

# NovaScale T860 E1

## User's Guide

NOVASCALÉ



REFERENCE  
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# NOVASCALE

## NovaScale T860 E1 User's Guide

### Hardware

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Keep this User's Guide at hand for quick reference at anytime necessary.



### SAFETY INDICATIONS

Follow the instructions in this User's Guide for your safety to use the server.




The server contains components with possible danger and hazards that may caused by ignoring warnings. Preventive actions can be taken against such hazards.

Server components potentially dangerous are indicated with a warning label placed on or around them, and described in this User's Guide.


In the User's Guide or warning labels, "WARNING" or "CAUTION" is used to indicate a degree of danger. These terms are defined as follows:


 <b>WARNING</b>	Indicates the presence of a hazard that may result in death or serious personal injury.
 <b>CAUTION</b>	Indicates the presence of a hazard that may cause minor personal injury, including burns, or property damage.

Precautions and notices against hazards are presented with one of the following three symbols. The individual symbols are defined as follows:

	This symbol indicates the presence of a hazard. An image in the symbol illustrates the hazard type. (Attention)
	This symbol indicates prohibited actions. An image in the symbol illustrates a particular prohibited action. (Prohibited Action)
	This symbol indicates mandatory actions. An image in the symbol illustrates a mandatory action to avoid a particular hazard. (Mandatory Action)

(Example)

 **CAUTION**



High temperature.  
Immediately after the server is powered off, its internal components such as hard disk drives are very hot. Leave the server until its internal components fully cool down before installing/removing any component.

Symbol to draw attention







Term indicating a degree of danger

Description of a danger



Symbol indicating a prohibited action (may not always be indicated)

## SYMBOLS USED IN THIS USER'S GUIDE AND WARNING LABELS



### Attentions

	Indicates that improper use may cause an electric shock.
	Indicates that improper use may cause personal injury.
	Indicates that improper use may cause fingers to be caught.
	Indicates that improper use may cause fumes or fire.
	Indicates a general notice or warning that cannot be specifically identified.
	Indicates that improper use may cause loss of eyesight due to laser beam.

### Prohibited Actions

	Indicates a general prohibited action that cannot be specifically identified.
	Do not disassemble, repair, or modify the server. Otherwise, an electric shock or fire may be caused.

### Mandatory Action

	Unplug the power cord of the server. Otherwise, an electric shock or fire may be caused.
	Indicates a mandatory action that cannot be specifically identified. Make sure to follow the instruction.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

### **Momentary voltage drop prevention:**

This product may be affected by a momentary voltage drop caused by lightning. To prevent a momentary voltage drop, an AC uninterruptible power supply (UPS) unit should be used.

### **Notes:**

- (1) No part of this manual may be reproduced in any form without the prior written permission of the manufacturer.
- (2) The contents of this manual may be revised without prior notice.
- (3) The contents of this manual shall not be copied or altered without the prior written permission of the manufacturer.
- (4) All efforts have been made to ensure the accuracy of all information in this manual. If you notice any part unclear, incorrect, or omitted in this manual, contact the service representative where you purchased this product.
- (5) The manufacturer assumes no liability arising from the use of this product, nor any liability for incidental or consequential damages arising from the use of this manual regardless of Item (4).

## **PREFACE**

Congratulations on your purchase of this server.

This is your assurance to receive state-of-the-art, high quality hardware to meet your needs, both now and in the future.

Read this User's Guide thoroughly to fully understand how to handle this server and appreciate its functions to the maximum extent.

---

## ABOUT THIS USER'S GUIDE

This User's Guide is a guide for proper setup and use of the server.

This User's Guide also covers useful procedures for dealing with difficulties and problems that may arise during setup or operation of the server. Keep this manual for future use.

The following describes how to proceed with this User's Guide.

### How to Use This User's Guide

To help you find the information quickly, this User's Guide contains the following information:

#### **Chapter 1 Notes on Using Your Server**

includes information that requires attention when using the server. Make sure to read this chapter before setting up and using the server. It also includes requirements and advisory information for the transfer and disposal of the server.

#### **Chapter 2 General Description**

includes information necessary to use the server, such as names and functions of its components, and the best way to handle the optical disk drive.

#### **Chapter 3 Setting Up Your Server**

describes you how to select a site, unpack the system, make the cable connections, and power on your system.

#### **Chapter 4 Configuring Your Server**

tells you how to configure the system and provides instructions for running the BIOS SETUP Utility and the RAID configuration utility, which is used to configure the RAID drives in your system.

This chapter also provides information on the motherboard jumper settings.

#### **Chapter 5 Installing the Operating System with Express Setup**

describes how to install the operating system.

#### **Chapter 6 Installing and Using Utilities**

describes how to install the utilities for the server. It also includes information on using the attached "EXPRESSBUILDER" DVD.

#### **Chapter 7 Maintenance**

provides you with all the information necessary to maintain successful operation of the server. This chapter also includes a description on relocating and storing the server.

#### **Chapter 8 Troubleshooting**

contains helpful information for solving problems that might occur with your system.

#### **Chapter 9 Upgrading Your Server**

provides you with instructions for upgrading your system with an additional processor, optional memory, optional add-in cards, hard disk drives, peripheral devices, and power supply.

#### **Chapter 10 Internal Cabling Diagram**

includes cabling information for the SAS/SATA2 controller, 5.25-inch device, and the power supply.

#### **Appendix A Specification**

provides your server's specifications.

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**Appendix B Other Precautions**

provides additional notes on using the server.

**Appendix C IRQ and I/O Port Address**

provides a list of the factory-set IRQs and of the I/O port addresses assigned.

**Appendix D Installing Windows Server 2003 x64 Editions**

describes how to install Microsoft Windows Server 2003 x64 Editions without using Express Setup. We recommend using the Express Setup tool to install Windows Server 2003 x64 Editions. See Chapter 5 for details.

**Appendix E Installing Windows Server 2003**

describes how to install Microsoft Windows Server 2003 without using Express Setup. We recommend using the Express Setup tool to install Windows Server 2003. See Chapter 5 for details.

**Appendix F Using a Client Computer Which Has a CD Drive**

describes how to install the EXPRESSBUILDER management software to the client computer without the DVD drive.

**Appendix G Product Configuration Record Table**

provides a table to be filled with your server configuration.

## Text Conventions

The following conventions are used throughout this User's Guide. For safety symbols, see "SAFETY INDICATIONS" provided earlier.

- IMPORTANT:** Items that are mandatory or require attention when using the server.
- NOTE:** Notes give important information about the material being described.

## IN THE PACKAGE

The carton contains various accessories, as well as the server itself. See the packing list to make sure that you have everything and that individual components are not damaged. If you find that any component is missing or damaged, contact your service representative.

- Store the provided accessories in a designated place for your convenience. You will need them to install an optional device or troubleshoot the server, as well as to set it up.
- Make a backup copy of each provided floppy disk, if any. Store the original disk as the master disk in a designated place, and use its copy.
- Improper use of any provided CD/DVD-ROM may alter your system environment. If you find anything unclear, immediately ask your service representative for help.

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# Chapter 1

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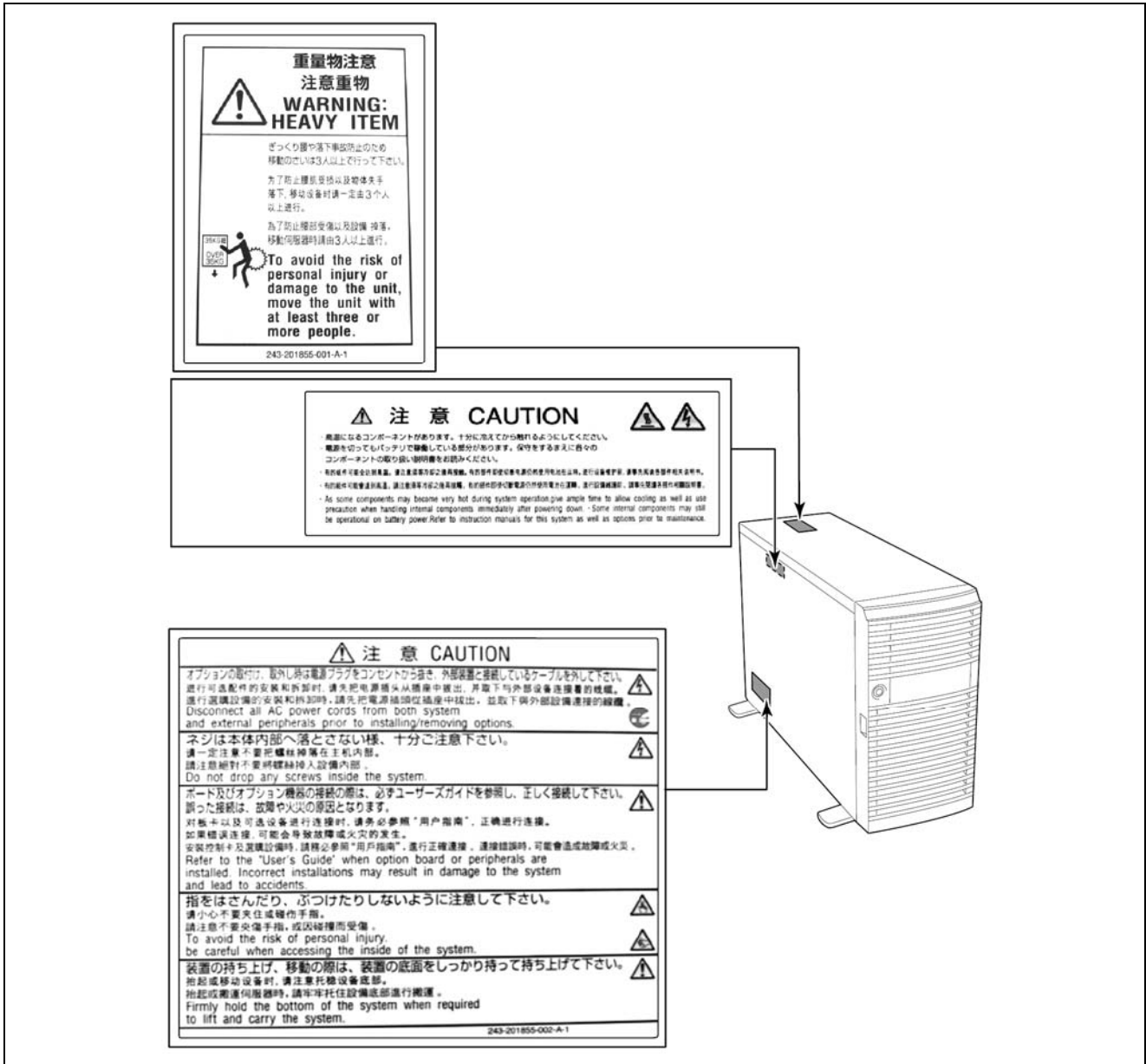
## Notes on Using Your Server

This chapter includes information necessary for the proper and safe operation of your server.

# WARNING LABELS

A warning label is attached to the potentially dangerous components or their vicinity in your server to inform the user that a hazardous situation may arise when operating the server. (Do not intentionally remove or damage any of the labels.)





If you find any labels totally/partially removed or illegible due to damage, contact your sales representative.






## SAFETY NOTES

This section provides notes on using your server safely. Read this section carefully to ensure proper and safe use of the server. For symbols, see "SAFETY INDICATIONS" provided earlier.

### General

 <b>WARNING</b>	
	<p>Do not use the server for services where critical high availability may directly affect human lives.</p> <p>Your server is not intended to be used with or control facilities or devices concerning human lives, including medical devices, nuclear facilities and devices, aeronautics and space devices, transportation facilities and devices; and facilities and devices requiring high reliability. The manufacturer assumes no liability for any accident resulting in personal injury, death, or property damage if the server has been used in the above conditions.</p>
	<p>Do not use the server if any smoke, odor, or noise is present.</p> <p>If smoke, odor, or noise is present, immediately power off the POWER/SLEEP switch, disconnect the power plug from the outlet, then contact your service representative. Using the server in such conditions may cause a fire.</p>
	<p>Keep needles or metal objects away from the server.</p> <p>Do not insert needles or metal objects into the ventilation holes in the server or the openings in the floppy disk or CD-RW/DVD-ROM drive. Doing so may cause an electric shock.</p>

 <b>CAUTION</b>	
	<p>Do not access the inside your server to service or replace an internal components.</p> <p>Only a service representative can install or remove internal components and optional devices. To avoid personal injury and/or electrical shock, contact your service representative when you need to install/remove internal components.</p>
	<p>Keep water or foreign matter away from the server.</p> <p>Do not let any form of liquid (water etc.) or foreign matter (e.g., pins or paper clips) enter the server. Failure to follow this warning may cause an electric shock, a fire, or a failure of the server. When such things accidentally enter the server, immediately power off the power and disconnect the power plug from the outlet. Do not disassemble the server. Contact your service representative.</p>

## Power Supply and Power Cord Use

### ⚠ WARNING



Do not hold the power plug with a wet hand.

Do not disconnect/connect the plug while your hands are wet. Failure to follow this warning may cause an electric shock.

### ⚠ CAUTION



Plug in to a proper power source.

Use a grounded wall outlet of the specified voltage. Using an improper power source may cause a fire or a power leak.

Do not install the server in a place where you need an extension cord. Using a cord that does not meet the power specifications of your server may heat up the cord and cause a fire.



Do not connect the power cord to an outlet that has an illegal number of connections.

The electric current exceeding the rated flow overheats the outlet, and may cause a fire.



Do not pull on the cable when disconnecting it.

When disconnecting the cable from the device, hold the cable connector and pull it straight out. Pulling the cable out by the cable portion or giving mechanical stress to the connector could damage the cables and connectors and result in an electrical shock hazard or a fire.



Insert the power plug into the outlet as far as it goes.

Heat generation resulting from a halfway inserted power plug (imperfect contact) may cause a fire. Heat will also be generated if condensation forms on the dusty blades of the halfway inserted plug, increasing the possibility of fire.



Use only the authorized power cord.

Use only the power cord that comes with your server. Using an unauthorized power cord may cause a fire if the electric current exceeds the rated flow. Also observe the following to prevent an electric shock or fire caused by a damaged cord.

Do not stretch the cord harness.

Do not pinch the power cord.

Do not bend the power cord.

Keep chemicals away from the power cord.

Do not twist the power cord.

Do not place any object on the power cord.

Do not bundle power cords.

Do not alter, modify, or repair the power cord.

Do not secure the power cord with staples or equivalents.

Do not use a damaged power cord. (Replace a damaged power cord with a new one of the same specifications. Ask your service representative for replacement.)

## Installation, Relocation, Storage, and Connection

### WARNING



Disconnect the power cord(s) before installing or removing the server.

Make sure to power off the server and disconnect the power cord(s) from a power outlet before installing/removing the server. All voltage is removed only when the power cords are unplugged.

### CAUTION



Never attempt to lift the server with two or less persons.

Your server weighs max 36 kg (depending on its hardware configuration). Carrying the server with two or less persons may strain their back. Hold the server firmly by its bottom with at least three persons. Do not hold the front mask to lift the server. The front mask may disengage from the server, causing personal injury.



Do not install the server in any place other than the ones specified.

Do not install the server in the following places or any places other than the ones specified in this manual. Failure to follow this instruction may cause a fire.

- a dusty place
- a humid place such as near a boiler
- a place exposed to direct sunlight
- an unstable place



Do not connect any interface cable with the power cord of the server plugged to a power source.

Make sure to power off the server and unplug the power cord from the power outlet before installing/removing any optional internal device or connecting/disconnecting any interface cable to/from the server. If you do not do so, touching an internal device, cable, or connector may cause an electric shock or a fire resulted from a short circuit.



Do not use any unauthorized interface cable.

Use only the interface cables provided by the manufacturer and locate a proper device and connector before connecting a cable. Using an authorized cable, or connecting a cable to an improper destination may cause a short circuit, resulting in a fire.

Also observe the following notes when using and connecting an interface cable.

- Do not use any damaged cable connector.
- Do not step on the cable.
- Do not place any object on the cable.
- Do not use the server with loose cable connections.

## Cleaning and Working with Internal Devices

### ⚠ WARNING



Do not disassemble, repair, or alter the server.

Never attempt to disassemble, repair, or alter the server on any occasion other than the ones described in this manual. Failure to follow this instruction may cause an electric shock or fire, as well as malfunctions of the server.



Do not look into the optical disc drive.

A laser beam used in the optical disc drive is harmful to the eyes. Do not look into or insert a mirror into the drive while the drive is powered. The laser beam is invisible, but you may lose your eyesight.



Do not remove the lithium battery.

Your server contains a lithium battery. Do not remove the battery. Placing the lithium battery close to a fire or in the water may cause an explosion.

If the server does not operate appropriately because the battery is dead, contact your service representative. Do not disassemble the server in order to replace or recharge the battery yourself.



Disconnect the power plug before accessing the inside of the server, or connecting the peripherals.

Make sure to power off the server and disconnect the power plug from the power outlet before cleaning or installing/removing internal optional devices. Touching any internal device of the server with its power cord connected to a power source may cause an electric shock even if the server is powered off.

Disconnect the power plug regularly from the outlet and clean it with a dry cloth. Heat will be generated if condensation forms on a dusty plug, and may cause a fire.

### ⚠ CAUTION



Avoid installation in extreme temperature conditions.

Immediately after the server is powered off, some of its internal components, such as the hard disk drives are very hot. Let the internal components fully cool down before installing/removing any components.



Make sure to complete board installation.

Always install a board firmly. An incompletely installed board may cause a contact failure, resulting in smoke or fire.



Protect the unused connectors with the protective cap.

The unused power supply cable connectors are covered with a protective cap to prevent short circuits and electrical hazards. When removing the power supply cable connector from the internal devices, attach the protective cap to the connector. Failure to follow this warning may cause a fire or an electric shock.

## During Operation

### CAUTION



Stay away from the fan.

Keep hands or hair away from the cooling fan at the rear of the server. Failure to follow this warning may get your hand or hair caught in the fan, resulting in personal injury.



Avoid contact with the server during thunderstorms.

Disconnect the power plug from the outlet when a thunderstorm is approaching. If it starts thundering before you disconnect the power plug, do not touch any part of the server, including the cables. Failure to follow this warning may cause a fire or an electric shock.



Keep animals away from the server.

Failure to follow this warning may cause a fire or an electric shock.



Do not leave the CD tray open.

If dust gets on the lens of an optical disc drive, the drive may have problems reading your disks. In addition, the tray may break if it is knocked.



Take off the headset before connecting it to the server.

To protect your ears, turn down the volume and take off the headset before connecting it to the headset jack.



Do not place any object on top of the server.

The server may fall and cause property damage to the surroundings.

---

## FOR PROPER OPERATION

Observe the following notes for successful operation of the server. Using the server while ignoring the notes will cause malfunctions or failures of the server.

- Install the server in a place that meets the requirements for successful operation. For more information, see Chapter 3, "Setting Up Your Server."
- Make sure to power off the server before connecting or disconnecting cables between the server and peripheral devices.
- When you have just turned off the server, wait at least 10 seconds before turning it on again. If the server is connected to the UPS, set at least 10 seconds delay in the power-on schedule.
- Playback of disks which do not conform to the CD or DVD standard is not guaranteed.
- Power off the power and unplug the power cord from the outlet before relocating the server.
- Clean the server on a regular basis. (See Chapter 7 for cleaning.) Regular cleaning proactively can prevent various failures of the server.
- Lightning may cause a momentary voltage drop. To prevent this problem, we recommend you use an uninterruptible power supply unit.
- Make sure to use the optional devices supported by the server. Some non-supported devices may be physically installed/connected but cause failures of the server as well as malfunctions of the server.
- Check and adjust the system clock before the operation if any of the following conditions is applicable.
  - After carrying of the server
  - After storage of the server
  - After the server entered into the pause state under the following environmental conditions (temperature: 10°C - 35°C, humidity: 20% - 80%)
- Check the system clock roughly once per month. If the system clock is installed in a system requiring high time precision, we recommended you use a time server (NTP server).  
If the system clock is delayed or advanced as time goes by in spite of adjustment, contact your sales agent and request a maintenance operation.
- Store the unit under the approved storage conditions (temperature: -10°C - 55°C, humidity: 20% - 80%, without condensation) to allow the built-in devices and the unit to operate correctly in the next operation.
- We recommend you use our genuine products. Some third-party products claim that they support our server. However, repairing the server due to a failure or damage resulting from the use of such third-party products will be charged.
- Power off any cellular phone or pager. Radio interferences may cause malfunctions of the server.



---

## TRANSFER TO THIRD PARTY

The following must be observed when you transfer (or sell) the server or software provided with the server to a third party:

### Server

Make sure to provide this manual along with the server to a third party.

---

**IMPORTANT:** About data on the hard disk drive

Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk drive to any third parties.

Data seems to be erased when you empty the Windows "Recycle Bin" or execute a "format" command of the operating system. However, the actual data remains written on the hard disk drive, and may be restored by special software and used for unexpected purposes.

We strongly recommend that a software or service (both available at stores) for data erasure is used in order to avoid the troubles explained above. For more information on data erasure, ask your sales representative.

---

### Provided software

To transfer or sell any software application that comes with the server to a third party, the following requirements must be satisfied:

- All the provided software applications must be transferred and no backup copies must be retained.
- The transfer requirements listed in the "Software License Agreement" that comes with each software application must be satisfied.
- The software applications that are not approved for transfer must be uninstalled before transferring the server.

## DISPOSAL AND CONSUMABLES



- Dispose of the server, internal devices, or DVD/CD-ROMs according to laws and regulations of the central and/or local government.

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### IMPORTANT:

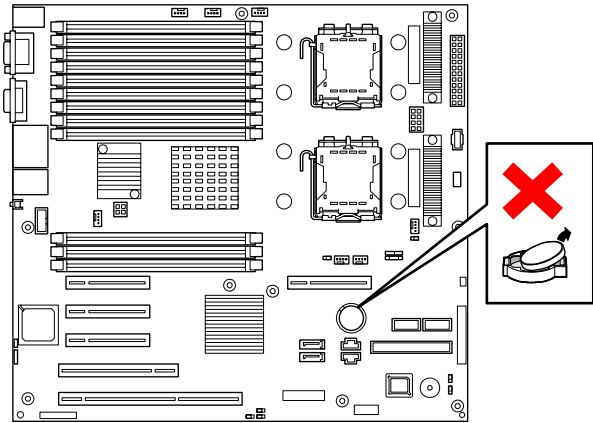
- For disposal (or replacement) of the battery on the motherboard of the server, consult with your service representative.
  - It is user's responsibility to completely erase or modify all the data stored in storage devices such as hard disk drives so that the data cannot be restored.
- 
- Your server contains some components that are only good for a limited period of time and require replacement, such as batteries, fans, the internal CD-RW/DVD-ROM drive, the floppy disk drive, and the mouse. For stable operation of the server, we recommend you replace these components on a regular basis. Ask your service representative for replacement or more information on the product lifespan.

**⚠ WARNING**

  Do not remove the lithium battery.

Your server contains a lithium battery. Do not remove the battery. Placing lithium battery close to a fire or in the water may cause an explosion.

When the server does not operate appropriately due to the exhausted lithium battery, contact your service representative. Do not disassemble the server to replace or recharge the battery by yourself.



**Motherboard**

## USER SUPPORT

Before Asking for Repair, do the following when the server appears to fail:

1. Check if the power cord and the cables to other devices are properly connected.
2. See Chapter 8 to find if your problem fits one of the descriptions. If it does, take the recommended measure to try and correct the issue.
3. Check if the software required for the operation of the server is properly installed.

If the server still appears to fail after you have checked the above points, consult with your service representative. Take notes on LED indications of the server and alarm indications on the display unit before calling, these may provide a significant help to your service representative.

## Advice for Health

The longer you keep using the computer equipment, the more you become tired, which may cause disorders of your body. When you use a computer, observe the following to keep yourself from getting tired:

### Good Working Posture

Your working posture is good if the following are satisfied when you use a computer:

- You sit on a chair with your back straight.
- Your hands are parallel with the floor when you put them on the keyboard.
- You look at the screen slightly lower than your eye height.

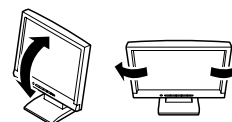
No part of your body must be under excessive strain, your muscles must be relaxed.

Your posture is bad when you sit with your back hunched up or you operate a display unit with your face close to the screen. A bad working posture may cause eye strain or poor eyesight.



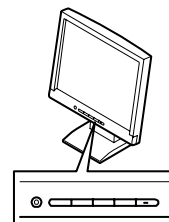
### Adjustment of the Display Unit Angles

Most display units are designed for adjustment of the horizontal and vertical angles. This adjustment is important to prevent the screen from reflecting bright lights and to make the display contents easy to see. You will not be able to keep a "good working posture" and you will feel more tired than you should if you operate a display unit without adjusting horizontal and vertical angles.



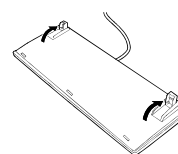
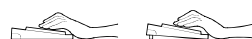
### Adjustment of Screen Brightness and Contrast

The display unit has brightness and contrast adjustment functions. The most suitable brightness and contrast adjustment depends on the individual and on the working environment (well-lighted room or insufficient light). Adjust brightness and contrast so that the screen is easy to see. An extremely bright or dark screen will have cause eye troubles.



### Adjustment of the Keyboard Angle

The keyboard provided with the server is designed for adjustment to a certain angle. Adjust the keyboard at an angle at which the keyboard is easy to operate. The adjustment assists in reducing strain on your shoulders, arms, and fingers.



### Cleaning the Equipment

Clean the equipment regularly. It is difficult to see the display contents on a dusty screen. Keeping your equipment clean is also important for your sight.

### Fatigue and Rest

If you feel tired, you should stop working and do light exercises.



## Chapter 2

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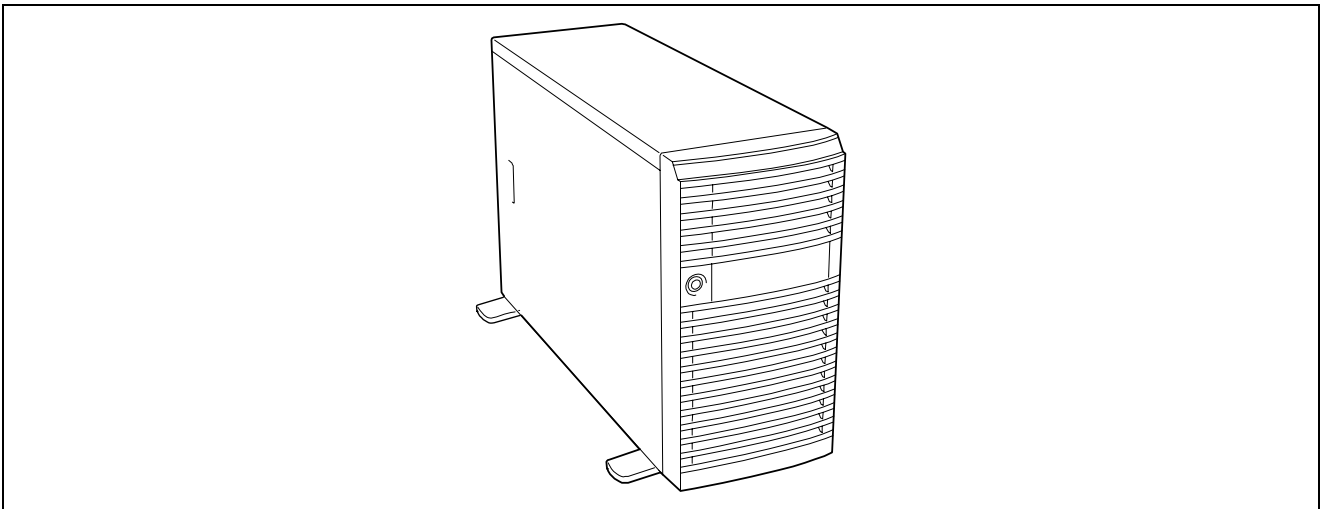
### General Description

This chapter provides information that you should be familiar with before using the server. It includes names and functions of the components and features of the server.

## OVERVIEW

Your server is a modular, multiprocessing server based on the Quad-Core/Dual-Core Intel® Xeon® processor family. It is a solid performer and offers the latest technology. The combination of computing performance, memory capacity, and integrated I/O provides a high performance environment for many server market applications. These range from large corporations supporting remote offices to small companies looking to obtain basic connectivity capability such as file and print services, e-mail, web access, web site server, etc.

Your server is housed and available as a tower-based system.



**Front View**

As application requirements increase, you can expand your server with additional memory, add-in boards and peripheral devices; tape devices, and hard disk drives. The server features the following major components.

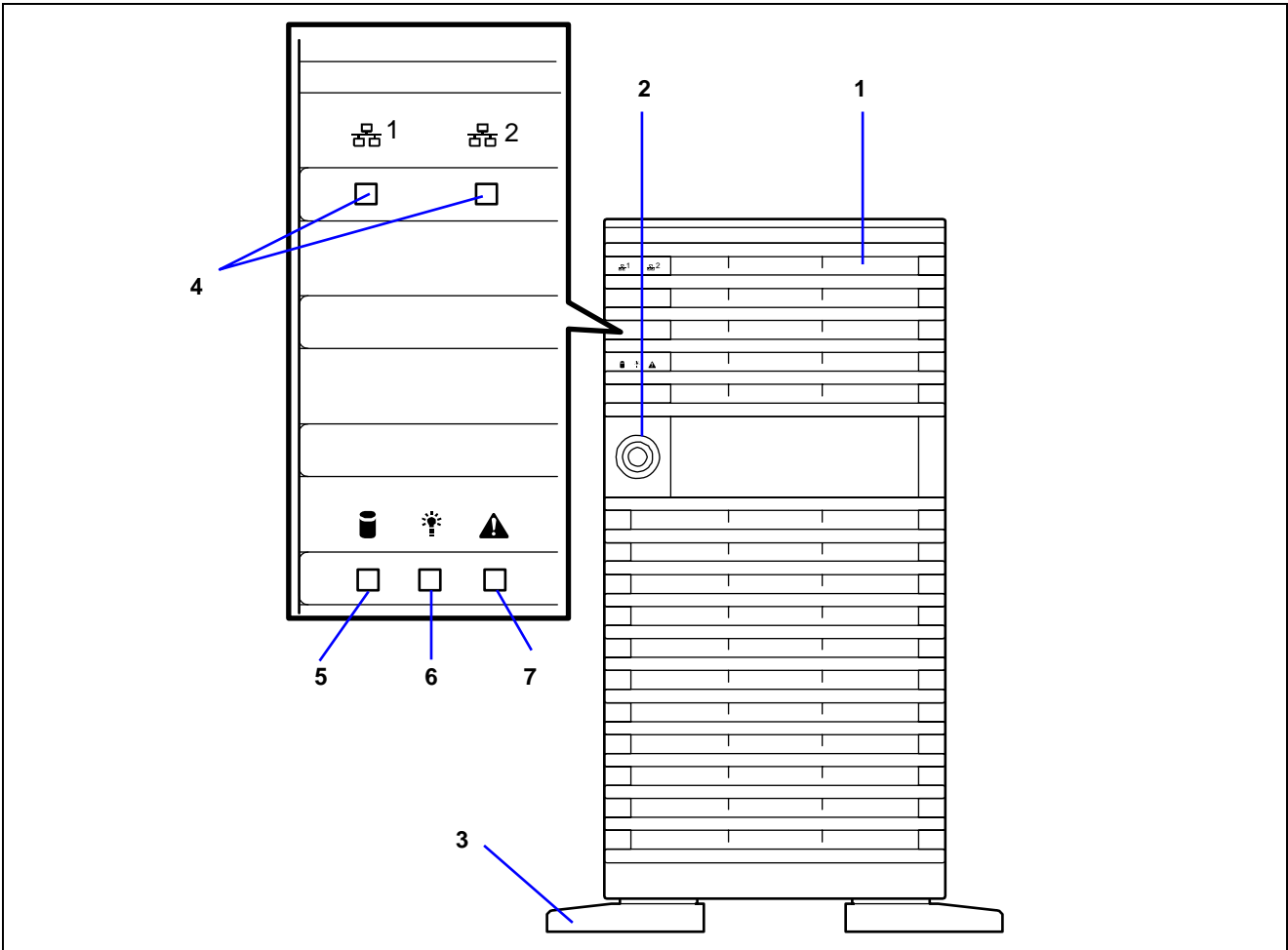
- Quad-Core/Dual-Core Intel® Xeon® processor
- Up to 48GB of memory (using 4GB DIMMs)  
Minimum configuration is 2GB of memory
- Dual channel memory configuration
- Five integrated I/O expansion PCI slots for add-in boards (three PCI Express slots, one 64-bit/133 MHz slot and one 32-bit/33 MHz slot)
- Onboard enhanced IDE interface controller
- Internal RAID Controller
- Onboard 1000/100/10 network controller
- Four hard disk drive bays (for 3.5-inch disk) or eight bays (for 2.5-inch disk)
- Embedded PC-compatible support (serial, parallel, mouse, keyboard, USB, LAN, and video)

# SYSTEM CHASSIS

Names and functions of the components are shown below.

## Front View

With Front Door Closed



**1 Front door**

Open this door to access the POWER switch, 5.25-inch devices, or the optical disk drive, to install/remove hard disk drives to the 3.5-inch (or 2.5-inch) device bays, or to connect the USB device. You can lock the front door using the provided security key.

**2 Key lock**

When locked, secures the front door, preventing access to the front system controls.

**3 Stabilizers (4)**

Use the stabilizers to prevent the server from falling down.

**4 LAN ACCESS lamp (green)**

Lights green when the server is connected to the network.

The blinking pattern indicates the network activity.

Numbers printed near the lamps indicate the LAN port numbers.

**5 DISK ACCESS lamp (green/amber)**

Lights green while accessing the internal hard disk drive.

When one of the internal hard disk drives fails, this lamp lights in amber.

**6 POWER/SLEEP lamp (green)**

Lights green when the server is powered on.

Goes off when the server is powered off.

Blinks when the system is in sleep mode.

**7 STATUS lamp (green/amber)**

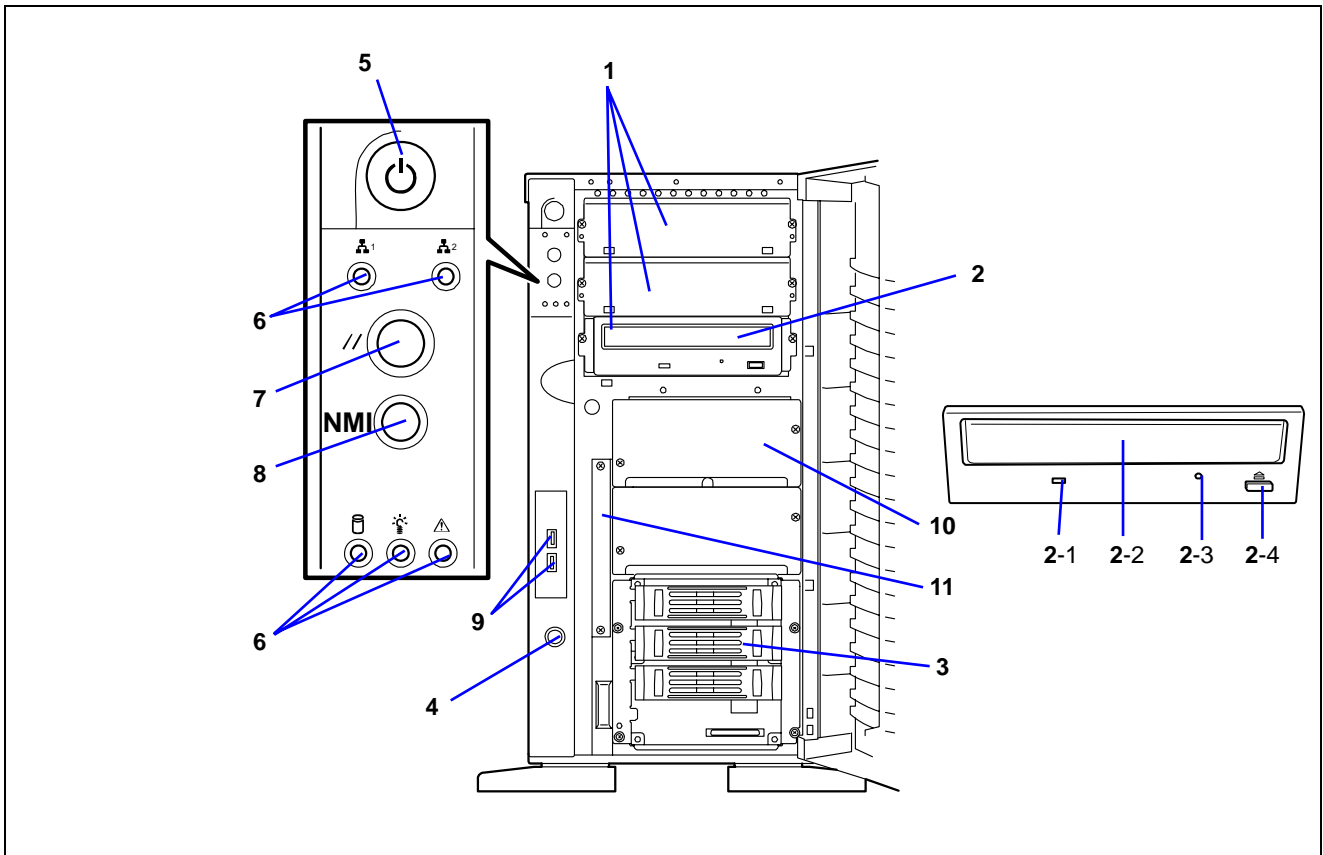
Lights green while the server is operating successfully.

If an error is detected, this lamp lights or blinks in amber.

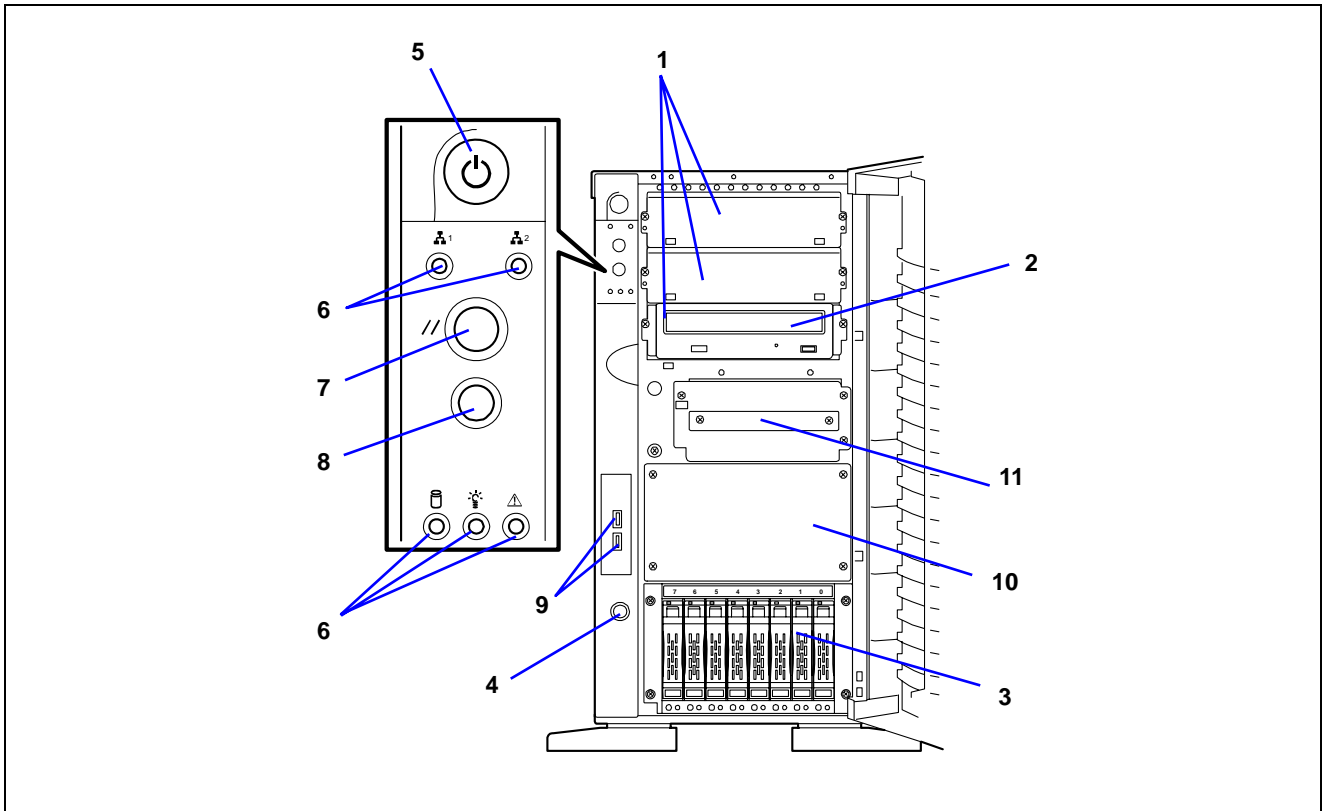


## With the Front Door Opened

Your server contains a factory-installed hot-swap 3.5-inch HDD cage. When the optional 3.5-inch HDD cage is additionally installed in the server, up to eight hard disk drives can be installed (either SAS or SATA drives).



An optional hot-swap 2.5-inch HDD cage can contain up to eight 2.5-inch hard disk drives. With two of these cages, up to 16 hard disk drives can be installed (SAS drives only).



- 
- 1 5.25-inch device bay**

Backup tape drives may be installed in the 5.25-inch device bays.
  - 2 Optical disk drive**

The optical disk drive reads data from the inserted CD/DVD-ROM.  
The optical disk drive is factory-installed.

    - 2-1 Access lamp**
    - 2-2 Tray**
    - 2-3 Emergency hole**
    - 2-4 Open/Close button**
  - 3 Hard disk drive bay**

The hard disk drive bay contains slots for hard disk drives.  
With the 3.5-inch HDD cage:
    - Can contain hard disk drives having thickness of about 1 inch (25.4 mm).
    - Port numbers are assigned to PORT0 to PORT3 from bottom to top.With the 2.5-inch HDD cage:
    - Can contain hard disk drives having thickness of about 0.6-inch (15 mm).
    - Port numbers are assigned to PORT0 to PORT7 from right to left.Hard disk drives are sold separately. Dummy trays are inserted into the empty slots except for port 0.
  - 4 Cover open sensor**

The cover open sensor detects the opening of the front door.
  - 5 Power switch**

The power switch is used to turn on/off the power.  
If you press the switch once, the POWER/SLEEP lamp goes on and the power is turned on.  
If you press the switch again, the power is turned off. The system is forcibly shut down when the power switch is pressed continuously for four seconds or longer.
  - 6 Lamps** (see the figure on the previous page)
  - 7 Reset switch**

The reset switch is used to reset the server.
  - 8 Dump switch (NMI switch)**

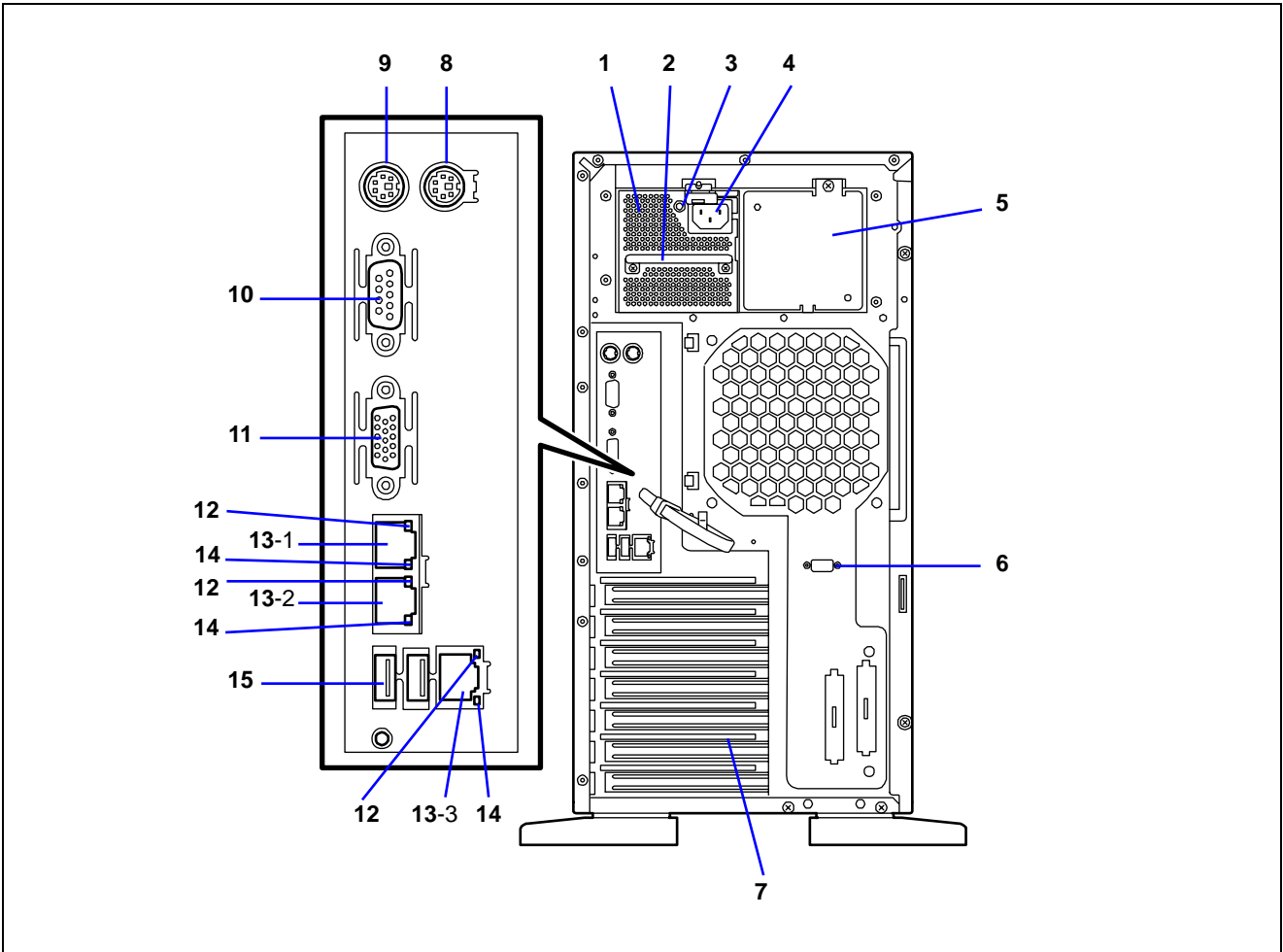
The dump switch is used to collect the event logs that occurred in the server.
  - 9 USB connectors**

The USB connectors allow the server to connect with USB devices.
  - 10 Additional HDD cage bay**

Installing an optional HDD cage allows the server to be equipped with up to eight hard disk drives (with a 3.5-inch HDD cage) or up to 16 hard disk drives (with a 2.5-inch HDD cage).
  - 11 Floppy disk drive bay**

The floppy disk drive bay contains an optional floppy disk drive.

### Rear View

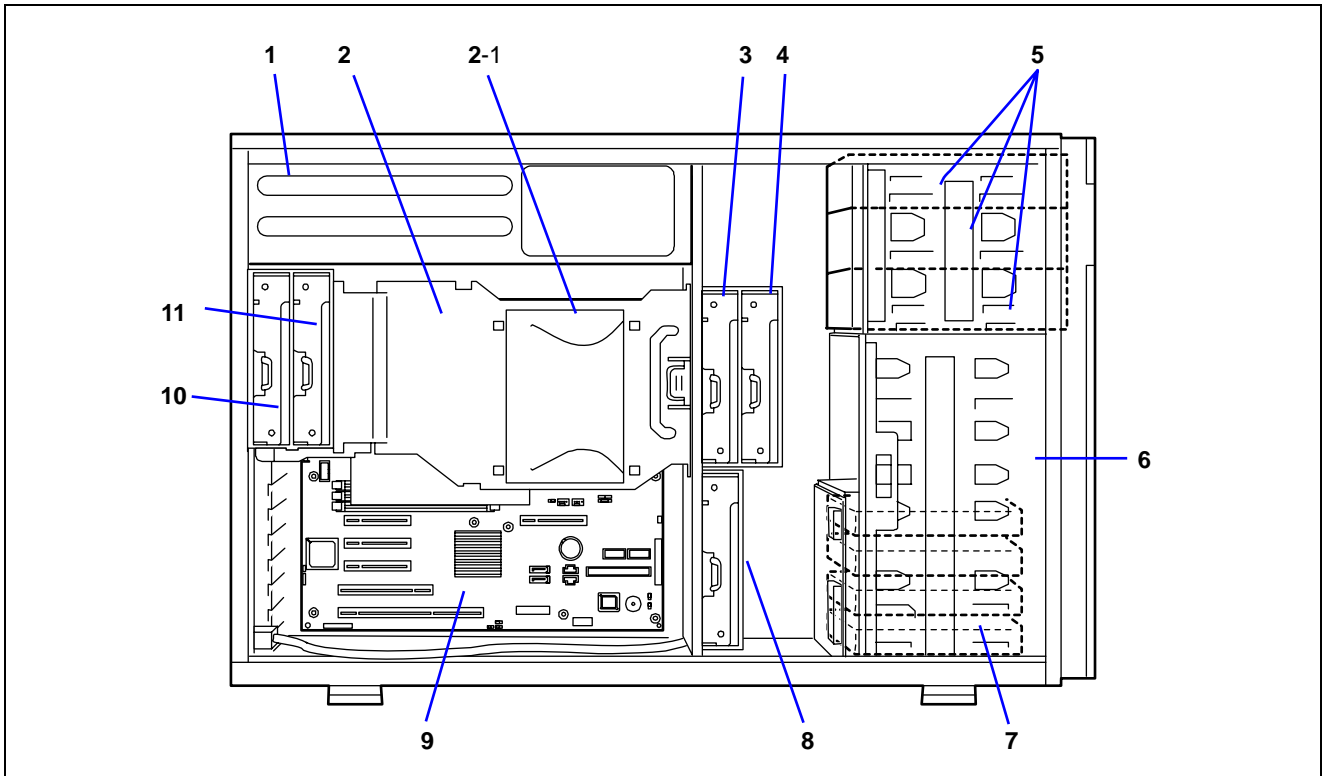


- 
- 1 Power supply**  
The power unit supplies DC power to the server.
  - 2 Handle**  
Grasp this handle to install or remove the power supply.
  - 3 POWER/FAIL lamp**  
The lamp blinks green if the power supply receives AC power through the power cord.  
The lamp lights green when the power of the server is turned on (DC ON).  
The lamp lights amber if the power unit fails.
  - 4 AC inlet**  
The AC inlet is connected with the power cord. An additional power unit also has an AC inlet.
  - 5 Additional power supply slot**  
An optional power supply may be installed in the slot.
  - 6 Serial port B connector**  
The serial port B connector is used to connect the server to a device with a serial interface.  
The server cannot be directly connected to a leased line through the connector.
  - 7 Additional PCI board slots**  
Optional PCI boards may be inserted into the slots.
  - 8 Mouse connector**  
Used to connect with the mouse.
  - 9 Keyboard connector**  
Used to connect with the keyboard.
  - 10 Serial port A connector**  
The serial port A connector is used to connect the server to a device with a serial interface.  
The server cannot be directly connected to a leased line through the connector.
  - 11 Monitor connector**  
Used to connect with the display unit.
  - 12 LINK/ACT lamp**  
The LINK/ACT lamp shows the LAN access status.
  - 13 LAN connector(s)**  
The LAN connectors are connected with a network system on LAN. Your server supports 100BASE-T/100BASE-TX/10BASE-T network subsystem.  
**13-1** LAN port 1 (onboard LAN)  
**13-2** LAN port 2 (onboard LAN)  
**13-3** Management LAN port (100BASE-TX/10BASE-T)
  - 14 Speed lamp**  
Indicates the transfer rate of the onboard LAN ports 1 and 2 and of the management LAN port.
  - 15 USB-1 and USB-2 connectors**  
The USB-1 and USB-2 are used to connect to devices accepting the USB interface.  
Connector 1 and connector 2 are assigned from left to right when viewed from the rear of the server.

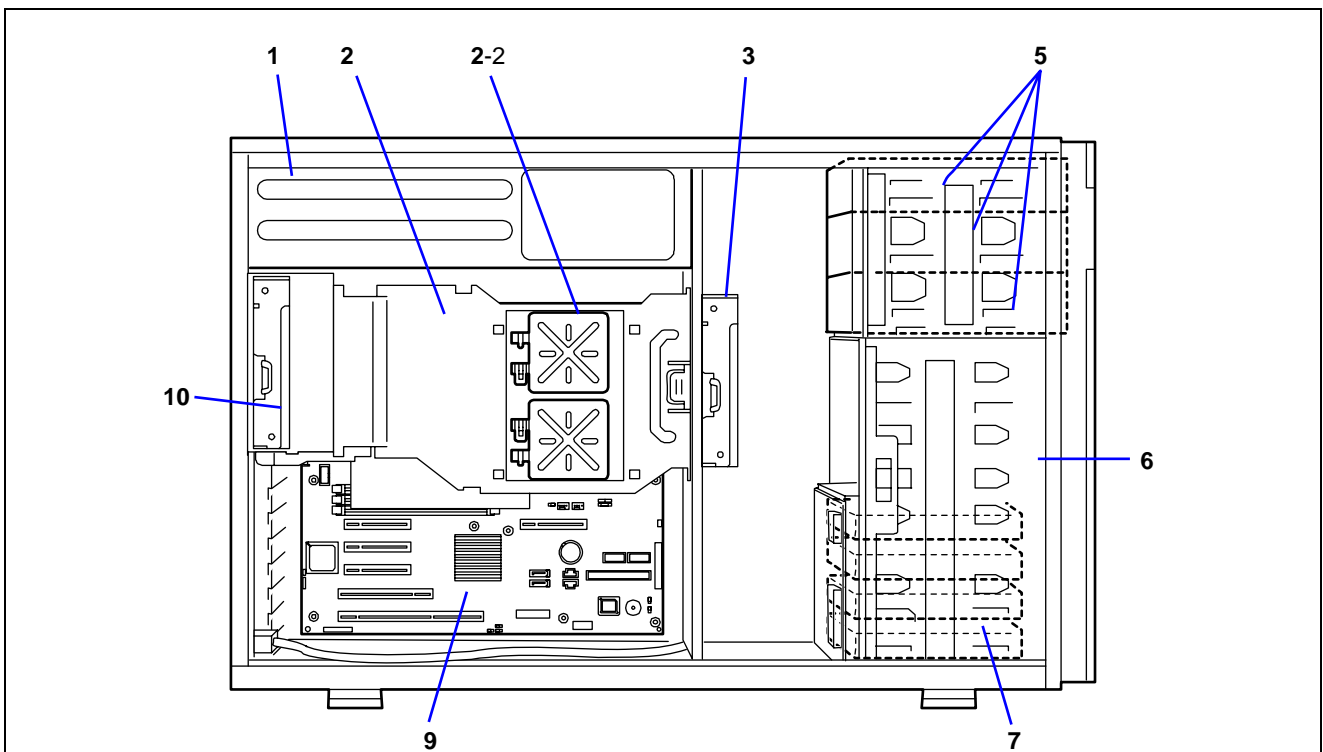
## Internal View

The figure below shows an internal view of the chassis with the 3.5-inch HDD cage installed. With the 2.5-inch HDD cage, up to eight hard disk drive can be installed.

With a standard (air-cooling heat sink) installed



With a water-cooling heat sink installed



- 1 Power supply unit**
- 2 CPU duct cover**
  - 2-1 Top cover (To be removed when a water-cooling heat sink is installed.)
  - 2-2 Water-cooling heat sink (See Chapter 9 for installation procedure.)
- 3 Front cooling fan unit (factory-installed)**
- 4 Redundant cooling fan unit (Option A)**

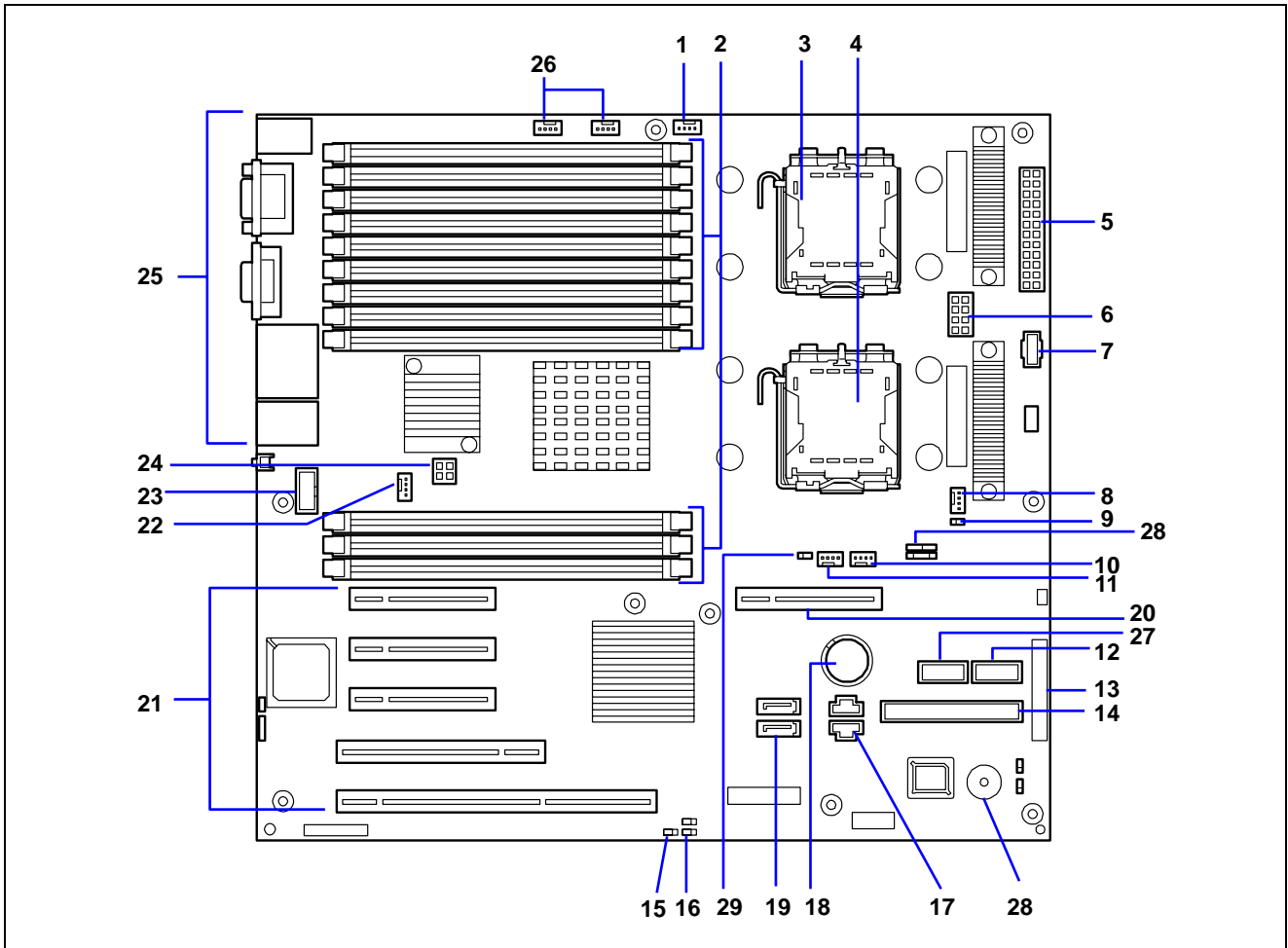
The redundant fan unit contains three fans; Option A (front), Option B (PCI/HDD cage), and Option A (rear).
- 5 5.25-inch device bays (3 slots)**

Up to two devices can be installed additionally. An optical disk drive is factory-installed.
- 6 HDD cage slot**

Used to install an optional HDD cage.
- 7 3.5-inch hard disk drive bay**

Up to four hard disk drives can be installed.
- 8 Redundant cooling fan unit (Option B)**
- 9 Motherboard**
- 10 Rear cooling fan unit (factory-installed)**
- 11 Redundant cooling fan unit (Option A)**

# MOTHERBOARD





- 
- 1 **Front cooling fan connector** (factory-installed)
  - 2 **DIMM sockets**  
(slot numbers 33, 32, 31, 23, 22, 21, 13, 12, 11, 41, 42 and 43 from top to bottom)  
Add 2 DIMMs at a time (the DIMM installation unit is called a group).
  - 3 **Processor 1 socket**
  - 4 **Processor 2 socket**
  - 5 **Power connector**
  - 6 **Power connector**
  - 7 **Power signal connector**
  - 8 **Cooling fan connector (when an optional redundant fan is used) /  
Water-cooling pump connector (when an optional water-cooling fan is used)**  
See Chapter 9.
  - 9 **Redundant fan jumper switch**
  - 10 **Redundant cooling fan connector (Option B)**
  - 11 **Water-cooling heat sink connector (option)**
  - 12 **Front USB connector**
  - 13 **Front panel interface connector**
  - 14 **IDE connector (for optical disk drive)**
  - 15 **CMOS Clear Jumper switch**
  - 16 **BIOS Password Clear Jumper switch**
  - 17 **SGPIO1 and SGPIO2 connectors**
  - 18 **Lithium battery**
  - 19 **SATA2 connector**  
SATA1 and SATA2 from top to bottom
  - 20 **Internal RAID Controller connector**
  - 21 **PCI board slots**  
(slots PCI #1, PCI #2, PCI #3, PCI #4, and PCI #5 from bottom to top)  
PCI #1: 64-bit, 133MHz  
PCI #2: 32-bit, 33MHz  
PCIe #3: x8  
PCIe #4: x4 (Connector: x8)  
PCIe #5: x8
  - 22 **Rear cooling fan connector (factory-installed)**
  - 23 **Serial port B connector**
  - 24 **Power connector**
  - 25 **External devices connectors**
  - 26 **Water-cooling heat sink (option) connector**
  - 27 **Internal USB device connector**
  - 28 **Buzzer**
  - 29 **Water-cooling heat sink jumper switch (CN6)**

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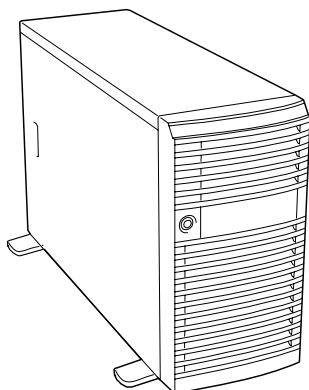
**NOTE:** The connectors described above are used to upgrade or maintain the server (including replacing some components). Leave any other connectors or components as factory-set.

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## STANDARD FEATURES

### High performance

- Quad-Core/Dual-Core Intel® Xeon® Processor
- High-speed memory access (DDR2-667)
- High-speed 1000BASE-T/100BASE-TX/10BASE-T interface (2 ports) (1Gbps/100Mbps/10Mbps supported)
- High-speed disk access (SATA2 and SAS)
- Dual channel memory configuration



### High-reliability

- Memory monitoring feature (error correction/error detection)
- Memory x4/x8 SDDC feature
- Sparing/mirroring memory feature
- BIOS password feature
- Temperature detection
- Cooling fan monitoring feature
- Internal voltage monitoring feature
- CPU/memory degradation feature
- RAID System (SATA2/SAS)
- Bus parity error detection
- Error notification
- Redundant fans
- Mechanical security lock

### Expandability

- Large memory of up to 48GB (4GB DIMMs x12 slots)
- USB interface (USB 2.0)
- Five integrated I/O expansion PCI slots
  - PCI Express (x8): 2 slots
  - PCI Express (x4): 1 slot (x8 connector)
  - PCI-X (64-bit/133 MHz): 1 slot
  - PCI (32-bit/33 MHz): 1 slot
- SATA2 x2 channels (not for hard disk drive)
- Ultra ATA 100 x1 channel
- Up to two multi-processors
- Can be used as rack-mount type. (with an optional rack conversion kit)

### Many Available Features

- El Torito Bootable CD-ROM (no emulation mode) format support
- Remote power-on feature
- AC-LINK feature
- RAID System (SATA)
- Hot-swap hard disk drive supported
- IPMI v2.0 compliant Baseboard Management Controller (BMC)

### Power Saving Feature

- Sleep feature (available for Windows Server 2003)
- Enhanced Intel SpeedStep® Technology
- Enhanced Halt State supported

### Management Utilities

- NEC ESMPRO
- NEC DianaScope
- NEC EXPRESSSCOPE Engine 2
- Power monitoring feature
- RAID System Management Utility
- Hard disk drive monitoring feature

### Easy and Fine Setup

- EXPRESSBUILDER (system setup utility)
- BIOS setup utility
- Parameter File Creator

---

## Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

- Three 5.25-inch file bays for installing 5.25-inch peripheral devices such as optional tape drives. (An optical disk drive is factory-installed.)
- The 3.5-inch device bays for installing up to four SATA or SAS hard disk drives, or the 2.5-inch device bays for installing up to eight SAS hard disk drives (depending on your model).

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## AC LINK Feature

When the power cord of the server is connected to an uninterruptible power supply (UPS) unit, the server supports the power linkage feature that enables control over the power supply from the UPS to the server. The AC LINK feature can be enabled or disabled using Power Management Setup in the Server menu of the BIOS setup utility, "SETUP." (See Chapter 4.)

---

## Security

The BIOS setup utility provides a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user has entered the correct password(s). For example:

- Set and enable an administrative password.
- Set and enable a user password
- Check the user account when entering the BIOS setup utility or booting the system.

---

## EXPRESSBUILDER

The DVD-ROM that comes with the server contains a setup utility called "EXPRESSBUILDER."

EXPRESSBUILDER should be used:

- To install the Operating System.  
"Express Setup" helps you to install the Windows Operating System. (See Chapter 5.)
  - To diagnose the system.  
EXPRESSBUILDER includes the System Diagnostics to check your server. (See Chapter 6.)
  - To create a support disk.  
Use this function to create the support disks used to boot the utilities from the floppy disk, or the OEM-disk used for a manual installation of Windows. (See Chapter 6.)
  - To update the BIOS.  
Use this function to update the system BIOS or firmware of the server. (See Chapter 6.)
  - To update the Windows System\*  
"Update the system" in Windows Autorun Menu (Windows-based EXPRESSBUILDER feature) updates several resources of Microsoft Windows Server 2003. (See Chapter 6.)
  - To install the utilities.  
The EXPRESSBUILDER DVD includes some management software for Windows (NEC ESMPRO, NEC DianaScope and so on).  
You can install the applications for Windows from the Windows Autorun Menu.  
(See Chapter 6.)
  - To read the online documents\*  
Refer to the online documents from the Windows Autorun Menu. (See Chapter 6.)
- \* These functions are available under the Windows system.

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**NOTE:** Some features among those listed above can be managed from a remote computer via a cross cable (COM), or LAN. See Chapter 6 for details.

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## NEC ESMPRO

NEC ESMPRO is server management software that runs on top of an OS. NEC ESMPRO includes the NEC ESMPRO Manager for the server monitoring terminal and the NEC ESMPRO Agent for the server.

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**NOTE:** For details on the major functions of NEC ESMPRO, the system configuration and the setups using NEC ESMPRO, see Chapter 6.  
The available functions of NEC ESMPRO depend on the OS you have installed. Ask your service representative for details.

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## Maintenance Tools

The Maintenance Tool is used for maintenance and fault analysis of the server. This tool is usually used by the service representative.

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## System Diagnostic Utility

The system diagnostic utility contained in the EXPRESSBUILDER is useful to detect hardware failures. See Chapter 7 for details.

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## Remote Management

The server may be monitored and managed via LAN/WAN using the EXPRESSSCOPE Engine 2 and the NEC DianaScope utilities stored in the EXPRESSBUILDER DVD.

The EXPRESSSCOPE Engine 2 provides the following features:

- Monitoring of temperature, voltage, fans, and electric power status
- Monitoring of the power supply unit
- Monitoring of the hard disk drives
- Generation of a SEL (system event log) at occurrence of hardware failure
- Monitoring of the system management watchdog timer
- Monitoring of the periodic SMI timer
- Remote management by using a Web browser (e.g., resetting the server, power on/off, viewing the System Event Log (SEL))
- Remote KVM and remote device features (An optional remote management license is required.)
- Remote management via LAN/WAN using NEC DianaScope and centralized management of several systems

For more information about remote management using Web browser, remote KVM feature, and remote device feature, refer to the "EXPRESSSCOPE Engine 2 User's Guide" stored in the EXPRESSBUILDER DVD.

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**NOTE:** To use the Remote Management Extended License, refer to our Web site to see the latest information about remote console/remote media feature.

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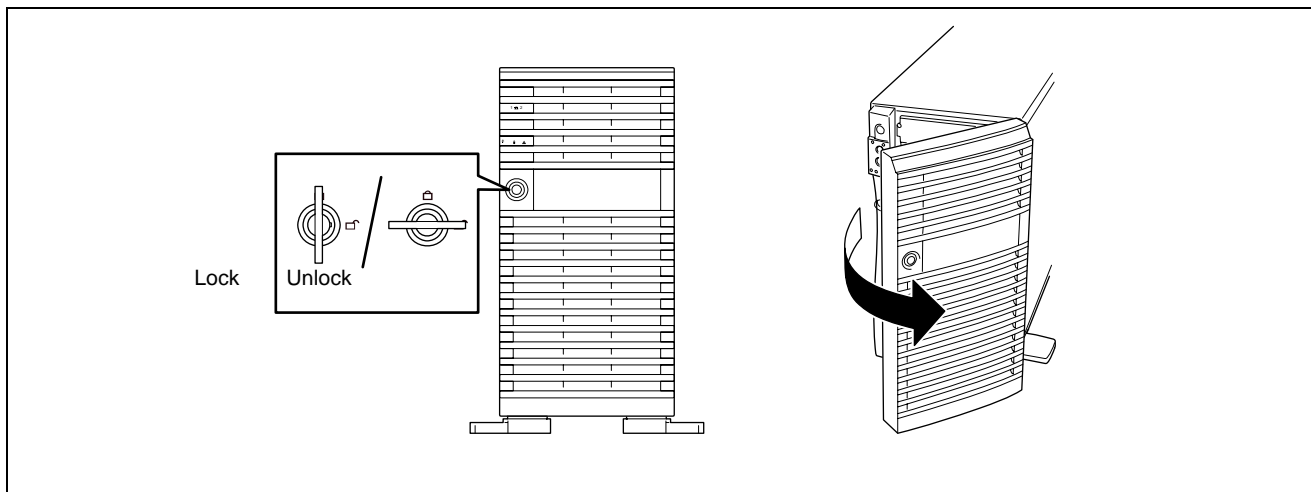
## USING YOUR SERVER

This section describes the basic operation of your server including how to use devices such as the optical disk drive. See Appendix B for notes on using the CD/DVD-ROM and accessories, including the keyboard and the mouse.

---

### Front Door

Open the front door to power on/off the server, to access the optical disk drive and the 5.25-inch devices, and to install/remove hard disk drives to/from the hard disk drive bays.



---

#### **IMPORTANT:**

- To open the front door, you must unlock the door with the provided security key.
  - Some software provides a command to eject the optical disk drive tray or a media in the drive. Before executing such a command, make sure that the front door is open. Otherwise, the drive tray or the media will hit the front door., and may cause a device failure to occur.
- 

Insert the provided security key into the key hole and turn the key to unlock the front door. Then, hold the front door edges and gently pull the door away from the computer chassis. When you close the front door, lock the door with the key for security.

---

**IMPORTANT:** If the front door does not open easily, hold the upper left and lower left corners of the front door with your hands and then pull it out toward you.

---

---

## POWER Switch

Use the POWER switch to turn on/off the server.

### Power On

1. Power on the display unit and peripheral devices.

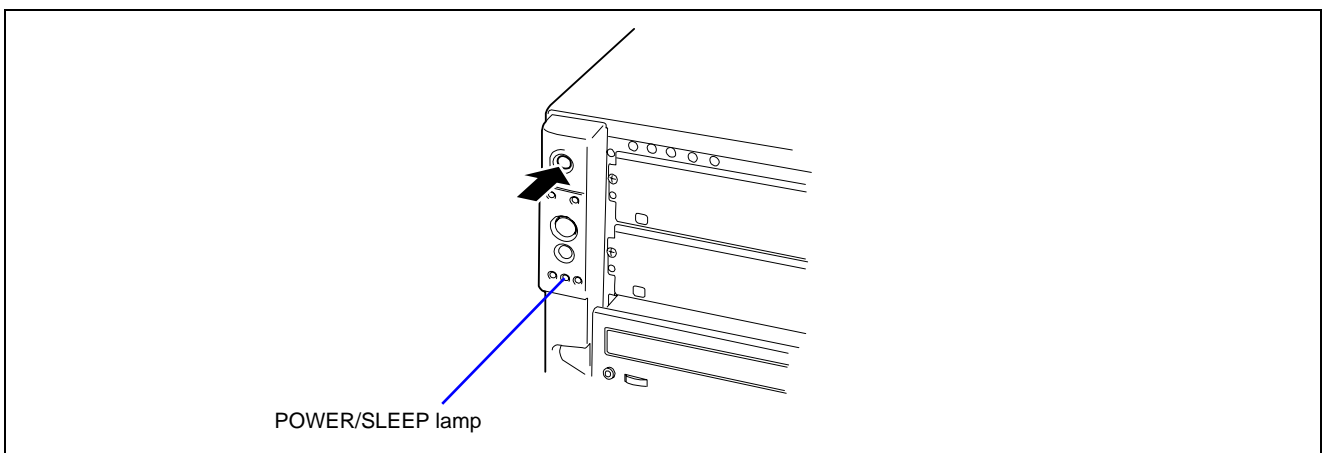
---

**NOTE:** If the power cord is connected to a power control device such as a UPS (Uninterruptible Power Supply), make sure that the power control device is powered on.

---

2. Press the POWER switch on the front of the computer chassis.

The POWER/SLEEP lamp lights green. After a while, characters appear on the screen.



---

### IMPORTANT:

- If the power cord is connected to the server, an initial diagnosis of the hardware starts. The POWER switch does not work while the diagnosis is processing. Wait for about 10 seconds, and press the POWER switch.
  - Do not turn off the server until characters have appeared on the screen.
-



## POST

The POST (Power On Self-Test) is the self-diagnostic program stored in the system memory.

When you power on the server, the system automatically runs POST to check the motherboard, ECC memory module, CPU module, keyboard, and mouse. The POST also displays messages from the BIOS Setup utility, such as the start-up message, while in progress.

A full screen logo appears on the display unit while POST is in progress. (To display the POST check results, press **Esc**.)

You do not always need to check the POST check results. Check the messages displayed by the POST when:

- you use the server for the first time.
- the server appears to fail.
- the server beeps many times between power-on and the OS start-up.
- an error message appears on the display unit.

## POST Execution Flow

The following describes in chronological order the progress of the POST.

---

### IMPORTANT:

- Do not power off the server while the POST is in progress.
  - Do not strike any key or perform any mouse operations while the POST is in progress.
  - Some system configurations may display the message "Press Any Key" to prompt a key entry. This message is driven by the BIOS of an installed optional board. Make sure to read the manual that comes with the optional board before striking any key.
  - If you installed or removed an optional PCI board or moved it to another slot, powering on the server may display a message that indicates an incorrect board configuration and suspend the POST.  
In such a case, press **F1** to continue the POST. The board configuration can be made using the utility described later.
- 

1. After a few seconds from power-on, POST starts checking the memory. The count message of the basic and expansion memory appears at top left on the display unit screen. The memory check may take a few minutes to complete depending on the size of the memory installed in the server. It may take approximately one minute for the screen display to appear after rebooting the server.
2. Some messages appear upon the completion of the memory check. These messages indicate that the system has detected the CPU, keyboard, and mouse.
3. After a while, the POST displays messages prompting you to launch the utilities for the LAN controllers on the motherboard. You do need not to launch the utility. (Ignore the message. The POST will automatically proceed.)
4. The POST detects the Internal RAID Controller, and displays the following message prompting you to launch the WebBIOS Setup utility.

Press <Ctrl> <H> for WebBIOS

Press **Ctrl + H** on the POST screen to run WebBIOS. See Chapter 4 for setup and parameters.

When you exit from the utility, you are prompted to reboot the system. Press **Ctrl + Alt + Delete**. The server restarts the POST all over again.

5. The POST displays the ID numbers of the SAS devices connected to the server.

6. After a few seconds, the POST displays the following message prompting you to launch the BIOS SETUP utility stored in the system memory of the server. This message appears at bottom left of the screen.

Press <F2> to enter SETUP or Press <F12> to boot from Network

Launch the BIOS setup utility when you need to change the settings to meet the requirements for the server. As long as the above message is not displayed with an error message, you do not have to launch the utility. (Ignore the message. The POST will automatically proceed.)

To launch the BIOS setup utility, press **F2** while the above message is displayed. See Chapter 4 for setup and parameters.

The server automatically restarts the POST all over again when you exit the SETUP utility.

7. If the POST detects the optional add-in card, it displays a message prompting you to launch the add-in card BIOS configuration utility. (Ignore the message. The POST will automatically proceed a few seconds later.)

Refer to the manual that comes with the optional add-in card for detail.

8. If you set a password using the BIOS SETUP utility, the password entry screen appears upon successful completion of POST.

Up to three password entries will be accepted. Three incorrect password entries prevent the server from booting. In such a case, turn off the power and wait about ten seconds before turning on the server again.

---

**IMPORTANT:** Do not set a password before the OS installation.

---

9. The OS starts when the POST completes.

## POST Error Messages

When the POST detects an error, it displays an error message on the display unit screen or emits a beep code. See Chapter 8 for POST error codes.

---

**IMPORTANT:** Note the messages displayed before consulting with your service representative. Alarm messages are useful information for maintenance.

---

---

## Power Off

Follow the procedure below to power off the server. If the power cord of the server is connected to a UPS, refer to the manual that comes with the UPS or to the manual for the application that controls the UPS.

---

**IMPORTANT:** Always allow the POST to complete before turning off the server.

---

1. Shut down the OS.
2. Press the POWER switch on the front of the server.  
The POWER/SLEEP lamp goes out.
3. Power off the peripheral devices.

---


**NOTE:** The standby function of Windows Server is not available. Do not select "Standby" in the Windows shutdown menu.

---

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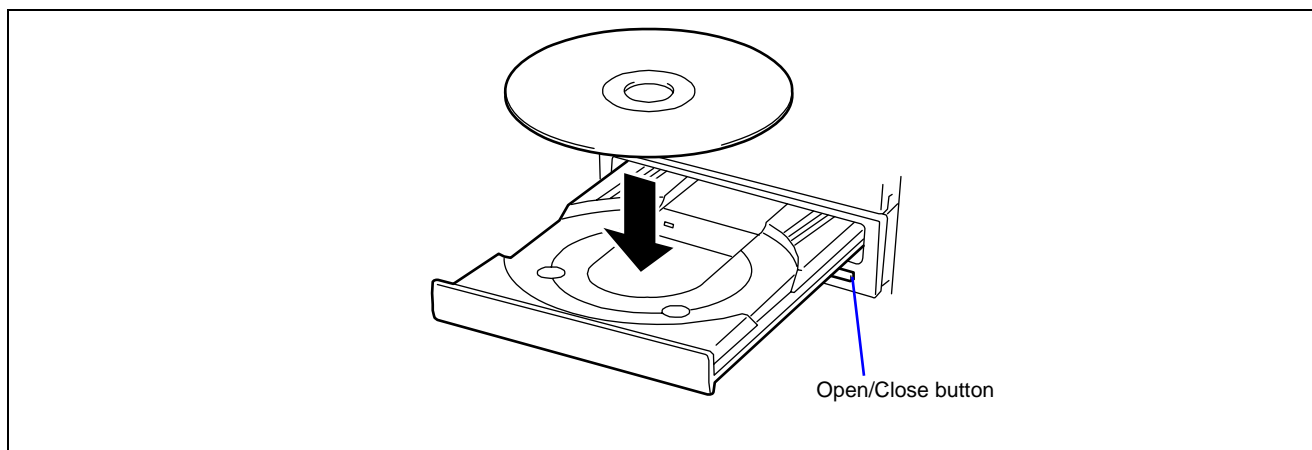
## Optical Disk Drive

The server is provided with an optical disk drive on its front to read/write data from/to a disc.

<b>⚠ CAUTION</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.</p> <p style="padding-left: 20px;">Do not leave the tray ejected from the optical disk drive. Take off the headphone before you plug in the headphone jack.</p>

### Setting and Removing the Disc

1. Make sure that the power of the server is on (the POWER/SLEEP lamp is lit in green) before setting the disc in the optical disk drive.
2. Press the Open/Close button on the front of the optical disk drive.  
The tray slides out.
3. Put the disc on the tray carefully and securely with the printed surface facing upward.
4. Press the Open/Close button or gently push on the front of the tray.  
The tray slides automatically back into the optical disk drive.



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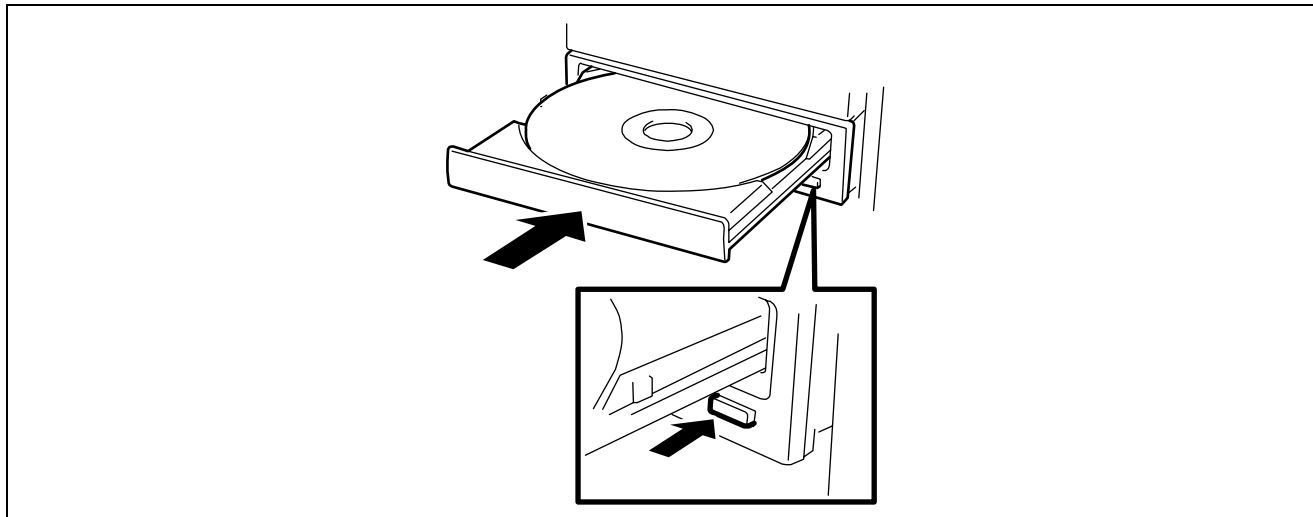
**IMPORTANT:** If a noisy sound occurs after setting a disc, set it again correctly.

---

To take out a disc from the optical disk drive, press the Open/Close button. If the access LED is lit, the disc is being accessed. Confirm that the access LED is not lit before pressing the Open/Close button.

Your OS may have a command to eject the tray.

When you have taken out the disc, slide the tray back in place.

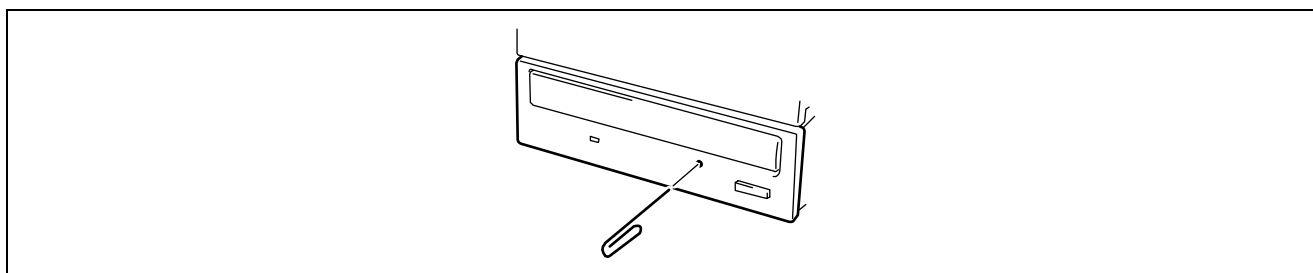


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### When you fail to eject:

When you fail to eject the tray with the Open/Close button and take out the disc from the server, follow the procedure below.

1. Press the POWER switch to power off the server. (The POWER/SLEEP lamp goes off.)
2. Insert a metal pin of approximately 1.2 mm in diameter and 100 mm in length (a straightened large paper clip will make a substitute) into the emergency hole on the front of the optical disk drive and gently push it in until the tray is ejected.



---

#### **IMPORTANT:**

- Do not use a toothpick or a plastic stick, which could break easily.
  - If the above procedure does not succeed, contact your service representative.
- 

3. Hold the tray and pull it out.
4. Take out the disc.
5. Push the tray back into position.

## Use of the Disc

Keep the following notes in mind to use the disc for the server:

- The playback of discs which do not conform to the standards is not guaranteed.
- Do not drop the disc.
- Do not place anything on the disc or bend the disc.
- Do not attach any label onto the disc.
- Do not touch the signal side (on which nothing is printed) with your fingers.
- Place the disc with its printed side facing up and gently put it on the tray.
- Do not scratch the disc or write anything directly on it with a pencil or ball-point pen.
- Keep the disc away from cigarette smoke.
- Do not leave the disc in a high-temperature place (e.g., place exposed to direct sunlight or close to a heater).
- When dust or fingerprints are attached on the disc, wipe the disc from its center to the edges with a dry soft cloth slowly and gently.
- Use the CD cleaner to clean the disc. Do not use record spray/cleaner, benzene, or thinner.
- Keep the disc in a disc case when not in use.
- If the disc emits a lot of noise in the optical disk drive, remove the disc and insert it back again.



## **Chapter 3**

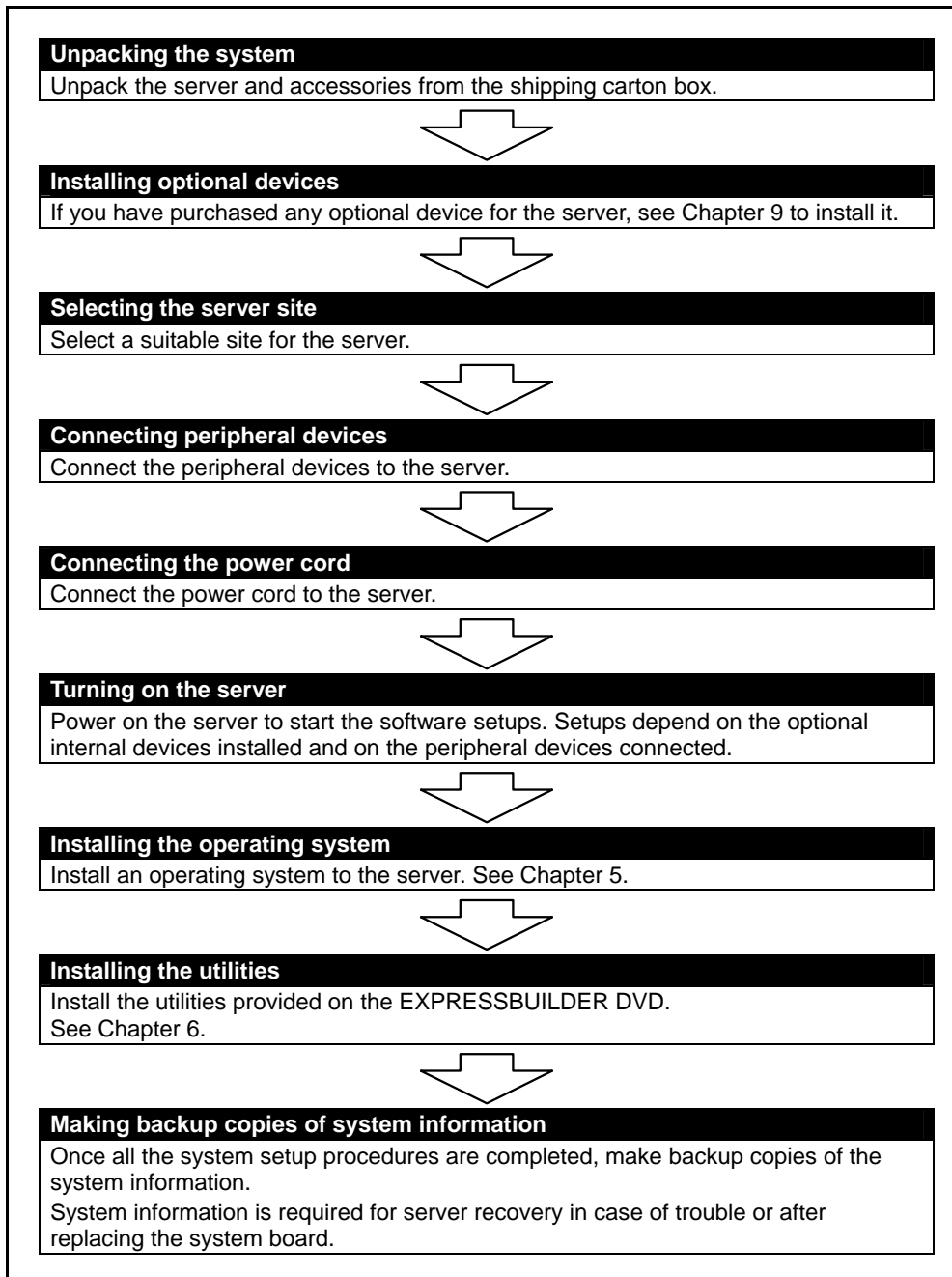
---

### **Setting Up Your Server**

This chapter describes how to set up your server appropriately for your system, on a step-by-step basis.

## SETUP FLOW

Follow the flowchart below to set up the server.



## UNPACKING THE SYSTEM

When you receive your system, inspect the shipping containers prior to unpacking. If the shipping boxes are damaged, note the damage, and if possible, photograph it for reference. Remove the contents of the containers, keep the cartons and the packing materials. If the contents appear damaged when you unpack the boxes, file a damage claim with the carrier immediately.

## INSTALLING OPTIONAL DEVICES

To install any optional device, see Chapter 9, "Upgrading Your Server," for the installation procedure. Proceed to the next section if you have no optional devices to install.

---


**IMPORTANT:** There are third-party products (memory modules, hard disk drives, etc.) available for the server in the markets. However, we recommend you use our genuine products for stable operation. We assume no liability for data errors and failures due to a malfunction of the server resulting from the installation of those third-party products.

---

## SELECTING A SITE

Read the following precautions before selecting a suitable site for your server. The following describes the installation and connection of the server.

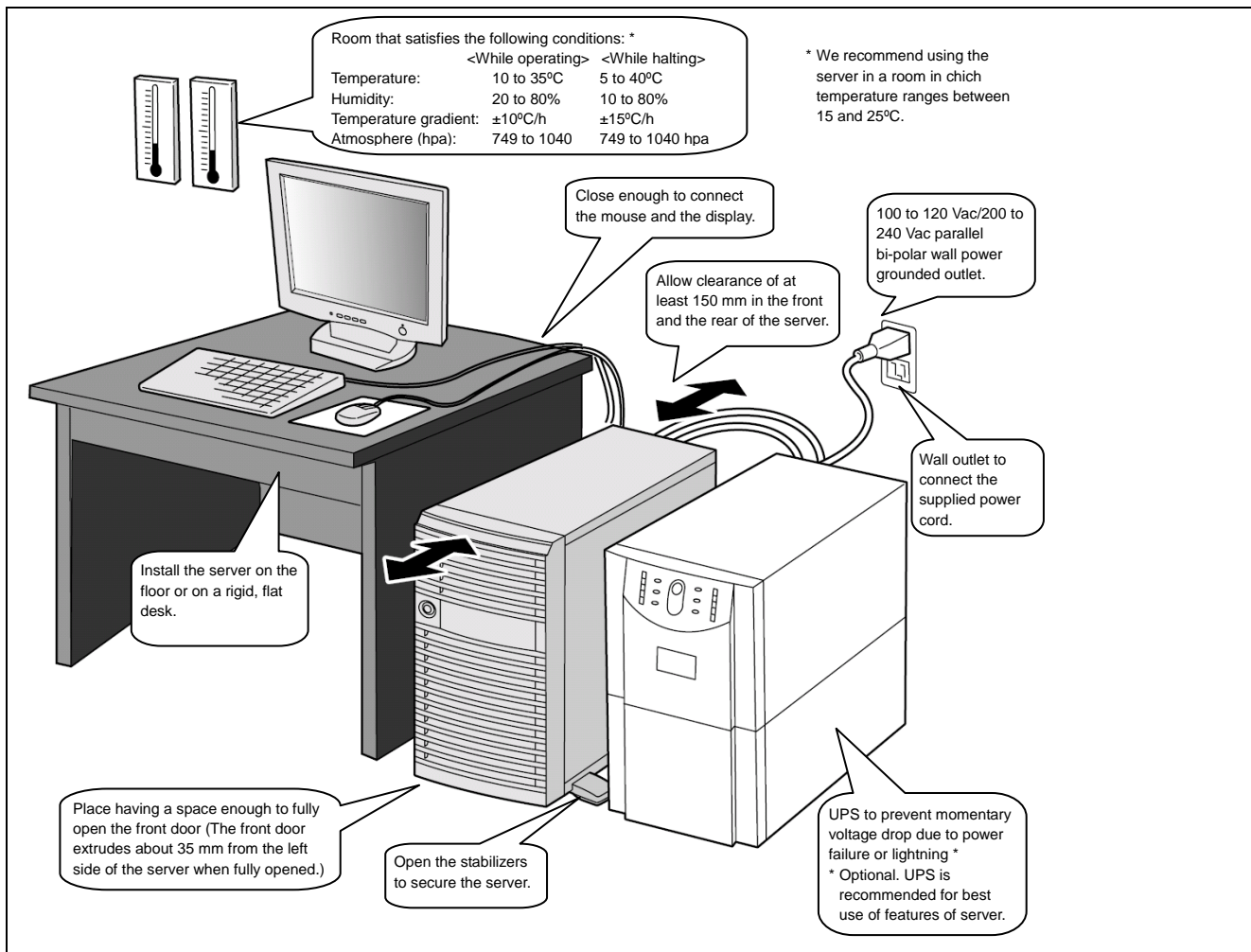
**⚠ CAUTION**



Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.

Never attempt to lift the server only by yourself.  
Do not install the server in any place other than specified.

The following figure illustrates a site suitable for installing the server.



When you have selected a server site, hold the server by its bottom with at least three persons and carry it to the site, then place it slowly and gently.

---

**IMPORTANT:**

- Do not hold the server by its front door to lift the server. The front door may disengage and damage the server.
  - Open the stabilizers and secure the server to the site.
  - Do not hold the handle of the power module when carrying the server.
- 




Do not place the server in the following places. Placing the server in such places may cause malfunctions of the server.

- Places with drastic changes in temperature (e.g., near a heater, air conditioner, or refrigerator)
- Places with strong vibration
- Places where corrosive gases are present, near chemicals, or where chemicals may be sprayed over
- On a non-antistatic carpet
- Places where objects may fall.
- Places where the power cord of the server must be connected to an AC outlet that shares other devices with large power consumption.
- Do not install the server next to an equipment that generates power noise (e.g., contact spark at power-on/power-off of commercial power supply through a relay). If you must install the server close to such equipment, request your service representative for separate power cabling or noise filter installation.

---

## CONNECTING PERIPHERAL DEVICES

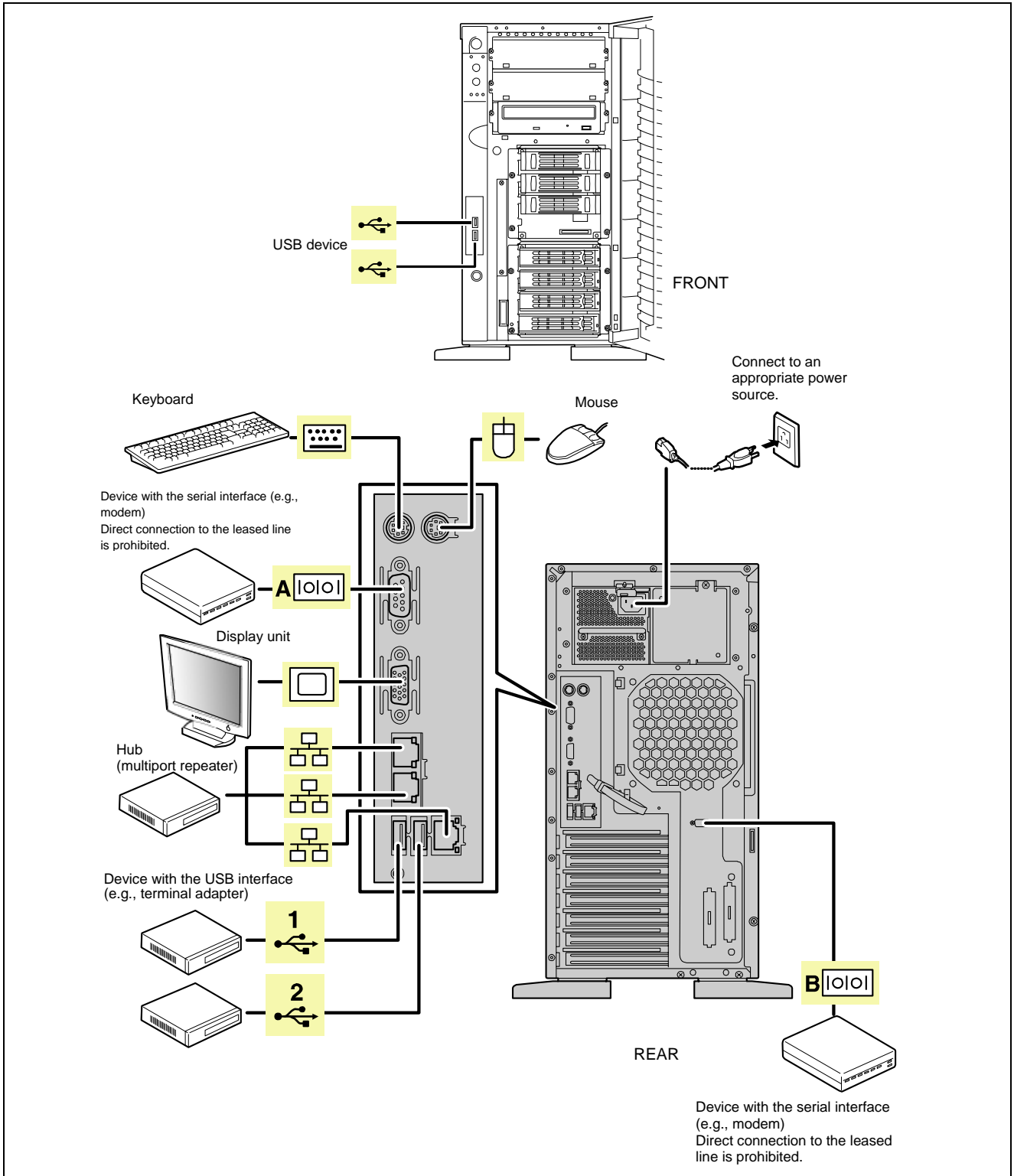
Connect peripheral devices to the server. The server is provided with connectors for wide variety of peripheral devices on its front and rear. The figure on the next page illustrates the available peripheral devices for the server in the standard configuration and the locations of the connectors for the devices.

 <b>CAUTION</b>	
 	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.</p> <ul style="list-style-type: none"><li>Do not use any damaged cable connector.</li><li>Do not use any unauthorized interface cable.</li><li>Do not use the server with any loose interface connection.</li><li>Do not step on the interface cable or place any heavy object on it.</li></ul>

---

### IMPORTANT:

- Power off the server and a peripheral device before connecting them. Connecting a powered peripheral device to the powered server will cause malfunctions and failures (not applicable to USB devices).
  - To connect a third-party peripheral device or interface cable to the server, consult with your service representative for the compatibility of such a device or cable. Some third-party devices must not be used with this server.
  - Plug in the keyboard and mouse with "Δ" on the connector upward.
  - A leased line cannot be connected directly to the serial port connectors.
-



## CONNECTING THE POWER CORD

Connect the provided power cord to the server.

### WARNING



Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See pages 1-3 to 1-8 for details.

Do not hold the power plug with a wet hand.

