure that the PWR (POWER) LED (green) on the panel goes out.
(24) Turn on the main switch after waiting for one minute or longer.
(25) Make sure that the RDY (READY) LED (green) comes on.
(26) When the subsystem configuration was changed from single controller to dual controller, register the disk array subsystem with the dual controller configuration with Disk Array management program 2.
(27) When upgrade to the dual controller system was made, reset the system parameters for the Control Unit #1.

NOTE: Reset the system parameters for the Control Unit #1.

(28) Turn off the main switch.
(29) Make sure that the PWR (POWER) LED (green) on the panel goes out.
(30) Remove the LAN cable connected to the Control Unit #0.
(31) Turn on the main switch.
(32) Make sure that the RDY (READY) LED (green) comes on.

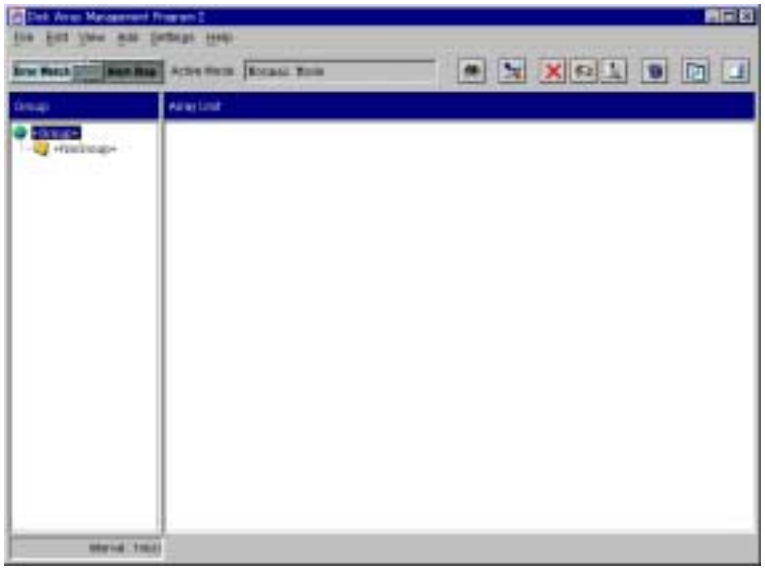
3.3.6 Registering Disk Array Subsystem

(1) Registering the newly introduced DF in the Disk Array management program 2

(a) Activating the Disk Array management program 2

(i) Execute the batch file or shell script for activating the Disk Array management program 2.
In the case of Windows, activate the batch file, startmgr2.bat.

(ii) The Disk Array management program 2 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 Disk Array management program 2. 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 Disk Array management program 2 Active 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 Active Mode
- Display of the version

‡1 : The mode change cannot be done at the time of the initial activation of the Disk Array management program 2. A registration of a password validates the mode change.

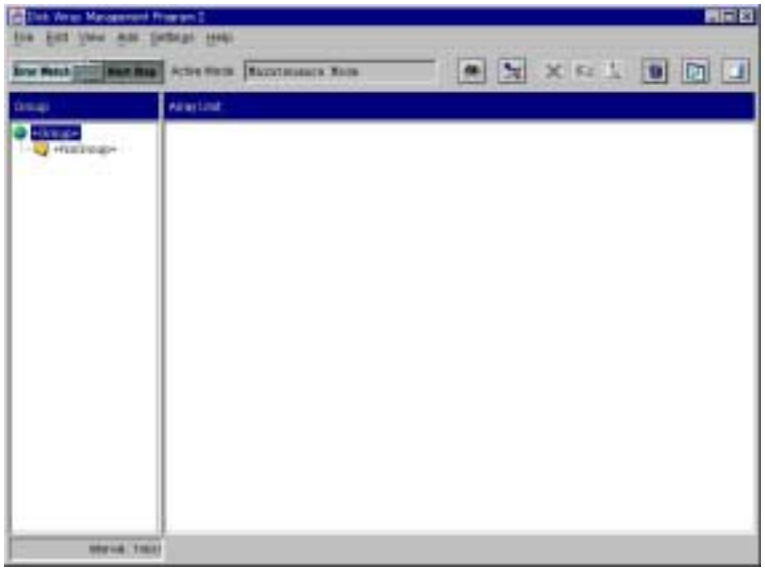
(b) Changing the Maintenance Mode

Disk Array management program 2 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 Active 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 [Active Mode] in the upper part of the main window.

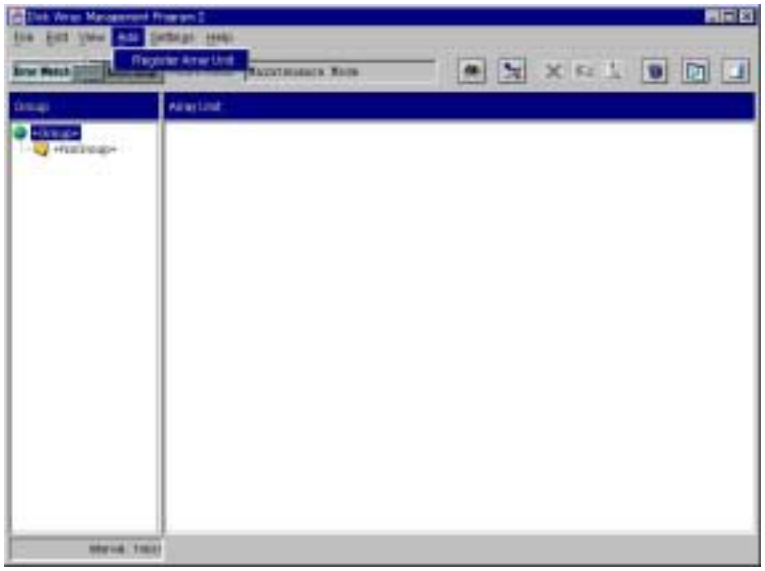
① In the main window, position the focus ([ ]) on the icon [] of the array subsystem register by pressing the [Tab] key, and then press the Ctrl, Shift, and E keys at the same time.
Maintenance Mode is displayed in the Active Mode field at the top right on the Main screen, and the Disk Array Management Program operates in the maintenance mode.



(c) Registering the disk array subsystem

Register the disk array subsystem to be operated in order to operate it from the Disk Array management program 2. A temporary registration of the disk array subsystem which does not exist cannot be done.

(i) Select [Registering Array Unit] in the main window or click [: Array Unit Registering].



(ii) Enter the information for the registration and click the [OK] 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 maintenance PC connected Controller only.
• 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.



[Group Name] : 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.

[Array Unit 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 _).

[Array Unit Type] : Select a type of the disk array subsystem.

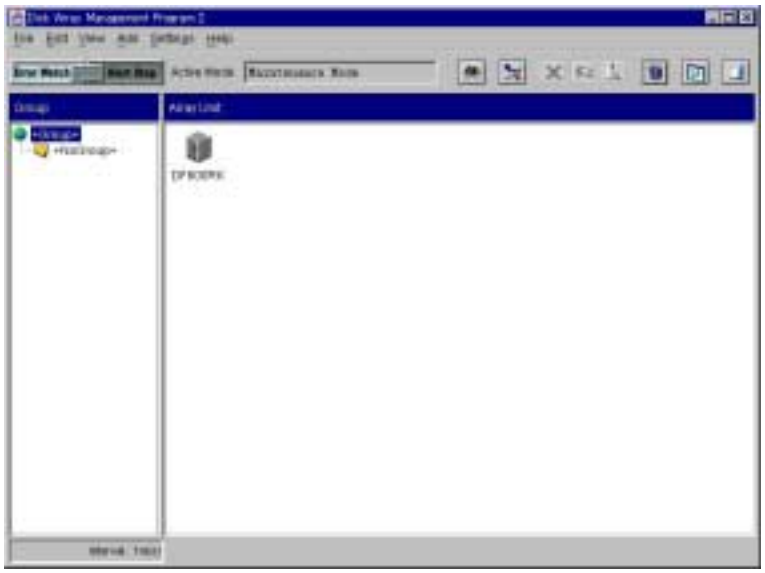
[Connection Type] : Select a type of the connection to be used for the disk array subsystem.
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

[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) Since 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.

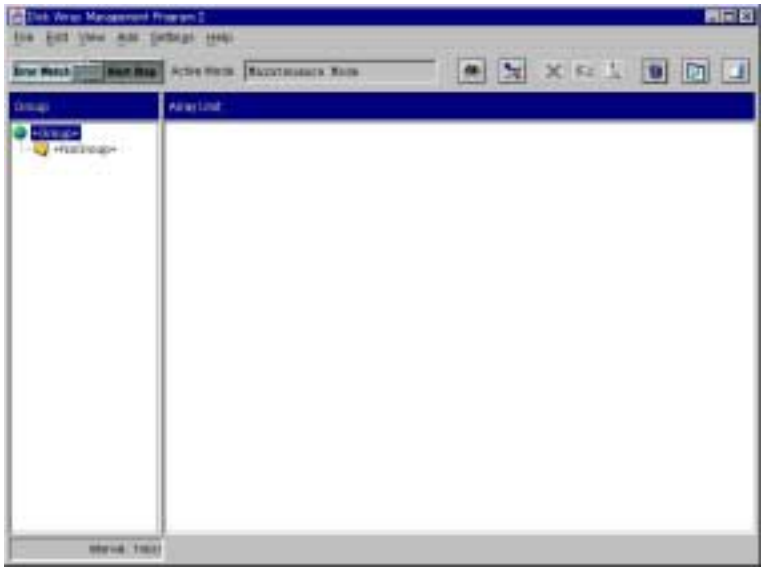
- Icon for the dual system : 
- Icon for the single system : 

The icons of the disk array subsystem are displayed in the order of the registration of the disk array subsystems.

(d) Changing the Maintenance Mode to the Normal Mode

Change the Active 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 [Active Mode] in the upper part of the main window.

(i) Select [File] – [Change Mode] in the main window or click [: Change Mode].



(ii) The message asking for the confirmation is displayed. Click [OK] button.



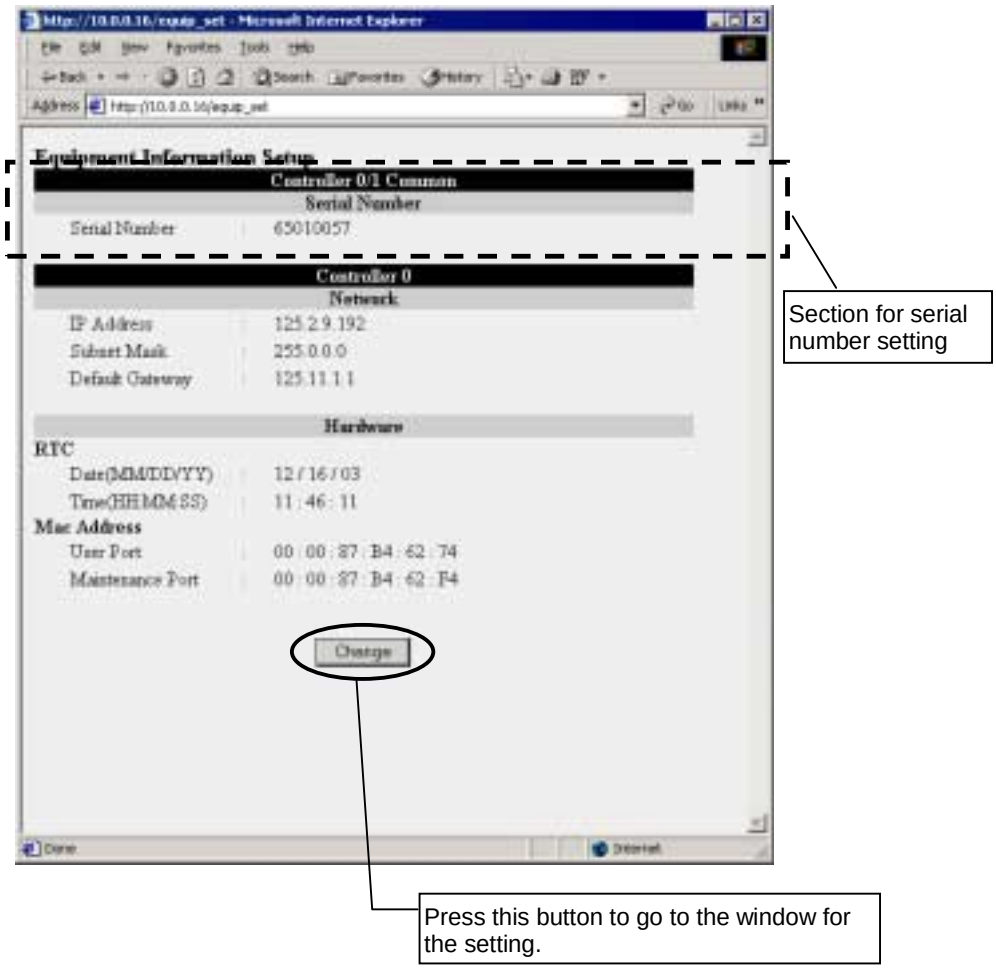
(iii) [Normal Mode] is displayed for the [Active Mode] in the upper part of the main window. When the unit window is displayed, the Disk Array management program 2 operates in the [Normal Mode].

3.3.7 Change the Serial Number

(1) Enter the following URL into the address bar of the browser and place the subsystem in the Maintenance mode.
URL http://(IP address of the subsystem)/equip_set
The current settings are 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) Click the [Change] button.



(3) The serial number that has been set is displayed in the Serial Number section. The serial number that has been set is displayed in the title frame for the Normal/Maintenance mode.

Table 3.3.2 List of Items Concerning Setting of Serial Number

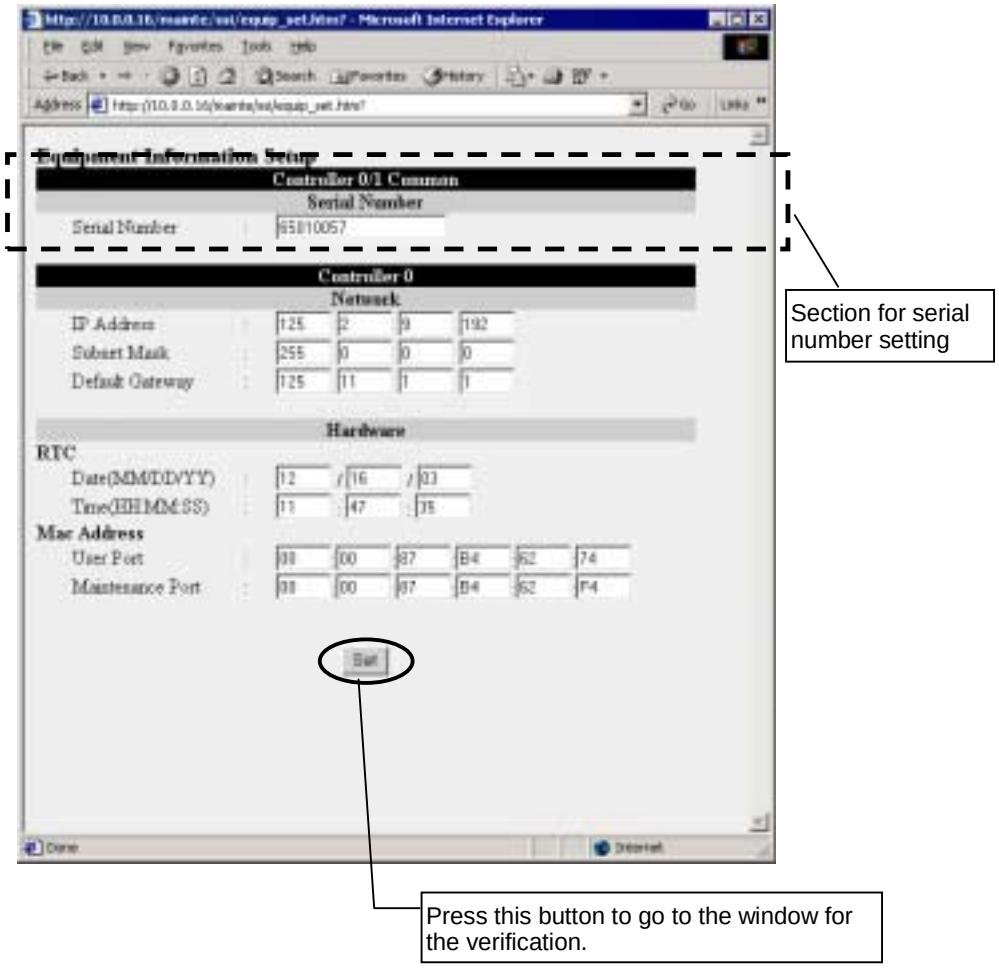
Major item title		Serial Number
Detailed item name		Serial Number
Setting	Expression form	Eight figure decimal number (When the setting is invalid, the number is replaced with eight hyphens ('-').)
	Reference	System parameter

(4) Change the serial number from 62aaaaaa to 65bbbbbb and press the [Set] button. (65bbbbbb: New number indicated on the WWN label and the model name label) The serial number is expressed as an eight figure decimal number.

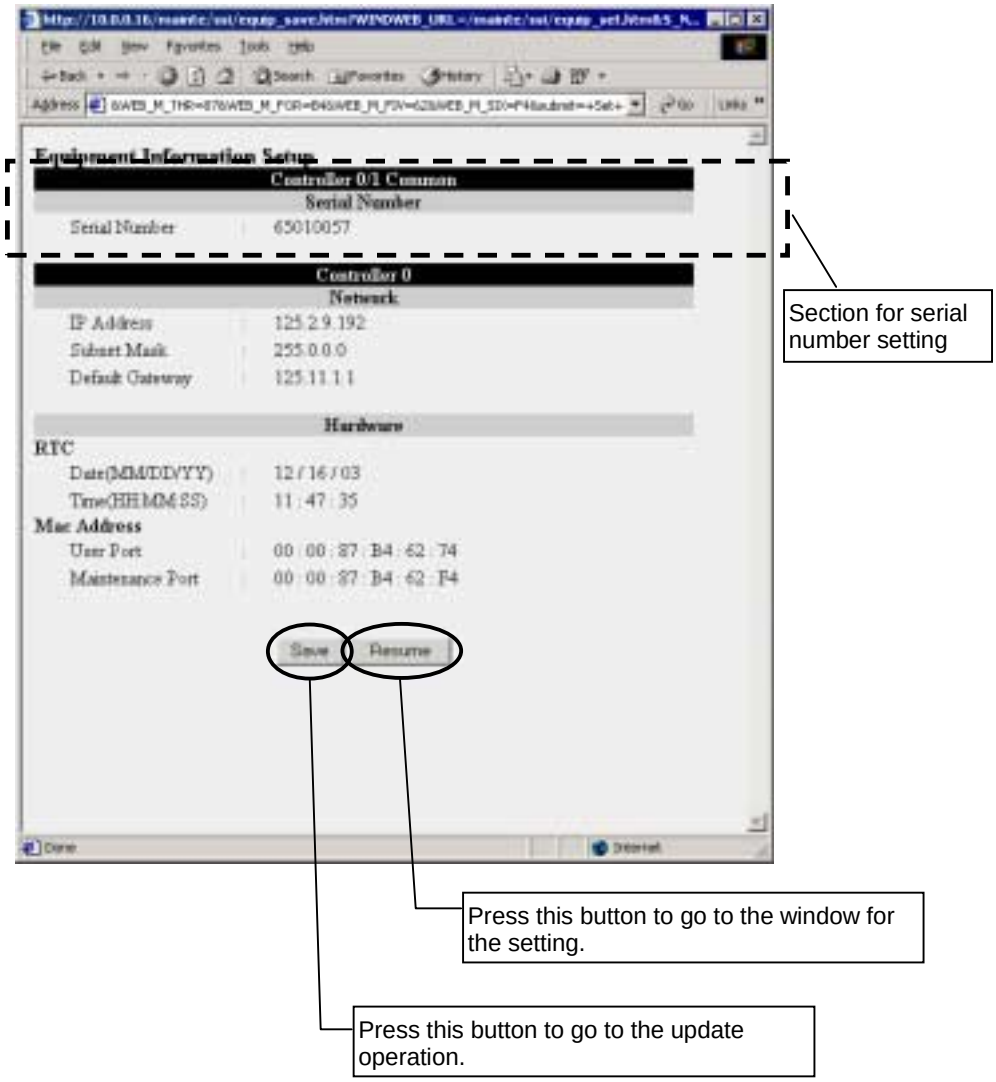
Organization of serial number.--- "abnnnnnn" (Eight figure decimal number)

ab : Kind of disk array unit (RKSD-61、RKS-62、RKD-63、RK-65)

nnnnnn : Serial number (010000 to 999999)



(5) Make sure that the setting to be made is correct and press the [Save] button.

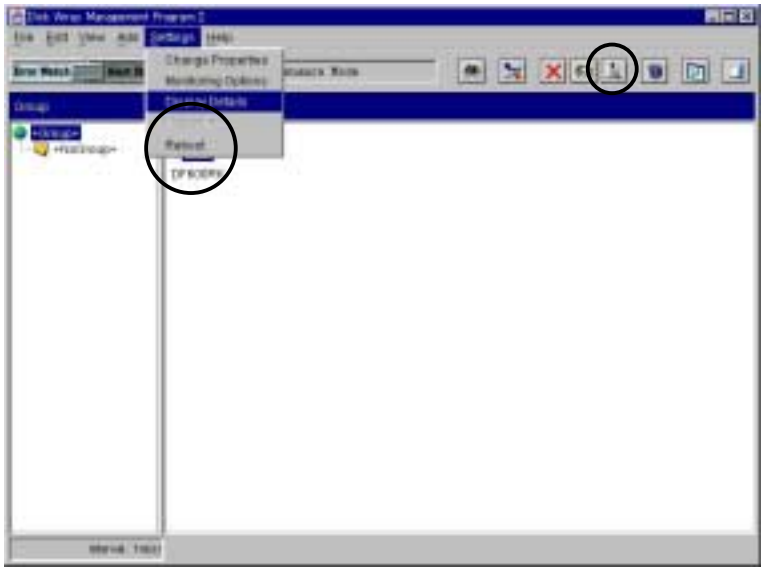


3.3.8 Setting of System Parameters

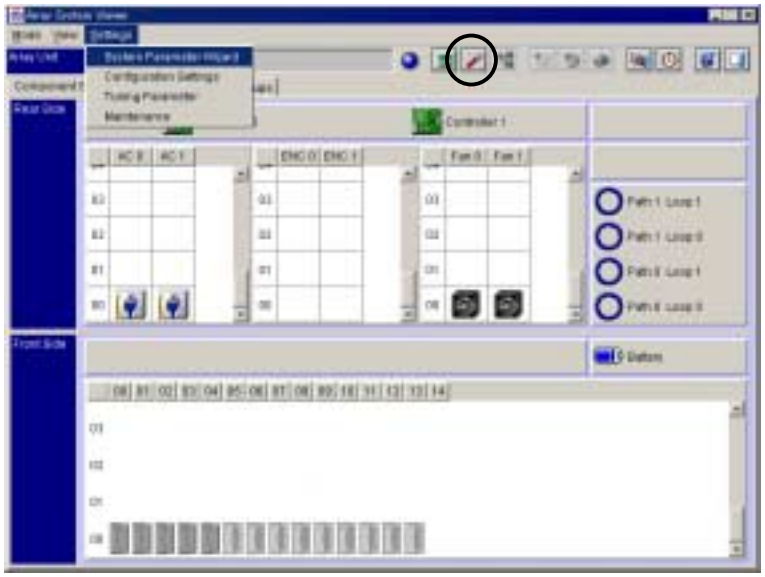
The procedures for setting a system parameter from the Disk Array management program 2 are described.

(1) Start the Disk Array management program 2 and set the Active Mode in the "Maintenance Mode".

(2) Click an icon of the disk array subsystem you want to set in the main window. There are three ways of the setting as shown below.
- Selecting [Set] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]



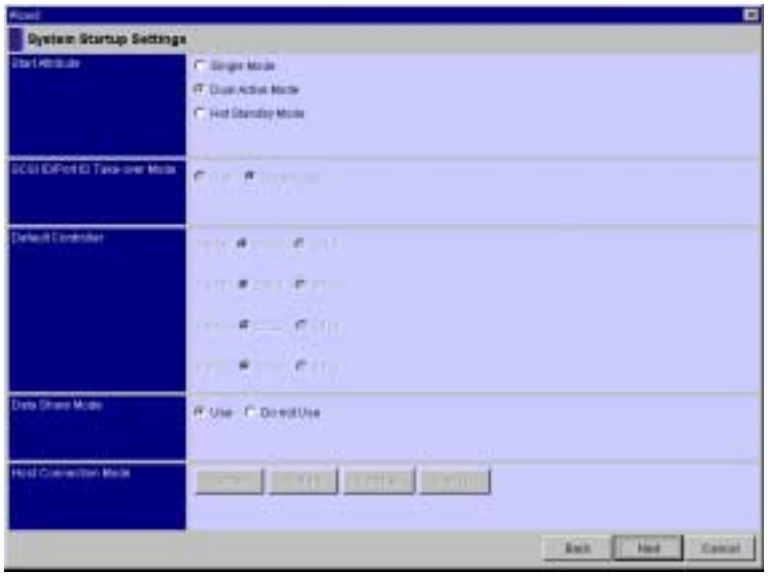
(3) Select [Settings] – [System Parameter Wizard] in the unit window or click [: System Parameter Wizard] button.



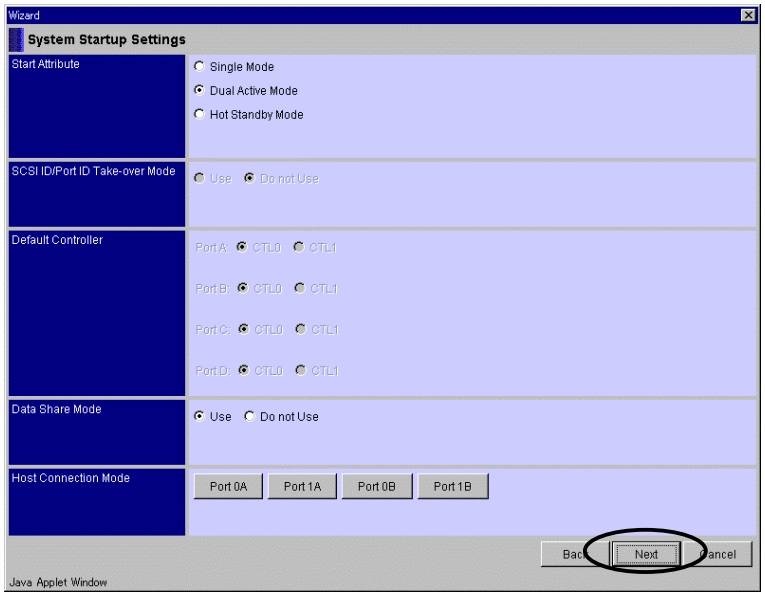
(4) Select “Basic Settings” and click the [Next] button.



(5) Check that “System Startup Settings” is displayed.



(6) Displayed starting with [System Startup Settings].
The window displays the items that are currently set. Check the displayed contents on the window and set each displayed item to the desired configuration.



[Start Attribute] : Select the configuration of the array unit.
[Single Mode] : Single configuration
[Dual Active Mode] : Dual active configuration
[Hot Standby Mode] : Hot standby configuration

[SCSI ID/Port ID Take-over Mode]: Specifies the take-over of SCSI ID/port ID.
[Use] : Used the SCSI ID/Port ID Take-over Mode.
[Do Not Use] : Not used the SCSI ID/Port ID Take-over Mode

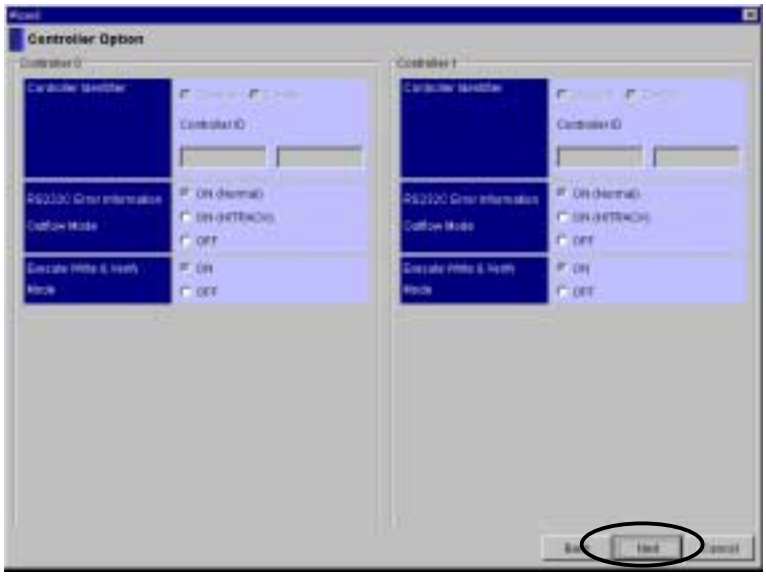
[Default Controller] : Specify a controller that controls the port.
The specification can be made only when the SCSI ID/Port ID Takeover mode is specified.

[Data Share Mode] : Specifies the attribute of the data share mode.
[Use] : Used in the data share mode.
[Do Not Use] : Not used in the data share mode.

[Host Connection Mode] : This item cannot be set for the DF600.

(7) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

(8) Displayed starting with [Controller Option].
The window displays the items that are currently set.
Check the displayed contents on the window and set each displayed item to the desired configuration.



[Controller Identifier] : Setting of this item is not necessary for the DF600.

[RS232C Error Information Outflow Mode] : Sets the mode of the error information sending to the RS232C of the controller 0/1.

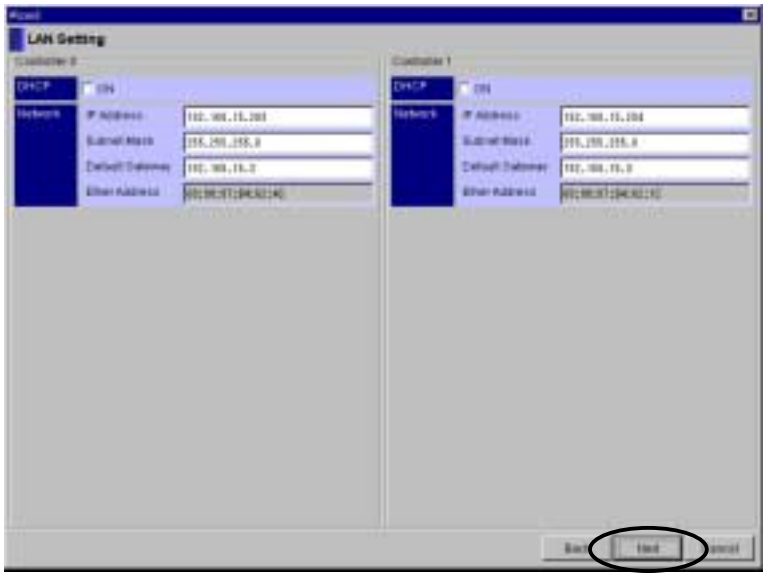
- [ON (Normal)] : Outputs information.
- [ON (HITRACK)] : Outputs HITRACK mode information.
- [OFF] : Inhibits an output of information.

[Execute Write & Verify Mode] : Sets the write & verify execution mode of the controller 0/1.

- [ON] : Executes write and verify.
- [Off] : Does not execute write and verify.

(9) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

(10) Displayed starting with [LAN Setting].
The window displays the items that are currently set.
Check the displayed contents on the window and set each displayed item to the desired configuration.



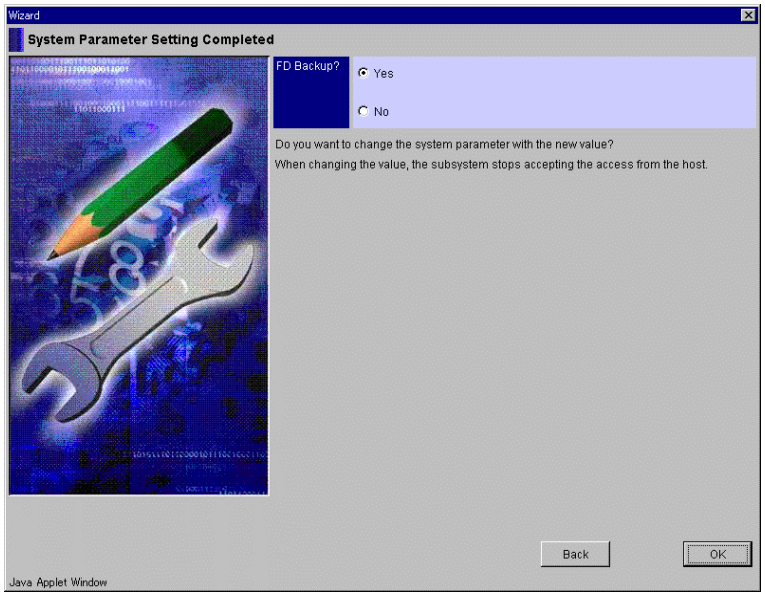
[DHCP] : Sets the DHCP function
When the check box of the [DHCP] is checked, the DHCP mode is validated.

[Network] : Sets the LAN parameter.
When the check box of the [DHCP] is checked, this item is grayed and cannot be set.

- [IP Address] : Sets the IP address.
- [Subnet Mask] : Sets the subnet mask.
- [Default Gateway] : Sets the default gateway.
- [Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

(11) Verify that the settings that have been made are correct and click the [Next] button.
When the [Return] button is clicked, the preceding window is displayed.
To abort the setting, click the [Cancel] button.

(12) Click the [OK] button.
Incidentally, the “FD backup” cannot be set for the DF600.

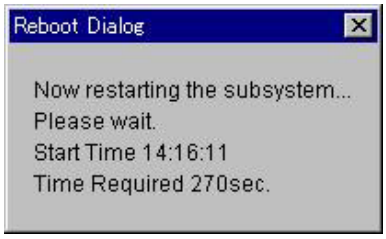


(13) If system parameter setting is completed, the following window is displayed.
Click the [OK] button.



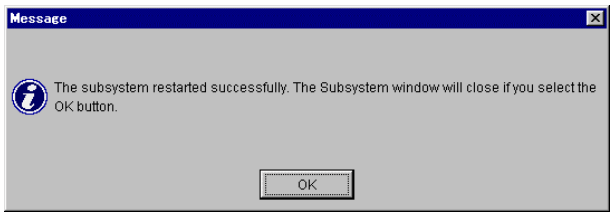
To validate the target ID which has been set, it is required to restart the subsystem.

(14) When the disk array subsystem is restarted, a time when the restarting is commenced is displayed. The restarting requires about two to six minutes.



NOTE : It may take a long time until a reply is made depending on the status of the disk array subsystem. If no reply is made after waiting for longer than ten minutes, check the status of the disk array subsystem.

(15) As a message is displayed when the restart has been completed, click the [OK] button.



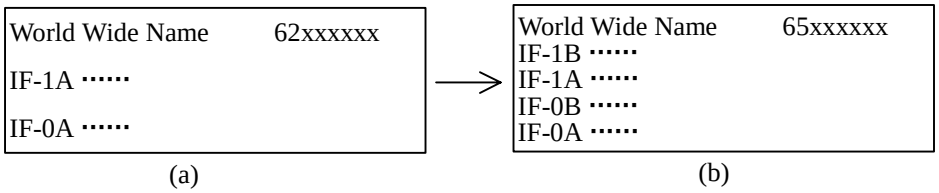
When the [OK] button is clicked, the unit window is closed.

NOTE : Although an alarm may be issued depending on the version of Disk Array management program 2 when the subsystem is restarted, proceed to the following steps.

(16) Quit Disk Array management program 2 by selecting [File] and [Close] in this order or click the [ : Close] button in the main window.

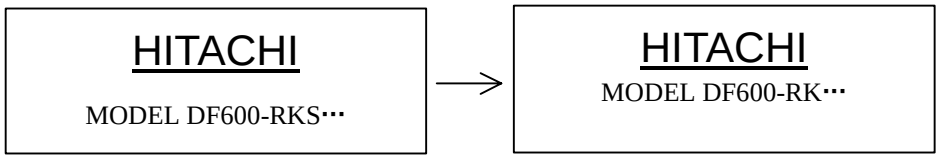
3.3.9 Replacing Label

Replacement of the following labels.
Peel off the labels (a) and affix the labels (b).



(a) (b)

Figure 3.3.8 WWN Label

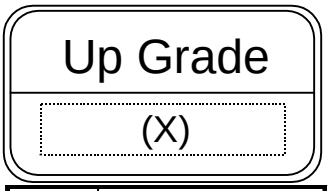


(a) (b)

Figure 3.3.9 Model Name Label

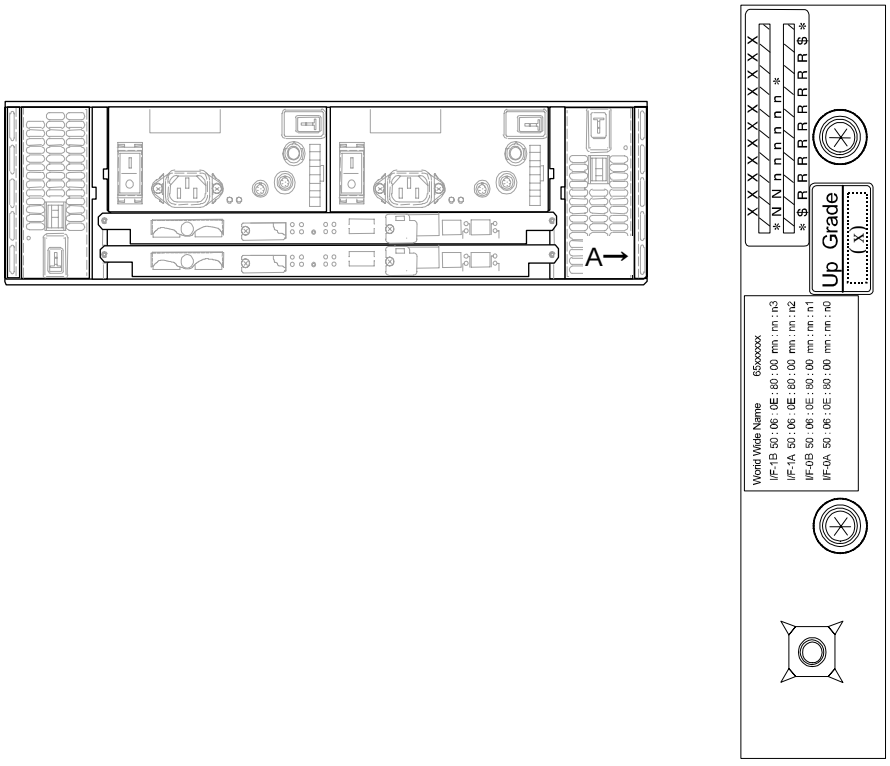
3.3.10 Affixing Label

After the upgrade work is completed, affix the Upgrade Label to the position A (see Figure 3.3.11) on the rear side of the subsystem.



Symbol	Notation character
(X)	RSUP

Figure 3.3.10 Upgrade Label



The figure from A

Figure 3.3.11 Rear Side of the Array Unit

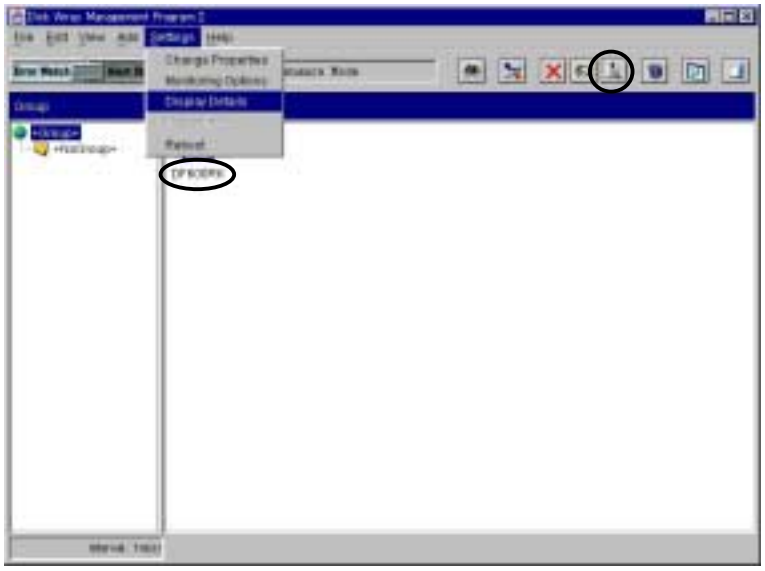
3.4 Appendix

3.4.1 Back up the system parameters and port/host group information

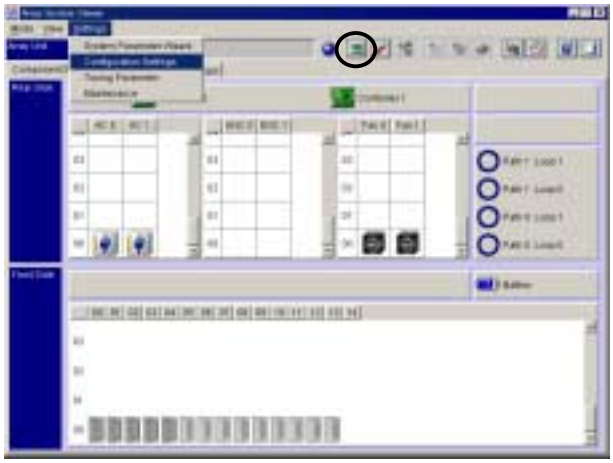
NOTE : If the setting is changed while an I/O is being executed, the I/O may be abnormally stopped or the succeeding I/O may be unable to be executed. Therefore, change the setting after stopping the I/O.
Besides, the setting on the host computer side must be changed depending on the host computer.

Operation as described below.

(1) Turn on the power supply.
(2) Start the Disk Array management program 2 and set the Active Mode in 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 setting as shown below.
- Selecting [Set] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [: Display Details]



(4) Select [Set] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



(5) 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.

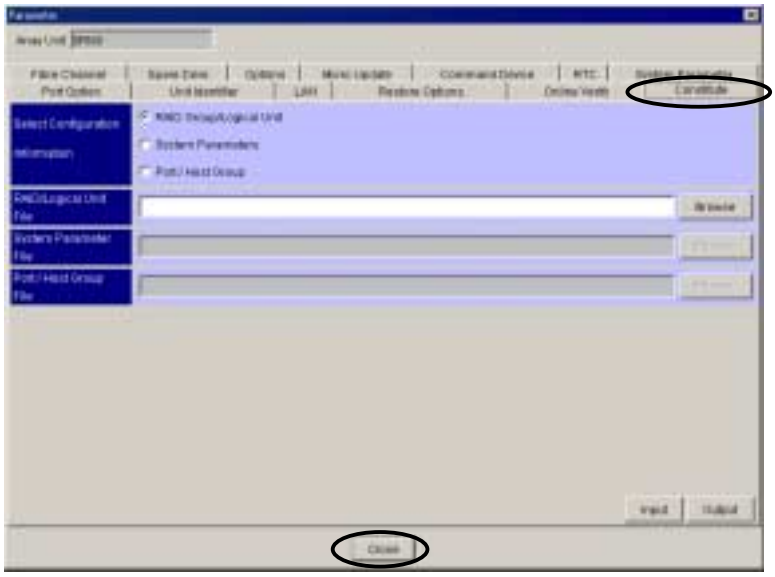
The configuration to be set includes RAID group/logical unit, system parameters, and port/host group information.

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.

(a) Click the [Constitute] tab. The window for setting the "Constitute" is displayed in the Parameter window.



① [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.
[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.

② [RAID/Logical Unit File] : This item can be set when the "RAID Group/Logical Unit" radio button is selected from the [Selection of Configuration Information Copy].
Select a directory and file name for an input/output by clicking the [Reference] button.

③ [System Parameter File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].

④ [Port/Host Group File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].
Select a directory and file name for an input/output by clicking the [Reference] button.

⑤ [Input] : Selected information is loaded and set with a specified file name.

⑥ [Output] : Selected information is output to a text file with a specified file name.

(b) To terminate the setting, click the [Close] button.

3.4.2 For Setting Changes in Host Computer and Others

When upgraded from Thunder 9530V to Thunder 9570V, the Disk Array subsystem shows the following changes.

No.	Name of Items	Thunder 9530V	Thunder 9570V	Existence of Limits
1	Subsystem Product Serial Number	620xxxxx	650xxxxx	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 ・Inquiry Product Serial Number ・Product Serial Number of Inquiry ・Subsystem ID
2	World Wide Name	-	-	By registering the subsystem product serial number to Thunder 9570V in the Subsystem Maintenance Mode and rebooting the subsystem, WWN on Front End Fibre Channel is changed to the different value from Thunder 9530V after Thunder 9530V Ready, Front End Fibre Channel can be used, and the LU recognition from the upper Host enables.
3	Inquiry	D60J	D600	Product Serial Number After upgrading from Thunder 9530V to Thunder 9570V, Thunder 9570V responds to D600.
4	Subsystem ID	Default is the last 4 digit subsystem product serial numbers.	Default is the last 4 digit subsystem product serial numbers.	After upgrading from Thunder 9530V to Thunder 9570V, Thunder 9570V succeeds the subsystem ID of Thunder 9530V. When the subsystem can be used in Thunder 9570V, you may use it without any changes. If customer use limits exist as Thunder 9530V is continuously used or, for management purposes, the subsystem ID needs to be unified to the last 4 digit subsystem product serial numbers, change the subsystem ID after upgrading Thunder 9570V. However, whether or not changing the subsystem ID, the RAID Manager should reboot once at the time of reconnecting the RAID Manager from Thunder 9530V to Thunder 9570V.

The device file name changes due to World Wide Name change. Following the change, OS reconstruction is needed.

The upgrading operation from Thunder 9530V to Thunder 9570V is new device addition image for OS. However, as different from new device addition, 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 AIX + HDLM is used.
  It is necessary to export the Volume Group before upgrading and import the Volume Group after upgrading.

- 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 IRIX is used.
  It is necessary to execute the device recognition and mapping file making again after upgrading and reboot the Host.

- When Windows2003 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.
  (1) For UFS: It is necessary to mount with the new device.
  (2) 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

- When Fabric Switch is used and WWN executes zoning.
  Execute the zoning setting review since WWN is changed.

Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Dec.18.2003				All	Issued	-

Thunder9580V to Thunder9585V Upgrade Procedures

Rev.0

Contents

1. Outline ····· HUP-0020
2. Components and Tools Required for Upgrade ····· HUP-0030
3. Upgrade Work ····· HUP-0040
3.1 Prerequisites ····· HUP-0040
3.2 Before Starting Upgrade Work ····· HUP-0040
3.3 Notes ····· HUP-0050
3.4 Upgrade Work ····· HUP-0060
3.4.1 User's Data Backup and Connection Host Setting ····· HUP-0080
3.4.2 Unpacking upgrade kit ····· HUP-0080
3.4.3 Connection of the maintenance PC ····· HUP-0090
3.4.4 Changing mode of DAMP and registering disk array subsystem ····· HUP-0120
3.4.5 Updating installation of microprogram for Thunder 9585V ····· HUP-0160
3.4.6 Replacing Control Unit ····· HUP-0470
3.4.7 Connect the maintenance PC to the disk array subsystem ····· HUP-0810
3.4.8 Setting the IP address ····· HUP-0810
3.4.9 Affixing Label ····· HUP-0830
4. Trouble Analysis ····· HUP-0840
4.1 Downgrade ····· HUP-0840
5. Appendix ····· HUP-0850
5.1 Back up the system parameters and port/host group information ····· HUP-0850
5.2 List of Parameter Settings for Disk Array Subsystem ····· HUP-0880

1. Outline

This procedure manual describes the operation procedure to upgrade the Disk Array subsystem from Thunder 9580V to Thunder 9585V with the data stored. Procedures concerning the whole system such as a system configuration change are not included.
In this procedures, the basic disk array unit of the Thunder 9580V (Model name: DF600-RKH) is described as “RKH”. In the same way, the basic disk array unit of the Thunder 9585V (Model name: DF600-RKHE) and the additional disk array unit (Model name: DF600-RKA) are described as “RKHE” and “RKA” respectively.

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		
		Model	Part name	Quantity
9580V ⇒ 9585V	DF-F600-F2HUP	Controller	DF-F600-F2HH (Excluding DF-F600-DH2G2, DF-F600-C5122H/C1GX2H)	2
		CD-ROM for installation of the microprogram for the Thunder 9585V	-	1
		Upgrade label	-	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 maintenance PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium II (233 MHz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended) • Disk Array Management Program 2 (GUI) (Ver 9.40 or later) • TDCONV analysis tool (Ver.0615 or later) • IE 5.5 or later

The following manuals are required for the upgrade procedures.

Table 2.3 Manuals Required

No.	Manual name	Object	Usage
1	Upgrade Procedures	For the upgrade procedure reference.	Attached to the upgrade kits
2	TDCONV manual	For checking the upgrade procedure system parameter.	Maintenance base position
3	DF600 Maintenance manual	For the recovery method reference when trouble occurs.	Maintenance base position
4	HDML user's guide	For checking the host parameter.	Customer preparation
5	Attached materials for HDML software	For checking the host parameter.	Customer preparation
6	HDML hardware note	For checking the host parameter.	Customer preparation

3. Upgrade Work

3.1 Prerequisites

- The Thunder 9580V to be upgraded must be in the state in which no failure has occurred.
- Use the version 9.40 or later for the Disk Array Management Program 2. If it is before the version 9.40, special purchase is required. In this procedures, the Disk Array Management Program 2 is described as “DAMP”.

3.2 Before Starting Upgrade Work

If a wrong operation is done in a upgrade work, it is feared that user data stored in the subsystem is lost.
In order to provide against the unlikely accident, perform the following before starting upgrade work.

(1) Back up user data.
Backup user data stored in the subsystem by operating a host computer.

(2) When performing the upgrade, it is required to install the microprogram from the CD-ROM using a service PC connected via a LAN.
- Prepare a PC in which a version of DAMP, which corresponds to the microprogram to be installed, is installed.
  The PC must fit the LAN environment and have a CD-ROM drive.
- LAN cross cable
- CD-ROM for installation of the microprogram for the Thunder 9585V (microprogram revision 1657/x or later).

(3) If the upgrade fails by any chance, perform the operation to return to the original. (Refer to F2HUP-0840)
Prepare for the following.
- The microprogram installation CD-ROM used in the configuration (Thunder 9580V configuration) before the upgrade.

3.3 Notes

- Do not upgrade the two or more disk array subsystems at the same time in order to prevent a mistake.
- Do not change the ports for connecting the fibre channel interface cables when the upgrade is made.
- An IP address that is used before the upgrade is succeeded to. Reset it as occasion demands.
- Collect the simple trace before starting the upgrade operation. (Refer to the DF600 Maintenance Manual.)
- If any trouble occurs in this operation, refer to the DF600 Maintenance Manual for recovery.

3.4 Upgrade Work

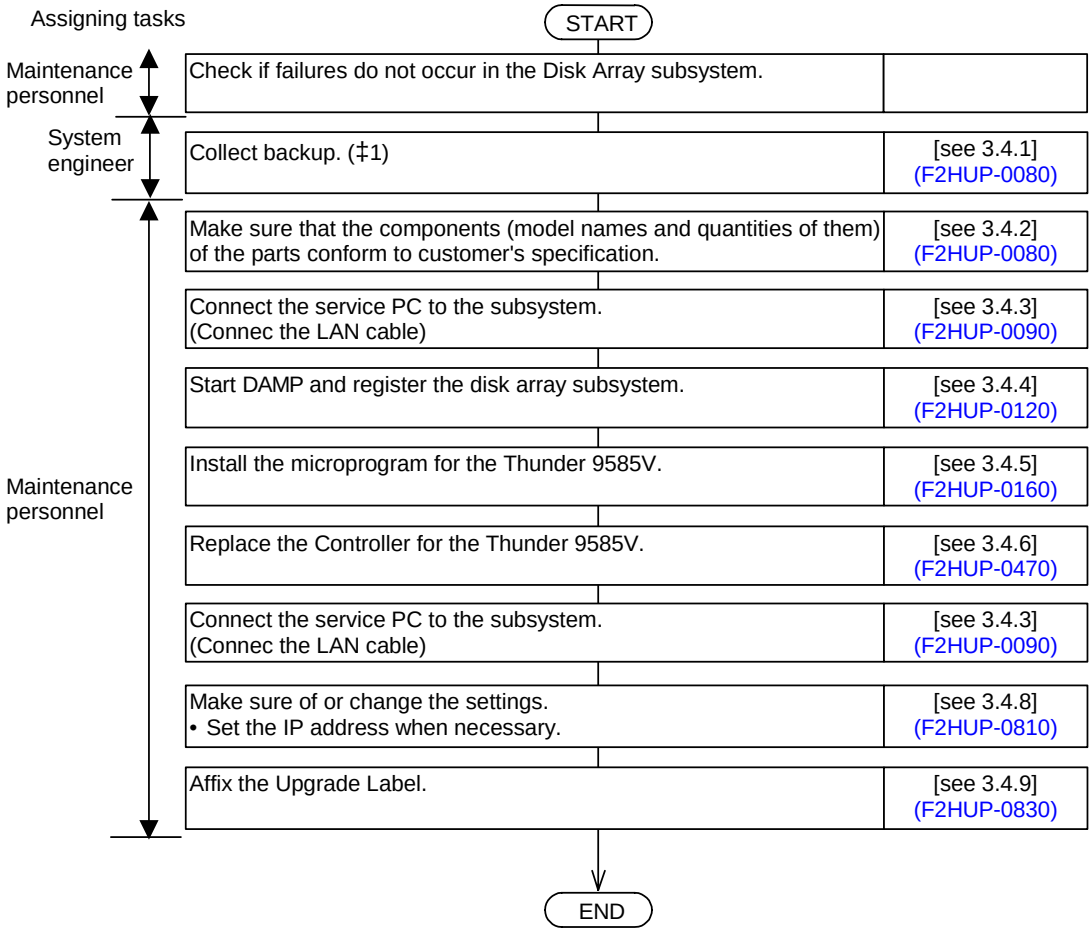
CAUTION

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.**

The procedure for upgrading the Thunder 9580V to the Thunder 9585V is shown below. Execute the procedure after making sure of the work to be done in each step.



‡1 Maintanance personnel should check if customers executed users' data backups. Without the backups, the upgrade cannot be executed.

3.4.1 User's Data Backup and Connection Host Setting

A danger to lose the user's data may arise if fails the upgrade procedures. To prepare for an emergency, all the Disk Drive data mounted on Thunder 9580V should be backed up.

NOTE : Maintenance personnel should check if customers executed users' data backups.

3.4.2 Unpacking upgrade kit

Unpack the kit for the upgrade to Thunder 9585V and check if the packed contents (their model names, serial numbers, and quantities) are the same as those listed in the shipping list.

3.4.3 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) Be sure to use a version of DAMP (Version 9.40 or later) that corresponds to the microprogram to be installed. (Make sure that the activation file startmgr2.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.
  If the maintenance PC cannot be connected, set the value in No. 2.

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)	255.255.255.224 (At the time of shipment)	**10.0.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.224	**192.168.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**

• Automatic change of network parameters of the Port 0 (for maintenance)
Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
When the network address of the Port 1o9 (for users) is set as “10.*.*.*”, that of the Port 0 (for maintenance) is changed as shown below.

NOTE : However, if the network address of the LAN device connected to Port 1 (for users) via the Gate Way accords with that of Port 0 (for maintenance), they will collide each other, disabling to communicate normally.
(i) When the Port 1(for users) address is set to other than “10.*.*.*”, “10.0.0.(0 to 31)” cannot be used for the IP address for LAN device to be connected to Port 1(for users) through a gateway. Therefore, set the IP address to other than “10.0.0.(0 to 31)”.
(ii) When the Port 1(for users) address is set to “10.*.*.*”, “192.168.0.(0 to 31)” cannot be used for the IP address for LAN device to be connected to Port 1(for users) through a gateway. Therefore, set the IP address to other than “192.168.0.(0 to 31)”.

Network parameter	Description	Control Unit#0	Control Unit#1
		Port 0 (for maintenance) < Fixed IP >	Port 0 (for maintenance) < Fixed IP >
IP Address	The IP Address is changed/set up.	192.168.0.16	192.268.0.17
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.224	255.255.255.224
Default Gateway	The Default Gateway is changed/set up.	0.0.0.0	0.0.0.0
DHCP	Enable/Disable of the DHCP function is set up.	OFF	OFF

(2) Open the rear door of the rack frame.

(3) Connecting the LAN cross cable

1. Remove the LAN Cover of the Control Unit #0 in the RKH/RKHE and connect the PC and the subsystem with the LAN cross cable.