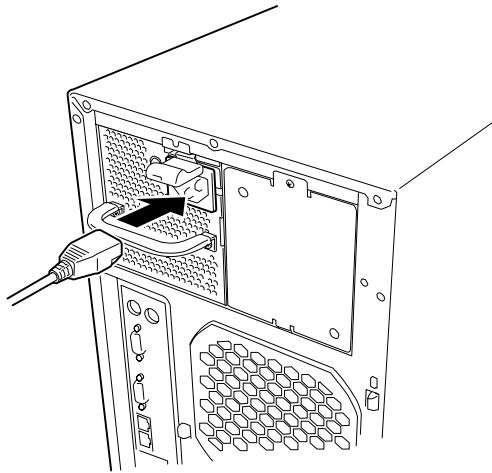
### CAUTION



Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.

Do not plug the power cord into an improper power source.  
Do not connect the power cord to an outlet that has an illegal number of connections.  
Insert the power plug into the outlet as far as it goes.  
Use the authorized power cord only.

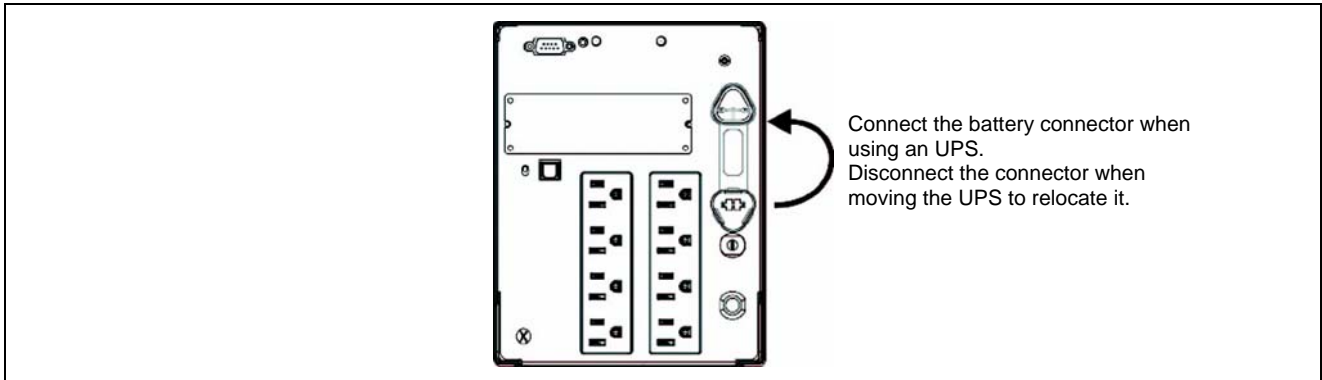
1. Plug the provided power cord into the power receptacle on the rear of the server.
2. Plug the other end of the power cord into the wall outlet.





To connect the power cord from the server to an interruptive power supply (UPS), use service outlets on the rear of the UPS.

Refer to the manual that comes with the UPS for details.



When the power cord from the server is connected to a UPS, change the BIOS SETUP utility of the server to link with power supply from the UPS.

Change the "AC-LINK" parameter under the Server menu of the BIOS SETUP utility. See Chapter 4 for details.

## TURNING ON THE SERVER

Turn on the server and follow the on-screen instructions.

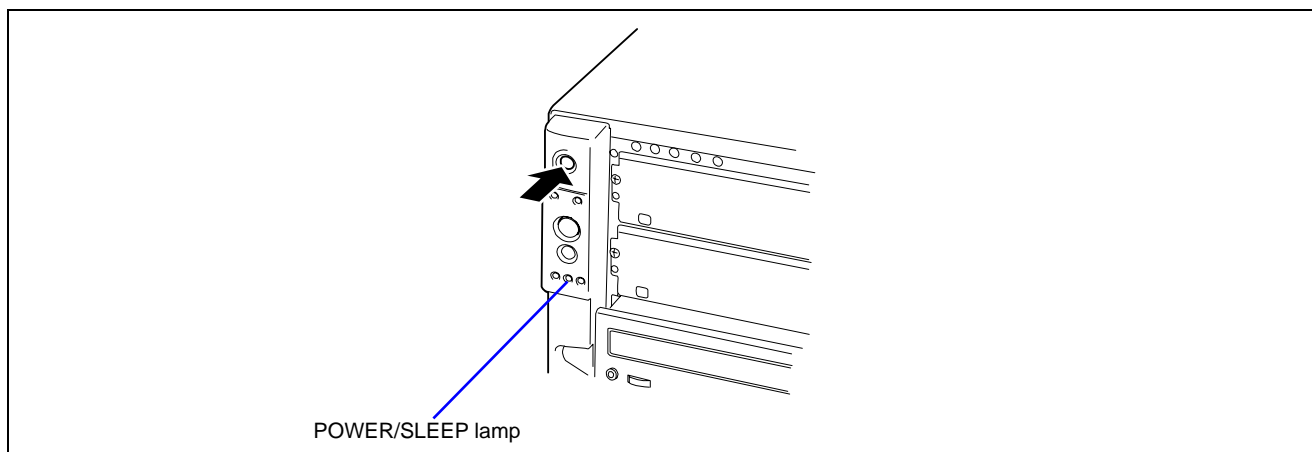
1. Power on the display unit and other external devices.

---

**NOTE:** If the power cord is connected to a power control unit such as an UPS, turn it on.

---

2. Open the front door and press the POWER switch. The POWER/SLEEP lamp on the front of the server lights up.




---

### NOTES:

- Connect the power cord and wait at least 10 seconds before pressing the POWER switch. The Status lamp lights amber immediately after the power cord is connected or AC power supplied to the server. Wait until the lamp goes off, and press the POWER switch.
  - Do not power off the server before some characters have appeared on the screen.
- 

The POWER/SLEEP lamp on the front of the server lights up.

After a few seconds, a full screen logo appears on the screen and the Power On Self-Test (POST) begins. The POST runs automatically when you power on the server or reset it with a keyboard operation (**Ctrl + Alt + Delete**). The POST runs diagnostics, initializes the server, sets the interrupt vectors, detects any installed peripheral devices, and boots the operating system (if installed). See Chapter 2 for a detailed description of the POST.

If the server halts before completing the POST, the POST emits a beep code indicating a fatal system error requiring immediate attention. (See Chapter 8, "Troubleshooting," for troubleshooting information.)

During the memory test, the POST displays the amount of memory it was able to access and test. Depending on the amount of installed memory, it may take several minutes to complete the memory test.

---

**NOTE:** The factory-set is defined to hide the POST screen with a full logo. You can always switch to the POST screen by pressing **Esc**. To change the start-up screen, use the BIOS setup utility, "SETUP." (See Chapter 4 for details.)

---

During the POST, you will see banner messages prompting you to launch the BIOS SETUP utility stored in the ROM of the motherboard or on an installed option board.

Start the BIOS SETUP utility appropriate to your system environment to change the BIOS setup. For the BIOS SETUP for the server, see Chapter 4. For the BIOS SETUP of the optional board, refer to the manual that comes with the optional board.

---

**IMPORTANT:** Always allow the POST to complete before turning off your system.

---

## **INSTALLING THE OPERATING SYSTEM**

See Chapter 5 for the Microsoft Windows Server 2003 installation.

To install another operating system, contact your service representative.

## **INSTALLING UTILITIES**

Install the utilities that come with the server. See Chapter 6 for details.

## **MAKING BACKUP COPIES OF THE SYSTEM INFORMATION**

The system information includes the current BIOS settings and any specific information for the server.

Save the information after the system setup completion.

Without the backup data, you will not be able to recover the information.

You can save the information using the following process.

1. Insert the EXPRESSBUILDER DVD into the optical disk drive and reboot the system.
2. Select [Maintenance Tools (Normal mode)].
3. Select [English].
4. Select [Maintenance Utility].
5. Select [System Information Management].
6. Insert a floppy disk into the floppy disk drive.
7. Select [Save].

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# Chapter 4

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## Configuring Your Server

Configuration and setup utilities are used to change your system configuration. You can configure your system, as well as the option boards you may add to your system, using the BIOS SETUP Utility. Several unique system parameters are configured using the BIOS SETUP, which is stored in the system FLASH memory.

The RAID configuration utility configures the RAID System and logical drives connected to the Internal RAID Controller.

If your system has been factory configured, the BIOS SETUP or RAID configuration utility do not need to be run unless you want to change the password or security features, add certain types of option boards or devices, upgrade your system board, or change the RAID configuration.

This chapter also provides information on several system configuration parameters that are set by jumpers on the system board. However, these parameters do not usually require change.

### SYSTEM BIOS (SETUP)

The SETUP utility is provided to make the basic hardware configuration for the server. This utility is pre-installed in the flash memory of the server and ready to run.

The server is factory-configured with the correct parameters using the SETUP utility. Only use the SETUP utility in the cases described below.

---

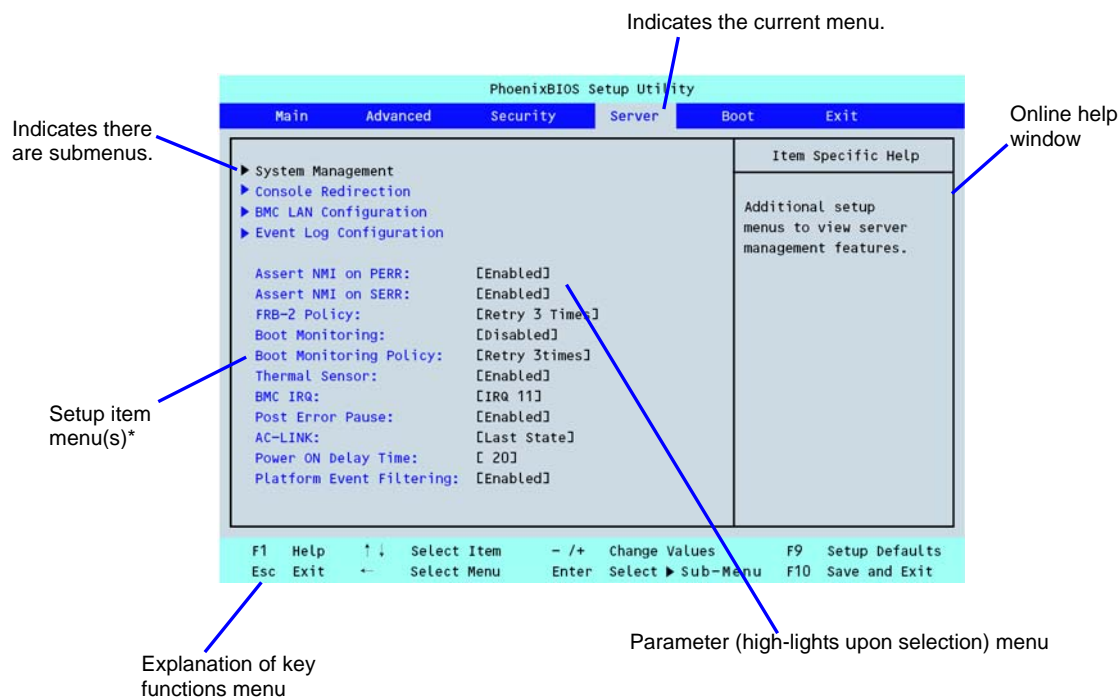
#### **IMPORTANT:**

- The SETUP utility is intended for system administrator use only.
  - The SETUP utility allows you to set a password. The server is provided with two levels of password: Supervisor and User. With the Supervisor password, you can view and change all the system parameters of the SETUP utility. With the User password, system parameters available for viewing and changing are limited.
  - Do not set any password before installing the OS.
  - The server contains the latest version of the SETUP utility. Dialog boxes appearing on your SETUP utility, may thus differ from the descriptions in this manual. If you find anything unclear, see the online help or ask your service representative.
  - Use the Exit menu when exiting the SETUP utility. Exiting the utility using the POWER switch or reset operation loses the stored parameters.
-



## Description of the On-Screen Items and Key Usage

Use the following keyboard keys to work with the SETUP utility. (Key functions are also listed at the bottom of the screen.)



\* The menus displayed in gray indicates the information only or unchangeable secured by BIOS password.

- Cursor** (↑, ↓): Selects an item on the screen. The highlighted item is currently selected.
- Cursor** (←, →): Selects the Main, Advanced, Security, Server, Boot, or Exit menu.
- and +:** Changes the value (parameter) of the selected item. When a submenu option (an option preceded by "\*") is selected, these keys are disabled.
- Enter** Press **Enter** to select (determine) parameters.
- Esc** Exit SETUP and return to the previous screen.
- F9:** Sets the parameter of the currently displayed item back to the factory set parameter.
- F10:** Save and exit the SETUP utility.

## Menu and Parameter Descriptions

The SETUP utility includes the following six major menus:

- Main
- Advanced
- Security
- Server
- Boot
- Exit

To set minute functions, select a submenu from the above menus. The following describes available functions and parameters, as well as the factory-setting for each menu.

### Main

Option	Parameter	Description	Your Setting
System Time	HH:MM:SS	Sets the system time.	
System Date	MM/DD/YYYY	Sets the system date.	
Hard Disk Pre-Delay	[Disabled] 3 seconds 6 seconds 9 seconds 12 seconds 15 seconds 21 seconds 30 seconds	When accessing the internal IDE device for the first time during POST, the system waits for the specified time until the device becomes ready.	
Primary IDE Master/ Primary IDE Slave Secondary IDE Master/ Secondary IDE Slave	Select submenu	Sets the information on the device connected to each channel on the submenu. We recommend you leave the items as they are at the shipment.	
Processor Settings	Select submenu	Shows the processor settings submenu.	
Language	[English (US)] Français (FR) Deutsch (DE) Español (SP) Italiano (IT)	Selects the language in which the BIOS is displayed.	

[ ]: Factory-set

**IMPORTANT:** Check and adjust the system clock before the operation if any of the following conditions is applicable.

- After carrying of device
- After storing of device
- After the device has entered into a pause state under the environmental condition enduring device operation (temperature: 10°C - 35°C, humidity: 20% - 80%)

Check the system clock roughly once per month. When the system clock is installed in a system requiring high time precision, we recommend using a time server (NTP server).

If the system clock is significantly delayed or advanced in spite of regular adjustments, contact your service representative to request maintenance.



## Processor Settings

Option	Parameter	Description	Your Setting
Processor Retest	[No] Yes	If yes, BIOS will clear the historical processor status and retest the processor on the next boot.	
Processor Speed	nnn GHz	Displays the clock speed for the processor. (View only)	
Processor 1 CPUID	Numeral Disabled	Displays the CPU ID for processor, if present. "Disabled" indicates that the processor is defective. (View only)	
Processor 1 L2 Cache	nnn KB	Displays the L2 cache size for processor.	
Processor 2 CPUID	Numeral Disabled	Displays the CPU ID for processor, if present. "Disabled" indicates that the processor is defective. (View only)	
Processor 2 L2 Cache	nnn KB	Displays the L2 cache size for the processor.	
Execute Disable Bit	[Enabled] Disabled	Displayed only when the CPU supports Execute Disable Bit.	
Virtualization Technology	[Enabled] Disabled	Enables or disables the Intel(R) virtualization technology.	
C1 Enhanced Mode	[Enabled] Disabled	Enables or disables the C1 Enhanced Mode.	
Intel SpeedStep(R) Technology	[Enabled] Disabled	Enables or disables the Intel(R) SpeedStep technology.	

[ ]: Factory-set

## Advanced

Option	Parameter	Description	Your Setting
Memory Configuration	–	Displays the Memory Configuration submenu.	
PCI Configuration	–	Displays the PCI Configuration submenu.	
Peripheral Configuration	–	Displays the Peripheral Configuration submenu.	
Advanced Chipset Control	–	Displays the Advanced Chipset Control submenu.	
Boot-time Diagnostic Screen	Enabled [Disabled]	When disabled, the BIOS will display a full screen logo during POST. Press <b>Esc</b> to switch to the POST execution screen.	
Reset Configuration Data	[No] Yes	Select "Yes" if you want to clear the system configuration data during the next boot. This parameter is automatically reset to "No" in the next boot.	
NumLock	On [Off]	Defines whether the numeric keypad is enabled or disabled during boot.	
Memory/Processor Error	[Boot] Halt	If "Halt" is selected, the boot stops when a POST error occurs.	

[ ]: Factory-set

---

**IMPORTANT:** Be sure to note the boot priority before selecting "Yes" for [Reset Configuration Data], because the boot device information will be cleared. Select [Exit Saving Changes] to reboot the system, run the BIOS SETUP utility, and reset the boot device order.

---

## Memory Configuration

Option	Parameter	Description	Your Setting
System Memory	nnn KB	Indicates the total capacity of the basic memory. (View only)	
Extended Memory	nnnnnnn KB	Indicates the total capacity of the extended memory. (View only)	
DIMM Group #1 - #6 Status	Normal Disabled Not installed	Indicates the current memory status. "Normal" indicates the normal status, "Disabled" indicates a memory error, and "Not installed" indicates that no DIMM is installed (view only). DIMM Group #1: DIMM sockets #11 and #21 DIMM Group #2: DIMM sockets #31 and #41 DIMM Group #3: DIMM sockets #12 and #22 DIMM Group #4: DIMM sockets #32 and #42 DIMM Group #5: DIMM sockets #13 and #23 DIMM Group #6: DIMM sockets #33 and #43	
Memory Retest	Yes [No]	Causes the BIOS to retest all the memory on the next boot.	
Extended RAM Step	1MB 1KB Every location [Disabled]	"1MB" indicates that the memory test is done in 1MB units. "1KB" indicates that the memory test is done in 1KB units. "Every location" tests every memory location. "Disabled" indicates that only the memory initialization is done. Press <b>Space</b> to suspend the test during the memory test.	
Memory RAS Feature	[Interleave] Mirror	Disables or enables the memory mirroring feature. See "DIMM" in Chapter 9 for details.	
Sparing	[Disabled] Enabled	Disables or enables the online spare memory feature. See "DIMM" in Chapter 9 for details.	

[ ]: Factory-set

## PCI Configuration

Option	Parameter	Description	Your Setting
PCI Slot 1-6 Option ROM	[Enabled] Disabled	Disables or enables the option ROM scan for the PCI board in the PCI slot.	

[ ]: Factory-set

### – Onboard Video Controller submenu

Option	Parameter	Description	Your Setting
VGA Controller	Disabled [Enabled]	When Disabled, the BIOS will hold the embedded chip in reset.	
Onboard VGA Option ROM Scan	[Auto] Force	Allows to select either the onboard VGA controller or the optional PCI VGA controller as the display device that will be active when the system boots. The “Force” option is selected to use the onboard VGA controller when an optional PCI VGA controller is installed in the system.	

[ ]: Factory-set

### – Onboard LAN submenu

Option	Parameter	Description	Your Setting
LAN Controller	Disabled [Enabled]	When Disabled, the BIOS will hold the embedded chip in reset.	
LAN1 Option ROM Scan	Disabled [Enabled]	When Enabled, initializes the device expansion ROM.	
LAN2 Option ROM Scan	Disabled [Enabled]	When Enabled, initializes the device expansion ROM.	

[ ]: Factory-set

## Peripheral Configuration

**IMPORTANT:** Note that the interrupt and/or base I/O address are not overlapped with others. If the value set for the interrupt or base I/O address is used in another resource, a yellow asterisk (\*) appears. Reset properly any item with a yellow asterisk.

Option	Parameter	Description	Your Setting
Serial Port A	Disabled [Enabled]	Enables or disables the serial port A.	
Base I/O address	[3F8] 2F8 3E8 2E8	Selects the base I/O address for the serial port A.	
Interrupt	IRQ 3 [IRQ 4]	Selects the interrupt for the serial port A.	
Serial Port B	Disabled [Enabled]	Enables or disables the serial port B.	
Base I/O address	3F8 [2F8] 3E8 2E8	Selects the base I/O address for the serial port B.	
Interrupt	[IRQ 3] IRQ 4	Selects the interrupt for the serial port B.	
USB Controller	[Enabled] Disabled	Enables or disables the USB controller.	
USB 2.0 Controller	Disabled [Enabled]	Enables or disables the USB 2.0 controller.	
Parallel ATA	Disabled [Enabled]	Enables or disables the parallel ATA.	

[ ]: Factory-set

## Advanced Chipset Control

Option	Parameter	Description	Your Setting
Multimedia Timer	[Disabled] Enabled	Specifies whether the system supports the multimedia timer feature.	
Intel(R) I/O AT	Disabled [Enabled]	Enables or disables the Intel(R) Acceleration technology.	
Wake On Ring	[Disabled] Enabled	Enables or disables the remote power-on function through a serial port.	
Wake On RTC Alarm	[Disabled] Enabled	Enables or disables the remote power-on function using the RTC alarm feature.	

[ ]: Factory-set

---

### IMPORTANT:

- If the AC power is turned off while the Wake On Ring feature is enabled, this feature is disabled at the next system boot after AC power-on. You need to press the Power switch to boot the system.  
If the AC power is turned off, the Wake On Ring feature on the power management chip is disabled until the next DC power-on.
  - To use this feature on Windows Server 2003, see Chapter 8 "Problems with Windows Server 2003".
-

## Security

Press **Enter** on "Set Supervisor Password" or "Set User Password," to display the password entry screen.

Enter the passwords on the dialog box.

---

### IMPORTANT:

- A User password can be set only when a Supervisor password is already set.
  - Set the passwords only after an OS has been installed.
  - If you forget the passwords, contact your service representative.
- 

See the table below for the items.

Option	Parameter	Description	Your Setting
Security Chip Configuration	–	The Security Chip Configuration submenu is displayed.	
Supervisor Password Is	Clear Set	Indicates the password setting status.	
User Password Is	Clear Set	Indicates the password setting status.	
Set Supervisor Password	Up to eight alphanumerics	Press <b>Enter</b> to display the supervisor password entry screen. This password enables all the SETUP menus to be accessed. This setting can be done only when logging to the Setup utility with a Supervisor password.	
Set User Password	Up to eight alphanumerics	Press <b>Enter</b> to display the user password entry screen. With this password, access to the SETUP menu is restricted.	
Password on boot	[Disabled] Enabled	Specifies whether the passwords are entered or not during boot. If the supervisor password is set and this option is disabled, the BIOS determines that a user is booting.	
Fixed disk boot sector	[Normal] Write Protect	Specifies whether writing to the boot sector of the hard disk drive is allowed or not.	
Power Switch Inhibit	[Disabled] Enabled	Enables or disables the power switch feature. The forced shutdown (pressing the POWER switch for at least four seconds) feature still works.	

[ ]: Factory-set

### Security Chip Configuration Submenu

Option	Parameter	Description	Your Setting
TPM Support	[Disabled] Enabled	Disables or enables the TPM feature. (This item can be selected when a Supervisor Password is set on the Security menu.)	
Current TPM State	–	Displays the current TPM state.	
Change TPM State	[No Change] Enable & Activate Deactivate & Disable Clear	Changes the TPM state.	

[ ]: Factory-set

## Server

Option	Parameter	Description	Your Setting
System Management	–	Displays the System Management submenu.	
Console Redirection	–	Displays the Console Redirection submenu.	
BMC LAN Configuration	–	Displays the BMC LAN Configuration submenu.	
Event Log Configuration	–	Displays the Event Log Configuration submenu.	
Assert NMI on PERR	Disabled [Enabled]	Enables or disables PCI PERR support.	
Assert NMI on SERR	Disabled [Enabled]	Enables or disables PCI SERR support.	
FRB-2 Policy	Disable FRB2 Timer Disable BSP Do Not Disable BSP [Retry 3 Times]	Sets the FRB level 2 timer.	
Boot Monitoring	[Disabled] 5 Minutes 10 minutes 15 minutes 20 minutes 25 minutes 30 minutes 35 minutes 40 minutes 45 minutes 50 minutes 55 minutes 60 minutes	Enables or disables the boot monitoring function, or selects the time limit for the timeout. To use this function, install the NEC ESMPRO Agent. Set this item to "Disabled" if the system is booted from the OS and no NEC ESMPRO Agent is installed.	
Boot Monitoring Policy	[Retry 3 Times] Always Reset	Specifies the action when a timeout occurs during the boot monitoring. If [Retry 3 times] is selected, the system is reset after the occurrence of the timeout and the OS boot is retried up to three times. If [Always Reset] is selected, the system is reset after the occurrence of the timeout and the OS boot is retried repeatedly. * If no service partition exists in the system, the OS boot is retried repeatedly from the system partition.	
Thermal Sensor	Disabled [Enabled]	Enables or disables the thermal sensor monitoring function. If a thermal error is detected and this item is set to "Enabled", the system stops at the end of the POST.	
BMC IRQ	Disabled [IRQ 11]	Determines the routing of the BMC interrupt.	
Post Error Pause	Disabled [Enabled]	Specifies whether to stop the POST at the end of POST if an error occurs during the POST.	
AC-LINK	Stay Off [Last State] Power On	Specifies the power state when the AC power to the server is turned off once and then on.	

Option	Parameter	Description	Your Setting
Power ON Delay Time (Sec)	[20] - 255	Specifies the power on delay time within a range between 0 and 255 seconds. The time specified is valid when "Power On" or "Last State" is specified for AC LINK.	
Platform Event Filtering	Disabled [Enabled]	Enables or disables the platform event filtering (PEF) feature.	

[ ]: Factory-set

**IMPORTANT:** To power on the server from an UPS (Uninterruptible Power Supply), select [Server] - [AC LINK] - [Power On].

The table below shows the operation when the AC power to the server is turned off once and then on again, depending on the "AC LINK" setting.

System status before the AC power off	AC LINK Setting		
	Stay Off	Last State	Power On
Operating	Off	On	On
Aborting (DC power being off also)	Off	Off	On
Forced shutdown*	Off	Off	On

\* Keep pressing the power switch for four seconds or longer. This forcibly turns off the power.

### System Management Submenu

Option	Parameter	Description	Your Setting
BIOS Version	–	Displays the current BIOS version. (View only)	
Board Part Number	–	Displays the part number of the motherboard. (View only)	
Board Serial Number	–	Displays the serial number of the motherboard. (View only)	
System Part Number	–	Displays the system part number. (View only)	
System Serial Number	–	Displays the system serial number. (View only)	
Chassis Part Number	–	Displays the chassis part number. (View only)	
Chassis Serial Number	–	Displays the chassis serial number. (View only)	
Onboard LAN1 MAC Address	–	Displays the MAC address of the onboard LAN port 1. (View only)	
Onboard LAN2 MAC Address	–	Displays the MAC address of the onboard LAN port 2. (View only)	
Management LAN MAC Address	–	Displays the MAC address of the management LAN port. (View only)	
BMC Device ID	–	Displays the BMC device ID. (View only)	
BMC Device Revision	–	Displays the BMC device revision. (View only)	
BMC Firmware Revision	–	Displays the BMC firmware revision. (View only)	
SDR Revision	–	Displays the sensor data record revision.	
PIA Revision	–	Displays the platform information area revision. (View only)	

[ ]: Factory-set

### Console Redirection Submenu

Option	Parameter	Description	Your Setting
BIOS Redirection Port	[Disabled] Serial Port A Serial Port B	Specifies the address/interrupt of the serial port to which a remote console is connected.	
Baud Rate	9600 [19.2K] 38.4K 57.6K 115.2K	Specifies the baud rate used for the interface with successive remote consoles.	
Flow Control	None Xon/Xoff [CTS/RTS] CTS/RTS+CD	Specifies the flow control method.	
Terminal Type	PC ANSI [VT100+] VT-UTF8	Specifies the remote console type.	
Continue Redirection after POST	Disabled [Enabled]	Specifies whether to continue the console redirection feature once the POST is completed.	
Remote Console Reset	[Disabled] Enabled	Enables or disables resetting by an Escape command (Esc R) sent from the remote console.	

[ ]: Factory-set



## BMC LAN Configuration Submenu

Option	Parameter	Description	Your Setting
IP Address	[192.168.001.001]	Specifies an IP address for the management LAN.	
IP Subnet Mask	[255.255.255.000]	Specifies a subnet mask for the management LAN.	
Default Gateway	[000.000.000.000]	Specify a default gateway for the management LAN.	
DHCP	[Disabled] Enabled	Set this item to [Enabled] to obtain an IP address from DHCP server automatically. If you intend to specify an IP address manually, set this item to [Disabled].	
Web Interface	–	–	
HTTP	[Disabled] Enabled	Set this item to [Enabled] to use the HTTP communication for the Web interface.	
HTTP Port Number	[80]	Specifies the TCP port number which the management LAN uses for the HTTP communication.	
HTTPS	[Disabled] Enabled	Set this item to [Enabled] to use HTTPS communication for the Web interface.	
HTTPS Port Number	[443]	Specifies the TCP port number which the management LAN uses for HTTPS communication.	
Command Line Interface	–	–	
Telnet	[Disabled] Enabled	Set this item to [Enabled] to use Telnet communication as a command line interface.	
Telnet Port Number	[23]	Specifies the TCP port number to be used for Telnet communication.	
SSH	[Disabled] Enabled	Set this item to [Enabled] to use SSH communication as a command line interface.	
SSH Port Number	[22]	Specifies the TCP port number to be used for SSH communication.	
Clear BMC Configuration	[Enter]	Press <b>Enter</b> and select "Yes" to initialize the BMC configuration.	

[ ]: Factory-set

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### **IMPORTANT:** Notes on performing a Clear BMC Configuration

- Executing "Load Setup Defaults" in the BIOS SETUP utility does not restore the default value for the settings related to the management LAN of the BMC. To restore the default value, you need to execute a Clear BMC Configuration.
  - It may take several minutes until the initialization completes after the execution of a Clear BMC Configuration.
  - Executing a Clear BMC Configuration also clears the settings made in NEC DianaScope. Before execution, be sure to make a backup copy of the settings information of NEC DianaScope.
- 

**NOTE:** Executing [Save Custom Defaults/Load Custom Defaults] of BIOS SETUP does not save the settings you have made in the BMC LAN Configuration menu.

---

## Event Log Configuration Submenu

Option	Parameter	Description	Your Setting
System Event Log	–	Displays the System Event Log submenu.	
Clear All Event Logs	–	Press <b>Enter</b> and select "Yes" to clear the system event log.	

[ ]: Factory-set

## Boot

The Boot menu is used to set the boot priority.

Indication	Device
USB CDROM	USB CD-ROM drive
IDE CD	ATAPI CD-ROM (including the factory-installed optical disk drive)
USB FDC	USB floppy disk drive
USB KEY	USB flash memory device
IDE HDD	IDE hard disk drives
PCI SCSI	Internal hard disk drives installed in your system ("Software RAID" is displayed in the RAID configuration.)
PCI BEV	<b>IBA GE Slot xxxx</b> Onboard LAN. LAN1: Slot 0C00, LAN2: Slot 0C01 <b>Other indication</b> Optional PCI board connected to the riser module.

- When BIOS detects a bootable device, it displays the information on the device in the relevant indication.  
To boot the server from a desired device, the device must be registered as a boot device. (Up to eight boot devices can be registered.)
- Pressing **X** after selecting a device allows the selected device to be registered as a boot device or deleted from the registration.  
When eight boot devices are registered, no other boot device can be registered when you press **X**. To register a new boot device, first delete the registration of another boot device.  
Select a device and press **Shift + 1** to enable or disable the selected device.
- You can change the boot priority (first to eighth) of each device by using **↑**, **↓**, **+** and/or **–**.  
To change the priority of a device, move the cursor to the device by using the **↑** or **↓**, and press **+** or **–**.

## Exit

The options on the menu are described below.

### Exit Saving Changes

Select this item to terminate SETUP after saving the newly selected information in CMOS (nonvolatile memory). Selecting "Exit Saving Changes" causes the confirmation screen to appear.

If you select "Yes," SETUP is terminated with the newly selected information saved in CMOS (nonvolatile memory). The server reboots automatically.

### Exit Discarding Changes

Select this item to terminate SETUP without saving the newly selected information in CMOS (nonvolatile memory). When the confirmation message "Save before exiting?" appears, select "No" to terminate SETUP without storage of the modified information. The server proceeds to the Boot menu.

If you select "Yes," SETUP is terminated and the modified information is stored. The server reboots automatically.

### Load Setup Defaults

Select this item to return all the SETUP values to the default values. Selecting "Load Setup Defaults" causes the confirmation screen to appear.

Select "Yes" to return the values to the default values.

Select "No" to return to the Exit menu screen.

### Load Custom Defaults

Select this item and press **Enter** to load the custom defaults stored. This menu does not appear if the Custom Defaults are not saved.

### Save Custom Defaults

Select this item and press **Enter** to save the parameters currently being edited as custom defaults. When the parameters are saved, the Load Custom Defaults menu appears.

### Discard Changes

Select this item to discard the changes you made to the CMOS values.

### Save Changes

Select this item to save the newly selected information to the CMOS (non-volatile memory) without closing SETUP.

## **RAID SYSTEM CONFIGURATION**

This section describes how to use the internal hard disk drives as a RAID System using the Internal RAID Controller .

For more information on the optional RAID Controller, refer to the documents provided with the optional RAID Controller.

---

### **RAID**

#### **Overview of the RAID System**

##### **What is RAID (Redundant Array of Inexpensive Disks)?**

RAID is an abbreviation for "Redundant Array of Inexpensive Disks". The RAID technology allows several hard disk drives (HDD) to be handled collectively.

RAID can configure several HDDs as a single array (disk group) to operate the HDDs effectively. This can bring higher performance than a single HDD of a large capacity.

The Internal RAID Controller has allows to divide a single disk group into several logical drives. The Internal RAID Controller recognizes these virtual disks as if they were a single HDD. The Internal RAID Controller can access in parallel several HDDs configuring a disk group.

Some RAID levels can recover data from the remaining data and parity by using a rebuild feature if an error occurs in a single HDD. This provides high reliability for the system.

## RAID Levels

The record mode enabling the RAID feature includes several levels. Among the levels, the on-board RAID (MegaRAID ROMB) supports the following levels; RAID 0, RAID 1, RAID 5, RAID 6, RAID10, and RAID 50. The number of HDDs required to create a disk group varies depending on the RAID level, as shown in the table below.

RAID level	Number of required HDDs	
	Min.	Max.
RAID 0	1	8
RAID 1	2	2
RAID 5	3	8
RAID 6	3*	8
RAID 10	4	8
RAID 50	6	8

---

### IMPORTANT:

- To use RAID 5 or RAID 6, you need to install the optional RAID Upgrade Kit.
  - To configure RAID6 using Express Setup, at least four hard disk drives of same capacity must be installed.
- 

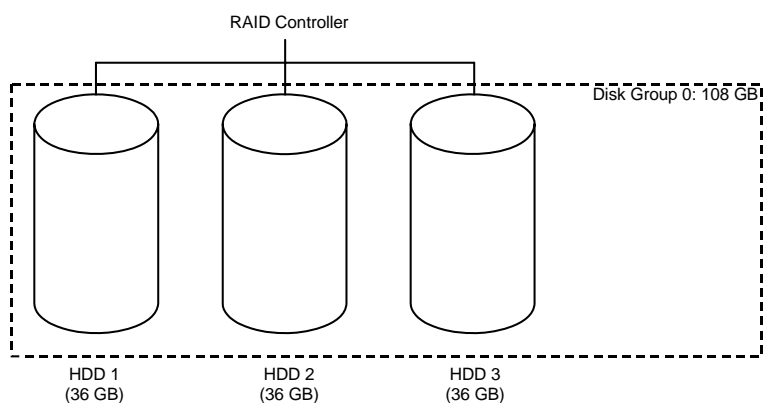
**NOTE:** For more information on the RAID levels, see "RAID Levels" described later in this chapter.

---

## Disk Group

A disk group is configured with several HDDs (at least two). The authorized number of disk groups is equal to the number of HDDs.

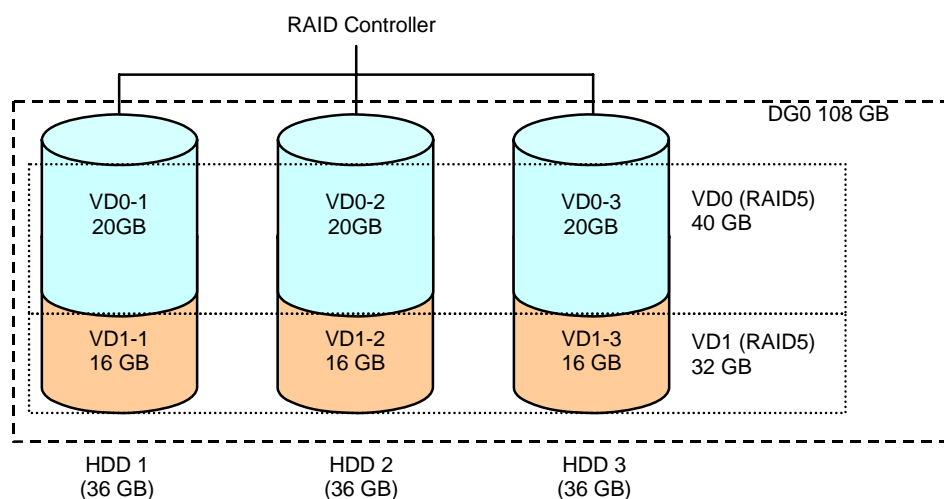
The figure below shows a sample configuration. The three HDDs are connected to the Internal RAID Controller (MegaRAID ROMB), creating one disk group (DG).



## Virtual Disk

A Virtual Disk is a logical drive defined in a Disk Group. It is recognized as a physical drive by the OS. The authorised number of virtual disks is up to 16 per disk group, or up to 64 per controller.

The figure below shows a sample configuration in which the Onboard RAID Controller (MegaRAID ROMB) is connected to three HDDs, creating one Disk Group. Two RAID5 virtual disks (VD) are defined in the Disk Group.



## Parity

Parity implies data redundancy. A single set of redundant data is created from the data saved in several HDDs (at least two). The redundant data thus created is used for data recovery when a HDD is defective.

## Hot-Swap

Hot-swapping enables a HDD to be removed (or replaced) under system operation.

## Hot-Spare

The hot-spare is prepared as an auxiliary HDD substituting for a defective HDD included in a logical drive which is configured at a redundant RAID level. Detecting a HDD fault, the system disconnects the HDD (or makes it offline) and starts rebuild using the hot-spare.

## RAID Levels

### Characteristics of the RAID Levels

The table below lists the characteristics of the RAID levels.

Level	Function	Redundancy	Characteristics
RAID0	Striping	No	<ul style="list-style-type: none"> <li>Data read/write at the highest rate</li> <li>Largest capacity</li> <li>Capacity: (capacity of single HDD) × (number of HDDs)</li> </ul>
RAID1	Mirroring	Yes	<ul style="list-style-type: none"> <li>Two HDDs required</li> <li>Capacity: capacity of single HDD</li> </ul>
RAID5	Striping of both data and redundant data	Yes	<ul style="list-style-type: none"> <li>Three or more HDDs required</li> <li>Capacity: (capacity of single HDD) × ((number of HDDs) - 1)</li> </ul>
RAID6	Striping of both data and redundant data	Yes	<ul style="list-style-type: none"> <li>Three or more HDDs required</li> <li>Capacity: (capacity of single HDD) × ((number of HDDs) - 2)</li> </ul>
RAID10	Spanning of RAID1	Yes	<ul style="list-style-type: none"> <li>Four or more HDDs required</li> <li>Capacity: (capacity of single HDD) × ((number of HDDs) - 2)</li> </ul>
RAID50	Spanning of RAID5	Yes	<ul style="list-style-type: none"> <li>Six or more HDDs required</li> <li>Capacity: (capacity of single HDD) × ((number of HDDs) - 2)</li> </ul>

---

**IMPORTANT:** To use RAID 5 or RAID 6, you need to install the optional RAID Upgrade Kit.

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### RAID0

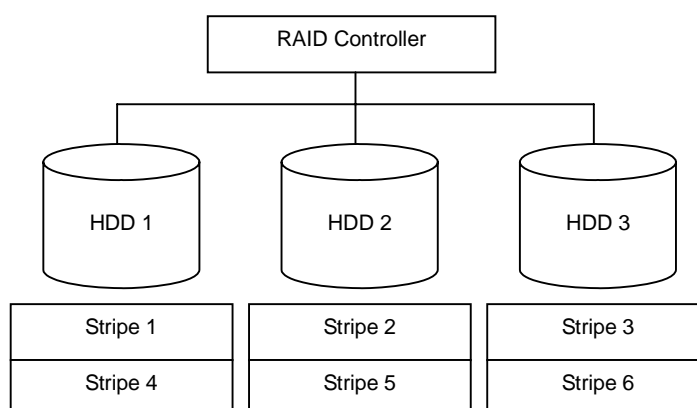
In RAID0, data to be recorded is distributed to HDDs. The mode is called "striping".

In the figure below, data is recorded in stripe 1 (disk 1), stripe 2 (disk 2), and stripe 3 (disk 3)... in this order. Because RAID0 allows all the HDDs to be accessed in parallel, it provides the best disk access performance.

---

**IMPORTANT:** RAID0 does not have data redundancy. If a HDD is defective, the data saved in the HDD cannot be recovered.

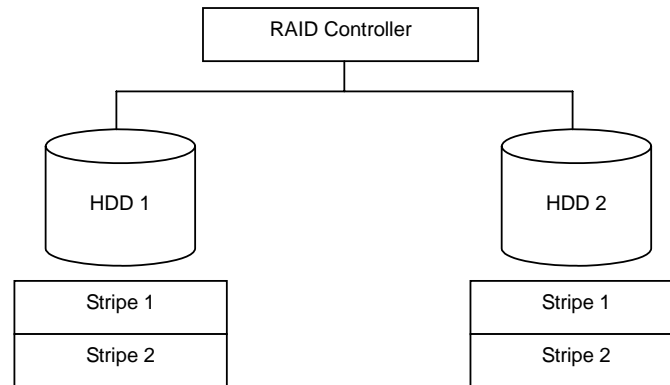
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## RAID1

In the RAID1 level, data saved in a HDD is written to another HDD without changes. This mode is called "mirroring".

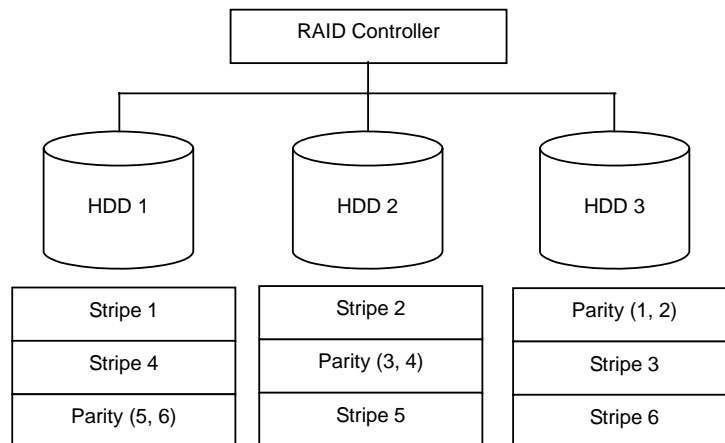
When data is written onto a single HDD, the same data is written onto another HDD. If either one of the HDDs is defective, the other HDD containing the same data can replace the defective HDD. Thus, the system can continue to operate without interruption.



## RAID5

In RAID5, data is distributed to HDDs by striping and, at the same time, the parity (redundant data) is distributed to the HDDs. This mode is called "striping with distributed parity".

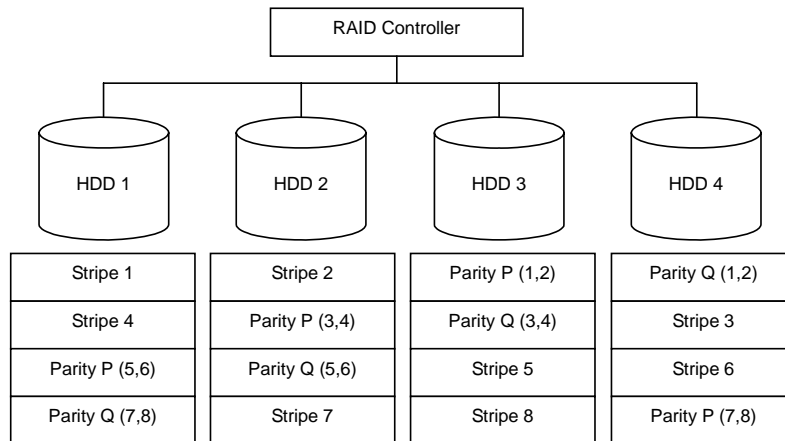
Each of stripe  $x$ , stripe  $x+1$ , and parity  $(x, x+1)$  created from stripe  $x$  and stripe  $x+1$  is written onto a specific HDD. Accordingly, the total capacity assigned to the parity is just the same as the capacity of a single HDD. If any of the HDDs configuring a logical drive is defective, data is still available.





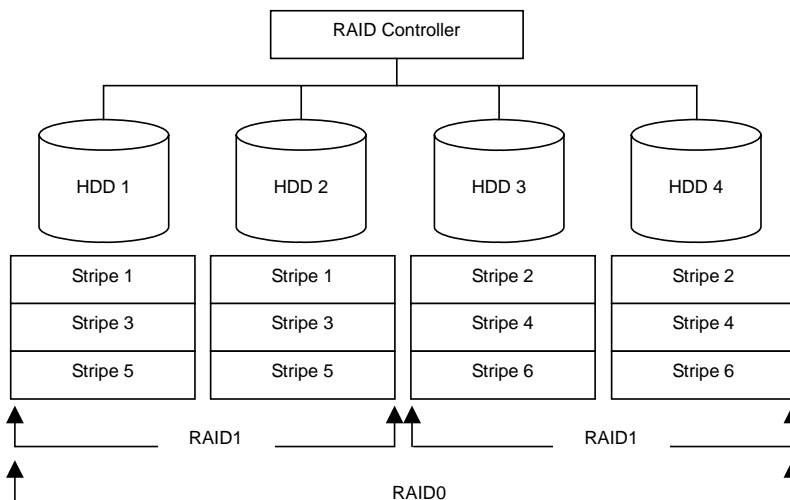
## RAID6

RAID 6 extends RAID 5 by adding an additional parity block (Q) created by different calculation method such as weighting by some factor, and thus uses block-level striping with two parity blocks distributed across all the member disks. This mode is called "striping with duplex and distributed parity". Accordingly, the total capacity assigned to the parity is just the same as the capacity of two HDDs. If two of the HDDs configuring a logical drive are defective, data is still available.



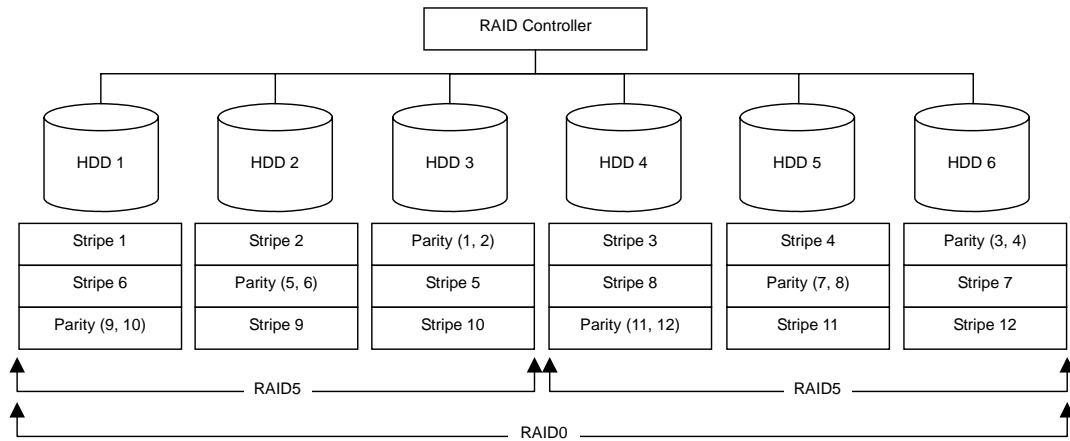
## RAID10

Data to be recorded is distributed to two HDDs in mirroring mode. Then, each mirrored data is written onto the HDDs by striping. This feature achieves the high disk access performance of RAID0 and, in addition, the high reliability of RAID1.



## RAID50

Data is distributed to the HDDs by striping with distributed parity, and then written onto the HDDs by striping. Owing to this feature, both the high disk access performance of RAID0 and, in addition, the high reliability of RAID5 can be achieved.



---

## Configuration using the Internal RAID Controller

This section describes how to use the internal hard disk drives as a RAID System using the Internal RAID Controller.

### Rebuild

If a HDD is defective, the rebuild feature can recover the data in the defective HDD. The rebuild can be applied to redundant virtual disks in the RAID1, RAID5, or RAID6 level.

### Manual Rebuild

The manual rebuild can be performed by using Universal RAID Utility, the management utility of the Internal RAID Controller. Select a HDD and start the rebuild manually.

For the detailed operation, refer to the "Universal RAID Utility User's Guide" in the EXPRESSBUILDER DVD included with the server.

### Auto Rebuild

The Onboard RAID Controller (MegaRAID ROMB) can automatically start the rebuild. The auto rebuild can be of two types, as follows:

- Standby rebuild

Automatic rebuild by using hot-spares. In a configuration including hot-spares, the rebuild is performed automatically if a HDD assigned to a virtual disk is defective.

- Hot-swap rebuild

Automatic rebuild by hot-swapping defective HDD.

---

**IMPORTANT:** Note the following for the rebuild:

- The HDD used for rebuild should have the same capacity, rotation speed, and standard as the defective HDD.
  - During rebuild, the processing rate is decreased due to the high load.
  - During rebuild, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as power interruption, turn on the power again as soon as possible. The rebuild restarts automatically.
  - The interval between the removal of the defective HDD and the installation of a substitute HDD should be at least 60 seconds.
  - If the hot-swap rebuild does not function, perform a manual rebuild.
-

## Patrol Read

The Patrol Read is a read & verify test in the entire area of HDDs. It can be performed for all the HDDs assigned to virtual disks and the hot-spares.

The Patrol Read allows subsequent defects of HDDs to be detected and repaired.

For HDDs configuring redundant virtual disks or those assigned to hot-spares, the error sectors detected during Patrol Read can be repaired.

---

**IMPORTANT:** Note the following for the patrol read:

- For the Internal RAID Controller, the Patrol Read feature is factory-set to "Enabled". For the external SAS HDD Disk Array Controller, the Patrol Read feature is either enabled or disabled depending on the firmware.
  - To change the Patrol Read settings, use the Universal RAID Utility.
  - If the system is restarted while running Patrol Read, Patrol Read resumes from the point where it was stopped.
- 

## Consistency Check

The Consistency Check is used to check the consistency among the virtual drives. It is available for the redundant virtual drives except for RAID0. It is also available for hot spare.

The Consistency Check can be performed through WebBIOS or the Universal RAID Utility.

The Consistency Check performs a consistency check but can also repair the error sectors. Accordingly, it can be used as preventive maintenance.

---

**IMPORTANT:** Note the following for Consistency Check:

- During Consistency Check, the processing rate is decreased due to the high load.
  - If the system is restarted, the Consistency Check is aborted and resumes after restart.
  - To schedule a Consistency Check execution, use WebBIOS, not the Universal RAID Utility.
-

---

## Background Initialize

The Background Initialize is automatically executed when RAID5 virtual disk is created in the disk group composed of five or more HDDs.

The Background Initialize performs the parity generation processing in the background of the area not initialized. This process is equivalent to the Consistency Check process.

However, the Background Initialize is not performed in the following cases.

- Full Initialize has already been executed and has completed normally before executing Background Initialize.  
(\* Full Initialize is a function that clears the entire area of a virtual disk with "0".
- Consistency Check has already been executed and completed normally before executing Background Initialize.
- Rebuild has already been executed and has completed normally before executing Background Initialize (for RAID5 only).
- "Yes" is specified for "Disable BGI" in VD Definition.
- Virtual disk is in degraded or offline state.  
Background Initialize is performed if a RAID6 virtual disk is partially degraded.

The Background Initialize is executed again if any of the following cases occurred in the virtual disk on which the Background Initialize has completed.

- When the virtual disk is degraded or offline, you execute Make Online to the HDD being in offline status, and the virtual disk state becomes Optimal.
- When you replace the RAID Controller with a maintenance parts or another.
- When you execute Reconstruction to an existing virtual disk to make a RAID5 VD with five or more HDDs.
- When you execute Reconstruction to an existing virtual disk to make a RAID6 VD with seven or more HDDs.

---

**IMPORTANT:** Note the following for Background Initialize:

- During the Background Initialize, the processing rate is decreased due to the high load.
  - Background Initialize will resume a few minutes later even if it is interrupted.
-

## Reconstruction

The reconstruction feature is used to change configuration and/or RAID level of existing virtual disk. The Reconstruction contains the following three features, however, the Internal RAID Controller only supports "Migration with addition".

---

**IMPORTANT:** You can use WebBIOS for Reconstruction. The Universal RAID Utility does not support Reconstruction.

---

### Removed physical drive

Unsupported.

### Migration only

Unsupported.

### Migration with addition

Use this feature to add HDDs to an existing virtual disk. The execution patterns are as shown below ( $\alpha$ : Number of HDDs to be added).

Before execution		After execution		Description
RAID level	Number of HDDs	RAID level	Number of HDDs	
RAID0	x	RAID0	$x+\alpha$	Capacity increased: equivalent to $\alpha$ HDDs
RAID0	1	RAID1	2	Capacity remains unchanged.
RAID0	x	RAID5	$x+\alpha$	Capacity increased: equivalent to $\alpha-1$ HDDs
RAID0	x	RAID6	$x+\alpha$ ( $\alpha=2$ or more)	Capacity increased: equivalent to $\alpha-2$ HDDs
RAID1	2	RAID0	$2+\alpha$	Capacity increased: equivalent to $\alpha+1$ HDDs
RAID1	2	RAID5	$2+\alpha$	Capacity increased: equivalent to $\alpha$ HDDs
RAID1	2	RAID6	$2+\alpha$	Capacity increased: equivalent to $\alpha-1$ HDDs
RAID5	x	RAID0	$x+\alpha$	Capacity increased: equivalent to $\alpha+1$ HDDs
RAID5	x	RAID5	$x+\alpha$	Capacity increased: equivalent to $\alpha$ HDDs
RAID5	x	RAID6	$x+\alpha$	Capacity increased: equivalent to $\alpha-1$ HDDs
RAID6	x	RAID0	$x+\alpha$	Capacity increased: equivalent to $\alpha+2$ HDDs
RAID6	x	RAID5	$x+\alpha$	Capacity increased: equivalent to $\alpha+1$ HDDs
RAID6	x	RAID6	$x+\alpha$	Capacity increased: equivalent to $\alpha$ HDDs

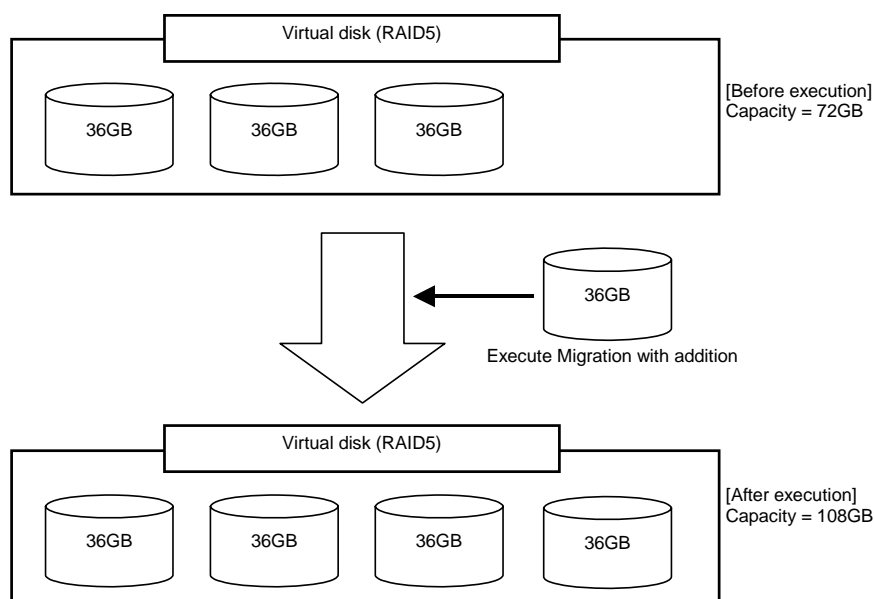
---

**IMPORTANT:** Note the following for the Reconstruction:

- Be sure to make a backup copy of the data and to perform a Consistency Check before starting the Reconstruction.
  - The Reconstruction is disabled in a configuration where several virtual disks are defined in one disk group.
  - During Reconstruction, the processing rate is decreased due to the high load.
  - The Reconstruction can be performed for a degraded or partially degraded virtual disk. However, it is recommended to execute a Rebuild to recover the virtual disk, then to execute the Reconstruction.
  - During the Reconstruction, do not shutdown or reboot the server. If the server is shutdown by an unforeseen accident such as a power interruption, turn on the power again as soon as possible. The Reconstruction restarts automatically.
  - In some configurations, the Background Initialize may start automatically upon the completion of the Reconstruction.
- 

### Ex: Migration with addition for RAID5 virtual disk

The figure below shows an example of adding a single 36GB HDD to a RAID5 virtual disk configured with three 36GB HDDs.



---

## Before Using WebBIOS

Read the following sections describing the supported functions and precautions before using "WebBIOS".

### Supported Functions

- Indication of the model name and capacity of hard disk drive (called HDD hereafter)
- Indication of the HDD allocation status
- Creation of the virtual disk
  - Setting the RAID level
  - Setting the Stripe Block size
  - Setting the Read Policy/Write Policy/IO Policy
- Indication of the configuration information and status of virtual disk
- Removal of the virtual disk
- Clearing of the configuration
- Execution of the initialization
- Execution of the Consistency Check
- Execution of the manual rebuild
- Execution of the reconstruction



## Notes on Creating the Virtual Drive

- The HDDs configuring the disk group should have the same capacity and rotation speed.
- Be sure to execute a Consistency Check after the creation of a VD.
- When installing an OS in the VD under the Onboard RAID Controller (MegaRAID ROMB), create a VD dedicated to the OS installation.
- WebBIOS cannot be handled via the remote console functions of NEC DianaScope.
- The physical drive numbers shown in WebBIOS and those shown in the Universal RAID Utility are identified as follows.

- WebBIOS

Enclosure number and slot number shown in Physical Drives box\*

\* "X:X:X" shown in the Physical Drives box represents

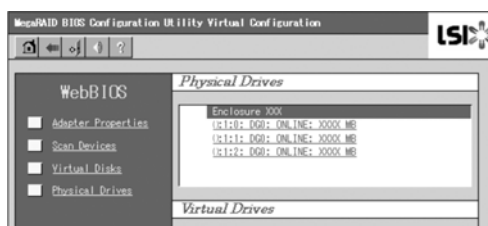
Connector number:Enclosure number:Slot number.

With this server, the Connector number is not supported, thus, it is always indicated as "()". The Enclosure Number is always "1". The Slot number (0 to 7) represents the slot number of the 2.5-inch hard disk drive bay.

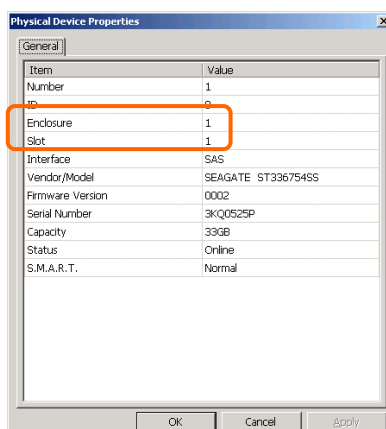
- Universal RAID Utility

Enclosure number and slot number shown in Physical Device Properties

Note that the slot numbers shown in the Physical Drives box of WebBIOS are represented by the 0-origin numbers, but those in the Universal RAID Utility are 1-origin numbers.



**Physical Drives View of WebBIOS**



**Property of Physical Device in Universal RAID Utility**

---

## Using WebBIOS

### Starting WebBIOS

1. Press **Esc** when a full-screen logo appears after powering on the server.
2. Press **Ctrl + H** on POST screen to start the WebBIOS.

#### *POST screen image (with no virtual disk assigned)*

```
LSI MegaRAID SAS-MFI BIOS Version XXXX (Build MMM DD, YYYY)
Copyright (c) xxxx LSI Corporation
HA -X (Bus X Dev X) MegaRAID SAS PCI 8708EM2
FW package: X.X.X-XXXX
```

```
X Logical Drive(s) found on the host adapter.
X Logical Drive(s) handled by BIOS
Press <Ctrl> <H> for WebBIOS
```

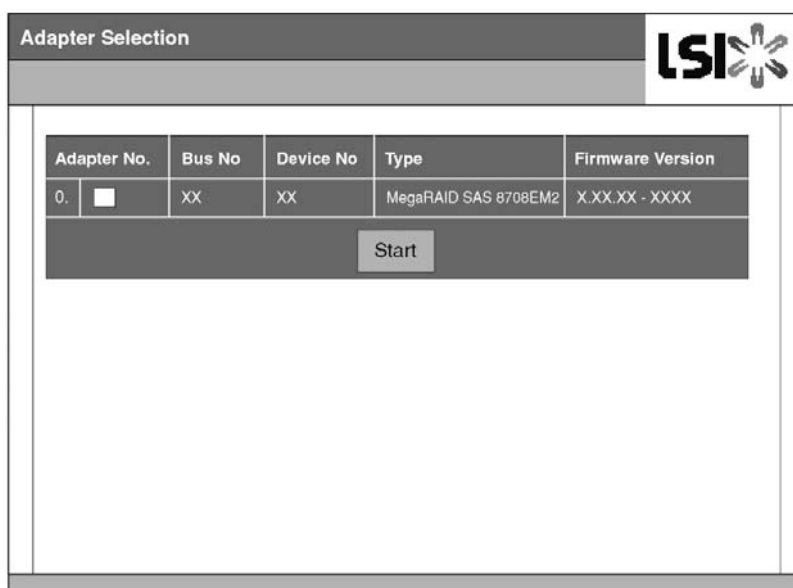
---

#### **IMPORTANT:**

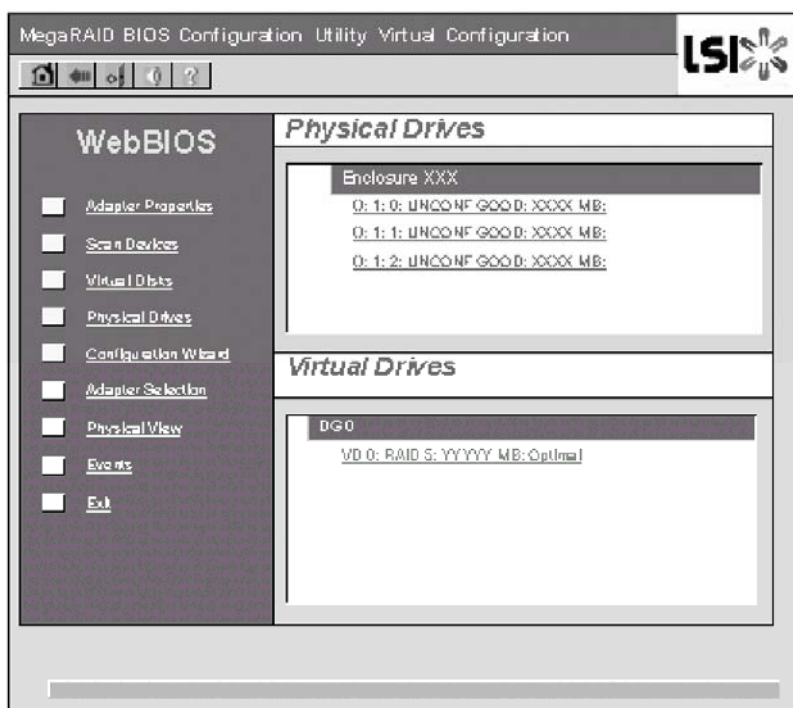
- Do not press unnecessary key such as **Pause** during POST.
  - If you fail to press **Ctrl + H** and the system proceeds without displaying the WebBIOS main menu (shown on the next page), reboot the system, and press **Ctrl + H** on the POST screen.
-

## Main Menu

The screen shown below is the [Adapter Selection] screen that appears first on WebBIOS. Select a controller to operate WebBIOS, and click [Start].



The WebBIOS Top Menu appears.



**IMPORTANT:** "X:X:X" shown in the Physical Drives box represents the Connector number:Enclosure number:Slot number. With this server, the Connector number is not supported, thus, it is always indicated as "()". The Enclosure number is always "1". The Slot number (0 to 7) represents a slot number of 2.5-inch hard disk drive bay.

## Adapter Properties

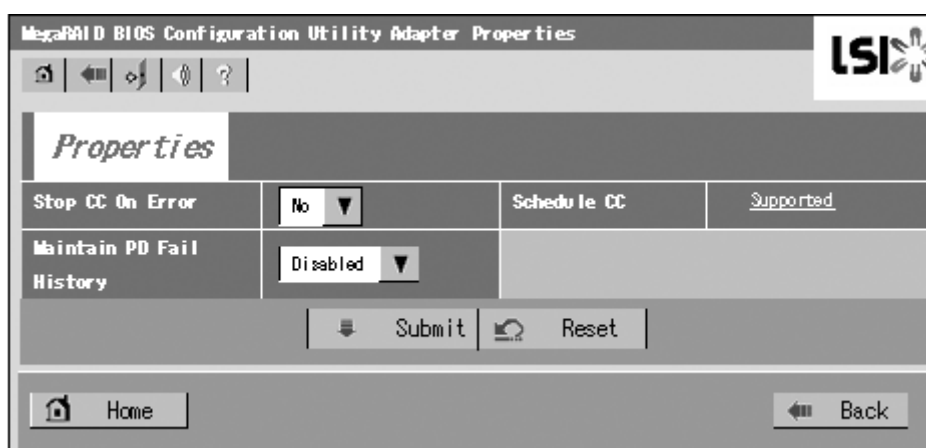
When you click [Adapter Properties] on the WebBIOS Top Menu, the configuration information is displayed.

MegaRAID BIOS Configuration Utility Adapter Information				LSI*
<b>MegaRAID SAS 8708EM2</b>				
Firmware Version X.XX.XX-XXXX		WebBIOS Version X.XX-XXX		
SubVendorID	0x1000	Sub Device ID	0x1013	
HostInterface	PCIE	Port Count	8	
NVRAM Size	32 KB	Memory Size	128 MB	
Firmware Time	XXX XX XXXX; XX: XX: XX	Serial Number	XXXXXXXX	
Min Stripe Size	8 KB	Max Stripe Size	1024K	
Virtual Disk Count	XX	Physical Disk Count	X	
Package Version		X.X.X-XXXX		
<input type="button" value="Next"/>				
<input type="button" value="Home"/>		<input type="button" value="Back"/>		

Click [Next] to see the detailed settings of this controller.

MegaRAID BIOS Configuration Utility Adapter Properties				LSI*
<i>Properties</i>				
Battery Back Up	Present	Coercion Mode	None	
Set Factory Defaults	No	PDF Interval	300	
Cluster Mode	Disabled	Alarm Control	Disabled	
Rebuild Rate	30	Patrol Read Rate	30	
BGI Rate	30	Cache Flush Interval	4	
CC Rate	30	Spinup Drive Count	2	
Reconstruction Rate	30	Spinup Delay	12	
Adapter BIOS	Enabled	Stop On Error	Disabled	
<input type="button" value="Submit"/> <input type="button" value="Reset"/> <input type="button" value="Next"/>				
<input type="button" value="Home"/>		<input type="button" value="Back"/>		

The detailed settings are continued to the next page. Click [Next] to view more information.



### Default settings and their explanation

Item	Default	Description	Change
Battery Backup	Present None	Displays Properties. <ul style="list-style-type: none"> <li>When battery is installed: Present</li> <li>When battery is not installed: None</li> </ul>	–
Set Factory Defaults	[No] Yes	Restores the vendor's factory defaults.	Prohibited *1
Cluster Mode	Disabled	–	Prohibited
Rebuild Rate	30	Recommended value: 30	Permitted
Patrol Read Rate	30	Recommended value: 30	Permitted
BGI Rate	30	Recommended value: 30	Permitted
CC Rate	30	Recommended value: 30	Permitted
Reconstruction Rate	30	Recommended value: 30	Permitted
Adapter BIOS	[Enabled] Disabled	–	Prohibited
Coercion Mode	[None] 128MB-way 1GB-way	–	Prohibited
PDF Interval	300	–	Prohibited
Alarm Control	[Disabled] Enabled Silence	Disabled: Does not issue an alarm.	Prohibited *2
Cache Flush Interval	4	–	Prohibited
Spinup Drive Count	2	–	Prohibited
Spinup Delay	12	–	Prohibited
StopOnError	[Disabled] Enabled	–	Prohibited
Stop CC On Error	[No] Yes	Specify the operation if an error is detected during the Consistency Check. No: Recover and resume. Yes: Abort	Permitted
Maintain PD Fail History	[Disabled] Enabled	–	Prohibited
Schedule CC	Supported	Set the scheduled consistency check.	Permitted

\*1 Do not perform "Set Factory Defaults". It changes the factory-set values which can no longer be restored afterwards.

## How to change setting value

On the [Adapter Properties] screen, change the parameter to the desired value, and then click [Submit].

If an optional battery is installed, the status of the "Battery Backup" is indicated as "Present". Clicking [Present] opens the Battery Status screen shown below.

The screenshot shows the 'MegaRAID BIOS Configuration Utility Battery Module' interface. It features a navigation bar at the top with icons for Home, Back, Forward, and Help. The main content area is divided into several sections:

- Battery Type:** iBBU
- Voltage:** XXXXX mV
- Current:** X
- Temperature:** XX deg centigrade
- Status:**
  - Gas Gauge Status : xxxxxxxx
  - Fully Charge Capacity remaining : XX%
  - Design Charge Capacity remaining : XX%
  - Expected margin of error :XX%
- Design Info:**
  - Mfg Name: LSI CORP
  - Mfg Date: MM/DD/YYYY
  - Serial No: XXXX
  - Design Capacity: 790mAh
  - Design Voltage: 3700mV
  - Device Name: 2970700
  - Device Chemistry: LION
- Capacity Info:**
  - FullCharge Capacity: XXXmAh
  - Remaining Capacity: XXXmAh
- Properties:**
  - Auto Learn Period (days) 30
  - Next Learn Time XX/XX/XXXX;XX/XX/XX
  - Learn Delay Interval (hrs) 0
  - Auto Learn Mode Disabled

At the bottom of the main content area, there is a 'Go' button. The footer contains 'Home' and 'Back' buttons.

**IMPORTANT:** You cannot change the "Auto Learn Period", "Next Learn Time", and "Learn Delay Interval" values.

### NOTES:

- The Status field shows "Charging" when the battery is charged. It shows "Discharging" when the battery is discharged.
- When powering on the server after the battery replacement, the Status may not immediately change to "Charging". In that case, leave the server powered on for several hours, and check "Status" again.

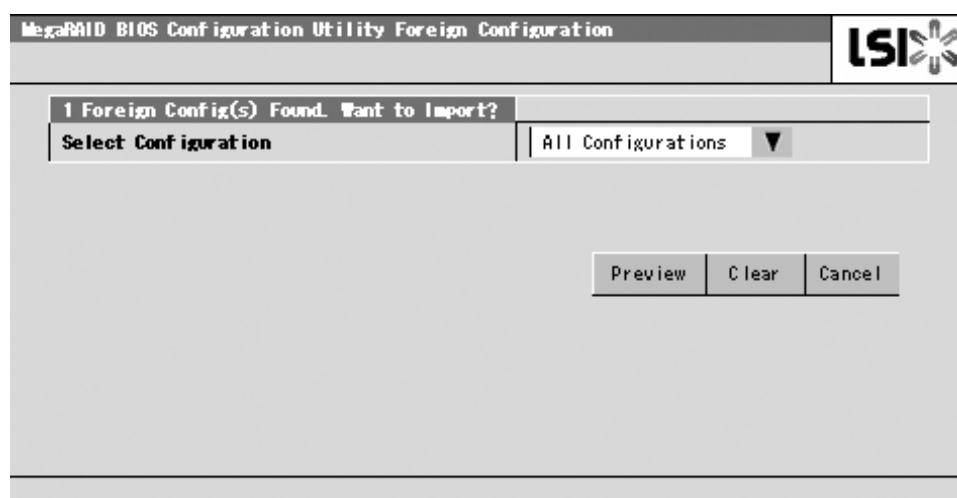
## Scan Devices

When you click [Scan Devices] on the WebBIOS Top Menu, the HDDs connected are detected again. Use this feature if you have installed a new HDD while the WebBIOS was running.

---

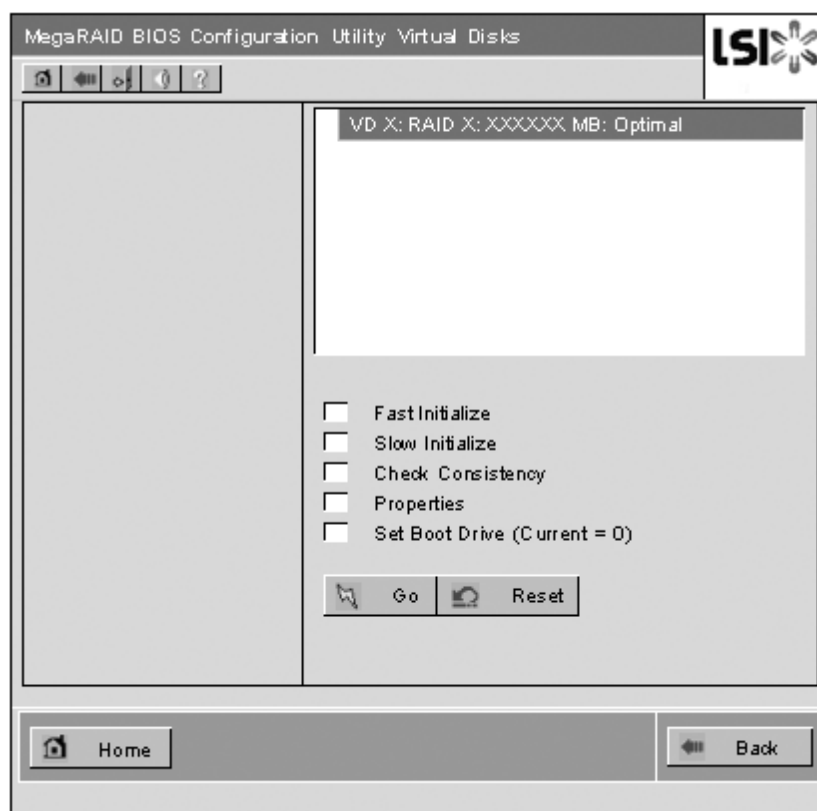
### IMPORTANT:

- If the newly connected HDD contains another configuration information, the [Foreign Configuration] screen shown below appears. To use the HDD as new one, click [Clear] to clear the configuration information in HDD.
  - If you use the Universal RAID Utility to configure a RAID system using the newly connected HDD containing another configuration information, first clear the other configuration information using the Scan Devices feature.  
(\* Universal RAID Utility does not include this feature.)
- 



## Virtual Disks

When you click on [Virtual Disks] on the WebBIOS Top Menu, the screen that appears can be used to operate the configured VD.



---

**IMPORTANT:** If no virtual disk exists, the upper right column of the screen is blank. Use this menu only when a virtual disk exists.

---



## Physical Drives

When you click on [Physical Disks] on the WebBIOS Top Menu, the screen that appears can be used to operate the physical drive (HDD).

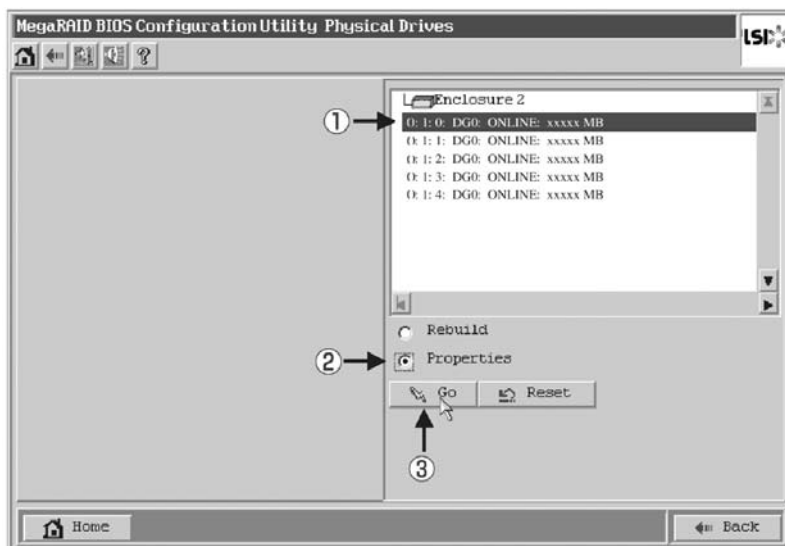


**IMPORTANT:** If no physical disk exists, the upper right column of the screen is blank. Use this menu only when a physical disk exists.

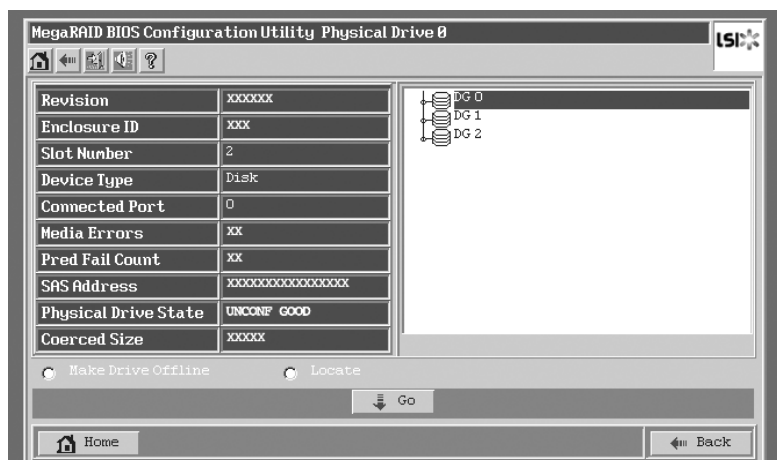
## Physical Drives Properties

Use the following procedure to check the Physical Drive Properties. The example shown below is an example of the physical drive 0:0:0 properties check.

1. Click the Physical Drive you want to check.
2. Click the checkbox for [Properties].
3. Click [Go].



The Properties screen shown below appears.



## Configuration Wizard

Use this wizard to configure a RAID system using the connected HDDs. The detailed explanation of this feature is given in "Configuring Virtual Disk".

## Adapter Selection

If optional RAID Controller is installed in the server, you need to select an adapter controlled by WebBIOS to configure each adapter. Clicking [Adapter Selection] on the WebBIOS top menu opens the [Adapter Selection] screen again.

## Physical View / Logical View

If the virtual disk has been configured using the RAID Controller, the DG (disk group) is displayed on the WebBIOS Top Menu. Clicking [Physical View] displays information for the HDDs in the DG. Clicking [Logical View] displays the virtual disk in the DG.

## Events

The Events screen is used to confirm the system events.

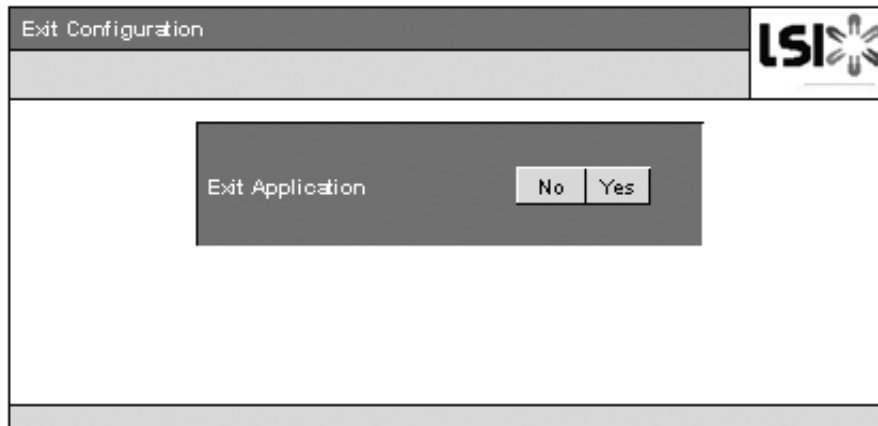
---

**IMPORTANT:** The Internal RAID Controller does not support the Events feature.

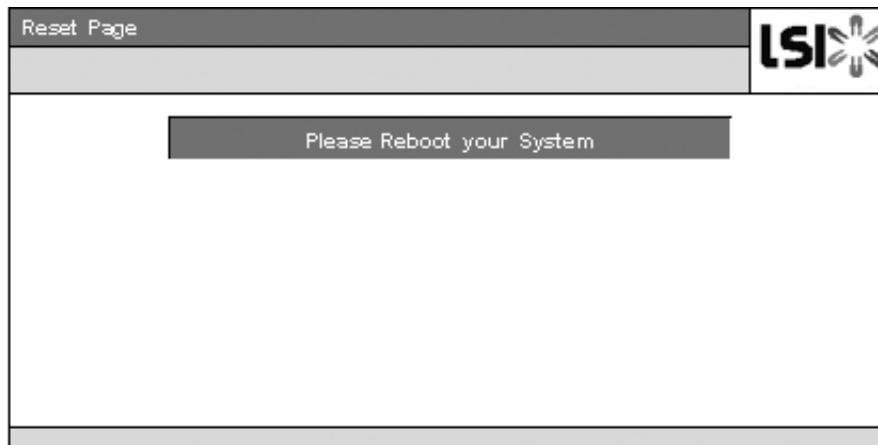
---

## Exit

When you click [Exit] on the WebBIOS Top Menu, you are prompted for confirmation. Click [Yes] to exit from WebBIOS.



The screen as shown below appears when WebBIOS is terminated. Restart the server.

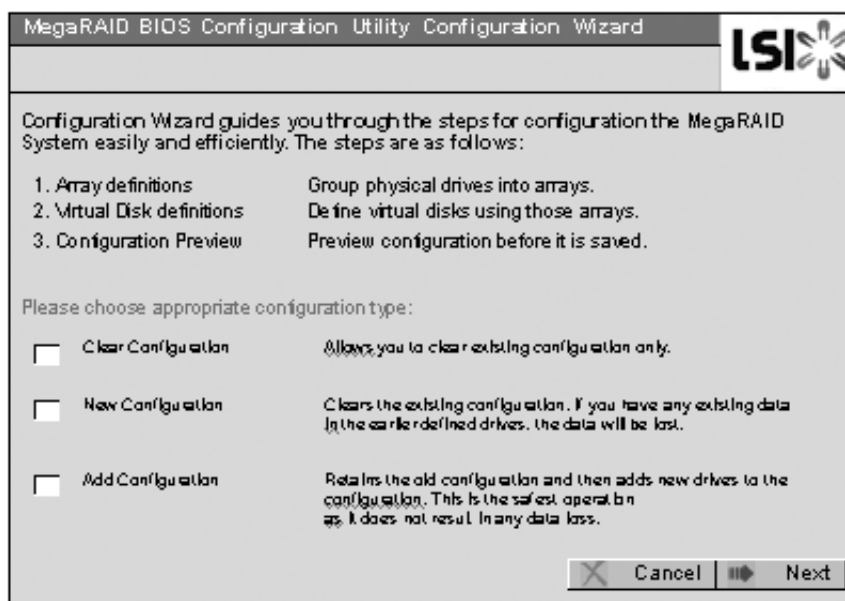


## Configuring a Virtual Disk

This section describes the procedures for the configuration of a VD (virtual disk) using WebBIOS.

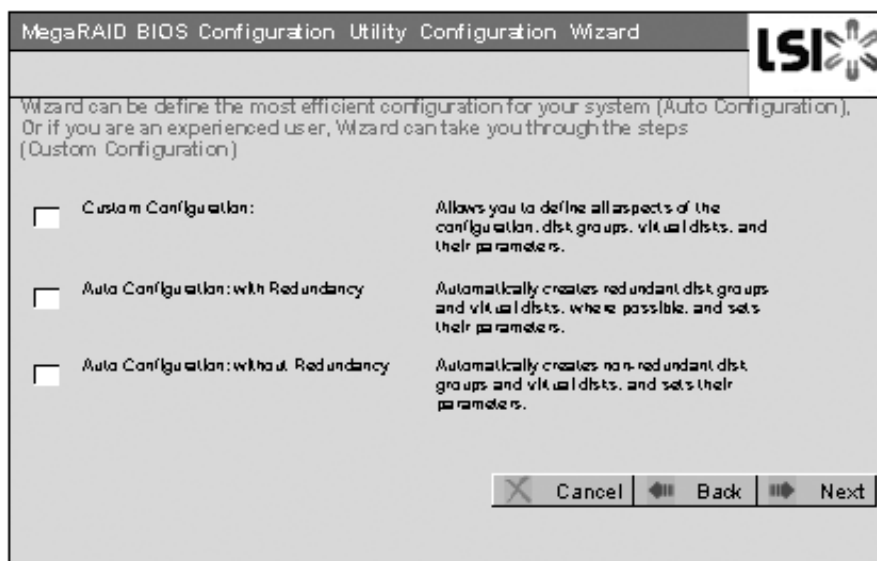
### Configuration Wizard

When you click [Configuration Wizard] on the WebBIOS Top Menu, the screen shown below appears. Select the relevant operation, and click [Next].



Clear Configuration	Allows you to clear the existing configuration.
New Configuration	Clears the existing configuration and creates a new VD. If you have any existing data in the virtual disk defined earlier, the data will be lost.
Add Configuration	Retains the old configuration and then adds a new virtual disk.

When you select [New Configuration] or [Add Configuration], the screen shown below appears.



Custom Configuration: Allows you to define all aspects of the configuration, RAID level, size, and others.

Auto Configuration with Redundancy: Automatically creates a redundant virtual disk.

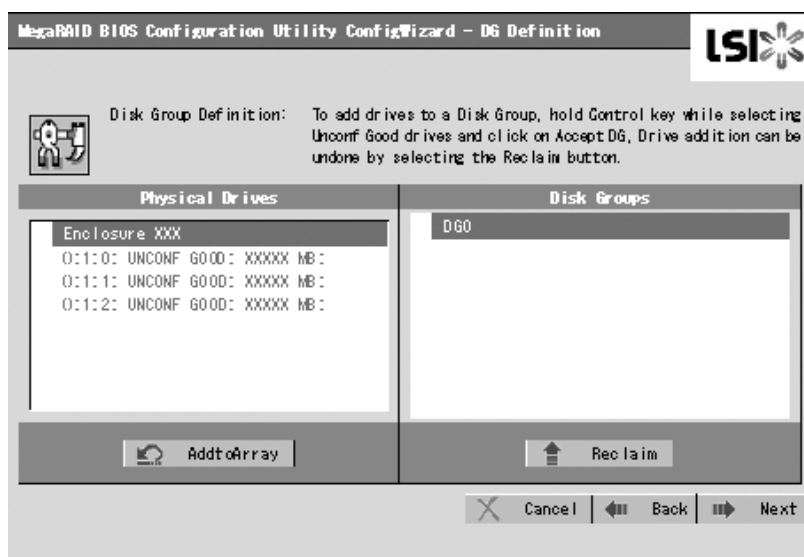
Auto Configuration without Redundancy: Automatically creates a non-redundant virtual disk.

---

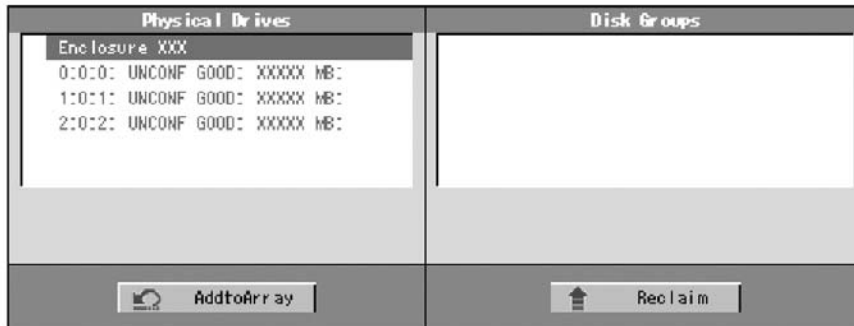
**IMPORTANT:** The Internal RAID Controller supports "Custom Configuration" only.

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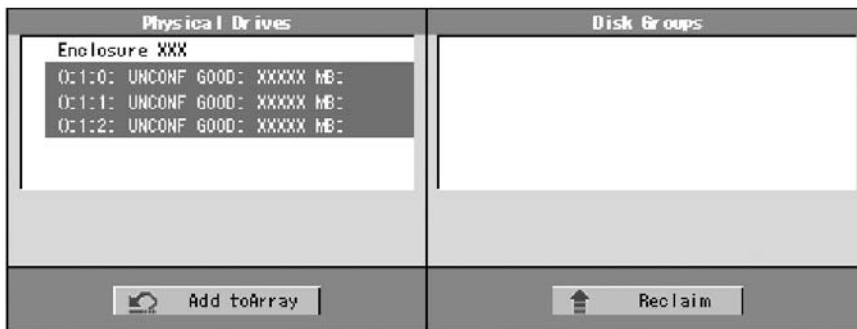
Use this menu to define several physical drives (PD) as a disk group (DG).



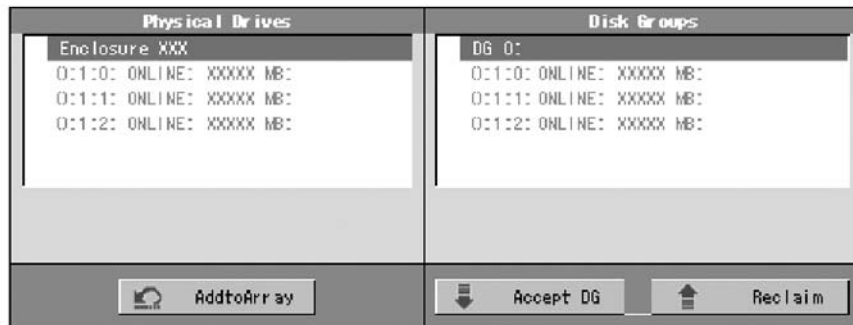
1. To add physical drives (HDDs) to a Disk Group, hold **Ctrl** and select the relevant physical drives (HDDs).



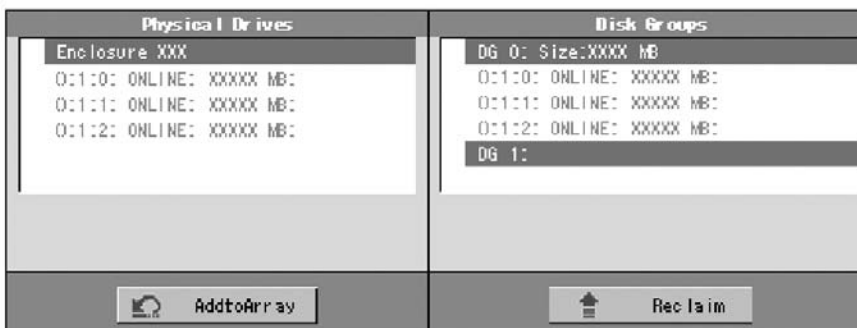
2. Once the selection is completed, click [Add to Array].



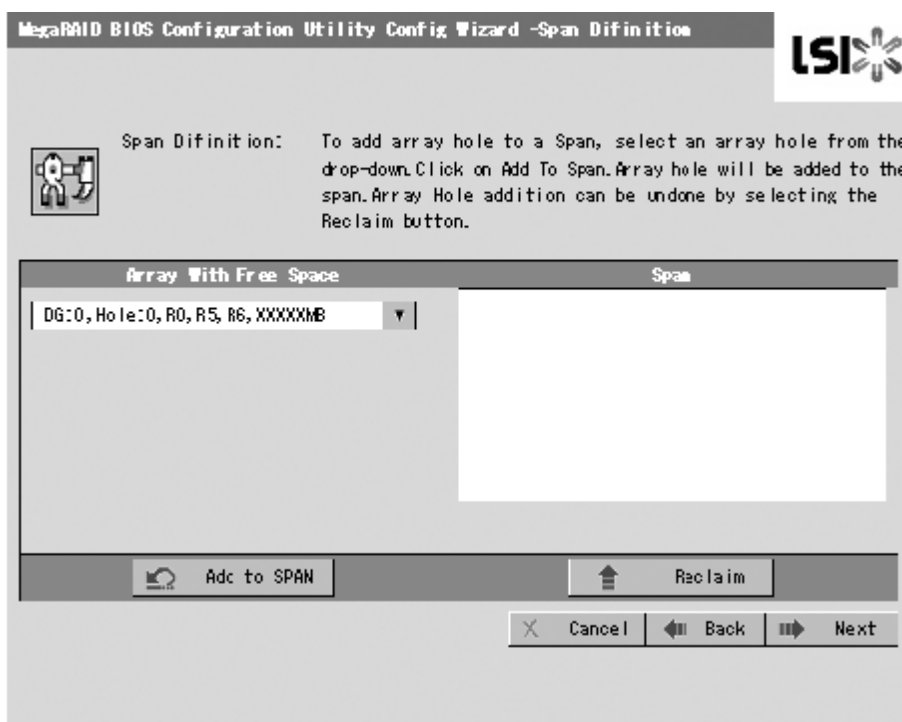
3. A new DG is defined in the Disk Groups frame. To define the new DG, click [Accept DG].



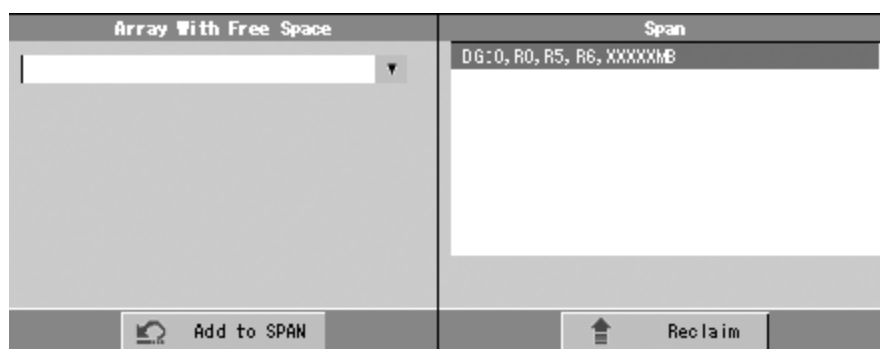
4. Once the DG has been defined, click [Next].



5. The Span Definition screen is displayed.



6. Select a DG to define VD from "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.



7. After the Span has been defined, click [Next] at the lower right of the screen.

---

**IMPORTANT:**

- To configure RAID0, 1, 5, or 6, perform the Span Definition to a single DG only. If you need to perform a Span Definition to several DGs, define the VD for the first DG, then select the next DG to define VD.
  - Span Definition cannot be performed to DGs containing a different number of HDDs.
-



Define the virtual disk (VD) in the DG that has been created in previous step.

When the DG is defined, the [VD Definition] screen is displayed. In the "Next LD, Possible RAID Levels" column, the available RAID levels and maximum size for the VD are displayed.

MegaRAID BIOS Configuration Utility ConfigWizard - VD Definition		LSI
RAID Level	RAID 6	<p>Next LD, Possible RAID Levels</p> <p>R0:XXXXX R5:YYYYY R6:ZZZZZ</p>
Strip Size	64 KB	
Access Policy	RW	
Read Policy	Normal	
Write Policy	WBack	
<input type="checkbox"/> Wrthru for BAD BBU		
IO Policy	Direct	
Disk Cache Policy	Disable	
Disable BGI	No	
Select Size	ZZZZZ MB	
<input type="button" value="Accept"/> <input type="button" value="Reclaim"/>		
<input type="button" value="Cancel"/> <input type="button" value="Back"/> <input type="button" value="Next"/>		

As an example, define a RAID5 VD of yyyyy MB.

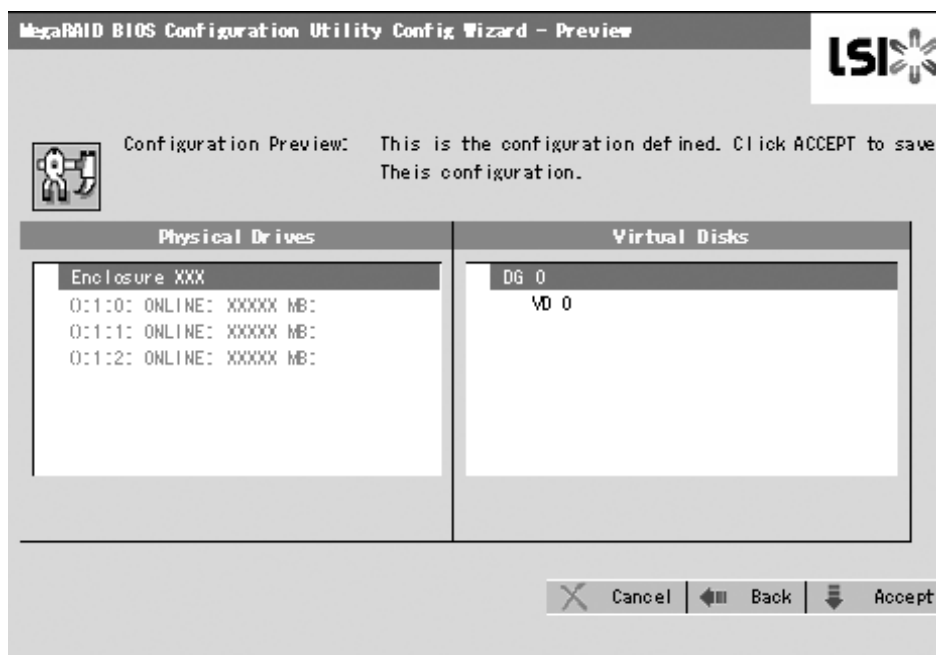
1. Specify the necessary parameters in the left column.
2. Enter "yyyyy" in the "Select Size" field.
3. Click [Accept].
4. If you want to define another VD, click [Back] and repeat the steps starting from the Span Definition screen.
5. When the VD definition is completed, click [Next].

MegaRAID BIOS Configuration Utility ConfigWizard - VD Definition		LSI*
RAID Level	RAID 0 ▼	DG 0 VD 0  Press Back Button To Add Another VD.
Strip Size	64 KB ▼	
Access Policy	RW ▼	
Read Policy	Normal ▼	
Write Policy	Write Back ▼	
<input type="checkbox"/> Wrrthru for BAD BBU		
IO Policy	Direct ▼	
Disk Cache Policy	Disable ▼	
Disable BGI	No ▼	
Select Size	0 MB	
<input type="button" value="Reclaim"/>		
<input type="button" value="Cancel"/>   <input type="button" value="Back"/>   <input type="button" value="Next"/>		

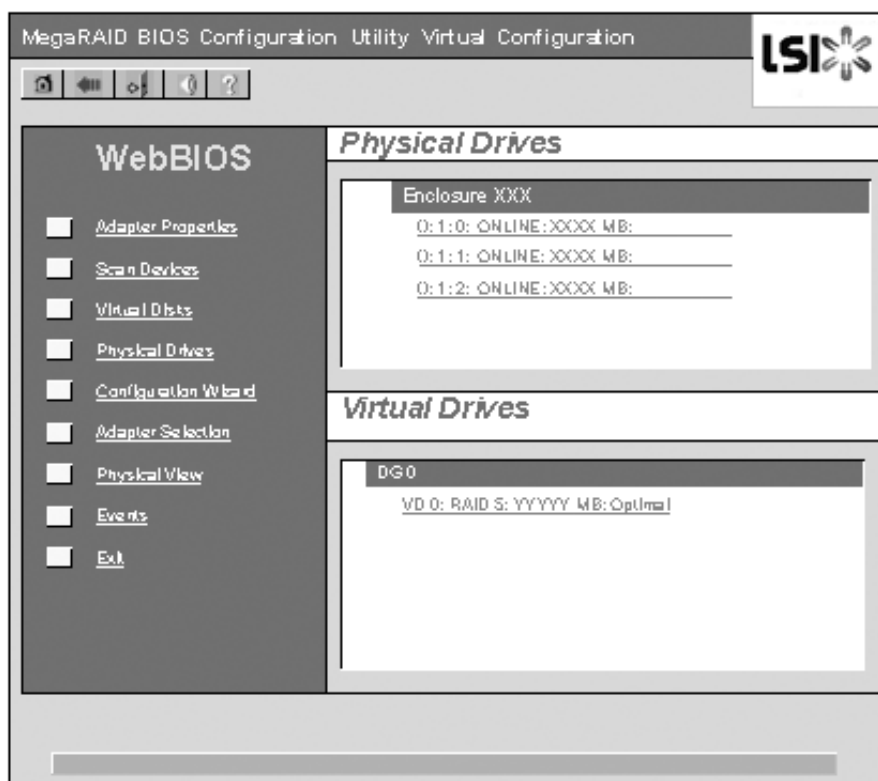
### IMPORTANT:

- The value shown in "Select Size" indicates the maximum size allowed for RAID1 or RAID6. You need to specify the maximum size for RAID0 or RAID5 according to "Next LD, Possible RAID Levels".
- To use RAID 5 or RAID 6, you need to install the optional RAID Upgrade Kit.
- If no optional RAID Upgrade Kit is installed, do not select the "RAID5" option that may appear in the [RAID Level] box. If you select it, you will fail to save the configuration information, and you will need to define a VD again from the start.