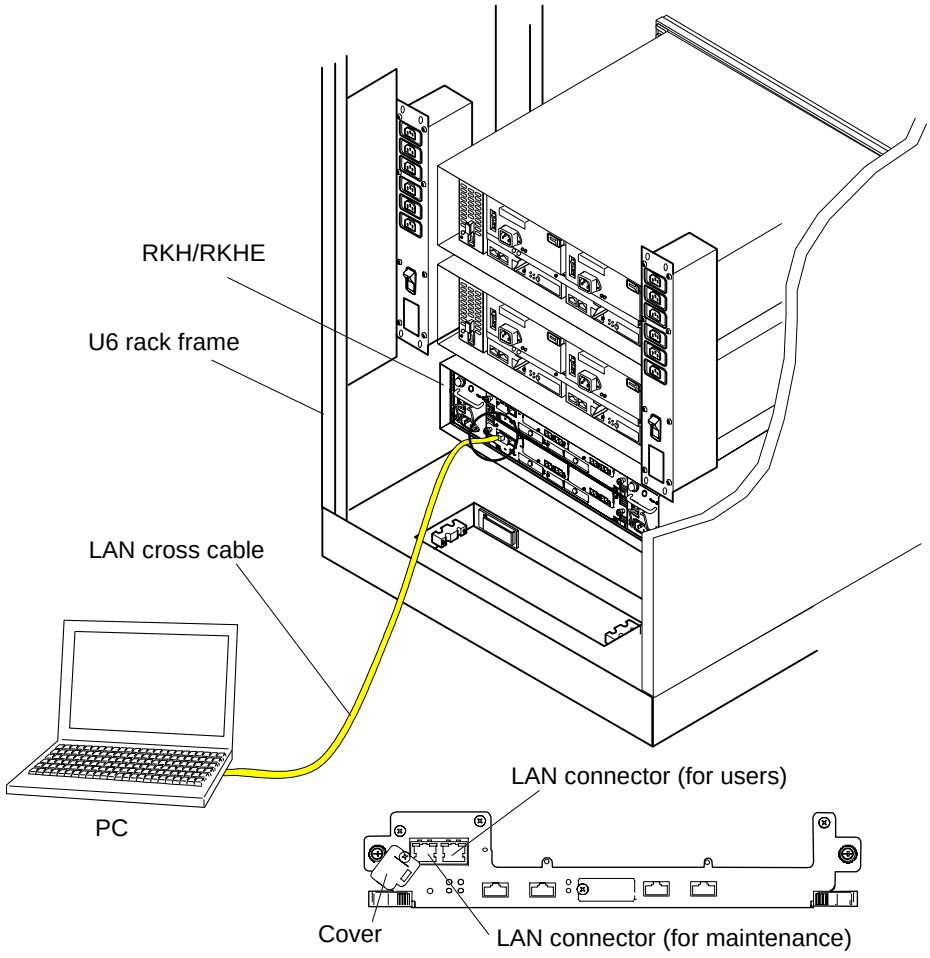


Figure 3.4.3.1 Connecting the maintenance PC

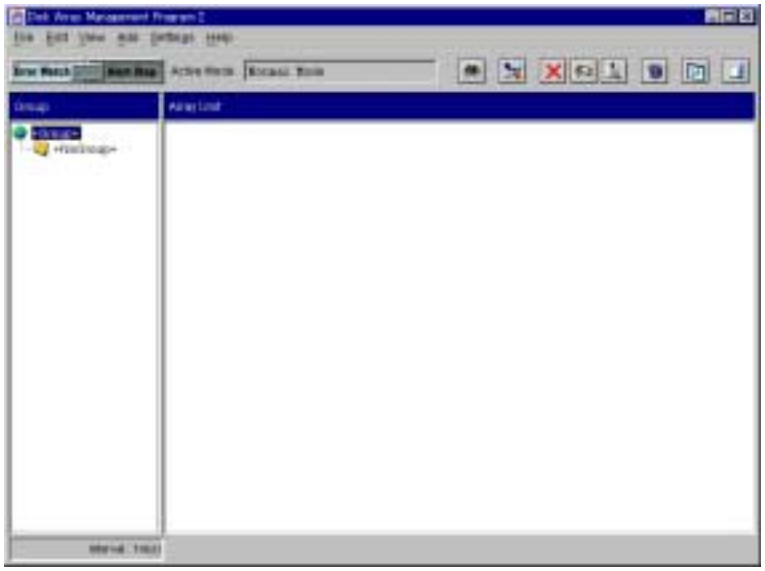
When removing the PC, disconnect the LAN cross cable from the Control Unit #0 and reinstall the cover, and close the rear door of the rack frame.

3.4.4 Changing mode of DAMP and registering disk array subsystem

Register the disk array subsystem using DAMP.
The procedure is shown below.

(1) Activating the DAMP

1. Execute the batch file or shell script for activating the DAMP.
   In the case of Windows, activate the batch file, startmgr2.bat.
2. The DAMP is activated in the Normal Mode and the main window is displayed(‡1).

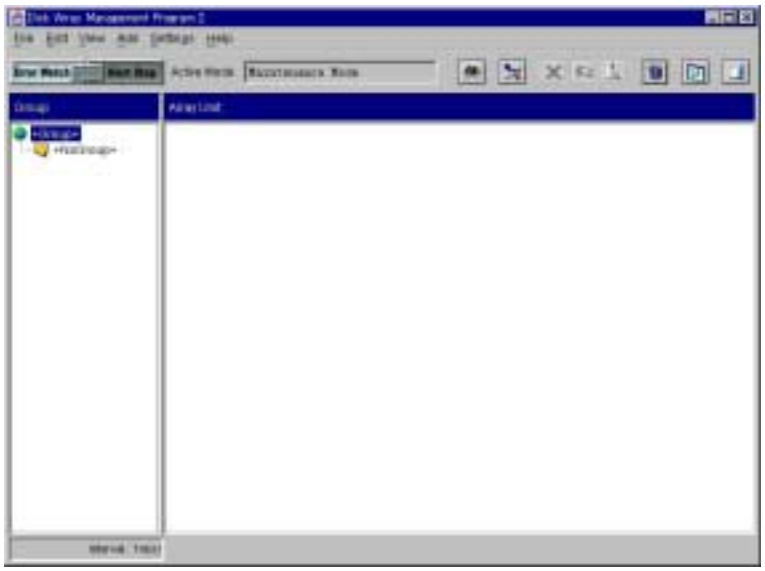


In the case of Windows, the prompt window is also displayed.
The prompt window has nothing to do with operation of DAMP. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.

‡1 : The mode change cannot be done at the time of the initial activation of the DAMP. A registration of a password validates the mode change.

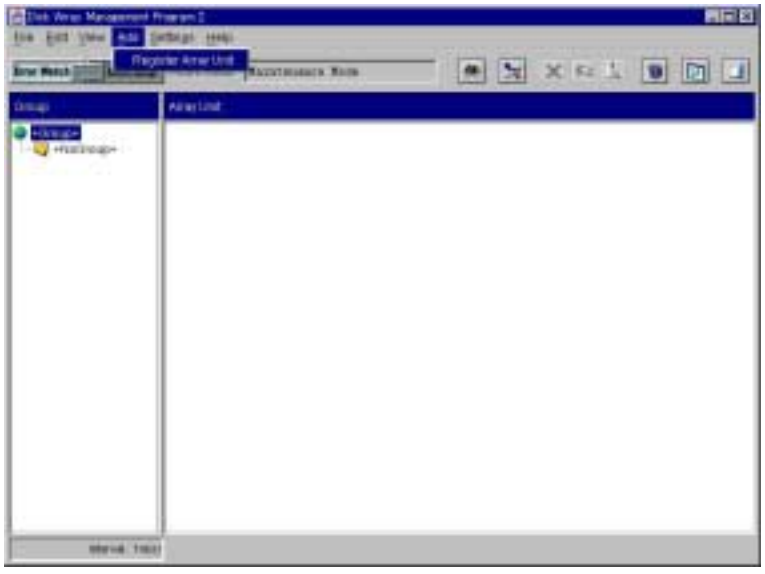
(2) Changing the Normal Mode to the Maintenance Mode

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 DAMP operates in the maintenance mode.



(3) Registering the disk array subsystem

1. Select [Registering Array Unit] in the main window or click [: Array Unit Registering].



2. Enter the information for the registration and click the [OK] 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 maintenance PC connected Controller only.
• 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.



[Group Name]: 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.

[Array Unit 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 _).

[Array Unit Type]: Select a type of the disk array subsystem.

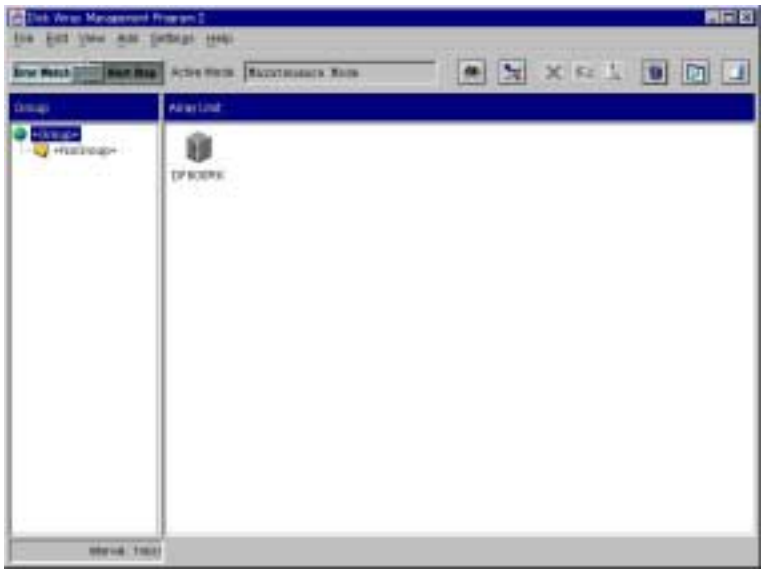
[Connection Type]: Select a type of the connection to be used for the disk array subsystem.
[IP Address, or Host Name]
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

[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.

3. Since a message informing of a completion of the registration is displayed, click the [OK] button.



4. 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.

3.4.5 Updating installation of microprogram for Thunder 9585V

Install the microprogram for the Thunder 9585V (the latest revision later than Rev. 1657) using the DAMP.

NOTE : If the microprogram used in the array subsystem before upgrading is Rev.1657 or later, this update installation operation is not necessary.
Go to 3.4.6.

Hot replacement of the microprogram is possible when the certain requirements are satisfied.

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.

The replacement needs to check the server 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, it is recommended that the operations perform during a time period when the I/O load to the host is light.

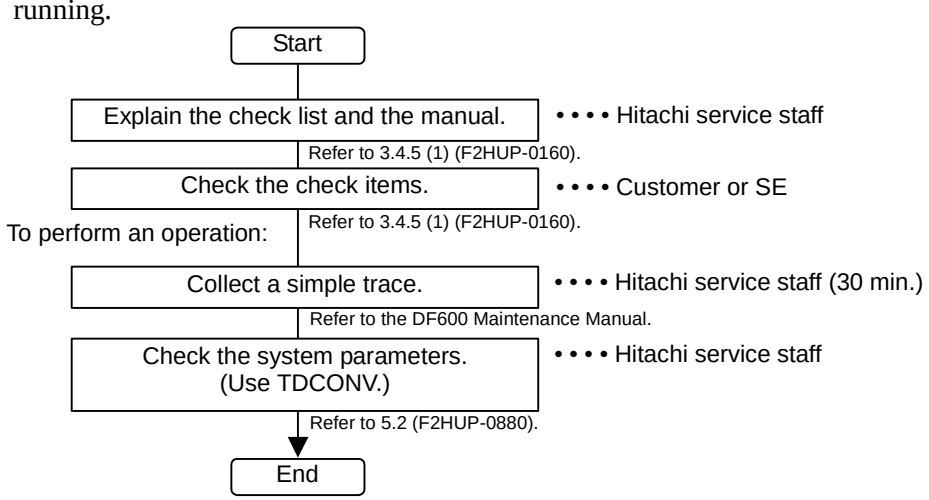
(1) Check List
If "No" is checked in any of the boxes on the above check list, replace the microprogram with the server suspended.

NOTE : It needs to be checked that the system parameters of the disk array subsystem written in the appendix are set up correctly.
Use TDCONV based on the information collected by the simple trace in advance and check if the system parameters match with those attached.

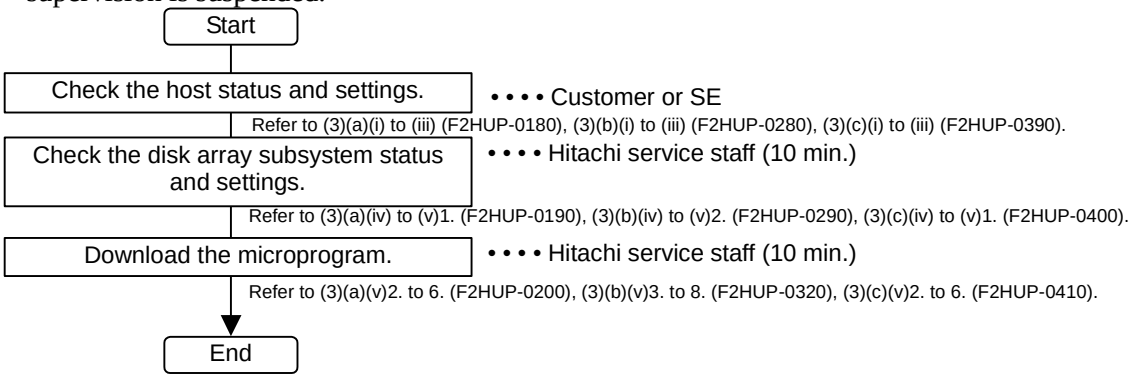
	Yes	No
• Does the disk array subsystem have a dual Control Unit configuration?	☐	☐
• Are you using the path switching software (PVLink or HDLM or VxVM-DMP)?	☐	☐
• Is the Control Unit of a main path to LUs (Logical Units) separated from the Control Unit of an alternative path?	☐	☐
• Is an alternative path set to all the volumes that the running operations access during the microprogram replacement?	☐	☐
• Are the host side parameters written in this procedure for microprogram replacement set up correctly?	☐	☐
• Is it possible to unchange the pair status for ShadowImage, QuickShadow, TrueCopy or a synchronous remote copy during the microprogram replacement (not executing an initial copy or resyncronization)?	☐	☐
• If you use the cluster software (MC/SG), is the lock disk stored in the disk other than the disk array subsystem ?	☐	☐
• An I/O error may be logged in a log file during the microprogram replacement (the operation continues on an alternative path). Can your system ignore such an error?	☐	☐
• The completion of I/O processing may take approximately 60 seconds during the microprogram replacement. Can your system wait for this time?	☐	☐

(2) The procedures for the installation are shown in the following flow chart.

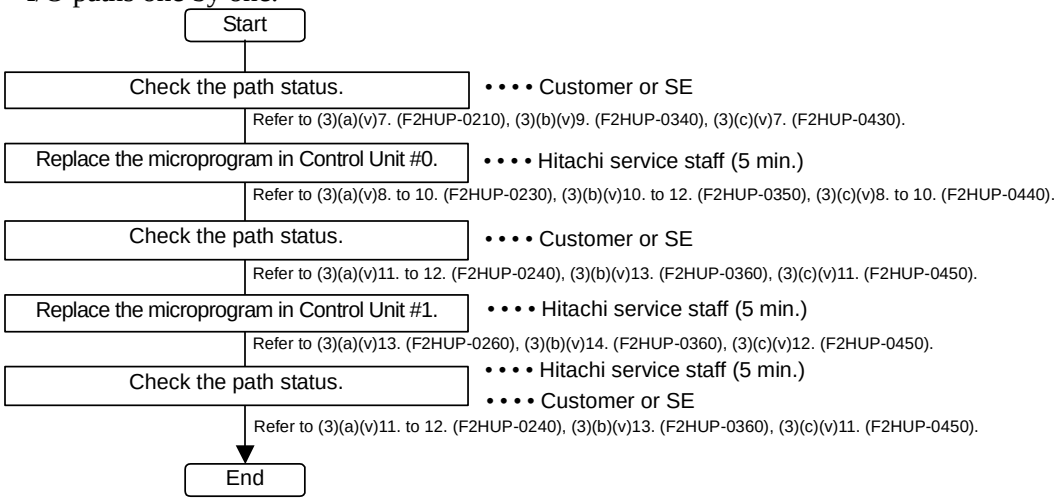
(a) Operations before the replacement: Perform the operations with the disk array subsystem running.



(b) Preparation: Perform the operations for the disk array subsystem in the status where LAN supervision is suspended.



(c) Replacement of microprograms: Perform the operations by separating the disk array subsystem I/O paths one by one.

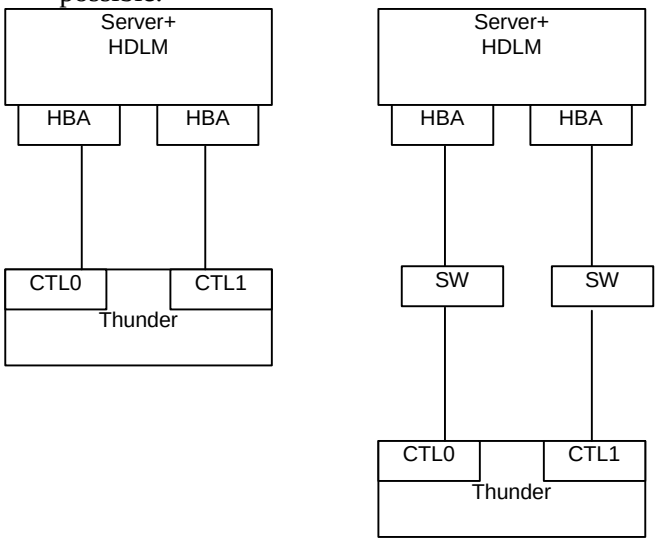


(3) Procedure for hot replacement of the microprogram

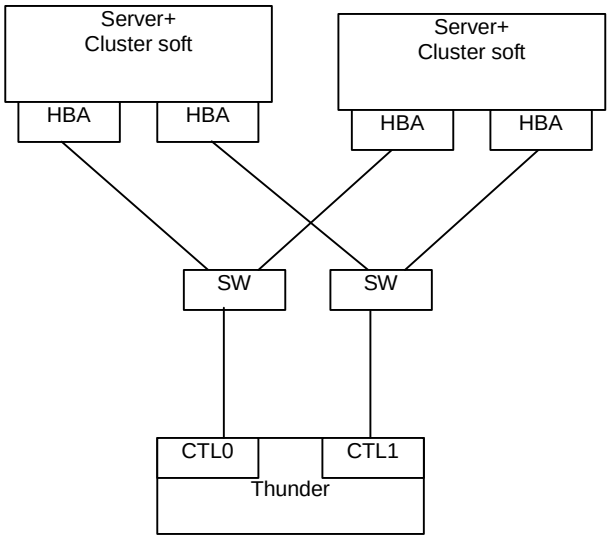
(a) When HP-UX+HDLM, Solaris+HDLM, AIX+HDLM, or Windows+HDLM is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online microprogram is 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 Thunder 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 Thunder.

(ii) Cautions

Always follow the cautions and restrictions shown below.

- The HDLM must run normally on all the servers connected to the Thunder 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 after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram 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.

(iii) 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.

(iv) Parameters of the disk array subsystem

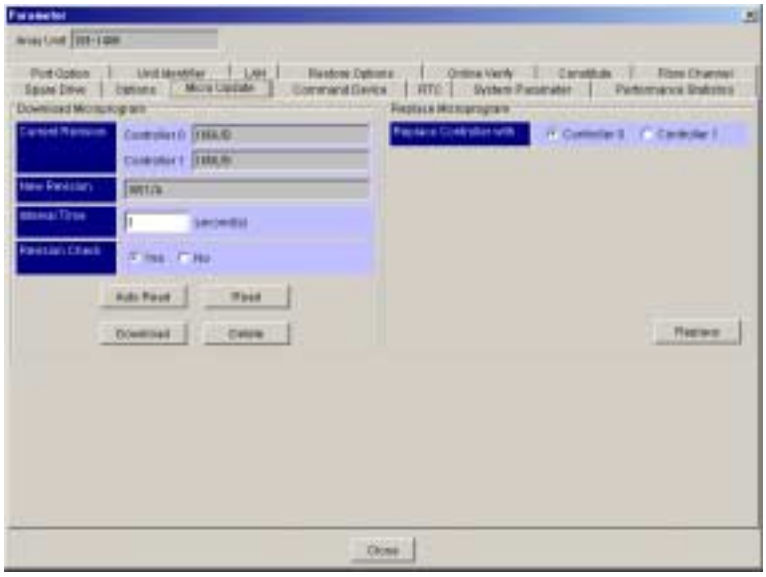
Refer to Appendix 5.2.

(v) Procedure for replacement

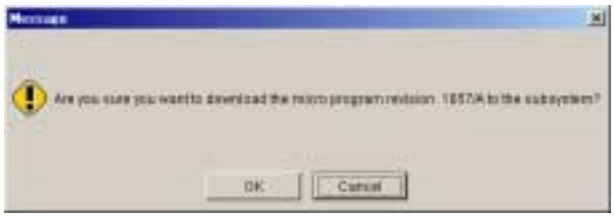
Perform the microprogram replacement following the procedure explained below.
Take notice that the version of DAMP must be 9.40 or later.

1. Do the following works before starting the microprogram replacement.
   - The system parameters for the Thunder series are set correctly. Check box ☐
   - The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
   - The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
   - In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
   - An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐
   - Connect the DAMP and download the microprogram to be replaced. Check box ☐

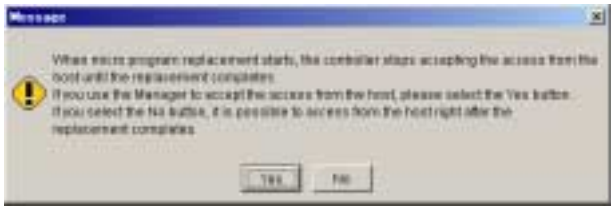
2. Click the [Download] button in the "Micro Update" window of DAMP.



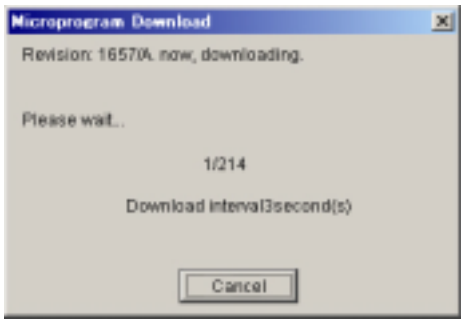
3. Click the [OK] button.



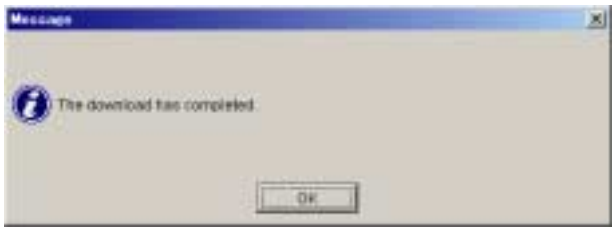
4. When the version of the microprogram of the disk array subsystem is 1655 or later, the following window is displayed. Click the [No] button.



5. A message informing that the download is in progress is displayed.



6. Since the following window is displayed when the download is completed, click the [OK] button.



7. Operations on the host side:
   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 DF600F   0A        Online    Own
000001    ・・・                HITACHI DF600F   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 DF600F  0A        Online    Own
000001    ・・・                HITACHI DF600F  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 DF600F  0A        Online    Own
000001    ・・・                HITACHI DF600F  1A        Online    Non
 :         :                    :               :         :         :
```

• In the case of Windows

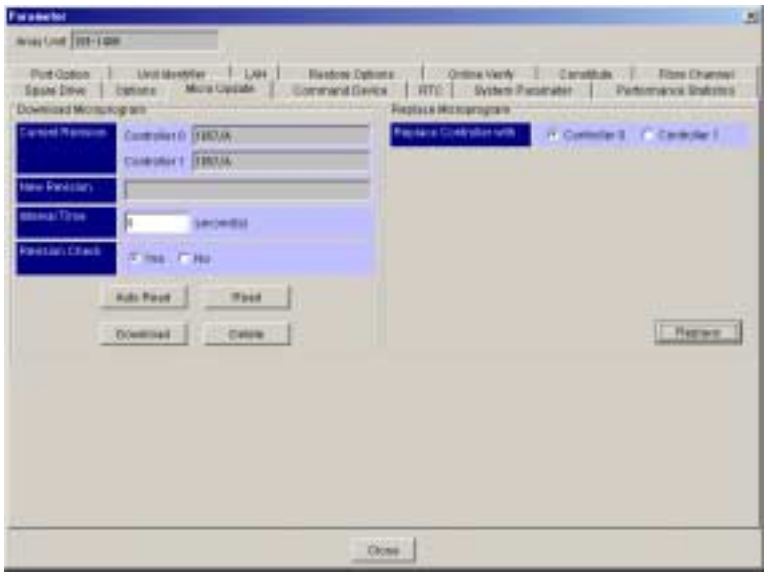
```
Execution example:
# dlnkmgr view –path
Paths:000006 OnlinePaths:000006
PathStatus    IO-Counts    IO-Errors
Online        334          0

PathID    PathNameDskName ・・・      ChaPort  Status    Type ・・・
000000    ・・・                HITACHI DF600F  0A        Online    Own
000001    ・・・                HITACHI DF600F  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 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 is to be replaced.

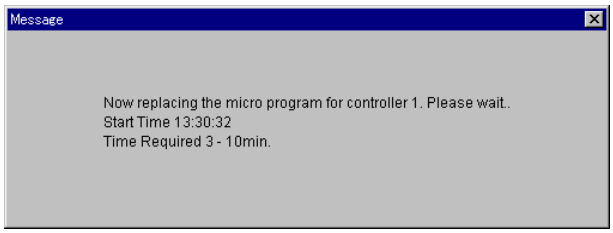
8. Operation to be reformed on the disk array subsystem side:
   Select the controller whose microprogram is to be replaced in the [Micro Update] window of the DAMP and click the [Replace] button.



9. Click the [OK] button.



   The following window is displayed and the microprogram is updated.



10. When the replacement of the microprogram terminates normally, a completion message is displayed. Click the [OK] button.



11. Operations on the host side:
    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
```

12. 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 DF600F   0A      Online          Own
000001    ・・・                HITACHI DF600F   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 DF600F   0A      Online          Own
000001    ・・・                HITACHI DF600F   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 DF600F   0A      Online          Own
000001    ・・・                HITACHI DF600F   1A      Online          Non
 :         :                    :                :       :               :
```

• 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 DF600F   0A       Online          Own
000001   ・・・                HITACHI DF600F   1A       Online          Non
 :        :                    :                :        :               :
```

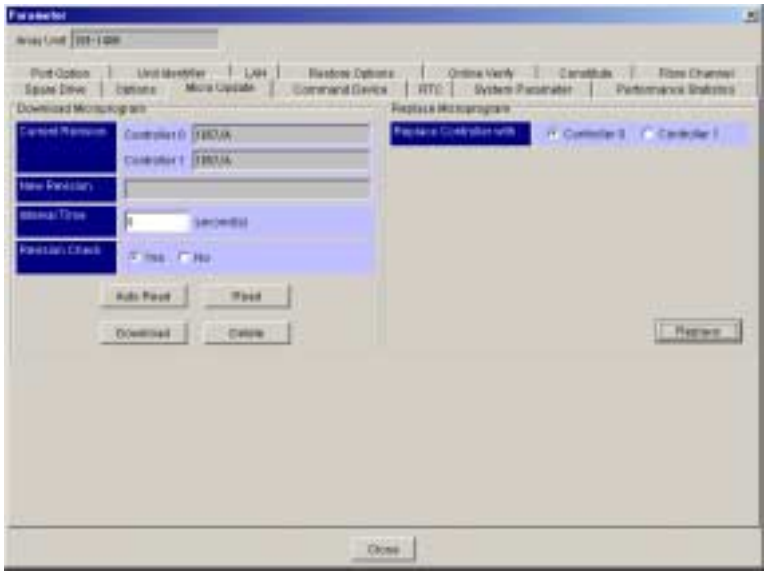
Make sure that values of the [Paths:] and [Online Paths:] are the same.
Next, make sure that descriptions in the [Status] column for all the paths are “Online”.

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram is to be replaced.

13. Replace the microprogram of the other controller also following the procedure starting from Step 8.
    When the replacement for the both controllers is completed normally, the microprogram replacement for the disk array subsystem is completed.

NOTE : When the microprograms are replaced, if the microprogram of only one of the controllers is replaced, the array unit is placed in a warning state. When the microprogram of the other controller is replaced, the array unit recovers from the warning state. When replacing the microprograms, replace the microprograms for both controllers.

14. Close the unit window. Select [View]-[Refresh] on the main window or click the [:Refresh] button.
15. Open the [Micro Update] tab selection window on the unit window again and check that the microprogram Rev.1657 or later is displayed in [Current Revision].

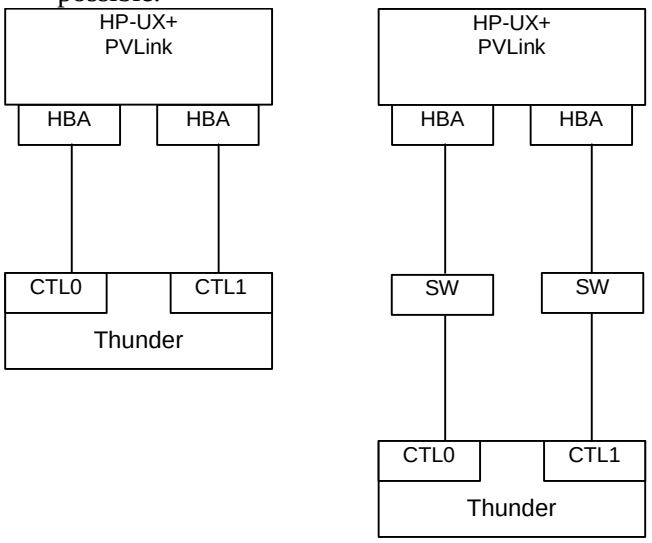


16. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.
17. Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Subsection 3.4.3, “Connecting of the maintenance PC”.

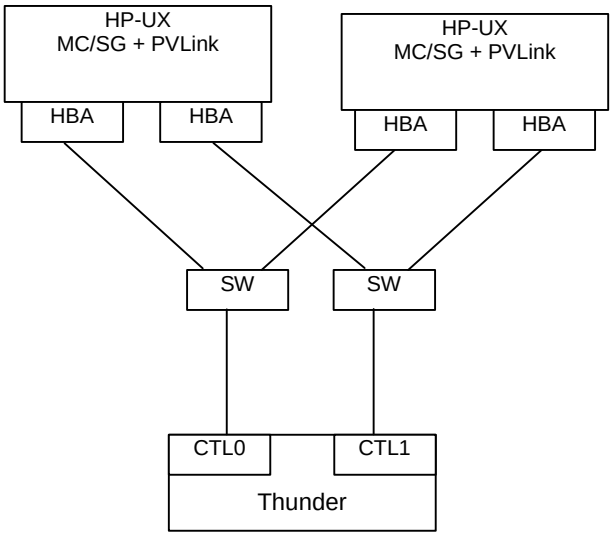
(b) When HP-UX+PVLink is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online microprogram is 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 Thunder.

(ii) 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 after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram 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.

(iii) 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 replacement, and return the values to the original values when the microprogram 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).

(iv) Parameters of the disk array subsystem

Refer to Appendix 5.2.

(v) Procedure for replacement

Perform the microprogram replacement following the procedure explained below.
Take notice that the version of DAMP must be 9.40 or later.

1. Do the following works before starting the microprogram replacement.
   - The system parameters for the Thunder series are set correctly. Check box ☐
   - The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
   - The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
   - In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
   - An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐

2. 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
```

Default is 30 seconds. Always change it to 60 seconds or longer since Host I/O may stop during the microprogram replacement.

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 [v[gdisplay /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.

When “Off” is specified for Autoswitch, execute the [pvchange –S y /dev/dsk/c?t?d?] command.

Execution example of Autoswitch value change:

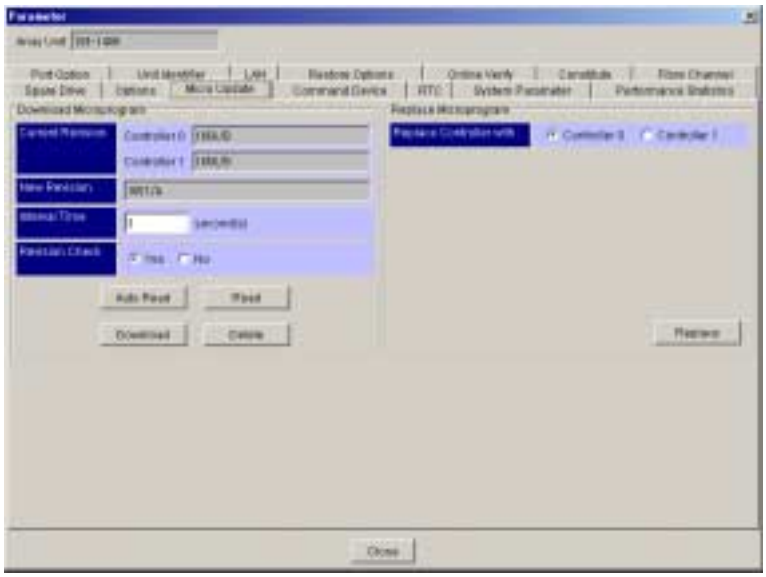
```
# pvchange -S y /dev/dsk/c11t0d1
Physical volume "/dev/dsk/c11t0d1" has been successfully changed.
Volume Group configuration for /dev/vg02 has been saved in /etc/lvmconf/vg02.conf

# 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
```

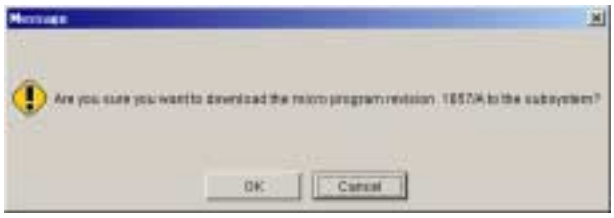
Change the Autoswitch to On.

Check that the Autoswitch was changed to On.

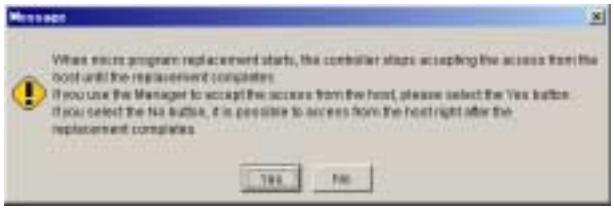
3. Connect the DAMP and download the microprogram to be replaced.
4. Click the [Download] button in the “Micro Update” window of DAMP.



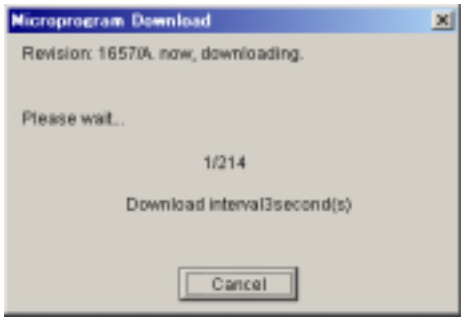
5. Click the [OK] button.



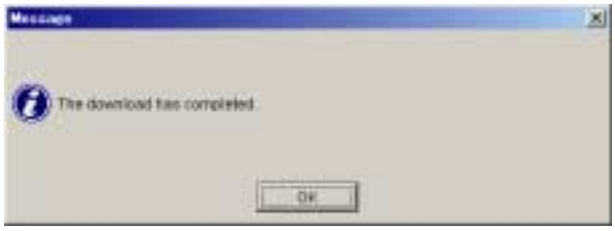
6. When the version of the microprogram of the disk array subsystem is 1655 or later, the following window is displayed. Click the [No] button.



7. A message informing that the download is in progress is displayed.



8. Since the following window is displayed when the download is completed, click the [OK] button.



9. Operations on the host side:
   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

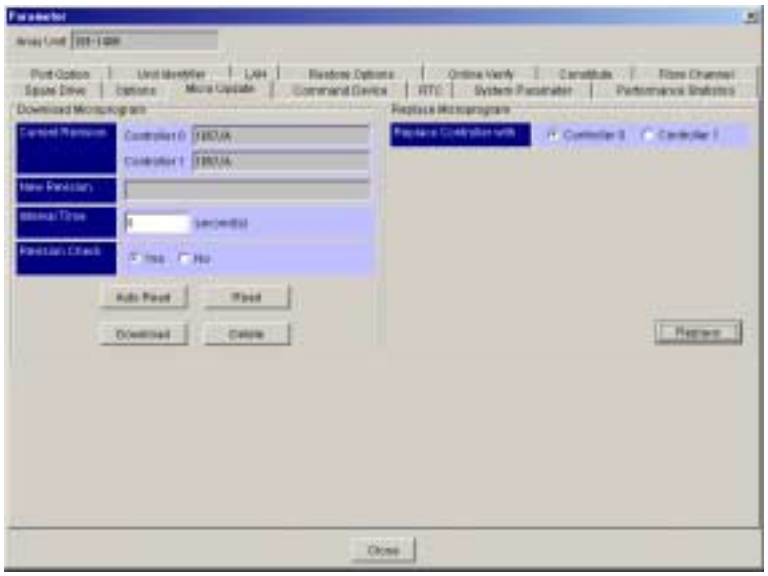
   --- Physical volumes ---
   PV Name                          /dev/dsk/c83t0d0
   PV Name                          /dev/dsk/c24t0d0    Alternate Link
   PV Status                        available
   Total PE                         511
   Free PE                          11
   Autoswitch                       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 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 is to be replaced.

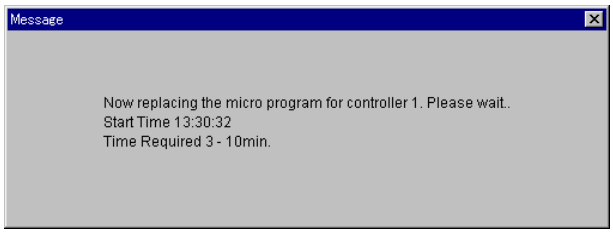
10. Operation to be reformed on the disk array subsystem side:
    Select the controller whose microprogram is to be replaced in the [Micro Update] window of the DAMP and click the [Replace] button.



11. Click the [OK] button.



The following window is displayed and the microprogram is updated.



12. When the replacement of the microprogram terminates normally, a completion message is displayed. Click the [OK] button.



13. Operations on the host side:
    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 is to be replaced.

14. Replace the microprogram of the other controller also following the procedure starting from Step 10.
    When the replacement for the both controllers is completed normally, the microprogram replacement for the disk array subsystem is completed.

NOTE : When the microprograms are replaced, if the microprogram of only one of the controllers is replaced, the array unit is placed in a warning state. When the microprogram of the other controller is replaced, the array unit recovers from the warning state. When replacing the microprograms, replace the microprograms for both controllers.

15. When the setting has been changed in Step 2, 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.

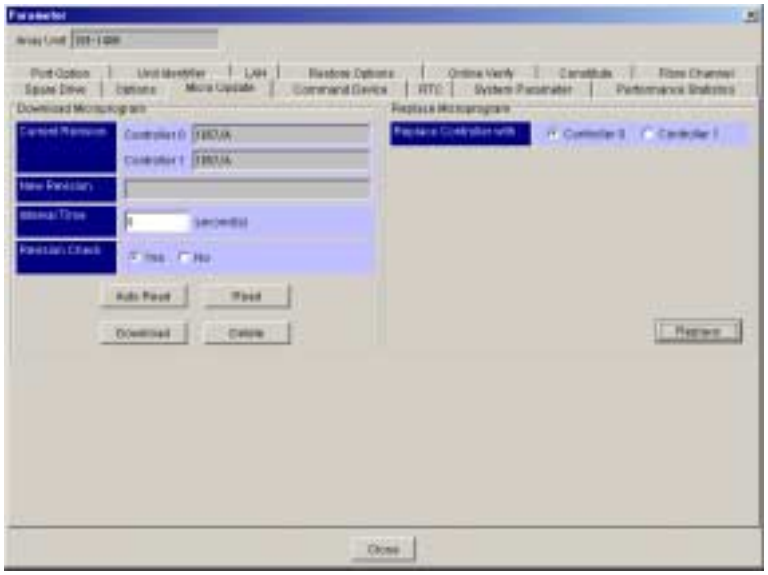
Execution example of Autoswitch value changes:

```
# 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”.

16. Close the unit window. Select [View]-[Refresh] on the main window or click the [:Refresh] button.
17. Open the [Micro Update] tab selection window on the unit window again and check that the microprogram Rev.1657 or later is displayed in [Current Revision].

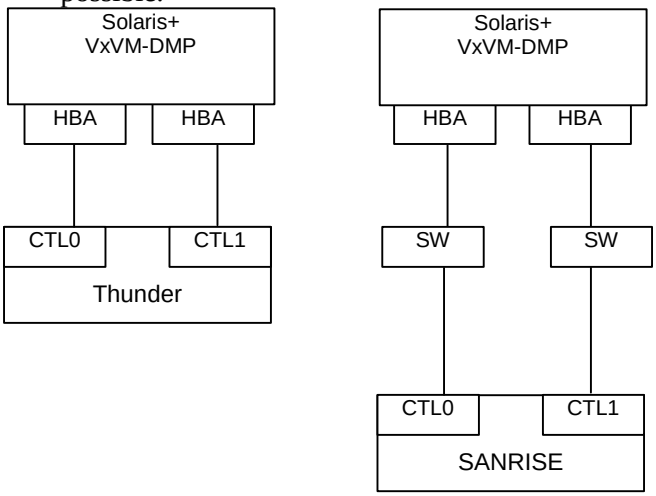


18. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.
19. Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Subsection 3.4.3, “Connecting of the maintenance PC”.

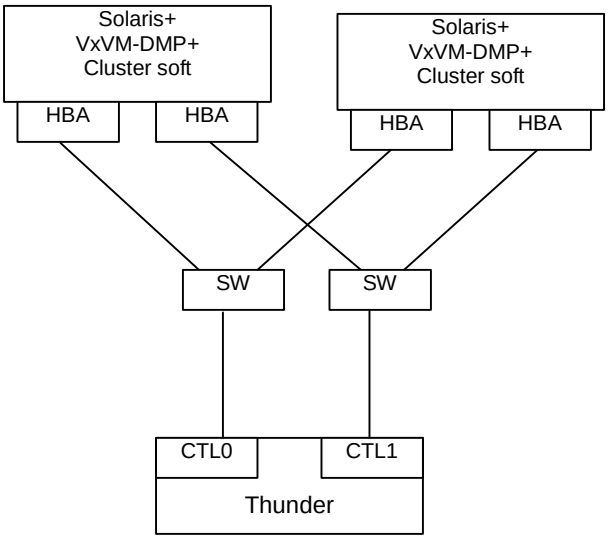
(c) When Solaris+VxVM-DMP is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online microprogram 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.



(ii) 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 after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the microprogram 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.

(iii) 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.

(iv) Parameters of the disk array subsystem

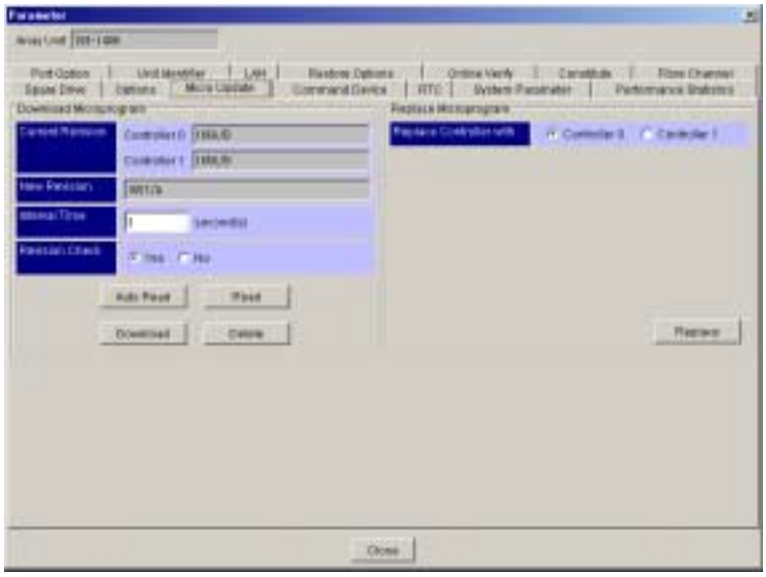
Refer to Appendix 5.2.

(v) Procedure for replacement

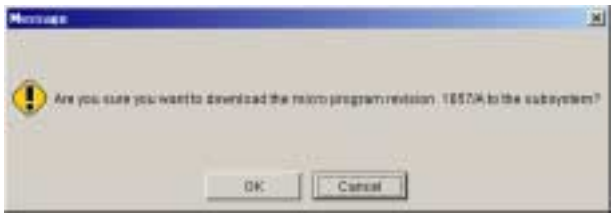
Perform the microprogram replacement following the procedure explained below.
Take notice that the version of DAMP must be 9.40 or later.

1. Do the following works before starting the microprogram replacement.
   - The system parameters for the Thunder series are set correctly. Check box ☐
   - The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
   - The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
   - In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
   - An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐
   - Connect the DAMP and download the microprogram to be replaced. Check box ☐

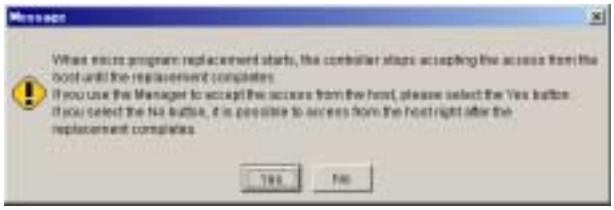
2. Click the [Download] button in the "Micro Update" window of DAMP.



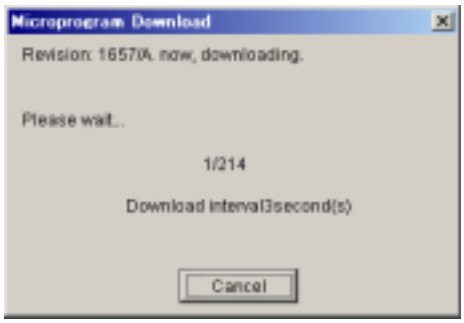
3. Click the [OK] button.



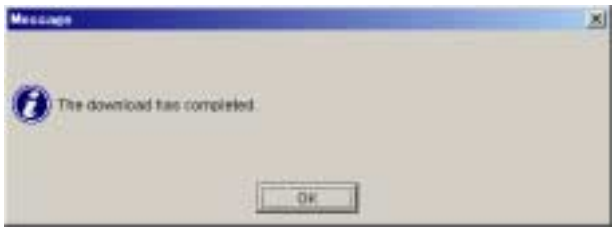
4. When the version of the microprogram of the disk array subsystem is 1655 or later, the following window is displayed. Click the [No] button.



5. A message informing that the download is in progress is displayed.



6. Since the following window is displayed when the download is completed, click the [OK] button.



7. Operations on the host side:
   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:

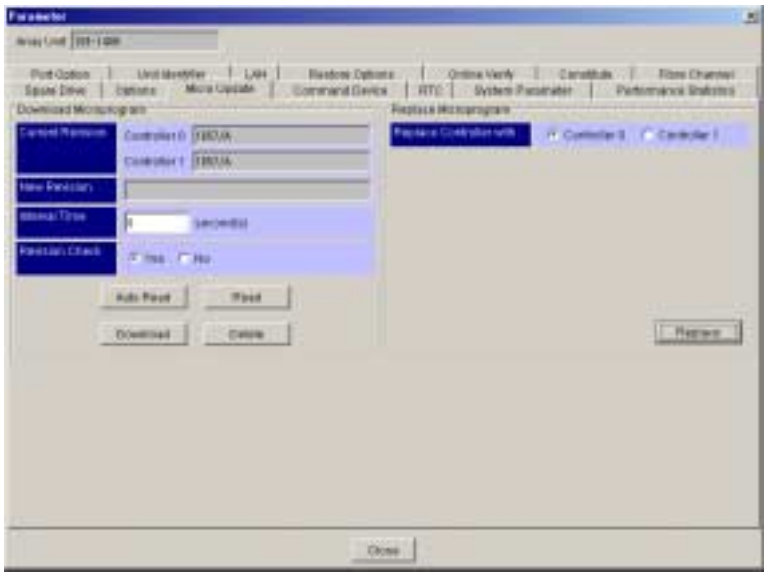
```
V880-1# vxdisk list
DEVICE          TYPE      DISK          GROUP          STATUS
c1t0d0s2        sliced                                 error
c1t0d0s3        simple    c1t0d0s3      rootdg         online
c4t0d0s2  sliced  disk01          DG0            online
c4t0d1s2        sliced    disk01        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 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 is to be replaced.

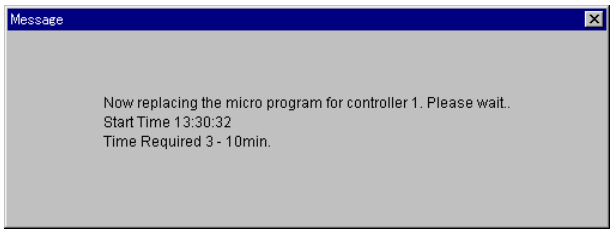
8. Operation to be reformed on the disk array subsystem side:
   Select the controller whose microprogram is to be replaced in the [Micro Update] window of the DAMP and click the [Replace] button.



9. Click the [OK] button.



   The following window is displayed and the microprogram is updated.



10. When the replacement of the microprogram terminates normally, a completion message is displayed. Click the [OK] button.



11. Operations on the host side:
    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:

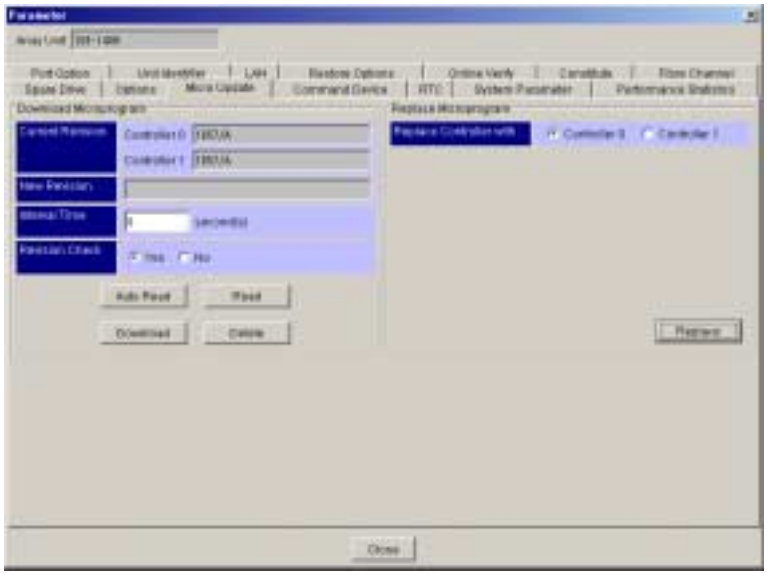
```
vxdmp: [ID 916426 kern.notice] NOTICE:
vxvm:vxdmp: enabled controller
/sbus@a,0/fcr@2,400000 connected to disk array ???
```

NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the microprogram is to be replaced.

12. Replace the microprogram of the other controller also following the procedure starting from Step 8.
    When the replacement for the both controllers is completed normally, the microprogram replacement for the disk array subsystem is completed.

NOTE : When the microprograms are replaced, if the microprogram of only one of the controllers is replaced, the array unit is placed in a warning state. When the microprogram of the other controller is replaced, the array unit recovers from the warning state. When replacing the microprograms, replace the microprograms for both controllers.

13. Close the unit window. Select [View]-[Refresh] on the main window or click the [:Refresh] button.
14. Open the [Micro Update] tab selection window on the unit window again and check that the microprogram Rev.1657 or later is displayed in [Current Revision].



15. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.
16. Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Subsection 3.4.3, “Connecting of the maintenance PC”.

3.4.6 Replacing Control Unit

Replace the Control Unit with those for upgrading the disk array subsystem to the Thunder 9580V. Make the replacement above and have the customer keep the components that become unused because they are used in the configuration of the Thunder 9580V only.
The procedure is shown below.

⚠ CAUTION

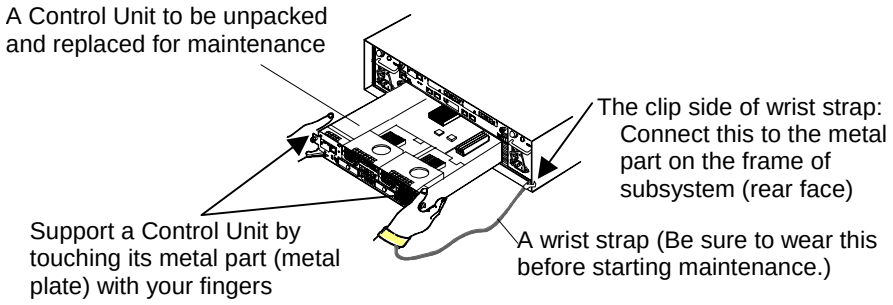
Touching heat sinks or ICs may cause getting burned. Be sure to handle with care.

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 (before removing bezel) and do not take it off until you finish. Please be sure to keep a wrist strap near the subsystem.**
- **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.**
- **In this operation, return the Interface Board, the Cache memory and each cable to be removed once to the original installation places.**

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.



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. Hot replacement of the Control Unit is possible when the certain requirements are satisfied. 2. Complete the replacement within five minutes. Otherwise, a powering off may occur because of an abnormal temperature rise. Perform the part replacement in haste. 3. When replacing Control Unit of both systems (CTL 0 and CTL 1), power off the subsystem before the replacement.	See 3.4.6 (1).
2	Replacement with the power turned off	—	See 3.4.6 (4).

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 server 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 Control Unit replacement, it is recommended that the operations perform during a time period when the I/O load to the host is light.

(1) Check List

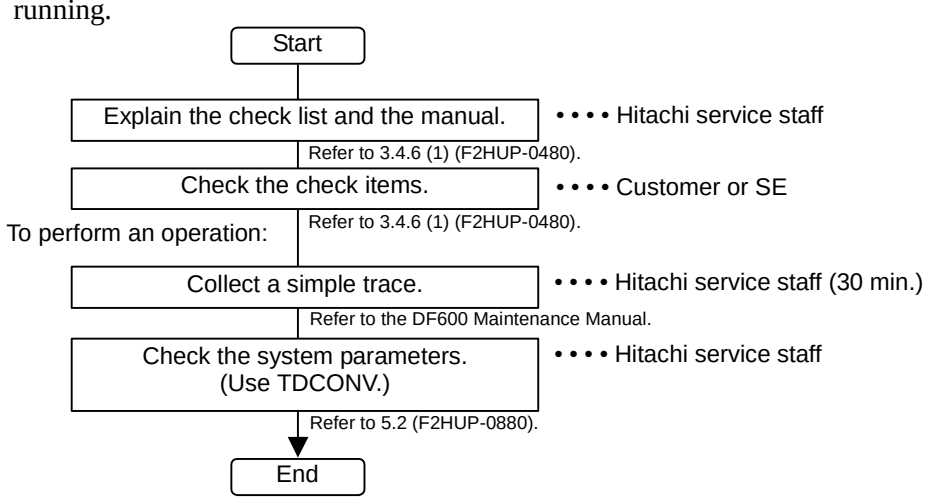
If "No" is checked in any of the boxes on the above check list, replace the Control Unit with the server suspended.

NOTE : It needs to be checked that the system parameters of the disk array subsystem written in the appendix are set up correctly.
Use TDCONV based on the information collected by the simple trace in advance and check if the system parameters match with those attached.

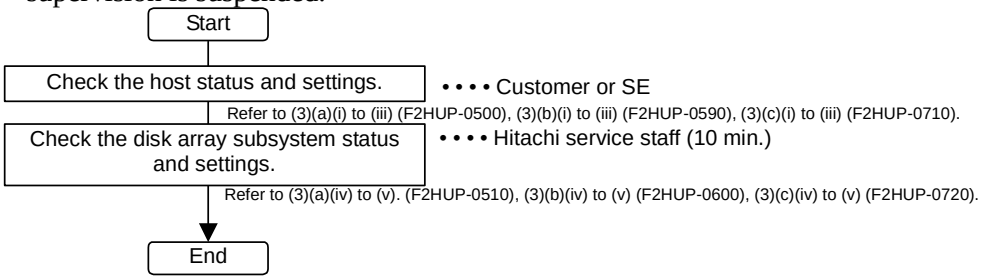
	Yes	No
• Does the disk array subsystem have a dual Control Unit configuration?	☐	☐
• Are you using the path switching software (PVLink or HDLM or VxVM-DMP)?	☐	☐
• Is the Control Unit of a main path to LUs (Logical Units) separated from the Control Unit of an alternative path?	☐	☐
• Is an alternative path set to all the volumes that the running operations access during the microprogram replacement?	☐	☐
• Are the host side parameters written in this procedure for Control Unit replacement set up correctly?	☐	☐
• Is it possible to unchange the pair status for ShadowImage, QuickShadow, TrueCopy or a synchronous remote copy during the Control Unit replacement (not executing an initial copy or resyncronization)?	☐	☐
• If you use the cluster software (MC/SG), is the lock disk stored in the disk other than the disk array subsystem ?	☐	☐
• An I/O error may be logged in a log file during the Control Unit replacement (the operation continues on an alternative path). Can your system ignore such an error?	☐	☐
• The completion of I/O processing may take approximately 60 seconds during the Control Unit replacement. Can your system wait for this time?	☐	☐

(2) The procedures for the installation are shown in the following flow chart.

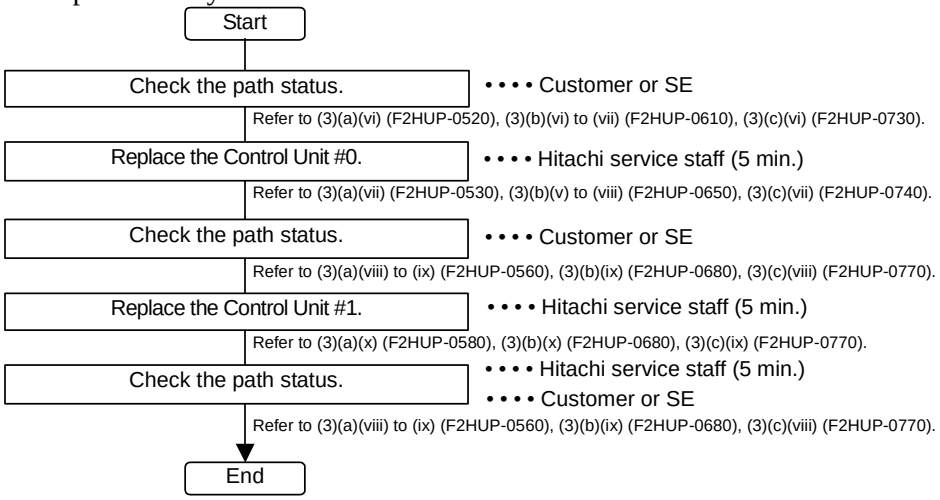
(a) Operations before the replacement: Perform the operations with the disk array subsystem running.



(b) Preparation: Perform the operations for the disk array subsystem in the status where LAN supervision is suspended.



(c) Replacement of Control Units: Perform the operations by separating the disk array subsystem I/O paths one by one.

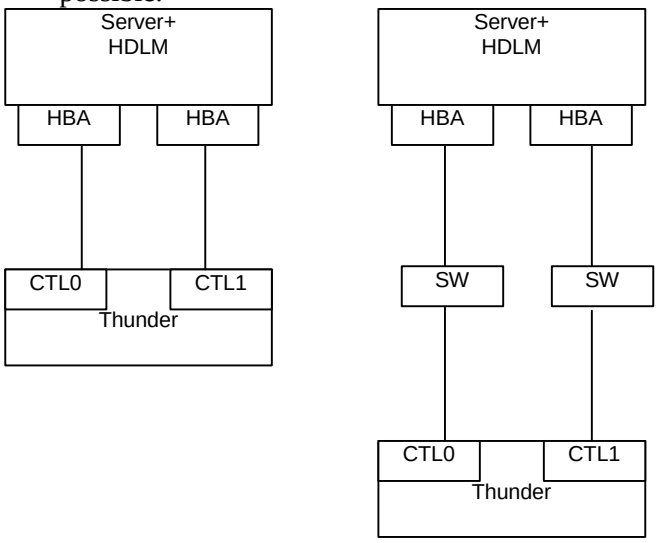


(3) Procedure for hot replacement of the Control Unit

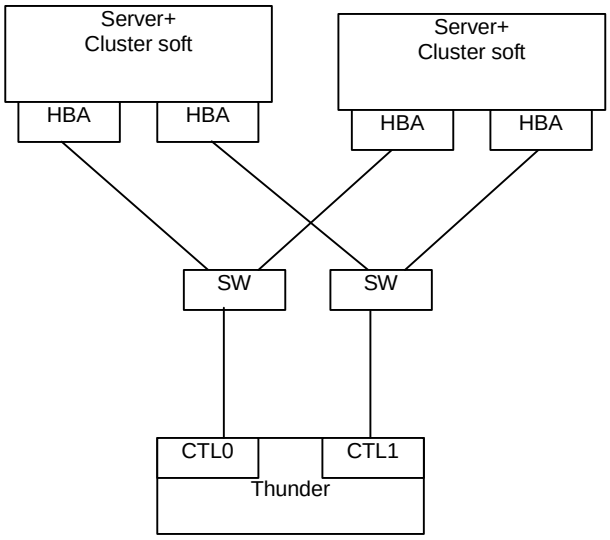
(a) When HP-UX+HDLM, Solaris+HDLM, AIX+HDLM, or Windows+HDLM is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online Control Unit is 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 Thunder 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 Thunder.

(ii) Cautions

Always follow the cautions and restrictions shown below.

- The HDLM must run normally on all the servers connected to the Thunder 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 Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the Control Unit after recovering the failure.
- Replace the Control Unit #0, and then replace the Control Unit #1. The reverse order of the replacement is possible.

(iii) 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.

(iv) Parameters of the disk array subsystem

Refer to Appendix 5.2.

(v) Do the following works before starting the Control Unit replacement.

- The system parameters for the Thunder series are set correctly. Check box ☐
- The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
- The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
- In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
- An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐
- Connect the DAMP and download the microprogram to be replaced. Check box ☐

(vi) Operations on the host side:

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 DF600F   0A        Online    Own
000001    ･･･                HITACHI DF600F   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 DF600F   0A        Online    Own
000001    ･･･                HITACHI DF600F   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 DF600F   0A        Online    Own
000001    ･･･                HITACHI DF600F   1A        Online    Non
 :         :                  :                :         :         :
```

• 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 DF600F  0A       Online   Own
000001   ・・・                HITACHI DF600F  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 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 Control Unit is to be replaced.

(vii) Replacement with the power turned on

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 “(4) Procedure for replacement with the power turned off”.
• 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.

1. Open the rear door of the rack frame.
2. For preventive detaching of the Control Unit(RKH), press RST SW.
   Make sure that the CALM LED (red) or EALM LED (red) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.
3. Loosen the left and right fixing screws of the Control Unit(RKH).
   Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit(RKH) a little way toward you.

4. Remove the all cables connected to the Control Unit(RKH) to be 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.

⚠ CAUTION

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

5. Remove the Control Unit(RKH) by pulling it out toward you.
6. Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit.
7. Remove the Cache Unit mounted on the Control Unit(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.

8. Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
9. Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit(RKHE) fitting it to the positioning pin.
10. When the RKA is connected, connect the ENC cable. When the RKA is not connected, go to Step 11.

    NOTE : When the RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit(RKHE) is inserted in the state in which the ENC cable is connected.

11. Wait for more than 20 seconds, and then insert the Control Unit(RKHE) into the specified position with its right and left levers being raised, then return the both levers to the direction shown by the arrows (⟶) at the same time.
12. CALM LED and EALM LED of newly installed Control Unit(RKHE) turn on, then EALM LED turns off and CALM LED turns off next.
    If the Control Unit(RKHE) is inserted without waiting for 20 seconds, it is possible that the Control Unit(RKHE) is not recovered from the failure normally.

    NOTE : 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(RKHE: maintenance parts) replacement since the failure may be caused in the Control Unit.

13. Tighten the left and right fixing screws of the Control Unit(RKHE).
14. Make sure that the WARNING LED (orange) on the Front Bezel is off. (Usually the Control Unit(RKHE) recovers in about three minutes.)
    When WARNING LED (orange) lights up or blinks, connect the LAN cross cable to the Control Unit(RKHE) and refer to Web to light it off. (Refer to the DF600 Maintenance Manual)
15. Connect the removed all cables to the Control Unit(RKHE).
16. Make sure that the READY LED (green) on the Front Bezel is on.
17. When the LAN cross cable is connected, remove it.
18. Close the rear door of the rack frame.

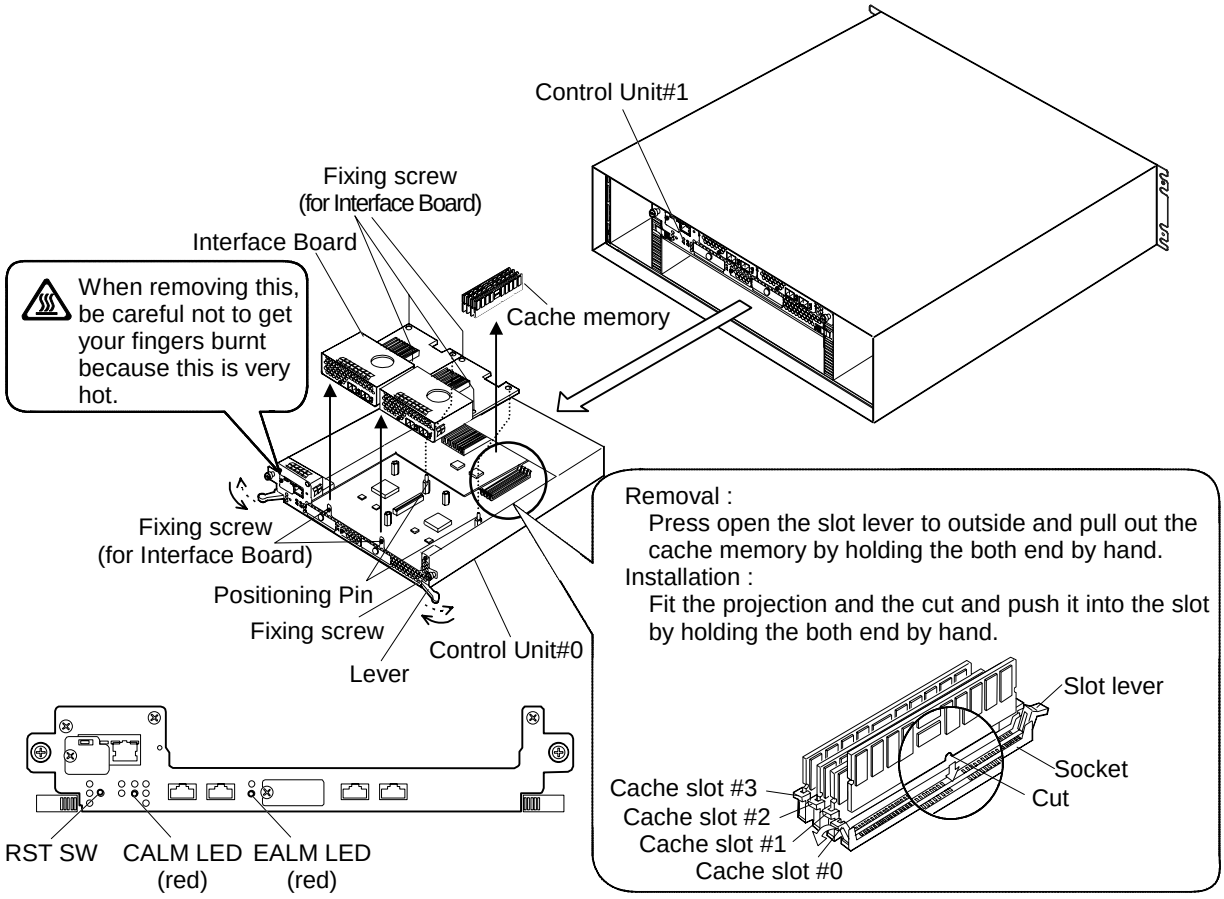


Figure 3.4.6.1 Control Unit replacement and LED locations

(viii) Operations on the host side:

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
```

(ix) 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 DF600F  0A       Online          Own
000001    ･･･                HITACHI DF600F  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 DF600F  0A       Online          Own
000001    ･･･                HITACHI DF600F  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 DF600F  0A       Online          Own
000001    ･･･                HITACHI DF600F  1A       Online          Non
 :         :                  :               :        :               :
```

• 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 DF600F   0A       Online          Own
000001   ・・・                HITACHI DF600F   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”.

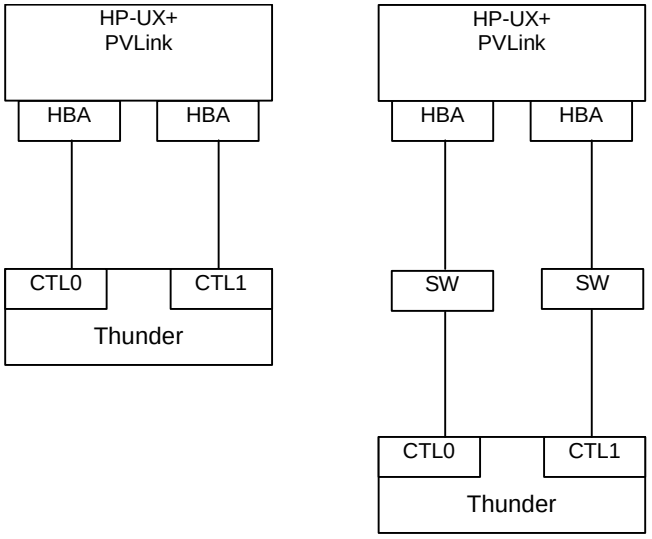
NOTE : If multiple OS are connected, perform the operations on all the servers connected to the disk array subsystem that the Control Unit is to be replaced.

(x) Replace the Control Unit of the other controller also following the procedure starting from Step (vii).
When the replacement for the both controllers is completed normally, the Control Unit replacement for the disk array subsystem is completed.

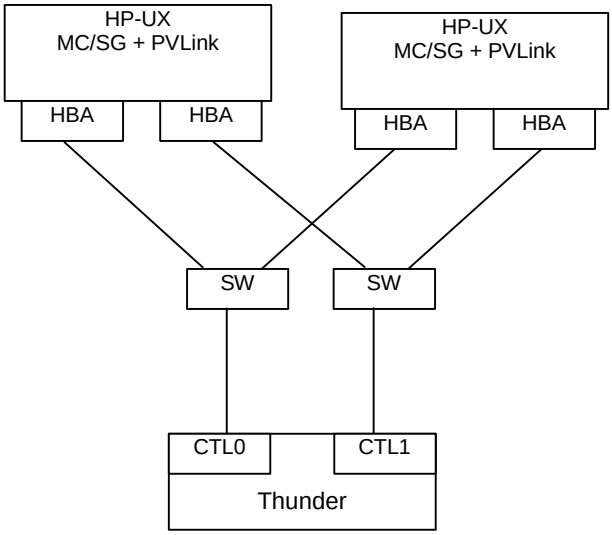
(b) When HP-UX+PVLink is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online Control Unit is 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 Thunder.

(ii) 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 Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the Control Unit after recovering the failure.
- Replace the Control Unit #0, and then replace the Control Unit #1. The reverse order of the replacement is possible.

(iii) 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 Control Unit replacement, and return the values to the original values when the 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).

(iv) Parameters of the disk array subsystem

Refer to Appendix 5.2.

(v) Do the following works before starting the Control Unit replacement.

- The system parameters for the Thunder series are set correctly. Check box ☐
- The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
- The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
- In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
- An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐

(vi) 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
```

Default is 30 seconds. Always change it to 60 seconds or longer since Host I/O may stop during the Control Unit replacement.

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 [v[gdisplay /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.

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.

(vii) Operations on the host side:

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 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 Control Unit is to be replaced.

(viii) Replacement with the power turned on

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 "(4) Procedure for replacement with the power turned off".

• 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.

1. Open the rear door of the rack frame.
2. For preventive detaching of the Control Unit(RKH), press RST SW.
   Make sure that the CALM LED (red) or EALM LED (red) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.
3. Loosen the left and right fixing screws of the Control Unit(RKH).
   Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit(RKH) a little way toward you.
4. Remove the all cables connected to the Control Unit(RKH) to be 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.

⚠ CAUTION

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

5. Remove the Control Unit(RKH) by pulling it out toward you.
6. Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit.
7. Remove the Cache Unit mounted on the Control Unit(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.

8. Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
9. Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit(RKHE) fitting it to the positioning pin.
10. When the RKA is connected, connect the ENC cable. When the RKA is not connected, go to Step 11.

NOTE : When the RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit(RKHE) is inserted in the state in which the ENC cable is connected.

11. Wait for more than 20 seconds, and then insert the Control Unit(RKHE) into the specified position with its right and left levers being raised, then return the both levers to the direction shown by the arrows (⟶) at the same time.
12. CALM LED and EALM LED of newly installed Control Unit(RKHE) turn on, then EALM LED turns off and CALM LED turns off next.
    If the Control Unit(RKHE) is inserted without waiting for 20 seconds, it is possible that the Control Unit(RKHE) is not recovered from the failure normally.

    NOTE : 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(RKHE: maintenance parts) replacement since the failure may be caused in the Control Unit.

13. Tighten the left and right fixing screws of the Control Unit(RKHE).
14. Make sure that the WARNING LED (orange) on the Front Bezel is off. (Usually the Control Unit(RKHE) recovers in about three minutes.)
    When WARNING LED (orange) lights up or blinks, connect the LAN cross cable to the Control Unit(RKHE) and refer to Web to light it off. (Refer to the DF600 Maintenance Manual)
15. Connect the removed all cables to the Control Unit(RKHE).
16. Make sure that the READY LED (green) on the Front Bezel is on.
17. When the LAN cross cable is connected, remove it.
18. Close the rear door of the rack frame.

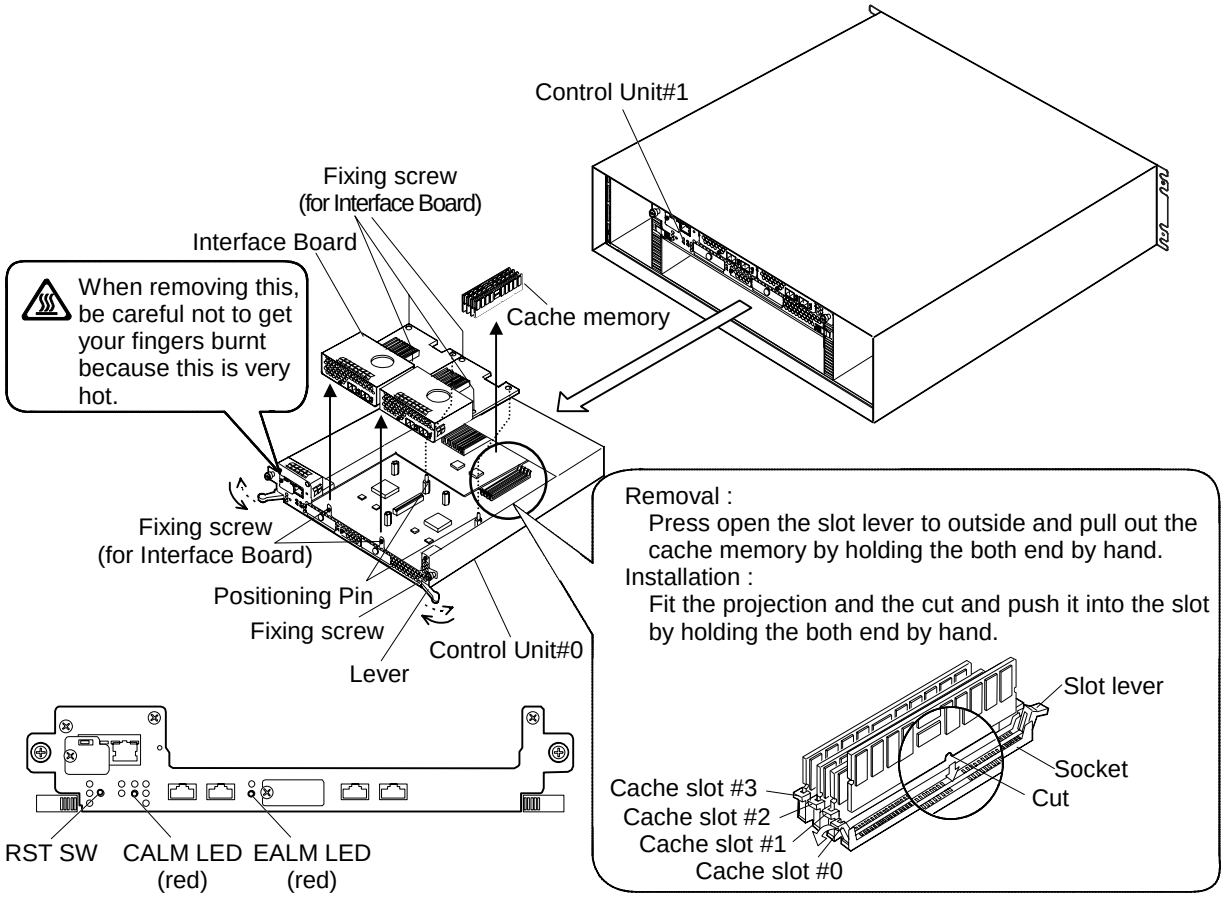


Figure 3.4.6.2 Control Unit replacement and LED locations

(ix) Operations on the host side:
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 ---                          Record the initial status.
   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, 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 Control Unit is to be replaced.

(x) Replace the Control Unit of the other Control Unit also following the procedure starting from Step (viii).
When the replacement for the both controllers is completed normally, the Control Unit replacement for the disk array subsystem is completed.

(xi) When the setting has been changed in Step 2, 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.

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

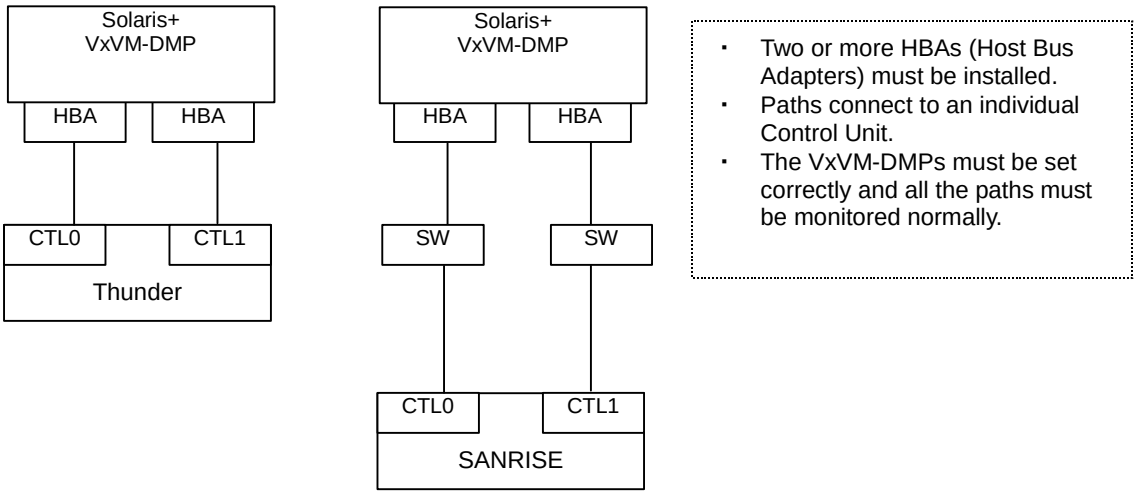
# pvdisplay /dev/dsk/c11t0d1
--- Physical volumes ---
PV Name                     /dev/dsk/c11t0d1
PV Name                     /dev/dsk/c13t1d1   Alternate Link
VG Name                     /dev/vg02
PV Status                   available
Allocatable                 yes
VGDA                        2
Cur LV                      4
PE Size (Mbytes)            4
Total PE                    1023
Free PE                     148
Allocated PE                875
Stale PE                    0
IO Timeout (Seconds)        60
Autoswitch                  Off
```

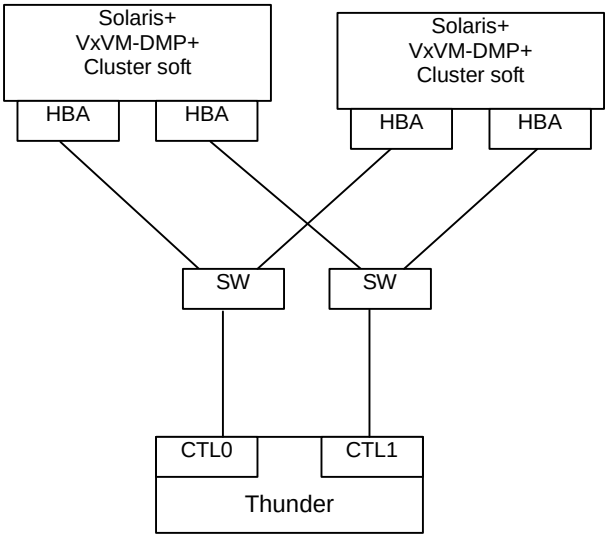
Return this value to the original value. Default is “On”.

(c) When Solaris+VxVM-DMP is used

(i) System Configuration

If the system is configured as shown below, the replacement of an online Control Unit is possible.





(ii) 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 Control Unit after dismounting it beforehand.
- All the paths must be normal. If a failure is found on the path, replace the Control Unit after recovering the failure.
- Replace the Control Unit #0, and then replace the Control Unit #1. The reverse order of the replacement is possible.

(iii) 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.

(iv) Parameters of the disk array subsystem

Refer to Appendix 5.2.

(v) Do the following works before starting the Control Unit replacement.

- The system parameters for the Thunder series are set correctly. Check box ☐
- The parameters for the OS, HBA or path switching software are set correctly. Check box ☐
- The alarm/warning light on the Thunder, the host or the switch does not light up. Check box ☐
- In case of a direct connection, a port on the Thunder is linked up with the system. In case of a switch connection, a port on the switch is linked up. Check box ☐
- An initial copy or resynchronization is not running in the ShadowImage, QuickShadow, TrueCopy or synchronous remote copy. Check box ☐

(vi) Operations on the host side:
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 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 Control Unit is to be replaced.

(vii) Replacement with the power turned on

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 "(4) Procedure for replacement with the power turned off".

• 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.

1. Open the rear door of the rack frame.
2. For preventive detaching of the Control Unit(RKH), press RST SW.
   Make sure that the CALM LED (red) or EALM LED (red) turns on within one second and the WARNING LED (orange) on the Front Bezel blinks.
3. Loosen the left and right fixing screws of the Control Unit(RKH).
   Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit(RKH) a little way toward you.
4. Remove the all cables connected to the Control Unit(RKH) to be 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.

⚠ CAUTION

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

5. Remove the Control Unit(RKH) by pulling it out toward you.
6. Removing the three screws (on the Control Unit) that is securing the Interface Board. Pull up the Interface Board and remove it from the Control Unit.
7. Remove the Cache Unit mounted on the Control Unit(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.

8. Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
9. Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit(RKHE) fitting it to the positioning pin.
10. When the RKA is connected, connect the ENC cable. When the RKA is not connected, go to Step 11.

NOTE : When the RKA is connected, the loop is not recovered and the Control Unit fails again unless the Control Unit(RKHE) is inserted in the state in which the ENC cable is connected.

11. Wait for more than 20 seconds, and then insert the Control Unit(RKHE) into the specified position with its right and left levers being raised, then return the both levers to the direction shown by the arrows (⟶) at the same time.
12. CALM LED and EALM LED of newly installed Control Unit(RKHE) turn on, then EALM LED turns off and CALM LED turns off next.
    If the Control Unit(RKHE) is inserted without waiting for 20 seconds, it is possible that the Control Unit(RKHE) is not recovered from the failure normally.

    NOTE : 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(RKHE: maintenance parts) replacement since the failure may be caused in the Control Unit.

13. Tighten the left and right fixing screws of the Control Unit(RKHE).
14. Make sure that the WARNING LED (orange) on the Front Bezel is off. (Usually the Control Unit(RKHE) recovers in about three minutes.)
    When WARNING LED (orange) lights up or blinks, connect the LAN cross cable to the Control Unit(RKHE) and refer to Web to light it off. (Refer to the DF600 Maintenance Manual)
15. Connect the removed all cables to the Control Unit(RKHE).
16. Make sure that the READY LED (green) on the Front Bezel is on.
17. When the LAN cross cable is connected, remove it.
18. Close the rear door of the rack frame.

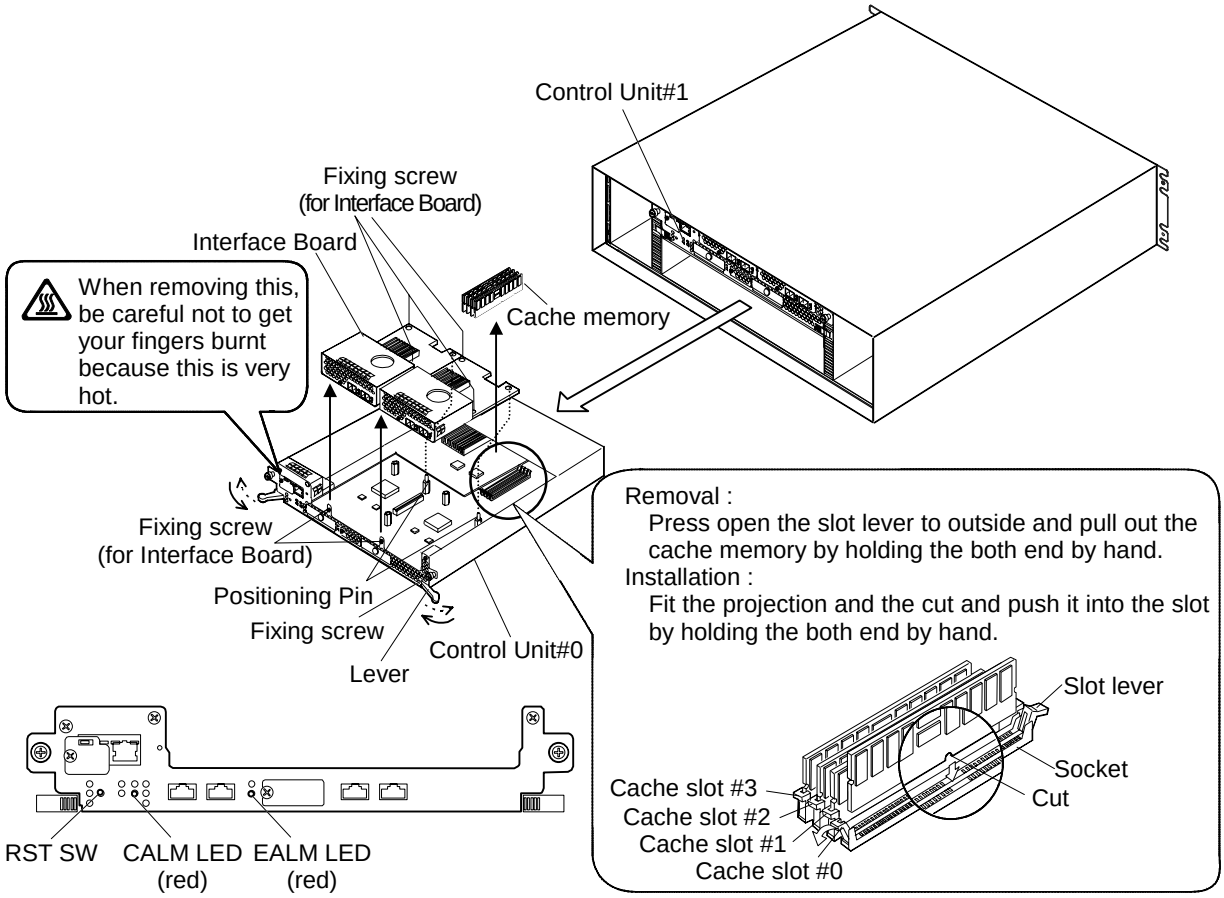


Figure 3.4.6.3 Control Unit replacement and LED locations

(viii) Operations on the host side:

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 Control Unit is to be replaced.

(ix) Replace the Control Unit of the other Control Unit also following the procedure starting from Step (vii).

When the replacement for the both Control Unit is completed normally, the Control Unit replacement for the disk array subsystem is completed.

(4) Replacement with the power turned off

1. Open the rear door of the rack frame.
2. Confirm the installation location of the Control Unit(RKH) whose CALM LED is on.
3. 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.
   If the memory is still being backed up, first release it from the back-up state, and then replace the Control Unit(RKH).

   In this case, check that the CACHE POWER LED (Green) on Control Unit(RKH) 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(RKH) may cause a loss of user data.

4. 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.

5. Loosen the right and left fixing screws of the Control Unit(RKH).
   Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit(RKH) a little way toward you.
6. Remove the all cables connected to the Control Unit(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.

⚠ CAUTION

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

7. Remove the Control Unit(RKH) by pulling it out toward you.
8. Removing the three screws (on the Control Unit) that is securing the Interface Board.
   Pull up the Interface Board and remove it from the Control Unit(RKH).

9. 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.
10. Insert the removed Cache Unit. Be sure to install it in the position with the same slot number as before.
11. Install the Interface Board (or Dummy Interface Board) that was removed on the new Control Unit(RKHE) fitting it to the positioning pin.
12. Insert the Control Unit(RKHE) in the specified position with its right and left levers being raised, then return the levers at the same time in the direction shown by the arrows (⟶).
    If the Control Unit(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.
13. Tighten the left and right fixing screws of the Control Unit(RKHE).
14. Connect the removed all cables to the Control Unit(RKHE).
15. Replace the Control Unit of the other Control Unit also following the procedure starting from Step 5.
16. Turn on the AC Power Unit Switch of the both Power Units.
17. Turn on the main switch. (Usually the Control Unit recovers in about five minutes.)
    Make sure that the WARNING LED (orange) on the Front Bezel has gone out.
    When WARNING LED (orange) lights up or blinks, connect the LAN cross cable to the Control Unit(RKHE) and refer to Web to light it off. (Refer to the DF600 Maintenance Manual)
18. Make sure that the READY LED (green) on the Front Bezel is off.
19. When the LAN cross cable is connected, remove it.
20. Close the rear door of the rack frame.

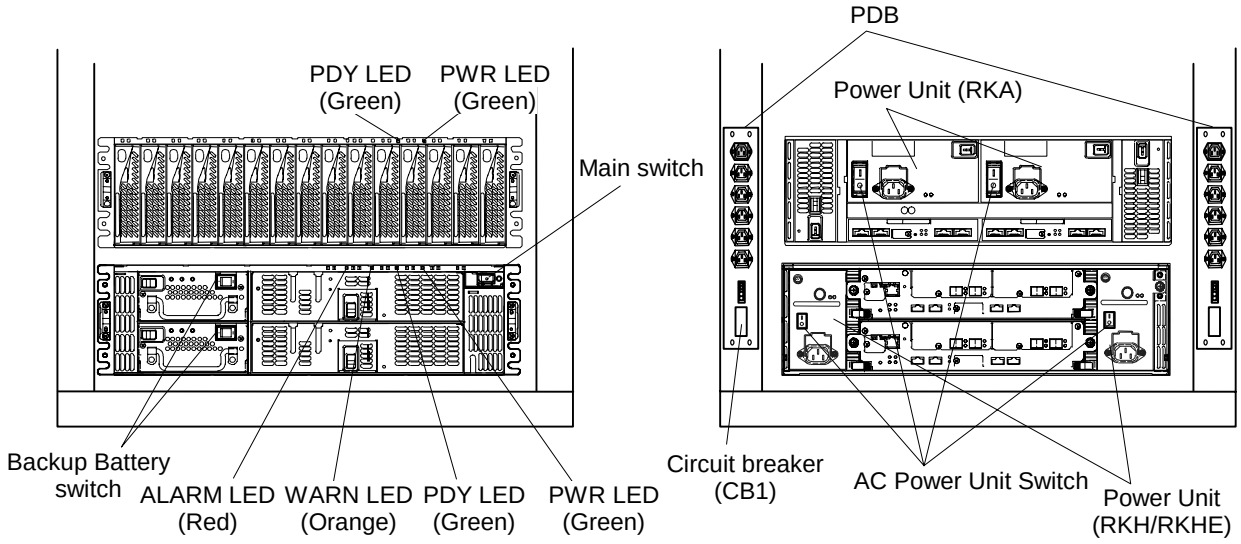


Figure 3.4.6.4 Locations of Switches

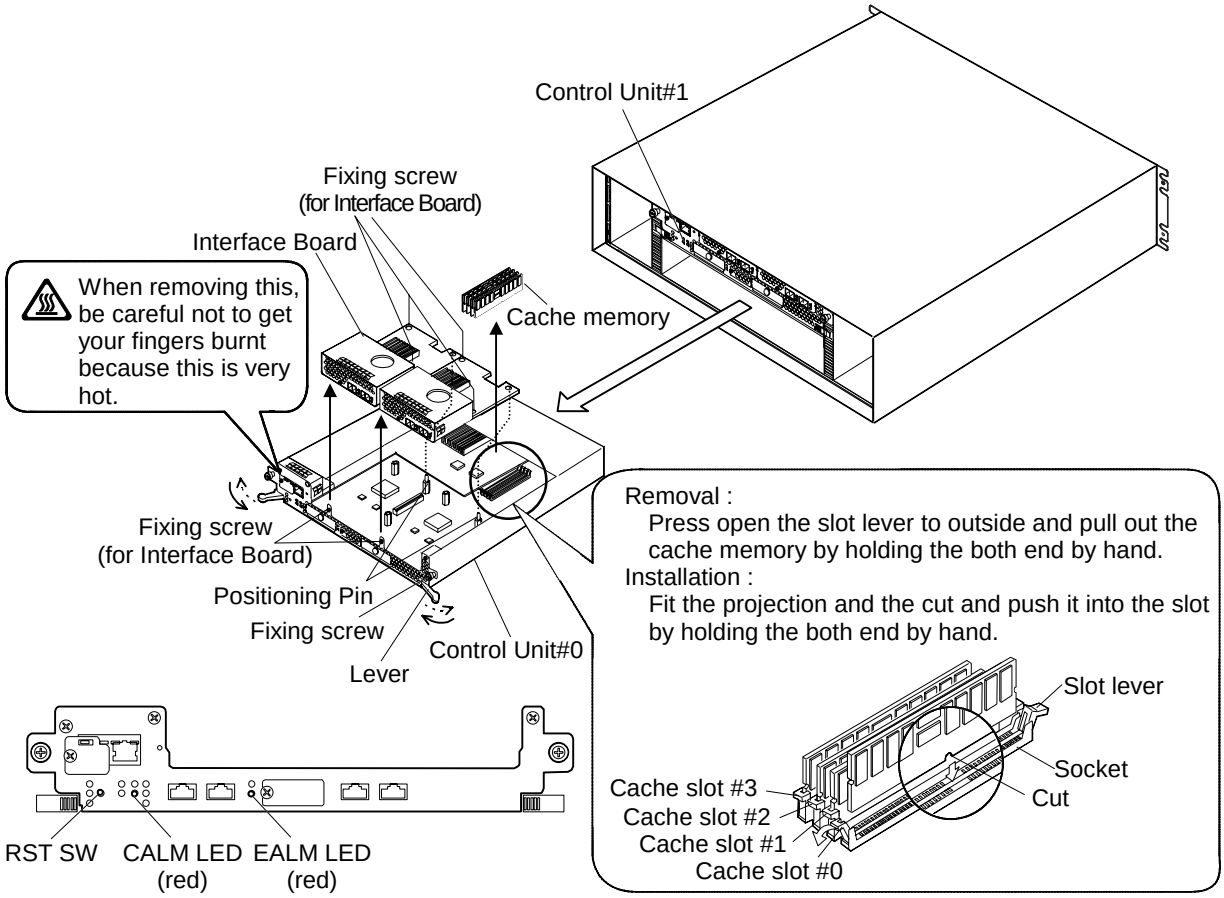


Figure 3.4.6.5 Control Unit replacement and LED locations

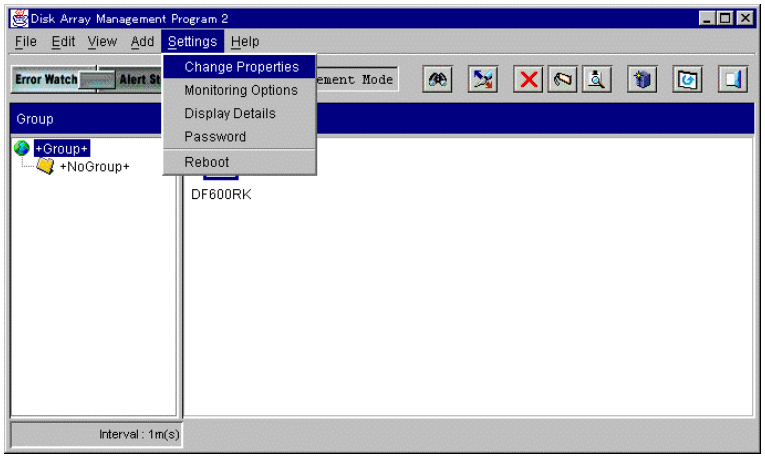
3.4.7 Connect the maintenance PC to the disk array subsystem

1. Connect the maintenance PC to the RKHE referring Subsection 3.4.3, “Connecting maintenance PC”.

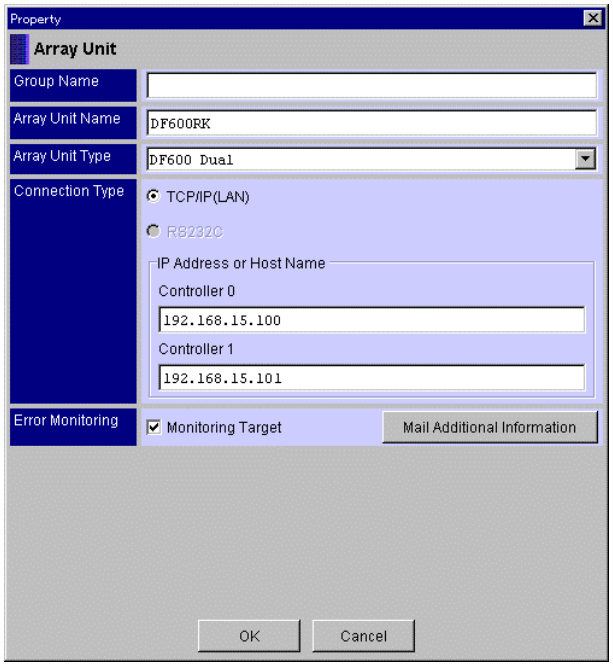
3.4.8 Setting the IP address

When it is necessary to change the IP address after the upgrade, make the change using DAMP. The procedure is shown below.

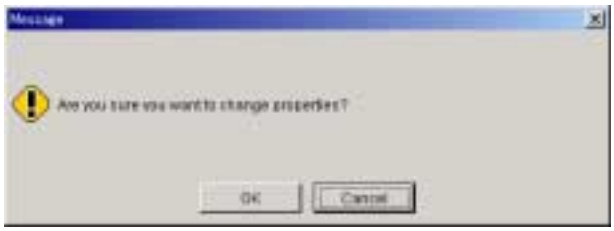
1. Connect the maintenance PC to the disk array subsystem and start DAMP.
2. Set the operation mode of DAMP as Maintenance mode.
3. Click the icon of an array unit on the Main screen. On the [Settings] menu, click [Change Properties].



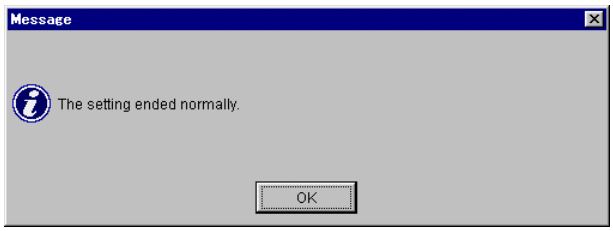
4. Enter the IP address in the [IP Address or Host Name] of the [Connection Type] and click the [OK] button.



5. When a message confirming whether the registration should be changed or not is displayed, click the [OK] button.



6. When a registration change completion message appears, click the [OK] button.

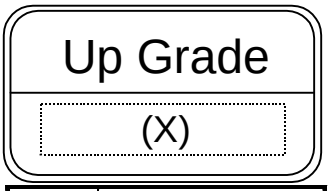


The Main screen is updated and then displayed.

7. When the property window is open, click the [Close] button.
8. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

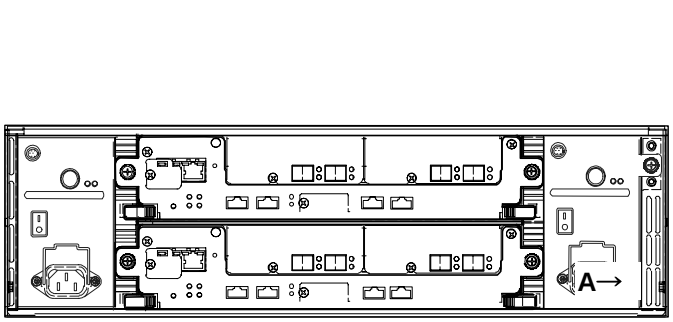
3.4.9 Affixing Label

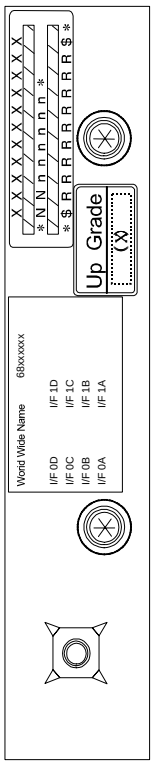
After the upgrade work is completed, affix the Upgrade Label to the position A (see Figure 3.4.9.2) on the rear side of the subsystem.



Symbol	Notation character
(X)	F2HUP

Figure 3.4.9.1 Upgrade Label





The figure from A

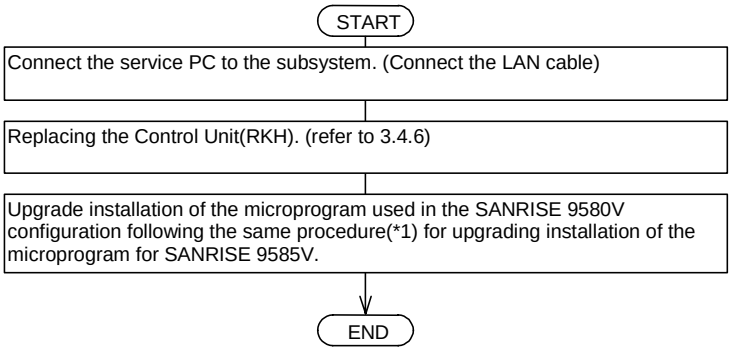
Figure 3.4.9.2 Rear Side of the Array Unit

4. Trouble Analysis

4.1 Downgrade

If the upgrade fails by any chance, downgrade to the SANRISE 9580V configuration following the procedure below.

NOTE : • The microprogram installation CD-ROM used in the SANRISE 9580V configuration is required.
• If other failures occur, refer to the DF600 Maintenance Manual for recovery.



(*1): When upgrading installation (downgrade) of the microprogram used in the SANRISE 9580V configuration from the microprogram for SANRISE 9585V, be cautions about the following points.

- Set “No” for [Revision Check] when downloading the microprogram.



- If the newly supported function is used or set up in the microprogram for SANRISE 9585V, cancel it.

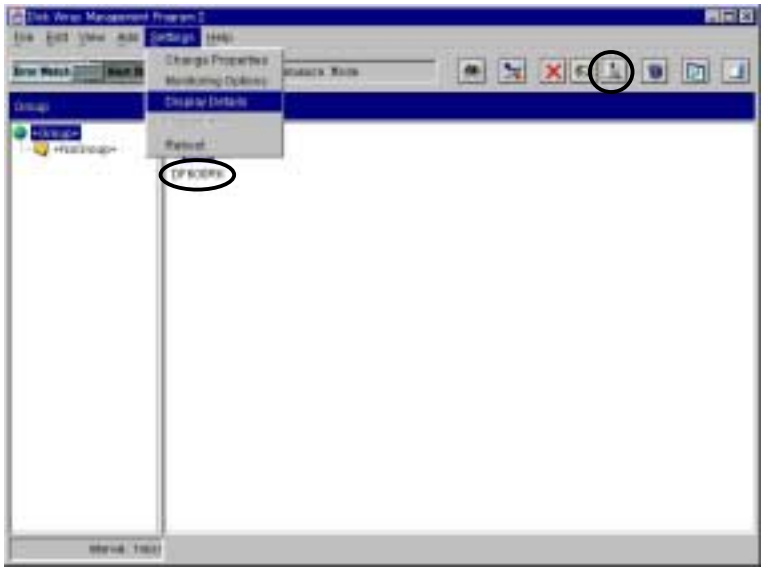
5. Appendix

5.1 Back up the system parameters and port/host group information

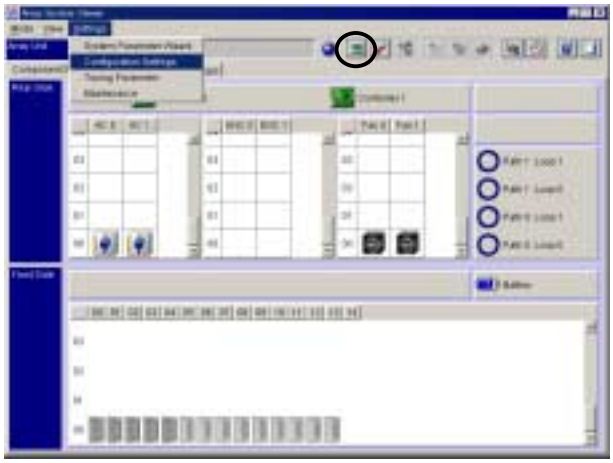
NOTE : Host computer side setting need to be changed depending on the host computer.

Operation as described below.

(1) Turn on the power supply.
(2) Start the DAMP and set the Active Mode in 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 setting as shown below.
- Selecting [Set] – [Display Details]
- Double-clicking an icon of the disk array subsystem you want to set
- Clicking [ : Display Details]



(4) Select [Set] – [Configuration Settings] in the unit window or click [: Configuration Settings] button.



(5) 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.

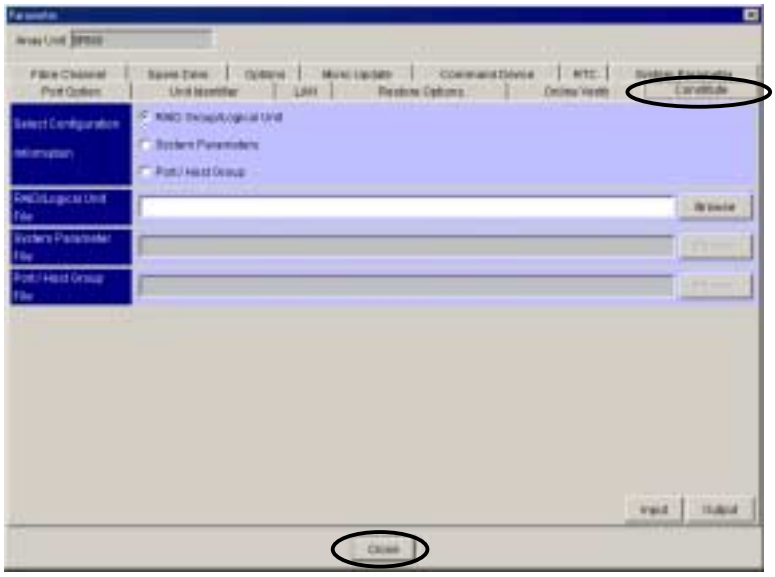
The configuration to be set includes RAID group/logical unit, system parameters, and port/host group information.

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.

(a) Click the [Constitute] tab. The window for setting the "Constitute" is displayed in the Parameter window.



- [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.
  - [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.
- [RAID/Logical Unit File] : This item can be set when the "RAID Group/Logical Unit" radio button is selected from the [Selection of Configuration Information Copy].
  Select a directory and file name for an input/output by clicking the [Reference] button.
- [System Parameter File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].
- [Port/Host Group File] : This item can be set when the [System Parameter] radio button is selected from the [Selection of Configuration Information Copy].
  Select a directory and file name for an input/output by clicking the [Reference] button.
- [Input] : Selected information is loaded and set with a specified file name.
- [Output] : Selected information is output to a text file with a specified file name.

(b) To terminate the setting, click the [Close] button.

5.2 List of Parameter Settings for Disk Array Subsystem

• In the case of HP-UX+HDLM

#	Operating system plus alternative path	HP-UX plus HDLM	
	Cluster	None	MC/SG
System parameters			
1	System start attribute	Dual active	
2	Data share mode	ON	
3	Operation during a processor failure	Reset the failure.	
4	Command queuing mode	ON	
5	Vender ID	HITACHI	
6	Product ID	DF600F	
7	Write & verify execution mode	ON	
Host groups			
1	Host connection mode (option 2)	–	
2	Host connection mode 1	Standard mode	
3	Host connection mode 2	–	
4	Logical unit mapping mode	–	
Configuration information			
1	Reset/LIP mode (signal transmission)	–	
2	Reset/LIP mode (processing transmission)	–	
3	All reset mode of LIP port	–	
4	128-byte minimum mode for lead frames	Not selected(*2)	

*1: Select “HP Connection Mode 2” when HP-UX needs to recognize the LU of which the LU number is eight or larger.

*2: Select “ON” when the SANRISE is used as a boot disk.

• In the case of Solaris+HDLM

#	Operating system plus alternative path	Solaris plus HDLM		
	Cluster	None	VCS	SCS
System parameters				
1	System start attribute	Dual active		
2	Data share mode	ON		
3	Operation during a processor failure	Reset the failure.		
4	Command queuing mode	ON		
5	Vender ID	HITACHI		
6	Product ID	DF600F		
7	Write & verify execution mode	ON		
Host groups				
1	Host connection mode (option 2)	–		
2	Host connection mode 1	Standard mode		
3	Host connection mode 2	–	Persistent RSV Cluster mode(*1)	Sun Cluster connection mode
4	Logical unit mapping mode	–		
Configuration information				
1	Reset/LIP mode (signal transmission)	–		
2	Reset/LIP mode (processing transmission)	–		
3	All reset mode of LIP port	–		
4	128-byte minimum mode for lead frames	–		

*1: This is set up only when VERITAS DBE/AC for Oracle9i is used.

• In the case of AIX+HDLM

#	Operating system plus alternative path	AIX plus HDLM	
	Cluster	None	HACMP
System parameters			
1	System start attribute	Dual active	
2	Data share mode	ON	
3	Operation during a processor failure	Reset the failure.	
4	Command queuing mode	ON	
5	Vender ID	HITACHI	
6	Product ID	DF600F	
7	Write & verify execution mode	ON	
Host groups			
1	Host connection mode (option 2)	–	
2	Host connection mode 1	Standard mode	
3	Host connection mode 2	NACA mode	
		UA(06/2A00) suppress mode	
		–	Logical Unit Reset Propagation mode
4	Logical unit mapping mode	–	
Configuration information			
1	Reset/LIP mode (signal transmission)	–	
2	Reset/LIP mode (processing transmission)	–	
3	All reset mode of LIP port	–	
4	128-byte minimum mode for lead frames	–	

• In the case of Windows+HDLM

#	Operating system plus alternative path	Windows plus HDLM	
	Cluster	None	MSCS
System parameters			
1	System start attribute	Dual active	
2	Data share mode	ON	
3	Operation during a processor failure	Reset the failure.	
4	Command queuing mode	ON	
5	Vender ID	HITACHI	
6	Product ID	DF600F	
7	Write & verify execution mode	ON	
Host groups			
1	Host connection mode (option 2)	–	
2	Host connection mode 1	Standard mode	
3	Host connection mode 2	–	Target Reset (Bus Device Reset) mode
		–	Third Party Process Logout propagation mode
4	Logical unit mapping mode	–	
Configuration information			
1	Reset/LIP mode (signal transmission)	–	
2	Reset/LIP mode (processing transmission)	–	
3	All reset mode of LIP port	–	ON
4	128-byte minimum mode for lead frames	–	

• In the case of HP-UX+PVLink

#	Operating system plus alternative path	HP-UX plus PVLink	
	Cluster	None	MC/SG
System parameters			
1	System start attribute	Dual active	
2	Data share mode	ON	
3	Processor operation when an error occurs	Reset the failure.	
4	Command queuing mode	ON	
5	Vender ID	HITACHI	
6	Product ID	DF600F	
7	Write & verify execution mode	ON	
Host groups			
1	Host connection mode (option 2)	–	
2	Host connection mode 1	Standard mode	
3	Host connection mode 2	HP connection mode2(*1)	
4	Logical unit mapping mode	–	
Configuration information			
1	Reset/LIP mode (signal transmission)	–	
2	Reset/L/P mode (processing transmission)	–	
3	All reset mode of LIP port	–	
4	128-byte minimum mode for lead frames	– (*2)	

*1: Select “HP Connection Mode 2” when HP-UX needs to recognize the LU of which the LU number is eight or larger.

*2: Select “ON” when the SANRISE is used as a boot disk.

• In the case of Solaris+VxVM-DMP

#	Operating system plus alternative path	Solaris plus VxVM-DMP		
	Cluster	None	VCS	SCS
System parameters				
1	System start attribute	Dual active		
2	Data share mode	ON		
3	Operation during a processor failure	Reset the failure.		
4	Command queuing mode	ON		
5	Vender ID	HITACHI		
6	Product ID	DF600F		
7	Write & verify execution mode	ON		
Host groups				
1	Host connection mode (option 2)	–		
2	Host connection mode 1	Standard mode		
3	Host connection mode 2	–	Persistent RSV Cluster mode(*1)	Sun Cluster connection mode
4	Logical unit mapping mode	–		
Configuration information				
1	Reset/LIP mode (signal transmission)	–		
2	Reset/LIP mode (processing transmission)	–		
3	All reset mode of LIP port	–		
4	128-byte minimum mode for lead frames	–		

*1: This is set up only when VERITAS DBE/AC for Oracle9i is used.

Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Mar.29.2004	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	Issued	-

FE-94DF672-03

Thunder9570V to Thunder9580V/9585V Upgrade Procedures

Rev.3

Contents

1. Outline ····· HUP-0030
2. Components and Tools Required for Upgrade ····· HUP-0030
3. Upgrade Work ····· HUP-0050
3.1 Prerequisites ····· HUP-0050
3.2 Before Starting Upgrade Work ····· HUP-0050
3.3 Notes ····· HUP-0060
3.4 Upgrade Work ····· HUP-0090
3.4.1 Suspend the work of the Host computer ····· HUP-0120
3.4.2 Splitting TrueCopy Basic pair ····· HUP-0120
3.4.3 User's Data Backup and Connection Host Setting ····· HUP-0140
3.4.4 Unpacking disk array units to be mounted ····· HUP-0150
3.4.5 Connection of the maintenance PC ····· HUP-0170
3.4.6 Changing mode of Disk Array Management Program 2 and registering disk array subsystem ····· HUP-0210
3.4.7 Making sure of various settings for the disk array subsystem ····· HUP-0250
3.4.8 Remove the fibre channel interface cables ····· HUP-0310
3.4.9 Updating installation of microprogram for Thunder 9570V ····· HUP-0330
3.4.10 Canceling RS232C Error Information Sending mode ···· HUP-0470
3.4.11 Canceling Report Status ····· HUP-0510
3.4.12 Canceling Single Mode ····· HUP-0540
3.4.13 Getting serial numbers of Disk Drives ····· HUP-0570
3.4.14 Collecting simple trace ····· HUP-0610
3.4.15 System power off ····· HUP-0640
3.4.16 Hardware upgrade works ····· HUP-0650
3.4.17 System power on ····· HUP-1010
3.4.18 Updating installation of microprogram for Thunder 9580V/9585V ····· HUP-1030
3.4.19 Setting serial number of disk array subsystem ····· HUP-1040
3.4.20 Setting the IP address ····· HUP-1080
3.4.21 Works to be done after the upgrade is completed ····· HUP-1100
3.4.22 Resetting of the Host ····· HUP-1110
3.4.23 Upgrade installation of microprogram to be executed when TrueCopy Basic is used ····· HUP-1120
3.4.24 Revalidation the TrueCopy Basic ····· HUP-1160

4. Trouble Analysis ····· HUP-1210
4.1 Error Messages ····· HUP-1210
4.1.1 Flash detected messages ····· HUP-1210
4.1.2 Failure messages ····· HUP-1220
4.1.3 Web error messages ····· HUP-1240
4.1.4 Error messages issued during upgrade made when Hitachi TrueCopy Basic is enabled ····· HUP-1240
4.1.5 Other messages ····· HUP-1250
4.2 When Abnormal End Empty System Retry Full Install occurs ····· HUP-1260
4.3 Procedure for making sure of flash program version ····· HUP-1270
4.4 When a Disk Drive was inserted in a wrong location ····· HUP-1280
4.5 When Returning Configuration of the Thunder 9580V/9585V to that of the Thunder 9570V ····· HUP-1300
4.5.1 Procedure for removing guard check against installation of the microprogram for the Thunder 9570V ····· HUP-1310
4.5.2 Procedure for removing downgrade check ····· HUP-1320
4.5.3 System power off ····· HUP-1330
4.6 Procedure for Recovery from Path Detachment and PSUE Status Occur during Upgrade Made when Hitachi TrueCopy Basic Is Enabled ····· HUP-1340
4.6.1 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9570V ···· HUP-1340
4.6.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9580V/9585V ····· HUP-1350
5. Appendix ····· HUP-1360
5.1 For Setting Changes in Host Computer and Others ····· HUP-1360

1. Outline

This procedure manual describes the operation procedure to upgrade the Disk Array subsystem from Thunder 9570V to Thunder 9580V/9585V with stored data.
In this procedures, the basic disk array unit of the Thunder 9570V (Model name: DF-600-RK) is described as “RK”. In the same way, the basic disk array unit of the Thunder 9580V/9585V (Model name: DF-600-RKH/DF-600-RKHE) and the additional disk array unit (Model name: DF-600-RKA) are described as “RKH/RKHE” and “RKA” respectively.

NOTE :In the configuration of the SANRISE 9570V, when the additional chassis frame for SATA (model name: DF600-RKAAT) is connected, it cannot be upgraded to the SANRISE 9580V/9585V.

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

No.	Name	Model	Unit per Assy	Components
1	RKH	DF600-RKH	1	Frame (1), Control unit (2) (Interface Board (2)), Panel (1), Backup battery unit (2), Fan assembly (2), AC cable J2H (2), Power unit (RKH) (2)
2	RKHE	DF600-RKHE	1	Frame (1), Control unit (2) (Interface Board (2)), Panel (1), Backup battery unit (2), Fan assembly (2), AC cable J2H (2), Power unit (RKHE) (2)
3	RKA	DF600-RKA	1	Frame (1), Fan assembly (2), AC cable J2H (2), Power unit (RKA) (2), ENC unit (2), ENC cable (4)
4	Cache memory (*1)	DF-F600-C5122H	4	Cache memory of 1,024 M bytes (512 M bytes×2)
		DF-F600-C1GX2H	4	Cache memory of 2,048 M bytes (1,024 M bytes×2)
5	Interface Board	DF-F600-DH2G2	2	2 G bps Fibre Channel Interface
6	ENC FC cable assembly	DF-F600-K5B	1 (*2)	ENC FC cable 5 m (2)
		DF-F600-K075B	(*3)	ENC FC cable 75 cm (2)

*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 Thunder 9570V.

*2 : This is required when the disk array unit had the maximum configuration mountable on the U6 rack frame when it was the Thunder 9570V.

*3 : The 75 cm cables are only required between the RKH/RKHE and the first RKA, the 50 or 75 cm can be used for the rest of the RKAs.

The following tools are required for the upgrade procedures.

Table 2.2 Tools Required

Division	Tool name	Specification	Usage
Tool	Phillips screwdriver	No.2	Securing the subsystem.
	Phillips screwdriver	No.1	For setting rotary switch, switch for Unit ID setting.
	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 maintenance PC and the subsystem
	PC for maintenance	Pentium	For maintenance (Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 M bytes or more (64 M bytes or more is recommended)

3. Upgrade Work

3.1 Prerequisites

- The configuration of the disk array subsystem when it was the Thunder 9570V must be the dual controller subsystem.
- The Thunder 9570V 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.
- Because you need to change the setting of host computers, it is necessary to stop and reboot it.
- Be sure to use a version of Disk Array Management Program 2 that corresponds to the microprogram to be installed.
- The Thunder 9580V/9585V can take over only functions that it can use. The Thunder 9580V/9585V cannot use the RS232C Error Information Sending mode and the Status Report mode which are not supported.
- For upgrading, all the Disk Drives mounted on the existing Thunder9570V are transferred.

Note: When Thunder9570V is Boot disk or rootdg of VxVM is set in Thunder9570V, the upgrade cannot be executed since the device file name recognized by the Host is changed at the time of upgrading from Thunder9570V to Thunder9580V/9585V.

- Thunder 9580V/9585V to the Thunder 9570V downgrade is not supported. Ugrade from the Thunder 9530V to the Thunder 9580V/9585V is not supported.

Note: The controllers that are used to upgrade to the Thunder9580V/9585V need to 1656/x or later flash program installed prior to performing any upgrade work.

3.2 Before Starting Upgrade Work

CAUTION: If a wrong operation is done in a upgrade work, it is feared that user data stored in the subsystem is lost.
In order to provide against the unlikely accident, perform the following before starting upgrade work.

(1) Backup all user data. Do not skip this step.
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 a version of Disk Array Management Program 2, which corresponds to the microprogram to be installed, is installed.
  The PC must fit the LAN environment and have a CD-ROM drive.
- LAN cross cable
- **CD-ROM for installation of the microprogram for the Thunder 9570V (microprogram revision 0656/x or later).**
- **CD-ROM for installation of the microprogram for the Thunder 9580V (microprogram revision 1656/x or later)/9585V (microprogram revision 1657/x or later).**

NOTE :Revisions of the microprograms for the Thunder 9570V and the Thunder 9580V/9585V must be the same.

3.3 Notes

WARNING:

- **In the configuration of the SANRISE 9570V, when the additional chassis frame for SATA (model name: DF600-RKAAT) is connected, it cannot be upgraded to the SANRISE 9580V/9585V.**
- **When executing a updating installation of the microprogram, be sure to select [Update]. Never execute the [Initial Setup] because all data will be lost.**
- Since configurations of the Thunder 9570V and the Thunder 9580V/9585V are different from each other, works such as an installation of the Control Unit for the Thunder 9580V/9585V in the RKH/RKHE, shifts of the Disk Drives installed in the RK of the Thunder 9570V, and a connection of the back end cable are required.
- 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 Thunder9570V is used in the Single Mode, change the mode to the Dual Active Mode or Hot Standby Mode before starting the upgrade operation.
- When the RS232C Error Information Sending mode and the Report Status is turned on, it must be turned off before starting the upgrade because the Thunder 9580V/9585V does not support it.
- Do not change the ports for connecting the fibre channel interface cables when the upgrade is made.
- In the upgrade operation, setting of the Host computer, peripherals and application software may need to be changed accordingly since WWN changes at the same time when the product serial number of the Disk Array subsystem changes. For the setting change, refer to "5.1 Setting Changes in Host Computer and Others".
- An IP address that is used before the upgrade is succeeded to. Reset it as occasion demands.
- When 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 FlashAccess Function, 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 Maximum FlashAccess Capacity (Number of Logical Blocks) for Each Cache Capacity of Thunder 9580V/9585V” 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-FlashAccess.
  However, when the FlashAccess Function is enabled after the upgrade in the case where the LU is used as a non- FlashAccess, the subsystem will be placed in a state in which a warning is kept issued.
  And, when concurrent use of QuickShadow, refer to the following “Table 3.3.2 Maximum FlashAccess Capacity (Number of Logical Blocks) for Each Cache Capacity of Thunder 9580V/9585V when concurrent use of QuickShadow”.

Table 3.3.1 Maximum FlashAccess Capacity (Number of Logical Blocks) for Each Cache Capacity of Thunder 9580V/9585V

Capacity of cache memory installed (MB/controller)	1,024	2,048	3,072	4,096
Hot stand-by mode	467,712	2,499,840	4,531,968	6,560,064
Dual active mode	233,856	1,249,920	2,265,984	3,280,032

Table 3.3.2 Maximum FlashAccess Capacity (Number of Logical Blocks) for Each Cache Capacity of Thunder 9580V/9585V when concurrent use of QuickShadow.

Capacity of cache memory installed (MB/controller)	1,024	2,048	3,072	4,096
Dual active mode		217,728	717,696	1,215,648

It is required that the total number of blocks of the LUs defined for the Thunder 9570V does not exceed the number of blocks shown above.

- When using the Hitachi QuickShadow Function, which is an optional feature, after the upgrade, the capacity of the cache memory installed must be 2 G bytes or more.
- When making the upgrade leaving the Hitachi QuickShadow Function enabled, RAID Manager (HORCM) must be restarted.
- When making the upgrade leaving the Hitachi ShadowImage Function enabled, RAID Manager (HORCM) must be restarted.
- When making the upgrade leaving the Hitachi TrueCopy Basic Function enabled, RAID Manager (HORCM) must be restarted.
- When the upgrade operation is executed with Hitachi TrueCopyBasic validated, pair splits are necessary for both local side and remote side to execute the operation with the pair kept in the secured status.
- When making the upgrade leaving Hitachi TrueCopy Basic 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 Basic 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.

- Hitachi TrueCopy Basic manages information stored in paired disk array subsystems. When making the upgrade leaving it enabled, it is necessary to execute updating installation of the microprogram and to change the management information for the mate disk array subsystem (not the subsystem being upgraded but the other one of the paired subsystems). 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.

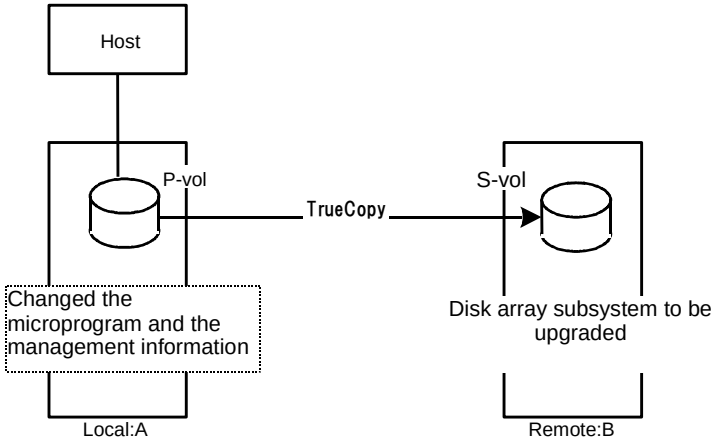


Figure 3.3.1 Paired Disk Array Subsystems

3.4 Upgrade Work

CAUTION

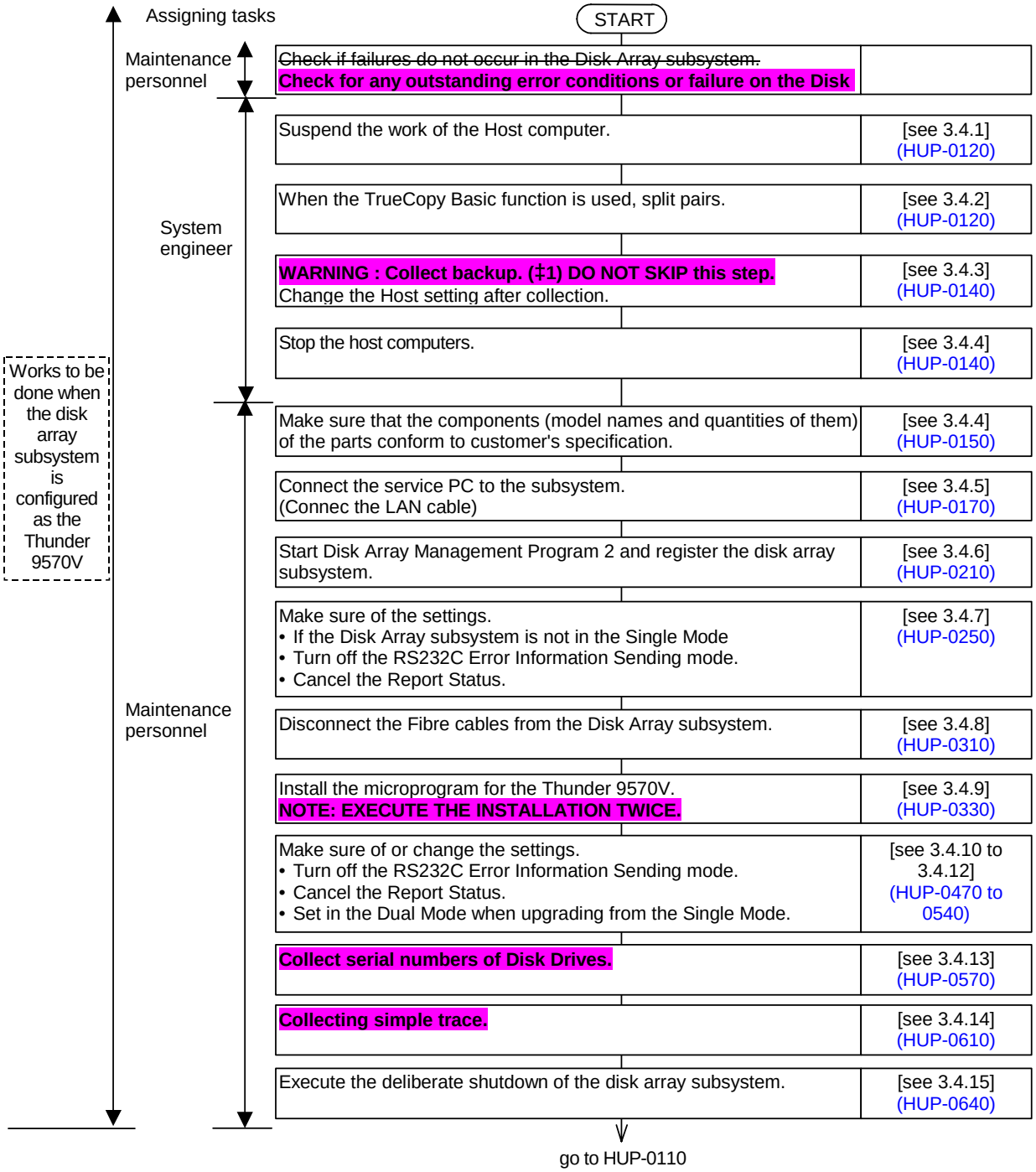
Touching heat sinks or ICs may cause injury. Be sure to handle with care.

CAUTION

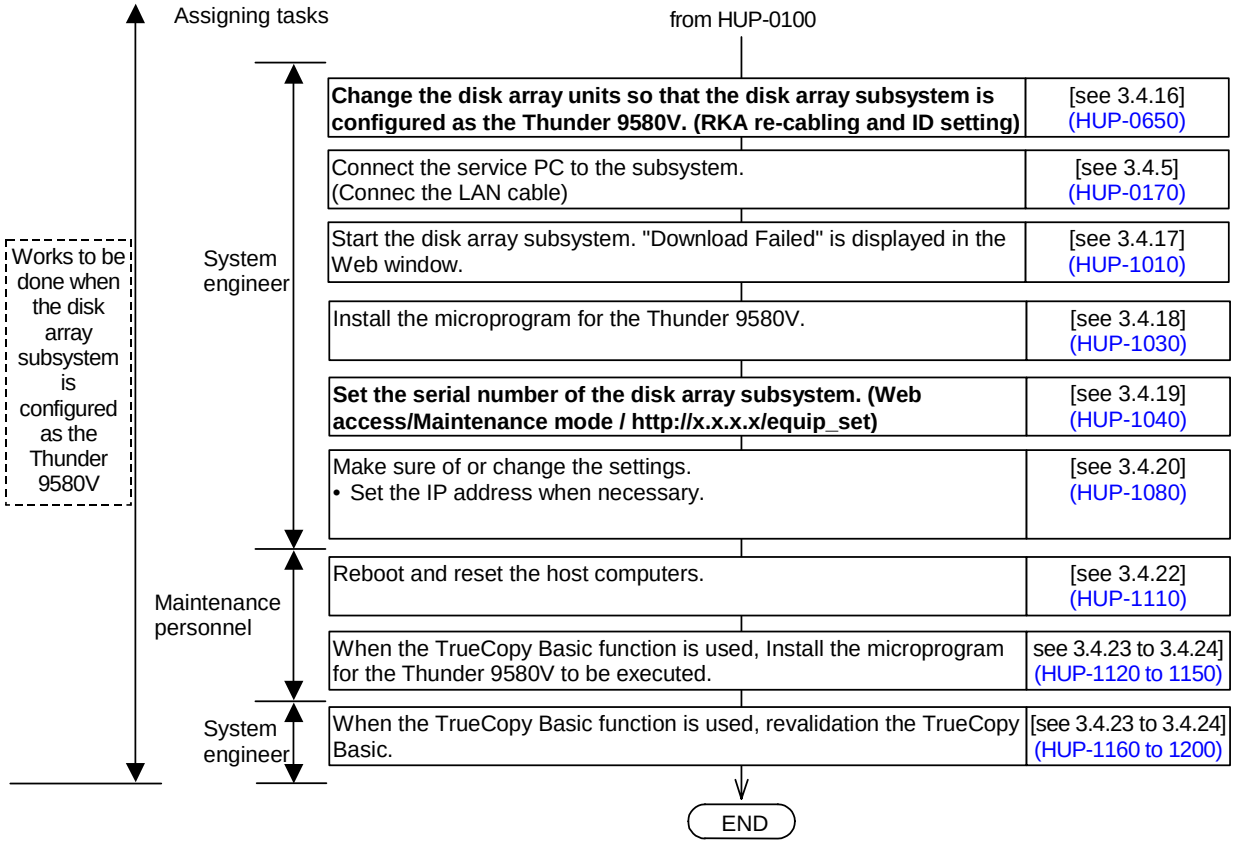
- **To prevent part failures caused by static electrical charge built up on your own body, be sure to wear a wrist strap connected to the chassis before starting and do not take it off until you finish.**
- **Be sure to wear a wrist strap connected to the chassis whenever you unpack parts . Otherwise,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

The procedure for upgrading the Thunder 9570V to the Thunder 9580V/9585V is shown below.
Execute the procedure after making sure of the work to be done in each step.



WARNING: ‡1 Maintenance personnel should check if customer has executed user data backups. Without the backups, the upgrade cannot be executed.


Assigning tasks
from HUP-0100
Works to be done when the disk array subsystem is configured as the Thunder 9580V
System engineer
Change the disk array units so that the disk array subsystem is configured as the Thunder 9580V. (RKA re-cabling and ID setting)
[see 3.4.16] (HUP-0650)
Connect the service PC to the subsystem. (Connec the LAN cable)
[see 3.4.5] (HUP-0170)
Start the disk array subsystem. "Download Failed" is displayed in the Web window.
[see 3.4.17] (HUP-1010)
Install the microprogram for the Thunder 9580V.
[see 3.4.18] (HUP-1030)
Set the serial number of the disk array subsystem. (Web access/Maintenance mode / http://x.x.x.x/equip_set)
[see 3.4.19] (HUP-1040)
Make sure of or change the settings.
• Set the IP address when necessary.
[see 3.4.20] (HUP-1080)
Maintenance personnel
Reboot and reset the host computers.
[see 3.4.22] (HUP-1110)
When the TrueCopy Basic function is used, Install the microprogram for the Thunder 9580V to be executed.
see 3.4.23 to 3.4.24] (HUP-1120 to 1150)
System engineer
When the TrueCopy Basic function is used, revalidation the TrueCopy Basic.
[see 3.4.23 to 3.4.24] (HUP-1160 to 1200)
END

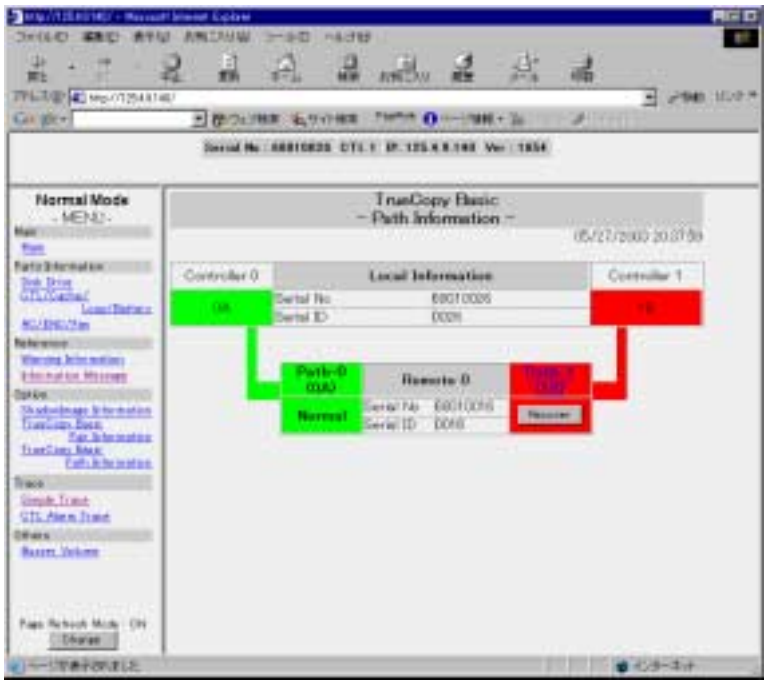
3.4.1 Suspend the work of the Host computer

Suspend the work of the Host computer.

3.4.2 Splitting TrueCopy Basic pair

This operation is not required when Hitachi TrueCopy Basic is not used.
When making the upgrade leaving TrueCopy Basic 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 referring to a log message:
When the Path of the [Summary of Exchangeable Part Statuses] is clicked in the main window, the window is changed to the one shown below and the detailed status of the path is displayed. Besides, when the [TrueCopy Basic Path Information] in the menu frame in the main window is clicked, the window is also changed to the one shown below and the detailed status of the path is displayed. When making a recovery from a failure by replacing a component, follow the instruction given in Subsection 2.4.3, "Procedure for recovery from path blockade and Suspend (PSUE) status to be used when the TrueCopy Basic function is used" on page MNTE 02-1320 in the Maintenance Manual.



(2) Split the pair by executing the pairsplit command and make sure that the pair status is changed to PSUS/SSUS.

1. Set the group name in the configuration definition file as "vg01." Split the TrueCopy pair in the PAIR status with the pairsplit command.