6. VD 0 is created in the DG 0 as shown in the screen below.



7. Make sure that the VD parameters are correct, and click [Accept].
8. The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.
9. The confirmation message "All data on the new Virtual Disks will be lost. Want to Initialize?" appears. Select "Yes".
10. The "Virtual Disks" operation screen is displayed. If no other operation is required, click [Home].
11. The WebBIOS Top Menu is displayed. The Virtual Disk you have created is displayed in the lower right frame of the screen.

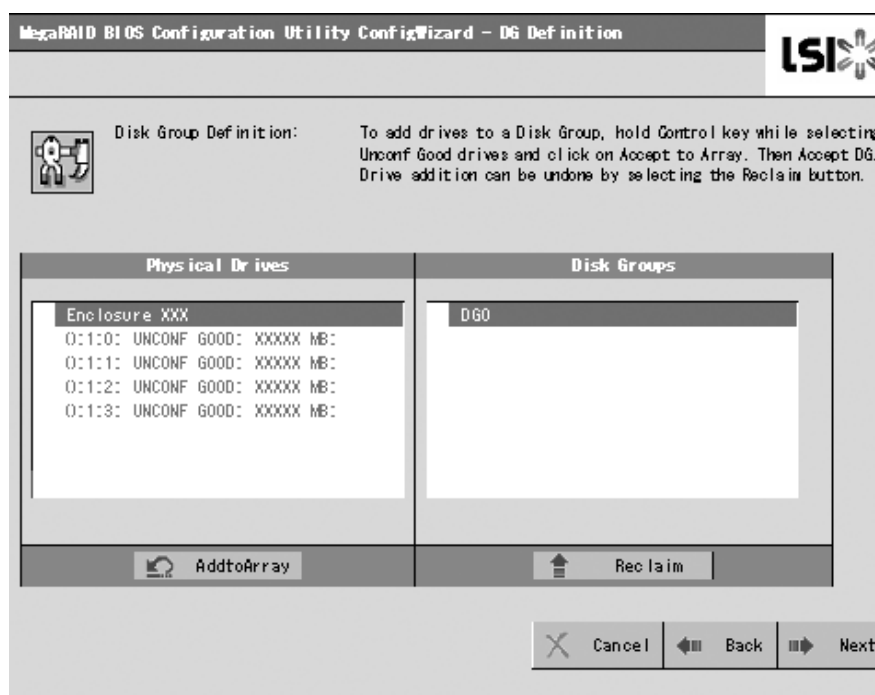


## Configure SPAN

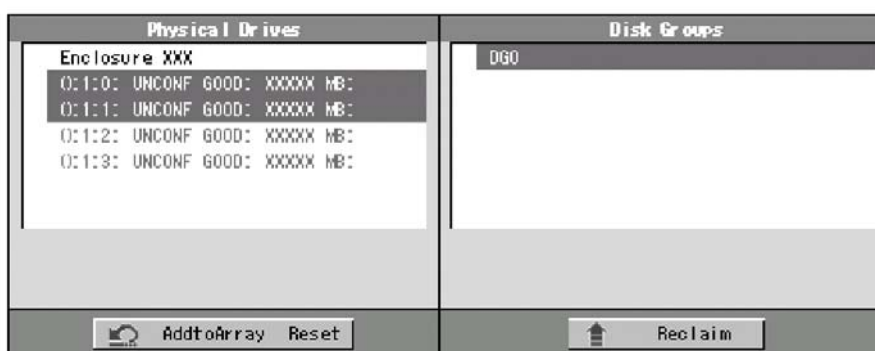
The following explains the sample procedure to configure a RAID10 (spanning of RAID1) with four HDDs.

**IMPORTANT:** Do not attempt to configure a RAID00 or RAID60. They are not supported.

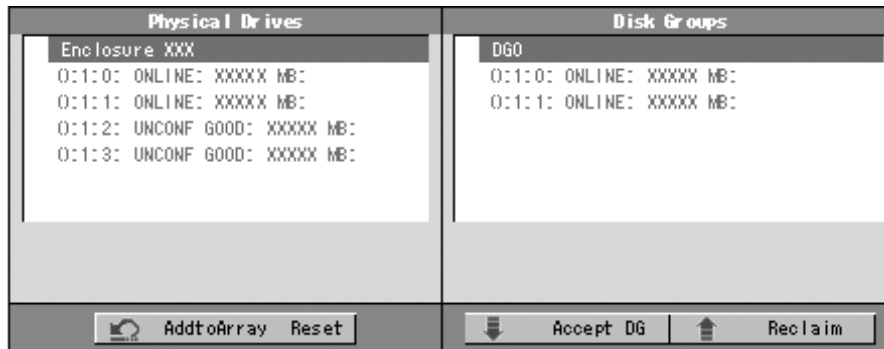
1. Click [Configuration Wizard] on the WebBIOS Top Menu to start the Wizard.



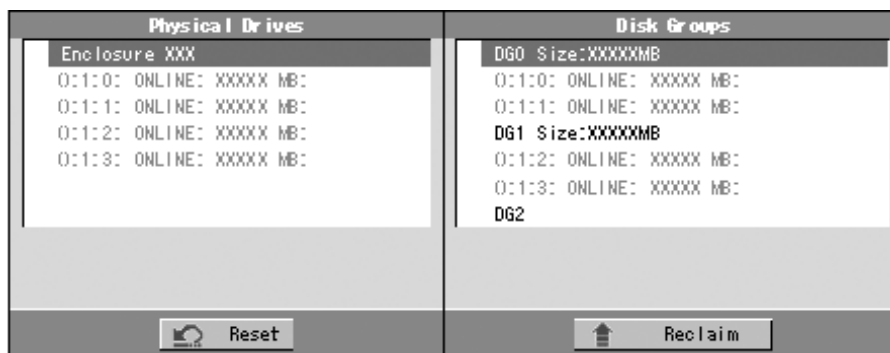
2. To add physical drives (HDD) to a Disk Group, hold **Ctrl** while selecting the HDDs in the DG. (In the example, two DGs will be configured and spanned.)



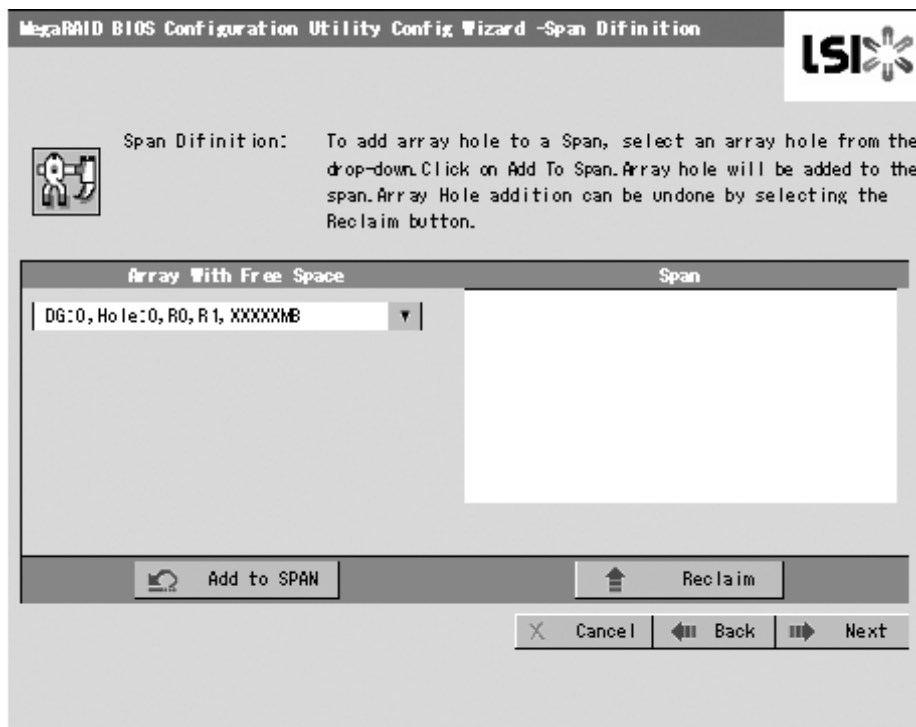
- When the selection is completed, click [Add to Array]. Make sure that the new DG is defined in the Disk Groups frame to the right, and click [Accept DG].



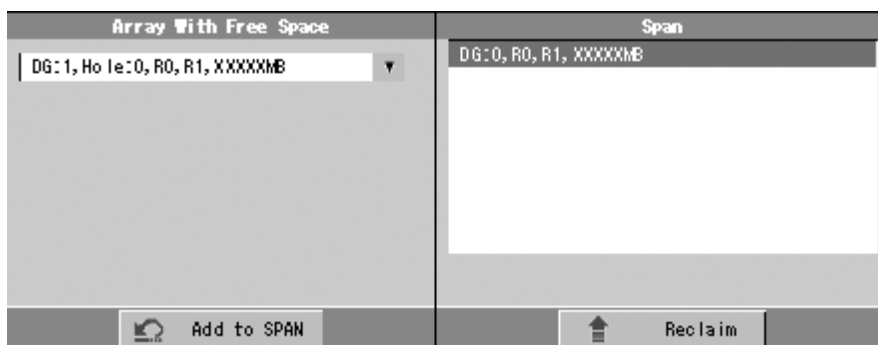
- A new DG is defined in the Disk Groups frame. Define another DG in the same way. Once the DGs have been defined, click [Next].



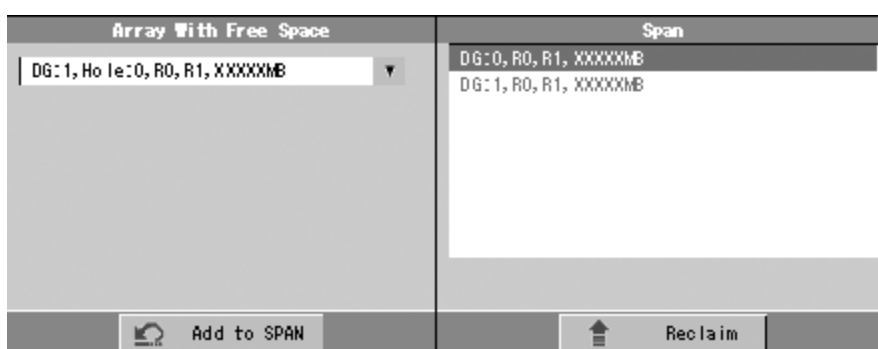
- Configure a RAID10 (spanning of RAID1) using the two DGs that have been created in the previous step. When the DGs are defined, the [VD Definition] screen is displayed.




6. Select DG0 from the "Array With Free Space" frame, then click [Add to SPAN]. The DG is defined in the "Span" field to the right.




7. Select DG1 and click [Add to SPAN]. When the two DGs are defined in the "Span" field to the right, click [Next].



8. The VD Definition screen is displayed. Enter the necessary parameters, and click [Accept].

MegaRAID BIOS Configuration Utility ConfigWizard - VD Definition 

RAID Level	RAID 10	 <p>Next LD, Possible RAID Levels R00:XXXXX R10</p>
Strip Size	64 KB	
Access Policy	RW	
Read Policy	Normal	
Write Policy	WBack	
<input type="checkbox"/> Wrthru for BAD BBU		
IO Policy	Direct	
Disk Cache Policy	Disable	
Disable BGI	No	
Select Size	ZZZZZ MB	

9. Make sure that both DG0 and DG1 are defined as VD 0, and click [Next].

MegaRAID BIOS Configuration Utility Config Wizard - VD Definition

LSI

RAID Level	RAID 0
Strip Size	64 KB
Access Policy	RW
Read Policy	Normal
Write Policy	WBack
<input type="checkbox"/> Wrtthu for BAD BBU	
IO Policy	Direct
Disk Cache Policy	Disable
Disable BGI	No
Select Size	0 MB

Virtual Disks:

```

DG 0
  VD 0
DG 1
  VD 0
  
```

Press Back Button To Add Another VD.

Reclaim

Cancel Back Next

10. On the "Preview" screen, make sure that the VD is defined correctly, and click [Accept].

MegaRAID BIOS Configuration Utility Config Wizard - Preview

LSI

Configuration Preview: This is the configuration defined. Click ACCEPT to save This configuration.

Physical Drives	Virtual Disks
Enclosure XXX	DG 0
0:1:0: ONLINE: XXXXX MB:	VD 0
0:1:1: ONLINE: XXXXX MB:	DG 1
0:1:2: ONLINE: XXXXX MB:	VD 0
0:1:3: ONLINE: XXXXX MB:	

Cancel Back Accept

11. The confirmation message "Save this Configuration?" appears. Click "Yes" to save the configuration.
12. The confirmation message "All data on the new Virtual Disks will be lost. Want to Initialize?" appears. Normally, select "Yes".
13. "Virtual Disks" operation screen is displayed. If no other operation is required, click [Home] at the lower left of the screen.
14. The WebBIOS Top Menu is displayed. Virtual Disk you have created is displayed in the lower right frame of the screen.

## Parameters for VD Definition

Listed below are parameters for Configuration Wizard.

Item	Parameter	Remarks
RAID Level	<b>RAID 0 / RAID 1 / RAID 5 / RAID 6 / RAID 00 / RAID 10 / RAID 50 / RAID60</b>	RAID 00 and RAID 60 are not supported.
Strip Size	8 KB / 16 KB / 32 KB / <b>64 KB</b> / 128 KB / 256 KB / 512 KB / 1024 KB	Recommended value: 64KB
Access Policy	<b>RW</b> / Read Only / Blocked	Recommended value: RW
Read Policy	<b>Normal</b> / Ahead / Adaptive	Recommended value: Normal
Write Policy	<b>WBack</b> / <b>WThru</b>	WBack: WriteBack WThru: WriteThru
WrtThru for BAD BBU	<b>Checked</b> / Unchecked	Select a mode when WriteBack is specified for Write Policy. Checked: Normal WriteBack Unchecked: Constant WriteBack Recommended value: Checked
IO Policy	<b>Direct</b> / Cached	Recommended value: Direct
Disk Cache Policy	NoChange / Enable / <b>Disable</b>	Recommended value: Disable
Disable BGI	<b>No</b> / Yes	Specify whether to perform Background Initialize after creation of VD. Recommended value: No

### IMPORTANT:

- BGI (Back Ground Initialize) is available only for a RAID5 VD configured with five or more HDDs or a RAID6 VD configured with seven or more HDDs.
- To use RAID 5 or RAID 6, you need to install the optional RAID Upgrade Kit.
- If no optional RAID Upgrade Kit is installed, do not select the "RAID5" option that may appear in the [RAID Level] box. If you select it, you will fail to save the configuration information, and you will need to define a VD again from the start.

The Write Policy includes the following modes depending on the combination with WrtThru for BAD BBU. Select a mode suitable for your environment.

		<b>WrtThru for BAD BBU</b>	
		<b>Checked</b>	<b>Unchecked</b>
Write Policy	WBack	Normal write back mode (recommended) This mode is available only when the additional battery backup is installed. The controller uses the cache memory for writing. However, if the battery is being charged or failed, the controller operates automatically in WThru (write through) mode. Thus, this mode can provide higher data security.	Constant write back mode This mode is available even if the additional battery backup is not installed. The controller uses the cache memory for writing. In this mode, the data in cache memory is not protected from damage if a power failure occurs due to a charged/discharged or defective battery. Be sure to use a UPS when specifying this mode for write policy.
	WThru	Write through mode This mode is recommended when the additional battery backup is not installed. The controller does not use cache memory to write the data.	* This mode is unavailable. If you do not check "WrtThru for BAD BBU" at the creation of VD, this item is automatically checked after the VD has been created.



You can change the parameters for the VD definition except for the RAID level and Stripe Size. On the WebBIOS Top Menu, click [Virtual Disks], specify the parameters in the "Policies" frame, and click [Change].

MegaRAID BIOS Configuration Utility Virtual Disk X

LSI

**Properties**  
RAID Level: X      State: Optimal  
Size: XXXXX MB      Strip Size: XX KB

**Policies**  
Access: RW      Read: Normal  
Write: WBack      Disk: Disable  
Cache:      I/O: Direct  
 Use wthru for failure or missing battery  
Disable BGI: No

**Operations**  
 Del     Locate     Fast Init     Slow Init  
 CC

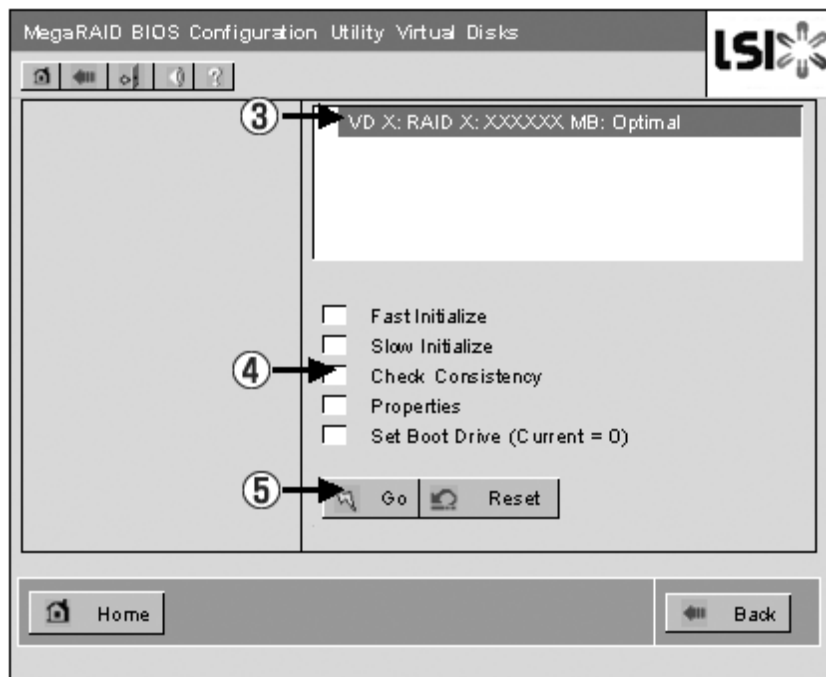
Remove physical drive  
DG 0  
0:1:0: XXXXX MB  
0:1:1: XXXXX MB  
 Migration only  
RAID 6  
 Migration with addition  
0:1:3: XXXXX MB  
0:1:4: XXXXX MB  
0:1:5: XXXXX MB

---

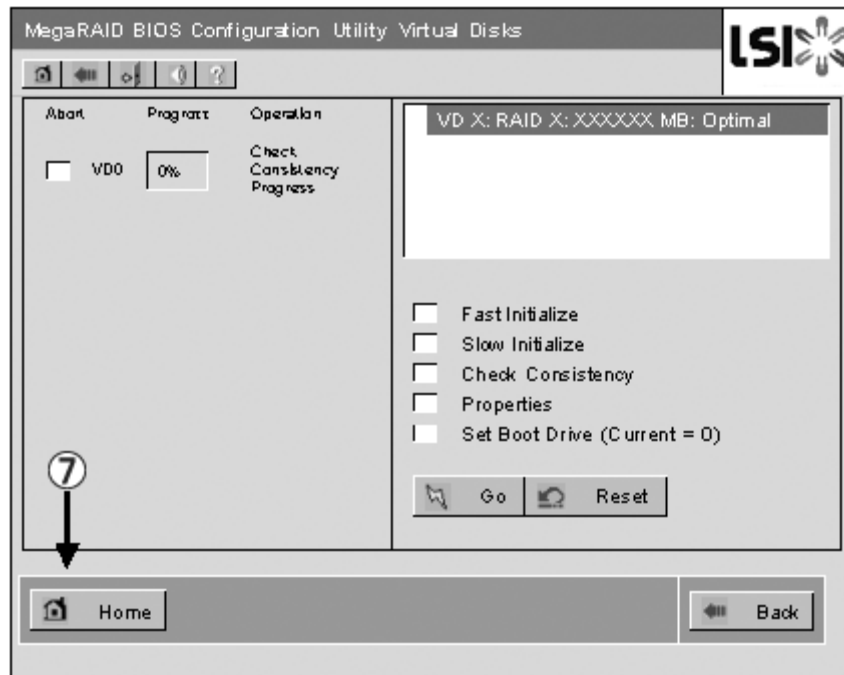
## Operation of the Various Features

### Check Consistency

1. Start WebBIOS.
2. Click [Virtual Disks] on the WebBIOS Top Menu.
3. Select a VD on which to perform a Check Consistency from the upper right frame of the Virtual Disks screen.
4. Click the checkmark column for Check Consistency from the lower right frame of the Virtual Disks screen.
5. Make sure that Check Consistency is checked, and click [Go].



6. The Check Consistency progress is displayed on the left frame of the Virtual Disks screen.
7. Click [Home] to return to the Top Menu.



---

**IMPORTANT:** Click [Home] while a background task such as Consistency Check, Rebuild, or Reconstruction is being executed. When the progress indication is displayed, the background task may process at a slower rate.

---

## Manual Rebuild

The procedures described below are based on the following assumption:  
One of the HDDs failed in a RAID5 virtual disk configured with three HDDs.

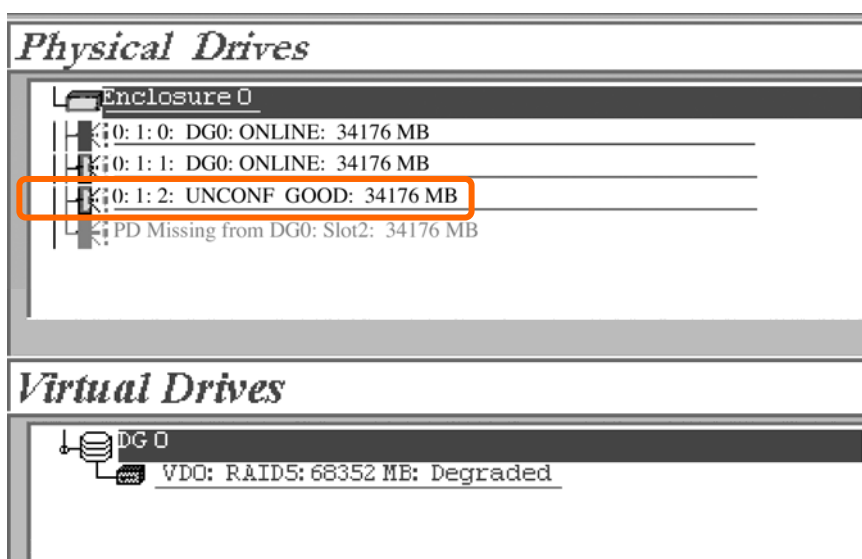
Power off the server and replace the failed HDD with a new one. The Auto Rebuild feature is disabled for non-hot-swap replacement. Use the Manual Rebuild feature to recover the virtual disk as described below.

### 1. Start WebBIOS.

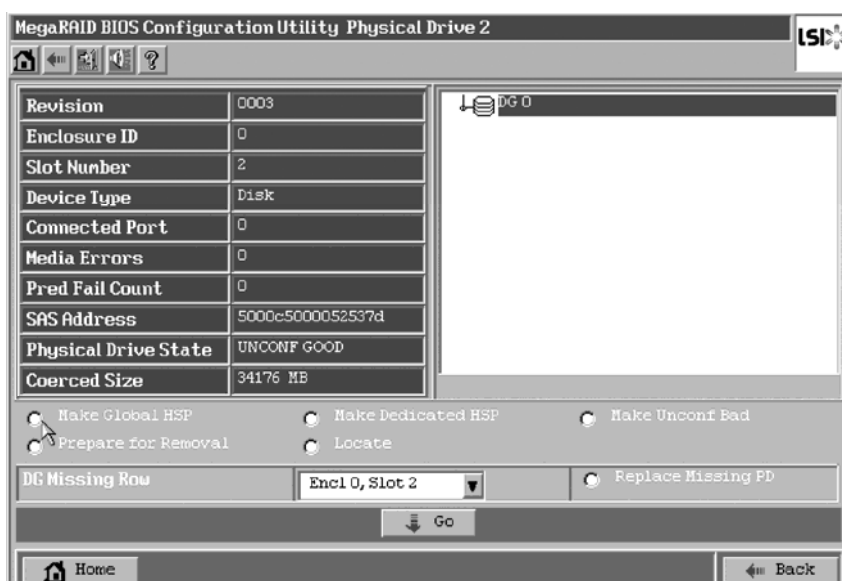
Make sure that the status for the replaced HDD is indicated as "UNCONF GOOD" in the right frame of the Top Menu.

In the example below, the hard disk drive in slot number 2 has been replaced.

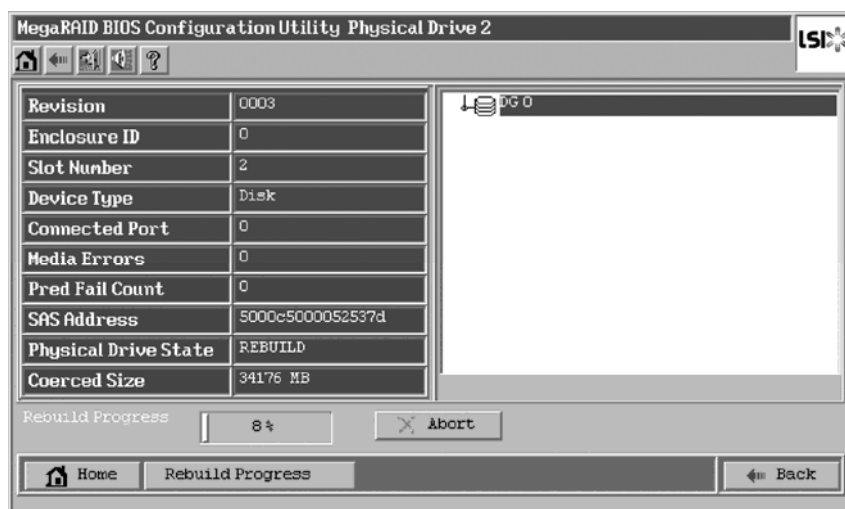
The indication "PD Missing from DGx: Slot 2: xxxxx MB" indicates that the PD (physical drive) installed in slot number 2 was removed.



2. Select "2:0:2" (newly connected HDD) in [Physical Drives].
3. The properties for the Physical Drive are displayed.
4. Select "Make Global HSP" or "Make Dedicated HSP", and then click [Go].



5. When the [Rebuild Progress] is displayed, click [Home] to go back to the WebBIOS Top Menu.



**IMPORTANT:** Click [Home] while a background task such as Consistency Check, Rebuild, or Reconstruction is being executed. When the progress indication is displayed, the background task may process at a slower rate.

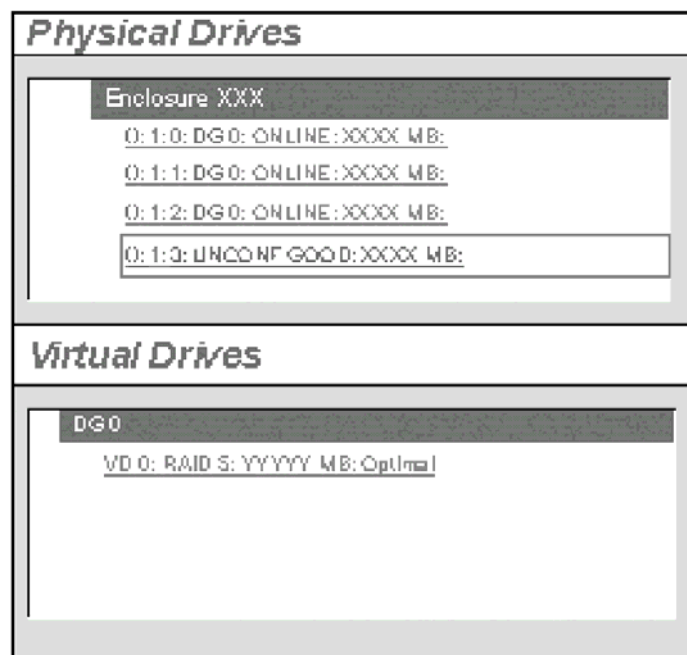
## Setting Hot Spare

The procedures described below are based on the following assumption:

Add a HDD to a RAID5 virtual disk configured with three HDDs and assign a newly added HDD as Hot Spare.

1. Start WebBIOS.

Make sure that the status for the added HDD is indicated as "UNCONF GOOD" in the right frame of the Top Menu.

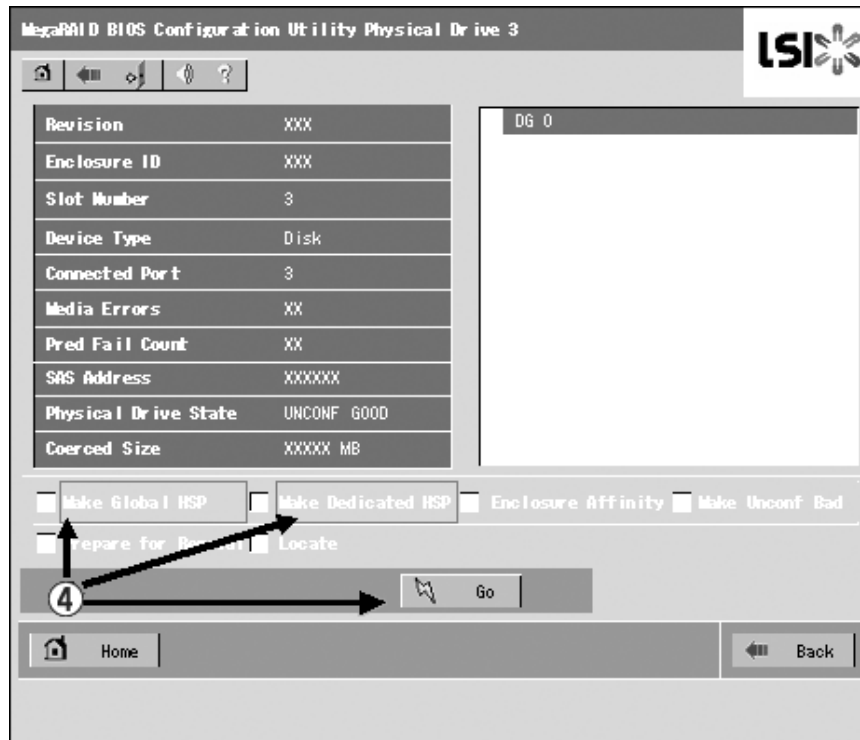


2. Select "3:0:3" (newly connected HDD) in [Physical Drives].
3. The properties for the Physical Drive are displayed.

4. Select [Make Global HSP] or [Make Dedicated HSP], and then click [Go].

Global HSP: Indicates the Hot Spare available for all the DGs.

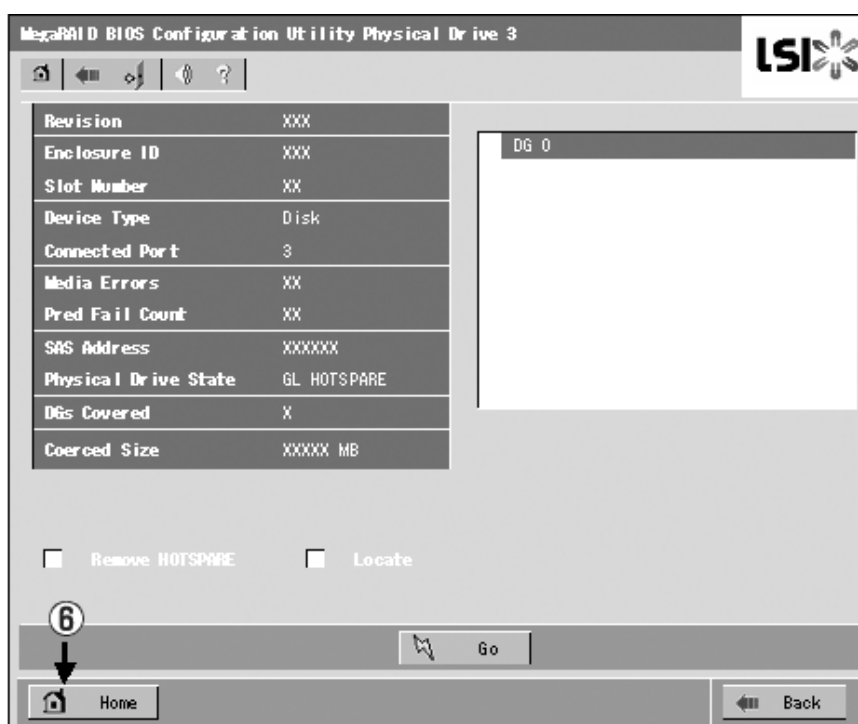
Dedicated HSP: Indicates the Hot Spare available only for the specific DG. You need to specify the target DG.



**NOTE:** Do not check "Enclosure Affinity" which defines the hot-spare to the specific enclosure. This setting is not supported by the system.

5. The status for the newly connected HDD changes to "HOTSPARE".

- Click [Home] to go back to the WebBIOS Top Menu.





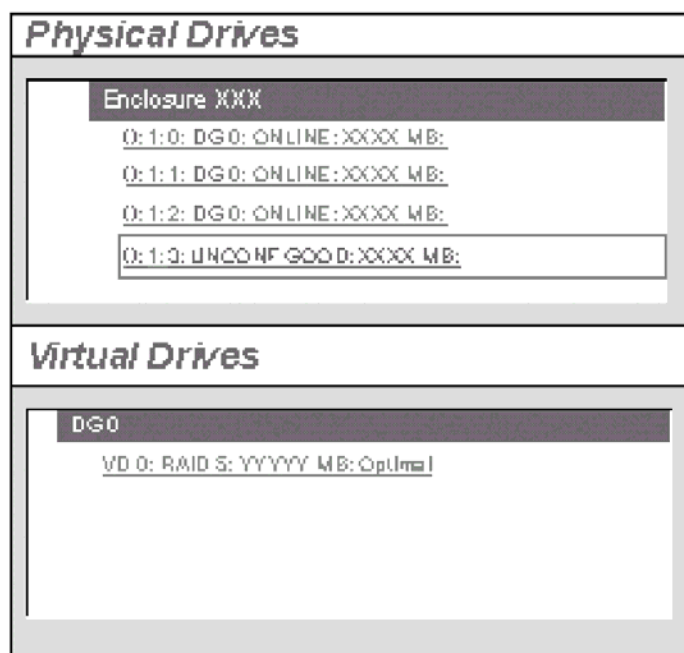
## Reconstruction

The procedures described below are based on the following assumption:

Add a HDD to a RAID5 virtual disk configured with three HDDs to make a RAID5 virtual disk configured with four HDDs.

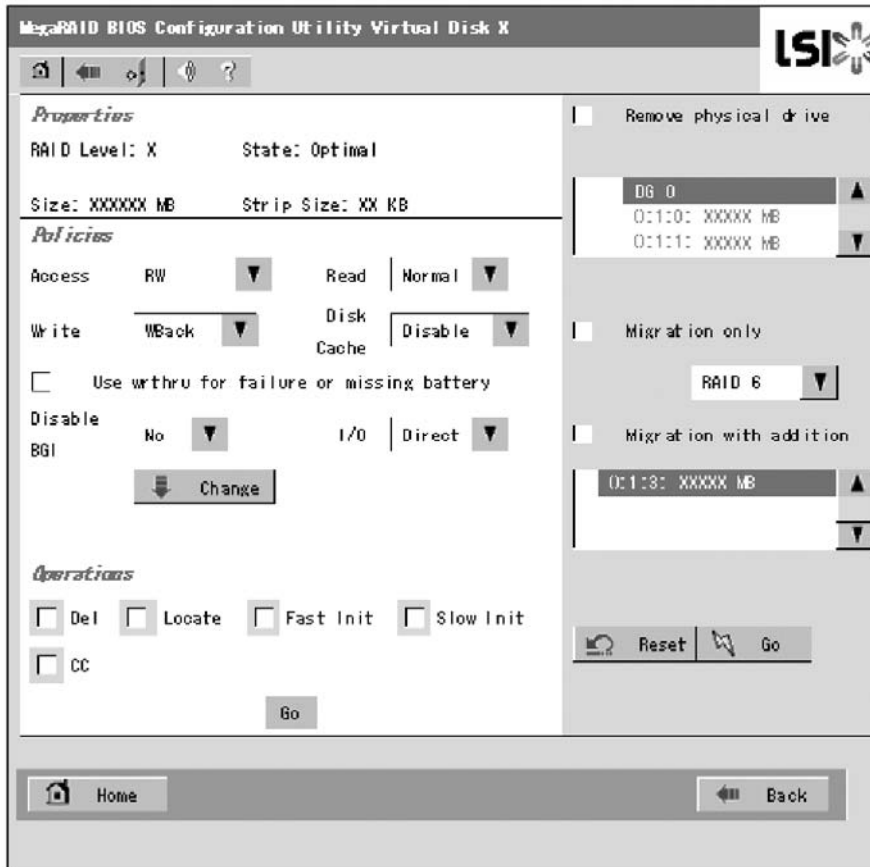
1. Start WebBIOS.

Make sure that the status for the added HDD is indicated as "UNCONF GOOD" in the right frame of the Top Menu.

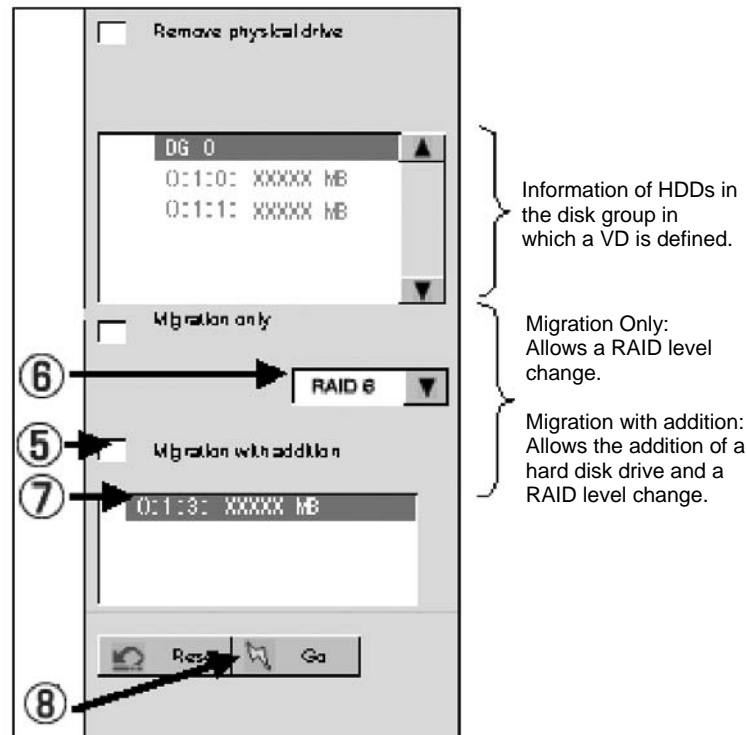


2. Select "VD 0" (already been constructed) in [Virtual Drives].

- The Setting menu for VD 0 is displayed.



- On the right of the screen, the items required for the reconstruction are displayed.



- Select "Migration with addition".
- Specify the RAID level to be used after the reconstruction.

7. Select the HDD to be added.
8. When you have finished the steps 5 to 7, click [Go].
9. The reconstruction progress is displayed. Click [Home] to return to the WebBIOS Top Menu.

---

**IMPORTANT:**

- The capacity of virtual disk may be incorrectly displayed after reconstruction. In this case, perform Scan Devices from the Top Menu.
  - Click [Home] while a background task such as Consistency Check, Rebuild, or Reconstruction is being executed. When the progress indication is displayed, the background task may process at a slower rate.
-

## WebBIOS and Universal RAID Utility

You can use the Universal RAID Utility for the configuration, management, and monitoring of the RAID System from the operating system.

Keep the following in mind when using the Universal RAID Utility together with the WebBIOS.

### Terms

The WebBIOS and the Universal RAID Utility use a different terminology, as listed below:

Term of WebBIOS	Term of Universal RAID Utility
Adapter	RAID Controller
Virtual Disk	Logical Drive
Disk Group	Disk Array
Physical Drive	Physical Device

### Number and ID

The number to manage each component of the RAID System of Universal RAID Utility is different from the one in WebBIOS.

#### Adapter and RAID Controller

WebBIOS manages the Adapter using a number of 0 origin. You can see an Adapter number in the [Adapter No] field in the [Adapter Selection] menu.

The Universal RAID Utility manages the RAID Controller using a number of 1 origin. You can see a RAID Controller number in the [Number] field in the properties of the RAID Controller on the RAID Viewer or [RAID Controller #X] in the properties of the RAID Controller on the raidcmd command.

You can also see the Adapter number managed by the WebBIOS in the [ID] field in the properties of the RAID Controller by the Universal RAID Utility.

#### Virtual Disk and Logical Drive

WebBIOS manages the Virtual Disk using a number of 0 origin. You can see a Virtual Disk number where [VD X] is displayed in Virtual Drives.

The Universal RAID Utility manages the Logical Drive using a number of 1 origin. You can see a Logical Drive number in the [Number] field in the Logical Drive properties of the RAID Viewer or [RAID Controller #X Logical Drive #Y] in the properties of the Logical Drive on the raidcmd command.

You can also see the Logical Drive numbers managed by WebBIOS in the [ID] field in the properties of the Logical Drive by the Universal RAID Utility.

#### Disk Array

WebBIOS manages the Disk Array using a number of 0 origin. You can see a Disk Array number where [DG X] in displayed in Physical Drives and Virtual Drives.

The Universal RAID Utility manages Disk Array using a number of 1 origin. You can see the Disk Array number in the [Disk Array] field in the Logical Drive properties of the RAID Viewer or [RAID Controller #X Disk Array #Y] in the properties of the Disk Array on the raidcmd command.

#### Physical Drive and Physical Device

WebBIOS manages the Physical Drive using three numbers (Connector number:Enclosure number:Slot number). You can view these numbers shown by [x:x:x] in the Physical Drives box. Note, however, that the Connector number is always shown as "()" because it is not supported by this server. The Enclosure numbers are represented by 1-origin, and

the Slot numbers are represented by 0-origin.

The Universal RAID Utility manages the Physical Device using a number of 1-origin and ID, Enclosure number, Slot number. The numbers of the physical devices connected to the controller are sorted in ascending order based on the ID and assigned with a 1-origin number starting from the smallest number. The ID is of the same value as the Connected Port shown in Physical Drives Properties box in WebBIOS. Enclosure number and Slot number are of 1-origin.

- 
- **IMPORTANT:** Note that the slot numbers shown in the Physical Drives box of WebBIOS are represented by 0-origin numbers, but those in the Universal RAID Utility are 1-origin numbers.
- 

## Priority Setting

WebBIOS displays and sets the Rebuild and Patrol Read Priority, and the Consistency Check Priority of the RAID Controller by percentage. The Universal RAID Utility uses three levels of priority: High/Middle/Low for these.

Item	Setting value of WebBIOS	Universal RAID Utility level
Rebuild Priority Rebuild Rate (WebBIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low
Patrol Read Priority Patrol Read Rate (WebBIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low
Consistency Check Priority Consistency Check Rate (WebBIOS)	80 to 100	High
	31 to 79	Middle
	0 to 30	Low

The setting level of Universal RAID Utility and the setting value

Item	Setting level of Universal RAID Utility	Setting value
Rebuild Priority Rebuild Rate (WebBIOS)	High	90
	Middle	50
	Low	10
Patrol Read Priority Patrol Read Rate (WebBIOS)	High	90
	Middle	50
	Low	10
Consistency Check Priority Consistency Check Rate (WebBIOS)	High	90
	Middle	50
	Low	10

---

### NOTES:

- WebBIOS can set the BGI Rate (Background Initialize Priority), but the Universal RAID Utility can't.
  - Universal RAID Utility can set Initialization Priority. But, the Internal RAID Controller does not have this setting of Initialization Priority function. Therefore, the Universal RAID Utility doesn't display the [Initialization Priority] in the properties of the RAID Controller. It will also fail if you change the Initialization Priority using the raidcmd command.
-

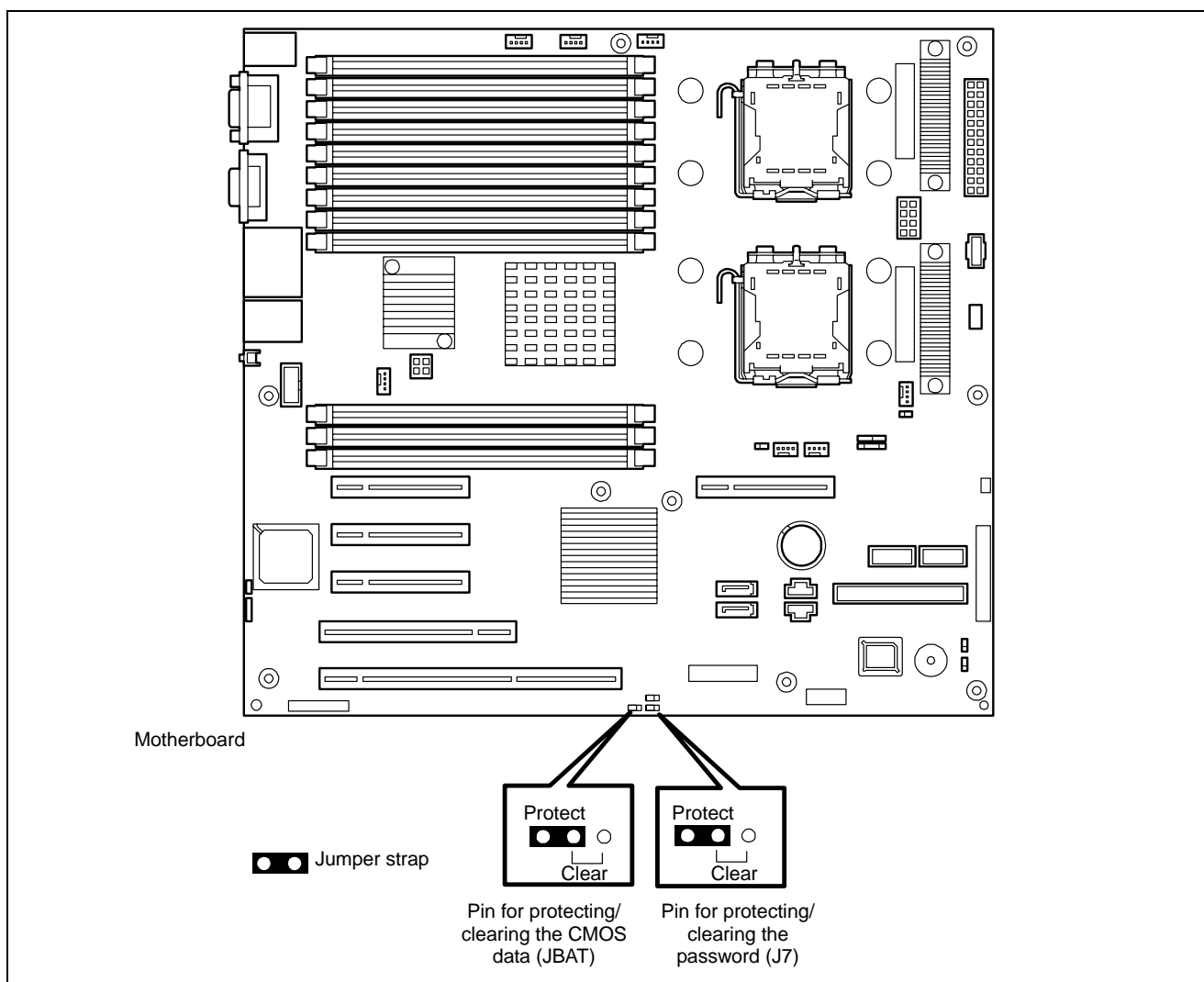
## CONFIGURING THE MOTHERBOARD JUMPERS

With the pre-installed SETUP utility, you can set passwords to protect the data stored in the server against access from unauthorized users. If you forget the passwords, however, you will want clear them. The following describes how to clear these passwords. You can also use the following procedure to clear the CMOS data in the server.



---



### IMPORTANT:

- Clearing the CMOS data resumes the factory-set configuration data.
  - Do not change any other switch settings. Any change may cause the server to fail or malfunction.
- 



The following describe the clearing procedure.

 <b>WARNING</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See pages 1-3 to 1-8 for details.</p> <ul style="list-style-type: none"><li>■ Do not disassemble, repair, or alter the server.</li><li>■ Do not remove the lithium battery.</li><li>■ Disconnect the power plug before working with the server.</li></ul>

 <b>CAUTION</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.</p> <ul style="list-style-type: none"><li>■ Make sure to complete the installation.</li><li>■ Do not pinch your fingers with mechanical components.</li><li>■ Avoid installation in extreme temperature conditions.</li></ul>

---

**IMPORTANT:** Components inside the server are easily affected by static electricity. Discharge the static electricity on your body before handling a component by making your body contact with a metallic frame section of the server. Do not touch the terminals and components with your bare hands. See "Static Precautions" in this chapter for details of the static electricity.

---

---

## Clearing CMOS Data

1. See the section "Preparing for Installation and Removal" in Chapter 9 to prepare
2. Remove the left side cover (see Chapter 9).
3. Change the jumper switch setting from "Protect" to "Clear".

---

**IMPORTANT:**

- Use the clip over the jumper pins 1 and 2 on the motherboard.
  - Do not lose the clip.
- 

4. After three seconds, reinstall the jumper.
5. Reinstall the server and then turn on the power.
6. Press **F2** during POST to run the BIOS Setup utility, and configure the motherboard again.

## Clearing the Password

1. See the section "Preparing for Installation and Removal" in Chapter 9 to prepare
2. Remove the left side cover (see Chapter 9).
3. Change the jumper switching setting from "Protect" to "Clear".

---

**IMPORTANT:**

- Use the clip over the jumper pins 1 and 2 on the motherboard.
  - Do not lose the clip.
- 

4. Reinstall the server and then turn on the power.
5. Press **F2** during POST to run the BIOS Setup utility, and set the password again.
6. Remove the left side cover (see Chapter 9).
7. Power off the server, and change the jumper switch setting from "Clear" to "Protect".
8. Reassemble the server.



## Chapter 5

---

### Installing the Operating System with Express Setup

This section provides information on the use of Express Setup to install and configure the following operating systems on the server.

- Microsoft® Windows® Server 2003 Standard Edition / Microsoft® Windows® Server 2003 Enterprise Edition
- Microsoft® Windows® Server 2003 R2 Standard Edition / Microsoft® Windows® Server2003 R2 Enterprise Edition

To use the server with the other operating systems described in this section, contact your service representative.

---

**IMPORTANT:** Before installing the operating system, adjust the system date and time by using the BIOS SETUP utility. See Chapter 4 for details.

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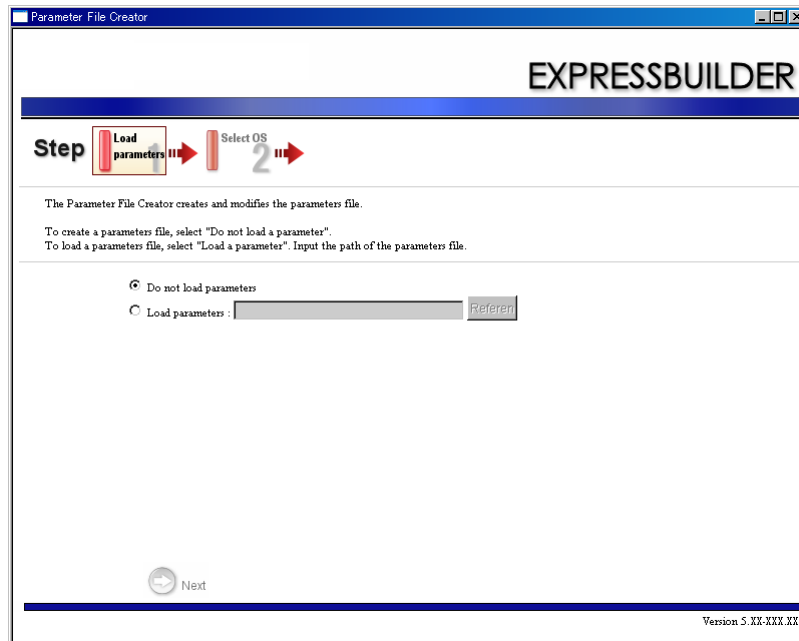
## About Express Setup

"Express Setup" helps you install the Windows Operating System. The setup automatically configures the RAID system and installs the Operating System and some management software.

---

**IMPORTANT:** Executing the Express Setup erases all data on the hard disk drive.

---



You can also use the "Parameters File" during "Express Setup" in order to save or backup the installation parameters.

If you want to set up the server using parameters defined previously, execute the Express Setup using an existing parameters file.

---

### NOTES:

- If you want to create a parameters file, have a blank floppy disk (MS-DOS 1.44MB format) ready.
  - When using a floppy disk, a USB floppy disk drive is required.
  - If you want to use the drivers located on the "OEM-Disk for Mass Storage Device" that ships with optional boards, a parameters file is mandatory.
  - You can create a parameters file in advance using the "Parameter File Creator" included in the EXPRESSBUILDER.
-

---

## Microsoft Windows Server 2003

This section explains how to install Microsoft® Windows® Server 2003 by using the Express Setup.

---

**IMPORTANT:** Be sure to prepare the Windows Server 2003 CD-ROM that includes Service Pack 1.

---

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**NOTES:**

- Express Setup does not support the installation of Windows Server x64 Editions. If you want to install it, see Appendix D.
  - If you install Windows Server 2003 without using Express Setup, see Appendix E.
- 

---

### Notes on the Windows Installation

Check the following before starting the Express Setup.

#### About the Windows family

This computer supports the following Windows editions:

- Microsoft® Windows® Server 2003 Standard Edition / Microsoft® Windows® Server 2003 Enterprise Edition (hereinafter, referred to as "Windows Server 2003")
- Microsoft® Windows® Server 2003 R2 Standard Edition / Microsoft® Windows® Server 2003 R2 Enterprise Edition (hereinafter, referred to as "Windows Server 2003")

---

**NOTE:** Express Setup does not support the installation of Windows Server 2003 x64 Editions. If you want to install it, see Appendix D.

---

To install other OS, contact your sales maintenance representative.

#### BIOS Settings

Confirm the BIOS settings described in Chapter 4 before installing Windows Server 2003.

## **Service Pack supported by the EXPRESSBUILDER**

The EXPRESSBUILDER DVD attached to the server supports the following combination of the OS installation media and Service Pack.

- Windows Server 2003 R2 x64 Edition
  - OS installation media (with Service Pack 2)
  - OS installation media (No Service Pack) + Service Pack 2
  - OS installation media (No Service Pack)
- Windows Server 2003 R2
  - OS installation media (with Service Pack 2)
  - OS installation media (No Service Pack) + Service Pack 2
  - OS installation media (No Service Pack)
- Windows Server 2003
  - OS installation media (with Service Pack 1)
  - OS installation media (with Service Pack 1) + Service Pack 2

## Optional Board Supported by the EXPRESSBUILDER

The EXPRESSBUILDER attached to this computer supports the following optional boards:

---

**NOTE:** If you want to install boards other than the ones listed below by using a driver floppy disk ("OEM-FD for Mass storage device"), see "Exceptional setup" and "Installing Optional Mass Storage Driver" of "Parameter File Creator" in Chapter 6.

---

- Supporting the OS installation in the EXPRESSBUILDER
  - RAID controller (128 MB, RAID0/1)
  - RAID controller (128 MB, RAID0/1/5/6)
- Other controllers
  - Disk Array Controller (External SAS HDD)\*
  - SCSI Controller (several are available)\*
  - SAS Controller\*

\* Option

---

### NOTES:

- The driver of the optional cards mentioned above is stored in the EXPRESSBUILDER DVD.
  - If you use other boards than the ones mentioned above, the Express Setup will fail. Refer to the instructions attached to the board.
- 

## About the Hardware Components

When you install Windows Server 2003, Express Setup requires several preparations if this computer uses the following hardware components.

### Installing on the Mirrored Volume

If you want to install Windows Server 2003 on the volume that is mirrored using "Disk Management", invalidate the mirroring before the installation, and validate the mirroring again after the installation.

You can create, invalidate or delete the mirror volume by using "Disk Management" in "Computer Management".

### Mounting MO Device

Do not mount an MO device on this computer during the Windows installation.

### About Removable Media

Do not set any removable media, such as a DAT, into the device mounted on this computer during the Windows installation.

### Connecting Hard Disk Drive

Do not connect other hard disk drives than the drive on which you want to create the Windows system drive.

If you create multiple logical drives in your system, see "Re-installing the Operating system when multiple logical drives exist" (Appendix E).

---

**NOTE:** If you connect the LSILogic MegaRAID SAS 8480E Disk Array Controller as a data disk, clear the RAID Controller's configuration information before you perform the Express Setup.

---

## Re-installing to the hard disk drive which has been upgraded to Dynamic Disk

You cannot re-install Windows Server 2003 if the current partition of the hard disk drive upgraded to Dynamic Disk remains. If you want to keep the current partition, see Appendix E to re-install the system.

## About the System Partition Size

The system partition size can be calculated using the following formula.

Size necessary to install the system	+ Paging File Size + Dump File Size
	+ Application Size
Size necessary to install the system	= 3500MB (Windows Server 2003 R2)
	= 3500MB (Windows Server 2003 with Service Pack1)
	= 3500MB (Windows Server 2003 R2 with Service Pack2)
	= 5300MB (Windows Server 2003 R2 + ServicePack 2 CD-ROM)
	= 5300MB (Windows Server 2003 + Service Pack 1
	+ ServicePack 2 CD-ROM)
Paging File Size (Recommended)	= Mounted Memory Size * 1.5
Dump File Size	= Mounted Memory Size + 12MB
Application Size	= Required Size

---

### IMPORTANT:

- The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.  
The correct debug information might not be able to be collected due to a virtual memory shortage if the paging file is insufficient, so set a size large enough for the entire system.
  - The maximum paging file size which can be set on one partition is 4095MB. If the above paging file size exceeds 4095MB, specify 4095MB for the paging file size.
  - The maximum dump file size for the system with more than 2GB memory mounted is '2048MB + 12MB'.
  - If you wish to install any application program or the like, add the necessary space to the partition to install these programs.
- 

For example, if installed memory size is 512 MB, the minimum required partition size is:

$2900 \text{ MB} + (512 \text{ MB} * 1.5) + (512 \text{ MB} + 12 \text{ MB}) = 4192 \text{ MB}$ .

Dividing into the partition of the recommended size into multiple disks as written below will solve problem that it cannot be reserved in one disk.

1. Set the "Size required for installation + Paging file size".
2. See Appendix F and set that debugging information (equivalent to the dump file size) is to be written to a separate disk.

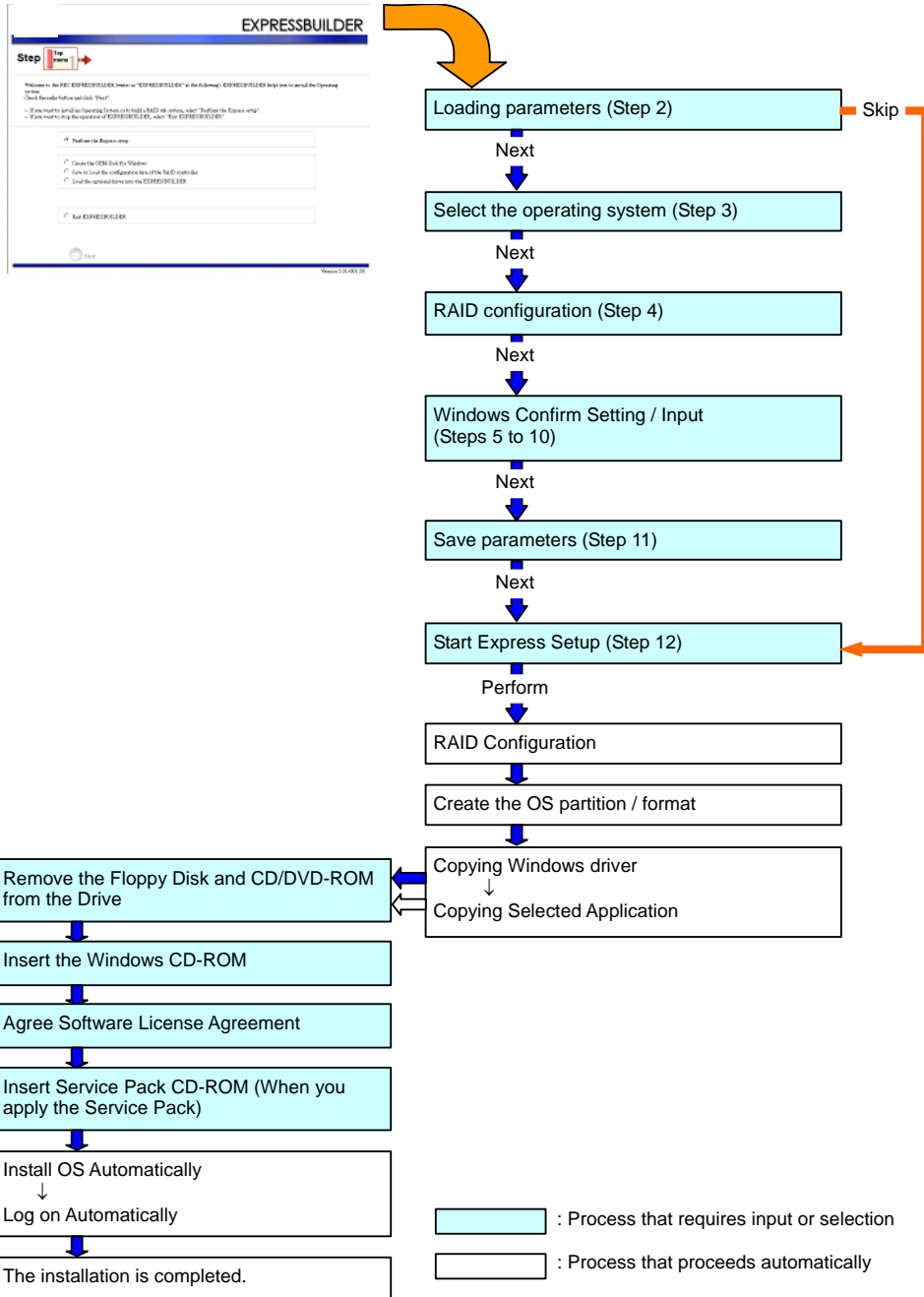
(If the disk does not have enough free space to enable the file size to be written, then after installing the system using the "Size required for installation + Paging file size," install an additional new disk.)

## Installing the Service Pack

When installing Windows Server 2003 R2, it is not necessary to install the Service Pack 1.

# SETUP FLOW

This section visually describes the setup flow operated by Express Setup.



---

## Installing Windows Server 2003

Express Setup proceeds with the setup by selecting or inputting several parameters on the wizard. You can also save the parameters to a floppy disk as a parameters file.

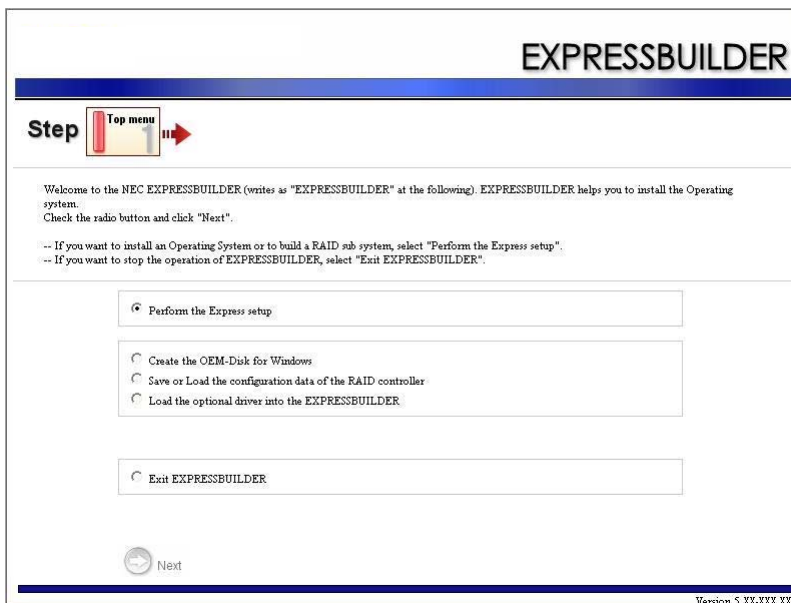
1. Turn the power of peripheral device on, and then turn on the server.
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.
3. Press the RESET switch or press **Ctrl, Alt, and Delete** to reboot from the EXPRESSBUILDER. (You may also turn off and then on again to reboot the server.)

The system will boot from the DVD-ROM and the EXPRESSBUILDER starts.

Select "OS installation \*\*\* default \*\*\*" from the boot selection menu. (If you do not hit any key, "OS installation" is selected automatically.)

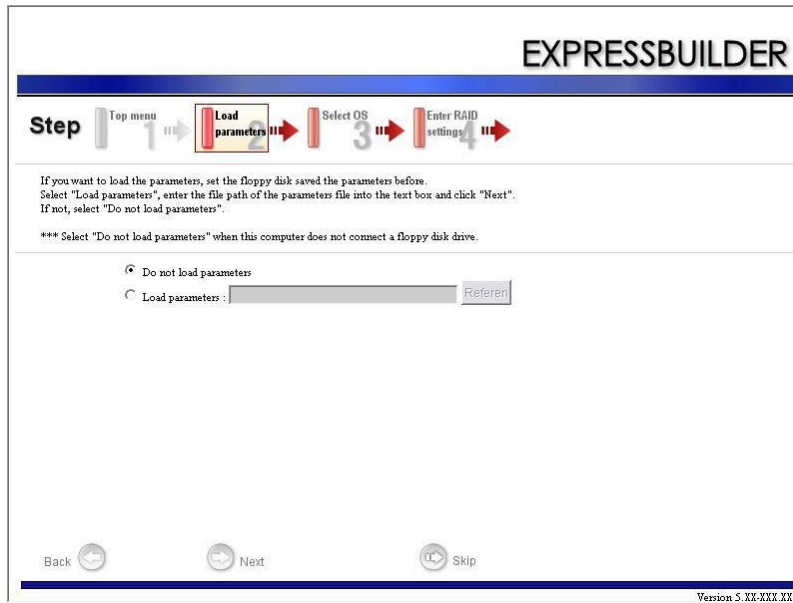
The Top menu appears.

4. Select [Perform the Express setup] from the Top Menu, and click [Next].





5. The [Load parameters] step is displayed.



[Do not load parameters]

- (1) Select [Do not load parameters].
- (2) Click [Next].

---

**NOTE:** If no floppy disk drive is connected, select this item.

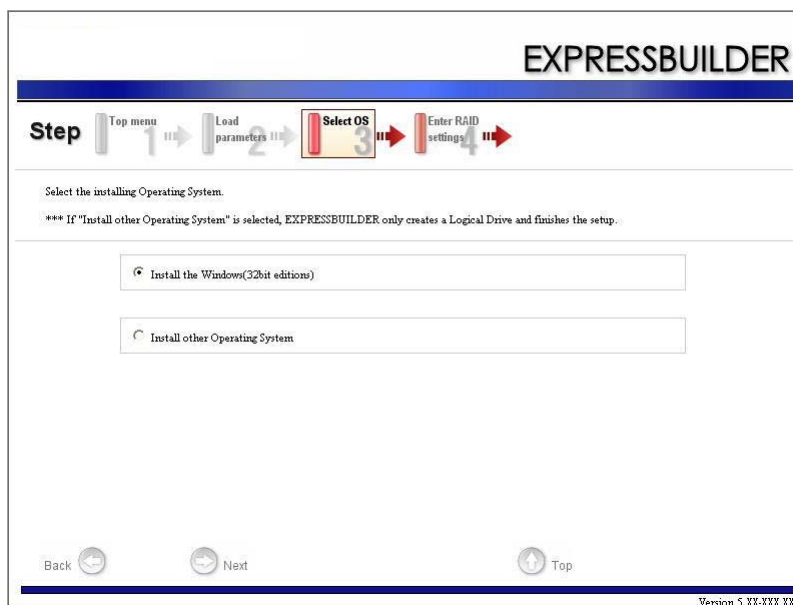
---

[Load parameters]

- (1) Insert the floppy disk containing the parameters file.
- (2) Select [Load parameters], and enter the file path of the parameters file into the text box.
- (3) Click [Next].

6. Select the installing Operating System.

Select [Install the Windows (32bit editions)] from the menu, and click [Next].



## 7. Enter the virtual disk settings.

The [Enter RAID settings] step is displayed. Confirm the parameters, modify if necessary, and then click [Next].

**EXPRESSBUILDER**

**Step** 1 2 3 **4** 5 6

Set a parameter to create a logical drive.  
If you are not using a RAID controller, select "Skip the logical drive creation" and press the "Next" button.  
If you want to use the existing logical drive, select "Skip the logical drive creation" and press the "Next" button.

Skip the logical drive creation  
 Create a logical drive using the settings that follow.  
 (If a logical drive already exists, all the data stored on the logical drive will be deleted.)

RAID controller	: MegaRAID SAS PCI Express(TM) ROMB
The number of the total physical devices	: 4
Number of physical devices used to create the logical drive	: 3
RAID level	: RAID5
The number of the physical devices specified as the hot spare	: 1
The number of the free physical devices	: 0

Back Next Top Default

Version 5.XX-XXX.XX

**IMPORTANT:** Be sure to perform a Consistency Check for the RAID drives configured by Express Setup.

### NOTES:

- You can use only physical devices that have an identical model number to configure a logical drive.
- If the process does not finish normally, it may be because the driver is not available in the EXPRESSBUILDER. See "Optional Board Supported by the EXPRESSBUILDER" described earlier in this chapter.

## 8. Specify the installation medium and the Windows system partition.

The [Setting medium / Partitions] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

**EXPRESSBUILDER**

**Step** 1 2 3 4 **5** 6

Specify the installing medium and the Windows system partition.  
\*\*\* Refer to the User's guide about the Service Pack installation.  
If "Use existing partitions" is selected, EXPRESSBUILDER installs the Operating System to the 1st partition."

Medium selection  
 Windows family/edition : Windows Server 2003 Standard Edition | English  
 Install the Service Pack  
 Keyboard layout : Default  
 Time zone : (GMT-08:00) Pacific Time (US and Canada), Tijuana

Windows system drive settings  
 Use existing partitions (only the 1st partition is formatted and its data is erased)  
 Create a new partition (all of the data in the disk is erased)  
 Use disk space as large as possible  
 Specify the size of the system partition : 12288 (MB)  
 (8487MB - 999999MB) \*1GB=1024MB

Next Top Default

Version 5.XX-XXX.XX

**IMPORTANT:**

- About the partition size
  - Specify a partition size larger than the required minimum size for the OS installation.
  - Do not specify partition size larger than the capacity of the connected hard disk drive.
- If you select "Create a new partition" at "Windows system drive settings", the contents of the hard disk will be all deleted.
- If "Use existing partitions" is selected, EXPRESSBUILDER installs the Operating System to the 1st partition (the 1st partition contents are deleted). The data in the other partition is kept if the system has two or more partitions. (See the figure below.)

First Partition Deleted	Second Partition Retained	Third Partition Retained
-------------------------------	---------------------------------	--------------------------------

- You can not re-install the system with an existing partition that is upgraded to Dynamic Disk. Do not select "Use existing partitions" at "Windows system drive settings".

9. Enter the user information, time zone and client license mode.

The [Enter basic parameters] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

**NOTE:** Even if you do not input a value into "Administrator password", "Confirm password", "?????" is displayed.

10. Enter the network protocol settings.

The [Enter Network Protocol] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

**EXPRESSBUILDER**

**Step** 7 8 9 10 11 12

Enter the settings of the network protocol.  
If you want to set the IP address, select "Customized settings" and click "Detail settings".  
If not, select "Standard setting" and click "Next".

Standard setting  
 Customized settings

standard adapsuter -- internet protocol	Detail settings
standard adapsuter -- internet protocol2	
standard adapsuter -- internet protocol3	
standard adapsuter -- internet protocol4	

Back Next Top Default

Version 5.XX-XXX.XX

11. Enter the domain or workgroup name to be used.

The [Enter domain and account] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

**EXPRESSBUILDER**

**Step** 7 8 9 10 11 12

If you want to join in a domain, enter the account name/password of the domain.  
If not, select "Join in a workgroup" and click "Next".

Join in a workgroup  
 Join in a domain

Workgroup name : WORKGROUP

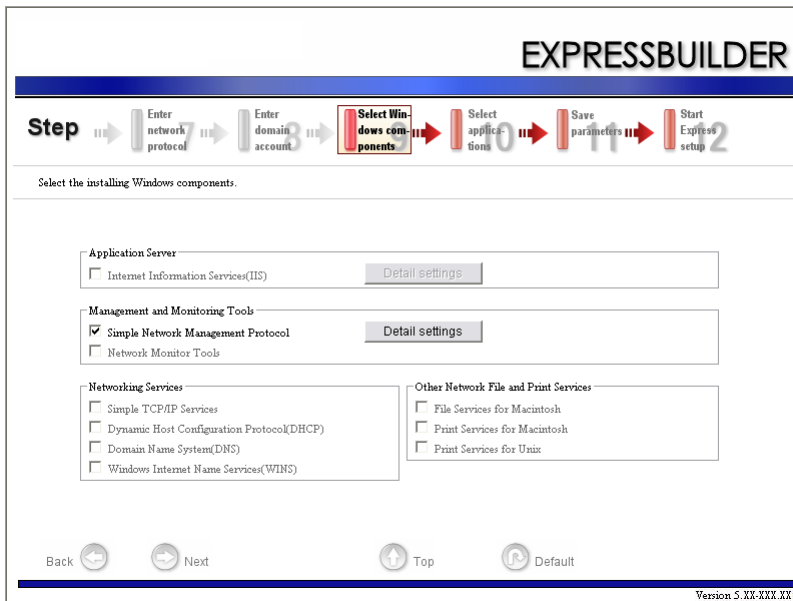
Domain name :  
Account name :  
Password :  
Confirm password :

Back Next Top Default

Version 5.XX-XXX.XX

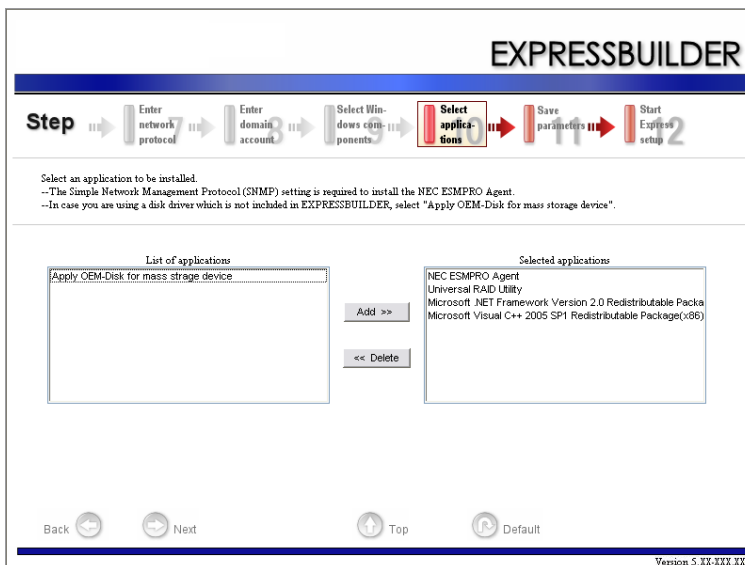
## 12. Select the installing components.

The [Select Windows component] step is displayed. Confirm the parameters, modify if necessary, and click [Next].



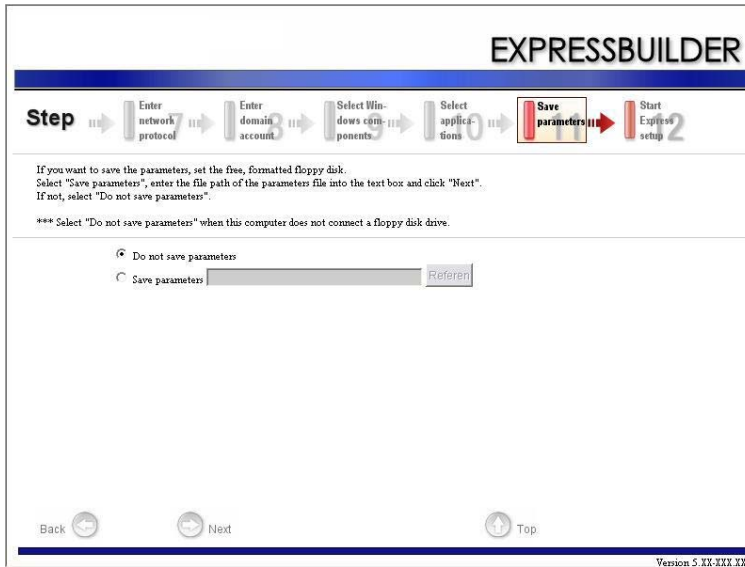
## 13. Select the installing applications.

The [Setting applications] step is displayed. Confirm the parameters, modify if necessary, and click [Next].



**14.** Save the parameters.

The [Save parameters] step is displayed.

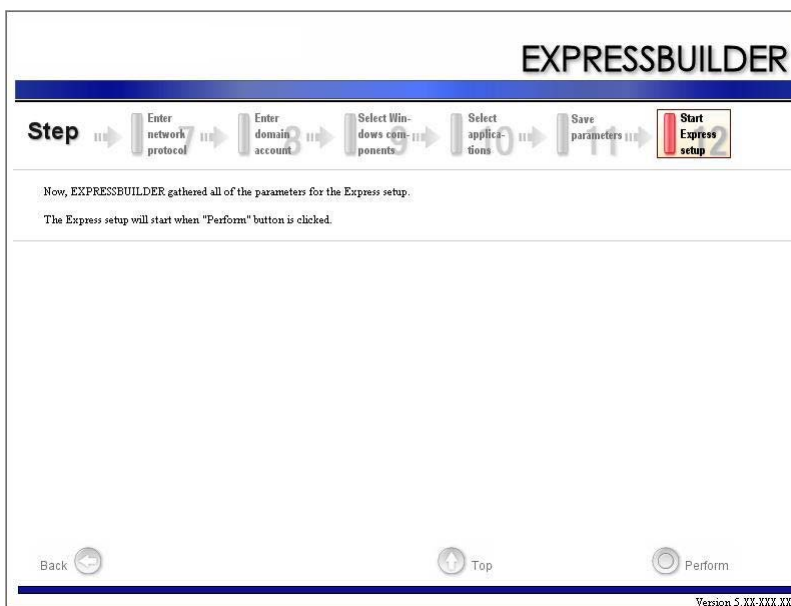


If you want to save the parameters, set the free formatted floppy disk.

Select [Save parameters], enter the file path of the parameters files into the text box and click [Next].

Otherwise, select [Do not save parameters].

**15.** The Express Setup will start when you click [Perform] in the [Start Express setup] step.



**16.** Copy the optional Mass Storage Driver module.

If you install an optional Mass Storage Driver, the message will be shown.

Insert the CD-ROM or floppy disk attached to the Mass Storage Driver and follow the on-screen messages.

**17.** Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive when prompted to do so.

If you proceed with the setup by using the setup parameters file, remove the floppy disk from the floppy disk drive.

Insert the Windows Server 2003 CD-ROM into the CD-RW/DVD-ROM drive.

The [Agree Software License Agreement] screen appears.

- 
18. Read the contents carefully and click [Yes] if you agree. If you do not agree, click [No].

---

**IMPORTANT:**

- If you do not agree to this agreement, the setup terminates and Windows Server 2003 will not be installed.
  - If "NetWare Gateway (and Client) Service" is specified to install, the window to specify the details of "NetWare Gateway (and Client) Service" pops up on the first logon. Specify the appropriate value.
- 

19. If you selected [Install the Service Pack] at the [Specify Medium Partition] step, follow the procedure below.

- 1) Follow the message to take Windows Server 2003 CD-ROM out of the CD-RW/DVD-ROM drive.
- 2) Follow the message to insert Windows Server 2003 Service Pack 2 into the CD-RW/DVD-ROM drive.

---

**IMPORTANT:** If you are installing the Windows CD-ROM that contains Service Pack 2 to your system, you do not have to apply the Service pack 2 again.

---

Windows Server 2003 and the specified application will be installed automatically. Install and configure the device drivers.

20. If you install Microsoft Windows Server 2003 R2, insert the Microsoft Windows Server 2003 R2 Standard Edition DISC 2 or the Microsoft Windows Server 2003 R2 Enterprise Edition DISC 2 into the CD-RW/DVD-ROM drive after the OS installation.

Follow the on-screen messages to complete the installation.

When the installation is finished, remove the optical disc from the CD-RW/DVD-ROM drive, and restart the system.

---

## Installing and Setting the Device Drivers

Follow these steps to install and configure the device drivers.

### PROSet

Using PROSet enables the following items:

- Detailed information of the adapter confirmation.
- Loop back test, packet transmission test diagnosis and so on.
- Teaming setup.

Configuring several network adapters as one team provides the server with a tolerant environment and enhances throughput between the switches.

PROSet is necessary to use these features.

---

**NOTE:** All of the operation that related to Intel® PROSet must be executed with administrator privileges. Operation by [Remote Desktop Connection] is prohibited.

If you make no changes to the parameters, click the [Cancel] button to close the dialog. Clicking the [OK] button will cause a temporary loss of network connectivity.

---

Follow the procedure below to install PROSet.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. The [Windows Explorer] dialog starts.
  - \* Procedure using a standard start menu  
Click Start menu and click [Windows Explorer].
  - \* Procedure using a classic start menu  
Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "dxsetup.exe" in the following directory.  
\\001\win\winnt\dotnet\dl3\proset\win32  
The [Intel(R) PROSet - InstallShield Wizard] dialog starts.
4. Click [Next].
5. Choose "I accept the terms in the license agreement" and click [Next].
6. Click [Next].
7. Select [I accept the terms in the license agreement] and click [Next].
8. Click [Install].
9. When [InstallShield Wizard Completed] window is displayed, click [Finished].
10. Remove the DVD from the Optical Disk Drive, and restart the system.



## Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB)

Adapter Fault Tolerance (AFT) is a feature that creates a group containing more than one adapter and automatically converts the process of the working adapter to the other adapter in the group when any trouble occurred on that adapter.

Adaptive Load Balancing (ALB) is a feature that creates a group containing more than one adapter and enhances the throughput by operating packet transmission from the server by all the adapters.

---

### IMPORTANT:

- AFT/ALB setup must be operated after installing the drivers and restarting the system.
  - All the adapters specified as a group of Adapter Teaming must exist on the same LAN. If they are connected to separate switches, they will not work normally.
  - The adapters specified as a group of Adaptive Load Balancing (ALB) can be connected only to the Switching Hub.
  - When replacing the motherboard or optional network card, make sure to remove the adapter teaming before the exchange and recreate the adapter team once the exchange is completed.
- 

If you want to use the AFT/ALB feature, follow the procedure below to setup.

1. The [Intel (R) PROSet] dialog box appears.
  - \* Procedure using the standard start menu
    - Click the Start menu, point to [Control Panel], [Administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.
  - \* Procedure using the classic start menu
    1. Click the Start menu, point to [Settings] and click [Control Panel].
    2. Click [Administrative Tools].
    3. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.
2. Select the [Teaming] tab and then check [Team with other adapters] and click [New Team...].  
The [New Team Wizard] dialog box appears. Click [Next].  
\*Specify a name for the team if necessary.
3. Select the adapters to include in the team.
4. Select "Adapter Fault Tolerance" or "Adaptive Load Balancing" and click [Next].
5. Click [Finish].
6. If it is necessary to set the adapter priority setting, refer the following step. If not, go through to step 7.
  1. Click [Settings] tab on [TEAM:xxx #yy Properties].
  2. Click [Modify Team].
  3. Point to the adapter [Intel(R)PRO/1000....]and click [Set Primary] or [Set Secondary].
  4. Click [OK].
  5. The setup will go back to [EAM:xxx #yy Properties] and the priority setting will be displayed in list ().
  6. Click [OK].
7. The setup will go back to [Intel (R) PROSet for Wired Connections] dialog box. Click [OK].
8. Restart the system.

---

## Network Driver

Specify the details of the network driver.

Two standard network drivers will be installed automatically, but the link speed and duplex mode must be manually specified.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.
  - \* Procedure using a standard start menu
    1. Click Start menu, click [Control Panel], click [Network Connections], and click [Local Area Connection].
  - \* Procedure using a classic start menu
    1. Click the Start menu, click [Settings] and click [Network Connections].  
The [Network Connections] dialog box appears.
    2. Right-click [Local Area Connection] and click [Properties] from the pop-up menu.
2. Click [Configure].  
The properties dialog box for the network adapter appears.
3. Click [Advanced] and specify a [Link Speed & Duplex] identical to the value specified for the HUB.
4. Click [OK] on the properties dialog box for network adapter.

[When PROSet is installed]

1. The [Intel PROSet] dialog box appears.
  - \* Procedure using a standard start menu  
Click the Start menu, point to [Control Panel] and click [Intel PROSet].
  - \* Procedure using the classic start menu
    1. Click Start menu, point to [Settings] and click [Control Panel].
    2. Click [administrative tools].
    3. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.
2. Click on [Speed] and specify a [Link Speed & Duplex Settings] value identical to the value specified for the HUB.
3. Click [Apply] and click [OK].

Specify the other network driver using the same procedure.

This procedure can also be applied on the properties dialog box for the local area network which appears from the [Network and Dial-up Connection].

---

**NOTE:** We recommend you add [Network Monitor] at [Adding Services]. [Network Monitor] can monitor the frame (or the packet) that the computer installing [Network Monitor] sends or receives. This tool is valuable when analyzing network troubles. For more information on how to install the tool, see the "Setting for Solving Problems" described later in this chapter.

---

## Optional Network Board Driver

When using a manufacturer-approved Network Board, the network driver will be installed automatically. Therefore, the driver attached to the Network board should not be used.

To use optional Network Boards, install the driver stored in EXPRESSBUILDER DVD.

When using the 100BASE-T protocol:

```
"\004\win\winnt\dotnet\d13\pro100\win32"
```

When using the 1000BASE-T protocol:

```
"\004\win\winnt\dotnet\d13\pro1000\win32"
```

If the procedure of installation is not clear, refer to the installation procedure described in the section "Installation of the Optional Network Board Driver".

When using the 10GbE protocol:

Please refer to the installation manual provided with the board.

## Installation of the Optional Network Board Driver

1. Start the Device Manager.
2. Click [Network adapters] and double-click [(Network Adapter Name)].  
The [(Network Adapter Name) Properties] appears.

---

**NOTE:** [(Intel(R) PRO/1000...)] is the name of On-Board adapter. All the other names show the Optional Network Board.

---

3. Click the [Driver] tab and click [Update Driver...].  
The [Hardware Update Wizard] appears.
4. Select the [Install from a list or specific location(Advanced)] radio button and click [Next].
5. Select the [Search for the best driver in these locations] radio button and check off the [Search removable media (floppy, CD-ROM...)] check box.
6. Check the [Include this location in the search] check box:
  - When using 100BASE-T cards, specify [\004\win\winnt\dotnet\d13\pro100\win32]. Click [Next].
  - When using 1000BASE-T cards, specify [\004\win\winnt\dotnet\d13\pro1000\win32]. Click [Next].
7. Click [Finish].

## Graphics Accelerator Driver

The standard graphics accelerator drivers that are mounted will be installed automatically. Follow the procedure below if it is necessary to install manually.

If you want to use the optional Graphics Accelerator Driver board, follow the document attached to the board to install the driver.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "setup.exe" in the following directory.  
    \001\win\winnt\dotnet\video\setup.exe.
4. Follow the on-screen message to proceed with the installation.  
    If the dialog message "Digital Signature could not be found." appears, select [Yes] to continue.
5. Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive, follow the on-screen instructions and restart the system.

## Installing a SCSI Controller Driver

When using a SCSI controller driver, update your system with the EXPRESSBUILDER DVD attached to your system. The SCSI controller driver will be installed automatically.

## Installing the Disk Array Controller Driver (LSILOGIC MEGARAID SAS 8480E)

The Disk Array controller driver will be installed automatically.

## Installing the SAS Controller Driver (LSISAS3443E-R)

When using the SAS controller driver (LSISAS3443E-R), update your system with the EXPRESSBUILDER DVD attached to your system.

The SAS controller driver will be installed automatically.

---

## Available switch options for the Windows Server 2003 Boot.ini file.

Many different switches will be available if you edit the Boot.ini file.

For the available switch options, refer to the following information:

- Microsoft Knowledge Base - Article ID: 833721

"Available switch options for the Windows XP and the Windows Server 2003 Boot.ini files"

If your system has a memory capacity in excess of 4GB in its installing, adding the /PAE switch in the Boot.ini file will enable the system to be installed with over 4GB of memory.

However, the Microsoft operating system products which support /PAE switch option are limited.

Refer to the following article in Microsoft Knowledge Base to check the supported products.

- Microsoft Knowledge Base - Article ID: 291988

"A description of the 4GB RAM tuning feature and the Physical Address Extension switch"

Below is the example on how to add /PAE switch to Boot.ini file.

1. Click [Start], point to [Settings], and then click [Control Panel].
2. In [Control Panel], double-click [System].
3. Click the [Advanced] tab, and then click [Settings] under [Setup and Recovery].
4. Under [System Setup], click [Edit] to open [Boot.ini].
5. Add "/PAE" to the [Operating Systems] section in the [Boot.ini] file, and then save it.

<Example of Boot.ini file>

```
[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(2)\WINDOWS
[operating systems]
multi (0)disk (0)rdisk (0)partition (2)\WINDOWS="Windows Server 2003" /fastdetect
multi (0)disk (0)rdisk (0)partition (2)\WINDOWS="Windows Server 2003, PAE" /fastdetect /PAE
C:\CMDCONS\BOOTSECT.DAT="Microsoft Windows Recovery Console" /cmdcons
```

---

**NOTE:** If you choose one of the items in the "Default operating system" drop-down list box in the [Setup and Recovery] group box, you can make your system start automatically from the switch you specified.

---

---

## Solving Problems Settings

Setup the following issue in advance so that your computer can recover from any trouble precisely and as soon as possible if it should occur.

### Memory Dump (Debug Information)

This section describes the procedure used to collect the memory dump (debug information) in the server.

---

**IMPORTANT:** Cautions for the Memory Dump

- The maintenance service representative is in charge of collecting memory dump. You only need to specify the memory dump.
  - If any trouble occurs after specifying the process below, a message informing that the system has a virtual memory shortage may appear, but continue to start the system. If you restart the system in such case, the memory dump may not be stored correctly.
- 

Follow the procedure below to specify the memory dump.

1. Select [Control Panel] and click [System].  
The [System Properties] dialog box appears.
2. Select the [Advanced] tab.
3. Click [Settings] on the [Startup and Recovery] group box.

---

**IMPORTANT:**

Windows Server 2003 x64 Editions

- We recommend you specify "Complete Memory Dump" to write the debug information.  
If the mounted memory size is larger than 2GB, "Complete Memory Dump" cannot be specified so specify "Kernel Memory Dump" instead.
- Specify a drive where there is a free area larger than the size of "the memory capacity mounted on the server + 1MB".
- In case the mounted memory size exceeds 2GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of the debugging information (memory dump) changes when adding memory. Check the size of the empty space in the debugging information (memory dump) write destination drive.

Windows Server 2003

- We recommend you specify "Complete Memory Dump" to write the debug information.  
If the mounted memory size is larger than 2GB, "Complete Memory Dump" cannot be specified so specify "Kernel Memory Dump" instead.
  - Specify a drive where there is a free area larger than the size of "the memory capacity mounted on the server + 12MB" (In case the memory capacity is larger than 2GB, a free area of "2048+12MB" or more).
  - In case the mounted memory size exceeds 2GB due to the added memory, change the write debugging information to [Kernel Memory Dump] before adding memory. The size of debugging information (memory dump) changes when adding memory. Check the size of the empty space in the debugging information (memory dump) write destination drive.
-

4. Specify "Complete memory dump" and modify [Dump file:] in the [Write debugging information] group box.  
e.g. To write the debug information in D drive, write the file name "MEMORY.DMP".  
D:\MEMORY.DMP
5. Click [Settings] on the [Performance] group box.  
The [Performance Options] window appears.
6. Click the [Advanced] tab on the [Performance Options] window.
7. Click [Change] on the [Virtual memory] group box.
8. Modify [Initial Size] in the [Paging file size for selected drive] box to a value larger than [Recommended], and click [Set].

---

**IMPORTANT:**

- The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.  
Correct debug information might not be collected due to a virtual memory shortage when the paging file is insufficient, so set a paging file size large enough for the entire system.
- For more information on the "Recommended" value, see "About the System Partition Size" described earlier.
- If the memory is expanded, re-specify the paging file to suit the new memory size.

9. Click [OK].

A message prompting to restart the system may appear according to the modified specification. In such a case, restart the system.

---

## Windows Dr. Watson

Windows Dr. Watson is a debugger for application errors. If any application error is detected, Dr. Watson diagnoses the server and logs the diagnostic information (log). Follow the procedure below to instruct Dr. Watson to collect diagnostic information.

1. Click [Run] on Start menu.
2. Type "drwtsn32.exe" in the [Open] box, and click [OK].  
The [Dr. Watson for Windows] dialog box appears.
3. Specify the location in which to store the diagnostic information in the [Log File Path] box.  
The diagnostic information will be stored with the file name "DRWTSN32.LOG".

---

**NOTE:** You can not specify a network path. Specify a path on a local computer.

---

4. Specify the location of the crash dump file in the [Crash Dump] box.

---

**NOTE:** "Crash Dump File" is a binary file that can be read with Windows Debugger.

---

5. Check the following check boxes on the [Option] box.

- Dump Symbol Table
- Dump All Thread Contexts
- Add To Existing Log File
- Create Crash Dump File

For more information on each of the above functions, refer to Online Help.

6. Click [OK].



## Network Monitor

Using Network Monitor helps you investigate and manage the network troubles. To use Network Monitor, you need to restart the system after the installation has completed, so we recommend you install Network Monitor as soon as possible, before any network troubles can occur.

1. Point to [Settings] from the Start menu and click [Control Panel].  
The [Control Panel] dialog box appears.
2. Double-click [Add or Remove Programs].  
The [Add or Remove Programs] dialog box appears.
3. Click [Add/Remove Windows Component].  
The [Windows Components Wizard] dialog box appears.
4. Click [Management and Monitoring Tools] and then click [Details].  
The [Management and Monitoring Tools] dialog appears.
5. Click to select the [Network Monitor Tools] check box, and then click [OK].
6. The [Windows Components Wizard] dialog box appears again, so click [Next].
7. If the setup asks to install the disk, insert the OS CD-ROM into CD-RW/DVD-ROM drive and click [OK].
8. Click [Finish] in the [Windows Component Wizard] dialog box.
9. Close the [Add or Remove Programs] dialog box.
10. Close the [Control Panel] dialog box.

To start Network Monitor, point to [Program] → [Administrative Tools] and click [NetworkMonitor]. For information on how to operate Network Monitor, refer to Online Help.

---

## Installing Maintenance Utilities

Various maintenance utilities are included in your EXPRESSBUILDER DVD. See Chapter 6 for more information on installing the utilities to your server or management workstations.

---

## Updating the System - Applying Service Pack -

---

**IMPORTANT:** If you install the Windows Server 2003 CD-ROM including the Service Pack 2 to your system, you do not have to apply the Service Pack 2 again.

---

"Updating the System" is automatically executed by Express Setup.

Execute "Updating the System" in following cases.

- Processor is expanded (expanded from single processor to multi-processor).
- Modified system configuration.
- Recovered the system using recovery process.

See the "Updating the System - Applying Service Pack -" section in Appendix D for details on the update process.

---

## Making Backup Copies of System Information

The system information includes the current BIOS settings and any specific information for the server.

Save the information after completing the system setup.

Without the backup data, you will not be able to recover the information.

You can save the information as described in the following procedure:

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive and reboot the system.
2. Select [Maintenance Tools (Normal mode)].
3. Select [English].
4. Select [Maintenance Utility].
5. Select [System Information Management].
6. Insert a floppy disk into the floppy disk drive.
7. Select [Save].

---

## Installing with the OEM-FD for Mass Storage Device

This section explains how to setup with the OEM-FD. This is not a standard procedure. The detailed information is provided by the manual of the Mass Storage Device.

### Installation of a Mass storage device not supported by Express Setup

If you would like to install or re-install the OS when the system has a new mass storage device not supported by the EXPRESSBUILDER, you have to set as follows.

1. Read the manual supplied with the mass storage device before setting the server.
2. If the mass storage device is a RAID Controller, configure the RAID system before running the EXPRESSBUILDER.
3. Boot the system from the EXPRESSBUILDER DVD.
4. Select [Load the optional driver into the EXPRESSBUILDER] from the Top menu, click [Next]. Setting the driver disk for the mass storage controller. Press the "Perform" button.

---

**NOTE** : By choosing this option, you can load the driver provided by CD-ROM or floppy disk to proceed with the Express Setup.

---

5. Perform Express Setup with the following settings.
  - (a) When the "Use Existing Array" dialog box appears, check "Skip Creating a Virtual disk".
  - (b) Check "Apply OEM-FD for Mass storage device".

6. Copy the driver for the mass storage device in the Express Setup.

Insert the floppy disk attached to the mass storage device into the floppy disk drive.

Follow the on-screen messages to continue the Express Setup.

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## Chapter 6

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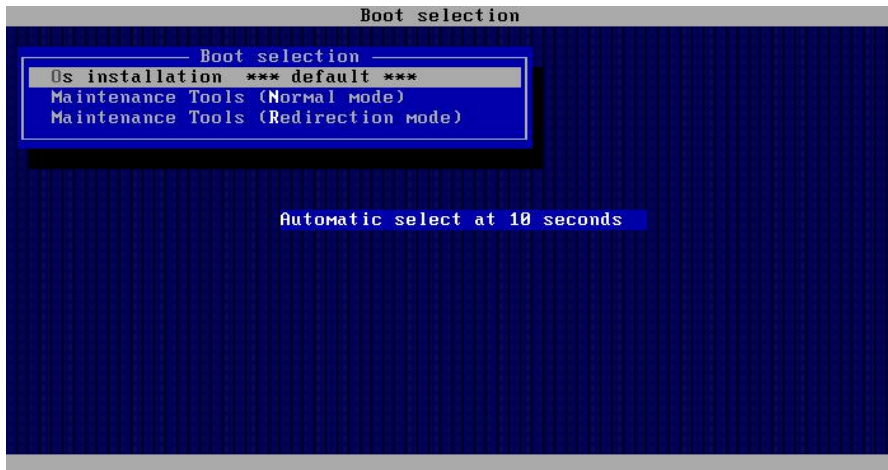
### Installing and Using Utilities

This section describes how to use the EXPRESSBUILDER DVD that comes with your server and to install the utilities stored on the EXPRESSBUILDER.

## EXPRESSBUILDER

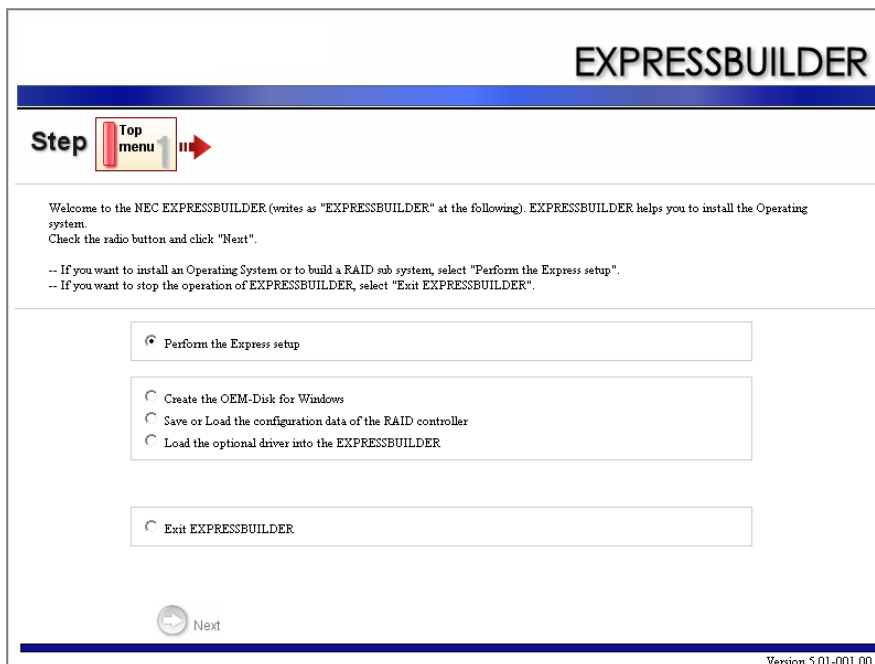
The EXPRESSBUILDER DVD (referred to as "EXPRESSBUILDER" hereinafter) helps you install the Operating system/the Management software or use the maintenance utilities.