```
c:¥horcm¥etc>pairsplit –g vg01
```

Figure 3.4.2.1 Example of Pairsplit Command Entry

2. 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 PSUS NEVER ,-----        1   -
```

The TrueCopy pair has been split. For details of the pairsplit command and its options, refer to Chapter 4 in the Hitachi RAID Manager System Administrator's Guide (Thunder 9500V Series).

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 Thunder 9570V 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".

Please stop the host computers.

3.4.4 Unpacking disk array units to be mounted

Unpack the RKH/RKHE and RKA(s) to be mounted to compose the configuration of the Thunder 9580V/9585V.
The procedure is shown below.

(1) Unpacking the RKH/RKHE and RKA.

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/RKHE is about 40 kg, RKA is about 42 kg.**

Figure 3.4.4.1 shows the subsystem within the outer package and Figures 3.4.4.2 show the packed subsystem without the outer package.
The packing for the RKH/RKHE and RKA are the same.

1. Remove the outer package and packing materials.
2. Take the subsystem out of the polyethylene bag.
3. Remove tapes, etc. applied to the subsystem.
4. Remove desiccating agent from the lower of the subsystem.
5. Check the exterior of the subsystem visually for distortion or damage owing to the transport.

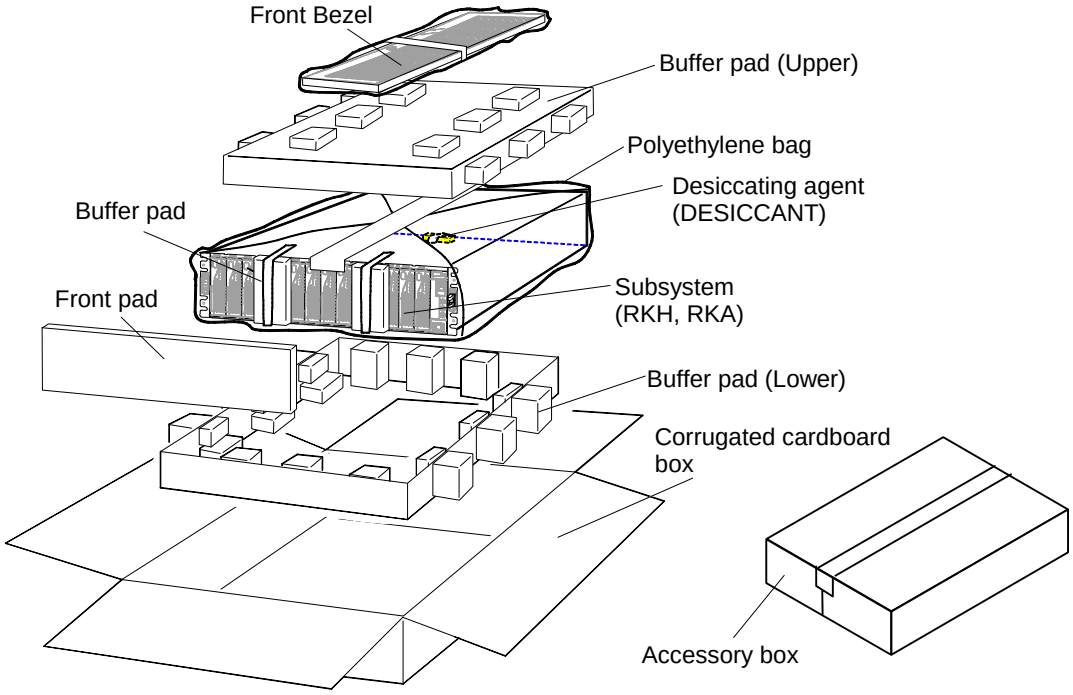


Figure 3.4.4.1 Packed Subsystem

(2) 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.
The key for the front bezel supplied with the subsystem and the keys for the latches (one each for latches of the Power Unit , and Fan Assembly) must be kept by service personnel in order to prevent users from maintaining the subsystem.

NOTE : The key for Front Bezel is used to mount and dismount Front Bezel.
The key for Latches is used to mount and dismount Power Units , or Fans Assembly.

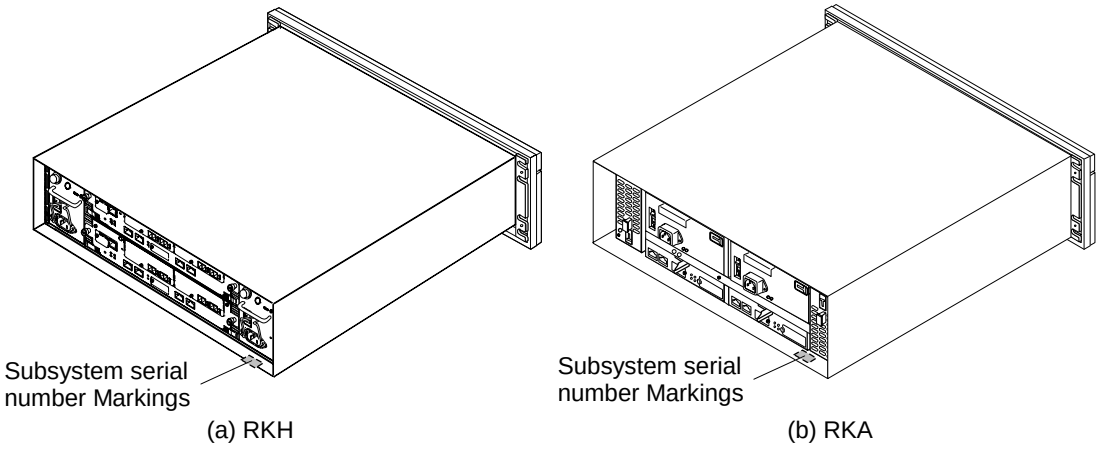


Figure 3.4.4.2 Locations of Subsystem Serial Number Markings

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) Be sure to use a version of Disk Array Management Program 2 that corresponds to the microprogram to be installed. (Make sure that the activation file startmgr2.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.
  If the maintenance PC cannot be connected, set the value in No. 2.

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)	2550.0.0/ 255.255.255.224(*1) (At the time of shipment)	**10.0.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0/ 255.255.255.224(*1)	**192.168.0.xxx ("xxx" is any value from 1 to 30 except 16, 17.)**	**255.255.255.224**

*1 : Micro revision is 0653/C or later.

• Automatic change of network parameters of the Port 0 (for maintenance)
Since communication is not performed normally when the network addresses of the Port 1 (for users) and the Port 0 (for maintenance) are the same, two sets of fixed values of the network parameters to be used for the Port 0 (for maintenance) are prepared and either of the two sets is automatically given to the Port 0 (for maintenance) depending on the network parameters of the Port 1 (for users).
When the network address of the Port 1o9 (for users) is set as "10.*.*.*", that of the Port 0 (for maintenance) is changed as shown below.

NOTE : However, if the network address of the LAN device connected to Port 1 (Users) via the Gate Way accords with that of Port 0 (Maintenance), they will collide each other, disabling to communicate normally.
Microprogram revision 0653/B or earlier
(i) When the Port 1(Users) address is set to other than "10.*.*.*", "10.*.*.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "10.*.*.*".
(ii) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.*" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "192.168.0.*".
Microprogram revision 0653/C or later
(i) When the Port 1(Users) address is set to other than "10.*.*.*", "10.0.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "10.0.0.(0 to 31)".
(ii) When the Port 1(Users) address is set to "10.*.*.*", "192.168.0.(0 to 31)" cannot be used for the IP address for LAN device to be connected to Port 1(Users) through a gateway. Therefore, set the IP address to other than "192.168.0.(0 to 31)".

Network parameter	Description	Control Unit#0	Control Unit#1
		Port 0 (Maintenance) < Fixed IP >	Port 0 (Maintenance) < Fixed IP >
IP Address	The IP Address is changed/set up.	192.168.0.16	192.268.0.17
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.0/ 255.255.255.224(*1)	255.255.255.0/ 255.255.255.224(*1)
Default Gateway	The Default Gateway is changed/set up.	0.0.0.0	0.0.0.0
DHCP	Enable/Disable of the DHCP function is set up.	OFF	OFF
*1 : Micro revision is 0653/C or later.			

(2) Connecting the LAN cross cable

(a) for the Thunder 9570V configuration

1. Remove the LAN Cover of the Control Unit #0 in the RK and connect the PC and the subsystem with the LAN cross cable.

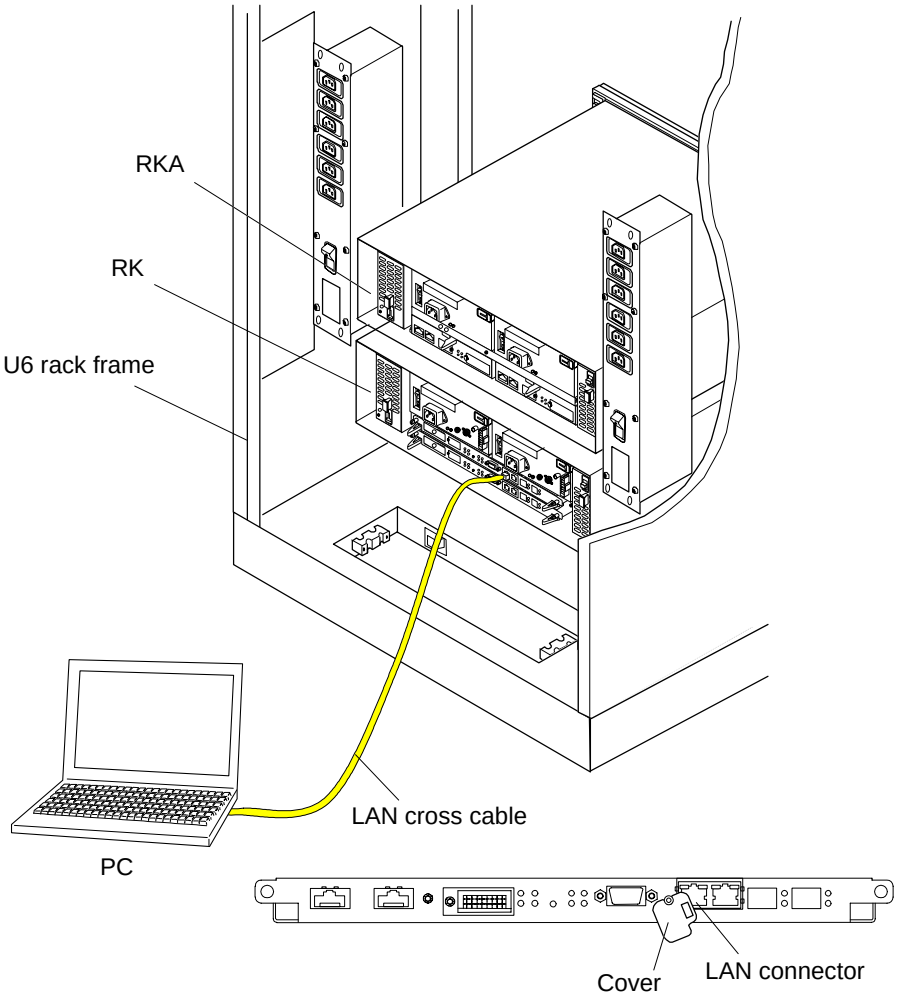


Figure 3.4.5.1 Connecting the maintenance PC (Thunder 9570V)

When removing the PC, disconnect the LAN cross cable from the Control Unit #0 and reinstall the cover.

(b) for the Thunder 9580V/9585V configuration

1. Remove the LAN Cover of the Control Unit #0 in the RKH/RKHE and connect the PC and the subsystem with the LAN cross cable.

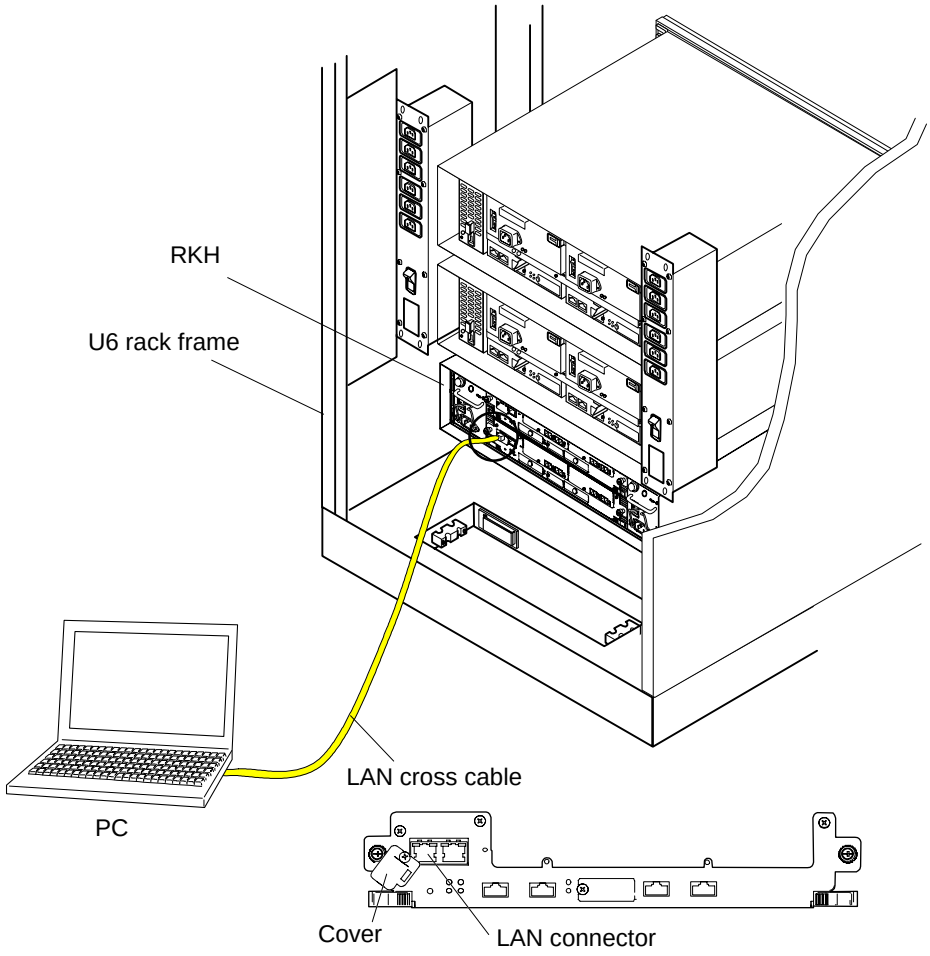


Figure 3.4.5.2 Connecting the maintenance PC (Thunder 9580V/9585V)

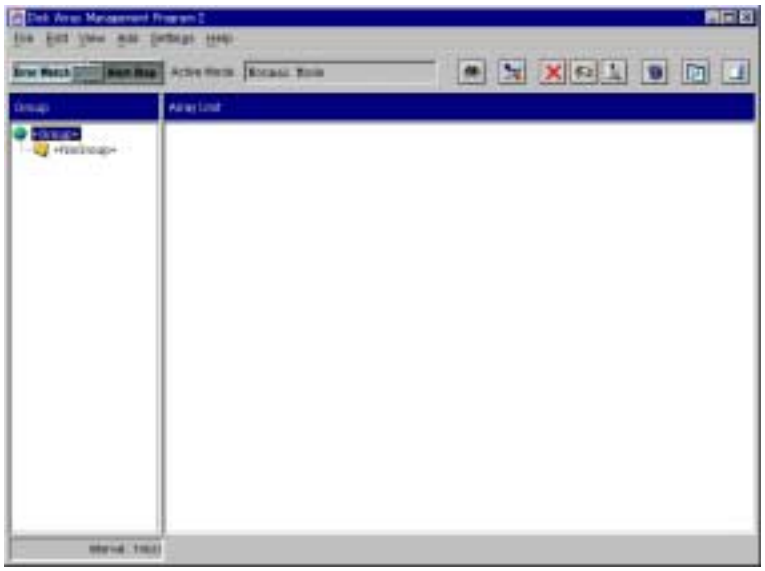
When removing the PC, disconnect the LAN cross cable from the Control Unit #0 and reinstall the cover.

3.4.6 Changing mode of Disk Array Management Program 2 and registering disk array subsystem

Register the disk array subsystem using Disk Array Management Program 2.
The procedure is shown below.

(1) Activating the Disk Array management program 2

1. Execute the batch file or shell script for activating the Disk Array management program 2.
   In the case of Windows, activate the batch file, startmgr2.bat.
2. The Disk Array management program 2 is activated in the Normal Mode and the main window is displayed(‡1).

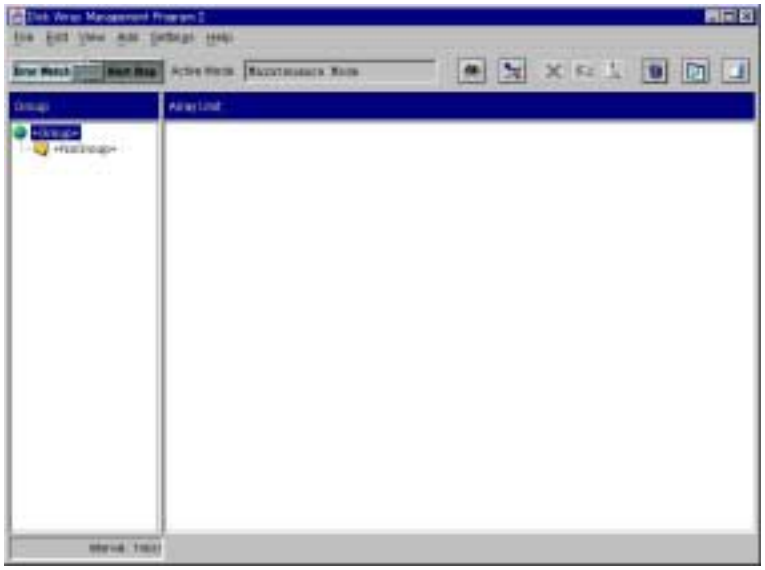


In the case of Windows, the prompt window is also displayed.
The prompt window has nothing to do with operation of Disk Array management program 2. But don't close the prompt screen. It is unusually finished.
The icon can be minimized automatically when "Program Quitting" is selected from the properties of the batch file.

‡1 : The mode change cannot be done at the time of the initial activation of the Disk Array management program 2. A registration of a password validates the mode change.

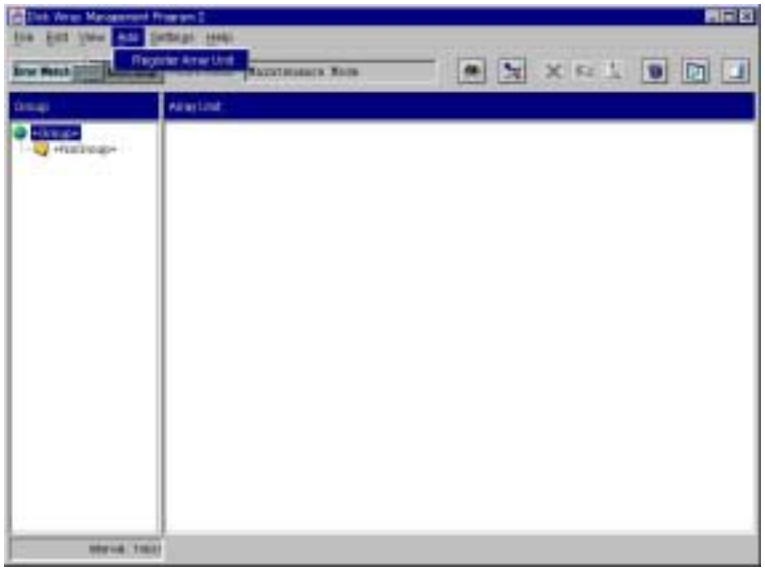
(2) Changing the Normal Mode to the Maintenance Mode

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 Disk Array Management Program 2 operates in the maintenance mode.



(3) Registering the disk array subsystem

1. Select [Registering Array Unit] in the main window or click [: Array Unit Registering].



2. Enter the information for the registration and click the [OK] 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 maintenance PC connected Controller only.

• 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.



[Group Name]: 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.

[Array Unit 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 _).

[Array Unit Type]: Select a type of the disk array subsystem.

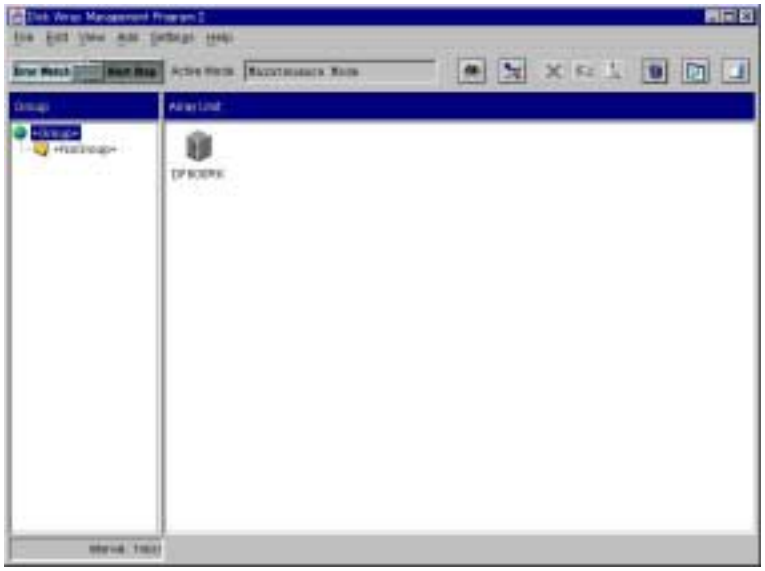
[Connection Type]: Select a type of the connection to be used for the disk array subsystem.
[IP Address, or Host Name]
When connecting the LAN, select the [TCP/IP (LAN)], and then specify the [IP Address], [Host Name], and [IP Address] or [Host Name] of controller 0 and 1.

[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.

3. Since a message informing of a completion of the registration is displayed, click the [OK] button.



4. 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.

3.4.7 Making sure of various settings for the disk array subsystem

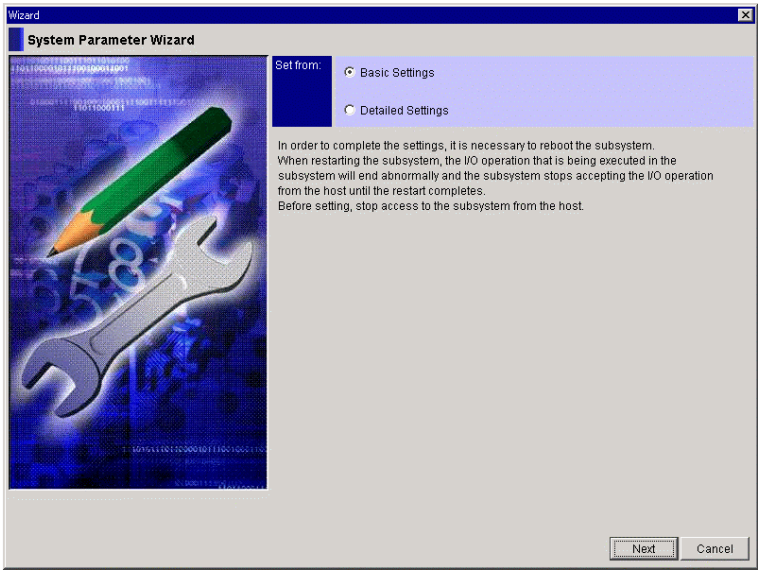
Make sure of the following settings that have been made for the disk array subsystem. When the various setting shown below does not meet to the condition, confirm customers that there is no problem if the setting is changed.

(1) Making sure of the dual controller system

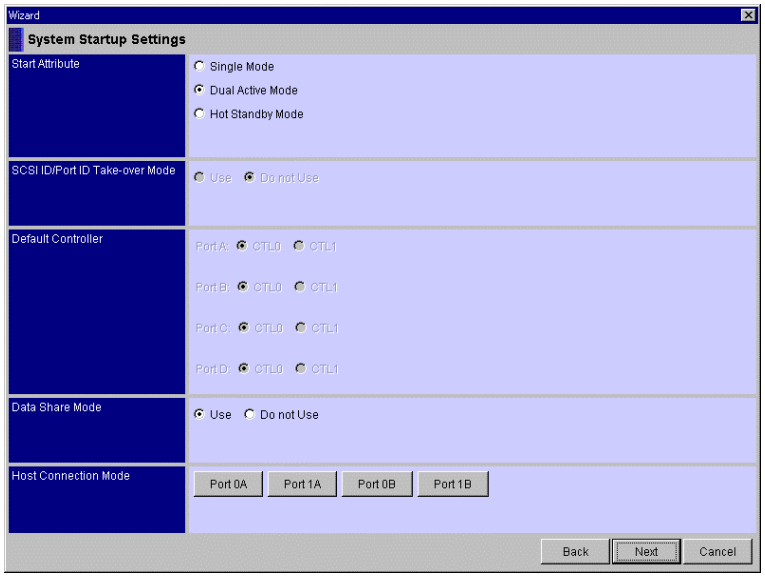
Because the Thunder 9580V/9585V does not support the Single mode, make sure that the disk array subsystem is not in the Single mode using Disk Array Management Program 2. If the subsystem is used in the Single mode, change the mode to Dual Active or Hot Standby referring to Subsection 3.4.12, “Changing Single mode”.

NOTE : It is a prerequisite for the upgrade to the Thunder 9580V/9585V that the disk array subsystem has the dual controller system.

1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [: System Parameter Wizard] button.
4. Click the [Basic Settings] radio button, and then click the [Next] button.



5. Since the “System Startup Settings” window is displayed, check if the [Dual Active Mode] or [Hot Standby Mode] has been set for the [Start Attribute].



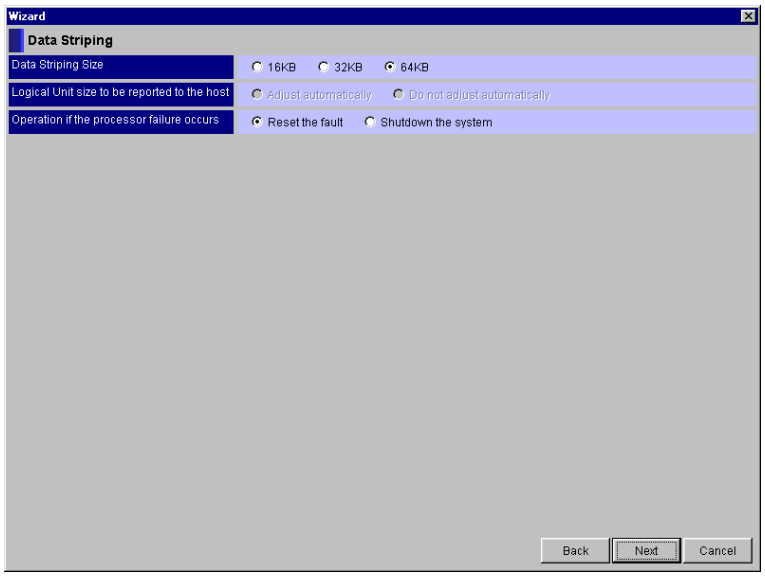
6. Click the [Cancel] button.
7. Since the “System Parameter Wizard” window is displayed, click the [Cancel] button.
8. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

(2) Making sure of the RS232C Error Information Sending mode
Making sure of the RS232C Error Information Sending mode turn off using Disk Array Management Program 2.
The Thunder 9580V/9585V does not support the RS232C Error Information Sending mode. When the RS232C Error Information Sending mode has been turned on, turn off the RS232C error information sending mode referring to "3.4.10 Cancellation of the RS232C Error Information Sending Mode".
The procedure is shown below.

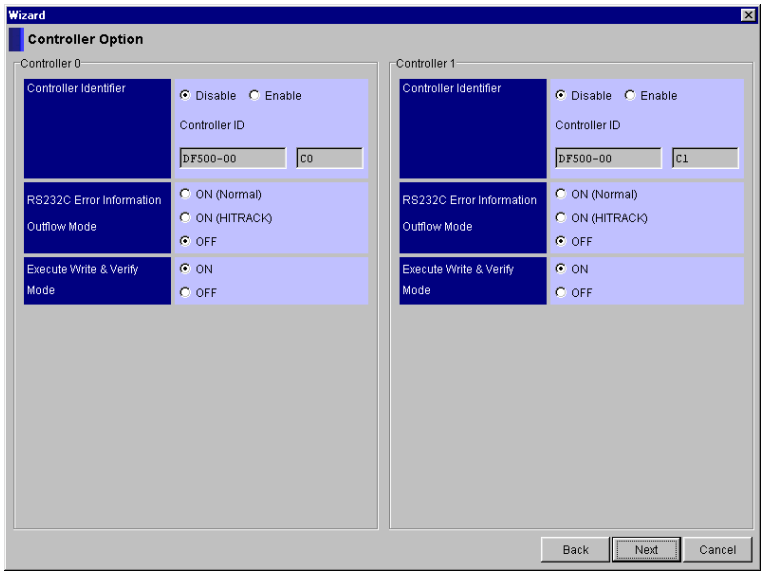
1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [: System Parameter Wizard] button.
4. Click the [Detailled Settings] radio button, and then click the [Next] button.



5. Since the “Data Striping” window is displayed, click the [Next] button repeatedly until the “Controller Option” window is displayed.
   (Windows are displayed in the following order: “Data Striping”, “INQUIRY Setting”, and “Controller Option” windows.)



6. Since the “Controller Option” window is displayed, check if the [OFF] has been set for the [RS232C Error Information Outflow Mode].



7. Click the [Cancel] button.
8. Since the “System Parameter Wizard” window is displayed, click the [Cancel] button.
9. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

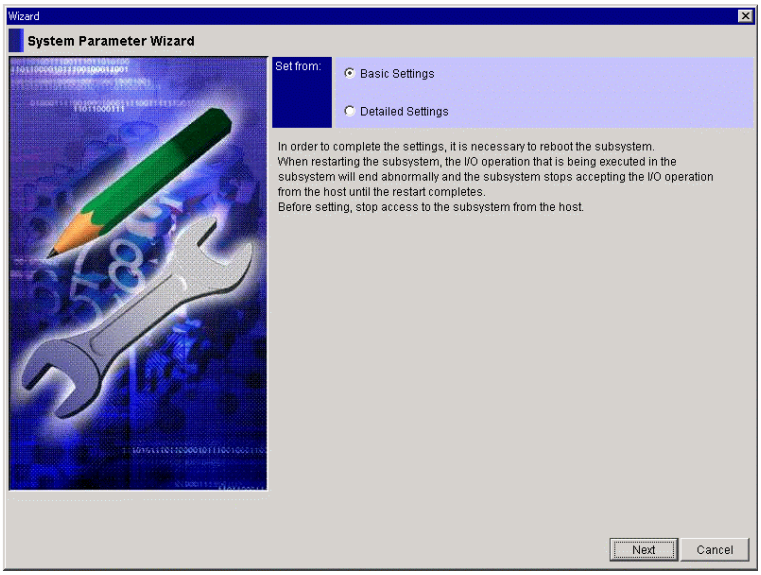
(3) Making sure of the Report Status

Making sure of the Report Status turn off using Disk Array Management Program 2.

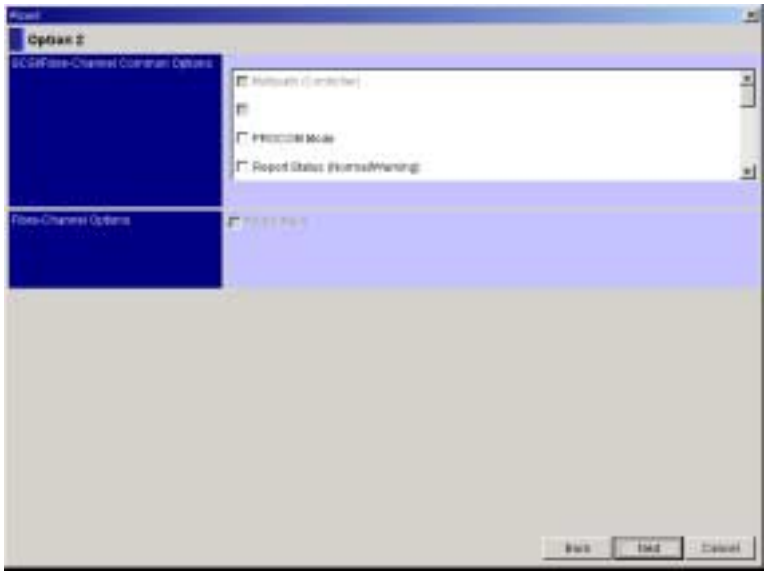
Since Thunder 9580V/9585V does not support the status reporting mode, when the status reporting mode is checked off, remove the checkmark referring to "3.4.11 Cancellation of the Report Status".

The procedure for confirmation is shown below.

1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [ : System Parameter Wizard] button.
4. Click the [Basic Settings] radio button, and then click the [Next] button.



5. Since the “System Startup Settings” window is displayed, click the [Next] button repeatedly until the “Option 2” window is displayed.
   (Windows are displayed in the following order: “System Startup Settings”, “Common 1”, “Option 1”, and “Option 2” windows.)
6. Since the “Option 2” window is displayed, has not set for the [Report Status (Normal/Warning)].



7. Click the [Cancel] button.
8. Since the “System Parameter Wizard” window is displayed, click the [Cancel] button.
9. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

3.4.8 Remove the fibre channel interface cables

To execute the subsequent operation, Fibre Channel Interface 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 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.

1. Disconnecting the Fibre Channel interface cable to the clamp
2. Disconnect the Fibre Channel interface cable connected to the Control Unit.
3. Install the blind at the each position, from where the fibre channel interface cable of the Control Unit has been removed, by tightening the thumb screw.

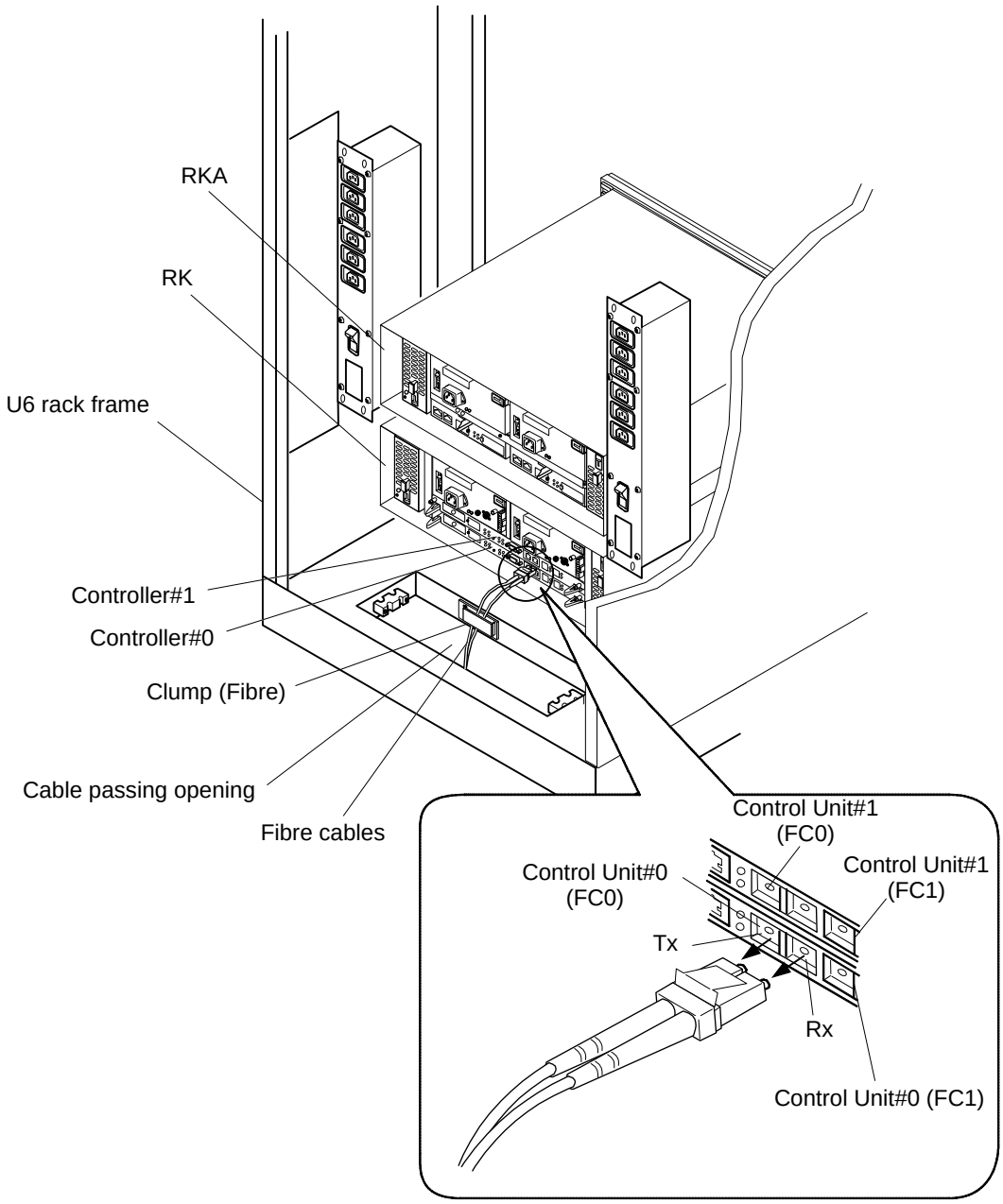


Figure 3.4.8.1 Disconnecting Interface Cable(Thunder 9570V)

3.4.9 Updating installation of microprogram for Thunder 9570V

Install the microprogram for the Thunder 9570V **(Rev. 0656 or the latest revision)** using the Web.
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) Outline of procedure for update installation
- Install the update microprogram using a maintenance PC via the Web connection.
- The microprogram updating installation can be done only when the subsystem is in the Maintenance mode. (It cannot be done when the subsystem is operating online.)
- In the maintenance PC, JRE (‡1) 1.3.1 03 must be installed.
- **[User Name] and a [Password] will 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) Preparation for update installation of microprogram

(a) 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 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.

(c) 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 (b), a Java error occurs. Details of the Java errors and actions for coping with them are shown below.

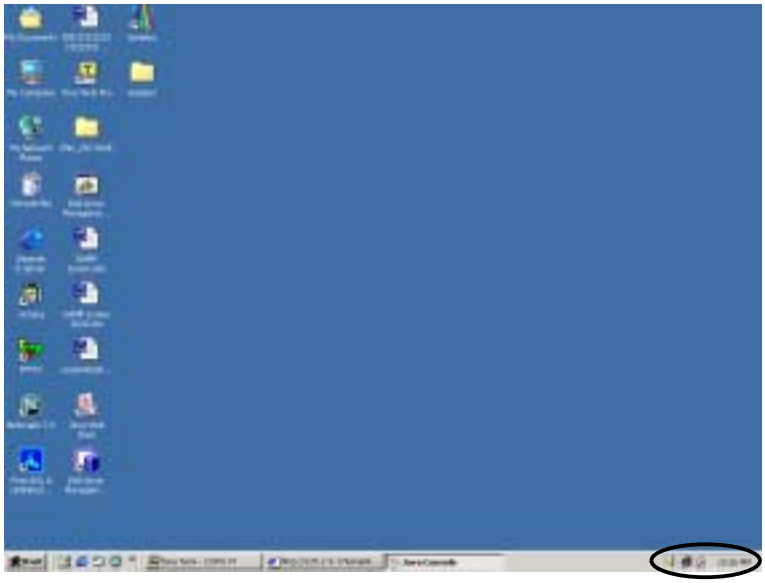
Table 3.4.9.1 Java error codes

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 3.4.9.) 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.

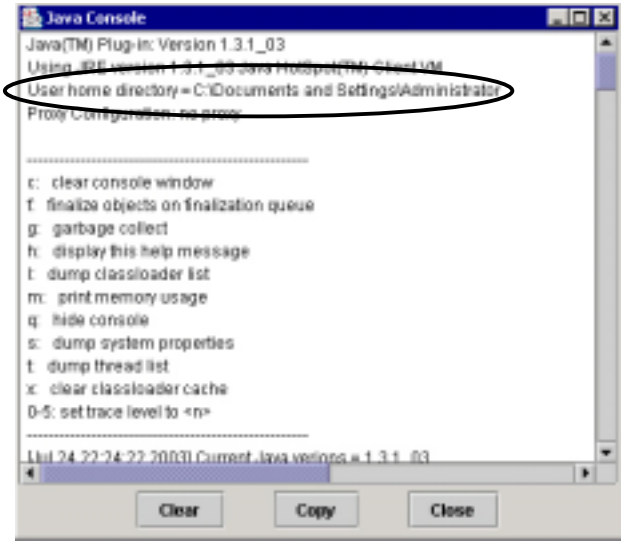
(i) Method for checking the drive for booting the OS

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.

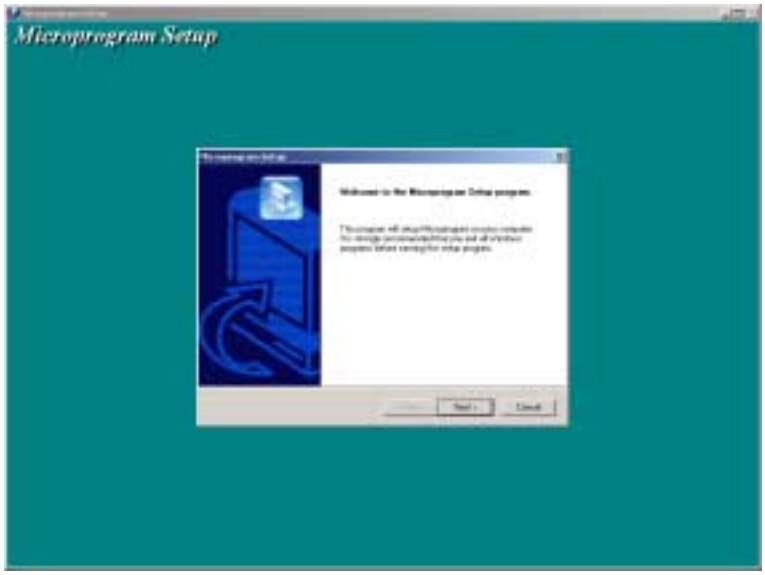


2. Since the JavaConsole window opens, make sure that the [User Home Directory] is the c drive (=C: ******…).

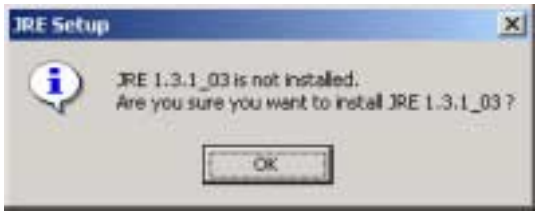


(d) Procedure for setting up the maintenance PC

1. Double click the “Program\micro upload\micro setup\Setup.exe” of the CD-ROM for microprogram installation.
2. 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 3. to 6. are not displayed.



3. A dialog box for asking confirmation of starting the JRE 1.3.1 03 installer.
   Click the [OK] button.



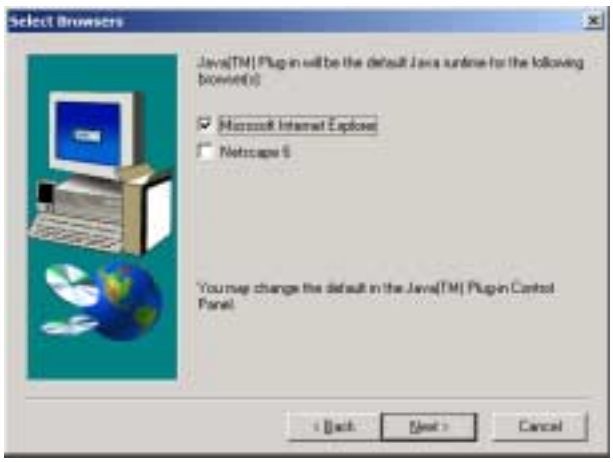
4. A window of product licensing contract is displayed. Click the [Yes] button.



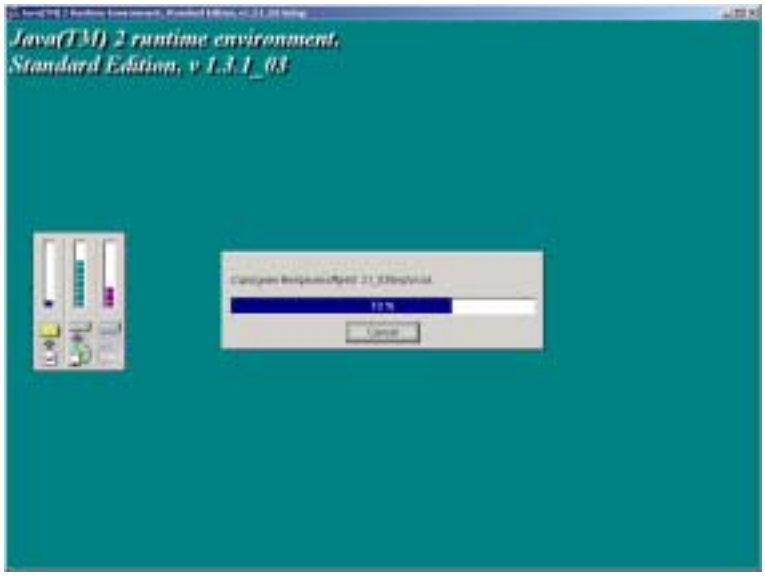
5. A window for selecting a directory in which the JRE 1.3.1 03 is to be installed. Select the directory for the installation and click the [Next] button.



6. A window for specifying the Java default browser is displayed. Select the browser being used and click the [Next] button.



Installation of the JRE 1.3.1 03 is started.

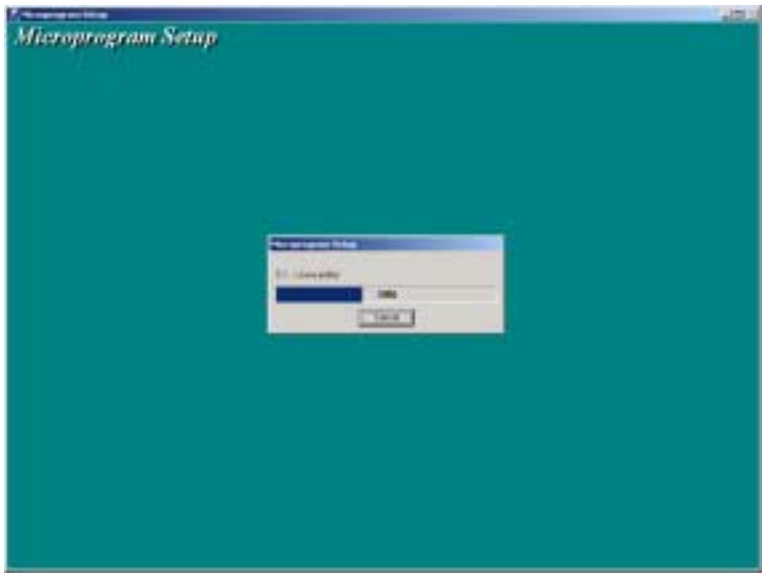


7. After the installation of the JRE 1.3.1 03 is completed, set the security policy file. When the security policy file (.java.policy) exists in the home directory of the current user, a window for asking confirmation of starting the setting is displayed. Click the [Yes] button.

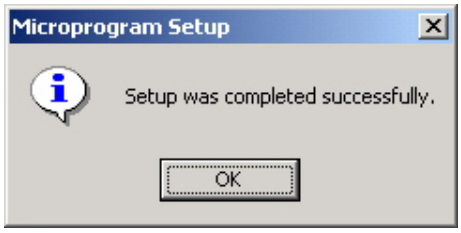




8. The microprogram is copied on the maintenance PC.
   Create a directory to which the microprogram is to be copied directly under the "C:\diskarray-microprogram\microprogram" for each microprogram revision and copy the microprogram file with the subdirectories (disk01, disk02, ---) into the directory.



9. 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.

(3) Install the microprogram for the Thunder 9570V.

1. 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.
   - Make sure that the microprogram has already been installed in the subsystem and the READY LED (green) on the front bezel is on. Besides, make sure that the WARNING LED (yellow) on the front bezel is not on.
   - Make sure that the status of system copy complete by "Information Message" window in the Web window.
     If it is in the middle of system copy, please wait until that is completed and update installation of microprogram.

2. Set the operation mode in the Maintenance Mode.
3. Make sure that the WARNING LED (orange) is not blinking fast (at intervals of 125 ms). 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).
4. Press the RST SW of the Control Unit#0. (While pressing RST SW, the RST LED is on.)
5. Wait for a while (ten seconds at the longest) and press the RST SW of the Control Unit#1 immediately (within ten seconds) after 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. 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 Front Bezel turns off, it transfers to Maintenance mode.

6. Start the setting after making sure that the subsystem has entered the Ready status.

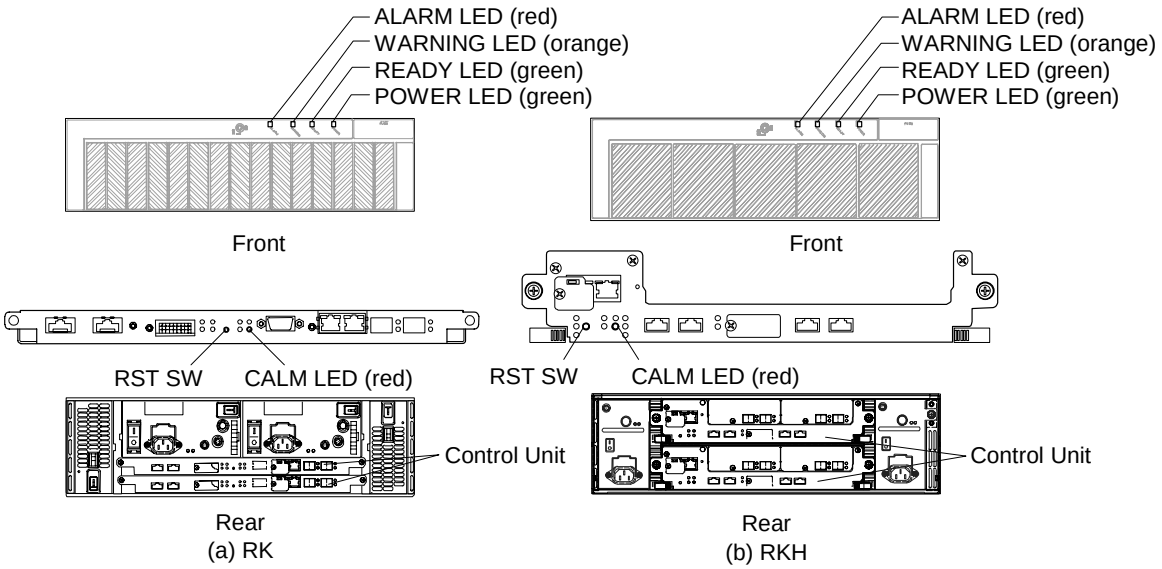


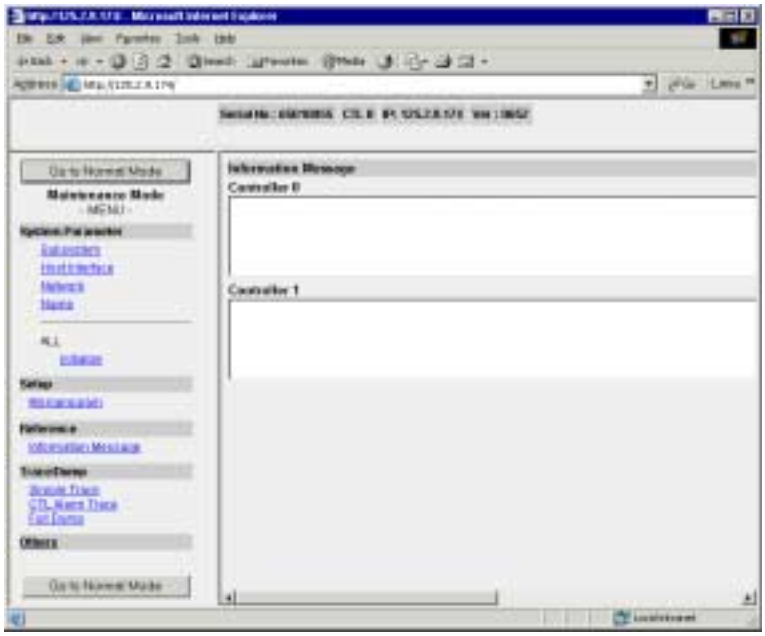
Figure 3.4.9.1 Indication Position

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.

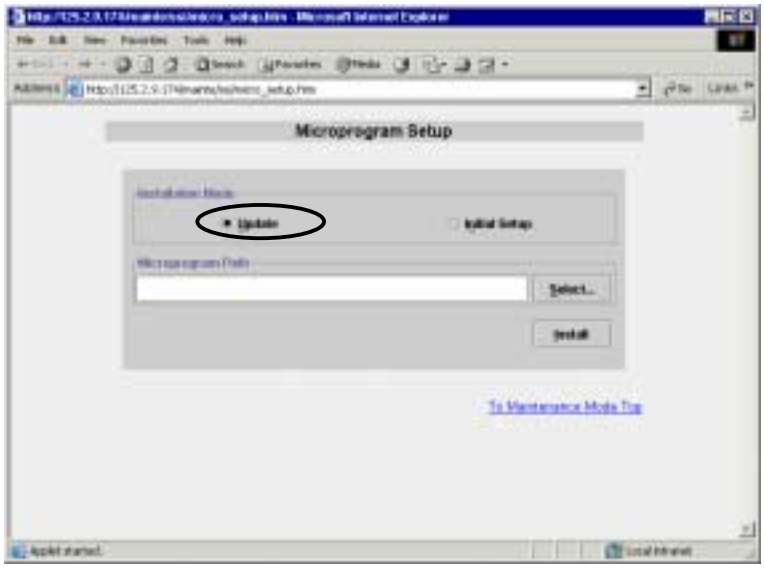
• Make sure that the browser is set to the condition in which the proxy server is not used because the connection cannot be done if the proxy server is set to be used. To make sure the setting, refer to the instruction manual of the browser to be used.

7. Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to the Web.

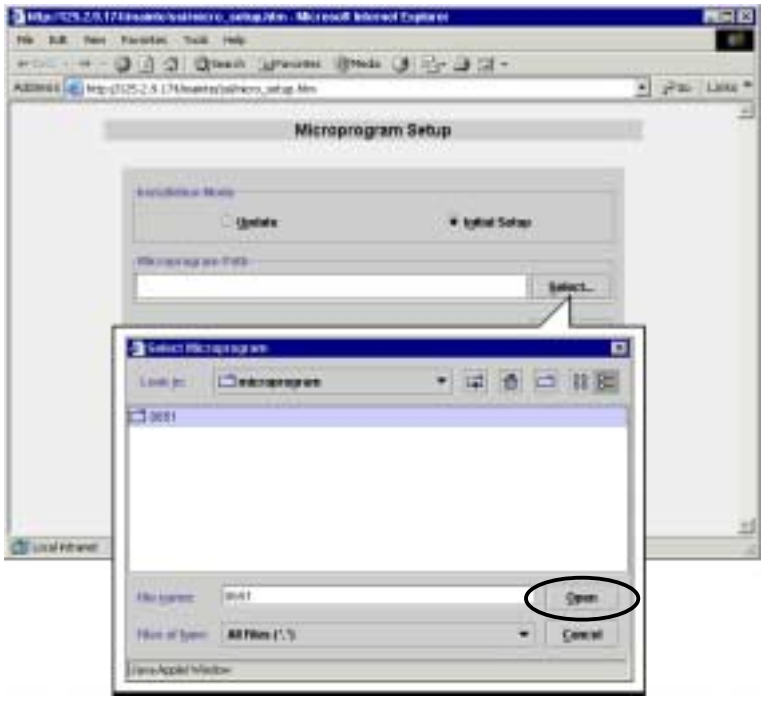
8. Click “Maintenance”, “Setup”, and “Microprogram” in this order in the Web window.
   A [User Name] and a [Password] may be requested at the time of Web connection or Web operation. In that case, input “maintenance” for the [User Name] and “hosyu9500” for the [Password].



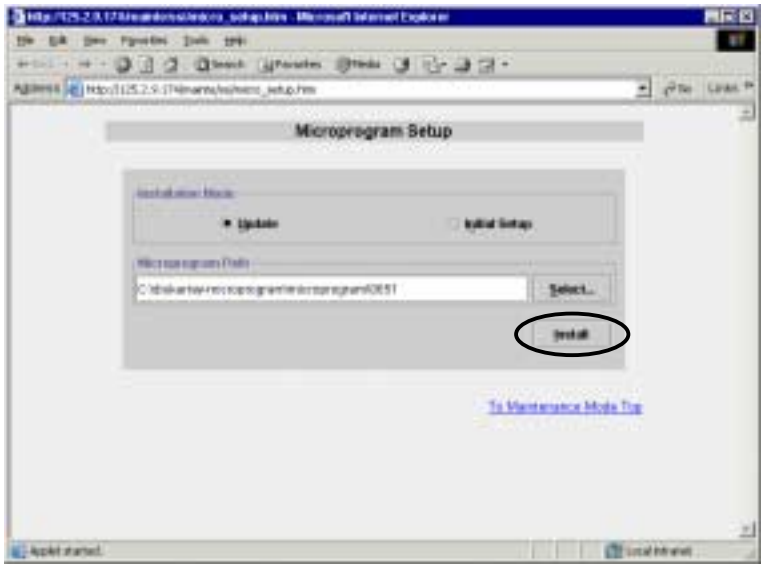
9. When the Microprogram Setup window is displayed, check the “Update” radio button of the “Installation Mode.”



10. Set the microprogram path.
    Specify the directory 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 directory in which the microprogram is stored and click the “Open” button.



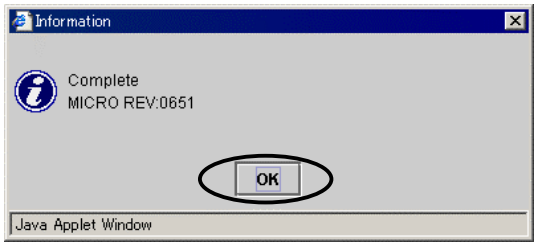
11. Click the “Install” button to install the microprogram.



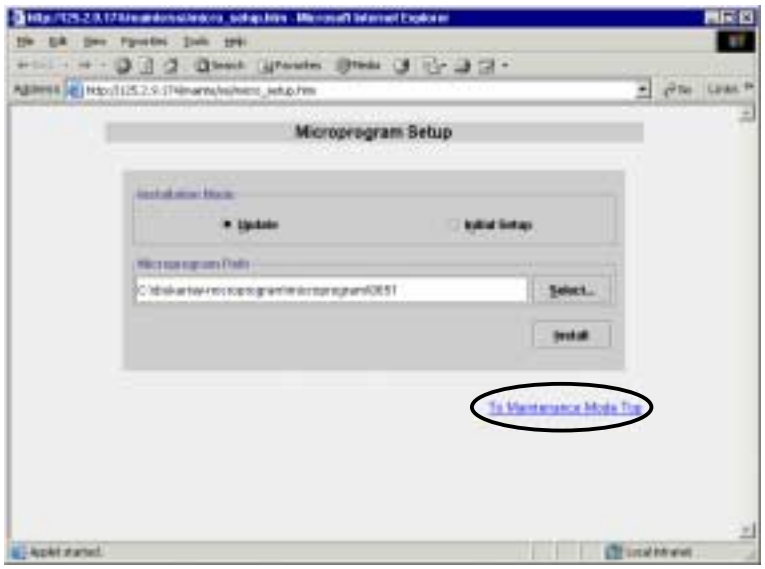
12. The following window that asks for confirmation is displayed. When the [OK] button in the window is clicked, the installation is started.



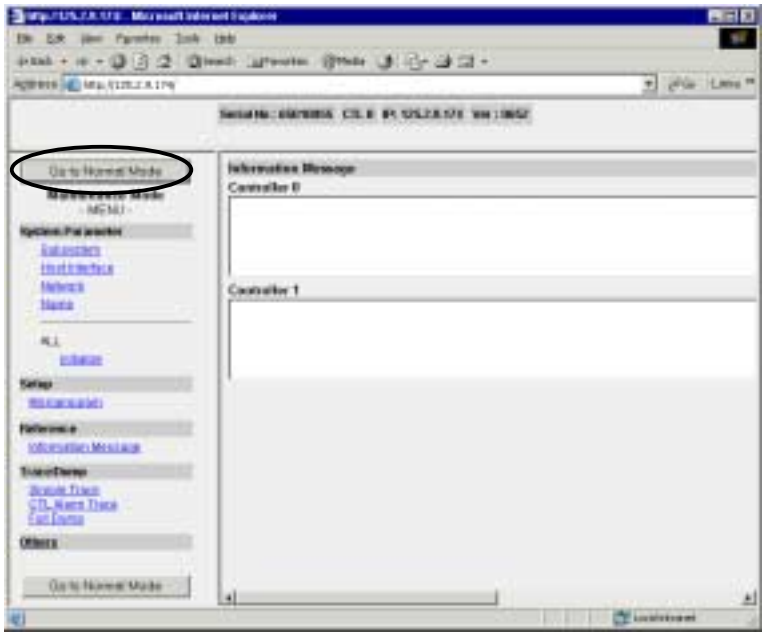
13. When the installation is completed, the completion window is displayed. Click the [OK] button.



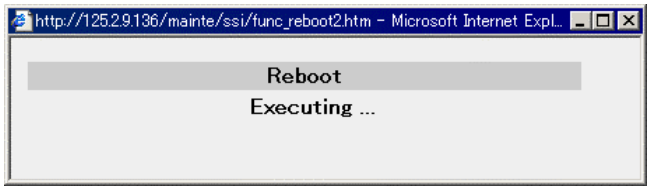
14. Go to the “Maintenance Mode” window by clicking “To Maintenance Mode Top” in the Microprogram Setup” window.



15. 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.



16. Click the [OK] button.



17. 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.
    Check the Web error log for error messages in case to update did not complete properly.

NOTE: Perform the microcode update installation twice.

18. After completing the microcode update installation return to Step "1." and execute the updating installation once again.
When the second updating installation is completed, quit the Web.

NOTE : Because TrueCopy Basic 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 Basic is used.
When the subsystem B shown in Figure 3.4.9.2 is upgraded, the path of the subsystem A is detached. 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 Section 4.5, "Procedure for Recovery from Path Detachment and PSUE Status Occur during Upgrade Made when Hitachi TrueCopy Basic Is Enabled."

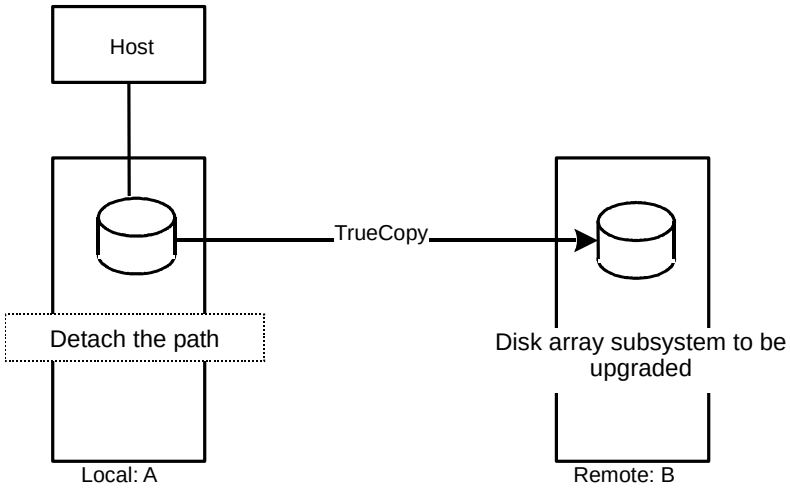


Figure 3.4.9.2 Paired Disk Array Subsystems (TrueCopy Basic)

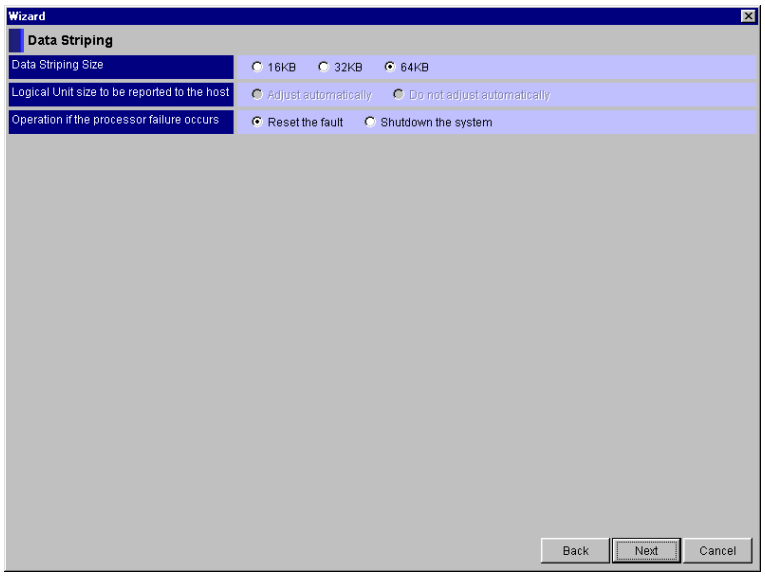
3.4.10 Canceling RS232C Error Information Sending mode

The Thunder 9580V/9585V does not support the RS232C Error Information Sending mode.
If the RS232C Error Information Sending mode is turned on, turn it off using Disk Array Management Program 2.
The procedure is shown below.

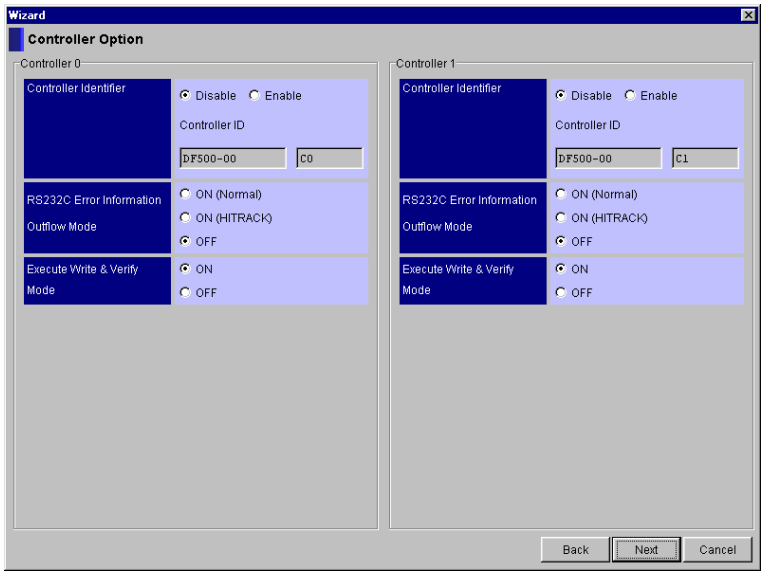
1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [: System Parameter Wizard] button.
4. Click the [Detailed Settings] radio button, and then click the [Next] button.



5. Since the “Data Striping” window is displayed, click the [Next] button repeatedly until the “Controller Option” window is displayed.
   (Windows are displayed in the following order: “Data Striping”, “INQUIRY Setting”, and “Controller Option” windows.)



6. Click the [OFF] radio button of the [RS232C Error Information Outflow Mode] in the “Controller Option” window (for both of the [Controller 0] and [Controller 1]).



7. Click the [Next] button repeatedly until the “System Parameter Setting Completed” window is displayed.
   (Windows are displayed in the following order: “Controller Option”, “LAN Setting”, and “System Parameter Setting Completed” windows.)

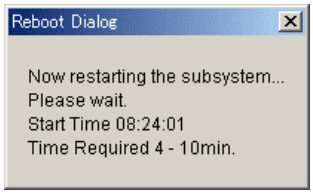
8. Click the [OK] button in the “System Parameter Setting Completed” window.



9. A message is displayed, requesting confirmation to restart the subsystem.
   Click the [OK] button to restart.
   The array unit cannot access the host until the reboot is completed and the system restarts. Therefore, be certain the host has stopped accessing data before beginning the restart process.

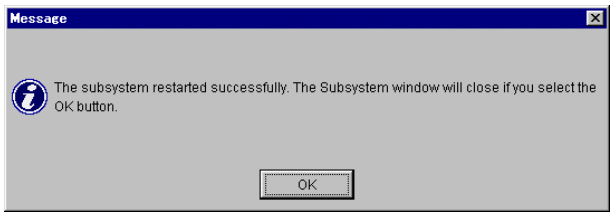


When you choose to restart the array unit, the time the restart began is displayed. This usually takes approximately four to ten minutes.



NOTE : It may take time for an array unit to respond, depending on the condition of the array unit. If it does not respond after 10 minutes or more, check the condition of the array unit.

10. A message appears, stating that the restart is successful. Click the [OK] button.

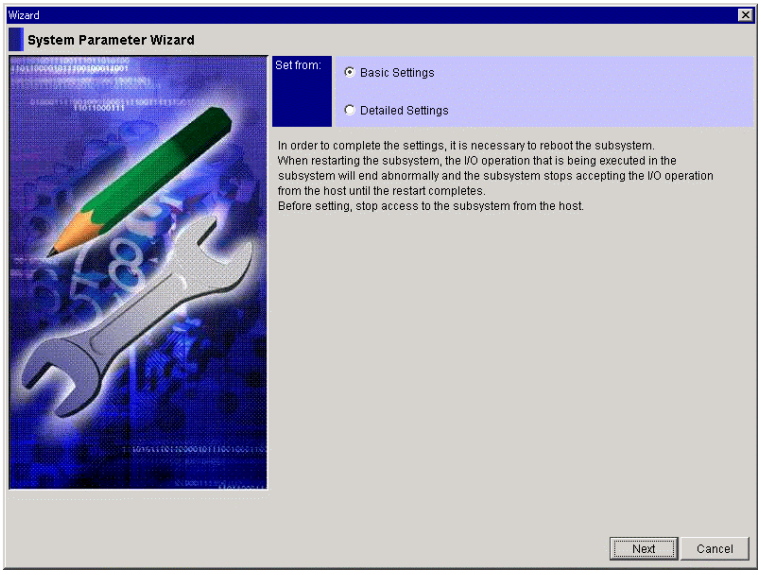


The Unit screen is closed.

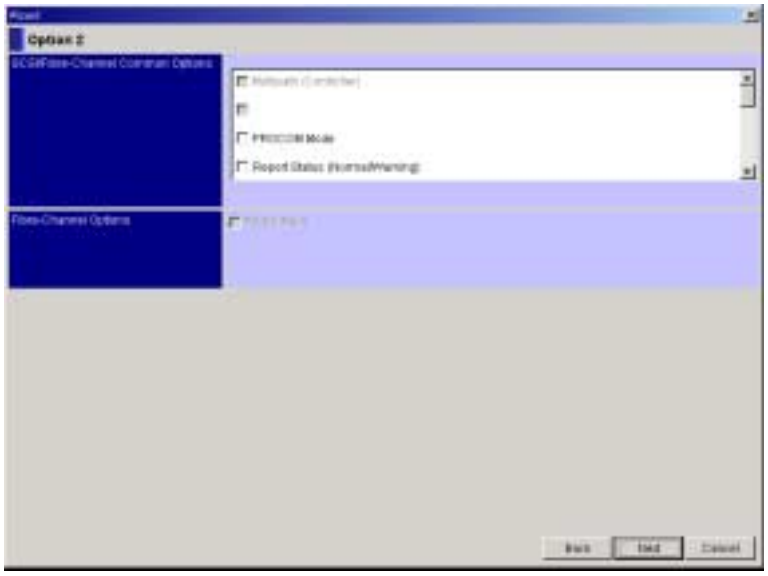
3.4.11 Canceling Report Status

The Thunder 9580V/9585V does not support the Report Status.
If the Report Status is turned on, turn it off using Disk Array Management Program 2.
The procedure is shown below.

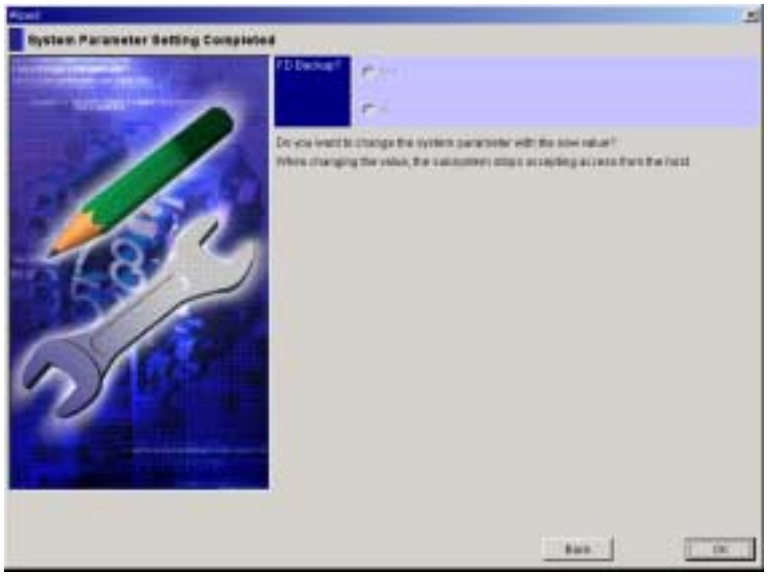
1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [: System Parameter Wizard] button.
4. Click the [Basic Settings] radio button, and then click the [Next] button.



5. Since the “System Startup Settings” window is displayed, click the [Next] button repeatedly until the “Option 2” window is displayed.
   (Windows are displayed in the following order: “System Startup Settings”, “Common 1”, “Option 1”, and “Option 2” windows.)
6. When the [Report Status (Normal/Warning)] is set, remove the checkmark and click the [Next] button. When it is not set, finish the setting operation by clicking the [Cancel] button.



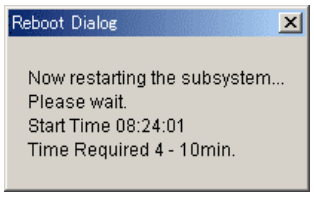
7. Click the [Next] button repeatedly until the “System Parameter Setting Completed” window is displayed.
8. Click the [OK] button in the “System Parameter Setting Completed” window.



9. A message is displayed, requesting confirmation to restart the subsystem. Click the [OK] button to restart.
   The array unit cannot access the host until the reboot is completed and the system restarts. Therefore, be certain the host has stopped accessing data before beginning the restart process.

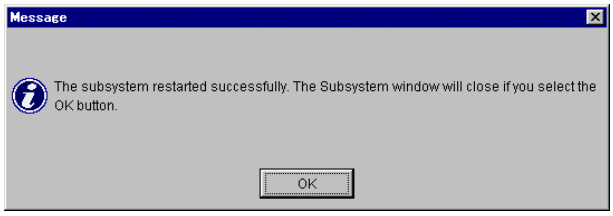


   When you choose to restart the array unit, the time the restart began is displayed. This usually takes approximately four to ten minutes.



NOTE : It may take time for an array unit to respond, depending on the condition of the array unit. If it does not respond after 10 minutes or more, check the condition of the array unit.

10. A message appears, stating that the restart is successful. Click the [OK] button.



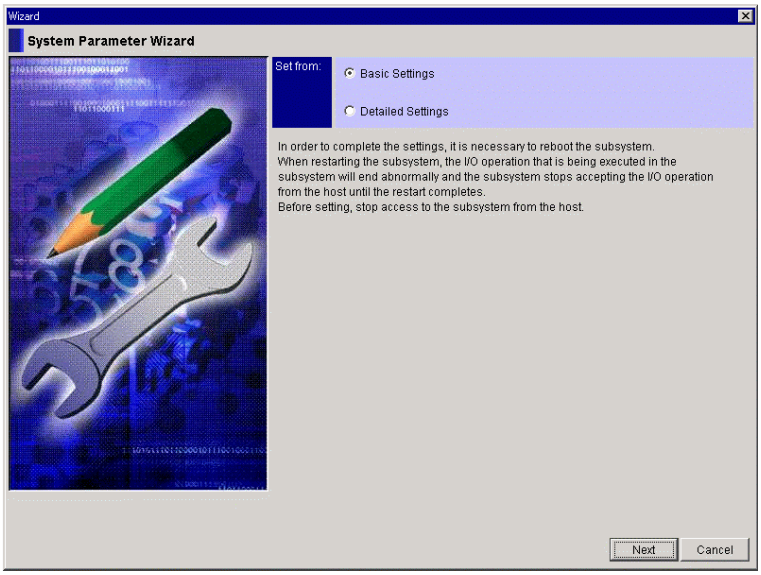
    The Unit screen is closed.

3.4.12 Canceling Single Controller Mode

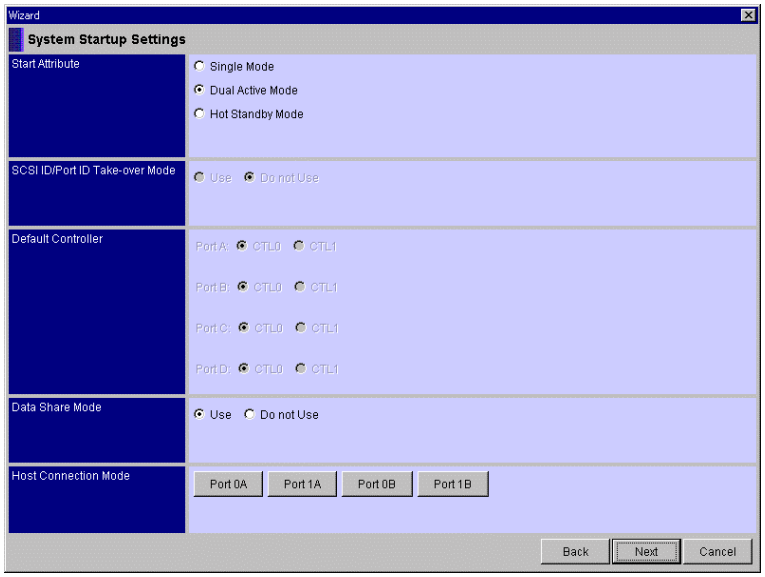
When it is made clear that the Single mode is set through the check that has been made according to Subsection 3.4.7, "Making sure of various settings for the disk array subsystem", change it to the Dual Active or Hot Standby mode using Disk Array Management Program 2.
The procedure is shown below.

NOTE : It is a prerequisite for the upgrade to the Thunder 9580V/9585V that the disk array subsystem has the dual controller system.

1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and select [Settings] and [System Parameter Wizard] in this order in the unit window or click the [ : System Parameter Wizard] button.
4. Click the [Basic Settings] radio button, and then click the [Next] button.



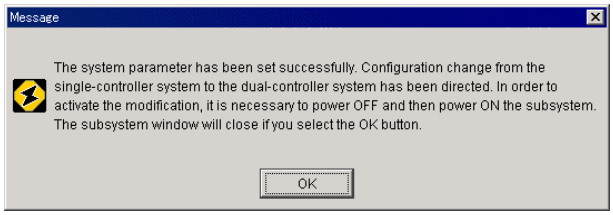
5. Since the "System Startup Settings" window is displayed, set the [System Start] as [Dual Active Mode] or [Hot Standby Mode].



6. Click the [Next] button repeatedly until the “System Parameter Setting Completed” window is displayed.
7. Click the [OK] button in the “System Parameter Setting Completed” window.



8. A message displayed. Click the [OK] button.



9. Turn off the main switch.
10. Make sure that the PWR LED (green) on the Front Bezel is off.
11. Turn on the main switch after waiting for one minutes or longer.

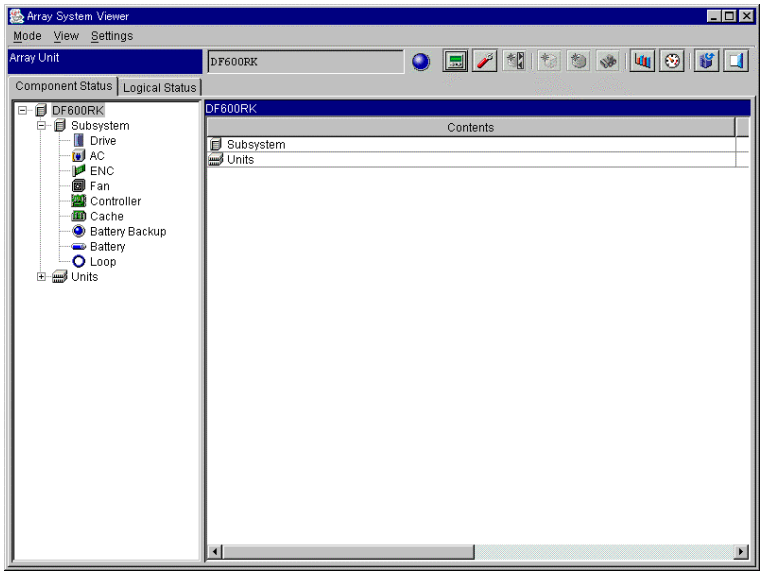
NOTE : Although a message, "CTL alarm (CTL-1)" is displayed and the subsystem is placed in the Alarm status when the subsystem is started up, it does not affect the upgrade. Continue the upgrade without doing anything.

NOTE : There goes the buzzer here. Push BUZZER OFF SW to turn off the buzzer.

3.4.13 Collecting serial numbers of Disk Drives **(Required)**

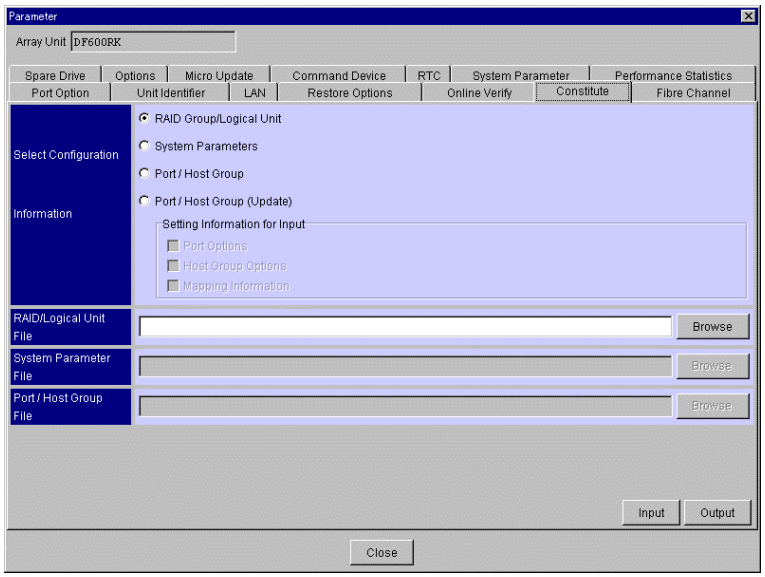
A work to reinstall the Disk Drives at the same locations as those in the Thunder 9570V is required as one of the hardware upgrade works (explained in Subsection 3.4.16) included in the procedure for upgrading to the Thunder 9580V/9585V. Therefore, information on installation locations of the Disk Drives in the Thunder 9570V must be got and recorded. Collect the serial numbers of the Disk Drives using Disk Array Management Program 2.

1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.



4. Select [Settings] and [Configuration settings] in this order in the unit window or click the [: System Parameter Wizard] button.

5. Click the [Constitute] tab.



6. Check the [RAID Group/Logical Unit] in the [Select Configuration Information] box.
7. Click the [Browse] button, and specify the directory and file name to output the file of the configuration.
8. Click the [Output] button.

9. Open the configuration information file that has been got in Step “8.” 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 : 0656
Array Unit Type : DF600
Serial Number : 65010055

---- 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

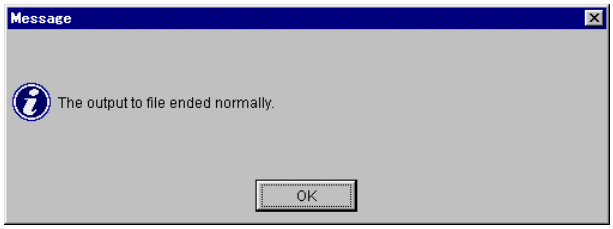
---- Drive Configuration ----
Location       Vendor ID   Product ID          Revision  Capacity   Status     Serial Number
Unit0 ,HDU0    HITACHI     DK32DJ-72FC           K0K0      72GB      Normal    305B4910
Unit0 ,HDU1    HITACHI     DK32DJ-72FC           K0K0      72GB      Normal    305B9100
Unit0 ,HDU2    HITACHI     DK32DJ-72FC           K0K0      72GB      Normal    30532706
Unit0 ,HDU3    HITACHI     DK32DJ-72FC           K0K0      72GB      Normal    305C5571
Unit0 ,HDU4    HITACHI     DK32DJ-72FC           K0K0      72GB      Normal    30542348
Unit0 ,HDU5    HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  30545271
Unit0 ,HDU6    HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305C5229
Unit0 ,HDU7    HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305B6777
Unit0 ,HDU8    HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305B3188
Unit0 ,HDU9    HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305L1373
Unit0 ,HDU10   HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  30575398
Unit0 ,HDU11   HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305N2858
Unit0 ,HDU12   HITACHI     DK32DJ-72FC           K0K0      72GB      Undefine  305K8917
Unit0 ,HDU13   HITACHI     DK32DJ-72FC           K3K3      72GB      Undefine  30575348