When you insert the EXPRESSBUILDER disk into the DVD drive and reboot the system, the following menu appears.



### ■ OS installation

If you select this item, the Top menu appears.



### IMPORTANT:

- This tool is a Configuration Tool built on Windows PE 2.0 technology. An automatic reboot occurs after 72 hours from the start.
- The configuration with Windows PE 2.0 supports Windows Server 2003 (32bit) and Windows Vista Business (32-bit (x86)), no other operating system is supported.

You can use the Express Setup (see Chapter 5) or the following functions from this menu.

– Create the OEM-Disk

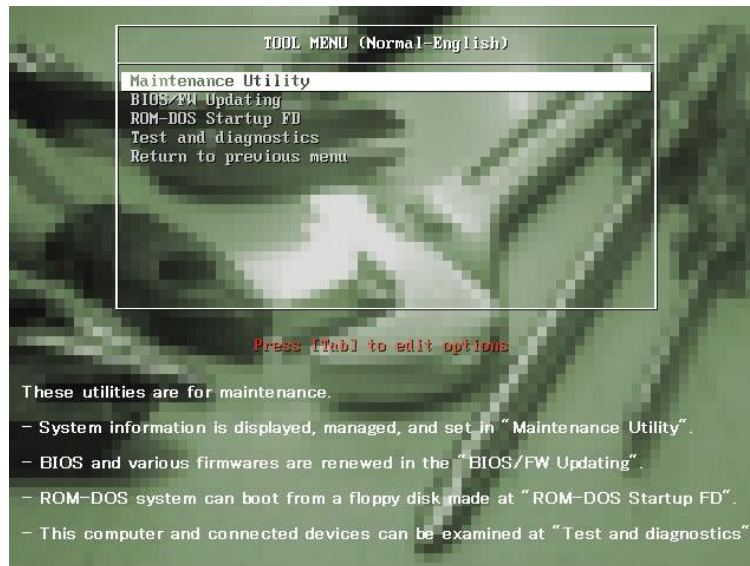
You can create the Windows OEM-Disk to use at the Windows manual setup.

- Load the driver

This function is not usually used. You may have to use it if you add a new device to the server. (See Chapter 5.)

- Maintenance Tools (Normal Mode)

If you select this item, the Tool menu appears.



You can use the below functions for maintenance.

- Maintenance Utility

The Maintenance Utility is usually used by the service representative. (See Chapter 7.)

- BIOS/FW Updating

You can update the system BIOS using a floppy disk (prepare a 3.5" floppy disk).

- ROM-DOS Startup FD

The ROM-DOS Startup FD is used to start the ROM-DOS system.

- Test and diagnostics

This function allows you to diagnose this computer. (See Chapter 7.)

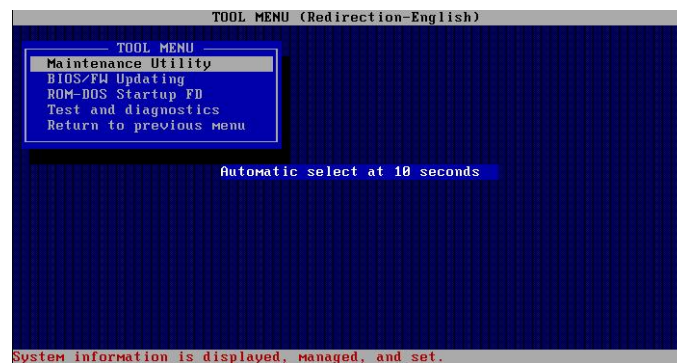
- Maintenance Tools (Redirection Mode)

If you want to operate this computer via the BIOS redirection (the console-less function), select this item.

---

**NOTE:** If you operate this computer via the Remote KVM function, select the "Maintenance Tools (Normal mode)".

---

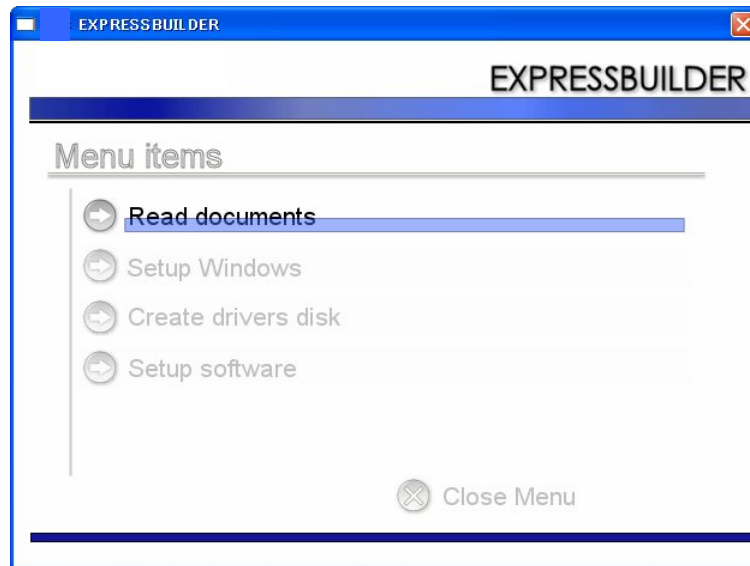


The menu's functions are the same as the "Maintenance Tools (Normal Mode)".

---

## Autorun Menu

When the EXPRESSBUILDER disk is inserted into the DVD drive, Windows automatically launches the menu shown below.



This menu is used to,

- Read the User's Guide or the other documents,
- Update the server system (Windows drivers), and
- Install the management software.

---

### NOTES:

- This menu requires Microsoft Windows XP, Vista or Windows Server 2003 (or later).
  - Some documents are provided in PDF format. Use the Adobe Reader to view or print these documents.
- 

If the menu does not appear, select "My computer" by using the Explorer, and double-click the icon of the DVD drive that contains the EXPRESSBUILDER DVD.

Some menu items are grayed-out when the logon user does not have administrator authority or if the menu item is not available for your system.

To use the menu,

- Click on the menu items, or
- Click the right mouse button on the menu window.



## PARAMETER FILE CREATOR

"Parameter File Creator" is a tool to create the [Parameters file] that is used for configuring the server with the Express Setup (see Chapter 5 for details).

If you use the Parameters file created by the Express Setup and the Parameter File Creator to operate the setup, the setup can be done automatically except for a few key inputs to confirm the specification. You can also install the system with the same specifications as before when re-installing the system. We recommend you create a [Parameters file] to setup the servers from the EXPRESSBUILDER.

When using a floppy disk, a USB floppy disk drive is required.

---

**IMPORTANT:** You cannot create a [Parameters file] for Microsoft Windows Server 2003 x64 Editions.

---

---

**NOTE:** You can install Windows Server 2003 without a [Parameters file]. Also, you can modify/newly create the [Parameters file] during the setup with the EXPRESSBUILDER.

---

### Parameters File

This section describes how to specify the setup information that is necessary for the OS installation and creation using a Parameters File.

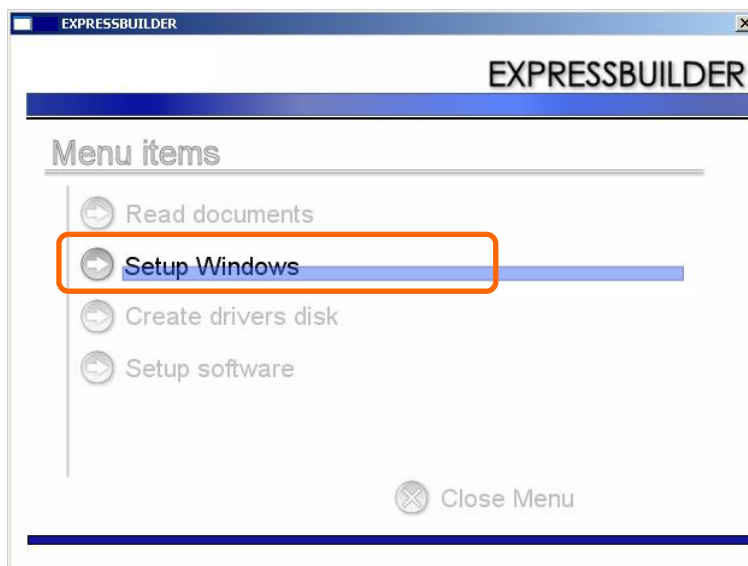
Follow the procedure below.

---

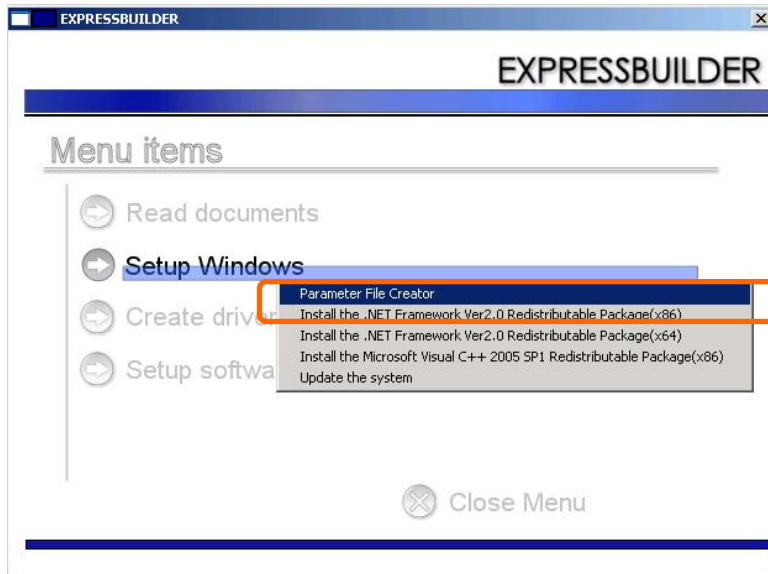
**IMPORTANT:** Do not remove the EXPRESSBUILDER DVD from the drive during the parameters file creation.

---

1. Start the OS.
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.  
The menu appears.
3. Right-click on the screen or left-click [Setup Windows]. The menu displayed below appears.



4. Click [Parameter File Creator].

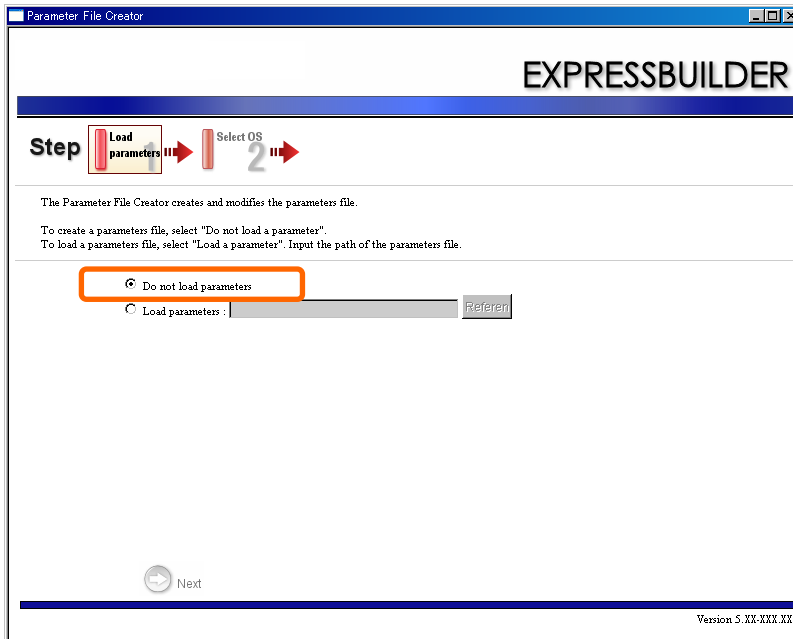


The Parameter File Creator is displayed.



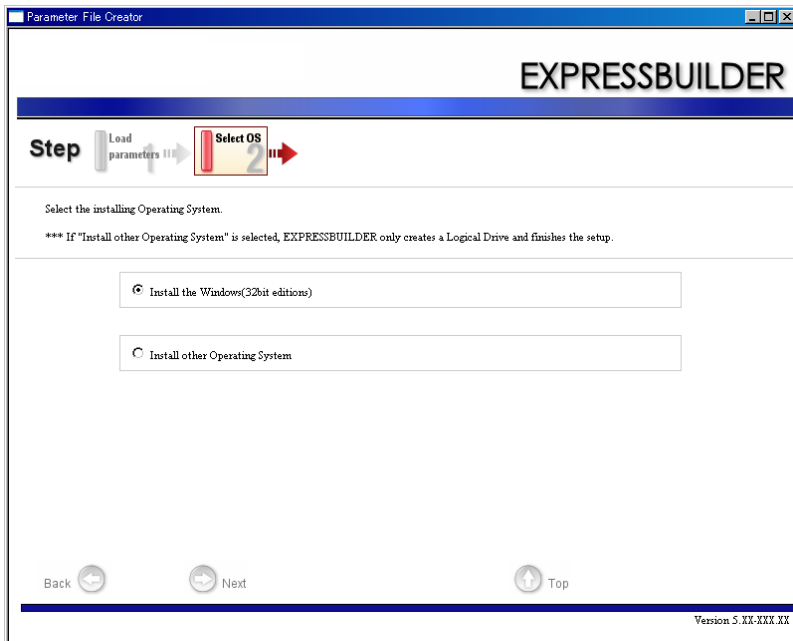
5. [Load Parameters] step is displayed.

Select [Do not load parameters] from the menu, and click [Next].



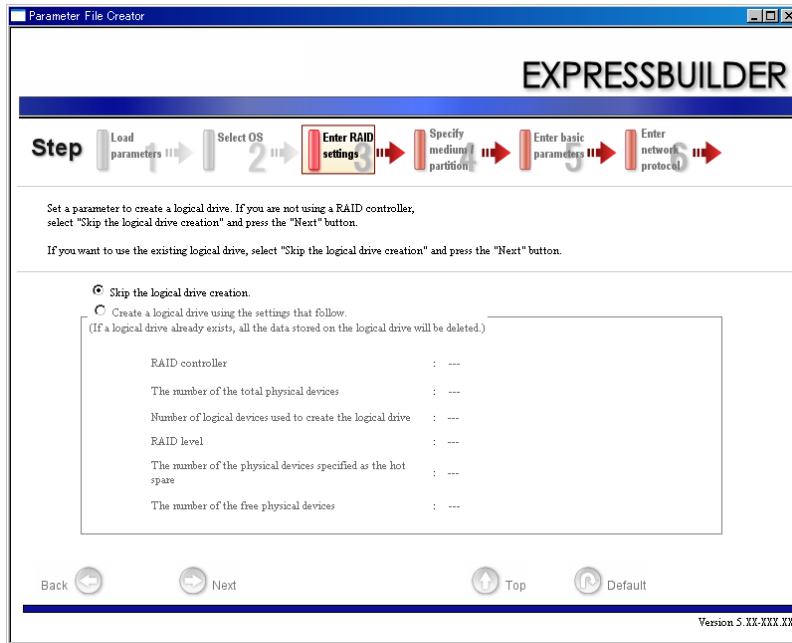
6. Select the Operating System to install.

Select [Install the Windows (32bit editions)] from the menu, and click [Next].



7. Enter the virtual disk settings.

The [Enter RAID setting] step is displayed. Confirm the parameters, modify if necessary, and click [Next].




---

**IMPORTANT:** At "The number of the total physical devices", the Parameter File Creator displays the upper limit that the RAID controller can support. The total of "The number of physical devices used to create the logical drive" and "The number of the physical devices specified as the hot spare" must not exceed "The number of the total physical devices" which are connected to the target system.

---



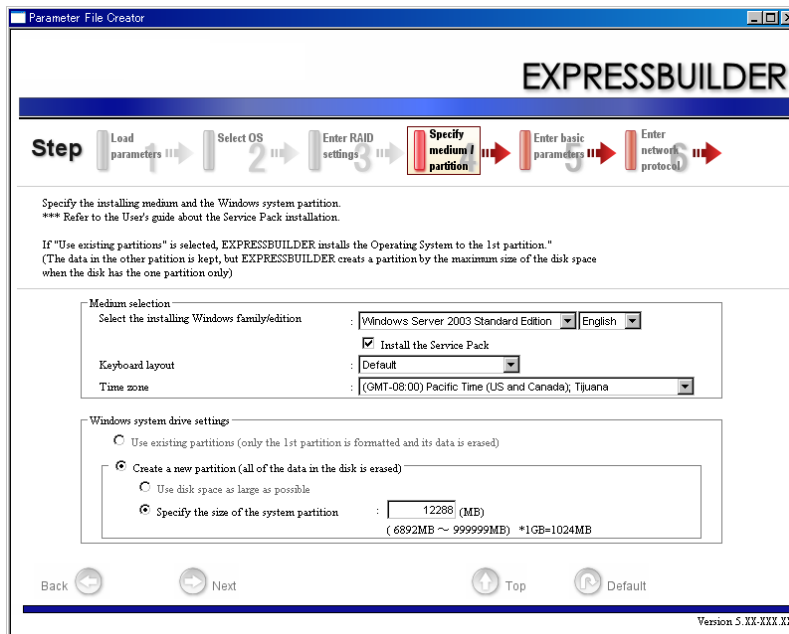
---

**NOTE:** You can use only physical devices that have the same model number to configure a logical drive.

---

## 8. Specify the installation medium and the Windows system partition.

The [Specify medium / Partitions] step is displayed. Confirm the parameters, modify if necessary, and click [Next].



### IMPORTANT:

- About the partition size
  - Specify a partition size larger than the required minimum size for the OS installation.
  - Do not specify a larger partition size than the capacity of the connected hard disk drive.
- If you select "Create a new partition" at "Windows system drive settings", the contents of the hard disk will be deleted.
- If "Use existing partitions" is selected, the EXPRESSBUILDER installs the Operating System to the 1st partition (the 1st partition contents are deleted). The data in the other partition is kept if the system has two or more partitions. (See the figure below.)

First Partition Deleted	Second Partition Retained	Third Partition Retained
-------------------------------	---------------------------------	--------------------------------

- You cannot re-install the system with an existing partition that is upgraded to Dynamic Disk remained. Do not select "Use existing partitions" at the "Windows system drive settings".

9. Enter the user information, time zone and client license mode.

The [Enter basic parameters] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

---

**IMPORTANT:** The Computer name and User name are required parameters.

---

**NOTE:** Even if you set no value into "Administrator password", "Confirm password", "●●●●●●" is displayed.

---

10. Enter the network protocol settings.

The [Enter network protocol] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

---

**NOTE:** The entry order in the custom settings may differ from the LAN port numbering.

---

11. Enter the domain or workgroup name to be used.

The [Enter domain and account] step is displayed. Confirm the parameters, modify if necessary, and click [Next].

The screenshot shows the 'Parameter File Creator' window with the 'EXPRESSBUILDER' title. A progress bar at the top indicates the current step is 'Enter domain and account'. Below the progress bar, there is a text box with instructions: 'If you want to join in a domain, enter the account name/password of the domain. (The account name is less than 32 characters, and the password is less than 14 characters) If not, select "Join in a workgroup" and click "Next".' The form contains two radio button options: 'Join in a workgroup' (selected) and 'Join in a domain'. Under 'Join in a workgroup', there is a text field for 'Workgroup name' containing 'WORKGROUP'. Under 'Join in a domain', there are text fields for 'Domain name', 'Account name', 'Password', and 'Confirm password'. At the bottom, there are buttons for 'Back', 'Next', 'Top', and 'Default'. The version number 'Version 5.XX-XXX.XX' is visible in the bottom right corner.

12. Select the components to install.

The [Select Windows component] step is displayed. Confirm the parameters, modify if necessary, and click [Next]

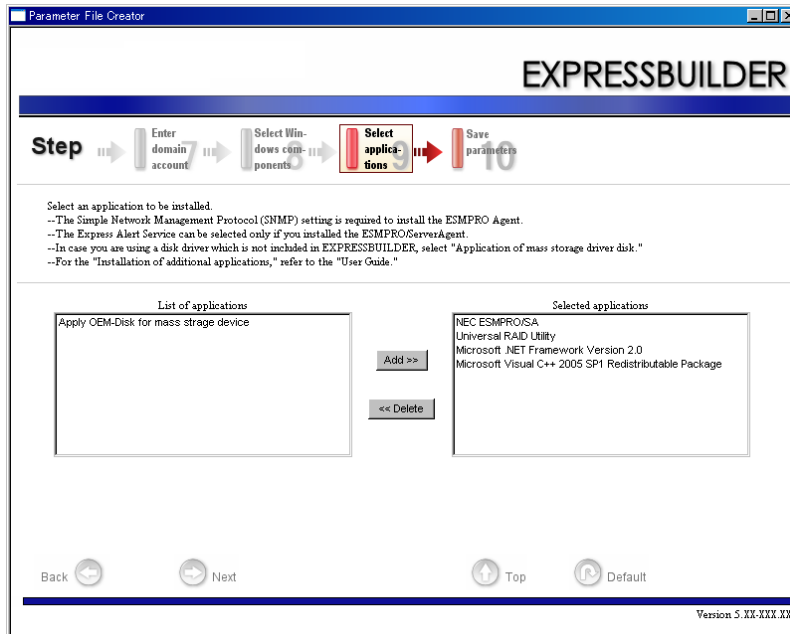
The screenshot shows the 'Parameter File Creator' window with the 'EXPRESSBUILDER' title. A progress bar at the top indicates the current step is 'Select Windows components'. Below the progress bar, there is a text box with the instruction: 'Select the installing Windows components.' The form contains several sections with checkboxes and 'Default settings' buttons:
 

- Windows component:**  Internet information service(IIS) [Default settings]
- Management and monitoring tools:**
  - Simple network management protocol(SNMP) [Default settings]
  - Network monitoring tools
- Network service:**
  - Simple TCP/IP service
  - Dynamic host configuration protocol(DHCP)
  - Domain name system(DNS)
  - Windows internet name service(WINS)
- Other network file and print services:**
  - File service for Macintosh
  - Print services for Macintosh
  - Print services for UNIX

 At the bottom, there are buttons for 'Back', 'Next', 'Top', and 'Default'. The version number 'Version 5.XX-XXX.XX' is visible in the bottom right corner.

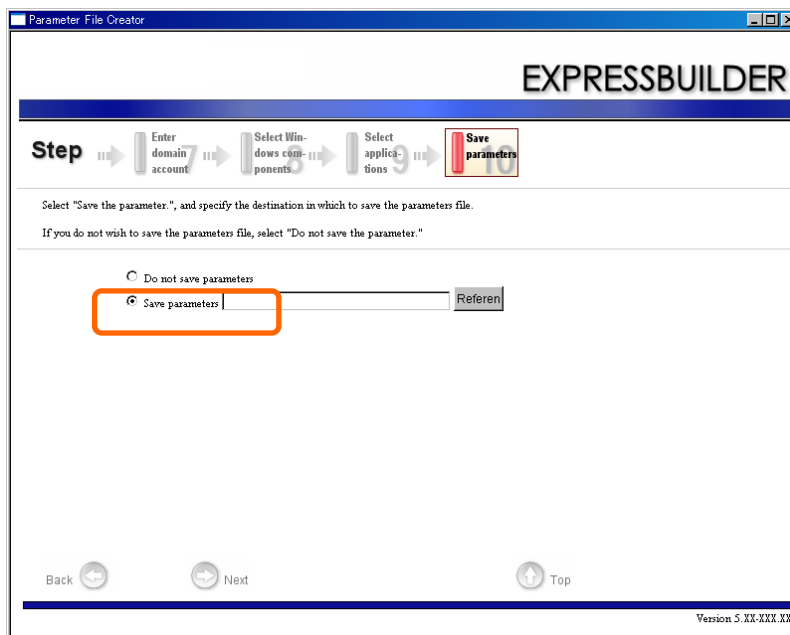
### 13. Select the applications to install.

The [Setting applications] step is displayed. Confirm the parameters, modify if necessary, and click [Next].



### 14. Save the parameters.

The [Save parameters] step is displayed.



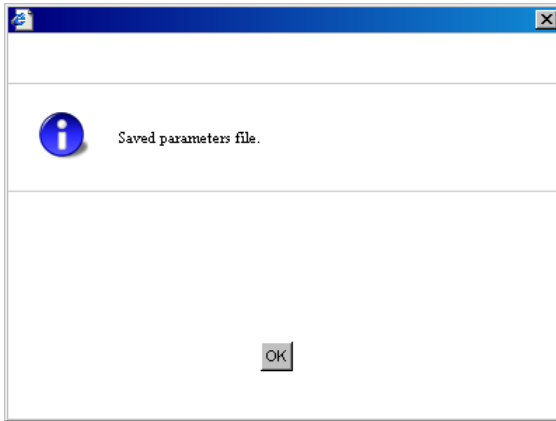
If you want to save the parameters, set the free formatted floppy disk.

Select [Save parameters], enter the file path of the parameters files into the text box and click [Next].

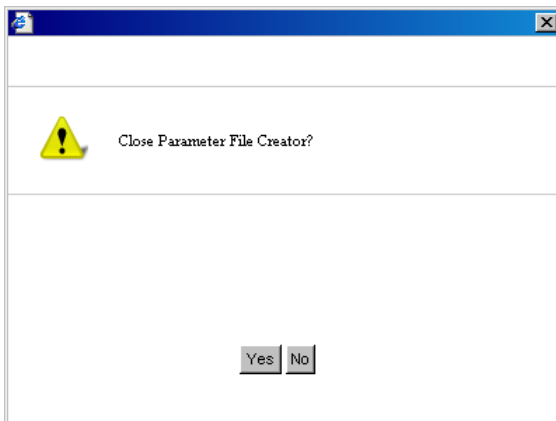
Otherwise, select [Do not save parameters].



15. Saved to a floppy disk.




The floppy disk containing the parameters file has been created.



Click [Yes] to exit the Parameter File Creator.

---

**NOTES:**

- If you wish to modify the existing information file (parameters file), click "Load Parameters" at the [Load Parameters] screen. Refer to the help to modify the information file.
  - If you wish to abort the operation , click  at the upper-right corner of the screen.
-

## NEC ESMPRO

The NEC ESMPRO (referred to as ESMPRO hereafter) lets a system administrator manage remote servers across a network. ESMPRO monitors the server hardware and software configurations, failures, and performance. With log data collected by ESMPRO, a system administrator can track long-term and short-term performance, monitor server usage, create graphs to record trends, and check the server failure rates. The administrator can use the information collected to create more efficient data routing procedures and optimize server usage.

---

### Functions and Features

The ESMPRO offers many functions and features to manage the remote servers across a network. These features help the system administrator perform daily system operation, system extension, and transfer tasks. Some features of the ESMPRO Manager include:

- Hardware and software server configuration
  - Hardware resources mounted in the servers, such as the processor, memory, disks, RAID System, and LAN boards.
  - Software resources, such as operating system information and drivers running on each server.
- Server failures
  - On-screen real-time displays provide the system administrator with the failure type, location, cause, and suggested corrective actions.
  - Failure data includes hardware failure information such as system board temperature, memory failure, crashes, and software failure information.
- Performance
  - ESMPRO monitors the server performance and the server usage and displays information, such as the rate of processor load, memory usage, disk usage, and LAN traffic. Usage threshold values can help the system administrator monitor and prevent server overloads.

**For installation procedure and detailed explanations on NEC ESMPRO, refer to the online documentation on the EXPRESSBUILDER DVD.**

---

## Universal RAID Utility

Universal RAID Utility is an application used to manage or monitor the following RAID Controllers.

- Internal RAID Controller
- RAID Controller (SAS/SATA, RAID0/1/5/6)
- Disk Array Controller (External SAS HDD)

Before attempting to operate the Universal RAID Utility, read the "Universal RAID Utility User's Guide" included in the EXPRESSBUILDER DVD. The manual explains the Universal RAID Utility installation procedure and provides notes on the Universal RAID Utility operation.

---

### Setup with Express Setup

You can install the Universal RAID Utility using the Express Setup contained in the EXPRESSBUILDER DVD. When you start the Express Setup, a dialog box prompting to specify an application appears. Select [Universal RAID Utility].

---

### Manual Setup

#### Windows

You can start the setup program of the Universal RAID Utility from the [Autorun Menu].

Click [Setup Software] → [Universal RAID Utility] in the [Autorun Menu].

You need to install the following software.

- Microsoft .NET Framework 2.0
- The Runtime component of the Microsoft Visual C++ 2005 SP1

You can also install these software from the [Autorun Menu].

Click [Setup Windows] → [Install the .NET Framework Ver 2.0 Redistributable Package (x86)] (If CPU architecture is x64, [Install the .NET Framework Ver2.0 Redistributable Package (x64)]) in the [Autorun Menu] for the setup of Microsoft.NET Framework 2.0.

Click [Setup Windows] → [Install the Microsoft Visual C++ 2005 SP1 Redistributable Package(x86)] (Use the x86 package whatever the CPU architecture may be.) for the setup of the Runtime component of the Microsoft Visual C++ 2005 SP1.

#### Linux

You need to run the setup.sh in the install image of the Universal RAID Utility.

The install image of the Universal RAID Utility is located in the following directory of EXPRESSBUILDER.

```
/BBB/lnx/pp/uraidutl
```

The part of BBB is BBB of the medium number (5.AA-BBB.CC) of EXPRESSBUILDER.

---

### Using the Universal RAID Utility via the Network

The Universal RAID Utility cannot manage via the network a computer on which a RAID Controller is installed. Use the remote console function to do so. (ex. Remote Desktop of Windows).

---

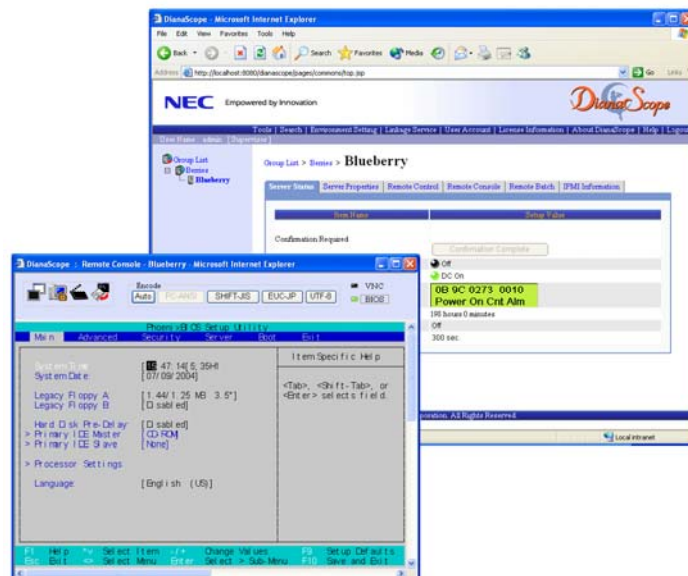
### Creating a RAID 6 Logical Drive

You must use four or larger Physical Devices in order to create a RAID 6 Logical Drive using the Universal RAID Utility. If you want to create a Logical Drive from three Physical Devices, you need to use WebBIOS.

## NEC DianaScope

NEC DianaScope is a software application that can be used for the remote management of the server.

Refer to the online documentation for more information on the features and the installation of NEC DianaScope.



### NOTES:

- One server license is required for each server managed remotely using NEC DianaScope.
- The following server license is included in this server product.
  - DianaScope Additional Server License (1)

# Chapter 7

---

## Maintenance

This chapter describes the daily maintenance of the server and the precautions to follow when relocating or storing the server.

### MAKING BACKUP COPIES


We recommend you make backup copies of your valuable data stored in the hard disk drives of the server on a regular basis. For information on the backup storage devices suitable for the server and the backup tools, consult with your service representative.


When you have changed the hardware configuration or BIOS configuration, select "System Information Management" and then "Save" of the Off-line Maintenance Utility to make a backup copy of the system information.

Also make a backup copy of the RAID System configuration data if your system is in a RAID System configuration. When your hard disk drives have been auto-rebuilt due to a failure, we recommend make a backup copy of the configuration data. To make a backup copy of the configuration data, use the configuration utility that is resident in the FLASH memory on the optional RAID controller. Refer to the manual supplied with the board.

## CLEANING

Clean the server on a regular basis to keep it in good shape.

<b>⚠ WARNING</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injuries. See pages 1-3 to 1-8 for details.</p> <ul style="list-style-type: none"> <li>Do not disassemble, repair, or alter the server.</li> <li>Do not look into the Optical Disc Drive.</li> <li>Do not remove the lithium battery.</li> <li>Disconnect the power plug before cleaning the server.</li> </ul>

<b>⚠ CAUTION</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.</p> <ul style="list-style-type: none"> <li>High temperature</li> <li>Make sure to complete the board installation.</li> </ul>

### Cleaning the Server

For daily cleaning, wipe the external surfaces of the server with a dry soft cloth. Follow the procedure below if stains remain on the surfaces:

---

#### IMPORTANT:

- To avoid altering the material and color of the server, do not use volatile solvents such as thinner and benzene to clean the server.
  - The power receptacle, the cables, the connectors on the rear panel of server, and the inside of the server must be kept dry. Do not moisten them with water.
- 

1. Make sure that the server is powered off (the POWER/SLEEP LED is unlit).
2. Unplug the power cord of the server from a power outlet.
3. Wipe off the dust from the power cord plug with a dry cloth.
4. Soak a soft cloth in a neutral detergent that is diluted with cold or lukewarm water, and squeeze it firmly.
5. Rub off stains on the server with the cloth prepared in Step 4.
6. Soak a soft cloth in water, squeeze it firmly, and wipe the server with it once again.
7. Wipe the server with a dry cloth.
8. Wipe off dust from the fan exhaust opening on the rear of the server with a dry cloth.

---

## Cleaning the Interior

**⚠ CAUTION**

Only a qualified service representative can only install or remove the components described in this subsection. To avoid personal injury or electrical shock, contact your service representative when you need to install/remove the internal components.

One of the most important items of a good maintenance program is a regular and thorough cleaning of the inside of the server, especially around the base board.

Dust buildup inside the server can lead to several problems. As dust acts as a thermal insulator, a buildup can prevent proper system cooling. Excessive heat will shorten the life of the server components. The dust may also contain conductive or corrosive materials that can cause short circuits or corrosion of the electrical contacts.

The frequency at which you should clean the inside of the server depends on the environment in which it is located. For most office environments, every 12 months is probably sufficient. For more severe environments, clean the inside every 6 months.

Cleaning the interior of the server implies powering off the server and removing the left side cover. You will need a small vacuum cleaner (with a plastic tipped nozzle and electrostatic protection), computer grade canned air, and a small brush.

Follow the procedure below to clean the inside of the server.

**⚠ WARNING**

Unplug all power cords.

Unplug all power cords before performing any maintenance. Voltage is present inside the server and display unit even after the power is turned off. All voltage is removed only when the power cord is unplugged.

---

**IMPORTANT:** Do not use a brush made of chemical fabric, or cleaning materials that can generate electrostatic electricity.

---

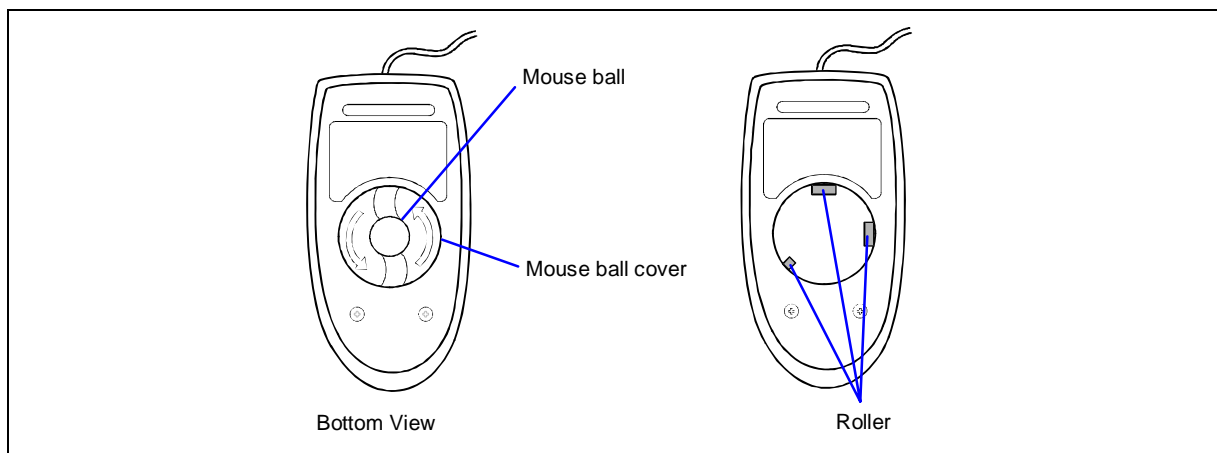
1. Turn off the server and unplug all power cables.
2. Remove the left side cover. (See Chapter 9.)
3. Remove the dust accumulated on the air inlet of the front and the rear fan.
4. Use a small brush to loosen any dust and debris on the base board.
5. Use computer grade canned air to blow dust off components on the base board.
6. Use a small vacuum cleaner with a plastic tip to vacuum out the dust and debris from the inside of the server.
7. Reinstall the left side cover. (See Chapter 9.)
8. Reconnect all the power cables and power on the server.

## Cleaning the Keyboard/Mouse

Make sure that the server and peripheral devices are powered off (the POWER/SLEEP LED is unlit), and then wipe the keyboard surface with a dry cloth.

The mouse operation depends on the degree of smoothness of the internal ball rotation. To keep the mouse ball clean, use the mouse in a place with little dust. Follow the steps below regularly to clean the mouse:

1. Prepare cold or lukewarm water, neutral detergent, alcohol, two dry soft clothes, and cotton swabs.
2. Make sure that the server is powered off (the POWER/SLEEP LED is unlit).
3. Turn the mouse upside down, and rotate the mouse ball cover counterclockwise to remove it.
4. Take out the ball from the mouse. Cover the bottom of the mouse with your hand, and turn your hand holding the mouse (the mouse is on your palm with the button upward). The mouse ball is released onto your palm.



5. Soak a soft cloth in a neutral detergent that is diluted with cold or lukewarm water, and squeeze it firmly.
6. Rub off stains on the mouse ball. Softly wipe the mouse ball with the cloth prepared in Step 5.
7. Wipe the mouse ball with a dry soft cloth.
8. Wipe the three small rollers inside the mouse with a cotton swab soaked with alcohol. Wipe the stains slowly and carefully by rotating the rollers with the tip of the cotton swab.
9. Blow out any dust from the mouse. Protect your eyes from the dust.
10. Put the mouse ball back into the mouse.
11. Place the mouse ball cover, and rotate it clockwise until it locks into place.



---

## Cleaning an Optical Disc

A dusty Optical Disc or dust-accumulated in a tray causes the device to fail to read the data correctly.

Follow the procedure below regularly to clean the tray and an Optical Disc:

1. Make sure that the server is powered on (the POWER/SLEEP LED is lit).
2. Press the Eject button on the front of the Optical Disc Drive.  
The tray comes out.
3. Hold the Optical Disc lightly and take it out from the tray.

---

**NOTE:** Do not touch the signal side of the Optical Disc with your fingers.

---

4. Wipe the tray with a dry soft cloth.

---

**IMPORTANT:** Do not wipe the lens of the Optical Disc Drive. Doing so may damage the lens and may cause a malfunction of the drive.

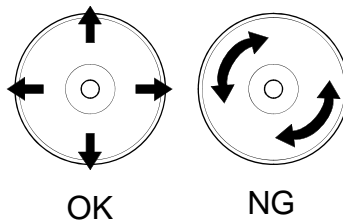
---

5. Press the Eject button or gently push the front of the tray front to close it.
6. Wipe the signal side of the Optical Disc with a dry soft cloth.

---

**IMPORTANT:** Wipe Optical Discs from the center to the outside. Use only a specific Optical Disc cleaner if necessary. Cleaning an Optical Disc with record spray/cleaner, benzene, or thinner causes damage to the Optical Disc contents. At worst, inserting the Optical Disc into the server may cause a failure.

---



## SYSTEM DIAGNOSTICS

The System Diagnostics runs several tests on the server.

Select [Maintenance Tools] - [Test and diagnostics] in the EXPRESSBUILDER to diagnose the system.

### Test Items

The following items are tested during the system diagnostics.

- Memory
- CPU cache memory
- Hard disk drive used as a system

---

**IMPORTANT:** When executing the system diagnostics, make sure to disconnect the LAN cable to avoid influence on the network.

---



---

**NOTE:** When checking the hard disk drive, no data is written on the disk.

---

### Startup and Exit of System Diagnostics

There are two ways to diagnose the server: using the local console (keyboard) of the server itself, and using the management PC via the serial port (remote console).

---

**IMPORTANT:** Use the serial port to execute System Diagnostics with remote console. The LAN connection is not for System Diagnostics.

---

The procedure to start the diagnostics program is as follows:

1. Shutdown the OS, power off the server, and unplug the power cord.
2. Disconnect all the LAN cables from the server.
3. Plug the power cord and power on the server.
4. Use the EXPRESSBUILDER DVD to start the system.

Select [Maintenance Tools (Normal mode)] when using the local console of the server, or select [Maintenance Tools (Redirection mode )] when using the remote console.

5. Select [English].

The following menu is displayed on the screen, when selecting [English].



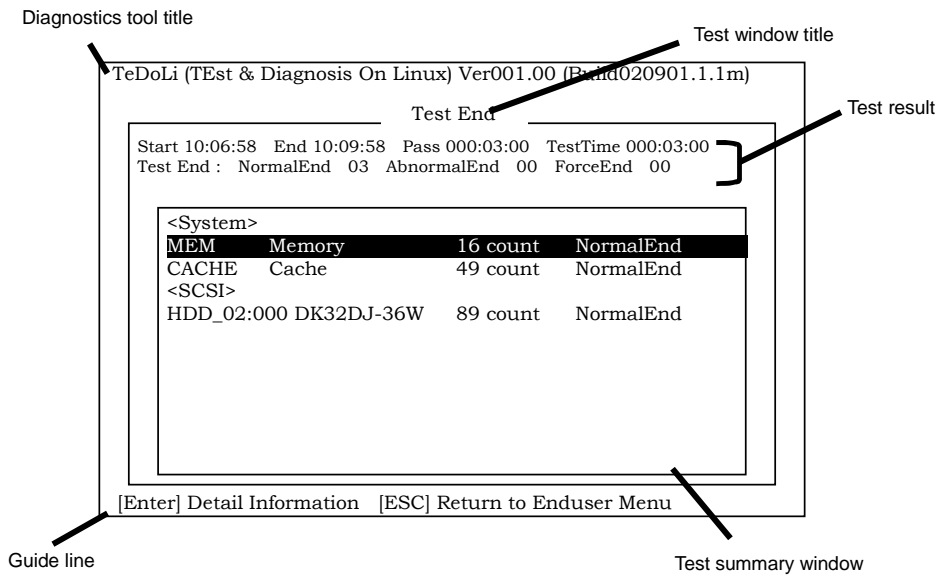
Local console



Remote console

## 6. Select [Test and diagnostics].

Select [End-User Mode] and the system diagnostics starts. The diagnostics are completed in approximately three minutes. Once the diagnostics are completed, the displayed screen changes as shown below:



### – Diagnostics tool title

Shows the name and version of the diagnostic tool.

### – Test window title

Shows the diagnostics progress. "Test End" is displayed when the diagnostics are completed.

### – Test result

Shows the start, end, elapsed time and completion status of the diagnostics.

### – Guide line

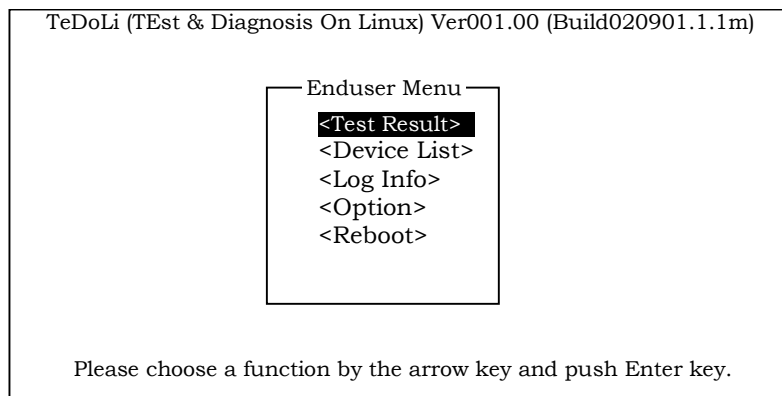
### – Test summary window

Shows the results of each test that executed the diagnostics. Move the cursor and press the **Enter** key on the cursor line to display the details of the test.

When an error is detected by the system diagnostics, the relevant test result in the test Summary window is highlighted in red, and "Abnormal End" is displayed in the result on the right side.

Move the cursor to the test that detected the error, and press the **Enter** key. Record the error message that has been output to the Detail Information screen and contact your service representative.

7. Follow the guide line shown at the bottom of the screen, and press the **Esc** key.  
The [Enduser Menu] below is displayed.




- <Test Result> Shows the diagnostics completion screen of the above diagnostics.
- <Device List> Shows the list of connected devices.
- <Log Info> Shows the log information of the diagnostics. It can be saved on a floppy disk. To save it on a floppy disk, insert a formatted floppy disk in the floppy disk drive, and select <Save(F)>.
- <Option> Runs the various optional menu.
- <Reboot> Reboots the system.

8. Select <Reboot> in the [Enduser Menu] above.  
The server restarts and the system is started from the EXPRESSBUILDER.
9. Exit the EXPRESSBUILDER, and remove the DVD-ROM from the Optical Disc Drive.
10. Power off the server and unplug the power cord from the receptacle.
11. Reconnect all the LAN cables were disconnected in Step 2 to the server.
12. Plug in the power cord.

This completes the system diagnostics.

## RELOCATING/STORING THE SERVER

Follow the procedure below to relocate or store the server:

<b>⚠ CAUTION</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injury, or property damage. See pages 1-3 to 1-8 for details.</p> <p>Never attempt to lift the server only by yourself. Do not install the server in any place other than specified. Do not connect/disconnect any interface cable with the power cord of the server plugged to a power source.</p>

---

### **IMPORTANT:**

- If the server needs to be relocated or stored, contact your service representative.
- Make sure to make a backup copy of your valuable data in the hard disk drive, if any.
- Make sure not to shock the hard disk drives when relocating the server.

1. Take any media out of the server, if any.
2. Power off the server (the POWER/SLEEP lamp goes off).
3. Unplug the power cord of the server from its power outlet.
4. Remove all the cables from the server.
5. Hold the server by its bottom to carry the server.

---

**IMPORTANT:** Do not hold the front mask to lift the server. The front mask may disengage from the server, causing personal injuries.

---

6. Protect the server with the shock-absorbing materials, and pack it securely.

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# Chapter 8

---

## Troubleshooting

If your server does not operate as expected, read this chapter before contacting your service representative.

---

**NOTE:** For provision against an unexpected failure, we recommend you install the Off-line Maintenance Utility, NEC ESMPRO, to the server and client computers.

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## LAMPS

The following describes the server lamps and their indications. See Chapter 2 for the location of each lamp.

---

### LAN ACCESS Lamp

The LAN ACCESS lamp lights green when the server is connected to a LAN. The lamp flashes while the server is accessed through the LAN (for packet transmission). The number next to the icon indicates the network port number on the rear panel.

---

### STATUS Lamp

The STATUS lamp lights green when the server is operating successfully. When the STATUS lamp is unlit or lit/flashing amber, it indicates that the server has failed.

The following table lists indications of the STATUS lamp, descriptions, and actions to take.

---

#### NOTES:

- If NEC ESMPRO is installed, you can confirm the cause of a failure by referring to the error log.
  - To cycle power to the server, shut down the server from the OS to and reboot it, if available. If it cannot be shut down from the OS, reset or execute a forced shut down or disconnect and connect the power cord to reboot the server.
-

STATUS lamp indication	Description	Procedure
On (green)	The server is operating normally.	–
Flashing (green)	<ul style="list-style-type: none"> <li>The server is operating with the memory or CPU in a degraded state.</li> <li>A single-bit memory error has occurred.</li> </ul>	Identify the device in degraded state by using the BIOS setup utility, and replace it as soon as possible.
Off	The power is off.	Turn on the power.
	POST is in progress.	Wait for a while. The STATUS lamp turns green when the POST is completed.
	A CPU error has occurred.	Turn the power off and then turn it on. If the POST screen displays an error message, note the message, and contact your service representative.
	A CPU temperature alarm was detected. (Thermal-Trip)	
	A timeout occurred when the time set for the watchdog timer arrived.	
	A CPU bus error has occurred.	
A memory dump has been requested.	Wait until the memory dump is completed.	
On (amber)	A temperature alarm was detected.	Check if the internal fans are clean and if the fan units are firmly connected. If the STATUS lamp indication does not change and the fans seem to be operating normally, contact your service representative.
	A voltage alarm was detected.	Contact your service representative.
	All the power supply units have failed.	
Flashing (amber)	Either of the following was detected in the redundant power configuration: <ul style="list-style-type: none"> <li>AC power is not supplied to one of the two power supply units.</li> <li>One of the two power supply units has failed.</li> </ul>	Connect the power cord to supply power. If the power supply unit is faulty, contact your service representative.
	A fan alarm was detected.	Check if the fan units are firmly connected. If the STATUS lamp indication does not change and the fans seem to be operating normally, contact your service representative.
	A temperature warning was detected.	Check if the internal fans are clean and if the fan units are firmly connected. If the STATUS lamp indication does not change and the fans seem to be operating normally, contact your service representative.
	A power supply alarm was detected.	Contact your service representative.
	A front door or a side cover may be open.	Close the door. If the STATUS lamp indication does not change, contact your service representative.

---

## **POWER/SLEEP Lamp**

The green POWER/SLEEP lamp lights to indicate normal operation while the server is powered on. When the server is powered off, the POWER/SLEEP lamp stays unlit.

If the OS supports a power-saving mode, the green lamp flashes while the server is in this power-saving mode. Pressing the POWER switch places the server back in the normal mode.

A power-saving mode is available in Windows Server 2003. Some OS's allow you to set the server to automatically switch to the power-saving mode when no access is made to the server for a certain period of time or to select the power-saving mode with a command.

---

## **DISK ACCESS Lamp**

The DISK ACCESS lamp indicates the state of hard disk drives in the hard disk drive bay.

This lamp lights in green every time any of the hard disk drives is being accessed.

When the DISK ACCESS lamp lights amber, it indicates that a hard disk drive error occurred. To identify a failed hard disk drive, see the lamps provided for each hard disk drive.

When the DISK ACCESS lamp flashes green and amber alternately or amber only, it indicates that the hard disk drives connected to the Internal RAID Controller are in auto-rebuilding mode (reconfiguration).

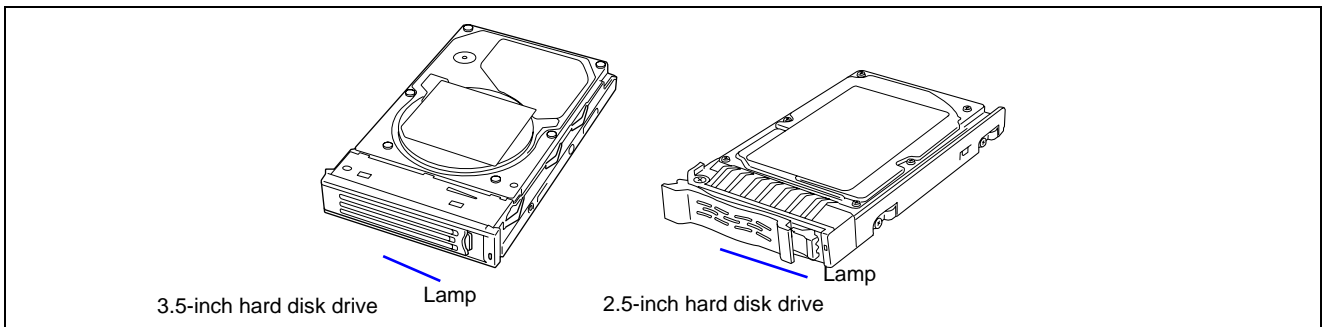
---

## **Access Lamps**

The access lamps for the optical disk drive lights when the media in the drive is being accessed.

## Hard Disk Drive Lamp

The disk lamp on the hard disk drive bay has different meanings depending on the display status.



- Lit green  
Indicates that power is supplied to the hard disk drive.
- Blinking green  
Indicates that the hard disk drive is being accessed.
- Lighting amber  
Indicates that the hard disk drive is defective in the RAID System configuration.

---

**NOTE:** While hard disk drives are in a RAID System configuration (RAID1/RAID5, RAID6, RAID10, or RAID50), a single failed hard disk drive does not affect the operation of the server. However, we recommend you replace the failed hard disk drive and auto-rebuild (reconfigure) the hard disk drives as soon as possible. (You can hot-swap such a failed hard disk drive.)

---

- Alternate lighting green or amber  
Indicates that the hard disk drive is being rebuilt (this status is not a failure). If the defective hard disk drive is replaced with a new one in the RAID System configuration, the data is automatically rebuilt (auto rebuild function). During the rebuild operation, the LED blinks amber.  
The LED goes off when the rebuild is terminated normally. The LED goes on amber if the rebuild fails.

---

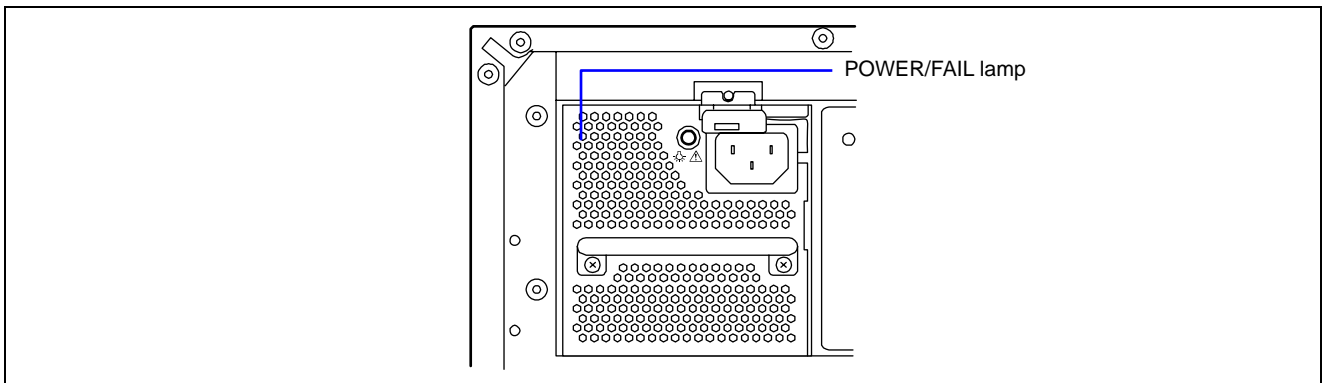
**IMPORTANT:** To abort a rebuild, power off the server. In such a case, restart the server, hot-swap the failed hard disk drive, and restart rebuilding. Observe the following notes to use the auto-rebuild feature.

- Do not power off the server. (If the server is powered off before rebuilding hard disk drives, the auto-rebuild feature will not start.)
  - Wait at least 90 seconds between the removal of a failed hard disk drive and the installation of a new hard disk drive.
  - Do not replace another hard disk drive while a rebuilding is already in progress.
-

---

## Power Supply Lamp

The power supply on the rear of the server has a POWER/FAIL lamp.



---

**NOTE:** A server equipped with an optional power unit can continue the operation when one of the power units is defective (redundant function). The defective power unit can be hot-swapped with a new one without shutting down the server.

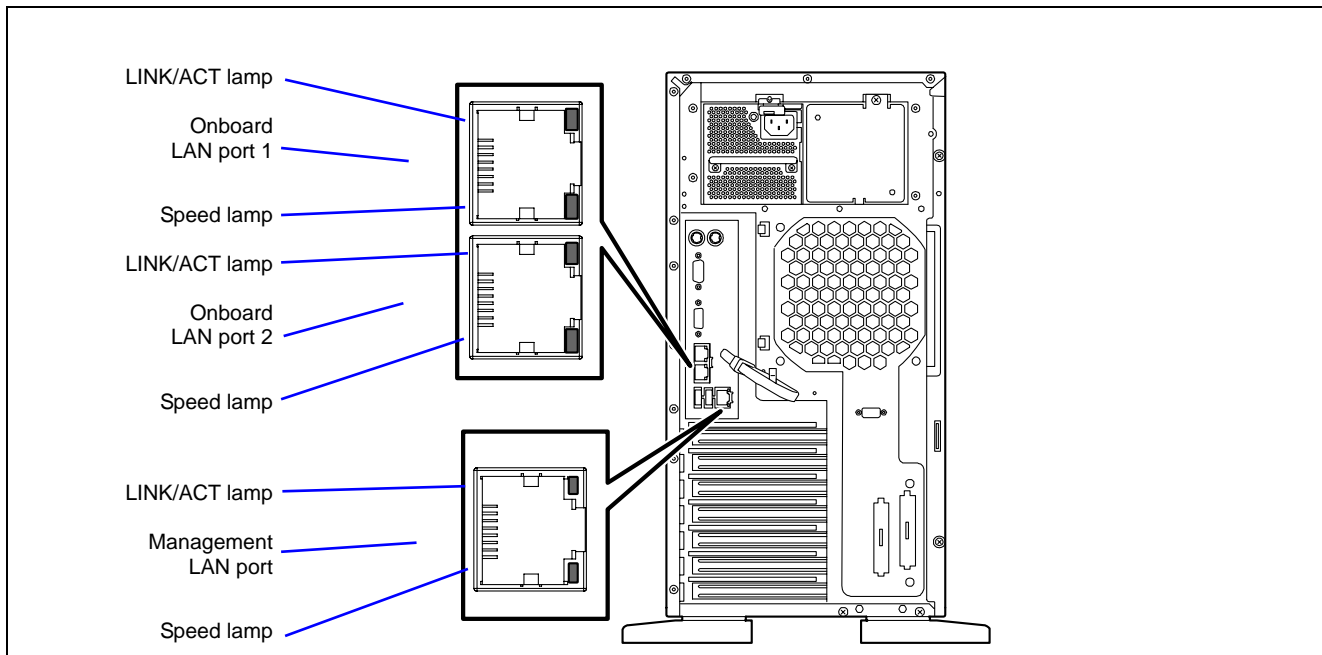
---

The POWER/FAIL lamp flashes green if the power supply unit receives AC power through the power cord (AC ON). The lamp lights green when you press the POWER switch to power on the server (DC ON).

The lamp lights amber if the power supply unit fails due to over-current, over-voltage, AC line failure, or fan failure.

## LAN Connector Lamps

Each of the three LAN connectors on the rear panel has two lamps as follows.



- **LINK/ACT lamp**

The LINK/ACT lamp indicates the state of each network port normally equipped with the server. If power is supplied to the server and the hub and they are correctly connected with each other, the lamp is lit in green (LINK state). If information is transmitted through a network port, the lamp blinks green (ACT state).

If the lamp does not light in the LINK state, check the network cable and the cable connection.

If the lamp still does not light, the network (LAN) controller may be defective. Contact your service representative.

- **Speed lamp (for data transmission ports)**

This lamp indicates whether each of the standard network ports is operated through the 1000BASE-T, 100BASE-TX or 10BASE-T network interface.

If the lamp lights amber, the network port is operated through 1000BASE-T.

If the lamp lights green, the network port is operated through 100BASE-TX.

If the lamp does not light, the network port is operated through 10BASE-T.

- **Speed lamp (for management port)**

If the lamp lights amber, the network port is operated through 100BASE-TX.

If the lamp does not light, the network port is operated through 10BASE-T.

---

## ERROR MESSAGES

If an error occurs in the server, an error message appears on the display unit connected to the server.

---

### Error Messages after Power-on

Powering on the server automatically starts the self-diagnostic program, POST (Power On Self-Test). When the POST detects any error, it displays an error message and a suggested corrective measure on the display unit.

Follow the table below to troubleshoot such errors.

Note that even when there is no hardware failure, using the keyboard or mouse at the times listed below causes the POST to assume a keyboard controller error and stop processing.

- Immediately after the server is powered on
- Immediately after the system was rebooted in response to a keyboard instruction (simultaneous key entry of **Ctrl + Alt + Delete**)
- Immediately after the system was rebooted in response to an OS instruction
- During the hardware initialization following the restart of the POST

When the POST detects a hardware failure due to one of the above reasons, restart the server once again. If the error message does not reappear, you can assume there is no hardware error.

To ensure normal operation of the server, however, make sure to follow the following restrictions.

- Do not make any keyboard entry or use the mouse before the memory count appears is displayed on the screen.
- Do not make any keyboard entry or use the mouse before the start-up message of the SCSI Configuration Utility is displayed on the screen following the server reboot.

---

**IMPORTANT:** Note the on-screen messages before contacting your service representative.

---

## POST Error Messages

When the POST detects an error, it displays an error message on the display unit screen. The following table lists the error messages, their descriptions, and the actions to take.

**IMPORTANT:** Note the messages that are displayed before consulting with your service representative. Alarm messages include useful information for maintenance.

Error code	Error message	Recommended Action
0200	Failure Fixed Disk.	Contact your service representative.
0210	Stuck Key.	Disconnect the keyboard and connect it again.
0211	Keyboard error	Disconnect the keyboard and connect it again. If it does not correct the error, contact your service representative.
0213	Keyboard locked - Unlock key switch.	Release the lock of the key switch. If it does not correct the error, contact your service representative.
0220	Monitor type does not match CMOS - Run SETUP.	Start the SETUP.. If it does not correct the error, contact your service representative.
0230	System RAM Failed at offset.	Contact your service representative.
0231	Shadow Ram Failed at offset.	
0232	Extended RAM Failed at address line.	
0250	System battery is dead - Replace and run SETUP.	Contact your service representative to replace the battery. (After restarting the computer, start the SETUP to provide the settings again.)
0251	System CMOS checksum bad - Default configuration used.	The default values have just been set. Start the SETUP to provide the settings again. If it does not correct the error, contact your service representative.
0252	Password checksum bad - Passwords cleared.	The password has just been cleared. Start the SETUP to provide the settings again.
0260	System timer error.	Start the SETUP to set the date and time again. If the error occurs successively in spite of the resetting, contact your service representative.
0270	Real time clock error.	
0271	Check date and time setting.	
0280	Previous boot incomplete - Default configuration used.	Start the SETUP to provide the settings again.
0281	Memory size found by POST differed from EISA CMOS.	Initialize the EISA CMOS.
02D0	System cache error - Cache disabled.	The cache cannot be used. Contact your service representative.



Error code	Error message	Recommended Action
02D1	System Memory exceeds the CPU's caching limit.	Contact your service representative.
02F4	EISA CMOS not write able.	
02F5	DMA Test Failed.	
02F6	Software NMI Failed.	
02F7	Fail-safe Timer NMI Failed.	
0611	IDE configuration changed	Check the IDE configuration.
0612	IDE configuration error - device disabled	Check the COM A configuration.
0613	Com A configuration changed	
0614	Com A config. error - device disabled	
0615	Com B configuration changed	Check the COM B configuration.
0616	Com B config. error - device disabled	
0B22	CPUs are installed out of order.	Contact your service representative to replace the CPU.
0B28	Unsupported CPU detected on CPU Socket 1.	Make sure that the server supports the CPU. If you are not sure, contact your service representative.
0B29	Unsupported CPU detected on CPU Socket 2.	
0B42	Resource Conflict	Contact your service representative.
0B43	Warning: IRQ not configured	
0B45	System configuration Data Write Error	
0B50	Processor #1 with error taken off line.	The system start was forced. Contact your service representative.
0B51	Processor #2 with error taken off line.	
0B5F	Forced to use Processor with error	
0B60	DIMM group #1 has been disabled	Contact your service representative.
0B61	DIMM group #2 has been disabled	
0B62	DIMM group #3 has been disabled	
0B63	DIMM group #4 has been disabled	
0B64	DIMM group #5 has been disabled	
0B65	DIMM group #6 has been disabled	
0B6F	DIMM group with error is enabled.	
0B70	The error occurred during temperature sensor reading.	Contact your service representative.
0B71	System Temperature out of the range.	Contact your service representative to replace the fan.
0B74	The error occurred during voltage sensor reading.	Contact your service representative.
0B75	System voltage out of the range.	
0B80	BMC Memory Test Failed.	Turn off the power once and then on again to start the server. If it does not correct the error, contact your service representative.
0B81	BMC Firmware Code Area CRC check failed.	
0B82	BMC core Hardware failure.	
0B83	BMC 1BF or 0BF check failed.	
0B8A	BMC SEL area full.	Start SETUP and select [Server] - [Event Log Configuration] - [Clear All Error Logs] and press <b>Enter</b> to clear the event logs.

<b>Error code</b>	<b>Error message</b>	<b>Recommended Action</b>
0B8B	BMC progress check timeout.	Turn off the power once and then on again to start the server. If it does not correct the error, contact your service representative.
0B8C	BMC command access failed.	
0B8D	Could not redirect the console - BMC Busy -	
0B8E	Could not redirect the console - BMC Error -	
0B8F	Could not redirect the console - BMC Parameter Error -	
0B90	BMC Platform Information Area corrupted.	
0B91	BMC update firmware corrupted.	
0B92	Internal Use Area of BMC FRU corrupted.	This is not a fatal error. Turn off the power once and then on again to restart the server. If it does not correct the error, contact your service representative.
0B93	BMC SDR Repository empty.	Turn off the power once and then on again to restart the server. If it does not correct the error, contact your service representative.
0B94	IPMB signal lines do not respond.	This is not a fatal error. Turn off the power once and then on again to restart the server. If it does not correct the error, contact your service representative.
0B95	BMC FRU device failure.	
0B96	BMC SDR Repository failure.	Turn off the power once and then on again to start the server. If it does not correct the error, contact your service representative.
0B97	BMC SEL device failure.	
0B98	BMC RAM test error.	
0B99	BMC Fatal hardware error.	
0B9A	BMC not responding.	
0B9B	Private I2C bus not responding.	Update the BMC firmware. If it does not correct the error, contact your service representative.
0B9C	BMC internal exception.	
0B9D	BMC A/D timeout error.	
0B9E	SDR repository corrupt.	
0B9F	SEL corrupt.	
0BB0	SMBIOS – SROM data read error.	
0BB1	SMBIOS – SROM data checksum bad.	Contact your service representative.
8010	The error occurred during water cooling unit sensor reading.	
8012	Water pump #n out of the range.	
8068	Unsupported Processor Speed detected on CPU Slot 1.	
8069	Unsupported Processor Speed detected on CPU Slot 2.	
8150	NVRAM Cleared by Jumper	Start SETUP and provide the settings again.
8151	Password Cleared by Jumper	Start SETUP and set the password again.
8160	Mismatched Processor Type/Speed detected on Processor 1.	Contact your service representative.
8161	Mismatched Processor Type/Speed detected on Processor 2.	
None	Expansion ROM not initialized – PCI Mass Storage Controller in slot xx (xx: slot number)	Disable the initialization of the optional device expansion ROM by using the BIOS SETUP utility (see Chapter 4).

## Beep Codes

If an error occurs during the POST, the server beeps, indicating the error type.

Each number indicates the number of short beeps, and a hyphen indicates a pause. For example, the beep interval 1-3-1-1 indicates 1 beep, pause, 3 beeps, pause, 1 beep, pause, and 1 beep notifying that the DRAM refresh test error occurred.

Beep code	Description	Recommended action
3-3 (repetitive)	ROM checksum error	Contact your service representative to replace the motherboard.
1-2-2-3		
1-3-1-1	DRAM refresh test error	Check if the DIMMs are properly connected. If the error persists, contact your service representative to replace a DIMM or the motherboard.
1-3-1-3	Keyboard controller error	Disconnect the keyboard and connect it again. If the error persists, contact your service representative to replace the motherboard.
1-3-3-1	No memory or capacity check error	Check if the DIMMs are properly connected. If the error persists, contact your service representative to replace a DIMM or the motherboard.
1-3-4-1	DRAM address error	
1-3-4-3	DRAM test Low Byte error	
1-4-1-1	DRAM test High Byte error	
1-5-1-1	CPU startup error	Contact your service representative to replace the motherboard.
1-5-2-2	No CPU installed	Contact your service representative to replace the CPU or the motherboard.
2-1-2-3	BIOS ROM copyright test error	Contact your service representative to replace the motherboard.
2-2-3-1	Unexpected interrupt test error	
1-2	Option ROM initialization error	Check if the BIOS SETUP is correctly configured. If an expansion of Option ROM for an additionally installed PCI board is not displayed, check if the PCI board is properly installed. If the error persists, contact your service representative to replace the motherboard or the PCI board.

**NOTE:** Beep code 1-5-4-2 informs you that the AC power supply was interrupted due to a power failure or momentary voltage drop and that the system was restarted. This is not an error.

---

## SOLVING PROBLEMS

When the server fails to operate as expected, see the following to find out your problem and follow the provided instructions before asking for repair.

If the server still fails to operate successfully, note the on-screen messages and contact your service representative.

---

### Problems with the Server

#### No screen display appears with beep:

Are the DIMMs installed securely?

- Check whether the DIMMs are connected firmly to their mating connectors.
- Check whether DIMMs of different specifications are installed in the specific group. See Chapter 9 for the correct DIMMs specifications.

#### Fail to power on the server:

Is the server properly supplied with power?

- Check if the power cord is connected to a power outlet (or UPS) that meets the power specifications for the server.
- Make sure to use the power cord provided with the server.
- Check the power cord for a broken shield or bent plugs.
- Make sure that the power breaker for the connected power outlet is on.
- If the power cord is plugged to a UPS, make sure the UPS is powered on and that it outputs power. See the manual that comes with the UPS for details.

Power supply to the server must be linked with the connected UPS using the BIOS setup utility of the server.

<Menu to check: [Advanced] - [AC-LINK]>

Did you press the POWER/SLEEP switch?

- Press the POWER/SLEEP switch on the front of the server to power on (the POWER/SLEEP LED lights).

#### POST fails to complete:

Is the DIMM board installed?

- At least two DIMM boards are required for operation.

Is the memory size large?

- The memory check may take a few minutes if the memory size is large. Wait for a while.

Did you perform any keyboard or mouse operation immediately after you started the server?

- If you perform any keyboard or mouse operation immediately after start-up, the POST may accidentally detect a keyboard controller error and stop proceeding. In such a case, restart the server. Do not perform any keyboard or mouse operation until the BIOS start-up message appears when you restart the server.

Does the server contains appropriate memory boards or PCI devices?

- Operation of the server with unauthorized devices is not guaranteed.

**Fail to access internal or external devices (or such devices fail to operate):**

Are the cables properly connected?

→ Make sure that the interface cables and power cord are properly connected. Also make sure that the cables were connected in the correct order.

Is the power-on order correct?

→ Power on the external devices first, then the server.

Did you install drivers for connected optional devices?

→ Some optional devices require specific device drivers. Refer to the manual that comes with the device to install its driver.

Is the BIOS configuration correct?

→ Some devices connected to a serial or parallel port may require I/O port address or operation mode settings. Refer to the manual that comes with the board for details to make correct settings.

**The keyboard or mouse fails to function:**

Is the cable properly connected?

→ Make sure that the cable is connected to the correct connector on the rear of the server.

→ The keyboard or mouse will not function if it is connected when the server is powered on (not applicable to USB devices). Power off the server first and connect it properly.

Are the server drivers installed?

→ Refer to the manual that comes with your OS to check that the keyboard and mouse drivers are installed. (These drivers are installed along with the OS.) Some operating systems allow you to change the keyboard and mouse settings. Refer to the manual that comes with your OS to check that the keyboard and mouse settings are correct.

**Fail to access the optical disc:**

Is the optical disc properly set in the optical disc drive tray?

→ The tray is provided with a holder to secure the optical disc. Make sure that the optical disc is placed properly in the holder.

Is the optical disc applicable to the server?

→ Macintosh optical discs cannot be read.

→ The playback of discs which do not conform to the DVD standard is not guaranteed.

**The POWER/SLEEP lamp goes on when the power cord is connected:**

→ When the server is connected to AC power, the POWER/SLEEP lamp goes on. This is the normal operation of the server, not a fault. The lamp will go off when DC power is turned on, and then off.

**Inserted the correct CD-ROM but the message below is displayed:**

The CD-ROM is not inserted or the wrong CD-ROM is inserted.  
Please insert the correct CD-ROM.

OK

Is the data side of the CD-ROM dirty or damaged?

→ Take the CD-ROM out of the optical disc drive, confirm that it is not dirty or damaged, set the disc again and click [OK].

**Fail to access the hard disk drive:**

(Refer to the documentation supplied with the RAID Controller.)

Is the hard disk drive applicable to the server?

→ Operation of any device that is not authorized by the manufacturer is not guaranteed.

Is the hard disk drive properly installed?

→ Make sure to lock the hard disk drive with the lever on its handle. The hard disk drive is not connected to the internal connector when it is not fully inserted (see Chapter 9).

**Fail to access the (internal or external) SCSI devices:**

Is the SCSI device applicable to the server?

→ Operation of any SCSI device that is not authorized by the manufacturer is not guaranteed.

Has the cable connection changed?

→ See Chapter 10 for cable connection.

Are the SCSI devices properly configured?

→ When external SCSI devices are connected to the server, device settings, including SCSI ID and terminator, are required. Refer to the manual that comes with the SCSI device for details.

Is the cable length exceeded?

→ Refer to the manual that comes with the SCSI device for details.

Are the SCSI controllers (including the optional controllers) properly configured?

→ If an optional SCSI controller is installed in the server, and if SCSI devices connected to it, use the BIOS setup utility that comes with the optional SCSI controller for proper configuration. Refer to the manual that comes with the optional SCSI controller for details.

**Event logs when using the Intel Network adapter teaming**

Event Type: Warning  
 Event Source: IANSMiniport  
 Event Category: None  
 Event ID: 11  
 Description: Adapter link down: Intel(R)PRO/1000 ----

Event Type: Warning  
 Event Source: IANSMiniport  
 Event Category: None  
 Event ID: 13  
 Description: Intel(R)PRO/1000 ---- has been deactivated from the team.

Event Type: Error  
 Event Source: IANSMiniport  
 Event Category: None  
 Event ID: 16  
 Description: Team #0: The last adapter has lost link.  
 Team network connection has been lost.

Event Type: Warning  
Event Source: IANSMiniport  
Event Category: None  
Event ID: 22  
Description: Primary Adapter does not sense any Probes:  
Intel(R)PRO/1000 ---- Possible reason: partitioned Team.

The above-mentioned event log will appear when the system starts. There is no problem in LAN driver operation.

---

## Problems with Windows

**In some cases an event log is registered as follows when you install Windows Server 2003 x64 Editions.**

Source: DCOM

Category: Error

Event ID: 10016

Description: The application-specific permission settings do not grant Local Activation permission for the COM server application with CLSID {555F3418-D99E-4E51-800A-6E89CFD8B1D7} to the user {NT AUTHORITY\LOCAL SERVICE} SID {S-1-5-19}.  
This security permission can be modified using the component Services administrative tool.

→ It is not a problem for system operation.

**In some cases an event log is registered as follows when you install Windows Server 2003 x64 Editions.**

Event Source: Service Control Manager

Event Type: Error

Event ID: 7011

Description: Timeout (30000 milliseconds) waiting for a transaction response from the IMAP4Svc service.

→ Reboot the system. If this event is not registered again, it is not a problem for system operation.

**In some cases an event log is registered as follows when you operate Windows Server 2003 R2.**

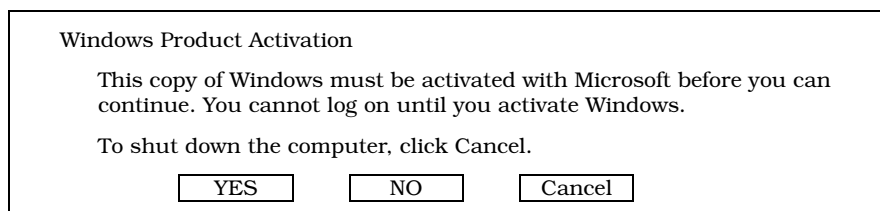
Source: IPMIDRV

Type: Error

Event ID: 1001

Description: The IPMI device driver attempted to determine if the system supported an IPMI BMC device. The driver attempted to detect the presence of the IPMI BMC by searching the SMBIOS for Type 38 record. But either no record was found or the record was not compatible with the version of the device driver.  
If a SMBIOS Type 38 record was detected, the Dump Data field of the event contains a binary representation of the record.

→ The above event log will be registered if you use "Hardware Management" which is provided by Windows Server 2003 R2.

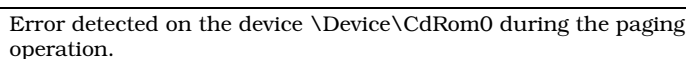
**The system displays the message below and fails to log on.**

→ In Windows Server 2003, the above message will be displayed if you use the operating system without executing the license authentication. Select "Yes", and execute the procedure for license authentication.

**The operating system cannot be installed correctly.**

Did you check the notes on the operating system installation?

→ See Chapter 6.

**During installation, the following warning is registered in the System Log of the EventViewer:**A screenshot of an Event Viewer warning message. The text reads: "Error detected on the device \Device\CdRom0 during the paging operation." The message is enclosed in a rectangular box with a thin border.

→ This is not an issue.

**Fail to start the OS:**

Is the EXPRESSBUILDER DVD in the optical disk drive?

→ Take out the EXPRESSBUILDER DVD and restart the server.

Is the OS functional?

→ Use the recovery process to recover the system.

**The OS presents unstable operation:**

Did you update the system?

→ Installing a network drive after installation of the OS may cause unstable operation. Use the EXPRESSBUILDER DVD to update the system. (See Chapter 6.)

**The system does not restart automatically when a stop error occurs, even though the system is set up to do so:**

→ In this case, restart it manually.



**The system restarts automatically when a stop error occurs, even though the system is NOT set up to do so:**

- This is not an issue.  
Check the System Event Log to confirm that a STOP error occurred.

**Cannot turn the power OFF during a blue screen occurrence:**

- If you want to turn off the power during a blue screen, execute a forced power off (forced shut down: continue to press POWER/SLEEP switch for 4 seconds). The power will not be turned off if you press the switch just one time.

**The PXE boot (network boot) fails or the server is not found on the network:**

Is the cable connected properly?

- Connect the proper cable to the network port on the rear of the server. In addition, make sure that the cable conforms to the network interface standard.

Is BIOS configuration correct?

- The internal LAN controller may be disabled in the BIOS Setup utility of the server. Check the BIOS Setup settings.

Have the protocol and service already been configured?

- Install the distinctive network driver for the server. Make sure that the protocol, such as TCP/IP, and services are properly specified.

Is the transfer speed correct?

- Open the network properties dialog box in the control panel to specify identical link speed and duplex values than the ones specified for the HUB.

**The Telnet Service is not installed.**

- Adjust the computer name to 14 characters or less, and then install the Telnet Service according to <How to install the Telnet Service>.

<How to install the Telnet Service>

1. Click [Run] on Start menu.
2. Type "tlntsvr /service" in the [Open] box, and click [OK].
3. Click the Start menu, point to [Control Panel], click [Computer Management] and then click [Services] to specify whether the Telnet Service is registered.

\* Once the installation of Telnet Service is finished, the computer name can be set to 15 characters or more.

**Wake-On-LAN Function**

The Remote Power ON/OFF function (Wake-On-LAN) is disabled immediately after the AC power is turned on.

Start Windows 2003 once, perform the steps below, and then shut down the system. Once the server has restarted, the Remote Power On/Off function is enabled unless the AC power is turned off.

1. Select [Start] - [Administrative Tools] - [Computer Management].
2. Select [Device Manager] - [Network Adapter], and double-click [Intel(R) PRO/1000 EB Network Connection with I/O Acceleration #n]. Set as follows in the [Detail] tab.

PME: [ON]

Wake On: [Magic Packet]

### Fail to start the OS with the /3GB switch

→ The system often fails to start the OS with the /3GB switch.

In this case, please adjust the capacity of the user mode area using the /userva switch in reference to the following URL.

<http://support.microsoft.com/kb/316739/en>

## Problems with the EXPRESSBUILDER

When the server does not boot from the EXPRESSBUILDER DVD, check the following:

Did you set the EXPRESSBUILDER during POST and restart the server?

→ If you do not set the EXPRESSBUILDER during POST and restart the server, either an error message will appear or the OS will boot.

Is BIOS configuration correct?

→ The boot device order may be specified with the BIOS setup utility of the server. Use the BIOS setup utility to change the boot device order to boot the system from the optical disc drive first.

<Menu to check: [Boot]>

**If [OS installation \*\*\*default\*\*\*] is selected at the BOOT Selection screen, the following message is displayed.**

After this message appears, check the error and take the appropriate corrective action according to the message listed in the table below.

Message	Cause
This EXPRESSBUILDER version was not designed for this computer. Insert the correct version and click [OK]. (When you click [OK], the computer reboots.)	This EXPRESSBUILDER version is not designed for this server. Execute the EXPRESSBUILDER on the compliant server.
EXPRESSBUILDER could not get the hardware parameters written in this motherboard. This version is not designed for this computer or the motherboard may be broken. (When you click [OK], the computer reboots.)	This message is shown when the EXPRESSBUILDER could not find system-specific information because of a motherboard exchange and so on.
The hardware parameters written in this motherboard are incorrect. This version is not designed for this computer or the motherboard may be broken.	

---

## Problems with Express Setup

The following message appeared when you tried to install Express Setup to a hard disk drive that has a smaller capacity than the specified partition size:

The creating of the partition was failed.  
The process can not be continued. The process was stopped.

OK

- Cannot continue the setup.  
Specify a smaller partition size than the capacity of the connected hard disk drive, and then retry the setup.

**The Express Setup terminated and asks to input setup information.**

- There are some errors on the specified setup information.  
Follow the instructions to input a correct value. It is not necessary to cancel the installation.

**The created system partition is of a smaller size than the specified value.**

- With Express Setup, in some cases the size of the created system partition is about 8MB smaller than the specified size.  
It is not a problem for system operation.

**Specified to join the Domain, but the system is installed as Workgroup.**

- When the setup fails to join the Domain during the installation, it will install the system as a Workgroup.  
Open [System] in Control Panel to specify joining the Domain.

**Changed the giga driver speed from 1000M bps to 100M bps. But the changed speed is not properly displayed in Network Details of NEC ESMPRO DataViewer (still 1000M bps is indicated):**

- It does not affect the operation of the LAN driver.

**Fail to start the Parameter File Creator:**

The Parameter File Creator requires to be un by "Microsoft® HTML Application host".

If the Parameter File Creator does not start, associate the file type with "Microsoft® HTML Application host" via following process.

- 1) Click [Run] on Start menu.
- 2) Type "%windir%\system32\mshta.exe /register" in the [Open] box, and click [OK].

---

## Error Message during RAID System Configuration

If the server configured with a RAID System does not work correctly or if the utility program fails, check the following and take an appropriate action.

### The OS cannot be installed:

Is the RAID Controller correctly configured?

→ Perform the configuration properly using WebBIOS.

### The OS cannot be started:

Has the BIOS setting for the RAID Controller changed?

→ Set it properly.

Does the POST recognize the RAID Controller?

→ Check that the RAID Controller is connected correctly and then turn the power ON.

→ When the RAID System is connected correctly but is not recognized, it may be faulty. Contact your service representative or the dealer that you purchased this controller from.

### Rebuilding cannot be performed:

Is the capacity of the hard disk drive to be used for the rebuild rebuilt insufficient?

→ Use a hard disk drive of the same capacity as the faulty one.

Is the Logical Drive configuration RAID0?

→ RAID0 does not have redundancy thus rebuilding cannot be performed. Replace the "DEAD" hard disk drive, create the configuration information again, perform the initialization and then restore using the backup data.

### A hard disk drive goes into the "FAIL" status:

→ Contact your service representative or the dealer that you purchased it from.

---

## Problems with Windows Autorun Menu

### Cannot read online document:

Is Adobe Reader installed correctly in your system?

→ Some online documents are supplied in PDF format. To read a PDF document, Adobe Reader is required in your system.

Is the operating system Windows XP SP2?

→ With Windows XP SP2, the following information may appear in the browser.

"To help protect your security, Internet Explorer has restricted this file from showing active content that could access your computer. Click here for options..."

1. Click the Information Bar.  
The shortcut menu appears.
2. Click [Allow blocked content].  
The security alert dialog box appears.
3. Click [Yes] on dialog box.

### The menu fails to appear:

Is your system Windows XP or later, or Windows 2003 or later?

→ The Windows Autorun menu is supported by Windows XP/Windows 2003 or later.

→ If your system runs on Windows Autorun Menu on Windows 2000 system, you need to setup IE6.0 before using Windows Autorun Menu.

Did you press **Shift**?

→ Setting the DVD/CD-ROM with **Shift** pressed down cancels the Autorun feature.

Is the system in the proper state?

→ The menu may not appear depending on the system registry setting or the timing to set the DVD/CD-ROM. In such a case, start the Explorer and double-click the icon of the optical disc drive.

### Some menu items are grayed-out:

Is your system environment correct?

→ Menu items are grayed-out when the logged on user does not have the Administrator authority or when the system does not meet the requirements to install the application. Login with a user having the proper authority on the proper system, and try again.

---

## Collecting the Event Log

This section describes how to collect the log of the various events that occurred on the server.

---

**IMPORTANT:** If a STOP error, system error, or stall occurred, follow the procedure below after restarting the system.

---

1. Click [Management Tool] → [Event Viewer] from the Control Panel.
2. Select the type of the log to collect.  
On [Application Log], the events related to the running application are archived.  
On [Security Log], the events related to the security are archived.  
On [System Log], the events which occurred at the item which configures Windows system are archived.
3. Click [Save as...] in the [Run] menu.
4. Input the file name of an archived log in the [File Name] box.
5. Select the type of the log file you want to save in the [File Type] list box and click [OK].

For more information, refer to Windows Online Help.

---

## Collecting the Configuration Information

This section describes how to collect the information on the hardware configuration and the inside specifications.

In order to collect information, use the "Diagnostic Program".

---

**IMPORTANT:** If a STOP error, system error, or stall occurred, follow the procedure below after restarting the system.

---

1. Point to [Settings] in Start menu, and click [Control Panel].  
The [Control Panel] dialog box appears.
2. Double-click [Management Tool], and double-click [Computer Management].  
The [Computer Management] dialog box appears.
3. Click [System Tool] → [System Information].
4. Click [Save as System Information File] in the [Operation] menu.
5. Input the file name to save in the [File Name] box.
6. Click [Save].

---

## Collecting Dr. Watson Diagnostic Information

Dr. Watson collects diagnostic information related to application errors. The location in which to save the information can be specified as you like. For more information, refer to Chapter 5.

---

## Memory Dump

If an error occurs, the dump file should be saved to acquire the necessary information. You can specify the location of your choice to save the diagnostic information. For more information, refer to "Specifying Memory Dump (Debug Information (refer to Chapter 5 for detail))"

If you saved the dump to a DAT, label the tape as "NTBackup" or "ARCServe".

---

**IMPORTANT:**

- Consult with your service representative before dumping the memory. Dumping the memory while the server is operating normally can affect the system operation.
  - Restarting the system due to an error may display a message indicating there is insufficient virtual memory. Ignore this message and proceed. Restarting the system may result in dumping improper data.
-

## **RECOVERY FOR WINDOWS SERVER 2003 X64 EDITIONS AND WINDOWS SERVER 2003**

If the system fails to start for some reason, recover the system using the recovery console. However, recovery using this method should be performed only by a system administrator or a user who has an expert knowledge of this subject. See the Online Help for details.



---

## MAINTENANCE TOOLS

The Maintenance Tools are used preventively, to maintain and to analyze potential troubles.

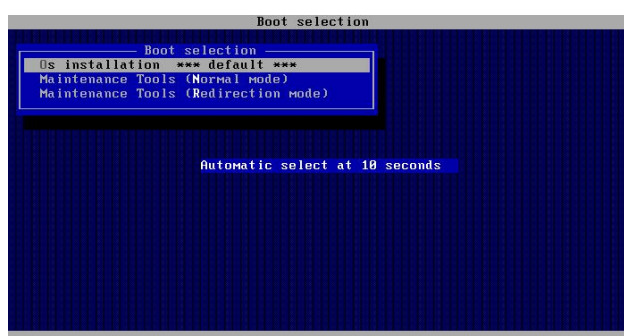
---

### Starting the Maintenance Tools

Start the Maintenance Tools as described in the following procedure.

1. Turn on first the peripheral devices and then the server.
2. Insert the EXPRESSBUILDER DVD supplied with your server into the optical disk drive of your server.
3. Press **Ctrl, Alt, and Delete** to reboot the server from the EXPRESSBUILDER. (You may also turn off and then on again to reboot the server.)

The system boots up displaying the Boot Selection menu.

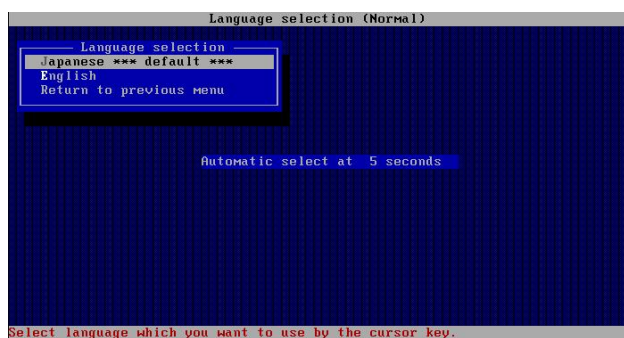


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**IMPORTANT:** The initial selection of the menu is "Os installation". "Os installation" starts automatically after the Boot Selection menu is displayed.

---

4. When a local console is used, "Maintenance Tools (Normal mode)" is selected.  
When a remote console is used, "Maintenance Tools (Redirection mode)" is selected.



---

**IMPORTANT:** The initial selection of the menu is "Japanese". "Japanese" starts automatically when no operation is performed during the five seconds following the on-screen display of the Language Selection menu.

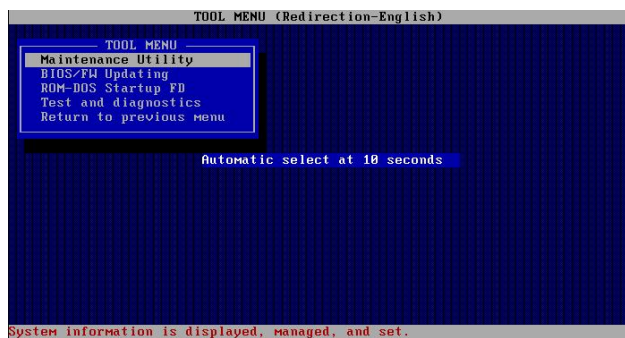
---

5. Select "English".

The tool menu is displayed.



### ***Using a local console***



### ***Using a remote console***

6. The tool starts.

---

## Maintenance Tools Functions

The following functions can be executed in the Maintenance Tools.

- Maintenance Utility

The Off-line Maintenance Utility is started in the Maintenance Utility. The Off-line Maintenance Utility is an OS-independent maintenance program. When you are unable to start the OS-dependent NEC ESMPRO to troubleshoot a problem, the Off-line Maintenance Utility can be used.

---

### IMPORTANT:

- The Off-line Maintenance Utility is intended to be used by your service representative. The EXPRESSBUILDER DVD you have created contains a file that describes the operation of the utility, but do not attempt to use the utility by yourself. Contact your service representative and follow their instructions.
  - See the online help for details of the Off-line Maintenance Utility. For further information, ask your service representative.
- 

The Off-line Maintenance Utility provides the following features.

- IPMI Information Viewer

Allows to view the system event log (SEL), sensor data record (SDR), and filed replaceable unit (FRU) and to make a backup copy of them.

Using this feature, you can find system errors and events to determine a maintenance part.

- BIOS Setup Viewer

Allows to export the current configuration data defined with the SETUP utility to a text file.

- System Information Viewer

Allows to view information on the processor and the BIOS and to export it to a text file.

- System Information Management

Allows to make a back-up copy of your data.

Without the backup data, the system-specific information and/or configuration may not be restored.

Only the authorized personnel is allowed to restore the backup data.

- System Management

The parameters of BMC (Baseboard Management Controller) are set for remote control and alert.

- BIOS/FW Updating

This menu allows you to update the software module (such as BIOS and firmware of the server) by using the update disk (3.5-inch floppy disk) that is distributed by the customer service representative.

After rebooting the system, an update program starts automatically from the floppy disk, and the various BIOS and firmware programs are updated.

---

**IMPORTANT:** Do not turn off the server while the update program is running. If the update processing is discontinued, the system becomes unable to start.

---

- ROM-DOS startup FD

Creates a support disk allowing to start the ROM-DOS system.

- Test and diagnostics

Execute various tests on the server system to check if the server functions are normal and if the connection between the server and the additional board is normal.

After the Test and diagnostics has been executed, a system check program assigned to each model starts. See "System Diagnostics" for details.

---

## Maintenance Tools with Remote Console

This subsection describes the procedures for using the Maintenance Tools with a remote console.

The Maintenance Tools contains a remote console feature that allows the system administrator to set up the server from the management workstation (management PC) via the network or the server's COM2 (serial) port.

---

### IMPORTANT:

- Do not use this feature on any other computer than the server, or on any other server obtained without the EXPRESSBUILDER. Doing so may cause a failure of the server.
  - Select "Maintenance Tools (Redirection mode)" for the remote console in the "Boot Selection" menu. Even if the rest is selected, it is not displayed in the management PC.
- 

### Starting

The following two methods are available to start the server.

- Running Maintenance Tools from the management PC via LAN
- Running Maintenance Tools from the management PC via direct connection (COM2)

For the procedure to start the Maintenance Tools with the Remote Console, see "NEC DianaScope".

---

### IMPORTANT:

- Do not change the boot device order in the BOOT menu in the BIOS SETUP. The EXPRESSBUILDER cannot be used if the Optical Disc Drive is not the first device in the boot order.
  - Use the standard LAN port for LAN connection.
  - Use the serial port B for direct connection.
  - To use this feature, you need to create a configuration file (3.5-inch floppy disk) that includes communication method between the server and the management PC, and various setup parameters. Use NEC DianaScope or run the "System Management" menu from the EXPRESSBUILDER to create a configuration file. Save the configuration file into the root directory of the floppy disk as the following file name.
    - File name: CSL\_LESS.cfg
  - If you exit the BIOS SETUP using an unusual way (e.g., forced power-off or reset), the redirection process may fail. In such a case, setup again using the configuration file.
- 

---

**NOTE:** The following items of BIOS setup information will be set as shown below.

- LAN Controller: [Enabled]
  - Serial Port A: [Enabled]
    - Base I/O Address: [3F8]
    - Interrupt: [IRQ 4]
  - Serial Port B: [Enabled]
    - Base I/O Address: [2F8]
    - Interrupt: [IRQ 3]
  - BIOS Redirection Port: [Serial Port B]
  - Baud Rate: [19.2K]
  - Flow Control: [CTS/RTS]
  - Console Type: [PC ANSI]
-

## RESETTING THE SERVER

If the server halts before starting the OS, press and hold **Ctrl** and **Alt** and press **Delete**. This restarts the server.

---

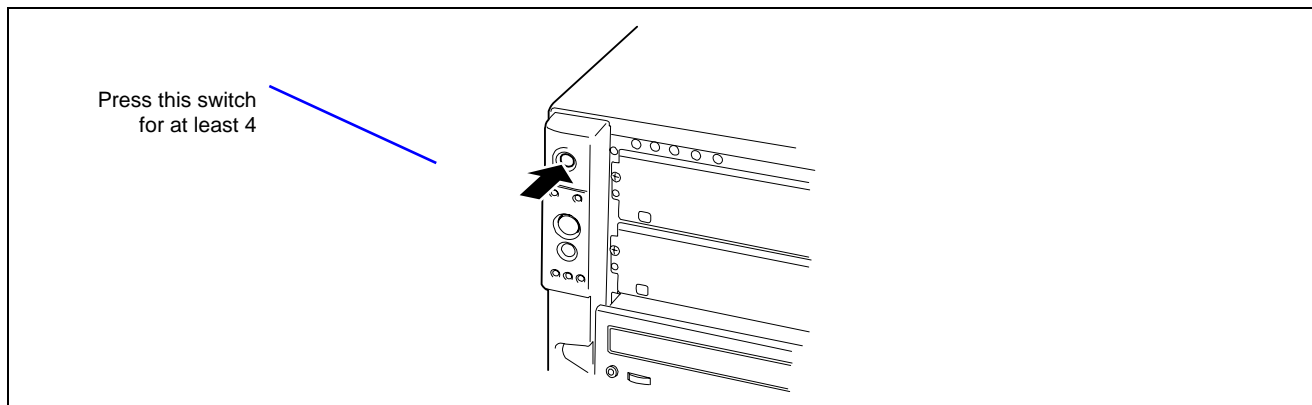
**IMPORTANT:** Resetting the server clears the DIMM memory and the data being processed. To reset the server when it is not frozen, make sure that no process is in progress.

---

## FORCED SHUTDOWN

Use this function when an OS command does not shut down the server, the POWER/SLEEP switch does not turn off the server, or resetting does not work.

Press and hold the POWER/SLEEP switch on the server for at least four seconds. The power is forcibly turned off. Wait at least 10 seconds before powering on again.



---

### IMPORTANT:

- If the remote power-on function is used, cycle the power once to load the OS, and power off again in the normal way.
  - If the processor is excessively heated, the circuit for protecting expensive components starts. If so, the POWER/SLEEP switch cannot be used to control the power because the system is being reset. Pull out the power cord and turn off the power. After a while, check the operating environment (including the ambient temperature). Connect the power cord and turn on the power. Note that it may be necessary to keep the system powered off until the processor has cooled down (around five minutes).
-

## Chapter 9

### Upgrading Your Server

This chapter describes the internal optional devices available for the server, the procedures for the installation or removal of such optional devices, and notes on using them.



---



#### IMPORTANT:

- Optional devices described in this chapter may be installed or removed by any user. However, the manufacturer does not assume any liability for damage to optional devices or the server or malfunctions of the server resulted from any installation by the user. We recommend you ask your service representative to proceed with the installation or removal of any optional devices.
  - Make sure to use only optional devices and cables authorized by the manufacturer. Repair of the server due to malfunctions, failures, or damage resulting from the installation of inappropriate devices or cables will be charged.
  - When you made any changes to the hardware configuration, make sure to update the system (see Chapter 5 for details.).
- 

#### SAFETY NOTES

Observe the following notes to install or remove optional devices safely and properly.

 <b>WARNING</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injuries. See the pages 1-3 to 1-8 for details.</p> <p>Do not disassemble, repair, or alter the server. Do not remove the lithium battery. Disconnect the power plug before working with the server.</p>

 <b>CAUTION</b>	
	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may cause a fire, personal injuries, or property damage. See pages 1-3 to 1-8 for details.</p> <p>Avoid installing in extreme temperature conditions. Make sure to complete the board installation. Protect the unused connectors with protective caps. Never attempt to lift the server only by yourself.</p>

---

## ANTI-STATIC MEASURES

The server contains electronic components sensitive to static electricity. Avoid failures caused by static electricity when installing or removing any optional devices.

- Wear an anti-static wrist strap (an arm belt or anti-static glove).  
If no anti-static wrist strap is available, touch an unpainted metal part of the cabinet before touching a component to discharge static electricity from your body.  
Touch a metal part regularly when working with components to discharge static electricity.
- Select a suitable work space.
  - Work with the server on an anti-static or concrete floor.
  - When you work with the server on a carpet where static electricity is likely to be generated, make sure to take anti-static measures beforehand.
- Use a work table.  
Place the server on an anti-static mat to work with it.
- Clothing
  - Do not wear a wool or synthetic cloth.
  - Wear anti-static shoes.
  - Take off any jewels (a ring, bracelet, or wrist watch).
- Handling of components
  - Keep any component in an anti-static bag until you actually install it to the server.
  - Hold a component by its edge to avoid touching any terminals or components.
  - To store or carry any component, place it in an anti-static bag.