-- End

～～～
(abbr.)
```

[Drive Configuration]
[Location]: Shows a location where a Disk Drive is installed.
[Unit]: Unit ID#
[HDU]: Disk Drive#
[Serial Number]: Serial #

10. 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.

11. Return the window to the unit window by clicking the [Close] button.
12. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

3.4.14 Collecting simple trace (Required)

Collect the simple trace and keep it so that in case of failure. It can be investigated..
Collectthe 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 5 M bytes at least is necessary.

(b) 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 Controller #0, and “simpl_trc1.dat” for the collection from Controller #1”.)

(c) Check that the WARNING LED (Orange) of the front bezel of RK/RKS/RKH/RKHE/RKD/RKSD is not blinking fast (at the interval of 125ms). 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.)

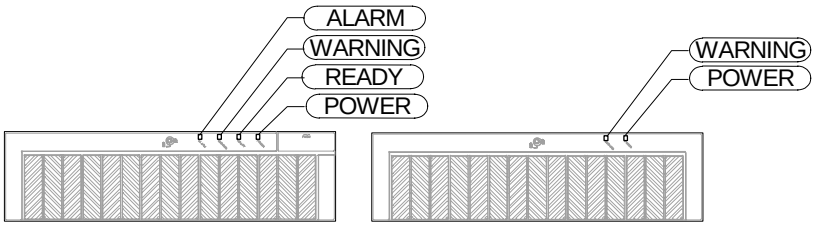
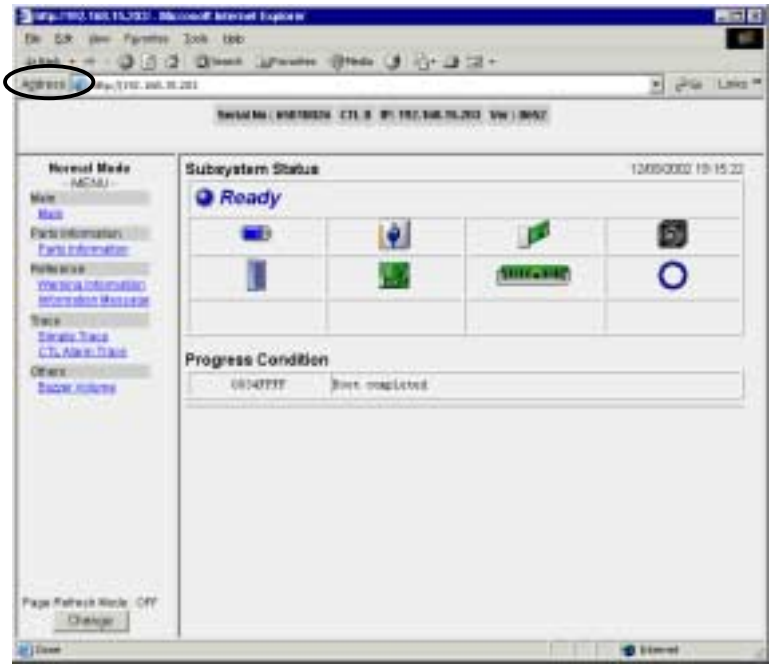


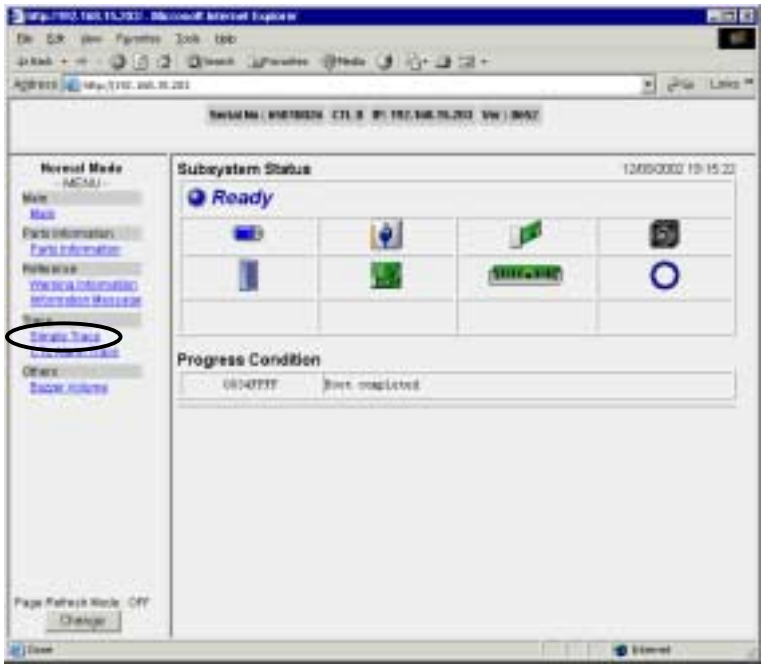
Figure 3.4.14.1 Indication Locations and Names of LED (Front Bezel)

(2) Collecting simple trace.

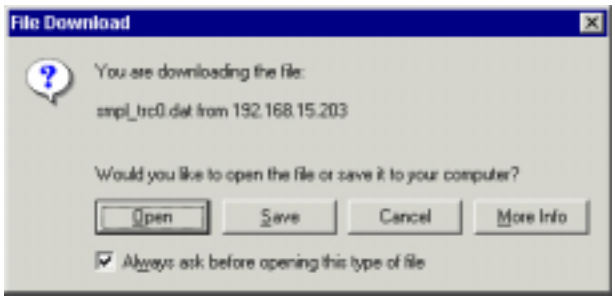
1. Connect the Web by connecting the LAN cross cable to the LAN connector for maintenance on the disk array subsystem.
2. Enter the IP address of the LAN connector for maintenance, to which the maintenance PC is connected, from the browser.



3. Click [Trace] in the menu frame of [Simple Trace].



4. The following dialog is displayed.
   Click the [Save] button.



5. 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.

6. Quit the Web.
7. Disconnect the maintenance PC from the disk array subsystem referring to the instruction given in Step (2) (a) in Subsection 3.4.5, “Connecting of the maintenance PC”.

‡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.

3.4.15 System power off

Execute the deliberate shutdown of the disk array subsystem.
The procedure is shown below.

1. Turn off the main switch.
2. Make sure that the PWR LED (green) on the Front Bezel is off.
   Check cache power LED.
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 (CB1) of the PDB.

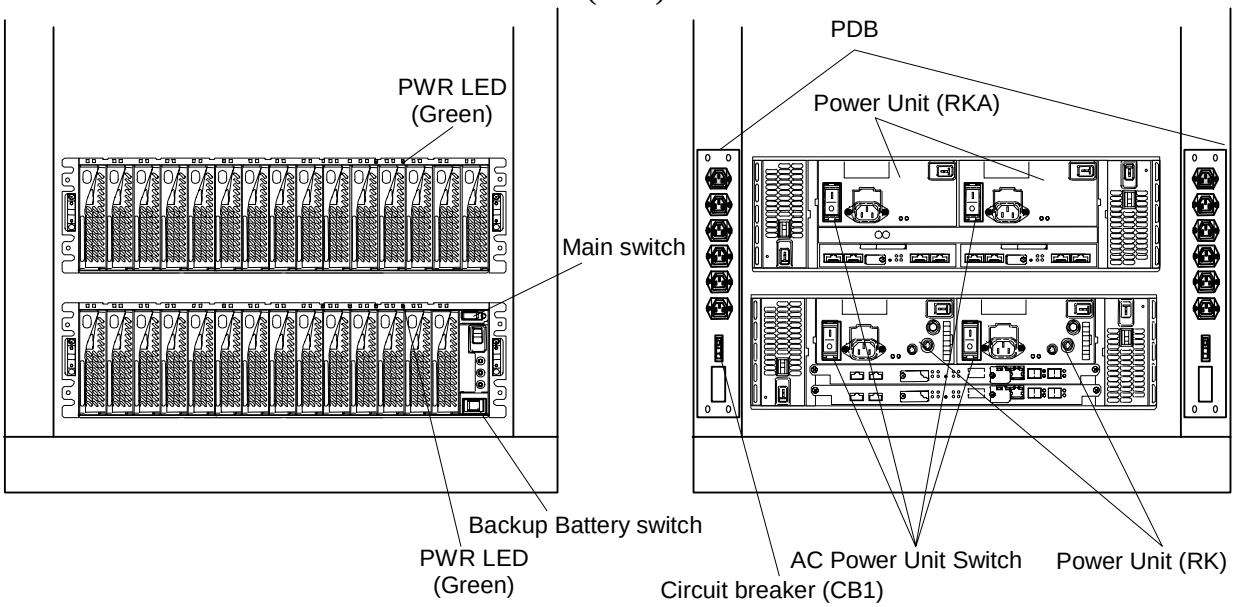


Figure 3.4.15.1 Locations of Switches for Power Off(Thunder 9570V)

3.4.16 Hardware upgrade work

Replace some components with those for upgrading the disk array subsystem to the Thunder 9580V/9585V. Make the replacement above and have the customer keep the components that become unused because they are used in the configuration of the Thunder 9570V only.
The procedure is shown below. (The procedure is the same as that for the U6 rack frame.)

⚠ 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.

(1) Note on hardware upgrade works

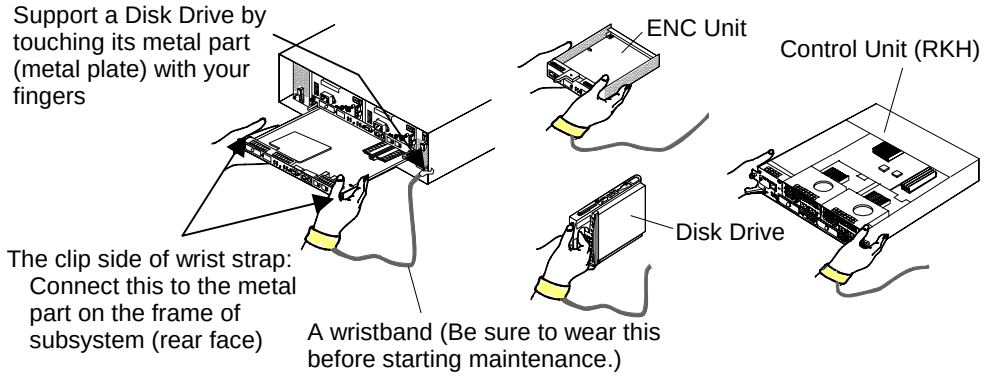
(a) Note on installing and removing parts

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 (before removing bezel) and do not take it off until you finish.**
  Please be sure to keep a wrist strap near the subsystem.
- **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, 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, hold it with your hand wearing the wristband having fingers contact metallic portions on the sides of the part.



(b) Note on cable routing

(i) Handling of cables laid 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.

(ii) 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.

(iii) How to route cables

- Give excess lengths to cables taking earthquakes, etc. in consideration.
- Route cables giving them excess lengths lest they should disturb replacement of part to be done for maintenance.
- Make power cables and power cable (DC) 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.

(iv) 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.

(v) 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.

(c) 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.)

(2) Remove the Front Bezel all of the Rackmount Model.

CAUTION

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

A key is necessary to attach or remove the Front Bezel.

1. Insert the key into the keyhole on the Front Bezel and turn it in the direction shown by the arrow (⟶).
2. Pull the front bezel toward you holding its sides to disengage it from the ball catches.
3. 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.
4. Return to Step "1." and remove the Front Bezels from the rest of the disk array units installed.

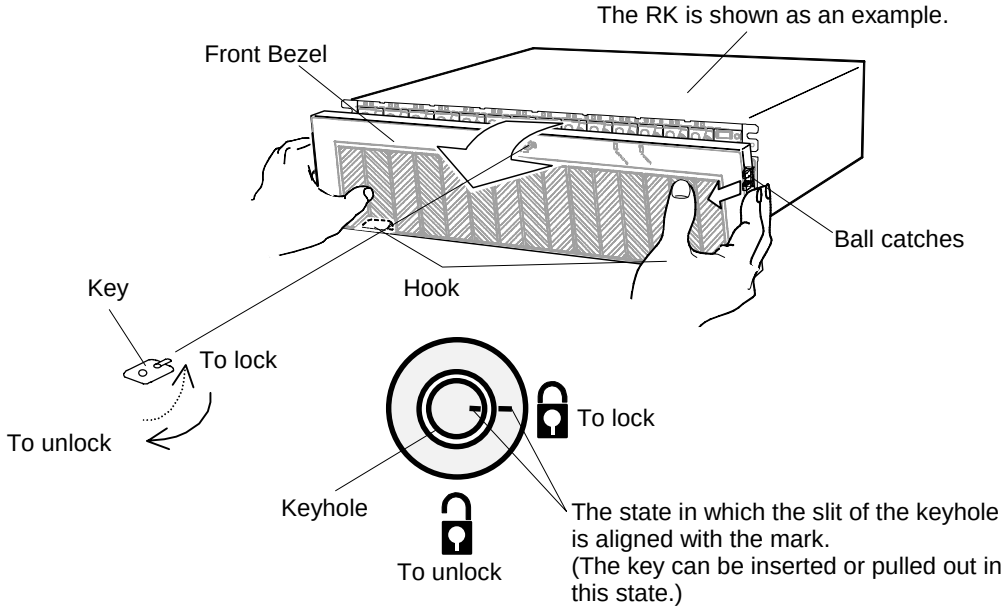
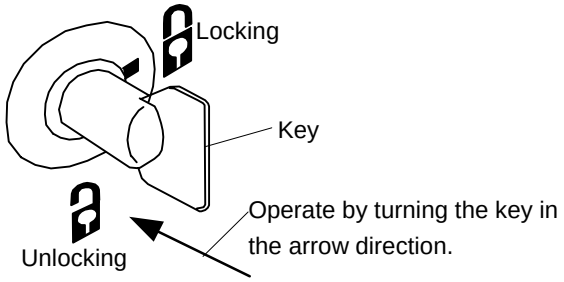
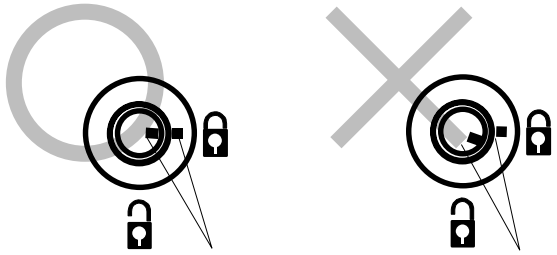


Figure 3.4.16.1 Procedure for Removing Front Bezel

NOTE : • When inserting and turning the key, have it inserted completely. If it is turned when it is inserted half way, a damage to key may occur



• When removing the key after locking up the Front Bezel, pull it off aligning its groove with the positioning mark on the lock.



Pull the key off aligning its groove with the positioning mark on the lock. (The key can be inserted or pulled off in this state.)

The key cannot be pulled off when its groove is not aligned with the positioning mark on the lock.

When the key is pulled out with its groove not aligned with the positioning mark on the lock, damage to the lock may occur

(3) Open the Rear Door of U6 rack frame.

CAUTION

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

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.

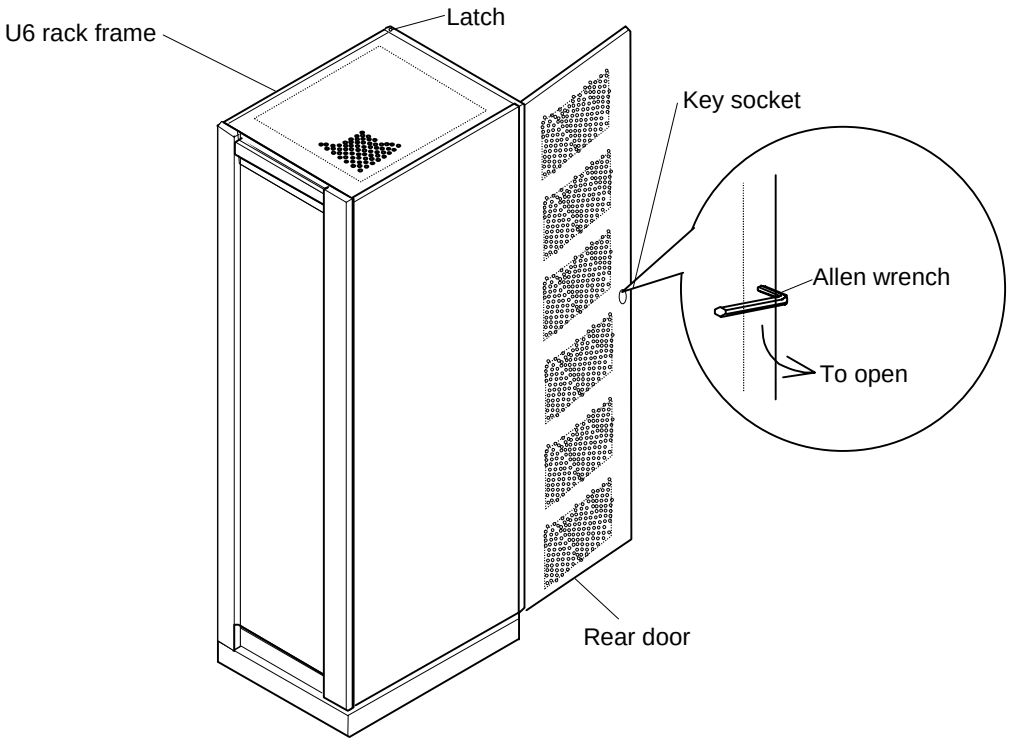


Figure 3.4.16.2 Procedure for Opening Rear Door

(4) Disconnect only one of the connectors of each power cable, which is connected to the RK, from the each AC/DC power supply (RK).

⚠ CAUTION

Make sure that there is no scratch or flaw on the 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.

1. Disconnect the power cable connected to the Power Unit (RK).
(It is not necessary to disconnect the power cables connected to the RKA.)

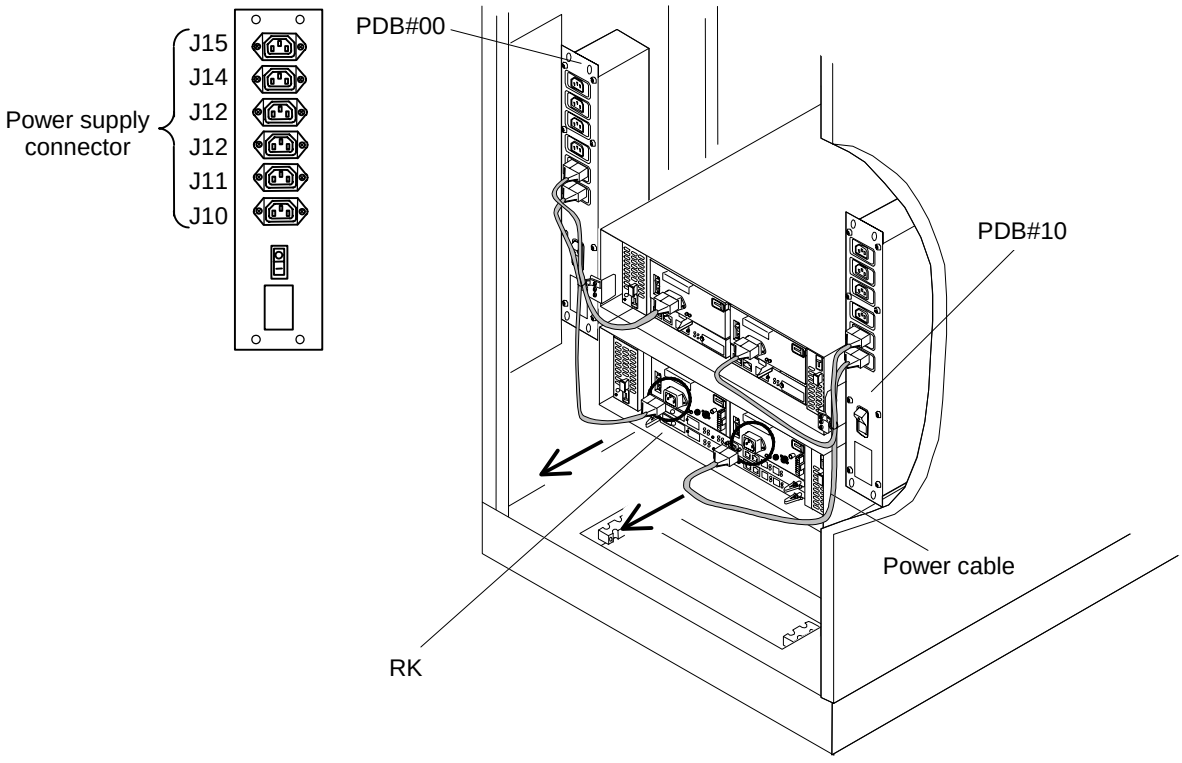


Figure 3.4.16.3 Disconnecting Power Cables

(5) Remove all the ENC cables connected to the disk array units mounted.

1. Remove all Repeat Binders securing the ENC cable to the stopper.
2. Remove all the ENC cables connecting the RK and RKA and pairs of the RKAs.

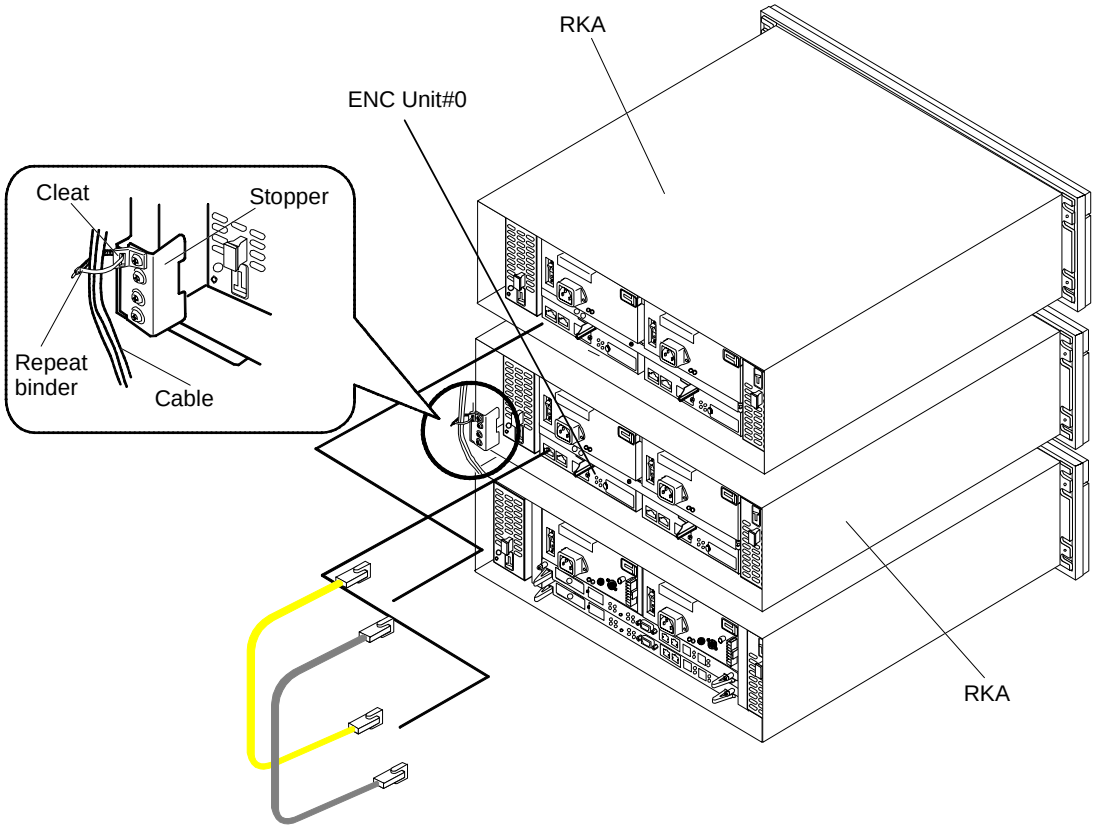


Figure 3.4.16.4 Removing ENC Cables(Thunder 9570V)

3. When the LAN cables and/or RS232C cables are connected, remove all of them.

(6) Install the rack rails at the location in the U6 rack frame where the RKA is to be mounted.

NOTE : The location for mounting the RKA must be adjacent to the disk array unit already mounted.

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 U6 rack frame

Wide intervals: Repeat of 44.45 mm (31.75 mm + 12.7 mm)
Maximum number of mountable unit spaces: 38

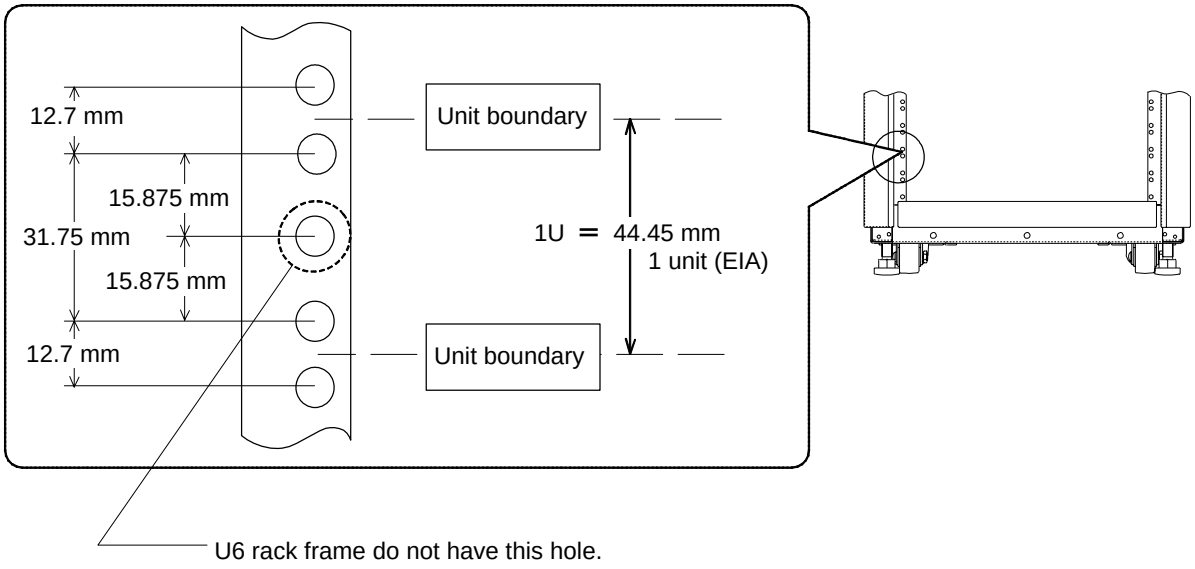
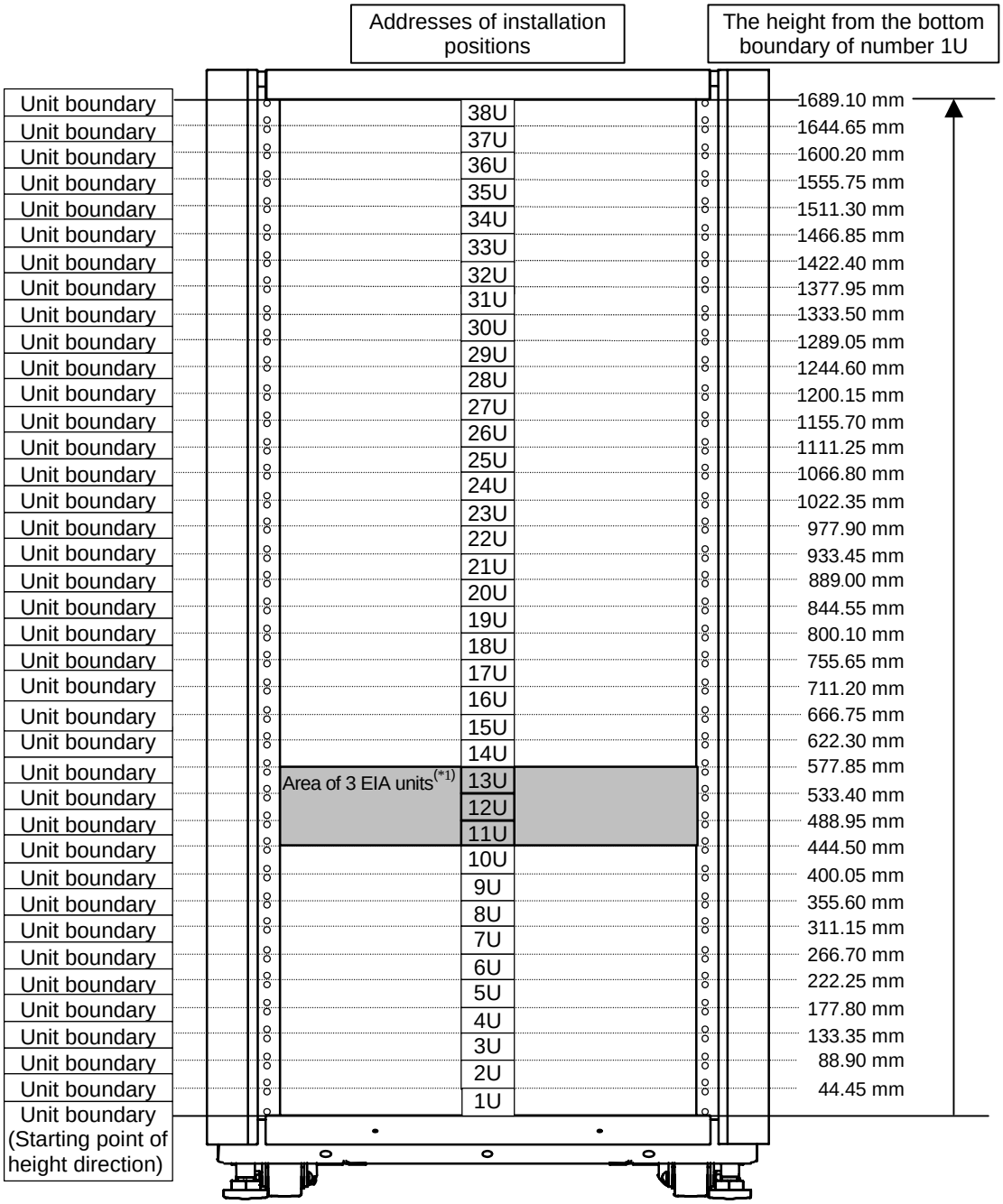


Figure 3.4.16.5 Attachment Hole Size of Rack

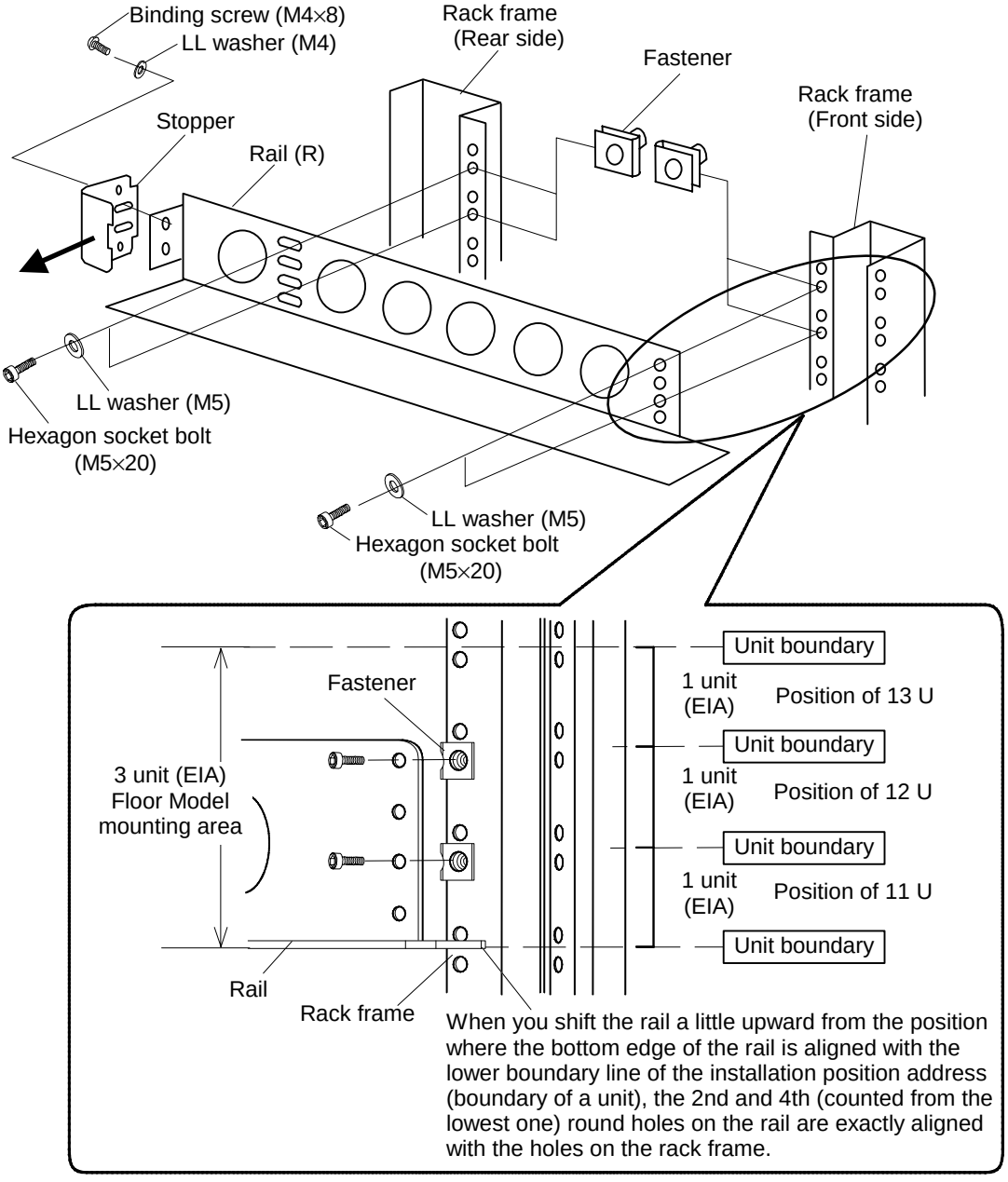
The addresses are given as 1, 2, 3, and so on counted from the bottom of the rack frame. In the case of the U6 rack frame, you must count the holes to know the address because no number is marked on the rack frame.
The following figure illustrates the whole layout of addresses of installation positions in the U6 rack frame.
There are 38 addresses, that is, the 1 U to 38 U counted in the vertical direction starting from the lower boundary of the 1 U (the lowest unit).



*1 : The grayed are shows a layout of an area for installing the RKA at the 11U

Figure 3.4.16.6 Whole Layout of Installation Position Addresses

1. 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 (M4 (at two places.)).
2. 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.).
3. Fasten the Rail (R) to the rack frame using the hexagon socket bolts and LL washers (M5 (at two places each on the front and rear sides.)).
4. Install the Rail (L) to the rack frame in the same way.



*1 : One EIA unit is approximately 44. 45 mm.

Figure 3.4.16.7 Installation of Rails to Frame and Installation Positions

5. Fit the two fasteners to each of the right and left beams on the front side of the rack frame referring to Figures 3.4.16.8 and 3.4.16.9.
   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.

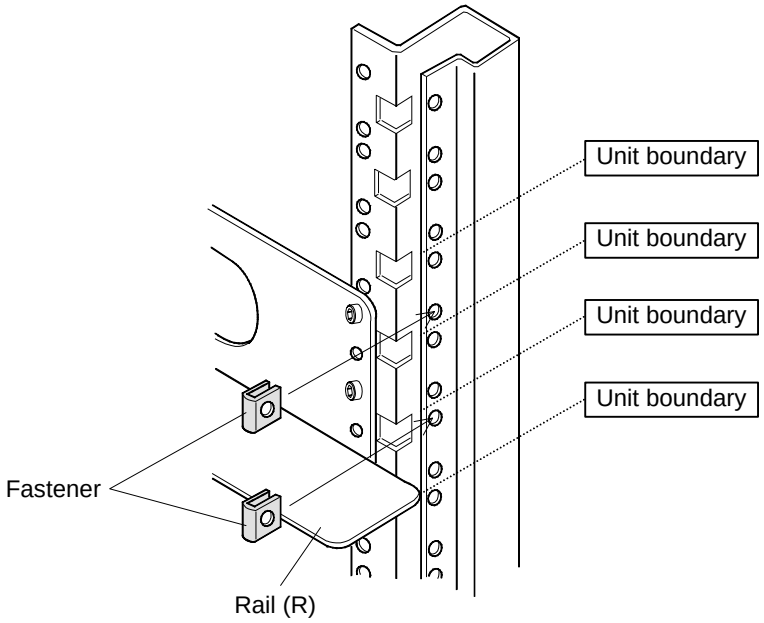


Figure 3.4.16.8 Installing Fasteners on the Front Side of the Rack Frame

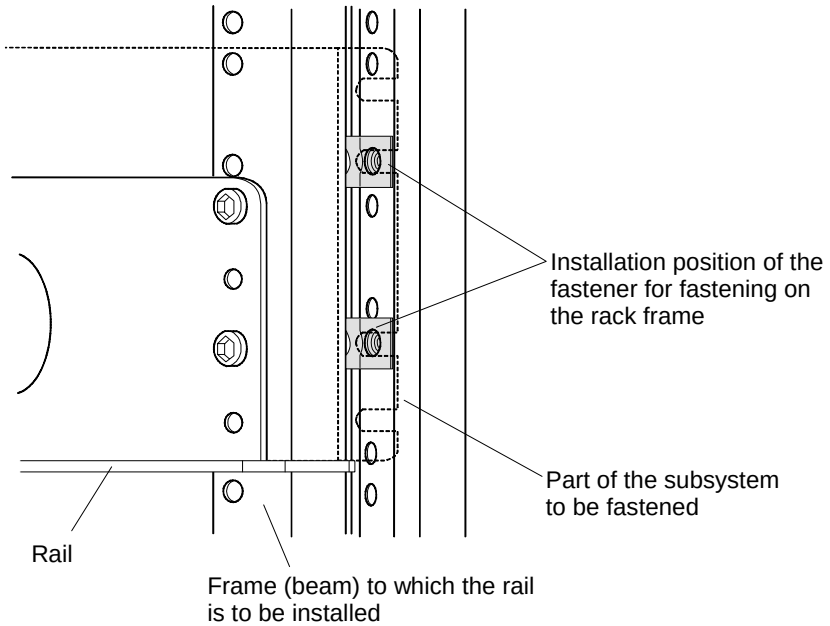


Figure 3.4.16.9 Installation Positions of Fasteners and Relation with Rails

(7) Stick the EMI gasket on the top of the RKA frame.

1. Make sure of the orientation of the open end of the EMI gasket. (Refer to Figure 3.4.16.11.)
   The orientation of the open end of the EMI gasket varies depending on the mounting condition of the subsystem on which the gasket is to be stuck.
2. Peel off the anti-adhesion sheet from the bottom surface of the EMI gasket.
3. Stick the EMI gasket taking care not to let it protrude by aligning its end (or the edge of the bend) with the front end of the top of the frame (the RKA).

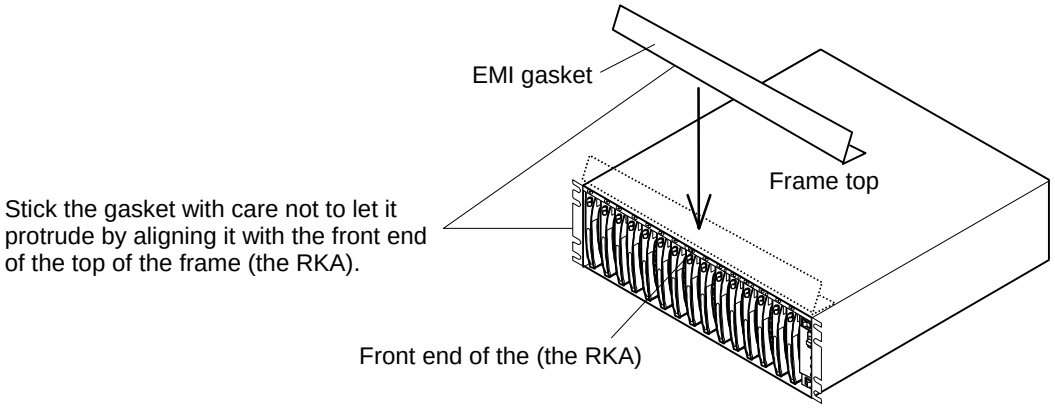
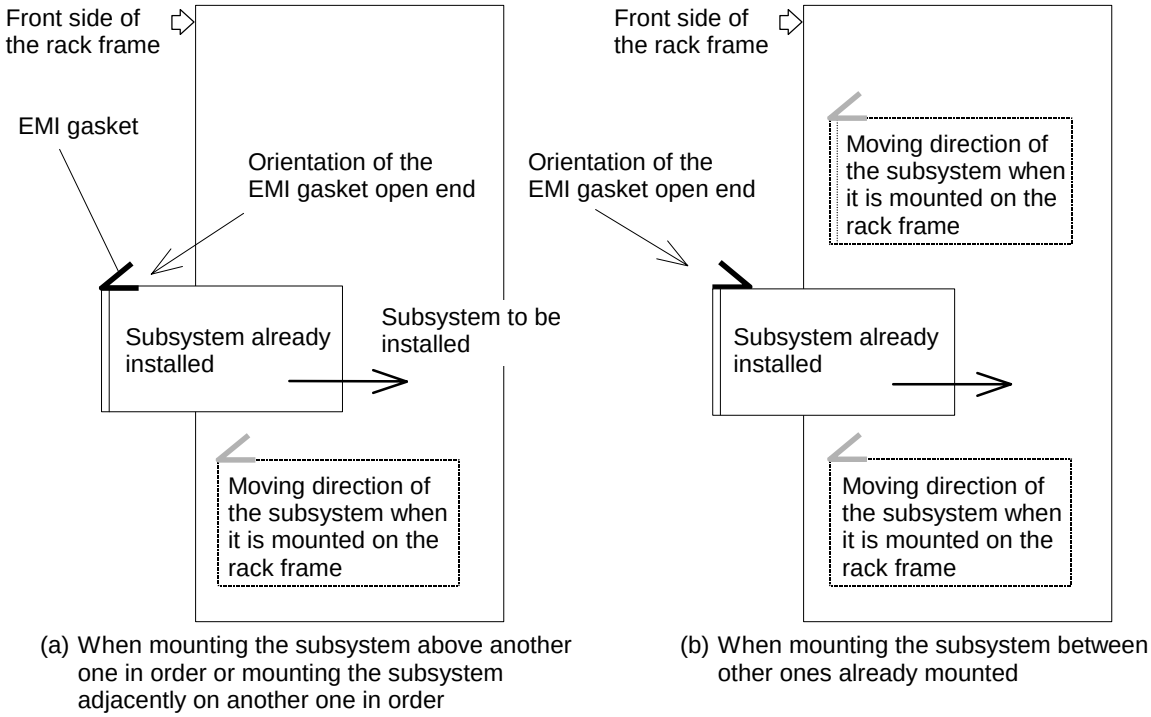


Figure 3.4.16.10 Position for Sticking EMI Gasket



(a) When mounting the subsystem above another one in order or mounting the subsystem adjacently on another one in order

(b) When mounting the subsystem between other ones already mounted

Figure 3.4.16.11 Orientation of EMI Gasket Open End when It Is Stuck

(8) Mounting the RKA on Rack Frame.

1. External appearance of the external lifter.
   Figure 3.4.16 12 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.

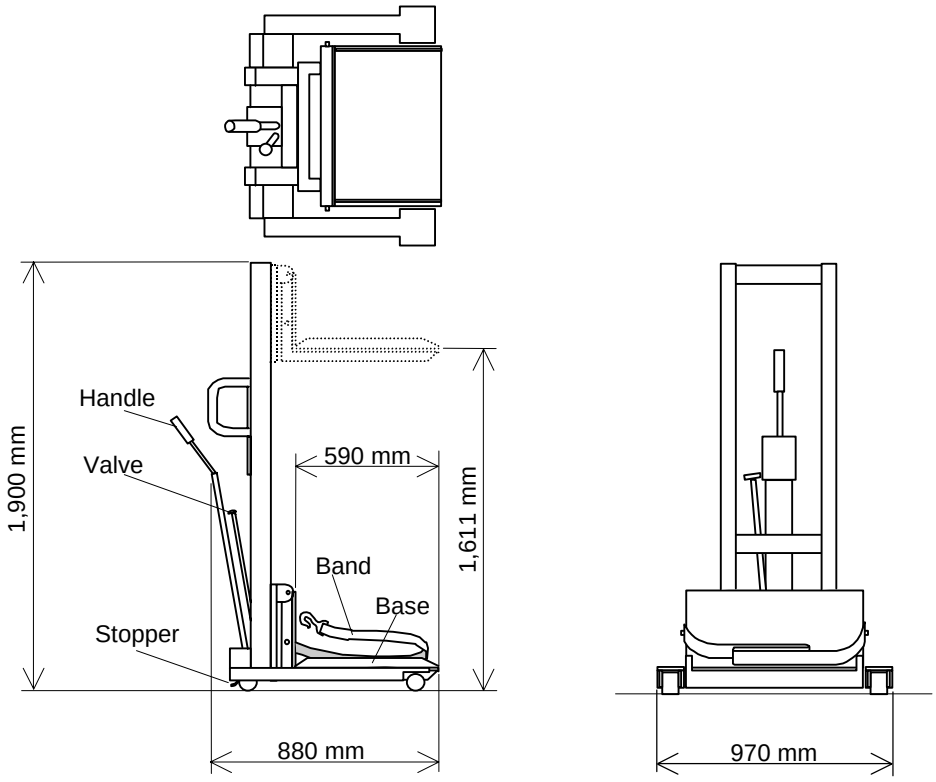


Figure 3.4.16.12 External lifter

CAUTION

- **Be sure to perform the operation with two or more workers.**
- **Work carefully because the weight of the single RKA is about 42 kg, RKH/RKHE is about 40 kg.**

2. Bring the external lifter close to the subsystem to be mounted and apply the brake to the lifter.

NOTE : When putting the subsystem on the external lifter, be sure to remove the front bezel beforehand.
In addition to the above, make sure that the no Disk Drive is installed in the RKA.

3. Put the subsystem on the external lifter.
4. 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.

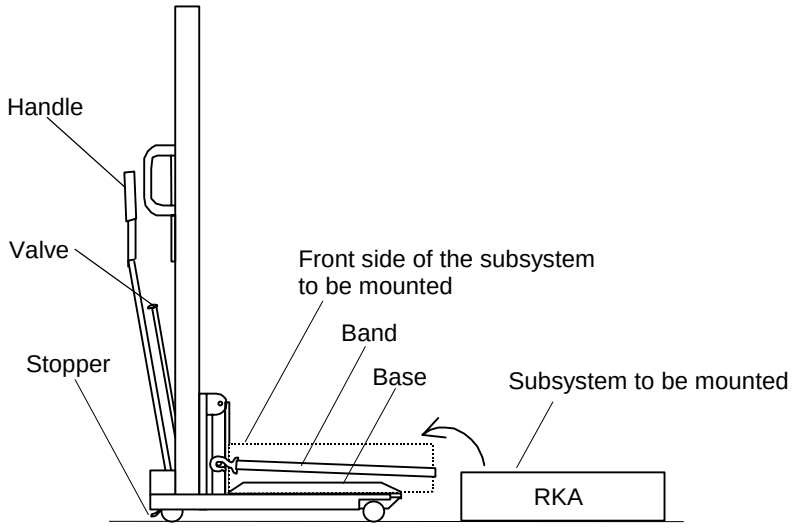


Figure 3.4.16.13 Putting the Subsystems on External Lifter

WARNING

If the RKA 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

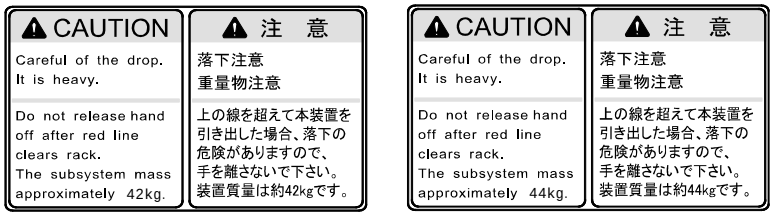
Operate the valve slowly when opening it. If it is opened quickly, the elevator of the lifter descends rapidly and may cause personal injury.

5. Take off the brake of the external lifter on which the subsystem has been put, and move the lifter close to the rack frame.
6. Adjust the position of the subsystem so that it is seated in the center of the rack frame.
7. Move the pumping handle of the external 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.
8. 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.

9. Shift the subsystem onto the rails in the rack frame. When shifting the subsystem, 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 subsystem enters the rack frame across the end of it. Otherwise, falling of the subsystem may be caused.



RKA RKH

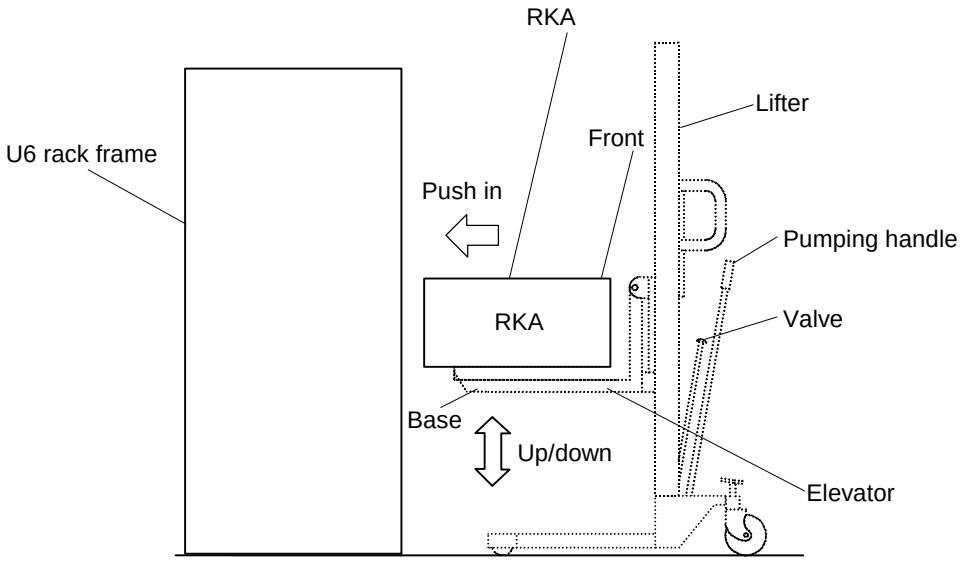


Figure 3.4.16.14 Mounting Subsystem on Rack Frame

10. 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 external lifter and take off the brake of the lifter.
11. Move the external lifter to the place where the lifter does not disturb the following works.

12. Fasten the subsystem to the rack frame with the four M5×10 binding screws.

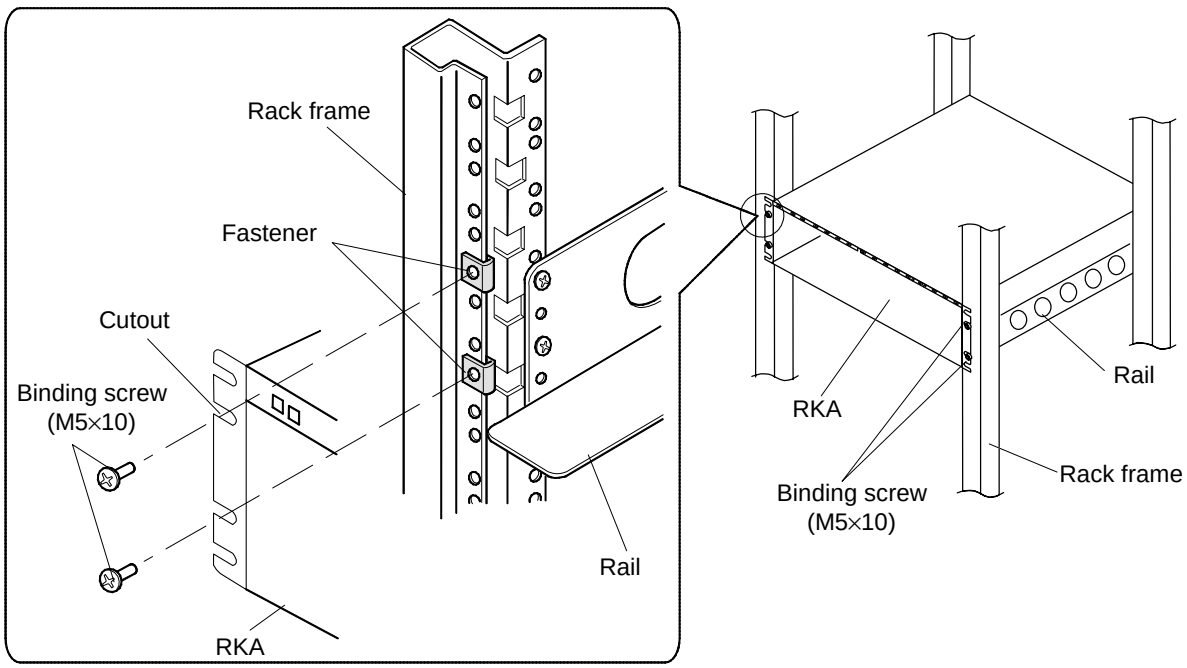


Figure 3.4.16.15 Fastening Front Side of the Subsystem

13. Shift each of the two stoppers in the direction shown by the arrow and make it contact the frame.
14. Tighten the binding screws.

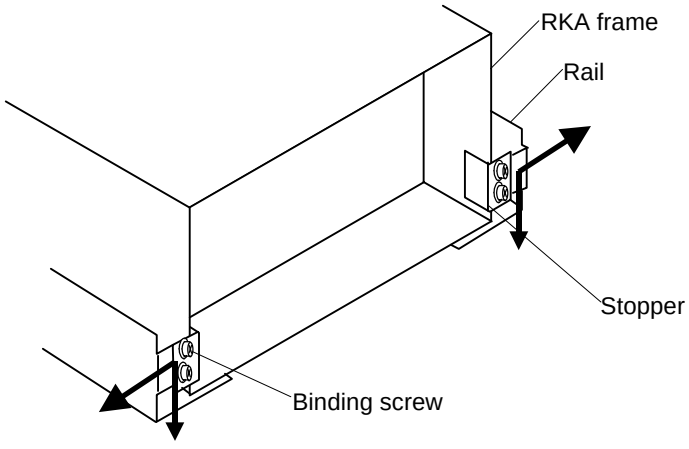


Figure 3.4.16.16 Securing Rear Side of the Subsystem

(9) Move the Disk Drives.

CAUTION

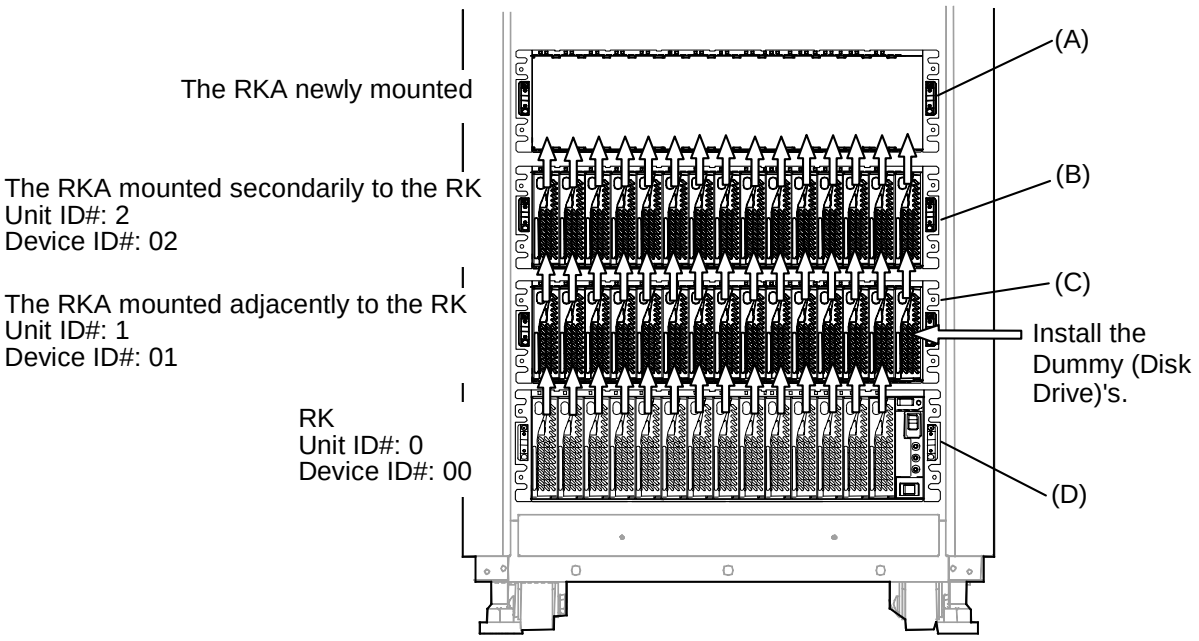
- **Disk Drives are precision components. Be careful not to expose drives to hard shock.**

NOTE : Neither unit ID nor device ID is set for the RKH/RKHE in the configuration of the Thunder 9580V/9585V (because no Disk Drive is installed in it).

Notes on the move of the Disk Drives:

Due to the fact that no Disk Drives can be installed in the RKH/RKHE, the Disk Drives installed in the RK of the disk array subsystem Thunder 9570V must be moved. Move the Disk Arrays following instructions described below so that the disk array subsystem is recognized correctly when its configuration is changed to that of the Thunder 9580V/9585V.

- Move the Disk Drives installed in the RKA, which had the last unit ID number when the disk array subsystem was the Thunder 9570V, to the RKA mounted in Step (8). The example in the figure 3.4.16.17 transfers the Disk Drive from (B) RKA to (A) RKA.
- Move the Disk Drives installed in the RKA, which had the 2nd unit ID number counted from the last one when the disk array subsystem was the Thunder 9570V, to the RKA with the last unit ID number.
  The example in the figure 3.4.16.17 transfers the Disk Drive from (C) RKA to (B) RKA.
- Move the Disk Drives installed in the RKA, which had the 3rd unit ID number counted from the last one when the disk array subsystem was the Thunder 9570V, to the RKA with the 2nd unit ID number counted from the last one.
  Repeat the move in the way similar to the above.
- Finally, move the Disk Drives installed in the RK to the RKA (with the unit ID# 1 and device ID# 01) that was mounted adjacently to the RK when the disk array subsystem was the Thunder 9570V. The example in the figure 3.4.16.17 transfers the Disk Drive from (D) RKA to (C) RKA.
  When doing the above, fill the slots left vacant with the Dummy (Disk Drive)'s because the RK could accommodate 14 Disk Drives only (see Figure 3.4.16.17).
- Move the Disk Drives to the locations where they can have the same Disk Drive numbers as they had before they are moved.



A case, where the Thunder 9570V is configured as RK+RKA+RKA+RKA, is shown as an example.

Figure 3.4.16.17 Locations in Disk Array Units from/to where Disk Drives Are Moved

1. Affix labels with the HDD numbers to all the Disk Drives that were installed in the RKA that had the last unit ID number when the disk array subsystem was the Thunder 9570V.
2. Remove all the Disk Drives or Dummy (Disk Drive)'s in the RKA having the last unit ID number.
   Operate the lock release button of the Disk Drive and remove the Disk Drive taking care not to apply any shock to it.
3. Store a removed Disk Drive or a dummy (Disk Drive) safekeeping box at the same position of address label.
   They are to be installed in the subsystem after the subsystem is installing on the floor stand kit.

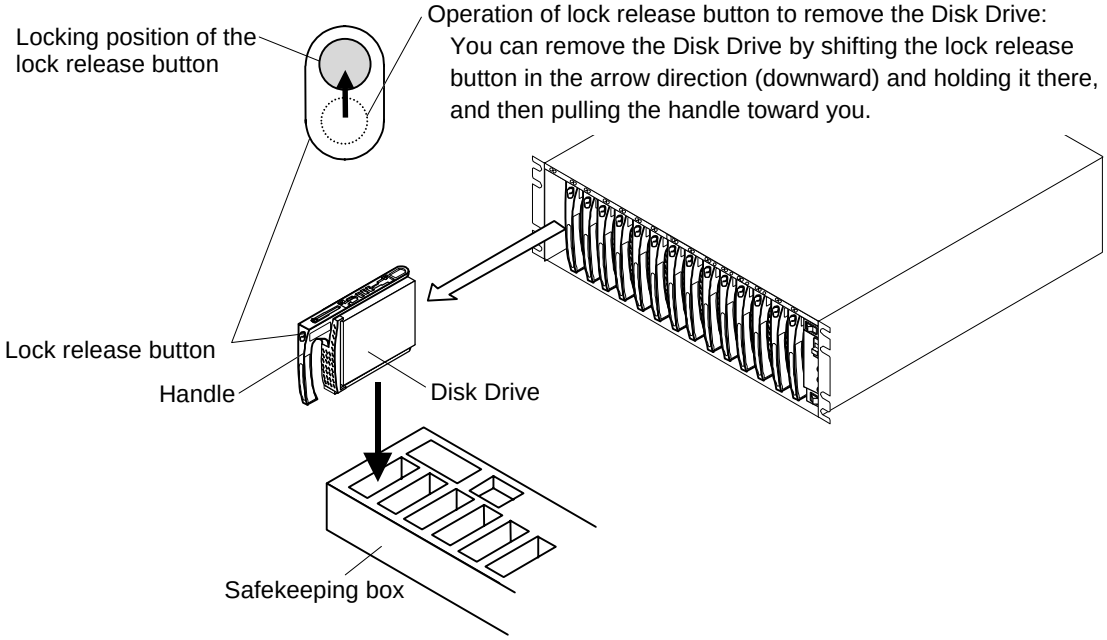


Figure 3.4.16.18 Removing Disk Drive

4. Install all the Disk Drives removed from the RKA having the last unit ID number in the RKA newly mounted in Step (8).
   Insert the Disk Drive into the position (address) where it was by holding it with the handle.

   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 Thunder 9570V by referring to the record made according to Subsection 3.4.13, “Getting serial numbers of Disk Drives”.

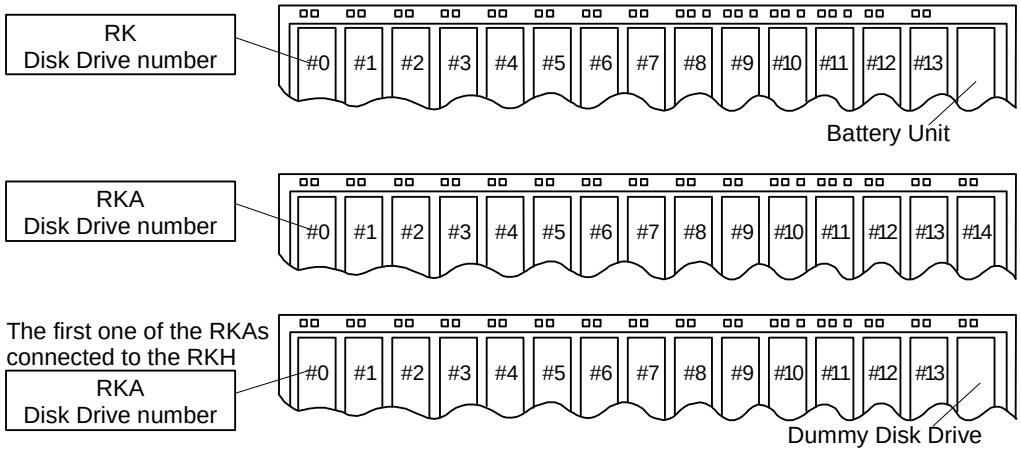


Figure 3.4.16.19 Disk Drive Mounting Location

5. Insert the Disk Drive aligning its positioning mark with that at the location where the Disk Drive is to be installed on the indication panel.
6. Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.

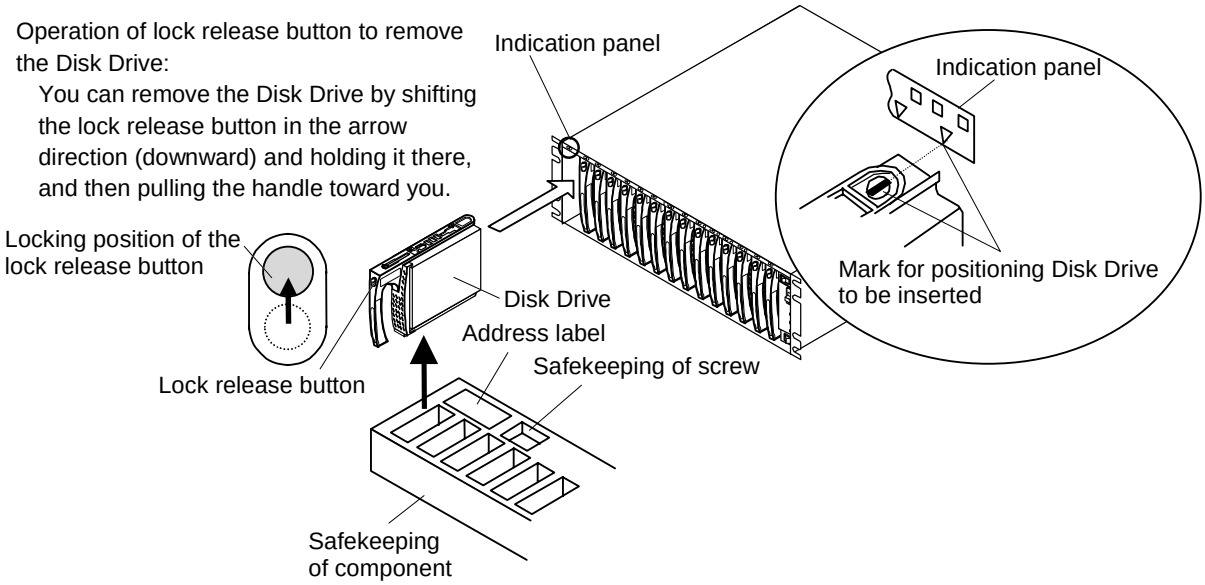


Figure 3.4.16.20 Installing of Disk Drive

7. Affix labels bearing the HDD numbers to all the Disk Drives that were installed in the RKA that had the 2nd unit ID number counted from the last one when the disk array subsystem was the Thunder 9570V.
8. Remove all the Disk Drives or Dummy (Disk Drive)'s in the RKA having the 2nd unit ID number counted from the last one.
   Operate the lock release button of the Disk Drive and remove the Disk Drive taking care not to apply any shock to it.
9. Store a removed Disk Drive or a dummy (Disk Drive) safekeeping box at the same position of address label.
   They are to be installed in the subsystem after the subsystem is installing on the floor stand kit.
10. Install all the Disk Drives removed from the RKA that had the 2nd unit ID number counted from the last one to the RKA having the last unit ID number. Insert the Disk Drive into the position (address) where it was by holding it with the handle.

    Move the Disk Drives to the RKAs each has a unit ID number higher by one by repeating the operation similar to the above for all the RKAs mounted on the U6 rack frame.
11. When the shifts of the Disk Drives in all the RKA is completed, remove the Disk Drives installed in the RK and move them to the RKA of the unit ID#1 in the same procedure.

(10) Demount the RK from the U6 rack frame.

1. Loosen the binding screws.

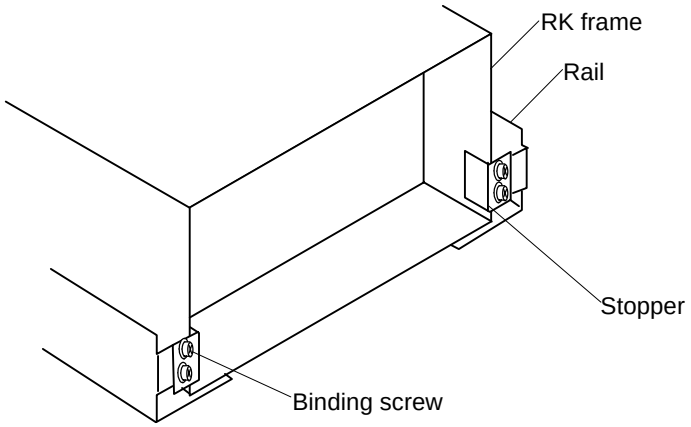


Figure 3.4.16.21 Rear Side of the Subsystem

2. Remove the four M5×10 binding screws.

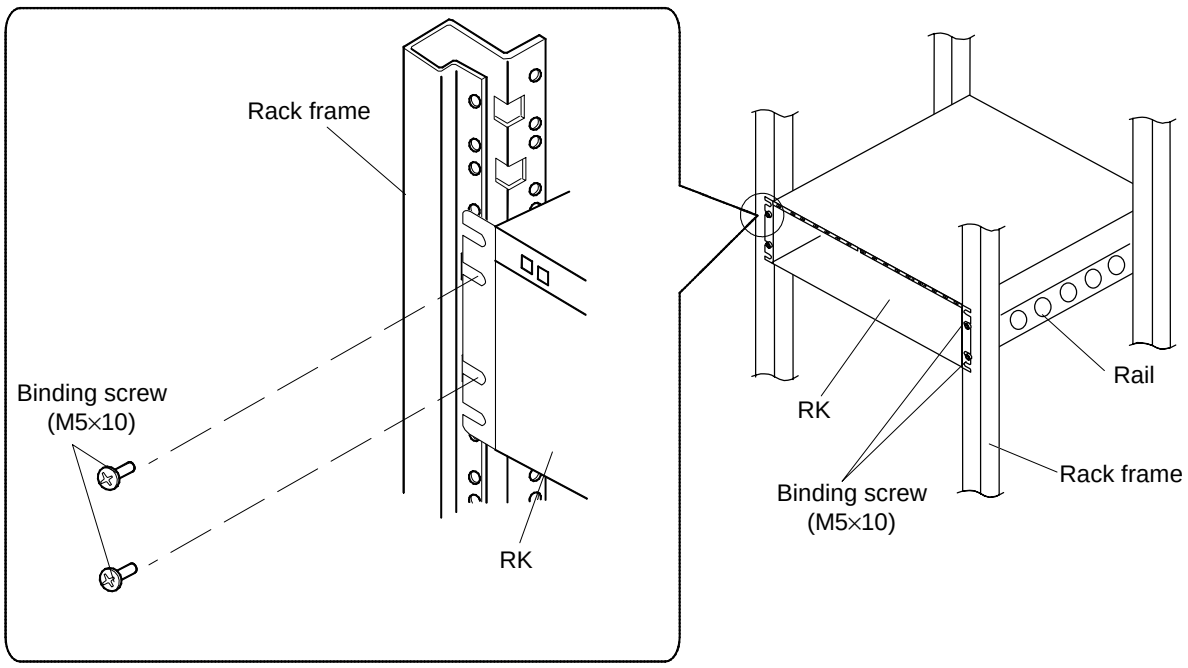


Figure 3.4.16.22 Front Side of the Subsystem

3. Adjust the position of the rack frame, and apply the brake to the lifter.
4. Move the pumping handle of the external lifter to the right and left repeatedly to lift the subsystem up to the height suitable for the unloading.

WARNING

If the RK 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

- **Be sure to perform the operation with two or more workers.**
- **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 RK is about 44 kg.**

5. Shift the RK onto the elevating base of the external lifter. Shift the RK 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 subsystem enters the base across the end of it. Otherwise, falling of the subsystem may be caused.



RK

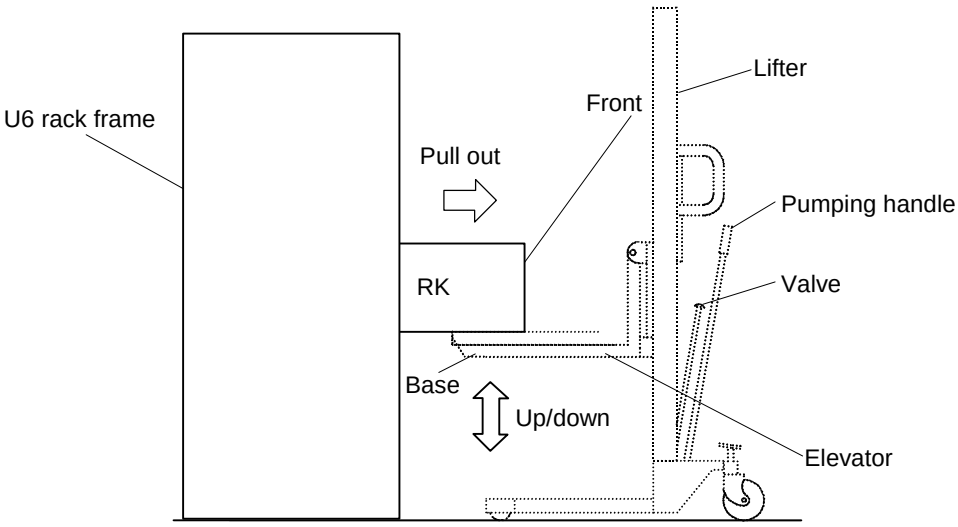


Figure 3.4.16.23 Mounting Subsystem on Eternal Lifter

6. 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.
7. After securing the RK to the elevating base, open the up/down valve of the external lifter gently and lower the elevating base to the lowermost position.
8. Take off the brake of the external lifter, move the lifter away from the U6 rack frame, and take down the RK after loosening the belt.
9. Move the external lifter to the place where the lifter does not disturb the following works.
10. Packing the RK. (See “Export Packing Specifications”)

(11) Mounting the RKH/RKHE on Rack Frame.

1. Paste the EMI gasket on the RKH/RKHE to be mounted referring to the instruction given in Step (7).
2. Mount the RKH/RKHE on the U6 rack frame at the position where the RK was mounted referring to the instruction given in Step (8) and fasten it.

(12) Change unit ID numbers and device ID numbers of all the RKAs making them conform to the configuration of the Thunder 9580V/9585V.

NOTE : Neither the unit ID nor device ID can be set for the RKH/RKHE in the configuration of the Thunder 9580V/9585V (because no Disk Drive is installed in it).

Set the unit ID number and device ID number of the RKH/RKHE that is in the configuration of the Thunder 9580V/9585V based on the unit ID number and device ID number that the RKH/RKHE had when it was in the configuration of the Thunder 9570V.
Set them correctly referring to the table shown above.
(When the "×16" switch of the device ID number setting switch is set to 0 and the "×1" switch to 0 to F, the unit ID number is set as 0 to 15.)

NOTE : If the unit ID number or device ID number is set wrongly, the upgrade will fail because the disk array subsystem is not recognized correctly.

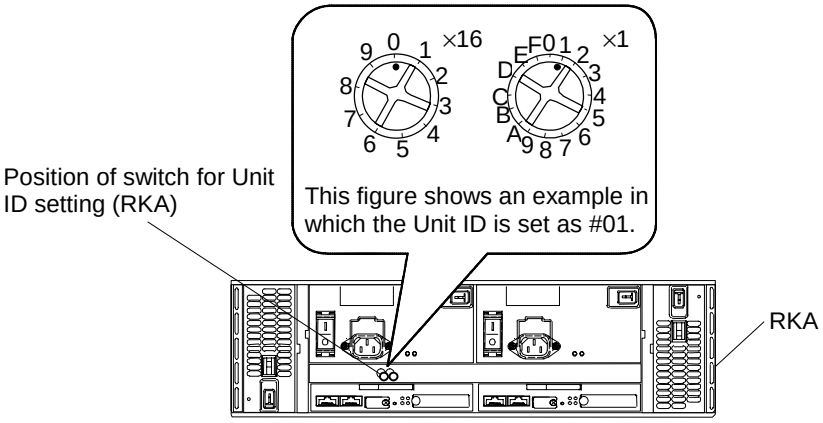


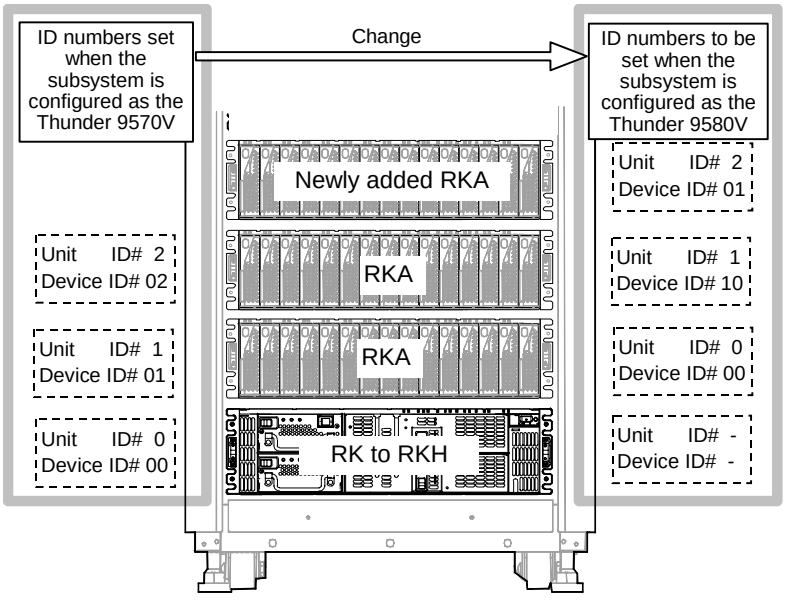
Figure 3.4.16.24 Position of Switch for Unit ID Setting

1. Set the unit ID number and device ID number for the Thunder 9580V/9585V based on those set for the disk array subsystem configured as the Thunder 9570V. Make the settings referring to the following list.

   NOTE : For the RKA newly added in Step (8), give the last unit ID and device ID numbers among all the RKAs mounted.

ID numbers set when the subsystem is configured as the Thunder 9570V				ID numbers to be set when the subsystem is configured as the Thunder 9580V/9585V		
Unit ID	Device ID	Device		Unit ID	Device ID	Device
#0	#00	RK	→	-	-	RKH/ RKHE