## CONFIRMATION AFTER INSTALLATION/REMOVAL

Confirm the following after installing an additional option or removing a component:

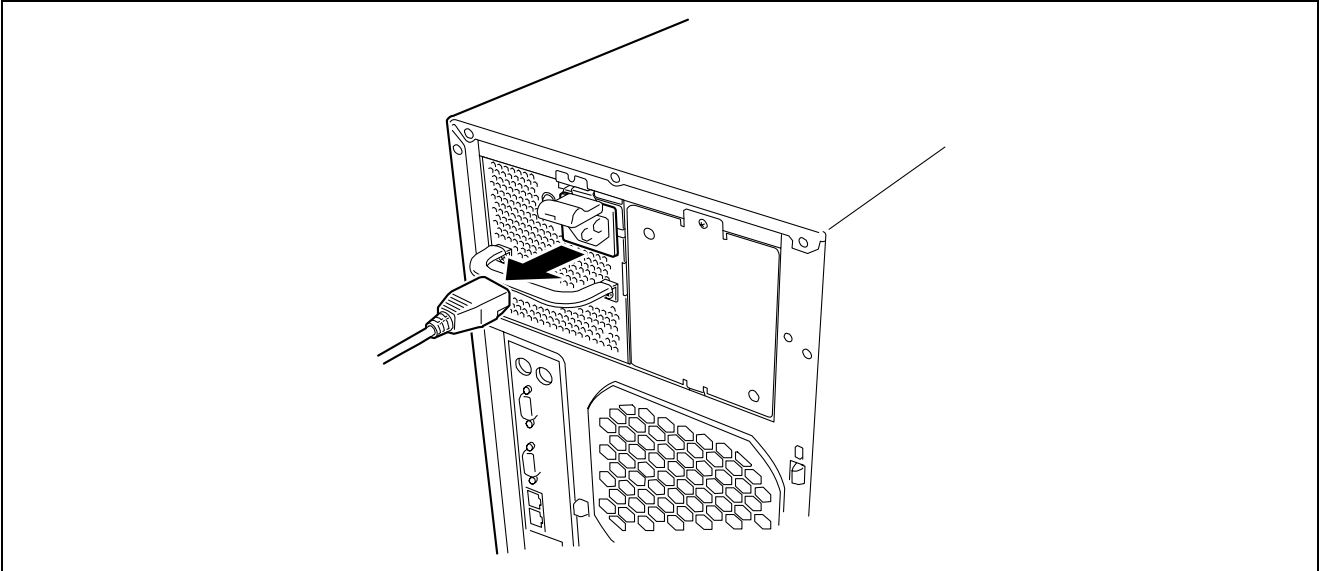
- Install removed components exactly as they were  
Install the components and cables which were removed and disconnected to add an option exactly as they were. Assembling without re-installing a component or with a disconnected cable may cause the server to malfunction.
- Confirm that no parts (such as screws) are left in the server  
Confirm that no particularly conductive parts, such as screws, are left in the server. Turning on the power with a conductive part on the motherboard or on a cable terminal may cause the server to malfunction.
- Confirm that the server is properly cooled  
Confirm that the ventilating holes are not covered with an internally connected cable. Insufficient cooling raises the internal temperature, which may cause the server to malfunction.
- Confirm that the server is operating normally  
Some additional devices require using a diagnostic utility or the BIOS SETUP utility to check if they are installed correctly. For more information, refer to the procedure for the additionally installed target device.



## PREPARING FOR INSTALLATION AND REMOVAL

Prepare the installation or removal of a component depending on the following procedure:

1. Shut down the OS.
2. Press the POWER switch to turn off the power of the server. (The POWER/SLEEP lamp goes off.)
3. Pull out all the power cords from the AC inlet on the server.



4. Remove all the cables connected to the server on the rear panel.
5. Free an area of 1m to 2m in the front and rear sides and left and right sides of the server.

## DEVICE INSTALLATION OR REMOVAL PROCEDURE




Install or remove a component from the server as described as described in the following procedure.

### Side Cover

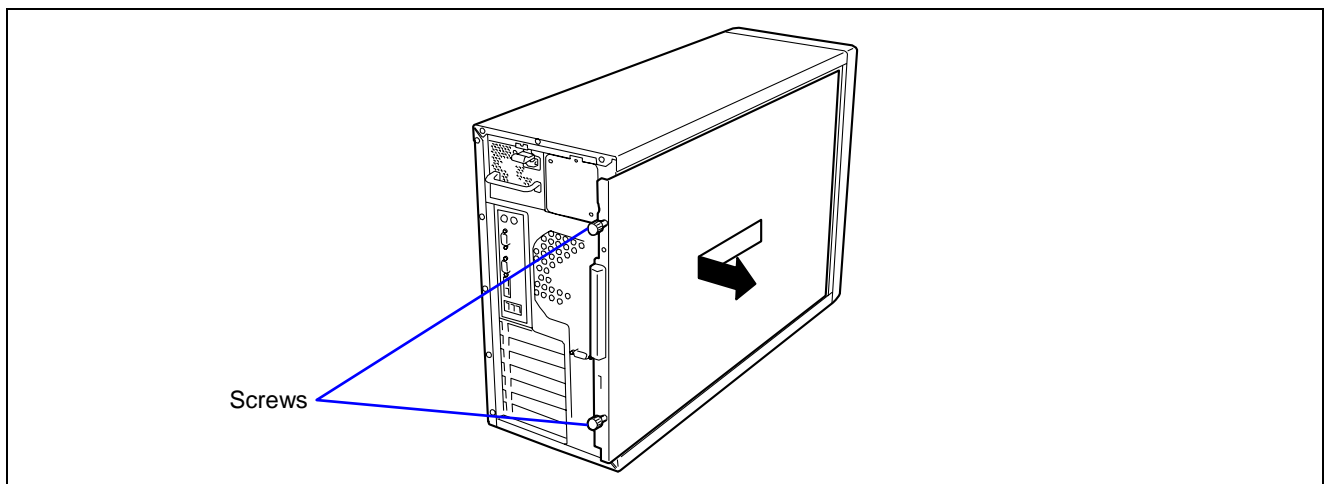
The left side cover should be removed to access to built-in devices and/or motherboard in the server. It is not necessary to remove the right side cover.

### Removal

Remove the left side cover as described as described in the following procedure.

 <b>WARNING</b>	
 	<p>Observe the following instructions to use the server safely. Failure to follow these instructions may result in death or serious personal injury. See pages 1-3 to 1-8 for details.</p> <p>Disconnect the power plug before working with the server.</p>

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Loosen the two screws.
3. Slide the cover backward a little.
4. Hold the side cover securely to remove it.



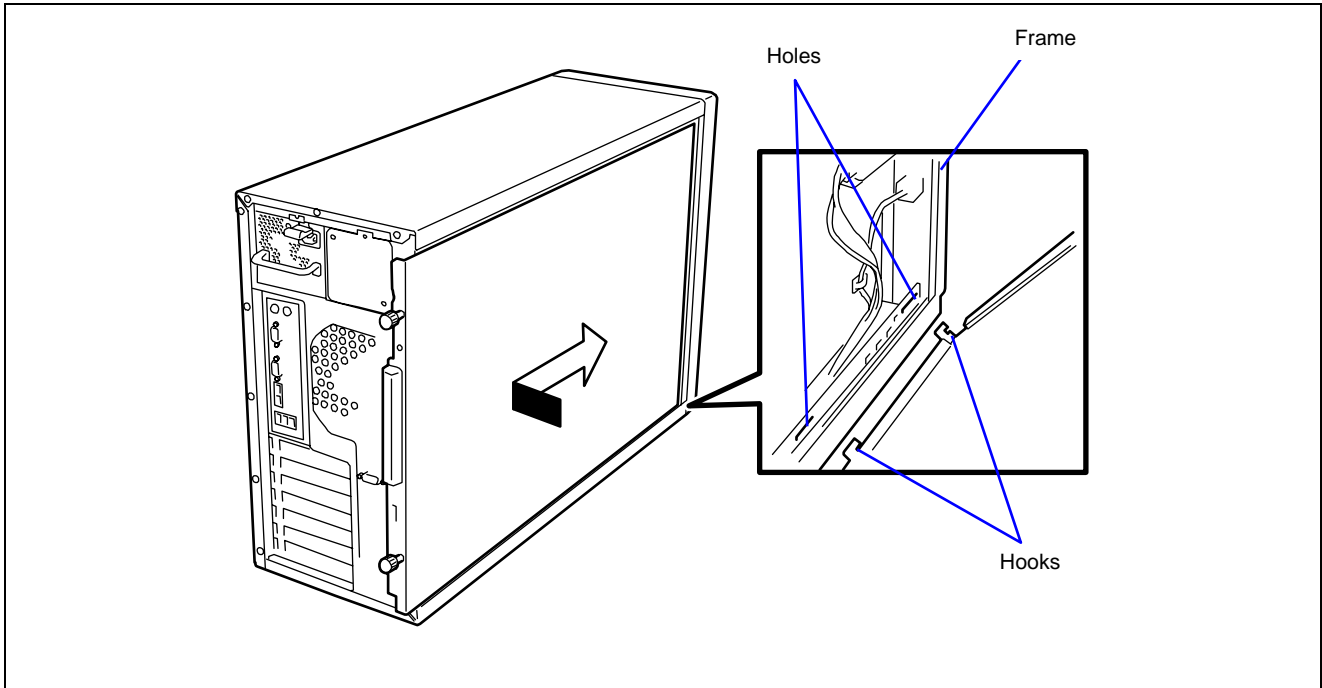
## Installation

The side cover can be installed in the reverse procedure of the removal. Make sure that the hooks on the side cover are inserted into the frames and holes of the server securely.

---

**IMPORTANT:** After one or more optional devices are installed or removed completely, install the removed side cover securely. The installation of the left side cover is monitored by a cover sensor.

---



---

## CPU Duct Cover

To install or remove the DIMM or processor, you will need to remove the CPU duct cover.

---

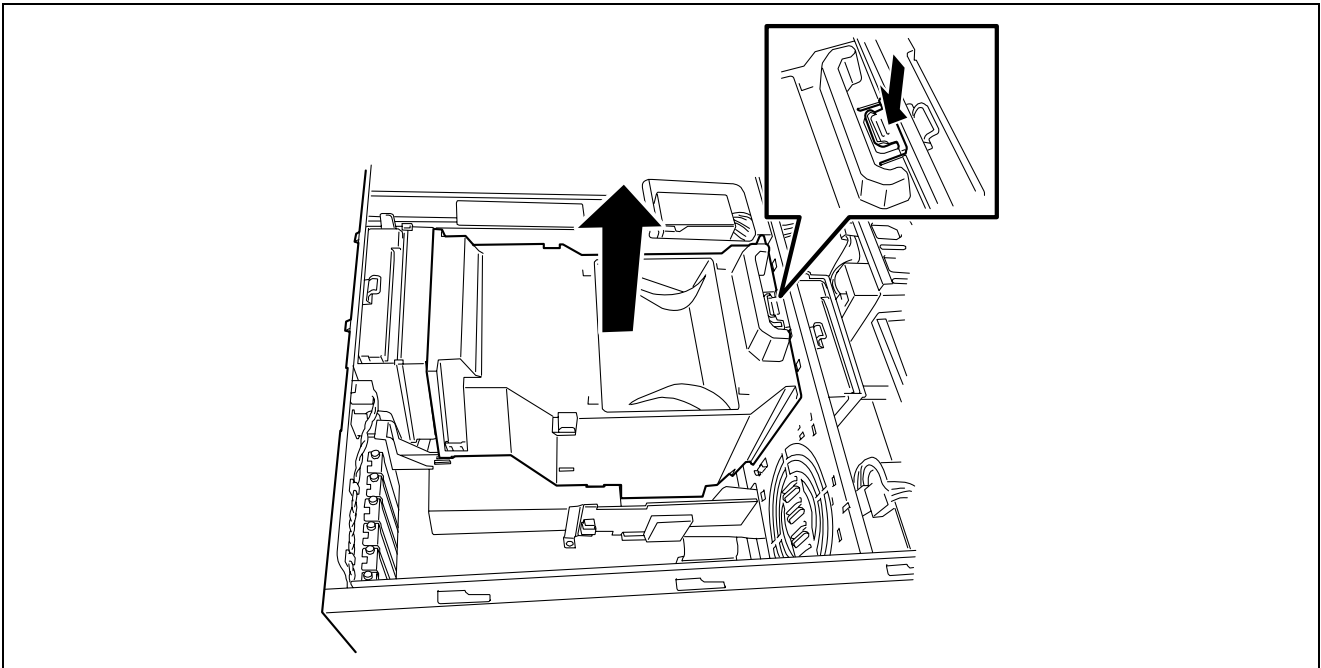
**IMPORTANT:** Do not assemble the server without installing the CPU duct cover. No duct cover installed in the system reduces cooling efficiency and can affect performance or cause damage due to overheating.

---

### Removal

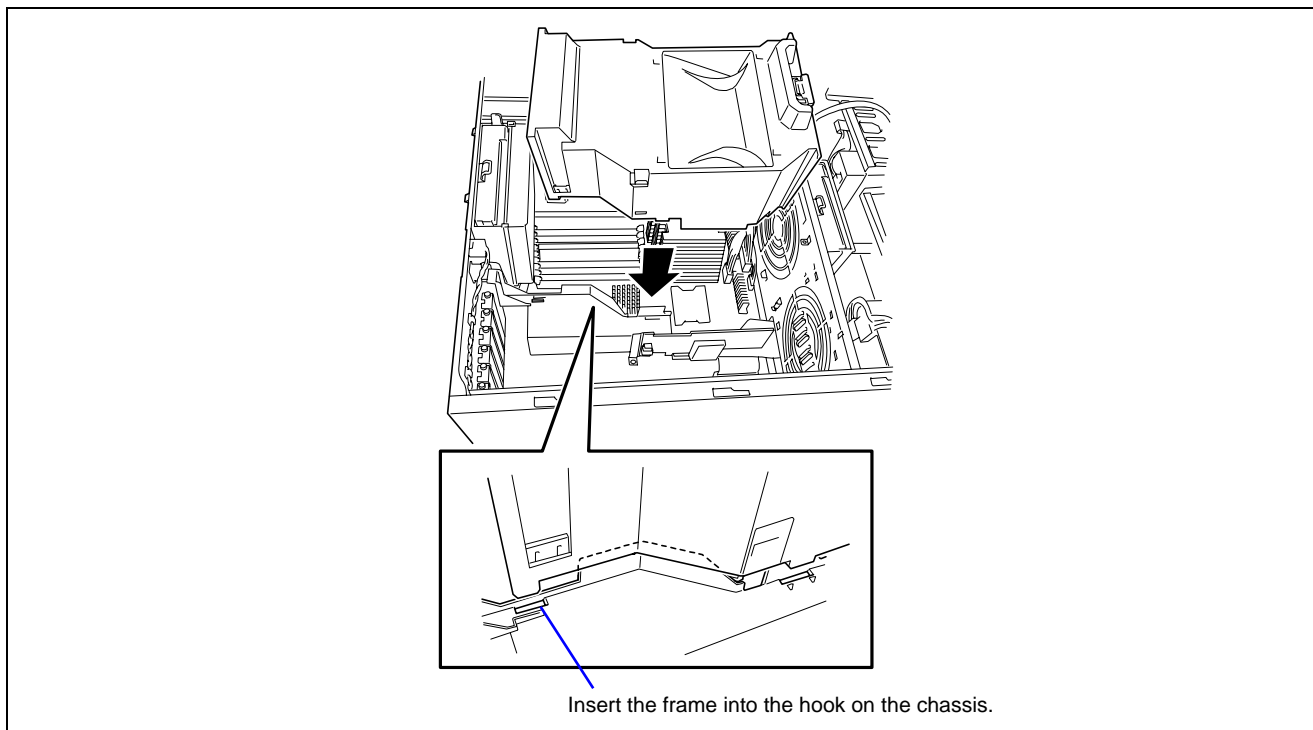
Follow these steps to remove the CPU duct cover.

5. See the section "Preparing for Installation and Removal" described earlier to prepare.
6. Remove the side cover.
7. Position the server unit so that its right side faces the floor.
8. Hold the left side of the CPU duct cover, and push the right end of the tab to release from the chassis.
9. Remove the duct from the chassis.

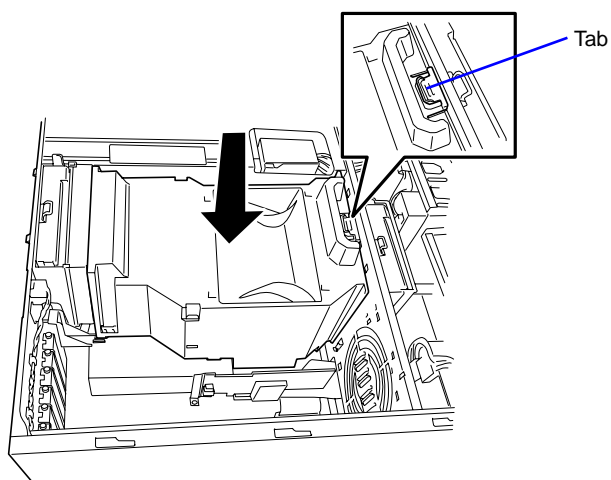


## Installation

Insert the CPU duct cover straight into the chassis while making sure that the CPU duct cover does not contact with any cables or components on motherboard. Adjust the CPU duct cover until the tab on the right end of the duct cover is engaged with the slot on the chassis.



**NOTE:** Make sure that the tab on the right end of the CPU duct cover is surely locked.



## 3.5-inch Hard Disk Drive

The hard disk drive bay may contain up to four hard disk drives.

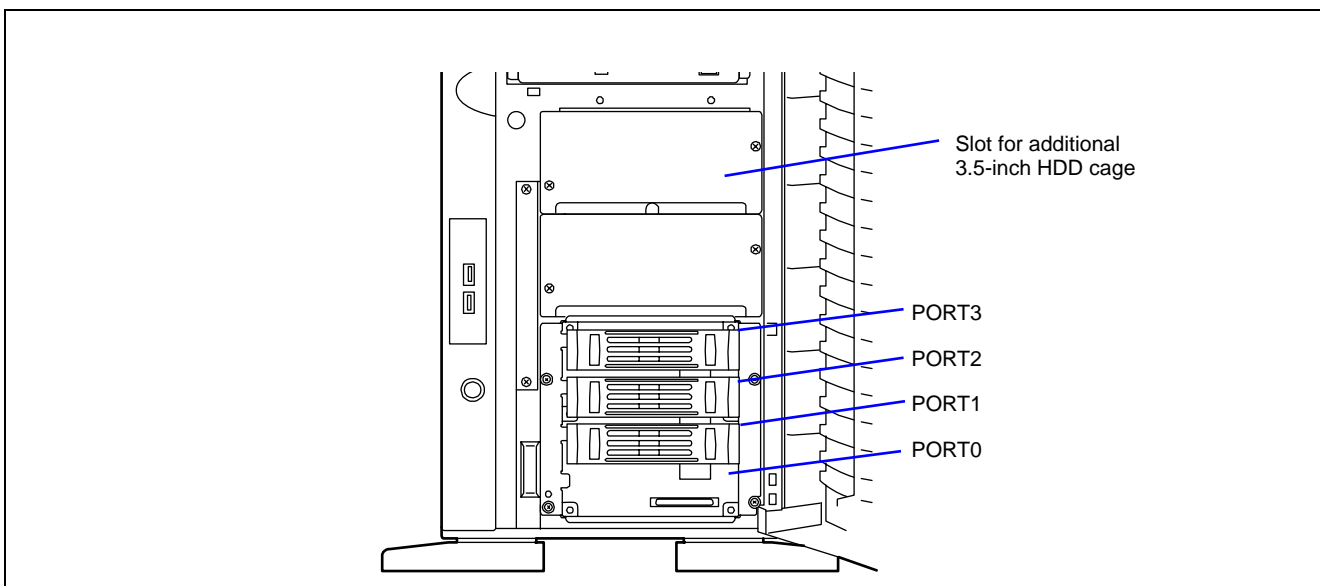
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### IMPORTANT:

- Use the hard disk drives authorized by the manufacturer. Installing a third-party hard disk drive may cause a failure of the server as well as the hard disk drive. Purchase hard disk drives of the following models:
    - 80GB, 7,200 rpm, SATA2/300
    - 160GB, 7,200 rpm, SATA2/300
    - 250GB, 7,200 rpm, SATA2/300
    - 500GB, 7,200 rpm, SATA2/300
    - 750GB, 7,200 rpm, SATA2/300
    - 36.3GB, 15000 rpm, SAS
    - 73.2GB, 15000 rpm, SAS
    - 146.5GB, 15000 rpm, SAS
    - 300GB, 15000 rpm, SAS
- Note: The SAS drive cannot coexist with SATA drive.

- To use RAID 5, RAID 6, or RAID 10 with Internal RAID Controller (SAS/SATA HW RAID0/1), you need to additionally install the optional RAID Upgrade Kit.
- 

A hard disk drive having the thickness of 1 inch can be installed on each of the slots. Installing an optional 3.5-inch HDD cage allows the server to be equipped with up to eight hard disk drives. See "3.5-inch HDD Cage" described later for details.



The port numbers are factory-assigned as PORT0 to PORT3 from bottom to top bay.

The hard disk drive bays are connected with Internal RAID Controller (SAS/SATA HW RAID0/1).

Use WebBIOS or Universal RAID Utility to build, configure, and manage the RAID System. See "RAID System Configuration" in Chapter 4 and "Universal RAID Utility" in Chapter 6. In addition, you may use Express Setup to configure the RAID System. See Chapter 5 for details.

---

### IMPORTANT:

- Use the dummy tray dedicated to the HDD cage.
  - The purpose of a dummy tray is to increase the cooling effect in the server. Install a dummy tray in slots not containing a hard disk drive.
-

## Installation

Install a hard disk drive as described as described in the following procedure. A hard disk drive may be installed in any other slot in the similar procedure.

---

### IMPORTANT:

- Fill the bays bottom-to-top.
  - Hard disk drives are connected with the Internal RAID Controller (SAS/SATA HW RAID0/1).
  - In RAID system, hard disk drives should have the same specification including the capacity.
- 

**NOTE:** Hard disk drives can be installed or removed from the server only by opening the front door. In the RAID system, hard disk drives may be installed or removed with the power of the server being on.

---

1. Release the lock of the front door by using the security key to open the front door.
2. Locate the slot in which the hard disk drive is installed.

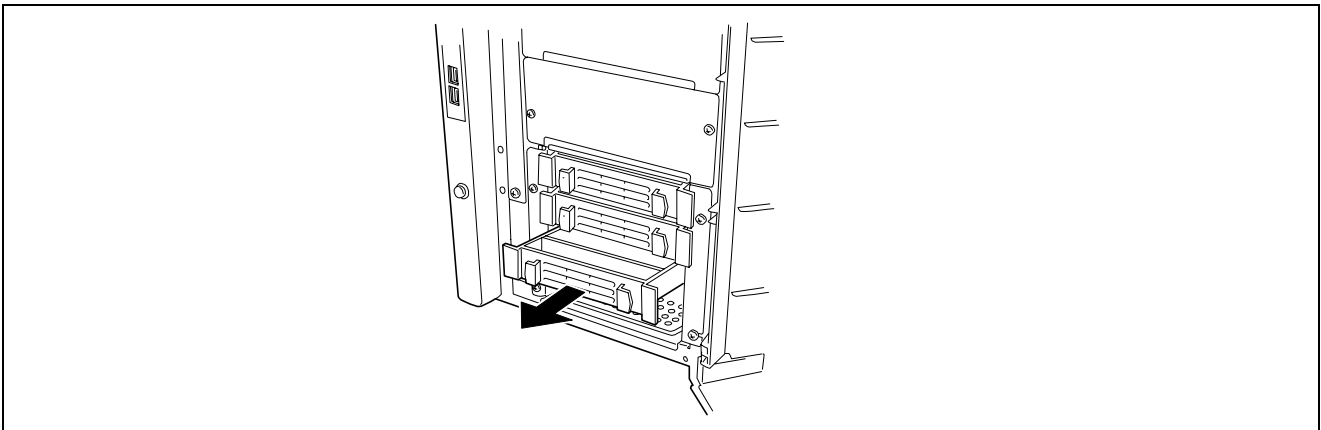
There are four slots. The port numbers are defined depending on the locations of the slots (PORT0 to PORT3 from bottom to top).

3. Hold the handle of the dummy tray and remove the dummy tray.

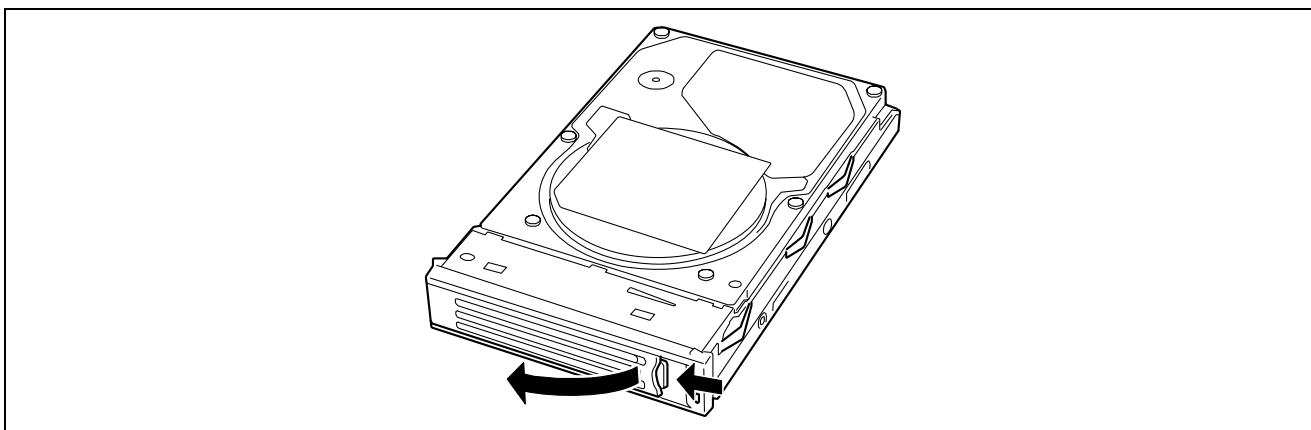
---

### IMPORTANT:

- Keep the dummy tray carefully.
  - The purpose of a dummy tray is to increase the cooling effect in the server. Install a dummy tray in slots not containing a hard disk drive.
- 



4. Unlock the lever of the hard disk drive.

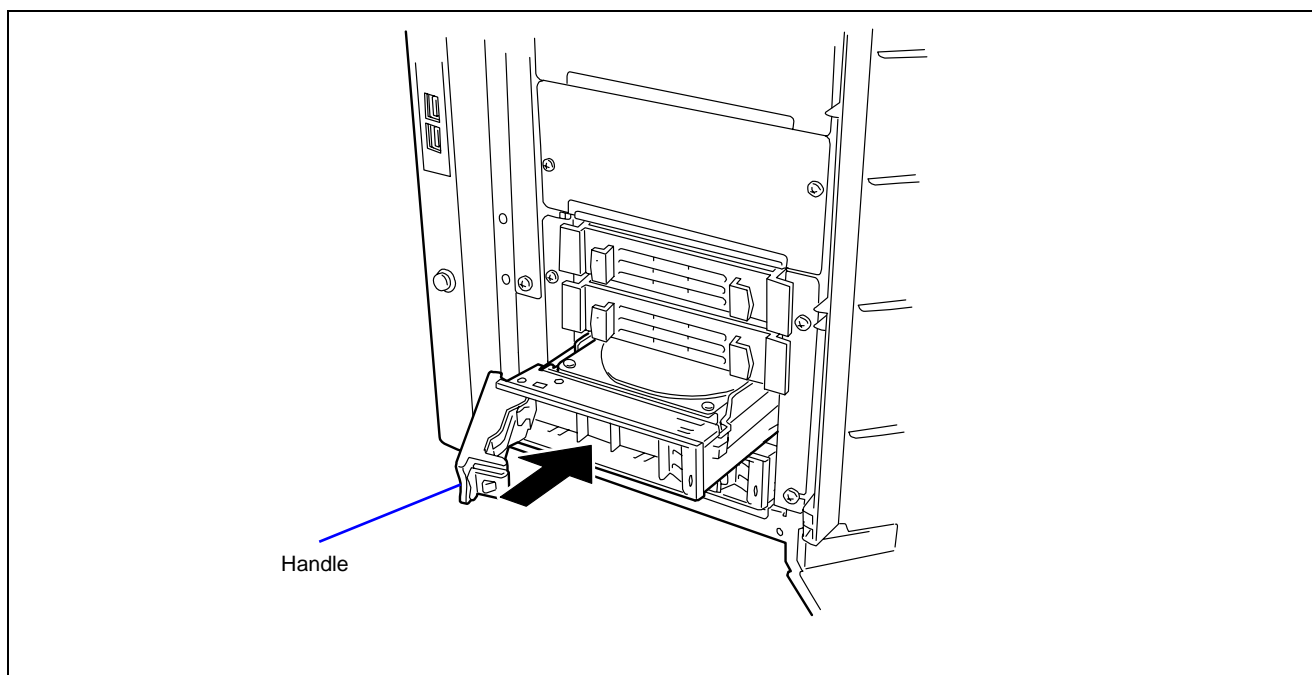


5. Securely hold the hard disk drive (with tray) and handle, and insert it into the slot.

---

**IMPORTANT:**

- Push the hard disk drive until the hook of the handle hits the frame.
  - Hold the hard disk drive carrier with both hands securely and carefully.
- 





6. Slowly push the handle. The handle is locked with a click.

---

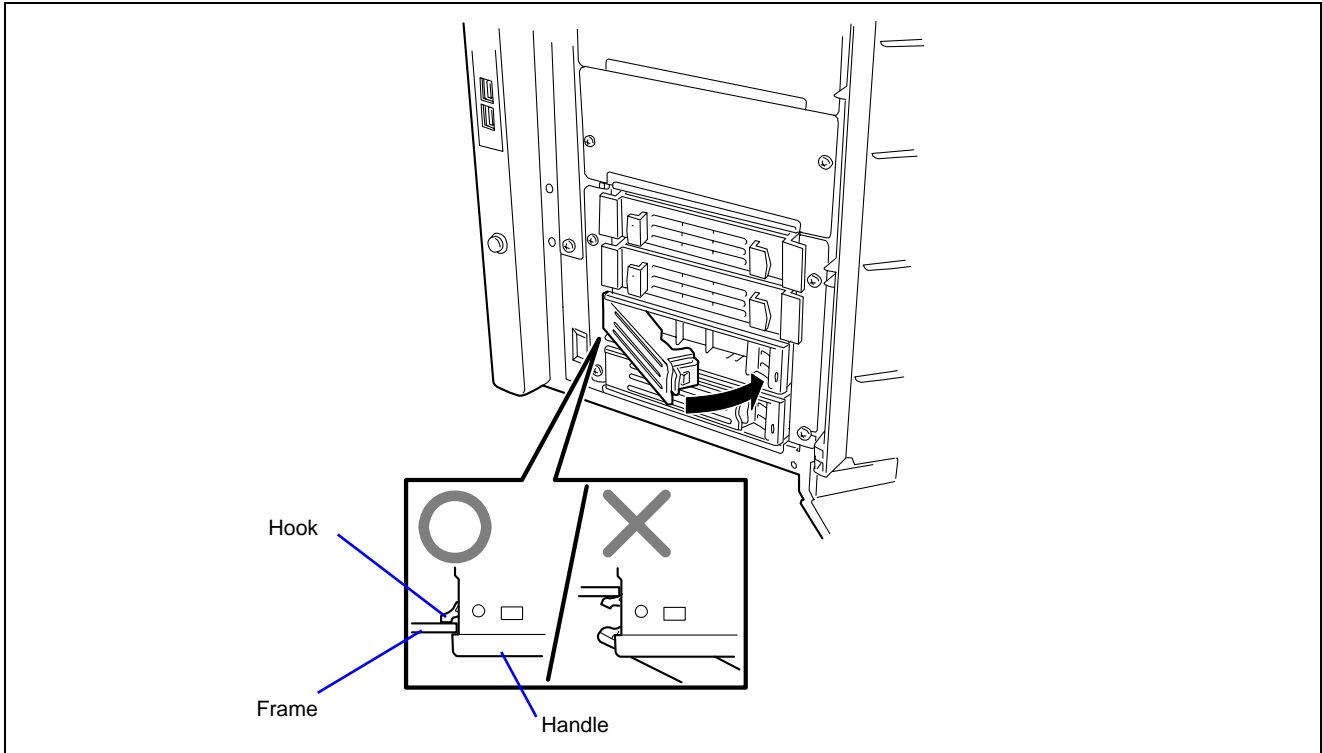
**IMPORTANT:** Note that your fingers may not be caught between the handle and the tray.

---

---

**NOTE:** Make sure that the hook of the handle is hanged on the frame.

---



7. Close the door opened in step 1.

---

**IMPORTANT:** To use the hard disk drives installed in the slots, you have to configure RAID System by using WebBIOS or Universal RAID Utility. See Chapter 4 for details of RAID System.

---

## Removal

Remove the hard disk drive as described as described in the following procedure.

---

**IMPORTANT:** About data on the hard disk drive

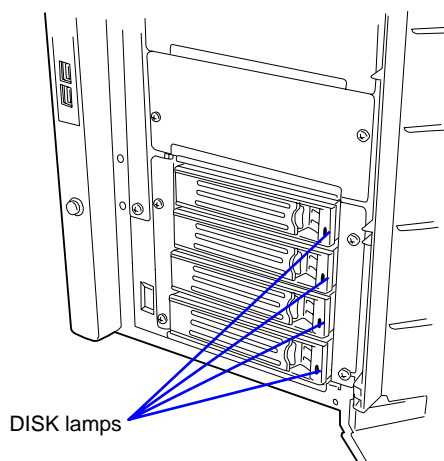
Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk drive to any third parties.

Data seems to be erased when you empty "Recycle Bin" of Windows or execute the "format" command of the operating system. However, the actual data remains written on the hard disk drive. Data not erased completely may be restored by special software and used for unexpected purposes.

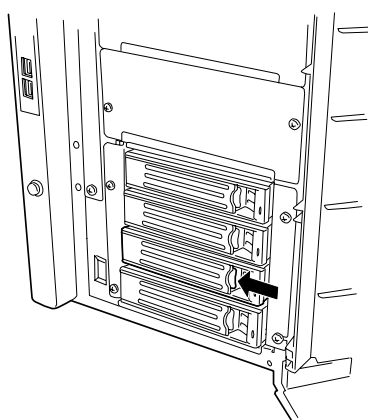
It is strongly recommended that the software or service (both available at stores) for data erasure should be used in order to avoid the trouble explained above. For details on data erasure, ask your sales representative.

---

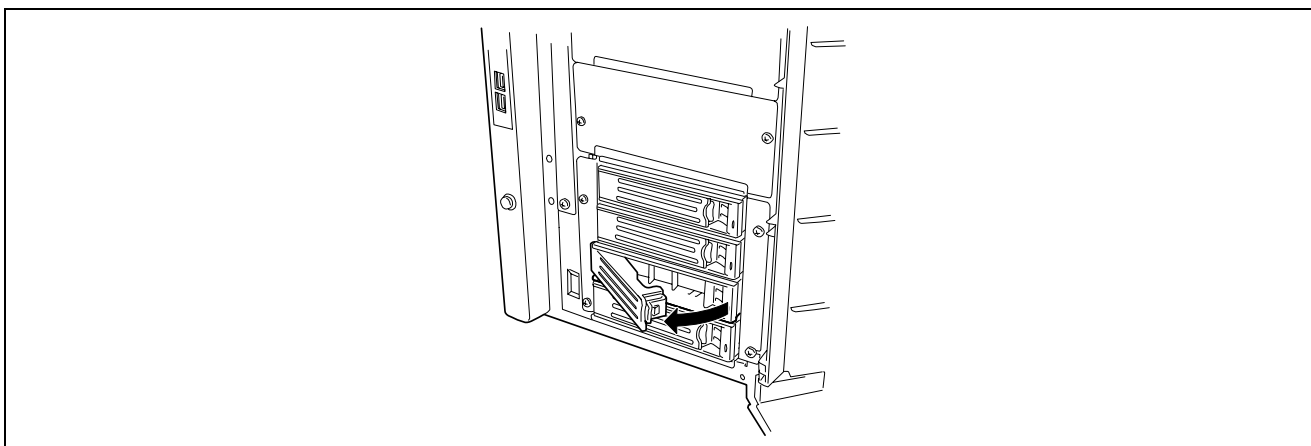
**NOTE:** To remove a defective hard disk drive, locate the slot on which the disk lamp of the hard disk drive is lit amber.



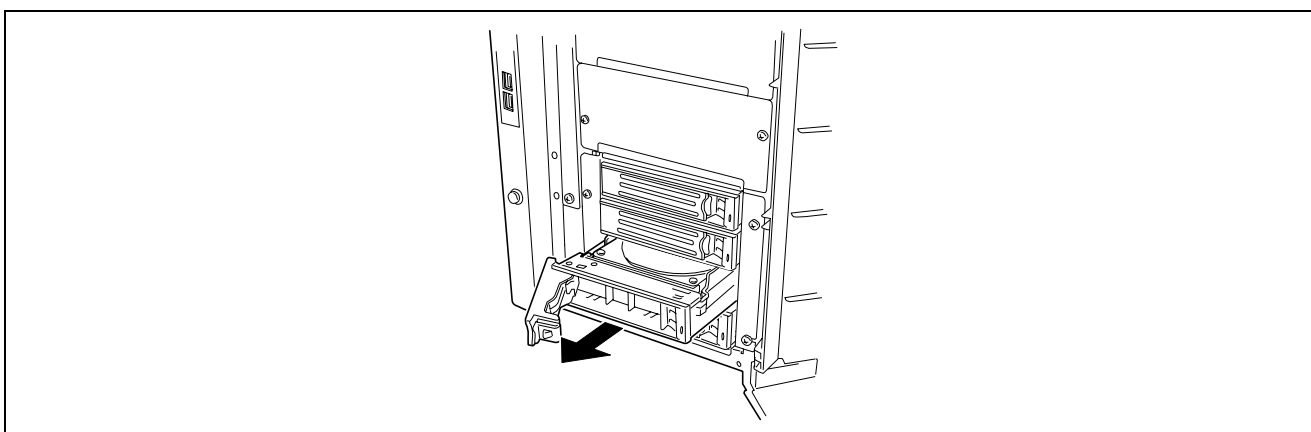
1. Release the lock of the front door by using the security key to open the front door.
2. Push the lever to release the lock.



3. Pull the handle toward you.



4. Hold the handle and hard disk drive securely and pull it forward.



5. To use the server with the hard disk drive removed, insert a dummy tray into the empty slot.

---

**IMPORTANT:** To maintain the cooling effect in the server, install the dummy tray in the vacant slot of the disk bay.

---

6. Close the door opened in step 1 securely.

In the RAID System, the auto rebuild function can be used. The auto rebuild function can record the information saved in a defective hard disk drive into the new replaced disk to recover the server to the state before the occurrence of the fault.

The auto rebuild function is valid for RAID System of RAID1, RAID5, or RAID6.

The auto rebuild is automatically started only by the hot-swap of a defective hard disk drive (or disk replacement in the power-on state). During the auto rebuild, the disk lamp on the hard disk drive is lit green or amber alternatively.

---

**IMPORTANT:** If the auto rebuild fails, the disk lamp on the hard disk drive goes on amber. Provide the disk removal or installation again, then run the auto rebuild.

---

Obey the following cautions when the auto rebuild function is used.

- Do not turn off the power of the server in the interval from a fault of a hard disk drive to the end of the auto rebuild.
- Install a new hard disk drive after the interval of 90 seconds or longer has passed from the removal of the defective hard disk drive.
- If a hard disk drive is being rebuilt, do not replace another disk. (The disk lamp on the hard disk being rebuilt is lit green or amber alternatively.)

---

## 2.5-inch Hard Disk Drive (in 2.5-inch HDD Cage)

The 2.5-inch hard disk drive bay may contain up to eight hard disk drives.

---

**IMPORTANT:** Use the hard disk drives authorized by the manufacturer. Installing a third-party hard disk drive may cause a failure of the server as well as the hard disk drive. Purchase hard disk drives of the following models:

- 36.3GB, 10000 rpm, SAS
  - 73.2GB, 10000 rpm, SAS
  - 146.5GB, 10000 rpm, SAS
  - 36.3GB, 15000 rpm, SAS
  - 73.2GB, 15000 rpm, SAS
- 

A hard disk drive having the thickness of 0.6-inch (15 mm) can be installed on each of the slots. The port numbers PORT0 to PORT7 are assigned from right to left.

The factory-installed HDD cage is connected to the Internal RAID Controller (SAS/SATA HW RAID0/1).

Installing an additional 2.5-inch HDD cage allows the server to be equipped with up to 16 hard disk drives. The port numbers for additional 2.5-inch HDD cage are assigned as PORT8 to PORT15 from right to left. To connect an additional 2.5-inch HDD cage, you need an additional RAID controller.

Use WebBIOS or Universal RAID Utility to build, configure, and manage the RAID System. See "RAID System Configuration" in Chapter 4 and "Universal RAID Utility" in Chapter 6.

A dummy tray is installed in the hard disk drive bays except for Port 0. The purpose of a dummy tray is to increase the cooling effect in the server. Install a dummy tray in slots not containing a hard disk drive.

---

**IMPORTANT:** Fill the slots with hard disk drives sequentially starting from slot 0 (the rightmost slot). If you start filling from slot 7 or skip filling the intermediate slot, the indication of DISK lamp will be incorrect.

---

## Installation

Install a hard disk drive as described in the following procedure. A hard disk drive may be installed in any other slot in the similar procedure.

---

### IMPORTANT:

- Fill the bays right-to-left.
  - Hard disk drives are connected with the Internal RAID Controller (SAS/SATA HW RAID0/1).
  - In the RAID System, hard disk drives should have the same specification including the capacity.
- 

**NOTE:** Hard disk drives can be installed or removed from the server only by opening the front door. In the RAID System, hard disk drives may be installed or removed with the power of the server being on.

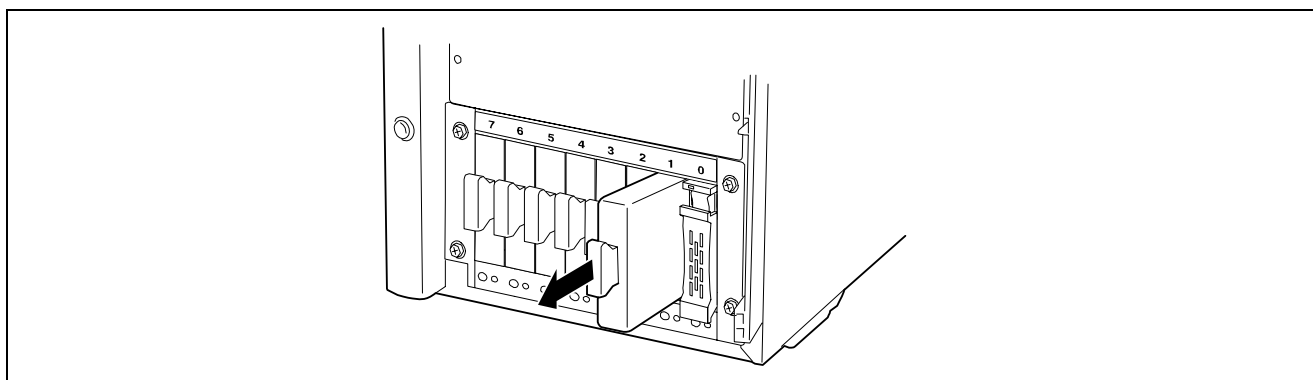
---

1. Release the lock of the front door by using the security key to open the front door.
2. Locate the slot in which the hard disk drive is installed.  
There are eight slots. The port numbers are defined depending on the locations of the slots (PORT0 to PORT7 from right to left).
3. Hold the handle of the dummy tray and remove the dummy tray.

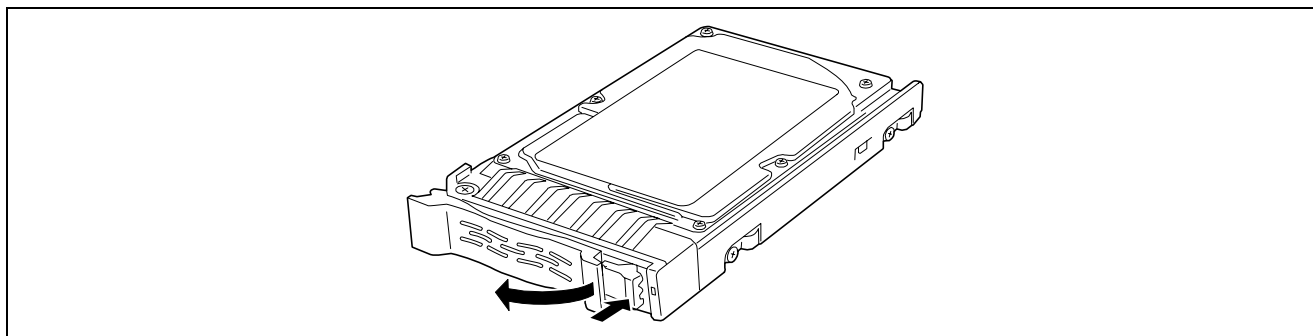
---

**IMPORTANT:** Keep the dummy tray carefully. The purpose of a dummy tray is to increase the cooling effect in the server. Install a dummy tray in slots not containing a hard disk drive.

---



4. Unlock the lever of the hard disk drive.



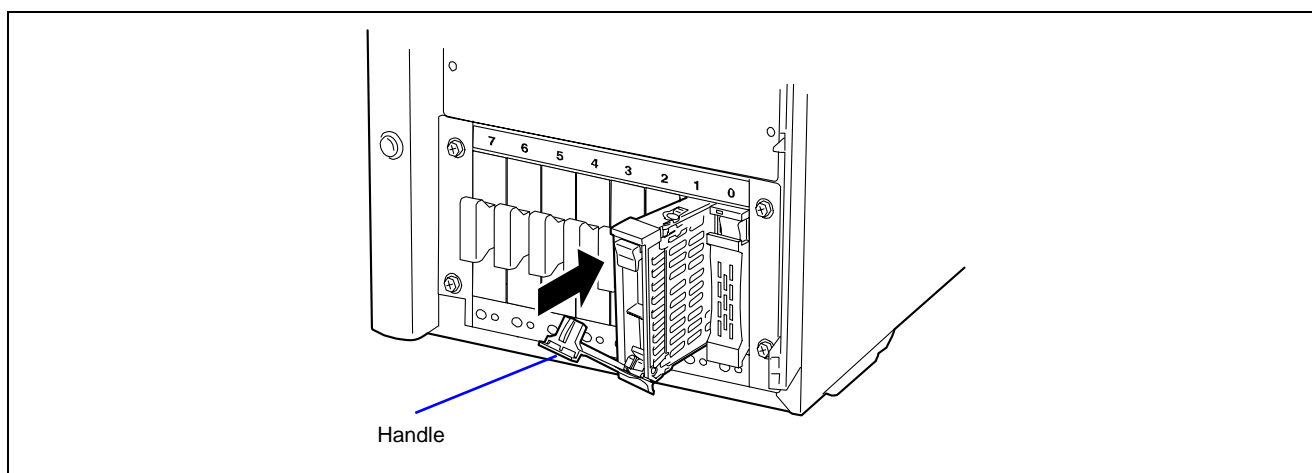
5. Securely hold the hard disk drive (with tray) and handle, and insert it into the slot.

The hard disk drive has a spring (EMI shield) to prevent malfunction due to static electricity or noise. Push the spring with your finger so that the spring is not caught with the chassis frame.

---

**IMPORTANT:**

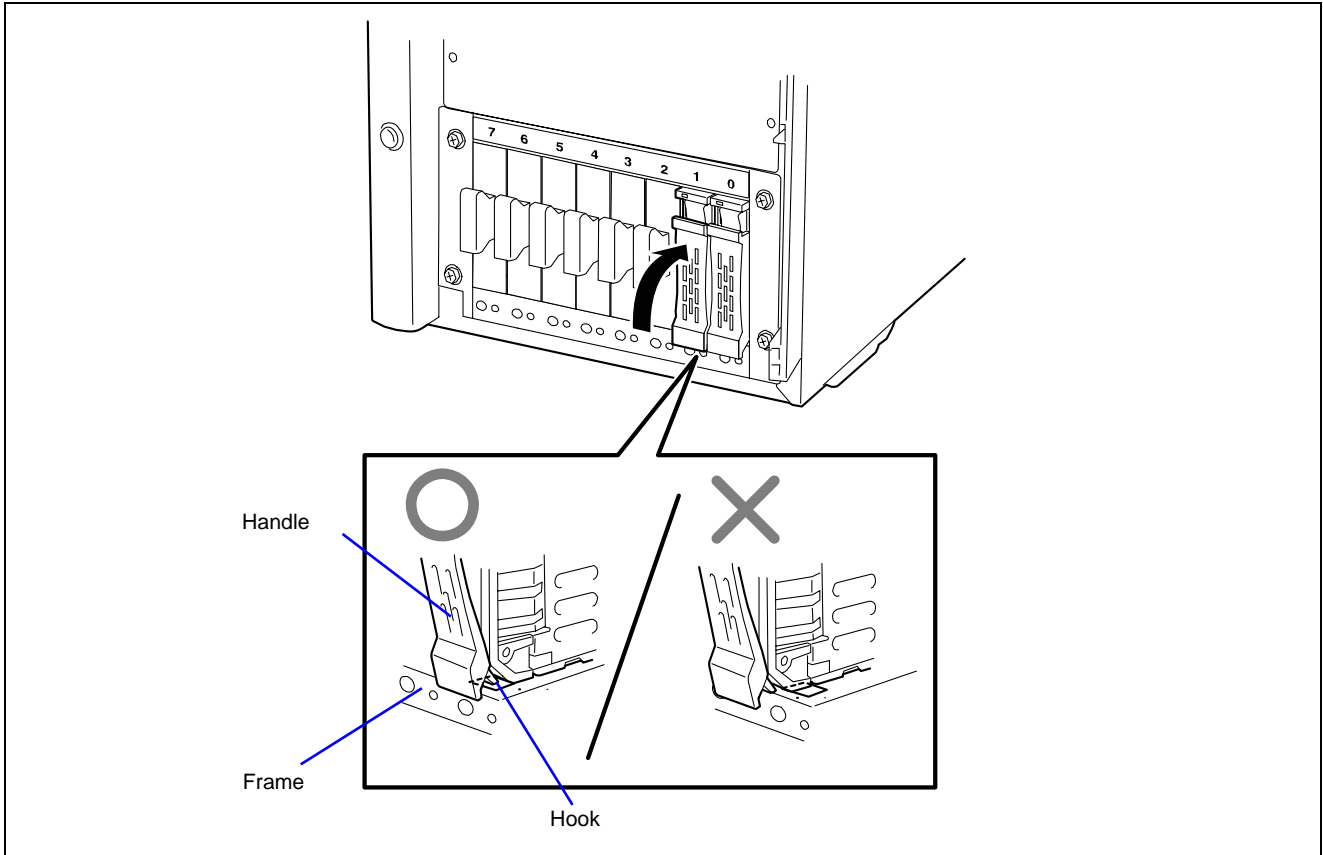
- Push the hard disk drive until the hook of the handle hits the frame.
  - Hold the hard disk drive carrier with both hands securely and carefully.
- 



6. Slowly push the handle. The handle is locked with a click.

**IMPORTANT:** Note that your fingers may not be caught between the handle and the tray.

**NOTE:** Make sure that the hook of the handle is hung on the frame.



7. Close the door opened in step 1.

## Removal

Remove the hard disk drive as described in the following procedure.

---

**IMPORTANT:** About data on the hard disk drive

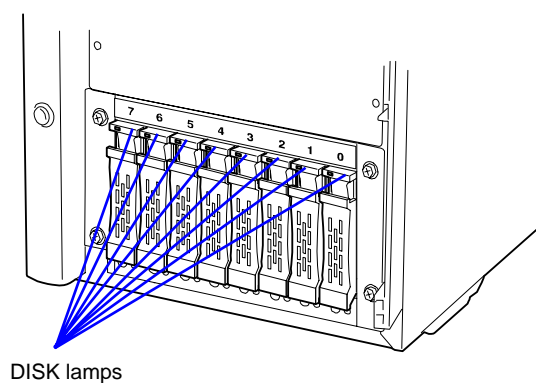
Be sure to take appropriate measures not to leak important data (e.g., customers' information or companies' management information) on the removed hard disk drive to any third parties.

Data seems to be erased when you empty the Windows "Recycle Bin" or execute a "format" command of the operating system. However, the actual data remains written on the hard disk drive, and may be restored by special software and used for unexpected purposes.

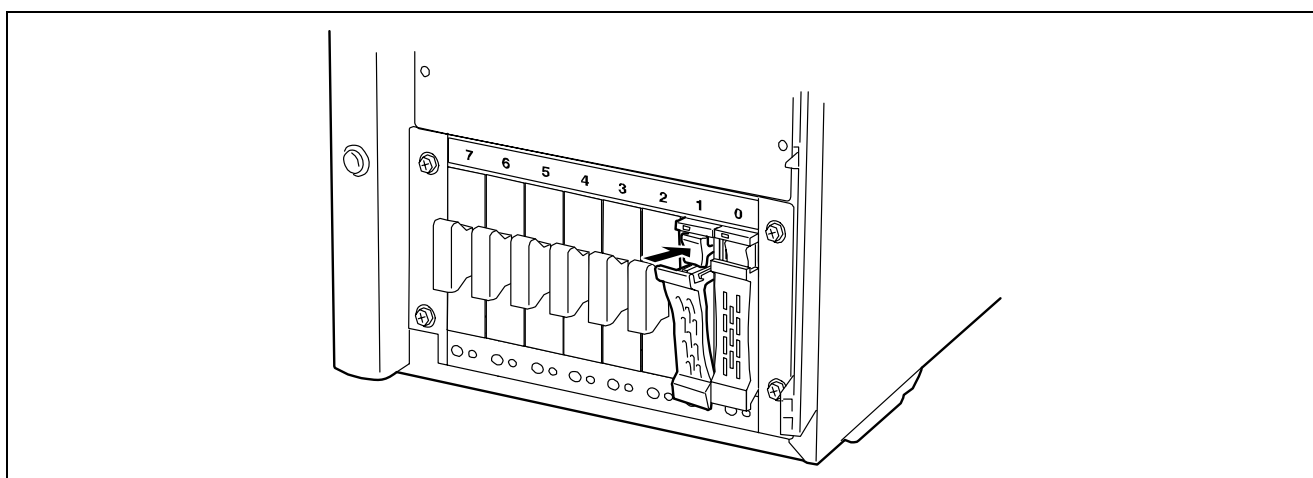
We strongly recommend that a software or service (both available at stores) for data erasure is used in order to avoid the troubles explained above. For more information on data erasure, ask your sales representative.

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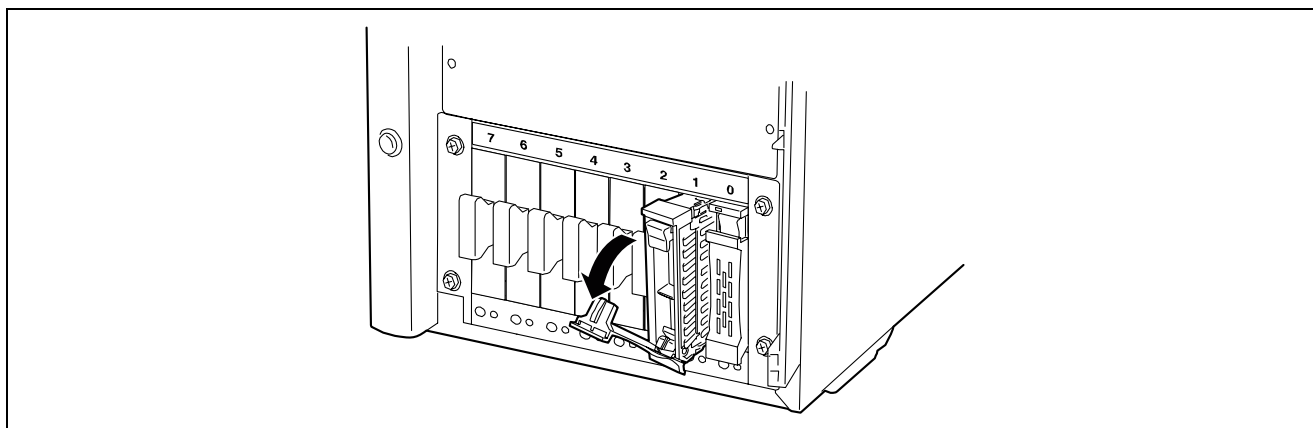
**NOTE:** To remove a defective hard disk drive, locate the slot where the disk lamp of the hard disk drive is lit amber.

1. Open the front door using the security key.
2. Push the lever to release the lock.

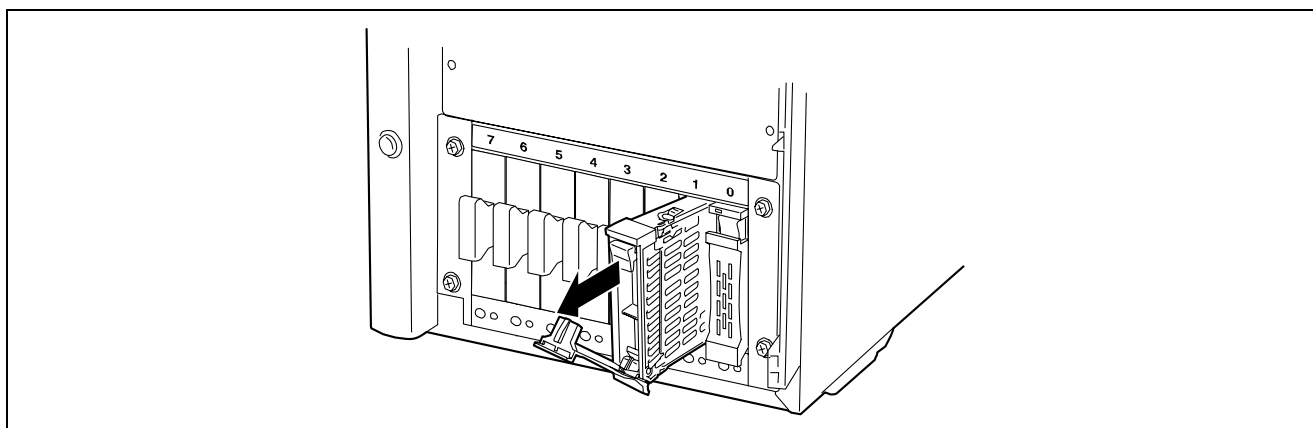




3. Pull the handle toward you.



4. Hold the handle and hard disk drive securely and pull it forward.



5. To use the server with the hard disk drive removed, insert a dummy tray into the empty slot.

---

**IMPORTANT:** To maintain the cooling effect in the server, install a dummy tray in the vacant slot of the disk bay.

---

6. Close securely the door opened in step 1.

In a RAID System, the auto rebuild function can be used. The auto rebuild function can copy the information saved in a defective hard disk drive into the newly replaced disk to recover the server as it was before the occurrence of the fault.

The auto rebuild function is valid for RAID System of RAID1, RAID5, or RAID6.

The auto rebuild starts automatically when hot-swapping a defective hard disk drive (or following a disk replacement in the power-on state). During the auto rebuild, the disk lamp on the hard disk drive blinks alternatively green and amber.

---

**IMPORTANT:** If the auto rebuild fails, the disk lamp on the hard disk drive lights amber. Reinstall the drive, and then run the auto rebuild.

---

Obey the following cautions when the auto rebuild function is used.

- Do not turn off the power of the server in the interval from a fault of a hard disk drive to the end of the auto rebuild.
- Install a new hard disk drive after the interval of 90 seconds or longer has passed from the removal of the defective hard disk drive.
- If a hard disk drive is being rebuilt, do not replace another disk. (The disk lamp on the hard disk being rebuilt is lit green or amber alternatively.)

## Use of Internal Hard Disk Drives in the RAID System

This section describes how to use hard disk drives in the RAID System.

You can build a RAID System by using the Internal RAID Controller (SAS/SATA HW RAID0/1), optional RAID controller (128MB, SAS/SATA HW RAID0/1/5/6), or optional Disk Array Controller (SAS, EXTERNAL).

---

### IMPORTANT:

- Making hard disk drives in the RAID System or changing the RAID level initializes hard disk drives. If the hard disk drive to be configured in the RAID System has your valuable data stored, make sure to make a backup copy of the data in another hard disk drive before installing the RAID Controller and configuring the RAID System.
  - More than one hard disk drive is required to configure a Logical Drive.
  - Use hard disk drives of the same capacity and performance (e.g., revolution) for each pack to configure them in the RAID System.
- 

### NOTES:

- Make sure of RAID levels and hard disk drives available for the RAID Controller to choose an appropriate controller.
  - A Logical Drive except for RAID0 increases disk reliability. However, the actually available capacity becomes smaller than the total hard disk drive capacity in the Logical Drive.
- 

## Internal RAID Controller / Optional RAID Controller

To build a RAID System, use the Internal RAID Controller (SAS/SATA HW RAID0/1) or optional RAID Controller (128MB, SAS/SATA HW RAID0/1/5/6). With this controller, the internal hard disk drives are recognized as RAID drives.

Use WebBIOS to configure the RAID System. See Chapter 4 for details.

## Disk Expansion Unit

A disk expansion unit is an external device that can install up to 14 hard disk drives. (The number of hard disk drives depends on the model.) The server containing a Disk Array Controller (SAS, EXTERNAL) can connect one or two of these devices. For details on the number of devices connected, see the manuals provided with the Disk Array Controller and disk expansion unit.

---

**IMPORTANT:** A disk expansion unit is provided with no hard disk drives. You need to purchase hard disk drives separately.

---

An optional cable may be required to connect with a disk expansion unit. Refer to the manual coming with the disk expansion unit for details.

After connecting the disk expansion unit, use WebBIOS or Universal RAID Utility to set the disk expansion unit in a RAID System (RAID0, RAID1, or RAID5). For details on settings and the setting methods, refer to the manual provided with the board.

While a disk expansion unit is set in a RAID System, you can use the "Auto Rebuild" feature of the SAS, EXTERNAL Disk Array Controller to restore data if one of the hard disk drives installed in the disk expansion unit fails. (Replace the failing hard disk drive while the power is on. (Hot swapping))

---

**IMPORTANT:** When the Disk Array Controller (SAS, EXTERNAL) is installed, do not let the system enter hibernation or standby mode.

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## Power Supply Unit

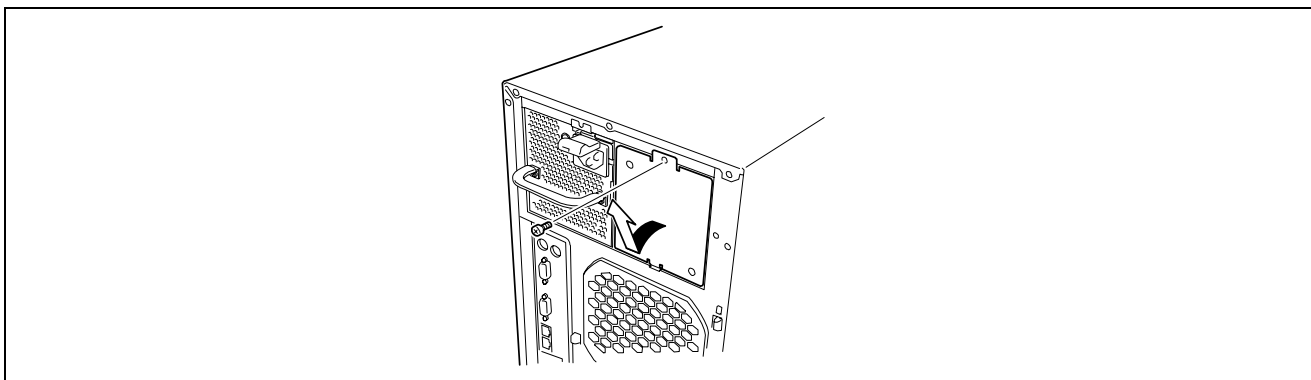
Your server can contain one or two power supply units.

With redundant power supply installed, the server can ensure continued operation of the system in the unlikely event one of the power supply units fails.

### Installation

Install the power supply unit as described in the following procedure.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Loosen a screw securing the blank cover to remove the cover from the chassis.



---

**IMPORTANT:** Keep the removed blank cover and the screw for future use.

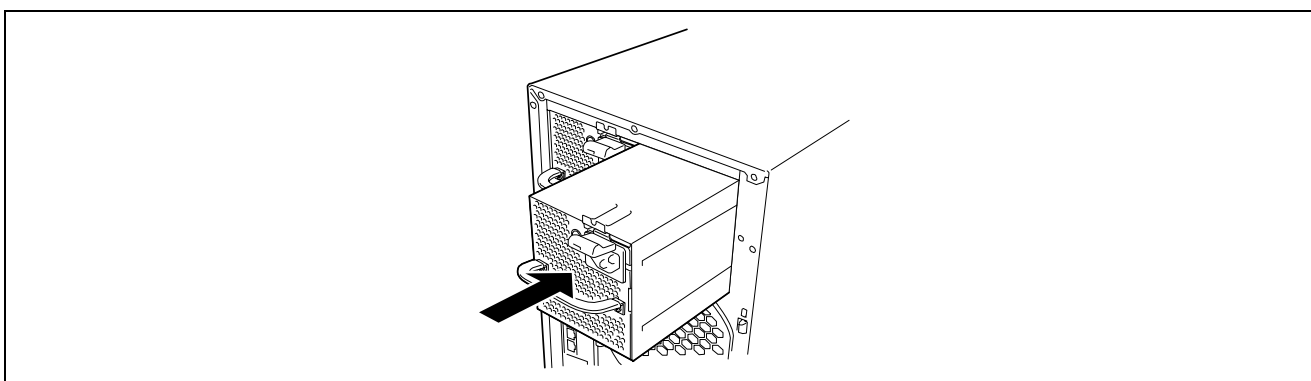
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3. Insert the power supply unit into the vacant slot until it locks.

---

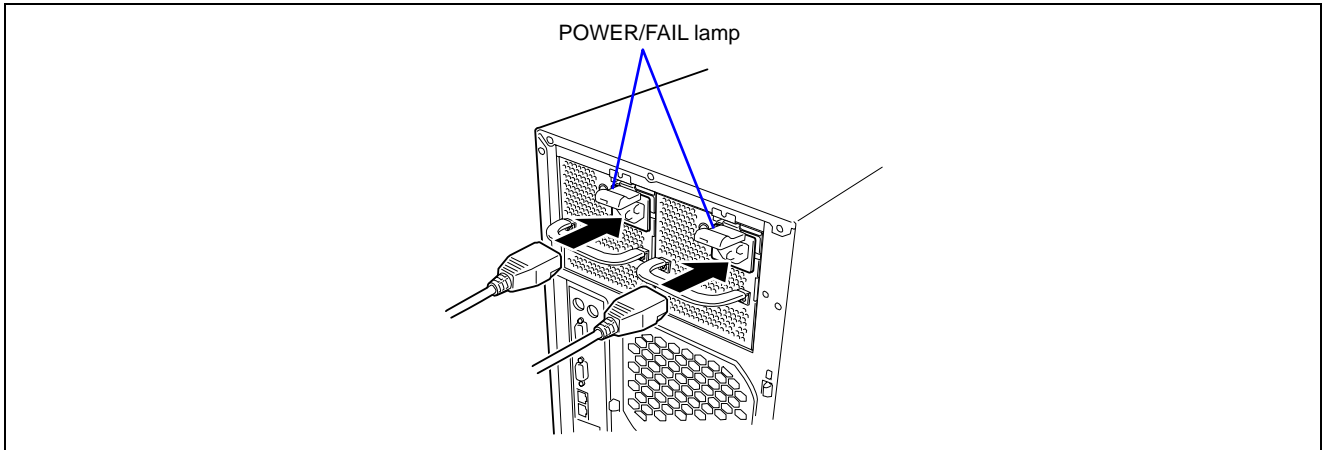
**IMPORTANT:** Insert the power supply unit straight into the slot. To avoid damaging the power supply unit, do not tilt or twist the unit as you push it into the connector.

---



4. Connect two power cords to the AC inlets.

Use the standard power cord coming with the server and the cord coming with the power supply unit. The POWER/FAIL lamp (green) blinks when the power cords are connected. If the lamp does not blink, check if the power is supplied to the unit. If the lamp remains off or the POWER/FAIL lamp goes on amber, the power cord or the power supply unit may be defective or the power supply bay containing the power supply unit may have failed. Contact your service representative to ask for maintenance.



5. Turn on the power of the server.

The POWER/FAIL lamps on the power supply units go on.

6. Make sure that no error occurred by checking the STATUS lamps and POST.

See Chapter 8 for details of error indications.

When the POWER/FAIL lamp of the power supply unit goes on amber, reinstall the power supply unit. If the POWER lamp is still amber, contact your service representative.

---

**NOTE:** When the optional power supply unit is installed but the power cord is connected to either of the power supply unit, the POWER/FAIL lamp on the other unit goes on amber.

---

## Replacement of Defective Power Supply Unit

The power supply unit should be replaced only when it is defective.

---

**IMPORTANT:** Do not remove any power supply unit if it operates normally.

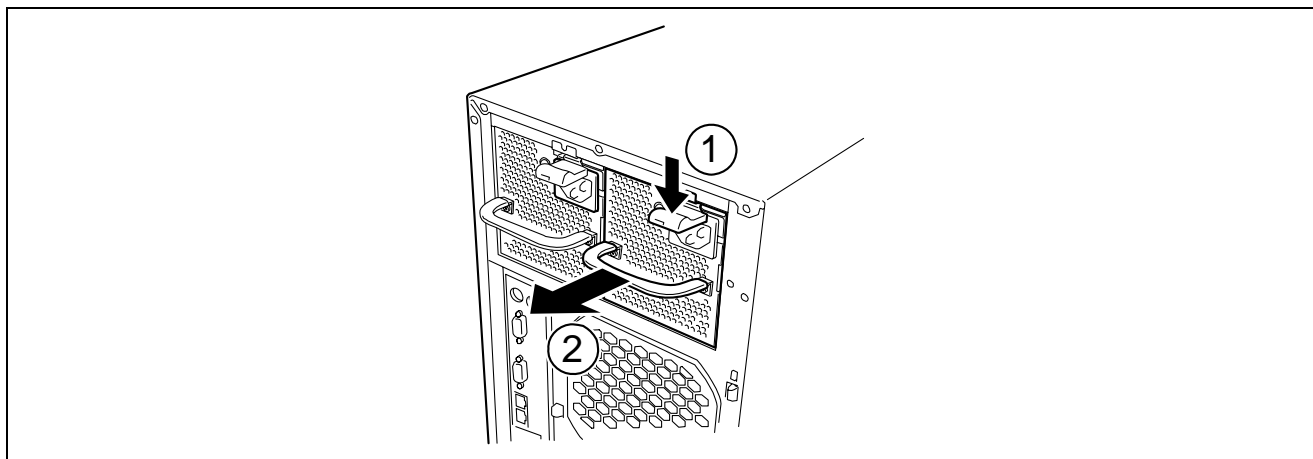
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**NOTE:** When the server is equipped with two power supply units and one of them operates normally, the other defective power supply unit can be replaced while the system is turned on and operating. In this case, skip step 2 in the procedure below.

---

1. Check the POWER/FAIL lamps (amber) of the power supply units on the rear face and determine which module needs to be replaced.
2. Shutdown the system and power off the server.
3. Disconnect the power cord from the failed power supply unit.
4. While pressing down on the lever, grasp the handle and carefully pull the power supply unit out of the bay.



5. If you are not going to install a replacement power supply unit, you must install the blank cover you removed in step 2 of installation procedure in the vacant slot.

---

**IMPORTANT:** To maintain the cooling effect in the server, install the blank cover in the vacant slot of the power supply unit bay.

---

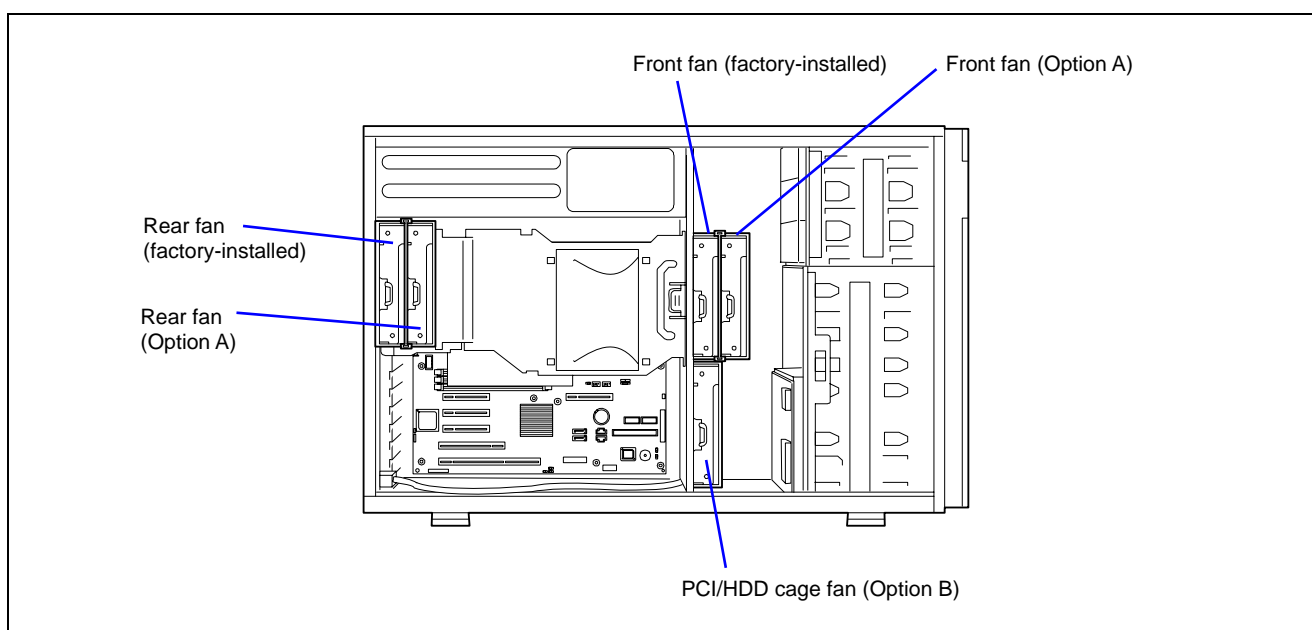
6. Install the power supply unit referring to steps 4 to 6 of the installation and make sure that the power supply unit is installed securely.

## Cooling Fan Unit

Two cooling fan units (front and rear) are factory-installed in your server. By installing an optional redundant fan unit (containing three fans), your server can contain up to five cooling fans for cooling the CPU, memory, and PCI devices. With optional redundant cooling fan unit, the server can continue operation even if one of the fan units is defective.

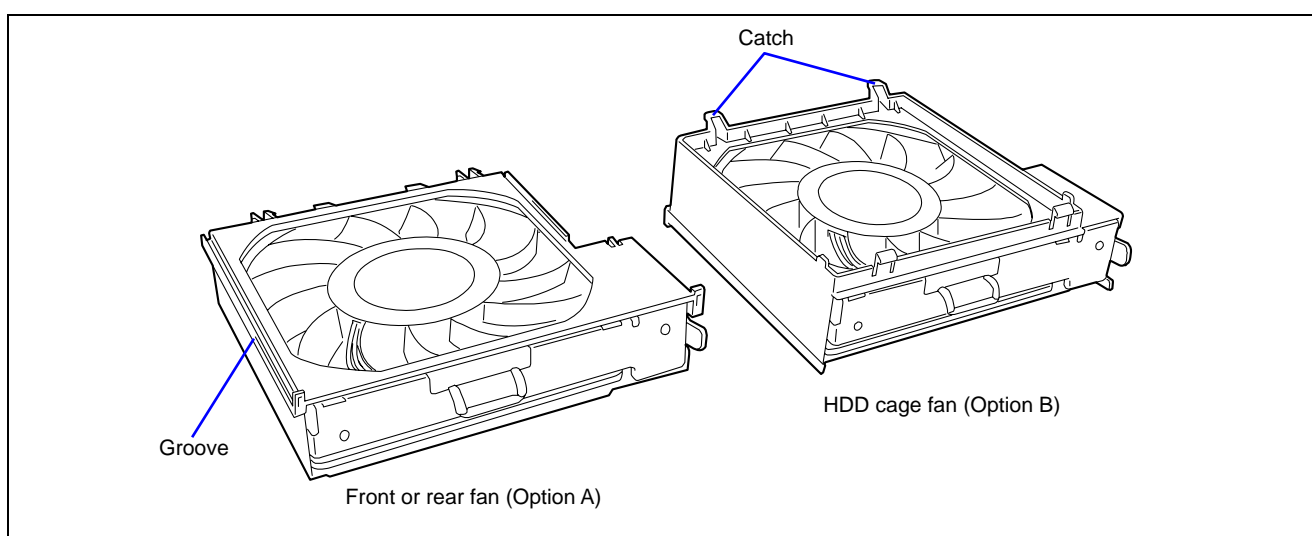
### IMPORTANT:

- Be sure to ask your service representative for replacement of a cooling fan unit if any of them is faulty.
- A redundant fan unit cannot be installed together with a water-cooling heat sink.



## Optional Fan Unit

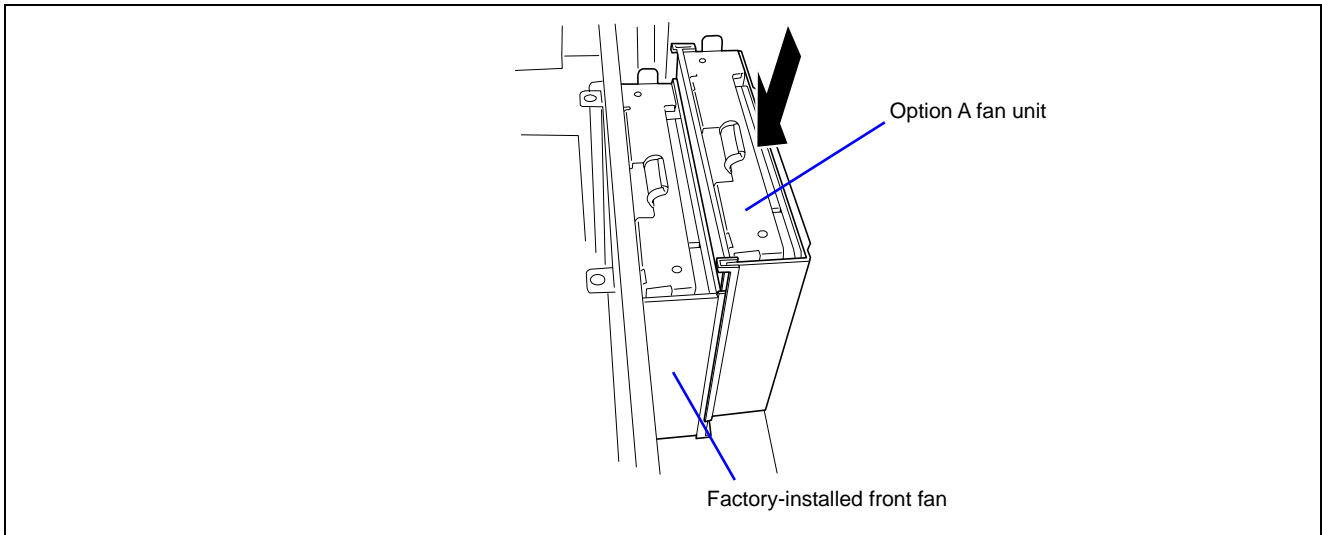
Optional fan unit is composed of three fan units. The shape of Option A (for front or rear fan) differs from that of Option B (for HDD cage). See the figure below.



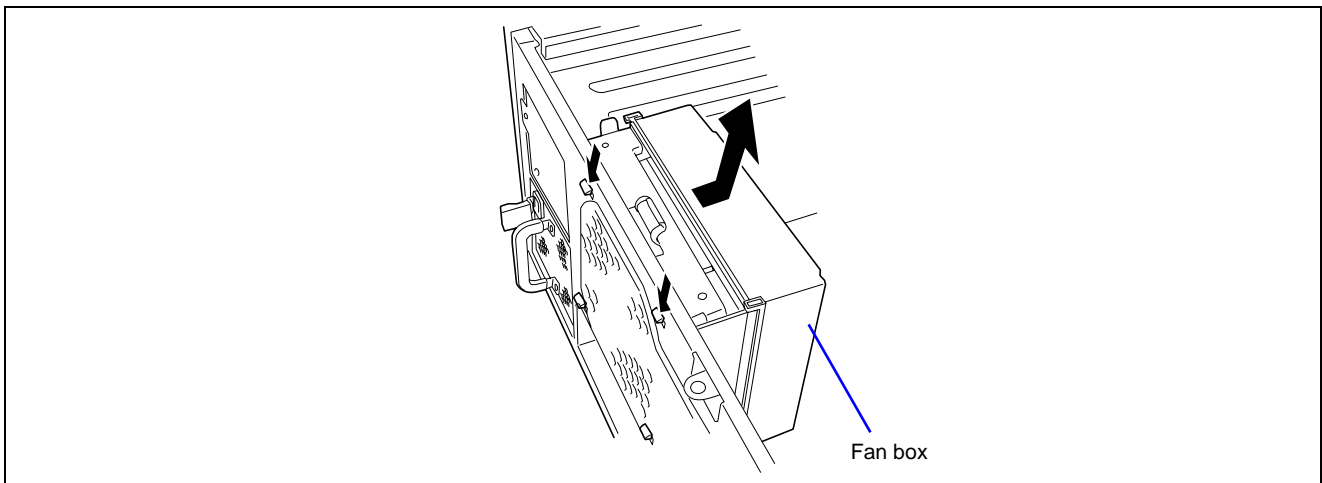
## Installation

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover.
3. Remove the CPU duct cover.
4. Insert the Option A fan unit into the slot for additional front fan.

Insert the groove of the Option A fan unit along with the guide of the factory-installed front fan, and push it to the end.



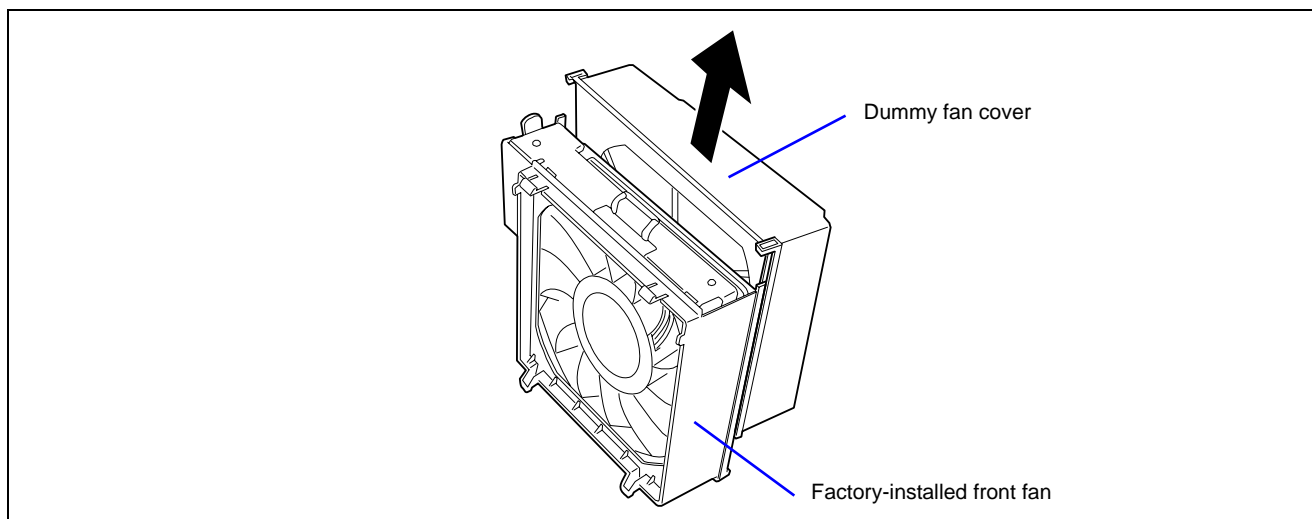
5. Remove the fan box from the slot for additional rear fan.  
Remove the stopper, then slowly lift the fan box to remove it.





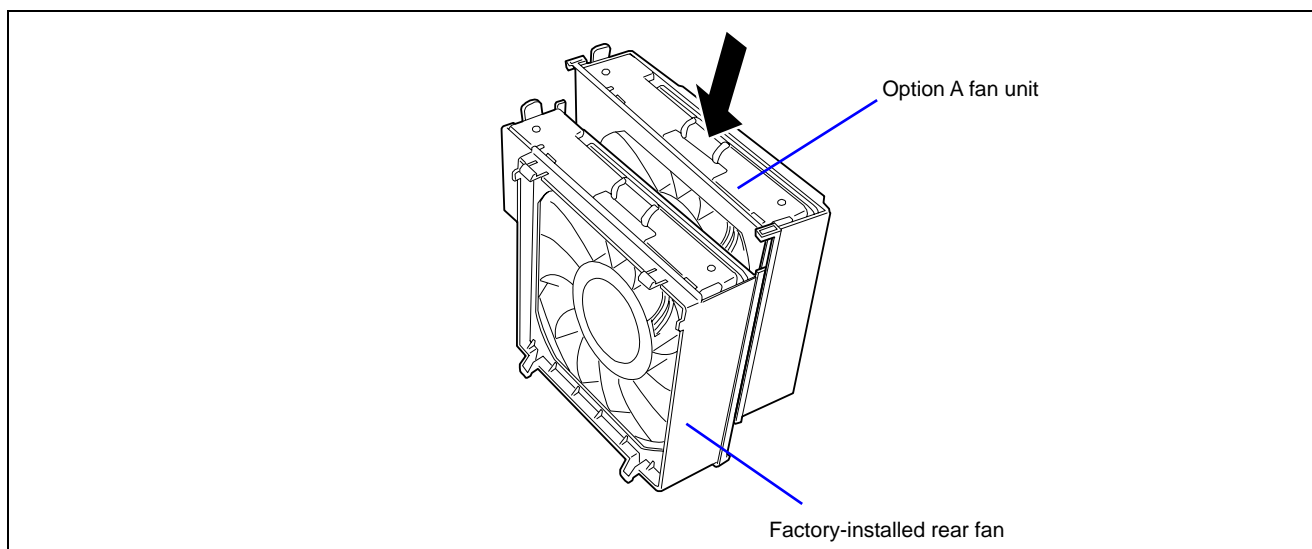
**6.** Remove the dummy cover from the fan box.

The dummy fan cover has a locking mechanism on its rear face. While pushing the lock, lift the dummy fan cover slowly to remove it.

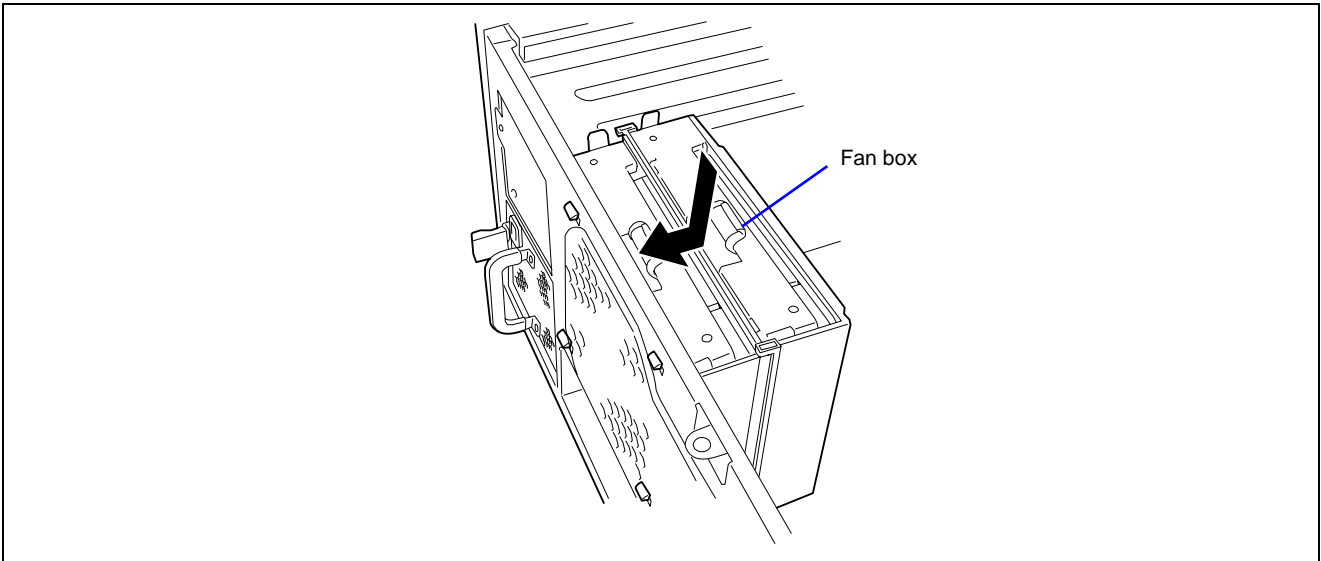


**7.** Insert the Option A fan unit into the slot for additional rear fan.

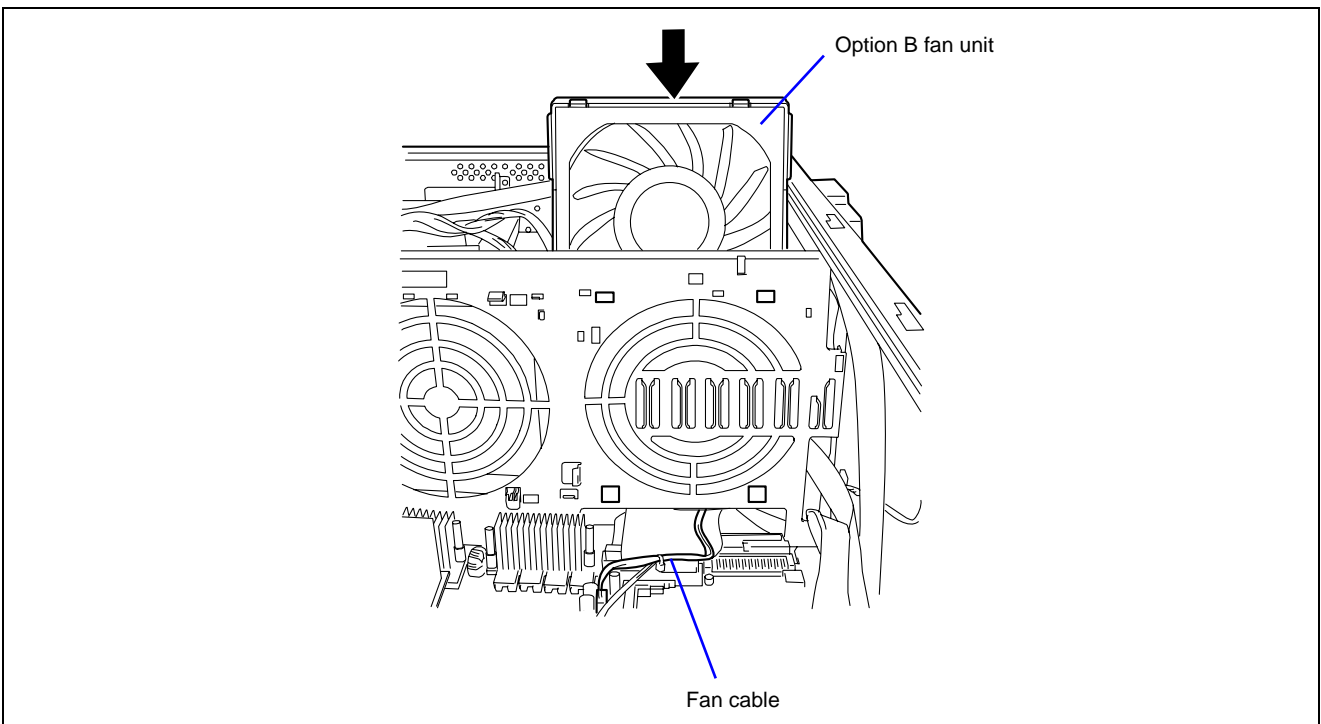
Insert the groove of the Option A fan unit along with the guide of the factory-installed rear fan, and push it to the end.



8. Install the fan box in the chassis.



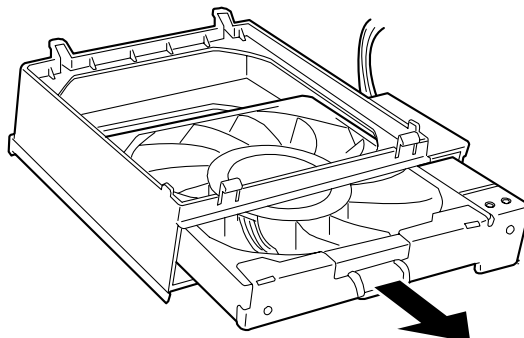
9. Insert the Option B fan unit into the additional slot for PCI/HDD cage.



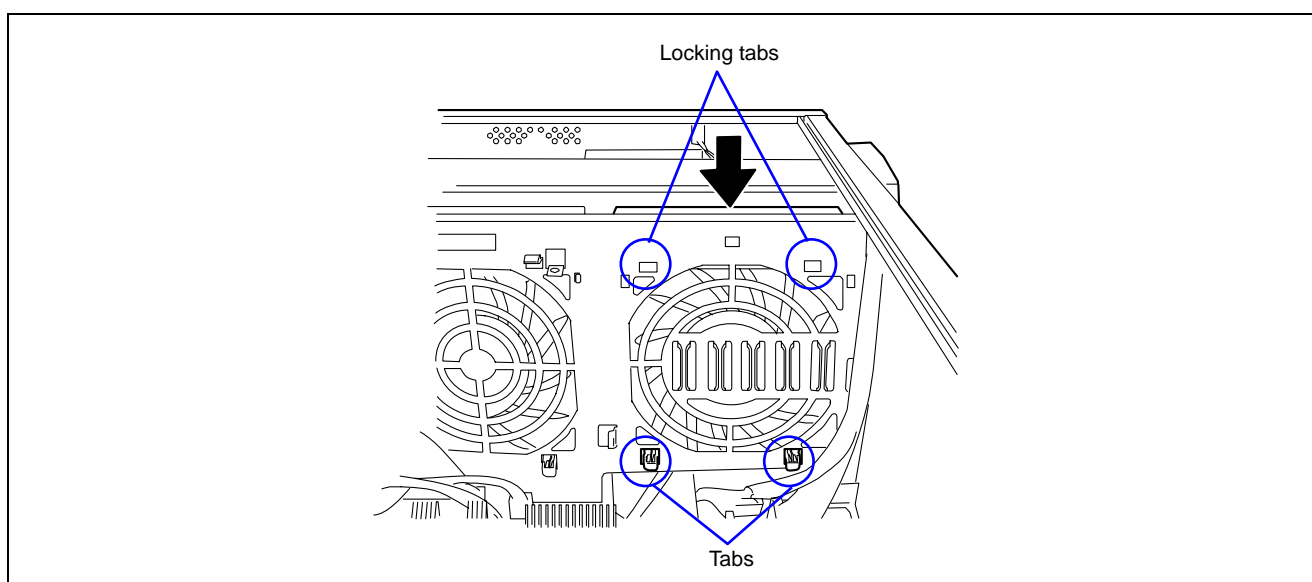
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**NOTES:**

- Pass the cables toward the motherboard connector.
- For easy installation, remove the hot-swap fan from the cooling fan unit during installation.

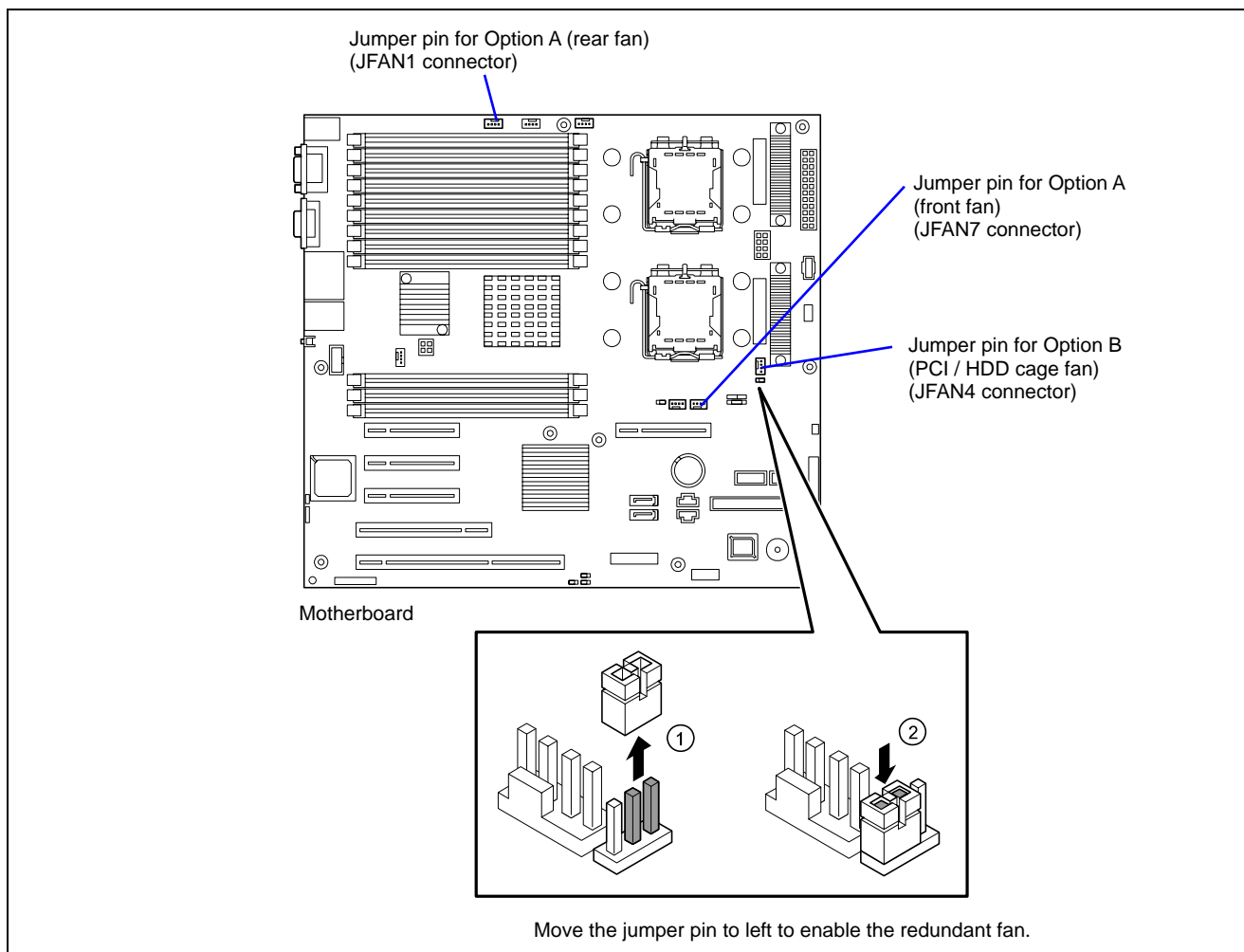


- 
- 10.** The cooling fan unit is locked with locking tabs. Insert the tabs into the holes on the frame of the server, and push the cooling fan unit toward the frame.



11. Move the jumper pin located below the connector for Option B. Connect the three cooling fan cables (for Options A and Option B) to the connectors on motherboard.

Take care to connect the cable to the proper connector. Otherwise, NEC ESMPRO will fail to monitor the server.



12. Reassemble the removed components.

---

## Installation of Water-cooled Heat Sink

Prepare a Phillips screwdriver for installation. The screwdriver must be magnetized.