#1	#01	RKA	→	#0	#00	RKA
#2	#02	RKA	→	#1	#10	RKA
#3	#03	RKA	→	#2	#01	RKA
#4	#04	RKA	→	#3	#11	RKA
#5	#05	RKA	→	#4	#02	RKA
#6	#06	RKA	→	#5	#12	RKA
#7	#07	RKA	→	#6	#03	RKA
#8	#08	RKA	→	#7	#13	RKA
#9	#09	RKA	→	#8	#04	RKA
#10	#0A	RKA	→	#9	#14	RKA
#11	#0B	RKA	→	#10	#05	RKA
#12	#0C	RKA	→	#11	#15	RKA
#13	#0D	RKA	→	#12	#06	RKA
#14	#0E	RKA	→	#13	#16	RKA

Example: Setting changes in the case where the two RKAs were connected when the disk array subsystem was configured as the Thunder 9570V
(Set the unit ID# 0 and device ID# 00 for the RKA for which the unit ID# 1 and device ID# 01 were set; set the unit ID# 1 and device ID# 10 for the RKA for which the unit ID# 2 and device ID# 02 were set.
Set the unit ID# 2 and device ID# 01 (the last ID numbers) for the RKA newly added.)



(13) Mount the Interface Boards, which are to be installed in the RKH/RKHE, on the Control Unit and install the Cache Units.
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.

1. Loosen the right and left fixing screws of the Control Unit.
   Raise the both right and left levers at the same time in the direction shown by the arrows (·····>) and pull out the Control Unit a little way toward you.

⚠ CAUTION

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

2. Remove the Control Unit by pulling it out toward you.
3. Place the Interface Board on the Control Unit fitting it to the positioning pin and fasten it by tightening the three mounting screws.
4. Make sure that the Interface Board is firmly installed.
5. Mount Cache Units on the Control Unit.
   - Insert the Cache Units with the same capacity into the same slots as those of the Control Unit in the other system.
   - 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.
   - Install the two Cache Units with the same capacities in the cache slots #0 and #1. In the same way, install the two Cache Units with the same capacities in the cache slots #2 and #3.
6. Make sure that the Cache Unit is firmly installed.
7. Insert the Control Unit in the specified position with the right and left levers being raised, then return in the two levers at the same time in the direction shown by the arrows (⟶).
8. Fasten the right and left fixing screws of the Control Unit.
9. Also mount the Interface Boards on the other Control Unit in the same procedure and install the Cache Units.

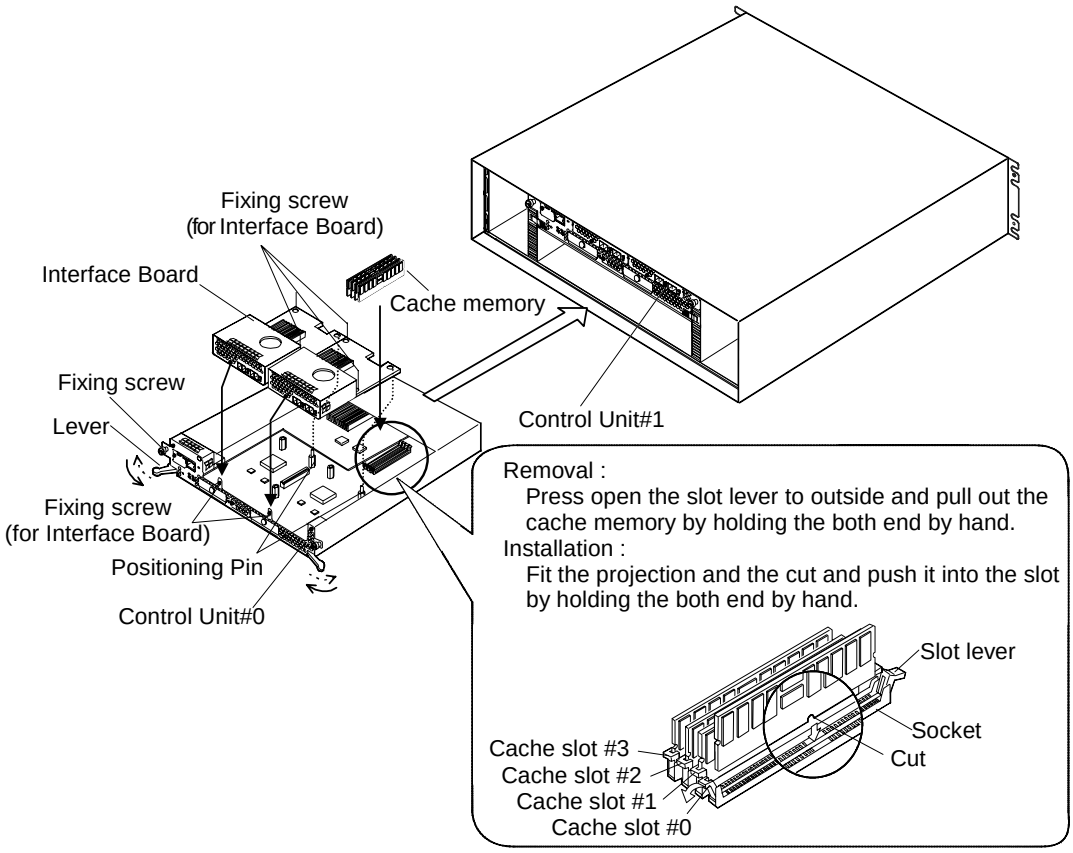


Figure 3.4.16.25 Installing Control Unit

(14) Connecting Cables.

CAUTION

Take full care to connect cables correctly.

Because operation of the subsystem is affected by the cable routing, follow the “Note on cable routing” in Item (1)(b) in Subsection 3.4.16.

NOTE : Power supply system of the RKH/RKHE 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 U6 rack frame is shown in Figure 3.4.16.26. Types of the cables to be used are shown in Table 3.4.16.1.

Table 3.4.16.1 Types Cables to be Connected

No.	Cable name	Remarks
1	Interface cable (Fibre Channel)	See (a) on page HUP-0940
2	ENC cable	See (b) on page HUP-0960
3	Power cable (100 V)	See (c) on page HUP-0990

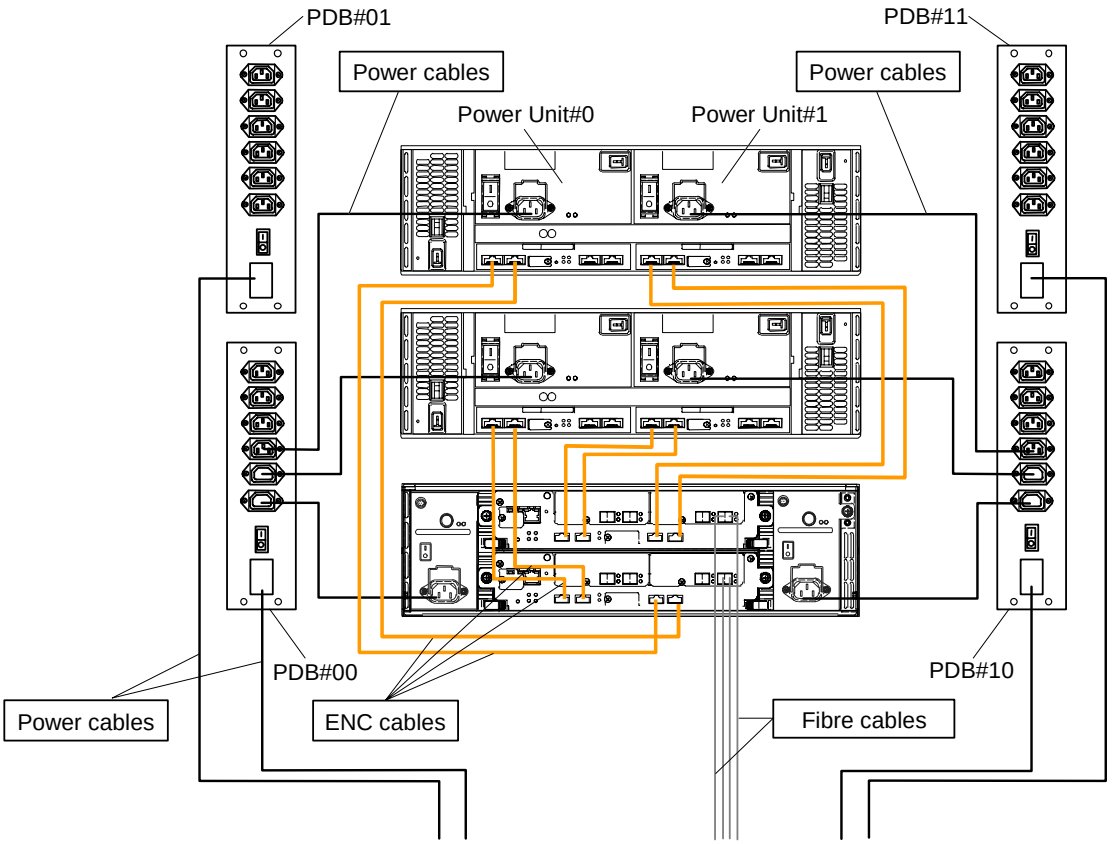


Figure 3.4.16.26 Cable Routing

(a) Connecting the Fibre Channel interface cable(‡1)

Two types of cable are provided as the interface cables to be used so that they fit to connector shapes of the RKH/RKHE and host computer (or HUB/SW) to be connected. Table 3.4.16.2 shows correspondences between the connector shapes and cable types. Choose the applicable cables from the table correctly.

Table 3.4.16.2 Types Cables to be Connected

Control Unit side (for RKH/RKHE side)			Host computer side (HUB/SW)	Types Cables to be Connected	
Parts name of connected cable plug	Model	Connector form	Connector form	Cable connector shape	Model
Control Unit	DF-F600-F1H DF-F600-F1HE	LC	SC	LC-SC cable	DF-F600-KB×M(*1)
			LC	LC-LC cable	DF-F600-KC×M(*1)
Interface Board	DF-F600-DH2G2	LC	SC	LC-SC cable	DF-F600-KB×M(*1)
			LC	LC-LC cable	DF-F600-KC×M(*1)
*1 : "x" denotes a valuable (1 to 5) that shows a cable length.					

1. Connect the Fibre Channel interface cables after making sure of the ports to be connected the label. (Refer to Figure 3.4.16.27.)

   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 an excessive stress .

2. Pull all the interface cables into the rack frame passing them through an opening for cables on the bottom plate of the rack frame.
3. Group the cables according to the destination to be connected, and bind each with Mini-Binders.

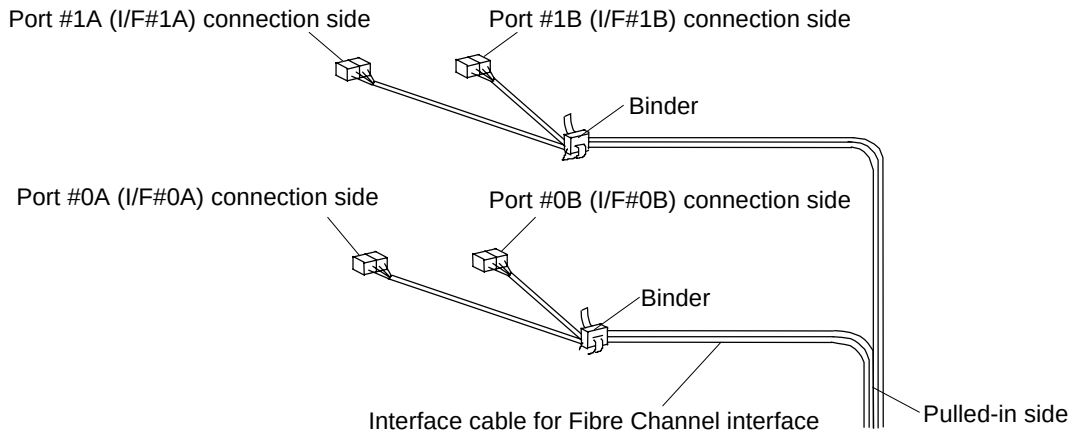


Figure 3.4.16.27 Binding Interface Cables

‡1 : When the multiple ports are used, make sure of the port corresponding to the host computer to be connected.

4. Connect the interface cable to the connector of the each port.
5. Route the fibre channel interface cables using cable clamps installed in the U6 rack frame.
6. Fasten the 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.

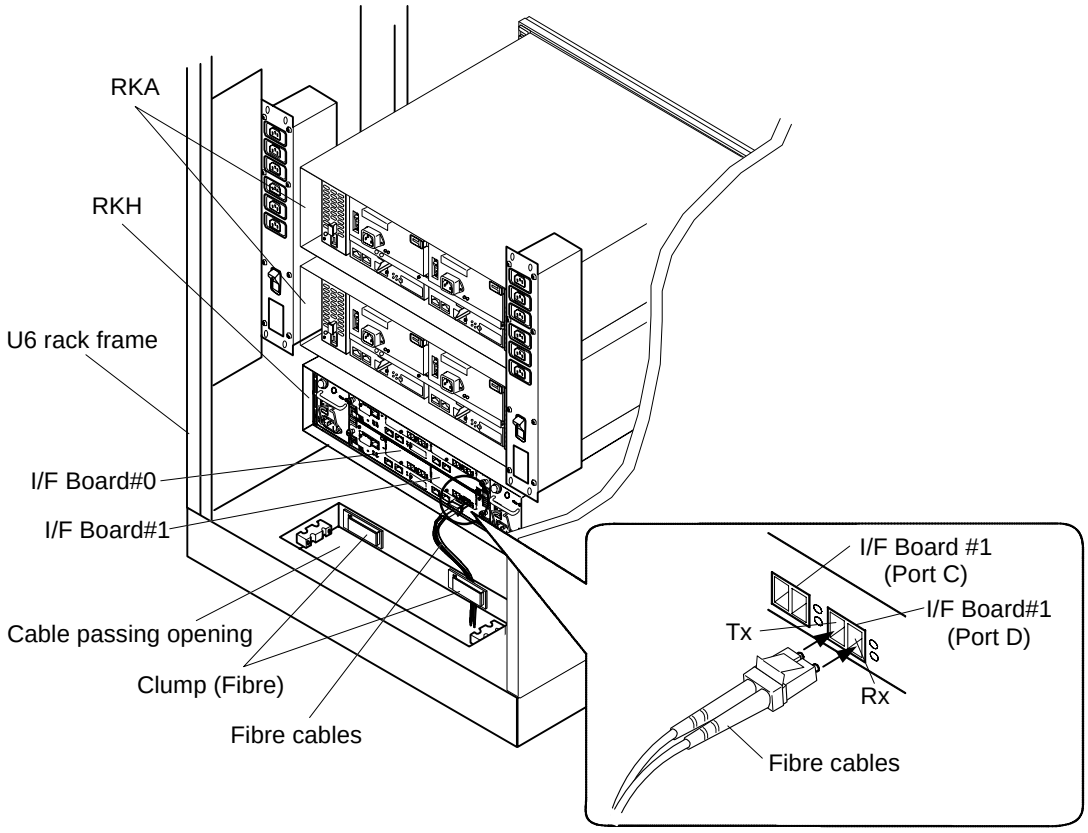


Figure 3.4.16.28 Routing Interface Cables

(b) Connecting the ENC cables.

In the case of the RKA with both of the Control Unit of RKA, it is required to connect the Control Unit (RKH/RKHE) 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 3.4.16.29 and Figure 3.4.16.30.

1. Loosen the thumb screws on the Control Unit and remove the blinds.
2. Connect the ENC cable to the Control Unit.
3. Connect the ENC cable to the ENC Unit of the RKA.

NOTE : Connect the Control Unit#0 of the RKH/RKHE with the ENC Unit#0 of the RKA and the Control Unit#1 of the RKH/RKHE with the ENC Unit 1 of the 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 (see Figure 3.4.16.29).

4. To the PATH#0 (marked in milky white on the RKH/RKHE side), connect the ENC cable marked in milky white.
5. To the PATH#1 (marked in yellow on the RKH/RKHE side), connect the ENC cable marked in yellow.
6. Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

When the two or more RKAs 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 RKAs using the ENC cables.

1. Remove the blinds 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 (marked in milk white) and PATH#1 (marked in yellow) of the ENC Unit, from which the blind was removed, with the ENC cables marked in the same color respectively.
3. Connect each of the connectors PATH#0 (marked in milk white) and PATH#1 (marked in yellow) of the adjacent RKA with the ENC cables marked in the same color.
4. Fasten each ENC cable, which has been connected, to the stopper with a Repeat binder.

‡1 : Keep the ENC cables carefully to provide for the case where they are needed.

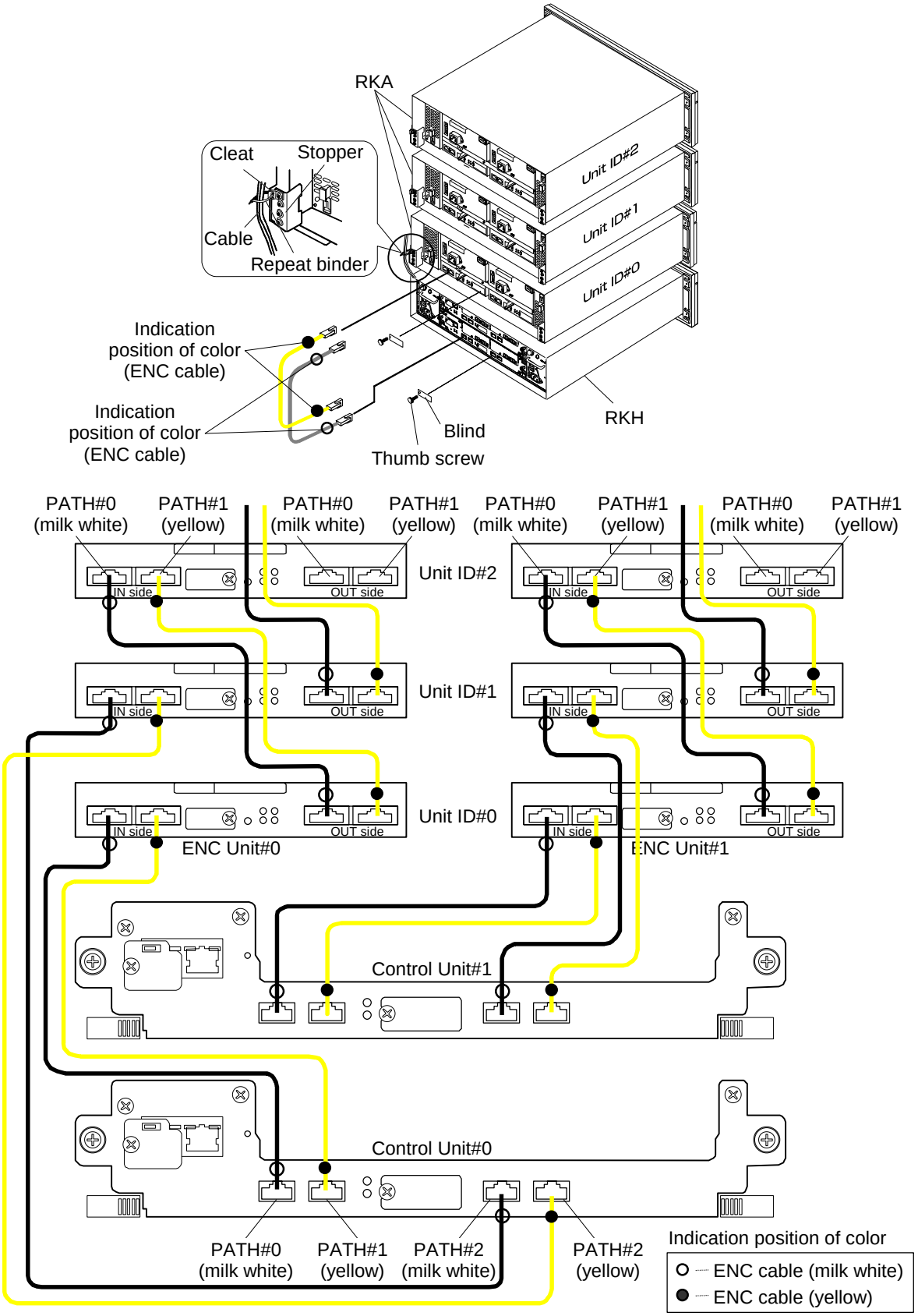


Figure 3.4.16.29 Connecting ENC Cables

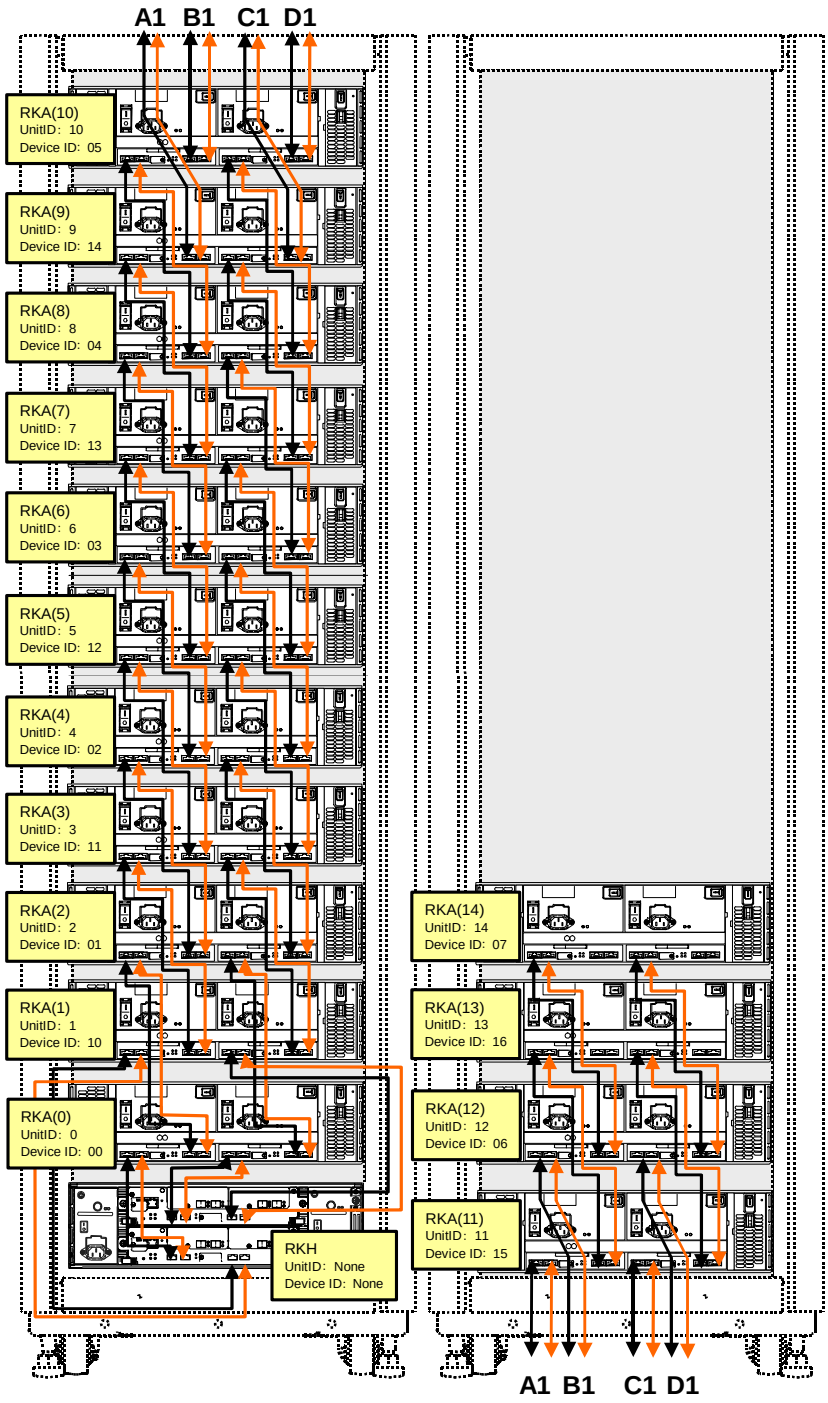


Figure 3.4.16.30 Example of Connection of ENC Cables

(c) 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. Make sure that the breaker of the each PDB has been turned off.
2. Make sure that the AC Power Unit Switch of the each Power Unit has been turned off.
3. Plug the connector of the each power cable disconnected from the RK in Step (4) into the connector on the AC/DC power supply (RKH/RKHE) in the RKH/RKHE.
4. Plug the connector of the each power cable into the connector on the AC/DC power supply (RKA) in the added RKA and fasten the power cable with Repeat Binders threaded through the cleats installed on the left or right stopper.
5. Plug the connector of the each power cable into the PDB of the added RKA. (Use the PDB receptacles in the order from the J10 to J15.)

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.
• The J15 is a service power outlet. When using the J15, limit the total current output from the outlets J10 to J15 so that it does not exceed 16 A(‡1).

6. Route the power cables.
7. 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 : Connect them so that the load on a PDB does not exceed 16 A after checking the load through a calculation.
RKH/RKHE one unit : 2.9 A
RKA one unit : 2.2 A

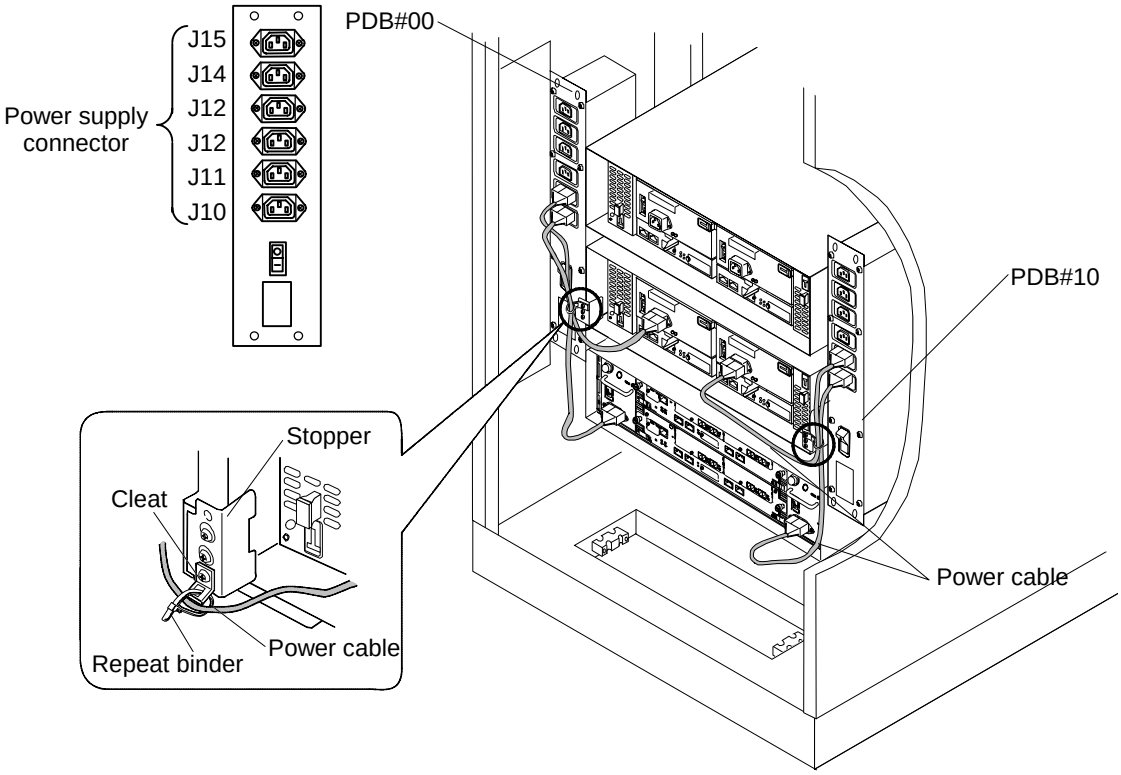


Figure 3.4.16.31 Routing Power Cables to the Mounted Subsystem

(15) Connect the maintenance PC to the disk array subsystem.

1. Connect the maintenance PC to the RKH/RKHE referring to Step (2) (b) in Subsection 3.4.5, “Connecting maintenance PC”.

3.4.17 System power on

1. Make sure that the circuit breaker (CB1) is turned off.
2. Make sure that the AC Power Unit Switch of the each Power Unit is turned off.
3. Make sure that the main switch is turned off.
4. Turn on the battery switch of the Backup Battery Unit on the front side of the subsystem.
5. Turn on the circuit breaker (CB1) of the PDB.
6. Turn on the AC Power Unit Switch of the Power Unit.
7. Turn on the main switch.
8. Make sure that the ALARM LED (red) comes on.
9. Check if the CALM LEDs (red) on the both Control Units light on.

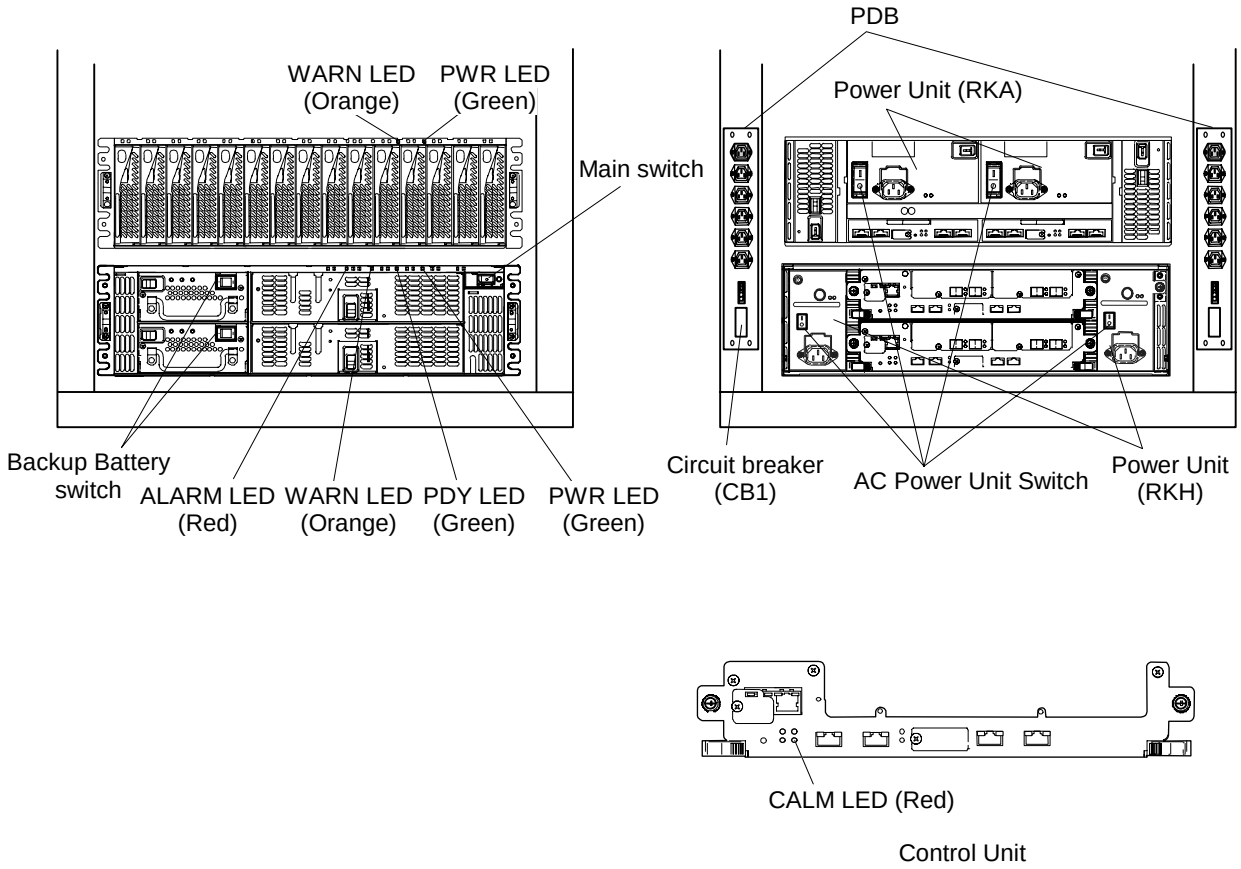
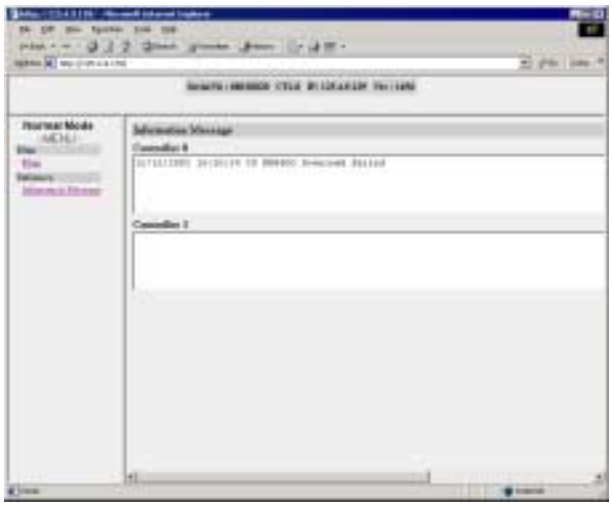


Figure 3.4.17.1 Locations of Switches for Power On

9. Connect the Web by connecting the LAN cross cable to the LAN connector for maintenance on the disk array subsystem.
10. Select the [Information Message].

11. Check that [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 “4. Trouble Analysis” to solve the problem.

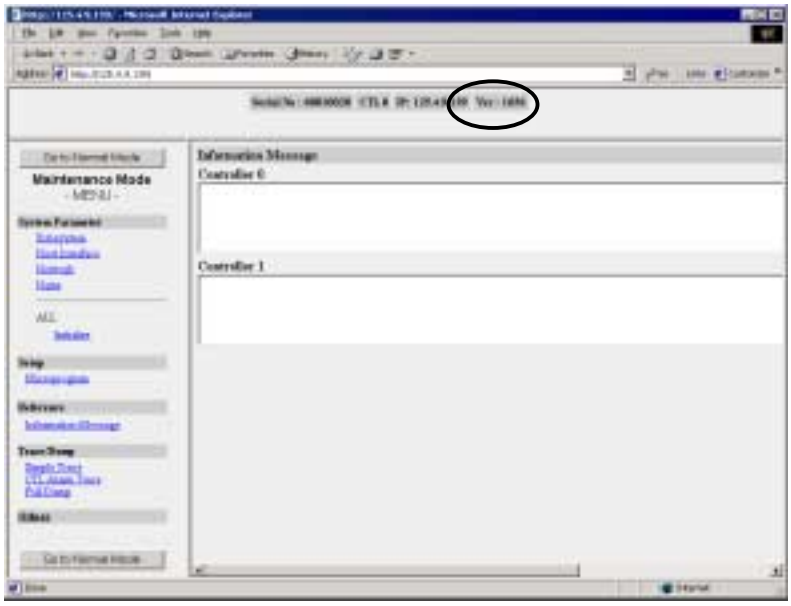
3.4.18 Updating installation of microprogram for Thunder 9580V/9585V

Install the microprogram for the Thunder 9580V (Rev. 1656 or the latest revision)/9585V (Rev. 1657 or the latest revision) using the Web.

Note:The updating installation must be executed twice in order to update all the microprograms in the system drives.

1. Execute a updating installation of the microprogram for the Thunder 9580V/9585V referring to the procedure explained in Subsection 3.4.9, “Updating installation of microprogram for Thunder 9570V”.
2. Execute the updating installation only once at this time although the updating installation is instructed to be executed twice in Subsection 3.4.9. (Omit to execute Step (3) 18. in Subsection 3.4.9.)

NOTE :When the mode is changed to the Maintenance mode, make sure that the flash program revision is 1656 or later (9580V) or 1657 or later (9585V) through the Web window. If the revision is earlier than 1656, a wrong Control Unit may have been inserted.
Turn off the power and replace the Control Unit to the correct one. Then, retry the upgrade operation referring to “3.4.17 System power on”.



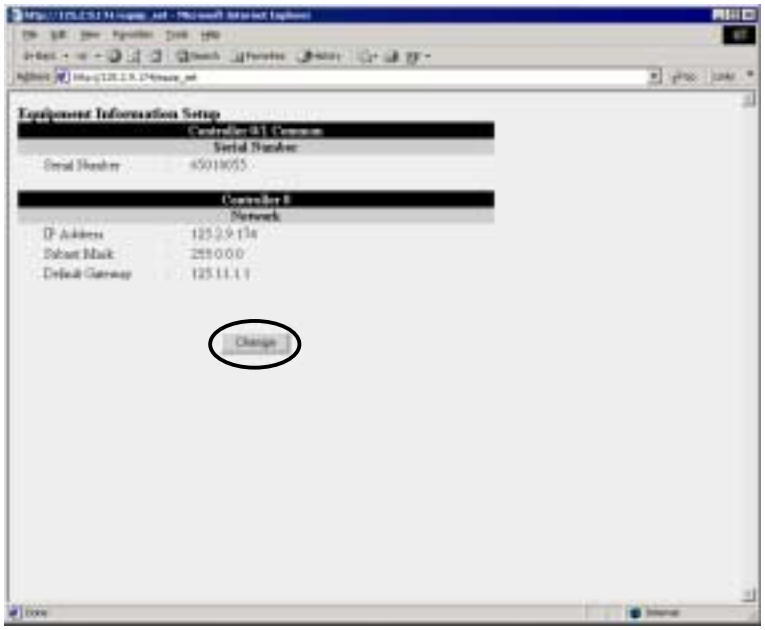
NOTE : When [Abnormal End Empty System Retry Full Install] is displayed, refer to the recovery procedure, “4.2 When Abnormal End Empty System Retry Full Install occurs”.

NOTE : After the updating installation is executed, the configuration of the disk array subsystem becomes unable to be returned to that of the Thunder 9570V at the time when the subsystem enters the Ready status.

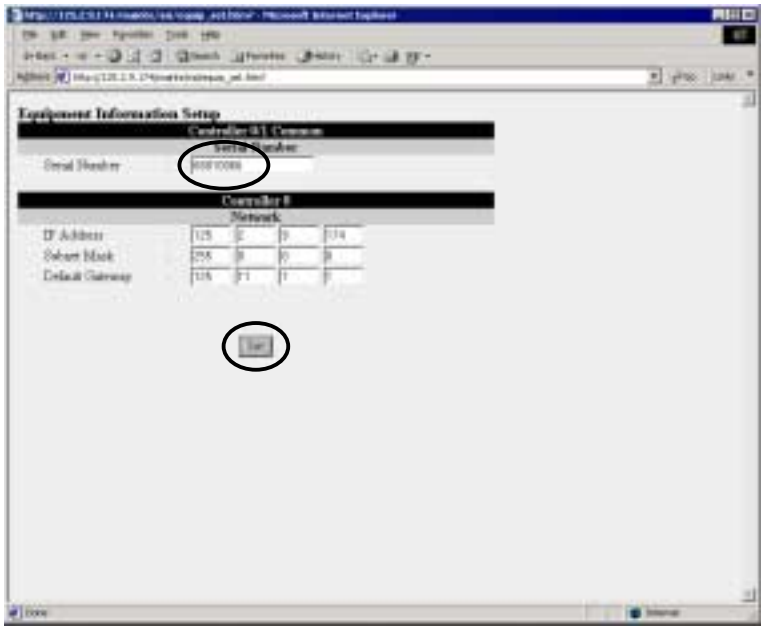
3.4.19 Setting serial number of disk array subsystem

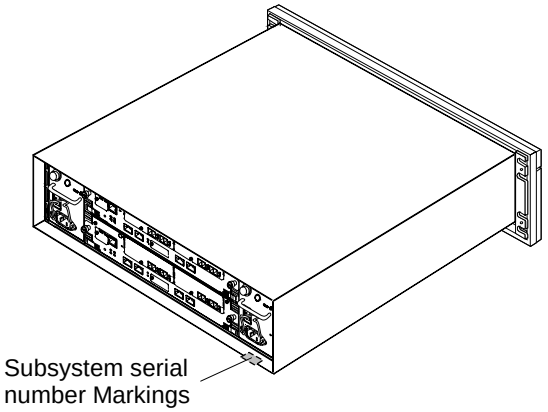
Change the serial number of the disk array subsystem through the hidden Web window using the serial number setting up function.
The procedure is shown below.

1. Set the operation mode in the Maintenance Mode.
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].

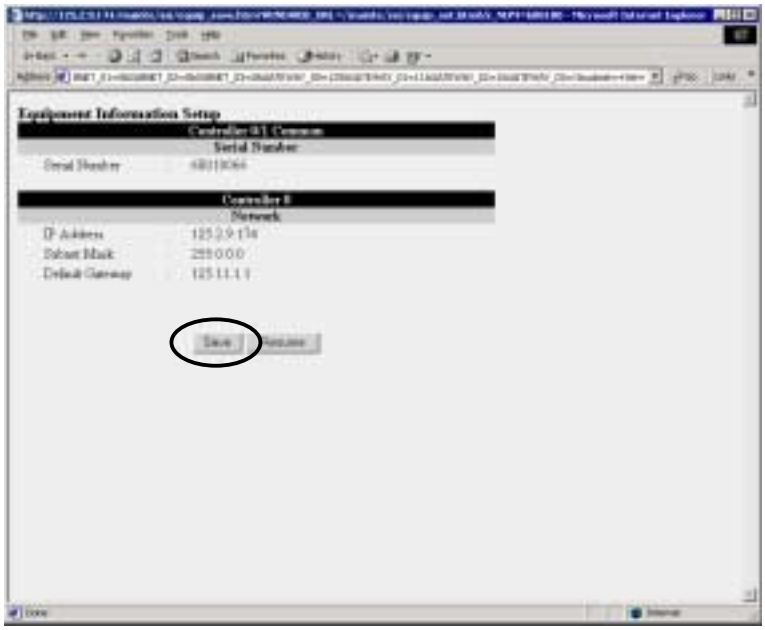


3. Displayed the [Equipment Information Setup].
   Click the [Change] button.
4. Enter a serial number in the [Serial Number] box and click the [Set] button.
   The serial number is an eight figure number indicated in the section for the serial number in Figure.



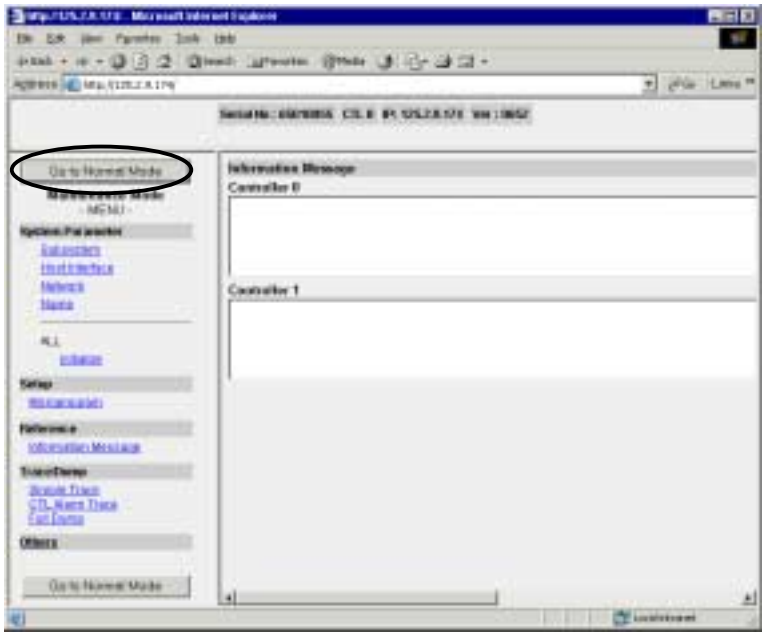


5. After making sure that the change to be made is correct, click the [Save] button.

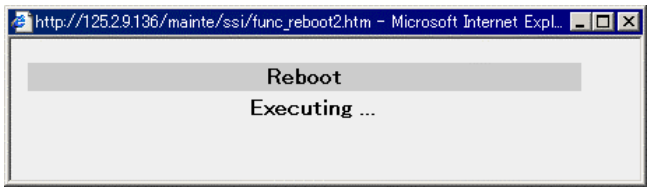


The subsystem serial number is changed.

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.

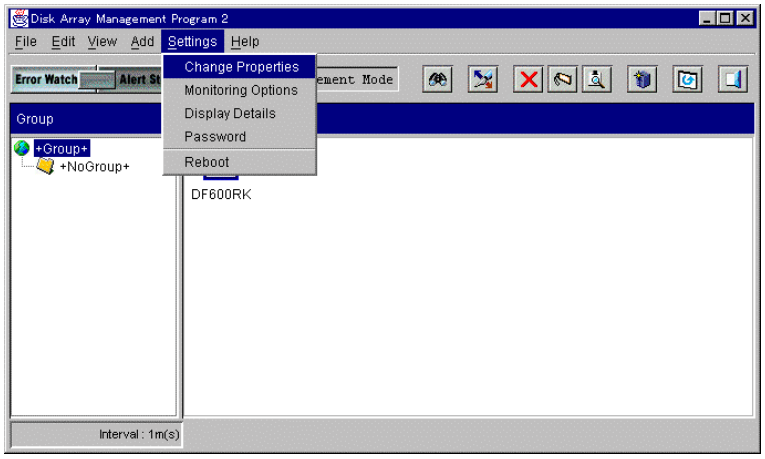


9. The subsystem becomes ready in about four minutes.
   Make sure that the RDY LED of the RKH/RKHE is on.
10. Quit the Web.

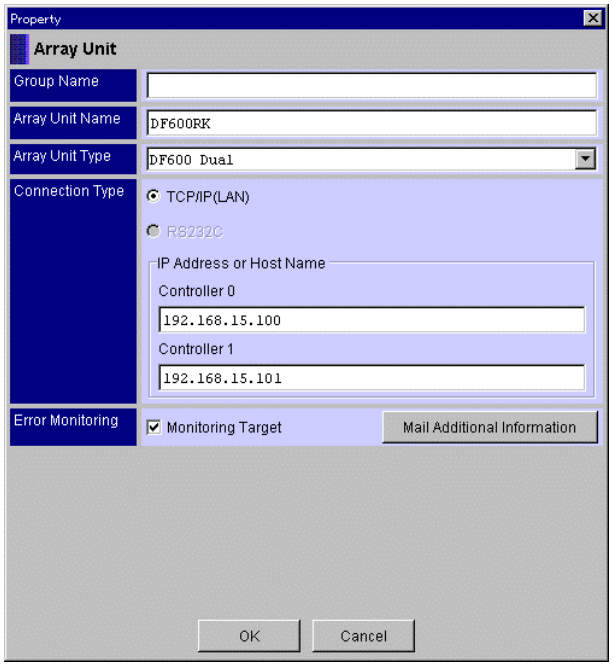
3.4.20 Setting the IP address

When it is necessary to change the IP address after the upgrade, make the change using Disk Array Management Program 2.
The procedure is shown below.

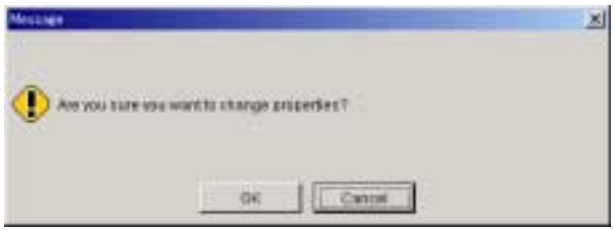
1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
3. Click the icon of an array unit on the Main screen. On the [Settings] menu, click [Change Properties].



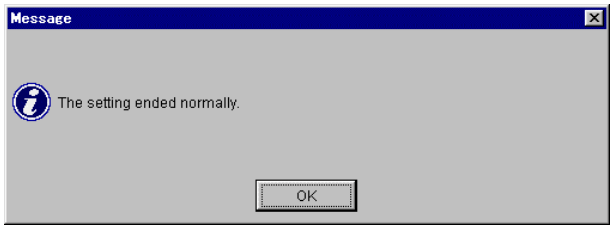
4. Enter the IP address in the [IP Address or Host Name] of the [Connection Type] and click the [OK] button.



5. When a message confirming whether the registration should be changed or not is displayed, click the [OK] button.



6. When a registration change completion message appears, click the [OK] button.



The Main screen is updated and then displayed.

7. When the property window is open, click the [Close] button.
8. Close the unit window. Quit Disk Array Management Program 2 by selecting [File] and [Exit] in this order in the main window or clicking the [: Exit] button.

3.4.21 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 (2) (a) in Subsection 3.4.5, “Connecting maintenance PC”.
2. Attach the Front Bezels to the RKH/RKHE and all the RKAs by executing the procedure (2) explained in Subsection 3.4.16, “Hardware upgrade works” in reverse order.

CAUTION

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

3. 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.
4. Make sure that the rear door is latched and cannot be opened.

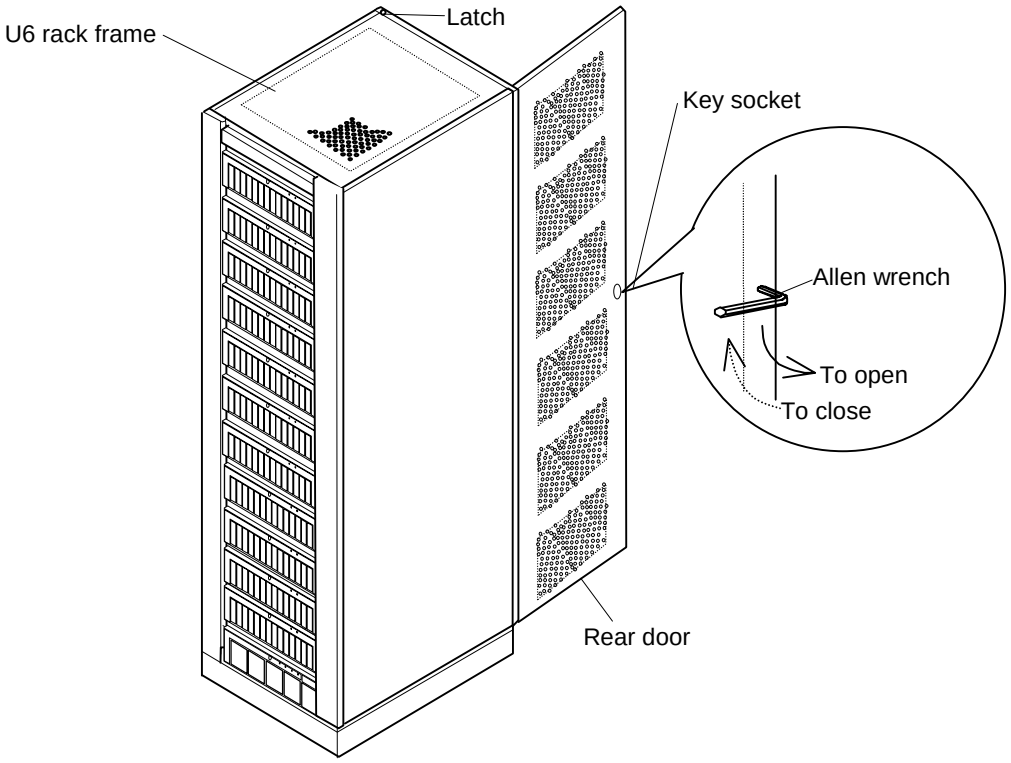


Figure 3.4.21.1 Procedure for Closing Rear Door

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.

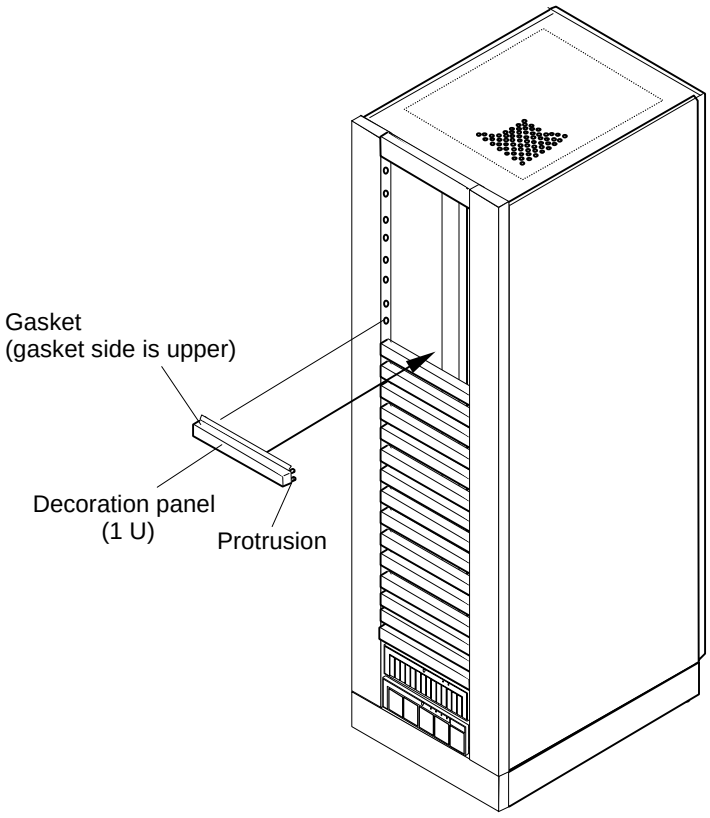


Figure 3.4.21.2 Attaching Decoration Panel

3.4.22 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”.

3.4.23 Upgrade installation of microprogram to be executed when TrueCopy Basic is used

This operation is not required when Hitachi TrueCopy Basic is not used.
Because it is necessary to change the management information of the other one of the two disk array subsystems paired by TrueCopy Basic (not the subsystem being updated but the other one of the paired subsystems), replace the microprogram with that of Rev. x656 or later if its revision is earlier than Rev. x656.
For example, even when the remote disk array subsystem is upgraded as shown in Figure 3.4.23.1, the microprogram of the local disk array subsystem must be updated.

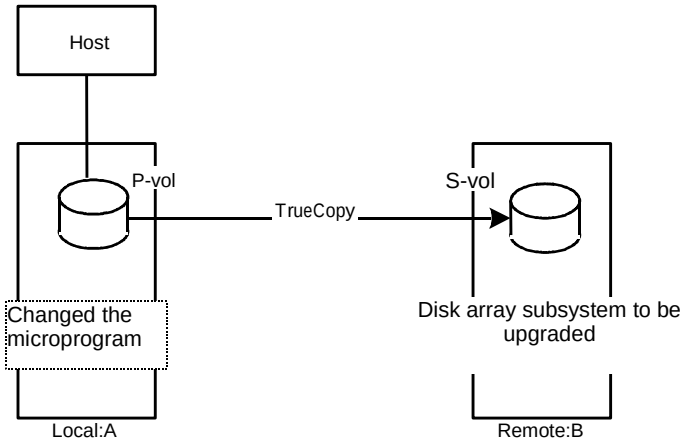


Figure 3.4.23.1 Upgrade the microprogram

The procedure is shown below.

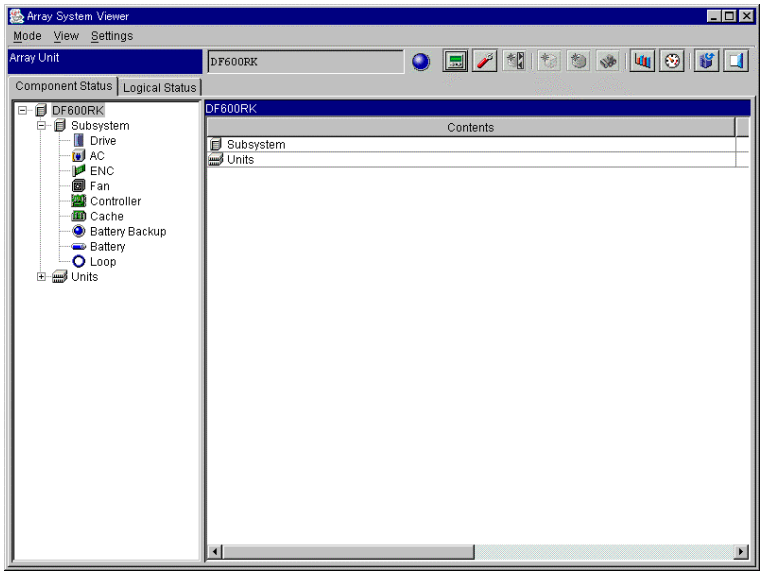
1. Connect the service PC to the other one of the two subsystems paired by TrueCopy Basic.
2. Start Disk Array Management Program 2 and register the other one of the two subsystems paired by TrueCopy Basic.
3. Download the microprogram (Rev. x656) using the Disk Array Management Program 2.

NOTE : Download the microprogram from the FD or CD-R into the array unit. In the download, the microprogram is stored in the array unit; the microprogram of the array unit is not replaced.

4. Copy the microprogram from the CD-R to the hard disk.
   When using Windows®, the microprogram can be stored from the CD-R; the microprogram is not copied when it is stored from the CD-R.
   When using Solaris™, IRIX®, HP-UX®, or Red Hat Linux® the microprogram is copied.

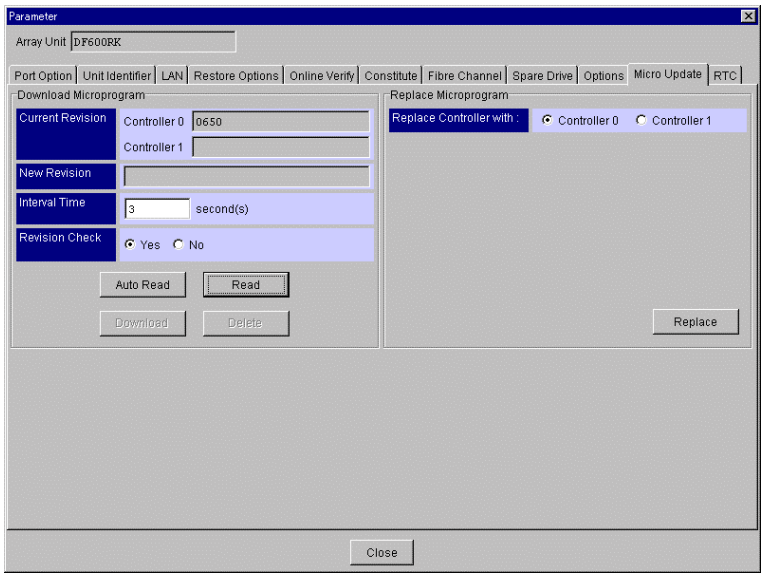
   NOTE : For a directory where the Disk Array Management Program 2 is installed, do not copy the microprogram directly to the CD-R. Create a sub-directory and copy it under this sub-directory. Specify the name of a directory in the hard disk drive to which the microprogram is copied, with a one-byte coded alphanumeric.

5. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
6. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
7. Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.



8. Select [Settings] and [Configuration settings] in this order in the unit window or click the [: System Parameter Wizard] button.

9. Click the [Micro Update] tab.



[Current Revision]: Microprogram revision of each controller of the array unit.

[New Revision]: A microprogram revision stored in the system in which the Manager 2 is installed. When the microprogram 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.

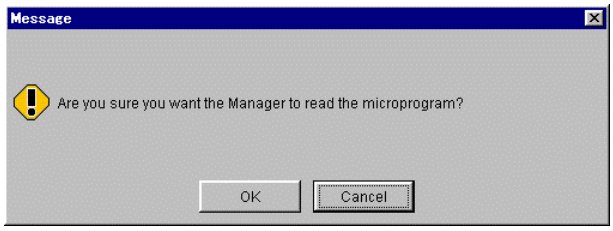
[Revision Check]: Instructs the revision check of the microprogram to be downloaded. When the download instruction is specified, whether or not a hot replacement is applicable to the microprogram is checked. Select Yes.

When no microprogram is read, the [Download] and [Delete] buttons are displayed in gray and cannot be selected.

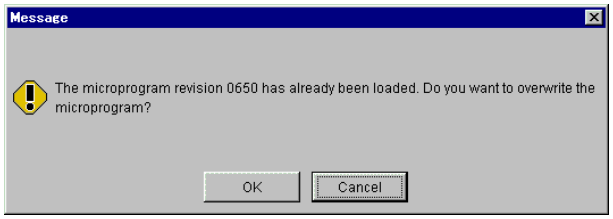
10. The microprogram is read into the PC or Server/Workstation in which the Manager 2 is installed. Click the [Auto Read] or the [Read] button. When a revision is displayed in [New Revision], the microprogram is already read. To download the microprogram that is already read, execute Download.
When you have clicked the [Read] button, specify an FD or the directory in which the microprogram is installed; follow the directions given in the window.
When the [Auto Read] button is clicked and the first directory where the microprogram is installed is specified, all the microprograms are read automatically.

    NOTE : When [Auto Read] is executed, an FD or CD-R cannot be read. Specify the name of the directory in which the microprogram is to be stored. The last two figures of the name of the first directory to be read first are '01'; the last two figures of the second directory to be read are '02'. If the directory name is wrongly specified, automatic reading will terminate abnormally. Designate appropriate numbers at the end of the directory names to indicate the order in which the directories are to be read.

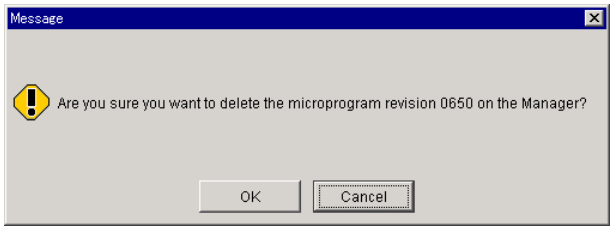
11. When a confirmation message appears, asking whether or not to read the microprogram appears, click the [OK] button.



If the microprogram is already read, a confirmation message is displayed. When the [OK] is clicked, the microprogram is overwritten. To stop reading the microprogram, click the [Cancel] button.



To delete the microprogram that is already read in the PC or Server/Workstation, click the [Delete] button. When a confirmation message appears, click the [OK] button.



3.4.24 Revalidation the TrueCopy Basic

This operation is not required when Hitachi TrueCopy Basic is not used.
Perform the revalidation
For example, even when the remote disk array subsystem is upgraded as shown in Figure 3.4.24.1, the microprogram of the local disk array subsystem must be updated.

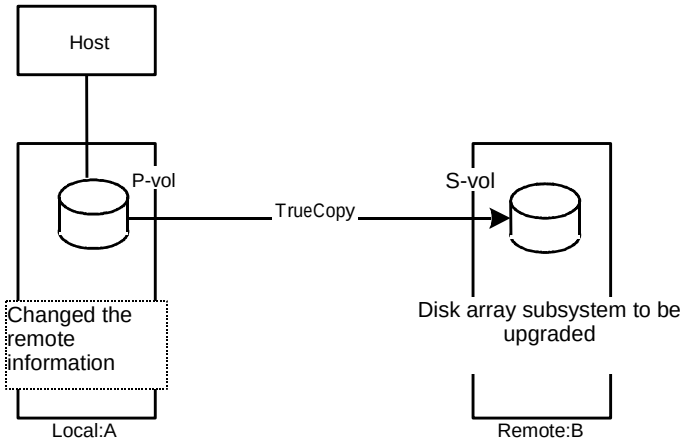


Figure 3.4.24.1 Change the Remote Information

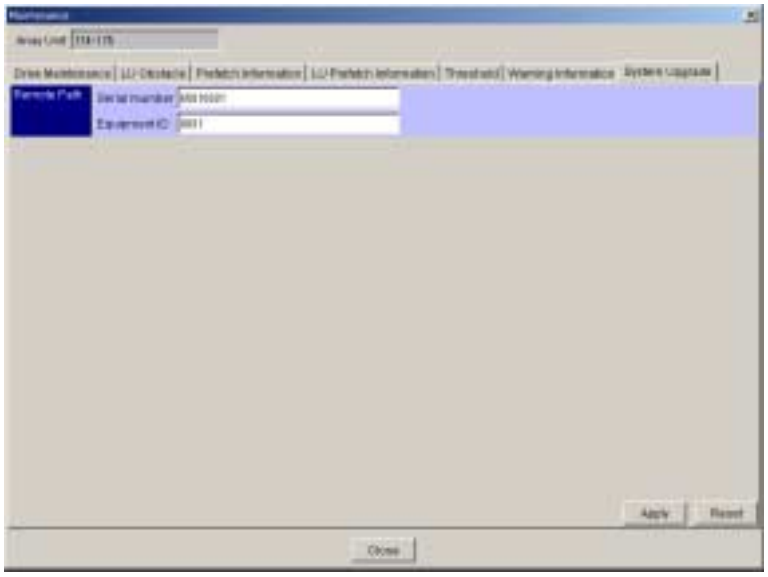
The procedure is shown below.

(1) Connect the service PC to the other one of the two subsystems paired by TrueCopy Basic.
(2) Start Disk Array Management Program 2 and register the other one of the two subsystems paired by TrueCopy Basic.
(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.
    1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
    2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
    3. Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.
    4. Select [Settings] and [Maintenance] in this order in the unit window.
    5. Click the [System Upgrade] tab.
    Take down notes of the displayed serial number and device ID in the following blank lines.

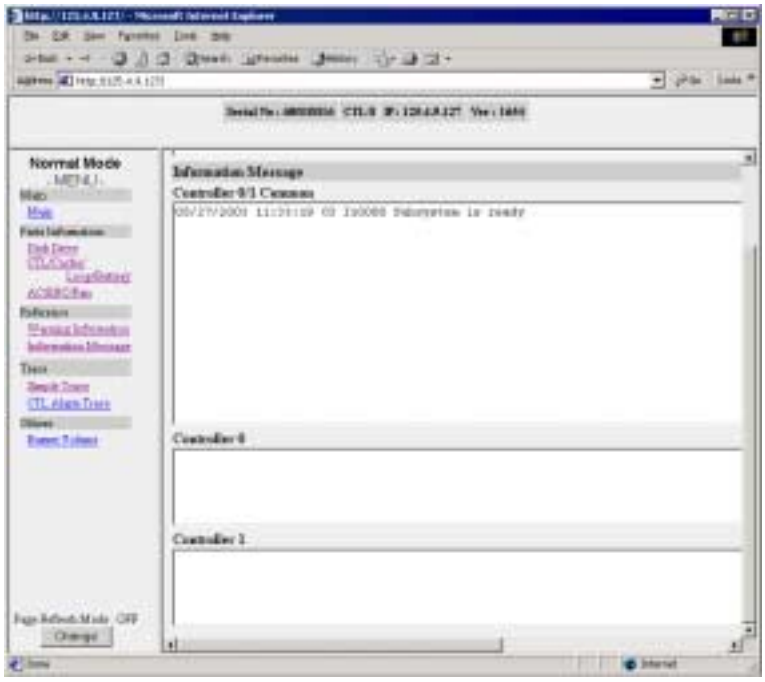
Serial Number: _____

Device ID: _____

6. Change the serial number and device ID.
   Enter the serial number and device ID of the disk array subsystem that has been upgraded.



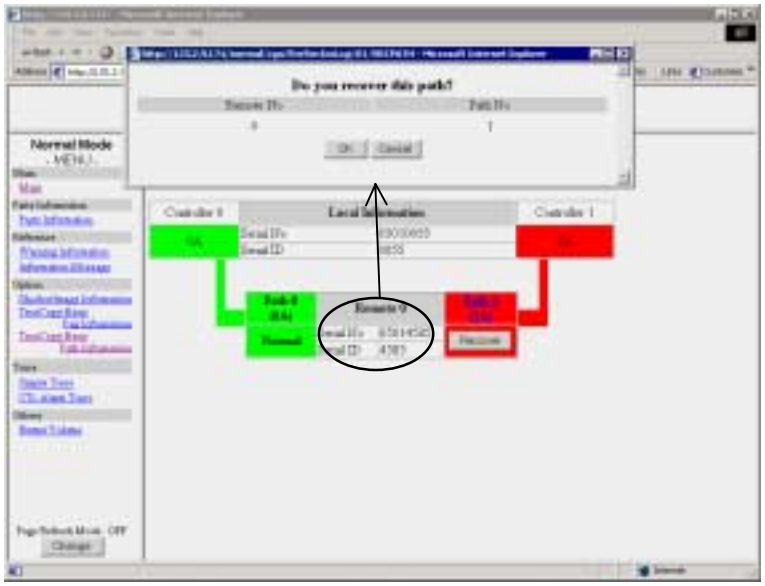
(4) Revalidate the path using the Web.
Perform the revalidation through the "TrueCopy Basic Path Information" window.
Screen 1: Image of the "Information Message" window



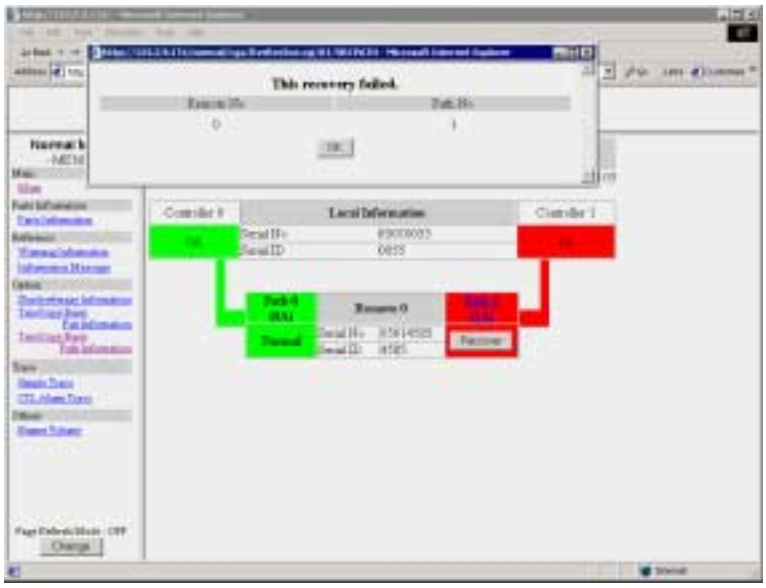
Screen 2: Image of the "Path Detachment Factors" window



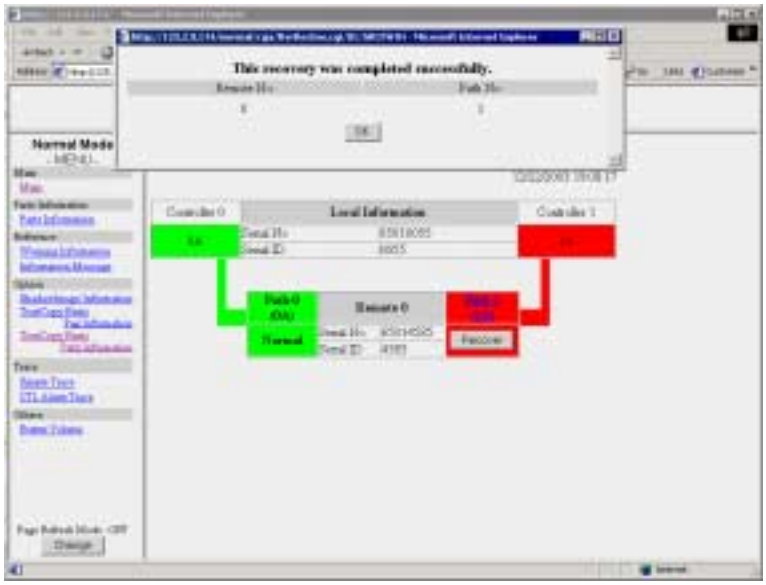
Screen 3: Image of the "Revalidation Instruction" window



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)



(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/2000) use the same command device.

1. Set an environmental variable that shows the each instance number. Enter the following via the command prompt window.