### Precautions

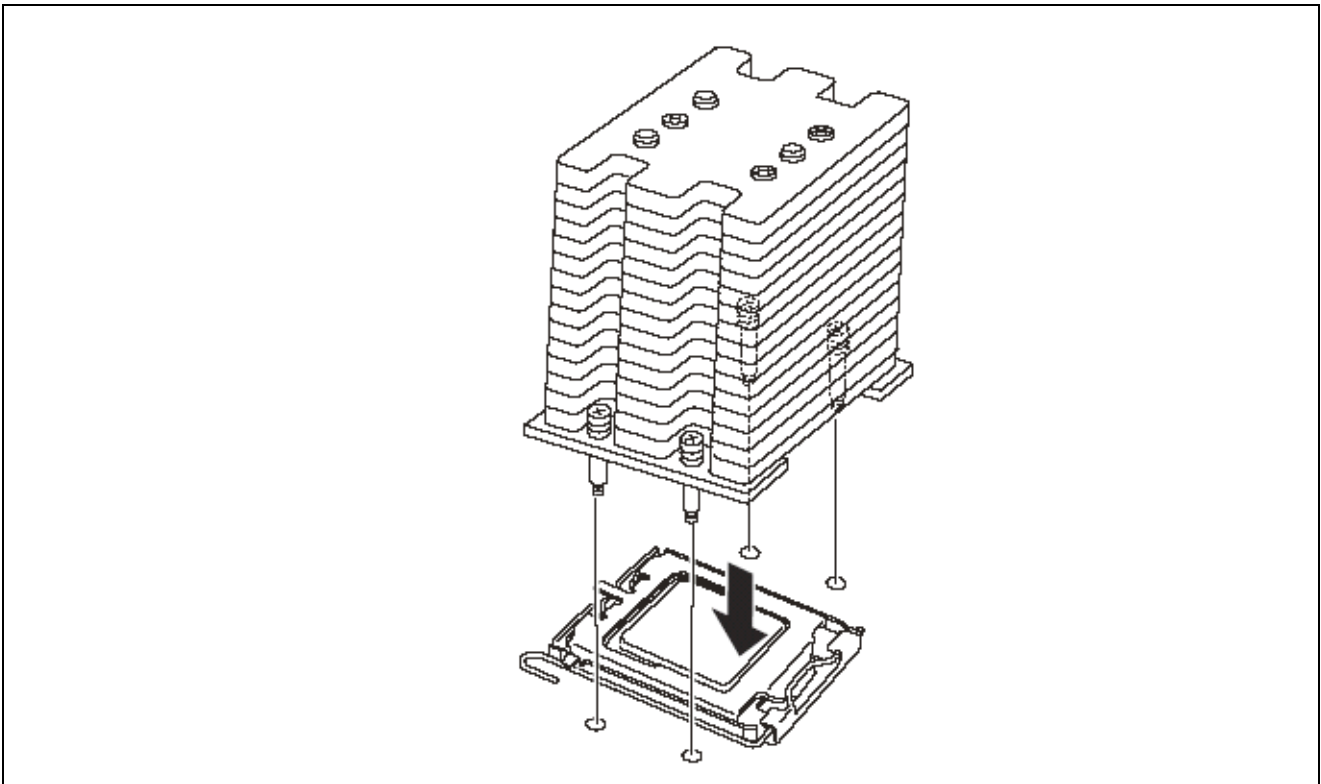
1. Before starting the installation, be sure to power off the server and unplug the power cord from the outlet. This is required to prevent personal injury and device failure.
2. Remove the side cover and other components according to the User Guide of the server.

### Preparation

#### Removal of CPU duct and heat sink

Remove the factory-installed CPU duct. The factory-installed heat sink is an air-cooled type.

1. Loosen the screw that secures the heat sink with Phillips screwdriver.  
If the heat sink is stuck to the processor, twist the heat sink horizontally to remove it.

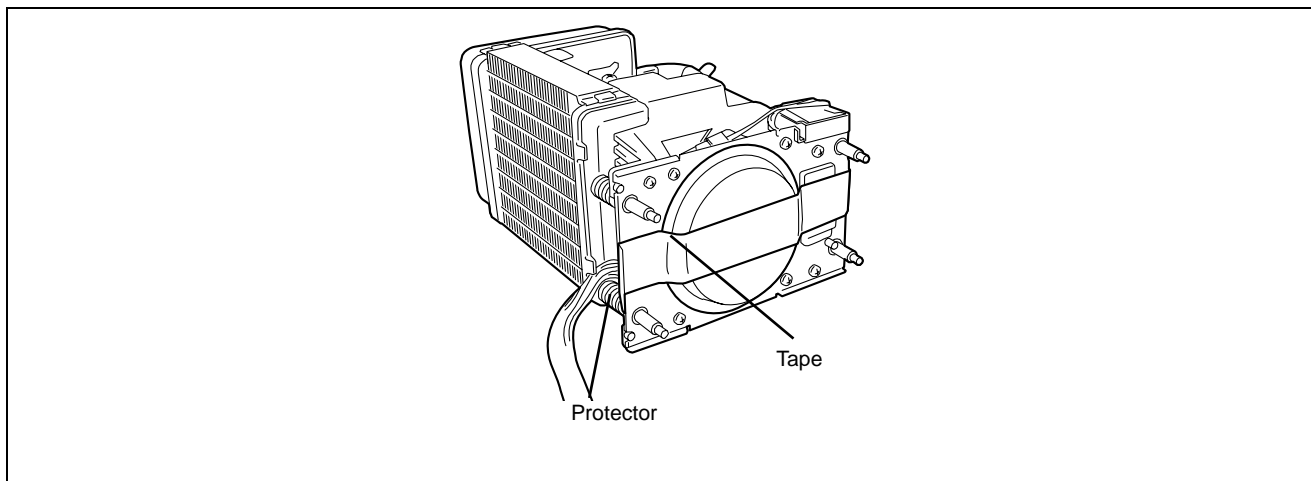


2. If the cooling sheet remained on the processor surface after you removed the heat sink, scrape it with a ruler or the like.

## Installation

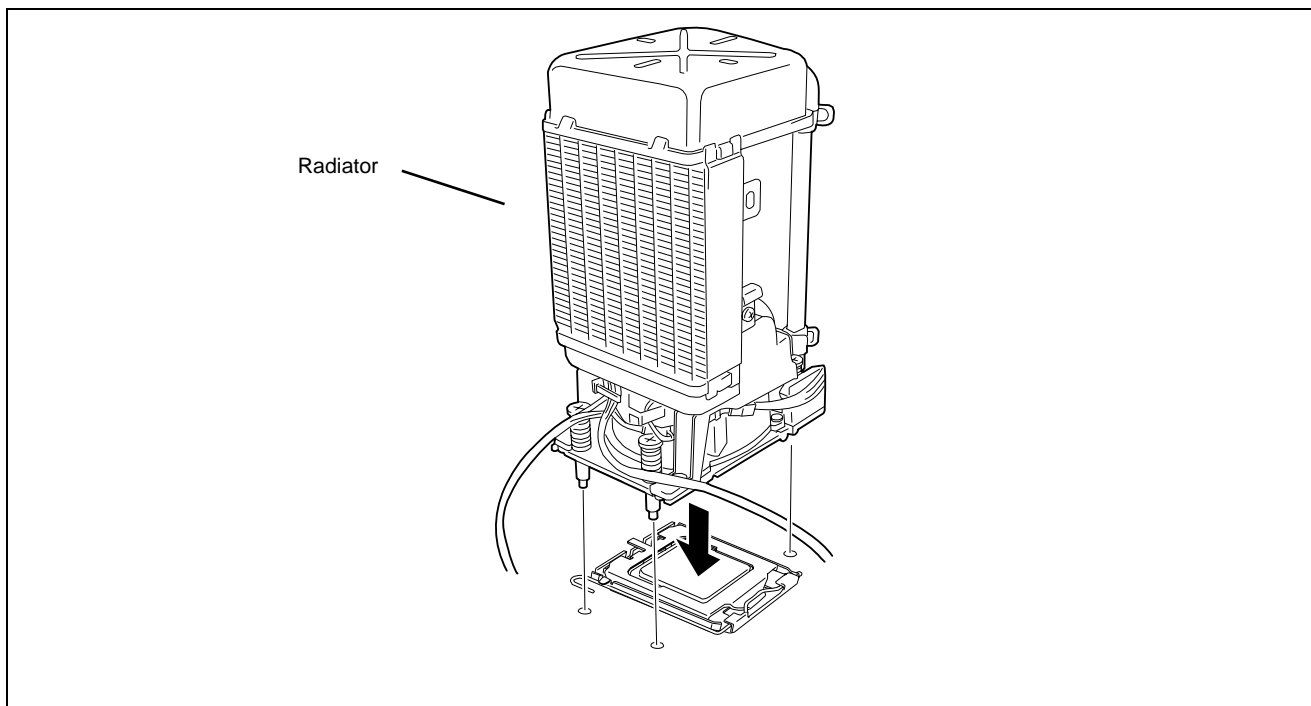
### Installation of the water-cooled heat sink

1. Remove the protector and the tape for protecting the cooling sheet from the bottom of the heat sink.



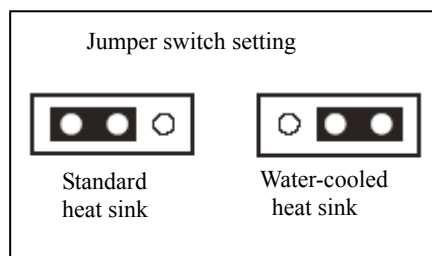
2. Install the heat sink so that the radiator faces the rear of the unit.

Pay attention to the orientation of the heat sink.

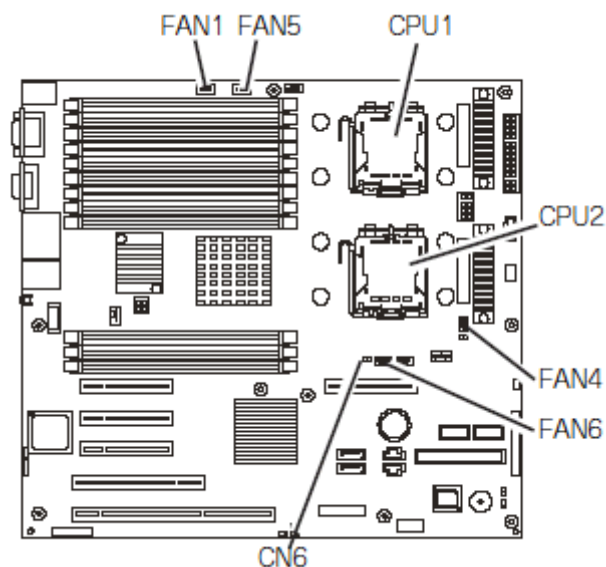


## Change setting of jumper switch on motherboard

For correct operation of the water-cooled heat sink, you must change the setting of the jumper switch (CN6) on the motherboard.



CPU1 ↔ P1 ↔ FAN5  
 CPU1 ↔ P2 ↔ FAN1  
 CPU2 ↔ P1 ↔ FAN6  
 CPU2 ↔ P2 ↔ FAN4



## Connect cables

Connect the cable of the water-cooled heat sink to the connector on the motherboard.

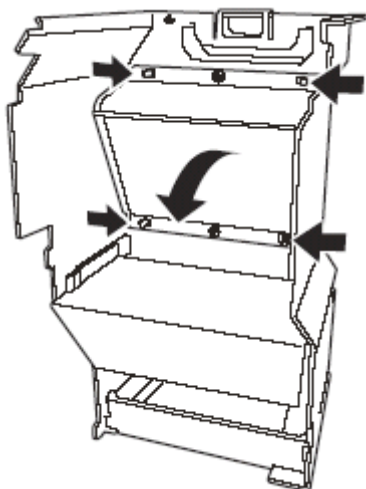
Check the connector number indicated on the cable and the indications on the motherboard for proper connection.

- Water-cooled heat sink for CPU1
  - Connect cable P1 to connector FAN5.
  - Connect cable P2 to connector FAN1.
- Water-cooled heat sink for CPU2 (when two processors are installed)
  - Connect cable P1 to connector FAN6
  - Connect cable P2 to connector FAN4.

## Install the dummy cover

If only one processor is installed, replace the dummy cover of CPU2 with the one provided with the water-cooled heat sink.

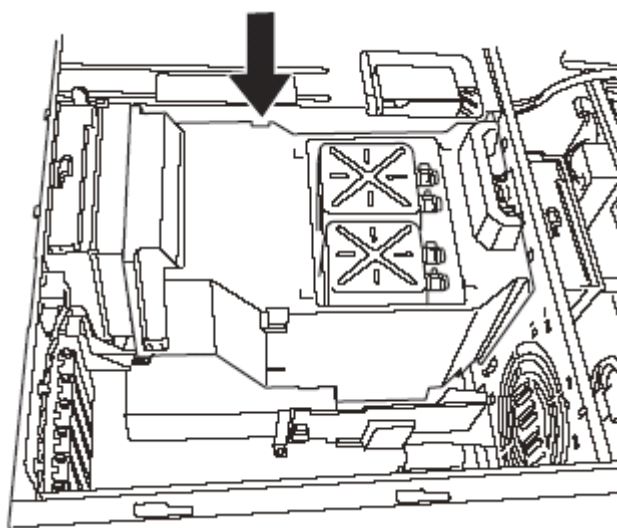
**Detach the top cover from the detached CPU duct.**



**Install the CPU duct.**

Install the CPU duct provided with the water-cooled heat sink.

This completes the installation.





## Update the system.

Updating the system is required for proper operation of water-cooled heat sink.

Use the "Update CD-ROM" provided with the water-cooled heat sink to update the system.

**NOTE:** The following message may appear on POST if the water-cooled heat sink has been installed but the system has not yet been updated.

8010 : The error occurred during water-cooling unit sensor reading.

1. Power on the server.
2. Insert the Update CD-ROM into the optical drive.
3. Updating the system will automatically start.
4. When updating is successfully completed, remove the CD-ROM from the optical drive, and power off the server.

```

-----
Programming complete, reboot sever for normal operation
SDR update has already done.
Please remove update media and power off/on.
-----

```

5. Disconnect the AC power cord, and wait for at least 10 seconds.
6. Connect the AC power cord, wait for at least 30 seconds, and then power on the server.

## Error Messages

If the water-cooled heat sink fails, POST detects an error at the startup of the server.

Shown below are error messages that may be displayed on the POST screen.

Code	Error message	Action
8010:	The error occurred during water-cooling unit sensor reading.	Contact your service representative.
8011:	Liquid leak occurs with a water-cooling unit #n.	
8012:	Water pump #n out of the range. #n: Water-cooled heat sink unit number	

## 3.5-inch HDD Cage

Your server has a factory-installed 3.5-inch HDD cage that can contain four hard disk drives on the front of the server. Installing an optional 3.5-inch HDD cage in another bay allows the server to be equipped with up to eight hard disk drives. Hard disk drives are not installed in the HDD cage. Purchase them additionally.

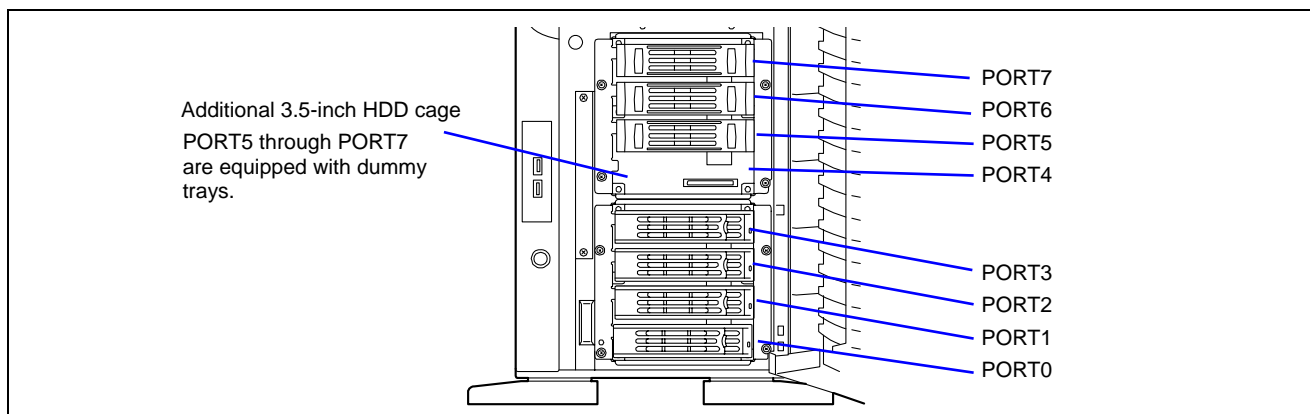
### IMPORTANT:

- Use a hard disk drives authorized by the manufacturer. Installing a third-party hard disk drive may cause the server or the hard disk drive to be damaged. Purchase hard disk drives of the following models:
  - 80 GB, 7,200 rpm, serial ATA2/300
  - 160 GB, 7,200 rpm, serial ATA2/300
  - 250 GB, 7,200 rpm, serial ATA2/300
  - 500 GB, 7,200 rpm, SATA2/300
  - 750 GB, 7,200 rpm, SATA2/300
  - 36.3 GB, 15000 rpm, SAS
  - 73.2 GB, 15000 rpm, SAS
  - 146.5 GB, 15000 rpm, SAS
  - 300 GB, 15000 rpm, SAS

Note: A SAS drive cannot coexist with a SATA drive.




- To use RAID 5, RAID 6, or RAID 50 with Internal RAID Controller (SAS/SATA HW RAID0/1), you need to install the optional RAID Upgrade Kit.

A hard disk drive having thickness of about 1 inch can be inserted to each of the four slots in the HDD cage. PORT4 to PORT7 are assigned in the order from bottom to top of additional 3.5-inch HDD cage.



**IMPORTANT:** Fill the slots with hard disk drives sequentially starting from PORT0 or PORT4 (the bottom slot of the cage). If you start filling from PORT3 (or PORT7) or skip filling an intermediate slot, the indication of DISK lamp will be incorrect.

## HDD Cage Jumper

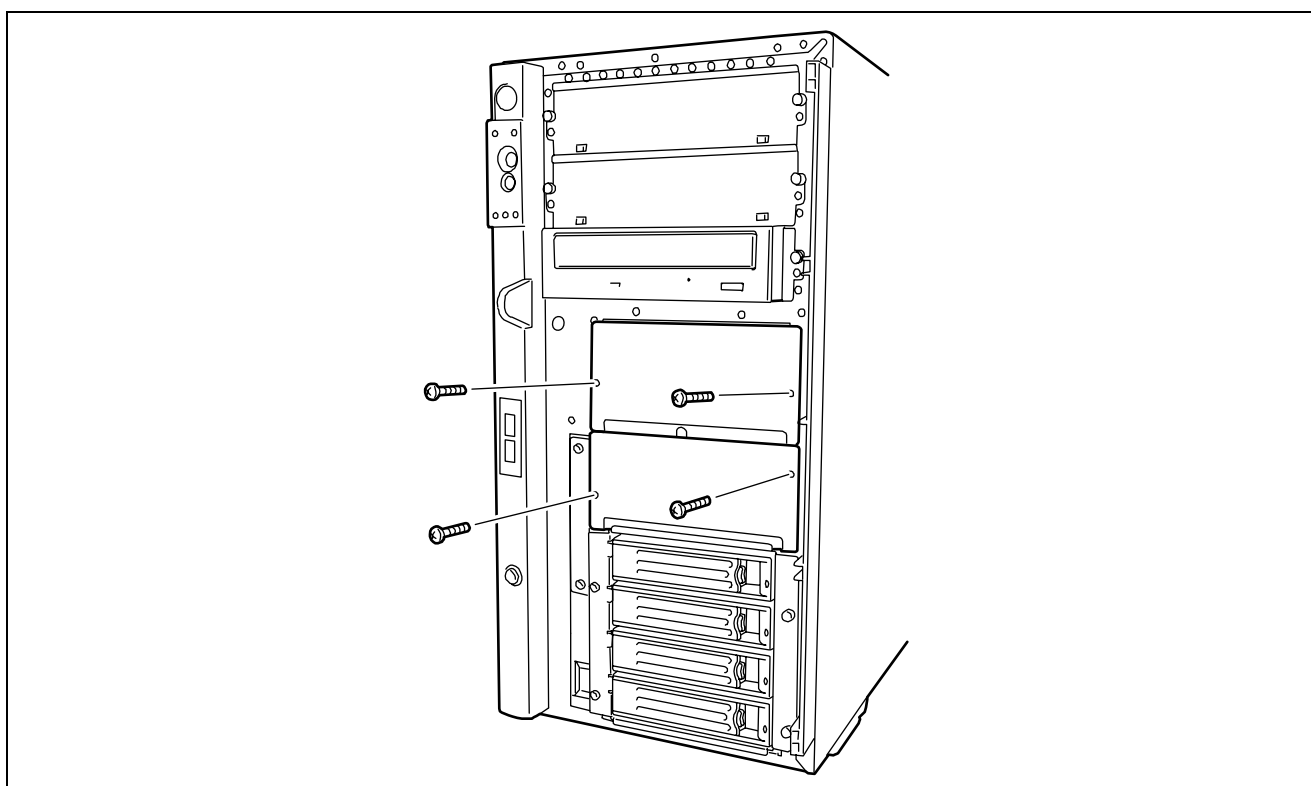
#	Loc	Description	Setting	Default
1	JP1	Mode Change (CntSel_0)	 1 2 3 1-2 ESB2 Mode 2-3 Disabled	2-3
2	JP2	Mode Change (CntSel_1)	 1 2 3 1-2 ICH9 Mode 2-3 Disabled	2-3
3	JP3	SAS/SATA Mode Change	 1 2 3 1-2 SAS Mode 2-3 SATA Mode	2-3

## Installation

Install the HDD cage in the 3.5-inch hard disk drive bay as described in the following procedure.

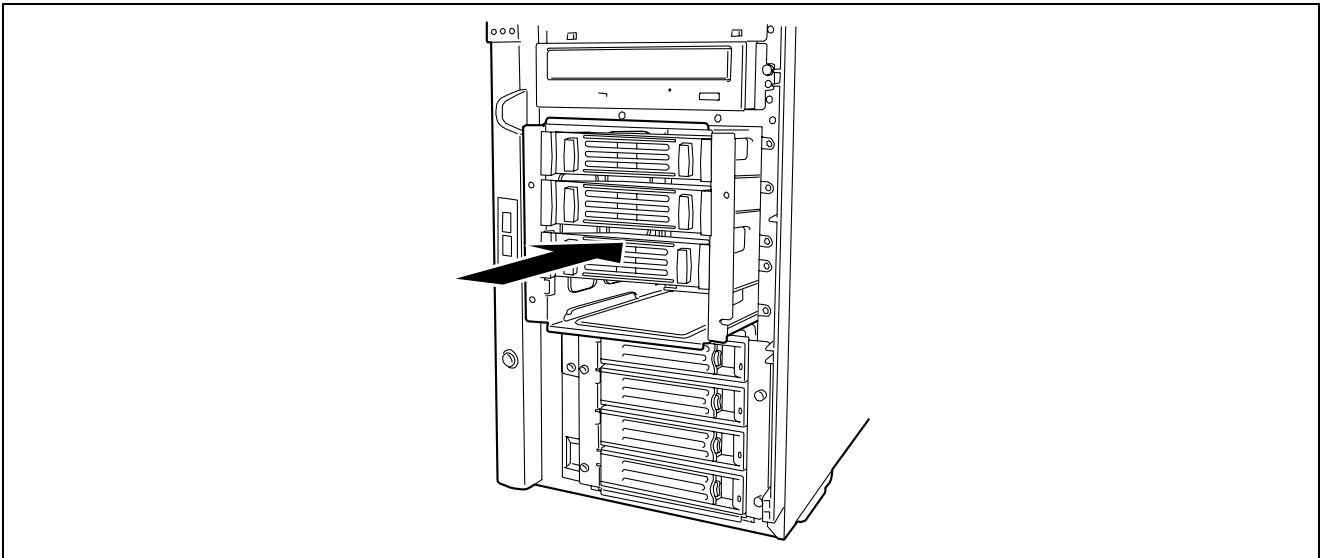
1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Release the lock of the front door by using the security key and open the front door.
3. Remove the side cover.
4. Remove the dummy cover from the slot to which the HDD cage is to be inserted.

Remove the four fixing screws to remove the dummy cover.



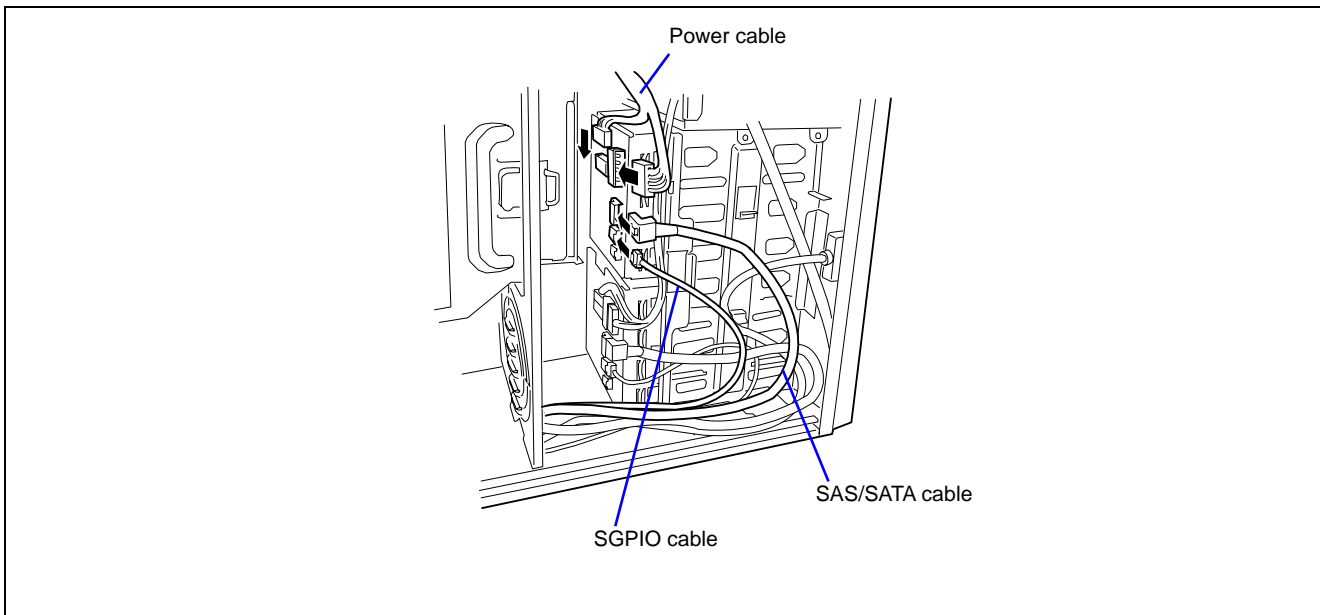
**IMPORTANT:** Keep the removed dummy tray for future use.

5. Insert the HDD cage to the corresponding slot.



6. Connect the proper cables to the connectors on the rear of the HDD cage.

Connect the power cables (P8 and P9) of the server to the corresponding power connectors on the rear of the HDD cage. Connect one end of the SAS/SATA cable to the SAS/SATA connector on the rear of the HDD cage and the other end to the second SAS/SATA connector on the RAID controller. Connect one end of SGPIO cable to the SGPIO connector on the rear of HDD cage and the other end to the SGPIO2 connector on motherboard.

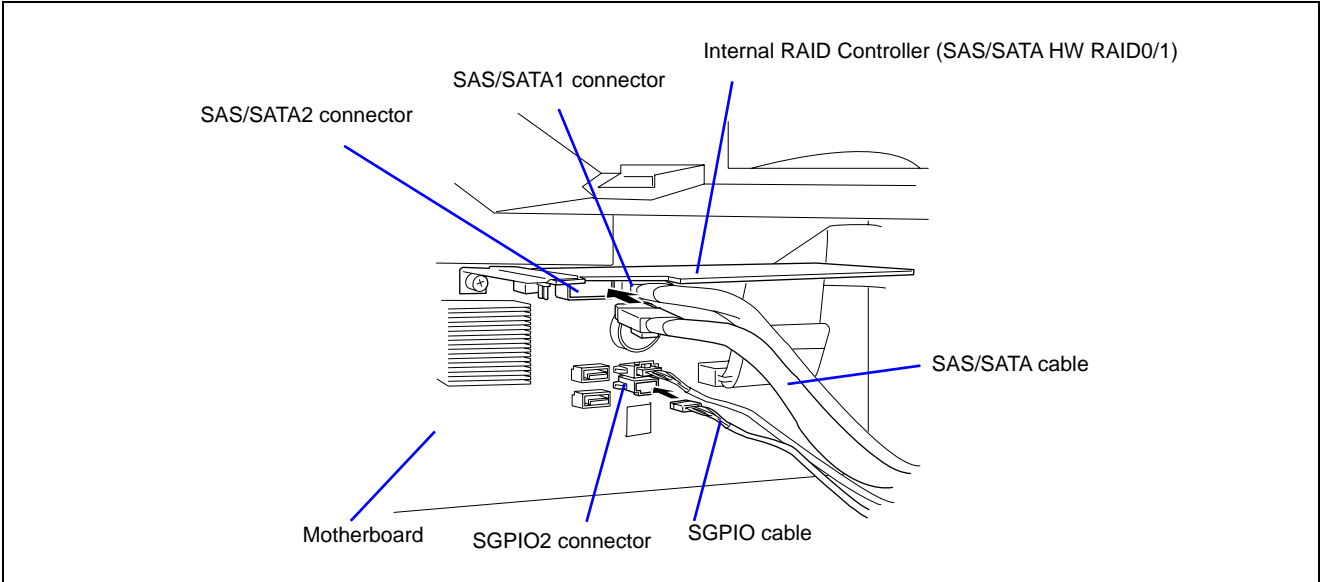


**SAS/SATA1 Connector**

Used to connect with the factory-installed 3.5-inch HDD cage (PORT0 to PORT3).

**SAS/SATA2 Connector**

Used to connect with the additional 3.5-inch HDD cage (PORT4 to PORT7).

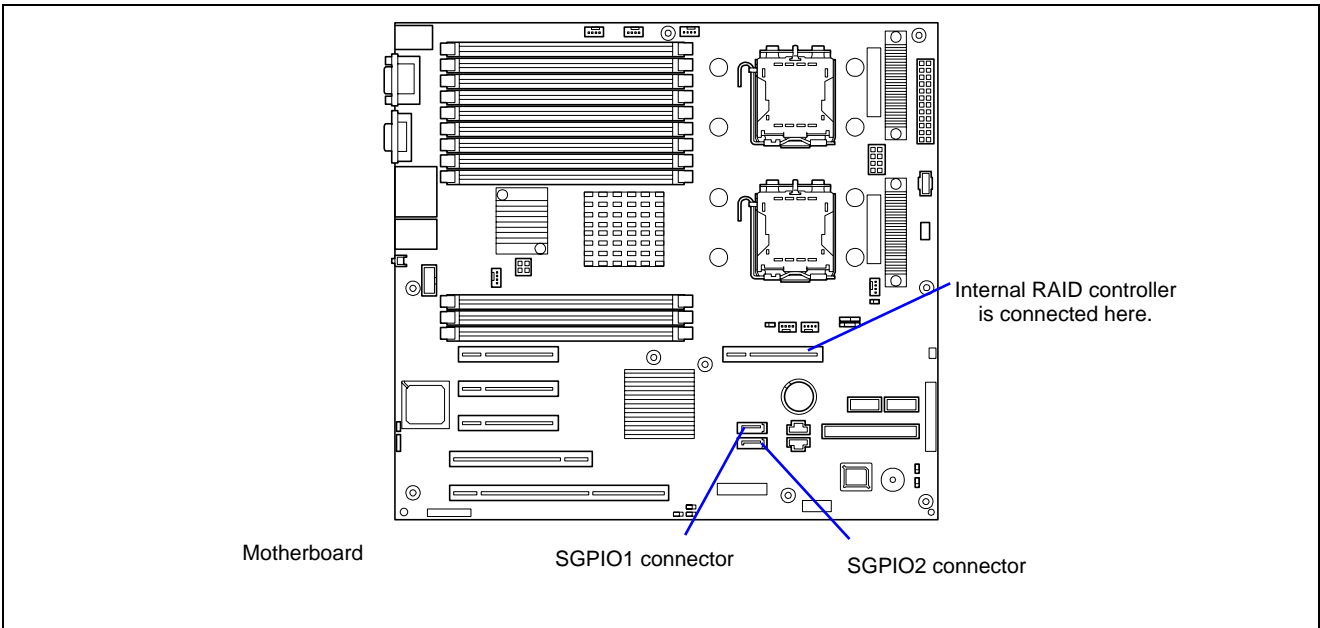


**SGPIO1 Connector**

Used to connect with the factory-installed 3.5-inch HDD cage (PORT0 to PORT3).

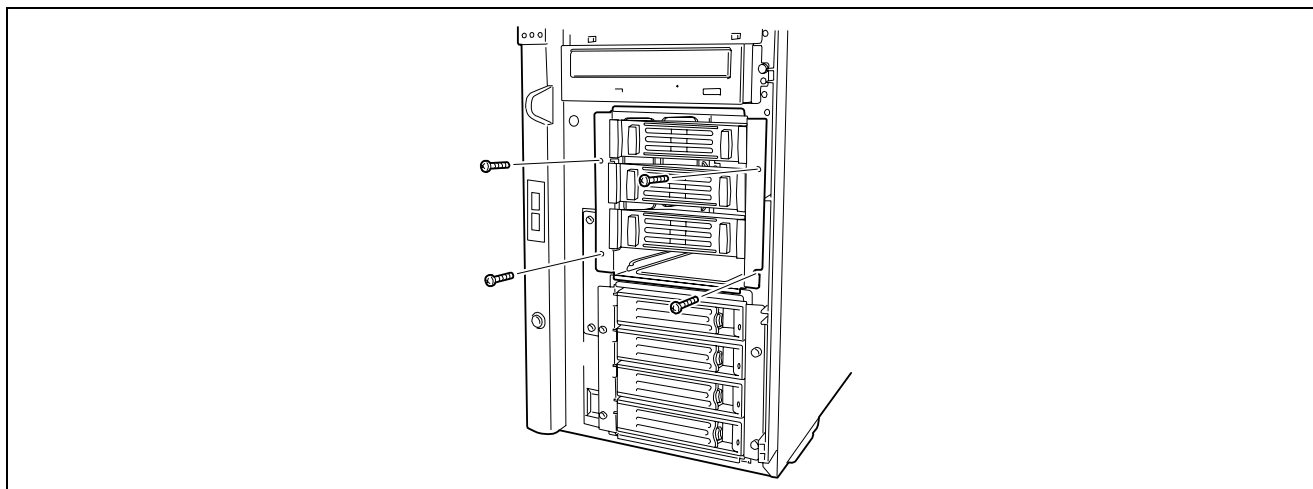
**SGPIO2 Connector**

Used to connect with the additional 3.5-inch HDD cage (PORT4 to PORT7).



7. Fix the 3.5-inch HDD cage to the chassis.

Fix the HDD cage to the server with four fixing screws.



8. Install the components which had been removed.

## Removal

To remove the HDD cage, follow the installation procedure in the reverse order.

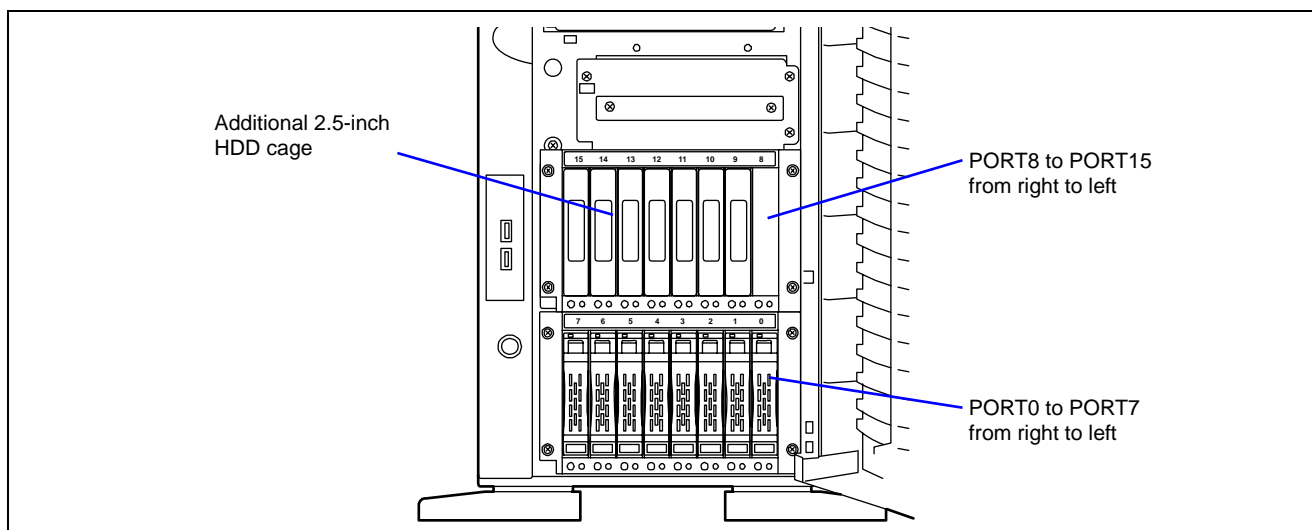
## 2.5-inch HDD Cage

Installing an optional HDD cage in the 2.5-inch hard disk drive bay on the front of the server allows the server to be equipped with up to eight hard disk drives in addition to the eight drives normally installable. Hard disk drives are not installed in the HDD cage. Purchase them additionally.

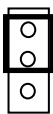

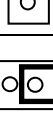

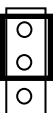
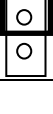

### IMPORTANT:

- Use the hard disk drives authorized by the manufacturer. Installing a third-party hard disk drive may cause a failure of the server as well as the hard disk drive. Purchase hard disk drives of the following models:
  - 36.3 GB, 15000 rpm, SAS
  - 73.2 GB, 15000 rpm, SAS
  - 146.5 GB, 15000 rpm, SAS
  - 300 GB, 15000 rpm, SAS
- To use RAID 5, RAID 6, or RAID 10 with Internal RAID Controller (SAS/SATA HW RAID0/1), you need to install the optional RAID Upgrade Kit.

A hard disk drive about 0.6 inches thick can be inserted into each of the eight slots in the HDD cage. PORT8 to PORT15 are assigned in the order from right to left of the additional 2.5-inch HDD cage.



## HDD Cage Jumpers

#	Loc	Description	Setting	Default
1	JP1	Mode Change (CntSel_0)	3  2  1 	1-2 ESB2 Mode 2-3 Disabled 2-3
2	JP2	Mode Change (CntSel_1)	 1 2 3	1-2 ICH9 Mode 2-3 Default 2-3
3	JP3	SAS/SATA Mode Change	3  2  1 	1-2 SAS Mode 2-3 SATA Mode 2-3

## Installation (First 2.5-inch HDD Cage)

Install the 2.5-inch HDD cage as described in the following procedure.

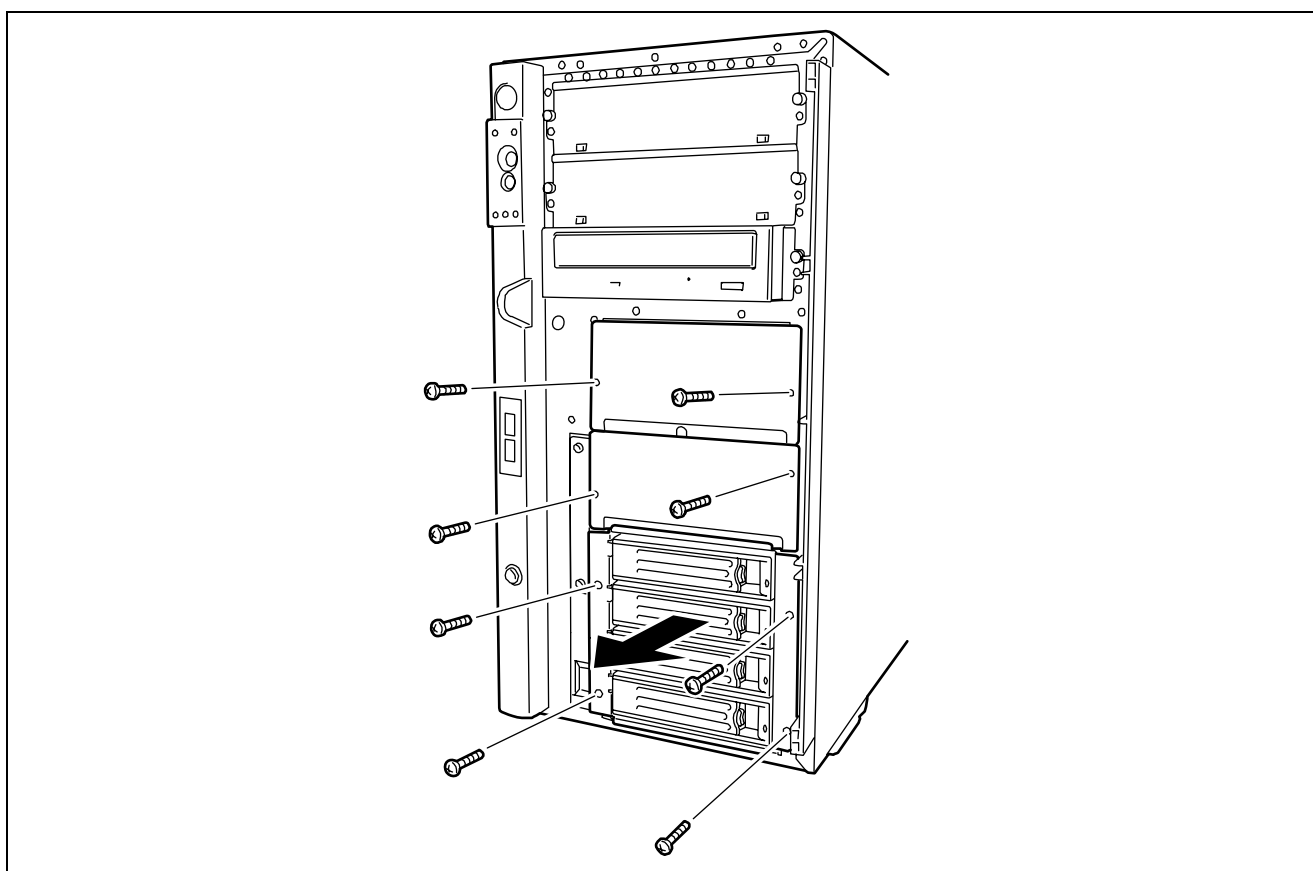
1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Release the lock of the front door by using the security key to open the front door.
3. Remove the side cover.
4. Disconnect all the cables from the rear of 3.5-inch HDD cage.

---

**NOTE:** To disconnect SGPIO cable or SAS/SATA cable, hold the connector, unlock it, then pull it out. Pulling the cable by the cord may damage the connector.

---

5. Remove the four screws from the 3.5-inch HDD cage, and the four screws from the two dummy covers. Then, remove the 3.5-inch HDD cage and dummy covers.



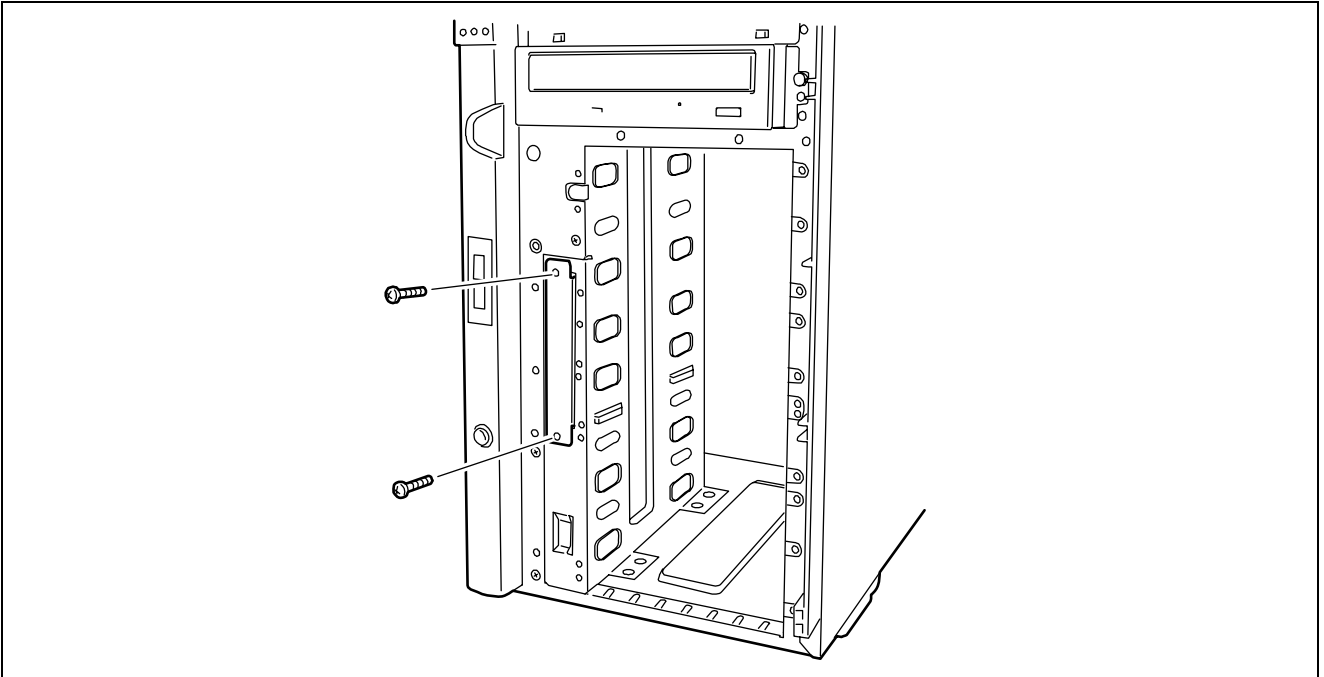
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**NOTE:** Keep the removed dummy covers and screws for future use. You will need these screws to install the 2.5-inch HDD cage.

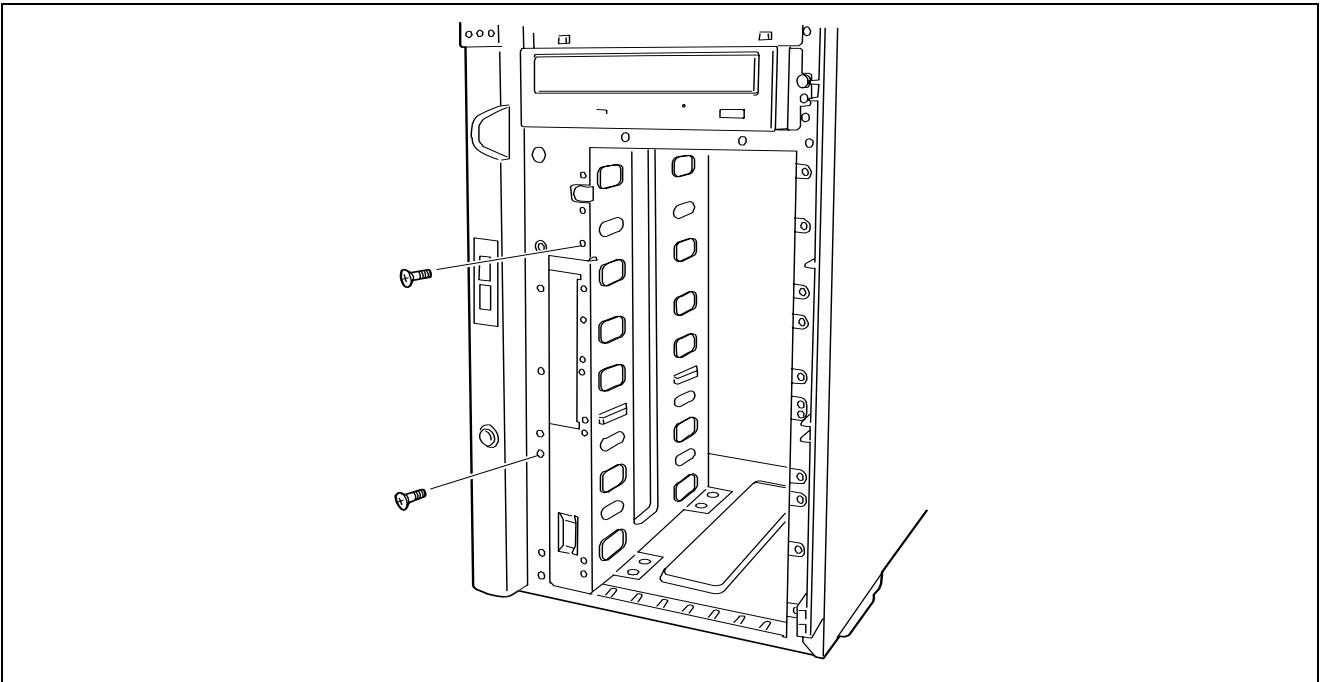
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6. Remove the two screws fixing the dummy cover of the floppy disk drive. Then, remove the dummy cover.

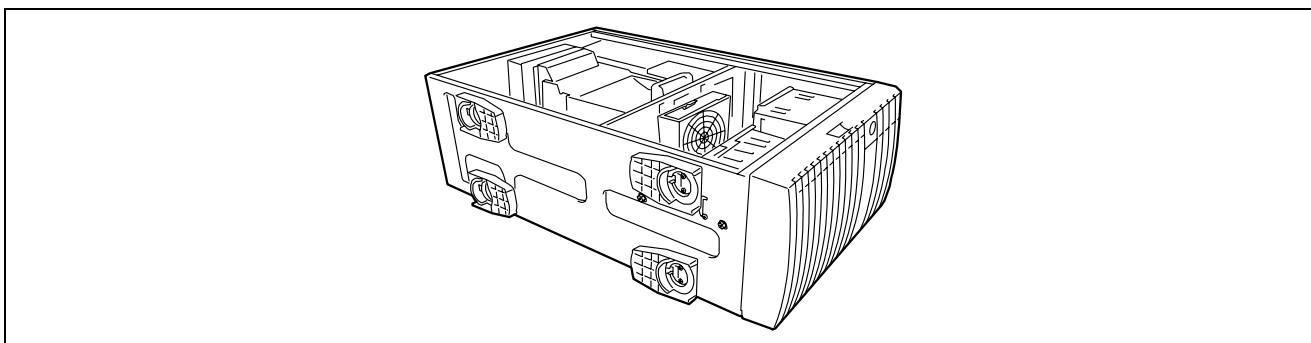




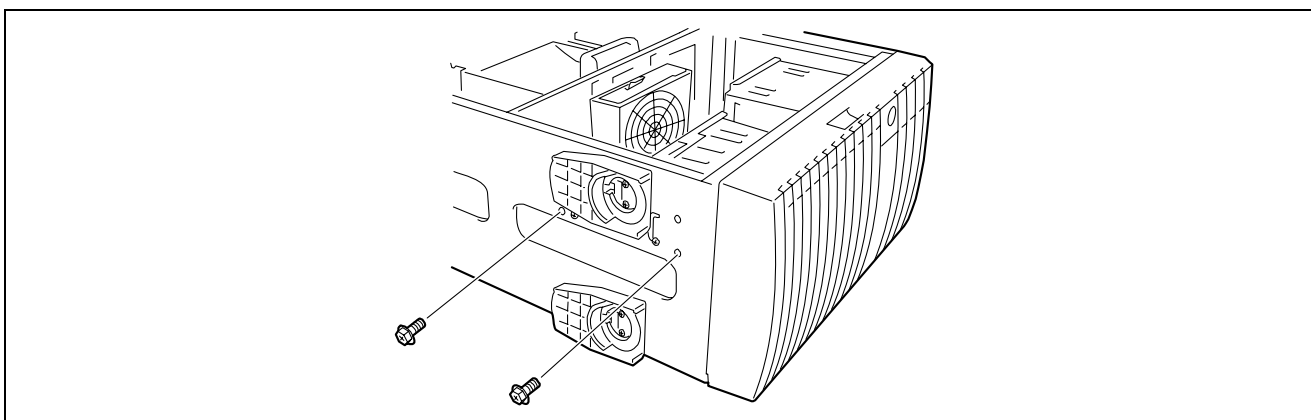
7. Remove the two flat countersunk screws from the front of the server chassis.



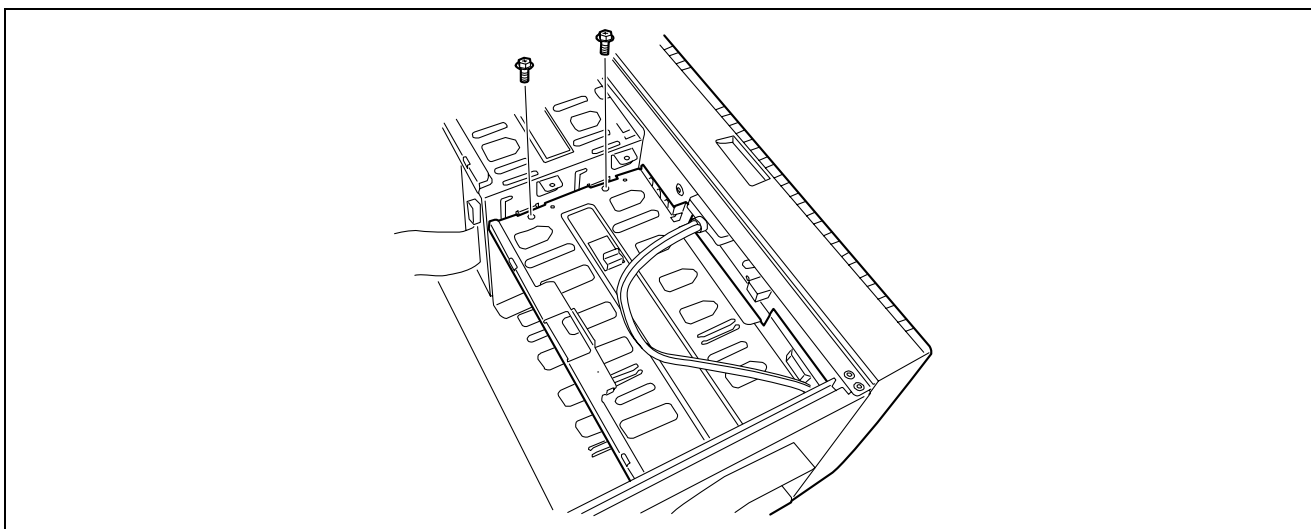
8. Slowly and carefully lay the server down on its right side.



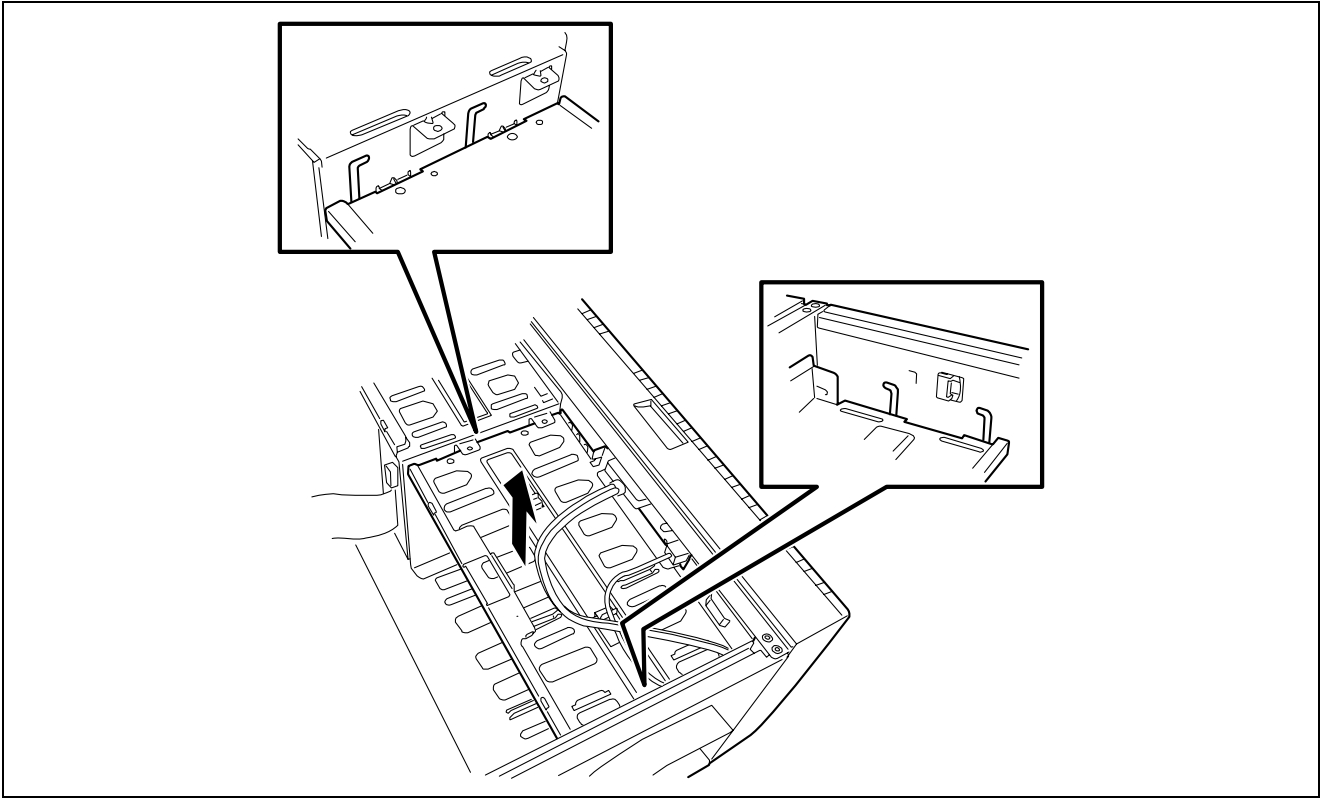
9. Remove the two hexagon set screws from the bottom of the chassis.



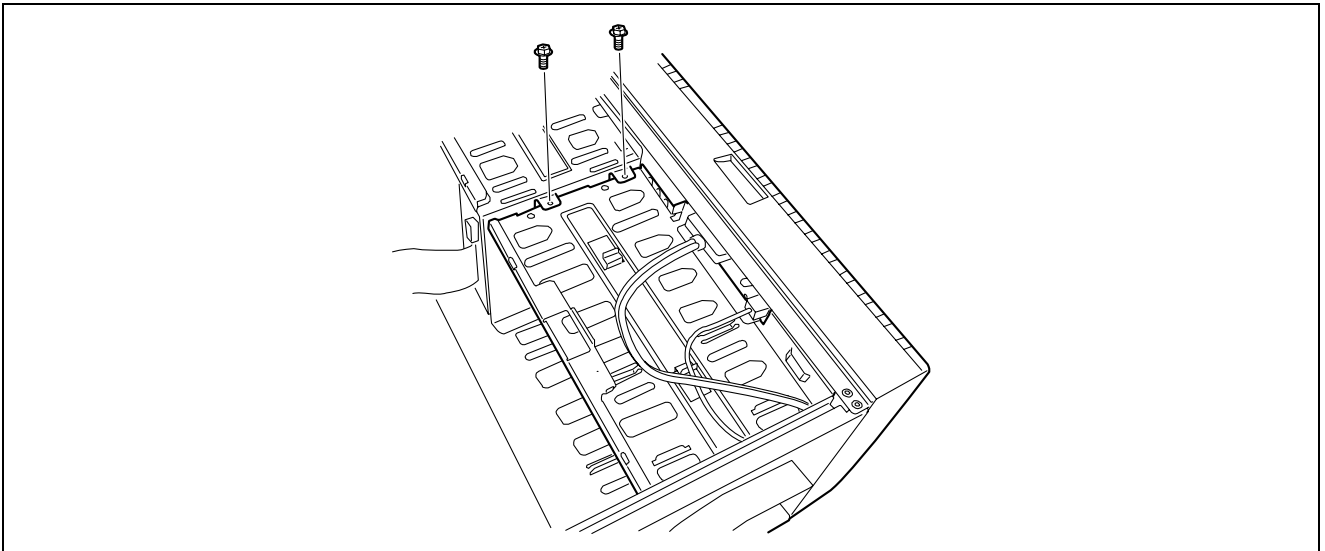
10. Remove the two screws from the side of the HDD cage frame.



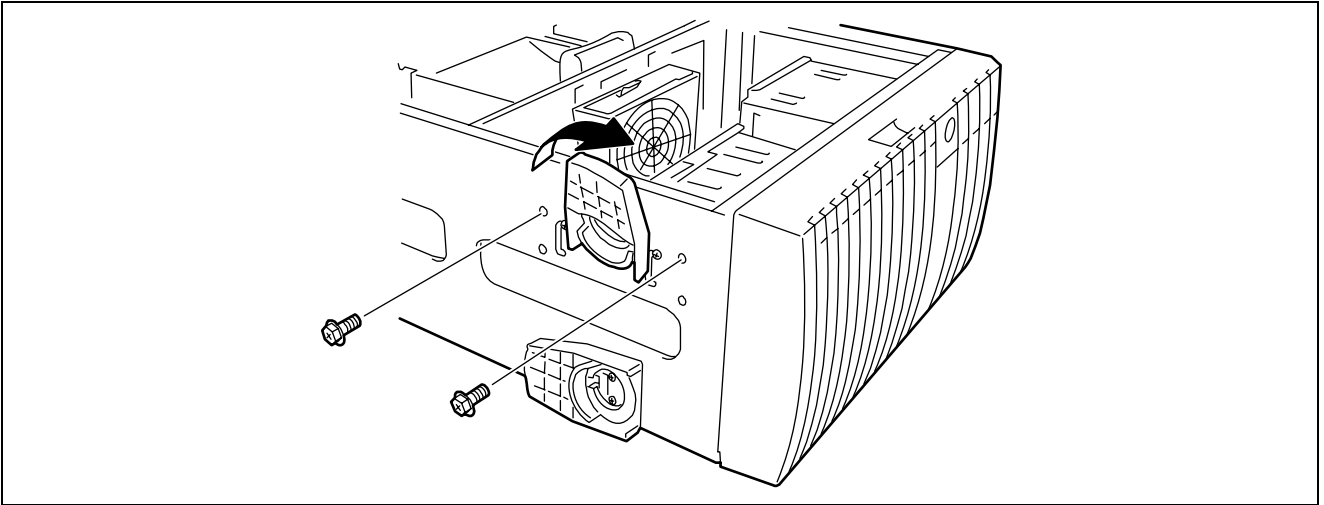
11. Move the HDD cage frame by lifting the frame along the L-shaped groove.



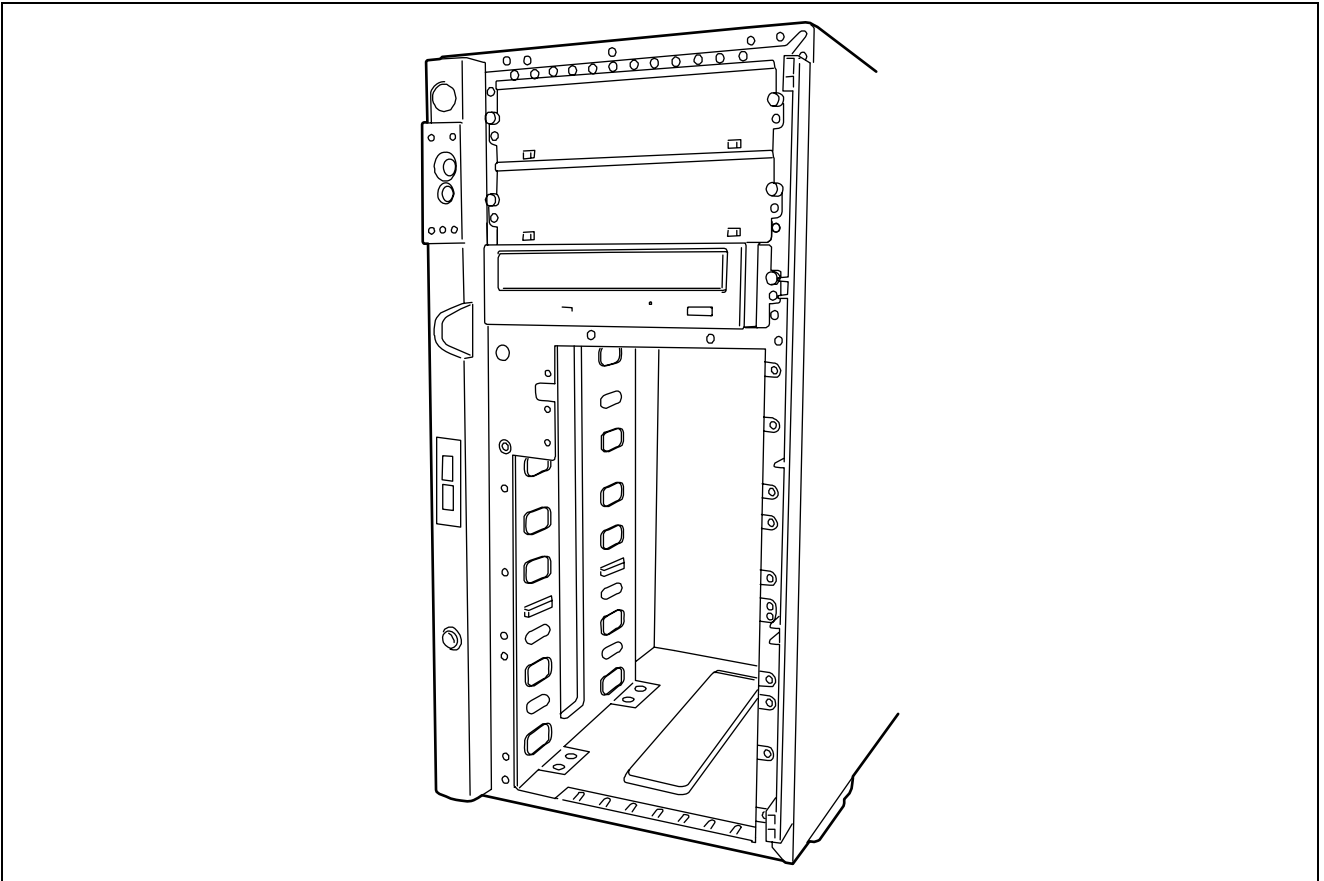
12. Secure the HDD cage frame with two screws.



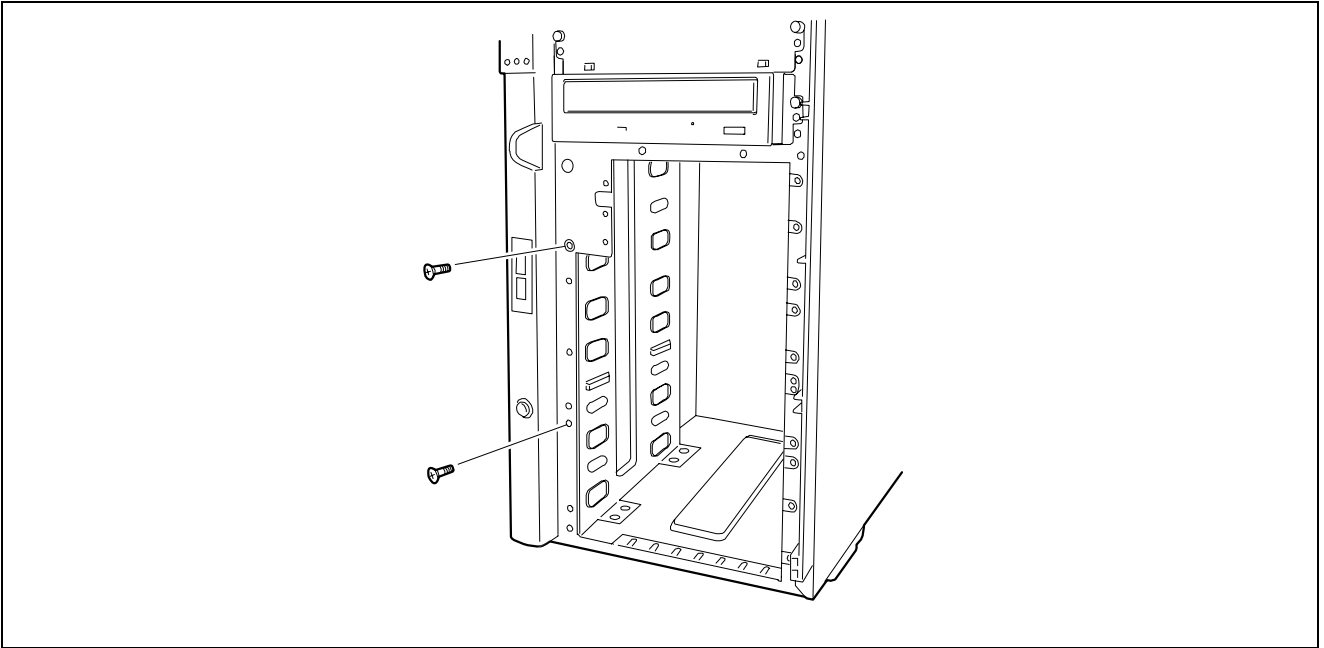
13. Rotate the stabilizer on bottom of chassis, and secure the HDD cage frame with two screws.



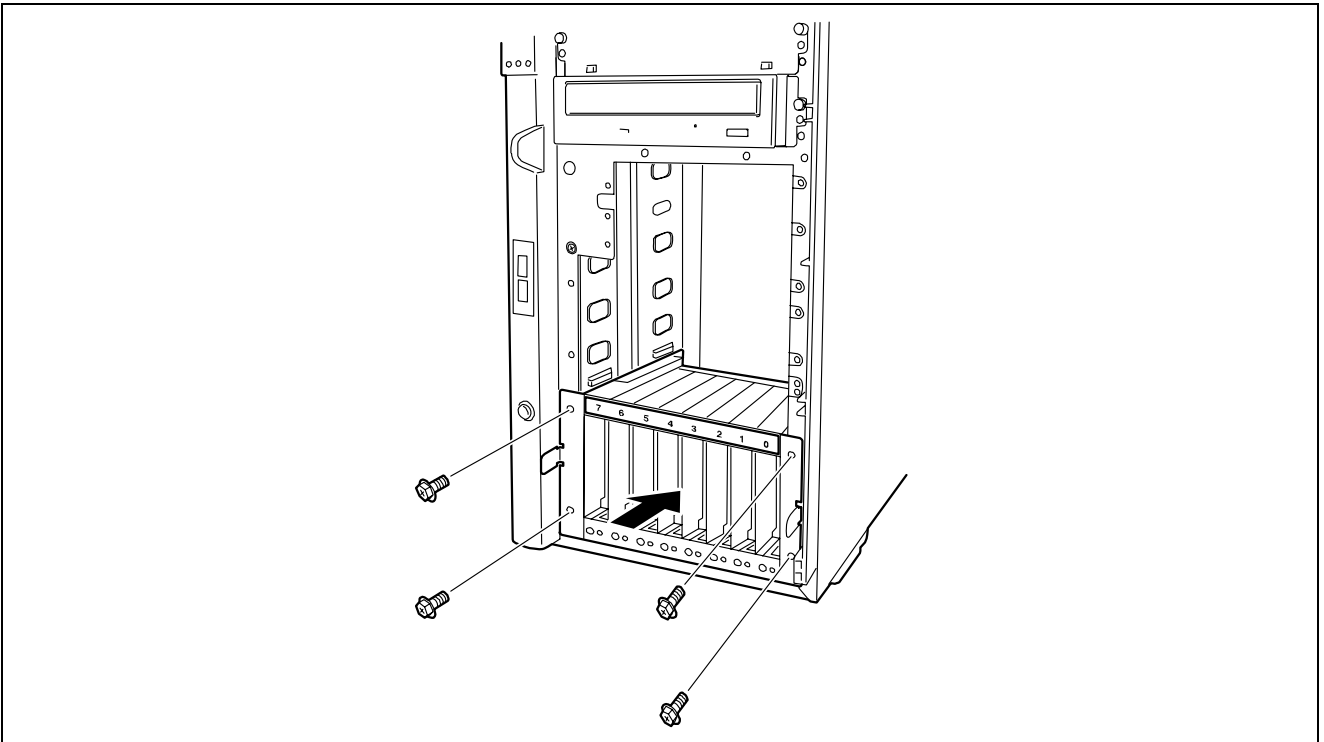
14. Slowly and carefully raise the chassis.



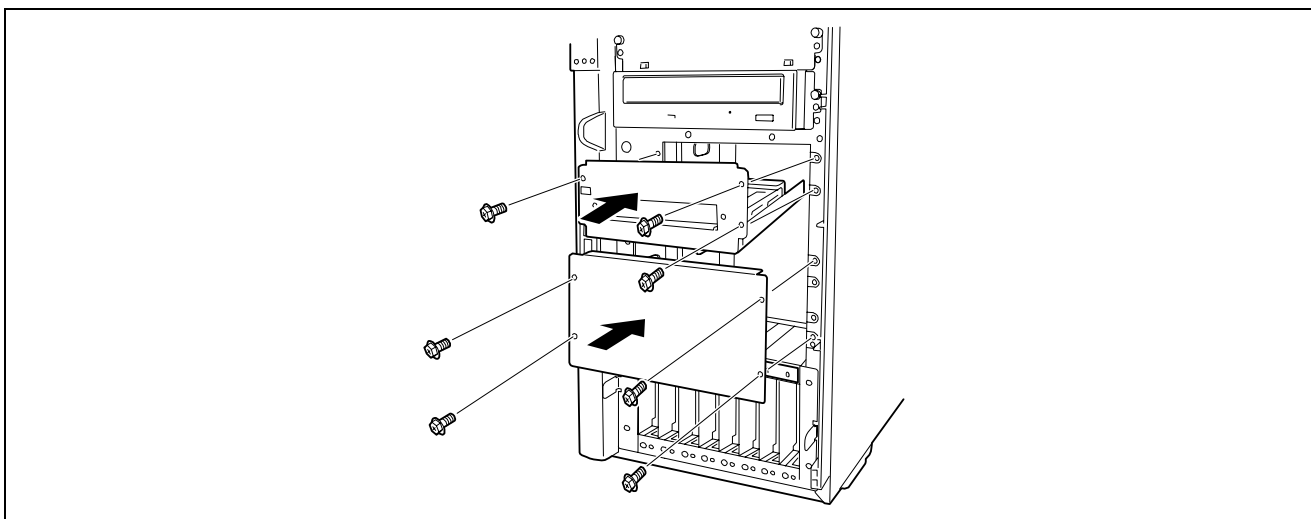
- 15.** Secure the front of the chassis with the two flat countersunk screws removed in Step 7.



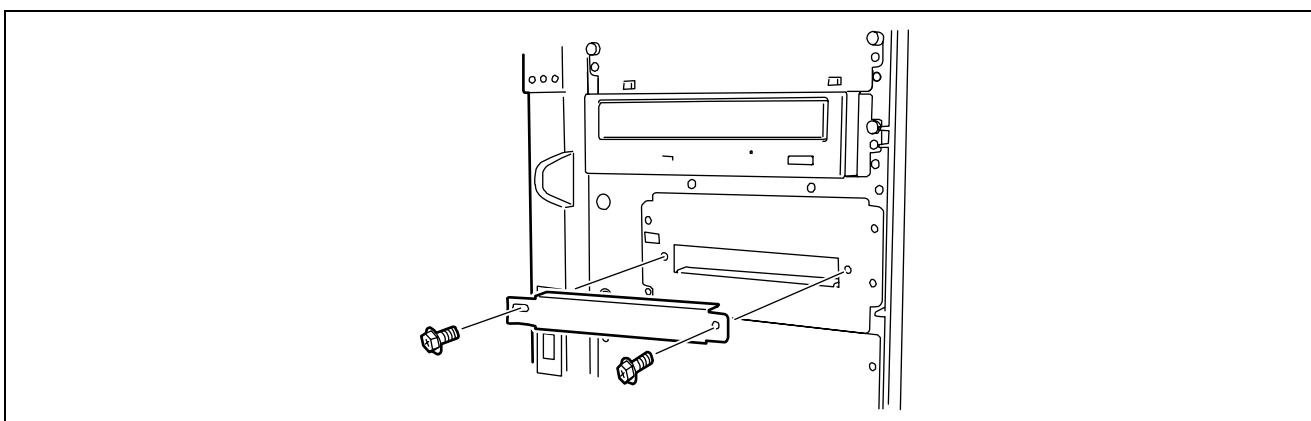
- 16.** Insert the 2.5-inch HDD cage into the lowest slot, and secure it with four screws that had been removed from the 3.5-inch HDD cage in Step 5.



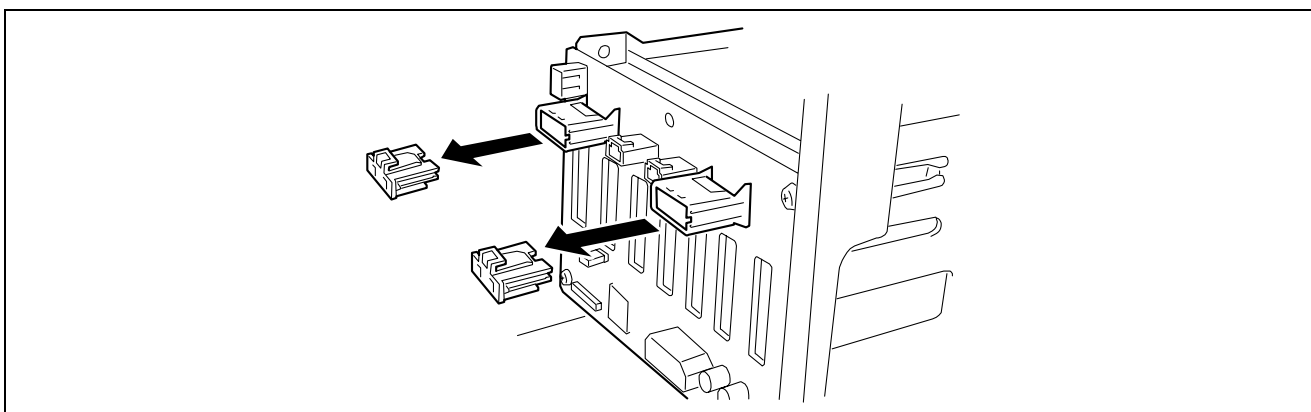
17. Secure the dummy covers that come with the 2.5-inch HDD cage with seven screws.



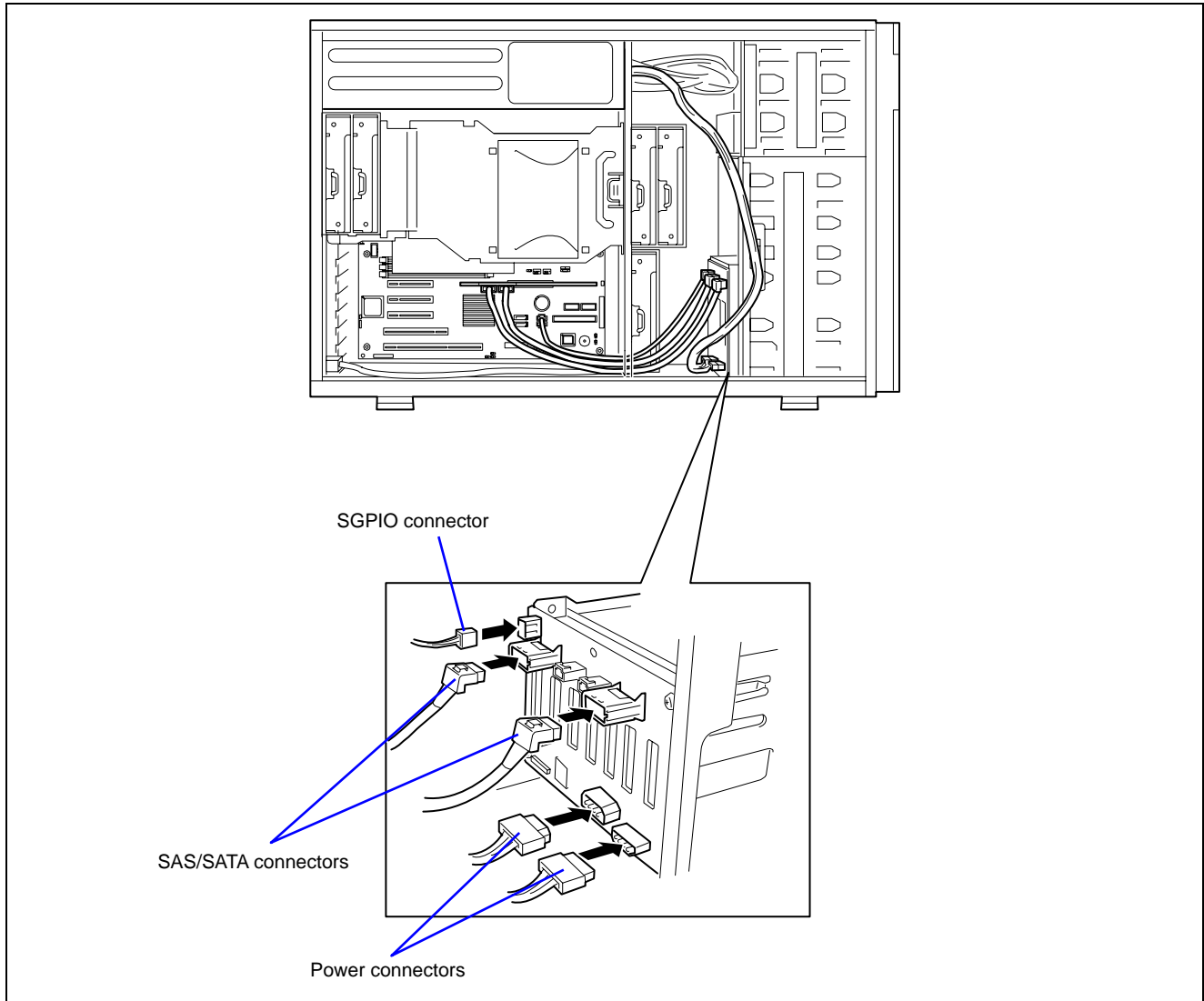
18. Secure the dummy cover for FDD slot removed in Step 6 with two screws.



19. Remove the dummy connector cover from the SAS/SATA connectors on the rear of the 2.5-inch HDD cage.



20. Connect the power cable, SAS/SATA cables, and SGPIO cable to the rear of the 2.5-inch HDD cage, as shown in the figure below.



– SAS/SATA cable

Connect the SAS/SATA cable from the farthest connector on the rear of the 2.5-inch HDD cage to the right connector on the Internal RAID Controller. Connect the other SAS/SATA cable from the nearest connector to the left connector on the Internal RAID Controller.

– SGPIO cable

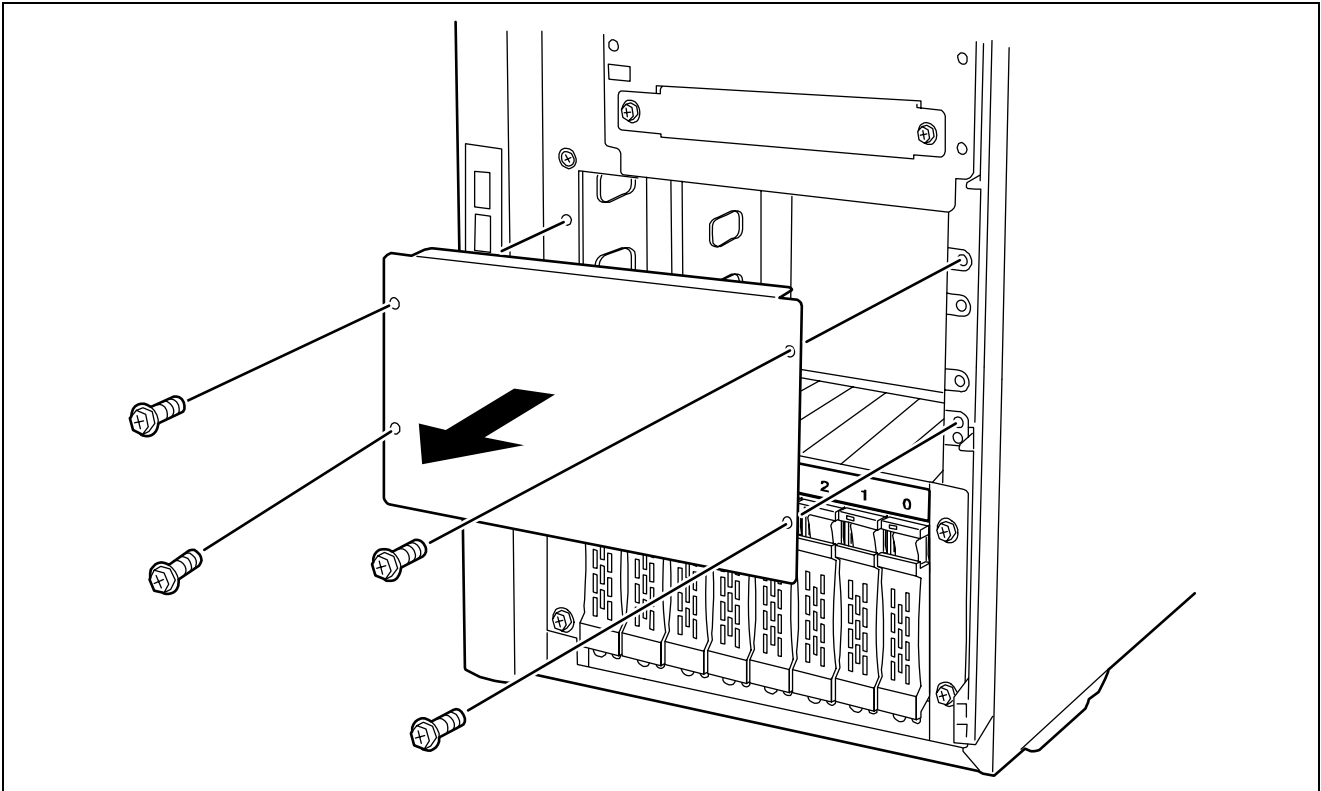
Connect the SGPIO cable to the SGPIO1 connector on the motherboard.

## Installation (Second 2.5-inch HDD Cage)

Install the HDD cage in the 2.5-inch hard disk drive bay as described in the following procedure.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Release the lock of the front door by using the security key and open the front door.
3. Remove the side cover.
4. Remove the dummy cover from the slot to which the HDD cage is to be inserted.

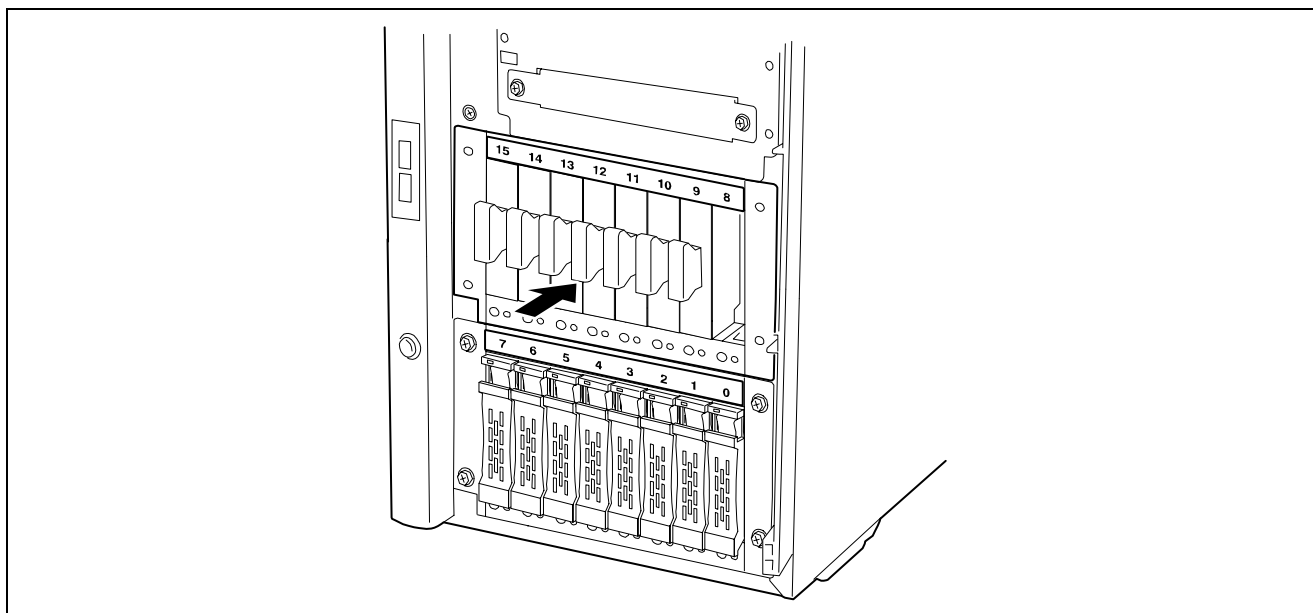
Remove the four fixing screws to remove the dummy cover.



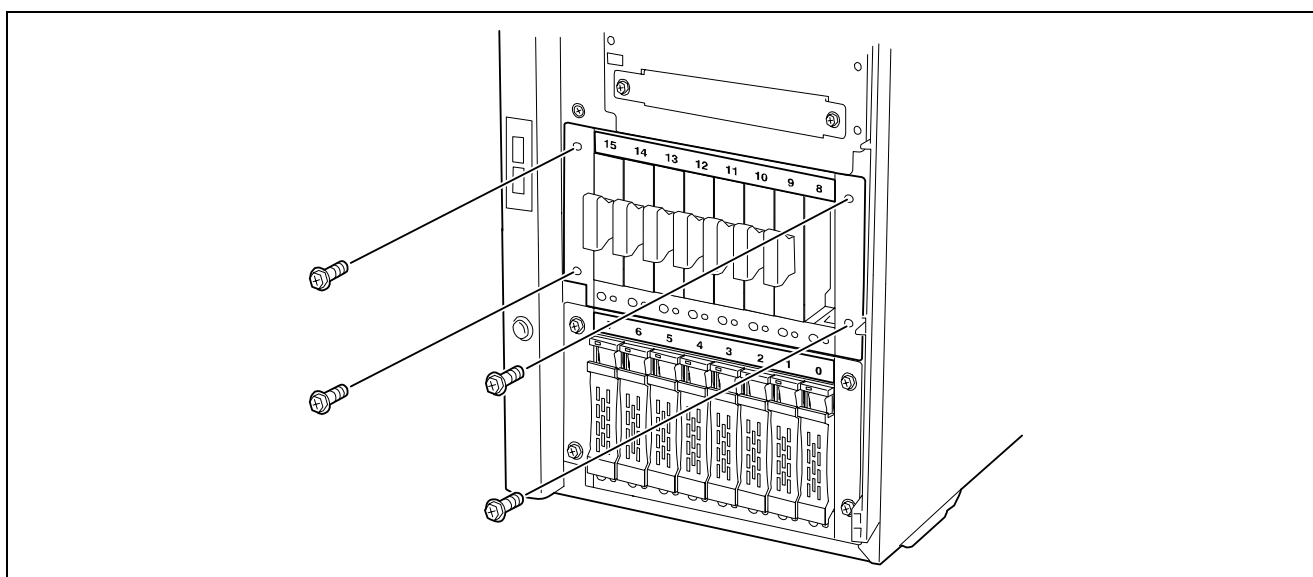
**IMPORTANT:** Keep the removed dummy tray and screws for future use.



5. Insert the HDD cage to the corresponding slot.



6. Fix the 2.5-inch HDD cage to the chassis.  
Fix the HDD cage to the server with four fixing screws.



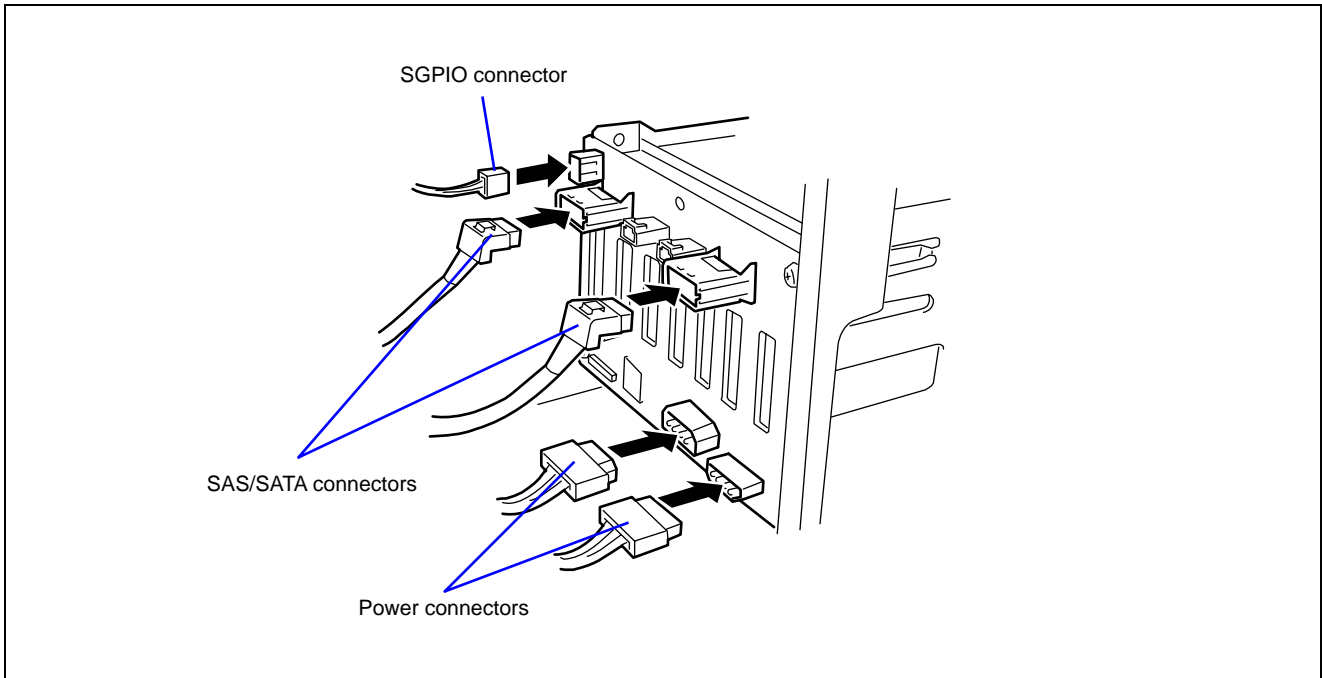
7. Remove the dummy connector covers from the SAS/SATA connectors on rear of the 2.5-inch HDD cage.
8. Connect the power cable, SAS/SATA cables, and SGPIO cable to the rear of the 2.5-inch HDD cage.

- SAS/SATA cable

Connect the SAS/SATA cable from the farthest connector on the rear of the 2.5-inch HDD cage to the connector on the optional RAID controller. Connect the other SAS/SATA cable from the nearest connector to the connector on the other optional RAID controller.

- SGPIO cable

Connect the SGPIO cable to the SGPIO2 connector on the motherboard.



9. Install the components having been removed.

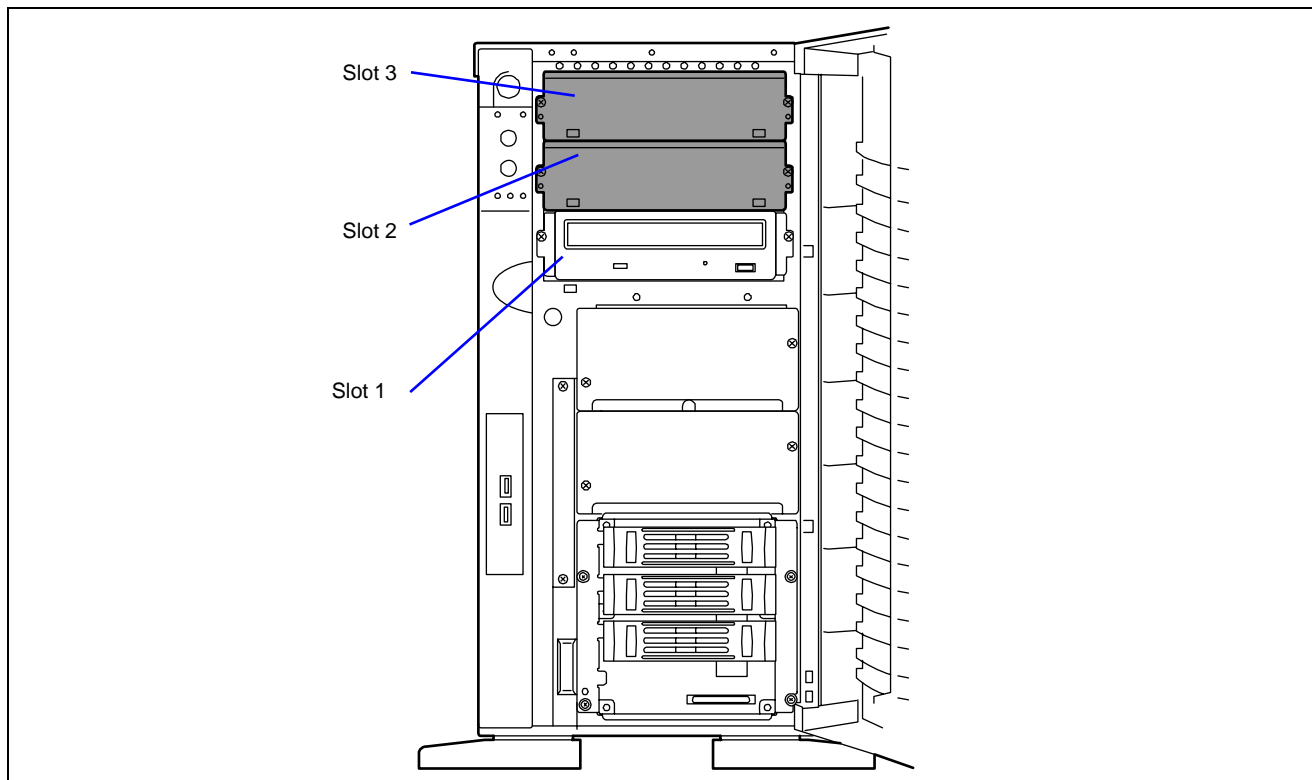
## Removal

To remove the HDD cage, follow the installation procedure in the reverse order.

---

## 5.25-inch Device

The server contains three slots in which backup devices can be installed, including optical disk drive and magnetic tape drive. The optical disk drive is factory-installed in the bottom slot. To install a backup device, you must purchase a SCSI controller separately.



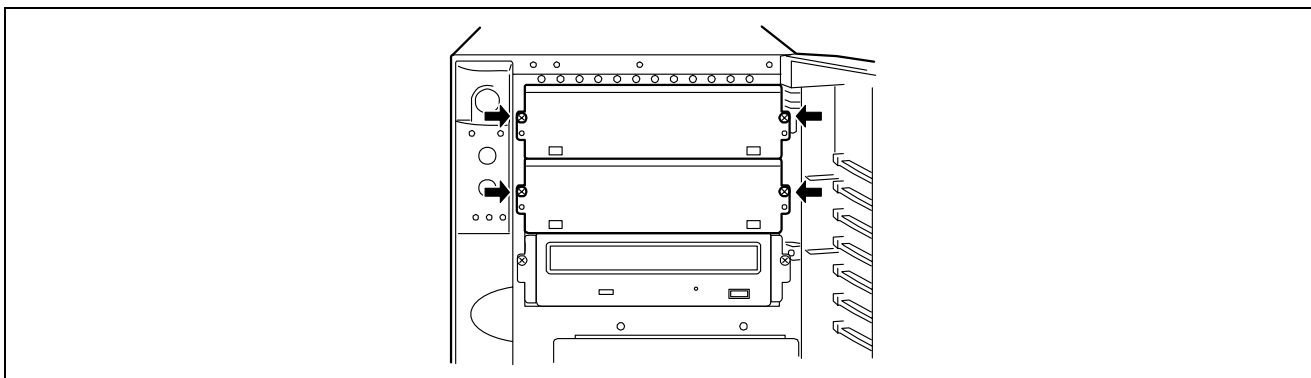
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### IMPORTANT:

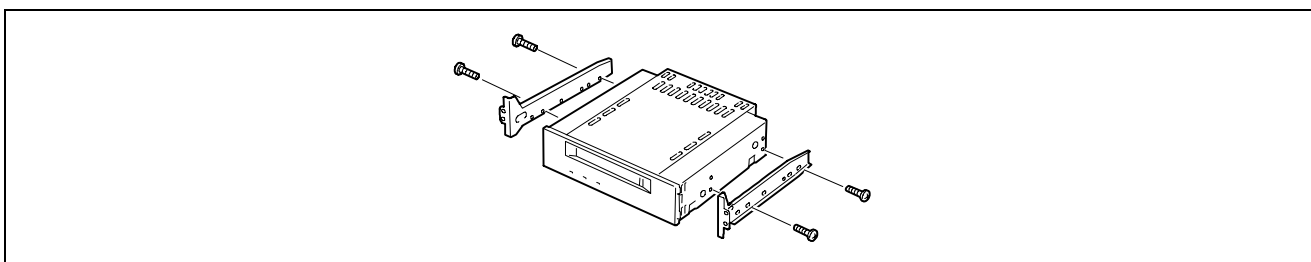
- Two single-height devices or one double-height device can be installed.
  - Set the SCSI termination to OFF for the device to be installed and assign a unique SCSI ID not duplicated or corrupted with that of any other device. To know how to assign an ID, refer to the documentation coming with each of the devices.
  - For a single-height device, first install a device in slot 1. Then install another device in slot 2.  
For a double-height device, install the device to the slots 2 and 3.
-

## Installation

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover.
3. Remove the two screws fixing the dummy cover.
4. Pull out the dummy cover toward you carefully.



5. Fix the rails coming with the server to the 5.25-inch device by using the four screws coming with the device.



---

### IMPORTANT:

- Always use the screws coming with the 5.25-inch device. Using longer screws or screws of a different diameter may cause the device to be damaged.
  - Some devices have a front cover. If the cover touches the front door when it is closed, move the rails so that the device can be pushed deeper in.
  - When installing a double-height device, use the DLT device rails (larger L-shaped rails) that come with the server.
-

6. Push the 5.25-inch device into the device bay carefully.

---

**NOTE:** Make sure that the cables are not trapped while the 5.25-inch device is pushed into the slot.

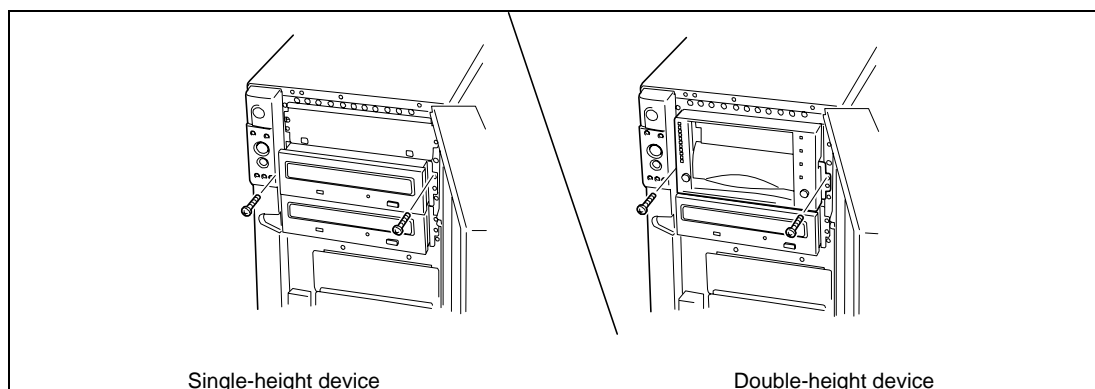
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**IMPORTANT:** If a 5.25-inch device occupying two slots cannot be inserted easily, lift it slightly while pushing it.

---

7. Fix the rails by using the screws removed in step 3.



8. Check whether the front face of the installed 5.25-inch device is correctly aligned with the front of the server, comparing it with the factory-installed optical disk drive.
9. Connect the interface and power cables to the 5.25-inch device installed from the left side of the server.  
See Chapter 10 for cable connection.

---

**IMPORTANT:** Connector pin bending or incomplete connection may cause a malfunction to occur. Take care to insert the connector gently.

---

---

**NOTE:** Make sure that the cable is not trapped.

---

10. Install the removed components.
11. Setup the SCSI BIOS for the SCSI device according to the manual that comes with the SCSI controller.
12. Install the device driver according to the manual that comes with the device.

## Removal

To remove the 5.25-inch device, follow the installation procedure in the reverse order.

---

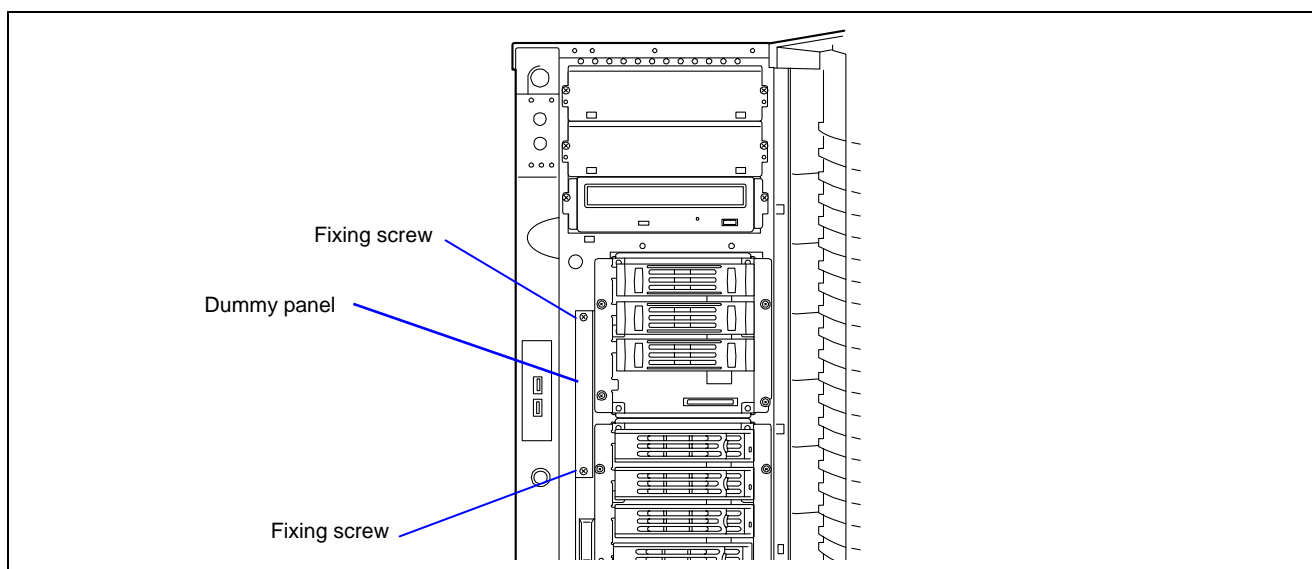
## Internal USB Floppy Disk Drive

Your server can contain an internal USB floppy disk drive.

### Installation (in 3.5-inch HDD Cage)

Follow steps below to install an internal USB floppy disk drive.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover and open the front mask as described earlier in this chapter.
3. Remove the two fixing screws and remove the dummy panel for floppy disk drive.

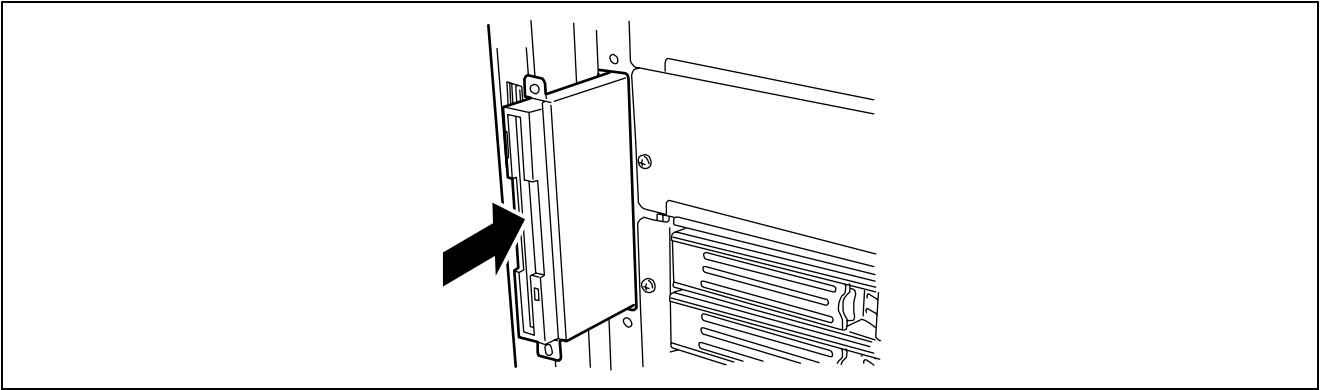


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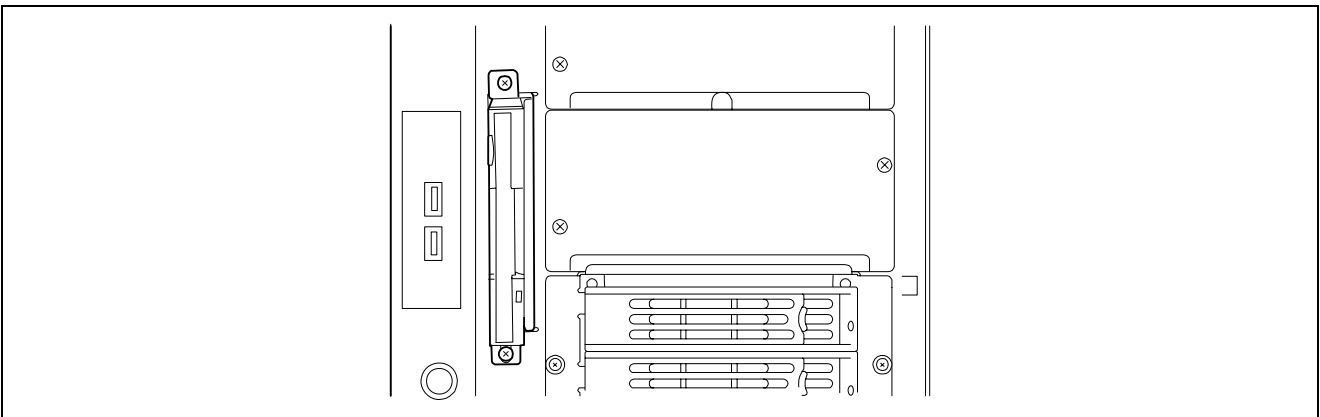
**IMPORTANT:** Keep the removed dummy panel and fixing screws carefully.

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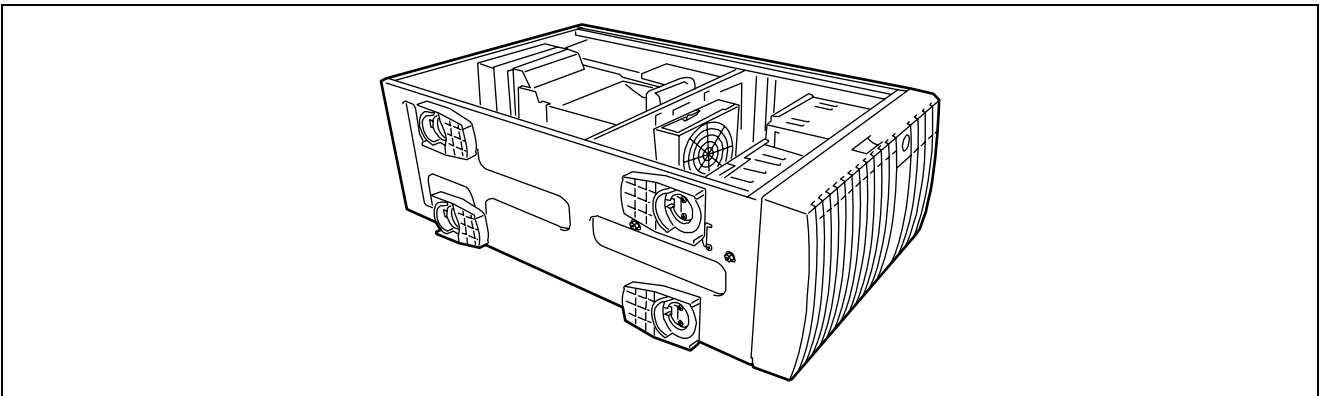
4. Insert the internal USB floppy disk drive into the bay slowly and carefully.



5. Secure the floppy disk drive to the server chassis with the two screws that come with the drive.

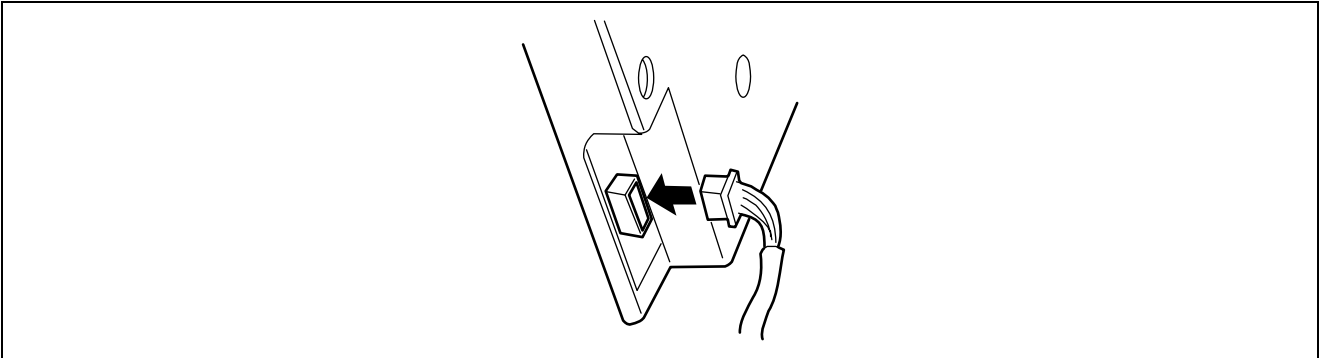


6. Close the front mask.
7. Fold the four stabilizers at the bottom of the server toward the inside.
8. Lay the server down slowly and gently on its right side.



9. Pass the 4-pin connector side of USB interface cable through the space between the fan and the bottom face and around the internal USB floppy disk drive.

10. Connect the 4-pin connector of the USB interface cable to the internal USB floppy disk drive.

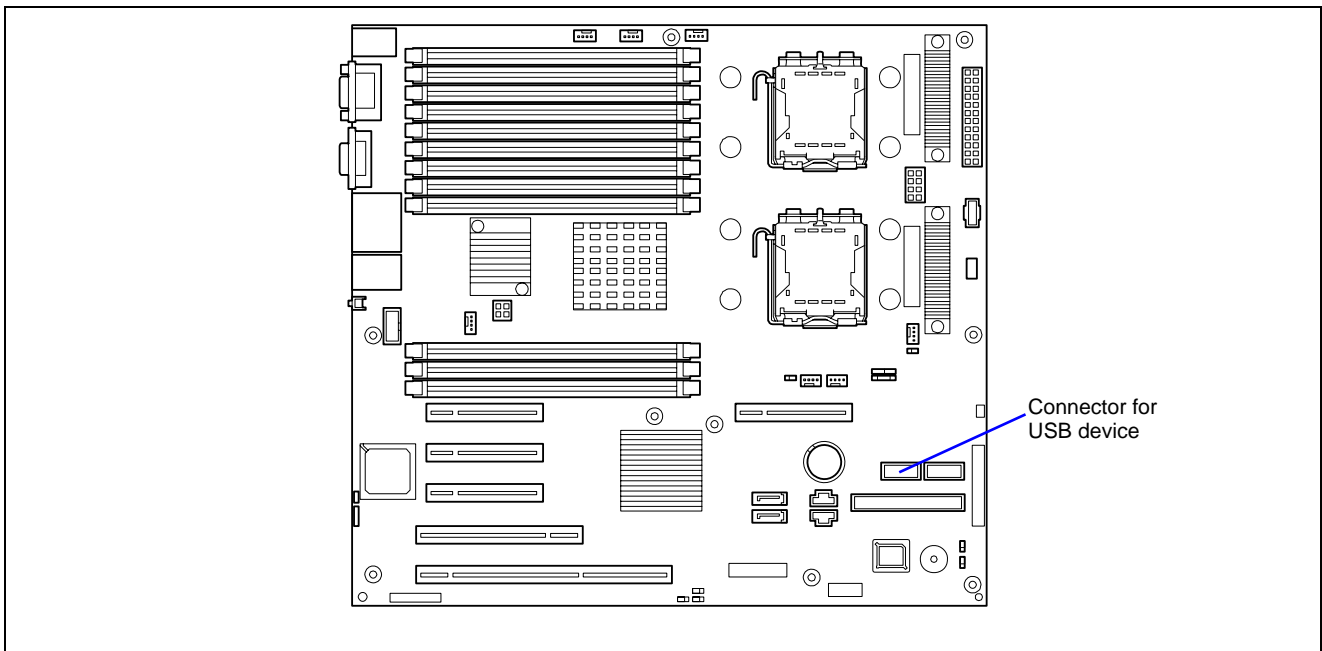


---

**NOTE:** Pay attention to orientation of the connector. The USB connector can be inserted only one way.

---

11. Connect the other side (10-pin connector) of the USB interface cable that comes with the internal USB floppy disk drive to the connector for USB device located on the motherboard.



---

**NOTE:** If any other USB device has already been installed in the server, this step is unnecessary.

---

12. Install the left side cover you have removed earlier.

## Removal

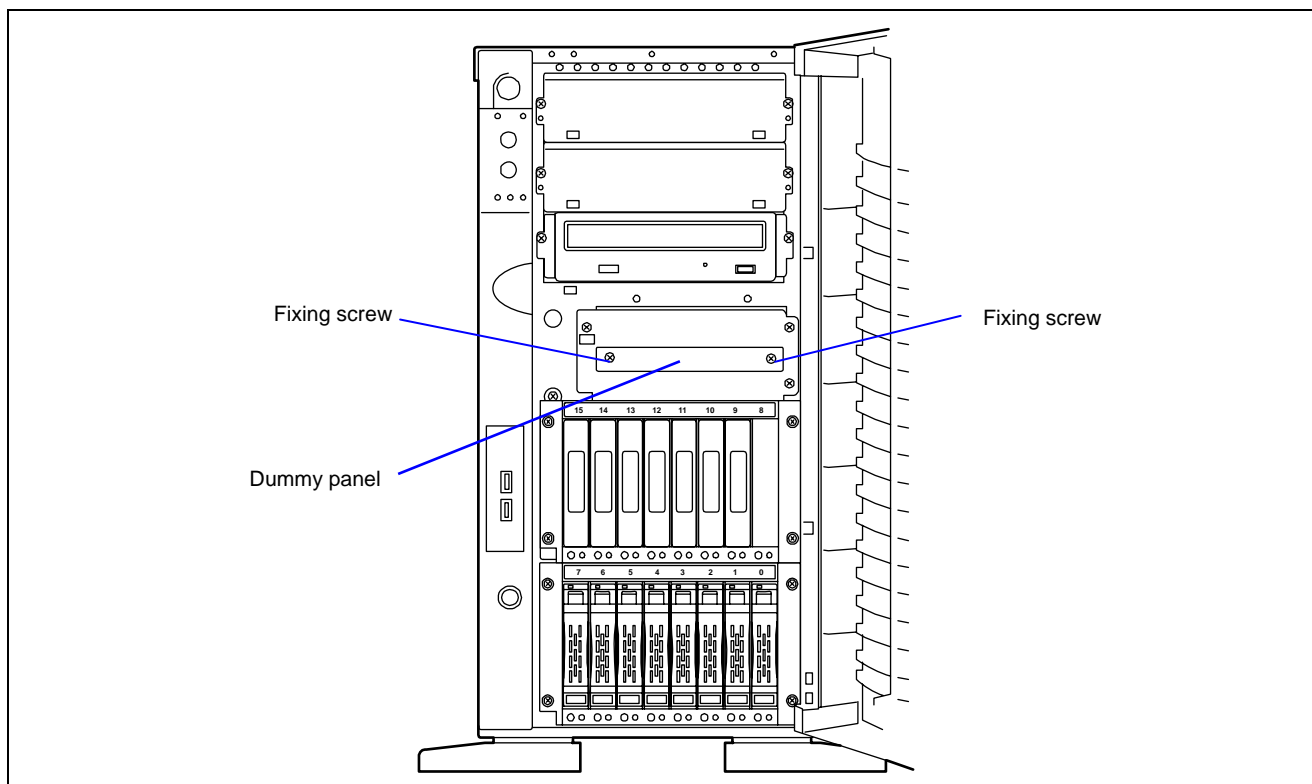
To remove the internal USB floppy disk drive, follow the installation procedure in the reverse order. If the device is removed and the slot left empty, install the dummy panel in the vacant bay.



## Installation (in 2.5-inch HDD Cage)

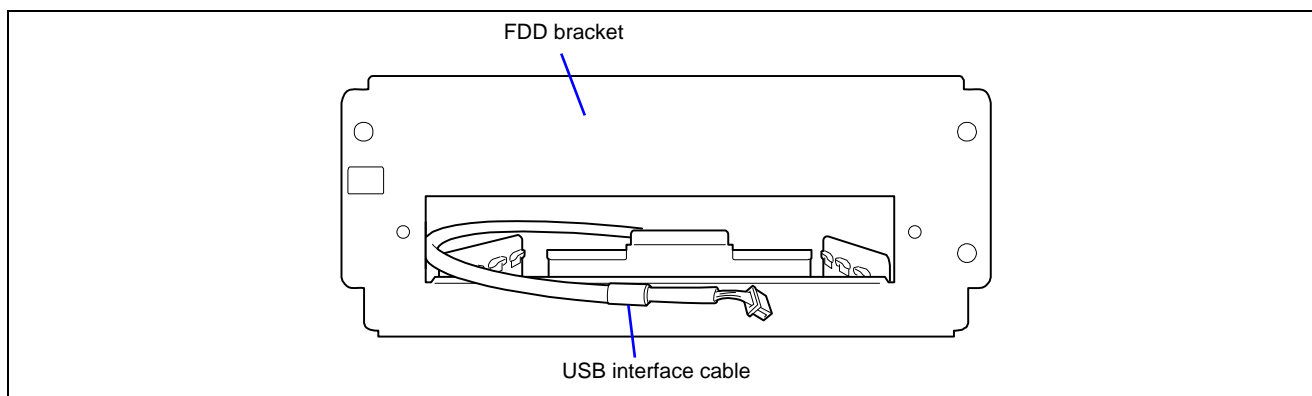
Follow the steps below to install an internal USB floppy disk drive.

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover and open the front mask as described earlier in this chapter.
3. Remove the two fixing screws and remove the dummy panel for floppy disk drive.

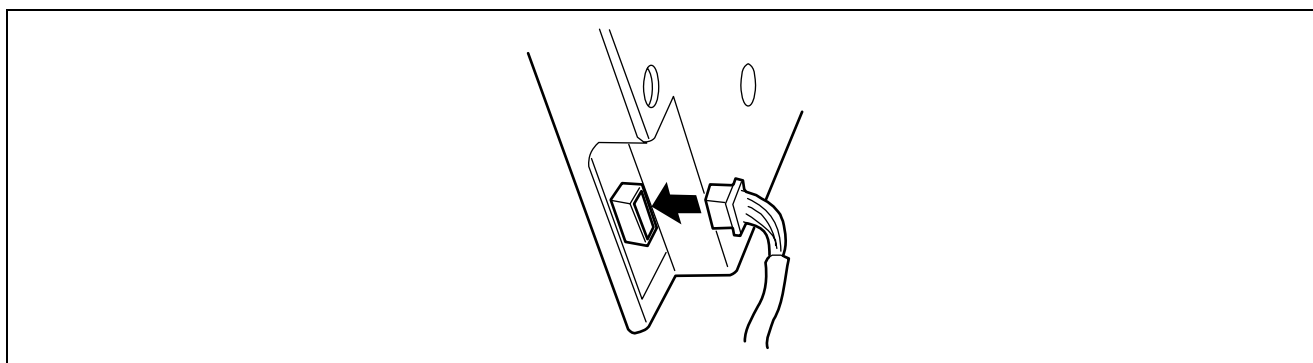


**IMPORTANT:** Keep the removed dummy panel and fixing screws carefully.

4. Draw the 4-pin connector side of the USB interface cable from the FDD bracket.

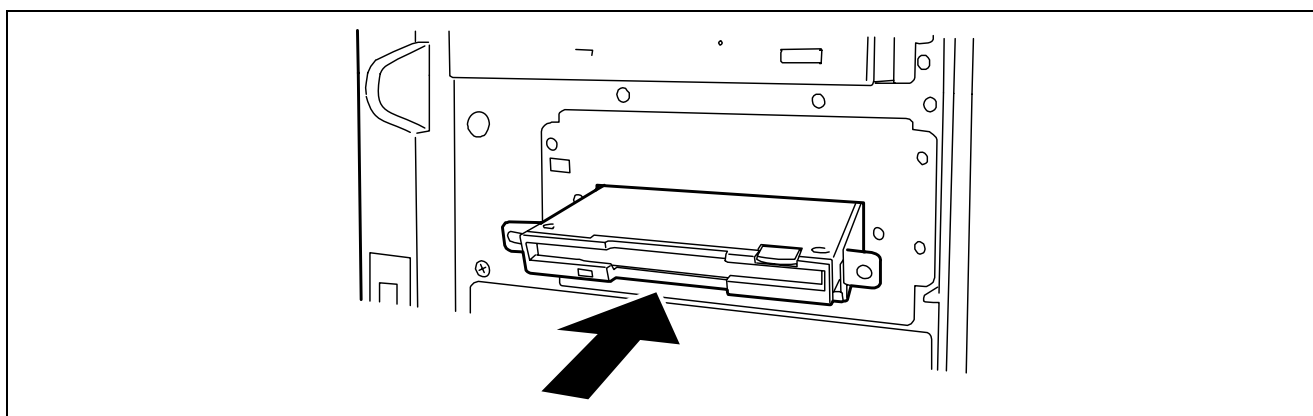


5. Connect the 4-pin connector of the USB interface cable to the internal USB floppy disk drive.

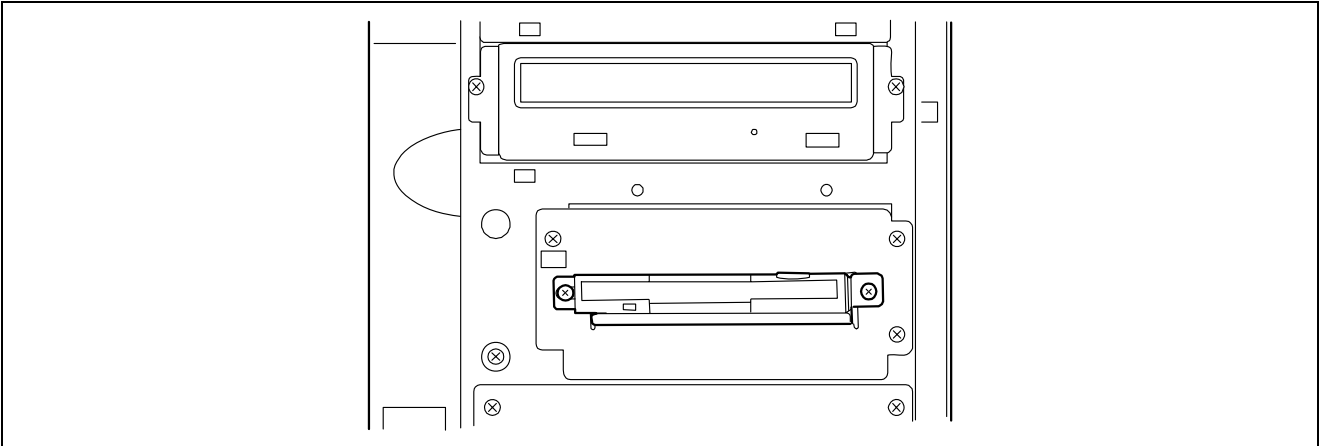


**NOTE:** Pay attention to orientation of the connector. The USB connector can be inserted only one way.

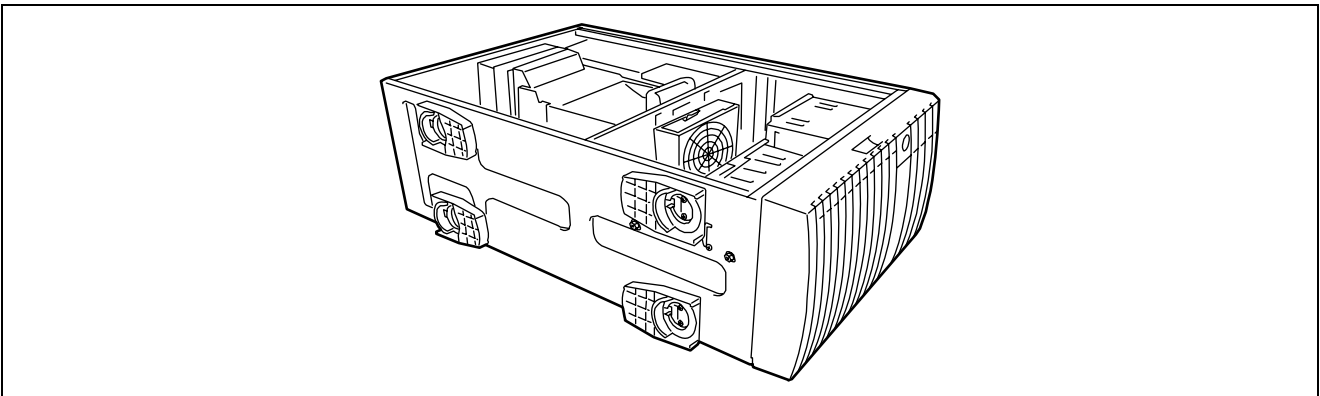
6. Insert the internal USB floppy disk drive into the bay slowly and carefully.



- Secure the floppy disk drive to the server chassis with the two screws that come with the drive.

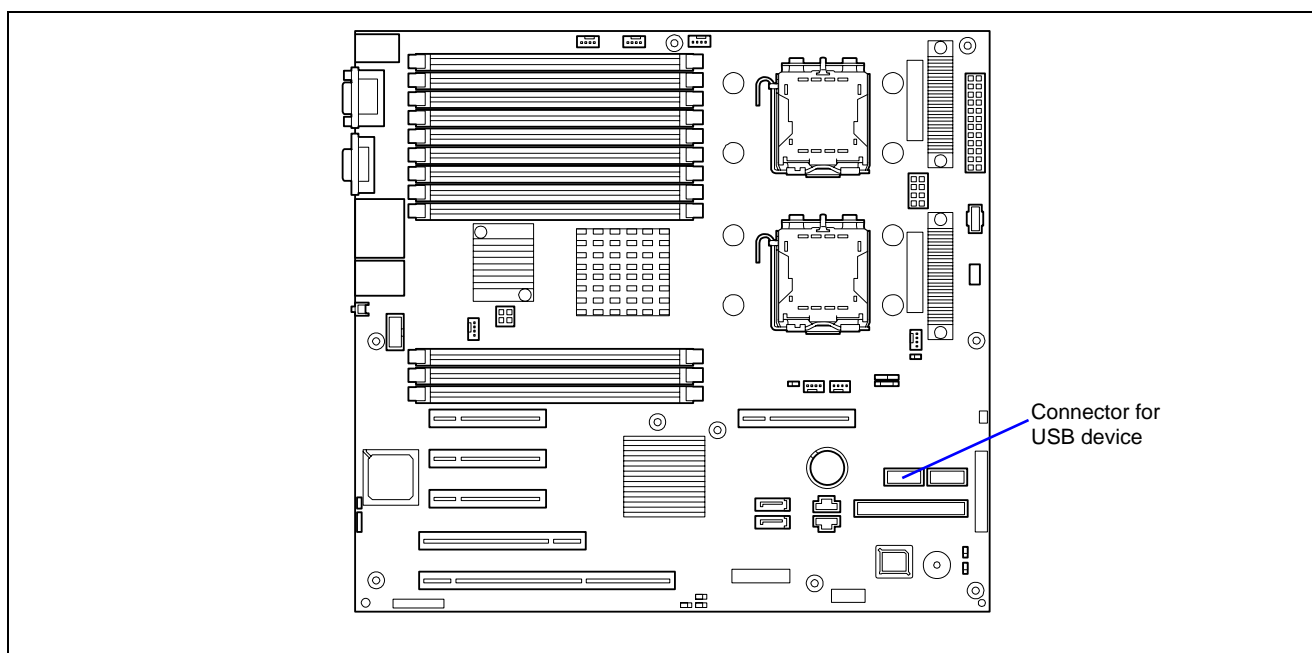


- Close the front mask.
- Fold the four stabilizers at the bottom of the server toward the inside.
- Lay the server down slowly and gently on its right side.



- Pass the 10-pin connector side of USB interface cable through the space between the fan and the bottom face and around the motherboard.

12. Connect the other side (10-pin connector) of the USB interface cable that comes with the internal USB floppy disk drive to the connector for USB device located on the motherboard.



---

**NOTE:** If any other USB device has already been installed in the server, this step is unnecessary.

---

13. Install the left side cover you have removed earlier.

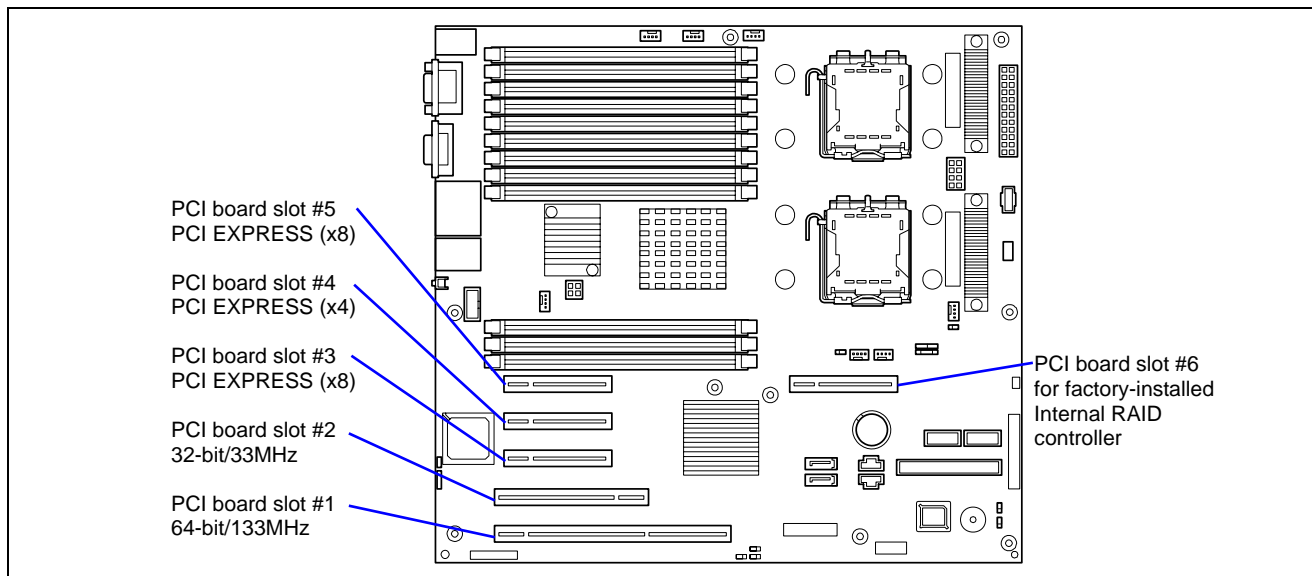
## Removal

To remove the internal USB floppy disk drive, follow the installation procedure in the reverse order. If the device is removed and the slot left empty, install the dummy panel in the vacant bay.

## PCI Board

The server contains five slots into which PCI boards can be inserted.

**IMPORTANT:** PCI boards are easily affected by static electricity. Before handling a PCI board, discharge the static electricity of your body by touching a metallic frame section of the server. Do not touch terminals and components on the PCI board with bare hands. In addition, do not put the PCI board directly on a desk. For details on static electricity, see "Static Precautions" in this chapter.



## Installation

Install a board connected to a PCI board slot as described in the following procedure.

### IMPORTANT:

- When installing several PCI boards in PCI slots, the SCSI cable should not pass between PCI boards. If the cable touches the IC and elements on the PCI board, the PCI board or the cable may be damaged.
- Depending on the type of board, you may have to remove the connector cap from the adjacent slot or SCSI connector for external devices before installing the board.
- 3.3 V or universal PCI board can be installed in PCI board slots #1.
- 5 V or universal PCI board can be installed in PCI board slot #2.

**NOTE:** When installing a PCI board, make sure that the PCI board connector matches the connector on the motherboard.

### Slots to install the PCI board

		PCIe #6	PCIe #5	PCIe #4	PCIe #3	PCI #2	PCI-X #1	Note		
		PCI slot capability	x4 lane	x8 lane	x4 lane	x8 lane	32 bit/33MHz		64 bit/133MHz	
		Slot size	Short			Full-height				
		PCI board type	x8 socket				5V		3.3V	
		Available board size		140 mm max.	Long / Short					
	SCSI controller (64-bit/66 MHz PCI)	-	-	-	-	√	√	Cannot connect with internal hard disk drive.		
SCSI CONTROLLER	SCSI controller (64-bit/133 MHz PCI-X)	-	-	-	-	√	√	Cannot connect with internal hard disk drive. Cannot be used together with SCSI CONTROLLER (PCI-E).		
SCSI CONTROLLER (PCI-E)	SCSI controller (PCI EXPRESS (x1))	-	-	√	√	-	-	Cannot connect with internal hard disk drive. Cannot be used together with SCSI CONTROLLER.		
SAS CONTROLLER		-	-	√	√	-	-	2 max.		
-	Internal RAID controller	●	-	-	-	-	-	Factory-installed		
RAID CONTROLLER (128MB, SAS/SATA HW RAID0/1/5/6)	RAID controller (SAS/SATA)	-	-	-	-	-	-			
RAID BATTERY BACKUP UNIT	Additional battery	-	-	-	-	-	-	To be installed in RAID CONTROLLER (128 MB, SAS/SATA HW RAID0/1/5/6)		
100BASE-TX ADAPTER	100BASE-TX adapter (32-bit/33 MHz PCI)	-	-	-	-	√	√	2 max.		
1000BASE-T	1000BASE-T adapter (64-bit/133 MHz PCI-X)	-	-	-	-	√	√	1 max. per PCI bus (2 max. per PCI bus with AFT) 1000BASE-T(2CH): 2 max. per system Cannot co-exist with 1000BASE-SX.		
1000BASE-T	1000BASE-T adapter (PCI EXPRESS (x1))	-	√	√	√	-	-	1 max. Teaming with any other NIC is unavailable.		
1000BASE-T(2CH)	1000BASE-T adapter (2 ch) (64-bit/133 MHz PCI-X)	-	-	-	-	√	√			
1000BASE-T(2CH)	1000BASE-T adapter (2ch) (PCI EXPRESS (x4))	-	√	√	√	-	-	2 max. together with 1000BASE-T(4CH)) Teaming (equivalent to AFT/ALB) with any other NIC is unavailable. 10BASE-T is not supported.		
1000BASE-T(4CH)	1000BASE-T adapter (4ch) (PCI EXPRESS (x4))	-	√	√	√	-	-	2 max. together with 1000BASE-T(2CH)) Teaming (equivalent to AFT/ALB) with any other NIC is unavailable. 10BASE-T is not supported.		
1000BASE-SX	1000BASE-SX adapter (2ch) (64-bit/133 MHz PCI-X)	-	-	-	-	√	√	1 max. per PCI bus (2 max. per PCI bus with AFT) Cannot co-exist with 1000BASE-T/1000BASE-T(2CH).		
10GBEA	10GBASE-SR adapter (PCI EXPRESS (x8))	-	-	√	√	-	-	1 max.		

●: Factory-installed, √: Available, -: Unavailable

The system searches for the PCI board in the following order:

PCI #6 (Standard RAID Controller) → PCI #3 → PCI #1 → PCI #5 → PCI #4 → PCI #2

Set "Disabled" for the Option ROM Scan of the PCI slot connected with non-bootable device by using BIOS SETUP utility. Disabling Option ROM Scan saves memory consumption and time for startup.

**NOTE:** The following message may be displayed on POST if many PCI boards are installed.

ERROR

Expansion ROM not initialized – PCI Mass Storage Controller in slot xx (xx: slot number)

Change setting in [Advanced] → [PCI Configuration] of the BIOS SETUP.

## **Onboard LAN Controller Considerations**

It is possible to configure the Teaming feature of AFT (Adapter Fault Tolerance)/ALB (Adaptive Load Balancing) with the onboard LAN controllers. But it is impossible to configure the Teaming function of the same AFT/ALB with the onboard network controller and an optional LAN board.

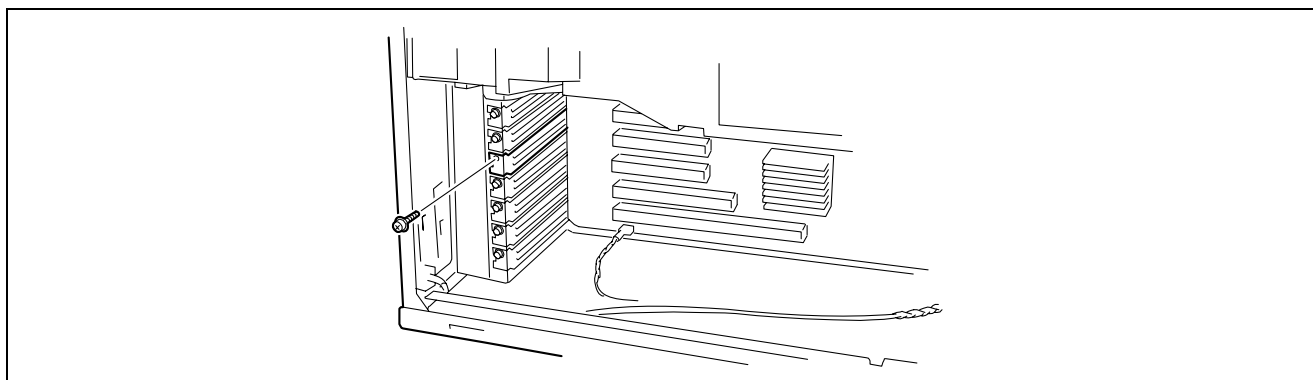
## Installation

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover.
3. Remove the additional slot cover and a screw at the same location (height) as the installation slot.

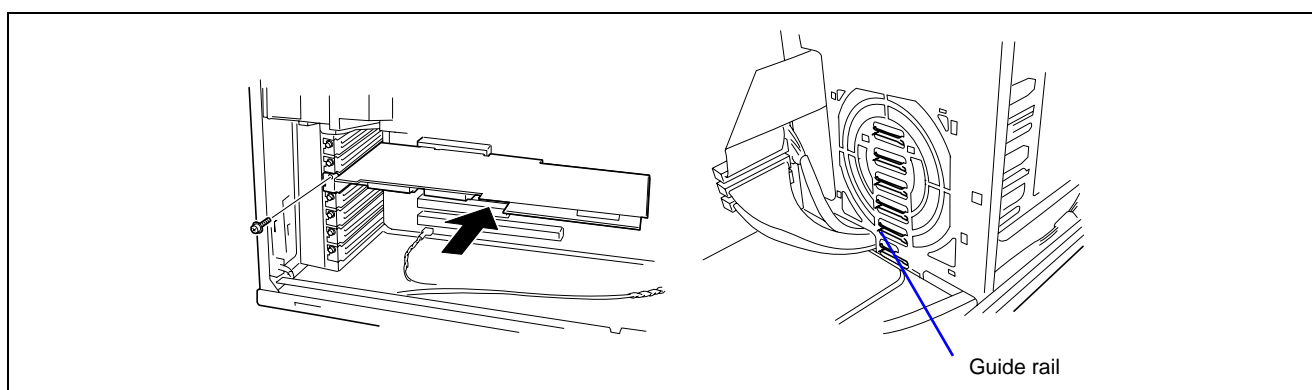
---

**IMPORTANT:** Keep the additional slot cover being removed for future use.

---



4. Make the component side of the board face the bottom of the server, the slowly insert the board aligning the board connector with the slot on motherboard.



---

**NOTE:** For a long-sized board, align the right end of the board with the groove of the guide rail on the server and then connect the board to the slot.

---

5. Push the board until the board connector is fully inserted in the slot.

---

**IMPORTANT:** If the board cannot be inserted easily, remove it and try again. Applying too much force on the board may damage it.

---

6. Fix the board with a screw removed in Step 3.
7. Reinstall the removed components.
8. Turn on the power of the server, and make sure that no error message appears during the POST. If an error message appears, write down the message and look it up in Chapter 8.
9. Run the BIOS SETUP Utility to set the "Reset Configuration Data" in the "Advanced" menu to "Yes". This is required to update the hardware configuration information. See Chapter 4 for details.



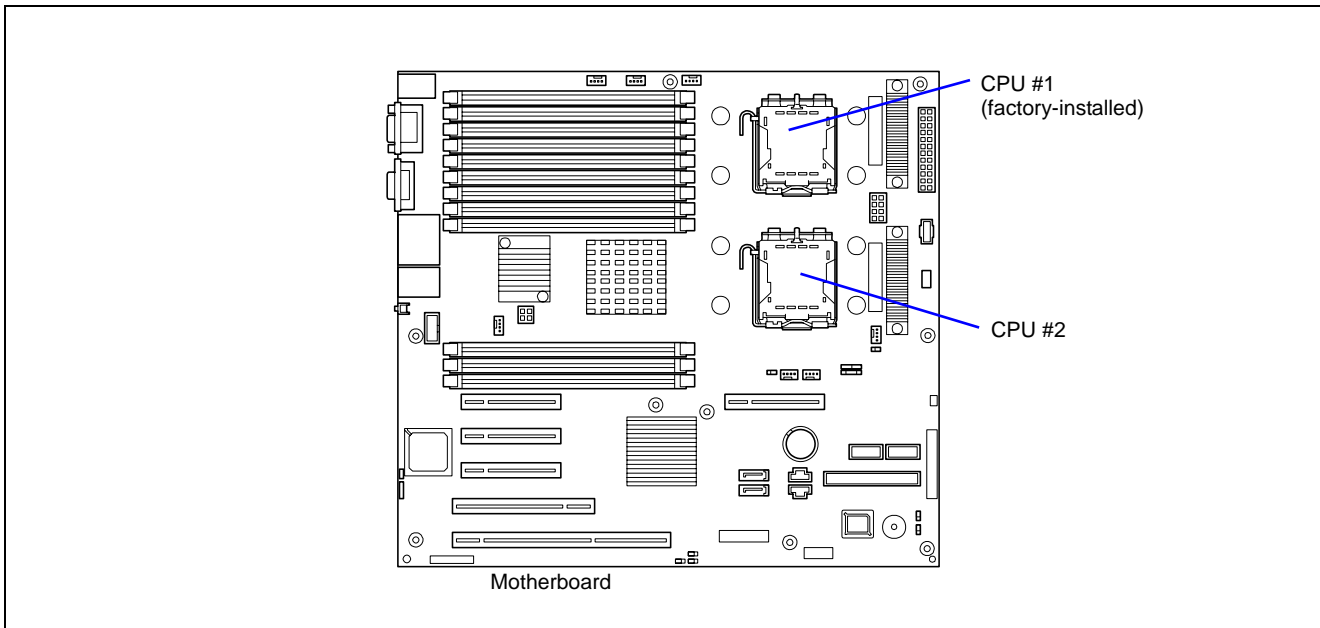
**Removal**

To remove the board, follow the installation procedure in the reverse order. Then install the additional slot cover.

---

## Processor (CPU)

The server may have another CPU installed in addition to the standard CPU (Intel Xeon Processor).

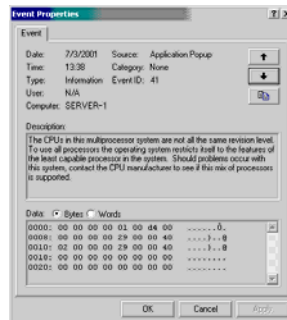


---

**IMPORTANT:** Two CPUs must have the same clock frequency. Make sure the CPU type is appropriate for your server.

---

**NOTE:** If a different revision of the processor is installed in the multiprocessor system, Windows logs the following information at every startup. This does not prevent the system to function.



## Installation

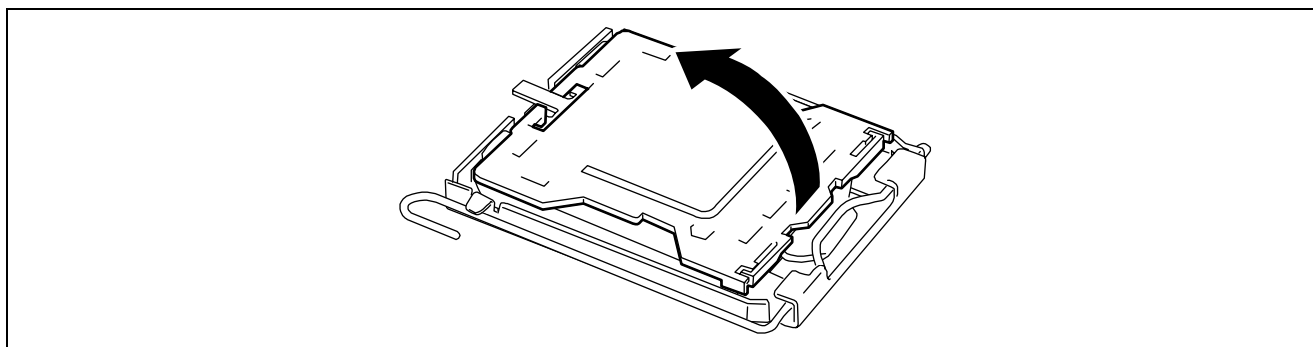
Install a CPU as described in the following procedure.

---

**IMPORTANT:** CPUs are easily affected by static electricity. Before handling a CPU, discharge the static electricity of your body by touching a metallic frame section of the server. Do not touch the CPU pins with bare hands. In addition, do not put a CPU directly on a desk. For more details on static electricity, see "Static Precautions".

---

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the following components:
  - Side cover
  - CPU duct cover
3. Locate the CPU socket where you are going to install the CPU.
4. Remove the CPU cover.

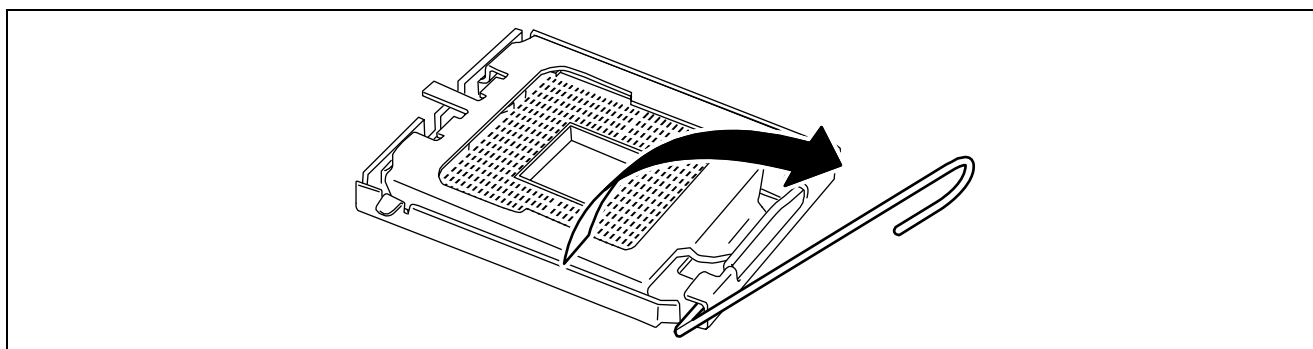


5. Raise the locking lever on the socket.

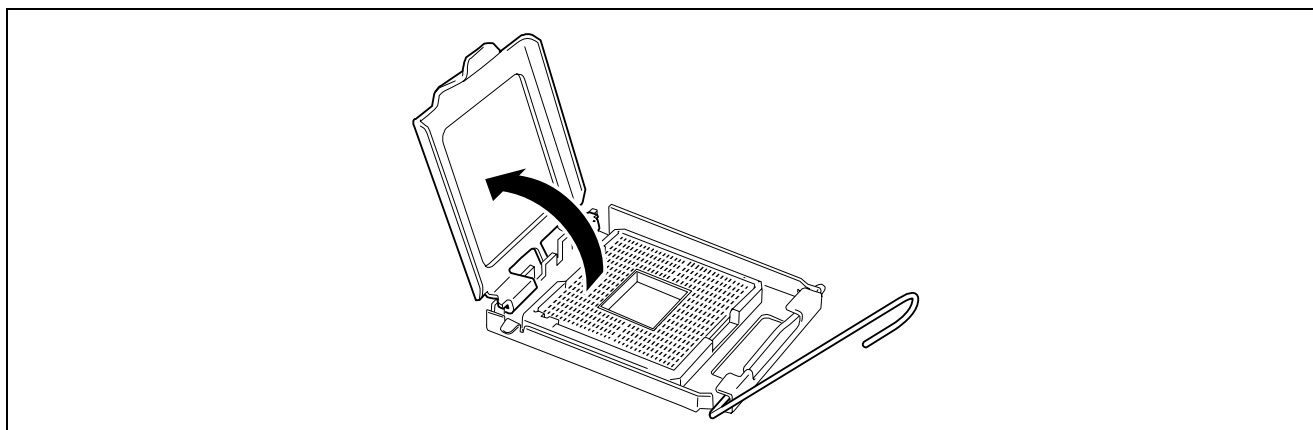
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**IMPORTANT:** Open the lever until it stops. The bar can be opened to 120 degrees or more.

---

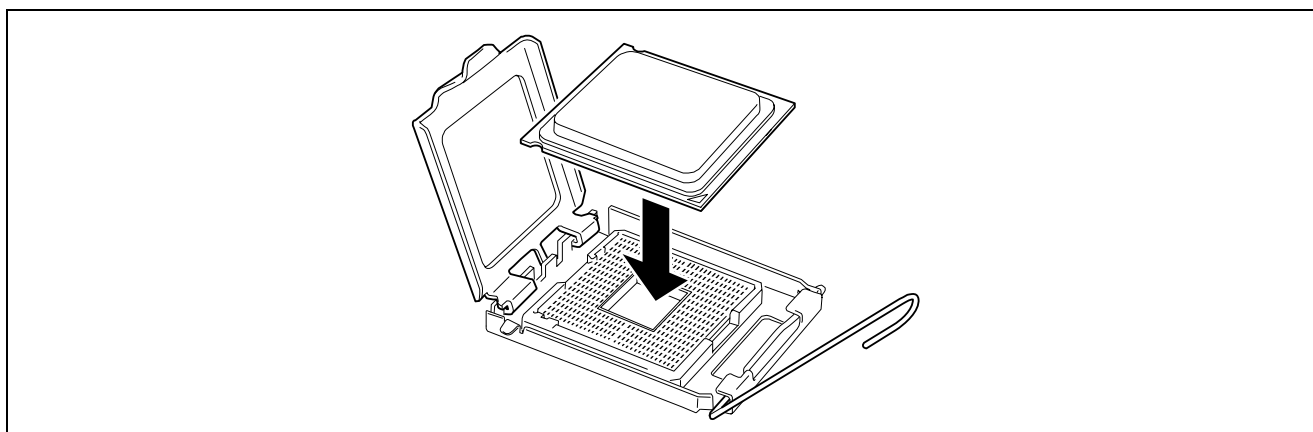


6. Raise the CPU socket holder.

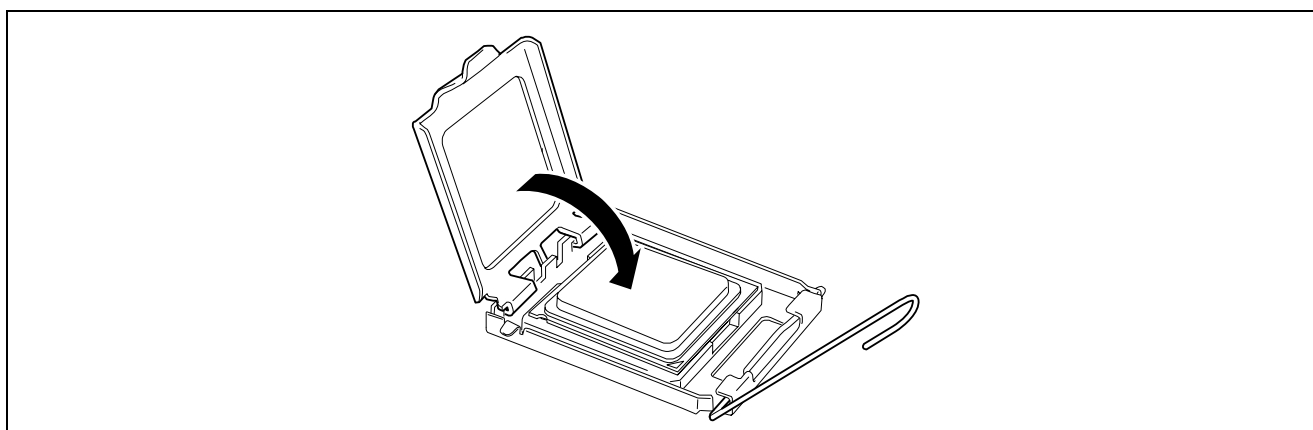


7. Put the CPU on the socket slowly and carefully.

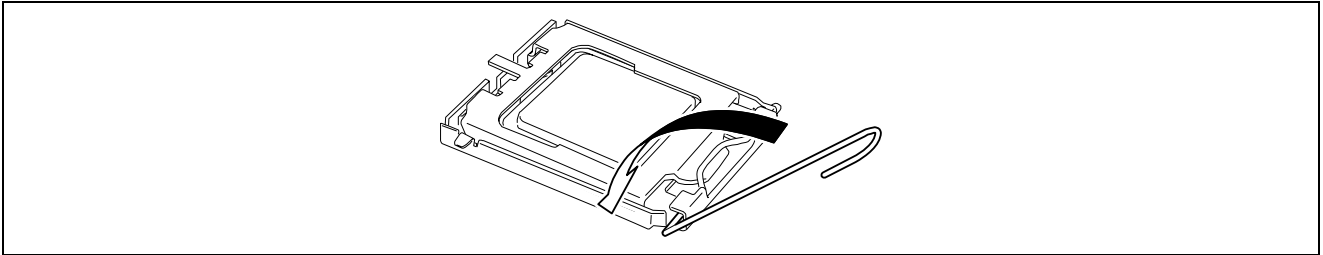
**IMPORTANT:** Make sure the orientation of the CPU is correct. A pin mark is placed on the CPU and on the CPU socket to prevent an incorrect insertion. Check the pin marks on CPU and socket before inserting CPU into socket.



8. Push the CPU lightly to the socket, and push down the CPU socket holder.



9. Push down the lever to secure the CPU.



10. Put the heat sink on CPU.  
If you are going to use the water cooling heat sink, see "Water Cooling Heat Sink" described later.
11. Install the components you removed previously.
12. Set [Reset Configuration Data] on the Advanced menu to "Yes".  
This setting is required to change the hardware configuration data. See Chapter 4 for details.
13. If the CPUs are additionally installed to configure a multi-processor system, provide the following settings on Windows.  
Select [Device Manager] - [Computer] and check the driver. If the driver is "ACPI single processor PC", change it to "ACPI multi-processor PC". Restart the server according to the on-screen message, and update the system. See Chapter 5 for details.

## Removal

To remove the CPU, follow steps 1 to 3 from the installation procedure to prepare, then follow steps 10 to 4. To remove the heat sink, try moving it slightly to make sure it is not stuck before removing it completely.

---

### **IMPORTANT:**

- Do not remove any CPU unless it failed.
  - After the operation, heat may make the cool seat at the bottom of the heat sink adhere to the CPU. To remove the heat sink from the CPU, first turn the heat sink to the left and right lightly to make sure that the heat sink is not stuck to the CPU. Removing the heat sink together with the CPU may cause the CPU and/or socket to be damaged.
- 

If a CPU is removed (or replaced):

1. Start SETUP, then go to [Main] – [Processor Settings] – [Processor Retest] in order to clear the error information on the removed CPU (see Chapter 4).

When a CPU is replaced, go to [Main] – [Processor Settings] to confirm that the ID and L2 Cache Size of the additional CPU are normally defined (see Chapter 4).

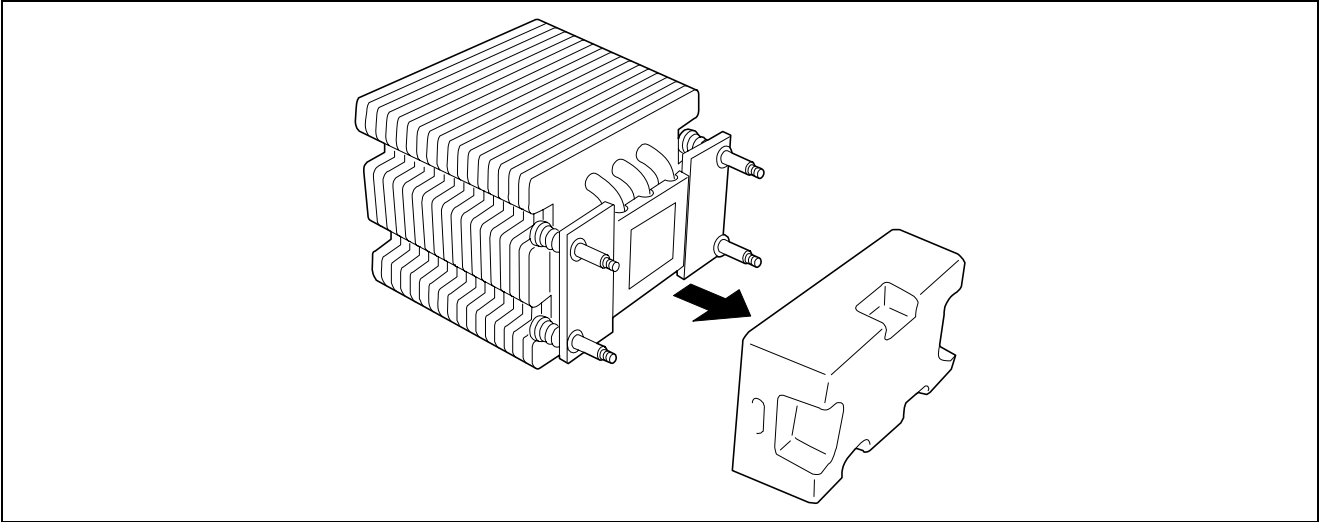
2. Set [Reset Configuration Data] in the Advanced menu to [Yes].

This is required to update the hardware configuration information. See Chapter 4 for details.

## Installation of Heat Sink

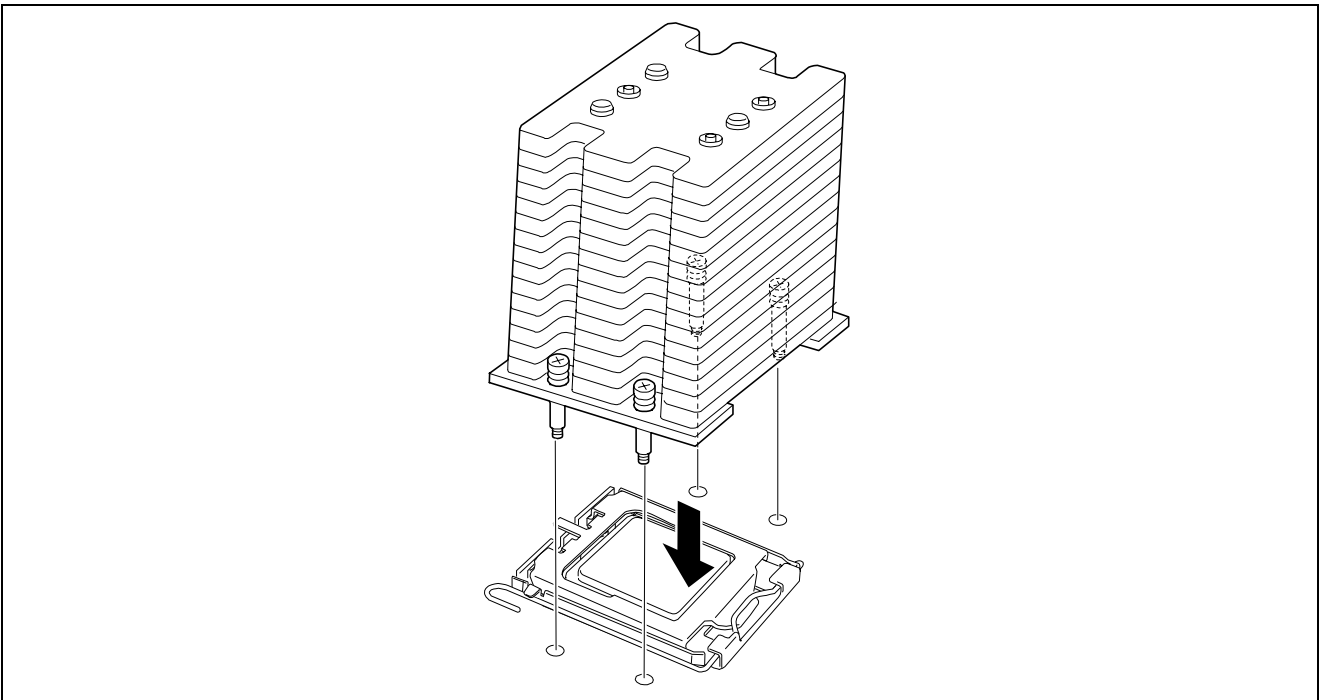
Install the heat sink as described in the following procedures.

1. Remove the protective cover from the heat sink.



2. Put the heat sink on the CPU.

If you are going to use the water cooling heat sink, see "Water Cooling Heat Sink" described later.

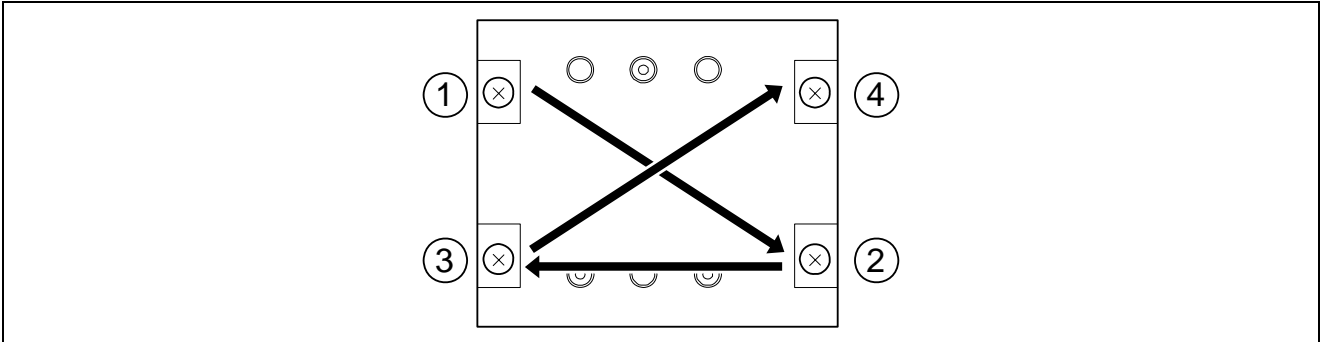


3. Fix the heat sink with four screws.

---

**NOTE:** First insert the four screws in the order shown in the figure below. Then, screw them tightly.

---



4. Make sure that the heat sink is aligned with the motherboard.

---

**NOTES:**

- If the heat sink is not aligned with the motherboard, remove it and install it again. The following probably causes the heat sink not to be correctly placed:
    - The CPU is not positioned correctly.
    - The heat sink is not completely secured with the screws.
  - Do not move the secured heat sink.
- 

## Removal

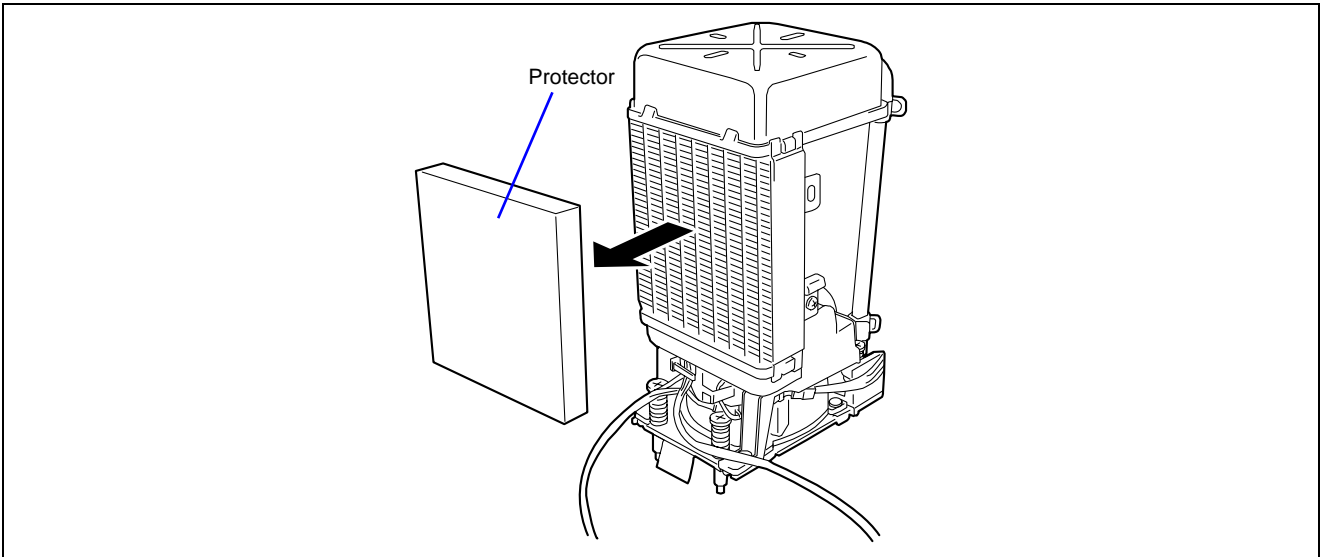
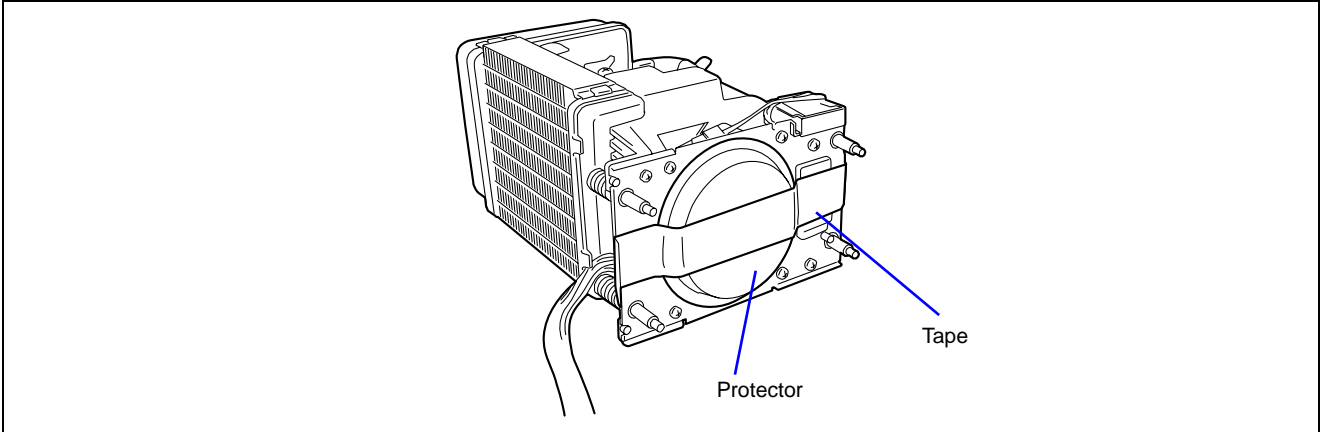
To remove the heat sink from the CPU, follow the installation procedure in the reverse order.



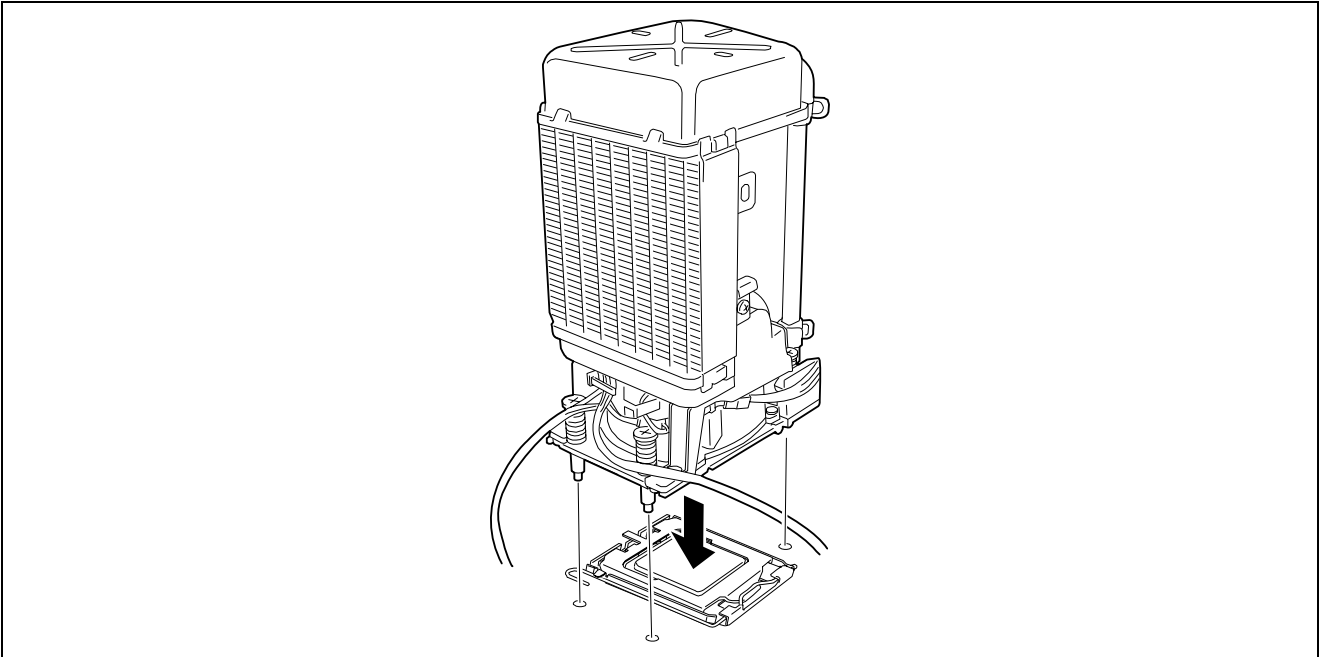
## Installation of Water Cooling Heat Sink

Install the water cooling heat sink on the CPU as described in the following procedure.

1. Peel off the tape and remove the protector on the bottom. Remove the protector on the side as well.

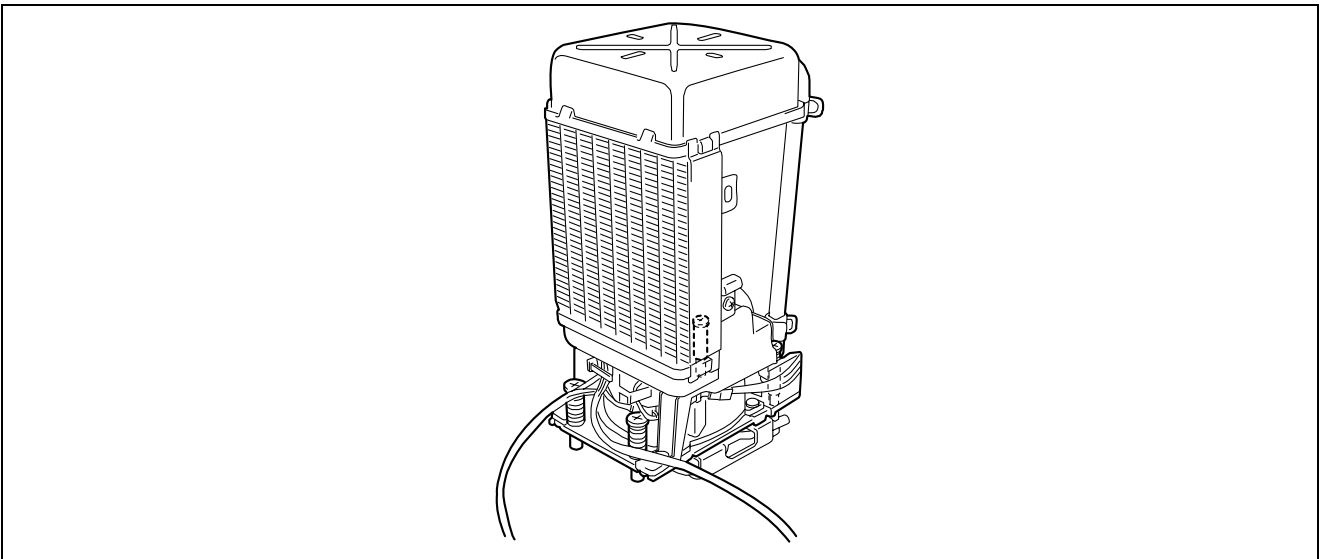


2. Put the water cooling heat sink on the CPU.



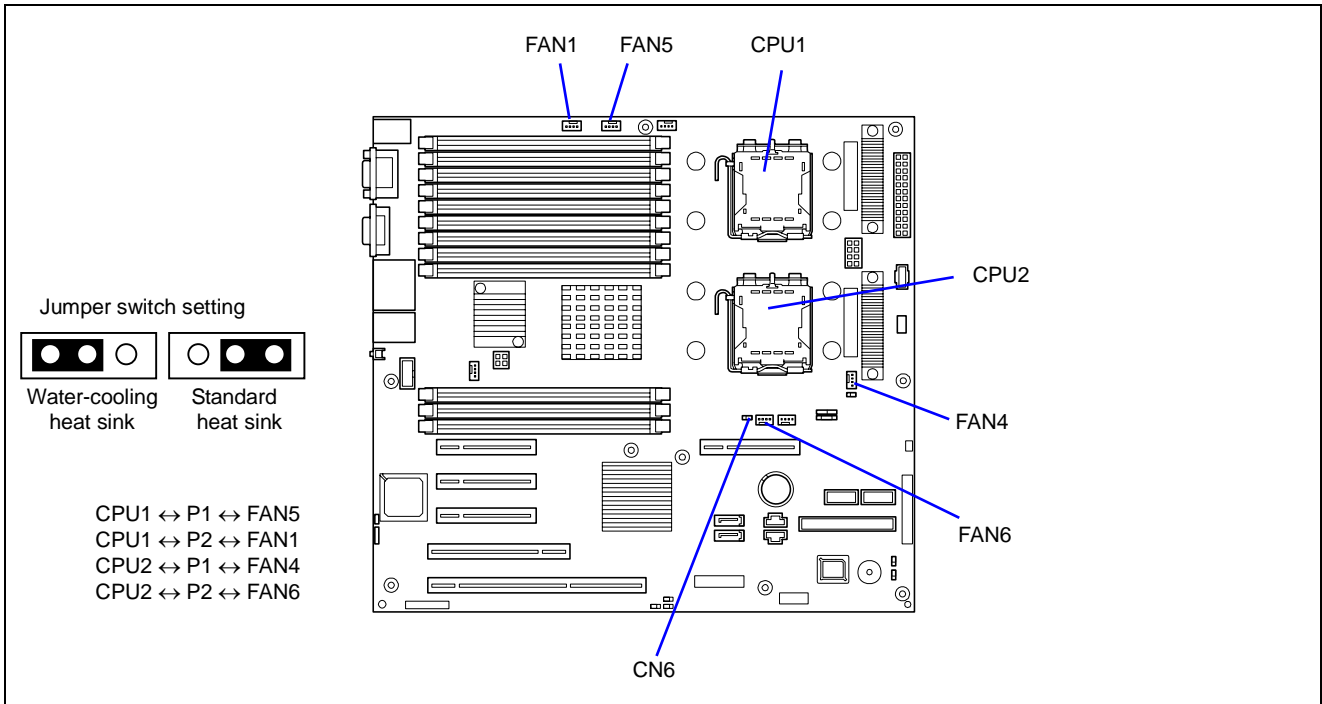
3. Fix the water cooling heat sink with screws.

To know how to fix the water cooling heat sink, see step 11 of the CPU installation procedure.



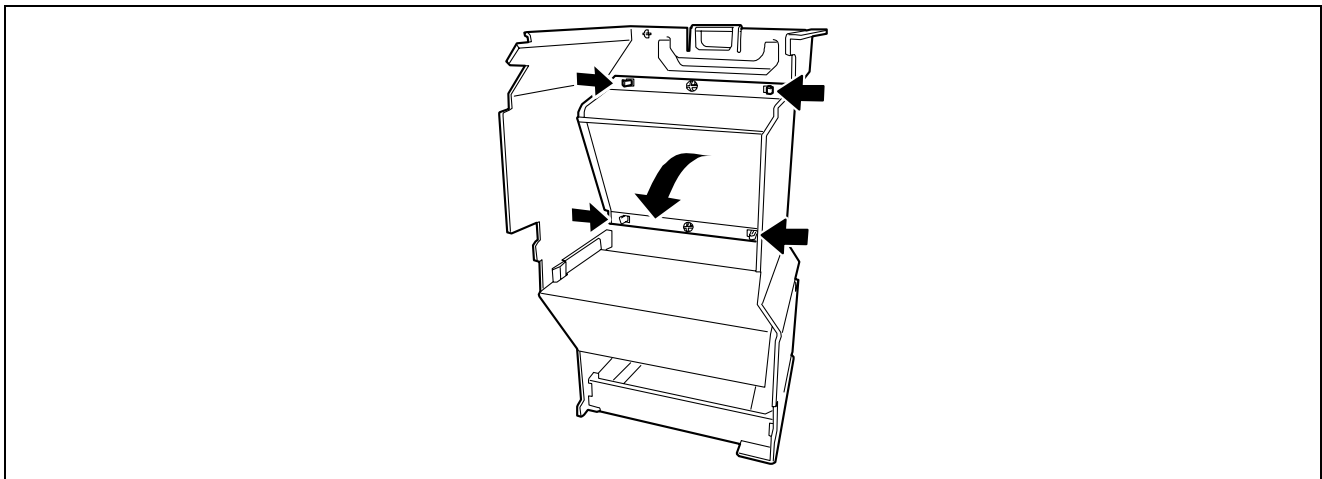
**4.** Connect the cables.

Check the connectors to which cables are to be connected for proper connections. Set the water-cooled heat sink exchange jumper switch (CN6) as shown in the figure below.

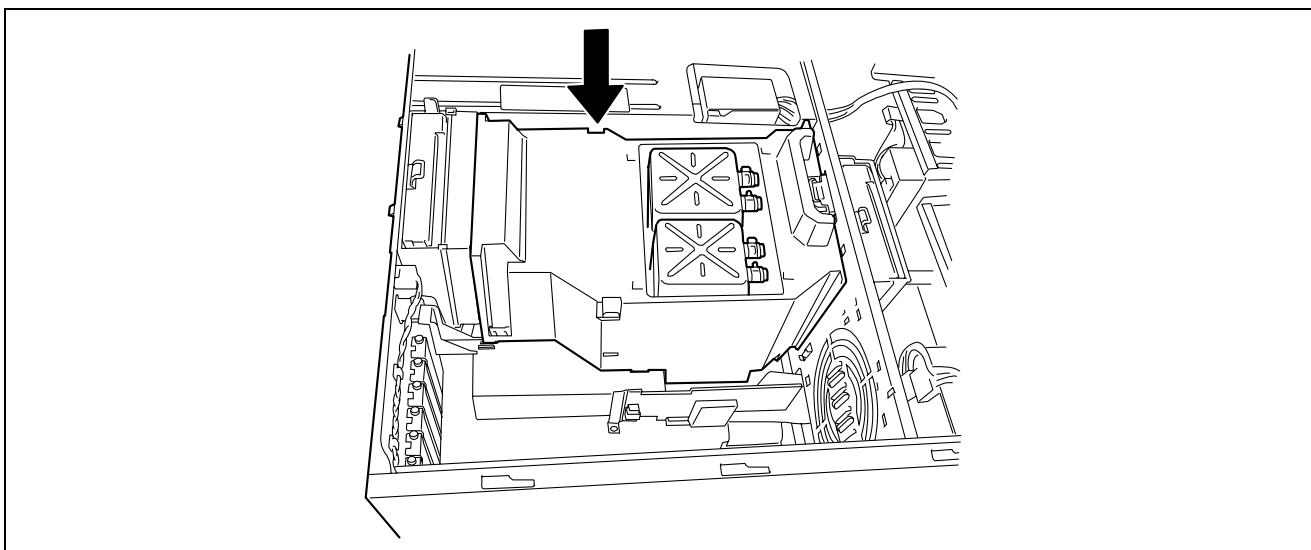


If you fail to connect the cables properly or to set the jumper switch correctly, the liquid leak and pump rotation of the water-cooled heat sink may be monitored incorrectly.

**5.** Remove the top cover from the CPU duct cover you have removed in the previous step.



6. Install the CPU duct cover.



### Removal (Water Cooling Heat Sink)

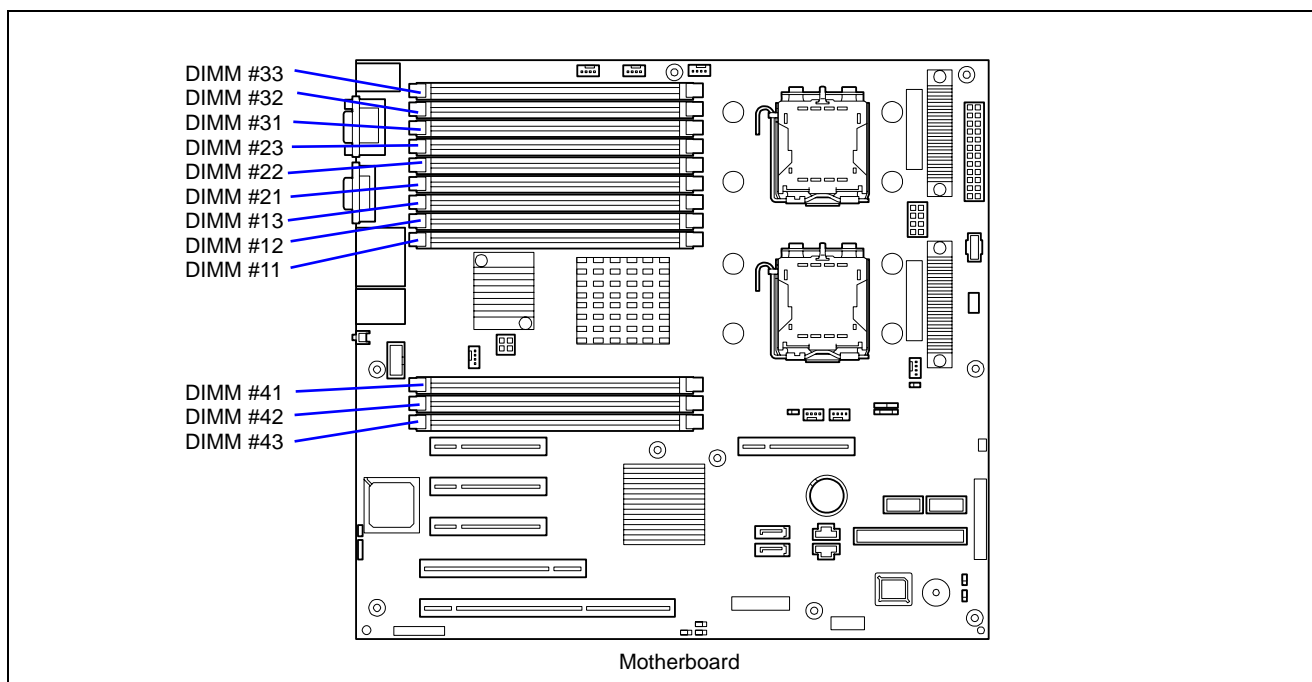
To remove the water cooling heat sink from the CPU, follow the installation procedure in the reverse order.

## DIMM

A DIMM (Dual Inline Memory Module) is installed in a DIMM socket on the motherboard.

The motherboard features 12 sockets in which DIMMs can be installed. Two 1 GB DIMMs are factory-installed in connectors DIMM #11 and DIMM #21. (The factory-installed DIMMs may be replaced.)

DIMMs are installed on the sockets in the ascending order of DIMM group numbers in the unit of two modules.




---

**IMPORTANT:** Due to the interleaving feature, you must always add two identic DIMMs at a time. The server will not operate if two DIMMs of different specifications are installed in a group.

---

**NOTE:** To use the memory mirroring and online spare memory feature, see "Using the Memory RAS Feature" described later.

---

Group number	Socket number in group
Group #1	DIMM #11 and DIMM #21
Group #2	DIMM #31 and DIMM #41
Group #3	DIMM #12 and DIMM #22
Group #4	DIMM #32 and DIMM #42
Group #5	DIMM #13 and DIMM #23
Group #6	DIMM #33 and DIMM #43

---

### IMPORTANT:

- DIMMs are easily affected by static electricity. Before handling a DIMM, discharge the static electricity of your body by touching a metallic frame section of the server. Do not touch terminals and components on a DIMM with bare hands. In addition, do not put the DIMM directly on a desk. For more details on static electricity, see "Static Precautions".
  - Use only DIMM approved by the manufacturer. If an unapproved third party's DIMM is installed in the server, not only the DIMM but also the server itself may be damaged. Any repair of a malfunction or defect caused by such a device within the warranty period will be at your charge.
  - An additional 8 GB DIMM cannot be used if a water-cooling heat sink is installed.
-

---

**NOTES:**

- Up to 48 GB (4 GB × 12) of DIMMs can be added. (If a water-cooling heat sink is installed, up to 24 GB (2 GB × 12) of memory can be added.)
  - In the error messages and logs in POST, NEC ESMPRO Manager, or Off-line Maintenance Utility, the DIMM connector may be called group. The number next to a group meets the connector number in the figure shown above.
- 

**Installation**

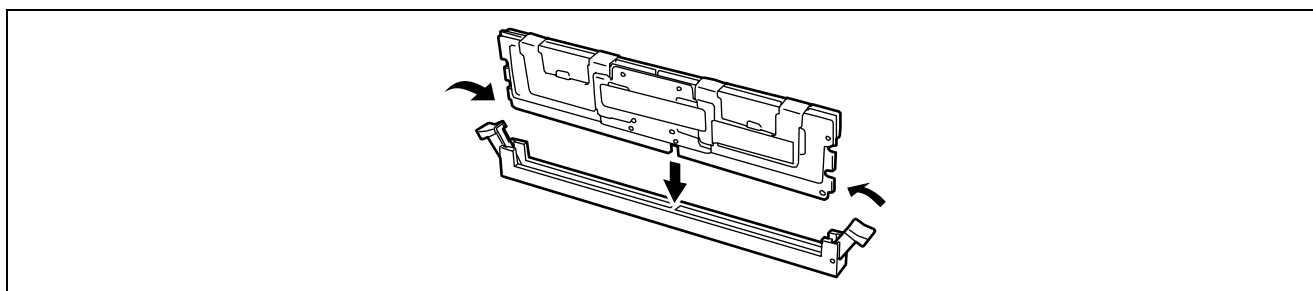
Install a DIMM as described in the following procedure.

---

**IMPORTANT:** Due to the interleaving feature, you must always add two identic DIMMs at a time. The server will not operate if two DIMMs of different specifications are installed in a group.

---

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover.
3. Remove the CPU duct cover.
4. Locate the socket where you are going to install the DIMM module.
5. Push the DIMM straight into the socket.



---

**NOTE:** Make sure the orientation of the DIMM is correct. The terminal side of the DIMM has a key to prevent incorrect insertion.

---

The levers are automatically closed when the DIMM is inserted into the DIMM socket.

---

**IMPORTANT:** Always install two DIMMs at a time. In addition, use a set of memory devices with the same specifications. The specification of a memory device is described on the label on the module.

---

6. Install the components you removed earlier.
7. Turn on the power of the server, then make sure that no error message appears during the POST.  
If an error message appears, write down the message and look it up in Chapter 8.
8. Start SETUP, then go to [Advanced] → [Memory Configuration]. Make sure that the status of the additional DIMM is set to "Normal" (see Chapter 4).
9. Set [Reset Configuration Data] on the [Advanced] menu to "Yes".  
This is required to update the hardware configuration. See Chapter 4 for details.
10. When a Windows operating system is used, set the paging file size to the recommended value or larger.  
Installed memory capacity × 1.5 (See Chapter 5.)

## Removal

Remove the DIMM as described in the following procedure.

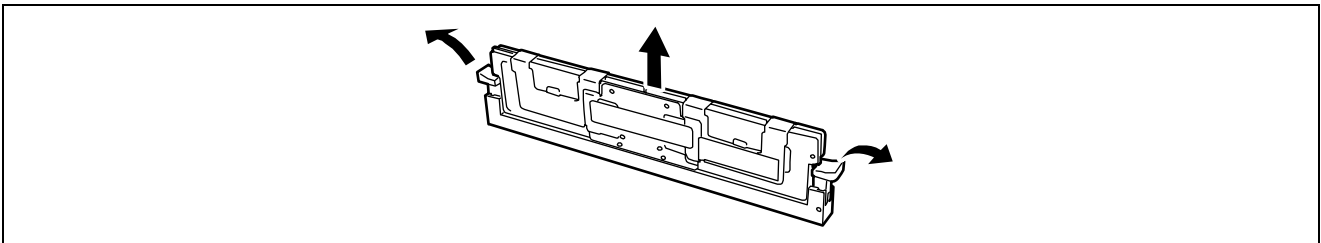
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### NOTES:

- To remove a defective DIMM, check the error message appearing in POST or in NEC ESMPRO to identify the DIMM socket (group) in which the defective DIMM is installed.
  - The server operates only when at least two DIMMs are installed.
- 

1. See the section "Preparing for Installation and Removal" described earlier to prepare.
2. Remove the side cover.
3. Remove the CPU duct cover.
4. Open the levers at the both ends of the socket.

You can then remove the DIMM.



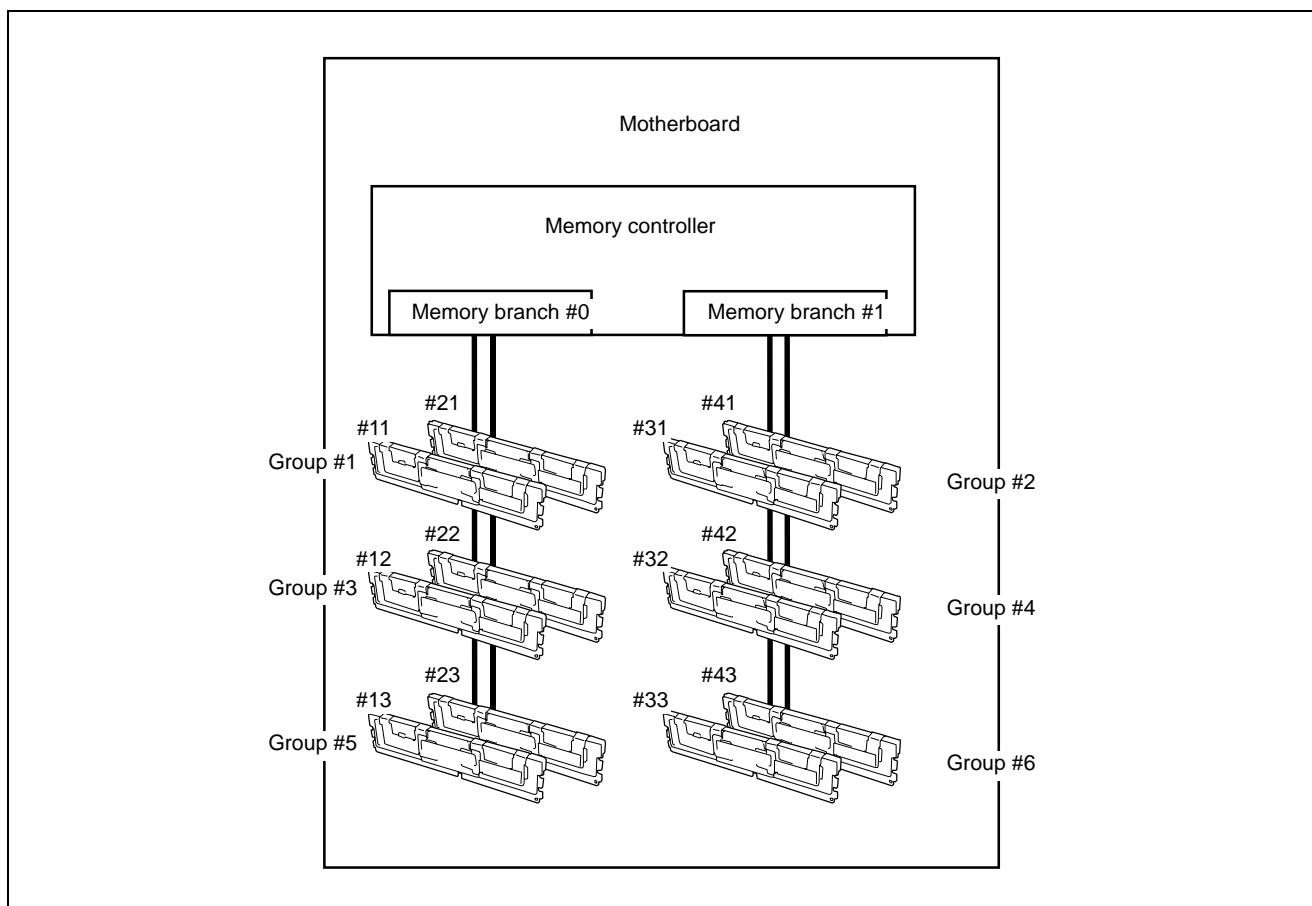
5. Install the components removed earlier.
6. Turn on the power of the server. Then make sure that any error message does not appear in POST. If an error message appears, write down the message and look it up in Chapter 8.
7. Start the SETUP, then go to [Advanced] → [Memory Configuration] → [Memory Retest] to clear the error information on the removed DIMM (see Chapter 4).
8. Set [Reset Configuration Data] on the [Advanced] menu to "Yes."  
This is required to update the hardware configuration information. See Chapter 4 for details.

## Using the Memory RAS Features

The server features the memory mirroring and online spare memory as well as the chipkill ECC memory, which can automatically correct a memory error (multi-bit error) causing system shutdown.

**IMPORTANT:** The memory mirroring and online spare memory features are not available in the normal memory configuration. (The chipkill ECC memory feature can operate in any configuration.)

The memory area on the motherboard of the server is divided into two memory branches as shown in the figure below.

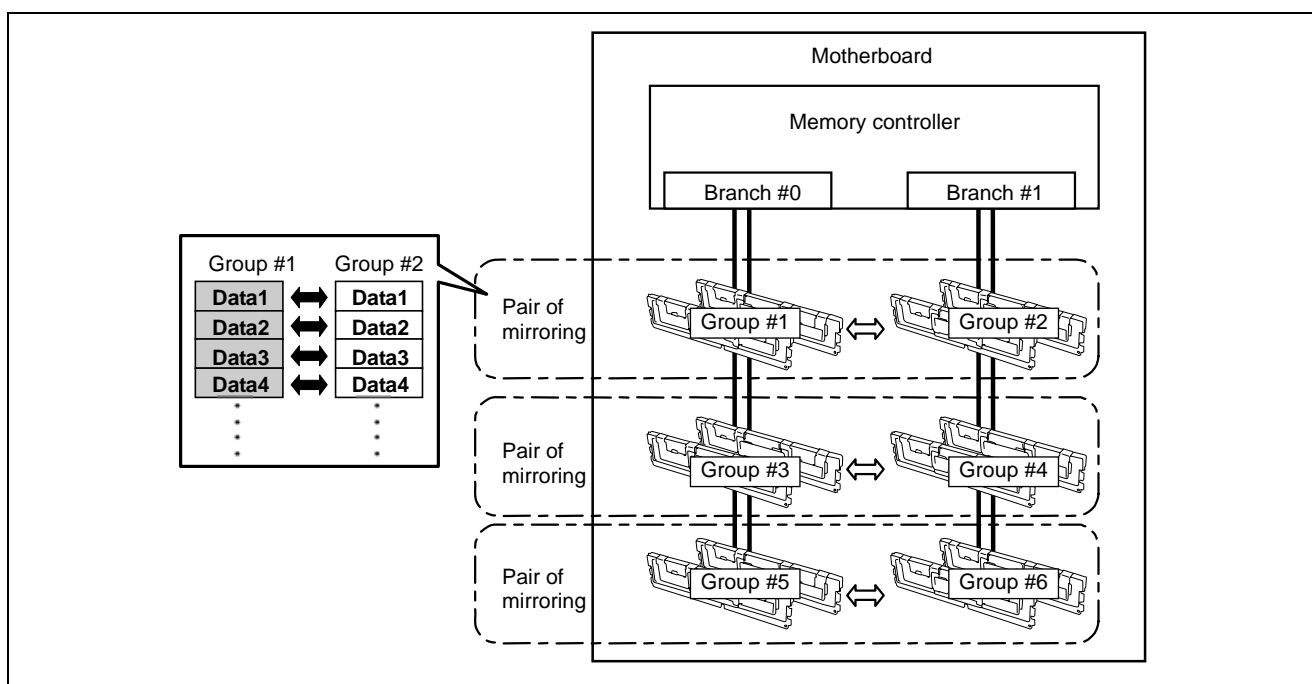


The memory mirroring and online spare memory features keep memory redundancy between memory branches and within a memory branch by monitoring or altering memory active/inactive status, respectively.



## Memory Mirroring

The memory mirroring feature writes the same data into two groups of DIMMs corresponding with each other between memory branches (mirror set) to provide data redundancy.