```
c:¥horcm¥etc>set HORCMINST=0
```

2. 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.

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..SMPL   ---- ------,-----   ----   -
vg01     oradb1(R)      (CL1-B , 1,   2)   175        2..SMPL   ---- ------,-----   ----   -
```

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 pair is explained below.

1. Set the group name in the configuration definition file as "vg01".
Resynchronize a TrueCopy 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 3.4.24.1 Examples of Input and Output Results of Pairresync Command

2. 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 pair has been resynchronize. For details of the pairsplit command and its options, refer to Chapter 4 in the Hitachi RAID Manager System Administrator's Guide (Thunder 9500V Series).

4. Trouble Analysis

When some problem occurs during the upgrade, refer to a message and take recovery actions corresponding to it.

4.1 Error Messages

4.1.1 Flash detected messages

Message code	Message text	Description	Recovery measures
RBA000	Down grade check NG	Down-grade check result was NG.	① Downgrade check to disable, and install the maicroprogram.
RBE800	Upgrade failed [the uploaded microprogram does not support the upgrade]	Upgrade from the RK to the RKH/RKHE failed.	① Update the RK microprogram to revision 0656 or later.
RBE900	Upgrade failed[the installed microprogram incorrect]	Upgrade from the RK to the RKH/RKHE failed.	① Install the microprogram revision 165x, which is the same as the RK microprogram revision 065x, in the RKH/RKHE.
RBEA00	Downgrade failed [the installed microprogram is incorrect]	Downgrade from the RKH/RKHE to the RK failed.	① Install the microprogram revision 065x, which is the same as the RKH/RKHE microprogram revision 165x in the drive, in the RK.
RBEB00	Downgrade failed [the uploaded microprogram does not support the downgrade]	Downgrade from the RKH/RKHE to the RK failed.	① Update the RK microprogram to revision 0656 or later.

4.1.2 Failure messages

Message code	Message text	Description	Recovery measures
HH2B00	Upgrade failed [PSOFF]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the deliberate shutdown had not been executed.	① Set the downgrade check as Disable, and then install the RK microprogram to update it.
			② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.
			③ Turn on the AC Power Unit Switches (DC 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 RK to the RKH/RKHE again.
HH2C00	Upgrade failed [Single]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the System Startup Attribute was set as the Single mode.	① Install the RK microprogram to update it.
			② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.
			③ Turn on the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and place the units in the Maintenance mode after the units become ready. Then select the Dual Active or Hot Standby mode for the System Startup Attribute of the system parameter.
			④ Make the upgrade from the RK to the RKH/RKHE again.
HH2D00	Upgrade failed [microprogram revision]	When upgrade from the RK to the RKH/RKHE was attempted, it failed because the microprogram revisions of the RK and RKH/RKHE were not the same.	① Install the RKH/RKHE microproram revision 165x, which is the same as the RK microprogram revision 065x in the drive.

Message code	Message text	Description	Recovery measures
HH2E00	Upgrade failed [RS232C]	At the time of upgrading from RK to RKH/RKHE, the upgrade failed since the RS232C error information sending mode or the status reporting mode was not OFF.	① Install the RK microprogram to update it.
			② After the updating installation is completed, turn off the AC Power Unit Switches (DC Power Unit Switches) of all the disk array units and return the hardware configuration of the disk array unit concerned to that of the RK.
			③ Turn on the AC Power Unit Switches of all the disk array units and place the units in the Maintenance mode after the units become ready. Then set the RS232C error information transmission mode of the system parameter to “OFF” and make the status report mode of the “SCSI/ Fibre Channel Common Option” unselected.
			④ Make the upgrade from the RK to the RKH/RKHE again.
HH2F00	Downgrade failed [Subsystem can not take over the user data]	The subsystem cannot be started normally because the basic disk array unit was returned to the RK after it had been upgraded to the RKH/RKHE.	① When operating the disk array unit as the RK, start the subsystem after making the initial setting up for it. In this case, user data cannot be retained.
			② When operating the disk array unit as the RKH/RKHE, return it to the state in which it is upgraded to the RKH/RKHE, and then turn on the power to start the subsystem.
HH2G00	Downgrade failed [SATA]	When upgrading from RK to RKH/RKHE, the upgrade failed because the SATA chassis frame was connected.	① Install the RK 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 RK.
			③ Reduce the SATA chassis frame in RK (delete RG if necessary).
			④ Make the upgrade from the RK to the RKH/RKHE again.
HH13B0	System change failed [PIN]	The upgrade cannot be made because the system change has not been made normally and a pinned segment exists.	① Return the Disk Drives to the RK, 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.	① Return the Disk Drives to the RK, restart the subsystem, execute the deliberate shutdown, and then make the upgrade again.

4.1.3 Web error messages

Message code	Message text	Description	Recovery measures
-	Abnormal End Empty System Retry Full Install	The update installation could not be done because no existing system was found.	① Execute the initial setting up.
		System impropriety at the time of upgrade work.	① Refer to the 4.2
-	A specified file doesn't exist. Confirm elements of designation.	Install guard NG	① Install guard check to disable, and install the maicroprogram.

4.1.4 Error messages issued during upgrade made when Hitachi TrueCopy Basic is enabled

This operation is not required when Hitachi TrueCopy Basic 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 Section 2.4.3, "Procedure for Recovery from Path Detachment and Suspend (PSUE) Status when the SRC Function Is Used".
		A serial number that does not exist was entered.	① Enter a correct serial number referring to Subsection 4.5.2, "When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9580V/9585V."
I62900	Remote equipment ID error	Path detach occurred due to inconsistency of remote equipment IDs.	① Refer to Section 2.4.3, "Procedure for Recovery from Path Detachment and Suspend (PSUE) Status when the SRC Function Is Used".
		A wrong device ID was entered.A wrong device ID was entered.	① Enter a device ID referring to Subsection 4.5.2, "When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9580V/9585V."
I62D00	Remote option disable [TrueCopy Basic]	A path detachment occurred because the optional SRC function of the remote DF was locked.	① Refer to Section 2.4.3, "Procedure for Recovery from Path Detachment and Suspend (PSUE) Status when the SRC Function Is Used".
		A serial number and a device ID of another subsystem was entered by mistake. The onerous option of the SRC in the subsystem was invalid.	① Enter a correct serial number and a device ID referring to Subsection 4.5.2, "When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9580V/9585V."

NOTE : During the upgrade made when Hitachi TrueCopy Basic is left enabled, one of the following messages is sure to be displayed even in the normal state.

Message code	Message text	Description
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 or B)
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.
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 or D)
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.

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 4.4, "When a Disk Drive was inserted in a wrong location".

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 in the connection order of the units or a wrong ID of a unit was detected.
- 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.

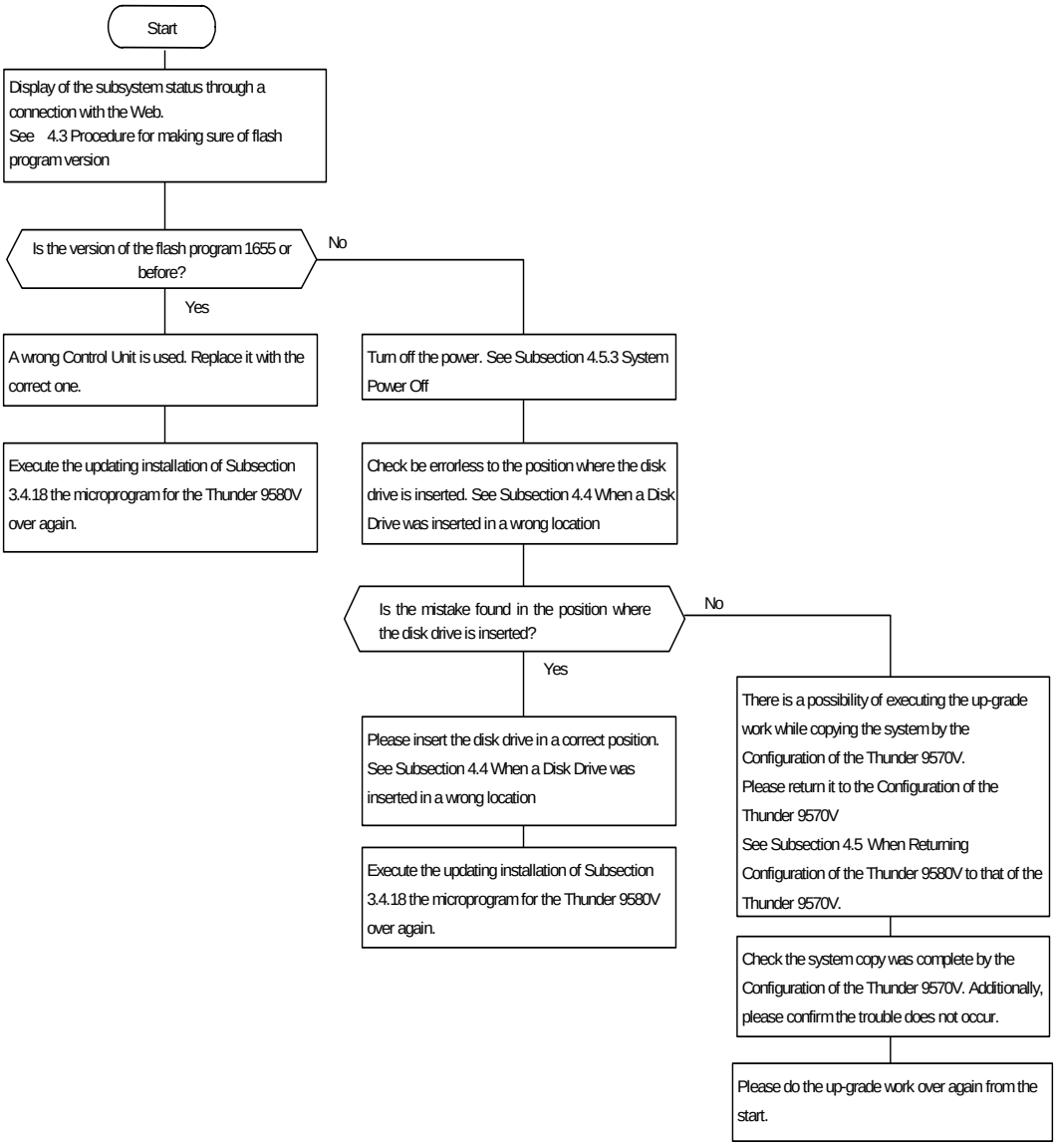
When one of the following messages is displayed, there may be a mistake in the Disk Drive location, the unit ID, or some other matter. Check if the configuration is correct.

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.

4.2 When Abnormal End Empty System Retry Full Install occurs

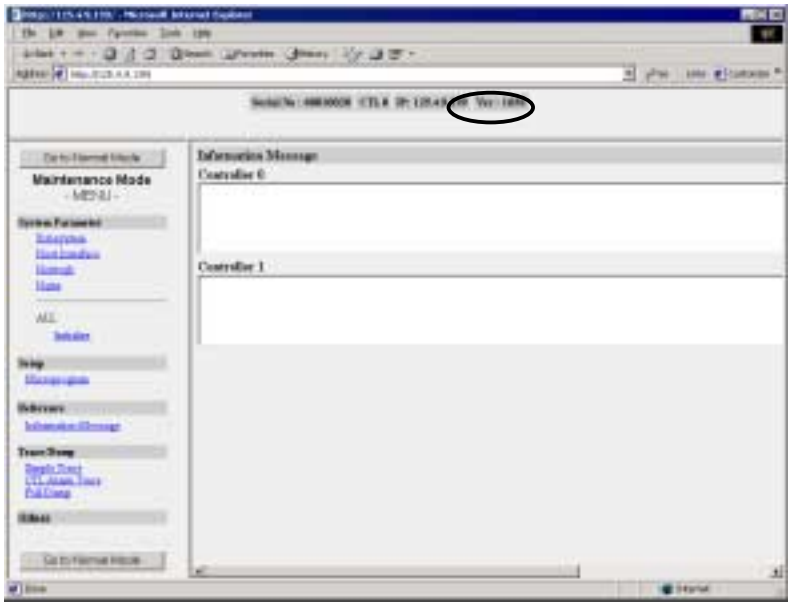
The procedure for troubleshooting and actions to be taken when the Abnormal End Empty System Retry Full Install occurs are shown below.

Make a recovery from the failure following the procedure for troubleshooting.



4.3 Procedure for making sure of flash program version

1. Set the operation mode in the Maintenance Mode.
2. Connect the Web by connecting the LAN cross cable to the LAN connector for maintenance in the disk array subsystem.
3. Make sure of the flash program version since it is displayed in the upper part of the window.



4. Quit the Web.
5. Disconnect the maintenance PC from the disk array subsystem.

4.4 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 3.4.13, “Getting serial numbers of Disk Drives”.

```
Array unit configuration information list.

DF Name : 174-175
Date : 2003/12/02 21:12:31
Micro Program Revision : 0656
Array Unit Type : DF600
Serial Number : 65010055

---- 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      DK32DJ-72FC              K0K0          72GB       Normal    305B4910
Unit0 ,HDU1     HITACHI      DK32DJ-72FC              K0K0          72GB       Normal    305B9100
Unit0 ,HDU2     HITACHI      DK32DJ-72FC              K0K0          72GB       Normal    30532706
Unit0 ,HDU3     HITACHI      DK32DJ-72FC              K0K0          72GB       Normal    305C5571
Unit0 ,HDU4     HITACHI      DK32DJ-72FC              K0K0          72GB       Normal    30542348
Unit0 ,HDU5     HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   30545271
Unit0 ,HDU6     HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305C5229
Unit0 ,HDU7     HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305B6777
Unit0 ,HDU8     HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305B3188
Unit0 ,HDU9     HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305L1373
Unit0 ,HDU10    HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   30575398
Unit0 ,HDU11    HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305N2858
Unit0 ,HDU12    HITACHI      DK32DJ-72FC              K0K0          72GB      Undefine   305K8917
Unit0 ,HDU13    HITACHI      DK32DJ-72FC              K3K3          72GB      Undefine   30575348

-- End

～～～～
(abbr.)
```

[Drive Configuration]
[Location]: Shows a location where a Disk Drive is installed.
[Unit]: Unit ID#
[HDU]: Disk drive#
[Serial Number]: Serial#

2. Remove Disk Drives from the RKA replaced and keep them in the safekeeping container.

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 4.1 Serial Number Recorded Location on the Side of the Disk Drive”.

   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.

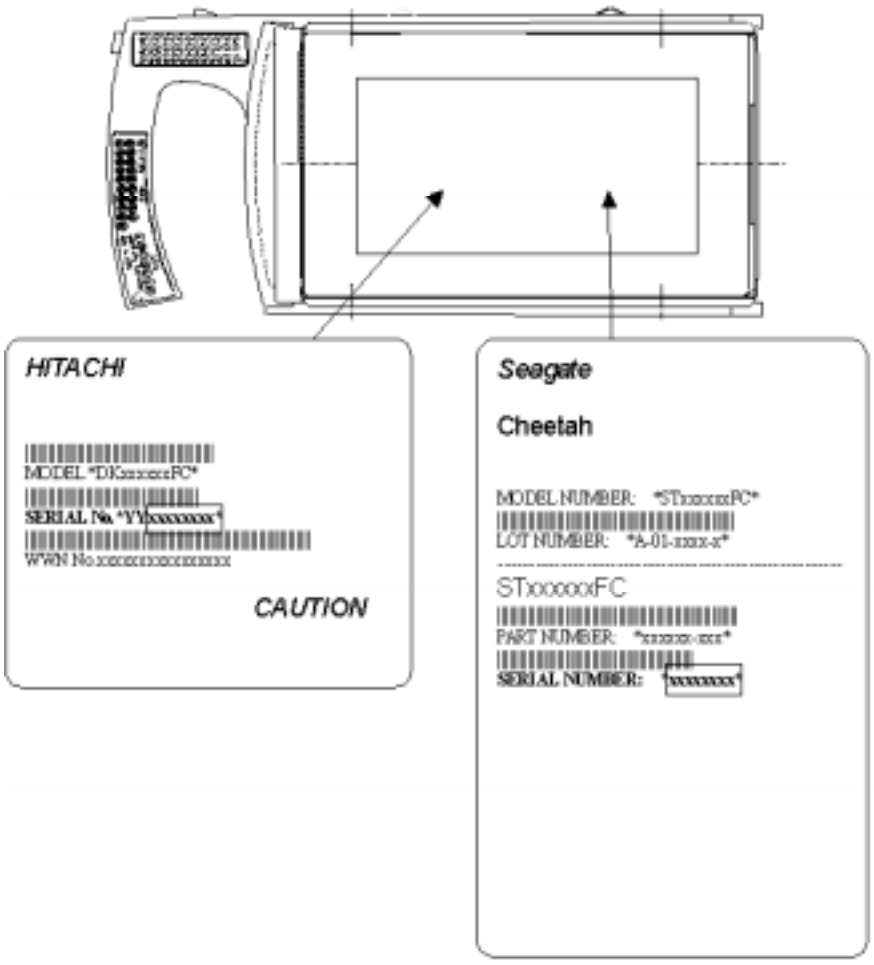


Figure 4.4.1 Examples of Input and Output Results of Pairresync Command

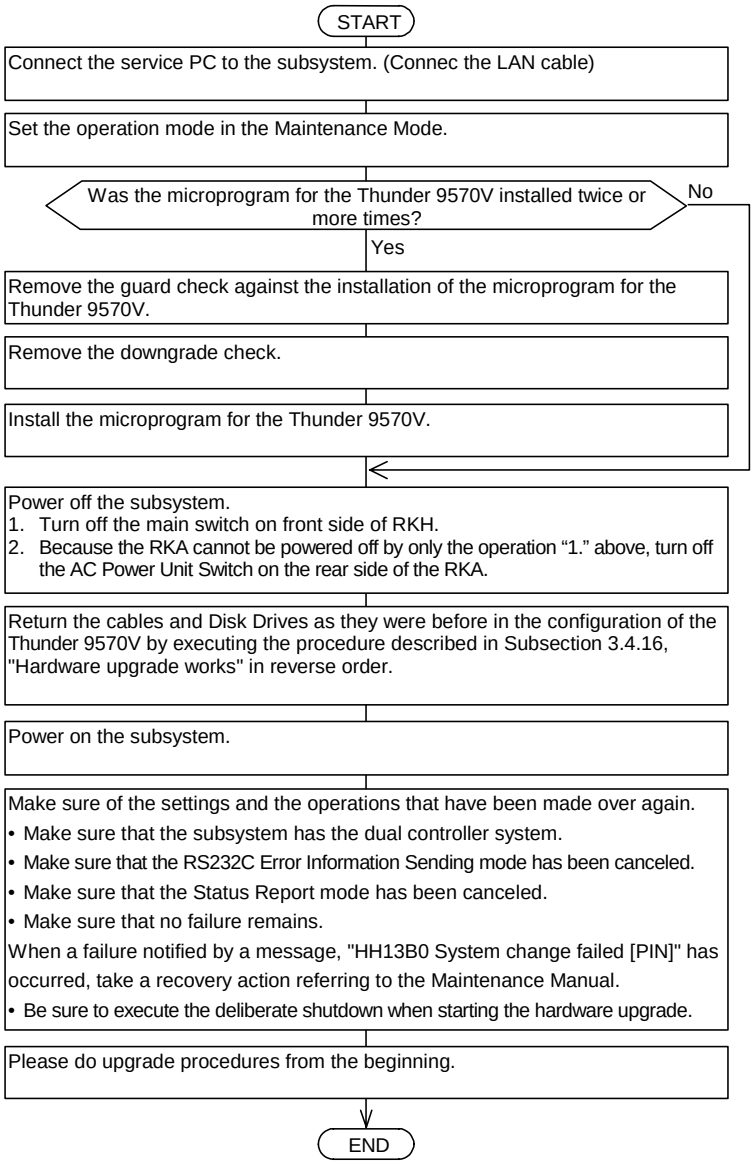
4. Refer to the configuration information file for the [Unit] and [HDU] of the Disk Drive having the same serial number and reinsert the Disk Drive in the slot having the unit ID number and Disk Drive number shown.
5. Pull the handle lightly to make sure that the Disk Drive cannot be pulled out.
6. Repeat the Steps “3.”, “4.”, and “5.” for each RKA if necessary and reinsert Disk Drive(s) in the correct slot(s).

4.5 When Returning Configuration of the Thunder 9580V/9585V to that of the Thunder 9570V

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 Thunder 9570V once.

NOTE : The configuration of the disk array subsystem cannot be returned to that of the Thunder 9570V after the updating installation of the microprogram for the Thunder 9580V/9585V is executed according to the procedure described in Subsection 3.4.9, “Updating installation of microprogram for Thunder 9580V/9585V” and the subsystem enters the Ready status.

The procedure for installing the microprogram for the Thunder 9570V to be used when the upgrade from the Thunder 9570V to the Thunder 9580V/9585V fails is shown below.



NOTE : Be sure to review all the settings and operations that have been made before making the upgrade again.

4.5.1 Procedure for removing guard check against installation of the microprogram for the Thunder 9570V

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].



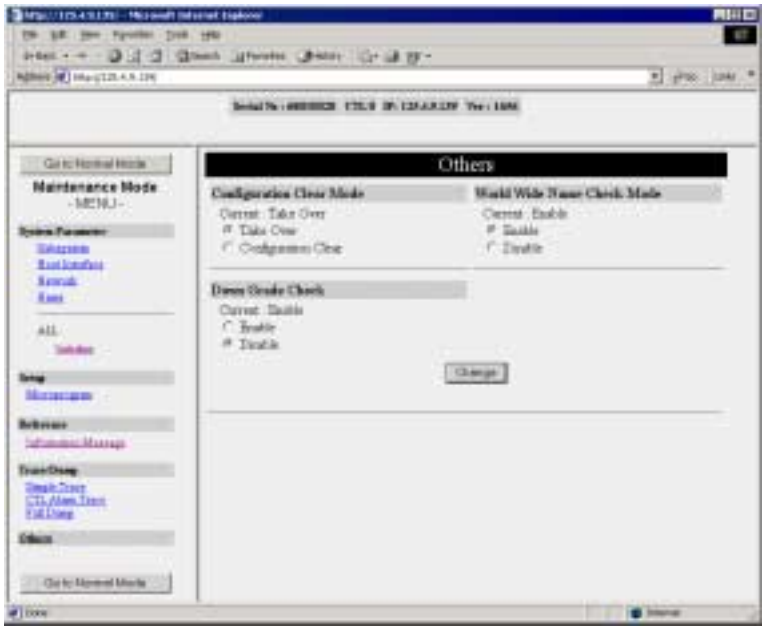
2. Select the [Disable] radio button of the [Install Guard] in the “Install Guard” window and click the [Change] button.



4.5.2 Procedure for removing downgrade check

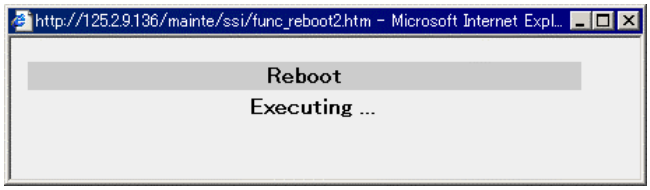
The procedure for removing the downgrade check is shown below.

1. Set the operation mode in the Maintenance Mode.
2. Connect the LAN cross cable to the subsystem LAN connector for maintenance and connect the subsystem to 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].
3. Click [Others] in the menu tree.
4. Select the [Disable] radio button of the [Down Grade Check].



5. Click the [Go to Normal Mode].

   When the [Go to Normal Mode] button is clicked, the following window is displayed.



6. Click the [OK] button.



4.5.3 System power off

Because a message, "Download Failed" is displayed and the disk array subsystem is in the Alarm status, the RKA cannot be powered off although the main switch on the front side of the RKH/RKHE is turned off. The power of the 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/RKHE and all the 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 (CB1) of the PDB.

4.6 Procedure for Recovery from Path Detachment and PSUE Status Occur during Upgrade Made when Hitachi TrueCopy Basic Is Enabled

The procedure for recovery, which is to be used when the pair status is changed to PSUE during the upgrade made when Hitachi TrueCopy Basic is enabled, is explained below. The recovery procedure varies depending on which configuration, the SANISE 9570V or the Thunder 9580V/9585V, the disk array subsystem has when the PSUE status occurs.

4.6.1 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9570V

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Thunder 9570V, make a recovery from the PSUE status first, split the pair again, and then make the ordinary upgrade.
The procedure for resynchronizing a TrueCopy 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.

4.6.2 When path detachment and PSUE status occur in the case where disk array subsystem is configured as the Thunder 9580V/9585V

When a path detachment and the PSUE status occur in the case where the disk array subsystem is configured as the Thunder 9580V/9585V, a wrong setting may have been made in the operation that has been made according to Item (3), "Changing settings of the disk array subsystem" in Subsection 3.4.23, "Setting change to be made when TrueCopy Basic is used."
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.
   1. Connect the maintenance PC to the disk array subsystem and start Disk Array Management Program 2.
   2. Set the operation mode of Disk Array Management Program 2 as Maintenance mode.
   3. Double click the icon of the disk array subsystem to be operated in the main window and display the unit window.
   4. Select [Settings] and [Maintenance] in this order in the unit window.
   5. Click the [System Upgrade] tab.
      Verification of the displayed serial number and device ID.
      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 and device ID that were noted down in Step (3), "Changing settings of the disk array subsystem" in Subsection 3.4.23, "Subsequent process to be done when TrueCopy Basic is used" 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.

5. Appendix

5.1 For Setting Changes in Host Computer and Others

When upgraded from Thunder 9530V to Thunder 9570V, the Disk Array subsystem shows the following changes.

No.	Name of Items	Thunder 9530V	Thunder 9570V	Existence of Limits
1	Subsystem Product Serial Number	620xxxxx	650xxxxx	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 ・Inquiry Product Serial Number ・Product Serial Number of Inquiry ・Subsystem ID
2	World Wide Name	-	-	By registering the subsystem product serial number to Thunder 9570V in the Subsystem Maintenance Mode and rebooting the subsystem, WWN on Front End Fibre Channel is changed to the different value from Thunder 9530V after Thunder 9530V Ready, Front End Fibre Channel can be used, and the LU recognition from the upper Host enables.
3	Inquiry	D60J	D600	Product Serial Number After upgrading from Thunder 9530V to Thunder 9570V, Thunder 9570V responds to D600.
4	Subsystem ID	Default is the last 4 digit subsystem product serial numbers.	Default is the last 4 digit subsystem product serial numbers.	After upgrading from Thunder 9530V to Thunder 9570V, Thunder 9570V succeeds the subsystem ID of Thunder 9530V. When the subsystem can be used in Thunder 9570V, you may use it without any changes. If customer use limits exist as Thunder 9530V is continuously used or, for management purposes, the subsystem ID needs to be unified to the last 4 digit subsystem product serial numbers, change the subsystem ID after upgrading Thunder 9570V. However, whether or not changing the subsystem ID, the RAID Manager should reboot once at the time of reconnecting the RAID Manager from Thunder 9530V to Thunder 9570V.
5	Mode Sense6	Support	The check condition response from the sense key/sense code 5/2400 (illegal request).	Thunder 9570V supports Mode Sense6.Page Code 30h as before, but the present Thunder 9580V/9585V is the check condition response from the Sense Key/Sense Code 5/2400 (illegal request). Therefore, the present Thunder 9580V/9585V cannot be connected to 3500 Server.

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 Thunder 9570V to Thunder 9580V/9585V 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.

  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

- 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.

  NOTE : 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.
  (1) For UFS: It is necessary to mount with the new device.
  (2) 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

  (3) For LSM, the data must be restored at the time of the LSM configuration since the disk group cannot be imported.

Revision Control

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
0	Dec.20.2002	A.Hirasawa	A.Hirasawa	Y.Takeuchi	All	Issued	-
1	Mar.18.2004	K.Onabe	N.Higaashijima	M.Kobayashi	HUP-0000	Rev.0→ Rev.1	CH
					HUP-0030	Table2.1 No.6 and No.7 were deleted	DL
					HUP-0050	3.2 (1) “Do not skip this step.” was added.	AD
					HUP-0060	“Tabele3.3.1 Maximum Flash…” text was added to “When using….”.	AD
					HUP-0070	“FlashAccess” was added to Table3.3.1.	AD
					HUP-0110	“(RKA re-cabling and ID setting)” was added.	AD
						“(Web access…/equip_set)” was added.	AD
					HUP-0460	“Check the Web…” was added to 17.	AD
						Figure 3.4.9.2 was moved to page HUP-0465.	DL
					HUP-0465	This page was newly added.	AD
						Figure 3.4.9.2 was moved from page HUP-0460.	AD
					HUP-0640	“Check cache power LED.” was added to 2.	AD
2	Mar.22.2004	K.Onabe	N.Higaashijima	M.Kobayashi	All	Header change. (Thunder 9580V→Thunder 9580V/9585V.)	AD
					HUP-0000	Rev.1→ Rev.2, Title change.(Thunder 9580V→Thunder 9580V/9585V.)	CH
					HUP-0010	3.4.18 was changed.	AD
					HUP-0020	4.5 and 4.6.2 were changed.	AD
					HUP-0030	Thunder 9580→Thunder 9580V/9585V, HT-4063-RKHE was added.	AD
					HUP-0050, HUP-0100, HUP-0250, HUP-0270, HUP-0290, HUP-0470, HUP-0510, HUP-0540, HUP-0570, HUP-0650, HUP-0900, HUP-1030, HUP-1240, HUP-1300, HUP-1340, HUP-1350, HUP-1360, HUP-1370	Thunder 9580→Thunder 9580V/9585V	AD
					HUP-0060, HUP-0150, HUP-0200, HUP-0820, HUP-0890	Thunder 9580→Thunder 9580V/9585V, RKH→RKH/RKHE	AD
					HUP-0610. HUP-0780. HUP-0910, HUP-0930, HUP-0940, HUP-0960, HUP-0990, HUP-1000, HUP-1070, HUP-1090, HUP-1210, HUP-1220, HUP-1230, HUP-1330	RKH→RKH/RKHE	AD
3	May.25.2004	K.Matsui	N.Higaashijima	M.Kobayashi	HUP-0000	Rev.2→ Rev.3	CH
					HUP-0030	“HT-4063-xx”→“DF-600-xx”	CR
						Added NOTE.	AD
					HUP-0050	“WARNING”→“CAUTION”	CH
					HUP-0060	Added “In the configuration …”	AD
						“Cache Management”→ “FlashAccess”	CH
						Added “And, when concurrent use of QuickShadow…”	AD
					HUP-0070	Table 3.3.1 was changed the position.	CH
						Added Table3.3.2.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW	CHKD	APPD	Sheet No.	Description	Code
						"When making the upgrade leaving the Hitachi QuickShadow Function …"was changed the position.	CH
						"Hitachi TrueCopy Basic manages information…" was moved to HUP-0080.	DL
					HUP-0080	"Hitachi TrueCopy Basic manages information…" was moved from HUP-0070.	AD
					HUP-0470	"Detailled"→"Detailed"	CR
					HUP-0780	"mass of the single"→"weight of the single"	CH
					HUP-0890	"nuber"→"number"	CR
					HUP-1230	Added "HH2G00" in Failure message	AD
					HUP-1290	"manufacturered"→"manufactured"	CR
					HUP-1360	"suppots"→"supports"	CR
					HUP-1370	"que"→"queue"	CR