**NOTE:** The operating system only recognizes a half of the total physical capacity.

The memory mirroring feature can be used under the following conditions:

- Install memory devices on four memory sockets configuring a mirror set.
- All the installed memory devices should have the same capacity.
- Run SETUP (see Chapter 4), change parameters appropriately in the [Mirror] menu selected as shown below, save the settings and exit from SETUP.  
[Advanced] → [Memory Configuration] → [Memory RAS Feature] → [Mirror]
- Install memory devices in the following order:  
Groups 1 and 2 → Groups 3 and 4 → Groups 5 and 6

The following mirroring cannot be configured:

- Memory mirroring between different mirror sets
- Memory mirroring within a specific memory branch

The table below lists examples of DIMM installation patterns enabling the memory mirroring feature to be used.

Example	Memory Set (Group #)		Memory Set (Group #)		Memory Set (Group #)		Capacity	
	#1	#2	#3	#4	#5	#6	Physical	Logical
1	2 GB	2 GB	-	-	-	-	4 GB	2 GB
2	2 GB	2 GB	1GB	1 GB	-	-	6 GB	3 GB
3	2 GB	2 GB	2 GB	2 GB	-	-	8 GB	4 GB
4	2 GB	2 GB	1 GB	1 GB	1 GB	1 GB	8 GB	4 GB
5	2 GB	2 GB	1 GB	1 GB	2 GB	2 GB	10 GB	5 GB
6	2 GB	2 GB	2 GB	2 GB	1 GB	1 GB	10 GB	5 GB
7	2 GB	2 GB	4 GB	4 GB	4 GB	4 GB	12 GB	6 GB
8	2 GB	2 GB	2 GB	2 GB	2 GB	2 GB	12 GB	6 GB
9	2 GB	2 GB	1 GB	1 GB	4 GB	4 GB	14 GB	7 GB
10	2 GB	2 GB	4 GB	4 GB	1 GB	1 GB	14 GB	7 GB
11	2 GB	2 GB	2 GB	2 GB	4 GB	4 GB	16 GB	8 GB
12	2 GB	2 GB	4 GB	4 GB	2 GB	2 GB	16 GB	8 GB
13	2 GB	2 GB	4 GB	4 GB	4 GB	4 GB	20 GB	10 GB
14	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	24 GB	12 GB
15	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	48 GB	24 GB

### Notes on Configuring Memory Mirroring

In memory mirroring configuration, the menus related to memory mirroring in BIOS SETUP are grayed out and unselectable in the following cases:

- When you additionally install DIMMs that unable to configure memory mirroring
- When you remove DIMMs that takes down the memory mirroring

In this case, execute [Load Setup Defaults] to cancel the memory mirroring configuration.

#### <Procedure>

1. Take a note of settings in BIOS SETUP.
2. Press **F2** during POST to run BIOS SETUP utility.
3. Select [Exit] → [Load Setup Defaults].
4. When a message "Load default configuration now?" appears, select [Yes].
5. Enter the parameter values you have saved in step (1).

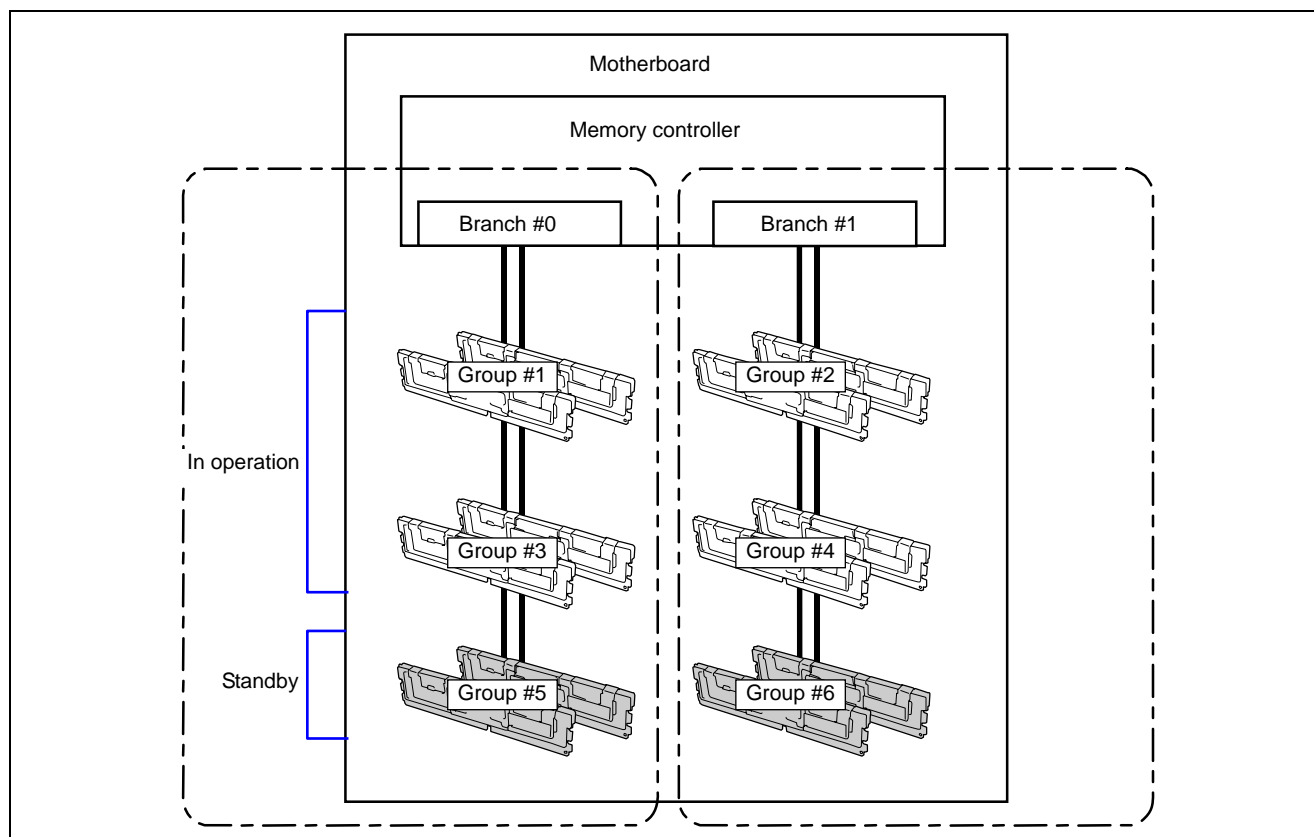
---

**NOTE:** Executing [Load Setup Defaults] restores the default values for all Setup parameters. You need to specify those parameters again.

---

## Online Spare Memory

The online memory spare feature puts a group of memory devices within a memory branch into standby status as spare devices. If an unrecoverable error occurs in a DIMM of the running group, the feature automatically changes the running DIMM from the failed one to a DIMM in the standby group to continue the processing.



**NOTE:** The operating system recognizes the memory devices as those with capacities less than the actual physical capacities. (The recognized capacities vary depending on the number of DIMMs and on the physical capacity per DIMM.)

The online spare memory feature can be used under the following conditions:

- Install memory devices to more than one group in each memory branch. The server can operate if the memory branches may be different in the number of DIMMs. For example, no error occurs if memory branch 0 include four DIMMs (or two groups) and memory branch 1 includes six DIMMs (or three groups).
- DIMMs installed in a specific memory branch should have the same capacity. The server can operate as long as DIMMs of the same capacity are installed in each memory branch. (For example, the server can operate if the total capacity of memory branch 0 is different from that of memory branch 1.)
- Run SETUP (see Chapter 4), change parameters appropriately in the [Sparing] menu selected as shown below, save the settings and exit from SETUP.

[Advanced] → [Memory Configuration] → [Sparing]

- Install memory devices in the following order:  
Group 1 → Group 3 → Group 5 for memory branch 0  
Group 2 → Group 4 → Group 6 for memory branch 1

The following sparing can be neither configured nor set.

- Sparing to another memory branch
- Specification of arbitrary memory devices as spare. The group of the largest number within a specific memory branch can be specified as spare.

The table below lists examples of DIMM installation patterns enabling the online spare memory feature to be used. While the following patterns are provided for memory branch 0, the same patterns can also be adapted to memory branch 1.

Example	Memory Branch #0 (Group #)			Capacity	
	#1	#3	#5	Physical	Logical
1	1 GB	1 GB	-	4 GB	1 GB
2	1 GB	1 GB	1 GB	3 GB	2 GB
3	2 GB	2 GB	-	4 GB	3 GB
4	2 GB	2 GB	2 GB	6 GB	5 GB
5	4 GB	4 GB	-	8 GB	6 GB
6	4 GB	4 GB	4 GB	12 GB	10 GB
7	8 GB	8 GB	-	16 GB	12 GB
8	8 GB	8 GB	8 GB	24 GB	20 GB

Depending on the specifications of the memory controller, the spare memory is set in unit of rank memory.

The logical memory capacity of single rank memory differs from that of dual rank memory when online spare memory is specified.

- Single rank memory configuration  
Logical memory capacity = (Physical memory capacity \* Nb of DIMMs) – (Physical memory capacity)
- Dual rank memory configuration  
Logical memory capacity = (Physical memory capacity \* Nb of DIMMs) – (Physical memory capacity / 2)

The server supports the following product number.

- 1 GB memory: Single rank
- 2 GB/4 GB/8 GB memory: Dual rank

## Chapter 10

---

### Internal Cabling Diagrams

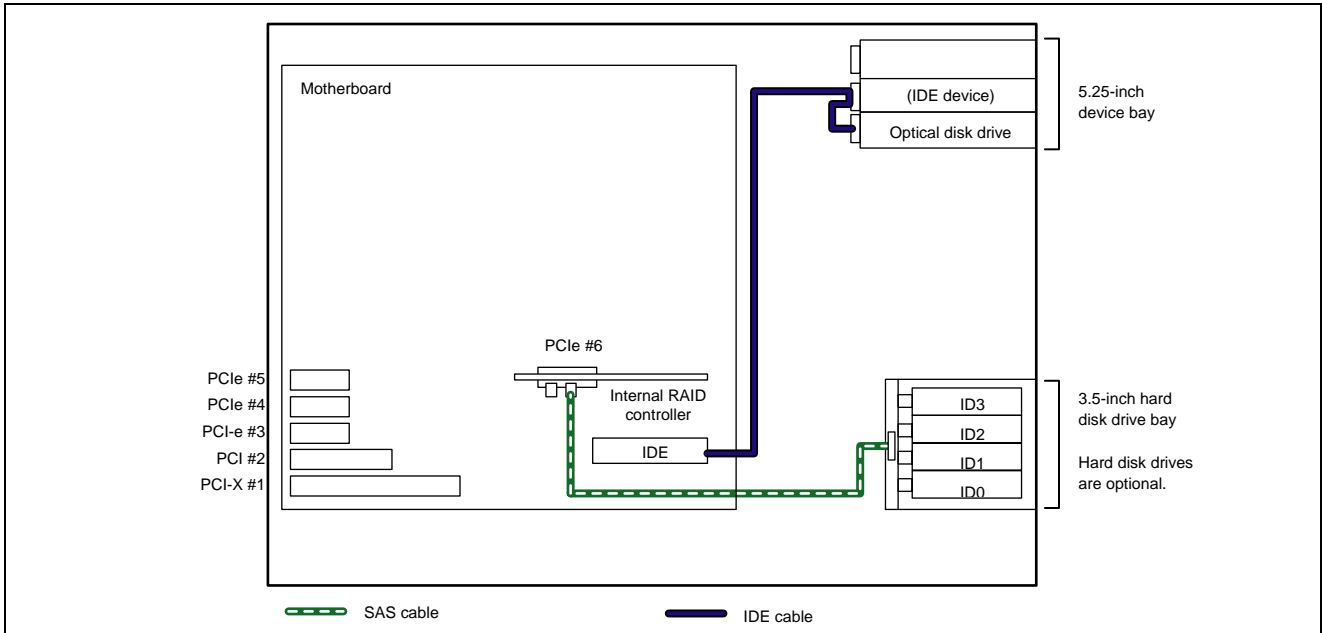
Internal cable connections of the server are shown below.

## INTERFACE CABLES

An example of the connection of the interface cables between the devices within the server and external devices is shown below.

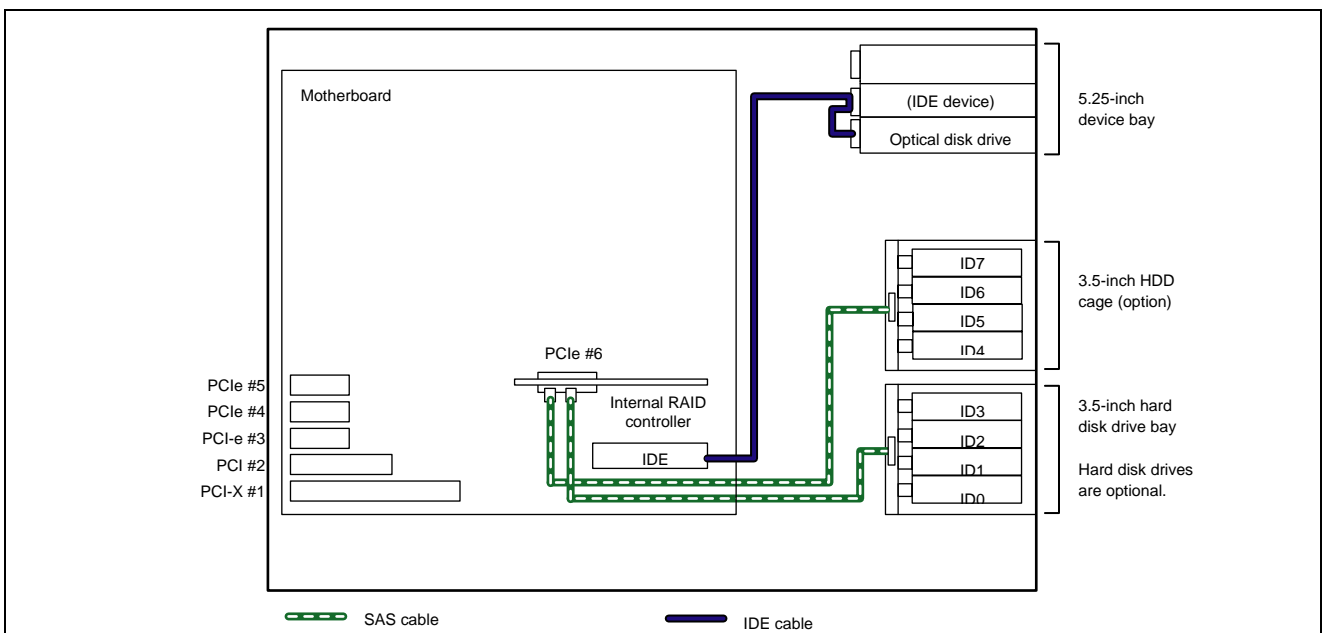
### Standard Configuration

The figure below shows an example of the connections in the standard configuration. One of the connectors on the Internal RAID Controller (PCIe #6) is connected to the hard disk drive bay.



### Installing Additional 3.5-inch HDD Cage

The figure below shows an example when five or more hard disk drives are to be connected. One of the connectors on the Internal RAID Controller (PCIe #6) is connected to the additional HDD cage.



## Installing an Internal SCSI File Device

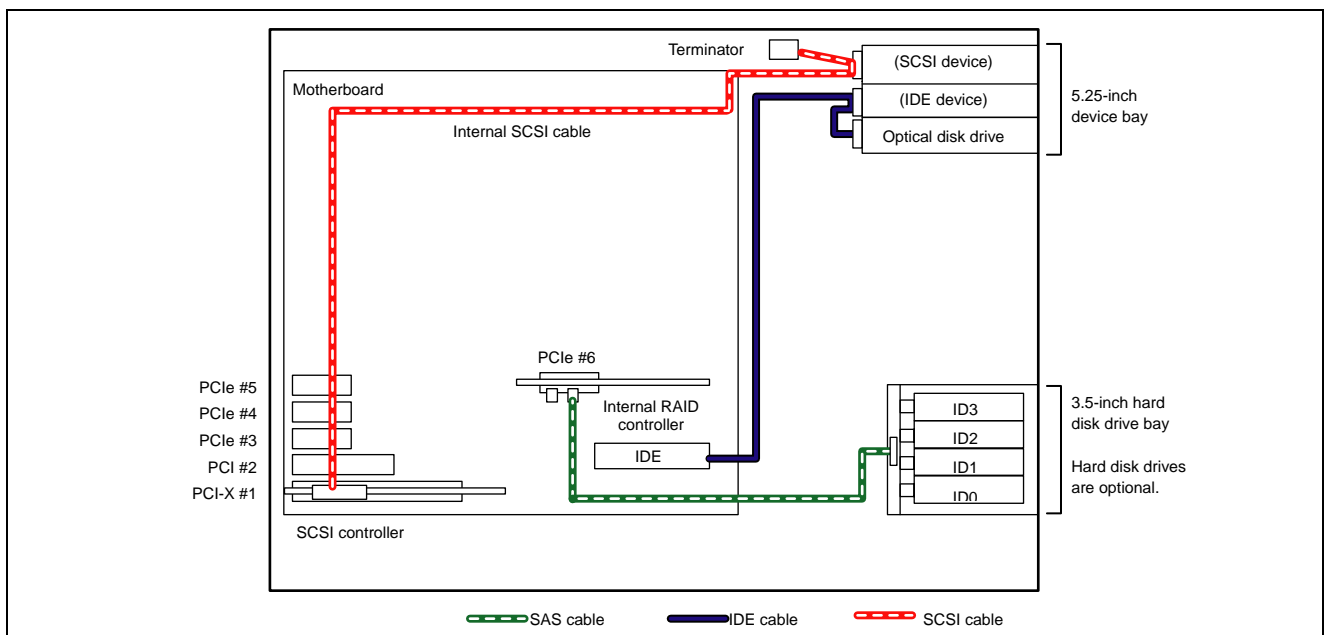
To install an internal SCSI file device, you need to prepare a SCSI controller and SCSI cable.

### IMPORTANT:

- Up to two SCSI devices can be installed in the server.
- To install two half-height SCSI devices in the 5.25-inch device bay, move the factory-installed optical disk drive to the top bay.

The internal SCSI cable approved by your manufacturer is equipped with a terminator. Set to "Disabled" all the terminators of the connected devices. For other settings, refer to the manual provided with the device.

The SCSI transfer rate, among other settings, must be set on a file device. Refer to the manual provided with the SCSI controller.



## Connecting with a Disk Expansion Unit

A disk expansion unit is an exclusive device in which you can install up to 14 hard disk drives. (The number of hard disk drives depends on the model.) The server containing a Disk Array Controller can connect to one or two of these devices. For more information on the number of devices connected, see the manuals provided with the Disk Array Controller and disk expansion unit.

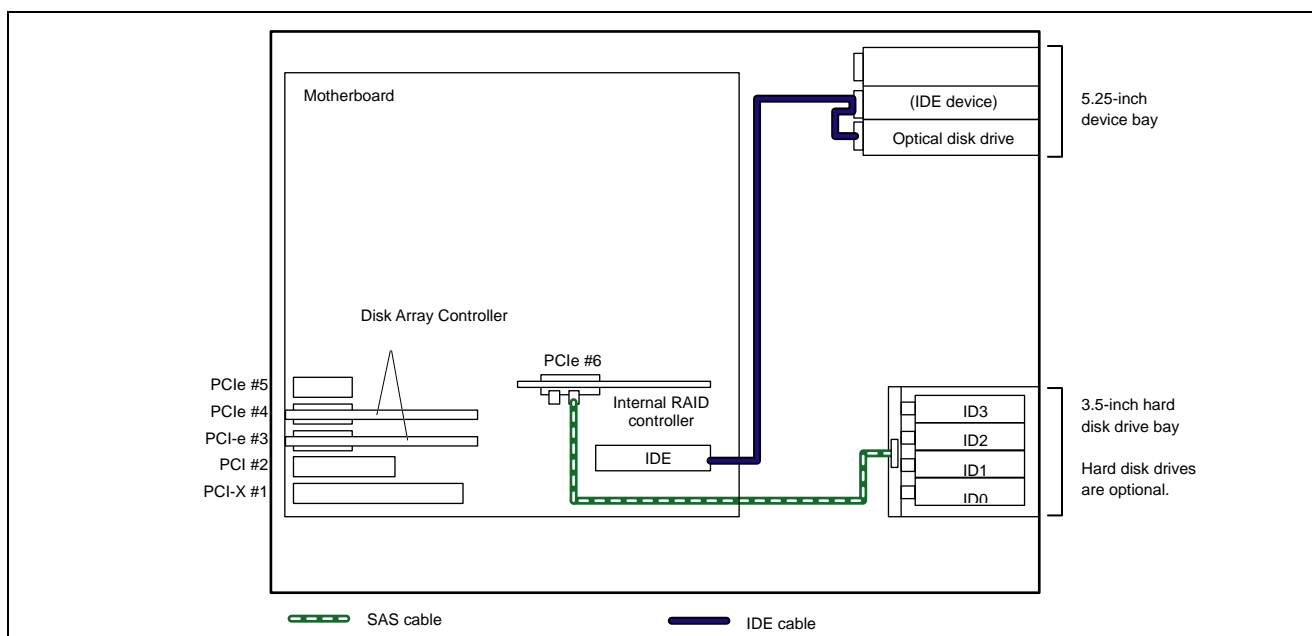
**IMPORTANT:** A disk expansion unit is provided without hard disk drives. You need to purchase hard disk drives separately.

An optional cable may be required to connect with a disk expansion unit. Refer to the manual of the disk expansion unit for more information.

Connect the disk expansion unit, use WebBIOS or the Universal RAID Utility to set the disk expansion unit in a RAID System (RAID0, RAID1, or RAID5). For more information, refer to the manual provided with the board.

When a disk expansion unit is set in a RAID System, you can use the "Auto Rebuild" feature of the Disk Array Controller to restore data if one of the hard disk drives installed in the disk expansion unit fails (hot-swap the defective hard disk drive).

**IMPORTANT:** When the Disk Array Controller is installed, do not let the system enter hibernation or standby mode.

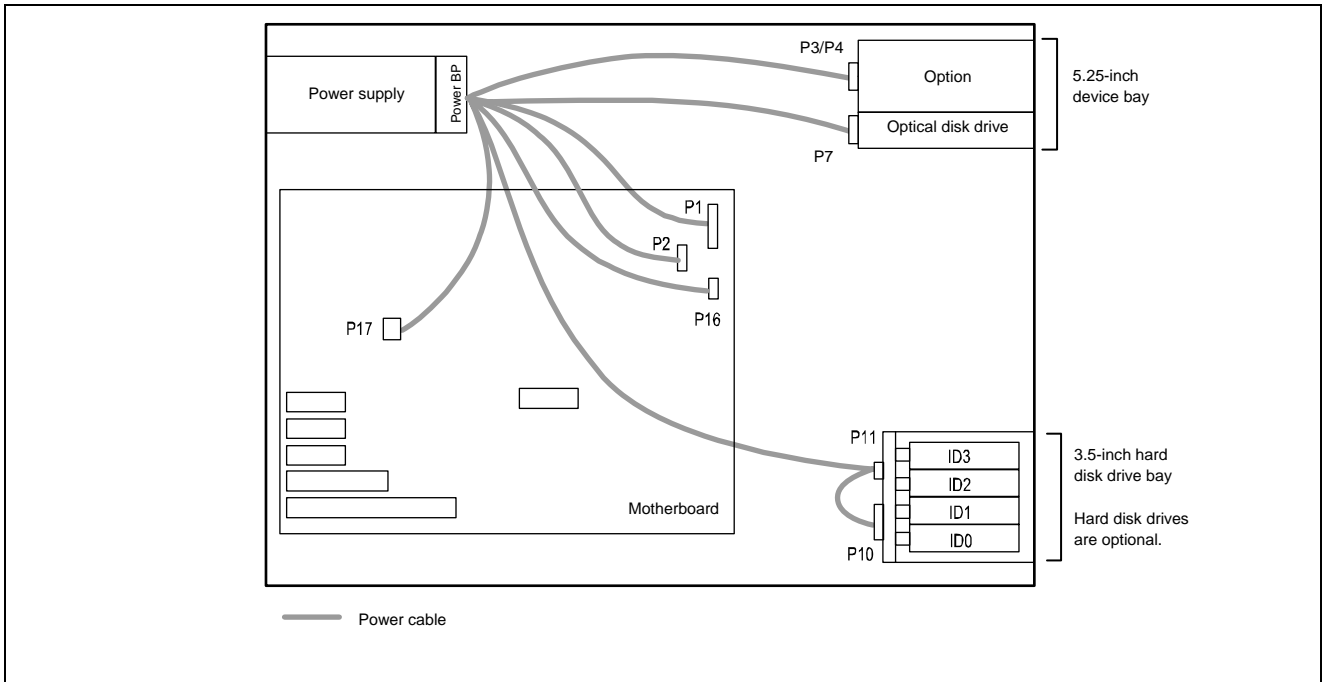




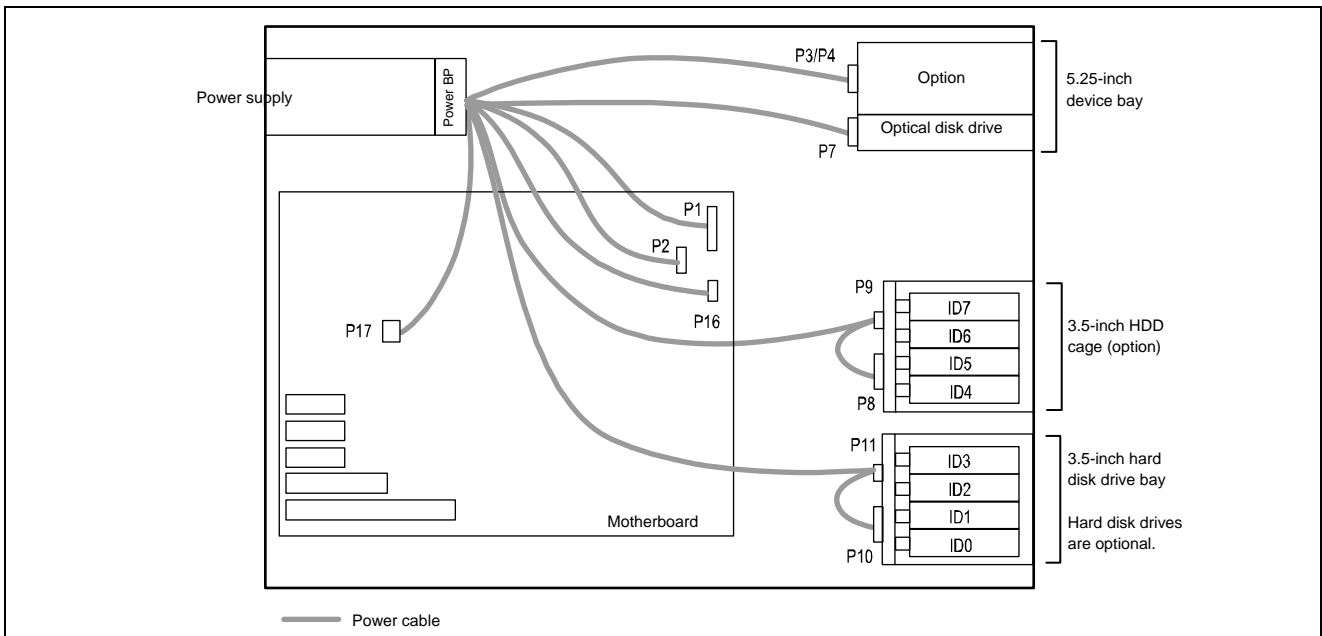
## POWER CABLE

Proper connector numbers of format Pnn (nn: numeral) are printed on the power cables connected to the power unit installed in the server. The connector numbers and the internal devices to which the connectors are connected are shown in the figures below.

### Standard Configuration



### Installing a 3.5-inch HDD Cage



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# Appendix A

## Specifications

Item						
CPU	Type	Dual-core Intel® Xeon® processor		Quad-core Intel® Xeon® processor		
	Model	E5205	E5260	E5420	X5450	X5460
	Clock	1.86 GHz	3.33 GHz	2.50 GHz	3.00 GHz	3.16 GHz
	2nd Cache	6MB		2x6MB		
	Standard	1				
	Maximum	2				
Chipset	Intel 5000P (1066/1333 MHz)					
Memory	Memory module	DDR2-667 FB-DIMM				
	Minimum	2GB (1GB × 2)				
	Maximum	48GB (4GB × 12)				
	Error check	ECC, x4/x8 SDDC, Mirroring and Sparing				
Display	Graphics accelerator	ServerEngines™ 2nd Gen Server Management Controller				
	Video RAM	8MB				
	Graphic display	640x480, 800x600, 1,024x768, 1,280x1,024: 16,770,000 colors max.				
Auxiliary storage device	Hard disk drive (standard)	None				
	Hard disk drive (maximum)	Factory-installed HDD cage: SAS: 1.2TB (300GB × 4)      SATA: 3TB (750GB × 4) With optional 3.5-inch HDD cage: SAS: 2.4TB (300GB × 8)      SATA: 6TB (750GB × 8) With optional 2.5-inch HDD cage: SAS: 2.344TB (146.5GB × 16)				
	Optical disk drive (standard)	DVD-RAM x 1 (Load on tray, x16 speed max.)				
	File bay	5.25-inch device bay	3 slots (An optical disk drive is factory-installed.)			
	3.5-inch floppy disk drive bay	1 slot				
	Hard disk drive bay	3.5-inch disk: 4 slots + 4 slots (with optional HDD cage) 2.5-inch disk: 8 slots + 8 slots (with two optional HDD cages)				
Additional slot (PCI)	PCI EXPRESS (x8) x2, PCI EXPRESS (x4) x1, 64-bit/133MHz PCI-X x1, 32-bit/33MHz PCI x1					
Disk array	Standard	Internal RAID Controller				
	Option	RAID controller				
External interface	Front	USB2.0 x 2				
	Rear	VGA x1, KB (PS/2) x1, Mouse (PS/2) x1, Serial x1, USB2.0 x2, 10/100/1000BASE-T x2, 10/100BASE-TX x1 (for management port)				
Chassis design	Tower					
External dimensions (mm)	205 (width) × 435 (height) × 599* (depth)					
Weight (Max.)	20 kg (26 kg)					
Power supply	100 to 120 VAC ±10%, 200 to 240 VAC ±10%, 50/60 Hz ±1 Hz					
Power consumption (maximum configuration)	550 VA / 548 W	658 VA / 655 W	629 VA / 626 W	755 VA / 751 W	734 VA / 730 W	
Switches	Front Panel: Power/Sleep, Dump, and Reset					
Mechanical lock	Security key provided					
LEDs	Front panel: Power/Sleep, Disk Access, Status, LAN x 2 Rear panel: LAN x 3					
Environmental requirements	Temperature	10 to 35°C (operating), -10 to 55°C (non-operating, storage)				
	Humidity	20 to 80% RH (no condensation)				

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# Appendix B

## Other Precautions

### Transfer Rate of the On-board LAN Controller

The LAN controller on the base board has two ports, and another two ports on the I/O riser board. Each port supports 10Base-T, 100Base-TX, and 1000Base-T networks and is capable of full or half duplex.

The controller can automatically detect and switch for network speed and transfer mode connected to the HUB. However, for proper network operation, specify a "Link Speed & Duplex" value identical to the value specified for the HUB.

### Server Management Software

The EXPRESSBUILDER DVD that comes with the server contains the NEC ESMPRO utility.

We recommend you install NEC ESMPRO for effective use of the reliability enhancement features of the server.

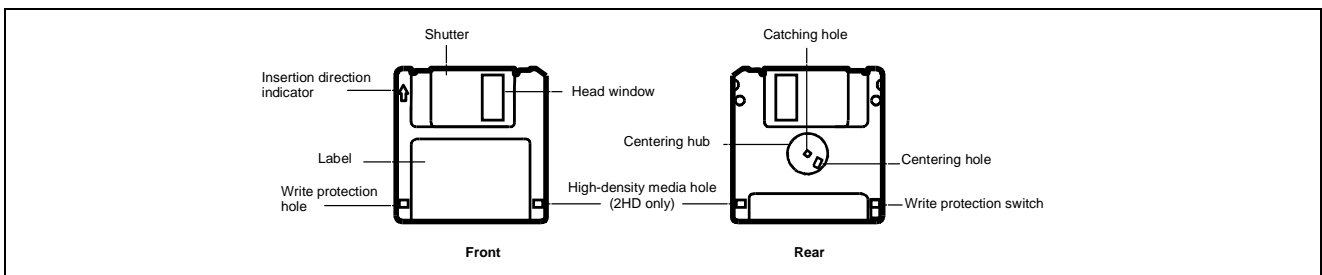
### Floppy Disk

The following describes use of the floppy disk.

#### Floppy disk type

The server uses 3.5-inch floppy disks. You can use the following two types of 3.5-inch floppy disks:

- 2HD floppy disk (double-sided high-density track type)  
Stores data of 1.44MB.
- 2DD floppy disk (double-sided double-density track type)  
Stores data of 720KB.



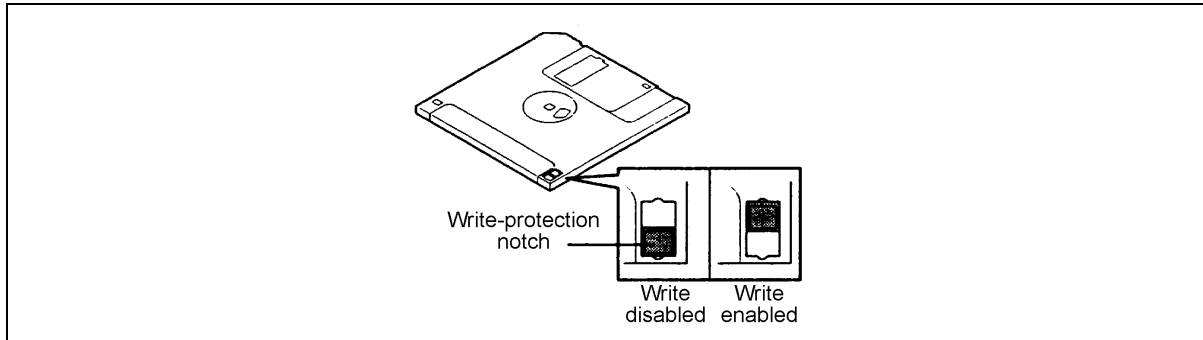
#### Notes on use

The floppy disk is an important data storage media with a delicate structure and requires care. Keep the following notes in mind to use it:

- Insert the floppy disk into the floppy disk drive gently as far as it goes.
- Attach the label on the appropriate spot.
- Do not write anything directly onto the disk surface with a pencil or ball-point pen.
- Do not open the shutter.
- Do not use the floppy disk in a dusty place.
- Do not place anything on the floppy disk.
- Do not leave the floppy disk in a high-temperature place (e.g., place exposed to direct sunlight or close to a heater).

- Do not leave the floppy disk next to food or beverages, or in a place exposed to cigarette smoke.
- Do not leave the floppy disk near liquids, chemicals, or in a place where a chemical may be accidentally sprayed.
- Do not place any magnetic objects (e.g., magnet) near the floppy disk.
- Do not clip or drop the floppy disk.
- Keep the floppy disk in a floppy disk case that protects it from magnetism and dust.
- Write-protection

Floppy disk feature a write-protect switch that prevents the stored data from accidental erasure.



You can read data from a write-protected floppy disk, but you cannot save data into the floppy disk or format it. We recommend you should write-protect any floppy disk containing valuable data unless you are about to save data.

To write-protect a 3.5-inch floppy disk, use the write-protect switch provided on its back.

- Disk format

To write data into a floppy disk, the floppy disk must be "formatted." "Formatting" is to initialize the floppy disk and make it available for the system environment (operating system).

---

**IMPORTANT:**

- Formatting a used floppy disk clears all the data contained in it, if any.
  - It is not possible to format a floppy disk from the DOS command line with the server.
- 

The format method depends on your operating system. Refer to the manual that comes with your operating system for more information.

- Data backup

"Data backup" consists in copying data stored in a media into another media (e.g., floppy disk, digital audio tape, or magnet-optical disk).

---

**IMPORTANT:** Make sure to make a back-up copy of every provided floppy disk.

---

The floppy disk is a very delicate storage media. Dust or thermal changes, as well as operator's misconduct or server failures, may cause loss of data. To avoid loss of data, We recommend you should make a back-up copy of your valuable data on a regular basis.

---

## CD/DVD-ROM

Keep the following notes in mind to use the CD/DVD-ROM for the server:

- Press the center of the storage case to remove the CD/DVD-ROM from its case.
- Do not drop the CD/DVD-ROM.
- Do not place anything on the CD/DVD-ROM or bend the CD/DVD-ROM.
- Do not attach any label onto the CD/DVD-ROM.
- Do not touch the signal side (nothing is printed on this side) with your fingers.
- Place the CD/DVD-ROM with its printed side upward and gently put it on the tray.
- Do not scratch the CD/DVD-ROM or write anything directly on it with a pencil or ball-point pen.
- Do not leave the CD/DVD-ROM near foods and drinks, or in a place exposed to cigarette smoke.
- Do not leave the CD/DVD-ROM in a high-temperature place (e.g., place exposed to direct sunlight or close to a heater).
- When dust or fingerprints are visible on the CD/DVD-ROM, wipe the CD/DVD-ROM from its center to the edge using a dry soft cloth slowly and gently.
- Use the CD/DVD cleaner to clean the CD/DVD-ROM. Do not use record spray/cleaner, benzene, or thinner.
- Keep the CD/DVD-ROM in a CD/DVD-ROM case when not using it.
- Do not hit the CD/DVD-ROM with the screw fixing the top cover when setting or removing disc.

---

## Tape Media

The following describes the handling of data with the DAT, DLT, or AIT optionally available for the server.

- Saving your valuable data

When you save your valuable data or programs into the cartridge tape, you should make two copies: a primary and a secondary tape.

This enables you to restore your data from one tape when the other makes a read error, as well as to protect your valuable data and programs from loss.

- Three-generation data management

We recommend that you should employ three-generation data management for data storage.

Three-generation data management uses three cartridge tapes: A, B, and C. You save data to tape A on the first day, tape B on the second day, tape C on the third day, tape A on the fourth day, and so on. That is, you save data into cartridge tapes cyclically from tape A through C.

This enables you, for example, to use tape B to restore the data when tape C makes a read error. Also when both tapes B and C make a read error, you can restore your valuable data by using the data stored in tape A.

---

## Keyboard

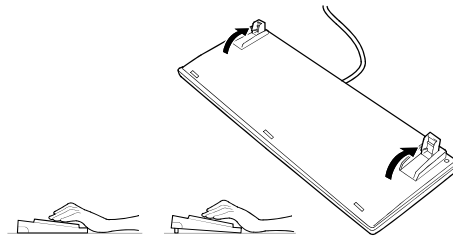
The keyboard is a device used to instruct your computer by entering alphanumeric characters or symbols.

---

### IMPORTANT:

- Do not pour any liquid such as water or put anything into the keyboard. Doing so may cause a failure of the keyboard.
- The keyboard provided with the server is designed for adjustment of an angle. Adjust the keyboard at an angle at which the keyboard is easy to operate. This adjustment helps

reducing strain on your shoulders, arms, and fingers.




---

**NOTE:** The keyboard functions depend on the software. Refer to the manual that comes with the software for details.

---

## Mouse

Like the keyboard, the mouse is a device to instruct your computer. Many OS's and application software require a mouse to operate properly.

---

### NOTE:

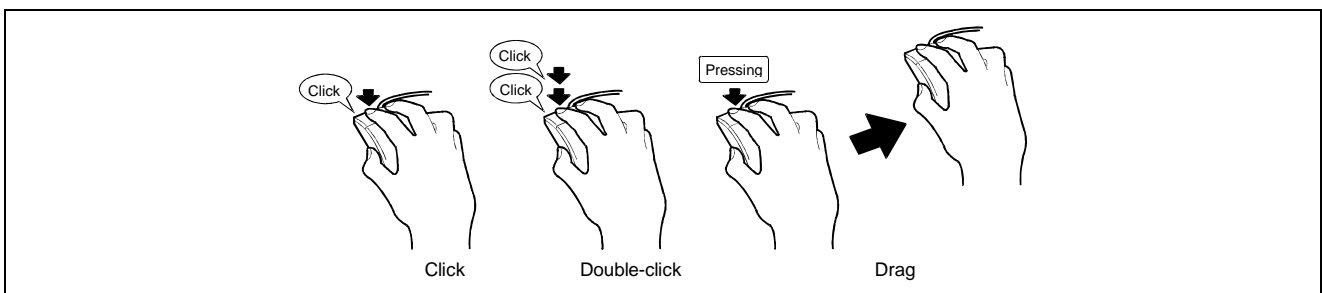
- Functions assigned to the mouse buttons vary depending on the software. For details, refer to the manual provided with the software.
- Use the mouse on a clean desk. Using the mouse on a dusty or dirty desk disturbs smooth movement or normal operation of the mouse. When your mouse movement seems dull, clean your mouse. (See Chapter 7.)



Mouse operation includes "Click," "Double-click," and "Drag."

- Click: Press the button only once and release it.
- Double-click: Press the button twice consecutively and release it.
- Drag: Press and hold the button and move the mouse.

Operation of the server involves combinations of these mouse operations and data entries with the keyboard.





---

# Appendix C

---

## IRQ

The factory-set interrupt requests are listed below. Find an appropriate one to install an optional device.

### Interrupt Request

The factory-set IRQs are assigned as follows:

IRQ	Peripheral Device (Controller)
0	System timer
1	–
2	–
3	COM2 serial port
4	COM1 serial port
5	PCI
6	PCI
7	PCI
8	Real-time clock
9	ACPI Compliant System
10	PCI
11	BMC IRQ
12	Mouse
13	Numeric processor
14	Primary IDE channel
15	Secondary IDE channel
16	VGA
17	VGA
18	LAN1
19	LAN2
20	USB
21	USB
22	USB
23	USB

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# Appendix D

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## Installing Windows Server 2003 x64 Editions

This section describes the procedure for the installation of Windows Server 2003 x64 Editions without using the Express Setup tool.

### BEFORE INSTALLING Windows Server 2003 X64 EDITIONS

Please read carefully the following information BEFORE installing Windows Server 2003 x64 Edition.

---

#### Optional Boards Supported by EXPRESSBUILDER

EXPRESSBUILDER DVD attached to your system supports the following optional boards:

---

**NOTE:** If you want to install boards other than the ones listed below, using a driver floppy disk ("OEM-FD for Mass storage device"), refer to "Exceptional Setup" and "Installing Optional Mass Storage Driver" of "Parameter File Creator" in Chapter 6.

---

- Controllers supporting installation of OS with Express Setup
    - RAID controller (128 MB, RAID0/1)
    - RAID controller (128 MB, RAID0/1/5/6)
  - Other controllers
    - Disk Array Controller (External SAS HDD)\*
    - SCSI Controller\*
    - SAS Controller\*
- \* Option

---

#### Service Packs Which the EXPRESSBUILDER Supports

The EXPRESSBUILDER DVD attached to the server supports the following combinations of OS installation media and Service Pack.

- Windows Server 2003 R2 x64 Edition
  - OS installation media (with Service Pack 2)
  - OS installation media (No Service Pack) + Service Pack 2
  - OS installation media (No Service Pack)

---

#### Installing a Service Pack

You can install a Service Pack on the server. When no Service Pack is attached to your system, prepare it by yourself.

---

#### Updating the System

If you modified the Windows system, execute "Update the System" in Autorun Menu.

---

## Re-installing to the Hard disk drive which has been upgraded to Dynamic Disk

If you want to keep the existing partition when installing the system on the hard disk drive upgraded to Dynamic Disk, note the following issue:

- Do not select the partition in which the OS had been installed as the partition on which to re-install the OS.
- Select "Use the current File System" as the format of the OS partition.

---

## Mounting MO Device

Do not mount an MO device on your server during the Windows installation.

---

## Media such as DAT

During the OS installation, do not attach any unnecessary media to the system, such as a DAT.

---

## About the System Partition Size

The size for the partition on which the system is to be installed can be calculated from the following formula.

Size necessary to install the system	+ Paging File Size + Dump File Size
	+ Application Size
Size necessary to install the system	= 4100MB (Windows Server 2003 x64 Editions)
	= 4100MB (Windows Server 2003 x64 Editions with Service Pack2)
	= 5900MB (Windows Server 2003 x64 Editions + Service Pack 2 CD-ROM)
Paging File Size (Recommended)	= Mounted Memory Size × 1.5
Dump file Size	= Mounted Memory Size + 1MB
Application Size	= Required Size

---

### IMPORTANT:

- The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.  
Correct debug information might not be able to be collected due to a virtual memory shortage if the paging file is insufficient, so set a paging file size large enough for the entire system.
  - Regardless of the size of the mounted memory, or the Write debugging information (type of memory dump), the maximum size of the dump file is 'The size of the mounted memory + 1MB'.
  - If you need to install any additional software applications, add necessary space to the partition to install these programs.
- 

For example, if the mounted memory size is 512MB, the partition size will be calculated by the above formula as follows:

$$4100\text{MB} + (512\text{MB} * 1.5) + (512\text{MB} + 1\text{MB}) + \text{Application Size} = 5381\text{MB} + \text{Application Size}$$

If the required partition size is larger than the size of a hard disk drive, we recommend you split the file across several disks.

1. Set the "Size required for installation + Paging file size".
2. Set the debugging information (equivalent to the dump file size) so that it is written to a separate disk. (If necessary, install an additional new disk.)

---

## INSTALLING Windows Server 2003 X64 EDITIONS

### Preparations for Installation

- EXPRESSBUILDER DVD
- Microsoft Windows Server 2003 Standard x64 Edition (CD-ROM) / Microsoft Windows Server 2003 Enterprise x64 Edition (CD-ROM)
- Microsoft Windows Server 2003 x64 Editions Service Pack 2 (CD-ROM)
- User's Guide
- Getting Started
- Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER

---

### Creating "Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER"

Before installing, create Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER.

---

**NOTE:** If you have already "Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER" for the server on which you are going to install Windows Server 2003 x64 Editions, you do not need to create it again.

---

You can create Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER using one of the two procedures below:

- Create from the menu which appears when running the server with the EXPRESSBUILDER.

If you have only the server to create Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER, use this procedure.

If Windows Server 2003 or Windows can be operated on the server, you can use the other procedure described later.

Follow the steps below.

1. Prepare one 3.5-inch floppy disk.
2. Turn on your server.
3. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.
4. Press the RESET switch or press **Ctrl, Alt** and **Delete** to reboot the server. (You may also turn off and then on again to reboot the server.)

The system will boot from the DVD-ROM and the EXPRESSBUILDER starts.

5. Select [Create the OEM-Disk for Windows] from [Tools Menu] step.
6. Select [Create an Windows Server 2003 x64 Editions OEM-Disk for EXPRESSBUILDER] at [Create OEM-Disk] and click [Perform].
7. Insert a floppy disk into the floppy disk drive according to the on-screen instructions.

Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER will be created.

Write-protect and attach a label, then keep it safely.

■ Create from [Autorun Menu]

This menu requires Microsoft Windows XP, Vista or Windows Server 2003(or later).

You can create the Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER from [Autorun Menu], if you have a computer on which one of the above operating systems operate.

Follow the steps below.

1. Prepare one 3.5-inch floppy disk.
2. Start the Operating System.
3. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.

The Menu appears.

4. Click [Create drive disk] and select [OEM-Disk for Windows Server 2003 x64 Edition].

---

**NOTE:** You can do the same operation using the menu that appears with a right-click.

---

5. Insert the floppy disk into the floppy disk drive according to the message.

Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER will be created.

Write-protect and attach a label, then keep it safely.

---

## Windows Server 2003 x64 Editions Clean Installation

This section explains how to perform a clean installation of Windows Server 2003 x64 Editions.

1. Power on the system.
2. Insert the Windows Server 2003 x64 Edition CD-ROM into the CD-RW/DVD-ROM drive.
3. Press **Ctrl + Alt + Delete** to restart the system.  
 If a bootable operating system is installed on the hard disk drive, press **Enter** while the message "Press any key to boot from CD..." is displayed at the top of the screen.  
 If no bootable operating system exists on the hard disk drive, this step is unnecessary.  
 The Windows Server 2003 x64 Editions setup screen will appear.  
 If the screen is not displayed, **Enter** was not pressed properly.  
 Restart the server and perform this step again.
4. Press **F6** during the few seconds in which the window is in one of the following states.
  - "Setup is inspecting your computer's hardware configuration ..." is displayed.
  - A screen with a solid blue background is displayed.

---

**IMPORTANT:** There is no visible indication on the screen when **F6** has been pressed.

---

5. When the following message is displayed, press **S**.

Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following mass storage device(s).

The following message is displayed.

Please insert the disk labeled  
 manufacturer-supplied hardware support disk  
 into Drive A:  
 \*Press ENTER when ready.

6. Insert the Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER into the floppy disk drive, and press **Enter**.  
 A list of mass storage devices is displayed.
7. Select the proper SCSI Adapter and press **Enter**.
  - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 for x64)]
  - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 for x64)]
8. When the following message is shown, press **Enter** to start "Welcome to Setup".

Windows Server 2003, XXXXXXXXXXX Edition Setup

---

Welcome to Setup.

---

**IMPORTANT:** If you install Windows Server 2003 x64 Editions on the hard disk larger than 2,097,152MB (2TB), you can specify only a value equal to or less than 2,097,152MB as partition size.

---

9. When the installation of Windows Server 2003 x64 Editions is finished, the system reboots automatically.
10. The [Windows Setup] screen is displayed after logging on to the system.



---

**IMPORTANT:**

- In this case, the [Windows setup] screen may not be displayed. Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 according to the following procedures.
  - You can install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 after the application of "System update". Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2. In this case, note that the [Windows setup] screen is not displayed.
- 

11. Insert the Microsoft Windows Server 2003 R2 x64 Edition DISC 2 CD-ROM into the CD-RW/DVD-ROM drive. Confirm the parameters and click [OK].
12. Once the installation is completed, remove the Microsoft Windows Server 2003 R2 x64 Edition DISC 2 CD-ROM from the CD-RW/DVD-ROM drive, and restart the system.

Make sure to execute the tasks described in "Driver Installation and Advanced Settings" and "Updating the System" of this manual.



---

## Reinstallation to Multiple Logical Drives

This subsection describes the procedure to reinstall the operating system if the multiple logical drives exist.

### Before Re-installing the Operating System

Be sure to make backup copies before re-installing the operating system.

### Re-installing the Operating System

1. Start the clean installation following the procedure described in this manual.
2. Specify the partition in which you want to install the operating system when the following message appears:

The following list shows the existing partitions and unpartitioned space on this computer.

Use the UP and DOWN ARROW keys to select an item in the list.

\* Cannot modify the drive letter of your system or boot volume. Confirm the proper drive letter is assigned and then, continue the setup.

3. Continue the clean installation again following the procedure described earlier in this chapter.

The drive letter of the re-installed system may differ from the one of the previous system. If you need to modify the drive letter, modify it according to the "Procedure for Modifying the Drive Letter".

---

## Modifying the Drive Letter

1. Click Start menu, right-click [My Computer], and specify [Manage] to start [Computer Management].
2. Specify the [Disk Management] in the left side of the window.
3. Right-click the volume for which you want to modify the drive letter and specify the [Change Drive Letter and Path...].
4. Click [Yes].
5. Choose the [Assign a drive letter] and specify the drive letter you want to assign.
6. Click [OK].
7. If the following message appears, click [Yes].

Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?

8. Close the [Computer Management].

---

## Procedure for License Authentication

The Product Key used for license authentication should match the COA label in which the product key contained in Windows Server 2003 is written.

---

### NOTES:

- Execute the activation within 30 days. The system may lock after 30 days have passed.
  - The COA label may be attached to your server.
-

---

## Updating the System - Applying Service Pack -

Update the system in the below situations:

- Expanded the CPU (expanded to single processor to multi-processor).
- Modified the system configuration.
- Recovered the system using recovery process.

The system update brings the correction program provided by Microsoft to be applied to reinforce the system security. We recommend this system update.

It is necessary to use ServicePack2 or more.

If you install the Windows Server 2003 x64 Editions CD-ROM which contains Service Pack 2, you do not have to apply "Hotfix for Windows x64" or "Hotfix for Windows Server 2003 (KB921411)".

Go on to the "Updating the System" section.

Perform "Updating the System" and apply the "Hotfix (KB921411)".

---

**IMPORTANT:** In the situations below, make sure to apply "Updating the System" and "Hotfix (KB921411)".

- Modified system configuration
  - Recovered the system using recovery process.
- 

---

**NOTE:** If you use Windows Server 2003 x64 Editions CD-ROM which includes Service Pack 2, the application of "Hotfix (KB921411)" is not required.

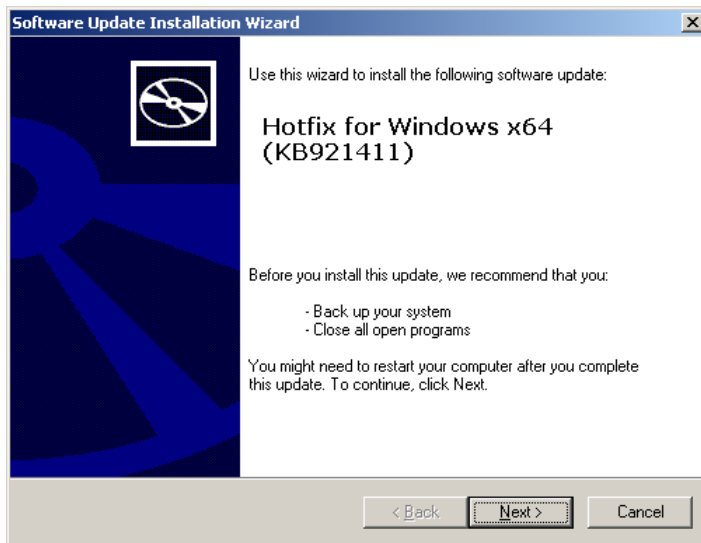
---

## Application Process of the Hotfix (KB921411)

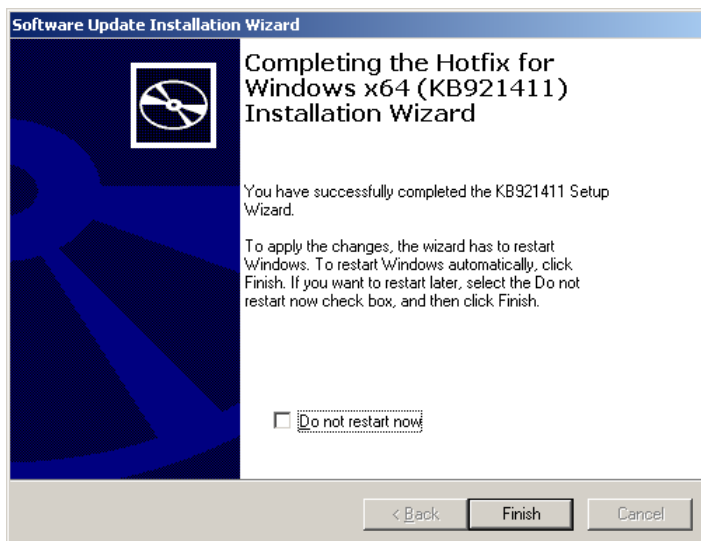
Apply the "Hotfix (KB921411)" before executing the system update.

1. Log on to the system with an account with administrator authority to the server (such as administrator).
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.
3. Click Start menu and [Run], and then execute the following command.  
<When Windows Server 2003 x64 Editions is used>  
\\001\win\winnt\w2k3amd\qfe\jpn\kb921411.exe
4. When the following message is displayed, click [Next].

After that, follow the message to continue the process.



5. When the following message is displayed, click [Finish] to restart the system.



With that, application process of the Hotfix (KB921411) is finished.

## Applying the "Updating the System" Process

"Updating the System" applies the drivers necessary for the NovaScale R480 E1 Series.

Follow this process after Hotfix for Windows x64 (KB921411) or Hotfix for Windows Server 2003 (KB921411) has been applied.

---

**NOTE:** If you install the Windows CD-ROM that contains Service Pack 2 to your system, you do not have to apply the Service pack 2 again.

---

1. Log on to the system using an account with administrator privileges (e.g.administrator).
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of server.  
The Windows Autorun Menu will be displayed
3. Left-click on [Setup Windows], and then click [Update the system].

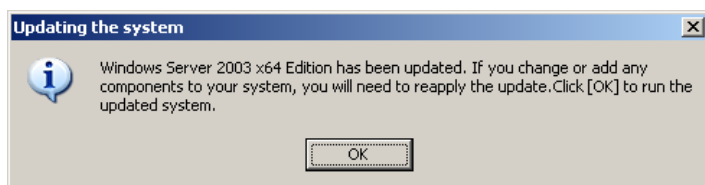
---

**NOTE:** You can also right-click the Autorun Menu.

---

Follow the on-screen messages to proceed to the application.

The [OK] dialog box is displayed.



---

**IMPORTANT:** During the "Updating the System" process, the following message may be shown, but there is no impact to the operation.

Do not click [cancel] since it disappears after a few seconds.



- 
4. Click [OK] to restart the system.
  5. Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive immediately when the system restarts.

## Recovery Process

If "Updating the System" is executed before the application of the "Hotfix for Windows x64 (KB921411)", "!" may be displayed on the USB root hub.

If "!" is displayed on the USB root hub, perform the application of the "Hotfix for Windows x64 (KB921411)" and the "Updating the System" according to the following process.

1. Start the Windows Explorer, and click the [Tools] and [Folder Options].
2. Select the [Files and Folders] - [Hidden files and folders] - [Show hidden files and folders] radio button from the Advanced settings in the [View] tab.
3. Check off the following check box in the [Files and Folders] from the Advanced settings in the [View] tab, and then click [OK].

Hide extensions for known file types

Hide protected operating system files [Recommended]

When the message "You have chosen to display protected operating system files..." is displayed, click [Yes].

4. Make sure that the files exist.

Open the "<System drive:>\WINDOWS\system32\drivers" directory, and make sure that usbhub.sys and usbport.sys exist in the directory.

If you can not found them, copy the files according to the following process.

- (1) Open "<System drive:>\WINDOWS\system32\dllcache" directory.
- (2) Copy usbhub.sys and usbport.sys from the directory noted above to "<Systemdrive:>\WINDOWS\system32\drivers".

5. Restart the system.
6. Refer to [Application process of the Hotfix (KB921411)] and apply the "Hotfix for Windows x64 (KB921411)".
7. Refer to [Application process of "Updating the System"] and execute "Updating the System".
8. Restart the system.

With that, the process is finished.

---

## DRIVER INSTALLATION AND ADVANCED SETTINGS

This section describes how to install and setup various standard drivers mounted on the device.

For any information on installing and setting up the driver that is not described in this section, please refer to the document attached to the driver.

---

### PROSet

Using PROSet enables the following items:

- Detailed information of the adapter confirmation.
- Loop back test, packet transmission test diagnosis and so on.
- Teaming setup.

Configuring several network adapters as one team provides the server with a tolerant environment and enhances throughput between the switches.

PROSet is necessary to use these features.

---

**NOTE:** All of the operation that related to Intel® PROSet must be executed with administrator privileges. Operation by [Remote Desktop Connection] is prohibited.

If you make no changes to the parameters, click the [Cancel] button to close the dialog. Clicking the [OK] button will cause a temporary loss of network connectivity.

---

Follow the procedure below to install PROSet.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. The [Windows Explorer] dialog starts.
  - \* Procedure using a standard start menu  
Click Start menu and click [Windows Explorer].
  - \* Procedure using a classic start menu  
Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "dxsetup.exe" in the following directory.  
\\001\win\winnt\dotnet\d13\proset\win32  
The [Intel(R) PROSet - InstallShield Wizard] dialog starts.
4. Click [Next].
5. Choose "I accept the terms in the license agreement" and click [Next].
6. Click [Next].
7. Select [I accept the terms in the license agreement] and click [Next].
8. Click [Install].
9. When [InstallShield Wizard Completed] window is displayed, click [Finished].
10. Remove the DVD from the Optical Disk Drive, and restart the system.

---

## Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB)

Adapter Fault Tolerance (AFT) is a feature that creates a group containing more than one adapter and automatically converts the process of the working adapter to the other adapter in the group when any trouble occurred on that adapter.

Adaptive Load Balancing (ALB) is a feature that creates a group containing more than one adapter and enhances the throughput by operating packet transmission from the server by all the adapters.

---

### IMPORTANT

- AFT/ALB setup must be operated after installing the drivers and restarting the system.
  - All the adapters specified as a group of Adapter Teaming must exist on the same LAN. If they are connected to separate switches, they will not work normally.
  - The adapters specified as a group of Adaptive Load Balancing (ALB) can be connected only to the Switching Hub.
  - When replacing the motherboard or optional network card, make sure to remove the adapter teaming before the exchange and recreate the adapter team once the exchange is completed.
- 

If you want to use the AFT/ALB feature, follow the procedure below to setup.

1. The [Intel (R) PROSet] dialog box appears.
  - \* Procedure using the standard start menu
 

Click the Start menu, point to [Control Panel], [Administrative tools], and click [Computer Management] and then double click the [(Network Adapter Name)] in the Network Adapter list.
  - \* Procedure using the classic start menu
    1. Click the Start menu, point to [Settings] and click [Control Panel].
    2. Click [Administrative Tools].
    3. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.
2. Select the [Teaming] tab and then check [Team with other adapters] and click [New Team...].  
The [New Team Wizard] dialog box appears. Click [Next].  
\*Specify a name for the team if necessary.
3. Select the adapters to include in the team.
4. Select "Adapter Fault Tolerance" or "Adaptive Load Balancing" and click [Next].
5. Click [Finish].
6. If it is necessary to set the adapter priority setting, refer the following step. If not, go through to step 7.
  1. Click [Settings] tab on [TEAM:xxx #yy Properties].
  2. Click [Modify Team].
  3. Point to the adapter [Intel(R)PRO/1000....]and click [Set Primary] or [Set Secondary].
  4. Click [OK].
  5. The setup will go back to [EAM:xxx #yy Properties] and the priority setting will be displayed in list ().
  6. Click [OK].
7. The setup will go back to [Intel (R) PROSet for Wired Connections] dialog box. Click [OK].
8. Restart the system.



---

## Network Driver

Specify the details of the network driver.

Two standard network drivers will be installed automatically, but the link speed and duplex mode must be manually specified.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.
  - \* Procedure using a standard start menu
    1. Click Start menu, click [Control Panel], click [Network Connections], and click [Local Area Connection].
  - \* Procedure using a classic start menu
    1. Click the Start menu, click [Settings] and click [Network Connections].  
The [Network Connections] dialog box appears.
    2. Right-click [Local Area Connection] and click [Properties] from the pop-up menu.
2. Click [Configure].  
The properties dialog box for the network adapter appears.
3. Click [Advanced] and specify a [Link Speed & Duplex] identical to the value specified for the HUB.
4. Click [OK] on the properties dialog box for network adapter.

[When PROSet is installed]

5. The [Intel PROSet] dialog box appears.
  - \* Procedure using a standard start menu  
Click the Start menu, point to [Control Panel] and click [Intel PROSet].
  - \* Procedure using the classic start menu
    1. Click Start menu, point to [Settings] and click [Control Panel].
    2. Click [administrative tools].
    3. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.
6. Click on [Speed] and specify a [Link Speed & Duplex Settings] value identical to the value specified for the HUB.
7. Click [Apply] and click [OK].

Specify the other network driver using the same procedure.

This procedure can also be applied on the properties dialog box for the local area network which appears from the [Network and Dial-up Connection].

---

**NOTE:** We recommend you add [Network Monitor] at [Adding Services]. [Network Monitor] can monitor the frame (or the packet) that the computer installing [Network Monitor] sends or receives. This tool is valuable when analyzing network troubles. For more information on how to install the tool, see the "Setting for Solving Problems" described later in this chapter.

---

---

## Re-install the Network Driver

The network driver will be installed automatically.

---

## Optional Network Board Driver

When using a manufacturer-approved Network Board, the network driver will be installed automatically. Therefore, the driver attached to the Network board should not be used.

To use optional Network Boards, install the driver stored in EXPRESSBUILDER DVD.

When using the 100BASE-T protocol:

```
"\004\win\winnt\dotnet\d13\pro100\win32"
```

When using the 1000BASE-T protocol:

```
"\004\win\winnt\dotnet\d13\pro1000\win32"
```

If the procedure of installation is not clear, refer to the installation procedure described in the section "Installation of the Optional Network Board Driver".

When using the 10GbE protocol:

Please refer to the installation manual provided with the board.

---

## Installation of the Optional Network Board Driver

1. Start the Device Manager.
2. Click [Network adapters] and double-click [(Network Adapter Name)].

The [(Network Adapter Name) Properties] appears.

---

**NOTE:** [(Intel(R) PRO/1000...)] is the name of On-Board adapter. All the other names show the Optional Network Board.

---

3. Click the [Driver] tab and click [Update Driver...].  
The [Hardware Update Wizard] appears.
4. Select the [Install from a list or specific location(Advanced)] radio button and click [Next].
5. Select the [Search for the best driver in these locations] radio button and check off the [Search removable media (floppy, CD-ROM...)] check box.
6. Check the [Include this location in the search] check box:
  - When using 100BASE-T cards, specify [\004\win\winnt\dotnet\d13\pro100\win32]. Click [Next].
  - When using 1000BASE-T cards, specify [\004\win\winnt\dotnet\d13\pro1000\win32]. Click [Next].
7. Click [Finish].

---

## Graphics Accelerator Driver

The standard graphics accelerator drivers that are mounted will be installed automatically. Follow the procedure below if it is necessary to install manually.

If you want to use the optional Graphics Accelerator Driver board, follow the document attached to the board to install the driver.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "setup.exe" in the following directory.  

```
\001\win\winnt\dotnet\video\setup.exe.
```

4. Follow the on-screen message to proceed with the installation.  
If the dialog message "Digital Signature could not be found." appears, select [Yes] to continue.
5. Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive, follow the on-screen instructions and restart the system.

### **Installing a SCSI Controller Driver**

When using a SCSI controller driver, update your system with the EXPRESSBUILDER DVD attached to your system. The SCSI controller driver will be installed automatically.

### **Installing the Disk Array Controller Driver (LSILOGIC MEGARAID SAS 8480E)**

The Disk Array controller driver will be installed automatically.

### **Installing the SAS Controller Driver (LSISAS3443E-R)**

When using the SAS controller driver (LSISAS3443E-R), update your system with the EXPRESSBUILDER DVD attached to your system.

The SAS controller driver will be installed automatically.

## About Windows Activation

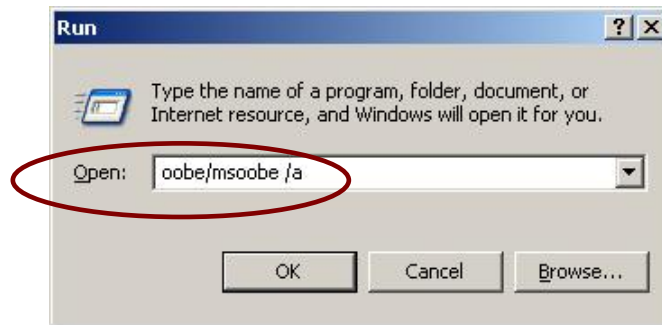
Windows Server 2003 x64 Editions must be activated before use.

Windows activation process is as follows.

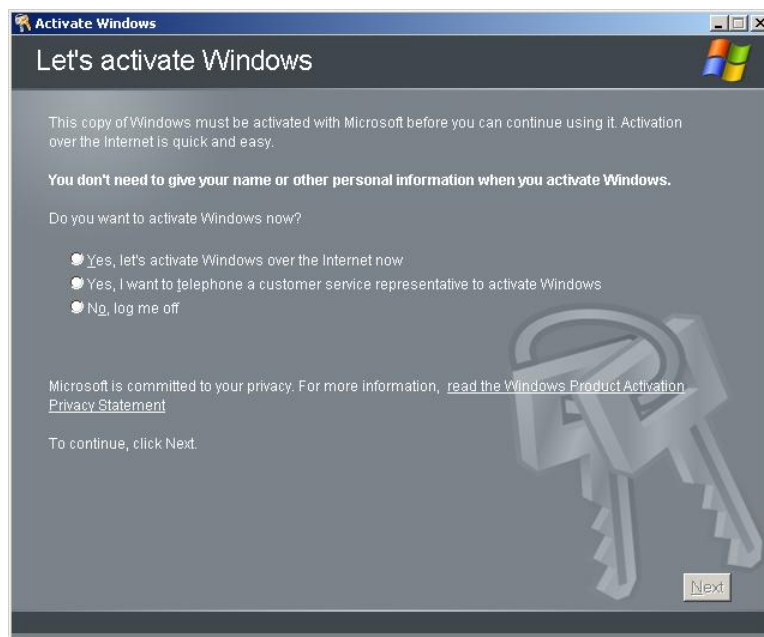
1. Click [Run] on [Start] menu.

Type the following in the [Open:] box, and click [OK].

oobe/msoobe /a



2. When the following screen is displayed, click [Next].



The following screen is displayed.

Generating new Installation ID...

3. Process with the "Windows activation" according to the following message.

Activate Windows by phone

Just four steps, and you're done...

Step 1:

Step 2: Call a number below to speak with a customer service representative:  
Toll-free number:  
Toll number:

Step 3: Provide the customer service representative with the following installation ID:  
000000-000000-000000-000000-000000-000000-000000-000000  
(Click **Change product key** only if requested to do so by the customer service representative)

Step 4: Type the confirmation ID that the customer service representative gave you:  
A B C D E F G  
 -  -  -  -  -  -

To continue, click Next.

Back Change Product key Remind Me Later Next

## **SETTING FOR COLLECTING MEMORY DUMP (DEBUG INFORMATION)**

Set the memory dump collection using the procedure described in Chapter 5.

---

# Appendix E

---

## Installing Windows Server 2003

This section describes the procedures for installing Windows Server 2003 without using Express Setup tool.

### BEFORE INSTALLING WINDOWS SERVER 2003

Read the following notes or information before installing the Windows Server 2003.

---

#### Optional Board Supported by the EXPRESSBUILDER

The EXPRESSBUILDER attached to this computer supports the following optional boards:

---

**NOTE:** If you want to install boards other than the ones listed below by using a driver floppy disk ("OEM-FD for Mass storage device"), see "Exceptional setup" and "Installing Optional Mass Storage Driver" of "Parameter File Creator" in Chapter 6.

---

- Supporting the OS installation in the EXPRESSBUILDER
    - RAID controller (128 MB, RAID0/1)
    - RAID controller (128 MB, RAID0/1/5/6)
  - Other controllers
    - Disk Array Controller (External SAS HDD)\*
    - SCSI Controller (several are available)\*
    - SAS Controller\*
- \* Option

---

#### Service Pack Which EXPRESSBUILDER Supports

The EXPRESSBUILDER DVD attached to the server supports the following combination of the OS installation media and Service Pack.

- Windows Server 2003 R2
  - OS installation media (with Service Pack 2)
  - OS installation media (No Service Pack) + Service Pack 2
  - OS installation media (No Service Pack)
- Windows Server 2003
  - OS installation media (with Service Pack 1)
  - OS installation media (with Service Pack 1) + Service Pack 2

---

#### Installing Service Pack

You can install a Service Pack on the server. If no Service Pack is attached to your system, prepare it by yourself.

When installing Windows Server 2003 R2, it is not necessary to apply the Service Pack 1.

---

## Updating the System

If you modified the Windows system, execute "Update the System" in Autorun Menu.

---

## Re-installing to the Hard Disk Drive which has been upgraded to Dynamic Disk

If you want to leave the existing partition when installing the system on the hard disk drive has been upgraded to Dynamic Disk, note the following issue:

- Do not select the partition on which the OS had been installed to re-install the OS.
- Select "Use the current File System" for the format of the OS partition.

---

## Mounting MO Device

Do not mount an MO device on your server during the Windows installation.

---

## About Removable Media

Do not set any removable media, such as a DAT, into the device mounted on this computer during the Windows installation.

---

## About the Upgrade to Windows Server 2003 R2

The "in-place upgrade" from Windows Server 2003 to Windows Server 2003 R2 is not recommended because it may overwrite some files or registries, and cause unexpected impact to the system or the applications.

If you install Windows Server 2003 R2, backup user data referring to "Windows Server 2003 Clean Installation", and reinstall Windows Server 2003 R2.

---

**NOTE:** "in-place upgrade" can be selected to overwrite Windows Server 2003 with Windows Server 2003 R2.

---



---

## About the System Partition Size

The system partition size can be calculated using the following formula.

Size necessary to install the system	+ Paging File Size + Dump File Size + Application Size
Size necessary to install the system	= 3500MB (Windows Server 2003 R2) = 3500MB (Windows Server 2003 with Service Pack1) = 3500MB (Windows Server 2003 R2 with Service Pack2) = 5300MB (Windows Server 2003 R2 + ServicePack 2 CD-ROM) = 5300MB (Windows Server 2003 + Service Pack 1 + ServicePack 2 CD-ROM)
Paging File Size (Recommended)	= Mounted Memory Size * 1.5
Dump File Size	= Mounted Memory Size + 12MB
Application Size	= Required Size

---

### IMPORTANT:

- The above-mentioned paging file size is recommended for collecting debug information (memory dump). A paging file with an initial size large enough to store the dump file in the boot drive is required.  
The correct debug information might not be able to be collected due to a virtual memory shortage if the paging file is insufficient, so set a size large enough for the entire system.
  - The maximum paging file size which can be set on one partition is 4095MB. If the above paging file size exceeds 4095MB, specify 4095MB for the paging file size.
  - The maximum dump file size for the system with more than 2GB memory mounted is '2048MB + 12MB'.
  - If you wish to install any application program or the like, add the necessary space to the partition to install these programs.
- 

For example, if installed memory size is 512 MB, the minimum required partition size is:

$$3500\text{MB} + (512\text{MB} * 1.5) + (512\text{MB} + 12\text{MB}) + \text{Application Size} \\ = 4792\text{MB} + \text{Application Size}$$

Dividing into the partition of the recommended size into multiple disks as written below will solve problem that it cannot be reserved in one disk.

1. Set the "Size required for installation + Paging file size".
2. See Appendix F and set that debugging information (equivalent to the dump file size) is to be written to a separate disk.

(If the disk does not have enough free space to enable the file size to be written, then after installing the system using the "Size required for installation + Paging file size," install an additional new disk.)

## **INSTALLING WINDOWS SERVER 2003**

### Preparations for Installation

- EXPRESSBUILDER DVD
- Microsoft Windows Server 2003 Standard x64 Edition (CD-ROM) / Microsoft Windows Server 2003 Enterprise x64 Edition (CD-ROM)
- Microsoft Windows Server 2003 x64 Editions Service Pack 2 (CD-ROM)
- User's Guide
- Getting Started
- Windows Server 2003 x64 Edition OEM-Disk for EXPRESSBUILDER

---

## Creating "Windows Server 2003 OEM-Disk for EXPRESSBUILDER"

Before installing, create Windows Server 2003 OEM-Disk for EXPRESSBUILDER.

---

**NOTE:** If you have already "Windows Server 2003 OEM-Disk for EXPRESSBUILDER" for the server on which you are going to install Windows Server 2003, you do not need to create it again.

---

You can create Windows Server 2003 OEM-Disk for EXPRESSBUILDER using one of the two procedures below:

- Create from the menu which appears when running the server with the EXPRESSBUILDER.

If you have only the server to create Windows Server 2003 OEM-Disk for EXPRESSBUILDER, use this procedure.

If Windows Server 2003 or Windows can be operated on the server, you can use the other procedure described later.

Follow the steps below.

1. Prepare one 3.5-inch floppy disk.
2. Turn on your server.
3. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.
4. Press the RESET switch or press **Ctrl, Alt** and **Delete** to reboot the server. (You may also turn off and then on again to reboot the server.)

The system will boot from the DVD-ROM and the EXPRESSBUILDER starts.

5. Select [Create the OEM-Disk for Windows] from [Tools Menu] step.
6. Select [Create an Windows Server 2003 OEM-Disk for EXPRESSBUILDER] at [Create OEM-Disk] and click [Perform].
7. Insert a floppy disk into the floppy disk drive according to the on-screen instructions.

Windows Server 2003 OEM-Disk for EXPRESSBUILDER will be created.

Write-protect and attach a label, then keep it safely.

- Create from [Autorun Menu]

This menu requires Microsoft Windows XP, Vista or Windows Server 2003 (or later).

You can create the Windows Server 2003 OEM-Disk for EXPRESSBUILDER from [Autorun Menu], if you have a computer on which one of the above operating systems operate.

Follow the steps below.

8. Prepare one 3.5-inch floppy disk.
9. Start the Operating System.
10. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.  
The Menu appears.
11. Click [Create drive disk] and select [OEM-Disk for Windows Server 2003].

---

**NOTE:** You can do the same operation using the menu that appears with a right-click.

---

12. Insert the floppy disk into the floppy disk drive according to the message.  
Windows Server 2003 OEM-Disk for EXPRESSBUILDER will be created.  
Write-protect and attach a label, then keep it safely.

---

## Windows Server 2003 Clean Installation

This section explains how to perform a clean installation of Windows Server 2003.

1. Turn on the system power.
2. Insert the Windows Server 2003 CD-ROM into the optical disk drive.
3. Press **Ctrl + Alt + Delete** to restart the system.  
If a bootable operating system is installed on the hard disk drive, press **Enter** while the message "Press any key to boot from CD..." is displayed at the top of the screen.  
If no bootable operating system exists on the hard disk drive, this step is unnecessary.  
The Windows Server 2003 setup screen will appear.  
If the screen is not displayed, **Enter** was not pressed properly.  
Restart the server and perform this step again.
4. Press **F6** during the few seconds in which the window is in one of the following states.
  - "Setup is inspecting your computer's hardware configuration ..." is displayed.
  - A screen with a solid blue background is displayed.

---

**IMPORTANT:** There is no visible indication on the screen when **F6** has been pressed.

---

5. When the following message is displayed, press **S**.

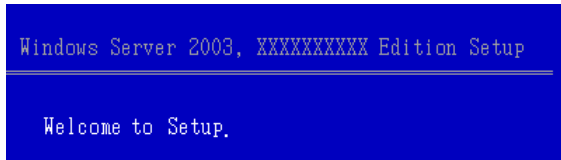
Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following mass storage device(s).

The following message is displayed.

Please insert the disk labeled  
manufacturer-supplied hardware support disk  
into Drive A:  
\*Press ENTER when ready.

6. Insert the Windows Server 2003 OEM-Disk for EXPRESSBUILDER into the floppy disk drive, and press **Enter**.  
A list of mass storage devices is displayed.

7. Select the proper SCSI Adapter and press **Enter**.
  - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 32-bit)]
  - [LSI MegaRAID SAS RAID Controller Driver (Server 2003 32-bit)]
 Continue performing tasks according to the subsequent messages that appear.
8. When the following message is shown, press **Enter** to start "Welcome to Setup".




---

**IMPORTANT:** If you install Windows Server 2003 on a hard disk larger than 2,097,152MB(2TB), you can specify only a value equal to or less than 2,097,152MB as partition size.

---

9. When the installation of Windows Server 2003 is finished, the system reboots automatically.
  - Windows Server 2003 has been installed: Go on the step 14.
  - Windows Server 2003 R2 has been installed: Go on the step 11.
10. The [Windows Setup] screen is displayed after logging on to the system.




---

**IMPORTANT:**

- In this case, the [Windows setup] screen may not be displayed. Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 according to the following procedures.
  - You can install Microsoft Windows Server 2003 R2 x64 Edition DISC 2 after the application of "System update". Be sure to install Microsoft Windows Server 2003 R2 x64 Edition DISC 2. In this case, note that the [Windows setup] screen is not displayed.
-

11. Insert Microsoft Windows Server 2003 R2 DISC 2 CD-ROM into the optical disk drive. Confirm the parameters and click [OK].
12. Once the installation is completed, remove the Microsoft Windows Server 2003 R2 DISC 2 CD-ROM from the optical disk drive, and restart the system.

Make sure to execute the tasks described in "Driver Installation and Advanced Settings" and "Updating the System" of manual.

---

## Reinstallation to Multiple Logical Drives

This subsection describes the procedure to reinstall the operating system if the multiple logical drives exist.

### Before Re-installing the Operating System

Be sure to make backup copies before re-installing the operating system.

### Re-installing the Operating System

1. Start the clean installation following the procedure described in this manual.
2. Specify the partition in which you want to install the operating system when the following message appears:

The following list shows the existing partitions and unpartitioned space on this computer.

Use the UP and DOWN ARROW keys to select an item in the list.

\* Cannot modify the drive letter of your system or boot volume. Confirm the proper drive letter is assigned and then, continue the setup.

3. Continue the clean installation again following the procedure described earlier in this chapter.

The drive letter of the re-installed system may differ from the one of the previous system. If you need to modify the drive letter, modify it according to the "Procedure for Modifying the Drive Letter".

### Modifying the Drive Letter

1. Click Start menu, right-click [My Computer], and specify [Manage] to start [Computer Management].
2. Specify the [Disk Management] in the left side of the window.
3. Right-click the volume for which you want to modify the drive letter and specify the [Change Drive Letter and Path...].
4. Click [Yes].
5. Choose the [Assign a drive letter] and specify the drive letter you want to assign.
6. Click [OK].
7. If the following message appears, click [Yes].

Changing the drive letter of a volume may cause programs to no longer run. Are you sure you want to change this drive letter?

8. Close the [Computer Management].

---

## Procedure for License Authentication

The Product Key used for license authentication should match the COA label in which the product key contained in Windows Server 2003 is written.

---

### NOTES:

- Execute the activation within 30 days. The system may lock after 30 days have passed.
  - The COA label may be attached to your server.
- 

---

## Updating the System - Applying Service Pack -

Update the system in the below situations:

- Expanded the CPU (expanded to single processor to multi-processor).
- Modified the system configuration.
- Recovered the system using recovery process.

The system update brings the correction program provided by Microsoft to be applied to reinforce the system security. We recommend this system update.

It is necessary to use ServicePack2 or more.

The Service Pack 2 need not be applied again when the Windows Server 2003 CD-ROM on which the Service Pack 2 is included is used.

Go on to the "Updating the System" section.

Perform "Updating the System" and apply the "Hotfix (KB921411)".

---

**IMPORTANT:** In the situations below, make sure to apply "Updating the System" and "Hotfix (KB921411)".

- Modified system configuration
  - Recovered the system using recovery process.
- 

---

**NOTE:** If you use Windows Server 2003 x64 Editions CD-ROM which includes Service Pack 2, the application of "Hotfix (KB921411)" is not required.

---

## Application Process of the Hotfix (KB921411)

Apply the "Hotfix (KB921411)" before executing the system update.

1. Log on to the system with an account with administrator authority to the server (such as administrator).
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of the server.
3. Click Start menu and [Run], and then execute the following command.

<When the English version of Windows Server 2003 R2 is used>

```
\004\win\winnt\dotnet\qfe\enu\kb921411.exe
```

<When the Simplified Chinese version of Windows Server 2003 R2 is used>

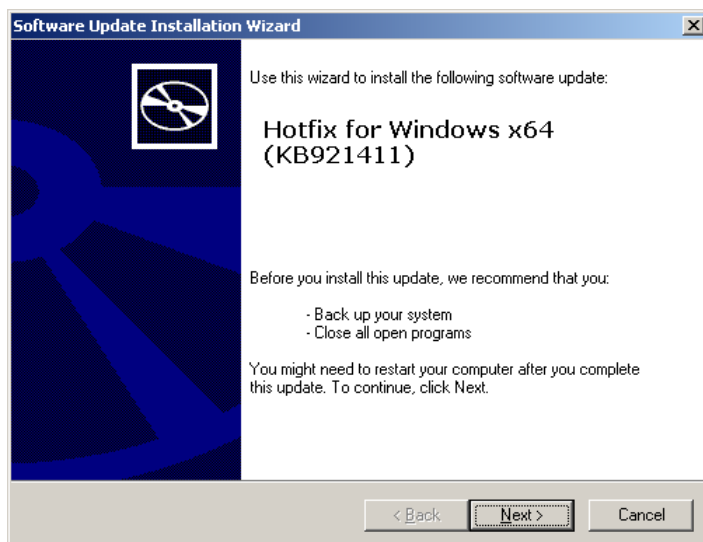
```
\004\win\winnt\dotnet\qfe\chs\kb921411.exe
```

<When the French version of Windows Server 2003 R2 is used>

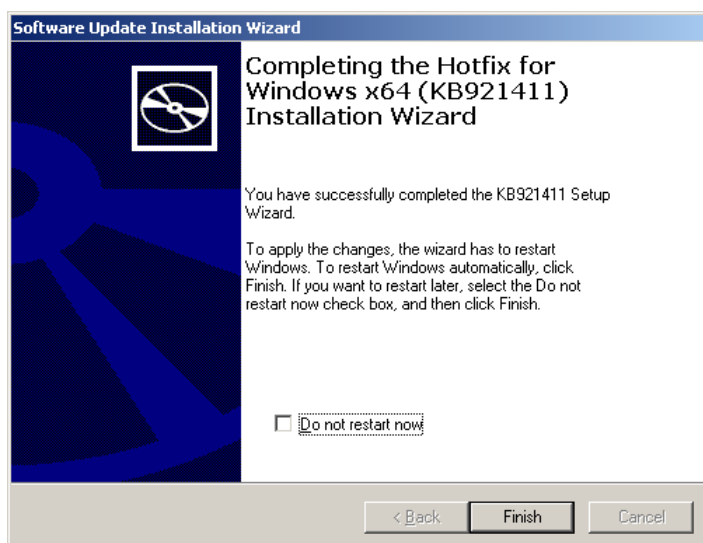
```
\004\win\winnt\dotnet\qfe\fra\kb921411.exe
```

4. When the following message is displayed, click [Next].

After that, follow the message to continue the process.



5. When the following message is displayed, click [Finish] to restart the system.



With that, application process of the Hotfix (KB921411) is finished.



## Applying the "Updating the System" Process

Follow this process after the Hotfix for Windows Server 2003 (KB921411) has been applied.

---

**NOTE:** If you install the Windows CD-ROM that contains Service Pack 2 to your system, you do not have to apply the Service pack 2 again.

---

1. Log on to the system using an account with administrator privileges (e.g.administrator).
2. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive of server.  
The Windows Autorun Menu will be displayed
3. Left-click on [Setup Windows], and then click [Update the system].

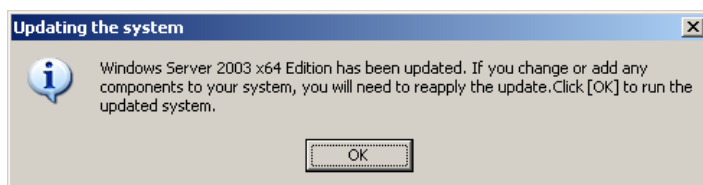
---

**NOTE:** You can also right-click the Autorun Menu.

---

Follow the on-screen messages to proceed to the application.

The [OK] dialog box is displayed.



---

**IMPORTANT:** During the "Updating the System" process, the following message may be shown, but there is no impact to the operation.  
Do not click [cancel] since it disappears after a few seconds.



- 
4. Click [OK] to restart the system.
  5. Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive immediately when the system restarts.

## Recovery Process

If "Updating the System" is executed before the application of the "Hotfix for Windows Server 2003 (KB921411)", "!" may be displayed on the USB root hub.

If "!" is displayed on the USB root hub, perform application of the "Hotfix for Windows Server 2003 (KB921411)" and the "Updating the System" according to the following process.

1. Start the Windows Explorer, and click the [Tools] and [Folder Options].
2. Select the [Files and Folders] - [Hidden files and folders] - [Show hidden files and folders] radio button from the Advanced settings in the [View] tab.
3. Check off the following check box in the [Files and Folders] from the Advanced settings in the [View] tab, and then click [OK].

Hide extensions for known file types

Hide protected operating system files [Recommended]

When the message "You have chosen to display protected operating system files..." is displayed, click [Yes].

4. Make sure that the files exist.

Open the "<System drive:>\WINDOWS\system32\drivers" directory, and make sure that usbhub.sys and usbport.sys exist in the directory.

If you can not found them, copy the files according to the following process.

- (1) Open "<System drive:>\WINDOWS\system32\dllcache" directory.
- (2) Copy usbhub.sys and usbport.sys from the directory noted above to "<Systemdrive:>\WINDOWS\system32\drivers".

5. Restart the system.
6. Refer to [Application process of the Hotfix (KB921411)] and apply the "Hotfix for Windows Server 2003 (KB921411)".
7. Refer to [Application process of "Updating the System"] and execute "Updating the System".
8. Restart the system.

With that, the process is finished.

---

## DRIVER INSTALLATION AND ADVANCED SETTINGS

This section describes how to install and setup various standard drivers mounted on the device.

For any information on installing and setting up the driver that is not described in this section, please refer to the document attached to the driver.

---

### PROSet

Using PROSet enables the following items:

- Detailed information of the adapter confirmation.
- Loop back test, packet transmission test diagnosis and so on.
- Teaming setup.

Configuring several network adapters as one team provides the server with a tolerant environment and enhances throughput between the switches.

PROSet is necessary to use these features.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. The [Windows Explorer] dialog starts.
  - \* Procedure using a standard start menu  
Click Start menu and click [Windows Explorer].
  - \* Procedure using a classic start menu  
Click Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "dxsetup.exe" in the following directory.  
\\004\win\winnt\dotnet\dl3\proset\win32  
The [Intel(R) PROSet - InstallShield Wizard] dialog starts.
4. Click [Next].
5. Choose "I accept the terms in the license agreement" and click [Next].
6. Click [Next].
7. Select [I accept the terms in the license agreement] and click [Next].
8. Click [Install].
9. When [InstallShield Wizard Completed] window is displayed, click [Finished].
10. Remove the DVD from the Optical Disk Drive, and restart the system.

---

### Network Driver

Specify the details of the network driver.

Two standard network drivers will be installed automatically, but the link speed and duplex mode must be manually specified.

[When PROSet is not installed]

1. The [Local Area Connection Properties] dialog box appears.
  - \* Procedure using a standard start menu
    1. Click Start menu, click [Control Panel], click [Network Connections], and click [Local Area Connection].
  - \* Procedure using a classic start menu

1. Click the Start menu, click [Settings] and click [Network Connections].  
The [Network Connections] dialog box appears.
2. Right-click [Local Area Connection] and click [Properties] from the pop-up menu.
2. Click [Configure].  
The properties dialog box for the network adapter appears.
3. Click [Advanced] and specify a [Link Speed & Duplex] identical to the value specified for the HUB.
4. Click [OK] on the properties dialog box for network adapter.

[When PROSet is installed]

5. The [Intel PROSet] dialog box appears.
  - \* Procedure using a standard start menu  
Click the Start menu, point to [Control Panel] and click [Intel PROSet].
  - \* Procedure using the classic start menu
    1. Click Start menu, point to [Settings] and click [Control Panel].
    2. Click [administrative tools].
    3. Click [Computer Management] and double click the [(Network Adapter Name)] in the Network Adapter list.
6. Click on [Speed] and specify a [Link Speed & Duplex Settings] value identical to the value specified for the HUB.
7. Click [Apply] and click [OK].

Specify the other network driver using the same procedure.

This procedure can also be applied on the properties dialog box for the local area network which appears from the [Network and Dial-up Connection].

---

**NOTE:** We recommend you add [Network Monitor] at [Adding Services]. [Network Monitor] can monitor the frame (or the packet) that the computer installing [Network Monitor] sends or receives. This tool is valuable when analyzing network troubles. For more information on how to install the tool, see the "Setting for Solving Problems" described later in this chapter.

---

---

## Re-installing the Network Driver

The network driver will be installed automatically.

See Chapter 5, "Optional Network Board Driver" for re-install the optional network board driver.

---

## Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB)

See Chapter 5, "Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB)" to reset the Adapter Fault Tolerance (AFT)/Adaptive Load Balancing (ALB).

---

## Graphics Accelerator Driver

The standard graphics accelerator drivers that are mounted will be installed automatically. Follow the procedure below if it is necessary to install manually.

If you want to use the optional Graphics Accelerator Driver board, follow the document attached to the board to install the driver.

1. Insert the EXPRESSBUILDER DVD into the CD-RW/DVD-ROM drive.
2. Click the Start menu, point to [Programs], [Accessories] and click [Windows Explorer].
3. Run "setup.exe" in the following directory.  
    \004\win\winnt\dotnet\video\setup.exe
4. Follow the on-screen message to proceed with the installation.  
    If the dialog message "Digital Signature could not be found." appears, select [Yes] to continue.
5. Remove the EXPRESSBUILDER DVD from the CD-RW/DVD-ROM drive, follow the on-screen instructions and restart the system.

---

## Installing a SCSI Controller Driver

When using a SCSI controller driver, update your system with the EXPRESSBUILDER DVD attached to your system. The SCSI controller driver will be installed automatically.

---

## Installing the Disk Array Controller Driver (LSILOGIC MEGARAID SAS 8480E)

The Disk Array Controller driver will be installed automatically.

---

## Installing the SAS Controller Driver (LSISAS3443E-R)

When using the SAS controller driver (LSISAS3443E-R), update your system with the EXPRESSBUILDER DVD attached to your system.

The SAS controller driver will be installed automatically.

---

## About Windows Activation

Windows Server 2003 must be activated before use.

Windows activation process is as follows.

---

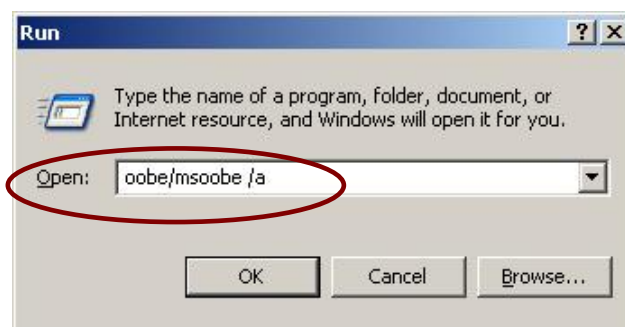
**NOTE:** When you use Windows Server 2003 R2, the activation process is not needed.

---

1. Click [Run] on [Start] menu.

Type the following in the [Open:] box, and click [OK].

oobe/msoobe /a



2. When the following screen is displayed, click [Next].



The following screen is displayed.



3. Process with the "Windows activation" according to the following message.

Activate Windows

## Activate Windows by phone

Just four steps, and you're done...

**Step 1:** Select your location

**Step 2:** Call a number below to speak with a customer service representative:  
Toll-free number:  
Toll number:

**Step 3:** Provide the customer service representative with the following installation ID:  
**000000-000000-000000-000000-000000-000000-000000-000000-000000**  
(Click **Change product key** only if requested to do so by the customer service representative)

**Step 4:** Type the confirmation ID that the customer service representative gave you:

A	B	C	D	E	F	G
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

To continue, click Next.

---

## Available Switch Options for Windows Server 2003 Boot.ini File

Many different switches will be available if you edit the Boot.ini file.

For the available switch options, refer to the following information:

- Microsoft Knowledge Base - Article ID: 833721

"Available switch options for the Windows XP and the Windows Server 2003 Boot.ini files"

If your system has a memory capacity in excess of 4GB in its installing, adding the /PAE switch in the Boot.ini file will enable the system to be installed with over 4GB of memory.

However, the Microsoft operating system products which support /PAE switch option are limited.

Refer to the following article in Microsoft Knowledge Base to check the supported products.

- Microsoft Knowledge Base - Article ID: 291988

"A description of the 4GB RAM tuning feature and the Physical Address Extension switch"

Below is the example on how to add /PAE switch to Boot.ini file.

1. Click [Start], point to [Settings], and then click [Control Panel].
2. In [Control Panel], double-click [System].
3. Click the [Advanced] tab, and then click [Settings] under [Setup and Recovery].
4. Under [System Setup], click [Edit] to open [Boot.ini].
5. Add "/PAE" to the [Operating Systems] section in the [Boot.ini] file, and then save it.

<Example of Boot.ini file>

```
[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(2)\WINDOWS
[operating systems]
multi (0)disk (0)rdisk (0)partition (2)\WINDOWS="Windows Server 2003" /fastdetect
multi (0)disk (0)rdisk (0)partition (2)\WINDOWS="Windows Server 2003, PAE" /fastdetect /PAE
C:\CMDCONS\BOOTSECT.DAT="Microsoft Windows Recovery Console" /cmdcons
```

---

**NOTE:** If you choose one of the items in the "Default operating system" drop-down list box in the [Setup and Recovery] group box, you can make your system start automatically from the switch you specified.

---



## **SETTING FOR COLLECTING MEMORY DUMP (DEBUG INFORMATION)**

Set the memory dump collection using the procedure described in Chapter 5.

---

# Appendix F

---

## Using a Client Computer Which Has a CD Drive

The EXPRESSBUILDER disk is contained on a DVD, meaning that the client machine you wish to use to manage the server needs a DVD drive.

If you want to install the EXPRESSBUILDER management software to the client without a DVD drive, make a CD-R from the EXPRESSBUILDER DVD as described in the following procedure.

---

**NOTE:** This procedure can only create one CD, for the purpose of installing the management software to the client.

---

1. Insert the EXPRESSBUILDER DVD in a DVD drive.
2. If the Autorun menu appears, close the menu.
3. Copy the following EXPRESSBUILDER files to a hard disk drive by using the Explorer.

```
\(root folder)
|
| \004 : copy version.xml
|
| --- \ar_menu : copy this sub-folder
|
| --- \doc : copy this sub-folder
|
| --- \win : copy this sub-folder
```

4. Delete the ar\_menu\autorun\_menu.xml on the hard disk drive, and rename the ar\_menu\autorun\_en.xml on the hard disk drive to the autorun\_menu.xml.
5. Copy the above files/folders to a CD-R.  
Match the root folder when you burn a CD-R.
6. Delete the files/folders that you copied in Step 3.
7. Insert the CD-R in the client machine on which you want to install the management software.
8. Kick the following file of the CD-R by using Explorer.

\004\ar\_menu\autorun\_menu.exe (for Windows 32 bit edition)

autorun\_menu\_x64.exe (for Windows 64 bit edition)

This page is intentionally left blank.

# Appendix G

## Product Configuration Record Table

Use this table for information about setup and system environment change.

### Hardware

Main Unit						
	Model name		Serial No.		Date Installed	
CPU						
#1	Clock		Serial No.		Date Installed	
Memory						
#1	Size		Serial No.		Date Installed	
#2	Size		Serial No.		Date Installed	
#3	Size		Serial No.		Date Installed	
#4	Size		Serial No.		Date Installed	
Monitor						
	Type		Model name		Serial No.	
					Date Installed	
Hard Disk Drive						
Bay #1	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Bay #2	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Bay #3	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Hard Disk Drive (optional SCSI controller installed)						
Bay #1 (ID0)	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Bay #2 (ID1)	Type			Serial No.		
	Capacity			Date Installed		
	Type number					
Bay #3 (ID2)	Type			Serial No.		
	Capacity			Date Installed		
	Type number					

5.25-inch Device						
Slot 1	Size		Capacity		Serial No.	
	Model name		Type number		Date Installed	
Slot 2 (standard ATAPI DVD drive)	Size		Capacity		Serial No.	
	Model name		Type number		Date Installed	
3.5-inch Device						
Slot 1 (standard 1.44-MB floppy disk drive)	Size		Capacity		Serial No.	
	Model name		Type number		Date Installed	
Slot 2	Size		Capacity		Serial No.	
	Model name		Type number		Date Installed	
PCI Slot #1						
	Model name				Serial No.	
					Date Installed	
PCI Slot #2						
	Model name				Serial No.	
					Date Installed	
PCI Slot #3						
	Model name				Serial No.	
					Date Installed	
PCI Slot #4						
	Model name				Serial No.	
					Date Installed	
PCI Slot #5						
	Model name				Serial No.	
					Date Installed	
AGP Board Slot						
	Model name				Serial No.	
					Date Installed	
Printer						
	Model name				Serial No.	
	Manufacturer				Date Installed	
Additional Cabinet for Disk						
	Model name				Serial No.	
					Date Installed	
External Peripheral Device 1						
	Model name				Serial No.	
	Manufacturer				Date Installed	
External Peripheral Device 2						
	Model name				Serial No.	
	Manufacturer				Date Installed	
External Peripheral Device 3						
	Model name				Serial No.	
	Manufacturer				Date Installed	
External Peripheral Device 4						
	Model name				Serial No.	
	Manufacturer				Date Installed	

---

**Software**

Firmware version	
OS Application of RUR media	<input type="checkbox"/> Apply      Name:                      Version: Name:                      Version:
File system	<input type="checkbox"/> FAT <input type="checkbox"/> HPFS <input type="checkbox"/> NTFS <input type="checkbox"/> Others (                      )
Bundled software installed	
Licensed software installed	
Application running when a failure occurred	
Remarks	

## Technical publication remarks form

<b>Title:</b>	NovaScale T860 E1 User's Guide
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<b>Reference:</b>	86 A1 13FA 00
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<b>Date:</b>	February 2008
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